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Vol. 1117

**OFFICIAL  
GAZETTE**

of the  
**UNITED STATES PATENT AND TRADEMARK OFFICE**

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August 7, 1990

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THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.  
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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed .....	550.00
—Corresponding prior U.S. national application filed .....	380.00
—Supplemental search fee, per additional invention .....	150.00
European Patent Office as ISA .....	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA .....	400.00
—Additional examination fee, per additional invention .....	130.00
—ISA not the USPTO .....	600.00
—Additional examination fee, per additional invention .....	200.00
International fees	
Basic fee .....	436.00
Basic Supplemental fee (for each page over 30) .....	9.00
Designation fee per country or region for the first 10 national or regional offices .....	106.00
Designation fee for 11th and subsequent designations .....	No Charge
Handling fee .....	134.00

## U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA .....	185.00	370.00
USPTO was neither ISA nor IPEA .....	250.00	500.00

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USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
—For each independent claim in excess of 3 .....	18.00	36.00
—For each claim in excess of 20 .....	6.00	12.00
—For each application containing a multiple dependent claim .....	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1) .....	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on August 4, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,683,592 through 4,685,150  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on August 2, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,395,781 through 4,397,042  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

## 37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

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beyond 4 years; the fee is due by three years and six months after the original grant.....	4,331,205 4,331,265 4,331,271	06/218,266 06/223,136 06/236,222	5/25/82 5/25/82 5/25/82
"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....	4,331,308 4,331,329 4,331,423 4,331,445 4,331,463	06/148,500 06/251,304 06/242,059 06/250,661 06/276,320	5/25/82 5/25/82 5/25/82 5/25/82 5/25/82
"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:	4,331,471 4,331,504 4,331,505 4,331,550 4,331,567 4,331,570	06/230,368 06/277,364 06/268,948 06/268,117 06/218,224 06/267,844	5/25/82 5/25/82 5/25/82 5/25/82 5/25/82 5/25/82
By a small entity (§1.9(f)).....	4,331,576 4,331,579	06/229,467 06/232,899	5/25/82 5/25/82
By other than a small entity.....	4,331,606 4,331,639 4,331,645 4,331,660 4,331,663 4,331,671	06/218,404 06/242,611 06/255,551 06/239,395 06/275,294 06/223,752	5/25/82 5/25/82 5/25/82 5/25/82 5/25/82 5/25/82
By a small entity (§1.9(f)).....	4,331,672 4,331,679	06/231,312 06/219,729	5/25/82 5/25/82
By other than a small entity.....	4,331,682 4,331,686 4,331,701 4,331,702 4,331,715 4,331,725	06/239,868 06/297,395 06/229,296 06/231,885 06/222,185 06/274,569	5/25/82 5/25/82 5/25/82 5/25/82 5/25/82 5/25/82
The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:	4,331,750 4,331,763 4,331,823 4,331,839 4,590,621 4,590,623 4,590,641 4,590,643	06/226,404 06/217,178 06/261,009 06/215,742 06/730,459 06/650,785 06/476,391 06/461,271	5/25/82 5/25/82 5/25/82 5/25/82 5/27/86 5/27/86 5/27/86 5/27/86
"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:	4,590,644 4,590,651 4,590,654 4,590,655 4,590,656 4,590,669	06/739,464 06/757,479 06/564,675 06/748,030 06/737,240 06/670,940	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
By a small entity (§1.9(f)).....	4,590,677 4,590,688	06/669,386 06/539,549	5/27/86 5/27/86
By other than a small entity.....	4,590,690 4,590,691 4,590,694 4,590,695 4,590,702 4,590,709	06/768,702 06/693,340 06/698,804 06/756,532 06/682,992 06/653,330	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....	4,590,714 4,590,715 4,590,718 4,590,719 4,590,723 4,590,727	06/667,785 06/664,910 06/579,274 06/700,603 06/727,005 06/592,017	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.	4,590,735 4,590,742 4,590,746 4,590,748 4,590,750 4,590,758	06/463,866 06/374,741 06/626,042 06/607,228 06/527,520 06/527,520	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.	4,590,767 4,590,775 4,590,778 4,590,784 4,590,787 4,590,813	06/706,451 06/698,627 06/749,287 06/753,013 06/753,166 06/544,663	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
PATENTS WHICH EXPIRED MAY 27, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES	4,590,832 4,590,834 4,590,839 4,590,851 4,590,852 4,590,871	06/601,547 06/655,249 06/767,188 06/547,331 06/584,528 06/729,688	5/27/86 5/27/86 5/27/86 5/27/86 5/27/86 5/27/86
Patent Number	Serial Number	Issue Date	
4,330,936	06/236,746	5/25/82	
4,330,942	06/244,707	5/25/82	
4,330,943	06/219,778	5/25/82	
4,330,954	06/239,660	5/25/82	
4,331,067	06/219,191	5/25/82	
4,331,106	06/249,958	5/25/82	
4,331,119	06/255,606	5/25/82	
4,331,134	06/225,861	5/25/82	
4,331,138	06/266,659	5/25/82	
4,331,145	06/229,045	5/25/82	



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			4,591,307	06/567,273	5/27/86
4,590,887	06/678,265	5/27/86	4,591,317	06/486,387	5/27/86
4,590,902	06/698,625	5/27/86	4,591,321	06/716,674	5/27/86
4,590,903	06/644,086	5/27/86	4,591,325	06/756,083	5/27/86
4,590,915	06/670,890	5/27/86	4,591,337	06/641,948	5/27/86
4,590,919	06/691,718	5/27/86	4,591,341	06/657,308	5/27/86
4,590,920	06/610,846	5/27/86	4,591,342	06/678,793	5/27/86
4,590,921	06/668,898	5/27/86	4,591,343	06/721,760	5/27/86
4,590,930	06/506,779	5/27/86	4,591,359	06/643,840	5/27/86
4,590,931	06/663,956	5/27/86	4,591,368	06/614,679	5/27/86
4,590,940	06/618,162	5/27/86	4,591,370	06/565,459	5/27/86
4,590,946	06/620,640	5/27/86	4,591,376	06/612,444	5/27/86
4,590,948	06/689,489	5/27/86	4,591,390	06/336,925	5/27/86
4,590,957	06/545,769	5/27/86	4,591,406	06/695,018	5/27/86
4,590,960	06/689,317	5/27/86	4,591,412	06/559,961	5/27/86
4,590,961	06/766,603	5/27/86	4,591,414	06/644,467	5/27/86
4,590,971	06/564,162	5/27/86	4,591,422	06/709,803	5/27/86
4,590,977	06/714,014	5/27/86	4,591,424	06/611,072	5/27/86
4,590,990	06/664,757	5/27/86	4,591,431	06/658,627	5/27/86
4,590,992	06/626,429	5/27/86	4,591,432	06/619,031	5/27/86
4,590,996	06/681,391	5/27/86	4,591,451	06/613,569	5/27/86
4,590,997	06/695,600	5/27/86	4,591,473	06/591,244	5/27/86
4,591,001	06/663,598	5/27/86	4,591,474	06/594,477	5/27/86
4,591,005	06/500,626	5/27/86	4,591,476	06/687,252	5/27/86
4,591,007	06/468,485	5/27/86	4,591,488	06/509,193	5/27/86
4,591,015	06/540,989	5/27/86	4,591,493	06/714,957	5/27/86
4,591,016	06/590,779	5/27/86	4,591,496	06/571,007	5/27/86
4,591,020	06/744,287	5/27/86	4,491,500	06/656,968	5/27/86
4,591,031	06/623,418	5/27/86	4,591,504	06/498,506	5/27/86
4,591,036	06/687,480	5/27/86	4,591,509	06/627,940	5/27/86
4,591,039	06/470,624	5/27/86	4,591,515	06/584,260	5/27/86
4,591,051	06/726,654	5/27/86	4,591,516	06/688,693	5/27/86
4,591,052	06/763,948	5/27/86	4,591,521	06/750,738	5/27/86
4,591,055	06/758,290	5/27/86	4,591,530	06/602,172	5/27/86
4,591,061	06/404,122	5/27/86	4,591,541	06/625,535	5/27/86
4,591,082	06/548,964	5/27/86	4,591,556	06/365,239	5/27/86
4,591,093	06/751,285	5/27/86	4,591,563	06/606,642	5/27/86
4,591,094	06/640,391	5/27/86	4,591,566	06/555,123	5/27/86
4,591,097	06/611,041	5/27/86	4,591,573	06/535,190	5/27/86
4,591,110	06/729,532	5/27/86	4,591,582	06/601,149	5/27/86
4,591,121	06/628,521	5/27/86	4,591,590	06/563,756	5/27/86
4,591,124	06/694,530	5/27/86	4,591,594	06/680,706	5/27/86
4,591,125	06/729,748	5/27/86	4,591,597	06/594,148	5/27/86
4,591,126	06/674,237	5/27/86	4,591,611	06/652,399	5/27/86
4,591,136	06/599,783	5/27/86	4,591,620	06/494,008	5/27/86
4,591,144	06/695,568	5/27/86	4,591,634	06/755,037	5/27/86
4,591,147	06/647,548	5/27/86	4,591,637	06/692,664	5/27/86
4,591,148	06/628,230	5/27/86	4,591,648	06/361,432	5/27/86
4,591,149	06/486,115	5/27/86	4,591,650	06/579,856	5/27/86
4,591,151	06/715,899	5/27/86	4,591,656	06/499,228	5/27/86
4,591,154	06/520,310	5/27/86	4,591,657	06/510,672	5/27/86
4,591,156	06/675,242	5/27/86	4,591,662	06/623,312	5/27/86
4,591,159	06/789,314	5/27/86	4,541,663	06/552,729	5/27/86
4,591,162	06/657,682	5/27/86	4,591,671	06/616,565	5/27/86
4,591,163	06/645,167	5/27/86	4,591,673	06/376,607	5/27/86
4,591,164	06/696,870	5/27/86	4,591,674	06/618,644	5/27/86
4,591,167	06/784,266	5/27/86	4,591,680	06/664,343	5/27/86
4,591,169	06/746,310	5/27/86	4,591,686	06/607,112	5/27/86
4,591,171	06/585,367	5/27/86	4,591,690	06/671,162	5/27/86
4,591,175	06/582,532	5/27/86	4,591,691	06/665,983	5/27/86
4,591,178	06/630,235	5/27/86	4,591,692	06/538,522	5/27/86
4,591,182	06/606,294	5/27/86	4,591,693	06/701,295	5/27/86
4,591,200	06/698,503	5/27/86	4,591,694	06/727,847	5/27/86
4,591,201	06/677,578	5/27/86	4,591,695	06/611,890	5/27/86
4,591,209	06/566,416	5/27/86	4,591,696	06/654,414	5/27/86
4,591,210	06/522,812	5/27/86	4,591,699	06/614,536	5/27/86
4,591,213	06/487,320	5/27/86	4,591,702	06/253,009	5/27/86
4,591,221	06/562,316	5/27/86	4,591,711	06/551,460	5/27/86
4,591,223	06/651,871	5/27/86	4,591,719	06/505,199	5/27/86
4,591,224	06/709,768	5/27/86	4,591,722	06/568,207	5/27/86
4,591,227	06/798,710	5/27/86	4,591,733	06/458,045	5/27/86
4,591,228	06/637,263	5/27/86	4,591,734	06/604,359	5/27/86
4,591,238	06/503,537	5/27/86	4,591,747	06/758,575	5/27/86
4,591,250	06/667,102	5/27/86	4,591,769	06/676,097	5/27/86
4,591,271	06/477,330	5/27/86	4,591,783	06/539,076	5/27/86
4,591,274	06/664,610	5/27/86	4,591,785	06/545,332	5/27/86
4,591,287	06/642,491	5/27/86	4,591,790	06/603,676	5/27/86
4,591,289	06/524,075	5/27/86	4,591,812	06/443,833	5/27/86

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			4,591,987	06/517,807	5/27/86
4,591,831	06/608,128	5/27/86	4,591,988	06/513,219	5/27/86
4,591,834	06/555,213	5/27/86	4,592,001	06/516,784	5/27/86
4,591,852	06/605,258	5/27/86	4,592,008	06/461,792	5/27/86
4,591,854	06/541,162	5/27/86	4,592,014	06/638,578	5/27/86
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4,591,872	06/659,252	5/27/86	4,592,042	06/467,139	5/27/86
4,591,883	06/778,281	5/27/86	4,592,059	06/640,161	5/27/86
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4,591,916	06/557,180	5/27/86	4,592,068	06/479,765	5/27/86
4,591,927	06/558,152	5/27/86	4,592,071	06/597,065	5/27/86
4,591,947	06/736,812	5/27/86	4,592,075	06/694,202	5/27/86
4,591,952	06/641,761	5/27/86	4,592,077	06/565,252	5/27/86
4,591,959	06/676,315	5/27/86	4,592,080	06/613,386	5/27/86
4,591,976	06/505,165	5/27/86	4,592,090	06/742,135	5/27/86
4,591,981	06/488,701	5/27/86	4,592,092	06/605,075	5/27/86

#### NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,447,673	06/286,750	5/08/84	7/24/81	1/27/89
4,537,318	06/607,640	8/27/85	5/07/84	6/26/90
4,543,246	06/657,508	9/24/85	10/04/84	6/26/90
4,545,010	06/575,794	10/08/85	2/01/84	6/26/90
4,548,331	06/673,012	10/22/85	11/19/84	6/26/90

#### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.111(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,963,471**, Re. S. N. 07/526,467, Filed May 21, 1990, Cl. 71/12, APPARATUS AND PROCESS FOR PRODUCING AN ORGANIC PRODUCT FROM SEWAGE SLUDGE, Quentin L. Hampton, Owner of Record: *Bernard A. Chilton, Dunedin, Fla.*, Attorney or Agent: Robert E. LeBlanc, Ex. Gp.: 118

**4,184,078**, Re. S. N. 07/520,946, Filed May 9, 1990, Cl. 378/34, PULSED X-RAY LITHOGRAPHY, David J. Nagel, et al., Owner of Record: *United States of America as represented by the Secretary of the Navy*, Attorney or Agent: Thomas E. McDonnell, Ex. Gp.: 256

**4,584,599**, Re. S. N. 07/541,787, Filed June 21, 1990, Cl. 358/36, SIGNAL TO NOISE RATIO ENHANCEMENT USING BASEBAND SIGNALS IN AN FM TELEVISION SYSTEM, Joseph G. Mobley, Owner of Record: *Scientific Atlanta, Inc., Atlanta, Ga.*, Attorney or Agent: Joseph M. Potenza, Ex. Gp.: 262

**4,739,614**, Re. S. N. 07/515,183, Filed April 26, 1990, Cl. 60/274, DOUBLE AIR-FUEL RATIO SENSOR SYSTEM IN INTERNAL COMBUSTION ENGINE, Toshiyasu Katsuno, et al., Owner of Record: *Toyota Jidosha Kabushiki Kaisha, Toyota, Japan*, Attorney or Agent: James A. Oliff, Ex. Gp.: 342

**4,751,172**, Re. S. N. 07/537,091, Filed June 12, 1990, Cl. 430/314, PROCESS FOR FORMING METAL IMAGES, Stephen S. Rodriguez, et al., Owner of Record: *Shipley Company, Inc., Newtown, Mass.*, Attorney or Agent: Robert L. Goldberg, Ex. Gp.: 158

**4,754,334**, Re. S. N. 07/542,251, Filed June 21, 1990, Cl. 358/244, IMAGE GENERATOR HAVING AUTOMATIC ALIGN-

MENT METHOD AND APPARATUS, J. Stanley Kriz, et al., Owner of Record: *Management Graphics, Inc., Bloomington, Mich.*, Attorney or Agent: Barry R. Lipsitz, Ex. Gp.: 235

**4,756,538**, Re. S. N. 07/538,431, Filed June 13, 1990, Cl. 350/6.5, SCANNING OPTICAL SYSTEM FOR USE IN A LASER BEAM PRINTER, Akira Morimoto, Owner of Record: *Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Frank L. Bernstein, Ex. Gp.: 257

**4,801,456**, Re. S. N. 07/526,469, Filed May 21, 1990, Cl. 421/422, GROWTH HORMONE-RELEASING FACTOR ANALOGS, Keith A. Drengler, Owner of Record: *International Minerals & Chemicals Corp., Terre Haute, Ind.*, Attorney or Agent: Barbara G. Ernst, Ex. Gp.: 158

**4,807,652**, Re. S. N. 07/477,492, Filed Feb. 8, 1990, Cl. 132/137, COMB, Frank Bachrach, Owner of Record: *American Comb Corp., Paterson, N. J.*, Attorney or Agent: Gerald H. Kiel, Ex. Gp.: 333

**4,841,170**, Re. S. N. 07/538,932, Filed June 15, 1990, Cl. 307/310, TEMPERATURE CONTROLLED HYBRID ASSEMBLY, Larry E. Eccleston, Owner of Record: *John Fluke Mfg. Co., Inc., Everett, Wash.*, Attorney or Agent: Richard A. Koske, Ex. Gp.: 254

**4,864,842**, Re. S. N. 07/534,732, Filed June 7, 1990, Cl. 73/001.00R, METHOD AND SYSTEM FOR TRANSFERRING CALIBRATION DATA BETWEEN CALIBRATED MEASUREMENT INSTRUMENTS, Ali Regimand, Owner of Record: *Troxler Electronic Laboratories Inc., Raleigh, N. C.*, Attorney or Agent: Raymond O. Linker, Ex. Gp.: 265

**4,868,781**, Re. S. N. 07/542,028, Filed June 21, 1990, Cl. 364/900, MEMORY CIRCUIT FOR GRAPHIC IMAGES, Koichi Kimura, et al., Owner of Record: *Inventor*, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 238

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,175,355**, Reexam. No. 90/002,063, Requested June 20, 1990, Cl. 047/064, ROOTING MEDIA AND METHODS OF MAKING THE SAME, Richard R. Dedolph, Owner of Record: *Gravi-Mechanics Co., Naperville, Ill.*, Attorney or Agent: Dithmar, Stotland, Stratman & Levy, Ex. Gp.: 184, Requester: Bud Antle, Salinas, Calif.

**4,215,513**, Reexam. No. 90/002,062, Requested June 20, 1990, Cl. 047/056, FIELD TRANSPLANT SYSTEMS AND METHODS AND COMPONENTS THEREOF, Richard R. Dedolph, Owner of Record: *Gravi-Mechanics Co., Naperville, Ill.*, Attorney or Agent: Dithmar, Stotland, Stratman & Levy, Ex. Gp.: 330, Requester: Bud Antle, Salinas, Calif.

**4,300,090**, Reexam. No. 90/002,061, Requested June 21, 1990, Cl. 323/311, DIRECT CURRENT POWER SUPPLY, Harold J. Weber, Owner of Record: *Inventor, Holliston, Mass.*, Attorney or Agent: None, Ex. Gp.: 212, Requester: Russel E. Hattis, Wallenstein, Wagner & Hattis, Chicago, Ill.

**4,512,616**, Reexam. No. 90/002,065, Requested June 25, 1990, Cl. 308/003, SLIDING GLIDE, Shigimi Suzuki, et al., Owner of Record: *Toto Ltd., Kitakyushu, Japan*, Attorney or Agent: Jones, Day, Reavis & Pogue, Cleveland, Ohio, Ex. Gp.: 245, Requester: Owner

**4,788,711**, Reexam. No. 90/002,066 Requested June 25, 1990, Cl. 379/059, APPARATUS AND METHOD FOR A CELLULAR FREEWAY EMERGENCY TELEPHONE SERVICE, Michael Nasco, Owner of Record: *Cellular Comm. Co., Irvine, Calif.*, Attorney or Agent: Beehler, Pavit, Siegemund, Jagger, Martella & Bethal, Ex. Gp.: 261, Requester: Metro Transportation Comm. Service Authority, Chicago, Ill.

**4,800,279**, Reexam. No. 90/002,064, Requested June 22, 1990, Cl. 250/339, METHODS AND DEVICES FOR NEAR-INFRARED EVALUATION OF PHYSICAL PROPERTIES OF

SAMPLES, Gary M. Hieftje, et al., Owner of Record: *Indiana University Foundation, Bloomington, Ind.*, Attorney or Agent: David L. Witeoff, Kirkland & Ellis, Ex. Gp.: 256, Requester: Abraham Rosner, Shugrue, Mion, Zinn, Macpeak & Seas, Washington, D. C.

**4,883,672**, Reexam. No. 90/002,067, Requested June 25, 1990, Cl. 426/002, METHOD FOR PREVENTING DIET INDUCED CARNITINE DEFICIENCY IN DOMESTICATED DOGS AND CATS, Dr. Austin L. Shug, et al., Owner of Record: *Inventor, Madison, Wisc.*, Attorney or Agent: Carl E. Gulbrandson, Ex. Gp.: 132, Requester: Owner

## Erratum

All reference to Patent No. 4,939,631 to Michael Burn, et al., of Woodbridge, England for "SPACE LIGHTING" appearing in the Official Gazette of July 13, 1990 should be deleted since no patent was granted."

## Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Mego Corp., New York, N.Y., Reg. No. 1,067,325, for the mark "SPARKLE", Canc. No. 18,454

Pure Foods Manufacturing Co., Phoenix, Ariz., Reg. No. 1,046,643, for the mark "CHAMPION AND DESIGN", Canc. No. 18,463

JEAN BROWN  
Administrator, Trademark  
Trial and Appeal Board  
For JEFFREY M. SAMUELS  
Assistant Commissioner  
for Trademarks

## Reclassification Alert Report

This report is a summary of classification changes which became effective by issuance of Classification Orders in April-June, 1990. Information includes:

- subclasses established or abolished
- subclass title, indent, or position change
- classes where existing subclass definitions have changed

This Reclassification Alert Report may appear from time to time in the Official Gazette, and is intended to provide an interim notice of classification changes pending publication of the Manual of Classification and revisions thereto.

July 5, 1990

WILLIAM S. LAWSON  
Administrator for Documentation

CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
008			Defn Change	1345
010			Defn Change	1342
016			Defn Change	1343
023			Defn Change	1333
023			Defn Change	1336
024	230.5		Abolish	1343
024	231	242	Abolish	1343
024	573	574	Abolish	1343
024	573.1	573.7	Establish	1343

CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
024	579.1		Establish	1343
024	598	601	Abolish	1343
024	598.1	598.9	Establish	1343
024	599.1	599.9	Establish	1343
024	600.1	600.9	Establish	1343
024	601.1	601.9	Establish	1343
024	697	699	Abolish	1343
024	697.1	697.2	Establish	1343
024	698.1	698.3	Establish	1343
024	716		Establish	1343
024	905	908	Establish	1343
029			Defn Change	1336
029			Defn Change	1333
029			Defn Change	1334
029	243.517	243.519	Establish	1346
029	243.52		Abolish	1346
029	243.521	243.529	Establish	1346
029	811		Abolish	1346
029	811.2		Establish	1346
029	812.5		Establish	1346
030			Defn Change	1339
030			Defn Change	1334
030	123		Title Change	1334
033			Defn Change	1338
034			Defn Change	1336
043			Defn Change	1343
044			Defn Change	1336
055			Defn Change	1344
056			Defn Change	1342
059			Defn Change	1343
065			Defn Change	1346
065			Defn Change	1345
070			Defn Change	1343
072			Defn Change	1334
072	241	243	Abolish	1346
072	241.2		Establish	1346
072	241.4		Establish	1346
072	241.6		Establish	1346
072	241.8		Establish	1346
072	242.2		Establish	1346
072	242.4		Establish	1346
072	243.2		Establish	1346
072	243.4		Establish	1346
072	243.6		Establish	1346
072	252.5		Establish	1346
072	342		Abolish	1346
072	342.1	342.8	Establish	1346
072	342.92		Establish	1346
072	342.94		Establish	1346
072	342.96		Establish	1346
072	352		Title Change	1346
072	353	355	Abolish	1346
072	353.2		Establish	1346
072	353.4		Establish	1346
072	353.6		Establish	1346
072	354.2		Establish	1346
072	354.6		Establish	1346
072	354.8		Establish	1346
072	355.2		Establish	1346
072	355.4		Establish	1346
072	355.6		Establish	1346
072	365	366	Abolish	1346
072	365.2		Establish	1346
072	366.2		Establish	1346
072	379		Abolish	1346
072	379.2		Establish	1346
072	379.4		Establish	1346
072	379.6		Establish	1346
072	391		Abolish	1346
072	391.2		Establish	1346
072	391.4		Establish	1346
072	391.6		Establish	1346
072	391.8		Establish	1346
073	019		Abolish	1344
073	019.01	019.12	Establish	1344
073	023		Abolish	1344

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CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
073	023.1		Abolish	1344
073	023.2	023.42	Establish	1344
073	024	030	Abolish	1344
073	024.01	024.06	Establish	1344
073	025.01	025.05	Establish	1344
073	028.01	028.06	Establish	1344
073	029.01	029.05	Establish	1344
073	030.01	030.04	Establish	1344
073	031.01	031.07	Establish	1344
075			Title Change	1336
075	000.5		Abolish	1336
075	001	009	Abolish	1336
075	010.1		Title Change	1336
075	010.1	010.67	Position Change	1336
075	010.13		Title Change	1336
075	010.15		Title Change	1336
075	010.18		Title Change	1336
075	010.21		Title Change	1336
075	010.25	010.27	Title Change	1336
075	010.31		Title Change	1336
075	010.33		Title Change	1336
075	010.38	010.51	Title Change	1336
075	010.54	010.55	Title Change	1336
075	010.57	010.6	Title Change	1336
075	010.63		Title Change	1336
075	010.66	010.67	Title Change	1336
075	020	121	Abolish	1336
075	101.3		Title Change	1336
075	228	250	Position Change	1336
075	230	232	Title Change	1336
075	234	235	Title Change	1336
075	238	250	Title Change	1336
075	251		Abolish	1336
075	252	255	Position Change	1336
075	253	255	Title Change	1336
075	256	257	Abolish	1336
075	300	773	Establish	1336
075	950	951	Title Change	1336
075	952	962	Establish	1336
075	D002	D003	Abolish	1336
076	005		Abolish	1334
076	005.1		Establish	1334
076	005.4		Establish	1334
076	005.6		Establish	1334
076	024	025	Abolish	1334
076	024.1		Establish	1334
076	024.5		Establish	1334
076	025.1		Establish	1334
076	047		Abolish	1334
076	047.1		Establish	1334
076	050.2		Establish	1334
076	050.4		Establish	1334
076	078		Abolish	1334
076	078.1		Establish	1334
076	079.5		Establish	1334
076	080.5		Establish	1334
076	101		Abolish	1334
076	101.1		Establish	1334
076	104		Abolish	1334
076	104.1		Establish	1334
076	106.5		Establish	1334
076	107	108	Abolish	1334
076	107.1		Establish	1334
076	107.4		Establish	1334
076	107.6		Establish	1334
076	107.8		Establish	1334
076	108.1	108.2	Establish	1334
076	108.4		Establish	1334
076	108.6		Establish	1334
076	115	119	Establish	1334
081			Defn Change	1334
083			Defn Change	1342
086			Defn Change	1342
099			Defn Change	1342
106			Defn Change	1336
106	074	121	Abolish	1345

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CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
106	314	315	Abolish	1345
106	600	823	Establish	1345
114			Defn Change	1343
119			Defn Change	1343
119			Defn Change	1345
124	020		Abolish	1338
124	020.1	020.3	Establish	1338
124	022		Title Change	1338
124	023	024	Abolish	1338
124	023.1		Establish	1338
124	024.1		Establish	1338
124	025		Title Change	1338
124	025.5	025.7	Establish	1338
124	028		Title Change	1338
124	031		Title Change	1338
124	035		Abolish	1338
124	035.1		Establish	1338
124	035.2		Establish	1338
124	040		Title Change	1338
124	041		Abolish	1338
124	041.1		Establish	1338
124	043		Title Change	1338
124	044.5	044.7	Establish	1338
124	045		Title Change	1338
124	050		Title Change	1338
124	051		Abolish	1338
124	051.1		Establish	1338
124	053		Title Change	1338
124	053.5		Establish	1338
124	080		Title Change	1338
124	900		Establish	1338
124	D001		Abolish	1338
125			Defn Change	1336
125	011		Abolish	1339
125	011.01	011.09	Establish	1339
125	011.1	011.19	Establish	1339
125	011.2	011.23	Establish	1339
125	013		Abolish	1339
125	013.01	013.03	Establish	1339
125	016		Abolish	1339
125	016.01	016.04	Establish	1339
125	023		Abolish	1339
125	023.01	023.02	Establish	1339
125	030		Abolish	1339
125	030.01	030.02	Establish	1339
125	901		Establish	1339
127			Defn Change	1345
128			Defn Change	1344
131			Defn Change	1335
134			Defn Change	1336
138			Defn Change	1336
139			Abolish	1332
139	116		Establish	1332
139	116.1	116.2	Abolish	1332
139	435		Establish	1332
139	435.1	435.6	Establish	1332
148			Defn Change	1336
149			Defn Change	1336
150			Defn Change	1335
152			Defn Change	1343
156			Defn Change	1334
156			Defn Change	1336
160			Defn Change	1345
162			Defn Change	1343
164			Defn Change	1345
174			Defn Change	1336
175			Defn Change	1336
175			Defn Change	1336
175			Defn Change	1334
177			Defn Change	1339
191			Defn Change	1342
192			Defn Change	1336
198	343	345	Defn Change	1336
198	343.1	343.2	Abolish	1342
198	345.1	345.3	Establish	1342
198	347		Establish	1342



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198	347.1	347.4	Establish	1342
198	356		Abolish	1342
198	357	358	Indent Change	1342
198	357	358	Position Change	1342
198	502.1		Indent Change	1342
198	502.1		Position Change	1342
198	503	505	Abolish	1342
198	626	628	Abolish	1342
198	626.1	626.6	Establish	1342
198	678		Abolish	1342
198	678.1		Establish	1342
198	687.1		Establish	1342
198	735		Abolish	1342
198	735.1	735.6	Establish	1342
198	774		Abolish	1342
198	774.1	774.4	Establish	1342
198	832.1	832.3	Establish	1342
198	836		Abolish	1342
198	836.1	836.4	Establish	1342
198	844		Abolish	1342
198	844.1	844.2	Establish	1342
198	854	859	Abolish	1342
198	958	959	Establish	1336
200			Defn Change	1336
201			Defn Change	1336
202			Defn Change	1336
203			Defn Change	1336
203			Defn Change	1337
204			Defn Change	1334
204			Defn Change	1336
204			Defn Change	1333
204	001		Abolish	1333
204	001.11		Establish	1333
204	153.1	153.23	Establish	1333
204	298		Abolish	1333
204	298.01	298.41	Establish	1333
206			Defn Change	1335
206			Defn Change	1338
206			Defn Change	1336
209			Defn Change	1342
209			Defn Change	1345
210			Defn Change	1336
210			Defn Change	1344
210			Defn Change	1336
219			Defn Change	1345
219			Defn Change	1338
220			Defn Change	1339
221			Defn Change	1343
223			Defn Change	1339
225			Defn Change	1332
226			Defn Change	1336
228			Defn Change	1335
229	087		Abolish	1335
229	087.01	087.09	Establish	1335
229	087.11	087.19	Establish	1335
238			Defn Change	1336
241			Defn Change	1339
241			Defn Change	1336
242			Defn Change	1340
250			Defn Change	1344
250			Defn Change	1336
252			Defn Change	1339
252			Defn Change	1345
252			Defn Change	1330
252			Defn Change	1337
260			Defn Change	1345
260			Defn Change	1330
260	397.1	397.2	Abolish	1330
260	297.25		Abolish	1330
260	397.3	397.4	Abolish	1330
260	397.45		Abolish	1330
260	397.47		Abolish	1330
260	397.5		Abolish	1330
260	500	653	Establish	1330
264			Defn Change	1336
264			Defn Change	1345
264			Defn Change	1334
266			Defn Change	1336

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CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
269			Defn Change	1334
277			Defn Change	1336
285			Defn Change	1336
294			Defn Change	1343
294			Defn Change	1334
310			Defn Change	1336
313			Defn Change	1336
324			Defn Change	1333
335			Defn Change	1336
338			Defn Change	1336
340			Defn Change	1336
343			Defn Change	1344
356			Defn Change	1336
356			Defn Change	1344
356			Defn Change	1342
358			Defn Change	1339
360			Defn Change	1340
364			Defn Change	1336
364			Defn Change	1344
364			Defn Change	1336
364	300		Abolish	1345
366			Defn Change	1345
369	044	046	Abolish	1340
369	044.11	044.19	Establish	1340
369	044.21	044.29	Establish	1340
369	044.31	044.39	Establish	1340
369	044.41	044.42	Establish	1340
369	275		Abolish	1340
369	275.1	275.5	Establish	1340
373			Defn Change	1336
374			Defn Change	1344
376			Defn Change	1336
378			Defn Change	1344
405			Defn Change	1345
406			Defn Change	1336
414			Defn Change	1342
416			Defn Change	1336
417			Defn Change	1336
418	055		Abolish	1341
418	055.1	055.6	Establish	1341
418	201		Abolish	1341
418	201.1	201.3	Establish	1341
419			Defn Change	1336
420			Defn Change	1336
422			Defn Change	1344
422			Defn Change	1336
423			Defn Change	1336
424			Defn Change	1336
424			Defn Change	1330
424	095	113	Abolish	1337
424	520		Establish	1337
424	522	526	Establish	1337
424	528	535	Establish	1337
424	537	539	Establish	1337
424	541	543	Establish	1337
424	545	551	Establish	1337
424	553	559	Establish	1337
424	561	563	Establish	1337
424	565		Establish	1337
424	568	574	Establish	1337
424	577	583	Establish	1337
425			Defn Change	1333
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430			Defn Change	1330
430			Defn Change	1345
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433			Defn Change	1336
435			Defn Change	1337

CLASS	FIRST SUBCLASS	LAST SUBCLASS	ACTION	ORDER NUMBER
435			Defn Change	1336
435			Defn Change	1345
445			Defn Change	1336
445			Defn Change	1333
474			Defn Change	1342
501			Defn Change	1345
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502			Defn Change	1336
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D009			Defn Change	1331
D010			Defn Change	1331
D012			Title Change	1331
D013			Abolish	1331
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D013	099		Establish	1331
D013	100	184	Establish	1331
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D014			Defn Change	1331
D015			Defn Change	1331
D016			Defn Change	1331
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D018	022		Title Change	1331
D021	048		Establish	1331
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D025			Defn Change	1331
D026			Defn Change	1331
D029			Defn Change	1331
D032			Defn Change	1331
D034			Defn Change	1331

## PATENT NOTICES

## Certificates of Correction For Week of August 7, 1990

4,408,168	4,825,826	4,851,353	4,862,737
4,558,444	4,826,588	4,852,385	4,862,827
4,585,662	4,826,913	4,853,236	4,863,929
4,663,907	4,826,968	4,853,438	4,864,713
4,678,475	4,828,004	4,853,471	4,864,719
4,700,713	4,830,740	4,853,804	4,864,765
4,727,137	4,832,859	4,853,844	4,864,882
4,728,466	4,833,496	4,853,850	4,865,066
4,740,506	4,833,929	4,853,863	4,865,067
4,743,691	4,835,073	4,853,888	4,865,321
4,749,003	4,835,270	4,854,444	4,865,326
4,754,126	4,835,507	4,855,112	4,865,436
4,759,565	4,835,534	4,855,146	4,865,622
4,760,475	4,836,327	4,855,863	4,865,779
4,776,072	4,837,284	4,855,926	4,865,833
4,777,850	4,840,553	4,856,299	4,866,240
4,780,590	4,841,488	4,856,503	4,867,044
4,788,479	4,842,061	4,857,128	4,867,575
4,789,433	4,843,061	4,857,205	4,867,851
4,791,788	4,843,599	4,857,279	4,868,207
4,792,913	4,844,124	4,857,693	4,868,404
4,793,358	4,844,139	4,858,124	4,868,715
4,801,966	4,844,523	4,859,022	4,868,797
4,808,298	4,844,531	4,859,394	4,868,951
4,812,450	4,844,724	4,859,424	4,869,673
4,812,656	4,845,213	4,859,476	4,870,121
4,813,038	4,845,655	4,859,659	4,871,629
4,814,051	4,845,661	4,860,540	4,871,795
4,814,960	4,847,007	4,860,611	4,871,876
4,817,057	4,847,376	4,860,733	4,872,039
4,817,477	4,847,943	4,861,112	4,873,839
4,817,819	4,849,346	4,861,299	4,875,897
4,818,577	4,849,488	4,861,522	4,876,570
4,818,776	4,849,549	4,861,536	4,893,549
4,819,859	4,850,401	4,861,621	4,902,280
4,820,823	4,850,552	4,861,767	4,923,544
4,820,967	4,850,815	4,862,112	
4,824,697	4,851,304	4,862,301	

4,904,330.—*James L. Vanderpool*, Kettering; *James M. Bain*, Xenia, both of Ohio. HAND-HELD LABELER HAVING IMPROVED WEB POSITION SENSING AND PRINT HEAD CONTROL. Patent dated Feb. 27, 1990. Disclaimer filed Feb. 23, 1990, by the assignee, Monarch Marketing Systems, Inc.

The term of this patent subsequent to April 12, 2005, has been disclaimed.

4,914,520.—*Terry D. Beard*, Westlake Village, Calif. VIDEO TRANSFER METHOD USING TIME-SPACED INTER-LEAVED FIELDS. Patent dated Apr. 3, 1990. Disclaimer filed May 25, 1990, by the inventor.

The term of this patent subsequent to March 21, 2006, has been disclaimed.

## Dedications

4,215,935.—*Ernst W. Loebach*, Eschen, Liechtenstein. METHOD AND DEVICE FOR THE PROJECTION PRINTING OF A MASK ONTO A SEMICONDUCTOR SUBSTRATE. Patent dated Aug. 5, 1980. Dedication filed Feb. 20, 1990, by the assignee, Mercotrust Aktiengesellschaft.

Hereby dedicates to the Public the remaining term of said patent.

4,866,160.—*David H. Coy*, New Orleans, La; *Jaques-Pierre Moreau*, Upton, Mass. THERAPEUTIC DECAPEPTIDES. Patent dated Sept. 12, 1989. Dedication filed Apr. 9, 1990, by the assignee, The Administrators of the Tulane Educational Fund.

Hereby dedicates to the Public the remaining term of said patent.

## Disclaimer and Dedications

3,870,821.—*Donald P. Steury*, Tigard, Oreg. PUSHBUTTON TELEPHONE PRINTER/RECORDER. Patent dated Mar. 11, 1975. Disclaimer and Dedication filed Apr. 13, 1990, by the inventor.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,872,579.—*Darrel Palmer*, Sandy, Utah. ASPIRATING/VENTILATING APPARATUS AND METHOD. Patent dated Oct. 10, 1989. Disclaimer filed Oct. 10, 1989, by the assignee, Ballard Medical Products.

The term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

4,893,591.—*Kevin G. Netson*, Tulsa, Okla. MANIFOLD FLAME ARRESTOR. Patent dated Jan. 16, 1990. Disclaimer and Dedication filed Jun. 11, 1990, by the assignee, Facet Enterprises, Inc.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

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	Milwaukee Public Library .....	(414) 278-3247

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JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF June 16, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
<b>CHEMICAL EXAMINING GROUPS</b>	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director .....	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director .....	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director .....	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director .....	4-20-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director .....	1-28-87
<b>ELECTRICAL EXAMINING GROUPS</b>	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director .....	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director .....	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director .....	3-8-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director .....	11-9-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director .....	3-31-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director .....	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director .....	2-6-86
<b>MECHANICAL EXAMINING GROUPS</b>	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director .....	3-24-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director .....	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director .....	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director .....	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director .....	5-5-89

**Expiration of patents:** The patents within the range of numbers indicated below expire during June 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,736,595 to 3,742,517 inclusive  
Plant Patents ..... 3,350 to 3,369 inclusive

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## STATUTORY INVENTION REGISTRATIONS

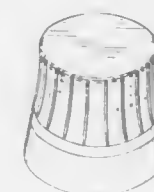
PUBLISHED AUGUST 7, 1990

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H803

## CAP FOR BOTTLE

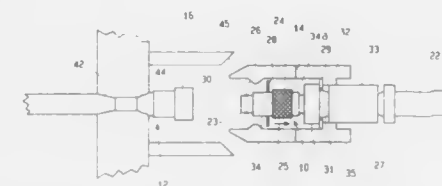
Mark Sherrington, 64 Waldemar Avenue Mansions, Colehill Lane, Fulham, London, England  
Continuation of Ser. No. 603,880, Apr. 26, 1984, abandoned.  
This application Mar. 14, 1989, Ser. No. 323,085  
U.S. Cl. 809—435



H804

## QUICK-CONNECT COUPLER FOR REMOTE MANIPULATION

James C. Dobbins, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Jul. 27, 1989, Ser. No. 385,519  
Int. Cl. 5 F16L 37/02  
U.S. Cl. 285—345



1. A quick-connect fluid coupler comprised of a removable coupler body with interlocking means with a push-to-connect/pull-to-disconnect release mechanism, and a stationary coupler body with complementary interlocking means without a release mechanism, adapted to permit connection and disconnection by remote manipulation, comprising:

a housing surrounding said removable coupler body, abutment means engaging portions of said removable coupler body, transferring the motion of said housing to said removable coupler body, comprising two or more detachable rings encircling said removable coupler body, and remote manipulator interfaces projecting from the exterior surfaces of said housing.

H805

## EXHALATION DUCT

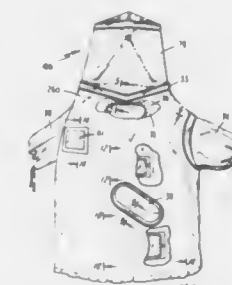
John G. Schriver, Baltimore, Md.; William L. Piffel, Jr., Wilmington, Del., and John D. Scheible, Chestertown, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Continuation of Ser. No. 191,082, May 6, 1988, abandoned. This application Sep. 18, 1989, Ser. No. 409,268  
Int. Cl. 5 A62B 7/02

U.S. Cl. 128—201.22

3 Claims

3. An exhalation duct provided for a breathing mask, said mask having a regulator with an exhalation valve and a breathing hose in the form of a linear air hose attached to an air-supply tank, comprising:

an exhalation valve cover of molded rubber communicating with said regulator and enclosing said exhalation valve



and said linear breathing air hose attachment to said regulator, and  
a flexible length of corrugated rubber hose communicating with said exhalation valve cover.

H806

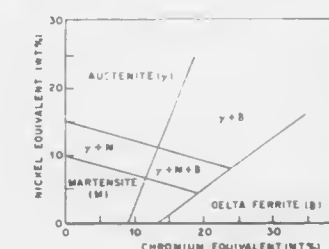
## HERBICIDAL CLOMAZONE COMPOSITIONS AND METHODS OF USE TOLERANT TO CORN AND OTHER CROPS

David W. Keifer, Skillman; John M. Tymonko, Hamilton Square; Earl D. Felix, Trenton, and William A. Van Saun, Titusville, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jul. 16, 1987, Ser. No. 74,383  
Int. Cl. 5 A01N 43/00

U.S. Cl. 71—88

5 Claims



1. A method of controlling undesirable vegetation in the locus of a gramineous crop while minimizing injury to the crop, which comprises applying, to seed of the crop or the locus thereof an antodotally effective amount of a safener against injury from the clomazone, and applying to the locus of the crop a herbicidally effective amount of clomazone.

H807

## MANGANESE-STABILIZED AUSTENITIC STAINLESS STEELS FOR FUSION APPLICATIONS

Ronald L. Klueh, Knoxville, and Philip J. Maziasz, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 16, 1988, Ser. No. 272,035  
Int. Cl. 5 C22C 38/38

U.S. Cl. 420—57

6 Claims

1. A composition of matter of austenitic stainless steel consisting essentially of iron, chromium and a sufficient amount of manganese and carbon to form a face centered cubic austenitic crystalline structure.

## H808

**REMOVAL OF I, RN, XE AND KR FROM OFF GAS STREAMS USING PTFE MEMBRANES**  
Darryl D. Siemer, and Leroy C. Lewis, both of Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Oct. 12, 1988, Ser. No. 256,812  
Int. Cl.<sup>3</sup> B01D 53/36; C01B 23/00

U.S. Cl. 423—262

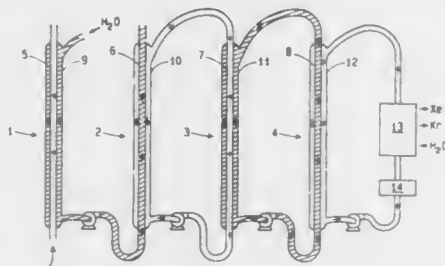
9 Claims

1. A process for separating gaseous elements including iodine, xenon, krypton, and radon from a gaseous effluent in the presence of oxides of nitrogen comprising:

passing said gaseous effluent across a gas-permeable membrane into an aqueous flow to transfer said elements and said oxides of nitrogen into said aqueous flow;

passing said aqueous flow across a second gas-permeable membrane against a flow of a first extractant gas to selectively transfer the gaseous elements to said first extractant gas;

flowing said first extractant gas with the transferred gaseous elements across a third gas-permeable membrane into a



flow of reductant solution to transfer said gaseous elements and to convert iodine to an iodide; flowing said reductant solution with said gaseous elements and said iodide across a fourth gas-permeable membrane into a second extractant gas to transfer xenon, radon, and krypton into said second extractant gas; and cryogenically separating said xenon, radon, and krypton from said second extractant gas.

## H809

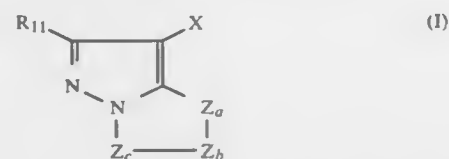
**METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL**  
Kazuto Andoh, Takatoshi Ishikawa, Hiroshi Fujimoto, and Morio Yagihara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan  
Filed Jan. 23, 1989, Ser. No. 299,487

Claims priority, application Japan, Jan. 21, 1988, 63-11294  
Int. Cl.<sup>3</sup> G03C 7/46, 5/18, 5/26, 1/08

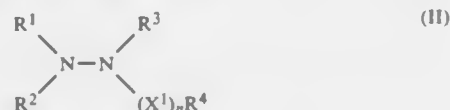
U.S. Cl. 430—386

8 Claims

1. A method for processing a silver halide color photographic material containing at least one pyrazoloazole magenta coupler represented by general formula (I), which comprises processing the light-sensitive material, after imagewise exposure, with a color developer containing an aromatic primary amine color developing agent and at least one member selected from among hydrazines and hydrazides represented by general formula (II):



wherein  $R_{11}$  represents a hydrogen atom or a substituent, X represents a hydrogen atom or a group capable of being eliminated by a coupling reaction with an oxidation product of an aromatic primary amine developing agent,  $Z_a$ ,  $Z_b$  and  $Z_c$  each represents a methine group, a substituted methine group,  $=N-$  or  $-NH-$ , provided that one of the  $Z_a$ - $Z_b$  bond and the  $Z_b$ - $Z_c$  bond is a double bond and the other is a single bond and, when  $Z_b$ - $Z_c$  is a carbon-to-carbon double bond, it may be a part of an aromatic ring, and a dimer or higher polymer may be formed at  $R_{11}$  or X, or, when  $Z_a$ ,  $Z_b$  or  $Z_c$  represents a substituted methine group, a dimer or higher polymer may be formed at the substituted methine group;



wherein  $R^1$ ,  $R^2$  and  $R^3$  each independently represents a hydrogen atom, an alkyl group, an aryl group or a heterocyclic group,  $R^4$  represents a hydrogen atom, a hydroxy group, a hydrazino group, an alkyl group, an aryl group, a heterocyclic group, an alkoxy group, an aryloxy group, a carbamoyl group or an amino group,  $X^1$  represents a divalent group, and n represents 0 or 1, provided that, when n is 0,  $R^4$  represents an alkyl group, an aryl group or a heterocyclic group, and that  $R^3$  and  $R^4$  may together form a heterocyclic ring.

## H810

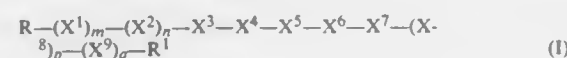
**BIOLOGICALLY ACTIVE AMIDES**  
Samuel Wilkinson, 12 Bevington Road, Beckenham, Kent, England  
Continuation of Ser. No. 815,774, Jul. 14, 1977, which is a continuation-in-part of Ser. No. 762,529, Jan. 26, 1977, abandoned. This application Feb. 1, 1988, Ser. No. 148,159  
Claims priority, application United Kingdom, Jan. 26, 1976, 02900/76

Int. Cl.<sup>3</sup> A61K 37/02; C07K 7/2

U.S. Cl. 514—15

8 Claims

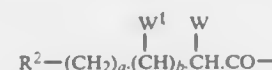
1. A peptide of formula (I):



or a salt, ester, amide, N-alkylamide or N,N-dialkylamide thereof, or an acid addition salt thereof, wherein

$X^1$  and  $X^2$  are the same or different and each is the radical of a basic amino acid (D or L);

$X^3$  is a D or L radical having the formula:



wherein  $R^2$  is phenyl or 1,4-cyclohexadien-1-yl, a is 0, 1 or 2, b is 0 or 1, one of  $W^1$  and  $W^2$  is a group  $-NR^3$  and the other is hydrogen, provided that  $W^1$  is always  $-NR^3$ —when b is 0 and that when  $R^2$  is 1,4-cyclohexadien-1-yl a is always 1 and b is always 0, where  $R^3$  is hydrogen or a group selected from alkyl, alkenyl, alkynyl, carboxyalkyl, carboxyalkenyl and carboxyalkynyl, and where  $R^2$  is optionally substituted by one or more groups each selected from hydroxy, alkoxy, alkanoyloxy, alkyl, nitro, trifluoromethyl, amino, N-alkylamino, halogen, N,N-dialkylamino and benzyloxy wherein the phenyl ring is optionally substituted by one or more groups each selected from hydroxy, alkoxy, alkanoyloxy, halogen, alkyl, nitro, trifluoromethyl, amino, N-alkylamino and N,N-dialkylamino;

$X^4$  and  $X^5$  are the same or different and each is glycyl or a D or L radical selected from C-propargylglycyl, alanyl,  $\alpha$ -alkyl alanyl,  $\beta$ -alanyl, valyl, norvalyl, leucyl, isoleucyl, norleucyl, prolyl, hydroxyprolyl, tryptophyl, asparagyl and glutamyl, where each of said radicals is optionally  $N^2$ -substituted with an alkyl group;

$X^6$  is selected from glycyl, a D or L radical selected from methionyl, leucyl, isoleucyl, norleucyl, valyl, norvalyl, prolyl, hydroxyprolyl, alanyl and histidyl, and the values recited hereinabove for  $X^3$ ;

$X^7$  is a D or L radical selected from seryl, homoseryl, O-alkyl seryl, O-alkyl homoseryl, threonyl, O-alkyl threonyl, methionyl sulphoxide, methionyl sulphone,  $\beta$ -homovalyl, homoleucyl,  $\beta$ -homoleucyl, S-methyl-homocysteinyl, homomethionyl, B-homomethionyl and the values recited hereinabove for  $X^6$ ;

$X^8$  is selected from the radical of a basic amino acid (D or L) and a D or L radical selected from seryl, threonyl, phenylalanyl and tyrosyl;

$X^9$  is selected from glycyl, the radical of a basic amino acid (D or L), and a D or L radical selected from seryl and threonyl;

R is selected from hydrogen, aralkyl, alkyl, alkenyl, alkynyl, carboxyalkyl, carboxyalkenyl and carboxyalkynyl;

$R^1$  represents the hydroxyl of the 1-carboxyl group of the C-terminal amino acid residue or a group, replacing said 1-carboxyl group, selected from  $-CH_2OR^4$ , where  $R^4$  is hydrogen or alkanoyl, and Tetrazolyl optionally substituted in the 1- or 2-position with a group selected from alkyl and benzyl; and

m, n, p and q are each selected from 0 and 1, except for the peptides of the formula:



and their salts, esters, amides, N-alkylamides and N,N-dialkylamides and acid addition salts thereof, wherein  $X^7$  is selected from L-leucyl and L-methionyl and either  $X^3$  is selected from L-tyrosyl and L-3,5-diiodotyrosyl and  $X^6$  is L-phenylalanyl, or  $X^3$  is L-tyrosyl and  $X^6$  is L-4-chlorophenylalanyl.

## H811

**BIOCIDAL COMPOSITION**  
Rikuo Nasu, Kyoto; Terumasa Komyoji, Shiga; Toshio Nakajima, Shiga; Kazumi Suzuki, Shiga; Keiichi Ito, Shiga; Tekeshi Ohshima, Shiga, and Hideshi Yoshimura, Osaka, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan  
Filed Mar. 13, 1989, Ser. No. 322,460

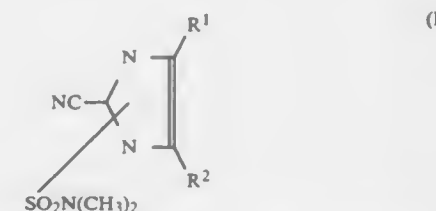
Claims priority, application Japan, Mar. 11, 1988, 63-57920; Sep. 13, 1988, 63-229327

Int. Cl.<sup>3</sup> A01N 43/48, 41/02, 33/10

U.S. Cl. 514—92

3 Claims

1. A biocidal composition containing, as active ingredients, at least one imidazole compound represented by formula (I):



wherein  $R^1$  represents a phenyl group, a halogen-substituted phenyl group, an alkyl group, or a halogen-substituted alkyl group; and  $R^2$  represents a halogen atom, and at least one compound selected from the group consisting ofazole compounds, quinoxaline compounds, dithiocarbamate compounds, organic chlorine compounds, benzimidazole compounds, pyridinamine compounds, cyanoacetamide compounds, phenylamide compounds, sulfenic acid compounds, copper compounds, isoxazole compounds, organophosphorus compounds, N-halogenothioalkyl compounds, dicarboximide compounds, benzamide compounds, benzamide compounds, piperazine compounds, pyridine compounds, pyrimidine compounds, piperidine compounds, morpholine compounds, organotin compounds, urea compounds, cinnamic acid compounds, carbamate compounds, pyrethroid compounds, benzoylurea compounds, thiazolidine compounds, thiadiazine compounds, nereistoxin derivatives, pyridazinone compounds, and spores of *Bacillus thuringiensis* and crystalline toxin produced thereby.

## H812

**REINFORCED POLYMER**  
Eric R. George, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.  
Continuation-in-part of Ser. No. 137,800, Dec. 24, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 289,155  
Int. Cl.<sup>3</sup> C08K 3/34

U.S. Cl. 524—444

10 Claims

1. A polymeric composition comprising a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon and an amount of ceramic fiber reinforcement wherein the fibers have an average diameter from about 1 micron to about 10 microns and a length of about 0.35 mm to about 15 mm.

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## REISSUES

AUGUST 7, 1990

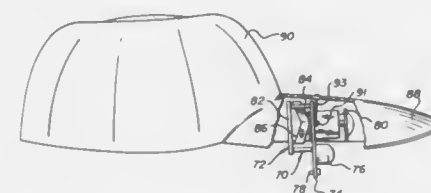
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,286

## PERSONAL AIR CONDITIONER

William A. Waters, 3648 E. 49th St., Tulsa, Okla. 74135  
Original No. 4,238,857, dated Dec. 16, 1980, Ser. No. 944,857,  
Sep. 22, 1978. Division of Ser. No. 563,066, Mar. 28, 1975,  
Pat. No. 4,141,083, which is a continuation-in-part of Ser. No.  
387,956, Aug. 13, 1974, Pat. No. 3,881,198. Application for  
reissue Feb. 14, 1989, Ser. No. 324,095  
Int. Cl.<sup>5</sup> A42C 5/04

U.S. Cl. 2—171.3



23. A self-contained air conditioning unit for use in the cooling or warming of persons and adapted to be secured to a head band and comprising:  
an electric motor secured to the head band without alteration of the configuration of the head band;  
a fan operably connected with the motor and rotatable thereby for moving air;  
a battery provided on the head band and operably connected with the motor for actuation thereof; and  
a switch secured to the head band and operably connected between the battery and motor for controlling the actuation of the motor.

Re. 33,287

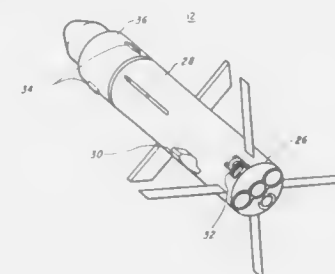
## CARRIER TRACKING SYSTEM

John B. Allen, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.  
Original No. 4,666,103, dated May 19, 1987, Ser. No. 118,164, Feb. 4, 1980. Application for reissue May 19, 1989, Ser. No. 355,741

Int. Cl.<sup>5</sup> F41G 7/30

U.S. Cl. 244—3.11

51 Claims



14. A carrier tracking method for detecting, tracking, and guiding a missile having a beacon thereon comprising:  
(a) establishing an image of a first selected scene including only clutter;  
(b) establishing the peaks of a second scene including clutter and the beacon;  
(c) eliminating the peaks in both scenes which correspond to each other;

(d) if more than one peak remains, selectively activating a blanking means to remove the peak produced by the beacon;  
(e) identifying as clutter any remaining peaks in the scene; and  
(f) activating the blanking means to return the beacon to the scene.

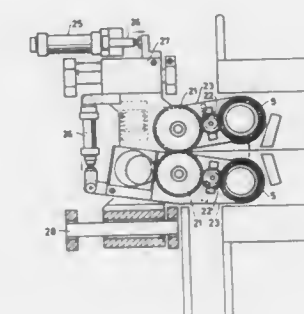
Re. 33,288

## AUTOMATIC LAMINATOR

Toshio Obayashi, Tokyo, Japan, assignor to Somar Corporation, Japan  
Original No. 4,585,509, dated Apr. 29, 1986, Ser. No. 655,840, Sep. 28, 1984. Application for reissue Apr. 26, 1988, Ser. No. 186,408  
Claims priority, application Japan, Sep. 29, 1983, 58-179275  
Int. Cl.<sup>5</sup> B32B 31/10

U.S. Cl. 156—497

19 Claims



10. An automatic laminator for depositing a web onto a base panel, comprising:  
rotatable rolls disposed on either side of said base panel;  
means for supporting said rolls and for translating said rolls both horizontally and vertically with respect to said base panel to allow said rolls to clamp said base panel and a leading end of said web;  
means for driving said rolls to press-seal said web to said base panel; and  
said supporting means including means for removing said rolls from said base panel upon completion of said press sealing operation.

Re. 33,289

## TRANSPARENT MEMBRANE STRUCTURES

Frank J. Modic, Scotia, N.Y., assignor to General Electric Company, Waterford, N.Y.  
Original No. 4,472,470, dated Sep. 18, 1984, Ser. No. 511,705, Jul. 7, 1983. Application for reissue Aug. 4, 1986, Ser. No. 367,127

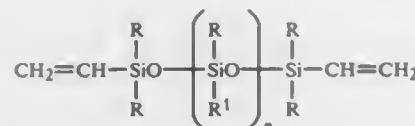
Int. Cl.<sup>5</sup> B32B 5/02

U.S. Cl. 428—145

42 Claims

1. A roofing fabric membrane structure composition comprising:  
(a) a base fabric material,  
(b) a base coating composition, applied to at least one surface of said base fabric material and  
(c) a silicone coating composition applied to at least one surface of said base fabric material already having thereon said base coating composition which is resistant to dirt pickup comprising:  
(i) a liquid vinyl chainstopped polysiloxane having the formula,





where R and R<sup>1</sup> are monovalent hydrocarbon radicals free of aliphatic unsaturation with at least 50 mole percent of the R<sup>1</sup> groups being methyl, and where n has a value sufficient to provide a viscosity up to about 1,000 centipoise at 25° C.;

- (ii) a resinous organopolysiloxane copolymer comprising:
- (R<sup>2</sup>)<sub>3</sub>SiO<sub>0.5</sub> units and SiO<sub>2</sub> units,
  - (R<sup>3</sup>)<sub>3</sub>SiO<sub>0.5</sub> units, (R<sup>3</sup>)<sub>2</sub>SiO units and SiO<sub>2</sub> units, or
  - mixtures thereof, where R<sup>2</sup> and R<sup>3</sup> are selected from the group consisting of vinyl radicals and monovalent hydrocarbon radicals free of aliphatic unsaturation, where from about 1.5 to about 10 mole percent of the silicon atoms contain silicon-bonded vinyl groups, where the ratio of monofunctional units to tetrafunctional units is from about 0.5:1 to about 1:1, and the [ratios of] difunctional units [to tetrafunctional units ranges up to about 0.1:1;] can be present in an amount of up to about 10 mole percent based on the total number of moles of siloxane units in the copolymer;
  - a platinum or platinum containing catalyst; and
  - a liquid organohydrogenpolysiloxane having the formula,



sufficient to provide from about 0.5 to about 1.0 silicon-bonded hydrogen atoms per silicon-bonded vinyl group, R is a monovalent hydrocarbon radical free of aliphatic unsaturation, a has a value of from about 1.0 to about 2.1, b has a value of from about 0.1 to about 1.0, and the sum of a and b is from about 2.0 to about 2.7, there being at least two silicon-bonded hydrogen atoms per molecule.

Re. 33,290

#### RIGID POLYURETHANE FOAM AND PROCESS FOR PRODUCING THE SAME

Reishi Naka, and Kazuyoshi Kuroishi, both of Ohiramaichi, Japan, assigns to Hitachi, Ltd., Tokyo, Japan  
Original No. 4,742,089, dated May 3, 1988, Ser. No. 84,216, Aug. 12, 1987. Application for reissue Jan. 19, 1989, Ser. No. 298,760

Claims priority, application Japan, May 27, 1987, 62-128141; Jul. 31, 1987, 62-189991

Int. Cl.<sup>5</sup> C08G 18/30

U.S. Cl. 521—110

14 Claims

1. A process for producing a rigid polyurethane foam which comprises reacting a polyol component with an isocyanate component in the presence of a blowing agent, a reaction catalyst and a foam stabilizer, said polyol component being a mixed polyol composition comprising

- 48 to 52% by weight of a polyol obtained by adding propylene oxide and ethylene oxide to tolylenediamine,
- 10 to 40% by weight of a polyol obtained by adding ethylene oxide to bisphenol,
- 13 to 17% by weight of a polyol obtained by adding propylene oxide to trimethylolpropane,
- 9 to 13% by weight of a polyol obtained by adding propylene oxide to sucrose, and
- 10 to 14% by weight of a polyol obtained by adding propylene oxide and ethylene oxide to diethanolamine, said mixed polyol composition having an average OH value of 440 to 470.

Re. 33,291

#### PROCESS FOR THE PREPARATION OF WHITE GRAFT POLYMER DISPERSIONS AND FLAME-RETARDANT POLYURETHANE FOAMS

Gerhard G. Ramlow, Montreal, Canada; Duane A. Heyman, Monroe, Mich.; Oscar M. Grace, Madison Heights, Mich.; Curtis J. Reichel, Wyandotte, Mich., and Robert J. Hartman, Southgate, Mich., assigns to BASF Corporation, Parsippany, N.J.

Original No. 44,454,255, dated Jun. 12, 1984, Ser. No. 364,336, Apr. 1, 1982. Application for reissue May 3, 1985, Ser. No. 730,085

Int. Cl.<sup>5</sup> C08L 75/00

U.S. Cl. 521—137

43 Claims

4. A white stable, low viscosity graft polymer dispersion comprising [a polymerized] from about 25 to 60 weight percent based on the total weight of the polymer dispersion of an ethylenically unsaturated monomer or mixture of monomers polymerized *in situ* in a polyol mixture initially containing from 0.001 to 0.09 mole of induced unsaturation per mole of said mixture.

Re. 33,292

#### PREPARATION OF METAL ALKYL

Donald C. Bradley, Middlesex; Halina Chudzynska, and Marc M. Faktor, both of London, all of England, assigns to The Secretary of State for Defense in Her Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, United Kingdom

Original No. 4,720,561, dated Jan. 19, 1988, Ser. No. 817,848, Mar. 26, 1985. Application for reissue Oct. 31, 1988, Ser. No. 264,866

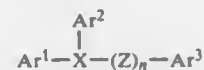
Claims priority, application United Kingdom, Mar. 26, 1984, 8407808; Dec. 7, 1984, 8430979

Int. Cl.<sup>5</sup> C07F 5/00, 5/06

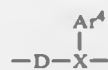
U.S. Cl. 556—1

7 Claims

1. A method of preparing a Group III metal alkyl which comprises (a) [combining a] forming an adduct of the metal alkyl [with a ligand to form an adduct of said alkyl with said ligand] and (b) heating the adduct to provide thermal dissociation thereof thereby releasing the Group III metal alkyl as a gaseous product, characterized in that the adduct formed is of formula (R<sub>3</sub>M)<sub>n</sub>L wherein R<sub>3</sub> represents three alkyl groups R which may be the same or different, M represents a Group III metallic element, L represents an aryl-containing Group V donor ligand provided by an organic Lewis base which is stable at 20° C. both the organic Lewis base and the ligand L are of general formula I



wherein Ar<sup>1</sup>, Ar<sup>2</sup> are aryl groups, X is a Group V atom and Ar<sup>3</sup> is an aryl group which may be the same or different to one or both of Ar<sup>1</sup> and Ar<sup>2</sup>, Z is



wherein D is an aromatic or aliphatic group and Ar<sup>4</sup> is an aryl group, n is an integer from 1 to 5 and y is an integer equal to or less than the number of Group V donor atoms present in the ligand.

Re. 33,293

#### READER-PRINTER

Masaaki Yanagi, Tokyo; Satoshi Ono, Yokohama; Takao Toda; Kazuo Kashiwagi, both of Tokyo; Makoto Endo, Yokohama, and Yoshihiro Saito, Tokyo, all of Japan, assigns to Canon Kabushiki Kaisha, Tokyo, Japan

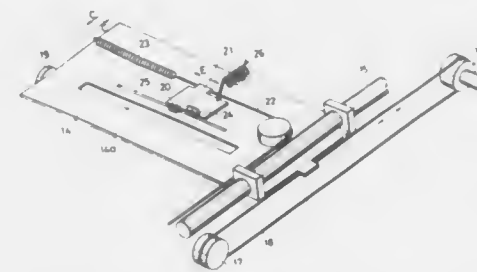
Original No. 4,589,767, dated May 20, 1986, Ser. No. 777,028, Sep. 17, 1985. Continuation of Ser. No. 483,122, Apr. 8, 1983, abandoned. Application for reissue May 19, 1988, Ser. No. 195,854

Claims priority, application Japan, Apr. 21, 1982, 57-58191(U); Apr. 22, 1982, 57-67651; Apr. 22, 1982, 57-67653; Apr. 23, 1982, 57-69118; Jul. 28, 1982, 57-72367

Int. Cl.<sup>5</sup> G03B 13/28

U.S. Cl. 355—45

19 Claims



11. A reader-printer capable of being changed over between a reader mode in which the image on a screen is observed and a printer mode in which the image is reproduced, said reader-printer comprising:

- a projection lens for [selectively imaging the] projecting an image of [an] the original on the screen or a photosensitive medium;
- [reflecting means statically located on a first position in the reader mode, and moved in a direction across the optical axis of said projection lens in the printer mode in order to scan the original;
- a photosensitive medium receiving the light reflected on said reflecting means and moving with a constant speed;]
- first reflecting means opposed to said projection lens and forming a reader optical path for guiding projection light through said projection lens to the screen;

second reflecting means being movable into or out of an optical path between said projection lens and said first reflecting means, said second reflecting means, in the reader mode, being placed in a first position which is out of the optical path between said projection lens and said first reflecting means, and in the printer mode, being located in a second position which is in the optical path between said projection lens and said first reflecting means, said second reflecting means when located in the second position forming a printer optical path for guiding the projected light through said projection lens to the photosensitive medium;

driving means moving said second reflecting means [in] said [direction, said] driving means first moving said second reflecting means toward [a] the second position and thereafter moving [it] said second reflecting means from the second position to [a third] the first position in the printer mode [], and the image being exposed on the photosensitive medium firing the movement of said reflecting means from the second position to the third position];

at least one light receiving element [on which the light from the original is not projected in the reader mode, and on which the light is projected by the movement of said reflecting means from the first to] for detecting the projection light through said projection lens, said at least one light receiving element being arranged in a position where said at least one light receiving element receives light, only when said second reflecting means is located in the second position; and

control means for [controlling the operation of said reader-printer on the basis of an output of light receiving element so that the proper reproduction image is formed] effecting control so that said at least one light receiving element may detect the projection light during the movement of said second reflecting means from the first position to the second position and so that a proper image may be formed on the photosensitive medium by a signal output from said at least one light receiving element during the movement of said second reflecting means from the second position to the first position.



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## PLANT PATENTS

GRANTED AUGUST 7, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,288

## ROSE PLANT — ROYPINPRO VARIETY

Elysee Roy, Deols, France, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed May 10, 1989, Ser. No. 349,857

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—18

1 Claim

1. A new and distinct variety of Grandiflora rose plant characterized by the following combination of characteristics:

- (a) forms in abundance attractive long lasting blossoms which are light salmon pink in coloration and which exhibit a pronounced fruity fragrance,
- (b) exhibits an upright growth habit which is well suited for cut flower production,
- (c) forms vigorous vegetation, and
- (d) exhibits good resistance to diseases;

substantially as herein shown and described.

7,289

## ROSE PLANT—MEIFRONY VARIETY

Alain A. Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed May 19, 1989, Ser. No. 354,281

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—18

1 Claim

1. A new and distinct variety of Hybrid Tea rose plant characterized by the following combination of characteristics:

- (a) forms elegant conical and elongated buds,
- (b) forms in abundance semi-double blossoms which are French rose in coloration and edged and suffused with neyron rose,
- (c) exhibits an upright growth habit,
- (d) forms vigorous vegetation,
- (e) is well adapted for greenhouse forcing,
- (f) exhibits good resistance to cryptogamic diseases;

substantially as herein shown and described.

7,290

## PEACH TREE "RICH LADY"

Chris F. Zaiger, 537 Rosemore Ave.; Gary N. Zaiger, 1907 Elm Ave.; Leith M. Gardner, 1207 Grimes Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351

Filed Apr. 24, 1989, Ser. No. 342,359

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—43

1 Claim

1. A new and distinct variety of peach tree, as illustrated and described, characterized by its large size, vigorous upright growth and a regular and productive bearer of large, yellow flesh, clingstone fruit with very good flavor and eating quality, the fruit is further characterized by having very firm flesh and maintaining good handling and shipping quality while being harvested near tree ripe, having an attractive red skin color and matures approximately 17 days earlier than its seed parent Amparo Peach (U.S. Plant Pat. No. 6,472).

7,291

## KALANCHOE PLANT NAMED LEMON DROP

Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Mar. 2, 1989, Ser. No. 318,058

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct cultivar of Kalanchoe plant named Lemon Drop, as illustrated and described.

7,292

## KALANCHOE PLANT NAMED SOMBRERO

Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Mar. 2, 1989, Ser. No. 318,180

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct cultivar of Kalanchoe plant named Sombrero, as illustrated and described.

7,293

## DISTINCT VARIETY OF POINSETTIA NAMED H-110-18 RED

Alexander Hrebeniuk, R.D. #1, Box 118, Sugar Run, Pa. 18846

Filed Apr. 17, 1989, Ser. No. 339,159

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct variety of Poinsettia plant as herein shown and described, particularly characterized by its double form, dark green leaves, dark red non-fading bracts, eight week response time, long lasting centers with continuing development of bracts after centers have dropped, long lasting under home ambient temperature, upright and compact growth habit with free branching.

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GRANTED AUG. 7, 1990

### ERRATA

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376-210	4,947,485

## PATENTS

GRANTED AUGUST 7, 1990

## GENERAL AND MECHANICAL

4,945,571

## LIQUID-CUSHIONED OUTERWEAR

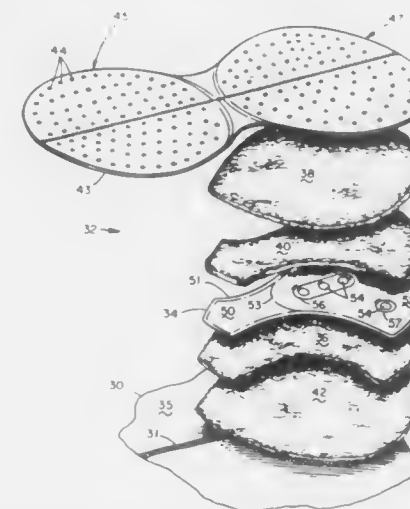
Nathaniel Calvert, Rochester, Minn., assignor to In Motion, Inc., Minneapolis, Minn.

Filed Sep. 26, 1988, Ser. No. 249,334

Int. Cl.<sup>3</sup> A41D 1/08, 19/00

U.S. Cl. 2—2

15 Claims



1. Clothing articles including a cushion secured to said clothing in a region intermediate a pressure contact point between the body of the wearer and an object contacting the clothing, wherein said cushion comprises:

- first and second liquid impermeable layers sealed to one another and filled with a viscous liquid to define a liquid filled chamber;
- third and fourth fabric layers covering and slideably mounting over said first and second layers;
- fifth and sixth absorbent layers covering said third and fourth layers; and
- wherein said third, fourth, fifth and sixth layers are sewn to said first and second layers in the region of a seal between said first and second layers.

4,945,572

## WELDING HELMET

Bernard Rosen, 7 Garden Ave. Brighton, Victoria 3186, Australia

PCT No. PCT/AU87/00422, § 371 Date Oct. 3, 1988, § 102(e)

Date Oct. 3, 1988, PCT Pub. No. WO88/05030, PCT Pub.

Date Aug. 25, 1988

PCT Filed Dec. 14, 1987, Ser. No. 279,667

Claims priority, application Australia, Feb. 12, 1987, P10308

Int. Cl.<sup>3</sup> A61F 9/06

U.S. Cl. 2—8

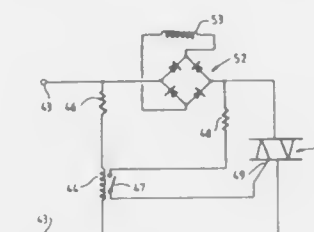
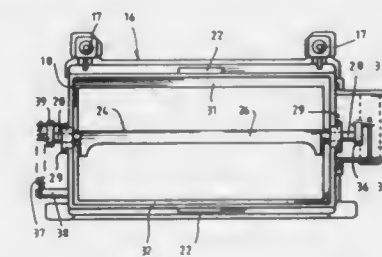
17 Claims

- A welding mask, comprising:
  - a face shield having a viewing opening therein;
  - a filter lens pivotally mounted relative to said face shield adjacent to said viewing opening;
  - solenoid means for moving said filter lens from a closed position to an open position;
  - pivoting means coupled to said solenoid means for pivoting said filter lens about an axis which passes either through the center of said filter lens or adjacent thereof;
  - restoring means for restoring said filter lens to the closed position;
  - electrical control means for controlling said solenoid means, said electrical control means including:

electrode voltage sensing means for sensing an electrode voltage on an electric arc welder;

circuit means responsive to a sensed electrode voltage for operating said solenoid means when the sensed electrode voltage rises above a predetermined maximum value, and for deactivating said solenoid means when the sensed electrode voltage falls below a predetermined minimum value for enabling said restoring means to move said filter lens from said open position to said closed position;

voltage input terminal means for connecting to a welder



electrode and the work for receiving the voltage therebetween;

a reed switch and a reed switch coil associated therewith, said reed switch being held in a closed position when a voltage across said reed switch coil is above said predetermined maximum value;

a triac having a gate which is connected in a circuit with said reed switch and which is held on while said reed switch is closed to energize said solenoid means through a bridge rectifier, said reed switch open-circuiting said triac gate when said electrode voltage falls below said predetermined minimum value.

4,945,573

## VISOR AND SHIELD ATTACHED TO EYEGLASSES

Timothy J. Landis, 2006 McLaren Dr., Roseville, Calif. 95661-4945

Filed Jul. 1, 1988, Ser. No. 214,437

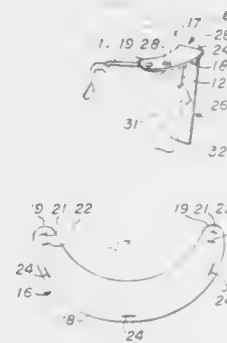
Int. Cl.<sup>3</sup> A61F 9/04

U.S. Cl. 2—9

3 Claims

- A face mask comprising an integral visor, said visor being formed of an initially flat resilient, flexible sheet of rubber-like material bent to assume a visor shape when said visor is attached to the eyeglasses of a user, means for attaching said visor to eyeglasses worn by the user, said visor being formed with an inner edge shaped to fit against the forehead of the user and a curved outer edge, said visor being substantially horizontal when in position of use, said visor being formed with a plurality of spaced slits through said visor spaced along said outer edge, and a removable shield formed of a sheet of flexible plastic transparent over at least a substantial portion of its area,

said shield having an upper edge formed with projections, said shield and said projections being formed together as a one piece structure, said projections dimensioned to be resiliently forced through said slits and preventing unintentional detach-



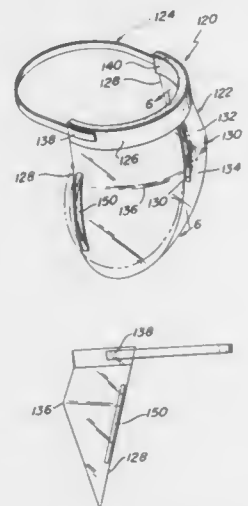
ment of said shield from said visor, so that said shield is supported by said visor extending substantially vertically, said shield being shaped and dimensioned to extend down and around the face of the user to protect the eyes, nose and mouth from contamination.

#### 4,945,574 PROTECTIVE MASK

F. Joseph Dagher, St. Petersburg, Fla., assignor to DHL Research and Development Corporation, Philadelphia, Pa.  
Continuation-in-part of Ser. No. 153,858, Feb. 9, 1988, abandoned. This application Mar. 2, 1989, Ser. No. 318,048  
Int. Cl.<sup>3</sup> A61F 9/04

U.S. Cl. 2-9

8 Claims



1. A protective mask for use by a person, said mask comprising mount means for securing said mask onto the head of said person, imperforate shield means supported by said mounting means and disposed therebelow, said shield means being formed of a transparent material and being of a sufficient width and height to cover substantially the entire face of said person, said width being defined between opposed side edges, said shield means including an anteriorly protruding portion, said protruding portion including an outwardly flaring upper portion and a downwardly flaring lower portion, and form adjusting means for adjusting and maintaining the contour of said shield means, said form adjusting means comprising elongate strips of malleable, form-retaining material, each of said strips secured adjacent a different one of said opposed side edges of said shield means and bridging said outwardly flaring upper portion and said downwardly flaring lower portion.

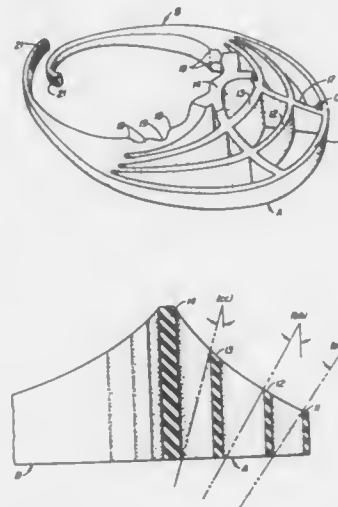
#### 4,945,575 SUN VISOR

Charles E. Townsend, One Market Plaza, 20th Floor, San Francisco, Calif. 94105

Filed Sep. 15, 1988, Ser. No. 244,873  
Int. Cl.<sup>3</sup> A42B 1/18

U.S. Cl. 2-12

12 Claims



1. An improved sun visor comprising an outwardly projecting bill portion, said bill portion comprising a plurality of curvilinear substantially vertically disposed ribbon-like louvers symmetrically arranged and spaced from one another and including an outer louver, at least one intermediate louver, and in inner louver, said outer, intermediate and inner louvers having graduated predetermined vertical heights with the outer louver being the lowest in vertical elevation, the innermost louver, being the highest in elevation, and the intermediate louver being higher in vertical elevation than the outer louver and less in vertical elevation than the intermediate louver, the inner louver adjacent its center front portion being at least 20% greater in height than the height of the outer louver adjacent its center front portion, the relative heights and maximum spacing between the louvers being predetermined and arranged to provide overhead light cut-off angles to shield the wearer's eyes from direct rays of the sun, and means to attach the visor to a wearer's head with the bill projecting outwardly from the wearer's forehead above eye level.

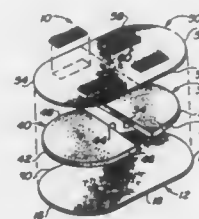
#### 4,945,576 SHOULDER PAD AND BRASSIERE STRAP CUSHION APPARATUS

Ardella R. Melton, 1647 W. Pima, Phoenix, Ariz. 85007

Filed Aug. 14, 1989, Ser. No. 393,273  
Int. Cl.<sup>3</sup> A41D 27/26

U.S. Cl. 2-268

8 Claims



1. Shoulder pad and bra strap cushion apparatus, comprising, in combination:  
outer layer means including a first half portion and second half portion, including a pair of spaced apart side edges

and a pair of spaced apart and generally rounded outer edges extending between the side edges;  
inner layer means having substantially the same configuration and dimensions as the outer layer and including a first half portion and a second half portion, the outer layer means and inner layer means adapted to be folded in half to align the first and second half portions in vertical alignment with the rounded outer edges aligned and disposed against each other and the fold defining a generally straight line;  
cushion means disposed between the outer and inner layer means; and  
fastening means secured to the inner layer means for securing together the first and second half portions in their vertical alignment and to secure the bra strap between the first and second half portions, with the rounded outer edges adapted to be disposed towards a user's neck and the fold adapted to be disposed towards the user's shoulder to comprise a shoulder pad and a bra strap cushion.

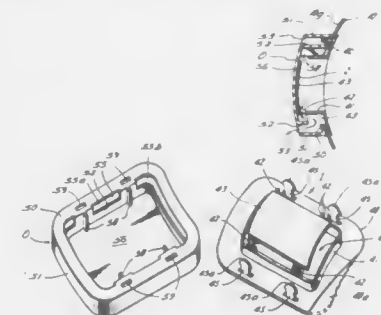
#### 4,945,577 VENTILATED SPLASH GOGGLE

Charles D. Hewitt, Houston, Tex., and Paul B. Specht, Wilmette, Ill., assignors to Encon Safety Products, Inc., Houston, Tex.

Filed Jun. 7, 1984, Ser. No. 618,233  
Int. Cl.<sup>3</sup> A61F 9/02

U.S. Cl. 2-437

16 Claims



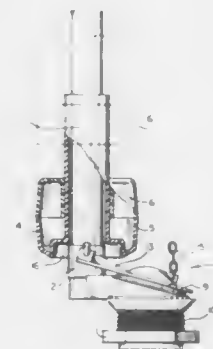
1. A protective goggle for protecting the eye area of the wearer which comprises:  
a goggle frame having front lens mounting means and a rear edge adapted to conform to the wearer's facial contour and means to hold the goggle frame to the wearer's face enclosing the wearer's eye area;  
a goggle lens mounted by said front lens mounting means with said goggle frame; and  
vent means mounted with said goggle frame to allow the circulation of air into and out of the interior of the goggle while inhibiting the entry of liquids into the goggle including an inner element for extending through a frame opening in the goggle frame and an outer element for mounting over said inner element, said inner and outer elements cooperating to provide attachment means for mounting said inner and outer elements together with said opening in said frame, said outer element including a continuous exterior wall to prevent the entry of fluid in a direction against said exterior wall and further including an interior wall cooperating with said exterior wall to provide a continuous channel behind said exterior wall, said inner and outer elements cooperating to provide means to prevent the further passage of splash fluid from said continuous channel into the interior of said goggle while allowing for the circulation of air into said goggle.

#### 4,945,578 TOILET FLUSH CONTROL DEVICE

Mohamed A. Jomha, 8815 - 163 Street, Edmonton, Alberta, Canada; Andrew Lazowski, deceased, late of Edmonton, Alberta, Canada (T5A 2Y1); by Greg C. Empson, administrator, #1800 Sun Life Place 10123 - 99th Street, Edmonton, Alberta, Canada, and by Jose Vieira, administrator, 137 Homestead Crescent, Edmonton, Alberta, Canada (T5A 2Y1)  
Filed Mar. 7, 1988, Ser. No. 164,853  
Int. Cl.<sup>3</sup> E03D 1/33

U.S. Cl. 4-391

4 Claims



1. A flush control device for a toilet tank of the type containing a standpipe and a flap valve pivotal on the standpipe for closing an outlet in the bottom of the tank, the outlet being connected to the toilet bowl; said device comprising adjustable buoyancy float means for movement on said standpipe between a valve closing position against the flap valve and a position in which the valve is open and clear of said float means, the buoyancy of said float means, and hence whether it floats higher or lower in the water, determining the water level at which the flap valve closes said outlet, whereby the quantity of water discharged through said outlet can be controlled, said float means comprising sleeve means for slidably mounting on the standpipe, and annular body means on said sleeve means for altering the effective buoyancy of the float means and hence the level at which the float means floats in the water, said body means including a bottom portion fixedly mounted on said sleeve means and a top portion slidably mounted on said sleeve means toward and away from said body portion, said bottom and top portions being substantially cup-shaped, the top cup-shaped portion opening downwardly and the bottom cup-shaped portion opening upwardly, the two cup-shaped portions including matable surfaces such that the two cup-shaped portions can be closed together to form a closed hollow flotation chamber of maximum buoyancy, and moved apart to form a less buoyant body wherein the bottom, upwardly opening, cup-shaped portion is filled with water and the float means floats lower in the water as the separation between said cup-shaped portions is increased.

#### 4,945,579 DRAIN VALVE ACTIVATOR ASSEMBLY

Thomas J. Husting, Sheboygan Falls, Wis., assignor to Kohler Company

Filed Mar. 30, 1989, Ser. No. 330,838  
Int. Cl.<sup>3</sup> E03C 1/22, 1/232

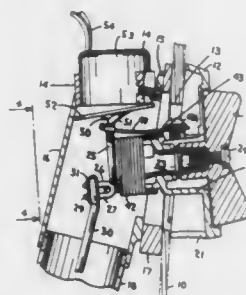
U.S. Cl. 4-203

7 Claims

1. A drain valve activator assembly for a bath tub or the like having a drain outlet, said drain outlet including a valve and operating linkage, the assembly comprising:  
a housing mountable adjacent a wall of the tub or the like; a stem positionable in said housing so as to be able to rotate about its own longitudinal axis, and so as to have an end extending outside of the tub or the like; a solenoid;

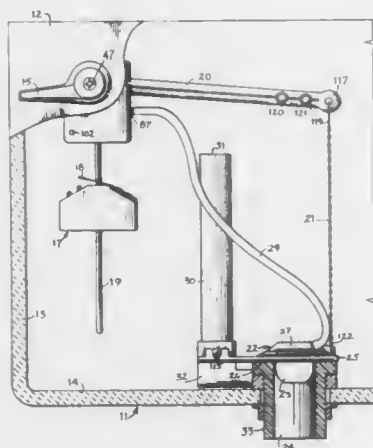


a holding member movable in response to solenoid activation away from said stem; means for moving said holding member towards said stem; the holding member and a portion of said outside stem end being configured so as to be able to interfit with each other, and inhibit stem rotation when they do interfit, wherein the stem may be manually moved to release the holding member, notwithstanding any interfitting of the holding member with the stem;



resilient means coupled to said stem that is tensioned by rotation of the stem along its longitudinal axis in one direction, and that drives stem rotation in the opposite direction in at least some circumstances when the interfitting is not occurring; and actuator linkage connected to the stem and movable in response to the rotation of the stem and connectable to the operating linkage to open and close the valve.

**4,945,580**  
**VOLUME-SELECTIVE WATER CLOSET FLUSHING SYSTEM**  
Marvin M. Schmitt, 2 N. 42nd Ave., Yakima, Wash. 98907, and Richard Sela, 801 Terrace Ht. Dr., Yakima, Wash. 98901  
Filed May 9, 1989, Ser. No. 349,054  
Int. Cl.<sup>5</sup> E03D 1/14  
U.S. Cl. 4—325 9 Claims

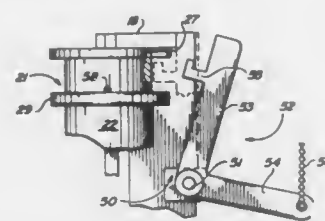
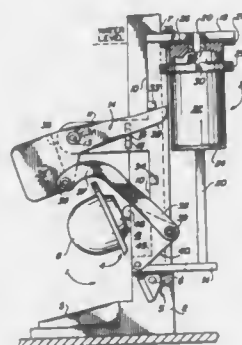


1. In a water closet comprising a toilet bowl and a water supply tank located at a level higher than the toilet bowl, the tank having vertical walls, a bottom and an openable top, and having conventional water filling means, an outlet opening through the tank bottom, and an outlet closure with an integral buoyancy chamber, an apparatus for accomplishing selectively either a discharge to the toilet bowl of substantially all the water in the tank, or a reduced discharge of a pre-selected volume of water, the reduced discharge being accomplished by venting the outlet closure buoyancy chamber at a selectively pre-determined time in the flush cycle, thereby causing the outlet closure to fall and to close the outlet opening before substantially all of the water has been discharged from the

tank, wherein the apparatus for accomplishing selectively either a full flush, or a partial flush using a preselected volume of water comprises:

- an air bleed passageway from the outlet closure buoyancy chamber to the toilet water tank, the passageway being closed in two locations relative to the water tank when the water closet is not in a flushing cycle;
- a first means selectable at the beginning of a flush cycle to select whether the air bleed passageway will remain open at the first location for a full flush or will be opened for a partial flush;
- a second means to open the air bleed passageway at the second location at a pre-determined time during any flushing cycle;
- an externally mounted operating handle mounted on said tank and including means connected to said outlet closure, said handle being; rotatable in one direction for actuating said closure to produce a full discharge of water into the toilet bowl, and rotatable in the opposite direction for actuating said closure to produce a partial discharge of water into the tank; and
- said means being operable by the operating handle to lift the outlet closure above the outlet opening when the operating handle is moved in either direction.

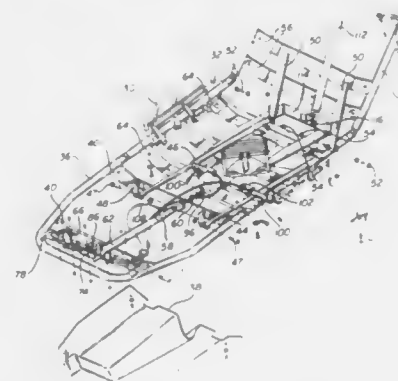
**4,945,581**  
**FLUSH TANK WATER SAVER**  
John L. Harris, 470 Palm Island NE., Clearwater, Fla. 34630  
Continuation of Ser. No. 30,080, Mar. 26, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,263  
Int. Cl.<sup>5</sup> E03D 1/14  
U.S. Cl. 4—325 19 Claims



1. A water saver control for a toilet flush tank having an outlet, an overflow pipe means, a flapper valve mounted on pivots on the overflow pipe means and an externally operated flush lever connected to the flapper valve for opening same on upward movement of the flush lever to flushing position, the combination of, a float adjacent the overflow pipe means in an area spaced laterally from that occupied by the major portion of the flapper valve, said float being located vertically so as to be operative to close the flapper valve at an intermediate water

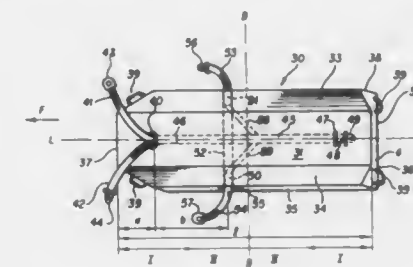
level in the tank, guide means for the float supported by the overflow pipe means, said guide means being constructed and arranged to allow up and down movement of the float substantially parallel with the overflow pipe means, pivotally mounted operating means for the flapper valve, said operating means having a float engaging portion and a flapper valve engaging portion, said operating means being constructed and arranged to cause movement of the flapper valve toward closed position on downward movement of the float.

**4,945,582**  
**PATIENT TRANSPORT APPARATUS INCLUDING INDEPENDENTLY OR SIMULTANEOUSLY OPERABLE LEG AND BACKREST PORTIONS**  
Eugene Hayton, Medina; Raymond A. Failor, Seville, and Dan Singleton, Wadsworth, all of Ohio, assignors to Hausted, Inc., Medina, Ohio  
Continuation-in-part of Ser. No. 166,675, Mar. 11, 1988, Pat. No. 4,858,260. This application May 10, 1989, Ser. No. 349,696  
Int. Cl.<sup>5</sup> A61G 7/06  
U.S. Cl. 5—67 21 Claims



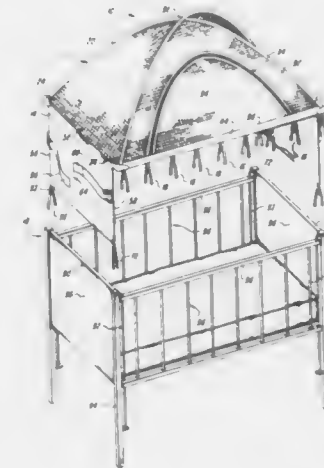
1. A patient support apparatus comprising:  
a seat assembly;  
a backrest assembly pivotally secured to said seat assembly;  
a leg supporting assembly pivotally secured to said seat assembly, said leg supporting assembly including an upper end and a lower end;  
first and second pivot members supported by said leg supporting assembly;  
first linkage means connecting said backrest assembly and said leg supporting assembly, one of said first and second pivot members being positioned nearer said upper end of said leg supporting assembly than the other of said first and second pivot members, said first linkage means including a first end portion pivotally connected to said backrest assembly and a second end portion pivotally connected to said first pivot member;  
first locking means for locking said first linkage means so that said first linkage means cannot extend or contract;  
second linkage means connecting said seat assembly and said leg supporting assembly, said second linkage means being extensible and contractible, said second linkage means including a first end portion pivotally connected to said seat assembly and a second end portion pivotally connected to said second pivot member; and  
second locking means or locking said second linkage means so that said second linkage means cannot extend or contract.

**4,945,583**  
**DEVICE FOR TRANSPORTING DISABLED OR SICK PERSONS**  
Alois Schnitzler, Hammerichs Bltze 9, D-5300 Bonn 3, Fed. Rep. of Germany  
Filed Mar. 16, 1988, Ser. No. 168,654  
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708680  
Int. Cl.<sup>5</sup> A61G 1/00  
U.S. Cl. 5—82 R 39 Claims



1. A stretcher mattress having an essentially planar upper side for supporting a disabled or sick person and an underside to be supported on a carrier, said mattress having a head end, a foot end, a central longitudinal axis extending therebetween and an opening in said upper side, said opening being spaced from said head end along said central longitudinal axis, a first pair of belt bands issuing from said opening, the free end of each one of said first pair of belt bands being connectable to a respective one of the free ends of a second pair of belt bands, one of said second pair of belt bands projecting from the left lateral edge area and the other from the right lateral edge area of said mattress at locations which are longitudinally displaced towards the middle of said mattress.

**4,945,584**  
**CRIB COVER**  
Mark A. LaMantia, Methuen, Mass., assignor to Tots-In-Mind, Inc., No. Andover, Mass.  
Filed Apr. 25, 1988, Ser. No. 185,483  
Int. Cl.<sup>5</sup> A47D 7/100  
U.S. Cl. 5—97 16 Claims



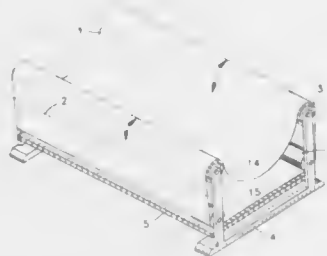
1. An improved safety canopy for a child's pen having end walls and at least two vertically slatted side walls comprising: a cover fabric and a frame for supporting the fabric in a tent-like configuration on the top of the pen, said fabric having four sides, a pair of side panels secured to and freely depending from

two opposite sides of the fabric for extending downwardly from the tops of opposite end walls of the pen substantially into said pen and lying inside the end walls, straps secured to the side edges of the panels and downwardly spaced from the tops of the opposite end walls and the fabric sides for extending about the outside of the end walls for securing the panels in place against the end walls, and ties secured to other opposite sides of the cover fabric for attaching the fabric to the top edges of the slatted side walls of the pen, while leaving the slatted side walls of the pen unobstructed.

4,945,585

**BED WITH ROTATABLE ROLLERS**

John V. Stewart, 1308 Henry Balch Dr., Orlando, Fla. 32810  
Filed Jul. 5, 1988, Ser. No. 215,254  
Int. Cl.<sup>5</sup> A47C 17/04; A45F 3/22  
U.S. Cl. 5—122 10 Claims

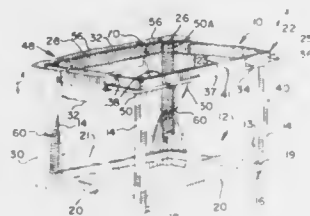


1. A furniture device adapted to support a reclining user, comprising:  
a generally horizontal tube of flexible material (1);  
a plurality of elongated shafts (3) inserted through and supporting said tube at intervals around its circumference;  
said material forming a sling between two uppermost shafts; and  
low friction means for allowing said tube to passively and freely rotate laterally around said shafts without using mechanical drive means with said shafts;  
whereby a person can recline in the sling, and can easily turn over.

4,945,586

**CANOPY BED FRAME ASSEMBLY**

Ramon Cross, Wilton, Conn.; Milton Markowitz, Flushing, N.Y., and Louis Selgrath, Mays Landing, N.J., assignors to CHF Industries, New York, N.Y.  
Filed Aug. 25, 1989, Ser. No. 399,223  
Int. Cl.<sup>5</sup> A47C 29/00  
U.S. Cl. 5—414 8 Claims



7. A free-standing canopy bed frame assembly for enclosing a bed with a bed canopy, the canopy bed frame assembly comprising, in combination:  
a plurality of vertical posts, the vertical posts defining the corners of said canopy bed frame;  
a plurality of elongate lower frame members connecting the vertical posts, the lower frame members defining a lower portion of said canopy bed frame, said lower frame mem-

bers being generally horizontally disposed between said vertical posts and operatively engaging said vertical posts in vertical post recess adapted to receive said lower frame members thereby providing stability to said canopy bed frame;

a plurality of elongate upper frame members operatively engaging said vertical posts and defining an upper portion of said canopy bed frame;  
track means extending around the general perimeter of said canopy bed frame upper portion, said track means including a valance rod supported from and spaced apart from said canopy bed frame upper frame members;

means for supporting said track means from said upper frame members including a plurality of hooks having a generally S-shaped configuration, said hooks having upper frame member engagement channels at one end thereof and track means engagement channels at an opposite end thereof, the upper frame member engagement channels and track means engagement channels being separated by a spacer portion disposed therebetween;

a plurality of fabric sleeves adapted to enclose said vertical posts and said upper frame members and substantially conceal portions of said vertical posts and said upper frame members from view;

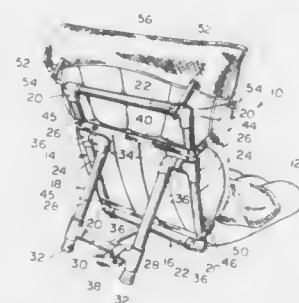
a plurality of canopy valance panels adapted to engage said track means, the canopy valance panels including longitudinal sleeves adapted to engage said valance rod, said canopy valance panels further including upper and lower valance portions disposed on opposite sides of said sleeves, said upper and lower valance portions extending a preselected distance from said valance panel sleeves and having a length sufficient to conceal a face of said upper frame members from view, and

a plurality of canopy corner panels adapted to engage said track means adapted to engage said vertical posts in an overlying relationship thereby substantially concealing said vertical posts from view, said canopy corner panels having a preselected length sufficient to overlie said vertical posts between said canopy frame upper and lower frame members, said canopy corner panels further including longitudinal sleeves adapted to engage said valance rod.

4,945,587

**BEACH CHAIR WITH ADJUSTABLE BACK HAVING AN AIR MATTRESS ATTACHED THERETO**

Robert M. Ferro, 821 Kinau St., No. C5, Honolulu, Hi. 96813  
Filed Jan. 22, 1990, Ser. No. 468,256  
Int. Cl.<sup>5</sup> A47C 27/08  
U.S. Cl. 5—419 5 Claims



1. An air chair comprising:  
a rectangular shaped air mattress;  
an adjustable backrest including  
a rectangular shaped backrest frame; and  
a back leg assembly adjustably connected to said backrest frame, said backrest frame comprising:  
four elbow fittings for each corner of said backrest frame;

two short pipe members for upper and lower portions of said backrest frame;  
two long pipe members for said portions of said backrest frame; and

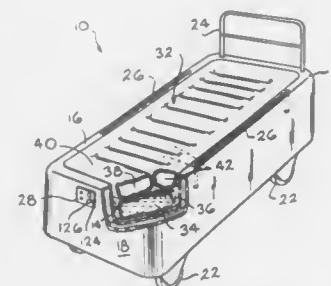
two tee fittings, each attached on one of said long pipe members near said upper short pipe member of said backrest frame, said back leg assembly comprising:

a pair of legs;  
a cross bar extending between said legs;  
a pair of leg tips, each attached to the bottom of each said leg;  
a pair of threaded nipples, each attached to the top of each said leg and one of said tee fittings to allow said legs to pivot together thereupon;  
a first set of gaskets, each positioned between one said threaded nipple and said tee fitting to prevent sand and other debris from entering therein; and  
a second set of gaskets, each positioned between one said lower elbow fitting and said short lower pipe member to prevent the sand and other debris from entering therein and to also protect said lower elbow fittings and said lower pipe member from getting scratched up when used on a hard surface, such as by a swimming pool or the like;  
and strap means for releasably securing said air mattress to said adjustable backrest so that said adjustable backrest may be positioned upon beach sand to adjust said air mattress in various reclined positions in which a person may sit upon said air mattress and lean comfortably against the portion of said air mattress on said backrest.

4,945,588

**AIR/WATER MATTRESS AND INFLATION APPARATUS**

Daniel G. Cassidy, Findlay, and Roger J. Koch, Ottawa, both of Ohio, assignors to Kuss Corporation, Findlay, Ohio  
Filed Sep. 6, 1989, Ser. No. 403,699  
Int. Cl.<sup>5</sup> A47C 27/08  
U.S. Cl. 5—451 19 Claims



1. In a mattress defining a first, lower chamber for water and a second, upper chamber for air, the improvement comprising, an apparatus for filling and exhausting air from said upper chamber, said apparatus including a housing, a pair of motor and blower assemblies disposed in opposed juxtaposition within said housing,  
control means for alternately and exclusively energizing one of said pair of motor and blower assemblies, said control means including a first, inflate switch, a second, deflate switch, and a pressure switch for sensing the pressure of air within said second, upper chamber.

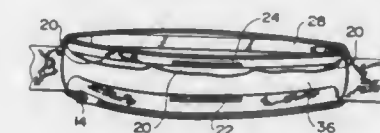
4,945,589

**COMBINATION SEAT CUSHION AND CARRYING BAG**

Arthur R. Carey, Box 311, Farmington, Del. 19942  
Filed Dec. 21, 1989, Ser. No. 454,370  
Int. Cl.<sup>5</sup> A47G 9/00  
U.S. Cl. 5—442 1 Claim

1. A combination seat cushion and carrying bag comprising: two opposed padded compartments each having an exterior and an interior side, each of said two compartments having a

padding material insert inside of said compartments, said carrying bag having a pocket for storing articles, said pocket positioned between the interior sides of said two opposed padded compartments, such that said padded compartments operate to cushion any articles stored in said pocket from the force applied to either exterior side of said padded compartments, said

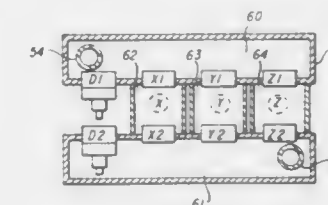


force occurring when said bag is used as a seat cushion, means for closing said pocket at the top of said pocket, an opening at the top of each padded compartment for removing the padded material inserts from each compartment, a means for closing said opening at the top of each padded compartment and a means for conveniently carrying said bag.

4,945,590

**VALVE FOR FLUID MAT AND APPARATUS FOR CONTROLLING AN ATTITUDE ASSUMED BY FLUID MAT**

Junshiro Ogura, Tokyo, Japan, assignor to Ogura Jewel Industry Co., Ltd., Tokyo, Japan  
Division of Ser. No. 268,407, Nov. 8, 1988, Pat. No. 4,895,183.  
This application Apr. 6, 1989, Ser. No. 333,930  
Int. Cl.<sup>5</sup> A47C 27/10  
U.S. Cl. 5—456 1 Claim



1. An apparatus for controlling an attitude assumed by an air mat having a plurality of bags comprising:  
a first air discharging chamber and a first air feeding chamber both of which are communicated with a pump,  
a plurality of secondary air discharging and feeding chambers communicating with said first air discharging chamber and said first air feeding chamber, respectively, via valves, each of said secondary air discharging and feeding chambers being formed with a port which is communicated with one of said bags, said secondary air discharging and feeding chambers being arranged between said first air discharging chamber and said first air feeding chamber, said secondary air discharging and feeding chambers being connected to one another in a side-by-side relationship with a partition interposed between the adjacent secondary air discharging and feeding chambers, and  
a plurality of valves, each in the form of a solenoid valve disposed on said first air discharge chamber and said first air feeding chamber.



4,945,591

**CUSHIONLIKE ITEM WITH PROJECTIONS ATTACHED THERETO BY STRINGS**

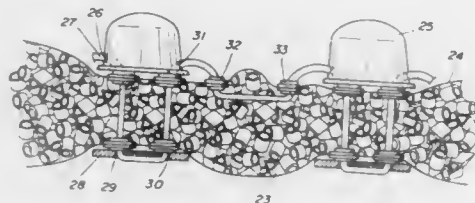
Jitsuo Inagaki, 71, Aza Kamiyashiki, Itsusikicho Hazugun, Aichi, 444-04, Japan

Division of Ser. No. 294,566, Nov. 2, 1988. This application Dec. 20, 1989, Ser. No. 454,020

Int. Cl.<sup>5</sup> A47G 9/00; A47C 31/00

U.S. Cl. 5-472

3 Claims



1. An item for use as an automobile seat pad, a pillow, a cushion and the like, said item comprising at least one bag-like body having a front surface and a back surface containing a large number of short cylindrical stuffing elements of synthetic resin, a number of strings arranged zigzag between the front and back surfaces thereof and a number of projections provided on the front surface thereof for spot pressure therapy, said projections extending outwardly from the front surface of sufficient distance to apply spot pressure on the user of the item, one of said strings securing each projection to the front surface of the bag-like body, said stuffing elements becoming rigidly held by pulling said strings to make the projections firmly stand on the surface of the item.

4,945,592

**TRANSPORT SYSTEM FOR PORTABLE PATIENT CARE APPARATUS**

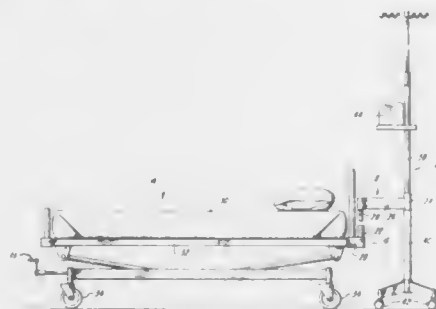
Nathaniel M. Sims, Wellesley Hills, and James P. Welch, Beverly, both of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Filed Sep. 30, 1988, Ser. No. 252,164

Int. Cl.<sup>5</sup> A47C 21/00

U.S. Cl. 5-508

20 Claims



1. An apparatus for transporting a patient care device, comprising:  
a patient transport device having a frame supporting a patient care platform;  
a first horizontal flange secured to the patient transport device, said first horizontal flange having disposed on one end thereof a means for mating to a second horizontal flange;  
a freestanding patient care apparatus having an elongate vertical member adapted for supporting a patient care device;  
a second horizontal flange extending from the vertical member, said second horizontal flange having disposed on one end thereof a means for mating to said first horizontal flange; and  
means for vertically adjusting at least one of said flanges to

matingly engage said mating means of said flanges and to suspend the patient care device from the first flange.

4,945,593

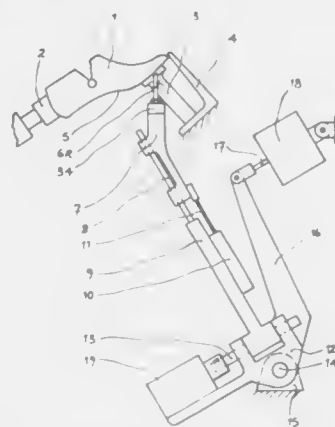
**AUTOMATIC DETERMINATION OF COORDINATES OF THE OPERATING PATH OF AN ADHESIVE-APPLYING NOZZLE IN AN ADHESIVE APPLICATOR FOR A SHOE MACHINE**Gerhard Giebel, Bad Soden; Hans-Jürgen Berny, Heusenstamm, and Albrecht Siegel, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to DVSG Engineering und Patentverwaltungs GmbH, Frankfurt am Main, Fed. Rep. of Germany  
Filed Mar. 15, 1989, Ser. No. 323,936

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1988, 3811565

Int. Cl.<sup>5</sup> A43D 25/18, 25/00

U.S. Cl. 12-12.4

12 Claims



2. A machine for performing a progressive adhesive-applying operation along marginal portions of shoe bottoms, comprising

a shoe support for supporting a shoe to the bottom of which adhesive is to be applied,  
a mounting on which selectively an adhesive-applying nozzle or a sensing head can be mounted, said mounting being resiliently urged in a direction towards the bottom of a shoe supported by the shoe support,  
drive means for moving the mounting along two coordinate axes relative to the shoe bottom, and  
computer control means for controlling the movement of the mounting along the two coordinate axes along a desired operating path, under the action of the drive means, said computer control means including a memory in which information comprising coordinate axis values for such operating path is stored,

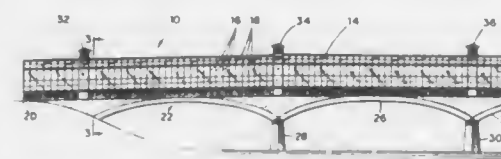
wherein, in a path-determining mode of the machine, with a sensing head mounted on the mounting and with an outline of the desired operating path supported by the shoe support, the drive means is caused to operate to move the mounting along one of said coordinate axes and, in response to the path of the sensing head diverging from said outline, to move the mounting along the other of said coordinate axis thus to maintain a desired relationship, in the direction of said other of the coordinate axes, between the outline and the sensing head,  
and wherein the computer control means monitors the movement of the mounting along the two axes and stores in the memory the coordinate axis values for each of a succession of points along said axes, said values constituting the information by which, in the adhesive-applying mode of the machine, the mounting is moved along the desired operating path as aforesaid.

4,945,594

**COVERED BRIDGE STRUCTURE**Richard H. Tomb, 130 Davis St., Painted Post, N.Y. 14870  
Filed Mar. 24, 1989, Ser. No. 328,529Int. Cl.<sup>5</sup> E01D 1/00

U.S. Cl. 14-1

20 Claims



1. A covered bridge structure comprising a covered bridge and at least one covered entrance to said bridge which is connected to said bridge, and means for ventilating said covered bridge, wherein:

- (a) said covered bridge comprises a bridge frame, a deck, a bridge enclosure framework enveloping said deck, means for connecting said deck to said bridge frame, means for connecting said bridge enclosure framework to said bridge frame, and a glass enclosure attached to said bridge enclosure framework, wherein said deck is comprised of at least about 80 weight percent of an inorganic composition selected from the group consisting of concrete, reinforced concrete, and mixtures thereof;
- (b) said bridge enclosure framework is comprised of a multiplicity of vertical columns and a multiplicity of roof trusses, wherein each of said roof trusses is connected to at least one of said vertical columns, and wherein both said vertical columns and said roof trusses are comprised of at least about 90 percent by weight of material selected from the group consisting of inorganic fiber, natural resin, synthetic resin, plastic, and mixtures thereof, provided that at least about 45 weight percent of such material is inorganic fiber;
- (c) said means for ventilating said covered bridge is comprised of a multiplicity of louvers and an inverted V-outlet; and
- (d) said glass enclosure is comprised of a multiplicity of panes of laminated reflective glass which are connected to said bridge framework enclosure, thereby sheltering said deck from the elements.

4,945,595

**MODULAR RAMP ASSEMBLY**

Jon D. Meriweather, Follansbee, W. Va., assignor to The Louis Berkman Company, Follansbee, W. Va.

Filed Jun. 29, 1989, Ser. No. 373,275

Int. Cl.<sup>5</sup> E01D 1/00

U.S. Cl. 14-69.5

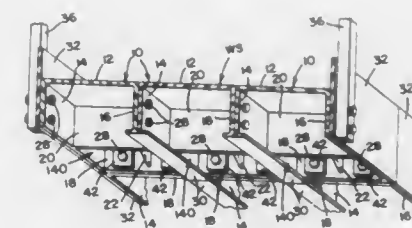
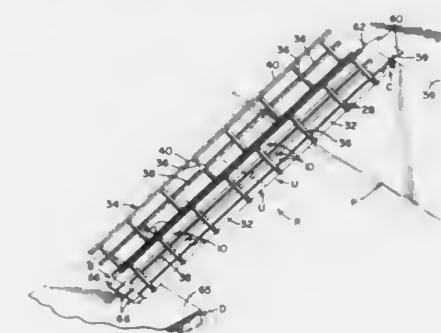
29 Claims

1. A modular ramp assembly for connecting first and second structures respectively having first and second pedestrian walkways and comprising:

an elongated rectangular modular ramp assembly having first and second ends and comprising a plurality of elongated rectangular channel shaped float modules of rigid self-supporting form comprised of a fiberglass material, said float modules each comprising a web portion with opposite side and end flanges of equal height and defining therewith an elongated channelway closed at its opposite ends by said end flanges,

said float modules being arranged in a laterally adjacent side-by-side position and being secured together into a unitary self-supporting elongated modular ramp unit structure solely by having their adjacent side flanges bolted together, with the backs of their channel web portions facing upwardly and defining a planar walking

surface extending between said ramp assembly ends and with their said closed end channelways facing down-



wardly to form downwardly opening air pocket means in said float modules.

4,945,596

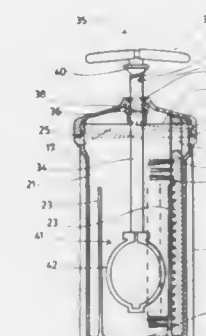
**GOLF BALL, GOLF CLUB AND GOLF SHOE SCRUBBER**  
Daniel G. Chang; Regina L. Urbantas, both of 680 Queen's Quay W., Suite 611, Toronto, Ontario, Canada M5V 2Y9, and Richard G. Urbantas, 104 Grant Ave., Hamilton, Ontario L8N 2X7, Canada

Filed Oct. 20, 1988, Ser. No. 260,465

Int. Cl.<sup>5</sup> A63B 47/04

U.S. Cl. 15-21.2

5 Claims



1. A golf ball washing device comprising:  
an elongated container for cleaning liquid having a lid at one end, the lid being engagable on the container in a liquid tight manner and being removable to allow access to the container for a golf ball;  
an axial longitudinal shaft in the container mounted to project through the lid for reciprocal longitudinal movement, a seal against liquid leakage between the lid and the shaft;

a cage for the golf ball mounted at an inner end of the shaft within the container, the cage comprising a plurality of resiliently deformable elongate members connected at their ends and shaped to form a generally spherical enclosure for the golf ball, whereby the golf ball is insertable into the cage by resilient deformation of the members; a handle on the outer end of the shaft outside the container; a pair of elongate brushes each comprising a base having bristles extending forwardly therefrom, the pair of brushes being arranged on opposite sides of the shaft and cage with the bristles of each brush directed towards the shaft and cage, the length of the brushes extending over at least a major portion of the length of the container, the bases of the brushes being releasably engaged in tracks located on an inner wall of the container, whereby the brushes are removable from the container when the lid is removed.

4,945,597

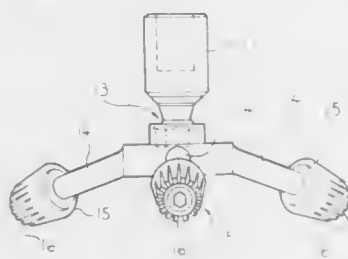
## ROTARY CLEANING DEVICE

Nicholas A. W. Fielder, West Australia, Australia, assignor to Dawson Offshore Pty. Ltd., Perth, Australia  
PCT No. PCT/AU87/00115, § 371 Date Nov. 3, 1988, § 102(e) Date Nov. 3, 1988, PCT Pub. No. WO87/06507, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 24, 1987, Ser. No. 283,370  
Claims priority, application Australia, Apr. 28, 1986, PH5633  
Int. Cl.<sup>5</sup> B08B 9/02

U.S. Cl. 15—104.13

8 Claims



1. A rotary cleaning element comprising a head fixed to a hub adapted to be mounted for rotation about a central axis and pivotal about at least two perpendicular transverse axes of said hub, said head supporting a plurality of radial arms which are spaced substantially angularly equidistant around the central axis, the free ends of the arms each supporting a tool which is rotatable about the end of the arm, the free ends of said radial arms intersecting a plane transverse to the central axis and spaced axially outwardly from the hub.

4,945,598

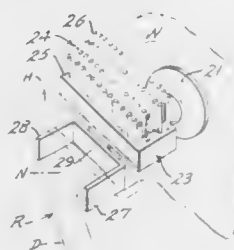
## RAZOR CLEANING BRUSHES

Richard J. Racioppi, RR #1, Box 195, Mahomet, Ill. 61853  
Filed Jul. 10, 1989, Ser. No. 377,073

Int. Cl.<sup>5</sup> A46B 9/02

U.S. Cl. 15—160

14 Claims



1. A razor cleaning device for selective placement on a vertical wall of a bathtub or shower enclosure to facilitate the cleaning of a razor having a handle and a head wherein the

head includes an inclined face and at least one blade and in which the blade is exposed along the inclined face of the head of the razor, said device comprising, a base portion including a suction cup means, a stem having a first end connected to said suction cup means and a second end extending generally perpendicularly with respect to said suction cup means, a cleaning head carried by said stem, a plurality of generally parallel bristles having first ends connected to said cleaning head and free ends extending upwardly therefrom, said free ends of said bristles forming a substantially continuous wiping plane which extends outwardly from the vertical wall when said base portion is secured thereto, and a pair of spaced support arm means extending generally horizontally outwardly from said cleaning head, said support arm means being of a length to selectively support the head of the razor therebetween so that the razor will be supported by the cleaning device when not in use.

4,945,599

## CAP SYSTEM FOR SPONGE MOPS

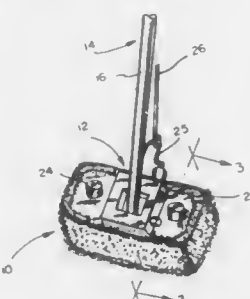
Angela Flynn, c/o FLower Fresh, Inc., P.O. Box 191, Allendale, N.J. 07401

Filed Jun. 1, 1989, Ser. No. 359,976

Int. Cl.<sup>5</sup> A47L 13/16

U.S. Cl. 15—244.3

7 Claims



1. A cap system for sponge mop, the sponge mop including a mop head, the mop head having a sponge element, and attachment plate, the cap system including a cap comprising a liquid permeable terry cloth fabric panel permitting flow of liquid to and from the sponge element, an outer surface of the panel including a mopping surface, the fabric panel being dimensioned for the cap to snugly cover the sponge element and peripheral edges of the attachment plate when secured to the mop head, means for releasably securing the fabric panel to the mop head in a position covering the sponge element and peripheral edges of the attachment plate, the securing means comprising an elastic band and means for permanently securing the elastic band to the fabric panel adjacent the periphery of the fabric panel, the elastic band being stretched when the fabric panel is secured to the mop head, the sponge element and the cap forming an integrated unit.

4,945,600

## PANE WIPER APPARATUS

Günter Gastmann, Essen, Fed. Rep. of Germany, assignor to Cedar Grove Limited, Gibraltar

Filed Jul. 2, 1987, Ser. No. 69,524

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1986, 3622279

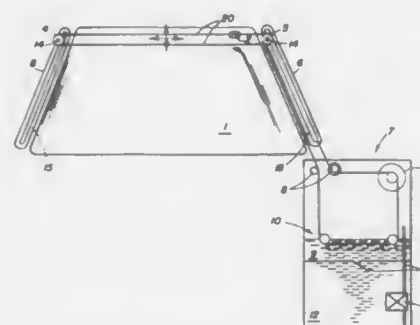
Int. Cl.<sup>5</sup> B60S 1/26, 1/38, 1/44, 1/50

U.S. Cl. 15—250.01

19 Claims

2. A pane wiper apparatus for wiping a pane, particularly a window pane such as a windshield and rear window of a motor vehicle, said wiper apparatus comprising a wiper implement which moves reciprocally over the window, and drive motor for moving the wiper implement; said wiper implement being in the form of a wiping strip which is moved over the height

and width of the window, and guide and drive means along the edges of the window over which said strip is guided and



driven, and means for applying a tension on said strip, said wiper strip comprising an endless toothed band and including an elastic insert having a contact surface with bristles.

4,945,601

## WINDSHIELD WIPER UNIT

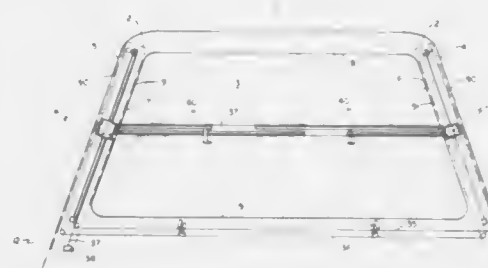
Andre E. Bilodeau, 13 Meadow Spring Dr., E. Sandwich, Mass. 02537

Filed Dec. 27, 1988, Ser. No. 290,755

Int. Cl.<sup>5</sup> B60S 1/04

U.S. Cl. 15—250.24

2 Claims



1. A windshield wiper system for vertically wiping the front windshield of an automobile, comprising:  
a left and right runner track, positioned and attached on either vertical side of said windshield, wherein each runner track is comprised of a wire rod connected at each end to an upper bracket and a lower bracket, said brackets being attached to automobile pillars on each side of said windshield, proximate to each upper corner and lower corner formed by said windshield;  
a runner assembly, slidably attached to each runner track;  
a horizontally positioned wiper assembly attached to each runner assembly by a wiper arm and extending on and past the midpoint of said windshield, wherein each wiper assembly has a first wiper blade assembly attached to its wiper arm such that the longitudinal axis of the assembly is in parallel to the longitudinal axis of the wiper arm, and a second wiper blade assembly connected to its first wiper blade assembly by means of a flat interconnecting member so that each wiper assembly's first and second wiper blade assemblies form a continuous wiping line, and wherein the longitudinal axis of one wiper assembly's horizontal wiping line is aligned with the longitudinal axis of the other wiper assembly's wiper arm;  
a plurality of driving cables interconnecting said runner assemblies for synchronously moving said runner assemblies vertically up and down said runner tracks;  
a tensioning cable tied across said wiper assemblies thereby holding them against said windshield; and  
a lifter unit for raising each wiper assembly at the end of its

downward stroke, wherein each lifter unit is comprised of a downwardly pointing vertical lifter arm attached to each wiper arm and having a horizontal member attached to the end of the arm opposite to that end attached to the wiper arm, and a lifter ramp aligned and corresponding to each lifter arm member and attached at the lower edge of the windshield, wherein each lifter ramp engages, lifts and then releases each said lifter arm at the end of the downward wiping stroke.

4,945,602

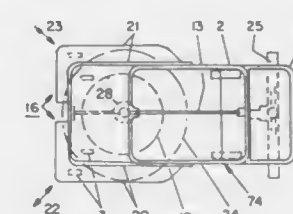
## ADJUSTABLE FRAME AUTOMATIC FLOOR CLEANING MACHINE

Albert Kohl, Solothurn, and Léon Seilaz, Koppigen, both of Switzerland, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 167,054, Mar. 11, 1988, abandoned. This application Dec. 18, 1989, Ser. No. 452,931  
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708087

Int. Cl.<sup>5</sup> A47L 11/202

U.S. Cl. 15—320

20 Claims



1. In a drivable automatic floor cleaning machine, having a carriage containing a fresh liquid compartment and a dirty liquid compartment, a cleaning rotor removably attached to a rotor receptacle associated with the fresh liquid compartment for the supply of fresh liquid thereto, at least one suction nozzle connected to the dirty liquid compartment for the return of dirty liquid thereto, a travel roller pair positioned between the cleaning rotor and the suction nozzle and a control handle supporting operating control elements, the improvement which comprises an adjustable machine frame supported for radial movement relative to said rotor receptacle to accommodate cleaning rotors of different diameters, said machine frame having a depending protective curtain on a circumferential region thereof, remote from the suction nozzle, to substantially surround the cleaning rotor.

4,945,603

## FRONT CASTER ASSEMBLY FOR CANISTER VACUUM CLEANER

Roy H. Herron, Jr., Starr, S.C., assignor to Ryobi Motor Products Corp., Pickens, S.C.

Filed Oct. 24, 1988, Ser. No. 261,626

Int. Cl.<sup>5</sup> A47L 9/00

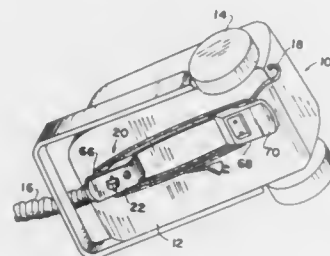
U.S. Cl. 15—323

4 Claims

1. A caster assembly for a vacuum cleaner casing, comprising:  
a body member;  
means for mounting said body member on a substantially planar lower surface of said casing, said mounting means being arranged to allow pivoting movement of said body member relative to said casing about an axis transverse to said lower surface;  
a caster wheel rotatably mounted on said body member for rolling contact with a floor surface supporting said vacuum cleaner casing, the line of rotation of said caster wheel passing through said pivot axis, the rotational axis of said caster wheel being spaced from said pivot axis and substantially parallel to said lower surface; and



a pair of idler wheels rotatably mounted on said body member for rolling contact with said lower surface of said casing, the axes of rotation of said idler wheels being equiangularly spaced on opposite sides of said caster wheel line of rotation and intersecting at said pivot axis;



wherein the improvement comprises said body member being formed with an integral substantially planar extension beyond said caster wheel from said pivot axis, said extension being spaced from and substantially parallel to said lower surface so as to cooperate with the remainder of said body member to provide a wrap tongue for the electric line cord of the vacuum cleaner.

4,945,604

## PORTABLE BLOWER

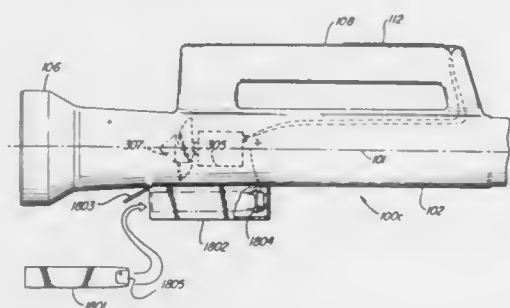
Jonathan L. Miner, Timonium; Vernon R. Lacher, Fallston; Gerald J. Rescigno, Baltimore, all of Md.; William B. Swim, Cookeville, Tenn.; Martin P. Gierke, and David A. Hahn, both of Baltimore, Md., assignors to Black & Decker Inc., Newark, Del.

Filed Dec. 4, 1989, Ser. No. 446,465

Int. Cl.<sup>5</sup> A47L 5/14, 9/28

U.S. Cl. 15—344

20 Claims



1. A hand-held portable, electrically driven blower adapted to be usable by users of varying heights, comprising: an elongated tubular housing defining a longitudinal axis; an electrical drive motor mounted to said housing and having a drive shaft; fan means coupled to the drive shaft of said motor and having a plurality of fan blades for moving air through said tubular housing; an elongated handle connected to said tubular housing and adapted to be grasped by the hand of the user at various positions along the length of said handle so that the tubular housing of the blower is suspended from the handle when in use; and switch means including an electrical switch electrically connected to said drive motor for controlling the application of electrical energy to said drive motor and elongated actuator means connected to said electrical switch for controlling the position of said switch, said elongated actuator means being located in said handle and actuatable

by the hand of the user when grasping said handle at any of said various positions on said handle.

4,945,605

## FITTING FOR SLIDING DOORS SUSPENDED AT A RUNWAY RAIL

Karl Haab, Rotkreuz, and Otto Haab, Mettmenstetten, both of Switzerland, assignors to Hawa AG, Mettmenstetten, Switzerland

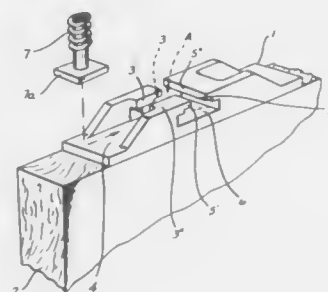
Filed Feb. 23, 1989, Ser. No. 314,082

Claims priority, application Switzerland, Mar. 4, 1988, 828/88

Int. Cl.<sup>5</sup> E05D 15/00

U.S. Cl. 16—97

9 Claims



1. A fitting for sliding doors suspended at a runway rail, which fitting is intended for a mounting to the upper edge of the sliding door and serves for the mounting to an associated travelling or sliding carriage, said fitting comprising: an elongate body adapted for mounting to an edge of a slidable door, the body including a longitudinal recess for the receipt and positioning there within of the head of a mounting member attached to said travelling or sliding carriage, a transverse recess intersecting the longitudinal recess and having two spaced upper side flanges partly overlaying the transverse recess and defining a transverse groove which extends across the entire width of the body, a longitudinal groove extending upwardly from the longitudinal recess and having a smaller width than that of the longitudinal recess to slidably receive the associated carriage.

4,945,606

## DOOR CAM HARDWARE WITH DOOR POST MOUNTED CAM

Alan Eckel, Westford, Mass., assignor to Eckel Industries, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 468,570, Feb. 22, 1983,

abandoned. This application Apr. 9, 1985, Ser. No. 721,196

Int. Cl.<sup>5</sup> E05F 1/04

U.S. Cl. 16—313

9 Claims

1. Improved door-supporting and door self-positioning hardware comprising in combination: a door-mounting post; means for mounting a door to said post so that said door and post will rotate as a unit; attaching means for rotatably attaching said post to a door jamb in a predetermined door opening, said attaching means comprising an angle iron adapted to be secured to a corner of a door jamb and a first journal bearing for rotatably mounting said post to said angle iron, said angle iron comprising first and second portions arranged at a right angle to one another, and said first journal bearing having a first hollow portion surrounding and rotatably engaging one end of said post and a second plate portion that is attached to said first portion of said angle iron; and a cam follower roller unit comprising a shaft attached to said first angle iron portion at a right angle thereto and a cam follower roller rotatably mounted to said shaft; a cam attached to one end of said post so as to rotate there-

with, said cam having an inclined surface with low and high points disposed in substantially diametrically opposed relation to one another; said cam and cam follower roller being positioned so that said cam follower roller makes a rolling contact with said



inclined surface of said cam as said cam rotates with said door-mounting post and a door attached to said post; and a second journal bearing rotatably engaging the opposite end of said post for rotatably mounting said door-mounting post to a door jamb.

4,945,607  
GRIPPING DEVICE PARTICULARLY FOR REMOVING FISH BONES

Rune Akesson, and Giuliano Pegoraro, both of Bjuv, Sweden, assignors to Nestec S.A., Vevey, Switzerland

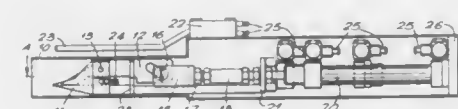
Filed Apr. 27, 1989, Ser. No. 344,211

Claims priority, application European Pat. Off., May 13, 1988, 88107722

Int. Cl.<sup>5</sup> A22C 25/16

U.S. Cl. 17—56

16 Claims



1. A retractable gripping device comprising: first and second matable jaw members; means having a pivot connecting the first jaw member to a cylinder such that, in operation, the cylinder and connecting means urge the first jaw member to open and close the jaws; means for maintaining the second jaw member in a fixed position relative to the cylinder; means for activating and deactivating the cylinder for closing and opening the jaw members; and means for linearly retracting and extending the jaws, the jaw opening and closing cylinder, the connecting means and the maintaining means.

4,945,608

## FISH SCALER

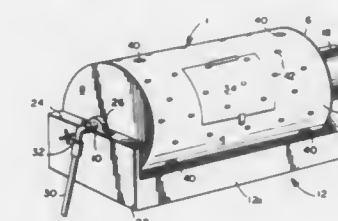
James Majure, and William N. Frazier, both of Philadelphia, Miss., assignors to Fish Scalers, Inc., Philadelphia, Miss.

Filed Feb. 26, 1987, Ser. No. 19,429

Int. Cl.<sup>5</sup> A22C 25/02

U.S. Cl. 17—64

23 Claims



1. Fish-scaling apparatus comprising: a frame; a hollow, cylindrical drum mounted on said frame for rotation about a center axis, said drum including a circumferential surface extending along said axis and first and second substantially closed ends; means for rotating said drum about said axis; means for dispensing liquid within said drum during rotation thereof; elongated spike means projecting radially inwardly from said interior circumferential surface for scaling the fish, said spike means arranged in an array of alternating axially offset rows extending substantially parallel to said center axis about the entire circumferential surface of the drum; and drain means located at axially and circumferentially spaced locations about said drum surface.

4,945,609

## REVOLVING FLAT ARRANGEMENT FOR A CARDING MACHINE

Werner Hauschild, Durnten, and Heinz Nitschke, Winterthur, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

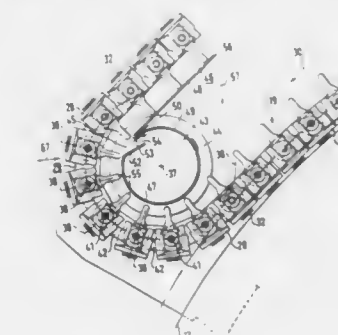
Filed Oct. 2, 1989, Ser. No. 416,044

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 3834040

Int. Cl.<sup>5</sup> D01G 15/78

U.S. Cl. 19—102

20 Claims



1. A revolving flat arrangement for a carding machine comprising: an endless loop of flats for disposition over a carding cylinder; and a suction tube within and extending across the width of said loop at one end of said loop, said suction tube having a slot extending across the width of said flats to define a supply

channel directed tangentially of said tube for drawing a flow of air thereinto and an outlet opening at one end for exhaust of the drawn-in air.

4,945,610

# DEVICE FOR FEEDING A FIBER LAP TO A PROCESSING ROLLER OF A FIBER PROCESSING MACHINE

Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

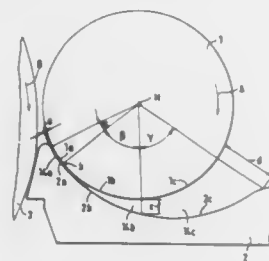
Filed Feb. 23, 1989, Ser. No. 313,867

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805829

Int. Cl.<sup>5</sup> D01G 23/00, 15/20

U.S. Cl. 19—105

15 Claims



1. In a device for advancing a fiber lap in a feeding direction to a processing roller of a fiber processing machine; said device including a feed roller and a feed table, together defining a gap having a length extending parallel to the feeding direction and a width defined by the distance between the feed roller and the feed table; said width increasing along said length in an upstream direction as viewed in said advancing direction; said feed roller and said feed table being relatively movable towards and away from one another; said feed table having a downstream terminal edge; said gap having a downstream terminal length portion forming a clamping zone defined by a circumferential length portion of the feed roller and an arcuate length portion of said feed table; said arcuate length portion terminating at said downstream terminal edge; the improvement wherein said gap further has an additional length portion forming a conveying zone situated immediately adjacent said clamping zone upstream thereof; said circumferential length portion is shorter than the length of the gap in the conveying zone and the width of the gap in the clamping zone is significantly smaller than the width of the gap in the conveying zone.

4,945,611

# COMBING MACHINE

Gerhard Reiter, Narzissenstrasse 21, D-4006 Erkrath, Fed. Rep. of Germany

Filed Aug. 29, 1989, Ser. No. 406,384

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1988, 3831020

Int. Cl.<sup>5</sup> D01G 19/00, 19/16

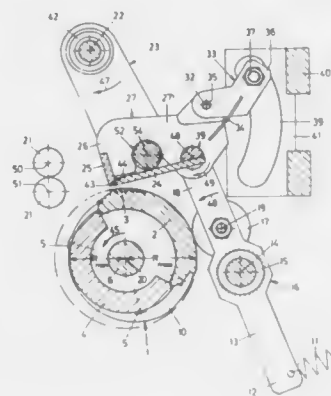
U.S. Cl. 19—234

4 Claims

1. A combing machine, in particular for combing of cotton, comprising  
a combing roller with at least one combing segment;  
conveyance means for the fiber tuft to be combed;  
an upper and lower nipper for fixing the fiber tuft during engagement of the combing segment, the upper and lower nipper being pivotably disposed in a forward and backward direction around an axis disposed above a comb cylinder;  
cam drive means for the combing roller and for directly driving the pivoting movement of the upper and lower nipper;  
the cam drive means including a cam disk, a spring-loaded

pivot lever, and a rotatably disposed feeler wheel supported by the pivot lever;

a lower nipper carrier which is pivotably seated around an axis ahead of and above the rotational axis of the combing roller and is acted upon by a free end of the pivot lever; and



a shaft connected with the lower nipper carrier and including a sliding dog, wherein the free end of the pivot lever has a longitudinal slot extending parallel to a longitudinal axis of the pivot lever, which is engaged with longitudinal play by the sliding dog.

4,945,612

# SYSTEM AND A METHOD FOR JOINING THE ENDS OF A BAND-SHAPED ELONGATE ELEMENT

Tauno Talonen, Tampere, Finland, assignor to Tamfelt OY AB, Tampere, Finland

PCT No. PCT/Fin87/00077, § 371 Date Oct. 14, 1988, § 102(e)

Date Oct. 14, 1988, PCT Pub. No. WO87/07664, PCT Pub. Date Dec. 17, 1987

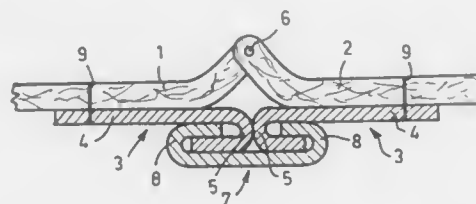
PCT Filed Jun. 4, 1987, Ser. No. 264,273

Claims priority, application Finland, Jun. 13, 1986, 862540

Int. Cl.<sup>5</sup> D21F 1/12, 7/10; F16G 3/04

U.S. Cl. 24—31 R

9 Claims



3. Apparatus for facilitating permanent joining of the ends of a band-shaped elongate element into an endless band after placement of said elongate element into approximately its useful position in a machine suitable for processing wood or cellulose products, for use of the joined elongate element after removal of said temporarily attached apparatus therefrom, comprising:

a pair of alignment strips, temporarily fastened at a predetermined distance from the respective ends of said elongate element after said placement thereof, each alignment strip being formed with a sheet-like part one edge of which is provided with a U-shaped element having two arms one of which is temporarily fastened to said elongate element and the other of which lies outwardly of the elongate element such that the ends of the elongate element are

disposed to make contact with each other for formation of said permanent joining thereat; and

a locking strip provided with two members, arranged to simultaneously engage with said outwardly lying arms of the U-shaped elements of said pair of alignment strips when the alignment strips are positioned side by side with the outer surfaces of bottom portions of their U-shaped elements placed in alignment for thereby temporarily locking said alignment strips to each other so as to hold said respective ends of said elongate element in contact for permanent joining thereof by known means that permanently remain with said joined ends to form said endless band following removal of said alignment strips and said locking strip thereafter from said permanently joined ends.

4,945,613

# CLOTHES-PIN

Hugo Ledermann, Schlösslistrasse 16, 6030 Ebikon, Switzerland

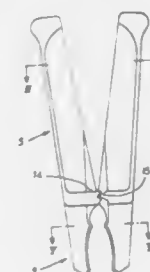
Filed Dec. 14, 1988, Ser. No. 284,712

Claims priority, application Switzerland, Dec. 16, 1987, 4928/87

Int. Cl.<sup>5</sup> A44B 21/00

U.S. Cl. 24—501

1 Claim



1. A clothespin comprising  
two members having a gripping section, a clamping section, and a pivot portion intermediate said gripping and clamping sections;  
a spring element connecting said members such that said members are pivotable relative to each other;  
each member including  
a recess on an inside of said gripping section,  
a groove on an inside portion of said member, which groove extends from said clamping section to said recess in said gripping section,  
and a support portion integrally formed on the inside of said gripping section and bridging said groove to form a support for said spring element;  
said spring element comprising  
an essentially V-shaped spring wire having two legs, a base portion of said V-shaped spring wire connecting said legs, and an end portion on a free end of each of said legs;  
said spring element being received in said recesses by said end portions on the free end of each of said legs;  
said legs disposed within said grooves, and said base of said V-shaped spring wire wrapped, at least partly, around said support portions forming said support for said spring elements;  
said pivot portion including  
a first section having a V-shaped notch,  
and a second section having a V-shaped projection,  
said first and second sections being provided on both sides of said groove.

4,945,614

# BUCKLE ASSEMBLY

Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

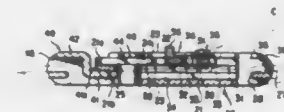
Filed Jan. 28, 1989, Ser. No. 372,529

Claims priority, application Japan, Jun. 28, 1988, 63-84435[U]

Int. Cl.<sup>5</sup> A44B 11/25

U.S. Cl. 24—573.1

6 Claims



1. A buckle comprising:  
(a) a base consisting of a base plate having an open hole formed therein on the longitudinal one end side thereof, a portion for connecting a first belt, said first belt connecting portion being formed in the base plate on the other end side thereof, and opposite rising pieces formed integrally therewith on both sides thereof, each rising piece having an inward projection piece formed integrally with said rising piece on the uppermost part thereof so as to form a guide groove thereat;  
(b) a socket consisting of a plate-shaped body having a portion for connecting a second belt, said second belt connecting portion being formed in the plate-shaped body on one end thereof, and a projection formed integrally with the plate-shaped body on the other end side thereof, said projection being fitted in said hole formed in the base plate and having an aperture formed therein so as to be parallel to an upper surface of the plate-shaped body; and  
(c) a plug consisting of a plate-shaped base body adapted to be slidably moved along said guide grooves formed at both sides of the base and having resilient pieces formed integrally therewith an extending from one end thereof, the resilient pieces being adapted to be engaged with said aperture of the socket in snap-fit fashion and disengaged therefrom, and further having a portion for connecting a third belt, the third belt connecting portion being formed in said plate-shaped base body on the other end side thereof;  
(d) said base plate of the base further having first, second and third grooves formed respectively in positions therein at both sides thereof, said grooves in each side being rectilinearly arranged at predetermined intervals in the longitudinal direction of said base plate, a first engaging portion formed between said first groove and said second groove, and a second engaging portion formed between the second groove and said third groove, and wherein said plug further comprises a pair of engaging pieces at both sides of said plate-shaped base body thereof, respectively, each engaging piece being formed at a longitudinally intermediate portion of the plate-shaped base body and projecting downwards so as to be slidably inserted into said first, second and third grooves of said base plate of the base and engaged with said first and second engaging portions of the base plate;  
wherein the respective sliding portions of the base and the plug are arranged such that the resistance to sliding of the plug on the base becomes large when the resilient pieces of the plug are located out of the hole formed in the base.



4,945,615

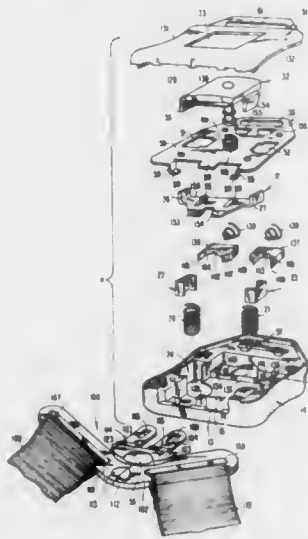
**BELT BUCKLE WITH INTERLOCKING DUAL TONGUE**  
James R. Anthony, Carmel; Michael A. Wiseman, Indianapolis,  
and Allan R. Lortz, Carmel, all of Ind., assignors to Indiana  
Mills & Manufacturing, Inc., Westfield, Ind.

Filed Jun. 22, 1989, Ser. No. 370,240

Int. Cl.<sup>5</sup> A44B 11/25

U.S. Cl. 24—573.5

17 Claims



1. A belt buckle-tongue combination comprising:  
a buckle main body; tongue means insertable into and releasable lockable with said buckle main body;  
a latch positioned in said main body and held captive therein, said latch movable between a latched position with said tongue means and an unlatched position;  
first means operably associated with said latch to move said latch back and forth between said latched position and said unlatched position; and  
movably mounted indicating means operable to move to a first indicating position when said latch is in said latched position and to move to a second position when said latch is in said unlatched position thereby said indicating means readily reveals when said tongue means is lockingly engaged with said buckle main body.

4,945,616

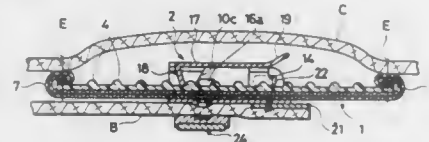
**ADJUSTABLE CLOSURE FOR OVERLAPPING PARTS**  
Shunsuke Okano, Nara, Japan, assignor to Morito Co., Ltd.,  
Osaka, Japan

Filed Jan. 30, 1990, Ser. No. 472,625

Claims priority, application Japan, Apr. 26, 1989, 1-49452[U]  
Int. Cl.<sup>5</sup> A44B 19/00

U.S. Cl. 24—585

2 Claims



1. An adjustable closure for overlapping parts of clothing comprising:  
(A) a rail having a plurality of projections, said rail being attached to one of the overlapping parts,  
(B) a slide comprising a mounting frame, an actuating frame and sheet spring, said slide being attached to the other overlapping part:  
(a) said mounting frame having a bottom, rear walls each having a ceiling, and front walls each having a ceiling at

the lateral ends of the bottom, said bottom, front and rear walls and ceilings make a sliding space having a width that allows the movement of the rail, engaging strips at the rear edges of the rear walls, slanted edges at the rear edges of the front walls,

- (b) said actuating frame having lateral walls and a cover, holes supporting the engaging strips, and corners, which become fulcrums of the movement of the actuating frame, claws which abut on the slanted edges of the mounting frame, an engaging tongue which is engageable with one of the projections and an engagement-releasing actuating strip, and
- (c) said sheet spring being attached to the bottom of the mounting frame.

4,945,617

**SEAT BELT BUCKLE**

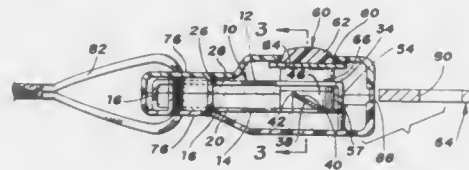
William O. Griffith, Middletown, Ohio, assignor to General  
Motors Corporation, Detroit, Mich.

Filed Mar. 20, 1989, Ser. No. 325,800

Int. Cl.<sup>5</sup> A44B 11/25

U.S. Cl. 24—633

4 Claims



1. In a seat belt buckle of the type having a detent movably mounted in a housing for spring biased movement into engagement with an apertured latch plate insertable into the buckle, and a release button adapted for manual movement to urge the detent against the spring bias thereof to release the apertured latch plate, the improvement comprising:  
the housing being a generally C-shaped one-piece stamping having upper and lower legs spaced apart to receive the apertured latch plate therebetween, a detent derived from and part of the one-piece stamping with the lower leg and projecting upward into the path of entry of the apertured latch plate so that the latch plate interacts with the detent to forcibly cam the lower leg downwardly away from the upper leg as permitted by inherent elastic yielding of the lower leg relative to the upper leg.

4,945,618

**AIR TEXTURING JET**

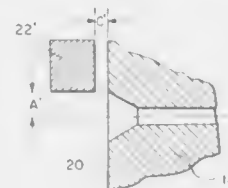
Adly A. Gorrafa, Hockessin, Del., assignor to E. I. Du Pont de  
Nemours and Company, Wilmington, Del.

Division of Ser. No. 178,961, Apr. 7, 1988, This application Apr. 3, 1989, Ser. No. 345,629

Int. Cl.<sup>5</sup> D02G 1/16

U.S. Cl. 28—254

2 Claims



1. In a yarn treating jet including a body having yarn inlet and outlet ends connected by a central bore along a central axis, means for introducing pressurized gas through a gas inlet into said bore between said ends to contact yarn passing

4,945,620

**SPINDLE HEAD ASSEMBLY**

Arnold Dassler, Aalen, Fed. Rep. of Germany, assignor to  
Schwaebische Huetttenwerke GmbH, Aalen-Wasseraffingen,  
Fed. Rep. of Germany

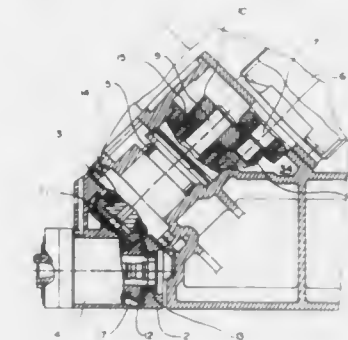
Filed Jul. 13, 1989, Ser. No. 379,297

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824427

Int. Cl.<sup>5</sup> B23B 7/04; B23C 1/12

U.S. Cl. 29—39

19 Claims



4,945,619  
**APPARATUS FOR CONVERTING TUBULAR BLANKS  
INTO SPACER FRAMES OF MULTIPLE-PANE  
WINDOWS**

Franz Bayer, Elzach, Fed. Rep. of Germany, assignor to Franz  
Xaver Bayer Isolierglasfabrik KG, Elzach, Fed. Rep. of Ger-  
many

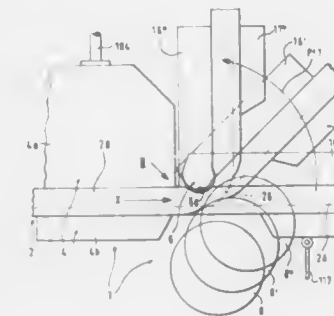
Filed Dec. 5, 1988, Ser. No. 280,090

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740921

Int. Cl.<sup>5</sup> B21D 9/15

U.S. Cl. 29—33 R

34 Claims



1. Apparatus for converting into a substantially L-shaped body, particularly into a portion of a spacer frame for use in multiple-pane windows, an elongated ductile tubular blank having two spaced-apart walls and two sidewalls alternating with the walls, disposed at a predetermined distance from each other and having a predetermined width, comprising means for locating spaced apart first and second portions of the blank so that an intermediate portion between the first and second portions assumes a predetermined position; and means for transforming the intermediate portion into an elbow, including a first deforming device arranged to engage one wall of the intermediate portion in said predetermined position, a second deforming device arranged to engage the other wall of the intermediate portion in said predetermined position substantially opposite said first device, means for displacing at least one of said devices toward the other of said devices so that the mutual spacing of the walls between said devices is reduced to less than said predetermined width, and means for moving the first portion of the blank relative to the second portion so as to bend the intermediate portion about said first device, at least one of said devices having a length—as measured transversely of the two spaced-apart walls of the blank—less than said predetermined distance so that the elbow which is constituted by the bent intermediate portion has a profile including a web extending between and being narrower than the sidewalls and two flanges each including one sidewall of the intermediate portion.

4,945,621

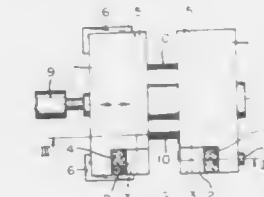
**DEVICE FOR ASSEMBLING A CONNECTOR TO A TUBE**  
Kenji Sugiyama, Numazu, Japan, assignor to Usui Kokusai  
Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Sep. 28, 1989, Ser. No. 415,119

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—237

5 Claims



1. A device for assembling a connector to a tube comprising:  
a pair of clamping blocks provided with a pair of holding grooves, respectively, said holding grooves having a substantially semicircular sectional configuration and arranged in face-to-face relationship;  
two-split type chuck members adapted to hold said clamping blocks via a resilient member disposed on the rear surface of each of said clamping blocks, said chuck members

being provided with a pair of clamping grooves which are aligned concentrically with said holding grooves, respectively;

a support pin projecting from one of said chuck members immediately below said holding groove and fitting into a hole bored in the outer chuck member; and

moving means for moving at least one of said chuck members in a transverse opposite direction thereto.

4,945,622

# AUTOMATIC ASSEMBLY SYSTEM FOR ASSEMBLING PARTS TO A CAR BODY

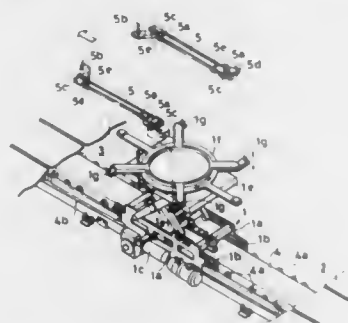
Shigeo Kaibuki; Shinpei Watanabe, and Yasuhiro Yamamoto, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 23, 1989, Ser. No. 370,499

Claims priority, application Japan, Jul. 6, 1988, 63-166928  
Int. Cl.<sup>5</sup> B23D 21/00

U.S. Cl. 29—281.1

1 Claim



1. An automatic assembly system for assembling parts to a car body in which an assembling jig, mounted on an automatic machine, is used to assemble said parts to said car body, said system comprising:

basic car-body positioning members provided on a bottom portion of said car body, said basic car-body positioning members include,

a reference hole provided, exclusively for positioning use, on an underside of a rear end portion of each of a pair of left and right front side frames of the car body, and

a seating piece for jacking-up the car body, said seating piece being attached to each of the front and rear end portions of the underside of the car-body side sills to be accurately adjusted in position, so that the car body is positioned longitudinally and laterally by said reference hole and is positioned vertically by said seating piece; and

locator holes for the assembling jig formed in a region of a particular portion of the car body to which said parts are to be assembled;

wherein, said car body being manufactured through maintaining control of relative positional accuracy with respect to each of the basic car-body positioning members and the locator holes, wherein said car body being positioned by using said basic car-body positioning members and, by using the locator holes, the assembling jig is positioned with respect to the particular portion of the car body to which said parts are to be assembled to ensure an accurate assembling of said parts to the car body.

# METHOD OF REPAIRING A SEAL JOINTING FITTING REPAIR

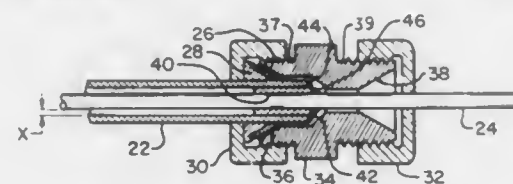
Douglas S. Porter, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 14, 1988, Ser. No. 218,774

Int. Cl.<sup>5</sup> B23P 7/00

U.S. Cl. 29—402.07

9 Claims



1. A method of repairing a seal joint between a stud tube type instrumentation nozzle and an elongated instrument member having a cylindrical surface of a smaller outside diameter than the inside diameter of the tube, said elongated instrument member mounted concentrically within the instrumentation nozzle stud tube, said seal joint to be repaired including a compression fitting having a fitting body, fitting nut means and radial compression means, said method of repairing comprising the steps of:

loosening and axially disassembling the fitting nut means and the fitting body,

removing the radial compression means from the elongated instrument member;

providing a collar between the inside of the tube and the outside surface of the elongated instrument member,

providing brazing material adjacent the end of the tube and surrounding the elongated instrument member,

heating the brazing material to provide a fusion bond and seal, and

axially returning and assembling the fitting nut means and the fitting body to complete the seal joint.

4,945,624

# METHOD OF FORMING AND ASSEMBLING DECORATIVE AWNING AND BUILDING FACIA

Andrew J. Toti, 311 W. River Rd., Modesto, Calif. 95351

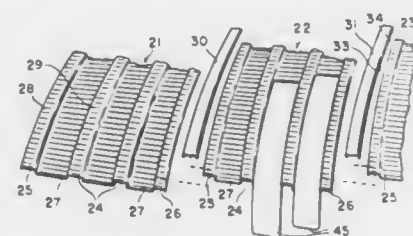
Division of Ser. No. 764,296, Aug. 9, 1985, Pat. No. 4,796,393.

This application Oct. 24, 1988, Ser. No. 261,513

Int. Cl.<sup>5</sup> B23P 11/02

U.S. Cl. 29—453

2 Claims



1. In a method for forming a main panel section for a metal awning or a decorative building facia or the like, the steps of:

forming a plurality of flat thin metal panels into straight panel sections having a plurality of spaced apart reinforcing rib sections and male and female edge rib sections which are adapted to snap into each other in locking fashion with light transverse corrugations on said rib sections and in panel regions therebetween for enhancing the structural rigidity of the panels and the locking joinder of the edge rib sections;

forming said straight ribbed panel sections into panel sections having identical longitudinally curved configurations; and

mounting two or more of said curved ribbed panels together in side-by-side relation by snapping the respective male and female rib sections of separate panels together.

4,945,625

# METHOD OF MAKING A FASTENING DEVICE

Emanuel A. Winston, 1448 Old Skokie Rd., Highland Park, Ill. 60035

Continuation-in-part of Ser. No. 885,152, Jul. 14, 1986, Pat. No. 4,776,738. This application Aug. 4, 1988, Ser. No. 228,324

Int. Cl.<sup>5</sup> B21D 39/00; B23P 19/02

U.S. Cl. 29—524.1

5 Claims



1. The method of installing a rivet into an aperture in a workpiece, the rivet having a cylindrical body and a rivet head with a head aperture extending through the rivet head and communicating with a channel in the cylindrical body of the rivet for defining a flexible cylindrical sidewall, comprising the steps of:

inserting the cylindrical body of the rivet into the aperture of the workpiece; and

injecting a resilient curable material under pressure into the head aperture thereby deforming the flexible cylindrical sidewall of the rivet into mechanical engagement with the workpiece.

4,945,626

# SINGLE-PASS PALLET DISASSEMBLER WITH SELF-ADJUSTING HEAD

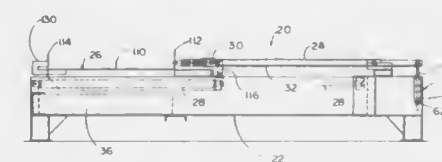
Gerald L. Dykstra, Wyoming; Craig Boogaard, Allendale, and Rodley Brunsting, Hudsonville, all of Mich., assignors to Industrial Resources of Michigan, Grand Rapids, Mich.

Filed Aug. 9, 1989, Ser. No. 391,953

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—564.3

21 Claims



1. An apparatus for unnauling wood pallets having first and second spaced sets of slats nailed to opposite sides of a plurality of wood stringers, said apparatus comprising:

a frame;

a first arm assembly including an elongated horizontal first member having opposite first and second end portions and first cutting means at said first end portion thereof for cutting nails, said first arm assembly further including pivot means for pivotally mounting a portion of said first member between said opposite end portions to an end of said frame to pivot about a horizontal axis and biasing means for biasing said second end portion thereof downwardly;

a second arm assembly including an elongated horizontal second member having opposite first and second end portions and second cutting means at said first end portion thereof for cutting nails, said second cutting means posi-

tioned vertically above said first cutting means, said second arm assembly further including second pivot means for pivotally mounting said second end portion of said second member to said end of said frame to pivot about a horizontal axis and biasing means for biasing said first end portion thereof upwardly;

guide means on said first end portions of said first and second members for guiding said first and second cutting means to opposite interfaces between a pallet stringer and the first and second associated sets of slats; and

pallet moving means mounted to said frame for moving a pallet horizontally in the direction of said first and second arm assemblies.

4,945,627

# FLAT CABLE-CONNECTOR HAVING IMPROVED CONTACT SYSTEM

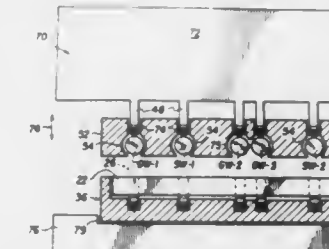
Edward P. Brandeau, 505 Starbridge Ct., Flemington, N.J. 08822, assignor to Edward P. Brandeau, Flemington, N.J.

Division of Ser. No. 65,684, Jun. 16, 1987, Pat. No. 4,829,668, which is a continuation of Ser. No. 633,897, Jul. 24, 1984, abandoned. This application May 2, 1989, Ser. No. 346,555

Int. Cl.<sup>5</sup> B23Q 41/00

U.S. Cl. 29—564.4

6 Claims



1. A tool connector system for gang terminating a plurality of fine gage, closely spaced wires in a matched impedance flat cable, said system comprising a connector having a housing, a substantially planar array of slot-like contacts mounted in said housing, each contact being on precise centers which correspond to the centers of the wires to be terminated, a tool frame having pockets means for precisely aligning each wire above the slots of the contact array, and blade means movably mounted on said tool frame for forcing each wire into a contact slot, said blade means comprising thin rounded ends which coin each wire into a contact slot.

4,945,628

# TOOL STORE FOR MACHINE TOOLS

Peter Novak, Tagerwilen, Switzerland, assignor to Starrfrsch-maschinen, AG, Rorschacherberg, Switzerland

Filed Aug. 22, 1989, Ser. No. 397,019

Claims priority, application Switzerland, Aug. 24, 1988, 3151/88

Int. Cl.<sup>5</sup> B23Q 3/157

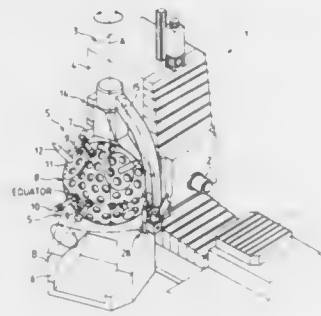
U.S. Cl. 29—568

25 Claims

1. A tool store device for machine tools, particularly for programmable machine tools, for storing, removing, returning and making available tools which are arranged individually and in groups with longitudinal axes thereof extending at right angles to a store surface, the device comprising a tool carrier carrying the tools; an advance unit for gripping the tools at said tool carrier; a tool changer for removing the tools from and returning the tools to said tool carrier; a stand in which is mounted said tool carrier, said tool carrier being formed as a substantially spherical segmental shell provided with tool-



receiving locations and being driven by a motor mounted in said stand to rotate about a horizontal axis intersecting a center



(M) of said spherical segmental shell, said advance unit being arranged in an interior of the spherical segmental shell.

4,945,629

## VERTICAL CARROUSEL

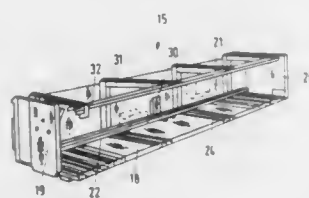
Ernst Schafft, Landau, Fed. Rep. of Germany, assignor to Bellheimer Metallwerk GmbH, Bellheim, Fed. Rep. of Germany  
Filed Sep. 16, 1988, Ser. No. 245,790

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 3731871

Int. Cl.<sup>5</sup> B23Q 3/155

U.S. Cl. 29—568

22 Claims



1. A vertical carousel within a housing, said housing including front and rear ends and side walls disposed between said ends, at least one of said ends of said housing having a first loading and unloading opening, said vertical carousel having a plurality of bearers, and means for circulating said bearers in said housing, said means for circulating including means for transferring said bearers into the region of said first loading and unloading opening, and at least one additional loading and unloading opening (14) defined in at least one of said side walls (12) of the housing (10) in the region of the first loading and unloading opening (11), and

an article holding carriage (22) provided on at least one of said bearers (15), and means for displacing said article holding carriage from the front side of said at least one bearer to the rear side and back of said at least one bearer.

4,945,630

## METHOD OF MAKING A SELECTED SIZE INJECTION MOLDING NOZZLE

Jobst U. Gellert, 7A Prince Street, Georgetown, Ontario, Canada L7G 2X1

Filed Feb. 12, 1990, Ser. No. 478,503

Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 29—611

7 Claims

1. A method of making a selected sized integral injection molding heated nozzle comprising the steps of:

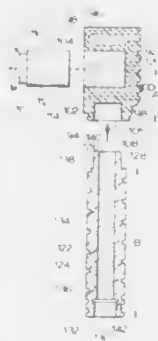
(a) making a steel rear portion having a forward end, a rear

end, and a generally cylindrical outer surface, the outer surface having a continuous convoluted first groove extending to receive an electrical heating element therein, having,

(b) selecting at least a first elongated steel forward portion made with a forward end, a rear end, and a generally cylindrical outer surface, the outer surface having a continuous convoluted second groove extending to receive an electrical heating element therein, the first elongated forward portion having a melt bore extending therethrough from an inlet at the rear end to an outlet at the forward end, the selected first forward portion being of a predetermined desired outer diameter and length from the forward end to the rear end, the melt bore inlet of the selected first forward portion being of a predetermined desired diameter,

(c) machining the rear portion to provide a melt channel extending therethrough from an inlet to an outlet at the forward end, the melt channel outlet having a diameter equal to the diameter of the melt bore inlet of the first forward portion,

(d) rotating the first forward portion relative to the rear



portion to a position wherein the second groove is in continuous alignment with the first groove, and joining the rear end of the first forward portion to the forward end of the rear portion in this position, wherein the melt bore inlet of the first forward portion is in alignment with the melt channel outlet of the rear portion,

(e) winding an electrically insulated heating element in the first and second grooves which extend continuously from the outer surface of the rear portion to the outer surface of the first forward portion,

(f) applying brazing material where the rear end of the first forward portion joins the forward end of the rear portion, and applying a coating of binder and metallic powder to the outer surfaces of the rear portion and the first forward portion, and

(g) heating the joined rear portion and first forward portion under a partial vacuum in the presence of an inert gas for a period of time and to a temperature sufficient to melt the brazing material to integrally braze the first forward portion to the rear portion and sufficient to melt the metallic powder and remove the binder to form a protective metallic coating on the outer surfaces of the rear portion and the first forward portion.

4,945,631

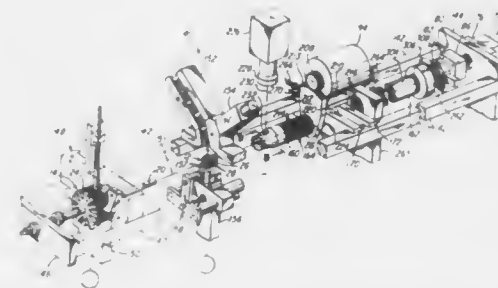
## ARMATURE ASSEMBLY APPARATUS

Alvin C. Banner, Kettering; Gary E. Clemenz, Bellbrook; Ballard E. Walton, Dayton, all of Ohio, and Frank D. Varecka, Churchville, N.Y., assignors to Globe Products Inc., Dayton, Ohio and General Motors Corporation, Detroit, Mich.  
Continuation of Ser. No. 203,378, Jan. 6, 1988, abandoned. This application Jan. 28, 1989, Ser. No. 372,105

Int. Cl.<sup>5</sup> H02K 15/00

U.S. Cl. 29—705

14 Claims



1. Apparatus for aligning a commutator relative to an armature core mounted on an armature shaft in preparation for placing the commutator onto the armature shaft utilizing a commutator placing ram having a commutator-receiving fixture at one end thereof that non-rotatably receives a commutator and positions said commutator with its center axis aligned with the axis of movement of said ram, said apparatus comprising:

means supporting an assembled armature core and armature shaft in axial alignment with said fixture;  
means positioning a tang-oriented commutator within said fixture;  
means for detecting the angular distance of an edge of a commutator bar of a commutator positioned in said fixture relative to a predetermined reference position; and  
means for rotating said fixture relative to said core through an angle equal to said detected angular distance to bar edge-orient said commutator relative to said core.

4,945,632

## ROTARY LINE FOR ASSEMBLY OF TIP FOR FLEXIBLE HOSE WITH CAULKING MEANS

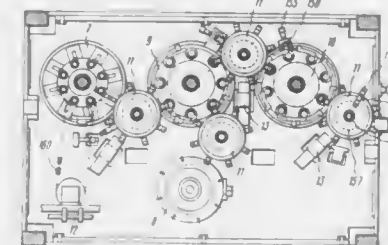
Lev M. Alman, 105, kv. 316, prospekt Rokossovskogo, Minsk, and Mikhail A. Lukashovich, 69, kv. 52 ulitsa Volgogradskaya, Minsk, both of U.S.S.R.

Filed Jul. 19, 1989, Ser. No. 382,182

Int. Cl.<sup>5</sup> B23P 21/00

U.S. Cl. 29—781

9 Claims



1. A rotary line for assembly of a tip for a flexible hose, comprising, mounted on a base; an automatic rotary means for feeding a line with bodies of tips; an automatic rotary means for feeding a line with inserts; transportation rotors; a pressing

rotor; devices to monitor the minimum and maximum pressing efforts, incorporated in said pressing rotor; an automatic rotary caulking means; a tool holder mounted on a drive shaft and coupled with said automatic rotary caulking means; tool blocks coupled with said tool holder, each made in the form of coaxial rods; a support tool coupled with one of said rods; a caulking punch of said automatic rotary caulking means, a coupled with the other coaxial rod; a control system; a memory of said control system, coupled with said automatic rotary means for feeding the line with tip bodies and said automatic rotary means for feeding the line with inserts; devices for monitoring the depth of a caulking trail, fitted in said tool blocks of said caulking rotor; photosensors through which the devices for monitoring the depth of the caulking trail are coupled with said memory of said line control system, a bushing as an element of said device for monitoring the depth of the caulking trail, installed on said caulking punch with a possibility of axial displacement; measuring rods associated with said bushing; a holder as an element of said device for monitoring the depth of the caulking trail, having recesses of its side surface, arranged on said measuring rods carrying said caulking punch with a possibility of axial and angular displacement and interaction of its end surface with the end surface of said bushing; balls fitted in spiral slots of said measuring rods carrying said caulking punch and partially in the recesses of the holder and associating the latter with said bushing, a base bushing installed on said measuring rods with a possibility of its end surface interacting, through said balls, with the end surface of said holder and spring-loaded relative to said measuring rods along its axis towards said caulking punch; a rod lock with a roller, arranged parallel to the axis of said base bushing and spring-loaded relative to the latter; radially spring-loaded friction blocks fitted between said base bushing and said measuring rods; flags located on said base bushing and holder and having slots to pass the beams of said photosensor, said flag of the base bushing carrying said rod lock and the flag of the holder having a hole accommodating said lock; a former interacting with said roller of said lock.

4,945,633

## METHOD OF MOUNTING A PRINTED CIRCUIT BOARD AND SECURING THE EARTHING TO A CASING

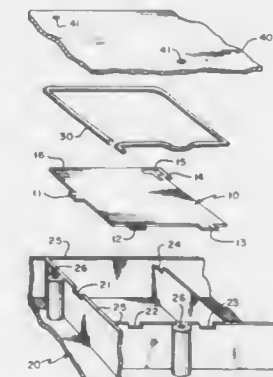
Pekka Hakanen, Turku; Lassi Lahti, Salo; Jari Suotari, Halikko; Eero Sirkiä, Salo; Timo Kallioinen, Forssa; Heikki Nieminen, Toijala; Seppo Alaspää, Tikkakoski; Kari Salo, Salo; Harri Halonen, Rovaniemi, and Markku Rauhanummi, Palmio, all of Finland, assignors to Nokia-Mobira Oy, Salo, Finland

Filed Mar. 1, 1989, Ser. No. 317,573

Int. Cl.<sup>5</sup> H05K 9/00

U.S. Cl. 29—825

5 Claims



1. A method of mounting a printed circuit board into a radio frequency shielding casing, the casing having an electrically conducting surface, and securing the earthing between the

printed circuit board and the casing, characterized in that the method comprises the steps of:

- providing the printed circuit board with projecting parts on at least two sides of the printed circuit board, and arranging earthing means on the printed circuit board to extend on at least one face of said projecting parts;
- providing the edges of the casing with a corresponding number of recesses dimensioned and positioned so as to receive said projecting parts therein;
- mounting the printed circuit board into the casing so that the projecting parts fit into the recesses to support the printed circuit board in the casing, the outer face of the printed circuit board situated at least as low as the plane defined by the edges of the casing;
- attaching a flexible sealing strip of electrically conducting material along the edges of the casing continuing over the projecting parts; and
- placing a lid on said sealing strip, tightening the lid against the sealing strip and securing the lid to the casing.

4,945,634

#### ASSEMBLY PACKAGING METHOD FOR SENSOR ELEMENTS

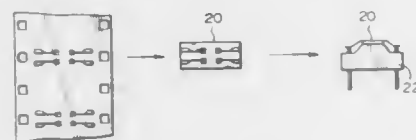
Akira Kumada, Kanagawa, Japan, assignor to Murata Mfg. Co., Ltd., Kyoto, Japan

Filed Aug. 29, 1989, Ser. No. 400,568

Claims priority, application Japan, Aug. 31, 1988, 63-218926  
Int. Cl.<sup>3</sup> H05K 13/04; H01R 43/00

U.S. Cl. 29—854

6 Claims



1. A method of assembly packaging a sensor element by connecting electrodes to a sensor chip having a plurality of terminals, coating said sensor chip with a protective insulation film and mounting the thus-obtained sensor on a sensor base, said method comprising the steps of:

- continuously providing electrode patterns which correspond to the respective terminals of sensor chips on a single side of a sheet-like tape carrier composed of an insulating material;
- bonding said sensor chips to said tape carrier to provide a bonded insulation film on said chips;
- connecting said terminals of each of said sensor chips to the corresponding electrode patterns on said tape carrier;
- separating portions of said tape carrier with said sensor chips mounted thereon from the tape carrier;
- and mounting the thus-obtained sensor on said sensor base.

4,945,635

#### METHOD OF MANUFACTURING BRAZABLE PIPES AND HEAT EXCHANGER

Mitsuru Nobusue, and Noboru Kodachi, both of Oyamashi, Japan, assignors to Showa Alumina Kabushiki Kaisha, Osaka, Japan

Filed May 30, 1989, Ser. No. 358,708

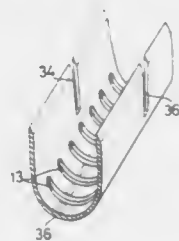
Claims priority, application Japan, Jul. 14, 1988, 63-176095  
Int. Cl.<sup>3</sup> B21D 53/02

U.S. Cl. 29—890.043

8 Claims

1. A process for producing a heat exchanger or the like, the heat exchanger including a header, fins and tubes whose ends are connected to the header, the process comprising: preparing a brazing sheet which includes a core sheet coated with a brazing substance at least on one surface; forming a bulged portion in the brazing sheet, the bulged portion having a semi-circular cross-section; providing apertures in the bulged portion; rolling the brazing sheet into a cylinder to form a header,

the opposite ends of the sheet being butt jointed to each other; providing a tube for each aperture; inserting the end of each tube into the corresponding aperture of the header; placing fins



between adjacent tubes so as to fabricate a provisional assembly of the tubes, the fins and the header; and heating the provisional assembly in a brazing furnace to effect a permanent joint among the tubes, the fins and the header.

4,945,636

#### COAXIAL CABLE STRIPPER

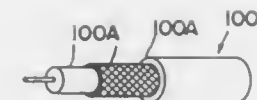
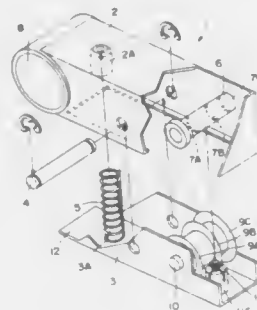
Takeshi Takizawa, Tokyo, Japan, assignor to Canare Electric Co., Ltd., Aichi, Japan

Filed Jan. 11, 1989, Ser. No. 295,915

Int. Cl.<sup>3</sup> H02G 1/12

U.S. Cl. 30—91.2

1 Claim



1. A coaxial cable stripper comprising:

- a main casing and a moving casing which are pivotally connected by a supporting pin;
- a spring provided between said main casing and moving casing so that said spring urges one end of said main casing and an opposing end of said moving casing in opposite directions;
- a plurality of circular blades rotatably mounted at another end of said moving casing, each of said plurality of blades being of a different diameter and separated from each other by a predetermined distance;
- a cylindrical cable holder provided in said main casing,
- a plurality of slits provided in said cable holder, each of said plurality of slits corresponding to one of said plurality of blades so that each of said plurality of blades enter a corresponding one of said plurality of slits by a spring force of said spring; and
- a blade adjusting means for setting an amount each of said blades extends into said slits provided at said another end

of said moving casing, said adjusting means comprising a boss and adjustment screw so that said adjustment screw can be screwed into and out of said boss and contact with said cable holder whereby a depth to which said coaxial cable is cut by said plurality of blades is adjusted.

4,945,637

#### POWER-DRIVEN CHAIN SAW

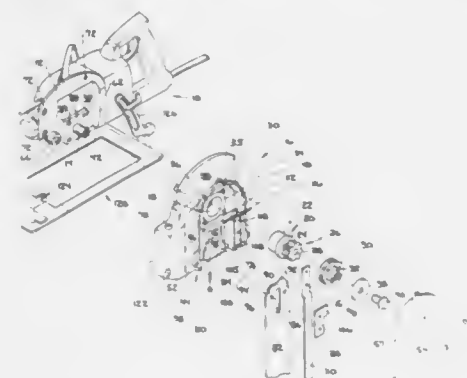
Harvey G. Anderson, Muskegon, Mich., assignor to Pro Power Corporation, Kalamazoo, Mich.

Filed Jan. 6, 1989, Ser. No. 294,765

Int. Cl.<sup>3</sup> B27B 17/02

U.S. Cl. 30—122

10 Claims



1. A power-driven chain saw converted from a power-driven hand saw which comprises:

- a stripped-down power unit of a power-driven circular hand saw having a mounting face on one side with a drive shaft projecting normally therefrom;
  - a chain-saw sprocket on said drive shaft;
  - a housing member for enclosing said sprocket and the chain-saw chain thereon;
  - said housing member having a base member normal to said drive shaft and having side members thereon parallel to said drive shaft and an open end through which a substantial portion of said chain and said support bar project and an arcuate closed end arcing around said shaft;
  - a cover plate adapted to conform to and to be removably fastened to said parallel side members and said arcuate closed-end member; and
  - one of said parallel side members and a portion of said arcuate member being close to said support bar and spaced therefrom to provide a relatively close clearance from said chain and the other of said parallel side members and the remainder of said arcuate portion being spaced farther from said chain support to leave a substantial area between said chain and said other parallel side member,
- in which said substantial area has a window therein comprising a substantially elongate opening extending lengthwise from adjacent said chain saw support bar to adjacent said other parallel side, said window being provided with deflecting means for deflecting sawdust to the exterior of said housing, said deflecting means comprising a flange projecting inwardly and upwardly from the lower edge of said housing toward said cover plate.

4,945,638

#### HEDGE CUTTING, TRIMMING AND PRUNING TOOL

Glenn Dietel, 305 Thistle Ln., Maitland, Fla. 32751

Filed Jul. 27, 1988, Ser. No. 225,026

Int. Cl.<sup>3</sup> B26B 3/00

U.S. Cl. 30—309

2 Claims

1. A tool for manually trimming, cutting and pruning hedges and the like comprising:

an elongated handle having a portion at one end which is offset from the remainder of the handle;

a blade aligned with and attached to the offset portion of the handle, said blade being semi-circularly shaped and hav-



ing a cutting surface on the inner edge of the semi-circular blade; and  
fastening means in the offset portion of the handle for attaching the blade to the handle.

4,945,639

#### BULLET KNIFE WITH SHEATH/HANDLE

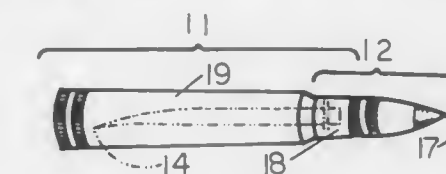
Randall R. Kirby, 3912 Markle Ave., Terre Haute, Ind. 47805

Filed Sep. 22, 1989, Ser. No. 410,875

Int. Cl.<sup>3</sup> B26B 1/00

U.S. Cl. 30—329

2 Claims



1. A bullet knife of two part construction comprising:

- a brass rifle shell having an outer, tapered open end adapted to receive a bullet tip, said rifle shell serving both as a sheath and a handle for said knife;
- a lead bullet tip having a flat inner end and an outer, nose-shaped end, said bullet tip being adapted to fit snugly in the outer, tapered open end of said brass rifle shell; and
- a knife blade rigidly secured to, and extending axially from the flat, inner end of said bullet tip, said bullet tip, said bullet tip being adapted to be disposed in the outer, tapered open end of said rifle shell in a first and second position, said first position having the knife blade exposed so that the rifle shell defines a knife handle, and said second position having the knife blade enclosed inside the rifle shell so that the rifle shell defines a sheath.

4,945,640

#### WEAR RESISTANT COATING FOR SHARP-EDGED TOOLS AND THE LIKE

Diwakar Garg, 2815 Whitmarsh Pl., Macungie, Pa. 18062; Carl F. Mueller, 1221 Tatamy Rd., Easton, Pa. 18042; Ernest L. Wrecsics, 6077 Weaversville Rd., Bethlehem, Pa. 18017; Paul N. Dyer, 3920 Pleasant Ave., Allentown, Pa. 18103, and Mark A. Pellman, 2908 Lindbergh St., Orefield, Pa. 18069

Continuation-in-part of Ser. No. 92,809, Sep. 3, 1987, Pat. No. 4,874,642, and a continuation-in-part of Ser. No. 153,738, Feb. 8, 1988, Pat. No. 4,855,188. This application Mar. 7, 1989, Ser. No. 319,774

Int. Cl.<sup>3</sup> B26B 9/00

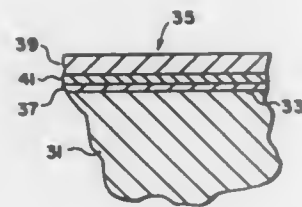
U.S. Cl. 30—350

13 Claims

1. A method for increasing the wear life of a sharp edged metal structure such as a cutting tool or the like wherein said sharp edge is defined by at least one surface, said method comprising the steps of: providing a base layer of a noble metal on said surface, said base layer having a thickness sufficient to protect said surface from corrosion during chemical vapor deposition, and chemically vapor depositing an outer coating comprising a mixture of tungsten and tungsten carbide wherein said tungsten carbide is selected from the group consisting of



W<sub>2</sub>C, W<sub>3</sub>C and mixtures of W<sub>2</sub>C and W<sub>3</sub>C, said outer coating being fine grained, non-columnar and having a substantially



layered microstructure and a thickness sufficient to confer a desired degree of wear resistance on said sharp edge while retaining the desired sharpness.

4,945,641

## CHAIN SAW SAFETY GUARD

Clifton L. Miller, 3 Riverview Rd., Riverside, Launceston Tas., and Ronald L. Kerrison, 171 Rosevears Dr., Legana, Tas. both of Australia

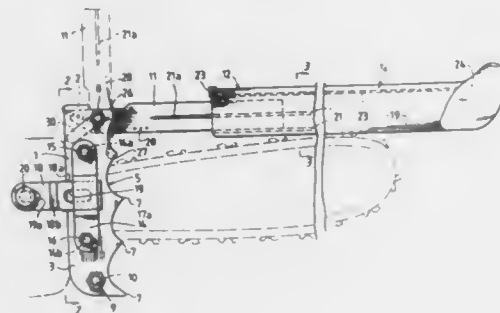
Filed Apr. 22, 1988, Ser. No. 184,687

Claims priority, application Australia, Apr. 24, 1987, P11592

Int. Cl.<sup>5</sup> B23D 57/02

U.S. Cl. 30—382

11 Claims



1. A protecting device for a chain saw including chain bar mounting nuts, comprising mounting bracket means, pivot means carried by said bracket means, an elongate protecting bar attached to said pivot means, means for biasing said bar towards a rest position in which the bar extends in use generally parallel to the chain of said chain saw, said bracket means including provision for attachment of said bracket means to the body of the chain saw by means of the chain bar mounting nut(s) thereof and wherein said mounting bracket means includes a member having a top portion and depending side portions which in use are positioned on either side of the chain bar of the chain saw, said pivot means being carried by said side portions adjacent said top portion and said protecting bar being positioned so that a portion thereof engages said top portion to maintain said bar in its rest position, said provision for attachment of said bracket means to the body of the chain saw being formed in or attached to one of said side portions.

4,945,642

## QUILTING TEMPLATE

Susan Saulietis, 12617 Harriet Ln., Santa Fe, Tex. 77510

Filed Dec. 19, 1988, Ser. No. 286,179

Int. Cl.<sup>5</sup> A41H 3/00

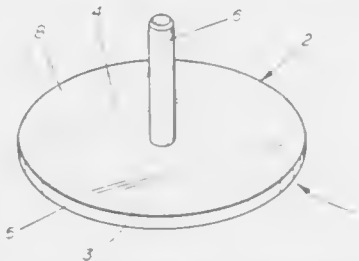
U.S. Cl. 33—17 R

3 Claims

1. A template for guiding a blade-type cutting tool for cutting material comprising:

a substantially rigid, substantially transparent template body

having a material contacting surface and an opposite non-contacting surface and a guiding edge wherein the guiding edge corresponds to a predetermine configuration to permit the cutting tool to be abutted against the edge during the cutting process for accurately guiding the tool to cut the material in the predetermined configuration;



the material contacting surface of the body includes a rough portion to provide resistance against sliding of the template over the material so that the template remains in place during the cutting process;

said template body includes a marking which defines a margin between the cutting edge and the center of the template body which corresponds to a predetermined seam allowance; and

said seam allowance marking includes said rough portion.

4,945,643

## AMUSEMENT APPARATUS FOR DRAWING A DISTORTED CARICATURE BY TRACING AN ORIGINAL PHOTOGRAPH OR THE LIKE

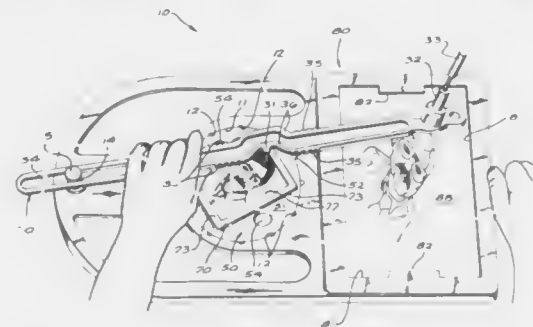
Adolph E. Goldfarb, 1432 SE. Wind Cir., Westlake Village, Calif. 91361

Continuation-in-part of Ser. No. 150,028, Jan. 29, 1988, Pat. No. 4,825,556. This application Feb. 10, 1989, Ser. No. 309,396

Int. Cl.<sup>5</sup> B43L 13/10

U.S. Cl. 33—23.04

8 Claims



1. An amusement apparatus for use with a drawing medium and drawing implement to draw a distorted caricature of an original picture by tracing of the original picture; said apparatus comprising:

a base;

a platform, supported from the base for rotation about a platform-rotation axis, for carrying such an original picture;

a drawing easel, supported from the base, for holding such drawing medium;

a drawing-implement arm having:

at one location along the arm, a motion-imparting stylus disposed generally adjacent to the platform for manual manipulation by a user to trace such original picture when in place on the platform.

at another location along the arm, a drawing-implement holder disposed generally adjacent to the easel for

holding such drawing implement for marking on such medium when such medium is in place on the easel, and at a third location along the arm, a longitudinal track; means, supported from the base, for defining an arm-pivot axis fixed relative to the base, and for engaging the track so that motions of the stylus are resolved into radial and rotary components of motion relative to the arm-pivot axis;

said radial components of motion of the stylus being produced by relative sliding motion of the track with respect to the arm-pivot axis means, and in turn producing substantially equal radial components of motion of the drawing-implement holder; and

said rotary components of motion of the stylus producing corresponding rotary components of motion of the drawing-implement holder, with an enlargement factor determined by the relative distances of the stylus and the drawing-implement holder from the arm-pivot axis;

whereby said apparatus produces such a caricature of the original picture that is distorted by being enlarged with respect to only the rotary components of tracing motion; a retainer, carried on the platform, for retaining such an original picture; and

manually operable means for positioning the platform, and the retainer and original picture thereon, in any user-selected one of a multiplicity of angular orientations;

whereby the user can select and set a desired particular angular orientation of the original picture relative to said radial components of motion of the stylus, and thereby select a desired relationship between directions in which enlargement occurs and features of the original picture; and wherein:

the positioning means comprise manually releasable detent means for holding the platform against rotation;

the platform is a generally circular disc having a downward-extending central shaft;

the base has a generally circular recess to receive the platform, and a central hole within the recess to receive the shaft;

the manually releasable detent means comprise first detent elements formed in the platform, and second detent elements formed along the recess for engaging the first detent elements;

a bottom end of the shaft protrudes below the base and is there captured by a fastener;

the fastener is positioned sufficiently far downward along the shaft to permit the platform and shaft to be raised out of the recess, to disengage the first detent elements from the second detent elements; and

finger-grip orifices are formed in the platform disc; whereby the user can repetitively and selectively release the holding of the platform in a particular orientation and restore the holding of the platform in another particular orientation, by inserting fingers through the orifices to grip the platform disc, raising the disc to disengage the detent elements, rotating the disc to differently align the detent elements, and lowering the disc to reengage the detent elements.

4,945,644

## HEMISPHERICAL SUNDIAL WITH INSTALLATION INDICIA

George L. Fuller, 444 E. Park Dr., Spartanburg, S.C. 29302

Filed Feb. 1, 1989, Ser. No. 304,564

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G04B 49/04; G01C 17/34

U.S. Cl. 33—270

3 Claims

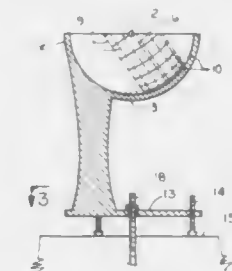
1. A hemispherical sundial comprising:

(a) a body having a hemispherical inner surface with a longitude index line on the inner surface in a plane containing the spherical center of said hemisphere and bisecting said hemisphere, and with a latitude index line on the inner surface in a plane containing the spherical center of said

hemisphere and at right angles to the plane containing said longitude index line and inclined to the plane end of said hemisphere at an angle within approximately 15° of the co-latitude of a site where said sundial may be used;

(b) a spherical gnomon with means to secure said gnomon at the spherical center of said hemisphere;

(c) longitude displacement indicia lines on the inner surface of said hemisphere with said longitude index line a basis representing zero longitude displacement—such that when a vertical line from the center of said gnomon intersects a longitude displacement indicium line for the site, the plane of said longitude index line will be inclined to the plane of said site longitude displacement indicium line an angular distance, measured along said latitude index line, equal to the difference between the longitude of the site meridian and the longitude of a time zone meridian;



(d) latitude indicia lines on the inner surface of said hemisphere with said latitude index line a basis representing zero latitude—such that when a vertical line from the center of said gnomon intersects the latitude indicium line representing said site latitude, the angular distance from said vertical line to said latitude index line, measured along a great circle will be equal to said site latitude; and

(e) time indicia lines on the inner surface of said hemisphere with said latitude index line a basis representing zero sun declination and with said longitude index line a basis representing 12 o'clock noon apparent zone time—such that when said gnomon is vertically above both said site longitude displacement indicium line and said site latitude indicium line, and when said site longitude displacement indicium line is in the plane containing said site meridian, the correct zone time will be indicated by the shadow of the gnomon from the sun.

4,945,645

## COMBINED CAR WASH AND WHEEL ALIGNMENT MEASURING DEVICE

Egon Brügelmeir, Jr., Buxheim, Fed. Rep. of Germany, assignor to Volker Remy, Montreal, Canada

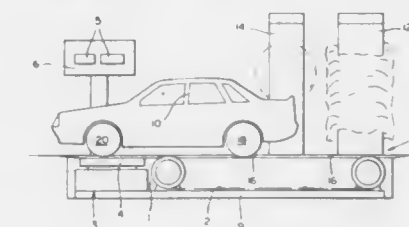
Filed Jul. 14, 1988, Ser. No. 218,939

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 8804443

Int. Cl.<sup>5</sup> G01B 5/255

U.S. Cl. 33—203.14

5 Claims



1. A car washing and wheel alignment unit comprising:

a car wash having a washing area and a drying area, a roller-conveyor belt extending through said car wash and terminating downstream from said drying area for driving a car through said car wash by pushing the rear wheels of the car through the car wash, and measuring means for measuring of the alignment of the front wheels of the car after the car has been driven through said car wash by pushing of the rear wheels of the car by said roller-conveyor belt, said measuring means being located downstream from said car wash in a path of travel of a car being driven through said car wash by said roller-conveyor belt and said measuring means being spaced from a terminal end of said roller-conveyor belt so that the front wheels of the car are moved across said measuring means by said roller-conveyor belt simultaneously pushing the rear wheels of the car as said roller-conveyor belt discharges a car from said car wash and the car continues along said path of travel beyond said measuring means.

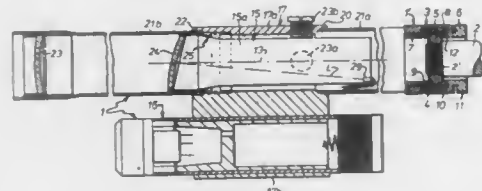
**4,945,646**  
**ARRANGEMENT IN A LUMINOUS DOT SIGHTING INSTRUMENT**

John A. I. Ekstrand, Ocala, Fla., assignor to Interarms Aktiebolag, Malmö, Sweden  
PCT No. PCT/SE86/00219, § 371 Date Nov. 9, 1988, § 102(e) Date Nov. 9, 1988, PCT Pub. No. WO87/07005, PCT Pub. Date Nov. 19, 1987

PCT Filed May 9, 1986, Ser. No. 269,787  
Claims priority, application Sweden, Nov. 15, 1984, 84057249  
Int. Cl.<sup>5</sup> G02B 27/36, 23/10, 27/34

U.S. Cl. 33—245

11 Claims



1. An arrangement in a luminous dot sighting instrument comprising:

- a supporting device;
- a tubular housing disposed in said supporting device, said housing containing a lens means with a semi-transparent mirror and a light source for producing a luminous sighting mark;
- means comprising adjusting screws disposed between said tubular housing and said supporting device for adjustment of the vertical and horizontal angular position of said tubular housing in relation to said supporting device; and
- elastic biasing means acting between said supporting device and said tubular housing for providing angularly adjustable resilient support of said tubular housing in said supporting device and for urging said tubular housing against said adjusting screws, said elastic biasing means acting on said tubular housing at a position axially spaced from said adjusting screws and comprising an annular elastic element encompassed by said supporting device and encompassing said tubular housing about a region adjacent one end of said tubular housing, said elastic biasing means exerting force components on said tubular housing which produce an obliquely directed bias on said tubular housing which tends to tilt said tubular housing into engagement with said adjusting screws; position axially spaced from said adjusting screws and comprising an annular elastic element encompassed by said supporting device and encompassing said tubular housing about a region adjacent one end of said tubular housing, said elastic biasing means exerting force components on said tubular housing which produce an obliquely directed bias on said tubular housing

which tends to tilt said tubular housing into engagement with said adjusting screws;

said annular elastic element being positioned between support members carried by said supporting device which exert an axially compressive force on said annular elastic element, and said tubular housing carries a circumferential ring which imparts an axial force component from said annular elastic element to said tubular housing.

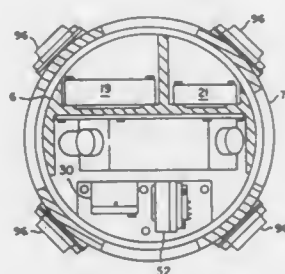
**4,945,647**  
**NORTH FINDING SYSTEM**

Thomas Beneventano, Washington Township, County of Bergen, and Raymond M. Bendett, Ridgewood, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Mar. 23, 1989, Ser. No. 327,874

Int. Cl.<sup>5</sup> G01C 19/38

U.S. Cl. 33—321

14 Claims



11. A north finding system of the type mounted to ground based equipment for providing a north reference for said equipment, and including platform means and control means, said north finding system comprising:

- the platform means including a case and a pivot rotatably supported by the case for being indexed to a plurality of positions;
- means coupled to the pivot for rotatably driving the pivot to index said pivot to the plurality of positions;
- first signal providing means coupled to the pivot for providing signals corresponding to the angular position of said pivot;
- means coupled to the pivot for locking the pivot to prevent said pivot from being rotatably driven and for thereby strapping down the platform means, and for otherwise unlocking said pivot;
- gyroscope means coupled to the pivot for sensing earth's rate when the platform means is strapped down, and thereupon being in a gyrocompassing mode and providing gyrocompassing signals;
- second signal providing means coupled to the pivot and providing signals corresponding to the tilt of the gyroscope means and signals corresponding to the motion of the ground based equipment when the gyroscope means is in the gyrocompassing mode;
- the control means including means connected to the gyroscope means and to the first and second signal providing means and responsive to the signals therefrom for compensating for predetermined gyroscope means tilt and ground based equipment base motion parameters, and including means for controlling the means for rotatably driving the pivot and means for controlling the pivot locking and unlocking means; and
- the gyroscope means including a ring laser gyro for providing frequency modulated analog signals corresponding to earth's rate, means connected to the ring laser gyro for processing the frequency modulated analog signals therefrom and for providing corresponding digital gyrocompassing signals, and the control means including means responsive to the digital gyrocompassing signals for providing north reference signals.

**4,945,648**

**MITERING GAUGE**

Klaus Roth, Viernheim, and Lothar Gerhards, Heidelberg, both of Fed. Rep. of Germany, assignors to ISOVER SAINT-GOBAIN, Courbevoie, France

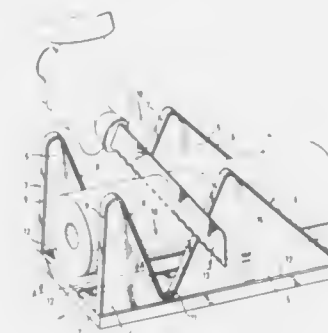
Filed Jan. 27, 1989, Ser. No. 302,204

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1988, 8801561

Int. Cl.<sup>5</sup> B27G 5/02

U.S. Cl. 33—529

6 Claims



1. Mitering gauge for cutting miters particularly on pipe insulating shells, which comprises:

- a console; and
- at least one upright side member having first, second, third and fourth guide surfaces to guide a cutting tool, wherein the thickness of the body of the side member is smaller than the width of each of the guide surfaces of the side member, said first guide surface located at one end portion of said side member defining an angle of 45° with said console and wherein the upright side member also includes a V-shaped cut-out which defines said second and third guide-surfaces, said second and third guide surfaces enclosing an angle of substantially 45° and having at the other end portion of the side member said fourth guide surface which extends at substantially a right angle to the console.

**4,945,649**

**ANGLE GAGE**

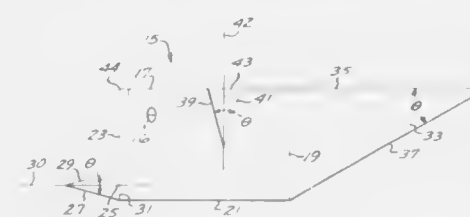
Kirk P. Parker, 9141 Loma St., Villa Park, Calif. 92667

Filed Dec. 11, 1989, Ser. No. 448,685

Int. Cl.<sup>5</sup> G01B 3/56

U.S. Cl. 33—534

6 Claims



1. An angle gage for making an accuracy determination of a preselected angle by visual comparison, comprising:

- a flat, rigid element having a contour defining a modified rectangle, the sides of the rectangle being modified such that,
- a first side of said rectangle has a converging isosceles projection extending therefrom, the convergence defining said preselected angle and the width of said projection being shorter than said first side;
- a second side of said rectangle, parallel to said first side, has a converging projection extending therefrom, the conver-

gence defining said preselected angle, the base of said projection coinciding with the entire length of said second side and an edge of said projection being perpendicular to said second side; and

- a third side of said rectangle, having formed therein a converging isosceles indentation, the convergence defining said preselected angle and the width of the indentation being shorter than said third side.

**4,945,650**

**MEASUREMENT DIGITIZER**

Edwin A. Hird, 10200 DeSoto Ave., #331, Chatsworth, Calif. 91311

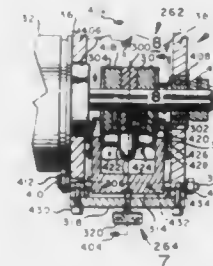
Continuation of Ser. No. 392,342, Jun. 25, 1982, which is a continuation-in-part of Ser. No. 783,608, Apr. 1, 1977, Pat. No. 4,419,672, Ser. No. 189,754, Sep. 23, 1980, Pat. No. 4,506,336, and Ser. No. 702,745, Jul. 6, 1976, Pat. No. 4,535,415. This application Dec. 22, 1988, Ser. No. 288,265

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> G01B 3/12

U.S. Cl. 33—763

36 Claims



1. A product for bidirectionally interconverting linear and rotary motions; said product comprising:

- a rotatably mounted sprocket wheel coupling including a wheel for regulating linear and rotary motions, and further including sprockets coaxial with said wheel; and a coilable rack having perforations and convex surface means for flattening about said wheel, the flattening of said convex surface means causing said perforations to respectively interlock with said sprockets thereby permitting said linear and rotary motions to be directed and received in equal amounts.

**4,945,651**

**APPARATUS FOR MEASURING LENGTH**

Aigner Georg, D-8386 Thannhausen, Fed. Rep. of Germany

Continuation of Ser. No. 940,550, Dec. 12, 1986, abandoned.

This application Dec. 29, 1988, Ser. No. 292,645

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1985, 3544515

Int. Cl.<sup>5</sup> G01B 3/28

U.S. Cl. 33—832

13 Claims

- 1. An apparatus for measuring length comprising:
- a single, substantially parallelepiped-shaped support foot (12) being elongated in a direction and having a first end and a second end, and an elongated contact plane (20) between said first end and said second end; a substantially parallelepiped-shaped housing (14) extending perpendicular to said support foot and said direction; and a grasping strip (18) connecting said support foot to said housing; and
- a sensor pin (16) housed in the housing (14) and being displaceable perpendicularly to the contact plane and remote from said support foot;
- said contact plane forming the bottom of said support foot (12) for contact with an object as reference surface for measurement between said contact plane (20) and said displaceable sensor pin (16); the support foot (12) having,



on at least one side thereof, a flat contact surface (50) extending transversely to the contact plane (20); and the housing (14) bearing the sensor pin (16) having a contact surface (52) coplanar with the contact surface (50) of the



support foot (12) so that said measuring apparatus is supportable on a flat planar reference surface with said flat contact surface (50) of the support foot (12) and said contact surface (52) of the housing (14) in stable and flatly supported abutment on the reference surface.

4,945,652

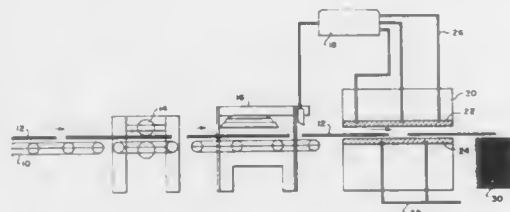
**CONTROLLED STEAM DRYING OF VENEER SHEETS**  
Michael R. Clarke, North Vancouver; Gary E. Troughton, Vancouver, and Donald C. Walser, Surrey, all of Canada, assignors to Forintek Canada Corporation, Vancouver, Canada

Filed Apr. 18, 1989, Ser. No. 340,077

Int. Cl.<sup>5</sup> F26B 7/00

U.S. Cl. 34—12

17 Claims



1. A process for drying unseasoned veneer sheets to a predetermined moisture content, comprising the steps of incising a veneer sheet, sensing moisture content of the incised veneer sheet, steam drying the veneer sheet under pressure, and controlling the drying, based on the sensed moisture content of the veneer sheet, to dry the sheet to the predetermined moisture content.

4,945,653

**APPARATUS FOR USE IN IMPREGNATING ELECTRICAL CABLES**

George S. Eager, Jr., Upper Montclair; Bogdan Fryszczyn, South Plainfield, both of N.J., and Ernest H. Thalmann, Southern Pines, N.C., assignors to Empire State Electric Energy Research Corp., New York, N.Y.

Division of Ser. No. 100,776, Sep. 24, 1987, Pat. No. 4,888,886.

This application Sep. 20, 1989, Ser. No. 409,751

Int. Cl.<sup>5</sup> F26B 7/00

U.S. Cl. 34—21

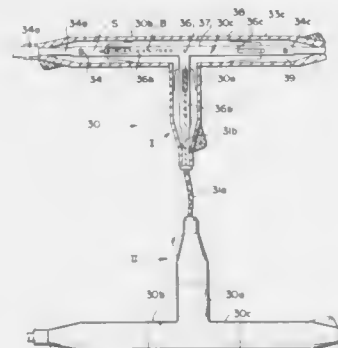
22 Claims

1. A method for passing fluid through the interior of a length of cable of an electric cable system comprising the following steps:

- (a) providing a fluid supply fitting having a plurality of elongate sections extending radially from a point of intersection, said sections including:
  - (i) a fluid section including a hollow core of conductive

material having an end adapted to be connected to a source of fluid;

- (ii) an electricity section including an essentially solid core of conductive material adapted to be connected to a source of electric current; and
  - (iii) an electricity-and-fluid section including a hollow core of conductive material in electrical contact with said solid core of conductive material of said electricity section and in communication with the hollow core of conductive material of said fluid section adapted to be connected to an end of a length of cable composed of internal conductive material covered by an insulation material for conducting electric current through a cable system;
- (b) installing said fitting in an electric cable system in a manner so that said electricity section is in electrical contact with a source of electric current, and so that said



electricity-and-fluid section is fastened to an end of a length of cable whereby a current of electricity from said source of electric current is conducted through said solid core of conductive material in said electricity section and said hollow core of conductive material of said electricity-and-fluid section of said fitting and into said end of a length of cable;

- (c) connecting said fluid section of said fitting to a reservoir of fluid;
- (d) introducing fluid from said source of fluid through the hollow core of conductive material of said fluid section and the hollow core of conductive material of said electricity-and-fluid section so as to supply said fluid into said end of a length of cable, without interrupting said current of electricity; and
- (e) continuing to supply said fluid to said end of a length of cable so that said fluid is dispersed throughout essentially the entire length of said cable.

4,945,654

**APPLICATION OF SUPERHEATED STEAM**

Robert J. H. Mason, 17-8720 Maple Grove Crescent, Burnaby, British Columbia, Canada V5A 4G5

Filed Apr. 20, 1989, Ser. No. 342,981

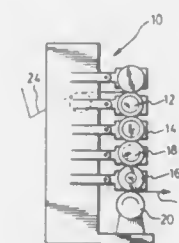
Int. Cl.<sup>5</sup> F26B 3/00

U.S. Cl. 34—23

16 Claims

1. A method of applying steam to a surface of a web comprising delivering steam in superheated condition from an applicator located immediately adjacent to a surface of said web to be impinged by said steam, moving said web relative to said applicator, transferring heat to said steam in said applicator immediately before said steam leaves said applicator to ensure said steam is in superheated condition when it issues from said applicator by maintaining said applicator at a temperature above 100° C., directing said superheated steam issuing

from said applicator toward said web and impinging said steam of said surface as said surface is moved passed said applicator



without significant condensation of said steam other than on said web.

4,945,655

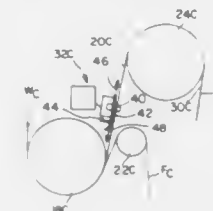
**APPARATUS FOR CUTTING A TAIL FROM A WEB**  
Gregory L. Wedel, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 14,569, Feb. 13, 1987, Pat. No. 4,934,067. This application Aug. 10, 1988, Ser. No. 230,627

Int. Cl.<sup>5</sup> F26B 3/00

U.S. Cl. 34—23

10 Claims



10. A method for cutting a tail from a web extending from a single tier dryer section to a further single tier dryer section, said method comprising the steps of:

- guiding the dryer felt around a last dryer of a dryer section such that the web is disposed between the dryer felt and the last dryer for drying a second side of the web;
- guiding the felt around a last felt roll disposed downstream relative to the last dryer;
- guiding a further felt around a first felt roll and thereafter around a first dryer of the further dryer section;
- guiding the web in open draw between the last dryer and the first dryer and thereafter around the first dryer between the further felt and the first dryer such that a second side of the web is dried as the web extends around the last dryer and a first side of the web is dried when the web extends around the first dryer;
- moving a rotating circular saw tail cutter to a position adjacent to the web in the open draw for cutting the tail for assisting threading of the further dryer section; and
- moving the first felt roll towards the last dryer when the tail cutting step is completed so that the open draw of the web between the dryers is reduced.

4,945,656

**CIRCULATING FLUIDISED BED APPARATUS**

Michael R. Judd, Westville, South Africa, assignor to National Energy Council, South Africa

Filed Jul. 31, 1989, Ser. No. 387,236

Claims priority, application South Africa, Aug. 12, 1988, 88/5986

Int. Cl.<sup>5</sup> F26B 17/00

U.S. Cl. 34—57 A

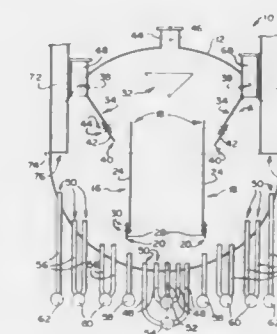
11 Claims

1. A circulating fluidized bed apparatus comprising: a housing;

a pair of spaced partitions located within the interior of the

housing, the partitions being opposed to each other and horizontally spaced from each other to define a draught zone therebetween, the partitions each extending upwardly from lower edges defining therebetween a lower inlet leading into said zone from the interior of the housing outside said zone, to upper edges defining therebetween an upper outlet leading from said zone into the interior of the housing outside said zone;

separate fluid feed arrangements respectively for feeding a fluidizing fluid into the housing for fluidizing a particulate material in the draught zone between the partitions and for feeding a fluidizing fluid into the housing for fluidizing a particulate material in the interior of the housing outside said draught zone, the feed arrangement for said draught



zone being a central feed arrangement located under the draught zone and the feed arrangement for the interior of the housing outside said draught zone being an outer feed arrangement located on opposite sides of the central feed arrangement and below the interior of the housing outside the draught zone; and

above the draught zone, fluid outlet arrangements from the housing respectively for fluidizing fluid from the draught zone and fluidizing fluid from the interior of the housing outside said draught zone, namely a central fluid outlet arrangement for fluidizing fluid from the draught zone and an outer fluid outlet arrangement for fluidizing fluid from the interior of the housing outside the draught zone, the outer fluid outlet arrangement being located on opposite sides of the central fluid outlet arrangement.

4,945,657

**ROTARY DRUM DRYER WITH IMPROVED PREMIXING ASSEMBLY**

Donald E. Shinn, and Andrew D. Livingston, both of Independence, Kans., assignors to Productization, Inc., Independence, Kans.

Filed Aug. 23, 1989, Ser. No. 398,837

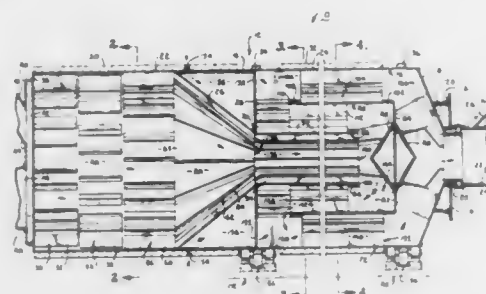
Int. Cl.<sup>5</sup> F26B 3/10

U.S. Cl. 34—128

12 Claims

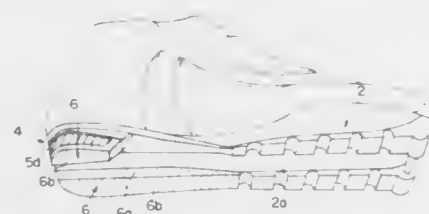
1. A multiple-pass product treating device comprising: an elongated, normally horizontally disposed, axially rotatable body having means defining a premixing zone and a plurality of elongated internal passageways intercommunicated to present a continuous, serpentine flow path within said body, there being an innermost passageway and at least one outer passageway, as a part of said flow path, said premixing zone including structure presenting a region of relatively large cross-sectional area and an aperture of relatively small cross-sectional area, said aperture being in fluid communication with the innermost of said passageways; inlet means defining a product inlet oriented for initially directing product to be treated into said premixing zone;

means defining a product outlet in communication with said outer one of said passageways, said one outer passageway having a larger crosssectional area than said innermost passageway; and means for creating air currents within said premixing zone



and along said flow path of said body, for conveying said product in a concurrent fashion with said air currents, from said product inlet to said premixing zone and thence along the flow path into and through said innermost passageway, and then into and through the remainder of said flow path and out said product outlet.

**4,945,658**  
**CROSS-COUNTRY SHOE**  
Marc Provence, Thorenes-les-Glières, France, assignor to Salomon S.A., Annecy Cedex, France  
Filed May 31, 1989, Ser. No. 359,456  
Claims priority, application France, May 31, 1988, 88 07225  
Int. Cl.<sup>5</sup> A43B 5/04  
U.S. Cl. 36—117 32 Claims



1. Cross-country ski boot comprising a sole (2) made of a molded plastic material having a longitudinal groove (2a), wherein said sole comprises, at least in a heel area (4) of said sole, a rigid reinforcing element (5) shaped to conform to a transverse profile of said groove (2a) of said sole (2) and embedded at least in part in the plastic material of the said sole (2), and wherein said reinforcing element (5) carries walking runners (6) mounted one element surfaces (5b, 5c) of said reinforcing element.

**4,945,659**  
**SKI BOOT HAVING AN INTERCHANGEABLE SOLE PORTION FOR CONTROLLING GLOBAL WEDGING ANGLE OF THE BOOT**  
Jean-Louis De Marchi, Duingt, and Michel Mabboux, Seynod, both of France, assignors to Salomon S.A., Annecy Cedex, France  
Filed Sep. 16, 1988, Ser. No. 245,272  
Claims priority, application France, Sep. 28, 1987, 87 13694  
Int. Cl.<sup>5</sup> A43B 5/04  
U.S. Cl. 36—117 29 Claims

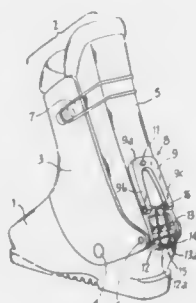
1. A ski boot for use with a ski having a top surface, said boot comprising:  
(a) a rigid shell base having an upper attached thereto, and having front and rear ends for establishing interior and exterior directions relative to the leg of a person wearing

the boot, and retention means on one of said ends, said upper being wedged on the base at an orientation angle alpha with respect to said retention means;  
(b) a sole portion having cooperation means cooperable with said retention means for releasably mounting the sole



portion on the shell base, said sole portion being constructed and arranged so that said cooperation means is adapted to be wedged on the ski at a wedging angle beta with respect to the top surface of the ski when the sole portion is connected to the ski by a binding.

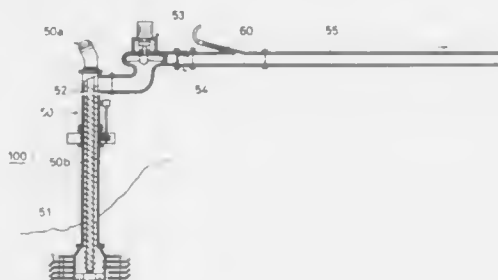
**4,945,660**  
**SKI BOOT**  
Claude Perrissoud, Saint-Jorioz, France, assignor to Salomon S.A., Annecy, France  
Filed Nov. 10, 1988, Ser. No. 269,323  
Claims priority, application France, Nov. 10, 1987, 87 15578  
Int. Cl.<sup>5</sup> A43B 5/04  
U.S. Cl. 36—120 19 Claims



1. Alpine ski boot comprising a shell base made of a rigid material, on which shell base is jointed, around a lower horizontal, transverse axis, a shaft composed of two pieces adapted to be tightened by tightening devices around a lower leg of a skier, said two pieces including a sleeve on a front part of the boot jointed onto the shell base around said axis and a rear cover jointed onto rear extensions of said sleeve around a second horizontal, transverse axis, said boot comprising elastic means for controlling flexion of said shaft which exert resistance to pivoting motion of the shaft, at least toward the front, in the case of forward flexion during skiing, wherein said elastic means comprise an energy cassette (8) attached to said rear cover (5) including an elastic deformable element (9) and at least one connector (12, 13; 18; 21-29; 46) extending between said elastic deformable element (9) and an anchoring block (14, 19) located on said shell base (1) beneath said energy cassette (8), said connector (12, 13; 18; 21-29; 46) being in traction whenever said shaft (2) pivots forward, thereby causing said connector to deform said elastic deformable element (9), said connector being inoperative in a static position of said shaft in which said boot is put on and removed, during rearward pivoting of said rear cover (5) alone about said second axis (6) and

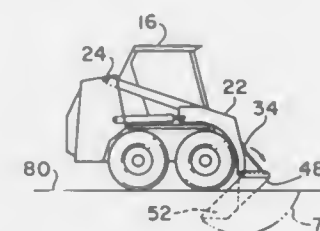
when said connector produces no resistance to pivoting movement of said shaft.

**4,945,661**  
**DREDGING APPARATUS**  
Kiyoshi Kukioka, Ryolchi Yamamoto, Koji Inaba, and Toyoma Hoshino, all of Yamaguchi, Japan, assignors to Ube Industries, Ltd., Ube, Japan  
Filed Aug. 7, 1989, Ser. No. 390,276  
Claims priority, application Japan, Nov. 29, 1988, 63-299444; Mar. 17, 1989, 1-63478  
Int. Cl.<sup>5</sup> E02F 3/92  
U.S. Cl. 37—67 6 Claims



3. A dredging apparatus comprising  
a vertical screw conveyor,  
a pressure feeder provided at the discharge port of said vertical screw conveyor,  
a check valve provided at the discharge port of said pressure feeder,  
a transport pipe provided after said check valve, and  
a nozzle for introducing compressed air into said transport pipe.

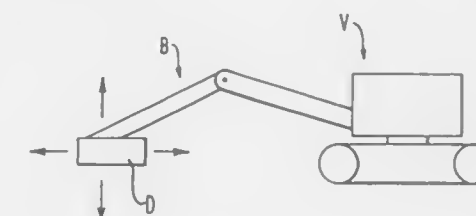
**4,945,662**  
**ATTACHMENT FOR TRACTOR**  
Luke Kreye, 125 Albemarle Ave., Hempstead, N.Y. 11550  
Filed Sep. 14, 1989, Ser. No. 407,119  
Int. Cl.<sup>5</sup> E02F 3/72  
U.S. Cl. 37—103 3 Claims



1. A backhoeing device comprising a tractor having a rectangular mounting plate operatively disposed in a forward position therefrom, a first forwardly extending piston means from said tractor having a pivotal connection along a lower edge of said rectangular mounting plate so as to urge said mounting plate through ascending and descending movements, a second forwardly extending piston means from said tractor having a pivotal connection along an upper edge of said rectangular mounting plate so as to urge said mounting plate in pivotal traverse towards and away from said tractor, said tractor having an operative position in which it is stationary adjacent to a first side of an excavation site, and a backhoeing bucket attached in downwardly facing relationship on said mounting plate, said bucket including a vertically oriented mounting plate adapted to attach in an abutting manner with

said rectangular mounting plate, said bucket mounting plate being affixed at its lower end to a bucket having a horizontal and vertical end wall members and a pair of parallel side walls, said end and side walls defining a generally trapezoidal inverted U shape bucket element having an open bottom and having an operative position adjacent a second opposite remote side of said excavation site, whereby incident to providing backhoeing service of said tractor said first piston means is adapted to initially lower said backhoeing bucket into contact with soil to be removed and said second piston means is adapted to thereupon urge said backhoeing bucket through a pivotal transverse towards said tractor and against the stationary weight thereof to thereby cause displacement of said soil from said excavation site into said backhoeing bucket.

**4,945,663**  
**APPARATUS AND METHOD FOR FORMING AND COMPACTING PLANTING MOUNDS**  
Aston Nilsson, Hälsjögatan 5, S-943 00 Öjebyn, Sweden  
Continuation of Ser. No. 185,903, Apr. 25, 1988, abandoned.  
This application Oct. 30, 1989, Ser. No. 427,985  
Claims priority, application Sweden, Apr. 28, 1987, 8701742  
Int. Cl.<sup>5</sup> E02F 3/00, 5/02; B66C 23/00  
U.S. Cl. 37—118 A 19 Claims



15. A method of forming and compacting planting mounds, such as for soil preparation prior to afforestation, comprising the steps of:

providing a carrier vehicle adapted to be driven along the ground and carrying a mound forming and compacting device on a boom means thereof for displacing the device upwardly and downwardly relative to the vehicle and toward and away from the vehicle substantially parallel to the ground, the device including a mound forming and compacting body having an elongate longitudinally concave soil-pushing surface of shape and dimensions suitable to define the upper surface of a planting mound for afforestation purposes and the like, the body being supported for pivotal movement relative to the boom means on a pivot axis parallel to the width of the soil-pushing surface and pivotable on said axis by an associated pivot means, and

operating the boom means and pivot means in such a manner as to position the mound forming and compacting body in the ground so that the soil-pushing surface has its length oriented generally upright and faces in a direction along the ground, to move the body along the ground in said direction while maintaining the soil-pushing surface in substantially the same orientation so that the soil-pushing surface breaks loose, collects and preliminarily compacts soil material for a planting mound, and to pivot the body to a position in which the soil-pushing surface faces downwardly into the ground, thus forming the soil material into a planting mound and further compacting the same.



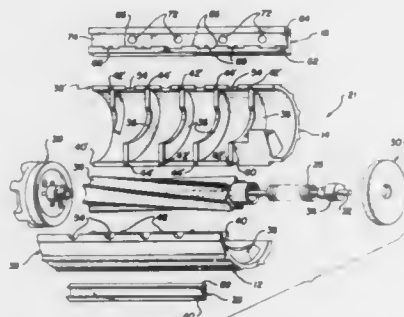
4,945,664

**AMMUNITION MAGAZINE HOUSING ASSEMBLY**  
Michael K. Miller, Bakersfield, Calif., assignor to AmerInd, Inc., Cleveland, Ohio

Filed Dec. 5, 1989, Ser. No. 446,340  
Int. Cl.<sup>3</sup> F41A 9/75

U.S. Cl. 42—49.01

20 Claims



1. An axially elongated hollow housing assembly for use in an ammunition magazine for a gun, the combination comprising:

first and second elongated housing halves having their outside configuration substantially symmetrical about the longitudinal plane of said housing assembly;  
means for releasably coupling said housing halves together comprising:

dovetail means extending longitudinally along substantially the entire length of said housing, said dovetail means comprising a first dovetail half on said first housing half and a second dovetail half on said second housing half, said second housing half having dovetail segments and dovetail cutouts alternating with each other and spaced longitudinally apart, and  
elongated clip means having a first elongated ledge for slideably engaging said first dovetail half, and a second elongated ledge for slideably engaging said second dovetail half, said second elongated ledge having ledge segments and ledge cutouts alternating with each other and spaced longitudinally apart,

said clip means slideably engaging said dovetail means for moving between an unlocked position where said ledge segments are aligned with said dovetail cutouts and said ledge cutouts are aligned with said dovetail segments to allow attachment or detachment of said clip means to said dovetail means, and a locked position where said ledge segments are aligned with said dovetail segments to hold said housing halves in the assembled together condition of said housing.

4,945,665

**QUICK-RELEASE GUN TRIGGER SAFETY DEVICE**  
Stephen G. Nelson, 469 Canton Dr., Solana Beach, Calif. 92075  
Filed Dec. 22, 1989, Ser. No. 455,172  
Int. Cl.<sup>3</sup> F41A 17/54

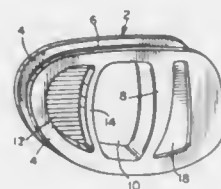
U.S. Cl. 42—70.07

8 Claims

1. A quick release trigger safety device for a gun having a trigger guard with an inner perimeter comprising:

a resilient block formed to closely fit said inner perimeter of said trigger guard with the gun's trigger depressed having a flange on each of two sides of said block extending beyond said inner perimeter to hold said block in place, an

opening having front and rear edges disposed at the center of said block, said opening being sufficiently large to



permit insertion of a user's trigger finger, and a simulated trigger formed at the rear edge of said opening.

4,945,666

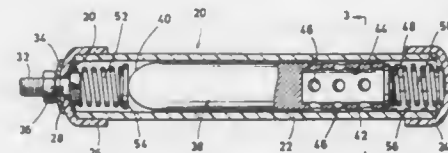
**REACTIVE FORCE COMPENSATOR FOR PROJECTILE FIRING DEVICE**

Harold J. Henry, 3143 Mariannwood Dr., and Paul M. Jennusa, 2636 Grand Blvd., both of Port Neches, Tex. 77651

Filed Jul. 26, 1989, Ser. No. 385,682  
Int. Cl.<sup>3</sup> F41B 5/20; F41C 23/06

U.S. Cl. 42—1.06

25 Claims



1. A reactive force compensator for a projectile firing device on which a force is exerted in a given direction when the projectile is fired, the compensator comprising:

an elongate, closed casing adapted to permit the casing to be mounted on the projectile firing device with the length of the casing generally parallel to the direction of said force on the projectile firing device, the casing having interior walls of constant transverse cross-section configuration along a significant portion of its length;

a weighted piston member disposed in the casing and reciprocable lengthwise of the casing, the piston member having a length, along a significant portion of which the transverse cross-sectional configuration of the piston member mates with that of the constant portion of the interior walls of the casing, said piston member having a closed end facing one end of the casing and a hollow skirt adjacent, and opening longitudinally through, the other end of the piston member;

the space between the piston member and the constant portion of the interior walls of the casing being sufficiently small to maintain the piston member generally parallel to the casing, but sufficiently large to allow free reciprocation of the piston member along the casing;

cushioning means comprising a resilient means disposed between the piston member and said one end of the casing, the casing being so adapted to be mounted on the projectile firing device with said one end of the casing rearmost with respect to the direction of said force on the projectile firing device; and

a volume of liquid disposed in the casing.

4,945,667

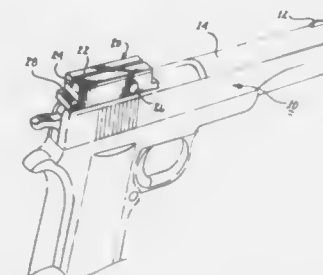
**SIMULATED SIGHTING DEVICE**

Curtis J. Rogalaki, 815 W. Beardsley Rd., Phoenix, Ariz. 85027, and Rudolph S. Rogalaki, 2346 E. Sylvia, Phoenix, Ariz. 85022

Filed Jan. 20, 1988, Ser. No. 209,174  
Int. Cl.<sup>3</sup> F41G 1/42

U.S. Cl. 42—100

8 Claims



1. A simulated sighting device for viewing on end a beam of light to assist in orienting an apparatus with a target, said device comprising in combination:

(a) a case, said case including a base member and a cover member;

(b) a source of visible light, said light source being disposed within said base member;

(c) means disposed within said case for channeling a beam of light from and in alignment with said light source along a predetermined axis of said case, said channeling means including baffles for defining the beam of light;

(d) an aperture disposed in said case, said aperture being aligned with the viewed beam of light for viewing on end the beam of light upon orientation of said device to locate the predetermined axis in alignment with an eye of the viewer; and

(e) means for attaching said device to the apparatus in a predetermined positional relationship; whereby, the apparatus will be oriented with the target in a predetermined relationship upon visual superimposition of the viewed beam of light with the target.

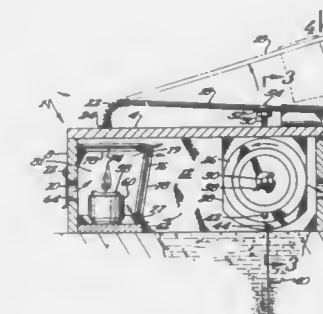
4,945,668

**ICE FISHING APPARATUS WITH HEATING CHAMBER**  
Cyril N. Keller, Rte. 3, Box 405, Fergus Falls, Minn. 56537

Filed Dec. 4, 1987, Ser. No. 128,595  
Int. Cl.<sup>3</sup> A01K 97/12

U.S. Cl. 43—17

13 Claims



1. An ice fishing hole heating device for dispensing and retrieving fishing line and for signalling the presence of a fish on the line comprising:

a housing having two opposed end walls, two side walls, a partially open bottom portion, and a hinged top wall, said hinged top wall being swingable between open and closed

positions, and having an exposed outer surface and an interior surface;

a pop-up flag bar attached to said exposed outer surface of said top wall and so constructed and arranged as to move from a generally horizontal restrained position to a normally upright signalling position upon release from said restrained position;

a reel for holding fishing line mounted to said interior surface of said top wall of said housing, said reel being mounted to said top wall so as to be suspended over said partially open bottom portion when said hinged top wall is in said closed position, said reel being so mounted as to allow free rotation for said dispensing and retrieving of fishing line;

a trip rod extending through an opening in said top wall in such manner as to be free to rotate within said opening, said trip rod having a detent arm for restraining said pop-up flag bar in said generally horizontal restrained position, and said trip rod having a portion thereof disposed within said housing and positioned so as to be actuated by said reel when said reel rotates so as to thereby rotate said trip rod and said detent arm and release said pop-up flag bar for movement to said normally upright signalling position; and

heat generating means supported inside said housing.

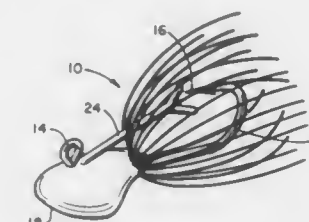
4,945,669

**JIG FISHING LURE WITH CONTROLLED RATE OF DESCENT**

Kenneth G. Webel, 8712 E. 46th St., Tulsa, Okla. 74145  
Filed Jan. 25, 1988, Ser. No. 147,760  
Int. Cl.<sup>3</sup> A01K 85/00

U.S. Cl. 43—42.39

12 Claims



1. A jig fishing lure characterized by a controlled rate of descent in water comprising:

(a) a fishing hook having an eyelet at one end of the shank and a barbed hook at the other end;

(b) a head means molded of plastic attached to the shank directly behind the eyelet wherein said plastic molded head means contains a metal core of sufficient mass to achieve an overall rate of fall in water for the lure of from less than 2 feet per second to about 1 foot per 3.25 seconds; and

(c) a skirt means attached to the shank and extending towards said barbed hook.

4,945,670

**DOWN RIGGER BREAKAWAY RELEASE DEVICE**  
Milo N. Wetherald, 6240 Piedmont Rd., Port Angeles, Wash. 98362

Filed Dec. 14, 1989, Ser. No. 445,402  
Int. Cl.<sup>3</sup> A01K 91/00

U.S. Cl. 43—43.12

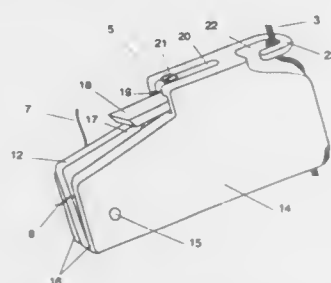
2 Claims

1. A release device for attachment to a down rigger cable for holding and releasing a fishing line, the release device comprising:

a body having a release end and a cable attachment end opposite said release end, said body made of one piece; and  
a means to securely hold said body to the down rigger cable,

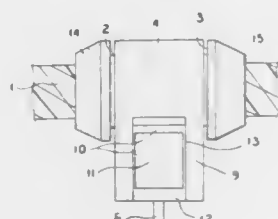


said securing means including means to prevent said body from slipping on the cable and said securing means including means to prevent twisting damage to the cable; a movable release trigger attached to said release end of said body, said trigger capable of moving between two positions, a first position wherein said trigger is closed and holds the fishing line to said release device and a second position wherein said trigger is open and releases the fishing line in response to a pull on the fishing line;



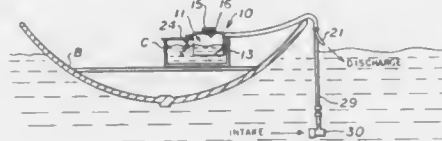
said securing means comprises a longitudinal groove at said cable attachment end of said body, said securing means further comprising means for holding the down rigger cable within said groove; said holding means further comprises at least one hook at one end of said groove for hooking the down rigger cable into a slot formed by said hook.

**4,945,671**  
**SNAP LOCK FOR HOOK-SNOOD ON A LINE FOR LONG-LINE FISHING TO CHANGE AUTOMATICALLY BROKEN SNOODS**  
Sigurbjorn A. Jonsson, P.O. Box 8947, 108 Reykjavik, Iceland  
Filed Aug. 31, 1989, Ser. No. 401,118  
Claims priority, application Iceland, Sep. 6, 1988, 3388  
Int. Cl.<sup>5</sup> A01K 91/04  
U.S. Cl. 43—44.94 12 Claims



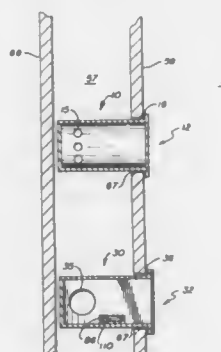
1. Apparatus for fastening a snood to a fishing line, including:  
a snap lock clip having a line gripping portion and a snood gripping portion, said line gripping portion having a central axial aperture formed by two resilient interengaging arms that releasably lock together, said snood gripping portion having a cavity and a cavity aperture in which a snood end is disposed;  
a snood having a hook end and an oppositely disposed attachment end, said attachment end having a knob disposed thereon, said knob is disposed in said cavity with said knob having a greater width than said cavity aperture and said snood disposed through said cavity aperture thereby holding said snood in swiveling relationship on said snap lock clip.

**4,945,672**  
**WATER CIRCULATING AND AERATING DEVICE FOR LIVE BAIT CONTAINERS**  
John A. Raia, 2102 Seamist Ct., Houston, Tex. 77008  
Filed Nov. 2, 1988, Ser. No. 265,894  
Int. Cl.<sup>5</sup> A01K 97/00  
U.S. Cl. 43—57 20 Claims



7. A water circulation and aerating device for live bait containers comprising:  
a housing formed of water resistant material having a continuous side wall enclosed by a bottom wall and a top wall and adapted to be removably mounted in the upper portion of a live bait container,  
apertures in the lower portion of said housing of sufficient size to prevent live bait from passing therethrough while allowing passage of liquid into said housing upon the level of liquid rising within the bait container,  
intake conduit means extending through the upper portion of said housing and having one end extending into the liquid in the bait container and another end extending remote from said housing and beneath the surface of the body of water being fished,  
exterior electric pump means at the remote end of said intake conduit means and adapted to be connected to a source of electrical current for pumping liquid from beneath the surface of the body of water into the bait container,  
aerating means on the portion of said intake conduit means passing through said housing for mixing air into the liquid being pumped into the bait container,  
interior electric pump means within said housing at the bottom portion thereof adapted to be connected to a source of electrical current and operative upon the liquid within said housing reaching a predetermined level to pump liquid from said housing, and  
discharge conduit means connected to said interior pump means for discharging the liquid pumped from said housing interior to a location remote from said housing.

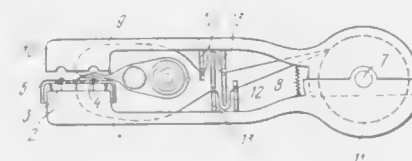
**4,945,673**  
**CENTRALIZED EXTERMINATION SYSTEM**  
Kevin P. Lavelle, 5 Emerson Ct., Winchester, Mass. 01890  
Filed Oct. 3, 1989, Ser. No. 416,384  
Int. Cl.<sup>5</sup> A01M 7/00, 1/20  
U.S. Cl. 43—124 15 Claims



1. A method for exterminating pests in the interior of a building and within the walls of a building, comprising:  
providing a plurality of orifices in the building walls, each of

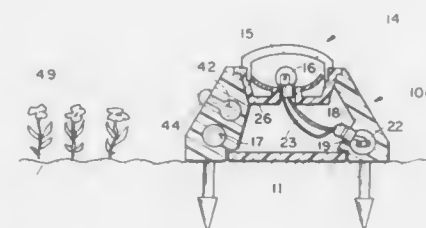
said orifices providing access to a cavity within the building walls;  
installing a chamber through each of said orifices, said chamber comprising a duct having an open end and sides, said open end opening to the orifice from the interior of the building, said chamber further comprising a plurality of holes within said sides to provide access to the cavity within the walls; and  
supplying a pest extermination substance into each of said chambers through said open end.

**4,945,674**  
**APPLIANCE FOR TYING UP PLANTS**  
Karen V. Alexandrian, ulitsa Teriana, 59, kv. 20; Karen G. Melikian, ulitsa Atarbekiana, 57/19, kv. 87; Akam A. Alexandrian, ulitsa Aboviana, 22, kv. 5; Kamo S. Saakian, Norashen Kvartal, 21, kv. 46; Levon Lachinian, ulitsa Tumaniana, 14, kv. 3, and Oganess S. Gendzhonian, ulitsa Dodokhiana, 2, all of Erevan, U.S.S.R.  
Filed Feb. 8, 1990, Ser. No. 477,308  
Int. Cl.<sup>5</sup> A01G 17/06  
U.S. Cl. 47—1.01 3 Claims



1. An appliance for tying up plants, comprising:  
a body with a welding tip and heating elements;  
a clamp with a gripping element spring-loaded relatively to said body;  
a reel for a tape tying material;  
a device for a cyclic advance of the tape from said reel, made in the form of shorter plates and longer plates arranged in succession on said body and clamp, each of said plates being provided with a slot for passing said tape;  
said slots are arranged on the shorter plates at free ends thereof and on the longer plates, level with the slots arranged on the shorter plates.

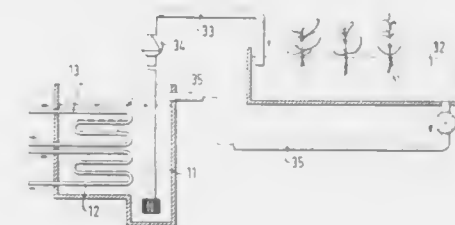
**4,945,675**  
**DIVIDING, WATERING AND LIGHTING SYSTEM FOR LAWNS**  
Glen T. Kendrick, 1181 W. Talton Ave., Deland, Fla. 32720  
Filed Aug. 23, 1988, Ser. No. 235,204  
Int. Cl.<sup>5</sup> A01G 1/00  
U.S. Cl. 47—33 11 Claims



1. A system for dividing, watering and illuminating lawns, plant beds, and the like, having a source of electric power and a source of water, comprising:  
(a) a plurality of elongate divider sections, each of said sections having at least one water conduit formed therealong for connection to said source of water, said conduit having a plurality of threaded outlets;

(b) at least one water sprinkler head disposed in said section and connected to one of said threaded outlets;  
(c) at least one wiring conduit formed along said section;  
(d) electrical wiring disposed in said wiring conduit and connected to said source of electrical power;  
(e) at least one electrical plug communicating with said wiring conduit and connected to said electrical wiring; and  
(f) at least one lighting fixture mounted on said section and connected to said electrical plug.

**4,945,676**  
**METHOD AND APPARATUS FOR SUPPLEMENTING THE FEED SOLUTION OF HYDROCULTURES WITH DESALINATED WATER**  
Erwin Sick, Icking, and Franz Penningsfeld, Freising, both of Fed. Rep. of Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Fed. Rep. of Germany  
Filed Sep. 27, 1988, Ser. No. 249,797  
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733440  
Int. Cl.<sup>5</sup> A01G 31/02  
U.S. Cl. 47—62 10 Claims

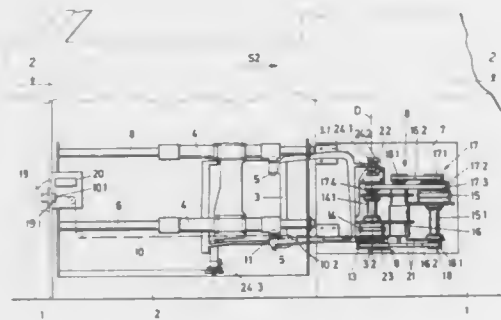


1. Apparatus for supplementing the feed solution of hydrocultures with desalinated water comprising:  
a feed solution tank for storing a feed solution adapted to fluctuate between two levels of the tank;  
pump means for supplying the feed solution by capillary force to the plant roots;  
a hollow feed structure of hydrophobic microporous material having an inside and an outside and being disposed in the store of the feed solution tank;  
said hollow feed structure separating salt water from the feed solution, the salt water having an elevated temperature relative to the store of feed solution and being feedable through the hollow feed structure such that water vapor only passes from the inside to the outside of said hollow feed structure and condenses in the surrounding colder store of feed solution, thereby heating feed solution portions disposed adjacent the hollow feed structure by the heat of condensation whereby the temperature of said feed solution portions rises.

**4,945,677**  
**SWINGING AND SLIDING DOOR FOR A VEHICLE, ESPECIALLY A MOTOR VEHICLE**  
Hans Kramer, Baunatal, Fed. Rep. of Germany, assignor to Gebr. Bode & Co. GmbH, Kassel, Fed. Rep. of Germany  
Filed May 10, 1989, Ser. No. 350,070  
Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816175  
Int. Cl.<sup>5</sup> E05F 11/38  
U.S. Cl. 49—210 10 Claims

1. In a swinging and sliding door for a vehicle, the door having a door panel, at least one pivoting arm securable to a wall of the vehicle, for pivoting about an axis of rotation, a carriage articulated to one end of the arm and sliding back and forth on a carrier connected to the door panel, and a drive mechanism securable to said wall of the vehicle and having a

first wheel driving a flexible linear-transmission element guided by rollers and attached to the door panel to generate the sliding motion and a second wheel that generates the swinging motion, the improvement comprising means mount-



ing the first and second wheel for rotation about an axis of rotation which is concentric with the axis of rotation of the at least one pivoting arm and means including automatic clutches for coupling both wheels to a common motor.

4,945,678

## WINDOW OPERATOR

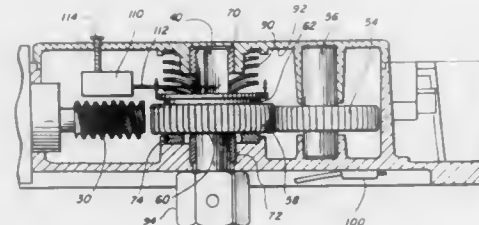
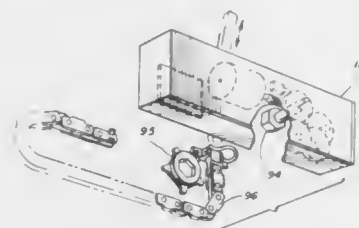
John M. Berner, Golden Valley; Eric C. Stender, New Hope; Frank W. Campbell, Brooklyn Center, and Allen J. Alden, Elk River, all of Minn., assignors to Truth Incorporated, Owatonna, Minn.

Filed Dec. 5, 1988, Ser. No. 280,590

Int. Cl.<sup>5</sup> E05D 13/04

U.S. Cl. 49—322

5 Claims



1. A window operator for moving a window component between fully open and closed positions and any desired position therebetween, comprising:

- a rotatable drive output member;
- a rotatable drive input member;
- a gear train between said drive input and drive output members;
- means for rotating said drive input member;
- a switch for controlling operation of said rotating means;
- means responsive to a closing torque applied to the rotatable drive output member in excess of a predetermined value for operating said switch to deenergize said rotating means;
- a clutch associated with said drive output member;
- spring means acting on said clutch to maintain a drive

through said clutch, said clutch including a pair of clutch members urged toward each other by said spring means, said clutch members having coating stops to prevent rotation of the clutch members and gear train in response to an externally-applied window component opening force;

coating helical ramps on said clutch members which cause progressive separating movement therebetween when said closing torque exceeds the force of said spring means holding the clutch members against movement; and means adjustably mounting said switch in the path of the clutch member which moves as the clutch members separate to establish said predetermined torque value.

4,945,679

## DRIVING DEVICE FOR THE OUTWARD PIVOTING FRAME OF DOORS OR WINDOWS

Laurent Aumercler, Phalsbourg, France, assignor to Ferco International, Sarrebourg, France

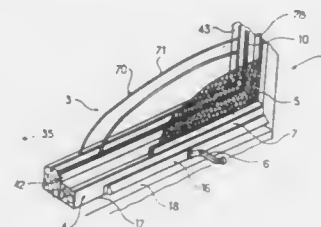
Filed Mar. 7, 1988, Ser. No. 164,951

Claims priority, application France, Mar. 12, 1987, 8703597

Int. Cl.<sup>5</sup> E05F 11/24

U.S. Cl. 49—342

8 Claims



1. A driving device for moving a pivoting frame with respect to a fixed frame comprising:

- (a) a first translation means mounted for translational movement with respect to said fixed frame;
- (b) a pinion mounted for engagement with said translation member, rotation of which effects the translational movement of said translation member;
- (c) means for rotating said pinion; and
- (d) a second translation means adapted to be connected to said pivoting frame for displacing a pivot axis of said pivoting frame in a plane substantially parallel to a plane defined by said fixed frame,

wherein said first translation means comprises a rack having a wing along a longitudinal edge extending therefrom at an angle of approximately thirty degrees, said wing having a toothed segment for cooperation with teeth of said pinion, said rack being mounted in a casing having a cover and a base plate disposed substantially parallel to a plane defined by said fixed frame.

4,945,680

## THRESHOLD SYSTEM FOR A DOMESTIC DOOR

Jean P. Giguere, St-Apollinaire, Canada, assignor to Donat Flamand Inc., St-Apollinaire, Canada

Filed Feb. 14, 1989, Ser. No. 310,289

Int. Cl.<sup>5</sup> E06B 1/70

U.S. Cl. 49—468

8 Claims

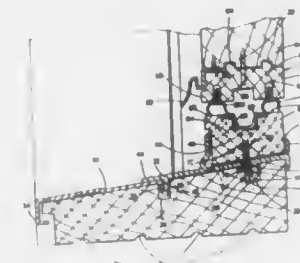
1. A threshold system for a domestic door of the type including a mobile panel, said threshold system comprising:

an elongated sill element mounted to a supporting structure, comprising:

- (a) a base member mounted to said supporting structure, said base member defining a seat;
- (b) an elongated member mounted in said seat, said elongated member comprising a longitudinally extending recess;

- c) a channel made of plastic material removably mounted in said recess, said channel constituting a water-catch pan;
- d) control means for adjusting the position of said elongated member in said seat, said control means being accessible for adjustment upon removal of said channel from said recess,

an elongated movable element for mounting to said panel, said movable element overlying said sill element and being



generally parallel thereto when said panel is in a closed position, a space being defined between said elements when said panel is in a closed position;

two weather strips mounted to one of said elements for closing said space, said weather strips being generally parallel to said water-catch pane and extending on either side thereof; and

drainage means establishing a fluid communication between said water-catch pan and the exterior.

4,945,681

## DOOR WEATHER STRIP FOR MOTOR VEHICLE

Masahiro Nozaki, Ama, and Junji Asai, Nagakute, both of Japan, assignors to Toyota Gosei Co., Ltd., Nishikasugai and Kabushiki Kaisha Toyota Jidoshokki Seisakusho, Kariya, both of Japan

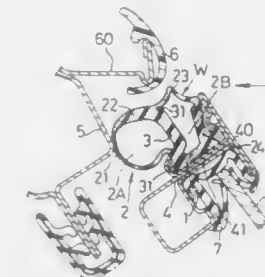
Filed May 19, 1989, Ser. No. 354,295

Claims priority, application Japan, May 20, 1988, 63-67118[U]

Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 49—495

6 Claims



pressed to a body surface formed around the door opening, and upper wall of said outside sealing portion being pressed to another body surface protruding along a roof side of the motor vehicle, the outer side wall of said outside sealing portion being in close contact with a projecting edge of the door frame so that an outward deformation is restrained by said projecting edge,

the thickness of both said bridge and an upper wall of said inside sealing portion, which extends from an upper end of said bridge to said inner side wall being made larger than that of the other portion of said sealing portion.

4,945,682

## PLASTIC MOTOR VEHICLE DOOR

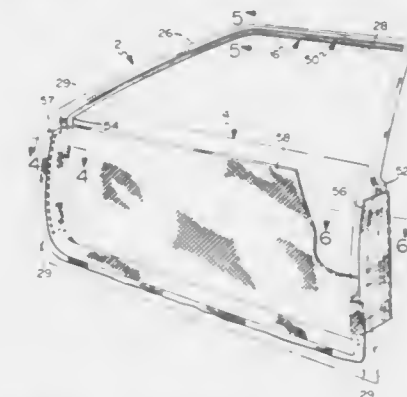
Gary F. Altman, E. Lansing, and Mark A. Cunningham, Mason, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 4, 1989, Ser. No. 445,248

Int. Cl.<sup>5</sup> B60J 5/04

U.S. Cl. 49—502

4 Claims



1. A vehicle door comprising:

an inner panel of molded synthetic resin construction and an outer panel, said inner panel having a structural lower portion concealed beneath the outer panel and an upper portion integral with the lower portion and defining a window frame surrounding a window opening, a tubular reinforcement member of generally inverted U-shape embedded in the upper portion of the inner panel and having leg portions extending downward from the upper portion and embedded in the structural lower portion so that the structural lower portion connects the leg portions of the upper portion.

4,945,683

## ABRASIVE BELT GRINDING MACHINE

James D. Phillips, Posen, Mich., assignor to J. D. Phillips Corporation, Alpena, Mich.

Filed Jul. 10, 1989, Ser. No. 377,067

Int. Cl.<sup>5</sup> B24B 21/00

U.S. Cl. 51—145 R

6 Claims

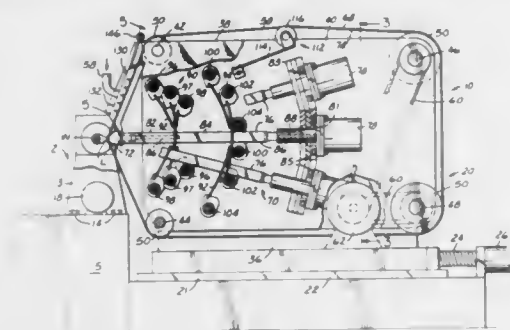
1. A door weather strip to be attached along an outer periphery of a door frame of a door of a motor vehicle for sealing between a door opening of the motor vehicle and the door frame when the door is closed, comprising:

- a base portion to be attached to the outer periphery of the door frame;
- a tubular sealing portion integrally formed with said base portion so as to project upwardly therefrom;
- a bridge formed between said base portion and an upper wall of said tubular sealing portion for dividing said tubular sealing portion into an inside sealing portion and an outside sealing portion, each having a side wall spaced from said bridge and projecting upwardly from said base portion, the inner side wall of said inside sealing portion being

6. Apparatus for grinding to predetermined contour a plurality of eccentric cams formed in axially spaced apart relation on an elongated camshaft, comprising means for supporting and rotating the camshaft about its longitudinal axis, a plurality of flexible, abrasive belts each having an abrasive surface and a backing surface opposite said abrasive surface, means supporting said belts adjacent the camshaft opposite the respective cams for linear movement such that the abrasive surfaces of said belts grind the peripheries of said cams, and means for guiding each belt at its point of contact with a cam periphery along a variable path according to the cam contour desired as said belt moves and the camshaft rotates, said guiding means for each belt comprising a shoe engaging the backing surface of said belt at its point of contact with a cam periphery, means

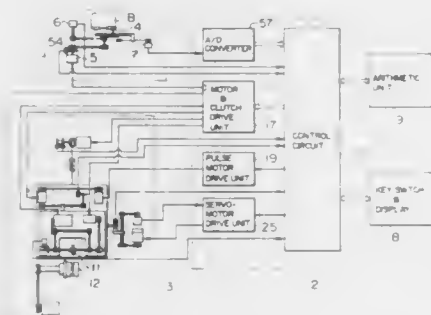


for moving each shoe toward and away from the camshaft axis independently of the movement of the other shoes, a combination coolant distributor and belt compensator for each said belt to saturate it with liquid coolant and compensate for shoe movement, each said coolant distributor and belt compensator comprising a receptacle having an open side, each said belt



moving through one of said receptacles in contact with the walls thereof to provide a substantially closed chamber in said receptacle on one side of said belt, and means for supplying coolant under pressure to each said chamber to saturate the belt passing therethrough and flex the same by the pressure of coolant in contact therewith to compensate for shoe movement.

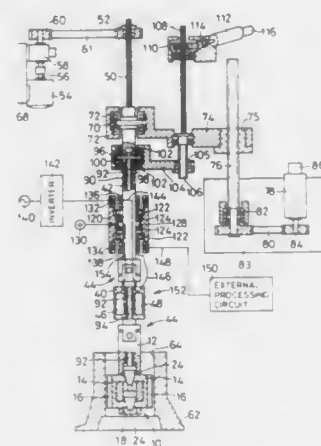
**4,945,684**  
**METHOD OF AND APPARATUS FOR PROCESSING PERIPHERAL EDGE OF LENS FOR SPECTACLES**  
Toyaji Wada, Fussa; Takashi Daimaru, Ohme, and Noriyasu Itoh, Fussa, all of Japan, assignors to Hoya Corporation, Tokyo, Japan  
PCT No. PCT/JP88/00022, § 371 Date Sep. 2, 1988, § 102(e) Date Sep. 2, 1988, PCT Pub. No. WO88/04974, PCT Pub. Date Jul. 14, 1988  
PCT Filed Jan. 12, 1988, Ser. No. 247,446  
Claims priority, application Japan, Jan. 12, 1987, 62-4400  
Int. Cl. B24B 17/00  
U.S. Cl. 51—165.77 15 Claims



1. A method of processing a peripheral edge of a lens to be ground, wherein said lens is to be fitted in a lens frame of a spectacle framework, said lens being rotatable about its rotational axis, and using a disc-shaped measuring probe having a radius and a columnar grindstone having a radius, the grindstone being rotatable about its rotational axis, said method comprising the steps of:
  - (a) moving the measuring probe along an inner periphery of the lens frame to measure a closed locus along which a center of the measuring probe moves;
  - (b) computing a plurality of circles having their respective centers located on said locus, each of said circles having a radius which is equal to a sum of the radius of the columnar grindstone and the radius of the measuring probe;
  - (c) computing a closed envelope by which outermost edge

- points of said respective circles are connected to each other in tangential relation to said outermost edge points; and
- (d) moving the rotational axis of the lens along said envelope relative to the rotational axis of the columnar grindstone to grind the peripheral edge of the lens, thereby forming a lens which is fitted in the lens frame.

**4,945,685**  
**HONING APPARATUS HAVING ELECTRICALLY OPERATED ACTUATOR FOR RELATIVE RECIPROCATING MOVEMENT BETWEEN HONING HEAD AND WORKPIECE**  
Yoshimi Kajitani, Toyota; Michiaki Ohta, Okazaki, and Takao Miyatan, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
Filed Sep. 16, 1988, Ser. No. 246,118  
Claims priority, application Japan, Sep. 19, 1987, 62-235284  
Int. Cl. B24B 49/00  
U.S. Cl. 51—165.93 16 Claims

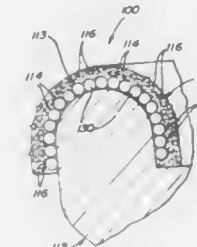


15. A honing apparatus for honing a cylindrical surface of a workpiece, comprising:
  - a honing head supporting honing stones such that said honing stones are opposed to said cylindrical surface of the workpiece;
  - a first drive device including a first electrically operated bidirectional actuator for effecting a relative reciprocating movement between said honing head and said workpiece in an axial direction of said cylindrical surface;
  - a second drive device for effecting a relative rotating movement between said honing head and said workpiece;
  - a diameter measuring device for measuring a diameter of said cylindrical surface of the workpiece; and
  - a reciprocation control device connected to said diameter measuring device and said first electrically operated actuator, governed by a measure diameter for determining either first values corresponding to a range of said relative reciprocating movement, second values corresponding to a speed distribution of said relative rotating movement over a range of the relative reciprocating movement, or both said first and second values, said reciprocation control device controlling said first electrically operated bidirectional actuator based on the determined values;
  - a changing mechanism, associated with said honing head, for changing one of a radial position of said honing stones in a radial direction of said cylindrical surface of the workpiece, and contact pressure between said honing stones and said cylindrical surface, said changing mechanism including a second electrically operated bidirectional actuator;
  - a resistance measuring device for measuring a honing resis-

tance between said honing stones and said cylindrical surface of the workpiece; and

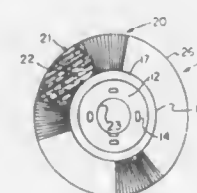
a honing control device connected to said resistance measuring device and said second electrically operated bidirectional actuator governed by the measured honing resistance for determining a value corresponding to one of the radial position of said honing stones in said radial direction, and said contact pressure between said honing stones and said cylindrical surface of the workpiece, said honing control device controlling said second electrically operated bidirectional actuator based on the determined one of the corresponding values.

**4,945,686**  
**MULTILAYER ABRADING TOOL HAVING AN IRREGULAR ABRADING SURFACE AND PROCESS**  
Ronald C. Wland, 18500 Fairway Dr., Detroit, Mich. 48221  
Continuation-in-part of Ser. No. 310,783, Feb. 14, 1989. This application Mar. 20, 1989, Ser. No. 326,152  
Int. Cl. B24D 3/00  
U.S. Cl. 51—293 14 Claims



1. A process for infiltrating a multilayer abrasive grit structure onto an abrading tool comprising the steps of:
  - (a) providing an tool substrate having an irregular surface;
  - (b) brazing a plurality of metal balls to said irregular surface to form a substrate;
  - (c) mixing quantities of an infiltrant and an abrasive grit material to form an abrasive grit coating having the abrasive grit suspended therein;
  - (d) applying said grit coating to said structured substrate such that said abrasive grit is suspended in said coating in a multilayer; and
  - (e) heating said structured substrate having said abrasive grit coating applied thereto for a time and at a temperature for infiltration of said abrasive grit, thereby attaching a multilayer of said abrasive grit to said structured substrate.

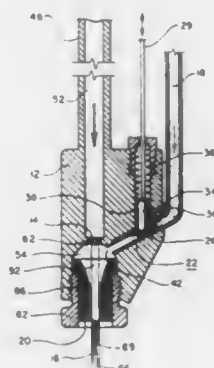
**4,945,687**  
**ROTARY FINISHING TOOL**  
Alfred F. Sebel, Orange, and R. Brown Warner, Westlake, both of Ohio, assignors to Jason, Inc., Cleveland, Ohio  
Filed Jul. 25, 1989, Ser. No. 384,759  
Int. Cl. B24D 11/00  
U.S. Cl. 51—394 12 Claims



1. A rotary finishing tool, comprising:
  - (a) a foamed elastomeric bond where the elastomeric bond has greater than 5% voids and contains (i) a medium

abrasive grit having a grain size of from about 30 to about 50, and (ii) a fine abrasive grit having a grain size of about 70 to about 100.

**4,945,688**  
**NOZZLE FOR ENTRAINING ABRASIVE GRANULES WITHIN A HIGH PRESSURE FLUID JET AND PROCESS OF USING SAME**  
Gene G. Yie, Auburn, Wash., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.  
Filed Oct. 22, 1985, Ser. No. 790,053  
Int. Cl. B24C 5/04  
U.S. Cl. 51—439 2 Claims



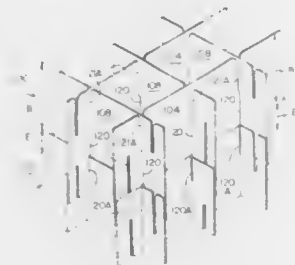
1. A high pressure water jet nozzle for entraining an abrasive material within a high pressure water jet, comprising:
  - (a) A nozzle body adapted for fluid communication with a high pressure fluid and a source of abrasive materials;
  - (b) orifice means disposed in said nozzle body so as to be in fluid communication with said high pressure fluid for dividing said high pressure fluid into a predetermined pattern of smaller high pressure fluid streams; and
  - (c) an orifice cone disposed within said nozzle body so as to be in fluid communication with said high pressure fluid, said orifice cone having orifice passages disposed throughout at predetermined locations to provide said predetermined pattern of high pressure fluid streams, said orifice passages are disposed within said orifice cone to provide a converging pattern of high pressure fluid streams, said converging pattern of high pressure fluid streams converging at a predetermined point external to said water jet nozzle to provide for a converging shaped cut in or through a workpiece.

**4,945,689**  
**COLLAPSIBLE GRIDWORK FOR FORMING STRUCTURES BY CONFINING FLUENT MATERIALS**  
Robert H. Johnson, Jr., 320 E. Main St., Lancaster, Ohio 43130  
Division of Ser. No. 27,281, Mar. 17, 1987, Pat. No. 4,785,604.  
This application Nov. 9, 1988, Ser. No. 269,774  
Int. Cl. E04C 5/04  
U.S. Cl. 52—668 21 Claims

1. A collapsible gridwork designed to be vertically stacked with at least one additional gridwork for confining fluent materials within cells defined by said gridwork to convert said fluent materials into stable columns capable of withstanding substantial vertical and horizontal loading, said gridwork comprising a plurality of strips each having defined spaced slots formed into one side thereof, said strips being divided into first and second groups which are perpendicularly orienting to one another and positioned such that strips of said first group have all slots facing upwardly and strips of said second groups have all slots facing downwardly, said gridwork being formed by intermeshing said upwardly facing slots with said downwardly

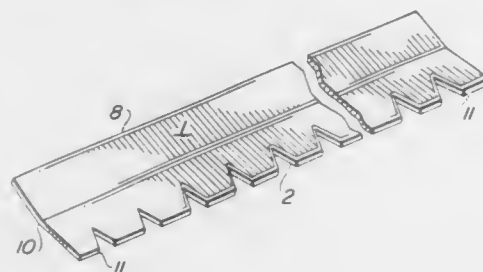


facing lots, said strips further defining means for interlocking said strips to stabilize said gridwork yet permitting said gridwork to be collapsed into a multilayer strip somewhat longer than any of said strips and said gridwork further comprising stabilizing means for reinforcing and aligning gridworks stacked one upon another, said stabilizing means comprising width extensions in at least some of said plurality of strips, said



width extensions vertically extending beyond at least one side of said gridwork to overlap with strips of at least one vertically adjacent gridwork to thereby reinforce and align gridworks stacked one upon the other, said width extensions being slotted to permit stacking with said slots being narrow to ensure alignment of stacked gridworks, retention of fluent material and improved stability of stacked gridworks subjected to horizontal loading.

**4,945,690**  
**COVER MEMBER FOR RAIN GUTTERS**  
Edgar H. Otto, 45 Hillcrest Dr., Pinehurst, N.C. 28374  
Continuation-in-part of Ser. No. 270,419, Nov. 9, 1988, which is a continuation of Ser. No. 204,534, Jun. 9, 1988. This application May 4, 1989, Ser. No. 348,031  
Int. Cl.<sup>5</sup> E04D 13/00  
U.S. Cl. 52—12 4 Claims



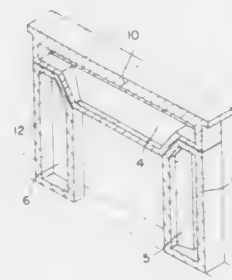
1. A gutter system, comprising in combination a conventional gutter having a predetermined width, an upper inwardly directed top lip, and means to secure said gutter to a building adjacent a shingled roof, said combination further comprising: a gutter shield formed from a length of generally planar, imperforate, semi-rigid metallic or plastic strip material, dimensioned to span said predetermined width and having first and second sides, said shield having a first planar edge on said first side adapted to permit insertion beneath a row of shingles having a lower edge adjacent said gutter, and notches punched out along a second edge on said second side, with resultant intervening tabs between the notches, positioned to fit snugly against the said inwardly directed lip of said gutter, with the second notched edge pushing snugly upward and toward against the inside of the gutter under the said inwardly directed lip, whereby water is permitted to enter the gutter through notches while leaves and other debris are excluded therefrom.

**4,945,691**  
**DEVICE FOR SECURING ROOF COVERINGS ON BUILDINGS**  
Robert E. Whitman, 2465 Knightshill, Toledo, Ohio 43614  
Filed Nov. 4, 1988, Ser. No. 267,505  
Int. Cl.<sup>5</sup> E04D 5/00  
U.S. Cl. 52—23 1 Claim



1. A device securing and holding roof covers to the upper surface of a roof structure comprising:  
(a) a lower container member with an open top with said lower container member having a plurality of vertically disposed compartments therein, which compartments are adapted to receive fill material and wherein said lower container member has a plurality of vertical openings extending all the way through such container;  
(b) an upper covering member an upper and lower surface, which upper covering member fits conformingly over the open top of such lower container member, wherein said upper covering member has a plurality of vertically disposed openings that hold vertically disposed fastening rods and wherein such vertically disposed fastening rods extend vertically downwardly from the lower surface of said upper cover member and further extend completely through the vertical openings in the lower container member, thereby fastening the upper cover member and the lower container member as a unit to the upper surface of such roof structure.

**4,945,692**  
**PREFABRICATED CHIMNEY MANTEL**  
Michel Gallier, Cusset, France, assignor to Marges S.A.R.L., Chamalieres, France  
Filed Mar. 27, 1989, Ser. No. 329,372  
Int. Cl.<sup>5</sup> F24C 15/06  
U.S. Cl. 52—36 9 Claims



1. A three piece chimney mantel comprising a pair of legs and lintel supported by the legs, the whole being intended to frame a fireplace arranged in the lower part of a wall wherein each of the three pieces (4,5,6) forming the mantel (1) is a monobloc piece produced from a composite material comprising a binder and an inorganic fibrous material, and wherein each of the pieces (4,5,6) has a hollow trough shape which is

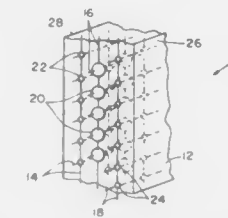
open on one face, the opening edges (10,11,12) being located in a plane.

**4,945,693**  
**CONCENTRIC DOME ENERGY GENERATING BUILDING ENCLOSURE**  
Warren L. Cooley, P.O. Box 2392/1111 H St., Davis, Calif. 95616  
Filed Mar. 10, 1989, Ser. No. 321,581  
Int. Cl.<sup>5</sup> E04B 1/32  
U.S. Cl. 52—81 9 Claims



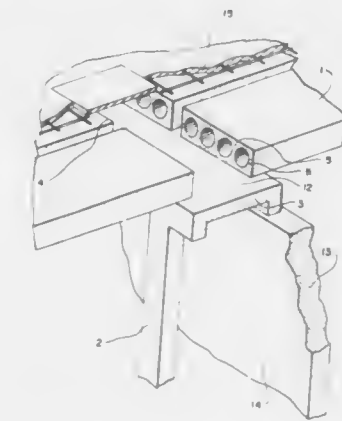
1. A dome building enclosure for generating mechanical or electric energy comprising: (a) a flexible interior concentric dome wall, (b) a sunlight transparent exterior concentric dome wall surrounding and supporting, by insulated suspension attachments, said interior concentric dome wall with said exterior concentric dome wall having, an apex, and a bottom perimeter air inlet, (c) an inner space defined by said interior concentric dome wall, (d) a conduit between said concentric dome walls, (e) and a turbine positioned over an opening in said apex of said exterior concentric dome wall.

**4,945,694**  
**BUILDING MODULE**  
John Mitchell, 1 Devonshire Pl., Suite 3917, Boston, Mass. 02109  
Filed Apr. 20, 1989, Ser. No. 340,758  
Int. Cl.<sup>5</sup> E04C 3/10  
U.S. Cl. 52—223 R 16 Claims



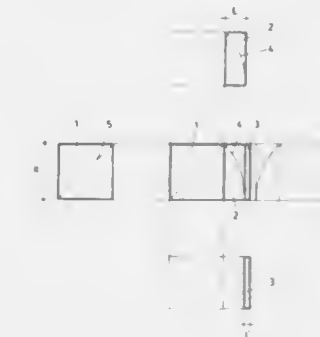
1. A composite building module which comprises a shaped cured matrix selected from the group consisting of cement, baked clay and baked earth, a plurality of metal wired prestressed under tensile forces, said metal wires extending through said cured matrix and secured under said tensile forces by said cured matrix and a plurality of discrete solid foam members positioned and spaced apart from each other along the length of said wires.

**4,945,695**  
**ARRANGEMENT IN AN INTERMEDIATE FLOOR OR THE BASE FLOOR OF A BUILDING**  
Joel Majurinen, Espoo, Finland, assignor to Insinööri Toimisto Joel Majurinen Ky, Helsinki, Finland  
Filed Jul. 10, 1989, Ser. No. 377,591  
Claims priority, application Finland, Dec. 29, 1988, 886034  
Int. Cl.<sup>5</sup> E04B 1/00  
U.S. Cl. 52—252 6 Claims



1. In a floor arrangement having two rows of adjacently placed cored slabs, each row of slabs defining at least one set of adjacent ends, the set of adjacent ends of one row being disposed opposite the set of adjacent ends of the other row and spaced apart to define a space between them, a common transverse component supporting the set of ends of each of the two rows, and two walls spaced apart subtending the transverse component for supporting the transverse component.

**4,945,696**  
**FLOORING AND/OR TILING**  
Antonio J. Ortiz Bordallo, Magallanes, 1, Madrid, Spain  
Filed Apr. 14, 1989, Ser. No. 337,883  
Int. Cl.<sup>5</sup> E04C 1/00  
U.S. Cl. 52—311 6 Claims



1. A tiling arrangement having golden arabesque designs comprises a plurality of tiling pieces, said plurality of tiling pieces comprising:  
a first tiling piece shaped in the form of a square, said square having sides of an arbitrary magnitude 'a';  
a second tiling piece shaped in the form of a rectangle, the longer sides of said rectangle having a magnitude 'a' and the short sides of said rectangle having a magnitude 'a(√2-1)'; and  
a third tiling piece shaped in the form of a rectangle, the longer sides of said rectangle of said third tiling piece

having a magnitude 'a' and the shorter sides of said rectangle having a magnitude

$$\frac{a(3 - 2\sqrt{2})}{2}$$

4,945,697

**FLOOR TILE AND FLOOR**

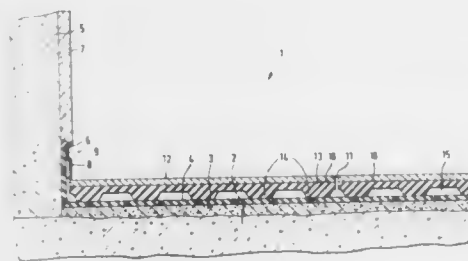
Willibald Ott; Günter Hoffmann, both of Wadern-Noswendel, and Werner Jacobs, Losheim, all of Fed. Rep. of Germany, assignors to Saar-Gummiwerk GmbH, Wadern-Büschfeld, Fed. Rep. of Germany

Filed Apr. 28, 1988, Ser. No. 187,357

Int. Cl.<sup>5</sup> E04F 15/22

U.S. Cl. 52—396

10 Claims



1. A support such as a floor or walkway, comprising a base; and an overlay on said base including a plurality of prefabricated tiles each of which comprises a first layer designed to contact objects carried by said support and a resilient second layer fast with the respective first layer, said second layers contacting said base and having anti-skid characteristics producing a relatively high coefficient of friction between said base and each of said second layers, and said tiles being arranged such that, upon loading of one of said tiles so as to compress the respective second layer, the first layer of said one tile is vertically shiftable relative to the first layer of an unloaded tile, said tiles being only in frictional engagement with said base.

4,945,698

**ADJUSTABLE SCREED SUPPORT**

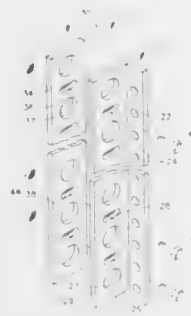
Jeffrey R. Jertberg, La Jolla; Robert M. Jertberg, San Diego, and Martin vanDinteren, El Cajon, all of, assignors to Vanberg Enterprises, San Diego, Calif.

Filed Aug. 7, 1989, Ser. No. 390,929

Int. Cl.<sup>5</sup> E04F 13/06

U.S. Cl. 52—365

4 Claims



1. An adjustable screed support for supporting one end of a

screed during screeding of cement on a wall; the wall having a support structure; said adjustable screed support comprising: support bracket means for attachment to the wall support structure including stand-off means extending outward, away from the wall support structure; and an elongate beam having: a bottom side toward the wall; a top side away from the wall; said beam top side in side view being a straight line; and a web joining and separating said top side and said bottom side; said beam being adjustably attached to said support bracket stand-off such that the distance of said top side from the wall support structure and the angle of the line of said top side relative to said wall support structure are variable.

4,945,699

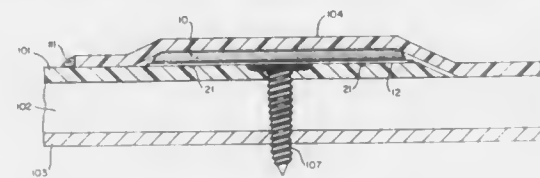
**STRESS PLATE**

Colin R. Murphy, Augusta, N.J., assignor to Engineered Construction Components (America), Panama City, Panama  
Continuation of Ser. No. 106,991, Oct. 5, 1987, Pat. No. 4,787,188, which is a continuation of Ser. No. 815,551, Jan. 2, 1986, abandoned. This application Oct. 3, 1988, Ser. No. 252,105

Int. Cl.<sup>5</sup> E04B 5/00, 1/38

U.S. Cl. 52—410

34 Claims



1. In a roof including a roof membrane, the improvement comprising: at least one stress plate having a top surface and a bottom surface, said plate including an opening for receiving a fastening means for securing the stress plate to a roof, said bottom surface being in contact with a roof membrane portion which is in contact with the roof, said stress plate having at least three spaced gripping prongs extending outwardly from the bottom surface of said plate, said prongs being unitary with said plate and circumferentially spaced around said opening; and fastening means received in said opening and secured to the roof, said gripping prongs terminating in a gripping point to prevent the membrane from sliding out from underneath the stress plate, whereby said membrane is held by said plate by both compression and by being gripped by the gripping prongs, said stress plate champing only a single membrane between the bottom surface of the stress plate and the roof.

4,945,700

**TOOL AND METHODOLOGY FOR PATCHING WALLBOARD**

Wayne T. Powell, P.O. Box 3934, San Clemente, Calif. 92672  
Filed Sep. 12, 1989, Ser. No. 408,181

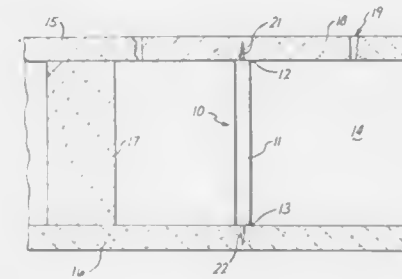
Int. Cl.<sup>5</sup> E02G 23/00

U.S. Cl. 52—514

10 Claims

1. A device, comprising: a shaft having first and second ends and a length between the first and second ends sufficient to span an airspace between first and second wallboards that are mounted on a wall framework so that they are separated by an airspace of predetermined size; first mounting means for securing a separately supplied patch to the first end of the shaft; and second mounting means for securing the second end of the

shaft to the second wallboard in order to support the patch in a hole in the first wallboard;



wherein the first and second mounting means are integrally attached to the shaft in one-piece construction.

4,945,701

**COMPOSITE CONCRETE FLOOR PANEL**

Jonathan Bell, Ellicott City, and Peter Blacklin, Columbia, both of Md., assignors to Tate Access Floors, Inc., Jessup, Md.  
Filed May 16, 1989, Ser. No. 352,488

Int. Cl.<sup>5</sup> E04B 5/04

U.S. Cl. 52—601

5 Claims



1. A panel, comprising: a pan having at least one side member with an upper edge portion, said pan having contained therein a fluid based cementitious material which has undergone pressing for removal of the fluid while within the pan; and at least one telescoping trim member attached to an upper edge portion of the side member of the pan, the trim member undergoing telescoping action upon pressing of the material in the pan so as to be rigidly secured to the upper edge portion of the side members of the pan.

4,945,702

**OBSERVABLE CORNER CONNECTION**

Horst Loos, Freudenberg, Fed. Rep. of Germany, assignor to Siegenia-Frank KG, Siegen, Fed. Rep. of Germany  
Filed Aug. 31, 1988, Ser. No. 239,108

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729114

Int. Cl.<sup>5</sup> E04C 2/38

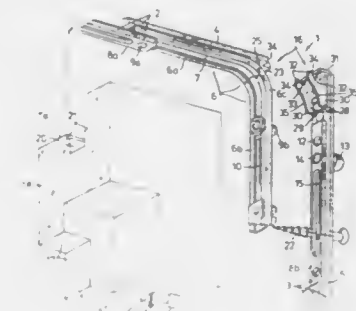
U.S. Cl. 52—656

8 Claims

1. A cover rail corner connection between two fitting components of a connecting rod fitting which are mounted substantially at a right angle to each other within a groove in a closure member, each fitting part having an inner side which faces the groove, an outer side which faces away from the groove and a cover rail which has longitudinal edges which are braceable against the steps of the groove, each fitting component being fastened within the groove by screws, the end of one of the

cover rails having a supporting stop which projects inwardly from the rail and a pocket beneath the stop having a spacing which corresponds to the thickness of the other cover rail, said cover rail corner connection comprising:

a bracket (28, 30) which is fixed to the inner side of one of the cover rails (5), a hook (32) which is fixed to the outer end of the bracket (28,30) and which projects inwardly



4,945,703

**MEANS FOR MOUNTING DECORATIVE SCROLLS TO A FRAME**

Lawrence L. Mascotte, 9106 SE. 82nd, Portland, Oreg. 97266  
Filed Dec. 4, 1989, Ser. No. 445,282

Int. Cl.<sup>5</sup> E04C 2/42

U.S. Cl. 52—663

14 Claims



1. Mounting means for mounting a scroll member onto a bar member, comprising:

mounting member means secured within a channel of the scroll member and including resilient leg members for extending along respective sides of the bar member, said leg members having free ends extending outwardly from an inner surface of the scroll member, said free ends defining securing members; and

securing means having securing legs matable with said securing members when said securing means is moved into engagement with said mounting member means thereby moving said resilient leg members into frictional engagement with the sides of the bar member and maintaining the scroll member in position on the bar member.

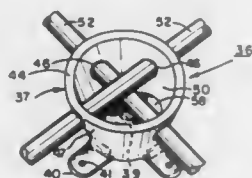


**4,945,704**  
**CONCRETE ANCHOR AND METHOD OF ATTACHING ELEMENTS TO CONCRETE SLABS**

Linn P. Brown, Jr., c/o Utility Products Company, 967 Penn Cir., Suite D-107, King of Prussia, Pa. 19406  
Filed May 3, 1989, Ser. No. 347,100  
Int. Cl.<sup>5</sup> E04C 5/20

U.S. Cl. 52-706

20 Claims U.S. Cl. 52-731



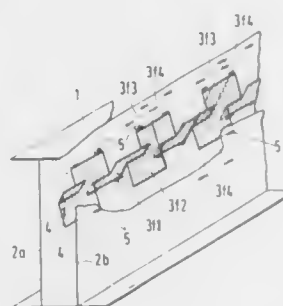
1. An anchor for attaching elements to a face of a concrete slab comprising a cup-shaped, one-piece body having a base and walls extending from the base to form an open end of the body, said base defining an outer transverse surface of said body and said base and walls together defining an outer side surface of said body sloping outwardly directly from said outer transverse surface, all about said outer transverse surface, to said open end, said body further including means extending from the base for mounting the body to a form for pouring the concrete slab, and means for attaching elements to said anchor.

**4,945,705**  
**STIFFENING FOR BOX GIRDERS OR BEAMS**  
Peter Rump, Schwerte, and Juergen Schmitt, Witten, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Dueseldorf, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 855,609  
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1985, 3514786

Int. Cl.<sup>5</sup> E04C 3/30  
U.S. Cl. 52-731

6 Claims



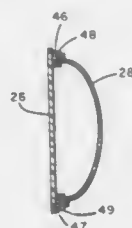
1. Box girder or beam with two lateral side webs arranged between upper and lower cords or flanges and facing each other across a box interior, a stiffening arrangement comprising:

means for stiffening being a longitudinal single sheet composed of crossing, angled off parts staggeredly arranged and alternatingly welded to one and the other of the two webs and extending in longitudinal direction as far as the beam and girder is concerned and between said two side webs such that in cross section at least one stabilizing triangle is established having a profile and extension which runs in longitudinal direction, the triangle including at the most one of said webs as one side of the triangle so that at least two sides of the triangle are established by the means for stiffening.

**4,945,706**  
**LIGHTWEIGHT OVERHEAD BEAM FOR PORTABLE DISPLAY STRUCTURE**

Bryan Beaulieu, Burnsville, Minn., assignor to Skylne Displays, Inc., Burnsville, Minn.  
Filed Feb. 10, 1989, Ser. No. 309,417  
Int. Cl.<sup>5</sup> E04C 2/30

16 Claims



1. A lightweight portable beam adapted for hanging attachment to a portable exhibit display frame, comprising a first thin plastic sheet of flexible material of a first predetermined width and an elongate length; a plate affixed to each of the elongate ends of said first sheet, said plate having means for removable attachment to said portable exhibit display frame; a second thin plastic sheet of flexible material of a second predetermined width, greater than said first width, and an elongate length; means for removably attaching said first sheet to said second sheet along respective edges of said elongate lengths, whereby said second sheet is affixed to and bowed outwardly from said first sheet; whereby said beam may be supported on said frame only by said end plate means for removable attachment, and said sheets may be detached from each other and respectively rolled together for storage.

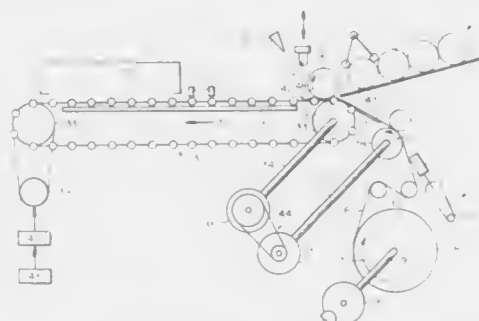
**4,945,707**  
**MACHINE AND METHOD FOR OVERWRAPPING CYLINDRICAL ARTICLES**

Guy Cosmo, Selden, N.Y., assignor to K. C. Technical Services, Inc., Bohemia, N.Y.

Filed Apr. 24, 1989, Ser. No. 342,110  
Int. Cl.<sup>5</sup> B65B 53/02, 11/10, 11/56

U.S. Cl. 53-399

12 Claims



1. A machine for wrapping generally cylindrical articles comprising:

a supply reel rotatably mounted in said machine for unreeling a web of sheet material;  
an endless transport means including a multiplicity of spaced-apart rollers operatively mounted thereon for moving said articles along a predetermined path;  
means for guiding and feeding said web on to said rollers of said endless transport means operatively connected to said supply reel;  
means for feeding articles at predetermined intervals on to said web at a location at which it has already been guided

on to said transport means, the movement of such feeding being synchronized to the movement of said transport means;

transverse cutting means operatively coacting with said transport means for severing a predetermined portion of said web after an article has been placed thereon;  
abutment means operatively mounted along said predetermined path disposed to tangentially engage the rollers of said transport means causing their rotation, which, in turn, causes rotation of said articles in a direction opposite the movement of said transport means, thereby wrapping a predetermined portion of said web around themselves, means for exposing the wrapped articles to heat for the purpose of hot sealing, shrinking or drying the sheet material and securely wrapping it about the articles, disposed along a portion of said endless transport means; and electronically-controlled drive means for accelerating and decelerating said transport means in timed relation with respect to the movement of said web and the feeding of said articles.

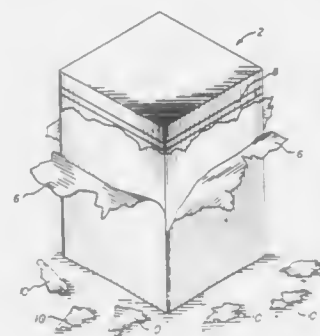
**4,945,708**  
**METHOD OF MAKING A TAMPER RESISTANT PACKAGE**

Yoram Curiel, Aurora, Colo., assignor to TSL Incorporated, Aurora, Colo.

Division of Ser. No. 209,822, Jun. 22, 1988, Pat. No. 4,890,763, and a continuation-in-part of Ser. No. 6,756, Jan. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 891,517, Jul. 29, 1986, abandoned. This application Jul. 31, 1989, Ser. No. 386,884

Int. Cl.<sup>5</sup> B65B 61/18, 61/26; B65D 53/06  
U.S. Cl. 53-411

24 Claims



16. A method of tamper resistant packaging a product comprising:

providing a product, and  
at least partially surrounding said product with an ultraviolet cured brittle material,  
said brittle material characterized by a propensity to irreversibly fracture and at least in part separate from other portions of said material in a plurality of pieces responsive to efforts to physically penetrate said material, whereby efforts to penetrate said material will irreversibly fracture and fragment said material to provide evidence of tampering.

**4,945,709**  
**DEVICE AND METHOD FOR APPLYING A STATIC SEAL**

Alain A. Cerf, Largo, Fla., assignor to Polycerf, Inc., Largo, Fla.  
Filed Mar. 17, 1989, Ser. No. 324,950

Int. Cl.<sup>5</sup> B65B 9/06, 51/26

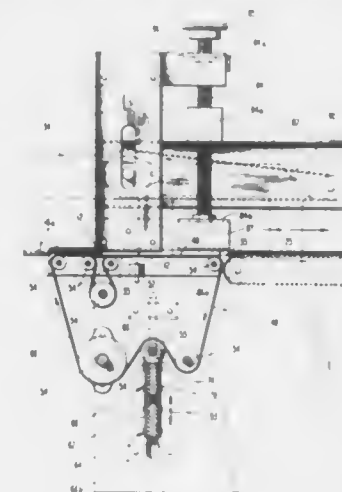
U.S. Cl. 53-450

21 Claims

21. A method for forming an electrostatic seal between

overlapping edges of a flexible film means, comprising the steps of:

shaping a flexible film means into a generally tubular form so that opposite edges of said film means are disposed in overlapping relation to one another;  
positioning all of the structure of a first electrode means wholly within a tubular cavity means defined by said film means;



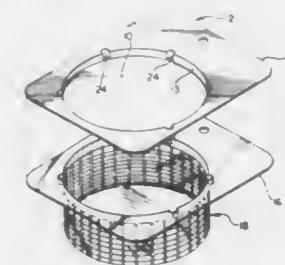
mounting said first electrode means so that it bears against the overlapped edges of said film means;  
positioning a second electrode means externally of said tubular cavity means; and  
establishing a potential difference between said first and second electrode means so that electrons flow across an air gap that separates said first and second electrode means.

**4,945,710**  
**METHOD OF FORMING A RECLOSABLE PACKAGE**  
Gerald O. Hustad, McFarland, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Nov. 3, 1988, Ser. No. 266,733  
Int. Cl.<sup>5</sup> B65B 7/02, 31/02; B65D 73/00

U.S. Cl. 53-432

1 Claim



1. A method of forming a vacuumized, hermetically sealed package which is characterized by a predetermined quantity of a product which is deformable and is arranged in the form of an upright mass on a raised panel portion of a thermoformed semi-rigid base, which base has peripherally extending flange margins sealed to corresponding flange margins of a body member of a thermoformed semi-rigid preformed plastic, said body member having a top panel for engaging the upper end of said product and depending side walls for engaging the side walls of said product, said top panel being joined to said side walls by a hinge forming portion, and the bottom edges of said



body side walls being in telescoping relationship with portions of said base at the peripheral edges of said raised panel portion, said method comprising supporting said preformed body member in inverted position with the flanged margins thereof sealed on the edge portions of a rigid upwardly opening hollow form, placing a sufficient quantity of said product in said body member to substantially fill said body member when the package is completed, positioning said base on the mouth of said body member with said product engaging panel disposed so as to telescope into said body member and engage with said product and with the flanged margins of said base overlying the corresponding margins of said body member, applying mechanical pressure inwardly of the outside surface of said raised panel portion and within the area defined by the bottom edges of said body side wall sufficient to force said product into close contact with the interior surfaces of said base and body members so as to shape said product to conform to the shape of said interior surfaces and to substantially completely fill the space available between the same with a product while vacuumizing the assembly and hermetically sealing the package, wherein the method further includes crimping locking projections in the base and body member side walls for snap locking the base to the body member, said crimping being a post-thermoforming crimping step forming projections which are at least 1/16 of an inch in length and which provide for friction interference fit characterized by an audible snapping sound when the base is snap locked to the body member.

4,945,711

**BULK BIN BAG CASSETTE**

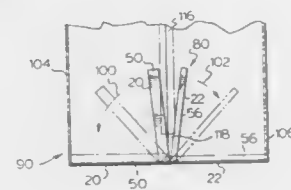
Bradley J. Crittenden, Burnaby, Canada, assignor to MacMillan Bloedel Limited

Division of Ser. No. 190,824, May 6, 1988, Pat. No. 4,836,363. This application Jul. 25, 1989, Ser. No. 384,751

Int. Cl.<sup>3</sup> B65B 1/02, 43/34; B31B 7/78

U.S. Cl. 53—449

4 Claims



1. A method of squaring a carton sleeve utilizing a cassette comprising inserting said cassette into said carton sleeve with said cassette extending substantially diagonally of said carton sleeve before said carton sleeve is squared, said cassette having a main bottom panel divided into a pair of side panels and a central diagonal panel by a pair of spaced parallel diagonal fold lines, each of said side panels being folded into a position substantially perpendicular to said diagonal panel on one of said pair of parallel diagonal fold lines, said method comprising inserting said cassette into said carton sleeve to extend diagonally of said carton sleeve with said diagonal panel extending substantially diagonally across and diagonally from a bottom axial end toward a top axial end of said carton and with said side panels folded relative to said diagonal panel, moving said cassette downward in said carton to a position wherein said diagonal panel extends diagonally across said carton along the bottom of said carton sleeve in a plane substantially perpendicular to a longitudinal axis of said sleeve and folding said side panels into a position substantially planar with said diagonal panel, said main bottom panel being substantially the same dimensions as the interior of the carton sleeve in said plane whereby opening of said cassette by moving said side panels into a position substantially planar with said diagonal panel insures squaring of said carton sleeve.

4,945,712  
**APPARATUS FOR HEAT SEALING THERMOPLASTIC SHEETING**

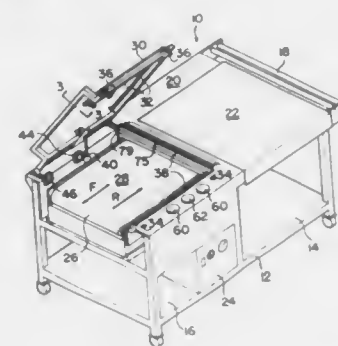
Charles J. Bennett, P.O. Box 154, Rte. 2, Oakboro, N.C. 28129

Filed Jul. 27, 1988, Ser. No. 225,031

Int. Cl.<sup>3</sup> B65B 9/02, 9/06, 51/26, 51/28

U.S. Cl. 53—555

10 Claims



1. In an apparatus for heat sealing thermoplastic sheeting of the type comprising an endless conveyor for supporting an article between two thermoplastic sheets and jaw means for clamping and heat sealing said thermoplastic sheets for enclosing said article, said endless conveyor being normally operable in a forward direction for discharging sealed thermoplastic sheet-enclosed articles away from said jaw means, the improvement comprising means for moving said conveyor in a reverse direction for relieving tension in said thermoplastic sheets during operation of said jaw means.

4,945,713

**METHOD AND APPARATUS FOR PACKETING OBJECTS IN A CHAIN OF BAGS**

Ralph Widenbäck, Stenungsund, Sweden, assignor to New Pac Systems AB, Sweden

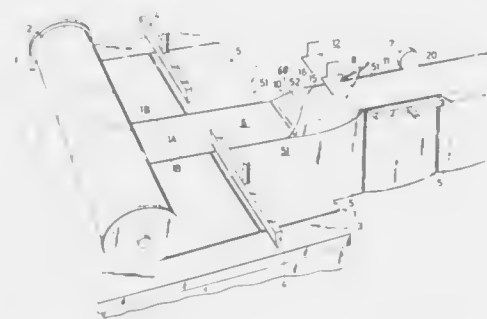
Filed Nov. 21, 1988, Ser. No. 275,066

Claims priority, application Sweden, Nov. 24, 1987, 8704666

Int. Cl.<sup>3</sup> B65B 5/02, 7/06, 9/08, 43/26

U.S. Cl. 53—459

23 Claims



16. A method of packeting objects in bags comprising: providing two chains of bags, each chain being secured to a respective opposite edge of a central strip, wherein each said edge is secured to one of said chains of bags by: rolling said chains of bags separated by the central strip into a roll of flat, tubular film, said film including an upper layer and a lower layer to define outer walls and inner walls, respectively, of said bags and prior to said rolling, bordering said central strip for defining a secured lip on the inner wall of each of said bags, said secured lip of each

said bag being attached to the respective edge of said central strip for the said chain of that said bag and forming a longitudinal slit in said upper layer of said tubular film to define a free lip on the outer wall of each of said bags; an aperture being defined between said inner and outer walls to receive objects to be packeted; transporting said bags and said central strip along an elongated transfer track extending in the direction of transport; supporting said bags from said central strip when said central strip travels along support edges of said track to transport said bags along the edges of said transfer track, said central strip supporting said bags by their respective secured lips on opposite sides of said transfer track; separating said outer walls from said inner walls of said bags for opening the apertures by decreasing the distance between the edges of said bags traveling along a portion of said track relative to the lengths of said inner walls of said bags traveling along that said portion of said track; packeting said bags with articles to be contained.

4,945,714

**FORM, FILL, SEAL AND SEPARATE PACKAGING MACHINE FOR RECLOSABLE CONTAINERS**

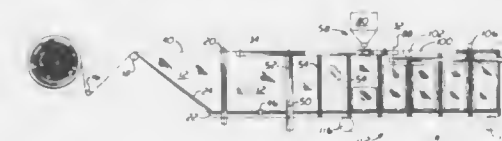
William A. Bodolay, Richard W. Smith, and Gregory A. Ward, all of Lakeland, Fla., assignors to Package Machinery Company, Bodolay/Pratt Division, Lakeland, Fla.

Filed Nov. 14, 1989, Ser. No. 436,911

Int. Cl.<sup>3</sup> B65B 9/08, 43/02, 61/18; B31B 1/64

U.S. Cl. 53—568

22 Claims



1. A form, fill, seal and separate packaging machine of the type primarily intended for use in packaging material in reclosable containers formed from a thermoplastic web folded upon itself, said web having a pair of mated, resealable closure strips substantially adjacent the fold and free edges opposite said closure strips, said machine comprising: web supply means for providing a source of said folded web; first web belt means for receiving and conveying said folded web along a path through said machine; second web belt means disposed at least partially downstream of said first belt means and below said first belt means, said second belt means receiving and conveying said folded web along said path; means for spot sealing said closure strips downstream of said web supply means; means for forming a side seal substantially normal to said closure strips and downstream of said spot sealing means, each of said side seals intersecting a corresponding one of said spot seals, whereby a series of partially formed containers are made as said folded web moves along said path; means for partially severing said partially formed container by substantially bisecting each of said side seals along a line extending from said one spot seal to the portion of said side seal adjacent said first web belt means; means for filling said partially severed containers downstream of said means for severing; means for transferring said filled partially severed containers to said second web belt means such that a segment of each of said filled partially severed containers extends above said second belt means; means for top sealing said free edges of said filled partially severed containers downstream of said means for transferring; and means for cutting said filled partially severed containers from said web.

4,945,715

**BALE BAGGING APPARATUS**

Gerald Brodrecht, R.R. #1, Thorsby, Alberta, Canada T0C 2P0 2P0

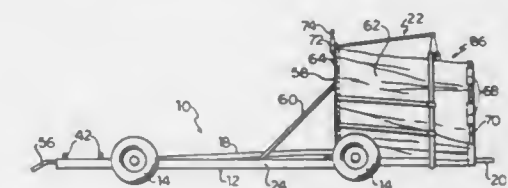
Filed Dec. 27, 1988, Ser. No. 289,687

Claims priority, application Canada, Nov. 2, 1988, 582,030

Int. Cl.<sup>3</sup> B65B 43/42

U.S. Cl. 53—567

19 Claims



1. A bale bagging apparatus comprising: a hoop of fixed size and configuration; a tube support comprising an annular, pliant, contractable sleeve with an inlet end and an outlet end, the tube support being secured at the inlet and thereof to the hoop; and sustaining means for sustaining the outlet end of the tube support in an annular configuration with a smaller circumference than the hoop.

4,945,716

**LAWN MOWER**

Masatake Murakawa, and Mikio Yuki, both of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan

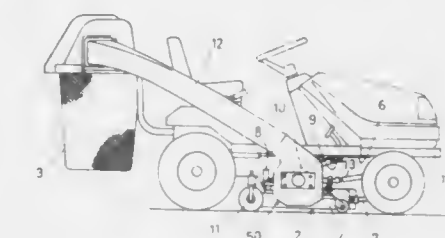
Filed Sep. 25, 1989, Ser. No. 412,360

Claims priority, application Japan, Feb. 14, 1989, 1-16100[U]; Feb. 16, 1989, 1-38029; Mar. 23, 1989, 1-33354[U]

Int. Cl.<sup>3</sup> A01D 34/03

U.S. Cl. 56—13.3

7 Claims

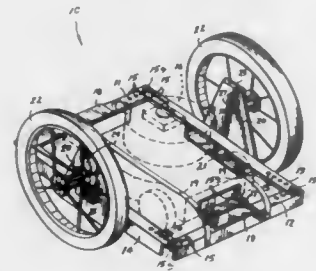


1. A lawn mower comprising: a mower unit including a mower housing defining a grass clipping side discharge opening, and at least one cutting blade rotatable on a substantially vertical drive shaft inside said mower housing; a blower unit mounted laterally of said mower housing, said blower unit including a blower case defining a chamber communicating with said side discharge opening, a blower shaft extending substantially horizontally in said blower case, a blower shaft extension extending through said blower case toward said mower housing, and a blower fan mounted on said blower shaft, and shaft transmission means connected at one end thereof to said blower shaft extension and extending substantially horizontally above said mower housing, said shaft transmission means including a PTO shaft for receiving power from said drive shaft through bevel gear means.

**4,945,717**  
**GRASS CUTTER CARRIAGE**  
 Norman G. Schaffer, 24 Greenleaf St., Emmaus, Pa. 18049  
 Filed Sep. 26, 1988, Ser. No. 248,990  
 Int. Cl.<sup>3</sup> A01D 34/03

U.S. Cl. 56—17.2

6 Claims



1. A grass cutter carriage apparatus for use in combination with a lawn mower, said lawn mower including a housing, a plurality of wheels, a motor and cutting blade where said grass cutter carriage apparatus comprises,  
 a frame means for accepting said lawn mower therein and including fastening means for adjustably fastening said lawn mower within said frame means,  
 said frame means further including a plurality of elongate frame members encircling said lawn mower, and  
 support plate means for adjustably securing a plurality of carriage wheels to said frame means, and  
 wherein said support plate means comprises two support plates, each of said support plates secured at opposite sides of said frame means, and  
 wherein said elongate frame members are formed with apertures proximate their terminal ends and are secured to one another by fasteners to form a rectangular framework, and  
 wherein each support plate has hingedly secured thereto a wheel bracket wherein each wheel bracket has a carriage wheel rotatably secured thereto and further including fastening means axially and rotatably supporting said carriage wheel to adjustably position each wheel with respect to each support plate.

**4,945,718**  
**AIR NOZZLE FOR PNEUMATIC FALSE-TWIST SPINNING**

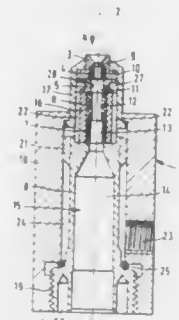
Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Überkingen, and Hans Stahlecker, Haldenstrasse 20, 7334 Süssen, both of Fed. Rep. of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany  
 Filed Aug. 25, 1989, Ser. No. 398,446

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829150

Int. Cl.<sup>3</sup> D01H 1/115; D02G 1/04, 1/16; D02J 1/08  
 U.S. Cl. 57—333 18 Claims

1. An air nozzle for pneumatic false-twist spinning of a yarn having several nozzle parts arranged behind one another in moving direction of the yarn, each part forming a section of a yarn duct and one of these parts being provided with compressed-air ducts leading into the yarn duct, wherein, in the moving direction of the yarn (A), behind the compressed-air duct nozzle containing the compressed-air ducts, a rear nozzle part is arranged which consists of a material which is harder and more resistant to wear and has a smaller inside diameter (d2) than the compressed-air duct part, and

wherein a front nozzle part which immediately precedes the compressed-air duct nozzle part is made of a harder, more



wear-resistant material and has a smaller inside diameter (d1) than said compressed-air duct nozzle part.

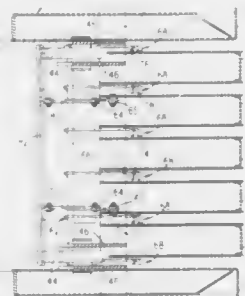
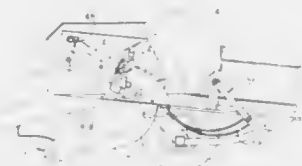
**4,945,719**  
**SQUARE BALER HAVING PLUNGER CLEANOUT APPARATUS**

Thomas G. Schrag, Hesston, and Lavern H. Unruh, Newton, both of Kans., assignors to Hay & Forage Industries, Hesston, Kans.

Filed Sep. 1, 1989, Ser. No. 402,056  
 Int. Cl.<sup>3</sup> A01D 39/00

U.S. Cl. 56—341

10 Claims



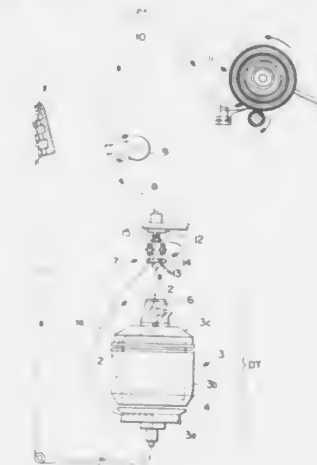
1. A baler comprising:  
 a bale chamber;  
 a plunger movable relative to the chamber along a substantially linear path between a retracted position and an extended position, the plunger including at least two crop engaging elements spaced from one another by a distance defining a clearance opening therebetween;  
 shifting means for shifting the plunger between the retracted and extended positions in a series of operating cycles, the shifting means including an arm pivotally connected to the plunger for movement about a first pivot axis relative to the plunger;  
 clearing means for clearing crop materials from at least a portion of the clearance opening in the plunger, the clearing means including a clearing member mounted directly on the plunger for pivotal movement relative thereto about a second pivot axis, and drive means for effecting

pivotal movement of the clearing member during shifting of the plunger between the extended and retracted positions,  
 said drive means includes a drive link connected between the clearing member and the arm of the shifting means, the drive link being pivotally connected to the clearing member at a position spaced from the second pivot axis.

**4,945,720**  
**THREAD CABLING MACHINE HAVING AN IMPROVED REGULATOR DEVICE**

René Neyraud, Saint Cyr au Mont d'Or, France, assignor to ICBT Lyon, France

Filed Jun. 7, 1989, Ser. No. 363,053  
 Claims priority, application France, Jun. 21, 1988, 88 08561  
 Int. Cl.<sup>3</sup> D01H 7/00, 13/10, 7/90; D02G 3/28  
 U.S. Cl. 57—58.36 2 Claims



1. A thread cabling machine provided with a plurality of work stations, each of said work stations comprising a DT unit which provides first and second elementary threads to be united by twisting, wherein a portion of said first thread extends outward from said DT unit so as to surround a bowl of said DT unit inside which a spool of said second thread is disposed, said second thread exiting said bowl substantially along a central axis of said DT unit, said threads being joined on a cabling head comprising:

two pulleys mounted on an axis substantially perpendicular to the central axis of said DT unit, said pulleys being driven rotationally by said first thread;  
 an eye carrier plate disposed between said DT unit and said pulleys, said threads passing from said DT unit through said eye carrier plate to said pulleys; and  
 a frustoconical member disposed on said eye carrier plate adjacent said DT unit, said frustoconical member and said eye carrier plate collectively forming a reserve groove in which said first thread is wound, said reserve groove being located in a plane substantially perpendicular to the axis of said DT unit.

**4,945,721**  
**ELECTROMAGNETIC CONVERTER FOR REDUCTION OF EXHAUST EMISSIONS**

James H. Cornwell, Raleigh, N.C., and William J. Kukla, Boulder, Colo., assignors to Environmental Research International, Inc., Boca Raton, Fla.

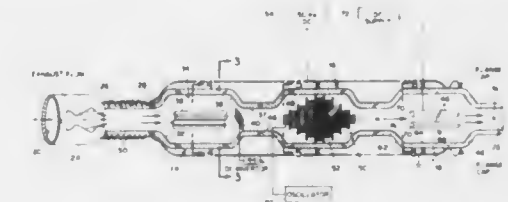
Filed Apr. 14, 1988, Ser. No. 181,625  
 Int. Cl.<sup>3</sup> F01N 3/08

U.S. Cl. 60—274

31 Claims

1. A device for reduction of emissions in the exhaust stream of fossil fuel combustion processes, said device comprising:  
 an ion generator chamber having non-conductive walls, an

inlet means for directing the exhaust stream into said chamber, and a first field generator means disposed within said walls in the path of said exhaust stream;  
 means for producing a dc positive field in said first field generator means of a field strength sufficient to achieve ionization potential of HC, CO, and CO<sub>2</sub> molecules present in the exhaust stream and for inducing molecular breakdown into base components of carbon, hydrogen, and oxygen;  
 a collector chamber being insulated from ground and being connected to receive the exhaust stream from said ion



generator chamber, said collector chamber having a surface means for effecting polar covalent bonding of the carbon ions in the exhaust stream and an outlet for discharging the remainder of said exhaust stream; and  
 an electron transfer chamber having non-conductive walls and being connected upstream of said ion generator chamber, said electron transfer chamber including a second field generator means for providing a dc negative field of strength sufficient to achieve the first ionization level of HC, CO, and CO<sub>2</sub> molecules present in the exhaust stream, and means for discharging the ionized exhaust stream to said ion generator chamber.

**4,945,722**  
**SOOT FILTERING UNIT FOR THE EXHAUST OF A DIESEL INTERNAL COMBUSTION ENGINE AND METHOD FOR REGENERATING THE FILTERS THEREOF**

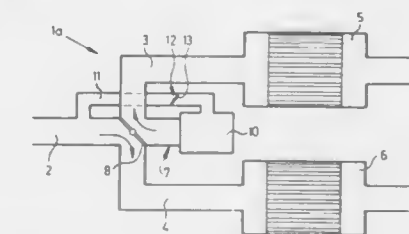
Dieter Goerlich, Emmering, Fed. Rep. of Germany, assignor to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,558  
 Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717140

Int. Cl.<sup>3</sup> F01N 3/02

U.S. Cl. 60—295

15 Claims



1. Soot filtering unit for a diesel internal combustion engine comprising at least two soot filters arranged in parallel branches of an exhaust gas line and a regeneration device with at least one burner for producing high temperature gases for regeneration of the soot filters, and with at least one control flap in the exhaust gas line for controlling flow through the exhaust gas line; wherein said at least one burner is exhaust gas operated and, for that purpose, has a fuel intake and an oxygen intake connected to said exhaust gas line by an exhaust feed pipe as a means for receiving oxygen for combustion purposes, and wherein an outlet of said at least one burner is connected to said exhaust gas line downstream of said at least one control



flap as a means for delivering said high temperature gases thereto, and wherein another control flap is placed in said exhaust gas feed pipe as a flow control device for regulating the amount of exhaust gas fed to the oxygen intake of the burner.

4,945,723

# FLOW CONTROL VALVES FOR HYDRAULIC MOTOR SYSTEM

Eiki Izumi, Ibaragi; Toichi Hirata, Ushiku; Yusaku Nozawa, Ibaragi, and Masahiko Shimotori, Nagareyama, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

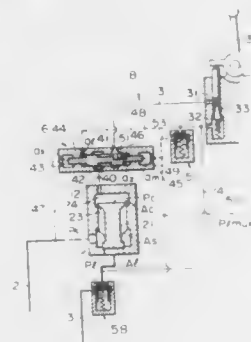
Filed Jun. 29, 1988, Ser. No. 213,179

Claims priority, application Japan, Jun. 30, 1987, 62-162703; Sep. 21, 1987, 62-234992

Int. Cl.<sup>5</sup> F15B 11/16

U.S. Cl. 60—426

19 Claims



12. A hydraulic excavator comprising: at least one hydraulic pump; a plurality of hydraulic actuators connected to said hydraulic pump through respective main circuits and driven by hydraulic fluid delivered from said hydraulic pump; a plurality of working members including a swing body, boom, arm and bucket, and driven by said plurality of hydraulic actuators, respectively; a plurality of flow control valve means connected to said respective main circuits between said hydraulic pump and said plurality of hydraulic actuators; pump control means for controlling a delivery pressure of said hydraulic pump; each of said plurality of flow control valve means comprising first valve means having an opening degree variable in response to the operated amount of operation means, and second valve means connected in series with said first valve means for controlling a differential pressure between the inlet pressure and the output pressure of said first valve means; and control means associated with each of said plurality of flow control valve means for controlling said second valve means based on the input pressure and the output pressure of said first valve means, the delivery pressure of said hydraulic pump, and the maximum load pressure among said plurality of hydraulic actuators, wherein:

each of said plurality of flow control valve means comprises: a main valve of seat valve type having a valve body for controlling communication between an inlet port and an outlet port both connected to said main circuit, a variable restrictor capable of changing an opening degree thereof in response to displacements of said valve body, and a back pressure chamber communicating with said inlet port through said variable restrictor and producing a control pressure to urge said valve body in the valve-closing direction; and a pilot circuit connected between said back pressure chamber and said outlet port of said main valve; said first valve means is a pilot valve connected to said pilot circuit for controlling a pilot flow passing through said pilot circuit, and said second valve means is constituted by auxiliary valve means connected to said pilot circuit for

controlling a differential pressure between the inlet pressure and the outlet pressure of said pilot valve; and said control means controls said auxiliary valve means for each of said plurality of flow control valve means associated with at least two working members among said swing body, boom, arm and bucket such that the differential pressure between the inlet pressure and the outlet pressure of said pilot valve has a relationship expressed by the following equation with respect to a differential pressure between the delivery pressure of said hydraulic pump and the maximum load pressure among said plurality of hydraulic actuators, a differential pressure between said maximum load pressure and the self-load pressure of each of said hydraulic actuators, and the self-load pressure,

$$\Delta P_z = \alpha (P_s - P_{lmax}) + \beta (P_{lmax} - P_l) + \gamma P_l$$

where

$\Delta P_z$ : differential pressure between the inlet pressure and the outlet pressure of the pilot valve  
 $P_s$ : delivery pressure of the hydraulic pump  
 $P_{lmax}$ : maximum load pressure among the plurality of hydraulic actuators  
 $P_l$ : self-load pressure of each of the plurality of hydraulic actuators

$\alpha, \beta, \gamma$ : first, second and third constants  
 said first, second and third constants  $\alpha, \beta, \gamma$  being set to respective predetermined values.

4,945,724

# APPARATUS FOR COLLECTING HYDRAULIC LEAKAGE FLUID

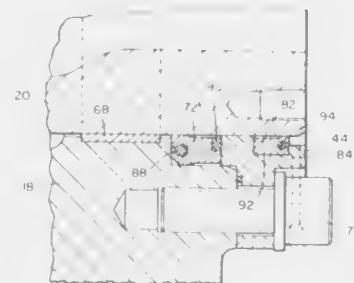
James I. O'Neal, Batavia, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jan. 26, 1989, Ser. No. 301,980

Int. Cl.<sup>5</sup> F16D 31/02

U.S. Cl. 60—455

6 Claims



2. Hydraulic cylinder and piston apparatus comprising:

- housing means adapted to contain hydraulic fluid under pressure, the housing means including a piston-receiving opening and fluid inlet and outlet means to admit and release pressurized fluid to and from the housing;
- piston means movably carried by the housing means and slidable into and out of the housing means through the piston-receiving opening in the housing means, the piston means movable relative to the housing means by selectively admitting and releasing from the housing means pressurized hydraulic fluid that acts the piston means;
- flexible sealing means carried by the housing means adjacent the piston-receiving opening for sealing engagement with the housing and with the piston means for limiting leakage of hydraulic fluid between the housing means and the piston means;
- seal retaining means carried by the housing means for retaining the sealing means in position relative to the housing means and for collecting leakage hydraulic fluid, wherein the seal retaining means includes an annular,

inwardly facing leakage fluid collection groove in surrounding relationship with the piston means;  
 (e) drainage conduit means carried by the retaining means outwardly of the sealing means for receiving hydraulic fluid that is carried by the piston means past the sealing means, the drainage conduit means positioned to receive leakage hydraulic fluid; and  
 (f) wiper means carried in the leakage fluid collection groove and in wiping engagement with the rod means, wherein the drainage conduit means has an axial dimension greater than a corresponding axial dimension of the leakage fluid collection groove to define a drain aperture that extends axially beyond the collection groove in each axial direction to receive leakage fluid from both axially spaced sides of the wiper means.

4,945,725

# DIFFERENTIAL-AREA PISTON TYPE MIXED-PHASE MOTORS

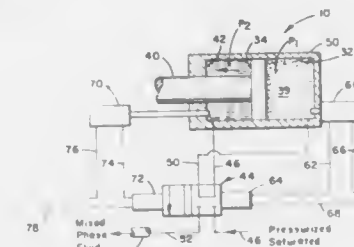
David E. Carmein, and Richard D. Hembree, both of Minneapolis, Minn., assignors to Recovery Engineering, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 062,177, Jun. 12, 1987, abandoned. This application Aug. 29, 1988, Ser. No. 237,774 The portion of the term of this patent subsequent to Dec. 27, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> F01K 25/04; F25B 15/00

U.S. Cl. 60—509

12 Claims



1. A motor for powering a use device, said motor using pressurized, saturated or near saturated liquid fluid from a source as input and exhausting said fluid when expended to a drain, said motor comprising:

- a block;
- a driven member operably mounted with respect to said block;
- means for driving said driven member, said driving means including means for metering a discrete quantity of said liquid fluid from said source to drive said driven member in a first direction through a hydraulic power stroke, said driving means further including means for expanding said quantity of said metered liquid fluid wherein at least a portion of said liquid fluid changes phase to drive said driven member in a second direction opposite to the first direction through an expansion power stroke;
- means for controlling said driving means; and
- means for transferring to said use device energy from said driven member.

4,945,726

# LEAKY GAS SPRING VALVE FOR PREVENTING PISTON OVERSTROKE IN A FREE PISTON STIRLING ENGINE

William T. Beale, Athens, Ohio, assignor to Sunpower, Inc., Athens, Ohio

Filed Aug. 23, 1989, Ser. No. 397,182

Int. Cl.<sup>5</sup> F02G 1/04

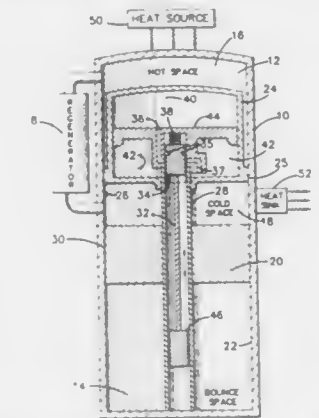
U.S. Cl. 60—520

10 Claims

1. In a free piston Stirling machine, including a displacer reciprocally mounted in a working gas space and engaged by a

gas spring and having a piston mounted for reciprocation in a cylinder and acted upon by the working gas, the improvement comprising:

- means for detecting piston amplitude beyond a selected amplitude during its reciprocation; and
- valve means connected in communication with the gas spring for permitting the connection of the gas spring to another gas space; and



(c) actuating means connected between the detecting means and the valve means for opening the valve means in response to detection of piston amplitude in excess of said selected amplitude to reduce the spring constant and make the gas spring more lossy and thereby increase its damping and for closing the valve means in response to the absence of piston amplitude in excess of said selected amplitude.

4,945,727

# HYDRAULIC SHAPE MEMORY ALLOY ACTUATOR

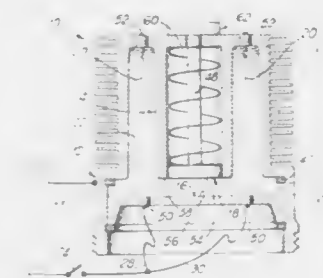
Charles A. Whitehead, 3508 S. Woodridge Rd., Birmingham, Ala. 36330, and Kenneth M. Groom, 119 Hillcrest Loop, Enterprise, Ala. 36330

Filed Dec. 11, 1989, Ser. No. 448,250

Int. Cl.<sup>5</sup> F03G 7/06

U.S. Cl. 60—527

27 Claims



1. A hydraulic shape memory alloy actuator, comprising:  
 (a) a first cylinder having fluid therein;  
 (b) a first piston capable of movement between first and second positions within said first cylinder, said first piston having a fluid contacting surface;  
 (c) a length of shape memory alloy having a first end connected to said first piston and a second end connected to a fixed point, said alloy capable of changing from a martensitic state to an austenitic state when said alloy is heated above a transition temperature range so as to move said first piston from said first position to said second position, said alloy also capable of changing back to said martensitic state from said austenitic state when said alloy is cooled below said transition temperature range whereby said first piston moves from said second position to said first position.



tion, said length of said alloy having a shorter longitudinal dimension in said austenitic state than in said martensitic state;

- (d) a second cylinder, said first and second cylinder being in fluid communication with each other;
- (e) a second piston capable of movement between a rest and an operating position within said second cylinder, said second piston having a fluid contacting surface, said second piston having said fluid dispersed between it and said first piston, said fluid contacting said fluid contacting surface of said first piston and said fluid contacting surface of said second piston, said fluid communicating the movement of said first piston to said second piston when said first piston moves between said first and second positions, said fluid also communicating the movement of said second piston to said first piston when said alloy changes from said austenitic state to said martensitic state;
- (f) biasing means capable of moving said second piston from said operating position to said rest position as said alloy changes from said austenitic state to said martensitic state; and
- (g) means for selectively heating said length of shape memory alloy above said transition temperature range.

4,945,728

#### CENTER COMPENSATING TANDEM MASTER CYLINDER WITH SEALS IN CYLINDER WALL

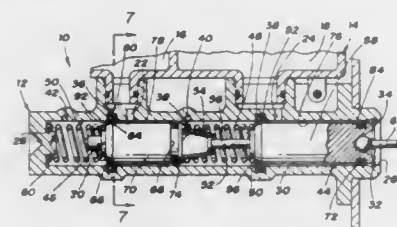
John R. Coleman, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 26, 1989, Ser. No. 371,187

Int. Cl.<sup>5</sup> B60T 11/20

U.S. Cl. 60—562

8 Claims



8. A master cylinder having a housing, a bore defined by a cylindrical bore side wall in said housing, a primary pressurizing piston and a secondary pressurizing piston reciprocally received in said bore in axially tandem relation and forming with said housing brake fluid primary and secondary pressurizing chambers adapted to be connected to separate brake fluid circuits, piston return springs in said chambers urging said pistons to the brake released position, and a brake fluid reservoir having rear and front compensating ports in continuous fluid communication with said bore through said bore side wall;

said primary and secondary pistons being smaller in diameter than the diameter of said bore side wall so as to define primary and secondary annular spaces therebetween, said pistons each having a front end, a rear end and an annular seal groove formed adjacent said rear end, each of said piston seal grooves having a seal therein engaging said bore side wall, each of said pistons having a beveled edge surface at said piston front end defining at least a part of a smaller diameter portion of each of said pistons;

said bore side wall having primary and secondary annular seal grooves formed therein respectively adjacent but in axially spaced relation to said rear and front compensating ports on the sides thereof respectively toward said primary and secondary pressurizing chambers, said bore side wall seal grooves respectively having therein primary and secondary V-block seals, said V-block seals each having an annular inner lip of smaller diameter than said pistons and extending radially into said bore from its groove; said smaller diameter portion of each of said pistons having a smaller diameter than said V-block seal inner lips so as to

provide radial clearance therebetween when said seal inner lips and said smaller diameter portions of said pistons are respectively in a radially aligned position occurring when said pistons are in their released position;

said pistons when moved in the pressurizing direction in said bore moving said piston smaller diameter portions axially beyond said seal inner lips, said seal inner lips then engaging said pistons in sealing relation with pressure being generated in said pressurizing chambers acting on said seals to maintain sealing action between said seal inner lips and said pistons;

said pistons when thereafter moved in the releasing direction moving to radially realign said seal inner lips and said piston smaller diameter portions to reestablish the radial clearances therebetween and thereby open brake fluid compensation communication from said pressurizing chambers to said reservoir via said annular spaces and said compensating ports.

4,945,729

#### TANDEM MASTER CYLINDER SLEEVE

Yoshihiro Hayashida, Kanagawa; Yoshihiro Nakamura, Yamanashi; Hideaki Ishii, Chiba, and Naganori Koshimizu, Yamanashi, all of Japan, assignors to Tokico Ltd., Kawasaki, Japan

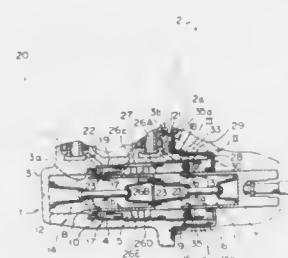
Filed Jun. 6, 1989, Ser. No. 361,867

Claims priority, application Japan, Jun. 10, 1988, 63-77129[U]; Nov. 18, 1988, 63-150620[U]; Nov. 18, 1988, 63-150621[U]

U.S. Cl. 60—562

Int. Cl.<sup>5</sup> B60T 11/20

3 Claims



1. A master cylinder wherein a sleeve is provided inside a cylinder main body to define a first pressure chamber in cooperation with primary and secondary pistons, characterized in that a plurality of through-holes adapted to communicate with an outlet port are disposed in said sleeve in such a manner as to be longitudinally spaced away from each other, and that positioning means is provided between said sleeve and said cylinder main body for locating at least one of said plurality of through-holes adapted to establish communication between said outlet port and first pressure chamber when said pistons are at their rearmost positions at such a position as to allow said one of the plurality of through-holes to face the top portion of the circumferential wall of said cylinder main body.

4,945,730

#### POWER ACTIVATED TOOL WITH SAFETY POWER CELL

Mark C. Laney, Lee, N.H., assignor to Burndy Corporation, Norwalk, Conn.

Filed May 11, 1989, Ser. No. 350,785

Int. Cl.<sup>5</sup> B25C 1/12

U.S. Cl. 60—635

8 Claims

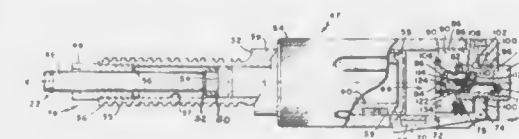
1. An explosively actuated tool in combination with a cartridge for forming a connection between main and branch cables comprising:

a base member having a fixed anvil and an upstanding sup-

port member having a sleeve for positioning a power ram in alignment with the anvil,

a main breech action assembly carried by the support member and including a power ram, a firing chamber housing, and a breech assembly,

the breech action assembly including an elongated tube having a forward portion mounted in the support member and a rear portion defining a firing chamber housing, the tube having an axial bore for receiving and projecting the power ram in alignment with the anvil, the axial bore further defining the firing chamber for receiving the cartridge case, the power ram in the axial bore having a ram end aligned with and adapted for cooperation with the anvil for finishing a connector and a breech end extending into the firing chamber,



the breech assembly including a cylindrical housing telescoped into the firing chamber housing and a breech plug for closing the breech end of the firing chamber, a firing pin and a breech pad carried by the breech plug in operative relation with the firing chamber, a cartridge case in the firing chamber having a power piston and a power cell slidably received therein,

means for extending the breech end of the power ram into the firing chamber for pressing the power cell against the breech plug in range of the operative excursion of the firing pin when the tool is in engagement with a connector workpiece,

and means for moving the power cell out of range of the firing pin when the ram is retracted from the firing chamber.

4,945,731

#### ABSORBING FLUID RECEIVER FOR SOLAR DYNAMIC POWER GENERATION AND SOLAR DYNAMIC POWER SYSTEM

Robin Z. Parker, 1608 Tigertail Ave., Miami, Fla. 33133; Peter W. Langhoff, 4890 Verness Woods Rd., Bloomington, Ind. 47401, and Edward J. Bair, 117 North Hilsdale Ave., Bloomington, Ind. 47401

Filed Dec. 12, 1988, Ser. No. 282,735

Int. Cl.<sup>5</sup> F03G 7/02; F02C 1/04

U.S. Cl. 60—641.15

15 Claims



1. A receiver for a solar dynamic power generator having a heat cycle engine to generate power, comprising:

a working fluid comprising a radiant energy absorber selected from halogens and interhalogens;

a hollow, cylindrical containment for containing the working fluid having a first end, a second end and an inner wall; a hollow, cylindrical member, disposed within the containment having an inner wall and an outer wall, and defining an annular working fluid flow space within the housing and a receiving space within the inner wall of the cylindrical member;

a window disposed in the first end of the containment for admitting solar radiation in the receiving space for heating working fluid contained in the receiving space, wherein the heated working fluid in the receiving space travels toward the first end of the containment;

a latent heat storing material disposed in the flow space between the outer wall of the cylindrical member and the inner wall of the containment for storing heat absorbed by the working fluid in the receiving space; and

means for coupling the working fluid with a heat engine, wherein, at the end of the heat cycle, the working fluid is reintroduced into the receiving space toward the second end of the containment.

4,945,732

#### REFRIGERATED DISPLAY CASE WITH A DAMPER CONTROLLED DEFROSTING MECHANISM

Yasuto Haruyama; Hirokazu Akabane, and Fumio Fukasawa, all of Gunma, Japan, assignors to Sanden Corporation, Gunma, Japan

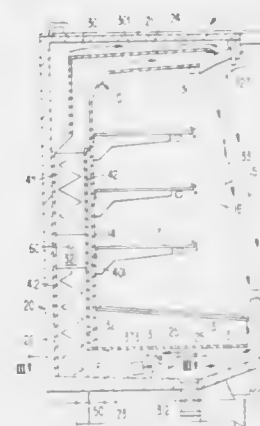
Filed Mar. 28, 1989, Ser. No. 329,835

Claims priority, application Japan, Mar. 28, 1988, 63-40700[U]

Int. Cl.<sup>5</sup> A47F 3/04

U.S. Cl. 62—256

9 Claims



1. In a refrigerated display case having an interior cabinet and an exterior member, including a refrigerating means including evaporator means, heater means for defrosting of said evaporator means located forwardly of said evaporator means, a circulating means for forcing air into contact with said refrigerating means, and a passage means for directing the refrigerated air, said case having a front opening for access to the interior thereof, at least two air inlets and corresponding outlets extending across opposed edges of said front opening, said passage means including at least inner and outer conduits communicating with the respective outlets and inlets and being defined between said interior cabinet and said exterior member, said circulating means operating to drive separate air streams through said passage means and across said front opening in an innermost stream and an outermost stream, and said refrigerating means being located wholly within said inner conduit for refrigerating the innermost stream crossing said access opening, the improvement comprising:

damper means for merging said air stream passing through said outer conduit into said inner conduit during operation

of a defrosting mode, said damper means comprising at least one damper plate positioned in advance of said refrigerating means, said damper means for directing the air to flow smoothly from the outer conduit to the inner conduit containing the refrigerating means.

#### 4,945,733 REFRIGERATION

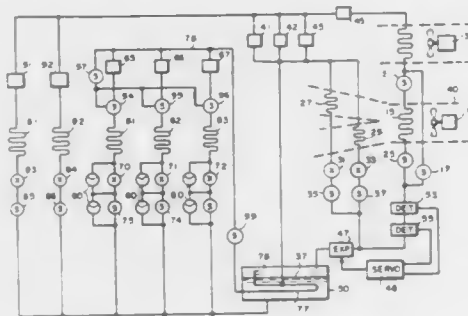
James C. LaBrecque, P.O. Box 2113, Bangor, Me. 04401

Filed Nov. 22, 1989, Ser. No. 440,982

Int. Cl.<sup>3</sup> F25B 47/02

U.S. Cl. 62—278

11 Claims



8. A multi-temperature refrigeration system comprising:
- a condenser for rejecting heat into the environment;
  - at least one evaporator operating in a moderate temperature environment;
  - at least one first compressor drawing refrigerant from said moderate temperature evaporator and driving refrigerant through said condenser;
  - means for providing refrigerant from the outlet side of said condenser to said moderate temperature evaporator;
  - a plurality of evaporators operating in respective low temperature environments;
  - a plurality of compressors for drawing refrigerant from corresponding low temperature evaporators;
  - a refrigerant processing vessel for receiving and allowing to separate a mixture of gas phase and liquid phase refrigerant, the liquid phase refrigerant settling to the lower portion of said vessel;
  - means including an expansion valve for providing refrigerant from the outlet side of said condenser to said vessel;
  - means for providing gas phase refrigerant from said vessel to the inlet of said first compressor;
  - in the lower portion of said vessel, a heat exchanging conduit which is normally submerged in a liquid phase refrigerant, the outlets of the low temperature compressors being selectively connected to the inlet end of said heat exchanging conduit; and
  - valve means for controllably disconnecting a selected one of said low temperature evaporators from the corresponding compressor and connecting it instead to the outlets of the other low temperature compressors thereby to effect defrosting of the selected evaporator.

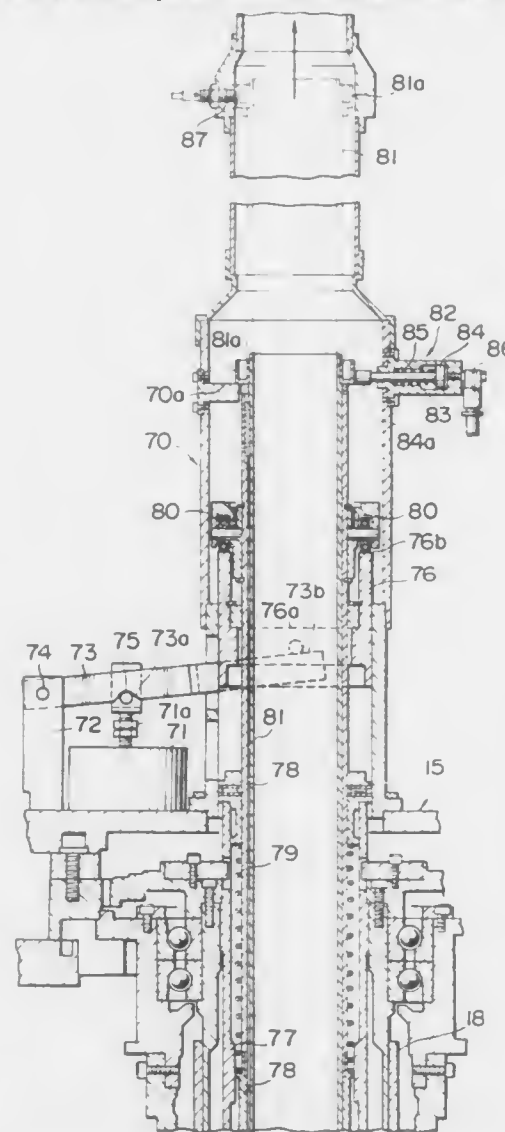
4,945,734  
FABRIC TENSIONING DEVICE IN A DOUBLE CYLINDER CIRCULAR KNITTING MACHINE  
Kakuji Maruyama, Bunsui, Japan, assignor to Nagata Seiki Kabushiki Kaisha, Tokyo, Japan  
Filed Sep. 22, 1989, Ser. No. 411,710  
Claims priority, application Japan, Sep. 26, 1988, 63-240313  
Int. Cl.<sup>3</sup> D04B 15/88

U.S. Cl. 66—149 R

7 Claims

1. In a double cylinder circular knitting machine, in combination:

- (a) an upper and a lower needle cylinder disposed end to end and defining a stitching zone therebetween;
- (b) an inner and an outer movable tube concentrically nested within the upper needle cylinder for axial displacement relative to each other and to the upper needle cylinder;
- (c) fabric locking means normally disposed within the lower needle cylinder for movement into and out of the upper needle cylinder;
- (d) a set of locking members included in the fabric locking means, the locking members being capable of fluid pressure actuation for locking a fabric being knitted against one end of the inner movable tube at the stitching zone;
- (e) fluid actuated tandem cylinder means including a first and a second piston member movable into and out of



end-to-end abutment against each other, with the second piston member being hollow and being coupled to the fabric locking means in fluid pressure communication therewith;

- (f) first port means for admitting pressurized fluid into the tandem cylinder means in order to move the first piston member over a first predetermined stroke and hence to move, via the second piston member, the fabric locking means into the stitching zone;
- (g) second port means for admitting pressurized fluid into the tandem cylinder means in order to actuate, via the hollow in the second piston member, the locking members of the fabric locking means into engagement with the one end of the inner movable tube via the fabric after the

- movement of the fabric locking means into the stitching zone, the pressurized fluid admitted into the tandem cylinder means via the second port means also acting on the second piston member to move the same over a second predetermined stroke and hence to cause the fabric locking means to move with the inner movable tube a corresponding distance into the upper needle cylinder for drawing the fabric;
- (h) third port means for admitting pressurized fluid into the tandem cylinder means in order to cause the second piston member to retract the fabric locking means into the lower needle cylinder; and
- (i) shift means coupled to the outer movable tube for moving the same into locking engagement with the fabric at the stitching zone preparatory to the retraction of the fabric locking means from the upper to the lower needle cylinder.

#### 4,945,735

#### WASHING MACHINE WITH IMPROVED PUMP CONTROL DEVICE FOR CLOSING A VALVE

Vincenzo Tarrano, and Luciano Guarino, both of Naples, Italy, assignors to Whirlpool International B.V., Eindhoven, Netherlands

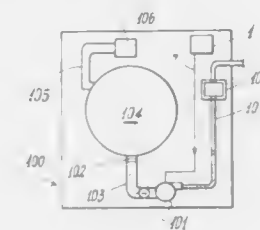
Filed Jun. 9, 1989, Ser. No. 364,335

Claims priority, application Italy, Jun. 22, 1988, 21069A/88

Int. Cl.<sup>3</sup> D06F 33/02, 39/08

U.S. Cl. 68—12 R

4 Claims



1. A washing machine comprising a tub (104), a solenoid valve (3) for the water feed into the tub (104), a discharge pipe (103) having a mouth through which it is connecting to the tub, a delivery pipe (107) for delivering water to the solenoid valve, a pump (101) situated between and connected to the discharge pipe and the delivery pipe and a valve (102) for detergent economy located at the mouth of the discharge pipe (103) at the tub (104), said washing machine (100) comprising a control device (1) for pulse-operating the pump (101) to create a water head in the discharge pipe (103) which is effective to close said valve (102), said device (1) comprising a resistor (2) the resistance of which varies directly as a function of its temperature and which is connected in parallel with the solenoid valve (3) and in series with said pump (101), the device (1) for pulse-operating the pump (101) further comprising means (14) which dissipates heat when traversed by current and which is thermally coupled with the variable resistor (2), said means (14) maintaining the temperature of said resistor (2) relatively high so that its resistance remains high during the operating stages of the washing machine (100) subsequent to starting.

#### 4,945,736

#### DEVICE FOR STRETCHING HIDES, PARTICULARLY FOR MANUFACTURING FURS AND LIKE

Agostino Lagori, Via Morone 3, 20121 Milan, and Giacomo Cotti, Via Stoppani 9, 20129 Milan, both of Italy

Filed Dec. 15, 1987, Ser. No. 132,977

Claims priority, application Italy, Dec. 31, 1986, 22902 A/86

Int. Cl.<sup>3</sup> C14B 1/26

U.S. Cl. 69—19.2

14 Claims

1. A device for stretching animal hides sewn together along

longitudinal edges to form a tubular hide muff having a head end and an opposite tail end, comprising:

- (A) at least one drawing frame including

- (a) an elongated middle strip and a pair of elongated side strips at opposite sides of the middle strip, said strips extending through the muff and past the head and tail ends thereof and terminating in head end regions at the head end of the muff and in tail end regions at the tail end of the muff;
- (b) a head end support extending transversely across the head end regions of the strips;
- (c) a tail end support extending transversely across the tail end regions of the strips;
- (d) means for pivotably mounting the tail and head end regions of the side strips to the tail and head end supports, respectively;
- (e) means for mounting at least one end region of the middle strip to at least one of the supports; and
- (f) means for detachably securing the tail and head ends of the muff to the tail and head end regions, respectively, of the middle strip;

- (B) a stretching frame on which the drawing frame and the muff are mounted, said stretching frame having a head stretching station and a tail stretching station, each stretching station including

- (a) a transversely-extending track,



- (b) a central member stationarily mounted on the track at a central region thereof;
- (c) a pair of slide members at opposite sides of the central member and slidably mounted on and along the track;
- (d) means for detachably coupling the tail and head end regions of the middle strip to the stationary central member of each stretching station; and
- (e) means for detachably coupling the tail and head end regions of the side strips to the slide members of each stretching station;
- (C) head drive means at the head stretching station for sliding the slide members thereat in opposite transverse directions away from each other, and for pivoting the side strips about their tail end regions, to a head stretching position in which the head end of the muff is stretched to a predetermined extent;
- (D) tail drive means at the tail stretching station for sliding the slide members thereat in opposite transverse directions away from each other, and for pivoting the side strips about their head end regions, to a tail stretching position in which the tail end of the muff is stretched to a preselected extent; and
- (E) said head and tail drive means being independently operable to control the extent to which each of the tail end and the head end of the muff is stretched.



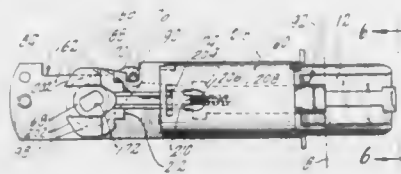
# 4,945,737 LOCKSET ASSEMBLY

Leroy Hart, Farmington, Conn., assignor to Emhart Industries, Inc., Towson, Md.  
Continuation of Ser. No. 6/568,542, Jan. 5, 1984, abandoned, which is a continuation-in-part of Ser. No. 6/537,896, Sep. 30, 1983, Pat. No. 4,594,864. This application Nov. 19, 1985, Ser. No. 799,555

U.S. Cl. 70-143

Int. Cl.<sup>5</sup> E05B 55/06

12 Claims



1. A lockset having unlocked and locked states for a door movable between open and closed positions comprising a latch bolt assembly including a bolt movable between a partially extended latching position, a fully extended deadbolt position, and a retracted position, spring means biasing said bolt toward its deadbolt position, a spindle extending through said latch bolt assembly in a direction transverse of the direction of movement of said bolt, means connecting said spindle to said bolt for moving said bolt between its positions upon rotation of said spindle, means for normally biasing said bolt in its latching position including means for retaining said bolt in said latching position when said door is open and means effective in response to closing of said door from the position when said door is in the open position and said bolt is in said latching position for causing said bolt to be moved automatically into its deadbolt position when said door is moved into its closed position.

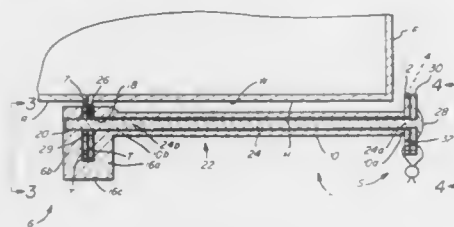
# 4,945,738 METER BOX LOCKS

Richard W. Blair, and Jack R. Grant, both of Houston, Tex., assignors to Houston Industries Incorporated, Houston, Tex.  
Filed Nov. 14, 1989, Ser. No. 436,343

U.S. Cl. 70-161

Int. Cl.<sup>5</sup> B65D 55/00

15 Claims



1. A lock for an electrical power meter box having closure tabs in a wall thereof comprising:  
(a) sleeve means having a flange at an outer end, said flange having apertures therethrough;  
(b) socket means having an outer end fixed to an inner end of said sleeve means, said socket means being adapted to fit over the closure tabs of the box;  
(c) said sleeve means being of a length such that said flange is located at or beyond the outer edge of the wall of the box when said socket means is fitted over the closure tabs of the box;  
(d) lock rod means insertable through said sleeve means into said socket means and through the closure tabs of the box for locking same; and  
(e) cap means having apertures adapted for aligning with apertures of said flange for a wire seal to be inserted therethrough.

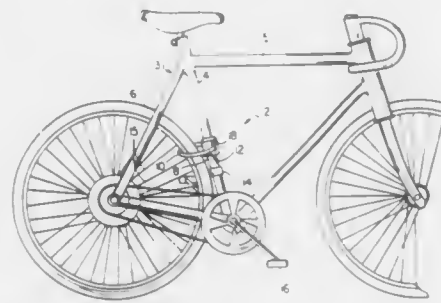
# 4,945,739 BICYCLE LOCK

Carl E. Prindle, 140 Marlboro St., Boston, Mass. 02116  
Filed Jun. 1, 1989, Ser. No. 360,052

U.S. Cl. 70-233

Int. Cl.<sup>5</sup> E05B 71/00

17 Claims



1. A bicycle lock comprising:  
a base member attachable to a member of a bicycle frame, near a wheel of said bicycle;  
a bent locking bar  
a rotation assembly attached to said base and supporting said locking bar from a first end of said locking bar, said locking bar extending to a second free end adapted to pass between the spokes of said wheel,  
said rotation assembly constructed to permit at least two degrees of freedom of rotation of said first end of said bent locking bar, said rotation assembly including first means permitting a first said motion about an axis that corresponds to said bicycle frame member to which said base member is attachable and second means permitting a second said motion about an axis lying at a substantial angle to said first axis, said first and second means of said rotation assembly cooperatively constructed and arranged to enable said motions of said bent locking bar about said axes without detachment from said base for moving said bar between a storage position in which said bent locking bar lies substantially in the vertical plane of said bicycle frame, in position not to impeded operation of said bicycle and a locking position in which said bent locking bar lies in a plane at a substantial angle to the plane of said frame with the free end of said bar extending through the spokes of the bicycle wheel to prevent rotation of said wheel; and  
a lock mechanism at said frame member for locking said bar in its said locking position.

# 4,945,740 VEHICLE STEERING LOCK DEVICE

Minoru Kawano; Tatsuro Yamashita; Noboru Izu; Shunsuke Shibata, all of Miyazaki; Norimithu Kurihara, Wako; Shigeo Hara, Wako; Kazuo Kojima, Wako, and Masashi Takezawa, Wako, all of Japan, assignors to Honda Lock Mfg. Co., Ltd., Kiyazaki and Honda Giken K. K. K., Minato, both of Japan  
Filed Dec. 9, 1988, Ser. No. 282,059

Claims priority, application Japan, Dec. 19, 1987, 62-322200; Dec. 19, 1987, 62-193085

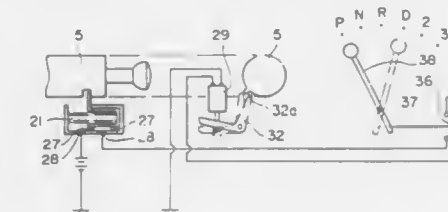
Int. Cl.<sup>5</sup> E05B 65/12

U.S. Cl. 70-248

11 Claims

1. A vehicle steering lock device mounted to an automotive vehicle, in which a rotor in a cylinder lock is allowed to rotate to a lock position thereby locking a steering shaft only when a first operation of rotating said rotor and a second operation other than said first operation are respectively conducted simultaneously wherein the device comprises  
a first switching means for detecting whether said operation other than the first operation is made, and

a second switching means for detecting whether a shift lever is situated to a parking position or not, in which



the rotation of said rotor to the lock position is allowed or inhibited in accordance with signals from said first switching means and said second switching means.

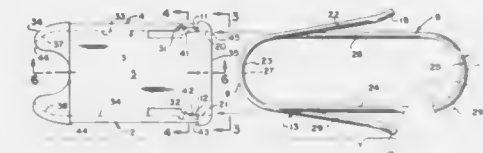
# 4,945,741 KEY TAG

Robert A. Brewer, 15 Castle Park Way, Oakland, Calif. 94611  
Filed Sep. 25, 1989, Ser. No. 411,734

U.S. Cl. 70-456 R

Int. Cl.<sup>4</sup> A47G 29/10

12 Claims



1. A tag device for holding articles and for attachment to an organizing member comprising:  
a. an open ended rigid sleeve having inner and outer walls and having an indicia receiving means on a portion of said outer wall;  
b. an elongated insert member having first and second ends and dimensioned for receipt within said inner wall of said rigid sleeve and retained by said rigid sleeve;  
c. article holding means on said first end of said insert member;  
d. organizer member holding means on said second end of said insert member;  
e. locking means for preventing movement of said insert member relative to said sleeve;  
f. openable gate means provided on said insert member;  
g. means formed in said open ended rigid sleeve and said elongated insert member preventing said elongated insert member from moving relative to said open ended rigid sleeve beyond a selected relative position in one direction only.

# 4,945,742 MONITORABLE AND COMPENSATABLE FEEDBACK TOOL AND CONTROL SYSTEM FOR A PRESS

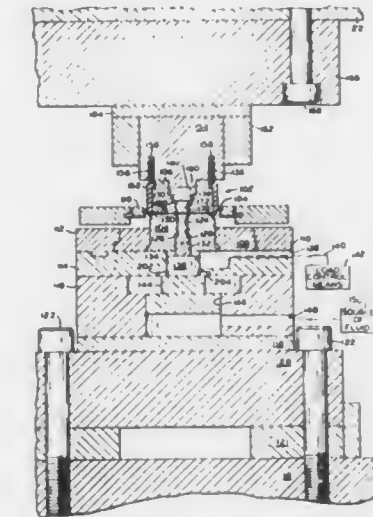
Daniel A. Schoch, Minster, Ohio, assignor to The Minster Machine Company, Minster, Ohio  
Division of Ser. No. 90,215, Aug. 27, 1987. This application Aug. 12, 1988, Ser. No. 231,446

U.S. Cl. 72-21

22 Claims

1. A method for monitoring and controlling a back-up load

to at least one of an upper and lower tool in a press assembly comprising:  
applying fluid at a pressure to said one tool to provide a back-up load thereto;  
sensing the back-up load at said tool and producing a single signal correlated to the sensed load;



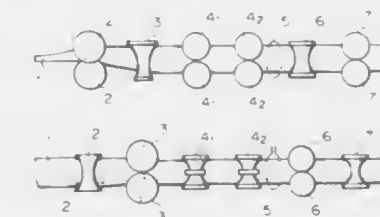
comparing a predetermined reference load signal and said sensed signal and producing an output control signal as a function only of said compared signals; and  
dynamically controlling said fluid pressure and thereby said tool back-up load in response to only said control signal.

# 4,945,743 APPARATUS FOR MANUFACTURING ELECTRIC WELDED PIPES UNDER HOT CONDITIONS

Ichiro Yasumura, and Kuniharu Fujimoto, both of Ibaraki, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan  
Filed Jul. 28, 1988, Ser. No. 225,191

U.S. Cl. 72-128

3 Claims



1. Apparatus for producing an electric welded pipe by continuously shaping a steel sheet as it passes from upstream to downstream along a constant pass-line into a tubular form in a hot condition, the apparatus comprising a forming roll arrangement which comprises breakdown rolls, forming rolls, at least an upstream pair of fin pass rolls and a downstream pair of fin pass rolls, squeeze rolls, and pull-out rolls, and said rolls of said arrangement have calibers arranged in the manner of a constant pass-line type in combination with a downward bending system, wherein:  
(i) said breakdown rolls are horizontal rolls having a caliber with radius of curvature of 265-285 mm;  
(ii) said forming rolls are vertical rolls having a double radius comprising an upper portion above a caliber center having a radius of curvature of  $R_1$  (mm) and a lower portion below the caliber center having a radius of curva-



ture of  $R_B$  (mm), wherein the ratio  $R_B/R_A=1.3-1.4$ , said forming rolls having a forming angle in the range  $210^\circ-240^\circ$ , and said caliber center thereof is placed at a position below the pass line which satisfies the equation  $c/R_A=0.18-0.25$ , wherein "c" stands for the distance between said pass line and said caliber center;

(iii) said upstream fin pass rolls are horizontal rolls which have a fin angle of  $45^\circ-65^\circ$ , and which are positioned so that the reduction at a neutral axis of the steel sheet is 2.0-3.5% and an edge forming angle thereof is  $80^\circ-90^\circ$ ;

(iv) said downstream fin pass rolls are horizontal rolls which have a horizontally-elongated cross section and an aspect ratio of 1.05-1.13, which have a fin angle of  $22^\circ-35^\circ$ , and which are positioned so that the reduction at said neutral axis of the steel sheet is 1.3-2.5%, an edge forming angle thereof is  $80^\circ-90^\circ$ , a lower gap between the fin pass rolls and the squeeze rolls is 2.0-4.0 mm, and an upper gap between the fin pass rolls and the squeeze rolls is 3.0-5.0 mm;

(v) said squeeze rolls are vertical rolls which have a vertically-elongated elliptical cross section and an aspect ratio of 1.01-1.025, which have a radius of curvature of 2.0-4.0 mm at corners adjacent sides which contact a weld edge of the steel sheet, and which are positioned so that the reduction at said neutral axis of the steel sheet is 1.5-2.5%;

(vi) said pull out rolls are horizontal rolls which have a circular caliber and which are positioned so that the reduction at said neutral axis of the steel sheet is 0.7-1.5%; and

(vii) a forming roll gap is adjusted to be 0.5-1.0 mm, a gap of each of the fin pass rolls, squeeze rolls, and pull-out rolls is adjusted to be within the range of 1.0-2.0 mm, and a V-angle for welding is adjusted to be  $2^\circ-4^\circ$ .

4,945,744

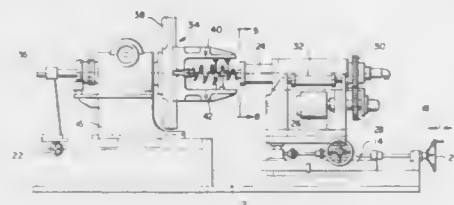
#### METHOD AND APPARATUS FOR FORMING A BARREL COIL SPRING

Gerold Lienert, Ontario, Canada, assignor to Rockwell International Suspension Systems Company, Milton, Canada  
Filed Jul. 26, 1988, Ser. No. 224,143

Int. Cl.<sup>3</sup> B21F 3/10, 35/02

U.S. Cl. 72-137

36 Claims



1. A method of forming a coil spring having a reduced coil diameter end portion comprising the steps of:

- attaching an end of the coil spring to a first rotatable head;
- inserting at least one forming die between adjacent coils so as to bear against an inner surface of a coil;
- rotating the first rotatable head in a first direction about a first axis substantially parallel to a longitudinal axis of the coil spring; and,
- rotating the at least one forming die in a second direction opposite to the first direction about a second axis substantially parallel to a longitudinal axis of the coil spring.

4,945,745

#### TELESCOPIC DRIVE SPINDLE ASSEMBLY

Bela I. Bathory; Robert W. Gronbeck, and Michael Lister, all of Sheffield, England, assignors to Davy McKee (Sheffield) Limited, Sheffield, England

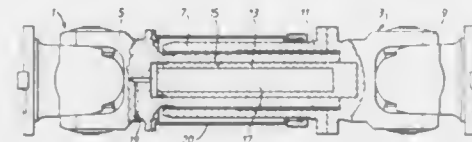
Filed Mar. 3, 1989, Ser. No. 318,668

Claims priority, application United Kingdom, Mar. 11, 1988, 8805839

Int. Cl.<sup>3</sup> B21B 35/14

U.S. Cl. 72-249

4 Claims



1. A telescopic drive spindle assembly for a rolling mill roll comprising a first member adapted for connection to drive means for rotating the roll and having an elongate cylindrical portion; a second member adapted for connection to one end of the mill roll and having an elongate cylindrical portion; said cylindrical portions being in telescopic overlapping relation and in angular driving relation with each other; one of the members having a piston which is located in a cylinder defined by the other member; said piston being displaced in the direction into the cylinder as the overlap between the cylindrical portions is increased; said piston defining a chamber which is in communication with the cylinder and including a compressible gas in the chamber which serves to urge the piston in the direction out of the cylinder; and including means for introduction of said gas into and withdrawal of said gas from said chamber.

4,945,746

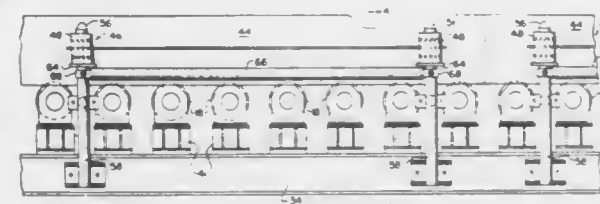
CONTAINMENT FENCE FOR RUNOUT TABLE  
Christopher C. Jakimowicz, Utica, and James H. Ramey, Newport, both of Mich., assignors to National Steel Corporation, Pittsburgh, Pa.

Filed Dec. 27, 1988, Ser. No. 290,276

Int. Cl.<sup>3</sup> B21B 39/16

U.S. Cl. 72-251

7 Claims



1. In a runout table for use with a hot strip finishing line for conveying rolled hot strip from the last mill stand through a cooling zone to a coiler spaced a substantial distance from the last stand, the runout table including a roller conveyor defined by a series of driven rollers supported on a rigid frame to define a conveyor path and a containment fence extending along each side of the driven roller conveyor adjacent the ends of and projecting above the rollers in position to engage the side edge of a strip which drifts to one side of the conveyor during movement therealong to thereby contain the strip on the conveyor between the containment fences, the improvement wherein each said containment fence comprises,

- a plurality of vertically extending posts mounted in fixed relation to and outboard of said rollers along each side of the runout table, said posts each terminating in a top end spaced above the conveying path defined by the rollers,
- a plurality of fence plate assemblies each including an elongated, generally rectangular plate and a pair of rigid mounting brackets on and extending outwardly from one

surface of the elongated plate one adjacent each end thereof, said mounting brackets each including means engaging and cooperating with the upwardly projecting end of one of said posts to support said elongated fence plates inboard of said posts and adjacent to the ends of the rollers of the conveyor, said plate assemblies each having a length to extend past the ends of a plurality of adjacent rollers of said conveyor, said posts and said mounting brackets supporting said elongated plates in overlapping relation along the length of said conveyor path, with the downstream end of each elongated plate extending inboard of the upstream end of the next adjacent elongated plate whereby said elongated plates along each side of the conveyor path form a continuous fence free from protrusions capable of impeding movement of a strip along the conveying path.

4,945,747

#### APPARATUS FOR BENDING ELONGATED MATERIALS IN ANY DIRECTION

Teruaki Yogo, Aichi, Japan, assignor to Chuo Electric Manufacturing Co., Ltd., Japan

Filed Jul. 3, 1989, Ser. No. 375,381

Claims priority, application Japan, May 11, 1989, 1-117815; May 11, 1989, 1-117816

Int. Cl.<sup>3</sup> B21D 7/024

U.S. Cl. 72-306

5 Claims



1. An apparatus for bending an elongated material in any direction comprising:

- a chucking unit including a gripper for chucking elongated material, said grippers having gripping surfaces for gripping said material so as to extend within said grippers along a longitudinal axis;
- an arm robot having at least four swiveling arm segments connected by four swiveling joints, the robot being provided at a side of the chucked material where a free end of a top one of the arm segments can reach elongated material held by said chucking unit, an axis of said four swiveling joint being parallel to said longitudinal axis of the gripper;
- a bending head provided on the free end having a bending die and a pressure die that is movable around the bending die; and
- a moving device for moving the arm robot along a line parallel to the longitudinal axis of the gripper an avoiding mechanism for avoiding interference between the chucking unit and the arm robots by withdrawing the chucking unit from the chucked material so that bending of the material by the bending heads can be accomplished in the region where the chucking unit interferes with the robot arms, said avoiding mechanism including a sliding device for supporting the chucking unit and sliding the chucking unit up and down as a whole, and a pivoting device for pivoting the sliding device with the chucking unit.

4,945,748

#### APPARATUS FOR THE MANUFACTURE OF FOUR-SIDED SHEET METAL CONTAINERS

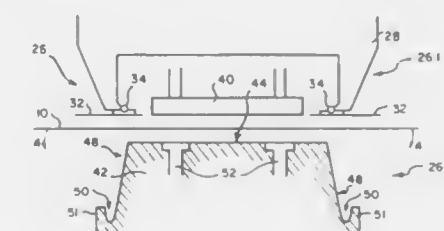
Leslie A. Worship, Stellenbosch; Peter Isaacs, Mitchells Plain, both of South Africa; Steven Bain, Kitchener, Canada, and Kenneth J. D. Bain, Cape Town, South Africa, assignors to Marsden (Proprietary) Limited, Phillippi, South Africa  
Filed Jan. 30, 1989, Ser. No. 303,301

Claims priority, application South Africa, Jan. 28, 1988, 88/0598

Int. Cl.<sup>3</sup> B21D 5/16, 51/16

U.S. Cl. 72-323

2 Claims



2. Apparatus for making tapered four-sided sheet metal containers, which apparatus comprises a tapered four-sided mould, and folding means for folding a sheet metal blank onto the mould, the folding means comprising a carrier and four folding elements mounted pivotally on the carrier, and the folding elements being arranged each to engage a peripheral portion of the blank and, by pivotal displacement of the folding element with respect to the carrier, to fold said peripheral portion onto the corresponding side of the mould;

wherein the mould has four corner edges which together define a first rectangle, each of the four sides of the mould extending from a corresponding one of said corner edges; wherein the pivot axis of each folding element is parallel to the corresponding corner edge of the mould so that the pivot axes together define a second rectangle, the width of the second rectangle being greater than the width of the first rectangle and the length of the second rectangle being greater than the length of the first rectangle; wherein each folding element has an outer portion extending outwardly from the corresponding pivot axis and an inner portion connected rigidly to the outer portion and extending inwardly from the corresponding pivot axis; and wherein the mould and the folding means are displaceable towards one another, folding of said peripheral portions of the blank taking place simultaneously as the mould and the folding means are displaced towards one another with the blank being disposed between them, said mould and folding elements being positioned so that folding of the blank is produced by displacement of the folding elements and the mould relative to one another with the pivot axes passing the level of the first rectangle.

4,945,749

COLD FORMING DIES AND COLD FORMING PROCESS  
Billy R. Walker, Daleville; George B. Emmons, Chesterfield, and Robert E. Dean, Yorktown, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 30, 1989, Ser. No. 429,929

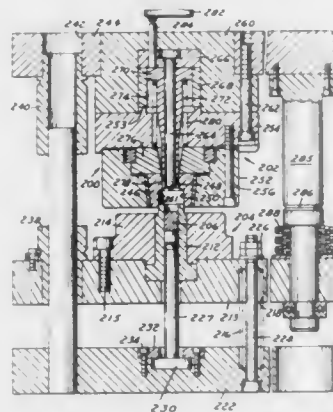
Int. Cl.<sup>3</sup> B21D 45/02; B21K 21/10

U.S. Cl. 72-356

7 Claims

1. A process of cold forming a metallic preform into a finished bushing having a central opening and an annular mounting flange lying between a lower stem and an upper tower for use as a terminal for a battery comprising the steps of: providing a blank of electrically conductive material with a predetermined mass; cold forming said blank into a generally cylindrical work part with at least one cylindrical portion between the ends

thereof having an outer diameter which equals the diameter of said flange portion of said finished bushing; making an opening through said workpart along the central axis thereof so as to provide said workpart with a predetermined remainder mass; cold working said workpart so as to extrude in one direction a generally cylindrical stem joined to said cylindrical portion and having a diameter less than said cylindrical portion to complete said preform; and



cold forming said cylindrical portion of said preform to extrude an annular tower in a second direction opposite to said first direction, said tower being reduced in diameter with respect to said cylindrical portion and to establish said cylindrical portion as said annular mounting flange between said stem and said tower and to thereby finish said bushing with a mass equal to said remainder mass.

4,945,750

#### PRESS FORGING OF MOLYBDENUM OR MOLYBDENUM ALLOY PARTS

Ricky D. Morgan, Ulster, and Vito P. Sylvester, Athens, both of Pa., assignors to GTE Products Corporation, Stamford, Conn. Continuation-in-part of Ser. No. 9,433, Feb. 2, 1987, Pat. No. 4,821,554. This application Aug. 3, 1988, Ser. No. 227,566 The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B21J 1/02

U.S. Cl. 72—377

3 Claims

1. A method for deforming a molybdenum based part from a billet to a press forged part for subsequent machining, said method consisting essentially of press forming a powder metallurgically produced part made of a material selected from the group consisting of molybdenum metal and molybdenum metal alloys, at a temperature of from about 1700° F. to about 2300° F. at an average strain rate of from about 5 inches per minute to about 20 inches per minute, said press forging being done in one step.

4,945,751

#### RE-ROD CUTTER AND BENDER

Ralph Ireland, Rte. 4, Box 163, Mankato, Minn. 56001 Filed May 27, 1988, Ser. No. 199,381

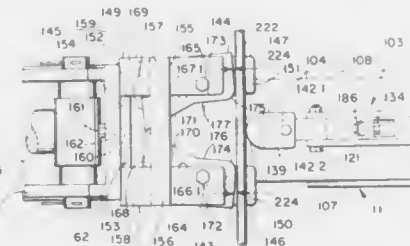
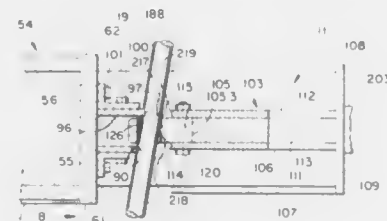
Int. Cl.<sup>5</sup> B21D 5/10

U.S. Cl. 72—384

17 Claims

1. A fabrication apparatus for bending and shearing rods and the like, comprising a main frame, a driver movably connected to said main frame and bending means connected to said main frame and to said driver and being operated by said driver for bending rods, said bending means including first and second pivotal spaced apart bending dies and an anvil, said dies and said anvil movable across each other, each of the bending dies including a

front end and an inner, angled side, the distance between front portions of the inner sides being greater than the diameter of the anvil to receive the anvil therebetween, the distance between rear portions of the inner sides being less than the diameter of the anvil whereby with one stroke of the driver the front ends are initially abutable against the rod to bend the rod with the anvil, the bent rod subsequently being drivable between the die blocks, the bent rod then being bearable against the rear portions to



pivot the die blocks so that the front portions are drivable against the bent rod to further bend the rod, and shear means connected to said main frame and to said driver and being operated by said driver for shearing a rod, said shear means including first and second shear blades movable across each other, said first shear blade including an elongate hole for receiving a rod to be sheared, said elongate hole having an edge disposed obliquely in relation to the directional movement of said driver and said second shear blade, the rod being shearable by said shear means.

4,945,752

#### TOOL CARRIER FOR A PUNCH OR STAMPING MACHINE

Bernd Stursberg, and Karl-Heinz Bauer, both of Ennepetal, Fed. Rep. of Germany, assignors to Rolf Peddinghaus, Ennepetal, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,756

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807075

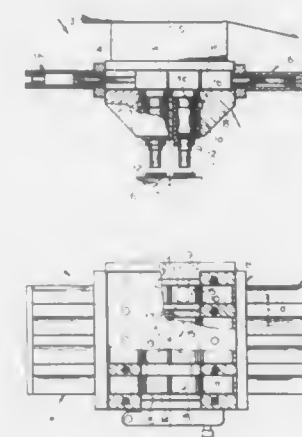
Int. Cl.<sup>5</sup> B21D 37/02

U.S. Cl. 72—442

7 Claims

1. A tool carrier assembly for a punching or stamping machine, said tool carrier comprising; a tool carrier body having a recess opening in a direction of at least one die; a plurality of tool holders interchangeably and replaceably received in said recess of said body, each of said tool holders being formed with at least one guide; respective punching or stamping tools received in said guides and displaceable therein toward and away from said at least one die; a multiplicity of tool-actuating elements receivable in said body and positionable so that at least one of said tool-actuating elements is in juxtaposition with each of said tools, and operable to enable the displacement of the respective tool in the respective guide; and

a respective positioning piston-and-cylinder device acting upon each of said tool-actuating elements for positioning same in juxtaposition with the respective tool, said positioning piston-and-cylinder devices being mutually parallel, said positioning piston-and-cylinder devices and the tool-actuating elements being spaced apart with a constant center-to-center spacing a on opposite sides of a line of symmetry S between pair of said devices and elements



and extending orthogonal to directions of displacement of said devices, said tool holders being formed so that the guides of a multiplicity of said holders are spaced in the direction of said line of symmetry with a center-to-center spacing  $n(a/2)$ , whereby at least one of said elements is juxtaposed with each tool and for any of said tools centered on said line of symmetry at least one pair of said elements symmetrically bear on the respective tool.

4,945,753

#### APPARATUS AND PROCESS FOR AUTOMATICALLY CALIBRATING LOCOMOTIVE SPEEDOMETERS AS WHEEL SIZE VARIES

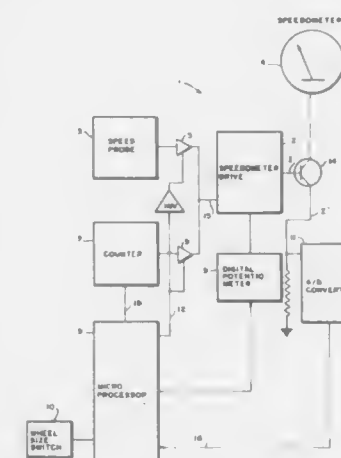
Jeffrey G. Twombly, Rochester, N.Y., assignor to General Signal Corporation, High Ridge Park, Conn.

Filed Dec. 11, 1989, Ser. No. 448,778

Int. Cl.<sup>5</sup> G01P 21/02

U.S. Cl. 73—2

11 Claims



1. A speedometer system for automatically calibrating a speedometer by adjusting the speedometer drive in accordance with the varying wheel sizes of a locomotive which comprises:

at least one speed probe; a speedometer drive coupled to such speed probe; a speedometer coupled to said drive; means for enabling and disabling the transmission of a normal speed signal from said speed probe to said speedometer drive; means for transmitting a test speed signal to said speedometer drive to produce a test speed current; means for enabling and disabling the transmission of said test speed signal to said speedometer drive; and means for calculating and generating respective test signal frequencies in accordance with wheel size variation, including means for measuring said test speed current and for adjusting said speedometer drive until a full scale current value is measured.

4,945,754

#### TEST WATER METER WITH DIGITAL DISPLAY

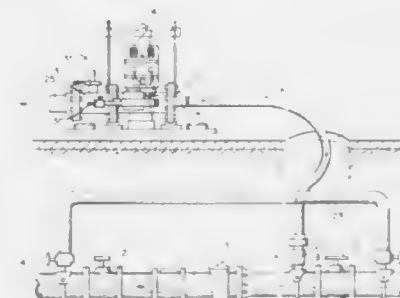
Edward E. Wissman, Jr., Millersville; Leonard M. Guralnick, Columbia, and Michael A. Perini, Forestville, all of Md., assignors to Washington Suburban Sanitary Commission, Hyattsville, Md.

Filed Jul. 18, 1989, Ser. No. 382,146

Int. Cl.<sup>5</sup> G01F 25/00

U.S. Cl. 73—3

6 Claims

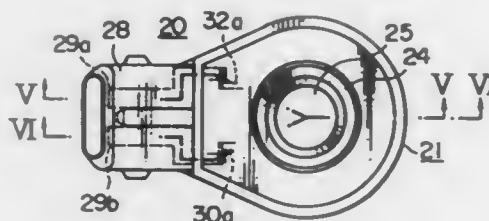


1. A portable test water meter for testing meters used in water lines, the test water meter comprising: a single inlet for admitting water which has been metered by a meter under test; first and second outlet means connected through the test water meter to the single inlet; first valve means disposed between the single inlet and first outlet means for allowing water to flow through the first outlet means when the first valve means is open; a first turbine meter means disposed downstream of the inlet means and upstream of the first valve means for measuring flow through the first turbine meter when the first valve means is open; first transmitter means connected to said first turbine meter means for converting information indicative of the measurements made by the first turbine meter means to electrical signals and for transmitting those signals; first digital display means connected to the first transmitter means for displaying the measurements made by the first turbine meter means; a second valve means disposed between the single inlet and the second outlet means in parallel with the first valve means; second turbine meter means disposed upstream of the second valve means, the second turbine meter means measuring flow therethrough; second transmitting means connected to the second meter means for converting information indicative of the measurements made by the second turbine meter means to electrical signals and for transmitting those signals; second digital display means for displaying measurements made by the second turbine meter means to measure flow at a lower rate through the meter under test;



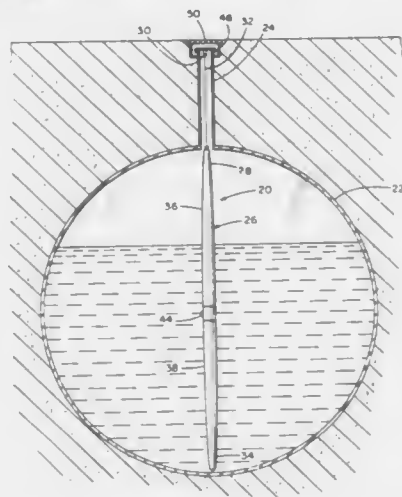
whereby flow through the test water meter may be compared to readings on the meter under test to determine the accuracy thereof, the test being conducted by closing the second valve while opening the first valve if the meter under test is a relatively large volume meter and being conducted by closing the first valve and opening the second valve if the meter is a relatively small volume meter.

**4,945,755**  
**ACCELERATION DETECTOR WITH PARALLEL GROUND PATHS**  
 Satoshi Komurasaki, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed May 19, 1989, Ser. No. 354,062  
 Claims priority, application Japan, May 19, 1988, 63-120619; Jun. 7, 1988, 63-74791  
 Int. Cl.<sup>3</sup> G01L 23/22  
 U.S. Cl. 73-35 7 Claims



1. An acceleration detector attached to an electrically conductive object for detecting accelerations thereof, comprising: a housing (21) defining a cavity (22) therein and including an electrically conductive bushing (24) mounted in contact with the object; an acceleration transducer assembly (23) disposed on said bushing in said cavity and including a piezoelectric element (31), an inertial weight (34), an output electrode (31a) and a reference electrode (31b) in contact with said bushing; securing means (35) for securing said transducer assembly to said housing; a resilient filler material applied around said acceleration transducer assembly for resiliently sealing said acceleration transducer assembly from the exterior, said resilient filler material being sufficiently resilient to allow the movement of said inertial weight relative to said housing when an acceleration is applied to said inertial weight; an output terminal (29a) connected to said output electrode of said transducer assembly and extending through said housing for external connection to a grounded control unit (38); and a ground terminal (29b) electrically connected to said reference electrode of said transducer assembly and extending through said housing for external connection to said control unit to establish parallel paths to ground through said object and through said control unit.

**4,945,756**  
**LEAKAGE DETECTION SYSTEM**  
 Garnet Lewis, Temple Terrace, Fla.; John G. Crump, Barrington Hills, Ill., and Gregory P. Crump, West Caldwell, N.J., assignors to Alert Technologies, Inc., Barrington Hills, Ill.  
 Filed Aug. 8, 1989, Ser. No. 391,152  
 Int. Cl.<sup>3</sup> G01M 3/26  
 U.S. Cl. 73-49.2 12 Claims

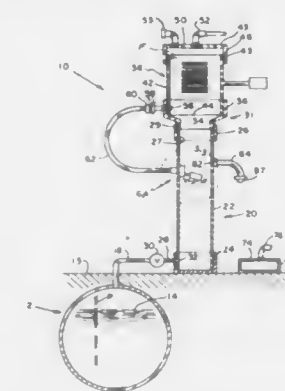


1. Apparatus for detecting leakage of liquid from a generally cylindrical tank which is substantially symmetrical about a horizontal axis, said tank holding a chemical or hydrocarbon-containing liquid such as gasoline or heating oil and including a pipe extending upwardly and communicating with the interior of said tank, said apparatus comprising: an elongate displacer having a vertical axis and extending substantially the full height of the liquid in said tank and having an upper end and a lower end, the displacer lower end terminating closely adjacent but spaced from the bottom of said tank, said displacer being made of a material having a coefficient of linear expansion of less than  $20 \times 10^{-6}$  per degree Centigrade, said displacer being substantially symmetrical about any plane through said vertical axis and having an outer surface which is a surface of revolution, the displacer having a varying diameter along its length corresponding to the horizontal surface area of the tank at the same height inside said tank, said displacer having its greatest diameter at its midpoint and its smallest diameter at said ends; indicating means for providing an indication of the weight of said displacer disposed in said liquid; and suspension means extending inside said pipe and connecting the upper end of said displacer to said indicating means.

**4,945,757**  
**CONSTANT LEVEL LEAK DETECTION APPARATUS AND METHOD**  
 Peter A. Schuster, 211 E. Grover, Kawkawlin, Mich. 48631  
 Filed May 1, 1989, Ser. No. 345,688  
 Int. Cl.<sup>3</sup> G01M 3/32  
 U.S. Cl. 73-49.2 3 Claims

1. Leak detection apparatus for testing whether a tank completely filled with liquid is leaking comprising: means, including a liquid containing standpipe in liquid communication with a tank to be tested, responsive to the liquid level in said standpipe for maintaining a substantially constant liquid head pressure on the bottom of a tank being tested as the volume of liquid in the tank tends to expand or contract; said means for maintaining a substantially constant head pressure comprising means for maintaining the liquid level in said standpipe substantially constant when the liquid volume in said tank expands or diminishes;

said means for maintaining the liquid level substantially constant comprising a liquid container conduit means in fluid communication between said standpipe and said container; and means for selectively mounting said container at lower and high elevations; and



means for measuring change in volume in said liquid container; said conduit means including a first conduit for coupling the lower end of said container to a first portion of said standpipe when said container is mounted at said higher elevation, and a second conduit for coupling the upper end of said container to a second portion of said standpipe when said container is mounted at said lower elevation.

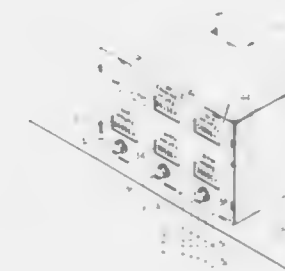
**4,945,758**  
**METHOD AND APPARATUS FOR MONITORING THE INTERIOR SURFACE OF A PIPELINE**  
 Sammy Carpenter, Dhahran, Saudi Arabia, assignor to Arabian American Oil Company, Dhahran, Saudi Arabia  
 Continuation of Ser. No. 55,068, May 28, 1987, abandoned. This application Sep. 9, 1988, Ser. No. 244,520  
 Int. Cl.<sup>3</sup> G01M 17/00  
 U.S. Cl. 73-86 21 Claims



1. In an apparatus for monitoring the effects attendant the flow of a pressurized fluid on the interior surface of a main-stream pipeline comprising (a) a sidestream pipeline; (b) an upstream bypass conduit adapted to divert a portion of the fluid flow from the mainstream pipeline to the sidestream pipeline; and (c) an upstream conduit bypass valve adapted to control the fluid flow to the sidestream pipeline; the improvement which comprises: (i) in combination, a plurality of fluid tight coupon alignment means secured to the exterior surface of the sidestream pipeline along its longitudinal axis and communicating with the interior of the sidestream pipeline; (ii) a removable coupon transporting assembly adapted to mate with, and adjustably positioned within each of the fluid tight coupon alignment means and adapted to move

radially outward from a position proximate the interior surface of the sidestream pipeline; (iii) a thin waferlike having a large surface area-to-weight ratio detachably affixed to each coupon transporting assembly and communicating with the interior of the sidestream pipeline, each coupon adapted to be positioned flush with the interior of the pipeline and not projecting beyond the inner surface of said pipeline, the shape of the coupon conforming to that of the inner surface of the pipeline; and (iv) access means communicating with at least the upstream end of the sidestream pipeline adapted to permit treatment of the interior surface of the sidestream pipeline by means selected from the group consisting of mechanical scraping devices and liquid biocidal chemical agents.

**4,945,759**  
**VEHICLE PERFORMANCE MONITORING SYSTEM**  
 Gary F. Kroschalk, 208 Dartbrook, Rockwall, Tex. 75087; Richard F. Dickey, Irving, and Courtney Hall, Dallas, both of Tex., assignors to Gary F. Kroschalk, Rockwall, Tex.  
 Filed Feb. 27, 1989, Ser. No. 316,507  
 Int. Cl.<sup>3</sup> G01M 15/00  
 U.S. Cl. 73-117.3 21 Claims



1. A performance monitoring system for an engine-driven vehicle comprising: means for determining manifold pressure of said engine; means for comparing manifold pressure of said engine to a manifold pressure threshold value; means for determining the total time during which the manifold pressure of said engine exceeds said manifold pressure threshold value; and means for determining the total time during which said engine is operating.

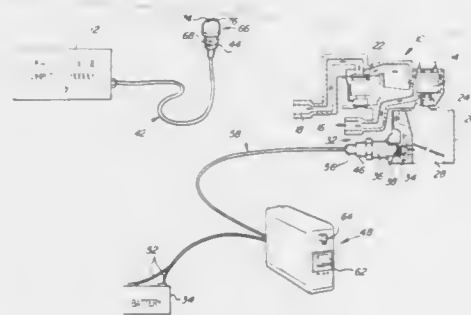
**4,945,760**  
**COMBINED MOTOR TESTER AND PULSE TRAIN MONITOR FOR STEPPER MOTORS**  
 Thomas F. Hornung, 144 Wimbleton Dr., Birmingham, Mich. 48009  
 Filed Oct. 18, 1989, Ser. No. 423,804  
 Int. Cl.<sup>3</sup> G01M 19/00  
 U.S. Cl. 73-118.1 7 Claims

1. In a tester for a vehicle engine idle air control system which includes an idle air intake valve, a stepper motor for actuating said valve, a vehicle engine computer for producing an idle air control signal in response to engine parameters and a driver circuit for producing first and second out-of-phase, sequence-controlled pulse trains for energization of first and second coils, respectively, of said motor for direction and displacement control thereof in response to said control signal, said driver circuit being coupled to said motor through a first wiring harness including a first disconnectable connector having first and second pairs of terminals connected to said motor, said first and second pulse trains being applied across said first



and second pairs of terminals, respectively, whereby said motor is controlled by said computer,

said tester including a motor tester of the type comprising a driver pulse generator for generating third and fourth out-of-phase pulse trains and manually actuated switch means for controlling the phase-sequence and time duration of said third and fourth out-of-phase pulse trains, a second wiring harness including a second disconnectible connector having third and fourth pairs of terminals adapted to be connected to said motor when said first disconnectible connector is disconnected, said third and fourth pulse trains being applied across said third and fourth pairs of terminals, respectively, for control of the direction and displacement of said motor by actuation of said switch means whereby the operating condition of said engine is changed and said computer responds thereto and causes said driver circuit to produce said first and second pulse trains across said first and second pairs of terminals, respectively, according to the actuation of said switch



means, the improvement comprising a pulse train monitor including:

- a third connector having fifth and sixth pairs of terminals,
- a first circuit with a first pair of unidirectionally conductive visual indicator devices connected in parallel with opposite polarity between said fifth pair of terminals of said third connector,
- a second circuit with a second pair of unidirectionally conductive visual indicator devices connected in parallel with opposite polarity between said sixth pair of terminals of said third connector,
- said third connector being adapted to mate with said first connector when it is disconnected from said motor with said first and second pairs of terminals being connected respectively with said fifth and sixth pairs of terminals, whereby said first and second pulse trains produced in response to actuation of said switch means cause each pair of indicator devices to alternately flash without both devices of a pair being off at the same time in response to satisfactory pulse trains.

4,945,761

#### METHOD AND DEVICE FOR TRANSMITTING DATA BY CABLE AND MUD WAVES

Jacques Lessi, Maule, and Pierre Morin, Levallois-Perret, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Feb. 22, 1989, Ser. No. 313,437

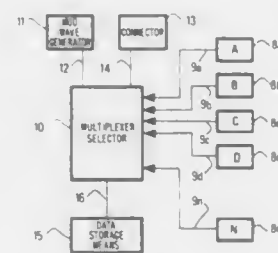
Claims priority, application France, Feb. 22, 1988, 88 02095  
Int. Cl.<sup>5</sup> E21B 47/12

U.S. Cl. 73—151

22 Claims

14. A device for transmitting data relevant to a well drilling operation generated by at least one of detection means and

measurement means for generating the data placed in a well, the device comprising transmission means including cable



transmission means and at least one of mud wave transmission means and electromagnetic wave transmission means.

4,945,762

#### SILICON SENSOR WITH TRIMMABLE WHEATSTONE BRIDGE

Fred W. Adamic, Jr., Sunnyvale, Calif., assignor to SenSym, Inc., Sunnyvale, Calif.

Filed Jan. 24, 1989, Ser. No. 301,403

Int. Cl.<sup>5</sup> G01L 1/22, 9/06

U.S. Cl. 73—862.67

16 Claims

1. A silicon force sensor comprising:
  - resistance means having an electrical resistance varying with the force applied to the sensor;
  - a plurality of trim resistors each having a resistance trimmable by applied current pulses and being electrically connected to the resistance means; and
  - a steering diode connected in parallel to a particular one of the trim resistors, so as to steer the current pulses applied to any of the other trim resistors around the particular one trim resistor.

4,945,763

#### ROTOR INBALANCE CORRECTION APPARATUS AND METHOD THEREOF

Richard Mueller, Lynchburg, Va., assignor to American Hofmann Corporation, Lynchburg, Va.

Filed May 24, 1989, Ser. No. 356,309

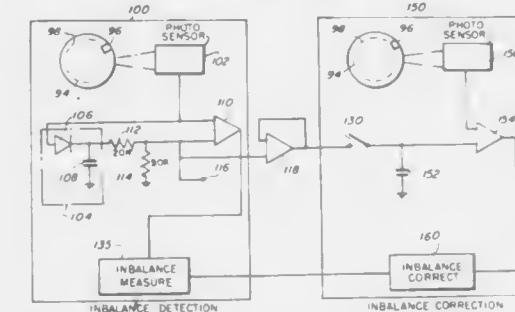
Int. Cl.<sup>5</sup> G01M 1/16

U.S. Cl. 73—462

14 Claims

1. A rotor inbalance detection and correction system, including a first station and a second station, comprising:
  - means, adapted to be disposed adjacent a rotating rotor, for

detecting reflective areas of the rotor, and producing a signal indicative thereof;  
peak detecting means, coupled to an output of said detecting means, for detecting a peak voltage of said signal;



- first means, coupled to said peak detecting means, for establishing a phase 0 at the first station using said peak voltage as a reference; and
- second means, coupled to said peak detecting means, for establishing the same phase 0 at the second station using said same peak voltage as a reference.

4,945,764

#### CONSTANT GAIN LAMINAR JET ANGULAR RATE SENSING DEVICE

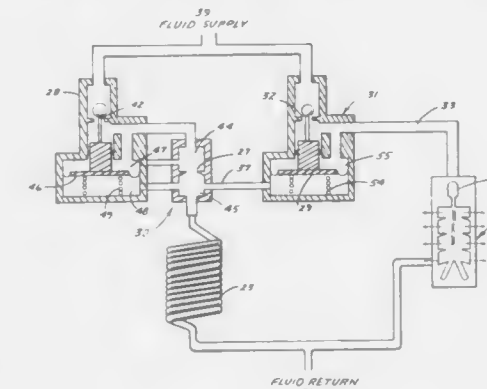
Gary L. Frederick, 1733 Brandon Close, Rockford, Ill. 61107

Filed Dec. 9, 1988, Ser. No. 281,680

Int. Cl.<sup>5</sup> G01P 9/00

U.S. Cl. 73—497

13 Claims



1. A constant gain angular rate sensing system comprising a laminar jet angular rate sensor having a supply nozzle for receiving pressurized hydraulic supply fluid and for producing a laminar jet of hydraulic fluid and further having means responsive to said jet for producing output pressure signals which vary as a function of deflection of said jet due to the angular velocity of the rate sensor, means for sensing the viscosity of said supply fluid, and means responsive to said sensing means for controlling the pressure of said supply fluid to said supply nozzle and for causing said pressure to change in direct proportion to and as a substantially linear function of changes in the viscosity of said supply fluid.

4,945,765

#### SILICON MICROMACHINED ACCELEROMETER

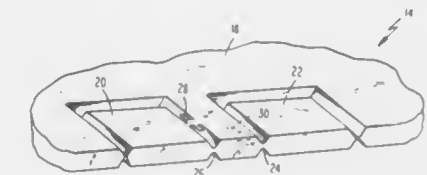
Terry V. Roszart, North Caldwell, N.J., assignor to Kearfott Guidance & Navigation Corp., Wayne, N.J.

Filed Aug. 31, 1988, Ser. No. 238,662

Int. Cl.<sup>5</sup> G01P 15/10

U.S. Cl. 73—517 AV

19 Claims



1. An integrated accelerometer comprising:
  - a substrate having a monolithic single crystal structure including therein:
    - mechanical means for oscillating at a predetermined frequency in response to application thereto of a predetermined acceleration;
    - said mechanical means including proof mass structure monolithically integrated in said substrate;
    - flexible hinging means monolithically integrated in a separating region in said substrate formed between a main body portion of said substrate and said proof mass structure for hingedly connecting said proof mass structure to said main body portion of said substrate; and
    - resonating means monolithically integrated in said separating region of said substrate substantially opposite said flexible hinging means and connected between said proof mass structure and said main body portion, thereby restraining rotation of said proof mass structure about said flexible hinging means in one direction, said resonating means being operable for converting mechanical acceleration of said proof mass structure to an oscillating signal; and
    - electrical means for converting oscillation of said mechanical means to an electrical signal indicative of a magnitude of said acceleration applied to said mechanical means.

4,945,766

#### METHOD AND APPARATUS FOR ULTRASONIC INSPECTION

Virgil R. Dahlmann, Bloomfield Hills; Karen M. Pirrallo; Kelly A. Talaki, both of Troy; Kenneth J. Zielesch, Fraser, all of Mich., and Robert Hickling, Oxford, Miss., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 8, 1989, Ser. No. 404,469

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73—598

15 Claims

1. In an ultrasonic sensing system having a sensor for inspecting a series of objects each having a plurality of surfaces facing the sensor including a reference surface at a known nominal distance from the sensor, the method comprising the steps of:

scanning the sensor over the surfaces of the objects and recording the time of flight of the ultrasonic signals;  
determining the average time of flight to the reference surfaces in the course of inspecting a series of objects;  
for each object, establishing parameters on the desired distance of each surface from the reference surface, extracting features from the recorded time of flight data, locating the feature corresponding to the reference surface based on the average time of flight, and determining the reference time of flight;

setting a window in which each acceptable surface other than the reference surface is to be found; and



determining whether each feature for a respective surface is in a corresponding window.

#### 4,945,767 METHOD AND SYSTEM FOR CONTROLLING ULTRASONIC PROBE OPERATION

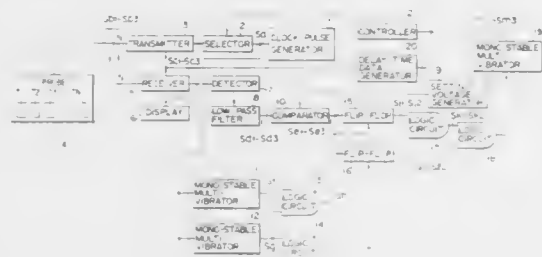
Toshio Shirasaka, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 146,180, Jan. 20, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 402,997

Claims priority, application Japan, Jan. 22, 1987, 62-13691  
Int. Cl.<sup>5</sup> G01N 29/06

U.S. Cl. 73—610

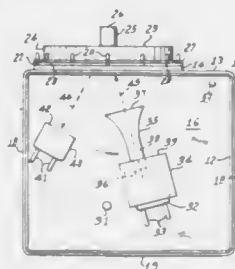
6 Claims



1. A method for controlling the number of transducers to be driven in an ultrasonic probe, the method comprising the steps of:

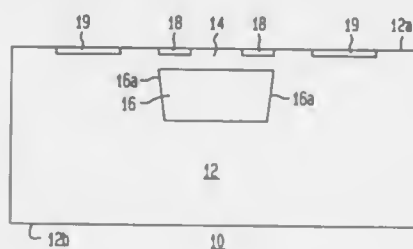
- driving at least one of the transducers;
- transmitting an ultrasonic beam generated by the transducer driven, and receiving an echo signal; and
- outputting a first command signal when the received echo signal includes a multi-echo signal reflected from an acoustic lens, thereby driving at least one transducer, and outputting a second command signal when the received echo signal includes the multi-echo signal and a subject echo signal reflected from an interior portion of a subject, thereby driving a plurality of transducers to obtain a tomogram image of the subject, the number of transducers driven by the first command signal being fewer than the number of transducers driven by the second command signal.

4,945,768  
PRESSURE SENSOR  
David F. Sorrells, Jacksonville, Fla., assignor to Parker Electronics, Inc., Jacksonville, Fla.  
Filed May 20, 1988, Ser. No. 196,562  
Int. Cl.<sup>5</sup> G01L 7/08, 11/00, 19/04  
U.S. Cl. 73—703 15 Claims



1. A pressure sensor comprising a housing, a sonic transmitter mounted inside said housing, oscillator means for driving said transmitter, a sonic receiver mounted inside said housing, a sonic reflector mounted in said housing in a signal path between said transmitter and said receiver, said reflector being movably responsive to pressure for causing changes in length of said signal path between said reflector and said receiver, means to substantially inhibit the creation of echoes and extraneous reflections of said signal within said housing, and circuit means for determining the relative movement of said reflector by measuring changes in said length of said signal path resulting from various pressure exerted on said reflector, said means to substantially inhibit echoes and extraneous reflections includes a waveguide for focusing a transmitted signal onto said reflector, said waveguide having a length at least equal to twice the wavelength of a signal from said transmitter.

4,945,769  
SEMICONDUCTIVE STRUCTURE USEFUL AS A  
PRESSURE SENSOR  
Diane W. Sidner, Noblesville; Douglas J. Yoder, Sharpville, and David E. Moss, Kokomo, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.  
Filed Mar. 6, 1989, Ser. No. 319,023  
Int. Cl.<sup>5</sup> G01L 7/08, 9/06  
U.S. Cl. 73—727 3 Claims



- 2. A semiconductive structure comprising:
  - a monocrystalline silicon chip including within its bulk an enclosed buried cavity whose lateral extent defines a surface of an overlying monocrystalline silicon diaphragm which includes an epitaxial monocrystalline silicon portion sealing the cavity, and which extends to a first surface of the chip;
  - means forming four piezoresistors in a portion of the diaphragm layer and interconnecting them to form a Wheatstone bridge; and
  - means in said chip surrounding said diaphragm layer for

forming circuit elements for interconnection with the Wheatstone bridge.

4,945,770  
STATE TRANSDUCERS IN COMBINATION WITH  
MECHANICAL COMPONENTS  
Birger Alvelid, Pianovägen 6, S-435 00, Mölnlycke, Sweden, and Ralph Crafoord, Skogsrydgatan 11, S-421 74 V., Fröunda, Sweden  
Continuation of Ser. No. 99,318, Aug. 11, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,453  
Int. Cl.<sup>5</sup> G01L 5/00  
U.S. Cl. 73—768 14 Claims



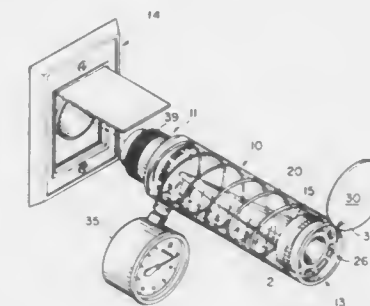
1. A mechanical component comprising in combination therewith at least one state transducer, and associated electric conductors (17, 18; 21, 23; 31-34), said transducer including at least one electronic circuit (20, 22, 29, 30; 35-38), and which transducer will emit an electric signal in response to the state of the component to which the transducer is responsive, and which transducer is capable of measuring and measures at least one operational state, to which said mechanical component is subjected, selected from a group of operational states consisting of state of wear, state of mechanical load and state of thermal load; said component having at least one active planar load bearing surface which is subject to at least one of said operational states; and wherein said transducer and its electric conductors have been applied upon said active planar surface of the component (7; 11) that will be subjected to said at least one operational state; and where a protective layer (10) is applied upon at least portions of said transducer and its conductors; said transducer and said conductors are applied on a microscale upon said planar active surface of the component, which said transducer including said at least one circuit are covered with said protective layer (10); and said transducer and any said circuits and said protective layer are an atomically integrated unit with said component (7, 11) so that said protective layer becomes the planar load bearing wear layer at said planar surface of the component; and that necessary connection terminals (12-14) are provided to enable connecting the component and state transducer to signal processing equipment.

4,945,771  
INTEGRATED FLOW METER AND VACUUM GAUGE  
AND USE  
Stanley D. Ogden, 1201 Scott Ave., #140, Clovis, Calif. 93612  
Filed Jul. 25, 1988, Ser. No. 223,521  
Int. Cl.<sup>5</sup> G01F 1/22  
U.S. Cl. 73—861.58 5 Claims

- 1. A combination air flow and vacuum meter comprising:
  - a rigid, tubular housing of transparent material having an outlet adapted for insertion into an inlet valve of a central vacuum unit and having an inlet open to atmosphere, said outlet carrying at least one electrical conductor for activating said inlet valve;
  - a piston member movably disposed within said housing for reciprocation along the longitudinal axis thereof, said piston member having a central bore;
  - a precalibrated spring located within said housing urging said piston member toward said inlet;
  - a reading scale on said housing calibrated with said spring for indicating air flow rate upon deflection of said spring-loaded piston member;
  - a conical member extending through said central bore of said

piston member and disposed longitudinally within said housing, said conical member having a perforated base covering said inlet, a tip projecting toward said outlet, and a cross sectional area selected to restrict air flow through said housing to correspondingly calibrated rates on said reading scale to spring deflection rates;

valve means attached to said base of said conical member and movable between closed and open positions to selectively prevent or allow air flow through said meter, said



base including an O-ring for sealing against said valve means when said valve means is in the closed position; a vacuum gauge communicating with the interior of said housing for measuring sealed or open vacuum when said valve means is moved to said closed or open position, respectively; and said piston member including O-ring indicia means for matching piston member deflection level against said reading scale.

4,945,772  
METHOD OF ROLL NIP LOAD MEASUREMENT  
Michael L. Shepard, Covington, and Charles A. Snyder, II, Millboro, both of Va., assignors to Westvaco Corporation, New York, N.Y.  
Division of Ser. No. 277,967, Nov. 30, 1988, Pat. No. 4,901,585.  
This application Nov. 6, 1989, Ser. No. 432,015  
Int. Cl.<sup>5</sup> G01L 1/22  
U.S. Cl. 73—862.55 1 Claim



- 1. A method of measuring the compressive nip load imposed between two rotatable process rolls comprising the steps of:
  - providing two parallel face plates in a closed nip between said process rolls, both said face plates having a pair of tapered, parallel bearing rails secured thereto between respective heel and toe face plate edges;
  - aligning said face plates within said closed nip with bearing rail edge surfaces respective to one face plate being positioned against the bearing rail edge surfaces respective to said other face plate and the heel end of said one face plate is adjacent the toe end of said other face plate whereby the planar distance between the toe ends of respective face plates is increased by relative sliding displacement of said bearing rail edge surfaces as the distance between face



plates respective to said parallel face plates is decreased by compressive load between said process rolls; providing a tensile load plate between said pairs of bearing rails, opposite ends of said load plate being secured to said respective face plate toe ends whereby said planar distance increase between said respective toe plates is opposed by said load plate; applying strain gauge means to said load plate to measure opposition load imposed thereon by said compressive load between said process rolls; and, calibrating said strain gauge means to report the magnitude of said compressive load between said process rolls.

4,945,773

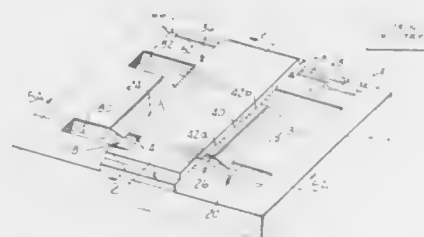
**FORCE TRANSDUCER ETCHED FROM SILICON**  
Edward N. Sickafus, Gross Ile, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Mar. 6, 1989, Ser. No. 319,495

Int. Cl.<sup>5</sup> G01P 15/08

U.S. Cl. 73—862.59

21 Claims



within, said hollow rotor between said feedthrough means and said mounting means.

4,945,775

**INERTIAL BASED PIPELINE MONITORING SYSTEM**  
John R. Adams; Patrick S. Price, and Jim W. Smith, all of Calgary, Canada, assignors to Pulsesearch Consolidated Technology Ltd., Calgary, Canada

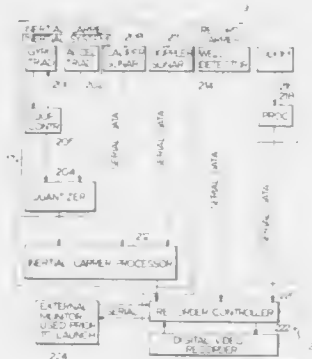
Filed Jun. 7, 1989, Ser. No. 362,504

Claims priority, application Canada, Dec. 30, 1988, 587332

Int. Cl.<sup>5</sup> G01C 9/06

U.S. Cl. 73—865.8

20 Claims



1. A pipeline monitoring system, comprising:

- (a) carrier means adapted for travelling through a pipeline;
- (b) a strapdown inertial system mounted within said carrier means for measuring dynamic characteristics of said carrier means within said pipeline relative to an inertial frame of reference, and in response generating first predetermined digital signals representative of said characteristics;
- (c) secondary sensor means different from the inertial system mounted within said carrier means for redundant measuring of one or more of said dynamic characteristics relative to said pipeline, and in response generating further predetermined digital signals representative thereof; and
- (d) recorder means mounted within said carrier means for receiving and recording said first and further predetermined digital signals for subsequent retrieval, whereby upon retrieval said first and further predetermined digital signals yield a nonunique solution of profile and structural characteristics of said pipeline.

4,945,774

**SAMPLE TREATMENT APPARATUS**

Nigel W. Beard, Forest Row; Robert B. Phillips, Horsham, and Paul R. Stonestreet, Newport Pagnall, all of United Kingdom, assignors to VG Instruments Group Limited, Crawley, England

Filed Dec. 13, 1988, Ser. No. 283,623

Claims priority, application United Kingdom, Dec. 15, 1987, 8729262

Int. Cl.<sup>5</sup> G01N 1/28

U.S. Cl. 73—863.11

16 Claims

1. An apparatus for communicating services to a continuously rotatable object disposed within a vacuum enclosure and comprising: vacuum-tight feedthrough means mountable on a wall of the vacuum enclosure; a hollow rotor, said rotor being rotatable about an axis; means for supporting said rotor from said feedthrough means whereby said rotor in use is disposed within the vacuum enclosure; means for mounting said object onto said rotor at a position axially spaced apart from said vacuum-tight feedthrough means; actuator means mounted outside of said vacuum enclosure, said actuator means being substantially co-axial with said rotor, said actuator means being magnetically coupled to said rotor and thereby capable of

4,945,776

**METHOD OF TESTING SPliced PORTION OF OPTICAL FIBERS**

Takeshi Yamada; Tsutomu Onodera, and Hiroyuki Taya, all of Sakura, Japan, assignors to Fujikura Ltd., Tokyo, Japan

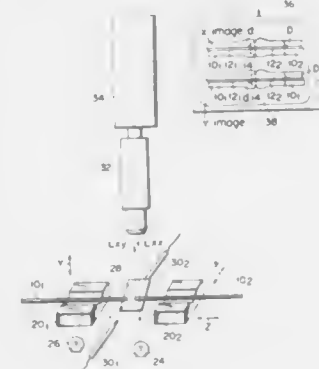
Filed Dec. 16, 1988, Ser. No. 285,701

Claims priority, application Japan, Dec. 21, 1987, 62-323508

Int. Cl.<sup>5</sup> C01M 19/00

U.S. Cl. 73—866

14 Claims



1. A method of testing a spliced portion of single-mode optical fibers comprising the steps of: aligning in line a pair of optical fibers with a predetermined distance therebetween so that ends of exposed fiber portions of said aligned optical fibers are opposite to each other; heating and melting said ends of said exposed fiber portions; pushing said aligned optical fibers toward each other by a predetermined distance so that said melted ends of said exposed fiber portions abut against each other to form a spliced portion; measuring a minimum value "d" of an outer diameter of said spliced portion before a surface tension of said exposed fiber portions occurs; and calculating a ratio of the measured minimum value "d" to an outer diameter "D" of said exposed fiber portion of said optical fiber.

4,945,777

**COAXIAL ENGINE STARTER**

Shuzoo Iozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

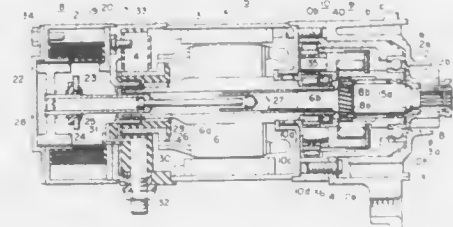
Filed Aug. 28, 1989, Ser. No. 399,145

Claims priority, application Japan, Aug. 29, 1988, 63-214330

Int. Cl.<sup>5</sup> F02N 15/06; F16H 1/28

U.S. Cl. 74—7 E

1 Claim



1. A coaxial engine starter comprising: an electric motor having a hollow armature rotary shaft; an axially slidable output rotary shaft rotatably supported in a housing and having at its front end a pinion adapted to engage an engine ring gear; a solenoid switch disposed behind said electric motor for

supplying current to said electric motor and causing sliding movement of said output rotary shaft; a planetary speed reduction gear, disposed in front of said electric motor and having a planetary bracket, for speed reducing the rotation of said armature rotary shaft; an over-running clutch, disposed in front of said planetary speed reduction gear and having a clutch outer member and a clutch inner member, for transmitting the speed-reduced rotation of said planetary speed reduction gear to said output rotary shaft; said planetary bracket of said planetary speed reduction gear being fitted against said clutch outer member of said over-running clutch in such a manner that they slip relative to each other upon a predetermined rotational torque exerted therebetween; a first bearing disposed between said planetary bracket and said armature rotary shaft for limiting the rearward movement of said planetary bracket; and a second bearing disposed between said housing and said clutch inner member of said over-running clutch for limiting the forward movement of said clutch outer member of said over-running clutch.

4,945,778

**FLUID-POWER DEVICE WITH ROLLERS**

Paul P. Weyer, 48811 284th S.E., Enumclaw, Wash. 98022

Continuation-in-part of Ser. No. 6,007, Jan. 20, 1987, Pat. No. 4,838,103, Ser. No. 931,223, Nov. 14, 1986, Pat. No. 4,846,007, Ser. No. 881,904, Jul. 3, 1986, Pat. No. 4,741,250, Ser. No. 662,256, Oct. 17, 1984, Pat. No. 4,667,528, Ser. No. 692,293, Jan. 17, 1985, Pat. No. 4,683,767, and Ser. No. 803,954, Dec. 2, 1985, Pat. No. 4,691,582, which is a continuation-in-part of Ser. No. 575,228, Jan. 30, 1984, Pat. No. 4,590,816. This application

Jun. 8, 1988, Ser. No. 204,521

Int. Cl.<sup>5</sup> F01B 3/04

U.S. Cl. 74—89.15

36 Claims



1. A fluid-power device comprising: a body having a first end portion and a second end portion with a midportion therebetween, said body second end portion having at least one helical groove formed on an interior generally cylindrical surface portion thereof, said body groove having an axial pitch and a lead angle with a left- or right-hand turn; an axially extending drive member supported for movement relative to said body, said drive member having a sleeve portion defined by a generally cylindrical sleeve wall positioned within said body first end portion, said sleeve wall having an open end positioned toward said body midportion and having at least one helical groove formed on an interior generally cylindrical surface portion thereof, said sleeve groove having an axial pitch and a lead angle with a left- or right-hand turn, said drive member further including an output drive element connected to said drive member sleeve portion for movement there-



with, said output drive element projecting outward of said body first end portion and being connectable to an external device;

an elongated, axially reciprocating carrier reciprocally mounted within said body and projecting within said drive member sleeve portion through said sleeve wall open end, said reciprocating carrier rotatably retaining first and second rollers in fixed axial and circumferential position relative to said reciprocating carrier during powered operation of the fluid-power device, said first and second rollers each having at least one circumferential ridge, said first roller being retained by a first end portion of said reciprocating carrier within said drive member sleeve portion in seated rolling engagement with said sleeve groove for transmitting force between said reciprocating carrier and said drive member, and said second roller being retained by a second end portion of said reciprocating carrier within said body second end portion in seated rolling engagement with said body groove for transmitting force between said reciprocating carrier and said body, each ridge of said rollers being positioned for rolling travel in the corresponding grooves of said body and drive member, said rollers being retained by said reciprocating carrier in an axially skewed position relative to said body and drive member with which engaged by a skew angle with an angular orientation corresponding to said hand turn of the corresponding one of said body or drive member groove with which engaged to improve alignment of said roller ridges with said engaged helical grooves; and

at least one piston mounted for reciprocal movement and operatively engaging said reciprocating carrier.

4,945,779

**BALL SCREW ROTARY ACTUATOR**

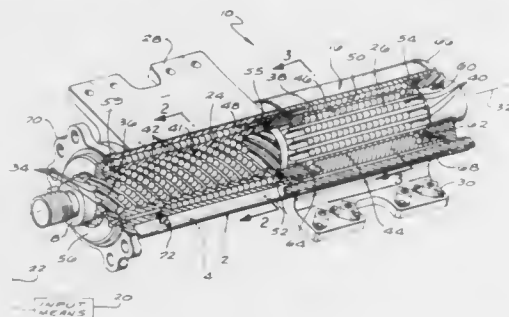
Mark Williams, Thousand Oaks, Calif., assignor to HR Textron, Inc., Valencia, Calif.

Filed Dec. 22, 1987, Ser. No. 136,630

Int. Cl.<sup>5</sup> B64C 13/36

U.S. Cl. 74—99 R

21 Claims



1. A ball screw rotary actuator for converting a linear input motion to a rotary output motion and have recirculating balls therein comprising:

- (A) A hollow housing having first and second sections, said first section being angularly relatively movable with respect to said second section;
- (B) A shaft mounted for reciprocal movement within said housing, said shaft including:
  - (1) Helical groove means formed in the surface of a first portion thereof and;
  - (2) Straight groove means formed in the surface of a second portion thereof displaced longitudinally from said first portion, said straight groove means disposed parallel to the axis of said shaft;
- (C) The interior faces of said first and second sections of said housing having groove means matching the groove means in said shaft portion disposed opposed thereto;
- (D) Ball screw means defined by said housing;

- (E) A plurality of balls disposed in and filling said matching groove means and said ball return means and;
- (F) Means for imparting reciprocal linear movement to said shaft.

4,945,780

**DRIVE UNIT FOR A MONORAIL CARRIER**

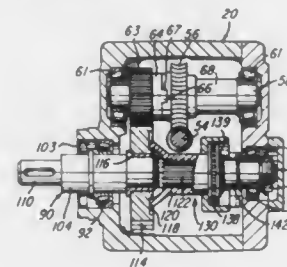
Marius A. Bosma, Tipp City, Ohio, assignor to Bosma Machine and Tool Corporation, Tipp City, Ohio

Filed Apr. 10, 1989, Ser. No. 335,562

Int. Cl.<sup>5</sup> F16H 5/08

U.S. Cl. 74—337.5

14 Claims



1. A drive unit adapted for moving a carrier tractor of an automated monorail system, said unit comprising a housing, an input shaft supported by said housing for rotation on a first axis, an output shaft supported by said housing for rotation on a second axis transverse to said first axis, an electric motor having a motor shaft, means for connecting said housing to said electric motor and for connecting said motor shaft to said input shaft, a set of reduction gears connecting said input shaft to said output shaft, clutch means connecting said set of gears to said output shaft and being movable between an engaged position and a disengaged position, a control shaft supported by said housing for rotation on an axis generally parallel to said axis of said output shaft, cam actuated means for moving said clutch means between said engaged and disengaged positions in response to rotation of said control shaft, said cam actuated means including a rotary cam member mounted on said control shaft within said housing, a shift lever mounted on said control shaft outwardly of said housing, means for moving said shift lever to effect rotation of said control shaft and said cam member to effect operation of said clutch means between said engaged and disengaged positions, and said cam member including overtravel portions providing for rotation of said control shaft and said shift lever to overtravel positions beyond said engaged and disengaged positions of said clutch means.

4,945,781

**BALL SCREW MECHANISM**

Hugo Isert, Im Leiboldgraben 16, D-6419 Eiterfeld 1, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,099

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 8809239[U]

Int. Cl.<sup>5</sup> F16H 25/22, 25/24

U.S. Cl. 74—424.8 A

9 Claims

- 1. A ball screw mechanism comprising in combination
  - (a) nut (20) that includes
    - (1) a worm tap hole (22) having a plurality of concave circumferential grooves,
    - (2) spaced apart jaws (26, 28) located laterally with respect to said worm tap hole (22),
    - (3) a recess (24) located between said jaws (26, 28),
  - (b) a worm spindle (12) of a selected thread pitch that has a plurality of circumferential concave helical grooves that extend through said worm tap hole (22) so that the worm tap hole (22) extends more than half way around the circumference of the worm spindle (12),

- (c) a recirculator (30) positioned in said recess (24) and encompassing the remainder of the circumference of the worm spindle (12), said recirculator (30) being clamped in place by said jaws (26, 28),
- (d) a plurality of balls (18) which are free to move within a channel formed by the grooves in said worm tap hole (22) and the grooves in said worm spindle (12), and



- (e) the inner concave face (32) of said recirculatory (30) having
  - (1) transition means in the form of a plurality of S-shaped grooves (34) arranged side-by-side at thread pitch distance for returning balls that circulate within said nut (20) by one worm tap flight each, and
  - (2) projections (33) which engage adjacent nut grooves.

4,945,782

**MOUNTING DEVICE FOR SECURING A RING GEAR TO A DRIVE DRUM**

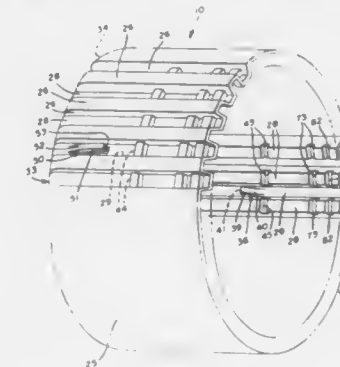
Michael J. Farrell, Brownsburg, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 28, 1989, Ser. No. 344,784

Int. Cl.<sup>5</sup> F16H 55/00, 55/12; F16D 13/52; F16B 3/00

U.S. Cl. 74—431

3 Claims



- 1. A mounting sleeve for releasably securing a gear member to a splined drive drum and for operatively effecting a driving connection therebetween, said sleeve comprising:
  - a generally annular body portion configured as an alternating series of circumferentially spaced, radially outer, crown plate portions and circumferentially spaced root plate portions displaced radially inwardly with respect to said crown plate portions;
  - said crown plate portions and said root plate portions being connected by substantially radially oriented web wall such that said crown plate portions, said root plate portions and said web walls delineate a circumferentially extending, corrugated configuration to said sleeve, to operatively to effect a driving engagement between said sleeve and the splined drive drum;
  - a series of locking dogs extending radially inwardly from at

least selected of said crown plate portions to engage said drive drum, thereby releasably securing said sleeve to said drive drum;

a series of annularly disposed stop surfaces presented radially outwardly from at least selected of said root plate portions and said crown plate portion; and,

locking means cooperating with at least selected ones of said root plate portions and said crown plate portions;

said stop surfaces and said locking means adapted to engage said gear member therebetween, thereby releasably securing said gear member to said sleeve.

4,945,783

**RING GEAR WITH ROLL FORMED TEETH**

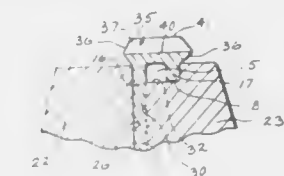
Benjamin Grob, Cedarburg, Wis., assignor to Grob, Inc., Grafton, Wis.

Filed Mar. 9, 1989, Ser. No. 322,094

Int. Cl.<sup>5</sup> B21H 5/00

U.S. Cl. 74—460

9 Claims



- 1. A method of manufacturing a ring gear from a metal plate having a generally flat circular body comprising the steps of:
  - (1) forming the outer peripheral edge of the plate into a radially inwardly opening U-shaped channel one leg of which is defined by an integral radial extension of the plate body and the other leg of which is defined by a radially inwardly extending circular lip;
  - (2) clamping the plate body axially to expose the radial outer surface of the U-shaped channel;
  - (3) supporting the edge of the circular lip on a cylindrical mandrel; and,
  - (4) cold rolling gear teeth in the outer surface of the U-shaped channel with a rolling tool moved across said outer surface in a direction perpendicular to the legs of the channel.

4,945,784

**CABLE CONNECTOR ASSEMBLY**

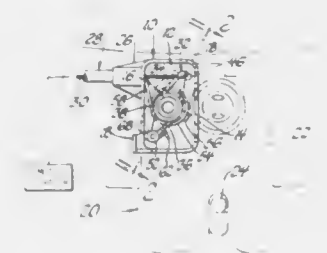
Bela Gergoe, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 626,769, Jul. 2, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 894,342

Int. Cl.<sup>5</sup> F16C 1/10

U.S. Cl. 74—501.5 R

3 Claims



- 1. A connector assembly for establishing the operating length of a cable member having one end connected to a re-

mote operator and the other end connectable to a lock releasing member of a vehicle lock structure and fixing such length when established, the connector assembly comprising, in combination:

a support mounted to the lock structure,  
a lever having a hub and a pair of arms,  
a first spring anchor on one arm of the lever and a second removable spring anchor on the other arm of the lever,  
a wound coil torsion spring coaxially preassembled with the hub of the lever,

one leg of the spring engaging the first spring anchor and the other leg of the spring engaging the second removable spring anchor to assemble the spring in a wound pre-stressed condition with the lever as a preassembled unit, cooperating means on the hub of the lever and the support for freely rotatably mounting the preassembled unit of the spring and lever on the support,

stop means on the lever,  
the preassembled unit being rotatable relative to the support to engage the stop means with the support and locate the lever in a non-operating position,  
means on the lever for moving the lock releasing member upon rotation of the lever,

means for securing the other end of the cable member to an arm of the lever while the lever is located in the non-operating position to establish and fix the operating length of the cable member between the remote operator and the lock releasing member,

the second removable spring anchor being removed after securement of the other end of the cable member to the other arm of the lever to release the other leg of the spring for engagement with the support to maintain the stop means in engagement with the support and maintain the lever in the non-operating position.

4,945,785

#### A CONTROL DEVICE FOR A BICYCLE INCLUDING A CONTROL LEVER PIVOTED ON AN ADJUSTABLE SUPPORT

Antonio Romano, Padova, Italy, assignor to Campagnolo S.r.l., Vicenza, Italy

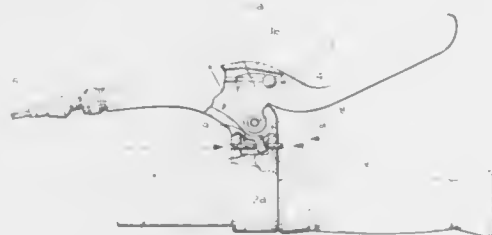
Filed May 2, 1989, Ser. No. 346,500

Claims priority, application Italy, May 2, 1988, 67401 A/88

Int. Cl.<sup>5</sup> G05G 11/00; F16C 1/10

U.S. Cl. 74—502.2

4 Claims



1. A control device adapted to be mounted on a handlebar of a bicycle comprising a support body having a control lever pivoted thereon and against which a sheath of a control wire adapted to be operated by the control lever abuts,

said support body including a first element adapted to be connected to the handlebar and a second element pivotally mounted on said first element for rotation about an axis.

said control lever being pivoted on said second element and adjustable abutment means interposed between said first and second elements for varying the angular position of the second element relative to the first and for making the second element fast with the first element.

4,945,786

#### STEERING WHEEL

Shinichi Goto, Nagoya, Japan, assignors to Toyoda Gosei Co., Ltd. Nishikasugai, Japan

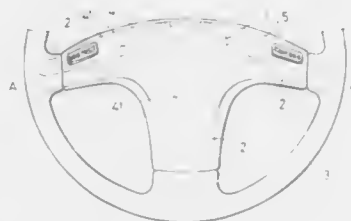
Division of Ser. No. 271,387, Nov. 14, 1988, Pat. No. 4,893,521, which is a continuation of Ser. No. 14,616, Feb. 13, 1987, abandoned. This application Nov. 14, 1989, Ser. No. 436,248

Claims priority, application Japan, Feb. 14, 1986, 61-031581; Feb. 14, 1986, 61-031582

Int. Cl.<sup>5</sup> B62D 1/06

U.S. Cl. 74—552

6 Claims



1. A steering wheel comprising:

an operating portion;

a hub portion for connection with a steering shaft, said hub portion have an outer end located generally centrally of said operating portion;

a spoke portion connecting said operating portion to said hub portion for transmitting steering motion applied to said operation portion, to the steering shaft via the spoke portion and the hub portion;

an impact energy absorbing member located on said outer end of said hub portion for absorbing impact energy;

a pad covering said impact energy absorbing member and said spoke portion, said pad including a hard insert integrally covered by a soft cover member, said hard insert comprising a plurality of hard insert parts which are divided from one another by respective joint means which provide respective lines of preferential bendability, whereby said pad can be bent when a force impacts said soft cover member, by causing bending movement of said parts along said lines of preferential bendability, wherein:

said joint means comprises respective lap joints at which respective edge portions of two respective said parts lap over and under one another.

4,945,787

#### ADJUSTABLE BICYCLE SHOE CLIP INCLUDING A TOOTHED BELT FOR LOCKING BOTH SIDES OF A CYCLIST FOOT

Giuseppe Bigolin, Via Fermi, 2/A, 31010 Casella d'Asolo (Treviso), Italy

Filed Jun. 14, 1989, Ser. No. 365,963

Claims priority, application Italy, Jun. 14, 1988, 21429[U]

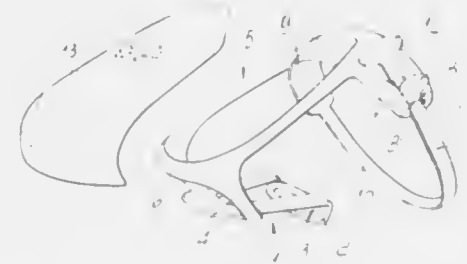
Int. Cl.<sup>5</sup> G05G 1/14

U.S. Cl. 74—534.6

1 Claim

1. A bicycle shoe clip comprising a clip frame including two slidably coupled portions and bearing a substantially rectangular structure having a front foot restraining band and a rear toothed belt holding fork which holds a toothed belt, said toothed belt having an end gripping member, a toothed belt engaging lever pivoted to said toothed belt holding fork, said lever having a bottom edge engaging with said toothed belt for displacing said toothed belt as said lever is operated, said substantially rectangular structure further including a stuffed collar associated with an inner portion of said toothed belt, said holding fork having end portions, a cross member extending between said end portions of said fork member, said toothed

belt passing between said bottom edge of said lever and said cross member, wherein said clip further comprises a shoe



covering structure having an encompassing front portion and provided for snap engaging in said clip.

4,945,788

#### ADJUSTABLE-MID-SPAN STRIPPER FOR WIRE AND CABLE

James J. Matthews, East Haddam, Conn., assignor to Ripley Company, Inc., Cromwell, Conn.

Filed Jan. 17, 1990, Ser. No. 466,239

Int. Cl.<sup>5</sup> H02G 1/12

U.S. Cl. 81—9.4

20 Claims



1. A tool for removing insulation from conductor cable comprising:

a frame including a first jaw member;

a second jaw member slidably mounted on said frame to close and cooperate with said first jaw member to secure said cable therein for rotation of said frame relative to said cable;

a ring-knife assembly slidably mounted on said frame for movement toward and away from cable secured in said jaw members, including means for releasably securing the ring-knife assembly in a fixed position relative to said frame, said ring-knife blade assembly further including means for extending and retracting a circular knife blade from and to the assembly in its fixed position whereby, upon closure of said jaw members, said ring-knife assembly may be secured in a fixed position with said circular knife blade in a retracted position adjacent to the cable jacket and, upon extension of said circular knife blade and at least one full rotation of said frame in a first direction relative to said cable, said circular knife blade scores said insulation along a closed cut around the complete periphery of said cable; and

an insulation stripping assembly slidably mounted in said frame for movement along a straight line toward and away from cable secured in said jaw members, said insulation stripping assembly including at least one blade edge and associated adjustable depth limiting means for removing said insulation from said cable, said blade edge being held at a constant, fixed angle relative to the line of movement of said insulation stripping assembly, said insulation stripping assembly being urged by spring means toward said cable from a retracted position when said jaw members are closed whereby, upon rotation of said frame in a second direction, opposite said first direction, relative to said cable, said blade edge strips said insulation from said cable.

4,945,789

#### DEVICE FOR SCREWING A SELF-TAPPING MEMBER INTO A SMOOTH HOLE PROVIDED IN A STRUCTURE INTENDED TO HOUSE THE MEMBER

Adriano Martignetti, Pianezza, Italy, assignor to Fiat Auto S.p.A., Turin, Italy

Filed Nov. 2, 1989, Ser. No. 430,454

Claims priority, application Italy, Nov. 7, 1988, 67988 A/88

Int. Cl.<sup>5</sup> B25B 21/00

U.S. Cl. 81—55

8 Claims



1. A device for screwing a self-tapping member (2) with an internal bore into a smooth hole (5) provided in a structure (6) which is intended to house the member (2), said device comprising:

a tubular body (7) for connection to a motor-driven shaft of a screwdriver,

a cylindrical element (12) which is situated within the tubular body (7), projects from an end face (7a) of the latter and is articulated to the tubular body (7) about two axes (16, 14) perpendicular to the longitudinal axis (17) of the body itself, the cylindrical element (12) having a polygonal recess (24) in its end face for receiving a correspondingly-shaped head (25) of the self-tapping member (2),

a frontal pin (32) which extends parallel to the longitudinal axis (17) of the cylindrical element (12) from an end face thereof and is slidable within a cavity (28) of the cylindrical element (12),

resilient retaining means (42) carried by the pin (32) for keeping a self-tapping member (2) fitted on the pin (32) with its head (25) engaged in the recess (24), the pin having a point (37) for centring and engaging the bottom (5a) of the smooth hole (5) as a result of the lowering of the screwing device (1) over the hole (5), so as to cause an inclination of the cylindrical element (12) about its axes (16, 14) of articulation to the tubular body (7) if the axis (17) of the latter does not exactly coincide with the axis of the smooth hole (5),

the resilient retaining means (42) being adapted to enable the release of the self-tapping member (2) from the frontal pin (32) when, the point (37) of the pin (32) having contacted the bottom (5a) of the smooth hole (5), the device (1) is lowered and then rotated to insert the self-tapping member (2) into the smooth hole (5).

4,945,790

#### MULTI-PURPOSE HAND TOOL

Arthur Golden, 555 Hahaione St. #10, A, Honolulu, Hi. 96825

Filed Aug. 7, 1989, Ser. No. 390,295

Int. Cl.<sup>5</sup> B25B 23/00

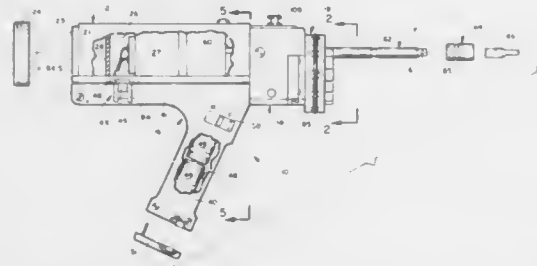
U.S. Cl. 81—57.14

11 Claims

1. A multi-purpose hand tool comprising:  
an elongated rear body assembly having a longitudinally extending axis, said rear body assembly having a front



end, a rear end, a top surface and a bottom surface, a compartment is formed in said rear body assembly and a D. C. electric motor is mounted therein and it has at least one drive shaft extending from one of its ends;  
 an elongated primary shaft having a predetermined length and having a front end and a rear end;  
 means for connecting said driveshaft to the rear end of said primary shaft so that said primary shaft can be rotated;  
 a handle assembly having a rear body assembly mounting portion and a handle portion, said rear body assembly having means on its bottom surface that mates with means on the top surface of the rear body assembly portion of said handle assembly that allows said rear body assembly to be reciprocally slid along the top surface of said mounting portion which allows the front end of said primary shaft to be withdrawn rearwardly from said revolver-like cylinder;



a front body assembly having a front wall, a rear wall, a top wall, and a pair of laterally spaced side walls, a bore hole extending from said front wall to said rear wall and being of a diameter such that said primary shaft freely passes therethrough;  
 means for detachably securing said front body assembly to the front end of said rear body assembly;  
 a revolver-like cylinder having a longitudinally extending axis, said cylinder having a front face and rear face, said cylinder having a first set of recesses formed in its front face that align with apertures in said rear face, said first set of recesses having longitudinally extending axes that are parallel to each other, said first set of recesses having their axes on a first common radius, said first common radius being substantially equal to the lateral distance from the longitudinal axis of said primary shaft to the axis of said cylinder; and  
 means for rotatably connecting said cylinder to the front wall of said front body assembly.

#### 4,945,791 ELECTRICAL CONNECTOR BACKSHELL TORQUE TOOL

Wilbert H. Herschler, Lomita; Charles H. Westmoreland, deceased, late of Compton; by Dorothy J. Westmoreland, heir, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

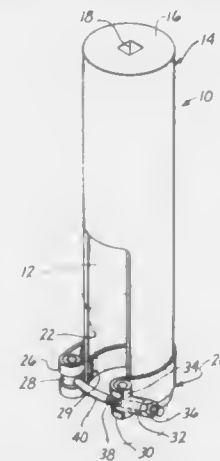
Filed Nov. 4, 1988, Ser. No. 267,479  
 Int. Cl.<sup>5</sup> B25B 13/04

U.S. Cl. 81—120

5 Claims

1. An electrical connector backshell torque tool, comprising: a cylindrical shell of suitable material, of selectable length and thickness, with an inner and outer surface, anchor means, retainer means, and an internal diameter slightly larger than the external diameter of an electrical connector backshell;  
 said cylindrical shell having a central axis and an upper and a lower portion, each of said portions having an upper and a lower end thereof;  
 said upper portion having its upper end fitted with a plug and socket means, said socket means disposed along said central axis;  
 said lower end of said upper portion and said upper end of said lower portion being integral;

said lower portion having a slot therein, said slot comprising a void of said suitable material, said void having first and second generally vertical edges and a horizontal edge coincident with said lower end of said upper portion;  
 said anchor means, for anchoring one end of a bar means, mounted on said outer surface near said lower end of said lower portion adjacent said first generally vertical edge;  
 said retainer means, for retaining another end of said bar



means, disposed near said lower end of said lower portion adjacent said second generally vertical edge; and  
 said bar means positionable between said anchor means and said retainer means;  
 said bar means fitted with tension adjustment means allowing forces between said anchor means and said retainer means to be controlled as necessary, wherein actuation of said tension adjustment means results in compression of said cylindrical shell around said backshell for applying torque to said backshell.

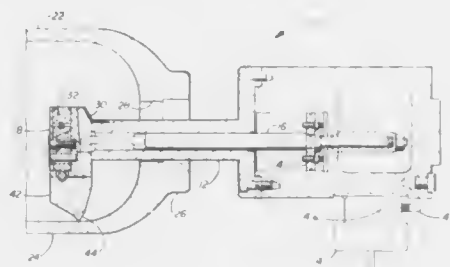
#### 4,945,792 BORING TOOL FOR MACHINING THE INTERIOR OF NARROW NECK CASING

Richard E. Gardner, Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Jan. 21, 1988, Ser. No. 146,404  
 Int. Cl.<sup>5</sup> B23B 41/00

U.S. Cl. 82—1.2

3 Claims



1. A boring tool for machining the interior of a workpiece having a neck at one end with a small end opening there-through comprising  
 a hollow boring bar having an enlarged portion on one end with a circular outer shape and a vertical slot there-through and a remaining small portion of the boring bar having a smaller outer shape extending from the enlarged portion to the opposite end of the boring bar,  
 an actuator mounted on the end of said boring bar opposite to the slotted end and having a connecting rod extending through the opening in the boring bar,

a tool block pivotally mounted within the slot at the end of said boring bar,  
 a cutting block having a cutting element secured thereto in preselected cutting position,  
 mounting means for securing said cutting block on said tool block,  
 a link pivotally connected to said tool block and to said actuator connecting rod whereby movement of the connecting rod toward said tool block causes said tool block to pivot into a position which is aligned with said boring bar and movement of the connecting rod away from said tool block causes said tool block to pivot into a cutting position with its cutting element in position to engage the interior surface of the workpiece,  
 means for controlling flow of fluid under pressure to said actuator to cause the movement of the connecting rod away and toward the tool block to position the tool block with respect to the slotted end of the boring bar,  
 the tool block and the enlarged end of the boring bar being sufficiently small to enter through the small end opening of a workpiece whose interior is to be machined,  
 the remaining portion of the boring bar having a size and shape to allow it to move radially and axially in the small neck opening of the workpiece whose interior is to be machined.

#### 4,945,793 TOOL COUPLING

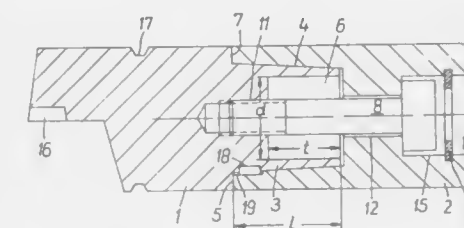
Rainer von Haas, Geesthacht, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany  
 Continuation of Ser. No. 129,963, Dec. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 907,084, Sep. 12, 1986, Pat. No. 4,748,879. This application Sep. 6, 1989, Ser. No. 402,973

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532891; Dec. 10, 1986, 3642132

Int. Cl.<sup>5</sup> B23B 29/00

U.S. Cl. 82—161

20 Claims



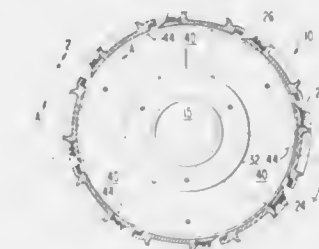
1. A tool coupling arrangement, comprising:  
 a tool head which serves as a cutting tool and which has a longitudinal center axis, the tool head additionally having a threaded bore and an annular contact collar;  
 a tool holder having a sleeve-shaped receiving bore, with at least a portion of the receiving bore being conically configured and having a predetermined cone angle, the tool holder additionally having an annular contact face; and  
 tool coupling means for connecting the tool head and the tool holder so that the tool head is secured against rotation and is axially prestressed, the tool coupling means including a shank attached to the tool head for insertion into the receiving bore, at least a portion of the shank being conically configured and having a cone angle that is equal to the cone angle of the receiving bore, the shank having a frontal blind bore which extends centrally along the longitudinal axis of the tool head, and a tightening screw mounted on the tool holder at a position to engage the threaded bore of the tool head,  
 wherein the blind bore has a frontal face and a bore diameter at the frontal face, wherein the shank has a region of smallest diameter, and wherein the bore diameter at the

frontal face ranges from about 70% to about 97% of the smallest diameter of the shank, and  
 wherein the blind bore has a depth and the shank has a length, the depth of the blind bore being greater than  $\frac{1}{2}$  the length of the shank.

4,945,794  
 METHOD AND APPARATUS FOR FEEDING PRODUCE ITEMS TO CENTRIFUGAL SLICERS  
 Geoffrey Q. Quo, and Philip W. Pound, both of Irving, Tex., assignors to Frito-Lay, Inc., Dallas, Tex.  
 Filed Aug. 8, 1988, Ser. No. 229,434  
 Int. Cl.<sup>5</sup> B26D 3/28

U.S. Cl. 83—13

7 Claims



5. A method of feeding whole produce items having peels to a centrifugal slicer of the type having a rotary impeller for centrifugally forcing produce items against a stationary slicing head assembly carrying blades for slicing the produce items, the slices passing outwardly through openings in the slicing head assembly, the method providing improved retention of peel on the slices and improved whole slices and comprising:

- (a) feeding a plurality of produce items with peels by gravity to the center of the rotary impeller;
- (b) centrifugally forcing the items radially outwardly from the center of the impeller through separate control paths in a horizontal plane, each of said paths having a central axis; and
- (c) holding the items forced radially outwardly against the blades of the slicing head assembly in a manner whereby the products are substantially non-rotatable about the central axis of the control paths to reduce product roll and bounce and prevent undue movement of items so that a greater amount of peel is retained on the slices and the amount of whole slices is maximized.

#### 4,945,795 APPARATUS FOR CONTINUOUSLY CUTTING SOFT MATERIAL SUBJECT TO ELONGATION BY TENSILE FORCE

Hideo Tone, Saitama, Japan, assignor to Kokusan Kogyo Kabushiki Kaisha, Saitama, Japan

Filed Sep. 23, 1988, Ser. No. 248,812

Claims priority, application Japan, Sep. 26, 1987, 62-242348  
 The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.  
 Int. Cl.<sup>5</sup> B26D 3/00

U.S. Cl. 83—27

8 Claims

6. A method for forming continuously extending cutting lines on material which is subject to elongation by tensile force, comprising the steps of:  
 providing a flexible, elongate and substantially continuously sheetlike primary member made of a soft material which is subject to elongation by tensile force applied thereto;  
 providing a flexible, elongate and substantially continuously sheetlike base member which is substantially more resistant to elongation by tensile force applied thereto than said primary member;  
 then longitudinally superimposing said elongate primary



member and said elongate base member to form a flexible, elongate and substantially continuously sheetlike severable member which is substantially more resistant to elongation by tensile force applied thereto than said primary member;

positioning said severable member such that it extends vertically alongside a horizontally movable cutting device so as to oppose said cutting device;



cutting said severable member with said cutting device so as to form thereon continuously extending cutting lines which divide said severable member, including said primary member and base member as components thereof, into an essential portion and a waste portion; removing said waste portion from said severable member so as to leave only said essential portion; and separating and then separately winding said essential portion of said primary member and said essential portion of said base member.

4,945,796

## METHOD OF PUNCHING MATERIAL

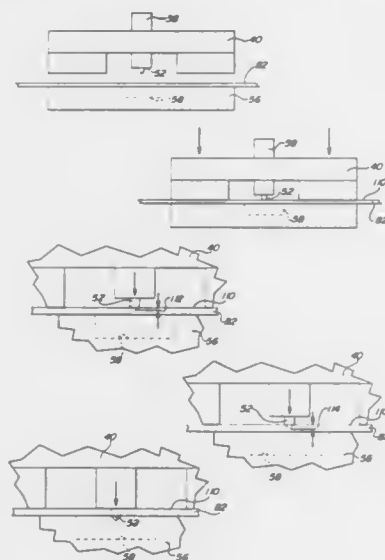
Wayne F. Riley, 38401 N. Pointe Dr., Apt. 115-T, Mount Clemens, Mich. 48045

Filed Feb. 27, 1989, Ser. No. 316,240

Int. Cl.<sup>5</sup> B23D 27/00

U.S. Cl. 83—49

6 Claims



1. A method for removing material from a sheet of material with a press having a movable upper platen, a stationary lower platen, and a cutting tool secured to the upper platen, the method comprising the steps of:

establishing a first reference point at the surface of the material with the cutting tool;  
moving the upper platen and cutting tool away from the lower platen a predetermined distance to a second reference point once the first reference point is established;  
moving the upper platen and cutting tool toward the lower

platen the predetermined distance plus a first predetermined percentage of the thickness of the material to displace material to be cut with the cutting tool;  
moving the upper platen and cutting tool away from the lower platen to the second reference point;  
moving the upper platen and cutting tool toward the lower platen the predetermined distance plus a second predetermined percentage of the thickness of the material to displace material to be cut with the cutting tool;  
moving the upper platen and cutting tool away from the lower platen to the second reference point; and  
moving the upper platen and cutting tool toward the lower platen the predetermined distance plus a third predetermined percentage of the thickness of the material to exceed the yield strength of the material to be cut with the cutting tool and removing the material being cut away from the remainder of the material.

4,945,797

## AUTOMATED MULTIPLE RIP SAW FEEDING APPARATUS

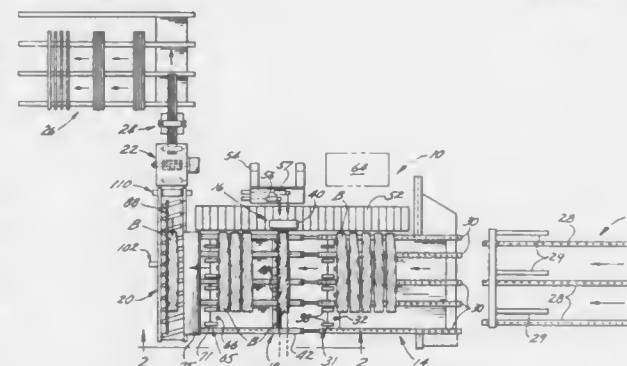
Thomas W. Hahn, Lenoir, N.C., assignor to Buss Automation, Inc., Lenoir, N.C.

Filed May 6, 1988, Ser. No. 191,101

Int. Cl.<sup>5</sup> B27B 5/00, 27/00

U.S. Cl. 83—75.5

18 Claims



1. An automated multiple rip sawing apparatus characterized by the ability to efficiently rip boards which have identifiable lateral boundaries that define a maximum clear area of each board into a plurality of components while maximizing the yield, and comprising

a board inspection station for sequentially receiving elongate boards at a fixed location thereon,

means for identifying and storing the lateral boundaries of the maximum clear area of each board positioned at said inspection station, said identifying and storing means comprising means for projecting a pair of lines of light along the length direction of each board positioned at said inspection station and with the lines of light being laterally adjustable by an operator and such that the pair of lines of light may be respectively aligned with the lateral boundaries of each board and the positioning of the pair of lines of light stored for each board,

saw feeding table defining a longitudinal direction and adapted to sequentially receive the boards from said inspection station with the boards aligned with said longitudinal direction,

multiple rip saw means including a plurality of laterally spaced apart blades and positioned adjacent and in longitudinal alignment with said saw feeding table, means for longitudinally conveying each board from said saw feeding table through said multiple rip saw means, and

computer control means for automatically adjusting the lateral positioning of each board received at said saw feeding table so as to longitudinally align each board with said multiple rip saw means, and with the alignment being determined by said stored positioning of said pair of lines

of light for such board and a predetermined program designed to maximize the yield of the board upon being rip cut in the multiple rip saw means.

4,945,798

## PUNCH KNIFE

Gerrit Alpbenaar, Watermolenstraat 39, 1551 BB Westzaan, Netherlands

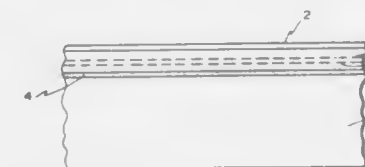
Filed Mar. 23, 1989, Ser. No. 327,869

Claims priority, application Netherlands, Mar. 23, 1988, 8800717

Int. Cl.<sup>5</sup> B26F 1/46

U.S. Cl. 83—652

19 Claims



1. A punch knife comprising:

a steel band with a hardened cutting edge and a bottom edge; and

a compressible zone provided in said steel band, said compressible zone extending below said cutting edge and substantially parallel thereto and at a distance from said bottom edge, said compressible zone allowing for self-adjustment of the cutting edge with respect to a cutting plate supporting material to be cut, along the length of the cutting edge.

4,945,799

## TOOL GUIDE

Marvin D. Knetzer, 1232 Baker, Wichita, Kans. 67212

Filed Mar. 24, 1989, Ser. No. 328,478

Int. Cl.<sup>5</sup> B27B 5/20

U.S. Cl. 83—745

9 Claims



1. A guide for guiding a cutting tool on a workpiece including a surface and front and back edges, which comprises:

(a) a primary guide rod with front and back ends;

(b) an angle section with a top, horizontal flange adapted to engage the workpiece surface and a vertical flange depending from said horizontal flange and adapted to engage the workpiece back edge;

(c) a pivotable connector assembly including:

(1) a connecting rod section connected to said guide rod back end and projecting laterally therefrom;

(2) a return rod section connected to and extending forwardly from said connecting rod section in parallel, spaced relation with respect to said guide rod;

(3) an extension rod section connected to said return rod section and extending laterally therefrom in a direction away from said guide rod;

(4) an upper plate connected to said return rod and extension rod sections;

(5) a lower plate connected to said angle section horizon-

tal flange and projecting rearwardly from said angle section;

(6) a pivot pin pivotally interconnecting said plates; and  
(7) clamp means adapted for selectively clamping said plates together;

(d) a primary guide tube including a mounting bar projecting laterally therefrom, said mounting bar being adapted for releasably mounting in a rip fence mounting bracket of a circular saw and the guide tube being adapted to telescopically and slidably receive said guide rod; and

(e) a secondary guide tube mounted in juxtaposed, parallel relation on said primary guide tube and having front and back ends located behind said primary guide tube front and back ends respectively, said secondary guide tube being adapted to permit cutting the workpiece at an angle without said guide interfering with the cutting tool.

4,945,800

## STRINGED MUSICAL INSTRUMENT MACHINE HEAD

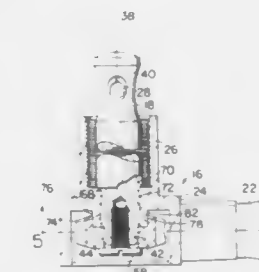
Helmut F. K. Schaller, Kuckucksweg 16, 8501 Feucht, Fed. Rep. of Germany

Filed Sep. 21, 1989, Ser. No. 410,332

Int. Cl.<sup>5</sup> G10D 3/14

U.S. Cl. 84—306

7 Claims



1. A stringed musical instrument machine head comprising:

a housing,  
an elongated string post having a longitudinal axis,  
means supporting said post for rotation about its longitudinal axis relative to said housing, said post having an upper end portion extending from said housing for attachment to a string and a lower end portion opposite said upper end portion, and

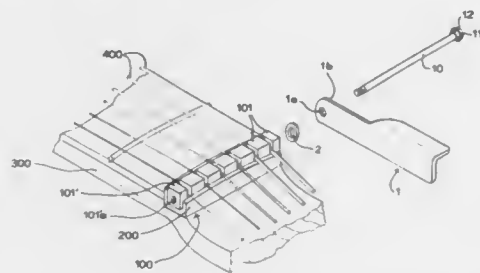
a worm wheel fixed to said lower end portion of said post, said means for supporting said post for rotation relative to

said housing including said housing having a vertically extending opening defining an internal cylindrical housing bearing surface, said post having an intermediate portion located between said upper and lower end portions thereof and received in and passing through said housing opening, said housing at the lower end of said opening having an annular sleeve portion with an internal surface forming part of said opening and with an external cylindrical bearing surface concentric with said opening, said worm wheel having an upwardly facing cylindrical recess receiving at least a part of said sleeve portion, said worm wheel recess being defined in part by an inwardly facing cylindrical bearing surface slideably engageable with said external bearing surface of said sleeve portion.

**4,945,801**  
**CLAMP WITH ADJUSTABLY POSITIONABLE HANDLE**  
 Paul F. Stroh, 10229 42nd SW., Seattle, Wash. 98146, and Dennis R. Gunn, Shiratori 2-5-13, Asou-ku, Kanagawa-ken, Kawasaki-shi, Japan

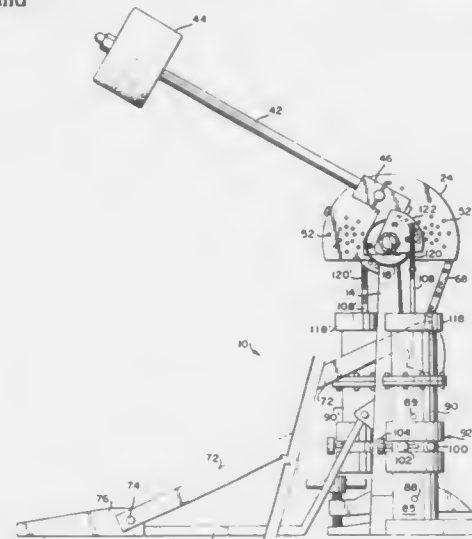
Filed Sep. 9, 1988, Ser. No. 242,425  
 Int. Cl.<sup>3</sup> G10D 3/06  
 U.S. Cl. 84—314 N

14 Claims



1. A clamp comprising:
  - a plurality of blocks said blocks having gaps therebetween;
  - a threaded bolt means, said threaded bolt means being defined by a threaded bolt having a threaded stud portion and being rotatable for cooperating with a screw thread formed on one of said plurality of blocks for driving at least one of said blocks in an axial direction for changing the width of said gaps between said blocks;
  - a string aligning means for aligning a string of a musical instrument at a predetermined orientation in one of said gaps;
  - a handle for rotating said bolt means relative to said plurality of blocks;
  - and
  - a handle retaining means, said handle retaining means retaining said handle means on said bolt so as to prevent said handle from falling from said bolt at any and all possible orientations of said clamp and said handle retaining means being selectively releasable for allowing selective reorientation of said handle relative to said bolt.

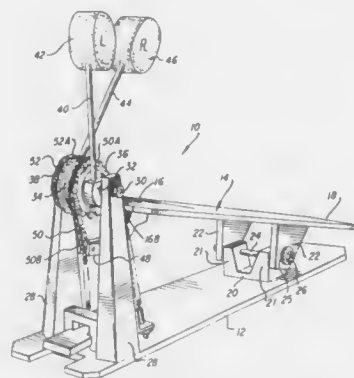
sive to movement of said pedal from a first neutral position; and



first pneumatic means responsive to movement of said pedal in said first direction to return said pedal to said neutral position.

**4,945,803**  
**DOUBLE BEAT BASS DRUM PEDAL ASSEMBLY**  
 Paul J. Norwood, 1541 Old Rte. 20, West, Norwalk, Ohio 44857  
 Filed Sep. 15, 1989, Ser. No. 408,067  
 Int. Cl.<sup>3</sup> G10D 13/02  
 U.S. Cl. 84—422.1

9 Claims



1. A double beat bass drum pedal assembly adaptable for placement adjacent to a head of a bass drum, comprising:
  - a. a base having a front portion and a rear portion;
  - b. a first pair of upstanding posts mounted on the front portion of the base;
  - c. a second pair of shorter posts mounted on the rear portion of the base;
  - d. a first shaft fixed between the first pair of upstanding posts;
  - e. two disks, each having a periphery and each being rotatably mounted on the first shaft;
  - f. a first mallet, carried by one of the two rotatably mounted disks so as to strike the head of the bass drum;
  - g. a second mallet, carried by the other of the two rotatably mounted disks so as to strike alternately the head of the bass drum;
  - h. a second shaft fixed between the second pair of shorter posts;
  - i. a one-piece foot pedal having a toe portion and a heel portion and being pivotably mounted on the second shaft;
  - j. a first flexible linkage means, connected between the toe

**4,945,802**  
**PNEUMATIC RETURN FOR FOOT PEDALS**  
 ASSOCIATED WITH PERCUSSION INSTRUMENTS  
 David S. Ruprecht, 11635 Glendora Lane, Parma Heights, Ohio 44130

Filed Jan. 11, 1989, Ser. No. 295,537  
 Int. Cl.<sup>3</sup> G10D 13/00; G10C 3/26

U.S. Cl. 84—422.1

32 Claims

1. A pneumatic pedal assembly for a musical instrument comprising:
  - a frame supporting a pedal for movement about a first axis located adjacent one end of the pedal;
  - a musical component operatively connected to another end of the pedal remote from said first end, said component being supported for movement in a first direction respon-

portion of the foot pedal and the periphery of one of the two rotatably mounted disks, for rotating the first mallet into contact with the head of the bass drum upon depression of the toe portion of the foot pedal clockwise around the second shaft;

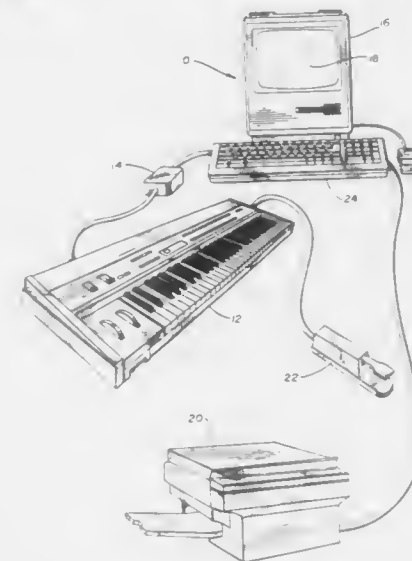
- k. a second flexible linkage means, connected between the toe portion of the foot pedal and the periphery of the other of the two rotatably mounted disks, for rotating the second mallet into contact with the head of the bass drum upon depression of the heel portion of the foot pedal counterclockwise around the second shaft;
- l. a first spring means, extended between the base and one of the two rotatably mounted disks, for rotating the first mallet out of contact with the head of the bass drum upon pivoting of the toe portion of the foot pedal counterclockwise around the second shaft; and
- m. a second spring means, extended between the base and the other of the two rotatably mounted disks, for rotating the second mallet out of contact with the head of the bass drum upon pivoting of the heel portion of the foot pedal clockwise around the second shaft.

**4,945,804**  
**METHOD AND SYSTEM FOR TRANSCRIBING**  
**MUSICAL INFORMATION INCLUDING METHOD AND**  
**SYSTEM FOR ENTERING RHYTHMIC INFORMATION**  
 Philip F. Farrand, Springfield, Mo., assignor to Wenger Corporation, Owatonna, Minn.

Filed Jan. 14, 1988, Ser. No. 143,861  
 Int. Cl.<sup>3</sup> G10G 3/04

U.S. Cl. 84—462

14 Claims

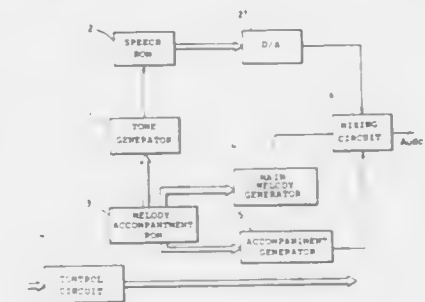


5. A system for notating musical information for a musical composition, comprising:
  - means for entering melodic information for said musical composition, said melodic information comprising:
    - a plurality of absolute note durations having a note-on indication and a note-off indication; and
    - a tone value for each of said absolute note durations;
  - means for entering rhythmic information for said musical composition, comprising:
    - means for designing a dynamically changing beat unit interval;
    - means for assigning a relative beat duration value to said beat unit interval; and
    - means for entering one or more of said beat unit intervals associated with said melodic information; and
  - processing means for receiving said melodic information and said rhythmic information and for automatically assigning relative note duration values to said absolute durations in response to the entering of said melodic and said rhythmic

information based on a comparison of the relationship between said beat unit intervals and said absolute note durations.

**4,945,805**  
**ELECTRONIC MUSIC AND SOUND MIXING DEVICE**  
 Jin-rong Hour, No. 37, Lane 99, Nan-Wan St., Nan-Wan Village, Yung-Kang Shiang, Tainan, Taiwan  
 Filed Nov. 30, 1988, Ser. No. 277,976  
 Int. Cl.<sup>3</sup> G10H 1/08, 1/36, 7/00  
 U.S. Cl. 84—610

5 Claims



1. An electronic music and sound mixing device for dolls and toy animals, comprising:
  - (a) control circuit means for selectively controlling the operation of said device;
  - (b) read only memory means coupled to said control circuit means for providing previously stored digital data representing melodies and accompaniments as a digital data signal responsive to an actuation signal from said control circuit means;
  - (c) reference oscillator means coupled to said control circuit means for generating a reference frequency oscillation signal;
  - (d) melody generator means coupled to said read only memory means and said reference oscillator means for generating a first signal derived from the combination of said reference frequency oscillation signal and said digital data signal;
  - (e) accompaniment generator means coupled to said read only memory means and said reference oscillator means for generating a second signal derived from the combination of said reference frequency oscillation signal and said digital data signal;
  - (f) voice synthesis means coupled to said read only memory means and said reference oscillator means for generating a digital voice signal;
  - (g) digital-to-analog converter means coupled to said voice synthesis for (1) generating an analog voice signal, and (2) generating an analog drive signal responsive to said digital voice signal; and,
  - (h) mixing circuit means coupled to (1) said melody generator means, (2) said accompaniment generator means, and (3) said digital-to-analog converter means for combining said first signal, said second signal and said analog voice signal to form a multivoice signal.

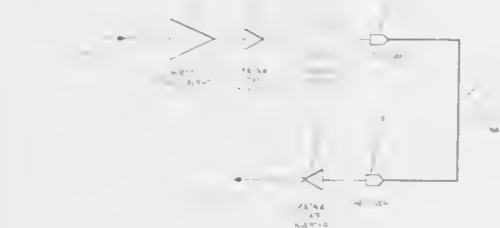
**4,945,806**  
**FIBER OPTIC MUSICAL INSTRUMENT DIGITAL INTERFACE**  
 Raymond Merrill, Jr., 367 S. N St., Livermore, Calif. 94550  
 Filed Jan. 19, 1989, Ser. No. 300,288  
 Int. Cl.<sup>3</sup> G02B 6/42; G10H 5/00; H04B 10/12, 10/22  
 U.S. Cl. 84—645

11 Claims

1. An interface for electronic musical instruments and the like which generate and respond to digital electronic signals in the MIDI format, comprising:



a transmitter circuit for producing an optical signal from a digital electronic signal in MIDI format, comprising:  
input connector means for inputting a digital electronic signal in MIDI format;  
optical signal generation means for converting the digital electronic signal into an optical signal;  
fiber optic connector means for connecting the output of the transmitter circuit to a fiber optic cable; and  
a receiver circuit for producing a digital electronic signal in the MIDI format from an optical signal, comprising:  
fiber optic connector means for connecting the receiver circuit to the fiber optic cable;  
optical signal conversion means for converting the optical signal back to a reconstructed digital electronic signal in MIDI format;



output connector means for outputting the reconverted digital electronic signal in the MIDI format;  
wherein the optical signal generation means comprises:  
a current to voltage converter;  
a voltage state inverter connected to the output of the converter;  
a transmitter driver connected to the output of the inverter;  
an electro-optical transmitter connected to the output of the driver; and  
the optical signal conversion means comprises:  
an electro-optical receiver;  
a voltage state inverter connected to the output of the receiver.

4,945,807

# METHOD AND APPARATUS FOR PROCESSING POTENTIALLY EXPLOSIVE AND SENSITIVE MATERIALS FOR FORMING LONGITUDINALLY PERFORATED EXTRUDATE STRANDS

Bernard A. Loomans; James E. Kowalczyk, both of Saginaw, and Jerry W. Jones, Bay City, all of Mich., assignors to APV Chemical Machinery, Inc., Saginaw, Mich.

Filed Aug. 29, 1988, Ser. No. 237,415

Int. Cl.<sup>3</sup> C06B 21/00; B28C 7/16; B29C 47/06

U.S. Cl. 86—1.1

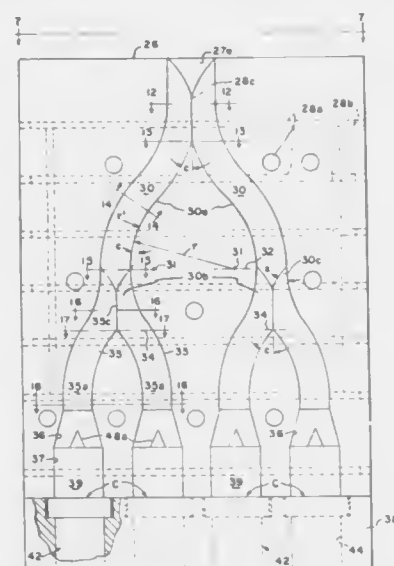
21 Claims

14. In a system for receiving plastic material extrudate from a mixer or other source of flow under pressure and discharging the material in a plurality of cylindrical configurations, each having a plurality of axially extending perforations:

- a die channel means including a plurality of separate branch lines;
- a plurality of downstream dies, each communicating with one of said branch lines;
- each die comprising a surrounding cylindrical body sleeve providing an axially extending passage means with an axially concentric entrance channel and reduced diameter discharge channel;
- an axially extending core portion having generally radially directed ribs connecting the core portion with the sleeve, said ribs separating said passage means into a group of circumferentially spaced upstream die passage portions with axially convergent marginal walls extending axially between the sleeve and core between said ribs to pass material to said discharge channel, said convergent walls

comprising axially convergent radial surfaces on circumferentially adjacent ribs connecting the core portion with the sleeve which axially converge, there being also convergent, radially opposite, circumferential surfaces on the sleeve and core leading to and, with said radial rib surfaces, defining reduced metering openings for said die passage portions of generally frusto-conical transverse configuration;

- said ribs also separating said passage means into a group of circumferentially spaced downstream die passage portions extending downstream from said metering openings toward said discharge channel and having divergent marginal walls extending axially between the sleeve and core between said ribs, said divergent walls comprising axially divergent radial surfaces on circumferentially adjacent



- ribs connecting the core portion with the body which axially diverge, there also being axially divergent, radially opposite, circumferential surfaces on the sleeve and core;
- The core portion in each die further having a conically projecting portion at its axially upstream and downstream ends, upstream and downstream respectively of said ribs;
- a plurality of axially extending elongate pins extending from said core portion into said discharge channel to form said perforations as said material exits the discharge channel; and
- said sleeve surfaces, said rib surfaces and said conically projecting portions all extending at relatively shallow acute angles relative to the sleeve axis.

21. The invention as defined in any one of claims 1, 10, 14, 15, or 17 wherein said plastic material extrudate is an explosive.

4,945,808  
PRIMER

Richard Dowling, Torquay; Jolanta Paull, Hawthorn, and David Vince, Essendon, all of Australia, assignors to ICI Australia Operations Proprietary Limited, Melbourne, Australia  
Division of Ser. No. 146,127, Jan. 20, 1988, Pat. No. 4,879,952.

This application Mar. 16, 1989, Ser. No. 324,470

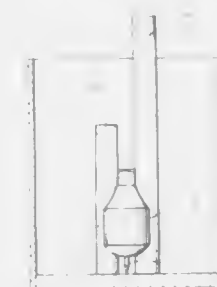
Claims priority, application Australia, Jan. 30, 1987, PI0122  
Int. Cl.<sup>3</sup> F42B 3/00

U.S. Cl. 86—20.12

1 Claim

1. A method of manufacture of a primer which comprises providing a mould having therein at least one rod which is so dimensioned as to provide in the primer, when the primer is cast in the mould, a cylindrical hole extending completely therethrough, providing a sensitizing charge enclosed in a rigid impermeable container whose external shape is such that it at least partially surrounds the hole-providing rod of said mould,

placing in the mould prior to casting the sensitizing charge enclosed in said rigid impermeable container so that it at least partially surrounds the hole-providing rod and is supported



thereby and then casting molten primer explosive in said mould so that the molten explosive surrounds said container allowing the primer explosive to set and removing the same with the container therein from the mould.

4,945,809

# LIQUID PROPELLANT GUN

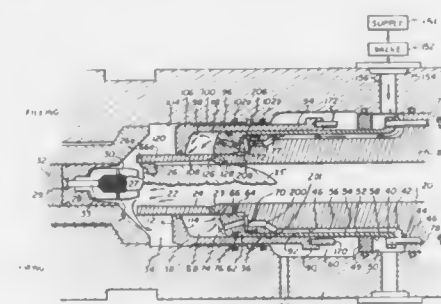
Melvin J. Bulman, Shelburne, and David L. Maher, Winooski, both of Vt., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 30, 1984, Ser. No. 677,151

Int. Cl.<sup>3</sup> F41D 11/24; F41F 1/04

U.S. Cl. 89—7

4 Claims



3. A liquid propellant gun system comprising:

- a housing,
- a gun barrel,
- a differential annular valve,
- a differential annular piston,
- said housing, barrel, valve and piston defining a fill chamber,
- a pumping chamber, a projectile receiving chamber, and a combustion chamber,
- a projectile disposed in said projectile receiving chamber, and
- valve means, disposed in part on said projectile, when under relatively low pressure for precluding the flow of liquid propellant from said pumping chamber into said combustion chamber and when under relatively higher pressure for permitting the flow of liquid propellant from said pumping chamber into said combustion chamber.

4,945,810

# RAILGUN RESTRIKE CONTROL

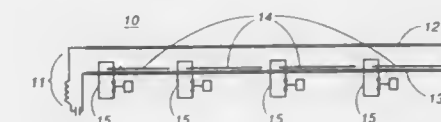
Jerald V. Parker, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 11, 1989, Ser. No. 336,377

Int. Cl.<sup>3</sup> F41B 6/00

U.S. Cl. 89—8

17 Claims



1. An electromagnetic railgun comprising:  
first and second substantially parallel electrically conductive rails;  
a plurality of electrically conductive segments substantially parallel to and spaced apart from said first conductive rail; power supply means capable of producing a plasma armature connected to said first and second conductive rails for propelling a nonconductive projectile and a plasma armature along a path defined by said second conductive rail and said plurality of conductive segments;  
a plurality of switch means each connected between said first conductive rail and each of said plurality of conductive segments for maintaining electrical connection between said first conductive rail and each of said plurality of conductive segments until each of said switch means opens one by one after said projectile and said plasma armature have passed each of said conductive segments.

4,945,811

# WEAPON SYSTEM

Hubert Grieb, Germering, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

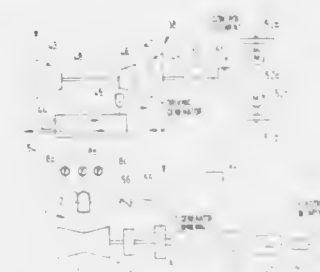
Filed Apr. 20, 1989, Ser. No. 340,927

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814454

Int. Cl.<sup>3</sup> F41B 6/00

U.S. Cl. 89—8

11 Claims



1. A weapon system including an electrical energy supply means for supplying electrical energy to fire an electrically operated gun, said electrical energy supply means comprising:  
a turbine drive non-continuously at full power by exhaust gases from a combustion chamber which is supplied by combustible fuel means and oxidant means, the exhaust gases having a pressure of equal to or greater than 70 bar and a temperature of equal to or greater than 1,300 K., the temperature and pressure being higher than possible during continuous operation of the turbine in order to produce a larger power output in a short period of time; and  
electrical energy storage unit means operatively coupled to the turbine for storing mechanical energy of the turbine as said electrical energy;

whereby the electrical supply means produces a large amount of power in a short period to quickly recharge the electrical energy storage unit means for the electrically operated gun.

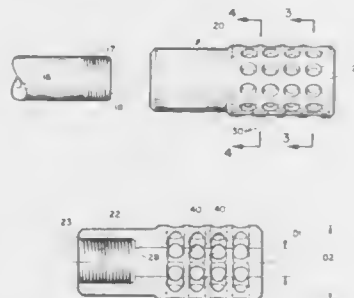
4,945,812

# **MUZZLE BRAKE AND METHOD OF MAKING THE SAME**

Vincent E. Mazzanti, 6114 Terryhill Dr., La Jolla, Calif. 92037  
Filed Apr. 7, 1988, Ser. No. 179,037  
Int. Cl.<sup>5</sup> F41C 21/18

U.S. Cl. 89—14.3

12 Claims



1. A muzzle brake comprising:  
an elongated tubular sleeve having a front and end and a rear end and being of a predetermined length that is less than three inches long;  
said tubular sleeve having a bore through which a bullet will pass having an internal diameter D1 and an external diameter D2 that forms a wall thickness T, said internal diameter being only slightly larger than that of the bullet that will pass therethrough; and  
a plurality of rows of circular apertures formed in said tubular sleeve, the circumferential spacing between each of these apertures in the same circular row being such that they intersect the adjacent apertures on both sides of them at a point intermediate the internal diameter D1 and the external diameter D2 to produce at least one integrally formed baffle in the bore of the tubular sleeve between each circular row of apertures, said baffles functioning to reduce recoil of a firearm to which the muzzle brake would be attached and further to aid in directing the propellant gases of a bullet radially outwardly through the apertures through the muzzle brake.

4,945,813

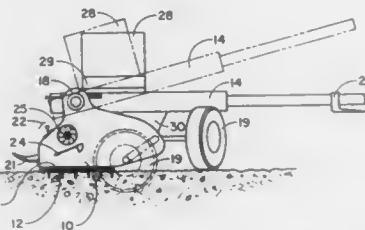
# **RAPID FIRE HOWITZER**

William M. Moscrip, King George Cty., Va., and Louis J. Kiraly, Brook Park, Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,847  
Int. Cl.<sup>5</sup> F41A 9/24

U.S. Cl. 89—33.1

3 Claims



1. A light weight rapid fire howitzer comprising:  
a gun mount having a base ring on the underside thereof;

- a grouted bearing plate rotatably mounted on the underside of said base ring;
- a pair of wheels on said gun mount and movable between trail and firing positions;
- an expendable breech gun trunnion mounted in cantilevered fashion on said gun mount and movable thereon in elevation;
- a pair of feed clips mounted on the top of said gun and pivotable between a vertical feed position and a horizontal load position to enable firing from one clip while loading the other;
- an ejection chute for expended breechcases fixed to the underside of said gun;
- a substantially constant force liquid recoil spring system; and
- a recoil operated hydraulic system for driving said wheels when they are in the firing position to rotate said gun mount in train about the axis of said base ring and bearing plate.

4,945,814

# **MOLDED COMPOSITE ARMOR**

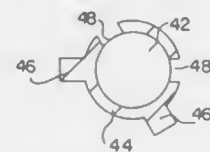
Roger Huet, Grenoble, France, assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 187,843, Mar. 6, 1979. This application  
Jul. 8, 1985, Ser. No. 752,922

Claims priority, application France, Mar. 8, 1978, 78 07538  
Int. Cl.<sup>5</sup> B22D 19/02; F41H 5/04

U.S. Cl. 89—36.02

8 Claims



1. A composite component useful in formation of armor, comprising:  
a core member exhibiting properties for resisting a projectile;  
a cast metal shell for said core member;  
said core member being embedded in said cast metal shell, said cast metal shell forming an individual metal cover surrounding the core.

4,945,815

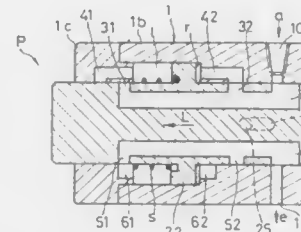
# **PNEUMATIC TYPE OF RECIPROCATING MOVEMENT DEVICE**

Shih-Dean Lo, Hsin Chu Hsien, Taiwan, assignor to Industrial Technology Research Institute, Hsin Chu Hsien, Taiwan

Filed May 25, 1988, Ser. No. 198,438  
Int. Cl.<sup>5</sup> F01L 21/02

U.S. Cl. 91—234

3 Claims



1. A pneumatic type reciprocating device comprising:  
a cylinder member having a through bore, said through bore being of larger diameter at the center of said cylinder member than at both ends of said cylinder member so as to form a cavity in the center of said cylinder member, said

cylinder member having an exhaust port and an intake port, each extending radially from an inside surface of said cylinder member, said intake port being connected to a source of pressurized fluid and said exhaust port being connected to ambient surroundings of said device,

a rod member slidably mounted inside said through bore of said cylinder member, said rod member and said cylinder member being sized so as to form an air tight said in said cavity while allowing said rod member to move axially within said cylinder member, said rod member containing a communication passage for intake of a working fluid into said cavity and a communication passage for exhaust of a working fluid out of said cavity, said communication passage for the intake being in communication with said intake port for all positions of said rod member relative to said cylinder member and said communication passage for the exhaust being in communication with said exhaust port for all positions of said rod member relative to said cylinder member, said communication passages terminating at one or more positions on a surface of said rod member at an interface of said rod member and said cylinder member, a flange member fixed coaxially, and at the center of said rod member such that it divides said cavity into left and right portions,

right and left intake passages on said cylinder member communicating to the left said and right side of said cavity respectively, each of said intake passages also communicating to respective positions along the interface of said cylinder member and said rod member, configured so as to allow the right intake passage to be aligned with said communication passage for intake, at the interface of said cylinder member and said rod member, when said flange is displaced to a predetermined position right of center of said cavity and the left intake passage to be aligned with said communication passage for intake, at the interface of said cylinder member and said rod member, when said flange is displaced to a predetermined position left of center of said cavity, and

right and left exhaust passages on said cylinder member, communicating to said right side and said left side of said cavity respectively, said exhaust passages also communicating respectively to positions along the interface of said rod member and said cylinder member, configured so as to allow said right exhaust passage to align with said communication passage for the exhaust when said flange is displaced to the left side of said cavity and said left exhaust passage to align with said communication passage for the exhaust when said flange is displaced to the right side of said cavity, resulting in an alternating force being applied to the sides of said flange causing said flange and said rod member to move in a reciprocating fashion.

4,945,816

# **RADIAL PISTON HYDRAULIC MOTOR WITH ROTARY CAM POSITION ENCODER AND VALVE CONTROL SYSTEM**

Renzo Mestieri, King City, Canada, assignor to Black Gold Development Corporation, Concord, Canada

Continuation of Ser. No. 803,597, Dec. 2, 1985, abandoned. This application Aug. 10, 1988, Ser. No. 230,435

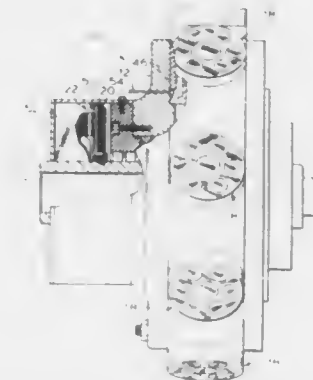
Int. Cl.<sup>5</sup> F01B 1/06; G05B 1/06

U.S. Cl. 91—473

3 Claims

1. A radial piston hydraulic motor comprising:  
a hydraulic motor body;  
a shaft mounted for rotation in said hydraulic motor body;  
a drive cam having a lobe mounted on the shaft for rotation therewith;  
a plurality of fluid actuated pistons disposed radially about said shaft for reciprocating movement relative thereto, each piston of said plurality sequentially engaging said lobe of said cam to driveably rotate said shaft;  
a plurality of electronically actuated control valves, a sepa-

rate valve of said plurality of control valves being associated with a separate piston of said plurality of pistons;  
controller means including means for individually and separately actuating each of said control valves;  
position code means on said shaft for rotation therewith, said position code means comprising a disc, mounted on said shaft for rotation therewith, and including, on one face of said disc, a plurality of discrete differently coded zones, each code in the zone of said plurality being indicative of the position of said lobe relative to each one of said plurality of pistons at the time said code is being read, whereby to provide continuous readings of the position of said lobe relative to each one of the plurality of pistons throughout the rotational cycle of said disc;  
electronic sensing means for continuously sensing the posi-



tion code means and providing an information signal responsive thereto as a continuous measure of the position of the lobe relative to each one of said plurality of pistons at any point in time;

said controller means including means for receiving said information signal;

an in-board computer connected to said controller means for receiving said information signal as an input signal and for sending an output signal to said controller means to actuate a selected one, or ones, of said control valves as determined by said input signals;

whereby to determine the position of any point on the drive cam, relative to any one of the pistons, at any point in time to thereby determine the point in time for opening each control valve to enable smooth lifting of the piston-cylinder assemblies.

4,945,817

# **AXIAL PISTON DEVICE**

Kenneth L. Scholl, Lockport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 24, 1989, Ser. No. 426,622

Int. Cl.<sup>5</sup> F04B 1/26; F16H 23/00

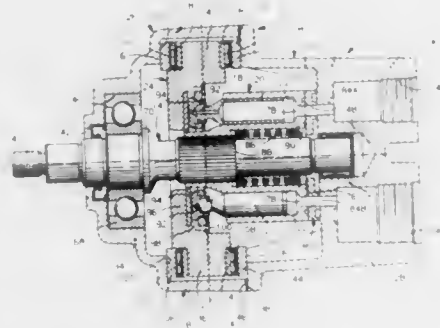
U.S. Cl. 91—505

4 Claims

1. In a variable displacement axial piston device including a cup-shaped mounting flange having an annular end, a cup-shaped valve block having an annular end, said valve block and said mounting flange abutting at said annular ends thereof to define a housing of said axial piston device,  
a drive shaft having a cylinder barrel thereon with a plurality of axial bores in said cylinder barrel and a corresponding plurality of pistons slidably disposed in respective ones of said axial bores,  
a primary bearing means supporting a first end of said drive shaft on said mounting flange for rotation about a drive shaft axis of said housing,  
a secondary bearing means supporting a second end of said

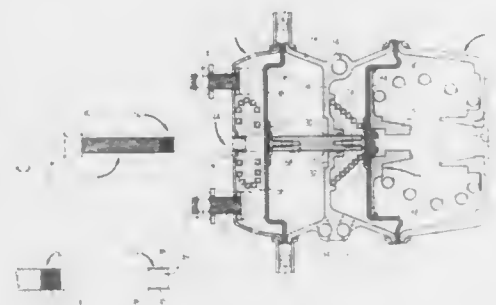


drive shaft on said valve block for rotation about said drive shaft axis, and  
 a tilt-yoke in said housing having an annular plate around said drive shaft engageable by said pistons and a pair of diametrically opposite trunnions extending radially out from said annular plate,  
 the improvement comprising:  
 a pair of bearing inner races each rigidly attached to a respective one of said trunnions,  
 a pair of retainers each having a cylindrical inner surface surrounding and radially spaced from respective ones of said pair of bearing inner races and a non-cylindrical outer wall,



a plurality of anti-friction bearings between each of said inner races and the surrounding one of said cylindrical surfaces,  
 means on said mounting flange defining a pair of sockets each including an open end adjacent said annular end of said mounting flange for reception of a respective one of said retainers and a non-cylindrical inner wall portion matching said non-cylindrical outer wall of said respective one of said retainers, and  
 means on said valve block defining a pair of retainers closing respective ones of open ends of said sockets when said mounting flange and said valve block abut at said annular ends thereof.

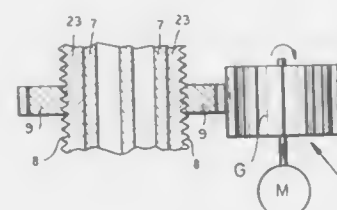
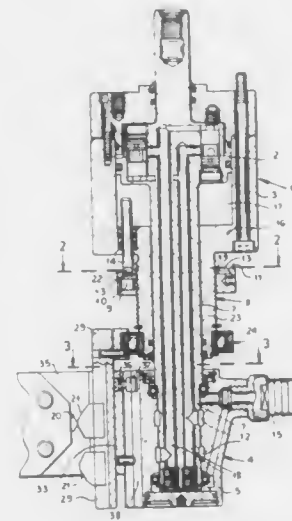
**4,945,818**  
**STROKE INDICATOR FOR AIR OPERATED DIAPHRAGM SPRING BRAKES**  
 Nathan C. Ware, North Muskegon, Mich., assignor to Lear Siegler Truck Products Corporation, Muskegon, Mich.  
 Filed Jan. 12, 1989, Ser. No. 296,517  
 Int. Cl.<sup>5</sup> F01B 25/26, 31/12  
 U.S. Cl. 92—5 R 14 Claims



1. In an air-operated diaphragm spring brake comprising:  
 a housing defining a chamber,  
 a push rod extending through an opening in the housing and

having an outer end which is adapted to connect to and to act upon a braking mechanism exterior to the housing, and  
 a diaphragm within the chamber for actuating the push rod longitudinally between operative and inoperative positions,  
 the improvement which comprises:  
 a visual indicium provided by a discontinuity formed in the surface of the push rod in a position whereby a portion of the indicium will be exterior to the housing only when the push rod is in the operative position and the braking mechanism is substantially out of adjustment.

**4,945,819**  
**CLAMPING APPARATUS FOR THE ROTARY SPINDLE OF A MACHINE TOOL**  
 Günter H. Röhm, Heinrich-Röhm-Strasse 50, 7927 Sontheim, Fed. Rep. of Germany  
 Filed Jun. 22, 1989, Ser. No. 370,247  
 Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 3826215  
 Int. Cl.<sup>5</sup> F01B 31/14; F15B 15/24; B23B 5/22, 31/10  
 U.S. Cl. 92—13.1 7 Claims



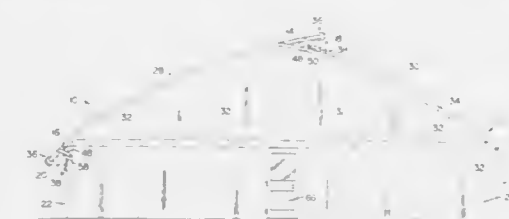
1. In a chuck actuating apparatus for a rotating spindle of a machine tool comprising a rotating clamping cylinder, an axially slidable clamping piston rotating with said clamping cylinder and a coaxial cylindrical projecting portion in said clamping cylinder, the improvement wherein said projecting portion carries a thread, on which a threaded ring is guided and engaged, which is provided with a coaxial undercut annular groove in an opposing surface facing said clamping cylinder and is securable against rotation on said projecting portion, a plurality of stop pins being provided which are axially unshiftable relative to said threaded ring and which engage and slide in said annular groove, said stop pins projecting through an opposing wall of said clamping cylinder into an interior space axially slidable and sealing axially in said clamping cylinder and forming a stop for said clamping piston.

**4,945,820**  
**AIR CIRCULATING DEVICE**  
 Kouzo Fukuda, 2 - 19 - 1 Mishikamakura, Kamakura-shi, Kanagawa-ken, Japan  
 Filed Apr. 5, 1989, Ser. No. 333,406  
 Int. Cl.<sup>5</sup> F24F 7/06  
 U.S. Cl. 98—31.5 4 Claims



1. An air circulating device comprising a base adapted to be mounted on the surface of a room wall, a first duct attached at one end thereof to one end of said base and having a first air port at the other end thereof, a second duct attached at one end thereof to the other end of said base and having a second air port at the other end thereof and at least one air circulating fan mounted within said base, wherein said base has a pair of elongated slots each extending along a longitudinal direction of said air circulating device and each of said first and second ducts is provided with a bolt to be inserted into one of said elongated slots such that said first and second ducts are longitudinally adjustably attached to said base and further wherein said base is provided with a pivotable mounting means for securing said base against said wall such that the positions of said first and second ducts can be interchanged.

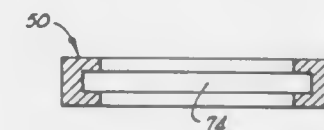
**4,945,821**  
**VENTILATED GREENHOUSE**  
 Douglas A. Holmberg, 1321 North Valrico, Valrico, Fla. 33954  
 Continuation of Ser. No. 410, Jan. 5, 1987, abandoned. This application Aug. 9, 1988, Ser. No. 230,334  
 Int. Cl.<sup>5</sup> F24F 13/10  
 U.S. Cl. 98—32 6 Claims



1. A ventilated greenhouse comprising an enclosure cooperatively formed by a first and second side wall disposed in spaced relationship relative to each other by a pair of end walls and a roof including a first and second roof section wherein opposite ends of said first roof section are disposed in overlapping spaced relationship relative to the upper portion of said second roof section and the upper portion of said first side wall respectively to cooperatively form a ridge vent and side vent respectively, a first elongated inflatable member secured to said enclosure adjacent said ridge vent having three corresponding elongated sealing elements extending substantially the length of said first elongated inflatable member and a second elongated inflatable member secured to said enclosure

adjacent said side vent having three corresponding sealing elements extending substantially the length of said second elongated inflatable member, said first and second elongated inflatable members each movable between a first and second position disposed in operative relationship relative to said ridge vent and side vent respectively to permit air circulation through said ventilated greenhouse when said first and second elongated inflatable members are in said first positions and to engage said corresponding elongated sealing elements to seal said ridge vent and said side vent respectively when said first and second elongated inflatable members are in said second positions, said first and second side walls, said pair of end walls and said first and second roof sections each comprises a plurality of frame members having a membrane secured thereto, said membrane secured to opposite ends of said first roof section by a pair of first primary sealing/securing means and secured to the upper portions of said second roof section and said first side wall by a pair of second primary sealing/securing means, said pairs of first and second primary sealing/securing means disposed to engage said first and second elongated inflatable members respectively when first and second elongated inflatable members are each in said second position.

**4,945,822**  
**AIR CONTROL APPARATUS FOR FORCED AIR CENTRAL AIR CONDITIONING SYSTEMS**  
 Lester R. Hicks, and E. LaRuth Hicks, both of Rte. 2, Fort Cobb, Okla. 73038  
 Filed Apr. 3, 1989, Ser. No. 332,872  
 Int. Cl.<sup>5</sup> F24F 7/06  
 U.S. Cl. 98—41.3 24 Claims



1. A forced air central air conditioning system for conditioning the air in a living area of a building, comprising:  
 an air conditioning unit for conditioning said air;  
 a duct for conducting said air from said air conditioning unit to said living area, said duct having a main section extending through an area outside of said living area and a tail section extending from said main section through a partition enclosing said living area into said living area; and  
 an air control apparatus positioned between a first portion of said main section of said duct and a second portion of said main section of said duct, said air control apparatus comprising:  
 a frame having a border and an air passage defined by said border, said border having a first surface attached to said first portion of said main section of said duct in a position such that said first portion of said main section of said duct is in fluid communication with said air passage and a second surface attached to said second portion of said main section of said duct in a position such that said second portion of said main section of said duct is in fluid communication with said air passage whereby air can flow from said first portion of said main section of said duct through said air passage into said second portion of said main section of said duct;  
 an air seal slidably disposed in said frame between said first and second surfaces of said border, said air seal being movable in and out of said air passage to open and close said air passage and thereby regulate the flow of air therethrough; and  
 a handle removably attached to said air seal and extending away from said frame through a partition enclosing said living area into said living area for allowing said air

passage to be manually opened and closed from within said living area.

4,945,823

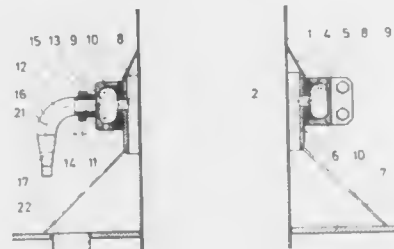
## WHIRLPOOL

Martin Widhopf, Freising, Fed. Rep. of Germany, assignor to Anton Steinecker Maschinenfabrik GmbH, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,980

Int. Cl.<sup>5</sup> C12B 1/02

U.S. Cl. 99—276



1. A whirlpool for discharging hot dregs from the wort in a beer brewing process, comprising a circular receptacle the diameter of which is approximately 2.0 to 3.5 times as large as its liquid level and which is provided with a base onto the central area of which nozzles are directed for leading the dregs deposited in said area off to the outer marginal area of said base,

characterized in that at least two nozzles (12; 36, 37) are arranged above the base (3; 25) such that they are adapted to be rotated about the central longitudinal axis (2; 23) of the receptacle, the respective nozzles (37) being arranged on a higher level than the nozzles (36) and being positioned at a distance from the central longitudinal axis (23) of the receptacle which is larger than the distance between said central longitudinal axis and the nozzles (36) arranged on a lower level.

4,945,824

## CAPPUCCINO MAKING ADAPTER FOR USE WITH COFFEE MAKERS

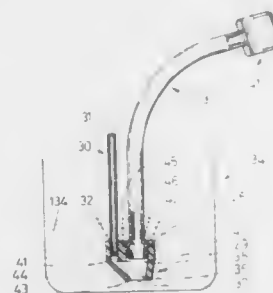
Michael Borgmann, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. Kg., Solingen, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,331

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1988, 3842206

Int. Cl.<sup>5</sup> A47J 31/40

U.S. Cl. 99—293



1. For use with a coffee making machine having a steam-supplying conduit, a cappuccino making adapter comprising an elastic body immersible into a supply of milk and having a steam-admitting first inlet directly connectable with the steam-

supplying conduit, an air-admitting second inlet, a chamber which communicates with said inlets for the establishment of a steam-air mixture, and an outlet for discharging the mixture into the supply of milk.

4,945,825

## INDEXING MACHINE FOR BAKING PANS

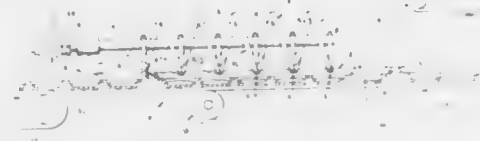
Augusto Florindez, 13029 Ocaso, La Mirada, Calif. 90638

Filed May 24, 1989, Ser. No. 356,118

Int. Cl.<sup>5</sup> A47J 27/00; B65B 35/46; B65G 47/29

U.S. Cl. 99—353

8 Claims



1. A machine for manufacturing bakery products, including means for depositing individual dough packets into cups of a bakery pan having a raised lip extending about the perimeter of the pan, said cups being arranged in rows which are spaced apart a predetermined distance, said dough packets being deposited row by row as the pan is advanced incrementally along a predetermined path,

means for advancing the pans along said path, said pans being arranged in series and aligned so that adjacent pans abut each other, said advancing means including indexing means comprising an arm in the form of a helical member having a plurality of flights which are spaced apart a distance corresponding to the distance between the rows of cups, said flights being positioned so that an edge of a flight engages the lip of the pan as it moves along said path,

motor means for turning said arm so that it rotates through one 360° turn and then stops momentarily, and means for removably coupling the arm to the motor means so that the arm may be disconnected and replaced with another arm which has flights with different spacings that accommodate different size pans.

4,945,826

## PERFECTED MACHINE FOR PREPARING A PORTION OF FRIED FOOD AND FOR IMMEDIATELY DISTRIBUTING OF THIS PORTION

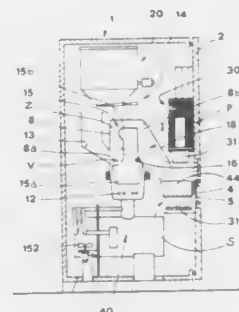
Gilberto Ripatonda, Via Quasimodo 3/A, Suzzara Mantova, Italy

Filed Mar. 27, 1989, Ser. No. 329,347

Claims priority, application Italy, May 31, 1988, 3486 A/88

Int. Cl.<sup>5</sup> A47J 37/12

10 Claims



1. A machine for preparing a portion of fried food and immediately distributing the portion, comprising a housing; a deep-pan for containing a mixture of oils supported in said housing;

a heat source connected to said deep-pan for keeping said oil mixture at a preset temperature;

a delivery station;

a pivotable mesh drainer having a net-part and a solid part, said drainer being rotatable about a horizontal axis from a filling position, in which said net-part is immersed in said mixture in said deep-pan, to an emptying position, in which said solid part of said drainer, shaped in such a way as to convey fried food, is rotated to a position over said delivering station;

said housing defining a doorway making said delivering station accessible from outside said housing;

a magazine for raw food;

means for delivering a preset portion of raw food from said raw food magazine;

guiding means positioned within said housing to receive raw food from said delivering means and to convey said preset raw food portion to said deep-pan;

a container feeder for a pile of containers located over said delivering station, said feeder having means to part a container lowest in said pile and to direct the parted container into said delivering station;

a purifier eliminating greasy fumes from said heated oil mixture;

a first cover for said purifier;

means interconnecting said deep-pan and said purifier for conveying greasy fumes coming out from said heated oil mixture to said purifier, said purifier having means to eliminate said greasy fumes;

an electric-electronic control unit for controlling said heat source, the rotational movement of said drainer, said delivering means, said container feeder, said means for conveying said greasy fumes to said purifier, and said purifier;

a removable second cover fitted to said deep-pan;

said second cover having a first vertical window in one side of said second cover adjoining an exit of said guiding means conveying a preset portion of raw food dropping from said magazine into said drainer and

a second window made in another side of said second cover adjoining said delivering station, said second window being closed by a door having an upper edge which is hinged to said second cover so that said door is able to turn outwards and upwards, when said drainer is rotated to a position over said delivering station;

said conveying means comprising

an aspirating means combined with a duct;

said first cover defining a space around said purifier;

said duct being kept under depression by said aspirating means which connects to a space delimited by said cover on said purifier; and

feeding means located outside said deep-pan for feeding said oil mixture and for keeping said oil mixture at a constant preset level.

4,945,827

## ROTARY TAMPON PRINTING MACHINE FOR PRINTING THE EDGE OF AUTOMOBILE GLAZINGS

Josef Audi; Hans Ohlenforst, both of Aachen, Fed. Rep. of Germany, and Peter Bergstein, Eh Kerkrade, Netherlands, assignors to Saint-Gobain Vitrage, Aubervilliers, France

Filed Apr. 17, 1989, Ser. No. 338,950

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813583

Int. Cl.<sup>5</sup> B41F 17/00

U.S. Cl. 101—35

13 Claims

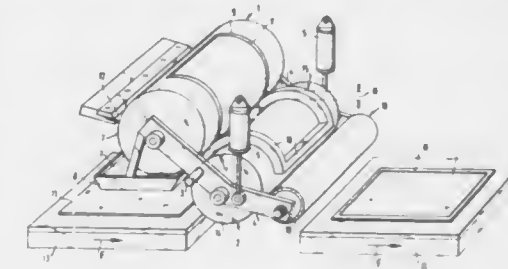
1. A rotary tampon printing machine for printing on a portion of a large-area object comprising:

a block containing printing ink in a desired design;

a tampon roller forming a cylindrical roller body and having a peripheral surface area; and

a flange-like tampon having a printing surface area and being mounted on the peripheral surface area of the tampon roller, said tampon having means for transferring the

printing ink from the block to the large-area object, the printing surface area of the tampon being substantially less than the peripheral surface area of the tampon roller, said flange-like tampon forming a continuous frame-like shape



defining a recess, wherein the printing surface area of said tampon is less than the area of the recess; whereby high-pressure printing can be achieved on large area objects.

4,945,828

## PULLEY FOR DRIVING A HIGH PERFORMANCE PRINTER

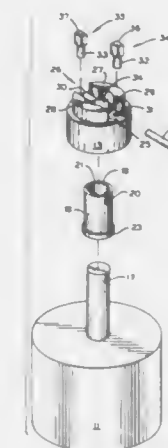
Charles F. Gabriel, Binghamton; Randy J. Kisacky, Johnson City; John Mako, and Lawrence A. Stone, both of Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 12, 1987, Ser. No. 295,987

Int. Cl.<sup>5</sup> B41J 1/20

U.S. Cl. 101—93.14

12 Claims



1. In a printer mechanism in which respective type font means is moved by electrical means that is subject to power line disturbances that produce momentary deviations in rotational speed, the combination comprising:

electrical motor means that is subject to power line disturbances, producing a momentary deviation in a predetermined rotational speed, to function as a driver means;

rotatable type font support means, in said printer mechanism to be rotated by said driver means, to function as a driven means;

pulley means connecting said driven means to said driver means;

the improvement comprising:

said driver means having means projecting therefrom to turn said pulley means;

means to de-couple said means projecting from said driver means from said pulley means responsive to said momentary deviation in rotational speed and to re-couple



therewith as said driver means returns to said predetermined rotational speed; and resilient means located between said means projecting from said driver means and said pulley means to apply a drive force gradually to said pulley means as said driver means returns to said predetermined rotational speed;

4,945,829

# METHOD FOR ORIENTATING PRINT MATERIAL FOR CORRECT PRINTING IN A PRINTING POSITION EXTERNALLY OF A PRINTING POSITION

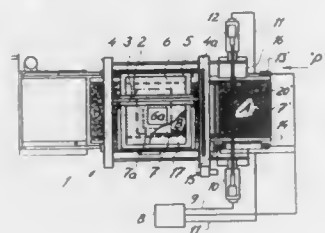
Sylve J. D. Ericsson, Tumba, Sweden, assignor to Svecia Silk-screen Maskiner AB, Sweden

Filed Aug. 23, 1988, Ser. No. 235,398

Claims priority, application Sweden, Aug. 28, 1987, 870333-8 Int. Cl.<sup>5</sup> B41F 15/10

U.S. Cl. 101-129

2 Claims



1. A method of orientating a second pattern derived from a first pattern formed on a stencil in a stencil frame, in relation to print material intended for receiving the second pattern, so that said second pattern will have a pre-determined position in relation to said material, and in which method the second pattern is formed by causing, in a printing position, coating substance to pass through the first pattern and onto the print material comprising the steps of:

- establishing the position of the material in relation to a reference value in a first print material registered position, a material feed position, and storing the resultant measurement value;
- moving the print material to a second print material registered position, and a printing position, and printing the second pattern on to said print material;
- moving the print material provided with the second pattern back to the first print material registered position, establishing the position of the printed second pattern in relation to said reference value, and storing the resultant measurement value;
- displacing one of the stencil frame, the print material, a printing table, and the first registered position of the print material in response to an established discrepancy between the actual position of the second pattern on the print material and a desired position, this displacement being effected to an extent and in a direction such as to minimize the established discrepancy;
- applying a second pattern with minimized discrepancy in the second print material registered position to each subsequent print material registered in a similar manner in the first and the second print material registered positions;
- changing the stencil and stencil frame in order to apply a further pattern to the print material; and compensating for a discrepancy which occurs in relation to the earlier applied second pattern by applying said further pattern to the print material in accordance with step "b", establishing any possible discrepancy in relation to the earlier applied second pattern in accordance with step "c", compensating for said discrepancy by displacing position-detecting devices in the first print material registered position to an extent and in a direction such as to minimize the established discrepancy, and locking said devices in set positions.

4,945,830

# OFF-SET PRINTING MACHINE FOR PRINTING CONTINUOUS WEB

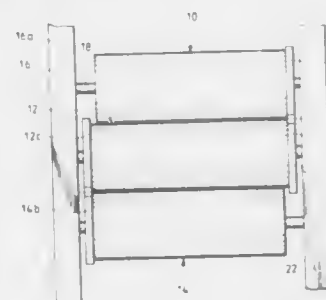
Kenso Maebara, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Filed Sep. 30, 1988, Ser. No. 251,480

Claims priority, application Japan, Sep. 30, 1987, 62-150883 Int. Cl.<sup>5</sup> B41F 7/04, 13/14

U.S. Cl. 101-217

3 Claims



1. An off-set printing machine for printing a continuous web (28) comprising:

- a rotatable plate cylinder (10);
- a rotatable blanket cylinder (12);
- a rotatable impression cylinder (14); said plate, blanket and impression cylinders being rotatably mounted between opposite walls of a frame and in parallel to one another;
- a first pair of gears (12c, 14b) in mesh with each other, one (14b) of said pair of gears being fixedly mounted coaxially on said impression cylinder for rotation therewith, and the other gear (12c) being rotatably mounted coaxially on said blanket cylinder for rotation therewith; mounting said other gear to said blanket cylinder for allowing angular adjustment of said other gear relative to said blanket cylinder and for fixing said other gear to said blanket cylinder for rotation therewith; and
- a second pair of gears (12b, 10b) in mesh with each other, said second pair of gears being located on an opposite side of said cylinders with respect to said first pair of gears; one (12b) of said second pair of gears being fixedly mounted coaxially on said blanket cylinder for rotation therewith, and the other (10b) of said second pair of gears being rotatably mounted coaxially on said plate cylinder; and means for releasably mounting said other gear of said second pair of gears to said plate cylinder for allowing angular adjustment of said last-mentioned other gear relative to said plate cylinder and for fixing said last-mentioned other gear to said plate cylinder for rotation therewith; and
- wherein the amount of feed of the web may be changed by adjusting the relative angular position of the blanket cylinder with respect to the impression cylinder by relative angular adjustment of said other gear of said first pair of gears, and the position of a printed image on the web may be changed by adjusting the relative angular position of the plate cylinder with respect to the blanket cylinder by relative angular adjustment of said other gear of said second pair of gears.

4,945,831

# INK TRAY DRIVE

Danilo P. Buan, Easton, Conn., and Arnold T. Eventoff, Pleasantville, N.Y., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,096

Int. Cl.<sup>5</sup> B41F 1/42

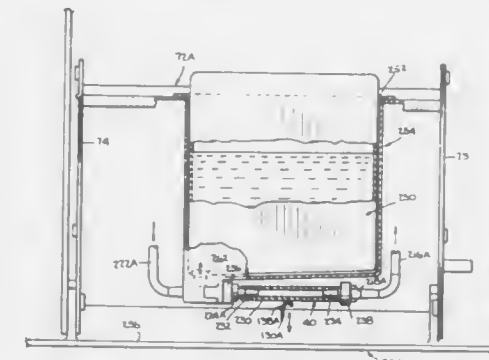
U.S. Cl. 101-340

9 Claims

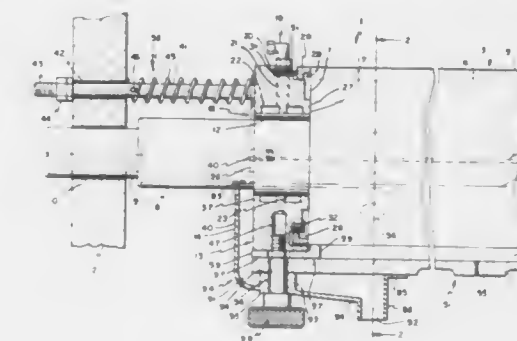
1. A drive for sequentially moving an ink pad along first and

second directions transverse to each other from a home position to an inking position, comprising:

- An ink pad;
- a first link member coupled at a first end thereof to said ink pad;
- a second link member coupled at a first end thereof to said ink pad;
- camming means having first and second camming surfaces for providing cammed displacement;
- an ink reservoir;
- an ink pump means for pumping ink from said reservoir to said ink pad in response to movement of said camming means;
- said first link member having at a second end thereof a cam follower surface;
- said second link member having at a second end thereof a cam follower surface;



a doctoring edge for contacting said peripheral surface of said second roll and for levelling the liquid on said second roll peripheral surface, and doctor blade support means carried by



the reservoir means and including a blade holder for holding said doctor blade, wherein said reservoir means maintains a substantially fixed radial distance between said doctor blade support means and said longitudinal axis of said second roll.

4,945,833

# PRINTING PROCESS USING A PH CHANGE TO TRANSFER A THIN LAYER OF INK TO A PRINTING PLATE

Kohzob Arahara; Tetsuro Fukui; Hiroshi Fukumoto, all of Kawasaki; Yoshio Takasu, Tama; Tadashi Sato, Kokubunji, and Fumitaka Kan, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,151

Claims priority, application Japan, Dec. 24, 1987, 62-325592 Int. Cl.<sup>5</sup> B41M 1/06

U.S. Cl. 101-450.1

7 Claims



said cam follower surface of said first link slidably engages said first camming surface and is cammed thereby to move said first link member upon movement of said camming means;

said cam follower surface of said second link slidably engages said second camming surface and is cammed thereby to move said second link member upon movement of said camming means;

said first link member being configured and coupled to said ink pad and said second link member being configured and coupled to said ink pad, and said cam surfaces being configured such that a given movement of said camming means causes said first link member to move said ink pad a given distance in said first direction, and a given movement of said camming means causes said second link member to move said ink pad a given distance in said second direction to said inking position.

4,945,832

# DOCTOR BLADE SYSTEM

Jimmie L. Odom, Rte. 1, Box 329A, Bailey, Miss. 39320

Continuation of Ser. No. 864,054, May 16, 1986, abandoned.

This application Feb. 21, 1989, Ser. No. 313,353

Int. Cl.<sup>5</sup> B41F 31/00

U.S. Cl. 101-350

28 Claims

1. Apparatus for applying a liquid to a travelling substrate, said apparatus comprising: a frame, a first roll rotatably carried by said frame and having a longitudinal rotational axis and a peripheral surface for applying the liquid to a surface of the substrate, a second roll rotatably carried by said frame and having a longitudinal axis parallel with the longitudinal axis of said first roll and adapted to be in contact with the peripheral surface of said first roll, reservoir means carried by and suspended from said second roll and supported independently of said frame, said reservoir means adapted to receive the liquid and to maintain the liquid in contact with the peripheral surface of the second roll, delivering means for delivering the liquid to said reservoir means, at least one doctor blade having

1. A printing process comprising:

- providing an ink which is substantially non-adhesive and capable of being imparted with an adhesiveness when subjected to a pH change;
- imparting a pH change to the ink to provide the ink with an adhesiveness corresponding to the pH change;
- supplying the ink provided with the adhesiveness to a printing plate having a pattern of ink receptibility; and
- transferring the ink from the printing plate to a transfer-receiving medium to form thereon an ink pattern corresponding to the pattern of the ink receptibility.

4,945,834

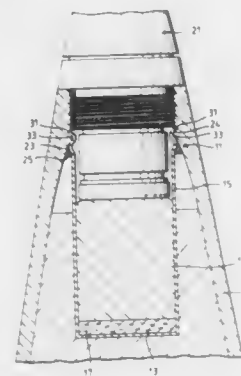
**EXPLOSIVE PROJECTILES**

Frederick M. Young, Chorley, England, assignor to Royal Ordnance plc, London, England  
Continuation of Ser. No. 161,230, Feb. 17, 1988, abandoned, which is a continuation of Ser. No. 915,758, Oct. 6, 1986, abandoned. This application Mar. 27, 1989, Ser. No. 328,780  
Claims priority, application United Kingdom, Oct. 22, 1985, 8526046

Int. Cl.<sup>5</sup> F42B 12/00

U.S. Cl. 102—473

6 Claims



1. An explosive shell comprising a shell casing having an opening in its forward end; a neck-shaped portion of the shell casing adjacent to the opening; a female screw thread formed in the internal wall of the said neck-shaped portion; an enlarged region of the internal wall of the shell casing rearward of and distinct from the said neck-shaped portion, said enlarged region having an average internal diameter greater than the internal diameter of the said screw thread; a charge of high explosive material partially filling the space inside the shell casing; and a booster case located between the charge and the neck-shaped portion, the booster case defining a detonation device cavity, the booster case being a malleable material and being swaged into the internal wall of the neck-shaped portion of the shell casing and into at least a part of the said enlarged region of the internal wall of the shell casing.

4,945,835

**SHAPED CHARGE PROJECTILE**

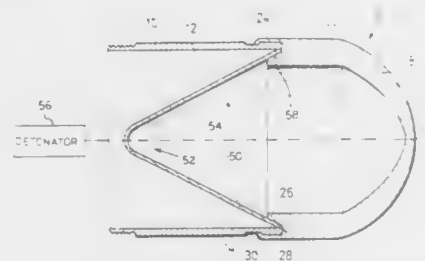
Michael Günter, Meerbusch; Siegfried Quick, and Jürgen Funk, both of Düsseldorf, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
Filed Jun. 28, 1989, Ser. No. 373,683

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1988, 3823908

Int. Cl.<sup>5</sup> F42B 12/10

U.S. Cl. 102—476

18 Claims



1. A shaped charge projectile, comprising:  
a cylindrical projectile housing having a front end with an opening;  
a shaped charge liner in the projectile housing, the shaped

charge liner having a forward edge that is oriented toward the front end of the housing;  
an explosive charge in the projectile housing behind the shaped charge liner; and  
a hood to close the opening at the front end of the projectile housing, the hood having a front portion with a center point and having a cylindrical attachment portion which is joined to the projectile housing at a connection region, the front portion of the hood having a wall with a thickness that decreases from the attachment portion to the center point and having an outer surface that is curved, the attachment portion of the hood having, at the connection region, a rearwardly oriented outer annular member which has a large inner diameter than the projectile housing, a rearwardly oriented inner annular member which has a smaller outer diameter than the projectile housing, and an annular recess between the inner and outer members, the annular recess receiving the forward edge of the shaped charge liner and providing a support for the explosive charge and the shaped charge liner when the hood hits a target.

4,945,836

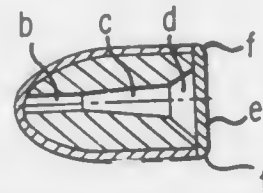
**RAPID EXPANSION BULLET**

Daniel J. Michaels, 9641 Mark Rd., Erie, Pa. 16509  
Filed Aug. 28, 1989, Ser. No. 399,624

Int. Cl.<sup>5</sup> F42B 10/34

U.S. Cl. 102—503

7 Claims

**RAPID EXPANSION**

1. A high energy bullet having a central axial bore or draft hole from the tip through the center of the base of the bullet, an annular seat on said base at right angles to the axis of said bore, an imperforate disc of malleable material having its rim seated on said annular seat and its center section axially spaced from an inclined seat on the center of the base of the bullet surrounding said bore and deformable against said inclined seat by pressure of gases generated by firing the bullet.

4,945,837

**PELLET FEED SYSTEM**

Oliver J. Whitfield, 4206 242nd St. SW., Mountlake Terrace, Wash. 98043

Continuation of Ser. No. 249,363, Sep. 23, 1988, abandoned, which is a division of Ser. No. 161,003, Feb. 26, 1988, Pat. No. 4,787,322. This application Sep. 1, 1989, Ser. No. 402,998

Int. Cl.<sup>5</sup> F23K 3/14

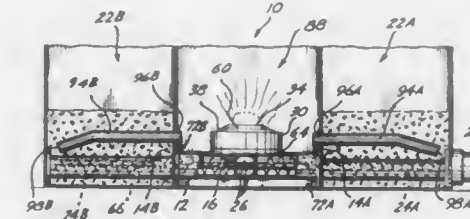
U.S. Cl. 110—110

5 Claims

1. A stoker assembly for a solid particulate fuel burning stove, said stove including a combustion chamber, at least one remote substantially airtight fuel storage bin and a conveyor system for transporting fuel from the fuel storage bin to the combustion chamber wherein the improvement comprises:

a conduit separate from the conveyor system, said said conduit communicating between the combustion chamber and the fuel storage bin for minimizing the pressure difference along the conveyor system, such that oxygen supplied to the conveyor system is insufficient to support

combustion of fuel in the conveyor system, said conduit being positioned above the conveyor system, the con-



veyor system including an auger and a casing for the auger.

4,945,838

**POST-COMBUSTION CHAMBERS**

Serge Carpentier, Villecresnes, France, assignor to Societe Generale pour les Techniques Nouvelles, Saint Quentin en Yvelines Cedex, France

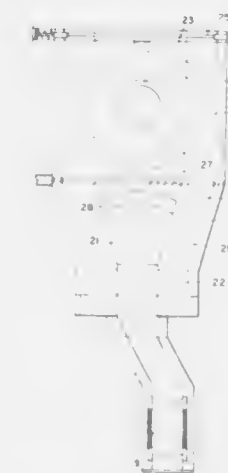
Filed Oct. 14, 1988, Ser. No. 258,002

Claims priority, application France, Apr. 28, 1988, 88 05704

Int. Cl.<sup>5</sup> F23B 5/00; F23C 9/00; F23G 7/06

U.S. Cl. 110—211

2 Claims



1. A post-combustion chamber for treating the gases coming from a combustion chamber, the post-combustion chamber comprising a conical bottom extended by a tube, and being separated into two compartments by a vertical wall, with both of said compartments containing a filter bed, said bed rising to a lower level in the compartment via which the gases enter than in the other compartment, said chamber also including an opening for removing gases which have passed through said filter bed and an opening in the top of the compartment via which the gases leave for inserting filter bed material.

4,945,839

**DUAL CHAMBER VOLATILIZATION SYSTEM**

Jerry R. Collette, P.O. Box 1482, Englewood, Fla. 34295-1482

Filed Jan. 6, 1989, Ser. No. 295,055

Int. Cl.<sup>5</sup> F23G 7/06

U.S. Cl. 110—212

3 Claims

1. A system for removing volatilizable organic components from solid materials comprising:

a primary volatilizer having an inlet end and an outlet end;  
a reflux gas line connected to said primary volatilizer inlet end;

said primary volatilizer having a gas outlet at said outlet end;  
said inlet end of said primary volatilizer having an inlet for

solid materials having volatilizable organic contaminants therein;

a secondary volatilizer having an inlet end and an outlet end;  
said secondary volatilizer having a gas inlet at said inlet end and a gas outlet at said outlet end;

said outlet end of said primary volatilizer connected to deliver solid material to said inlet end of said secondary volatilizer;

said gas outlet of said primary volatilizer connected to deliver gas to said gas inlet of said secondary volatilizer;

a primary dust collector in fluid communication with said



outlet end of said secondary volatilizer and said reflux gas inlet of said primary volatilizer;

said primary dust collector having a dust outlet;

a gas to air heat exchanger having an inlet end and an outlet end;

said gas outlet of said secondary volatilizer connected to deliver a first gas portion through said primary dust collector to said reflux line and a second gas portion through said primary dust collector to said gas to air heat exchanger;

a secondary dust collector connected to receive gas from said outlet end of said gas to air heat exchanger.

4,945,840

**COAL COMBUSTION METHOD AND APPARATUS**

Charles H. Winter, Jr., 1301 N. Harrison St., Suite 802, Wilmington, Del. 19806

Filed Jan. 30, 1989, Ser. No. 302,775

Int. Cl.<sup>5</sup> F23G 7/06

U.S. Cl. 110—214

4 Claims



1. An apparatus for the partial gasification of granular coal with air, comprising:

a tubular reactor having combined air and granular coal inlet mean for tangentially introducing air and granular coal into said reactor for partial combustion, said air inlet being adjusted to supply less than the amount of air required for complete combustion of said granular coal;

external heating means adjacent said reactor, including control means for regulating the amount of heat supplied to said reactor;

insulating means for maintenance of an ignition temperature by heat generated during said combustion at a tempera-

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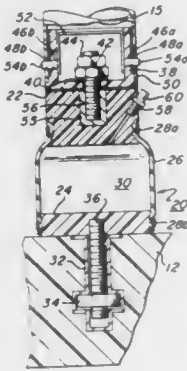
UMI



## 20 Claims

1. In an apparatus for attaching a sailboard mast to a sailboard which includes a universal joint, means to attach said

mast to said universal joint, and means to attach said universal joint to said sailboard, the improvement which comprises: a hollow universal joint having a top surface, an opposing bottom surface, a flexible side wall extending between the top and bottom surfaces, and an airtight sealed interior;



wherein said side wall is adapted to flex to absorb impact force upon the joint's top or bottom surface, and to bend to position said top surface substantially perpendicular to said bottom surface.

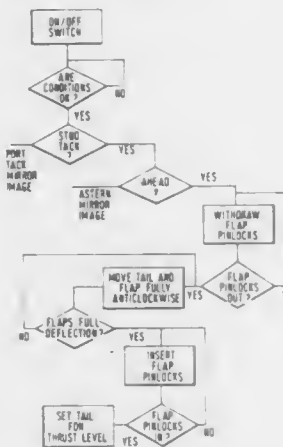
4,945,847

## WINGSAIL FLAP DEFLECTION SYSTEM

John G. Walker, Tipwell House, St Mellion, Cornwall PL12 8RS, United Kingdom  
Continuation-in-part of Ser. No. 5,167, Jan. 2, 1987, Pat. No. 4,770,113. This application Jul. 22, 1988, Ser. No. 222,822  
Claims priority, application United Kingdom, May 2, 1985, 8511232; May 2, 1985, 8511233; May 2, 1985, 8511234; May 2, 1985, 8511235

Int. Cl.<sup>5</sup> B63H 9/04

U.S. Cl. 114—102

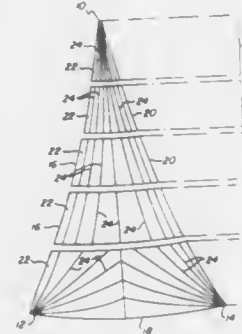


1. A method of operating a self-trimming sailset comprising a thrust wing having a leading airfoil and a trailing airfoil flap and a trimming tail airfoil, the method comprising adjusting the angle between the tail and the leading airfoil to rotate the sailset towards a position in which the moment opposing a movement of the flap in a particular direction is reduced, moving the flap in said particular direction, and then readjusting the tail to trim the sailset to the desired angle of attack.

4,945,848  
REINFORCED SAILCLOTH  
James C. Linville, 16 S. Beach Dr., Rowayton, Conn. 06853  
Filed Oct. 17, 1988, Ser. No. 258,868  
Int. Cl.<sup>5</sup> B63H 9/06

U.S. Cl. 114—103

20 Claims



1. A composite sail having a head, a tack and a clew, said sail being comprised of a plurality of panels, each of said panels being joined to an adjacent panel and each of said panels comprising a laminate of (i) a first outer layer of material, (ii) a second outer layer which comprises at least one film layer having bonded thereto a plurality of strands of non-woven, force-bearing thread material disposed along the principal stress lines for said panel in said sail, and (iii) an inner layer disposed between said first and second outer layers and comprised of a weft-free warp of strands of a stretch resistant polymer aligned transverse to the direction of the non-woven, force-bearing thread material in said second outer layer, all of said layers being bonded together by a synthetic adhesive resin.

4,945,849

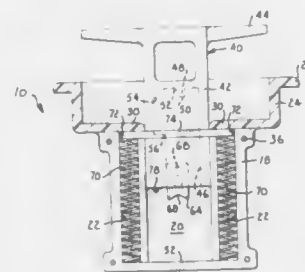
## RETRACTABLE CLEAT

John L. Morris, and Robert L. Martin, both of Springfield, Mo., assignors to Bass Pro Shops, Inc., Springfield, Mo.  
Continuation-in-part of Ser. No. 173,878, May 28, 1988. This application Jun. 9, 1989, Ser. No. 364,075

Int. Cl.<sup>5</sup> B63B 21/04

U.S. Cl. 114—218

9 Claims



7. A device for securing a boat line, comprising: a housing presenting a cavity therein and a pair of spring chambers on opposite sides of said cavity, said cavity having a bottom; a cleat having a body and a head on said body for receiving the boat line, said cleat being received in the cavity for reciprocating movement between an extended position wherein said head projects out of the cavity and is accessible to receive the boat line and a retracted position wherein the body is situated adjacent to but spaced from bottom and the head is recessed into the cavity; a pair of compression springs in the respective spring cham-

bers acting against said body of the cleat in a manner to continuously urge the cleat toward the extended position; and  
releaseable latch means selectively operable to latch said cleat in the retracted position, said latch means being releaseable to allow the cleat to move to the extended position under the influence of said spring.

4,945,850

## LIGHT-WEIGHT ANCHOR

William Steinhoff, P.O. Box 953, St. Catharines, Ontario, Canada L2R 6Z4

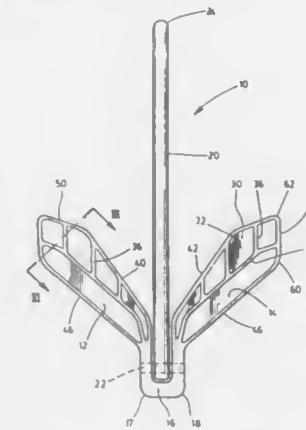
Filed Mar. 17, 1989, Ser. No. 324,765

Claims priority, application Canada, Dec. 30, 1988, 587324

Int. Cl.<sup>5</sup> B63B 21/34

U.S. Cl. 114—304

7 Claims



1. A light-weight boat anchor comprising a pair of flukes connected together adjacent a bottom end portion of each of the flukes by an integral U-shaped bar, an anchor shank pivotally attached to said bar, and motion limiting means for limiting the pivotal movement of said shank relative to said flukes, each of said flukes having an upper edge which extends upwardly and outwardly from the bottom end portion of the fluke and at an angle of at least 30 degrees to said anchor shank, and wherein each fluke has a straight lower edge which extends outwardly and upwardly at an angle relative to said shank in the 45° to 60 degree range, said angles being measured when said flukes and shank are in a common plane.

4,945,851

## SUBMERSIBLE INFLATABLE CRAFT

Brian L. Buckle, Colwyn Bay, United Kingdom, assignor to Budyco (Divers) Limited, Colwyn Bay, United Kingdom  
Filed Jul. 27, 1988, Ser. No. 224,910

Claims priority, application United Kingdom, Jul. 27, 1987, 8717714

Int. Cl.<sup>5</sup> B63B 7/08

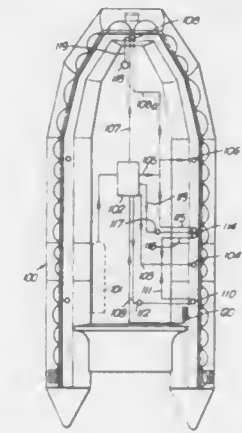
U.S. Cl. 114—345

29 Claims

1. A water craft including an inflatable buoyancy chamber, by inflation and deflation of which buoyancy chamber the buoyancy of the craft floating or submerged in water may be regulated, buoyancy control apparatus for controlling inflation and deflation of said buoyancy chamber, and a source of compressed gas connected via said control apparatus to said buoyancy chamber, wherein said buoyancy control apparatus comprises:

- (1) means responsive to a control signal for producing venting of said buoyancy chamber;
- (2) buoyancy increasing means for introducing gas from said source of compressed gas to said buoyancy chamber;
- (3) means for controlling the descent of the craft in water, including means for sensing when the rate of descent exceeds a predetermined value, and providing inflation

gas to said buoyancy increasing means when said rate of descent exceeds said predetermined value;  
(4) means for controlling the ascent of the craft in water and including means for sensing when the rate of ascent exceeds a predetermined value and providing a control signal to activate said venting means when said rate of ascent exceeds said predetermined value;  
(5) means for producing hovering of said craft submerged in



water by intermittently admitting gas through said buoyancy increasing means and intermittently venting gas through said venting means to counteract downward and upward motion respectively of said craft; and  
(6) operator actuable control means for actuating selected ones of said venting means, buoyancy increasing means, descent control means, ascent control means and hover means to select between the functions of descent at a controlled rate, ascent at a controlled rate, and hovering.

4,945,852

## COMPACT PLANNING TYPE BOAT

Noboru Kobayashi, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

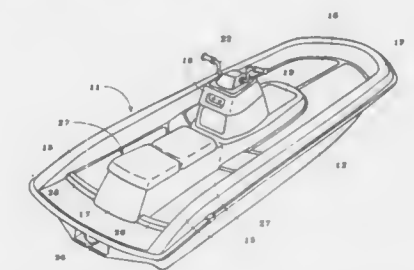
Filed Sep. 2, 1988, Ser. No. 240,100

Claims priority, application Japan, Sep. 4, 1987, 62-220392

Int. Cl.<sup>5</sup> B63B 35/86

U.S. Cl. 114—363

6 Claims



1. A hull configuration for a small watercraft having a raised peripheral area defining a depressed central area in which a rider's feet are adapted to be positioned, said depressed central area opening through the stern of the watercraft for permitting water to flow into the depressed central area through the stern, the improvement comprising water barrier means formed in said depressed central area forwardly of the stern and below the level of said raised peripheral area for precluding the flow of water past said water barrier means into said depressed central area and one way check valve means for permitting water to flow from the depressed central area rearwardly out of the stern and not into the depressed central area from the stern.



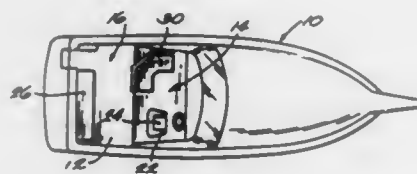
4,945,853

**RECREATIONAL BOAT SWIVEL SEAT**  
Michael W. Lathers, Metamora, Mich., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jul. 8, 1988, Ser. No. 216,817

Int. Cl.<sup>5</sup> B63B 17/00

U.S. Cl. 114—363



1. A marine vehicle comprising a deck, an L-shaped seat including a first seat back portion, a second seat back portion generally perpendicular to said first seat back portion, a first seat portion extending outwardly from said first seat back portion, and a second seat portion extending outwardly from said second seat back portion, means mounting said seat on said deck for pivotal movement about a generally vertical axis and between a first position wherein said first seat back portion faces fore and a second position wherein said second seat back portion faces aft, and means for selectively and releasably locking said seat in said first and second positions.

4,945,854

**APPARATUS FOR THE DISTRIBUTION OF A FOAMABLE REACTION MIXTURE UPON A MOVING BASE**

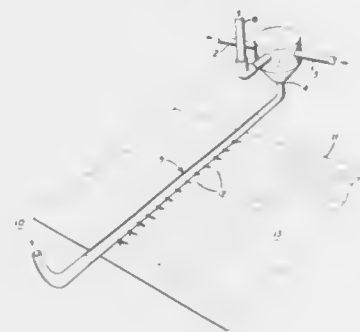
William J. Nicola, Jr., Burgettstown, and Edward A. Miller, Coraopolis, both of Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1989, Ser. No. 324,839

Int. Cl.<sup>5</sup> B05B 3/00

U.S. Cl. 118—324

1 Claim



1. An apparatus for the distribution of a foamable reaction mixture upon a moving base comprising:

- (a) a mixing device having at least one inlet for receiving foam raw materials and an outlet for the foamable reaction mixture,
- (b) an elongated hollow, pipe-like applicator connected at one terminal end to said outlet and at the other terminal end to an air source, said applicator having a multiplicity of holes along the length thereof, said holes opening above said base,
- (c) means for transporting said mixture through said mixing device, into said applicator, and through said holes,
- (d) means for simultaneously pumping air from said air source through said other terminal end into said applicator and through said holes, and

(e) means for simultaneously pumping air through said outlet, into said applicator and through said holes.

4,945,855

COATER

21 Claims Dan Eklund, Kauniainen, and Sivert Westergard, Järvenpää, both of Finland, assignors to Valmet Paper Machinery Inc., Helsinki, Finland

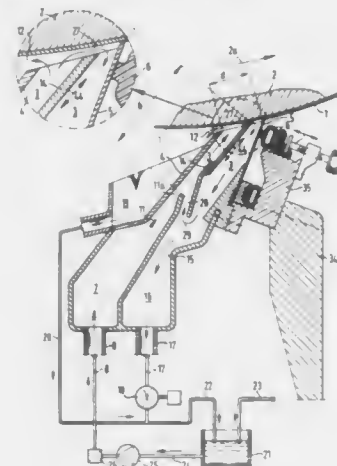
Division of Ser. No. 917,256, Oct. 8, 1986, Pat. No. 4,791,879, which is a continuation of Ser. No. 729,467, May 1, 1985, abandoned. This application Oct. 24, 1988, Ser. No. 261,500

Claims priority, application Finland, May 11, 1984, 841899

Int. Cl.<sup>5</sup> B05D 3/12; B05C 3/12

U.S. Cl. 118—407

23 Claims



1. A coater for coating a running paper or cardboard web, comprising:

- wall means defining a coating chamber having an inlet end and an opposite outlet end, the chamber having an inlet opening at its inlet end for introducing coating substance into the chamber and being open against the web at its outlet end, the wall means including a web entrance wall that bounds the chamber in the upstream direction with respect to the path of movement of the web and is spaced from the web so as to define a slot for the web to enter the chamber, and a back wall structure that bounds the chamber in the opposite, downstream direction, said back wall structure including a doctor member that engages the web for forming a coating layer on the web, the distance between the web entrance wall and the doctor member at the outlet end of the chamber being such that, at normal web running speed, the web moves from the entrance wall to the doctor member in a time of at most 0.3 s, and the inlet opening being closer to the web entrance wall than to the back wall structure, whereby the flow of coating substance introduced into the coating chamber by way of the inlet opening is, at a position close to the web entrance wall, divided into two branches, of which a first branch follows the web in its running direction toward the back wall structure and a second branch, which is of a considerably greater volume flow rate than the first branch, flows out from the coating chamber through the slot,
- a partition wall located in said coating chamber between the web entrance wall and the back wall structure and spaced from the web, said partition wall defining passageways for the coating substance in said chamber, thereby leading the flow in said chamber, firstly, mainly along said web entrance wall, thereafter in the direction of the movement of the web, and thereafter along said back wall structure of the coating chamber away from the web, there being a throttled passage in the flow path of the coating substance at the web entrance wall side of the partition wall, and

there being a pressure equalizing opening in the partition wall connecting the region of the coating chamber that is between the back wall structure and the partition wall with the region of the coating chamber that is between the web entrance wall and the partition wall and is immediately downstream of the throttled passage, and supply means connected to the inlet opening of the coating chamber for delivering pressurized coating substance into the coating chamber, the slot defined between the web entrance wall and the web being sufficiently narrow to limit the flow of coating substance from the coating chamber and thereby maintain the coating substance in the coating chamber under pressure.

4,945,856

PARYLENE DEPOSITION CHAMBER

Jeffrey Stewart, 690-D Avenida Sevilla, Laguna Hills, Calif. 92653

Filed Jun. 23, 1988, Ser. No. 211,338

Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 118—715

18 Claims



13. A parylene deposition system comprising:

- a vaporization chamber for vaporizing a quantity of diparaxylylene dimer;
- a pyrolysis chamber connected to said vaporization chamber, and wherein said vaporized dimer may be pyrolyzed to form a reactive monomer vapor;
- a deposition chamber comprising a generally cylindrical tank having a floor, a cylindrical side wall and a lid movable between a first open position and a second closed position, said disposition chamber being connected to said pyrolysis chamber such that the reactive monomer vapor will enter the deposition chamber tangentially, and will thereafter flow in a generally rotational path about the interior of the chamber; and
- a substrate support fixture positioned with said deposition chamber, said substrate support fixture having an upper end and a lower end; said lower end being pivotally articulable with and supported by the deposition chamber floor and said upper end being pivotally articulable with and supported by the deposition chamber lid when in said second closed position.

4,945,857

PLASMA FORMATION OF HYDRIDE COMPOUNDS

John C. Marinace, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 117,443, Nov. 3, 1987, abandoned, which is a continuation of Ser. No. 839,760, Mar. 14, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 323,714

Int. Cl.<sup>5</sup> C23C 16/50

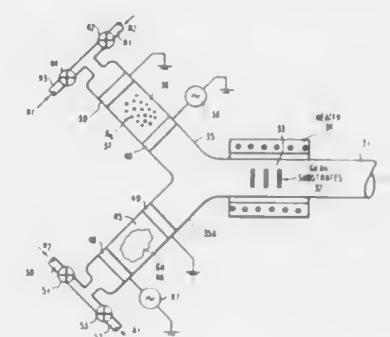
U.S. Cl. 118—719

8 Claims

1. A semiconductor fabrication apparatus comprising:

- semiconductor formation site having means to decompose at least two gas products into a semiconductor at said semiconductor formation site,
- at least two reaction sites separate and upstream from said semiconductor formation site,

means for providing a first phase of at least one raw material to a first reaction site,  
means for providing a second phase of at least one raw material to a second reaction site,  
means for providing hydrogen to at least two reaction sites,  
means for combining said raw material and said hydrogen at each of said reaction sites,



means for subjecting said raw material and said hydrogen to plasma energy to induce said raw material and said hydrogen to form said gas product at said reaction site, and means for transporting each of said gas products to said semiconductor formation site.

4,945,858

SANITARY ANIMAL STALL

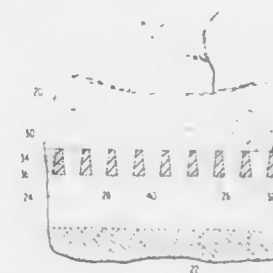
William F. Myers, 202 Cedar La., Channelview, Tex. 77530, and Robert E. Myers, 18507 Prince William La., Nassau Bay, Tex. 77058

Filed Aug. 25, 1988, Ser. No. 236,388

Int. Cl.<sup>5</sup> A01K 1/015

U.S. Cl. 119—28

2 Claims



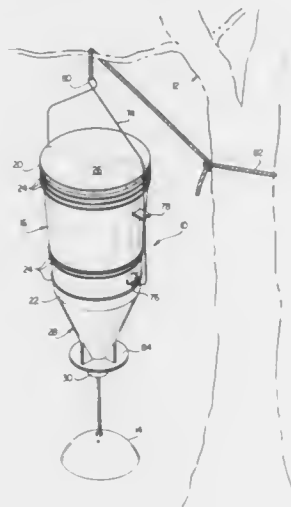
1. In a floor structure of an animal stall comprising:

- a vertical wall enclosure, an underlying base floor within said wall enclosure, a layer of sand overlying the base floor, and apertured surface decking overlying said sand and partially embedded therein, the improvement wherein:
- said surface decking consists of molded plastic grating formed of laterally spaced, intersecting load bearing bars and cross bars, each having a flat top and bottom surface and opposed sidewalls, and wherein at least each of said load bearing bars have opposite oblique sidewalls thereof tapering towards each other from the bottom to the top, said flat bottom surface being wider than said flat top surface such when embedded in the sand, the wider bottom surfaces of said load bearing bars resists grating movement downwardly within the sand, while contact by the animals with the sand captured within the openings between the load bearing bars solidly pack the sand between opposing oppositely oblique sidewalls of adjacent

load bearing bars to further resist downward penetration of said decking into the sand.

**4,945,859**  
**COMPLETE DEER FEEDER**  
William C. Churchwell, 3309 Red Cliff Cir., Temple, Tex. 76502  
Filed Jun. 8, 1989, Ser. No. 363,100  
Int. Cl.<sup>5</sup> A01K 5/02  
U.S. Cl. 119—57.91

8 Claims



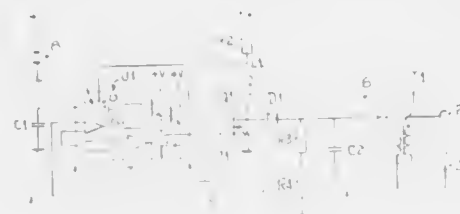
1. A deer feeder, comprising:
  - a bucket having an interior;
  - a conical section having an interior and extending from the lower end of the bucket, the conical section having a discharge opening at its lower end;
  - a distributing assembly, including:
    - a plate mounted in the interior of the conical section and having at least one feed orifice of predetermined size therethrough for feed to pass from the interior of the bucket to exterior of the feeder;
    - a rod pivoted at its upper end to the plate and extending downward through the discharge opening; and
    - a metering disc mounted on the rod having a metering post of predetermined size so that when the rod is vertical, the metering post prevents feed from passing through the feed orifice to the discharge opening, movement of the rod from vertical in a predetermined direction causing the metering post to move relative to the feed orifice to permit a predetermined quantity of feed to pass through the feed orifice to the discharge opening.

**4,945,860**  
**STOCK HANDLING DEVICE**  
Peter C. Walker, "Murra Murra", East Mail Run, Esperance, W.A. 6450, Australia  
PCT No. PCT/AU87/00425, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/04523, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 16, 1987, Ser. No. 266,628  
Claims priority, application Australia, Dec. 16, 1986, PH9529  
Int. Cl.<sup>5</sup> A01K 15/00

- U.S. Cl. 119—108
1. A stock handling device comprising: a head stall for attaching to the head of an animal; a shock unit mounted on the head stall; a pressure switch mounted on the head stall to be activated when the animal pushes its head against an object; contact pads carried on the head stall for contacting the animal in a spaced apart relationship; means connecting the shock unit to the pressure switch and contact pads to apply a shock to the

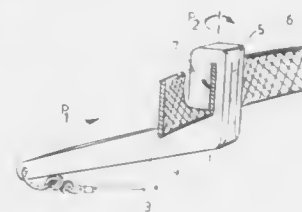
animal during use when the pressure switch is actuated; wherein the shock unit comprises an oscillator, a battery for energizing the oscillator, an output capacitor connected to the



**4,945,861**  
**DOG LEAD**  
Frank de Koning, Leiden, Netherlands, assignor to Adrianus W.A.J. van den Elshout, Netherlands  
Filed Dec. 5, 1988, Ser. No. 279,813  
Claims priority, application Netherlands, Dec. 7, 1987, 8702947

Int. Cl.<sup>5</sup> A01K 27/00  
U.S. Cl. 119—109

4 Claims



1. A device for controlling a dog, which comprises the combination of anchoring means including a groove of generally rectangular cross-section for slidably and frictionally receiving a wearer's belt and including a cantilever portion adapted to project rearwardly of the wearer to terminate in an attaching point disposed behind the wearer, an elongate lead secured to the anchoring means at said attaching point and having a dog collar attached at its free end, the length of the lead being such that the lead extends laterally from the attaching point to pass behind and across the posterior of the wearer and thence forwardly to one side of the wearer's thigh to position the collar slightly ahead of such thigh, said anchoring means being made of resilient material having a high coefficient of friction to resist movement of the anchoring means on the belt when a dog applies tension to the lead to swing the attaching point laterally with respect to said anchoring means while resiliently resisting forward pull on the collar by the dog.

**4,945,862**  
**TWO DIMENSIONAL SHUTTLE ROTARY CLEANING DEVICE**

Thomas C. Vadakin, Marietta, Ohio, assignor to Vadakin, Inc., Marietta, Ohio

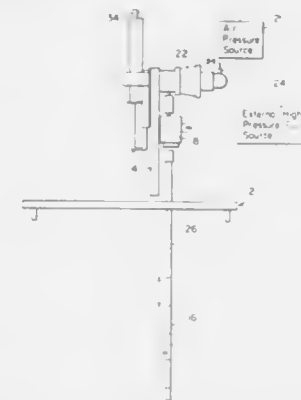
Filed Dec. 18, 1989, Ser. No. 451,776  
Int. Cl.<sup>5</sup> F28G 3/16

U.S. Cl. 122—392

7 Claims

1. Apparatus for cleaning spaced parallel rows of pendant tubes in boilers, comprising
  - (a) a frame arranged parallel to the pendant tubes;

- a bracket connected with said frame for pivotal movement between first and second positions normal and parallel to said frame, respectively;
- cleaning means slidably connected with said bracket for cleaning the exterior surfaces of the pendant tubes, said cleaning means including
  - (1) a tubular lance; and
  - (2) rotary means connecting said lance with said bracket and for rotating said lance about its axis; and

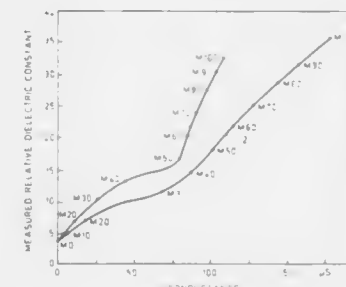


- means for reciprocating said cleaning means relative to said bracket along the axis of said lance, whereby when said bracket is in said first position, said lance extends between and normal to the pendant tubes for cleaning the exterior surfaces thereof when said rotary and reciprocating means are operated, and when said bracket is pivoted to said second position, said lance is swung from between the pendant tubes to a position parallel thereto so that the frame may be moved to a position adjacent the next row of tubes for cleaning.

**4,945,863**  
**PROCESS FOR OPERATING A FUEL-BURNING ENGINE**  
Günter Schmitz, and Hans-Jürgen Kutz, both of Aachen, Fed. Rep. of Germany, assignors to FEV Motorentechnik GmbH & Co. Kg, Fed. Rep. of Germany

Filed Mar. 28, 1989, Ser. No. 329,839  
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810808; Dec. 8, 1988, 3841264  
Int. Cl.<sup>5</sup> F02D 41/00, 41/14; G01N 27/22  
U.S. Cl. 123—1 A

12 Claims

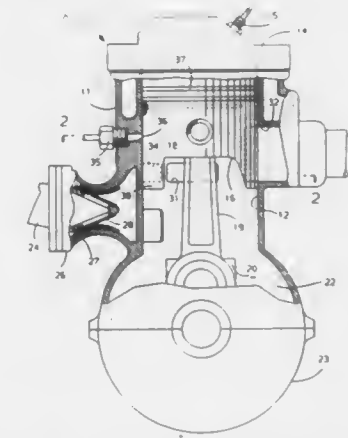


1. A process for operating a fuel-burning engine which uses a conventional fuel containing alcohol as an alternative fuel, comprising the steps of measuring the fuel-alcohol ratio for controlling the quantity of fuel to be injected during engine operation, and determining the alcohol content of the fuel-alcohol ratio in a shared circuit by measuring the capacitance and the conductance of a quantity of fuel accommodated in a measuring cell.

**4,945,864**  
**TWO CYCLE ENGINE PISTON LUBRICATION**  
James G. Solomon, Grosse Pointe Woods, and Chester J. Rivard, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.  
Filed Jun. 21, 1989, Ser. No. 369,224  
Int. Cl.<sup>5</sup> F01P 1/04

U.S. Cl. 123—41.39

4 Claims



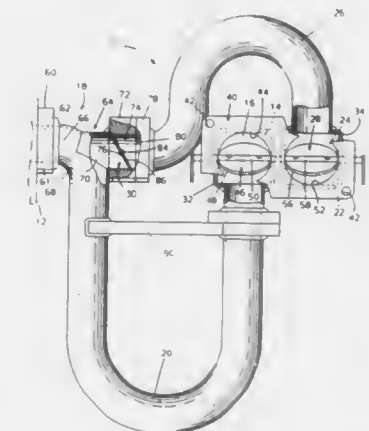
1. An internal combustion engine having in combination a cylinder having circumferentially spaced inlet and exhaust ports and a piston reciprocable in the cylinder, the piston having a cylinder engaging skirt and wherein the improvements comprise

oil distribution means in and opening to the interior of the cylinder at a location circumferentially intermediate said ports for delivering lubricant to the cylinder interior, and oil passage means in the piston and opening through the skirt of the piston in circumferential alignment with said oil distribution means for receiving lubricant therefrom during communication therewith and said passage means directly communicating with lubrication requiring means associated with the piston.

**4,945,865**  
**ENGINE INDUCTION SYSTEM**  
Jordan R. Lee, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Jun. 2, 1989, Ser. No. 360,634  
Int. Cl.<sup>5</sup> F02M 35/10

U.S. Cl. 123—52 M

13 Claims

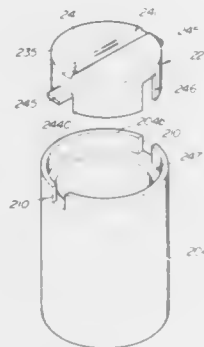
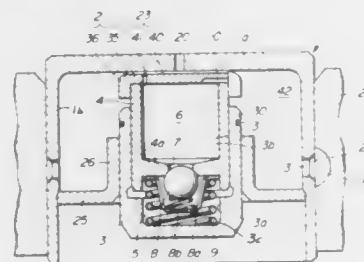


1. An engine induction system for providing air to the cylinders of an engine comprising:



first means, associated with said second plunger member and

said top closure member, for defining a first communication path for establishing fluid communication between the annular chamber and said fluid reservoir chamber with a limited fluid flow rate; and



second means for defining a second communication path extending on a planar surface for establishing fluid communication between said annular chamber and said drainage opening for draining excessive working fluid together with an air contained in the working fluid.

4,945,872

**THEFT PREVENTION APPARATUS**

Paul E. Embry, Rte. 2, Box 40, Ragland, Ala. 35131  
Filed Aug. 19, 1988, Ser. No. 233,730

Int. Cl.<sup>5</sup> B60R 25/04; F02P 11/04; H01R 31/08

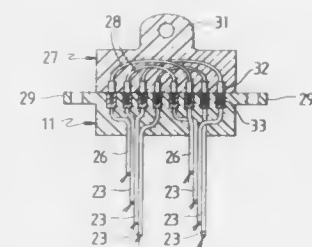
U.S. Cl. 123—146.5 B

4 Claims

1. A theft prevention apparatus for use in combination with a device having an electrical circuit therein wherein said electrical circuit has a number of components and a plurality of wires connecting said components, comprising:

- a female terminal having distinct electrically isolated contact points;
- a plurality of paired input and output wires having a first end of each one of said input and output wires connected to a distinct contact point and a second end serially connected to said connecting wires intermediate selected ones of said components, thereby creating an open circuit, said first ends being connected to said contact points in random pattern;
- a plurality of non-functional dummy wires connected to selected electrically isolated contact points on said female connector; and
- a male terminal for closing said circuit comprising a concealed internal network of jumper wires correspond-

ing to said random pattern connection of said input and output wires such that each jumper wire connects a pair of



contact points which are connected to the first ends of paired input and output wires.

4,945,873

**INTERNAL COMBUSTION ENGINE WITH TWO INLET VALVES PER CYLINDER**

Karl Kirchweber, and Irol Killmann, both of Graz, Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr.Dr.h.c. Hans List, Graz, Austria

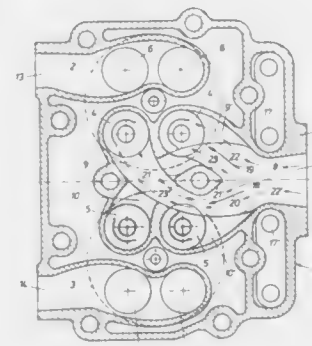
Filed Dec. 1, 1989, Ser. No. 444,396

Claims priority, application Austria, Dec. 2, 1988, 2967/88

Int. Cl.<sup>5</sup> F01L 3/00

U.S. Cl. 123—188 M

4 Claims



1. An internal combustion engine comprising a cylinder head made in one piece, having a common inlet flange with an inlet channel and at least two cylinders, each of said cylinders is provided with two inlet valves and two intake passages, wherein said intake passages of two adjacent cylinders leading up to said inlet valves, are located side by side, symmetrically relative to a symmetry plane of said two cylinders, said inlet channel is flow-connected with said intake passages formed by guiding surfaces and leading to said inlet valves, past a lug receiving a cylinder head stud, wherein said intake passages leading to said inlet valves positioned at a lesser distance in the

direction of flow, are running on one side of said lug and said intake passages leading to said inlet valves positioned at a greater distance are running on the other side of said lug, and wherein said inlet valves of said adjacent cylinders are delivered with combustion air at different points in time.

4,945,874

**THROTTLE BODY HAVING INTERCONNECTING LEVER FOR CONVERTING AN OPERATIONAL AMOUNT OF ACCELERATOR TO AN OPENING OF THROTTLE VALVE**

Tutomu Nishitani; Takio Suzuki; Yasuaki Kono; Tadamasu Osako; Sunao Kitamura; Youzou Sakakibara, and Naruto Ito, all of Obu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu, Japan

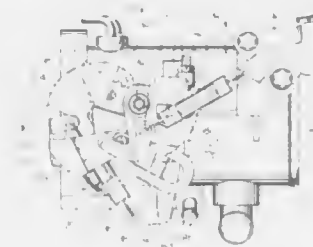
Filed Dec. 19, 1988, Ser. No. 286,139

Claims priority, application Japan, Dec. 19, 1987, 62-193171[U]; Dec. 22, 1987, 62-194205[U]; Dec. 22, 1987, 62-194206[U]; Jan. 22, 1988, 63-7548[U]; Jan. 27, 1988, 63-9210[U]; Oct. 15, 1988, 63-134967[U]; Dec. 3, 1988, 63-157743[U]

Int. Cl.<sup>5</sup> F02D 9/02

U.S. Cl. 123—400

7 Claims



7. A throttle body for an internal combustion engine, comprising:

- a suction passage for supplying a suction air to said internal combustion engine;
- a throttle valve provided in said suction passage and fixed to a rotatable throttle valve shaft so as to adjust a quantity of said suction air;
- a first interconnecting lever rotatably mounted to an interconnecting shaft and adapted to be rotated by pulling an accelerator cable;
- a second interconnecting lever adapted to follow the rotation of said first interconnecting lever and adapted to be solely rotated by operating an auto speed control mechanism independently of said first interconnecting lever;
- a throttle valve operating lever fixed to said throttle valve shaft, said throttle valve operating lever being rotated in association with rotation of said throttle valve shaft;
- a cam groove formed on either of said first interconnecting lever or said throttle valve operating lever; and
- a cam follower mounted to the other of said first interconnecting lever or said throttle valve operating lever so as to be engaged with said cam groove.

4,945,875

**ELECTRONIC IGNITION TIMING CONTROL DEVICE**

Masahira Akasu, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1989, Ser. No. 318,799

Claims priority, application Japan, Mar. 7, 1988, 63-54301; Mar. 7, 1988, 63-54306; Mar. 7, 1988, 63-54302

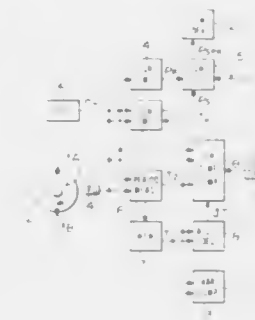
Int. Cl.<sup>5</sup> F02D 5/15

U.S. Cl. 123—422

12 Claims

1. An ignition timing control device, comprising: a period measuring means for measuring the rotational period of an engine from a time required by an engine crankshaft to rotate through a specific range of crank angle; an ignition timing

computing means for computing an ignition timing according to engine operating conditions; an ignition time computing means for computing a time from a specific crank angle position to the ignition timing, from said measured rotational period and said ignition timing computed by said ignition timing computing means; a first ignition command signal output means for outputting an ignition command signal to an ignition device after the lapse of a time computed by said ignition timing computing means after the time of detection of said specific crank angle position; a reference position detecting means for producing a reference position signal at a specific reference crank position of said engine; a second ignition com-



mand signal output means for outputting an ignition command signal at the time of generation of said reference position signal; memory means for storing said measured rotational period; a rate of variation computing means for comparing for computation between the rotational period previously stored in said memory means at the time of measurement of said rotational period and the present measured rotational period; and a means for selecting and outputting an ignition command signal to said ignition device such that the next ignition will be performed by the ignition command signal of said second ignition command signal output means when there has taken place a variation in the rotational period exceeding a specific rate of variation.

4,945,876

**SYSTEM AND METHOD FOR DETECTING KNOCKING IN AN INTERNAL COMBUSTION ENGINE**

Noriyuki Nakanishi, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 8, 1989, Ser. No. 307,467

Claims priority, application Japan, Feb. 8, 1988, 63-28384

Int. Cl.<sup>5</sup> F02P 5/15

U.S. Cl. 123—425

13 Claims



1. A system for detecting an engine knocking for an internal combustion engine, comprising:

- first means for detecting pressure vibrations on an engine body and outputting a signal indicative thereof;
- second means for deriving a characteristic of a fuel used in the engine;



- (c) third means for amplifying the output signal from the first means with a predetermined amplification factor;
- (d) fourth means for filtering the amplified signal of the third means so as to pass a component of the amplified signal in a predetermined frequency range; and
- (e) fifth means for comparing the amplified and band passed signal of the fourth means with a predetermined slice level for determining the occurrence of the knocking, both the predetermined amplification factor and the predetermined slice level being varied according to the derived fuel characteristic.

4,945,877

## FUEL INJECTION VALVE

Ewald Ziegler, Heimsheim; Joerg Widera, Gerlingen; Stefan Arndt, Stuttgart, and Nikolaus Simon, Murnau A Staffelsee, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

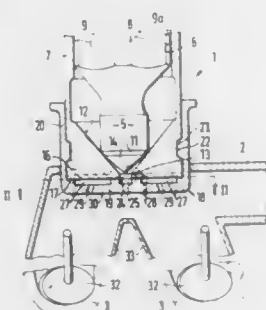
Filed Mar. 1, 1989, Ser. No. 317,509

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808396

Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123-472

14 Claims



1. A fuel injection valve for internal combustion engines having a valve housing embodied symmetrically to a longitudinal axis, a valve seat face formed on said housing, a valve closing element that cooperates with said valve seat face disposed in said valve housing, a central opening (13, 24, 25) downstream of the valve seat face (12), at least two tangential conduits (28) extending radially outward from said central opening, each of said tangential conduits discharging tangentially into a separate swirl chamber (27) within said fuel injection valve, each of said separate swirl chambers including a central metering opening (29) in a bottom surface thereof which directs fuel to the outside (30) of said fuel injection valve.

4,945,878

## EXTENDED OVER TEMPERATURE OPERATION AND CONTROLS FOR IC ENGINE

Paul D. Daly, Troy, and Peter E. Luchinski, Sterling Heights, both of Mich., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Jun. 16, 1989, Ser. No. 367,273

Int. Cl.<sup>5</sup> F02D 41/26; F01P 5/14

U.S. Cl. 123-478

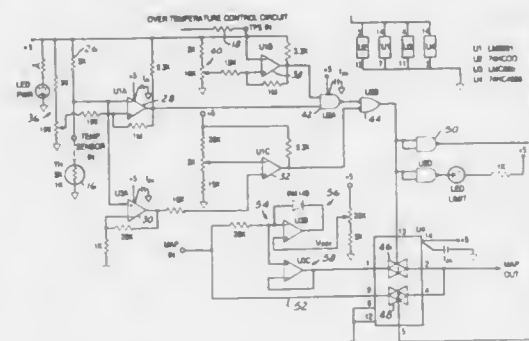
6 Claims

1. In an automotive vehicle that is powered by an I.C. engine whose operation is controlled by an engine E.C.U. according to different inputs to the E.C.U., one of said inputs being an engine load signal, and the E.C.U. causing the engine to produce greater power as the engine load signal increases, the improvement which comprises:

temperature sensing means for distinguishing between a range of normal engine operating temperatures and an abnormally high temperature indicative of engine overheating; and

control means, effective during sensing of an abnormally

high temperature by said temperature sensing means, for causing 100% of the value of said engine load signal to be acted upon by the engine E.C.U. for only certain values of



said engine load signal and causing less than 100% of the value of said engine load signal to be acted upon by the engine E.C.U. for other values of said load signal.

4,945,879

## FUEL CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE

Takanori Fujimoto, and Toshiro Hara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

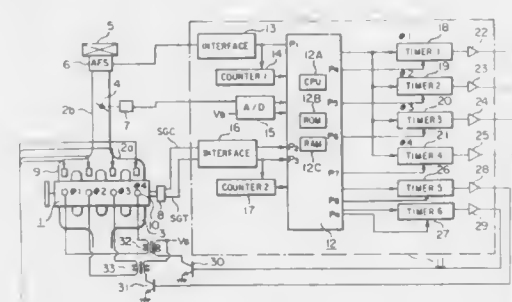
Filed Feb. 1, 1989, Ser. No. 304,628

Claims priority, application Japan, Feb. 1, 1988, 63-22323

Int. Cl.<sup>5</sup> F02D 41/26

U.S. Cl. 123-479

5 Claims



1. A fuel controller for an internal combustion engine comprising:

a crank angle sensor which generates a crank angle signal whose level changes at one or more prescribed crankshaft angles of the engine and a cylinder recognition signal which indicates a prescribed cylinder of the engine;

determining means for determining whether the cylinder recognition signal is abnormal on the basis of the crank angle signal and the cylinder recognition signal; and

fuel cut-off means for cutting off the supply of fuel to the engine if the determining means determines that the cylinder recognition signal is abnormal and the engine has been running for at least a prescribed length of time.

4,945,880

## MULTI-FUEL ENGINE CONTROL WITH FUEL CONTROL PARAMETER LOCK

Eugene V. Gonze, and David B. Brown, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

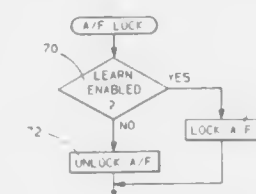
Continuation of Ser. No. 367,161, Jun. 16, 1989, abandoned.

This application Dec. 21, 1989, Ser. No. 453,118

Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 123-478

3 Claims



1. A fuel control for a vehicle engine having a fuel tank with a liquid fuel mixture comprising first and second combustible fuels of different volumetric heat content, a fuel composition sensor responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second fuels in the fuel mixture, induction means effective to provide the liquid fuel mixture and air to the engine in a desired air/fuel ratio and responsive to the fuel composition signal in a first mode of engine operation to derive from the fuel composition signal a fuel control parameter and determine from the fuel control parameter a fuel quantity required for the desired air/fuel ratio, the induction means being effective in a second mode of engine operation following the first mode of engine operation to determine the desired air/fuel ratio as substantially stoichiometric and maintain the desired air fuel ratio with assistance from the air/fuel ratio sensor in closed loop operation, the induction means being further effective to lock the value of the fuel control parameter at the end of the first mode of engine operation for use in determining the fuel quantity required for the desired air/fuel ratio throughout the second mode of engine operation.

4,945,881

## MULTI-FUEL ENGINE CONTROL WITH INITIAL DELAY

Eugene V. Gonze, and David B. Brown, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 367,282, Jun. 16, 1989, abandoned.

This application Dec. 21, 1989, Ser. No. 453,086

Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 123-486

5 Claims



1. A fuel control for a vehicle engine having a fuel tank with a liquid fuel mixture comprising first and second combustible

fuels, a fuel conduit to the engine, a fuel pump activated during engine operation to pump fuel mixture for the fuel tank to the engine, the fuel control comprising a fuel composition sensor in the fuel conduit responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second fuels in the fuel mixture, means normally responsive to the fuel composition sensor during engine operation to vary an engine operating parameter in response to the fuel composition signal, memory means for storing a value derived from the fuel composition signal as sensed near the end of a period of engine operation and maintaining the value through the next start of engine operation, and means activated at the next start of engine operation to substitute the value in the memory means for the fuel composition signal for an initial time period beginning with the next start of engine operation and lasting for a delay time sufficient to ensure that the fuel mixture in the fuel composition sensor is mixed.

4,945,882

## MULTI-FUEL ENGINE CONTROL WITH OXYGEN SENSOR SIGNAL REFERENCE CONTROL

David B. Brown, and Eugene V. Gonze, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

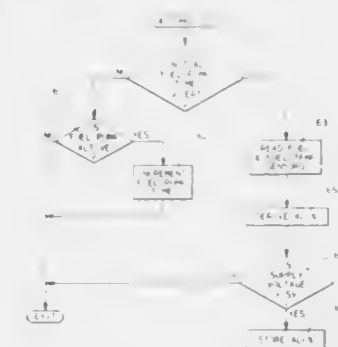
Continuation of Ser. No. 366,961, Jun. 16, 1989, abandoned.

This application Dec. 21, 1989, Ser. No. 453,117

Int. Cl.<sup>5</sup> F02D 41/14

U.S. Cl. 123-489

6 Claims



1. A closed loop engine fuel control for providing to a combustion chamber a fuel mixture of two combustible fuels and air in a stoichiometric fuel/air ratio in response to an air/fuel ratio signal from an exhaust sensor effective to generate an output signal varying with air/fuel ratio in a range about stoichiometry but shifting relative to stoichiometry with varying proportions of the first and second combustible fuels in the fuel mixture, the fuel control comprising means for comparing the air/fuel ratio signal to a reference in determining the rich/lean status of the air/fuel ratio and further comprising:

a fuel composition sensor in the fuel conduit responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second fuels in the fuel mixture; and

means responsive to the fuel composition signal to shift the reference in the same direction as the shift in the air/fuel ratio signal with varying fuel composition so that the reference maintains a consistent relationship with stoichiometry.

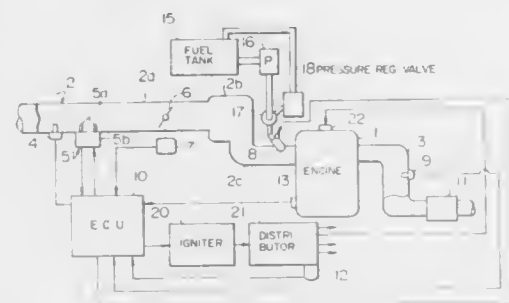
**4,945,883**  
**CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE**

Kenichi Ono, Obu; Masumi Kinugawa, Okazaki; Masakazu Ninomiya, Kariya, and Atsushi Suzuki, Obu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan  
Filed Mar. 2, 1989, Ser. No. 318,185

Claims priority, application Japan, Mar. 3, 1988, 63-50120  
Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 123—494

19 Claims



1. A control device for an internal combustion engine, comprising:

air intake quantity detecting means for detecting a quantity of air input into the internal combustion engine;  
engine speed detecting means for detecting a rotational speed of the internal combustion engine;  
judging means for judging whether or not the engine is running in an intake air pulsation generating range based on operational parameters of the engine;  
air intake quantity estimating means for estimating a quantity of air input into the internal combustion engine based on the engine speed detected by said engine speed detecting means;

correction value calculating means for calculating a correction value related to the density of the air input into the internal combustion engine;

correction means for correcting, by the correction value obtained by means of said correction value calculating means, the air intake quantity estimated by said air intake quantity estimating means;

control means adapted to control the engine in accordance with the estimated air intake quantity as corrected by said correction means when the engine is judged to be running in the intake air pulsation generating range, and in accordance with the air intake quantity detected by said air intake quantity detecting means when the engine is judged to be running outside the intake air pulsation generating range; and

air-fuel ratio detecting means for detecting the air-fuel ratio of the air-fuel mixture supplied to the engine, wherein said control means includes:

reference fuel amount calculating means for calculating a reference amount of fuel supplied to the engine in accordance with one of said detected air intake quantity and said estimated air intake quantity as corrected;

fuel amount correcting means for correcting the calculated reference fuel amount by an air-fuel ratio correction value which is determined in accordance with the result of comparison between the air-fuel ratio detected by means of said air-fuel ratio detecting means and a predetermined air-fuel ratio; and

fuel supply means for supplying the corrected amount of fuel to the engine;

the air-fuel ratio of the air-fuel mixture applied to the engine being so controlled that it agrees with said predetermined air-fuel ratio.

**4,945,884**  
**MODULAR FUEL DELIVERY SYSTEM**

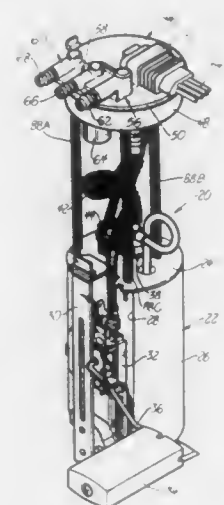
Timothy F. Coba, Davison; Richard F. Kostelic, Flint, and Gregory K. Rasmussen, Grand Blanc, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 24, 1989, Ser. No. 426,631

Int. Cl.<sup>5</sup> F02M 37/10

U.S. Cl. 123—509

5 Claims



1. In a modular fuel delivery system for an installation on a fuel tank of an automotive vehicle and including a canister for disposition in said fuel tank, an electric pump disposed in said canister for pumping fuel therefrom to an engine of said vehicle, and a cover for closing an access port in a wall of said fuel tank having an inside surface facing said canister and an exposed surface opposite said inside surface and a low pressure return fuel connector on said exposed surface, the combination comprising:

a plurality of hollow struts, means defining a plurality of sockets on said inside surface of said cover corresponding in number to the number of said struts and evenly angularly arrayed around said inside surface,

a first end of each of said struts being press fitted into a respective one of sockets,

means on said canister defining a plurality of cylindrical bores corresponding in number to the number of said struts and evenly angularly arrayed around said reservoir canister,

said cylindrical bores communicating with the interior of said canister and telescopically receiving respective ones of said struts so that a second end of each of said struts is exposed to the interior of said canister,

spring means between said cover and said canister urging relative separation therebetween,

means on each of said struts defining a stop at said second end thereof engageable on said canister to limit relative separation between said canister and said cover, and

means on said cover defining a passage from said return fuel connector to one of said sockets so that return fuel flows to the interior of said canister through the one of said struts press fitted into said one socket.

**4,945,885**  
**MULTI-FUEL ENGINE CONTROL WITH CANISTER PURGE**

Eugene V. Gonze, and David B. Brown, both of Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

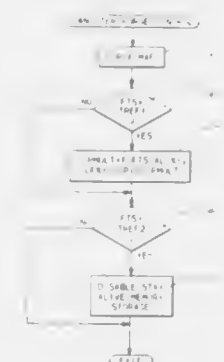
Continuation of Ser. No. 367,157, Jun. 16, 1989, abandoned.

This application Dec. 21, 1989, Ser. No. 453,166

Int. Cl.<sup>5</sup> F02M 33/02

U.S. Cl. 123—520

4 Claims



1. A fuel control for a vehicle engine having a fuel tank containing a liquid fuel mixture comprising first and second combustible fuels and having a volatility varying with the relative proportion of one of the first and second fuels, induction means effective to provide the liquid fuel mixture and air to the engine in a predetermined air/fuel ratio, a fuel composition sensor in the fuel conduit responsive to a physical parameter of the fuel mixture to generate a fuel composition signal indicative of the relative proportions of the first and second fuels in the fuel mixture, canister means in fluid communication with fuel vapor in the fuel tank and effective to store fuel vapor therefrom, and canister purge means for establishing fluid communication from the canister means to the induction means for removal of fuel vapor from the canister means to the engine at a controlled purge rate, the canister purge means being responsive to the fuel composition signal to vary the purge rate as a function of the fuel composition.

**4,945,886**  
**METHOD OF FUEL INJECTION**

Michael L. McKay, 3 Meldreth Court, Willetton, W.A. 6155; Ian R. Thompson, 25 Juniper Way, Duncraig, W.A. 6023, and Ralph T. Sarich, 17 Weelara Road, City Beach, W.A., all of Australia

Continuation of Ser. No. 16,115, Feb. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 908,963, Sep. 18, 1986, abandoned, which is a continuation of Ser. No. 454,657, Dec. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 694,311, Jan. 24, 1985, abandoned. This application Jul. 10, 1989, Ser. No. 377,742

Claims priority, application Australia, Dec. 31, 1981, PF2124; Aug. 31, 1984, PG6875

Int. Cl.<sup>5</sup> F02M 67/02

U.S. Cl. 123—533

19 Claims

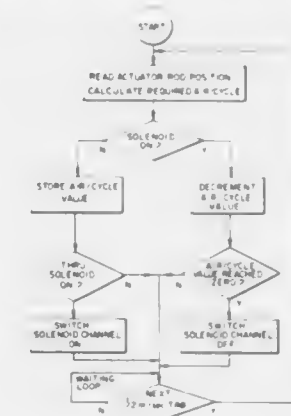
1. A method of delivering liquid fuel to an engine, comprising the steps of:

collecting a metered quantity of fuel in a chamber, said quantity of fuel varying with the fuel demand of the engine;

admitting compressed gas to the chamber to displace therefrom a metered quantity of fuel; and

varying the mass of gas admitted to the chamber with varia-

tions in the fuel demand of the engine at least over part of the range of the engine fuel demand so that as the fuel



demand increases or decreases the mass of gas admitted to the chamber increased or decreases.

**4,945,887**  
**CRANKCASE VENT SYSTEM**

Kenichi Sakurai, and Kazutoshi Ueda, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

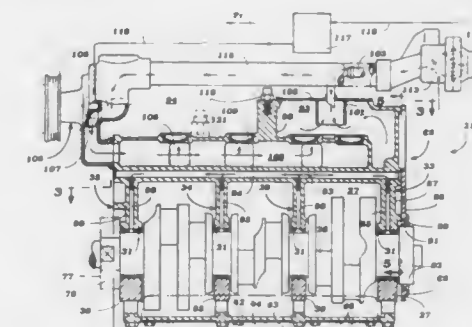
Filed Sep. 29, 1989, Ser. No. 414,680

Claims priority, application Japan, Sep. 30, 1988, 63-247760

Int. Cl.<sup>5</sup> F01M 13/00

U.S. Cl. 123—573

17 Claims



1. A crankcase ventilating system for an internal combustion engine comprising a cylinder block having a plurality of aligned cylinders, a crankcase positioned beneath said cylinder block, a crankcase ventilating chamber formed at least in part by said cylinder block and extending along at least a portion of its length, a crankcase ventilating inlet communicating said crankcase ventilating chamber with said crankcase for receiving ventilating gases therefrom, a crankcase ventilating outlet for discharging crankcase ventilating gases from said crankcase ventilating chamber, and a cooling jacket formed in said cylinder block and positioned to extend adjacent said crankcase ventilating chamber and separating said crankcase ventilating chamber from said crankcase for cooling the crankcase ventilating gases to recondense vaporized lubricant from said crankcase.



4,945,888

**METHOD OF DRESSING GRINDING WHEELS**

Heinrich Mushardt, Neu-Börnsen; Uwe Uhlig, Buchholz; Peter Lütjens, Hamburg; Horst Beyer, Hamburg, and Frank Matysick, Hamburg, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

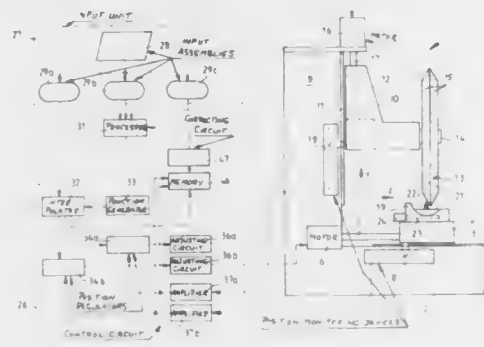
Filed Aug. 2, 1988, Ser. No. 227,238

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725776

Int. Cl.<sup>5</sup> B24B 53/06

U.S. Cl. 125—11.15

11 Claims



1. A method of imparting to the working surface of a grinding wheel a predetermined sharpness profile in the course of path-controlled dressing of the working surface with a dressing tool which contacts the working surface in the course of the dressing operation, comprising the steps of rotating the grinding wheel about its axis; moving the grinding wheel and the dressing tool relative to each other along the desired profile in a first direction and in a second direction substantially transversely of said first direction; and varying the velocity of movement in at least one of said directions in the course of the dressing operation in accordance with a predetermined pattern while the dressing tool is in contact with the working surface.

4,945,889

**BELT-CONFIGURED SAW FOR CUTTING SLOTS INTO STONES HAVING A POLY-CRYSTALLINE DIAMOND CUTTING SURFACE**

Donald D. Fish, Bedford, Ind., assignor to W. F. Myers Company, Inc., Bedford, Ind.

Filed Dec. 11, 1987, Ser. No. 131,461

Int. Cl.<sup>5</sup> B28D 1/08

U.S. Cl. 125—21

12 Claims



8. A stone cutting belt, comprising:  
a flexible and continuous main body with length and lateral width, said main body having a top surface and a bottom surface, said bottom surface having a drive portion adapted to be drivenly engaged by a sheave;  
means, extending through said main body along the length thereof, for providing belt strength;  
a plurality of stone cutting elements, each of said elements having a width substantially less than the lateral width of said main body; and  
means for mounting each of said plurality of stone cutting elements in said main body such that said plurality of elements are spaced along the length thereof and such that at least a portion of each of said cutting elements projects above said top surface of said main body, wherein said stone cutting elements are staggered across the lateral width of said main body in a pattern to form a continuous

cutting width at least equal to the lateral width of said main body; wherein  
said main body is of a resilient material;  
said means for mounting each of said plurality of stone cutting elements includes a plurality of rigid blocks embedded in said resilient material and spaced along the length of said main body;  
said stone cutting elements each include a poly-crystalline diamond cutting tooth mounted in each of said rigid blocks such that at least a portion of said tooth projects above said top surface of said main body; and  
said means for providing belt strength includes:  
at least one bore through each of said plurality of rigid blocks along the length of said main body, said bore including a necked-down portion generally mid-length in said bore; and  
at least one flexible elongated member extending through each of said at least one bore,  
wherein each of said elongated members is entirely embedded in said resilient material and is insulated from the walls of said bore by said resilient material.

4,945,890

**INDUCED DRAFT WARM AIR FURNACE WITH RADIANT INFRARED BURNER**

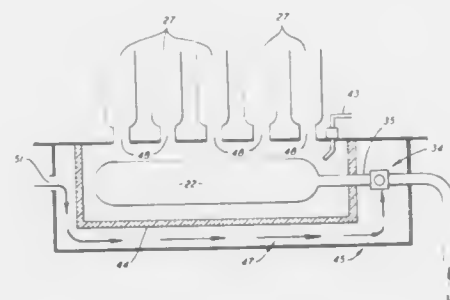
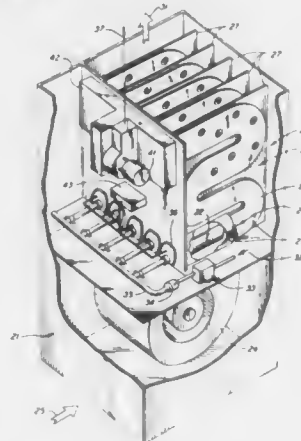
Chester D. Ripka, East Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Sep. 5, 1989, Ser. No. 402,734

Int. Cl.<sup>5</sup> F24H 3/02

U.S. Cl. 126—110 R

16 Claims



1. A warm air furnace having a heat exchanger enclosure comprising:  
an updraft heat exchanger within said heat exchanger enclosure;  
means for circulating air to be heated through said heat exchanger enclosure and around said heat exchanger;

4,945,892

**WATER HEATER WITH OUTER JACKET DAM**

James L. Chevalier, Mequon; John D. Pfeffer, Brookfield, and Leslie R. Wright, West Bend, all of Wis., assignors to A.O. Smith Corporation, Skokie, Ill.

Filed Jan. 5, 1989, Ser. No. 293,682

Int. Cl.<sup>5</sup> A47J 27/00; F24H 7/00; B23H 1/00

U.S. Cl. 126—373

11 Claims



a combustion chamber having means for passing gases of combustion from said combustion chamber to said heat exchanger and a combustible gas inlet and otherwise sealed to the entry and exit of air or other gases;  
a radiant infrared burner mounted within said combustion chamber and in closed flow communication with said combustible gas inlet;  
means for mixing fuel and air drawn from within the space to be heated by said furnace to form a combustible gas for combustion on said burner;  
a combustible gas feed pipe connecting said mixing means to said inlet; and  
means for both inducing  
(a) a flow of said combustible gas from said mixing means, through said feed pipe and said inlet to and through said burner and  
(b) a flow of gases of combustion from said combustion chamber through said heat exchanger.

4,945,891

**DRIVE MECHANISM FOR RETRACTABLE DOWN DRAFT VENT**

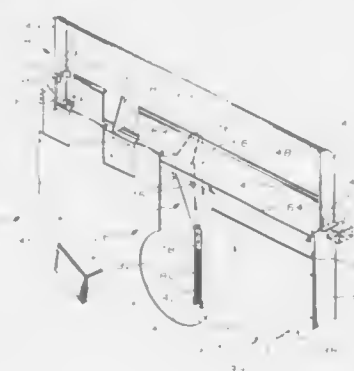
Rebecca J. Cecil, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 30, 1989, Ser. No. 331,415

Int. Cl.<sup>5</sup> F24C 15/20

U.S. Cl. 126—299 D

6 Claims



3. In a motor driven retractable down draft vent system for a cooking appliance, the vent system including a vent member mounted for vertical movement between a lowered position and a raised position; a guide track; a first drive member slidably captured in the track for vertical movement therein, a motor, linking means positively connecting the first drive member and the motor for moving the first drive member between a first position and a second position; the improvement comprising a second drive member fixedly connected to the vent inlet member and disposed for abutting engagement with the first drive member as said first drive member moves from its first to its second position, the first drive member being operative to drivingly abuttingly engage said second drive member, thereby driving the vent inlet member from its lowered to its raised position as said first drive member moves from its first to its second position; said second member being driven by the weight of the vent inlet member to engage and follow said first drive member as it returns from its second to its first position, whereby in the event an obstruction prevents the vent inlet member from returning to its lowered position, said first drive member disengages said second drive member and continues to its first position unaffected by such obstruction.

4,945,893

**FRYER FILTRATION SYSTEM**

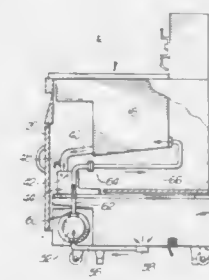
Robert A. Manchester, Manhattan Beach, Calif., assignor to Welbilt Corporation, New Hyde Park, N.Y.

Filed May 13, 1988, Ser. No. 193,938

Int. Cl.<sup>5</sup> A47J 27/00

U.S. Cl. 126—391

6 Claims



1. A fryer having a vessel for heating oil, a frame for supporting the vessel and a housing for enclosing the frame;  
a low profile cart adapted to be removably-received within the fryer frame and housing and underneath the fryer vessel, the cart having a vessel for receiving oil from the fryer vessel, a filter for filtering oil from the fryer vessel

and a pump for pumping oil from the cart vessel back to the fryer vessel;  
 wherein said fryer vessel has an oil return orifice and said fryer has a return conduit internal to the housing coupled to the fryer vessel orifice and wherein said pump has a discharge outlet and the cart has a discharge conduit coupled to the pump outlet;  
 wherein said system further comprises means for selectively coupling the fryer return conduit and the cart discharge conduit together so that filtered oil may be pumped from the cart vessel to the fryer vessel internally via the cart discharge conduit and the fryer return conduit when the fryer return conduit and cart discharge conduit are coupled together; and;  
 wherein the frame of the fryer includes two upstanding wall portions and an inverted U-shaped bracket joining the two wall portions, the center of the bracket providing sufficient clearance to allow the filter cart to pass under the bracket.

4,945,894

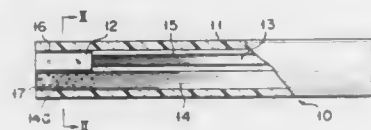
# ENDOSCOPE HAVING X-RAY NON-TRANSMITTING MATERIAL

Masahiro Kawashima, Hino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,647  
 Claims priority, application Japan, Oct. 18, 1988, 63-136045  
 Int. Cl.<sup>5</sup> A61B 1/06

U.S. Cl. 128—6

11 Claims



## 1. An endoscope comprising:

an endoscope main body having an insertion portion to be inserted in a body cavity, said insertion portion comprising an outer tube, and at least image guide fibers having distal ends, light guide fibers having distal end portions, and an objective lens which are disposed at the distal ends of said image guide fibers, said image guide fibers, said light guide fibers and said objective lens being respectively disposed in said outer tube, and said objective lens being disposed at the distal ends of said image guide fibers; an adhesive for adhering said objective lens to said outer tube;  
 a coupling agent for binding and coupling at least said distal end portions of said light guide fibers; and  
 an X-ray non-transmitting material mixed in at least one of said adhesive and said coupling agent.

4,945,895

# REMOTE FIBER OPTIC MEDICAL PROCEDURE AND DEVICE

Kazuo Takai, Tokyo; Scott Genty, Kanagawa, both of Japan, and Frederick D. Roemer, Bloomington, Ind., assignors to Vance Products Incorporated, Spencer, Ind.

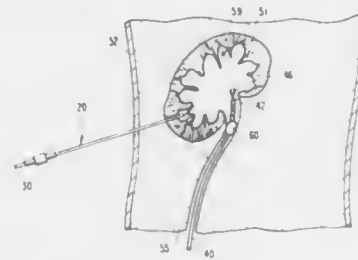
Filed Mar. 20, 1989, Ser. No. 326,011  
 Int. Cl.<sup>5</sup> A61B 1/06, 17/34

U.S. Cl. 128—6

25 Claims

1. An endoscopic method comprising the steps of:
  - A. inserting a medical instrument into the body, said instrument having at least one operative end;
  - B. penetrating into the body remote from said instrument with a needle having a lumen;
  - C. introducing a fiber optic means through the lumen of said

needle, said fiber optic means being also remote from said medical instrument; and,



- D. guiding the operative end of said medical instrument under vision via said remote fiber optic means.

4,945,896

# SURGICAL RETRACTOR ASSEMBLY HAVING TISSUE VIABILITY SENSOR EMBEDDED THEREIN

George F. Gade, 307 Placentia Ave., Suite 205, Newport Beach, Calif. 92660

Filed Jan. 24, 1989, Ser. No. 301,614  
 Int. Cl.<sup>5</sup> A61B 17/02

U.S. Cl. 128—20

11 Claims



1. A retractor assembly for retracting and holding soft body tissue in a stationary retracted position and monitoring the viability of said soft body tissue underlying said retractor, said assembly comprising:

a generally flat, elongated blade insertable within a surgical cavity, said blade having an underside, an upper side, a distal end portion and a proximal end portion, said underside of said distal end portion contacting said soft body tissue when said blade is positioned in said cavity to retract said tissue, said blade having a first slot through its upper side and a second slot through its under side;  
 sensor means embedded in said distal end portion of said blade for detecting physiologic and metabolic status of said underlying tissue and for producing a signal representative of said status, said sensor means removably inset in said second slot; and  
 conduit means for passing said signal from said sensor means along said blade and from said distal end to said proximal end whereby the signal can be connected to a signal processor for remotely processing and displaying the detected status in the underlying tissue, said conduit means being mounted to the upper side of said blade and passing through said first and second slots to said sensor means.

4,945,897

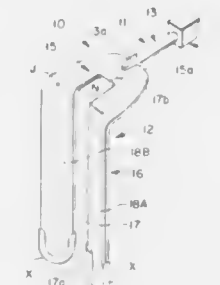
# SURGICAL RETRACTOR

Robert Greenstein, Tenafly, N.J., and Nash Aussenberg, New York, N.Y., assignors to Automated Medical Products Corp., New York, N.Y.

Filed May 22, 1989, Ser. No. 355,439  
 Int. Cl.<sup>5</sup> A61B 17/02

U.S. Cl. 128—20

10 Claims



1. A surgical retractor for use with an adjustable holder in performing a gastropasty procedure for morbid obesity wherein such procedure requires a vertical line to be formed on the abdomen of a patient by the head of a surgical staple gun, said retractor being of unitary construction and comprising a blade section having an exposed upper first portion and an elongate substantially transverse second portion depending from a juncture formed between said first and second portions for disposition within an incision made in the patient; and a handle section disposed opposite the juncture and extending laterally from a peripheral segment of said first portion; said blade section second portion including a pair of substantially rigid finger-like elements, each element having a substantially broad convex exterior first surface for engaging a tissue portion of the patient circumjacent the incision, said blade section including an elongate slot disposed intermediate said finger-like elements; said slot having a depending first segment extending the full length of said finger-like elements and having an open lower end, and a second segment extending transversely of said first segment and terminating within the blade section upper first portion at a substantial distance from the juncture of said first and second portions, said second segment forming a notch within the blade section upper first portion, said notch being adapted to accommodate the head of the surgical staple gun during the gastropasty procedure; the lower end portion of each depending finger-like element having a blunt configuration.

4,945,898

# POWER SUPPLY

James W. Pell, Los Altos; Richard E. Spielmaker, and Arthur W. Zikorus, both of San Jose, all of Calif., assignors to DiaSonics, Inc., Milpitas, Calif.

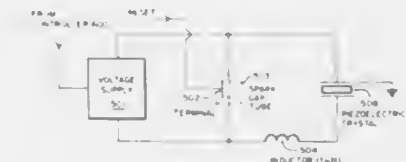
Filed Jul. 12, 1989, Ser. No. 379,573  
 Int. Cl.<sup>5</sup> A61B 17/22

U.S. Cl. 128—24 A

1 Claim

1. In a lithotripsy system having a piezoelectric means for generating an energy beam upon expansion and a focussing means for focussing said energy beam on a calculus in a patient, said focussing means attached to said piezoelectric means, the improvement comprising a means for supplying power to said piezoelectric means, said power supply means comprising:
  - a trigger pulse generating means for generating a trigger pulse;
  - voltage supply means, coupled to said trigger pulse generating means, for generating a ramped output voltage upon receiving said trigger pulse;
  - said piezoelectric means coupled in parallel with said voltage supply means and contracting as said ramped output voltage is received; and
  - a spark gap tube means, coupled in parallel with said voltage

supply means, for creating a short circuit when said ramped output voltage reaches a predetermined level



thereby rapidly decreasing the voltage across said piezoelectric means causing said piezoelectric means to expand thereby generating said energy beam.

4,945,899

# METHOD OF AND APPARATUS FOR ARTIFICIAL RESPIRATION IN SYNCHRONISM WITH VOLUNTARY BREATHING OF A PATIENT

Yoshihiko Sugiyama, Tokyo; Muneshige Kurahashi, Tokorozawa; Sakari Yokoyama, Narashino, and Tadayuki Ishihara, Tokyo, all of Japan, assignors to Nihon Kohden Corporation, Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 219,075  
 Int. Cl.<sup>5</sup> A61H 31/00

U.S. Cl. 128—28

1 Claim

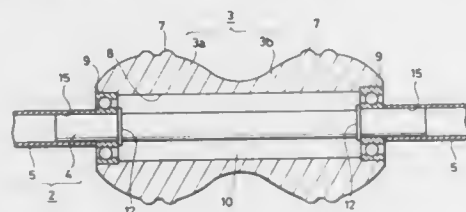


1. Apparatus for effecting artificial respiration in synchronism with a patient's voluntary breathing, which comprises:
  - a jacket having a rigid shell for surrounding the chest of a patient and forming an air-tight chamber between said chest and said rigid shell when said jacket is applied to said chest of said patient;
  - a suction pump;
  - a suction pipe in fluid communication with said air-tight chamber of said jacket;
  - changeover means for effecting a changeover between releasing the air in said air-tight chamber through said suction pipe and into the atmosphere during exhalation and connecting said suction pipe to said suction pump during inhalation;
  - an acceleration detection means installable on the jaw of said



patient for producing a signal which directly corresponds to the movement of said jaw; and changeover controlling means for determining a timing of voluntary breathing by said patient on the basis of said signal produced by said acceleration detection means, and for controlling said changeover means on the basis of said timing, said changeover controlling means controlling said changeover means at a predetermined timing when the timing of said patient's breathing movement exceeds a predetermined time interval.

**4,945,900**  
**ROLLER MASSAGING APPARATUS**  
Isama Masuda, Fukuoka, Japan, assignor to Nihonkenkozoshin-kenkyukai Co., Ltd., Fukuoka, Japan  
Filed Sep. 5, 1989, Ser. No. 403,217  
Int. Cl.<sup>5</sup> A61H 15/00  
U.S. Cl. 128—57 9 Claims

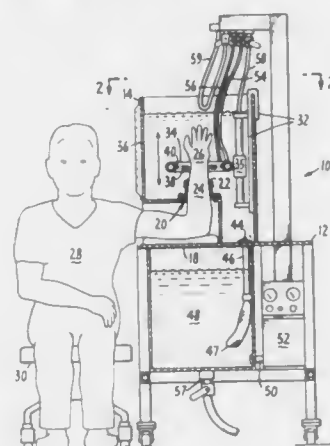


1. A massage device comprising a longitudinal operating shaft means having a diameter, a first end, and a second end opposite said first end; a pushing pressure roller means arranged about said operating shaft means for applying localized pressure to a body, said pushing pressure roller means having a first end, a second end, an outer surface and an inner peripheral surface, said inner peripheral surface defining a longitudinal hollow core extending from said first end of said roller means to said second end of said roller means, said hollow core having a diameter of greater size than said diameter of said operating shaft means; first bearing means and second bearing means engaging, respectively, said first and second ends of said roller means with said shaft means for rotatably supporting said roller means about said shaft means, said hollow core forming a cavity between said first and second bearing means wherein said inner peripheral surface of said roller means is arranged in spaced relation to said shaft means, said cavity extending continuously from said first bearing means to said second bearing means; and first and second hand grip means connected, respectively, to said first and second ends of said shaft means.

**4,945,901**  
**HAND THERAPY APPARATUS AND METHOD THEREFOR**  
Harry J. Burke, Jr., 1565 Kingswood Dr., Hillsborough, Calif. 94010  
Filed Mar. 22, 1989, Ser. No. 327,019  
Int. Cl.<sup>5</sup> A61H 9/00  
U.S. Cl. 128—66 9 Claims

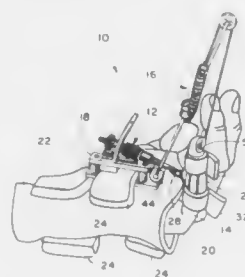
1. A hand therapy apparatus comprising:  
a tank having a removable top, a bottom and a port substantially near the bottom thereof for the insertion of said hand along with its forearm into said tank, said tank further having sleeve means for sealing said forearm in said port; an adjustable support having a member encircling said hand

for supporting said hand, substantially in an elevated totally upright position near the center of said tank; means for directing a therapeutic fluid at said hand;



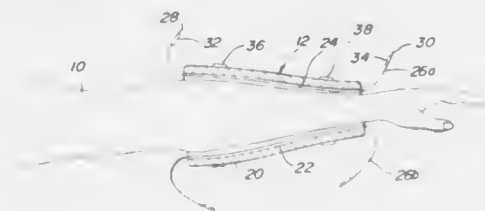
means for controlling the temperature of said fluid; and means for directing a therapeutic energy at said hand.

**4,945,902**  
**PROGRESSIVE STATIC FLEXION DEVICE FOR PHALANGES**  
Robert E. Dorer, Thousand Oaks, and Lawrence Belden, Pacific Palisades, both of Calif., assignors to Bissell Health Care Corporation, Grand Rapids, Mich.  
Filed Dec. 15, 1988, Ser. No. 284,668  
Int. Cl.<sup>5</sup> A61F 5/10  
U.S. Cl. 128—87 A 29 Claims



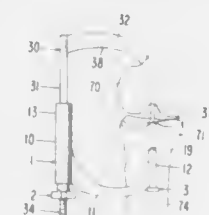
1. A passive flexion system for applying passive flexion to multiple phalanges of the same hand, said system comprising: a plurality of devices operative independently of each other to apply traction and flexion forces to a plurality of phalanges, each one of said devices including traction means for applying long-axis traction to the respective phalange; flexion means for applying flexion force to the respective phalange; said flexion means adapted to apply said flexion force directly to the respective proximal phalanx and generally perpendicular to said longaxis traction whereby the flexion force may be controlled independent of the traction force, said system further including a palmar base, said plurality of devices being attached to said base, said base is adapted for connection to the hand adjacent the palm.

**4,945,903**  
**ANTI-ITCH CAST**  
Max Alper, 3103 Greenfield Ave., Los Angeles, Calif. 90034  
Filed Apr. 28, 1989, Ser. No. 345,003  
Int. Cl.<sup>5</sup> A61H 11/00  
U.S. Cl. 128—91 R 3 Claims



1. A device for protecting an injured body part comprising:  
(a) a cast having a proximal and a distal end and an exterior, surrounding said injured body part; and  
(b) a comfort band comprising an elongated length of flexible material having a proximal and a distal end, movably disposed adjacent to said injured body part and beneath said cast and protruding longitudinally from both proximal and distal ends of said cast, wherein gripping said proximal and distal ends of said comfort band allows movement of said comfort band beneath said cast to alleviate epidermal irritation;  
said comfort band having securing means on said proximal and distal ends for storing said comfort band on said cast when said comfort band is not in use,  
said means for securing being synthetic material that adheres together when pressed together.

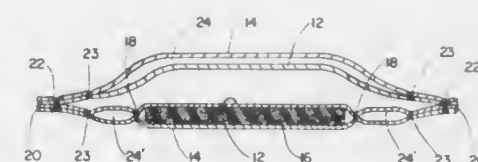
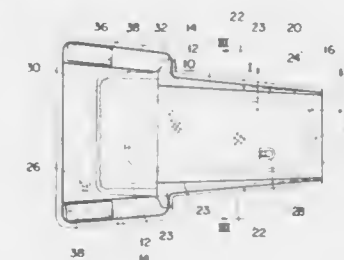
**4,945,904**  
**ORTHOPEDIC DRILL GUIDE DEVICE**  
Carl W. Bolton, Flagstaff, Ariz.; Robert R. Oden, Aspen, Colo., and Stanislaw L. Zukowski, Flagstaff, Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.  
Filed Oct. 25, 1989, Ser. No. 427,164  
Int. Cl.<sup>5</sup> A61F 2/00  
U.S. Cl. 606—96 23 Claims



1. An orthopedic drill guide device comprising:  
(a) a handle;  
(b) a tibial component; and  
(c) a threaded nut for securing the tibial component to the handle;  
said handle having an arm with a first and second end, attached to said first end of said arm is a hollow sleeve having a longitudinal axis and a means for slideably receiving and aligning with the tibial component, attached to said second end of said arm is a pilot tube with a longitudinal axis parallel to the longitudinal axis of said hollow sleeve, said pilot tube having at one end at least one bone-engaging tooth;  
said tibial component having an alignment rod with a first and second end, said alignment rod having a threaded section extending over all or part of its length beginning from said first end, said alignment rod having a longitudinal axis and engaging said slideably and receiving aligning

means of the hollow sleeve of the handle in a direction parallel to the longitudinal axis of the alignment rod, said tibial component having a locating arm with a first and second end and an inner and outer edge, the first end of said locating arm being attached to the second end of said alignment rod, the second end of said locating arm being tapered to a sharp point, the inner edge of said locating arm intended to contact the posterolateral corner of the intercondylar notch of a femur bone, said inner edge contact in conjunction with the tapered point of the second end of the locating arm and a tooth of the pilot tube of the handle planarly locating said drill guide for the purpose of drilling a through-hole in a bone;  
wherein the threaded section of the tibial component alignment rod is positioned in the hollow sleeve of the handle so that the means for slideably receiving and aligning the alignment rod with the hollow sleeve is engaged, the sharp pointed second end of the tibial component locating arm is positioned to engage one surface of a tibial bone and the bone engaging tooth of the tubular pilot of the handle is positioned to engage a second surface of the tibial bone, the nut being threaded onto the alignment rod threads to compressively secure the handle and tibial component to the bone for the purpose of aligning and drilling a through-hole in said tibial bone.

**4,945,905**  
**COMPRESSIBLE BOOT**  
John F. Dye, Elgin, and Mark Kolstedt, Algonquin, both of Ill., assignors to The Kendall Company, Boston, Mass.  
Filed Feb. 8, 1988, Ser. No. 153,755  
Int. Cl.<sup>5</sup> A61H 1/00  
U.S. Cl. 128—24 R 6 Claims



1. A foot sleeve adapted to enclose a foot of a patient and to apply compressive pressure to the top of said foot to the exclusion of compressive pressure to the sole thereof, said sleeve comprising:  
first and second fluid-impervious flexible sheets in superposition with superposed peripheral portions sealed together to form a common periphery;  
said sheets being folded in an overlapping relationship at an approximate mid-point between opposed peripheral portions, the overlapping edges of said folded sheets being sealed together to form said sleeve having a closed end and an opposed open end through which a foot can be inserted with the toes of the foot adjacent said closed end and the foot seated on the lowermost portion of said sleeve;

fluidtight seal means between said common periphery sealing said sheets to define a single inflatable chamber between said sheets within said seal means into which fluid may be introduced to inflate said chamber and thereby apply compressive pressure to the sides and top of the foot within said sleeve;  
said lowermost portion having a fluidtight seal around the periphery thereof, whereby said lowermost portion is not in fluid communication with said inflatable chamber and is therefore non-inflatable beneath the foot seated thereon; and  
means for introducing fluid within said inflatable chamber.

4,945,906

# METHOD AND APPARATUS FOR ADMINISTERING ANESTHETICS

Erik A. Lindkvist, Korpralsvägen 38, S-902 53 Umea, Sweden  
Division of Ser. No. 739,812, May 31, 1985, abandoned, which is a continuation-in-part of Ser. No. 414,357, Aug. 17, 1982, abandoned. This application Oct. 25, 1988, Ser. No. 261,747  
Claims priority, application Sweden, Dec. 18, 1980, 8008962

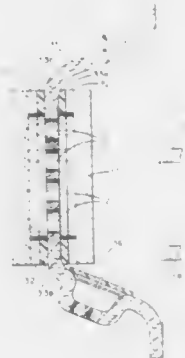
Int. Cl.<sup>5</sup> A61M 16/00

U.S. Cl. 128—203.29

3 Claims

hole through the central portion thereof, and elasticity that enables the edge of said unitary mask shell to conform and seal to the face of a wearer around their nose and mouth;

a first mounting means separate from but fastened to said mask shell, said first mounting means being made from a rigid material said first mounting means having an opening that is in registration with said at least one hole; and



a first filter liner for filtering the air passing through said holes, said first filter liner having an adhesive strip around its periphery, and said adhesive strip being used to fasten said first filter liner and said face mask by being adhesively fastened to said first mounting means, said filter liner not contacting the face of the wearer when the face mask is worn, and said first filter liner covering said at least one hole to thereby filter all inhaled air passing through said at least one hole.

4,945,908

# BALNEO-PHOTOTHERAPEUTICAL TREATMENT PROCESS AND BATH

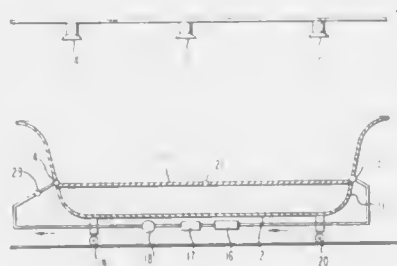
Karl Schneider, Ostlandstrasse 12, D-6427 Bad Salzschlirf, Fed. Rep. of Germany  
Continuation of Ser. No. 928,086, Nov. 7, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 240,383

Claims priority, application European Pat. Off., Nov. 7, 1985, 85114154.9

Int. Cl.<sup>5</sup> A61H 33/00

U.S. Cl. 128—369

28 Claims



1. A treatment apparatus comprising:

a salt bath basin containing a salt solution exhibiting a prone support surface at a depth of 10–50 cm, below a surface of said salt solution and a liquid outlet;

means for emitting light radiation having a spectral wavelength of 290–420 nm arranged to irradiate said prone support surface;

means for processing said salt solution which is connected to said liquid outlet, wherein said means for processing: (a) filters the salt solution from said liquid outlet, (b) controls

1. A method of minimizing the contamination of the atmosphere around an anesthetic mask intended to be applied to the face of a patient, said method comprising:

(a) providing a mask body for engagement with the oral-nasal portion of the patient, the mask body having a rim defining an outer opening;

(b) establishing an anesthetic gas zone within said mask body;

(c) establishing an annular extraction zone surrounding said mask body;

(d) providing communication of said extraction zone with a source of reduced pressure;

(e) feeding anesthetic gas at a predetermined rate into said anesthetic zone;

(f) creating a zone of turbulence in the anesthetic gas in said anesthetic zone to define a bubble of anesthetic gas that is confined substantially within said anesthetic zone and extends at most only marginally outwardly from the outer opening of said mask body; and

(g) withdrawing anesthetic gas that escapes from said outer opening by drawing it into said annular zone for extraction from the atmosphere surrounding the mask body.

4,945,907

# FACE MASK

Amad Tayebi, Westford, Mass., assignor to New England Thermoplastics, Inc., Lawrence, Mass.

Division of Ser. No. 41,001, Apr. 13, 1987, Pat. No. 4,856,508. This application Oct. 21, 1988, Ser. No. 260,593

Int. Cl.<sup>5</sup> A62B 7/10

U.S. Cl. 128—206.12

6 Claims

1. A face mask for filtering air comprising;

a unitary mask shell formed of a flexible, air impermeable, foam that has physical properties that provide shape retention to said mask shell, said mask shell having a least one

the temperature of said salt solution, and (c) controls the salt bath composition of said salt solution  
means for filling said salt bath basin with processed solution from said means for processing.

4,945,909

# PACEMAKER WITH ACTIVITY-DEPENDENT RATE LIMITING

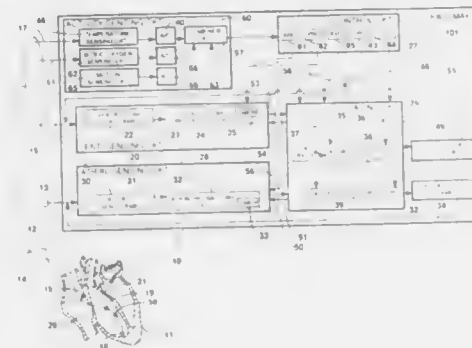
Neal E. Fearnot, West Lafayette, Ind.; Kevin S. Heggs, Monroeville, Pa.; William L. Johnson, Kittanning, Pa., and Donald A. Stevens, Spring Church, Pa., assignors to Cook Pacemaker Corporation, Leechburg, Pa. and Medical Engineering & Development Institute, Inc., West Lafayette, Ind.

Filed Jun. 6, 1989, Ser. No. 362,064

Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—419 PG

38 Claims



1. A pacemaker with activity-dependent rate limiting, comprising:

electrical sensing circuit means for producing a first control signal indicative of a predetermined electrical activity of a patient's heart;

pacing circuit means responsive to an upper rate limit and said first control signal for electrically stimulating said heart at a pacing rate restricted by said upper rate limit; and

control circuit means responsive to an activity signal, from activity sensing circuit means, indicative of a patient's level of activity other than said predetermined electrical activity for varying said upper rate limit according to the patient's level of activity.

4,945,910

# DEVICE FOR ELECTROANALGESIA OF PATIENT'S TISSUES

Viktor A. Budyko, ulitsa Mira, 20, Kv. 60; Vladimir V. Konovlenko, ulitsa Vodopornaya, 16a; Andrei F. Ivanchenko, ulitsa Angolenko, 14a, kv. 17; Valentin D. Kutsov, ulitsa Kedrovaya, 67; Boris N. Lastochkin, prospekt Lenina, 58, kv. 4; Vladimir M. Krokhmal, prospekt 40 let Pobedy, 51, kv. 135, and Nikolai N. Zhdan, ulitsa Sytova, 2, kv. 32, all of, Zaporozhie, U.S.S.R.

PCT No. PCT/SU88/00045, § 371 Date Nov. 2, 1988, § 102(e) Date Nov. 2, 1988, PCT Pub. No. WO88/06906, PCT Pub. Date Sep. 22, 1988

PCT Filed Feb. 25, 1988, Ser. No. 283,366

Claims priority, application U.S.S.R., Mar. 17, 1987, 4211982

Int. Cl.<sup>5</sup> A61N 1/34

U.S. Cl. 128—421

7 Claims

1. A device for electroanalgesia of a patient's dental tissues comprising an electrode to be connected directly to the patient and an electrode for intermittent electrical connection to the patient's tooth, and a pulse train generator connected to said electrodes for transmitting a train of current pulses between said electrodes when an electric circuit is closed between said electrodes through the patient's tissues, said pulse train comprising a series of alternating first and second current pulses,

said current pulses being positive and of a first duration and said second current pulses being negative and of a second duration shorter than said first duration, and pulse triggering

means effective upon a closure of said electric circuit, after an opening thereof, for re-transmitting said pulse train starting always with one of said second pulses.

4,945,911

# MEDICAL ELECTRODE

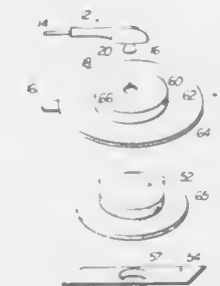
Joel Cohen, and Esther R. Cohen, both of 1020 NW, 99th Ave., Plantation, Fla. 33322

Filed Jan. 22, 1988, Ser. No. 146,755

Int. Cl.<sup>5</sup> A61B 5/0402

U.S. Cl. 128—640

4 Claims



1. An electrode to connect to the head of a lead wire which head has a male projecting portion of predetermined size and configuration having an enlarged distal end, said male projecting portion being of a first overall predetermined length, said electrode including:

(A) a base of non-conductive, plastic, bendable and resilient material and comprising:

(a) an annular plate portion with a central opening of predetermined companionate shape for tight passage of said enlarged distal end of said projecting portion and said opening being foreshortened sized with respect to the cross-sectional area of said projecting portion to permit forced passage of the enlarged distal end through said opening,

(b) a cylindrical portion extending away from said plate portion a first predetermined distance to a terminal end, and

(c) an out-turned flange on the terminal end of the cylindrical portion spaced from the plane of said plate portion and in generally parallel relation thereto, and said flange having a distal surface about the cylindrical portion facing toward the plate portion and an annular proximal surface to abut the skin of a wearer,

(B) conductive gel defining a cylindrical plug filling the cylindrical portion and extending axially from the proximal surface a distance slightly greater than the distance from said plate portion to said flange proximal surface,



said plug having a terminal end generally parallel to said proximal surface and said plug including a portion coating said annular proximal surface,  
 a linear means removably and normally protectively overlying said terminal end of said plug, said terminal end of said plug including an adhesive means to removably apply the electrode to the skin of a person; said adhesive means and gel comprising a mixture, and  
 (C) the axial distance from the plate portion through the axial length of the gel being greater than said first predetermined length.

4,945,912

### CATHETER WITH RADIOFREQUENCY HEATING APPLICATOR

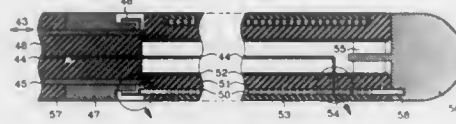
Edwin Langberg, Medford, N.J., assignor to Sensor Electronics, Inc., Mt. Laurel, N.J.

Filed Nov. 25, 1988, Ser. No. 276,294

Int. Cl.<sup>5</sup> A61B 5/04; A61N 5/00

U.S. Cl. 128—642

10 Claims



1. A radiofrequency (RF) heating and monitoring applicator connected to an RF energy source and an intracardiac electrogram monitor, and comprising

a transmission line having a proximal end connected to the RF energy source and to said monitor and further having a distal end;

a solenoidal antenna at said distal end of said transmission line commensurate with the transmission line in diameter; at least one monitoring electrode carried on said antenna; and

coupling means for connection of said solenoidal antenna to said monitoring electrode and to the transmission line for providing efficient coupling of RF energy from the RF energy source through the transmission line to the solenoidal antenna and for transmitting lower frequency intracardiac potential intercepted by said at least one monitoring electrode to said proximal end of the transmission line.

4,945,913

### SINGLE CHAMBER ACOUSTICAL TONOMETER

Edward J. Krasnicki, Skaneateles, N.Y., and Donald L. Margolis, Davis, Calif., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,156

Int. Cl.<sup>5</sup> A61B 3/16

U.S. Cl. 128—647

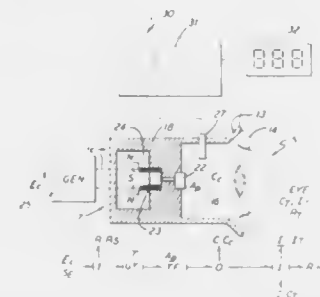
13 Claims

1. The method of evaluating the compliance of human tissue that includes

dynamically sealing a target containing human tissue within a chamber,

acoustically exciting the target over a given range of frequencies wherein the pressure in the chamber varies in response to resonant behavior of the target,

measuring the pressure within the chamber over the range of frequencies, and



relating a measured chamber pressure value directly to the compliance of the target.

4,945,914

### METHOD AND APPARATUS FOR PROVIDING RELATED IMAGES OVER TIME OF A PORTION OF THE ANATOMY USING AT LEAST FOUR FIDUCIAL IMPLANTS

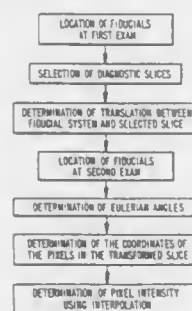
George S. Allen, 628 Westview Ave., Nashville, Tenn. 37205

Continuation-in-part of Ser. No. 119,353, Nov. 10, 1987. This application Jul. 18, 1988, Ser. No. 223,975

Int. Cl.<sup>5</sup> A61B 6/03

U.S. Cl. 128—653 R

4 Claims



4. A method for providing comparable images of a portion of anatomy having  $n$  fiducial implants, where  $n \geq 4$  is an integer, comprising the steps of:

a. taking a cross-sectional image slices of the portion of the anatomy during a first time period; and

b. reformatting an image of a specified view of the portion of the anatomy with respect to an internal coordinate system defined by 3 of the  $n$  implants.

4,945,915

### ULTRASONIC DIAGNOSIS APPARATUS

Tatsuo Nagasaki, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,843

Claims priority, application Japan, Feb. 20, 1987, 62-36931; Apr. 3, 1987, 62-82628

Int. Cl.<sup>5</sup> A61B 8/00

U.S. Cl. 128—660.07

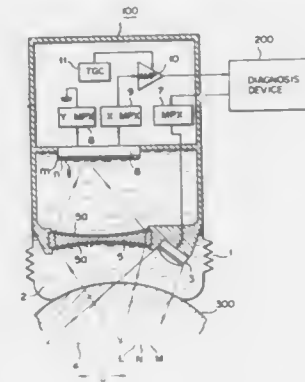
9 Claims

1. An ultrasonic diagnosis apparatus comprising:

beam transmission means for sequentially transmitting an ultrasonic beam to each pixel of one slice of a target body from a direction other than a direction parallel to said one slice, said one slice comprising a plurality of pixels arranged in a predetermined manner; and

image pick-up means having a plurality of pixel electrodes, each pixel electrode corresponding to each respective pixel of said one slice, for receiving an ultrasonic beam

reflected at said pixels of said one slice and for outputting pixel signals from said pixel electrodes to acquire an image



indicating an ultrasonic characteristic of said pixels of said one slice said image pick-up means being separate from said beam transmission means.

4,945,916

### OPTICAL DEVICE FOR THE SIMULTANEOUS DETECTION OF HEART AND RESPIRATORY MOVEMENTS

Sylvain Kretschmer, Paris; Jean-Paul Do-Huu, Ivry, and Francois Micheron, Gif Sur Yvette, all of France, assignors to Thomson CSF, Paris, France

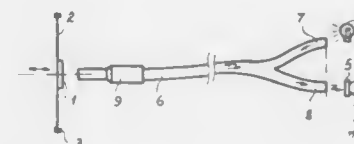
Filed Oct. 14, 1987, Ser. No. 112,672

Claims priority, application France, Oct. 14, 1986, 86 14260

Int. Cl.<sup>5</sup> A61B 5/0205

U.S. Cl. 128—671

10 Claims



1. An optical device for the simultaneous detection of heart and respiratory movements, comprising a sensor comprising a movable mirror coupled to means used to move the mirror according to heart and respiratory movements, a light generator coupled to light guide means, to illuminate the mirror, and electro-optical means also coupled to the light guide means, to convert intensity of a light beam reflected by the mirror into an electrical signal, and processing means for receiving the electrical signal and converting this signal into output signals respectively indicative of heart and respiratory movements.

4,945,917

### METHOD AND APPARATUS FOR INDICATING REPETITION INTERVALS OF A SPECIFIED COMPONENT OF A COMPOSITE ELECTRICAL SIGNAL, PARTICULARLY USEFUL FOR DISPLAYING FETAL R-WAVES

Solange Akselrod, 18 Rahayat Ilan, Givat Shmuel; Jacob Karin, 24 Lean Street, Ramat-Gan, and Michael Hirsch, 37 Nordau Street, Herzliya, all of Israel

Filed May 23, 1988, Ser. No. 197,190

Claims priority, application Israel, May 29, 1987, 82698

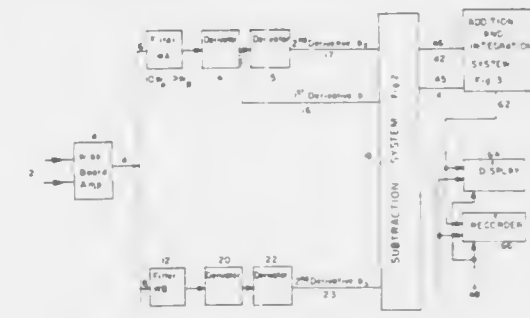
Int. Cl.<sup>5</sup> A61B 5/04

U.S. Cl. 128—696

20 Claims

1. A method of indicating the repetition intervals of a specified component of a composite cyclically-repeating electrical signal, comprising the steps:

generating a first electrical signal corresponding to the second derivative of said composite signal;  
 generating a second electrical signal corresponding to the second derivative of said composite signal after said specified component has been removed;



subtracting said second electrical signal from said first electrical signal to produce a third electrical signal; and utilizing said third electrical signal for indicating the repetition intervals of said specified component.

4,945,918

### METHOD AND APPARATUS FOR MONITORING A PATIENT'S CIRCULATORY STATUS

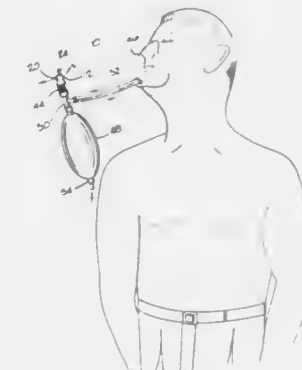
Charles M. Abernathy, 2420 E. Miami Rd., Montrose, Colo. 81401

Filed May 4, 1988, Ser. No. 189,977

Int. Cl.<sup>5</sup> A61B 5/08

U.S. Cl. 128—719

18 Claims



1. An apparatus for monitoring a patient's circulatory status during cardiopulmonary resuscitation comprising:

a housing defining carbon dioxide indicating passageway means for passing the patient's breath and means in communication with said passageway means for indicating the presence of carbon dioxide in the patient's breath over a temporary period wherein the length of the temporary period of indicating is a known function of the level of carbon dioxide in the patient's breath so that the carbon dioxide level is determinable by measuring the length of the temporary period, the level of carbon dioxide thereby providing an indication of the patient's circulatory status.

4,945,919

**RHINOLOGICAL DIAGNOSTIC DEVICE**

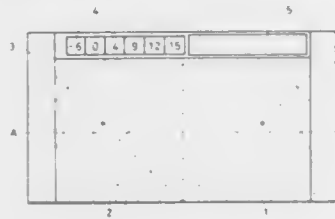
Akira Hattori, Ashiya, Japan, assignor to Yamaguchi Yakuhin Shokai Ltd., Osaka and Japan Capsular Products, Inc., Tokyo, both of, Japan

Filed Feb. 10, 1989, Ser. No. 308,769

Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—736

3 Claims



1. A rhinological diagnostic device for diagnosing an abnormality of nasal cavities of a patient which comprises a rigid base plate, a heat insulating layer formed of a foamed plastic material overlying said base plate, a black coating layer covering said heat insulating layer, a thermochromic liquid crystal layer extending over said black coating layer, and a transparent plastic layer covering said liquid crystal layer, said transparent plastic layer and said liquid crystal layer being disposed in heat conductive relationship so that when expired air from the nostrils of said patient is directly applied to said transparent plastic layer, a thermochromic, topographic pattern of said liquid crystal layer is displayed.

4,945,920

**TORQUEABLE AND FORMABLE BIOPSY FORCEPS**

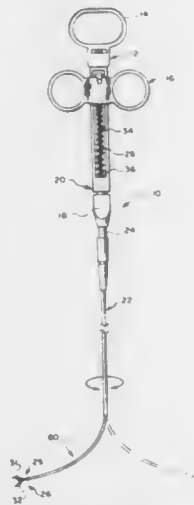
James P. Clossick, Miami Lakes, Fla., assignor to Cordis Corporation, Hialeah, Fla.

Continuation-in-part of Ser. No. 172,774, Mar. 28, 1988, abandoned. This application Oct. 25, 1988, Ser. No. 262,277

Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—751

13 Claims



1. A biopsy forceps comprising a handle portion having a distal end, an elongate tubular torqueable and formable body assembly and a forceps assembly, said tubular body assembly including a coil spring guide wire having a proximal portion and a distal portion extending between said handle portion and said forceps assembly, a first tubing or covering over said proximal portion of said coil spring guide wire extending from said handle portion towards said forceps assembly, said first tubing or covering having a distal end and a proximal end, and having a high resistance to twisting and a high transmission of

torque applied thereto, and a second tubing or covering or formable material received over and tightly engaging said distal portion of said coil spring guide wire to form with said coil spring guide wire a plastic tubing assembly for imparting a high formability to said distal portion of said coil spring guide wire, said second tubing or covering having a distal end, a proximal end and extending rearwardly from said forceps assembly to a distal end of said high torque transmitting first tubing or covering, said end of said first tubing or covering being in overlapping relationship with said proximal end of said second tubing, said second tubing or covering being heat shrunk on and over said distal portion of said coil spring guide wire thereby to form said second tubing or covering with inwardly extending annular ribs of material which extend into spaces between coils of said coil spring guide wire and said plastic tubing assembly including said coil spring guide wire and said second tubing or covering defining a tip portion of said elongate torqueable and formable body assembly which is physically deformable to a desired shape and which will hold that shape until deformed to another shape.

4,945,921

**BODY CAVITY SPECIMEN COLLECTING AND TESTING APPARATUS**

Paul M. Okimoto, 638 Cornell, Albany, Calif. 94706

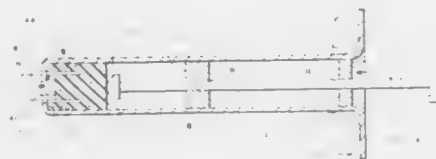
Continuation-in-part of Ser. No. 87,807, Aug. 21, 1987, Pat. No.

4,784,158. This application Dec. 30, 1987, Ser. No. 139,621

Int. Cl.<sup>5</sup> A61B 10/00

U.S. Cl. 128—759

6 Claims



1. In a body cavity specimen collecting apparatus including an elongated hollow body dimensioned for insertion into a body cavity and having an open front end and an open opposite end, plunger means mounted for reciprocation in said body with a first end proximate said open front end and a manually engageable second end extending outwardly of said opposite end, and specimen contacting means mounted proximate said open end and having a portion of said specimen contacting means dimensioned to pass through said open front end, said plunger means being mounted for reciprocation between an advanced position displacing said portion of said specimen contacting means beyond said open front end and a retracted position with said specimen contacting means retracted inside said body inwardly of said open front end, wherein the improvement in said collecting apparatus comprises:

said specimen contacting means being formed of a sponge material which is resilient prior to contact with said bodily fluids and which is suitable for collecting and retaining a sufficient quantity of bodily fluids from said body cavity to enable transfer of a specimen of said bodily fluids to a separate specimen testing means after said collecting apparatus is removed from said body cavity and said contacting means is brought into contact with said bodily fluids, said sponge material resiliently biasing said plunger means to said retracted position to automatically shield said specimen contacting means from contamination by bodily fluids upon release of said manually engageable end during insertion and removal of said collecting apparatus to and from said body cavity.

4,945,922

**PACING LEAD**

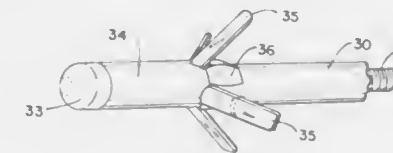
Frits M. van Krieken, AT Dieren, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Mar. 13, 1989, Ser. No. 322,308

Int. Cl.<sup>5</sup> A61N 1/05

U.S. Cl. 128—785

23 Claims



1. A pacing lead having proximal and distal ends, a substantially cylindrical length between said ends, and an electrode at about the distal end thereof, said length having a conductor connected to said electrode for conducting signals between said proximal end and said electrode and an outer tubing enclosing said conductor, characterized by

an integral tined piece enveloping said tubing just proximal to said electrode, said piece having a plurality of tines extending radially and proximally from said tubing, each such tine being formed with a C-shaped cross-section having a concave inner surface substantially complementary to the adjacent surface of said tubing.

4,945,923

**CONTRACEPTIVE AND PROPHYLACTIC DEVICE**

Mark I. Evans, 4734 Rolling Ridge, West Bloomfield, Mich. 48033, and Frederick C. Greenwood, 949 Koae St., Honolulu, Hi. 96826

Continuation of Ser. No. 89,970, Aug. 27, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 378,449

Int. Cl.<sup>5</sup> A61F 6/00

U.S. Cl. 128—842

3 Claims



1. A contraceptive device adapted to be worn by a female which serves to prevent the exchange of body fluids during intercourse, comprising:

an elongate tubular sheath formed of thin, flexible, fluid impermeable material, said sheath having a closed inner end portion and an open outer end portion;  
a resilient inner ring directly connected about the entire periphery thereof to said inner end portion of said tubular sheath for mounting said inner end portion to the walls of the vagina so as to overlie the cervix of a wearer, and such that no portion of said closed end of said sheath extends radially outwardly from said inner ring, and  
an outer ring directly connected about the entire periphery thereof to said open outer end portion for maintaining said outer end portion in an open configuration, said elongate tubular sheath and said outer ring being sized and configured so that said inner ring and said closed inner end portion may be mounted to overlie the cervix and with said outer ring positioned exterior to and adjacent the

vaginal introitus of a wearer and so as to permit normal intercourse.

4,945,924

**STERILIZABLE REFLECTIVE SURGICAL DRAPE**

Robert J. Poettgen, Arlington, Tex., assignor to O.R. Concepts, Inc., Roanoke, Tex.

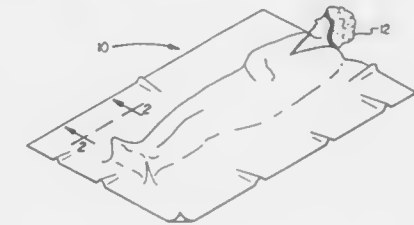
Continuation-in-part of Ser. No. 890,402, Jul. 25, 1986, Pat. No. 4,765,323. This application Aug. 19, 1988, Ser. No. 234,314

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 15/00, 17/00

U.S. Cl. 128—849

27 Claims



1. A sterilizable reflective surgical drape for covering at least a portion of and reducing heat loss from a surgical patient's body, comprising:

(a) a non-conductive core layer of aluminum;  
(b) a first thermoplastic material layer superposed on said core layer;  
(c) a second thermoplastic material layer superposed on said core layer; and  
(d) a layer of flexible non-woven sterilizable material superposed on said first thermoplastic material layer.

4,945,925

**ARM/LEG BOARD**

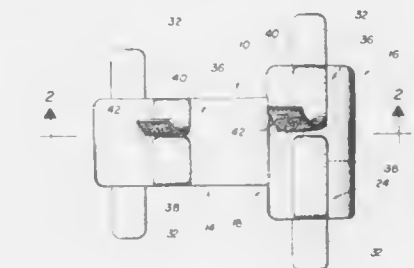
Rosa F. Garcia, 4054 W. 8th La., Hialeah, Fla. 33012

Filed May 22, 1989, Ser. No. 354,888

Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 128—877

1 Claim



1. A support assembly for the extremities of a patient including the arm/hand portions and the leg/foot portions of the body to facilitate attachment and stability of an I.V. set-up to the supported extremities, said assembly comprising:

a. a base formed of a rigid material and including a first elongated portion and a second elongated portion disposed transversely to said first portion at one end thereof,  
b. covering means for covering said base and secured in overlying relation to an exposed surface of both said first and second portions of said base,  
c. said covering means including a layer of fluid absorbent materials secured to both said first and second portions and disposed in confronting relation to a body portion mounted thereon,  
d. an outwardly projecting portion mounted on said base at



one end of said first portion and extending along an entire length of said second portion transversely to said first portion, said projecting portion having a substantially curvilinear outer surface and configured to orient and support a body portion attached thereto substantially at a position of function,

- e. attachment means including a plurality of wing members formed of a material capable of being penetrated by a sharp pointed connected and secured to said base at spaced apart locations along the periphery of said base and extending outwardly therefrom for attachment to a supporting surface on which said base is disposed, and
- f. mounting mean including a strap assembly secured to said base being dimensioned and configured to at least partially surround a body portion supported on the base in gripping relation thereto.

4,945,926

# DEVICE FOR FEEDING STRIP PAPER ON A DUAL-ROD CIGARETTE MANUFACTURING MACHINE

Riccardo Mattei, Bologna, and Bruno Belvederi, S. Martino Di Monte S. Pietro, both of Italy, assignors to G. D. Societa' Per Azioni, Bologna, Italy

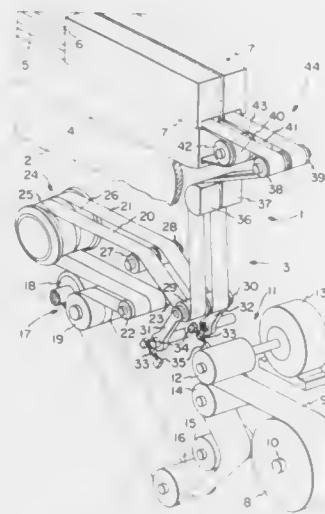
Filed Jan. 12, 1987, Ser. No. 2,294

Claims priority, application Italy, Jan. 20, 1986, 3308 A/86

Int. Cl.<sup>5</sup> A24C 5/18

U.S. Cl. 131—84.1

3 Claims



1. A device for feeding strip paper on a dual-rod cigarette manufacturing machine (1), said device comprising means (11) for supplying a main strip (9); a cutting device (17) for longitudinally dividing the said main strip (9) into two strips (20, 21) for wrapping two continuous cigarette rods; transmission means (20-30; 38, 39) for feeding the said strips along the same route; and a tension detecting device (36, 37) connected to each of the said two strips (20, 21); characterised by the fact that it comprises means (45, 46, 47, 48, 53), connected to the said tension detecting devices (36, 37), for regulating the speed of the said means (11) supplying the said main strip (9).

## 4,945,927 CONTINUOUS CIGARETTE ROD MANUFACTURING MACHINE

Bruno Belvederi, S. Martino Di Monte S. Pietro, Italy, assignor to G.D. Societa' Per Azioni, Bologna, Italy

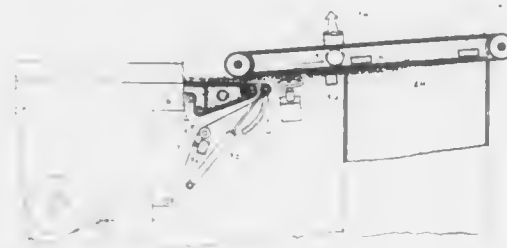
Filed Jun. 16, 1987, Ser. No. 62,458

Claims priority, application Italy, Jun. 25, 1986, 3448 A/86

Int. Cl.<sup>5</sup> A24C 5/14, 5/20, 5/31

U.S. Cl. 131—84.1

8 Claims



1. A continuous cigarette rod manufacturing machine (1) for producing at least one continuous cigarette rod; said machine comprising, for each said rod, a shredded tobacco supply duct (2) having a top outlet; a bed (5) for forming the said rod; means (18) for feeding a continuous paper strip (19) along the said rod forming bed (5); and a suction conveyor (6) extending over the said outlet so as to enable the formation, on the suction conveyor (6) itself, of a continuous layer (48) of tobacco particles, and for feeding the said layer (48) to the said rod forming bed (5) and on to the said paper strip (19); characterised by the fact that it also comprises means (37) for detecting any variation in the flow of tobacco along the said suction conveyor (6), in relation to a given flow value; and means (29) for retaining and guiding the said paper strip (19), said means (29) being connected to the said detecting means (37) and being designed to positively engage the said paper strip (19) subsequent to the said variation in flow.

4,945,928

## SMOKING OF REGENERATED TOBACCO SMOKE

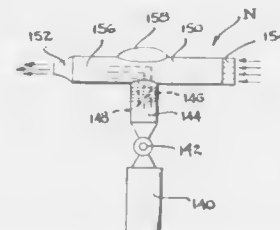
Jed E. Rose, 1371 Appleton Way, Venice, Calif. 90291

Continuation-in-part of Ser. No. 840,072, Mar. 17, 1986, Pat. No. 4,845,199. This application Mar. 13, 1989, Ser. No. 322,689

Int. Cl.<sup>5</sup> A24F 47/00

U.S. Cl. 131—270

39 Claims



1. A method for producing solvent extracted tobacco smoke constituents and which constituents are capable of being formed into an aerosol for smoking thereof, said method comprising:

- (a) heating tobacco to produce a tobacco smoke comprised of a mixture of fluidized components and gaseous components,
- (b) introducing the mixture of smoke components into a solvent,

(c) entrapping certain of the components in the solvent thereby separating the entrapped tobacco smoke components from other tobacco smoke components and in which many of such other tobacco smoke components may be harmful to a user of tobacco smoke,

- (d) expelling the non-entrapped smoke components, and
- (e) collecting the solvent with the entrapped smoke components and without many of those components which may be harmful so that an aerosol may be formed of the entrapped smoke components for smoking thereof.

4,945,929

## AEROSOL DEVICE SIMULATING A SMOKING ARTICLE

Nazli Egilmex, Southampton, England, assignor to British-American Tobacco Co., Ltd., London, England

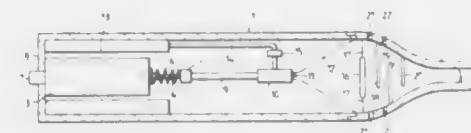
Filed Jun. 16, 1987, Ser. No. 62,815

Claims priority, application United Kingdom, Jun. 18, 1986, 8614805

Int. Cl.<sup>5</sup> A24F 47/00; A61M 11/00, 15/06

U.S. Cl. 131—273

15 Claims



1. A nicotine dispensing aerosol device comprising nicotine-aerosol generating means and nozzle means for generating an aerosol spray of propellant gas and nicotine, including storage means for storing propellant gas and for storing nicotine, said device further comprising an aerosol confining chamber of substantially conical form having an inlet end and an outlet end into which chamber said nozzle means is directed in the region of said inlet end, for directing the aerosol from the nozzle toward aerosol impact means at the outlet end of the confining chamber and at which said nozzle means is directed for removing large particles from the nicotine-aerosol spray flowing from the confining chamber and baffle means at the side of said impact means further from said nozzle means for creating a turbulent flow of the nicotine-aerosol spray received by the baffle means from the impact means.

4,945,930

## APPARATUS FOR EXPANDING AND/OR DRYING PARTICULATE MATERIAL

Richard E. G. Neville, Dauntsey, Great Britain, assignor to GBE International PLC, Great Britain, Great Britain

PCT No. PCT/GB88/00512, § 371 Date Mar. 1, 1989, § 102(e)

Date Mar. 1, 1989, PCT Pub. No. WO89/00014, PCT Pub. Date Jan. 12, 1989

PCT Filed Jul. 1, 1988, Ser. No. 326,667

Claims priority, application United Kingdom, Jul. 2, 1987, 8715523; Feb. 5, 1988, 8802654

Int. Cl.<sup>5</sup> A24B 3/18

U.S. Cl. 131—296

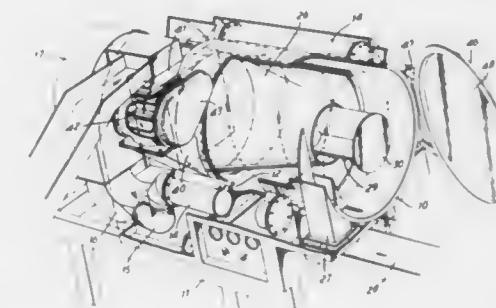
14 Claims

1. A method for the expansion of tobacco in which the tobacco to be treated is fed into a substantially cylindrical stationary container and steam and/or humid air introduced into the container, comprising the steps of:

- continuously feeding the tobacco into the container at or near one end and out at the other end;
- introducing the steam substantially tangentially to the interior surface of the container by way of jet nozzles or slits to engage the entering tobacco causing the resulting turbulent mixture of steam and tobacco to travel along a helical path and to be maintained by centrifugal force against the interior surface of the container as the stream moves axially therein and to maintain the circulation and to provide a succession of repeated high relative velocity,

highly turbulent and dispersive contacts between the heating medium and the tobacco;

separating the steam and/or humid air from the treated



tobacco which is maintained by centrifugal force in close proximity to the interior surface of the cylinder, said steam and/or humid air being recycled and return to the jet nozzles or slits.

4,945,931

## SIMULATED SMOKING DEVICE

Gio B. Gori, Bethesda, Md., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jul. 14, 1989, Ser. No. 379,831

Int. Cl.<sup>5</sup> A24B 15/00

U.S. Cl. 131—335

10 Claims



1. A simulated smoking device comprising:

a cylindrical tube having a sidewall, an air inlet end and an aerosol air outlet end;

a capsule having a sidewall and containing pressurized aerosol generating material located in the tube;

means defining an air flow passage between and defined by the sidewall of the capsule and sidewall of the tube, the air flow passage being in flow communication with the air inlet end of the tube and the aerosol air outlet end of the tube;

an aerosol outlet port formed in the capsule;

valve means disposed at the aerosol outlet port for selectively opening the port allowing pressurized aerosol generating material to flow from the capsule through the open port and closing the port preventing pressurized aerosol generating material from flowing from the capsule;

air operated valve activation means located within the tube downstream of the air flow passage and operatively associated with the valve means, so that the air flowing from the air flow passage operates the valve activation means to open the valve means; and,

an aerosol passage communicating at an inlet end with the aerosol outlet port of the capsule and having a discharge end downstream of the valve activation means.

**4,945,932**  
**CIGARETTE WHICH GOES OUT RAPIDLY OR IS SELF-EXTINGUISHING**  
 Edgar Mentzel, Quickborn, and Wolfgang Wildenau, Bargfeld-Stegen, both of Fed. Rep. of Germany, assignors to H. F. & ph. F. Reemtsma GmbH & Co., Fed. Rep. of Germany  
 Filed Jan. 25, 1989, Ser. No. 301,113  
 Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802645

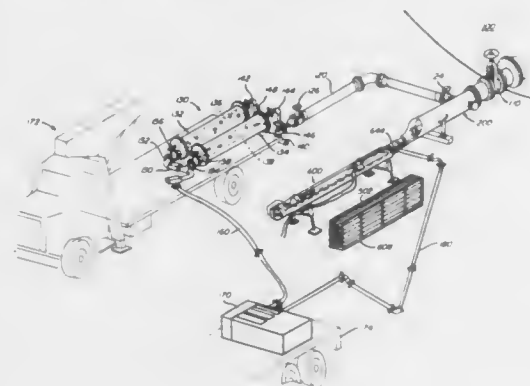
Int. Cl.<sup>5</sup> A24D 1/02  
 U.S. Cl. 131—365

11 Claims

1. A cigarette that is rapidly self-extinguishing and having an incandescent zone that extinguishes after a smouldering time without a puff in less than about 210 seconds or after a burning off length of less than 6 mm, comprising a cigarette having a core of tobacco surrounded by a casing of paper, said casing of paper having areas with lesser and greater air permeability in the form of patterned zone wherein the casing of paper having an initial permeability of less than 15 P and an average total air permeability under 4 P as a result of at least a single batonncing to produce said patterned zones.

**4,945,933**  
**LIQUID CIRCULATOR USEFUL FOR DISPERSING SEDIMENT CONTAINED IN A STORAGE TANK**  
 Richard W. Krajcek, Houston, Tex., and Robert R. Cradeur, Sulphur, La., assignors to Serv-Tech, Inc., Houston, Tex.  
 Filed Apr. 11, 1988, Ser. No. 180,334  
 Int. Cl.<sup>5</sup> B08B 3/02  
 U.S. Cl. 134—167 R

21 Claims

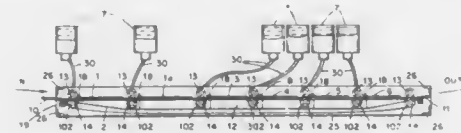


17. In a crude oil storage tank containing hydrocarbon sludge and crude oil, said storage tank having a diameter of about 100 to about 300 feet, a height of about 20 to about 50 feet, and having a manway in the side thereof, apparatus useful for redispersing said hydrocarbon sludge in said crude oil comprising:  
 a gate valve mounted on the outside of said storage tank over said manway,  
 an elongate open-ended tubular isolation barrel laterally mounted on said gate valve, a cover plate mounted in and adjacent the rear of said isolation barrel closing the rear end thereof, a tubular packing gland mounted in said cover plate in lateral axial alignment with the lateral axis of said isolation barrel and a drain line mounted on said isolation barrel at the side thereof,  
 a crude oil circulator insertable into said isolation barrel through the open end thereof, said circulator comprising a hollow housing closed at the front end and open at the rear end thereof, nozzled liquid agitation means comprising nozzled outlet jets rotatably mounted on said hollow housing, and connecting means comprising a tubular casing having a front end and a rear end, said tubular casing being mounted at the front end thereof on the open end of said housing, said tubular casing being independently rotatably about its longitudinal axis, said tubular casing

having a kelly mounted therein, and also having nozzle drive means carried thereon and operatively connected with said outlet jets of said liquid agitation means,  
 multi-joint support pipe means comprising a plurality of joints of pipe sequentially coupled to each other, each joint of pipe having a kelly rod rotatably mounted therein and coupled to the next adjacent kelly rods, the most forward of said joints of pipe passing through said packing gland and being coupled to the rear end of said tubular casing and the kelly rod of said most forward of joints of pipe being operatively coupled to said kelly,  
 a tripping rack adjacent said storage tank in lateral axial alignment with said isolation barrel, said tripping rack comprising an elongate frame, reciprocation means carried by said frame for movement forward and back along said frame, a tripping sled carried by said reciprocation means, and push-pull coupling means comprising a push-pull sub mounted on said tripping sled for releasably mounting the rearmost of said joints of pipe on said frame, high pressure crude oil pump means fluidly interconnected with said rearmost of said joints of pipe for supplying crude oil under pressure through said joints of pipe to the interior of said tubular casing, said housing and, thence, to said outlet jets, and  
 indexing power means operatively connected with the outermost of said kelly rods for rotating said kelly rods and said kelly, and, hence, for rotating said outlet jets at a predetermined rate independent of the rate of flow of crude oil through said nozzled outlet jets,  
 whereby by simultaneously pumping crude oil through outlet jets of said crude oil circulator and into hydrocarbon sludge in said storage tank while rotating said outlet jets, said hydrocarbon sludge can be redispersed in said crude oil.

**4,945,934**  
**METHOD AND APPARATUS FOR PROCESSING AND TRANSPORTING SHEET MATERIALS**  
 Quentin D. Vaughan, IV, Knoxville, Tenn., assignor to Visicon, Inc., Powell, Tenn.  
 Filed Oct. 29, 1987, Ser. No. 114,561  
 Int. Cl.<sup>5</sup> B08B 3/04  
 U.S. Cl. 134—64 R

15 Claims



1. Apparatus for transporting and processing a sheet material with flowable process substance comprising:  
 a source of flowable process substance;  
 at least one pliable web having a multiplicity of protrusions defined on at least one surface thereof, said protrusions being spaced apart from one another in a substantially uniform distribution over said one surface and defining interstices therebetween for receiving effective volumes of said flowable process substance therein, said interstices being in fluid communication with adjacent interstices thereby defining fluid communication channels over substantially the entire area of said surface;  
 means delivering a controlled volume of said flowable process substance to said web, said volume being sufficient to substantially fill said interstices; and  
 means moving said sheet material and said web into surface-to-surface contact with and relative to one another with said protrusions in contact with said sheet material whereby said sheet material is caused to contact said process substance disposed in said interstices and said process substance is caused to flow within and between

said interstices and said process substance in said reservoirs is agitated thereby transferring process substance which has contacted said sheet material away from said sheet material and causing such process substance to be mixed with other process substance in said reservoirs.

**4,945,935**  
**CAR SHIELDING COVER**  
 Yung-Fr Su, No. 28, Lane 9, Ming Yu Rd. Kang San Chen, Kaohsiung Hsien, Taiwan  
 Filed Jan. 19, 1989, Ser. No. 299,100  
 Int. Cl.<sup>5</sup> E04H 15/06  
 U.S. Cl. 135—88

2 Claims



1. A plastic car shielding cover comprising a rectangular top for covering a top of a car and a rectangular bottom surface for covering a portion of a bottom of said car and two side lateral surfaces for covering both sides of said car, said top and bottom surfaces being joined together by seams at their respective longitudinal ends, said lateral surfaces being joined to and interposed between respective latitudinal edges of said top and bottom surfaces, said bottom surface having a rectangular opening for receiving a car therein, said rectangular opening having a length and width less than that of said bottom surface for providing lips about edges of said bottom surface for covering said portion of said bottom of said car, said lateral surfaces having inward folding surfaces formed by a fold extending between said longitudinal ends, said folds and said seams forming angular grooves at said longitudinal ends for receiving bumpers of said car, said surfaces being made of a plastic material having sufficient elasticity for inserting one of said bumpers in one of said angular grooves, stretching said cover over said car and inserting another of said bumpers in another of said angular grooves and sufficient tensile strength for maintaining said cover on said car.

**4,945,936**  
**COLLAPSIBLE TENT AND FRAME THEREFOR**  
 Dennis C. Surrendi, 2 Ironstone Place, St. Albert, Alberta, Canada T8N 5J6  
 Filed Aug. 16, 1989, Ser. No. 394,481  
 Int. Cl.<sup>5</sup> E04H 15/28

U.S. Cl. 135—98

15 Claims

1. In an umbrella tent frame, the combination of a plurality of legs each comprising  
 a lower portion,  
 an upper portion, and  
 a pivot connector interconnecting the lower and upper portions;  
 a clevis assembly comprising  
 an upper clevis member,  
 a lower clevis member, and  
 stop means supported by the lower clevis member and projecting toward the upper clevis member and constructed and arranged to engage the upper clevis member to limit movement of the lower clevis member toward the upper clevis member; a plurality of radial pivot members each fixed to a different one of the upper leg portions; and  
 a plurality of brace members each having one end pivoted to

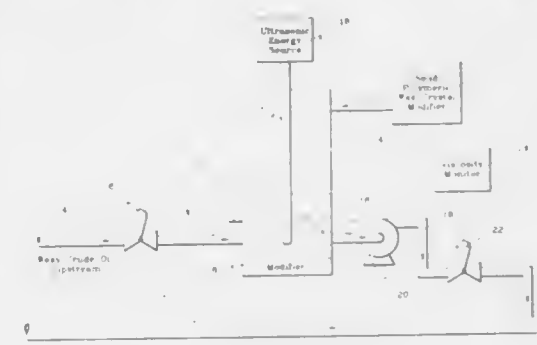
one of the radial pivot members and the other end pivoted to the lower clevis member  
 wherein each of the leg portions is in the form of a hollow tubular polymeric extrusion; and



wherein the leg portions have transverse cross sections in the form of a rectangle with longer sides and shorter sides, the longer sides of the cross sections of the lower leg sections extending toward the interior of the tent frame when the frame is erected.

**4,945,937**  
**USE OF ULTRASONIC ENERGY IN THE TRANSFER OF WAXY CRUDE OIL**  
 Michael E. Scribner, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.  
 Filed Oct. 6, 1989, Ser. No. 418,013  
 Int. Cl.<sup>5</sup> F17D 3/00  
 U.S. Cl. 137—13

10 Claims



1. In a process for flowing waxy crude oil through a pipeline, the improvement which comprises:  
 (a) combining at least a portion of the flowing crude oil with a solid polymeric wax crystal modifier;  
 (b) applying ultrasonic energy to the combined crude oil and modifier whereby a sufficient amount of said modifier is dissolved in said crude oil to lower the gel strength thereof.

**4,945,938**  
**REELS AND CARRIERS THEREFOR**  
 George L. Ponsford, Mesquite; William H. McCormick, Plano; Malcolm N. Council, Richardson, and Albert W. Carroll, Dallas, all of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Sep. 22, 1989, Ser. No. 410,878  
 Int. Cl.<sup>5</sup> F16K 51/00

U.S. Cl. 137—15

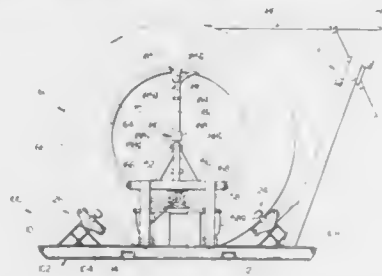
14 Claims

1. The method of emplacing a reel on a carrier such as a trailer, semi-trailer, skid, or the like, for rotational movement, said reel having a drum portion with a flange fixed to each end



thereof, an axial opening extending through said reel, and gear means carried on said reel, said carrier having a bed, said bed having an opening therein for receiving a portion of said flanges of said reel, said carrier having support roller means including first roller means for engaging the outer edges of said flanges for supporting said reel, second roller means for stabilizing said reel upon said first roller means, and drive means including a driving gear mounted thereon for rotating said reel, said method including the steps of:

- (a) placing said reel on said carrier with a portion of its flanges entering said opening;



- (b) supporting said reel in said opening with the outer edges of its flanges resting upon said first roller means;
- (c) moving said stabilizing means to a position wherein said second roller means thereof is disposed within said axial opening of said reel to prevent said reel from tilting;
- (d) engaging said drive gear with said gear means of said reel;
- (e) operating said drive means to rotate said reel;
- (f) disengaging said stabilizing means and said drive means from said reel; and
- (g) lifting said reel out of said bed opening and away from said carrier.

4,945,939

#### PH CONTROL SYSTEM FOR AN AQUEOUS LIQUID RESERVOIR

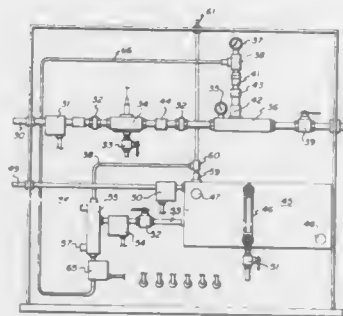
Richard Maxwell, 2021 E. 56th, and David L. Pinnell, 3709 E. 29th, both of Odessa, Tex. 79760

Filed Nov. 2, 1989, Ser. No. 430,299

Int. Cl.<sup>5</sup> G05D 11/08

U.S. Cl. 137-93

12 Claims



1. In an aqueous liquid reservoir system having a pH control, the improvement comprising,
- a pH control system having a flow line for circulating a portion of the aqueous liquid from the reservoir and returning such aqueous liquid back to the reservoir,
- a storage reservoir means for holding pH affecting liquid and dispensing a measured quantity of pH affecting liquid,
- an injection means within said flow line coupled to said storage reservoir means for injecting pH affecting liquid

from said storage reservoir into said flow line whenever activated responsive to aqueous liquid flowing therein,

- a pH probe means upstream of said injection means for detecting the pH of the aqueous liquid from the reservoir, and
- a control computer for comparing the pH of the aqueous liquid with a preselected pH and activating the injector means and storage reservoir means for injecting measured quantities of pH affecting liquid intermittently into the aqueous liquid whereby the pH of the aqueous liquid is maintained within a preset tolerance of the preselected pH.

4,945,940

#### TAMPER PROOF BACKFLOW PREVENTION ASSEMBLY

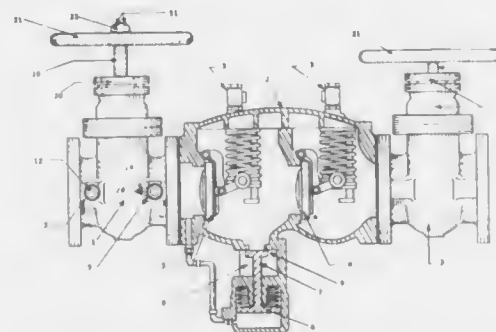
Robert B. Stevens, P.O. Box 26284, Honolulu, HI. 96825

Filed Aug. 21, 1989, Ser. No. 396,113

Int. Cl.<sup>5</sup> F16K 24/00

U.S. Cl. 137-218

9 Claims



1. A testable backflow prevention assembly, provided with a means to access the water within the assembly by those authorized such access, comprising: an upstream gate valve, a primary check valve, a secondary check valve, a zone differential pressure sensing valve, a relief valve, a discharge port, a downstream gate valve, a test cock located upstream of the upstream gate valve, a test cock located between the upstream gate valve and the primary check valve, a test cock located between the primary check valve and the secondary check valve, and a test cock located between the secondary check valve and the downstream gate valve; wherein said test cocks are equipped with a locking valve such that a key is required to unlock and open the valve of the test cock, and, wherein, the test cocks are locked to the backflow prevention assembly body by means of a locking mechanism, said locking mechanism requiring a key in order to permit removal of a test cock from the backflow prevention assembly body.

4,945,941

#### MEANS TO REDUCE VIBRATION IN CHECK VALVES AND STOP/CHECK VALVES CAUSED BY PULSATING LOW FLUID FLOW

Erich J. Kocher, Milwaukee, Wis., assignor to Vilter Manufacturing Corporation, Milwaukee, Wis.

Filed Mar. 5, 1990, Ser. No. 489,252

Int. Cl.<sup>5</sup> F16K 43/00, 15/18, 1/02

U.S. Cl. 137-315

13 Claims

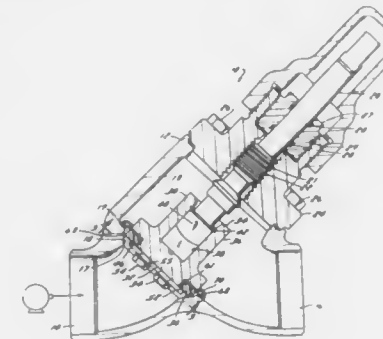
1. A check valve for controlling the flow of fluid there-through comprising:
- a housing having an inlet port and an outlet port, a valve seat between the inlet port and outlet port, and an inner wall surface located between the valve seat and the outlet port;
- a valve disc movable relative to the valve seat into a closed position where it engages the valve seat, and an open position where it is separated by a space from the valve seat;
- said valve disc being movable toward the open position in

response to pressure from a high rate of fluid flow from the fluid inlet port to the fluid outlet port,

said valve disc being movable to the closed position in response to fluid backwash from the fluid outlet port to the fluid inlet port;

said valve disc tending to exhibit vibrating movement toward and away from the valve seat in response to pulsations in the flow of fluid as the fluid passes from the fluid inlet port to the fluid outlet port and, when the rate of fluid flow is relatively low and the frequency of pulsations is relatively low, tending to vibrate into and out of engagement with the valve seat;

said valve disc having an annular groove around the periphery thereof;



- a removable deflector ring disposed in said annular groove for deflecting the flow of fluid through said space to increase pressure acting to move the valve disc so as to reduce vibrating movement of the valve disc and to prevent the valve disc from vibrating into and out of engagement with the valve seat when the rate of fluid flow and the frequency of pulsation are relatively low;
- a removable seal ring disposed in said annular groove for engagement with said valve seat when said valve disc is in the closed position; and
- means being positioned below said annular groove and extending along at least a portion of said annular groove for holding said deflector ring and said seal ring in said annular groove.

4,945,942

#### ACCELERATED HOT WATER DELIVERY SYSTEM

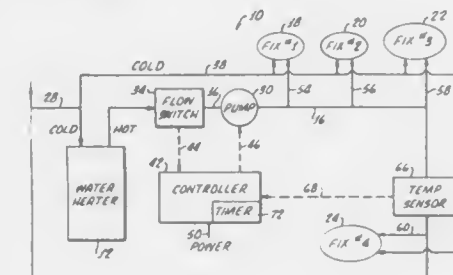
William J. Lund, Stockton, Calif., assignor to Metlund Enterprises, Stockton, Calif.

Filed Sep. 29, 1989, Ser. No. 414,394

Int. Cl.<sup>5</sup> F16K 49/00

U.S. Cl. 137-337

1 Claim



1. A plumbing system comprising:
- a hot water source;
- conduit means, in fluid communication with said hot water source and at least one plumbing fixture, for enabling

circulation of hot water from said hot water source to said plumbing fixture and return to said hot water source;

pump means for circulating hot water through the conduit means;

flow switch means for generating a signal in response to water flow in said conduit means;

control means for causing said pump means to circulate hot water through the conduit means in response to the flow switch means signal and for stopping said pump means, said control means including timing means for causing said control means to stop the pump means after a selected period of time;

temperature sensor means for generating a signal in response to sensing a selected water temperature in said conduit means, said control means being responsive to said temperature sensor means signal for stopping said pump means; said sensor means being disposed along said conduit and adjacent to said plumbing fixture;

a draw pipe connected between each plumbing fixture and the conduit means and wherein said conduit means comprises a conduit pipe having a substantial larger diameter than said draw pipe;

one-way valve means, disposed proximate said plumbing fixture, for enabling cold water to pass from a cold water line into said conduit means; and

hot water recovery means for drawing hot water from said conduit means into said hot water source subsequent to withdrawal of hot water from said plumbing fixture, hot water withdrawn from said conduit being replaced by cold water passing through said one-way valve means.

4,945,943

#### COMPUTERIZED WATER FAUCET

John J. Cogger, Newport Beach, Calif., assignor to Kolator Water Dynamics, Inc., Rochester, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,164

Int. Cl.<sup>5</sup> F16K 11/24

U.S. Cl. 137-360

17 Claims



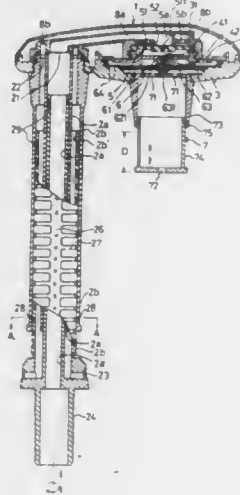
1. A water control system for use with preexisting water supply fixture having at least one valve accessible through at least one preexisting aperture in a wall or countertop comprising:

input means for allowing a user to set a desired water temperature or pressure;

a valve actuator assembly including at least one electromechanical valve actuator and means for coupling the valve actuator to the valve, the spatial arrangement of the coupling means being such that the coupling means may be coupled to the preexisting valve when the valve actuator assembly is mounted on the wall or countertop so as to surround the preexisting aperture, and

control means responsive to the input means for controlling the valve actuator assembly in order to deliver water at the temperature and/or pressure set by the input means.

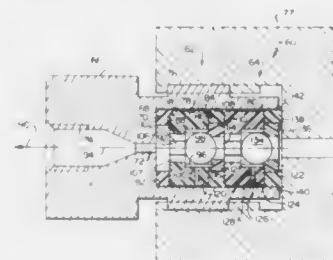
**4,945,944**  
**FILL VALVE FOR TOILET TANKS**  
 Shu-Yuan Chen, No. 15, Alley 5, Lane 217, Chung Hsiao East Road., Sec. 3, Taipei, Taiwan  
 Filed Jun. 28, 1989, Ser. No. 372,472  
 Int. Cl.<sup>3</sup> F16K 31/34, 21/20  
 U.S. Cl. 137—403 3 Claims



1. A fill valve mechanism for toilet flush tanks comprising a valve assembly and pipe means disposed on one side of said valve assembly, said pipe means including an inlet pipe connectible at a lower end thereof to the upper end of a supply pipe at the bottom of a tank, and an outlet pipe having at a lower end thereof, a water discharge hole, said valve assembly including:
  - a generally flat valve body containing generally horizontally extending intake and outlet passageways communicating with upper ends of said supply and outlet pipes, respectively, said intake passageway terminating in a downwardly facing valve seat, said outlet passageway terminating in a downwardly facing outlet opening disposed next to said valve seat,
  - a median partition mounted on said valve body beneath said valve seat and said outlet opening and having in a center thereof a small through-hole and on a lower side thereof a protruding seat communicating with said through-hole,
  - a main valve for opening and closing the flow of water disposed beneath said valve seat and said outlet opening and slightly above said median partition, said main valve comprising a first elastic diaphragm secured along its outer periphery and arranged to normally close said valve seat and said outlet opening and being flexible downwardly by water pressure to open said valve seat and said outlet opening, said first diaphragm including a small through-hole to communicate said intake passageway with a space formed between said first diaphragm and said median partition, a bottom surface of said first diaphragm defining a greater area than said valve seat, an auxiliary valve for regulating the opening and closing movements of said main valve disposed slightly beneath said median partition, said auxiliary valve comprising:
    - a rigid guide plate secured at its outer periphery and including an aperture at about its center, and
    - a second elastic diaphragm secured at an outer periphery thereof below said guide plate, a portion of said second diaphragm being disposed inwardly of said outer periphery and being spaced below said guide plate so as to be movable upwardly and downwardly relative to said guide plate, said second diaphragm including a projection freely slidably disposed in said

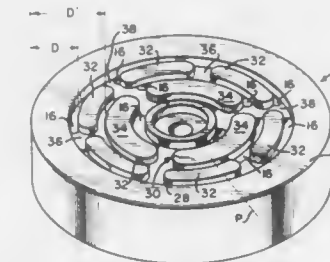
aperture, said projection normally spaced below said protruding seat to keep open said through-hole in said median partition, said second diaphragm being flexible by air pressure toward said median partition whereby said projection slides upwardly in said aperture to close said through-hole in said median partition so as to maintain a positive alignment therewith and an extensible cylinder disposed below said second diaphragm and open at its lower end to communicate with an interior of the tank to conduct pressurized working air toward said second diaphragm when rising water in the tank closes off said lower end of said air cylinder and continues to rise, whereby said second diaphragm is raised to close said through-hole in said median partition, enabling pressure to equalize above and below said first diaphragm whereupon said first diaphragm rises to close said valve seat and said outlet opening responsive to a predetermined vertical adjustment of said extensible air cylinder.

**4,945,945**  
**CHECK VALVE ASSEMBLY FOR CORROSIVE FLUIDS**  
 Carl E. Schmid, Easton, Conn., assignor to The Perkin-Elmer Corp., Norwalk, Conn.  
 Filed Nov. 30, 1989, Ser. No. 443,997  
 Int. Cl.<sup>3</sup> F16K 15/04  
 U.S. Cl. 137—512 16 Claims



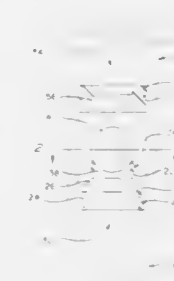
1. A high pressure check valve assembly useful for corrosive fluids under high pressure, comprising:
  - a body having a cylindrical bore therethrough;
  - a ball;
  - a ceramic cage loosely fitted into the bore so as to leave at least a partial clearance between the cage and the body, the cage having an inlet end, an outlet end and a passage therebetween receptive of fluid at the inlet end, the passage having a retaining section adjacent the inlet end for loosely containing the ball and further having obstruction means therein adjacent the retaining section to obstruct the ball without hindering fluid flow forwardly through the passage;
  - a washer-shaped seat member affixed within the bore adjacent to and in sealed relationship with the inlet end, the seat member being cooperative with the ball to effect closure under fluid pressure from the outlet end;
  - inlet-end sealing means for sealing the inlet end of the cage to the body; and
  - outlet-end sealing means for sealing the outlet end of the cage to the body.

**4,945,946**  
**VALVE SEAT FOR A PLATE-TYPE, FLUID-CONTROL VALVE**  
 Brian E. Gangloff, Fairport, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.  
 Filed Jan. 2, 1990, Ser. No. 459,494  
 Int. Cl.<sup>3</sup> F16K 15/00  
 U.S. Cl. 137—516.13 8 Claims



1. A valve seat, for a plate-type, fluid-control valve, comprising:
  - a body; wherein
  - said body has (a) an outer periphery, (b) a first plurality of throughgoing ports formed therein at a first radial distance inwardly from said periphery, (c) a second plurality of throughgoing ports formed therein at a second radial distance inwardly from said periphery, and (d) at least a first plurality of lands at a common radial distance inwardly from said periphery; and
  - adjacent lands, of said plurality thereof, define flow paths therebetween which are in open communication with ports in said first and second pluralities of ports.

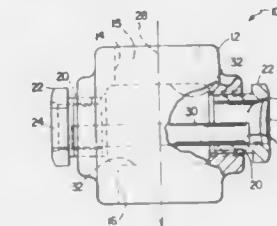
**4,945,947**  
**BALL-TYPE CHECK VALVE**  
 Lubbert Westra, and Brent Lirette, both of Houma, La., assignors to Chromalloy American Corporation, St. Louis, Mo.  
 Filed May 26, 1989, Ser. No. 357,121  
 Int. Cl.<sup>3</sup> F16K 15/00  
 U.S. Cl. 137—519.5 4 Claims



1. In a ball-type check valve, a ball retainer consisting essentially of:
  - (a) a base at one end, designed to securely mount said ball retainer inside a cylindrical conduit, wherein a channel is adapted to allow fluid to pass through the base, wherein said channel includes a central channel region and at least two peripheral channel regions formed by recessed areas in said base;
  - (b) a retainer ring which forms a continuous circle at a second opposed end, wherein said retainer ring forms and encloses a central orifice through which fluid can pass if a ball is not seated on the retainer ring; and
  - (c) at least two vertical supports connecting said base to said retainer ring, wherein said vertical supports are predominantly within a cylindrical region that includes said re-

tainer ring, and wherein orifices pass between said vertical supports, adapted to allow fluid to flow through the ball retainer when a ball is seated on the retainer ring, wherein each orifice is adjoined with one of said aforesaid peripheral channel regions passing through said base to form a contiguous flow channel.

**4,945,948**  
**SIGHT FLOW INDICATOR**  
 Michael A. Fischer, Kingston, and Roger S. Wilkins, Warwick, both of R.I., assignors to Grinnell Corporation, Exeter, N.H.  
 Filed Nov. 7, 1989, Ser. No. 433,490  
 Int. Cl.<sup>3</sup> G01F 15/00; F16K 37/00  
 U.S. Cl. 137—559 11 Claims



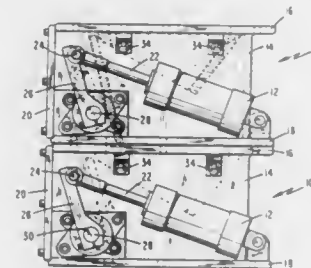
1. A sight flow indicator for visually indicating fluid flow through a conduit comprising
  - a housing that has an inlet and an outlet and defines a flow passage between the two,
  - said flow passage including a sighting region and a restricted region that is between said sighting region and said outlet and has a smaller flow area than said sighting region,
  - a window in said housing providing viewing of said sighting region, and
  - an elongated member that is located in said sighting region and is too long to move from said sighting region into said restricted region and is sufficiently smaller than said sighting region so as to be capable of vibrating about in said sighting region in response to flow of fluid therethrough, and
  - wherein said elongated member is disposed in said sighting region such that its longitudinal axis is essentially perpendicular to the direction of flow from said inlet to said outlet.

**4,945,949**  
**REDUCE HEIGHT DUST VALVE**  
 Urgel R. Carpentier, Plattsburgh, N.Y., assignor to Plattco Corporation, Plattsburgh, N.Y.  
 Continuation of Ser. No. 323,103, Jan. 23, 1989, abandoned, and a continuation of Ser. No. 154,511, Feb. 5, 1988, abandoned, which is a continuation of Ser. No. 45,806, Apr. 10, 1987, abandoned, which is a continuation of Ser. No. 868,764, May 30, 1986, abandoned. This application Dec. 18, 1989, Ser. No. 449,070  
 Int. Cl.<sup>3</sup> F16K 1/00 2 Claims

1. A dust trap comprising a pair of dust valves coaxially mounted to each other, each valve comprising: a valve body having a longitudinal flow path therethrough;
  - a conduit member removably mounted in the upper portion of said valve body surrounding the flow path and forming a valve seat contained in a plane disposed at an acute angle to the longitudinal axis of said valve body said seat being a rectangle having upper and lower ends and angular sides said upper end being disposed adjacent the side of said valve body where said shaft is mounted;
  - a valve flapper;
  - an actuator shaft rotatably mounted on and extending through the lower portion of said body adjacent a side

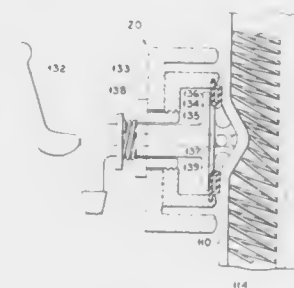


thereof and means coupled thereto for rotating said shaft about 90 degrees;  
an actuator arm affixed to said shaft and a valve flapper plate pivotally mounted on the end of said arm opposite said shaft, said arm being disposed to seat and unseat the upper surface of said flapper plate against said valve seat to open and close said valve as said shaft rotates the upper end



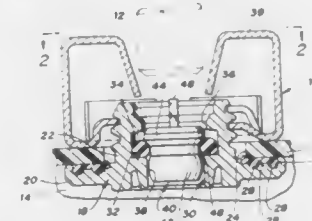
surface of said seat and the corresponding surface of said flapper plate defining opposed radial surfaces said actuator arm being pivotally mounted on said flapper plate adjacent the end thereof which defines the radial surface whereby as said valve opens the radial surface said flapper plate will pivot against the radial surface of said seat and the opposite end will rotate downwardly to lie against said arm.

**4,945,950**  
**CONTINUOUS TAPPING DEVICE**  
Lars A. H. Nilsson, Oskarshamn, Sweden, assignor to Astra Meditec AB, Molndal, Sweden  
PCT No. PCT/SE87/00526, § 371 Date Jun. 14, 1989, § 102(e) Date Jun. 14, 1989, PCT Pub. No. WO88/03626, PCT Pub. Date May 19, 1988  
PCT Filed Nov. 11, 1987, Ser. No. 358,368  
Claims priority, application Sweden, Nov. 13, 1986, 86048550  
Int. Cl.<sup>5</sup> F16L 27/00  
U.S. Cl. 137—798 8 Claims



1. A continuous output device for liquid or gaseous fluids, comprising:  
a rail (1) having at least one channel (10, 11) opening to a first surface (5) of the rail via a slit (9) sealed by a sealing strip (12) within said channel, a fluid being supplied to said channel; and a coupling (20) having an opening member (38) for locally pushing aside said sealing strip (12) for passing the fluid to said coupling beyond said sealing strip for further distribution to a using place, said sealing strip (12) using a spiral spring (114) covered with a sealing material (111, 112) for sealing against the slit.

**4,945,951**  
**TEMPORARY PLUG FOR FLUID FITTING**  
Henry E. Beamer, Middleport, N.Y., assignor to General Motors Corporation, Detroit, Mich.  
Filed Oct. 24, 1988, Ser. No. 261,308  
Int. Cl.<sup>5</sup> B65D 51/00  
U.S. Cl. 138—89 2 Claims



1. In combination, a female fluid fitting having an internal annular groove, an O-ring mounted in said internal groove for normally sealingly contacting with a male fitting on insertion of the latter into said female fitting, and a temporary plug closing said female fitting comprising an imperforate body inserted into said female fitting, said body having a rounded insertion ramp end and an annular shoulder axially spaced therefrom and arranged coaxial therewith so as to define an external annular groove, said rounded insertion ramp end constituting a means to slidably receive said O-ring in said external groove and to sealingly receive said O-ring, said O-ring constituting a means to sealingly close said plug to said female fitting and also readily releasably retain said plug in place with said O-ring and said shoulder adapted to act as a stop against said O-ring to prevent over insertion of said plug.

**4,945,952**  
**MULTIPLE LAYER PAPER MAKING WIRE WITH ZIG ZAG DIRECTED CONNECTING THREADS BETWEEN LAYERS**  
Fritz Vöhringer, Heidenheim, Fed. Rep. of Germany, assignor to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik, Fed. Rep. of Germany  
Filed Feb. 11, 1988, Ser. No. 154,807  
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705345  
Int. Cl.<sup>5</sup> D03D 11/00, 13/00, 15/02  
U.S. Cl. 139—383 A 11 Claims



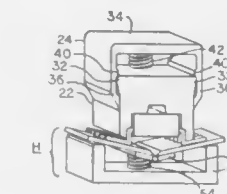
1. A composite paper-making wire as sheet forming part of a paper-making machine sheet comprising:  
an upper fabric layer, and  
a lower fabric layer,  
wherein said upper fabric layer is connected to said lower fabric layer by at least two connecting thread, said connecting thread interwoven between said upper and lower layers in both a longitudinal and crossways direction;  
said connecting thread crating an upper connecting point with said upper fabric layer and a lower connecting point with said lower fabric layer;  
wherein the points of interweaving of said connecting thread with said upper and lower layers create a zig-zag pattern in the plane view, wherein said connecting thread tra-

verses horizontally creating an oblique angle between said connecting thread and said upper or lower fabric layer; wherein said connecting thread runs substantially perpendicular to said upper and lower fabric layers forming a straight line pattern in the perspective view; wherein said connecting thread further comprises a connecting thread length equal to the length between said one point of interweaving of said lower fabric layer and said one point of interweaving of said upper fabric layer, said connecting thread length defined as

$$l = \sqrt{d^2 + s^2} + a^2 > 0$$

where l is the connecting thread length;  
d is the vertical distance of the connecting thread measured from an upper side of said upper fabric layer to a lower side of said lower fabric layer;  
s is the horizontal distance between said upper connecting point and said lower connecting point; and  
a is the transverse distance between said upper connecting point and said lower connecting point.

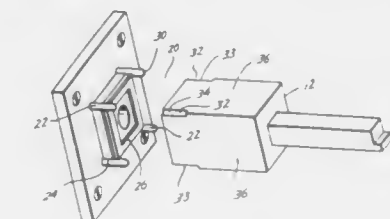
**4,945,953**  
**SURFACE MOUNT COMPONENT JIG**  
James W. Kronberg, Beech Island, S.C., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed May 2, 1989, Ser. No. 346,761  
Int. Cl.<sup>5</sup> B21F 11/00  
U.S. Cl. 140—105 3 Claims



1. A device for bending an end portion of an array of pins extending from a dual-inline-package electrical circuit component, and the like, and cutting an excess length from said end portion so that said component can be conveniently mounted to a same surface rather than to an opposing surface of a circuit board wherein said device comprises  
a means for holding said component so that said array can be bent,  
said holding means having two shoulders each having a side extending downwardly so as to form a recess for holding said component between said sides and having a means for releasing said component from said holding means;  
a pin cutting means positioned astride said holding means for cutting an excess length of end portion,  
said pin cutting means having dependant cutter bars with blades at distal ends, said cutter bars flanking said sides of said holding means;  
said pin cutting means having a first biasing means for urging said holding means and said pin cutting means apart;  
said cutter bars having ridges engaging said shoulders of said holding means so that a force applied to said pin cutting means to move said pin cutting means downward is transferred by said ridges to said shoulders and by said first biasing means to said holding means so that said holding means moves downwards with said pin cutting means; and  
a means for guiding and bending said end portion positioned opposite said holding means so that when said holding means and said guiding and bending means are brought together said end portion is guided outwardly and bent upwardly past a horizontal position,  
said guiding and holding means having two flat members pivotally interconnected so that said two flat members can

move from an upward peaked position to a downward peaked position;  
said guiding and bending means having a second biasing means urging said two flat members toward said upward peaked position from said downward position so that as said holding means and said guiding and bending means are brought together, said end portion, first engages said flat members in said upward peaked position, and is guided outwardly, and said end portion, said flat members moving to said downward peaked position under force applied by said holding means being brought together with said guiding and bending means, is bent upwardly against said sides of said holding means.

**4,945,954**  
**METHOD AND APPARATUS FOR ALIGNING MATING FORM TOOLS**  
James D. Wehrly, Jr., and Michael J. Bertram, both of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.  
Filed Sep. 28, 1989, Ser. No. 414,549  
Int. Cl.<sup>5</sup> B21D 37/12  
U.S. Cl. 140—105 20 Claims



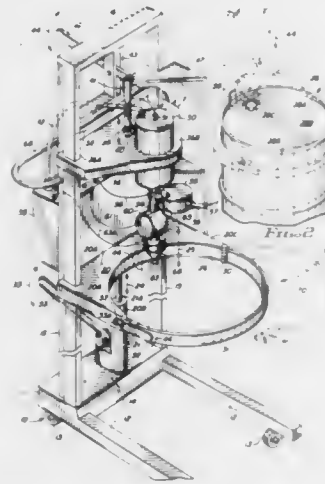
1. A tooling alignment apparatus comprising:  
first and second mating tools,  
the first tool comprising a plurality of alignment tracks formed in the exterior sides in the direction normal to the movement between the tools, and  
the second tool comprising a plurality of alignment members extending upwardly towards the first tool and positioned directly beneath the alignment tracks, wherein the alignment members are formed to engage in slidable contact with the alignment tracks as the tools are brought together.

**4,945,955**  
**HAZARDOUS WASTE REMOVAL DEVICES**  
Dennis Murphy, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.  
Filed Mar. 23, 1988, Ser. No. 171,949  
Int. Cl.<sup>5</sup> B65B 31/04  
U.S. Cl. 141—65 9 Claims

1. Apparatus for transferring hazardous liquid from a container into a storage drum, comprising in combination:  
(a) a base supported on a floor by wheels;  
(b) an upright member attached to the base;  
(c) a drum cradle connected to the upright member and a clamp assembly releasably attaching the drum to the drum cradle;  
(d) means for raising and lowering the drum cradle and the drum attached thereto to allow transporting the drum by rolling the base along the floor;  
(e) a transfer reservoir;  
(f) an inlet valve coupled between the transfer reservoir and an inlet tube;  
(g) a dump valve coupled between the transfer reservoir and a dump tube extending into an opening in the top of the drum;  
(h) reservoir sensing means for providing a first signal if the transfer reservoir is full, and means for producing a sec-

ond signal after dumping contents of the transfer reservoir;

- (i) first means for producing a vacuum in the transfer reservoir, closing the dump valve, and opening the inlet valve to draw hazardous liquid into the transfer reservoir in response to the second signal;



- (j) second means for sensing when the transfer reservoir is full, releasing the vacuum in the transfer reservoir, closing the inlet valve, and opening the dump valve to dump the hazardous liquid in the transfer reservoir into the drum in response to the first signal; and
- (k) a transfer reservoir stage supporting the transfer reservoir and the third means for raising and lowering the reservoir.

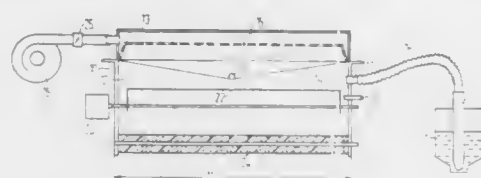
4,945,956

**DEVICE FOR TRANSFERRING TONER FROM A TRANSPORT CONTAINER INTO A TONER RESERVOIR**  
 Mehmet-A. Bueyueguelue, and Manfred Maier, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 PCT No. PCT/DE87/00438, § 371 Date Apr. 3, 1989, § 102(e) Date Apr. 3, 1989, PCT Pub. No. WO88/02503, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 25, 1987, Ser. No. 347,883  
 Claims priority, application Fed. Rep. of Germany, Oct. 2, 1986, 3633599

Int. Cl.<sup>5</sup> B65G 53/24; G03G 15/00  
 U.S. Cl. 141—67

8 Claims



1. A device for transferring toner from a transport container into a toner reservoir and from the latter into a developer station of an electrophotographic printer or copier means, whereby a suction nozzle comprising a take-in region having a take-in opening and introducible into the transport container is provided for decanting the toner from the transport container into the toner reservoir by producing a low pressure in the toner reservoir, characterized in that the toner reservoir comprises a settling space that is in communication with the developer station and comprises a suction space separated from the settling space by a filter, said suction space being connected to a means for generating a low pressure to establish an airstream, the filter being fashioned such that, first, it arcs outward under

the influence of the airstream flowing therethrough and, second, arcs back again given interruptions of the airstream.

4,945,957

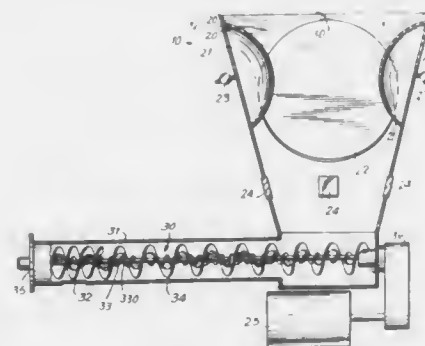
**HIGH-RESOLUTION WEIGHER/FEEDER FOR FINE PARTICULATE MATERIALS**

Kenneth A. Kardux, Wayne, and Thomas Kristo-Nagy, Clifton, both of N.J., assignors to Ohaus Corporation, Florham Park, N.J.

Continuation of Ser. No. 189,177, May 2, 1988, abandoned. This application Aug. 14, 1989, Ser. No. 393,833

Int. Cl.<sup>5</sup> B65D 5/00; G01G 11/00  
 U.S. Cl. 141—83

9 Claims



1. A loss-of-weight feeder for weighing and dispensing fine particulate-material, said feeder comprising:

a hopper having a top and a bottom;  
 an outlet tube extending horizontally from the bottom of said hopper to a feeder outlet;

feeding means at the bottom of said hopper for feeding said fine particulate material from said hopper at a first feed rate and a second feed rate, the ratio of said first rate to said second rate being about 500:1, said feeding means comprising first and second screw conveyors for conveying said fine particulate material horizontally through said outlet tube, one of said screw conveyors being a high-volume screw conveyor capable of running at a high volume rate, and the other of said screw conveyors being a low-volume screw conveyor capable of running at both a high volume rate and a low volume rate, said low-volume conveyor being an auger capable of a high rate of rotation and a low rate of rotation, and said high-volume conveyor being a coreless auger wrapped around said low-volume conveyor, said high-volume conveyor being capable of said high rate of rotation, both of said augers having the same length, the ratio of said high rate of rotation to said low rate of rotation being about 300:1, said feeding means feeding said fine particulate material from said hopper at said first feed rate until a desired weight of material to be fed is approached at which time said feeding means feeds said fine particulate material from said hopper at said second feed rate until said desired weight is reached; and

high-resolution weighing means, said hopper being coupled to said weighing means, said weighing means allowing high-resolution measurement of the weight of material fed; whereby:

said feeder provides highly accurate control of the weight of material fed.

4,945,958

**AUTOMATIC PROCESSING HEAD REPLACEMENT DEVICE IN WOOD WORKING MACHINE**

Isao Sboda, 116-4, Okaba-cbo, Hamamatsu-shi, Shizuoka-ken, Japan

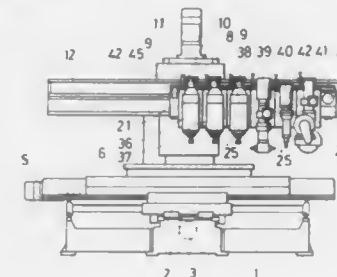
Filed Dec. 16, 1988, Ser. No. 285,552

Claims priority, application Japan, Dec. 16, 1987, 62-19094[U]

Int. Cl.<sup>5</sup> B23B 7/04; B27C 9/04

U.S. Cl. 144—1 R

4 Claims



1. A wood working machine, comprising:  
 a column having vertical rails provided on a front face thereof;  
 a ram slidably mounted on said vertical rails and extending vertically;  
 left- and right-hand horizontal beams respectively mounted on opposite sides of said column, said beams being spaced from each other proximate said ram to define a predetermined clearance therebetween to allow for vertical movement of said ram;  
 first-guide means disposed on said beams for guiding a plurality of head holders arranged in side by side relationship for leftward and rightward slidable movement;  
 second guide means disposed on the front face of said ram, said second guide means being alignable with said first guide means such that said second guide means can receive one of said head holders from said first guide means;  
 a rack provided on one of said left- and right-hand beams in parallel to said first and second guide means;  
 a carriage mounted on said first guide means on one of said beams for leftward and rightward slidable movement;  
 a slide block mounted on said first guide means of another of said beams, said carriage and said slide block being connected together by means of a stay for slidable movement in unison;  
 a motor mounted on said carriage for driving the carriage;  
 a pinion mounted on said carriage to be driven by said motor and meshing with said rack for moving said carriage along said first guide means on said one beam, said plurality of head holders being arranged in side by side relationship between said carriage and said slide block for movement in unison therewith; and  
 a sensor mounted on said ram for detecting any optional one of said head holders to stop said motor on the carriage.

4,945,959

**DEVICE FOR PLANING AND MOLDING SURFACE TEXTURES IN WOOD BOARDS**

Marita Bledenbach, Hunfeld, Fed. Rep. of Germany, assignor to Hubert Josef Koch, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 318,207

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807722; Jul. 26, 1988, 3825340

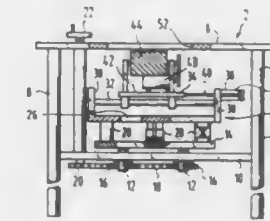
Int. Cl.<sup>5</sup> B27C 5/00

U.S. Cl. 144—134 R

13 Claims

1. Apparatus for machining a selected texture in a machinable surface of a board, comprising:  
 two machining heads disposed to be separated with respect to each other in a first direction, each machining head

having a predetermined machining profile for correspondingly machining said machinable surface of the board;  
 means for guiding movement of the board relative to said machining heads along said first direction;



4,945,960

**DOUBLE-ACTION VERTICAL WOOD SPLITTER**  
 Christopher J. McCanley, Rt. 2, Box 320D, Hillsboro, N.H. 03244

Filed Jul. 21, 1989, Ser. No. 383,662

Int. Cl.<sup>5</sup> B27L 7/00

U.S. Cl. 144—193 A

24 Claims



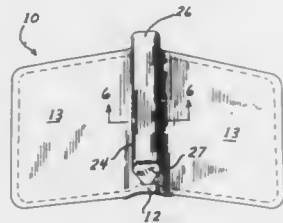
1. A vertical double-action wood splitter adapted to be mounted on a vehicle, comprising:  
 (a) a substantially vertical frame with an upper and lower wood restraining means projecting generally horizontally therefrom at respective ends thereof and a generally vertical guide member;  
 (b) an elongated carriage slidably mounted for reciprocating motion on said guide member;  
 (c) a wood splitting means removably mounted on said carriage;  
 (d) a coupling means for operatively interconnecting said wood splitting means with said carriage, thereby permitting easy removal of said wood splitting means from said carriage;  
 (e) two way activating means mounted within said vertical frame wherein said two way activating means is operatively interconnected with said carriage and said wood splitting means for driving said wood splitting means alternately upward and downward between said upper and lower wood restraining means for splitting wood.



4,945,961

**WALLET ATTACHMENT FOR FACILITATING WITHDRAWAL FROM A POCKET**  
 William C. Healy, 2634 N. Lake Dr., Milwaukee, Wis. 53211  
 Filed Jun. 30, 1989, Ser. No. 374,442  
 Int. Cl.<sup>5</sup> A45C 1/06, 11/18, 13/30  
 U.S. Cl. 150—132

8 Claims

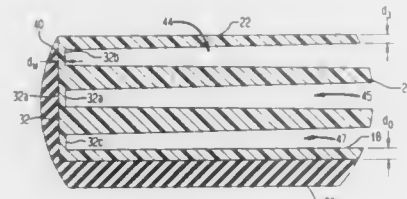
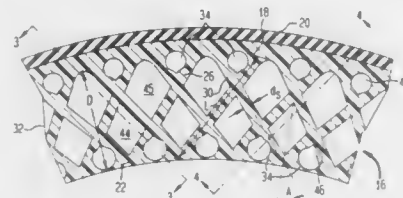


4. In a pocket-size wallet of the type adapted to be folded in half about a center fold line in its outer surface layer to define oppositely facing outer surface portions, said wallet intended for insertion into a pocket with the center fold line at the upper edge of the wallet and nearest the pocket opening, the improvement comprising flexible finger-engageable withdrawal means on the outside of the wallet, formed independently of the outer surface layer, and adjacent the fold line for facilitating withdrawal of the wallet from a pocket, said withdrawal means comprising a tab attached to the wallet on the fold line and extending therealong, said tab including an outer free edge opposite its attachment comprising a region of enhanced thickness.

4,945,962

**HONEYCOMB NON-PNEUMATIC TIRE WITH A SINGLE WEB ON ONE SIDE**  
 Scott R. Pajtas, Warren, Mich., assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio  
 Filed Jun. 9, 1989, Ser. No. 364,344  
 Int. Cl.<sup>5</sup> B60C 7/10  
 U.S. Cl. 152—7

21 Claims



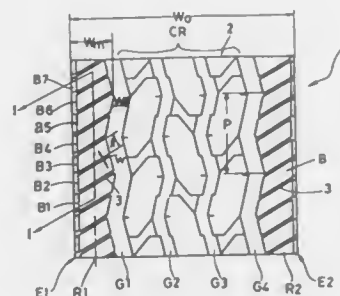
1. A non-pneumatic tire rotatable about an axis, said tire comprising an annular body of a resilient elastomeric synthetic resinous material, said body consisting essentially of a generally cylindrical outer member at the outer periphery of said body, a generally cylindrical inner member spaced radially inward from and coaxial with said outer member, a plurality of axially extending, circumferentially spaced-apart first and second rib members connected at their corresponding inner

and outer ends to said inner and outer cylindrical members, said rib members being oppositely directed at angles of from about 15° to 75° to radial planes which intersect them at their inner ends, and a unitary circumferential side web member having opposite side faces at an angle  $\theta$  in the range from 0° to 30° on either side of the vertical to the rotational axis of the tire, said side web member having its radially inner and outer peripheries connected respectively to said inner and outer cylindrical members only at one edge of each, one connected edge above the other, said side web member being connected on only one side face to both said first and second rib members, said first rib members being directed oppositely to said second rib members with respect to said radial planes, to form with said inner and outer cylindrical members and said web member, a loadcarrying honeycomb structure which provides locally loaded members adapted to buckle.

4,945,963

**RADIAL TIRE TREAD PATTERN HAVING SHOULDER BLOCKS**  
 Kenichi Fujiwara, Miki, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
 Filed Jul. 13, 1988, Ser. No. 218,260  
 Claims priority, application Japan, Jul. 13, 1987, 62-107729[U]  
 Int. Cl.<sup>5</sup> B60C 11/06  
 U.S. Cl. 152—209 R

7 Claims

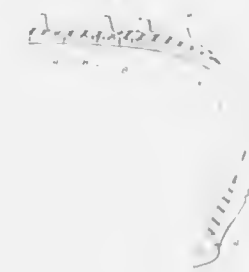


1. A radial tire, having a tread provided with at least two zigzag longitudinal grooves, each containing a plurality of zigzag pitches, said longitudinal grooves extending circumferentially of the tire to define a tread shoulder portion between each of the outermost longitudinal grooves and each tread edge, and transverse grooves extending between said outermost longitudinal grooves and the tread edges to divide each of the tread shoulder portions into shoulder blocks, each having circumferentially opposed sidewalls, said transverse grooves being arranged circumferentially so as to have at least four transverse grooves per single zigzag pitch of the longitudinal grooves, wherein the sidewall area total of each shoulder block is defined as the total of the area of one of said circumferentially opposed sidewalls thereof and that of the other, and the difference between a maximum and a minimum in the sidewall area totals is not more than 10% of the maximum, wherein in the transverse grooves in each zigzag pitch, at least the longest transverse groove is provided with a raised portion to decrease the sidewall area of the adjacent shoulder block so that the difference between the maximum value and the minimum value of the sidewall area totals is not more than 10% of the maximum value.

4,945,964

**TIRE WITH DEFINED INNER AND OUTER TREAD RUBBER COMPOSITIONS**  
 Eiji Takiguchi, and Toshiharu Kikutsugi, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan  
 Continuation of Ser. No. 897,952, Aug. 19, 1986, abandoned.  
 This application Nov. 22, 1988, Ser. No. 274,686  
 Claims priority, application Japan, Aug. 27, 1985, 60-186532  
 Int. Cl.<sup>5</sup> B60C 1/00  
 U.S. Cl. 152—209 R

2 Claims



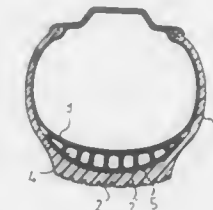
1. In a pneumatic radial tire comprising a pair of sidewalls, a tread toroidally extending between the sidewalls, a carcass composed of at least one rubberized ply containing organic fiber cords arranged in a direction substantially perpendicular to the equatorial plane of the tire for reinforcing the sidewalls and tread, and a belt composed of at least one inextensible cord layer and superimposed about a crown portion of the carcass, the improvement wherein said tread has a composite structure of an outer rubber layer located outward in the radial direction of the tire and an inner rubber layer located inward in the radial direction, and said outer rubber layer is composed of a vulcanized tread rubber composition comprising:

- (A) 70-150 parts by weight of carbon black,
- (B) 1.5-2.0 parts by weight in total of sulfur and a thiuram series vulcanizing agent, provided that the amount of said thiuram series vulcanizing agent is 0.3-1.0 part by weight, and
- (C) 30-120 parts by weight of a softening agent, per 100 parts by weight of a diene rubber inclusive of at least one styrene-butadiene rubber, wherein the sum of the percent by weight of the styrene portion in the total styrene-butadiene rubber and the percent by weight of the vinyl portion in the butadiene unit of the total styrene-butadiene rubber is not less than 45, wherein said outer rubber layer has a loss tangent at 30° C. of at least 0.45, a modulus at 100% elongation of 12-23 kg/cm<sup>2</sup> and a blow temperature of 210°-230° C. and said inner rubber layer has a loss tangent of not less than 0.37 at 30° C. but smaller than that of said outer rubber layer, a modulus at 100% elongation and blow temperature higher than the respective upper limits of those of said outer rubber layer, and wherein the outer rubber layer has a ratio of monosulfide crosslinking structure to total crosslinking structure of not less than 25 mol % prior to actual use of the tire, and a loss tangent peak temperature of not lower than -25° C. as properties after vulcanization.

4,945,965

**SAFETY TUBE ASSEMBLY FOR PNEUMATIC TIRES**  
 Bok-Kyu Kim, Bldg. 201, #1004, Hyundai APT, 23-3 Cheongdam-dong, Kangnam-ku, Seoul, Rep. of Korea  
 Filed Oct. 26, 1988, Ser. No. 262,957  
 Claims priority, application Rep. of Korea, Oct. 29, 1987, 18432/1987  
 Int. Cl.<sup>5</sup> B60C 5/00  
 U.S. Cl. 152—511

1 Claim

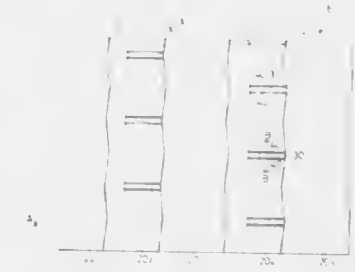


1. A safety tube assembly for use within a pneumatic tire, said assembly comprising a plurality of small balloons inflated at a predetermined pressure, said small balloons being contiguously disposed and juxtapositioned in a position corresponding to the underside of the tread portion of a pneumatic tire, and an annular primary tube accommodated within the circumference of said small balloons, whereby said small balloons serve as independent small chambers in contact with one another between the position corresponding to the underside of said tread portion and the outer circumferential surface of said primary tube by means of inflation of said primary tube, each of said small balloons being made of a pliable, flexible, elastically expandable and contractible material, said safety tube assembly including a band provided completely and circumferentially in a position corresponding to the underside of said tread portion and which when installed within a pneumatic tire directly contacts said tread portion, wherein said band is made of a flexible and puncture resistant material.

4,945,966

**RADIAL TIRE TREAD FOR HEAVY-DUTY ROAD VEHICLES HAVING PLATFORM DEPTH MAINTAINED WITH WEAR**  
 Hiroshi Ogawa, Higashiyamato, Japan, assignor to Bridgestone Corporation, Kyo, Japan  
 Filed Oct. 22, 1987, Ser. No. 111,332  
 Claims priority, application Japan, Oct. 23, 1986, 61-250862  
 Int. Cl.<sup>5</sup> B60C 11/06  
 U.S. Cl. 152—209 R

12 Claims

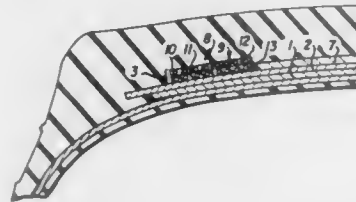


1. A radial tire for heavy-duty road vehicles, comprising: (a) at least two main circumferential grooves (10) arranged at intervals in the transverse direction of a tire tread (T); (b) a plurality of platforms (30) arranged at intervals in the circumferential direction on land portions (20) formed between said two main circumferential grooves (10), said platforms having a height difference (H) smaller than a

depth of said main circumferential grooves so as to provide a height difference down from the surface of the tire land portion; and

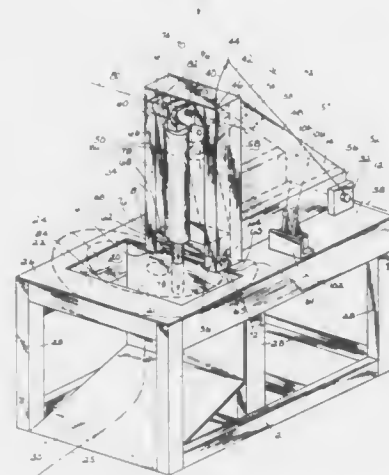
(c) a plurality of narrow grooves (40) formed in a land portion along each of said platforms to separate said platform from the tire land portion, wherein when a regular load is applied to said tire in use, surfaces of said platforms are in contact with the ground during tire rotation such that the wear rate on the surface of the land portion is substantially equal to that on the surface of the platform and said height difference is substantially maintained over the life of the tire.

**4,945,967**  
**REINFORCING ARMOURING OF TIRES FOR VEHICLE WHEELS**  
 Giuseppe Tavazza, Milan, and Luigi Maiocchi, Vernate fraz. Moncuoco, both of Italy, assignors to Pirelli Coordinamento Pneumatici S.p.A., Italy  
 Filed Apr. 4, 1988, Ser. No. 177,449  
 Claims priority, application Italy, Apr. 28, 1987, 20292 A/87  
 Int. Cl.<sup>5</sup> B60C 9/22  
 U.S. Cl. 152—531 9 Claims



1. A tire for vehicle-wheels comprising a carcass of the radial type, a tread-band upon such carcass and a breaker structure positioned between the tread-band and the carcass, said breaker structure comprising at least two radially overlapped layers of metallic fabric, having a width substantially the same as that of the tread-band, reinforced by cords having an elongation at break between 2.6% and 3.2%, said cords being disposed parallel to one another in each layer and crossed with those in the adjacent layer, and said cords being symmetrically inclined in respect to the longitudinal direction of the tire at an angle between 10° and 30°, said breaker structure also including two axially spaced reinforcing rings, wherein each ring is disposed at one lateral side of said breaker structure, in a position radially outward in respect to said at least two metallic fabric layers, each of said rings having an axial width between 7% and 40% of the axial width of said breaker structure, each ring comprising at least a strip of rubberized fabric reinforced with cords disposed in the circumferential direction of the tire, each strip having an axial inside edge and an axial outside edge, said strip cords having an elongation at break of a value higher than that of the reinforcing cords of said metallic fabric layers, said strips comprising two axially flanked groups of said reinforcing cords, outer and inner groups respectively, the positioning and treatment of the cords being such that in the vulcanized tire the modulus of said cords is approximately equal to one another within each group and substantially different from those of the flanked group, the group with cords having the greater modulus being disposed in the strip nearest the axial outside edge of that strip.

**4,945,968**  
**TIRE DERIMMER AND METHOD FOR TIRE DERIMMING**  
 Marvin Bradburn, Muncie, Ind., assignor to Car-Go Corporation, Muncie, Ind.  
 Continuation of Ser. No. 175,756, Mar. 31, 1988, abandoned.  
 This application Oct. 10, 1989, Ser. No. 420,666  
 Int. Cl.<sup>5</sup> B60C 25/06  
 U.S. Cl. 157—1.17 12 Claims

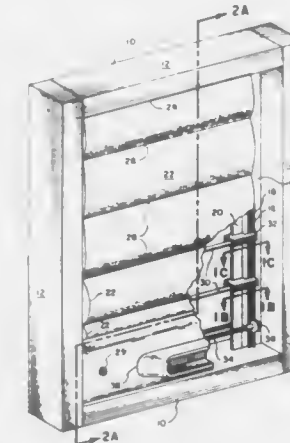


1. A derimmer comprising a base, said base having an opening, said base having a working edge partially bounding said opening, said opening having a dimension extending in a direction generally perpendicular to said working edge of less than the diameter of said wheel, a jaw movably attached to said base, and a jaw mover operatively connected to said jaw, said jaw being movable by said jaw mover between a raised portion and a lowered position, said jaw in said lowered position clamping a tire mounted on a wheel against said base adjacent to said opening and opposite to said working edge, a ram connected to said jaw and a ram extender operatively connected to said ram, said ram being extendible by said ram extender against said wheel of a mounted tire clamped by said jaw to pivot said wheel about said working edge, thereby separating said wheel from said tire.

**4,945,969**  
**METHOD AND MACHINERY FOR MAKING A FLAWLESS SHADE PRODUCT**  
 John T. Schnebly, Watervliet; Thomas J. Marusak, Loudonville, and John A. Corey, Melrose, all of N.Y., assignors to Comfortex Corporation, Cohoes, N.Y.  
 Filed Oct. 6, 1988, Ser. No. 254,381  
 Int. Cl.<sup>5</sup> E06B 3/94  
 U.S. Cl. 160—84.1 16 Claims

1. A shade for covering framed openings comprising:  
 a pair of tracks disposed opposite and essentially parallel each other along the sides of a framed opening, said tracks bearing on at least one side thereof detented traction means;  
 movable header means mounted transversely across said opening for movement along said tracks, said header having first and second pairs of wheels, each pair rotatably secured at each end of said header means and engageable with a track, each of said wheel pairs having an interior wheel adapted to travel on one side of a track and an opposing, closely biased exterior wheel adapted to travel on an opposite side of the track, at least one wheel in said first wheel pair mechanically coupled to a wheel in said second wheel pair to compel uniformly coupled movement of said wheel pairs along said tracks; and

a flexible shade attached at one marginal end to a fixed sill of said opening and, at an opposite marginal end, to said header means and containing therein, at regularly spaced intervals, a plurality of parallel stiffener rods, said rods also disposed transversely to said tracks and having slot-



**4,945,970**  
**CORD LOCK UNIT FOR DRAPE OR BLIND ASSEMBLY**  
 Norbert Marocco, 46 Pennygrass Court, Woodbridge, Ontario, Canada  
 Filed Jun. 28, 1989, Ser. No. 372,564  
 Int. Cl.<sup>5</sup> E06B 9/38  
 U.S. Cl. 160—178.2 18 Claims



1. A cord lock unit for use in a window covering assembly comprising a hollow channel-shaped header unit defined by a plurality of outer walls, defining an interior and an exterior, a pair of mutually spaced apart pull cords extending upwardly into said header unit along said interior of said header unit and downwardly from said header unit through an opening in at least one of said walls of said header unit to said exterior, and said opening being defined by a peripheral edge; and which cord lock unit comprises:  
 a first exterior portion larger than said opening in said header unit, adapted to be located on said exterior of said header unit;  
 a second interior portion secured to said first portion and dimensioned so as to be insertable through said opening in said header unit from said exterior into said interior with said first portion extending outwardly beyond said peripheral edge of said opening on said exterior;  
 resilient engagement means integral with said cord lock unit adapted to be deflected during insertion of said second portion and to pass through said opening from said exterior to said interior to permit such insertion and resiliently

to return to a position after such insertion whereby to engage said interior of said header unit and to retain said cord lock unit in position within said opening by resilient engagement and being resiliently disengageable for release of said cord lock unit;  
 pulley means for guiding said pull cords for movement through said cord lock unit, and,  
 releasable cord-engaging means movable between a cord-engaging position and a cord-releasing position for engaging the cords in said cord-engaging position to prevent movement thereof and for permitting movement of said cords in said cord-releasing position.

**4,945,971**  
**LADDER CORDS FOR VENETIAN BLINDS**  
 Sune I. Ivarsson, Tranerud 5591, S-662 02 Fångersfors; Sten A. Smederöd, Kyrkebacken 4, S-415 06 Göteborg, and Karl-Erik Larsson, Pl 5544, S-662 02 Fångersfors, all of Sweden  
 Filed May 26, 1989, Ser. No. 357,472  
 Claims priority, application Sweden, Jan. 25, 1989, 8900255; Mar. 1, 1989, 8900697  
 Int. Cl.<sup>5</sup> E06B 9/38  
 U.S. Cl. 160—178.3 9 Claims



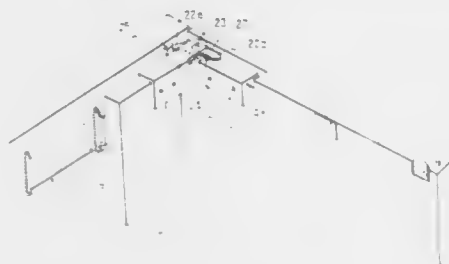
1. A ladder cord for a venetian blind comprising:  
 a pair of chain legs comprising a first chain leg and a second chain leg formed by crocheting and vertically aligned substantially parallel to each other;  
 a plurality of cross connectors formed from at least one continuous cross connector thread having portions integrated into said first and second chain legs and having portions extending crosswise between said first and second chain legs at predetermined intervals thereof to support slats of the venetian blind; and  
 a pair of mounting openings comprising a first opening positioned at a predetermined height on said first chain leg and a second opening oppositely positioned on said second chain leg at a height substantially equal to the height of said first opening, wherein each mounting opening comprises a loop formed between one of said chain legs and an integral thread extending outwardly from said one of said chain legs and returning back into said same one of said chain legs and wherein each mounting opening is capable of receiving a venetian blind mounting means.

**4,945,972**  
**CONTAINABLE DOOR OF FOLDING TYPE**  
 Katsuyuki Takeuchi, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan  
 Filed Aug. 28, 1989, Ser. No. 399,587  
 Claims priority, application Japan, Aug. 31, 1988, 63-217694  
 Int. Cl.<sup>5</sup> E05D 15/26  
 U.S. Cl. 160—203 5 Claims

1. A folding door containable in a cabinet, comprising:  
 a foldable door body, said door body having an urging surface on its inner face adjacent to its distal end;  
 a slide member slidable along an inner surface of the cabinet toward and away from a front side thereof, said door body being angularly movably connected at its proximal end portion to said slide member by a hinge;



a lock member mounted on the proximal end portion of said door body so as to be angularly movable about an axis disposed at a central portion of said lock member, said lock member having an engaging portion extending obliquely toward the inner surface of the cabinet, said lock member also having a contact portion extending toward the distal end of said door body;  
means for urging said lock member to be angularly moved in a direction to abut said engaging portion against the inner surface of the cabinet; and



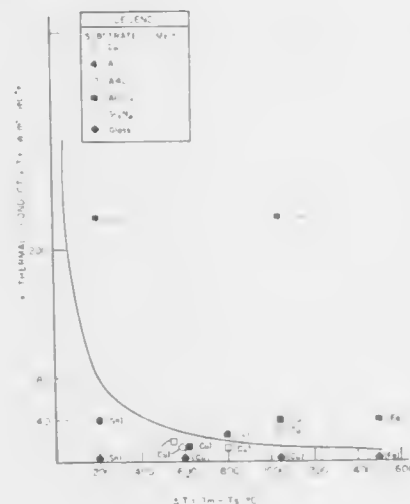
means for retaining said engaging portion of said lock member, said retaining means being provided on the inner surface of the cabinet,  
wherein when said door body is folded, said urging surface of said door body is engaged with said contact portion of said lock member so as to angularly move said lock member in a direction to move said engaging portion away from the inner surface of the cabinet.

4,945,973

**THERMAL CONDUCTIVITY OF SUBSTRATE MATERIAL CORRELATED WITH ATOMIZING GAS-PRODUCED STEADY STATE TEMPERATURE**  
Sankaranarayanan Ashok, Bethany; W. Gary Watson, Cheshire, and Harvey P. Cheskis, North Haven, all of Conn., assignors to Olin Corporation, New Haven, Conn.  
Filed Nov. 14, 1988, Ser. No. 270,605  
Int. Cl.<sup>5</sup> B22D 23/00

U.S. Cl. 164—429

7 Claims



1. In a molten metal gas-atomizing spray-depositing apparatus, the combination comprising:  
(a) means employing a pressurized gas flow for atomizing a stream of molten metal into a spray pattern of semi-solid metal particles and producing a flow of said particles in

said pattern thereof along with said gas flow in a generally downward direction;

(b) a substrate disposed below said atomizing means for impingement on said substrate of said gas flow at a steady state temperature resulting primarily from heat transfer by said metal particles to said gas flow and for receiving thereon a deposit of said particles in said spray pattern to form a product thereon; and  
(c) said substrate being composed of a material having a thermal conductivity correlated with said steady state temperature of said gas flow so as to limit heat transfer from said deposit to said substrate and thereby prevent complete solidification of an initial portion of said deposit contacting said substrate whereby a sufficient fraction of liquid is maintained in said initial deposit portion to feed the inherent interstices between the particles and to provide an interface with subsequent deposits, resulting in a reduction of porosity and improvement of flatness of the deposit, said correlation being such that for iron and nickel base alloys, the substrate thermal conductivity is below 15 W/m<sup>2</sup>-sec degrees K., for aluminum alloys the substrate thermal conductivity is up to about 40 W/m<sup>2</sup>-sec degrees K., and for copper base alloys, the substrate thermal conductivity is up to about 25 W/m<sup>2</sup>-sec degrees K.

4,945,974

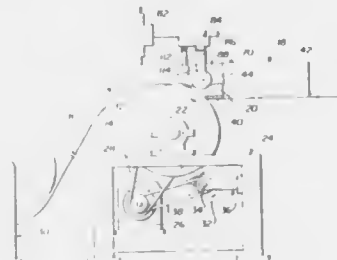
**APPARATUS FOR AND PROCESS OF DIRECT CASTING OF METAL STRIP**

LeRoy Honeycutt, III, Salisbury, N.C., assignor to Reynolds Metals Company, Richmond, Va.

Continuation-in-part of Ser. No. 152,486, Feb. 5, 1988, abandoned. This application Mar. 14, 1989, Ser. No. 323,028. The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> B22D 11/06

U.S. Cl. 164—479

20 Claims



1. In a melt drag metal strip casting apparatus wherein molten metal is delivered from a supply of the molten metal into contact with a chill surface at a casting station and the chill surface is driven for movement in a path past the casting station at a predetermined linear rate to quench and withdraw a continuous strip of metal from the molten metal supply, the strip having a bottom surface adhering to the chill surface and an unsolidified top surface as it is withdrawn from the molten metal supply, the improvement comprising,

a plurality of generally parallel grooves formed in said chill surface, said grooves being spaced from one another to provide a finite, substantially smooth land region between each adjacent pair of said grooves, said grooves having a density of at least about 12 grooves per centimeter and having a width sufficiently small so that molten metal being cast forms a meniscus spanning each groove,

a top roll,  
mounting means supporting the top roll for rotation about a horizontal axis above the chill surface with the top roll surface spaced from the chill surface by a distance substantially equal to the thickness of the strip desired and in position to contact only the unsolidified top surface of the

strip whereby a strip being formed is not forced into said grooves,  
means independent of the metal being cast for applying heat to the top roll,  
means driving the top roll for rotation about its horizontal axis, and  
means withdrawing the solidified layer as a continuous metal strip.

13. The method of casting commercial quality metal sheet directly from molten metal in a melt pool in a tundish, comprising

grooving the outer cylindrical surface of a chill wheel with axially spaced substantially circumferentially extending grooves to produce a casting surface with a uniform groove density within the range of from about 12 to about 35 grooves per centimeter and having smooth substantially cylindrical land regions between adjacent grooves with the substantially flat land regions intersecting the sides of adjacent grooves along generally circumferentially extending, axially spaced lines,

rotating the chill wheel about a first axis and passing the grooved surface through the melt pool to extract a melt layer on the grooved surface, the melt layer directly contacting the land regions and substantially spanning each groove between adjacent land surfaces,

providing an uncooled cylindrical top roll adjacent the exit of the melt layer from the pool with the axis of rotation of the top roll substantially parallel to the axis of rotation of the chill wheel and having its outer substantially cylindrical surface in spaced relation to the cylindrical surface of the chill wheel to define a gap therebetween corresponding to the thickness of the metal strip to be cast,

adjusting the gap so that the top roll contacts only the molten metal above the solidifying strip whereby the strip is not pressed into the grooves on the chill surface, rotating the top roll to smooth the top surface of the strip and provide gauge control for the strip, and withdrawing heat from the melt layer through the grooved surface to progressively solidify the melt layer from the grooved surface to the melt layer top surface.

4,945,975

**METHOD OF OSCILLATION OF MOLD OF VERTICAL CONTINUOUS CASTER**

Kenichi Sorimachi; Hirokazu Tozawa; Tetsuya Fujii; Seiji Itoyama, and Yuji Miki, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

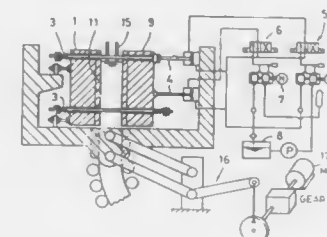
Filed Nov. 30, 1989, Ser. No. 444,318

Claims priority, application Japan, Dec. 8, 1988, 63-308780; Feb. 3, 1989, 1-23806

Int. Cl.<sup>5</sup> B22D 11/04

U.S. Cl. 164—478

12 Claims



1. A method of oscillating a mold of a vertical continuous caster having a pair of longer side frames and a pair of shorter side frames, said method comprising: moving a pair of mold walls towards and away from the cast metal in synchronization with a vertical oscillation of said mold, so as to control the condition for supplying a mold powder into the gap between said mold walls and said cast metal.

4,945,976

**LUGGED CHAIN BOARD LOADING APPARATUS**

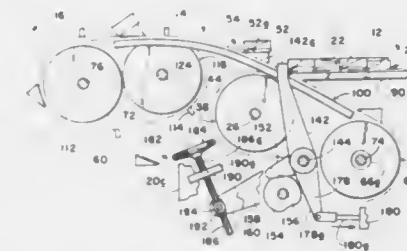
Edward Ritola, La Center, Wash., assignor to Harvey Industries, Inc., Little Rock, Ark.

Filed Nov. 4, 1988, Ser. No. 267,396

Int. Cl.<sup>5</sup> B65G 47/31

U.S. Cl. 198—461

5 Claims



1. High-speed board loading apparatus, comprising:  
a substantially horizontal feed conveyor for supporting the undersides of boards in a planar feed zone, said feed conveyor being powered by drive means to move at a given speed and to advance the boards in a downstream direction;

an endless pick off conveyor having projecting lugs mounted thereon and distributed along the conveyor, said lugs having board supporting surfaces, said pick off conveyor having an upwardly inclined run extending across said feed zone, with the surfaces of said lugs within said run being approximately parallel with the plane of said feed zone the pick off conveyor being power driven at a speed such that the horizontal component of the travel speed of said inclined run exceeds said given speed;  
a receiving conveyor for receiving each board at the upper end of said run; and  
an arrester and means synchronizing the operation of said arrester with upwardly inclined movement of said pick off conveyor to permit the board foremost on said feed conveyor to be loaded onto said receiving conveyor.

4,945,977

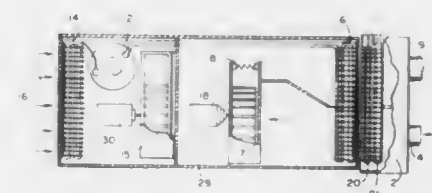
**COMBINATION VEHICLE HEATING AND COOLING SYSTEM**

Raymond D'Agaro, 1623 NE. 45th St., Fort Lauderdale, Fla. 33334

Continuation-in-part of Ser. No. 117,638, Jan. 5, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 287,543  
Int. Cl.<sup>5</sup> B60H 3/00

U.S. Cl. 165—43

10 Claims



1. A modular auxiliary air conditioning system for a motor vehicle having a primary air conditioning refrigerant supply and an engine coolant system, comprising:

(a) electric air circulating means powered by low voltage direct current;  
(b) air distribution means including input and output means and air directing means including divider means for providing a reversing air path for air for compact structure;  
(c) heating coil means in said air path, said heating coil

means including means for fluid connection to said engine coolant system;

(d) evaporator coil means in said air path, said evaporator coil means including means for fluid connection to said refrigerant supply;

(e) said system mounted beneath the floor of said vehicle and said input and output means constructed for moving air out of and into the interior of said motor vehicle to condition said air by moving it past said heating coil means and said evaporator coil means; and in which said reversing air path provides air flowing in a first direct through a first portion of said heating coil means and a first portion of said evaporator coil means, said air then flowing in a second, reverse direction through a second portion of said heating coil means and a second portion of said evaporator coil means.

4,945,978

**HEAT EXCHANGER SYSTEM**

Helmut A. Herrmann, Kassel, Fed. Rep. of Germany, assignor to Schmidt'sche Heissdampf GmbH, Kassel-Bettenhausen, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,970

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734216

Int. Cl.<sup>5</sup> C10G 9/18; F28F 7/00, 13/00

U.S. Cl. 165—47

4 Claims



1. Apparatus for the cooling of a hot process fluid comprising:

a plurality of heat exchanger means, each of said heat exchanger means comprising:

cooling jacket means for defining a central passageway for the flow of a fluid to be cooled, said cooling jacket

means comprising a plurality of conduits arranged in side-by-side relationship to define said central passageway, said passageway having first and second ends and comprising a first stage of the heat exchanger means;

a second stage heat exchanger connected to and fluidically downstream of said heat exchanger means first stage, said second stage heat exchanger being in part defined by said cooling jacket means and having an inlet and an outlet, said inlet being coupled to said cooling jacket means defined central passageway, the process fluid flowing in a generally opposite direction in said second stage heat exchanger when compared to said heat exchanger means first stage;

means defining a fluid impermeable supply connector for the delivery of a heated fluid to the first end of said cooling jacket means defined central passageway; and

means defining a fluid impermeable discharge connector for fluid passing through said central passageway, said discharge connector being coupled to the second end of said central passageway;

means for simultaneously delivering a hot process fluid to the supply connectors of said plurality of heat exchanger means whereby said hot process fluid will flow through said cooling jacket means defined passageways;

first common collector means for receiving cooled process fluid exiting the discharge connectors of said plural heat exchanger means, said first collector means including a first control valve located downstream, in the direction of fluid flow, from said heat exchanger means;

second common collector means, said second common collector means being connected to said second stage heat exchanger outlets and including a control valve located downstream, in the direction of fluid flow, from said heat exchanger means;

means for delivering a fluid coolant to said heat exchanger means cooling jacket means conduits at first ends thereof; and

means for receiving coolant from said heat exchanger means cooling jacket means conduits at second ends thereof.

4,945,979

**ROBOTIC ARM FOR DELIVERING A TUBE PLUGGING TOOL**

William K. Cullen; Warren E. Lester, both of Pittsburgh, and Robert J. Maurer, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 23, 1988, Ser. No. 210,222

Int. Cl.<sup>5</sup> F28F 11/06

U.S. Cl. 165—76

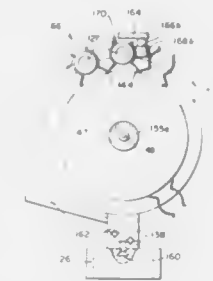
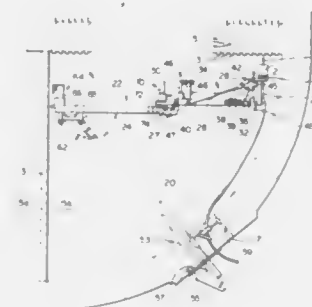
19 Claims

1. An improved apparatus for delivering a tool designed for plugging a defective heat exchanger tube in a steam generator, said apparatus being of the type including a support member, a plug magazine mounted on the base arm for storing and unloading tube plugs, a guidance mechanism having said tool mounted thereon for aligning and positioning said tool relative to a selected tube to be plugged, a positioning mechanism movably supported on said base arm and having said guidance mechanism mounted thereon for positioning said tool between said selected tube and said plug magazine incident to a plug unloading operation.

wherein the improvement comprises a compliance coupling between said tool and said guidance mechanism that is compliant in three dimensions, including a first mounting member connected to said tool, a second mounting member connected to said guidance mechanism, and a plurality of extendible and compressible spring members connected between said first and second mounting members such that the compliance coupling exhibits both a high lateral flexibility and a high axial flexibility so that the plug may be axially aligned with the defective heat exchanger tube.

10. An improved apparatus for delivering a tool designed for plugging a defective heat exchanger tube in a steam generator, said apparatus being of the type including a support member, a

base arm movably connected to the support member, a plug magazine mounted on the base arm for storing and unloading tube plugs, a guidance mechanism having said tool mounted thereon for aligning and positioning said tool relative to a selected tube to be plugged, a positioning mechanism movably supported on said base arm and having said guidance mechanism



nism mounted thereon for positioning said tool between said selected tube and said plug magazine incident to a plug unloading operation,

wherein the improvement comprises a rotary plug magazine including a bracket means mounted onto said base arm, and a drum means rotatably mounted on said bracket means for retaining a plurality of the plugs.

4,945,980

**COOLING UNIT**

Kazuhiko Umezawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 7, 1989, Ser. No. 403,828

Claims priority, application Japan, Sep. 9, 1988, 63-225843

Int. Cl.<sup>5</sup> F28F 27/02

U.S. Cl. 165—101

3 Claims

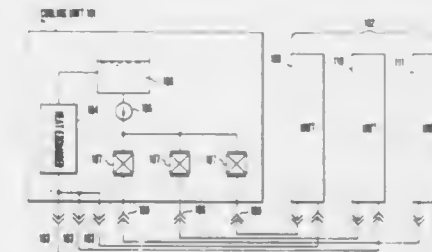
1. A cooling unit comprising:

a coolant inlet through which a cooling coolant flows into said cooling unit;

a plurality of devices to be cooled which are connected to the coolant inlet in parallel;

a coolant outlet through which the cooling coolant flows out from said cooling unit to said plurality of devices;

a plurality of flow rate adjusting portions, connected to said coolant outlet in parallel, for selectively adjusting the coolant flow rate flowing through said coolant outlet corresponding to each device to be cooled;



a circulating pump through which the cooling coolant flows to said plurality of flow rate adjusting portions; and

heat exchanging means for heat-exchanging the cooling coolant flowing into said cooling unit through said coolant inlet and supplying the heat-exchanged cooling coolant to said circulating pump.

4,945,981

**OIL COOLER**

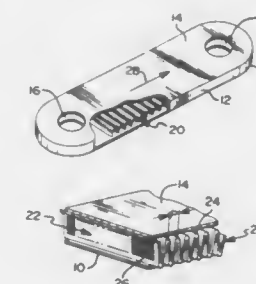
Shrikant M. Joshi, Getzville, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 26, 1990, Ser. No. 470,504

Int. Cl.<sup>5</sup> F28D 1/03; F28F 1/40

U.S. Cl. 165—109.1

4 Claims



1. An oil cooler for transferring heat from oil within the cooler to fluid without the cooler, comprising:

a pair of elongated plates secured together at their margins and spaced from one another between the margins to form an oil flow path, the plates having inlet and outlet ports to define the general direction of oil flow,

an oil center between the plates in thermal contact with the plates and in the oil flow path for transferring heat from the oil to the plates,

the oil center comprising a corrugated metal sheet having a plurality of substantially plane fins in side-by-side relationship and joined at bends wherein the bends make the thermal contact with the plates, and

a plurality of louvers in each fin for creating turbulence in the oil flow and defining openings in the fins, wherein the oil center is disposed with the direction of the fin planes transverse to the general direction of flow so that the oil passes through the openings of the fins.



# 4,945,982

## WIRE RACEWAY

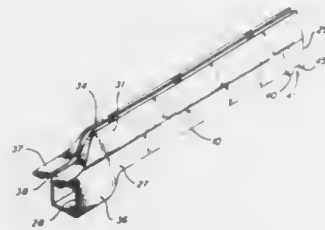
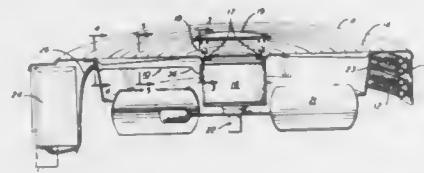
Sathish R. Das, Indianapolis, Ind., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jul. 20, 1989, Ser. No. 382,460

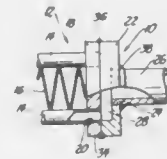
Int. Cl.<sup>5</sup> F24F 13/12; H02G 3/00

U.S. Cl. 165—125

8 Claims



and the slot, and said one plate having a planar margin at the interface located outboard of said cavity and overlapping one



side only of said slot along the length thereof so as to form a stop for the tubing.

# 4,945,984

## IGNITER FOR DETONATING AN EXPLOSIVE GAS MIXTURE WITHIN A WELL

Ernest H. Price, 1266 Pepper Dr., El Centro, Calif. 92243

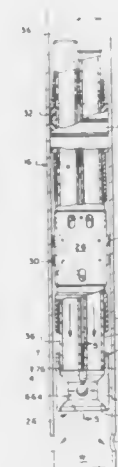
Division of Ser. No. 324,398, Mar. 16, 1989, Pat. No. 4,895,206.

This application Aug. 14, 1989, Ser. No. 393,375

Int. Cl.<sup>5</sup> E21B 43/00, 43/263, 43/27

U.S. Cl. 166—63

3 Claims



1. An improved wire raceway structure of the type which contains a segment of electrical wires extending between a fan motor suspended from a central portion of an air conditioner unit and a control box located at a side wall of the unit comprising:

a U-shaped bottom portion having a width which is substantially greater than a diameter of the wire such that a pair of wires can be contained therein and extend along a length thereof;

a converging top portion integrally connected to said bottom portion and converging inwardly as it extends upwardly to its top end where it defines a longitudinal gap along its length, the width of said gap being normally less than the diameter of the wire to be contained but being temporarily expandable by flexing of said top portion to thereby allow insertion of the wire into the raceway structure; and

wherein the raceway structure is mounted between the fan motor and an orifice ring, with the ends of the raceway structure being formed to accommodate attachment to said motor and said orifice ring without separate fasteners.

# 4,945,983

## FITTING FOR HEAT EXCHANGER AND METHOD OF MANUFACTURE THEREOF

Dominic N. Dalo, Buffalo, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 222,875, Jul. 22, 1988, Pat. No. 4,881,312.

This application Jul. 24, 1989, Ser. No. 383,517

Int. Cl.<sup>5</sup> F28F 9/02; F28D 1/47

U.S. Cl. 165—173

5 Claims

1. A fitting for coupling to a flat tube serpentine heat exchanger comprising: tube coupling means comprising a first flat plate of uniform thickness having at least one slot shaped to conform to and receive flat tubing, a nipple, nipple coupling means comprising a second flat plate of uniform thickness joined to the nipple and joined at a planar interface to the first plate, the second plate having a single opening communicating with the nipple and conforming to the nipple size, a cavity in one of the plates at the interface extending between the single opening and the slot for fluid distribution between the nipple

1. Igniter apparatus for detonating an explosive gas mixture within a well comprising:

a mandrel having an internal bore and an annular shoulder projecting radially into said bore defining an annular electrode and an arc discharge chamber, and having a blocker plate attached to said mandrel and sealing said mandrel bore;

a tubular mandrel intersecting said blocker plate and communicating with said arc discharge chamber;

a first conductor electrically connected to said annular electrode;

a central electrode disposed within said arc discharge chamber, said central electrode being an electrically conductive ball; and,

a second electrical conductor electrically connected to said central electrode for completing a circuit with said first electrical conductor for delivering a high voltage pulse of electrical current to said electrodes.

# 4,945,985

## PIPE DOWN-HOLE RETRIEVAL TOOL

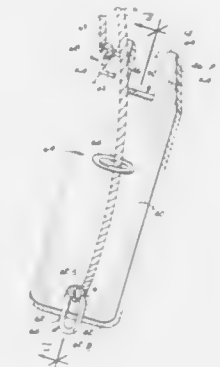
Robert L. Lynds, 1043 Old Hiway 12 Mile Rd., Addy, Wash. 99101

Filed Dec. 5, 1989, Ser. No. 446,478

Int. Cl.<sup>5</sup> E21B 31/18

U.S. Cl. 166—98

11 Claims



shoulder engaging means into engagement with the pipe section and the joint shoulder to raise the pipe and pump assembly as the elongated body is raised by the retrieval cable.

# 4,945,986

## CONSTANT HEAD PUMP FOR SONIC WAVE GENERATOR USED IN TREATING SUBSURFACE FORMATIONS

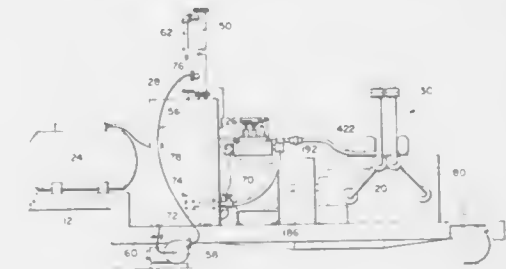
Nathaniel A. Hardin, Forsyth, Ga., and George C. Morgan, Birmingham, Ala., assignors to N.A. Hardin 1977 Trust, N.A. Hardin, Trustee, d/b/a Sonofrac Associates, Forsyth, Ga.

Filed Jan. 21, 1989, Ser. No. 370,050

Int. Cl.<sup>5</sup> B06B 1/20, 3/02; E21B 43/25

U.S. Cl. 166—249

11 Claims



1. Apparatus comprising:

energy generating means for carrying high frequency waves of variable characteristics as to amplitude, frequency and strength in a liquid medium which is transmitted to an object, area, or subsurface formation to be treated;

feed pump means having a suction inlet and an outlet for supplying said liquid medium under pressure to said energy generating means;

a fluid reservoir for supplying said liquid medium to said suction inlet of said feed pump, and means to maintain a substantially positive and constant hydrostatic head to said suction inlet.

10. A method of treating objects comprising the steps of: generating, by a sonic or wave generator means, high frequency waves of variable characteristics as to amplitude, frequency, pressure, and volume into a liquid medium and transmitting said liquid medium to said object to be treated;

providing a feed pump having a suction inlet and an outlet means to supply liquid medium to said wave generator means, and

providing a substantially constant hydrostatic pressure head of liquid to said suction inlet.

# 4,945,987

## METHOD AND DEVICE FOR TAKING MEASUREMENTS AND/OR CARRYING OUT INTERVENTIONS IN A SHARPLY INCLINED WELL SECTION AND ITS APPLICATION TO PRODUCTION OF SEISMIC PROFILES

Christian Wittrisch, Rueil Malmaison, France, assignor to Institut Francais du Pétrole, Rueil Malmaison, France

PCT No. PCT/FR87/00524, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO88/05111, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 30, 1987, Ser. No. 251,701

Claims priority, application France, Dec. 31, 1986, 86 18416 Int. Cl.<sup>5</sup> E21B 23/00, 47/00, 49/00

U.S. Cl. 166—250

14 Claims

1. A method for carrying out measurements and/or interventions in a horizontal well section or a well section which is sharply inclined to the vertical with a set of one or more measurement and/or intervention instruments located at the lower

1. A pipe and pump retrieval tool for retrieving an unconnected pipe and pump assembly from the bottom of a well with a wall having a known interior diameter, in which the assembly has a pipe section of a known exterior diameter with a pipe coupling on an upper end thereon, in which the pipe coupling has an exterior diameter greater than the diameter of the pipe section forming a joint shoulder at the upper end of the pipe section, comprising:

an elongated body have a length between a lower end and an upper end greater than the interior diameter of the well and a width less than the interior diameter of the well sufficient to enable the body to be lowered to the bottom of the well along side the pipe section and below the pipe coupling, in which the body has a center of gravity between the upper and lower end;

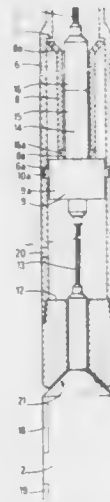
shoulder engaging means at the upper end of the elongated body for engaging the joint shoulder;

cable connecting means for operatively connecting a retrieval cable to the elongated body adjacent the lower end spaced from the center of gravity to raise and lower the elongated body in response to the raising and lowering of the retrieval cable;

body stabilizing means for operatively engaging the retrieval cable and securing the cable to the elongated body at a location spaced from the cable connecting means and between the center of gravity and the upper end for stabilizing the decent of the elongated body to the bottom of the well to an elevation along side the pipe section and for stabilizing the accent of the elongated body to direct the

end of a rigid tubular string under longitudinal compression, said set having anchoring means including arms characterized by the following stages:

said set is positioned or held in position as an extension of said string at said lower end of said string, said set being in a first position with respect to said end,  
said set and said lower end of said string are introduced into said well,  
said set is made to advance down said well until said set essentially reaches a desired position,  
said set is released and disengaged from its first position, then brought into a second position away from the first position by activating the anchoring means so that said set is held against a wall of the well,  
said string being moved forward and/or backward so that said set reaches said second position, and  
the measurement and/or intervention is carried out; said set



being positioned as an extension of the string by exerting a tension stress on a cable which is connected to the set.

12. Device for carrying out measurements and/or interventions in a section of a well with a set of measuring and/or intervention instruments located at the lower end of a string, said device having means cooperating with said end and said set, said means being designed to hold said set as an extension of said end when said set is in an engaged position and designed to be inoperative when said set is in a disengaged position, characterized by said means having, in combination, a seat, a base, and a link cable, said seat being designed to withstand the stresses on said set and designed to hold said set as an extension of said end, the stress is being in a direction opposite to the direction in which the string advances in said well, said set being held in place on said seat by means of said link cable attached to the upper end of said set and attached to a base made integral with the string, said link cable passing through said seat and said link cable being held under tension.

4,945,988

#### APPARATUS AND PROCESS FOR REMOVING VOLATILE CONTAMINANTS FROM BELOW GROUND LEVEL

Frederick C. Payne, and Jerry B. Lisiecki, both of Charlotte, Mich., assignors to Midwest Water Resource, Inc., Charlotte, Mich.

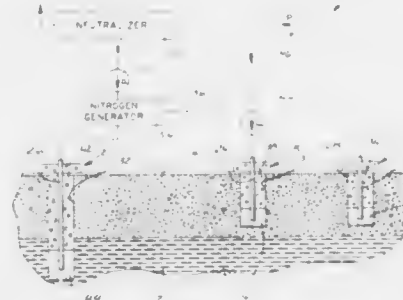
Filed Oct. 23, 1989, Ser. No. 424,983  
Int. Cl.<sup>5</sup> E21B 43/40; E02D 3/00

U.S. Cl. 166—266

6 Claims

1. Apparatus for removing volatile contaminants located below ground level, said apparatus comprising a withdrawal well terminating in a vadose zone above a below ground aquifer, a first conduit positioned in said withdrawal well and extending upwardly of ground level, first blower means posi-

tioned in flow communication along said first conduit for pumping air and volatile contaminants out of said vadose zone, a second conduit positioned in a first air injection well terminating in said aquifer, second blower means in flow communication along said second conduit for pumping atmospheric air



into said vadose zone to urge said volatile contaminants toward said withdrawal well, and separator means positioned in flow communication along said second conduit downstream of said second blower means, said separator means for removing oxygen from said atmospheric air prior to pumping of deoxygenated air into said aquifer.

4,945,989

#### POLYMER CONTAINING PENDANT TERTIARY ALKYL AMINE GROUPS USEFUL IN ENHANCED OIL RECOVERY USING CO<sub>2</sub> FLOODING

Cyrus A. Irani, Houston, Tex.; Thomas V. Harris, Benicia, Calif., and Wayne R. Pretzer, Wheaton, Ill., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 73,791, Jul. 14, 1987, Pat. No. 4,913,235, which is a continuation-in-part of Ser. No. 58,690, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 910,041, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 749,479, Jun. 27, 1985, abandoned. This application Dec. 28, 1987, Ser. No. 138,545

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> E21B 43/22

U.S. Cl. 166—268

10 Claims

1. In a method for recovering oil from an underground oil-bearing earth formation penetrated by an injection well and a producing well, in which method carbon dioxide is injected into said formation to displace oil towards said producing well from which oil is produced to the surface, the improvement comprising injecting into said formation carbon dioxide, the viscosity of which is increased at least three-fold by the presence of a sufficient amount of a polymer containing pendant tertiary alkyl amine groups and a sufficient amount of a cosolvent to form a solution of said polymer in said carbon dioxide, wherein the minimum solubility parameter of said polymer is reduced to 6.85 (cal/cc)<sup>1/2</sup> or less by control of the number of pendant tertiary alkyl amine groups and by the selection of said tertiary alkyl amine groups.

4,945,990

#### POLYMER CONTAINING PENDANT VINYL ETHER GROUPS USEFUL IN ENHANCED OIL RECOVERY USING CO<sub>2</sub> FLOODING

Cyrus A. Irani, Houston, Tex.; Thomas V. Harris, Benicia, Calif., and Wayne R. Pretzer, Wheaton, Ill., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 73,791, Jul. 14, 1987, Pat. No. 4,913,235, which is a continuation-in-part of Ser. No. 58,690, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 910,041, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 749,479, Jun. 27, 1985, abandoned. This application Dec. 24, 1987, Ser. No. 138,225

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> E21B 43/22

U.S. Cl. 166—268

10 Claims

1. In a method for recovering oil from an underground oil-bearing earth formation penetrated by an injection well and a producing well, in which method carbon dioxide is injected into said formation to displace oil towards said producing well from which oil is produced to the surface, the improvement comprising injecting into said formation carbon dioxide, the viscosity of which is increased at least three-fold by the presence of a sufficient amount of a polymer containing pendant vinyl ether groups and a sufficient amount of a cosolvent to form a solution of said polymer in said carbon dioxide, wherein the minimum solubility parameter of said polymer is reduced to 6.85 (cal/cc)<sup>1/2</sup> or less by control of the number of pendant vinyl ether groups and by the selection of said vinyl ether groups.

4,945,991

#### METHOD FOR GRAVEL PACKING WELLS

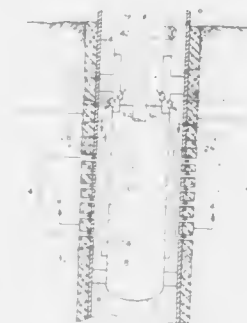
Lloyd G. Jones, Dallas, Tex., assignor to Mobile Oil Corporation, New York, N.Y.

Filed Aug. 23, 1989, Ser. No. 397,217

Int. Cl.<sup>5</sup> E21B 43/04

U.S. Cl. 166—278

40 Claims



1. A method for gravel packing a well that penetrates an unconsolidated or poorly consolidated subterranean oil or gas reservoir, comprising:

- providing a borehole casing through said reservoir; perforating said casing at preselected intervals therealong to form at least one set of longitudinal, perforation tunnels adjacent a substantial portion of said reservoir;
- locating a sand screen inside the casing and in juxtaposition with said perforation tunnels, an annulus being formed between said sand screen and said casing;
- positioning a conduit in juxtaposition with said sand screen extending substantially the length of said sand screen and having its upper extremity open to fluids, said conduit having openings at preselected intervals throughout a substantial portion of the conduit to establish fluid communication between the conduit and said annulus;
- injecting a fluid slurry containing gravel down through

said annulus and conduit whereby the fluid portion of the slurry is forced out of said annulus through said perforation tunnels into said reservoir and the gravel portion of the slurry is deposited in said annulus and forced into the perforation tunnels into the formation;

- sizing the cross-sectional area of said conduit and said annulus so that if gravel forms a bridge in a portion of said annulus thereby blocking the flow of fluid slurry through the said annulus, fluid slurry containing gravel will continue to flow through the conduit and into the annulus around the gravel bridge; and
- terminating the injection of said fluid slurry containing gravel when the said annulus is completely packed with gravel.

4,945,992

#### PROCESS FOR PRODUCING OR CLEANING HIGH PRESSURE WATER INJECTION WELLS

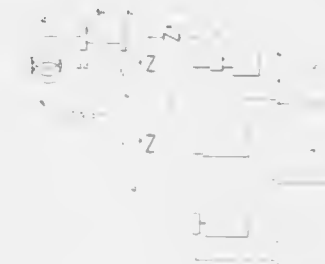
Frank J. Sacco, 26582 El Mar Dr., Mission Viejo, Calif. 92691

Continuation of Ser. No. 78,744, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 944,794, Dec. 22, 1986, Pat. No. 4,823,826. This application Jun. 12, 1989, Ser. No. 366,246

Int. Cl.<sup>5</sup> E21B 37/06

U.S. Cl. 166—310

32 Claims



1. A process for cleaning a producing well, the process comprising the steps of stopping the pumping of oil out of the well;

- generating an aqueous solution of chlorine dioxide gas under pressure; and
- injecting under pressure the solution of chlorine dioxide gas into a pumped water injection stream and thereafter under pressure into the well.

24. A process for cleaning a producing well, the process comprising the steps of stopping the pumping of oil out of the well; selecting an oxidant reactive with hydrogen sulfide under downhole conditions; and injecting said oxidant under pressure into a pumped water injection stream and thereafter under pressure into a well containing hydrogen sulfide.

4,945,993

#### SURFACE CONTROLLED SUBSURFACE SAFETY VALVE

Rennie L. Dickson, Carrollton, and Roddie R. Smith, Plano, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Continuation of Ser. No. 191,185, May 6, 1988, abandoned. This application May 19, 1989, Ser. No. 354,373

Int. Cl.<sup>5</sup> E21B 34/10

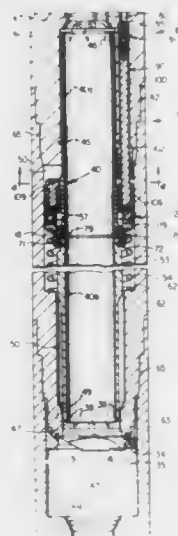
U.S. Cl. 166—321

14 Claims

- A safety valve for downhole use in a well comprising:
  - housing means having a longitudinal bore extending therethrough;
  - valve closure means mounted in the housing means to control fluid flow through the longitudinal bore;
  - the valve closure means having a first position which



- allows fluid flow through the longitudinal bore and a second position which blocks fluid flow therethrough;  
 d. an operator tube in the housing means to shift the valve closure means from its second position to its first position;  
 e. piston means for moving the operator tube in response to control fluid pressure from the well surface;  
 f. the piston means disposed within the housing means offset from the longitudinal bore;



- g. a bearing assembly carried on the exterior of the operator tube with a plurality of ball bearings disposed between an upper bearing race and a lower bearing race and its outside diameter compatible with the interior of the housing means and slidably disposed around the exterior of the operator tube; and  
 h. the piston means engaging the bearing assembly to transmit force to the operator tube.

4,945,994

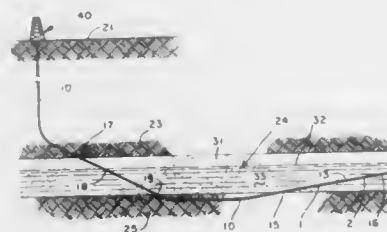
**INVERTED WELLBORE COMPLETION**  
 Theodore O. Stagg, Anchorage, Ak., assignor to Standard Alaska Production Company, Cleveland, Ohio

Filed Dec. 17, 1987, Ser. No. 134,397

Int. Cl.<sup>5</sup> E21B 43/30

U.S. Cl. 166—369

8 Claims



1. A method for selectively producing oil from a subterranean reservoir containing both gas and oil and a gas-oil interface, the method comprising:  
 (a) drilling a wellbore within the reservoir from a first point located below the interface to a second point, where the second point is higher relative to the first point;  
 (b) completing the wellbore between the first and second points to thereby form a primary producing interval and to allow oil to flow from the reservoir into the wellbore and to the earth's surface;  
 (c) subsequently at least partially restricting the passage of gas through the wellbore with at least one restrictor situated between the first and second points and lower than

the interface to thereby decrease the production of gas fluids downhole from said restrictor.

4,945,995

**PROCESS AND DEVICE FOR HYDRAULICALLY AND SELECTIVELY CONTROLLING AT LEAST TWO TOOLS OR INSTRUMENTS OF A VALVE DEVICE ALLOWING IMPLEMENTATION OF THE METHOD OF USING SAID DEVICE**

Michel Tholance, Feucheroles; Jacques Lessi, Maule, and Jean-Paul Michel, Vaucresson, all of France, assignors to Institut Francais du Pétrole, Rueil Malmaison, France

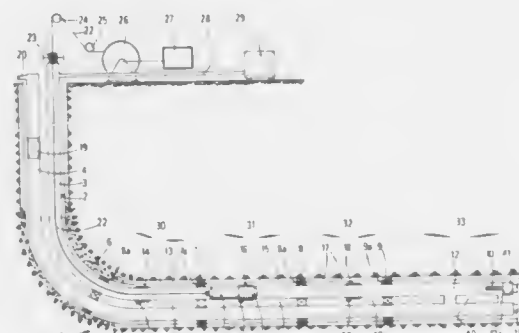
Filed Jan. 27, 1989, Ser. No. 302,666

Claims priority, application France, Jan. 29, 1988, 88 01087; Jan. 29, 1988, 88 01088

Int. Cl.<sup>5</sup> E21B 34/10, 43/12; F16K 3/26, 31/163

U.S. Cl. 166—375

22 Claims



1. A device for hydraulically and selectively controlling a set of at least two instruments or tools connected to a casing located inside a well having at least two different producing zones, said two instruments or tools being disposed adjacent to each of said producing zones, characterized by having a first hydraulic line with branches to said instruments or tools and by having distribution means including solenoid valve means placed on each of the branches and controlled independently of each other by a control element, said first hydraulic line being connected to a hydraulic power generator.

4,945,996

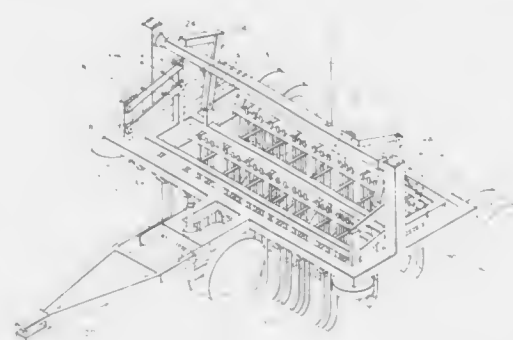
**RAKE AND SOIL CONDITIONER**  
 Charles B. Coddling, 100 S. Pon Dr., Mount Dora, Fla. 32757

Filed Dec. 12, 1988, Ser. No. 283,125

Int. Cl.<sup>5</sup> A01B 45/00, 51/00

U.S. Cl. 172—233

9 Claims



8. A lawn or garden implement capable of raking leaves, pine needles, grass and the like comprising:  
 a frame movable along the ground, the frame having an openings formed therein;

means for attaching the implement to a vehicle;  
 three wheels carried by the frame;  
 a rectangular deck having a first side and a second side, a front and a back further having three bars extending transversely between the first side and the second side, each bar having a plurality of spaced-apart resilient tines extending downwardly therefrom, the deck being removably mounted within the frame;  
 means for remotely raising and lowering the deck from a fully raised position to a fully lowered position and all intermediate positions therebetween; and  
 a release grid having a plurality of spaced-apart parallel rods extending downwardly from the front of the deck to the plane of the axle of the wheels, the rods extending backwardly and extending upwardly to the back of the frame such that the deck may be raised and lowered without obstruction of the tines by the release grid and further such that when the deck is in a lowered position and the tines having raked leaves, grass and the like, the deck may be raised and the leaves, grass and the like are engaged by the release grid and are prevented from being raised and are deposited beneath the device, permitting remote emptying of the device and enabling continuous, uninterrupted raking operation.

4,945,997

**FOLDING AGRICULTURAL IMPLEMENT**

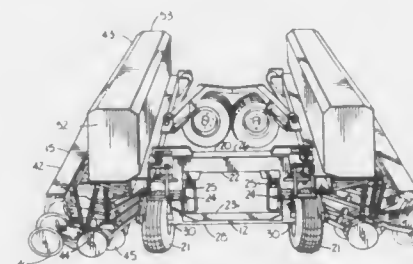
Raymond A. Adey, 1504 Terrace Dr., Newton, Kans. 67114

Filed Aug. 16, 1989, Ser. No. 395,280

Int. Cl.<sup>5</sup> A01B 73/06

U.S. Cl. 172—311

18 Claims



16. A folding agricultural implement adapted to be connected in a towed relation to a tow vehicle, said implement comprising:

- (a) a rear carrier;  
 (b) a pair of folding implement frames each having an inboard end and an outboard end and each being rotatably and pivotally connected to said rear carrier at said inboard end;  
 (c) said implement frames mounting work performing means;  
 (d) said implement frames having field and transport positions;  
 (e) said implement frames being oriented substantially perpendicular to the direction of travel in their field positions and substantially parallel to the direction of travel in their transport positions;  
 (f) a pair of joint assemblies each pivotally and rotatably connecting a respective implement frame to said rear carrier;  
 (g) towing tongue means adapted for connecting said implement frames with a tow vehicle; and  
 (h) each said joint assembly including:  
 (1) first pivotal connection means pivotally connecting a respective implement frame to said rear carrier; and  
 (2) second pivotal means pivotally interconnecting a respective implement frame to said rear carrier and including link means having a rear end pivotally attached to a re-

spective implement frame and a front end pivotally attached to said rear carrier.

4,945,998

**HYDRAULIC IMPACT TOOL**

Takanobu Yamanaka, Yao, Japan, assignor to Nippon Pneumatic Manufacturing Co., Ltd., Osaka, Japan

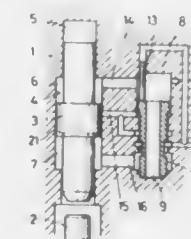
Filed Jul. 25, 1989, Ser. No. 384,763

Claims priority, application Japan, Jul. 26, 1988, 63-186349

Int. Cl.<sup>5</sup> B23B 45/16

U.S. Cl. 173—134

6 Claims



1. A hydraulic impact tool for striking a tool, comprising:  
 a cylinder in which the tool can be slidably mounted in a lower end thereof;  
 a piston slidably mounted in said cylinder for striking the tool during its downward movement, said piston having a large-diameter portion, said cylinder having an upper chamber filled with a fluid to apply fluid pressure to the top of said piston, and a middle chamber in which said large-diameter portion is slidable and having an upper portion above said large-diameter portion and a lower portion below said large-diameter portion, respectively;  
 a valve chest connected to said upper portion and said lower portion and having an oil supply port and an oil discharge port;  
 a valve body slidably mounted in said valve chest for controlling the communication between said upper portion and said lower portion and said oil supply port and said oil discharge port, respectively, for supplying oil to and removing oil from said cylinder for alternately raising and lowering said piston; and  
 a cylindrical member slidably mounted on said piston beneath said large-diameter portion and slidable on said piston between said piston and the inner periphery of said cylinder and the bottom of said cylindrical member defining the top end of said lower chamber.

4,945,999

**DIRECTIONAL ROD PUSHER**

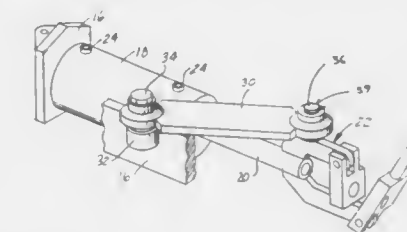
G. Edwin Malzahn, Perry, Okla., assignor to The Charles Machine Works, Inc., Perry, Okla.

Filed Apr. 6, 1989, Ser. No. 333,678

Int. Cl.<sup>5</sup> E21B 4/06, 7/06, 7/26, 44/00

U.S. Cl. 175—19

17 Claims



1. In a device for forming a borehole through the earth having a directional boring head mounted on one end of a push rod and axially moveable thrust for exerting an axial force on

the push rod to thereby move the push rod through the earth, the improvement comprising:

conversion means mounted between said thrust means and said push rod for directly transforming the axial movement of the thrust means into combined axial and rotational movement of the push rod.

4,946,000

## UNDISTURBED SOIL SAMPLER

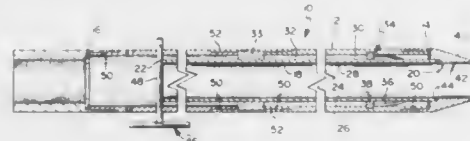
Thomas L. Gibson, Utica, and Abdul S. Abdul, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 5, 1989, Ser. No. 361,163

Int. Cl.<sup>5</sup> E21B 25/00

U.S. Cl. 175—251

4 Claims



1. A soil sampler assembly for obtaining undisturbed soil samples comprising:

an elongated hollow tubular outer corer means for coring the soil during sampling, said means defining inner and outer surfaces and including first and second ends;  
an elongated hollow tubular inner sampling means defining inner and outer surfaces having first and second ends and being removably disposed within said outer corer means for receiving a soil sample and adapted to be removed from said outer corer means without disturbing the soil sample, and

retaining means disposed adjacent the first end of said corer means between its inner surface and the outer surface of the sampling means for retaining soil in said sampling means, the retaining means including a plurality of flexible arcuate leaves extending toward the first end and movable between an open position and a closed cup-like position, the leaves being held in the open position by the outer surface of the sampling means when it is fully disposed within the corer means and the leaves being adapted to continually self-close to the cup-like position about the end of the sampling member as it is withdrawn from the corer member.

4,946,001

## APPARATUS AND METHOD OF CONTROLLING ELECTRIC POWER STEERING APPARATUS

Yoshiaki Taniguchi, Masaki Watanabe, both of Saitama, and Ryuji Iizawa, Kanagawa, all of Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo and Fujitsu Limited, Kawasaki, both of Japan

Filed Mar. 8, 1989, Ser. No. 321,628

Claims priority, application Japan, Apr. 30, 1988, 63-108287 Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—79.1

5 Claims

1. An electric power steering apparatus for assisting a steering torque with a motor output torque, comprising:  
detection means for detecting a reverse torque R against the steering torque and the motor output torque;  
target value setting means for setting a target value  $T_{DT}$  of

a parameter for determining a steering operation based on the detected reverse torque R; and



control means for controlling the motor output torque based upon the detected reverse torque R and the target value  $T_{DT}$  whereby  $T_{DT} \times R > R^2$ .

4,946,002

## HOOD BUMPER PROTECTOR

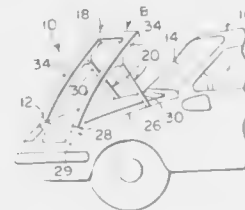
Thuan D. Vu, 323 18th St., Brooklyn, N.Y. 11215, and George Spector, 233 Broadway Suite 3815, New York, N.Y. 10007

Filed Mar. 30, 1989, Ser. No. 330,830

Int. Cl.<sup>5</sup> B60R 19/38, 21/02

U.S. Cl. 180—271

4 Claims



1. A device for protecting a hood and windshield of a motor vehicle which comprises:

- (a) a bumper member;
- (b) an actuator for moving said bumper member from a retracted stowed position into a raised operative position;
- (c) means for actuating said actuator before a collision takes place between the motor vehicle and another object so that said bumper member will go from its stowed position to its operative position to protect the hood and windshield of the motor vehicle from damage caused by the collision;
- (d) the hood of the motor vehicle having an inverted U-shaped recess therein and
- (e) said bumper member being substantially U-shaped in which a pivot point is formed at each extremity of said "U" so that said bumper member can be received within said recess and be pivotable by said actuator about said pivot points to move freely through the hood from its stowed position to its operative position.

4,946,003

## MOBILE AND AERIAL LIFT HAVING OFFSET BOOM SUPPORT

Van J. Walbridge, Arvada, Colo., assignor to GK Technologies, Inc., Woodcliff Lake, N.J.

Filed Dec. 7, 1988, Ser. No. 280,889

Int. Cl.<sup>5</sup> B66F 11/04

U.S. Cl. 182—2

6 Claims

1. In a mobile aerial lift, a vehicle of the type having a frame with a longitudinal axis, front and rear ground-engaging wheels carried by the frame, an operator's driving station carried by the frame, a van-type body carried by the frame to

the rear of the operator's driving station, an aerial lift carried by the frame, the aerial lift including a boom structure and control means for the boom structure which permits the outer extremity of the boom structure to be raised and lowered about a horizontal axis, rotated about a vertical axis and extended and



retracted, a mast carrying the boom structure and extending vertically through and above the van-type body so that the boom structure is adapted to extend over the van-type body and means securing the mast to the frame to one side of the frame and spaced from the longitudinal axis of the frame and between the front and rear ground engaging wheels.

4,946,004

## POLE GRIPPING LADDER STABILIZING DEVICE

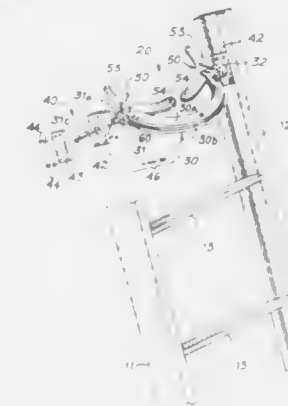
Kenneth H. Henson, 180 Ridge Rd., Candler, N.C. 28715

Filed Oct. 16, 1989, Ser. No. 423,175

Int. Cl.<sup>5</sup> E06C 7/48

U.S. Cl. 182—206

15 Claims



1. A ladder comprising a pair of generally parallel elongate spaced apart side rails and a series of steps transversely connecting said side rails at predetermined positions along the length thereof in combination with a pole gripping assembly for stabilizing the upper portion of the ladder when the upper portion is positioned to rest against a utility pole or the like, said pole gripping assembly comprising:

a yoke member mounted transversely between said side rails adjacent one end of said ladder for supporting said ladder against a pole or the like, said yoke member having a pair of opposite ends and being of generally arcuate configuration such that the portion intermediate said opposite ends defines a pole receiving space generally between said opposite ends;

a pair of gripping arms pivotally mounted to said yoke member adjacent respective ones of said opposite ends for pivotal movement between an open position for receiving a pole into the pole receiving space and a closed position for holding a pole in the pole receiving space to said yoke member, said gripping arms including inner arm portions positioned in said pole receiving space when said arms are

in said open position for engaging a pole as it enters the pole receiving space and for causing said gripping arms to pivot from said open position to said closed position; and means for biasing said gripping arms toward said open position whereby the ladder may be inclined uprightly against a pole and the pole gripping assembly may grip and hold the pole and release the pole when the ladder is pulled away therefrom.

4,946,005

## APPARATUS AND METHOD FOR CHARGING A LUBRICANT INTO A MARINE ENGINE OUTDRIVE

Paul A. Levine, 1550 S. Highland Ave., Ste. B, Clearwater, Fla. 34616

Filed Sep. 15, 1989, Ser. No. 407,834

Int. Cl.<sup>5</sup> F16N 3/06

U.S. Cl. 184—28

13 Claims



1. An apparatus having utility in connection with the introduction of a lubricating fluid into a reservoir therefor which reservoir requires charging from the bottom thereof, comprising:

- a first axially bored, externally threaded fitting adapted to releasably and selectively engage a drain opening and a vent opening confluent with said reservoir;
- a second axially bored, internally threaded fitting adapted to releasably engage an externally threaded spout of a squeezable container for lubrication;
- an elongate, flexible tube member disposed in interconnecting relation between said first and second fittings so that the respective axial bores thereof are in fluid communication with one another;
- a valve means for selectively opening and closing said tube member to fluid flow therethrough;
- whereby clean lubricating fluid is introduced into said reservoir by screw threadedly engaging said first fitting to said drain opening, by screw threadedly engaging said second fitting to said spout of said squeezable container and by driving said fluid through said tube member and into said reservoir by squeezing said squeezable container;
- whereby draining dirty lubricating fluid from said reservoir as a preparatory step to charging clean fluid into said reservoir is accomplished by engaging said first fitting to said drain opening, positioning said second fitting in open communication with a receptacle for the collection of dirty fluid, and opening a vent so that dirty fluid flows out of said drain opening, through said tube and into said receptacle; and
- whereby the reservoir is flushed after draining as a further preparatory step to charging said reservoir with clean fluid, and accomplishing said flushing by positioning the first fitting into fluid communication with said drain opening, positioning said second fitting in open communication with said receptacle, preparing a second assembly of parts consisting of an elongate flexible tube having fittings at its opposite ends and charging the contents of a squeezable lubricating fluid container into said vent opening so that



said contents passes through said reservoir and into said receptacle to thereby flush said reservoir.

4,946,006

# **ELEVATOR APPARATUS WITH A SECTORED VERTICAL SHAFT AND A TURNTABLE FOR TRANSFERING ELEVATOR CAGES BETWEEN THE INDIVIDUAL SECTORS**

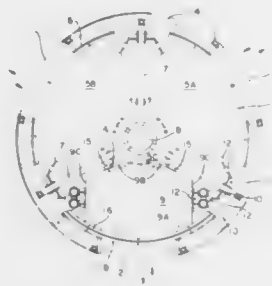
Takeshi Kume, Amagasaki, Japan, assignor to T. K. M. Engineering Kabushiki Kaisha, Amagasaki, Japan

Filed Apr. 13, 1989, Ser. No. 337,552

Claims priority, application Japan, Apr. 13, 1988, 63-91999  
Int. Cl.<sup>5</sup> B66B 11/04

U.S. Cl. 187—25

4 Claims



1. An elevator system for use in a multi-story building, the building having a vertical space formed therein, said elevator system comprising a stationary framework adapted to be mounted in said space, said framework comprising frame members dividing said vertical space into a plurality of angularly spaced sectors, at least one elevator cage in each of said sectors, at least one turntable means rotatably mounted in said space adjacent said stationary framework, said turntable means being located to receive a cage from said stationary framework and rotate said cage from one of said sectors to another of said sectors, and power means on said frame members, said turntable means and each cage for moving each cage in the vertical direction.

4,946,007

# **SELF-ENERGIZING BRAKE**

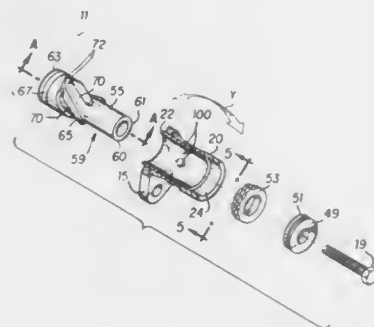
David F. Pederson, and Steven R. Miller, both of Twin Falls, Id., assignors to Pedersen Development Co., Twin Falls, Id.

Continuation-in-part of Ser. No. 116,291, Nov. 3, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 240,497

Int. Cl.<sup>5</sup> B62L 1/14

U.S. Cl. 188—24.14

20 Claims



1. In a bicycle having a frame and at least one tire mounted on a rim, a self-energizing brake comprising:  
a pair of rocker arms each having a friction pad extending therefrom;  
means for rotatably mounting each of said pair of rocker arms adjacent opposite sides of said tire rim such that said

friction pads are movable into contact with respective sides of said rim as said rocker arms are rotated in a first direction;

a pair of tubular members fixed to said mounting means to extend transversely on opposite sides of said tire rim, each said tubular member having an outer surface;

a pair of housings, each housing being integral with and extending transversely from one of said rocker arms and surrounding a respective one of said tubular members, each said housing having an inner surface;

one of said outer surfaces of said tubular members and said inner surfaces of said housings being configured with a plurality of helical ridges thereon, and the other one of said outer surfaces of said tubular members and said inner surfaces of said housings being configured with means for cooperating and mating with said helical ridges to move said housings axially along and rotate said housings relative to the respective tubular member as said rocker arms are rotated to increase the pressure of said friction pads against said rim.

4,946,008

# **FRICTIONAL DAMPER**

Hans-Peter Bauer; Hans J. Bauer; Ludwig Stadelmann, all of Altdorf, and Dieter Mayer, Sulzbach-Rosenberg, all of Fed. Rep. of Germany, assignors to SUSPA Altdorf Federungs-technik GmbH, Altdorf, Fed. Rep. of Germany

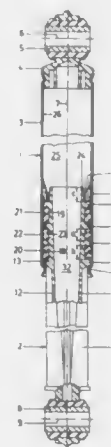
Filed Sep. 27, 1989, Ser. No. 413,368

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834127

Int. Cl.<sup>5</sup> F16F 7/08

U.S. Cl. 188—129

6 Claims



1. A frictional damper, in particular for washing machines with spinning action, comprising:

an approximately circular cylindrical housing having an inner wall;

a tappet which is coaxially displaceable inside the cylindrical housing and extends out of the housing with a first end;

an approximately cylindrical friction piston provided at a second end of the tappet which is inside the housing the friction piston having at least one approximately circular cylindrical support segment and bracing flanges radially extending beyond the latter, which are axially limited at fixed distances;

a friction coating made of an elastically resilient material being disposed on the support segment and between the bracing flanges and being elastically pressed against the inner wall of the housing;

a grease chamber, open towards the inner wall of the housing being formed on the friction piston; and

an extension tube being formed on the second end of the tappet which tube, together with the adjacent bracing

flange and the inner wall of the housing, defines a grease collecting chamber.

4,946,009

# **ELECTROMAGNETIC VALVE UTILIZING A PERMANENT MAGNET**

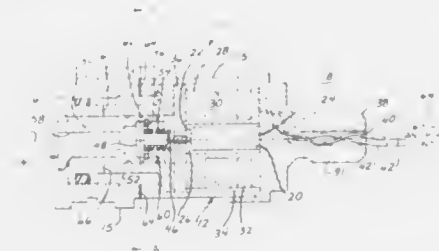
Dale A. Knutson, Nashotah, Wis., assignor to Applied Power, Inc., Milwaukee, Wis.

Filed Apr. 12, 1989, Ser. No. 337,180

Int. Cl.<sup>5</sup> F16F 9/46

U.S. Cl. 188—299

12 Claims



1. A pulse-width modulated valve for regulating fluid flow between first and second chambers, said valve comprising:

(a) a generally cylindrical housing holding magnetic drive means connected to regulator means by connector means;

(b) said magnetic drive means comprising:

(1) a cylindrical ferromagnetic armature axially reciprocable between first and second positions;

(2) magnetic motive means, generally surrounding said armature, comprising a radially magnetized permanent magnet and electromagnet means, said motive means designed to move said armature alternately between said first and second limit positions and to hold said armature at one of said limit positions in a preselected fashion; and

(3) means for controlling said motive means; and

(c) said regulator means comprising:

(1) a generally cylindrical poppet, connected to said armature by said connector means, and axially reciprocable in a sleeve between a first open position when said armature is in said first limit position and a second closed position when said armature is in said second limit position;

(2) wherein when said poppet is in said closed position, said poppet and said sleeve prevent fluid flow between said chambers, and when said poppet is in said open position, said poppet and said sleeve permit fluid flow between said chambers; and

(3) means for biasing said poppet toward said open position.

4,946,010

# **TELEPHONE CORD RETRACTION DEVICE**

Peter A. DiBono, 25 Santa Ana Ave., San Francisco, Calif. 94127

Filed Mar. 30, 1989, Ser. No. 331,274

Int. Cl.<sup>5</sup> H02G 11/00

U.S. Cl. 191—12.2 R

5 Claims

1. A telephone cord retraction device adapted for connection between a fixed telephone terminal and a movable telephone set, said device comprising:

a housing comprising a pair of molded plastic housing sections that fit together along peripheral edge portions;

a fixed conductor extending from said housing and adapted for connection with said telephone terminal;

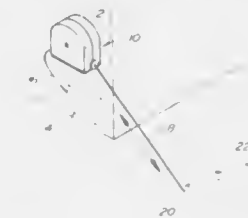
a rotatable spool in said housing comprising a central drum portion and flange members at opposite ends of said drum portion;

an extendable cord on said spool whose outer end is connectable to a telephone set;

connection means on said spool and said housing for providing electrical continuity between said fixed conductor and said extendable cord;

a spring motor connected to said spool for urging it in one rotational direction to provide wind-up tension on the extendable cord

spool control means for temporarily holding said spool stationary within said housing against the force of said



spring motor and for releasing said spool to allow said motor to rotate said spool and thereby wind-up said cord within said housing, said spool control means comprising a generally semi-circular sector, having a series of spaced apart notches along its outer edge and a flexible pawl engageable with said sector, said sector being integral with one said housing section on its inside surface and said pawl being fixed to one said flange of said spool, said pawl being of plastic material and having an outer end portion retained on said spool flange.

4,946,011

# **SHAFT-TURNING DEVICE WITH HYDRO-MECHANICAL OVERRUNNING CLUTCH**

Heinrich Oeynhausen, Ruhr, and Ernst Winkelhake, Bochum, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

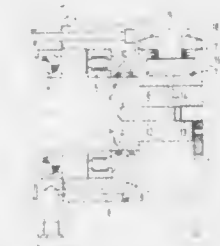
Filed Jul. 15, 1988, Ser. No. 220,000

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723385

Int. Cl.<sup>5</sup> F16D 25/065, 43/28

U.S. Cl. 192—0.096

16 Claims



1. Shaft-turning device, comprising a hydraulic motor having a first pressure fluid inflow line, a hydraulic overrunning clutch for connection with a shaft to be turned having a second pressure fluid inflow line constantly communicating with said first pressure fluid inflow line during operation, said clutch including spring means, locking elements, and means for hydraulically forcing said locking elements counter to the force of said spring means, a hydraulic oil supply, a common supply line communicating with said hydraulic oil supply and both of said inflow lines, and a throttle in said common supply line.

**4,946,012**  
**BRAKE ACTIVATED ACCELERATION OVERRIDE APPARATUS**

Al Foster, Davisburg, Mich., assignor to James G. Wells, Rochester, Mich.

Filed Jul. 20, 1989, Ser. No. 382,399

Int. Cl.<sup>5</sup> B60K 41/20; F02B 77/08

U.S. Cl. 192—1.46

8 Claims



1. A brake activated accelerator override apparatus for a vehicle having an engine with a throttle plate pivotal between closed and open positions, a first throttle lever connected to the throttle plate, an accelerator linkage means connected to the first throttle lever, a return spring acting on the first throttle lever to bias the first throttle lever and the throttle plate to a closed position and a vehicle brake system, the apparatus comprising:

- a second throttle lever connected to the throttle plate for pivoting the throttle plate to the closed position;
- means for sensing activation of the vehicle brake system; and actuator means, responsive to actuation of the vehicle brake system and connected to the second throttle lever, for pivoting the second throttle lever and the attached throttle plate to the closed position independent of the first throttle lever when the vehicle brake system is activated, the actuator means comprising:
- an electromagnetic solenoid having a core and coil and a plunger movably disposed within the core and retractable when electric current is applied to the coil of the solenoid; and
- a link connecting the plunger to the second throttle lever.

**4,946,013**  
**APPARATUS FOR MANUAL OPERATION OF VEHICLE BRAKE AND ACCELERATOR PEDALS**

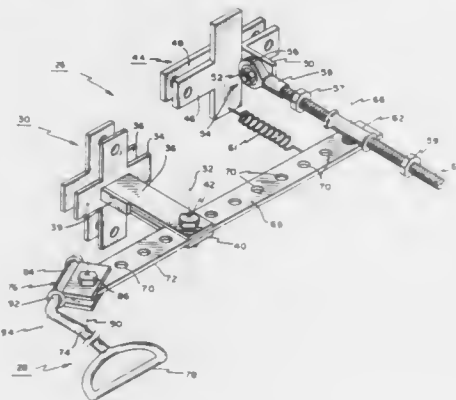
Andrew C. Conlyn, Jr., P.O. Box 3037, Pineland, Fla. 33945, and John V. Masters, 315 Berkman Rd., Augusta, Ga. 30906

Filed Jun. 12, 1989, Ser. No. 364,060

Int. Cl.<sup>5</sup> B60K 41/20; G05G 9/02, 1/14

U.S. Cl. 192—1.52

19 Claims



1. A hand operated control device for controlling a vehicle having a movable brake actuator for selectively applying and releasing a braking system, and having an accelerator actuator

independent of and spaced from the brake actuator for selectively moving a throttle between closed and open positions, said device comprising:

- (a) first primary support means connected with the brake actuator for pivotally supporting a control lever means for pivotal movement about a first pivot axis movable with the brake actuator;
- (b) second auxiliary support means connected with the accelerator actuator for movement of the accelerator by movement of the control lever means;
- (c) said control lever means extending between and pivotally connected with the first movable support means and including an extension extending outwardly from the first pivot axis in a direction opposite from accelerator actuator to define a lever arm; and
- (d) manually operable control handle means connected with the lever means extension at a point spaced from the first pivot axis, for hand operation in a linear direction toward and away from a vehicle user to operate respectively the brake actuator and the accelerator actuator for control of motion of the vehicle.

**4,946,014**  
**RETARDER**

Masaki Okada, Fujisawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

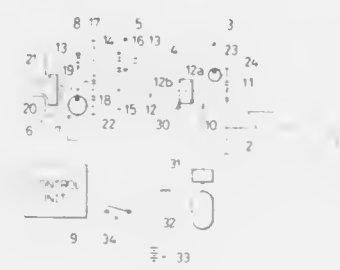
Filed Oct. 2, 1989, Ser. No. 416,083

Claims priority, application Japan, Oct. 31, 1988, 63-273021

Int. Cl.<sup>5</sup> B60K 41/28

U.S. Cl. 192—4 B

9 Claims



9. A retarder adapted for use on a vehicle having a crankshaft, comprising:

- a speed change mechanism connected with the crankshaft, the speed change mechanism having at least an output shaft and a bearing;
- a clutch provided between the speed change mechanism and the crankshaft for selectively connecting and disconnecting the speed change mechanism relative to the crankshaft;
- a blower connected to the output shaft of the speed change mechanism;
- an oil supply device for supplying lubrication oil to the bearing of the speed change mechanism;
- a pressure sensor provided at the bearing of the speed change mechanism for detecting a pressure of the lubrication oil supplied from the oil supply device;
- an electromagnetic valve;
- a main switch having an ON position and an OFF position, for allowing the clutch to connect the crankshaft with the blower via the electromagnetic valve when it is in the ON position and to disconnect the crankshaft from the blower when it is in the OFF position;
- a clutch switch for detecting whether the clutch connects the speed change mechanism with the crankshaft; and
- a control unit for allowing the clutch to disconnect the crankshaft from the speed change mechanism via the electromagnetic valve when the clutch switch has detected that the clutch has connected the crankshaft with the speed change mechanism.

the speed change mechanism and the oil pressure detected by the pressure sensor drops below the predetermined level.

**4,946,015**  
**VEHICLE TRACTION CONTROL SYSTEM**

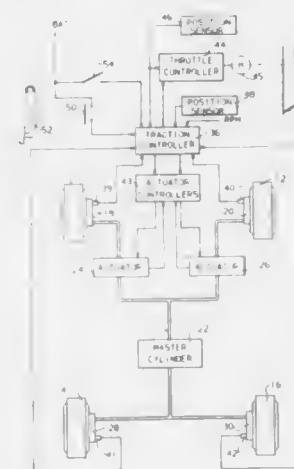
Edmund S. Browalski, W. Bloomfield, and Philip E. Nimmo, IV, Fenton, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 11, 1989, Ser. No. 350,272

Int. Cl.<sup>5</sup> F16D 25/14

U.S. Cl. 192—1.23

6 Claims



1. A traction control system for a vehicle having an engine for applying a driving torque to first and second driven wheels, the system comprising, in combination:

- means for determining an excessive spin condition of each of the first and second driven wheels resulting from an excessive driving torque applied thereto from the engine;
- first and second wheel brakes for the first and second driven wheels, respectively;
- means for controlling the first brake to apply a braking force to the first driven wheel in response to a determined excessive spin condition of the first driven wheel, the applied braking force to the first driven wheel having a magnitude that is a predetermined function of selected wheel parameters representing a degree of excessive spin of the first driven wheel;
- means for controlling the second brake to apply a braking force to the second driven wheel in response to a determined excessive spin condition of the second driven wheel, the applied braking force to the second driven wheel having a magnitude that is a predetermined function selected wheel parameters representing the degree of excessive spin of the second driven wheel;
- means for determining a total value of engine torque being absorbed by the first and second wheel brakes represented by the sum of the braking forces applied to the first and second wheel brakes; and
- means for reducing the driving torque applied to the first and second driven wheels by the engine by an amount having a predetermined relationship to the total value of engine torque being absorbed by the first and second wheel brakes.

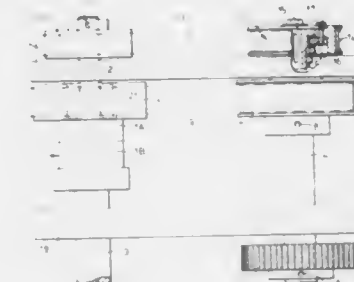
**4,946,016**  
**DEVICE FOR CONTROLLING POSITIONED STOPPING OF A PACKAGING UNIT**

Jean Torres, Lausanne, Switzerland, assignor to SAPAL Societe Anonyme des Plieuses Automatiques, Ecublens, Switzerland  
Continuation-in-part of Ser. No. 919,023, Oct. 15, 1986, abandoned. This application Oct. 25, 1988, Ser. No. 262,553  
Claims priority, application Switzerland, Oct. 16, 1985, 4453/85

Int. Cl.<sup>5</sup> F16D 47/00

U.S. Cl. 192—48.2

3 Claims



1. A device for controlled positioned stopping of a packaging unit comprising a first packaging machine and a second packaging machine, said device comprising a clutch having a first part connected to a first shaft functioning as an input shaft and coupled with said first packaging machine, and a second part connected to a second shaft functioning as an output shaft and coupled with said second packaging machine, a torque limiter inserted between said second part of said clutch and said input shaft, means coupling said torque limiter with said input shaft, and means coupling said torque limiter with said output shaft, said first part of said clutch being rotatably mounted on said output shaft and said second part of said clutch being fixedly mounted on said output shaft, said torque limiter comprising a rotating pulley mounted on a central axle, and a friction member arranged for coupling said rotating pulley with said central axle, said pulley being coupled with said second part of said clutch, and said central axle being coupled with said input shaft.

**4,946,017**  
**ANGLED RELEASE CLUTCH SYSTEM**

Richard A. Flotow, Butler, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 16, 1988, Ser. No. 285,153

Int. Cl.<sup>5</sup> F16D 19/00

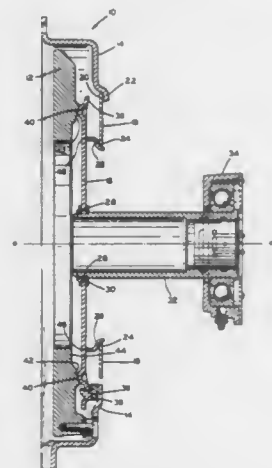
U.S. Cl. 192—70.3

7 Claims

1. In a friction clutch system adapted to drivingly engage rotatable drive and driven members comprising an engine flywheel and an input shaft, respectively, said clutch having a central axis about which said flywheel and said driven member are rotatable, said clutch comprising a cover secured to said engine flywheel for rotation therewith, and for limited axial movement relative to said cover, a plurality of levers pivotally attached to said cover for urging said pressure plate axially relative to said cover into and out of driving engagement with said input shaft, an annular Belleville spring compressed between said cover and said lever for biasing said lever to cause said lever to urge said pressure plate into engagement with said driven member; an improvement comprising said spring having an inner annular edge portion engageable with at least one of said levers and an outer annular edge portion engageable with said cover, in combination with said pressure plate having an annular inclined surface portion for cooperating with said one lever, said surface portion having a planar cross-section, said lever having an arcuate contacting portion for engaging said planar inclined surface portion of said pressure plate, an intermediate portion biased relative to said pressure plate by



said annular spring, and an inner end portion connectable to throw out means disposed about said central axis for pivoting said lever to enable said pressure plate to move out of driving engagement with said input shaft, wherein said lever further comprises an outer terminal portion pivotally attached to said cover, said contacting portion positioned adjacent said terminal portion and adapted to contact said inclined surface portion of said pressure plate, said intermediate portion being urged toward said pressure plate by said spring, and wherein said inner end portion is disposed about said central axis for urging



said end portion away from said pressure plate to enable said pressure plate to move out of driving engagement with said input shaft, wherein said cover comprises rotational restraint means for said Belleville spring to prevent relative rotation between said cover and said spring, and wherein said spring comprises a plurality of radially outwardly extending tongues for engagement of said rotational restraint means in said cover, wherein said inclined surface portion of said pressure plate extends angularly outwardly in a direction toward said outer terminal portion of said lever as a function of radial distance along said surface of said portion from said central axis.

4,946,018

**EXTENSIBLE AND RETRACTABLE CHUTE**

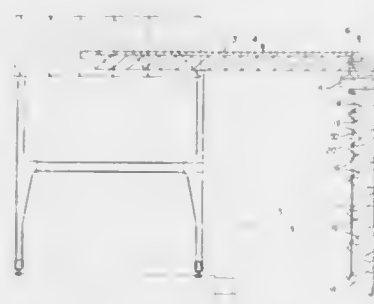
Willard Binzen, Mars; Chung C. Lee, and David A. Gadsby, both of Coraopolis, all of Pa., assignors to Dravo Wellman, Inc., Pittsburgh, Pa.

Filed Oct. 30, 1989, Ser. No. 429,076

Int. Cl.<sup>5</sup> B65G 11/14

U.S. Cl. 193—25 C

16 Claims



1. An extensible and retractable bulk material chute comprising:

- a hoist frame having rotatable hoist drum means associated therewith and including means for rotating said hoist drum means;
- a plurality of elongated chute segments positioned be-

neath the hoist frame, each chute segment having a material conveying surface and opposed first upper end and a second lower end, said chutes positioned in a vertical array;

- hinge means for pivotally joining said chute segments at respective adjacent first and second ends, whereby the lower end of a chute segment is pivotally joined to an upper end of a subjacent chute segment;
- pivot pin means extending outwardly on each of said hinge means;
- support strand means attached to each of said pivot pin means and extending between the upper end of a chute segment and the lower end of a subjacent chute segment, and including hinge means for attaching an upper end of an uppermost chute segment to the hoist frame and support strand means for attaching the pivot pin means carried on a lower end of the uppermost chute segment to the hoist frame, whereby a weight of said chute segments is carried by said support strand means; and
- hoist rope means attached at an upper end to said hoist drum means and to a lowermost chute segment at a lower end thereof to selectively extend and retract said loading chute, whereby said chute segments foldably nest and un-nest one upon the other as said chute segments pivot about said hinge means when said hoist rope means is raised and lowered, respectively.

4,946,019

**COIN DISCRIMINATOR WITH PHASE DETECTION**

Riichiro Yamashita, Tokasago, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

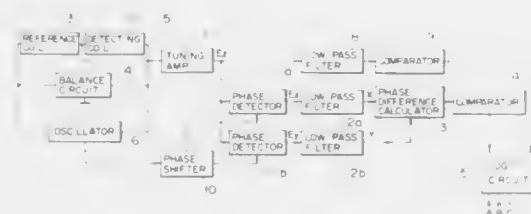
Filed Mar. 1, 1989, Ser. No. 317,823

Claims priority, application Japan, Mar. 7, 1988, 63-52967

Int. Cl.<sup>5</sup> G07D 5/08

U.S. Cl. 194—318

1 Claim



1. A coin discriminator including an impedance level discrimination circuit provided with a bridge circuit including a detecting coil, a reference coil and a balance circuit, an oscillator for supplying a high frequency voltage to the bridge circuit, a tuning amplifier for amplifying an output voltage of the bridge circuit, a low pass filter for detecting a low frequency component of a variation of a voltage proportional to an absolute value of a variation of an impedance in the detecting coil when a coin passes through the detecting coil, and a comparator for comparing a voltage level of the impedance variation of the detecting coil with predetermined voltage levels, comprising a phase shifter for producing an in-phase voltage and a voltage delayed by  $\pi/2$  in phase with regard to the oscillation voltage of the oscillator, phase detectors for detecting an in-phase component and a component delayed by  $\pi/2$  in phase from an output voltage of the tuning amplifier on the basis of the in-phase voltage and the voltage delayed by  $\pi/2$  in phase produced by said phase shifter, respectively, low pass filters for cutting high frequency components from the in-phase component voltage and the  $\pi/2$ -phase-delayed component voltage, respectively, to detect low frequency component of variation of a voltage when the coin passes through the detecting coil, a phase difference calculator for calculating a phase difference of the impedance variation of the detecting coil caused by the coin on the basis of the in-phase component voltage and the

$\pi/2$ -phase-delayed component voltage produced from said low pass filters, respectively, and a logic circuit for calculating a logical product of an output of the impedance level discrimination circuit and an output of said phase difference calculator to discriminate a coin.

4,946,020

**LOW FRICTION ESCALATOR HANDRAIL GUIDE**

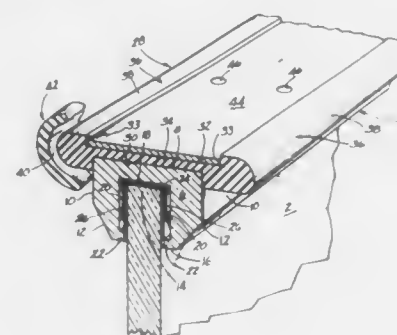
James A. Rivera, Bristol, and Gerald Johnson, Farmington, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Filed Jul. 28, 1989, Ser. No. 386,314

Int. Cl.<sup>5</sup> B65G 15/00

U.S. Cl. 198—335

5 Claims



1. A handrail guide assembly adapted to be mounted on the balustrade of an escalator, said guide assembly comprising:

- a metal base portion adapted to be fitted onto a top edge of the escalator balustrade;
- a handrail contacting and guiding track disposed on said base, said track being formed from a low coefficient of friction plastic material;
- a metal reinforcing strip mounted on a central portion of said track on the side thereof opposite said base whereby said track is sandwiched between said base and said strip; and
- means securing said strip to said base through said track whereby said track is pinned to said base by said strip.

4,946,021

**MULTIPLE POSITION, CONVEYOR MOUNTABLE WORKPIECE CARRIER**

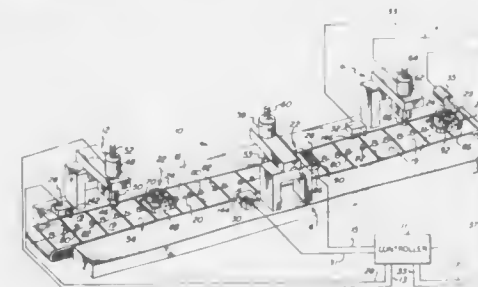
James F. Murphy, Lynchburg, Va., assignor to Simplicatic Engineering Company, Lynchburg, Va.

Filed Oct. 17, 1988, Ser. No. 258,486

Int. Cl.<sup>5</sup> B65G 49/00

U.S. Cl. 198—375

17 Claims



1. A device for conveying a workpiece along a conveyor path having spaced therealong at least two workstations to present said workpiece in seriatim to said workstations in at

least two positional orientations as required for each particular workstation, said device comprising:

- a base for being transported along said path from a first workstation to a next successive workstation along said path;
- means mounted on said base for nesting said workpiece in a positional orientation with respect to said base to present said workpiece to each of said workstations, said nesting means being repositionable relative to said base for changing said positional orientation; and
- at least one means for repositioning said nesting means from one position to at least a second position;
- means for at least one of said workstations for activating said repositioning means being disposed along said path in spaced relationship to said selected ones of said workstations;
- means for conveying said device along at least a portion of said path, said conveying means for carrying said device along said path past said activating means for repositioning of said nesting means, said conveying means having a conveying surface for supporting objects placed thereon, said base including a body having a bottom face for resting on said surface, said body further forming a plurality of apertures therein, said apertures for mating with corresponding protuberances on said surface to releasably lockingly engage said device on said conveying means, said base comprising means for guiding said activating means into engagement with said repositioning means when said base is transported by said conveying means into position adjacent said activating means, whereby said workpiece can be successively presented to each of said workstations in plurality of positional orientations as required by each of said workstations.

4,946,022

**ARTICLE SORTING SWITCH**

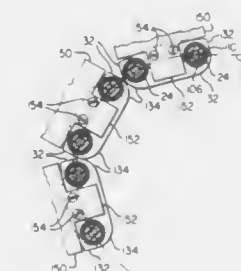
Bill E. Davis, Irving, and Paul Podsiad, Plano, both of Tex., assignors to Stewart Systems, Inc., Plano, Tex.

Filed Aug. 23, 1989, Ser. No. 397,721

Int. Cl.<sup>5</sup> B65G 47/46

U.S. Cl. 198—365

21 Claims



1. An article sorting switch comprising:

- a plurality of pallet support members;
- means for moving said pallet support members through a predetermined closed course, said course comprising an upper article sorting portion and a lower return portion, said upper article sorting portion comprising a plurality of diverging article conveying paths;
- sorting guide means, associated with each of said article conveying paths;
- return guide means associated with said lower return portion of said closed course;
- a plurality of pallets in substantially abutting relationship, each of said pallets comprising a top portion and lower arcuate side portions, each of said pallets being slideably retained on at least one of said pallet support members, said arcuate side portions allowing said pallet support members to retain each of said pallets in substantially

continuous sequential contact with each adjacent pallet as said pallets are moved through the closed course; switch engaging means, said switch engaging means depending from each of said pallets; switching means for receiving said switch engaging means and selectively directing said pallets to one of said diverging article conveying paths.

4,946,023

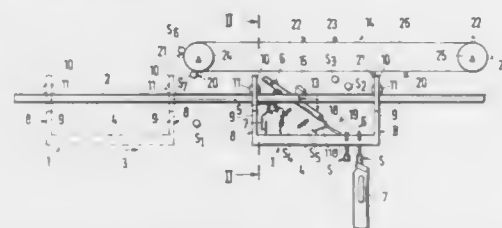
# APPARATUS FOR MANIPULATING GARMENT HANGERS

Hans Heinold, Dietzenbach, and Joseph Rau, Heppenheim, both of Fed. Rep. of Germany, assignors to Manfred A. Jennewein, Mürfelden-Walldorf, Fed. Rep. of Germany  
Filed Jun. 2, 1989, Ser. No. 360,402  
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819102

Int. Cl.<sup>5</sup> B65G 47/26

U.S. Cl. 198—419.1

17 Claims



1. Apparatus for manipulating discrete articles of the type having substantially hook-shaped carriers, particularly for manipulating hangers for garments, comprising a file of conveyances each having an elongated carrier-supporting member; an elongated track defining for said conveyances an elongated first path; article feeding means defining a second path with a discharge end adjacent said first path and arranged to supply a series of articles toward and beyond said discharge end onto the supporting member of the conveyance which is adjacent said discharge end; singularizing means adjacent said second path and operable to release successive articles for advancement toward and beyond said discharge end; means for transporting successive conveyances of said file past the discharge end of said second path, including a conveyor for successive conveyances of said file and a prime mover for said conveyor; means for operating said singularizing means a predetermined number of times during transport of successive conveyances past said discharge end so that the supporting member of each conveyance receives a predetermined number of articles; control means including a sensor adjacent said first path and having means for generating signals in response to detection of a conveyance in a predetermined portion of said first path; and means for starting said prime mover in response to said signals so that said conveyor transports the conveyance from said predetermined portion of said first path.

4,946,024

# PROCEDURE AND APPARATUS FOR SEPARATING BATCHES FROM A STREAM OF LOGS

Matti Forsberg, Lahti, Finland, assignor to Kone Oy, Helsinki, Finland

Filed Dec. 20, 1988, Ser. No. 286,734

Claims priority, application Finland, Dec. 22, 1987, 875670

Int. Cl.<sup>5</sup> B65G 47/00

U.S. Cl. 198—429

8 Claims

3. An apparatus for separating batches from a continuous stream of logs on a conveyor comprising a plurality of conveyor units, with a batching operation taking place in gaps between said conveyor units comprising blocking means to close said gaps and movable in the vertical direction, two or more upper limiter means which are capable of being pushed

up through said stream of logs, and lifting means with which a batch of logs entrapped between said blocking means and said



4,946,025

# APPARATUS AND METHOD FOR SEPARATING ARTICLES ON A CONVEYOR

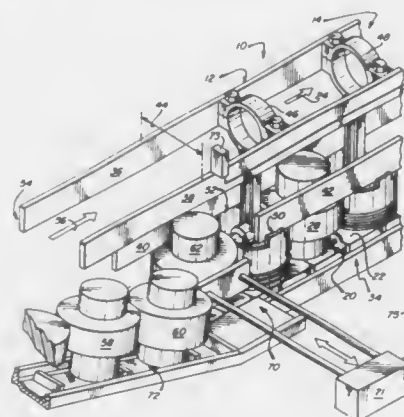
James F. Murphy, Lynchburg, Va., assignor to Simplimatic Engineering Company, Lynchburg, Va.

Filed Nov. 28, 1988, Ser. No. 276,776

Int. Cl.<sup>5</sup> B65G 47/26

U.S. Cl. 198—459

19 Claims



1. A method for conveying a series of articles along an endless conveyor path freely disposed on an endless conveyor surface having an upper run while maintaining protective article-to-article separation, said method comprising the steps of:

- moving an article from an article storage zone onto said endless conveyor surface;
- moving a noncompressible and inelastic protective means from a supply storage zone onto the endless conveyor surface for providing a freely disposed member directly adjacent the article;
- alternately repeating steps (a) and (b) to provide a continuous series of articles with noncompressible and inelastic protective means alternately dispersed between each article, for protecting and separating said articles; and
- conveying said series of articles alternated with said protective means on either side thereof along said endless conveyor surface, said articles being free to contact said protective means but not any other article in said series.

4,946,026

# RESIDUE REMOVAL SYSTEM FOR A CONVEYOR ASSEMBLY

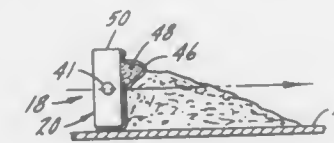
William S. Rickman, Leucadia, Calif., assignor to Ogden Environmental Services, Inc., San Diego, Calif.

Filed Aug. 28, 1989, Ser. No. 399,322

Int. Cl.<sup>5</sup> B65G 45/10

U.S. Cl. 198—494

19 Claims



1. In a conveyor assembly for transporting compactible materials, said assembly having an inlet port, a discharge port, a plurality of conveyor flights and a means for driving said flights, each of said conveyor flights being drivingly coupled to said driving means and comprising a plate element having a front surface, a top edge and a bottom edge,

- a flexible member secured to said plate element and displaced from said front surface at a reference position, which flexible member is non-elastomeric,
- said front surface and said flexible member defining a gap therebetween at said reference position, which flexible member is resistant to displacement against the overall front surface of said support element by the force from transfer of said compactible material, said flexible member inherently recovers to said reference position, when the transfer force is removed, to discharge said transported material from the conveyor assembly by dislodging adherent material from said conveyor flight.

4,946,027

# BOOM CONVEYOR

John P. Jenkins, Aslockton, United Kingdom, assignor to Sovex Marshall Limited, Carlton, Great Britain

Continuation of Ser. No. 48,828, May 12, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,132

Claims priority, application United Kingdom, Jan. 9, 1987, 8700474

Int. Cl.<sup>5</sup> B65G 15/26

U.S. Cl. 198—592

12 Claims



1. A raisable and lowerable boom conveyor including:

- a chassis means;
- a cantilevered movable conveyor mounted on the chassis means so that the conveyor's outer free end is capable of raising and lowering in a vertical plane between predetermined limits;
- an operator's platform at the outer free end of the conveyor;
- support means for supporting said outer free end located between the outer free end and a support floor and arranged independently of the conveyor, the support means being passively extendable by the raising of the conveyor, passively retractable by the lowering of the conveyor and self-locking, and
- release means for enabling retraction of the support means when the conveyor is lowered.

4,946,028

# CONVEYOR BELT TREATMENT

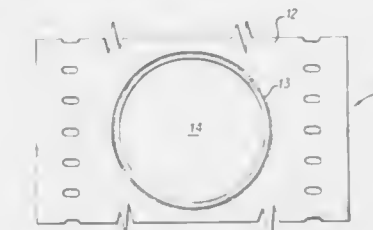
Harry A. Eichmann, and Gieselle Eichmann, both of S. 8228 Inspiration Dr., Merrimac, Wis. 53561

Filed Jul. 26, 1989, Ser. No. 385,066

Int. Cl.<sup>5</sup> B65G 15/58

U.S. Cl. 198—688.1

16 Claims



1. In an apparatus for the conveyance of can lids during manufacture and stamping, wherein each of said can lids including a central portion radially adjacent, integral with and encircled by a peripheral flange, comprising:

- a metallic sheet having a top surface and a bottom surface, said metallic sheet having a plurality of can lid holes there-through,
- frictional augmentation means on said metallic sheet encircling said can lid holes, said frictional augmentation means comprising a separately defined area adjacent each said can lid hole of said metallic sheet, said frictional augmentation means comprises an area engraved to a specific roughness on said sheet top surface,
- said frictional augmentation means disposed on said top surface of said metallic sheet and positioned relative to said can lid holes to locate said frictional augmentation means beneath said peripheral flange when one of said lids is concentrically disposed atop one of said can lid holes of said metallic sheet,
- whereby said frictional augmentation means provides an increased frictional force between said peripheral flange and said metallic sheet to discourage angular and radial displacement of said can lid relative to said metallic sheet.

4,946,029

# PURIFICATION OF CARBOXYLIC ESTERS WHICH CONTAIN ALDEHYDES, ACETALS AND/OR UNSATURATED COMPOUNDS

Gerhard Frank, Hirschberg; Hubert Lendle, Ludwigshafen; Wilfried Seyfert, Weisenheim, and Peter Stops, Altrip, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 24, 1989, Ser. No. 314,952

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 3806304

Int. Cl.<sup>5</sup> B01D 3/34; C07C 67/54

U.S. Cl. 203—29

4 Claims

1. A process for purifying C<sub>1</sub>-C<sub>4</sub>-alkyl adipates prepared by carbonylation of butadiene or C<sub>1</sub>-C<sub>4</sub>-alkyl pentenoates with carbon monoxide and C<sub>1</sub>-C<sub>4</sub>-alkanols, and containing color formers, including aldehydes, acetals and unsaturated dicarboxylic acids, comprising the following steps:

- contacting the C<sub>1</sub>-to-C<sub>4</sub>-alkyl adipates containing such color formers with a strongly acidic agent at from 20 to 200° C. for a period of from 0.1 to 4 hours, while stripping off the C<sub>1</sub>-to-C<sub>4</sub>-alkanols formed,
- contacting the C<sub>1</sub>-to-C<sub>4</sub>-alkyl adipates obtained in step (a) in a separate and subsequent stage with hydrogen at from 50 to 200° C. under a pressure of from 1 to 50 bar in the presence of one or more metals of subgroups VIII of the periodic table for a period of from 0.3 to 3 hours, and
- purifying the C<sub>1</sub>-to-C<sub>4</sub>-alkyl adipates obtained in step (b), by fractional distillation, while removing low and high boilers.



4,946,030

**EMERGENCY KEY HOLDER CARD**

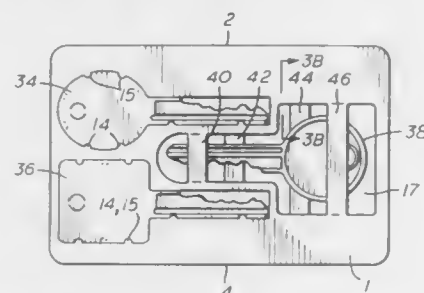
Jose J. S. Guridi, 2000 Bering Dr., #805, Houston, Tex. 77057, and Jerry D. Perdue, Rte. 4, P.O. Box 4714, Porter, Tex. 77365

Filed Jun. 20, 1988, Ser. No. 208,572

Int. Cl.<sup>5</sup> A45G 11/32

U.S. Cl. 206—37.1

2 Claims



1. An emergency key holder card comprising:
  - a. a single rectangular credit card sized body of similar dimensions as a credit card;
  - b. two longitudinally parallel emergency key apertures located within said card body;
  - c. two emergency keys of substantially the same shape as said apertures;
  - d. a means of retaining said emergency keys within said apertures; and
  - e. a plurality of tabs placed intermittently about said key retaining aperture, said tabs extending outward from said card body to said aperture from both sides of said card each tab being offset from any other tab and corresponding to a recess in the emergency key intended to be retained within said aperture.

4,946,031

**HOLDER PARTICULARLY FOR A SHEET BLOCK**

Giulio Confalonieri, Milan, Italy, assignor to Nava Milano S.P.A., Milan, Italy

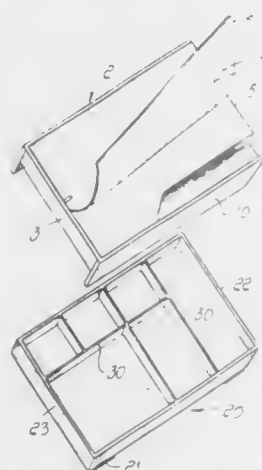
Filed Jan. 16, 1990, Ser. No. 465,820

Claims priority, application Italy, Jan. 25, 1989, 20475/89[U]

Int. Cl.<sup>5</sup> B65D 85/00

U.S. Cl. 206—38

6 Claims



1. A holder particularly for a sheet block, comprising a tray-shaped body having a missing edge and defining a holding seat for a stack of sheets, said tray-shaped body being slidably supported by a base body which can be upwardly closed by said tray-shaped body and defines a plurality of compartments.

4,946,032

**DISPLAY COOLER**

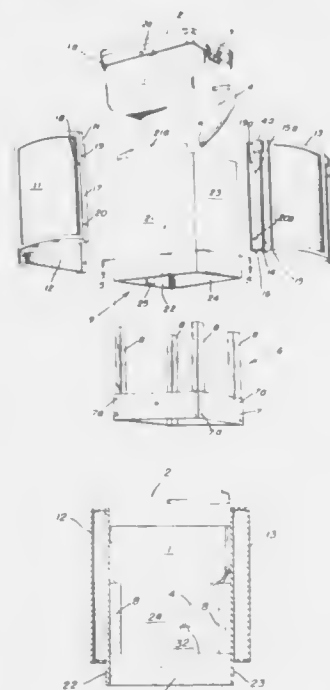
David C. F. Stoddard, Atlanta, and Randall E. Bailey, Alpharetta, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jun. 14, 1989, Ser. No. 366,695

Int. Cl.<sup>5</sup> B65D 5/52

U.S. Cl. 206—44 R

18 Claims



1. A display cooler for cold drinks and the like comprising a support stand, a bin formed of insulating material and mounted atop said support stand, said bin having side walls arranged in quadrilateral cross sectional configuration and having right angle corners, and an open ended enclosure of said cross sectional configuration which is complementary to that of said bin and being which is disposed about said support stand and said bin in snug relation therewith, means securing said enclosure to said support stand and forming a fixed structural relation therewith, and decorative covering means including a plurality of panels arranged in overlying relation with a plurality of corresponding walls of said enclosure respectively.

4,946,033

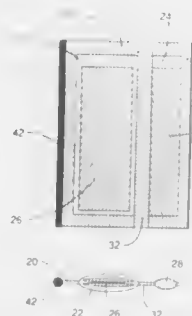
**SKIN CLEANER/TOWEL PACKAGE**

Bruce E. Conner, 11-A Sachem St., Lynn, Mass. 01902  
Continuation-in-part of Ser. No. 275,939, Nov. 25, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,061

Int. Cl.<sup>5</sup> B65D 75/34, 75/52

U.S. Cl. 206—223

20 Claims



1. A convenient, single use, portable package comprising:

a pouch comprising superposed layers of packaging material, said layers forming between them compartments, at least one margin of which is formed by a sealing flange in which the edge portions are sealed together;  
said pouch comprising a plurality of compartments providing a means of physical segregation of components contained therein;  
said pouch wherein one or more edges of said pouch comprises a scraping means whereby the user can scrape areas of skin and nails which could prove otherwise inconvenient or inaccessible.

4,946,034

**PROTECTIVE CASE AND MANUAL FOR FISHING TACKLE**

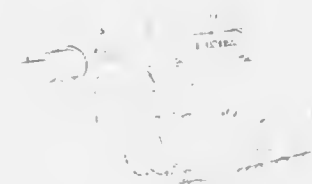
Teiji Matsubara, Huntington Beach, Calif., assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,726

Int. Cl.<sup>5</sup> B65D 85/00

U.S. Cl. 206—315.11

4 Claims



1. A fishing tackle protective case comprising a box member for containing a fishing reel mounted by a foot thereof on a fishing rod and a cylindrical member for covering a fishing reel-mounted section of said fishing rod, both the box member and cylindrical member being integrally formed of transparent or translucent synthetic resin material, said box member comprising a case body for containing the fishing reel while mounted on the fishing rod and a lid for covering the opening of the case body, the case body and lid both being integrally connected with the cylindrical member, the case body and lid both flanges forming outwardly projecting flanges having projections and depressions formed respectively therein, the case body and the lid being made so as to be integrally closed by engaging the respective projections and depressions, the case body and the lid when closed forming only a reel foot opening extending from the case body to the cylindrical member for receiving the reel foot, said cylindrical member accommodating an owner's manual formed in a shape to coincide with the foot opening for engagement of the reel foot, the owner's manual being notched along one edge to provide a depression engaging the reel foot to retain the manual within the cylindrical portion.

3. A fishing tackle protective case comprising a box member for containing a fishing reel mounted by a foot thereof on a fishing rod and a cylindrical member for covering a fishing reel-mounted section of said fishing rod both being integrally formed of transparent or translucent synthetic resin material, said box member consisting of a case body for containing the fishing reel mounted on the fishing rod and a lid for covering the opening of the case body, the case body and lid forming said box member being connected with a hinge, the case body and lid having flanges formed to project outwardly, these flanges having projections and depressions formed respectively therein, and the case body and lid being so made as to be integrally closed by engaging the projections and depressions, the case body when closed with the lid forming only a reel foot opening extending from the case body to the cylindrical member for receiving the foot of the fishing reel, said cylindrical member accommodating an owner's manual formed in a shape to coincide with the foot opening for engagement of the foot of the fishing reel.

the fishing reel, the owner's manual being notched along one edge to provide a depression engaging the reel foot to retain the manual within the cylindrical portion.

4,946,035

**IMPLANTER APPLICATOR**

C. Louis Grimm, Shawnee, Kans., and Irving V. Sollins, Cuernavaca, Mexico, assignors to Ivy Laboratories, Inc., Overland Park, Kans.

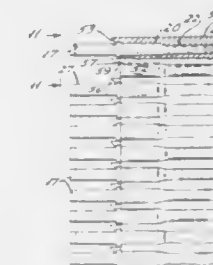
Division of Ser. No. 179,985, Apr. 11, 1988. This application

Nov. 17, 1989, Ser. No. 437,670

Int. Cl.<sup>5</sup> B65D 85/20

U.S. Cl. 206—366

2 Claims



1. A cartridge formed from a resilient material for disposable needles pre-charged with solid form medicament said cartridge being much like a thin parallelepiped in shape and having a thin front face thereon;

a multiplicity of rounded blind hole sockets opening into said thin front face, each said socket extending inside said cartridge to an acute angle terminus within said cartridge, whereby a rounded in cross-section needle formed with an acute angle cut needle point end fits within said socket at but one orientation therein;  
a multiplicity of hooks extending from said thin face between sockets, with one hook adjacent and facing each socket, each hook being configured to provide a prong spaced apart from the socket faced by the hook and a channel between the prong and the cartridge wall around the socket, said channel being adapted to receive a flange upstanding from the shank of a disposable needle fitted into the socket whereby the prong locks such a needle in the socket; and,  
a bevelled surface on each said prong angled so that a force applied thereto will tilt the prong away from the socket faced by the hook of which the tilted prong forms part, unlocking thereby the upstanding needle flange to allow removal of such a needle from its socket in the cartridge.

4,946,036

**CRADLE CONSTRUCTION FOR SHIPPING CONTAINERS**

Julius B. Kupersmit, 299 W. 12th St., New York, N.Y. 10014

Filed May 30, 1989, Ser. No. 358,249

The portion of the term of this patent subsequent to Apr. 18,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65D 19/00

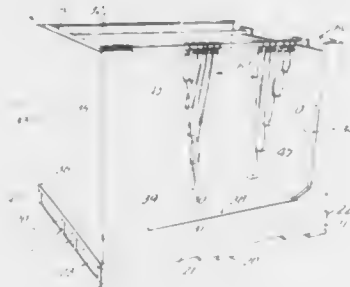
U.S. Cl. 206—386

3 Claims

1. In a shipping container including a generally rectangular box element having a bottom wall, a pair of oppositely disposed vertical side walls, a vertical rear wall and a vertical front wall defining an opening therein, said side walls having horizontal upper edges, channel-forming means supported by said horizontal edges, and plural load supporting elements, each including an elongated bar having first and second channel engaging members at opposite ends of said bar, each of said bars having plural load supporting cradles in pendent relation thereto, the improvement comprising: said load supporting

cradles including an elongated primary strap having first and second ends, said first end being detachably secured to said bar, said bar having plural hooks thereon, said second end having a grommet thereon defining an opening, said opening being selectively engageable with one of said plural hooks.

3. In a shipping container, including a generally rectangular box element having a bottom wall, a pair of oppositely disposed vertical side walls, a vertical rear wall, and a vertical front wall defining an opening therein, said side walls having horizontal upper edges, channel-forming members supported by said horizontal upper edges, and plural load supporting

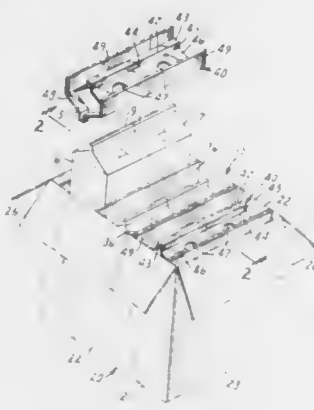


elements, each including an elongated bar having first and second channel-engaging members at opposite ends of said bar, each of said bars having load supporting cradles in pendent relation thereon, the improvement comprising: said channel-engaging members having an axial length such that when all of said bars are in engaged condition upon said channel-forming members, said channel-engaging members are placed in abutted relation; and first and second pintle means selectively penetrating said channel-forming members and abutting the exposed end surfaces of the first and last of said channel-engaging members to prevent relative movement between said channel-engaging members and said channel-forming members.

**4,946,037**  
**PACKAGE HAVING SUPPORTED GABLETOP CONTAINERS FOR TWO PART COMPOSITION**  
Roger H. Keith, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Continuation-in-part of Ser. No. 212,901, Jun. 29, 1988, Pat. No. 4,860,888. This application Oct. 25, 1988, Ser. No. 262,279. The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B65D 85/30

U.S. Cl. 206—431

16 Claims



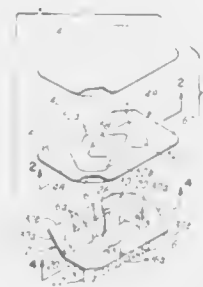
1. A package for shipping a plurality of gable-topped containers comprising:  
a plurality of containers with bottom walls, side walls and

gabletops including inclined roof panels connected by a ridge seal,  
a rigid carton having wall means defining at least one cavity for receiving a pair of said containers and for supporting said container bottom and side walls and for supporting said gable-tops, and  
support means for supporting the gabletops of said containers in said cavity from said wall means adjacent said gabletops, said support means comprising a support piece having leg and rib means extending from a support panel juxtapositioned to a roof panel of each container affording area contact therewith for supporting said support panel from said wall means a distance sufficient for retaining said ridge seals from engagement with said wall means.

**4,946,038**  
**MEDICINE CONTAINER AND COVER THEREFOR**  
Roland Eaton, 16 N. Dutoit St., Dayton, Ohio 45402  
Filed Dec. 20, 1989, Ser. No. 453,934  
Int. Cl.<sup>5</sup> B65D 83/04

U.S. Cl. 206—528

26 Claims

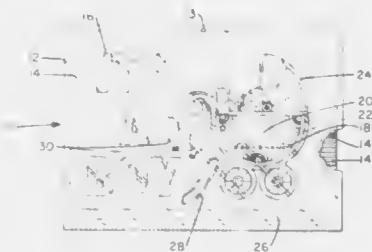


1. A medicine container comprising a small box-like body which includes a bottom wall, a pair of side walls, each of the side walls including a wave formation portion, a pair of end walls, each of the end walls including a substantially straight portion which is angular with respect to the side walls, and a flange integral with the side walls and end walls and extending laterally therefrom.

**4,946,039**  
**SIGN DISPLAY KIT**  
Joseph F. Garran, Northfield, Ohio, assignor to Vanguard Marketing Group, Northfield, Ohio  
Filed Aug. 16, 1989, Ser. No. 395,030  
Int. Cl.<sup>5</sup> G09F 15/00; B65D 69/00

U.S. Cl. 206—575

16 Claims



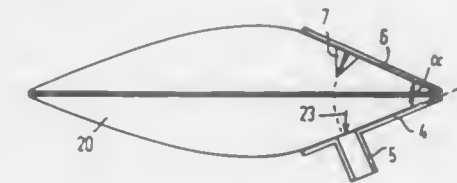
1. A sign display kit comprising:  
(a) a flexible waterproof plastic container;  
(b) a single sign having a surface which can be marked by hand with a marking instrument, said surface having thereon a printed message announcing a cause for celebration and a space for information written by hand;  
(c) a stake; and  
(d) a longitudinally stretchable mounting device for attach-

ing said sign to said stake, said sign and said stake being separate from each other in said kit.

**4,946,040**  
**DEVICE FOR FITTING A CONNECTING NIPPLE ON A POUCH**  
Willem Ipenburg, Nieuwegein, Netherlands, assignor to Chemische Industrie Filiform B.V., Netherlands  
Filed May 22, 1989, Ser. No. 354,848  
Int. Cl.<sup>5</sup> B65D 33/16; B61B 7/24

U.S. Cl. 206—603

5 Claims



1. A device for sealingly fitting a nipple on the outside of a flexible pouch having opposed, flexible side walls, comprising:  
(1) a pusher member having a substantially flat first portion and a piercing element attached thereto, said piercing element being substantially perpendicular to said flat first portion and having an upstanding, tapered terminating end which is suitable for piercing at least one pouch side wall and forming a passage therethrough;  
(2) a connecting nipple having a substantially flat first portion for engaging the opposite pouch sidewall, a passage-way disposed substantially perpendicularly therethrough, and a nipple second portion communicating with said passageway and forming a connection for a hose or the like;  
(3) a fold line portion connecting the pusher member and the connecting nipple so as to form an integral unit thereof and said pusher member and the connecting nipple being foldable about said fold line; and  
wherein the piercing element and the nipple second portion are disposed on opposite sides of said integral unit and equally spaced from said fold line.

**4,946,041**  
**EASY OPENING GABLE TOP CARTON**  
Donald A. Poole, Greenfield Park, Canada, assignor to FBI Brands Ltd., Canada  
Filed Oct. 24, 1988, Ser. No. 261,325  
Claims priority, application Canada, Mar. 11, 1988, 561,264  
Int. Cl.<sup>5</sup> B65D 5/70

U.S. Cl. 236—621.1

11 Claims



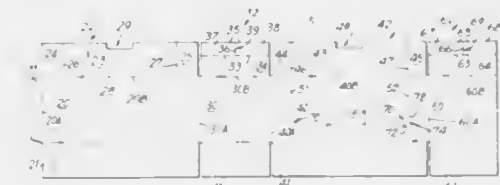
1. A gable top carton the gable closure of which includes opposed side panels with side flaps extending therefrom and opposed end panels with end flaps extending therefrom to a lower height than the flaps of the side panels, said side panels and an end panel having score lines to facilitate closing and opening one end of the carton, the opposed side flaps being adhered to each other and the end flaps being adhered to the

lower portions of the side flaps, leaving an area that is not firmly adhered at the center of the upper portion of said end flap, and a stake point immediately below the area which is not firmly adhered, to facilitate opening of the carton by a consumer.

**4,946,042**  
**READILY OPENABLE COMBINATION SHIPPING AND DISPLAY CARTON**  
Paul Ferreri, Allendale; Heinz Maurer, Ridgefield, both of N.J.; Jennifer Kan, New York, N.Y.; Harry Allers, Oak Lawn, and Michael Lackey, Geneva, both of Ill., assignors to Lever Brothers Company, New York, N.Y.  
Filed Nov. 29, 1988, Ser. No. 277,581  
Int. Cl.<sup>5</sup> B65D 5/54

U.S. Cl. 206—628

51 Claims



1. A carton blank adapted to form a container comprising:  
a rear panel having a rear panel top flap and a rear panel bottom flap,  
a first side panel connected to said rear panel and having a first side panel top flap and a first side panel bottom flap, said first side panel top flap being connected to said first side panel by a fold line and being divided by a perforation line, oriented approximately parallel to said fold line, into a first portion connected to said first side panel and a second portion,  
a front panel connected to said first side panel and having a front panel top flap and a front panel bottom flap, said front panel top flap being divided into a center section and two end sections by two perforation lines extending through said front panel top flap, said two perforation lines being approximately perpendicular to a fold line connecting said front panel top flap to said front panel, and said two perforation lines extending from said front panel top flap partially into said front panel and being connected by a transverse perforation line,  
a second side panel connected to said front panel and having a second side panel top flap and a second side panel bottom flap, said second side panel top flap being connected to said second side panel by a fold line and being divided by a perforation line, oriented approximately parallel to said fold line, into a first portion connected to said second side panel and a second portion, and  
fastening means adapted for fastening said rear panel and said second side panel together so as to form a sleeve, wherein said second portion of said first side panel top flap and said second portion of said second side panel top flap are each divided into a first section and a second section by a dividing line extending approximately perpendicularly from each said perforation line through each said second portion.



4,946,043

## RETAINER FOR SURGICAL SUTURES

Constance E. Roshdy, North Brunswick, N.J.; Robert J. Cerwin, Pipersville, Pa., and Marvin Alpern, Glen Ridge, N.J., assignors to Ethicon, Inc., Somerville, N.J.  
Division of Ser. No. 346,421, May 3, 1989, Pat. No. 4,887,710, which is a division of Ser. No. 264,292, Oct. 28, 1988, Pat. No. 4,884,681. This application Dec. 4, 1989, Ser. No. 446,226  
Int. Cl.<sup>5</sup> A61L 15/00

U.S. Cl. 206—63.3

7 Claims



1. An improved retainer for surgical sutures which encloses a surgical suture attached to a surgical needle comprising: a panel on which means for holding a surgical needle is to be located, said location including two parallel slots; and a foam needle holder, including a central region including a slit for holding a surgical needle, and a pair of outwardly extending insertion tabs for inserting into said parallel slots, said parallel slots being spaced with respect to the dimension of said central region such that said central region of said needle holder assumes an inverted v-shape when said tabs are inserted in said slots.

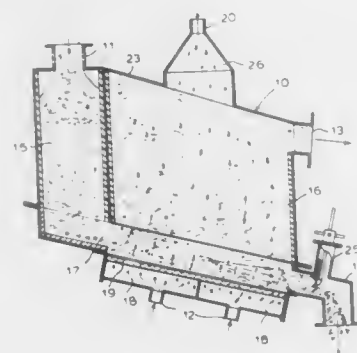
4,946,044

## AERATION SEPARATOR

John R. Havrilla, Danville, Pa., assignor to Kennedy Van Saup Corporation, Danville, Pa.  
Filed May 18, 1988, Ser. No. 195,719  
Int. Cl.<sup>5</sup> B07B 4/00

U.S. Cl. 209—474

14 Claims



1. An aeration separator for separating lighter and heavier particles comprising a separation chamber having lower and upper regions and upstream and downstream ends, the lower region accommodating the flow by gravity of heavier particles and the upper region accommodating the flow of airborne lighter

particles, an inlet at the upstream end for the particles to be separated, a discharge from the upper region at the downstream end for the lighter particles, a discharge from the lower region at the downstream end for the heavier particles, a downwardly sloping passage in the lower region of the separation chamber, an upper wall defining the chamber and a flow passage in the upper region of the chamber for the flow of the airborne lighter particles toward the discharge from the upper region, an air source for introducing air into the lower region of the separation chamber for upward flow through the particles in the downwardly sloping passage in the lower region of the separation chamber to separate the lighter particles and direct them to the discharge from the upper region as the heavier particles flow through the downwardly sloping passage to the discharge from the lower region, and an air vent communicating with the upper region of the separation chamber through said upper wall to vent air from the chamber.

4,946,045

## SORTING

Robert W. Ditchburn, 9 Summerfield Rise, Goring-on-Thames, Reading, Berkshire RG8 0DS, and Martin P. Gouch, 211 Cranbury Road, Reading, Berkshire, both of Great Britain  
Continuation of Ser. No. 943,128, Dec. 18, 1986, abandoned.  
This application Jul. 1, 1988, Ser. No. 214,465  
Claims priority, application United Kingdom, Dec. 20, 1985, 8531396

Int. Cl.<sup>5</sup> B07C 5/342

U.S. Cl. 209—576

34 Claims



1. A method of sorting a succession of objects according to shape, comprising: feeding each successive object through a feeding zone at a rate of at least one per second; illuminating the object as it passes through the viewing zone; viewing the object as it passes through the viewing zone using at least four fixed electronic viewers spaced in one plane around the viewing zone, each viewer viewing substantially the whole of the profile of the object as presented to the viewer; deriving from each viewer signals representative of substantially the whole of the profile of the object as viewed at a particular instant by each respective viewer; processing the signals electronically to determine in which of at least two shape categories the object falls; and automatically directing the object into one of at least two paths according to its shape.

4,946,046

## APPARATUS FOR SORTING SEEDS ACCORDING TO COLOR

Sheldon Affleck, and Lavern Affleck, both of Box 324, Rocanville, Saskatchewan, Canada  
Continuation of Ser. No. 191,906, May 9, 1988, abandoned. This application Jan. 25, 1990, Ser. No. 471,022  
Int. Cl.<sup>5</sup> B07C 5/00

U.S. Cl. 209—580

11 Claims

1. An apparatus for sorting seeds according to color, comprising:

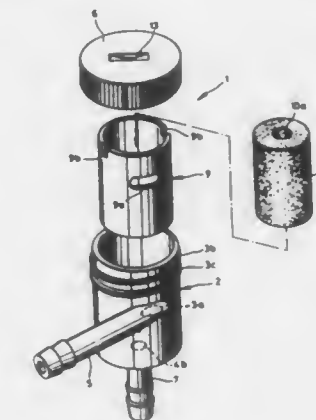
4,946,047

## FILTER APPARATUS WITH STOP VALVE

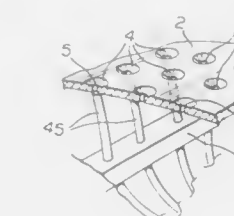
Toohio Kurokawa, and Kazuo Daigo, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Dec. 22, 1988, Ser. No. 288,172  
Claims priority, application Japan, Feb. 1, 1988, 63-21770  
Int. Cl.<sup>5</sup> B01D 35/00

U.S. Cl. 210—234

6 Claims



- (a) drum means including a peripheral wall having an external peripheral surface;
- (b) said peripheral surface having a width;
- (c) said peripheral wall having a thickness;
- (d) a plurality of seed receiving means disposed in rows extending across the width of said peripheral surface and each receiving an individual seed therein;
- (e) each of said seed receiving means including indentation means;
- (f) said indentation means comprising generally cup-shaped recesses extending substantially through the thickness of the peripheral wall of said drum means and for holding therein an individual seed by the force of gravity;
- (g) means associated with each of said seed receiving means for dislodging individual seeds therefrom;
- (h) digital imaging means for creating an image of a portion of the peripheral surface of said drum means including at least one row of seeds;



1. A filter apparatus for filtering a fluid, comprising: a tubular body having a closed end and provided with an inlet port and an outlet port, said inlet port being disposed on the side of said tubular body, an upper outer circumference of said tubular body having a first threaded portion; a tubular stop valve rotatably disposed in said tubular body, said stop valve having a first engagement portion on the top end thereof and an opening disposed on the side thereof for directing the fluid into said body; a filter element contained inside said stop valve and between the inlet port and the outlet port so as to strain all of the fluid directed into said body; and a cap having a second threaded portion engageable with the first threaded portion of said tubular body and a second engagement portion engageable with the first engagement portion of said stop valve, wherein said stop valve is rotatable together with said cap due to engagement between the first and second engagement portions, causing the inlet port to be open while the cap is mounted and to be closed when the cap is removed; wherein the first and second threaded portions satisfy the following condition:

$$\theta_1 < \theta < 360 - \theta_1;$$

where  $\theta$  is an angle through which said cap must rotate to be fitted to and removed from said body and  $\theta_1$  is an angle through which said stop valve rotates while allowing the fluid to enter said body.

where  $\theta$  is an angle through which said cap must rotate to be fitted to and removed from said body and  $\theta_1$  is an angle through which said stop valve rotates while allowing the fluid to enter said body.

4,946,048

## ADJUSTABLE SHOE CAROUSEL

Edgard Francois, 974 St. Nicholas Ave., #6, New York, N.Y. 10032

Filed Jul. 5, 1989, Ser. No. 375,703

Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—34

4 Claims

1. An adjustable shoe carousel comprising: (A) a base element; (B) an adjustable support mounted on said base element and including

- (i) means for analyzing said image for determination of differences in seed color in said at least one row of seeds and comparing color differences of seeds against a predetermined standard;
- (j) means for selectively operating said dislodging means for ejecting seeds which do not conform to said predetermined standard from respective seed receiving means;
- (k) first hopper means disposed on one side of and for feeding seeds to said drum means by the force of gravity;
- (l) second hopper means disposed opposite to said first hopper means for receiving seeds that do not conform to said predetermined standard;
- (m) two-roller brush means disposed external to said drum means and positioned between said first hopper means and said digital imaging means for uniformly distributing the seeds over the peripheral surface of said drum means; and
- (n) single drive means for rotating both said drum means and said two-roller brush means.

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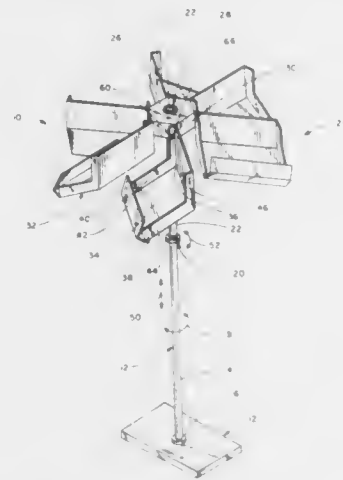
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- (1) a sleeve element mounted at one end thereof on said base element and extending upwards therefrom;
- (2) a bearing joint connecting said sleeve element to said base to permit said sleeve element to rotate with respect to said base element;
- (3) a rod element telescopically mounted on said sleeve element, and
- (4) a coupling joint for coupling said rod element to said sleeve element and which permits said rod to move with respect to said sleeve to telescope into said sleeve and to move at an angle with respect to said sleeve; and



- (C) a shoe mounting unit which is mounted on said rod element and which includes
- (1) a support element attached to said rod element;
  - (2) a plurality of shoe mounting compartments attached to said shoe mounting unit support element; and
  - (3) joint means connecting each compartment to said shoe mounting unit support element to permit such compartment to move with respect to said mounting unit support element.

4,946,049

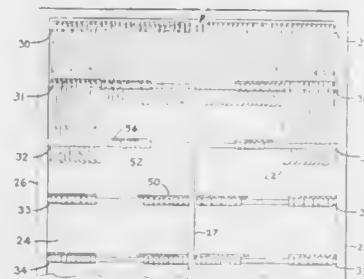
**TIE DISPLAY ASSEMBLY**

Harry G. Silverberg, Glencoe, Ill., assignor to Bigsby & Kruthers, Inc., Chicago, Ill.

Filed Sep. 8, 1989, Ser. No. 405,663  
Int. Cl.<sup>5</sup> A47F 5/00

U.S. Cl. 211—87

12 Claims



1. A tie display assembly, comprising:
  - a tie-support means comprising an elongated tie-supporting finger for supporting a clothing tie in a substantially upright position from a location positioned above and in proximity to a substantially horizontal hanging clothes rod; and
  - carrying means comprising an inverted substantially U-shaped saddle connected to said finger for sitting upon,

releasably engaging, and sliding along said clothes rod, said saddle having a top comprising a bight positioned upon said clothes rod and having downwardly depending legs including a front leg and a back leg extending downwardly from said bight; and

said tie-supporting finger fixedly connected to and cantilevered from said bight at an elevation spaced above said legs.

4,946,050

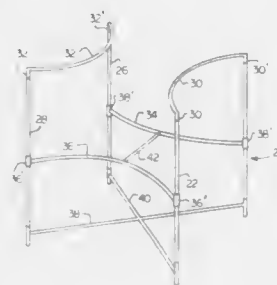
**DISPLAY RACK**

Avedik Akopiantz, Greenwich, Conn., assignor to Sweaters, U.S.A., Alamance, N.C.

Filed Apr. 28, 1989, Ser. No. 345,640  
Int. Cl.<sup>5</sup> A47F 5/00

U.S. Cl. 211—182

10 Claims



1. A display rack comprising:
  - (a) a plurality of upstanding support standards so arranged with respect to each other as to form the vertices of a polygon; and
  - (b) at least one inwardly curved support rod joining at least one adjacent pair of support standards.

4,946,051

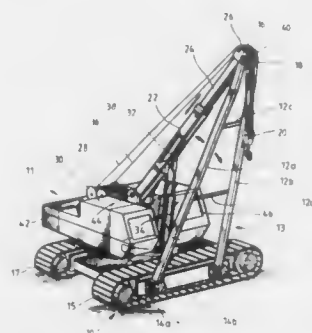
**TWO-BOOM CRAWLER CRANE**

John O. Cliff, 211 Deerfield La., Franklin, Tenn. 37064

Filed Apr. 5, 1989, Ser. No. 333,264  
Int. Cl.<sup>5</sup> B66C 23/26

U.S. Cl. 212—258

5 Claims



1. A crawler crane comprising, joined together in a lifting and moving capacity:
  - (1) a crane frame;
  - (2) tracks positioned in a travelable manner on both sides of said frame;
  - (3) a main body mounted on said frame in a rotatable manner;
  - (4) a telescoping boom projecting from said main body;
  - (5) a fixed-length A-frame boom with two arms thereof at lower ends thereof joined to one side of said frame along

- the length of one of said tracks and projecting upward therefrom, said arms of said A-frame boom being pinned together at upper ends thereof and affixed in a rotatable manner where they are pinned together at upper ends thereof to the upper end of said telescoping boom in a supporting manner;
- (6) a load winch having at least one cable extending over said telescoping boom providing support for said A-frame boom;
  - (7) means for lifting said telescoping boom and
  - (8) means for extending said telescoping boom.

4,946,052

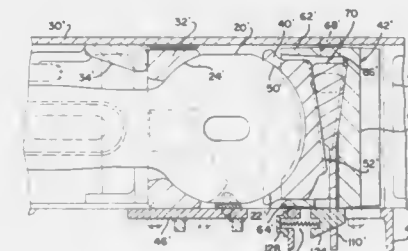
**GRAVITY WEDGE FOR SLACKLESS RAILCAR CONNECTIONS**

John W. Kaim, and Horst T. Kaufhold, both of Chicago, Ill., assignors to AMSTED Industries Incorporated, Chicago, Ill.

Filed May 12, 1989, Ser. No. 351,066  
Int. Cl.<sup>5</sup> B61G 9/20, 9/24, 5/00

U.S. Cl. 213—75 R

18 Claims



7. An improved gravity wedge shim member for use in combination with slackless railcar connections, said wedge shim member comprising:
  - a tapered wedge body having a narrow bottom and relatively thick top connected by a front face and a rear face diverging from said bottom; and
  - a single tailpiece extending from the central area of said bottom and offset so as to be spaced from one of said faces.

4,946,053

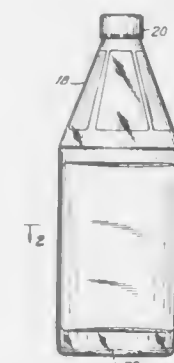
**OVALIZED LABEL PANEL FOR ROUND HOT FILLED PLASTIC CONTAINERS**

George R. Conrad, Dunwoody, Ga., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 15, 1989, Ser. No. 407,827  
Int. Cl.<sup>5</sup> B65D 1/02, 23/00, 23/10

U.S. Cl. 215—1 C

7 Claims



1. A plastic container for use in containing a product which is filled therein a hot state and then sealed with the cooling of

such product creating a negative pressure in said container, comprising:

- a bottom portion having a circular cross section;
- a shoulder portion having a circular cross section corresponding to the cross section of the bottom portion, said bottom and shoulder portions in axial alignment;
- a neck portion coupled to the shoulder portion having an opening therein so as to allow the ingress and egress of a product contained in the container;
- a label portion disposed between the bottom and shoulder portion and coupled therewith, said label portion having an ovalized cross section of approximately the same dimension throughout its length with respect to the circular cross section of the bottom and shoulder portion; and
- wherein upon the creation of a negative pressure in the container the label portion is subject to uniform deformation inwardly causing a straightening thereof so as not to distort the appearance of the container.

4,946,054

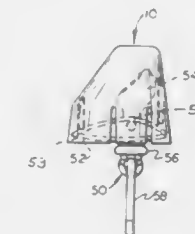
**COVER FOR PACIFIERS**

Daniel A. Maniero, Reedsburg, Wis., and Edward H. Meisner, Short Hills, N.J., assignors to Gerber Products Company, Fremont, Mich.

Filed Nov. 20, 1989, Ser. No. 439,466  
Int. Cl.<sup>5</sup> A61J 9/08, 17/00

U.S. Cl. 215—11.6

20 Claims



1. A removable cover for snap-in insertion, retention and protection of pacifiers of the type having a mouth shield and a nipple mounted on and extending outwardly from the shield, said cover comprising:
  - a top wall;
  - walls depending from said top wall defining an enclosure and having an interior surface, said depending walls terminating in a common bottom edge defining an opening to said enclosure opposite to said top wall, said opening adapted to generally outline the periphery of the pacifier shield when received therein;
  - at least one pair of spaced slots in said depending walls, said slots extending toward said top wall from said bottom edge and defining a flange terminating at said bottom edge which can resiliently flex outwardly when the pacifier shield is received therein, said flange having an interior surface including a first detent thereon which is spaced toward said top wall from said bottom edge;
  - said depending walls further including a plurality of stops on said interior surface spaced toward said top wall from said bottom edge for supporting the pacifier shield and a second detent positioned on said interior surface of said depending walls generally opposite to the location of said first detent;
  - whereby when the pacifier shield is inserted in said cover, said detents engage the periphery of the shield and retain the shield firmly against said stops within said cover while said flange resiliently urges the shield against the opposite portion of said depending walls.



4,946,055

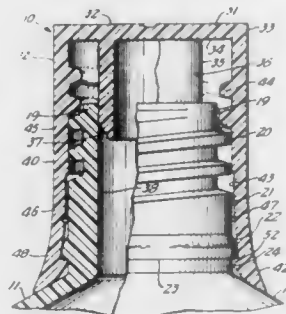
**TAMPER INDICATING SCREW CAP**

Edward J. Towns, 12 Woods End Rd., Flovham Park, N.J. 07932, and Edward M. Brown, 128 Passaic Ave., Livingston, N.J. 07039

Filed Jan. 9, 1990, Ser. No. 462,551  
Int. Cl.<sup>5</sup> B65D 41/34

U.S. Cl. 215—254

5 Claims



1. An improved tamper-indicating screw cap closure construction comprising: a dispensing container having a hollow neck element at one end thereof, and a cap element selectively engageable upon said neck element; said neck element having a free end thereof and an outer generally cylindrical surface, a first portion of said cylindrical surface joining said free end having spiral threads thereon, a second adjacent portion of said cylindrical surface having a frusto-conically shaped rib thereon defining a radially extending undercut, and a third cylindrical portion of said cylindrical surface adjacent said rib; said cap being of flexible synthetic resinous material and having a transversely extending end wall bounded by a peripheral edge and outer and inner surfaces; said cap having a generally cylindrical side wall joining said upper wall at one end thereof and having inner and outer surfaces, said inner surface defining a first threaded portion adjacent said one end, a second medially positioned portion which is free of threads, and a third portion frangibly interconnected to said second portion, said third portion having a manually engageable tab for effecting disconnection; said third portion having an inwardly directed rib, and being resiliently radially distortable upon engagement with said rib on said neck element; whereby, upon initial engagement of said cap element with said neck element by relative axial movement, said inwardly directed rib is engaged with said frusto-conical rib on said neck element to effect an initial securement which can be dislodged only by removal of said third segment of said cap element, removal of said third segment allowing further relative axial movement and engagement of the threaded portion of said cap element with the threaded segment on said neck element to provide a selectively openable closure.

4,946,056

**FABRICATED PRESSURE VESSEL**

James H. Stannard, Basking Ridge, N.J., assignor to Buttes Gas & Oil Co. Corp., Houston, Tex.

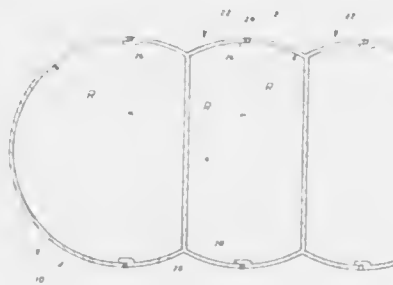
Filed Mar. 16, 1989, Ser. No. 324,020  
Int. Cl.<sup>5</sup> B65D 8/00, 90/00

U.S. Cl. 220—3

10 Claims

1. A fluid tank comprising:  
a first internal septum formed by one unitary pair of upright and inverted Y-shapes with generally vertical legs joined together bottom to bottom, each Y-shape having two laterally extending arcuate arms;  
the arms of said one pair of Y-shapes being internally concave, each part and together forming back to back generally semi-cylinders of a predetermined radius terminating in straight top and bottom outer edges in first and second common vertical planes; and  
a side wall comprising a semicylinder of said predetermined

radius terminating at top and bottom in straight inner edges in said first common vertical, plane sealed along said



inner edges to the outer edges of a top and bottom pair of arms of said first internal septum to form an outer, generally cylindrical lobe therebetween.

4,946,057

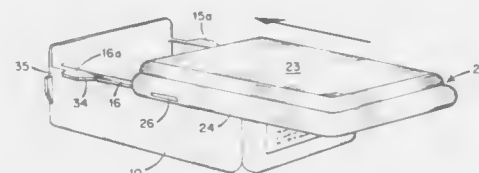
**STORAGE BOX WITH LOCKING LID AND WALL MOUNTING APPARATUS**

Brian D. Connolly, 7 King Henry Ct., Merrimack, N.H. 03054, and Michael J. Osbourne, 153 Barrett Hill Rd., Hudson, N.H. 03051

Filed Feb. 13, 1989, Ser. No. 309,822  
Int. Cl.<sup>5</sup> B65D 25/22, 43/12

U.S. Cl. 220—481

8 Claims



1. A storage container and mounting arrangement comprising:

a box having a pair of spaced side walls, a pair of spaced end walls, a bottom wall, and an open top, said box having first extensions projecting outwardly from the top edge of each of said side walls, said first extensions each having a second extension projecting outwardly therefrom with said second extensions being located near the rear end wall, and said second extensions each having sloped surfaces facing toward the front and rear end walls of said box;  
a lid for said box, said lid having a top and bottom side, front, rear, and left and right side edges, said left and right side edges being rolled under toward the bottom side of said lid, said rolled edges each having a linear slot there-through near the rear edge of said lid, the distance between the inside of said rolled edges being slightly greater than the distance between the outside edges of said first extensions, and said lid is attached to said box by sliding said rolled edges over and along said first extensions, as said lid is slid onto said first extensions the rolled edges contact the front sloped surfaces of said second extensions and are deformed slightly outward as said lid is slid further onto said first extensions of said box, and when said lid fully closes said box said second extensions enter said linear slots through said rolled edges to thereby lock said lid to said box and prevent accidental opening of the storage container while not preventing subsequent removal of said lid from said box, and said lid is unlocked and removed from said box by applying a force to said lid

to slide it toward the front of said box, said force causing said rolled edges to deform slightly outward as they contact the rear sloped surface of said second extensions and said second extensions exit from said linear slots.

4,946,058

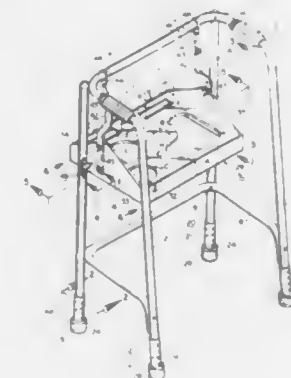
**TRAY APPARATUS FOR PATIENTS**

John H. Stamm, Salt Lake City, Utah, assignor to Harold N. Wilkinson, Salt Lake City, Utah

Filed Oct. 24, 1988, Ser. No. 261,087  
Int. Cl.<sup>5</sup> B65D 21/00; A47C 7/62; A61H 3/00

U.S. Cl. 220—23.83

4 Claims



1. In combination: a patient support structure having legs; a patient tray including, a tray member having a bottom and contiguous sides standing from the periphery of said bottom; an essentially planar plate provided with receptacle apertures, designed to removably receive receptacles that rest upon said tray bottom, and removably disposed over, engaging, and supported by said sides; mutually opposite upstanding arms fixedly secured to said sides and having upper extensions each provided with a respective aperture; plural, actuatable, linkage means for articulatively securing respective ones of the arms to said support structure; said tray being provided with an aperture in one of said sides for receiving a pin of a hand-actuatable, releasable locking means mounted on one of said legs, to selectively deter relative movement between said tray and said support structure.

4,946,059

**REINFORCED PLASTIC BASKET**

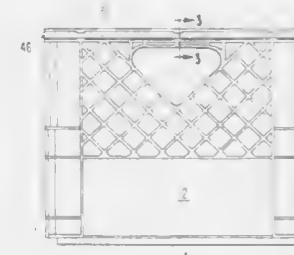
Houston Rehrig, Pasadena, Calif., assignor to Rehrig International, Inc., Richmond, Va. and Rehrig-Pacific Co., Inc., Los Angeles, Calif.

Division of Ser. No. 177,453, Apr. 4, 1988, Pat. No. 4,865,338.  
This application Aug. 3, 1989, Ser. No. 389,323

Int. Cl.<sup>5</sup> B62B 3/02

U.S. Cl. 220—73

10 Claims



1. A reinforced container comprising:

a plastic basket, said plastic basket having a channel formed by channel first, second and third walls;  
a reinforcing ring positionable in said channel; and  
a projection means on said channel for snap-actingly receiving said reinforcing ring into said channel.

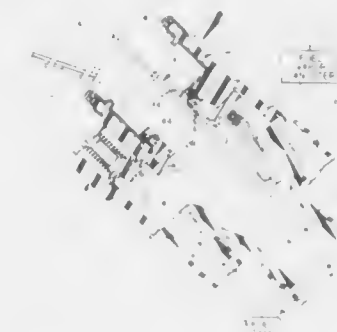
4,946,060

**SEAL ASSEMBLY FOR VEHICLE FILLER NECK**  
Carl H. Sherwood, Brockport; Karen M. Meyer, Webster; Charles H. Covert, Manchester, and Gregory P. Wellnau, Churchville, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 31, 1989, Ser. No. 388,099  
Int. Cl.<sup>5</sup> B65D 90/28

U.S. Cl. 220—86.2

1 Claim



1. A vehicle filler neck assembly for use with a fuel nozzle that is subject to side loads, a protected seal assembly for sealing around said nozzle, comprising,

a hard molded plastic cylindrical side wall with a generally annular, integrally molded shelf extending radially inwardly therefrom through which said nozzle is receivable, a metal insert lining said side wall and having a circular lower edge axially spaced from said shelf,  
a metal seal casing having an annular upper rim with an inner diameter substantially equal to said shelf and an outer diameter substantially equal to said liner lower edge, said casing also having a generally cylindrical sleeve depending from said rim with an axial length substantially equal to the axial space between said shelf and insert lower edge,  
flexible retention means on said seal casing sleeve engageable with said insert lower edge when said seal casing sleeve is also engaged with said shelf, and,  
an elastomeric seal member fixed to said seal casing sleeve, said seal member having a circular seal lip of a diameter slightly smaller than said nozzle located coaxial to and below said seal casing rim,  
whereby, said seal casing and seal member may be removably installed in said filler neck by pushing said casing sleeve into said insert until said sleeve abuts said shelf and said flexible retention means engage said insert lower edge, after which said nozzle may be inserted through said rim, lip, and shelf, with said seal casing rim and shelf cooperating to shield said lip from nozzle side loads.

4,946,061

**RECLOSABLE OPENING DEVICE FOR A CONTAINER**  
Douglas H. Hobbs, Seabrook, Tex., assignor to Shell Oil Company, Houston, Tex.

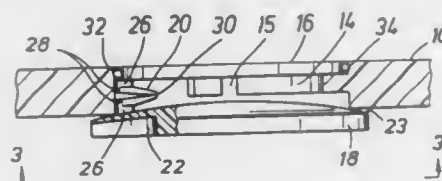
Filed Sep. 25, 1989, Ser. No. 411,764  
Int. Cl.<sup>5</sup> B65D 45/00

U.S. Cl. 220—243

16 Claims

1. An easy opening and reclosable top closure assembly for a container which comprises:

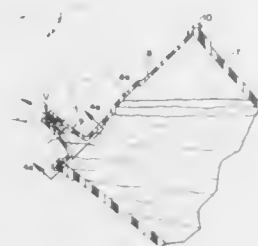
- (a) a container top having a substantially circular aperture of a given diameter formed therein,  
 (b) a closure disc having a diameter greater than the given diameter of the aperture whereby the closure disc completely covers the bottom of the aperture when it is positioned in the closed position,  
 (c) a cover disc having a diameter at least as great as the given diameter of the aperture whereby the cover disc



completely covers the top of the aperture when it is positioned in the closed position, and

- (d) a narrow hinged post connecting the closure disc and the cover disc, said post being of such a length whereby the discs are tightly frictionally engaged against the container top in the open position and said post being sufficiently flexible such that the cover disc can be rotated and inserted through the aperture.

**4,946,062**  
**VALVED CONTAINER CLOSURE**  
 Peter Coy, 3510 S. Wakefield St., Fairlington Mews, Arlington, Va. 22206  
 Continuation of Ser. No. 208,369, Jun. 17, 1988, Pat. No. 4,828,141, which is a continuation-in-part of Ser. No. 152,537, Feb. 5, 1988, Pat. No. 4,782,975. This application Feb. 3, 1989, Ser. No. 306,765  
 The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> A47G 19/22  
 U.S. Cl. 220—90.4

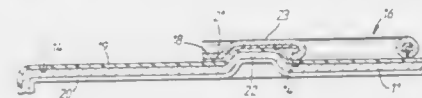


1. A valved spout for controlled dispensing of a liquid from a container, said spout comprised of an outer resilient member having inlet and outlet ends and a body segment which defines the exterior of said spout and an inner member having downwardly depending opposed portions that close the outlet end of said outer member and terminate in an apex valve.

**4,946,063**  
**METAL CAN ENDS WITH METAL PULL TABS BONDED THERETO**

Peter J. Heyes, Wantage, and Robert A. Owen, Faringdon, both of England, assignors to CMB Packaging (UK) Limited, Worcester, England  
 PCT No. PCT/GB88/00848, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO89/03350, PCT Pub. Date Apr. 20, 1989  
 PCT Filed Oct. 12, 1988, Ser. No. 378,215  
 Claims priority, application United Kingdom, Oct. 15, 1987, 8724246

Int. Cl.<sup>5</sup> B65D 17/34  
 U.S. Cl. 220—270 22 Claims

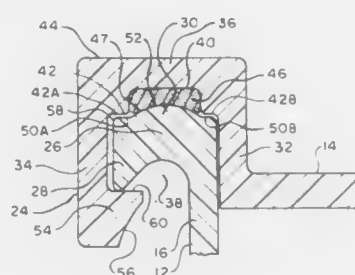


1. A metal can end provided with a score line defining a detachable area of the can which can be detached by tearing along the score line to form an aperture and with a metal pull tab having a shank portion bonded to the upper side of said detachable area,

wherein the upper side of the can end is provided with a protective polymer coating and the under side of the shank of the pull tab is also provided with a polymer coating, the polymer of the surface at least of said coating on the shank portion being based on the same monomer as the polymer of the surface at least on the coating on the upper side of the can end, and

wherein said surfaces are bonded directly to one another by welding to provide a bond of sufficient strength that the said detachable area of the can end can be detached by using the pull tab without the shank portion of the pull tab becoming detached from said detachable area.

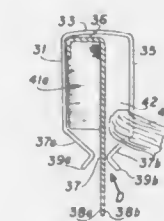
**4,946,064**  
**SEALED CONTAINER**  
 James M. VanCucha, Strongsville, Ohio, assignor to Cleveland Container Corporation, Cleveland, Ohio  
 Continuation of Ser. No. 185,126, Apr. 22, 1988, Pat. No. 4,887,736. This application Oct. 10, 1989, Ser. No. 407,342  
 Int. Cl.<sup>5</sup> B65D 39/00  
 U.S. Cl. 220—355 2 Claims



1. A container assembly comprising a container and a lid for sealing an open end of said container, said container having a radially outwardly extending curled sealing lip at its upper most periphery, said lid having a peripheral rim including radially inner and outer legs and a bridge extending between and connecting said legs, said legs and said bridge of said rim cooperatively defining a downwardly opening channel receiving said container lip when said lid is assembled on said container, a seal cavity formed by at least said bridge, said cavity including a sealing material received therein which is slightly compressed by said lip when said lid is assembled on said

container to form a seal therebetween, said lid having contact surface means for engaging opposed stop surface means on said container lip for limiting further travel of said lid relative to said container thereby to limit the minimum size of said cavity when said lid is pressed onto said container with excessive force to avoid over compression of said sealing material by limiting the minimum size of said cavity; said outer leg of said lid including a substantially horizontally and radially inwardly extending hook to engage the bottom outside periphery of said container lip so as to secure said lid on said container; said sealing material being positioned to bias said lid upwardly such that said sealing material biases said substantially horizontally extending hook into contact with said lip; said contact surface means being of sufficient height that the yield point of said sealing material is not reached and there is no permanent deformation of said sealing material when said lid is pressed onto said container and said contact surface means engage said stop surface means on said lip; said container lip having a top surface which throughout its length is substantially arcuate and said bridge includes a bottom surface which forms said cavity, said surface contact means comprising a protruding tab located inboard of said cavity and contiguous with said inner leg of said peripheral rim, said protruding tab having a bottom surface that extends outwardly from said inner leg of said peripheral rim, said sealing material located outboard of said protruding tab between said protruding tab and said outer leg of said peripheral rim, said sealing material also extending within said cavity towards said lip of said container and below the bottom surface of said protruding tab when said lid is pressed onto said container and said hook of said outer leg of said lid is in engagement with the bottom outside periphery of said container lip, said bottom surface of said protruding tab contacting said top surface of said container lip when said lid is pressed onto said container with excessive force thereby limiting the minimum size of said cavity.

**4,946,065**  
**HOLDER FOR HAND-CARRYING PLASTIC BAGS OR SUPPORTING SAME WITHIN TRASH CONTAINER WITH BAG HANDLE INSERTED IN SPACE UNDER HOLDER**  
 Victor H. Goulter, and Brian A. Brown, both of San Francisco, Calif., assignors to David Pressman, San Francisco, Calif., a part interest  
 Continuation of Ser. No. 724,910, Apr. 19, 1985, abandoned.  
 This application May 30, 1986, Ser. No. 869,827  
 Int. Cl.<sup>5</sup> B65D 25/22, 25/08, 33/06, 90/04  
 U.S. Cl. 220—404 20 Claims



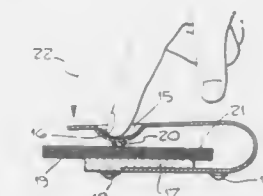
1. A pair of holders for manually carrying one or more handled plastic grocery bags and for supporting one of such bags within a container of the type having flat, thin, vertical side walls and an open top with a relatively wide horizontal rim which has a predetermined cross-sectional area and which forms an overhanging ledge above the sides of said container, said holders each being made of a sheet of elastic material which is formed to have a generally U-shaped configuration when seen from an end thereof in a given direction normal to the plane of said "U", said holders each being elongated in said given direction for about the width of an adult human hand and so that when placed over opposite sides of said container with the handles of a plastic grocery placed thereunder, respec-

tively, said handles will each be spread enough to hold said bag open, the legs and bight portion of each of said holders having a relatively small thickness, when measured in directions perpendicular to said direction of elongation, in relation to the length of the legs of said "U" and in relation to the length of said "U" in said given direction,

said legs of each said holders being spaced apart at least as far as the width of said widened top rim of said container, said legs of each of said holders having free ends which are bent inwardly toward each other so that said free ends are spaced apart less than the width of said widened top rim, each of said holders being shaped so that

- (a) when its legs are spread apart with said "U" upside down and said holder is placed over said widened top rim and pressed down as far as possible, with one said legs on the inside of said container, and said legs are allowed to spring back, sufficient space will exist between the inside of said side wall of said container and said one leg to accommodate a handle of said plastic grocery bag,  
 (b) the free end of said one leg will contact and press against the inside of said side wall, and  
 (c) said handle of said plastic grocery bag, when placed in said space, will be retained in said space and will not fall out of said space unless pulled down with a force in excess of a predetermined value.

**4,946,066**  
**PAPER DISPENSING DEVICE**  
 Gerry Teitelman, 2026 Oak St. #1, Santa Monica, Calif. 90405  
 Filed Jan. 23, 1990, Ser. No. 468,900  
 Int. Cl.<sup>5</sup> B65H 3/00  
 U.S. Cl. 221—210 8 Claims



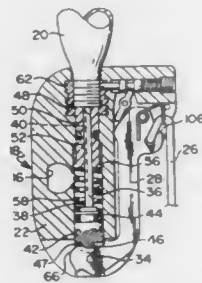
1. A paper dispensing device comprising:  
 a unitary sheet of resilient material curving upon itself to form a U-shaped configuration having a top wall and a bottom wall, said walls each having an upper and lower surface and lying in planes generally parallel to each other;  
 a raised weighted plate fixedly secured to the upper surface of said bottom wall;  
 a depression in the upper surface of said top wall extending onto the other side or lower surface of said top wall forming a concave protuberance on the lower surface of said top wall extending toward said plate; and  
 paper adhering means removably and fixedly secured to said protuberance adapted to pick up a single piece of paper disposed on top of said plate when said top wall is pushed downwardly.



**4,946,067**  
**INFLATION VALVE WITH ACTUATING LEVER INTERLOCK**  
 Gerrard Kelsall, Orange, Calif., assignor to Wickes Manufacturing Company, Southfield, Mich.  
 Filed Jun. 7, 1989, Ser. No. 362,781  
 Int. Cl.<sup>5</sup> B63C 9/24

U.S. Cl. 222—5

17 Claims



1. An inflation valve actuator comprising a body having a cartridge chamber for receiving a replaceable pressure cartridge;  
 a connected piercing pin chamber extending to the body exterior;  
 a cartridge piercing pin slidable in the pin chamber between extended and retracted positions and having a piercing end and a remote abutment end;  
 a sleeve slidable on the pin within the pin chamber adjacent the cartridge chamber and movable between a retracted position in the cartridge chamber and an extended position in the pin chamber;  
 biasing means biasing the pin and the sleeve to retracted positions; and  
 an actuating lever pivotally mounted to the housing adjacent the pin chamber for movement between stored, actuating, actuated and reset positions, the lever including an operating portion on end end having a recess for receiving the pin abutment in stored position, an adjacent first cam surface for engagement with the pin abutment in lever actuating position to move the pin to retracted position to pierce the cartridge, an adjacent locking surface for engagement with the pin abutment in lever actuated position to prevent movement of the lever toward stored position, and an adjacent second cam surface for engagement with the pin abutment to move the pin and sleeve to retracted positions in lever reset position to enable subsequent movement of the lever to stored position.

**4,946,068**  
**FRESH CATALYST CONTAINER**  
 Michael E. Erickson, Country Club Hills, and Roman T. Plichta, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.  
 Filed Sep. 30, 1985, Ser. No. 781,921  
 Int. Cl.<sup>5</sup> B65B 1/00

U.S. Cl. 222—23

5 Claims

1. A fresh catalyst container, comprising:  
 generally upright walls including substantially parallel side walls and substantially parallel front and back walls, said front and back walls extending between and connecting said side walls, said upright walls intersecting and cooperating with each other to define upright edges;  
 substantially parallel top and bottom walls extending between, intersecting, and connecting said upright walls and cooperating with said upright walls to define corners of said container;  
 said walls comprising substantially solid catalytically resistant metal and cooperating with each other to provide an impervious enclosure for containing fresh catalyst;  
 said top wall defining an inlet opening for ingress of said

fresh catalyst and having a lid for closing said inlet opening;  
 one of said sidewalls defining an outlet opening in proximity to said bottom wall for egress of said fresh catalyst when said container is tilted and having closure means operatively connected to said one sidewall for closing said outlet opening;  
 lock-receiving means comprising legs extending downwardly from said bottom for matingly engaging and locking receiving lock pins of a flatbed truck trailer;  
 lower forklift channels extending across and secured to said bottom wall for receiving tines of a forklift truck, said



truck forklift channels being positioned at a height below all the corners of said container;  
 upper monorail grab channels extending through said front and back walls for receiving grab hooks of a monorail, said upper monorail grab channels being spaced above said lower forklift channels, said upper monorail grab channels being spaced from edges of said container;  
 said upper monorail grab channels and said lower forklift channels extending in substantially the same direction and being substantially parallel to each other; and  
 substantially horizontal electrical limit switch-tripping means operatively connected to said walls for indicating the type of fresh catalyst in said container.

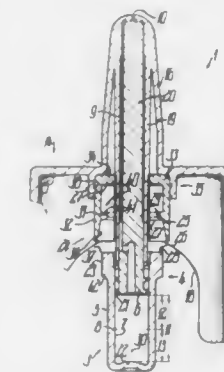
**4,946,069**  
**DISPENSER FOR MANUALLY DISCHARGING FLOWABLE MEDIA**  
 Karl-Heinz Fuchs, Radolfzell, Fed. Rep. of Germany, assignor to Ing. Erich Pfeiffer GmbH & Co. KG, Fed. Rep. of Germany  
 Filed Oct. 5, 1988, Ser. No. 254,965  
 Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734306

U.S. Cl. 222—43

26 Claims

12. A dispenser for manually discharging flowable media comprising:  
 a body provided to receive a media reservoir;  
 a thrust piston pump having a pump piston displaceably guided on a piston path of a pump cylinder between an initial position and an end position of a pump stroke;  
 a pump chamber providing a dosing chamber determining a discharge volume per pump stroke, said dosing chamber being bounded by said pump cylinder and said pump piston;  
 a discharge opening of the apparatus in fluid connection with said dosing chamber via an outlet channel, wherein

retaining means are provided for preventing removal of the pump cylinder by preventing a return stroke from

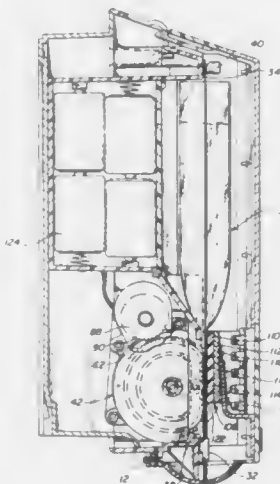


beyond a point at which the pump cylinder is located at an end of at least one of a partial stroke and said pump stroke.

**4,946,070**  
**SURGICAL SOAP DISPENSER**  
 Stephen B. Albert, Menlo Park, and W. Benjamin Thomas, Fremont, both of Calif., assignors to Johnson & Johnson Medical, Inc., Arlington, Tex.  
 Filed Feb. 16, 1989, Ser. No. 312,018  
 Int. Cl.<sup>5</sup> B67D 5/60

U.S. Cl. 222—52

15 Claims



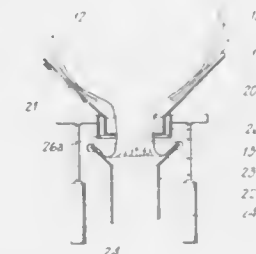
1. A device for dispensing a predetermined quantity of a liquid product comprising:  
 (a) a roller mounted for rotation and movable along an endless path which is substantially straight along a first portion of said path;  
 (b) a base pad adjacent said path along said first portion of said path and defining a nip with said roller as it travels along at least part of said first portion;  
 (c) a flexible walled conduit means positioned adjacent said base pad within said nip;  
 (d) a valve means biased in a normally closed position sealing said conduit, said valve means being openable in response to increased pressure within the conduit means and recloses upon reduction of said pressure increase below a predetermined level;  
 (e) an amount of said liquid product within said conduit between said nip and said valve means; and  
 (f) moving means for moving said roller along said first portion of said path toward said valve means to squeeze

said product between said nip and said valve means to increase the pressure within said conduit to open said valve means and permit passage of said product past said valve means out of said conduit, said moving means including a pair of spaced parallel rotatable walls each defining a slot extending radially from a center of rotation of one wall, said slots supporting said roller, and biasing means for biasing said roller along said slots into a position forming said nip.

**4,946,071**  
**MATERIALS HANDLING EQUIPMENT**  
 Barrie Poulton, Cheltenham, England, assignor to Flomat Limited, Derbyshire, England  
 Filed Mar. 17, 1989, Ser. No. 330,864  
 Int. Cl.<sup>5</sup> B65D 33/00

U.S. Cl. 222—105

3 Claims

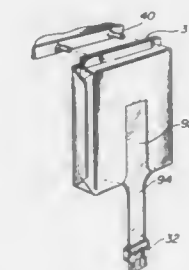


1. Equipment for discharging a container comprising  
 (a) means for supporting a bag over a discharge duct;  
 (b) said discharge duct being fixed and having an open frusto conical mouth at its upper end;  
 (c) means for sealably connecting a lower end of a tubular spout over the open mouth of the discharge duct; and  
 (d) movable means for clamping the lower end of the spout against the upper end of the duct comprising  
 (i) an annular member of cylindrical form moveable between a raised position spaced from the upper end of the duct and a lower position engaging the duct, and  
 (ii) an upturned cuff on the tubular spout which may be clamped between the conical surfaces of the mouth and annular member.

**4,946,072**  
**CONTAINER FOR SURGICAL SOAP DISPENSER**  
 Stephen B. Albert, Menlo Park, and W. Benjamin Thomas, Fremont, both of Calif., assignors to Johnson & Johnson Medical, Inc., Arlington, Tex.  
 Filed Feb. 16, 1989, Ser. No. 312,019  
 Int. Cl.<sup>5</sup> B65D 35/28

U.S. Cl. 222—105

8 Claims



1. A container, for holding product to be dispensed from a dispenser, comprising:

- (a) a pair of thin flexible walls in face-to-face position having a top and bottom wherein:  
 (i) said walls have a first width adjacent their top; and  
 (ii) a second width less than 30 percent of said first width adjacent their bottom;  
 (b) said walls being sealed about their perimeter to define a reservoir portion at their top and a depending dispensing leg in communication with said reservoir portion defined by said second width at their bottom; and  
 (c) a normally closed valve means comprising a plastic clip having a body which surrounds said depending leg and an integrally formed plastic tongue which is cantilevered resiliently from said body and cooperates with said body to pinch a portion of the depending leg between a lip on the distal end of said tongue and said body.

4,946,073

# BEVERAGE AND ICE DISPENSING METHOD AND APPARATUS

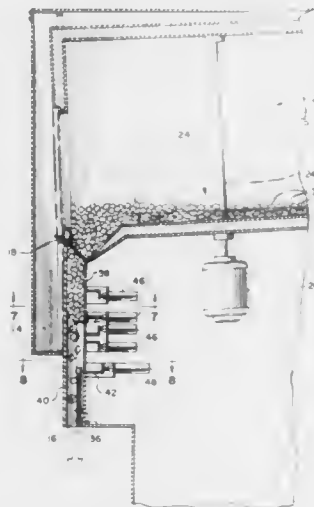
Frank D. Brill, Fox Lake; Benjamin D. Miller, Chicago; Thaddeus M. Jablonski, Palatine, all of Ill.; Douglas F. Marsh, Raymond, Me., and Richard E. Marsh, West Chicago, Ill., assignors to Restaurant Technology, Inc., Oak Brook, Ill.

Filed Apr. 1, 1988, Ser. No. 176,491

Int. Cl.<sup>5</sup> B65B 3/04

U.S. Cl. 222—129.4

19 Claims



1. A dispensing apparatus for dispensing ice bodies and beverage into a cup at a single cup location, comprising:  
 a plurality of spouts for dispensing beverages, each said spout capable of dispensing at least one type of beverage and being oriented at an acute angle relative to vertical;  
 a storage hopper for ice bodies located above said spouts;  
 a plurality of vertically disposed chutes equal to the number of spouts, each chute having an upper end which communicates with said hopper for receiving ice bodies from said hopper and a lower end for dispensing a predetermined quantity of ice bodies vertically downward into the cup positioned below said chute from said chute, said lower end being associated with one of said spouts to allow both beverage and ice bodies to be dispensed at a single cup location.  
 for each chute, a plurality of divider gates selectively insertable into said chute at preselected positions intermediate said ends of said chute, each said divider gate being movable between a first, open position in which said chute is substantially clear of said divider gate and a second, closed position in which a portion of said divider gate has been inserted into said chute to prevent or substantially prevent the flow of ice bodies therethrough;  
 a dispensing gate selectively insertable near said lower end of said chute to prevent dispensing of ice bodies from said

chute, said dispensing gate and said divider gates, said dispensing gate being movable between a first, open position in which said chute is substantially clear of said dispensing gate and a second, closed position in which a portion of said dispensing gate has been inserted into said chute to prevent the flow of ice bodies out of said chute, the spaces between said dispensing gate and each of said divider gates when said dispensing gate and each of said divider gates are in their respective said second positions defining different, preselected quantities of ice bodies; means for adjusting said preselected quantities of ice bodies; and means located in said hopper for delivering ice bodies into said chutes.

16. A method for dispensing ice bodies and beverage into a cup at a single location, comprising:

positioning the cup on an incline under a spout for dispensing beverages of a dispensing apparatus for dispensing ice bodies and beverage into a cup at a single cup location, said apparatus including a stop in a location relative to the incline so that the cup is in an ice body and beverage receiving location when against the stop, the stop for preventing the cup from sliding down the incline as it is being filled;

dispensing ice bodies from the dispensing apparatus into the cup at said location from a vertically disposed chute, the cup receiving the ice bodies to create a horizontal force component in a direction down the incline and against said stop to assist in keeping the cup relatively stationary as the cup is being filled; and

dispensing beverage from the dispensing apparatus into the cup at said location.

4,946,074

# TAMPER EVIDENT MANUALLY ACTUATED PUMP SPRAYER

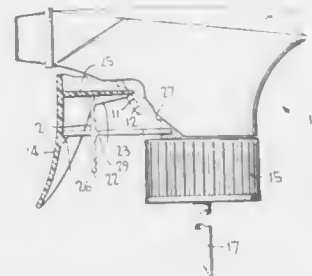
Richard P. Grogan, Downey, Calif., assignor to Calmar, Inc., Watchung, N.J.

Filed Jun. 15, 1989, Ser. No. 366,633

Int. Cl.<sup>5</sup> B67D 5/40

U.S. Cl. 222—153

9 Claims



1. A tamper evident manually actuated pump sprayer having a pivotable pump actuator movable upon application of a substantially horizontal finger force applied thereto, the sprayer having a pump body and a reciprocable pump piston, and the actuator comprising a lever having tongue means bearing against the piston, a locking device in combination comprising a flat element extending between and bearing against said lever and a portion of the pump body which confronts said lever, said element having at least one wing transversely extending from one side thereof and bearing against said tongue means, and said element having a weakened section adjacent said wing, whereby said device wedges the lever for locking the sprayer in an inoperative position, said device being manually removable for unlocking the sprayer to an operative position upon application of external force to said element causing said element to at least bend along said weak-

ened portion thus indicating said locking device has been removed.

4,946,075

# DEVICE FOR DISPENSING FLOWING SUBSTANCES

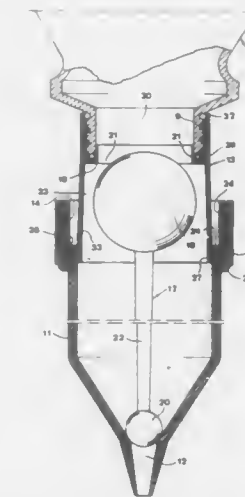
Rune Lundbäck, Gävle, Sweden, assignor to Unro Teknik AB, Gävle, Sweden

Filed Jun. 29, 1989, Ser. No. 372,776

Int. Cl.<sup>5</sup> B67D 3/02

U.S. Cl. 222—181

15 Claims



1. A dispensing device for flowing substances, said device being attachable to a container and comprising an outlet tube of flexible material adapted to be dependent from the container and at the bottom terminated by an outlet opening, said dispensing device further comprising a valve arrangement comprising two valve members, a first of said valve members being arranged in the vicinity of the upper end of the outlet tube for opening and closing respectively a communication opening, via which the substance may flow from the container into the outlet tube, a second of said valve members being arranged in the vicinity of the outlet opening for opening and closing respectively thereof, said outlet tube having a sufficient length for allowing gripping of the tube by hand in an area between the valve members and squeezing of the tube without mechanically affecting the valve members, said valve arrangement being adapted to be influenced by the fluid pressure in the tube upon squeezing thereof so as to close the communication opening by means of the first valve member and open the outlet opening by means of the second valve member, whereas upon release of squeezing pressure the first valve member opens the communication opening and the second valve member closes the outlet opening, said device comprising an intermediate piece comprising first means for releasably securing the outlet tube to the intermediate piece and second means for releasably securing the intermediate piece to communicate with a discharge opening of the container, said intermediate piece comprising means for restricting movement upwardly of the valve arrangement on squeezing of the outlet tube.

4,946,076

# DISPENSER FOR PASTY COMPOSITIONS

Ludger Hackmann, and Josef Wilken, both of Lohne/Oldenburg, Fed. Rep. of Germany, assignors to Bramlage Gesellschaft mit beschränkter Haftung, Lohne/Oldenburg, Fed. Rep. of Germany

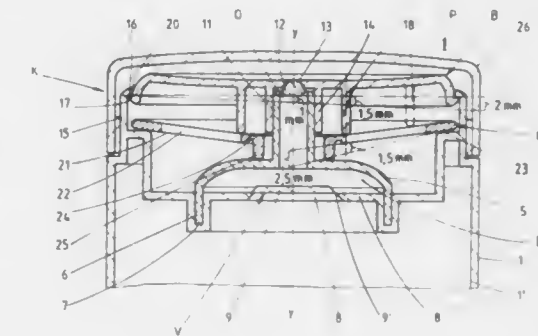
Filed Oct. 3, 1988, Ser. No. 252,523

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733354

Int. Cl.<sup>5</sup> B65D 37/00

U.S. Cl. 222—207

20 Claims



1. A dispenser for pasty contents, comprising  
 a housing,  
 a piston disposed in said housing displaceable in only a direction of emptying of the contents,  
 a restorable wall which is pressable in a direction towards the piston, the wall forming an outlet tube having an opening coordinated with an outlet opening of the dispenser, said dispenser outlet opening being disposed above said outlet tube,  
 a stopper formed on said outlet tube at said opening of the outlet tube,  
 said stopper releasably closes the outlet opening of the dispenser by resting from below against the outlet opening of the dispenser,  
 an actuator on an upper front side of said housing having said outlet opening of the dispenser formed therein at the upper front side, said actuator is spaced apart from said restorable wall,  
 means comprising a lever transmission,  
 said actuator via said means comprising said lever transmission presses on said wall.

4,946,077

# IN-LINE AIR-BLEED VALVE FOR HAND-OPERATED GREASE GUNS

LaVerne R. Olsen, Route 2, Osage, Iowa 50461

Continuation-in-part of Ser. No. 167,292, Mar. 11, 1988, abandoned. This application Apr. 3, 1989, Ser. No. 332,056

Int. Cl.<sup>5</sup> G01F 11/00

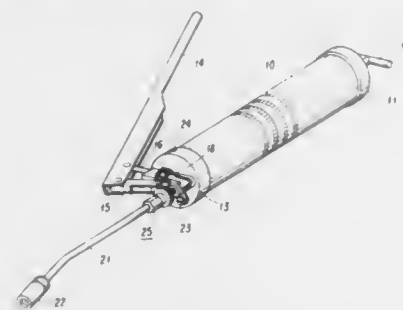
U.S. Cl. 222—256

8 Claims

1. In a hand-operable grease gun having a cylindrical reservoir for grease with a closure at each end, the closure at one end constituting an end housing incorporating a hand-operated grease pump having a pump chamber communicating with the interior of the grease reservoir, and an internally threaded grease outlet from the pump chamber integral with the end housing and opening therefrom, the pump being effective to supply grease from the grease reservoir under pressure to the grease outlet, and an elongated tubular member for conveyance of grease under pressure from the grease outlet, the tubular member being externally threaded at one end for threaded connection into the grease outlet, the combination therewith of an in-line, air-bleed valve disposed between the grease gun outlet and the tubular member and selectively operable to



bleed off air trapped within the pump chamber, the air-bleed valve comprising: an integral fitting having opposite first and second ends and an internal bore extending axially through said fitting between said ends for passage of grease from said grease outlet to said tubular member, the fitting including a first portion having an internally threaded counterbore into said internal bore from the first fitting end threadedly receiving said threaded end of the tubular member and a reduced second portion concentric with said internal bore and forming a shoulder with the first portion intermediate said fitting ends, the fitting second portion being externally threaded in the axial direction of the fitting from the second fitting end to adjacent said shoulder and threadedly connected at said second fitting



end into the grease gun outlet, the axial extent of the threads along the fitting second portion providing a length of exposed threads on the fitting second portion between said shoulder and the grease gun outlet, an air-bleed port extending from said internal bore and opening through the fitting second portion closely adjacent said shoulder; and a hand-turnable nut internally threaded on said exposed threads, the axial length of said exposed threads allowing the nut to be rotated on said exposed threads to move the nut in one axial direction of said fitting to encompass said port and to move the nut in the opposite axial direction to expose said port, the nut having an end face providing engagement with said shoulder when the nut encompasses said port.

4,946,078

APPARATUS FOR FEEDING BULK MATERIAL

Dieter Heep, Bergatreute; Paul Vogel, Weingarten, and Joachim Schmalz, Ravensburg, all of Fed. Rep. of Germany, assignors to Waeschle Maschinenfabrik GmbH, Ravensburg, Fed. Rep. of Germany

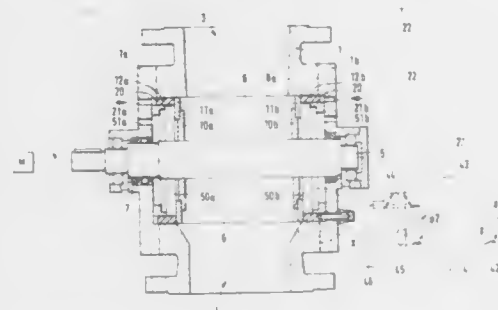
Filed Dec. 6, 1988, Ser. No. 280,706

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1987, 3742522

Int. Cl.<sup>5</sup> B65G 29/00

U.S. Cl. 222-368

16 Claims



14. Apparatus for feeding bulk material; comprising: a housing having an inlet and an outlet; a rotor accommodated in said housing and having a plurality of radially extending vanes to define compartments for

transporting the bulk material from said inlet to said outlet; sealing means for axially sealing said rotor; and force-applying means acting upon said sealing means with a uniform and constant holding force and subjecting said sealing means in periodic intervals momentarily to a predetermined displacement force which exceeds the holding force.

4,946,079

VENTED AND VALVED POURING SPOUT

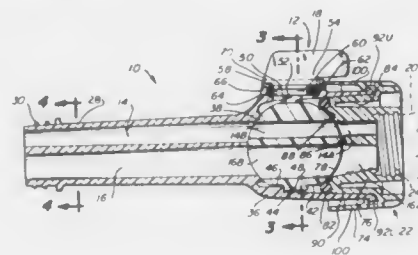
John T. Campbell, P.O. Box 126, Midwest, Wyo. 82643

Filed Jul. 21, 1988, Ser. No. 222,898

Int. Cl.<sup>5</sup> B67D 3/00

U.S. Cl. 222-484

1 Claim



1. A valved and vented pouring spout comprising: an elongated tubular spout member internally partitioned to divide its interior into an airflow passage and a material flow passage, both extruding longitudinally of the said spout member; an interior portion of said spout member forming a hemispherically shaped seat a connector section detachably mounted on one end of the spout member, the connector section having thereon a hemispherically shaped seat, said hemispherically shaped seats or said spout member and said connector section forming a spherical pocket therebetween; an opening between the spherical pocket and the exterior of the spout; a ball valve body rotatably disposed in the pocket, said body having bores therethrough which, in one rotatable position of the body, are respectively alignable with the passages of the tubular spout member; and actuator means attached to the valve body and projecting through the opening.

4,946,080

FLUID CONTAINER WITH DOSAGE ASSEMBLY

Stten Vesborg, Brussels, Belgium, assignor to Colgate-Palmolive Company, Piscataway, N.J.

Filed Apr. 19, 1989, Ser. No. 340,184

Claims priority, application Denmark, Apr. 13, 1988, 2030/88; Mar. 31, 1989, 1582/89

Int. Cl.<sup>5</sup> G01F 11/00

U.S. Cl. 222-500

20 Claims

1. A dosage-metering assembly for a fluid container, which has a neck with an opening through which fluid is dispensed when the container is inverted, comprising: a stopper member which is mounted on the neck of the container in alignment with a central axis of the neck opening for the dispensing of fluid and which has an outlet portion concentric with the central axis provided with an outlet passage therethrough for the outflow of fluid from the container, and a dosage-metering portion formed with an annular wall concentric with the central axis and extending in the neck of the container; a plunger disposed concentrically with the central axis and

with said annular wall of said stopper member and being slidably movable under gravity along the central axis from a start position to an end position when the container is inverted, said plunger having a timer flange which extends radially to said annular wall and is in slidable sealing engagement therewith so as to sweep through a predetermined volume defined from the start position to the end position of said plunger, said predetermined volume swept by said timer flange of said plunger constituting a timer chamber which communicates by fluid flow into said outlet passage of said stopper member; a feed opening positioned near the start position of said



plunger communicating into said timer chamber through which fluid in the container feeds into said timer chamber and into said outlet passage of said stopper member when the container is inverted, said feed opening being cut off by said timer flange of said plunger moving past said feed opening a predetermined time after the container is inverted, said timer flange thereby cutting off further flow of fluid from said feed opening into said timer chamber after said predetermined time from the start position, and said timer chamber thereby being emptied of fluid when the plunger reaches the end position in order to allow quick return of the plunger to the start position when the container is returned to its upright position.

4,946,081

APPLICATOR NOZZLE FOR SEALANT CARTRIDGES AND THE LIKE

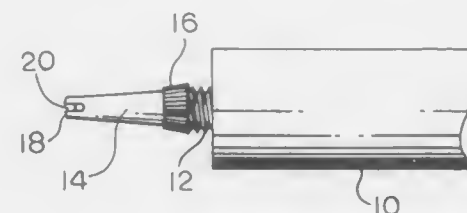
Lawrence R. Jacobson, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 27, 1989, Ser. No. 317,304

Int. Cl.<sup>5</sup> B65D 25/42

U.S. Cl. 222-568

5 Claims



1. In combination, an applicator nozzle formed of an elongated, hollow tubular body having an input end fitted over the discharge spout of a tube or cartridge containing viscous sealant materials, said nozzle having a discharge opening bounded on three sides by continuous skirts, devoid of apertures, which provide for the smooth application and trowelling of said viscous material squeezed from said tube, and a forward surface in which there is a slot or aperture of substantially smaller cross-sectional area than the area of said discharge opening, whereby the user is enabled to view and monitor the amount of material being discharged from said tube or cartridge, said

aperture comprising a rectangular slot having a height along an axis parallel to the body of said tube which is greater than its width.

4,946,082

TRANSFER TUBE WITH IN SITU HEATER

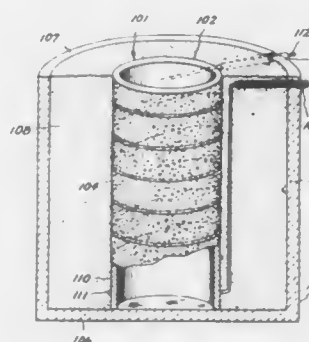
Milivoj K. Brun, Ballston Lake; Marcus P. Borom, Schenectady; Steven A. Miller, Amsterdam; Lawrence E. Szala, and Paul S. Svec, both of Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 10, 1989, Ser. No. 377,387

Int. Cl.<sup>5</sup> B22D 41/00

U.S. Cl. 222-593

21 Claims

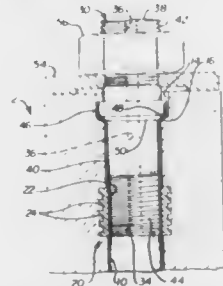


1. An integral transfer tube useful for transfer of molten metal comprised of a hollow high density tube, a low density shell, and a continuous elongated heating element comprised of a heating wound portion and two end portions, said wound portion of said heating element being in direct contact with the outer surface wall of said high density tube, said shell surrounding said wound portion of said heating element and the outer surface wall of said high density tube leaving no significant portion thereof exposed, said shell being in direct contact with said wound portion of said heating element and being directly bonded to said outer surface wall of said high density tube, at least a sufficient amount of said end portions of said heating element being exposed for electrical attachment, said heating wound portion of said heating element being electrically characterized as having an electrical resistance and a surface area sufficient to preheat and maintain said high density tube at a temperature within 300° C. of the temperature of use of said transfer tube, said heating element being comprised of a metal or metal alloy having a melting point higher than 700° C. and at least 200° C. higher than the temperature of use of said transfer tube, said high density tube and low density shell being comprised of polycrystalline ceramic oxide material, said high density tube having a density of at least about 90% of its theoretical density, said high density tube having a passageway extending through its length with a cross-sectional area at least sufficient for transfer of molten metal therethrough, said low density shell ranging in density from about 40% to about 80% of its theoretical density, said low density shell having a thermal conductivity at least sufficient for transfer of molten metal therethrough, said low density shell ranging in density from about 40% to about 80% of its theoretical density, said low density shell having a thermal conductivity at least about 10% lower than that of said high density tube, said low density shell having a thermal expansion coefficient within about  $\pm 25\%$  of the thermal expansion coefficient of said high density tube.

**4,946,083**  
**ONE-PIECE STOPPER ROD**  
 Mark K. Fishler, Tervuren; Jean-Marie Koten, Ostende, both of Belgium, and Pascal Dubois, Geignies, France, assignors to Vesuvius Crucible Company, Pittsburgh, Pa.  
 Filed Dec. 29, 1988, Ser. No. 291,497  
 Int. Cl.<sup>5</sup> B22D 11/10

U.S. Cl. 222—602

16 Claims



1. A stopper rod adapted for attachment to an inert gas supply line and lifting mechanism adjacent a metallurgical vessel comprising:

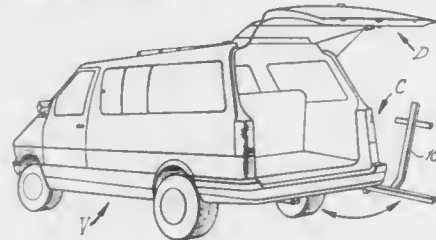
an elongated stopper rod body of a refractory material having an upper end and a lower end and an axial bore extending from the upper end to the lower end and including means at the lower end communicating with the axial bore for emitting an inert gas to an exterior surface therefore, said axis bore having an enlarged diameter countersunk portion including an annular sealing surface spaced from the upper end of the stopper rod body adapted to form a gas tight seal with a like annular surface carried by a threaded metal rod attached to the inert gas supply line and lifting mechanism adjacent to the metallurgical vessel; and

a metal bushing insert copressed and fired within the stopper rod body positioned beneath said annular sealing surface, said bushing insert including an outer sidewall carrying means for providing a mechanical interlock with the refractory material of the stopper rod, and having a threaded bore positioned coaxially with the bore of the stopper rod body and adapted to threadably receive the threaded metal rod for attachment to said inert gas supply line and lifting mechanism.

**4,946,084**  
**SPARE TIRE SUPPORT FOR VEHICLE**  
 John H. Britto, 1219 38th St., Sarasota, Fla. 34234  
 Filed Aug. 25, 1989, Ser. No. 398,720  
 Int. Cl.<sup>5</sup> B62D 43/00

U.S. Cl. 224—42.21

5 Claims



1. A spare tire support for a vehicle having a horizontally hinged rear closure, a horizontally extending frame member disposed below and spaced from the rear closure, and an upwardly extending frame member adjacent to but spaced from the rear closure said upwardly extending frame member including walls defining a cavity therebetween, access holes in said frame member into the interior of said cavity for mounting a rear light cluster therein, the upwardly extending frame member having a wall portion opposite the vehicle access holes comprising:

an L-shaped swing bracket having a long leg with a top end adapted to be secured adjacent to said opposite wall portion of the upwardly extending frame member through the vehicle access holes after removal of the rear light cluster;

said L-shaped swing bracket having a short leg adapted to be disposed below and spaced from the horizontally extending frame member;  
 a horizontal swing bar having one end disposed between said swing bracket short leg and the horizontally extending frame member;  
 a hinge bolt extending through said short leg of said L-shaped swing bracket, said one end of said horizontal swing bar, and the horizontally extending frame member adapted to receive said hinge bolt;  
 whereby said horizontal swing bar is adapted to be moved between a stowed position below the horizontal frame member and an unstowed position at least orthogonal to the horizontal frame member;  
 a clearance bar secured to said horizontal swing bar and extending orthogonally therefrom;  
 an upwardly extending support bar secured to said clearance bar a distance from said horizontal swing bar sufficient to permit said horizontal swing bar to be placed in said stowed position;  
 a lug support bar, having at least one wheel mounting lug secured thereto, secured to said upwardly extending support bar.

**4,946,085**  
**APPARATUS FOR PRODUCING PAPER WITH DECORATIVE EDGES**  
 Ingvar Nilsson, Akarp, Sweden, and William H. Gunther, Jr., Mystic, Conn., assignors to Svecia Antiqua Limited, Kent, England

Filed Mar. 2, 1987, Ser. No. 20,448  
 Int. Cl.<sup>5</sup> B26F 3/02; B26D 9/00

U.S. Cl. 225—3

33 Claims

1. An apparatus for producing a deckled edge on a sheet of paper and comprising a pair of rollers contacting each other, at least one of said rollers having a resilient, abrasion-resistant surface to develop a paper-engaging nip for engaging the sheet of paper and for keeping the sheet of paper taut as it passes between said pair of rollers, wherein a first of said rollers includes a circumferential groove and a second of said rollers includes a blade having a dull-edged periphery which is semi-circular in cross-section projecting radially from the surface of said second roller and into the groove of said first roller, and wherein said sheet of paper is engaged by said nip so that as said rollers are rotated, portions of said sheet of paper are displaced into the groove of said first roller by the blade of said second roller, bursting fibers of said sheet of paper and simulating said deckled edge.

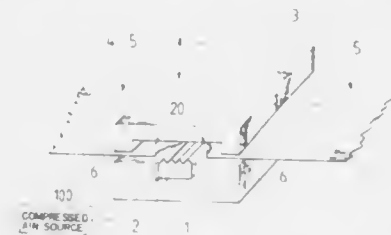
**4,946,086**  
**METHOD AND APPARATUS FOR SEVERING A PAPER WEB, PARTICULARLY PERFORATED PAPER**  
 Lasse Suuronen, Järvenpää; Teuvo Lappalainen, Kerava, and Pentti Harakka, Järvenpää, all of Finland, assignors to Valmet Paper Machinery Inc., Helsinki, Finland  
 Filed Jul. 1, 1988, Ser. No. 214,440  
 Claims priority, application Finland, Jul. 3, 1987, 872965  
 Int. Cl.<sup>5</sup> B26F 3/02; B65H 35/10

U.S. Cl. 225—4

17 Claims

1. A method for severing a perforated web comprising the steps of:

providing two clamping members, an anvil and an inflatable tensioning member, the tensioning member being positioned between the two clamping members;  
 passing the web between the two clamping members and the anvil, said two clamping members being positioned generally transverse to a direction of movement of the web;  
 moving the two clamping members into engagement with the web to clamp the web against the anvil; and



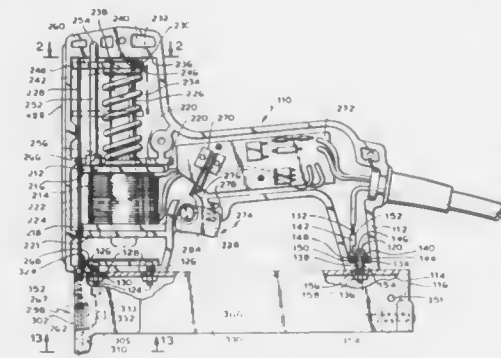
inflating the tensioning member to thereby expand and contact the web proximate a perforation thereof to thereby sever the web, said tensioning member only severing the web at the perforation thereof when being inflated.

**4,946,087**  
**STAPLE DRIVING TOOL**  
 Rudolf Wingert, West Milford, N.J., assignor to Arrow Fastener Company, Inc., Saddle Brook, N.J.  
 Division of Ser. No. 203,485, Jun. 6, 1988, Pat. No. 4,858,813, which is a division of Ser. No. 76,327, Jul. 22, 1987, Pat. No. 4,770,335, which is a division of Ser. No. 794,305, Nov. 1, 1985, Pat. No. 4,700,876. This application Jun. 8, 1989, Ser. No. 364,088

U.S. Cl. 227—131

Int. Cl.<sup>5</sup> B25C 7/26, 7/36

11 Claims



1. A hand-held, electrically-driven staple driving tool comprising:

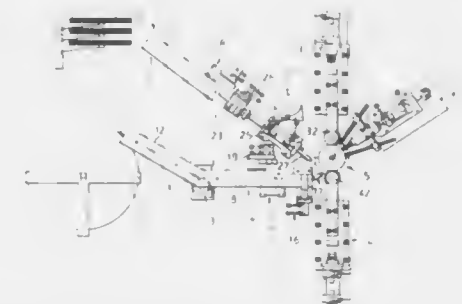
- (a) a housing;
- (b) an electromagnetic solenoid coil mounted to said housing, said coil having a central hole;
- (c) means for energizing said solenoid coil;
- (d) a magnetizable primary drive plunger centrally aligned with the hole of said solenoid coil, said primary drive plunger being free to move in a linear direction from an extended position to a retracted position into said central hole of said solenoid coil upon energization of said solenoid coil;

- (e) means for urging said primary drive plunger from said retracted position to said extended position;
- (f) a mainframe assembly mounted to said housing;
- (g) a staple magazine;
- (h) means for mounting said staple magazine to said mainframe assembly in a predetermined position;
- (i) a generally straight staple driving knife positioned outboard of said solenoid coil and oriented generally parallel to the linear direction of motion of said primary drive plunger and non-axially aligned with said primary drive plunger; and
- (j) a drive beam, said drive beam being positioned above and oriented transverse to the direction of motion of said primary drive plunger and having a first end and a second end, said second end being operatively connected to the upper end of said primary drive plunger and said first end being operatively connected near the upper end of said staple driving knife so that motion of said primary drive plunger in a generally linear direction between said extended position and said retracted position causes an approximately simultaneous and equal motion of said staple driving knife in a direction generally parallel to the direction of motion of said primary drive plunger; and
- (k) a guide shaft fixedly mounted to the housing and positioned between said primary drive plunger and said staple driving knife, said guide shaft being slidably received into a hole in said drive beam between said primary drive plunger and said staple driving knife to guide said drive beam in an up and down path.

**4,946,088**  
**BUSHING FORMING MACHINE**  
 Shyue S. Chuang, No. 10, Ta Yu 3r St., Ta Liao Shiang, Kaoh-siung Hsien, Taiwan  
 Filed Jul. 14, 1989, Ser. No. 380,139  
 Int. Cl.<sup>5</sup> B23K 11/10, 11/32

U.S. Cl. 228—18

10 Claims



1. A bushing forming machine comprising:

- a metal strip delivery system including:
  - a metal strip wound on a drum to form a spool;
  - a forming mill for forming said metal strip to a predetermined shape;
  - a first conveyer being provided for carrying said metal strip to said forming mill; and
  - a punch provided on a passage of said metal strip after said forming mill for cutting said metal strip to a predetermined length;
- a filler delivery system including:
  - a filler wound on a drum to form a spool;
  - a cutter for cutting said filler to a predetermined length;
  - a second conveyer being provided for carrying said filler to said cutter; and
  - a gripper feeder being provided for holding and feeding a cut filler;



a mold rotatably receiving and driving said metal strip and said filler;  
a first pair of compression rollers being actuated to compress said metal strip and said filler wound on said mold; and  
a welder being provided radially beside said mold for welding said metal strip.

4,946,089

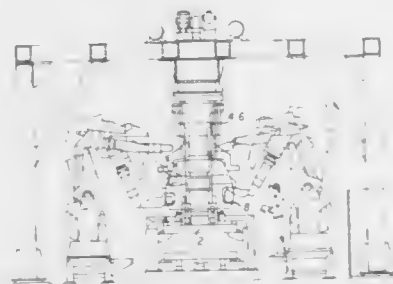
# PROCESS FOR INTERPOSITIONING OF TOOLS OF A BODY ASSEMBLY MACHINE

Dominique Baulier, Paris; Christian Defilippis, Evry; Jacques Jami, Aulnay-Sous-Bois; Bernard Negre, Paris; Alain Pierdet, Rosny-Sous-Bois, all of France; Bernard Negre, Paris, and Alain Pierdet, Rosny-Sous-Bois, all of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Jan. 27, 1989, Ser. No. 302,259  
Claims priority, application France, Feb. 17, 1988, 88 01855  
Int. Cl.<sup>5</sup> B23K 37/00

U.S. Cl. 228—45

6 Claims



1. Process for mounting tools for positioning vehicle bodies, comprising at least three tools including a lower tool positioned on the work station, a front upper tool, and a rear upper tool, comprising the steps of:

- positioning the lower part of front tool by self-centering on the front part of lower tool;
- positioning the lower part of rear tool by self-centering on the rear part of lower tool; and
- positioning the upper part of front tool by self-centering with the upper part of rear tool, thus forming a rigid annular structure independent of any exterior structure.

4,946,090

# SEALS BETWEEN CERAMIC ARTICLES OR BETWEEN CERAMIC ARTICLES AND METAL ARTICLES

William D. Hepburn, Edinburgh, Scotland, assignor to Ferranti International Signal, plc, Cheshire, England

Filed Aug. 9, 1988, Ser. No. 230,492

Claims priority, application United Kingdom, Aug. 18, 1987, 8719498

Int. Cl.<sup>5</sup> B23K 1/20

U.S. Cl. 228—121

4 Claims

1. A method of providing a seal between two ceramic articles, or between a ceramic and a metal article, comprising forming a composite sealing member from a body having aluminum, at least, as a major constituent thereof; providing the body with a surface film of a metal selected from the group consisting of zinc and tin and removing any aluminum oxide surface film therefrom and then coating the surface film with a material selected from the group consisting of silver, gold, an alloy of silver and gold, a suitable alloy containing silver, and a suitable alloy containing gold, to complete the composite sealing member, and then assembling the sealing member between the articles to be bonded together and heating the assembly to melt the composite sealing member, either in an inert atmosphere, or in a high vacuum, and then cooling the assembly to obtain the required seal.

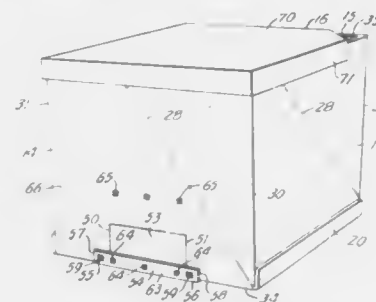
# COLLAPSIBLE CONTAINER HAVING CONGRUENT DOOR RETAINING MEANS

Julius B. Kupersmit, 145-80 228th St., Springfield Gardens, N.Y. 11413

Filed Sep. 20, 1989, Ser. No. 409,767  
Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 229—122.1

3 Claims



1. In a collapsible fibrous container for use in transporting and dispensing particulate and similar material, the container having vertical front, rear and side walls and a bottom wall interconnected to form a rectangular enclosure, a liner member including front, side and rear walls and positioned in abutted relation to said container within said enclosure, there being a through opening in said front wall of said liner and said container adjacent said bottom wall, the improvement comprising: said front wall of said container having a first integral closure flap hingedly connected by a fold line at an upper edge thereof, said first flap having inner and outer surfaces and hook and pile interconnecting means on each of said inner and outer surfaces; said front wall of said liner member having a second flap thereon in generally congruent relation relative to said first flap, said second flap having hook and pile means on an outer surface thereof selectively engageable with said hook and pile means on said inner surface of said first flap; said first flap having a laterally extending elongated closure member secured to said outer surface of said first flap, said closure member having means for selectively securing said closure member to an outer surface of said front wall of said container, thereby maintaining said first flap in closed condition; said last mentioned outer surface having hook and pile means thereon selectively engageable with hook and pile means on said outer surface of said first flap to maintain said flap in opened condition; whereby upon the opening of said container for discharge of the contents thereof, said closure member is first disengaged from said outer surface of said front wall of said container, and said first flap is pivoted into contact with said front wall, said second flap being subsequently pivoted to engage said first flap to form a clear passage in said through opening.

4,946,092

# METHOD FOR ARRANGING A THROUGH-CHANNEL IN A SOLID BODY, AND THE BODY OBTAINED WITH THIS METHOD

Antonius van Poorten, Deurne, Netherlands, assignor to Nagron Precision Tooling B.V., Netherlands

Filed Apr. 11, 1989, Ser. No. 336,084

Int. Cl.<sup>5</sup> B23P 15/00; B29C 45/27

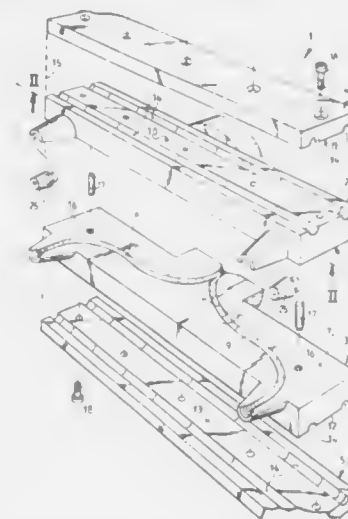
U.S. Cl. 228—162

8 Claims

1. A method for providing a through-channel having a desired rheological form in a solid body, said method comprising the steps of:

- (a) providing a plurality of solid blocks which have respective side faces that complement one another and which together can form the solid body,
- (b) forming respective grooves in the side faces of the solid blocks, said grooves having corresponding forms,
- (c) placing said solid blocks together such that the side faces

thereof abut one another and the grooves therein cooperate to define a through-channel,  
(d) coupling said solid blocks so as to provide the solid body containing a through-channel, and



(e) forcibly passing a liquid abrading agent through the through-channel for a predetermined time period sufficient to not only smooth the grooves defining the through-channel by honing, but additionally to change the configuration of the through-channel and provide it with the desired rheological form.

4,946,093

# HALF SLOTTED CONTAINER LID WITH SELF-LOCKING DOUBLE SIDE PANELS

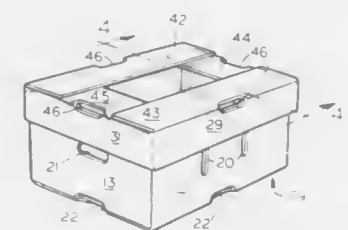
Stephen E. Moorman, Bowling Green, Ohio, assignor to Nekoosa Packaging Corporation, Maumee, Ohio

Filed Sep. 12, 1989, Ser. No. 405,526

Int. Cl.<sup>5</sup> B65D 5/68

U.S. Cl. 229—128.19

16 Claims



1. A blank for forming a container lid comprising alternating side and end flaps hinged along one of their sides at a first longitudinal fold-line, said flaps being separated from each other from said fold-line to one longitudinal edge of the blank, a second longitudinal fold line parallel with the first, lateral fold-lines extending from the first longitudinal fold-line to the other longitudinal edge of the blank, said lateral fold-lines defining alternating side and end panels and a tab, said tab being disposed at the end of the blank providing a manufactures joint for fastening the blank into a closed perimeter of the lid, said second longitudinal fold-line forming side-by-side inner and outer panels disposed lengthwise along one side of the blank, two diagonal fold lines provided by scores in the blank extending from the intersection of each lateral fold-line

and the second longitudinal fold line to the adjacent other longitudinal edge of the blank, said two diagonal fold-lines having an included angle of 90 degrees and each extending 45 degrees from said second longitudinal fold line, said diagonal fold lines, together with the lateral fold-line adapted to provide a gusset-style corner for the lid upon folding the inner panels inwardly about said second longitudinal fold-line.

4,946,094

# CONTAINER SYSTEM

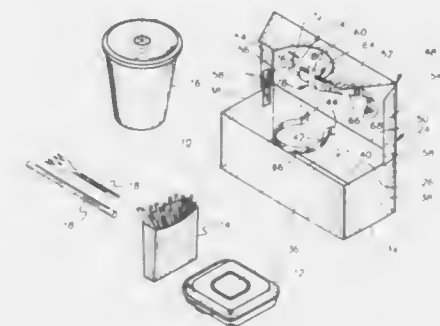
Michael A. Stang, 26 Stockmill Rd., Apt. F, Pikesville, Md. 21208

Filed Sep. 20, 1988, Ser. No. 246,678

Int. Cl.<sup>5</sup> A45F 5/00

U.S. Cl. 224—270

17 Claims



1. A container system adapted to be removably coupled to the body of a user, comprising:

- (a) a container housing defining an internal housing chamber having an opening formed therein for at least temporarily storing objects therein, said objects being insertable and removable from said container through said housing opening;
- (b) a cover member secured to said container housing;
- (c) means for releasably coupling said container housing to said user's body, said releasable coupling means including (1) a strap member having one end fixedly secured to said cover member and an opposing strap end adapted to pass around a neck portion of said user for releasable securement to said cover member, and (2) strap adjustment means for releasably coupling said strap member around said neck portion of said user, said strap adjustment means including a slit formed through said cover member for passage therethrough of said strap opposing end for providing securement of said strap member opposing end to said cover member; and,
- (d) means for releasably storing said releasable coupling means adjacent said cover member, said means for releasably storing said releasable coupling means includes a tab member secured to an inner surface of said cover member, said strap member being insertable under said tab member for releasably capturing said strap member to said cover member, whereby said strap member is stored within said internal housing chamber.

4,946,095

# CHANGE RETURN PROTECTION DEVICE

Salvatore Anello, Box 313, Tuckers Corner Rd., Highland, N.Y. 12528, and Nathan Turk, Rocking Horse Ranch, Rte. 44-55, Highland, N.Y. 12528

Continuation-in-part of Ser. No. 275,074, Nov. 22, 1988. This application Dec. 13, 1988, Ser. No. 283,583

Int. Cl.<sup>5</sup> B65G 11/04

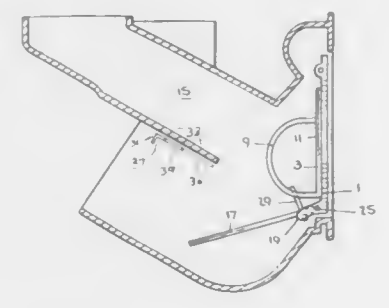
U.S. Cl. 232—57.5

4 Claims

1. A change return protection device for installation on the back side of a door to a coin return box connected to a coin

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return passage having a slotted lower wall of a coin operated machine, comprising:  
means for preventing the insertion of obstructing material past said coin return door;



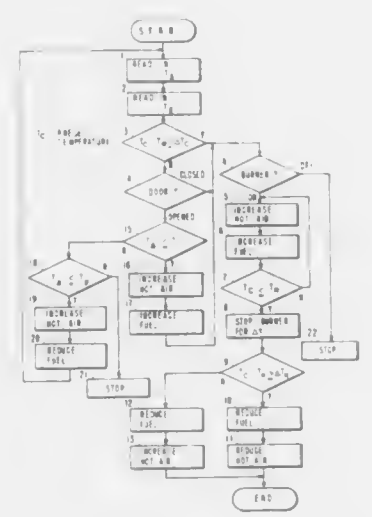
means for sealing off the coin return passage of the coin-operated machine when said door is opened to allow a user to retrieve returned coinage; and  
means for blocking said slotted lower wall.

**4,946,096**  
**METHOD AND APPARATUS FOR OPERATING A FURNACE FROM A 12V DC BATTERY**  
Gary W. Ballard, Plainfield, and Kevin D. Thompson, Indianapolis, both of Ind., assignors to Carrier Corporation, Syracuse, N.Y.  
Filed Dec. 11, 1989, Ser. No. 448,414  
Int. Cl.<sup>5</sup> F25N 5/00  
U.S. Cl. 236—11



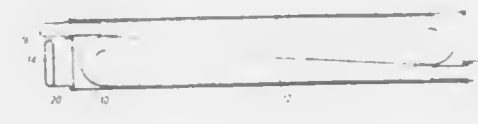
1. A method of operating on auxiliary power, a furnace of the type for use with an electrical power source that is susceptible to interruption and having blower and burner assemblies with each having high and low heat capabilities comprising the steps of:  
sensing when power from the electric power source has been interrupted;  
connecting an auxiliary source of power to the furnace when said interruption is sensed; and  
substantially inhibiting the blower from operating in a high heat mode during the period of time in which the furnace is operating with auxiliary power.

**4,946,097**  
**CONTROL SYSTEM FOR HEATING CONTAINER FOR USE ON MOTOR VEHICLE**  
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan  
Filed Jun. 7, 1989, Ser. No. 362,226  
Claims priority, application Japan, Jun. 10, 1988, 63-143092  
Int. Cl.<sup>5</sup> G05D 23/00  
U.S. Cl. 237—2 A



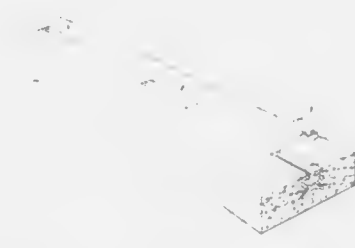
1. A control system for supplying hot air into a heating container on a motor vehicle to keep the interior of the heating container hot, said control system comprising:  
a burner adapted to be mounted on the motor vehicles for burning fuel;  
fuel supply means for supplying fuel to said burner;  
a heat exchanger for transferring heat of an exhaust gas produced by burning fuel in said burner to air to be supplied to the heating container;  
a blower for supplying hot air heated by said heat exchanger into the heating container;  
a container air temperature sensor for detecting the temperature in the heating container;  
an ambient air temperature sensor for detecting the temperature of ambient air outside of the motor vehicle;  
a door position sensor for detecting whether a door of the heating container is in an opened or closed position; and  
control means coupled to said container air temperature sensor, ambient air temperature sensor, and door position sensor for controlling said fuel supply means and said blower based on the temperature and door position detected by said container air temperature sensor, said ambient air temperature sensor, and said door position sensor, respectively,  
wherein said control means comprises means for controlling said fuel supply means to supply fuel at a higher rate and for controlling said blower to supply hot air at a higher rate if the temperature of ambient air is lower than a first preset ambient air temperature when the temperature in the heating container is lower than a predetermined temperature and the door of the heating container is opened.

**4,946,098**  
**CENTRAL HEATING INSTALLATION WITH A HOT WATER CIRCUIT FOR DOMESTIC USAGE**  
René Prevot, Drancy, France, assignor to E. L. M. Leblanc, Drancy, France  
Filed Feb. 9, 1989, Ser. No. 308,088  
Claims priority, application France, Feb. 16, 1988, 88 01800  
Int. Cl.<sup>5</sup> F24D 3/08  
U.S. Cl. 237—19



1. A central heating installation comprising:  
an enclosure having a burner provided within an inner portion thereof and a heating circuit duct extending through a fin assembly situated in an upper portion of the enclosure and in a path of travel of hot gases produced by the burner;  
a water heating circuit extending through the fin assembly, and comprising a plurality of flattened tubes connected to one another by arcuate connectors;  
a tap water heating circuit including a plurality of tubular sections each having a coil or hairpin shape positioned inside a corresponding one of the flattened tubes extending through the fin assembly;  
wherein each section of the tap water heating circuit is positioned inside, but not in contact with, its corresponding flattened tube of the water heating circuit; each section having an outer peripheral dimension which defines the volume of the section; and  
wherein the dimensions of the flattened tubes of the water heating circuit closely conform to lateral portions of the outer peripheral dimensions of the sections of the tap water heating circuit thereby defining a minimum volume of water contained within the flattened tubes.

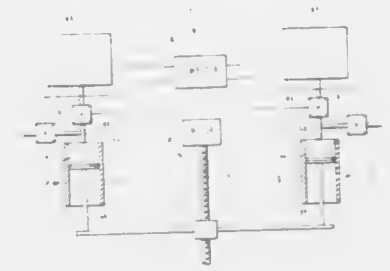
**4,946,099**  
**SLEEPER CONSTRUCTION**  
Robert L. Bratchell, Piccadilly, Australia, assignor to Amatek Limited, Chatswood, Australia  
Filed Jan. 24, 1989, Ser. No. 301,620  
Claims priority, application Australia, Jan. 28, 1988, P16463  
Int. Cl.<sup>5</sup> E01B 9/18  
U.S. Cl. 238—264



1. A concrete sleeper assembly comprising a concrete supporting member, at least one elongate metal insert embedded in the concrete of the sleeper extending in the direction of the length of the sleeper, the insert being of general cruciform cross sectional shape, having diverging outer side walls defining V-shaped recesses by which the insert is keyed to the concrete of the sleeper, the insert side walls terminating at their upper edges in intumed flanges which define a continuous T-slot extending substantially the length of the insert,  
a pair of rail retaining blocks each having an upper portion

bearing downwardly on the flanges, a T-head slidably mounted in the T-slot bearing upwardly against the flanges, the T-head being substantially shorter than the length of the slot, a stem joining the upper portion and the T-head, and rail clip engagement surfaces on each said retaining block,  
the shapes and dimensions of the insert and retaining blocks being such that, when a said insert underlies a rail foot, the T-slot extends away from the rail foot on each side thereof by an amount such that each stem and T-head is slidable in the T-slot on a respective side of the rail foot.

**4,946,100**  
**LIQUID DISPENSER**  
J. Peter Flemming, R.D. #2, 6 Cleveland Rd. West, Princeton, N.J. 08540, and Robert J. Dee, 338 S. 3rd Street, Philadelphia, Pa. 19106  
Continuation-in-part of Ser. No. 156,729, Feb. 17, 1988, Pat. No. 4,878,601, which is a continuation-in-part of Ser. No. 156,439, Feb. 16, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 365,600  
Int. Cl.<sup>5</sup> B05B 9/03; B01F 11/00  
U.S. Cl. 239—1



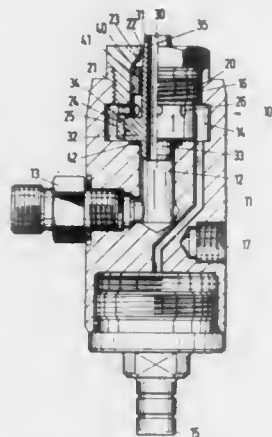
1. A liquid dispensing system comprising  
(a) a reservoir for containing the liquid to be dispensed;  
(b) means for stirring the liquid in the reservoir;  
(c) a nozzle for dispensing the liquid connected to said reservoir;  
(d) means for removing liquid from reservoir and feeding the liquid to the nozzle;  
(e) means for purging liquid remaining in the nozzle, subsequent to dispensing some of the liquid;  
(f) means for feeding a controlling amount of the liquid to the nozzle for dispensing; and  
(g) means for causing liquid remaining in the nozzle tip subsequent to dispensing to be sucked-back.

**4,946,101**  
**ATOMIZER**  
Stefan H. Winheim, Frankfurt, Fed. Rep. of Germany, assignor to V.I.B. Apparatebau GmbH, Maintal, Fed. Rep. of Germany  
Filed Jun. 9, 1989, Ser. No. 364,016  
Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819762  
Int. Cl.<sup>5</sup> B05B 7/10; B05C 9/02  
U.S. Cl. 239—8

23. A method of wetting webs of paper or other hygroscopic material, comprising the steps of imparting to a first gas stream a swirling movement about a predetermined axis while maintaining the first stream at a relatively low pressure; conveying



a second gas stream in the direction of said axis; supplying a flow of liquid into said first and second gas streams so that the



flow of liquid is atomized; and advancing a web of hygroscopic material across the atomized liquid flow.

#### 4,946,102 SPRAYING APPARATUS

Carl DeWitt, 318 E. Poplar St., Cobden, Ill. 62920, and Gerald A. Fink, RR 2, Box 120, Murphysboro, Ill. 62966  
Filed Jul. 3, 1989, Ser. No. 374,873  
Int. Cl.<sup>5</sup> B05B 1/20

U.S. Cl. 239—167

18 Claims

1. A vehicular apparatus for spraying of liquids, for herbicidal and insecticidal application and the like, comprising a supporting frame for being carried vehicularly, upright support means carried by the frame and trailing boom support means extending rearwardly from the upright support means, means for providing selective pivoting of the trailing boom support means relative to the upright support means for providing vertical adjustability, lateral boom means supported by the trailing boom support means, means for providing selective pivoting of the lateral boom means relative to the trailing boom support means, the lateral boom means including at least inner and outer sections, at least one of the sections including spray nozzle means for selective spraying of liquids, pivotal connection means for connecting and providing pivotal movement of the inner and outer sections relative to each other, the pivotal connection means providing selective boom section positioning as well as approximation by the boom sections of terrain contour to be sprayed.

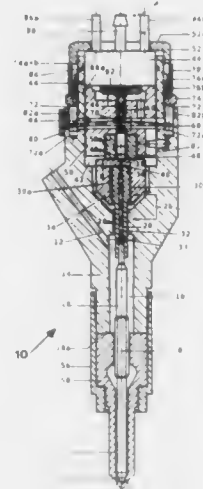
#### 4,946,103 ELECTRONICALLY CONTROLLED FUEL INJECTOR

Marco A. Ganser, Zürich, Switzerland, assignor to Ganser-Hydromag, Switzerland  
Filed Nov. 25, 1988, Ser. No. 276,415  
Claims priority, application Switzerland, Dec. 2, 1987, 04792/87

Int. Cl.<sup>5</sup> F02M 47/02

U.S. Cl. 239—88

28 Claims



1. A fuel injector for intermittently injecting fuel into a combustion chamber of an internal combustion engine, comprising an injector housing (14) with a valve seat (22) and at least one discharge orifice (24), an elongated injector valve member (18) provided with a piston member (26) and mounted within said housing (14) for engagement with said valve seat (22) for closing said discharge orifice (24), said injector valve member (18) being shiftable in its axial direction to be momentarily lifted from said valve seat (22) to open said discharge orifice (24) to allow for the injection of a desired quantity of fuel into the combustion chamber of the internal combustion engine, a control chamber (40) provided within said housing (14) and being connectable to a fuel supply line (12); the fuel pressure in said control chamber (40) acting upon said piston member (26) of said injector valve member (18) to force the latter against said valve seat (22), means (34, 38, 44, 46; 172, 182) for quickly reducing and quickly restoring the fuel pressure in said control chamber (40) to allow for the momentary axial movement of said injector valve member (18), said means for quickly reducing and restoring the fuel pressure in said control chamber (40) including a first orifice (34) and a second orifice (38) opening into said control member (40), electromagnetically controlled pilot valve means (46; 182) for closing and temporarily opening one end of said second orifice (38) and a solenoid (44; 172) for opening said pilot valve means (46; 182) depending upon applied electric pulses of a predetermined duration; at least one first member (36; 166) defining in part said control chamber (40) and being subject at least to the fuel pressure present in said control chamber (40), said first member (36; 166) being in connection with further member means (44, 48, 50, 52, 54, 14; 51, 53; 107, 172) including plural members and said solenoid (44; 172) for transmitting the hydraulic forces acting upon said first member (36; 166) to said further member means, said solenoid (44; 172) in addition to its function as an actuating device for said pilot valve (46; 182) being also used to carry and to transmit said forces from one of said plural members of said further member means (50, 107, 166) to a next one of said plural members of said further member means (52, 53).

#### 4,946,104 SPRAYING APPARATUS WITH COUNTERWEIGHT MEMBER

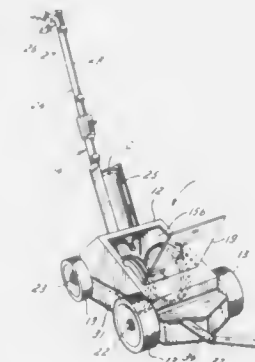
Thomas J. Smrt, Cary, Ill., assignor to Fox Valley Systems, Inc., Cary, Ill.

Filed Mar. 30, 1989, Ser. No. 331,265

Int. Cl.<sup>5</sup> B05B 1/28, 9/04; E01C 23/16

U.S. Cl. 239—150

6 Claims



1. A movable marking apparatus for marking a supporting surface comprising: a housing member; wheel means rotatably mounted to said housing member for engaging the supporting surface and rolling on the supporting surface; handle means secured to a rear portion of said housing for controlling said housing and pushing or pulling the housing along the supporting surface; and counterweight means disposed at a front portion of said housing to prevent inadvertent lifting of the front end of the housing away from the supporting surface.

#### 4,946,105 FUEL NOZZLE FOR GAS TURBINE ENGINE

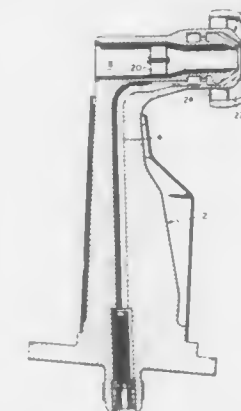
Francis C. Pane, Jr., South Windsor, and James A. Dierberger, Hebron, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 12, 1988, Ser. No. 180,749

Int. Cl.<sup>5</sup> B05B 7/06

U.S. Cl. 239—590.3

7 Claims



1. A liquid fuel nozzle for a gas turbine engine comprising: an annular plate with a plurality of circumferentially spaced orifices in parallel flow relationship; means for delivering fuel to said plurality of orifices; an annular chamber downstream of said orifices; an outwardly extending humped circumferential baffle located on the downstream side of said annular chamber with the upstream surface of said baffle directly in line

with said orifices, whereby flow through said orifices impinges on said surface; an annular flow restriction between the outside edge of said baffle and an outer surrounding surface; an annular expansion flowpath downstream of said flow restriction; and an increasingly restrictive flow frusto conical annulus of decreasing diameter to discharge located downstream of said expansion flowpath.

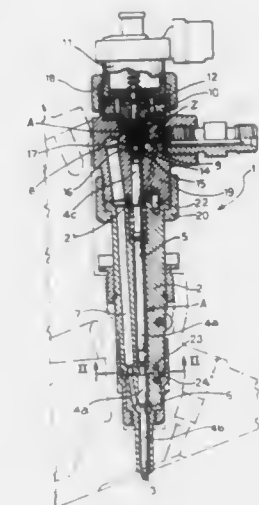
#### 4,946,106 ELECTROMAGNETICALLY-CONTROLLED FUEL INJECTION VALVE FOR DIESEL ENGINES

Sergio Turchi, Rivalta, and Alessandro Valetto, Turin, both of Italy, assignors to Weber S.r.l., Turin, Italy  
Filed Aug. 25, 1988, Ser. No. 236,468  
Claims priority, application Italy, Aug. 25, 1987, 53611/87[U]

Int. Cl.<sup>5</sup> B05B 1/30

U.S. Cl. 239—585

8 Claims



1. An electromagnetic-controlled fuel injection valve for diesel engines, comprising: a body (2) defining an axially extending cavity (5) with an upper end, a lower injection nozzle (3) and an injection chamber (6) between said upper end and said nozzle, said body including a fuel supply passage (7) extending from a location near said upper end of said cavity, to said injection chamber for supplying fuel to said injection chamber, said body defining a seat (8) communicating with said upper end of said cavity, and an upper opening communicating with said seat on a side of said seat opposite from said cavity, said body also including a fuel supply conduit communicating with said seat and a fuel discharge conduit communicating with said upper opening; a needle (4) mounted for axial movement in said cavity and through said injection chamber for opening and closing said lower injection nozzle; means for biasing said needle toward said injection nozzle; a structurally and functionally independently testable electromagnetic metering valve unit (11) detachably connected to said body, said unit comprising a head element (10) engaged in said upper opening of said body, said head element having an appendage (9) extending into said seat (8) with sealing means (16, 17) for sealing opposite ends of said appendage to opposite ends of said seat for isolating said fuel supply conduit from said fuel discharge conduit, said appendage having an inlet port (Z) communicating with said seat and an outlet (A) communicating with said upper opening, said appendage including a control chamber (14) therein communicating with the upper end of said cavity, a valve passage extending through said head and

said appendage, said valve passage communicating with said control chamber, said inlet port and said outlet port, said unit including an obturator (12) electromagnetically movable in said valve passage for opening and closing communication between said control chamber and said outlet port;

block means (15) in said upper end of said cavity for separating said control chamber from an upper end of said needle and for defining the upper end of a stroke of movement of said needle in said cavity; and  
axial clamping means (18) for detachably and axially clamping said unit to said body so that said unit with said head and appendage can be detached from said body without disturbing said fuel supply conduit and without disturbing said fuel discharge conduit.

4,946,107

**ELECTROMAGNETIC FUEL INJECTION VALVE**

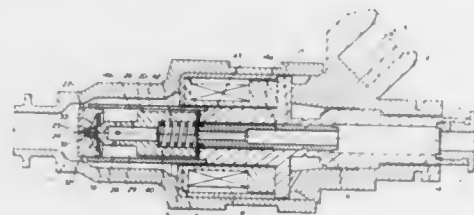
Donald E. Hunt, New Haven, Mo., assignor to Pacer Industries, Inc., Washington, Mo.

Filed Nov. 29, 1988, Ser. No. 277,328

Int. Cl.<sup>5</sup> B05B 1/30

U.S. Cl. 239—585

5 Claims



1. An electromagnetically operable fuel injection valve for use with an internal combustion engine, said injection valve including:

- a housing having a fuel passage therethrough,
- a fixed magnetic core disposed within said housing,
- a non-magnetic sleeve within said housing,
- a magnetic movable armature floatably movable within said sleeve without frictional engagement,
- said movable armature having a nozzle portion of reduced diameter which carries at the exit end thereof a ball valve,
- a nozzle seat for reception of said ball valve having a fuel discharge orifice therein, and
- means for guiding said ball valve into sealing engagement with said orifice.

4,946,108

**APPARATUS FOR PRODUCING COMPOST**

Norbert König, Augsburg, and Peter Kasberger, Aystetten, both of Fed. Rep. of Germany, assignors to Lescha Maschinenfabrik GmbH & Co. KG, Augsburg, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 381,100

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3827282

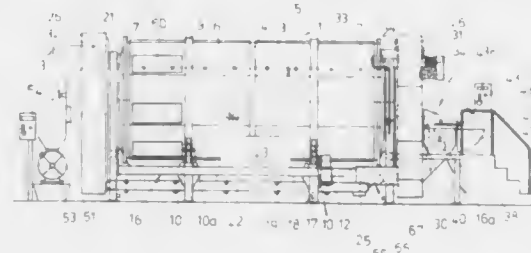
Int. Cl.<sup>5</sup> B02C 23/12

U.S. Cl. 241—78

22 Claims

1. A composting apparatus comprising a drum supported for rotation about a substantially level longitudinal axis thereof, means for driving said drum about said axis, said drum including a peripheral casing which is at least partly in the form of perforated sheet metal panels, a longitudinal conveying device fitted under said drum and able to be driven selectively in opposite directions for selective conveying of compost falling from said drum to a compost deposit and a lifting conveying device arranged at an entry end of said drum, a charging device arranged in an upper part of the drum for cooperation with the lifting conveyor, the said drum driving means being

adapted to turn said drum in either direction about said axis, and at least one internal hinged door in said casing for closing



and opening a door opening in said casing, said door being arranged to pivot about a hinge axis parallel to the drum axis.

4,946,109

**TOOTH ASSEMBLY FOR ROTARY GRINDING APPARATUS**

Herbert H. Lewis, Jacksonville Beach, Fla., assignor to Newman Machine Company, Inc., Greensboro, N.C.

Filed Aug. 9, 1989, Ser. No. 391,466

Int. Cl.<sup>5</sup> B02C 13/09

U.S. Cl. 241—189 R

21 Claims



1. An apparatus for grinding scrap material, comprising:

- a casing adapted to receive said material;
- a breaker bar member fixedly mounted within said casing;
- a rotor assembly mounted within said casing adjacent said breaker bar for rotation about a central axis, said assembly including a plurality of breaker rings concentric with and spaced along the length of said axis, each of said breaker rings having upon its outer periphery a breaker tooth assembly including a tooth member and a tooth seat supporting said tooth member;

said tooth member and said tooth seat each having an opening extending therethrough, said openings being aligned with each other and being generally parallel to said axis;

an elongate pin member located within and shielded by said openings, said pin member releasably retaining said tooth member in association with said seat;

said tooth seat and said tooth member having complementary abutting surfaces preventing forward, rearward, inward and lateral movement of said tooth member relative to said tooth seat and to said pin member; and  
releasable detent means engaging said pin member intermediate the length thereof for releasably retaining said pin member within said openings.

4,946,110

**LAMINAR SEGMENTS FOR USE WITH COMMINUTION EQUIPMENT**

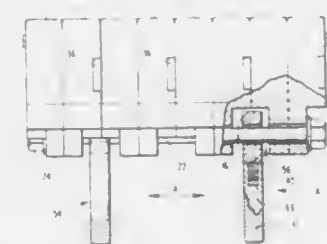
Terrance R. Harris, Pulaski, Tenn., and Darrell R. Larsen, Salt Lake City, Utah, assignors to American Magotteaux Corporation, Nashville, Tenn.

Filed Jan. 20, 1989, Ser. No. 295,740

Int. Cl.<sup>5</sup> B02C 13/282, 17/22

U.S. Cl. 241—182

36 Claims



1. A laminar segment for use as an impact surface in comminution equipment, comprising:

- a plurality of laminae configured such that the laminae may be associated together to form an integral segment, each lamina having opposing faces, and a core, and being configured such that a distance from the center of the core in the axial direction to a face of the lamina is less than a distance from the center of the core to a surface of the laminae in the radial or transverse direction;
- means for combining the plurality of laminae to form an integral segment; and
- means for attaching the integral segment to the comminution equipment.

4,946,111

**METHODS AND APPARATUS FOR WINDING STATORS FOR ELECTRIC MOTORS AND THE LIKE**

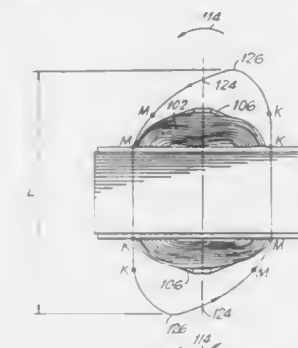
Sabatino Luciani, Sesto Fiorentino, and Massimo Ponzio, Gambassi Terme, both of Italy, assignors to AXIS USA, Inc., Peabody, Mass.

Filed May 18, 1989, Ser. No. 353,486

Int. Cl.<sup>5</sup> H02K 15/02

U.S. Cl. 242—1.1 R

16 Claims



1. Apparatus for winding a coil of wire on a pole of a stator having a central longitudinal axis and axially opposite end faces which are transverse to said longitudinal axis, said apparatus comprising:

- a needle having an end from which the wire to be wound on said pole is drawn; and
- means for causing said end of said needle (1) to reciprocate longitudinally through said stator along reciprocation strokes having axially spaced reciprocation stroke endpoints, each of said reciprocation stroke endpoints being outside of said stator adjacent a respective one of said end faces, and (2) to rotationally oscillate along oscillation

strokes disposed about said longitudinal axis, each oscillation stroke taking place substantially while said end of said needle is outside the stator adjacent each end face, and each oscillation stroke having rotationally spaced oscillation stroke endpoints and an oscillation stroke midpoint which is midway between said oscillation stroke endpoints, said means for causing comprising:

means for allowing relative adjustment of said reciprocation and oscillation strokes to that said oscillation stroke midpoints can be made noncoincident with said reciprocation stroke endpoints.

4,946,112

**WINDING APPARATUS**

Friedrich Nelle, Stuttgart; Heinz Lehner, Oberschnelling, and Klaus Nitzsche, Straubing, all of Fed. Rep. of Germany, assignors to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

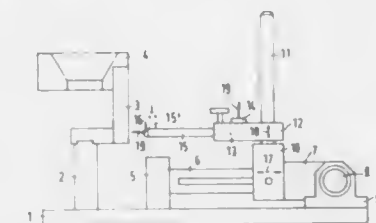
Filed Mar. 21, 1989, Ser. No. 326,296

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1986, 3635220

Int. Cl.<sup>5</sup> H01J 9/236

U.S. Cl. 242—7.14

3 Claims



1. An apparatus for winding a saddle coil on a coil form having a central axis and preformed grooves in which said coil is to be wound, said grooves being formed in both interior and exterior surfaces of said coil form, said apparatus comprising:

- a device for supporting the coil form;
- a wire guide tube having an axis disposed in a plane perpendicular to the central axis of the coil form and having a wire outlet disposed at an angle of about 90° from the axis of the wire guide tube and rotatable about the axis of the wire guide tube;
- means for rotating said wire outlet about the axis of the wire guide tube; and
- means for linearly moving said wire guide tube in three directions orthogonal to each other, one of said directions being parallel to the central axis of the coil form, and for operating in co-operation with the means for rotating said wire outlet so that the wire outlet moves along paths defined by said grooves, whereby any point in the space defined by the maximum linear movement of the outlet of the wire guide tube can be reached by the wire outlet, and the wire outlet is positionable adjacent to the coil form and movable along the contours of the turns to be wound in the grooves of the coil form.

4,946,113

**WIRE REEL CARRIER**

Charles E. Riffle, and Douglas Riffle, both of Rte. 1 Box 152, Cutler, Ohio 45724

Filed Mar. 9, 1989, Ser. No. 321,005

Int. Cl.<sup>5</sup> B65H 75/40; B60D 1/00

U.S. Cl. 242—86.5 R

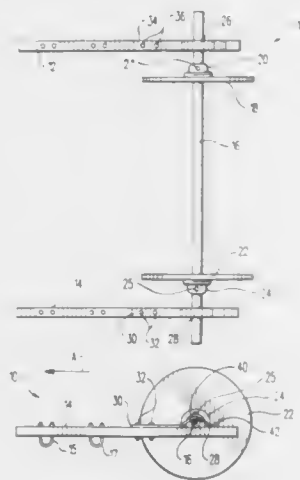
9 Claims

1. A wire reel carrier for attachment to a horizontal cargo rack of an ATV, comprising:

- a pair of spaced frame rails;
- clamping means for securing said frame rails in spaced parallel horizontal orientation on said cargo rack;
- an elongated rod adapted to rotatably mount a roll of wire, said rod extending transversely between said frame rail;

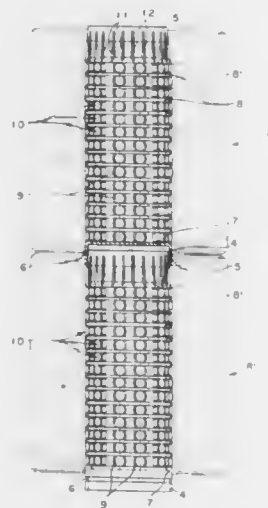


a pair of retaining plates, each having a central aperture received in said rod;  
a pair of collars on rod for retaining said plates in a desired orientation on said rod;  
and



safety latch means for securing said rod to said frame rails and for releasing said rod on exertion of an excess force on said rod by a wire being strung from a roll supported on said rod.

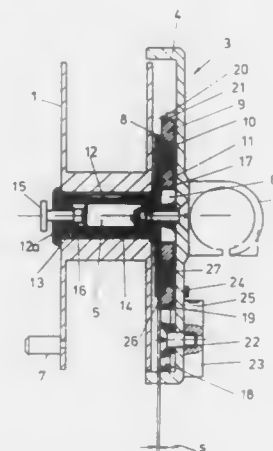
**4,946,114**  
**METHOD AND DYE TUBE FOR UNIFORM COMPRESSION OF YARN**  
Josef Becker, Hubert Becker, and Matthias Becker, all of Niederforstbächer Str. 80-84, D-5100 Aachen, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 299,755, Jan. 23, 1989, abandoned. This application Nov. 20, 1989, Ser. No. 438,808  
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801898; Aug. 18, 1988, 3828082  
Int. Cl.<sup>5</sup> B65H 75/18, 75/20, 75/24  
U.S. Cl. 242—118.1



1. The method for the compression of yarn rolls to achieve a substantially uniform yarn density said rolls having an initial yarn density adjacent the distal ends greater than the yarn density at the central portions comprising the steps of providing a series of yarn carriers adapted to be inserted into said

rolls, said carriers being characterized in that said carriers, when mounted in end to end engaging relation, are adapted to partially nest by a predetermined distance when subject to a first axial compressive force and to decrease uniformly in length when subjected in said nested condition to a second and greater axially compressive force, mounting a yarn roll to be compressed on each said carrier, thereafter placing a series of said yarn carriers in end to end relation to form a column of said carriers such that the spacing of the distal ends of adjacent said rolls is less than said predetermined distance, thereafter applying a first compressive force to the ends of the outermost said carriers of said column to thereby move said carriers to said partially nested position and to shift said yarn rolls toward each other by said predetermined distance, whereby the distal ends of adjacent said rolls are brought into contact with each other and said rolls are axially foreshortened by axial compressive forces exerted between adjacent said rolls, said foreshortening occurring preferentially in said central portion of said rolls, and thereafter applying a further compressive force to said carriers to axially foreshorten said yarn carriers and said yarn rolls to thereby compress the yarn substantially uniformly.

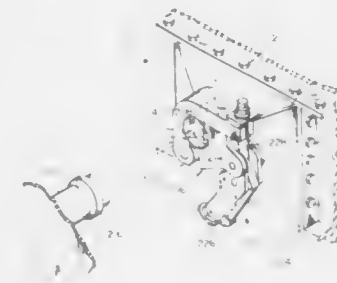
**4,946,115**  
**DEVICE FOR TAKING UP A LINE**  
Gerhard Müller, Kiefernweg 1, 8901 Stadtbergen 2, Fed. Rep. of Germany  
Filed Jun. 22, 1988, Ser. No. 209,914  
Int. Cl.<sup>5</sup> A01K 89/0155, 89/02  
U.S. Cl. 242—289



1. A device for taking up and paying out a line, comprising:  
a spool support having a cover-like housing;  
a spool arranged on said spool support and adapted to have the line wound and unwound therefrom, said spool being made of a non-magnetic material, said spool having an end face;  
a first central hollow shaft around which said spool is capable of being turned;  
a second shaft being mounted on said cover-like housing of said spool support, said first central hollow shaft being mounted on said second shaft on a side of said spool so as to be able to rotate and to slide axially;  
a braking device for braking said spool, at least in a pay-off direction, said braking device having at least one braking element, with a space existing between said braking element and said spool, said braking element being in the form of a flange mounted on said first central hollow shaft and fitting around the end face of said spool on a support side thereof, said braking element including means for preventing an axial shift of said spool relative to said first central hollow shaft, means for coupling said spool to said central shaft in the pay-off direction;

a counter-abutment adjacent said braking element, said braking element being capable of being applied against said counter-abutment;  
at least one magnet adapted to apply said braking element against said counter-abutment stationarily arranged in relation to said braking element of said braking device on said spool support; and,  
means for adjusting a distance between said at least one magnet and said braking element.

**4,946,116**  
**ENGINE MOUNT INCLUDING LATCH MECHANISM**  
John Vander Hoek, Bainbridge Island, Wash., assignor to The Boeing Company, Seattle, Wash.  
Filed Dec. 14, 1988, Ser. No. 285,053  
Int. Cl.<sup>5</sup> B64D 27/00  
U.S. Cl. 244—54

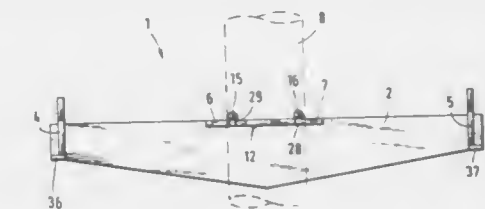


1. An improved engine mount for mounting an aircraft engine to the body of the aircraft, wherein the engine includes an engine pin adapted to be mounted to the body of the aircraft, said engine mount comprising:  
jaw means for defining an engine pin housing within which the engine pin may be positioned, said jaw means including a first jaw adapted to be fixedly mounted to the body of the aircraft and a second jaw adapted to be selectively engaged with said first jaw to define the engine pin housing;  
latching means for selectively latching said second jaw to said first jaw by providing a latching force therebetween, said latching means including a locking arm and a linking member for transferring the latching force to said first and second jaws, said linking member being pivotally coupled to said locking arm and said jaw means such that angular displacement of said linking member results in displacement of said locking arm to thereby provide the latching force;  
first and second locking members coupled to said linking member and said locking arm, respectively, said first and second locking members being positioned to be selectively engaged to thereby lock said latching means in the latched position; and  
plunger means for selectively disengaging said first and second locking members to allow said latching means to be disengaged.

**4,946,117**  
**MOUNTING CLIP FOR SUPPORTING PIPES IN UPRIGHT ORIENTATION**  
Gerhard Liesegang, Zeven, Fed. Rep. of Germany, assignor to Lisega GmbH, Fed. Rep. of Germany  
Filed May 15, 1989, Ser. No. 351,620  
Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817015  
Int. Cl.<sup>5</sup> F16L 3/00

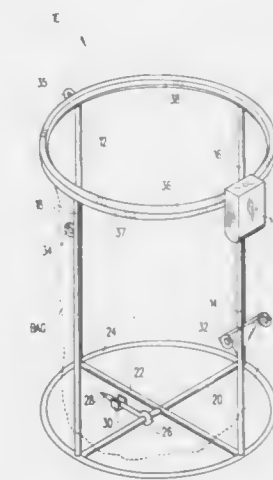
U.S. Cl. 248—65  
1. A clip for supporting pipes or the like in generally upright orientation comprising a pair of generally transversely spaced longitudinal plates each having opposite ends, a pair of gener-

ally longitudinally spaced transverse plates each spanning said longitudinal plates at the opposite ends thereof, means for securing said longitudinal and transverse plates to each other, a pair of carrier elements having cooperative means for supporting a pipe or the like therebetween in generally upright orientation, each of said carrier elements for longitudinal plates include cooperative intermeshed means bridgily intercon-



necting said carrier elements in generally transverse spanning relationship between said longitudinal plates, said carrier elements are positioned between said transverse plates and generally atop upper edges of said longitudinal plates, and said cooperative intermeshed means include an upwardly opening slot in an upper edge of each of said longitudinal plates upon which said carrier elements seat.

**4,946,118**  
**TRASH BAG RETAINER**  
Stanley V. Hastings, 2029 Lakeside Apt. #5, Moses Lake, Wash. 98837  
Filed Mar. 29, 1989, Ser. No. 330,168  
Int. Cl.<sup>5</sup> A63B 55/04  
U.S. Cl. 248—97



1. A trash bag retainer, comprising:  
a generally cylindrical wire frame having a bottom support ring and top support ring connected by vertical support members and a fixed upper support ring secured to said top support ring;  
a pair of intersecting perpendicular brace struts secured diametrically across said bottom support ring;  
a hinged clamping ring overlying said fixed upper support ring and pivotally connected to said top support ring by a hinge means;  
said hinge means being a counter weight having an apertured lobe mounted for pivotal movement on said top support ring, said counter weight having an upper end portion provided with a recess receiving a portion of said clamping ring in an open position during installation of a trash bag;

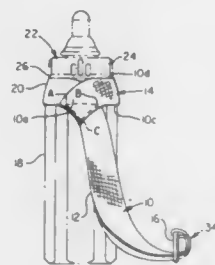
a ground insertion spike having a circular ring at one end received around one of said brace struts, said spike mounted for pivotal movement between operative and retracted positions on said bottom support ring for retaining said bag retainer in a selective location, and for lateral sliding movement along said brace strut;  
a clip mounted on the other of said brace struts for securing said spike in a retracted position;  
a first ring means on said frame for securing said frame to a stationary object;  
and  
second ring means on said frame for securing said clamping ring in a closed position.

4,946,119

**SECURITY SUPPORT FOR FEEDING BOTTLE**  
Thomas M. Hellhake, 2323 Adams, Quincy, Ill. 62301  
Filed Oct. 30, 1989, Ser. No. 437,523

Int. Cl.<sup>5</sup> A47B 15/00  
U.S. Cl. 248—102

3 Claims



1. A security support for an infant feeding bottle, comprising:
  - (a) an elastically deformable strap having an elongated body terminating in opposed end segments;
  - (b) a bottle-gripping loop formed by one end segment of said body which is attached back upon said body by stitching;
  - (c) a ring member stitched to the other end segment;
  - (d) said bottle-gripping loop as formed by said one end segment being extendable through said ring member;
  - (e) an adjustable loop for attaching said strap to a selected object; and,
  - (f) said adjustable loop defined by the extension of said bottle-gripping loop and an adjacent portion of said body through and beyond said ring member;
  - (g) said one end segment overlies said body whereby the marginal edges of said one end segment intersect the marginal edges of said body at four points; and,
  - (h) less than all of said points are stitched together,
  - (i) three of said intersecting points are stitched together.

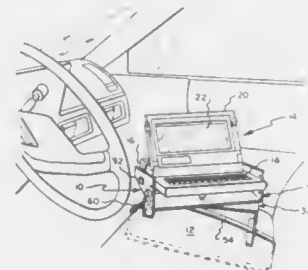
4,946,120  
SUPPORT

David O. Hatcher, Williamsville, N.Y., assignor to Posting Equipment Corporation, Buffalo, N.Y.  
Filed Aug. 9, 1988, Ser. No. 230,331  
Int. Cl.<sup>5</sup> F16M 11/00

U.S. Cl. 248—183 10 Claims  
10. A support capable of mounting a computer on a car seat, said support comprising:

a lower unit adapted to be positioned on a car seat, the lower unit including upper intermediate planar portion and a pair of front and rear opposed downwardly extending legs, one of said downwardly extending legs being provided with adjustable means so that the length of the one downwardly extending leg may be varied so that the upper intermediate planar portion of the lower unit may be disposed in a generally horizontal position;  
holding means in the form of a lower belt carried by the lower unit, the lower belt being adapted to be passed

around the car seat so that the ends of the lower belt may be secured together to hold the lower unit on the car seat; an upper unit which receives a computer, the upper unit including a lower intermediate planar portion and a pair of front and rear opposed upwardly extending legs;  
pivot means pivotally securing the lower intermediate portion of the upper unit to the upper intermediate planar portion of the lower unit for swiveling the upper unit with respect to the lower unit so that the computer carried by the upper unit may be properly angled about a vertical axis with respect to the operator;



a vertically adjustable fore and aft extending auxiliary support means carried by the front and rear opposed upwardly extending legs of the upper unit for adjustably supporting one edge of the computer in various positions of vertical adjustment so that the computer may be positioned for maximum ease of use and viewing; and  
second holding means in the form of an upper belt carried by the upper unit for securing the computer between the upwardly extending legs, the ends of the upper belt being secured to each other to hold the computer in place.

4,946,121

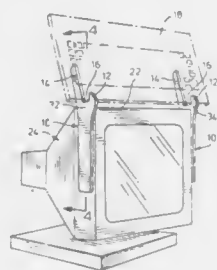
**COMPUTER KEYBOARD HOLDER**

Jamie T. Troke, 112 Humewood Drive, Belleville, Ontario K8N 4E7, Canada

Filed Jul. 20, 1989, Ser. No. 382,196  
Claims priority, application Canada, Jul. 21, 1988, 572,776  
Int. Cl.<sup>5</sup> F16M 11/00

U.S. Cl. 248—201

8 Claims



1. A holder for supporting a keyboard on a computer monitor, comprising:
  - two elongate body members having upper and lower ends;
  - means for attaching each body member to side surfaces of said monitor, with said upper ends extending above a top surface of the monitor;
  - each said upper end comprising a pair of fingers, a front finger and a rear finger, each pair of fingers defining a bight therebetween for reception of said keyboard;
  - the fingers being inclined upwardly and rearwardly relative to a longitudinal axis of a main part of each body member, said bights being inclined upwardly and rearwardly, the

rear finger of each pair extending a distance a number of times longer than the front finger of each pair.

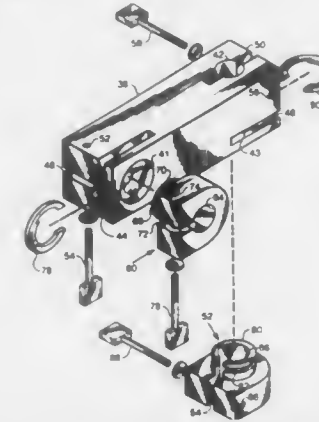
4,946,122

**POST CLAMP**

John K. Ramsey, Mansfield, and Erwin H. Meyn, Broadview Hts., both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.  
Filed Sep. 29, 1989, Ser. No. 414,816  
Int. Cl.<sup>5</sup> F16M 13/00

U.S. Cl. 248—229

14 Claims



1. Apparatus for positioning and clamping a pair of posts at right angles to each other comprising
  - a body member having a pair of offset passages extending therethrough at right angles to each other, each of said offset passages comprising a minor bore portion and a major bore portion,
  - a first clamp member having a first bore for receiving one of said posts,
  - means on said first clamp member for selectively gripping said one post thereby preventing movement of said one post relative to said first clamp member,
  - means for mounting said first clamp member for rotation in one of said major bore portions,
  - means on said body member for selectively gripping said one post thereby preventing movement of the same relative to said body member,
  - a second clamp member having a second bore for receiving the other of said posts,
  - means on said clamp member for selectively gripping said other post thereby preventing movement of said other post relative to said second clamp member,
  - means for mounting said second clamp member for rotation in the other of said major bore portions, and
  - means on said body member for selectively gripping said other post thereby preventing movement of the same relative to said body member.

4,946,123

**ROOF BRACKET**

Rino P. Albert, 53 Shademaster Ct., Scarborough, Ontario, Canada M1B 1Y5

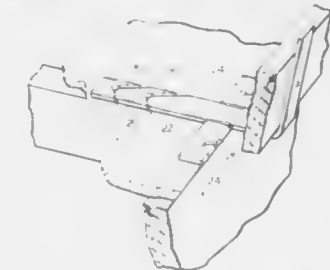
Filed Jul. 26, 1989, Ser. No. 385,082  
Claims priority, application Canada, Aug. 4, 1988, 573,852  
Int. Cl.<sup>5</sup> E04G 27/00

U.S. Cl. 248—237

6 Claims

1. Roofing device comprising:
  - flat metal arm adapted to be applied flatwise to a sloping roof to extend upwardly thereon,
  - a pair of flat cross members rigidly attached to said metal arm to be approximately coplanar therewith and extending perpendicularly thereto, on each side of said arm,
  - said metal arm including an extent located to extend downward beyond said cross member,
  - a support extending upwardly and perpendicular to said roof

from the lower end of said extent to support a wooden beam having its width dimension extending upwardly and outwardly and perpendicular to said roof in the desired orientation,



said device defining a relatively flat lower surface and a relatively flat upper surface, passages in said arm and cross member for nailing said device to said roof.

4,946,124

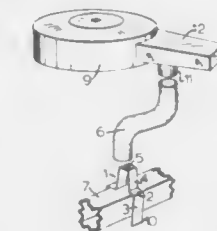
**SPRING CLAMP AND KIT TO SUPPLY HOT AIR TO CARBURETOR**

Marlin W. Peickert, North Oaks, and LeRoy A. Kuta, Mah-tomedi, both of Minn., assignors to Pollution Control Auto Parts, Inc., St. Paul, Minn.

Filed Nov. 25, 1988, Ser. No. 275,895  
Int. Cl.<sup>5</sup> A47B 96/06

U.S. Cl. 248—231.8

2 Claims



1. A clamp, to hold the mouth of an air duct against a pipe or similar object, made from a strap of spring steel, as illustrated and described in the specification, and characterized by the features: a head, a neck, shoulders, and arms; the head serving to maintain the width of the neck; the neck serving to insert into the throat of the duct and to hold it by spring expansion; the shoulders serving to adapt the clamp to the width of the pipe and to maintain the spring forces by deflection of the S bends which define the shoulders; and the arms serving to hold the pipe by spring contraction, which clamp is employed in combination with a malleable sheet metal cover having an aperture to accommodate the neck of the clamp and with which cover the arms of the clamp may be closed upon the pipe prior to the engagement of the duct upon the neck of the clamp and which cover may be bent to shroud the manifold.

4,946,125

**EYEGLASS HOLDER**

Allan McCarty, 1112 Pinehurst, Royal Oak, Mich. 48073  
Filed Jun. 26, 1989, Ser. No. 372,705

Int. Cl.<sup>5</sup> A47F 5/00

U.S. Cl. 248—316.7

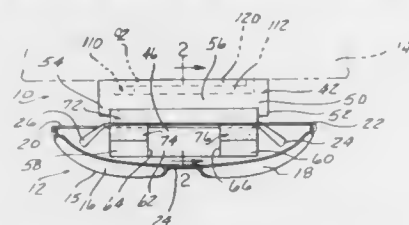
12 Claims

1. An article holder comprising:
  - a housing; and
  - resilient article support means, mounted within the housing and including first and second opposed surfaces disposed in substantial registry defining a deformably openable cavity therebetween for slidably and releasably receiving an article in contact therebetween;

wherein the housing comprises: a body having a first wall, a

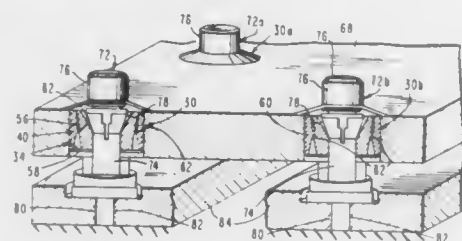


second wall spaced from the first wall, a third wall interconnecting one end of the first and second walls and an



open end opposed from the third wall and disposed between the other end of the first and second walls.

**4,946,126**  
**SELF-LOCKING FASTENERS AND IN ARTICLES SUPPORTED THEREBY**  
David A. Williams, Hawthorne, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed May 6, 1988, Ser. No. 190,919  
Int. Cl.<sup>5</sup> A47G 1/24  
U.S. Cl. 248—476 18 Claims

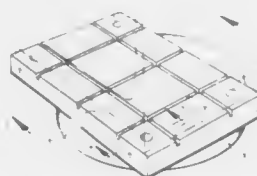


1. A self-locking fastener having a peripheral surface which is matable with a surface of an article, comprising:  
a first portion that supports the peripheral surface;  
a remaining portion coupled to said first portion; and  
means for enabling uniform locking of substantially the entire peripheral surface with the surface of the article including means for enabling movement of said first portion with respect to said remaining portion, said movement enabling means comprising  
joint means joining said first portion and said remaining portion, and  
means defining a tubular opening extending from said joint means and being positioned between said first portion and said remaining portion.

**4,946,127**  
**THEFT RESISTANT ROTATABLE MOUNT FOR COMPUTER CONSOLES AND THE LIKE**  
Mark Kulaga, Lombard, Ill., assignor to Ark International, Inc., Lisle, Ill.  
Filed Jan. 12, 1990, Ser. No. 464,527  
Int. Cl.<sup>5</sup> F16M 13/00  
U.S. Cl. 248—551 8 Claims

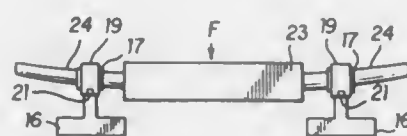
1. A theft-resistant mount for rotatably mounting an instrument on a stand comprising:  
a lower section adapted to be fixedly mounted on said stand, said lower base having a horizontal circular upper surface provided with a central recess;  
an upper section having a lower surface defined in part by a circular depending rim adapted to nest over said lower base section, said upper section having an upper surface adapted to receive said instrument;

said upper section having a rotatably mounted stud depending from its lower surface and adapted to enter said recess when said upper and lower sections are nested;  
said stud having a hole extending transversely through the stud;  
said lower section having a diametrical tubular passage intersecting said recess and registering with said hole in said stud when said upper and lower sections are nested;



an opening in said depending rim adapted to register with said passage; and  
an elongated locking pin adapted to enter said passage through said opening in said outer rim and to engage said hole in said stud, whereby separation of said upper and lower base sections is prevented without inhibiting relative rotation thereof.

**4,946,128**  
**HOMEOSTATIC LIFTING AND SHOCK-ABSORBING SUPPORT SYSTEM**  
John Cunningham, 35 Loughberry Rd., Saratoga Springs, N.Y. 12866  
Continuation-in-part of Ser. No. 47,330, May 8, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 236,787  
Int. Cl.<sup>5</sup> F16M 1/00  
U.S. Cl. 248—560 9 Claims



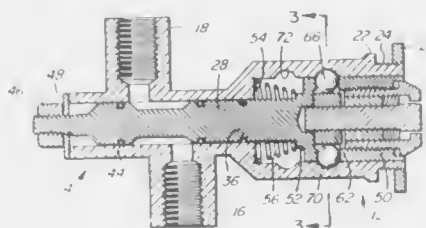
1. A shock-absorbing support structure for a load, comprising:  
at least two fixed bearing supports, each having a top portion;  
at least two load-bearing elongated kinestatic members having longitudinally sliding ends and also having midportions extending between the two fixed bearing supports, said kinestatic members being capable of bending from an original straight shape to assume an arcuate or bowed shape when the load is applied to the midportions of the kinestatic members intermediate the two fixed bearing supports and each kinestatic member returning to the original straight shape when the load is removed; and  
open channel means, formed along the top portion of each of the two fixed bearing supports, for slidably and frictionally engaging and supporting the kinestatic members at a distance spaced from said longitudinally sliding ends so that the longitudinally sliding ends move relative to the fixed bearing supports as a result of the bending of the kinestatic members when the load is applied to the midportions of the kinestatic members intermediate the bearing supports;  
wherein each of the kinestatic members is a composite including a rigidly flat central platform on which the load can rest, said platform having opposite end portions, with at least one flexible rod attached thereto.

**4,946,129**  
**EQUIPMENT HOUSING ASSEMBLIES**  
Frank E. Eastwick, Maidstone, England, assignor to GEC-Marconi Limited, England  
Filed Nov. 16, 1988, Ser. No. 272,718  
Claims priority, application United Kingdom, Nov. 18, 1987, 8727007  
Int. Cl.<sup>5</sup> F16M 13/00  
U.S. Cl. 248—680 10 Claims



7. A housing hold-down device comprising first and second parts adapted to be secured one to a housing and the other to a frame structure supporting the housing to exert a hold-down force on the housing when the housing is inserted into the frame structure by movement in a first direction with respect to said frame structure; said first part comprising a first portion adapted to be secured to one of said housing and frame structure and a second portion mounted on said first portion for spring biased movement with respect thereto in said first direction and having a planar surface having a first component of inclination at an angle to said first direction and a second component of inclination at an angle to a direction transverse to said first direction, and said second part being adapted to be secured to another one of said housing and frame structure and having a planar surface inclined so as to be in contacting parallel relationship with said planar surface of said first part with the two parts respectively secured to the housing and the frame structure and said housing inserted in the frame structure.

**4,946,130**  
**FLOW CONTROL DEVICE**  
Peter Kooiman, Box 352, Red Deer, Alberta, Canada T4N 5E9  
Filed Nov. 25, 1988, Ser. No. 276,897  
Claims priority, application Canada, Mar. 16, 1988, 561608  
Int. Cl.<sup>5</sup> F16K 31/00, 35/00, 31/44  
U.S. Cl. 251—95 2 Claims



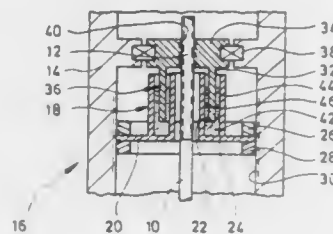
1. A flow control device for using in a fluid or gas line, comprising:  
(a) a housing having an operative end and a control end, and defining an interior passage that extends through the housing and communicates with interior portions of the operative end and the control end;  
(b) said housing defining an inlet port and an outlet port in said control end of said housing, with each of said ports

being in communication with the passage in interior portions of the control end of said housing to provide fluid or gaseous flow thereamong;  
(c) an operator controlled lockable valve assembly having opposed operative and control end regions thereof, and being movably carried within the passage of said housing for movement relative to the housing between an operative position and an inoperative position, with valve means at the control end region thereof and being located in said control end portion of said passage, and with locking means at the operative end region thereof and being located in said operative end portion of said passage;  
(d) said valve means of said assembly including a spool portion of reduced diameter and piston valve means on either side thereof;  
(e) said locking means including:  
(i) a key actuated lock cylinder and shaft concentrically located in said operative end region of said assembly;  
(ii) rotatable cam means on said shaft; and  
(iii) at least one movable locking member actuated by said cam means;  
(f) locking member receiving means in said housing for receiving said locking member:  
(i) for selectively retaining said assembly in said operative position to thereby establish communication among said ports and said passage to provide fluid or gaseous flow between said inlet port and said outlet port; and  
(ii) for selectively retaining said valve assembly in said inoperative position to thereby cause said piston valve means to close at least one of said inlet and outlet ports to close off communication among said ports and said passage;  
(g) means biasing said valve assembly to said operative position;  
(h) said housing including a first stop means and said valve means including a second stop means;  
(i) said cam means being initially rotatable to free only said movable locking member in either the open or closed positions for effective movement and alignment of said locking member with said locking member receiving means; and  
(j) said first and second stop means engaging one another for movement and alignment of said movable locking member with said locking member receiving means when said valve means is moved to a closed position.

**4,946,131**  
**ARRANGEMENT FOR DAMPING LINEAR MOVEMENTS**  
Manfred Weyand, Viersen, Fed. Rep. of Germany, assignor to Sempell AG, Fed. Rep. of Germany  
PCT No. PCT/EP88/00343, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/08936, PCT Pub. Date Nov. 17, 1988  
PCT Filed Apr. 22, 1988, Ser. No. 424,268  
Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715562  
Int. Cl.<sup>5</sup> F16F 9/30; F16K 47/00  
U.S. Cl. 251—48 8 Claims

1. An arrangement for damping linear movement for use on a safety valve, said safety valve including  
(a) a housing (14),  
a valve shaft (10) to be connected to a valve element to be damped,  
(c) an outer cup-shaped damping part (18) mounted within said housing (14),  
(d) a rotary inner cup-shaped damping part (36) located within said housing (14) and extending into said damping part (18) from above, the outer surface of said damping part (36) together with the inner surface of said damping part (18) defining a working gap in which a viscous medium (42) is located,  
(e) a movement-conversion transmission means (12, 38, 40)

for converting the linear movement of the valve shaft (10) into a rotary movement of said rotary inner damping part (36), and



(f) means for adjusting the axial relative positions of said damping part (18) and said rotary inner damping part (36) to thereby adjust the depth of immersion of the said rotary damping part (36) in said damping part (18) and to thereby control the dampening intensity for the valve element.

#### 4,946,132 MAGNET ARMATURE

Ferdinand Reiter, Markgroeningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

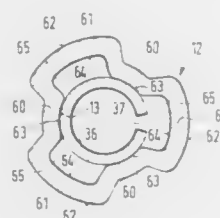
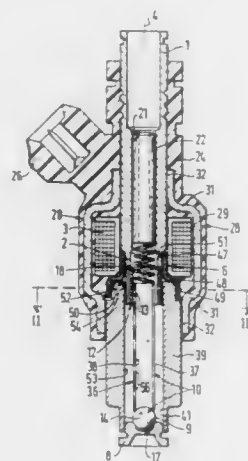
Filed Nov. 29, 1989, Ser. No. 442,814

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904447

Int. Cl.<sup>5</sup> F16K 31/06

U.S. Cl. 251—129.21

11 Claims



1. A hollow magnet armature for an electromagnetically activated fuel injection valve for fuel injector units in compressed-mixture, applied-ignition combustion engines, having at least one core surrounded by a magnet coil, said core facing said hollow magnet armature, a valve stem that extends in a direction of a valve seat joined to said hollow magnetic armature, said hollow magnet armature (12) having an undulating

profile including alternate valleys (60) and peaks (61) in at least one region (70) where it surrounds the valve stem (36, 14) said valleys (60) are in contact with the valve stem (36, 14) and said peaks (61) rise radially above said valleys to form axially oriented flow passages (65).

4,946,133

#### HEMOSTASIS VALVE

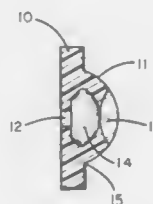
Wade M. Johnson, Minneapolis, and Edward A. Barlow, Bloomington, both of Minn., assignors to Schneider (U.S.A.) Inc., A Pfizer Co., Plymouth, Minn.

Filed Nov. 21, 1988, Ser. No. 274,479

Int. Cl.<sup>5</sup> F16L 37/28

U.S. Cl. 251—149.1

4 Claims



1. A hemostasis valve gasket comprising:

(a) a cylindrical base formed from a resilient material and having a central passage therethrough;

(b) a dome-shaped member projecting outwardly from said base, said dome-shaped member having an internal hollow chamber in communication with said central passage of the cylindrical base; and

(c) at least one arcuate slit formed in the external surface of said dome-shaped member and extending inwardly toward said hollow chamber to meet along a common tangent for forming a central, self-sealing passage between said internal chamber and said slit so that an implement can be passed through the central passage of the base, through the internal chamber and out through said self-sealing passage with said cylindrical base and said dome-shaped member forming a seal around said implement when it is present and to allow closure of the self-sealing passage when no implement is present.

4,946,134

#### PAIR OF COOPERATING DISKS TO CONTROL THE DELIVERY OF LIQUID IN SO-CALLED "SCREW" VALVES

Alessio Orlandi, Castiglione D/Stiviere, Italy, assignor to Galatron S.r.l., Castiglione D/Stiviere, Italy

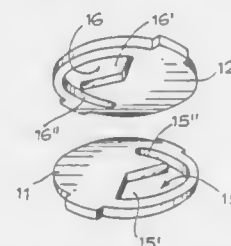
Filed Nov. 30, 1989, Ser. No. 443,934

Claims priority, application Italy, Dec. 2, 1988, 7117/88[U]

Int. Cl.<sup>5</sup> F16K 5/08

U.S. Cl. 251—208

3 Claims



1. A pair of superimposed ceramic disks for faucet valves, comprising: a fixed disk having a fixed disk opening passing through the fixed disk with a first arcuate wall cooperating with a second arcuate wall spaced a substantially constant distance from said first arcuate wall to define a slot opening portion having a substantially constant width and cooperating

with opposite walls to define an angular segment opening portion, the fixed disk segment opening portion and the fixed disk slot opening portion being contiguous; a movable disk having an opening passing through the movable disk with a first arcuate wall cooperating with a second arcuate wall spaced a substantially constant distance from said movable disk first arcuate wall to define a slot opening portion having a substantially constant width and cooperating with opposite walls to define an angular segment opening portion, the movable disk segment opening portion being contiguous with the movable disk slot opening portion; said movable disk being superimposed on said fixed disk with said movable disk slot opening portion lying adjacent said fixed disk slot opening portion such that rotation of said movable disk results first in superposition of said movable disk slot opening portion and said fixed disk slot opening portion and further movement of said movable disk results in superposition of said movable-disk segment opening portion and said fixed disk segment opening portion thereby first establishing a small amount of flow through said slot opening portions and gradually increasing any flow of delivered liquid as said segment openings are brought into coincidence with the flow of liquid reaching a maximum when the two segment openings are coinciding.

4,946,135

#### STRUCTURE OF WATER TAP

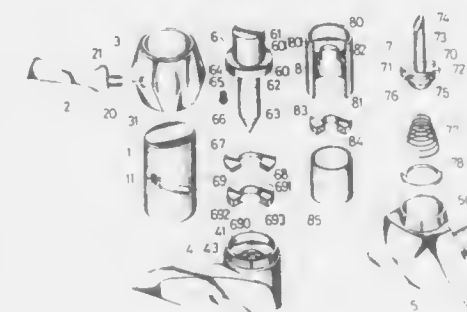
Shun-Ching Yang, No. 202-20, Hou Pi Village, Jen Te Country, Tainan Hsien, Taiwan

Filed Jan. 8, 1990, Ser. No. 461,907

Int. Cl.<sup>5</sup> F16K 31/528

U.S. Cl. 251—253

8 Claims



1. A water tap, including:

a upper cap having internally a hollow cylinder and comprising an oblique track piercing through its wall surface; a socket mounted on said upper cap and comprising a trough-hole on its wall surface;

a pressure rod comprising a projecting collar which defines therewith a circular upper end and a lower portion, said upper end being received in said hollow cylinder of said upper cap, said lower portion having a cone shaped bottom end;

a handle comprising a round rod which extends from the bottom end thereof, said round rod being inserted from said through-hole of said socket into said oblique track of said upper cap and firmly secured to said pressure rod;

a cylindrical body firmly secured to said upper cap at its bottom and comprising therein an upper circular recess hole for the setting therein of a rubber seal ring and a plastic washer, a lower circular recess hole for the insertion therein of said lower portion of said pressure rod, and having an unitary water discharging pipe extending outwardly therefrom for the discharging of water;

a valve seat having generally a hollow body comprising internally a division board defining therewith an upper circular recess and a lower circular recess;

a valve element comprising a pillar having a top slant face, a projecting collar, and a cap-like bottom end having a

circular groove thereon for the connection thereto of a conical spring, said pillar having a rubber water seal mounted thereon, said rubber water seal having its bottom surface tightly in contact with the upper surface of the projecting collar of said valve element and its upper surface tightly in contact with the bottom surface of said division board of said valve seat said conical spring and said cap-like bottom end being set in said upper trough of said base to releasably seal said water inlet;

a metal ring set in said lower circular recess of said valve seat for receiving said valve element, said metal ring being designed in such a size that its outer wall surface can be firmly in contact with the inner wall surface of said lower circular recess of said valve seat when it is set therein; and a base comprising therein an upper trough for the setting therein of a rubber washer and said valve seat, and a water inlet communicating with said upper trough;

wherein the moving of said handle in said oblique track determines the spirally upward or downward moving range of said pressure rod as said cone shaped end abuts against said slant face to directly control the tilting angle of deviation of the valve element so as to further control the quantity of water which flows out of said water discharging pipe.

4,946,136

#### SHAMPOO COMPOSITIONS AND OTHER MILD WASHING PRODUCTS CONTAINING TWO AMPHOTERIC AND ANIONIC SURFACTANTS

Eric G. Fishlock-Lomax, Chipping Warden, England, assignor to Amphoterics International Limited, Leamington Spa, United Kingdom

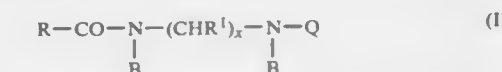
Continuation-in-part of Ser. No. 10,964, Feb. 4, 1987, abandoned, Continuation of Ser. No. 727,081, Apr. 25, 1985, abandoned. This application Apr. 29, 1988, Ser. No. 187,926 Claims priority, application United Kingdom, Apr. 25, 1984, 8410403

Int. Cl.<sup>5</sup> A61K 7/075, 7/50; C11D 1/88, 1/94

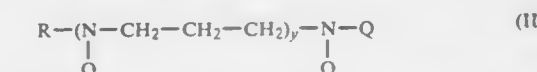
U.S. Cl. 252—546

3 Claims

1. A shampoo composition or other mild washing product which contains (a) at least one amphoteric surfactant of formula (I) and (b) at least one amphoteric surfactant of formula (II) together with (c) at least one anionic surfactant; said composition containing 5–50% of one or more surfactants of formula (I), 1–50% of one or more surfactants of formula (II) and 1–50% of one or more anionic surfactants (by weight of the total composition); said formula (I) being:



in which for formula (I) R is a C<sub>8–20</sub> hydrocarbyl group, optionally substituted by hydroxy; R<sup>1</sup> is H or C<sub>1–6</sub> alkyl; B is H, C<sub>1–6</sub> alkyl, optionally substituted by hydroxy or amino, or a group Q; Q is a group —R<sup>3</sup>COOM where R<sup>3</sup> is a C<sub>1–6</sub> alkylene group and M is —H or an alkali metal, alkaline earth metal, ammonium or hydroxy ethyl-substituted ammonium ion; and x is 2 to 6; formula (II) being:



in which for formula (II) R is a C<sub>12–20</sub> alkyl group; Q is —CH<sub>2</sub>COOM or —CH<sub>2</sub>CH<sub>2</sub>COOM; M is —H or an alkali metal, alkaline earth metal, ammonium or hydroxy ethyl-substituted ammonium ion; and y is 2 or 3.



4,946,137

**WIRE FEEDING TOOL**

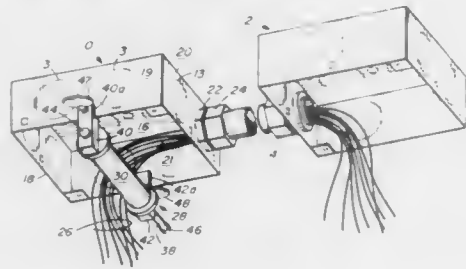
Thomas Adamczek, 13N654 Gunpowder La., Elgin, Ill. 60123

Filed Sep. 21, 1989, Ser. No. 410,483

Int. Cl.<sup>5</sup> E21C 29/16

U.S. Cl. 254—134.3 FT

2 Claims



1. A wire feeding tool for attachment to an electric junction box having a first pair of upstanding, mutually parallel side walls and a second pair of upstanding mutually parallel side walls which are perpendicular to said first side walls, a tubular conduit being affixed to one of said first walls over an aperture therein, comprising in combination

first and second mounting brackets each having a slot for receiving a distal edge portion of a respective one of said second walls, said slots having a thickness dimension greater than the thickness of said second walls, an elongate axle mounted to said mounting brackets with the longitudinal axis of said axle lying perpendicular to said second walls when said second side walls are received in said slots of said first and second mounting brackets, whereby said axle is parallel to said first walls, an elongate roller mounted on said axle for free rotation and extending perpendicular to said second side walls when said second side walls are received in said slots in said first and second mounting brackets, said roller having a length less than the distance between said second side walls, the end portions of said roller being disposed in proximity to the inner sides of said second side walls when said second side walls are received in said slots, and means for locking said brackets to said second side walls.

4,946,138

**ROUNDWOOD HIGHWAY GUARDRAILS**

Christian Gaillard, and Thierry Papineschi, both of Beziers, France, assignors to Compagnie Francaise des Etablissements Gaillard, Beziers, France

Filed Nov. 22, 1988, Ser. No. 275,148

Claims priority, application France, Nov. 27, 1987, 87 16682

Int. Cl.<sup>5</sup> A01K 3/00

U.S. Cl. 256—13.1

9 Claims



1. A road safety guardrail comprising vertical wood posts carrying at least one horizontal rail made up of wood logs, said logs having a vertical and an horizontal diametrical plane, said

logs being interconnected end to end by pairs of metal straps, said straps being interconnected by bolts, wherein each log interconnection includes a pair of vertical metal rods associated with at least one of its bolts, with said rods being symmetrically disposed about the vertical diametrical plane of said logs, each of said bolts passing through each pair of straps and one of said logs, said bolts lying in said horizontal diametrical plane of the logs, said metal rods being further incorporated in each log reinforcing each connection between two logs, said metal rods being vertical and perpendicular to said horizontal diametrical plane, each of said metal rods passing through the log and being placed in the immediate proximity of one of said bolts, on the same side (s) of said bolt as the closest join between two logs, said rods intersecting said horizontal diametrical plane of the logs in which said bolts are lying and having two ends which are received in recesses formed in the log to prevent them from projecting outside the log.

4,946,139

**OBSTACLE FOR EQUESTRIAN SPORTS, MADE UP OF MODULAR ELEMENTS OF SIMPLE AND RAPID ASSEMBLY, FOR INSTALLATION ON THE EQUESTRIAN FIELD**

Garzia D. Tomellini, Via Caetana, 13, Rome, Italy

Filed Jul. 19, 1989, Ser. No. 381,962

Int. Cl.<sup>5</sup> E04H 17/14

U.S. Cl. 256—64

12 Claims



1. An obstacle for equestrian purposes which is easily assembled in an equestrian ring, comprising:

a first and a second upright support spaced apart from one another; the first upright support having an inner and an outer spaced apart upright member, the members being substantially parallel to each other, each upright member having a top, a midpoint and a bottom; a first horizontal supporting member connecting the upright supporting members at the tops thereof, a second horizontal supporting member connecting the midpoints of the upright supporting members; a base support member perpendicularly connected to bottom of each upright member such that the base supporting members are substantially parallel to one another, at least one base horizontal supporting member connecting the base support members, such that the first upright support is stable and self supporting; a bar support on the inner upright support member, the bar support being adjustably mounted to be movable between the top and the bottom of the inner upright support member; the second upright support being substantially identical to the first upright support and disposed such that the respective bar supports are facing one another; and a bar removably disposed on the bar supports on the first and the second upright supports and extending therebetween.

4,946,140

**SYSTEM FOR AUTOMATICALLY FEEDING CHEMICAL LIQUIDS TO COOLING TOWERS**

Kunihito Kajihara, Yokohama, Japan, assignor to Michio Toyomasu, Kawasaki, Japan

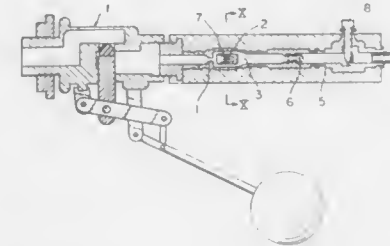
Filed Apr. 19, 1989, Ser. No. 340,464

Claims priority, application Japan, Apr. 21, 1988, 63-52741

Int. Cl.<sup>5</sup> B01F 3/04

U.S. Cl. 261—18.1

4 Claims



1. A system for automatically feeding a chemical liquid to a cooling tower comprising:

a water reservoir for storing water circulating through the cooling tower; a water feeding pipe extending into said water reservoir; a float valve provided at a portion of said water feeding pipe, which is actuated in response to a variation in a water level in said water reservoir to open or close a passage within said water feeding pipe; a means for increasing the flow rate of water flowing through said water feeding pipe to inject water from a discharge port at the time when said float valve opens said passage, said means for increasing the flow rate being enclosed within said water feeding pipe and located downstream from said passage; a negative pressure generating chamber enclosed within said water feeding pipe and located in the vicinity of said discharge port, wherein negative pressure is generated in said negative pressure generating chamber by said injection of water from the discharge port; and a chemical liquid pipe in communication with said negative pressure generating chamber; a chemical liquid in said chemical liquid pipe being injected with water from said discharge port after passing through said negative pressure generating chamber under the action of a negative pressure generated in said negative pressure generating chamber.

4,946,141

**METAL PROCESSING CONVERTER**

Robert Vatan, Saint-Chamond, France, assignor to CLECIM, Cergy Pontoise, France

Filed Feb. 21, 1989, Ser. No. 312,843

Claims priority, application France, Feb. 19, 1988, 88 02037

Int. Cl.<sup>5</sup> C21C 5/50

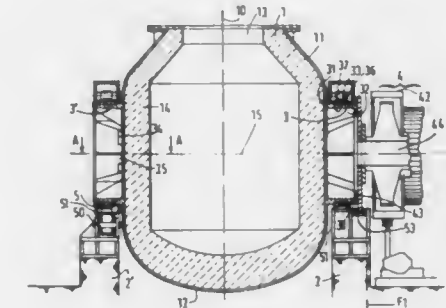
U.S. Cl. 266—246

14 Claims

1. Converter comprising (a) an elongated vessel; (b) two raised fixed supports respectively located on either side of said vessel; (c) two means for rotatably supporting said vessel bearing respectively on said fixed supports, said rotatably supporting means being located diametrically opposite each other and centered on a same transverse axis perpendicular to an axis of said vessel; (d) means for effecting tilting of said vessel about said transverse axis; (e) each of said two means for rotatably supporting said vessel comprising a circular collar centered on said trans-

verse axis and forming an integral part of said vessel fixed directly on a side-wall of said vessel;

(f) each said collar being provided on a side thereof facing said vessel with a plurality of openings regularly distributed around said transverse axis and respectively defining between them a plurality of strips having inner ends facing



said vessel; said inner ends being directly fixed onto said side-wall of said vessel;

(g) the diameter of each said collar and the size and number of said openings being so determined that said collar is joined to said side-wall over a length sufficient for withstanding flexural, compressive and shearing forces and permitting deformations of said vessel.

4,946,142

**PIVOTING DEVICE FOR LADLES**

Robert Vatan, Saint Chamond, France, assignor to CLECIM, Courbevoie Cedex, France

PCT No. PCT/FR88/00006, § 371 Date Sep. 6, 1988, § 102(e) Date Sep. 6, 1988, PCT Pub. No. WO88/04969, PCT Pub. Date Jul. 14, 1988

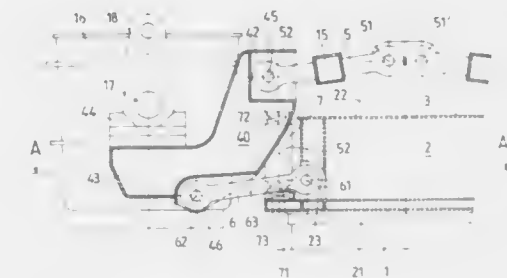
PCT Filed Jan. 5, 1988, Ser. No. 261,964

Claims priority, application France, Jan. 6, 1987, 87 00056

Int. Cl.<sup>5</sup> B22D 41/00

U.S. Cl. 266—276

10 Claims



1. A ladle turntable comprising (a) a stationary base; (b) a barrel rotatably mounted on said base; (c) at least one arm extending in an overhung manner from said barrel; (d) means for rotating said barrel with said at least one arm about a vertical axis; (e) at least one lifting jack for lifting said at least one arm; (f) said at least one arm being composed of an articulated assembly in the form of a deformable parallelogram comprising two supporting stays spaced from one another to enable insertion of a ladle between them; (g) said supporting stays each having a free outer end provided with bearing members for supporting said ladle; (h) said supporting stays being rigidly fastened to a transverse frame extending horizontally and passing exteriorly

of said ladle between said ladle and said barrel, that stays forming with said transverse frame a rigid fork-shaped supporting chair in which said ladle is nested;

- (i) said supporting chair being connected to said barrel by upper and lower parallel connecting rods respectively connected to said stays by means of joints defining two respectively upper and lower moveable axes and to said barrel by means of joints defining two respectively upper and lower stationary axes, said two moveable axis and said two stationary axes of articulation constituting vertices of said deformable parallelogram;
- (j) said supporting chair bearing directly on said at least one lifting jack, said lifting jack being interposed between said barrel and said transverse frame.

#### 4,946,143 GAS SPRING

Hans J. Bauer; Hans-Peter Bauer, both of Altdorf, Fed. Rep. of Germany, and Mario Antoniani, Collegno, Italy, assignors to Fritz Bauer & Sohne oHG, Altdorf, Fed. Rep. of Germany  
Filed May 4, 1989, Ser. No. 347,296

Claims priority, application Fed. Rep. of Germany, May 26, 1988, 3817776

Int. Cl.<sup>5</sup> F16F 9/02

U.S. Cl. 267—64.11

27 Claims



1. A gas spring with a tubular housing (1) closed at one end (2) and having an inner space (8) filled with compressed gas and a piston rod (4) brought out of another end (3) of the housing (1) which piston rod is provided at an end situated in the housing (1) with a piston (6) for lateral support relative to an inner wall (7) of the housing (1), which rod, at the other end of the housing (1) is guided in a guide bush (11, 11') and, in the direction of a central longitudinal axis (5), can be moved between a position substantially pushed into the housing (1) and a position substantially extended out of the housing (1), against which a seal (15) made of an elastic sealing material rests sealingly, wherein the piston rod (4) has a tapering (23) which, in the pushed-in position of the piston rod (4), cooperates with the seal (15) wherein the seal (15) is designed radially resilient supporting ring (13, 13'), and, wherein said seal (15) prevents gas passage between said seal (15) and said piston rod (4) at all positions of said piston rod (4).

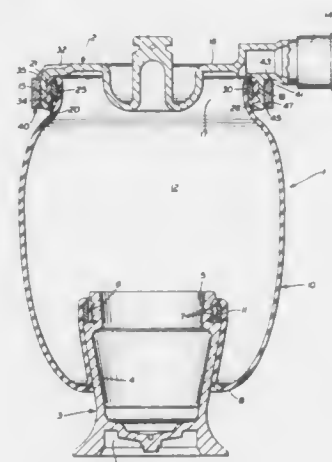
#### 4,946,144

EXTERNAL CLAMPING BAND FOR AIR SPRING  
Wayne H. Geno, Cicero, and Kelth E. Hoffman, Atlanta, both of Ind., assignors to Bridgestone/Firestone, Inc., Akron, Ohio  
Filed Mar. 30, 1989, Ser. No. 330,673

Int. Cl.<sup>5</sup> F16F 9/04

U.S. Cl. 267—64.27

15 Claims



1. An air spring including an end cap for mounting the air spring on a structure; a piston member located in a spaced relationship from the end cap; a flexible sleeve; a fluid pressure chamber formed between the end cap and the piston member by the flexible sleeve sealingly connected at opposite ends thereof to the end cap and piston member; an annular sealing ring located within an open end of the end cap placing an end of the flexible sleeve in a state of compression against an annular sealing surface formed on an interior surface of an annular sidewall of the end cap to form a generally air-tight seal; and annular clamping band concentrically engaged with an outer annular surface of the annular sidewall of the end cap to restrict outward movement of said sidewall and subsequent loosening of the interior seal between the flexible sleeve and sealing ring, said band having inner and outer circumferential surfaces and a pair of opposed end surfaces with at least one of said end surfaces being connected to the inner circumferential surface by a tapered surface to facilitate the placement of the band about the sidewall of the end cap; and projection means formed on the end cap for restraining axial movement of the clamping band along the annular sidewall of end cap in first axial direction.

#### 4,946,145

AIR SUSPENSION DEVICE FOR VEHICLE SEAT  
Susumu Kurabe, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 400,225

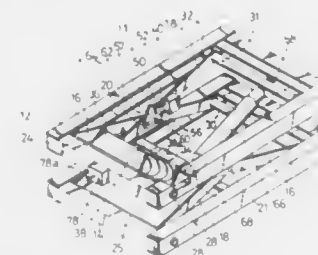
Int. Cl.<sup>5</sup> F16F 5/00; B60N 2/52

U.S. Cl. 267—131

9 Claims

1. An air suspension device for a vehicle seat, in which said seat includes a seat cushion, comprising:  
an upper frame on which said seat cushion is mounted;  
a lower frame fixed on a floor of said vehicle;  
an X-shaped link provided between said upper and lower frames, said X-shaped being expandable and contractible vertically;  
an air spring interposed between said upper and lower frames;  
an air supply source adapted to supply a compressed air into said air spring;  
a control valve disposed between said air spring and air supply source, said control valve being adapted to control

supply and exhaust of said compressed air into and from said air spring;  
a manual control valve disposed between said air supply source and said control valve;



a check valve disposed between said manual control valve and air spring in a parallel relation with said control valve, said check valve being adapted to permit flow of said compressed air in a sole direction from said air spring towards said manual control valve.

#### 4,946,147

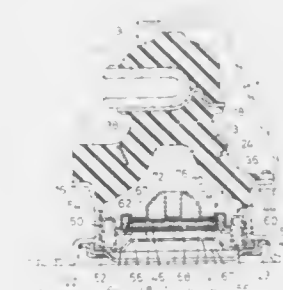
FLUID-FILLED ELASTIC MOUNTING STRUCTURE HAVING ORIFICES  
Rentaro Kato, Kasugai; Ryonji Kanda, Komaki, and Kiyohiko Yoshida, Kasugai, all of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan

Filed Mar. 13, 1989, Ser. No. 322,126

Claims priority, application Japan, Mar. 19, 1988, 63-66777  
Int. Cl.<sup>5</sup> B60G 15/04

U.S. Cl. 267—140.1

11 Claims



4,946,146  
HOLDING DEVICE, IN PARTICULAR, FOR TOOLS OR WORKPIECES FOR INDUSTRIAL ROBOTS  
Michael Hoepf, Stuttgart, Fed. Rep. of Germany, assignor to C & E Fein GmbH & Co., Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE88/00191, § 371 Date Nov. 21, 1988, § 102(e)  
Date Nov. 21, 1988, PCT Pub. No. WO88/07440, PCT Pub. Date Oct. 6, 1988

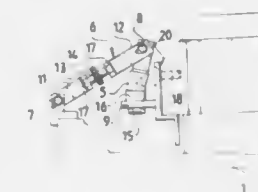
PCT Filed Mar. 25, 1988, Ser. No. 276,444

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710381

Int. Cl.<sup>5</sup> F16F 1/52

U.S. Cl. 267—137

17 Claims



1. Holding device for a tool, comprising:  
a holder;  
a receiving part for said tool;  
a guide means connected with said holder and said receiving part and allowing said receiving part linear and/or rotary motion with respect to said holder;  
a damping element arranged so as to be structurally separate from said guide means;  
said damping element being designed to maintain said receiving part in a distinct middle position with respect to said holder and being arranged between said receiving part and said holder such that during motion of the receiving part away from said distinct position deflection forces acting on said damping element are exertable essentially perpendicular to the direction of tension.

1. A fluid-filled elastic mounting structure including (a) a first and second support member which are opposed to and spaced apart from each other in a load-receiving direction in which a vibrational load is applied to the mounting structure, (b) an elastic body interposed between the first and second support members, for elastically connecting the first and second support members, (c) a closure member which has a flexible portion and which is secured to the second support member, so as to cooperate with the elastic body to define therebetween a fluid chamber filled with a non-compressible fluid, (d) a partition assembly disposed within the fluid chamber, so as to divide the fluid chamber into a pressure-receiving chamber on the side of the elastic body, and an equilibrium chamber on the side of the closure member, and (e) first-orifice defining means for defining a first orifice for fluid communication between the pressure-receiving chamber and the equilibrium chamber, wherein the improvement comprises:

- said partition assembly including an opening formed in a central portion thereof, such that the pressure-receiving chamber and the equilibrium chamber communicate with each other through the opening;  
a first and a second movable member disposed within the opening of the partition assembly, such that the first and second movable members are spaced apart from each other by a suitable distance in the load-receiving direction of the mounting structure, and cooperate with each other to define an intermediate fluid chamber, one of said first and second movable members being movable in said load-receiving direction over a first distance while the other of said movable members is movable in said load-receiving direction over a second distance larger than said first distance; and  
second orifice-defining means for defining a second orifice for fluid communication of the intermediate fluid chamber with one of the pressure-receiving and equilibrium chambers which corresponds to said one movable member, said second orifice-defining means including said one movable member, and an orifice-defining member movable with said one movable member.



**4,946,148**  
**LEAF SPRING FOR SUPPORTING REELS OF A VIDEO**  
**TAPE CASSETTE**

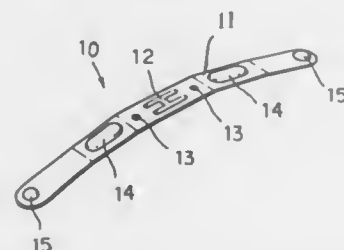
In J. Kim, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd.,  
 Seoul, Rep. of Korea

Filed Aug. 24, 1989, Ser. No. 397,966

Int. Cl.<sup>5</sup> G11B 23/08

U.S. Cl. 267—158

3 Claims



1. A leaf spring for use in a video tape cassette which comprises:

- a plate body having a substantially narrow and uniform width,
- a tension supporting recess disposed at the center portion of said plate body,
- a pair of tension retaining protrusions disposed on either side of said tension supporting recess, and
- a pair of pivoting protrusions disposed at both ends of said plate body and adapted to receive pivots of supply and take-up reels of the video tape cassette reels, whereby the leaf spring for supporting the supply and take-up reels prevents a tape from badly travelling and reduces waste pieces from cutting materials.

**4,946,149**  
**PROGRAMMABLE BED FOR MACHINE TOOLS AND**  
**THE LIKE**

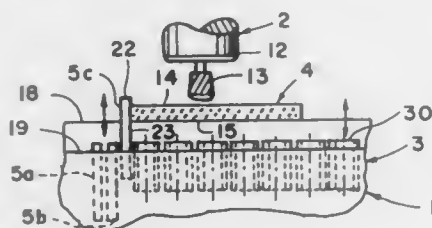
David G. Greene, Arden, N.C., assignor to Steelcase, Inc., Grand Rapids, Mich.

Continuation of Ser. No. 128,493, Dec. 3, 1987, Pat. No. 4,880,218. This application Sep. 15, 1989, Ser. No. 407,534

Int. Cl.<sup>5</sup> B25B 11/00

U.S. Cl. 269—21

13 Claims



1. A programmable bed for machine tools and the like, comprising:

- a platen having a support surface adapted to uphold a variety of differently sized workpieces thereon adjacent an associated machine tool;
- means for selectively retaining each of the differently sized workpieces on the support surface of said platen at a preselected position to coordinate with the associated machine tool, including:
- first and second retractable stops mounted in said platen, and arranged in opposite angular orientations so as to locate the workpieces both longitudinally and laterally with respect to the associated machine tool; said first and second stops each having a retracted position wherein said stop is disposed below the support surface

of said platen to permit the workpieces to move thereover, and an extended position wherein at least a portion of said stop is disposed above the support surface of said platen to abut an associated one of the workpieces, and thereby locate the same at the preselected position on the work surface of said platen;

means for selectively and individually shifting said first and second stops between the extended and retracted positions in response to identification of one of the differently sized workpieces to be machined, whereby the differently sized workpieces can each be automatically indexed at their preselected position on the work surface of said platen to facilitate machining.

**4,946,150**  
**METHOD AND FABRIC LAYING MACHINE FOR EXACT**  
**POSITIONING OF A LEADING EDGE OF A FABRIC WEB**

Rolf Jung, Waiblingen, Fed. Rep. of Germany, assignor to Krauss u. Reichert GmbH & Co., Stuttgart, Fed. Rep. of Germany

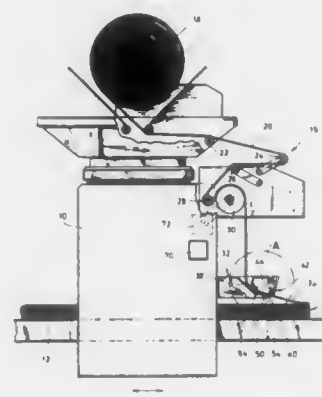
Filed Dec. 19, 1988, Ser. No. 286,423

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744036

Int. Cl.<sup>5</sup> B65H 29/46

U.S. Cl. 270—31

13 Claims



1. A method of exactly positioning a transverse leading edge of a fabric web extending transversely to a longitudinal spreading direction of said fabric web in a fabric web guide of a fabric spreading machine at a starting line, comprising the following steps:

- (a) the fabric web is moved forward with its leading edge in the direction of spreading up to the starting line,
- (b) the leading edge is then detected and the fabric web slowed down and stopped,
- (c) after stopping it is determined whether or not the leading edge coincides with the starting line,
- (d) when the leading edge coincides with the starting line the positioning is finished,
- (e) when the leading edge does not coincide with the starting line the fabric web is withdrawn contrary to the direction of spreading until the leading edge is located at a predetermined distance behind the starting line and then the fabric web is moved forward again in the direction of spreading up to the starting line, whereupon at least steps (b) and (c) are performed again.

**4,946,151**  
**COMBINED FOLDED SUBSTRATE TRANSFER AND**  
**SPEED MATCHING APPARATUS**

Oskar Liebert, Neuss, Fed. Rep. of Germany, assignor to MAN Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

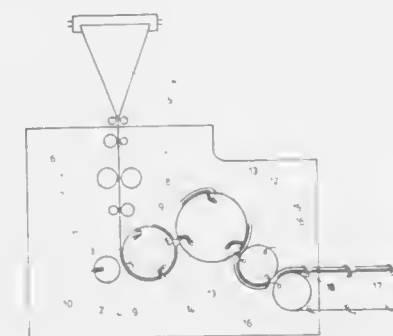
Filed Sep. 29, 1988, Ser. No. 251,541

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735303

Int. Cl.<sup>5</sup> B42C 1/00

U.S. Cl. 270—47

20 Claims



1. Combined folded substrate transfer and speed matching system, for foled substrate sheets, wherein said sheets are received at a first speed and positively delivered and removed at a second speed differing from said first speed, comprising means (12) for supplying the folded sheets at a first speed; means (17, 18) for removing the folded sheets at a second speed; a transfer cylinder (15) transferring the sheets from said supply means (12) to said removal means (17, 18); grippers (16) located on the transfer cylinder for gripping the folded substrate sheets; and a drive system for rotating the transfer cylinder, said drive system (24, 27) rotating the transfer cylinder (15) at a circumferentially non-uniform speed in which, at the time of receiving of the folded sheets by the grippers (16) of said transfer cylinder and transfer of the sheets thereof, the transfer cylinder is rotating at a speed which is essentially synchronous with said first speed and, at the time of delivery to and positive transfer of the folded sheets from the grippers of said transfer cylinder, the transfer cylinder is rotating at a speed which is essentially synchronous with said second speed of the sheet removal means to provide for positive transfer of the sheets from said grippers (16) on the transfer cylinder (15) to said sheet removal means (17, 18) at predetermined positions thereon.

**4,946,152**  
**SORTER-FINISHER**  
 Takuma Ishikawa; Kuniaki Ishiguro; Toshio Matsui, all of Osaka, and Kazuhito Ozawa, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 1, 1988, Ser. No. 239,290

Claims priority, application Japan, Sep. 4, 1987, 62-222368

Int. Cl.<sup>5</sup> B42B 1/02

U.S. Cl. 270—53

4 Claims

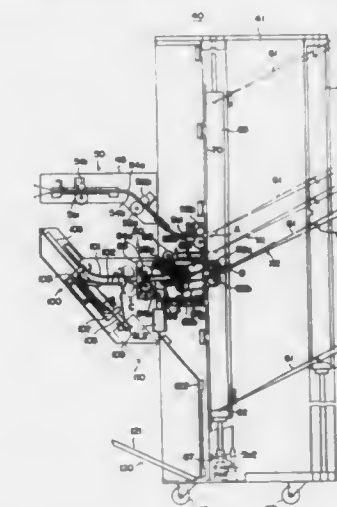
1. A sorter-finisher attachable to an image forming apparatus, comprising:

- a guiding member extending in a substantially vertical direction;
- a plurality of bins movable in the vertical direction along said vertical guiding member, each bin including an inclined sheet holding surface for holding sheets thereon,

one end of each bin opposed to said guiding member being lower than the other end;

a first opening, provided at a first position of said guiding member, through which first opening sheets ejected from the image forming apparatus may be selectively fed into each of said bins when the bin is located opposite to the first opening;

a second opening, provided at a second position of said guiding member, through which second opening sheets held in each of said bins may be taken out when the bin is located opposite to the second opening;



a stapling device for stapling the sheets taken out through said second opening;

a first gate member provided at said first opening and movable from a closing position where the first gate member closes the first opening to an opening position where the first gate member is out of the first opening; and

a second gate member provided at said second opening and movable from a closing position where the second gate member closes the second opening to an opening position where the second gate member is out of the second opening.

**4,946,153**  
**PAPER HANDLING APPARATUS WITH A PAPER**  
**STAPLING FUNCTION**

Keichi Kinoshita; Akiyoshi Johdai; Hiroki Yamashita, all of Osaka; Kazuhito Ozawa, Toyokawa, and Toshio Matsui, Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,517

Claims priority, application Japan, Jul. 10, 1987, 62-172386; Oct. 16, 1987, 62-261989; Nov. 13, 1987, 62-287691

Int. Cl.<sup>5</sup> B42B 2/00

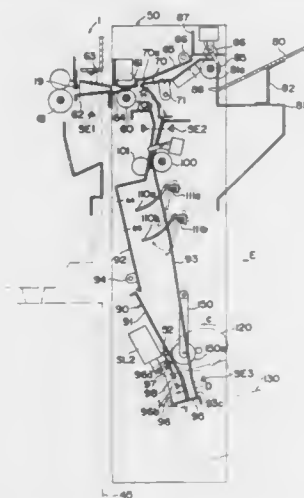
U.S. Cl. 270—53

8 Claims

1. A paper handling apparatus for storing papers ejected from an image forming apparatus, aligning and stapling them by stapling means, comprising:

- a tray for storing the ejected papers therein in substantially vertical position which has an alignment reference member in its lower portion;
- means for transporting the ejected papers into said tray from above;
- a plurality of pressing means each of which corresponds to a respective size of paper for pressing a surface of each paper transported into said tray at an upper portion thereof against said tray;
- control means for actuating one of said pressing means cor-

responding to the size of the transported paper in conjunction with the operation of said transport means;



means for aligning each paper being transported into said tray along said alignment reference member; and means for stapling the aligned papers.

4,946,154

#### AFTER-PROCESSING APPARATUS FOR A COPYING MACHINE

Tsuyoshi Nakamura, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

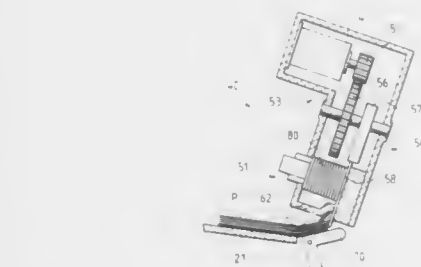
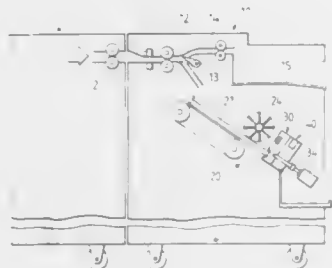
Filed Aug. 18, 1988, Ser. No. 233,529

Claims priority, application Japan, Aug. 20, 1987, 62-205192

Int. Cl.<sup>5</sup> B42B 2/00

U.S. Cl. 270—53

3 Claims



1. An after-processing apparatus for a copy machine for binding copies together, the apparatus comprising: a compiling tray for accumulating and aligning the copies to be bound, the compiling tray including a binding location corresponding to the area on said copies where binding occurs; a binding device having a staple driving unit portion and a clip fitting unit portion, said staple driving unit portion

and said clip fitting unit portion being selectively alignable with said binding location; a positioner for selectively aligning the relative position of the staple driving unit portion and the clip fitting unit portion to the binding location of said compiling tray; and means for bending the end portion of the copies in said compiling tray such that a clip can be fitted to said copies at the bent end portions thereof.

4,946,155

#### OFFICE MACHINE COMPRISING A PAPER STORAGE MAGAZINE

Udo I. Weiss, Siegen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

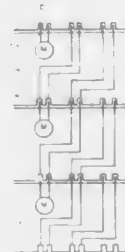
Filed Dec. 5, 1988, Ser. No. 280,611

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 3741311

Int. Cl.<sup>5</sup> B65H 3/44

U.S. Cl. 271—9

3 Claims



1. A paper storage cassette for an office machine having a magazine for removably receiving at least two cassettes and a plurality of first terminals associated with the magazine each for supplying electrical power for a drive motor, said machine including means for selecting a cassette and for feeding a sheet from that selected cassette to said machine, each cassette comprising:

storage means for holding a plurality of sheets; decollation means for withdrawing a sheet from said storage means; a first drive motor coupled to operate said decollation means; connection means connected to said first drive motor and arranged to be connected to one of said first terminals for supplying electrical power to said first drive motor, said connection means including means for engaging others of said first terminals of said office machine and means for engaging the connection means on a further cassette; and conductor means connecting the connection means of each cassette in a manner so that the drive motors of second and further cassettes can be connected electrically to selected different ones of the plurality of first terminals of said office machine via the connection means and conductor means of an intervening cassette.

4,946,156

#### ORTHOSES OR PROSTHESES FOR COORDINATING LIMB MOVEMENT

David Hart, Keighley, England, assignor to Steeper (Orthopidic) Limited

Filed Jun. 24, 1988, Ser. No. 211,474

Claims priority, application United Kingdom, Jun. 24, 1987, 8714739; Aug. 20, 1987, 8719672; Jan. 28, 1988, 8801894

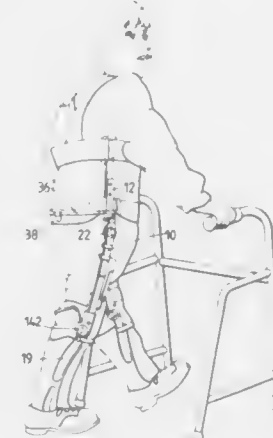
Int. Cl.<sup>5</sup> A63B 23/04

U.S. Cl. 272—70

11 Claims

1. A reciprocating gait orthosis or prosthesis comprising, a left leg member and a right leg member adapted to be secured to a user's legs or replace a user's missing legs,

wherein said leg members include a pivotal hip joint at the upper end of each leg member, means of coordinating the movement of said leg members, wherein said coordinating means consists of a single push/pull member coupled to each leg member by respective releasable coupling means,



said coupling means comprise a pivotable member connected to the push/pull member and locking means for releasably locking the associated leg member to the pivotable member, wherein the pivotable member is arranged to pivot about its associated hip joint.

4,946,157

#### SHEET LOADING AND UNLOADING MECHANISM

William H. Gunther, Jr., Mystic, Conn., assignor to Gunther International, Ltd., Mystic, Conn.

Filed Sep. 12, 1988, Ser. No. 242,906

Int. Cl.<sup>5</sup> B65H 3/06

U.S. Cl. 271—163

2 Claims



1. A container comprising end walls, each of said walls having upper and lower edges, a bottom movably mounted within said container, an exit mouth in one of said walls and said movable bottom having slots therein, means in the container to support said movable bottom within the container at a level adjacent the said exit mouth, said support means comprising flange means extending inwardly from at least some of said walls, the upper surface of said movable bottom being substantially on the same plane as the exit mouth when the movable bottom is in its lowermost position.

4,946,158

#### BABY WALKER

Hamad Olayan, P.O. Box 15391, Riyadh, 11444, Saudi Arabia, and George Spector, 233 Broadway Rm 3815, New York, N.Y. 10007

Filed Feb. 16, 1989, Ser. No. 311,055

Int. Cl.<sup>5</sup> A63B 1/00; A61H 3/00

U.S. Cl. 272—70.3

2 Claims



1. An infant walker which comprises:

- (a) a handle to be gripped by two hands of an infant;
- (b) a T-shaped base member;
- (c) means for elevating said handle over said T-shaped base member so that the infant can stand up with respect to the infant walker; said elevating means includes three support legs, in which each of said legs extends upwardly from one distal end of said T-shaped base member to converge to meet and connect to a middle region of said handle;
- (d) three wheels, in which each of said wheels is rotatably connected to one distal end of said T-shaped base member making said infant walker portable so that the infant can push said infant walker when learning how to walk;
- (e) preventing means comprising:
  - (a) a stabilizer shaft extending transversely through the long section of said T-shaped base member parallel with the short section of said T-shaped base member; and
  - (b) a pair of small wheels each of which is rotatably connected to one distal end of said stabilizer shaft so as to prevent said infant walker from laterally tipping over when the infant pushes against said handle.
- (c) a ball bearing collar within the long section of said T-shaped base member so that said stabilizer shaft can slide therethrough to be adjustable when said infant walker tips to the right and to the left;
- (d) a pair of spring biased L-shaped brackets each mounted to an opposite side of the long section of said T-shaped base member below said ball bearing collar;
- (e) a pair of rollers each disposed on a distal end of each of said brackets so as to bear against said stabilizer shaft; and
- (f) a screw in one of said brackets to adjust the pressure of said roller against said stabilizer shaft to control movement of said stabilizer shaft when the infant tips said infant walker.

4,946,159

#### MARTIAL ARTS TRAINING DEVICE WITH REACTIVE ARMS

Mitchel Jones, 4725 Harding Dr., Beaumont, Tex. 77703

Filed Dec. 23, 1988, Ser. No. 288,970

Int. Cl.<sup>5</sup> A63B 69/00

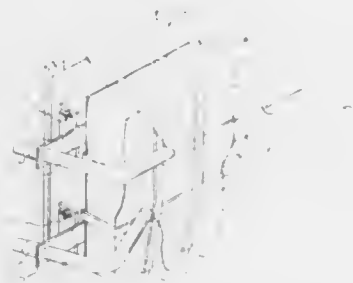
U.S. Cl. 272—76

13 Claims

1. A device for use in the practice of martial arts wherein blows are struck to a target striking member comprising: a striking member including a frontal striking surface;



a rigid supporting structure elastically connected to the striking member;  
at least one limb member;  
at least one hinge mechanism connecting each limb member to the striking member;  
the axis of rotation of each hinge mechanism being located between the limb member and the striking member;  
spring means provided at each hinge mechanism to normally bias each limb member in a first position;



a rigid member biased against the back side of each limb member;  
whereby striking of the striking surface results in backward movement of the striking member with relation to the rigid member resulting in rotational movement of each limb member about the axis of the hinge thereby rotating the limb member in the direction of an area in front of the striking surface.

4,946,160

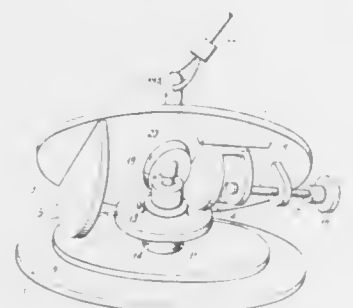
# INCLINABLE ROTARY PLATFORM APPARATUS FOR PHYSICAL TRAINING, PARTICULARLY OF PRE-SKI TYPE

Giovanni Bertolotti, 25036 Palazzolo Sull'Oglio, Brescia, Italy  
Filed Apr. 18, 1989, Ser. No. 339,648

Claims priority, application Italy, Apr. 18, 1988, 2927 A/88  
Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 272-97

6 Claims



1. Apparatus for physical training, particularly for pre-ski purposes, said apparatus comprising a base (1, 1') which rests on ground (2) and engages an upper platform (3, 3') by engagement means which permit the upper platform to move angularly about a vertical axis (8) upon rocking movement about a horizontal axis (21) caused by the feet of a person (S) carrying out said physical training which bear on said upper platform, said engagement means comprising a pair of half wheels (4-5, 4'-5') rockable about said horizontal axis (21) of said upper platform, one of said half wheels being engaged by friction on the base, and the other half wheel being rotationally independent of said base, so that said half wheels move angularly about said horizontal axis as the result of inclination imposed on the upper platform by the feet of the person, said half wheels and the upper platform to which they are engaged thus being made

to orbit about a vertical axis (8), only one of said half wheels being torsionally engaged with the base.

4,946,161

# TRAINING APPARATUS

Benita Cantieni-Habegger, and Hanspeter Habegger, both of Zürich, Switzerland, assignors to Habegger Marketing, Zürich, Switzerland

Filed Feb. 14, 1989, Ser. No. 310,131

Claims priority, application Switzerland, Feb. 15, 1988, 538/88

Int. Cl.<sup>5</sup> A63B 21/02

U.S. Cl. 272-137

9 Claims



1. Training apparatus for the planned strengthening of individual muscle groups with at least one spring body and with in each case at least one gripping element thereon, characterized in that the gripping elements (30) of a first spring body (3) are terminally arranged on a spring element (6) and that terminal gripping elements (12) of a second spring body (1, 2) are so constructed with at least one further spring element (6, 6), that the gripping elements (30) of the first spring body can be inserted in the gripping elements (12) of the second spring body.

4,946,162

# PORTABLE EXERCISE APPARATUS

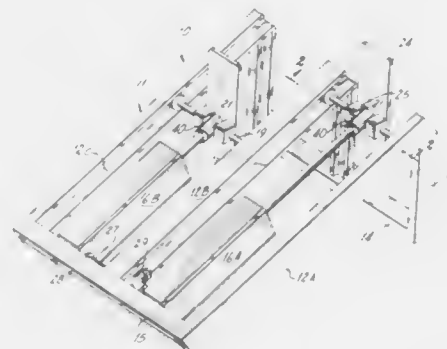
Nathan F. Lubie, 1041 N.E. 204 Terrace, No. Miami Beach, Fla. 33179

Filed Mar. 30, 1989, Ser. No. 330,653

Int. Cl.<sup>5</sup> A63B 21/008

U.S. Cl. 272-130

7 Claims



1. Portable exercise apparatus comprising a frame assembly comprising a plurality of angled structural support members including a plurality of obliquely angled guide channels and a plurality of vertical support members each extending downward from one end of an angled member so as to comprise vertical legs,

4,946,164

# SUSPENDED BALL WATER TOY

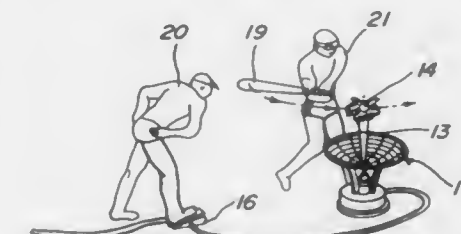
Mark W. Fuller, Studio City; Alan S. Robinson, El Monte, and John Werner, Sunland, all of Calif., assignors to Wet Enterprises, Inc., Universal City, Calif.

Filed Feb. 5, 1988, Ser. No. 152,746

Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 273-26 R

9 Claims



a hydraulic resistance apparatus attached to the frame assembly comprising a pair of side-by-side hydraulic cylinders flow connected together by a hydraulic line having resistance adjusting means attached thereto,  
each of said hydraulic cylinders having a piston and stem axially movable relative to its associated hydraulic cylinder, a transversely apertured stem adapter fixed to an end of each said stem, a pair of transversely apertured mounting lugs, one on each side of said stem adapter, an axle rod extending through each said transversely apertured stem adapter and said pair of transversely apertured mounting lugs, a limb-engaging pedal rigidly secured to said pair of mounting lugs to pivot therewith relative to said axle rod, said axle rod having a roller at each end thereof and fitted within said obliquely angled guide channels formed within the angled structural support members,  
whereby said pedal is free to pivot in response to movement of said axle rod in response to movement of a limb of a person using said exercise apparatus.

4,946,163

# PORTABLE BASKETBALL BACKBOARD ASSEMBLY

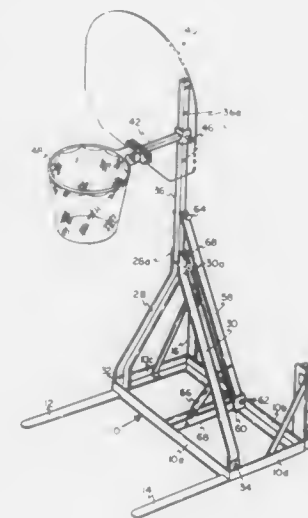
Stewart C. Aakre, Rural Route 3, Hawley, Minn. 56549; William A. Fulcher, P.O. Box 657, Sandia Park, N. Mex. 87047, and Gary L. Johnson, 12200 Ranchitos Rd., NE., Albuquerque, N. Mex. 87122

Filed Apr. 10, 1989, Ser. No. 336,202

Int. Cl.<sup>5</sup> A63B 63/08

U.S. Cl. 273-1.5 R

10 Claims



1. A portable, collapsible basketball backboard assembly comprising a generally flat base having front and rear edges, flat stabilizer means extending outwardly from said front edge of said base, support arm means having a lower end and an upper end, said lower end of said support arm means being hinged for swinging motion in a substantially vertical plane to said front edge of said base, a goal post having upper and lower ends, said lower end of said goal post being hinged to said upper end of said support arm means, a basketball backboard being affixed to said goal post, a bracing lift arm having upper and lower ends, said lower end of said bracing lift arm being hinged to said rear edge of said base, said upper end of said bracing lift arm being pivotally attached to said goal post at an intermediate point between said upper and lower ends of said goal posts, whereby said support arm means supports said goal post substantially vertically when said assembly is in an upright deployed position, and whereby said support arm means, goal post, and bracing lift arm may be folded downwardly from said upright deployed position to a compact folded position for storage.

4,946,165

# FOOTBALL HOLDER FOR PLACE-KICKING

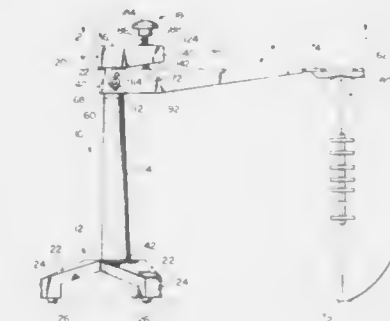
Martin K. Rambacher, Maple Grove Rd., Bemus Point, N.Y. 14712

Filed May 25, 1989, Ser. No. 356,934

Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 273-55 B

30 Claims



1. A football holder for place kicking a regulation NFL type football comprising:  
a base adapted to rest on a playing surface;

a vertical support member having an upper end and a lower end, said support member being connected to said base at said lower end of said support member, and said support member extending upwardly from said base;

a holding arm having a longitudinal axis, a distal end, and a proximal end, an upper surface and a lower surface, said proximal end being pivotally connected to said upper end of said support member for movement about a pivot axis perpendicular to said longitudinal axis of said holding arm, and said lower surface at said distal end being adapted to engage a tip of the football;

stop means connected to said upper end of said support member to prevent said holding arm from rotating below a predetermined lowest position; and

adjustable tensioning means for causing said holding arm to exert an adjustable amount of tension on the football, said tensioning means comprising resilient biasing means for biasing said holding arm towards said predetermined lowest position and adjustment means acting on said biasing means for adjusting said holding arm to a range of positions above said predetermined lowest position, whereby the tension exerted by said holding arm on the football can be adjusted;

said holding arm being provided with an aperture there-through adjacent said proximal end and said biasing means comprising:

a stud having a head and a stem, said stem being positioned in said aperture in said holding arm for reciprocating, sliding motion therein perpendicular to said longitudinal axis of said holding arm; and

a helical spring mounted around said stem between said head and said upper surface of said holding arm.

#### 4,946,166 TENNIS BALL

Kuniyasu Horiuchi, Kobe, and Yoshinobu Nakamura, Nishimomiya, both of Japan, assignors to Sumitomo Rubber Industries Ltd., Kobe, Japan

Continuation-in-part of Ser. No. 190,560, May 5, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 422,718  
Claims priority, application Japan, May 8, 1987, 62-69239; Apr. 6, 1988, 63-46406

Int. Cl.<sup>5</sup> A63B 39/00, 69/38

U.S. Cl. 273—61 C



1. A hollow tennis ball comprising:

(a) a hollow spherical core of elastic material enclosing an interior space;

(b) a layer of substantially felt-like material applied to the outer surface of said hollow core;

(c) the overall weight of said ball is between 30 and 50 grams;

(d) the pressure in said interior space is from 0 to 0.4 kg/cm<sup>2</sup> higher than the atmospheric pressure;

(e) the thickness of said hollow core is between 2.2 and 3.0 mm;

(f) the forward deformation of said ball is from 10.0 to less than 11.5 mm under loading force of 3.5 and 18 pounds and the return deformation is from 13.5 to less than 14.0 mm after it has been deformed to 2.54 cm under a loading force of 18 pounds;

(g) the hardness of the rubber of the hollow core is from 55 to 70 based on JIS A standard; and

(h) rebound is from 90 to 120 cm when dropped, from a height of 254 cm, onto a concrete base.

#### 4,946,167 GOLF BALL

Kaname Yamada, Kakogawa, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

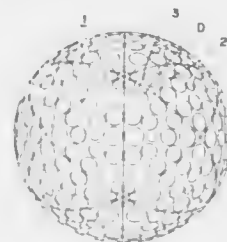
Filed Feb. 24, 1989, Ser. No. 315,114

Claims priority, application Japan, Mar. 3, 1988, 63-52301

Int. Cl.<sup>5</sup> A63B 37/14

U.S. Cl. 273—232

10 Claims



1. A golf ball having a spherical surface which is divided into a plurality of congruent spherical triangles to form a complete geodesic 24-hedron, 10 to 25 dimples of at least two different diameters arranged in each of the 24 congruent spherical triangles, said spherical surface consisting of two equal sides and divided by the ridge lines or great circle paths of a complete 24-hedron so that the dimple arrangements in each of the 24 congruent spherical triangles are identical to each other, and one of the great circle paths being formed by connecting the ridge lines with each other in coincidence with a parting line formed by a pair of hemispherical molds, wherein at the intersection of 3 great circle zones, 6 dimples, which have diameters in the range of 2.0 to 5.0 mm, are arranged so as to contact each other.

#### 4,946,168

MYTHOLOGY GAME HAVING AN ELEVATED GAME BOARD SURFACE REPRESENTING MOUNT OLYMPUS

Sean P. Fauls, 14013 Bramble La., No. 103, Laurel, Md. 20708

Continuation of Ser. No. 245,801, Sep. 19, 1988, This application Dec. 20, 1989, Ser. No. 453,907

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—241

1 Claim

1. A board game including:

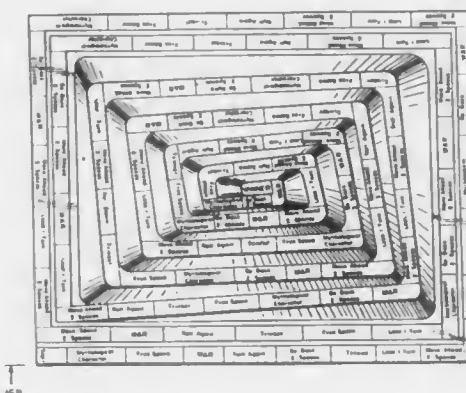
a primary game comprising a first game board having a flat playing surface and a 3-dimensional playing surface representative of a mountain, said first game board having a playing path extending along the flat playing surface and continuously extending along the 3-dimensional playing surface up to the top of said mountain, said playing path being divided into a plurality of spaces, a plurality of differently shaped trinket pieces, a set of first playing pieces, a random number generating means for determining the movement of said first playing pieces along the path;

a first secondary game comprising a second game board having a matrix of square spaces thereon, a set of second playing pieces, a set of instruction cards for determining the movement of said second playing pieces on said second game board;

said playing path having a set of first spaces having indicia corresponding to said first secondary game, wherein when a first playing piece lands on a first space said first secondary game is played;

a second secondary game comprising, a set of differently shaped third playing pieces, wherein each third playing

piece has a hollowed out portion at the base thereof capable of covering a trinket playing piece;  
said playing path having a set of second spaces each having an indicia corresponding to a differently shaped third



playing piece, wherein when a first playing piece lands on a second space, said second secondary game is played using the corresponding third playing pieces to obtain a trinket piece.

#### 4,946,169

GAMEBOARD APPARATUS

Elsa O. Hofmann, P.O. Box 456, Montclair, N.J. 07042

Filed Aug. 8, 1988, Ser. No. 230,006

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—253

4 Claims



1. A board game apparatus comprising:

a board having marked thereon a playing path divided into a plurality of spaces;

a plurality of playing pieces for indicating the position of each player;

a random number generating means for randomly determining the movement of said playing pieces along said path;

a plurality of play money;

said path comprising a plurality of purchasable property spaces;

a plurality of lease cards one for each of said purchasable property spaces for indicating ownership a set of cards, each card being distinguishable by having one of plurality of different indicia;

said path further comprising unpurchasable spaces, each distinguishable by having one of said different indicia;

an instruction card having marked thereon all of said different indicia and having a corresponding monetary amount marked next to each indicia for indicating the amount of money a player must pay wherein the winner is the players with the most currency and/or property value.

#### 4,946,170

MULTI-USE BOARD GAME

Anthony V. Mastro, 2728 Kreider Rd., Lititz, Pa. 17543

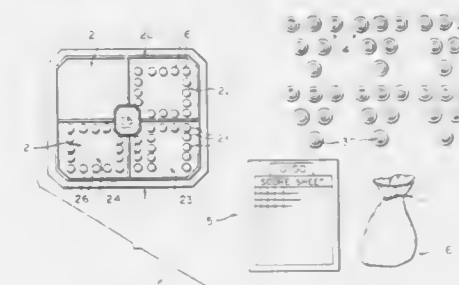
Continuation of Ser. No. 114,839, Nov. 30, 1987, abandoned.

This application Jul. 27, 1989, Ser. No. 385,947

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—258

3 Claims



1. A multi-use board game, comprising:

a relatively rigid game board having first and second playing surfaces on opposite sides thereof;

first indicia subdividing the first playing surface into four identical adjoining playing areas, said playing areas each being representative of a home or starting area for one each of a plurality of players;

second indicia subdividing the second playing surface into three identical adjoining playing areas, said playing areas each being representative of a home or starting area for one each of a plurality of players;

third indicia uniformly spaced throughout each playing area on both playing surfaces, subdividing each playing area into a plurality of closely adjacent identical playing spaces for playing substantially the same game or both playing surfaces, said first playing surface having a different number of playing areas thereon than said second playing surface and the number of playing spaces on the first playing surface being different than the number of playing spaces



on the second playing surface, for accommodating different numbers of players;  
fourth indicia subdividing said playing areas on said second playing surface into additional playing areas, whereby the additional playing areas may accommodate additional players; and  
a plurality of playing pieces for each of a plurality of players, said playing pieces adapted to rest on said playing spaces and be movable from one playing space to an adjacent playing space.

4,946,171

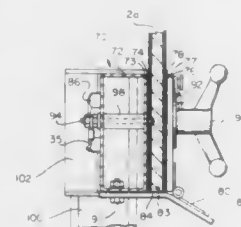
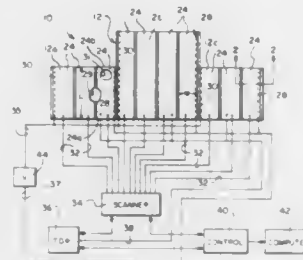
**LIVE FIRE TARGET MODULAR SUPPORT STRUCTURE**  
Thomas C. Merle, Rochester, and William M. Dickman, Lyons, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 3, 1989, Ser. No. 293,781

Int. Cl.<sup>5</sup> F41J 1/08, 9/13

U.S. Cl. 273—348.1

24 Claims



1. A target system comprising:  
a plurality of target modules, each of said modules having a dielectric support of selected shape defining a back surface with an electrically conductive strip backplane disposed on said back surface;  
energizing means providing an electrical signal for passing a current through said conductive backplane of each said module so as to cause said backplane to generate a thermal image;  
mechanical clamping means having oppositely disposed, relatively movable, insulated clamping surfaces for engaging and removably supporting said plurality of target modules relative to one-another so that said modules form a desired silhouette; and  
means, including electrical contacts having tips protruding through said clamping surfaces, for automatically applying said electrical signal from said energizing means by contact of said tips to said conductive backplanes of said plurality of target modules when said modules are engaged by said clamping means, so as to cause said plurality of target modules to generate a thermal image in the form of said desired silhouette.

4,946,172

**SAFETY DART**

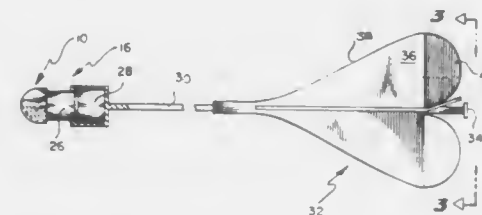
Tak-Ko Wong, Wanchai, Hong Kong, assignor to Franklin Sports Industries, Inc., Stoughton, Mass.

Filed Feb. 16, 1989, Ser. No. 311,595

Int. Cl.<sup>5</sup> A63B 65/02

U.S. Cl. 273—420

16 Claims



1. A safety dart, comprising:  
a deformable nose section;  
an elongated shaft  
a substantially cylindrical intermediate section connected to said nose section, comprising:  
first and second telescoping members;  
said first telescoping member connected to said nose section and having a first diameter;  
said second telescoping member connected to said elongated shaft and having a second diameter dimensioned to receive said first telescoping member in sliding engagement;  
said elongated shaft extending from said intermediate section, said shaft having a distal end;  
a tail section mounted on said elongated shaft; and  
wherein the center of gravity of said dart is located nearer to said nose section than to said shaft distal end.

4,946,173

**THROWING RING**

Jörg-Frieder Schlegel, Heidberg 48, 2000 Hamburg 60, Fed. Rep. of Germany, and Gerhard Sattler, Grindelallee 80, 2000 Hamburg 13, Fed. Rep. of Germany

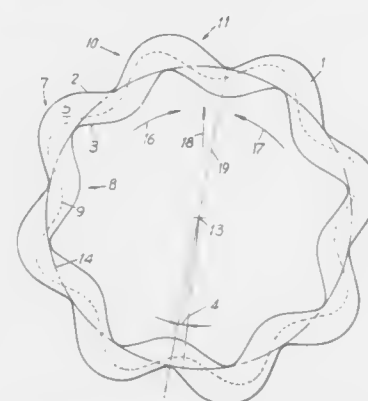
Filed Apr. 24, 1989, Ser. No. 342,163

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813491

Int. Cl.<sup>5</sup> A63H 27/00

U.S. Cl. 273—425

20 Claims



1. A throwing ring, including a substantial flat ring web having an outer edge, an inner edge defining a central opening, said ring web having a profile which over its periphery is periodically non-uniform and is folding non-symmetrically at both sides of a ring diameter, said throwing web having a plurality of outwardly projecting ring web lugs and a plurality of inwardly offset ring web regions located between said ring

web lugs and together forming said outer edge in a substantially wave-shape, said inner edge also having a substantially wave-shape such that its apex points are directed radially toward respective apex points of said outer edge, an apex point line of said upper surface being offset relative to said outer edge in a peripheral direction so that in a first leg of each of said outwardly projecting ring web lugs it extends closer to said outer edge and said upper ring surface falling down from said apex line with a stronger curvature toward said outer edge and a longer and flatter curvature relative to said inner edge, while in a second leg is said apex line it extends near said inner edge and said upper ring surface falling down with a stronger curvature toward said inner edge and with a longer and flatter curvature relative to said upper edge.

4,946,174

**ANNULAR METAL GASKET**

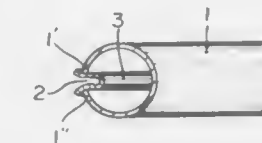
Masayoshi Usui, Numazu City, Japan, assignor to Usui Kokusai Sangyo Kaisha, Ltd., Sunto, Japan

Filed Feb. 25, 1988, Ser. No. 160,264

Int. Cl.<sup>5</sup> F16J 15/00

U.S. Cl. 277—199

8 Claims



1. An annular metal gasket comprising:  
an annulus having an endless groove formed in the outer periphery thereof, said groove defining a narrow gap at said outer periphery and defining dimensions larger than said gap at locations in said groove radially inwardly from said gap, such that said annulus defines a generally C-shaped cross-section; and  
a resilience control member of generally omega-shaped cross-section which is inserted in said gap said resilience control member comprising a first portion fitted on and supported by both edges of said annulus defining said gap, a second portion disposed in the larger dimension portion of the groove in said annulus, and a third portion disposed radially outwardly from the annulus.

4,946,175

**SEALING RING FOR A PIPE JOINT**

Olof Nordin, Värnamo, and Uno Andersson, Forsheda, both of Sweden, assignors to Forsheda AB, Forsheda, Sweden

Filed May 13, 1988, Ser. No. 193,871

Claims priority, application Sweden, May 27, 1987, 8702237

Int. Cl.<sup>5</sup> F16J 15/02, 15/10; F16L 21/02

U.S. Cl. 277—207 A

10 Claims



1. A sealing ring for sealing a space between two substantially coaxial first and second sealing surfaces which are jointable by being axially inserted one in the other, the sealing ring being adapted in advance of the jointing of the sealing surfaces to be positioned in connection with one of the sealing surfaces,

said sealing ring comprising: a first sealing portion of the sealing ring adapted to be in substantially undisplaceable engagement with said first sealing surface; a second sealing portion which is adapted at the axial insertion of the sealing surfaces one in the other to engage with and to be displaced by the second sealing surface while sliding in relation to said first sealing portion, said second sealing portion comprising a skin-like portion being much thinner than said first sealing portion in the radial dimension of said first sealing portion, said skin-like second sealing portion forming with the first sealing portion a lubricant pocket; a lubricant contained in the lubricant pocket; and a releasable connector means for releasably connecting said second sealing portion to said first sealing portion at a side of said sealing ring facing generally toward the second sealing surface at the axial insertion of the sealing surfaces one in the other such that said second sealing portion detaches from said first sealing portion when the second sealing portion is pushed rearwardly beyond a given axial limit by engagement with the second sealing surface, said connector means comprising an edge portion of said second sealing portion being connected with said first sealing portion by means of a releasable adhesive joint.

4,946,176

**CHUCK WITH MOVABLE JAW HALVES**

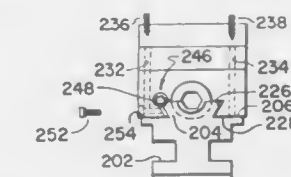
Mark W. Hillenburg, 3902 Wagner Lee, Corpus Christi, Tex. 78418

Filed Oct. 14, 1988, Ser. No. 257,542

Int. Cl.<sup>5</sup> B23B 31/16

U.S. Cl. 279—111

17 Claims



1. A chuck comprising  
a chuck body having an axis;  
a plurality of chuck jaws movable radially on the body in a converging path for grasping a work piece therebetween including a first jaw part, a second jaw part, means mounting the second jaw part on the first jaw part for movement toward the axis relative to the first jaw part for engaging a work piece, and means including a threaded member interconnecting the first and second jaw parts for moving the second jaw part relative to the first jaw part;  
means carried by the body and engaging the first jaw part of each of the plurality of chuck jaws for simultaneously moving each of the chuck jaws toward and away from the axis; and  
means carried by the jaw parts to determine when each of the second jaw parts are at a predetermined location, the predetermined locations being concentric with the axis, including  
a spring biased detent carried by one of the jaw parts, the other jaw part providing a recess receiving the detent.

4,946,177

**SYSTEM FOR RAPIDLY CHANGING CLAMPING JAWS ON A MACHINE TOOL**

Jacques Barbieux, Louvres, France, assignor to Sandvik Tobler S.A., Louvres, France

Filed Jul. 14, 1989, Ser. No. 380,108

Claims priority, application France, Jul. 21, 1988, 88 09874

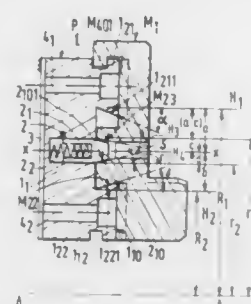
Int. Cl.<sup>5</sup> B23B 5/34

U.S. Cl. 279—123

8 Claims

1. A workpiece holding mechanism adapted for a rapid

interchange of inside and outside clamping jaws which clamp workpieces from the inside and outside, respectively, of the workpieces; said mechanism including a locking element having an abutment face against which a respective jaw rests when in a blocked and locked position, said locking element including first and second bearing faces inclined at first and second angles, respectively, relative to imaginary planes disposed perpendicularly to said abutment face; said inside and outside clamping jaws each having an inclined contact face arranged to engage the respective one of said first and second bearing faces when a respective jaw is in a blocked and locked position; retaining means for retaining a respective jaw in a blocked and locked position comprising a retaining member having at one end thereof third and fourth bearing faces inclined at third and fourth angles, respectively, relative to imaginary planes dis-



posed perpendicular to said abutment face, each of said inside and outside clamping jaws including an inclined reaction face arranged to be engaged by a respective one of said third and fourth bearing faces such that when said reaction face of said inside clamping jaw is engaged by said third bearing face said contact surface of said inside clamping jaw is urged against said first bearing surface, and when said reaction face of said outside clamping jaw is engaged by said fourth bearing face said contact surface of said outside clamping jaw is urged against said second bearing surface; all of said first, second third, and fourth angles being open in the same direction; said first and second angles being larger than said third and fourth angles, respectively; and means for enabling said retaining means to be released relative to said reaction surface of a respective jaw for unblocking and unlocking said jaw.

4,946,178

**CHUCK AND METHOD OF CHUCKING**

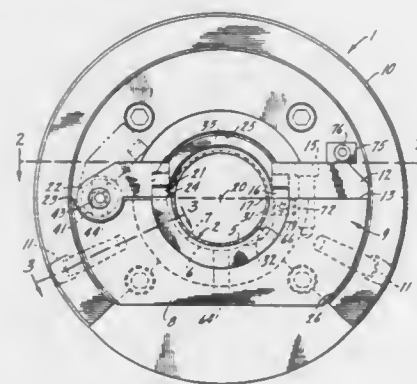
John A. Korson, Box 21 Rte. 1, Lake Leelanau, Mich. 49653, and Bruce W. Korson, Box 463, Rte. 1, Suttons Bay, Mich. 49682

Filed Oct. 2, 1989, Ser. No. 415,607

Int. Cl.<sup>5</sup> B23B 31/02

U.S. Cl. 279—1 R

21 Claims



1. A chuck for holding a workpiece having a portion shaped

like a circular arc that is less than 360 degrees, said chuck comprising a cradle portion having circular arcuate surface for supporting said workpiece, a stop member at one end of said cradle portion for abutting against one end of said workpiece when said workpiece is supported by said circular arcuate surface, a jaw adjacent the other end of said cradle portion for clamping against the other end of said workpiece when said workpiece is supported by said circular arcuate surface, and means for moving said jaw into and out of contact with said other end of said workpiece.

4,946,179

**SELF-GRADUALLY LOCKING CHUCK**

Giovanni De Bastiani, Verona; Giovanni Faccioli, Monzambano; Roberto Aldegheri, San Giovanni Lupatoto, and Lodovico R. Brivio, Castenedolo, all of Italy, assignors to Orthofix S.r.l., Verona, Italy

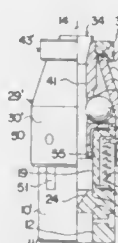
Division of Ser. No. 1,578, Jan. 8, 1987, Pat. No. 4,828,277. This application Feb. 10, 1989, Ser. No. 309,788

Claims priority, application Italy, Sep. 30, 1986, 84947 A/86

Int. Cl.<sup>5</sup> B23B 31/02

U.S. Cl. 279—1 SG

8 Claims



1. A gradual self-locking chuck comprising:  
a sleeve adapted to be fixed to a rotating shaft;  
a ferrule having a frusto-conical portion, a small diameter cylindrical portion and a large diameter cylindrical portion at each end of the frusto-conical portion respectively, the end of the sleeve opposite the rotating shaft being received within the larger diameter cylindrical portion of the ferrule;  
a mounting having a longitudinal axis and located at least partially within the ferrule and having a longitudinal passage running therethrough, the mounting having at least two holes therein, locking jaws located between the mounting and the ferrule at the holes, the locking jaws movable between a first unlocked condition in a radially outer position relative to the longitudinal axis of the mounting, and a second locked condition in a radially inner position relative to the longitudinal axis of the mounting, the locking jaws being adapted to engage a tool located in the longitudinal passage when in the locked position, the mounting having a central portion, an anterior portion which projects through the smaller diameter cylindrical portion of the ferrule, and a posterior portion located at least partially within the larger diameter cylindrical portion of the ferrule, the holes through which the jaws move being located in the central portion of the mounting;

means for permitting relative movement between the mounting and the ferrule, such relative movement moving the locking jaws between the radially outer and radially inner positions; and

an annular ring located coaxially with and adjacent the smaller diameter cylindrical portion of the ferrule, and means for securing the annular ring to the anterior portion of the mounting projecting beyond the smaller diameter cylindrical portion of the ferrule, and retaining means between the annular ring and the ferrule for releasably securing the annular ring and the ferrule to each other, the

annular ring when firmly secured to the small diameter portion of the ferrule engages the tool in the second locked condition preventing accidental release of the tool by the chuck.

4,946,180

**CONVERTIBLE CHILD SUPPORT APPARATUS**

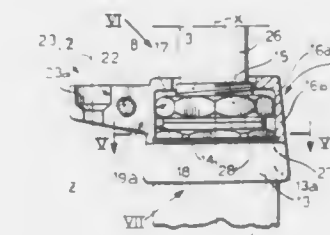
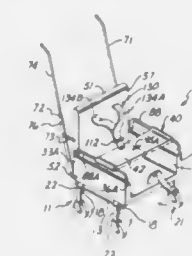
Luke Baer, 11330 Corner Brook Ct., Reno, Nev. 89511

Filed Jun. 1, 1988, Ser. No. 200,946

Int. Cl.<sup>5</sup> B62B 9/12, 7/00

U.S. Cl. 280—39

9 Claims



clamping means for clamping said ring element coaxially on the second ring on the bearing and on the lock nut to fix them firmly together and prevent them from accidentally becoming unscrewed from each other.

3. A convertible child support apparatus comprising:  
an undercarriage;  
a seat supported by said undercarriage for accommodating and supporting a small child; and  
restraining means disposed on said seat for restraining an occupant thereof when said apparatus is used as an automobile infant seat;  
wherein said seat is generally U-shaped having an integrally formed base and equally spaced support arm projecting generally upwardly and perpendicularly from said base, terminating in an outwardly turned rim having a generally flat surface having a pair of holes for mounting said restraining means onto said seat;  
wherein said restraining means includes a pair of opposed restraining arm assemblies each having: a U-shaped tubular frame comprising an integrally formed top portion having at least one detente disposed thereon and spaced apart side portions, each respective side portion having a downturned end for being received in one of said holes and rigidly secured to said support arm and said undercarriage, and a restraining tray having a tubular portion with an integrally formed notch;  
said tubular portion surrounding a portion of said tubular frame for supporting said tray slidably along the top portion of the frame;  
wherein when the restraining tray of one of the arm assemblies is disposed in mating arrangement with the restraining tray of the oppositely disposed arm assembly, said trays assist in restraining an occupant of said seat when said notch is disposed in said detente.

4,946,181

**SAFETY DEVICE FOR THE STEERING UNITS OF BICYCLES AND THE LIKE**

Antonio Romano, Padova, Italy, assignor to Campagnolo S.r.l., Vicenza, Italy

Filed Apr. 21, 1989, Ser. No. 341,179

Claims priority, application Italy, Apr. 21, 1988, 67372 A/88

Int. Cl.<sup>5</sup> B62K 21/04

U.S. Cl. 280—279

5 Claims

1. A safety device for the steering unit of a bicycle, motorcycle and the like provided with a steering tube within which a sleeve is rotatably mounted with the interposition of rolling bearing including an upper bearing comprising a first ring mounted on the steering tube and a second ring screwed onto a threaded portion of the sleeve and locked in position by a lock nut having an external polygonal surface, wherein said safety device comprises a ring element including a first portion

4,946,182

**MULTI-DIRECTIONAL ADJUSTABLE TOWING HITCH**

Randall Weber, Elkhart, Ind., assignor to Weber Manufacturing Company, Elkhart, Ind.

Filed Jan. 17, 1989, Ser. No. 297,206

Int. Cl.<sup>5</sup> B60P 3/12

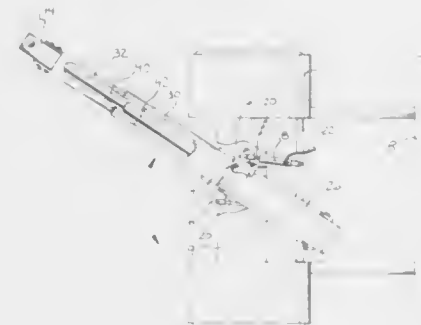
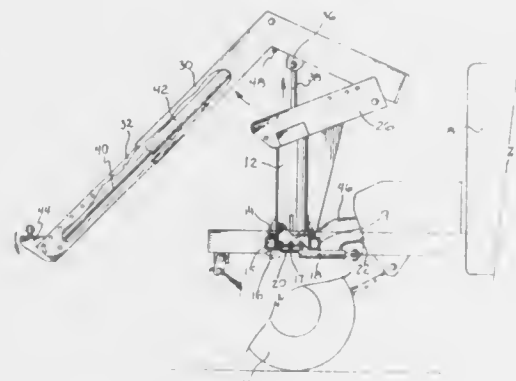
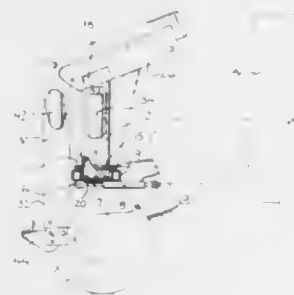
U.S. Cl. 280—402

7 Claims

1. A towing hitch adapted for connection to a towing vehicle, said hitch comprising an upright cylinder rotatably mounted to a supporting surface and defining an axis, first power driven means connected to opposite sides of said cylinder for effecting rotational movement of the cylinder about said axis relative to the supporting surface, a support member connected to said cylinder, a hoist arm pivotally connected at one end thereof to an end of said support member, second power driven means extending through said cylinder along said axis and connected to said hoist arm for raising and lower-



ing the hoist arm relative to said supporting surface, said hoist arm terminating at an end opposite its said one end in a hitch



coupler means for connecting the hoist arm to a vehicle to be towed.

4,946,183

# RETRACTABLE FIFTH WHEEL PULL HANDLE

W. D. Benson; Hollis L. Cahela; William N. Kirkland, and Anthony D. Pidgeon, all of Birmingham, Ala., assignors to Fontaine Fifth Wheel Company, Birmingham, Ala.

Filed Dec. 15, 1988, Ser. No. 285,812

Int. Cl.<sup>5</sup> B62D 53/10

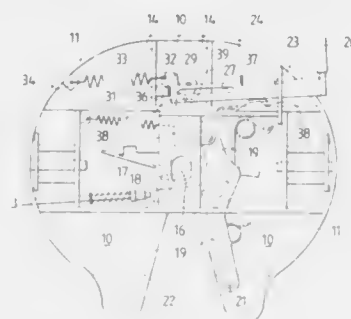
U.S. Cl. 280—434

7 Claims

1. In a fifth wheel, for connecting a tractor to a trailer, having a movable locking jaw for securing a king pin within said fifth wheel and an operating handle for moving said jaw to an open position, the improvement comprising:

- (a) a handle member cooperatively attached to said operating handle and displaceable laterally to an open position;
- (b) means for reducing the lateral extension of said handle member subsequent to displacement thereof to an open position including a spring attached to said handle member and resiliently biasing said handle toward a retracted position and means for slidably attaching said handle

member to said operating handle including an elongated L-shaped slot formed in said handle member proximal said



operating handle and a shoulder bolt engaged within said slot for rigidly affixed to said operating handle.

4,946,184

# ANTIFRICTION TRAILER COUPLING ASSEMBLY

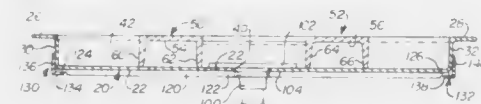
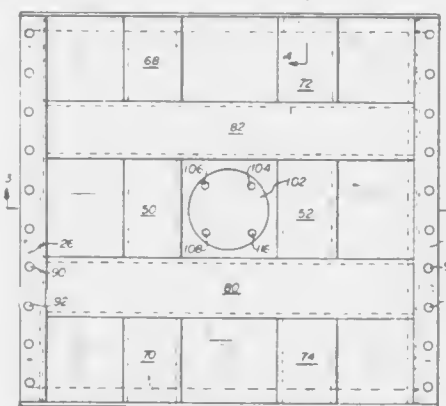
Michael Larocco, Murrysville, Pa., assignor to American Made, Inc., Pittsburgh, Pa.

Filed Feb. 15, 1989, Ser. No. 311,098

Int. Cl.<sup>5</sup> B62D 53/08

U.S. Cl. 280—433

30 Claims



1. A trailer coupling for securing a trailer to a tractor having a fifth wheel comprising

- a coupling plate having an upper portion for securement to said trailer, a lower portion and a transitional portion extending from said upper portion to said lower portion, said lower portion having an opening;
- a king pin means supported by said coupling plate and having a king pin member projecting downwardly therefrom;
- an antifriction member fixedly secured adjacent to the lower surface of said lower portion for substantial non-movement of said antifriction member relative to said lower portion;

said antifriction member having an opening through which said king pin member projects, and said antifriction member further having a substantially continuous, non-interrupted antifrictional contacting surface except for said antifriction member opening for contacting the part of the fifth wheel which is attached to said tractor, thereby allowing relative movement between said trailer and said tractor.

4,946,185

# TOWING DEVICE

Arthur Likei, 9265 - 156th Street, Surrey, British Columbia, Canada V3R 4L1

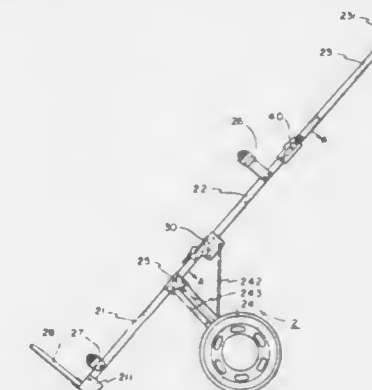
Filed Feb. 2, 1988, Ser. No. 151,613

Claims priority, application Canada, Feb. 6, 1987, 529241

Int. Cl.<sup>5</sup> B60D 1/28

U.S. Cl. 280—457

7 Claims



1. In a tow hitch system comprising:

a tow bar to be secured to a towing and to a towed vehicle, the towing vehicle including spaced openings adjacent the point where the tow bar is secured, the improvement comprising:

- an anchor point on the tow bar;
- a chain attached to the anchor point at a point intermediate the ends of the chain;
- a pair of safety catches, one of said pair of safety catches at each end of the chain, to engage the spaced openings;
- each safety catch comprising a central limb to be received in an opening and dimensioned for rotatable movement in said opening;
- elongated side limbs extending parallel thereto from each end of the central limb to contact opposed sides of an area of the towing vehicle adjacent the point where the tow bar is secured to maintain the catch in position; and
- an eye at one end of one of said side limbs of each safety catch to receive the chain.

4,946,186

# TELESCOPIC AND COLLAPSIBLE GOLF CART

Alex Cheng, No. 36, Lane 320, Sec. 2, Cheng kung Road, Taipei, Taiwan

Filed Apr. 6, 1989, Ser. No. 333,965

Int. Cl.<sup>5</sup> B62B 1/04

U.S. Cl. 280—646

1 Claim

1. A telescopic and collapsible golf cart comprising:

- (a) a longitudinal frame member including a first section, a second section having a hollow inner space, and a third section terminating in a handle and telescopically receivable within the hollow inner space of the second section;
- (b) a base frame means pivotally connected to a lower end of the first section for swinging movement between a perpendicular position and a parallel position with respect to the first section;
- (c) a bracket means secured to the first section and including lateral wings, a side beam pivotally connected to each lateral wing, and a wheel rotatably mounted on each side beam;

(d) a pair of spaced bag cradles secured to the first and second sections, and each cradle including strap means;

(e) hinge means pivotally and laterally interconnecting an upper end of the first section to a lower end of the second section for permitting the first and second sections to be disposed in either a longitudinally aligned position or a parallel position with respect to each other, the hinge means including a first bracket secured to an upper end of the first section and a second bracket secured to a lower end of the second section, the first bracket including first and second projectors extending laterally from opposite sides thereof, the second bracket including a pair of parallel plates and a hook, a pin member pivotally connecting



the parallel plates to the first projector, and first lock means including an arm having one end pivotally connected to the second projector and a catch frame secured to the arm for engaging the hook to lock the first and second sections in the longitudinally aligned position and for hanging the golf cart from a support means when the first and second sections are disposed in the parallel position;

(f) a link member pivotally interconnecting each side beam to the hinge means; and

(g) second lock means including a threaded bolt secured adjacent an upper end of the second section for selectively locking the third section in a desired telescopic position with respect to the second section.

4,946,187

# PORTABLE CARRIER

I. Shan Chang, 184, Pu Tse Pu, Wanchao Tsun, Chu Chee Hsiang, Chla-Yi Hsien, Taiwan

Filed Nov. 30, 1989, Ser. No. 444,003

Int. Cl.<sup>5</sup> B62B 1/00

U.S. Cl. 280—652

1 Claim

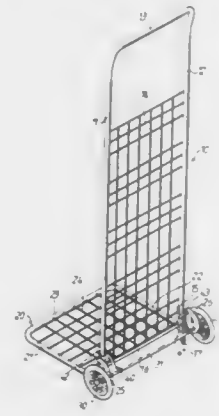
1. A portable carrier, including:

- a handle frame, having a pair of parallel handlebar tubes, wherein the lower part of the right-side handlebar tube is equipped with a hook rod;
- a luggage frame, having a pair of parallel side-tubes, wherein the tail of each side-tube is formed in a U-shape and a beam is fixed on each of the U-shaped tails respectively;

a supporting rod is fixed on and between the beams to which the lower part of the handlebar tubes are pivotally connected;

an axle, each end going through the U-shaped tail rotationally mounting a wheel, and the axle and the U-shaped tails are statically fitted without relative motion to each other;

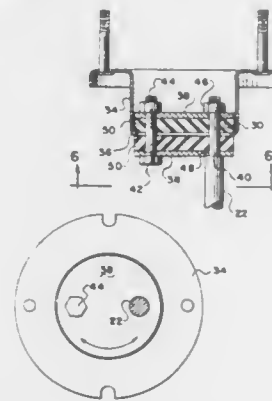
a fork mechanism, disposed on the left-side U-shaped tail and the left side of the supporting rod, wherein the size of the fork mechanism complies with the diameter of the left-



sided handlebar tube, so that the fork mechanism may snap to the left-sided handlebar tube; and

a fastening mechanism, disposed on the right-sided U-shaped tail and the right side of the supporting rod, wherein the fastening mechanism complies with the hook rod provided at the lower part of the right-sided handlebar tube, so that in case the fastening mechanism encounters the hook rod when the luggage frame is folded, the fastening mechanism will be restrained from further rotation.

**4,946,188**  
**WHEEL ALIGNMENT**  
Sammy D. Key, and Martin T. Quintanilla, both of Brownfield, Tex., assignors to Doreen Mason, Helena, Minn.  
Filed Oct. 12, 1989, Ser. No. 421,553  
Int. Cl.<sup>5</sup> B62D 17/00  
U.S. Cl. 280—661



1. In an automobile having

- a ground engaging wheel attached to
- a body by
- a telescoping strut including
- a lower cylinder member and
- an upper piston rod partially telescoped in the cylinder member,
- the cylinder member attached to
- a spindle to which the wheel is journaled,
- the piston rod extending into
- a bearing retainer attached to the automobile body, and

j. a helical compression spring surrounding telescoping strut and extending from

k. a lower spring retainer on the cylinder member to

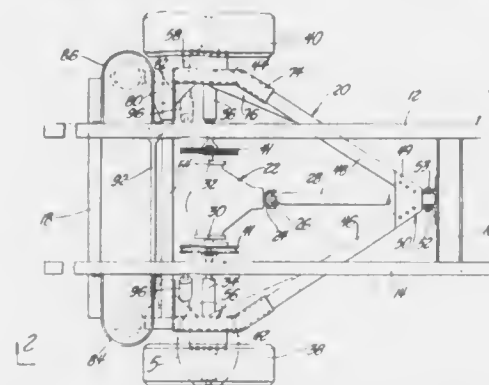
l. a bearing encircling the piston rod,

m. said bearing seated on said bearing retainer;

n. the improved structure connecting the piston rod and the bearing retainer comprising in combination:

o. plate means interconnecting the bearing retainer and piston rod for connecting the piston to the bearing retainer at any point along a circle concentric with the bearing.

**4,946,189**  
**REAR SUSPENSION**  
Donald L. Manning, Orchard Lake, Mich., assignor to DLMA Transportation Inc., Troy, Mich.  
Filed Jul. 17, 1989, Ser. No. 380,390  
Int. Cl.<sup>5</sup> B60G 9/02  
U.S. Cl. 280—688



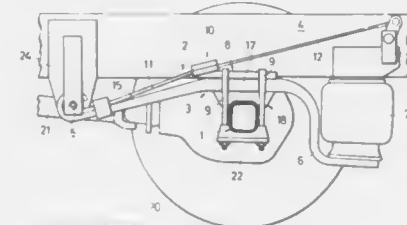
1. A rear suspension assembly of the type including a dead axle (20) adapted to support driving wheels (38,40) outboard thereof; a vehicle body supporting chassis (10), the forward end of said dead axle being articulated to said chassis; a differential (22) mounted to said chassis and having a power input shaft (24) and a pair of output shafts (30,32), a pair of axles drivingly connected between said output shafts (34,36) and said wheels; and spring means (90) supporting said chassis upon said dead axle, the improvement comprising:

sid dead axle having

- a first pair of longitudinal beam sections (42,44) respectively disposed outboard and on opposite sides of said differential, said beam sections being parallel and having rectangular cross sections;
- a second pair of beam sections (46,48) having the same cross section shape as and abuttingly secured to the front ends of said longitudinal beam sections, each of said second beam sections extending forwardly and inwardly extending from the respective longitudinal beam sections, said second beam sections converging and being joined at their forward ends to provide an apex portion (50) articulated to said chassis; and
- wheel supporting spindle mounts (56,58) mounted on and projecting above each of said longitudinal beam sections; each spindle mount including a wheel supporting sleeve (70) transversely aligned with the differential output shafts, said driving axles (34,36) extending through said sleeves and vertically movable relative thereto; and
- a transverse beam (54) integrally connecting said longitudinal beam sections and being of the same general cross-sectional shape and size as said beam sections, said transverse beam being disposed immediately rearwardly of said spindle mounts and forwardly of the rear ends of said first beam sections.

8 Claims

**4,946,190**  
**SUSPENSION FOR THE VEHICLE WHEEL AXLE**  
Josef Büttner, Waldaschaff, Fed. Rep. of Germany, assignor to Otto Sauer, Achsenfabrik Keilberg, Bessenbach-Keilberg, Fed. Rep. of Germany  
Filed Sep. 6, 1988, Ser. No. 240,613  
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729792  
Int. Cl.<sup>5</sup> B60G 9/02  
U.S. Cl. 280—712



1. A suspension for a vehicle wheel axis on a vehicle chassis having a rigid axle member, comprising:

at least one upper guide leaf having a front end;

a bearing point on the vehicle chassis, wherein said front end of said upper guide is articulated at said bearing point;

at least one bottom bearing leaf having a front arm articulated at said bearing point;

clamping means for clamping said upper guide leaf and for clamping said bottom bearing leaf at midpoints thereof to the rigid axle member;

means for mounting the rear end of said upper guide leaf to the vehicle chassis such that said rear end can move longitudinally relative to the chassis; and

a bearing arm on said at least one bottom bearing leaf projecting rearwards from the rigid axle member, said bearing arm comprising a bottom bearing for supporting an air spring for supporting the vehicle chassis;

wherein said bearing point, relative to a horizontal plane, is substantially level with said rigid axle member, said upper guide leaf is sloped upwardly as it extends rearwardly from said bearing joint, and said front arm of said bottom bearing leaf is sloped upwardly as it extends rearwardly from said bearing point.

19 Claims

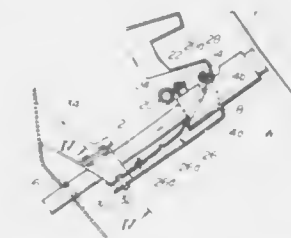
**4,946,191**  
**MOTOR VEHICLE SEAT WITH A BACK REST AND AIR BAG ASSEMBLY**  
Peter-Ulrich Putsch, Rockenhausen, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Co., Fed. Rep. of Germany  
Filed Dec. 8, 1988, Ser. No. 281,230  
Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741637  
Int. Cl.<sup>5</sup> B60R 21/18, 21/22  
U.S. Cl. 280—730



1. Vehicle seat, particularly a motor vehicle seat for support-

ing a vehicle user, comprising a back rest having a head rest for supporting only a back side of the user's head, an area supporting the shoulders of the user, and having at least one forwardly projecting side wing in the area supporting the shoulders of the seat user but not laterally of the user's head, wherein the vision of the user is unobstructed, said side wing having an upper surface; said side wing including at least one recess positioned in said upper surface, in which an inflatable air bag is located, whereby said air bag, in the inflated condition of said air bag, forms a support laterally adjacent the head of the seat user.

**4,946,192**  
**KNEE PROTECTOR**  
Takanori Kuwahara, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Japan  
Filed Dec. 22, 1988, Ser. No. 288,173  
Claims priority, application Japan, Dec. 25, 1987, 62-195938[U]  
Int. Cl.<sup>5</sup> B60R 21/04  
U.S. Cl. 280—751



1. A knee protector for use in an automotive vehicle equipped with an instrument panel and a steering column which detaches from a mounting portion so as to absorb energy applied to the steering wheel, comprising:

a knee protector body which is arranged between the steering column and the instrument panel and is fixed to the instrument panel, said knee protector body being arranged beneath and at a location adjacent to the steering column so as to provide a sufficient amount of space under the steering column for the vehicular driver's legs, said knee protector body being deformable to absorb kinetic energy due to a car crash so that a load applied to the driver's knee is restricted to be within a predetermined limit when the knees strike against the instrument panel in the car crash; and

means for reinforcing said knee protector body and for making deformation of said knee protector body easy so as to assure smooth detachment of the steering column, when a load is applied to said steering wheel in the direction of the axis of said steering column.

**4,946,193**  
**UTILITY VEHICLE HAVING CARGO BEARING SURFACES INCLUDING A FOLDED SEAT BACK**  
Yoshio Oka, Hermosa Beach, Calif., assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation-in-part of Ser. No. 47,834, May 6, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 284,370  
Int. Cl.<sup>5</sup> B60N 2/24; B60P 3/40  
U.S. Cl. 280—769

1. A substantially body-less utility vehicle, comprising:

a frame;

substantially rectangularly disposed front and rear wheels supporting said frame;

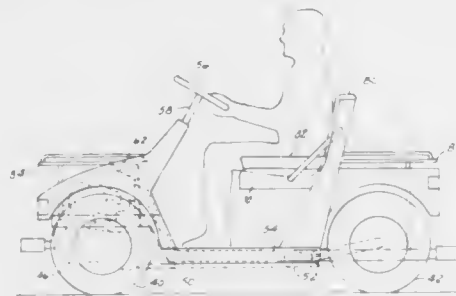
drive means carried by said frame and operatively connecting at least one of said front and rear wheels for driving said vehicle;

a steering mechanism coupled with said front wheels including an upstanding steering column extending downwardly from above said frame to between said front wheels;

8 Claims



a seat support positioned between said front and rear wheels rearwardly of said steering column, said seat support including a first seat and backrest rearwardly of said steering column and a second seat and backrest in laterally spaced relation thereto, said backrest for said second seat being adapted to pivot to a folded, horizontal position upon said second seat, and rack means in longitudinal alignment with said second seat including a first rack and

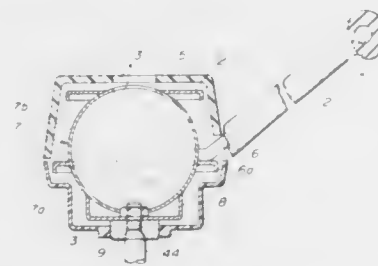


a second rack in substantially overlying relation to said front and rear wheels, respectively, and said racks and said folded seat back being disposed in substantially horizontally aligned relation; said seat means and said backrest means being separate from one another, and means for mounting at least said backrest means to said seat support for pivotal movement to extend the storage area of said vehicle.

**4,946,194**  
**STEERING WHEEL CONSTRUCTION OF MOTOR VEHICLE**  
Kouzo Maeda; Munemasa Shimamura, both of Yokohama; Hideo Omura, and Makoto Hikone, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Feb. 8, 1989, Ser. No. 308,903  
Claims priority, application Japan, Feb. 10, 1988, 63-29625  
Int. Cl.<sup>5</sup> B60R 21/02

U.S. Cl. 280—777

34 Claims



1. A steering wheel construction comprising:  
a circular rim;  
a hub adapted to connect to a steering shaft;  
at least one spoke connecting said circular rim and said hub;  
a center pad supported by said spoke and located at a generally center portion of said circular rim; and  
an energy absorbing structure positioned between said hub and said center pad, said energy absorbing structure comprising at least one cylindrical metal member, wherein said energy absorbing structure is so arranged as to be deformed when said spoke is subjected to deformation.

**4,946,195**  
**STEERING ASSEMBLY SUPPORTING CONSTRUCTION OF A MOTOR VEHICLE**

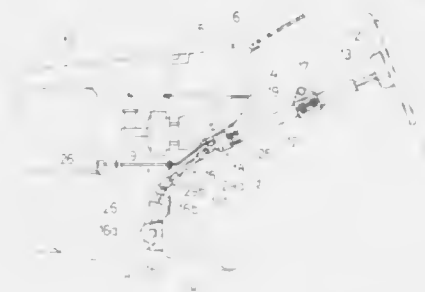
Tadashi Ioka; Katsumi Sakane; Toshifumi Suzuki; Kazunari Amatsu, and Kaoru Shimada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan  
Filed Mar. 7, 1989, Ser. No. 319,689

Claims priority, application Japan, Mar. 8, 1988, 63-54001; Mar. 14, 1988, 63-60964

Int. Cl.<sup>5</sup> B62D 1/18

U.S. Cl. 280—777

17 Claims



1. A steering assembly supporting construction for a motor vehicle, said construction comprising:  
a steering column to be arranged in an upwardly inclined orientation and supporting rotatably a steering shaft for transmitting turning force of a steering wheel to a gear box unit;  
a first steering column supporting member to be fixed to a body of the vehicle and supporting an upper part of said steering column at a fixed position;  
a second steering column supporting member for releasably connecting a lower part of said steering column to a member on the body side; and  
releasing means for detecting a predetermined state of collision upon the occurrence of a collision of the vehicle and for releasing the connected state of said steering column by said second steering column supporting member before the impact of the collision is transmitted to said steering column.

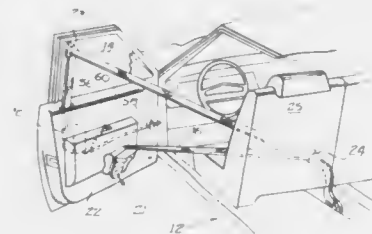
**4,946,196**  
**RETRACTOR WITH MANUALLY-OPERABLE REMOTE CONTROL FOR TENSION-RELIEVING SYSTEM**  
Gerald A. Doty, Crown Point, Ind., assignor to Gateway Industries, Inc., Olympia Fields, Ill.

Filed Mar. 31, 1988, Ser. No. 176,304

Int. Cl.<sup>5</sup> B60R 22/08

U.S. Cl. 280—803

16 Claims



1. A seat belt retractor apparatus for manual operation into and from a tension-relieving position, said apparatus comprising:

a seat belt retractor having a reel and a belt, which is wound on said reel for protraction or retraction,  
biasing means biasing the belt to rewind to a fully-wound position after usage of the seat belt,  
a selectively operable tension-relieving means positionable in a tension-relieving position for holding the reel and belt against the rewind force of the biasing means to relieve belt tension on a user, the tension-relieving means being positionable in a release position to allow the belt to be rewound,  
a solenoid with a solenoid actuator movable to a first position to shift the tension-relieving means to the release position,  
mechanical means in said tension-relieving means to shift the tension-relieving means to its release position on belt protraction beyond a predetermined length,  
circuit means for the solenoid including a manually operable switch means operable by a user to energize the solenoid and shift the actuator to shift the same to its first position to place the tension-relieving means in the tension relieving position said solenoid being movable with energization to shift its actuator to its first or second position, said actuator staying at the shifted position with de-energization of the solenoid.

**4,946,197**  
**AUTOMATIC SEAT BELT SYSTEM**  
Kenji Matsui, and Tatsuo Yamashita, both of Niwa, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Japan

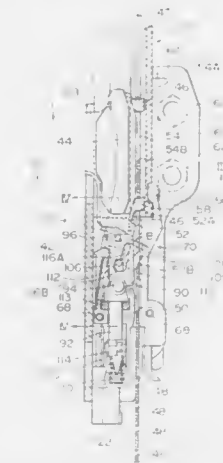
Filed Mar. 27, 1989, Ser. No. 329,409

Claims priority, application Japan, Mar. 31, 1988, 63-44163 [U]; Mar. 31, 1988, 63-44161 [U]; Mar. 31, 1988, 63-44162 [U]; Mar. 31, 1988, 63-44164 [U]

Int. Cl.<sup>5</sup> B60R 22/06

U.S. Cl. 280—804

20 Claims



1. An automatic seat belt system capable of girding a crew member automatically with a webbing, comprising:  
a slider on which one end portion of said webbing is supported;  
a guide rail supporting said slider slidably thereon to guide frontward and rearward of a car, the crew member being girded with the webbing when the slider is positioned at an end portion of the guide rail on a car rear side;  
a reinforcement anchor mounted on an end portion of the guide rail on a car rear side to reinforce the end portion of the guide rail on the car rear side;  
a lock member locked on the slider when said slider is positioned at an end portion of the guide rail on a car rear side;  
a housing enclosing said lock member therein, mounted on the reinforcement anchor, and supporting the lock member on the reinforcement anchor;  
an enclosing part provided on said reinforcement anchor,

allowing said guide rail to enter therein only from its longitudinal end portion; and  
locking means for locking the guide rail enclosed in said enclosing part and the housing, fixing the guide rail on the reinforcement anchor through the housing.

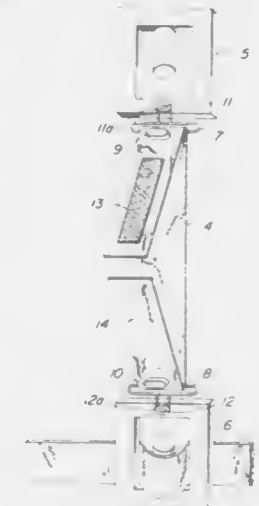
**4,946,198**  
**CHILD SAFETY STRAP**  
Joseph P. Pittore, 803 Sandwedge Ct., Warrington, Pa. 18976, and Bruce J. Waldron, 15 Buckmanville Rd., Newtown, Pa. 18940

Filed Jan. 9, 1989, Ser. No. 294,800

Int. Cl.<sup>5</sup> B60R 22/00

U.S. Cl. 280—808

6 Claims



1. In a safety belt having a lap belt and a shoulder belt with an angle therebetween when in use, an apparatus for adjusting the angle comprising:  
(a) a safety strap;  
(b) means for,  
(i) attaching one end of the safety strap to the lap belt, and,  
(ii) attaching the other end of the safety strap to the shoulder belt, said means for attaching the safety strap to the lap and shoulder belts comprising a first set of two clips to which the lap belt and shoulder belt are attached, a second set of two clips to which the safety strap is attached, and means for attaching the first set of clips to the second set of clips, said means for attaching the first set of clips to the second set of clips comprising pivot means for enabling the second set of clips to freely pivot about a point of attachment relative to the first set of clips.

**4,946,199**  
**HIGH PRESSURE TUBE ATTACHMENT MECHANISM**  
Carl E. Goubeaux, Troy, and Donald M. Flory, Arcanum, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 18, 1989, Ser. No. 381,602

Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 285—24

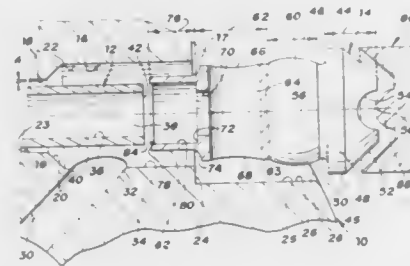
3 Claims

1. A high pressure tube attachment mechanism comprising:  
a housing having a stepped passage therein through which high pressure fluid may be conducted and fluid pressure transmitted and a side passage intersecting said stepped passage;  
a high pressure tube for conducting high pressure fluid therethrough and for transmitting fluid pressure there-through, said tube having an inner cylindrical surface and an outer cylindrical surface respectively having an inner surface diameter and an outer surface diameter, said tube

also having one open end positioned in said housing stepped passage in fluid communication therewith so as to conduct high pressure fluid between said side passage and the interior of said tube and to transmit fluid pressure between said housing stepped passage and the interior of said tube;

and a securing device having means providing said fluid communication between said tube one open end and said housing, said securing device further having an axially extending tube-like first portion thereof received about said tube within said stepped passage in press fitted sealing relation to said tube and to said housing, an axially extending second portion extending inwardly of said housing stepped passage, and axially extending adjacent closed third and fourth portions having a reduced outer diameter area therebetween, said fourth portion defining the other end thereof axially opposite said first portion;

said housing stepped passage having a first section, said passage first section having an outer end and being defined by a wall surface conically tapered with about a two degree decreasing diameter taper which decreases toward said housing passage first section outer end, the minimum wall surface diameter of said housing stepped passage being greater than diameter of said tube, said housing stepped passage having a second section defined by a side wall surface of larger diameter than said first section and connected thereto by a conical annular shoulder, said tube one end extending axially through said housing passage first section outer end and said housing stepped passage tapered first section and at least into said conical annular shoulder;



said securing device first and second portions each having an outer surface the maximum outer diameter of which is less than the diameter of said housing passage second section side wall surface, said second portion having a cross passage therethrough said securing device third and fourth portions each having an outer surface the maximum outer diameter of which is greater than the diameter of said housing passage third section wall surface;

said securing device further having a stepped inner diameter bore formed therein through said first portion and into said second portion in at least part of which said tube one end is slidably received prior to final assembly of said attachment arrangement;

said securing device first portion having an end extending toward said outer end of said housing passage first section and fitting into said tapered first section of said housing passage;

said securing device having been axially pressed to extend into said housing opening with said securing device first and third portions being press fitted in said housing passage;

said first portion having been axially pressed to extend into said housing passage tapered first section and by press fit tapered deformation be outwardly press fitted to said housing passage tapered first section and also be inwardly press fitted to said tube to a sufficient extent to sealingly secure said tube to said housing so as to hold high fluid pressure and to hold said tube securely in said housing passage against axial and rotational removal forces tend-

ing to remove said tube from said housing, said third portion having been pressed into said housing passage second section and sealing same, said fourth portion having been pressed into engagement with said housing and deforming parts of said housing into said reduced diameter area between said third and fourth securing device portions to stake said securing device; said securing device having a shoulder formed in said securing device stepped inner diameter bore and said tube one end having a transverse end surface in abutting engagement with said shoulder during and after the press fitting action to provide axial location of said tube one end relative to said securing device and said housing passage.

4,946,200

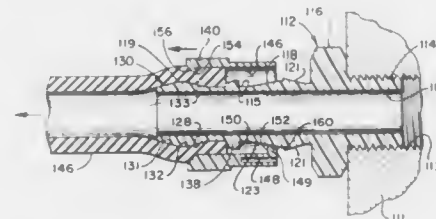
# SELF-TIGHTENING SOFT TUBING FITTING AND METHOD

Brian J. Blenkush, Maple Grove, and Blaine C. Sturm, Anoka, both of Minn., assignors to Colder Products Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 252,254, Sep. 30, 1988, Pat. No. 4,903,995. This application Mar. 21, 1989, Ser. No. 324,747 Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 285—38

22 Claims



1. An improved fitting for use with soft tubing, comprising: a body section defining an axially extending passage therein; stem means adapted for receiving a section of soft tubing over at least a portion thereof, said stem means extending axially from said body section and having a passage defined therein which is in communication with said body section passage;

radially extending flange means at an end of said stem means that is distal from said body section and adapted for sealing against an inner wall of the tubing;

sleeve means mounted for sliding movement on said stem means and having an annular contact surface defined thereon adapted for sealing against an outer wall of the tubing, the radial distance between said flange means and the contact surface of said sleeve means being less than the thickness of the soft tubing;

stop means intermediate of the radially extending flange means and the body section for limiting axial movement of the sleeve means toward the radially extending flange means; and

means for resisting movement of said sleeve means toward said body section, whereby a section of soft tubing may be tightly secured, in communication with said passages, between said sleeve means and said flange means.

4,946,201

# OIL FIELD TUBULAR CONNECTION

Wen-Tong Tai, Houston, Tex., assignor to Baroid Technology, Inc., Houston, Tex.

Filed Mar. 8, 1989, Ser. No. 320,718

Int. Cl.<sup>5</sup> F16L 25/00

U.S. Cl. 285—94

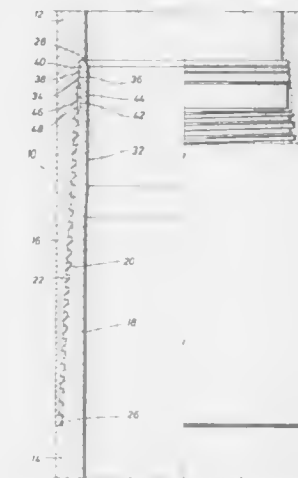
19 Claims

1. An oil field tubular connection for coaxially joining first and second lengths of metallic tubular members at a well site made up with a lubricant, each of the first and second tubular

members having an elongated tubular body, a flow path interior of the tubular body and about a tubular axis, and a threaded end having threads for structurally interconnecting the first and second tubular members, and the first tubular member having a frustoconical exterior sealing surface for metal-to-metal fluid-tight sealing engagement with a corresponding interior sealing surface of the second tubular member to withstand a high pressure differential across the tubular connection, the threaded end of the first tubular member further comprising:

the exterior sealing surface spaced axially opposite the threads with respect to its tubular body;

a plurality of antigalling grooves each projecting radially inward from and adjoining the exterior sealing surface, each antigalling groove circumferentially encircling the threaded end of the first tubular member and sealed from fluid communication with the interior of the first tubular member by the exterior sealing surface, such that each



antigalling groove receives the lubricant for reducing galling between the metal sealing surfaces during makeup of the connection; and

an energizing groove spaced axially between the exterior sealing surface and the threads of the first tubular member and projecting radially inward of a lowermost portion of the exterior sealing surface spaced axially closer to the threads than all other portions of the exterior sealing surface, the energizing groove further having a uniform radial depth circumferentially about the first tubular member for reducing cross-sectional thickness of an adjoining portion of the first tubular member over an axial length of at least 3% of the nominal diameter of the tubular connection, such that fluid pressure internal of the tubular connection forces the exterior sealing surface radially outward by flexing the first tubular member at a location along the axial length of the energizing groove to increase sealing effectiveness between the external and internal sealing surfaces of the first and second tubular members.

4,946,202

# OFFSET COUPLING FOR ELECTRICAL CONDUIT

Vincent Perricone, 44 Tuttle Pl., East Haven, Conn. 06512

Filed Apr. 14, 1989, Ser. No. 339,140

Int. Cl.<sup>5</sup> F16L 27/04

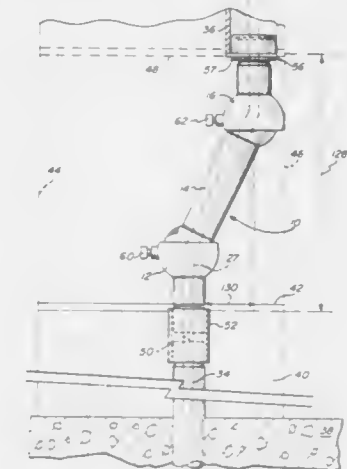
U.S. Cl. 285—166

20 Claims

1. A coupling for connecting between an electrical conduit and an electrical device for enclosing electrical wires passing therebetween, said conduit and device being laterally offset as well as spaced apart from each other, said coupling comprising:

(a) at least first, second, and third hollow tubular members extending along first, second, and third axes respectively and joined end to end by at least a pair of joint means to

form a unitary structure having relatively smooth interior wall forming a substantially unobstructed passageway suitable for accommodating passage of electrical wires therethrough, there being one joint means between said first and second tubular members and another joint means between said second and third tubular members, said joint means being angularly adjustable in any plane aligned with said second axis to permit alignment of said first, second, and third axes not only in coalignment with each



other, but also said first and third axes displaced one from the other by an offset distance corresponding to said lateral offset;

(b) means for coupling free ends of said first and third tubular members to said conduit and said device respectively to form said passageway therebetween for enclosing said electrical wires therein; and

(c) means associated with each joint means for securing each said joint means in a fixed angular orientation corresponding to said offset.

4,946,203

# WASTE PIPE CONNECTOR

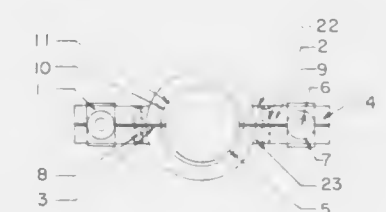
Joseph A. Giametta, 6912 Cheyenne St., Biloxi, Miss. 39532

Filed May 22, 1989, Ser. No. 355,447

Int. Cl.<sup>5</sup> E03C 1/00

U.S. Cl. 285—189

1 Claim



1. A waste pipe connector for mounting a fixture with an integral trap, such as a urinal to a drain pipe which extends through a wall comprising:

a cylindrical body divided longitudinally into two arcuate members having a pipe receiving socket, a pair of horizontal bars extending perpendicularly from the longitudinal sides of the cylindrical body, and a protrusion extending from the receiving socket;

a flexible gasket positioned on the inside of the cylindrical body having a lip that envelopes the protrusion; said receiving socket having an opening smaller than the



outside diameter of the gasket and including means for engaging and locking the gasket;  
 said pair of horizontal bars are positioned such that each pair of horizontal bars extend in a side-by-side relationship and where there is a screw hole in one of the horizontal bars of the pair of horizontal bars and a tapped hole in alignment with the screw hole in the other bar of the horizontal bars so that draw screws can be placed in the screw and tapped holes and used to secure the two bars together;  
 said arcuate members are positioned around the gasket which receives the drain pipe and wherein this arrangement is secured via the draw screws which when tightened in the screw holes pull the arcuate members around the gasket and results in a seal;  
 and wherein the bars have metal bolt holders which receive and hold a closet bolt which is able to slide on the bar to secure many different sizes of fixtures.

**4,946,204**  
**SNAP SWIVEL COUPLING FOR FLUID FLOW APPLICATIONS**

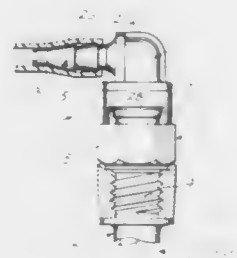
John A. Boticki, Racine, Wis., assignor to Fred Knapp Engraving Co., Inc., Racine, Wis.

Filed Mar. 3, 1989, Ser. No. 318,626

Int. Cl.<sup>5</sup> F16L 27/08

U.S. Cl. 285—281

26 Claims



1. A swivel coupling, comprising a tubular socket member having a line connecting end and a coupling end, a tubular stem member having a line connecting end and coupling end telescoped into said coupling end of said socket, said coupling ends including integral complementing annular projection and recess portions having uninterrupted and continuous peripheral annular bearing surfaces, said annular projection portion having a diameter greater than the diameter of said recess and thereby defining a close fitting bearing unit with the peripheral annular bearing surfaces in internal stress and creating forced engagement therebetween to establish a smooth rotational support of said socket member and said stem member.

**4,946,205**  
**CONNECTOR FOR CONNECTING SMALL DIAMETER PIPE**

Katsushi Washizu, Shizuoka, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Feb. 27, 1989, Ser. No. 316,479

Claims priority, application Japan, Mar. 1, 1988, 63-48075  
 The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> F16L 39/00

U.S. Cl. 285—319

7 Claims

1. A connector for connecting a small diameter pipe, comprising:  
 a pipe;  
 a joint body formed with a bore extending axially therethrough, said bore including a large diameter portion defining an insertion bore for said pipe, an intermediate diameter portion and a small diameter portion in sequence from an inlet thereof;  
 a seal ring attached to said intermediate diameter portion

and elastically joined to an outer peripheral surface of said pipe when inserting said pipe into said insertion bore;  
 a holder provided with a pair of protrudent elastic stoppers at one end thereof;  
 an opening, formed in said large diameter portion, in which said holder is fitted; and



an annular swelling wall, shaped on the outer periphery of said pipe, for engaging with said elastic stoppers, thus positioning said pipe and preventing its removal, characterized by a confirmative member so stopped in said opening formed in said large diameter portion of said joint body as to be demountable therefrom only when said pipe is set in an adequate connecting position with respect to said joint body.

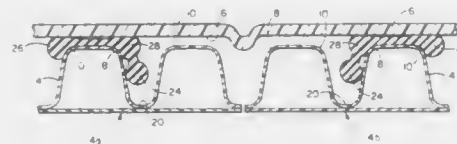
**4,946,206**  
**BIDIRECTIONAL CORRUGATED PIPE-RIB SEAL**  
 Stephen L. Roe, Willmar; Eldon G. Bonnema, Prinsburg, and John L. Seehausen, Morton, all of Minn., assignors to Prinsco, Inc., Prinsburg, Minn.

Filed Feb. 27, 1989, Ser. No. 315,718

Int. Cl.<sup>5</sup> F16L 17/02

U.S. Cl. 285—369

28 Claims



1. A section of corrugated plastic pipeline comprising:  
 (a) a section of corrugated plastic pipe having axially spaced annular ribs with circumferentially extending valleys disposed therebetween, each of said ribs having a crest with axially spaced distal and proximal areas;  
 (b) a sleeve constructed and arranged to telescopically receive in close-fitting relation said section of pipe there-within;  
 (c) a flat annular body of elastomeric readily flowable incompressible rubber-like material;  
 (d) said body in its free form having its major cross-sectional dimensions extending in its radial plane, said radial dimensions of said body being less than the cumulative axial dimension of one said valley and rib of said section of corrugated pipe;  
 (e) said body having a predetermined annular interior diameter and having its interior diametrical surface constructed and arranged to be received in snug-fitting relation within one of said valleys of said section of corrugated plastic pipe;  
 (f) said body having an annular circumferential sealing rib defining its circumference, said sealing rib being constructed and arranged to engage and seal against said distal areas of said crest of an adjacent rib of said section of corrugated plastic pipe;  
 (g) a second annular sealing rib disposed radially inwardly of said circumferential sealing rib and extending concentrically thereof and being constructed and arranged to en-

gage and seal against said proximal areas of said crest of said adjacent rib of said corrugated plastic pipe;  
 (h) said second sealing rib of said gasket, when the latter is in its free form, being disposed radially inwardly of said circumferential sealing rib a distance approximating the axial dimension between said distal and said proximal areas of said crest of said adjacent rib of said corrugated plastic pipe;  
 (i) said second sealing rib and said circumferential sealing rib having axial dimensions at least greater than the axial dimensions of the portions of said body disposed therebetween;  
 (j) said circumferential sealing rib being disposed in sealing relation between the interior surface of said sleeve and said distal areas of said crest of said adjacent rib of said corrugated plastic pipe; and  
 (k) said second sealing rib being disposed in sealing relation between the interior surface of said sleeve and said proximal areas of said crest of said adjacent rib of said corrugated plastic pipe.

**4,946,207**  
**ELECTRICALLY CONTROLLED LOCKS**

Peter J. Gillham, Cranbrook, United Kingdom, assignor to Newman Tonks Security Limited, United Kingdom  
 PCT No. PCT/GB88/00810, § 371 Date May 12, 1989, § 102(e)  
 Date May 12, 1989, PCT Pub. No. WO89/02967, PCT Pub. Date Apr. 6, 1989

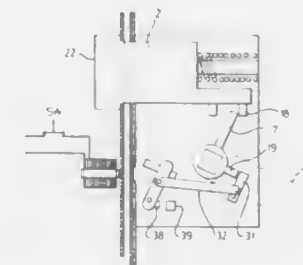
PCT Filed Sep. 30, 1988, Ser. No. 358,369

Claims priority, application United Kingdom, Oct. 3, 1987, 8723266

Int. Cl.<sup>5</sup> E05C 1/16

U.S. Cl. 292—173

9 Claims



1. An electrically controlled lock and keep assembly (10,20) comprising a locking member (12) which is movable between a locking position in which it projects from the lock assembly (10) and can engage in the keep assembly (20) and a releasing position in which it is substantially withdrawn, a locking mechanism (30) including a dead-locking element (31) movable between an operative position in which the locking mechanism is dead-locked to hold the locking member in its locking position and an inoperative position in which the locking mechanism is freed to enable the locking member (12) to be withdrawn, and an electrically operated control device (35) for controlling movement of said dead-locking element (31) at least from its operative position to its inoperative position, characterized in that said control device (35) is associated with the keep assembly (20) and is operatively interconnected with the dead-locking element (31) through a magnetic coupling means (37,34), wherein said magnetic coupling means comprises a first magnetic element (37) associated with the keep assembly (20) and a second magnetic element (34) associated with the lock assembly (10), said first and second magnetic elements being coupled by a magnetic flux extending between said keep assembly (20) and said lock assembly (10).

**4,946,208**  
**ADJUSTABLE STRIKER ASSEMBLY WITH ANTI-THEFT PROTECTION**

Robert J. Myslicki, West Bloomfield; Carl D. May, Farmington Hills, and Douglas L. Russell, Lake Orion, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 12, 1989, Ser. No. 364,948

Int. Cl.<sup>5</sup> E05C 3/26

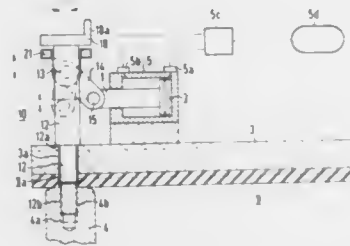
U.S. Cl. 292—216

3 Claims



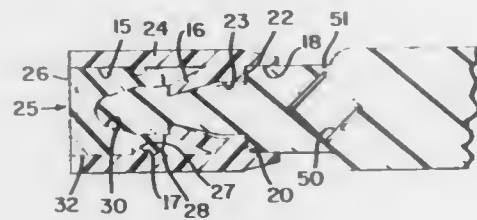
1. In combination with a vehicle having a compartment which is defined in part by a vehicle panel having interior and exterior sides and first and second apertures therethrough, a vehicle closure which is mounted on the vehicle for movement between open and closed positions with respect to the compartment, and latch means mounted on the closure, a striker assembly mounted on the vehicle panel comprising, a striker support member having an aperture therethrough, a striker mounted to the support member for engagement by the latch means to hold the closure in a closed position, first stud means of a given diameter carried by the striker support member and extending through said first aperture of the vehicle panel to the exterior side of the vehicle panel, nut means threaded on the stud means on the exterior side of the vehicle panel for securing the stud means and the striker support member to the vehicle panel, said first aperture in said vehicle panel having a maximum transverse dimension which is greater than the given diameter of said first stud means to permit the stud means to be engaged from the exterior side of the vehicle panel and moved within the first aperture in said vehicle panel to adjust the position of the striker support member and striker relative to the compartment when the closure is in a closed position and the latch means is engaged with the striker, and anti-theft means preventing release of the striker support member from the vehicle panel and movement of the closure from its closed position to an open position should the nut means be released, the anti-theft means including second stud means carried by and extending through said second aperture of said vehicle panel and extending through the aperture in the striker support member, said second stud means having a round convex head located on the exterior side of said vehicle panel, and securing means operatively connected to said second stud means for securing the striker support member to the vehicle panel and with said rounded convex head at its underside clampingly engaging the exterior side of said vehicle panel after the striker support member has been secured to the vehicle panel, the second stud means being of lesser transverse dimension than the transverse dimension of said aperture in said striker support member aperture to permit adjustment of the striker support member and first stud means relative to the second stud means.

**4,946,209**  
**FAST-ACTING CLAMPING DEVICE FOR RELEASABLY CONNECTING TWO COMPONENTS**  
 Jakob Stauner, Nuernberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany  
 Filed Feb. 21, 1989, Ser. No. 313,620  
 Claims priority, application Fed. Rep. of Germany, Feb. 23, 1988, 8802326[U]  
 Int. Cl.<sup>5</sup> E05C 5/04  
 U.S. Cl. 292—256 11 Claims



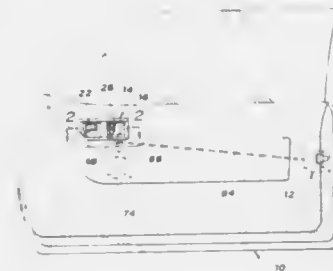
1. Fast-acting clamping device for releasably connecting first and second components, comprising a bolt passing through an opening in the first component and having one end with a head and another end with anchoring means anchored in an opening in the second component, a cylinder disposed on the first component, a piston disposed in said cylinder, a rod connected to said piston, and a lever configuration connected between said rod and said bolt for generating a clamping force between said head and the first component when a pressure medium is applied to said cylinder.

**4,946,210**  
**TAMPER RESISTANT SHACKLE SEAL**  
 Charles Fuehrer, Scarsdale, N.Y., assignor to Stoffel Seals Corporation, Nyack, N.Y.  
 Filed Jun. 20, 1988, Ser. No. 209,056  
 Int. Cl.<sup>5</sup> B65D 33/34  
 U.S. Cl. 292—318 9 Claims



1. A resilient seal housing open at both ends and a resilient shackle, said housing and a shackle end having means for locking engagement when the shackle end is inserted into one end of the housing, and means for closing the other end of the housing, comprising a resilient plug having an end wall at one end and having an outer wall of a size to be frictionally received within the housing, said housing having an inwardly extending ridge spaced from said one end and said plug having groove means adapted to receive said ridge and spaced from said end wall of said plug, said plug having a cavity in its other end of a configuration closely to receive the extreme end of said shackle to prevent inward compression of said plug within the portion thereof having said groove means, said plug being entirely received within said housing so that no portion thereof extends outside of said housing.

**4,946,211**  
**LATCH CONTROL ARRANGEMENT**  
 Bela Gergoe, Birmingham, and Joseph M. Osenkowski, Detroit, both of Mich., assignors to General Motors Corporation, Detroit, Mich.  
 Filed Apr. 24, 1989, Ser. No. 342,267  
 Int. Cl.<sup>5</sup> E05B 3/00  
 U.S. Cl. 292—336.3 4 Claims



1. In combination with a vehicle door latch having a locking member movable between locked and unlocked positions to place the door latch in locked or unlocked positions, a door latch control arrangement for moving the locking member between its locked and unlocked positions comprising, a support, operating means mounted on the support and coupled to the locking member for moving in unison with the locking member between locked and unlocked positions, power operating means coupled to the operating means for moving the operating means and locking member, a manual operator mounted on the support for movement relative thereto in opposite directions from a neutral position, means normally locating the manual operator in the neutral position, means operable upon movement of the manual operator from the neutral position in either direction to a first operating position for actuating the power operating means to move the operating means and locking member between their positions, and cooperating means on the manual operator and operating means operable upon movement of the manual operator past either first operating position for moving the operating means and locking member in unison between their positions.

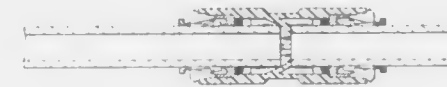
**4,946,212**  
**LIFTING MEANS FOR A PAPER ROLL**  
 Robert C. Pruitt, Newberry, S.C., assignor to Carolina Slings Co., Inc., Hardeeville, S.C.  
 Filed Apr. 19, 1989, Ser. No. 340,447  
 Int. Cl.<sup>5</sup> B65H 49/00; B66C 1/16  
 U.S. Cl. 294—67.1 11 Claims



11. A lifting means for a roll of paper received on a hollow, cylindrical core, said lifting means comprising:  
 (a) a metal supporting plate having a first plane, said metal plate having an upper surface;  
 (b) a metal loop disposed in the central portion of said sup-

porting plate, said loop having a straight bottom side and a straight upper side in a common second plane and spaced from each other, said loop having ends joining the adjacent ends of said upper side and said bottom side, said common plane being perpendicular to said first plane, whereby said upper side of said loop is spaced above said upper surface;  
 (c) means for securing said bottom side of said loop directly to said upper surface of said plate;  
 (d) a flat, flexible strap having an upper bight and a lower bight, said lower bight extending around a portion of said upper side of said loop, the width of said strap being less than the distance between said ends of said loop and being sufficiently wide that said lower bight engages and extends along a substantial part of the straight portion of said upper side of said loop; and  
 (e) said flexible strap being sufficiently long that it may protrude through the hollow portion of said core and outwardly of an upper end portion of said hollow core so that said upper bight extends externally of said core.

**4,946,213**  
**TUBE COUPLINGS**  
 John D. Guest, "Iona", Cannon Hill Way, Bray, Maidenhead, Berkshire, United Kingdom  
 Filed Mar. 22, 1989, Ser. No. 327,310  
 Claims priority, application European Pat. Off., Mar. 25, 1988, 88302711.2  
 Int. Cl.<sup>5</sup> F16L 21/02  
 U.S. Cl. 285—31 8 Claims



1. A tube coupling comprising a coupling body having a throughway open at opposite ends thereof to receive tubes to be coupled to the body and to enable a tube to pass through the body, two collets disposed in the respective ends of the coupling body through which tubes to be inserted in the body pass, the collets having resilient arms extending axially into the throughway to grip the respective tubes and the coupling body having internal frusto-conical cam surfaces adjacent said open ends and tapering towards the respective ends of the body to be engaged by the resilient arms of the collet with movement of the respective tubes outwardly of the coupling body to press the arms inwardly against the outer surfaces of tubes, and means in the throughway between said frusto-conical cam surfaces to limit the entry of a tube into the coupling body when inserted from one end thereof while permitting the tube to pass through the body when inserted from the other end.

**4,946,214**  
**CONTAINER COLLAPSIBLE TO FORM A FLAT PLATFORM STRUCTURE**  
 Dietmar J. Neumann, 67 Lakeshore Rd., Pointe Claire, Quebec, Canada H9S 4H5, and Josef Linecker, Salzburgerstrasse 9, A-5230 Mattighofen, Austria  
 Continuation-in-part of Ser. No. 921,076, Oct. 21, 1986, abandoned. This application Apr. 13, 1988, Ser. No. 183,447  
 Claims priority, application Austria, Oct. 25, 1985, 3086/85  
 Int. Cl.<sup>5</sup> B60P 3/42  
 U.S. Cl. 296—10 26 Claims

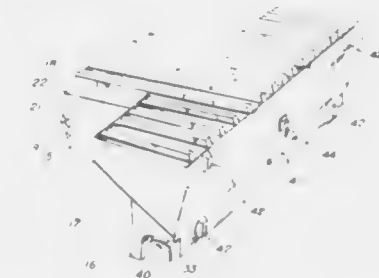
1. A collapsible container having a closed position forming a flat platform configuration, and an open position, the container comprising:  
 a rectangular top frame;  
 a rectangular bottom frame at least as large as the top frame and substantially parallel to the top frame;  
 collapsible strut members, each having a pivot connection at one end to a side of one frame, and a sliding connection at

the other end to a side of the other frame, such that the collapsible strut members are substantially perpendicular to the top and bottom frame in the open position and substantially parallel to the top and bottom frame and within the flat platform configuration in the closed position;



at least two opposing walls connected to the top frame and the bottom frame, the walls having predetermined fold lines therein between lateral surfaces to ensure the walls fold and unfold on the fold lines within the platform configuration; and means for raising the top frame to the open position and for lowering the top frame to the closed position.

**4,946,215**  
**STORAGE DEVICE FOR A PICKUP TRUCK BED**  
 Clyde Taylor, 8555 Newsom Sta. Rd., Nashville, Tenn. 37221  
 Filed Sep. 28, 1988, Ser. No. 250,327  
 Int. Cl.<sup>5</sup> B60R 9/00  
 U.S. Cl. 296—37.6 10 Claims



1. A storage device for a pickup truck bed having a bottom bed wall and opposed side bed walls projecting upward from the bottom bed wall, comprising:  
 (a) a compartment element having a longitudinal rear wall, a longitudinal front wall and opposed first and second end walls and an open top, said compartment element being adapted to be received on the bottom bed wall of a pickup truck bed with said longitudinal rear and front walls extending transversely of said bed between said side bed walls, in an operative position;  
 (b) a lid element having a rear panel, a front panel, opposed first and second end panels, a top panel, and an open bottom;  
 (c) hinge means connecting said rear panel to said rear wall to permit said lid element to swing between a closed position engaging said compartment element to enclose the inside space between said compartment element and said lid element, and an open position away from said compartment element;  
 (d) rear securing means comprising an elongated mounting tube having opposite open ends and fixed longitudinally on said rear wall, first and second elongated lock shafts telescopically received within said mounting tube and having free ends projecting from said opposite ends, gripping means on each of said free ends to securely grip the corresponding opposite side bed walls of a pickup truck in said operative position, and spring means normally biasing



said lock shafts outward from said mounting tube toward engagement with the opposite side walls;

(e) front securing means comprising first and second slide bearings mounted inside said front wall adjacent said corresponding opposite end walls, a first lock rod having a free end slidably received in said first slide bearing for longitudinal movement transversely of said first end wall, a second lock rod having a free end slidably received in said second slide bearing for longitudinal movement transversely of said second end wall, gripping means on said free ends of said lock rods, said lock rods being slidably movable between a locking position projecting transversely from the outside of said end walls in which said gripping means engage the opposite side bed walls in said operative position, and a retracted unlocked position;

(f) rod securing means for holding said lock rods in said operative positions; shaft lock means for locking said lock shafts in various positions protruding from said mounting tube; and

(g) lock means for securing said lid element to said compartment element in said closed position.

4,946,216

## VEHICLE WITH INTEGRATED SEAT RISERS

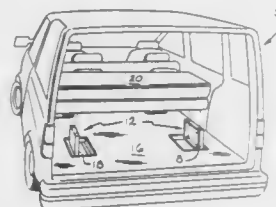
Robert L. Demick, East Detroit, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Sep. 28, 1989, Ser. No. 413,956

Int. Cl.<sup>5</sup> B60N 2/04

U.S. Cl. 296—63

15 Claims



1. In a vehicle having a floor and a removable unitary seat member including a cushion portion and a back portion mounted on the rear edge of said cushion portion, a pair of seat risers, each said seat riser comprising:

- a generally box shaped support structure being pivotally attached to said floor enabling said support structure to rotate between a generally concealed horizontal position and a generally vertical position, said support structure also having one wall corresponding to and being flush with said floor of said vehicle when in said horizontal position;
- means for locking said support structure in said vertical position; and
- means on said support structure for engaging said removable seat when said support structure is in said vertical position.

4,946,217  
PICKUP BOX COVERS

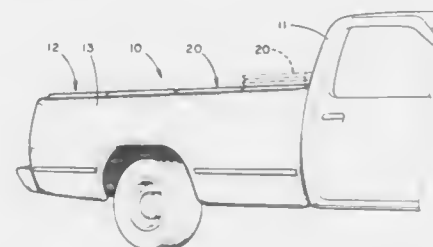
Charles J. Steffens, Grand Rapids, and John Kooiker, Caledonia, both of Mich., assignors to Steffens Enterprises, Inc., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 140,533, Jan. 4, 1988, Pat. No. 4,844,531. This application Jul. 17, 1989, Ser. No. 380,396

Int. Cl.<sup>5</sup> B60P 7/02

U.S. Cl. 296—100

9 Claims



1. Means for providing a seal between a foldable cover for a cargo compartment of a truck and the sides of the compartment, said sides having a flat top portion extending the length thereof, said means comprising: a generally rigid L-shaped outer member extending the length of each of said sides and having a horizontal first leg adapted to be seated on and mounted to the top of said sides of the compartment and a second leg extending upwardly from and along the edge thereof remote from the cargo compartment; a resilient seal member having a base leg and a seal forming leg extending upwardly from said base leg, said base leg of said seal being secured to said first leg of said outer member; said seal forming leg being inclined outwardly and upwardly away from the interior of said compartment and adapted to be folded outwardly and downwardly when the cover is seated thereon whereby the plane of contact between the seal and the cover is spaced above the surface to which the seal is attached at least the thickness of the folded leg to positively prevent the entrance of moisture into the compartment.

4,946,218

## VEHICLE STABILIZING DEVICE

Peter L. Jurik, 275 Solar Court, Coquitlam, B.C. V3K 6B3, Canada

Filed Mar. 21, 1989, Ser. No. 326,644

Int. Cl.<sup>5</sup> B62D 35/00

U.S. Cl. 296—180.1

11 Claims



1. A stabilizing arrangement adapted for use in a vehicle, comprising a plurality of undulations defining a series of convex cylindrical surfaces facing a road surface upon which the vehicle is intended to ride and extending between sides of the vehicle, the plurality of undulations running along a longitudinal direction on the underside of the vehicle and spaced from the road surface such that low pressure areas are formed at portions of the undulations closest to the road surface when relative motion between the vehicle and the road surface causes passage of air over the undulations.

4,946,219  
ROOF SIDE SEALING MECHANISM FOR  
AUTOMOTIVE VEHICLE HAVING A HOOD ATTACHED  
THERETO

Harumi Okai, and Yukiya Takada, both of Hamamatsu, Japan, assignors to Suzuki Motor Company, Ltd., Shizuoka, Japan

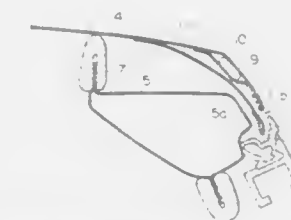
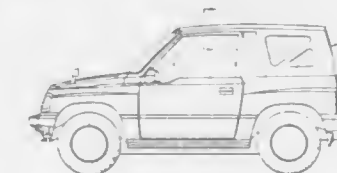
Filed Mar. 29, 1989, Ser. No. 330,117

Claims priority, application Japan, May 18, 1988, 63-120968

Int. Cl.<sup>5</sup> B60J 7/10

U.S. Cl. 296—213

3 Claims



1. A roof side sealing mechanism for an automotive vehicle of the type having a hood removably attached thereto, comprising:

- a roof side frame for support of the hood including a frame side surface withdrawn inwardly of a door sash a predetermined distance in a door sash closed position, and including a lateral frame surface contacting a door sash weather strip in the door sash closed position; a roof side frame weather strip element connected to the roof side frame disposed above the roof side frame for contact with the hood; a hood pad provided inside a side surface of the hood, the side surface of the hood extending downwardly a distance to adjacent said door sash and defining a gap between said side surface of the hood and an upper end of said door sash; a sealer wrap provided in the interior of the hood, one end of said sealer wrap being secured to the inner surface of said hood at a predetermined position and another end of said sealer wrap being provided as a free end positioned adjacent said gap, said sealer wrap extending a distance beyond said side surface of said hood and beyond said gap.

4,946,220

## VENTILATED CHAIR OR SIMILAR DEVICE

David Wyon, Lillmyravägen 47, S-804 27 Gävle, Sweden, and Christer Tennstedt, Smedjegatan 14, S-802 50 Gävle, Sweden

PCT No. PCT/SE88/00401, § 371 Date Jun. 14, 1989, § 102(e)

Date Jun. 14, 1989, PCT Pub. No. WO89/01306, PCT Pub.

Date Feb. 23, 1989

PCT Filed Aug. 9, 1988, Ser. No. 346,830

Claims priority, application Sweden, Aug. 17, 1987, 8703176

Int. Cl.<sup>5</sup> A47C 7/72

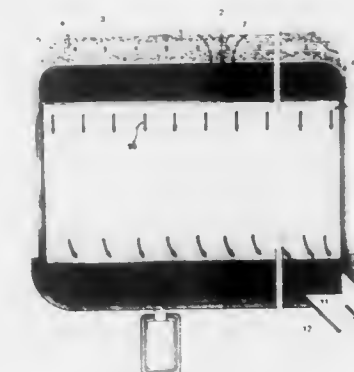
U.S. Cl. 297—180

19 Claims

1. In a body-supporting device forming at least one of the seat and backrest of a chair and arranged to avoid sweating caused by the thermal insulating capacity of the chair, wherein at least those sections of the exterior surface of the device that form support surfaces for parts of the body of a person sitting in the chair are made of a material that is easily permeated by air, at least one opening to the exterior is provided in said device to communicate with the interior side of said air-permeable sections, a suction device is provided capable of creating a negative air pressure and is connectable to said at least one

opening, and the interior of the body-supporting device is so arranged that the suction device, when connected and running, causes air that is exterior to said support surfaces to be drawn through the air-permeable sections via the interior of the body-supporting device and out of it through said at least one opening and a suction-equalizing means is provided to produce a substantially even distribution of negative air pressure generated by the suction device over the inner side of the air-permeable sections forming the support surfaces, the improvement wherein the suction-equalizing means comprises:

- a bag of substantially airtight material on the interior side of said air permeable material opposite to said external surface;
- at least one opening in said bag tightly connected to said at least one opening in the chair connectable to the suction device;
- a plurality of holes through said bag located adjacent to said sections forming said support surfaces and arranged in a



substantially U-shaped pattern in the seat and a substantially straight line pattern in the backrest;

- a porous air stream diverging body of foamed plastic within said bag having side walls tightly engaging portions of said bag and closing outer pores in said side walls, a first large surface facing said holes and a second large surface facing in a direction substantially away from said first large surface, said at least one opening in said bag being adjacent a part of said second large surface so that air drawn into said bag by said suction device through said holes passes through said porous body and through said at least one opening;
- a first layer of fibrous material disposed between said first large surface and said bag so that engagement of said bag against said first large surface and resultant sealing of surface pores of said porous body at said first large surface are prevented and air drawn through said holes into said bag passes through said first layer of fibrous material.

4,946,221

## INFANT SEAT COVER

Isabel C. Livingston, R.D. 2, Box 134B, Hudson, N.Y. 12534

Filed Mar. 21, 1988, Ser. No. 170,880

Int. Cl.<sup>5</sup> A47C 7/66

U.S. Cl. 297—184

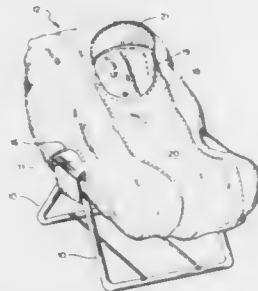
1 Claim

1. For use with an infant car seat having an upwardly open rigid frame within which an infant reclines facing outwardly, a removable cover separate from said seat and frame comprising (a) a body of pliable material assembled from edge-joined sections in non-planar form and including

- i. a peripheral portion adapted to fit over and around the seat frame,
- ii. a hem forming a casing along substantially all of the peripheral portion,
- iii. the hem being continuous and the casing being discon-

tinuous to define cut-outs through which a lap belt may be directed, and

- iv. a central portion adapted to extend continuously and loosely over the entire upwardly open frame and the infant reclining therein except for a face opening adapted to register with the face of the reclining infant,
- v. the central portion including a puffed frontal portion adapted to fit particularly loosely over the legs of the reclining infant,



- vi. the central portion also including a peak element projecting from that edge of the face opening adapted to extend across the forehead of the reclining infant; and
- (b) a closed-loop elastic element fitted within the peripheral casing to releasably grip the frame;
- (c) said cover being entirely without rigid framing of its own separate from the seat with which it is used and hence being foldable into compact form when not in use;
- (d) said cover being entirely without elements fastened about any part of the infant's body including the head and hence allowing maximum freedom of movement for the infant.

4,946,222

## LIFT PLATFORM FOR CHAIRS

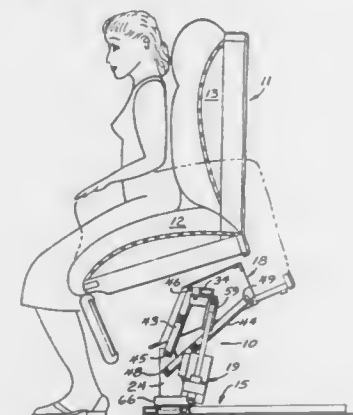
Carl G. Matson, Little Rock, Ark., assignor to Triangle Engineering of Arkansas, Inc., Jacksonville, Ark.

Filed Jan. 30, 1989, Ser. No. 303,914

Int. Cl.<sup>5</sup> A47C 1/02

U.S. Cl. 297—345

7 Claims



1. An improved lift platform for moving a chair between a raised position and a lowered position comprising: a base adapted to rest on a support surface and having a front and a rear-corresponding respectively to the front and the rear of said chair; left and right stanchions secured to the left and right sides of the front of said base; a lift frame including left and right side frame sections; left and right side lift linkages pivotally connected at their forward ends respectively to said left and right stanchions and pivotally connected to their rear ends respectively to said left and right side frame sections of said lift frame, each lift linkage including an upper link and lower link forming a four-bar linkage with their associated stanchion and

side frame section to tilt said lift frame downwardly and forwardly in the raised position, the upper link of each linkage being shorter than the associated lower link; and a linear actuator pivotally connected at one end to a forward portion of said base and pivotally connected at the other end to said lift frame adjacent a central rear portion thereof and characterized in that said left and right side lift linkages and said linear actuator are constructed and arranged such that the line of thrust of said linear actuator lies generally along a line, the extension of which, when viewed from the side, lies between the pivot connecting of said upper and lower links to said lift frame and thereby maintains said upper and lower links of said left and right side linkages in tension during movement between said raised and lowered positions.

4,946,223

## REDUNDANT SEAT LOCKING MECHANISM

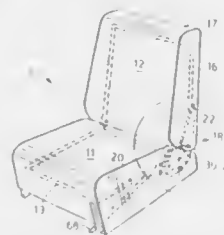
George Croft, 3178 Windwood Dr., Mississauga, Ontario, Canada L5N 2J9, and Gulam Premji, 4503 Kimbermount Ave., Mississauga, Ontario, Canada L5M 4J4

Filed Sep. 15, 1989, Ser. No. 409,559

Int. Cl.<sup>5</sup> A47C 1/026

U.S. Cl. 297—367

5 Claims



1. In a vehicle seat assembly having a backrest member pivotally moveable with respect to a seat member, a device for controlled adjustment of the inclination of the backrest member with respect to the seat member, said device comprising:
  - (a) a first hinge bracket secured to one of said members and a second hinge bracket secured to the other of said members, wherein the one of said first and second hinge brackets which is secured to the backrest member is pivotally moveable with respect to the other of said first and second hinge brackets;
  - (b) a gear sector means mounted on said second hinge bracket;
  - (c) a gear means mounted on said first hinge bracket in meshing engagement with said gear sector means so as to rotate upon said pivotal movement of the said one of the first and second hinge brackets;
  - (d) a first locking gear affixed to the gear means for rotation therewith;
  - (e) a first locking pawl pivotally mounted on the first hinge bracket for movement between a first position in which the first locking pawl restrainingly engages the first locking gear and a second position in which the locking pawl is removed from said restraining engagement;
  - (f) a second locking pawl pivotally mounted on the first hinge bracket for movement between a first position in which the second locking pawl restrainingly engages the first locking gear and a second position in which the second locking pawl is removed from said restraining engagement;
  - (g) a handle means pivotally mounted on the first hinge bracket so as to be moveable between a first position in which a cam portion of the handle means bears upon a head portion of the first locking pawl so as to urge the first locking pawl into its said first position, and a second position in which said cam portion bears upon a tail portion of the first locking pawl so as to urge the first locking pawl into its said second position;

- (h) a first spring means mounted on the first hinge bracket so as to be adapted to bias the second locking pawl towards its said first position;
- (i) a second spring means of greater strength than said first spring means, interconnected between the handle means and the second locking pawl so as to bias the handle means to said first position of said handle means, while at the same time biasing the second locking pawl to its said second position against said biasing of the first spring means, such that, upon failure of the second spring means, the second locking pawl is biased by the first spring means to its first position so as to restrainingly engage the first locking gear, thereby to hold the backrest member against said pivotal movement.

4,946,224

## COMBINATION WOOD-METAL CHAIR

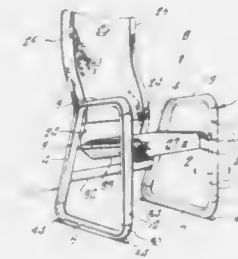
Roger K. Leib, 1064 S. Crescent Heights, Los Angeles, Calif. 90035

Filed Mar. 21, 1988, Ser. No. 171,420

Int. Cl.<sup>5</sup> A47C 1/02

U.S. Cl. 297—445

33 Claims



1. A chair comprising:

- (a) a pair of spaced-apart, wooden side members, each side member forming a front leg and an armrest;
- (b) a pair of spaced-apart, frame members forming a seat and a backrest;
- (c) a pair of metallic support elements pivotally supporting the frame members to pivot substantially about the front legs, each support element being connected with the front leg of a respective member, each support element comprising a substantially rigid metal post extending at least partly along the length of the corresponding front leg and being at least partly embedded therein, the metal post being substantially rectangular in cross section; and
- (d) cover means substantially hiding the metal posts from normal view so that the side members have an overall substantially wooden appearance.

4,946,225

## VEHICLE ROOF

Hans Jardin, Inning, Fed. Rep. of Germany, assignor to Webasto AG Fahrzeugtechnik, Gauting, Fed. Rep. of Germany

Filed Aug. 15, 1988, Ser. No. 232,175

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727722

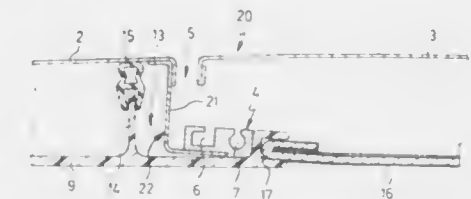
Int. Cl.<sup>5</sup> B60J 7/00

U.S. Cl. 296—213

20 Claims

1. Vehicle roof of the type having a fixed roof area with a roof opening formed therein, a closure panel for selectively opening and closing said opening, an installation unit and an interior headliner for covering an interior side of said fixed roof area, wherein said installation unit comprises drive and guide parts including a guide member having a channel for an actuating device and track means for a guide element of the closure panel at each side of the roof opening, and attachment means extending from said installation unit to the fixed roof area for attaching said installation unit to the fixed roof area along the perimetric area of the roof opening, and wherein a

water drainage means is provided that is mounted independently of said installation unit and said attachment means, and



is positioned below said attachment means in association with said interior headliner.

4,946,226

## VEHICLE SEAT ASSEMBLY WITH ATTITUDE ADJUSTABLE ARMREST

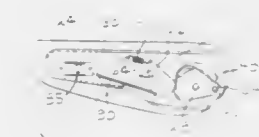
Randy D. Hurn, Livonia, and John W. Green, Oak Park, both of Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Jul. 24, 1989, Ser. No. 383,715

Int. Cl.<sup>5</sup> A47C 7/54

U.S. Cl. 297—417

14 Claims



1. A vehicle seat assembly comprising:

- a generally horizontal lower seat cushion having a rear end;
- a seat back extending upwardly from the rear end of said seat cushion in a substantially upright position, said seat back being pivotally mounted to enable said seat back to be reclined rearwardly from said upright position as desired by a seat occupant;
- at least one armrest mounted to said seat back and extending forwardly from said seat back in an operative position, said armrest being pivotally mounted to said seat back about a main pivot having a first axis to enable the armrest to be raised to an upright position adjacent said seat back; and
- lock means operatively associated with said armrest for preventing downward rotation of said armrest from said operative position, said lock means including a stationary cam member mounted to said seat back, a locking member pivotally mounted to said armrest about a secondary pivot having a second axis parallel to said first axis, and means for biasing said locking member into surface to surface engagement with said cam member to increase the engagement force sufficient to enable friction forces acting on said locking member in response to downward rotation forces on said armrest to urge said locking member to pivot toward said cam member to increase the engagement force between the locking member and the cam member to prevent sliding motion of the locking member relative to the cam member to lock the armrest in said operative position.



4,946,227

## BUCKET WHEEL ASSEMBLY

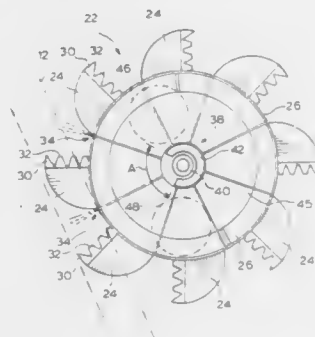
Raj Paul, Calgary, Canada, assignor to Esso Resources Canada Limited, Calgary, Canada

Filed May 22, 1989, Ser. No. 354,602

Int. Cl.<sup>5</sup> F21C 25/60

U.S. Cl. 299—39

5 Claims



1. A bucket wheel assembly for excavating solid material from the ground which can be slurried with water, said apparatus comprising:

a series of bucket members mounted on a framework rotatable about a substantially horizontal axis, said bucket members being secured to the framework at spaced positions around the periphery thereof, each bucket member having a leading edge portion engagable with the ground as the framework rotates to cause material to be scooped from the ground into a bucket member,

a series of nozzle means mounted around the framework, each nozzle means comprising a set of nozzles aligned in a substantially straight row which extends transversely of the bucket wheel assembly in a direction substantially parallel to the axis of rotation of the framework and being located between an adjacent pair of bucket members and spaced in the direction of movement of the bucket members from the leading edge portion of a following bucket member, and

rotary valve means connected to the series of nozzle means and having means to enable a source of liquid under pressure to be connected thereto,

said rotary valve means being operated by rotation of the framework, when a source of liquid under pressure is connected to said rotary valve means, to cause liquid under pressure to be selectively supplied from said source of liquid under pressure to each nozzle means in turn when such nozzle means and its following bucket member are approaching the ground to cause liquid from such nozzle means to impinge on the ground and form a slurry of the said material which is subsequently scooped into a following bucket member.

4,946,228

## DEVICE FOR FASTENING A WHEEL COVER

Tung-Fu Hsu, 70, Cheng Tze Lias, Chungking Li, Tainan, Taiwan, and Mark J. Plumer, 13010 South Broadway, Los Angeles, Calif. 90061

Filed Jul. 11, 1989, Ser. No. 378,054

Int. Cl.<sup>5</sup> B60B 7/06

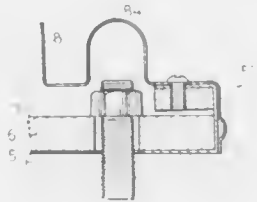
U.S. Cl. 301—37 S

4 Claims

1. A device for mounting on a wheel cover to conceal an exposed end of the axle on which said wheel is mounted, said wheel cover having a plurality of annularly disposed bores formed therein, comprising:

an annular mounting plate having a plurality of openings disposed peripherally, said plate capable of being mounted on said axle so that each of said openings can respectively

align with the corresponding bore of said wheel cover, said plate having at least a pair of first locking apertures; a plurality of first screw members, each of which passes through each said bore and each said opening so as to lock said plate on said wheel cover with a nut; a hub cover having a plurality of recessed portions, each of which is aligned with said openings and dimensioned



slightly larger than the nut on the end of each of said first screw members so as to receive and cover a respective one of said first screw members and its corresponding nut, said hub cover also including a pair of holes, each of which is positioned to align with the corresponding one of said locking apertures; and a pair of second screw members passing through said hole and said apertures to lock said hub cover to said plate.

4,946,229

## ADAPTIVE AIR BRAKE CONTROL SYSTEM

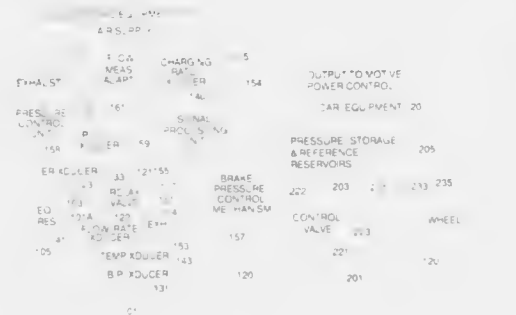
Milton C. Deno, Satellite Beach; Eugene A. Smith, Jr., Palm Bay, and Dale H. Delaruelle, Melbourne, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Continuation of Ser. No. 232,466, Aug. 15, 1988, Pat. No. 4,859,000. This application Jun. 2, 1989, Ser. No. 360,417

Int. Cl.<sup>5</sup> B60T 15/22

U.S. Cl. 303—33

33 Claims



1. For use with the brake system of a railway train having a locomotive which contains an equalizing reservoir and a brake pipe coupled in fluid communication therewith through a brake pipe control valve, said brake pipe control valve being coupled to a source of braking control fluid through which said brake pipe is controllably charged, and one or more cars each of which contains a brake pressure reference reservoir and a train fluid line coupled in fluid communication therewith through a brake mechanism control valve, said fluid line and said brake pipe being in fluid communication with one another, so that said fluid line may be controllably charged through said brake pipe control valve, in accordance with the control of the fluid pressure within said equalizing reservoir, a method of controlling the pressure in said equalizing reservoir, and thereby the pressure in said fluid line through which said brake control mechanism is controlled, in response to a request for a reduction in the pressure in said equalizing reservoir, comprising the steps of:

- monitoring the change in pressure in said brake pipe in response to a request for application of the train's brakes;
- in response to the pressure within said brake pipe reaching a preselected condition, storing the value of the pressure within said equalizing reservoir; and
- causing the pressure in said equalizing reservoir to be changed to an amount corresponding to said requested reduction modified by the difference between a preestablished equalizing reservoir pressure and said stored equalizing reservoir pressure, whereby the pressure in said fluid line is caused to be reduced by an amount corresponding to said requested reduction.

4,946,230

## METHOD AND AN APPARATUS FOR CHARGING AN ANTI-LOCK BRAKE SYSTEM WITH BRAKE LIQUID

Shunji Sakamoto, Higashihiroshima, and Kunji Kimura, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

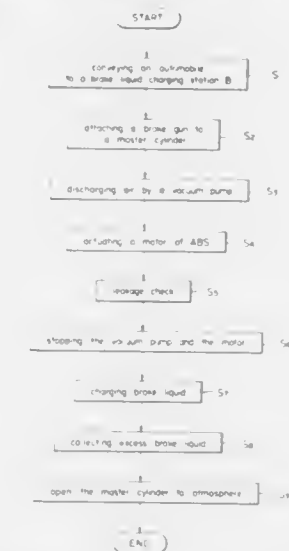
Filed Apr. 27, 1989, Ser. No. 343,559

Claims priority, application Japan, Apr. 27, 1988, 63-105113

Int. Cl.<sup>5</sup> B60T 8/32, 11/30

U.S. Cl. 303—113

11 Claims



1. A method for supplying brake liquid to a brake system provided with an anti-lock brake device, comprising the steps of:
  - discharging air in brake piping by discharging means;
  - vibrating the fluid in the brake system by actuating a motor for the anti-lock brake device after the air is discharged; and
  - charging the brake piping with brake liquid after the air has been discharged.

4,946,231

## POLARIZER PRODUCED VIA PHOTOGRAPHIC IMAGE OF POLARIZING GRID

Helmut H. Pistor, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 19, 1989, Ser. No. 354,162

Int. Cl.<sup>5</sup> G02B 5/00, 1/00

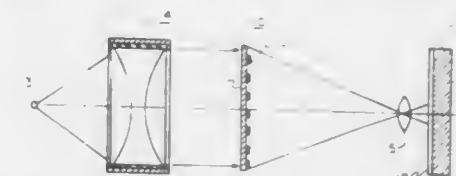
U.S. Cl. 350—1.1

5 Claims

1. A method for forming a far-infrared polarization grating comprising the steps of:

- optically projecting an image of a Ronchi ruling, wherein the ruling comprises numerous parallel lines impressed on the front surface of a transparent substrate, by illuminating the back surface of said substrate with a collimated light source;
- focussing said image on a sheet of ordinary black and white

film, having a backing layer and an emulsion layer with silver halides dispersed therein, such that the spacing between said parallel lines is about a quarter of the wavelength in the far-infrared range to be polarized;



developing said film to form a black image of said ruling formed of colloidal silver particles dispersed uniformly through the thickness dimension of said emulsion; and further processing said film using a silver diffusion procedure to obtain an electrically conductive image of said ruling in thin strips of specularly reflecting silver.

4,946,232

## VARIABLY CURVED REFLECTOR FOR PROJECTING LUMINOUS LINES ON AN OBJECT BY A LASER BEAM

Andrew P. Frisque, 23456 Vallarta, Laguna Niguel, Calif. 92677

Filed Oct. 24, 1988, Ser. No. 261,660

Int. Cl.<sup>5</sup> G02B 26/10

U.S. Cl. 350—6.5

1 Claim



1. A variably curved reflector for projecting a luminous line on an object which is used with a laser system which provides a laser beam and which is located at a position subsequent to the laser system, said variably curved reflector comprising:

- a variably curved reflecting surface having a pair of parallelly disposed peripheral edges, a pair of parallel curved side surfaces each of which intersects along one of said peripheral edges;
- means for pivoting said variably curved reflector about an axis which is orthogonal to said pair of parallel curved side surfaces whereby said variably curved reflecting surface reflects the laser beam to form a plane of light which has an angular span which is determined by the radius of curvature at the point of contact along said variably curved reflecting surface.

4,946,233

## LIGHT SCANNING APPARATUS

Fumiaki Seto, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 207,629, Jun. 16, 1988, abandoned.

This application Jan. 31, 1990, Ser. No. 473,113

Claims priority, application Japan, Jun. 19, 1987, 62-154021

Int. Cl.<sup>5</sup> G02B 26/08, 17/00; G02F 1/33; G01D 15/06

U.S. Cl. 350—6.5

15 Claims

1. A light scanning apparatus comprising:
  - light means for emitting a low energy density light beam;
  - electronically controlled optical switch means, positioned to have said light beam incident thereon, for outputting a switched light beam at specified output angles determined in accordance with a first control signal;
  - focusing means, positioned to have said switched light beam at one of said specified output angles incident thereon, for

focusing said incident switched light beam and for outputting a finely focused light spot;  
first acousto-optic light-modulating means, positioned to have said finely focused light spot incident thereon, for outputting a modulated light spot at predetermined output angles determined in accordance with a video signal;

modulator driver means for providing said video signal to said first acousto-optic light-modulating means; and circuit means for providing said first control signal so that said switched light beam at one of said specified output angles is incident on said focusing means for limited time periods.

4,946,234

# **LIGHT BEAM DEFLECTION SCANNING METHOD AND AN APPARATUS THEREFOR**

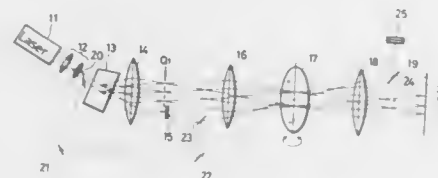
Shigeru Sasada, and Yoshihiro Kishida, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed May 13, 1988, Ser. No. 193,880

Claims priority, application Japan, May 13, 1987, 62-114705  
Int. Cl.<sup>5</sup> G02F 1/11

U.S. Cl. 350—6.6

13 Claims



## 1. A method, comprising:

focussing a light beam by means of a scanning lens, sweeping said beam along a surface in a main scanning direction by deflecting said beam, said beam impinging upon said lens at an angle with respect to a plane which is parallel to the optical axis of said lens or which includes said optical axis, said lens causing said beam to deviate in a subscanning direction;  
determining the amount of said deviation; and  
cancelling said deviation by deflecting said beam in said subscanning direction an amount corresponding to said amount of said deviation.

4,946,235

# **NONLINEAR OPTICAL WAVEGUIDE DEVICE**

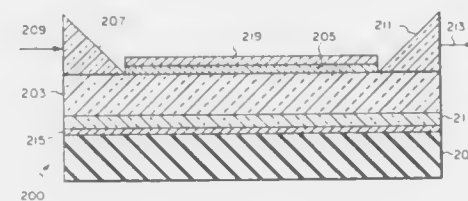
Michael Scozzafava; Phat T. Dao, both of Rochester; Douglas R. Robello, Webster; Jay S. Schildkrant, Rochester; Craig S. Willand, Pittsford, and David J. Williams, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Oct. 11, 1989, Ser. No. 419,818

Int. Cl.<sup>5</sup> G02B 6/00, 5/30; H03F 7/00; F21V 9/14  
U.S. Cl. 350—96.34

12 Claims

1. An optical article comprised of an organic layer for the nonlinear propagation of electromagnetic radiation and

a transmission enhancement layer contiguously overlying said organic layer,  
characterized in that said transmission enhancement layer is an amorphous layer of at least 0.5  $\mu\text{m}$  in thickness trans-



missive to the nonlinearly propagated electromagnetic radiation, exhibiting a refractive index less than that of said organic layer, and comprised of a low molecular weight aromatic compound.

4,946,236

# **MOVABLE FIBER OPTICAL SWITCH**

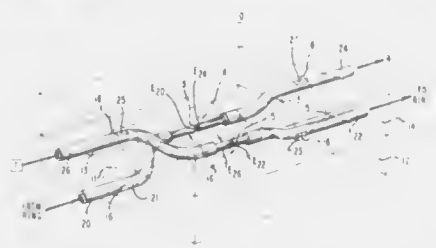
Mindaugas F. Dautartas, Alburis, Pa.; Yinon Degani, Highland Park, N.J.; Richard T. Kraetsch, Berkeley Heights, N.J.; Richard J. Pimpinella, Hampton, N.J., and King L. Tai, Berkeley Heights, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 30, 1989, Ser. No. 358,912

Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20

34 Claims



1. An optical fiber switch for providing coupling between a first optical fiber and at least a second optical fiber when in a first state and a third optical fiber when in a second state, the switch comprising

a housing having an elongated opening extending completely therethrough and a coupling region wherein the fibers are disposed in end-to-end relationship, the interior surfaces of said opening forming a plurality of grooves, no portion of said surfaces being sufficiently inwardly directed in said coupling region to prevent said at least one of said fibers from being capable of moving directly from one groove to an adjacent groove, with said first and second optical fibers capable of being disposed in said coupling region in an end-to-end configuration along a first groove, and said first and the third optical fibers capable of being disposed in said coupling region in an end-to-end configuration along a second groove, this disposition of said first and second fibers being utilized to achieve the first state of said switch and that of the first or third fibers being utilized to achieve a second state of said switch,  
holding means for releasably maintaining the optical fibers in said first state;  
moving means for physically moving said at least one fiber in said coupling region between said first and second grooves such that said second state of said switch is achieved.

4,946,237

# **CABLE HAVING NON-METALLIC ARMORING LAYER**

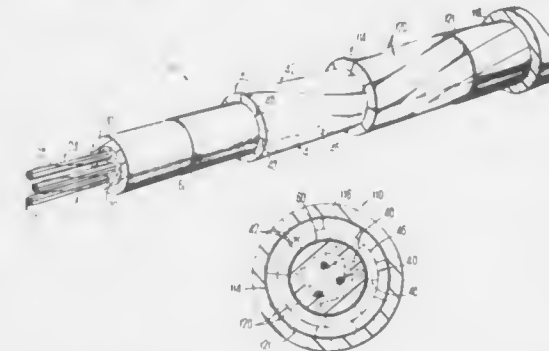
Candido J. Arroyo, Lithonia, and Paul F. Gagen, Duluth, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 30, 1989, Ser. No. 375,170

Int. Cl.<sup>5</sup> G02B 6/44

U.S. Cl. 350—96.23

22 Claims



## 1. A cable, which comprises:

a core which comprises at least one transmission media; and a sheath system which encloses said core, said sheath system comprising:

a plurality of longitudinally extending segments cooperating to provide a shell enclosing said core with at least portions of facing longitudinal edge surfaces of adjacent segments preformed to be substantially contiguous, being stranded helically about said core and being sufficient in number to allow said cable to be routed in a path having a predetermined radius without damaging said cable, each of said segments being a composite comprising a substrate portion which is made of a dielectric material that provides suitable tensile and compressive strength for said cable and which has an outer surface provided with a layer of a coating material having a relatively high hardness which cooperates with the substrate layer to cause the shell segment to be characterized by a relatively high hardness; and  
at least one outer element being disposed about said segments and being effective to hold said segments in the configuration of said shell.

4,946,238

# **FIBER OPTIC COUPLER**

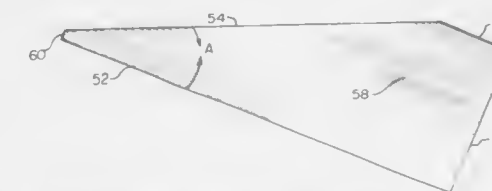
Donald Sashin, Pittsburgh, Pa., and Ernest J. Sternglass, Bloomington, Ind., assignors to University of Pittsburgh, Pittsburgh, Pa.

Continuation of Ser. No. 220,054, Jul. 15, 1988, abandoned, which is a continuation of Ser. No. 832,429, Feb. 24, 1986, abandoned, which is a division of Ser. No. 574,588, Jan. 27, 1984, Pat. No. 4,696,022. This application Apr. 3, 1989, Ser. No. 332,589

Int. Cl.<sup>5</sup> G02B 6/08

U.S. Cl. 350—96.27

3 Claims



1. An apparatus converting X-ray energy to electrical signals comprising:

a scintillator means which receives said X-ray energy and converts said X-ray energy into visible light photons;  
a self-scanning photodiode array means which converts said

visible light photons into electrical signals, said self-scanning photodiode array means being smaller in length than said scintillator means; and

a fiber optic coupler means connecting said scintillator means and said self-scanning photodiode array, said fiber optic coupler means comprising:  
a light receiving end wall adjacent to said scintillator means;  
a light discharging end wall adjacent to said self-scanning photodiode array means;  
a pair of substantially parallel sidewalls that are oriented generally perpendicular to said light discharging end wall;  
an array of optic fibers oriented generally perpendicularly to said light discharging end wall and extending from said light receiving end wall to said light discharging end wall;  
said light receiving end wall being of greater length than said light discharging end wall; and  
at least some of said fibers in said array, whereby light entering said light receiving end wall is transported efficiently to said light discharging end wall and the image introduced into said fibers in said array at said light receiving end wall will be reduced as it passes through said fibers in said array in order that said self-scanning photodiode array means can be smaller in length than said scintillator means.

4,946,239

# **OPTICAL POWER ISOLATOR**

Jeff P. Garmon, Marietta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Sep. 27, 1988, Ser. No. 249,828

Int. Cl.<sup>5</sup> G02B 6/18

U.S. Cl. 350—96.31

15 Claims



1. A device for improving the isolation in an optical communications system between a coherent optical source and a transmission link comprising a tapered lens and including a core region and cladding material, said tapered lens having a large diameter input end and a small diameter output end wherein said core region exhibits a higher index of refraction than said cladding material such that light coupled into said input end is transmitted at low insertion loss to said output end, and light entering said output end and which feeds back to said coherent optical source is reduced.

4,946,240

# **OPTICAL HARMONIC GENERATION DEVICE**

Kazuhiya Yamamoto, Hirakata, and Tetsuo Taniuchi, Kobe, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 1, 1988, Ser. No. 176,772

Claims priority, application Japan, Dec. 28, 1987, 62-331964

Int. Cl.<sup>5</sup> G02B 6/34

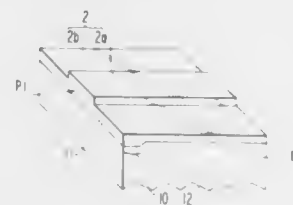
U.S. Cl. 350—96.19

8 Claims

1. An optical harmonic wave generating device comprising:



a substrate of  $\text{LiNb}_3\text{Ta}_{1-x}\text{O}_3$  ( $0 \leq x \leq 1$ ); an optical waveguide on said substrate formed by a proton exchange process and having an input part for receiving an input optical wave having a fundamental frequency and propagating said fundamental frequency wave in a single mode and outputting a harmonic wave, said optical waveguide having an upwardly protuberant core part extending in a direction along one surface of said substrate and a



clad part having a thickness in a direction perpendicular to said one surface of said substrate less than the corresponding thickness of said core part and covering the part of said one surface of said substrate which is not covered by said core part; and said substrate having an output part for receiving the harmonic wave outputted by said optical waveguide and outputting it from said device.

#### 4,946,241 METHOD OF MANUFACTURING IRON GARNET LAYERS

Jens-Peter Krumme, Hamburg, Fed. Rep. of Germany; John Petruzello, Briarcliff Manor, N.Y., and Wolfgang Radtke, Scharbeutz, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 25, 1989, Ser. No. 385,137  
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825787

Int. Cl.<sup>5</sup> G02B 5/14; C23C 14/34  
U.S. Cl. 350—96.12 19 Claims

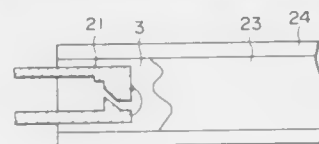
1. A method of manufacturing iron garnet layers on a substrate, in a layer sequence of different order by means of RF-cathode sputtering in an inert gas plasma, making use of a target electrode which comprises predominantly an iron garnet phase in addition to residual phases having an almost equal sputtering rate, the ions of said inert gas plasma bombarding the growing layer having an ion energy of less than  $10^2$  eV, and a pressure in the range from 0.1 to 2.0 Pa, wherein RF-power is first applied to the target electrode at a RF-voltage of approximately 200 V<sub>rms</sub>, thereby first depositing an amorphous iron garnet layer as an intermediate layer at a substrate temperature below 460° C. and, subsequently depositing a polycrystalline iron garnet layer at a substrate temperature exceeding 520° C., while simultaneously applying a RF-voltage of approximately 50 V<sub>rms</sub> to the substrate electrode, which voltage is linearly reduced during the deposition of the first 5–10 nm of the polycrystalline iron garnet layer to a floating potential relative to earth.

#### 4,946,242 OPTICAL PART INCLUDING INTEGRAL COMBINATION OF OPTICAL FIBER AND LIGHT EMITTING OR RECEIVING ELEMENT AND METHOD OF MANUFACTURING THE SAME

Seikichi Tanno, Hitachi; Noriaki Taketani, Katsuta; Shuji Eguichi, Hitachi; Hideki Asano, Mito; Yukio Shimazaki, Katsuta; Yuetsu Takuma, Hitachi; Masahiko Ibamoto, Katsuta, and Junji Mukai, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan  
Filed Aug. 22, 1988, Ser. No. 234,929  
Claims priority, application Japan, Aug. 28, 1987, 62-212816  
Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—96.15 37 Claims

1. An optical part for light transmission, comprising a light conductor composed of a core formed of a transparent macromolecular material and a clad or a combined clad and jacket formed of a macromolecular material having a smaller refractive index than that of said core material, and a light emitting and/or receiving element incorporated in said light conductor at least at one end portion thereof, wherein said core has a higher rigidity than that of said clad or said combined clad and jacket and wherein a macromolecular material combining said light emitting and/or receiving element integrally with said



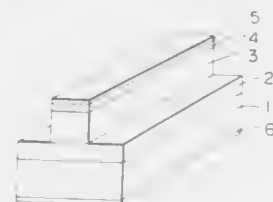
light conductor at the end portion thereof has a substantially same refractive index as that of the core material.

#### 4,946,243 OPTICAL MODULATION ELEMENT

Masatoshi Suzuki; Shigeyuki Akiba; Hideaki Tanaka, all of Tokyo, and Katsuyuki Uta, Musashino, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 387,511  
Claims priority, application Japan, Aug. 5, 1988, 63-195840  
Int. Cl.<sup>5</sup> G02F 1/29

U.S. Cl. 350—96.13 3 Claims



1. An optical modulation element which has, on a substrate, directly on or through a lower clad layer, an optical waveguide layer of a low impurity concentration, an upper clad layer of a refractive index smaller than that of the optical waveguide layer, and electrodes for applying an electric field between the substrate and the upper clad layer, and in which light of a constant intensity incident on a light incident end face of the optical waveguide layer is intensity-modulated by changing the absorption coefficient of the optical waveguide layer by means of an electric field applied thereto across the electrodes so that the thus modulated light is emitted from a light emitting end face of the optical waveguide layer, characterized in that a plurality of low impurity concentration regions and a plurality of high impurity concentration regions are disposed alternately with each other in contact with at least one of the lower and upper clad layers in the direction of travel of light in such a manner that the distri-

bution density of the plurality of high impurity concentration regions increases in the direction of travel of light.

#### 4,946,244 FIBER OPTIC DISTRIBUTION SYSTEM AND METHOD OF USING SAME

John J. Schembri, Danville, Calif., assignor to Pacific Bell, San Francisco, Calif.  
Continuation-in-part of Ser. No. 34,087, Apr. 2, 1987, Pat. No. 4,871,225. This application Mar. 13, 1989, Ser. No. 322,529  
Int. Cl.<sup>5</sup> G02B 6/28; G02F 1/00; H04B 9/00  
U.S. Cl. 350—96.16 14 Claims

1. A fiber optic distribution system for providing communication access between a central office and a plurality of users generally in a localized area, said fiber optic distribution system comprising:

an optical fiber primary loop including one or more optical fibers, said primary loop leaving said central office, passing in the vicinity of each user of said plurality of users, and returning to said central office, and

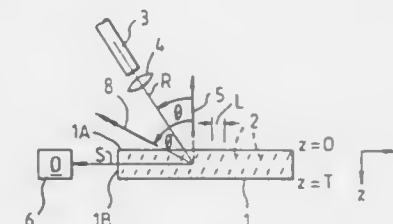
at least one or more patch means arranged in said primary loop for coupling a selected user with the central office through said primary loop, each said patch means including means for interrupting an optical fiber in said primary loop to create first and second optical fiber segments, each said optical fiber segment providing a bi-directional communication path between said user and said central office, each said patch means including first light transmitting means for transmitting light signals of a first predetermined wavelength to said central office on said first optical fiber segment and first light detecting means for receiving light signals of a second predetermined wavelength from said central office on said first optical fiber segment, said first and second wavelengths being chosen such that no two said patch means coupled to the same optical fiber utilize the same first and second wavelength.

#### 4,946,245 OPTICAL FILTERS

Giles R. Chamberlin, Ipswich; David B. Payne, Wickham Market, and David J. McCartney, Ipswich, all of England, assignors to British Telecommunications public limited company, Great Britain

PCT No. PCT/GB88/00807, § 371 Date May 17, 1989, § 102(e) Date May 17, 1989, PCT Pub. No. WO89/03056, PCT Pub. Date Apr. 6, 1989  
PCT Filed Sep. 30, 1988, Ser. No. 358,331  
Claims priority, application United Kingdom, Oct. 1, 1987, 8723050

Int. Cl.<sup>5</sup> G02B 6/34, 5/32  
U.S. Cl. 350—96.19 9 Claims



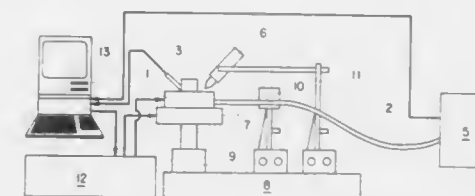
1. An optical filter comprising: an optical waveguide within which is provided a volume diffraction grating of refractive index modulations, the grating having a thickness sufficient such that when an optical beam is incident on the grating from outside the waveguide, wavelengths at or near a predetermined Bragg wavelength for the grating are diffracted and coupled into the waveguide, all but the first order diffraction being substantially eliminated, while wavelengths away from the Bragg wavelength pass through the waveguide substantially undiffracted.

#### 4,946,246 APPARATUS FOR MANUFACTURING AN OPTICAL TRANSMISSION MODULE

Nobuo Shiga, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 29, 1989, Ser. No. 399,211  
Claims priority, application Japan, Aug. 31, 1988, 63-218060  
Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20 2 Claims



1. An apparatus for manufacturing an optical transmission module having a semiconductor laser in a package and an optical fiber optically coupled to the semiconductor laser, comprising:

a heating device for heating said semiconductor laser; a temperature sensor for measuring a temperature of said semiconductor laser; an optical power meter for measuring an optical power of said semiconductor laser; a manipulator for holding said optical fiber and positioning an end of said optical fiber to a desired position; and a control unit for controlling said heating device and said manipulator; said control unit carrying out a first control operation of

8. A method for providing communication access between a central office and a plurality of users generally in a localized area, said method comprising the steps of:

providing an optical fiber primary loop including one or more optical fibers, said primary loop leaving said central office, passing in the vicinity of each user of said plurality of users, and returning to said central office, and

interrupting an optical fiber in said primary loop by the insertion of at least one or more patch means therein to create first and second optical fiber segments, each said optical fiber segment providing a bi-directional communication path between said user and said central office, said patch means including first light transmitting means for transmitting light signals of a first predetermined wavelength to said central office on said first optical fiber segment and first light detecting means for receiving light signals of a second predetermined wavelength from said central office on said first optical fiber segment, said first and second wavelengths being chosen such that no two said patch means coupled to the same optical fiber utilize the same first and second wavelength.

reading, from time to time, data measured by said temperature sensor and said optical power meter and storing the data as a temperature-optical output characteristic of said semiconductor laser while the temperature of said semiconductor laser is changed and a constant current is supplied to said semiconductor laser, and a second control operation of keeping said semiconductor laser in a light emitting state, deriving temperature data from said temperature sensor, deriving optical output data of said semiconductor laser through said optical fiber from said optical power meter, modifying the measurement of said optical output in accordance with said temperature-optical output characteristic and said temperature data, and driving said manipulator to bring the modified measurement to maximum.

4,946,247

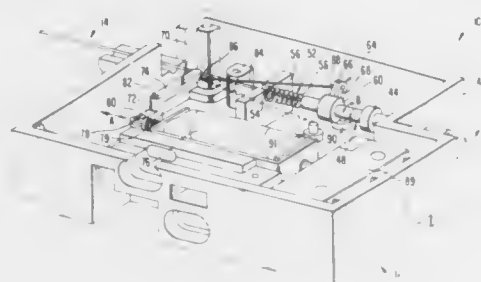
**FIBER OPTIC BYPASS SWITCH**

Willis M. Muska, Roanoke, Va., and Philip R. Couch, Cambridge, England, assignors to FiberCom, Inc., Roanoke, Va.

Filed Sep. 29, 1988, Ser. No. 250,563  
Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20

20 Claims



1. A rotary optical fiber switch comprising: first and second bodies each having a first end and a second end and a single axial bore extending therebetween, said bore having an inner wall and being adapted to receive a plurality of optical fibers dimensioned to fit in contiguous relation with each other and said inner wall for precise positioning within said bore, and said bore being adapted to locate first ends of said fibers in substantially coplanar relation with the respective first ends of said first and second bodies; means for mounting said first body in a fixed predetermined orientation; means for positioning said second body in predetermined coaxial relation to said first body, the first ends of said bodies being disposed in substantially abutting relation, said positioning means including means for permitting rotation of said second body about its axis; and means for selectively rotating said second body between predetermined angular positions, the first end of each fiber in the second body being in optical-transmission alignment with the first end of one fiber in the first body in each said position.

4,946,248

**CONNECTION END OF A LIGHT WAVEGUIDE BONDED TO A HOLDER**

Ulrich Grzesik, Bergisch-Gladbach, and Erich Schürmann, Sendenhorst, both of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

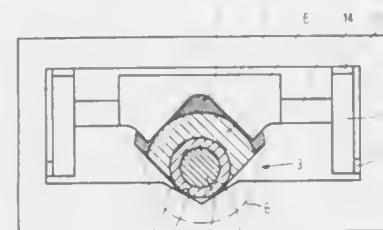
Filed Apr. 8, 1988, Ser. No. 179,106

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3711966

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.21

4 Claims



1. A connection assembly at a connection end of a light waveguide (LWG) for enabling coupling of the LWG to a plug connector; the LWG having a central core, a sheath layer over the central core, and an outer coating over the sheath layer; said connection assembly comprising: a holder bonded to the outer coating of said LWG over a portion of the circumferential area of said connection end and extending in the axial direction of the LWG; and a pair of surfaces formed on another portion of the circumferential area of said connection end by removal of said outer coating from such other portion thereof, each of said surfaces including a respective exposed axially extending zone of said sheath layer where said outer coating has been removed therefrom; said exposed zones of said sheath layer causing axial centering of said connection end of the LWG in a vee-shaped guide groove of a plug connector when said connection end is positioned so that said zones are in contact with respective surfaces of said guide groove.

4,946,249

**FIBER OPTIC SPLICE ASSEMBLY**

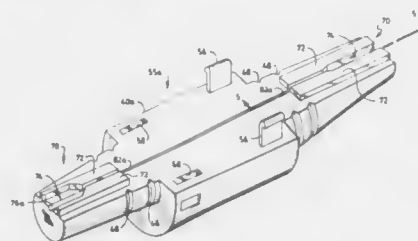
Robert W. Barlow, Canton; Thomas M. Lynch, and Steven E. Swanson, both of Williamsport, all of Pa., assignors to GET Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 403,438, Sep. 5, 1989. This application Oct. 2, 1989, Ser. No. 415,812

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.21

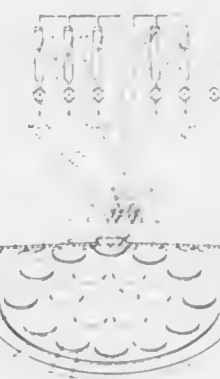
3 Claims



1. A fiber optic splice assembly for splicing optical fibers, said fibers having a transparent core and a buffer coating thereon, said assembly comprising: a longitudinal body having a male half and a female half, each half having ends and a central portion, said female half having internal portions of said female ends, each of said internal female ends being formed with a rectangular slot having a centrally located, raised rib therein and a miniscule slot through said central

portion and connecting said raised ribs; each end of said male half having internal portions of said male ends which are formed to provide raised, rectangular pads for mating engagement with said rectangular slots, said pads defining therebetween a gap which corresponds in mating configuration to said raised ribs, said gap having the bottom thereof provided with a V groove for receiving said fiber; and a V groove extending the length of said central portion of said male half and joining said gaps.

ing the step of forming a guiding layer of arsenosilicate glass on a substrate, the arsenosilicate glass consisting essentially of



4,946,250

**COMPACT WAVELENGTH FILTER INTEGRATED TO A SINGLE-MODE OPTICAL FIBER**

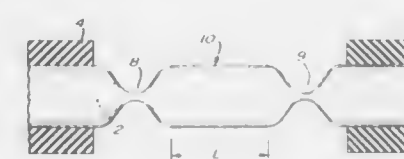
Francois Gonthier, Outremont; Xavier Daxbelet, Montreal; Suzanne LaCroix, Verdun; Richard J. Black, Montreal, and Jacques Bures, Outremont, all of Canada, assignors to Ecole Polytechnique, Montreal, Canada

Filed Sep. 7, 1989, Ser. No. 404,471

Int. Cl.<sup>5</sup> G02B 6/02

U.S. Cl. 350—96.29

20 Claims



1. A wavelength filter integrated to a single-mode optical fiber capable of propagating a light signal and comprising a longitudinal outer jacket enveloping the optical fiber, the said fiber being stripped of its jacket on a given length thereof to form a non-jacketed length of optical fiber, said non-jacketed fiber length being formed with first and second concatenated biconical tapers separated from each other by a given distance and each having a given profile, wherein the said given distance and the given profile of each biconical taper can be chosen to enable transmission through the filter of a first, predetermined wavelength of the propagated light signal while stopping a second, predetermined wavelength of said signal.

4,946,251

**FABRICATION OF OPTICAL WAVEGUIDE**

Gareth W. B. Ashwell, and Benjamin J. Ainslie, both of Ipswich, England, assignors to British Telecommunications public limited company, United Kingdom

Continuation of Ser. No. 249,247, Sep. 26, 1986, abandoned, which is a continuation-in-part of Ser. No. 875,973, Jun. 19, 1986, abandoned. This application Sep. 5, 1989, Ser. No. 403,069

Claims priority, application United Kingdom, Jun. 21, 1985, 8515814

Int. Cl.<sup>5</sup> G02B 5/14; C03B 37/027

U.S. Cl. 350—96.34

21 Claims

1. An optical waveguide comprising a guiding portion of arsenosilicate glass, the arsenosilicate glass consisting essentially of silicon, oxygen and arsenic, the arsenic content of the arsenosilicate glass being from 1.7 to 17 mole percent.

11. A method of fabricating an optical waveguide compris-

4,946,252

**FOCUSING SCREEN**

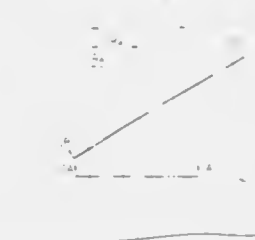
Saburo Sugawara, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,097

Claims priority, application Japan, Aug. 5, 1987, 62-194379  
Int. Cl.<sup>5</sup> G02B 3/08

U.S. Cl. 350—167

7 Claims



1. A focusing screen comprising: a substrate; and a plurality of small lenses formed on a surface of said substrate, each of said small lenses being a composite lens comprising a concave lens portion in right circular conical form and a convex lens portion in right circular conical form, both lens portions having a common axis.

4,946,253

**RECONFIGURABLE SUBSTRATE-MODE HOLOGRAPHIC INTERCONNECT APPARATUS AND METHOD**

Raymond K. Kostuck, Tucson, Ariz., assignor to Arizona Board of Regents For and On Behalf of the University of Arizona, Tucson, Ariz.

Filed Oct. 16, 1989, Ser. No. 422,097

Int. Cl.<sup>5</sup> G02B 27/10

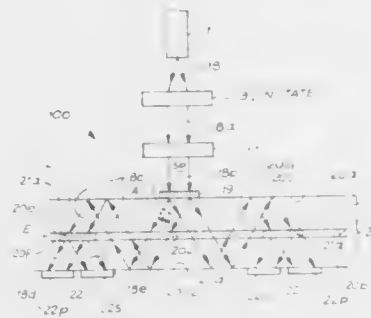
U.S. Cl. 350—169

16 Claims

10. A reconfigurable substrate-mode holographic interconnect apparatus, said apparatus comprising: first dielectric substrate layer member; second dielectric substrate layer member, said first and second dielectric substrate layer members being disposed in an overlay relationship with one another; interface means for attaching said first and second substrate layer members to each other, said interface means having



a refractive index that matches refractive indices of said first and second dielectric substrate layer members to form a composite homogeneous dielectric substrate;  
first plurality of holographic means attached to said first dielectric substrate layer member for coupling a polarized input optical beam into said composite dielectric substrate at a preselected diffraction angle, said composite dielectric substrate structure having totally internal reflection dielectric property requirements that are satisfied by said diffraction angle to enable said composite dielectric structure to reflectively guide said input optical beam away from said first plurality of holographic means to produce a polarized reflected optical beam;



second plurality of holographic means for receiving said reflected optical beam and for selectively directing and producing a directed polarized optical beam, said directed polarized optical beam having a same polarity as said reflected optical beam, said second plurality of holographic means being embedded between said first and second dielectric substrate layer members along said interface means; and  
a plurality of receiver detector means attached to said second substrate layer member for receiving and outputting said directed optical beam.

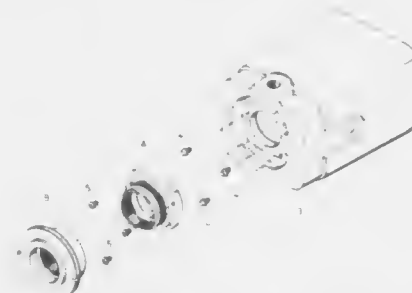
**4,946,254**  
**IMAGE SHIFTING DEVICE FOR TRACING**  
Wayne R. Tauer, 8231 Queen Ave. North, Brooklyn Park, Minn. 55444  
Filed Oct. 31, 1988, Ser. No. 265,218  
Int. Cl.<sup>5</sup> G02B 7/18, 27/14, 5/08  
U.S. Cl. 350—174 5 Claims



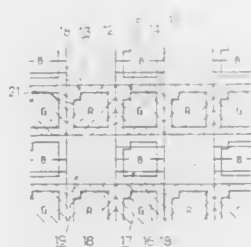
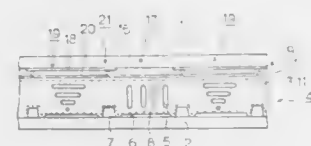
1. A tracing apparatus comprising a frame for mounting onto a surface having an original image to be transferred to another location offset from the original image, the original image being on a first support surface portion, the frame including:  
a first panel oriented substantially perpendicular with respect to the support plane and having a mirrored first surface;  
a second semi-transparent panel having the ability to reflect an image on one surface and to transmit light through the panel simultaneously, said second panel being spaced from

said first panel a desired amount in the direction of sight of a user with the one surface facing the mirrored surface and facing a user whereby a user viewing the one side of the second panel and looking through the second panel sees an image reflected from the mirror surface of the first panel onto the second panel, the image reflected on the second panel being on a line of sight of the viewer carrying onto a second support surface portion offset from the original image on the first surface portion to permit tracing the image at the second support surface portion, the first and second panels being generally parallel to each other; and  
adjusting screw means mounted on the frame for engaging a support surface and for adjustably changing the angle of the first and second panels relative to a support surface.

**4,946,255**  
**IMAGE INPUT APPARATUS WITH LENS ADJUSTMENT**  
Yoshiyuki Mizoguchi, Yokohama, and Yoshitaka Watanabe, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 14, 1988, Ser. No. 257,560  
Claims priority, application Japan, Oct. 15, 1987, 62-260852  
Int. Cl.<sup>5</sup> G02B 7/04  
U.S. Cl. 350—255 11 Claims



a second electrode arranged on the second side of the liquid crystal layer opposite the first and second pixel electrodes; a color filter covering the first pixel; and



a noncolored translucent filter covering the second pixel, said noncolored translucent filter also overlapping a peripheral portion of the first pixel.

4,946,260

#### DUAL-FREQUENCY, DIELECTRIC ANISOTROPY LIQUID CRYSTAL OPTICAL DEVICE

Koh Fujumura, Hino; Maskatsu Higa, Fussa, and Hisashi Aoki, Tokyo, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Division of Ser. No. 66,720, Jun. 24, 1987, Pat. No. 4,836,654. This application Feb. 24, 1989, Ser. No. 316,221

Claims priority, application Japan, Jun. 30, 1986, 61-153539; Nov. 27, 1986, 61-282471; Dec. 26, 1986, 61-308645

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G02F 1/133; G09G 3/36

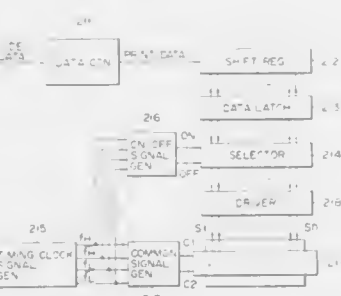
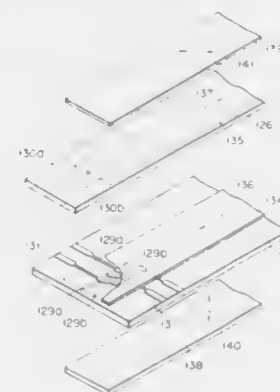
U.S. Cl. 350—346

21 Claims

1. A liquid crystal optical apparatus comprising: a liquid crystal optical device including, a pair of substrates having electrodes which at least partially face each other and are formed on opposing inner surfaces, a liquid crystal material which is sealed between said pair of substrates, and whose molecules are aligned in initial state in accordance with an aligning treatment subjected to said inner surfaces of said substrates, an alignment state of the molecules being controlled by an electric field applied across said electrodes, said liquid crystal material having a crossover frequency at which its dielectric anisotropy becomes "0" and exhibiting a dielectric dispersion phenomenon wherein the polarity of the dielectric anisotropy is inverted in an electric field of a frequency lower than the crossover frequency and in an electric field of a frequency higher than the crossover frequency, and a pair of polarizing means arranged at both sides of said liquid crystal material, polarizing axis of said polarizing means being substantially perpendicular to each other, and at least one polarizing axis intersecting the direction of the aligning treatment of said inner surfaces of said pair of substrates, an angle falling within the range of 35° to 45°; and

electric field applying means for selectively applying an ON electric field and an OFF electric field to said liquid crystal material, to control an ON state and OFF state of the liquid crystal device, the ON electric field having an electric field for applying a force for obliquely aligning liquid crystal molecules relative to the substrate and a non-electric field for releasing the liquid crystal molecules

from the force of said force-applying electric field, the ON electric field obliquely aligning the liquid crystal molecules and maintaining this state to hold the optical device



in an ON state, and the OFF electric field aligning the liquid crystal molecules perpendicularly to said substrates, to obtain an OFF state of the device.

4,946,261

#### RECORDING METHOD AND RECORDING APPARATUS

Hisao Yaegashi; Hideaki Mitsutake, both of Yokohama; Kazuo Yoshinaga, Machida, and Masashi Miyagawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

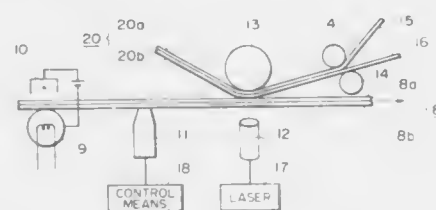
Filed Jun. 10, 1988, Ser. No. 204,730

Claims priority, application Japan, Jun. 11, 1987, 62-144116; Oct. 6, 1987, 62-250568; Jun. 6, 1988, 63-137251

Int. Cl.<sup>3</sup> G02F 1/01; G03B 7/48; G01D 9/42; G03C 11/00

U.S. Cl. 350—353

31 Claims



1. A recording method, comprising the steps of: providing a recording medium including a substrate and a recording layer formed thereon, said recording layer comprising a solid solution of a guest compound in a polymer, said guest compound having a second order molecular nonlinear optical susceptibility  $\beta$  of at least  $5 \times 10^{-30}$  e.s.u. but substantially no nonlinear optical effect in its crystal form; and writing a record in the recording layer by heating and cooling at least a part of the recording layer and applying an external field to at least a part of the recording layer so that at least a part of the

recording layer is cooled to solidify under the application of the external field to form a portion showing a nonlinear optical effect and a part of the recording layer cooled to solidify in the absence of the external field to form a portion showing substantially no nonlinear optical effect, said record in said recording layer being written by the combination of said part showing a nonlinear optical effect and said part showing substantially no nonlinear optical effect.

4,946,262

#### METHOD AND DEVICE FOR CONTROLLING A BEAM OF LIGHT

Martius B. J. Diemeer, Zoetermeer, Netherlands, assignor to Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie), Hague, Netherlands

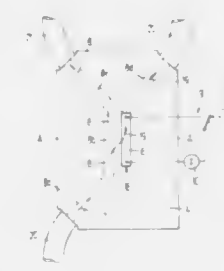
Filed Nov. 17, 1988, Ser. No. 273,468

Claims priority, application Netherlands, Nov. 23, 1987, 8702804

Int. Cl.<sup>3</sup> G02F 1/01

U.S. Cl. 350—362

8 Claims



1. Method for controlling a beam of light coupled into an optically conductive working layer, which beam of light is supplied to a working area made of solid electro-optical polymer material and lying within said working layer, characterized by the following sequential stages for reaching a first optically conductive state:

the working area (16) is warmed up to above its softening temperature, the working area is exposed to a first electric field, the working area is cooled down to below its softening temperature; as well as by the following sequential stages for reaching a second optically conductive state: the working area is warmed up to above its softening temperature, the working area is exposed to a second electric field, unequal to said first electric field, the working area is cooled down to below its softening temperature.

4,946,263

#### OPTICAL DEVICE WITH DIELECTRIC HEATING

Nuno A. Vaz, West Bloomfield; Thomas H. VanSteenkiste, Washington, and George W. Smith, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1988, Ser. No. 274,153

Int. Cl.<sup>3</sup> G02F 1/13

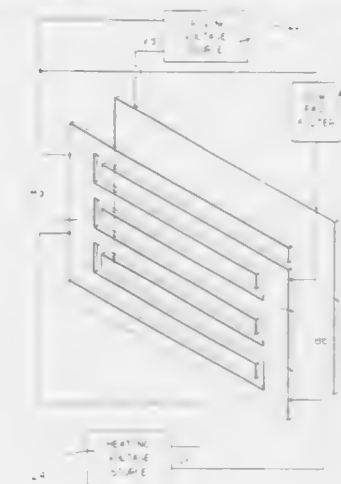
U.S. Cl. 350—351

1 Claim

1. In an optical device containing dielectric material in which the device is switchable between an inactive relatively opaque state and an activated relatively transparent state in response to the application of a driving electric field of sufficiently low frequency wherein the switching time between the inactive-opaque state and the activated-transparent state is increased and/or the light transmissivity in the activated-transparent state is decreased when the device is at a relatively low temperature, and in which a heating electric field is applied to the device sufficiently high frequency as to heat the dielectric material while not switching the device to the activated-trans-

parent state thereby raising the temperature of the device to decrease the switching time between the inactive-opaque state and the activated-transparent state and/or to increase the light transmissivity in the activated-transparent state, the improvement comprising:

- a first electrode located on one side of the device, second and third interdigitated electrodes located on an opposite side of the device, means for applying the driving electric field between the first electrode and one of the second and third electrodes,



means for applying the heating electric field between the second and third electrodes, and low pass filter means connected between the second and third electrodes for effectively connecting the electrodes together at the low frequency of the driving electric field and for effectively disconnecting the electrodes one from the other at the high frequency of the heating electric field.

4,946,264

#### ELECTRO-OPTIC SIGNAL PROCESSING APPARATUS

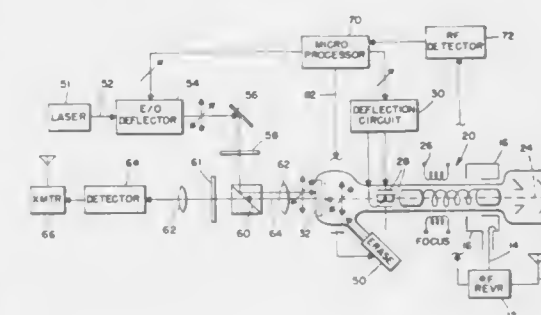
Dennis W. Davis, Boca Raton, Fla., assignor to United Technologies, Inc., Hartford, Conn.

Filed Dec. 6, 1988, Ser. No. 280,382

Int. Cl.<sup>3</sup> H01S 3/02

U.S. Cl. 350—486

8 Claims

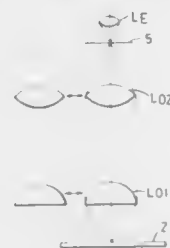


1. An electro-optic signal processing apparatus comprising: means for generating an electron beam; optical target means including means for temporarily storing a plurality of manifestations of said beam, each said stored manifestation modifying an optical property of said optical target means; means for modulating said beam in accordance with the characteristics of a received high frequency signal and



scanning said modulated beam across said optical target means;  
means for scanning a beam of collimated light over said optical target means and sensing reflections thereof which result from the interaction between said beam of light and said optical target means and its modified optical properties; and  
means for controlling the operation of said collimated light beam scanning means so as to alter a characteristic of said signal waveform.

**4,946,265**  
**MICROSCOPE WHOSE ENLARGEMENT  
MAGNIFICATION IS CHANGEABLE**  
Yoshiyuki Shimizu, Miura, and Reiko Ohya, Kawasaki, both  
of Japan, assignors to Nikon Corporation, Tokyo, Japan  
Filed Dec. 9, 1988, Ser. No. 282,111  
Claims priority, application Japan, Dec. 10, 1987, 62-313354  
Int. Cl.<sup>5</sup> G02B 21/02, 15/02, 4/06  
U.S. Cl. 350—520 9 Claims

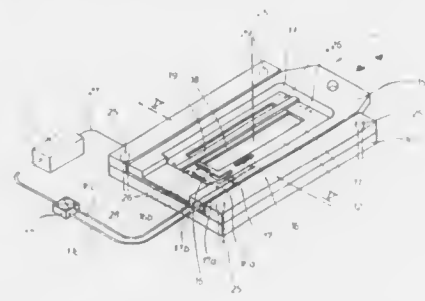


1. A microscope whose enlargement magnification is changeable including a plurality of interchangeable first objective lenses of different focal lengths for changing a divergent light flux from an object on a stage into a parallel light flux, first interchanging means for moving said first objective lenses and interchangeably installing them on a predetermined optic axis, a plurality of interchangeable second objective lenses of different focal lengths for condensing the parallel light flux from said first objective lenses and forming an enlarged image of said object at a predetermined position, an eyepiece for observing therethrough the enlarged image of said object formed by said second objective lenses, a prism for directing the light flux from said second objective lenses to said eyepiece, and second interchanging means provided between said first interchanging means and said prism for moving said second objective lenses and interchangeably installing them on said predetermined optic axis.

**4,946,266**  
**UNIVERSAL OBJECT HOLDER FOR MICROSCOPES**  
Winfried Kraft, Asslar; Volker Waerfel, Braunsfels; Wolfram Stebel, Berlin, and Heinz Maerzhaeuser, Wetzlar, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Fed. Rep. of Germany  
Filed Sep. 16, 1988, Ser. No. 245,147  
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3731120  
Int. Cl.<sup>5</sup> G02B 21/26 14 Claims

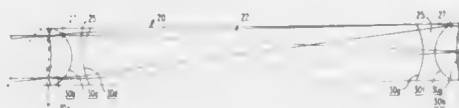
U.S. Cl. 350—529  
1. A universal object holder for the selective reception of plate-shaped objects of differing dimensioning, especially of wafers, masks or mask with a pellicle frame, for use on a microscope, having reflected light and transmitted light illumination, comprising:  
a rectangular frame exhibiting an internal clear opening;  
abutments stepped in the manner of a staircase associated with said frame, the steps forming along the inner edges of said frame a continuous, stepped-down contact surface which is provided in one piece for supporting the objects;  
air suction openings disposed over a corner and connected

to a vacuum device are provided in the contact surface; and



one adjustable abutment strip having a bearing surface for supporting said objects over said clear opening.

**4,946,267**  
**ENDOSCOPE RELAY OPTICS**  
Jan Hoogland, 8982 N. Applegate Rd., Grants Pass, Ore. 97527  
Filed May 9, 1988, Ser. No. 191,926  
Int. Cl.<sup>5</sup> G02B 9/60, 23/24 9 Claims  
U.S. Cl. 350—465

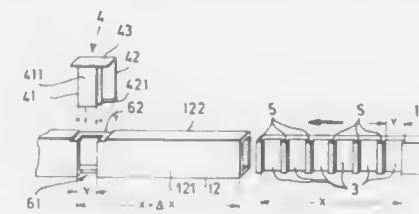


1. A lens assembly for incorporation into an optical transfer system wherein two such assemblies define an optical transfer module for transferring an image between successive image planes, comprising:  
a rod-like central element constructed of a first material having a relatively high index of refraction and having first and second end surfaces;  
first and second negative elements construed of a second material having a relatively low index of refraction, being axially spaced apart from each other by said central element and being cemented to said first and second end surfaces, respectively;  
first and second positive elements constructed of said first material, being spaced apart from each other by said central element and said negative elements and being cemented to said negative elements;  
the dispersions of said first and second materials being chosen to substantially correct chromatic aberration;  
the index difference contribution to the Petzval sum dominating the bending and spacing contributions to the Petzval sum.

**4,946,268**  
**LENGTH-ADJUSTABLE SPECTACLE TEMPLE**  
Norbert Nowotny, Leonberg, and Jürgen Rössner, Stuttgart, both of Fed. Rep. of Germany, assignors to Marwitz & Hauser GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Apr. 12, 1989, Ser. No. 336,916  
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 8805603  
Int. Cl.<sup>5</sup> G02C 5/20 10 Claims

U.S. Cl. 351—118  
1. A length-adjustable spectacle temple for a spectacle frame, the spectacle temple comprising:  
first and second temple parts arranged along a common axis;  
said first temple part having an end portion defining a sleeve extending along said axis;

said second temple part having an elongated end portion for telescopically engaging said sleeve;  
indexing means formed on said elongated end portion so as to extend along at least a portion thereof in the direction of said axis;  
access means formed in said sleeve; and  
an insert piece manually insertable into and manually removable from said access means and having an engaging portion



tion formed thereon for engaging said indexing means to selectively fix the position of said second part with respect to said first part;  
said sleeve having a latch catching surface formed thereon; and  
said insert piece having a resiliently biased latching member formed thereon for snap engaging said latch catching surface when said insert piece is seated in said access means.

**4,946,269**  
**COLORED CONTACT LENS**  
Shlomo Magdassi, Jerusalem, Israel, assignor to Med Optics Corporation, Maaleh Edomim, Israel  
Filed Jun. 13, 1988, Ser. No. 205,698  
Claims priority, application Israel, Jun. 23, 1987, 82961  
Int. Cl.<sup>5</sup> G02C 7/04 2 Claims  
U.S. Cl. 351—162

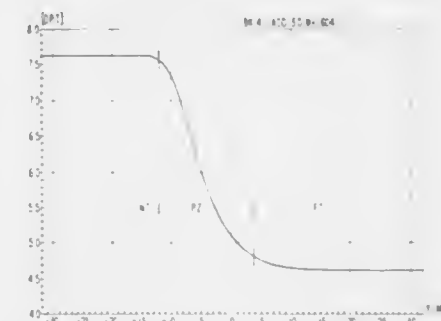


1. Opaque contact lens comprising a lens body constructed of polymer and solid latex polymer particles directly bound to at least a portion of a surface of the lens.

**4,946,270**  
**PROGRESSIVE POWER OPHTHALMIC LENS**  
Günther Guilino, Munich; Rudolf Barth, Vierkirchen, and Hans Stetter, Munich, all of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany  
PCT No. PCT/DE88/00286, § 371 Date Jan. 11, 1989, § 102(e) Date Jan. 11, 1989, PCT Pub. No. WO88/08994, PCT Pub. Date Nov. 17, 1988  
PCT Filed May 14, 1988, Ser. No. 301,751  
Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716201  
Int. Cl.<sup>5</sup> G02C 7/06 12 Claims

U.S. Cl. 351—169  
1. A progressive power ophthalmic lens comprising at least one surface contributing to an increase in refractive power from a distant portion via a progressive zone to a reading portion, the radii of curvature  $rh$  of horizontal section curves of the at least one surface contributing to the increase in refractive power and having horizontal planes where  $y$  is a constant so that a function of a distance  $x$  from a main meridian decreases in a front surface in a region of the main meridian in the distant portion and increases in the reading portion and in-

creases in a rear surface in the distant portion and decrease in the reading portion, a course of change of curvature  $\Delta rh = rh(x, y) - rh(0, y)$  reversing with increasing distance  $x$  from the main meridian, the course of the change in the curvature of the horizontal section curves with increasing distance in the  $x$  direction from the main meridian being yielded by superimposing first and second functions  $F_1(x, y)$  and  $F_2(x, y)$ , where  $\Delta rh = F(x, y) = F_1(x, y) + F_2(x, y)$ , the first function  $F_1(x, y)$  providing that the radius of curvature initially increases in the front surface or decreases in the rear surface, whereby the change in the radius of curvature reverse at a distance of 14 to



26 mm from the main meridian, the second function  $F_2(x, y)$  providing that the radius of curvature initially decreases in the front surface or increases in the rear surface, whereby the change in the radius of curvature reverses at a distance of 14 to 26 mm from the main meridian, the absolute values of the amplitude of the first and second functions changing in reverse along the main meridian at least in the progressive zone, and for one strip on opposite sides of the main meridian at least in the region of the distant portion a relationship is provided that  $\delta F_2 / \delta x (x = x_0, y = y_0) > \delta F_1 / \delta x (x = x_0, y = y_0)$ , where  $\delta F_1 / \delta x$  and  $\delta F_2 / \delta x$  represents the first derivations of the functions  $F_1$  and  $F_2$  from  $x$ .

**4,946,271**  
**OPTICAL DEVICE**  
Göte Pålsgård, Nygatan 28, 702 11 Örebro, and Lars O. Östlin, Gundbo 3328, 822 00 Alfta, both of Sweden  
PCT No. PCT/SE87/00268, § 371 Date Jan. 26, 1988, § 102(e) Date Jan. 26, 1988, PCT Pub. No. WO87/07497, PCT Pub. Date Dec. 17, 1987  
PCT Filed Jun. 3, 1987, Ser. No. 153,841  
Claims priority, application Sweden, Jun. 4, 1986, 8602521  
Int. Cl.<sup>5</sup> A61B 3/14 6 Claims  
U.S. Cl. 351—210



1. A device for allowing persons without the capability to speak and to move their arms to communicate with the environment, comprising:  
detection means for detecting the direction of the pupil of one of the eyes of said person;  
evaluation means for evaluating the direction information

from said detection means so as to deliver a signal corresponding to the direction of the eye of the person; an apparatus arranged to show one or more pictures to the person, said pictures being divided into a number of fields with symbols or text corresponding to different information, which the person may be expected to wish to communicate to another person or a machine; said detection means being arranged to detect towards which field of said picture the person directs his gaze; the detection means including a light sensitive element towards which the light emitted by one eye of the person is intended to directly or indirectly fall, and that said element is adapted to at different portions thereof deliver a signal corresponding to the intensity of the incident light so as to be able to give the evaluation means information making it possible to determine the direction of the eye; and the detection means also including an optical system having a first set of mirrors and a first set of lenses which are arranged to throw an image of the eye of the person directly upon said light sensitive element.

4,946,272

# STABILIZED EQUIPMENT SUPPORT, PRIMARILY FOR USE WITH LIGHT-WEIGHT CAMERAS

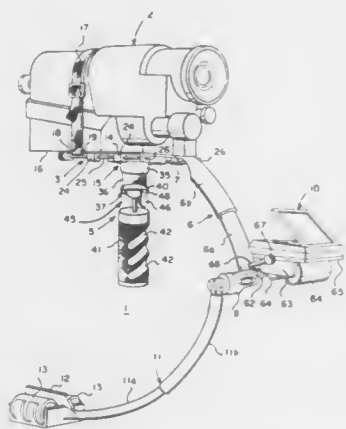
Garrett W. Brown, 515 Addison Ct., Philadelphia, Pa. 19147

Filed Sep. 22, 1988, Ser. No. 247,900

Int. Cl.<sup>5</sup> G03B 17/00, 21/00

U.S. Cl. 352—243

126 Claims



1. An equipment support which is capable of being handheld with improved stability against angular deviations in pan, tilt and roll to isolate equipment for use with said equipment support, including equipment to be oriented and equipment associated with said equipment to be oriented, from unwanted angular movements caused by motion of the equipment support when in use, comprising:

equipment support means for receiving said equipment in an expanded, balanced arrangement which provides an accessible center of gravity; and handle means for engagement by at least one hand of an operator and for attachment to said equipment support means to access said center of gravity, including a gripping portion for supporting and transporting the weight of said equipment and said equipment support means, and an orienting portion for orienting said equipment to be oriented, coupled by means for isolating said orienting portion from unwanted angular movements of said gripping portion caused by movements of said handle means.

## 4,946,274 PRESENTATION DEVICE USED IN COMBINATION WITH AN OVERHEAD PROJECTOR

Masami Honda, Oome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 25, 1989, Ser. No. 342,778

Claims priority, application Japan, Apr. 28, 1988, 63-57836[U]

Int. Cl.<sup>5</sup> G03B 21/00

U.S. Cl. 353—122

8 Claims



1. A presentation device for an overhead projector, comprising: a panel unit including a frame, a liquid crystal panel of a transmission type mounted in the frame and capable of displaying information, including characters and images to be projected, at least one recess on the outer surface of the frame, a movable leg having a proximal end rockably mounted in the recess by means of a pin, said movable leg being adapted to be fully housed in the recess when rocked in one direction, and to have its distal end project from the recess when rocked in the other direction, urging means for urging the movable leg to rock in the other direction, and stopper means disposed in the recess and adapted to restrain the movable leg from rocking in the other direction when the movable leg is urged to rock in the other direction by the urging means; and a case capable of encasing the panel unit therein, said case having an opening edge defining an inlet opening through which the panel unit is inserted into the case, said opening edge serving as an operating portion adapted to engage the movable leg, thereby rocking the movable leg in the one direction against the urging force of the urging means, so that the movable leg is housed in the recess, when the panel unit is inserted into the case through the inlet opening, in the direction perpendicular to the axial direction of the pin.

4,946,275

# FIBER OPTIC POSITION TRANSDUCER

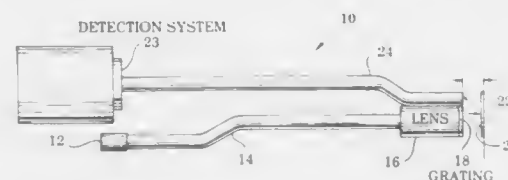
Bruce J. Bartholomew, Poway, Calif., assignor to General Dynamics Corporation Convair Division, San Diego, Calif.

Filed Mar. 31, 1988, Ser. No. 177,579

Int. Cl.<sup>5</sup> G01C 3/08; H01J 5/16

U.S. Cl. 356—4

15 Claims



1. A gap distance measuring device comprising: a source of white light; a transmit optic cable having an input and output end for receiving said white light at said input end thereof; a collimating lens having an input and output end, said output end being positioned for collimating the white light leaving said output end of said transmit optic cable; a grating positioned at said output end surface of said collimating lens for changing said white light into a spectrum of different frequency light rays;

a reflecting surface positioned on an object which has movement relative to a distal surface of said grating lens thereby forming said gap therebetween; a receiving optic cable with a receiving end positioned adjacent to said reflective surface for receiving at least one of said different frequency light rays reflected from said reflective surface; and detecting means positioned at the opposite end of said receiving optic cable opposite the receiving end for detecting which of said at least one of said different frequency light rays is present.

4,946,276

# FULL ROLL FINGERPRINT APPARATUS

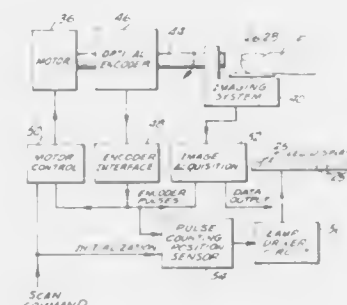
William J. Chilcott, Ossining, N.Y., assignor to Fingermatrix, Inc., North White Plains, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,435

Int. Cl.<sup>5</sup> G06K 9/20

U.S. Cl. 356—71

8 Claims



5. In the method of optically scanning a finger object to provide a modulated light beam having finger surface information that can be focused as a fingerprint image, the improvement to provide a full roll fingerprint image comprising the steps of:

positioning the finger on the platen, rolling the finger to a first end position in which a first nail edge end of the full roll fingerprint is applied to the platen, initiating the optical scan, sequentially changing the state of each of a plurality of sensory indicia in synchronization with the optical scan, rolling the finger on the platen to a second nail edge end position, said step of rolling the finger over said platen between one nail edge end position to the other nail edge end position being taken in track with the change of state of said sensory indicia.

4,946,277

# OPTO-ELECTRONIC DEVICE FOR DETECTING AND LOCATING A RADIANT SOURCE

Patrice Marquet, Paris; Jean-Marc Lemaire, Rueil Malmaison, and Philippe Dunouvin, Paris, all of France, assignors to Thomson CSF, Paris, France

Filed Sep. 27, 1988, Ser. No. 249,894

Claims priority, application France, Oct. 2, 1987, 87 13666

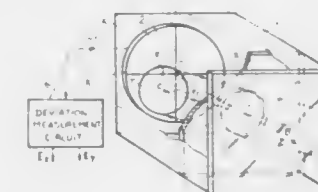
Int. Cl.<sup>5</sup> G01C 1/00; G01J 1/20

U.S. Cl. 356—141

18 Claims

9. An opto-electronic device for detecting and locating radiant sources in a wide field of observation comprising: an optical receiver receiving unfocused radiant energy from said radiant sources, comprising a plane diaphragm having a specified aperture with a center O', said plane diaphragm formed by a transparent central zone of an opaque mask; a plane detector located to receive unfocused radiant energy from said optical receiver, having four quadrants which are bounded by two orthogonal axes OX, OY, where O is a center of said plane detector, for respectively

detecting four signals, one indicative of radiant energy on each said quadrant, when a radiant source is in the field of observation, said diaphragm and said detector being parallel, and orthogonal to an axis OO' between said center O and said center O' which axis is a reference optical direction for the device, and



—means for processing and deviation measurement, receiving the four signals, and determining a direction of said source in relation to said reference optical direction for a deviation measurement curve determined according to a distance D between a plane in which said diaphragm is located and a plane in which said detector is located and to a shape and dimension of the aperture of said diaphragm.

4,946,278

# GRAPHITE TUBE FURNACE WITH SPECIMEN SUPPORT FOR ATOMIC ABSORPTION SPECTROSCOPY

Bruno Hütsch, and Bernd Schmidt, both of Bonn, Fed. Rep. of Germany, assignors to Ringsdorf-Werke GmbH, Bonn, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 373,174

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823346

Int. Cl.<sup>5</sup> G01N 21/74

U.S. Cl. 356—312

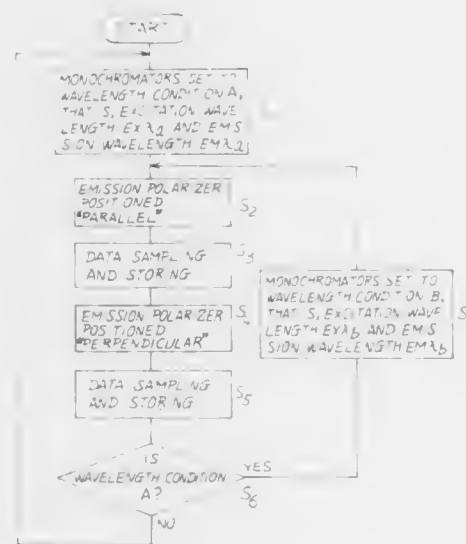
6 Claims



1. Graphite tube furnace assembly, comprising a graphite tube furnace having an inner wall surface, at least two peripheral flanges disposed on said inner wall surface, and a specimen support for atomic absorption spectroscopy supported on said flanges in said graphite tube furnace at a distance from said inner wall surface.

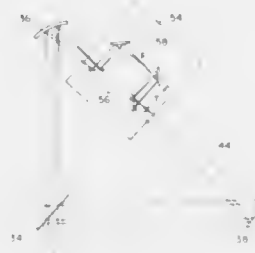


**4,946,279**  
**FLOURESCENCE SPECTROPHOTOMETER FOR MEASURING FLUORESCENT LIGHT OF A PLURALITY OF WAVELENGTH CONDITIONS**  
 Kunihiro Ohkubo, Moriyama, Japan, assignor to Shimadzu Corporation, Japan  
 Filed Jan. 19, 1989, Ser. No. 298,969  
 Claims priority, application Japan, Feb. 16, 1988, 63-34735  
 Int. Cl. G01N 21/64  
 U.S. Cl. 356—318 12 Claims



1. A fluorescence spectrophotometer comprising:
  - a. a light source;
  - b. an excitation monochromator for receiving the light from said light source to provide an excitation light of a selected wavelength;
  - c. a sample cell containing a sample to be analyzed, to which said excitation light is projected to cause said sample to emit fluorescent light;
  - d. an emission monochromator for receiving said fluorescent light to provide an emission light of a selected wavelength;
  - e. a photodetector for converting said emission light to an electrical signal corresponding to the intensity of said emission light;
  - f. means for controlling said excitation and emission monochromators to simultaneously change the wavelengths of said excitation and emission lights in accordance with each of a plurality of wavelength conditions;
  - g. an excitation light polarizer disposed in the path of said excitation light;
  - h. an emission light polarizer disposed in the path of said emission light;
  - i. means for controlling the position of said emission light polarizer, in each of said wavelength conditions, so that the direction of polarization of said emission light polarizer may coincide selectively with each of the directions parallel and perpendicular to a plane including the light paths of said excitation and emission lights;
  - j. signal processing means for sampling said output signal from said photodetector, in each of said wavelength conditions, when the direction of polarization of said emission light polarizer coincides with each of said parallel and perpendicular directions, and processing said sampled signal; and
  - k. means for storing said processed signal.

**4,946,280**  
**WAVEFRONT ANALYSIS FOR SEGMENTED MIRROR CONTROL**  
 Richard F. Horton, Las Cruces, N. Mex., assignor to Massachusetts Institute of Technology, Cambridge, Mass.  
 Filed Sep. 15, 1988, Ser. No. 245,134  
 Int. Cl. G01B 9/02  
 U.S. Cl. 356—353 30 Claims



1. A method of analyzing a wavefront of light comprising: splitting the wavefront of light into wavefronts in plural paths of a shearing interferometer; modulating, relative to time, the curvatures of the wavefronts of light through the plural paths; recombining the wavefronts from the plural paths; and detecting the interference of the recombined wavefronts as a function of time.

**4,946,281**  
**LASER PROFILER FOR HIGH PRECISION SURFACE DIMENSIONAL GROUPING APPARATUS AND METHOD**  
 Mark L. Dell'Eva, Schaumburg, Ill.; Chieh-Yi J. Yen, Rochester Hills, and Jacob George, Mt. Clemens, both of Mich., assignors to General Motors Corporation, Detroit, Mich.  
 Filed Apr. 24, 1989, Ser. No. 342,276  
 Int. Cl. G01B 11/24  
 U.S. Cl. 356—376 12 Claims



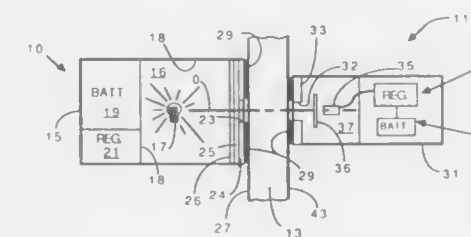
9. A laser optical profiler for determining a shape of a workpiece, said profiler in combination comprising:
  - means for projecting a laser probe line at a fixed focal length on said workpiece at a first angle;
  - translating mirror means to move said probe line with respect to said workpiece;
  - imaging lens means for focusing on said workpiece at an angle nonspecular with said first angle at a second fixed focal length a receiver path to provide an image reflected off said translating mirror workpiece via said imaging lens means forming a line coterminous with said probe line, said receiver path having a predetermined transverse width with longitudinal alpha and beta portions parallel spaced from one another;

a beam splitter means for dividing said receiver image into first and second parts;  
 a first linear array of individual detectors associated with said first part of said receiver image for detecting said alpha portion of the width of said image and generating a signal in response thereto;  
 a second linear array of individual detectors associated with said second part of said receiver image for detecting said beta portion of the width of said receiver image and generating a signal in response thereto; and  
 means of computing a differential ratio of the response of said first and second linear arrays and for rejecting any response not within a ratio of 40/60 to 60/40 between said first and second linear arrays for determining the focal point to said probe line with respect to said workpiece and for determining the linear location of said translating mirror with respect to said workpiece whereby the profile of said workpiece is determined.

**4,946,282**  
**TRANSPARENCY TRANSMISSIVITY MEASUREMENT DEVICE**

Harry L. Task, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 18, 1988, Ser. No. 273,309  
 Int. Cl. G01N 21/59, 21/84  
 U.S. Cl. 356—432 21 Claims



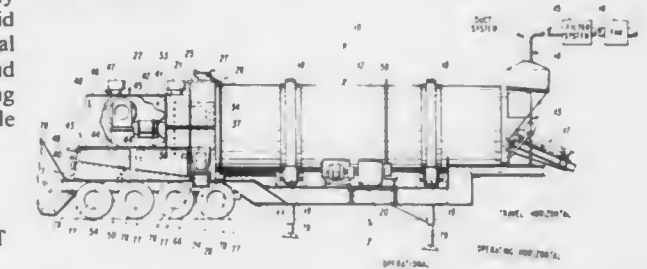
1. A device for measuring optical transmissivity of a transparency, comprising:
  - (a) a diffuse light source of controllable substantially constant luminance and preselected light emitting surface area for placement near the surface defined by a first side of a transparency for transmission of diffuse light along an optical axis through said transparency in measuring the transmissivity thereof;
  - (b) housing having a wall defining an aperture for placement near the surface defined by the second side of said transparency and substantially along said optical axis opposite said diffuse light source;
  - (c) a detector having preselected effective light detection surface area disposed within said housing and coaxial with and spaced a preselected distance from said aperture; and
  - (d) said aperture selected in diametric size smaller than said light emitting surface area of said diffuse light source whereby substantially all said effective light detection surface area of said detector is exposed to said light emitting surface area of said diffuse light source.

**4,946,283**  
**APPARATUS FOR AND METHODS OF PRODUCING A HOT ASPHALTIC MATERIAL**  
 Joseph E. Musil, Ely, Iowa, assignor to Cedarapids, Inc., Cedar Rapids, Iowa

Filed Jun. 16, 1989, Ser. No. 367,343  
 Int. Cl. B28C 5/08; B01F 15/06  
 U.S. Cl. 366—15 16 Claims

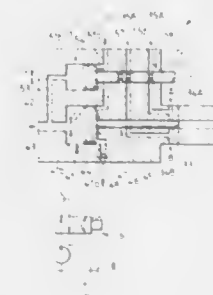
1. Apparatus for producing hot asphaltic material, such apparatus including a drum mounted for rotation about a substantially horizontal axis, said drum having an aggregate feeder

port at a first end thereof for introducing a first type of aggregate material into the drum, and an aggregate discharge end at a second end thereof for discharging said first type of aggregate material, and a burner communicating with the drum, said burner having primary and secondary air intake means for supplying air to a flame in said burner and for sustaining combustion of the fuel to generate a supply of hot gases, said burner being communicatively coupled to said drum for blowing such generated supply of hot gases into said drum to dry and to heat aggregate introduced into said drum through said feeder port, characterized by:



- a pugmill being located adjacent the discharge end of the drum, the discharge end communicatively coupling the drum to the pugmill to discharge the dried and heated aggregate from the drum into the pugmill; and
- a housing enclosing the pugmill and the burner, portions of said housing forming a common chamber including a space above the pugmill and the secondary air intake means, whereby hot gases emanating from the pugmill become part of the secondary air for the burner and pass through the flame of the burner.

**4,946,284**  
**MIXING HEAD**  
 Masatoshi Teranishi; Noboru Hara; Katsumi Tachi, and Hisayasu Sugita, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan  
 Filed Apr. 28, 1989, Ser. No. 344,591  
 Claims priority, application Japan, Apr. 30, 1988, 63-108541  
 Int. Cl. B01F 15/02  
 U.S. Cl. 366—131 5 Claims



1. A mixing head, comprising:
  - a mixing chamber;
  - a plurality of inflow passages terminating at said mixing chamber for plural kinds of liquid materials a plural liquid materials can be flowed through said inflow passages into, mixed with each other discharged from said mixing chamber;
  - a plurality of return passages each branched from a respective inflow passage;
  - a discharge control valve for opening and closing said inflow passages for said liquid materials flowed into said mixing chamber, said discharge control valve including a shaft and a first piston, said shaft extending from said first piston, said piston moving back and forth so that said

valve shaft moves back and forth in said mixing chamber, said discharge control valve being normally in a closed state;

a circulation control valve for simultaneously opening and closing said return passages, said circulation control valve including a spool and a second piston, said spool extending across said return passages from said second piston and moving back and forth, said circulation control valve being normally in an open state;

a first cylinder including said first piston therein;

a first forward movement passage communicated with said first cylinder, said first piston being moved to open said discharge control valve when a working fluid flows into said first forward movement passage;

a first backward movement passage communicated with said first cylinder, said first piston being moved to close said discharge control valve when said working fluid flows into said backward movement passage;

a second cylinder including said second piston therein;

a second forward movement passage communicated with said second cylinder, said second piston being moved to close said circulation control valve when said working fluid flows into said second forward movement passage; and

a second backward movement passage communicated with said second cylinder, said second piston being moved to open said circulation control valve when said working fluid flows into said second backward movement passage; wherein said first forward movement passage is branched from said second forward movement passage and extends across said spool;

said spool is provided with a groove for opening said first forward movement passage when said circulation control valve is in a closed state; and

a restriction passage having a check valve for keeping said working fluid from flowing into said first cylinder is formed to be communicated with said first cylinder at a side of said first forward movement passage and is branched from said second forward movement passage.

4,946,285

# BOWL SCRAPER ATTACHMENT FOR PLANETARY FOOD MIXER

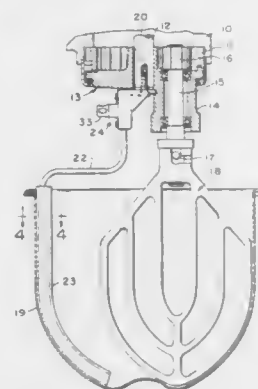
Chris A. Vennemeyer, Vandalia, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Mar. 8, 1990, Ser. No. 490,908

Int. Cl.<sup>5</sup> B01F 9/22

U.S. Cl. 366—288

4 Claims



1. In a food mixer having an upwardly-opening stationary cylindrical bowl, a depending beater shaft rotating on a vertical axis and a vertical depending drive shaft coaxial with the bowl and about which the beater shaft orbits when the bowl is in position to receive and contain product during mixing, said mixer further including means for driving said drive shaft at a preselected speed, a supporting member supported on said

drive shaft and rotatably mounting said beater shaft radially-outward therefrom, external gear means on said beater shaft and cooperating stationary internal gear means on said food mixer for rotating the beater shaft at a speed higher than said preselected speed in response to rotation of said supporting member, and food beater means detachably mounted to said beater shaft, the improvement comprising:

bowl scraper means removably mounted for rotation with said supporting member for scraping food product being mixed from the inner surface of said bowl and returning it to the path of orbital action and rotation of said beater means, said bowl scraper means including:

bracket means mounted at the underside of said supporting member and a single, upwardly-directed bolt for fastening said bracket means to said drive shaft;

cooperating means on said bracket means and said supporting member restraining said bracket means against angular movement about said single bolt;

a radially-outwardly-and-downwardly depending scraper arm having a downwardly-extending scraper blade at its remote end for essentially vertically contacting the inner surface of said bowl; and

means detachably mounting said scraper arm to said bracket means.

4,946,286

# LIQUID PITCHER INCLUDING A MIXING AND GRINDING MECHANISM

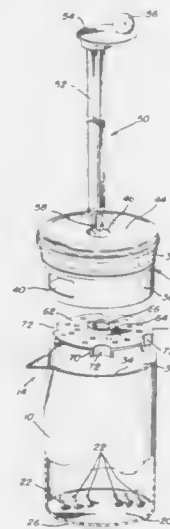
Emerson J. Purkapile, Chicago, Ill., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Nov. 23, 1988, Ser. No. 275,381

Int. Cl.<sup>5</sup> B01F 7/26

U.S. Cl. 366—247

15 Claims



9. A container for breaking up and mixing material including a frozen juice concentrate, comprising:

a container body open at one end and closed at the other end; a removable lid fitted to the open end of the container body, said lid further including a journaled aperture for supporting a crank member;

a crank member capable of both rotary and a reciprocatory motion extending through said aperture and including a lever arm member, a handle, and an elongated shaft having one end attached to the lever arm member;

a grinding and mixing plate attached to the other end of the elongated shaft and including a plurality of mixing openings therein, a lower surface portion facing the closed end of the container body and having a first set of grinding teeth and a plurality of curvilinear rim segments projecting toward said closed end of said container body; and

a second set of grinding teeth located on an inner surface of

said closed end of said container body and intermeshing with said first set of grinding teeth and acting in concert therewith for grinding material placed in the container body,

whereby rotary motion of the crank member provides a unitary grinding and stirring operation on said material while reciprocatory motion thereof provides a mixing operation on said material.

4,946,287

# AGITATOR FOR A FOOD MIXER AND METHOD OF USE THEREOF

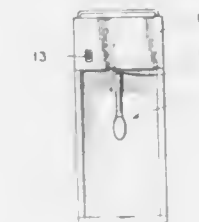
John K. Barnard, Bay Village, and David A. Brown, Rocky River, both of Ohio, assignors to Vita-Mix Corporation and Flurry International, Cleveland, Ohio

Continuation-in-part of Ser. No. 53,073, May 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 896,400, Aug. 14, 1986, abandoned. This application Jun. 30, 1989, Ser. No. 373,459

Int. Cl.<sup>5</sup> B01F 7/16

U.S. Cl. 366—343

15 Claims



1. A disposable food mixer agitator for use by a consumer, the agitator being engageable with a rotatable elongate shaft, the shaft tapering downwardly from a larger cross section to a smaller cross section and including coupling means, the agitator comprising, an elongate plastic stem, said stem being hollow along its entire length and being adapted to fit over substantially the entire shaft and be strengthened thereby, said stem tapering downwardly from a larger cross section to a smaller cross section corresponding to the taper of the shaft, blade means on the lower end of said stem configured to induce the consumer to remove said stem from the shaft and use the agitator to consume the food, said blade means being in the shape of a bowl of a spoon and closing the lower end of said stem to prevent contamination of the shaft, and means on said stem to temporarily engage the coupling means of the shaft to temporarily position said hollow stem longitudinally on the shaft and permit rotation of said stem and said blade means with the shaft so that said blade means will mix the food after which time the consumer is induced by said blade means to remove said stem from the shaft and consume the food with the agitator thereby preventing contamination of the shaft from exposure to different food items.

4,946,288

# DEW POINT ANALYZER

Paul Siska; Kewal K. Vij, and Gyula Eisenbart, all of Calgary, Canada, assignors to Nova Husky Research Corporation, Calgary, Canada

Filed Nov. 2, 1988, Ser. No. 266,157

Int. Cl.<sup>5</sup> G01N 25/02

U.S. Cl. 374—20

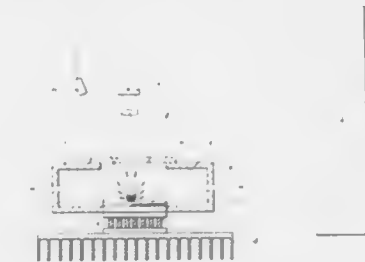
25 Claims

5. A dew point detection device for determining the dew points of hydrocarbon and of water in a gas stream comprising: a gas sample-receiving chamber; a light reflecting and light scattering surface located in said chamber, said surface having a first portion which is polished to be highly reflective and a second portion which is roughened to be light scattering;

means for changing the temperature of said surface and for monitoring the temperature of said surface;

a light beam source arranged to direct a beam of light onto both portions of said surface at an oblique angle while cooling said surface so that light from the beam is scattered and reflected from said surface; and

light detection means located along a light transmittance path generally perpendicular to said surface for detecting only light scattered by both portions of said surface and



producing output signals corresponding to the intensity of light scattered from both portions of said surface and connected into circuit means capable of registering both an increase in light scattered from the first portion of said surface as an indication of water dew point, and a decrease in light scattered from the second portion of said surface as an indication of hydrocarbon dew point; and

said temperature changing means being arranged to continue cooling of said surface after the first dew point has been indicated and until both dew points have been indicated.

4,946,289

# RECLOSABLE OPEN MOUTH BAG

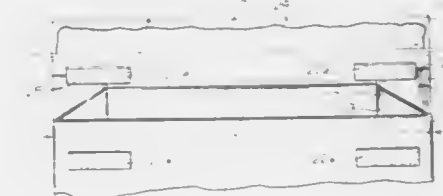
Robert W. Bolling, and James R. Sanders, both of Savannah, Ga., assignors to Union Camp Corporation, Wayne, N.J.

Filed Feb. 6, 1987, Ser. No. 12,146

Int. Cl.<sup>5</sup> B65D 33/18, 33/16

U.S. Cl. 383—61

2 Claims



1. In an open mouth bag including front and rear panels disposed in generally parallel relationship to one another and interconnected along their longitudinal edges by means of gussets, the rear panel being provided with a lip extending above the mouth of the bag, said rear panel being foldable along a fold line on the rear panel, positioned below the lip and the mouth of the bag, and securable to the face of the front panel; and means for securing the lip to the face of the front panel to form a primary closure of said open mouth of the bag, said lip being provided with means for unsecuring at least part of the lip from the front panel; an improved secondary closure at said open mouth of the bag in cooperation with said primary closure, comprising:

a fastening tape with mating hook and loop strips, one strip being secured to the lip of the rear panel above said gussets and the other mating strip being secured to the face of the front panel in a position so that the strips will be superimposed when the lip is folded over, the secondary closure being positioned to secure the lip to the front panel after the lip has been unsecured;



said gussets comprising front and rear gusset panels articulated along central fold lines, the rear gusset panels being extended above the mouth of the bag and secured under the fastening tape strips to hold the rear gusset panels in place against the rear panel of the bag; whereby the secondary closure can be repeatedly opened and reclosed after the lip has been unsecured.

4,946,290

## EXPANDABLE BAG

Krzysztof Matyja, 211-5777 Willingdon Avenue, Burnaby, B.C., Canada V5H 4B1

Filed Sep. 13, 1988, Ser. No. 243,927

Int. Cl.<sup>5</sup> B65D 30/20, 33/6

U.S. Cl. 383—10

17 Claims

and makes contact with the wall portions of the exterior bag portion; and  
(d) means associated with the collapsed interior liner means for providing that the wall portion of the collapsed interior



rior liner means substantially conforms to and abuts against the wall portions of the exterior bag portion when the interior liner means expands and makes contact with the exterior bag portion.

4,946,292

## BAG HAVING EXPANDING MEANS THEREIN

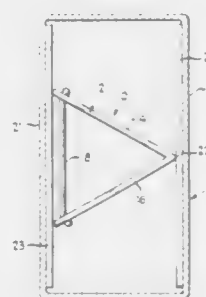
Sidney Diamond, 3800 North Lake Shore Drive, Apt. 11B, Chicago, Ill. 60613, and Deborah L. Diamond, Northbrook, both of Ill., assignors to Sidney Diamond, Niles, Ill.

Filed Jun. 19, 1989, Ser. No. 367,759

Int. Cl.<sup>5</sup> A45C 7/00

U.S. Cl. 383—127

15 Claims



1. A bag expanding device in combination with a soft bag comprising:

a pair of opposed portions partially forming the bag; means connected between the portions and together with the portions defining a compartment expandable to a predetermined shape;

one or more of the means and the portions being soft and flexible so that the compartment may be readily collapsed into a substantially flattened state or expanded into a substantially stuffed state in which the portions are spaced apart from each other to substantially the full extent permitted by the predetermined shape of the expanded compartment;

the expanding device including a generally planar, rigid insert;

the generally planar, rigid insert being inserted inside the compartment adjacent to one of the portions;

the expanding device also including an expandable piece having a pair of sections foldably attached to each other with each of the sections having a free end spaced from and opposite the free end of the other section;

the sections of the expandable piece being foldable between a first substantially flat coplanar position and a second position in which the sections are substantially parallel to each other;

the expanding device further including a resilient member

1. A flexible bag, comprising:

a tapered body portion with a closed bottom narrower than a top thereof;

a handle portion; and

a folding portion coupling said body portion to said handle portion such that on folding, said body portion pivots about the bottom of said body portion to become substantially flat and on unfolding said folding portion expands outwardly to form an enlarged chamber intermediate the top and bottom of said body while a remaining lower portion of body portion pivots open about the bottom wherein the fold creases provide rigidity and resist the tendency of the body pulling in against its contents in response to the weight of those contents;

wherein said handle portion includes two handle halves separable to open said bag to provide access to an interior thereof and movable from a flat position in which said folding portion is folded to an expanded unfolded position in response to the weight of bag contents.

4,946,291

## SEMI-BULK WITH LINER

Daniel R. Schnaars, 204 "A" Easy St., Lafayette, La. 70506

Continuation of Ser. No. 59, Jan. 2, 1987, abandoned. This

application Sep. 27, 1988, Ser. No. 251,020

Int. Cl.<sup>5</sup> B65D 88/16, 90/04

U.S. Cl. 383—113

5 Claims

1. A storage bag for transporting bulk material, the bag having an upper inlet opening, the bag comprising:

(a) an exterior fabric bag portion comprising a plurality of wall portions, a floor portion and top portion, all defining a bulk storage space therewithin;

(b) a collapsed interior plastic-like liner means contained within the bag portion and at least comprising a continuous wall portion, for storing bulk material therein;

(c) glue circumferentially placed on the wall portions of the exterior bag portion along the bulk storage space in at least two spaced apart positions, a first position being adjacent and surrounding the upper inlet opening, serving as a permanent adhesive contact between the wall portion of the interior liner means and the wall portions of the exterior bag portion, so that the collapsed interior liner means adheres to the wall portions of the exterior bag portion when the collapsed interior liner means expands

attached directly to the sections adjacent to the opposite free ends;  
the resilient member being in tension when the expandable piece is in the first substantially flat position;  
the expandable piece being inserted in the first substantially flat position between the generally planar, rigid insert and the other opposed portion; and  
the resilient member urging the sections from their relatively flat coplanar position to an intermediate position in which the sections are at an angle to each other and are restrained by the predetermined shape of the expanded compartment.

4,946,293

## GAS BEARING HAVING AN AUXILIARY RESERVOIR

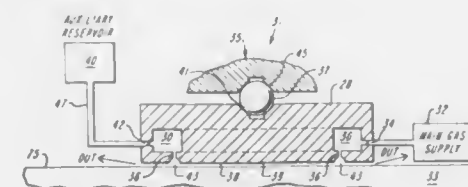
Israel F. Helms, Coventry, R.I., assignor to Brown & Sharpe Manufacturing Company, North Kingstown, R.I.

Filed Feb. 10, 1989, Ser. No. 309,428

Int. Cl.<sup>5</sup> F16C 32/06

U.S. Cl. 384—12

15 Claims



1. A gas bearing system for guiding movement of one member relative to another member, said system comprising:

a first member having a bearing surface disposed thereon;  
a bearing shoe associated with a second member and having a bearing surface disposed thereon in spaced, confronting relation with said bearing surface of said first member, said first member bearing surface and said bearing shoe bearing surface being movable relative to one another;

means for supplying pressurized gas to said bearing shoe;  
an enclosed first reservoir disposed in gaseous communication with said supplying means;

a second reservoir disposed in gaseous communication only with said first reservoir;

at least one port for restricting a flow of gas from said first reservoir to a space between said bearing surface of said shoe and said bearing surface of said first member;

first means for restricting a flow of gas to said first reservoir from said supplying means; and

second means for restricting a flow of gas between said first reservoir and said second reservoir.

12. A coordinate measuring machine comprising:

a base;

a table disposed on said base for supporting a part to be measured;

a pair of spaced, parallel X-rails mounted on said base;

two support members, each support member being slideable along one of said two X-rails;

a Y-rail aligned in a direction generally orthogonal to said X-rails and extending between said support members;

a carriage slideable along said Y-rail;

a Z-rail mounted on said carriage in slideable relation therewith in a direction generally normal to said Y-rail and said X-rail;

means associated with one of said X-rails for driving said support members and said Y-rail along said X-rails; and  
gas bearing system for guiding movement of each of said support members along its associated X-rail, said gas bearing system comprising:

a bearing surface disposed on an associated X-rail;

a bearing shoe associated with said support member and

having a bearing surface disposed thereon in spaced,

confronting relation with said bearing surface of said associated X-rail;

means for supplying pressurized gas to said bearing shoe;

an enclosed first reservoir disposed in gaseous communication with said supplying means;

a second reservoir disposed in gaseous communication only with said first reservoir;

at least one port for restricting a flow of gas from said first reservoir to a space between said bearing surface of said shoe and said bearing surface of said X-rail;

first means for restricting a flow of gas to said first reservoir from said supplying means; and

second means for restricting a flow of gas between said first reservoir and said second reservoir.

4,946,294

## BEARING APPARATUS

Takao Yamada, Tokyo, Japan, assignor to NKK Corporation, Tokyo, Japan

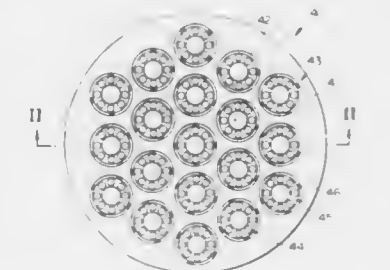
Filed Jan. 25, 1989, Ser. No. 302,017

Claims priority, application Japan, Feb. 1, 1988, 63-19475

Int. Cl.<sup>5</sup> F16C 29/04; B65G 13/00

U.S. Cl. 384—49

6 Claims



1. A bearing apparatus comprising:

linking means having a plurality of substantially circular holes therein;

a plurality of substantially circular bearing units, each bearing unit being mounted loosely in a respective substantially circular hole of said linking means; and

each of said substantially bearing units comprising a plurality of steel balls and a substantially circular shaped retainer, said retainer holding said steel balls in a substantially circular arrangement and said steel balls being rotatably movable in said retainer and relative to said linking means,

said steel balls projecting both from above and below said linking means and said retainer so as to rollingly contact surfaces above and below said steel balls.

4,946,295

## BEARING WITH INFORMATION SENSOR

Christian Hajzler, Annecy, France, assignor to The Torrington Company, Torrington, Conn.

Filed Dec. 13, 1989, Ser. No. 449,166

Claims priority, application France, Dec. 20, 1988, 88 16795

Int. Cl.<sup>5</sup> F16C 32/00

U.S. Cl. 384—448

4 Claims

1. In combination: a housing having a bore for retaining a bearing; a bearing in said bore having a fixed ring and a rotating ring radially spaced from the fixed ring to provide a fixed ring—rotating ring annulus; rolling elements in the annulus which roll on said rings; the fixed ring having an annular

Technical drawing of a mechanical component, likely a valve or pump assembly, showing a cross-section with various numbered parts (1-26) and dimensions (e.g., 42, 32, 33, 10, 36, 40, 44, 30, 19).

```

graph TD
    Start([START]) --> S1{NUMERICAL EXPRESSION PRINT MODE?}
    S1 -- NO --> S2[ ]
    S2 --> S2a[NORMAL PROCESSING]
    S2a --> S2b[ ]
    S2b --> S1
    S1 -- YES --> S3[SELECT CHARACTER PITCH]
    S3 --> S4[/INPUT NUMERICAL EXPRESSION/]
    S4 --> S5{PRINTING INITIATED?}
    S5 -- NO --> S6[ ]
    S6 --> S6a[SIZE CHARACTER ROW]
    S6a --> S6b[ ]
    S6b --> S1
    S5 -- YES --> S7[RESET FLAG  
SYMF ← C  
CHDF ← C]
    S7 --> A([A])
  
```

The flowchart illustrates the program logic for the medical expression character pitch. It begins with a 'START' terminal, leading to decision point S1: 'NUMERICAL EXPRESSION PRINT MODE?'. If the answer is 'NO', the flow proceeds to a junction point, then to 'NORMAL PROCESSING', and returns to the junction point before S1. If the answer is 'YES', the flow proceeds to S3: 'SELECT CHARACTER PITCH', then to S4: '/INPUT NUMERICAL EXPRESSION/'. From S4, the flow goes to decision point S5: 'PRINTING INITIATED?'. If 'NO', it proceeds to S6: 'SIZE CHARACTER ROW', then to another junction point, and returns to the junction point before S1. If 'YES', it proceeds to S7: 'RESET FLAG SYMF ← C CHDF ← C', and then to the 'A' terminal.

U.S. Cl. 401—49 5 Claims

1. An adhesive stick for the application of adhesive on a substrate for temporary bonding to another substrate, which stick contains a binder, water and, as a shape-giving gel-forming agent, an alkali metal or ammonium salt of an aliphatic carboxylic acid having from 8 to 36 carbon atoms, said binder being a combination of an aqueous dispersion of a copolymer based on C<sub>2</sub>-C<sub>10</sub>alkyl esters of acrylic acid and, as a water-dis-



persible tackifier, a modified tall oil rosin or a modified gum rosin, said components being present in the following amounts based on the total weight of the stick: copolymer 15-50 percent by weight, calculated as dry substance; tackifier 5-30 percent by weight, calculated as dry substance; gel-forming agent 7-15 percent by weight; and water 15-60 percent by weight.

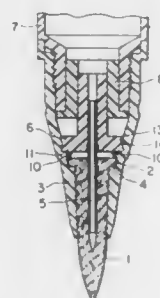
**4,946,302**  
**LIQUID APPLICATOR WITH RESILIENT BRUSH MOUNTING**

Masaki Uchida, Fujioka, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Dec. 15, 1989, Ser. No. 450,956  
Claims priority, application Japan, Jan. 31, 1989, 11084[U]  
Int. Cl.<sup>5</sup> A46B 11/00

U.S. Cl. 401-288

3 Claims



1. In a liquid applicator comprising a main body or shaft sleeve, a front shaft provided with at least one inner shoulder portion, said front shaft being fixedly mounted on said shaft sleeve; a brush tip for applying an application liquid, which brush tip has its rear-end portion formed into a solid flange portion, said brush tip being constructed of a tuft of fibers while mounted in said front shaft so as to extend forward from said front shaft; and a pipe-connecting piece provided with an axial through-hole in its central portion, in which through-hole is fixedly mounted a guide pipe for supplying said application liquid from said shaft sleeve to said brush tip which is sandwiched between said inner shoulder portion of said front shaft and a front-end surface of said pipe-connecting piece, the improvement wherein: said pipe-connecting piece is provided with a front resilient projection in its front-end surface.

**4,946,303**  
**ANGULARLY MOVABLE ROLLING BOOT**

Slawomir Sawicki, Dietzenbach, Fed. Rep. of Germany, assignor to Löhr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 180,365  
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 3712199

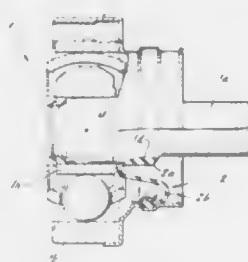
Int. Cl.<sup>5</sup> F16J 15/52

U.S. Cl. 403-50

8 Claims

1. An angularly movable rolling boot for sealing a universal joint, said boot being attachable to an outer part of a joint so as to sealingly enclose a shaft journal connected to the joint, and having a sleeve formed integrally on a wall of the boot so as to continuously rest under radial pretensioning against an axial portion of the shaft journal, the sleeve (2a) being fitted on the shaft journal (1a) without any connecting means and pretensioning on the axial portion of the shaft journal (1a) increasing

axially towards a free end (2c) of the sleeve so that the boot can be initially rolled off a portion of the shaft with a small force



and so that resistance to rolling off increases as rolling off continues so as to prevent creation of a sharp bending edge.

**4,946,304**  
**WELD JOINT**

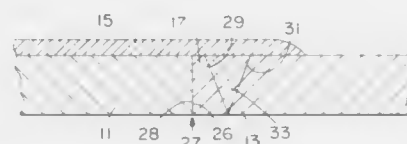
Heinz Scharbach, Plankstadt, Fed. Rep. of Germany, assignor to The Pfaudler Companies, Inc., Rochester, N.Y.  
Continuation of Ser. No. 785,695, Oct. 9, 1985, abandoned. This application May 13, 1988, Ser. No. 193,909

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1984, 3437618

Int. Cl.<sup>5</sup> B23K 15/00

U.S. Cl. 403-272

1 Claim



1. A glass coated article comprising a glass coated substrate, said substrate comprising at least two dissimilar metals and means for joining together said two dissimilar metals which substantially eliminates intermingling of said dissimilar metals, said dissimilar metals being joined by a weld joint adapted to prevent the cracking of the glass coating over a surface of said weld joint, said weld joint comprising:

- (a) a base metal element, of a given composition of metal, including a first flat plane smooth surface on one edge thereof, said first flat plane smooth surface extending across that full surface of said base metal element which is to be joined to a dissimilar metal;
- (b) a welding insert which is of a metal composition which is dissimilar to said base metal element, said welding insert including a second flat plane smooth surface on one edge thereof which is equivalent to said first flat plane smooth surface of said base metal element, said first flat plane smooth surface and said second flat plane smooth surface being welded together without substantial intermingling of said dissimilar metals of said welding insert and said base metal element, said welding insert including on its edge opposite from said second flat plane smooth surface, a first bevel adapted to form a first element of a v-shaped weld groove; and
- (c) a secondary metal element which is of a metal composition which is substantially identical to that of said welding insert, including a second bevel on one edge of said secondary metal element adapted to form a second element of said v-shaped weld groove, mated to said first element of said v-shaped weld groove, said v-shaped weld groove which is filled with welding filler metal to weld said first bevel to said second bevel.

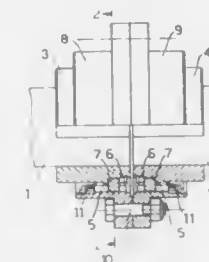
**4,946,305**  
**COUPLING FOR TRANSMITTING ROTARY MOTION BETWEEN A PAIR OF SHAFTS, EVEN WHEN SAID SHAFTS ARE OFF-CENTERED**

Silvano Dell'Acqua, Varese, Italy, assignor to Nuova Sircop Engineering S.r.l., Italy

Filed Mar. 24, 1989, Ser. No. 328,249  
Claims priority, application Italy, Sep. 22, 1988, 21903/88[U]  
Int. Cl.<sup>5</sup> F16L 23/00; F16B 3/00

U.S. Cl. 403-336

2 Claims



1. A coupling for connecting the ends of a pair of shafts, comprising:
  - a hub non-rotatably connected to the end of each shaft, each hub facing the other hub at a facing end thereof, each hub having an outer surface with a plurality of circumferentially spaced axially extending slots distributed therein;
  - a bell engaged over the slots and facing ends of the hubs and including an inner surface with a plurality of circumferentially spaced, axially extending slots corresponding in number and positioned to respective slots of said hubs to form a plurality of roller housings between said hubs and said bell, said bell comprising a pair of semi-bells connected to each other;
  - a barrel-shaped rounded roller rotatably mounted in each housing for co-rotation of said hubs and the shaft ends, and for allowing some non-coaxial orientation between the shaft ends;
  - an annular rim having a rounded outer surface connected to each hub adjacent the axial slot of each hub and engageable with the inner surface of said bell for permitting non-coaxial orientation between the shaft ends; and
  - a pair of cage gaskets engaged between said bell and each respective hub for sealing a space containing said housings.

**4,946,306**  
**HIGHWAY BARRIER**

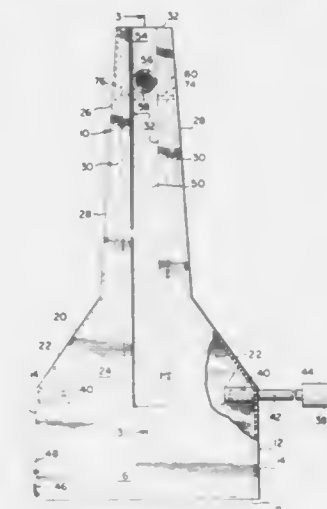
Leo J. Yodock, Box 425, Bloomsburg, Pa. 17815  
Continuation of Ser. No. 38,641, Apr. 15, 1987, Pat. No. 4,773,629. This application Aug. 24, 1988, Ser. No. 235,675  
Int. Cl.<sup>5</sup> A01K 3/00

U.S. Cl. 404-6

24 Claims

1. A highway barrier structure comprising:
  - a longitudinally extending container having a base portion, a pair of side walls, a pair of end walls, and a top portion, said container being substantially hollow and comprising a semi-rigid plastic material whereby said container is self-supporting and has a predetermined shape;
  - filling means for filling said substantially hollow container with a liquid, whereby said filling of said container with said liquid substantially increases the weight of said container without changing said predetermined shape thereof and;
  - each of said pair of end walls defining an aperture adapted to

provide fluid communication between said longitudinally extending container and a second longitudinally extending



container placed in juxtaposition with said longitudinally extending container.

**4,946,307**  
**ASPHALT PAVEMENT RECYCLING APPARATUS**

Herbert E. Jakob, Taylors, S.C., assignor to Astec Industries, Inc., Chattanooga, Tenn.

Filed Aug. 15, 1989, Ser. No. 394,373  
Int. Cl.<sup>5</sup> E01C 23/12

U.S. Cl. 404-91

12 Claims



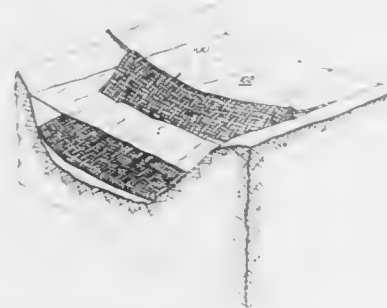
1. A self-propelled apparatus for removing a thickness of asphalt paving from an asphalt roadway and reprocessing the removed asphalt so as to permit the recycling thereof, and comprising:
  - a frame having longitudinally separated front and rear ends, roadway engaging wheel means mounted to said front and rear ends of said frame,
  - power means mounted to said frame and operatively connected to said wheel means for propelling the apparatus along the roadway,
  - pavement milling means mounted to said frame at a medial location along the longitudinal length thereof and for rotation about a transverse axis, and drive means for rotating said milling means to remove a thickness of the asphalt paving and break the same into particles as the apparatus moves forwardly along the roadway,
  - particle processing means mounted to said frame for receiving the asphalt particles removed by said milling means and separating the same into a first portion of relatively small particles suitable for recycling and a second portion of oversized particles, and for delivering said first portion to a rear discharge outlet located adjacent said rear end of said frame and delivering said second portion to a forward discharge outlet located adjacent said front end of said frame and so that said second portion is delivered onto the roadway forwardly of and in alignment with said milling means and the milling means again contacts said second portion upon forward movement of the apparatus.

4,946,308  
**EROSION-CONTROL MATTING AND METHOD FOR MAKING SAME**  
 Donald M. Chevalier, 248 15th Ave., S., Great Falls, Mont. 59405

Continuation-in-part of Ser. No. 909,906, Sep. 22, 1986, abandoned. This application Nov. 7, 1988, Ser. No. 268,272  
 Int. Cl.<sup>5</sup> E02B 3/12

U.S. Cl. 405—15

20 Claims



1. A method of forming an interwoven matting formed from continuous strips of rubber cut from used vehicle tires, wherein the steps thereof comprise:

- stripping vehicle tires, wherein each tire, including the tread and side wall portions, defines a continuous strip, each having a predetermined width, thickness and shape;
- attaching at least two of said strips together, end-to-end, whereby a continuous length of rubber stripping is defined;
- winding said rubber strips onto a spool holding a predetermined length of continuous rubber stripping;
- placing a multiplicity of spools adjacent a weaving machine to dispense said rubber strips longitudinally onto said weaving machine;
- positioning a single spool whereby said rubber stripping thereon is dispensed transverse to the longitudinally disposed rubber strips; and
- weaving said rubber strips to form a section of interwoven matting having a predetermined dimension and configuration as required for use.

4,946,309  
**SEALING PROFILE**

Siegfried Glang, Hamburg, Fed. Rep. of Germany, assignor to Phoenix Aktiengesellschaft, Hamburg, Fed. Rep. of Germany  
 Continuation of Ser. No. 94,077, Sep. 4, 1987, abandoned, which is a continuation of Ser. No. 820,711, Jan. 17, 1986, abandoned.  
 This application May 17, 1989, Ser. No. 353,212

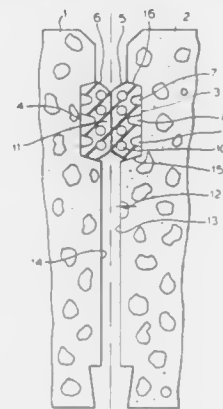
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502620

Int. Cl.<sup>5</sup> E21D 11/38; E04B 1/68; E16J 15/02  
 U.S. Cl. 405—152 4 Claims

1. A sealing profile formed of rubber or rubber-like material adapted to be inserted in a groove extending annularly in segments of a tunnel tube for sealing adjacent segments of the tunnel tube, said sealing profile comprising:

- (a) a planar base surface having three longitudinally extending, parallel, curved grooves therein, the middle one of said grooves being 10 to 20 percent deeper and wider than the adjacent grooves;
- (b) four parallel spaced apart ducts lying in a plane parallel to the base surface of said profile and laterally staggered with respect to said curved grooves, the middle two ducts disposed centrally in the profile having a greater spacing therebetween than the spacing between each one of said centrally disposed ducts and the outer duct adjacent thereto;
- (c) a maximum lateral width defined by a plane parallel to

the planar base surface and disposed between the plane of the four ducts and the base surface; and,  
 (d) lateral flanks extending from said base surface inclined at an angle from 10 to 20 degrees with respect to a plane perpendicular to said base surface;



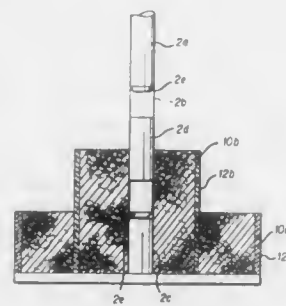
so that when respective sealing profiles in adjacent tunnel tube segments are pressed together, all sections of the profiles are evenly deformed and subjected to uniform stress throughout.

4,946,310  
**DOVE FOR WASTE DUMPS**  
 Wilfried Wunderatzke, Cologne, Fed. Rep. of Germany, assignor to Akzo NV, Netherlands  
 Filed Jun. 6, 1988, Ser. No. 202,543  
 Claims priority, application Fed. Rep. of Germany, Jun. 9, 1987, 3719208

Int. Cl.<sup>5</sup> B01D 29/15

U.S. Cl. 405—128

11 Claims



1. A dome for a waste dump, comprising at least one outside filter layer and one draining and/or degassing area disposed within the outside filter layer, said draining and/or degassing area comprising at least one shaped body of plastic material which has a hollow space volume of at least 70%, and a continuous supporting tube means for maintaining said shaped body in a substantially vertical arrangement despite formulation of transverse forces created by dumped material and acting on the dome, said continuous supporting tube means being disposed within said at least one shaped body and having a length corresponding to a height of the dome, said continuous supporting tube means comprising a plurality of tubes interconnected end-to-end in series whereby the supporting tube means can be extended in accordance with the level of the dumped material.

4,946,311  
**CO-DISPOSAL POLLUTION CONTROL METHOD-II**  
 Edward C. Rosar, Lakewood, and Maurice G. Pattengill, Golden, both of Colo., assignors to NaTec Mines, Ltd., Houston, Tex.

Continuation-in-part of Ser. No. 874,622, Jun. 16, 1986, Pat. No. 4,726,710. This application Feb. 19, 1988, Ser. No. 158,201  
 The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> E02D 3/00

U.S. Cl. 405—129

21 Claims

1. A method of preparing waste ash for disposal comprising the steps of:

- (a) providing a waste ash;
- (b) introducing a sodium oxide salt compound into said ash in the range of from about 5 to 85 weight % on a dry basis;
- (c) said sodium oxide salt compound being selected from  $\text{Na}_2\text{SO}_x$  where x is 3 or 4,  $\text{NaHCO}_3$ ,  $\text{Na}_2\text{CO}_3$ , and mixtures thereof;
- (d) said sodium oxide compound and said ash comprising an ash/sodium oxide salt composite; and
- (e) adjusting the water content of said composite to have from about 15 to about 28% by weight water content to produce a substantially homogenous, substantially impermeable wetted composite mass in non-pellet form having a coefficient of permeability value below about  $10^{-6}$  cm/sec suitable for substantially solid mass landfill disposal without heat sintering.

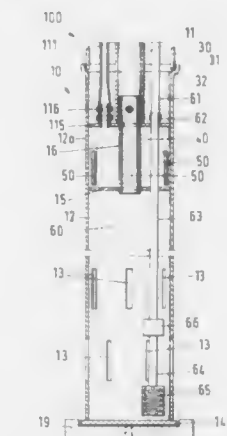
4,946,312  
**APPARATUS FOR OPENING UP GARBAGE DUMPING GROUND GAS SOURCES AND FOR THE EXPLORATION AND SANIFICATION OF OLD DEPOSIT SITE BURDENS AND CONTAMINATED SOILS**  
 Rudolf Looek, and Claus Jebens, both of Hamburg, Fed. Rep. of Germany, assignors to Holsteiner Gas-Gesellschaft mbH, Hamburg, Fed. Rep. of Germany  
 PCT No. PCT/DE88/00066, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/06209, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 12, 1988, Ser. No. 273,819  
 Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704481

Int. Cl.<sup>5</sup> E21B 45/00

U.S. Cl. 405—129

11 Claims



1. Apparatus for evacuating gases from garbage dumps and the like, said apparatus comprising:

- a rigid cylindrical body member having an outer cylindrical wall with perforations therethrough for passage of gas, having a bottom plate closing one end of said body member, and having a first cover plate closing the other end of said body member, said body member adapted to be driven into the ground, said body member having a plurality of holes therethrough above said first cover plate and

adapted to permit engagement of a drawing device to said body member to remove said body member from the ground;

a gas evacuation duct detachably connected to said first cover plate and axially extending from said other end of said body member, with a diameter less than the diameter of said body member; and

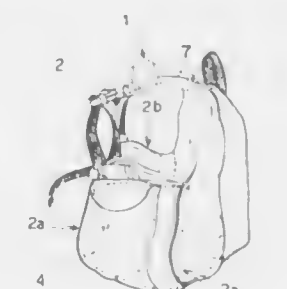
a drive pipe coupled to and extending from said body member other end to permit said body member to be driven into the ground to a depth greater than the length of said body member, said drive pipe having a diameter substantially equal to the diameter of said body member, said other end of said body member including concentric guiding means cooperating with one end of said drive pipe of frictionally connect said drive pipe to said body member during driving of said body member into the ground, while permitting separation of said drive pipe from said body member upon pulling of said drive pipe from the ground.

4,946,313  
**VARIABLE-TRIM JACKET FOR SUBAQUEOUS USE**  
 Benito Augurelli, Bologna, Italy, assignor to Free Shark Italia S.R.L., Bologna, Italy  
 Filed Feb. 1, 1989, Ser. No. 305,368

Claims priority, application Italy, Nov. 25, 1988, 3674 A/88  
 Int. Cl.<sup>5</sup> B63C 11/08

U.S. Cl. 405—186

3 Claims



1. An improved variable-trim jacket for subaqueous use in connection with a diver's self-contained survival bottle or bottles containing a survival gas, said variable-trim jacket comprising:

- a garment made of soft material and partially wrapping up the diver's trunk, and having side areas designed to wrap up said diver's abdomen; and
- an air bag to be applied to or being formed with the garment itself, and adapted to be connected to at least one of the diver's self-contained survival gas-bottles, said air bag being partially fastened to said garment and being capable of receiving a variable volume of survival gas from said self-contained survival bottle, said garment being provided in either or both of its side areas, with at least a pocket adapted to freely hold respective flaps forming a portion of said air bag said flaps being free to slide outwardly or inwardly in relation to said pockets, the sliding being due to the adjustment variations in the configuration of said flaps, as a result of an increase or decrease in volume of the survival gas introduced into or evacuated from said air bag.



# 4,946,314 ROCK ANCHOR

Heinz Gruber, Seesen/Rhueden, Fed. Rep. of Germany, assignor to G. D. Anker GmbH, Seesen/Rhueden, Fed. Rep. of Germany

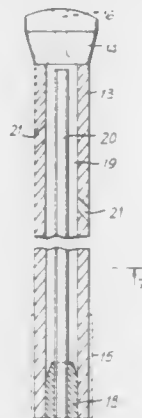
Continuation of Ser. No. 211,235, May 9, 1988. This application Aug. 4, 1989, Ser. No. 390,188

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630832; Jul. 22, 1987, 3624165

Int. Cl.<sup>5</sup> E21D 20/00

U.S. Cl. 405—260

13 Claims



1. Rock anchor, consisting of a tubular body member having a threaded section at least at one end and, at the other end, a drill-head (2, 14, 25) and provided with bores (6, 21), characterized in that the bores (6) are arranged exclusively in a region adjacent the drill-head (2) and that the drill-head (2) is provided in known manner with an axial hydraulic bore (5), and the bores (6, 21) in the surface of the body member, seen in radial section, run at an angle to a radial direction and extend from inside to outside in the opposite direction to the direction of rotation of the drill-head (2, 14, 25).

# 4,946,315 MINE ROOF SYSTEM

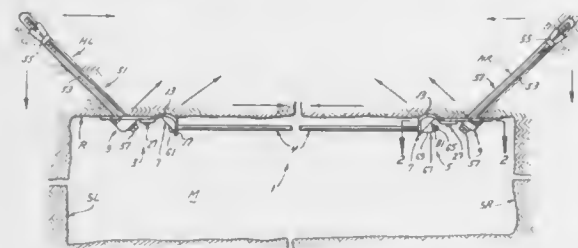
Yoginder P. Chugh, 1618 Tina Dr., Muphysboro, Ill. 62966; John R. Alongi, 350 E. Main, DuQuoin, Ill. 62832, and Joey Linton, R.R. #4, Box 162, West Frankfort, Ill. 62896

Filed Dec. 13, 1988, Ser. No. 283,601

Int. Cl.<sup>5</sup> E21D 21/00

U.S. Cl. 405—288

18 Claims



1. In a mine having a roof and opposing side pillars, apparatus for supporting the roof and for exerting a compressive load on the roof comprising:

first and second connection means positionable against the roof at opposite sides thereof adjacent the opposing pillars, each connection means having an upset surface contacting the mine roof for exerting a compressive load on the roof;

(b) anchoring means at each side of the roof for anchoring each connection means to the roof; and

(c) tie means interconnecting the first and second connection means, the tie means being adjustable to vary the compressive load exerted on the mine roof by the connection

means and said connection means upset surface being offset from said tie means and spaced from the anchoring means.

# 4,946,316

## METHOD AND DEVICE FOR MOVING A SHIELD-TYPE SUPPORT TRESTLE

Willy Watermann, Dortmund, and Herman-Josef Schulze-Heiming, Datteln/Horneburg, both of Fed. Rep. of Germany, assignors to Klöckner-Becorit GmbH, Fed. Rep. of Germany

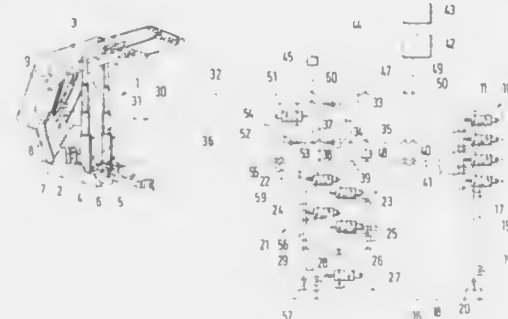
Filed Jul. 19, 1989, Ser. No. 381,839

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1988, 3825276

Int. Cl.<sup>5</sup> E21D 23/16

U.S. Cl. 405—302

21 Claims



1. A method of moving a shield-type support trestle, the trestle having stamps arranged between a roof pressure cap and a lying skid, and control valves, the method comprising the steps of:

(a) reducing a pressure in pressure chambers of the stamps to attain a desired remainder pressure by activating an electronic control device via a pressure in a pressure line of the pushing ram, actuating a discharge valve via the electronic control device and opening an unlockable reflux valve via the discharge valve, the unlockable reflux valve being located between interconnected stamp pressure chambers of the stamps and a return line;

(b) pressurizing the pushing ram within a given time span from before attaining the remainder pressure until after;

(c) advancing the trestle via the pressurized pushing ram after the remainder pressure is attained;

(d) maintaining the remainder pressure in the stamps at an approximately constant value during said advancing of the trestle; and

(e) positioning the shield-type support trestle after said advancing is completed by altering the pressure in the stamp chambers.

12. A device for moving a shield-type support trestle, the trestle comprising stamps having an inlet valve and a discharge valve and being arranged between a roof pressure cap and a lying skid, a pushing ram in the lying skid with a first control valve communicating with a piston chamber of the pushing ram and a second control valve communicating with an annular chamber of the pushing ram, and a return line, the moving device comprising:

a pressure line provided between the first control valve and the pushing ram of the trestle;

a valve controlled by pressure existing in said pressure line and which interconnects stamp pressure chambers of the stamps;

a manometric switch arranged on said pressure line, said switch activating an electronic control device;

an unlockable reflux valve provided in a line between the stamp pressure chambers and the return line; wherein said unlockable reflux valve is actuated through the electronic control device and the stamp discharge valve.

# 4,946,317 COAL LOG PIPELINE SYSTEM AND METHOD OF OPERATION

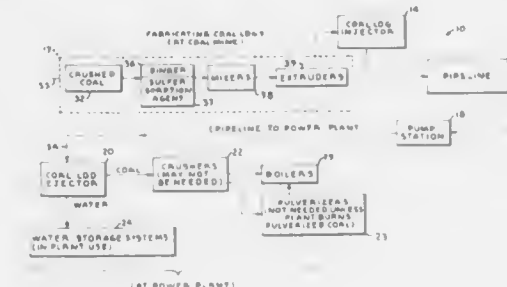
Henry Liu, and Thomas R. Marrero, both of Columbia, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Sep. 28, 1988, Ser. No. 251,100

Int. Cl.<sup>5</sup> B65G 53/00

U.S. Cl. 406—46

19 Claims



1. A method of transporting coal in a conduit, which comprises the steps of:

(a) forming a solid body of coal;

(b) placing said body of said coal in said conduit;

(c) causing a carrier fluid to flow in said conduit at a bulk velocity,  $V_b$ , for coal being less than or equal to 2 times the lift-off velocity,  $V_l$ ; and

(d) removing said body of coal from said conduit.

# 4,946,318

MILLING CUTTER WITH REMOVABLE INSERTS  
Maurice J. A. David, Nantes; Marianneau, Michel E. A., Lamontagne, both of France; Gilbert Aebi, Trelex, and Pierre Raye, Gland, both of Switzerland, assignors to Stellram S.A., Nyon, Switzerland and Societe Nationale Industrielle et Aerospatiale, Paris, France

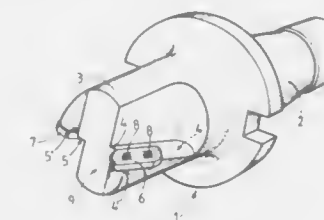
Filed Jun. 27, 1988, Ser. No. 212,261

Claims priority, application Switzerland, Jun. 25, 1987, 240/87

Int. Cl.<sup>5</sup> B23C 5/10, 5/04

U.S. Cl. 407—42

11 Claims



1. Milling cutter with removable inserts, comprising a body having front rear portions, said top portion including at least two indentations along the circumference of said front portion, each of said indentations including a slot extending transversely to said circumferential surface of said rear portion, said slot having a longitudinal axis which together with the longitudinal axis of the body defines a helix angle other than zero, a cutting insert removably mounted in each slot, said cutting insert comprising a top surface and a side surface, said top surface and said side surface intersecting to define a main or major cutting edge extending beyond a lateral edge of the slot, said top surface having a depression therein extending longitudinally parallel to the main cutting edge, being open at both ends, and being connected to the cutting edge by a slope which is constant along the longitudinal extent of the insert with respect to a plane containing the longitudinal axis of the slot,

said side surface having a slope which varies along the longitudinal extent of the insert with respect to said plane, and the shape of said cutting insert and its position on the cutter being such that the radial rake angle of the cutter decreases towards the front end of the body, and such that the radial clearance angle of the cutter remains constant.

# 4,946,319

## CUTTING INSERT AND CLAMPING ARRANGEMENT THEREFOR

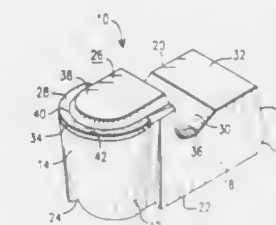
James R. Lyon, Ovid, Mich.; Gary L. Morsch, Dayton, Minn.; Gerald D. Murray, Raleigh, N.C., and James B. Robinson, Speedway, Ind., assignors to Kennametal Inc., Latrobe, Pa.

Filed Aug. 12, 1988, Ser. No. 231,792

Int. Cl.<sup>5</sup> B23B 17/16, 27/18, 27/20, 27/04

U.S. Cl. 407—115

6 Claims



1. An improved cutting insert comprising: an insert body having a first end and a second mounting end; a pair of substantially parallel side walls extending between said first and second ends; a bottom wall generally perpendicular to said side walls and including therein means defining a first notch disposed in said insert body and substantially extending from said first end to said second end; and a top wall having a forward section, a middle section and a rearward section, said forward section in combination with said first end including means defining a cutting edge disposed at a first elevation relative to said bottom wall, said middle section including means defining at least in part a second notch substantially extending thereacross so as to be substantially perpendicular to said first notch and with said second notch bottom portion being disposed at a second elevation relative to said bottom wall, and said rearward section being disposed at a third elevation relative to said bottom wall, which third elevation is less than said first and greater than said second elevations and wherein said top wall forward section of said insert body which includes means defining said cutting edge further includes means defining a chipbreaker disposed at a fourth elevation relative to the bottom wall, which fourth elevation is greater than said first elevation.

# 4,946,320 ROUTING PROCEDURE

Dean T. VanderMey, 4684 60th, SW., Grandville, Mich. 49418

Filed May 27, 1988, Ser. No. 199,810

Int. Cl.<sup>5</sup> B23Q 3/00

U.S. Cl. 409—132

2 Claims

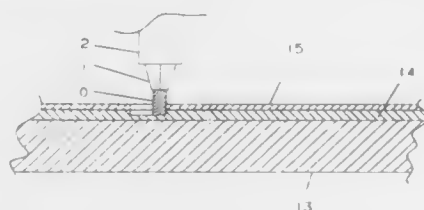
1. A process for routing patterns in sheet material, comprising:

coating a backing panel of laminated paperboard with a releasable adhesive, and solidifying said adhesive;

placing a work sheet on said adhesive;

routing said work sheet according to a predetermined pat-

tern with a router bit traversing said work sheet and entering said panel; and



removing at least island areas isolated by said router bit by pulling them free of said adhesive.

4,946,321

**METHOD FOR LINEAL MACHINING**

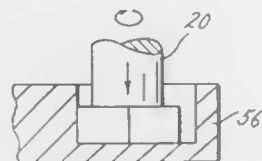
James D. Allemann, Eureka, Mo., assignor to Westhoff Tool and Die Company, St. Louis, Mo.

Division of Ser. No. 328,431, Mar. 24, 1989. This application Dec. 26, 1989, Ser. No. 456,499

Int. Cl.<sup>5</sup> B23P 13/00

U.S. Cl. 409—132

4 Claims



1. A method for lineal milling of a workpiece comprising the steps of:

milling a pilot opening into the workpiece, thereby creating an edge through which the cutting tool is advanced, advancing a rotating cutting tool axially into the workpiece to thereby mill an arcuately edged opening therein; retracting the tool from the workpiece by backing the tool away from the newly milled edge in a generally radial direction and then withdrawing the tool in a generally axial direction from the opening; repositioning the tool so that it partially overlaps the arcuately edged opening as well as the unmilled surface of the workpiece adjacent the opening; and repeating the previously recited steps until the workpiece is milled, as desired.

4,946,322

**METHOD AND APPARATUS FOR CONFINING AND COLLECTING DUST AND PARTICLES PRODUCED BY MACHINE TOOLS**

Kevin J. Colligan, Snoqualmie, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 2, 1989, Ser. No. 305,793

Int. Cl.<sup>5</sup> B23C 1/20

U.S. Cl. 409—137

4 Claims

1. In a device having a machine tool for machining a workpiece, an apparatus for collecting dust and chips generated by said machine tool during the machining of said workpiece, said apparatus comprising:

a shroud having an annular inner wall surrounding a central opening, and an outer wall surrounding and spaced apart from said inner wall to define an annular air passage therebetween, said shroud being mounted so that said machine tool extends through said central opening and is surrounded by said inner wall; a vacuum source;

a pressurized air source; a first air duct extending from said vacuum source to the central opening of said inner wall so that said vacuum source draws air from said central opening; and a second air duct extending from said pressurized air source to the annular air passage of said shroud so that said pres-

surized air source supplies air to said annular air passage whereby air flowing from said annular air passage arrests the outward movement of dust and chips from said machine tool and air flowing from said central passage toward said vacuum source carries said dust and chips from said central passage.

4,946,323

**CHAMFERING DEVICE**

Yasuo Kazama, and Osahiko Miyazaki, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

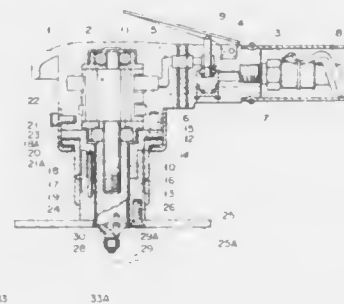
Filed Aug. 21, 1989, Ser. No. 395,982

Claims priority, application Japan, Aug. 31, 1988, 63-114293[U]

Int. Cl.<sup>5</sup> B23C 1/20

U.S. Cl. 409—178

6 Claims



1. A chamfering device comprising:

a housing containing a motor; a rotating shaft extending along an axis and having first and second end portions connected to the motor; a rectangular cutter in the form of a thin plate, for chamfering that corner portion of a workpiece which is defined by a curved surface and a flat surface, said cutter being fixed to the second end portion of said rotating shaft and having a chamfering blade inclined with respect to the axis of said rotating shaft; a guide provided on the second end portion of said rotating shaft and located at a position farther from the first end portion of said rotating shaft than the position of the chamfering blade, said guide being rotatable on the curved surface of said corner portion of the workpiece; a fixed boss in the form of a hollow cylinder having an axis, and which is fixed to said housing and through which said rotating shaft passes; a slide boss in the form of a hollow cylinder having first and second end portions which are mounted on said fixed boss

so as to be movable only in the axial direction of said fixed boss; a plate-like guide base fixed to the second end portion of said slide boss and having a guide plane perpendicular to the axis of said rotating shaft, said guide plane being slidable on the flat surface of said corner portion of the workpiece; and an adjusting ring, mounted on said fixed boss so as to be rotatable around the axis thereof, for moving said slide boss in its axial direction and adjusting the amount of projection of said chamfering blade with respect to a plane including said guide plane.

4,946,324

**RAILROAD FLATCAR WITH TURNTABLE**

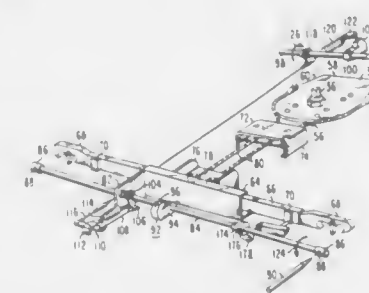
Yan H. Tse, Plymouth Meeting, Pa., and Dennis L. Beecher, Hammonton, N.J., assignors to Consolidated Rail Corporation, Philadelphia, Pa.

Filed Jan. 13, 1989, Ser. No. 297,305

Int. Cl.<sup>5</sup> B61D 47/00

U.S. Cl. 410—1

19 Claims



1. A railroad car comprising:

a substantially flat deck mounted on wheels for rolling on a track; at least one turntable rotatably mounted on said deck; means on said turntable for slidably receiving a container from a truck which is along a side of said railroad car; and means on said deck operably by said truck for rotating said turntable; wherein said turntable includes a lower turntable plate which is supported on said deck for rotation about an axis perpendicular to said deck, and said means for rotating said turntable includes a shuttle bar slidably mounted on and extending transversely across said deck and cable connecting said shuttle bar to said lower turntable plate so that sliding movement of said shuttle bar rotates said lower turntable plate.

4,946,325

**EXPANSION ANCHOR STUD**

Frederic C. Abraham, P.O. Drawer 385, Pequannock, N.J. 07440-0142

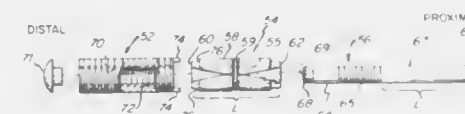
Continuation-in-part of Ser. No. 832,991, Feb. 26, 1986, Pat. No. 4,789,282. This application Dec. 5, 1988, Ser. No. 279,956

The portion of the term of this patent subsequent to Dec. 6, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16B 13/04

U.S. Cl. 411—24

13 Claims



1. An expansion anchor stud comprising:

a threaded bolt having a shank of a first diameter and a head

of greater diameter than the shank, the shank of said bolt having an externally threaded portion; an externally threaded stud of a second diameter, greater than the first diameter and having a hole therethrough for receiving the shank of the bolt, said hole through the stud having a threaded portion for engaging the externally threaded portion of the bolt; and an expansion anchor having an outside diameter substantially equal to the second diameter and having a hole therethrough for receiving the shank of the bolt; wherein the shank of the bolt extends through the expansion anchor and is rotatable relative to the stud to compress and expand the expansion anchor.

4,946,326

**METHOD FOR PRESERVATION OF FRESH FISH OR SEA-FOOD**

Pascal Schvester, Chicago, and Richard Saunders, Downers Grove, both of Ill., assignors to American Air Liquide, New York, N.Y. and Liquid Air Corporation, Walnut Creek, Calif.

Filed Jun. 7, 1988, Ser. No. 203,415

Int. Cl.<sup>5</sup> A23B 4/08, 4/09, 4/16; B65B 31/00

U.S. Cl. 426—316

7 Claims

1. A method for preserving fish and sea-food products comprising the steps of placing said product in a gas impermeable container, pulling a vacuum in said container, introducing in said container a gas mixture comprising, in partial pressure from about 50% to 68% carbon dioxide, 5% to 20% oxygen and 27% to 45% argon, and then sealing said container to seal said product in said gas mixture at said partial pressures to avoid substantially any contamination from the external atmosphere surrounding said container and storing said container at refrigerated temperatures.

4,946,327

**FILM CARRIAGE ASSEMBLY AND METHOD FOR MOVING AND STORING A FILM PLATTER**

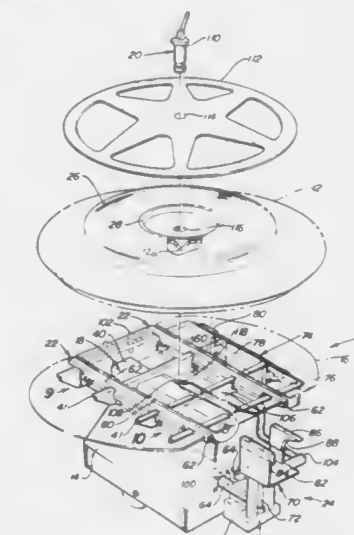
Samuel Kinsora, 27200 Ursuline, St. Claire Shores, Mich. 48081

Filed Mar. 14, 1989, Ser. No. 323,292

Int. Cl.<sup>5</sup> B65G 1/00

U.S. Cl. 414—331

26 Claims



1. A carriage assembly for moving and storing an object comprising:

a housing; a surface supported by said housing and transfer means moveable between a retracted position and an extended position with respect to said surface and adapted to movably support the object; indexing means supported by said housing and moveable



between a retracted position and an extended position with respect to said housing for indexing the object from one position to a predetermined second position; said transfer means operative to transfer the object from said surface to said indexing means and to transfer the object from said indexing means to said surface when said object has been indexed to said predetermined second position; means for rotating said surface to any position between a substantially horizontal position and a substantially vertical position; and said means for rotating said surface being disposed between said surface and said housing and including an elongated portion extending along an axis of said surface, said elongated portion rotatably supported about its longitudinal axis on said housing, said elongated portion including a driven gear disposed at one end thereof and a drive gear mounted on said housing operatively meshing with said driven gear to rotate said elongated portion so as to rotate said surface to any position between a substantially horizontal and substantially vertical position.

4,946,328

## SWINGING-LINK ROTARY LOADERS

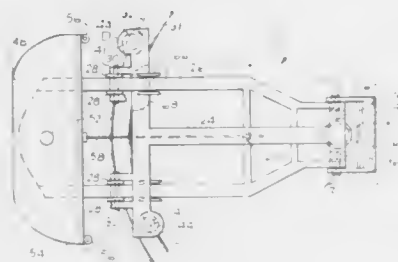
Leonard D. Barry, 19300 Pennington, Detroit, Mich. 48221

Filed Aug. 22, 1988, Ser. No. 234,476

Int. Cl.<sup>5</sup> B65G 67/02

U.S. Cl. 414—334

8 Claims



1. In a rotary loader having at least one loadspreader activated to engage against the side of a vehicle to move for aligning the loadspreader with the vehicle when moved for transfer of a load between the loader and the vehicle and to lift or lower the load for transfer, at least one rotary load support arm mounted to describe a horizontal arc in and out over a path that the vehicle moves for transfer, vertical locating members depending from said loadspreader and support means pivotally connected to said loadspreader for supporting and turning said loadspreader to rotate horizontally to align for transfer, the improvement comprising: a plurality of parallel and depending free-swinging substantially vertical links spaced longitudinally along said support arm and connecting said support means to said support arm to form a parallelogram linkage to support said loadspreader to swing in and out lengthwise relative to said support arm and swing in when said loadspreader is brought against said vehicle to cushion against the vehicle and to allow the loadspreader to follow a chord across an arc along which transfer is made to closely align the loadspreader with the vehicle throughout the arc.

4,946,329

## MICROMANIPULATOR USING HYDRAULIC BELLOWS

John W. Krueger, New Rochelle, N.Y., assignor to Albert Einstein College of Medicine of Yeshiva University, Bronx, N.Y.

Filed Apr. 1, 1988, Ser. No. 176,599

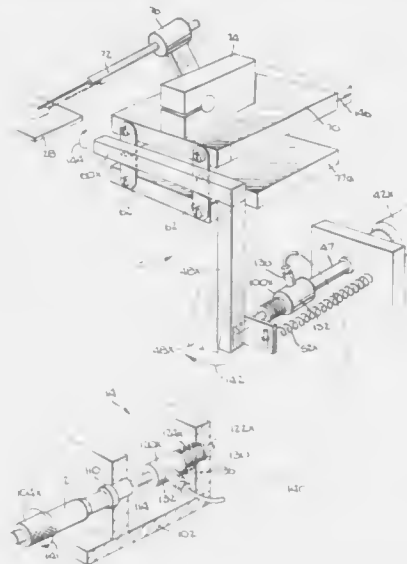
Int. Cl.<sup>5</sup> B25J 3/00

U.S. Cl. 414—4

32 Claims

1. A micromanipulator for making precise, reproducible microadjustments of the position of a platform adapted to support a microtool for relative movement, comprising:

- (A) a frame;
- (B) a lever arm associated with said frame and adapted to functionally engage the platform;
- (C) a hydraulically-operated fluid-tight bellows member in operative engagement at one end with said frame and at the other end with said lever arm, said bellows member



being reversibly adjustable in length with a functionally substantially constant average cross-sectional area; and (D) means for reversibly supplying said bellows member with a substantially incompressible liquid to adjust the length of said bellows member, thereby effecting microadjustments to the position of the platform relative to said frame.

4,946,330

## TRUCK RESTRAINT

Paul A. Pedersen, Guelph, and John E. Pedersen, Puslinch, both of Canada, assignors to Pentalift Equipment Corporation, Guelph, Canada

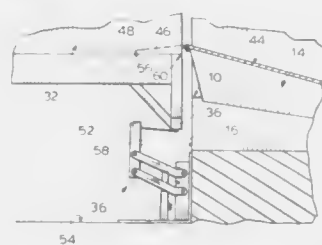
Filed Nov. 1, 1988, Ser. No. 265,529

Claims priority, application Canada, Sep. 14, 1988, 577338

Int. Cl.<sup>5</sup> B65G 67/02, 69/00

U.S. Cl. 414—401

10 Claims



1. An apparatus for restraining movement of a parked vehicle away from a fixed structure, said apparatus comprising a support frame, an upwardly extending block, a sensor arm mounted on said block a linkage having two spaced-apart link arms and means for driving said linkage for raising and lowering said linkage, a first end of said two link arms being pivotally connected to said block and a second end of said two link arms being pivotally connected to said support frame, said two link arms being a parallelogram linkage which serves to substantially maintain said block in a vertical position throughout its travel from its lower position, said drive means for raising and lowering said first end of said linkage determining an upper position for said block to capture a portion of a vehicle frame to restrain a parked vehicle and a lower position for said

block to permit a parked vehicle to move away from a fixed structure said sensor arm extending away horizontally from said block towards said second end of said two link arms, said sensor arm contacting a portion of a vehicle frame which is captured by said block to indicate thereby that a parked vehicle is restrained by said apparatus.

4,946,331

## DISCHARGE CONTROL APPARATUS FOR COTTON CART BASKET

Mark L. Johnson, 114 Spruce, Mt. Park, Okla. 73559

Filed Mar. 3, 1989, Ser. No. 318,232

Int. Cl.<sup>5</sup> B65B 69/00

U.S. Cl. 414—421

12 Claims



1. A discharge control apparatus for the basket of a cotton cart, comprising:

- a discharge control member having a leading edge and being reciprocally supported within the basket for movement between a retracted position and an extended position so that the leading edge of the member follows an eccentrically arced path which generally conforms to the inner contour of the basket; and
- means for controlling the movement of the discharge control member;

wherein the basket has a bottom, an intake side wall and a discharge side wall, and wherein the discharge control member is supported by a link assembly comprising:

- an intake side link having an upper end and a lower end, the lower end being pivotally connected at a fixed point to the basket at the junction of the bottom and the intake side wall;
- a discharge side link having an upper end and a lower end, the lower end being pivotally connected at a fixed point to the basket at the junction of the bottom and the discharge side wall;
- a connecting link having a first end and a second end, the first end being pivotally connected to the upper end of the intake side link and the second end being pivotally connected to the upper end of the discharge side link; and
- a support depending from the connecting link on which the discharge control member is fixed.

4,946,332

## CONVERTIBLE BOAT &amp; VEHICLE TRAILER

Lewis D. Daniels, E. 14 16th Ave., Spokane, Wash. 99203

Filed Sep. 20, 1988, Ser. No. 247,050

Int. Cl.<sup>5</sup> B60P 1/04, 3/08

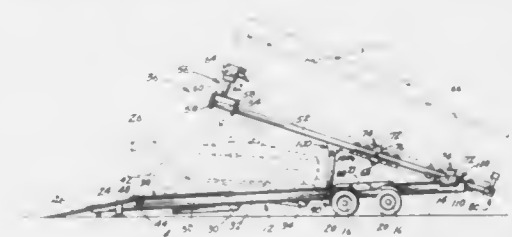
U.S. Cl. 414—477

6 Claims

1. A convertible dual load trailer capable of simultaneously carrying a boat and wheeled vehicle in a dual load mode of operation wherein the wheeled vehicle is carried in a forward position and a boat is carried in a rearward inclined position with portions of the boat extending upwardly and over portions of the wheeled vehicle, and capable of converting to a single load mode of operation wherein a boat is carried in a

lowered collapsed position without a wheeled vehicle on the trailer, comprising:

- frame means;
- at least one wheel means for rollably supporting the frame means upon a road surface;
- hitch means connected to the frame means for connecting the trailer to a pulling vehicle;
- at least one vehicle support means connected to said frame means for supporting a wheeled vehicle thereon in a traveling position above the road surface;
- at least one boat carriage adjustably and movably connected to the frame means;
- at least one rearward boat carriage mounting for connecting rearward portions of the boat carriage to rearward portions of the frame means; said rearward boat carriage mounting permits pivotal and translational movement between the boat carriage and the frame means to thereby allow the boat carriage to move rearwardly as the boat carriage is extended upwardly into an extended position and to move forwardly as the boat carriage is retracted downwardly into a collapsed position;
- an operator for moving the boat carriage between the extended and collapsed positions;



a boat carriage weight redistribution mechanism connected between the frame means and the boat carriage; said weight redistribution mechanism including at least one connection linkage which forces the boat carriage rearwardly as the boat carriage is extended upwardly, and which forces the boat carriage forwardly as the boat carriage is retracted downwardly, to thereby shift the center of gravity of the boat carriage and any boat supported thereon to compensate for changes in loading associated with removal and installation of a wheeled vehicle onto the vehicle support means;

whereby the boat carriage can be converted between the collapsed position wherein the boat carriage is collapsed downwardly toward the frame means, and the extended position wherein the boat carriage is inclined relative to the frame with rearward portions of the boat carriage positioned lower than front portions of the boat carriage to support rear portions of a boat, and said front portions of the boat carriage positioned relatively higher to support bow portions of a boat above any wheeled vehicle resting on said vehicle support means.

4,946,333

## ASSEMBLY FOR MOVING AND GUIDING A VEHICLE ONTO AND OFF OF A BED OF A TOWING VEHICLE

Derrell W. Boatwright, Box 536, Leesville, S.C. 29070

Filed Jun. 15, 1989, Ser. No. 367,333

Int. Cl.<sup>5</sup> B60P 3/00

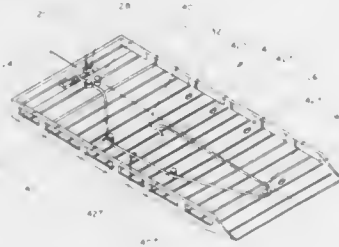
U.S. Cl. 414—559

1 Claim

1. A control means for moving and guiding a towed vehicle onto and off of a towing vehicle comprising:

- (A) a towing vehicle bed which includes
  - (1) a forward end which is located adjacent to a towing vehicle,
  - (2) an aft end,
  - (3) a longitudinal centerline extending from said forward end to said aft end,

- (4) sides,  
 (5) a transverse centerline extending between said sides, and  
 (6) a plurality of towed vehicle supporting slats, each slat extending parallel to said transverse centerline and having an upper surface on which the towed vehicle is supported and a lower surface, and a thickness measured between said slat upper surface and said slat lower surface;  
 (B) a winch assembly mounted on said towing vehicle bed adjacent to said forward end and including a cable having a towing hook thereon; and  
 (C) a cable guide means mounted on said towing vehicle bed for guiding the wench assembly cable as a vehicle being towed is moved onto and off of said vehicle bed using said winch assembly, said cable guide means including  
 (1) a plurality of anchors fixedly mounted on the bed at spaced apart locations, each of said plurality of anchors including  
 (a) a cylindrical body having a top and a bottom,  
 (b) a blind-ended bore defined in said cylindrical body from said top,  
 (c) a blind-ended bore depth measured from adjacent to said bottom to said anchor top,  
 (d) means fixedly attaching said cylindrical body to one of said slats on a lower surface of such slat with said blind-ended bore facing upwards, and  
 (e) each slat including an anchor-receiving hole defined therethrough which is in alignment with said upward facing blind-ended bore and defining a bottomed bore through said slat,



said plurality of anchors including

- (a) a first anchor located on a first slat near the bed longitudinal centerline and near said bed aft end,  
 (b) a second anchor located on said first slat adjacent to said first anchor with the bed longitudinal centerline being located between said first and second anchors,  
 (c) a third anchor located on a second slat near the bed longitudinal centerline and near said bed forward end,  
 (d) a fourth anchor located on said second slat near said third anchor with the bed longitudinal centerline being located between said third and fourth anchors, with said third and fourth anchors located closer to each other than said first and second anchors,  
 (e) a fifth anchor located near the bed transverse centerline on a third slat and near one side of said bed,  
 (f) a sixth anchor located near the bed transverse centerline on a fourth slat and near said bed one side with said bed transverse centerline being located between said fifth and sixth anchors,  
 (2) a plurality of mounting pins, each mounting pin being associated with one of said anchors and including  
 (a) a cylindrical body that is received in one of said bottomed holes through a slat and into a blind-ended bore which is aligned with such slat hole,  
 (b) said cylindrical body being sized to slide into and out of said bottomed hole,  
 (c) each cylindrical body including a bottom end which abuts the bottom of the anchor associated with such

- mounting pin, and a mushroom-shaped head on another end of said body and having a length which is defined between said bottom end and said head,  
 (3) a plurality of cable guide pulleys, each cable guide pulley being associated with one of said mounting pins and each cable guide pulley including  
 (a) an annular body,  
 (b) a bore defined through said body,  
 (c) a concave groove defined in an edge of said body,  
 (d) each body being rotatably mounted on an associated one of said mounting pins to rotate about said mounting pin in a plane which is parallel to said bed slat upper surfaces,  
 (e) a bottom surface slidably engaging an upper surface of a slat,  
 (f) an upper surface,  
 (g) a width defined between said guide pulley upper surface and said guide pulley bottom surface, and  
 (4) each of said mounting pins having a length which is greater than the combined dimension of said anchor blind-ended bore depth plus said slat thickness plus said guide pulley width so that said guide pulleys rotate freely on associated ones of said mounting pins.

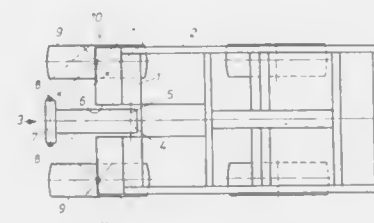
4,946,334

**WORKING VEHICLE, ESPECIALLY A LOADER**  
 Karl Friedrich, Sipplingen, and Dieter-Heinz Maly, Überlingen, both of Fed. Rep. of Germany, assignors to Kramer-Werke GmbH, Überlingen Bodensee, Fed. Rep. of Germany

Filed Mar. 10, 1989, Ser. No. 321,935  
 Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808312

Int. Cl.<sup>5</sup> B66F 9/00  
 U.S. Cl. 414—697

7 Claims



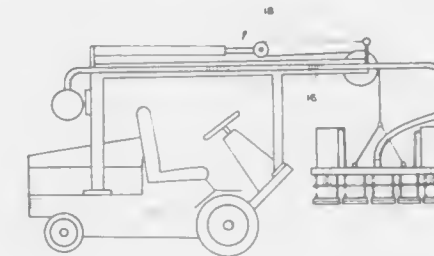
1. In a vehicle-mounted loader comprising a frame; wheels; and a loading apparatus disposed centrally at the front of said frame and including a raising arm, a lifting jack articulated on said raising arm and supported at the front end of said frame, a dumping beam, and a quick-change device connected to a front end of said raising arm and being articulated through a dumping rod to said dumping beam which is actuated by a dumping cylinder, the improvement comprising said frame being formed at said front end thereof with a channel-like recess open at a forward end thereof and accommodating a vehicle-facing end portion of said raising arm, said dumping cylinder being articulated to said front end of said frame, and said raising arm being a single element which has a sufficiently narrow width as seen in a plan view, so that said raising arm together with said quick-change device are situated between front wheels of a vehicle when said quick-change device is in a fully lowered position and only said quick-change device projects slightly downwardly out of a space between said front wheels as seen in an elevation view, whereby a steering deflection of over 40° of said front wheels can be obtained without impairing stability of the vehicle.

4,946,335

**SUCTION LIFTING DEVICE**  
 James F. King, and Brodie T. Winborne, both of Winston-Salem, N.C., assignors to Winborne Company, Ltd., Winston-Salem, N.C.

Filed Aug. 17, 1988, Ser. No. 234,123  
 Int. Cl.<sup>5</sup> E01C 5/00, 19/00  
 U.S. Cl. 414—736

30 Claims



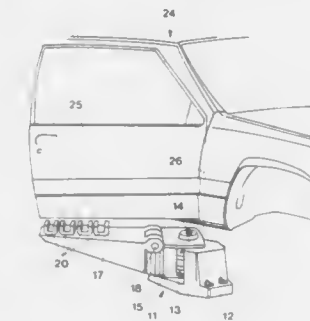
1. A suction lifting device comprising:  
 a supporting means; a load bearing member carried by said supporting means; a frame having a vacuum plenum attached thereto; means movably connecting said frame to said load bearing member; a plurality of vacuum pucks adjacent said frame; a plurality of flexible tubular members connecting each of said vacuum pucks to said vacuum plenum; a puck alignment plate engaging said tubular members; means associated with said alignment plate to move said plate with respect to said frame and said pucks; seal means affixed at each of said pucks; a vacuum source; and means connecting said vacuum source to said vacuum plenum.

4,946,336

**DEVICE FOR CONTACT-FREE PIVOTING OF A STRUCTURE MEMBER**  
 Ove Larsson, Gothenburg, Sweden, assignor to Spine Engineering AB, Molndal, Sweden  
 Continuation-in-part of Ser. No. 872,877, Jan. 11, 1986, abandoned. This application Oct. 28, 1988, Ser. No. 265,343  
 Claims priority, application Sweden, Jun. 12, 1985, 8502899

Int. Cl.<sup>5</sup> B66C 1/04  
 U.S. Cl. 414—744.2

11 Claims



1. A device for pivoting of a magnetic metallic structural member about the axle of a hinge, the hinge being fitted to the structural member and to an object so as to permit pivoting of said member along a path relative to the object, said device including at least one magnet for directly magnetically coupling with said member for effecting pivoting of said member about said axle, said magnet being located along said path and located a small distance outside an area over which said member is pivotable, said magnet being arranged to exert via an air gap a magnetic force upon at least one side of said member to thereby effect pivoting of said member about said axle upon

relative movement between said magnet and said object wherein said magnet does not contact said object or said member.

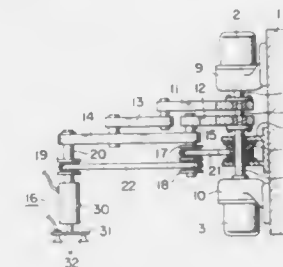
4,946,337

**PARALLEL LINK ROBOT ARM**  
 Shuichi Tonal, Kitakyushu, and Shigeo Matsushita, Yukuhashi, both of Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Filed Jul. 5, 1988, Ser. No. 215,328  
 Claims priority, application Japan, Jul. 9, 1987, 62-105667  
 Int. Cl.<sup>5</sup> B66C 23/00

U.S. Cl. 414—744.5

6 Claims



1. A parallel link robot arm having a work holding device at an end of the arm, comprising:  
 first and second driving motors affixed to a supporting member, said driving motors having respective first and second driving shafts axially-aligned with each other;  
 a first lever having an end fixedly-supported on said first driving shaft;  
 a second lever having an end fixedly-supported on said second driving shaft;  
 a third lever having an end pivotally-connected to an opposite end of said first lever;  
 a fourth lever having an end pivotally-connected to an opposite end of said second lever and having an opposite end rotatably-connected to said work holding device, said fourth lever having an intermediate portion pivotally-connected with an opposite end of said third lever;  
 a pedestal affixed to said supporting member, said second driving shaft passing through a hollow passage in said pedestal;  
 a first pulley fixedly-supported on said pedestal and axially aligned with said first and second driving shafts;  
 a second pulley rotatably-supported around a pivot axis connecting said second lever with said fourth lever, said second pulley having a pitch circle diameter equal to that of said first pulley;  
 a third pulley rotatably-supported with said second pulley;  
 a fourth pulley rotatably-supported on an axis connecting said fourth lever with said work holding device, said fourth pulley having a pitch circle diameter equal to that of said third pulley;  
 a first belt coupling said first pulley with said second pulley; and  
 a second belt coupling said third pulley with said fourth pulley.

4,946,338

**TUBE HOLDING OR GUIDING APPARATUS**  
 Edwin L. Cutright, Powhatan, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,606  
 Int. Cl.<sup>5</sup> B65G 51/00

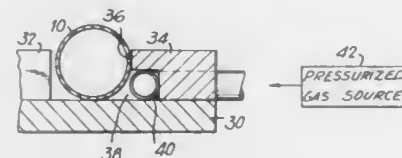
U.S. Cl. 414—745.1

3 Claims

1. Apparatus for holding a tube on a predetermined path parallel to the longitudinal axis of the tube comprising:



a first surface parallel to said path for contacting a first longitudinal portion of the outer surface of said tube; a second surface parallel to said path for contacting a second longitudinal portion of the outer surface of said tube which is circumferentially spaced from said first portion, the circumferential spacing between said first and second portions being less than 180°;



a longitudinal channel between said first and second surfaces, said channel extending longitudinally parallel to said path and opening toward the outer surface of said tube between said first and second longitudinal portions, the bottom of said channel being spaced from the outer surface of said tube; and means for directing a stream of gas longitudinally along said channel to hold said first and second portions against said first and second surfaces, respectively.

4,946,339

# METHOD FOR THE EMPTYING OF A PACKAGE BAND AND AN ARRANGEMENT FOR IT

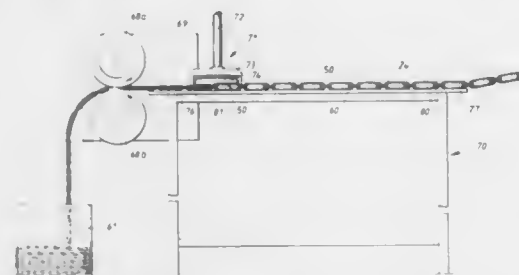
Sven-Olof Berg, Haverdal; Ingemar Broden, Halmstad, and Odvan Johansen, Partille, all of Sweden, assignors to Pronova AB, Halmstad and Aktiebolaget SKF, Goteborg, both of, Sweden

Filed Jul. 11, 1988, Ser. No. 217,363

Claims priority, application Sweden, Jul. 13, 1987, 8702839  
Int. Cl.<sup>5</sup> B65B 69/00

U.S. Cl. 414—786

11 Claims



1. A method for discharging articles from the pockets of a package which extends longitudinally and has first and second facing walls of flexible material joined together at opposite edges and provided with spaced transverse joints forming the pockets in a succession lengthwise of the package, said method comprising

advancing the package longitudinally with one of said walls resting on a support base, the package being advanced on said support base so that successive pockets move past a work station, cutting the package so that each pocket is formed with an opening near one of said opposite edges when the pocket is at said work station, holding the package relative to the support base to prevent transverse movement of the package, moving a discharge device at the work station transversely of the package and lengthwise of the pocket towards the opening therein while pressing the discharge device against the other of said walls so that as the discharge device travels along the pocket towards said one edge from the other edge, the walls of the package are moved closer together and pressed against said support base to

discharge the articles from the pocket through said opening.

4,946,340

# DUNNAGE HANDLING SYSTEM

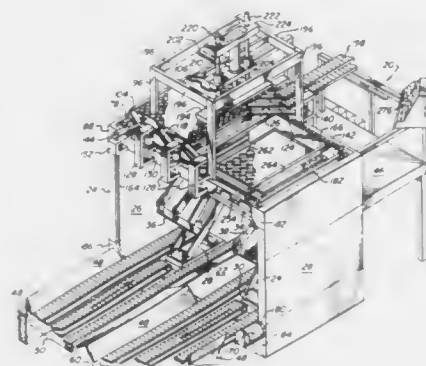
James F. Murphy, and John A. Wiseman, both of Lynchburg, Va., assignors to Simplimatic Engineering company, Lynchburg, Va.

Filed Sep. 30, 1988, Ser. No. 252,803

Int. Cl.<sup>5</sup> B65G 60/00

U.S. Cl. 414—788.8

32 Claims



1. A device for unloading parts from a plurality of stacked trays, said device comprising:

- (a) a receiving station having elevator means for lifting and lowering said stack along a vertical path above said receiving station, said elevator means for lifting a topmost tray of said stack to a predetermined vertical position;
- (b) means for temporarily holding said topmost tray at said predetermined vertical position while said elevator means lowers the remaining trays in said stack below said vertical position to provide at least a preselected distance between said topmost tray and said stack;
- (c) conveying means for moving from an initial position to a position below said topmost tray but above said stack, said holding means further for releasing said topmost tray onto said conveying means when said conveying means is positioned between said topmost tray and said stack, said conveyor means further for conveying said topmost tray under an unloading station;
- (d) means disposed at said unloading station positioned above said topmost tray for removing said parts from said topmost tray as said conveying means moves said topmost tray thereunder;
- (e) means attached to said conveying means, for locating said topmost tray in an aligned position relative with said removing means, said locating means for engagement with the bottom of said topmost tray;
- (f) means for receiving said topmost tray after unloading; and
- (g) said conveying means further for returning to said initial position after unloading of said topmost tray to receive the next tray in the stack for conveying to said unloading station after said next tray has been lifted to said vertical position.

4,946,341

# APPARATUS FOR DISPENSING PARTS

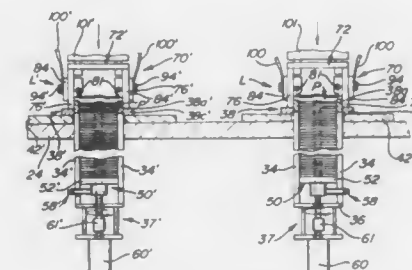
Clovis L. Parsley; Carl D. Curtis; Marvin D. Atchison; Brett A. Seidle, all of Bedford, and Danny R. Cousineau, Mitchell, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 8, 1989, Ser. No. 363,189

Int. Cl.<sup>5</sup> B65G 59/04

U.S. Cl. 414—796.7

10 Claims



1. Apparatus for dispensing an individual part from a stack of identical parts wherein each part includes at least two spaced sites susceptible to magnetic attraction and an electrical conductive pathway interconnecting said sites, comprising:

- (a) a supply magazine for receiving the stack of parts,
- (b) an elevator disposed in the supply magazine for supporting the stack of parts and movable to raise the stack for positioning an uppermost part of the stack at a pick-up position,
- (c) an electrical motor actuatable to raise the elevator,
- (d) a pick-up member movable to a load position above the pick-up position and comprising at least two spaced magnetic contacts, each contact being disposed for contact with a respective magnetically susceptible site of the uppermost part at the pick-up position, said magnetic contacts having sufficient magnetic attraction force relative to said sites to lift said uppermost part from the stack, and
- (e) control circuit means for actuating the electrical motor to raise the stack toward the pick-up member positioned at the load position to bring the sites of said uppermost part into contact with said pick-up member contacts, said control circuit means comprising a switch for generating a motor stop signal for deactuating the electrical motor to thereby stop the elevator, said switch comprising the pick-up member magnetic contacts and being closed by a part therebetween whereby when said pick-up member is at said load position, said control circuit means actuates said motor to raise the stack and thereby bring the uppermost part into contact with the pick-up member magnetic contacts, whereupon said switch is closed to deactuate the motor and thereby discontinue raising of the elevator.

4,946,342

# ARTICLE POSITIONING DEVICE

Arnold Fassman, 40 Oak St., Westport, Conn. 06880

Filed Feb. 15, 1989, Ser. No. 311,172

Int. Cl.<sup>5</sup> B65G 59/12

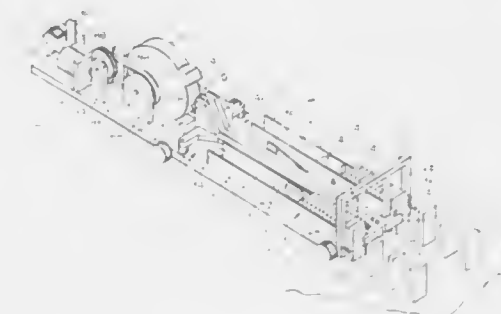
U.S. Cl. 414—798.9

18 Claims

1. A device for positioning a plurality of generally elongate articles having two planar faces and four planar edges enclosing said faces on a flat surface in an upstanding orientation and in evenly spaced relationship with each other, said device comprising:

- A. elongate article retaining means for retaining a plurality of said articles in an upstanding orientation with each of said articles having one of said edges resting on the surface on which said articles are to be positioned in spaced relationship with each other,
- B. discharge means mounted in said retaining means for sequentially discharging said articles from one end of said

retaining means so that said articles remain in said upstanding orientation while said retaining means is stationary relative to said surface, and



C. means for alternately actuating said discharge means and moving said retaining means across said surface in predetermined increments of movement, whereby said articles are positioned on said surface in evenly spaced relationship.

4,946,343

# METHOD OF REGULATION THAT PREVENTS SURGE IN A TURBOCOMPRESSOR

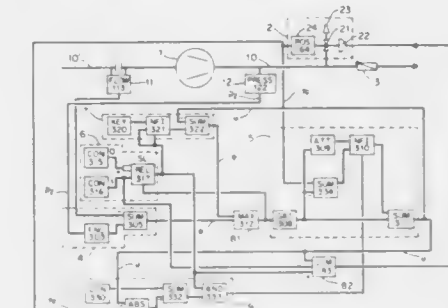
Wilfried Blotenberg, Dinslaken, Fed. Rep. of Germany, assignor to MAN Gutehoffnungshütte AG, Fed. Rep. of Germany  
Filed Mar. 9, 1989, Ser. No. 321,518

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3809881

Int. Cl.<sup>5</sup> F04D 27/02

U.S. Cl. 415—27

10 Claims

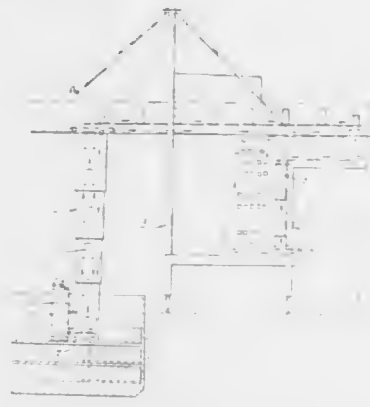


1. A regulating method for preventing surges in a turbocompressor comprising the steps: measuring continuously compressor flow and forwarding pressure, said compressor flow and forwarding pressure defining an operating point; preventing surge by regulating opening of at least one blow-off valve by a regulator with an adjustment parameter when said operating point has arrived at a blow-off curve that parallels a surge limit but before said operating point arrives at the surge limit; returning said adjustments parameter to an actual state of said blow-off valve by a readjustment circuit when a difference exceeding a predetermined threshold occurs between the actual state of the blow-off valve and said adjustment parameter of said regulator.

**4,946,344**  
**GENERAL CARGO CRANE**  
 Willem F. Prins, Zandvoort, Netherlands, assignor to B.V. Machinefabriek Figee, Haarlem, Netherlands  
 Filed Dec. 8, 1988, Ser. No. 281,829  
 Claims priority, application Netherlands, Dec. 8, 1987, 8702962

Int. Cl.<sup>5</sup> B65G 67/00  
 U.S. Cl. 414—137.1

9 Claims



1. General cargo crane for unloading general cargo from a ship's hold, in particular general cargo placed on a pallet, comprising a vertical shaft and an adjacent horizontal conveying part together having disposed therein continuously operating conveyor means, said shaft being vertically displaceable at least with its bottom part, a cage-type frame being provided at the bottom end of the shaft, said frame being provided at at least one side with a deposit platform and lifting means for moving the deposit platform between a lower position in which a general cargo can be deposited on said deposit platform and a higher position in which general cargo can be transferred to a continuously operating conveyor, said cage being provided with a fixed transfer platform at the level of the higher position of the the deposit platform, transfer means being present for transferring general cargo standing on the deposit platform in the higher position thereof onto the transfer platform, the deposit platform being provided with a recess containing a sliding plate, said transfer means for transferring general cargo from the deposit platform to the transfer platform being adapted to shift the sliding plate holding the general cargo, and means being also present for transferring general cargo standing on the transfer platform from said transfer platform to said continuously operating conveyor means.

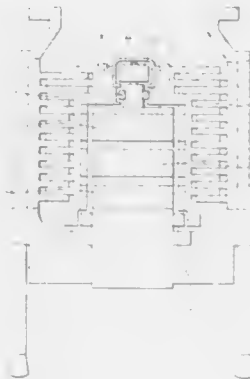
**4,946,345**  
**TURBO-MOLECULAR PUMP**  
 Katsuhide Watanabe, and Satoshi Inanaga, both of Kanagawa, Japan, assignors to Ebara Research Co., Ltd., Fujisawa and Ebara Corporation, Tokyo, both of Japan  
 Filed Mar. 16, 1989, Ser. No. 324,514  
 Claims priority, application Japan, Mar. 18, 1988, 63-63403  
 Int. Cl.<sup>5</sup> F01D 1/36

U.S. Cl. 415—90

6 Claims

1. A turbo-molecular pump comprising a casing (1), a fixed static shaft (2) fixed inside of said casing, a rotor (3) placed over said fixed static shaft (2), a pair of active radial magnetic bearings (5, 5) provided at said fixed shaft for movably supporting said rotor (3), a motor (6) disposed between said pair of active radial magnetic bearings (5, 5), said magnetic bearings being symmetric with respect to a longitudinal axis of said fixed static shaft, said fixed static shaft generating only a bending vibration when activated, and a dynamic damper (10) provided at one end of said fixed static shaft (2), wherein said dynamic damper (10) comprises a ring-shaped weight (11) disposed in such a manner as to surround a spindle (2a) mounted at one end of said fixed static shaft (2) and a ring-

shaped resilient member secured between said weight (11) and spindle (2a) and further wherein said dynamic damper has a

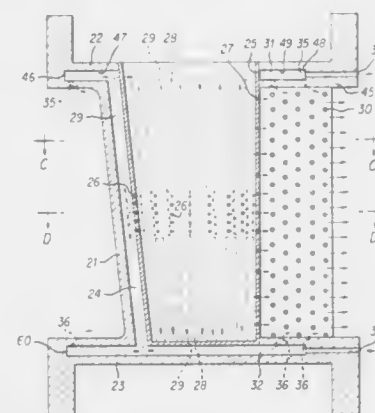


predetermined natural frequency of a bending vibration so as to substantially eliminate said bending vibration of said fixed static shaft.

**4,946,346**  
**GAS TURBINE VANE**  
 Syoko Ito, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Sep. 23, 1988, Ser. No. 247,930  
 Claims priority, application Japan, Sep. 25, 1987, 62-241432  
 Int. Cl.<sup>5</sup> F01D 5/18

U.S. Cl. 415—115

14 Claims



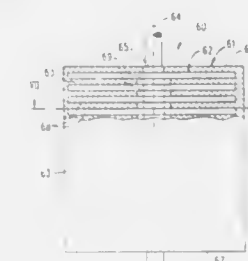
1. A fluid-cooled turbine vane, comprising:

- a vane airfoil;
- a cavity within the vane airfoil extending along the longitudinal direction thereof; and
- a guide cylinder in the cavity for guiding coolant fluid supplied into the cylinder from an external source thereof, the guide cylinder including hole means for ejecting coolant fluid toward the inside of the vane airfoil for cooling, said hole means being concentrated substantially centrally with respect to the vane airfoil in the longitudinal direction of the vane airfoil.

**4,946,347**  
**TURBINE BLADE FOR HYDROELECTRIC GENERATORS**  
 Karl Otto, Rodenberg, Fed. Rep. of Germany, assignor to Kunststofftechnik Rodenberg GmbH & Co. KG, Rodenberg, Fed. Rep. of Germany  
 Filed Dec. 9, 1988, Ser. No. 282,627  
 Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742046

Int. Cl.<sup>5</sup> F01D 5/14  
 U.S. Cl. 415—200

1 Claim



1. A turbine blade for rotatably mounted guide apparatuses of hydroelectric generators wherein a hydroelectric generator includes a plurality of said blades which are rotatably mounted and are adapted to rotate about an axis of rotation between two positions, one of the positions being a closed position having each said blade abutting adjacent ones of said blades, said turbine blade comprising:

- a body including two spaced apart ends, an approach edge and a departure edge extending between said ends and generally parallel to said axis of rotation, said body having a wetted surface extending from said approach edge to said departure edge;
- a unitary cast metallic core extending within said body, said core including a cylindrical portion which is coaxial with said axis of rotation, said cylindrical portion being welded to a plurality of generally identical plates, said plates spaced equidistantly across said cylindrical portion between said ends, each of said plates having a cross-section generally identical in contour to but smaller in dimension than said turbine blade, each said plate extending from said approach edge to said departure edge, said cylindrical portion being coplanar with a central plane extending through said approach edge and said departure edge; and
- a molded outer skin form-fit on said core and substantially defining said wetted surface, said outer skin adapted to form a water-tight seal with adjacent blades in the closed position, said outer skin formed of a non-metallic elastic material selected from the group consisting of polyurethane caoutchouc, and similar elastomeric plastics.

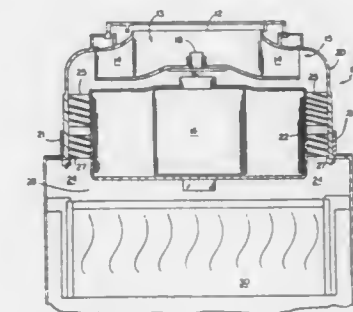
**4,946,348**  
**CENTRIFUGAL FAN WITH AIRFOIL VANES IN ANNULAR VOLUTE ENVELOPE**  
 Martin G. Yapp, Needham, Mass., assignor to Airflow Research & Manufacturing Corporation, Watertown, Mass.  
 Continuation of Ser. No. 310,827, Feb. 14, 1989, abandoned.  
 This application Nov. 17, 1989, Ser. No. 437,324  
 Int. Cl.<sup>5</sup> F04D 29/44

U.S. Cl. 415—211.2

8 Claims

- 1. A centrifugal blower comprising
  - (a) an impeller mounted to rotate on an axis, said impeller comprising a plurality of rearwardly curved blades which draw air in through a central inlet and force air radially outward, into an annular envelope around said impeller, and out of an annular discharge from said envelope, and
  - (b) a plurality of airfoil vanes positioned in said annular envelope; said airfoil vanes being positioned to form at least two stages axially displaced with respect to each other; said vanes being angled with respect to airflow

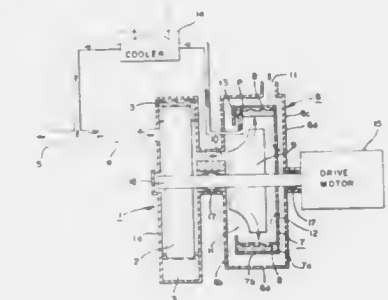
entering said envelope to turn and diffuse airflow in said envelope, converting swirl energy into pressure,



said blower having a blade chord Reynolds number of 40,000-200,000.

**4,946,349**  
**WATER RING VACUUM PUMP**  
 Kyoichi Manabe, Tokyo, and Hideo Yamashiro, Kobe, both of Japan, assignors to National Space Development Agency of Japan, Tokyo and Kawasaki Jukogyo Kabushiki Kaisha, Kobe, both of Japan  
 Filed Jul. 19, 1989, Ser. No. 382,558  
 Int. Cl.<sup>5</sup> F04C 19/00; F04B 23/08, 23/14  
 U.S. Cl. 417—68

6 Claims



1. A pumping system comprising:

- a casing,
- a drive shaft journaled with respect to said casing and adapted to be rotated,
- a liquid ring vacuum pump coupled to be driven by said shaft and having inlet and outlet ports,
- a Pitot pump having a gas/liquid inlet port connected to said outlet port of said vacuum pump and a gas outlet port, said Pitot pump including a rotary drum coupled to be rotated by said shaft,
- said drum having a peripheral sump, an inlet opening communicating with said gas/liquid inlet port of the Pitot pump, and an outlet opening communicating with said gas outlet port of the Pitot pump,
- a centrifugal impeller coupled to be rotated by said shaft, said drum surrounding said impeller, and
- a Pitot tube having an opening located in said sump of the drum, said Pitot tube further being connected to said inlet port of said vacuum pump.



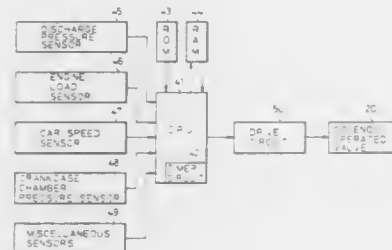
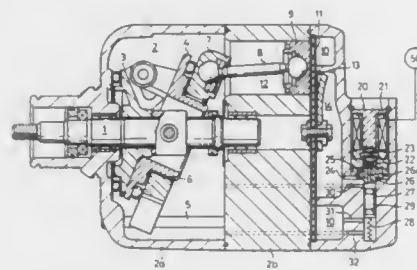
**4,946,350**  
CAPACITY CONTROL ARRANGEMENT FOR A  
VARIABLE CAPACITY WOBBLE PLATE TYPE  
COMPRESSOR

Shinichi Suzuki; Hiroshi Tanaka, and Akira Nakamoto, all of  
Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jido-  
shokki Siesakusho, Aichi, Japan

Filed Feb. 23, 1989, Ser. No. 314,386  
Claims priority, application Japan, Feb. 24, 1988, 63-41690  
Int. Cl.<sup>5</sup> F04B 1/28

U.S. Cl. 417—222

8 Claims



1. A capacity control arrangement for a variable capacity wobble plate type compressor used for air-conditioning an engine driven car and provided with a drive shaft connectable to the car engine, a crankcase having a chamber for receiving an assembly of rotatable drive and non-rotatable wobble plates mounted on the drive shaft to cause a reciprocation of compressing pistons in response to the rotation of the drive shaft, a cylinder block having cylinder bores therein for the compressing pistons, a suction chamber for a refrigerant gas before compression, a discharge chamber for the compressed refrigerant gas, and a solenoid-operated valve for controlling a fluid communication between the crankcase and discharge chambers to thereby control a pressure level in the crankcase chamber in such a manner that an inclination of the wobble plate is changed to vary the capacity of the compressor, comprising, in combination:

- a first detecting means for detecting a pressure of the compressed gas discharged from said variable capacity wobble plate type compressor;
- a second detecting means for detecting a load on said car engine;
- a first control means connected to said first and second detecting means for controlling the operation of said solenoid-operated valve in such a manner that said solenoid-operated valve takes a fully open position to establish a complete fluid communication between said crankcase chamber and said discharge chamber to thereby bring the inclination of said wobble plate to a position for a lowest capacity of said compressor by the introduction of the compressed gas of a high pressure from said discharge chamber to said crankcase chamber when the load on said car engine detected by said second detecting means exceeds a predetermined level;
- a time setting means for setting a time for which said solenoid-operated valve is maintained at the fully open position

tion in relation to the pressure of the compressed gas detected by said first detecting means; and  
a second control means also connected to said first and second detecting means for controlling the operation of said solenoid-operated valve in such a manner that said solenoid-operated valve is moved from the fully open position to a given reduced opening position suitable for maintaining the pressure in said crankcase chamber at a level capable of maintaining the lowest capacity of said compressor for a time from the elapse of the time set by said time setting means to a detection of a reduction in the engine load below the predetermined level by said second detecting means.

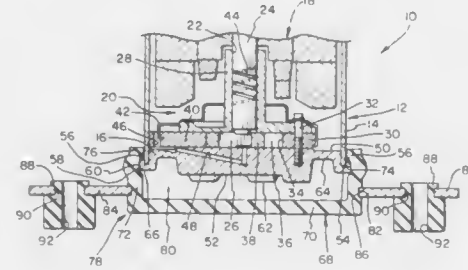
**4,946,351**  
COMPRESSOR MOUNTING SYSTEM  
Hubert Richardson, Jr., Brooklyn, Mich., assignor to Tecumseh  
Products Company, Tecumseh, Mich.

Filed Jun. 14, 1989, Ser. No. 365,698

Int. Cl.<sup>5</sup> F04B 39/00

U.S. Cl. 417—363

16 Claims



1. A vertically upright hermetic compressor assembly for mounting to a horizontal support surface, comprising:
- a housing including a bottom end;
  - a motor compressor unit operably disposed within said housing;
  - a resilient boot attached to said bottom end by a sidewall for substantially covering said bottom end and vertically supporting said housing, said boot including a base having said sidewall circumferentially, upwardly extending from said base, said sidewall having an upper rim located above an inner portion, said inner portion receiving said housing bottom end, and said rim having an inner circumference extending towards a central portion of said housing such that said housing bottom end is frictionally secured within said boot;
  - a plate having an aperture in which said boot is received to support said boot; and
  - mounting means, removably attached to said plate, for mounting said compressor and said boot to a horizontal support surface.

**4,946,352**  
DUAL ACTION PISTON PUMP  
Randy Evenson, Houston, Tex., assignor to Multi-Pump, Inc.,  
Germantown, Ohio

Filed Sep. 28, 1989, Ser. No. 413,850

Int. Cl.<sup>5</sup> F04B 17/00

U.S. Cl. 417—396

13 Claims

1. A dual action piston pump comprising:
- a pump cylinder;
  - a pump piston mounted for reciprocating movement in said pump cylinder;
  - first and second piston rods extending from opposite sides of said pump piston;
  - first and second pump cylinder transition sections connected at opposite ends of said pump cylinder;

**4,946,354**  
HYDRAULIC DEVICE FOR INDIVIDUAL CONTROL OF  
PITCH OF A ROTOR BLADE

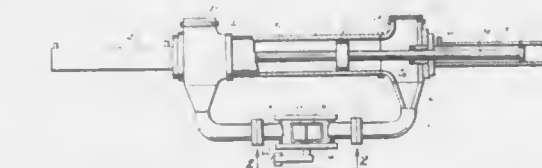
Jacques A. Aubry, Cabries, and Michel Deguise, Mallemort,  
both of France, assignors to Aerospatiale Societe Nationale  
Industrielle, Paris, France

Filed Dec. 15, 1988, Ser. No. 285,167

Claims priority, application France, Dec. 15, 1987, 87 17500  
Int. Cl.<sup>5</sup> B64C 27/72

U.S. Cl. 416—158

51 Claims



- and mounted for reciprocating movement in said second drive cylinder between said proximal end and said distal end;
- a four way valve having a first connection by a first tube to said first transition section and a second connection by a second tube to said second transition section;
- said four way valve also having a suction intake and a discharge and a controlled valve spade moveable between a first position wherein said first tube is connected to said suction intake and said second tube is connected to said discharge, and a second position wherein said first tube is connected to said discharge and said second tube is connected to said suction intake; and a valve spade controller.

**4,946,353**  
EXTERNAL STATOR ROLLING ROTOR SCROLL  
COMPRESSOR

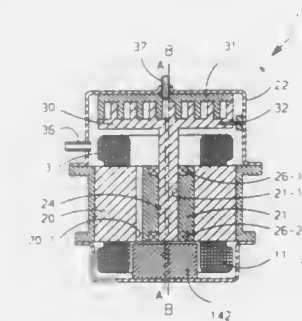
James F. Crofoot, Kirkville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jul. 3, 1989, Ser. No. 374,800

Int. Cl.<sup>5</sup> F04C 18/02

U.S. Cl. 417—410

5 Claims



1. A scroll compressor means comprising:
- hermetic shell means;
  - a rolling rotor motor means within said shell means and including a stator and a rotor with said stator and said rotor each having an axial bore and with said rotor being located within said bore of said stator;
  - drive shaft means supported in said bore of said rotor by bearing means whereby relative rotary motion between said drive shaft means and said rotor can take place;
  - fixed scroll means fixedly secured within said shell means; and
  - orbiting scroll means integral with said drive shaft means so as to be movable therewith and coacting with said fixed scroll means for compressing gas.

1. A hydraulic device for individual control of the pitch of a blade of an aerodyne rotor, said device comprising
- (a) at least one double-acting rotary hydraulic jack (18-20, 21-24) adapted to be mounted on said rotor and to be driven in rotation with said rotor, said at least one jack having an axis of rotation coinciding with a longitudinal pitch-changing axis of said blade;
  - (b) at least one servo-distributor rotating with said rotor and controlling a supply of pressurized hydraulic fluid to said at least one jack, said servo-distributor connecting said jack to at least one hydraulic power circuit and being adapted to receive control signals indicating a state of at least one blade emanating from at least one detector means;
  - (c) said jack comprising a substantially tubular stator fixed to a central part of a hub of a head of said rotor and a substantially tubular rotor coaxial with said stator and being rotatably connected to said blade and comprising at least one inner chamber of variable volume delimited at least partially between said rotor and said stator and connected to at least one said servo-distributor;
  - (d) said stator and said rotor being coaxial about said pitch axis of said blade and having opposing lateral surfaces of revolution about their common axis, a first one of said lateral surfaces being a cylindrical surface of circular cross-section, and a second one of said lateral surfaces having the form of a spherical cap, at least one jack vane diametrically opposed relative to said common axis projecting from each of said lateral surfaces and extending to the immediate vicinity of the respective opposite lateral surface, each of said at least one jack having a convex shape facing toward said opposite lateral surface, said at least one jack vane projecting from said second lateral surface having the shape of a spherical segment connected by a convex face thereof to said spherical cap and having a face in the shape of a portion of a circular cylinder opposite said cylindrical surface, said at least one jack vane projecting from one of said lateral surfaces being circumferentially offset about said pitch axis relative to said at least one jack vane projecting from said opposite lateral surface, so as to delimit at least two chambers of variable volume with a small leakage flow from one said chamber to the other via a small radial play between said jack vanes and said opposite surfaces of revolution;
  - (e) there being at least one axial stack, substantially concentric with said pitch axis, of at least one said rotary hydraulic

lic jack and of at least one cylindrical pivot bearing for the pitch of said blade and for attachment on said hub enabling said blade to rotate about said pitch axis relative to said hub, said rotor of at least one jack being mounted for rotation relative to a corresponding stator by means of at least one said cylindrical pivot bearing, said bearing comprising two axially spaced pairs of facing cylindrical bearing surfaces, a rotor and a stator of at least one rotary hydraulic jack being integrated between said pairs of bearing surfaces; and

(f) a ball joint centered substantially on said pitch axis comprising at least one element of elastic material which element is at least partly in the form of at least a portion of at least one spherical cap retained between two rigid supports, one of said supports being integral with said blade in terms of torsion about said pitch axis of said blade, the other of said supports being integral in terms of rotation with the rotor of at least one said rotary hydraulic jack about said pitch axis, said ball joint being rigid circumferentially about said pitch axis while permitting, about a center of said ball joint, relative freedom of angular movement of said blade under flapping and drag as a result of shearing of said elastic material.

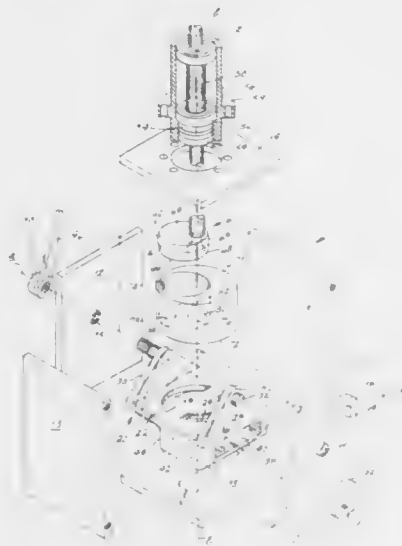
4,946,355

## ORBITAL PUMP

Russell A. B. Old, P.O. Box 74, Encinitas, Calif. 92024, and Francis B. Oldham, 8301 Cornell, St. Louis, Mo. 63132  
Filed Jun. 22, 1989, Ser. No. 370,029  
Int. Cl.<sup>5</sup> F04C 2/00, 15/02

U.S. Cl. 418—16

10 Claims



1. A rotary pump for liquid substances, comprising casing means having liquid inlet and outlet connections, a shaft inlet opening including bearing means defining a shaft axis, a port plate assembly positioned within said casing means substantially opposite said shaft inlet opening, said port plate assembly including a port plate with a substantially circular track inclined or inclinable from perpendicular to such shaft axis, and two ports, one for inflow and the other for outflow, whose midpoints are spaced substantially 180° from each other along said track, and means connected through said casing means to said port plate inflow port form a supply source from which liquid may be drawn, the casing further having an outflow connection, in combination with

a rotatable hollow pumping chamber member accommodated within the casing and having an inner cylindrical wall portion and a ported bottom seated on said port plate

and including a flow opening movable along said track thereof,

a rotatable driving shaft supported on said shaft axis and extending through said shaft inlet opening, and rotor member means each eccentrically mounted on said shaft and fitted with said inner cylindrical wall portion of said pumping chamber member, each said means comprising a substantially spherical segment having an equator in a plane perpendicular to said shaft and being of sufficient latitudinal extent, on both sides of the equator, to maintain contact with said inner cylindrical wall despite relative inclination of the port plate out of parallelism with the equator of said spherical segment,

whereby, with said port plate assembly so inclined that its track is out of parallelism with the equator of said spherical segment, on rotation of the shaft the volume within said pumping chamber member beneath said rotor member means will increase as the pumping chamber member flow opening means is in registration with said track inflow port, and will decrease as the pumping chamber member flow opening means is in registration with said track outflow port.

4,946,356

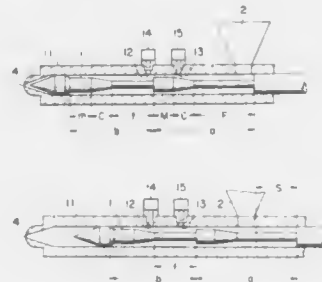
## VENT TYPE INJECTION MOLDING MACHINE

Hiroshi Kumazaki, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 6, 1989, Ser. No. 333,892

Claims priority, application Japan, Apr. 11, 1988, 63-88386  
Int. Cl.<sup>5</sup> B29C 47/76

U.S. Cl. 425—135

5 Claims



1. In a vent type injection molding machine including a heating cylinder, a screw contained in said heating cylinder and formed with first and second stages, each stage having a feed zone, a compression zone and a metering zone, the improvement comprising a plurality of axially spaced apart vent openings for communicating an inside of said heating cylinder to an outside of said cylinder, said vent openings being provided in a range in which said screw is moved in said feed zone of said second stage, and means for selectively opening and closing said vent openings in accordance with a position of said screw which is moved in an axial direction of said heating cylinder during an operation of said injection molding machine.

4,946,357

## DIVERter CHUTE ASSEMBLY FOR MOLDING MACHINE

James Harrison, 13182 Marshall La., Bldg. 103, Ste. 318, Tustin, Calif. 92680

Filed Oct. 30, 1989, Ser. No. 428,976  
Int. Cl.<sup>5</sup> B29C 45/00

U.S. Cl. 425—182

6 Claims

1. A diverter chute assembly, for separating molded products from runners separately ejected from a mold assembly, comprising:

(a) a housing;

(b) a deflector plate, disposed within said housing and pivotally attached to said housing;

(c) an actuator for translating said deflector plate between first and second positions;

(d) a first chute, disposed within said housing, for receiving products ejected from the mold assembly when said deflector plate is disposed in a first position;

(e) a first chute diverter, detachably mounted within said first chute for diverting products entering said first chute in either of two directions and also removable to allow

ery mechanism for delivering said mold carried by said mold carrying apparatus, to a desired injection molding machine.

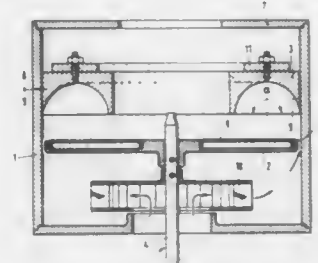
4,946,359

## APPARATUS FOR MAKING SPHERICAL GRANULES

Daniel Christen, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Filed Sep. 20, 1989, Ser. No. 410,188  
Claims priority, application Switzerland, Sep. 22, 1988, 3524/88

Int. Cl.<sup>5</sup> B29C 43/08; A21C 11/00  
U.S. Cl. 425—222

18 Claims



products to drop straight through said first chute without being diverted;

(f) a second chute disposed within said housing for receiving runners ejected from the mold assembly when said deflector plate is disposed in a second position; and

(g) a second chute diverter, detachably mounted within said second chute for diverting runners in either of two directions and also removable to allow runners to drop straight through said second chute without being diverted.

6. The apparatus of claim 1, said mold assembly being associate with an injection molding machine.

4,946,358

## MOLD MOUNTING APPARATUS

Masahisa Okuda, Okazaki; Atsushi Nishimura, Aichi; Hiroaki Kitagawa, Okazaki, and Koichi Kaku, Nagoya, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

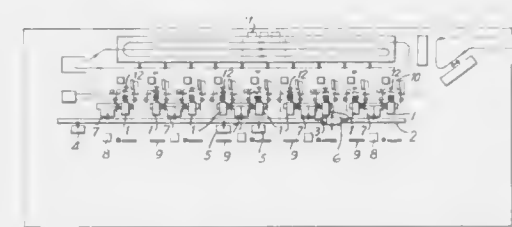
Filed Aug. 8, 1989, Ser. No. 391,317

Claims priority, application Japan, Aug. 29, 1988, 63-212380; Aug. 29, 1988, 63-212381; Aug. 29, 1988, 63-212382; Aug. 29, 1988, 63-212383; Aug. 29, 1988, 63-112128[U]

Int. Cl.<sup>5</sup> B29C 45/04

U.S. Cl. 425—183

10 Claims



1. A mold mounting apparatus, comprising: a plurality of injection molding machines juxtaposed in a line; rails laid along said injection molding machines; a first mold holding apparatus located on a first side of said injection molding machine at an end of said rails, for positioning and holding a mold; a second mold holding apparatus located on a second side of said injection molding machines opposite said first side and along said rails, for preheating, positioning and holding said mold; a mold carrying apparatus which travels on said rails, and has a carrier for receiving and delivering said mold; and a mold delivery apparatus provided for every two injection molding machines, and each mold delivery apparatus equipped with a mold deliv-

1. An apparatus for making spherical granules from a material in the form of powder, cylindrical or unshaped granules or strand-form extrusions, comprising: a fixed, rotationally symmetrical housing, a drive shaft arranged vertically within the housing, a centrifugal disc mounted for rotation on the drive shaft and extending transversely across the housing in the manner of a base, and deflecting ring member arranged above the centrifugal disc and spaced apart therefrom, such that material propelled outwards by the centrifugal disc and upwards at the wall of the housing is positively deflected inwards and downwardly.

4,946,360

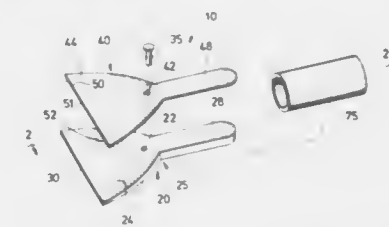
## FINISHING TOOL

John Brown, 1132 Spruce, Indianapolis, Ind. 46203  
Filed Feb. 6, 1989, Ser. No. 306,886

Int. Cl.<sup>5</sup> B05C 17/10

U.S. Cl. 425—458

11 Claims



1. A tool for providing a smooth finish to seam sealing material applied to taped corner joints defined by converging wall board surfaces comprising:

a resilient flexible working plate having at least one substantially straight edge, said straight edge having a central portion and two outer portions; and

a resilient flexible supporting plate having at least one substantially straight edge;

said supporting plate being positioned adjacent said working plate so that the straight edge of the supporting plate is juxtaposed and substantially parallel to the straight edge of the working plate, the working plate extending beyond the straight edge of the supporting plate;

said working plate and said supporting plate being adapted to yield to hand pressure when the straight edge of said working plate is pressed upon said converging wall board



surfaces, said plates being adapted to move flexurally longitudinally and latitudinally upon the application of said pressure to allow the central portion of the straight edge of the working plate to engage the seam sealing material applied to the taped corner joint and the outer portions of said straight edge to contact the verging wall board surfaces adjacent the corner joint substantially simultaneously so as to distribute and smoothly feather the seam sealing material about the corner joint and the adjacent surfaces to provide a smooth, continuous finish thereto;

said supporting plate being affixed to the working plate at a single location so as to permit said plates to move flexurally independently of each other.

4,946,361

# HORIZONTAL SCROLL COMPRESSOR WITH OIL PUMP

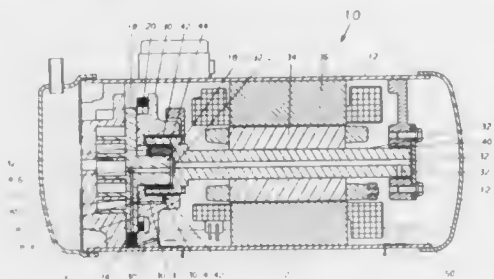
Raymond L. DeBlois; Richard C. Stoeffler, both of Tolland, Conn.; David J. McFarlin, Ellington, Conn., and Howard H. Fraser, Jr., Lafayette, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,442

Int. Cl.<sup>3</sup> F04C 18/04, 29/02

U.S. Cl. 418—55.6

24 Claims



1. In a hermetic horizontal scroll compressor including a shell containing a fixed and an orbiting scroll, a crankcase, a crankshaft extending substantially in a horizontal direction, bearings for supporting said crankshaft, means for driving said crankshaft, an anti-rotation means for limiting said orbiting scroll to orbiting motion and an oil sump, a lubrication system comprising:

means defining a piston bore in fluid communication with said oil sump;  
piston means reciprocatably located in said piston bore;  
a lubrication distribution means in fluid communication with said piston bore for delivering oil to lubricate said orbiting scroll, said crankshaft and said bearings whereby when said orbiting scroll is caused to orbit, said orbiting scroll coacts with said piston means to cause said piston means to reciprocate in said piston bore and thereby pump oil from said sump to said lubrication distribution means.

4,946,362

# ROTARY SCREW COMPRESSOR WITH A LIFT VALVE MOUNTED IN HIGH PRESSURE END WALL

Frits Söderlund, Saltsjöbaden, and Sören Edström, Uppsala, both of Sweden, assignors to Svenska Rotor Maskiner AB, Stockholm, Sweden

Filed Apr. 11, 1989, Ser. No. 336,212

Claims priority, application Sweden, Apr. 25, 1988, 8801525

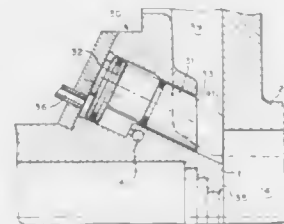
Int. Cl.<sup>3</sup> F04C 18/16, 29/08

U.S. Cl. 418—201.2

4 Claims

1. A rotary screw compressor comprising:  
means defining a working space in which two rotors are rotatably mounted;  
a high pressure end wall at one end of said working space;

a low pressure end wall at the other end of said working space; and  
a lift valve mounted in said high pressure end wall of the compressor;  
said lift valve comprising:  
a valve member having two rigidly connected cylindrical sections of different diameter displaceably mounted in a valve housing, said valve housing sealingly surrounding



each of said sections of said valve member, said section of said valve member having the smaller diameter and the corresponding part of the valve housing facing the working space of the compressor; and  
said lift valve being mounted such that a direction of motion of said displaceable valve member, relative to said high pressure wall, is inclined relative to the axial direction of the compressor.

4,946,363

# MOLD AND MOLD VENT

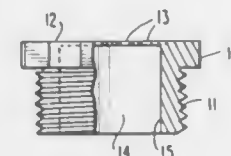
Keith D. Cavender, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jul. 20, 1988, Ser. No. 221,758

Int. Cl.<sup>3</sup> B29C 67/22

U.S. Cl. 425—4 R

5 Claims



1. In a mold for molding a foaming mixture of polyurethane to produce a molded polyurethane article, said mold having a mold cavity and internal intricacies defining the shape of said article and a plurality of reusable vents, the improvement comprising each of said vents being provided with a plurality of clustered small self-cleaning openings which have a cumulative cross-sectional area sufficiently large to provide the desired direction and rate of flow of said foaming mixture in said mold cavity to fill the intricacies of said mold, wherein each of said openings having a cross-sectional area sufficiently small to prevent exudation of substantial amounts of foaming mixture therethrough, thereby reducing the amount of said mixture passing through said vents and reducing the amount of foam collapse in those portions of said article adjacent said vents and wherein in each of said openings the ratio of the depth of said openings to the diameter of said openings is 1 or less thereby enhancing the self-cleaning ability of said openings.

4,946,364

# APPARATUS FOR MANUFACTURING REINFORCED POLYMERIC TUBING

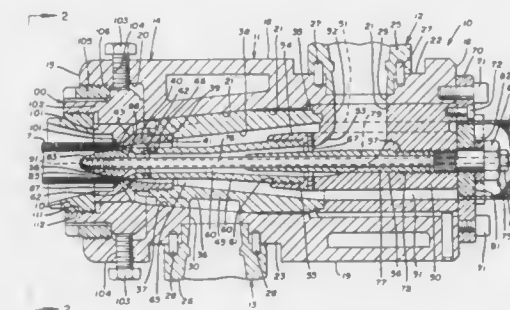
Hans-Dieter Wagner, Eggingen, Fed. Rep. of Germany, and Heinrich Holzer, Niederglatt, Switzerland, assignors to RCM, Ltd., Rubber Consulting & Machinery, Hürli-Zürich, Switzerland

Filed May 31, 1989, Ser. No. 359,851

Int. Cl.<sup>3</sup> B29C 47/02

U.S. Cl. 425—72.1

20 Claims



1. Apparatus for manufacturing polymeric tubing containing a reinforcing material enclosed between first and second polymeric compounds including an extrusion head comprising, elongate housing means, bore means extending from a front end of said housing means to a rear end of said housing means, rear material guide sleeve means fixed in said bore means proximate said rear end of said housing means and having channel means for passing reinforcing material, forward material guide sleeve means fixed in said bore means proximate said front end of said housing means for radially outwardly constraining passing reinforcing material, center pin means extending substantially the length of said housing means and located centrally of said bore means thereof, flow pipe means extending from said rear material guide sleeve means and forming inner channel means supplying a first polymeric compound, means for adjusting the concentricity of said flow pipe means relative to said center pin means, outer channel means supplying a second polymeric compound, and adjustable die means controlling the interior and exterior dimensions of the first and second polymeric compounds as the polymeric tubing is extruded.

4,946,365

# APPARATUS FOR INJECTION MOLDING AND INJECTION BLOW MOLDING MULTI-LAYER ARTICLES

Frederick G. Kudert, Niles; Maurice G. Latreille, Batavia; Robert J. McHenry, St. Charles; George F. Nahill, Crystal Lake, all of Ill.; Henry Pfutzenreuter, III, Alta Loma, Calif.; William A. Tennant, Schaumburg, Ill.; Thomas T. Tung, Hoffman Estates, Ill., and John Vella, Jr., Aurora, Ill., assignors to American National Can Company, Chicago, Ill.

Continuation of Ser. No. 283,000, Dec. 2, 1988, abandoned, which is a continuation of Ser. No. 909,941, Sep. 19, 1986, abandoned, which is a division of Ser. No. 484,707, Apr. 13, 1983, Pat. No. 4,712,990. This application Aug. 22, 1989, Ser. No. 397,348

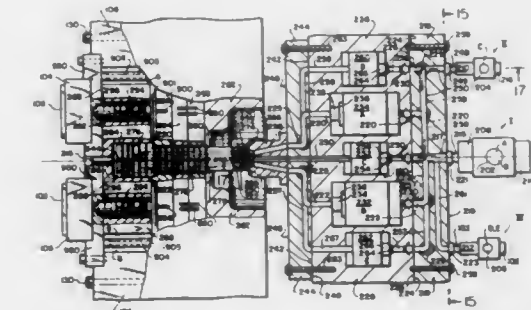
Int. Cl.<sup>3</sup> B29C 45/03, 45/16, 45/22

U.S. Cl. 425—130

72 Claims

1. A multi-coinjection nozzle injection molding apparatus for an injection molding machine for injection molding a multi-layer, multi-material plastic article, which comprises, a plurality of injection molds which define injection cavities mounted on a member,  
a plurality of juxtaposed co-injection nozzles each having a central channel, and polymer flow stream passageways in communication with the central channel, said central

channel having an open end, a gate at the open end, and a polymer material combining area in communication with the passageways and the gate,  
means for abutting the juxtaposed nozzles and injection molds,  
a source of polymeric material located upstream of the nozzles for each material which is to form a layer of the article,  
means located upstream of the nozzles for displacing each polymer material which is to form a layer of the article from its source to a co-injection nozzle passageway, and for pressurizing each said material in its passageway,  
a separate flow channel for each polymer material which is to form a layer of the article, each channel being in communication with one of the displacement and pressurizing means,  
flow channel splitter means in communication with each said flow channel downstream of its associated displacement and pressurizing means, for splitting each said flow channel into a plurality of separate branched flow channels, there being a separate branched flow channel for each material which is to form a layer of the article,



means in communication with a branched flow channel for each material which is to form a layer of the article and in communication with a co-injection nozzle, for separately feeding each separate polymer material to its associated co-injection nozzle,

a plurality of valve means cooperatively associated with the co-injection nozzles, said plurality including separate valve means for each co-injection nozzle and operative in the combining area of the nozzle's central channel with respect to each polymeric material fed to the nozzle and which is to form a layer of the article,

drive means for driving each of said separate valve means substantially simultaneously and substantially identically within the central channel of each of said co-injection nozzles to provide in each co-injection nozzle substantially simultaneous and identical control over the initiation, regulation, and termination of the flows of the polymer materials through each of the co-injection nozzles, and

control means connected to the simultaneous drive means for moving the valve means in a desired mode which provides said substantially identical simultaneous movements of said separate valve means in said respective co-injection nozzles.

4,946,366

# NEEDLE ASSEMBLY FOR BLOW MOLDING ASEPTIC BOTTLES

Dennis L. Dundas, Dover, and Eugene L. Moore, York, both of Pa., assignors to Graham Engineering Corporation, York, Pa.

Filed Jun. 22, 1989, Ser. No. 369,736

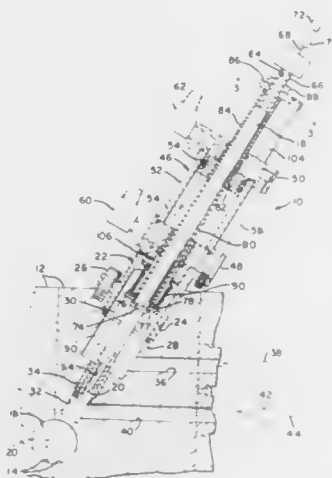
Int. Cl.<sup>3</sup> B29C 49/60

U.S. Cl. 425—536

18 Claims

1. A blow needle assembly including one mold half of a flow molding machine, the mold half having a recess, a bore in the

mold half opening into the recess, an exhaust line joining the bore adjacent the recess, a hollow blow needle mounted in the bore and having a tip facing the recess and a free end, needle drive means for moving the needle between an extended position where the needle tip extends into the recess and a retracted position where the needle tip is withdrawn into the bore, the tip end of the needle having a sliding fit in the bore when retracted with a clearance permitting sterile air to flow



along the needle through the clearance and flood the tip when the needle is in the retracted position, a source of blow air connected to the free end of the needle, a source of sterile air, and an air line connecting the source of sterile air to the bore at a location further away from the recess than the needle tip when in the retracted position for flowing sterile air through the clearance and along the retracted needle, past the needle tip and then out the exhaust line.

4,946,367

## ROTARY TYPE BLOW MOLDING MACHINE

Yoshinori Nakamura, Nagano, Japan, assignor to Nissei ASB Machine Co., Ltd., Japan

PCT No. PCT/JP88/00712, § 371 Date Mar. 16, 1989, § 102(e) Date Mar. 16, 1989, PCT Pub. No. WO89/00491, PCT Pub. Date Jan. 26, 1989

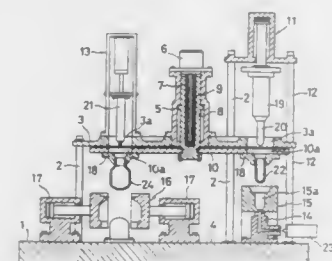
PCT Filed Jul. 18, 1988, Ser. No. 350,749

Claims priority, application Japan, Jul. 17, 1987, 62-179595; Jul. 15, 1988, 63-176419

Int. Cl.<sup>5</sup> B29C 49/06, 49/36, 49/64

U.S. Cl. 425—526

23 Claims



1. A rotary molding machine, comprising:
  - a machine bed;
  - a plurality of operational stations disposed on the machine bed, including an injection molding station, a temperature control station, an orientation blow molding station, and a molded product removing station;
  - a transfer plate disposed above the machine bed, rotating

means for rotating the transfer plate about an axis and moving means for moving the transfer plate vertically along said axis, up and down relative to said machine bed; a plurality of lip molds supported by the transfer plate, said lip molds being effective for interacting with said operational stations located on said machine bed; said moving means comprising a stationary cylinder having a piston movable therein, said piston coupled to said transfer plate and effective for moving the same vertically up and down; and said rotating means comprising a stationary rotating driving device having a driving shaft coupled to said piston and effective to rotate said piston to thereby rotate said transfer plate, said driving shaft being flexibly coupled to said piston in a manner which maintains a driving connection with said piston in all vertical positions of said piston.

4,946,368

## APPARATUS FOR MOLDING A PLASTICS CONTAINER

Kazubiro Masumoto, Ichihara, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

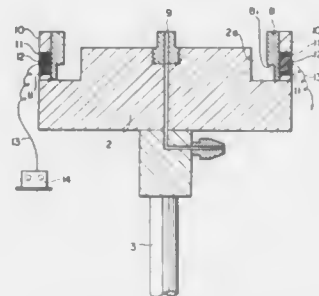
Division of Ser. No. 783,591, Oct. 3, 1985, Pat. No. 4,849,154. This application Jan. 25, 1989, Ser. No. 301,298

Claims priority, application Japan, Oct. 4, 1984, 59-207101; Dec. 12, 1984, 59-187355; May 22, 1985, 60-75098; May 22, 1985, 60-108249; May 22, 1985, 60-108250

Int. Cl.<sup>5</sup> B29C 49/30

U.S. Cl. 425—525

1 Claim



1. In a blow-molding apparatus for molding a plastic container, said apparatus comprising: a lower mold and a pair of opposite side molds, said lower mold having a concave portion having a predetermined configuration and predetermined width and height for molding a top portion of said container, said top portion having a chime, said pair of opposite side molds molding a side and a bottom portions of said plastic container; said lower mold having a lift cylinder for lifting said lower mold to a position near a die so that a predetermined clearance is formed between said concave portion of said lower mold and said die for extruding a molten resin from said die and for further lifting said concave portion of said lower mold into a press contact with said die for molding said top portion of said plastic container and for then lowering said mold for extruding molten resin from said die at a speed for forming a parison at a speed coincident with a parison speed and to a predetermined lowered position where said pair of said side molds are closed to form a blow-mold, whereby said plastic container provided with said chime in its top portion is molded, the improvement comprising:

a ring-like portion of an outer portion of said lower mold is formed into a separate split-type mold; and between said split-type mold and said lower mold is provided a connecting means for selectively connecting said split-type mold to said lower mold.

4,946,369

## SILICONE MOLD AND ELASTOMER TOOL LIFE

Earl W. Beck, Anaheim, Calif., and Schuyler B. Smith, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

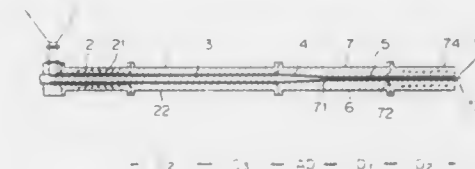
Filed Jun. 19, 1989, Ser. No. 368,478  
Int. Cl.<sup>5</sup> B44D 1/20

U.S. Cl. 427—133

8 Claims

1. A method for improving the life of a silicone elastomer mold or elastomeric tool used in contact with an amine containing molding material, the method consisting essentially of coating the surface of the elastomer mold or elastomeric tool, to be contacted by the amine containing molding material, with a protective coating selected from the group consisting of a silane of the formula  $R_3SiX_4$ , where R is a monovalent halogenated hydrocarbon having 1 through 6 carbon atoms and the halogen selected from the group consisting of chlorine, bromine, and iodine, X is a monovalent radical that reacts with a hydroxyl radical on silicon, and a is 1 through 3; a partial hydrolyzate of the above silane; or a mixture of the two.

external pressure creep of at least 200 hours, an outer diameter of 50 mm or less, and a ratio of outer diameter to wall thickness



of 6 to 20, said tube being extruded from a rotational mandrel equipped melt screw.

4,946,372

## COMPOSITE PAPER

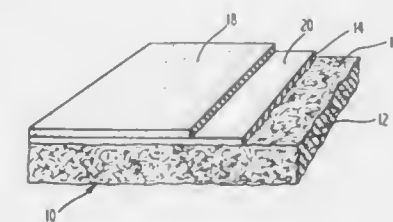
Eitan Avni, Langhorne, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Filed Dec. 5, 1988, Ser. No. 280,165

Int. Cl.<sup>5</sup> B32B 5/16, 27/10

U.S. Cl. 428—325

20 Claims



1. A composite paper, comprising:
  - a paper substrate having first and second opposing surfaces;
  - a first continuous thermoplastic film having opposed inner and outer surfaces, said inner surface of said first continuous thermoplastic film being adhered to the first surface of said paper substrate; and
  - a first layer of an ink absorbent particulate composition bonded to said outer surface of said first continuous thermoplastic film, whereby said first layer is printable through application of ink in patterns to an outer surface thereof.

4,946,373

## RADIATION-POLYMERIZABLE COMPOSITION

John E. Walls, Hampton, and Carlos Tellechea, Shrewsbury, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 185,342, Apr. 19, 1988, Pat. No. 4,851,319, which is a continuation of Ser. No. 872,566, Jun. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 707,110, Feb. 28, 1985, abandoned. This application Jun. 14, 1989, Ser. No. 366,115

Int. Cl.<sup>5</sup> G03F 7/03, 7/26, 7/00

U.S. Cl. 430—300

20 Claims

1. A process for using a photographic element comprising combining an admixture
  - a. a polymeric binder in sufficient amount to bind the composition components in a cohesive matrix;
  - b. a photoinitiator in sufficient amount to initiate the free-radical polymerization of the photopolymerizable mixture
  - c. a light sensitive diazonium salt in sufficient amount to insolubilize upon exposure to sufficient actinic radiation; and
  - d. a photopolymerizable mixture of
    - (i) from at least about 50% by weight of the photopolymerizable mixture of a polymerizable mixture of a poly-

4,946,371

## FLEXIBLE TUBE OF THERMOPLASTIC RESIN HAVING POOR MELT FLOWABILITY AND PRODUCTION METHOD AND APPARATUS THEREOF

Takeshi Shiraki, Kuga, and Yoshihiro Yoshimura, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 31,205, Mar. 30, 1987, abandoned, which is a continuation of Ser. No. 736,028, May 20, 1985, abandoned. This application Jul. 13, 1989, Ser. No. 379,387  
Claims priority, application Japan, May 22, 1984, 59-101712

Int. Cl.<sup>5</sup> F16L 11/00; D01D 5/24

U.S. Cl. 428—36.9

3 Claims

1. A melt extruded flexible tube of an ultra-high-molecular-weight polyethylene, said tube having an intrinsic viscosity ( $\eta$ ), determined at 135° C. in decalin, of at least 8 dl/g, a tensile strength at break of at least 250 kg/cm<sup>2</sup>, a breaking time at hot



functional acrylic monomer having from 3 to 6 unsaturated groups; and

(ii) from about 1% to about 50% by weight of the photopolymerizable mixture of a monofunctional acrylic monomer having 1 unsaturated group;

wherein the polyfunctional acrylic monomer is capable of reacting with the monofunctional acrylic monomer upon exposure to imaging radiation; and wherein the photopolymerizable mixture is present in sufficient amount to provide a tough image matrix upon exposure to imaging radiation; and the process further comprising coating the composition formed by the mixture of a, b, c and d on a substrate to form a photographic element; drying said mixture; thereafter imagewise exposing said element to actinic light to thereby form image-wise exposed and imagewise nonexposed areas and thereafter developing said element with a developer to thereby remove the imagewise non-exposed areas while substantially not removing the imagewise exposed areas.

4,946,374

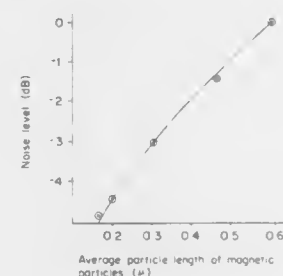
## MAGNETIC RECORDING MEDIUM

Satoru Yamaguchi, Kyoto; Jojo Shimizu, Nagaokakyō; Kozaburo Satoh, Kameoka, and Haruo Andoh, Suita, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan  
Continuation of Ser. No. 590,467, Mar. 16, 1984, abandoned.  
This application Dec. 21, 1988, Ser. No. 287,648

Claims priority, application Japan, Mar. 20, 1983, 58-46186  
Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—323

11 Claims



1. A magnetic recording medium which comprises a lower magnetic layer on a base and an upper magnetic layer thereon, said lower magnetic layer containing magnetic particles having an average particle length (long axis diameter) of 0.4 to 0.7 μm, said upper magnetic layer having a thickness of 1.5 to 3.0 μm and containing magnetic particles having an average particle length (long axis diameter) of 0.15 to 0.35 μm, the coercive force of which is 370 to 460 oersteds, the ratio of the coercive force of the upper layer to that of the lower magnetic layer being 1.05/1 to 1.2/1, and the ratio of the thickness of the upper layer to that of the lower magnetic layer being 3/7 to 6/5.

4,946,375

## LOW TEMPERATURE FINISH

Fleming H. Day, Greenville, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Continuation of Ser. No. 73,534, Jul. 15, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 386,191

Int. Cl.<sup>5</sup> B32B 27/34

U.S. Cl. 428—395

7 Claims

1. A polyamide yarn especially suitable as a tire yarn having 0.2–2.0 wt. % of finish, said finish consisting essentially of

50–95 wt. % pentaerythritol tetrapelargonate, 5–50 wt. % of the finish is a sorbitan triester adduct having 10–30 moles of ethylene oxide, 0–5 wt. % of the finish is antioxidant and 0–2 wt. % of finish is a polysiloxane.

4,946,376

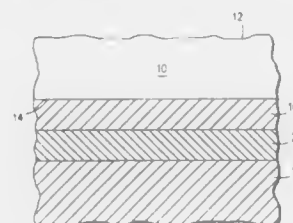
## BACKSIDE METALLIZATION SCHEME FOR SEMICONDUCTOR DEVICES

Ravinder K. Sharma, Mesa; William H. Lytle, Chandler; Angela Rogona, Phoenix, and Bennett L. Hileman, Tempe, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.  
Filed Apr. 6, 1989, Ser. No. 333,938

Int. Cl.<sup>5</sup> H01L 23/48, 21/58

U.S. Cl. 428—620

11 Claims



1. A metallization scheme for semiconductor devices comprising:

a vanadium layer having a thickness in the range of 500 to 3,000 angstroms disposed on the backside of a wafer; and  
a silver layer having a thickness in the range of 10,000 to 20,000 angstroms disposed on said vanadium layer.

4,946,377

## TISSUE REPAIR DEVICE

Larry J. Kovach, Flagstaff, Ariz., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Nov. 6, 1989, Ser. No. 432,096

Int. Cl.<sup>5</sup> A61F 2/08

U.S. Cl. 623—13

16 Claims



1. A tissue repair device comprised of a length of braided, biocompatible material having a hollow core for the entire

length, said length having a first end portion, a second end portion disposed within the hollow core of the first end portion rendering the first and second end portions coaxial with each other, and a middle portion looped to form an eyelet.

4,946,378

## ARTIFICIAL INTERVERTEBRAL DISC

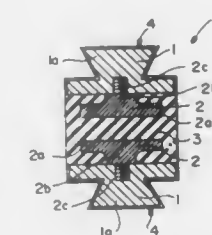
Yasuhiko Hirayama; Haruko Ikata; Satoshi Ojima, and Hiromi Matsuzaki, all of Tokyo, Japan, assignors to Asahi Kogyo K.K., Tokyo, Japan

Filed Nov. 22, 1988, Ser. No. 274,960

Claims priority, application Japan, Nov. 24, 1987, 62-295811  
Int. Cl.<sup>5</sup> A61F 2/44

U.S. Cl. 623—17

12 Claims



1. An artificial intervertebral disc comprising a pair of end bodies, and a medical synthetic polymeric intermediate which is held between the end bodies via connecting members, said connecting members including projections for abutting associated end bodies, and embedded portions which are embedded in said medical synthetic polymeric intermediate, the transverse dimension of each said embedded portion being larger than the transverse dimension of each said projection, whereby said connecting members are connected to said medical synthetic polymeric intermediate so that resistance and elasticity occur through said connecting members when both compression and tensile forces are applied.

4,946,379

## JOINT PROSTHESES ESPECIALLY HIP JOINT PROSTHESES

Rütger Berchem, Essen, Fed. Rep. of Germany, assignor to Metalpraecis Berchem & Schaberg Gesellschaft Für Metallformgebung Mit Beschränkter Haftung, Gelsenkirchen-Ückendorf, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 331,401

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1988, 3811207

Int. Cl.<sup>5</sup> A61F 2/30

U.S. Cl. 623—18

4 Claims

1. An implantable joint prosthesis for insertion into a prepared intramedullary cavity comprising:  
a ball joint means for engagement in a corresponding socket;  
an elongated shaft having a longitudinal axis and terminating at opposite proximal and distal ends;  
a collar disposed at the proximal end of said shaft intermediate said ball joint means and said shaft, said collar having a bottom surface configured to seat on a resected surface on the bone; and  
at least a proximal portion of said shaft having a generally triangular uniform cross-section, said cross-section defin-

ing three convex contact surfaces formed on respective vertices thereof wherein each of the contact surfaces



having sawtooth profiling thereon for engaging the inner surface of the intramedullary cavity.

4,946,380

## ARTIFICIAL DEXTEROUS HAND

Sukhan Lee, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Filed May 30, 1989, Ser. No. 359,086

Int. Cl.<sup>5</sup> A61F 2/68

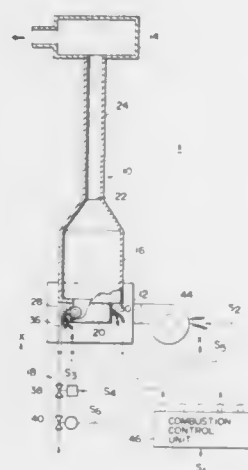
U.S. Cl. 623—24

26 Claims



1. An artificial dexterous hand for conformably engaging and manipulating objects, comprising:  
an articulated digit having a digit base and first and second phalanges, said digit base being operatively interconnected to said first phalange by a base joint having a base pulley, said phalanges being operatively interconnected by a separate first phalange joint having a first phalange pulley; and  
engagement sub-assembly means for causing said phalanges to pivot relative to said base joint and for causing said second phalange to pivot relative to said first phalange, said engagement sub-assembly means including,  
a tendon received by said base pulley and by said first phalange pulley,  
actuation means for selectively tensioning said tendon, and  
first shape adaption means, responsive to and receiving said tendon, for controlling the sequence of pivoting of said phalanges through application of braking force to said tendon, said first shape adaption means being located between said base joint and said first phalange joint and being connected to said first phalange.

**4,946,381**  
**PULSATING COMBUSTION SYSTEM CAPABLE OF VARYING COMBUSTION POWER**  
 Kazuo Saito, Fujisawa; Ichiro Hongo, Yokohama; Akio Mitani, Fuji, and Hiroshi Ito, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Nov. 16, 1989, Ser. No. 437,187  
 Claims priority, application Japan, Nov. 30, 1988, 63-300926; Nov. 30, 1988, 63-302465  
 Int. Cl.<sup>5</sup> F23C 11/00  
 U.S. Cl. 431—1 20 Claims

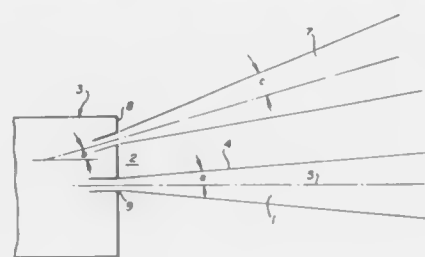


1. A pulsating combustion system comprising:  
 a pulsating combustor including a combustion chamber having an air-intake port and an exhaust port, an air-intake pipe having one end connected to an air-intake port, and a tail pipe having one end connected to said exhaust port;  
 fuel supply means for supplying fuel into said combustion chamber;  
 air-intake means for supplying combustion air into said combustion chamber through said air-intake pipe and said air-intake port, said air-intake means comprising an air supply source for supplying said combustion air, and back-flow limiting means provided on said air-intake pipe to limit a backflow of air from the interior of said combustion chamber to said air supply source;  
 fuel amount varying means connected to said fuel supply means to vary the amount of fuel supplied to said combustion chamber; and  
 pressure control means for controlling the amount of air flowing into said combustion chamber by variably controlling a differential between pressure within said combustion chamber and pressure between said air supply source and said backflow limiting means according to the amount of fuel varied by said fuel amount varying means.

**4,946,382**  
**METHOD FOR COMBUSTING FUEL CONTAINING BOUND NITROGEN**  
 Hisashi Kobayashi, Putnam Valley, N.Y., and Louis S. Silver, Montreal, Canada, assignors to Union Carbide Corporation, Danbury, Conn.  
 Filed May 23, 1989, Ser. No. 355,451  
 Int. Cl.<sup>5</sup> F23C 1/10  
 U.S. Cl. 431—8 19 Claims

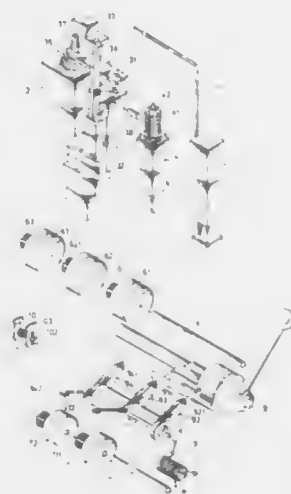
1. A method for combusting fuel containing bound nitrogen to achieve reduced NO<sub>x</sub> emissions comprising:  
 (A) injecting into a combustion zone fuel containing bound nitrogen in an axially flowing stream;  
 (B) injecting oxidant into the combustion zone in at least one stream spaced from the fuel injection point, said oxidant comprising pure oxygen or oxygen enriched air, said oxidant being injected at an angle equal to or greater than

the sum of the angles formed by the periphery of the fuel stream with the fuel stream axial centerline and the spreading angle of the oxidant stream, said oxidant being



injected such that the total oxidant momentum is at least three times the momentum of the fuel stream; and  
 (C) entraining fuel from the fuel stream into the oxidant stream(s) and combusting entrained fuel with oxidant.

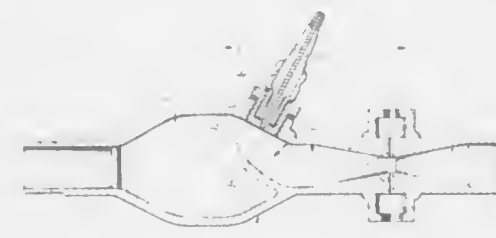
**4,946,383**  
**AMUSEMENT LIGHTER**  
 Matthew Wu, 1F., No. 10-3, Lane 180, Tzu Chyang St., Pei Tou District, Taipei, Taiwan  
 Filed Jan. 3, 1990, Ser. No. 460,476  
 Int. Cl.<sup>5</sup> F23Q 2/00  
 U.S. Cl. 431—125 2 Claims



1. A lighter, including a bottom shell having set therein a gas tank at its left side, a rectangular flame hole right above said gas tank, a triangular pressure plate at the right side of said gas tank, a ladder-like shielding plate extending upwardly from said pressure plate and being secured to said gas tank by means of a torque spring and a pin through a hole thereon, a nozzle extending upwardly from said gas tank and pressed by said shielding plate, a regulating ring which comprises an unitary regulating knob being mounted on said nozzle for gas flow regulation, a rectangular control plate mounted on said nozzle above said regulating ring and connected to a propulsive device, said propulsive device having an elongated conical top end mounted with a compression spring thereon, a rectangular hole for the passing therethrough of said pressure plate, a piezoelectric switch at the right side relative to said propulsive device, three upper wheels having a variety of patterns respectively printed on the face thereof being sleeved on a first positioning rod set in the middle, two lower wheels having a variety of patterns printed thereon and being sleeved on a second positioning rod set right below and in parallel to said three

upper wheels, a L-shaped push rod having thereon a torque spring and a gear driving device being set between said three upper wheels and said two lower wheels, said gear driving device comprising a pair of V-shaped plates and an end plate having notches thereon respectively engaged with said three upper wheels and said two lower wheels, a clip attached at the back side and including a torque spring for fastening, and a rectangular front shell mounted on said bottom shell, said front shell comprising a slant show window through which the patterns on said three upper wheels can be clearly seen, two small display holes through which the patterns on said two lower wheels can be presented, two supporting plates set in said front shell corresponding to said two lower wheels, a sliding rod which has a spring thereon being transversely mounted on said two supporting plates with its spring squeezed in therebetween, said sliding rod having a slant front end protruding beyond said supporting plates to connect to said V-shaped plates.

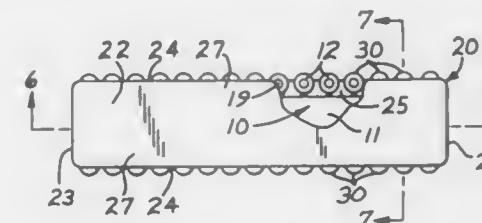
**4,946,384**  
**GAS PILOT-IGNITER FOR BURNERS**  
 Paul W. London, 6217 Manchester La., Bakersfield, Calif. 93309  
 Filed Oct. 7, 1988, Ser. No. 254,840  
 Int. Cl.<sup>5</sup> F23D 14/70, 14/00  
 U.S. Cl. 431—349 11 Claims



1. A gas pilot-igniter for use in igniting combustible gases in a main burner, the gas pilot-igniter including:  
 an air inlet means for supplying air under pressure to a primary mixing chamber which includes a mixing venturi,  
 a fuel gas inlet means for directing fuel gas under pressure into the mixing venturi for primary mixing with the air, the primary mixing chamber including an elongated conduit leading downstream from the mixing venturi to an outlet opening of the mixing chamber, so that a flow stream of the primary fuel/air mixture therein is propelled from the mixing venturi toward the outlet opening of the primary mixing chamber,  
 a main combustion chamber comprising a tubular outer housing extending axially downstream from the primary mixing chamber,  
 a pre-combustion chamber in an upstream region of the main combustion chamber, downstream from the primary mixing chamber, the outlet from the primary mixing chamber opening into the pre-combustion chamber,  
 the pre-combustion chamber being formed between said outer housing and an elongated baffle plate spaced from said outer housing and extending from a first wall portion of the outer housing and across the outlet opening of the primary mixing chamber in a downstream direction to form the pre-combustion chamber as an elongated open passageway which tapers narrower in cross section from the outlet of the primary mixing chamber toward a discharge end of the baffle plate, the baffle plate being positioned in the path of the flow stream of the fuel/air mixture propelled away from the primary mixing chamber for creating turbulence and secondary mixing of the fuel/air mixture in a reduced diameter portion of the pre-combustion chamber defined between the discharge end of the

baffle plate and a second wall portion of the outer housing and downstream from the primary mixing chamber,  
 the baffle plate providing means for guiding the fuel/air mixture to an igniter means adjacent the discharge end of the baffle plate in the reduced diameter portion of the pre-combustion chamber for igniting the fuel/air mixture therein to produce a pre-combustion flame directed in a downstream direction away from the discharge end of the baffle plate,  
 the baffle plate dimensioned to allow a remaining portion of the fuel/air mixture to flow freely between the outer housing and around sides of the baffle plate and away from the pre-combustion chamber and into the main combustion chamber where the remaining fuel/air mixture is ignited by the pre-combustion flame, thereby producing a pilot flame which exits a pilot outlet means from the main combustion chamber to ignite the main burner fuel/air mixture.

**4,946,385**  
**CASE FOR DISPENSING ORTHODONTIC ELASTIC RINGS**  
 Robert P. Eckert, Alta Loma, and Benjamin A. Shabtay, Arcadia, both of Calif., assignors to Unitek Corporation, Monrovia, Calif.  
 Continuation of Ser. No. 132,922, Dec. 15, 1987, abandoned.  
 This application Jan. 5, 1989, Ser. No. 296,417  
 Int. Cl.<sup>5</sup> A61C 3/00  
 U.S. Cl. 433—2 8 Claims



1. Orthodontic apparatus comprising a case and a molded O-ring assembly having a core and plurality of spaced-apart O-rings each frangibly joined to the core, the O-rings having central openings, the case having a cavity receiving the core, the case having a pair of spaced-apart walls defining therebetween a slot in communication with the cavity and configured to receive the O-rings projecting from the core, the walls being configured to substantially cover the O-ring central openings while permitting respective portions of the rings to simultaneously extend beyond the walls and slot to be accessible to a gripping tool.

**4,946,386**  
**ORTHODONTIC O-RING DISPENSER AND METHOD OF MAKING**  
 Patrick D. Kidd, San Dimas, and Terry L. Sterrett, Long Beach, both of Calif., assignors to Ormco Corporation, Glendora, Calif.  
 Filed Jun. 9, 1988, Ser. No. 204,635  
 Int. Cl.<sup>5</sup> A61C 3/00  
 U.S. Cl. 433—18 26 Claims

1. A dispensing device for dispensing elastomeric orthodontic appliances comprising:  
 an integral rigid support structure having an elongated support section at one end and a finger gripping section disposed at the other end of said support structure, said support section having an outer layer secured thereto, said outer layer having a plurality of orthodontic appliances integrally formed therewith which are detachably con-

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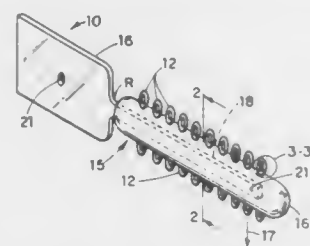
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nected to said outer layer, said rigid support structure being made of a material having a stiffness substantially



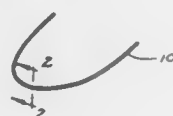
greater than said outer layer such that said orthodontic appliance may be removed therefrom while holding said finger gripping section.

4,946,387

**MULTI-COATED ORTHODONTIC ARCH WIRE**  
Loren S. Adell, 6207 Telluride La., Dallas, Tex. 75252, assignor to Loren Adell and Michael Adell, both of Sunnyvale, Tex.  
Filed Jun. 3, 1988, Ser. No. 202,785  
Int. Cl.<sup>5</sup> A61C 3/00

U.S. Cl. 433—20

8 Claims



1. An orthodontic wire comprising a metal wire, a layer of tooth color material covering said metal wire to present a color simulating that of teeth with which the orthodontic wire is adapted to be used, and a layer of clear material covering said tooth color layer to protect said layer of tooth color material in an intra-oral environment while allowing the color of the layer of tooth color material to be presented through the layer of clear material.

4,946,388

**DENTAL ARTICULATOR MOUNTING FOR DENTAL CASTS**

Wayne A. Bolton, 5302 Scenic Dr., Yakima, Wash. 98908  
Filed Jan. 21, 1988, Ser. No. 146,414  
Int. Cl.<sup>5</sup> A61C 11/00

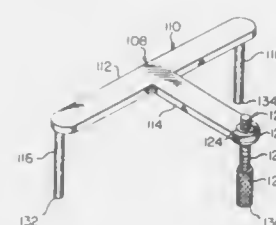
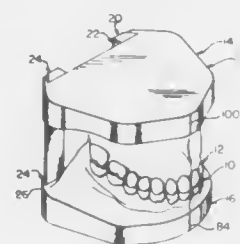
U.S. Cl. 433—56

10 Claims

1. The combination of a dental articulator used to position patients' lower and upper dental casts in either their centric occlusion positions or their neuromuscular resting positions, to measure the distance between these positions, wherein the patient's lower dental cast is positioned at the cant of the occlusal plane of a patient's teeth, and a tripod,

- wherein the dental articulator comprises:
- (a) a lower tray, to receive a patient's lower dental cast, having rear receiving structures;
  - (b) an upper tray, to receive a patient's upper dental cast, having rear receiving structures; and
  - (c) an upright rigid support, having extending structures to be slidably and frictionably positioned at selected locations within the respective receiving structures of the lower and upper trays; and wherein the tripod comprises:

- (a) a planar body having end portions; and
- (b) three depending spaced legs secured to end portions of the planar body, one of the legs being adjustable in height, and the other two legs being equal in height, whereby, the tripod, via adjustment of the adjustable leg, positions the planar body at an angle which is the cant of the occlusal plane of a patient's teeth, and the legs which



are equal in height determine the maximum height of positioning the patient's lower dental cast, and thereafter the tripod is used to position the patient's lower dental cast in the lower tray, at the cant of the occlusal plane of a patient's teeth, during the use of the dental articulator to measure the distance between the centric occlusion position and the neuromuscular resting position.

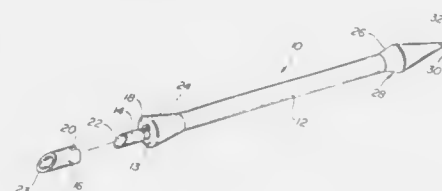
4,946,389

**APPLICATOR AND TIPS FOR STAIN REMOVAL**  
Edward A. Weissenburger, Mercerville, N.J., assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.

Filed May 31, 1988, Ser. No. 200,812  
Int. Cl.<sup>5</sup> A61C 3/06

U.S. Cl. 433—142

8 Claims



1. A device for cleaning teeth comprising:
- a shaft culminating in two ends;
  - the first of said shaft ends culminating in a tip, said end adapted for emplacement of a collar;
  - a collar fitting over said tip and extending beyond said tip wherein a space is created between the edge of said tip and the edge of said collar;
  - the second of said shaft ends culminating in a point, said point surrounding a hollow;

wherein said hollow of said point and said space created between said tip and the edge of said collar are adapted for emplacement of a tooth cleanser; and wherein said collar is generally cylindrical and formed to be placed over said tip in an interference fit, said collar containing a notch on a first end and generally formed to fit against said first shaft end, said first shaft end containing a key extending along said tip to accommodate said notch, said key and notch combination preventing rotation of said collar on said tip.

4,946,390

**CABLE TERMINATION ASSEMBLY WITH CONTACT SUPPORTING HOUSING AND INTEGRALLY MOLDED STRAIN RELIEF**

Joseph S. Smyers, Mentor, Ohio, assignor to Minnesota Mining & Manufacturing Co., Saint Paul, Minn.  
Continuation of Ser. No. 372,197, Jun. 26, 1989, abandoned, which is a continuation of Ser. No. 215,034, Jul. 5, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 441,339  
Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—404

23 Claims



1. An insulation displacement cable termination assembly, comprising an electrical cable having at least one conductor, insulation displacement contact means for effecting electrical connection and having an IDC portion for connection with such conductor and a contacting portion for connection with an external member inserted to engagement therewith, a support body for holding said contact means, strain relief means directly molded to at least part of said contact means, cable and support body to form a substantially integral structure, and means including at least part of said contact means for shutting off flow of molding material of said strain relief means during molding thereof to prevent flow of molding material to said contacting portion of said contact means.

4,946,391

**ELECTRONIC ARITHMETIC LEARNING AID WITH SYNTHETIC SPEECH**

William R. Hawkins, and Steve Weinstein, both of Lubbock, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

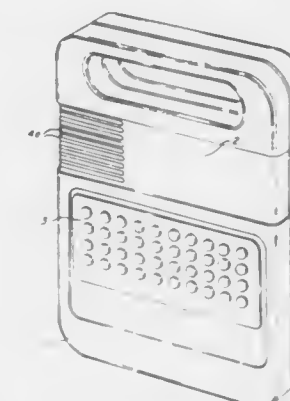
Filed May 30, 1980, Ser. No. 154,722  
Int. Cl.<sup>5</sup> G09B 19/02

U.S. Cl. 434—201

32 Claims

1. An electronic arithmetic learning aid comprising: memory means having digital data stored therein from which a plurality of mathematical problems may be derived for presentation to an operator for solution, wherein at least some of the mathematical problems comprise respective sets of at least first and second numbers from which the operator is expected to determine the relative magnitude of one number with respect to the other number as the solution to the respective mathematical problem; means for randomly selecting a plurality of numbers as a set including at least said first and second numbers corresponding to digital data as stored in said memory means to derive a particular mathematical problem; presentation means operably associated with said random

selection means and responsive to the random selection of said plurality of numbers for posing a particular mathematical relationship between at least said first and second numbers of said set from which the operator is expected to determine the relative magnitude of one number with respect to the other number as the solution to the respective mathematical problem; operator input means for receiving an input from an operator of the learning aid indicative of a choice of one of two possible answers as a proposed solution to said mathematical problem as presented by said presentation means;



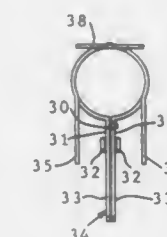
digital logic means including comparator means operably associated with said random selection means, said operator input means and said presentation means for determining the appropriateness of the input received by said operator input means from the operator with respect to said mathematical problem as presented by said presentation means; and means coupled to said comparator means for producing an indication of the accuracy of the input from the operator received by said operator input means in relation to the correct solution to the presented mathematical problem.

4,946,392

**COAXIAL CONNECTOR IN A HOUSING BLOCK**  
Robert J. Kobler, Harrisburg, Pa.; Ronald C. Laudig, Lakeland, Fla., and Tracy L. Smith, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Division of Ser. No. 230,403, Aug. 9, 1988, Pat. No. 4,846,711.  
This application Sep. 5, 1989, Ser. No. 402,957  
Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 439—63

6 Claims



1. A connector comprising: coaxial connector means comprising, at least one center contact, a corresponding dielectric body encircling concentrically each said center contact and a conductive and unitary first shell encircling each corresponding dielectric body, each said first shell having an axially extending seam and at least one projecting terminal adjacent to the seam for insertion into a corresponding aperture of a circuit board, wherein the improvement comprises:

a housing block mounted within a conductive second shell

comprising, a front end with a D-shaped interface, a mounting flange with a first portion extending transverse to said front end, and with a base intersecting the first portion for mounting on a circuit board, each said first shell is adapted for insertion into and along a corresponding first cavity of the housing block, wherein a flange of each said first shell is provided along each side of the seam and projects outward radially from a corresponding said first shell for alignment into and along the same recess extending in the housing block transversely of the corresponding first cavity, each corresponding terminal extends from a corresponding flange through the recess and outwardly of the housing block, additional cavities extend from the front end of the housing block, and conductive electrical contacts in corresponding additional cavities have corresponding electrical terminals extending from the housing block for connection in corresponding additional apertures of a circuit board.

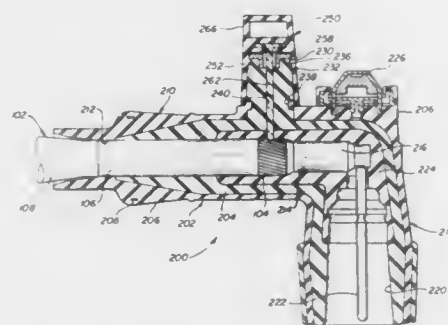
**4,946,393**  
**SEPARABLE CONNECTOR ACCESS PORT AND FITTINGS**

Alan D. Borgstrom, and David R. Stevens, both of Hackettstown, N.J., assignors to Amerace Corporation, Parsippany, N.J.

Filed Aug. 4, 1989, Ser. No. 389,572  
Int. Cl.<sup>5</sup> H01R 4/58

U.S. Cl. 439—88

15 Claims



1. An access to the interior of a high voltage separable connector component to permit interaction with elements within said component comprising:

a projection extending radially, outwardly away from the body portion of said high voltage separable connector component;

said projection having an outer surface and an outer free face spaced apart from the body portion of said connector component, and an axially located bore extending from said outer free face to the interior of said connector component;

and a removable cap member positionable upon the outer surface of said projection and over said outer free face to seal said bores, said cap member having a probe made of insulating material dimensioned to enter and fill said bore when said cap member is positioned upon the outer surface of said projection and over the outer free face thereof.

**4,946,394**  
**CONNECTION MECHANISM FOR CONNECTING A CABLE CONNECTOR TO A BUSHING**

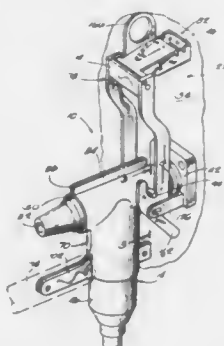
Todd K. Knapp, Waukesha, and Harvey W. Mikulecky, Oconomowoc, both of Wis., assignors to Cooper Power Systems, Inc., Coraopolis, Pa.

Continuation of Ser. No. 906,720, Sep. 12, 1986, abandoned. This application Oct. 22, 1987, Ser. No. 110,605

Int. Cl.<sup>5</sup> H01R 13/62

U.S. Cl. 439—157

17 Claims



1. A connection mechanism for connecting and disconnecting a cable connector to a bushing mounted on an electrical apparatus, said mechanism comprising:

a saddle shroud adapted to be connected to the cable connector and adapted to be movable by a shotgun stick, means adapted to be connected adjacent the bushing to the electrical apparatus for receiving and releasably locking said saddle shroud adjacent the electrical apparatus as the cable connector is forced onto the bushing, and

a lever mechanism adapted to be pivotally connected adjacent the bushing to the electrical apparatus and having a pair of notches which releasably receives and drives said saddle shroud so that the cable connector is forced onto the bushing when said lever mechanism is pivoted in one direction and so that the cable connector is forced away from the bushing when said lever mechanism is pivoted in the opposite direction, and wherein said locking means adapted to be connected to the electrical apparatus adjacent the bushing locks in multiple positions said saddle shroud adjacent the electrical apparatus as the cable connector is forced onto the bushing.

**4,946,395**  
**ELECTRICAL CONNECTOR WITH CONNECTOR POSITION ASSURANCE DEVICE**

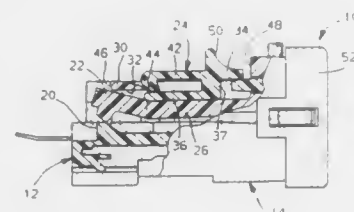
Kenneth P. Cope, Warren; Raymond A. Maga, Poland, and Teddy L. Hall, Columblana, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1989, Ser. No. 380,571

Int. Cl.<sup>5</sup> H01R 13/627

U.S. Cl. 439—352

6 Claims



2. An electrical connector comprising:

a connector body which has a side wall which extends to a forward mating end of the connector body, the side wall having a flexible lock arm which extends forwardly in cantilever fashion for engaging a lock shoulder of a mating connector body, a pair of laterally spaced side rails which are integrally attached to the side wall of the connector body on opposite sides of the flexible lock arm, a cross member which is integrally attached to the side rails near the forward end of the connector body and which is spaced outwardly of the side wall of the connector body to form a gauge slot which is partially defined by the flexible lock arm, and a connector position assurance device which comprises a clamp member which is slideably disposed on the side rails of the connector body so that the connector position assurance device is slideably movable between a rearward release position where the flexible lock arm is free to flex outwardly toward the cross member to engage and disengage a lock shoulder of a mating connecting body and a forward lock position where a gauge plate which is attached to the clamp member at the rearward end of the gauge plate so that the forward end of the gauge plate fits into the gauge slot and prevents the flexible lock arm from flexing outwardly toward the cross member and disengaging the lock shoulder.

**4,946,397**  
**ELECTRONIC CONTROL PANEL AND RACK THEREFOR FOR USE IN DATA-PROCESSING SYSTEMS AND THE LIKE**

Edmond Grässer, Grünstadt, Fed. Rep. of Germany, assignor to rako electronic-Vertriebsgesellschaft mbH, Grünstadt, Fed. Rep. of Germany

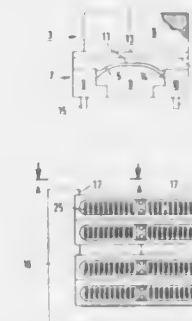
Filed May 9, 1988, Ser. No. 192,587

Claims priority, application Fed. Rep. of Germany, May 9, 1987, 8706704

Int. Cl.<sup>5</sup> H01R 13/74

U.S. Cl. 439—532

17 Claims



1. The combination of a rack with a control panel, said rack supporting said control panel, the combination being particularly for use in a data-processing system wherein the control panel is provided with an array of jacks and/or sockets for attachment to input and/or output units of the data-processing system, said control panel comprising a carrier having two spaced-apart walls provided with elongated guide slots for portions of the rack, at least one insert separably affixed to said carrier, said deformable means for releasably holding at least one of said portions of the rack in the respective slot, said deforming means comprising a leaf spring extending longitudinally of and into the respective slot, said carrier and said walls thereof and said leaf spring having a metallized external surface to enhance the shielding properties of the carrier against incident, reflected and/or radiated electromagnetic or electrostatic interference fields.

**4,946,396**  
**ADAPTER FOR CONNECTOR TO EXTERNAL POWER SUPPLY**

Shinya Saitoh, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

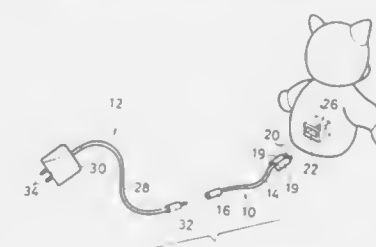
Filed Oct. 18, 1989, Ser. No. 423,039

Claims priority, application Japan, Oct. 19, 1988, 63-263586

Int. Cl.<sup>5</sup> H01R 3/00, 11/00

U.S. Cl. 439—500

11 Claims



1. An adapter for connection to an external power supply, comprising: an adapter body detachably fitted in a battery box of a battery-operated device; a connector electrically connected to the external power supply; and contacts electrically connected to contacts of said battery box; said contacts of said adapter being arranged at said adapter body.

**4,946,398**  
**CONNECTOR TERMINAL RETAINER**

Kenji Takenouchi; Toshihiko Makita, and Mitsuru Matsumoto, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

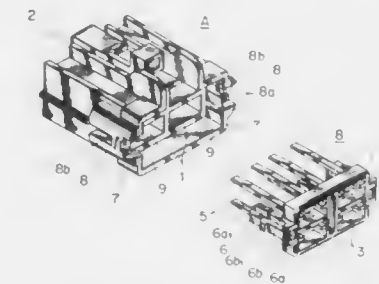
Filed Apr. 28, 1989, Ser. No. 344,728

Claims priority, application Japan, May 6, 1988, 63-59415[U]

Int. Cl.<sup>5</sup> H01R 13/40

U.S. Cl. 439—599

3 Claims



1. A connector terminal retainer comprising a connector housing having a plural number of terminal compartments, terminal members to be inserted in said terminal compartments, and a retainer having a frame-like body fittingly con-



nected to a rear portion of said connector housing stepwise through a stage of provisional engagement and a stage of final engagement, wherein said connector terminal retainer comprises;

a pair of locking arms extending forward from opposite side walls of said terminal retainer for engagement in socket portions in said connector housing, each locking arm comprising a pair of vertically resilient portions extending parallel on opposite sides of a gap space formed in the longitudinal direction of said arm and a horizontally resilient portion extending over and along said gap space on the outer side of said vertically resilient portions; and

provisional and main locking projections provided in longitudinally shifted positions on said vertically and horizontally resilient portions of said locking arms for stepwise engagement with corresponding locking portions provided in said socket portions of said connector housings; wherein

said socket portions comprise laterally bulged wall portions extended outwardly from the opposite sides of said connector housing and provided with first locking portions projecting inwardly at the rear end of each one of said bulged wall portion for interlocking engagement with said provisional locking projections on said locking arm and a second locking portion provided at the outer side of said bulged wall portion for interlocking engagement with said main locking projection on said locking arm.

4,946,399

#### DOUBLE-LOCKING DEVICE FOR CONNECTOR TERMINALS AND METHOD OF PREPARING THE LOCKING DEVICE

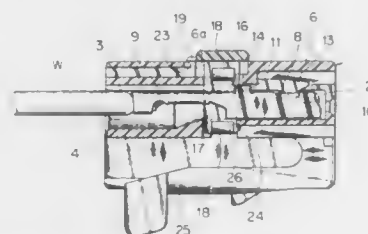
Toshiharu Kawashima, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,630

Claims priority, application Japan, Oct. 9, 1987, 62-153989  
Int. Cl.<sup>5</sup> H01R 13/514

U.S. Cl. 439—752

10 Claims



1. A double-locking connector comprising an insulated housing having a cut-out portion and at least one stage of a plurality of terminal holding chambers arranged in parallel and receiving and holding contact terminals inserted at one end, a primary locking means including a flexible arm provided in a wall of each terminal holding chamber and retractably protruding into the chamber and an opening in each contact terminal engageable with the arm in the terminal holding chamber wall, and a secondary locking means carried by said insulated housing in said cut-out portion and including a locking pin multiple having a horizontal pin supporting plate and a plurality of locking pins depending from the supporting plate, each of the locking pins having a protrusion movable into a terminal holding chamber, each of said contact terminals having a projection formed thereon, and said locking pin multiple is movable after said primary locking means is engaged to engage said protrusions with said contact terminal projections to protect the contact terminals from disengaging from the primary locking means when the locking pin protrusions are moved into the terminal chambers to engage the protrusions with said projections.

4,946,400  
**SURFACE MOUNTED ELECTRICAL CONNECTOR**  
Mitsuru Kawai; Masaru Yoshida, and Yoshihiro Sasaki, all of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan

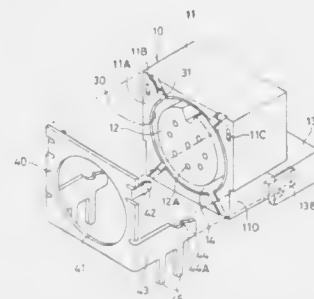
Filed Sep. 15, 1989, Ser. No. 407,627

Claims priority, application Japan, Oct. 4, 1988, 63-129623[U]

Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—79

8 Claims



1. A surface mounted electrical connector comprising: an insulating housing having an annular recess extending rearwardly from a front end thereof for receiving a shell member of a mating connector; a cylindrical shield member made from a thin metal sheet and fitted into said annular recess; contact means provided on a front edge of said cylindrical shield member; an end face protection member made from a metal sheet which is thicker than said thin metal sheet and attached to said front end so that it comes into contact with said contact means to provide electrical continuity; a pair of attachment sections extending rearwardly from opposite lower sides of said end face protection member; a pair of leg members extending downwardly from lower edges of said attachment sections to be secured to a printed circuit board; and latch means provided on opposite sides of said insulating housing for engagement, in part, with said attachment sections, whereby said end face protection member is locked to said insulating housing.

4,946,401  
**CONNECTING BLOCK FOR TELEPHONE**  
Akira Hori; Minoru Noda; Shigenobu Ohara; Yuzo Mochizuki, and Junji Nomura, all of Inazawa, Japan, assignors to Tomei Thushin Kogyo Co., Ltd., Inazawa, Japan

Filed Nov. 17, 1989, Ser. No. 437,610

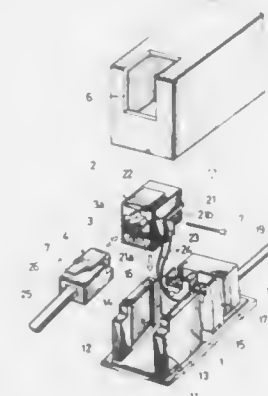
Int. Cl.<sup>5</sup> H01R 27/00

U.S. Cl. 439—224

3 Claims

1. A connecting block for electrically connecting a plug of a telephone set to a telephone line, comprising: a base plate having a terminal for connection to the telephone line; a jack unit including a jack having an opening for inserting the plug therein, said jack unit having parallel side walls across said jack opening; a pair of parallel retaining members extending upwardly from side edges of said base plate for removably retaining said jack unit therebetween; and a cover for enclosing said retaining members, said jack unit

and said terminal, said cover having a window to which said jack opening may be exposed;



the arrangement of said jack unit and said retaining members being such that said jack opening may selectively extend parallel to said base plate or perpendicular thereto.

4,946,402

#### ELECTRICAL CONNECTOR WITH IMPROVED SEALING ARRANGEMENT

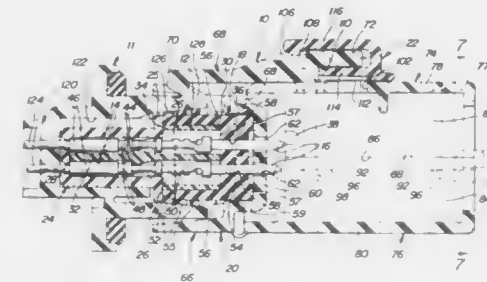
Randy L. Fink, Warren, and Bruce J. Serbin, Austintown, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 19, 1989, Ser. No. 423,115

Int. Cl.<sup>5</sup> H01R 13/52

U.S. Cl. 439—274

2 Claims



1. An electrical connector comprising: a connector body having a plurality of terminal cavities extending axially through the connector body from a forward contact end to a rearward conductor end, an elastomeric seal mounted on the rearward conductor end of the connector body, the elastomeric seal having an annular wall which includes a circumferential sealing lip means which is adapted to provide an interface seal between the connector body and a mating connector body, the elastomeric seal having a back wall which seals the terminal cavities at the conductor end of the connector body, the back wall having a circumferential rib and a plurality of apertures inwardly of the circumferential rib which are aligned with the respective terminal cavities of the connector body and which are adapted for sealing around insulated conductor wires which project out of the terminal cavities at the conductor end of the conductor body, and a back shell which is attached to the rearward conductor end of the connector body over the elastomeric seal, the backshell having a back wall which compresses the

circumferential rib so as to bias the back wall of the elastomeric seal into tight engagement with a rearward end face of the connector body and which has a plurality of guide holes which are aligned with the apertures of the elastomeric seal and the terminal cavities of the connector body for guiding terminals attached to insulated conductor wires into the terminal cavities via the apertures of the elastomeric seal.

4,946,403

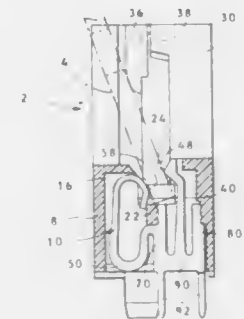
**LOW INSERTION FORCE CIRCUIT PANEL SOCKET**  
Timothy B. Billman, King; Robert G. McHugh, Lewisville, and Roger L. Thrush, Clemmons, all of N.C., assignors to AMP Incorporated, Harrisburgh, Pa.

Filed Aug. 24, 1989, Ser. No. 398,795

Int. Cl.<sup>5</sup> H01R 13/62

U.S. Cl. 439—326

33 Claims



1. A socket for establishing electrical connections with a circuit panel, comprising: an insulative housing having a mating face and a rear face; a plurality of cavities extending from the rear face to the mating face; a contact terminal in each cavity comprising first and second springs exposed adjacent the mating face of the housing for establishing electrical contact with opposite sides of the circuit panel and first and second terminal securing means engageable with the housing for securing each terminal in the housing, the first terminal securing means located between the first and second springs which extend beyond the first and second securing means toward the mating face of the housing, so that when a circuit panel is inserted between the first and second springs, the first terminal securing means is located below the circuit panel.

4,946,404

#### LOCKING SECURITY MECHANISM OF ELECTRICAL CONNECTOR

Kenji Takenouchi; Toshihiko Makita, and Mitsuru Matsumoto, all of Shizuoka, Japan, assignors to Yazaki Corp., Tokyo, Japan

Filed May 11, 1989, Ser. No. 350,485

Claims priority, application Japan, May 13, 1988, 63-63041[U]

Int. Cl.<sup>5</sup> H01R 13/627

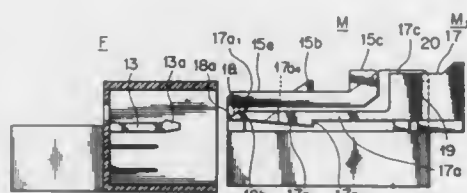
U.S. Cl. 439—352

17 Claims

1. A locking security mechanism for an electrical connector having a pair of male and female connector members, the male member having a plurality of longitudinal compartments receiving terminal fittings and the female member having a rear portion having a plurality of longitudinal compartments corresponding to those of the male member and a front portion having a chamber for receiving at least a front portion of the male connector member, the locking security mechanism comprising:

lug means provided in one of the male and female connector

members for locking the male and female connector members when engaged;  
opening means provided in the other of the connector members for receiving the lug means; and  
locking security means for securing the locking of the male and female connector members, wherein the locking security means has a locking security member mounted in one of the connector members in a normally undetachable state and maintained in a pre-engagement position in which it is prevented from coming into a position for



securing the locking of the lug means with the opening means, a pre-engagement releasing means provided in the other of the connector members for making the locking security member capable of coming into the position for securing the locking of the lug means with the opening means when the connector members are engaged, and a means for preventing the locking security member from coming into securing position when the lug means with the opening means is placed in an incomplete locking position.

4,946,405

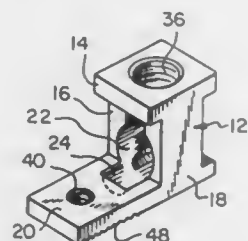
**ELECTRICAL TERMINAL CONNECTOR**

William J. Boehm, Hamilton, Ohio, assignor to Connector Manufacturing Company, Hamilton, Ohio  
Continuation of Ser. No. 27,764, Mar. 19, 1987. This application  
Dec. 15, 1989, Ser. No. 451,497

Int. Cl.<sup>5</sup> H01R 4/34

U.S. Cl. 439—387

8 Claims



1. An electrical connector for terminating the end of an electrically conductive wire comprising:  
a body member having upper, central and lower portions;  
at least one elongated tang formed integrally with and extending from said lower portion, said tang having a lower surface for engaging a mounting surface;  
means forming a wire receiving opening extending through said central body opening;  
means for clamping the wire securely in said wire receiving opening;  
means forming a mounting aperture extending through said tang;  
means forming a plurality of notches in and extending across the lower surface of the tang for improving the electrical and thermal contact of the connector with the mounting surface; and wherein  
said central body portion, in the dimension parallel to the axis of the wire receiving opening, is smaller than the

diameter of the set screw, said diameter being at the point where said set screw meets the wire.

4,946,406

**ELECTRICAL CONNECTOR WHICH REQUIRES NO APPLICATION TOOL**

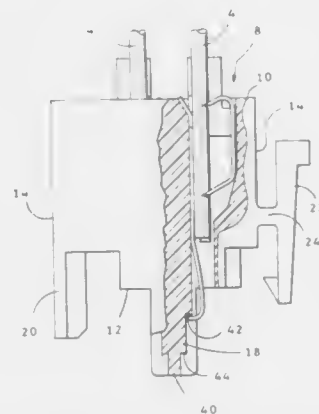
David Lane, Greensboro, and Richard A. Nelson, Winston-Salem, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 19, 1989, Ser. No. 354,177

Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—417

20 Claims



1. An electrical connector comprising an insulating housing and at least one stamped and formed contact terminal in the housing, the housing having a conductor-receiving face, at least one terminal-receiving cavity extending into the housing from the conductor-receiving face, the terminal having a conductor-receiving portion at one end thereof and having a conductor contacting portion which is adjacent to the conductor-receiving portion, the terminal being partially inserted into the cavity and being movable from its partially inserted position to a fully inserted position, the connector being characterized in that:

the conductor contacting portion has contacting means, comprising a single sharpened edge at the forward free end of the conductor contacting portion which is movable against, and into contacting engagement with, a conductor, the terminal having conductor guide means for guiding a conductor to the contacting means upon insertion of the conductor into the terminal from the one end thereof, and

the cavity has camming surface portions defined by inwardly directed surfaces adjacent to the contacting means for moving the contacting means into engagement with a conductor during movement of the terminal from its partially inserted position to its fully inserted position whereby,

upon insertion of a conductor into the terminal and subsequent movement of the terminal into the cavity to its fully inserted position, the contacting means will contact the conductor and the conductor will be electrically connected to the terminal.

4,946,407

**HIGH CURRENT CONNECTORS AND METHODS OF ASSEMBLY**

Thomas A. Young, Barboursville, W. Va., assignor to OB Products, Inc., Mansfield, Ohio

Filed Oct. 11, 1988, Ser. No. 255,481

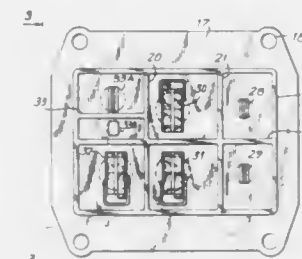
Int. Cl.<sup>5</sup> H01R 13/502

U.S. Cl. 439—686

14 Claims

1. A high current carrying connector plug comprising:  
(a) A body of electrical insulating material having a front

face, a rear face and a plurality of shaped passages extending from said rear face to said front face;  
(b) a plurality of electrical conductors having a flat bladed contact portion, a stop means portion and a cylindrical body portion with a recess formed therein for receiving and securing a current carrying electrical cable;  
(c) each of said passages shaped to include stop engaging means for engaging said stop means, such that said con-



ductors inserted in said passages from said rear face toward said front face are stopped with the flat bladed contact portion extending for mating engagement; and  
(d) retainer means engaging said flat bladed portion for retaining said conductors within said body of electrical insulating material against said stop engaging means whereby axial movement of said conductors, along an axis from said front face to said rear face, is prevented.

4,946,408

**MALE CIRCUIT BOARD TERMINAL**

Roger L. Garrett, New Wilmington, Pa., and Behrooz S. Nikaft, Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 14, 1989, Ser. No. 407,090

Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—872

6 Claims



1. A male circuit board terminal for mechanically and electrically connecting a wire end having an insulating cover and wire strands extending therefrom to electrically conductive plating on a circuit board at a terminal connection hole extending between inboard and outboard surfaces of the board comprising:

a unitary electrically conductive housing having inboard, outboard and core portions thereon, said inboard, outboard and core portions each having a strand support surface along the length thereof and spaced side wall portions;

said side wall portions including a first pair of crimping tabs thereon for connecting said outboard portion to the outer surface of the wire end;

a second pair of crimping tabs on said side wall portions at said outboard portion, said second pair of crimping tabs engageable with the strands where said strands extend from the wire end;

a pair of stops formed in said side wall portions immediately inboard of said second pair of crimping tabs and extending

outwardly of said side wall portions into overlying engagement with one surface of the circuit board to position the terminal in a seated relationship on the circuit board; and lock finger means integrally formed on the inboard end of said terminal, said lock finger means including a return bend portion wrapping around the ends of said strands to form a solder pocket therearound and including a free end portion thereon engageable with the other surface of the circuit board to resiliently capture the circuit board between said pair of stops and said lock finger means.

4,946,409

**LUBRICATING DEVICE FOR POWER DEVICE OF INBOARD/OUTBOARD UNIT**

Takayoshi Suzuki, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

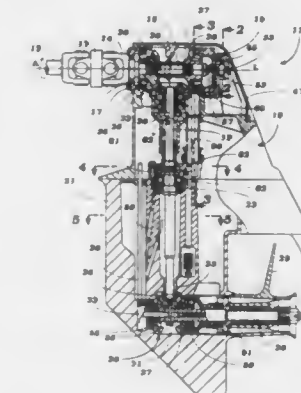
Filed Apr. 3, 1989, Ser. No. 332,707

Claims priority, application Japan, Apr. 4, 1988, 63-081349

Int. Cl.<sup>5</sup> B63H 23/34

U.S. Cl. 440—75

15 Claims



1. A marine outboard drive comprised of an outer casing adapted to be mounted on the transom of a watercraft comprising an input shaft journaled within said outer casing for rotation about a generally horizontally extending axis, a drive shaft journaled for rotation about a generally vertically extending axis in said outer casing, first transmission means for driving said drive shaft from said input shaft, propulsion means carried by said outer casing at the lower end thereof, and second transmission means for driving said propulsion means from the lower end of said drive shaft, the improvement comprising a lubricant sump formed in said outer casing and surrounding in part said second transmission means, a lubricant pump positioned at the upper end of said outer casing and driven with said input shaft, and lubricant passage means communicating said lubricant sump with the input side of said lubricant pump and the output side of said lubricant pump with said lubricant sump for circulating lubricant through said outer casing.

4,946,410

**MARINE PROPULSION DEVICE WITH IMPROVED OIL SEAL PROTECTION DEVICE**

David F. Haman, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Oct. 24, 1988, Ser. No. 261,116

Int. Cl.<sup>5</sup> B63H 1/14

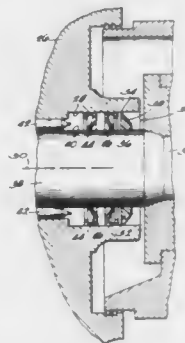
U.S. Cl. 440—83

14 Claims

1. A marine propulsion device comprising a propulsion unit including a gearcase having a cylindrical inner surface with a rearward end and centered on an axis, a propeller shaft which is adapted to be driven by an engine, said propeller shaft being located partially inside said inner surface and spaced therefrom to define therebetween an annular space, said propeller shaft being supported by said gearcase for rotation about said axis,



and said propeller shaft having a rearward end adapted to have mounted thereon a propeller, an annular oil seal extending in said annular space and engaging said propeller shaft and said inner surface, and means for protecting said oil seal from foreign matter, said means including an annular member fixed on



said propeller shaft for rotation therewith, located in said annular space and between said oil seal and said rearward end of said cylindrical inner surface, and spaced from said oil seal, said member having an outer surface spaced closely adjacent said inner surface and having a beveled surface portion facing rearwardly.

4,946,411

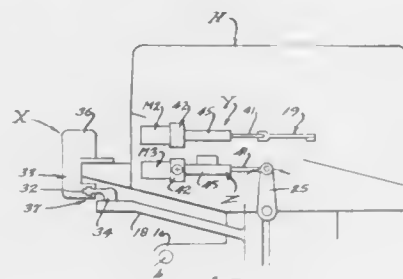
# **HAND HELD REMOTE CONTROL FOR OUTBOARD POWERHEADS**

Richard T. Novey, 1031 Linden Ave., Glendale, Calif. 91201  
Filed Oct. 20, 1988, Ser. No. 260,506

Int. Cl.<sup>5</sup> B63H 25/24

U.S. Cl. 440-84

8 Claims



1. A control for outboard powerheads pivoted on a steering axis and having a throttle means and a shifting means lever for operation between reverse and forward positions through a neutral position, and including;

- a reversible motor and pinion engaged with a segmental member and acting between the powerhead and a mounted bracket therefor to turn the powerhead reversely on the steering axis,
- a reversible motor and servo means engaged with the throttle means and having a reciprocally shiftable rod engaged with and positioning the throttle means, and having a cam with a rise engageable with and to open a cam engageable switch at moderate and all fast powerhead speeds and said cam engageable switch being in circuit with a start switch to disable the same,
- a reversible motor and servo means engaged with the shifting means lever and having a reciprocally shiftable rod shiftable between said reverse and forward positions through said neutral position,
- and a circuit means having right and left switches to reversibly operate the reversible motor and pinion engaged with said segmental member to steer, having fast and slow

switches to reversibly operate the reversible motor and servo means engaged with said throttle means, and having reverse, forward and neutral switches with means to reversely operate the reversible motor and servo means and shiftable rod engaged with the shifting means lever to shift it between neutral and reverse and between neutral and forward positions.

4,946,412

# **SWIMMING AID**

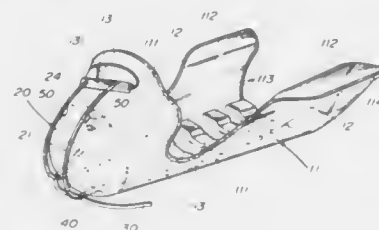
Yoshinobu Maruo, and Tsuyoshi Maeda, both of Kanagawa, Japan, assigns to Nissan Shatai Company, Limited, Kanagawa, Japan

Filed Jul. 11, 1988, Ser. No. 217,333

Int. Cl.<sup>5</sup> B63C 11/00

U.S. Cl. 441-135

8 Claims



1. A buoyant swimming aid comprising:
  - a rigid body receiving portion for receiving the upper half of a swimmer's body;
  - a hollow bottom viewer, provided at one end of said body receiving portion, for providing forward and underwater view to the swimmer, said bottom viewer defining a sealed chamber and providing buoyancy to said body receiving portion;
  - floatation means for providing buoyancy; and
  - wherein said chamber includes a transparent dome-shaped member and a flat transparent lid member attached on the peripheral edge of said dome-shaped member.

4,946,413

# **MULTI-USE TOY**

Roger W. Lebmann, 18 Flintlock Ct., Bernardsville, N.J. 07924, and Michael I. Satten, 4 Farmers Rd., Kings Point, N.Y. 11024

Filed Sep. 23, 1988, Ser. No. 248,397

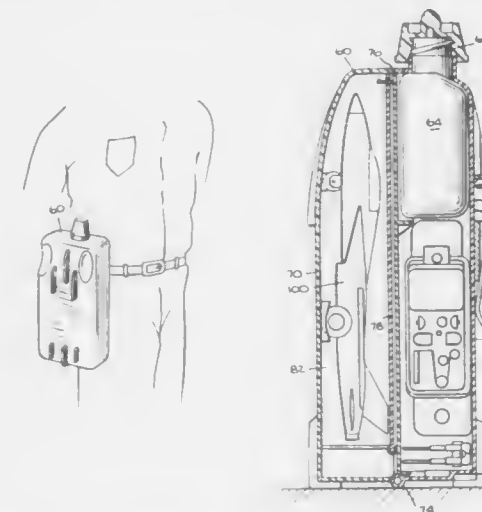
Int. Cl.<sup>5</sup> A63H 33/00

U.S. Cl. 446-28

5 Claims

1. A multi-use toy comprising:
  - a. a useful article adapted for play use by children;
  - b. said useful article having the configuration of a type of article recognizable by children and being of generally normal size for that type of article;
  - c. said useful article having at least one inner compartment,
  - d. a toy set built into said compartment,
  - e. said toy set being of miniature size relative to the size of the useful article;
  - f. said useful article being adapted to be opened to expose said toy set and being adapted to be closed to enclose said toy set;
  - g. said useful article, when closed, being adapted to be used as a toy;
  - h. said toy set being adapted to be used as a toy when the useful article is opened;
  - i. said useful article, when closed, being additionally adapted to function as a storing and carrying case for the toy set;

j. said useful article, when open, being additionally adapted to function as a support for said toy set, and



4,946,414

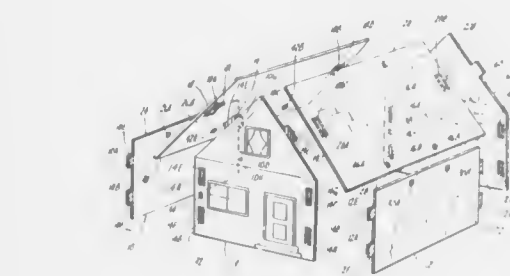
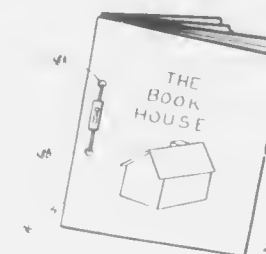
# **CHANGEABLE BOOK STRUCTURE**

Kathleen M. Zimmer, 23919 Pickett, Farmington, Mich. 48024  
Filed Oct. 2, 1989, Ser. No. 415,715

Int. Cl.<sup>5</sup> A63H 33/08; B42F 3/00

U.S. Cl. 446-71

4 Claims



1. A changeable structure, comprising:
  - a plurality of panels;
  - each of said panels having a hinge-receiving opening, said hinge-receiving openings being aligned when the panels are disposed in a side-by-side assembly;
  - an elastic hinge member removeably mounted in said aligned hinge-receiving openings to hingedly connect the panels together to permit adjacent panels in the assembly to be

moved away, one from the other, for viewing the face of the panels;

certain of said panels having at least one tab-receiving slot; other of said panels each having a tab receivable in the slots of said certain of said panels to cooperate therewith to form a self-supporting structure, when said elastic hinge is removed from said openings in said panels; and

a first of said panels having a tab-receiving slot, and a color-coded section adjacent said slot, and a second of said panels having a tab color-coded according to the color-coded section on the first of said panels to indicate that the tab is receivable in said tab-receiving slot.

4,946,415

# **REMOTE CONTROL MYLAR TOY AIRCRAFT**

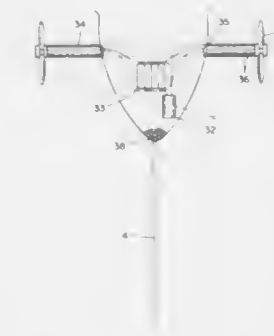
San Y. Huang, 2, Lane 164, Pai-Lin 5th Road, Pei-Tou, Taipei, Taiwan

Filed Jan. 26, 1989, Ser. No. 302,441

Int. Cl.<sup>5</sup> A63H 27/10

U.S. Cl. 446-225

1 Claim



1. A remotely controllable toy aircraft, consisting of in combination,
  - a body made of light material and being inflatable by a gas lighter than air, said body having a center of gravity,
  - a receiver box detachably connected to said body whereby the weight of said body, said receiver box acts on the center of gravity of said body, said receiver box including in the interior thereof a remotely controllable receiver fitted with a receiving antenna and several units of balance weights, said receiver box comprising a motor tube, two battery powered motors each of which is located at one end of said motor tube, each of said motors being located at each end of said receiver box, said motors being controlled by said receiver and two propellers each of which is connected to each of said motors,
  - a length-adjustable balance strip made of several units of strips in series connection, said balance strip being suspended from the bottom of said receiver box, said balance weights being located above said balance strip,
  - a transmitter spaced from said receiver box, including trans-

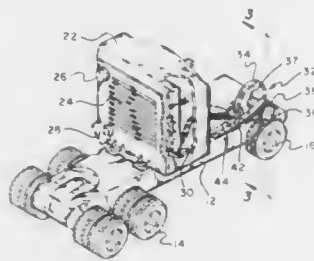
mitting means and a control keyboard, for transmitting a signal to said receiving box initiated by said control keyboard, said toy aircraft less said balance weights having a certain upwardly directed pull of floatability, the total weight of said body, said receiver box, said balance weights and said balance strip being greater than said floatability whereby a small segment of the rear portion of said balance strip is in contact with the ground to facilitate controlling the floating height of said toy aircraft, the floating height of said toy aircraft being adjustable by increasing the units of said balance weights and reducing the length of said balance strip, or by increasing the length of said balance strip and reducing the units of said balance weights.

4,946,416

#### VEHICLE WITH ELECTRONIC SOUNDER AND DIRECTION SENSOR

Carl M. Stern, Pennington; Richard N. Meckstroth, Princeton, and Stephen L. Hayes, East Windsor, all of N.J., assignors to Innova Development Corporation, Pennington, N.J.  
Filed Nov. 1, 1989, Ser. No. 431,020

Int. Cl.<sup>5</sup> A63H 5/00, 33/26, 33/22, 30/00  
U.S. Cl. 446—409 16 Claims



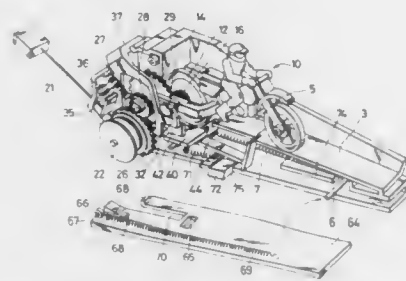
1. In a toy wheeled vehicle including electronic sound generating means for generating a sound which varies in relation to the speed at which the vehicle is moved, the improvement comprising means for determining the direction in which the vehicle is moving including means for generating an asymmetrical electrical wave form in response to movement of the vehicle.

4,946,417

#### RUNNING TOY SHOOTING APPARATUS

Ichiro Ishikawa, and Hiroyoshi Kamei, both of Tokyo, Japan, assignors to Sente Creations Co., Ltd., Tokyo, Japan  
Filed Aug. 18, 1989, Ser. No. 395,465

Claims priority, application Japan, Jul. 4, 1989, 1-79471[U]  
Int. Cl.<sup>5</sup> A63H 29/00, 29/20, 17/21  
U.S. Cl. 446—430 8 Claims



1. A running toy shooting apparatus for shooting a running toy having flywheel as a drive wheel and a pinion rotating as

one body with said flywheel, which are supported freely with an axle, said shooting apparatus comprising:

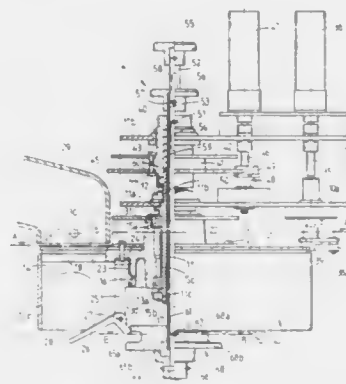
a holder means adapted to hold said running toy axle, said holder means being movable between a starting position and a shooting position located forward of said starting position, a stopper means for retaining said running toy axle and said holder means in a stationary state at said starting position, said stopper means and said holder means adapted to hold said running toy axle such that said flywheel is lifted from engagement with any surface while in said starting position, an energizing means for energizing said flywheel by engaging with and rotating said pinion while said flywheel is lifted from engagement with any surface and said running toy is stationary at said starting position, a manual release means for disengaging said stopper means, a runway extending forwardly from said shooting position, and a drive means for driving said holder means and said running toy up to said shooting position upon activation of said release means, to propel said running toy onto said runway with said flywheel engaged on said runway, and thereby propel said running toy from said shooting apparatus.

4,946,418

#### ROTATING DRUM MAGAZINE FOR STORING AND MANAGING COINS IN TELEPHONE SETS OR DISPENSERS

Carlo De Feo, Napoli, Italy, assignor to I.P.M. Industria Politecnica Medidionale S.p.A., Napoli, Italy  
Continuation of Ser. No. 1,605, Dec. 4, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 378,425

Claims priority, application Italy, Apr. 5, 1985, 47933  
Int. Cl.<sup>5</sup> G07D 1/00  
U.S. Cl. 453—20 6 Claims



1. A rotating drum magazine for storing and managing coins, in particular in a telephone apparatus or dispenser of public utility comprising: a feeding duct, for transporting coins within said magazine, a rotating drum (13), which is rotatable about a vertical axis and has a plurality of radially located compartments (14', 14'' . . . 14'') able to receive coins (28) falling by gravity from the feeding duct (29), closure means for closing the bottom of said compartments to retain said coins including a rocking lever (26) hinged (27) near the bottom of the compartment to retain the coin received, driving means controlling the closure means for the selective opening of each compartment, said driving means being rotatable in two directions and logic control means for controlling the feeding of the coins from the drum, the bottom of each compartment of the drum being closed by the closure means rotating said rocking lever in a radial plane between a closed and opened position, said

driving means being rotatable coaxially with the rotating drum, coding means for coding the angle through which said driving means has rotated, the logic control means controlling the rotation of the rotating drum and the driving means, and said rotating drum and the driving means controlling the closure means for the selective opening of the compartments at a plurality of positions.

4,946,419

#### AXIAL FLOW HARVESTING MACHINE

Eric L. A. Crombeecke, Bredene, and Russell W. Strong, Brugge, both of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

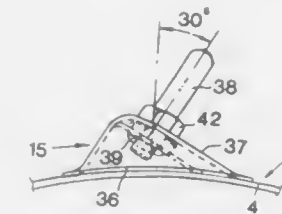
Filed May 5, 1989, Ser. No. 348,349

Claims priority, application United Kingdom, May 6, 1988, 8810759

Int. Cl.<sup>5</sup> A01F 12/22

U.S. Cl. 460—68

7 Claims



1. In an axial flow harvesting machine having at least one generally cylindrical rotor rotatably mounted within a casing and operable, in conjunction with the casing, to thresh and separate grain from straw material, and a plurality of mounting means permanently provided at predetermined positions over the periphery of the rotor for the connection thereof of detachable crop operating members to effect said threshing and separating, the improvement comprising:

the mounting means being in the form of raised mounts attached to the main body of the associated rotor and having mounting surfaces oriented in a predetermined manner so that said crop operating members mounted thereon for engaging the straw material are oriented in a predetermined orientation, said mounts being arranged in axially spaced, radially offset pairs with the mounting surfaces thereon being inclined with respect to each other to receive said crop operating members in a paired configuration in said predetermined orientation.

4,946,420

#### APPARATUS FOR DAMPING TORSIONAL VIBRATIONS

Johann Jäckel, Bühl, Fed. Rep. of Germany, assignor to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Filed Jul. 2, 1987, Ser. No. 69,611

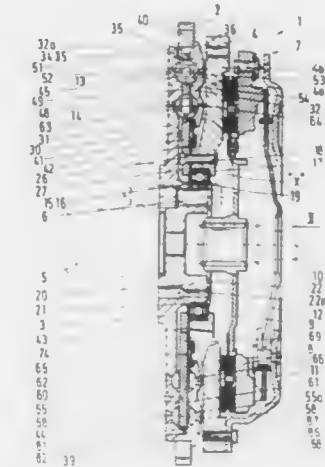
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622697; Sep. 19, 1986, 3631985; Dec. 13, 1986, 3642687  
Int. Cl.<sup>5</sup> F16D 3/12, 3/80; F16F 15/10

U.S. Cl. 464—7

38 Claims

1. Apparatus for damping torsional vibrations in the power train between an engine and a transmission, comprising a composite flywheel having at least two components including a first component connectable with the engine and a second

component rotatable relative to the first component and connectable with the transmission by way of a clutch, at least one of said components defining a chamber for a supply of viscous fluid medium which at least partially fills the chamber; antifriction bearing means between said components; damper means provided in said chamber to oppose rotation of said components relative to each other, said damper means comprising a flange-like member and energy storing elements acting in the



4,946,421

#### ROBOT CABLE-COMPLAINT DEVICES

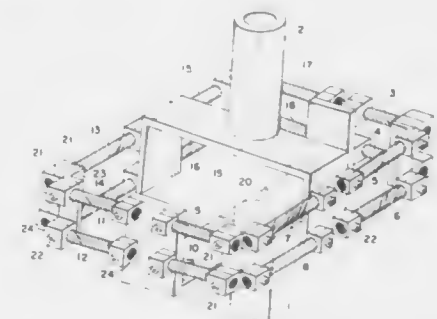
James J. Kerley, Jr., Greenbelt, Md., assignor to United States of America as represented by the Administrator, National Aeronautics & Space Administration, Washington, D.C.

Filed May 13, 1988, Ser. No. 193,612

Int. Cl.<sup>5</sup> F16D 3/50

U.S. Cl. 464—56

8 Claims



1. A cable-compliant robotic joint including:

a plurality of brackets, two of said brackets having an essentially "U" configuration cross-section, the other of said brackets being angle brackets, said two U-shaped brackets having their said "U" configuration cross-sections in substantially different, orthogonal planes; first means for coupling one of said U-shaped brackets to a robotic arm; second means for coupling said other of said U-shaped



brackets to an end-effect tool, said tool having a major axis being defined as the general translation direction that the tool must travel to approach a work object;

a plurality of cable segments, said segments having longitudinal axes which lie substantially in at least two planes, all of said at least two planes being orthogonal to said planes of said "U" cross-sections of said two U-shaped brackets and generally perpendicular to said tool major axis, all of said plurality of said brackets having means to retain said cable segments, wherein one end of each of said cable segments is secured to one of said angle brackets and the other end of each of said cable segments is secured to one of said two U-brackets, wherein said angle brackets are circumferentially interposed between the adjacent legs of said U-shaped brackets, and wherein said cable segments permit compliant movement of said robotic joint.

4,946,422

## UNIVERSAL JOINT FOR A DRIVE SHAFT

Hans Lindenthal, Heidenheim, and Reinhard Bretzger, Gerstetten, both of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Fed. Rep. of Germany

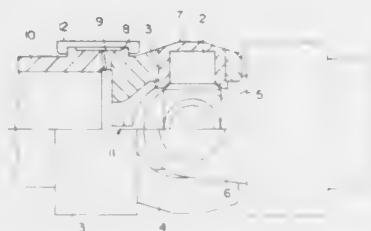
Filed Apr. 16, 1984, Ser. No. 600,471

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314322

Int. Cl.<sup>5</sup> F16D 3/40

U.S. Cl. 464—135

8 Claims



1. A universal joint for a drive shaft, comprising:
  - a spider cross having first and second pairs of oppositely, outwardly directed pins;
  - a first and a second yoke, each yoke having two respective yoke arms each yoke arm engaging one of the pins; the arms of the first yoke engaging the first of the pairs of pins, and the arms of the second yoke engaging the second of the pairs of pins, said engagement being in a pivotal manner such that the spider cross is pivotable around a first axis between the first pair of pins with respect to the first yoke and is pivotable around a second axis between the second pair of pins with respect to the second yoke;
  - at least one of the respective yoke arms in at least the first yoke being separable from the rest of the first yoke; the separable yoke arm having an engaging surface for receiving torque from a generally circular surface, the engaging surface having a length extending over substantially half the circumference of the generally circular surface;
  - means for transmitting torque between the engaging surface and the generally circular surface;
  - means for clamping the two yoke arms of the first yoke together and for clamping them over the respective pair of pins of the spider cross, the clamping means further being for applying a pressing force over substantially the entire length of the engaging surface for holding the engaging surface against the generally circular surface; and
  - a hub extending away from the spider cross, the hub having the generally circular surface defined thereon; wherein said separable yoke arm has an end side facing away from the spider cross; a respective flange at the end side of the separable arm, the flange having the engaging surface defined thereon; the torque transmitting means being between the flange and the respective hub of the yoke for

transmitting torque between the engaging surface on the flange and the generally circular surface on the hub.

4,946,423

## INFINITELY VARIABLE TRANSMISSION

Coenraad H. van Beek, Dlessen, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands

Filed Jan. 9, 1989, Ser. No. 295,095

Claims priority, application Netherlands, Feb. 10, 1988, 8800315

Int. Cl.<sup>5</sup> F16H 9/04

U.S. Cl. 474—25

4 Claims



1. An infinitely variable transmission, comprising:
  - an endless transmission belt;
  - at least one V-shaped pulley, comprising two pulley-halves axially movable with respect to one another, between opposed faces of which said belt is confined;
  - a hydraulic cylinder and piston combination connected to at least a first pulley-half of the V-shaped pulley for displacing the first pulley-half in an axial direction, the cylinder defining a cylindrical chamber within which said piston moves axially;
  - means to supply hydraulic fluid under pressure to said cylindrical chamber;
  - a pressure compensation chamber communicating with the cylindrical chamber;
  - wherein said piston and cylinder are formed to define a calibrated opening between a radially outer surface of the piston and a wall of the cylindrical chamber, to control the flow of fluid from the cylindrical chamber to the pressure compensation chamber.

4,946,424

## BELT DRIVEN CONTINUOUSLY VARIABLE TRANSMISSION

Shiro Sakakibara, Toyokawa; Masahiro Hasebe, Anjo; Masashi Hattori, Anjo, and Shigekazu Ohara, Anjo, all of Japan, assignors to Aisin Aw Co., Ltd., Anjo, Japan

PCT No. PCT/JP88/00856, § 371 Date Apr. 26, 1989, § 102(e) Date Apr. 26, 1989, PCT Pub. No. WO89/02043, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 27, 1988, Ser. No. 343,286

Claims priority, application Japan, Aug. 28, 1987, 62-214378; Aug. 27, 1988, 63/00856

Int. Cl.<sup>5</sup> F16H 11/02

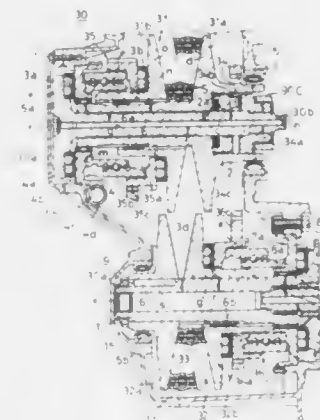
U.S. Cl. 474—11

5 Claims

1. A belt driven continuously variable transmission including a primary pulley and a secondary pulley both of which being made of two relatively slidable sheaves being supported by shafts, a pressure regulating mechanism giving an axial force according to the transmission torque to at least one of said pulleys, an actuator mechanism to move movable sheaves of both pulleys axially, a belt wound around both pulleys, improvement comprising:

said pressure regulating mechanism which is situated right in front of a power transmission path led to a sheave imparting axial force so that said sheave and said pressure regu-

lating mechanism have no radial interconnection of supporting.



4,946,425

## ELECTROMECHANICAL BICYCLE GEAR SHIFT MECHANISM

René Bühlmann, Reinach, Switzerland, assignor to Villiger Sohne AG Cigarrenfabriken, Pfeffikon LU, Switzerland

PCT No. PCT/EP87/00529, § 371 Date Jul. 15, 1988, § 102(e) Date Jul. 15, 1988, PCT Pub. No. WO88/01962, PCT Pub. Date Mar. 24, 1988

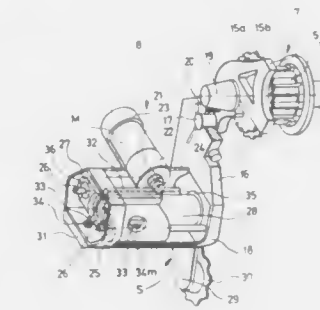
PCT Filed Sep. 16, 1987, Ser. No. 207,044

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1986, 3631481

Int. Cl.<sup>5</sup> F16H 7/22, 9/00

U.S. Cl. 474—80

13 Claims



1. An electromechanical bicycle gear shift mechanism (8) comprising a housing (18) secured to a frame and carrying an electric motor (M), a carrier for a shift actuator member (S) in the form of a tensioning arm (29) of a derailleur or a shifting plunger of a hub gear transmission, said carrier being mounted in said housing for reciprocating displacement parallel to the wheel axis, a drive transmission member adapted to be driven by the electric motor (M) and operatively connected to said carrier, and an electric circuit for said electric motor (M) adapted to be controlled through a gear shift selector (11), characterized in that said carrier is a cursor (27) slidably mounted in said housing (18) on at least two mutually spaced parallel guides (26) fixedly connected to said housing (18), the side of said cursor (27) facing towards said shift actuator member (S) being provided with a preferably integrally formed extension (28) extending through a sliding seal gasket (35) in a sidewall (16) of said housing (18) facing towards the wheel (4).

4,946,426

## SELF-POSITIONING BELT TENSIONER

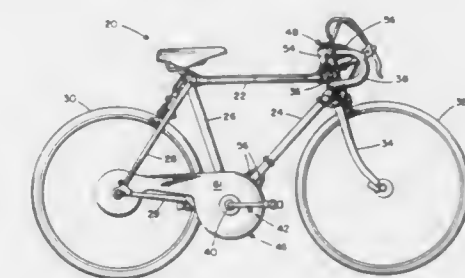
George H. Leonard, Darien, Conn., assignor to Stern & Leonard Associates, Wilton, Conn.

Filed Sep. 6, 1989, Ser. No. 403,571

Int. Cl.<sup>5</sup> F16H 7/08, 55/54

U.S. Cl. 474—101

16 Claims



said sheave imparting axial force which is directly supported on a case through a bearing.

1. A self adjusting drive means tensioning system for a variable transmission comprising:
  - frame means;
  - a pair of spaced apart variable diameter sheaves mounted on said frame means;
  - endless drive means wrapped at least partially around each said sheave for transmitting rotational force from one said sheave to the other; and
  - tensioning means for said drive means including at least two spaced apart guides adjacent said drive means for placing force through said guides against said drive means whereby said guides maintain said drive means around said sheaves in optimum driving relationship for all diameters of said sheaves, said guides being supported by said frame means for movement in a non-rotational path as determined by the geometry of said drive means depending upon the diameters of said sheaves for any given ratio of the transmission whereby as the ratio of the transmission changes and said drive means achieves a new geometry in response to the changing diameters of said sheaves, said drive means automatically adjusts the position of said tensioning means.

4,946,427

## COMPOSITE ROTARY DRIVE MEMBER AND METHOD OF ITS FORMATION

John F. Rampe, Bratenahl, Ohio, assignor to Jepmar Research, Fairport Harbor, Ohio

Continuation-in-part of Ser. No. 879,578, Jun. 27, 1986, Pat. No. 4,722,722. This application Jan. 29, 1988, Ser. No. 150,074

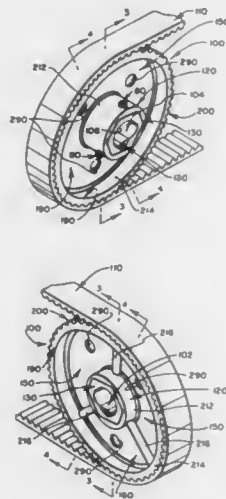
Int. Cl.<sup>5</sup> F16H 55/14

U.S. Cl. 474—161

72 Claims

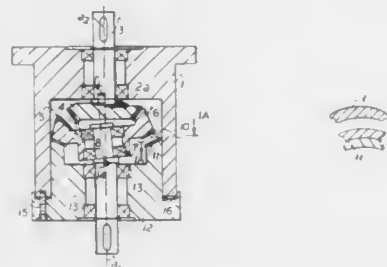
1. A composite rotary drive member formed of metal and plastics components including at least one metal component that has mounting means defining at least portions of a mounting formation for mounting the composite rotary drive member for rotation about an axis of rotation, and including a component formed of plastics material that is molded so as to rigidly drivingly interconnect the metal and plastics components, with the plastics component including peripheral means having a peripheral portion extending coaxially about the axis of rotation for defining a circumferentially extending drive formation including drive features of desired shape and size for drivingly engaging another drive element as the rotary drive member rotates about the axis of rotation, and wherein the peripheral means is formed in a dual-stage injection molding process wherein a first injection molding of plastics material is utilized to provide a composite preform that includes plastics material that is molded about and rigidly connected to the at least one metal component, and that has peripheral surface portions that approach the location of but stop short of defining portions of the drive formation, and wherein a second

injection molding of plastics material is utilized to provide the remainder of the portion and to define the drive formation so as to provide said drive features of desired shape and size, with the plastics material of the second molding including a band-like ring of plastics material that extends in an uninterrupted manner continuously and contiguously about the peripheral surface portions of the composite preform such that the plastics materials of the first and second injection moldings are



united during the second molding to form a single component of plastics material, with the band-like ring of plastics material that is provided by the second molding being molded at a time after the plastics material of the first molding has undergone shrinkage that occurs during its solidification, and with the band-like ring of plastics material that is provided by the second molding having a minimum thickness that is within the range of about forty thousandths of an inch to about ninety thousandths of an inch.

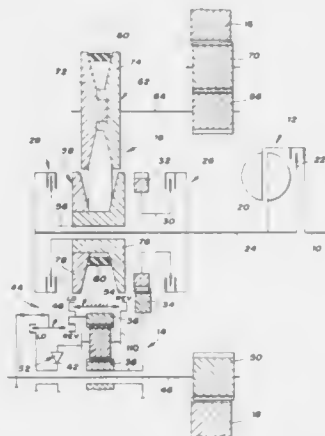
**4,946,428**  
**COMPACT PLAY-FREE SPEED-REDUCING TRANSMISSION**  
Gian P. Barozzi, Via Desti 7, Crema (Cremona), Italy  
Filed Nov. 18, 1987, Ser. No. 122,095  
Claims priority, application Italy, Nov. 18, 1986, 22376 A/86  
Int. Cl.<sup>5</sup> F16H 1/28  
U.S. Cl. 475—164  
6 Claims



1. A compact high-ratio speed reducer without play, in particular, for an automatic manipulator, comprising: an external housing having a first part and a second part, said first and second parts having respective first and second axes and being coaxial with each other; a driving shaft rotatably mounted in one of said part's a driven shaft rotatably mounted in the other of said parts, said shafts extending axially opposite each other beyond

the respective parts, said driving and driven shafts being rotatable about said first and second axes; a first transmission gear on said driving shaft formed with a pair of toothings in said external housing; another gear rigidly connected with said driven shaft in said external housing facing said first gear; a crown wheel formed on said housing coaxial with said driving shaft, said toothings of said gears and of said crown wheel being helicoidal toothings, each of said helicoidal toothings including two contiguous portions having oppositely evolving directions of respective helix, so that one of said toothings of said first gear is in an engagement with said crown wheel of said external housing and the other of said pair of toothings of said first gear meshes with said another gear transmitting a torque thereto; means for mutual axial adjustment of said first and second parts of said external housing for eliminating a play of said toothings upon the engagement thereof, and at least one registering element extending transversely perpendicular to the axis of rotation of said shafts through at least one of said first and second parts of said external housing and cooperating with said means for mutual axial adjustment, so that said registering element arrests the mutual axial adjustment of said first and second part of the housing upon the elimination of the play of said toothings.

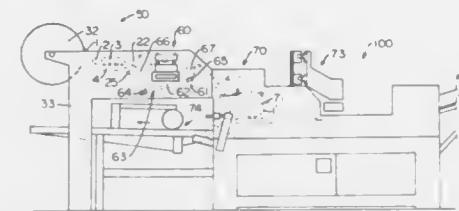
**4,946,429**  
**POWER TRANSMISSION WITH A CONTINUOUSLY VARIABLE SPEED RANGE**  
James F. Sherman, Brighton, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Aug. 14, 1989, Ser. No. 393,502  
Int. Cl.<sup>5</sup> F16H 37/00  
U.S. Cl. 475—210  
1 Claim



1. A transmission comprising: input means for delivering power to the transmission; a planetary gear arrangement including a sun gear, a ring gear and a carrier assembly; first selectively engageable input clutch means for connecting said input means to said sun gear; output means for delivering power from the transmission; selectively engageable low clutch means for connecting said carrier assembly to said output shaft; selectively engageable low brake means for preventing rotation of said ring gear; reverse clutch means and reverse brake means for selectively connecting said ring gear to said output means and for selectively preventing rotation of said carrier assembly respectively for establishing a reverse ratio in said transmission; variable ratio pulley and belt means disposed for power transfer between said input means and said output means; and second selectively engageable input clutch means for connecting said input means to said variable ratio

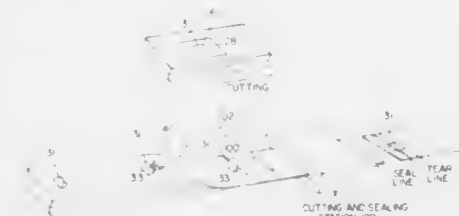
pulley and belt means for establishing a high forward variable ratio drive between said input means and said output means.

**4,946,430**  
**APPARATUS AND METHOD FOR FORMING AT LEAST ONE FOLD LINE IN A SUBSTANTIALLY RIGID PLASTIC MATERIAL**  
Karl-Heinz Kohmann, Mettmann, Fed. Rep. of Germany, assignor to Kohmann GmbH & Co. KG Maschinenbau, Fed. Rep. of Germany  
Filed Nov. 1, 1988, Ser. No. 265,754  
Claims priority, application Fed. Rep. of Germany, Nov. 7, 1987, 3737968  
Int. Cl.<sup>5</sup> B31B 1/25, 1/62, 1/82, 1/88  
U.S. Cl. 493—58  
45 Claims



24. A method of making folding box blanks comprising the steps of moving a length of substantially rigid plastic material into a heating at least one zone, heating portion of the length of the plastic material which is to be embossed, said heated portion being less than the whole width of the plastic material, moving the heated plastic material from the heating zone to an embossing means, embossing at least one fold line in the heated portion of the plastic material, intermittently punching cutout portions in the plastic material, cutting the embossed and punched plastic material at said cutout portions, fastening the cut plastic material to a cardboard box blank having a cutout and at least one fold line so as to cover said cutout and so that said at least one fold line in the plastic material is aligned with at least one fold line of the cardboard box blank.

**4,946,431**  
**APPARATUS FOR THE MANUFACTURE OF BLOCK-SEALED SIDE-GUSSETED BAGS**  
Harold A. Jensen, Brockton, Mass., assignor to Katana Corporation, Somerville, Mass.  
Division of Ser. No. 07/229,159, Aug. 4, 1988, Pat. No. 4,854,451, which is a division of Ser. No. 06/942,605, Dec. 17, 1986, Pat. No. 4,767,391, Continuation-in-part of Ser. No. 06/879,899, Jun. 30, 1986, abandoned. This application Jun. 12, 1989, Ser. No. 365,183  
Int. Cl.<sup>5</sup> B31B 23/14, 23/80, 27/86, 27/24  
U.S. Cl. 493—195  
5 Claims



1. A method for forming flexible bags which includes: introducing a continuously moving tubular film in a substantially flat configuration between two plates spaced apart from one another, one of said plates being a vacuum plate; inflating the film to billow the same by introducing an air stream into the film downstream of said plates such that one ply ply contacts the vacuum plate with the other ply

contacting said other plate, the vacuum plate having a die; and one ply drawn into engagement with the die, said one ply cut substantially simultaneously upon contacting the die thereby forming a non-continuous cut tabular section in the shape of the die; deflating said film whereby it resumes its substantially flat configuration; contacting the tabular section such that the tab is folded rearwardly with reference to the direction of travel of the film; sealing the film from one side to the other along a seal line, the tab being sealed to the film; and cutting the film from one side to the other, said cutting and sealing effected along the lines which are spaced apart from one another to form a bag.

**4,946,432**  
**DEVICE FOR SEALING AND PERFORATING A THERMOPLASTIC FILM**  
Etienne Susini, Villecresnes, France, and Pierre Soubrier, Brussels, Belgium, assignors to Baxter International Inc., Deerfield, Ill.  
Continuation of Ser. No. 155,923, Mar. 2, 1988, abandoned. This application Mar. 28, 1989, Ser. No. 330,993  
Claims priority, application France, May 21, 1986, 86 07210  
Int. Cl.<sup>5</sup> B65B 61/00  
U.S. Cl. 493—341  
11 Claims



1. A sealing and perforating device for a thermoplastic film folded back on itself, and driven step by step, comprising a support movable in a direction transverse to that of the film, and heating means carried by the movable support, the heating means including two sealing strips that conduct electricity, spaced apart from each other and each including a portion heated by the passage of an electric current, and the support further including perforating means located between the sealing strips, the sealing strips including a non-heating portion the length of which is at least equal to the heating portion, the non-heating portion being located downstream from the heating portion relative to the direction of movement of the film, the movable support urging the heating means and the perforating means into contact with the film.



4,946,433

## CENTRIFUGE DRIVE

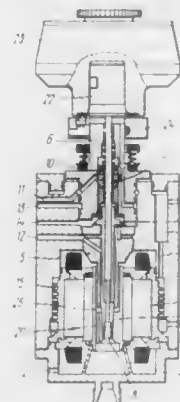
Boris P. Gorodissky, Leninsky prospekt, 154, kv. 201, and Alexander I. Sambursky, ulitsa I. Susanina, 6, korpus 4, kv. 10, both of Moscow, U.S.S.R.

Filed Jul. 17, 1989, Ser. No. 380,980

Claims priority, application U.S.S.R., Jul. 18, 1988, 4447751[1]

Int. Cl.<sup>5</sup> B04B 9/00, 9/04, 9/12, 9/14  
U.S. Cl. 494—15

4 Claims



1. A centrifuge drive, comprising:  
a casing having a plurality of passages for circulation of lubricant and coolant, and an internal surface;  
a stator fixed in said casing and having an external surface;  
a rotor rotatably fixed in said casing and having a shaft and a blind hole arranged coaxially with the rotation axis of said rotor;  
an angular bearing supporting said shaft of said rotor, having a supporting slide surface, a radial slide surface, and a plurality of passages, said angular bearing being fixed in said rotor and installed in said blind hole of said rotor so that said radial slide surface is located at least partly in said blind hole of said rotor;  
a damping device located in said casing whereby said angular bearing is fixed in said rotor; and  
a flexible shaft rigidly connected with said shaft of said rotor and fixed rotatably in said damping device;  
wherein said plurality of passages of said angular bearing providing circulation of lubricant over said supporting and radial surfaces of said bearing.

4,946,434

## DISPOSABLE MANIFOLD AND VALVE

Richard Plaisted, Framingham, and Richard M. Lueptow, Arlington, both of Mass., assignors to Haemonetics Corporation, Braintree, Mass.

Continuation-in-part of Ser. No. 90,325, Aug. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 888,764, Jul. 22, 1986, abandoned. This application Feb. 4, 1988, Ser. No. 152,078

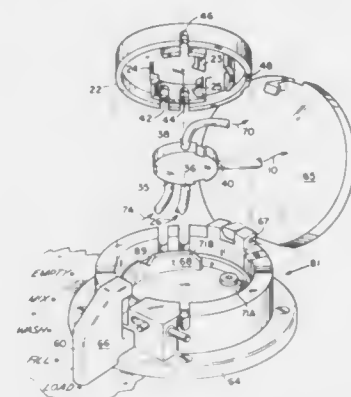
Int. Cl.<sup>5</sup> B04B 11/04; F16K 7/00

U.S. Cl. 494—29

20 Claims

1. A valve for controlling biological fluid flow comprising:  
(a) a manifold having a fluid junction and a plurality of fluid pathways in the manifold through which fluid can flow into and out of the junction; and  
(b) one flexible tube coupled to a respective one of the pathways;  
(c) a retainer having a bearing surface, the manifold being secured in a predetermined position in the retainer and the tubes also being secured in a predetermined position against said bearing surface on said retainer, and  
(d) a rotatable cam having a spindle loaded by a spring, said cam not in fluid communication with the pathways such that rotation of the cam relative to the manifold closes and

opens selected tubes contacting the cam and bearing surface to control the flow of fluid through the junction;  
(e) a support member; and



- (f) a cover on said support member which, when the manifold retainer and tubes are loaded into the support member and said cover is closed, forces the manifold and retainer against the cam, resulting in compression of the spring.

4,946,435

# FLEXIBLE SEALED RADIOACTIVE FILM FOR RADIOTHERAPY, AND METHOD OF MAKING SAME

Krishnan Suthanthiran, Lorton, Va., and Raj Lakshman, Bethesda, Md., assignors to Best Industries, Inc., Springfield, Va.

Filed Oct. 24, 1988, Ser. No. 261,327

Int. Cl.<sup>5</sup> A61N 5/00

U.S. Cl. 600—3

37 Claims



1. A flexible sealed radioactive film for medical treatments including implantation within a living body, comprising:  
a substantially flat, flexible carrier film;  
a radioactive material in or on said flexible carrier film; and  
a substantially flat, flexible envelope having the flexible carrier film sealed therein.

4,946,436

# PRESSURE-RELIEVING DEVICE AND PROCESS FOR IMPLANTING

Stewart G. Smith, Cloud Farm, Nine Gates Rd., Yorklyn, Del. 19736

Filed Nov. 17, 1989, Ser. No. 437,840

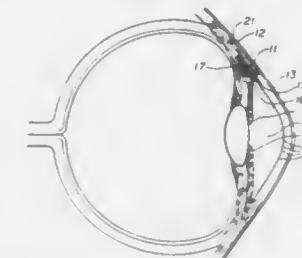
Int. Cl.<sup>5</sup> A61M 5/00, 27/00

U.S. Cl. 604—8

6 Claims

1. A device for relieving intraocular pressure comprises a body portion and wall portion in the form of a hexahedron; at least the body portion composed of a biocompatible porous material; said device adapted to be implanted within the scleral tissue of the eye with at least one edge of the device at an opening of, with no substantial extension into, the anterior chamber and adjacent to the area where the sclera makes the

transition into clear cornea of the eye; the pores of the body portion are of such size and quantity as to permit drainage of



fluid from the anterior chamber to the scleral tissue without collapse of the anterior chamber.

4,946,437

# METHOD FOR THE STIMULATION OF BONE MARROW CELLS

Benjamin Sredni, Beni Brak, and Michael Albeck, Ramat Gan, both of Israel, assignors to Bar-Ilan University, Ramat-Gan, Israel

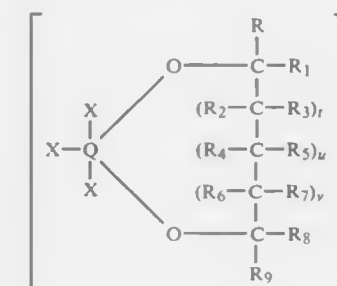
Filed Dec. 2, 1988, Ser. No. 278,957

Int. Cl.<sup>5</sup> A61M 31/00

U.S. Cl. 604—49

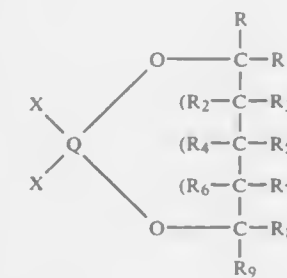
6 Claims

1. A method for the transplantation of bone marrow cells said method comprising:  
(a) obtaining bone marrow cells;  
(b) contacting said bone marrow cells with an amount of a compound which is:  
(A) a source of tetravalent tellurium ions which are capable of inducing the proliferation or differentiation of bone marrow cells;



(B)

or



(C)

or

- (D)  $\text{TeO}_2$  or
- (E)  $\text{PhTeCl}_3$  or
- (F)  $(\text{C}_6\text{H}_5)_4\text{P}^+ (\text{TeCl}_3(\text{O}_2\text{C}_2\text{H}_4))^-$  or
- (G) a tellurium tetrahalide, wherein Q is Te or Se; t is 1 or 0; u is 1 or 0; v is 1 or 0; R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub> and R<sub>9</sub> are the same or different and are independently selected from the group consisting of hydrogen, hydroxyalkyl of 1 to 5 carbons, hydroxy, alkyl of from 1 to 5 carbon atoms, halogen,

haloalkyl of 1 to 5 carbon atoms, carboxy, alkylcarbonylalkyl of 2 to 10 carbons, alkanoyloxy of 1 to 5 carbon atoms, carboxyalkyl of 1 to 5 carbon atoms, acyl, amido, cyano, amidoalkyl of 1 to 5 carbons, N-monoalkylamidoalkyl of 2 to 10 carbons, N,N-dialkylamidoalkyl of 4 to 10 carbons, cyanoalkyl of 1 to 5 carbons, alkoxy of 1 to 5 carbon atoms, alkoxyalkyl of 2 to 10 carbon atoms and —COR<sub>10</sub> wherein R<sub>10</sub> is alkyl of from 1 to 5 carbons; Y is a cation and X is halogen; or a tetravalent complex of Te or Se which is capable of inducing the proliferation or differentiation of bone marrow cells and is sufficient to reduce the quantity of bone marrow cells which are required to establish a viable bone marrow and form modified bone cells and thereafter carrying out the bone marrow transplant by transplanting said modified cells to a host.

4,946,438

# PROCESS FOR DEVELOPMENT OF ACCEPTANCE OF TRANSPLANTED ORGANS AND TISSUES

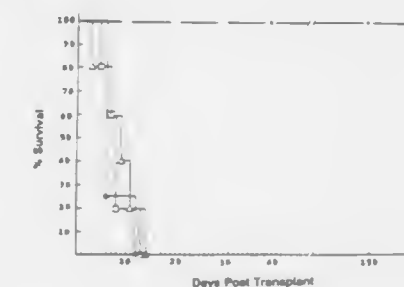
Keith Reemtsma, New York; Mark A. Hardy, Scarsdale, and Henry T. Lau, New York, all of N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation of Ser. No. 918,282, Oct. 8, 1986, Pat. No. 4,861,704, which is a continuation of Ser. No. 528,525, Sep. 1, 1983, abandoned. This application Jan. 12, 1989, Ser. No. 365,013

Int. Cl.<sup>5</sup> A01N 1/02; C12N 13/00

U.S. Cl. 604—53

6 Claims



1. A method for transplanting a foreign organ or tissue from a donor into a subject so as to enhance acceptance of the transplanted foreign organ or tissue by the subject which comprises:

- (a) irradiating donor-specific blood with ultraviolet-B radiation at a dosage of less than 1000 J/m<sup>2</sup> so as to render the blood capable of inducing donor-specific immunological unresponsiveness in the subject;
- (b) transfusing the irradiated, donor-specific blood into the subject prior to transplanting the foreign organ or tissue into the subject so as to enhance subsequent acceptance of the organ or tissue by the subject; and
- (c) thereafter transplanting the foreign organ or tissue into the subject.

4,946,439

# DUAL SOURCE PARENTERAL INFUSION SYSTEM WITH SECONDARY INFUSION MODULE

Philip N. Eggers, San Jose, Calif., assignor to Critikon, Inc., Tampa, Fla.

Filed Aug. 15, 1988, Ser. No. 232,058

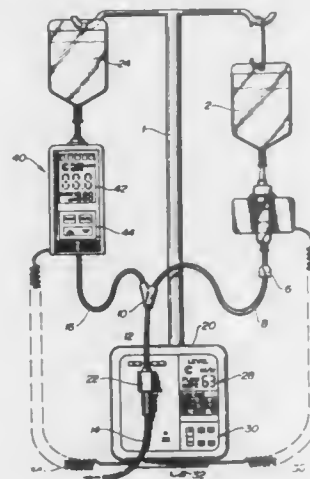
Int. Cl.<sup>5</sup> A61M 5/16

U.S. Cl. 604—67

15 Claims

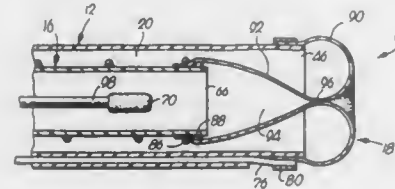
1. A dual source parenteral infusion system comprising:  
a source of primary parenteral solution;  
a source of secondary parenteral solution;

- a primary administration set connected to said primary solution source, including a Y-connector and a section of common tubing;
- a secondary administration set connected to said secondary solution source and to said Y-connector and including a secondary drip chamber;
- a primary controller, including flow control means connected to said common tubing, means for detecting the delivery of primary solution, a display for displaying fluid delivery parameters, and means for programming said controller with fluid delivery parameters;



- a secondary infusion module, separable from said primary controller and communicating with said primary controller, operating in conjunction with said secondary drip chamber, and adapted for connection with said secondary administration set, and including a display for displaying fluid delivery parameters of said secondary solution; and wherein said secondary infusion module further includes means for communicating information concerning the operation of said secondary chamber to said primary controller.

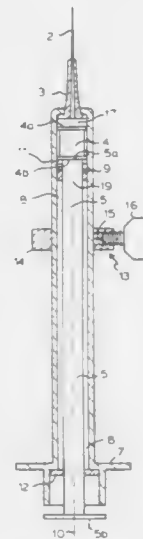
**4,946,440**  
**EVERTIBLE MEMBRANE CATHETER AND METHOD OF USE**  
 John E. Hall, 5751 Richards Cir., Shawnee, Kans. 66216  
 Filed Oct. 5, 1988, Ser. No. 253,696  
 Int. Cl.<sup>5</sup> A61M 37/00  
 U.S. Cl. 604—95 24 Claims



1. A catheter for introduction into a body cavity comprising:
  - a flexible outer tube having a distal end and a user end, said distal end being adapted for insertion into a body cavity;
  - a flexible inner tube having a distal end and a user end, said inner tube being within and substantially co-axial with said outer tube, said inner tube being slidable with respect to said outer tube and defining an annular space therebetween;
  - a cylindrical membrane coupled to both the distal end of the outer tube and the distal end of the inner tube, to define a

pristine chamber when the membrane is in a first, reflected position within said outer tube,  
 means associated with the user end of said outer tube for introducing a fluid under pressure into said annular space; and  
 means for selectively directing the distal end of said outer tube from a location proximate said user end, said directing means comprising a flexible guide wire coupled to the exterior of the distal end of said outer tube and located exterior to said annular space, said guide wire extending longitudinally at least a portion of the distance between said user end and said distal end,  
 said guide wire being selectively shiftable relative to said outer tube for transversely deflecting the distal end of said outer tube from its axial orientation from a location proximate said user end when located inside said body cavity.

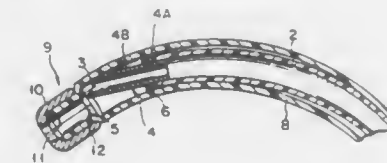
**4,946,441**  
**LIMITED USE HYPODERMIC SYRINGE**  
 Maurice Laderoute, 118 Samosette Ave., Hull, Mass. 02045  
 Filed Jul. 21, 1988, Ser. No. 222,553  
 Int. Cl.<sup>5</sup> A61M 5/00  
 U.S. Cl. 604—110 14 Claims



1. A hypodermic syringe comprising,
  - (a) a cylinder having an open end and a restricted end,
  - (b) a hollow needle at said cylinder restricted end for discharging liquid from said syringe,
  - (c) a piston having a front end and a back end, said piston being slidably positioned within said cylinder forming a liquid tight seal with the interior of said cylinder and defining a liquid dosage space between said piston front end and said needle,
  - (d) a piston stem slidable within said cylinder on the back end side of said piston, said piston stem having a front end and a back end, said piston stem back end extending beyond said cylinder open end and an annular space between said stem and said cylinder,
  - (e) said stem being movable towards said open end of said cylinder without moving said piston,
  - (f) said stem being movable toward said piston back end and upon said stem front end contacting said piston back end, moving said piston towards said needle forces dosage liquid from said dosage liquid space through said hollow needle, and
  - (g) means in said annular space attached to said stem for stopping withdrawal of said stem from said open of said cylinder,
  - (h) whereby said piston can be driven by said stem to forcibly discharge dosage liquid from said needle, but said

piston cannot be driven by said stem to draw dosage liquid through said needle into said dosage space.

**4,946,442**  
**ENDOSCOPE TREATMENT DEVICE**  
 Kenichiro Sanagi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan  
 Division of Ser. No. 875,714, Jun. 18, 1986, Pat. No. 4,857,057.  
 This application Apr. 26, 1989, Ser. No. 344,100  
 Claims priority, application Japan, Jun. 28, 1985, 60-142183; Aug. 9, 1985, 60-175508  
 Int. Cl.<sup>5</sup> A61M 5/18  
 U.S. Cl. 604—164 3 Claims



1. An endoscope treatment device to be slidably inserted in a channel of an endoscope comprising:
  - a flexible curved outer tube having a distal end portion, a center of curvature, an inner section having a radius of curvature measured from said center of curvature, an outer section having a radius of curvature measured from said center of curvature, said outer section radius of curvature being greater than said inner section radius of curvature, a distal end portion, an outside surface on said outer section, and an inner surface on said outer tube inner section and said outer tube outer section, said outer tube having an inner diameter defined by said inner surface;
  - an elongated curved member which is inserted in said outer tube to be movable forward/backward, said elongated curved member having a distal end portion, a center of curvature, an inner side having an inner radius of curvature extending from said elongated curved member center of curvature, and an outer side having an outer radius of curvature extending from said curved member center of curvature, said elongated curved member center of curvature and said flexible curved outer tube center of curvature being located proximate to each other so that said elongated curved member and said outer tube are congruent with each other adjacent to said distal end portions of each, said elongated curved member having an axis located between said elongated curved member inner section and said elongated curved member outer section;
  - a treatment section having a distal end and a proximal end and being mounted at said treatment section proximal end on the distal end portion of said elongated curved member, said treatment section having an outer wall located adjacent to the outer wall inner surface of said elongated curved member outer wall and an inner wall having a sharp point at said distal end thereof, said sharp point being located between said elongated curved member axis and said elongated curved member center of curvature and being located between said elongated curved member axis and the inner surface of said elongated curved member inner wall, and a shoulder portion formed on said treatment section proximal end;
  - a regulating member mounted on said outer tube outside surface near said outer tube distal end portion and surrounding said outer tube and having a distal end and a proximal end; and
  - an abutting portion formed on said outer tube inner surface adjacent to said regulating member proximal end, said abutting portion having an inner diameter which is smaller than said outer tube inner diameter and which is located to be engaged with said treatment section shoulder portion to regulate the amount of said treatment section which

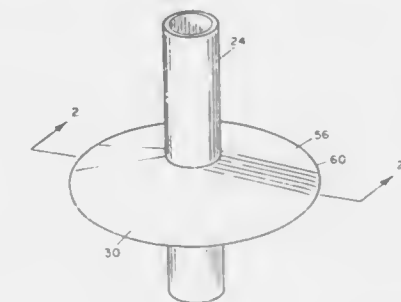
projects out of said outer tube through said outer tube distal end portion.

**4,946,443**  
**CATHETER INTRODUCER**  
 Jean-Luc Hauser, Antibes; Bernard Tomatis, Magagnosc, and Christian Sainte-Rose, Paris, all of France, assignors to Cordis Corporation, Miami, Fla.  
 Filed Oct. 26, 1988, Ser. No. 262,614  
 Claims priority, application France, Oct. 27, 1987, 87 14852  
 Int. Cl.<sup>5</sup> A61M 5/18  
 U.S. Cl. 604—165 27 Claims



1. A catheter introducer for positioning a catheter within the human body, the catheter introducer comprising:
  - a tubular cannula having a body member mounted at one end thereof, said body member having a recess formed therein, said recess extending from an end of said body member to said cannula, such that said end of said cannula opens into said recess;
  - a stylet reversibly positioned in a sliding engagement within said cannula, said stylet having an extraction member mounted at one end thereof and a stylet tip at the other end thereof, said extraction member including a neck portion dimensioned to fit within said recess of said body member, said stylet being affixed to and extending from said neck portion; and
  - catheter retention means including a clip for releasably retaining a catheter in close proximity adjacent to said cannula during insertion into an area of the body.

**4,946,444**  
**PERCUTANEOUS DEVICES WITH FLANGES OF VARIABLE STIFFNESS**  
 Gunther Heimke, Clemson, and Andreas F. von Recum, Six Mile, both of S.C., assignors to Clemson University, Clemson, S.C.  
 Continuation of Ser. No. 276,156, Nov. 23, 1988. This application Feb. 7, 1989, Ser. No. 307,685  
 Int. Cl.<sup>5</sup> A61M 5/00  
 U.S. Cl. 604—175 9 Claims



1. A percutaneous device comprising:
  - (a) a main body portion, including means for receiving a percutaneous structure therein;
  - (b) a flange extending outwardly from said main body portion and having a free edge;
  - (c) means for varying the stiffness of different portions of said flange, said stiffness gradually decreasing as an imaginary point proceeds from portions of said flange nearest



said main body portion to portions of said flange nearest said free edge; and  
(d) wherein, said stiffness varying means includes a plurality of pores defined in said flange, the volume of space occupied by said pores gradually increasing as said imaginary point moves from nearest said main body portion to said free edge.

4,946,445

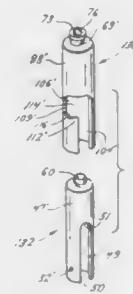
## INTRAVENOUS LINE COUPLING DEVICE

Lawrence A. Lynn, 862 Curleys Ct., Worthington, Ohio 43085  
Filed Sep. 6, 1988, Ser. No. 240,539

Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—192

33 Claims



21. A medical device for securing the connection of a liquid source with a junction section of a tubing system which can be connected with a patient's blood vessel, the junction section having a truck section which is substantially straight and an arm section extending at an angle from the trunk and in liquid flow connection therewith, the device comprising:

- a generally elongated tube having a bore for receiving the trunk of the junction tube, the tube having a generally longitudinal slot with an opening for slidably receiving the arm of the junction tube so that the elongated tube can be moved to fit about the trunk when the arm is aligned with the slot opening and the elongated tube is moved in a generally longitudinal direction relative to the junction tube and
- a second tube coupled to said elongated tube and having a distal end and having a bore sized to receive the first tube, the second tube having a second slot, the said second slot having a first section and a second section, the first slot section having an opening at the distal end of the second tube, the second slot section having an end and having an opening that connects with the first slot section so that the arm can pass from the first slot section into the second slot section, the first and second slots being positioned relative to the first and second tubes, respectively, so that the first and second tubes can be put in a first position to allow the junction arm to be within the first slot and within the first section of the second slot to allow the junction tube to be moved away from the first and second tubes to be disconnected therefrom, and so that the second tube and first tube can be rotated relative to one another to a second position so that the junction tube is blocked from disconnection from the second tube when the junction tube is moved relative to the second tube in any single direction of motion.

4,946,446

## RETRACTABLE NEEDLE

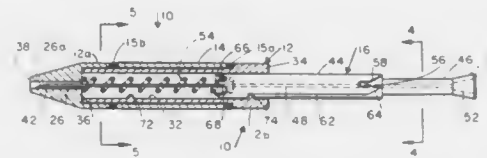
Dinesh L. Vadher, St. John's Medical Arts Bldg.-Rte. 25A, Smithtown, N.Y. 11787

Filed Jun. 14, 1989, Ser. No. 365,800

Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—198

9 Claims



1. Apparatus for the safe disposal of a needle which is part of said apparatus comprising:

- a. extended housing means having an opening at the distal end for accommodating said needle and an opening at its proximate end;
- b. plunger means mounted and being both slidable and rotatable within said housing means and extending out of the proximate end of said housing means;
- c. a passage extending through said plunger means;
- d. said needle having one end mounted within said passage-way and extending out of said plunger means in the direction of the distal end of said housing means;
- e. means within said housing means for biasing said plunger means toward the proximate end of said housing means;
- f. cam and slot means on said plunger means, and cam operating means mounted on the inside of said housing means for cooperating with said cam and slot means to establish a number of discrete positions of said plunger means, including a first axial position along the length of said housing means with said needle extending out of the distal end of said housing means with said needle retracted into said housing means;
- g. said discrete positions of said plunger means including a plurality of positions as said plunger means is rotated so that said plunger means may be positioned both axially and rotationally;
- h. said passageway including means adjacent the end of said plunger means extending from the proximate end of said housing means having means for engaging a syringe; and
- i. said cam and slot means including means upon said plunger means being pushed toward the distal end of said housing means for overcoming said biasing means for rotating said plunger means into the next successive radial position and placing said plunger means into its next successive axial position along the length of said housing means, said biasing means locking said plunger means in each next successive position, so that in successive pushes of said plunger means said needle alternates between extending out from said housing means and being retracted into said housing means.

4,946,447

## PROTECTIVE COVER FOR HYPODERMIC NEEDLE

Samuel L. Hardcastle, P.O. Box 325, Union, Mo. 63084, and Yit K. Lee, 8528 Douglas Ct., Brentwood, Mo. 63144

Filed Feb. 14, 1989, Ser. No. 310,780

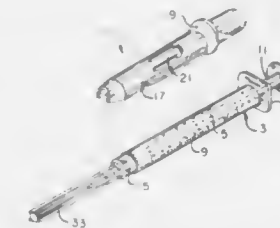
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—198

16 Claims

1. In the combination of a hypodermic syringe assembly having a cylindrical body for holding a medicament, a hollow needle at a forward end of said body for administering said medicament, and an axially slidable plunger to force said medicament out of said body through said needle, and a protective cover slidable on said body from a retracted position exposing said needle to an extended position extending axially beyond said needle, the improvement wherein said protective cover

comprises a resilient semicylindrical sleeve having a longitudinal slit extending its entire length, said sleeve being sized and



4,946,448

## CHECK VALVE FOR USE WITH INTRAVENOUS PUMP

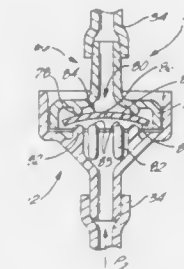
Douglas S. Richmond, Mission Viejo, Calif., assignor to Kendall McGaw Laboratories, Inc., Irvine, Calif.

Filed Oct. 23, 1989, Ser. No. 425,792

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—247

18 Claims



1. A check valve for incorporation into a liquid supply system for preventing flow from a location in the system downstream from the check valve to a location upstream from the check valve when the downstream pressure is greater than the upstream pressure by no more than a selected value, the check valve comprising:

- a housing configured to be disposed in the system between an upstream liquid source and a downstream portion of the system;
- a valve seat disposed in the housing;
- a valve member disposed in the housing having an upstream-facing surface and a downstream-facing surface; and
- means in the housing for supporting the valve member downstream from the valve seat when the upstream pressure is greater than the downstream pressure, the valve member being movable to the valve seat for preventing flow in an upstream direction through the check valve when the downstream pressure is greater than the upstream pressure by no more than a selected value, the valve member including means for relieving downstream pressure when the downstream pressure exceeds the upstream pressure by the selected value.

4,946,449

## INDWELLING URETHRAL CATHETER SYSTEM AND METHOD

Richard C. Davis, Jr., 3384 Tarpon Woods Blvd., Palm Harbor, Fla. 34685

Filed Dec. 18, 1986, Ser. No. 943,014

Int. Cl.<sup>5</sup> A61B 19/00

U.S. Cl. 604—256

15 Claims

1. An indwelling urethral catheter system for use with a human body comprising:  
a catheter drainage shaft defining an enclosed drainage canal

for extending through a urinary tract of the human body to provide urinary drainage therethrough and having distal and proximal ends;

an anchoring means attached to the catheter drainage shaft near said distal end thereof for holding said drainage shaft in a proper position in said urinary tract;

a valve means attached to said catheter drainage shaft and being positioned in said drainage canal near said proximal end of said shaft for being in a closed position to prevent flow of urine through said drainage canal but for being selectively moved from said closed position to an open position by applying force thereto from outside the human body for respectively allowing and disallowing fluid flow through said enclosed drainage canal;

said catheter drainage shaft being of a length, and said anchoring means being located at a position therealong, such that when said catheter drainage shaft is held in said proper position in said urinary tract, said valve means and the proximal end of said drainage shaft are located entirely within said urinary tract yet accessible from outside the human body; and,

a removable insertion conduit separate from said catheter drainage shaft, said removable insertion conduit defining a drainage passage and having a distal end and a proximal end, said removable insertion conduit including at the distal end thereof an elongated connector stint having a



cross-sectional size and a length for fitting into the drainage canal of the catheter drainage shaft from the proximal end thereof and extending from outside the human body into the human body to impinge on said valve means for holding said valve means open;

said valve means having the further function of remaining open in response to engagement with said stint to be held open thereby, but upon removal of said stint from engagement therewith, of being allowed to close to prevent further passage of liquid through said drainage canal;

whereby said catheter drainage shaft can be held in a urinary tract by said anchoring means with its proximal end being positioned in said urinary tract accessible to the meatus thereof to outside the human body and the removable insertion conduit can extend through the meatus of the urinary tract with elongated connector stint inserted into the proximal end of the drainage-shaft drainage canal for engaging said valve and thereby holding said valve open to allow continuous flow of urine past said valve and out through the insertion conduit drainage passage to outside the body and said removable insertion conduit can then be removed from the urinary tract, thereby removing said stint from the drainage canal of said catheter drainage shaft and from said urinary tract for disengaging said valve and allowing it to close but to be selectively opened by a force applied there from outside said body.

4,946,450

**GLUCAN/COLLAGEN THERAPEUTIC EYE SHIELDS**  
Robert L. Erwin, San Francisco, Calif., assignor to Blosource Genetics Corporation, Vacaville, Calif.

Filed Apr. 18, 1989, Ser. No. 341,012

Int. Cl.<sup>5</sup> A61M 35/00; A61F 2/00

U.S. Cl. 604—294

19 Claims

1. A therapeutic eye shield comprising a mixture of a therapeutically effective amount of glucan, and sufficient collagen to hold the glucan and form said therapeutic eye shield of sufficient dimensions to substantially cover a cornea when applied to an eye.

4,946,451

**LIQUID VALVE SYSTEM**

James P. Cianci, Cary, Ill., assignor to The Kendall Company, Boston, Mass.

Continuation of Ser. No. 682,993, Dec. 18, 1984, abandoned,

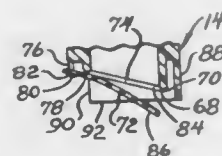
which is a division of Ser. No. 461,351, Jan. 27, 1983, Pat. No.

4,526,576

Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—323

6 Claims



1. A liquid drainage system, comprising:

- a receptacle having a front wall, a back wall, and a chamber for collection of liquid therein;
- a housing secured to an upper portion of the receptacle, said housing having a drip chamber, an annular wall in a lower portion of the drip chamber defining a valve seat, said seat being disposed at an acute angle relative to the horizontal when the receptacle is in an upright position;
- an anti-reflux valve comprising a sheet of flexible material having an upper portion and a lower portion and extending across said drip chamber such that the sheet is sufficiently large to engage against said seat peripherally around the drip chamber; and

means for retaining an upper portion of the valve against an upper portion of the seat, said valve being sufficiently flexible such that a lower portion of the valve flexes away from the seat when the receptacle is placed in an upright position due to gravity in the absence of liquid adjacent said valve and seat, and said lower portion of the valve flexes against the seat when the receptacle is disposed in a horizontal position.

4,946,452

**OCULAR TREATMENT APPARATUS**

Daniel Py, 54 Falmouth St., Short Hills, N.J. 07078

Continuation-in-part of Ser. No. 118,388, Nov. 6, 1987, Pat. No.

4,792,334. This application Nov. 4, 1988, Ser. No. 267,526

Int. Cl.<sup>5</sup> A61H 33/04

U.S. Cl. 604—301

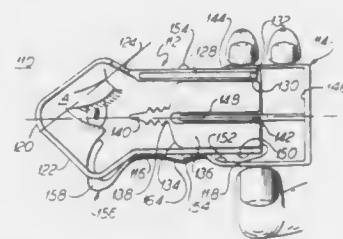
31 Claims

1. An ocular treatment apparatus for applying medicament into an eye, said apparatus comprising:

- an inner housing member including an eyepiece portion on a free end thereof, said eyepiece portion having a peripheral edge defining an opening, said peripheral edge being shaped for conformable engagement with the facial tissue surrounding an eye, said inner housing member further including a body portion connected to said eyepiece portion for receiving a vial of medicament for application to the eye;

an outer housing member defining an open free end, said open end being slideably engaged over the other end of

said inner housing member, said outer housing member further defining a medicament displacement member projecting outwardly from the end opposite said free end and into said body portion of said inner housing member, said displacement member being depressible against a flexible vial received within said body portion of said inner housing member by sliding said outer housing member toward



said eyepiece portion to displace medicament from the vial and, in turn, through said opening in said eyepiece portion and into the eye; and  
means for displacing the lower eyelid of an eye coupled to said outer housing member, so that medicament released from the vial may be applied to the ocular cul-de-sac of the eye.

4,946,453

**WEIGHT REDUCING ATHLETIC GARMENT**

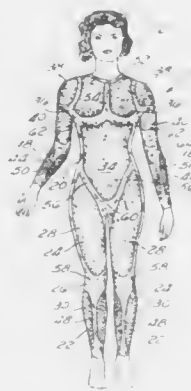
Demetrius A. Monson, 567 San Nicolas, Third Floor, Newport Beach, Calif. 92660

Filed Apr. 14, 1988, Ser. No. 181,683

Int. Cl.<sup>5</sup> A61F 7/00

U.S. Cl. 604—312

18 Claims



17. A form-fitting full pants suits, adapted to cover the lower torso of a wearer below the wearer's waistline, and substantially the entire legs of the wearer, said full pants suit further adapted to effect slimming to certain specified areas of the body covered, said full pants suit comprising:

- at least one first segment, adapted to cover first areas of the body where fatty tissue is concentrated, said first segment formed from an insulating material so as to prevent ventilation to said first areas and facilitate increased perspiration to effect slimming;
- at least one second segment of homogeneous material, adapted to exclusively cover second areas of the body by conforming to and directly engaging said second areas so as to minimize the insulation provided to said second areas, said second segment formed from porous elastic fabric so as to allow ventilation to said second areas, and to facilitate freedom of movement; said second segment constructed only in single layer applications; and

said first and second segments arranged discretely; whereby

said first and second segments are joined together to form said garment which is worn while exercising.

4,946,454

**PERINEAL SHIELD AND DISCHARGE CONTAINMENT FLAP**

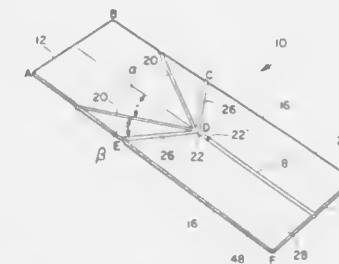
Sheila A. Schmidt, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 44,085, Apr. 29, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,369

Int. Cl.<sup>5</sup> A61F 13/56

U.S. Cl. 604—385.1

17 Claims



1. A perineal shield and discharge containment device comprising: a sheet of flexible material in generally elongate form defined by a top body side surface, a bottom surface, a front edge, a back edge, and two side edges, said sheet being inwardly folded along a central longitudinal fold line such that portions of said body side surface on opposite sides of said central longitudinal fold line are brought closer together, said sheet further being inwardly folded along a pair of first diverging fold lines originating on said central longitudinal fold line at a first common point and extending from said first common point towards the front edge to said side edges such that portions of said body side surface on opposite sides of said first diverging fold lines are brought into contact, said sheet further being outwardly folded along a pair of second diverging fold lines disposed between said first pair of fold lines and said side edges, said second fold line originating at a second common point and extending from said second common point towards the front edge to said side edges such that portions of said bottom surface are brought closer together, said folded sheet defining a partial funnel-shaped portion having an open neck defined by the outward fold along said second fold line, said neck being spaced from said front edge a distance of about 15 percent to 40 percent of the total length of said device, said folded sheet further defining a generally centrally located pocket whereby said partial funnel-shaped portion serves to direct any fluid discharged directed thereat into said pocket.

4,946,455

**MEDICAL TUBING CONNECTOR**

Robert J. Rosen, 291 Church Street, New York, N.Y. 10013

Filed Nov. 25, 1988, Ser. No. 276,151

Int. Cl.<sup>5</sup> A61M 5/14

U.S. Cl. 604—403

9 Claims

1. A universal medical connector assembly for sterile connection of medical tubing, comprising:

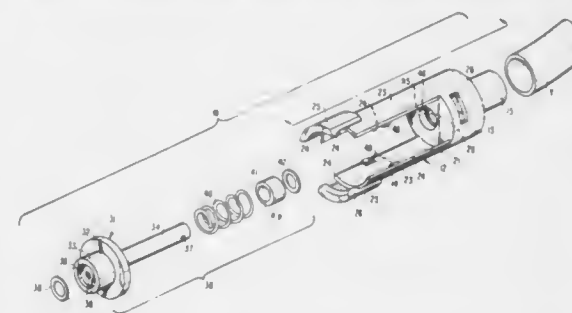
- a pair of interengageable connectors, each of said pair of connectors being of identical construction and including; an elongated housing having an open connecting end, a nozzle for connection to a tube, and a base portion defining a fluid passageway therethrough from said nozzle;

said housing further having an interlocking portion between said base portion and said open connecting end, said interlocking portion including at least two fingers equally perimetricaly spaced about said housing, each of said at least two fingers having an inner surface, said several fingers defining an equal number of complemen-

tary slots perimetricaly interspersed between said at least two fingers; a valve assembly disposed within said housing and including;

a piston movable relative to said housing and having opposite ends with a feed orifice at one end for communicating with said fluid passageway, a coupling face at the other end with a coupling port therein and a bore between said feed orifice and said coupling port for communicating fluid therebetween; valve means, associated with said base portion, for controlling fluid flow between said fluid passageway in said base portion and said feed orifice in said piston; and

biasing means for biasing said piston to a closed position in which said valve means is operable to restrict fluid flow between said fluid passageway and said feed orifice;



whereby, when said pair of connectors are moved towards one another, said at least two fingers of each one of said pair of connectors fit within the complementary slots of

the other of said pair of connectors in juxtaposed relation with and substantially contacting the fingers of the other of said pair of connectors so that the inner surfaces of each of said at least two fingers of each of said pair of connectors form a continuous inner surface defining an enclosure about said valve assemblies of each of said pair of connectors;

whereby, as said pair of connectors are moved towards one another, the coupling faces of the pistons corresponding to one each of said pair of connectors contact to establish a sealing engagement between said coupling faces and to establish a fluid connection between the respective coupling ports of said coupling faces, and further whereby as said pair of connectors are moved towards one another the coupling face of the piston of each of said pair of connectors remain in contact with one another as the piston of each of said pair of connectors moves relative to the respective housing of each of said connectors, from said closed position to an open position in which said fluid passageway and said feed orifice are in fluid communication for each of said pair of connectors.

4,946,456

**FLUID IMBIBING PUMP ACTIVATED BY CAPILLARY ACTION OF A FABRIC OR POLYMERIC SLEEVE**

Nathan Roth, San Francisco; Su I. Yum, and Felix Theeuwes, both of Los Altos, all of Calif., assignors to Alza Corp., Palo Alto, Calif.

Filed Aug. 26, 1988, Ser. No. 236,868

Int. Cl.<sup>5</sup> A61K 9/22

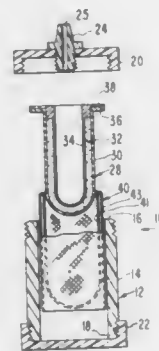
U.S. Cl. 604—892.1

30 Claims

1. A fluid imbibing pump assembly particularly adapted for operation with a containment vessel for the pump and a driving fluid for said pump, said pump comprising, in combination: a fluid imbibing pump having an outer, generally rigid cas-



ing, at least a portion of which is semipermeable to said driving fluid; and



a fluid absorbent material coupled with said fluid imbibing pump for wetting the semipermeable portion of said casing for all operative positions of said containment vessel.

4,946,458

## PEDICLE SCREW

Jürgen Harms, Am Rüppur Schloss 5, D-7500 Karlsruhe, and Lutz Biedermann, Am Schiffersteig 8, D-7730 VS-Villingen, both of Fed. Rep. of Germany

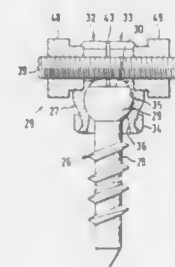
Continuation of Ser. No. 38,734, Apr. 15, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,144

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614101

Int. Cl.<sup>5</sup> A61F 2/00

U.S. Cl. 606—61

5 Claims



1. A pedicle screw for stabilizing spinal segments comprising a shaft embodying a thread shank, a partially spherical-shaped head at one end of the threaded shaft, a receiver part embodying two halves for receiving the head of the shaft and a ring disposed about said halves for holding the halves in embracing engagement with said head.

4,946,459

## INTRAMEDULLARY DEVICE

Anthony J. Bradshaw, Suwanee; Raymond T. Morrissey, Atlanta; Christopher J. Ketchum, Doraville, and John R. Hawkins, Warm Springs, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Dec. 4, 1989, Ser. No. 445,376

Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 606—62

23 Claims



1. An intramedullary fixation device for fixing a long bone separated into upper and lower sections, the bone having a proximal end and a distal end, said device comprising, in combination,

a nail member having proximal and distal ends and adapted to be inserted through a hole drilled in the proximal end of the bone and to extend toward the distal end of the lower section of the bone, means for attaching said distal end of the said nail member to the lower section of the bone adjacent the distal end thereof,

4,946,457

## DEFIBRILLATOR SYSTEM WITH CARDIAC LEADS AND METHOD FOR TRANSVENOUS IMPLANTATION

Clyde D. Elliott, Mountain Brook, Ala., assignor to Dimed, Incorporated, Birmingham, Ala.

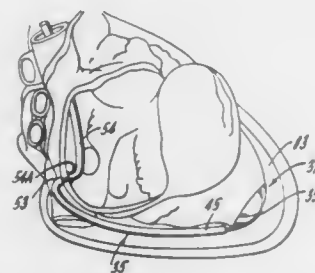
Filed Dec. 3, 1987, Ser. No. 128,226

The portion of the term of this patent subsequent to Dec. 5, 2009, has been disclaimed.

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—1

21 Claims



1. A method for the transvenous implantation of a device through a vein in a patient having a lumen into a pericardial space surrounding a cardium having an atrium and an atrial lateral wall comprising:

entering the vein with a catheter; translating the catheter through the vein lumen to the atrium; puncturing the atrial lateral wall with a puncturing means thereby forming a hole therein; exiting the atrium through the hole to the pericardial space with a guide wire; and inserting the device into the pericardial space through the catheter.

a receptacle affixed to the proximal end of said nail member, an adjustment shaft having one end thereof adapted to fit within and bear against said receptacle, a hollow cylinder member having proximal and distal ends and adapted to contain said adjustment shaft, said cylinder member being adapted to be inserted into the bone through the hole in the proximal end thereof, means for preventing rotational movement of said adjustment shaft relative to said receptacle and to said cylinder member while permitting longitudinal movement therebetween, an adjustment member for imparting longitudinal movement to said adjustment shaft relative to said cylinder member, and fixation means for rotationally and longitudinally fixing said cylinder member adjacent the proximal end of the bone.

4,946,460

## APPARATUS FOR CRYOSURGERY

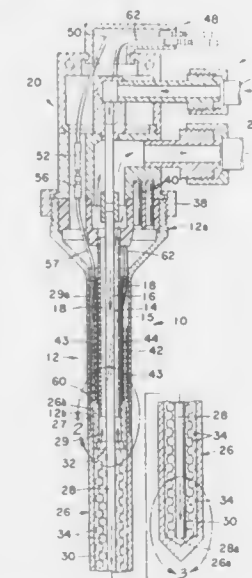
Nir Merry, Berkeley, and Michael Smidebush, Concord, both of Calif., assignors to Cryo Instruments, Inc., Berkeley, Calif.

Filed Apr. 26, 1989, Ser. No. 343,950

Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—24

8 Claims



1. An apparatus for cryosurgery comprising:  
a. a source of low temperature cooling fluid;  
b. at least one cryosurgical probe having:  
(1) a housing having first and second ends and fluid inlet and outlet passageways extending therethrough, said fluid inlet passageway being in communication with said source of low temperature cooling fluid;  
(2) a freezing tip closed at one end to define an expansion chamber and being removably connected at its opposite end to said housing, said freezing tip having:  
(a) a supply passageway having an open end disposed proximate said expansion chamber of said freezing tip and being in communication at its opposite end with said fluid inlet passageway of said housing; and  
(b) an exhaust passageway in communication with said expansion chamber and with said outlet passageway of said housing; and  
(3) heater means for controllably heating selected portions of said freezing tip and said housing; and  
(4) sensor means for sensing the temperature of selected portions of said freezing tip and said housing;  
c. control means for precisely controlling the heating and cooling of said cryosurgical probe in accordance with a desired temperature regimen, said control means including:  
(1) fluid flow control means operably associated with said

cryosurgical probe for controlling the flow of fluid from said source of low temperature cooling fluid to said cryosurgical probe; and

(2) heater control means operably associated with said sensor means and said heater means for controlling said heater means, said heater means operating in cooperation with said fluid flow control means to control the rate and degree of cooling of said cryosurgical probe.

4,946,461

## TOOL FOR REMOVING THE BALL OF THE FEMUR

William B. Fischer, 707 N. Fairbanks Ct., Chicago, Ill. 60611

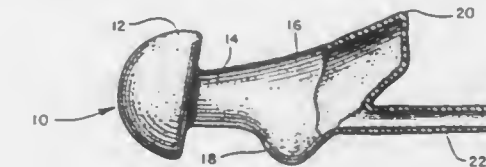
Continuation-in-part of Ser. No. 58,913, Jan. 5, 1987, abandoned, which is a division of Ser. No. 820,549, Jan. 17, 1986, Pat. No. 4,714,478. This application Sep. 29, 1988, Ser. No.

250,943

Int. Cl.<sup>5</sup> A61B 17/16

U.S. Cl. 606—84

16 Claims



1. A tool for removing the ball of the femur through an aperture passing through the lateral cortex and femoral neck comprising:

a. a rotatable shaft having a front end portion and a back end portion, wherein a forward direction is defined from said back end portion to said front end portion;  
b. a cutting blade hingedly mounted at one end to said front end portion of said shaft, said blade having a retracted position and an open position, the other end of said blade projecting in said forward direction when said blade is in said retracted position such that said other end of said blade is adapted to rotate in a backward direction;  
c. means for extending and retracting said blade; and  
d. drive means attached to said shaft for rotating said shaft and said blade about the longitudinal axis of said shaft, such that said ball of the femur is ground by said blade upon rotation of said shaft and said blade.

4,946,462

## ARTHROSCOPIC GUIDE AND METHOD

Robert S. Watanabe, 11645 Wilshire Blvd., Ste. 701, Los Angeles, Calif. 90025

Filed Dec. 12, 1988, Ser. No. 283,495

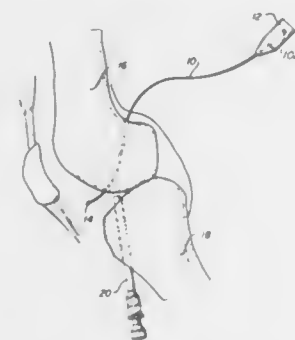
Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—148

9 Claims

1. A guide for use in arthroscopic knee surgery for the repair and reconstruction of the anterior cruciate ligament comprising: an elongated flexible wire, means attached to one end of

the wire for receiving the end of a tendon to be pulled through the patient's knee by the guide and a receiver for receiving the



other end of the wire to facilitate pulling the wire and tendon through the knee joint.

4,946,463

## VESSEL OCCLUDER

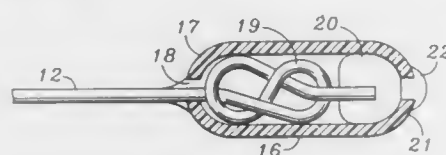
John T. M. Wright, Conifer, Colo., assignor to Pioneering Technologies, Inc., Wheat Ridge, Colo.

Filed Apr. 10, 1989, Ser. No. 340,145

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—158

3 Claims



1. An improved vessel occluder for preventing or minimizing the hemorrhage of vessels during surgery of the type wherein two occluders are connected together, the improvement wherein:

- both occluding members are thermoformed from extruded plastic tubing having a diameter of from about 1.0 to 6.0 mm, each end of the occluding members configured to define a rounded bullet shape;
- the occluding members are attached to each other by a monofilament having a knot formed in each of the respective occluding members and a biocompatible adhesive bonding the knots to the members, to secure such members, respectively, to the respective ends of the monofilament.

4,946,464

## METHOD OF MANUFACTURING MINIATURE BALLOON CATHETER AND PRODUCT THEREOF

Paul H. Pevsner, 2026 N. Taylor St., Arlington, Va. 22207

Continuation-in-part of Ser. No. 286,100, Jul. 22, 1981, abandoned. This application Dec. 30, 1983, Ser. No. 567,123

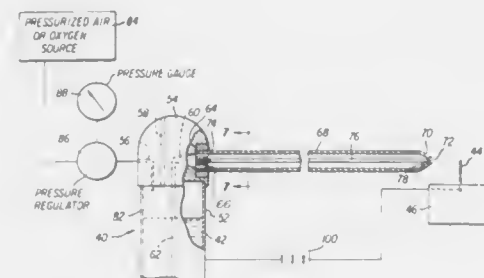
Int. Cl.<sup>5</sup> A61M 5/32; B29C 41/08

U.S. Cl. 606—192

22 Claims

10. A balloon catheter made by the process of: spraying aerosolized particles of a balloon-catheter-material solution comprising a balloon-making material dissolved in a solvent onto a mandril having the approximate shape

and size of said miniature balloon to form a coat of said balloon-making material on said mandril; allowing said coat to cure;



thereafter removing said coat forming said miniature balloon catheter.

4,946,465

Patent Not Issued For This Number

4,946,466

## TRANSLUMINAL ANGIOPLASTY APPARATUS

Leonard Pinchuk, and John B. Martin, both of Miami, Fla., assignors to Cordis Corporation, Miami, Fla.

Filed Mar. 3, 1989, Ser. No. 318,620

Int. Cl.<sup>5</sup> A61M 29/02

U.S. Cl. 606—194

30 Claims



17. A surgical apparatus for performing transluminal angioplasty, comprising:

- a stainless steel hollow guidewire having a proximal end and a distal end, said hollow guidewire having an outer diameter of less than about 0.04 inches;
- an expandable balloon member affixed to said hollow guidewire near said distal end; and
- a fill hole located in the side of said hollow guidewire and

within said expandable balloon member when said balloon member is affixed to said guidewire.

4,946,467

## SURGICAL SUTURE

Shigeo Ohi, Masakazu Suzuki, and Toru Yamamoto, all of Ayabe, Japan, assignors to Gunze Limited, Ayabe, Japan

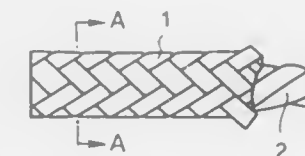
Filed Mar. 8, 1989, Ser. No. 320,529

Claims priority, application Japan, Mar. 14, 1988, 63-34397[U]

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—228

10 Claims



1. A surgical suture characterized in that the suture comprises a core of at least one synthetic fiber filament yarn, and a covering layer formed of a plurality of silk strands and sheathing the core, the core and the covering layer having substantially the same elongation at break.

4,946,468

## SUTURE ANCHOR AND SUTURE ANCHOR INSTALLATION TOOL

Lehmann K. Li, Wellesley, Mass., assignor to Mitek Surgical Products, Inc., Norwood, Mass.

Continuation of Ser. No. 362,004, Jun. 6, 1989, abandoned. This application Dec. 8, 1989, Ser. No. 449,118

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—232

55 Claims



1. A suture anchor for anchoring an intermediate portion of a piece of conventional suture in bone, said suture anchor comprising:

- a coupling member having a first end surface and a second end surface,
- at least one barb, said barb having a first end and a second end and being curved in its normal unstressed state and being capable of being elastically deformed to a substantially straight configuration, said barb being attached to said coupling member so that said second end of said barb is substantially displaced from said coupling member when said barb is in its normal unstressed state but is capable of being aligned with said coupling member when said barb is deformed to a substantially straight length, and
- attachment means for attaching an intermediate portion of a piece of conventional suture to said suture anchor, said attachment means comprising a bore formed in said

coupling member and a pin extending across said bore, whereby the suture can be passed around said pin so that an intermediate portion of the suture is supported by said pin and the two ends of the suture are free to attach a desired object or objects to bone.

4,946,469

## INTRAOCULAR LENS

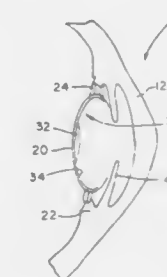
Farzesh Sarfarazi, 25 Wiswall Rd., Newton Center, Mass. 02159

Filed Apr. 20, 1989, Ser. No. 340,925

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623—6

10 Claims



1. An intraocular lens for implant into the posterior lens capsule of a human eye after the nucleus thereof has been removed comprising a central optical portion of biconvex configuration formed of PMMA and a relatively soft and relatively thin annular supporting portion formed of a different material surround said optical portion, said supporting portion being connected to said optical portion around its periphery and extending outwardly in a dish-shaped configuration compatible with, conforming to and shaped to lie against the posterior of the lens capsule of the human eye, the periphery of said supporting portion having a rounded shape for engagement with the inner surface of the outer periphery of the human eye lens capsule.

4,946,470

## HARD INTRAOCULAR LENS WITH THE SHAPE MEMORY

Jiri Sule, and Zuzana Krcová, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Mar. 31, 1989, Ser. No. 331,503

Claims priority, application Czechoslovakia, Apr. 1, 1988, 2261-88

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623—6

1 Claim

1. A hard intraocular lens having a shape memory
  - (1) that is made of a copolymer which has a glass transition temperature ( $T_g$ ) from about 40 to about 60 degrees C. and has an original shape suitable for functioning as an intraocular lens after implantation in a human eye;
  - (2) that is capable of being deformed, at a temperature above its  $T_g$ , into the shape of a rod which has diameter from about 1 to 4 mm and which is capable of being inserted into the human eye;
  - (3) that will soften and relax to its original shape upon being rinsed in the eye with a rinsing solution having a temperature from about 40 degrees to about 50 degrees C.; and
  - (4) that will harden and remain hardened at normal body temperature of about 37 degrees C.



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## CHEMICAL

4,946,471

**ADHESION PROMOTER FOR LEATHER FINISHING**  
Hans-Herbert Friese, Monheim; Gerhard Kaindl, Hilden, and Ludwig Schieferstein, Ratingen, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dueseldorf, Fed. Rep. of Germany

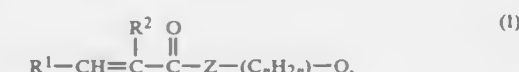
Filed May 10, 1989, Ser. No. 350,055  
Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816103

Int. Cl.<sup>5</sup> C14C 5/00

U.S. Cl. 8-94.23 20 Claims

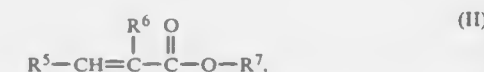
1. In a process for finishing leather, the improvement comprising applying to the surface of the leather, after tanning and oiling but before applying the bulk of the materials to be used in finishing, a composition obtainable by copolymerization of only:

(A) monomers containing amino groups and corresponding to general formula (I)



in which each of R<sup>1</sup> and R<sup>2</sup> independently represents a hydrogen or a methyl group; Z represents either an oxygen or a —NH— group; n is an integer from 2 to 5; (C<sub>n</sub>H<sub>2n</sub>) represents a bivalent saturated hydrocarbon moiety that may be straight chain or branched and that contains n carbon atoms; and Q is selected from the group consisting of piperazino, piperidino, and morpholino groups and groups having the formula R<sup>3</sup>—N—R<sup>4</sup>, with each of R<sup>3</sup> and R<sup>4</sup> independently representing a hydrogen or a C<sub>1-4</sub> alkyl group; and

(B) monomeric esters corresponding to general formula (II)



in which each of R<sup>5</sup> and R<sup>6</sup> independently represents a hydrogen or a methyl group and R<sup>7</sup> represents a C<sub>1-6</sub> alkyl group.

4,946,472

**HAIR-DYEING COMPOSITION AND HAIR-DYEING METHOD USING THE SAME**

Masahiro Motono, Kurume, Japan, assignor to Sansho Seiyaku Co., Ltd., Onojo and Teruaki Hayashi, Kawanishi, both of Japan

Filed Mar. 6, 1989, Ser. No. 319,584  
Claims priority, application Japan, Mar. 18, 1988, 63-66854  
Int. Cl.<sup>5</sup> A61K 7/13; C09B 67/00

U.S. Cl. 8-424 10 Claims

1. A hair-dyeing composition comprising geraniintannin and a water-soluble iron salt.

4,946,473

FUEL COMPOSITION

Thomas H. Johnson, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 325,801, Mar. 20, 1989. This application Jan. 19, 1990, Ser. No. 468,477

Int. Cl.<sup>5</sup> C10L 1/22

U.S. Cl. 44-71 24 Claims

1. A concentrate suitable for use in liquid fuels in the gasoline boiling range comprising  
(a) from about 25 to about 500 ppm by weight of at least one poly(olefin)-N-substituted-carbamate of the formula I



in which R is a poly(olefin) polymer chain having an average

molecular weight of from about 500 to about 9,900; R<sup>1</sup> is a hydrocarbyl or substituted hydrocarbyl group containing up to 20 carbon atoms; and A is derived from an N-substituted amino group in which the substituent is a hydrocarbyl or substituted hydrocarbyl group containing up to 20 carbon atoms;

(b) from about 10 to about 1000 ppm by weight of a polymeric component which is (i) a polymer of a C<sub>2</sub> to C<sub>6</sub> monoolefin, (ii) a copolymer of a C<sub>2</sub> to C<sub>6</sub> monoolefin, (iii) the corresponding hydrogenated polymer or copolymer, (iiii) a poly(oxy-C<sub>2</sub> to C<sub>6</sub>-alkylene) alcohol, glycol or polyol, (v) a poly(olefin)amine of a C<sub>2</sub> to C<sub>6</sub> monoolefin, or mixture thereof;

(c) from about 0 to about 20 ppm by weight of a dehaizer; and  
(d) balance a diluent, boiling in the range from about 50° C. to about 232° C.

4,946,474

**PROCESS FOR BENEFICIATION OF COAL BY SELECTIVE CAKING**

Antonio Vettor, San Donato Milanese; Nello Passarini, Colturano, and Armando Marcotullio, San Donato Milanese, all of Italy, assignors to Eniricerche, S.p.A., Milan, Italy

Filed Nov. 28, 1988, Ser. No. 276,678

Claims priority, application Italy, Dec. 16, 1987, 23036 A/87  
Int. Cl.<sup>5</sup> C10L 5/00

U.S. Cl. 44-627 20 Claims

1. A process for beneficiation of coal with a caking composition, said caking composition comprising of at least one solvent selected from light hydrocarbons having a boiling point not higher than 70° C.; and at least one non-ionic additive selected from propoxylated phenolic and propoxylated alkylphenolic compounds which are oil soluble.

2. The process of claim 1 wherein the caking composition furthermore comprises at least one co-caking agent selected from among the group consisting of a coal-derived oil having a boiling point between 200° C. and 400° C., and a residual product of petroleum refining, and mixtures thereof.

4,946,475

**APPARATUS FOR USE WITH PRESSURIZED REACTORS**

Charles W. Lipp; Douglas D. Merrick, and Richard A. Lee, all of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 39,493, Apr. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 723,771, Apr. 16, 1985, abandoned. This application Nov. 30, 1988, Ser. No. 279,285

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C10J 3/48

U.S. Cl. 48-86 R 3 Claims

1. A process burner which consists essentially of:  
(a) concentric and radially spaced central and middle conduits, wherein

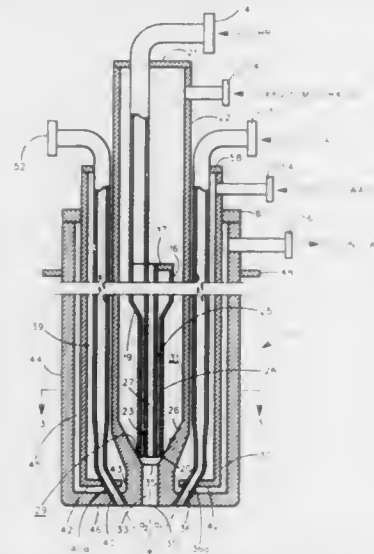
(i) the central conduit defines a cylindrical passageway having an open discharge end and having a fluid feed inlet upstream of its discharge end, and

(ii) the middle conduit and central conduit define an annular passageway concentric with the central passageway, the annular passageway has an open discharge end, a fluid feed inlet upstream of its discharge end and has its discharge end lying substantially in the same plane as the discharge end of the central passageway;

(b) a frusto-conical conduit which defines a frusto-conical passageway which is coaxial with and displaced radially outward from the annular passageway, the frusto-conical passageway converges towards a point downstream of the discharge ends of the central and annular passageways; and

(c) an acceleration conduit defining a coaxial acceleration passageway which is coaxial and in fluid communication

with, located downstream from the central, middle and frusto-conical passageways, and connected at its upper end to the apex of the frusto-conical conduit, the acceleration



passageway has a cross-sectional area for flow less than the combined cross-sectional areas for flow of the central, middle and frusto-conical conduits at their discharge ends.

4,946,476

**PARTIAL OXIDATION OF BITUMINOUS COAL**  
Mitri S. Najjar, Wappingers Falls, and Walter C. Gates, Jr., Carmel, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Aug. 24, 1989, Ser. No. 397,945  
Int. Cl.<sup>5</sup> C10J 3/46

U.S. Cl. 48—197 R

13 Claims

1. A partial oxidation process for producing synthesis gas, reducing gas or fuel gas from bituminous coal comprising the steps of:

- (1) reacting said bituminous coal by partial oxidation with a free-oxygen containing gas and a temperature moderator in a free-flow vertical refractory-lined gas generator at an autogenous temperature in the range of about 2000° F. to 2700° F., a pressure in the range of about 17 to 100 atmospheres, an O/C atomic ratio in the range of about 0.7 to 1.6, and a weight ratio of H<sub>2</sub>O to bituminous coal in the range of about 0.10 to 5.0, to produce a raw gas stream comprising synthesis gas, reducing gas, or fuel gas with entrained molten slag and carbon-rich particulate material;
- (2) cooling said raw gas stream from (1) and separating therefrom coarse slag and carbon-rich particulate material;
- (3) reacting a fuel comprising from about 20 to 100 wt. % of said carbon-rich particulate material and any remainder comprising a supplemental fuel selected from the group consisting of liquid hydrocarbonaceous fuel, coal, petroleum coke, and mixtures thereof by partial oxidation with a free-oxygen containing gas and a temperature moderator in a free-flow vertical refractory-lined gas generator at an autogenous temperature in the range of about 2000° F. to 2700° F., a pressure in the range of about 1 to 16 atmospheres and at least 16 atmospheres below the pressure in the gas generator in (1), an O/C atomic ratio in the range of about 0.6 to 1.3, and a weight ratio of H<sub>2</sub>O to fuel mixture in the range of about 0.1 to 5.0, to produce a raw product gas stream comprising synthesis gas, reducing gas, or fuel gas with entrained molten slag and containing less carbon-rich particulate material than that produced when said fuel mixture is reacted by partial oxidation at substantially the same operating conditions as those in the

gas generator in (3) except for a higher pressure which is in the range of about 17 to 100 atmospheres; and  
(4) cooling said raw gas stream from (3).

4,946,477

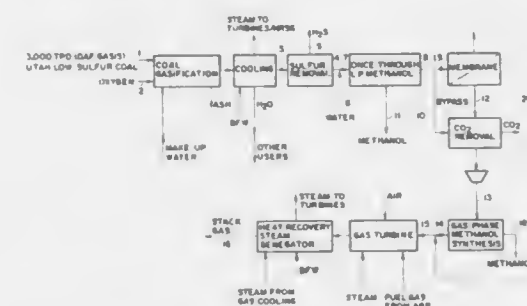
**IGCC PROCESS WITH COMBINED METHANOL SYNTHESIS/WATER GAS SHIFT FOR METHANOL AND ELECTRICAL POWER PRODUCTION**

Alan T. Perka, Macungie; Thomas H. Hsiung, Emmaus; Joseph Klosek, Wescosville, and Robert B. Moore, Allentown, all of Pa., assignors to Air Products & Chemicals, Inc., Allentown, Pa.

Filed Apr. 7, 1988, Ser. No. 178,955  
Int. Cl.<sup>5</sup> C07C 31/04

U.S. Cl. 48—197 R

3 Claims



1. In an integrated gasification combined cycle (IGCC) electric power plant process wherein the IGCC process converts hydrocarbon fuels in a gasifier producing a carbon monoxide-rich synthesis gas, which in turn is combusted in a gas turbine to produce power; wherein the IGCC process also includes a provision for production of methanol from the carbon monoxide-rich synthesis gas prior to combustion; and wherein methanol is produced by reacting at least a portion of the carbon monoxide-rich synthesis gas in the presence of a methanol synthesis catalyst; the improvement for increasing methanol productivity which comprises combining water/gas shift and methanol synthesis reactions in a single step by reacting the portion of the carbon monoxide-rich synthesis gas with water in the presence of a catalyst in a liquid-phase reactor thereby producing both a crude methanol product and a reduced carbon monoxide content and increased hydrogen and carbon dioxide content synthesis gas for combustion; and processing a first portion of the reduced carbon monoxide content and increased hydrogen and carbon dioxide content synthesis gas to separate the reduced carbon monoxide content and increased hydrogen and carbon dioxide content synthesis gas into a hydrogen-rich component and a carbon monoxide-rich component, both components comprising hydrogen, carbon dioxide and carbon monoxide, combining the hydrogen-rich component and a second portion of the reduced carbon monoxide content and increased hydrogen and carbon dioxide content synthesis gas to form a gas-phase methanol reactor feed stream, reacting the gas-phase methanol reactor feed stream in a gas-phase reactor to produce methanol, and combining the unconverted effluent from the gas-phase methanol reactor with the carbon monoxide-rich component to form a gas turbine combustion feed.

4,946,478

**PARTICULATE COLLECTION AND DEWATERING MEANS FOR AIRBORNE PARTICULATE MATTER**

Charles Davis, Brick Town, and Robert A. Kennedy, Mendham, both of N.J., assignors to Axon Industrial, Inc., Avenel, N.J.

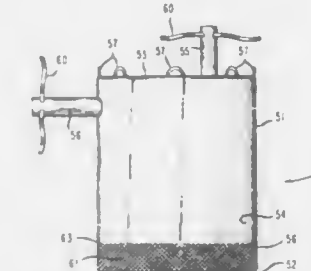
Filed May 15, 1989, Ser. No. 351,836  
Int. Cl.<sup>5</sup> B01D 46/00

U.S. Cl. 55—97

14 Claims

1. A separation chamber for use in a negative pressure sys-

tem for the collection of fluid and particulate matter from an airstream and the subsequent separation of said particulate matter from said fluid, said separation chamber having: A first chamber defined by an impervious outer wall and an impervious bottom wall secured to said outer wall and an impervious top wall removably secured to said outer wall; a second chamber defined by a perforated inner wall concentric with said outer wall defining an annular space therebetween, said second chamber having a perforated bottom wall secured to said inner wall, said perforated bottom wall in parallel alignment with said impervious bottom wall to define a space therebetween, said second chamber having an open top, said second chamber secured within said first chamber; an admitting means and a first discharge means comprising a means for introduction of said airstream and said particulate matter and said fluid into said first chamber and said second chamber and means for evacuating said gaseous airstream from said first chamber and said second chamber, said admitting means comprising a port means external to said first chamber and said second chamber for introducing said gaseous airstream and particulate matter



and said fluid into said second chamber, said first discharge means comprising a port means external to said first chamber and said second chamber for discharging said gaseous airstream from said second chamber; a communication means comprising a conduit communicating with said annular space between said first chamber and said second chamber and said first discharge means, said particulate matter and said fluid accumulated within; a collection means disposed within said second chamber, said collection means comprising:

- a resilient disposal bag having an inlet means in alignment with said admitting means in said separation chamber and an outlet means, in alignment with said first discharge means to said separation chamber, said collection means disposed in said second chamber and substantially conforming to the size and shape of said second chamber, said collection means having a fluid porous bottom wall;
- a second discharge means comprising a drain port secured to said impervious bottom wall of said first chamber, said second discharge means communicating with said annular space between said first chamber and said second chamber, said second discharge means being selectively open or closed for the discharge of fluid.

4,946,479

**APPARATUS FOR SOLVENT RECOVERY**  
Masanori Izumo, Neyagawa, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Oct. 28, 1988, Ser. No. 263,802  
Claims priority, application Japan, Oct. 28, 1987, 62-165927[U]; Oct. 28, 1987, 62-165930[U]; Oct. 28, 1987, 62-165931[U]

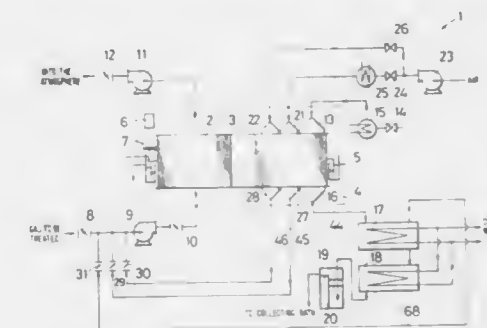
Int. Cl.<sup>5</sup> B01D 53/06

U.S. Cl. 55—181

4 Claims

1. A solvent recovery apparatus, comprising:  
a housing, said housing having upper and lower chambers, a gas inlet communicating with said lower chamber and a gas outlet communicating with said upper chamber;

a rotor mounted within said housing for rotation about an axis;  
means for rotating said rotor;  
adsorbent means mounted within said rotor;  
seal means disposed between the outer periphery of said rotor and said housing, said rotor and said seal means separating said upper and said lower chambers;  
adsorbent recovery means including an airtight case covering an arcuate section of said rotor and having three airtight arcuate sections, means for introducing a first recovery gas into a first of said three sections, means for introducing a second recovery gas into a second of said three



sections, and means for introducing a third recovery gas into a third of said three sections, said first, second and third sections being arranged sequentially in the direction of rotation of said rotor;

first, second and third means for receiving gaseous output from said first, second and third sections, respectively, said second and said third output receiving means each comprising conduit means in communication with said gas inlet of said housing, and said first output receiving means comprising condenser means and conduit means in gas communication with said condenser means and said gas inlet of said housing for feeding gaseous output from said condenser means to said gas inlet of said housing.

4,946,480

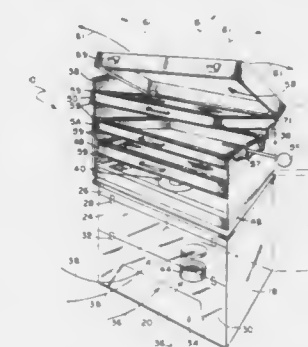
**FILTER APPARATUS WITH IMPROVED FILTRATION AND SATURATION LEVEL DETECTOR**

Francois P. Hanville, 3 Royal Crest Dr., #12, North Andover, Mass. 01845

Filed Sep. 27, 1989, Ser. No. 413,280  
Int. Cl.<sup>5</sup> B01D 53/04, 53/30

U.S. Cl. 55—270

20 Claims



1. An apparatus for removing contaminants generated in a volume of air contained within a structure, said apparatus comprising:  
a housing;



an inlet aperture disposed in said housing for receiving the contaminated air generated in the structure;  
 an outlet aperture for passing of filtered air disposed in another portion of said housing removed from said inlet aperture;  
 a plurality of removable interchangeable filter means disposed in said housing in spaced relationship between the inlet and outlet apertures thereby forming a plurality of chambers each defined by adjacent filter means and the housing;  
 detector means engaged with at least the first chamber adjacent the inlet aperture for detecting the level of concentration of contaminants in the air passing through said chamber; and  
 means to direct the contaminated air from within said structure through the inlet aperture of said housing whereby the contaminated air passes through each filter means and intermediate chambers for removal of at least a portion of the contaminants, and then to direct the filtered air through said outlet aperture.

4,946,481

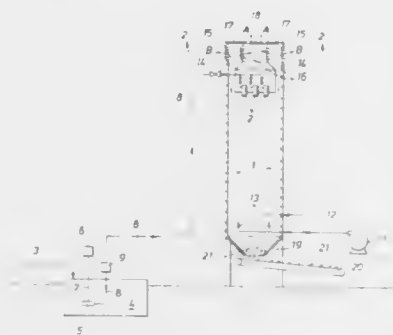
#### FILTER SCREEN APPARATUS FOR THE AIR OUTLET OF A PARTICLE PRODUCTION APPARATUS

Johannes Bakker, Calgary, Canada, assignor to Shell Oil Company, Houston, Tex.  
 Division of Ser. No. 799,681, Nov. 19, 1985, Pat. No. 4,705,467.  
 This application Feb. 24, 1987, Ser. No. 17,414  
 Claims priority, application Canada, Nov. 28, 1984, 468768  
 The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 46/04

U.S. Cl. 55—300

4 Claims



1. A filter screen apparatus for use in an air outlet of a particle production apparatus, said filter screen apparatus comprising:

- a plurality of closely spaced resiliently deformable filter elements comprising coil springs mountable across the air outlet effective to collectively releasably receive and hold fines carried in the air passing through the air outlet of the particle production apparatus; and
- vibrating means for resiliently deforming the filter elements effective to dislodge and release fines held on mounted filter elements.

4,946,482

#### DUST REMOVING APPARATUS FOR AIR CLEANER

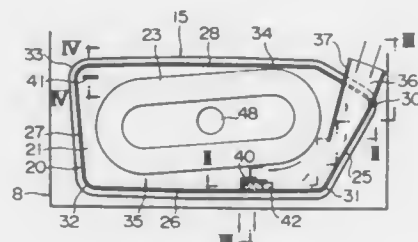
Shinichi Tamba, Kakogawa; Hltomi Miyake, Kobe, and Hiromu Tanaka, Akashi, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 105,046, Oct. 6, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,394

Claims priority, application Japan, Oct. 15, 1986, 62-245018  
 Int. Cl.<sup>5</sup> F01P 5/06; B01D 36/00

U.S. Cl. 55—320

11 Claims



1. An air cleaner for an engine comprising:

- a hollow casing having an air inlet, an air outlet, and an inner surface;
- an air filter which is housed inside said casing surrounding said air outlet and which has an outer surface which together with the inner surface of said casing forms an air passage which is connected to said air inlet and generally decreases in cross-sectional area downstream of said air inlet, the inner surface of said casing having a non-straight portion in its inner surface which changes the direction of flow of air that flows along said air passage; and
- a dust receiver which is formed in a surface of said casing in a location downstream of where the direction of flow of air has been changed by said non-straight portion of the inner surface of said casing, said dust receiver comprising a discharge port extending outside of said casing into an external passage through which there is a high-speed air flow and a dust-guiding surface which is formed as an end wall portion of said dust receiver and extends inwards from the inner surface of said casing adjacent said discharge port and guides particles in a direction transverse to the direction of air flow through the air passage into said discharge port.

4,946,483

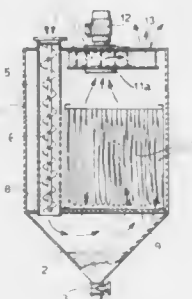
#### FILTER FOR THE SEPARATION OF OILY FUMES

Luciano Coral, Leini, Italy, assignor to Coral S.p.A., Turin, Italy  
 Filed Jun. 8, 1989, Ser. No. 362,910

Claims priority, application Italy, Jun. 10, 1988, 53221/88[U]  
 Int. Cl.<sup>5</sup> B01D 45/12, 46/02

U.S. Cl. 55—323

4 Claims



1. A filter e separation of oily fumes, characterised in that it comprises:  
 a closed casing (1) with a collecting hopper (2) at the bottom

and an upper air intake (4) which communicates with a centrifugal mechanical separator constituted by a substantially vertical duct (5) whose lower end opens into the collecting hopper and in which a fixed helical element (6) surrounded by wire mesh (7) is inserted,  
 additional filtering means (9, 10) interposed in the path for the air between the lower end of the duct (1) and a delivery opening (13) which is situated at the top of the casing and adjacent which induction means (11) are provided for drawing the air from the interior of the casing (1) and expelling it to the exterior through the delivery opening (13),  
 so that the air in which the oil particles are suspended is drawn from the environment through the air intake (4) as a result of the vacuum created by the induction means (11), and passes along the substantially vertical duct (1) in which the internal helical element (6) causes the mechanical separation of the oil particles by centrifugal action due to the rotation of the air imparted by the helix, the oil particles collecting on the wall of the duct (5) from which they drain into the collecting hopper (2), after which the air is further filtered by the additional filtering means (9, 10) before reaching the delivery opening (13).

4,946,484

#### SUPPORT FOR CLEAN ROOM CEILING GRID SYSTEM

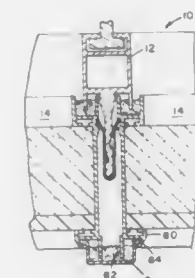
Donald R. Monson, West St. Paul; James A. LeBlanc, Eden Prairie, and Joseph C. Tokar, Apple Valley, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Filed Feb. 5, 1988, Ser. No. 152,943

Int. Cl.<sup>5</sup> B01D 50/00

U.S. Cl. 55—385.2

10 Claims



1. A system for providing an airtight/particle tight hermetically sealed clean room environment from which air is passed through a filter panel, said system having a plurality of filter panel supporting grid members defining filter panel receiving apertures, each of said grid members comprising:

- (a) a structural upper section including mounting means for installing said grid member in the clean room; and
- (b) an elongate vertically oriented filter panel mounting lower section connected to and extending from said structural upper section having detent means movable between a first compressed position permitting a filter panel having a frame supporting flange to be inserted into and removed from said filter panel supporting grid member and a second extended position at which said detent means operably supports the filter panel beneath said structural upper section and lateral to said elongate vertically oriented filter panel mounting lower section; the detent means comprising a spring clip having an anchoring section and a selectively compressible filter panel engaging section, said anchoring section having a generally U-shaped cross section and means for anchoring said spring clip onto said grid member filter panel mounting lower section, said selectively compressible filter panel engaging section having top and bottom ends, said bottom end being attached to said anchoring section, and said top end being resiliently bent away from said grid member filter panel mounting lower section so that the filter panel may be

selectively and readily inserted into, supported by, and removed from said filter panel supporting grid member from a location therebeneath.

4,946,485

#### AIR DRIER TOWER

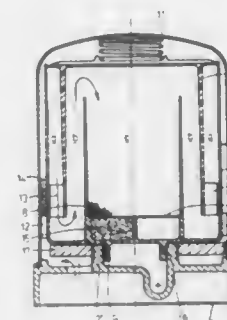
Anders M. Larsson, Helsingborg, Sweden, assignor to Garphyttan Haldex AB, Landskrona, Sweden

Filed Oct. 12, 1989, Ser. No. 420,540

Claims priority, application Sweden, Oct. 18, 1988, 8803715  
 Int. Cl.<sup>5</sup> B01D 53/02

U.S. Cl. 55—387

3 Claims



1. An air drier tower, comprising a base part (2), a reservoir (1) attached thereto, and in the reservoir a cartridge (7) containing desiccant (8), the cartridge (7) is composed of a lower half (9) and an upper half (10) having circular walls extending into each other to form a winding air path through the desiccant (8), the two halves being spring biased together and mounted in the reservoir (1).

4,946,486

#### SCRUBBER SYSTEM FOR THE REMOVAL OF CONTAMINANTS FROM A FLUID STREAM

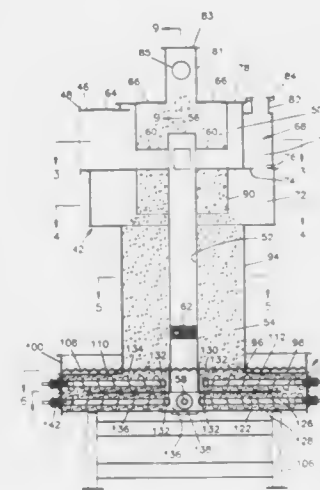
Thomas H. Parker, Marathon, N.Y., and Virgil J. Flanagan, Rolla, Mo., assignors to H. E. Technology, Ltd., Marathon, N.Y.

Filed Oct. 14, 1988, Ser. No. 257,661

Int. Cl.<sup>5</sup> B01D 45/00

U.S. Cl. 55—479

21 Claims



10. A system for scrubbing a fluid having a gaseous component and containing contaminants to remove the contaminants therefrom which system comprises means for providing a body

of scrubbing media having particles in contact in which flow of said media occurs between a fresh media inlet and a spent media outlet, means for passing said fluid through said media in counterflowing relationship therewith, said fluid passing means having an inlet through said media body closer to said media outlet than to said inlet whereby the cleanest gaseous component and the cleanest media in said body contact each other, said fluid containing said gaseous component and a liquid component, means in communication with said spent media outlet for containing a portion of said media body and collecting said liquid, and means for passing said liquid in counterflowing relationship with said media in said containing and collecting means.

4,946,487

## HIGH TEMPERATURE FILTER

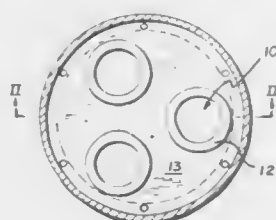
Anthony K. Butkus, Worcester, Mass., assignor to Norton Company, Worcester, Mass.

Filed Nov. 14, 1988, Ser. No. 271,459

Int. Cl.<sup>5</sup> B01D 46/00

U.S. Cl. 55—523

5 Claims



1. Filter for removing particles from hot gases comprising:
  - (a) a main body composed of a large number of grains in a tightly-packed mass, the grains being formed of a ceramic having a high melting temperature and of relatively uniform selected size, so that the grains engage one another at contact points to form uniform passages of a selected size, and
  - (b) a small amount of binder located at each contact point, the binder consisting of the same ceramic as the grains, the filter being free of organic binder,
 wherein some of the binder is formed in situ during sintering by reaction of a fine powder of a metallic element of the same ceramic and carbon of an organic binder.

4,946,488

## VEHICLE-MOUNTED BRUSH CUTTER

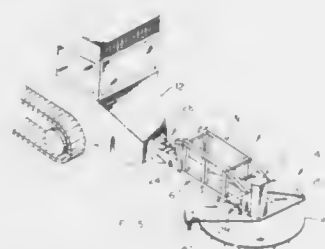
Timothy A. Davison, 12100 203 Ave., SE., Monroe, Wash. 98272

Filed Oct. 27, 1988, Ser. No. 263,258

Int. Cl.<sup>5</sup> A01D 34/03

U.S. Cl. 56—14.9

9 Claims



1. A vehicle-mounted brush cutting apparatus which comprises a vehicle having boom means extending outward therefrom for mounting a cutter head assembly on the outer end thereof; a cutter head assembly mounted to the end of said vehicle boom means, the cutter head assembly comprising a

generally circular rotary cutter blade, a blade-rotating motor and a drive shaft means, and a semi-circular cutter blade shroud mounting said motor and drive shaft means; said shroud comprising a top deck mounting said blade and motor and drive shaft means with said blade generally coplanar with and positioned a distance below said top deck, said top deck having a first peripheral edge lying in a plane generally parallel to the plane of the rotary cutter blade encompassing an obtuse arc, a second segmental edge lying radially outwardly from said first edge and non-radially across the plane of the underlying cutter blade, and a third segmental edge extending from said first edge and intersecting the second edge at an obtuse angle, said first peripheral edge being set outward from the outer edge of said blade to define an enclosure bounded by said first, second and third edges within which said blade rotates; cutter mounting means for connecting said cutter head assembly to said boom means, comprising mounting bracket means attached to said boom means and attached to said top deck at a location whereby said shroud is positioned to locate said top deck in rear and side quadrants, with respect to said motor and drive shaft means, so that said cutter blade is exposed for cutting in said front and opposite side quadrants with said second segmental edge being oriented across the front of said shroud in front of said motor and drive shaft means and with said third segmental edge being oriented along said opposite side of said shroud; power means for operating said motor and drive shaft means to cause said cutter blade to rotate toward said third segmental edge; and said shroud including an anvil cutting edge provided at the leading end of said top deck third segmental edge and positioned whereby an oversized object carried by said blade will strike said anvil cutting edge and be severed or dislodged from said blade before such object is carried into the shroud enclosure.

4,946,490

## METHOD FOR PREPARING FLUORIDE GLASSES

Bruce T. Hall, Groton; Leonard J. Andrews, Wayland, and Robert C. Folweiler, Bedford, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 177,204, Apr. 4, 1988, This application May 4, 1989, Ser. No. 347,304

Int. Cl.<sup>5</sup> C03B 5/225, 5/235; C03C 3/32

U.S. Cl. 65—32.5

14 Claims

1. A method for preparing an optically clear fluoride glass comprising the following steps:
  - Step 1—melting in an atmosphere of inert gas a water free mixture consisting essentially of an in situ oxidant consisting of a nonvolatile metal fluoride consisting of SnF<sub>4</sub> and high purity starting materials for a fluorozirconate optical glass, wherein the amount of said SnF<sub>4</sub> oxidant in the mixture is sufficient to substantially prevent the reduction in oxidation state of zirconium during the melting of the mixture and said SnF<sub>4</sub> oxidant does in fact prevent said reduction during said melting, wherein
  - Step 2—cooling the product of Step 1 to form an optically clear fluorozirconate fluoride glass.

4,946,491

## METHOD AND APPARATUS FOR GLASS TEMPERING

Jonathan Barr, Leigh Sinton, England, assignor to Glasstech, Inc., Perrysburg, Ohio

Filed Nov. 21, 1988, Ser. No. 274,459

Int. Cl.<sup>5</sup> C03B 27/04

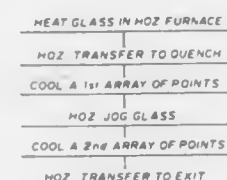
U.S. Cl. 65—114

13 Claims

1. A method of quenching a glass sheet comprising the following steps:
  - heating the glass sheet;
  - transferring the heated glass sheet on a horizontal roller conveyor to a first position in a quenching station having an upper and lower array of nozzles for directing coolant upon opposite sides of the glass sheet and cooling a first

array of points on the glass sheet while in the first position; and horizontally jogging the glass sheet on the conveyor within the quenching station a selected distance to a second position so that a series of points nearest a roller of the conveyor during the step of cooling the first array are no longer adjacent a roller of the conveyor and cooling a second array of points on the glass sheet while in the second position.

10. A glass sheet quenching apparatus comprising: a horizontal roller conveyor for transferring a sheet of heated glass along a generally horizontal axis;



an upper and lower array of matching nozzles for directing coolant upon the upper and lower surfaces of the glass sheet to cool a corresponding array of points thereon; drive means for rotating the rollers of the conveyor to advance the glass sheet; and control means for controlling the drive means and the nozzle array for transporting the glass sheet to a first position and causing the nozzle array to cool an array of first points while in the first position, and to horizontally jog the glass sheet to a second position and causing the nozzle array to cool an array of second points while in the second position which are oriented relative to the array of first points.

4,946,492

## 5-(PYRAZOL-1-YL)-BENZOIC ACID THIOL ESTERS, PLANT GROWTH REGULATING COMPOSITIONS AND USE

Georg Pissiotas, Lörrach, Fed. Rep. of Germany; Hans Moser, Magden, and Hans-Georg Brunner, Lausen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 5, 1989, Ser. No. 361,188

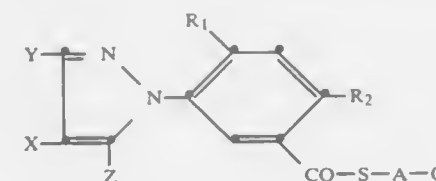
Claims priority, application Switzerland, Jun. 16, 1988, 2322/88; Oct. 6, 1988, 3719/88

Int. Cl.<sup>5</sup> A01N 43/56; C07D 231/12, 231/16, 231/56

U.S. Cl. 71—72

7 Claims

1. A 5-(pyrazol-1-yl)-benzoic acid-thiol ester of the formula I



wherein

X is hydrogen or halogen,  
Y is C<sub>1</sub>-C<sub>4</sub>alkyl  
X and Y together with the carbon atoms, to which they are bound, form also a 5- to 6-membered ring, which can be substituted by methyl  
Z is halogen, C<sub>1</sub>-C<sub>6</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>alkoxy or C<sub>1</sub>-C<sub>4</sub>alkylthio  
R<sub>1</sub> is hydrogen or halogen,  
R<sub>2</sub> is halogen,  
A is a straight chain or branched C<sub>1</sub>-C<sub>4</sub>alkylene bridge, which is unsubstituted or mono- or polysubstituted by C<sub>1</sub>-C<sub>4</sub>alkoxy, C<sub>1</sub>-C<sub>4</sub>alkylthio or cyano,  
Q is C<sub>1</sub>-C<sub>6</sub>alkylcarbonyl, a radical benzoyl or benzylcarbo-

nyl whose phenyl ring is unsubstituted, mono- or polysubstituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>haloalkyl, C<sub>1</sub>-C<sub>4</sub>alkoxy, C<sub>1</sub>-C<sub>4</sub>haloalkoxy, cyano or nitro, Q is further a radical COOR<sub>14</sub>.

R<sub>14</sub> is hydrogen, C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>2</sub>-C<sub>8</sub>alkoxyalkyl, C<sub>3</sub>-C<sub>7</sub>alkenyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>3</sub>-C<sub>5</sub>alkenylthio-C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>6</sub>alkylthio-C<sub>1</sub>-C<sub>4</sub>alkyl or C<sub>1</sub>-C<sub>4</sub>dialkylamino-C<sub>1</sub>-C<sub>4</sub>alkyl.

5. A herbicidal and plant-growth-regulating composition, which contains, beside inert carrier material and other additives as active component, a herbicidally and growth-regulating effective amount of a 5-(pyrazol-1-yl)-benzoic acid-thiolester according to claim 1.

4,946,493

## TRIAZOLE AND IMIDAZOLE COMPOUNDS

Balasubramanyam Sugavanam, Wokingham, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 482,885, Apr. 7, 1983, and Ser. No. 687,936, Dec. 31, 1984, abandoned, each is a continuation of Ser. No. 317,853, Nov. 3, 1981, Pat. No. 4,507,140. This application Jan. 27, 1987, Ser. No. 7,341

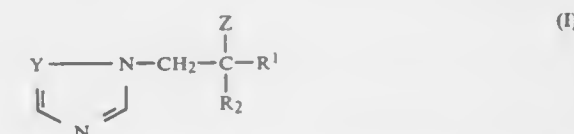
Claims priority, application United Kingdom, Nov. 19, 1980, 8037103; Jan. 12, 1981, 8100804; Jan. 29, 1981, 8102703; Mar. 23, 1981, 8109024; Jul. 3, 1981, 8120670

Int. Cl.<sup>5</sup> A01N 43/653; C07D 249/08

U.S. Cl. 71—92

3 Claims

1. A compound selected from compounds of the formula (I):



where R<sup>1</sup> is —CH<sub>2</sub>—CH<sub>2</sub>—X where X is alkyl of 1 to 6 carbons or cycloalkyl of up to 6 carbons; R<sup>2</sup> is alkyl of 1 to 6 carbons or cycloalkyl of up to 6 carbons; Z is OR<sup>3</sup> where R<sup>3</sup> is H, acetyl, alkyl of 1 to 6 carbons, alkenyl of up to 6 carbons or phenylalkyl wherein the alkyl has 1 to 6 carbons; Y is —N—; and acid addition salts and metal complexes thereof.

4,946,494

## HERBICIDAL PYRIDINE SULFONYLUREAS

Eric D. Taylor, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

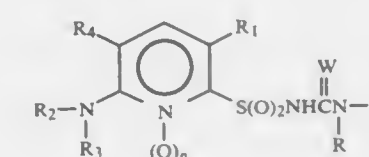
Continuation-in-part of Ser. No. 115,502, Oct. 30, 1987, abandoned. This application Sep. 15, 1988, Ser. No. 243,865

Int. Cl.<sup>5</sup> C07D 401/12; A01N 43/66, 43/68, 43/70

U.S. Cl. 71—93

15 Claims

1. A compound of the formula

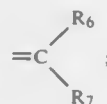


wherein

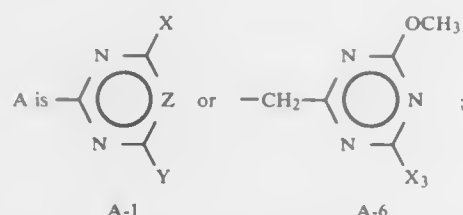
W is O or S;  
R is H or CH<sub>3</sub>;  
R<sub>1</sub> is H, F, Cl, Br, I, CN, C<sub>1</sub>-C<sub>2</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> haloalkyl, OCH<sub>3</sub>, OCH<sub>2</sub>CH<sub>3</sub>, OCH<sub>2</sub>CF<sub>3</sub>, OCF<sub>2</sub>H, SCH<sub>3</sub>, SCF<sub>2</sub>H, C<sub>1</sub>-C<sub>3</sub> alkylsulfonyl or SO<sub>2</sub>CF<sub>2</sub>H;  
R<sub>2</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> haloalkyl, CN, OH, C<sub>1</sub>-C<sub>2</sub> alkoxy, NH<sub>2</sub>, NHCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, C<sub>1</sub>-C<sub>2</sub> alkyl substituted by CN, C<sub>1</sub>-C<sub>2</sub> alkoxy or C<sub>1</sub>-C<sub>2</sub> alkylthio, C<sub>3</sub>-C<sub>4</sub> cycloalkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl or C(O)R<sub>5</sub>;



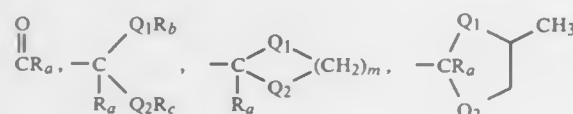
R<sub>3</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>2</sub> haloalkyl; or  
R<sub>2</sub> and R<sub>3</sub> may be taken together as —(CH<sub>2</sub>)<sub>n</sub>— or —CH<sub>2</sub>C—  
H<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>— or



R<sub>4</sub> is H, F, Cl or CH<sub>3</sub>;  
R<sub>5</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> alkoxy, NH<sub>2</sub>, NHCH<sub>3</sub> or  
N(CH<sub>3</sub>)<sub>2</sub>;  
R<sub>6</sub> is H, C<sub>1</sub>-C<sub>2</sub> alkyl or phenyl;  
R<sub>7</sub> is H or CH<sub>3</sub>;  
n is 2, 3, 4 or 5;  
p is 0 or 1;

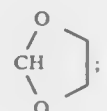


X is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>2</sub>-C<sub>4</sub> haloalkoxy,  
C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio,  
C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub>  
alkylamino or di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino;  
Y is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>2</sub>-C<sub>4</sub> haloalkoxy,  
C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl,  
C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub>  
alkyl)amino, C<sub>3</sub>-C<sub>4</sub> alkenyloxy, C<sub>3</sub>-C<sub>4</sub> alkynyloxy, C<sub>2</sub>-C<sub>5</sub>  
alkylthioalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfinylalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfo-  
nylalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>2</sub>-C<sub>4</sub> alkynyl, C<sub>3</sub>-C<sub>5</sub> cycloal-  
kyl, azido, cyano,



or N(OCH<sub>3</sub>)CH<sub>3</sub>;  
m is 2 or 3;  
Q<sub>1</sub> and Q<sub>2</sub> are independently O or S;  
R<sub>a</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;  
R<sub>b</sub> and R<sub>c</sub> are independently C<sub>1</sub>-C<sub>3</sub> alkyl;  
Z is N; and  
X<sub>3</sub> is CH<sub>3</sub> or OCH<sub>3</sub>;

and their agriculturally suitable salts; provided that  
(1) when W is S, then R is H, A is A-1, and Y is CH<sub>3</sub>, OCH<sub>3</sub>,  
OC<sub>2</sub>H<sub>5</sub>, CH<sub>2</sub>OCH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, CF<sub>3</sub>, SCH<sub>3</sub>, OCH<sub>2</sub>CH=CH<sub>2</sub>,  
OCH<sub>2</sub>=CH, OCH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>, CH(OCH<sub>3</sub>)<sub>2</sub> or



and  
(2) when the total number of carbon atoms of X and Y is  
greater than four, then the combined number of carbons of  
R<sub>2</sub> and R<sub>3</sub> is less than or equal to six.

#### 4,946,495 2-PHENOXYPYRIMIDINE DERIVATIVE AND HERBICIDAL COMPOSITION

Nobuhide Wada; Yoshihiro Saito, both of Shizuoka; Shoji  
Kusano, Hamamatsu; Yasufumi Toyokawa, Shizuoka; Take-  
shige Miyazawa, Shizuoka; Satoru Takahashi, Shizuoka, and  
Takayoshi Takehi, Shizuoka, all of Japan, assignors to Kumiai  
Chemical Industry Co., Ltd. and Ihara Chemical Industry Co.,  
Ltd., both of Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 181,319

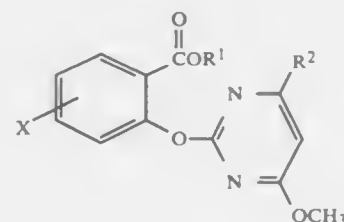
Claims priority, application Japan, Apr. 14, 1987, 62-091783;  
Apr. 14, 1987, 62-091786; Dec. 5, 1987, 62-308283; Dec. 28,  
1987, 62-336251

The portion of the term of this patent subsequent to Dec. 26,  
2006, has been disclaimed.

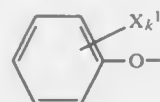
Int. Cl.<sup>5</sup> A01N 43/54; C07D 239/52

U.S. Cl. 71-92                      11 Claims

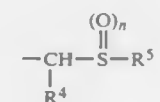
1. A 2-phenoxyypyrimidine derivative having the formula:



wherein X is a group of the formula:



wherein X<sup>1</sup> is a halogen atom, a lower alkyl group, a lower  
alkoxy group, a nitro group or a lower alkylthio group and k  
is 0, 1 or 2; R<sup>1</sup> is a hydrogen atom, a benzyl group or a group  
of the formula —(CH<sub>2</sub>)<sub>m</sub>R<sup>3</sup>, wherein R<sup>3</sup> is a cyano group, a  
formyl group, a lower dialkylamino group, a phenyl group, a  
pyridyl group, a trimethylsilyl group, a naphthyl group, a  
lower alkoxy carbonyl group, a benzoyl group, a lower alkyl-  
thio group, a phenylthio group, a lower alkylsulfonyl group or  
a benzyloxy group and m is 1, 2 or 3, or a group of the formula:



wherein R<sup>4</sup> is a hydrogen atom or a lower alkyl group, R<sup>5</sup> is a  
lower alkyl group or a group of the formula:



wherein X<sup>2</sup> is a hydrogen atom, a halogen atom, a lower alkyl  
group, a lower alkoxy group or a nitro group, and n is 0 or 1;  
provided that when R<sup>5</sup> is a lower alkyl group, n is 1; and R<sup>2</sup> is  
a chlorine atom or a methoxy group.

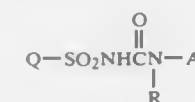
11. A herbicidal composition which comprises a herbicidally  
effective amount of a 2-phenoxyypyrimidine derivative of the  
formula I as defined in claim 1 and an agricultural adjuvant.

4,946,496

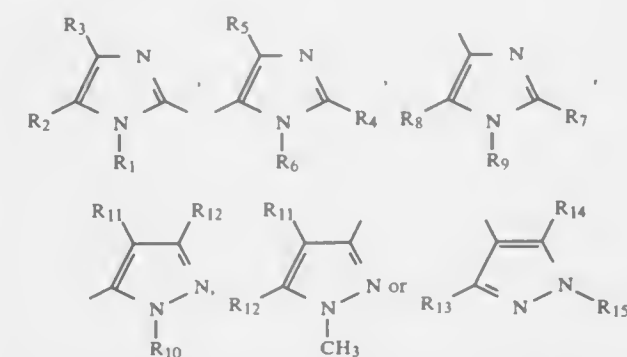
#### HERBICIDAL DIAZOLES

Anthony D. Wolf, Elkton, Md., assignor to E. I. du Pont de  
Nemours and Company, Wilmington, Del.  
Division of Ser. No. 486,092, Apr. 25, 1983, which is a  
continuation-in-part of Ser. No. 384,043, Jun. 1, 1982,  
abandoned. This application Oct. 28, 1986, Ser. No. 923,987  
Int. Cl.<sup>5</sup> A01N 43/70, 43/68, 43/66; C07D 403/12  
U.S. Cl. 71-93                      57 Claims

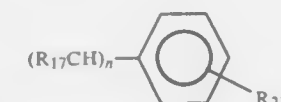
1. A compound of the formula:



where  
R is H or CH<sub>3</sub>;  
Q is



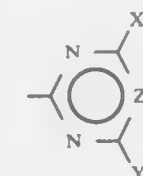
R<sub>1</sub> is H, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> alkenyl, C<sub>5</sub>-C<sub>6</sub> cycloalkyl, C<sub>5</sub>-C<sub>6</sub>  
cycloalkenyl, C<sub>3</sub>-C<sub>6</sub> alkynyl, C<sub>4</sub>-C<sub>7</sub> cycloalkylalkyl,  
(R<sub>17</sub>CH)<sub>n</sub>C(O)R<sub>16</sub>, (R<sub>17</sub>CH)<sub>n</sub>CO<sub>2</sub>R<sub>18</sub>, (R<sub>17</sub>CH)<sub>n</sub>COSR<sub>19</sub>,  
(R<sub>17</sub>CH)<sub>n</sub>CONR<sub>20</sub>R<sub>21</sub>, (R<sub>17</sub>CH)<sub>n</sub>SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>,  
(R<sub>17</sub>CH)<sub>n</sub>SO<sub>2</sub>R<sub>22</sub>,



or C<sub>1</sub>-C<sub>6</sub> alkyl substituted either with  
(a) 1-3 atoms of F, Br or Cl; or  
(b) OR<sub>16</sub>;

provided that,  
(1) the total number of carbon atoms in R<sub>1</sub> is less than or equal  
to 8; and  
(2) if R<sub>1</sub> is other than C<sub>1</sub>-C<sub>3</sub> alkyl, then R<sub>3</sub> must be H;  
R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently H or CH<sub>3</sub>;  
R<sub>5</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, —OR<sub>6</sub>, NO<sub>2</sub>, F, Cl, Br, CO<sub>2</sub>R<sub>24</sub>,  
S(O)<sub>m</sub>R<sub>25</sub> or SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>;  
R<sub>6</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, CO<sub>2</sub>R<sub>18</sub>,  
SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>, SO<sub>2</sub>R<sub>22</sub> or C<sub>1</sub>-C<sub>4</sub> alkyl substituted with (a)  
1-3 atoms of F, Cl or Br; or (b) OCH<sub>3</sub>; provided that,  
(1) when R<sub>5</sub> is other than H, CH<sub>3</sub>, OCH<sub>3</sub>, or NO<sub>2</sub>, then R<sub>6</sub> is  
H or CH<sub>3</sub>; and  
(2) when R<sub>6</sub> is CO<sub>2</sub>R<sub>18</sub>, SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub> or SO<sub>2</sub>R<sub>22</sub>, then R<sub>5</sub> is H,  
CH<sub>3</sub>, OCH<sub>3</sub> or NO<sub>2</sub>;  
R<sub>7</sub> is H or CH<sub>3</sub>;  
R<sub>8</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, —OR<sub>16</sub>, NO<sub>2</sub>, F, Cl, Br, CO<sub>2</sub>R<sub>24</sub>,  
S(O)<sub>m</sub>R<sub>25</sub> or SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>;  
R<sub>9</sub> is CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub>;  
R<sub>10</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, CO<sub>2</sub>R<sub>24</sub>,  
SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub> or SO<sub>2</sub>R<sub>22</sub>;  
R<sub>11</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, F, Cl, Br, NO<sub>2</sub>, —OR<sub>16</sub>, CO<sub>2</sub>R<sub>24</sub>,  
S(O)<sub>m</sub>R<sub>25</sub> or SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>; provided that, when

R<sub>10</sub> is other than C<sub>1</sub>-C<sub>3</sub> alkyl, then R<sub>11</sub> is H, Cl, OCH<sub>3</sub>, NO<sub>2</sub> or  
CH<sub>3</sub>;  
R<sub>12</sub> is H or CH<sub>3</sub>;  
R<sub>13</sub> and R<sub>14</sub> are independently H, C<sub>1</sub>-C<sub>3</sub> alkyl —OR<sub>16</sub>, F,  
Cl, Br, NO<sub>2</sub>, CO<sub>2</sub>R<sub>24</sub>, S(O)<sub>m</sub>R<sub>25</sub> or SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>; pro-  
vided that, when either of R<sub>13</sub> or R<sub>14</sub> is CO<sub>2</sub>R<sub>24</sub>,  
S(O)<sub>m</sub>R<sub>25</sub> or SO<sub>2</sub>NR<sub>20</sub>R<sub>21</sub>, then the other is H, Cl, CH<sub>3</sub>,  
OCH<sub>3</sub> or NO<sub>2</sub>;  
R<sub>15</sub> is H or CH<sub>3</sub>;  
R<sub>16</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;  
R<sub>17</sub> is H or CH<sub>3</sub>;  
R<sub>18</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl,  
CH<sub>2</sub>CH<sub>2</sub>Cl or CH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>;  
R<sub>19</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl or  
CH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>;  
R<sub>20</sub> and R<sub>21</sub> are independently CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub>;  
R<sub>22</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl or CF<sub>3</sub>;  
R<sub>23</sub> is H, Cl, Br, CH<sub>3</sub>, F, CF<sub>3</sub>, OCH<sub>3</sub> or NO<sub>2</sub>;  
R<sub>24</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl or allyl;  
R<sub>25</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;  
m is 0, 1 or 2;  
n is 0 or 1;  
A is



X is CH<sub>3</sub>, OCH<sub>3</sub>, OCF<sub>2</sub>H or SCF<sub>2</sub>H;  
Y is CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, CH<sub>2</sub>OCH<sub>3</sub>, CH(OCH<sub>3</sub>)<sub>2</sub>,  
OCH<sub>2</sub>CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub> or GCF<sub>2</sub>T  
where G is O or S and T is H, CHClF, CHBrF, CF<sub>2</sub>H or  
CHFClF;  
Z is N;

and agriculturally suitable salts thereof.

45. A method for controlling the growth of undesired vege-  
tation which comprises applying to the locus to be protected  
an effective amount of a compound of claim 1.

4,946,497

#### PYRIDINE-3-CARBOXAMIDES HAVING PLANT GROWTH REGULATING PROPERTIES

Yukihisa Goto; Kazuhisa Masamoto; Hiroshi Yagihara; Yasuo  
Morishima, and Hirokazu Osabe, all of Himeji, Japan, assign-  
ors to Daicel Chemical Industries Ltd., Osaka, Japan  
Continuation of Ser. No. 945,396, Dec. 23, 1986, abandoned.

This application Nov. 22, 1988, Ser. No. 274,616

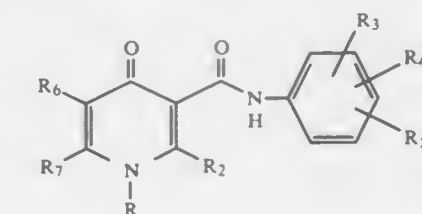
Claims priority, application Japan, Dec. 27, 1985, 60-2989153;  
Dec. 27, 1985, 60-2989154; Apr. 23, 1986, 61-94034; Apr. 23,  
1986, 61-94035

The portion of the term of this patent subsequent to Jul. 4, 2006,  
has been disclaimed.

Int. Cl.<sup>5</sup> C07D 211/84, 211/86, 211/90; A01N 43/40

U.S. Cl. 71-94                      11 Claims

1. A compound of the formula:



wherein:  
R is hydrogen;

R<sub>2</sub> and R<sub>7</sub> are the same and are each C<sub>1-11</sub> alkyl; lower alkenyl; lower alkynyl; C<sub>3-6</sub> cycloalkyl; lower alkoxyalkyl; phenyl-C<sub>1-4</sub>alkyl; or phenyl-C<sub>1-4</sub>alkyl substituted by halogen, lower alkyl, lower alkoxy, or haloalkyl; R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are the same or different and are each hydrogen, halogen, amino, lower alkyl, lower haloalkyl, hydroxy, lower alkoxy, phenoxy, carboxy, or lower alkoxy-carbonyl; R<sub>6</sub> is lower alkyl, phenyl, or phenyl-C<sub>1-4</sub>alkyl; and, when R<sub>2</sub> and R<sub>7</sub> are both methyl, R<sub>6</sub> is lower alkyl, phenyl or phenyl-C<sub>1-4</sub>alkyl; and an addition salt of said compound with an acid or a base.

8. A plant growth inhibitor, which comprises an effective amount of the active compound of claim 1 in an inert carrier or solvent.

4,946,498

# PROCESS FOR THE PRODUCTION OF STEEL FROM FINE ORE HOT BRIQUETTED AFTER FLUIDIZED BED REDUCTION

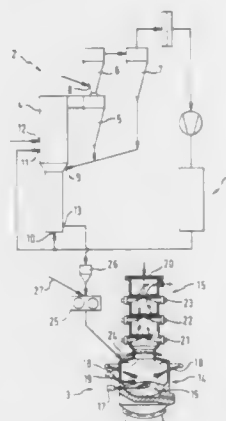
Ralph Weber, Am Nordglacis 93, 423 Wesel, Fed. Rep. of Germany

Filed Oct. 16, 1989, Ser. No. 422,033

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1988, 3835332

Int. Cl.<sup>5</sup> C22B 5/14  
U.S. Cl. 75—26

7 Claims



1. A process for the production of steel from fine ore comprising the step of reducing the fine ore in the presence of coal in a fluidized bed of a reduction unit together with a reduction gas to form iron sponge particles, and passing the particles to a melting vessel in which they are melted with a feed of coal and oxygen and are refined to produce steel, the improvement in said process comprising the step of subjecting a mixture of iron sponge particles and fine coal which is discharged from the reduction unit to hot compacting to form hot iron sponge-coal briquettes before said briquettes are introduced into the melting and refining vessel.

4,946,499

# METHOD OF PREPARING IRON BASE POWDER MIXTURE FOR PM

Ichio Sakurada; Ritsuo Okabe; Takao Omura; Yoshisato Kiyota, and Shigeaki Takajo, all of Chiba, Japan, assignors to Kawasaki Steel Corp., Japan

Filed Sep. 29, 1988, Ser. No. 252,066

Claims priority, application Japan, Sep. 30, 1987, 62-244071  
Int. Cl.<sup>5</sup> C22C 1/00

U.S. Cl. 75—343

1 Claim

1. A method for producing an iron base powder mixture for powder metallurgy, comprising the steps of mixing a ferrous powder and an alloying powder with a powdered metal soap or wax, and with an oil, heating the mixture either while mix-

ing or thereafter to 90°–150° C. to produce a melted-together binder of the oil and the metal soap or wax powder; and subsequently stirring and cooling to 85° C. or lower, thereby causing the alloying powder to adhere to the surface of the ferrous powder by the said melted-together binder.

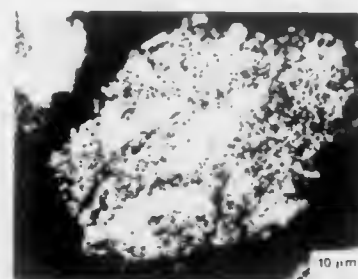
4,946,500

ALUMINUM BASED METAL MATRIX COMPOSITES  
Michael S. Zedalis, Randolph, N.J., and Paul S. Gilman, Suffern, N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 142,103, Jan. 11, 1988, abandoned. This application Sep. 12, 1988, Ser. No. 242,987  
Int. Cl.<sup>5</sup> C22C 29/12

U.S. Cl. 75—232

20 Claims



1. A process for producing a composite having a metal matrix and a reinforcing phase, comprising the steps of:

- forming a charge containing, as ingredients, a rapidly solidified aluminum based alloy and particles of a reinforcing material present in an amount ranging from about 0.1 to 50 percent by volume of said charge;
- ball milling the charge energetically to enfold metal matrix material around each of said particles while maintaining the charge in a pulverulent state said ball milling step being carried out without addition of a processing aid; and
- consolidating said charge to provide a mechanically formable, substantially void-free mass.

4,946,501

# ALLOY TARGET FOR MAGNETO-OPTICAL RECORDING

Tasuo Nate; Toshio Morimoto; Kouichi Oka, all of Ichikawa, and Shinobu Endo, Komae, all of Japan, assignors to Sumitomo Metal Mining Company Limited, Japan

Filed Oct. 16, 1989, Ser. No. 421,958

Claims priority, application Japan, Oct. 15, 1988, 63-258381  
Int. Cl.<sup>5</sup> B22F 9/00

U.S. Cl. 75—246

8 Claims

1. An alloy target for magneto-optical recording consisting essentially of 10 to 50 atom % of at least one rare earth element selected from the group consisting of Sm, Nd, Gd, Tb, Dy, Ho, Tm and Er, the balance being substantially at least one transition metal selected from the group consisting of Co, Fe and Ni, and having a mixed structure comprising a phase of intermetallic compound of said rare earth element and said transition

metal and a finely mixed phase of said rare earth element and intermetallic compound of said rare earth element and said transition metal.

4,946,502

# PROTECTIVE COATINGS FOR THE CARRIER BARS OF PRE-BAKED ANODES AND THE EMERGING PART OF THE ANODES

Gabriel Audras, Lyon, and Bernard Samanos, Ste. Foy Les Lyon, both of France, assignors to Socle des Electrodes & Refractaires Savole, Courbevoie, France

Continuation-in-part of Ser. No. 272,907, Nov. 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 118,023, Nov. 6, 1987, Pat. No. 4,787,965. This application Oct. 25, 1989, Ser. No. 426,200

Claims priority, application France, Nov. 14, 1986, 86 16285; Dec. 22, 1987, 87 18452

Int. Cl.<sup>5</sup> C04B 9/02

U.S. Cl. 106—14.21

6 Claims

1. A coating composition for protecting from corrosion and oxidation in the hot condition carrier bars of pre-baked anodes and the emergent carbonaceous part of the anodes for the production of aluminum in the Hall-Heroult process, consisting essentially of:

- dry matter consisting essentially of, by weight, 10–99.8% calcium aluminate cement having an alumina content of at least 70% and a total content of impurities of SiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, K<sub>2</sub>O and Cr<sub>2</sub>O<sub>3</sub> less than 5%, 0.2 to 10% magnesium spinel, and 0 to about 90% further alumina; and
- 10 to 80% by weight of the total dry matter of water.

4,946,503

RUST PREVENTIVE COATING COMPOSITION  
Tutomu Hattori, Zama; Masashi Ohno, Chigasaki, and Shouji Aramaki, Kanagawa, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Nihon Tokushu Torio Co., Ltd., Tokyo, both of Japan

Filed Jan. 29, 1988, Ser. No. 150,257

Claims priority, application Japan, Jan. 30, 1987, 62-18718

Int. Cl.<sup>5</sup> C23F 11/00

U.S. Cl. 106—14.34

15 Claims

1. A rust preventive coating composition comprising asphalt, metallic salt of petroleum sulfonic acid, metallic salt of petrolatum oxide, petroleum wax, microwax, metallic salt of lanolin fatty acid, metallic salt of synthetic sulfonic acid, plasticizer, solvent, extender pigment including barium sulfate ranging not less than 20 wt% of total amount of said extender pigment, and calcium carbonate ranging not less than 5 wt% of the total amount of said extender pigment, additive, reforming agent ranging from 1 to 10 wt% of total amount of said rust preventive coating composition, said reforming agent being at least one selected from the group consisting of rubber, EVA, alkyd resin and polyurethane resin, and inorganic running preventive agent ranging from 0.5 to 10 wt% of the total amount of said rust preventive coating composition, said rust preventing coating composition having non-volatile content ranging not less than 70 wt%.

4,946,504

# CEMENT BUILDING MATERIAL

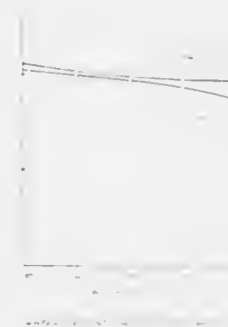
Simon Hodson, Santa Barbara, Calif., assignor to Concrete Technology Corporation, Santa Barbara, Calif.

Filed Aug. 19, 1988, Ser. No. 235,042

Int. Cl.<sup>5</sup> C04B 7/00

U.S. Cl. 106—713

6 Claims



1. A building material formed from at least 20% by weight Portland cement, the building material consisting of at least 30% by volume of monolithic crystals of calcium silicate hydrate.

4,946,505

# PROCESS FOR DYEING CONCRETE

Axel E. Jungk, Naubeim, Fed. Rep. of Germany, assignor to Chemische Werke Brockhues AG, Walluf, Fed. Rep. of Germany

Continuation of Ser. No. 159,964, Mar. 29, 1988, abandoned.

This application Jul. 17, 1989, Ser. No. 380,744

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619363; PCT Int'l Appl., Jun. 5, 1987, PCT/DE87/00262  
Int. Cl.<sup>5</sup> C04B 20/00

U.S. Cl. 106—712

11 Claims

1. A process of dyeing concrete comprising mixing pigment-containing granules with cement and aggregate at conditions sufficient to result in a generally homogeneous dispersal of pigment in the concrete, wherein:

- pigment-containing granules other than compacted or briquette granules are used,
- each granule consisting essentially of at least one pigment selected from the group consisting of manganese oxide and iron oxide and of at least one binder for promoting the dispersal of the pigment in the concrete,
- at least 90% of the granules have a particle size of about 20 microns or more, and
- the finite water content of the granules is not in excess of about 4.2%.

4,946,506

# CORROSION INHIBITING HYDRAULIC CEMENT ADDITIVES AND COMPOSITIONS CONTAINING SAME

Ahmad Arfaei, Milford, N.H.; Neal S. Berke, Chelmsford, Mass.; Michael P. Dallaire, Dover, N.H., and Maria Hicks, Newton, Mass., assignors to W.R. Grace & Co.-Conn., Lexington, Mass.

Filed Sep. 7, 1989, Ser. No. 404,157

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C04B 24/32

U.S. Cl. 106—724

15 Claims

1. A cementitious composition comprising:

- hydraulic cement;
- at least about 0.01 weight percent based upon the dry weight of said cement of a graft copolymer plasticizer comprising a polyether backbone and side chain polymers formed by polymerization of an ethylenically unsaturated monomer; and



(c) at least about 0.01 weight percent based upon dry weight of said cement of an alkali or alkaline earth metal nitrite.

**4,946,507**  
**PIGMENT DISPERSANT RESIN: REACTION PRODUCT OF IMIDAZOLINE ARMINE AND ALKYLENE CARBONATE**

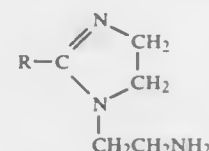
Stephen C. Peng, Utica, and Tadesse Gebregiorgis, Sterling Heights, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 12, 1989, Ser. No. 380,544  
Int. Cl.<sup>5</sup> C09D 1/00

U.S. Cl. 523—400

6 Claims

1. A pigment dispersant which is prepared by bringing into contact compound (i) an alkylene carbonate with a compound (ii) of the structure:



where R is C<sub>8</sub>—C<sub>24</sub> alkyl.

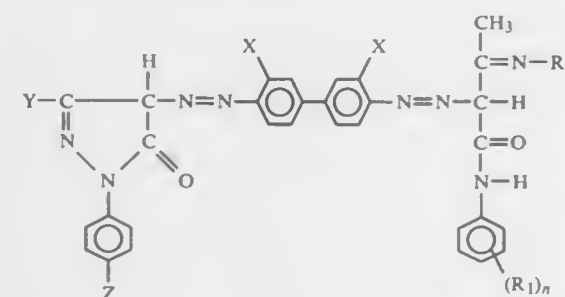
**4,946,508**  
**DISAZO PYRAZOLONE PIGMENT COMPOSITIONS**  
Russell J. Schwartz, and Manuel Z. Gregorio, both of Cincinnati, Ohio, assignors to Sun Chemical Corporation, Fort Lee, N.J.

Filed May 23, 1989, Ser. No. 356,040  
Int. Cl.<sup>5</sup> C09B 27/00

U.S. Cl. 106—496

11 Claims

1. An azomethine composition of matter having the formula:



wherein:

X is OCH<sub>3</sub> or Cl;  
Y is CH<sub>3</sub> or COOC<sub>2</sub>H<sub>5</sub>;  
Z is CH<sub>3</sub> or H;  
R is an alkylene oxide polymer containing about 4 to about 200 groups;  
R<sub>1</sub> is H, CH<sub>3</sub>, Cl, OCH<sub>3</sub> or OCH<sub>2</sub>CH<sub>3</sub>; and  
n is an integer from 1 to 5.

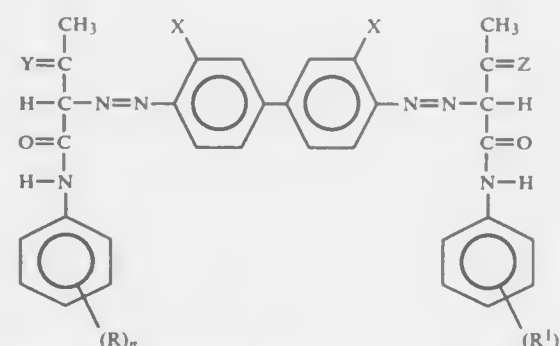
**4,946,509**  
**DIARYLIDE PIGMENT COMPOSITIONS**  
Russell J. Schwartz; Manuel Z. Gregorio, both of Cincinnati, and Anthony C. Zwirgdsas, Fairfield, all of Ohio, assignors to Sun Chemical Corporation, Fort Lee, N.J.

Filed May 23, 1989, Ser. No. 356,045  
Int. Cl.<sup>5</sup> C09B 27/00

U.S. Cl. 106—496

20 Claims

1. An azomethine composition of matter having the general formula:



wherein:

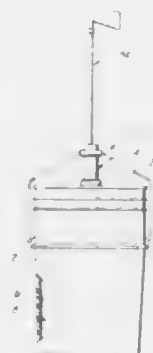
R and R<sup>1</sup> are independently selected from the group consisting of H, CH<sub>3</sub>, OCH<sub>3</sub>, OCH<sub>2</sub>CH<sub>3</sub> and Cl;  
n is an integer from 1 to 5;  
X is selected from the group consisting of Cl, CH<sub>3</sub> and OCH<sub>3</sub>;  
Y is N-R<sup>2</sup>, wherein R<sup>2</sup> is an alkylene oxide polymer containing about 4 to about 200 groups; and  
Z is selected from the group consisting of O and Y.

**4,946,510**  
**GOLF CLUB GRIP CLEANER**  
Earl G. Kinnebrew, II, Edmond, and Joseph D. Fitzpatrick, Blanchard, both of Okla., assignors to Master's International Corporation, Edmond, Okla.

Filed Aug. 4, 1988, Ser. No. 228,708  
Int. Cl.<sup>5</sup> B08B 1/00

U.S. Cl. 134—40

10 Claims



1. A method for cleaning a rubber grip of golf club comprising:

applying a cleaning mixture to the grip, the cleaning mixture comprising a grease cutting agent and an agent for restoring tackiness to said grip, the grease cutting agent removing grease or oils from the grip and the tackiness agent operating to maintain the tackiness of the grip, and wiping any excess cleaning mixture from the grip.

**4,946,511**  
**THERMOELECTRIC DEVICES**  
Moshe Shiloh, and Danielle Ilzyer, both of Ness Ziona, Israel, assignors to The State of Israel, Atomic Energy Commission, Soreq Nuclear Research Center, Israel

Filed Feb. 9, 1989, Ser. No. 308,415  
Claims priority, application Israel, Feb. 10, 1988, 85389

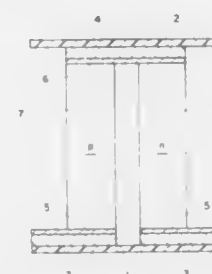
Int. Cl.<sup>5</sup> H01L 35/28

U.S. Cl. 136—212

4 Claims

1. A thermoelectric device comprising an array of thermoelectric rods of two different materials alternatingly arranged between first and second carrier plates each bearing a plurality

of discrete conductive metal junctions to which the thermoelectric rods are pairwise connected by soldering with the pattern of the junctions on said first and second carrier plates being complementary so that with the exception of two extreme thermoelectric rods, each thermoelectric rod of one material forms with two flanking rods of different material two thermoelectric couples said thermoelectric couples having



empty spaces between adjacent rods, one of which junctioned at the second carrier plate, whereby there is formed a plurality of thermoelectric couples connected in series, wherein:

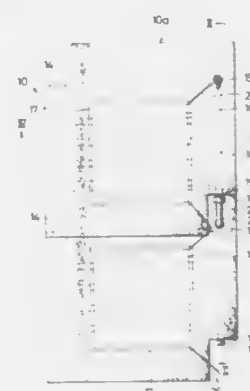
- said first and second carrier plates are made of synthetic polymeric material; and
- each of said junctions comprises a prefabricated monolithic metal member directly linked to a carrier plate.

**4,946,512**  
**SOLAR ENERGY COLLECTOR DEVICE**  
Takeo Fukuroi, Uozu; Shinichiro Yoshida, and Akira Ohmura, both of Kurobe, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,678  
Claims priority, application Japan, Mar. 28, 1988, 63-40956[U]

Int. Cl.<sup>5</sup> H01L 31/058  
U.S. Cl. 136—248

7 Claims



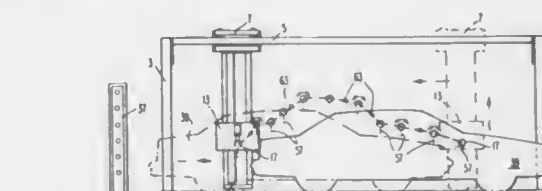
1. A solar energy collector device comprising a composite material comprising a particulate inorganic substance and a metal in the form of a roofing tile or an exterior wall member, at least one solar battery disposed on an outer surface of said tile or wall member exposed to sun rays, and a heating medium passageway underlying at least the region of said tile or wall member where said solar batteries are located.

**4,946,513**  
**AUTOMATED CAR WASH SYSTEM**  
Daniel J. Del Prato, Marlton, N.J.; David R. McKenna, Canton, Ohio, and Sherman L. Larson, Palmyra, N.J., assignors to Sherman Industries, Inc., Palmyra, N.J.

Continuation-in-part of Ser. No. 86,326, Apr. 20, 1990. This application Aug. 12, 1987, Ser. No. 84,180  
Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—18

9 Claims



- An automated car wash system, comprising:
  - conveyor means for transporting a vehicle through the system,
  - means for sensing the height of the vehicle at a given fixed location, the sensing means being capable of repeated measurements of the height of the vehicle as the vehicle passes said location, the sensing means thereby being capable of generating a signal representing the contour of the vehicle,
  - a carriage means, the carriage means including nozzle means, the carriage means being movable in the direction of motion of the vehicle and in the reverse of said direction, and also being movable vertically, the carriage means being movable while the vehicle is moving, and
  - means for controlling the movement of the carriage means, the controlling means being connected to the sensing means, the controlling means being programmed to move the carriage means so as to follow the contour of the vehicle while the vehicle is moving,
- wherein the nozzle means is disposed on a spray bar, the spray bar being mounted to move with the carriage means,
- the system further comprising means for rotating the spray bar about the longitudinal axis of the spray bar, wherein the position of the nozzle means can be adjusted, and
- wherein the means for rotating includes a shifting mechanism, the shifting mechanism having a first extendable means, a shifting lever connected to the first extendable means, a second extendable means connected to the shifting lever, and means for connecting the second extendable means to the spray bar.

**4,946,514**  
**THIN FILM PHOTOELECTROMOTIVE FORCE ELEMENT HAVING MULTI-THIN FILMS STACKED SEMICONDUCTOR LAYER**

Katsumi Nakagawa, Nagahama, and Isamu Shimizu, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

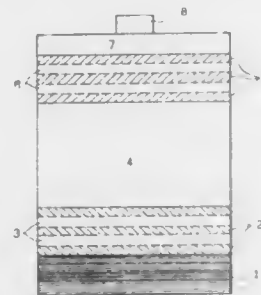
Filed Mar. 25, 1988, Ser. No. 173,579  
Claims priority, application Japan, Mar. 27, 1987, 62-73626  
Int. Cl.<sup>5</sup> H01L 31/075

U.S. Cl. 136—258

1 Claim

1. An improved pin type film photoelectromotive force element comprising a p-type semiconductor layer, an i-type semiconductor layer and an n-type semiconductor layer which has enhanced short-circuit current, open-circuit voltage, fill factor, S/N ratio and photoelectric conversion efficiency, characterized in that said p-type semiconductor layer contains 1 to 10 atomic % of hydrogen atoms and comprises a plurality of an alternating stack of (i) a p-type amorphous silicon film 100 Å or less thick containing 1 to 10 atomic % of hydrogen atoms and a p-type impurity and (ii) a non-doped amorphous silicon film 100 Å or less thick containing 1 to 10 atomic % of

hydrogen atoms; said i-type semiconductor layer comprises a non-doped amorphous silicon film containing 1 to 10 atomic % of hydrogen atoms; and said n-type semiconductor layer contains 1 to 10 atomic % of hydrogen atoms and comprises a



plurality of an alternating stack of (iii) an n-type amorphous silicon film 100 Å or less thick containing 1 to 10 atomic % of hydrogen atoms, and an n-type impurity and (iv) a non-doped amorphous silicon film 100 Å or less thick containing 1 to 10 atomic % of hydrogen atoms.

4,946,515

**HIGH STRENGTH HIGH TOUGHNESS STEEL AND METHOD OF MANUFACTURING THEREOF**  
Roelof J. Mostert, Verwoerdberg, and Rudolf P. Badenhorst, Pretoria, both of South Africa, assignors to Iscor Limited, Pretoria, South Africa

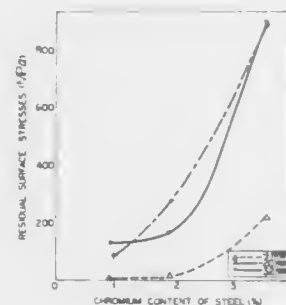
Filed Jan. 27, 1988, Ser. No. 149,121

Claims priority, application South Africa, Jan. 29, 1987, 87/0651

Int. Cl. C21D 8/00; C22C 38/06

U.S. Cl. 148—12 F

5 Claims



1. A, high strength, high toughness bar and sheet steel which is substantially non-susceptible to the formation of delayed surface cracks in the as rolled condition, and which has the following constitution on a percentage mass to mass basis:

C=0.21-0.28  
Mn=0.80-1.80  
Cr=1.60-2.10  
Si=0.35 maximum  
Al=0.02-0.05  
P and S each=0.025 maximum  
Fe=the balance;

wherein the concentration of the constituents of the steel are chosen so that the physical properties of the steel are within the following range:

Hardness	=	470-520	Vickers
Yield limit	=	1250-1350	MPa
Tensile strength	=	1500-1650	MPa
Charpy toughness	=	30-60	joule at 20° C.

the steel having been subjected to air cooling following hot

rolling, with the transformation temperature of the steel during the cooling being at a sufficiently high level to ensure that there is sufficient thermal contraction possible after the phase transformation has been completed to accommodate at least the thermal expansion which had taken place during the transformation.

4,946,516

**PROCESS FOR PRODUCING HIGH TOUGHNESS, HIGH STRENGTH STEEL HAVING EXCELLENT RESISTANCE TO STRESS CORROSION CRACKING**

Seinosuke Yano, Yoshihiro Okamura, and Hirohide Muraoka, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

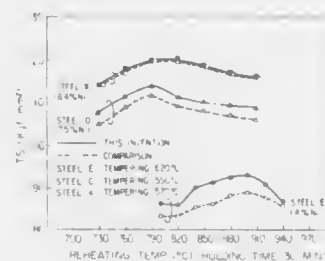
Filed Mar. 8, 1989, Ser. No. 321,199

Claims priority, application Japan, Mar. 8, 1988, 63-52726

Int. Cl. C21D 8/02

U.S. Cl. 148—12 F

4 Claims



1. A process for producing high toughness, high strength steel having good resistance to stress corrosion cracking, comprising the steps of:

preparing a steel slab comprised of 0.02 to 0.10 wt% C., 0.50 wt% or less Si, 0.4 to 1.5 wt% Mn, 1.0 to 8.0 wt% Ni, 0.1 to 1.5 wt% Mo, 1.8 wt% or less Cr, 0.01 to 0.08 wt% sol. Al, with the balance of Fe and unavoidable impurities; heating the steel to a temperature of from 1000° C. to 1250° C.;

hot rolling the steel at a reduction rate of 20 to 60% at an austenite recrystallization temperature regions then at a reduction rate of 30 to 70% at an austenite nonrecrystallization temperature region, and finishing the rolling at a temperature of 650° C. or higher;

quenching the steel by initiating water cooling at a temperature at or above the  $A_{c3}$  point thereof and terminating the water cooling at a temperature of 150° C. or lower;

quenching the steel after reheating the steel to a temperature between the  $A_{c3}$  point and the  $A_{c3}$  point + 100° C. thereof; and

tempering the steel at a temperature at or below the  $A_{c1}$  point thereof.

4,946,517

**UNRECRYSTALLIZED ALUMINUM PLATE PRODUCT BY RAMP ANNEALING**

Alex Cho, Richmond, Va., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 12, 1988, Ser. No. 256,520

Int. Cl. C22F 1/04

U.S. Cl. 148—12.7 A

78 Claims

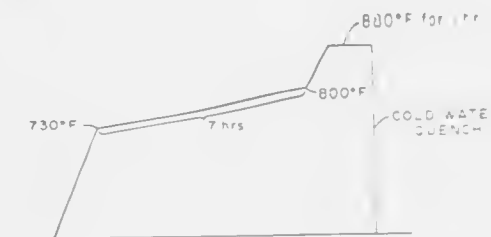
1. A method of producing an unrecrystallized aluminum based thin gauge flat rolled, heat treated product having improved levels of strength and fracture toughness, the method comprising the steps of:

(a) providing a body of a aluminum base heat treatable alloy;

(b) working the body to a wrought product;

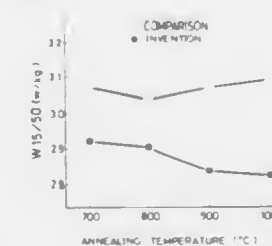
(c) subjecting said product to a ramp anneal wherein the anneal is started at a temperature of less than 750° F. and

the temperature is increased at a rate of 2° to 100° F./hr.; and



(d) solution heat treating, quenching and aging said final gauge flat rolled product to provide a substantially unrecrystallized product having improved levels of strength and fracture toughness.

Al: 0.21 to 0.6%,  
P: 0.02 to 0.10%,  
Mn: 0.5 to 1.5%,



Ni: 0.1 to 1.0%,  
and a balance of iron and inevitable impurities.

4,946,520

**COPPER ROD MANUFACTURED BY CASTING, HOT ROLLING AND CHEMICALLY SHAVING AND PICKLING**

Benjamin A. Escobar, Jr., Lester J. Wahner, Gilbert Montes, and John T. Farraro, all of El Paso, Tex., assignors to Phelps Dodge Industries, Inc., New York, N.Y.

Division of Ser. No. 9,775, Feb. 2, 1987, Pat. No. 4,754,803. This application Jun. 29, 1988, Ser. No. 213,221

Int. Cl. C22C 9/00

U.S. Cl. 148—432

7 Claims

4,946,518

**METHOD FOR IMPROVING THE ADHESION OF A PLASTIC ENCAPSULANT TO COPPER CONTAINING LEADFRAMES**

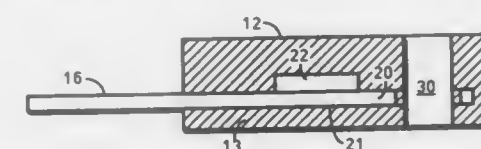
Keith G. Spanjer, and Dervin L. Flowers, both of Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 14, 1989, Ser. No. 322,845

Int. Cl. C23F 3/02; H01L 21/48, 21/56

U.S. Cl. 148—282

10 Claims



1. A method for reducing delamination in plastic encapsulated electrical components, comprising:

providing a leadframe having a first portion for external connection and a second portion for receiving an electrical component, wherein parts of the second portion have exposed copper and exposed nickel;

exposing the leadframe to a liquid or plasma oxidant at a temperature less than the leadframe annealing temperature to simultaneously oxidize the exposed copper and clean the exposed nickel in a single operation; and thereafter encapsulating the parts of the second portion in a plastic encapsulant.

4,946,519

**SEMI-PROCESSED NON-ORIENTED ELECTROMAGNETIC STEEL STRIP HAVING LOW CORE LOSS AND HIGH MAGNETIC PERMEABILITY, AND METHOD OF MAKING**

Atsuhito Honda, Chiba; Michiro Komatsubara, Kurashiki; Ko Matsumura, Chiba, and Keiji Nishimura, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Japan

Filed Jun. 16, 1988, Ser. No. 207,198

Claims priority, application Japan, Jun. 18, 1987, 62-150208

Int. Cl. H01F 1/147

U.S. Cl. 148—307

9 Claims

1. A semi-processed non-oriented electromagnetic steel strip having a low core loss and a high magnetic permeability, said strip consisting essentially of, in % by weight,

C: up to 0.02%,  
Si: 0.2 to 2.0%,

1. Chemically shaved and pickled hot-rolled copper rod suitable for subsequent drawing or rolling to form copper wire and characterized by improved surface smoothness and substantial freedom from surface oxides and surface marks from mechanical machining and produced by a process comprising the steps of providing a molten bath of copper having a purity corresponding to the purity of electrolytically refined copper cathodes, casting said molten bath into cast copper bar, hot-rolling said cast copper bar to form hot-rolled copper rod, regulating the temperature of said hot-rolled copper rod within the range of 250-1,200° F., regulating the passage of said hot-rolled copper rod through an aqueous solution containing a controlled concentration of sulfuric acid within the range of 180-450 grams/liter free acid and a controlled concentration of stabilized hydrogen peroxide within the range of 5 to 50 grams/liter concentration to produce a chemically shaved and pickled hot-rolled copper rod, regulating the temperature of said aqueous solution containing sulfuric acid and stabilized hydrogen peroxide to a range of 120° and about 160° F., said passage of said hot-rolled copper rod regulated to provide a reaction time in the range of 2 seconds to 2 minutes in said aqueous solution containing sulfuric acid and stabilized hydrogen peroxide, withdrawing a sample length of said chemically shaved and pickled hot-rolled copper rod, subjecting said sample to a 3-die twist test to indicate the surface smoothness of said chemically shaved and pickled hot-rolled copper rod,



and adjusting one or more of the process variables comprising the temperature of said hot-rolled copper rod, the concentration of said hydrogen peroxide in said aqueous solution, the concentration of said sulfuric acid in said aqueous solution, the time of passage of said hot-rolled copper rod through said aqueous solution and the temperature of said aqueous solution whereby the surface smoothness of said chemically shaved and pickled hot-rolled copper rod is improved, the surface oxides are substantially removed, the surface contains no marks from mechanical machining and the rod qualifies as "Class 1" when evaluated by a 3-die twist test.

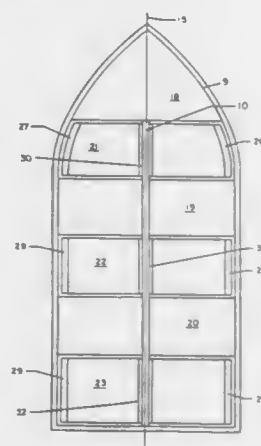
4,946,521

## SELECTIVELY ACTIVATED EXPLOSIVE

Evan H. Walker, Aberdeen, and Warren W. Hillstrom, Bel Air, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Oct. 3, 1989, Ser. No. 416,791  
Int. Cl.<sup>5</sup> C06B 47/08

U.S. Cl. 149—36

13 Claims



1. An explosive consisting essentially of an effective amount of non-explosive ingredients which combine upon mixing to produce a safe explosive, wherein said non-explosive ingredients are ethylene diamine and nitric acid.

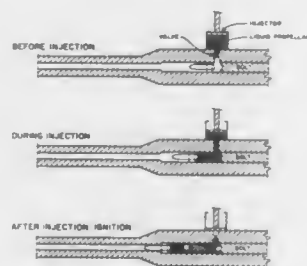
4,946,522

## LIQUID MONOPROPELLANT FOR A GUN

Larry L. Liedtke; H. Dean Mallory; William R. McBride, all of Ridgecrest; Everett M. Bens, Novato; Klaus C. Schadow, and Thomas L. Boggs, both of Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Jun. 15, 1981, Ser. No. 276,576  
Int. Cl.<sup>5</sup> C06B 47/08

U.S. Cl. 149—36

4 Claims



1. A method for propelling a projectile from a gun wherein a liquid monopropellant is injected into a chamber behind the projectile and ignited, the improvement residing in utilizing

the liquid monopropellant consisting of ammonium nitrate, hydrazine hydrate, and water.

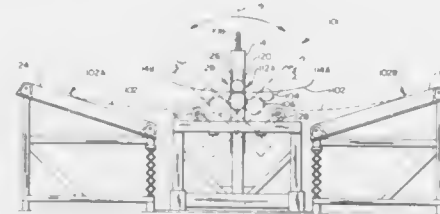
4,946,523

## METHOD AND APPARATUS FOR USE IN MANUFACTURING SAFETY GLASS LAMINATES

Mark A. Meussner, Allen Park, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 22, 1988, Ser. No. 288,593  
Int. Cl.<sup>5</sup> B32B 31/20

U.S. Cl. 156—64

16 Claims



9. A method for controlling the operation of a machine used in the manufacture of a safety glass laminate to remove air from said laminate and promote a bonding operation there-within, said machine comprising pinch roll means mounted for rotational movement about a generally horizontal axis and defining a pressure nip by rolls through which said laminate passes, said method comprising the steps of:

coupling motive means to said pinch roll means for rotating said pinch roll means about said axis;  
connecting encoder means to said motive means for sensing the motion of said motive means;  
storing a number of predefined sequences which each correspond to different laminates;  
selecting one of said predefined sequences corresponding to said laminate;  
modifying the selected one of said predefined sequences to define a sequence which is not included within said number of stored predefined sequences; and  
operating said motive means to rotate said pinch roll means in accordance with the modified sequence for said laminate to maintain said pinch roll means oriented substantially normal to said laminate as it passes through said pinch roll means.

4,946,524

## APPLICATOR AND METHOD FOR APPLYING DRY FILM SOLDER MASK ON A BOARD

Robert C. Stumpf, Orange; Jose L. Correa, Fullerton, and Charles L. Farnum, Riverside, all of Calif., assignors to Morton International, Inc., Chicago, Ill.  
Filed Mar. 2, 1989, Ser. No. 318,023  
Int. Cl.<sup>5</sup> B32B 31/20

U.S. Cl. 156—87

19 Claims

1. An applicator for applying a dry film solder mask on the surface of a board, said board having a leading edge surface and a trailing edge surface, comprising:

a dry film, said dry film having a first region at a leading portion thereof, a second region at a trailing portion thereof and a third region intermediate said first and second regions, each of said regions extending completely across the width of said dry film and the dimension of said third region between said first and second regions being substantially the same as that between the leading and trailing edge surfaces of said board,  
means for positioning said dry film relatively to said board such that said first region of said dry film initially is positioned adjacent said leading edge surface of said board and

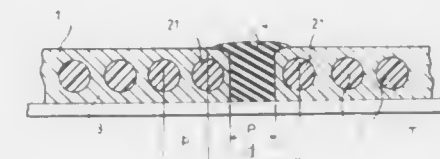
4,946,525

## PROCESS FOR THE BUTTED CONNECTING OF THE EDGES OF A RUBBERIZED FABRIC INTENDED FOR THE MANUFACTURE OF A CARCASS REINFORCEMENT, AND THE TIRE WITH RADIAL CARCASS REINFORCEMENT OBTAINED THEREBY

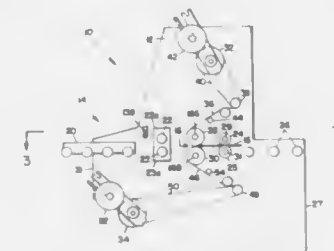
Bernard Anple, and Jean-Claude Tardivat, both of Clermont-Ferrand, France, assignors to Compagnie Generale des Etablissements Michelin - Michelin & CIE, Clermont-Ferrand, France  
Filed Dec. 2, 1988, Ser. No. 278,827  
Claims priority, application France, Dec. 3, 1987, 87 16946  
Int. Cl.<sup>5</sup> B60C 9/00

U.S. Cl. 156—134

2 Claims



subsequently said second region is positioned adjacent said trailing edge surface of said board, and tacking means operative to tack said first and second regions of said dry film to the leading and trailing edge surfaces, respectively, of said board while allowing said third region of said dry film to be loosely applied to the surface of said board between said leading and trailing edges thereof, wherein said tacking means utilizes heat and pressure or pressure alone for tacking said first and second regions of said dry film to the leading and trailing edge surfaces of said board with said third region of said film being applied to said board without the utilization of heat or pressure, and wherein said tacking means includes first and second parallel tacking rolls, said rolls being positioned to form a tacking region therebetween and normally being disposed closely adjacent to each other in a closed position but being relatively movable to effect separation thereof to an open position, means for conveying said dry film into the tacking region between said tacking rolls, means for conveying said board with the leading edge surface thereof into the tacking region between said tacking rolls, engagement of the leading edge of said board with said tacking rolls being operative to produce a force tangential to said tacking rolls for effecting separation thereof to allow the leading edge surface of said board to be moved between said tacking rolls,



first sensing means sensing such separation of said tacking rolls, and actuating means connected to and actuated by said first sensing means for producing a force tending to move said rolls toward the closed position thereof to press said dry film at said first region thereof against the leading edge surface of said board.

19. A method for applying a dry film solder mask on the surface of a board, said board having a leading edge surface and a trailing edge surface, said dry film having a first region at a leading portion thereof, a second region at a trailing portion thereof and a third region intermediate said first and second regions, with each of said regions extending completely across the width of said dry film and the dimension of said third region between said first and second regions being substantially the same as that between the leading and trailing edge surfaces of said board, comprising the steps of:

positioning said dry film relatively to said board such that said first region of said dry film initially is positioned adjacent said leading edge surface of said board and subsequently said second region of said dry film is positioned adjacent said trailing edge surface of said board, and tacking said first and second regions of said dry film to the leading and trailing edge surfaces, respectively, of said board such that said dry film is applied to the surface of the board as an integrated whole while allowing said third region of said dry film to be loosely applied to the surface of the board between said leading and trailing edge surfaces thereof.

4,946,526

## METHOD FOR COMPRESSION MOLDING OF LAMINATED PANELS

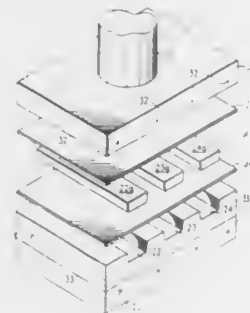
Jamie L. Petty-Galis, Fort Worth, and James C. Foster, Arlington, both of Tex., assignors to LTV Aerospace and Defense Company, Dallas, Tex.  
Filed Oct. 29, 1987, Ser. No. 114,621  
Int. Cl.<sup>5</sup> B32B 31/04

U.S. Cl. 156—155

25 Claims

1. In a method for the formation of a reinforced laminate panel structure, the steps comprising:  
(a) disposing a first sheet formed of a thermoplastic resin on a first molding member having a female mold receptacle;  
(b) disposing a mold mandrel conformable to said mold receptacle and formed of particulate ceramic material and a binder functioning as an adhesive between the said ceramic material at a location opposite said mold receptacle whereby said thermoplastic resin sheet is interposed between said mold receptacle and said mandrel;  
(c) disposing a second thermoplastic resin sheet over said mandrel whereby said mandrel is interposed between said first and second sheets;  
(d) subsequent to step (b) heating at least said first thermoplastic resin sheet to the melt point of said sheet to render said sheet deformable and compressing said mandrel into said mold receptacle to shape said first sheet to the conforming profiles of said mandrel and said receptacle;

- (e) subsequent to or concomitant with step (d), heating said second thermoplastic resin sheet to the melt point thereof; (f) subsequent to step (c) and subsequent to or concomitant with step (e) compressing said first and second sheets together while said first and second sheets are heated to the melt points thereof and thereafter allowing said sheets to cool so that such sheets are laminated together and the



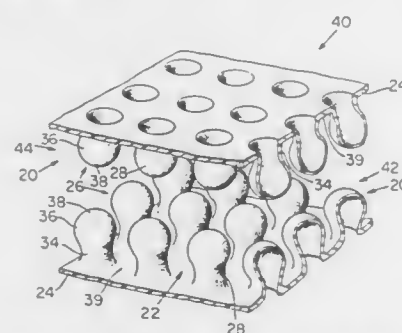
- portion of said first sheet in said receptacle is shaped conformably to the profiles of said mandrel and said receptacle; and (g) concomitant with or subsequent to the heating of step (f) disrupting the binder integrity in said mold to cause said ceramic particulate material to be in a frangible condition and withdrawing said particulate material from between said first and second sheets.

**4,946,527**  
**PRESSURE-SENSITIVE ADHESIVE FASTENER AND METHOD OF MAKING SAME**  
Charles F. Battrell, Erlanger, Ky., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 19, 1989, Ser. No. 409,206  
Int. Cl.<sup>5</sup> B32B 3/30

U.S. Cl. 156—60

30 Claims



1. A pressure-sensitive adhesive fastener having a textured fastening surface comprising:  
a backing web having a first surface and a second surface, said backing web exhibiting a pattern of discrete, bulbous surface aberrations projecting from said first surface, each of said bulbous surface aberrations having a base portion and an end portion; and  
a layer of pressure-sensitive adhesive coated over and bonded to at least a portion of the surface of said bulbous surface aberrations to define the fastening surface of the fastener.

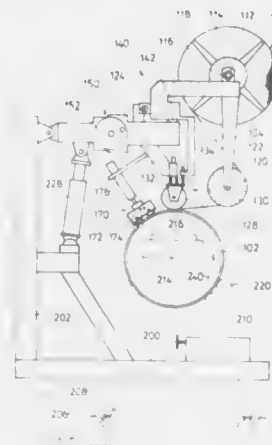
**4,946,528**  
**METHOD AND EQUIPMENT FOR PRODUCING PROTECTIVE-COATED STEEL PIPE**  
Isao Takahashi, and Toyokazu Sakaki, both of Tokyo, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan  
Filed Nov. 14, 1988, Ser. No. 271,088

Claims priority, application Japan, Nov. 18, 1987, 62-291530; May 24, 1988, 63-126860; May 24, 1988, 63-126861; May 24, 1988, 63-126862

Int. Cl.<sup>5</sup> B65H 81/08

U.S. Cl. 156—187

7 Claims



1. A method for producing a protective-coated steel pipe by winding a belt-like thermoplastic synthetic resin sheet spirally around the outer peripheral surface of a preheated steel pipe and melt-bonding the sheet onto said outer peripheral surface of the pipe, which method includes:  
heating said steel pipe to a temperature sufficient for melt bonding of said thermoplastic synthetic resin sheet;  
a winding step of winding said sheet around the outer peripheral surface of the steel pipe while contacting adjacent side end faces of the sheet in a face-to-face relation to each other to form a spiral joint defining a mountain peak with air remaining under the peak;  
a bonding step of heat melt-bonding the adjacent sheet portions to each other in the contacted state of the respective side end faces while pressing both sheet portions together by a pressing means when they begin to melt; and simultaneously expelling said air from said spiral joint.

**4,946,529**  
**CROSSLINKED ADHESIVE SYSTEM**  
Elwyn G. Huddleston, Franklin, Ky., assignor to The Kendall Company, Boston, Mass.

Filed Jan. 28, 1986, Ser. No. 823,222

Int. Cl.<sup>5</sup> B65H 81/00

U.S. Cl. 156—187

23 Claims

1. A method for applying a protective adhesive wrap to metal tubular articles comprising the steps of:  
(1) providing a rubber-based adhesive mix including a homogeneous blend of pre-crosslinked butyl rubber, virgin butyl rubber and a tackifier;  
(2) providing a rubber-based primer coating;  
(3) incorporating a rubber crosslinking agent in one of said adhesive mix or said primer coating, and a crosslinking activator in the other of said adhesive mix or primer coating, provided that when said crosslinking agent is incorporated in said adhesive mix, said incorporation is in a separate mixing step subsequent to providing said adhesive mix;  
(4) coating said adhesive mix containing one of said crosslinking agent or activator onto a backing material to provide an adhesive tape;

- (5) applying said primer coating to the outer surface of said tubular article; and  
(6) thereafter, overlapping said primer coated article with the adhesive surface of said tape.

**4,946,530**  
**METHOD OF MAKING A MAGNETIC RECORDING DISKETTE**  
Hung Q. Lam, Yukon, Okla., assignor to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Division of Ser. No. 831,839, Feb. 24, 1986, Pat. No. 4,839,765.  
This application Nov. 21, 1988, Ser. No. 273,887

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—227

6 Claims



1. A method of making diskettes having jackets formed with a central jacket fold and openings, including aligned central openings, aligned data transfer slots, and aligned timing holes, said method comprising the steps of:  
(a) continuously cutting a roll of wiping fabric into a plurality of spaced apart fabric panels having edges defining apertures corresponding to and greater in size than said jacket openings;  
(b) continuously laminating said panels of cut wiping fabric to a roll of jacket material;  
(c) continuously removing the portions of the cut wiping fabric that lie inside said apertures;  
(d) forming jacket blanks having openings and a central jacket fold, wherein the edges of the fabric panels are out of registry with the edges of said openings in the jacket, and wherein the edges of the fabric panels are set back from the central jacket fold; and  
(e) folding and sealing each jacket blank around a flexible magnetic recording disk to provide a diskette.

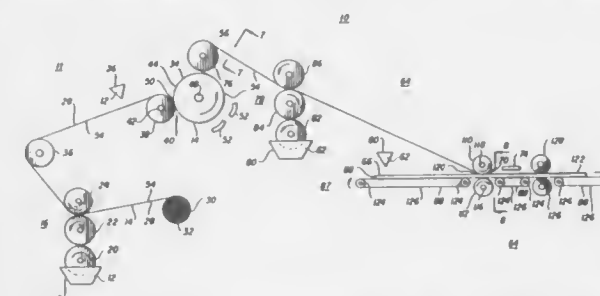
**4,946,531**  
**PROCESS FOR HARDCOATING POLYCARBONATE SHEET**  
Earl T. Crouch, and Ronald F. Sietloff, both of Evansville, Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 1, 1988, Ser. No. 278,649

Int. Cl.<sup>5</sup> B32B 31/28

U.S. Cl. 156—242

2 Claims

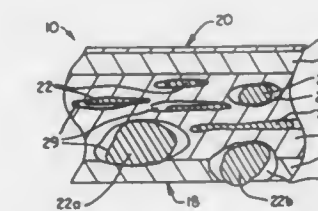


1. A process for producing a hardcoated aromatic polycarbonate resin sheet, said process comprising the steps of:  
(a) hardcoating a flexible aromatic polycarbonate film having a thickness selected from between about 0.5 mils and

- about 30 mils, the hardcoating of the film being a continuous procedure involving:  
(i) applying an uncured coating material to the film, the coating material comprising an amount of polyfunctional acrylate ester monomers and an amount of a photoinitiator;  
(ii) passing the film and applied uncured coating material through a constant pressure compression nip, the compression nip pressure being selected from between about 5 psi to about 50 psi to provide a substantially uniform layer of uncured coating material on the film;  
(iii) anaerobically contacting the uniform coating layer with a peripheral surface of a longitudinally rotateable, cylindrical casting drum;  
(iv) curing the coating layer by directing ultraviolet radiation through the film to the coating layer while the coating layer is in contact with the drum surface to provide a hardcoated film having a cured coating having surface characteristics determined by the casting surface, the cured coating having a thickness selected from between 0.1 mils and 1.0 mils; and  
(b) laminating the hardcoated film onto a rigid aromatic polycarbonate substrate, the substrate having a thickness selected from between about 35 mils to about 1000 mils, the laminating involving:  
(i) preparing an overlay by placing an amount of an acrylic adhesive between a surface of the substrate and an uncoated surface of the hardcoated film, and by bringing the uncoated surface of the film into a position adjacent to the surface of said substrate;  
(ii) passing the overlay through a laminating nip to eliminate diatomic oxygen from between the film and the substrate, and from the adhesive, said laminating nip pressing the overlay with a substantially constant pressure to create a substantially uniform layer of adhesive between the film and the substrate; and  
(iii) curing the adhesive layer by directing ultraviolet radiation through the film to the adhesive layer to cure the adhesive layer and bond the hardcoated film to the substrate, said cured adhesive layer having a thickness selected from between 0.2 mils and 2.0 mil.

**4,946,532**  
**COMPOSITE FACESTOCKS AND LINERS**  
Melvin S. Freeman, Beachwood, Ohio, assignor to Avery International Corporation, Pasadena, Calif.  
Division of Ser. No. 88,402, Aug. 24, 1987, Pat. No. 4,888,075, which is a division of Ser. No. 853,772, Apr. 18, 1986, Pat. No. 4,713,273, which is a continuation-in-part of Ser. No. 699,204, Feb. 5, 1985, abandoned. This application May 16, 1989, Ser. No. 352,766  
Int. Cl.<sup>5</sup> B29C 47/06  
U.S. Cl. 156—243

17 Claims



1. A method of economically manufacturing die-cut labels or signs using roll or sheet facestock, comprising the steps of providing a plurality of at least two charges of film-forming resin, coextruding said charges to thereby form a construction in the form of a multilayer extrudate comprising a relatively thick core layer and at least one relatively thin skin layer, the former layer providing the majority of the dimensional stability.



ity and stiffness of the construction, preselecting the charge for said core layer, as by selection of density or flex modulus, to provide a degree of stiffness suitable for the label or sign application, preselecting the charge for said skin layer to provide a skin adapted to the intended decorating process, such as printability, or surface performance characteristics, such as weatherability, of the facestock, and combining said extrudate with a pressure-sensitive adhesive layer to form label or sign facestock, combining said facestock with a liner, die-cutting said facestock to form a label or sign releasably adhered to said liner and surrounded by a matrix of excess facestock material, and stripping said matrix of excess facestock material to utilize non-tearing self-supporting properties of said material to pull said matrix away from the die-cut label or sign.

4,946,533

# METHOD OF PREPARING VOLUME TYPE HOLOGRAM FILM

Nobuo Kushibiki, Kanagawa; Yoko Yoshinaga, Machida; Naosato Taniguchi, and Tetsuro Kuwayama, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 195,644, May 18, 1988, Pat. No. 4,871,411. This application May 2, 1989, Ser. No. 346,513

Claims priority, application Japan, May 21, 1987, 62-122419; May 21, 1987, 62-122420; May 21, 1987, 62-122421; Oct. 30, 1987, 62-273349

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—249

3 Claims

1. A method of preparing a hologram member having a surface layer on which a grating is not formed, comprising forming a volume type phase hologram in a polymer film formed on a polymer film substrate and comprised of a vinyl-carbazole polymer, separating said polymer film from said polymer film substrate, and then allowing said hologram to be supported on said polymer film substrate so that the surface of said hologram not having contacted said polymer film substrate, contacts said polymer film substrate.

4,946,534

# PROCESS FOR THE PREPARATION OF MAGNETIC RECORDING DISK

Kunihiko Honda; Tadashi Ishiguro, and Masaaki Fujiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1988, Ser. No. 183,804

Claims priority, application Japan, Apr. 20, 1987, 62-96817

Int. Cl.<sup>5</sup> B32B 31/04, 31/18

U.S. Cl. 156—261

4 Claims

1. A process for the preparation of a magnetic recording disk comprising the steps of providing a magnetic recording layer on a surface of a nonmagnetic support, punching the nonmagnetic support together with the magnetic recording layer into a disk having a circular hole in the central portion, and fitting mechanical members including a center core made of a synthetic resin into the hole of the support, wherein the nonmagnetic support as provided with the magnetic recording layer and at least the center core of the mechanical members are subjected to heat treatment independently prior to fitting the mechanical members including the center core into the hole of the support.

# POLYESTER POLYURETHANES CONTAINING HYDROXYL END GROUPS AND THEIR USE AS ADHESIVES

Walter Meckel, Neuss; Horst Müller-Albrecht, Cologne, and Manfred Dollhausen, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 275,253

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502379

Int. Cl.<sup>5</sup> C09J 3/14

U.S. Cl. 156—331.7

7 Claims

1. Substantially linear polyester polyurethane containing hydroxyl end groups, prepared by reacting (a) a polyester diol having a molecular weight above 600 and (b) an organic diisocyanate, optionally in the presence of (c) diols in the molecular weight range of from 62 to 600 as chain lengthening agents,

at an equivalent ratio of hydroxyl groups to isocyanate groups of from 1:0.9 to 1:0.999, and wherein at least 80% by weight of component (a) consists of a polyester diol having a molecular weight of from 4000 to 6000 based on (i) adipic acid and (ii) a mixture of 1,4-dihydroxy butane and 1,6-dihydroxy hexane in a molar ratio of from 4:1 to 1:4.

6. A method for bonding plastics to leather substrates comprising applying the polyester polyurethane of claim 1 to the surfaces to be bonded and then contacting said surfaces.

# METHOD OF MAKING A FUSION BONDED CARTRIDGE

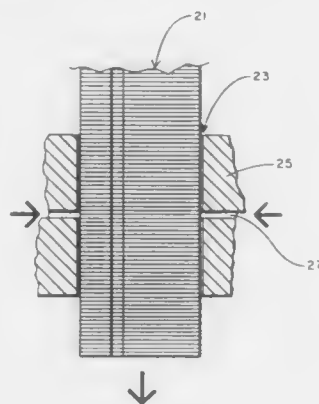
John T. Roberts, Rte. 5, Box 198B, Clover, S.C. 29710

Division of Ser. No. 45,223, Apr. 29, 1987, Pat. No. 4,811,861, which is a continuation-in-part of Ser. No. 421,859, Sep. 23, 1982, abandoned. This application Dec. 12, 1988, Ser. No. 282,575

Int. Cl.<sup>5</sup> B32B 31/26

U.S. Cl. 156—272.2

3 Claims



1. A process for forming a dispensing cartridge comprising the steps of: stacking a plurality of individual articles formed of rigid or semi-rigid thermoplastic articles one upon the other to form a stack; and passing said stack through a heating zone to fusion bond the articles to one another about the periphery of each article; said step of passing to form a fusion bond being carried out to form said bond without the formation of visual discontinuities and to permit non destructive removal of each of said individual articles from an end of said stack by shearing.

4,946,537

# PLASMA REACTOR

Isamu Hijikata, and Akira Uehara, both of Kanagawa, Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan

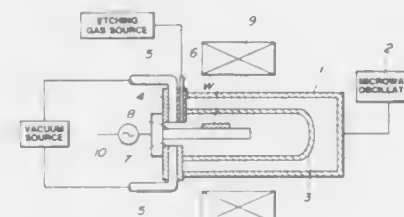
Filed Jun. 26, 1989, Ser. No. 371,743

Claims priority, application Japan, Jul. 12, 1988, 63-173516

Int. Cl.<sup>5</sup> H01L 21/306; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—345

9 Claims



1. A plasma reactor comprising:

a chamber;  
means for generating a plasma in said chamber;  
means for generating a magnetic field in said chamber;  
support means disposed in said chamber for supporting a specimen to be treated, parallel to the generated magnetic field;  
a waveguide which houses said chamber and associated with a microwave oscillator;  
a vacuum source and a reaction gas source which are connected to said chamber; and  
a high-frequency power supply connected to said support means.

4,946,538

# PRECISION APPARATUS FOR PLACING FILAMENTS

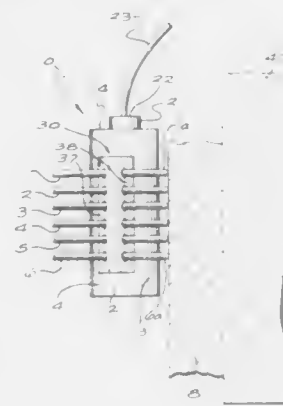
Robert H. Bendarzewski, deceased, late of Westlake Village, Calif. (by Alexandra Bendarzewski, legal representative), and Andrew M. Zsolnay, P.O. Box 7554, Burbank, Calif. 91510, assignors to Andrew M. Zsolnay, Burbank, Calif.

Filed Dec. 28, 1988, Ser. No. 291,211

Int. Cl.<sup>5</sup> B32B 31/00

U.S. Cl. 156—361

22 Claims



1. Apparatus for placing filaments on a tool, comprising: a drum mounted for rotation;  
means for independently feeding a plurality of tows of such filaments to the drum;  
a plurality of guides, defined along the drum, for receiving the plurality of tows respectively from the feeding means; gathering means for rotating the drum in a first direction, to wind up on the drum, through the guides, respective segments of the plurality of tows; and  
depositing means for rotating the drum in the opposite direc-

tion, to unwind from the drum said respective segments of the plurality of tows.

21. Apparatus for placing filaments on a tool, comprising: a drum mounted for rotation;  
means for independently feeding a plurality of tows of such filaments to the drum;  
a plurality of guides, defined along the drum, for receiving the plurality of tows respectively from the feeding means; gathering-and-depositing means, including bidirectional drum-rotating means and a controller to automatically operate the bidirectional drum-rotating means, for rotating the drum alternately:  
in a first direction, to wind up on the drum, through the guides, respective segments of the plurality of tows, and  
in the opposite direction, to unwind from the drum said respective segments of the plurality of tows.

4,946,539

# APPARATUS FOR APPLYING CONTOURED ELASTIC TO A SUBSTRATE

Thomas M. Ales; Jeffrey J. Samida, both of Neenah; Donald F. Arthur, and Ronald H. Wideman, both of Menasha, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis. Continuation of Ser. No. 111,967, Oct. 22, 1987, abandoned, which is a division of Ser. No. 791,885, Oct. 28, 1985, Pat. No. 4,726,873. This application Apr. 4, 1989, Ser. No. 334,066

Int. Cl.<sup>5</sup> B29C 55/06

U.S. Cl. 156—495

8 Claims



1. Apparatus for applying a self-adhering elastic to a web comprising means to bring at least one strand of self-adhering elastic into contact with one of a multiple pattern of supports extending outwardly from an applicator drum having a release surface for the self-adhering elastic, means to attach and to cut said elastic to form at least one loop, means to bring a web into contact with said supports, and means to withdraw said supports into said applicator drum as said elastic held by said supports and said supports are both pressed by said web.

4,946,540

# APPARATUS FOR THE MANUFACTURE OF LAMINATED BULK BOXES

John M. Mitchard, Cherry Hill, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed Nov. 16, 1988, Ser. No. 272,088

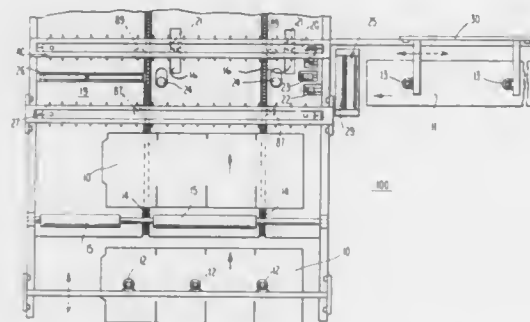
Int. Cl.<sup>5</sup> B65B 41/00

U.S. Cl. 156—556

23 Claims

1. In an apparatus for laminating a liner to a blank, said apparatus having supports for stacks of box blanks and liners, a laminating table disposed to receive said blanks and liners, shuttle means disposed between said supports and said laminating table, said shuttle means having means for gripping and lifting said blanks and liners and being adapted to take alternately blanks and liners from said stacks on said supports to said laminating table and place a blank in registered position on

the laminating table and a liner in registered position on the blank, first stop means projecting upwardly from the laminating table to limit the forward and side motions of the blank and register it in position as it is placed on the laminating table, second stop means movable into position over the blank to limit the forward and side motions of the liner and register it in position on the blank, adhesive applying means disposed to apply adhesive to the liner as it moves from the stack of liners



to the laminating table, and means to convey the laminated liner-blank from the laminating table, wherein said shuttle means of said apparatus comprises:

- blank shuttle means movable in a first direction;
- liner shuttle means movable in a second direction, and
- pusher means disposed to successively register both said blank and liner in a cross-machine direction on said laminating table.

4,946,541

#### PRESS FOR FORMING AN ENDLESS CONVEYOR BELT AND FOR REPAIRING A CONVEYOR BELT

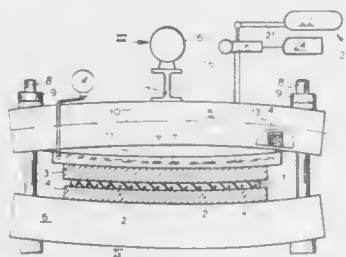
Peter Thies, Ennepetal, and Harald Fudickar, Solingen-Gräfrath, both of Fed. Rep. of Germany, assignors to C. S. Fudickar KG, Wuppertal, Fed. Rep. of Germany  
Filed Nov. 29, 1988, Ser. No. 277,560

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742650

Int. Cl.<sup>5</sup> B30B 15/06

U.S. Cl. 156—580

10 Claims



1. A press for forming an endless conveyor belt and for repairing a conveyor belt, the press comprising:
  - upper and lower heatable press platens;
  - a plurality of pairs of lower transversely extending crossbars below the press platens;
  - respective upper transversely extending crossbars above the upper press platen each directly above a respective lower crossbar;
  - respective upper press plates arranged between the upper crossbars and the upper platen;
  - at least one longitudinally extending beam fixed to the upper crossbars;
  - means for pressing the respective plates downward and

thereby vertically compressing a conveyor belt engaged between the platens, the means including respective transversely extending hydraulic tubes of uniform section positioned adjacent one another and each engaging downward against the upper press platen via the respective upper plate and upward against the upper crossbars; and

two vibratory motion-inducing generators mounted respectively on the longitudinal beam and on one of the platens and operable to vibrate same.

4,946,542

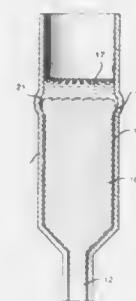
#### CRYSTAL GROWTH METHOD IN CRUCIBLE WITH STEP PORTION

Jim E. Clemans, Hopewell Township, Mercer County, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
Filed Dec. 5, 1988, Ser. No. 280,059

Int. Cl.<sup>5</sup> C30B 27/00, 29/00

U.S. Cl. 156—607

12 Claims



1. A process for making large single crystals of a semiconductor material comprising the steps of: introducing into the bottom part of a crucible a relatively small monocrystalline seed crystal of the material; introducing over the seed crystal a quantity of raw material from which the single crystal may be made and an encapsulant material; heating the crucible to melt the raw material, the encapsulant material, and part of the seed crystal; the molten encapsulant material having a lower density than the molten semiconductor material so as to float on the molten semiconductor material; and freezing the semiconductor material such that it extends as substantially a single crystal from the seed crystal, wherein:

the inner surface of the crucible has a larger periphery portion and a smaller periphery portion defining therebetween a step portion extending around the periphery of the inner surface of the crucible;

at least part of the larger periphery portion is located between the molten encapsulation material, as it is supported on the frozen semiconductor material, and the smaller periphery portion;

the larger periphery portion causes the frozen large single crystal to have a bulge in a portion of its outer periphery, whereby, when the molten semiconductor material freezes, the bulge in the outer periphery of the frozen semiconductor crystal nests against the step portion around the inner surface of the crucible, thereby to prevent molten encapsulant material from flowing between the semiconductor crystal and the crucible.

4,946,543

#### METHOD AND APPARATUS FOR GROWING FILMS ON A SUBSTRATE

Murray H. Kalisher, 555 S. San Marcos Rd., Santa Barbara, Calif. 93111, and Paul E. Herning, 1410 N. Refugio Rd., Santa Ynez, Calif. 93460

Continuation of Ser. No. 870,478, Jun. 2, 1986, abandoned. This application Mar. 29, 1988, Ser. No. 178,803

Int. Cl.<sup>5</sup> C30B 23/06

U.S. Cl. 156—612

13 Claims



1. A method for forming films on a plurality of substrates comprising the steps of:

loading source material into a first reservoir portion of an annular capsule, said annular capsule having an interior region operable to accommodate said plurality of substrates, said annular capsule having an open ended portion axially extended from said first reservoir portion, said first reservoir portion having an aperture connecting said first reservoir portion to said interior region of said annular capsule;

loading source material into a second reservoir portion of a removable annular plug, said second reservoir portion having an aperture connecting said second reservoir portion to said interior region of said annular capsule when said removable annular plug is inserted into said annular capsule;

positioning a plurality of substrates in said annular capsule between said first reservoir portion and said open ended portion such that said plurality of substrates are substantially perpendicular to the axial center line of said annular capsule;

inserting said removable annular plug into said open ended portion of said annular capsule until said first and second reservoir portions lie substantially equidistant from the center of said plurality of said substrates; and

growing said films on said substrates by vaporizing said source material and allowing the constituents of said source material to interdiffuse with the constituents of said substrates, said films comprising the constituents of said source material and the constituents of said substrate; whereby the growth of said films may be controlled by the size of said aperture connecting said first reservoir portion to said interior region of said annular capsule and the size of said aperture connecting said second reservoir portion to said interior region of said annular capsule.

4,946,544

#### CRYSTAL GROWTH METHOD

Theophilus I. Ejim, Fairless Hills, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 27, 1989, Ser. No. 315,667

Int. Cl.<sup>5</sup> C30B 11/02, 17/00, 27/00, 29/40

U.S. Cl. 156—616.41

7 Claims

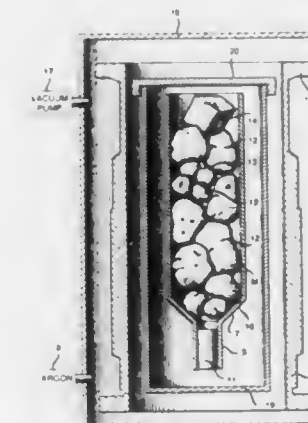
1. A process for making crystalline III-V material comprising:

introducing into the bottom end of a vertically-extending crucible a relatively small monocrystalline seed crystal of III-V material, the top end of the crucible being open; introducing over the seed crystal a quantity of the III-V material in polycrystalline form and a quantity of an elemental group V material, the elemental group V material being of the same element which forms part of the III-V material;

heating the crucible to melt the quantity of III-V material and the quantity of group V material to form a melt; the heating step resulting in the vaporization of at least part of the quantity of group V material;

applying an external pressure of gas to the surface of the melt, the gas being of a material having a lower density than that of the group V material and which does not significantly react with the III-V material or the elemental group V material;

the applied gas pressure exceeding a pressure equal to about the equilibrium pressure of the vaporized group V element at the melting temperature of the III-V material; containing vapor of the group V element in a volume above and contiguous to the surface of the melt;



and freezing the III-V material such that at least a major portion of it extends as a single crystal from the seed crystal;

the freezing step comprising the step of reducing the temperature in the crucible such that freezing proceeds from the seed end of the crucible toward the open end;

the quantity of elemental group V material introduced into the crucible being sufficient such that vaporized group V material displaces at least part of the gas in the volume over the surface of the melt during substantially the entire freezing step;

the quantity of elemental group V material introduced into the crucible and the applied gas pressure together being insufficient to cause a significant richness of group V material in the frozen III-V crystal.

4,946,545

#### METHOD OF GROWING HOMOGENEOUS CRYSTALS

Günter Engel, Leitring; Alfred Enko, Graz; Peter W. Krempel, Graz/Ragnitz, and Uwe Posch, Graz, all of Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof. Dr. Dr. h.c. Hans List, Graz, Austria

Filed Aug. 31, 1988, Ser. No. 238,580

Claims priority, application Austria, Sep. 4, 1987, 2242/87

Int. Cl.<sup>5</sup> C30B 7/10, 29/14

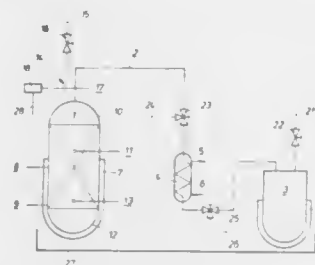
U.S. Cl. 156—623 R

12 Claims

1. A method of growing homogeneous crystals in a growing tank from a hydrothermal growing solution, solubility of said crystals in said growing solution decreasing with an increase in temperature, consisting essentially of preheating an unsaturated growing solution which includes a dissolved salt corresponding to the crystals being grown to a temperature close to but less than saturation temperature, said preheating being carried out in an external tank separate from said growing tank,



adding said preheated growing solution to said growing tank having seed crystals therein, and heating said growing solution



in said growing tank to a temperature at which crystal growth is initiated.

4,946,546

# METHOD OF METALLIZING A SUBSTRATE OF SILICA, QUARTZ, GLASS OR SAPPHIRE

Jean-Paul Bourgeois-Moine, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 289,282

Claims priority, application France, Dec. 23, 1987, 87 18039

Int. Cl.<sup>5</sup> B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—643

13 Claims



1. A method of adhering a metal to a surface of a substrate of silica, quartz, glass or sapphire, in which the surface is first roughened by mechanical abrasion in order to obtain a surface roughness lying between 0.2  $\mu\text{m}$  and 0.7  $\mu\text{m}$  and is then subjected to a chemical treatment of etching by immersion in an aqueous hydrofluoric acid solution, characterized in that it further comprises the subsequent steps of ion etching (in a neutral medium) of the surface down to a depth smaller than 30 nm, and applying to the surface a first metallic adherence layer by cathode sputtering.

4,946,547

# METHOD OF PREPARING SILICON CARBIDE SURFACES FOR CRYSTAL GROWTH

John W. Palmour, Hua-Shuang Kong, both of Raleigh, and John A. Edmond, Apex, all of N.C., assignors to Cree Research, Inc., Durham, N.C.

Filed Oct. 13, 1989, Ser. No. 421,375

Int. Cl.<sup>5</sup> H01L 2/306; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—643

25 Claims

1. A method of epitaxially growing a monocrystalline silicon carbide thin film on a silicon carbide surface that reduces defect density in the resulting thin film and in the interface between the thin film and the silicon carbide surface, the method comprising:

forming a substantially planar surface on a monocrystalline silicon carbide crystal;

exposing the substantially planar surface to an etching plasma until any surface or subsurface damage caused by the mechanical preparation is substantially removed, but for a time period less than that over which the plasma etch will develop new defects in the surface or aggravate

existing ones, and while using a plasma gas and electrode system that do not themselves cause substantial defects in the surface; and depositing a thin film of monocrystalline silicon carbide upon the etched surface by chemical vapor deposition.

4,946,548

# DRY ETCHING METHOD FOR SEMICONDUCTOR

Masahiro Kotaki, and Masafumi Hashimoto, both of Nagoya, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai; Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi and Research Development Corporation of Japan, Tokyo, all of Japan

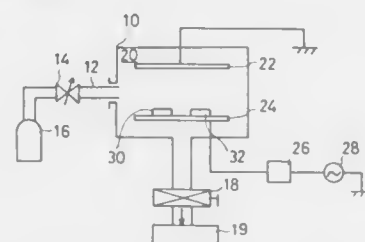
Filed Apr. 17, 1989, Ser. No. 338,855

Claims priority, application Japan, Apr. 29, 1988, 63-108666; Apr. 29, 1988, 63-108667

Int. Cl.<sup>5</sup> H01L 21/306

U.S. Cl. 156—643

4 Claims



1. A dry etching method for  $\text{Al}_x\text{Ga}_{1-x}\text{N}$  ( $0 \leq x \leq 1$ ) semiconductors comprising: introducing carbon tetrachloride ( $\text{CCl}_4$ ) etching gas into a reaction chamber under vacuum; applying high-frequency power to produce plasma of said carbon tetrachloride gas; and etching said  $\text{Al}_x\text{Ga}_{1-x}\text{N}$  ( $0 \leq x \leq 1$ ) semiconductor with said plasma.

4,946,549

# METHOD FOR FABRICATING OR MODIFYING AN ARTICLE COMPRISING THE REMOVAL OF A POLYMER COATING

Bonnie J. Bachman, Chester; Elizabeth A. Hofstatter, East Hanover; Joan M. Ritter, Fanwood, and Jerry J. Rubin, Warren, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 27, 1989, Ser. No. 428,137

Int. Cl.<sup>5</sup> B44C 1/22; C03C 15/00, 25/06; B29C 37/00

U.S. Cl. 156—643

19 Claims

1. Method of fabricating or modifying an article, the article comprising a body comprising, at least some time during the fabrication or modification, a polymer layer, the method comprising:

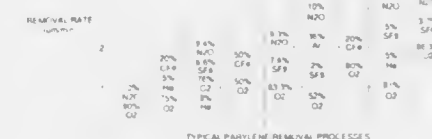
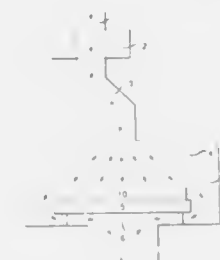
(a) removing at least a portion of the polymer layer from the body by a process that comprises:

(i) causing a flow of gas into a plasma chamber, the gas flow comprising oxygen and optionally comprising one or more additives chosen from the group consisting of  $\text{N}_2\text{O}$ , He, Ne, Ar, Kr, and Xe, where, during at least a portion of the process, the volume percentage of the total additives to the total gas flow is in the range 0% to 60%;

(ii) generating a plasma in the plasma chamber, thereby producing plasma discharge products;

(iii) causing at least a portion of the plasma discharge products to enter a reaction chamber through an inlet, the body located in the reaction chamber such that the plasma discharge products contact the body, reacting with at least a portion of the polymer layer, and forming

an exhaust gas comprising reaction by-products and unreacted plasma discharge products; and (iv) causing the exhaust gas to exit the reaction chamber; and (b) completing fabricating or modifying the article; characterized in that (c) the polymer is a member of the group consisting of poly-para-xylylene, its derivatives, and co-polymers, (d) the flow of gas further comprises at least one second gas selected from the group consisting of fluorocarbons of



general formula  $\text{C}_x\text{F}_y$ , with x and y being integers,  $1 \leq x \leq 4$  and  $1 \leq y \leq 12$ ; fluorosulfides of general formula  $\text{S}_r\text{F}_t$ , with r and t being integers,  $1 \leq r \leq 3$  and  $1 \leq t \leq 16$ ; and chlorofluorocarbons of general formula  $\text{C}_u\text{F}_v\text{Cl}_w$ , with u, v, and w being integers,  $1 \leq u \leq 2$  and  $1 \leq v \leq 2$ , and  $1 \leq w \leq 2$ , wherein the integers are chosen such that each second gas is a stoichiometric gas at room temperature; (e) the plasma is a microwave plasma; and (f) the plasma chamber is separate from the reaction chamber, and is connected to the reaction chamber by tubular means.

4,946,550

# FORMING ELECTRICAL CONNECTIONS FOR ELECTRONIC DEVICES

Josephus M. F. G. Van Laarhoven, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 21, 1989, Ser. No. 313,661

Claims priority, application United Kingdom, Mar. 30, 1988, 8807579

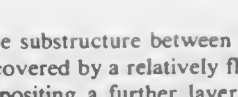
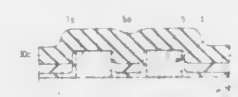
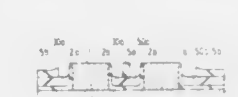
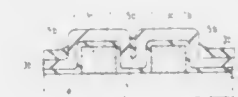
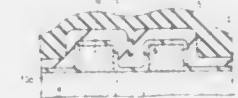
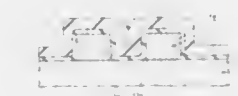
Int. Cl.<sup>5</sup> H01L 21/306; B44C 1/22; C03C 15/00; C23F 1/02

U.S. Cl. 156—643

18 Claims

1. A method of providing insulating material on an electrically conductive level of a substructure forming part of an electronic device, which electrically conductive level has at least two spaced-apart electrically conductive regions, which method comprises providing insulating material over the electrically conductive level to a thickness insufficient for insulating material on adjacent conductive regions to meet, thereby leaving a recess in the insulating material between the conductive regions, applying a planarising medium onto the insulating material, etching the planarising medium so as to expose a top surface of the insulating material, thereby leaving planarising medium in the recess, etching the insulating material anisotropically using the remaining planarising medium as a mask so that the surface of the electrically conductive level is exposed, characterised by controlling the etching of the insulating mate-

rial so that the insulating material is etched away just down to the bottom of the planarising medium in the recess, and then removing the remaining planarising medium, thereby leaving



the surface of the substructure between the electrically conductive regions covered by a relatively flat layer of insulating material, and depositing a further layer onto the remaining relatively flat layer of the insulating material.

4,946,551

# METHOD AND APPARATUS FOR LAMINATING THERMOPLASTIC SHEETS

Yoshiki Ishige; Shoji Sato; Hisashi Masuda; Yoji Ushiki; Kiyoshi Kumagai; Junichi Saida, and Kiyoshi Minoya, all of Sayama, Japan, assignors to Honda Gikin Kogyo Kabushiki Kaisha, Tokyo, Japan

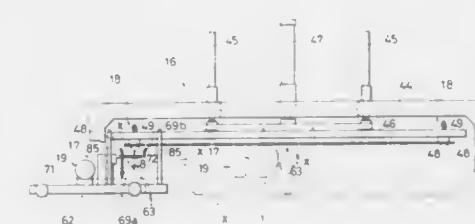
Filed Aug. 10, 1989, Ser. No. 391,987

Claims priority, application Japan, Aug. 10, 1988, 63-198069; May 31, 1989, 1-135898

Int. Cl.<sup>5</sup> B32B 5/02

U.S. Cl. 156—222

16 Claims



1. An apparatus for heating a plurality of thermoplastic sheets, laminating the heated thermoplastic sheets into a lami-

nated assembly, charging the laminated assembly into a shaping die assembly, and pressing the laminated assembly with the shaping die assembly, said apparatus comprising:

transfer means for transferring onto a mount table the thermoplastic sheets which are arranged in a juxtaposed relationship in the order in which the sheets will be laminated; mount table feed means for feeding said mount table along a path to a laminating position in which the sheets are laminated into the laminated assembly;

heating means disposed in said path for heating the sheets on said mount table;

holder means in said laminating position for penetrating the sheets on said mount table with needles from above to detachably hold the sheets and removing the sheets from said mount table while keeping the sheets in the juxtaposed relationship;

support means having a support member for supporting the sheets horizontally, said support member being movable below the sheets held by said holder means in said laminating position and relatively to the sheets in a direction in which the sheets are arranged in the juxtaposed relationship;

laminated assembly forming means for moving said support means relatively to the sheets held by said holder means and for causing the sheets to be released from said needles onto said support member to stack the sheets thereon into the laminated assembly while said support member is being moved relatively to the sheets;

feed means for delivering said support means with the laminated assembly supported thereon from said laminating position into a charging position in the shaping die assembly, and for delivering said support means from said shaping die assembly toward said laminating position after the laminated assembly has been charged into said shaping die assembly in said charging position; and

charging means for charging the laminated assembly into said shaping die assembly from said support member which has been delivered into said charging position.

15. A method of laminating a plurality of thermoplastic sheets into a laminated assembly, and pressing the laminated assembly, said method comprising the steps of:

heating the sheets to be laminated in one cycle while the sheets are arranged in a juxtaposed relationship in the order in which they are to be laminated; penetrating the heated sheets with needles to detachably hold the sheets while keeping the sheets in the juxtaposed relationship; moving a support member which supports the laminated assembly below the sheets held and relatively to the sheets in a direction in which the sheets are arranged in the juxtaposed relationship, and releasing the sheets from said needles onto said support member to stack the sheets thereon into the laminated assembly while said support member is being moved relatively to the sheets;

delivering said support member into a shaping die assembly; charging the laminated assembly on the support member which has been delivered into the shaping die assembly, into a charging position in the shaping die assembly, and delivering the support member from the shaping die assembly; and

pressing the laminated assembly into a shaped product with the shaping die assembly after the laminated assembly has been charged into said charging position.

4,946,552

#### METHOD OF MAKING A CARDBOARD COMPOSITE PATTERN

Grant L. Onnle, 301 Academy St., Ferndale, Mich. 48220  
Filed Jan. 27, 1989, Ser. No. 302,372

Int. Cl.<sup>5</sup> B29C 67/22

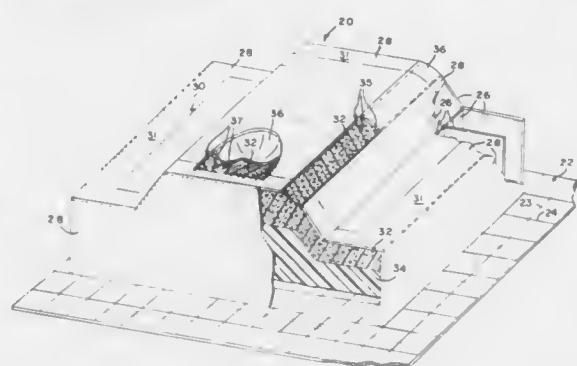
U.S. Cl. 156—250

2 Claims

1. Process for making a cardboard composite pattern comprising joining together a plurality of cardboard templates and cardboard surface parts disposed so as to simulate a prototype

part as same will be positioned in a die position, the surface parts having such extent of surface area as to provide the cardboard composite pattern with its exterior surface save for curved surfaces thereof, the curved surfaces of the cardboard composite pattern being provided by the following steps:

- covering interior surfaces of the surface parts with a layer of an hardenable two-part foamable material and foaming said material into a rigid foam mass;
- cutting said surface parts and said foam mass along tangent lines and wherever else curvature is needed to expose a foam substrate;



(iii) then covering such cut surface parts and cut foam substrate with a pliable material and shaping and smoothing said pliable material to form the curved surfaces for the cardboard composite pattern; and

(iv) thereafter coating the cardboard surface parts and the curved surfaces of pliable material with an hardenable sealant to fix a surface finish of the cardboard composite pattern, the exterior surface of the cardboard composite pattern duplicating the desired prototype part to within tolerances of plus or minus one millimeter.

4,946,553

#### APPARATUS FOR INTERFACING AN OPTICAL FIBER TO AN OPTICAL SOURCE

Daniel P. Courtney, Wilbraham, and Timothy J. Bailey, Longmeadow, both of Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 8, 1988, Ser. No. 241,739

Int. Cl.<sup>5</sup> B32B 31/04

U.S. Cl. 156—304.1

17 Claims

1. Apparatus for interfacing and aligning an optical fiber to an optical source, comprising:

a source carrier;

said source carrier having a surface in a XY plane and a surface in a YZ plane;

an optical light source,

said optical light source having an aperture for providing light;

said optical light source attached to said source carrier and aligned with



an optical fiber attached to said source carrier, a fiber carrier, said fiber carrier having a surface in a XY plane and a surface in a XZ plane; said source carrier being interfaced and bonded to a common XY plane of said fiber carrier whereby said optical fiber length is supported in the region adjacent to the fiber carrier source carrier interface, to provide maximum stability in high gravitational environments.

4,946,554

#### MOLD FOR RECAPPING A TIRE

Arthur W. Magee, Richardson; Richard D. Shockley, Dallas, and Michael E. Crawford, Irving, all of Tex., assignors to Long Mile Rubber Company, Inc., Athens, Ga.

Division of Ser. No. 601,543, Apr. 18, 1984, Pat. No. 4,588,460.

This application Jan. 31, 1986, Ser. No. 825,683

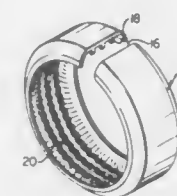
The portion of the term of this patent subsequent to Dec. 20,

2005, has been disclaimed.

Int. Cl.<sup>5</sup> B29D 30/54

U.S. Cl. 156—909

4 Claims



1. Mold apparatus for retreading a built-up tire carcass of a given outer circumference, comprising:

a flexible elastomeric arcuate segment having a first and second end, and an inner surface, said segment dimensioned to be generally disposed circumferentially about the built-up tire carcass;

a pattern of ribs extending radially inward from the inner surface of said segment, said pattern defining the negative contour of a desired tread pattern; and

said segment having an inner tread pattern circumferential length somewhat shorter than the outer circumference of the built-up tire carcass such that said rib pattern causes said first and second end to be separated by a gap when said pattern is not fully imbedded in the surface of the built-up tire carcass, and such that said first and second ends are abutable when said pattern is fully imbedded in the surface of the built-up tire carcass during curing of said tire carcass.

4,946,555

#### APPARATUS AND METHOD FOR MEASURING VENT GAS FLOW RATES AND PARAMETERS IN PULP AND PAPER PROCESSING

Robert G. H. Lee, Montreal; Derek Hornsey, Beaconsfield; José Dieguez, St-Bruno, all of Canada, and Arthur S. Perkins, Moraga, Calif., assignors to Canadian Liquid Air Ltd./Air Liquide Canada, Montreal, Canada

Filed Jan. 19, 1989, Ser. No. 298,749

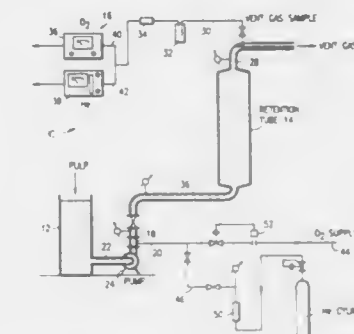
Int. Cl.<sup>5</sup> B21C 9/147

U.S. Cl. 162—49

6 Claims

1. In a method of treating an aqueous cellulosic pulp with oxygen in which a stream of oxygen gas is delivered to the pulp and oxygen is dispersed therein, the pulp with the oxygen is introduced into a reactor and the pulp is reacted with dispersed oxygen in the reactor, the improvement comprising: measuring the flow rate of the stream of oxygen gas, introducing an inert gas, at a known flow rate, into said stream of oxygen gas,

removing a vent gas from said reactor, said vent gas comprising said inert gas and unreacted oxygen, measuring the concentration of said inert gas and the concentration of oxygen in said vent gas, and



determining the oxygen gas consumption of the reactor from the measured parameters, said inert gas being essentially insoluble in said pulp and non-reacting in said reactor and having a property such that it can be determined in the presence of oxygen.

4,946,556

#### METHOD OF OXYGEN DELIGNIFYING WOOD PULP WITH BETWEEN STAGE WASHING

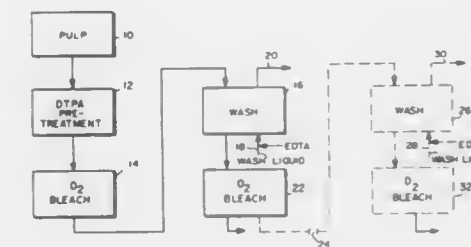
J. Robert Prough, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.

Filed Apr. 25, 1989, Ser. No. 342,937

Int. Cl.<sup>5</sup> D21C 1/04, 9/02, 9/147

U.S. Cl. 162—60

20 Claims



1. A method of oxygen delignifying paper pulp comprising the steps of:

- effecting oxygen delignification of the pulp to a given degree of delignification in at least two consecutive stages for a time of at least about 30 minutes each; and
- effecting washing of the pulp between each of said at least two consecutive stages under conditions to maximize viscosity for a given degree of delignification.

4,946,557

#### PROCESS FOR THE PRODUCTION OF PAPER

Per J. Svending, Knogälv, Sweden, assignor to Eka Nobel AB, Surte, Sweden

Continuation-in-part of Ser. No. 165,635, Mar. 8, 1988, abandoned. This application Feb. 24, 1989, Ser. No. 315,349

Int. Cl.<sup>5</sup> D21H 17/32, 17/44, 17/68

U.S. Cl. 162—168.3

7 Claims

1. A process for the production of paper, by forming and dewatering a suspension of cellulose containing fibers and optionally fillers on a wire, with improved retention and dewatering, characterized in that the forming and dewatering takes place in the presence of a cationic silica based sol and a cationic

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polymeric retention agent selected from the group consisting of cationic guar gum and synthetic cationic polymers wherein the weight ratio of said cationic retention agent to cationic silica particles is at least 0.01:1.

4,946,558

## WATER DISTILLING APPARATUS

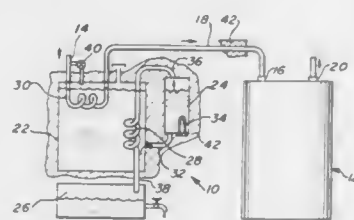
Michael E. Salmon, Spartanburg, S.C., assignor to Terrill Designs, Inc., Spartanburg, S.C.

Filed Dec. 9, 1988, Ser. No. 282,026

Int. Cl.<sup>5</sup> B01D 3/02, 3/42; C02F 1/02

U.S. Cl. 202-167

34 Claims



1. A water distiller for use in conjunction with hot water heater, said distiller comprising:  
a heat storage tank for holding water;  
an evaporator tank for boiling water having a water inlet, heating means for boiling the water, and an outlet for steam;

first heat exchanger means for condensing steam and transferring the heat generated thereby to the heat storage tank, said first heat exchanger means provided with a steam inlet coupled to the evaporator tank outlet, and a distilled water outlet; and

second heat exchanger means for transferring heat from the heat storage tank to water provided to the hot water heater, said second heat exchanger means having an inlet coupled to a source of pressurized water, and an outlet coupled to the hot water heater.

11. A water distiller for use in conjunction with a hot water heater, said distiller comprising:

a heat storage tank for holding water having an inlet, and an outlet;

an inlet valve cooperating with the heat storage tank inlet and a source of water;

an evaporator tank for boiling water having a water inlet, heating means for boiling the water, and an outlet for steam;

first heat exchanger means for condensing steam and transferring the heat generated thereby to the storage tank, said first heat exchanger means provided with a steam inlet coupled to the evaporator tank outlet, and a distilled water outlet; second heat exchanger means for transferring heat from the heat storage tank to water provided to the hot water heater, said second heat exchanger means having an inlet coupled to a source of pressurized water, and an outlet coupled to the hot water heater;

a reservoir having an outlet and an inlet for receiving the distilled water from the first heat exchanger means outlet; a reservoir level sensor for sensing the water level therein; and

control means for automatically regulating the operation of the distiller, said control means cooperating with the reservoir level sensor and the heating means to maintain the amount of distilled water in the reservoir within a predetermined range.

4,946,559

## REMOVAL OF DISSOLVED VOLATILE IMPURITIES FROM LIQUID

Rolf Kroneld; Markku Reunanen, both of Turku, and Esko Huhta-Kolvisto, Espoo, all of Finland, assignors to Oy Santasalo-Sohlberg AB, Finland

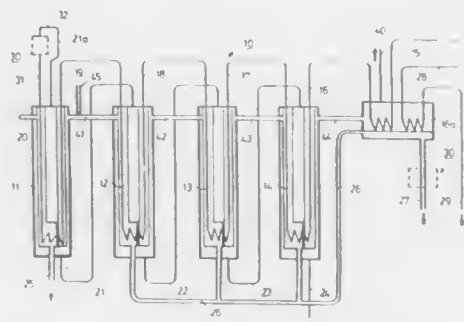
Filed Nov. 3, 1988, Ser. No. 266,791

Claims priority, application Finland, Nov. 3, 1987, 874831

Int. Cl.<sup>5</sup> C02F 1/08, 1/20

U.S. Cl. 203-4

4 Claims



1. Method for removing dissolved volatile substance including halogenated hydrocarbon from feed water, comprising the steps of

heating the feed water to temperature at which part of the feed water changes into vapor,

conducting the remaining feed water to a purifying device and discharging the feed water as a thin film into the purifying device, whereby more of the feed water changes into the vapor,

separating the vapor generated in the purifying device from the remaining feed water and conducting the vapor away from the feed water, and

then conducting said thus-purified feed water into at least one stage of a distilling apparatus or evaporator, whereby the thus-purified feed water is evaporated or distilled and the volatile substance which is present in the vapor is removed away from the feed water prior to said distilling or evaporating,

wherein when the feed water is discharged as the thin film into the purifying device, more of the feed water changes into the vapor which disperses the film into numerous droplets,

the film impinging on a wall of the purifying device contributes to conversion of the volatile substance into vaporous form and

as the feed water runs further down the wall, particles of the vaporous volatile substance join the vapor that has been generated from the feed water.

3. Device for removing dissolved volatile substance from feed water comprising

an inlet connector for connection to a source of the feed water to be purified, and for conducting the feed water to the device,

a disperser member for spreading the feed water in the device, means for separating vapor including the volatile substance, an outlet pipe for conducting the vapor out of the device, and

an outlet connector coupled to said device for passing said thus-purified feed water to a distilling apparatus or evaporator, said disperser member being arranged in said device to discharge the feed water therein as a thin film on a wall of said device,

so that part of the feed water changes into vapor which disperses the remaining feed water into numerous droplets running down said wall, which contributes to converting

the volatile substance to vaporous form which mixes with the vapor and is then separated by said separating means and is charged through said outlet pipe.

4,946,560

## PROCESS FOR SEPARATING ALPHA AND INTERNAL OLEFINS

Lynn H. Slaugh, Cypress, and Howard L. Fong, Sugarland, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 27, 1988, Ser. No. 263,218

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 3/34; C07C 7/152

U.S. Cl. 203-38

12 Claims

1. A process for converting a feedstock comprising alpha olefins and internal olefins into a first product wherein the internal olefin content is enriched over that of the feedstock and a second product wherein the alpha olefin content is enriched over that of the feedstock which process comprises:

(a) contacting said feedstock with an anthracene at a temperature ranging of from about 150° to about 275° C. to form an olefin adduct with anthracene,

(b) separating said adduct from the feedstock to leave said first product enriched in internal olefin,

(c) heating said separated adduct at a temperature of from between about 250° to about 400° C. to produce anthracene and an olefin product enriched in alpha olefin, and

(d) separating anthracene from the product of step (c) to produce said second product enriched in alpha olefin.

4,946,561

## PROCESS FOR OBTAINING TRIOXANE FROM AQUEOUS SOLUTIONS BY HIGH-PRESSURE EXTRACTION

Gero Braun, Darmstadt; Karlheinz Burg, and Karl-Friedrich Mück, both of Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

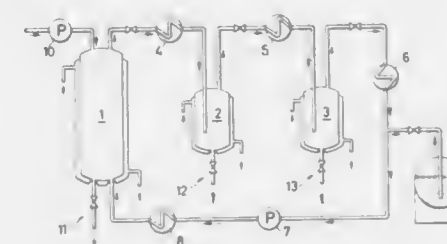
Filed Jun. 6, 1985, Ser. No. 741,754

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1984, 3421300

Int. Cl.<sup>5</sup> B01D 3/34, 11/04; C07D 323/06

U.S. Cl. 203-49

18 Claims



1. A process for the isolation of trioxane by treatment of a dilute aqueous reaction solution containing formaldehyde said solution being obtained (1) after completion of a reaction of formaldehyde to give trioxane, or (2) during said reaction of formaldehyde, the process comprising the steps of (a) contacting and thereby extracting the aqueous solution of trioxane with an extracting agent in an amount of 1-10 kg/kg of trioxane solution, said agent (a1) being maintained during the contacting under supercritical conditions in the temperature range between the critical temperature and 200° C. and in the pressure range between the critical pressure and 1000 bar of the extracting agent, thereby forming a supercritical solution or (a2) being in a subcritical state in the form of a liquified gas in the temperature range between the critical temperature of the liquified gas and 0° C. and a pressure between 5 bar and 500 bar above the particular vapor pressure of the liquified gas, thereby forming a subcritical solution, the resulting solutions of (a1) or (a2) comprising trioxane and extracting agent as well

as water and formaldehyde which are coextracted, (b) separating the substances dissolved in the extracting agent in separators in one or several stages from the extracting agent by (b1) reducing the pressure or the temperature or both (b2) increasing the temperature, such that pressure and temperature are still above the above-mentioned particular critical values or by (b3) decreasing the temperature or the pressure or both into the subcritical region to separate the solutions obtained into the extracting agent and a mixture of concentrated trioxane which is in the form of a slurry of crystals, formaldehyde and water, which are separately discharged from the separators during the separation step.

4,946,562

## APPARATUS AND METHODS FOR SENSING FLUID COMPONENTS

Vinodhini Guruswamy, Bethesda, Md., assignor to MedTest Systems, Inc., College Park, Md.

Continuation of Ser. No. 8,554, Jan. 29, 1987, Pat. No.

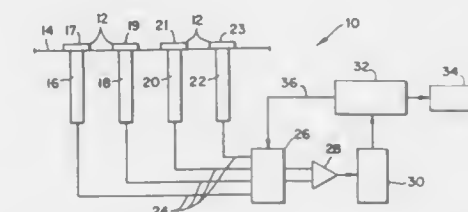
4,762,594. This application Aug. 4, 1988, Ser. No. 228,020

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 27/26

U.S. Cl. 204-153.1

10 Claims



1. A method that is capable of single point calibration measurement of at least first and second dissimilar species in solution employing only ion specific sensors, the ion specific sensors being equal to the number of species plus one where in a multi-component solution containing at least two species to be measured a first sensor is sensitive to the first and second species, a second sensor is sensitive to the first species and a third sensor is sensitive to the second species, the method comprising the steps of:

(a) contacting the sensors with a solution containing the first and second species,

(b) obtaining first and second signals, said first signal being the difference between said first and second sensors and said second signal being the difference between said first and third sensors,

(c) conveying the first and second signals to a signal processor,

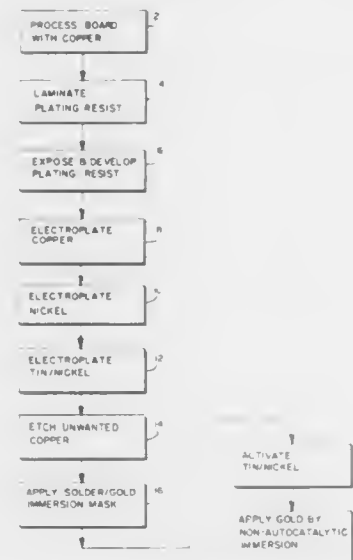
(d) contacting the sensors with a second solution containing known quantities of the first and second species and obtaining third and fourth signals from the first and second sensors and said first and third sensors, respectively,

(e) conveying the third and fourth signals to a signal processor,

(f) establishing algebraic constants from said third and fourth signals,

(g) inputting the constants into a calculating device to determine the concentration of said first and second species.

**4,946,563**  
**PROCESS FOR MANUFACTURING A SELECTIVE PLATED BOARD FOR SURFACE MOUNT COMPONENTS**  
 Alfred T. Yeatts, Effingham, S.C., assignor to General Electric Company, Lynchburg, Va.  
 Filed Dec. 12, 1988, Ser. No. 282,630  
 Int. Cl.<sup>5</sup> H05K 3/34; C25D 5/05  
 U.S. Cl. 204—15

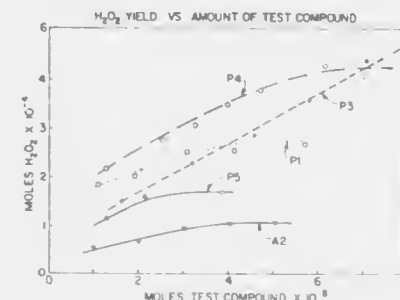


1. A process for manufacturing a printed circuit board for surface mount components comprising the steps of: disposing a non-reflowable coating on the circuit board for retaining the solderability of the circuit board; applying, after said non-reflowable coating has been disposed on said circuit board, a solder mask to the circuit board having said non-reflowable coating thereon, said applying step including the steps of identifying the points to be soldered with said solder mask and identifying the areas to be coated with a precious metal with said solder mask; and applying said precious metal to only those areas of the non-reflowable coating which are exposed by the solder mask.

**4,946,565**  
**PROCESS FOR THE PRODUCTION OF ALKALI METAL CHLORATE**  
 Bo Hakansson, Sundsvall, Sweden, assignor to Eka Nobel AB, Surte, Sweden  
 Filed Oct. 20, 1988, Ser. No. 260,171  
 Claims priority, application Sweden, Oct. 21, 1987, 8704090  
 Int. Cl.<sup>5</sup> C25B 1/14

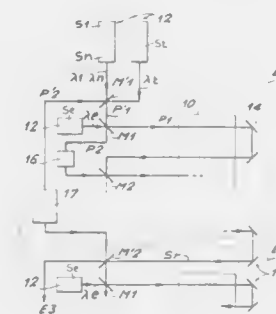
U.S. Cl. 204—95 13 Claims  
 1. A process for the production of alkali metal chlorate comprising electrolysis of an electrolyte containing alkali metal chloride in an electrolyzer, and further comprising the removal of silicon impurities by complex formation of the silicon impurities with iron ions and precipitation wherein the iron ions comprise Fe(II) ions or a mixture of Fe(II) and Fe(III) ions.

**4,946,566**  
**PHOTOCHEMICAL PRODUCTION OF HYDROGEN PEROXIDE**  
 R. D. Samuel Stevens, Thornhill; Stephen R. Cater, and Clarke E. Slemon, both of Willowdale, all of Canada, assignors to Canadian Patents & Development Ltd., Ottawa, Canada  
 Filed Sep. 5, 1989, Ser. No. 402,463  
 Claims priority, application Canada, Oct. 3, 1988, 579701  
 Int. Cl.<sup>5</sup> B01J 19/12  
 U.S. Cl. 204—157.5 23 Claims



1. A photochemical process for the manufacture of hydrogen peroxide wherein a 9,10-phenanthraquinone compound is exposed, in the presence of an effective amount of an hydrogen donor alcohol, to electromagnetic radiation to photoreduce the 9,10-phenanthraquinone compound to the corresponding dihydrocompound, wherein the dihydro-compound obtained is oxidized to produce hydrogen peroxide and to regenerate the 9,10-phenanthraquinone compound, and characterised in that said 9,10-phenanthraquinone compound is a member of the group of compounds consisting of unsubstituted 9,10-phenanthraquinone and 9,10-phenanthraquinone substituted by one or more members of the class consisting of alkyl groups of 1 to 8 carbon atoms, —CF<sub>3</sub>, F and —SO<sub>3</sub>M, M being H or an alkali metal.

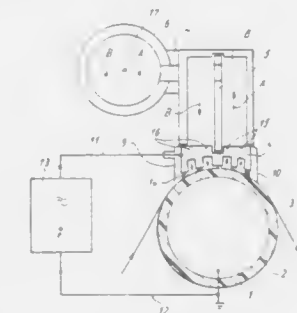
**4,946,567**  
**APPARATUS FOR THE DISTRIBUTION OF LASER BEAMS USED DURING A SELECTIVE REACTION IN A PROCESS FOR ISOTOPE SEPARATION BY LASERS**  
 Maurice Michon, Draveil, and Paul Rigny, Sceaux, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France  
 Filed Dec. 9, 1988, Ser. No. 281,623  
 Claims priority, application France, Dec. 10, 1987, 87 17233  
 Int. Cl.<sup>5</sup> B01D 59/00; H01J 39/34  
 U.S. Cl. 204—157.22 7 Claims



4. Apparatus for the distribution of laser beams used during a laser isotope separation process comprising: in an enclosure (10), a material whereof one species is to be

extracted to remove it from the enclosure, said material being in the form of a vapour flow, first laser sources (12) supplying laser pulses along beams S1 . . . , Sn, n being an integer at least equal to 1, at selective excitation wavelength  $\lambda_1$ , . . . ,  $\lambda_n$  and along a beam St at wavelength  $\lambda_t$  permitting a transformation of said excited species, means (14) for the return of the beams permitting several passages through the enclosure (10), at least two stages, each stage Ei, i being an integer at least equal to 1, comprising: a laser source Se, supplying laser pulses along a beam at wavelength  $\lambda_e$ , a first series of partial reflection mirrors M'j, j being an integer at least equal to 1, arranged in such a way that, with the exception of beam Se, the transmitted and reflected beams S1, . . . , Sn, St are superimposed, one part P'1 of said beams being directed to a mirror MK, the other part P'2 being directed to the next stage E1+1, a second series of partial reflection mirrors each partial reflection mirror Mk, k being an integer at least equal to 1, arranged in such a way that the transmitted and reflected beams S1 . . . , Se, . . . , Sn, St are superimposed, part P1 of the beams being directed to the enclosure (10) and another part P2 to a mirror Mk+1 following the partial reflection mirror Mk, return means (14) making it possible to adjust the length of the path in enclosure (10) between two mirrors Mk and Mk+1, optical delay means (16) permitting the synchronization of the pulses of the beams from a partial reflection mirror Mk and directed to a partial reflection mirror Mk+1 following the partial reflection mirror Mk with the pulses having traversed the enclosure (10) and means (17) for the synchronization of the pulses from one stage E1 with those supplied by the laser source Se at wavelength  $\lambda_e$  from stage E1+1.

**4,946,568**  
**METHOD OF AN ARRANGEMENT FOR CORONA TREATMENT**  
 Klaus Kalwar, Alte Landwehr 10, 4803 Steinhagen; Horst Berger, Bielefeld; Otto Berger, Halle, and Fritz Gumpert, Steinhagen, all of Fed. Rep. of Germany, assignors to Klaus Kalwar, Steinhagen, Fed. Rep. of Germany  
 Filed Jul. 6, 1987, Ser. No. 70,539  
 Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622737  
 Int. Cl.<sup>5</sup> C01B 13/10  
 U.S. Cl. 204—164 62 Claims



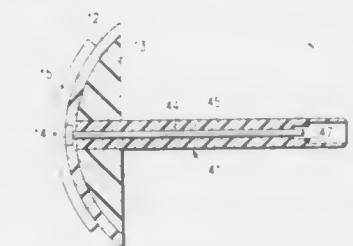
1. A method of corona treatment of web-shaped materials or shaped bodies, comprising the steps of providing a web-shaped material; arranging at least one corona electrode having an operating region for a corona discharge to treat the web-shaped material so as to improve its adhesion which corona discharge produces a gas and a heat; and increasing an efficiency of the treatment by returning into the operating region

of the corona electrode at least one of said gas and said heat at least in a partial quantity.

**4,946,569**  
**CONTROLLED FILM BUILD EPOXY COATINGS APPLIED BY CATHODIC ELECTRODEPOSITION**  
 John M. McIntyre; Nancy A. Rao, and Richard A. Hickner, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.  
 Division of Ser. No. 887,850, Jul. 18, 1986, Pat. No. 4,829,104.  
 This application Jan. 17, 1989, Ser. No. 297,525  
 Int. Cl.<sup>5</sup> C25D 13/06; C08K 3/20; C08L 63/02  
 U.S. Cl. 204—181.7 4 Claims

1. In a process of coating a cationic, epoxy resin-based composition onto an object having an electroconductive surface by steps comprising immersing the electroconductive object into a coating bath comprising an aqueous dispersion of cationic particles of the epoxy-based composition, passing an electric current through said bath sufficient to electrodeposit a coating of said composition on the object by providing a difference of electrical potential between the object and an electrode that is (a) spaced apart from said object, (b) in electrical contact with said bath and (c) electrically positive in relation to said object, the improvement which comprises using as the cationic resin composition a composition comprising a blend of (I) a cationic, epoxy-based resin containing a diglycidylether of a polyether-polyol which has been advanced with a dihydric phenol and (II) a different cationic epoxy-based resin, said blend containing from about 18 to about 90 percent of (I) and from about 10 to about 82 percent of (II) based on the total weight of cationic resin and having a charge density of from about 0.2 to about 0.6 milliequivalent of cationic charge per gram of resin.

**4,946,570**  
**CERAMIC COATED STRIP ANODE FOR CATHODIC PROTECTION**  
 Ashok Kumar, Champaign, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
 Filed Feb. 28, 1989, Ser. No. 316,703  
 Int. Cl.<sup>5</sup> C23F 13/00  
 U.S. Cl. 204—196 30 Claims



1. A cathodic protection device for hydraulic structures which comprises: an elongated shield having a generally convex outer surface, when viewed along a plane perpendicular to the longitudinal axis of the shield, and an inner surface; said inner surface of said shield being generally concave when viewed along a plane perpendicular to the longitudinal axis of said shield, such that said shield has the configuration of a segment of an annular wall which can flex upon being impacted by an external force; said shield being a segment of a cylindrical pipe and the angle of inclusion of said segment being in the range of about 30° to about 180°; said shield having an elongated groove in at least said generally convex outer surface with said groove extending at least generally parallel to said longitudinal axis; an elongated anode having a substrate of a suitable valve



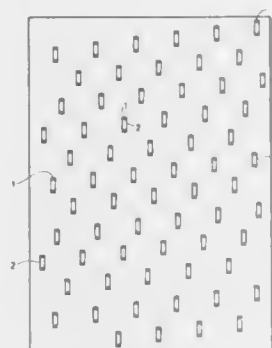
metal and a coating on one face of said substrate, said coating being a suitable electrically conductive ceramic material, said anode being positioned in said shield such that said coating faces outwardly from said shield through said groove;  
means for securing said shield to a hydraulic structure to be protected; and  
means for electrically connecting said anode to a suitable external source of electric power.

#### 4,946,571 ELECTRODE

Heinrich Simon, Langensfeld, and Reinhard Koch, Freige-  
richt, both of Fed. Rep. of Germany, assignors to Heraeus  
Elektroden GmbH, Hanau, Fed. Rep. of Germany  
PCT No. PCT/EP88/00385, § 371 Date Oct. 17, 1988, § 102(e)  
Date Oct. 17, 1988, PCT Pub. No. WO88/08889, PCT Pub.  
Date Nov. 17, 1988

PCT Filed May 6, 1988, Ser. No. 272,894  
Claims priority, application Fed. Rep. of Germany, May 13,  
1987, 8706827

Int. Cl.<sup>5</sup> C25D 17/00  
U.S. Cl. 204—206 10 Claims



1. Electrode for the electrochemical treatment of metal strips, wherein a plurality of spacer elements having an electrically insulating surface protrude from the electrode surface that in operation faces the strip to be treated, characterized in that the spacer elements are spacer rollers (2) aligned in the same direction of travel with respect to one another, and that the roller diameter is between 20 and 60 mm.

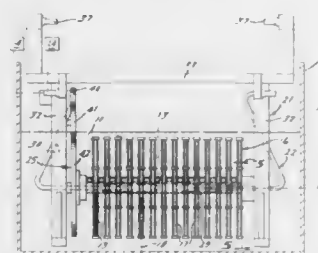
#### 4,946,572

##### ELECTROPLATING OF PRECISION PARTS

John C. Hickey, Ypsilanti, Mich., assignor to Ford Motor Com-  
pany, Dearborn, Mich.

Filed Dec. 27, 1989, Ser. No. 457,676

Int. Cl.<sup>5</sup> C25D 17/16  
U.S. Cl. 204—213 8 Claims



1. An apparatus assembly for use in an electroplating cell

having an electrolyte and one or more sacrificial anodes, com-  
prising:

- (a) an electrically conductive magazine defining a sliding supportive track for electrically conductive articles to be coated, said magazine being supported for turning about an axis generally perpendicular to said track, said maga-  
zine providing freedom for sliding movement of such articles along said track to either side of said axis during each half-revolution of the magazine about the axis;
- (b) means for establishing a current throw through said electrolyte between said anode and article along planes generally parallel to said axis; and
- (c) means for rotatably driving said magazine about said axis so that each of said articles will experience electrolyte flow reversal and a generally equal length path of move-  
ment through said electrolyte for each revolution of the magazine about said axis.

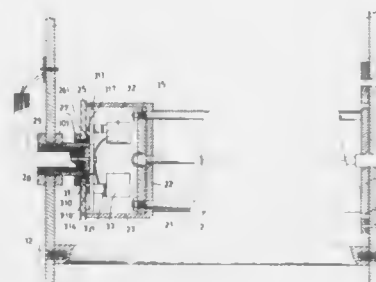
#### 4,946,573

##### PUMP-ATTACHED DIPOLE ELECTRO-PLATING BARREL

Evans Weng, No. 1, Alley 4, Lane 63, Fu Hsin Rd., Taipei,  
Taiwan

Filed Jan. 12, 1990, Ser. No. 464,064

Int. Cl.<sup>5</sup> C25D 17/20  
U.S. Cl. 204—213 6 Claims



1. A pump-attached dipole electro-plating barrel, including:  
a cylinder mounted on two opposite supporting frames and  
driven to rotate by a motor through a speed change gear,  
said cylinder having positioned therein a hexad of elec-  
trodes, an unitary hood circumferentially upstanding from  
an end wall portion thereof covered with a water proof  
cover and sealed with a water packing therebetween, said  
water proof cover having thereon a center hole mounted  
with a socket serving as a shaft collar for connection  
thereto of a shaft element, said shaft element being secured  
to a first support frame and having inserted therein her-  
metically a double-line cable, said double-line cable hav-  
ing its one end respectively connected to an anode conduct-  
ing arm and a cathode conducting arm and having its  
other end coupled with two terminals, said two terminals  
being disposed to penetrate through said socket into said  
water proof hood to further connect to an electric polarity  
changing device, said electric polarity changing device  
including a carbon brush holder connected with said two  
terminals, two carbon brushes, and an electric distributor,  
said electric distributor being comprised of a plurality of  
fan-shaped copper pads respectively arranged in equal

circumferential pitch to form a disc-like structure with  
insulators respectively squeezed therebetween, said fan-  
shaped copper pads being respectively coupled with said  
electrodes to follow said cylinder to rotate so as to alterna-  
tively induce the positive and negative electricity through  
said two terminals to said electrodes; and a flexible impellar  
vane pump mounted on a second supporting frame to  
equalize the electro-plating solution in said cylinder with  
that outside said cylinder.

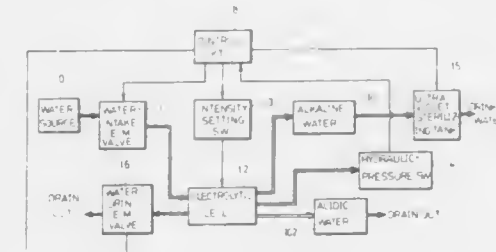
#### 4,946,574

##### APPARATUS FOR THE PRODUCTION OF STERILIZED CALCIUM-ION WATER

Chun-Ew Lin, No. 205, Ming-Cheng Rd., San-Ming Dist.,  
Kaohsiung City, Taiwan

Filed Sep. 11, 1989, Ser. No. 405,203

Int. Cl.<sup>5</sup> C25B 15/08, 9/00; B01D 13/02  
U.S. Cl. 204—229 4 Claims



1. An apparatus for the production of sterilized calcium-ion water comprising:  
a housing structure;  
an electrolytic cell having a plurality of positive and negative terminals and electrode means respectively disposed therein installed in said housing structure for performing electrolysis operations and producing the desired calcium-ion water through said electrode means;  
an electromagnetic water-intake valve installed at a water-intake pipe in said housing structure and communicatively connected to said electrolytic cell for being activated to supply water thereto;  
an electromagnetic water-drain valve provided at a water-drain pipe in said housing structure and communicatively connected to said electrolytic cell for being activated to drain water from said electrolytic cell;  
a setting switch provided at said housing structure and electrically coupled with said electrolytic cell for being operated to adjust the current intensity of the electrolysis thereof;  
a hydraulic-pressure switch provided at a water-pressure pipe in said housing structure and communicatively connected to said electrolytic cell for being actuated to detect the water level therein and control water intake through said electromagnetic water-intake valve;  
an ultraviolet sterilizing tank having an ultraviolet lamp electrically disposed therein installed at an outlet pipe communicatively connected to said electrolytic cell for sterilizing desired water produced therefrom before draining out for drinking purpose; and  
a control circuit electrically coupled with said electrolytic cell, said electromagnetic water-intake and water-drain valves, said setting switch, said hydraulic-pressure switch and said ultraviolet sterilizing tank for effecting control operations therewith; whereby, calcium-ion water can be effectively produced and sterilized for drinking purposes.

#### 4,946,575

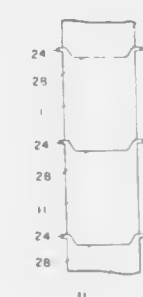
##### METALLIC ANODES MANUFACTURED FROM MOLTEN COPPER

John M. A. Dompas, Olen, Belgium, assignor to Metallurgie  
Hoboken-Overpelt, Hoboken, Belgium  
Continuation of Ser. No. 664,934, Oct. 25, 1984, abandoned,  
which is a continuation of Ser. No. 582,000, Feb. 21, 1984,  
abandoned, which is a continuation of Ser. No. 490,141, Apr. 29,  
1983, abandoned, which is a division of Ser. No. 241,612, Mar. 9,  
1981, Pat. No. 4,393,296, which is a division of Ser. No. 957,445,  
Nov. 3, 1978, abandoned. This application Dec. 13, 1988, Ser.  
No. 284,799

Claims priority, application Luxembourg, Nov. 16, 1977,  
78-531; Jun. 21, 1978, 79-853

Int. Cl.<sup>5</sup> C25C 7/02

U.S. Cl. 204—288 5 Claims



1. An article of manufacture consisting essentially of an anode formed from molten copper, said anode having first and second substantially parallel opposed surfaces and further having integral suspension lugs in the as-cast state, wherein both said first and said second surfaces are flat and of electrolytically enhancing, functionally equivalent smoothness, said anode being shaped such that the anode scrap which remains upon electrolysis thereof comprises less than 25% of the original weight of said anode.

#### 4,946,576

##### APPARATUS FOR THE APPLICATION OF THIN LAYERS TO A SUBSTRATE

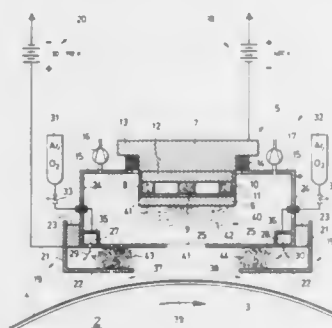
Anton Dietrich, Rodenbach, and Klaus Hartig, Ronneburg, both  
of Fed. Rep. of Germany, assignors to Leybold Aktiengesell-  
schaft, Hanau, Fed. Rep. of Germany  
Continuation of Ser. No. 132,642, Dec. 7, 1987, abandoned,  
which is a continuation of Ser. No. 872,924, Jun. 11, 1986,  
abandoned. This application Feb. 14, 1989, Ser. No. 311,401  
Claims priority, application Fed. Rep. of Germany, Jun. 12,  
1985, 3521053

Int. Cl.<sup>5</sup> C23C 14/35

U.S. Cl. 204—298.06 7 Claims

1. A sputtering apparatus for application of thin layers on a substrate comprising:  
a cathode adapted to be sputtered;  
a substrate to be coated;  
an anode having an opening of a first size located adjacent said substrate and forming a first shutter;  
a second shutter between said cathode and said anode, and second shutter dividing the space between said cathode and said substrate into a first region located between said cathode and said second shutter and a second region located between said anode and said second shutter, wherein only said second region is adapted to receive a reactive gas, said second shutter having an opening of a second size, smaller than said anode opening;  
first means for generating a first glow discharge located in said first region;  
second means for generating a second glow discharge lo-

cated in said second region separated and independent from said first glow discharge by said second shutter; and



exhaust means connected to said first region and coupled through said second shutter to said second region for exhausting gases therefrom.

4,946,577

## OXYGEN SENSOR

Kazuyoshi Shibata, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan

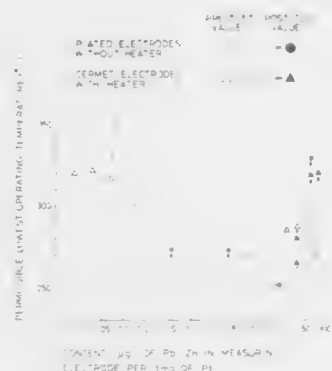
Filed Oct. 4, 1989, Ser. No. 417,032

Claims priority, application Japan, Oct. 4, 1988, 63-250627

Int. Cl.<sup>5</sup> G01N 27/409

U.S. Cl. 204—427

6 Claims



1. An oxygen sensor having an oxygen sensing element which includes a solid electrolyte body made of an oxygen-ion conductive solid electrolyte material, and a measuring electrode and a reference electrode formed on the solid electrolyte body, said measuring and reference electrodes respectively communicating with a measurement gas, and a reference gas having a predetermined oxygen concentration, so that an electromotive force is induced between the measuring and reference electrodes, based on a difference in oxygen concentration between the measurement gas and the reference gas, wherein the improvement comprises:

said measuring electrode including a conductor principally consisting of platinum, and lead and/or zinc serving as activation component for said platinum, an amount of said lead and/or zinc per 1 mg of said platinum being within a range of 0.2–100 μg.

4,946,578

## PROCESS FOR TREATING HYDROCARBONS

Thomas J. Clough, Santa Monica, and John W. Sibert, Malibu, both of Calif., assignors to Ensci, Inc., Woodland Hills, Calif. Continuation of Ser. No. 225,732, Jul. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 931,246, Nov. 17, 1986, abandoned. This application May 25, 1989, Ser. No. 361,709

Int. Cl.<sup>5</sup> C10G 27/00

U.S. Cl. 208—46

49 Claims

1. A process for treating a petroleum hydrocarbon material comprising:

contacting said petroleum hydrocarbon material in the presence of an aqueous liquid medium with at least one metal component selected from the group consisting of vanadium components in which vanadium is present in the 5+ oxidation state in an amount effective to promote the oxidation of at least one component of said petroleum hydrocarbon material and which vanadium components are present in said aqueous liquid medium at said contacting conditions, iron (3+) ligand complexes in which iron is present in the 3+ oxidation state in an amount effective to promote the oxidation of at least one component of said petroleum hydrocarbon material and which iron (3+) ligand complexes are present in said aqueous liquid medium at said contacting conditions, manganese components in which manganese is present in the 3+ oxidation state in an amount effective to promote the oxidation of at least one component of said petroleum hydrocarbon material and mixtures thereof, and at least one oxygen transfer agent in an amount effective to do at least one of the following: maintain at least partially the promoting activity of said metal component; produce at least a portion of said metal component; and oxidize at least a portion of said component of said petroleum hydrocarbon material, said contacting occurring at conditions effective to oxidize said component of said petroleum hydrocarbon material and produce a petroleum hydrocarbon product.

4,946,579

## CHEMICAL CONVERSION PROCESSES UTILIZING CATALYST CONTAINING CRYSTALLINE GALLIOSILICATE MOLECULAR SIEVES HAVING THE ERIONITE-TYPE STRUCTURE

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 922,272, Oct. 22, 1986. This application May 1, 1989, Ser. No. 345,689

Int. Cl.<sup>5</sup> C10G 47/04; C07C 2/10, 4/06, 2/58

U.S. Cl. 208—111

20 Claims

1. A process for the acid catalyzed chemical conversion of a feedstock containing organic compounds into reaction products which process comprises contacting said feedstock under acid catalyzed conversion conditions with a catalyst comprising a catalytically active, crystalline, galliosilicate molecular sieve, wherein said molecular sieve (1) comprises silicon, gallium and oxygen, (2) has an X-ray powder diffraction pattern characteristic of the erionite structure and (3) contains less than about 0.10 weight percent alumina.

4,946,580

## BINARY ZEOLITIC SYSTEMS, THEIR SYNTHESIS AND THEIR UTILIZATION

Francois Fajula, Thérèse; Francois Figueras, Montpellier; Claude Gueguen, Irigny, and Roger Dutartre, Prades le Lez, all of France, assignors to Elf France, Courbevoie, France

Division of Ser. No. 64,321, Jun. 19, 1987, Pat. No. 4,847,224. This application May 5, 1989, Ser. No. 348,285

Int. Cl.<sup>5</sup> B01J 29/06

U.S. Cl. 208—120

3 Claims

1. A method for the catalytic cracking of a hydrocarbon feed to transfer it essentially into gasoline, gas and hydrogen, which

comprises contacting said hydrocarbon feed with a catalytically effective cracking amount of catalyst wherein the catalyst is a binary zeolitic system comprised of zeolites, A and B, having different crystalline structures while having common structural units, wherein the crystals of the zeolite A forming a central core are selected from the group consisting of offretite and omega zeolite and are surrounded by a crown or ring of crystals of zeolite B, which are selected from the group consisting of omega zeolite and mordenite, the zeolites A and B being disposed concentrically and following the same longitudinal axis, and thereafter recovering gasoline, gas and hydrogen.

4,946,581

## CRACKING PROCESS EMPLOYING A CATALYST COMPOSITION AND ABSORBENT WHICH CONTAIN AN ANIONIC CLAY

Emanuel H. van Broekhoven, Monnickendam, Netherlands, assignor to Akzo N.V., Netherlands

Division of Ser. No. 137,539, Dec. 28, 1987, Pat. No. 4,866,019.

This application May 19, 1989, Ser. No. 354,242

Claims priority, application Netherlands, Jan. 13, 1987, 8700056

Int. Cl.<sup>5</sup> C10G 45/00

U.S. Cl. 208—120

15 Claims

1. A process comprising cracking a sulphur-containing hydrocarbon feedstock in the presence of a catalyst composition comprising a catalytically active material selected from the group consisting of amorphous aluminosilicates and zeolitic, crystalline aluminosilicates, a sulphur oxides binding material and a matrix material, the sulphur oxides binding material containing an anionic clay which has a crystalline structure of the pyroaurite-sjogrenite-hydrocalcite group, the hydrocalumite group or the ettringite group.

4,946,582

## METHOD OF REMOVING MERCURY FROM HYDROCARBON OILS

Takashi Torihata, and Etsuko Kawashima, both of Chiba, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 299,025

Claims priority, application Japan, Jan. 22, 1988, 63-12285; Jan. 22, 1988, 63-12286; Jan. 22, 1988, 63-12287; Jan. 22, 1988, 63-12288; Jan. 22, 1988, 63-12289; Jan. 22, 1988, 63-12290

Int. Cl.<sup>5</sup> C10E 17/00

U.S. Cl. 208—251 R

6 Claims

1. A method of removing mercury from a hydrocarbon oil comprising contacting said hydrocarbon oil with an adsorbent consisting essentially of a cupric halide or a hydrate thereof, a stannous halide or a hydrate thereof, or a mixture thereof.

4,946,583

## PROCESS FOR THE LIQUEFACTION OF COAL

Helmut Würfel, Blieskastel, Fed. Rep. of Germany, assignor to GfK Gesellschaft für Kohleverflüssigung mbH, Saarbrücken, Fed. Rep. of Germany

PCT No. PCT/DE84/00233, § 371 Date May 20, 1985, § 102(e) Date May 20, 1985, PCT Pub. No. WO85/01954, PCT Pub. Date May 9, 1985

PCT Filed Nov. 3, 1984, Ser. No. 744,554

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1983, 3340041

Int. Cl.<sup>5</sup> C10G 1/00

U.S. Cl. 208—400

18 Claims

1. Process for the liquefaction of coal in which ground coal is mixed with grinding oil to form a coal paste and is treated with pressure and heat in a liquefaction zone in the presence of hydrogen to form a liquefaction product having a gaseous phase and a liquid phase containing solid matter, comprising: passing the liquefaction product from the liquefaction zone to a coking zone, mixing in a mixing zone hot gases and vapors exiting the

coking zone with the fresh coal paste which is fed into the liquefaction zone thereby cooling the hot gases and vapors in a direct heat exchange with the coal paste which is heated in the heat exchange, wherein heavy distillates in the hot gases and vapors condense in the fresh coal paste, and wherein uncondensed distillates are extracted from the mixing zone, and passing heated coal paste, together with the condensed residue, to the liquefaction zone, wherein pressure in the liquefaction zone is between 150 to 250 bar.

4,946,584

## HYDRAULIC PRODUCT SEPARATOR

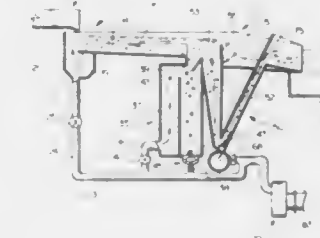
George J. Olney, Westernville, N.Y., assignor to George J. Olney, Inc., Westernville, N.Y.

Continuation of Ser. No. 105,317, Oct. 5, 1987, abandoned. This application Oct. 31, 1988, Ser. No. 266,322

Int. Cl.<sup>5</sup> B03D 5/62, 5/68

U.S. Cl. 209—18

4 Claims



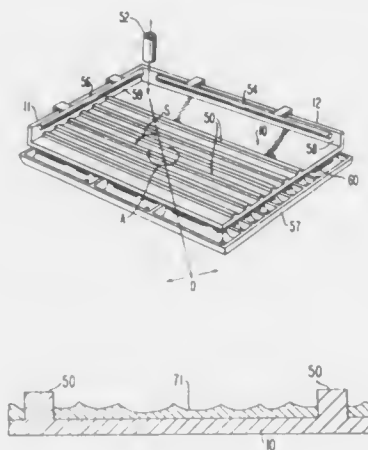
1. Apparatus for separating healthy peanut kernels from unhealthy peanut kernels comprising: a rectangular separation tank for holding a quantity of water which has an inlet at one end and an outlet at the opposite end, said tank having a width substantially greater than the depth thereof; a feed chamber formed in the inlet of said separation tank, said feed chamber having a width about equal to the width of the separation tank and a bottom wall containing vertically disposed vanes mounted thereacross which define uniformly spaced peanut distributing channels that extend substantially along the length of the chamber, said bottom wall sloping downwardly from an inlet end of the feed chamber towards an outlet end of the feed chamber; pump means for introducing a first flow of water into the inlet end of said feed chamber and into said distributing channels so that water flows across the separation tank between said feed chamber inlet and said feed chamber outlet along well-defined streamlines and continues to flow to the tank outlet; conveyor means for loading peanut kernels onto said bottom wall across said distributing channels so that the peanut kernels are carried in said well-defined streamlines through said feed chamber and said separation tank; a first heavy particle separating trap mounted in the floor of said separation tank immediately downstream of the outlet end of the feed chamber; means for directing a second flow of water from said pump means upwardly across the mouth of said trap to help healthy peanut kernels thereacross; a vertically disposed capture duct having a rectangular cross section mounted in the floor of the separation tank immediately downstream from said first trap, said capture duct having an upstream wall and a downstream wall which define a rectangular entrance that extends across the width of said separation tank; an upwardly inclined discharge duct connected to the bottom of said capture duct and extending to a height below



the bottom wall of said feed chamber, gate means mounted on the downstream wall of said capture duct so as to extend across the width of the separation tank and direct less buoyant, healthy kernels into the capture duct and allow more buoyant, unhealthy kernels to pass over said gate means and out of said separation tank through said separation tank outlet;

ejector means mounted in the bottom of the captured duct having an elongated slot nozzle extending across the width of said capture duct;  
means for directing a third flow of water from said pump means through said slot nozzle into the discharge duct for sweeping the bottom of the capture duct to clean out, and propel healthy peanut kernels falling to the bottom of the capture duct upwardly through the discharge duct;  
dewatering means mounted at the exit of said upwardly inclined discharge duct for immediately removing the discharge water as the healthy kernels leave the discharge duct.

planar circular motion on the standing wave; and thereby causing the components of the mixture to separate from one



4,946,585

## METALS RECOVERY BY FLOTATION

Alexander S. Lambert, Lisvane Cardiff, United Kingdom, assignor to American Cyanamid Company, Stamford, Conn.

Filed Sep. 18, 1989, Ser. No. 408,582

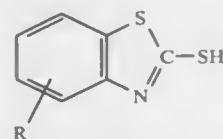
Claims priority, application United Kingdom, Dec. 1, 1988, 8828065

Int. Cl.<sup>5</sup> B03D 1/008, 1/01, 1/012

U.S. Cl. 209—166

5 Claims

1. In a froth flotation process for beneficiating a sulfide ore containing gold and/or silver comprising slurring liberation sized particles of said ore in an aqueous medium, conditioning said slurry with effective amounts of a frothing agent and a gold and/or silver collector, respectively, and frothing the desired gold and/or silver containing sulfide minerals in the froth by froth flotation methods, the improvement comprising: employing as the gold and/or silver collector, from about 0.005 to about 0.5 lbs./ton of ore, of at least one mercaptobenzothiazole compound having the formula:



wherein R is a butyl or C<sub>2</sub>-C<sub>8</sub> alkoxy radical.

4,946,586

## GRAVITATIONAL SEPARATION

John M. Fletcher, 373 Norwood Rd., London SE27 9BL, England

Filed Jul. 7, 1987, Ser. No. 70,810

Claims priority, application South Africa, Jul. 9, 1986, 86/5107

Int. Cl.<sup>5</sup> B03B 5/02

U.S. Cl. 209—435

12 Claims

1. A method of treating material composed of a mixture of particulate components which have different physical characteristics: which consist in flowing a stream of the material and of a wash medium on to an inclined deck having riffles therein which define a plurality of troughs therebetween, and creating a standing wave in the wash medium containing said material in the troughs between the riffles while imposing continuous

another into fractions, and the continuously discharging the fractions from the deck.

4,946,587

## AUTOMATED GAUGING APPARATUS

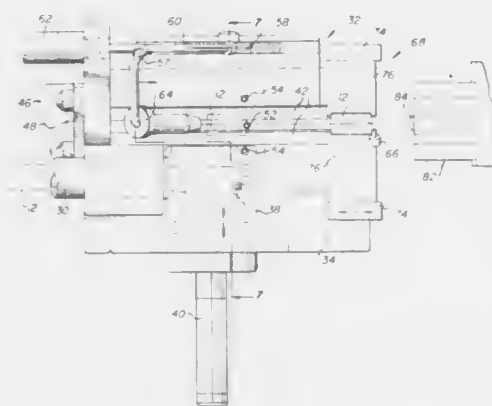
James W. Reeves, Wilmington; Harold B. King, Jr., Wrightsville Beach, both of N.C., and William M. Childers, Hartselle, Ala., assignors to General Electric Company, San Jose, Calif.

Filed Dec. 2, 1988, Ser. No. 279,008

Int. Cl.<sup>5</sup> B07C 5/02, 5/34

U.S. Cl. 209—539

16 Claims



1. Automated gauging apparatus for measuring the radial spacing between first and second sites on the inner and outer surfaces, respectively, of a tubular part, said radial spacing constituting a critical dimension of a surface feature formed in the part sidewall, said apparatus comprising, in combination:

- A. an orienting station automatically operating to manipulate successive parts to a predetermined orientation at a pickup position;
- B. a gauging fixture including
  - (1) an arbor for insertion into the bore of the part and having a reference surface,
  - (2) means carried by said arbor for radially biasing the part to a gauging position with said first site bearing against said reference surface,
  - (3) a sensor block located adjacent said arbor, and
  - (4) a sensor mounted in fixed relation to said reference surface by said block for generating an output signal indicative of the sensor position relative to said second

site and thus the critical dimension of the radial spacing between said first and second sites,  
C. means for processing said output signal to determine if the critical dimension is within tolerance limits; and  
D. means for transferring successive parts from said pickup position to said arbor.

4,946,588

## FLUID TREATMENT OR MONITORING ASSEMBLIES

John R. Wise, Cotswold Pulborough Rd., Cootham, Storrington, West Sussex, United Kingdom

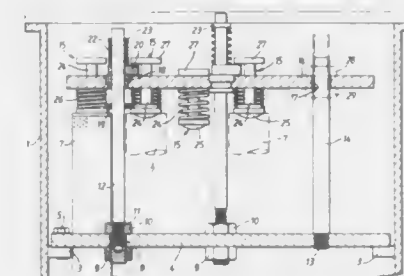
Filed Sep. 12, 1988, Ser. No. 242,621

Claims priority, application United Kingdom, Sep. 10, 1987, 8721308

Int. Cl.<sup>5</sup> B01D 35/14

U.S. Cl. 210—85

8 Claims



1. An assembly for mounting a plurality of elements through which fluid is to flow in a closed vessel, the assembly comprising a first structure for carrying said elements in an ordered array, a second structure carrying a correspondingly ordered array of spring-loaded locators having an original position and being constructed and arranged to be movable into a second position wherein each locator is moved against its spring loading by an associated said element if said element is present, means for securing said second structure in said second position, wherein the absence of any said element allows the associated said locator to remain in its original position in relation to the second structure, said locators having means to impede complete operation of said securing means when any said locator is in its said original position.

4,946,589

## HIGH VOLUME PERMANENT MAGNET FILTER FOR REMOVING FERROMAGNETIC IMPURITIES

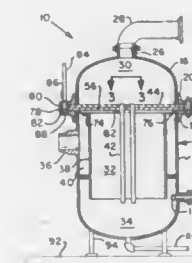
James K. Hayes, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 27, 1987, Ser. No. 20,324

Int. Cl.<sup>5</sup> B01D 35/06

U.S. Cl. 210—222

23 Claims



1. A permanent magnet filter, comprising:  
a closed vessel having an inlet plenum, a central filtering region with upstream and downstream ends, and an exit plenum;

inlet means for supplying raw fluid to the inlet plenum from outside the vessel;  
outlet means for discharging filtered fluid from the vessel;  
means for distributing fluid from the inlet means substantially uniformly over the upstream end of the filter region;  
a plurality of filter tubes located within the filtering region and spaced apart in a substantially uniform array, each tube comprising a nonmagnetic cylindrical outer housing, a plurality of magnetic slugs stacked in the housing, each slug separated from adjacent slugs by a nonmagnetic disk, the slugs being alternatively oriented so that the closest surfaces of adjacent slugs are of the same polarity; and  
means detachably connected to the vessel for supporting the tubes laterally to each other in said array, wherein said means for supporting the tubes comprises a plurality of vertical bars oriented transversely to the longitudinal axis, each bar having two vertical sides, each side having a plurality of scalloped recesses, each recess being substantially semi-circular, such that two adjacent bars form a plurality of substantially circular openings for circumscribing a plurality of tubes.

4,946,590

## CLAMP-ON MAGNETIC WATER TREATMENT DEVICE

Arthur A. Hertzog, Whitehall, Pa., assignor to Fluid Care Industries, Inc., Whitehall, Pa.

Filed Apr. 12, 1989, Ser. No. 336,735

Int. Cl.<sup>5</sup> C02F 1/48

U.S. Cl. 210—222

14 Claims



11. A clamp-on fluid treatment device for minimizing accumulation of hard lime and scale deposits in a water supply system having at least one conduit for carrying the water along a flowpath, the conduit having at least a section along its length which is non-ferromagnetic around its circumference and characterized by low magnetic permeability, the device comprising:

an array of at least four permanent bar magnets to be mounted on a surface of the conduit at the non-ferromagnetic section, the array of bar magnets abutting one another longitudinally of the conduit and defining at least two pairs of magnetic poles of opposite polarity across the flowpath, whereby a magnetic field is produced directly perpendicular to the flowpath and magnets in the array attract one another across the flowpath, magnets in the array also defining magnetic poles of opposite polarity proceeding downstream along the flowpath, each of the bar magnets defining a magnetic pole directed toward the non-ferromagnetic section of the conduit and an opposite magnetic pole directed away from the non-ferromagnetic section, the bar magnets individually being nonpolar in a direction parallel to the flowpath, poles of successive ones of the bar magnets on a same side of the non-ferromagnetic conduit being at opposite polarities proceeding along the flowpath, whereby a charged particle moving along the flowpath is subjected to alternating Hall Effect forces, tending to agitate the charged particle and interfere with hard lime and scale precipitation; and  
a housing for the magnets, the housing being magnetically

permeable and defining a magnetic flux path encircling the conduit and bridging between outward facing opposite poles of the magnets, the housing having two substantially semi-cylindrical halves, each said half having a bottom section magnetically attracted to a pair of said magnets on a respective side of the pipe, the magnets being disposed between the bottom section and the non-ferromagnetic section, the housing having wings extending outwardly from the bottom section and from the non-ferromagnetic section of the conduit, the wings defining supporting flanges at which the two halves of the housing are supported in contact along a plane including a longitudinal axis of the non-ferromagnetic section, the halves of the housing being magnetically attracted to one another at facing edges thereof, the halves of the housing have flanges extending radially and parallel to the flow-path, the halves being disposed in surface contact at the flanges, whereby the magnets are positioned opposite one another on the non-ferromagnetic section of the conduit and magnetic flux is confined to the housing and to the flowpath.

4,946,591

# **TUBULAR SUPPORT WITH IMPERFORATE PLASTIC SHEET AND FILTER CLOTH STRAINER**

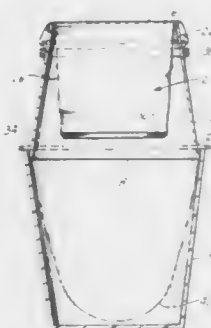
Andrew N. Mealey, 4610 Toland Way, Los Angeles, Calif. 90041

Continuation-in-part of Ser. No. 263,046, Oct. 26, 1988, abandoned. This application Jun. 23, 1989, Ser. No. 370,622

Int. Cl.<sup>5</sup> B01D 29/085

U.S. Cl. 210—474

19 Claims



1. A strainer assembly for straining a liquid to be poured into the interior of either of two containers each having a respective open top of a known diameter, comprising:

a strainer support having (a) an imperforate tubular side wall with an open top and an open bottom, (b) a first flange projecting outwardly from the tubular side wall of the support adjacent the open bottom of the support, the open bottom having a diameter greater than the diameter of the open top of the container, with the first flange projecting a sufficient distance so the flange can removably rest on the open top of a first container to hold the strainer support in an upright position above the first container, with the open bottom of the strainer support facing down toward the interior of the first container, and (c) a second flange projecting outwardly from the side wall of the support adjacent the open top of the support, the second flange projecting a sufficient distance so the flange can removably rest on the open top of a second container of smaller size than the first container to hold the strainer support in an upright position above the second container; and

a filtering medium for mounting inside the strainer support above either container by releasable attachment of the medium to the end of the support opposite from the container.

4,946,592

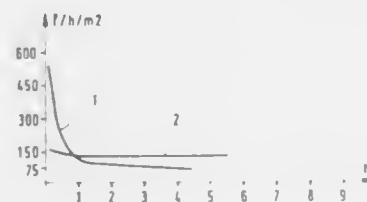
# **MEMBRANE FILTER**

Stanislas Galaj, Arcueil; Marie-Paule Besland, Saintonge; Alain Wicker, Paris; Jacques Gillot, Laloubere, and Raymond Soria, Bazet, all of France, assignors to Societe des Ceramiques Techniques, Bazet, France

Continuation of Ser. No. 179,364, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 101,927, Sep. 28, 1987, abandoned. This application Nov. 15, 1989, Ser. No. 436,956 Claims priority, application France, Oct. 10, 1986, 86 14134 Int. Cl.<sup>5</sup> B01D 71/02

U.S. Cl. 210—490

2 Claims



1. A filter membrane comprising a porous structure made of a material selected from sintered ceramics and sintered metals, and formed by grains which are fixed one to another by bonded portions of their surfaces leaving pores therebetween delimited by the remaining exposed portions of the surfaces of the said grains, wherein the entire exposed portions of the surfaces of the grains including the surface inside the pores of the porous structure are covered with a thin and continuous film of an oxide selected from the group consisting of ZrO<sub>2</sub>, MgO, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, TiO<sub>2</sub>, Cr<sub>2</sub>O<sub>3</sub>, MnO, Fe<sub>2</sub>O<sub>3</sub>, CoO, NiO, CuO, ZnO, Ga<sub>2</sub>O<sub>3</sub>, GeO<sub>2</sub>, TiO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, MoO<sub>3</sub>, RuO<sub>2</sub>, PdO, CdO, SnO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, HfO<sub>2</sub>, Ta<sub>2</sub>O<sub>5</sub>, WO<sub>3</sub>, PbO<sub>2</sub>, Ce<sub>2</sub>O<sub>3</sub>, and Bi<sub>2</sub>O<sub>3</sub>, alone or in combination, or in mixture with B<sub>2</sub>O<sub>3</sub>, BaO or CaO, wherein the thickness of said film lies between 2 nm and 1000 nm, wherein the average pore diameter of the surface layer of said structure lies between 0.02 microns and 15 microns, the porosity of the membrane being then substantially that of the initial porous structure.

4,946,593

# **RUBBER COMPOSITION FOR USE WITH POTABLE WATER**

Edward P. Pinigis, Fairhaven, Mass., assignor to Acushnet Company, New Bedford, Mass.

Continuation of Ser. No. 103,435, Sep. 30, 1987, abandoned, which is a division of Ser. No. 32,873, Mar. 31, 1987, abandoned. This application Aug. 29, 1989, Ser. No. 401,495

Int. Cl.<sup>5</sup> B01D 39/00

U.S. Cl. 210—500.36

9 Claims

1. In a water system for potable water including one or more parts being of butyl rubber, the improvement comprising said one or more parts being made from a rubber composition comprising butyl rubber and, per hundred parts butyl rubber (phb), the following ingredients:

Carbamate-free accelerator	1-5 phb
Filler	20-100 phb
Activator	3-10 phb
Paraffin wax	0-3 phb
Sulfur	0-5 phb
Fatty acid	0-2 phb

said carbamate-free accelerator minimizing objectionable taste transmitted to potable water by said butyl rubber composition.

4,946,594

# **CROSSLINKED COPOLYMERS OF ALIPHATIC POLYESTER DIOLS AND DIANHYDRIDES**

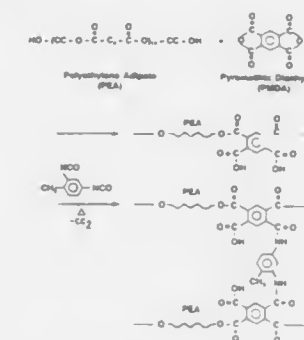
Warren A. Thaler, Flemington; W. S. Winston Ho, and Guido Sartori, both of Annandale, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 16, 1989, Ser. No. 422,217

Int. Cl.<sup>5</sup> B01D 13/00

U.S. Cl. 210—651

7 Claims



1. A method for separating aromatics from feeds which are mixtures of aromatics and non-aromatics which method comprises providing a thin membrane including a crosslinked copolymer composition wherein said copolymer is derived from an aliphatic polyester diol, a dianhydride, and a diisocyanate crosslinking reagent, and said aliphatic polyester is a polyadipate, a polysuccinate, a polymalonate, a polyoxalate, or a polyglutarate and selectively permeating the aromatic through.

4,946,595

# **PROCESS AND APPARATUS FOR RE-CYCLING ENGINE COOLANT**

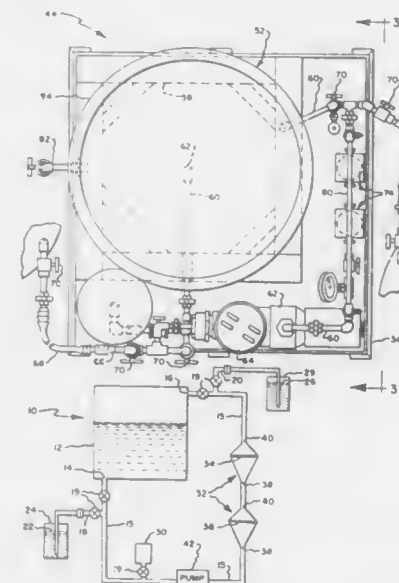
Robert C. Miller, Jr., Roseland, N.J., assignor to FPPF Chemical Corporation Inc., Buffalo, N.Y.

Filed Sep. 9, 1988, Ser. No. 243,319

Int. Cl.<sup>5</sup> B01D 13/00

U.S. Cl. 210—651

22 Claims



1. A process for physically and chemically treating a used coolant composition of the type used within an internal combustion engine cooling system, after removal from said system, to remove unwanted impurities and degradation by-products including dissolved metals, dirt, silt, salts and other unwanted

suspended particulate matter contained therein, said coolant composition containing one or more glycol and/or alcohol-based antifreeze components, said process comprising:

contacting said coolant composition with one or more known oxidizing agents in an amount sufficient to form metallic oxides from any unwanted dissolved metals present in said composition thereby forming particulate metallic oxide precipitates;

contacting said coolant composition with one or more known salt forming agents in an amount sufficient to react with any unwanted organic acids present in said composition thereby forming particulate salt precipitates;

filtering said coolant composition through any suitable filtration membrane or other separation means capable of removing particulate precipitates therefrom;

adding to said coolant composition one more suitable corrosion inhibiting agents selected from the group consisting of phosphates, phosphonates, silicates, borates, nitrites, nitrates, azols, modified acrylates and molybdates; and introducing into said coolant composition one or more known buffering agents in an amount sufficient to adjust the pH of the final solution to between about 9.5 and 10.5 thereby providing a recycled coolant composition having corrosion capabilities equal or superior to that of the original coolant composition prior to removal.

4,946,596

# **METHOD FOR REMOVING MERCURY FROM A LIQUID HYDROCARBON**

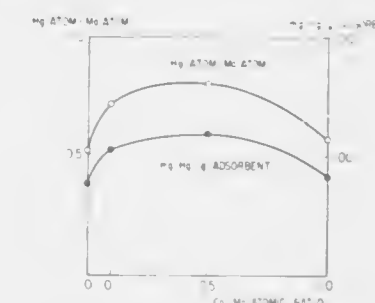
Akio Furuta; Kunio Sato; Kazuo Sato, and Tooru Matsuzawa, all of Handa, Japan, assignors to JGC Corporation, Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,023

Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 210—679

2 Claims



1. A method for removing mercury from a liquid hydrocarbon containing mercury, comprising the following steps:

contacting the liquid hydrocarbon with an adsorbent composed of multi-component metal sulfide supported on a carrier wherein one of the metal components in said multi-component metal sulfide is molybdenum, said molybdenum being 3-15 weight-% of the adsorbent calculated as molybdenum metal and a second metal component in said multi-component metal sulfide is selected from the group consisting of cobalt and nickel, the atomic ratio of said second metal component to molybdenum being in the range of 0.05-0.9.

4,946,597

# **LOW TEMPERATURE BITUMEN RECOVERY PROCESS**

Kohur N. Sury, Calgary, Canada, assignor to Esso Resources Canada Limited, Calgary, Canada

Filed Mar. 24, 1989, Ser. No. 328,420

Int. Cl.<sup>5</sup> C02F 1/40

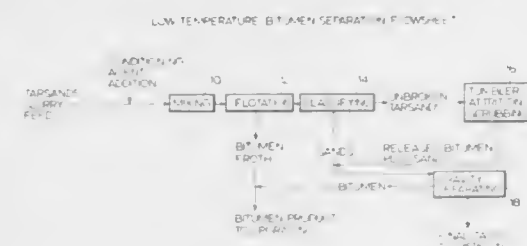
U.S. Cl. 210—705

29 Claims

1. A process for separating and recovering bitumen from



tarsands which comprise the steps of slurring 15 to 70% by weight tarsands in water at a temperature in the range of from above about freezing to about 35° C. to form an aqueous slurry and mixing said slurry in the presence of a conditioning agent to selectively enhance flotation of the bitumen, said conditioning agent consisting of a floatation agent having the characteristics of a floatation agent selected from the group consisting of kerosene, diesel and kerosene/diesel and a frothing agent hav-



ing the characteristics of methyl-isobutyl-carbinol added in an amount in the range of 100 to 800 ppm floatation agent and 50 to 400 ppm frothing agent, subjecting said slurry to which the conditioning agent has been added to mixing for a time sufficient to release bitumen from the tarsands and to uniformly disperse the conditioning agent on the bitumen, and subjecting the resulting conditioned slurry to froth flotation for recovery of a bitumen product and productions of sand tails.

4,946,598

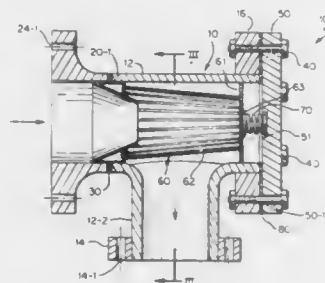
**SUCTION STRAINER AND METHOD OF ASSEMBLY**  
Paul F. Murphy, and Brian M. Marriott, both of York, Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 9, 1989, Ser. No. 321,042

Int. Cl.<sup>5</sup> B01D 35/02

U.S. Cl. 210—452

5 Claims



1. A suction strainer assembly comprising: housing means including a tee having a crossarm with a bore therein and a perpendicular branch with a bore therein intersecting said bore of said crossarm to define an intersection; said crossarm bore having a first end defining an inlet and a second end; seat means secured to said first end and extending partially into said crossarm bore and defining a flow path whereby all flow in said crossarm bore is directed through said flow path; first attachment means connected to said first end of said crossarm bore; second attachment means connected to said second end of said crossarm bore; third attachment means connected to said perpendicular branch; strainer means having a porous body portion with an open end and a closed end;

said open end of said strainer means seating on said seat means;

said seat means includes an outer cylindrical portion extending into said crossarm bore and into said first attachment means and an inner frustoconical portion located at least partially within said outer cylindrical portion and defining said flow path and said inner frustoconical portion having an outer surface upon which said open end of said strainer means seats;

closure means coacting with said second attachment means and said closed end of said strainer means to seal said second end of said crossarm bore and to hold said strainer means seated on said seat means and spaced from said intersection and said crossarm bore whereby an annular space is formed between said strainer means and said crossarm bore and fluid entering said inlet serially passes through said flow path in said seat means, into said strainer means, through said porous body portion into said annular space and thence into said perpendicular branch bore.

4,946,599

**APPARATUS AND METHOD FOR CONVERTING BOTTLED WATER DISPENSERS TO CONTINUOUS SUPPLY SYSTEMS**

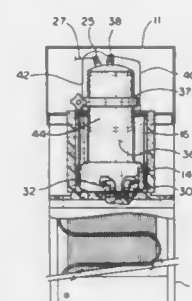
Thomas L. Craig, 1015 Grove St., Avoca, Pa. 18641, assignor to Thomas L. Craig, Avoca and Thomas J. Carroll, Taylor, both of, Pa.

Filed Nov. 21, 1988, Ser. No. 274,025

Int. Cl.<sup>5</sup> C02F 1/00

U.S. Cl. 210—741

19 Claims



18. A method for converting a bottled water dispenser to receive water from a continuous source in lieu of a bottled source, said dispenser being of the type having a water tank, said tank being in thermal relationship with refrigeration means and connected to an output tube which is terminated by a spigot, and filter means, whereby chilled water is dispensed upon demand, said conversion method comprising the steps of:

- controlling the input pressure from the continuous water source to provide output source of water at a pressure substantially equal to a bottled source;
- providing a housing, constructed to fit within said tank, said housing being in thermal relationship with said tank;
- connecting said output source to inlet means attached to said housing;
- retaining a volume of chilled water within said housing;
- filtering said volume of chilled water upon demand;
- providing outlet means attached to said housing; and
- connecting said outlet means to said output tube of said bottled water dispenser;

whereby, said controlled pressure source water is introduced into said housing and chilled, the chilled water is thereafter introduced into said filter means and said filter means provides chilled, purified water at a flow rate sufficient to fulfill the demand created by opening said spigot at substantially the same pressure and velocity as provided by a bottled source.

4,946,600

**WATER REPURIFICATION METHOD OF CITY WATER AND ITS EQUIPMENT**

Kyong S. Shin, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed Aug. 31, 1988, Ser. No. 239,177

Claims priority, application Rep. of Korea, Sep. 12, 1987, 1987/10141

Int. Cl.<sup>5</sup> B01D 24/16

U.S. Cl. 210—758

17 Claims



1. A method for purifying water from a public supply which has been treated with chlorine to kill bacteria, said water containing oxidizing agents and solid impurities, comprising the steps of:

- taking the water to be purified continuously from the public supply;
- leading the water through piping to a vertical tube into which the water flows so that the water in said tube has a free water surface subject to air pressure;
- leading the water from the bottom of said vertical tube to a settling zone of a filter basin;
- filtering the water in said filter basin by using water pressure from water in said transparent vertical tube to slowly force the water from said settling zone upwards through a particulate filter material having voids, chlorine in the water being oxidized in said voids by said oxidizing agents and said solid impurities being retained in said particulate material;
- leading the water from said filter basin to a water storage basin located above said filter basin;
- storing the filtered water in said water storage basin; and
- draining overflow water from the top of said water storage basin when there is more than a given amount of water in said water storage basin.

4,946,601

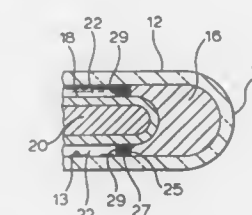
**BLOOD SERUM SEPARATOR TUBE**  
William R. Fiehler, St. Louis, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.

Filed Aug. 22, 1988, Ser. No. 235,068

Int. Cl.<sup>5</sup> B01D 21/26

U.S. Cl. 210—782

28 Claims



24. A method of separating blood into a lighter phase and a heavier phase comprising the steps of: providing a container having an upper end and a lower end, gel material initially disposed in the container lower end, the gel material being thixotropic and chemically inert to

the lighter and heavier phases and having a specific gravity intermediate the specific gravities of the heavier and lighter phases, the container having energizer means having a lower portion initially partially submerged the gel material for causing the gel material to flow toward the container upper end, under the influence of centrifugal force, along an inner wall of the container in a space between the inner wall and the energizer means, in response to movement of the energizer means toward the container lower end, and pouring a curable searing means having a specific gravity at least as great as the specific gravity of the gel material initially on top of the gel material in the space between the inner wall and the energizer means for preventing contact between the gel and any atmosphere in the upper end of the container; placing an amount of blood to be separated in the container after the sealing means has been cured; and centrifuging the container so as to cause movement of the energizer means toward the lower end of the container, thus breaking the cured sealing means and causing the gel material to migrate in the blood toward the upper end of the container to a location intermediate the lighter phase and the heavier phase.

4,946,602

**METHOD OF CLEANING FILTER DISCS IN A SUCTION DRYER USING ULTRASONIC VIBRATION**

Bjarne Ekberg, Turku, and Göran Norrgård, Parainen, both of Finland, assignors to Valmet Paper Machiney Inc., Finland  
PCT No. PCT/FI88/00032, § 371 Date Nov. 21, 1988, § 102(e)  
Date Nov. 21, 1988, PCT Pub. No. WO88/07887, PCT Pub. Date Oct. 20, 1988

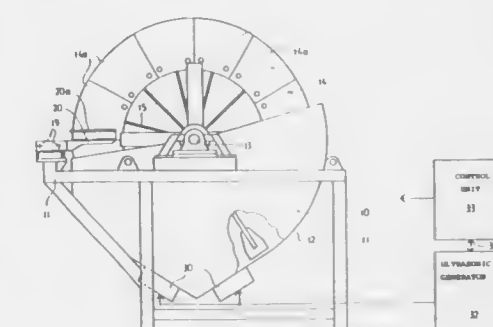
PCT Filed Feb. 29, 1988, Ser. No. 278,536

Claims priority, application Finland, Apr. 16, 1987, 871706

Int. Cl.<sup>5</sup> B01D 33/24

U.S. Cl. 210—785

11 Claims



1. A method for cleaning a suction dryer, wherein a suspension of particulate material in a basin (12) of the suction dryer (10) is dried by suction of the suspension through rotating porous ceramic filter discs (14) onto which filtrate cakes are formed and removed from the filter discs, and wherein said filter discs are cleaned so as to maintain the porous structure thereof, said cleaning method comprising draining the suspension from the basin, filling the basin with a cleaning liquid, passing ultrasonic frequency through the cleaning liquid filling the basin (12) while the ceramic filter discs (14) are rotated, thereby intensifying ultrasonic vibration and thus maintaining the porous structure of the filter discs.

4,946,603

**ELECTRONEGATIVELY CHARGED BLOOD FILTER AND BLOOD CELL SEPARATION METHOD**  
James A. Laugharn, Cambridge; Denis Hammerton, Wayland, and Timothy W. Towle, Burlington, all of Mass., assignors to Crystal Diagnostics, Inc., Woburn, Mass.

Filed Nov. 17, 1988, Ser. No. 272,457  
Int. Cl.<sup>5</sup> B01D 39/06

U.S. Cl. 210—807

20 Claims



1. A method for rapid and effective separation of cellular and non-cellular constituents in a blood sample, said method comprising the steps of:

obtaining a porous matrix expressing a negative electrical surface charge, said porous matrix having a plurality of internal and external surfaces comprised of at least one crystalline composition having an overall negative electrical surface charge;  
introducing a blood sample to an external surface of said negatively charged porous matrix;  
waiting a determinable period of time for said introduced blood sample to become separated into cellular and non-cellular fractions by interaction with at least the negative electrical surface charge of said porous matrix; and  
collecting at least one of said separated fractions.

4,946,604

**METHOD FOR TREATING A WELL BORE**  
William H. Smith, Walters, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Nov. 23, 1988, Ser. No. 276,189  
Int. Cl.<sup>5</sup> E21B 43/26, 33/13, 43/267

U.S. Cl. 252—8.551

11 Claims

1. A method for treating a well bore and the surrounding subterranean formation comprising:

preparing a fluid by admixing an aqueous liquid, a solvatable polysaccharide selected from the group comprising galactomannans, galactomannan derivatives and derivitized cellulose ethers and a crosslinking agent for said polysaccharide;  
admixing a non-reducing sugar in an amount sufficient to induce viscosity reduction of the fluid under well bore conditions; and  
injecting the fluid into said well bore.

4,946,605

**AQUEOUS DRILLING AND PACKER FLUIDS**  
David Farrar, and Brian Dymond, both of Bradford, England, assignors to Allied Colloids Ltd., United Kingdom  
Continuation-in-part of Ser. No. 761,953, Aug. 2, 1985, Pat. No. 4,675,119, which is a continuation-in-part of Ser. No. 641,901, Aug. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 672,308, Nov. 16, 1984, Pat. No. 4,554,307, which is a continuation-in-part of Ser. No. 612,516, May 21, 1984, Pat. No. 4,507,422. This application Jun. 19, 1987, Ser. No. 64,815  
Claims priority, application United Kingdom, Aug. 3, 1984, 8419805

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> C09K 7/02

U.S. Cl. 252—8.514

8 Claims

1. An aqueous fluid selected from drilling and packer fluids formed from fresh water and containing at least 25 g/l colloidal clay and, as thinner, an effective thinning amount of a water soluble polymer that has a viscosity of below 300 cps

(Brookfield Viscometer, Model RVT, Spindle No. 1, speed 20 rpm 15% by weight active polymer solution at 20° C.) and a polydispersity below about 2.0 and molecular weight of from 1,000 to 8,000 and is formed from monomers consisting essentially of (a) 10 to 60% by weight ethylenically unsaturated monomer having a sulphonate group substituted on to an aliphatic carbon atom and (b) 40 to 90% by weight ethylenically unsaturated carboxylate selected from acrylate, methacrylate, itaconate and maleate, wherein the sulphonate and carboxylate groups are selected from free acid groups and water soluble salts thereof.

4,946,606

**PRODUCING OIL-IN-WATER MICROEMULSIONS FROM A MICROEMULSION CONCENTRATE**  
William T. Osterloh, Missouri City, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 17, 1987, Ser. No. 134,424  
Int. Cl.<sup>5</sup> E21B 43/22

U.S. Cl. 252—8.554

12 Claims

12. A method of recovering oil and hydrocarbons with a microemulsion from an underground hydrocarbon formation penetrated by at least one injection well and at least one production well, which comprises:

injecting into an hydrocarbon formation through an injection well a homogeneous oil-in-water microemulsion comprised of oil, brine and surfactant,  
said microemulsion produced by mixing a microemulsion concentrate with sufficient water of the proper salinity to form an oil-in-water microemulsion,  
said microemulsion concentrate produced by determining the concentrations of oil, brine and surfactant desired in the oil-in-water microemulsion to be injected into the formation, said oil having an equivalent alkane carbon number higher than the crude oil which is to be recovered by the microemulsion, preparing a mixture of oil, water and surfactant having the same relative ratios of oil to surfactant as in the microemulsion desired to be injected, but having higher oil and surfactant concentrations relative to water and salt in the microemulsion desired to be injected, and stirring the mixture while adding salt until the mixture changes from cloudy to clear and becomes an oil-in-water microemulsion concentrate;  
injecting a drive fluid into the formation through the injection well to push the microemulsion towards a production well; and  
recovering oil, hydrocarbon and other fluids from the production well.

4,946,607

**AQUEOUS LUBRICANT DISPERSIONS OF RARE EARTH HALIDES**  
Christian Segaud, Genas, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Oct. 10, 1989, Ser. No. 419,218

Claims priority, application France, Oct. 10, 1988, 88 13263  
Int. Cl.<sup>5</sup> C10M 173/00, 141/02

U.S. Cl. 252—25

39 Claims

1. A lubricant composition of matter, which comprises an aqueous dispersion of at least one rare earth halide and at least one dispersing agent therefor, said at least one dispersing agent comprising:

(a) a copolymer of an ethylenically unsaturated carboxylic acid or derivative thereof with an  $\alpha$ -olefin comonomer and/or a vinyl comonomer;  
(b) a homopolymer or copolymer of an ethylenically unsaturated carboxylic acid or derivative thereof;  
(c) a copolymer of at least one ethylenically unsaturated carboxylic acid and at least one ethylenically unsaturated sulfonic acid comonomer; and/or  
(d) a polymer of an alkylene oxide of an (arylalkyl)phenol, or phosphated or sulfated derivative thereof.

4,946,608

**LUBRICANT DISPERSIONS OF RARE EARTH HALIDES IN AN OILY MEDIUM**  
Christian Segaud, Chassieu, France, assignor to RHONE-POULENC CHIMIE, Courbevoie, France

Filed Oct. 23, 1989, Ser. No. 425,236

Claims priority, application France, Oct. 21, 1988, 88 13796  
Int. Cl.<sup>5</sup> C10M 141/02

U.S. Cl. 252—25

31 Claims

1. A lubricant composition of matter which comprises at least one rare earth halide and at least one surface active agent dispersed in an oil medium compatible therewith, said at least one surface active agent containing a hydrophobic moiety and a hydrophilic moiety comprising ethylene oxide and/or propylene oxide structural units.

4,946,609

**ENGINE LUBRICATING OIL FOR DIESEL ENGINES AND PROCESS FOR OPERATING A DIESEL ENGINE**  
August-Wilhelm Pruess, Dorsten; Dieter Hoeher, Wessel; Kurt-Peter Schug, Dorsten, and Hansjuergen Guttman, Schermbeck, all of Fed. Rep. of Germany, assignors to Veba Oel Aktiengesellschaft, Gelsenkirchen, Fed. Rep. of Germany

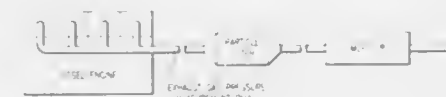
Filed Mar. 20, 1988, Ser. No. 325,998

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3309307

Int. Cl.<sup>5</sup> C10M 139/06

U.S. Cl. 252—35

15 Claims



1. An engine lubricating oil for diesel engines equipped with a particulate filter in the exhaust gas system, consisting essentially of a diesel engine lubricating oil and 5–20,000 ppm, based on said engine lubricating oil, of an iron compound selected from the group consisting of ferrocene, an alkylated ferrocene, a bis-ferrocene and a complex salt of an organic acid and iron, in which the ratio of the number of equivalents of the organic acid to the number of iron atoms has a value of 3 or less, wherein said iron compound catalyzes the oxidative regeneration of said particulate filter.

4,946,610

**SULFUR-BRIDGED PHENOLIC ANTIOXIDANTS**  
William Y. Lam, Ballwin, and Gregory P. Liesen, St. Louis, both of Mo., assignors to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Filed Aug. 3, 1989, Ser. No. 389,329  
Int. Cl.<sup>5</sup> C10M 135/30

U.S. Cl. 252—48.2

21 Claims

1. A liquid, sulfur-bridged, hindered phenol product prepared by the process comprising reacting a liquid mixture of phenols, which mixture contains at least two different hindered phenols each phenol having at least one hydrogen in the ortho or para position, with a sulfur chloride, in amounts of from about 0.45 to 0.55 mole of sulfur chloride per mole of phenol, in the presence of an amount of a nitrogen containing polar modifier which is effective to reduce the copper corrosion properties of said product and recovering the liquid, sulfur-bridged hindered phenol product.

4,946,611

**REFRIGERATOR OIL CONTAINING FLUORINATED SILOXANE COMPOUNDS**  
Masato Kaneko, Ichihara, Japan, assignor to Idemitsu Kosan Co., Ltd., Tokyo, Japan

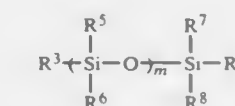
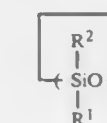
Filed Dec. 7, 1988, Ser. No. 280,959

Claims priority, application Japan, Dec. 11, 1987, 62-312357  
Int. Cl.<sup>5</sup> C10M 105/56, 105/76

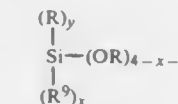
U.S. Cl. 252—49.6

9 Claims

1. A refrigerator oil which comprises at least one of the fluorinated compounds represented by the following general formula:



or



wherein R is an alkyl group having 1 to 30 carbon atoms, an aryl group having 6 to 30 carbon atoms or cycloalkyl group having 6 to 30 carbon atoms, R<sup>1</sup> to R<sup>8</sup> are independently an alkyl group having 1 to 30 carbon atoms, an aryl group having 6 to 30 carbon atoms, a cycloalkyl group having 6 to 30 carbon atoms, a fluorine-substituted alkyl group having 1 to 30 carbon atoms, a fluorine-substituted aryl group having 1 to 30 carbon atoms or a fluorine-substituted cycloalkyl group having 6 to 30 carbon atoms, and R<sup>9</sup> is a fluorine-substituted alkyl group having 1 to 30 carbon atoms, a fluorine-substituted aryl group having 6 to 30 carbon atoms, or a fluorine-substituted cycloalkyl group having 6 to 30 carbon atoms provided that at least one of R<sup>1</sup> and R<sup>2</sup> is a fluorine-containing group, and that at least one of R<sup>3</sup> to R<sup>8</sup> is a fluorine-containing group; and n is an integer of 3 to 6, m is an integer of 1 to 100, and x and y are integers each satisfying the following expressions:

$$1 \leq x \leq 4, 0 \leq y \leq 3, 0 \leq x + y \leq 4$$

4,946,612

**LUBRICATING OIL COMPOSITION FOR SLIDING SURFACE AND FOR METALLIC WORKING AND METHOD FOR LUBRICATION OF MACHINE TOOLS USING SAID COMPOSITION**

Hideo Kanamori, and Katumi Hasimoto, both of Ichihara, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed May 29, 1987, Ser. No. 55,522

Claims priority, application Japan, Jun. 9, 1986, 61-133123  
The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C10M 173/00, 133/16

U.S. Cl. 252—49.5

19 Claims

1. A lubricating oil composition for lubrication of sliding surfaces and for lubrication of metal working comprising 2–60% by weight of a reaction product of a dibasic acid which has from 16 to 24 carbon atoms and carboxyl groups at both ends as substituents with a piperazine compound; a lubricating oil; 3–30% by weight of an emulsifier; wherein each ratio is based on the weight of the lubricating oil and piperazine compound has the following general formula:

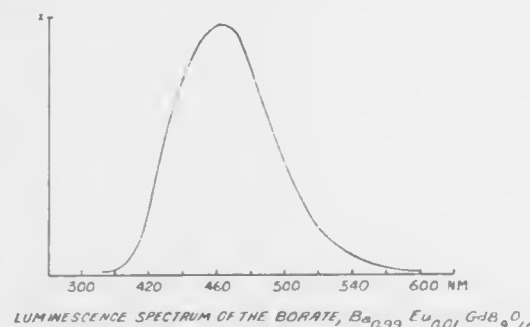




wherein

M(II) represents at least one divalent metal selected from the group consisting of barium, strontium, lead and calcium, with the proviso that in said mixed borate, the amount of lead and calcium taken together does not represent more than 20 molar percent relative to the total number of moles of said M(II) metal,

M(III) represents a metal selected from the group consisting of lanthanum, gadolinium, yttrium, cerium, lutetium and bismuth,



x is a number greater than or equal to 0 and lower than or equal to 0.2,

p, q and r each represent a number ranging from 0 to 1, with the proviso that for a given borate at least one of the x, q and r numbers is other than 0 and the sum of p+q+r is equal to 1, and wherein said mixed borate is selected from the group consisting of (1) that for which q equals 0 and (2) that for which x equals r equals 0 and when q=r=0, M(II) is barium and M(III) is gadolinium, the mixed borate has a luminescence spectrum substantially as depicted in FIG. 3.

4,946,622

#### BLUE LUMINESCING GLASSES

Akos Kiss, Aschaffenburg; Peter Kleinschmit, Hanau; Werner Volker, Bad Vilbel, and Gunter Halbritter, Schollkrippen, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 180,694, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 678,947, Dec. 6, 1984, abandoned. This application Feb. 6, 1989, Ser. No. 307,231  
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1983, 3346685

Int. Cl.<sup>5</sup> C03C 8/10, 3/105, 3/108; C09K 11/08

U.S. Cl. 252-301.4 F

1 Claim

1. An amorphous blue luminescent glass capable of absorbing radiation at 254 nm and emitting radiation at 420 nm ( $\Delta\lambda = \pm 2$  nm) and a band width of the band at 50 percent down of approximately 35 nm, said glass consisting of the following:

2-15 mole % Na<sub>2</sub>O, K<sub>2</sub>O or a mixture of Na<sub>2</sub>O and K<sub>2</sub>O,  
1 to 3 mole % Al<sub>2</sub>O<sub>3</sub>,  
7 to 12 mole % B<sub>2</sub>O<sub>3</sub>,  
71-82 mole % SiO<sub>2</sub> and  
0.8 to 1.8 mole % PbO.

#### 4,946,623 PROCESS FOR THE PRODUCTION OF A FERROMAGNETIC COMPOSITION, FERROMAGNETIC LIQUID CRYSTAL OBTAINED BY THIS PROCESS AND APPARATUS USING SAID LIQUID CRYSTAL

James Tabony, Villebon/Yvette, France, assignor to Commissariat à l'Energie Atomique, Paris, France

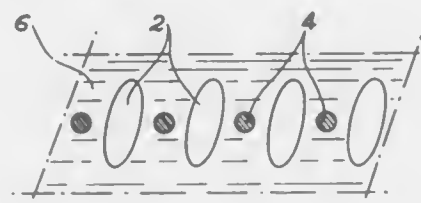
Filed Oct. 26, 1987, Ser. No. 113,289

Claims priority, application France, Nov. 7, 1986, 86 15593

Int. Cl.<sup>5</sup> B01J 13/00; C09K 19/52

U.S. Cl. 252-314

16 Claims



1. A process for producing a ferromagnetic composition consisting essentially of:

(i) forming a micro-emulsion by:

(a) dispersing an aqueous solution containing ferrous cations and ferric cations in

(b) an oil,

(c) in the presence of a surfactant and a co-surfactant such that said aqueous solution becomes a disperse liquid phase comprising aqueous aggregates dispersed in said oil which is a continuous liquid phase;

said aqueous solution consisting of water or a saline solution and said oil being a hydrocarbon selected from the group of hydrocarbons consisting of saturated and unsaturated hydrocarbons having 5 to 30 carbon atoms and including both cyclic and non-cyclic hydrocarbons, and fluorine derivatives of such hydrocarbons, and

(ii) said ferrous cations and ferric cations a chemical compound to form ferromagnetic particles in situ in said aqueous aggregates such that the size of said particles is limited by the size of the aggregates in which they are formed.

4,946,624

#### MICROCAPSULES CONTAINING HYDROPHOBIC LIQUID CORE

Daniel W. Michael, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 27, 1989, Ser. No. 316,727

Int. Cl.<sup>5</sup> B01J 13/02; C11D 3/50

U.S. Cl. 252-315.2

13 Claims

1. An aqueous fabric softener composition having a pH of less than about 7 comprising cationic fabric softener and perfume microcapsules prepared by a coacervation process between gelatin and polyanionic material selected from the group consisting of: (a) polyphosphates; (b) alginates; (c) carrageenan; (d) carboxymethyl cellulose; (e) polyacrylates; (f) gum arabic; (g) silicates; (h) pectin; (i) Type B gelatin; and (j) mixtures thereof, the walls of said microcapsules containing from about 1% to about 25%, by weight of the core material, of particles that have diameters of less than about 5 microns.

4,946,625

#### PARTICULATE DEFOAMING COMPOSITIONS

Anthony J. O'Lenick, Jr., Lilburn, Ga., assignor to Siltech Inc., Norcross, Ga.

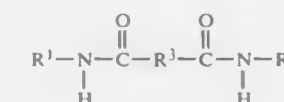
Filed Mar. 27, 1989, Ser. No. 328,621

Int. Cl.<sup>5</sup> B01D 19/04

U.S. Cl. 252-358

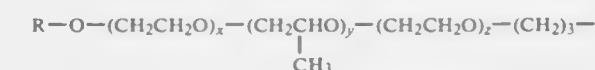
7 Claims

1. A composition conforming to the following structure;



wherein;

R<sup>1</sup> and R<sup>2</sup> are independently;



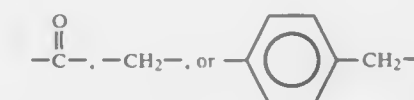
R is alkyl C<sub>10</sub> to C<sub>40</sub>, and may be saturated or unsaturated, linear or branched;

x, y, and z are independently 0 to 10;

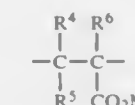
R<sup>3</sup> is selected from  $-(\text{CH}_2)_n-$ ,  $-(\text{CH}_2)_m\text{CH}=\text{CH}(\text{CH}_2)_m-$ ;

n is 1 to 10;

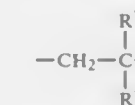
m is 0 to 8.



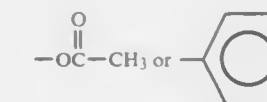
R<sup>1</sup> and R<sup>3</sup> are H or C<sub>1-6</sub> alkyl groups; R<sup>2</sup> is H, C<sub>1-6</sub> alkyl group or  $-\text{CO}_2\text{M}$  where M is H or metal cation; Y is H or C<sub>1-3</sub> alkyl group; p is 1 to 4; q is 1 to 15; n is 6 to 20; A is a repeating unit of the structure:



where R<sup>4</sup> is H or C<sub>1-6</sub> alkyl group; R<sup>5</sup> is H, C<sub>1-6</sub> alkyl group or  $-\text{CO}_2\text{M}^2$ , R<sup>6</sup> is H, C<sub>1-6</sub> alkyl group or  $-\text{CH}_2\text{CO}_2\text{M}^3$  where each of M<sup>1</sup>, M<sup>2</sup> and M<sup>3</sup> are H or a metal cation; B is a repeating unit having the structure:



where R<sup>7</sup> is H or C<sub>1-6</sub> alkyl group; R<sup>8</sup> is CO<sub>2</sub>R<sup>9</sup>,



with R<sup>9</sup> being a C<sub>1-6</sub> alkyl group; and r, s and t represent repeating units such that the [hydrophobic monomer], unit comprises from about 1 to 50% by weight of the polymer, copolymer unit [A], comprises from about 40 to 95% by weight of the polymer, and copolymer unit [B], comprises from about 0 to 40% by weight of polymer.

11. A detergent composition comprising a detergent effective amount of a surfactant and an effective amount of the polymer of claim 1 as a builder.

4,946,626

#### CORROSION INHIBITORS

Richard L. Veazey, E. Windsor, N.J., and Ewa A. Bardasz, Langhorne, Pa., assignors to Union Camp Corporation, Wayne, N.J.

Filed Jun. 14, 1988, Ser. No. 206,451

Int. Cl.<sup>5</sup> C23F 11/10

U.S. Cl. 252-392

17 Claims

1. A method of inhibiting corrosion of a metal exposed to oxidative conditions, which comprises; applying to the metal a corrosion inhibiting proportion of the Diels-Adler adduct of 2,3 and 6,7 poly(alloocimene) and an activated olefin, said adduct being 5 to less than 85 percent adducted.

4,946,627

#### HYDROPHOBICALLY MODIFIED POLYCARBOXYLATE POLYMERS UTILIZED AS DETERGENT BUILDERS

John C. Leighton, Flanders, and Carmine P. Iovine, Bridgewater, both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

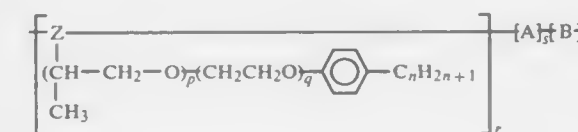
Filed Jul. 19, 1989, Ser. No. 381,894

Int. Cl.<sup>5</sup> C02F 5/12; C08F 220/58; C11D 3/37, 17/08

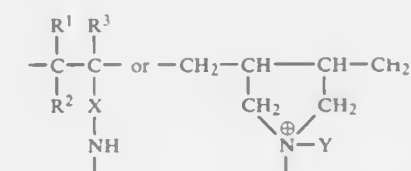
U.S. Cl. 252-542

22 Claims

1. A hydrophobically modified polycarboxylate polymer which comprises repeating units of the structure:



where Z is



wherein X is

4,946,628

#### LIQUID DETERGENTS WHICH CONTAIN STILBENE WHITENERS

Ulrich Schüssler, Leverkusen, and Florin Seng, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,685

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726266

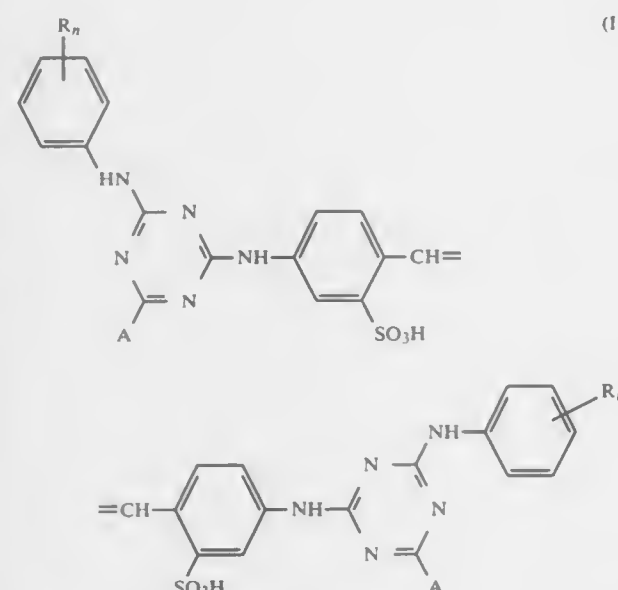
Int. Cl.<sup>5</sup> C11D 3/42

U.S. Cl. 252-543

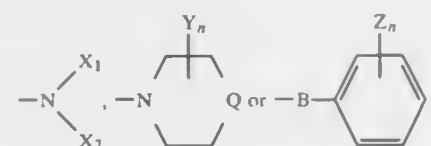
9 Claims

1. A whitener-containing liquid detergent which comprises a liquid detergent and a whitener, said whitener being a compound of the formula





in which independently of each other  
A denotes



B denotes O, NH, NH, or NH(CH<sub>2</sub>)<sub>n</sub>,  
R denotes H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub>-O alkoxy, F, Cl, CF<sub>3</sub> or OCF<sub>3</sub>,  
X<sub>1</sub> denotes C<sub>4</sub>-C<sub>12</sub> alkyl or C<sub>5</sub>-C<sub>7</sub> cycloalkyl,  
X<sub>2</sub> denotes H or C<sub>1</sub>-C<sub>12</sub> alkyl,  
Q denotes —O—, —CH<sub>2</sub>—, —CH<sub>2</sub>CH<sub>2</sub>— or denotes a direct bond,  
Y denotes C<sub>1</sub>-C<sub>4</sub> alkyl,  
Z denotes R and  
n denotes 1, 2 or 3,  
with the proviso that, if Z is H and B is NH, R is not H, and alkali metal, amine and ammonium salts of said compound.

4,946,629

# OPTICAL ELEMENT HAVING NON-LINEAR OPTICAL PROPERTIES INCLUDING A SUBSTRATE HAVING A COATING OF AN AZO COMPOUND

Simon Allen, Cheshire; Paul F. Gordon, Rochdale, and Richard A. Hann, Cheshire, all of England, assignors to Imperial Chemical Industries, Plc, London, England

Division of Ser. No. 6,919,640, Oct. 16, 1986, Pat. No. 4,804,787. This application Nov. 25, 1988, Ser. No. 274,926

Claims priority, application United Kingdom, Nov. 18, 1985, 8525745; Jun. 9, 1986, 8613921

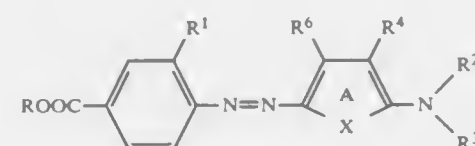
Int. Cl.<sup>5</sup> G02B 1/04, 1/08, 6/00

U.S. Cl. 252-589

2 Claims

1. An optical element having non-linear optical properties comprising a transparent or reflecting substrate having a coating which consists essentially of at least two monomolecular layers of a compound of the formula set forth below wherein the molecules in both molecular layers are aligned in the same manner:

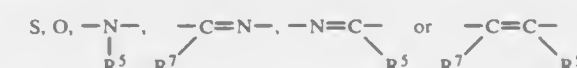
(I)



wherein

R is selected from H, cadmium, calcium, barium, lead, manganese, zinc, magnesium and strontium or a group containing a tetravalent nitrogen atom selected from ammonium, bis(ammonium), guanidinium, biguanidinium, amidinium and a mono-, di- or tri-substituted or quaternary ammonium group in which the substituents are selected from C<sub>1</sub>-20-alkyl, C<sub>1</sub>-4-alkoxy-C<sub>1</sub>-20-alkyl, halo-C<sub>1</sub>-20-alkyl, hydroxy-C<sub>1</sub>-20-alkyl, phenyl, C<sub>1</sub>-4-alkylphenyl, C<sub>1</sub>-4-alkoxyphenyl, halophenyl, hydroxyphenyl, benzyl, C<sub>1</sub>-4-alkylbenzyl, C<sub>1</sub>-4-alkoxybenzyl, halobenzyl, hydroxybenzyl, cyclohexyl and C<sub>1</sub>-4-alkyl-cyclohexyl;

X is



R<sup>1</sup> is NO<sub>2</sub>, CN or COOY;

Y is selected from H, C<sub>1</sub>-4-alkyl, cadmium, calcium, barium, lead, manganese, zinc, magnesium and strontium or a group containing a tetravalent nitrogen atom selected from ammonium, bis(ammonium), guanidinium, biguanidinium, amidinium and a mono-, di- or tri-substituted or quaternary ammonium group in which the substituents are selected from C<sub>1</sub>-20-alkyl, C<sub>1</sub>-4-alkoxy-C<sub>1</sub>-20-alkyl, halo-C<sub>1</sub>-20-alkyl, hydroxy-C<sub>1</sub>-20-alkyl, phenyl, C<sub>1</sub>-4-alkylphenyl, C<sub>1</sub>-4-alkoxyphenyl, halophenyl, hydroxyphenyl, benzyl, C<sub>1</sub>-4-alkylbenzyl, C<sub>1</sub>-4-alkoxybenzyl, halobenzyl, hydroxybenzyl, cyclohexyl and C<sub>1</sub>-4-alkyl-cyclohexyl;

R<sup>2</sup> and R<sup>3</sup> are each independently H or non-hydrophilic aliphatic or cycloaliphatic group containing up to 30 carbon atoms selected from alkyl, alkenyl, cycloalkyl, a mixture thereof and alkyl, alkenyl, cycloalkyl or a mixture thereof interrupted by not more than one oxygen or sulphur for every twelve chain carbon atoms;

R<sup>4</sup> and R<sup>5</sup> are each independently H or non-hydrophilic aliphatic or cycloaliphatic group containing up to 30 carbon atoms selected from alkyl, alkenyl, cycloalkyl, a mixture thereof and alkyl, alkenyl, cycloalkyl or a mixture thereof interrupted by not more than one oxygen or sulphur for every twelve chain carbon atoms, each of R<sup>4</sup> and R<sup>5</sup> being attached directly to Ring A or joined thereto by a linking group selected from oxygen, sulphur, nitrogen, —CO—, —SO<sub>2</sub>—, —CO.O— and SO<sub>2</sub>O; and

R<sup>6</sup> and R<sup>7</sup> are each independently H or non-hydrophilic aliphatic group containing up to 4 carbon atoms selected from C<sub>1</sub>-4-alkyl, C<sub>1</sub>-4-alkoxy, NH<sub>2</sub>, and mono- and di-C<sub>1</sub>-4-alkylamino; or

R<sup>4</sup> and R<sup>6</sup> together with the carbon atoms of Ring A to which they are attached form a benzene, pyrrole, furan, thiazole, isothiazole, thiophene or pyridine ring fused to Ring A and R<sup>5</sup> and R<sup>7</sup> are as hereinbefore defined; or R<sup>5</sup> and R<sup>7</sup> together with the carbon atoms of Ring A to which they are attached form a benzene, pyrrole, furan, thiazole, isothiazole, thiophene or pyridine ring fused to Ring A and R<sup>4</sup> and R<sup>6</sup> are as hereinbefore defined; or R<sup>2</sup> and R<sup>4</sup> together with the N atom and the carbon atoms of Ring A to which they are attached form a 2-pyrroline, tetrahydropyridine, 4-oxazoline or 4-thiazoline ring fused to Ring A and R<sup>3</sup> and R<sup>5</sup> are as hereinbefore defined; or R<sup>3</sup> and R<sup>5</sup> together with the N atom and the carbon atoms of Ring A to which they are attached form a 2-pyrroline,

tetrahydropyridine, 4-oxazoline or 4-thiazoline ring fused to Ring A and R<sup>4</sup> and R<sup>6</sup> are as hereinbefore defined; or provided there are, in total, from 8 to 40 carbon atoms in one or two of the groups independently represented by R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup>.

2. An optical device comprising a non-linear optical element according to claim 1.

4,946,630

# MAKING HOT PRESSED SILICON NITRIDE BY USE OF LOW DENSITY REACTION BONDED BODY

Andre Ezis, Grosse Ile, Mich., assignor to Ceradyne, Inc., Costa Mesa, Calif.

PCT No. PCT/US82/01461, § 371 Date Oct. 12, 1982, § 102(e) Date Oct. 12, 1982

PCT Filed Oct. 12, 1982, Ser. No. 448,889

Int. Cl.<sup>5</sup> C04B 35/58

U.S. Cl. 264-65

12 Claims

1. A method of manufacturing a silicon nitride comprising object by the steps of:

(a) heating an uncompacted quantity of a mixture of powdered silicon and a fluxing agent for aiding the pressure sintering of the mixture, said mixture having an increased pore network to increase the inward migration of the atmosphere and having an increased surface area exposed to the atmosphere to decrease the nitriding diffusion distance, said heating being carried out in a nitriding atmosphere without the use of pressure normally associated with hot pressing to fully react said mixture with said atmosphere to form a silicon nitride comprising body of dimensions greater than the required finished product and of density less the required finished product; and

(b) mechanically hot pressing said silicon nitride body to produce a silicon nitride comprising product of the required dimensions and the required density, the product being useful as a cutting tool material for machining metals.

4,946,631

# CARBURETOR

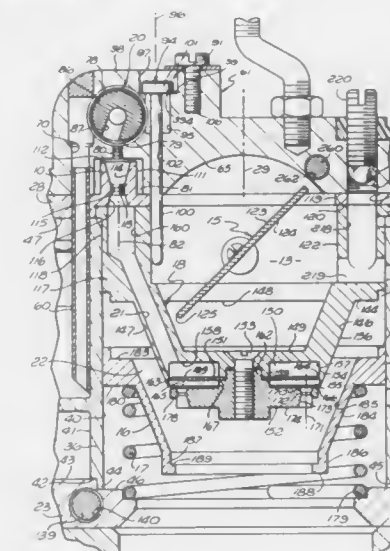
Charles G. Buford, Oceanside, Calif., assignor to Crown Carburetor Co., Ltd., Arcadia, Calif.

Filed Dec. 6, 1988, Ser. No. 280,716

Int. Cl.<sup>5</sup> F02M 7/28

U.S. Cl. 261-39.5

87 Claims



62. A carburetor comprising:  
a body structure through which a vacuum induced primary flow of air passes;

a throttle valve adjustable to regulate said primary flow of air;

a flow actuated member positioned along the path of said primary flow of air at a location downstream of said throttle valve and which is movable by said air to different positions varying the width of an essentially annular restriction through which the air flows;

fuel delivery means for directing fuel and secondary air into admixture with one another in isolation from said primary flow of air to form a combined stream, and then directing said combined stream for induction by vacuum into said primary flow of air;

said fuel delivery means including a second valve operable to regulate the flow of secondary air before admixture with the fuel in a manner enriching said combined stream when the flow of secondary air is reduced; and

automatic actuating means operable by said flow actuated member, upon movement thereof in an opening direction increasing the width of said restriction, to progressively close said second valve and thereby enrich said combined stream;

said fuel delivery means being constructed to direct said combined stream of fuel and secondary air into said primary flow of air at a location downstream of said throttle valve and directly adjacent said essentially annular restriction in all positions of said flow actuated member and in a generally annular pattern corresponding generally to that of said essentially annular restriction, to intimately intermix the combined stream of fuel and secondary air with the primary flow of air at essentially the maximum velocity of the primary flow of air as it passes the flow actuated member.

4,946,632

# METHOD OF CONSTRUCTING A MASONRY STRUCTURE

Peter J. Pollina, 1150 Hylan Blvd., Staten Island, N.Y. 10305

Division of Ser. No. 54,514, May 27, 1987, Pat. No. 4,765,115.

This application Aug. 9, 1988, Ser. No. 229,998

Int. Cl.<sup>5</sup> B28B 1/16; B29C 33/42; B32B 31/06; E04B 1/16

U.S. Cl. 264-33

2 Claims



1. In a method of constructing modular tooled masonry structures comprising the steps of:

(a) providing a pre-fabricated wire support structure having a shape generally corresponding to the shape of the completed masonry structure,

(b) assembling a first lowermost horizontal row of bricks in a pre-determined pattern onto said support structure using said support structure as a support and spacing guide for said bricks,

(c) placing an open top removable mortar molding form having an elongated forward vertical wall with equally spaced internal projecting vertical spacing elements adapted to interfit between adjacent bricks, and a continuous inverted inwardly directed horizontal flange assembly having an upper vertical flange the width of the desired mortar layer to be formed above said bricks, said inwardly directed horizontal flange assembly adjacent the upper edge of said elongated forward vertical wall for engaging and resting on the upper surface edge of said bricks adjacent their external face, which molding form is placed upon and partially surrounds a plurality of said bricks of said horizontal row,

(d) applying a pre-determined quantity of mortar into said

mortar molding form thereby covering accessible unmasked areas of said bricks with a pre-determined thickness of mortar and forming tooled masonry joints between said bricks,

- (e) covering the upper surface of said bricks with mortar by filling said open top of said form to the top edge of said vertical flange and leveling said mortar to provide a uniform thickness mortar layer with an upper surface flush with said top edge of said form,
- (f) allowing said mortar to partially set,
- (g) removing said mortar molding form from said bricks, successively repeating the application of said molding form and said mortar horizontally along adjacent sections of said horizontal row of bricks to complete the applying of said mortar to said horizontal brick row thereby forming a portion of said modular tooled masonry structures.

4,946,633

#### METHOD OF PRODUCING SEMICONDUCTOR DEVICES

Junichi Saeki; Aizo Kaneda, both of Yokohama; Shigeharu Tsunoda, Fujisawa; Isamu Yoshida, Yokohama, and Kunihiro Nishi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

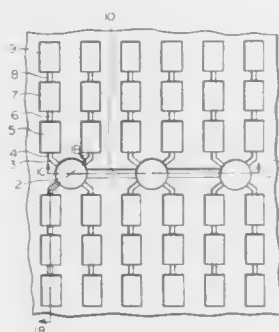
Filed Apr. 22, 1988, Ser. No. 184,790

Claims priority, application Japan, Apr. 27, 1987, 62-101906; Oct. 23, 1987, 62-266342; Mar. 16, 1988, 63-60551

Int. Cl.<sup>3</sup> B29C 45/02, 45/14

U.S. Cl. 264—40.1

25 Claims



1. A method of producing semiconductor devices, said method comprising the steps of:

- providing a mold having a plurality of pots for supplying a molding resin;
- communicating said pots with each other by communication passages;
- providing groups of cavities in the mold with each group of cavities comprising a plurality of cavities arranged in series to receive the resin from one of said pots;
- placing a lead frame in said mold over said cavity;
- supplying said pots with said molding resin;
- injecting said molding resin into said cavities by pressing said resin in said pots by a plurality of plungers;
- connecting the cavities of each group of cavities with each other by passages formed by slits in the lead frame and feeding the resin from an associated pot through said slits into the cavities of the group.

4,946,634

#### POWDER COMPACTING PRESS TO CONTROL GREEN DENSITY DISTRIBUTION IN PARTS

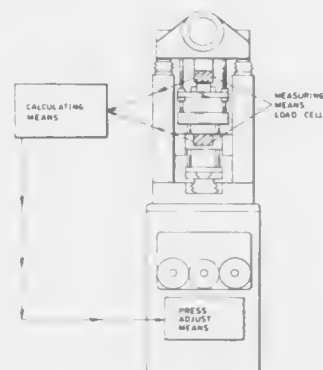
Kenneth H. Shaner, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 39,032, Apr. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 731,221, May 7, 1985, abandoned. This application Oct. 3, 1988, Ser. No. 252,719

Int. Cl.<sup>3</sup> B22F 3/02

U.S. Cl. 264—40.5

6 Claims



1. An improvement in a process for compacting powder in a powder compacting press wherein one or more upper and one or more lower punches are respectively advanced toward each other in a die filled with an amount of powder to produce a pressed part in the shape of said die and punch configuration, the improvement comprising:

- (a) measuring the peak forces applied to said upper and lower punches and generating a first signal proportional to said forces;
- (b) receiving said first signal with calculating means and calculating the ratio of said forces of said upper and said lower punches with said calculating means and transmitting a second signal proportional to said ratio; and
- (c) receiving said second signal with adjusting means and adjusting the forces applied to each punch based upon said second signal with said adjusting means to achieve a pre-determined green density distribution in said pressed part whereby substantial uniformity in part dimensions is achieved.

4,946,635

#### METHOD FOR THE CONTINUOUS PRODUCTION OF CHIP, FIBER-AND SIMILAR BOARDS

Hans-Peter Steininger, Springe, Fed. Rep. of Germany, assignor to Wilhelm Mende GmbH & Co., Gittelde, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 921,159, Oct. 20, 1986, abandoned. This application Jun. 3, 1988, Ser. No. 202,140

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1985, 3538531

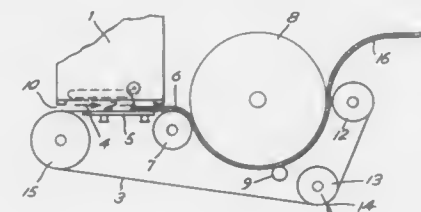
Int. Cl.<sup>3</sup> B29C 43/40

U.S. Cl. 264—120

5 Claims

1. In a method for the continuous production of chip board in which a mixture of cellulose chips and resin binder is compressed against a heated rotating drum by means of a steel band which partially encircles the underside of the drum and applies pressure to said mixture, and in which a first pressure is applied to the mixture at a first circumferential position on the heated drum surface at the entry slit between said drum and said band, and a second greater pressure is applied at a second circumferential position on the heated drum surface downstream of said first circumferential position, the improvement comprising applying at said first circumferential position a pressure of

about 250–325 kp/cm (kilopond per centimeter) to achieve a density for heat transfer through said mixture, heating said mixture to a temperature between 105° and 220° C. to render the chips flexible to minimize their resilience and simultaneously to achieve the temperature at which



the resin binder is sufficiently fluid to maximize the wetting of the chips, and applying at said second circumferential position a pressure of 400–475 kp/cm to compress said mixture to the final and desired thickness as the binder hardens and intimately binds the chips.

4,946,636

#### PROCESS FOR PRODUCING AGGLOMERATED CERAMIC GLAZES

Palmiro Brunetti, Lucia; Luigi Capitanio, Capriate; Henning M. Salge, Sassuolo, and Felix Schlegel, Spezzano di Fiorano, all of Italy, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,309

Claims priority, application Italy, May 2, 1988, 20417 A/88

Int. Cl.<sup>3</sup> B29C 47/00

U.S. Cl. 264—141

7 Claims

1. Process for producing agglomerated ceramic glazes which comprises mixing dry or wet ground glaze with a hardening binder until a paste-like mass is obtained, extruding the paste-like mass, cutting the extruded product into pieces, subjecting said cut pieces to a rapid surface-drying process and then heating the dried pieces to 100°–120° C. until the binder hardens.

4,946,637

#### MOLDING METHOD

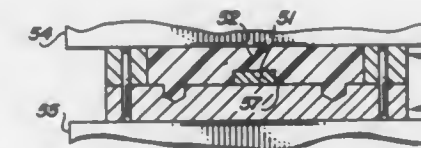
Victor J. Masciarelli, Jr., 18 Salem End La., Framingham, Mass. 01701

Filed Jan. 17, 1989, Ser. No. 297,149

Int. Cl.<sup>3</sup> B29C 33/42

U.S. Cl. 264—226

10 Claims



1. A molding method comprising the steps of: providing a first mold part defining a substantially planar base surface interrupted by a plurality of spaced apart perturbations; providing a second mold part having a substantially planar bottom surface with a first inner annular periphery, a substantially planar top surface with a second inner annular periphery, and first walls extending between said first and second peripheries; engaging said base surface of said first mold part with said bottom surface of said second mold part such that said first inner annular periphery encompasses said perturbations; positioning a model to be reproduced on said base surface

within a first cavity formed by said first walls, said base surface and said perturbations; filling said first cavity with a pliable mold compound; effecting hardening of said mold compound to provide a first mold piece; removing said first mold part from said second mold part while retaining said first mold piece in said second mold part so as to expose a molded surface of said first mold piece having complementary disturbances formed by said perturbations and including said model; providing a third mold part having a substantially planar lower surface with a third inner annular periphery, an upper surface, and second walls extending from said third periphery; engaging said bottom surface of said second mold part with said lower surface of said third mold part while retaining said first mold piece in said second mold part so as to form a second cavity defined by said molded surface and said second walls and retaining said object; filling said second cavity with a pliable mold compound; effecting hardening of said mold compound in said second cavity to provide a second mold piece; separating said first and second mold pieces; and removing said model.

4,946,638

#### SLUSH MOLDING METHOD AND APPARATUS THEREFOR

Shigeki Takamatsu, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

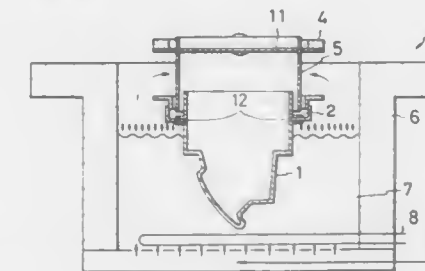
Filed Mar. 25, 1988, Ser. No. 173,166

Claims priority, application Japan, Mar. 26, 1987, 62-72281

Int. Cl.<sup>3</sup> B29C 41/18

U.S. Cl. 264—302

4 Claims



1. A slush molding method comprising the steps of: preparing a mold having side portions and a bottom portion with a groove provided around the outer periphery of the side portions thereof; engaging the bottom portion of a heating medium guard frame with said groove in such a manner as to be vertically movable; charging a resin material into said mold; dipping said mold in a fluidized-bed oven with said heating medium guard frame engaged with said groove to prevent heating media from entering said mold; heating said mold to melt and resin and cause said resin to adhere to the molding surface; taking said mold out of said oven and removing said heating medium guard frame from said groove; discharging the surplus resin; and cooling said mold.



4,946,639

**METHOD FOR INJECTION MOLDING ELONGATED BODIES**

Norbert Majerus; Harold E. Mills, and John S. Rambacher, all of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

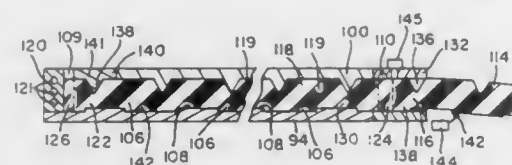
Division of Ser. No. 201,769, Jun. 2, 1988, Pat. No. 4,818,203.

This application Jan. 9, 1989, Ser. No. 294,407

Int. Cl.<sup>5</sup> B29C 45/14

U.S. Cl. 264—308

14 Claims



1. A method of injection molding a continuous elongated body of curable fluid molding material by increments in a mold with a mold cavity having a temperature moderating closed end and an open end wherein the distance between said closed end and said open end is less than the length of said elongated body comprising:

- injecting a curable fluid molding material into said mold cavity forming a first section of said elongated body in a first position having a trailing portion abutting said closed end;
- heating said fluid molding material after injection to cure said first section;
- limiting the heating of said trailing portion of said first section at said closed end of said mold cavity to prevent full curing of said trailing portion;
- opening said mold;
- shifting said first section longitudinally from said first position in said mold cavity to a second position with said trailing portion of said first section in said open end of said cavity and the remainder of said first section outside of said mold;
- closing said mold to enclose said mold cavity and clamp said trailing portion of said first section;
- injecting a curable fluid molding material into said mold cavity forming a second section of said elongated body with a leading portion of said second section abutting said trailing portion of said first section and a trailing portion of said second section abutting said closed end of said mold cavity;
- heating said fluid molding material after injection of said second section and said trailing portion of said first section to cure said second section and adhere said trailing portion of said first section to said leading portion of said second section; and
- opening said mold and removing said trailing portion of said first section and said second section of said elongated body from said mold cavity.

4,946,640

**METHOD FOR FORMING PREFORMED MATERIAL**

Nazim S. Nathoo, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 17, 1989, Ser. No. 338,684

Int. Cl.<sup>5</sup> B29C 51/20

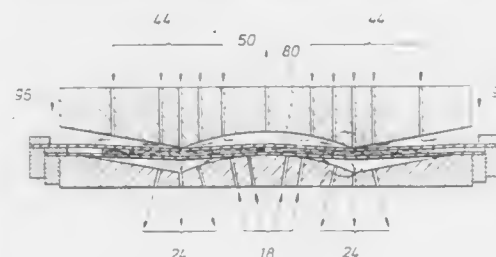
U.S. Cl. 264—316

2 Claims

1. A method of shaping a fibrous preform material, said method comprising:

- providing a lower mold having a non-planar surface with a first fluid lubrication opening and a vacuum/vent opening;
- providing an upper mold having a non-planar surface with a second fluid lubrication opening and a fluid vent opening, said upper mold non-planar surface shaped to be coopera-

tively locatable a spaced distance away from said lower mold non-planar surface, heating said fibrous preform material to a temperature above the softening point of a sizing coating said preform material, holding in an air-tight manner the fibrous preform material between an impermeable upper elastomeric sheet and an impermeable lower elastomeric sheet to prevent wrinkles in said preform material, the sheets and the fibrous preform material forming an impermeable laminate assembly, a portion of said laminate assembly unsupported by said non-planar lower mold surface, defining a first fluid chamber bounded by the lower elastomeric sheet of said impermeable laminate assembly and the lower non-planar lower mold surface, said first fluid chamber being in fluid communication with said first fluid lubrication opening and said vacuum/vent opening, shaping initial portions of said lower elastomeric sheet about portions of said non-planar lower mold surface by removing fluid from said first fluid chamber, thereby shaping corresponding portions of said fibrous material held within said impermeable laminate assembly,



defining a second fluid chamber bounded by the upper elastomeric sheet of said laminate assembly and the non-planar upper mold surface by moving said non-planar upper mold surface downward into contact with portions of said upper elastomeric sheet, said second fluid chamber being in fluid communication with said second fluid lubrication opening and said fluid vent opening, shaping additional portions of said elastomeric sheets about additional portions of said upper and lower mold surfaces, thereby shaping corresponding portions of said fibrous material held within said elastomeric sheets, including lubricating outer surfaces of said impermeable laminate assembly by adding fluid to said first fluid chamber through said first fluid lubrication opening to provide fluid lubrication between said shaped initial portions and said lower mold surface and adding fluid to said second fluid chamber through said second fluid lubrication opening to provide fluid lubrication between said portions of said upper elastomeric sheet and said upper mold surface to prevent said outer surfaces of said impermeable laminate assembly from binding to said upper and lower mold surfaces, and cooling said fibrous preform material below the softening temperature of said sizing.

4,946,641

**PROCESS OF MAKING A GOLD-COLORED OLEFIN PRODUCT**

Majorie B. Skinner, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 9, 1988, Ser. No. 282,233

Int. Cl.<sup>5</sup> B29C 47/00, 49/04; C08L 23/02

U.S. Cl. 264—540

19 Claims

15. A blow molding process to manufacture a glossy, metallic, Fort Knox gold product in a grit blasted mold by blending:

- from about 97 to about 98 weight percent polyethylene;
- from about 0.5 to about 4 weight percent mica-based gold pigment;

4,946,642

- from about 0.01 to about 0.4 weight percent mica-based bronze pigment;
- from about 0.001 to about 0.006 weight percent carbon black; and
- from about 0 to about 1 weight percent yellow pigment; under conditions comprising;
- dry blending at a rate of less than about 1000 rpm to form a dry blended product;
- extruding said dry blended product with a screw speed of less than 80 rpm;
- extruding said dry blended product through at least one opening wherein each opening has a size of greater than about 0.25 mm;
- feeding the thus-formed extrudate to a continuous blow molder extruder connected to a mold; and
- forming a container.

4,946,642

**APPARATUS FOR HANDLING A MEASURING INSTRUMENT FOR THE INSIDE OF A NUCLEAR REACTOR**

Isao Yoshinaga, and Toshikazu Edashima, both of Kobe, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

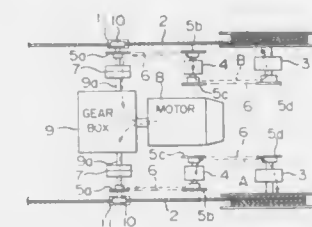
Filed Oct. 20, 1988, Ser. No. 260,320

Claims priority, application Japan, Jan. 20, 1988, 63-8226

Int. Cl.<sup>5</sup> G21C 17/00

U.S. Cl. 376—260

1 Claim



1. An apparatus for handling a measuring instrument for the inside of a nuclear reactor comprising:

- a pair of take-up drums;
  - a pair of wire ropes, each of which has one end wrapped around one of said take-up drums and the other end connected to a measuring instrument for the inside of a nuclear reactor;
  - a pair of drive wheels which are disposed between the measuring instruments and said take-up drums, each of said drive wheels corresponding to one of said take-up drums, and being drivingly engaged with one of said wire ropes; and
  - a motor; and
- selector means coupled between the motor, the drive wheels, and the take-up drums for selectively rotating either of said take-up drums one at a time together with the corresponding drive wheel, said selector means including a gear box which has two output shafts and which is connected to the motor so as to be driven thereby, clutch means for selectively rotating one of the output shafts of the gear box, and means for transmitting the rotation of each of the output shafts of the gear box to one of the take-up drums and the corresponding drive wheel.

4,946,644

**AUSTENITIC STAINLESS STEEL WITH IMPROVED CASTABILITY**

William J. Schumacher, Monroe, and James A. Daniels, Loveland, both of Ohio, assignors to Baltimore Specialty Steels Corporation, Baltimore, Md.

Filed Mar. 3, 1989, Ser. No. 319,400

Int. Cl.<sup>5</sup> C22C 38/58, 39/26

U.S. Cl. 420—56

11 Claims

1. An austenitic stainless steel of high work hardening rate, high stability against thermal martensite transformation and improved castability, said steel consisting essentially of, in weight percent:

- about 13.5% to about 15.5% chromium;
- about 8% to 12% manganese;
- about 0.05% to 0.2% carbon;
- about 0.15% to 0.22% nitrogen;
- about 1.5% maximum nickel; and
- balance essentially iron.

4,946,645

**STEEL FOR GEARS, HAVING HIGH STRENGTH, TOUGHNESS AND MACHINABILITY**

Kunio Namiki, Nagoya; Atsuyoshi Kumura, Kawan; Sukehisa Niwa, Tokorozawa, and Toshihiko Matsubara, Kawagoe, all of Japan, assignors to Daido Tokushuko Kabushiki Kaisha and Honda Giken Kogyo Kabushiki Kaisha, both of Japan  
Filed Mar. 28, 1989, Ser. No. 329,822

Claims priority, application Japan, Mar. 28, 1988, 63-74199  
Int. Cl.<sup>5</sup> C22C 38/00

U.S. Cl. 420—84

6 Claims

2. A steel composition for gears, consisting of: 0.10–0.30% by weight of C; less than 0.15% by weight of Si; no more than 1.5% by weight of Mn; no more than 0.015% by weight of P; no more than 0.005% by weight of S; 0.50–1.50% by weight of Cr; 0.005–0.06% by weight of Pb; no more than 1.5% by weight of Ni and/or no more than 0.5% by weight of Mo; and the balance being Fe and inevitably included impurities.

4,946,646

**ALLOY FOR HYDROGEN STORAGE ELECTRODES**

Takaharu Gamo; Yoshio Moriwaki, both of Osaka, and Tsutomu Iwaki, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed May 16, 1988, Ser. No. 194,568

Claims priority, application Japan, May 15, 1987, 62-119411; Jul. 30, 1987, 62-190698; Aug. 19, 1987, 62-205683; Aug. 31, 1987, 62-216898; Oct. 14, 1987, 62-258889

Int. Cl.<sup>5</sup> C22C 22/00; C01F 3/00

U.S. Cl. 420—415

18 Claims



1. A hydrogen storage electrode comprises a body of an alloy of the general formula,  $AB_n$ , or a hydride thereof, in which A represents Zr or a mixture of at least 30 atomic percent Zr and the balance of at least one element selected from the group consisting of Ti, Hf, Al and Si, B represents a mixture of at least 40 atomic percent Ni and a balance of at least one element selected from the group consisting of V, Cr, Mn, Fe, Co, Cu, Zn, Al, Si, Nb, Mo, W, Mg, Ca, Y, Ta, Pd, Ag, Au, Cd, In, Sn, Bi, La, Ce, Mm where Mm is a mixture of rare earth elements, Pr, Nd, Th and Sm provided that A and B are different from each other, and a is a value of from 1.0 to 2.5, said alloy being substantially a Laves phase of an intermetallic compound of A and B, and having a crystal structure of a hexagonal symmetric C14 type having crystal lattice constants, a and c, of from 4.8 to 5.2 angstroms and from 7.9 to 8.3 angstroms, respectively, and/or a cubic symmetric C15 type having a crystal lattice constant of from 6.92 to 7.70 angstroms.

4,946,647

**PROCESS FOR THE MANUFACTURE OF ALUMINUM-GRAPHITE COMPOSITE FOR AUTOMOBILE AND ENGINEERING APPLICATIONS**

Pradeep K. Rohatgi; Tapan K. Dan; Arya, S. C.; S. V. Prasad; Das, S.; A. K. Gupta; B. K. Prasad, and Amol K. Jha, all of Regional Research Laboratory, Bhopal, Madhya Pradesh, India

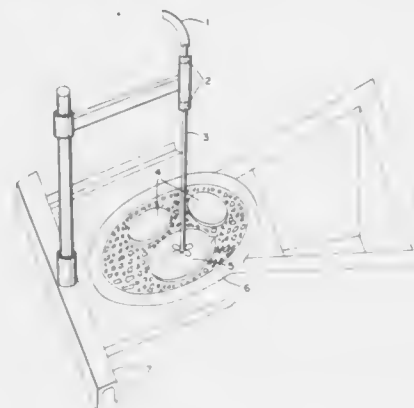
Filed May 4, 1988, Ser. No. 190,024

Claims priority, application Australia, Aug. 28, 1987, 77685/87

Int. Cl.<sup>5</sup> C22C 1/10

U.S. Cl. 420—528

12 Claims



1. A process for the manufacture of aluminium-graphite composite using uncoated graphite particles for automobile and engineering applications which comprises melting aluminium alloy in a furnace, adding a flux to cover the molten aluminium alloy, treating the molten aluminium alloy with a reactive metal to increase the wettability of the alloy and graphite particles, mixing the molten aluminium alloy for the proper distribution of the reactive metal, cleaning and degassing the molten aluminium alloy with dry nitrogen to remove aluminium oxide and dissolved hydrogen gas, treating the molten aluminium alloy thereafter with flux and gradually adding surface activated graphite powder to the bath and stirring at about 500 to about 600 rpm at a temperature of about 700° to about 730° C.

4,946,648

**METHOD OF STERILIZING PLASMA OR PLASMA FRACTIONS**

Herbert Dichtelmüller, Sulzbach; Wolfgang Möller, Oberursel; Wolfgang Stephan, Dreieich, and Hans Schleussner, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Blot-test Pharma GmbH, Dreieich, Fed. Rep. of Germany  
Filed Sep. 7, 1988, Ser. No. 241,300

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730533

Int. Cl.<sup>5</sup> A61L 2/10, 2/18; C07K 15/06

U.S. Cl. 422—24

13 Claims

1. In a method of sterilization of plasma or plasma fractions, including fractions that contain the blood-coagulating Factor VIII, by treatment with  $\beta$ -propiolactone, the improvement which comprises additionally treating the plasma or fractions with tri-n-butyl phosphate and sodium cholate either prior or simultaneously with the  $\beta$ -propiolactone treatment.

9. In a method of sterilization of plasma or plasma fractions, including fractions that contain the blood-coagulating Factor VIII, by treatment with ultraviolet radiation, the improvement which comprises additionally treating the plasma or fractions with tri-n-butyl phosphate and polyoxyethylene-20 sorbitan monooleate either prior to or simultaneously with the ultraviolet radiation.

4,946,649

**COLORIMETRIC GAS DIFFUSION TESTING TUBE**

Karl-Helz Pannwitz, Lübeck, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,191

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503234

Int. Cl.<sup>5</sup> G01N 31/22

U.S. Cl. 422—60

7 Claims



1. A colorimetric gas-diffusion testing tube for detecting a particular gas comprising:  
a testing tube closed at both ends and having an end portion and a main portion;  
said testing tube having a tube wall configured so as to be weakened at only a predetermined location thereon so as to permit only said end portion to be separated from said main portion so as to cause the latter to have only a single opening for receiving said particular gas into said main portion when said end portion is separated from the latter;  
a porous reagent layer disposed in said main portion between the closed end thereof and said predetermined location;  
an indicator layer inert to said particular gas to be detected and mounted between said predetermined location and said porous reagent layer for conducting said particular gas to said porous reagent layer; and,  
said porous reagent layer being for converting said particular gas into substances for coloring said indicator layer as said substances migrate into the latter.

4,946,650

**APPARATUS FOR INTEGRATING SAMPLING AND IN-LINE SAMPLE SPLITTING OF DISPERSE PRODUCTS FROM TRANSPORT CONDUITS OR AT FLOW TRANSFER POINTS**

Stephan Röhle, AM Rollberg 5, 3392 Clausthal-Zellerfeld, Fed. Rep. of Germany  
Continuation of Ser. No. 304,922, Feb. 1, 1989, abandoned, which is a continuation of Ser. No. 940,065, Dec. 10, 1986, abandoned. This application Oct. 13, 1989, Ser. No. 423,523  
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3543758

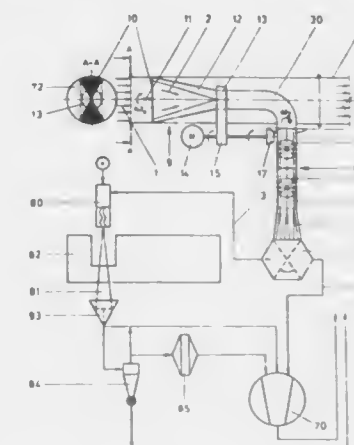
Int. Cl.<sup>5</sup> G01N 1/02

U.S. Cl. 422—68.1

21 Claims

1. A sampling apparatus, said sampling apparatus comprising:  
a vertically arranged sampler housing defining a longitudinal axis therethrough, said sampler housing being connectable to a conduit carrying the products to be sampled so that the products flow by gravity through said sampler housing, said sampler housing defining a first entrance port in a top portion thereof to receive the flow of products from the conduit, said sampler housing further defining a first exit port in a bottom portion thereof connectable to a conduit to permit the flow of products through said first exit port to pass into the conduit;  
a sampler head rotatably coupled to said sampler housing about the longitudinal axis thereof, said sampler head being located on the downstream side of said first entrance port to deflect the flow of products therethrough;  
a distributing member located downstream of said sampler head and rotatably coupled to said sampler housing about the longitudinal axis thereof, said distributing member defining a distributing conduit to receive a first sample

flow of products flowing over said sampler head and distribute the first sample flow of products therethrough;  
a motor coupled to said sampler head to rotatably drive said sampler head and coupled to said distributing member to rotatably drive said distributing member;  
a first collecting member mounted to said sampler housing downstream of said sampler head, said first collecting member defining a second entrance port to receive the remainder of the flow of products over said sampler head, said first collecting member further defining a second exit port to permit the products to pass therethrough and into said first exit port;  
a flow splitting member coupled to said sampler housing downstream of said distributing member to receive the first sample flow of products from said distributing mem-



ber, said flow splitting member defining at least one splitter opening extending therethrough to receive a second sample flow of products from the first sample flow of products flowing onto said splitting member, said flow splitting member including  
first means for varying the size of said splitter opening during the operation of said apparatus to control the amount of second sample products flowing therethrough,  
said flow splitting member further defining a third exit port to permit the remainder of the first sample flow of products to pass therethrough and flow through said housing first exit port; and  
a sampling conduit coupled to said housing downstream of said at least one splitter opening, said sampling conduit defining a third entrance port to receive said second sample flow of products for analyzing the sampled products.

4,946,651

**SAMPLE HOLDER FOR A BODY FLUID ANALYZER**

Max D. Liston, Irvine; Paul K. Hse, Huntington Beach; David G. Dickinson, Glendale; George M. Daffern, Irvine, and James G. Fetty, Orange, all of Calif., assignors to SmithKline Diagnostics, Inc., Sunnyvale, Calif.

Division of Ser. No. 798,791, Nov. 15, 1985. This application May 17, 1988, Ser. No. 194,935

Int. Cl.<sup>5</sup> B01L 3/00

U.S. Cl. 422—102

7 Claims

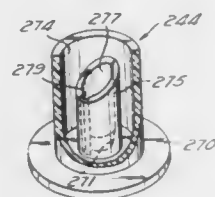
**MICROFICHE APPENDIX INCLUDED**

(1 Microfiche, 74 Pages)

1. A sample holder for use in a body fluid analyzer device, said sample holder comprising:  
a cup member having an open top and closed bottom end;  
a well formed in said cup member extending axially downward adjacent said top end toward said bottom end, said well adapted to store a body fluid sample therein; and



a reservoir formed about said well sized to accommodate any spill over of said body fluid sample from said well;



wherein said well includes an axially extending channel upon its inner surface.

4,946,652

## CHEMICAL ANALYSIS PROBE STATION

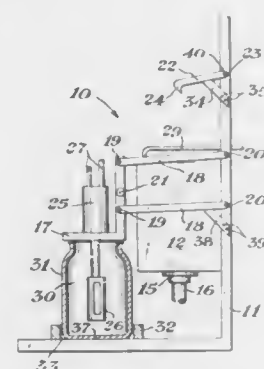
Lamar R. Dewald, and William E. Ryan, both of Antioch, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 30, 1987, Ser. No. 139,510

Int. Cl.<sup>5</sup> B01L 9/04

U.S. Cl. 422-104

1 Claim



1. An analytical chemistry probe station suitable for use by unskilled persons, comprising:

a sample support;

a chemical analysis probe;

means for selectively placing the chemical analysis probe in a precise first position and in a spacially different precise second position relative to the sample support, so that the probe can be immersed into a sample positioned at the sample support when the probe is placed in the precise second position, the means for selectively placing the chemical analysis probe in said precise first position and in said spacially different precise second position comprising four two-ended link members each of which is pivotally attached at one end thereof to a stationary portion of the station and each of which is pivotally attached at the other end thereof to a movable portion of the station, the probe being attached to the movable portion of the station; means for collecting a liquid used to wash the probe when the probe is placed in the precise first position, so that any residual sample remaining on the probe when the probe is placed from the second position to the first position can be washed from the probe by a wash liquid and collected; and

means for latching in the precise first position the means for placing the chemical analysis probe in said precise first position and in a spacially different precise second position, the means for latching comprising a pre-formed L-shaped hook member, the shank end of which is pivotally attached to the stationary portion of the station, the hook end of which engages a handle attached to the movable portion of the station when the probe is positioned in

the precise first position, so that the probe is latched in the precise first position.

4,946,653

## PROCESS FOR THE SIMULTANEOUS CLASSIFICATION AND REGULATED, CONTINUOUS DISCHARGE OF PARTICULATE MATERIAL FROM FLUIDIZED BED REACTORS

Gerhard Stopp; Karl-Heinz Kreutzer, both of Leverkusen; Horst Karkossa, Leichlingen; Karl Mannes, Leverkusen; Hans-Joachim Laakmann, Leichlingen, and Viktor Trescher, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

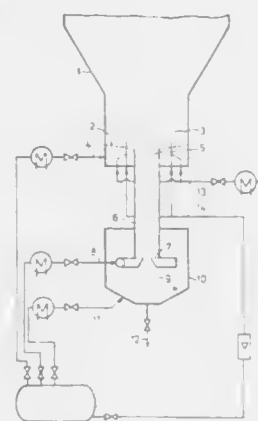
Filed Feb. 1, 1983, Ser. No. 462,738

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1982, 3206236

Int. Cl.<sup>5</sup> B01J 2/02, 8/26

U.S. Cl. 422-140

12 Claims



1. A process for granulating and classifying a product which consists essentially of:

(a) spraying a material consisting essentially of a liquid to be converted into solid granules into a first fluidized bed to which a gas is admitted from below;

(b) solidifying at least one component of said liquid in said first fluidized bed and therein forming aggregates of the resultant solidified component;

(c) maintaining a second fluidized bed in a central narrow zone subsequent and below said first fluidized bed, said second fluidized bed and said first fluidized bed communicating with one another;

(d) said second fluidized bed terminating at its bottom in a perforated screen;

(e) removing solidified and aggregated granules from said first fluidized bed into said second fluidized bed and fluidizing said granules therein by directing a gas upon said granules from below;

(f) the gas stream of step (e) being passed through said perforated screen countercurrently to the flow of said granules;

(g) maintaining a pressure gradient between said first and said second fluidized bed such that the highest prevailing pressure is at the bottom of said second fluidized bed while allowing solids to flow from said first fluidized bed to said second fluidized bed; and

(h) continuously discharging granules through said perforated screen along a path which is the longitudinal axis of said central narrow zone and is in a direction which is opposite to the direction of said gas of step (e), whereby the solidified and aggregated granules are classified in said second fluidized bed and are recovered downstream of said perforated screen, wherein said first fluidized bed and said second fluidized bed have individual gas supply means.

4,946,654

## PROCESS FOR PREPARING GRANULATES

Hans Uhlemann, Solingen; Burkhard Braun, Cologne; Heinz Heusmann, Leichlingen; Gerhard Stopp, Leverkusen, and Horst Karkossa, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 718,129, Apr. 1, 1988, abandoned. This application Jul. 26, 1988, Ser. No. 224,524

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1984, 3413200; Mar. 2, 1985, 3507376

Int. Cl.<sup>5</sup> B01J 2/02, 8/22

U.S. Cl. 422-140

5 Claims

interior of said wall of said vessel for closely receiving said outer edge of said circular grid floor, and wherein said outer edge of said grid floor occupies less than  $\frac{1}{4}$  of the volume of said annular space when said vessel is unheated; and



a quantity of compressible packing material positioned in said annular space adjacent to said cylindrical wall and spaced apart from said outer edge of said grid floor so as to form an empty space therebetween when said vessel is unheated, and wherein said compressible packing material occupies essentially  $\frac{1}{4}$  of the volume of said annular space.

4,946,656

## VENTED STRIPPER SECTION FOR A FLUID CATALYTIC CRACKING UNIT APPARATUS

Mark S. Ross, Lawrenceville, and John C. Zahner, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 22, 1987, Ser. No. 137,116

Int. Cl.<sup>5</sup> F27B 15/02, 15/09

U.S. Cl. 422-144

11 Claims

1. A process for the continuous preparation of granules having a narrow grain size distribution and which grow in a shell-like fashion, comprising

(a) upwardly spraying a feed forming product to be granulated in liquid form into a fluidized bed of such granules, the feed consisting essentially of a liquid form, the bed being established within a vessel having an outflow bottom for the passage of granules,

(b) maintaining a flow of fluidizing gas such that fine material escaping from the fluidized bed in an off-gas is separated from the off-gas and is returned to the fluidized bed as nuclei for granule formation,

(c) forming granules of a predetermined size solely by means of setting a classifying gas flow, and

(d) removing the completed granules solely by way of at least one countercurrent gravity classifier disposed in the outflow bottom of the vessel.

4,946,655

## SEAL SYSTEM FOR A PROCESS VESSEL

James D. Whiteside, II, and David F. Bichler, both of Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 28, 1988, Ser. No. 250,797

Int. Cl.<sup>5</sup> E04B 1/68; F16J 15/00; F26E 15/02

U.S. Cl. 422-143

9 Claims

1. Apparatus comprising:

a vessel having a generally cylindrical wall wherein said vessel is generally vertically oriented;

a circular grid floor having a circumferential outer edge, said grid floor being disposed generally horizontally within said vessel, said grid floor being perforated for the passage of air therethrough;

means for supporting said grid floor in a horizontal plane in a lower portion of said vessel, wherein said means for supporting said grid floor allows horizontal expansion of said grid floor relative to said vessel;

means for forming a continuous annular space around the

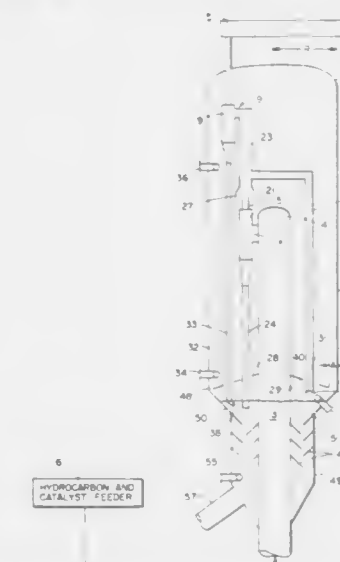
1. A fluid catalytic cracking apparatus comprising:

(a) a reactor vessel comprising sidewalls;

(b) an elongated tubular fluid catalytic cracking riser having a downstream end which terminates within said reactor vessel;

(c) a downwardly sloped stripper cap attached to said riser and located within said reactor vessel and downwardly extending away from said riser to adjacent said reactor vessel sidewalls and having a first opening and a second opening;

(d) means for stripping catalyst defined by a lower portion of said reactor vessel below said stripper cap;



- (e) first means for injecting stripping gas into a lower portion of said stripping means;
- (f) a riser cyclone having a dipleg and being located within said reactor vessel, said riser cyclone dipleg extending downwardly from said riser cyclone through said stripper cap first opening into said stripping means;
- (g) means for passing a gaseous effluent from said riser to outside said reactor vessel, without adding said gaseous effluent to a reactor vessel atmosphere during steady state conditions, comprising a riser cyclone inlet conduit attached to said riser and attached to said riser cyclone, said inlet conduit being in communication with said riser and said riser cyclone;
- (h) means for passing stripped hydrocarbons from said stripping means to outside said reactor vessel without adding said stripped hydrocarbons to said reactor vessel atmosphere above said stripper cap; and
- (i) means for discharging catalyst from said stripping means to outside said reaction vessel.

4,946,657

# SYSTEM TO REDUCE ENERGY CONSUMPTION IN HETEROGENEOUS SYNTHESIS REACTORS AND RELATED REACTORS

Umberto Zardi, Breganzona, Switzerland, assignor to Ammonia Casale SA, Switzerland

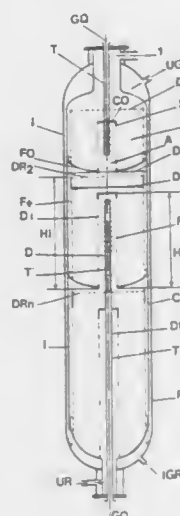
Filed Oct. 20, 1987, Ser. No. 110,925

Claims priority, application Switzerland, Oct. 22, 1986, 04202/86

Int. Cl.<sup>3</sup> B01J 8/02

U.S. Cl. 422-148

7 Claims



1. A system to increase the conversion yields and to reduce the energy consumption in heterogeneous synthesis reactors, consisting of an external shell (P) generally in one piece, and of a cartridge (C) having a diameter (Dc) and containing granular catalyst arranged in a plurality of catalytic beds (K) that have an axial height (Hi) and are closed between an external cylindrical wall made up of sections of said cartridge (C) having internal diameter (Dc) and height (Hi), an internal cylindrical wall made up of sections of internal feed pipe for fresh quench gas (T) having diameter (Dt) which is small with respect to the internal diameter (Dc) and a bottom, the top face of each bed being open and invested axially by synthesis gas, wherein there are provided:

- (a) inside and near said external wall forming the cartridge (C), an external cylindrical wall (Fe) which is substantially perforated on its height (Hi) and has a diameter (Di) just slightly less than that (Dc) of the cartridge (C);
- (b) an internal cylindrical wall (Fi) having, on at least one major portion (H'i) of the height (Hi) of the catalytic bed,

- a diameter (D'i) greater than that (Dt) of said internal feed pipe (T), and perforations; and
- (c) a perforated cover (CO) at the top of the internal wall of height (H'i) whereby the catalytic bed has an annular structure of diameter (Di-D'i) on said height (H'i) and a substantially cylindrical, annular structure with diameter (Dj-Dt) on the minor height (Hi-H'i), and wherein the ratio (Hi/H'i) varies from one catalyst basket to another.

4,946,658

# ADDITION OF PYRITIC MATERIALS TO FEED MIX FOR DESULFURIZATION OF PHOSPHOGYPSUM

Jerome H. Marten, and George M. Lloyd, Jr., both of Lakeland, Fla., assignors to Florida Institute of Phosphate Research, Bartow, Fla.

Continuation of Ser. No. 188,700, May 4, 1988, abandoned, which is a continuation of Ser. No. 927,439, Nov. 6, 1986, abandoned. This application May 11, 1989, Ser. No. 351,269

Int. Cl.<sup>3</sup> C01F 11/46

U.S. Cl. 423-168

12 Claims

1. In a process of desulfurization of gypsum comprising the steps of:

- (a) forming a mixture of carbonaceous material and gypsum,
- (b) balling the mixture to form pellets,
- (c) charging the pellets to a travelling grate,
- (d) moving the travelling grate to carry the charge of pellets successively through a firing and post firing zones,
- (e) heating the charge on the grate in the firing zone to produce a solid sintered material and a gaseous effluent containing sulfur dioxide, sulfur or mixtures thereof, and
- (f) passing a portion of the gaseous effluent from the firing zone through the charge in the post firing zone, the improvement comprising adding a pyritic material or its equivalent amount of Fe and S to the mixture of carbonaceous material and gypsum wherein the total amount of the carbonaceous material and the pyritic material is greater than 9 percent by weight of the mixture.

4,946,659

# PROCESS FOR THE REDUCTION OF THE NITROGEN OXIDES IN EXHAUST GASES USING A ZEOLITE-CONTAINING CATALYST

Wolfgang Held; Axel König, both of Wolfsburg, and Lothar Puppe, Burscheld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

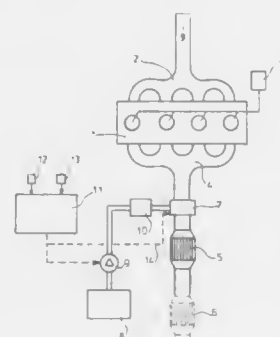
Filed Aug. 21, 1989, Ser. No. 395,985

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3830045

Int. Cl.<sup>3</sup> B01D 47/00; B01J 8/00; C01B 21/00

U.S. Cl. 423-212

6 Claims



1. In an improved process for reducing nitrogen oxides in internal combustion engine exhaust gases by contacting the gases under oxidizing conditions with a zeolite-containing

catalyst in the presence of a reducing agent in the exhaust gas, the improvement comprises said reducing agent being urea or a urea-containing substance.

4,946,660

# DESULPHURIZATION

Patrick J. Denny, Darlington, and David G. Shipley, Stockton-on-Tees, both of Great Britain, assignors to Imperial Chemical Industries PLC, London, England

Filed Mar. 1, 1989, Ser. No. 317,569

Claims priority, application United Kingdom, Mar. 7, 1988, 8805351

Int. Cl.<sup>3</sup> C01B 17/16, 31/20; C02F 1/68; B01J 38/48

U.S. Cl. 423-230

10 Claims

1. A process for the removal of hydrogen sulphide from a substantially water-free hydrogen sulphide-containing feedstock stream comprising passing the feedstock stream, at a temperature between -10° and 350° C. through a bed of zinc oxide-containing absorbent particles thereby forming a hydrogen sulphide-depleted product stream and in order to increase the absorption capacity of the particles for hydrogen sulphide, after a period of use for absorption of hydrogen sulphide from the feedstock stream contacting the particles with a water-containing fluid so as to temporarily increase the water content within the fluid space of the bed for a period of time until the particles absorb such an amount of water that the particles increase in weight by an amount in the range 0.5 to 20%.

4,946,661

# PROCESS FOR REMOVING NITROGEN OXIDES

Takahiro Tachi; Akira Kato; Hiroshi Kawaguchi; Hisao Yamashita; Tomochi Kamo; Shinpei Matsuda, all of Hitachi; Yasuyoshi Kato, and Fumito Nakajima, both of Kure, all of Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1988, Ser. No. 271,540

Claims priority, application Japan, Nov. 16, 1987, 62-289100

Int. Cl.<sup>3</sup> B01J 8/00; C01B 21/00

U.S. Cl. 423-239

2 Claims

1. A process for removing nitrogen oxides from an exhaust gas, comprising the step of:

- contacting an exhaust gas containing the nitrogen oxides in the presence of ammonia with an effective amount of a denitrating catalyst which includes titanium oxide, wherein said exhaust gas contains volatile metal compounds; the average pore diameter of said titanium oxide is 10,000 Å or less; and the proportion of the volume of pores having pore diameters of 400 to 5,000 Å to the total pore volume is 50% or more.

4,946,662

# METHOD OF FORMING CONDENSED PHOSPHATES IN AQUEOUS SOLUTIONS

David R. Gard, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

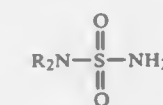
Filed Jun. 30, 1989, Ser. No. 374,407

Int. Cl.<sup>3</sup> C01B 15/16, 25/26

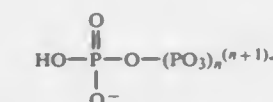
U.S. Cl. 423-314

11 Claims

11. A method of forming an aqueous solution of suspension of condensed phosphates comprising reacting together a sulfamide of the formula



where each R is independently selected from the group consisting of alkyl, aryl, substituted alkyl or substituted aryl, hydrogen or a combination thereof, and phosphate ions of the formula



where n is from about 2 to about 1000, in an aqueous polar solvent selected from the group consisting of water, mixtures of water and dimethylsulfoxide, mixtures of water and a ketone and mixtures of water and an alcohol, at a pH in the range of from about 8 to about 10, at a reaction temperature of from about 30° C. to about 100° C., and at a reaction time of from about 2 h to 300 h.

4,946,663

# PRODUCTION OF HIGH SURFACE AREA CARBON FIBRES

Gary J. Audley, and Alan Grint, both of Weybridge, England, assignors to The British Petroleum Company, p.l.c., London, England

Filed Oct. 14, 1988, Ser. No. 258,296

Claims priority, application United Kingdom, Oct. 15, 1987, 8724211

Int. Cl.<sup>3</sup> D01F 9/12

U.S. Cl. 423-447.1

13 Claims

1. The process for the production of high surface area carbon fibres which comprises heating carbon fibres in the presence of a quantity of alkali metal hydroxide in the range of 200%-1000% by weight based on weight of carbon at temperatures above 500° C. in an inert atmosphere.

4,946,664

# METHOD OF MAKING β'-ALUMINA

Arnold Van Zyl, Swellendam, South Africa; Graham K. Duncan, Stafford; Peter Barrow, Alvaston, both of England, and Michael M. Thackeray, Pretoria, South Africa, assignors to Lilliwite Societe Anonyme, Luxembourg

Filed Jan. 25, 1989, Ser. No. 301,864

Claims priority, application United Kingdom, Jan. 25, 1988, 8801554

Int. Cl.<sup>3</sup> C01F 7/04

U.S. Cl. 423-600

8 Claims

1. A method of making β'-alumina which comprises: homogeneously dispersing a dopant metal oxide selected from the group comprising Li<sub>2</sub>O, MgO, ZnO, CoO, NiO, FeO and mixtures of at least two thereof, or a precursor of the dopant metal oxide, in a cubic close-packed aluminium oxide (Al<sub>2</sub>O<sub>3</sub>) or a precursor thereof to form a starting mixture; calcining the starting mixture by heating it to a temperature in the range 250°-1100° C. in an oxygen-containing atmosphere; homogeneously dispersing Na<sub>2</sub>O or a precursor thereof, in the calcined starting mixture to form a final mixture; and heating the final mixture to a temperature in an oxygen-containing atmosphere of at least 1100° C. to produce β'-alumina from the final mixture.

4,946,665

# REACTIVE ZIRCONIUM OXIDE AND ITS PREPARATION

Joseph Recases, Sorgues; Daniel Urffer, Morieres, and Pierre Ferland, le Pontet, all of France, assignors to Societe Europeenne des Produits Refractaires, France

Filed Mar. 17, 1989, Ser. No. 324,685

Claims priority, application France, Mar. 22, 1988, 88 03680

Int. Cl.<sup>3</sup> C01G 25/02; C04B 35/48

U.S. Cl. 423-608

5 Claims

1. A compound of zirconium oxide, containing at most 0.7% by weight silicon oxide, in the form of fine particles whose median diameter is between 1 and 10 μm, which has a structure



selected from the group consisting of amorphous structure and structure crystallized in the tetragonal form, the size of the elementary coherence regions in the latter case being between 10 and 30 nm, and which has a B.E.T. surface area between 30 and 130 m<sup>2</sup>/g. wherein the zirconium oxide contains a minimal amount of silicon oxide which is at most 0.7% by weight.

4,946,666

# PROCESS FOR THE PRODUCTION OF FINE TABULAR ALUMINA MONOHYDRATE

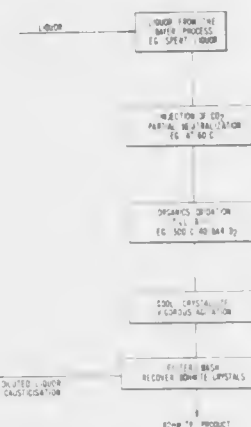
Neil Brown, Bonn, Fed. Rep. of Germany, assignor to Vereinigte Aluminium-Werke Aktiengesellschaft, Fed. Rep. of Germany  
Continuation of Ser. No. 17,308, Feb. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 847,634, Apr. 3, 1986, Pat. No. 4,668,486. This application Aug. 15, 1988, Ser. No. 233,885

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 3512404

Int. Cl.<sup>5</sup> C01F 7/02

U.S. Cl. 423—625

19 Claims



1. A process for the production of tabular boehmite crystals comprising the steps of:

- contacting a Bayer process liquor with an oxygen-containing gas at a temperature of between about 150° C. and about 300° C. and at a pressure of between about 1 bar O<sub>2</sub> and about 150 bar O<sub>2</sub>, adjusting the molar ratio of Na<sub>2</sub>O-free to Al<sub>2</sub>O<sub>3</sub> in said liquor by injecting CO<sub>2</sub> into said liquor, to be less than or equal to 1;
- cooling said Bayer process oxidized liquor under said pressure and simultaneously vigorously agitating said liquor to induce nucleation of a tabular boehmite; and
- recovering tabular boehmite crystals having an average diameter of between about 0.2 and 0.8 microns.

4,946,667

# METHOD OF STEAM REFORMING METHANOL TO HYDROGEN

Bahjat S. Beshty, Lower Makefield, Pa., assignor to Engelhard Corporation, Edison, N.J.

Continuation of Ser. No. 743,204, Jun. 10, 1985, abandoned.

This application May 6, 1988, Ser. No. 191,725

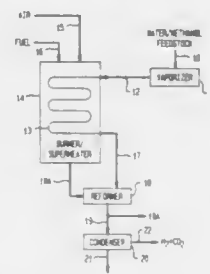
Int. Cl.<sup>5</sup> C01B 3/02, 3/32

U.S. Cl. 423—648.1

6 Claims

1. In a process for the production of hydrogen, said process comprising passing a gaseous feed mixture consisting essentially of methanol and water into a reactor over a catalyst bed, the improvement comprising superheating the gaseous mixture to a temperature between about 700° F. and 1100° F. while controlling both the ratio of water vapor to methanol in, and the degree of superheat, of the gaseous feed mixture at such values that upon feeding the superheated gaseous mixture to

the reactor in contact with the catalyst bed contained therein to produce hydrogen, at least a major portion of the heat



required for the endothermic catalytic reforming reaction is extracted directly from the superheated gaseous mixture.

4,946,668

# TUMOR IMAGING WITH TECHNETIUM LABELLED GLUCARATE

Peter E. Daddona, West Chester; Koon Y. Pak, Bluebell, and Mark Nedelman, Downingtown, all of Pa., assignors to Centocor, Inc., Malvern, Pa.

Continuation-in-part of Ser. No. 254,961, Aug. 7, 1988. This

application Nov. 22, 1988, Ser. No. 274,763

Int. Cl.<sup>5</sup> A61K 49/02; C07F 13/00

U.S. Cl. 424—1.1

3 Claims

1. A method of obtaining an image of a tumor in a subject, comprising the steps of:

- a. injecting parenterally an effective imaging amount of <sup>99m</sup>Tc-glucarate into the subject;
- b. allowing the <sup>99m</sup>Tc-glucarate to localize at the site of the tumor; and
- c. scanning the subject with a gamma camera to obtain an image of the tumor.

4,946,669

# HISTOLOGICAL FIXATIVES

Barry A. Siegfried, 12212 Foxpoint Dr., St. Louis, Mo. 63043, and Eugene A. Holland, 204 E. Main, Washington, Mo. 63090

Filed Oct. 9, 1987, Ser. No. 107,026

Int. Cl.<sup>5</sup> G01N 1/06; A01N 1/00

U.S. Cl. 424—4

21 Claims

1. A mercury and formaldehyde free composition consisting essentially of an animal tissue histological fixative amount of a solution comprised of one or more alkanols as a tissue fixative, at least one member selected from the group consisting of an organic diol and triol having the capacity to dehydrate tissue and enhance microscopic detail, at least one acid to precipitate proteins, contribute to nuclear morphological detail, and increase penetration rate of fixative into tissue, 0 to about 700 millimoles per kilogram of solvent in the fixative of an osmotically active substance having the capacity to control osmotically induced cell volume changes, 0 to about 0.2 mole per liter of fixative of a mordant having the capacity to enhance staining characteristics, and water, the alkanols having a combined concentration of about 200 to about 800 milliliters per liter of fixative, the diols and triols having a combined concentration of about 150 to about 700 milliliters per liter of fixative, and the acids having a combined concentration of about 0.01 to about 0.5 mole per liter of fixative.

4,946,670

# POLYGLYCEROL ETHERS AND THEIR USE IN COSMETICS AND IN PHARMACY

Henri Sebag, Paris, and Guy Vanlerberghe, Claye-Souilly, both of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 4,498, Jan. 20, 1987, Pat. No. 4,788,345.

This application Aug. 2, 1988, Ser. No. 227,136

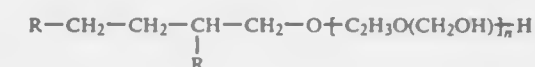
Claims priority, application Luxembourg, Jan. 27, 1986, 86258

Int. Cl.<sup>5</sup> A61K 7/021, 7/075, 7/48, 47/10

U.S. Cl. 424—47

19 Claims

1. A cosmetic composition for the treatment of the skin, scalp or hair comprising, in a cosmetically acceptable vehicle, in an amount effective to treat the skin, scalp or hair, a mixture of compounds having the formula



wherein

R represents a saturated hydrocarbon radical, or a mixture of saturated hydrocarbon radicals, having 10 to 12 carbon atoms, and

n represents a mean statistical value of 2 to 15.

4,946,671

# PHOTOPROTECTION COMPOSITIONS COMPRISING SORBOHYDROXAMIC ACID AND AN ANTI-INFLAMMATORY AGENT

Donald L. Bissett, Hamilton, and Ranjit Chatterjee, Fairfield, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 112,588, Oct. 22, 1987, Pat. No. 4,847,069.

This application May 2, 1989, Ser. No. 346,046

Int. Cl.<sup>5</sup> A61K 7/06, 7/42, 7/48

U.S. Cl. 424—59

19 Claims

1. A photoprotective composition useful for topical application comprising:

- (a) a safe and photoprotectively effective amount of an agent selected from the group consisting of sorbohydroxamic acid and pharmaceutically-acceptable salts thereof;
- (b) a safe and photoprotectively effective amount of an anti-inflammatory agent selected from the group consisting of a steroidal anti-inflammatory agent; a non-steroidal anti-inflammatory agent selected from the group consisting of the oxicams, the salicylates, the acetic acid derivatives, the fenamates, the propionic acid derivatives, the pyrazoles, the 2,6-di-tert-butyl phenol derivatives, and the 2-naphthyl-containing ester compounds; and a natural anti-inflammatory agent selected from the group consisting of candelilla wax, alpha bisabolol, aloe vera, Manjistha, and Guggal;
- (c) a safe and photoprotectively effective amount of a sunscreensing agent; and
- (d) a safe and effective amount of a topical carrier.

4,946,672

# DEODORIZING COMPOSITIONS

Anthony Gibbs, Norwich, United Kingdom, assignor to Walex Products Company, Jamestown, N.C.

Continuation-in-part of Ser. No. 70,911, Jul. 8, 1987, Pat. No. 4,818,524. This application Nov. 22, 1988, Ser. No. 275,431

Claims priority, application United Kingdom, Jul. 9, 1986, 8616740; Dec. 5, 1986, 8629179

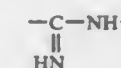
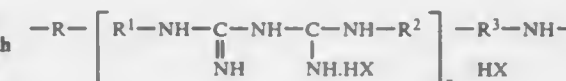
Int. Cl.<sup>5</sup> A61L 9/01

U.S. Cl. 424—76.1

15 Claims

1. An odour removal composition comprising

- (a) a complexing agent which is a biguanide polymer of the formula (1)



in which R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are a substituted or unsubstituted alkylene group having up to 12 carbon atoms in the unsubstituted chain, HX is an acid, and n has a value of 2 to 20;

- (b) a carrier capable of assisting wetting of odour forming compositions; and
- (c) a cationic moiety; said moiety being part of a chemically independent compound, or chemically associated with a complexing agent or the carrier.

4,946,673

# IODINE-CONTAINING GERMICIDAL PREPARATIONS AND METHOD OF CONTROLLING GERMICIDAL ACTIVITY

William Pollack, Weston, Conn., and Oliver Iny, Little Neck, N.Y., assignors to Euroceltique, S.A., Luxembourg

Division of Ser. No. 12,850, Feb. 15, 1987, abandoned, which is a continuation of Ser. No. 776,125, Sep. 13, 1985, abandoned,

which is a division of Ser. No. 615,835, May 31, 1984, Pat. No. 4,575,491. This application Jan. 23, 1989, Ser. No. 298,924

Int. Cl.<sup>5</sup> A61K 33/36

4 Claims

1. Germicidal composition, said composition comprising an aqueous solution of povidone-iodine with the concentration of between about 4 and 10 ppm equilibrium iodine and an iodate compound in solution, the ratio of iodine to iodate compound being between about 2:1 and 1:1.

4,946,674

# PROCESS FOR TREATMENT OF RHEUMATIC DISEASES

Johann-Friedrich von Eichborn, Huttisheim; Hans-Joachim Obert, Laupheim, and Franz Link, Bad Abbach, all of Fed. Rep. of Germany, assignors to Bioferon Biochemische Substanzen GmbH & Co., Laupheim, Fed. Rep. of Germany  
Filed Sep. 30, 1985, Ser. No. 782,221

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436638; European Pat. Off., Jun. 18, 1985, 85107490.6; Sep. 4, 1985, 85111183.1

Int. Cl.<sup>5</sup> A61K 37/66

9 Claims

1. A process for treating rheumatic diseases comprising the step of administering to a mammal a pharmaceutically acceptable composition which comprises a pharmaceutically effective amount of IFN-γ.

4,946,675

# HEPATIC BLOCKING AGENTS

Robert W. Baldwin, Long Eaton, England, and Vera S. Byers, San Francisco, Calif., assignors to Xoma Corporation, Berkeley, Calif.

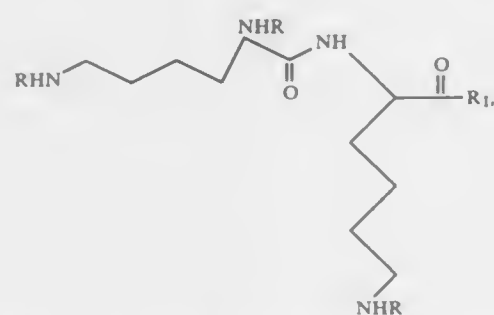
Filed May 27, 1987, Ser. No. 55,266

Int. Cl.<sup>5</sup> A61K 39/00

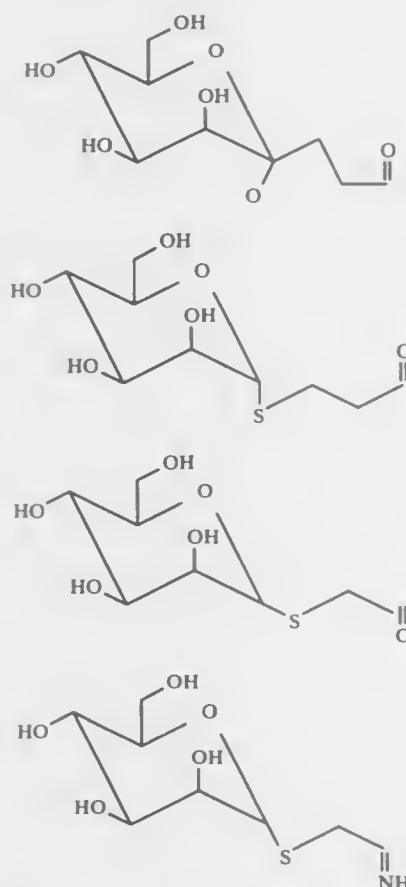
U.S. Cl. 424—85.91

10 Claims

1. A method for enhancing the bioavailability of an immunotoxin, said method comprising administering said immunotoxin to a mammalian host concomitantly with the administration of a blocking agent selected from compounds of the formula:



wherein R is a saccharide compound selected from the group consisting of



and R<sub>1</sub> is selected from the group consisting of hydroxyl and NHR<sub>2</sub> wherein R<sub>2</sub> is 6-aminoheptyl or acid addition salts thereof.

4,946,676

#### VACCINE COMPRISING AN IMMUNOGENIC PROTEIN AND, AS AN ADJUVANT, A SUBSTANTIALLY NON-IMMUNOGENIC, SEQUENTIALLY HOMOLOGOUS PEPTIDE

Antonius L. Van Wezel, Bilthoven; Antonius G. Hazendonk, Nieuwegein, and Eduard C. Beuvery, Vianen, all of Netherlands, assignors to De Staat Der Nederlanden, Lelischendam, Netherlands

Filed Aug. 27, 1986, Ser. No. 900,739  
Int. Cl.<sup>5</sup> A61K 39/12; C12N 7/04

U.S. Cl. 424—89

11 Claims

1. A vaccine comprising an immunogenic protein which induces the production of protective antibodies in a host, and a protein or peptide having sequential homology with said immunogenic protein wherein the protein or peptide having

sequential homology will induce the priming effect for said immunogenic protein but which protein or peptide having sequential homology does not induce the formation of protective antibodies to an extent sufficient to confer a protective immunity, the said protein or peptide having sequential homology being present in the vaccine in an amount sufficient to increase the host's response to the immunogenic protein.

4,946,677

#### PREPARATIONS ACTIVE AGAINST PSEUDOMONAS AERUGINOSA INFECTIONS AND METHODS OF PRODUCING THEM

Friedrich Dörner, and Johann Eibl, both of Vienna, Austria, assignors to Immuno Aktiengesellschaft für Chemisch-Medizinische Produkte, Vienna, Austria

Filed Jun. 17, 1987, Ser. No. 63,094

Claims priority, application Austria, Jun. 24, 1986, 1716/86  
The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C07K 3/02, 15/04; A61K 35/74, 39/104

U.S. Cl. 424—92

7 Claims

1. Vaccines active against *Pseudomonas aeruginosa* infections, comprising protective flagellar (H) antigens of *Pseudomonas aeruginosa* of the serotype a and b, respectively, in combination with a pharmaceutically acceptable carrier which consist of monomeric components, each monomeric component

(a) containing the following amino acids: aspartic acid (Asp), threonine (Thr), serine (Ser), glutamic acid (Glu), glycine (Gly), alanine (Ala), valine (Val), isoleucine (Ile), leucine (Leu), tyrosine (Tyr), phenylalanine (Phe), lysine (Lys), arginine (Arg), and optionally tryptophane (Trp) and methionine (Met),

(b) having the N-terminal amino acid sequence alanine (Ala)—leucine (Leu)—threonine (Thr)—valine (Val)—asparagine (Asn)—threonine (Thr)—asparagine (Asn)—isoleucine (Ile)—alanine (Ala),

(c) having a molecular weight of from 43,500 to 53,050 and (d) being free from proline, semi-cystine and histidine, and being free from lipopolysaccharides,

said vaccines being suited for application to man.

4,946,678

#### PROCESS OF TREATING THE SCALP AND HAIR

Thomas L. Dodd, Rt. 14, Box 733, Tyler, Tex. 75710, and David A. O'Steen, 3601 Glendale Dr., Tyler, Tex. 75701

Continuation-in-part of Ser. No. 176,593, Apr. 1, 1988, abandoned. This application May 3, 1989, Ser. No. 346,885  
Int. Cl.<sup>5</sup> A61K 35/54, 37/02, 31/19, 31/17

U.S. Cl. 424—581

11 Claims

1. A process of treating human scalp and hair comprising the steps of:

applying a sanitizing agent to the balding area of the scalp to open and sanitize the pores and hair follicles of the scalp; applying heat and a softening agent to soften and separate sebum deposits in the pores and follicles of the scalp once they have been opened by the application of the sanitizing agent;

then rinsing the scalp to remove deposits and agents previously applied thereto; and

then applying a chalaza mixture and oxygen to the scalp to nourish the roots and papillae of the hair in the scalp.

4,946,679

#### METHOD FOR THE TREATMENT OF PREMENSTRUAL SYNDROME

Susan Thys-Jacobs, 135 Hickory Grove Dr., Larchmont, N.Y. 10538

Continuation of Ser. No. 223,498, Jul. 25, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 414,620  
Int. Cl.<sup>5</sup> A01N 59/06, 59/26

U.S. Cl. 424—682

6 Claims

1. A method for treating premenstrual syndrome comprising administering to an individual in need of said treatment an effective dose of elemental calcium so that the symptoms of premenstrual syndrome are significantly reduced.

4,946,681

#### METHOD TO PREPARE AN IMPROVED STORAGE STABLE NEEM SEED EXTRACT

James F. Walter, Ashton, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Jun. 26, 1989, Ser. No. 371,353

Int. Cl.<sup>5</sup> A61K 35/78

U.S. Cl. 424—195.1

4 Claims

1. A process for the production of stable azadirachtin solutions comprising extracting ground neem seeds with an alcohol or aprotic solvent in which azadirachtin is soluble to produce an aqueous-containing azadirachtin extract solution and then adding an effective amount of 3–4 Angstrom molecular sieves to selectively remove water from the extract to yield a storage-stable azadirachtin solution having less than 5% water by volume.

4,946,682

#### MEDICATION CONTAINING EXTRACT SUBSTANCES FROM PLANTS OR PLANT PARTS OF THE SPECIES LEPTOSPERMUM SCOPARIUM

Alfred Stirnadel, Zweibrücker Strasse 63, D-6660 Zweibrücken 15, and Ute H. Stirnadel, Zweibrücken, both of Fed. Rep. of Germany, assignors to Alfred Stirnadel, Zweibrücken, Fed. Rep. of Germany

Continuation of Ser. No. 105,450, Oct. 5, 1987, abandoned, which is a continuation of Ser. No. 775,401, Sep. 12, 1985, abandoned. This application Feb. 1, 1989, Ser. No. 304,932  
Claims priority, application European Pat. Off., Aug. 2, 1985, 85109771.3

Int. Cl.<sup>5</sup> A61K 35/78

U.S. Cl. 424—195.1

5 Claims

1. A pharmaceutical composition comprising an extract of the leaves, stems or blossoms of a hybrid of the specie *Leptospermum scoparium*, wherein the hybrid is Ballerina, Big Red, Blossom, Burgundy Queen, Fantasia, Cherry Ripe, Coral Candy, Gaiety Girl, Jubilee, Pink Pearl, Spectrecolour, Sunraysia, Winter Cheer, or Crimson Glory.

4,946,683

#### MULTIPLE STEP ENTRAPMENT/LOADING PROCEDURE FOR PREPARING LIPOPHILIC DRUG-CONTAINING LIPOSOMES

Eric A. Forssen, La Canada, Calif., assignor to Vestar, Inc., San Dimas, Calif.

Continuation of Ser. No. 122,354, Nov. 18, 1987, abandoned. This application Aug. 4, 1989, Ser. No. 393,118

Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 424—422

27 Claims

1. A method of preparing a phospholipid-entrapped cationic, lipophilic drug composition which comprises:

a. forming liposomes in an aqueous medium containing an acid which has at least one ionizable functional group, is of sufficient polarity to be highly soluble in water and exhibits a low permeability through the vesicle membranes to give an acidic liposome-containing aqueous medium in which the acid is present in the internal and external liposome phases, said liposome being prepared from hydroxyamino(lower)aliphatic-substituted phospho-

tidyl carboxylic acid diesters of a tri- or higher functional aliphatic polyol in which the ester moieties are derived from a saturated or ethylenically unsaturated aliphatic monocarboxylic acid having at least 14 carbon atoms, b. adding to the thus-obtained acidic liposome-containing aqueous medium a cationic, lipophilic drug, and c. then adding a base whose cations cannot pass through the liposomes' lipid bilayers to charge neutralize the acid anions in the external aqueous phase, thereby inducing the cationic, lipophilic drug to pass into the liposomes' internal aqueous phase.

4,946,684

#### FAST DISSOLVING DOSAGE FORMS

Robert G. Blank; Dhiraj S. Mody, both of Hammon, N.Y.; Richard J. Kenny, Manahawkin, and Martha C. Aveson, Voorhees, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 20, 1989, Ser. No. 368,612

Int. Cl.<sup>5</sup> A61K 9/34

U.S. Cl. 424—441

3 Claims

1. In a pharmaceutical dosage form for oral administration as a solid, which dosage form can be disintegrated by water within ten seconds and which consists essentially of an open matrix network carrying a unit dosage of a water soluble pharmaceutical substance, the open matrix network consisting essentially of a pharmacologically acceptable water-soluble or water-dispersible carrier material, the improvement which comprises selecting the carrier material from the group consisting essentially of mannitol in admixture with at least one natural gum, the mannitol content of the solid dosage form constituting at least about 50% by weight of the solid dosage form.

4,946,685

#### CELLULOSIC DOSAGE FORM

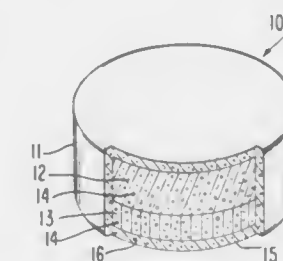
David E. Edgren, El Granada; Judy A. Magruder, Mt. View, and Gurdish K. Bhatti, Fremont, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 34,971, Apr. 6, 1987, Pat. No. 4,786,503. This application Sep. 1, 1988, Ser. No. 239,231  
The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/24

U.S. Cl. 424—472

14 Claims



1. A dosage form for delivering a drug to an environment of use, the dosage form comprising: (a) a first lamina comprising from 15 weight percent to 80 weight percent of a cellulose ether composition comprising at least one cellulose ether selected from the group consisting of a hydroxypropylmethylcellulose ether comprising a degree of polymerization of 40 to 1600, a viscosity of 2 to 225,000 and a number average molecular weight of 7,680 to 307,200; (b) a second lamina in mated relation with the first lamina, the second lamina comprising a different cellulose ether composition comprising 2 weight percent to 60 weight percent of at least one hydroxypropylcellulose comprising a hydroxypropoxyl content of 7 percent to 16 percent; (c) a dosage amount of 25 ng to 1.5 g of drug in at least one of the lamina; and, (d) a coat that surrounds the first



lamina and the second lamina, said coat comprising a hydroxypropyl(alkyl)<sub>n</sub> cellulose wherein n is 0 to 1 and alkyl comprises 1 to 7 carbon atoms.

4,946,686

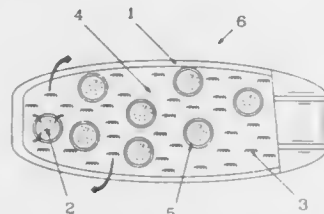
**SOLUBILITY MODULATED DRUG DELIVERY SYSTEM**  
Gregory A. McClelland, Lenexa, and Gaylen M. Zentner, Lawrence, both of Kans., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 100,664, Sep. 24, 1987, abandoned. This application May 1, 1989, Ser. No. 348,099

Int. Cl.<sup>5</sup> A61K 9/22

U.S. Cl. 424—473

8 Claims



1. A drug-delivery device for the controlled release of a therapeutically active ingredient into an environment of use which comprises:

(A) a core composition comprising

(a) a plurality of controlled release solubility modulating units which modulate and increase solubility of said therapeutically active ingredient within said core comprising solubility modulating agents each of which is either a complexing agent or a surfactant and which is (i) surrounded by a water insoluble coat containing at least one pore forming additive dispersed throughout said coat, or

(ii) dispersed in an individual matrix substrate, and (b) a therapeutically active ingredient; and

(B) a water insoluble microporous wall surrounding said core composition and prepared from

(i) a polymer material that is permeable to water but substantially impermeable to solute and

(ii) 0.1 to 75% by weight, based on the total weight of (i) and (ii), of at least one water leachable pore forming additive dispersed throughout said wall.

4,946,687

**DOSAGE FORM FOR TREATING CARDIOVASCULAR DISEASES**

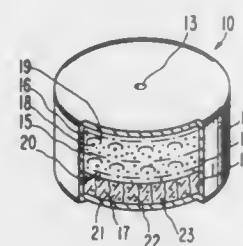
Atul D. Ayer, David R. Swanson, and Anthony L. Kuczynski, all of Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 104,006, Oct. 2, 1987, Pat. No. 4,816,268. This application Nov. 7, 1988, Ser. No. 267,894

Int. Cl.<sup>5</sup> A61K 9/24

U.S. Cl. 424—473

13 Claims



1. An osmotic dosage form for the administration of isradipine to a biological environment of use, wherein the dosage form comprises:

(A) a first composition comprising a dosage amount of isradipine, and a polyethylene oxide comprising a molecular weight of about 200,000;

(B) a second composition comprising a polyethylene oxide comprising a molecular weight of about 5,000,000 to 7,800,000;

(C) a wall comprising at least in part a composition permeable to the passage of an exterior fluid present in the environment of use, which wall surrounds the first and second compositions; and,

(D) at least one passageway in the wall connecting the exterior of the dosage form with the interior of the dosage form for delivering isradipine to the environment of use.

4,946,688

**INTRAPROSTATIC INJECTION OF ZINC IONS FOR TREATMENT OF INFLAMMATORY CONDITIONS AND BENIGN AND MALIGNANT TUMORS OF THE PROSTATE**

Mostafa S. Fahim, 500 Hulén Dr., Columbia, Mo. 65203

Filed Jul. 5, 1988, Ser. No. 214,773

Int. Cl.<sup>5</sup> A61K 33/32, 31/315, 31/555, 31/60

U.S. Cl. 424—643

3 Claims

1. A method of treating benign adenomatous hyperplasia of the prostate in a male animal having a compact or solid prostate which comprises injecting zinc ions from a zinc salt having a physiologically acceptable anion into the prostate in an amount effective to increase the amount of prostatic antibacterial factor and to limit the rate of prostatic growth, said ions injected in a solution in a volume from about 0.25 cc to 2 cc and a concentration equivalent to about 0.25% to 20% by weight ZnSO<sub>4</sub>·7H<sub>2</sub>O as ZnSO<sub>4</sub>·7H<sub>2</sub>O or as some other suitable zinc salt.

4,946,689

**CONCENTRATED, STABILIZED CIS-DIAMMINEDINITRATOPLATINUM SOLUTIONS FOR CONVERSION TO CISPLATIN**

Murray A. Kaplan, Syracuse; Robert K. Perrone, Liverpool; Joseph B. Bogardus, Manlius, and Kenneth W. Douglas, Sr., Mexico, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Nov. 23, 1988, Ser. No. 275,489

Int. Cl.<sup>5</sup> A61K 33/24

U.S. Cl. 424—649

2 Claims

1. A sterile, stable concentrated aqueous solution of cis-diamminedinitratoplatinum, said solution consisting essentially of cis-diamminedinitratoplatinum in a concentration between about 1 and 100 mg/ml and nitric acid in an amount ranging from 0.1 to 2.0 mL per ml of said solution.

4,946,690

**CURATIVE AND PREVENTIVE METHOD FOR AQUARIUM FISH**

Akira Yamabe, and Ryuichi Yoshida, both of Tokyo, Japan, assignors to Japan Pet Drugs Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 348,252

Int. Cl.<sup>5</sup> A01N 25/00

U.S. Cl. 424—665

4 Claims

1. A curative and preventive method for aquarium fish which comprises applying stabilized chloride dioxide to a place line containing aquarium fish infected with ichthyophthiriasis, and thereby curing said aquarium fish and preventing healthy aquarium fish from being infected with, ichthyophthiriasis at the same time.

4,946,691

**PROCESS FOR THE PREPARATION OF ISOMERIZED HOP PELLETS**

Ronald J. Burkhardt, Yakima, Wash., and Richard J. H. Wilson, Sittingborne, Great Britain, assignors to Steiner Hops Limited, Epping, Great Britain

Filed Sep. 30, 1988, Ser. No. 252,427

Claims priority, application United Kingdom, Oct. 2, 1987, 8723135

Int. Cl.<sup>5</sup> C12C 3/00

U.S. Cl. 426—106

20 Claims

1. A process for the stabilization of alpha-acids in hops by comminuting and treating hops with calcium or magnesium oxide or hydroxide to form the metal salts and subjecting them to an elevated temperature while isomerization to iso-alpha-acids occurs, comprising forming a mixture of hops and calcium or magnesium oxide or hydroxide into pellets under conditions effective to minimize isomerization, packaging and sealing the pellets in the absence of oxygen and subjecting the sealed packs to controlled heating at about 40° to 55° C. for a period of at least one day, the time, temperature and calcium or magnesium oxide or hydroxide content being selected so as to effect substantially complete isomerization.

4,946,692

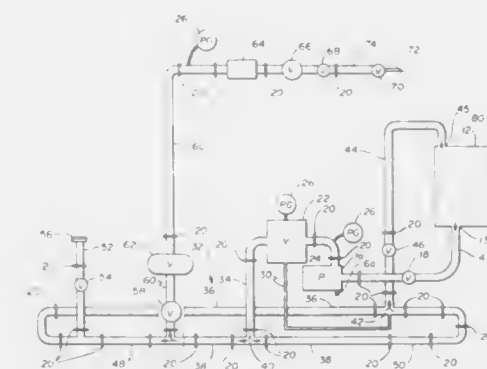
**METHOD FOR TREATING SLAUGHTERED ANIMALS**  
Douglas H. Bernhardt, Minnetonka; Guillermo R. Matheu, Eden Prairie; Spencer E. Crum, Minneapolis, and John T. Adelman, Prior Lake, all of Minn., assignors to Meat Processing Service Corporation, Inc., Minneapolis, Minn.

Division of Ser. No. 13,580, Feb. 11, 1987. This application Nov. 9, 1988, Ser. No. 269,678

Int. Cl.<sup>5</sup> A22C 9/00

U.S. Cl. 426—231

6 Claims



1. A method of controlling the injection of predetermined amounts of solution into the circulatory system of slaughtered animals by means of a microcomputer and apparatus including a plurality of valves for controlling the flow of solution into the circulatory system of individual animals comprising the steps of:

predetermining durations of time to operate a valve, the times relating to the amount of solution to be injected into a slaughtered animal and varying depending on the type and weight of the animal;

storing the predetermined durations of time in a memory of a microcomputer;

selecting a valve to operate whereby the flow of a solution is controlled;

entering data into the microcomputer relating to the animal type and weight;

selecting a duration of time from the stored durations, based on the data entered;

operating the selected valve for the selected duration of time;

whereby a predetermined amount of solution is injected into the slaughtered animal.

4,946,693

**PROCESS FOR THE PREPARATION OF INTERMEDIATE MOISTURE VEGETABLES**

Pierre Risler, Montmorency, and Jean-François Tence, Clamart, both of France, assignors to Nestec S.A., Vevey, Switzerland

Continuation of Ser. No. 806,122, Dec. 6, 1985, abandoned, which is a division of Ser. No. 468,980, Feb. 23, 1983, abandoned.

This application Jul. 21, 1988, Ser. No. 223,662

Claims priority, application France, Mar. 3, 1982, 82 03513

Int. Cl.<sup>5</sup> A23B 7/022, 7/06, 7/14

U.S. Cl. 426—243

16 Claims

1. A process for the preparation of intermediate moisture vegetables comprising treating pieces of vegetables by a treatment selected from the group consisting of microwave blanching and microwave cooking the pieces such that the vegetables retain at least 85% of their intracellular soluble substances, partially drying the treated vegetables to a moisture content of from 45% to 55% by weight and dry mixing the partially dried vegetables with salt to infuse salt into the vegetables such that the moisture content of the pieces is from 40% to 50% by weight.

4,946,694

**LIQUID COATING FOR FRUITS**

Robert E. Gunnerson, Manteca, and Richard C. Bruno, Lodi, both of Calif., assignors to Sun-Maid Growers of California, Kingsburg, Calif.

Filed Mar. 10, 1989, Ser. No. 322,151

Int. Cl.<sup>5</sup> A23B 9/00

U.S. Cl. 426—273

22 Claims

1. A system for coating sticky fruit, which system comprises a first composition including a vegetable wax, a vegetable oil and a wetting agent and a second composition including a protein, said first composition being applied to said fruit before said second composition, said first and second compositions being applied in an amount sufficient to give fruit that is no longer sticky.

4,946,695

**PROCESS FOR THE EXTRACTION OF NONPOLAR CONSTITUENTS FROM PLANT MATERIAL**

Adrian Forster, Stefan Geyer, Josef Schulmeyr, Roland Schmidt, and Manfred Gehrig, all of Wolnzach, Fed. Rep. of Germany, assignors to Hopfen-Extraktion HVG Bart, Raiser & Co., Wolnzach, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 100,798, Sep. 24, 1987, Pat. No. 4,842,878. This application Mar. 31, 1989, Ser. No. 332,244

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632401

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C12C 3/00

U.S. Cl. 426—286

16 Claims

1. A process for extracting nonpolar constituents from a natural substance while simultaneously separating soluble residues of nonpolar plant protectives from the natural substance comprising, in a first step, extracting the soluble plant-protective residue and nonpolar constituents from said natural substance with a solvent comprising compressed carbon dioxide under selected temperature and pressure conditions sufficient to extract the soluble plant-protective residue and nonpolar constituents from said natural substance to form a dissolved mixture, and then, in a second step, passing the dissolved mixture through an adsorbent to selectively adsorb the plant-protective residue from the mixture.

4,946,696

**PROCESS FOR PRODUCING FINE PATTERNATION IN CHOCOLATE SURFACES**

Joe Nendl, and Edith Nendl, both of S. 5013 Dorset Rd., Spokane, Wash. 99204

Filed Nov. 14, 1988, Ser. No. 270,365  
Int. Cl.<sup>3</sup> A23G 3/20, 3/28, 7/00

U.S. Cl. 426—383 5 Claims

1. A process for the formation of a comestible having cocoa butter patternation embedded in one surface of a settable chocolate matrix, comprising the steps of:

- forming a base sheet defining at least one pattern indentation;
- depositing thermally plasticized cocoa butter in patterned configurations in the indentations defined in the base sheet by screen printing with a screen at a spaced distance above the adjacent indented surface of the base sheet;
- curing the patterned configurations of cocoa butter for a period of approximately twenty-four hours;
- forming plasticized settable chocolate over the cocoa butter patternation to embody the exposed surfaces of the cocoa butter patternation;
- setting the plasticized chocolate; and
- removing the chocolate and embodied cocoa butter patternation from the base sheet.

4,946,697

**PUFFING BIOLOGICAL MATERIAL**

Frederick A. Payne, Lexington, Ky., assignor to University of Kentucky Research Foundation, Lexington, Ky.

Filed Nov. 25, 1988, Ser. No. 275,898  
Int. Cl.<sup>3</sup> A23P 1/14

U.S. Cl. 426—445 14 Claims

1. A method of puffing cellular biological material in a pressure chamber, comprising the steps of:

- bringing the moisture content of the cellular biological material to between substantially 15 to 60% wet basis;
- placing the cellular biological material including at least one dimension of between substantially 0.025 and 1.0 inches in a pressure chamber;
- reducing the volume of the pressure chamber;
- subjecting the cellular biological material to a puffing gas at an increased pressure between substantially 400 and 1200 psi and at a temperature below a level sufficiently high to result in adverse chemical or enzymatic reactions that alter overall product quality;
- quickly releasing the puffing gas pressure to puff the cellular biological material;
- increasing the volume of said pressure chamber while substantially simultaneously releasing said puffing gas; and
- drying the cellular biological material after puffing to set the cellular biological material in the puffed state.

4,946,698

**METHOD OF PRECIPITATING CHEESE FINES FROM WHEY**

Karl H. Zettler, Oelde; Siegfried Klapper, Herzbrock-Clarpholz; Hartwig Fritze, Weingarten, and Reinhard Meyer, Munich, all of Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jun. 22, 1988, Ser. No. 209,829

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720961

Int. Cl.<sup>3</sup> A23C 21/00, 19/00

U.S. Cl. 426—495 3 Claims

1. In a method of precipitating cheese fines from whey by means of a self-emptying centrifuge, wherein clarified whey is continuously extracted from the centrifuge, cheese fines are intermittently extracted from the centrifuge, the cheese fines are intercepted by a solids collector in a drum and rinse is supplied to the solids collector, the improvement comprising partly emptying the centrifuge drum at intervals of approximately five minutes and heating clarified whey to a tempera-

ture of approximately 30° to 40° C. and rinsing the solids collector in the centrifuge drum with the heated clarified whey.

4,946,699

**METHOD FOR PRODUCING BREAD FROM PRESERVED DOUGH**

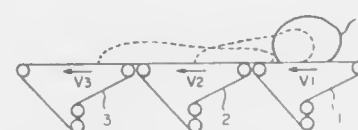
Minoru Kageyama, and Mikio Kobayashi, both of Utsunomiya, Japan, assignors to Rheon Automatic Machinery Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,753

Claims priority, application Japan, Aug. 11, 1987, 62-200454  
Int. Cl.<sup>3</sup> A21C 1/08

U.S. Cl. 426—502

19 Claims



1. A method for producing bread from preserved dough comprising the steps of:

- mixing and kneading materials required for producing a desired type of bread, to make a dough body having a gluten network;
- stretching said dough body into an elongated first form while subjecting said dough body to vibrations such that a thixotropy effect appears in the dough body and said gluten network is not damaged during the stretching step;
- cutting said first form of said dough body into two or more dough parts each having a desired second form;
- fermenting said dough parts;
- freezing said fermented dough parts;
- preserving said frozen dough parts; and
- baking or frying said preserved dough parts.

4,946,700

**METHOD OF PRODUCING LINEAR CURDLAN GELS**

Tetsuya Taguchi, Hyogo; Yukihiko Nakao, Osaka, and Hiroshi Kasai, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 21, 1989, Ser. No. 410,500

Claims priority, application Japan, Sep. 22, 1988, 63-238119; Oct. 27, 1988, 63-271838; Aug. 4, 1989, 1-203636

Int. Cl.<sup>3</sup> A23L 1/00

U.S. Cl. 426—520

7 Claims

1. A method of producing linear curdlan gels, which comprises heating to gel an aqueous suspension of curdlan at a temperature not lower than 85° C. during or after passage through a small-diameter tubing with a sectional area of 0.1 to 30 mm<sup>2</sup> at a discharge rate not exceeding 500 cm/sec.

4,946,701

**BEVERAGES**

Chee-Hway Tsai, West Chester; David C. Heckert, Oxford, and James T. Kuznicki, Cincinnati, all of Ohio, assignors to Procter &amp; Gamble, Cincinnati, Ohio

Filed Aug. 4, 1989, Ser. No. 389,442

Int. Cl.<sup>3</sup> A23F 3/00

U.S. Cl. 426—597

29 Claims

1. A beverage comprising:

- at least 80% by weight of water;
- at least about 0.05% flavanols selected from the group consisting of catechin, catechin derivatives, epicatechin, epicatechin derivatives and mixtures thereof; and
- an effective amount of flavorant.

4,946,702

**LOW VISCOSITY ORANGE JUICE CONCENTRATES USEFUL FOR HIGH BRIX PRODUCTS HAVING LOWER PSEUDOPLASTICITY AND GREATER DISPERSIBILITY**

Gordon K. Stipp, and Chee-Hway Tsai, both of West Chester, Ohio, assignors to The Procter &amp; Gamble Company, Cincinnati, Ohio

Filed Mar. 31, 1988, Ser. No. 175,708

Int. Cl.<sup>3</sup> A23L 2/02

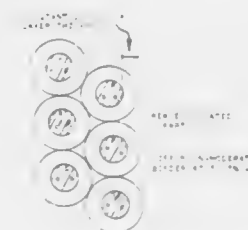
U.S. Cl. 426—599 35 Claims

1. A low viscosity orange juice concentrate having the following characteristics:

- a juice solids content of from about 50° to about 70° Brix;
- a viscosity of about 5.5 centipoise or less when measured at 8° C. and at 11.8° Brix;
- a mean sinking pulp particle size of about 125 microns or less

wherein said low viscosity orange juice concentrate is producible by high shear treatment of an orange juice concentrate by a process selected from the group consisting of high pressure homogenization and colloid milling.

said reagent coated particles are further coated with a diffusion layer which permits diffusion of the gaseous substance through it to contact the specific reagent at the surface; followed by



(b) cutting the rectangular sheet crosswise into a multiplicity of test strips.

4,946,706

**METHOD OF ION IMPLANTATION**

Hisashi Fukuda, Tokyo, Japan, assignor to Oki Electric Industry, Co., Ltd., Tokyo, Japan

Division of Ser. No. 227,255, Aug. 2, 1988, Pat. No. 4,892,752.

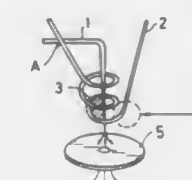
This application Jun. 27, 1989, Ser. No. 371,976

Claims priority, application Japan, Aug. 12, 1987, 62-200001; Aug. 12, 1987, 62-200002; Aug. 19, 1987, 62-204254; Aug. 31, 1987, 62-215453

Int. Cl.<sup>3</sup> B05D 3/06

U.S. Cl. 427—35

15 Claims



1. A method of cleaning an emitter of a liquid metal ion source of a focused ion beam ion implantation apparatus, wherein said liquid metal ion source is for holding a molten metal to be ionized and extracted by an extraction electrode, said method comprising the steps of:

- supplying a gas which comprises at least one of hydrogen and argon to said liquid metal ion source;
- causing electric discharge in said liquid metal ion source; and
- venting said gas.

4,946,707

**METHOD FOR PRODUCING AN ALUMINUM OXIDE COATED MANGANESE ACTIVATED ZINC SILICATE PHOSPHOR**

Anthony F. Kasenga, Towanda, and Bella M. Dorfman, Athens, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jul. 28, 1989, Ser. No. 388,110

Int. Cl.<sup>3</sup> B05D 5/06, 5/12

U.S. Cl. 427—64

1 Claim

1. A method for producing an aluminum oxide coated manganese activated zinc silicate phosphor, said method comprising:

- forming a solution of Al<sup>3+</sup> ions from aluminum nitrate in water with the concentration of said aluminum being from about 0.01 to about 0.30 moles/l.
- adding manganese activated zinc silicate phosphor to said aluminum solution to form a slurry wherein the amount of said phosphor is about 0.7 to about 1.0 moles

4,946,703

**PROCESSES FOR PRODUCTS FROM TRUE YAM**

Karen M. Slimak, 9207 Shotgun Ct., Springfield, Va. 22153

Filed Jan. 31, 1986, Ser. No. 825,659

Int. Cl.<sup>3</sup> A23L 1/214, 1/216

U.S. Cl. 426—637

16 Claims

1. A non-grain, non-bitter edible yam flour possessing the ability to maintain a risen structure in the absence of grain flour, legume flour, or added fiber; said nongrain edible flour consisting of comminuted particles of the entire true yam of family Dioscoreaceae including substantially all of the starch and fibrous portions of the true yam, comminuted to a size so that all of said particles pass through a screen of 0.02 inch mesh, wherein said flour has a moisture content of less than 20% by weight.

4,946,704

**AGGLOMERATES OF POTATO GRANULES**

Johannes De Wit, Beauvais, France, assignor to Nestec S.A., Vevey, Switzerland

Division of Ser. No. 88,947, Aug. 24, 1987, Pat. No. 4,797,292.

This application Oct. 31, 1988, Ser. No. 265,050

Claims priority, application France, Sep. 26, 1986, 86 13473  
Int. Cl.<sup>3</sup> A23L 1/2165

U.S. Cl. 426—637

8 Claims

1. An agglomerated potato product reconstitutable in water for consumption comprising potato granules bound into agglomerates by egg white solids.

4,946,705

**INTEGRATED EXPOSURE MONITORING DEVICE**

Charles R. Manning, Palo Alto, and Leroy J. Pinto, Los Altos, both of Calif., assignors to Assay Technologies, Inc., Palo Alto, Calif.

Division of Ser. No. 43,921, Apr. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 644,762, Aug. 27, 1984, which is a continuation-in-part of Ser. No. 354,497, Mar. 3, 1982, abandoned, which is a continuation-in-part of Ser. No. 644,771, Aug. 27, 1984, abandoned. This application Nov. 23, 1988, Ser. No. 275,346

Int. Cl.<sup>3</sup> A01N 1/02

U.S. Cl. 427—2

9 Claims

1. A process for manufacturing a test strip useful for quantifying time weighted average exposure to a gaseous substance, which process comprises:

- casting lengthwise onto the surface of a rectangular sheet of reflectant nonporous, planar backing, a casting which comprises a microparticulate layer composed of reflectant adsorbent microparticles wherein said micro-particles are coated at their surface with a reagent specifically reactive with the gaseous substance to be quantified and wherein



per liter of said slurry with agitation for a sufficient time to result in aluminum ions being adsorbed onto the surfaces of the particles of said phosphor;

(c) separating the resulting phosphor with adsorbed aluminum ions from the resulting liquor;

(d) drying said phosphor with said adsorbed aluminum ions;

(e) firing the resulting dried phosphor at a temperature of from about 750° C. to about 850° C. in an oxidizing atmosphere for a sufficient time to oxidize the adsorbed aluminum ions to aluminum oxide and forming a coating of aluminum oxide on the particles of said phosphor, said coated phosphor having an increase in maintenance in a fluorescent lamp at about 100 hours over said phosphor absent said coating.

4,946,708

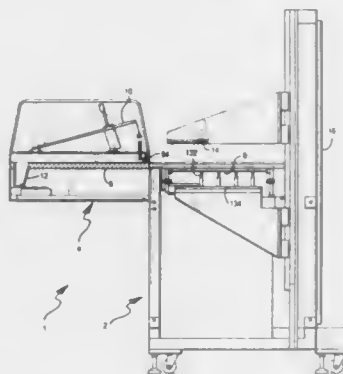
**PIN TRANSFER ADHESIVE APPLICATION FOR SURFACE MOUNT COMPONENT PROCESSES**  
 Adolph B. Habich, Georgetown; Karl Hermann, Austin; Ronald E. Hunt, Georgetown, and Verlon E. Whitehead, Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1988, Ser. No. 273,523

Int. Cl.<sup>5</sup> C23C 26/00

U.S. Cl. 427—96

22 Claims



1. Apparatus for pin transfer of a fluid to a surface of a circuit board comprising:  
 a plate;  
 means for depositing a layer of said fluid on said plate;  
 a pin plate carrying a plurality of fluid applicator pins, said pins having pre-selected compliance;  
 means for effecting momentary contact between said fluid layer and said pins;  
 means for effecting momentary contact between said surface and said pins;  
 a backup plate for supporting said board; and  
 plate means for moving said fluid layer into and out of registry with said pin plate and said backup plate.

4,946,709

**METHOD FOR FABRICATING HYBRID INTEGRATED CIRCUIT**

Mitsuyuki Takada; Eishi Gofuku, and Hayato Takasago, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 220,724, Jul. 18, 1988, abandoned. This application Aug. 17, 1989, Ser. No. 395,213

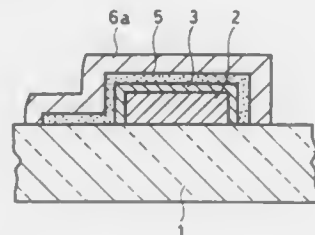
Int. Cl.<sup>5</sup> H01C 17/06

U.S. Cl. 427—98

8 Claims

1. The method for fabricating a hybrid IC substrate comprising the steps of:  
 preparing an insulating ceramic substrate having a major surface;

baking a first conductor, selected from a first group of high melting point metals, on said major surface;  
 covering said first conductor with a first plated film formed by electroless plating;  
 forming an insulating porous active layer including a glass component having a catalytic action for electroless plating on said first plated film, and



forming a second conductor selected from a second group of metals by electroless plating on said active layer, and rendering portions of said active layer located between said conductors conductive, thereby bringing said conductors into electrical contact with each other through said active layer.

4,946,710

**METHOD FOR PREPARING PLZT, PZT AND PLT SOL-GELS AND FABRICATING FERROELECTRIC THIN FILMS**

William D. Miller, Rio Rancho; Leo N. Chapin, and Joseph T. Evans, Jr., both of Albuquerque, all of N. Mex., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 2, 1987, Ser. No. 57,323

Int. Cl.<sup>5</sup> B05D 5/12

U.S. Cl. 427—126.3

36 Claims

1. A method of preparing a mixture suitable for spin deposition on substrates, comprising:

- (a) solubilizing amounts of two or more precursors of lead, titanium, zirconium and lanthanum in predetermined solvents said solvent being different for each precursor at proportions such that upon hydrolysis the metal precursors will exhibit approximately equal reaction rates;
- (b) mixing the metal precursors and solvents at a temperature sufficient to maintain the metal precursors in solution and for a period of time sufficient to produce a homogeneous mixture;
- (c) adding a amount of water to resulting solution sufficient to begin a hydrolysis reaction without causing precipitation of solids; and
- (d) boiling the mixture at a temperature sufficient to vaporize said solvents and azeotrope water to increase the viscosity suitable for spin coating.

4,946,711

**MASKING COMPOSITIONS AND METHOD FOR APPLYING THE SAME**

Fred D. Hawker, Villa Park; Victor E. Pietryga, Berwyn; Robert W. Byrd, Burr Ridge; James Wichmann, Schaumburg, and Patricia A. Nicpon, Arlington Heights, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 108,430, Oct. 14, 1987, Pat. No. 4,806,390. This application Dec. 16, 1988, Ser. No. 285,790. The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65B 33/00; B05D 1/18, 1/36, 3/02

U.S. Cl. 427—156

14 Claims

1. A method of coating an etchable metal part with a peelable mask which is resistant to attack by the strong acid and strong base etchants used in chemical milling comprising coating said part with a layer of polyvalent metal cation salt, con-

tacting said salt-surfaced metal part with an anionic emulsion of coalescent rubbery particles pigmented to strengthen the mask which is formed, said emulsion having a total solids content of at least about 10 weight percent and a weight ratio of pigment to rubbery particles of about 0.1:1 to about 2:1, respectively, the contacting between said salt-surfaced part and said emulsion being for a time period effective to cause said emulsion to deposit anionically to form a coating having a dry thickness of at least about 0.5 mils.

4,946,712

**GLASS COATING METHOD AND RESULTING ARTICLE**  
 Ronald D. Goodman, Toledo; William M. Greenberg, Oregon, and Peter J. Tausch, Perrysburg, all of Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Division of Ser. No. 87,789, Aug. 25, 1987, Pat. No. 4,847,157, which is a continuation-in-part of Ser. No. 901,282, Aug. 28, 1986, abandoned. This application Apr. 25, 1989, Ser. No. 342,746

Int. Cl.<sup>5</sup> B05D 5/06

U.S. Cl. 427—166

7 Claims

1. A method of producing a heat reflective glazing including a glass substrate having a multilayer coating on one surface thereof wherein the shading coefficient measured on both the glass surface and the coated surface is less than 0.35 and is lower on the glass surface than on the coating surface, comprising the steps of:

- (a) maintaining the glass substrate sheet at a temperature of at least about 1100° F. in a non-oxidizing atmosphere;
- (b) contacting said one surface of the glass substrate with a gas mixture containing silane for a time sufficient to form a first silicon coating on said one surface;
- (c) contacting said first silicon coating with a non-oxidizing gas including ammonia and a titanium tetrahalide for a time sufficient to form a titanium nitride coating over said first silicon coating;
- (d) contacting said titanium nitride coating with a gas mixture containing silane gas for a time sufficient to form a second silicon coating overlaying said titanium nitride coating; and
- (e) removing said coated glass substrate from said non-oxidizing atmosphere and cooling the substrate to room temperature.

4,946,713

**POLY(ALKENYLPENTABORANE) CERAMIC PRECURSORS**

Larry G. Sneddon, Havertown, and Mario G. L. Mirabelli, Philadelphia, both of Pa., assignors to University of Pennsylvania, Philadelphia, Pa.

Filed Feb. 9, 1988, Ser. No. 153,995

Int. Cl.<sup>5</sup> B05D 3/02; C01B 21/06; C08F 130/06

U.S. Cl. 427—226

56 Claims

1. Ceramic precursors comprising condensation products of alkenylpentaboranes.

11. A process for preparing substantially non-crosslinked ceramic precursors comprising heating an alkenylpentaborane under conditions effective to induce condensation of the alkenylpentaborane but not to induce crosslinking of said ceramic precursors.

31. A process for preparing B<sub>4</sub>C comprising pyrolyzing a ceramic precursor of claim 1.

47. A process for preparing a film of B<sub>4</sub>C comprising casting a film of a substantially non-crosslinked condensation product of an alkenylpentaborane, treating said film to induce crosslinking of said condensation product, and pyrolyzing said film.

4,946,714

**METHOD FOR PRODUCING SEMICONDUCTOR DEVICES**

Susumi Shigeki, Fukuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 235,164, Aug. 23, 1988, Pat. No. 4,920,920.

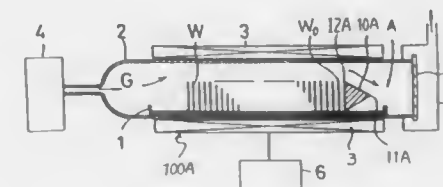
This application Jan. 16, 1990, Ser. No. 465,503

Claims priority, application Japan, Aug. 25, 1987, 62-210584

Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 427—248.1

1 Claim



1. A method of producing semiconductor devices by using a reaction tube in which a boat carrying a multiplicity of semiconductor wafers held generally parallel to each other and transverse to the flow of a reaction gas introduced into said reaction tube, said method comprising introducing said reaction gas into said reaction tube from one end of said reaction tube while placing, at least on the downstream side of said row of wafers, a flow stabilizing member, the cross-section area of which progressively decreases toward the other end of said reaction tube.

4,946,715

**METHOD FOR PRODUCING FAUX FINISHES ON NON-POROUS SURFACES**

Ronald T. Arera, 706 Mockingbird, Pasadena, Tex. 77502

Filed Jul. 11, 1988, Ser. No. 217,562

Int. Cl.<sup>5</sup> B05D 5/00, 1/02, 3/00

U.S. Cl. 427—273

18 Claims

1. An automated method for producing a faux marble finish on a non-porous substrate, comprising the steps of:

- (a) feeding said substrate at a substantially constant rate through a coating apparatus;
- (b) coating said substrate with at least one oil-based paint to provide a wet painted surface;
- (c) immediately thereafter spattering onto said wet painted surface a non-uniform coating of solvent for said paint;
- (d) inducing at least some of the wet paint spattered with the solvent to flow randomly on said surface thereby creating said finish; and
- (e) drying said paint on said surface.

4,946,716

**METHOD OF THINNING A SILICON WAFER USING A REINFORCING MATERIAL**

Brian L. Corrie, Gaston, Ore., assignor to Tektronix, Inc., Beaverton, Ore.

Continuation of Ser. No. 18,832, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 740,102, May 31, 1985, abandoned. This application Dec. 27, 1988, Ser. No. 289,514

Int. Cl.<sup>5</sup> B05D 3/12, 5/12

U.S. Cl. 427—289

13 Claims

1. A method of thinning a plate-like body of a given material at least about 0.5 mm thick, comprising forming a coating on one main face of the body, the coating comprising as a component at least about 18 weight percent of said given material and being in finely divided form, fusing the coating material so as to form a mechanically-supportive coating in direct adhesive relationship with said body, and thinning the body from the opposite main face of the body to a thickness in the range from about 10 μm to about 160 μm.

4,946,717

## WATER BASED PRECURE PAINT FOR RUBBER ARTICLES

Fredrick L. Magnus, Mogadore, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio  
 Filed Mar. 10, 1986, Ser. No. 837,999  
 Int. Cl.<sup>3</sup> C08K 3/00, 3/26, 3/40, 3/34

U.S. Cl. 427—393.5 4 Claims

1. A composition for the coating of an unvulcanized rubber article, said composition comprising:

- (1) from 0 to 60 percent by weight of solids of the composition, of a rubber latex selected from the group consisting of styrene-butadiene rubber, polybutadiene, NBR, natural rubber or blends thereof;
- (2) from 10 to 95 percent by weight of solids of the composition of a polymeric antidegradant, said polymeric antidegradant comprising a polymer in latex form that contains as a segmeric unit thereof from 1 to 50 segmers that possess antidegradative functionality per 100 segmers;
- (3) from 1 to 10 percent by weight of solids of the composition of additional anionic or nonionic emulsifier or blends thereof;
- (4) from 0.1 to 20 percent by weight of solids of the composition of a thickening agent; and
- (5) from 1 to 60 percent by weight of solids of the composition of a filler/mold release/lubricating agent selected from the group consisting of silicon dioxide, carbon black, magnesium carbonate, magnesium silicate, aluminum silicate, glass spheres, silica, calcium carbonate, clay, or blends thereof.

3. A process for the manufacture of a vulcanized rubber article comprising the steps of:

- (a) providing an article comprising at least one outer layer of an unvulcanized rubber;
- (b) applying a coating between 0.001 and 0.1 cm thick of an aqueous precure paint to the surface of the unvulcanized rubber, said aqueous precure paint comprising:
  - (1) from 0 to 60 percent by weight of solids of the composition of a rubber latex selected from the group consisting of styrene-butadiene rubber, polybutadiene, NBR, natural rubber or blends thereof;
  - (2) from 10 to 95 percent by weight of solids of the composition of a polymeric antidegradant, said polymeric antidegradant comprising a polymer in latex form that contains as a segmeric unit thereof from 1 to 50 segmers that possess antidegradative functionality per 100 segmers;
  - (3) from 1 to 10 percent by weight of solids of the composition of additional anionic or nonionic emulsifier or blends thereof;
  - (4) from 0.1 to 20 percent by weight of solids of the composition of a thickening agent;
  - (5) from 1 to 60 percent by weight of solids of the composition of a filler/mold release/lubricating agent selected from the group consisting of silicon dioxide, carbon black, magnesium carbonate, magnesium silicate, aluminum silicate, glass spheres, silica, clay, or blends thereof; and
- (c) vulcanizing the so coated curable rubber article.

4,946,718

## AIR CURTAIN HOUSING FOR CONVEYOR MECHANISM

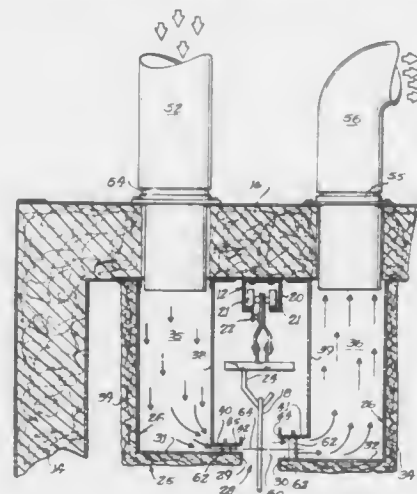
Stanley C. Napadow, Elgin, Ill., assignor to Protectaire Systems Co., Elgin, Ill.

Continuation of Ser. No. 815,258, Dec. 31, 1985, abandoned.  
 This application Nov. 21, 1988, Ser. No. 274,017

Int. Cl.<sup>3</sup> B05D 1/02; B05B 15/12  
 U.S. Cl. 427—424 5 Claims

1. A method of conveying articles with a conveyor having a conveyor housing substantially surrounding the conveyor through a booth having a slot connecting an internal chamber within the booth with an interior of the conveyor housing and having process equipment and a treating atmosphere in the booth's internal chamber deleterious to the conveyor,

traveling a conveyor through the interior of the enclosed conveyor housing having clean air therein, treating articles within the enclosed internal chamber in the booth and within the deleterious atmosphere, moving a portion of the conveyor projecting through the slot for travel within the slot and extending from the clean air in the conveyor housing interior into the deleterious atmosphere in the enclosed chamber in the booth, blowing air across the slot between the conveyor housing and the enclosed chamber to separate the clean air in the conveyor housing from the deleterious atmosphere,



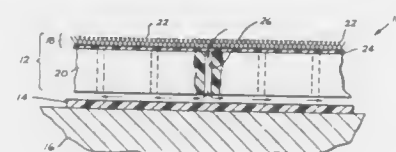
pulling the air flowing across the slot and conveying the pulled air from the booth, preventing clean air from flowing downwardly through the slot from the enclosed conveyor housing into the deleterious atmosphere within the enclosed internal chamber and adversely affecting the treating atmosphere within the enclosed internal chamber, and preventing the upward flow of the deleterious atmosphere from the booth's internal chamber into the enclosed conveyor housing and adversely affecting the conveyor within the conveyor housing.

4,946,719

## DRAINABLE ARTIFICIAL TURF ASSEMBLY

Barry J. Dempsey, White Heath, Ill., assignor to AstroTurf Industries, Inc., Dalton, Ga.  
 Filed Dec. 5, 1988, Ser. No. 280,229

Int. Cl.<sup>3</sup> B32B 33/09  
 U.S. Cl. 428—17 24 Claims



1. An artificial turf system, comprising:

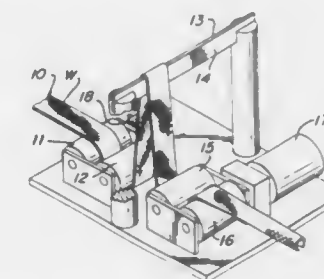
- (a) a permeable section comprising:
  - (i) a water-permeable upper layer of artificial turf, and
  - (ii) a water-permeable lower layer of shock absorbing material positioned below said upper layer; and
- (b) a layer of water-impermeable material positioned below said permeable section for collecting water passing through said permeable section, said permeable section resting on said water-impermeable layer in the absence of water passing through said permeable section and whereby space is formed by water being collected be-

4,946,722

## PROTECTIVE FABRIC SLEEVES

James D. Moyer, Downingtown, Pa., assignor to The Bentley-Harris Manufacturing Company, Lionville, Pa.  
 Filed Sep. 30, 1988, Ser. No. 252,181  
 Int. Cl.<sup>3</sup> F16L 11/00

U.S. Cl. 428—36.1 20 Claims



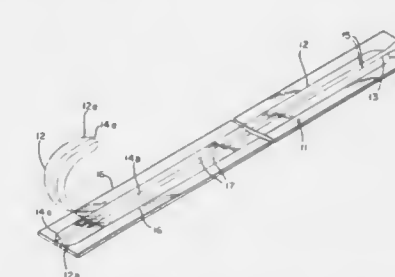
1. An elongated fabric sleeve for protection of conduit, cable or the like, said sleeve being formed of an elongated braided sheet comprised of monofilaments formed from a material which is cold workable to take a permanent set when subjected to a stress beyond its elastic limit, the surfaces of said monofilaments on one side of said braided sheet being subjected to longitudinal stress to a value beyond the elastic limit of the material and the opposite surfaces being relatively unstressed, whereby the braided sheet is permanently biased to form a tubular sleeve having its longitudinal axis extending lengthwise of the sheet with the side edges of the sheet being adjacent one another.

4,946,723

## TAMPER-PROOF SEALING STRIP WITH A TEAR TAB AND A CONTAINER

Eugene H. Paules, 24 Willard Rd., Huntington, Conn. 06484, and Denis E. Bruggeman, RR1, Box 25, Colton, S. Dak. 57018  
 Filed Nov. 9, 1988, Ser. No. 269,064

Int. Cl.<sup>3</sup> B32B 3/30  
 U.S. Cl. 428—43 12 Claims



1. A spoolable sealing strip and a carrier therefor, wherein said combination comprises: a sealing strip; an adhesive layer on an underside of said sealing strip; a tear strip for said sealing strip; a tear tab for said tear strip; said tear tab and tear strip pre-scored for removal from said carrier and adheringly affixed to said sealing strip onto the outermost exterior surface of said tear tab and tear strip; and a pair of bottom score lines in said sealing strip for a length thereof corresponding to said tear strip short of an exterior surface of said sealing strip.

4,946,720

## CONTAINERS FOR FILTHY MATTER

Tsukasa Oishi, Muko, and Toshio Marui, Ogaki, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka and Nichigo Film Kabushiki Kaisha, Ogaki, both of, Japan

Filed Dec. 15, 1988, Ser. No. 294,631  
 Claims priority, application Japan, Dec. 17, 1987, 62-320565  
 Int. Cl.<sup>3</sup> A61F 5/44; B65D 30/08

U.S. Cl. 428—35.4 4 Claims



1. A bag for the collection of waste material discharged from an artificial anus, said bag comprising an opening portion, a sealed portion and a multilayer packaging material, said multilayer packaging material consisting of at least three layers, wherein:

- (a) an inside layer consists of an oxyalkylene group-containing vinyl alcohol copolymer film layer which is soluble in water only at a temperature not lower than 55° C., having a 10% Young's modulus value of not more than  $2 \times 10^3$  kg/cm<sup>2</sup> as measured at 20° C. and 50% relative humidity, and wherein the oxyalkylene group-containing vinyl alcohol copolymer has an oxyalkylene group content of 1–80 percent by weight;
- (b) a middle layer consists of a film layer of another polymer, and
- (c) an outside layer consists of a nonwoven fabric material.

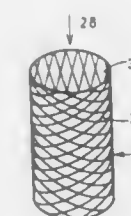
4,946,721

## COMPOSITE FOR THE ABSORPTION OF ENERGY

Christof Kindervater, and Helmut Weissinger, both of Stuttgart, Fed. Rep. of Germany, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Dec. 28, 1988, Ser. No. 291,232  
 Claims priority, application Fed. Rep. of Germany, Dec. 28, 1987, 3744349

Int. Cl.<sup>3</sup> D03D 3/02  
 U.S. Cl. 428—36.1 18 Claims



1. A composite for the absorption of energy consisting of a matrix of embedded fibers, containing fibers having a breaking length of at least 80 km and an elongation at break of at least 2%, wherein the fibers are embedded in a matrix with other, preferably inorganic fibers, which form an acute angle of 0° to +/–30° to the direction of pressure application.



4,946,724

## VITREOUS FILM AND HEAT-MODE OPTICAL RECORDING MEDIUM USING SAME

Seiichi Shingaki, Hadano; Kazuyoshi Nagao, Yokohama; Yasuo Takahashi, Tokyo, and Takashi Noma, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 27, 1988, Ser. No. 290,699

Claims priority, application Japan, Dec. 28, 1987, 62-334990; Dec. 9, 1988, 63-311464

Int. Cl.<sup>5</sup> B32B 3/02

U.S. Cl. 428—64

6 Claims

1. A vitreous film formed on a substrate, containing 30-90 wt. % of Sn, 1-20 wt. % of P, 0.1-20 wt. % of Pb, 2-30 wt. % of O and 5-35 % of F as principal elements.

4,946,725

## EQUIPMENT SUPPORT PAD AND METHOD

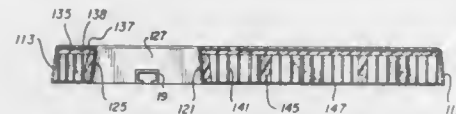
Samuel P. Harlan, San Bruno, Calif., assignor to Homac Mfg. Company, Ormond Beach, Fla.

Filed Aug. 4, 1988, Ser. No. 228,622

Int. Cl.<sup>5</sup> B32B 3/12

U.S. Cl. 428—73

10 Claims



1. An equipment support pad comprising a substantially flat top layer of polymer concrete; a layer of fiberglass material adjacent said top; a second layer of polymer concrete adjacent said layer of fiberglass; honeycomb material of a predetermined thickness having one surface adjacent said second layer of polymer concrete; a plurality of polymer concrete supporting columns within selected cells of said honeycomb material, said columns being of a height substantially equal to the thickness of said honeycomb material; a layer of fiberglass sheet material laminated over the other surface of said honeycomb material; and fiberglass strips laminated about the periphery of said pad.

4,946,726

ORTHOPEDIC SPLINTING ARTICLES AND METHODS  
Timothy C. Sandvig, Woodville, Wis.; Dennis C. Bartizal, and Matthew T. Scholz, both of Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 784,345, Oct. 4, 1985, Pat. No. 4,683,877. This application Feb. 18, 1987, Ser. No. 15,972

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 428—76

35 Claims

1. An article suitable for forming an orthopedic splint around at least a portion of an animal body part, comprising: a unitary blank dimensioned in a first direction sufficient to extend the length of said body part and dimensioned in a second direction sufficient to extend at least partially around the circumference of said body part, said unitary blank being packaged as an orthopedic splinting material and comprising:

an open-celled foam sheet; and

a water curable, isocyanate functional, prepolymer resin impregnated into said open-celled foam sheet, said prepolymer resin being formed by reacting a polyisocyanate with a polyol wherein the ratio of NCO groups in said polyisocyanate to OH groups in said polyol is between about 2 to 1 and about 3.5 to about 1, said prepolymer resin having an NCO equivalent weight of from about 350

to about 1000 grams of prepolymer resin per NCO group, whereby upon activating said water curable prepolymer resin and applying said blank around said portion of said body part, said orthopedic splint is formed.

4,946,727

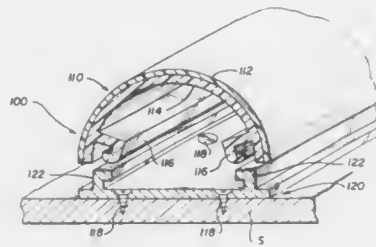
## DUAL DUROMETER RUB RAIL

Gerald Kessler, 302 McClurg Rd., Youngstown, Ohio 44501  
Filed Mar. 8, 1989, Ser. No. 320,447

Int. Cl.<sup>5</sup> B32B 3/06

U.S. Cl. 428—99

14 Claims



1. An extruded rub rail member defining an axis of extrusion and being adapted for secure attachment to a well-mounted attachment means, the rub rail member comprising:

a first portion having a predetermined width and a length extending in the direction of said axis of extrusion, said first portion including engaging means, carried by one surface, for engaging the wall-mounted attachment means;

a second portion having a predetermined width and a length extending in the direction of said axis of extrusion, said second portion overlying and engaging the surface of said first portion disposed opposite to said one surface and being integral therewith;

said first and second portions being disposed in contiguous engagement throughout their entire widths and lengths, said first portion consisting of a rigid plastic material, and said second portion consisting of a flexible plastic material,

said rub rail member being sufficiently thin so as to be bendable in its widthwise direction to form an arcuate configuration and coilable in its lengthwise direction.

4,946,728

## ADHESIVE PAPER FOR COPYING

Takeshi Ikeda; Akira Nozaki, and Kazuyoshi Ebe, all of Saltama, Japan, assignors to FSK Kabushiki Kaisha, Tokyo, Japan

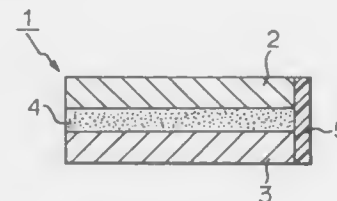
Continuation-in-part of Ser. No. 80,014, Jul. 31, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 213,289

Claims priority, application Japan, Aug. 1, 1986, 61-181393; Apr. 22, 1987, 62-098884

Int. Cl.<sup>5</sup> B32B 3/06, 3/08, 7/06, 7/12

U.S. Cl. 428—40

15 Claims



1. In an adhesive paper for copying prepared by laminating an overlying sheet with a release sheet so that an adhesive

layer coated on the bottom surface of said overlying sheet is in contact with the releasing surface of said release sheet, the improvement which comprises a radiation-induced polymer layer having a glass transition temperature ranging from 50° C. to 200° C., applied to at least one edge face of said adhesive paper for copying, said radiation-induced polymer layer being formed by applying a solvent free radiation polymerizable composition to said edge face followed by irradiation curing, said radiation polymerizable composition comprising a radiation polymerizable prepolymer and from 1 to 300 parts by weight, based on 100 parts by weight of said prepolymer, of at least one radiation polymerizable monomer, said radiation polymerizable prepolymer comprising a urethane acrylate oligomer having a molecular weight of from 1,000 to 10,000.

4,946,729

## RESIN COMPOSITION AND MAGNETIC RECORDING MEDIUM EMPLOYING THE COMPOSITION

Masaharu Nishimatsu, Komoro; Shigeru Shimada, Saku; Toshiki Ide, Saku; Hiroyuki Arioka, Saku, and Yuichi Kubota, Komoro, all of Japan, assignors to TDK Corporation, Tokyo, Japan

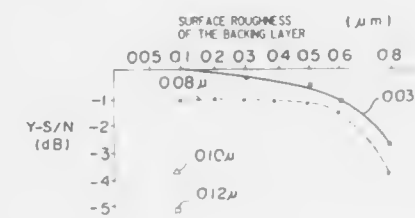
Filed Sep. 26, 1984, Ser. No. 654,364

Claims priority, application Japan, Oct. 5, 1983, 58-185027

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—141

1 Claim



1. A magnetic recording medium comprising a substrate, a magnetic recording layer formed on one side of the substrate and a back coating layer formed on the other side of the substrate, wherein the binder of the back coating layer is a radiation-curable resin composition comprising:

(A) a plastic compound having a molecular weight of from 5,000 to 100,000 and containing at least two radiation-curable double bonds;

(B) a thermoplastic elastomer or prepolymer having a molecular weight of from 3,000 to 100,000 and containing at least one radiation-curable double bond or containing no such double bond; and

(C) a compound having a molecular weight of from 200 to 3,000 and containing at least one radiation-curable double bond,

and wherein the magnetic recording layer is composed essentially of a ferromagnetic alloy powder dispersed in a resin binder and having a surface area of at least 48 m<sup>2</sup>/g as measured by BET method, and has a coercive force of at least 1000 Oe and a surface roughness of at most 0.08 μm.

4,946,730

## METHOD OF AND PHOTOMASK FOR MANUFACTURING OPTICAL MEMORY ELEMENT

Tetsuya Inui; Junji Hirokane; Akira Shibata; Yoshiyuki Nagahara, and Kenji Ohta, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 1, 1988, Ser. No. 278,378

Claims priority, application Japan, Dec. 4, 1987, 62-307127

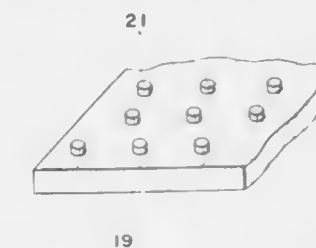
Int. Cl.<sup>5</sup> B32B 3/02

U.S. Cl. 428—64

3 Claims

1. An optical memory element for recording, reproducing or erasing information by using light, comprising:

a substrate having a track formed thereon; and a recording medium which is provided on the substrate; wherein a first plurality of raised portions are so provided as



to be staggered with respect to a center line of the track and wherein a second plurality of raised portions are disposed on the center line, the raised portions being formed convexly relative to the substrate.

4,946,731

## CONSTRUCTION FOR AN EXTENDED NIP PRESS BELT

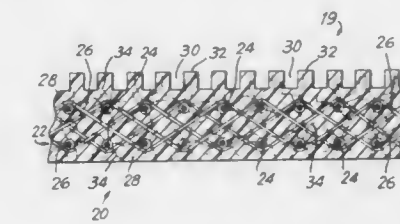
William H. Dutt, Rensselaer, N.Y., assignor to Albany International Corp., Albany, N.Y.

Filed Sep. 28, 1989, Ser. No. 413,788

Int. Cl.<sup>5</sup> B32B 3/28; F16G 1/00

U.S. Cl. 428—156

10 Claims



1. A belt for use in an extended nip press for dewatering a fibrous web, said extended nip press having a cylindrical press roller and an arcuate pressure shoe which together define a nip therebetween, said belt being passed through said nip in conjunction with at least one press felt supporting and carrying said fibrous web to be dewatered between said press felt and said arcuate pressure shoe, said belt having a shoe side and a felt side, said belt comprising:

a base fabric in the form of an endless loop having an inner surface and an outer surface, said base fabric having machine direction and the cross-machine direction yarns, said machine-direction being around said loop and said cross-machine direction being across said loop, wherein at least one of said machine-direction yarns and said cross-machine direction yarns are spun yarns, and wherein said spun yarns are spun from a plurality of staple fibers;

and a coating of a polymeric resin on said inner and outer surfaces of said base fabric, said coating impregnating and rendering said base fabric impervious to liquids, said coating being smooth and giving said belt a uniform thickness, wherein a plurality of grooves are cut in said coating on said outer surface of said base fabric, said plurality of grooves defining channels for water pressed from said fibrous web alternating with land areas, said land areas being anchored to said base fabric by said plurality of staple fibers of said spun yarns, so that said land areas will not delaminate from said belt.

4,946,732

**INSULATION WITH TAPE ADHERING SURFACE**  
 Lewis S. Cohen, Hingham, Mass., and Ivan Rodrigues, North Providence, R.I., assignors to Venture Tape Corp., Rockland, Mass.

Division of Ser. No. 96,660, Sep. 15, 1987, Pat. No. 4,842,908.  
 This application Jan. 3, 1989, Ser. No. 292,766

Int. Cl.<sup>5</sup> C09J 7/02

U.S. Cl. 428—192

6 Claims



1. A pressure sensitive adhesive tape for use in securing together segments of insulation, said tape comprising:  
 an upper layer;  
 a lower layer formed of a pressure sensitive adhesive; and  
 a strip of a water resistant, non-tacky coating material disposed on said upper layer adjacent one end thereof and comprising a cured adhesive, said coating material being capable of bonding to the pressure sensitive adhesive of said lower layer.

4,946,733

**ELECTRIC CARRIER DEVICES AND METHODS OF MANUFACTURE**

Richard E. Seeger, Jr., Kittery; Noredin H. Morgan, Woburn, and Joseph R. Landry, Jr., Burlington, all of Mass., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 43,684, Apr. 27, 1987, Pat. No. 4,759,970, which is a continuation of Ser. No. 664,598, Oct. 25, 1984, abandoned. This application Jul. 21, 1988, Ser. No. 222,435. The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 9/00

U.S. Cl. 428—209

26 Claims



1. A three-dimensional device comprising an insulating surface carried by a thermoplastic or thermosetting, or mixtures thereof, organic resin substrate having a thickness and defining a first side surface comprising an electronic component mounting area,

a flange extending at an angle from the mounting area and defining a lip area having an outer peripheral edge,  
 a particle loaded ink lying in a plurality of distinct circuit paths and extending from the vicinity of said mounting area toward said lip, said particle of said ink comprising a metallic component.

said particle loaded ink being bound to said substrate by a curable cross-linkable thermosetting organic resin, and a conductive metal plating plated over said ink.

4,946,734

**RESIN COMPOSITION FOR PRINTED CIRCUIT BOARD AND SUCH BOARD FORMED BY USE THEREOF**

Katuo Sugawara, Hitachi; Akio Takahashi, Hitachiota; Masahiro Ono, Hitachi, and Toshikazu Narahara, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Nov. 18, 1987, Ser. No. 122,268

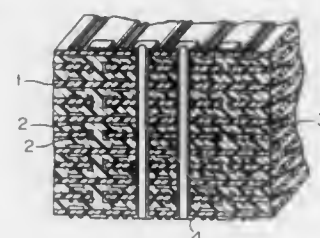
Claims priority, application Japan, Nov. 21, 1986, 61-276591  
 Int. Cl.<sup>5</sup> B05D 1/00

U.S. Cl. 428—209

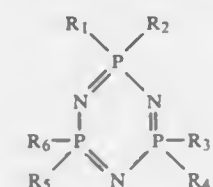
4 Claims

1. A printed circuit board formed by compression molding under application of heat from a prepreg sheet obtained by the impregnation of a reinforcing base material with a thermoset-

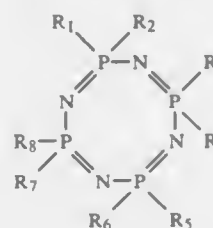
ting resin composition comprising at least one cyclic phosphonitrile compound represented by the following formula [I] and [II] and at least one compound selected from the group consisting of an aromatic maleimide compound and an aromatic amine compound:



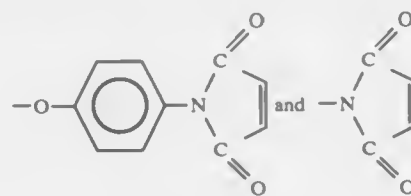
[I]



[II]



wherein at least two of R<sub>1</sub> to R<sub>8</sub> are groups selected from



4,946,735

**ULTRA-THIN SEMICONDUCTOR MEMBRANES**

Kevin C. Lee; Charles A. Lee, and John Silcox, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 828,564, Feb. 10, 1986, abandoned, which is a continuation of Ser. No. 464,835, Feb. 8, 1983, abandoned. This application Dec. 14, 1988, Ser. No. 284,821  
 Int. Cl.<sup>5</sup> H01L 21/306, 21/465, 49/02

U.S. Cl. 428—220

22 Claims

1. A method for forming ultra thin semiconductor material films which comprises:

(a) implanting ions on the reverse side of a semiconductor material film to a predetermined depth of two microns or less, which is a depth less than the thickness of the film, in an amount sufficient to cause a damaged layer in the crystalline structure with damage sufficient to create a significant differential etching dissolution rate between the damaged layer and the remainder of the semiconductor material;

(b) etching the front side of the semiconductor material by an anodic etching process to remove at least a portion of the undamaged portion of the semiconductor material to expose the damaged layer;

(c) annealing the resultant exposed damaged layer at a temperature and for a time sufficient to heal the ion implantation damage to thereby provide a thin film of semiconductor material less than two microns in thickness.

4,946,736

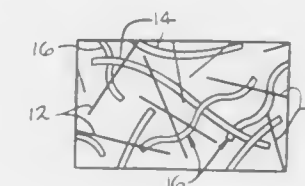
**NON-WOVEN FIBROUS PRODUCT**

Vaughn C. Chenoweth, Coldwater, and Roger C. Goodsell, Alblon, both of Mich., assignors to Guardian Industries Corp., Northville, Mich.

Continuation-in-part of Ser. No. 343,579, Apr. 27, 1989, Pat. No. 4,889,764, which is a continuation-in-part of Ser. No. 332,642, Mar. 13, 1989, Pat. No. 4,888,235, which is a continuation of Ser. No. 195,262, May 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 53,406, May 22, 1987, Pat. No. 4,751,134. This application Dec. 22, 1989, Ser. No. 455,606  
 Int. Cl.<sup>5</sup> B32B 17/12

U.S. Cl. 422—284

20 Claims



1. A non-woven fibrous product comprising, in combination, a blended matrix of bushing glass fibers and synthetic fibers, said synthetic fibers including homogeneous fibers selected from the group consisting of polyester, nylon, Nomex or Kevlar and bi-component fibers having a core of higher melting temperature polymer and a sheath of lower melting temperature polymer, and a thermosetting resin dispersed in said matrix.

4,946,739

**ENAMEL RECEPTIVE BANNER FABRIC**

Dwight E. Chapman, Columbus, Ohio, and David R. Morse, Sandown, N.H., assignors to Borden, Inc., Columbus, Ohio  
 Filed Dec. 13, 1988, Ser. No. 283,717

Int. Cl.<sup>5</sup> B32B 27/30

U.S. Cl. 428—286

9 Claims

1. A flexible substrate that is receptive to enamel paint comprising:

(a) a base fabric;  
 (b) a first coating disposed over at least one surface of said base fabric; and  
 (c) an outer coating disposed over the outer surface of said first coating;  
 wherein said first coating comprises a plasticized polyvinyl chloride film,  
 wherein said outer coating comprises a copolymer that is the reaction product of vinyl and acrylic monomers, and that is applied to said first coating as a water-based dispersion comprising said poly (vinyl-acrylic) copolymer reaction product, and

wherein said outer coating provides superior enamel paint receptiveness over the polyvinyl chloride film of the first coating.

4,946,740

**MAGNETIC RECORDING MEDIUM**

Toshio Ono; Hiroshi Ogawa; Chiaki Mizuno, and Shinji Saito, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 1, 1988, Ser. No. 214,256

Claims priority, application Japan, Jul. 6, 1987, 62-169329  
 Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—323

6 Claims

1. A magnetic recording medium comprising a non-magnetic support having thereon (a) a first magnetic layer comprising a resinous binder and at least about 1.0 part by weight of carbon black having an average primary particle diameter of from

4,946,736

**PROTECTIVE ELECTROMAGNETICALLY TRANSPARENT WINDOW**

Robert L. Sassa, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Continuation of Ser. No. 83,746, Aug. 6, 1987, abandoned. This application May 26, 1989, Ser. No. 425,454

Int. Cl.<sup>5</sup> B32B 7/12, 27/08

U.S. Cl. 428—245

7 Claims



1. A weather and moisture resistant laminate comprising adhered layers, in sequence, of:

(a) a first layer of porous expanded polytetrafluoroethylene;  
 (b) thermoplastic polymer that is an adhesive for layers (a) and (c);  
 (c) a second layer of porous expanded polytetrafluoroethylene disposed on the other side of layer (b) than the first layer (a); and  
 (d) a backing fabric consisting essentially of woven fibers of porous expanded polytetrafluoroethylene.

4,946,737

**GASKET COMPOSITION HAVING EXPANDED MICROSPHERES**

Charles M. Lindeman, and Ralph D. Andrew, both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Sep. 3, 1987, Ser. No. 92,721

Int. Cl.<sup>5</sup> B65D 53/00; F16J 15/00

U.S. Cl. 428—283

34 Claims

1. A gasket material comprising a wet-laid gasket sheet which has good sealability, good compressive strength and good compression/ recover; further providing that the wet-laid gasket sheet includes fiber, expanded polymeric microspheres and a binder, wherein the fibers and expanded microspheres are held by the binder, and wherein the said expanded microspheres inflated inside the wet-laid sheet after it was formed.



about 20 to 80  $\mu\text{m}$ , per 100 parts by weight of magnetic particles contained in the first magnetic layer, and (b) on said first magnetic layer, a second magnetic layer containing a resinous binder and from about 0.1 to less than 1.0 part by weight of carbon black having an average primary particle diameter of from about 20 to 150  $\mu\text{m}$ , per 100 parts by weight of magnetic particles contained in the second magnetic layer.

4,946,741

## INK RECORDING SHEET

Toshiaki Aono, and Takeo Sakai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Mar. 7, 1989, Ser. No. 320,124  
Claims priority, application Japan, Mar. 7, 1988, 63-52939; Apr. 26, 1988, 63-103191

Int. Cl.<sup>5</sup> B41M 5/00

U.S. Cl. 428—336

18 Claims

1. An ink recording sheet comprising a transparent support having thereon an ink recording layer comprising a mixture of an amino group-deactivated gelatin derivative and a polyalkylene oxide.

4,946,742

## PRESSURE-SENSITIVE ADHESIVE HAVING IMPROVED ADHESION TO PLASTICIZED VINYL SUBSTRATES

Donald T. Landin, Eagan, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed May 20, 1988, Ser. No. 196,441  
Int. Cl.<sup>5</sup> C09J 7/02; B32B 27/04, 27/22

U.S. Cl. 428—354

12 Claims

1. A normally tacky and pressure-sensitive adhesive tape comprising a sheet backing carrying a layer of adhesive, said adhesive having outstanding ability to bond to plasticized vinyl substrates and to remain firmly bonded thereto even after remaining in contact therewith for extended periods of time, said adhesive comprising:

a copolymer of 100 parts of monomers consisting essentially of 60–88 parts of acrylic acid ester of non-tertiary 4–14 carbon alcohol, 2–30 parts of polar nitrogen-containing vinyl monomer, and 0–12 parts of vinyl carboxylic acid, said copolymer being intimately blended with 2–35% by weight of plasticizer based on said copolymer, the adhesive being characterized by having a 180° peel adhesion to plasticized vinyl cable jacketing of at least 48 N/dm after being adhered thereto for three days at room temperature, and at least 31 N/dm after being adhered thereto for one week at 70° C.

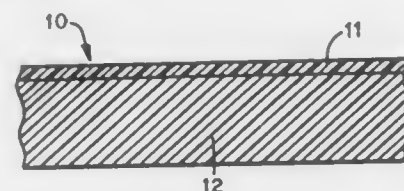
4,946,743

## NONORIENTED POLYESTER FILMS FOR LIDDING STOCK WITH MODIFIED HEAT SEAL LAYER

John P. Winter, Wauwatosa, Wis., assignor to Reynolds Consumer Products, Inc., Appleton, Wis.  
Continuation-in-part of Ser. No. 67,672, Jun. 26, 1987, and Ser. No. 50,166, May 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 759,391, Jul. 26, 1985, Pat. No. 4,765,999, said Ser. No. 67,672, is a continuation-in-part of Ser. No. 50,166. This application Oct. 14, 1988, Ser. No. 258,174  
Int. Cl.<sup>5</sup> B32B 27/00

U.S. Cl. 428—249

19 Claims



1. A coextruded, heat sealable, nonoriented film comprising: (a) a nonoriented base layer comprising polyester and (b) a heat seal layer comprising about 50% to about 80% copolyester and about 20% to about 50% of an olefin polymer.

4,946,744

## SUBSTRATE COATED WITH A CLEARCOAT/BASECOAT COMPOSITION COMPRISING AN ANHYDRIDE-FUNCTIONAL COMPOUND AND AN HYDROXY-FUNCTIONAL COMPOUND

Mohamad D. Shalati, Richton Park; James A. Marquart, Chicago Heights; John R. Babjak, Tinley Park, and Rodney M. Harris, Chicago, all of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio  
Filed Nov. 16, 1987, Ser. No. 120,894  
Int. Cl.<sup>5</sup> B32B 27/00; C08L 33/14

U.S. Cl. 428—500

28 Claims

1. In a substrate coated with a multi-layer decorative and/or protective coating which comprises:

(a) a basecoat comprising a pigmented film-forming polymer; and

(b) a transparent clearcoat comprising a film-forming polymer applied to the surface of the basecoat composition; the improvement which comprises utilizing as the clearcoat and/or the basecoat a multicomponent curable composition which is reactive upon mixing of the components, wherein the curable composition comprises:

(i) an anhydride-functional compound having an average of at least two cyclic carboxylic acid anhydride groups per molecule; and

(ii) a hydroxy-functional compound having an average of at least two hydroxyl groups per molecule;

wherein at least one of the compounds (i) or (ii) comprises a film forming polymer.

4,946,745

## NOVELTY STATUE

John Kempa, 69 Nugent Ave., Staten Island, N.Y. 10305  
Filed May 4, 1989, Ser. No. 347,206  
Int. Cl.<sup>5</sup> A63H 3/38, 3/40

U.S. Cl. 428—542.2

7 Claims

1. A statue comprising:

(A) a base;

(B) a figure mounted on said base, said figure being in the shape of a human eye;

(C) an eyelid-like element being movably mounted on said figure;

(D) means for moving said eyelid-like element in a blinking movement, said means including

(1) a power source,

(2) a motor attached to said eyelid-like element to move said eyelid-like element between an eye covering position and an eye uncovering position,

(3) control means connecting said motor to said power source, said control means including

(a) a normally open switch connecting said motor to said power source when it is closed to move said eye-lid element from said eye uncovering position to said eye covering position and back to said eye uncovering position during one cycle of said motor,

largest, 20° relative to the metal fiber axis, a diameter of said metal fiber being not larger than 100  $\mu\text{m}$ .

4,946,747

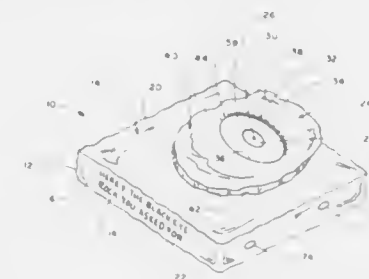
## MACHINE ELEMENT AND METHOD OF MAKING

Erich Bergmann, Mels, and Manfred Berger, Gofis, both of Austria, assignors to Balzers AG, Fürstentum, Liechtenstein  
Filed Apr. 27, 1988, Ser. No. 186,589

Claims priority, application Switzerland, Apr. 30, 1987, 01668/87  
Int. Cl.<sup>5</sup> B32B 15/01

U.S. Cl. 428—653

19 Claims



(b) a noise sensor connected to said normally open switch to close said switch and connect said motor to said power source when a noise above a prescribed level is sensed by said noise sensor, said noise sensor including a microphone in said base and a signal amplifier,

(c) a heat sensor in said base and connected to said normally open switch to close said switch when that heat sensor is exposed to a temperature above a prescribed level, and

(d) a control element connected to said normally open switch to open said switch after that switch has been closed and said motor has completed one cycle.

1. A method for producing a rolling element part to be subjected to rolling wear comprising:

forming a rolling element body with a contact surface, the formed body surface having surface irregularities; smoothing said contact surface to reduce the surface irregularities;

applying a coating on the smoothed surface by physical vapor deposition; the coating consisting of an alloy matrix containing at least one of the elements aluminum, chromium, nickel, magnesium, copper and metallic particles embedded in the matrix, said particles containing at least one of the elements tin, lead, indium and zinc; applying the coating in a thickness of 0.2 to 4 times the vertical height of the reduced surface irregularities, remaining after said smoothing.

4,946,746

## METAL FIBER AND PROCESS FOR PRODUCING THE SAME

Takaharu Ichiryu; Yoshiki Ono, and Hideaki Ishihara, all of Ohtsu, Japan, assignors to Toyo Boseki Kabushikika Kaisha, Osaka, Japan  
Filed Dec. 6, 1988, Ser. No. 280,320

Claims priority, application Japan, Dec. 8, 1987, 62-310259; Dec. 8, 1987, 62-310260; Dec. 8, 1987, 62-310261; Dec. 8, 1987, 62-310262; Dec. 8, 1987, 62-310263  
Int. Cl.<sup>5</sup> C21D 9/52; B22D 11/00

U.S. Cl. 428—606

30 Claims



1. A soft magnetic metal fiber having a unidirectional dendritic texture which is an assembly texture of a group of dendrites wherein primary arms have grown at an angle of, at

4,946,748

## HIGHLY ANTICORROSIVE COATED STEEL SHEET FOR FUEL VESSEL AND PROCESS FOR PRODUCTION THEREOF

Seijun Higuchi; Kenichi Asakawa; Toshinori Mizuguchi, and Minoru Fujinaga, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan  
Filed Oct. 19, 1989, Ser. No. 425,519

Claims priority, application Japan, Dec. 30, 1984, 59-281056  
Int. Cl.<sup>5</sup> B32B 15/04, 15/18; C25D 5/10, 5/48

U.S. Cl. 428—644

14 Claims

1. A highly anticorrosive coated steel sheet for a fuel vessel, which comprises (A) a substrate composed of (a) a steel sheet and (b) at least one undercoat covering layer formed on at least one surface of the steel sheet and composed of at least one member selected from the group consisting of nickel, cobalt and copper, (B) at least one first covering layer formed on the undercoat covering layer and comprising, as a main component, an alloy of lead and tin, (C) at least one second covering layer formed on the first covering layer and comprising a compound of lead with phosphorous, and (D) at least one third covering layer formed on said second covering layer and comprising, as a main compound, at least one member selected from the group consisting of tin, nickel cobalt and alloys of at least two of the above-mentioned metals.

4,946,749

COATED NEAR- $\alpha$  TITANIUM ARTICLES

Janet E. Restall, Camberley, and Tony Homewood, Farnborough, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government, London, England

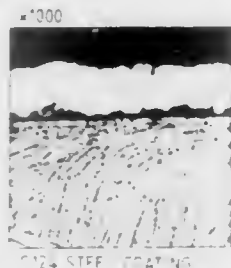
PCT No. PCT/GB88/00389, § 371 Date Oct. 31, 1989, § 102(e) Date Oct. 31, 1989, PCT Pub. No. WO88/09396, PCT Pub. Date Dec. 1, 1988

PCT Filed May 17, 1988, Ser. No. 435,398

Claims priority, application United Kingdom, May 18, 1987, 8711697

Int. Cl.<sup>5</sup> B32B 15/00

U.S. Cl. 428—660



1. An article comprising a near- $\alpha$  titanium based alloy when coated with a high temperature oxidation and/or corrosion resistant coating, the coating being applied by a process selected from the group consisting of ion plating, sputter plating and sputter ion plating and comprising an iron-chromium based alloy wherein the iron and chromium in combination constitute at least 75% by weight of the applied coating with an iron to chromium ratio in the range 10:1 to 2.5:1.

4,946,750

## PROCESS FOR GENERATING ELECTRICITY

Jan F. Nomden, and Paul F. Van Den Oosterkamp, both of Zoetermeer, Netherlands, assignors to KTI Group B.V., Netherlands

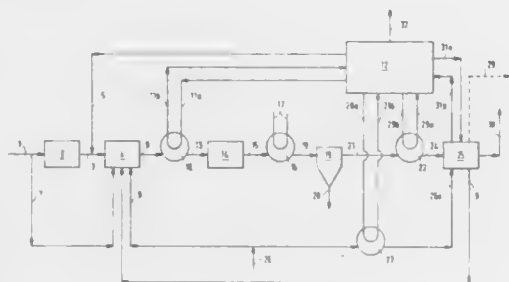
Filed Sep. 25, 1989, Ser. No. 411,924

Claims priority, application Netherlands, Sep. 26, 1988, 8802357

Int. Cl.<sup>5</sup> H01M 8/04

U.S. Cl. 429—17

20 Claims



1. A process for generating electricity from a fuel on the basis of one or more hydrocarbons, which comprises catalytically converting said fuel into a CO and H<sub>2</sub> containing gas, supplying the resulting gas to at least one shift reactor, in which at least part of the CO present is converted into H<sub>2</sub> to form a H<sub>2</sub> containing gas, supplying the H<sub>2</sub> containing gas to the anode spaces of at least one fuel cell unit, the difference between the operating temperature of the fuel cell unit and the temperature of the gas supplied to the shift reactor being not more than 50° C.,

using a fuel cell unit having an operating temperature of at least 125° C., and maintaining the temperature of the fuel cell unit to form process steam, which process steam is also used to heat the feeds to the fuel cell.

4,946,751

## METHOD OF MANUFACTURING A MASK FOR RADIATION LITHOGRAPHY

Angelika Bruns, Henstedt-Ulzburg; Waldemar Götze; Margret Harms, both of Hamburg, and Holger Lühje, Halstenbek, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 31, 1988, Ser. No. 239,093

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729432

Int. Cl.<sup>5</sup> G03F 1/00

U.S. Cl. 430—5

47 Claims

1. A method of manufacturing a mask for radiation lithography comprising the steps of  
(a) forming a mask support and substrate,  
(b) forming an absorber layer of partly oxidized tungsten having an oxygen content of from 21 to 29 at.% on said substrate, wherein said absorber layer only exhibits a reproducible adjustable minimum residual stress in a defined region of said absorber layer,  
(c) structuring said absorber layer into a predetermined mask pattern, and  
(d) subjecting said absorber layer to a step of annealing at least during said step (b) to control oxygen content in said absorber layer, and to obtain a low stress absorber layer.

4,946,752

## FLEXOGRAPHIC CURED PRINTING PLATE COMPRISING A CHLORINATED POLYMER AND A HYDROPHILIC POLYMER

Akira Tomita; Toshihiko Kajima; Keizo Kawahara, and Hiroshi Satomi, all of Ohtsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 137,120, Dec. 23, 1987, abandoned. This application Dec. 15, 1988, Ser. No. 285,368

Claims priority, application Japan, Dec. 27, 1986, 61-315218; Jan. 28, 1987, 62-19490; Oct. 22, 1987, 62-267678

Int. Cl.<sup>5</sup> G03C 1/68, 1/22

U.S. Cl. 430—18

8 Claims

1. A flexographic printing plate comprising the cured reaction product of an aqueous developable photosensitive resin composition which comprises:

- (A) epichlorohydrin rubber;
- (B) a hydrophilic polymer;
- (C) an ethylenic unsaturated compound; and
- (D) a photopolymerization initiator.

3. A flexographic printing plate comprising the cured reaction product of an aqueous developable photosensitive resin composition which comprises:

- (A) a polymer having a chlorine content of 10 to 50% by weight and a glass transition temperature of not higher than 5° C. provided that the polymer is other than that of a conjugated diene hydrocarbon and a copolymer thereof;
- (B) a hydrophilic polymer having, per 10<sup>6</sup> g thereof, 50 to 50000 polar groups represented by the formula —COOM wherein M is a hydrogen atom, an alkali metal, or ammonium, and a polyoxyalkylene chain;
- (C) an ethylenic unsaturated compound; and
- (D) a photopolymerization initiator.

4,946,753

## LIQUID ELECTROPHOTOGRAPHIC TONERS

Mohamed A. Elmasry, Woodbury, Minn.; Gregory L. Ziradlo, Ellsworth, Wis.; Kevin M. Kedzie, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 2, 1988, Ser. No. 279,424

Int. Cl.<sup>5</sup> G03G 13/01

U.S. Cl. 430—45

20 Claims

1. An electrophotographic process for producing high quality full color prints wherein color separation toner images are assembled on a positively charged photoreceptor using successive liquid toning steps, comprising selecting two or more liquid toners comprising toner particles comprising a pigment particle having polymer particles on its exterior surface, said polymer particles having charge coordinating moieties extending from the surface of said polymeric particles, said toner particles being dispersed in a non-polar carrier liquid, said two or more liquid toners having  
(a) a ratio of conductivities of said carrier liquid in said liquid toner and of said liquid toner less than 0.6, and  
(b) a zeta potential of said toner particles between +60 mV and +200 mV, and carrying out the assembly of said color separation toner images on said photoreceptor using said successive liquid toning steps.

4,946,755

## ELECTROPHOTOGRAPHIC ONE COMPONENT MAGNETIC TONER COMPRISING HYDROPHOBIC SILICA AND IRON OXIDE

Sukejiro Inoue, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 217,121, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 902,135, Sep. 2, 1986, abandoned, which is a continuation of Ser. No. 696,895, Jan. 31, 1985, abandoned, which is a continuation of Ser. No. 479,315, Mar. 28, 1983, abandoned. This application May 8, 1989, Ser. No. 349,900

Claims priority, application Japan, Apr. 1, 1982, 57-54382

Int. Cl.<sup>5</sup> G03G 9/14

U.S. Cl. 430—106.6

30 Claims

1. A one component magnetic developer comprising:  
(i) a magnetic toner, said magnetic toner comprising:  
(a) a binder resin, said binder resin selected from the group consisting of a copolymer of styrene and acrylic acid ester, a copolymer of styrene and methacrylic acid ester and polyester resin, said binder resin being contained in an amount of 40–80 % by weight based on the total weight of the magnetic toner,  
(b) a low molecular weight polypropylene or low molecular weight polyethylene,  
(c) a metal complex dye or nigrosine, and  
(d) a magnetic powder having a number average particle size 0.2–0.7 microns, said magnetic powder consisting essentially of iron oxide having an excess Fe<sup>III</sup> content in said magnetic powder, said iron oxide containing 16–25 % by weight FeO and about 75–84 % by weight of Fe<sub>2</sub>O<sub>3</sub>, based on the iron oxide, said magnetic powder being contained in an amount of 20–60 % by weight based on the total weight of said magnetic toner, and  
(ii) a hydrophobic silica.

4,946,756

## METHOD FOR FIXING A POWDERED DEVELOPER DEPOSITED ON A SHEET, AND APPARATUS FOR FIXING THE DEVELOPER BY THIS METHOD

Jacques Estavoyer, par Baviilliers, and Pascal Falvre, Valdoie, both of France, assignors to Bull S.A., Paris, France

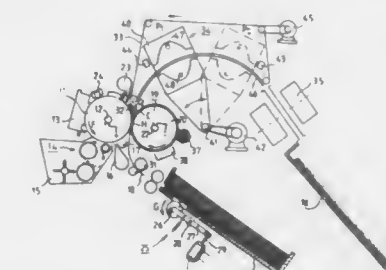
Filed Nov. 3, 1988, Ser. No. 266,676

Claims priority, application France, Nov. 4, 1987, 87 15309

Int. Cl.<sup>5</sup> G03G 13/20

U.S. Cl. 430—124

4 Claims



1. A method for fixing a powder developer image formed on at least one of the sides of a sheet (18), said sheet being transported along a sheet transport path provided with a movable radiation source (47) temporarily immobilized in a position of repose (Po), said sheet being moved along said path in a predetermined direction and at a constant speed (V<sub>1</sub>) so that said sheet has a leading edge (BV) and a trailing edge (BR), said method comprising:

first stopping said sheet when its leading edge (BV) arrives in front of said radiation source (47) in said position of repose (Po), and displacing said source past said stopped sheet, in a direction opposite to said predetermined direction, at a constant speed (V<sub>2</sub>) equal to V<sub>1</sub>/k and over a length (N) given by the following relation:

4,946,754

## PHOTOCONDUCTIVE IMAGING MEMBERS WITH DIARYL BIARYLAMINE CHARGE TRANSPORTING COMPONENTS

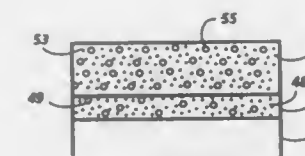
Beng S. Ong, Mississauga; Barkev Keoshkerian, Thornhill, and Giuseppe Baranyi, Mississauga, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 21, 1988, Ser. No. 274,160

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—59

2 Claims



1. A photoconductive imaging member comprised of an inorganic photogenerating layer, or a photogenerating layer selected from the group consisting of squaraines, perylenes, metal phthalocyanines, metal free phthalocyanines, vanadyl phthalocyanines, or dibromoanthracene; and a charge transport layer comprised of diaryl biarylamine compounds of Formula (I) wherein Ar is naphthyl; Ar' is selected from the group consisting of phenyl, naphthyl, substituted phenyl, and substituted naphthyl; R and R' are electron donating substituents; and m and n represent the numbers 0, 1, or 2.



$$N = \frac{k-1}{k} L$$

where k is a positive given number greater than 1 and L is the distance that separates said leading edge (BV) from said trailing edge (BR), then displacing said sheet in said predetermined direction, at said aforementioned sheet constant speed (V<sub>1</sub>), and simultaneously displacing said source (47) in the same direction as said sheet, at a constant speed (V<sub>2</sub>) equal to:

$$V_1 \frac{(k-1)}{k}$$

until said source reaches its position of repose (Po).

4,946,757

# POSITIVE TYPE 1,2 QUINONE DIAZIDE CONTAINING PHOTSENSITIVE RESINOUS COMPOSITION WITH ACRYLIC COPOLYMER RESIN

Mamoru Selo, Hyogo; Kanji Nishijima, Osaka, and Katsukiyo Ishikawa, Kyoto, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/00093, § 371 Date Oct. 27, 1988, § 102(e) Date Oct. 27, 1988, PCT Pub. No. WO88/05927, PCT Pub. Date Aug. 11, 1988

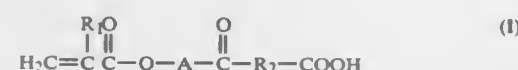
PCT Filed Feb. 2, 1988, Ser. No. 255,191

Claims priority, application Japan, Feb. 2, 1987, 62-023114 Int. Cl.<sup>3</sup> G03F 7/023

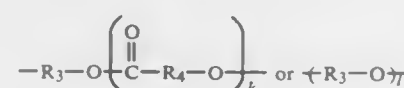
U.S. Cl. 430—192

1 Claim

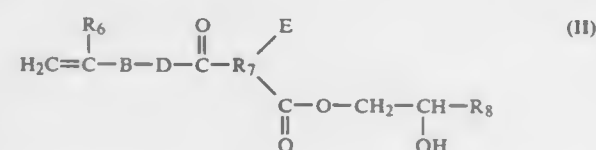
1. A positive type photosensitive resinous composition which comprises an admixture of photosensitive 1,2 quinone diazide compound and an acrylic resin obtained by polymerizing 3 to 80 parts by weight of an acrylic monomer represented by the formula:



wherein R<sub>1</sub> is hydrogen or a methyl group, R<sub>2</sub> is an aliphatic hydrocarbon of 2 to 10 carbon atoms, an alicyclic hydrocarbon of 6 to 7 carbon atoms or an aromatic hydrocarbon of 6 carbon atoms, A is a repeating unit of the formula:



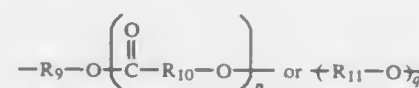
in which R<sub>3</sub> is ethylene or propylene, R<sub>4</sub> is alkylene of 2 to 5 carbon atoms, k an l each is an average number of the parenthesized group and k is 1 to 10 and l is 2 to 50, or the formula:



wherein R<sub>6</sub> is hydrogen or a methyl group, R<sub>7</sub> is an aliphatic hydrocarbon of 5 to 10 carbon atoms, an alicyclic hydrocarbon of 6 to 7 carbon atoms or an aromatic hydrocarbon of 6 to 13 carbon atoms, R<sub>8</sub> is an aliphatic hydrocarbon of 1 to 30 carbon atoms, an aromatic hydrocarbon of 6 to 13 carbon atoms or such hydrocarbon substituted with a member selected from the group consisting of vinyl, allyl, ether, ester and carbonyl groups, B is a



in which m and n each is 0 or 1, D is a repeating unit represented by the formula:



R<sub>9</sub> is ethylene or propylene, R<sub>10</sub> is alkylene of 2 to 7 carbon atoms, R<sub>11</sub> is alkylene of 2 to 5 carbon atoms, p and q each is an average number of the parenthesized repeating unit and p is 1 to 10 and q is 2 to 50, E is a carboxylic acid or sulfonic acid group, and 97 to 20 parts by weight of another α,β-ethylenically unsaturated copolymerizable monomer, the solid weight ratio of said acrylic resin to quinone diazide compound being 100:5 to 100:150.

4,946,758

# MULTILAYER, SHEET-LIKE, PHOTSENSITIVE RECORDING MATERIAL

Karl-Rudolf Kurtz, Heidelberg; Horst Koch, Gruenstadt; Thomas Telser, Ludwigshafen, and Helmut Bach, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 264,893

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736980

Int. Cl.<sup>3</sup> G03C 1/82

U.S. Cl. 430—259

7 Claims

1. A photosensitive recording material comprising the following layers one on top of the other in the following order:

(A) a photopolymerizable relief-forming layer in which imagewise exposure to actinic light results in a difference in solubilities between the exposed and unexposed parts, so that the layer can be developed with organic, aqueous alcoholic or aqueous alkaline liquid media,

(B) a non-tacky top layer which is transparent to light and soluble or swellable in the relevant liquid media, being formed from a polymer forming films of high tensile strength, the top layer (B) adhering more firmly to the layer (A) than to the cover sheet (C) and

(C) a cover sheet which can be readily peeled off from the top layer (B),

the said photopolymerizable relief-forming layer (A) consisting essentially of, based on its total amount,

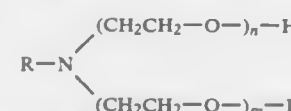
(a<sub>1</sub>) from 20 to 98.999% by weight of one or more polymeric binders,

(a<sub>2</sub>) from 0.001 to 10% by weight of one or more photoinitiators,

(a<sub>3</sub>) from 1 to 60% by weight of one or more components which are compatible with the binder (a<sub>1</sub>) and contain photopolymerizable olefinically unsaturated groups and

(a<sub>4</sub>) from 0 to 40% by weight of one or more assistants, and the said top layer (B) containing, based on its total amount, from 1 to 20% by weight of one or more compounds from the group consisting of the

(b<sub>1</sub>) tertiary amines and amides of the formula I



where R is C<sub>12</sub>-C<sub>18</sub>-alkyl, C<sub>18</sub>-alkenyl, C<sub>12</sub>-C<sub>18</sub>alkanecarbonyl or C<sub>18</sub>-alkenecarbonyl, n is an integer from 1 to 15, and, independently of this, m is an integer from 1 to 15,

and/or from the group consisting of the  
(b<sub>2</sub>) quaternary ammonium salts of the formula II



X<sup>-</sup> is Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, R<sup>1</sup>-O-PO<sub>3</sub>H<sup>-</sup>, (R<sup>1</sup>-O)<sub>2</sub>PO<sub>2</sub><sup>-</sup>, R<sup>1</sup>-PO<sub>3</sub><sup>-</sup>, R<sup>1</sup>-SO<sub>3</sub><sup>-</sup>, R<sup>1</sup>-COO<sub>3</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup> or R<sup>1</sup>-OSO<sub>3</sub><sup>-</sup>, R<sup>1</sup> is C<sub>1</sub>-C<sub>4</sub>-alkyl, R<sup>2</sup> and R<sup>3</sup> are each C<sub>1</sub>-C<sub>20</sub>-alkyl or -(CH<sub>2</sub>CH<sub>2</sub>-O)<sub>n</sub>-H, where n is an integer from 1 to 15 and R<sup>2</sup> and R<sup>3</sup> can be identical or different, R<sup>4</sup> is -(CH<sub>2</sub>CH<sub>2</sub>-O)<sub>n</sub>-H, where n is an integer from 1 to 15, C<sub>12</sub>-, C<sub>14</sub>-, C<sub>16</sub>- and C<sub>18</sub>-alkyl, 3-azatridecan-1-yl to 3-azadocosan-1-yl, 4-azatridecan-1-yl to 4-azadocosan-1-yl, 3-aza-4-oxotridecan-1-yl to 3-aza-4-oxodocosan-1-yl, 4-aza-5-oxotridecan-1-yl to 4-aza-5-oxodocosan-1-yl, 3-oxatridecan-1-yl to 3-oxadocosan-1-yl, 4-oxatridecan-1-yl to 4-oxadocosan-1-yl or 2-hydroxy-4-oxatridecan-1-yl to 2-hydroxy-4-oxadocosan-1-yl.

4,946,759

# POSITIVE RADIATION-SENSITIVE MIXTURE AND RADIATION-SENSITIVE RECORDING MATERIAL PRODUCED THEREFROM

Karl-Friedrich Doessel, Wiesbaden; Ralph Dammel, Mainz-Bretzenheim, and Juergen Lingnau, Mainz-Laubenheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 13, 1988, Ser. No. 243,792

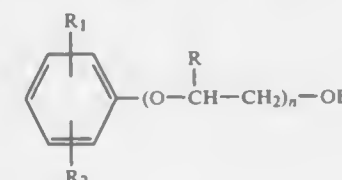
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1987, 3730787

Int. Cl.<sup>3</sup> G03C 1/52, 5/00

U.S. Cl. 430—270

14 Claims

1. A positive radiation-sensitive mixture comprising: a compound which forms an acid under the action of actinic radiation; and an acid-cleavable acetal or ketal compound; wherein a compound of the formula I



in which

R denotes hydrogen or alkyl, R<sub>1</sub> and R<sub>2</sub> may be identical or different and denote hydrogen, hydroxyl, halogen, cyano, nitro, alkyl, alkoxy, aryl or substituted carbonyl,

or

R<sub>1</sub> and R<sub>2</sub> together form a ring,

n denotes 1 to 3,

is formed as a cleavage product.

7. A radiation-sensitive mixture as claimed in claim 1, wherein R<sub>1</sub> and R<sub>2</sub> together form a ring that is substituted by at least one of R<sub>1</sub> and R<sub>2</sub>.

4,946,760

# RADIATION-SENSITIVE MIXTURE

Andreas Elsaesser, Idstein, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 1, 1988, Ser. No. 265,838

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737734

Int. Cl.<sup>3</sup> G03C 5/04

U.S. Cl. 430—270

9 Claims

1. A radiation-sensitive mixture, comprising: a compound that forms a strong acid on exposure to actinic radiation, and

a polymeric compound containing repeating acid-cleavable acetal or ketal groups,

wherein the polymeric compound is the reaction product of:

- a polymeric organic compound containing free OH groups,
- an organic compound containing at least two isocyanate groups or at least two epoxy groups,
- a compound containing repeating acid-cleavable acetal or ketal groups and at least one free OH group.

4,946,761

# IMAGE-FORMING LAYER

Kazuo Maemoto, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jul. 26, 1988, Ser. No. 224,376

Claims priority, application Japan, Jul. 28, 1987, 62-188453 Int. Cl.<sup>3</sup> G03F 7/00, 7/028

U.S. Cl. 430—270

6 Claims

1. An image-forming layer comprising a polymer having a carboxyl group-containing group which can be decarboxylated by exposure to light in the presence or absence of a photosensitizer, said polymer having the following formula:



wherein X represents a sulfur atom, an oxygen atom, a single bond, >C=W or >N=U, W being an oxygen or a sulfur atom and U being a substituted or unsubstituted aryl or alkyl group or a hydrogen atom, Y represents a substituted or unsubstituted alkylene, arylene or a divalent heterocyclic ring, P represents the main chain of the polymer, Z is selected from the group consisting of an ether, amide, ester, urethane or ureide or a group containing such a bond, k represents 0 or 1, l represents 0 or 1, m represents 0 or 1, n represents a numeral so that the acid content of the polymer is 0.01 meq/g to 6.0 meq/g, and, when k=l=0, x is >C=W.

4,946,762

# MONOSUBSTITUTED AND DISUBSTITUTED PHTHALOCYANINES

Bernhard Albert, Maxdorf; Harald Kuppelmaier, Heidelberg, and Gerhard Wagenblast, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 134,100, Dec. 17, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 316,610

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643770

Int. Cl.<sup>3</sup> G11B 7/24; G03C 1/72, 5/16; B41M 5/26

U.S. Cl. 430—270

28 Claims

1. A laser-optical recording element useful for the laser-optical recording of analog or digital data and which is capable of recording analog or digital data in the form of written areas or spots on a recording layer, said written areas or spots being formed by thermally altering areas or spots of the recording layer by phase transformation such that the written, thermally altered areas or spots show an increase in reflectivity compared to unwritten, unaltered areas and whereby no ablation or deformation leading to hole or pit formation takes place, said recording element consisting of

(A) a dimensionally stable support layer and

(B) a thermally alterable amorphous laser-optical recording layer of a thickness from about 50 to about 160 nm consisting of one or more monosubstituted or disubstituted phthalocyanines I wherein the monosubstituted phthalocyanine has one radical as a substituent on one of its four benzene rings and wherein the disubstituted phthalocyanine I has one radical as a substituent on each of two of its four benzene rings, said radical being XR<sup>1</sup>, where X is oxygen, sulfur, or imino and R<sup>1</sup> is C<sub>1</sub>-C<sub>6</sub>-alkyl, fluorinated C<sub>1</sub>-C<sub>6</sub>-alkyl or C<sub>6</sub>-C<sub>20</sub>-aryl; or Se(R<sup>2</sup>)<sub>3</sub>, where R<sup>2</sup> is C<sub>1</sub>-C<sub>6</sub>-alkyl.

4,946,763

# METHOD FOR PROVIDING A DESIGN PATTERN ON A METAL STENCIL AND METAL STENCIL HAVING A PATTERNABLE COVERING LAYER

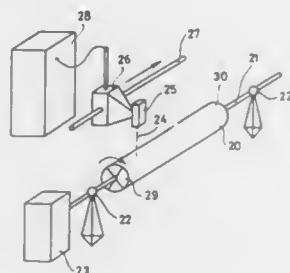
Johannes T. Saakenborg, Dieren, Netherlands, assignor to Stork Screens B.V., Boxmeer, Netherlands  
Filed May 13, 1988, Ser. No. 193,740

Claims priority, application Netherlands, May 15, 1987, 8701176

Int. Cl.<sup>5</sup> G03F 7/12

U.S. Cl. 430—308

5 Claims



1. A method for providing a design pattern on a metal stencil for screen printing which is provided with a patternable covering layer, by a process in which the patternable covering layer, in accordance with a predetermined pattern, is locally subjected to the influence of high energy radiation in beam form, as a result of which, parts of the covering layer are removed, wherein a resist material, extended with a metal powder, is used as the material for forming the patternable covering layer and said material is removed from the zone of impact between said beam and said covering layer.

4,946,764

# METHOD OF FORMING RESIST PATTERN AND RESIST PROCESSING APPARATUS USED IN THIS METHOD

Yasuo Matsuoka, 102 Toshiba-Kosugi-Ryo, I-526, Kosugi-cho, Nakahara-ku, Kawasaki-shi, and Takashi Tsuchiya, 105 Heim-Hanazone, 3-4-31, Hanazono-cho, Kitakami-shi, Iwate-ken, both of Japan  
Continuation of Ser. No. 811,740, Dec. 20, 1985, abandoned.  
This application Dec. 7, 1987, Ser. No. 129,907  
Claims priority, application Japan, Dec. 21, 1984, 59-269986

Int. Cl.<sup>5</sup> G03C 5/16

U.S. Cl. 430—325

4 Claims

1. A method of forming a resist pattern comprising the steps of:  
coating the resist film on a substrate;  
baking said resist film;  
selectively radiating electromagnetic waves or particle rays onto a surface of said resist film; and  
developing said resist film, wherein said method further comprises, after the baking step and before the developing step, the step of cooling said resist film in such a manner that a temperature control plate is disposed opposite said substrate, said substrate is moved gradually or stepwise toward said temperature control plate and said substrate is stopped at a position which is separated from said temperature control plate by a distance of not more than 20 mm, and said substrate is brought into contact with said temperature control plate after the temperature of said resist film is lower than a glass transition temperature thereof by at least 30° C.  
3. A method according to claim 1, wherein the cooling step is performed after the radiating step.

4,946,765

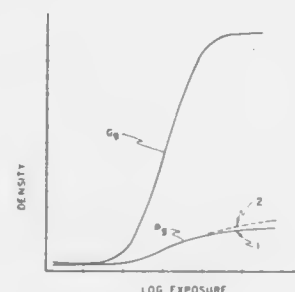
# PHOTOGRAPHIC MATERIAL WITH INCREASED EXPOSURE LATITUDE

Paul T. Hahn, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 15, 1988, Ser. No. 232,259  
Int. Cl.<sup>5</sup> G03C 1/46, 7/20

U.S. Cl. 430—504

11 Claims



1. A color photographic reflection print material comprising an opaque support, first and second silver halide emulsion layers each sensitive to a different region of the electromagnetic spectrum and each containing a coupler that forms a dye complementary in color to the principal spectral sensitivity of the emulsion and a non-light sensitive interlayer between the two emulsion layers, wherein:  
the interlayer contains a non-diffusible colorless coupler that forms, as a function of development of the first emulsion layer, a dye complementary in color to the principal sensitivity of the second emulsion layer.

4,946,766

# ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING INTERMEDIATE LAYER COMPRISING INDIUM OXIDE

Toshio Fukagai, Numazu, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 315,165  
Claims priority, application Japan, Mar. 14, 1988, 63-61296

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—60

27 Claims

1. An electrophotographic photoconductor comprising an electroconductive support;  
an undercoat layer formed on said electroconductive support, comprising (i) a reaction product between an active-hydrogen-containing compound having a plurality of active hydrogens and an isocyanate-group-containing compound, which reaction product serves as a binder resin, and (ii) finely-divided particles of indium oxide dispersed in said reaction product; and  
a photosensitive layer formed on said undercoat layer.

4,946,767

# SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Hiroaki Yamagami, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 23, 1988, Ser. No. 248,005  
Claims priority, application Japan, Sep. 25, 1987, 62-240179

Int. Cl.<sup>5</sup> G03C 1/46

U.S. Cl. 430—505

17 Claims

1. A silver halide color photographic material comprising a support having thereon at least one red-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer, and at least one blue-sensitive silver halide emulsion layer, provided outwardly from said support, said material

having a specific photographic sensitivity of from 320 to 800 and a surface spectral reflectance of from 20% to less than 35% at a wavelength of 600 nm on the emulsion side film surface.

4,946,768

# 3-AMINOALLYLDENEMALONONITRILE UV-ABSORBING COMPOUNDS AND PHOTOGRAPHIC ELEMENTS CONTAINING THEM

Angelo Vallarino, Spontorno/Savona, Italy, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

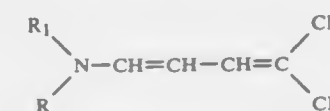
Filed Jul. 2, 1986, Ser. No. 881,066  
Claims priority, application Italy, Jul. 11, 1985, 21545 A/85

Int. Cl.<sup>5</sup> G03C 1/84

U.S. Cl. 430—512

14 Claims

1. A photographic material comprising a support base, at least one silver halide gelatin emulsion layer and at least one auxiliary layer over said silver halide emulsion layer, said photographic material being characterized by having at least one of said emulsion and auxiliary layers containing a radiation absorbing amount of a compound of the formula:



wherein R<sub>1</sub> is a short alkyl chain having 1 to 3 carbon atoms and R is a substituted or unsubstituted long alkyl chain greater than 10 carbon atoms and up to 20 carbon atoms.

4,946,769

# SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL AND THE METHOD OF PREPARING THE SAME

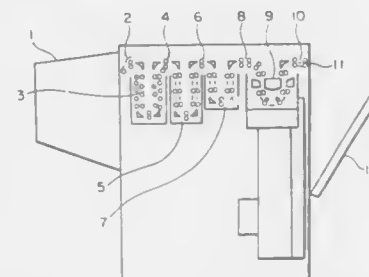
Takeo Arai, Hachioji, and Toshiharu Nagashima, Hino, both of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 15, 1988, Ser. No. 271,253  
Claims priority, application Japan, Nov. 16, 1987, 62-289030;

Nov. 17, 1987, 62-290108; Jul. 13, 1988, 63-174059

U.S. Cl. 430—539

8 Claims



1. A method for preparing a silver halide photographic light-sensitive material, which comprises a support bearing, on one side thereof, a layer containing light-sensitive silver halide emulsion comprised of silver halide grains having an average size of from 0.05 μm to 0.3 μm and gelatin and, on the other side thereof, a non-light-sensitive layer containing gelatin, comprising a step for bringing at least one of said layer containing said emulsion and said non-light-sensitive layer into contact with air having a temperature of from 35° C. to 80° C. or a relative humidity of from 5% to 25% for a period not shorter than 5 seconds to not longer than one minute, within 5 minutes from the point of time when the average surface temperature of said layer is raised up to a temperature 1° C. lower than the average temperature of atmospheric air for drying said layer in the step where said layer is coated on said support and is cooled to be gelled and dried.

4,946,770

# SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Osamu Takahashi, Tsumoru Hirano, and Seiki Sakanoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

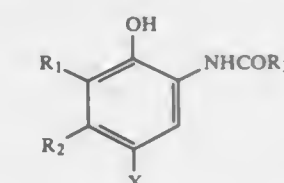
Filed Aug. 13, 1987, Ser. No. 84,771  
Claims priority, application Japan, Aug. 13, 1986, 61-189771

Int. Cl.<sup>5</sup> G03C 1/04, 7/34

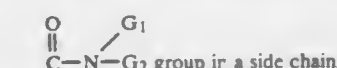
U.S. Cl. 430—545

6 Claims

1. A silver halide color photographic material comprising a support having thereon at least one silver halide emulsion layer containing a dispersion, said dispersion comprising oleophilic fine particles containing (a) at least one oil-soluble cyan coupler represented by formula (I)



wherein R<sub>1</sub> represents a hydrogen atom or a halogen atom; R<sub>2</sub> represents a straight chain or branched chain alkyl group having from 2 to 4 carbon atoms; R<sub>3</sub> represents a ballast group; and X represents a hydrogen atom or a coupling releasable group, said coupler being capable of forming a substantially non-diffusible cyan dye upon coupling with an oxidation product of an aromatic primary amide developing agent, and (b) a water-insoluble, organic solvent-soluble vinyl homopolymer or copolymer comprising a repeating unit having a



wherein G<sub>1</sub> represents a hydrogen atom and G<sub>2</sub> represents an unsubstituted alkyl group or a substituted or unsubstituted phenyl group, wherein said repeating unit when present in a copolymer is present in an amount of at least 60 mol %, and further comprising not more than about 20% by weight of a repeating unit having an acid radical in the main chain or a side chain thereof, wherein said homopolymer or copolymer has a number average molecular weight of not more than 150,000 and said dispersion does not contain in high-boiling point organic solvents having a boiling point of about 140° C. or higher.

4,946,771

# SILVER HALIDE PHOTOGRAPHIC MATERIAL

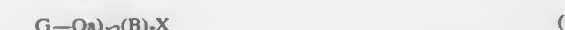
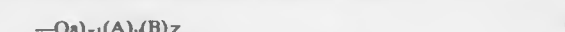
Yukio Maekawa, and Tsumoru Hirano, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 172,528, Mar. 24, 1988, abandoned. This application Sep. 28, 1989, Ser. No. 414,215

U.S. Cl. 430—548

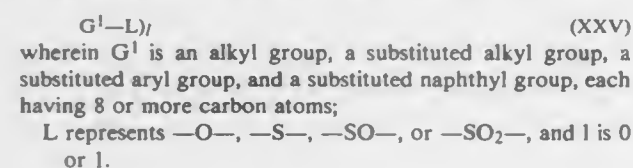
13 Claims

1. A silver halide photographic material which comprises, as a photographic color coupler, a watersoluble polymer coupler that can couple with the oxidized product of an aromatic primary amine developing agent to form a dye, and said coupler has the ability to lower the surface tension of water, wherein the polymer coupler is selected from those with repeating units represented by the following formula (I) or those represented by the following formula (II):





wherein Qa represents an ethylenically-unsaturated monomer unit having a coupler residue that can couple with the oxidized product of an aromatic primary amine developing agent, A represents a monomer unit derived from a copolymerizable ethylenically-unsaturated monomer that has a fluorine-atom-containing substituent; B represents a monomer unit derived from a copolymerizable ethylenically-unsaturated monomer;  $x_1$  is 10 to 98 wt. %,  $x_2$  is 10 to 100 wt. %,  $y$  is 2 to 80 wt. %, and  $z$  is 0 to 80 wt. %; A and B do not include a coupler residue; X represents a monovalent group; and G in formula (II) is represented by the following formula (XXV):



4,946,772

# SILVER HALIDE EMULSIONS AND PHOTOGRAPHIC MATERIALS

Tadashi Ogawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 2, 1988, Ser. No. 189,268

Claims priority, application Japan, Apr. 30, 1987, 62-106884  
Int. Cl.<sup>3</sup> G03C 1/02

U.S. Cl. 430—567

45 Claims

1. A silver halide emulsion containing at least 20 wt %, on the basis of the total silver halide, of rod-like or needle-like crystal grains and/or crystal grains each formed by at least two grains of said rod-like or needle-like crystal grains joined at right angles or in parallel, said rod-like or needle-like crystal grains each being defined by crystal planes consisting essentially of (100) faces, wherein, when the ratio of length of the edges along which said planes intersect is taken as  $l:m:n$  in the order of from the smallest to the largest,  $m$  and  $n$  satisfy the following relationships (I) and (II):

$$l \leq m \leq 7$$

$$n \geq 7m$$

4,946,773

# DETECTION OF BASE PAIR MISMATCHES USING RNAASE A

Thomas P. Maniatis, and Richard M. Myers, both of Cambridge, Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

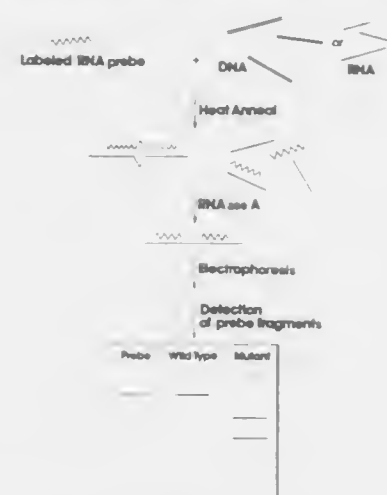
Filed Dec. 23, 1985, Ser. No. 812,261

Int. Cl.<sup>3</sup> C12Q 1/68; G01N 33/48; C12N 15/00  
U.S. Cl. 435—6

14 Claims

1. A method to detect at least one single base pair mismatch between a single stranded DNA or RNA sample and a single stranded RNA probe wherein said method comprises: annealing together said single stranded DNA or RNA sample and said single stranded RNA probe to form a sample duplex, providing a control duplex comprising said single stranded RNA probe and a polynucleotide strand, wherein said duplex is free from mismatches, mixing said sample duplex and said control duplex with RNAase A, separating by size the products of said RNAase A treatment,

and comparing the number and sizes of the products from said sample duplex with the products from identically



treated said control duplex, as an indication of the presence or absence of a mismatch in said sample duplex.

4,946,774

# PROCESS FOR DETECTING CANCER AND FOR MONITORING THE EFFECTIVENESS OF CANCER THERAPY

Se-Kyung Oh, Brookline, Mass., assignor to Trustees of Boston University, Boston, Mass.

Filed Nov. 9, 1987, Ser. No. 118,719

Int. Cl.<sup>3</sup> G01N 33/53; 33/536; C07K 15/00; C12N 15/00  
U.S. Cl. 435—7

2 Claims

1. A process for detecting cancer in a human patient, wherein the body of said patient produces an immunosuppressive factor, which comprises contacting a body fluid of the patient with an antibody that reacts with a haptoglobin variant of said immunosuppressive factor under conditions to effect an immunoreaction between said antibody and said haptoglobin variant when said immunosuppressive factor is present in said body fluid, said variant of haptoglobin comprising a beta subunit of a molecular weight of 38–40K Daltons covalently bonded to a second alpha-subunit of a molecular weight of 17–19K Daltons, detecting said immunoreaction wherein an increase of immunosuppressive factor in said patient is an indication of cancer.

4,946,775

# COMPOSITION, KIT AND METHOD FOR ASSAYING HEPARIN AND A METHOD FOR MAKING THE COMPOSITION

E. Thye Yin, 2335 S. Hanley Rd., St. Louis, Mo. 63144

Continuation of Ser. No. 236,857, Aug. 26, 1988, Pat. No. 4,851,336, which is a continuation of Ser. No. 14,261, Feb. 11, 1987, abandoned, which is a continuation of Ser. No. 772,846, Sep. 5, 1985, abandoned. This application Jun. 9, 1989, Ser. No. 363,783

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

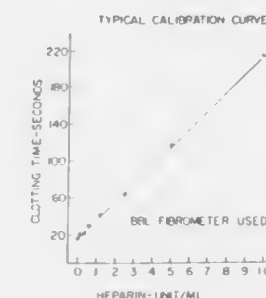
Int. Cl.<sup>3</sup> C12Q 1/56; G01N 21/75; 33/86

U.S. Cl. 435—13

4 Claims

1. A method for determining the concentration of heparin in a blood plasma sample which comprises (A) incubating the blood plasma sample for a limited period of time with a known amount of Factor X<sub>0</sub>, to form an incubated product which known amount is in excess of the amount needed to react with all heparin - AT III com-

plexes in the blood plasma sample within a given time period,  
(B) combining the incubated product of step (A) with an admixture of  
(1) calcium chloride,  
(2) brain phospholipids, and  
(3) a buffered plasma fraction that has been produced by treating mammalian blood to substantially remove clotting Factors II, VII, IX and X while retaining clotting Factor V and fibrinogen,  
said admixture being characterized by the fact that  
(a) it does not clot by itself for at least 24 hours at 37° C., and



(b) it forms a firm clot in the presence of added thrombin, and  
(c) it contains at least 50% of Factor V that is present in one ml of normal human plasma, and  
(d) it provides a linear heparin dilution curve using a standard heparin preparation, and  
(C) measuring the time it takes for clotting to occur after combining the incubated product of step (A) with said admixture, which clotting time is directly proportional to the concentration of heparin present in the blood plasma sample.

4,946,776

# STABLE CHROMOGENIC SUBSTRATE MIXTURE OF INDOXYL PHOSPHATE AND TETRAZOLIUM SALT, METHOD OF MAKING AND USING SAME IN BIOLOGICAL AND DIAGNOSTIC ASSAYS

Menachem Ritterband, Rehovot, Israel, assignor to Orgenics Ltd., Israel

Filed Dec. 30, 1988, Ser. No. 292,578

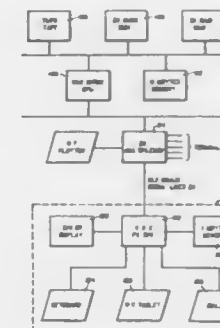
Claims priority, application Israel, Jan. 3, 1988, 85018  
Int. Cl.<sup>3</sup> C12Q 1/42

U.S. Cl. 435—21

9 Claims

1. A method of preparing a stable chromogenic substrate mixture of indoxyl phosphate and tetrazolium salt comprising the steps of

(a) dissolving indoxyl phosphate in dimethyl formamide at a concentration of 10–75 mg/ml; and  
(b) combining said dissolved indoxyl phosphate with tris(hydroxymethyl)aminomethane buffer pH 9.0–10.5 containing magnesium chloride with stirring; and  
(c) dissolving tetrazolium salt in 70% dimethyl formamide at a concentration of 10–100 mg/ml.  
(d) mixing said solution (b) with solution (c) with stirring; and  
(e) storing said mixture below about 20° to 30° C. and in the absence of light.



14. A method of producing a single chain polypeptide having binding affinity for an antigen, said polypeptide comprising: (a) a first polypeptide comprising the binding portion of the light chain variable region of an antibody; (b) a second polypeptide comprising the binding portion of the heavy chain variable region of an antibody; and (c) a peptide linker linking said first and second polypeptides (a) and (b) into said single chain polypeptide, said method comprising:  
(i) providing a genetic sequence coding for said single chain polypeptide;

4,946,777

# METHOD FOR DETERMINATION OF THE PRESENCE OF ANTIBIOTICS

Sophia A. Laméris, The Hague; Jan L. van Os, Voorburg, and Joannes G. Oostendorp, Rijswijk-ZH, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands  
Continuation of Ser. No. 493,377, May 10, 1983, abandoned, which is a continuation of Ser. No. 390,847, Jun. 22, 1982, abandoned, which is a continuation of Ser. No. 23,595, Mar. 26, 1979, abandoned, which is a continuation of Ser. No. 926,868, Jul. 24, 1978, abandoned, which is a continuation of Ser. No. 602,014, Aug. 5, 1975, abandoned, which is a division of Ser. No. 472,511, May 22, 1974, Pat. No. 3,941,658. This application Oct. 11, 1985, Ser. No. 786,810

Claims priority, application United Kingdom, May 31, 1973, 25947/73

Int. Cl.<sup>3</sup> C12Q 1/02, 1/18; C12N 11/02; C12M 1/16  
U.S. Cl. 435—29

19 Claims

1. A test set for the determination of the presence or absence of residues of antibiotics in a sample of liquid and meat consisting essentially of a tablet of nutrients, a color indicator and an upright test vessel not wider than high, having a cross-section between 3 and 20 mm and a height between 3 and 30 mm, containing a solidified culture in agar medium, lacking nutrients, of spores of a microorganism possessing a high sensitivity for the antibiotic to be determined in a concentration sufficiently high to ascertain quick germination and growth after addition of nutrients and incubation at or near optimal temperature, and said test vessel having above said solidified spore culture sufficient space to allow for accommodation of said tablet of nutrients which is separate from said test vessel and the sample to be tested, and said solidified culture or said tablet of nutrients containing said color indicator.

4,946,778

# SINGLE POLYPEPTIDE CHAIN BINDING MOLECULES

Robert C. Ladner, Ijamsville; Robert E. Bird, Rockville, and Karl Hardman, Chevy Chase, all of Md., assignors to Genex Corporation, Gaithersburg, Md.  
Continuation-in-part of Ser. No. 92,110, Sep. 2, 1987, abandoned, and a continuation-in-part of Ser. No. 902,971, Sep. 2, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 299,617

Int. Cl.<sup>3</sup> C12N 15/00, 15/11, 15/03; C12P 21/00  
U.S. Cl. 435—69.6

20 Claims

- (ii) transforming a host cell with said sequence;  
 (iii) expressing said sequence in said host;  
 (iv) recovering said single chain polypeptide having binding affinity for an antigen.

4,946,779

# PSEUDO-AMINOSUGARS, THEIR PRODUCTION AND USE

Yukihiko Kameda, Kanazawa, and Satoshi Horii, Sakai, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 367,105, Apr. 9, 1982, Pat. No. 4,827,036. This application Apr. 27, 1989, Ser. No. 343,586

Claims priority, application Japan, Apr. 13, 1981, 56-55907; Jan. 14, 1982, 57-4751

Int. Cl.<sup>5</sup> C07C 87/36; C12P 19/26; C12R 1/55 U.S. Cl. 435—84 3 Claims

1. A process for producing 5-amino-1-hydroxymethyl-1,2,3,4-cyclohexanetetrol, which comprises culturing in a culture medium a microorganism which belongs to the genus *Streptomyces* and is capable of producing 5-amino-1-hydroxymethyl-1,2,3,4-cyclohexanetetrol to produce 5-amino-1-hydroxymethyl-1,2,3,4-cyclohexanetetrol in the cultured broth and recovering the said product from the cultured broth.

4,946,780

# METHOD FOR PRODUCING SODIUM HYALURONATE BY FERMENTATION METHOD

Masamichi Hashimoto, Tokyo; Haruhisa Saegusa, Yokohama; Susumu Chiba; Hironoshin Kitagawa, both of Machida, and Teruzo Miyoshi, Yokohama, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1989, Ser. No. 347,337  
 Claims priority, application Japan, Oct. 12, 1988, 63-254985; Mar. 9, 1989, 1-54880

Int. Cl.<sup>5</sup> C12P 19/04; C12R 1/46 U.S. Cl. 435—101 32 Claims

1. *Streptococcus equi* FERM BP-2396.

4,946,781

# RECOMBINANT DNA, BACTERIA CARRYING SAID RECOMBINANT DNA AND A PROCESS FOR PRODUCING L-THREONINE OR L-ISOLEUCINE USING SAID BACTERIA

Shigeru Nakamori, Yokohama; Hiroshi Takagi, Kawasaki; Masaaki Ishida, Kawasaki; Takaaki Sato, Kawasaki; Kiyoshi Miwa, Matsudo, and Konosuke Sano, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation of Ser. No. 649,747, Sep. 12, 1984, abandoned. This application Feb. 3, 1988, Ser. No. 153,488

Claims priority, application Japan, Sep. 14, 1983, 58-170005 Int. Cl.<sup>5</sup> C12P 13/08, 13/06; C12N 1/20, 15/00

U.S. Cl. 435—115 6 Claims

5. A process for producing an amino acid by fermentation, which comprises:

- (a) cultivating in a culture medium a coryneform bacterium carrying a recombinant DNA molecule comprising a vector having operationally inserted therein a gene coding for homoserine kinase, wherein said bacterium produces an amino acid selected from the group consisting of L-threonine and L-isoleucine, and wherein said gene is a chromosomal gene of *Corynebacterium* and *Brevibacterium*, and  
 (b) isolating said amino acid from said culture medium.

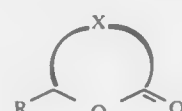
4,946,782

# PROCESS FOR PREPARING COMPOSITIONS CONTAINING UNSATURATED LACTONES, PRODUCTS PRODUCED THEREBY AND ORGANOLEPTIC USES OF SAID PRODUCTS

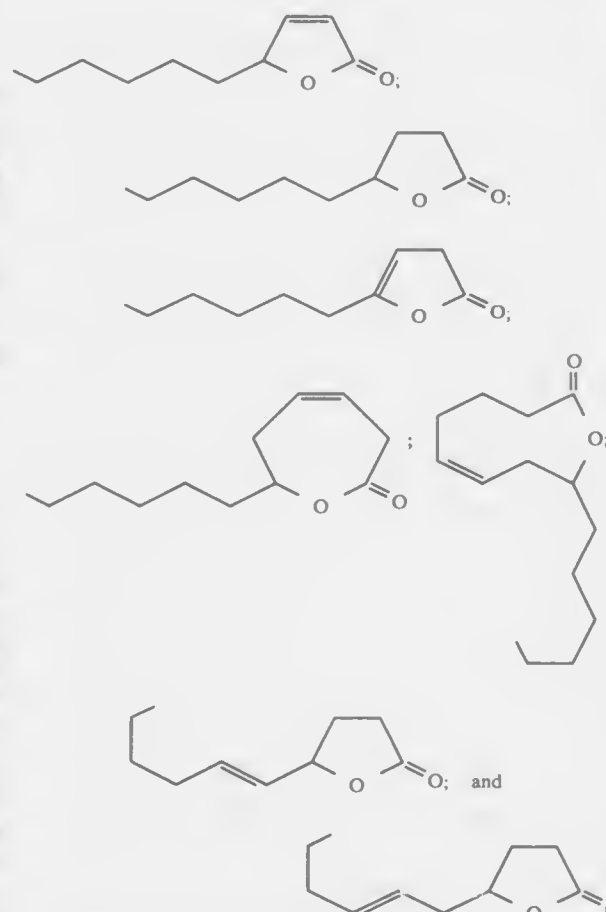
Mohamad I. Farbood, Holmdel; James A. Morris, Belmar; Mark A. Sprecker, Sea Bright; Lynda J. Bienkowski, Perth Amboy; Kevin P. Miller, Middletown; Manfred H. Vock, Locust, and Myrna L. Hagedorn, Edison, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 5, 1988, Ser. No. 228,512  
 Int. Cl.<sup>5</sup> C12P 17/04, 17/02, 17/08; C12N 1/16 U.S. Cl. 435—126 1 Claim

1. A process for the preparation of a mixture of unsaturated lactones each of which is defined according to the structure:



wherein R represents C<sub>6</sub> alkyl or alkenyl; and X represents C<sub>2</sub>, C<sub>4</sub> or C<sub>6</sub> alkylene or alkenylene; with the provisos that R is C<sub>6</sub> alkyl when X is C<sub>2</sub>, C<sub>4</sub> or C<sub>6</sub> alkenylene and R is C<sub>6</sub> alkenyl when X is C<sub>2</sub>, C<sub>4</sub> or C<sub>6</sub> alkylene, said lactones having the structures:



consisting of the sequential steps of:

- (i) fermenting at a pH in the range of from about 5.5 up to about 7 and at a temperature in the range of from about 20° C. up to about 35° C., castor oil, a castor oil hydrolysate or ricinoleic acid with a microorganism selected from the group consisting of:

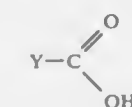
*Candida petrophilum*, ATCC 20226;

*Candida oleophila*, ATCC 20177;

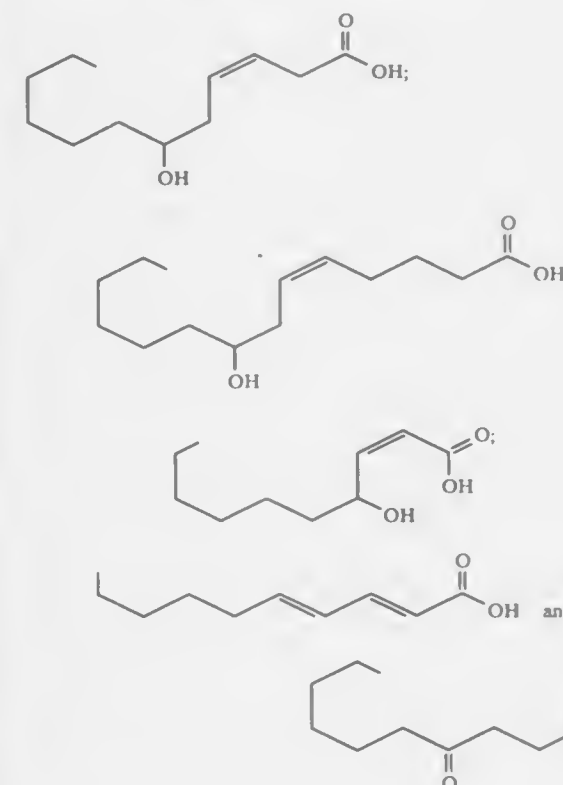
*Candida sp.*, ATCC 20504; and

*Candida sake*, ATCC 28137

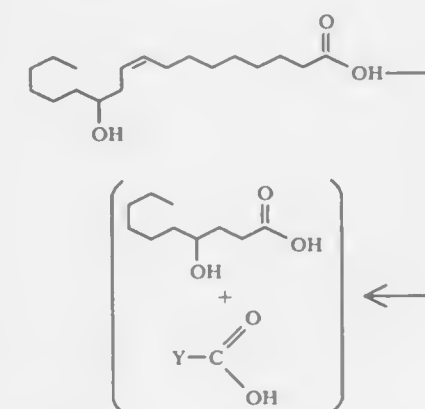
whereby gamma hydroxydecanoic acid and a mixture of other acids defined according to the generic structure:



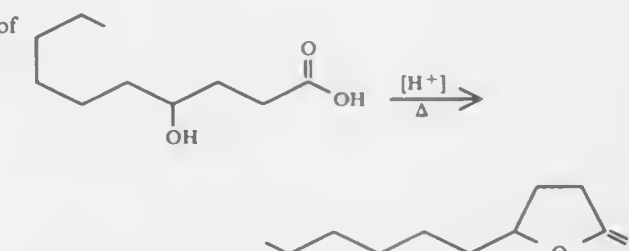
is formed having the specific structures:



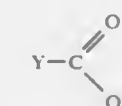
wherein Y represents an oxo-saturated, oxo-unsaturated or di-unsaturated C<sub>9</sub>, C<sub>11</sub> or C<sub>13</sub> moiety according to the reaction:



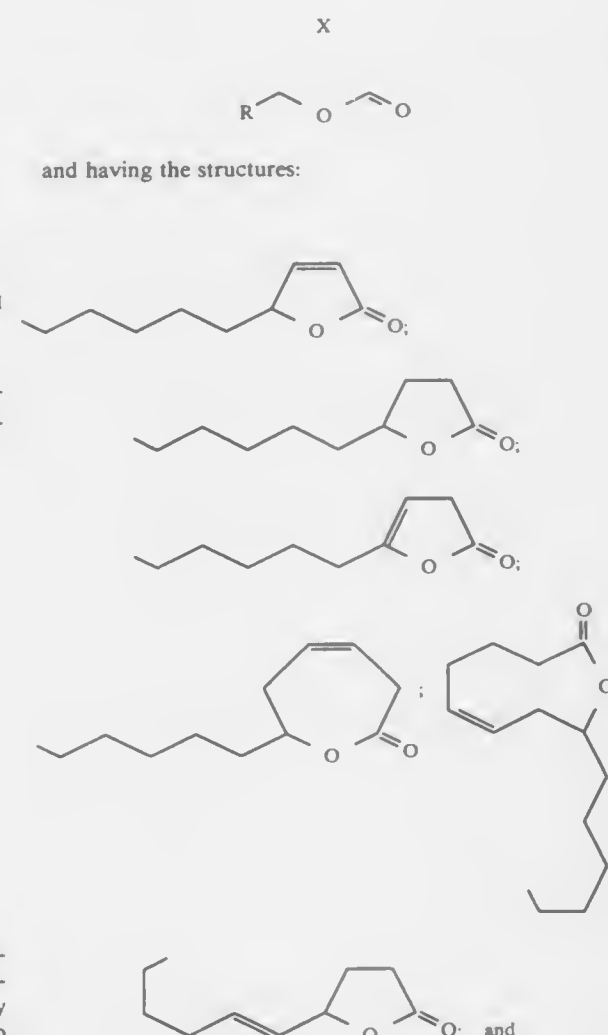
- (ii) effecting the lactonization of the resulting gamma hydroxydecanoic acid at a pH in the range of 0-5 and at a temperature in the range of from about 90° C. up to about 120° C. by means of simultaneous acidification and heating according to the reaction:



and then  
 (iii) effecting lactonization by means of distillation at a temperature in the range of 120°-220° C. and at a pH of between about 1 and about 7 of the resulting acids defined according to the structure:

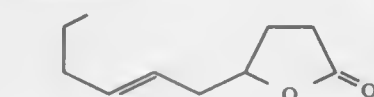


to form the mixture of lactones defined according to the structure:

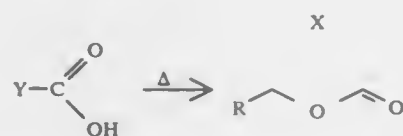




-continued



according to the reaction:



whereby the sum of the number of carbon atoms in the X moiety and in the R moiety is equal to the number of carbon atoms in the Y moiety minus 1.

4,946,783

# PERIPLASMIC PROTEASE MUTANTS OF *ESCHERICHIA COLI*

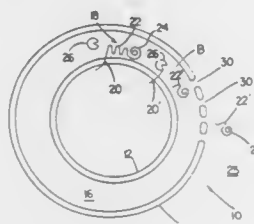
Jonathan R. Beckwith, Cambridge, and Kathryn L. Strach, Brighton, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Continuation-in-part of Ser. No. 9,233, Jan. 30, 1987, abandoned. This application Aug. 14, 1987, Ser. No. 85,402

Int. Cl.<sup>5</sup> C12N 15/00, 1/20

U.S. Cl. 435—172.1

20 Claims



1. A method of isolating a mutant strain of *Escherichia coli* having a defective periplasmic protease, said method comprising the steps of:

mutagenizing an *E. coli* cell, said cell comprising:

- an inner and an outer membrane,
- a periplasmic space between said membranes,
- a protein which in a first state is mobile, being able to move through said outer membrane and enter medium surrounding said cell, and in a second state is not mobile, remaining inside said cell, said protein in said first state being detectable in said medium, and
- a periplasmic protease which converts said protein from said second state to said first state in said cell, and selecting and isolating a mutant cell which produces when in said medium a reduced level of said detectable protein in said medium compared to the level of said detectable protein produced by said non-mutagenized *E. coli* cell when suspended in an identical medium, which mutant cell comprises a periplasmic protease having a reduced ability, compared to the corresponding native periplasmic protease in said *E. coli* cell, to degrade abnormal or foreign proteins.

# SPHERICAL BIOCATALYST CONTAINING TITANIUM DIOXIDE PARTICLES

Ulrich Sander, Friedrichsdorf, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 154,175

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704478

Int. Cl.<sup>5</sup> C12N 11/10, 11/14, 11/04, 11/02

U.S. Cl. 435—178

7 Claims

1. A spherical biocatalyst which consists essentially of at least one immobilized micro-organism, titanium dioxide particles having a diameter from 0.1 to 1 micrometer, and of an ionotropic biopolymer selected from the group consisting of an alginate, pectin, carrageenan and chitosan, said biocatalyst being produced by forming an essentially homogeneous degassed aqueous dispersion containing the biopolymer, 0.1 to 20 percent by weight of the micro-organism and 7 to 35 percent by weight of the titanium dioxide particles, dropping droplets of said dispersion from a nozzle into a precipitation bath containing polyvalent cations to precipitate the biopolymer as spherical biocatalyst particles having a diameter of about 0.05 to 5 mm, and removing said spherical biocatalyst particles from said bath.

4,946,785

# METHOD OF SUPPRESSING THE THERMAL DEGRADATION OF UROKINASE

Hajime Hiratani, Sennan, Japan; Satoshi Nishimuro, Birmingham, Ala.; Koichi Nakanishi, Kobe; Masaichi Ota, Nishinomiya, and Hiroshi Matsumoto, Ashiya, all of Japan, assignors to Japan Chemical Research Co., Ltd., Hyogo, Japan

Filed Jun. 17, 1988, Ser. No. 208,156

Claims priority, application Japan, Jun. 18, 1987, 62-153043

Int. Cl.<sup>5</sup> C12N 9/06, 9/72

U.S. Cl. 435—188

5 Claims

1. A method for suppressing the thermal degradation of urokinase in an aqueous solution, which method consists essentially of heating a urokinase-containing aqueous solution at about 60° C. for at least 10 hours, while maintaining its pH at 6.0 to 7.5, in the presence of citric acid or a water-soluble salt thereof, in a concentration corresponding to 0.1 to 0.5% calculated as sodium citrate.

4,946,786

# T7 DNA POLYMERASE

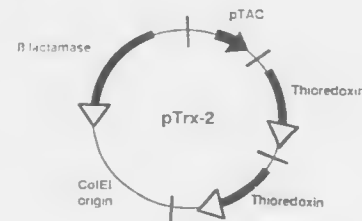
Stanley Tabor, Cambridge, and Charles C. Richardson, Chestnut Hill, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Continuation of Ser. No. 132,569, Dec. 14, 1987, which is a continuation-in-part of Ser. No. 3,227, Jan. 14, 1987. This application Mar. 1, 1990, Ser. No. 487,746

Int. Cl.<sup>5</sup> C12N 9/12, 15/00, 1/20, 7/00

U.S. Cl. 435—194

18 Claims

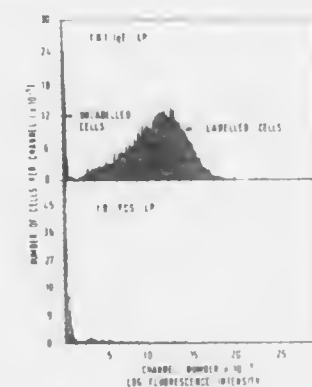


1. A method for production of a composition consisting essentially of a T7-type DNA polymerase and thioredoxin, comprising the steps of:

culturing a cell comprising plasmid DNA encoding a T7-

type DNA polymerase to express said T7-type DNA polymerase from said plasmid DNA, and purifying said T7-type DNA polymerase expressed from said cell to reduce the exonuclease activity associated with said T7-type DNA polymerase to a level below that of exonuclease activity associated with a corresponding naturally-occurring T7-type DNA polymerase.

of the hybridoma cell lines 208.25 D.2/94, 208.25 A.4.3/135, 207.25 A.4.4/30, 207.25 A.4.4/45 or 208.25 D.2.1/176, and a



# N-(ω,ω-1)-DIALKYL-OXY- AND N-(ω,ω-1)-DIALKENYLOXY-ALK-1-YL-N,N,N-TET-RASUBSTITUTED AMMONIUM LIPIDS AND USES THEREFOR

Deborah A. Epstein, Menlo Park; Philip L. Felgner, Los Altos; Thomas R. Gadek, Oakland; Gordon H. Jones, Cupertino, all of Calif., and Richard B. Roman, Fairhope, Ala., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 114,809, Oct. 29, 1987, Pat. No. 4,897,355, which is a continuation-in-part of Ser. No. 877,916, Jun. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 689,407, Jan. 7, 1985, abandoned. This application Oct. 27, 1989, Ser. No. 428,815

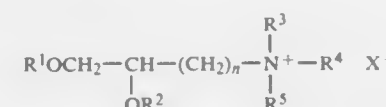
Int. Cl.<sup>5</sup> A61K 9/50, 45/02

U.S. Cl. 435—240.2

8 Claims

1. A double coated liposome complex, comprising: a polyanion;

a lipid of Formula I



or an optical isomer thereof wherein R<sup>1</sup> and R<sup>2</sup> are the same or different and are an alkyl or alkenyl group of 6 to 24 carbon atoms; R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are the same or different and are alkyl of 1 to 8 carbon atoms, aryl, aralkyl of 7 to 11 carbon atoms, or when two or three of R<sup>3</sup>, R<sup>4</sup>, and R<sup>5</sup> are taken together to form quinuclidino, pyrrolidino, piperidino, or morpholino; n is 1 to 8; and X is a pharmaceutically acceptable anion; and

a negatively charged co-lipid.

4,946,789

# BACILLUS BREVIS STRAINS AND APPLICATION THEREOF

Shigezo Ueda, Aichi; Hiroaki Takagi, and Kiyoshi Kadowaki, both of Chiba, all of Japan, assignors to Higeta Shoyu Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1987, Ser. No. 43,459

Claims priority, application Japan, Aug. 26, 1986, 61-198120

Int. Cl.<sup>5</sup> C12N 1/20, 15/00; C12P 21/00

U.S. Cl. 435—252.3

2 Claims

1. A *Bacillus brevis* selected from the group consisting of *Bacillus brevis* H102 (FERM BP-1087) and *Bacillus brevis* H503 (FERM BP-1088) strain in substantially pure form.

4,946,790

# RECOMBINANT PLASMID FOR THE EXPRESSION OF L-PHENYLALANINE AMMONIA-LYASE AND TRANSFORMED STRAIN CARRYING SAME

Nobuhiro Fukuhara, Ohmura; Setsuo Yoshino, Yokohama; Satoru Sone, Yokohama; Yoshiyuki Nakajima, Yokohama, and Nobuyoshi Makiguchi, Fujisawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

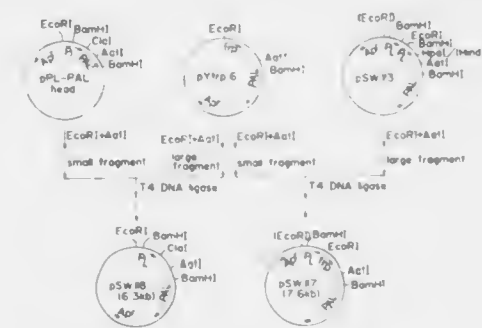
Filed Feb. 1, 1988, Ser. No. 151,234

Claims priority, application Japan, Feb. 6, 1987, 62-024705; Jun. 18, 1987, 62-152357

Int. Cl.<sup>5</sup> C12N 1/21, 15/70

U.S. Cl. 435—252.33

3 Claims



4,946,788

# PURIFIED IMMUNOGLOBULIN-RELATED FACTOR. NOVEL MONOCLONAL ANTIBODIES, HYBRIDOMA CELL LINES, PROCESSES AND APPLICATIONS

Guy Delespess, Winnipeg, Canada, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 4, 1986, Ser. No. 870,573

Claims priority, application United Kingdom, Jun. 11, 1985, 8514732; Oct. 21, 1985, 8525882; Nov. 11, 1985, 8527765

Int. Cl.<sup>5</sup> C12N 5/00, 15/00; A61K 39/00; C12P 21/00

U.S. Cl. 435—240.27

17 Claims

1. A monoclonal antibody to the receptor for IgE (FcεR) of RPMI 8866 cells crossreacting with human immunoglobulin binding factor (IgE-BF), which antibody is secreted by anyone

1. A recombinant plasmid comprising:

- a vector capable of replicating in *Escherichia coli*;
- a combined promoter comprising the tac promoter and, the P<sub>L</sub> promoter of the lambda phage, said P<sub>L</sub> promoter being connected downstream of said tac promoter; and

(c) a DNA sequence derived from *Rhodospiridium toruloides* coding for L-phenylalanine ammonia-lyase, said DNA sequence being operably linked to and inserted downstream of said combined promoter, whereby the two promoters constituting said combined promoter have the same directional property and the  $P_L$  promoter is located upstream of said DNA sequence so as to have the directional property which permits transcription of said DNA sequence.

4,946,791

**NOVEL STRAIN OF LACTOBACILLUS ACIDOPHILUS**  
Eugene T. Manfredi, Seattle, and Robert E. Miller, Redmond, both of Wash., assignors to Bio Techniques Laboratories, Inc., Redmond, Wash.

Filed Oct. 2, 1986, Ser. No. 915,279

Int. Cl.<sup>5</sup> C12N 1/20

U.S. Cl. 435—252.9

1 Claim

1. A biologically pure culture of a strain of the microorganism *Lactobacillus acidophilus* having the identifying characteristics of ATCC No. 53545.

4,946,792

**PROCESS FOR DEBRIDING BONE**  
Robert K. O'Leary, Spring Lake, N.J., assignor to Osteotech, Inc., Shrewsbury, N.J.

Filed Aug. 18, 1989, Ser. No. 395,782

Int. Cl.<sup>5</sup> C07G 15/00

U.S. Cl. 435—268

20 Claims

1. A process for the debridement of harvested bone having its periosteum intact which comprises contacting the periosteum with a proteolytic enzyme solution under proteolytic conditions for a period of time sufficient to loosen the periosteum from the underlying bone surface and thereafter removing the enzymatically loosened periosteum from the bone.

4,946,793

**IMPEDANCE MATCHING FOR INSTRUMENTATION WHICH ELECTRICALLY ALTERS VESICLE MEMBRANES**

John Marshall, III, Boulder, Colo., assignor to Electropore, Inc., Boulder, Colo.

Continuation-in-part of Ser. No. 47,208, May 8, 1987, which is a continuation-in-part of Ser. No. 861,534, May 9, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 283,215

Int. Cl.<sup>5</sup> C12N 13/00, 15/00

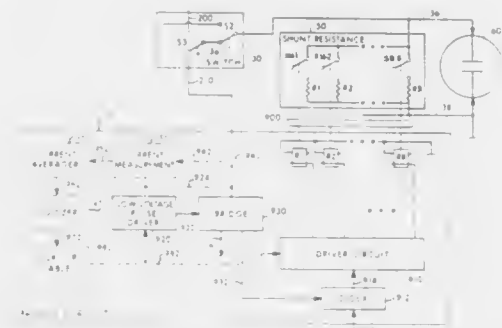
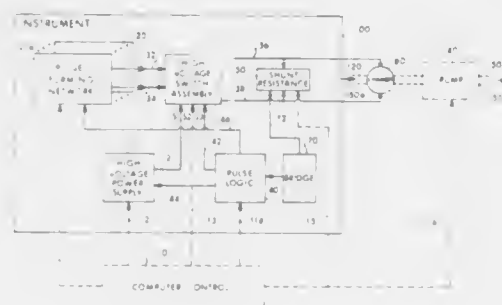
U.S. Cl. 435—291

15 Claims

1. An instrument for electrically altering the membranes of vesicles in a suspension in order to perform vesicular alteration and electrostructuring of said membranes, said instrument comprising:

- means for supplying voltage,
- means selectively connected to said supplying means for forming one or a series of treatment pulses,
- a pair of electrodes,
- means receptive of said vesicles in said suspension for holding said suspension between said pair of electrodes,
- means connected to said forming means for selectively delivering each said treatment pulse from said forming means across said electrodes in said holding means,
- means connected in parallel across said electrodes for matching the impedance of said holding means containing said suspension to the impedance of said forming means,
- means connected to said matching means and selectively connecting to said electrodes in said holding means before the delivery of said treatment pulses from said delivering means for determining whether the impedance of said

holding means matches the impedance of said forming means, said connecting means changing the impedance of



said matching means until said holding means impedance matches said forming means impedance.

4,946,794

**VISUALIZATION OF PROTEINS ON ELECTROPHORESIS GELS USING PLANAR DYES**  
Gene R. Berube, Cheshire, Conn., assignor to Protein Databases, Inc., Huntington Station, N.Y.

Continuation of Ser. No. 943,623, Dec. 18, 1986, abandoned, which is a continuation of Ser. No. 765,969, Aug. 15, 1985, abandoned. This application Dec. 15, 1987, Ser. No. 132,978

Int. Cl.<sup>5</sup> G01N 21/78, 33/68

U.S. Cl. 436—86

6 Claims

1. A method for analyzing proteins comprising separating proteins contained in a gel by electrophoresis to produce an electrophoresed gel, fixing the separated proteins on the electrophoresed gel, exposing the electrophoresed gel to a planar dye component selected from the group consisting of acridine orange, rhodamine, eosin and fluorescein, which is precluded from penetrating the proteins, and exposing the electrophoresed gel to a metal salt selected from the group consisting of chromium, silver, magnesium and calcium salts capable of complexing with said planar dye component to produce a color, thereby producing a highly sensitive negative stain wherein the gel is markedly stained in comparison to the separated proteins which are not stained.

4,946,795

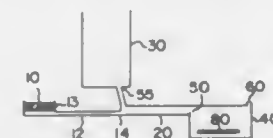
**APPARATUS AND METHOD FOR DILUTION AND MIXING OF LIQUID SAMPLES**

Ian Gibbons, Menlo Park; Robert S. Hillman, Cupertino; Channing R. Robertson, Stanford, and Jimmy D. Allen, Los Altos, all of Calif., assignors to Biotrack, Inc., Mountain View, Calif. Continuation of Ser. No. 90,026, Aug. 27, 1987, Pat. No. 4,868,129. This application Aug. 18, 1989, Ser. No. 395,808

Int. Cl.<sup>5</sup> G01N 1/10; B01L 3/02

U.S. Cl. 436—179

15 Claims



9. A method of diluting a sample with a diluent, comprising: adding an unmeasured volume of said sample to sample application site means of a device in which said sample flows by the sum of capillary and gravitational forces to measuring chamber means having a first volume, said measuring chamber means being terminated by a stop flow junction which stops sample flow as a result of back pressure resulting from interaction of said sample with wall means of said device at said stop flow junction, said device further comprising receiving chamber means having a second volume greater than said first volume, said receiving chamber means being located in fluid receiving relationship to said measuring chamber means; then adding said diluent to diluent application site means of said device, wherein said diluent flows by the sum of capillary and gravitational forces to said measuring chamber means; and then starting flow at said stop flow junction, wherein said starting flow comprises: moving said device, whereby said moving overcomes said back pressure and allows sample and diluent to flow through said stop flow junction into said receiving chamber means, whereby a fixed ratio of sample and diluent fills said receiving chamber means.

4,946,796

METHOD OF IMMUNOASSAY

Daniel Collet-Cassart, Kraainem; Carl-Gustav M. Magnusson, and Pierre L. Masson, both of Brussels, all of Belgium, assignors to International Institute of Cellular & Molecular Pathology, Brussels, Belgium

Continuation of Ser. No. 770,045, Aug. 2, 1985, abandoned, which is a continuation of Ser. No. 452,180, Dec. 22, 1982, abandoned. This application Apr. 6, 1987, Ser. No. 34,246

Int. Cl.<sup>5</sup> G01N 33/563, 33/546, 33/53, 33/566

U.S. Cl. 436—512

8 Claims

1. A rear wheel steer angle control system for a vehicle, comprising:

- (a) actuating means for steering rear wheels of the vehicle in response to a control signal;
- (b) means for sensing a steering wheel angle of the vehicle;
- (c) means for sensing a vehicle speed of the vehicle; and
- (d) controlling means connected with said steering wheel angle sensing means and said vehicle speed sensing means for controlling a rear wheel steer angle  $\delta_r(s)$  with respect to a front wheel steer angle  $\delta_f(s)$  by producing a control signal representing said rear wheel steer angle in accordance with a mathematical relationship expressed as;

$$\frac{\delta_r(s)}{\delta_f(s)} = \frac{K + T_1 \cdot s}{1 + T_2 \cdot s}$$

where  $\delta_r(s)$  is the Laplace transform of said rear wheel steer angle  $\delta_r$ ,

$\delta_f(s)$  is the Laplace transform of said front wheel steer angle  $\delta_f$ ,

$s$  is a complex variable,

$K$ ,  $T_1$ , and  $T_2$  are first, second and third control parameters given by;

$$K = \frac{C_1 \{aMV^2 + C_2 l(l_3 - b)\}}{C_2 \{bMV^2 + C_1 l(l_3 + a)\}}$$

$$T_1 = \frac{C_1 V(aMl_3 - l)}{C_2 \{bMV^2 + C_1 l(l_3 + a)\}}$$

$$T_2 = \frac{V(bMl_3 + l)}{bMV^2 + C_1 l(l_3 + a)}$$

$M$  is a constant representing a vehicle mass,  
 $I$  is a constant representing a yawing moment of inertia,  
 $l_0$  is a constant representing a wheelbase,  
 $a$  is a constant representing a first distance between a center of gravity of the vehicle and a front wheel position,  
 $b$  is a constant representing a second distance between said center of gravity and a rear wheel position,  
 $l_3$  is a third distance which is a quantity representing a distance between said center of gravity and a zero sideslip angle position at which a vehicle sideslip angle is zero, and which is positive when said zero sideslip angle position is closer to said rear wheel position than said center of gravity,  
 $C_1$  is a constant representing a front wheel cornering power,  
 $C_2$  is a constant representing a rear wheel cornering power, and  
 $V$  is said vehicle speed.

4,946,797

MICROWAVE-BASED KJELDAHL METHOD

Edwin D. Neas, Indian Trail, N.C., and Terry S. Floyd, Clover, S.C., assignors to CEM Corporation, Matthews, N.C.

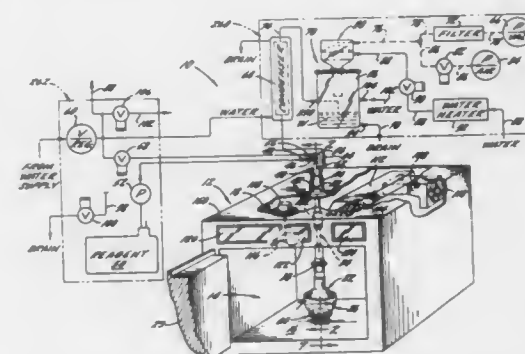
Division of Ser. No. 55,921, Jan. 8, 1987, Pat. No. 4,861,556, which is a continuation-in-part of Ser. No. 874,278, Jan. 13, 1986, abandoned. This application Jan. 25, 1989, Ser. No.

301,805

Int. Cl.<sup>5</sup> G01N 1/28

U.S. Cl. 436—175

7 Claims



1. A rapid, microwave-based, Kjeldahl digestion method which permits immediate digestate dilution, said digestion method comprising while removing digestion off-gases, applying sufficient microwave energy to an acid/sample mixture with a sample size of at least about 0.5 g, to attain an optimum Kjeldahl digestion temperature and continuing to apply microwave energy to form a digestate; adding to said acid/sample mixture at the beginning of, and there-



after during, the digestion, a boil-over reducing additive comprising hydrogen peroxide, in an amount sufficient to reduce boil-over; and

after discontinuing the application of microwave energy, diluting said digestate by pulsed addition of water followed by continuous addition of water, such dilution step preventing a sudden surge in gas evolution, reducing processing time, and being carried out within a microwave system.

5. A rapid, microwave-based, Kjeldahl digestion method that provides for fat separation from a fat-containing protein sample during digestion, said digestion method comprising applying sufficient microwave energy to an acid/sample mixture which comprises said protein sample, to provide an optimum Kjeldahl digestion temperature to produce a digestate; while removing off-gases, adding to said acid/sample mixture at the beginning of, and thereafter during, the digestion, a boil-over reducing additive comprising hydrogen peroxide, in an amount sufficient to reduce boil-over and while applying said microwave energy, drawing off-gases and entrained fat particles away from said acid/sample mixture by applying suction to said acid/sample mixture while controllably inletting ambient air proximate to the locus of digestion off-gas generation, so as to increase the efficiency of said suction.

4,946,798

# SEMICONDUCTOR INTEGRATED CIRCUIT FABRICATION METHOD

Akira Kawakatsu, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Japan

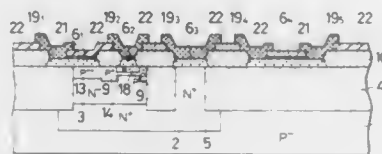
Filed Feb. 2, 1989, Ser. No. 305,735

Claims priority, application Japan, Feb. 9, 1988, 63-26670; Mar. 4, 1988, 63-49715; Mar. 4, 1988, 63-49717

Int. Cl.<sup>5</sup> H01L 21/331

U.S. Cl. 437—33

42 Claims



1. A semiconductor integrated circuit fabrication method, comprising:

first, creating isolated regions of a first conductive type in a silicon substrate, depositing polysilicon on the principal surface of said silicon substrate including said isolated regions, and forming an oxidation-resistant layer on the exposed surface of said polysilicon;

second, selectively removing parts of said oxidation-resistant layer and forming, in part of said isolated regions of said first conductive type not overlain by said oxidation-resistant layer, a first passive base region of a second conductive type;

third, selectively oxidizing said polysilicon, using said oxidation-resistant layer as a mask, then removing said oxidation-resistant layer;

fourth, introducing a dopant of said second conductive type at a first concentration into part of said polysilicon left unoxidized by said third step, and at a second concentration, lower than said first concentration, into all of said polysilicon left unoxidized by said third step;

fifth, depositing an insulating layer on both the oxidized and unoxidized parts of said polysilicon surface by chemical vapor deposition, then forming a second passive base region and an active base region of said second conductive type of diffusion of said dopant of said second conductive type from said polysilicon into said isolated regions of said first conductive type, said second passive base and active

base regions being contiguous with said first passive base region;

sixth, selectively removing parts of said insulating layer to create contact holes in which the surface of said polysilicon is exposed;

seventh, introducing a dopant of said first conductive type into said exposed polysilicon surface disposed above said active base region;

eighth, diffusing said dopant of said first conductive type to create an emitter region of said first conductive type within said active base region; and

ninth, forming metal electrodes in said contact holes.

4,946,799

# PROCESS FOR MAKING HIGH PERFORMANCE SILICON-ON-INSULATOR TRANSISTOR WITH BODY NODE TO SOURCE NODE CONNECTION

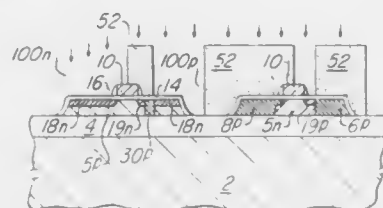
Tereace G. W. Blake, and Hsindao Lu, both of Dallas, Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Division of Ser. No. 216,933, Jul. 8, 1988, Pat. No. 4,899,202. This application Nov. 9, 1989, Ser. No. 435,135

Int. Cl.<sup>5</sup> H01L 21/336

U.S. Cl. 437—41

8 Claims



1. A method of fabricating an integrated circuit in a semiconductor layer overlying an insulating film, comprising:

defining first and second portions of said semiconductor layer, said first and second portions of first and second conductivity types, respectively;

forming a gate electrode over each of said first and second portions;

applying a first mask layer over said first portion to cover source and drain regions adjacent the gate electrode over said first portion;

doping source and drain locations of said second portion adjacent said gate electrode with a dopant of said first conductivity type;

applying a second mask layer over said second portions to cover the source and drain regions of said second portion;

doping the source and drain locations of said first portion adjacent said gate electrode with a dopant of said second conductivity type;

forming sidewall dielectric filaments on the sides of said gate electrodes to cover a portion of the semiconductor layer adjacent to the gate electrodes;

applying a third mask layer over said first and second portions to expose a contact region of said first portion adjacent said sidewall filament on the source side of said gate electrode, and the source and drain regions of said second portion, and to cover a contact region of said second portion adjacent said sidewall filament on the source side of said gate electrode, and the source and drain regions of said first portion;

additionally doping the exposed locations of said first and second portions with a dopant of said first conductivity type;

applying a fourth mask layer over said first and second portions to expose the contact region of said second portion and the source and drain regions of said first portion, and to cover said contact region of said first portion and the source and drain regions of said second portion;

additionally doping the exposed locations of said first and second portions with a dopant of said second type; and forming a silicide film over the source and contact regions of said first and second portions.

4,946,800

# METHOD FOR MAKING SOLID-STATE DEVICE UTILIZING ISOLATION GROOVES

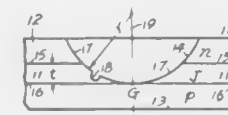
Chou H. Li, 379 Elm Dr., Roslyn, Nassau, N.Y. 11576

Continuation-in-part of Ser. No. 154,300, Jun. 18, 1971, abandoned, which is a continuation-in-part of Ser. No. 761,646, Sep. 23, 1968, Pat. No. 3,585,714, which is a continuation-in-part of Ser. No. 490,955, Sep. 28, 1965, Pat. No. 3,430,109. This application Aug. 6, 1973, Ser. No. 386,102

Int. Cl.<sup>5</sup> H01L 21/20, 21/302, 21/76

U.S. Cl. 437—65

26 Claims



1. A method of making a semiconductor device comprising: providing a semiconductor material having a selected shape; and

forming, at least in part from said semiconductor material, a semiconductor device having (i) a semiconductor material substrate of one conductivity type having a first surface, (ii) a semiconductor material body of opposite conductivity type on said first surface of the substrate, (iii) a PN isolation junction extending laterally along at least a part of the structure and forming an insulation barrier between said substrate and said body, and (iv) at least one isolation groove which comprises electrically isolating material and divides said body into a plurality of semiconductor material pockets which are laterally spaced from each other by said at least one isolation groove;

wherein said forming step comprises causing said isolation material to extend into the structure at least to said isolation junction and together therewith to electrically isolate said plurality of pockets from each other; and

wherein the forming step further comprises making the bottom of said at least one groove continuously curve throughout substantially the entire width of said at least one groove, including the central part of the bottom of said at least one groove, wherein the radius of curvature at any one point on the curved portion of the bottom of said at least one groove is less than 1 cm, and wherein the bottom of said at least one groove is less than 0.1 microns from the nearest level of said PN isolation junction.

4,946,801

# EPITAXIAL WAFER

Tadashige Sato, and Yasuji Kobashi, both of Tsuchiura, Japan, assignors to Mitsubishi Monsanto Chemical Co., Ltd. and Mitsubishi Kasei Corporation, both of Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,275

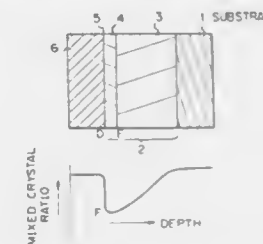
Claims priority, application Japan, Nov. 13, 1987, 62-287054

Int. Cl.<sup>5</sup> H01L 33/00

U.S. Cl. 437—126

9 Claims

1. An epitaxial wafer comprising of a single crystalline substrate (1), a p type gallium aluminum arsenide mixed crystalline layer (2) and an n type gallium aluminum arsenide mixed crystalline layer (6) having an indirect transition type band structure, wherein said p type gallium aluminum arsenide mixed crystalline layer (2) consists of a gallium aluminum arsenide mixed crystalline layer (4) having a direct transition type band structure, extending from the pn junction (5) and a gallium aluminum arsenide mixed crystalline layer (3) having an indi-



rect transition type band structure, and the aluminum arsenide mixed crystal ratio in the gallium aluminum arsenide being

4,946,802

# SEMICONDUCTOR LASER DEVICE FABRICATING METHOD

Akihiro Shima, and Wataru Susaki, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

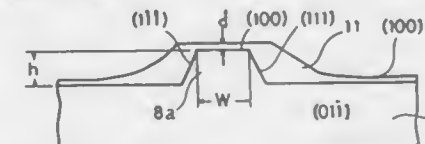
Division of Ser. No. 54,764, May 27, 1987, Pat. No. 4,813,050. This application Nov. 18, 1988, Ser. No. 273,393

Claims priority, application Japan, May 31, 1986, 61-126505

Int. Cl.<sup>5</sup> H01L 21/20

U.S. Cl. 437—129

6 Claims



1. A method for fabricating a semiconductor laser device, comprising the steps of:

preparing a substrate;

forming a ridge on a main surface of said substrate from one end to the opposite end, wherein width of said ridge is narrower in regions near both the ends and wider in a middle region;

forming a depression in the wider region of said ridge;

forming a narrow groove, narrower than said depression, along the surface of said ridge from said one end to said opposite end;

forming a first clad layer over the main surface of said substrate;

forming an active layer on said first clad layer, whereby thickness of said active layer is made thinner in portions just above said narrower ridge regions and made thicker in portion just above said wider ridge region; and

forming a second clad layer on said active layer.

4,946,803

# METHOD FOR MANUFACTURING A SCHOTTKY-TYPE RECTIFIER HAVING CONTROLLABLE BARRIER HEIGHT

Russell C. Eliwanger, Orem, Utah, assignor to North American Philips Corp., Signetics Division, Sunnyvale, Calif.

Division of Ser. No. 447,745, Dec. 8, 1982, Pat. No. 4,816,879. This application Dec. 8, 1988, Ser. No. 282,232

Int. Cl.<sup>5</sup> H01L 21/00, 21/02, 21/283, 21/285

U.S. Cl. 437—175

4 Claims

1. A method of forming a rectifier, the method comprising the steps of:

depositing a metallic layer composed of at least two selected metals on an exposed surface of an N-type silicon semiconductor region in a semiconductor body;

subsequently heating the body and the metallic layer to a suitable temperature to cause the metals to react with silicon along the surface and form an original metal silicide layer which adjoins the remainder of the N-type

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1. A catalyst composition comprising a gallosilicate molecular sieve having the X-ray diffraction lines of Table 1 of the Specification, a platinum metal component, and a chloride component.



2. The composition of claim 1 wherein the platinum metal component is present in an amount ranging from about 0.01 to about 5 wt.% calculated as the zero valent metal and the chloride is present in an amount ranging from about 0.5 to 5 wt.% based on the total weight of the composition.

4,946,813

**CATALYSTS FOR UPGRADING LIGHT PARAFFINS**  
Victor K. Shum, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 82,083, Aug. 5, 1987, Pat. No. 4,806,701.

This application Aug. 18, 1988, Ser. No. 233,453

Int. Cl.<sup>5</sup> B01J 29/04

U.S. Cl. 502—61

9 Claims

1. A catalyst composition comprising a gallosilicate molecular sieve, a Group VIII metal component and a Group IB metal component.

4,946,814

**PROCESS FOR IMPROVING THE PHYSICAL AND CATALYTIC PROPERTIES OF FLUID CRACKING CATALYSTS**

Joseph C. S. Shi, Bartow, Ga.; Edwin W. Albers, Annapolis, and Geoffrey R. Wilson, Timonium, both of Md., assignors to Thiele-Kaolin Company, Sandersville, Ga.

Filed Mar. 10, 1989, Ser. No. 321,355

Int. Cl.<sup>5</sup> B01J 31/00

U.S. Cl. 502—62

12 Claims

1. A process for improving the physical and catalytic properties of a sol based fluid cracking catalyst which comprises the steps of:

- preparing an acid aluminum sulfate silica sol binder component,
- preparing a clay slurry component,
- combining components (a) and (b),
- preparing a zeolite slurry component,
- preparing an alumina slurry component,
- adding an effective amount of an acid stable anionic fluorocarbon surfactant to at least one of the components,
- combining the components and spray drying,
- washing, exchanging, drying, calcining and recovering the catalyst product.

4,946,815

**SOLID PHOSPHORIC ACID CATALYST**

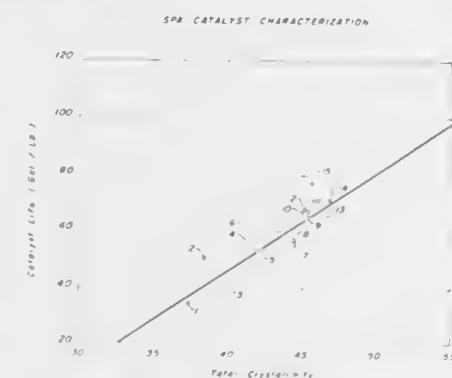
Tai-Hsiang Chao, Mt. Prospect; Fiona P. Wilcher, Des Plaines; Mark R. Ford, Buffalo Grove, and Andrzej Z. Ringwelski, Marengo, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 23, 1988, Ser. No. 288,921

Int. Cl.<sup>5</sup> B01J 21/16, 27/182, 37/28; C07C 2/68

U.S. Cl. 502—81

9 Claims



1. A solid phosphoric acid catalyst having a total silicon phosphate X-ray intensity greater than 40 percent relative to alpha-alumina and comprising silicon pyrophosphate crystallites with at least 1.0 percent x-ray intensity and silicon orthophosphate crystallites with at least 30 percent x-ray intensity,

both relative to alpha-alumina, with the desired phosphoric acid catalyst crystallinity produced by crystallizing an amorphous mixture of an acid oxide of phosphorus and a siliceous material in a crystallizing means where the crystallizing means is operated at a temperature of from 350° to 450° C., and at a steam concentration of from 10 to 50 mole percent based upon the total vapor in the crystallizing means.

4,946,816

**MORPHOLOGY-CONTROLLED OLEFIN POLYMERIZATION CATALYST**

Steven A. Cohen; Gregory G. Arzoumanidis; Nicholas M. Karayannis; Habet M. Khelghatian, all of Naperville, and Sam S. Lee, Hoffman Estates, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 21, 1989, Ser. No. 395,990

Int. Cl.<sup>5</sup> C08F 4/64

U.S. Cl. 502—126

20 Claims

1. A solid, hydrocarbon-insoluble alpha-olefin polymerization catalyst component comprises a product formed by:

- Forming a solution of a magnesium-containing species from a magnesium hydrocarbyl carbonate or a magnesium carboxylate;
- Precipitating solid particles from such magnesium-containing solution by treatment with a transition metal halide and an organosilane having a formula:  $R_nSiR'_4-n$ , wherein  $n=0$  to 4 and wherein R is hydrogen or an alkyl, a haloalkyl or aryl radical containing one to about ten carbon atoms or a halosilyl radical or haloalkylsilyl radical containing one to about eight carbon atoms, and R' is OR or a halogen;
- Reprecipitating such solid particles from a solution containing a cyclic ether; and
- Treating the reprecipitated particles with a transition metal compound and an electron donor; in which at least one solution in Steps A, B or C is a toluene-based solution containing about 0.1 to about 2 wt. %  $C_8-C_{10}$  aromatic hydrocarbon.

4,946,817

**LATENT CATALYSTS FOR EPOXY-CONTAINING COMPOUNDS**

James L. Bertram, Lake Jackson; Louis L. Walker, Clute, and Van I. W. Stuart, Missouri City, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

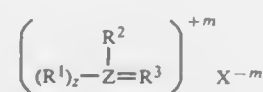
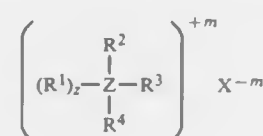
Continuation-in-part of Ser. No. 155,656, Feb. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 21,837, Mar. 4, 1987, Pat. No. 4,725,652, which is a continuation-in-part of Ser. No. 849,087, Apr. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 716,279, Mar. 25, 1985, Pat. No. 4,594,291, which is a continuation-in-part of Ser. No. 631,676, Jul. 17, 1984, abandoned. This application Nov. 18, 1988, Ser. No. 274,264

Int. Cl.<sup>5</sup> B01J 31/12, 31/02

U.S. Cl. 502—154

13 Claims

1. A composition which results from contacting (1) an onium compound represented by the following formulas IA or IB



wherein each  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  is independently an aliphatic hydrocarbyl group having from 1 to about 18 carbon atoms or

an aliphatic group having from 1 to about 18 carbon atoms which group also contains one or more oxygen, sulfur, halogen or nitrogen atoms; each X is the anion portion of a relatively strong-nucleophilic acid; Z is arsenic; m has a value equal to the valence of the anion X; z has a value of zero or 1 depending on the valence of Z; and with (2) (a) an inorganic acid free of boron, said inorganic acid having a weak-nucleophilic anion, (b) a Group I or II metal salt of an inorganic acid free of boron, said inorganic acid having a weak-nucleophilic anion, (c) an acid containing boron represented by the formula  $BR_3R'$  wherein each R is independently hydrogen or an aliphatic, cycloaliphatic or aromatic hydrocarbyl group having from 1 to about 12 carbon atoms or a halogen and R' is an inert non-nucleophilic group other than a hydrocarbyl group, (d) a Group I or II metal salt of an acid containing boron represented by the formula  $BR_3R'$  wherein each R is independently hydrogen or an aliphatic, cycloaliphatic or aromatic hydrocarbyl group having from 1 to about 12 carbon atoms or a halogen and R' is an inert non-nucleophilic group other than a hydrocarbyl group, or (e) any combination of any two or more of components (a), (b), (c) or (d); wherein components (1) and (2) are contacted in quantities which provide from about 0.6 to about 1.4 moles of acid per mole of onium compound.

4,946,818

**RHODIUM COLLOID, METHOD OF MAKING, AND USE**  
Larry N. Lewis, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 5, 1988, Ser. No. 177,717

Int. Cl.<sup>5</sup> B01J 23/46, 21/06

U.S. Cl. 502—158

6 Claims

1. A rhodium hydrosilylation catalyst consisting essentially of comprising the reaction product of rhodium trichloride and from 10 to about 100 moles of a silicon hydride, per mole of rhodium trichloride, where the silicon hydride has a boiling point of at least 25° C. at atmospheric pressure and the silicon atom of the silicon hydride is satisfied with from 1 to 3 hydrogen atoms and at least 1, and up to 3 monovalent radicals, other than hydrogen, selected from 1 or 2  $C_{(1-13)}$  hydrocarbon radicals and 1 to 3  $C_{(1-8)}$  alkoxy, siloxy, halogen and mixtures of such monovalent radicals.

4,946,819

**PHOSPHORUS-ANTIMONY-CONTAINING CATALYST FOR OXIDATION**

Yutaka Sasaki; Hiroshi Utsumi; Masato Otani, and Shinji Yamamoto, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,586

Claims priority, application Japan, Nov. 27, 1987, 62-300995

Int. Cl.<sup>5</sup> B01J 27/182, 27/186

U.S. Cl. 502—214

7 Claims

1. A phosphorus-antimony-containing catalyst for oxidation, which is obtained by calcining a metal oxide composition containing, as essential components, (a) antimony, (b) at least one element selected from the group consisting of iron, cobalt, nickel, tin, uranium, chromium, copper, manganese, titanium, thorium, and cerium, and (c) silica at a temperature ranging from 500° C. to 950° C. to prepare a base catalyst, impregnating the base catalyst with a solution containing a phosphorus compound so that the atomic ratio of impregnated phosphorus to antimony in the base catalyst is within the range of from 0.01:1 to 2:1, drying the impregnated base catalyst, and calcining the dried product at a temperature ranging from 300° C. to 850° C.

3. The phosphorus-antimony-containing catalyst as claimed

in claim 1, wherein said base catalyst has a composition represented by empirical formula:



wherein

Me represents at least one element selected from the group consisting of Fe, Co, Ni, Sn, U, Cr, Cu, Mn, Ti, Th, and Ce;

X represents at least one element selected from the group consisting of V, Mo, and W;

Q represents at least one element selected from the group consisting of Be, Mg, Ca, Sr, Ba, Y, La, Zr, Hf, Nb, Ta, Re, Ru, Os, Rh, Ir, Pd, Pt, Ag, Zn, Cd, Al, Ga, In, Ge, and Pb;

R represents at least one element selected from the group consisting of B, P, Te, Bi, As, and Se;

S represents at least one element selected from Li, Na, K, Rb, Cs, and Tl;

O represents an oxygen atom; and

a, b, c, d, e, f, g, and h each represents the atomic ratio of the respective element for which each is a subscript, wherein a is from 5 to 15;

b is from 5 to 100;

c is from 0 to 15;

d is from 0 to 20;

e is from 0 to 10;

f is from 0 to 5;

h is from 10 to 200; and

g is the number oxygens corresponding to the oxides formed by each of the components described above; provided that the P/Sb atomic ratio is 0.2:1 or less.

4,946,820

**PREPARATION AND USE OF TIN (IV) OXIDE DISPERSION**

Edward S. Lane, Southampton; David L. Segal, Harwell, and Donald F. Rush, Didcot, all of United Kingdom, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Jul. 21, 1989, Ser. No. 382,496

Claims priority, application United Kingdom, Jul. 22, 1988, 8817541; Jul. 22, 1988, 8817540

Int. Cl.<sup>5</sup> B01J 23/14, 23/26, 23/72

U.S. Cl. 502—310

10 Claims

1. A process for preparing a dispersion of tin(IV) oxide which includes the step of peptizing metastannic acid with a primary, secondary or tertiary amine peptizing agent

9. A process according to claim 8 wherein the ceramic coated substrate is contacted with a dispersion of a chromium(VI) compound in a liquid medium, followed by conversion of the compound to chromium(VI) oxide thereby to give a mixture comprising tin(IV) oxide and chromium(VI) oxide on the substrate.

4,946,821

**PROCESS FOR THE PREPARATION OF A HYDROGENATION CATALYST**

Johannes C. Oudejans, Maassluis, and Dirk Verzijl, Barendrecht, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 81,491, Aug. 4, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 319,839

Claims priority, application European Pat. Off., Aug. 25, 1986, 86201463

Int. Cl.<sup>5</sup> B01J 21/04, 23/72, 23/74

U.S. Cl. 502—335

3 Claims

1. Process for the preparation of a hydrogenation catalyst which comprises alumina and an active metal (M) selected from the group consisting of nickel, cobalt, and copper, wherein said process comprises combining an ammoniacal metal ion solution at temperatures between 10° C. and 85° C. with an aqueous solution of an aluminum compound, removing

1. A process for the preparation of a low molecular weight alkali metal or ammonium huminate fraction comprising stirring an aqueous suspension of a humic containing material while adding an alkali... substance without exceeding a pH of 7, stirring the suspension until the pH is 7, allowing the solids to settle from the suspension, centrifuging the solid free solutions and subjecting the solution to ultrafiltration to obtain a low molecular weight alkali metal or ammonium huminate fraction.



4,946,830

## AGENT AND METHOD FOR THE PREVENTION OF METASTASES OF MALIGNANT TUMORS

Gerhard Pulverer, Mohnweg 25, 5000 Cologne 40; Kurt Oette, Braunstrasse 39, and Gerd Uhlenbruck, Gleueler Strasse 308, both of 5000 Cologne 41, all of Fed. Rep. of Germany  
Filed May 1, 1987, Ser. No. 44,483

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615621

Int. Cl.<sup>5</sup> A01N 43/04; C07G 3/00, 00/00; C07H 5/04

U.S. Cl. 514—23

4 Claims

1. Method for preventing metastases of malignant tumors in a mammal which comprises the administration of an effective amount of a monosaccharide which is specific for organ cell lectins, wherein the monosaccharide is selected from the group consisting of beta-D-galactose, glycoconjugates of beta-D-galactose, mannose, glycoconjugates of mannose, L-fucose, N-acetyl-glucosamine, N-acetylgalactosamine and N-acetylneuraminic acid.

4,946,831

## INJECTABLE READY-TO-USE SOLUTIONS CONTAINING AN ANTITUMOR ANTHRACYCLINE GLYCOSIDE

Gaetano Gatti, Diego Oldani, both of Milan; Giuseppe Bottoni, Bergamo; Carlo Confalonieri, Milan; Luciano Gambini, Milan, and Roberto De Ponti, Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

Continuation of Ser. No. 878,784, Jun. 26, 1986, abandoned.

This application Jul. 27, 1989, Ser. No. 385,999

Claims priority, application United Kingdom, Aug. 2, 1985, 8519452

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—34

6 Claims

1. A sealed glass container containing therein a stable, intravenously injectable, sterile, pyrogen-free doxorubicin antitumor composition in a solution which consists essentially of doxorubicin hydrochloride dissolved in a physiologically acceptable solvent therefor, wherein said solution has not been reconstituted from a lyophilizate, and wherein said solution has a pH adjusted to 2.7114 3.14 with hydrochloric acid, and a concentration of said doxorubicin of from 0.01 to 100 mg/ml.

4,946,832

## COSMETIC BASE COMPOSITION WITH THERAPEUTIC PROPERTIES

Stephan T. Goode, Woodstock, Ill.; Robert R. Linton, Crystal Lake, Ill., and Fred Baiocchi, Prairie Village, Kans., assignors to R.I.T.A. Corporation, Woodstock, Ill.

Continuation-in-part of Ser. No. 25,569, Mar. 13, 1987, Pat. No. 4,822,601. This application Jul. 21, 1988, Ser. No. 222,051

Int. Cl.<sup>5</sup> A61K 7/00; C07H 13/12; C11C 3/04

U.S. Cl. 514—53

20 Claims

1. A composition for use as a cosmetic base comprising about 1% to about 15% by weight sucrose fatty acid ester, about 3% to about 45% by weight acyl fatty acid alpha-hydroxy carboxylic acid ester or alkali metal salt thereof, and a solvent.

4,946,833

## N-(23-VINBLASTINOYL)COMPOUNDS OF 1-AMINOMETHYLPHOSPHONIC ACID USEFUL FOR TREATING NEOPLASTIC DISEASES

Gilbert Lavielle, La Celle St-Cloud; Patrick Hauteffaye, Sevran Brie Comte Robert, and Claude Cudennec, La Celle St-Cloud, all of France, assignors to Adir et Cie, Neuilly-sur-Seine, France

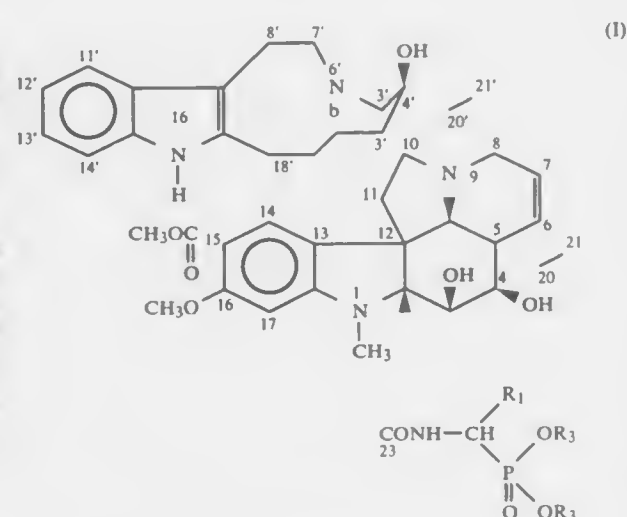
Filed Nov. 23, 1988, Ser. No. 276,357

Claims priority, application France, Nov. 25, 1987, 87 16327  
Int. Cl.<sup>5</sup> A61K 31/475; C07D 519/04; C07F 9/6561

U.S. Cl. 514—81

8 Claims

1. A compound of formula I:



in which:

R<sub>1</sub> is a hydrogen atom, a linear or branched alkyl radical containing from 1 to 6 carbon atoms, a linear or branched alkylene radical containing from 1 to 6 carbon atoms, an arylalkyl radical having 7 to 10 carbon atoms and which may have a halogen atom as a substituent on the aromatic ring, a hydroxyl radical or an alkyl or alkoxy radical each containing from 1 to 5 carbon atoms, a 2-indolylmethyl radical, a 4-imidazolylmethyl radical or an alkoxy carbonylmethyl radical containing from 3 to 11 carbon atoms,

R<sub>2</sub> and R<sub>3</sub>, which may be identical or different, each are independently a linear or branched alkyl radical containing from 1 to 4 carbon atoms,

in the form of a mixture of diastereoisomers or of pure isomers, their N<sup>b</sup>-oxides or an addition salt thereof with a pharmaceutically-acceptable inorganic or organic acid.

7. A method for the treatment of a neoplastic disease of a type known to be responsive to treatment with a vinca alkaloid in a living being comprising the step of administering to the living being an effective amount of a compound of any one of claims 1 to 4, inclusive, or a pharmaceutical composition of claim 5.

4,946,834

## PHOSPHONIC ACID SUBSTITUTED STEROIDS AS STEROID 5α-REDUCTASE INHIBITORS

Dennis A. Holt, Downingtown; Mark A. Levy, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

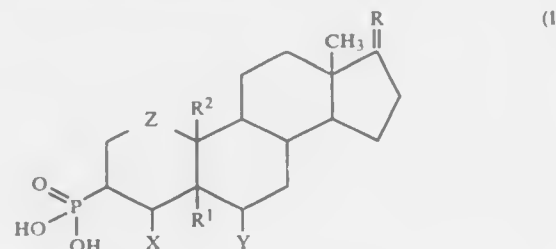
Filed Dec. 23, 1988, Ser. No. 290,211

Int. Cl.<sup>5</sup> A61K 31/66; C07J 1/00, 43/00

U.S. Cl. 514—119

24 Claims

1. A compound represented by the formula:

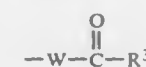


in which

the A ring has up to 2 double bonds;  
the B, C, and D rings have optional double bonds where indicated by the broken lines, provided that the A B and

C ring does not have adjacent double bonds and the D ring does not have a C<sub>16</sub>-C<sub>17</sub> double bond when R represents two substituents or a divalent substituent;  
Z is CH<sub>2</sub> or, when part of a double bond, CH;  
X is H, Cl, F, Br, I, CF<sub>3</sub>, or C<sub>1</sub>-alkyl;  
Y is H, CF<sub>3</sub>, F, or Cl, CH<sub>3</sub>, provided that Y is H when there is no C<sub>5</sub>-C<sub>6</sub> double bond;  
R<sup>1</sup> is absent or present as an alpha hydrogen, provided R<sup>1</sup> is absent when there is a C<sub>4</sub>-C<sub>5</sub>, C<sub>5</sub>-C<sub>6</sub>, or C<sub>5</sub>-C<sub>10</sub> double bond;  
R<sup>2</sup> is absent or present as H or CH<sub>3</sub> provided R<sup>2</sup> is absent when the carbon to which it is attached is double bonded, and  
R is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or



where W is a bond or C<sub>1-12</sub>alkyl, and R<sup>3</sup> is

- (i) hydrogen,
- (ii) hydroxyl,
- (iii) C<sub>1</sub>-alkyl,
- (iv) hydroxy C<sub>1</sub>-alkyl,
- (v) C<sub>1</sub>-alkoxy,
- (vi) N(R<sup>4</sup>)<sub>2</sub>, where each R<sup>4</sup> is independently selected from hydrogen, C<sub>1</sub>-alkyl, C<sub>3-6</sub>cycloalkyl, phenyl; or taken together with the nitrogen to which they are attached represent a 5-6 membered saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or
- (vii) OR<sup>5</sup>, where R<sup>5</sup> is hydrogen, alkali metal, C<sub>1-18</sub>alkyl, benzyl, or
- (b) —Alk-OR<sup>6</sup>, where Alk is C<sub>1-12</sub>alkyl, and R<sup>6</sup> is
  - (i) phenylC<sub>1</sub>-alkylcarbonyl,
  - (ii) C<sub>5-10</sub>cycloalkylcarbonyl,
  - (iii) benzoyl,
  - (iv) C<sub>1</sub>-alkoxycarbonyl,
  - (v) aminocarbonyl, or C<sub>1</sub>-alkyl substituted aminocarbonyl,
  - (vi) hydrogen, or
  - (vii) C<sub>1</sub>-alkyl,
- (2) —CH—W—CO—R<sup>3</sup> or —CH—W—OR<sup>6</sup>, where W is a bond or C<sub>1-12</sub>alkylidene, and R<sup>3</sup> and R<sup>6</sup> have the same meaning as above and R<sup>6</sup> also is hydrogen or C<sub>1-20</sub>-alkylcarbonyl;



where the dashed bond replaces the 17α-hydrogen,

- (4) α-hydrogen and NHCOR<sup>7</sup> where R<sup>7</sup> is C<sub>1-12</sub>alkyl or N(R<sup>4</sup>)<sub>2</sub> where R<sup>4</sup> has the same meaning as above,
- (5) α-hydrogen and cyano,
- (6) α-hydrogen and tetrazolyl, or
- (7) keto;

or a pharmaceutically acceptable salt thereof.

4,946,835

## ANTIFUNGAL FERMENTATION PRODUCT AND METHOD

Charles F. Hirsch, Sommerville; Jerrold M. Liesch, Princeton Junction; Michael J. Salvatore, South Plainfield; Robert E. Schwartz, and David F. Sesin, both of Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

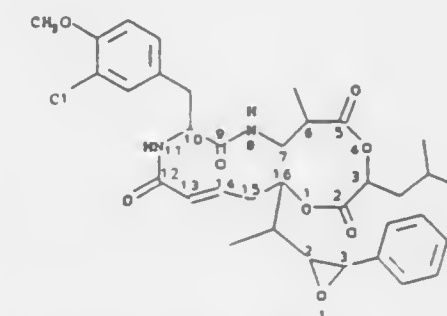
Filed Jul. 15, 1988, Ser. No. 219,942

Int. Cl.<sup>5</sup> A61K 31/395; C07D 273/08

U.S. Cl. 514—183

6 Claims

1. A compound represented by the formula



4. A method for controlling fungal growth comprising administering to an area where growth is to be controlled, an antifungally effective amount of the compound of claim 1.

4,946,836

## NITROGEN-CONTAINING CYCLO-ALIPHATIC COMPOUNDS HAVING AN AMINO RADICAL AND A PYRIDINE RADICAL

Jürgen Engel, Alzenau; Axel Kleemann, Mühlheim; Bernd Nickel, Mühlital, and Istvan Szeleanyi, Schwaig, all of Fed. Rep. of Germany, assignors to Asta Pharma AG, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 182,662, Apr. 18, 1988, abandoned.

This application Aug. 28, 1989, Ser. No. 399,439

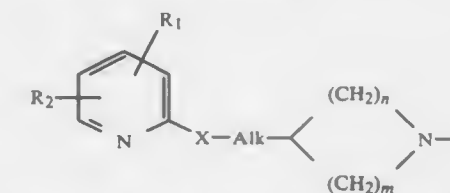
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 3713246

Int. Cl.<sup>5</sup> A61K 31/55; C07D 401/12

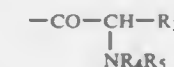
U.S. Cl. 514—183

3 Claims

1. Compounds of the formula

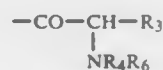


wherein the radicals R<sub>1</sub> and R<sub>2</sub> are the same or different and represent hydrogen, halogen atoms, a trifluoromethyl group, a cyano group, a nitro group, an amino group, a mono-C<sub>1</sub>-C<sub>6</sub>-alkylamino group, a di-C<sub>1</sub>-C<sub>6</sub>-alkylamino group, an amino group that is substituted by a phenyl-C<sub>1</sub>-C<sub>4</sub>-alkyl radical or a halogenphenyl-C<sub>1</sub>-C<sub>4</sub>-alkyl radical, a C<sub>2</sub>-C<sub>6</sub>-alkanoylamino group, a C<sub>1</sub>-C<sub>6</sub>-alkoxycarbonylamino group, a C<sub>1</sub>-C<sub>6</sub>-alkyl group optionally substituted by a phenol radical, a hydroxy group, a C<sub>1</sub>-C<sub>6</sub>-alkoxy group, a C<sub>2</sub>-C<sub>6</sub>-alkanoyloxy group, a phenoxy group or a carbamoyl group optionally substituted by one or two C<sub>1</sub>-C<sub>6</sub>-alkyl groups, the radical A represents the group



wherein R<sub>3</sub> is hydrogen, a phenyl radical, an indolyl-(3)-methyl radical, imidazolyl-(4)-methyl radical, a C<sub>1</sub>-C<sub>10</sub>-alkyl group, or wherein R<sub>3</sub> represents a C<sub>1</sub>-C<sub>10</sub>-alkyl group which is substituted by a carboxy group, a C<sub>1</sub>-C<sub>6</sub>-alkoxycarbonyl group, an aminocarbonyl group, a hydroxy group, a C<sub>1</sub>-C<sub>6</sub>-alkoxy group, a C<sub>2</sub>-C<sub>6</sub>-alkanoyloxy group, a mercapto group, a C<sub>1</sub>-C<sub>6</sub>-alkylthio group, a C<sub>2</sub>-C<sub>6</sub>-alkanoyl mercapto group, a phenol group, a hydroxyphenyl group, a dihydroxyphenyl group, an amino-C<sub>1</sub>-C<sub>6</sub>-alkylthio group, an amino-C<sub>1</sub>-C<sub>6</sub>-alkoxy group, an amino group, a ureido group (H<sub>2</sub>NCONH—) or a guanidino group where R<sub>3</sub> together with the structural portion >CH(NHR<sub>4</sub>) represents the pyrrolidine-2-yl radical (proline radical) or the 4-hydroxy-pyrrolidine-2-yl radical, R<sub>4</sub> is hydrogen, benzyl or a C<sub>1</sub>-C<sub>6</sub>-alkyl

radical, R<sub>5</sub> is hydrogen, benzyl, a C<sub>1</sub>-C<sub>6</sub>-alkyl radical, a C<sub>2</sub>-C<sub>6</sub>-alkanoyl radical or the group



wherein R<sub>3</sub> and R<sub>4</sub> have the meanings stated above and R<sub>6</sub> is hydrogen, benzyl or C<sub>2</sub>-C<sub>6</sub>-alkanoyl, X is oxygen, sulphur, SO or SO<sub>2</sub>, Alk is a direct bond or alkylene with 1-4 carbon atoms and n and m are the same or different and can represent the numbers 1-3, provided that n can also be 0 when Alk is alkylene and m represents in this case the numbers 2-6, their pyridine-N-oxides and/or amino oxides or a pharmaceutically-acceptable salt thereof.

4,946,837

## CEPHEM COMPOUNDS

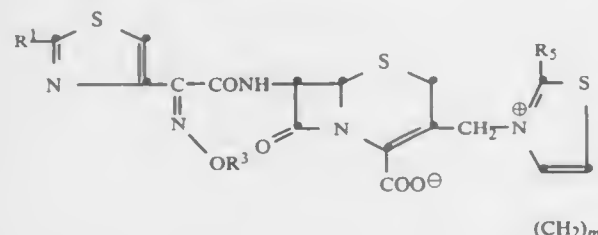
Akio Miyake, Hirakata; Masahiro Kondo, Osaka, and Masahiko Fujino, Takarazuka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan  
Filed May 12, 1988, Ser. No. 195,399

Claims priority, application PCT Int'l Appl., Jun. 8, 1984, PCT/JP84/00296; Apr. 30, 1985, PCT/JP85/00245  
Int. Cl.<sup>3</sup> C07D 501/46; A61K 31/545

U.S. Cl. 514-206

19 Claims

1. Cephem compound of the formula:



wherein R<sup>1</sup> stands for protected or unprotected amino, R<sup>2</sup> stands for hydrogen or C<sub>1-3</sub> alkyl unsubstituted or substituted with a group selected from the class consisting of carboxyl, methoxycarbonyl, ethoxycarbonyl, n-propoxycarbonyl, isopropoxycarbonyl, n-butoxycarbonyl, carbamoyl, N-methylcarbamoyl, N,N-dimethylcarbamoyl, and N-ethylcarbamoyl, and R<sup>3</sup> is selected from the class consisting of hydrogen, hydroxyl, C<sub>1-4</sub> hydroxyalkyl, halogen, C<sub>1-4</sub> halogenoalkyl, cyano, cyano-C<sub>1-4</sub> alkyl, carboxyl carboxy-C<sub>1-4</sub> alkyl, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec-butyl, tert-butyl, methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, tert-butoxy, methoxymethyl, ethoxymethyl, 2-methoxyethyl methoxycarbonyl, ethoxycarbonyl, n-propoxycarbonyl, isopropoxycarbonylmethyl, ethoxycarbonylmethyl, tert-butoxycarbonylmethyl, methoxycarbonylmethyl, tert-butoxycarbonylmethyl, acetoxymethyl, propionyl, and butyryloxy, and wherein m is 3 to 5.

4,946,838

## CRYSTALLINE ANHYDROUS AZTREONAM

David Floyd, Pennington; Octavian R. Kocy, Kendall Park; Donald C. Monkhouse, Princeton, and James D. Pipkin, New Brunswick, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 282,636, Jul. 13, 1981, abandoned. This application Jul. 28, 1986, Ser. No. 888,640

Int. Cl.<sup>3</sup> C07D 205/085; A61K 31/395

U.S. Cl. 514-210

6 Claims

1. A dry mixture of the crystalline, anhydrous form of [3S-[3α(Z), 4β]]-3-[[[(2-amino-4-thiazolyl)](1-carboxy-1-methylethoxy) imino]acetyl]amino]-4-methyl-2-oxo-1-azetidinesulfonic acid and a basic material.

4,946,839  
AZETIDINE DERIVATIVES, COMPOSITIONS AND METHODS OF TREATING

Alan P. Kozikowski, Pittsburgh, Pa.; Jarda T. Wroblewski, Kensington, and Erminio Costa, Chevy Chase, both of Md., assignors to Fidia-Georgetown Institute for the Neurosciences, Washington, D.C.

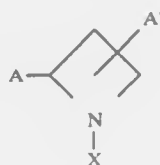
Filed Jul. 17, 1987, Ser. No. 74,958

Int. Cl.<sup>3</sup> A61K 31/395; C07D 205/04

U.S. Cl. 514-210

15 Claims

1. A compound having the formula



wherein A and A' are the same or different and selected from the group consisting of



and C(OR)<sub>2</sub>H and wherein R and R' are the same or different and selected from the group consisting of hydrogen and lower alkyl, benzyl, and an amino acid; n = 1-6; X is hydrogen, or an acyl group and pharmaceutically acceptable salts thereof.

4,946,840

## BENZAZEPINE AND BENZOTHIAZEPINE DERIVATIVES

Joel C. Barrish, Holland, Pa.; Spencer D. Kimball, East Windsor, and John Krapcho, Somerset, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

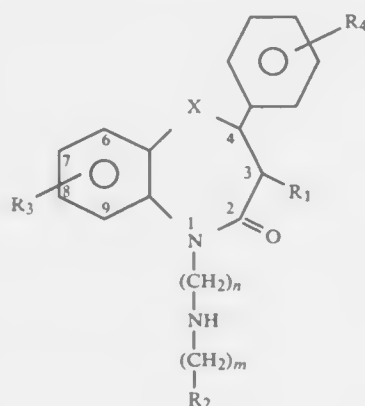
Filed Apr. 6, 1989, Ser. No. 334,025

Int. Cl.<sup>3</sup> A61K 31/55; C07D 417/12, 405/12

U.S. Cl. 514-211

18 Claims

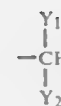
1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein:

X is —CH<sub>2</sub>— or —S—;

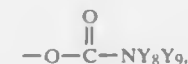
R<sub>1</sub> is



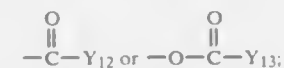
or —O—Y<sub>3</sub>;

R<sub>2</sub> is imidazolyl, furanyl, pyridinyl, pyrrolyl, indolyl, piperidinyl, morpholinyl, or any of such groups substituted with alkyl;

R<sub>3</sub> and R<sub>4</sub> are each independently hydrogen, halogen, alkyl, alkoxy, aryloxy, arylalkoxy, arylalkyl, cyano, hydroxy, alkanoyloxy,



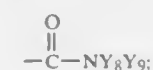
fluoro-substituted alkoxy, fluoro-substituted alkyl, (cycloalkyl)alkoxy, —NO<sub>2</sub>, —NY<sub>10</sub>Y<sub>11</sub>, —S(O)<sub>k</sub>alkyl, —S(O)<sub>k</sub>aryl,



n is 0, 1, 2 or 3;  
m is 0, 1, 2 or 3;  
k is 0, 1 or 2;

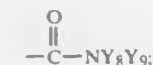
Y<sub>1</sub> and Y<sub>2</sub> are each independently hydrogen or alkyl; or Y<sub>1</sub> is hydrogen and Y<sub>2</sub> is alkenyl, alkynyl, aryl, or cycloalkyl; or Y<sub>1</sub> and Y<sub>2</sub>, together with the carbon atom to which they are attached, are cycloalkyl;

Y<sub>3</sub> is hydrogen, alkyl, alkanoyl, alkenyl, arylcarbonyl, or



Y<sub>8</sub> and Y<sub>9</sub> are each independently hydrogen, alkyl, or aryl; or Y<sub>8</sub> and Y<sub>9</sub>, together with the nitrogen atom to which they are attached, are pyrrolidinyl, piperidinyl, or morpholinyl;

Y<sub>10</sub> and Y<sub>11</sub> are each independently hydrogen, alkyl, alkanoyl, arylcarbonyl, or



Y<sub>12</sub> is hydroxy, alkoxy, aryloxy, amino, alkylamino, or dialkylamino; and

Y<sub>13</sub> is alkyl, alkoxy or aryloxy; and wherein:

"alkyl" and "alkoxy" refer to straight and branched chain hydrocarbon groups having 1 to 10 carbon atoms;

"alkenyl" and "alkynyl" refer to straight and branched chain hydrocarbon groups having 2 to 10 carbon atoms;

"aryl" refers to unsubstituted phenyl groups and to phenyl groups substituted with 1, 2, or 3 groups selected from amino, alkylamino, dialkylamino, nitro, halogen, hydroxyl, trifluoromethyl, alkyl (of 1 to 4 carbon atoms), alkoxy (of 1 to 4 carbon atoms), alkylthio (of 1 to 4 carbon atoms), alkanoyloxy, carbamoyl, and carboxyl;

"alkanoyl" refers to groups of the formula alkyl



having 2 to 11 carbon atoms;

"cycloalkyl" refers to cyclic hydrocarbon groups having 3, 4, 5, 6, or 7 carbon atoms; and

"fluoro-substituted alkyl" and "fluoro-substituted alkoxy"

refer to alkyl and alkoxy groups in which one or more hydrocarbon atoms are replaced by fluorine atoms.

17. A method of treating a host having a disease susceptible to treatment with a vasodilator, which comprises administering to said host an effective amount of a compound as defined in claim 1.

4,946,841

## PYRIDAZINE 3,5-DIHYDROXY CARBOXYLIC ACIDS AND DERIVATIVES THEREOF, THE USE THEREOF FOR HYPERCHOLESTEROLEMIA

Ekkehard Baader, Königstein/Taunus; Heiner Jendralla, Frankfurt am Main; Bela Kerekjarto, Hofheim am Taunus, and Gerhard Beck, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 294,096

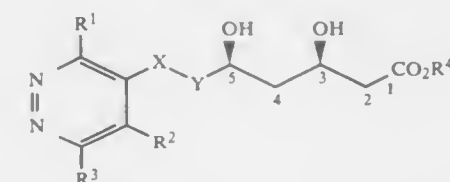
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800439; Jan. 14, 1988, 3800785

Int. Cl.<sup>3</sup> A61K 31/50; C07D 237/06

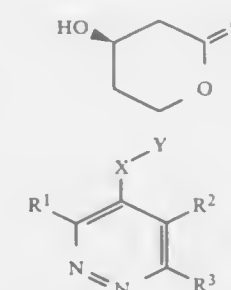
U.S. Cl. 514-247

6 Claims

1. 3,5-Dihydroxy carboxylic acids and derivatives thereof, of the formula I



and the corresponding lactones of the formula II



where, in the general formulae I and II, X-Y denotes a radical of the formula —CH=CH— or —CH<sub>2</sub>—CH<sub>2</sub>—

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> denote, independently of one another hydrocarbon, a saturated or unsaturated, straight-chain or branched hydrocarbon radical which has up to 6 carbon atoms and can optionally be substituted on the terminal carbon by a saturated or unsaturated, cyclic hydrocarbon radical having 3 to 6 carbon atoms, or denote a cyclic, saturated or up to doubly unsaturated hydrocarbon radical having 3 to 7 carbon atoms, an aromatic radical selected from phenyl, furyl, thienyl and pyridyl, which can optionally carry in the nucleus 1 to 3 identical or different substituents selected halogen trifluoromethyl, alkyl and alkenyl, having up to 6 carbon atoms in each case, hydroxyl, alkoxy having 1 to 6 carbon atoms, carboxyl or carbalkoxy having 1 to 6 carbon atoms in the alkoxy moiety,

R<sup>4</sup> denotes hydrogen, a straight-chain or branched, saturated or unsaturated hydrocarbon radical having up to 8 carbon atoms, mono- or dihydroxyalkyl having 1 to 4 carbon atoms, a phenyl or benzyl radical whose nuclei can be substituted once or twice by halogen or an alkyl radical having 1 to 4 carbon atoms, or denotes alkali metal or an ammonium ion.



4,946,842  
GUANIDINO PYRIDAZINONES AS CARDIAC  
STIMULANTS

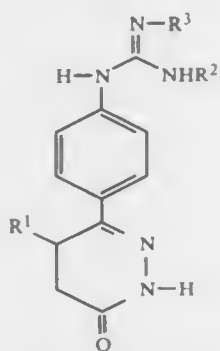
William J. Coates, Welwyn Garden City; John C. Emmett, Welwyn, and Robert A. Slater, Letchworth, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Filed Jun. 30, 1986, Ser. No. 880,372

Claims priority, application United Kingdom, Jul. 5, 1985, 8517052; Jul. 5, 1985, 8517053; Jul. 5, 1985, 8517054; Jul. 5, 1985, 8517055

Int. Cl.<sup>5</sup> C07D 237/04, 401/12, 403/12; A61K 31/50  
U.S. Cl. 514—247 20 Claims

1. A compound of the formula (I):



or a pharmaceutically acceptable salt thereof wherein:

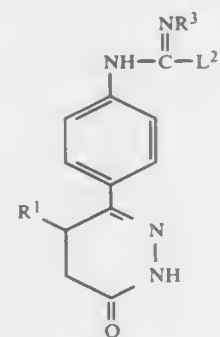
R<sup>1</sup> is hydrogen or methyl;

R<sup>2</sup> is C<sub>1-4</sub> alkyl, or C<sub>1-4</sub> alkyl substituted by one or two groups selected from hydroxy, C<sub>1-4</sub> alkoxy, carbamoyl, C<sub>1-4</sub> alkoxy-carbonyl and trifluoromethyl, provided that the carbon atom adjacent to the nitrogen atom is not substituted by hydroxy and that no carbon atom is distributed by hydroxy, or —A—R<sup>4</sup> where A is C<sub>1-4</sub> alkylene (straight or branched) and R<sup>4</sup> is phenyl or phenyl substituted by one or two alkoxy, halo, hydroxy, sulfonamido, or trifluoromethyl groups, or is 2-, 3- or 4- pyridyl or 2-benzimidazolyl;

R<sup>3</sup> is cyano, COR<sup>5</sup> or —SO<sub>2</sub>R<sup>6</sup> where R<sup>5</sup> is C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy or phenyl and R<sup>6</sup> is NHR<sup>7</sup>, C<sub>1-4</sub> alkyl or phenyl; and R<sup>7</sup> is hydrogen or C<sub>1-4</sub> alkyl, R<sup>2</sup> can also be C<sub>3-6</sub> cycloalkyl, alkyl or propargyl when R<sup>3</sup> is cyano; provided that R<sup>2</sup> is not C<sub>1-4</sub> alkyl when R<sup>3</sup> is cyano.

18. A pharmaceutical composition having phosphodiesterase (type III) inhibition activity which comprises an effective amount thereof of a compound according to claim 1 and a pharmaceutically acceptable carrier.

20. A compound of the formula (IV):



wherein:

R<sup>1</sup> is hydrogen or methyl,

R<sup>3</sup> is COR<sup>5</sup> or SO<sub>2</sub>R<sup>6</sup> where R<sup>5</sup> is C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy or phenyl and R<sup>6</sup> is NHR<sup>7</sup>, C<sub>1-4</sub> alkyl or phenyl; and R<sup>7</sup> is hydrogen or C<sub>1-4</sub> alkyl; and

L<sup>2</sup> is selected from the group consisting of benzylthio, C<sub>1-6</sub> alkylthio, C<sub>1-6</sub> alkoxy, phenoxy and benzyloxy.

4,946,843  
2-(HETEROCYCLYLALKYL)IMIDAZOPYRIDINES

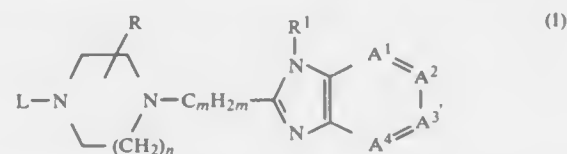
Frans E. Janssens, Bonheiden; Francois M. Sommen, Wortel; Joseph L. G. Torremans, Beerse, and Gaston S. M. Diels, Ravels, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed Jun. 27, 1988, Ser. No. 211,652

Claims priority, application United Kingdom, Jul. 10, 1987, 87/16313

Int. Cl.<sup>5</sup> A61K 31/495, 31/505; C07D 403/06  
U.S. Cl. 514—253 15 Claims

1. A method of treating allergic diseases in warm-blooded animals suffering from the same, which method comprises the systemic administration to warm blooded animals of an effective anti-allergic amount of a compound of the formula:



a pharmaceutically acceptable acid addition salt or a stereochemically isomeric form thereof, wherein:

—A<sup>1</sup>=A<sup>2</sup>—A<sup>3</sup>=A<sup>4</sup>— represents a bivalent radical of the formula:

—N=CH—CH=CH— (a-1);

—CH=N—CH=CH— (a-2);

—CH=CH—N=CH— (a-3); or

—CH=CH—CH=N— (a-4);

wherein one or two hydrogen atoms in said radicals (a-1)–(a-4) may, each independently from each other, be replaced by halo, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkyloxy, trifluoromethyl, or hydroxy;

R represents hydrogen or C<sub>1-6</sub> alkyl;

R<sup>1</sup> represents hydrogen, C<sub>1-10</sub> alkyl, C<sub>3-6</sub> cycloalkyl, Ar<sup>1</sup>, C<sub>1-6</sub> alkyl substituted with one or two Ar<sup>1</sup> radicals, or a radical of the formula —Alk—G—R<sup>2</sup>, wherein:

Ar<sup>1</sup> represents phenyl; phenyl substituted with 1, 2, or 3 substituents each independently selected from halo, hydroxy, nitro, cyano, trifluoromethyl, C<sub>1-6</sub> alkyloxy, C<sub>1-6</sub> alkylthio, mercapto, amino, mono- and di(C<sub>1-6</sub> alkyl)amino, carboxyl, C<sub>1-6</sub> alkyloxycarbonyl, and C<sub>1-6</sub> alkylcarbonyl; thienyl; halothienyl; furanyl; C<sub>1-6</sub> alkyl substituted furanyl; pyridinyl; pyrimidinyl; pyrazinyl; thiazolyl; imidazolyl; or imidazolyl substituted with C<sub>1-6</sub> alkyl;

Alk represents C<sub>1-6</sub> alkanediyl;  
G represents O, S, or NR<sup>3</sup>, wherein R<sup>3</sup> represents hydrogen, C<sub>1-6</sub> alkylcarbonyl, C<sub>1-6</sub> alkyloxycarbonyl, or Ar<sup>2</sup>—C<sub>1-6</sub> alkyl;

Ar<sup>2</sup> represents phenyl or phenyl substituted with 1, 2, or 3 substituents each independently selected from halo, hydroxy, nitro, cyano, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkyloxy, C<sub>1-6</sub> alkylthio, mercapto, amino, mono- and di(C<sub>1-6</sub> alkyl)amino, carboxyl, C<sub>1-6</sub> alkyloxycarbonyl and C<sub>1-6</sub> alkylcarbonyl; and

R<sup>2</sup> represents hydrogen; C<sub>2-6</sub> alkenyl; C<sub>2-6</sub> alkenyl substituted with Ar<sup>2</sup>; C<sub>3-6</sub> alkynyl; Ar<sup>1</sup>; C<sub>1-6</sub> alkyl; or C<sub>1-6</sub> alkyl substituted with Ar<sup>1</sup>, hydroxy, C<sub>1-6</sub> alkyloxy, carboxyl, C<sub>1-6</sub> alkyloxycarbonyl, Ar<sup>2</sup>-oxycarbonyl, or Ar<sup>2</sup>—C<sub>1-6</sub> alkyloxycarbonyl, wherein Ar<sup>1</sup> and Ar<sup>2</sup> are as defined above;

m represents a number having a value of from 1 to 4;

n represents a number having a value of from 1 to 2; and L represents hydrogen, C<sub>1-6</sub> alkylcarbonyl, C<sub>1-6</sub> alkylsulfonyl, C<sub>1-6</sub> alkyloxycarbonyl, Ar<sup>2</sup>—C<sub>1-6</sub> alkyloxycarbonyl, Ar<sup>2</sup>-carbonyl, Ar<sup>2</sup>-sulfonyl, C<sub>3-6</sub> cycloalkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkenyl substituted with Ar<sup>2</sup>, C<sub>1-12</sub> alkyl, wherein Ar<sup>2</sup> is as defined above, or a radical of the formula:

—Alk—R<sup>4</sup> (b-1)

—Alk—Y—R<sup>5</sup> (b-2)

—Alk—Z<sup>1</sup>—(C=X)—Z<sup>2</sup>—R<sup>6</sup> (b-3) or

—CH<sub>2</sub>—CHOH—CH<sub>2</sub>—O—R<sup>7</sup> (b-4);

wherein:

Alk is as defined above;

R<sup>4</sup> represents Ar<sup>2</sup>, cyano, isocyanato, isothiocyanato, Ar<sup>2</sup>-sulfonyl, or halo, wherein Ar<sup>2</sup> is as defined above; R<sup>5</sup> represents hydrogen, Ar<sup>2</sup>, C<sub>1-6</sub> alkyl, or C<sub>1-6</sub> alkyl substituted with halo or Ar<sup>2</sup>, wherein Ar<sup>2</sup> is as defined above;

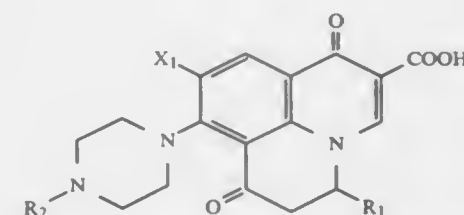
R<sup>6</sup> represents hydrogen, Ar<sup>2</sup>, C<sub>1-6</sub> alkyl, or C<sub>1-6</sub> alkyl substituted with halo or Ar<sup>2</sup>, wherein Ar<sup>2</sup> is as defined above;

R<sup>7</sup> represents Ar<sup>2</sup> or naphthalenyl, wherein Ar<sup>2</sup> is as defined above;

Y represents O, S, NR<sup>8</sup>, wherein R<sup>8</sup> represents hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkylcarbonyl, or Ar<sup>1</sup>-carbonyl, wherein Ar<sup>1</sup> is as defined above;

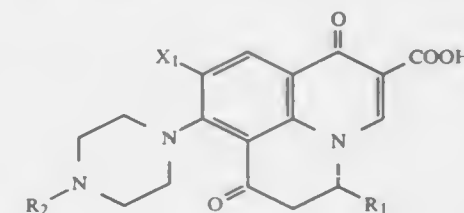
Z<sup>1</sup> and Z<sup>2</sup> each independently represent O, S, NR<sup>9</sup>, or a direct bond, wherein R<sup>9</sup> represents hydrogen or C<sub>1-6</sub> alkyl; and

X represents O, S, or NR<sup>10</sup>, wherein R<sup>10</sup> represents hydrogen, C<sub>1-6</sub> alkyl, or cyano.



where X<sub>1</sub> represents a halogen atom, and R<sub>1</sub> and R<sub>2</sub> represent lower alkyl groups, a physiologically active salt thereof, or a hydrate of either of the foregoing compounds, which comprises optically resolving the benzoquinolizine compound in a solvent containing a metallic ion and an amino acid, with the aid of a resolving agent containing octadecylsilylated silica gel as a component.

18. An antibacterial composition comprising a pharmaceutical carrier or diluent and an antibacterially effective amount of an optically active (+)-isomer of a benzoquinolizine compound of the formula



where X<sub>1</sub> represents a halogen atom, and R<sub>1</sub> and R<sub>2</sub> represent lower alkyl groups, a physiologically acceptable salt thereof, or a hydrate of either of the foregoing compounds.

4,946,845  
NAPHTHALENE ANTI-PSORIASIS AGENTS

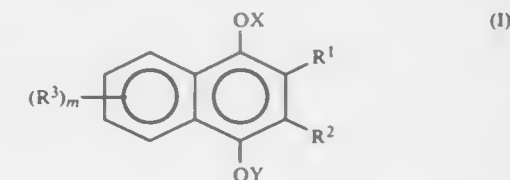
D. V. Krishna Murthy, Cupertino; Michael C. Veneti, San Francisco, and John M. Young, Redwood City, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 856,929, Apr. 28, 1986, Pat. No. 4,792,556, which is a continuation-in-part of Ser. No. 773,912, Sep. 9, 1985, abandoned. This application Nov. 25, 1988, Ser. No. 248,525

Int. Cl.<sup>5</sup> A61K 31/22, 31/275, 31/415, 31/44; C07C 69/35, 121/15

U.S. Cl. 514—256 14 Claims

1. A compound of the formula

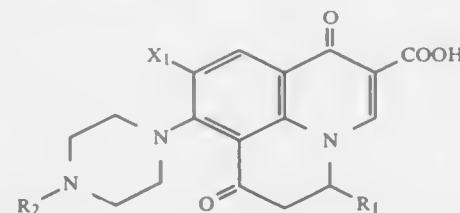


wherein:

m is 0, 1 or 2;

R<sup>1</sup> and R<sup>2</sup> are the same and are lower alkoxy or phenoxy optionally substituted by one or two lower alkyl of one to four carbon atoms, lower alkoxy of one to four carbon atoms or halo;

R<sup>3</sup> is lower alkyl, lower alkoxy, halo, amino, lower alkyl-amino, lower dialkylamino, halo, cyano, phenyl optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino and lower acyl-amino, phenyl-lower-alkyl wherein the phenyl ring is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy,



where X<sub>1</sub> represents a halogen atom, and R<sub>1</sub> and R<sub>2</sub> represent lower alkyl groups, a physiologically acceptable salt thereof, or a hydrate of either of the foregoing compounds.

11. A process for preparing an optically active (+)-isomer of a benzoquinolizine compound of the formula

halo, lower acyl, lower acyloxy, cyano, nitro, amino and lower acylamino, phenyl-lower-alkoxy wherein the phenyl ring is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino and lower acylamino, or  $S(O)_nR$  wherein  $n$  is 0, 1 or 2, and  $R$  is lower alkyl, phenyl optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino and lower acylamino, phenyl-lower-alkyl wherein the phenyl ring is optionally substituted by one or more substituents selected from the group consisting of thiapyranyl, benzothiapyranyl, furyl, pyrrolyl, imidazolyl, pyrazolyl, pyridinyl, pyrimidinyl, indolyl, quolinyl and indazolyl wherein the heterocyclic aryl is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and cyano and the pharmaceutically acceptable acid addition salts thereof;

with the proviso that if  $R^3$  is phenyl, phenyl-lower-alkyl, phenyl-lower-alkoxy, amino, lower alkylamino, lower dialkylamino, cyano, or  $S(O)_nR$ , then  $m$  is not 2;

one of  $X$  or  $Y$  is  $C(O)W$  and the other is  $R^4$ , wherein  $W$  is alkyl, phenyl optionally substituted by one or two substituents selected from the group consisting of lower alkyl of one to four carbon atoms, lower alkoxy of one to four carbon atoms and halo, and  $R^4$  is lower alkyl of one to four carbon atoms or phenyl-lower-alkyl wherein the phenyl ring is optionally substituted with one or two lower alkyl of one to four carbon atoms, lower alkoxy of one to four carbon atoms or halo; or a pharmaceutically acceptable acid addition salt thereof.

4,946,846

**FUSED PYRIMIDINES, THEIR PRODUCTION AND USE**  
Hiroaki Nomura, Osaka; Hiroshi Akimoto, and Tetsuo Miwa, both of Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 27, 1989, Ser. No. 329,374

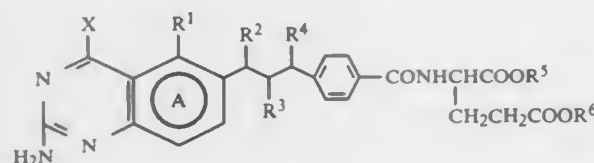
Claims priority, application Japan, Apr. 1, 1988, 63-82043; Feb. 6, 1989, 64-28120

Int. Cl.<sup>5</sup> A61K 31/505; C07D 471/04

U.S. Cl. 514-258

35 Claims

1. A compound of the general formula:



wherein the ring A is a pyridine ring which may be hydrogenated or a benzene ring which may be hydrogenated,  $X$  is an amino group or a hydroxyl group,  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  are independently hydrogen, fluorine or a lower alkyl group, and  $-COOR^5$  and  $-COOR^6$  are independently a carboxyl group which may be esterified, or a salt thereof.

4,946,847

**QUINOLINE DERIVATIVES**

Synèse Jolidon, Therwil; Rita Locher, Basel; Ivan Kompis, Oberwil, all of Switzerland; Ekkehard Weiss, Inzlingen, Fed. Rep. of Germany, and Pierre-Charles Wyss, Muttens, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J. Division of Ser. No. 910,566, Sep. 22, 1986, Pat. No. 4,806,541. This application Nov. 21, 1988, Ser. No. 274,162

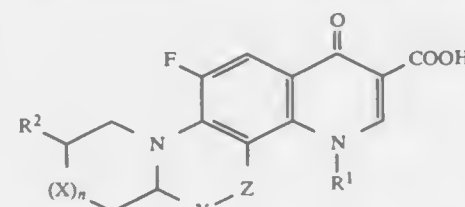
Claims priority, application Switzerland, Sep. 24, 1985, 4120/85; Aug. 7, 1986, 3177/86

Int. Cl.<sup>5</sup> A61K 31/535; C07D 498/14

U.S. Cl. 514-229.5

10 Claims

5. A method of treating bacterial infections which comprises administering to a host requiring such treatment an antibacterially effective amount of a compound of the formula



wherein

$n$  is the integer 1 or 0,

$X$  is a group  $N-R$ ,

$R$  is a hydrogen,  $C_{1-4}$ -alkyl,  $C_{2-4}$ -alkylene- $N(R^a, R^b)$ , benzyl or benzyl independently ring-substituted by up to 3 substituents selected from the group consisting of hydroxy, halogen,  $C_{1-4}$ -alkyl,  $C_{1-4}$ -alkoxy or nitro,

$Y$  is methylene or ethylene,

$Z$  is methylene, O or S,

$R^1$  is  $C_{3-6}$ -cycloalkyl,  $N(R^c, R^d)$ , phenyl or phenyl independently substituted by up to 3 substituents selected from the group consisting of hydroxy, halogen,  $C_{1-4}$ -alkyl,  $C_{1-4}$ -alkoxy or nitro; or optionally fluorinated  $C_{1-4}$ -alkyl or  $C_{2-4}$ -alkenyl,

$R^2$  is hydrogen,  $C_{1-4}$ -alkyl or, when  $n$  is 0, it can also be OH or  $N(R^e, R^f)$ ,

$R^a$  to  $R^f$  are hydrogen or  $C_{1-4}$ -alkyl or  $N(R^g, R^h)$  is a 5- or 6-membered saturated ring which can contain containing an additional heteroatom selected from O or N- $R^g$ ,

an enantiomer or diastereomer thereof, or pharmaceutically acceptable salt thereof.

4,946,848

**METHOD OF TREATING PRURITUS WITH NALMEFENE AND CLONIDINE**

Ronald R. Tuttle, Escondido, Calif., and J. R. Thornton, Leeds, England, assignors to Baker Cumins Dermatologicals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 43,525, Apr. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 792,587, Oct. 29, 1985, abandoned. This application Feb. 21, 1989, Ser. No. 312,720

Int. Cl.<sup>5</sup> A31K 31/485

U.S. Cl. 514-282

4 Claims

1. A method of treating a human patient suffering from pruritus comprising: (a) orally administering to said patient from about 1 to about 25 mg. of nalmefene per day for an initial period, (b) gradually increasing the amount of nalmefene administered in successive periods by about 1 to about 25 mg. per day up to a maximum of about 150 mg. per day, and (c) orally administering from about 25 to about 1,000 mg. of clonidine or clonidine hydrochloride to the patient daily concomitantly with the nalmefene, whereby tolerance develops to any opioid withdrawal symptoms induced by the nalmefene while the patient's pruritus is substantially alleviated.

4,946,849

**METHOD FOR THE TREATMENT OF MALARIA**  
Michael T. Makler, Portland, Oreg., assignor to Flow Incorporated, Portland, Oreg.

Filed Oct. 10, 1989, Ser. No. 418,086

Int. Cl.<sup>5</sup> A61K 31/47

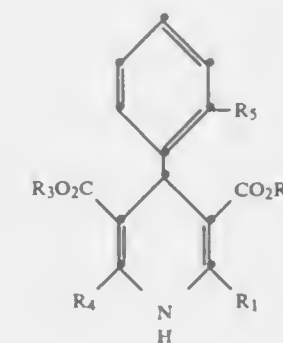
U.S. Cl. 514-313

5 Claims

1. A method for the treatment of malaria in warm blooded animals afflicted with malaria comprising administering a composition comprising a dequalinium salt wherein said dequalinium salt is selected from the group consisting of an acetate, chloride bromide, iodide, and salicylate salt;

to a warm blooded animal afflicted with malaria at a therapeutically effective level sufficient to kill malaria parasites within said animal; and

allowing said composition to kill said malaria parasites in said animal.



wherein,

$R_1$  and  $R_4$  independently represent a  $C_{1-4}$  alkyl group;

$R_2$  and  $R_3$  independently represent a  $C_{1-6}$  straight or branched chain alkyl or a  $C_{1-4}$  alkyl group substituted by a  $C_{1-3}$  alkoxy group;

$R_5$  represents a group  $CH=CR_6R_7$  where  $R_6$  is a hydrogen atom or  $C_{1-3}$  alkyl group and  $R_7$  represents a phenyl group optionally substituted by one or more halogen atoms or  $C_{1-4}$  alkyl or  $C_{1-4}$  alkoxy groups, pyridyl or cyano group; or

$R_5$  represents the group  $C|CR_8$  where  $R_8$  is a phenyl group optionally substituted by one or more halogen atoms or  $C_{1-4}$  alkyl or  $C_{1-4}$  alkoxy groups.

4,946,852

**4(R)-SUBSTITUTED 6(S)-PHENOXYMETHYL-, 6(S)-BETA-PHENYLENTHYL-AND 6(S)-BETA-STYRYL-TETRAHYDROPYRAN-2-ONES, A HIGHLY STEREOSELECTIVE PROCESS FOR THEIR PREPARATION, PHARMACEUTICAL PRODUCTS BASED ON THESE COMPOUNDS, AND THEIR USE**

Heiner Jendralla, Kelkheim; Gerhard Beck, Frankfurt am Main; Günther Wess, Erlensee, and Bela Kerekjarto, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 46,689, May 7, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 330,979

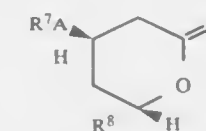
Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615620

Int. Cl.<sup>5</sup> A61K 31/365, 31/44; C07B 213/24, 307/08

U.S. Cl. 514-336

5 Claims

1. A 4(R)-substituted 6(S)-phenyloxymethyl-, 6(S)- $\beta$ -phenylethyl- and 6(S)- $\beta$ -styryl-tetrahydropyran-2-one of the formula V



in which:

A is -S-

$R^7$

(a) is a straight-chain or branched alkyl group which has 1-3 carbon atoms and which is unsubstituted or is substituted (aa) by a hydroxyl group

(ab) by an amino or ammonium group

(ac) by a carboxyl group  $CO_2H$  or the methyl, ethyl or benzyl ester or methyl- or dimethylamide or sodium, potassium or ammonium salt thereof

(ad) by a phenyl group

(ae) by 1 to 3 halogen atoms

(b) is an alkanoyl group

4,946,851

**1,4-DIHYDROPYRIDINES**

Claudio Semeraro, Bresso; Dino Micheli, Carpi; Daniele Pieracoli; Giovanni Gaviraghi, both of Verona, all of Italy, and Alan D. Borthwick, London, England, assignors to Glaxo, Sp.A., Italy

Continuation of Ser. No. 16,256, Feb. 19, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 266,233

Claims priority, application Italy, Feb. 20, 1986, 19481 A/86

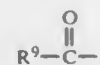
Int. Cl.<sup>5</sup> A61K 31/455; C07D 211/86

U.S. Cl. 514-332

18 Claims

1. A compound of general formula (I)



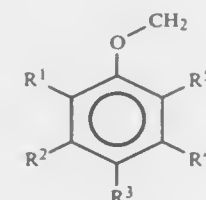


in which R<sup>9</sup> is a straight-chain or branched alkyl group which has 1 to 4 carbon atoms and is unsubstituted or is substituted by the groups recited under (aa) or (ae)

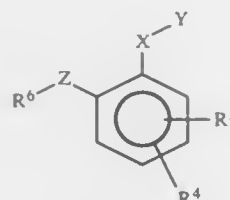
(c) is a carboxyl group, the methyl, ethyl or benzyl ester, or methyl- or dimethylamide, or sodium, potassium or ammonium salt thereof, or

(d) is hydrogen

R<sup>8</sup> represents the structural elements of the formulae VI or VII



or



in which

X-Y is a group of the formula trans -CH=CH- or -CH<sub>2</sub>-CH<sub>2</sub>-

Z is a -CH<sub>2</sub>- or -CH<sub>2</sub>-CH<sub>2</sub>- group

R<sup>1</sup> and R<sup>5</sup> are identical or different and

(a) are hydrogen or halogen

(b) are cycloalkyl with 4 to 8 carbon atoms or a phenyl group, which is unsubstituted or is mono-, di- or tri-substituted in the nucleus by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl and alkoxy, said alkyl or alkoxy having 1 to 4 carbon atoms, or

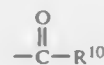
(c) is a straight-chain or branched alkyl group with 1 to 18 carbon atoms, a straight-chain or branched alkenyl group with 2 to 18 carbon atoms, said alkyl and alkenyl groups being unsubstituted or mono-, di- or trisubstituted by

(i) a straight-chain or branched alkoxy group with up to 10 carbon atoms, a cycloalkoxy group with 3 to 7 carbon atoms, or a straight-chain or branched alkenyloxy or alkyloxy group with 3 to 6 carbon atoms

(ii) halogen, hydroxyl, cycloalkyl with 3 to 7 carbon atoms, unsubstituted phenyl or α- or β-thienyl groups or phenyl or α- or β-thienyl groups which are mono-, di- or trisubstituted in the nucleus by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl and alkoxy, said alkyl or alkoxy having 1 to 4 carbon atoms,

(iii) unsubstituted phenoxy, benzyloxy or α- or β-thienyloxy groups, or phenoxy, benzyloxy or α- or β-thienyloxy groups which are mono-, di- or trisubstituted in the nucleus by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl and alkoxy, said alkyl or alkoxy having 1 to 4 carbon atoms,

(iv) the group



in which R<sup>10</sup> is a straight-chain or branched alkyl or alkenyl group with up to 8 carbon atoms, or a cycloalkyl or cycloalkenyl group each having 3 to 8 carbon atoms, or a phenyl group which is unsubstituted or is mono-, di- or trisubstituted in the nucleus by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl, alkoxy and a pyridyl group, said alkyl or alkoxy having 1 to 4 carbon atoms R<sup>2</sup> and R<sup>4</sup> are identical or different and are hydrogen, alkyl with 1 to 4 carbon atoms, halogen or alkoxy with 1 to 4 carbon atoms, and

VI R<sup>3</sup> is hydrogen, alkyl or alkenyl with up to 4 carbon atoms, halogen or alkoxy with 1 to 4 carbon atoms, and

R<sup>6</sup> is a cycloaliphatic hydrocarbon group with 3 to 7 carbon atoms, a phenyl group which is unsubstituted or is mono-, di- or trisubstituted in the nucleus by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl, alkoxy, said alkyl or alkoxy having 1 to 6 carbon atoms, and hydroxymethyl, a furyl, thienyl or pyridyl group, or said furyl, thienyl or pyridyl group which is mono- or disubstituted by at least one substituent selected from the group consisting of halogen, trifluoromethyl, alkyl and alkoxy, said alkyl or alkoxy having 1 to 6 carbon atoms, or a pharmacologically acceptable salt thereof with a base.

VII

5. A method for the prophylaxis and therapy of hypercholesterolemia which comprises administering to a host in need of said prophylaxis and therapy, an effective amount of the formula V as claimed in claim 1.

4,946,853

#### METHOD FOR THE TREATMENT OF WITHDRAWAL SYMPTOMS ASSOCIATED WITH SMOKING CESSATION AND PREPARATIONS FOR USE IN SAID METHOD

Yvonne B. Bannon, Naas; John Corish, Leopardstown; Owen I. Corrigan, Howth; Edward J. Geoghegan, Athlone, and Joseph G. Masterson, Dublin, all of Ireland, assignors to Elan Transdermal Limited, Athlone, Ireland

Filed Apr. 29, 1988, Ser. No. 188,226

Claims priority, application Ireland, May 1, 1987, 1119/87; Jul. 17, 1987, 1946/87

Int. Cl.<sup>5</sup> A61K 31/44, 31/78; A61F 13/02

U.S. Cl. 514-343

43 Claims

1. A preparation for the once-daily, percutaneous administration of nicotine which comprises nicotine uniformly distributed in a solid or semi-solid medium which can be placed in intimate contact with the skin, said solid or semi-solid medium comprising a given amount of nicotine in a solution of a solidifying or gel-forming agent or mixture thereof in a suitable solvent or mixture of solvents, said mixture thereby obtained having been mixed or heated to form said solid or semi-solid medium, wherein said medium is effective to permit controlled release of said nicotine to the skin.

4,946,854

#### 3-AMINOBENZOYLPHENYLUREAS USEFUL FOR CONTROLLING PARASITES AND INSECTS THAT ATTACK DOMESTIC ANIMALS AND LIVESTOCK

Peter Maiefisch; Jean-Claude Gehret, both of Aesch, and Bruno Frei, Lausen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 5, 1988, Ser. No. 280,061

Claims priority, application Switzerland, Dec. 7, 1987, 4756/87

Int. Cl.<sup>5</sup> C07D 213/64; A01N 43/40

U.S. Cl. 514-346

22 Claims

1. A compound of formula I

4,946,856

#### 5-PHENYL-3H-1,2,4-TRIAZOL-3-ONES AND THEIR USE AS ANTICONVULSANTS

John M. Kane, Cincinnati, and Francis P. Miller, Loveland, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

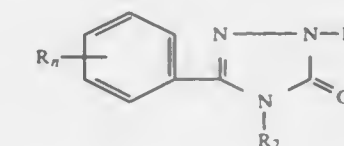
Continuation-in-part of Ser. No. 90,310, Aug. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 944,634, Dec. 19, 1986, abandoned. This application Mar. 1, 1989, Ser. No. 317,482

Int. Cl.<sup>5</sup> A61K 31/41

U.S. Cl. 514-384

9 Claims

1. A method for the treatment of seizure disorders which comprises administering an anticonvulsant amount of a compound of the formula



R<sub>1</sub> is hydrogen or C<sub>1-4</sub> lower alkyl,

R<sub>2</sub> is C<sub>1-4</sub> lower alkyl,

R is halogeno or trifluoromethyl, and

n is zero, 1 or 2.

4,946,857

#### TERPENE AMINO ALCOHOLS AND MEDICINAL USES THEREOF

Koichi Kanehira, Kurashiki; Katsushi Eziri, Okayama; Manzo Sbiono; Yoshiji Fujita, both of Kurashiki, and Johji Yamahara, Otsu, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Jul. 21, 1986, Ser. No. 887,431

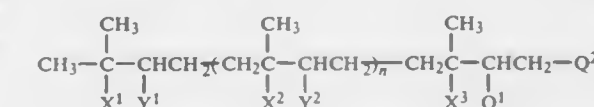
Claims priority, application Japan, Jul. 19, 1985, 60-160782; Mar. 7, 1986, 61-50784; Apr. 11, 1986, 61-84822

Int. Cl.<sup>5</sup> H61K 31/045; C07D 233/60

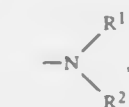
U.S. Cl. 514-399

5 Claims

1. A terpene amino alcohol of the formula

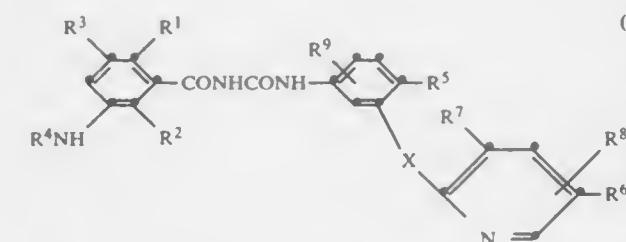


wherein X<sup>1</sup> is a hydrogen atom or a hydroxyl group and Y<sup>1</sup> is a hydrogen atom or X<sup>1</sup> and Y<sup>1</sup> taken together represent a bond; X<sup>2</sup> is a hydrogen atom or a hydroxyl group and Y<sup>2</sup> is a hydrogen atom or X<sup>2</sup> and Y<sup>2</sup> taken together represent a bond; Q<sup>1</sup> and Q<sup>2</sup> are such that either one is Y<sup>3</sup> with the other being



and X<sup>3</sup> is a hydrogen atom or a hydroxyl group; Y<sup>3</sup> is a hydroxyl group when X<sup>3</sup> is a hydrogen atom, or Y<sup>3</sup> is a hydrogen atom or a hydroxyl group when X<sup>3</sup> is a hydroxyl group; R<sup>1</sup> and R<sup>2</sup> taken together with the adjacent nitrogen atom form an imidazole; and n is an integer of 0 to 2, or a pharmaceutically acceptable ester or salt thereof.

5. A method for preventing or treating allergic diseases or disorders of cerebral function which comprises administering an effective amount for the prevention or treatment of said allergic diseases or disorders of cerebral function of a terpene amino alcohol of the formula



wherein

each of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup>, independently of the others, is H or halogen,

R<sup>4</sup> is H, R<sup>10</sup>CO- or R<sup>11</sup>NHCO- wherein R<sup>10</sup> is a C<sub>1-4</sub> alkyl group which is unsubstituted or substituted by one to three identical or different substituents selected from the group consisting of halogen, C<sub>1-4</sub> alkoxy,

C<sub>1-4</sub> acyloxy and -COOG, wherein G is H, an alkali metal cation or an alkaline earth metal cation, and R<sup>11</sup> is an unsubstituted or halo-substituted C<sub>1-4</sub> alkyl or phenyl group,

each of R<sup>5</sup> and R<sup>6</sup>, independently of the other, is H, halogen, C<sub>1-6</sub> or C<sub>1-6</sub> and

X is 0 or S(0)n wherein n is 0, 1 or 2.

20. A method of controlling parasites or insect pests that attack livestock or domestic animals, which comprises applying externally a parasitocidally or insecticidally effective amount of a compound of formula I according to claim 1 to the livestock.

4,946,855

#### CARBOXAMIDE DERIVATIVES HAVING TETRAZOLE AND THIAZOLE RINGS AND THEIR USE

Junji Yoshinaga, Neyagawa; Takeshi Shogaki, Suita; Takao Kakita, Toyonaka; Hiromi Ozeki, Osaka, and Yoshiko Kato, Nishinomiya, all of Japan, assignors to Sawai Pharmaceutical Co., Ltd., Osaka, Japan

Filed Nov. 28, 1988, Ser. No. 276,953

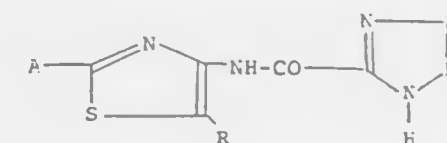
Claims priority, application Japan, Dec. 14, 1987, 62-318211; Mar. 9, 1988, 63-055583; Apr. 15, 1988, 63-093686

Int. Cl.<sup>5</sup> C07D 417/12, 417/44; A61K 31/425

U.S. Cl. 514-371

12 Claims

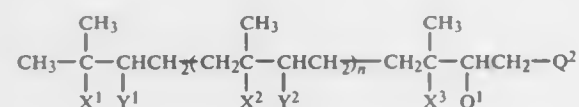
1. The compound which is represented by the formula:



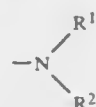
wherein A is a C<sub>1-6</sub> alkyl group,

an aryl group having 6 to 10 ring carbon atoms which is unsubstituted or substituted with at least one substituent selected from the group consisting of hydroxy, C<sub>1-6</sub> alkoxy, aryl-(C<sub>1-6</sub>) alkoxy, halo-(C<sub>1-6</sub>) alkyl, halogen and nitro,

or 5-membered heterocyclic group having from 1 to 4 ring carbon atoms containing at least one hetero atom selected from oxygen, nitrogen and sulfur, or a condensed heterocyclic group consisting of a heterocycle as defined above and benzene nucleus, or a 6-membered heterocyclic group having from 1 to 5 ring carbon atoms containing at least one hetero atom selected from oxygen, nitrogen, and sulfur, or a condensed heterocyclic group consisting of a heterocycle as defined above and a benzene nucleus, these two heterocyclic groups being unsubstituted or substituted with at least one substituent selected from halogen, R is hydrogen or a C<sub>1-6</sub> alkyl group.



wherein  $\text{X}^1$  is a hydrogen atom or a hydroxyl group and  $\text{Y}^1$  is a hydrogen atom or  $\text{X}^1$  and  $\text{Y}^1$  taken together represent a bond;  $\text{X}^2$  is a hydrogen atom or a hydroxyl group and  $\text{Y}^2$  is a hydrogen atom or  $\text{X}^2$  and  $\text{Y}^2$  taken together represent a bond;  $\text{Q}^1$  and  $\text{Q}^2$  are such that either one is  $\text{Y}^3$  with the other group being



and  $\text{X}^3$  is a hydrogen atom or a hydroxyl atom, or  $\text{Y}^3$  is a hydrogen atom or a hydroxyl group when  $\text{X}^3$  is a hydroxyl group;  $\text{R}^1$  and  $\text{R}^2$  taken together with the adjacent nitrogen atom form an imidazole; and  $n$  is an integer of 0 to 2, or a pharmacologically acceptable ester or salt thereof.

4,946,858

#### SPIROSUCCINIMIDES AS ALDOSE REDUCTASE INHIBITORS AND ANTIHYPERGLYCEMIC AGENTS

Jay E. Wrobel, Lawrenceville, N.J., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 260,149, Oct. 20, 1988, Pat. No. 4,900,739.

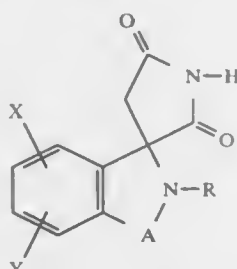
This application Jun. 28, 1989, Ser. No. 373,016

Int. Cl.<sup>5</sup> C07D 487/10; A61K 31/40

U.S. Cl. 514—409

13 Claims

1. A compound of formula (I)



wherein A is CO; R is lower alkyl containing 1 to 6 carbon atoms, benzyl, halogen substituted benzyl, (2-naphthalenyl)-methyl, (1-bromo-2-naphthalenyl)methyl; X is hydrogen, halogen, lower alkyl containing 1 to 4 carbon atoms, lower alkoxy containing 1 to 4 carbon atoms, lower alkylthio containing 1 to 4 carbon atoms, carboalkoxy containing 1 to 4 carbon atoms, phenyl, nitro; Y is hydrogen or chlorine; or X and Y are joined to form  $\text{CH}=\text{CH}-\text{CH}=\text{CH}$ , and the pharmaceutically acceptable salts thereof.

4,946,859

#### 4-(2-METHYL-2-HYDROXYPROPYLAMINO)-5,6-DIHYDROTHIENO-[2,3-B]THIOPYRAN-2-SULFONAMIDE-7,7-DIOXIDE

Jacob M. Hoffman, Jr., North Wales; Ling L. Lee, Lansdale; Sander L. Varga, Harleysville, and Anthony G. Zacchei, Ambler, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

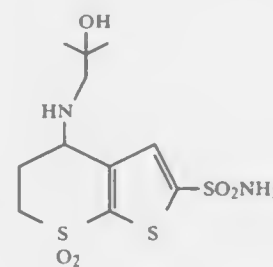
Filed Jul. 31, 1989, Ser. No. 387,033

Int. Cl.<sup>5</sup> C07D 495/04; A61K 31/38

U.S. Cl. 514—432

1. A compound of structural formula:

3 Claims



4,946,860

#### BENZOTHIOPYRANYL DERIVATIVES AS HMG-COA REDUCTASE INHIBITORS

Robert L. Morris, Wayne, and Jeffrey N. Barton, Philadelphia, both of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

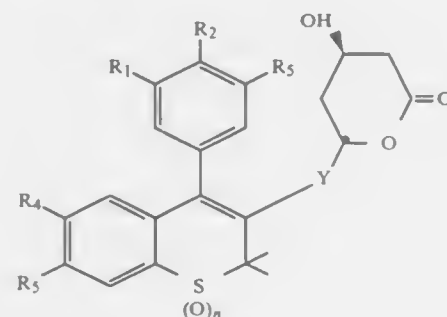
Filed Nov. 3, 1989, Ser. No. 431,417

Int. Cl.<sup>5</sup> A61K 31/38; C07D 335/06

U.S. Cl. 514—432

5 Claims

1. A compound of the formula



(I)

wherein:

$\text{R}_1$  is H, alkyl, hydroxyalkyl, alkoxy or  $\text{CF}_3$ ;

$\text{R}_2$  is H, Cl, F, Br, I, alkoxy or  $\text{CF}_3$ ;

$\text{R}_3$  is H, alkyl, Cl, F, Br, I, alkoxy or  $\text{CF}_3$ ;

$\text{R}_4$  and  $\text{R}_5$  are independently

H, alkyl or alkoxy;

Y is  $\text{CH}=\text{CH}$  or  $\text{CH}_2-\text{CH}_2$ ;

n is 0, 1 or 2;

or a corresponding dihydroxy acid; or a pharmaceutically acceptable salt thereof.

5. A method of inhibiting cholesterol biosynthesis in a patient in need of such treatment comprising administering a pharmaceutical composition defined in claim 2.

#### 4,946,861 1,3-DITHIAN-2-YLIDENES, THEIR OXIDES, PHARMACEUTICAL COMPOSITIONS, AND METHODS OF USE THEREOF

André J. Weith, Signy, and Philippe M. Narld, Prangins, both of Switzerland, assignors to Zyma SA, Nyon, Switzerland  
Division of Ser. No. 13,164, Feb. 11, 1987, Pat. No. 4,818,765, which is a continuation of Ser. No. 717,481, Mar. 28, 1985, abandoned, which is a continuation of Ser. No. 504,714, Jun. 15, 1983, abandoned. This application Nov. 14, 1988, Ser. No. 271,125

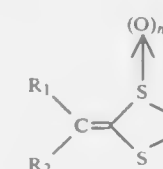
Claims priority, application United Kingdom, Jun. 25, 1982, 8218472

Int. Cl.<sup>5</sup> C07D 339/08; A61K 31/385

U.S. Cl. 514—436

28 Claims

1. A compound of the formula



(Ic)

wherein

(I)

$\text{R}_1$  is phenyl which is unsubstituted or substituted by a substituent selected from hydroxy, lower alkoxy, carboxy-lower alkoxy,  $\text{HO}_3\text{S}$ -lower alkoxy, di-lower alkylamino-lower alkoxy, halogen, lower alkanoyl, lower alkyl, halo-lower alkyl, carboxy, amino, di-lower alkylamino, lower alkanoylamino, and carboxy-lower alkanoylamino;

$\text{R}_2$  is (a) phenyl substituted by a substituent selected from carboxy-lower, alkoxy, halogen, halo-lower alkyl, carboxy, and di-lower alkylamino; or is (b) selected from the group consisting of lower alkyl, phenyl-lower alkyl, halo-lower alkyl, carboxy-lower alkyl, lower alkoxy-carbonyl-lower alkylamino-lower alkyl, hycarbonyl-lower di-lower alkylamino-lower alkyl, hydroxybenzoyl, lower alkoxybenzoyl, carboxy, alkoxy-carbonyl having up to 9 carbon atoms, and di-lower alkylamino- $\text{SO}_2$ —;

A is 1,3-propylene which is unsubstituted or monosubstituted by oxo or hydroxy; and n is zero or 1;

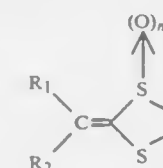
(II)

$\text{R}_1$  is di-lower alkoxyphenyl;

$\text{R}_2$  is hydrogen; and

A and n are as defined above; or a pharmaceutically acceptable salt of such a compound having a salt-forming group.

26. A method of bearing hepatic fibrosis in a mammal comprising administering to a mammal in need of such treatment a therapeutically effective amount of a compound formula Ia or of a pharmaceutically acceptable salt thereof wherein said formula Ia is



(Ia)

wherein

$\text{R}_1$  is phenyl which is unsubstituted or substituted by hydroxy, lower-alkoxy, carboxy-lower alkoxy,  $\text{HO}_3\text{S}$ -lower alkoxy, di-lower alkylamino-lower-alkoxy, halogen, lower alkanoyl, lower alkyl, halo-lower alkyl,

carboxy, amino, di-lower alkylamino, lower alkanoylamino, or carboxy-lower-alkanoylamino;

$\text{R}_2$  is

(a) hydrogen;

(b) phenyl which is unsubstituted or substituted by hydroxy, lower alkoxy, halogen, halo-lower alkyl, or di-lower alkylamino; or

(c) lower alkyl, halo-lower alkyl, carboxy-lower alkyl, lower alkoxy-carbonyl-lower alkyl, di-lower alkylamino-lower alkyl, phenyl lower alkanoyl, hydroxy benzoyl, lower alkoxy benzoyl, carboxy, alkoxy-carbonyl having up to 9 carbon atoms, cyano, or di-lower alkylamino- $\text{SO}_2$ —;

A is 1,3-propylene which is unsubstituted or monosubstituted by oxo or hydroxy; and n is zero or 1.

4,946,862

#### THIOPHENE DERIVATIVE AND PROCESS FOR PREPARING THE SAME

Kimiaki Hayashi, Suita; Yasuhiko Ozaki, Neyagawa; Kenji Yamada, Suitama; Hideyuki Takenaga, Urawa, and Ichizo Inoue, Kawanishi, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Jul. 6, 1988, Ser. No. 215,775

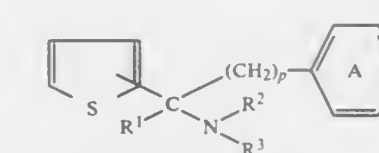
Claims priority, application Japan, Jul. 9, 1987, 62-171669

Int. Cl.<sup>5</sup> C07D 333/20; A61K 31/38

U.S. Cl. 514—438

6 Claims

1. A thiophene derivative of the formula:



(I)

wherein  $\text{R}^1$  is an ethyl group and  $\text{R}^2$  and  $\text{R}^3$  are a lower alkyl group, Ring A is a phenyl group, and p is an integer of 3, or a salt thereof.

4,946,863

#### CNS-AFFECTING 6-OXY-3-AMINOMETHYL INDANES, COMPOSITIONS THEREOF, AND METHOD OF TREATING THEREWITH

Klaus P. Boegesoe, Lyngby, and Jens K. Perregaard, Oelstykke, both of Denmark, assignors to H. Lundbeck A/S, Copenhagen-Valby, Denmark

Division of Ser. No. 155,354, Feb. 12, 1988, Pat. No. 4,847,254.

This application Jan. 18, 1989, Ser. No. 298,630

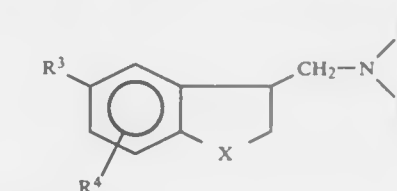
Claims priority, application United Kingdom, Feb. 26, 1987, 8704572

Int. Cl.<sup>5</sup> A61K 31/13; C07C 87/06

U.S. Cl. 514—447

11 Claims

1. Indane compound of the following formula:



wherein X is  $\text{CH}_2$ ,

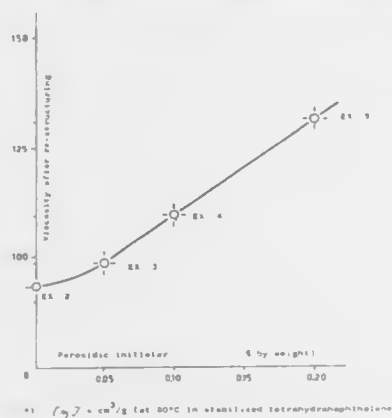
$\text{R}^1$  is hydrogen, lower alkyl (1-6 C-atoms) or lower alkenyl (2-6 C-atoms), branched or unbranched, optionally substituted with a hydroxy group, aralkyl with from 4-13 C-atoms inclusive, the aromatic group being phenyl, thienyl, or cycloalkyl (3-6 C-atoms),

$\text{R}^2$  is hydrogen, lower alkyl (1-6 C-atoms), branched or



(a) heating a starting copolymer of ethylene with vinylacetate and/or alkyl ester of acrylic or methacrylic acid, having a M.F.I. equal to or greater than 1, as well as a density ranging from about 0.92 to 0.95 g/cm<sup>3</sup>, which is contacted with a

free radical initiator at a temperature of from 120° to 200° C. in an amount from about 0.05 to 0.50% by weight and (b) inject-



ing into the thus-obtained polymer a physical blowing agent, thereafter foaming said polymer.

4,946,872

**POLYISOCYANATE PREPOLYMERS PREPARED FROM RIGID POLYAROMATIC PRECURSOR MATERIALS, AND POLYURETHANES PREPARED THEREFROM**  
Oomman P. Thomas, Lake Jackson; Earl E. Burt, III, Clute, and Richard D. Peffley, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

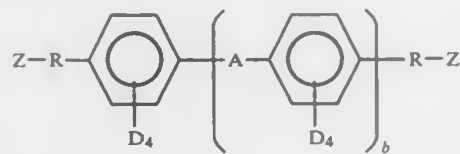
Continuation of Ser. No. 73,046, Jul. 14, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 330,537

Int. Cl.<sup>3</sup> C08G 18/10, 18/72

U.S. Cl. 521—159

9 Claims

1. A polyurethane and/or polyurea polymer prepared in the reaction of an active hydrogen-containing composition with a liquid prepolymer composition containing free isocyanate groups which comprises the reaction product of a stoichiometric excess of a polyisocyanate and an polyaromatic active hydrogen-containing compound which is represented by the structure



wherein each D is independently an inert substituent group which, when ortho to the—A—linkage, can form a cyclic structure with the—A—linkage and the aromatic rings, b is a number from about 1 to about 10, each z is independently an active hydrogen-containing group, each R is independently a divalent radical which is inert to the reaction of the isocyanate-reactive polyphenylene compound with a polyisocyanate, and A is a covalent bond or a rigid linking group, or forms a cyclic structure with the aromatic rings and the groups D ortho to the—A—linkage.

4,946,873

**PREPOLYMERS CONTAINING IMIDE LINKAGES**  
Steve Carter, Leuven, and David Thorpe, Everberg, both of Belgium, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 1, 1989, Ser. No. 304,487

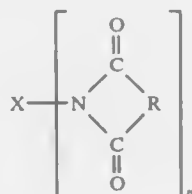
Claims priority, application United Kingdom, Feb. 5, 1988, 8802672

Int. Cl.<sup>3</sup> C07D 209/90, 209/32; C08 9/00

U.S. Cl. 521—185

16 Claims

1. Compound having the formula

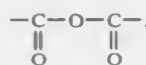


wherein

X is the residue of a polyoxyalkylene diamine or triamine having an average equivalent weight of at least 500, after having deleted the two or three amine groups,

n is two if X is a residue of a diamine and three if X is a residue of a triamine, and

R is the residue of a cyclic anhydride of an aromatic polycarboxylic acid having four carboxyl groups, after having deleted one group



9. A polyimide foam obtained by reacting an organic polyisocyanate with a liquid prepolymer comprising the reaction product of a polyoxyalkylene diamine or triamine having an average equivalent weight of at least 500 and at least one mole per amine equivalent of a cyclic anhydride of an aromatic polycarboxylic acid having three or four carboxyl groups.

15. Process for preparing a polyimide foam by reacting an organic polyisocyanate with a liquid prepolymer comprising the reaction product of a polyoxyalkylene diamine or triamine having an average equivalent weight of at least 500 and at least one mole per amine equivalent of a cyclic anhydride of an aromatic polycarboxylic acid having three or four carboxyl groups.

4,946,874

**FAST ULTRAVIOLET RADIATION CURING SILICONE COMPOSITION CONTAINING TWO VINYL POLYMERS**  
Chi-Long Lee, and Michael A. Lutz, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 863,672, May 15, 1986, Pat. No. 4,780,486, which is a continuation-in-part of Ser. No. 545,729, Oct. 26, 1983, abandoned. This application Apr. 18, 1988, Ser. No. 151,748

Int. Cl.<sup>3</sup> C08F 2/50; C08G 77/20, 77/28

U.S. Cl. 522—14

8 Claims

1. A composition comprising a material which is storable in one package, is viscosity stable indicated by the failure of the 25 C. viscosity to double when heated at 100° C. for 24 hours, cures when exposed to ultraviolet radiation of 70 millijoules or less per square centimeter in one second or less where the ultraviolet radiation includes a wavelength of 365 nanometers, and is obtained by mixing

(A) a mixture of at least one polydiorganosiloxane having a low alkenyl radical content of at least two alkenyl radicals per molecule up to five mole percent siloxane units containing an alkenyl radical and at least one polydiorganosiloxane having a high alkenyl radical content such that 15

to 30 mole percent siloxane units contain an alkenyl radical, wherein the polydiorganosiloxanes are alkenyl functional, linear triorganosiloxane endblocked polydiorganosiloxane having a degree of polymerization of 30 to 1,000 where each silicon-bonded organic radical is selected from the group consisting of vinyl, methyl, phenyl, 3,3,3-trifluoropropyl, beta-(cyclohexenyl)ethyl, ethyl, cyclohexenyl allyl, higher alkenyl radicals represented by the formula—R\*(CH<sub>2</sub>)<sub>t</sub>CH=CH<sub>2</sub> wherein R\* is —(CH<sub>2</sub>)<sub>s</sub>— or —(CH<sub>2</sub>)<sub>s</sub>CH=CH—, r has a value of 1, 2, or 3; s has a value of 3 or 6; and t has a value of 3, 4, or 5, and silacyclopentenyl, and having per molecule at least two silicon-bonded organic radicals selected from the group consisting of vinyl, beta-(cyclohexenyl)ethyl, cyclohexenyl, allyl, higher alkenyl radical and silacyclopentenyl, the amount of the polydiorganosiloxane having a low alkenyl radical content is at least 75 weight percent and the amount of the polydiorganosiloxane having a high alkenyl radical content is up to 25 weight percent,

(B) mercapto functional crosslinker which is at least one material selected from the group consisting of mercapto functional polyorganosiloxanes and mercapto organic compounds, said mercapto functional polyorganosiloxanes are represented by the general formula



wherein each R is a mercaptoalkyl radical having from 2 to 6 carbon atoms per radical; each R' is selected from the group consisting of methyl, phenyl, 3,3,3-trifluoropropyl, and ethyl; and each R'' is a radical selected from the group consisting of —OH, R, and R'; and each R''' is methyl or phenyl, on the average there being per molecule at least two mercaptoalkyl radicals x is 0 or greater, y is 0 or greater, and the amount and kind of organic radicals represented by R, R', R'', and R''' being of such a nature as to make (A) and (B) compatible by resulting in a mixture which does not separate into phases, and said mercapto organic compounds have at least two mercapto groups per molecule, consisting of atoms of sulfur, carbon, and hydrogen, and optionally oxygen, having a molecular weight less than 1,000, and being of such a nature as to make (A) and (B) compatible,

(C) photosensitizer, and

(D) storage stabilizer,

there being in said material from 0.5 to 1.5 total alkenyl radical per mercapto group.

4,946,875

**IN SITU CYCLOPOLYMERIZED VINYL ANHYDRIDE IN POLYEPOXIDE**

Frederick J. Hirsekorn, Delran, N.J., and William D. Emmons, Huntingdon Valley, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 109,687, Dec. 28, 1987, Pat. No. 4,814,398, which is a division of Ser. No. 938,296, Dec. 5, 1986, Pat. No. 4,732,952. This application Jan. 9, 1989, Ser. No. 294,711

Int. Cl.<sup>3</sup> C08L 63/10

U.S. Cl. 522—170

1 Claim

1. A B-stageable thermosettable composition comprising a polyepoxide, a linear vinyl anhydride monomer and an ultraviolet photoinitiator wherein said ultraviolet photoinitiator generates free radicals for the B-stage in situ cyclopolymerization of said vinyl anhydride monomer without significant crosslinking with said polyepoxide to form a thermoplastic material that is stable upon storage at room temperature, said composition producing a high service temperature thermoset upon curing, and wherein the molar ratio of vinyl anhydride monomer to polyepoxide ranges from about 0.4/1 to 1.1.

4,946,876

**POLYURETHANE-FORMING FOUNDRY BINDERS CONTAINING A POLYESTER POLYOL**

William G. Carpenter, Powell, and William R. Dunnivant, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Russell, Ky.

Filed Oct. 31, 1988, Ser. No. 264,649

Int. Cl.<sup>3</sup> C08L 75/04

6 Claims

U.S. Cl. 523—143

1. A foundry molding composition which comprises:

A. a major amount of aggregate; and

B. an effective bonding amount of a polyurethane-forming binder composition comprising:

(1) phenolic resole resin component comprising:

(a) a phenolic resole resin prepared by reacting formaldehyde with a phenol in a molar ratio of formaldehyde to phenol of at least 1.0 and in the presence of a divalent metal catalyst, such that the resulting resin contains polymeric structures having a preponderance of bridges joining the phenolic nuclei of the polymer which are ortho-ortho benzylic ether bridges;

(b) an effective amount of a polyester polyol; and

(c) a solvent in which the phenolic resole resin is soluble, and such that the solvent is present in an amount of from 20 to 80 weight percent based upon the weight of the phenolic resole resin; and

(2) a polyisocyanate hardener component.

4,946,877

**PROCESS FOR PRODUCING BISPHENOL A**

Shigeru Imuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,639

Claims priority, application Japan, Feb. 10, 1988, 63-27628

Int. Cl.<sup>3</sup> C07C 37/20, 39/16, 37/68

U.S. Cl. 568—727

7 Claims

1. In a process for producing bisphenol A by reacting a reaction mixture comprised of phenol and acetone in the presence of hydrochloric acid as a catalyst at a temperature of 30° to 85° C. to produce a reaction product mixture which is subjected to dehydrochlorination, the improvement comprising adding water-containing phenol separated from the reaction product mixture during dehydrochlorination to the reaction mixture containing phenol and acetone, in such an amount that the water content in the reaction mixture is within the range of 1 to 5 wt %.

4,946,878

**RAPIDLY CURABLE EXTRUDABLE ORGANOSILOXANE COMPOSITIONS**

Jary D. Jensen, and Carl J. Bilgrien, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jan. 29, 1990, Ser. No. 471,322

Int. Cl.<sup>3</sup> C08K 9/06

U.S. Cl. 523—213

7 Claims

1. In an improved curable organosiloxane composition comprising the product obtained by mixing to homogeneity

A. from 70 to 95 weight percent, based on the total weight of (A) and (B), of a first liquid diorganosiloxane terminated polydiorganosiloxane exhibiting a viscosity of at least 12 Pa.s at 25 degrees C. and containing substantially no ethylenically unsaturated hydrocarbon radicals bonded to non-terminal silicon atoms.

B. from 5 to 30 weight percent, based on the total weight of (A) and (B), of a second liquid diorganosiloxane-terminated polydiorganosiloxane which is miscible with said first polydiorganosiloxane and exhibits a viscosity of at least 0.1 Pa.s at 25 degrees C., where from 1 to 5 mol percent of the non-terminal repeating units of said second polydiorganosiloxane contain an alkenyl radical,

C. an amount sufficient to cure said composition of an or-



ganohydrogensiloxane that is miscible with the other liquid ingredients of said composition and contains an average of more than two silicon bonded hydrogen atoms per molecule,

D. a platinum-containing hydrosilation catalyst in an amount sufficient to promote curing of said composition at a temperature of from ambient to 250 degrees C., and

E. an amount of a treated reinforcing silica filler sufficient to improve the physical properties of a cured elastomer prepared from said composition, where the filler treating agent is comprised at least in part of an organosilicon compound containing an average of at least one alkenyl radical per molecule,

the improvement comprising the presence, as the alkenyl radical in said second liquid diorganoalkenylsiloxyl-terminated polydiorganosiloxane (B), of a radical which is terminally unsaturated and contains at least four carbon atoms.

4,946,879

# REACTION PRODUCT OF A ROSIN ACID AND AN ANTIDEGRADANT

Lawson G. Wideman, and Paul H. Sandstrom, both of Tallmadge, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 21,095, Mar. 3, 1987, Pat. No. 4,775,496.

This application Aug. 11, 1988, Ser. No. 231,030

Int. Cl.<sup>5</sup> C08C 1/06

U.S. Cl. 524—93

6 Claims

1. A rubber composition comprising a polymer susceptible to the degradative effects of oxidation and/or ozonization having incorporated therein an effective amount of a reaction product of

(a) a rosin acid and

(b) a polyfunctional compound having at least one functional group capable of reacting with a carboxylic acid functionality and another functional group having antidegradant properties selected from the group consisting of substituted or unsubstituted hydroquinone, 4-hydroxymethyl-2,6-di-t-butyl phenol, 4,4'-methylenebis-(2,6-di-t-butyl phenol), 4,4'-butylidenebis-(6-t-butyl-3-methyl phenol), 4,4'-thiobis-(6-t-butyl-m-cresol), 4,4'-thiobis(6-t-butyl-o-cresol), 2-mercaptobenzimidazole, p-amino-diphenylamine, p-hydroxy-diphenylamine, p-hydroxy-p'-amino-diphenylamine, and p,p'-diamino-diphenylamine.

4,946,880

# SILYLATED U.V. STABILIZERS CONTAINING HINDERED TERTIARY AMINES

Silvestro Costanzi; Damiano Gussoni, both of Milan; Omero Zavattini, deceased, late of Curtatone; by Clara Pungiluppi, heir; by Renato Zavattini, heir, both of Mantova, and Luciano Pallini, Parma, all of Italy, assignors to Enlchem Synthesis S.p.A., Palermo, Italy

Filed Oct. 5, 1987, Ser. No. 103,961

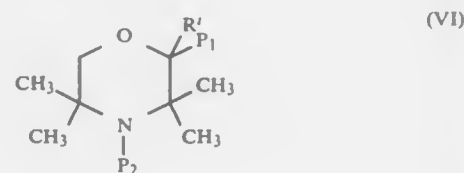
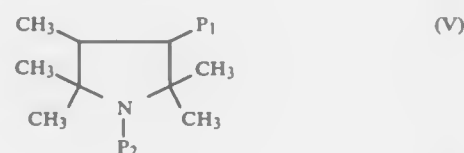
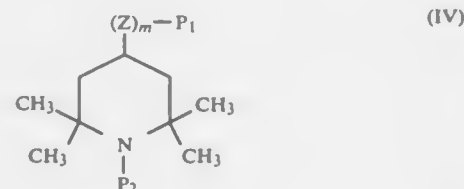
Claims priority, application Italy, Oct. 8, 1986, 21935 A/86

Int. Cl.<sup>5</sup> C08K 5/3435, 5/3477, 5/357

U.S. Cl. 524—96

21 Claims

1. Reactive stabilizer compounds containing a 2,2,6,6-tetramethylpiperidine group, a 2,2,6,6-tetramethylmorpholine group, or a 2,2,5,5-tetramethylpyrrolidine group, said groups bearing at least one silicic function hydrolyzable into silanol, linked by a silicon-carbon link, said stabilizer compounds having the following formulas:

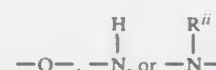


wherein:

m is 0 or 1;

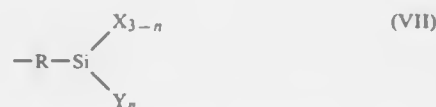
R' is H or CH<sub>3</sub>;

Z is a group selected from

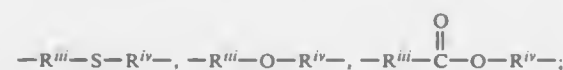


wherein R<sup>ii</sup> is a straight or branched alkyl radical containing from 1 to 5 carbon atoms;

wherein P<sub>1</sub>, P<sub>2</sub> or both P<sub>1</sub> and P<sub>2</sub> are radicals having the formula:



wherein R is a straight or branched alkylenic radical containing from 1 to 10 carbon atoms, or



wherein R<sup>iii</sup> and R<sup>iv</sup> are straight or branched alkylene radicals containing from 2 to 10 carbon atoms;

X is a straight or branched alkyl radical of from 1 to 5 carbon atoms;

Y is H, halogen, acyl-(C<sub>1-4</sub>)-oxy, alkyl-(C<sub>1-4</sub>)-oxy, amino, amino-oxy or silyl-oxy;

n is 1, 2, or 3; and

in the situation where either P<sub>1</sub> or P<sub>2</sub> is a radical of formula (VIII), the other of P<sub>1</sub> or P<sub>2</sub> is

(a) a straight or branched alkyl radical of from 1 to 10 carbon atoms; or

(b) a phenyl or cycloaliphatic, alkyl-phenyl or alkyl-cycloaliphatic radical.

4,946,881

# TIRE SIDEWALL

Robert J. Cornell, Naugatuck; Edward L. Wheeler, Watertown; Russell A. Mazzeo, Waterbury, and Sung W. Hong, Cheshire, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Continuation-in-part of Ser. No. 90,298, Aug. 28, 1987, Pat. No.

4,794,135. This application Mar. 4, 1988, Ser. No. 163,921

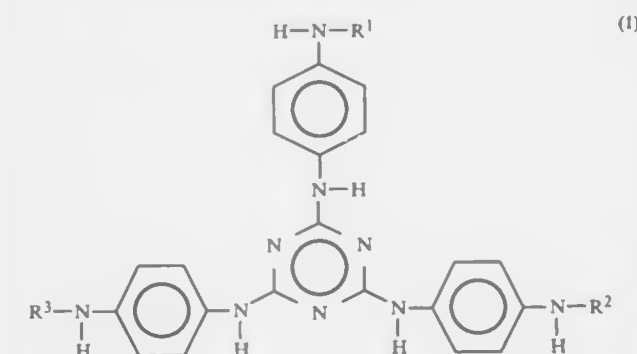
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C08K 5/3477, 5/17

U.S. Cl. 524—100

16 Claims

1. A thermosetting composition comprising an admixture of:  
(a) at least one highly unsaturated rubbery polymer;  
(b) at least one elastomer having lesser unsaturation than said highly unsaturated rubbery polymer;  
(c) a compound of structure (I):



in which R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are radicals independently selected from a C<sub>3</sub>-C<sub>18</sub> branched or linear alkyl, or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl substituted with one or more C<sub>1</sub>-C<sub>12</sub> alkyl groups.

4,946,882

# COMPOSITIONS OF POLYPHENYLENE ETHER, AROMATIC PHOSPHATE, AROMATIC HALOGEN COMPOUND AND IMPACT MODIFIER COMPRISING DIENE POLYMER

William R. Haaf, Voorheesville, and Gim F. Lee, Jr., Albany, both of N.Y., assignors to General Electric Company, Selkirk, N.Y.

Continuation of Ser. No. 83,320, Oct. 10, 1979, abandoned, which is a division of Ser. No. 838,861, Oct. 3, 1977, Pat. No. 4,191,685. This application Sep. 25, 1981, Ser. No. 305,906

Int. Cl.<sup>5</sup> C08K 5/03, 5/51, 5/52; C08L 71/12

U.S. Cl. 524—129

17 Claims

1. A flame retardant, impact resistant thermoplastic composition consisting essentially of:

(a) a polyphenylene ether resin;  
(b) an aromatic phosphate, aromatic phosphonate or aromatic phosphine oxide compound;  
(c) an aromatic halogen compound; and  
(d) an impact modifier consisting essentially of an elastomeric hydrogenated A-B-A or A-B block copolymer wherein A is a polymerized vinyl aromatic compound and B is a polymerized diene compound, components (b) and (c) being present in an amount at least sufficient to render said composition flame retardant, and component (d) being present in an amount at least sufficient to improve the impact resistance of articles molded from said composition.

4,946,883

# FLUORORUBBER COMPOSITIONS EXHIBITING IMPROVED WORKABILITY AND MECHANICAL PROPERTIES

Kaoru Kunitatsu, and Atsushi Komatsu, both of Chiba, Japan, assignors to Toray Dow Corning Silicone, Tokyo, Japan

Filed Dec. 20, 1989, Ser. No. 453,900

Claims priority, application Japan, Jan. 26, 1989, 1-17030

Int. Cl.<sup>5</sup> C08K 5/24

U.S. Cl. 524—265

3 Claims

1. A curable fluororubber composition comprising  
(A) 100 parts by weight of a peroxide-curable organic fluororubber,  
(B) 1 to 60 parts by weight of a peroxide-curable organopolysiloxane gum,  
(C) 0.1 to 30 parts by weight of an epoxy group-containing organoalkoxysilane or partial hydrolyzate thereof,  
(D) 1 to 60 parts by weight of a reinforcing filler, and  
(E) An amount of an organic peroxide sufficient to cure said fluororubber and said gum.

4,946,884

# BLENDS OF POLY(PROPYLENE CARBONATE) AND POLY(METHYL METHACRYLATE) AND THEIR USE IN DECOMPOSITION MOLDING

Jeffrey A. Kuphal, Blandon; Lloyd M. Robeson, Macungie, and James J. Weber, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

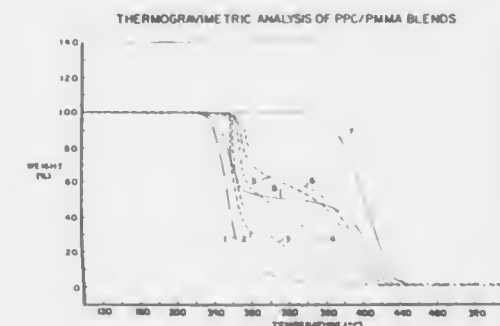
Division of Ser. No. 326,938, Mar. 22, 1989, Pat. No. 4,874,030.

This application Jun. 12, 1989, Ser. No. 365,277

Int. Cl.<sup>5</sup> C08K 3/10; C08L 77/02

U.S. Cl. 524—403

8 Claims



1. A composition comprising a blend of (a) polymer having greater than 50 weight percent propylene carbonate units and (b) polymer having greater than 50 weight percent methyl methacrylate units.

4,946,885

# FLAME RETARDANT THERMOPLASTIC CONTAINING PHOSPHAM

Edward D. Weil, Hastings-on-Hudson, and Navin G. Patel, Farmingdale, both of N.Y., assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Sep. 11, 1989, Ser. No. 405,320

Int. Cl.<sup>5</sup> C08K 5/55, 3/38, 3/32

U.S. Cl. 524—415

18 Claims

1. A flame retardant thermoplastic composition comprising a flame retardant amount of phospham.

4,946,886

## SOLVENT FOR PAINT

Atsushi Nasu, 99 Katako, Yokaichiba-shi, Chiba-ken, Japan  
 Filed Apr. 22, 1987, Ser. No. 41,289  
 Claims priority, application Japan, Oct. 24, 1986, 61-254069  
 Int. Cl.<sup>5</sup> C08K 3/26

U.S. Cl. 524—425

17 Claims

1. A paint comprising a solvent fraction and a paint fraction dissolved in said solvent fraction, said solvent fraction comprising an aqueous solution of an alkaline agent, the cations of said alkaline agent being predominantly calcium ions and present in an amount sufficient to provide a pH of at least 12, said paint fraction being a member selected from the group consisting of oil-base paints, aqueous latex paints, lacquers, epoxy paints and coal tar-base paints.

4,946,887

## TIRE TREAD RUBBER COMPOSITION AND TIRE FOR PASSENGER CAR

Hiroshi Takino, Ibaraki; Satoshi Iwama, Takatsuki; Riichiro Ohara, Suita; Noriyuki Isobe; Hiroyuki Tabori, both of Ibaraki, and Makoto Komai, Itami, all of Japan, assignors to Toyo Tire & Rubber Company Limited, Osaka, Japan  
 Filed Oct. 20, 1988, Ser. No. 260,109

Claims priority, application Japan, Oct. 21, 1987, 62-267472; Dec. 28, 1987, 62-333827; Dec. 28, 1987, 62-333828; Feb. 23, 1988, 63-40312

Int. Cl.<sup>5</sup> C08K 3/04; C08L 7/00, 9/00, 9/06

U.S. Cl. 524—495

4 Claims

1. A passenger car tire with a tire tread made of a rubber composition which is composed of an isoprene rubber and a styrene-butadiene rubber in a ratio of 5/95 to 60/40 (by weight) and 50 to 200 parts by weight of carbon black having an iodine adsorption value (IA) of 100 mg/g or above, said isoprene rubber containing more than 50% in total of 3,4-vinyl bond and 1,2-vinyl bond, and said styrene-butadiene rubber having a glass transition temperature lower by 10° C. or more than that of said isoprene rubber, said tire tread rubber composition having a two-peak  $\tan\delta$  characterized in that the temperature distribution curve for loss tangent ( $\tan\delta$ ) has two peaks in the range from -120° C. to +100° C.

4,946,888

## HIGH-HARDNESS RUBBER COMPOSITION

Keisaku Yamamoto; Yoshio Tanimoto, and Isao Takano, all of Chiba, Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

Filed Nov. 17, 1989, Ser. No. 437,607

Claims priority, application Japan, Mar. 9, 1989, 64-58432

Int. Cl.<sup>5</sup> C08K 3/00, 3/04; C08L 9/00, 23/26

U.S. Cl. 524—526

5 Claims

1. A rubber composition which is obtained by vulcanizing an unvulcanized rubber composition comprising an unvulcanized ethylene- $\alpha$ -olefin rubber composition (A) comprising 100 parts by weight of an ethylene- $\alpha$ -olefin copolymer rubber, 60–150 parts by weight of a reinforcing agent and 0–70 parts by weight of a softener; 5–40 parts by weight of a solid diene rubber (B) based on 100 parts by weight of said ethylene- $\alpha$ -olefin copolymer rubber; and 4–15 parts by weight of sulfur (C) based on 100 parts by weight of said ethylene- $\alpha$ -olefin copolymer rubber, wherein said unvulcanized rubber composition is obtained by adding said solid diene rubber (B) and said sulfur (C) to said unvulcanized ethylene- $\alpha$ -olefin rubber composition (A).

4,946,889

## COATING COMPOSITION

Akinori Nishioka, Mie, Japan, assignor to Atochem North America, Inc., Philadelphia, Pa.

Filed Jun. 7, 1989, Ser. No. 362,729

Claims priority, application Japan, Jun. 24, 1988, 63-156291

Int. Cl.<sup>5</sup> C08J 27/12; C08F 8/00

U.S. Cl. 524—544

5 Claims

1. A coating composition comprising:

- a vinylidene fluoride-based polymer selected from the group consisting of vinylidene/tetrafluoroethylene copolymer, vinylidene/tetrafluoroethylene/hexafluoropropylene terpolymer and mixtures thereof;
- an acrylic polymer containing hydrolyzable silyl groups and isocyanate groups; and
- at least one organic solvent; wherein the vinylidene fluoride-based polymer (a) comprises from 40% to 95% by weight of the combined weight of polymers (a) and (b), and the organic solvent (c) is present in the amount of from about 100 to about 300 parts per 100 parts by weight of the combined weight of polymers (a) and (b).

4,946,890

## LADDER POLYMERS FOR USE AS HIGH TEMPERATURE STABLE RESINS OR COATINGS

Mary Ann Meador, Strongsville, Ohio, assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

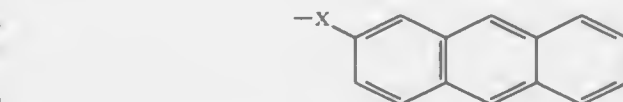
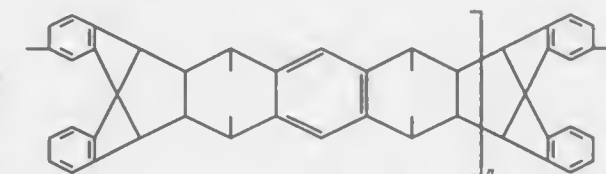
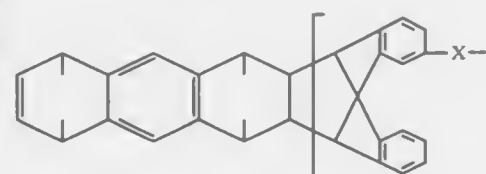
Filed Aug. 11, 1988, Ser. No. 231,026

Int. Cl.<sup>5</sup> C08G 73/10

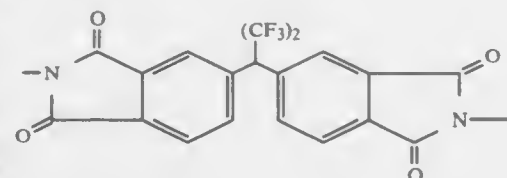
U.S. Cl. 524—600

15 Claims

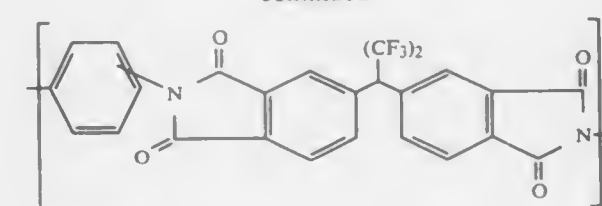
1. An addition ladder polymer having the following general formula:



in which n is 15 to 30; and  
 x is



-continued



wherein m is 0 to 5.

4,946,891

## SEMI-CONTINUOUS EMULSION POLYMERIZATION PROCESS

James E. Devona, Mt. Prospect, and Gregory D. Shay, Oak Forest, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Nov. 10, 1988, Ser. No. 269,704

Int. Cl.<sup>5</sup> C08F 2/22, 218/08

U.S. Cl. 524—833

9 Claims

1. A method of carrying out a semicontinuous aqueous emulsion copolymerization using a single continuously stirred tank reactor to reduce the particle size distribution of the copolymer product comprising, supplying to said reactor the materials used in the copolymerization including the monomers which are copolymerized while maintaining conditions causing copolymerization to proceed until the reactor is filled, continuing said supply while maintaining said conditions until the total supply is in the range of from about 1.5 to about 5 reactor volumes, the excess material in the reactor being removed therefrom and collected in one or more separate vessels in which the copolymerization reaction is completed, and then combining and mixing together all of the product of the copolymerization.

4,946,892

## COMPOSITES OF IN-SITU EXFOLIATED GRAPHITE

Deborah D. L. Chung, Pittsburgh, Pa., assignor to UCAR Carbon Technology Corporation, Danbury, Conn.

Filed Oct. 5, 1987, Ser. No. 105,102

Int. Cl.<sup>5</sup> C08K 3/04; H01B 1/24

U.S. Cl. 524—847

7 Claims

1. A method for forming a composite of exfoliated graphite dispersed in a polymeric resin matrix which comprises:  
 (a) forming a suspension comprising intercalated unexfoliated graphite flakes in a liquid polymeric thermoset resin matrix, wherein the liquid resin cures at a temperature above the graphite exfoliation onset temperature;  
 (b) heating to a temperature above the graphite exfoliation onset temperature to exfoliate the graphite flakes and initiate solidification by curing of liquid thermoset resin, and maintaining a temperature to fully solidify the thermoset resin to form a solid composite comprising graphite flakes with an expanded exfoliated structure dispersed in a solid polymer matrix.

4,946,893

## METHOD FOR PREPARING FILLED SILICONE RUBBER PARTICLES

Masayuki Saito; Keiji Yoshida, both of Ichihara, and Mitsuo Hamada, Kisarazu, all of Japan, assignors to Dow Corning Toray Silicone Company Limited, Tokyo, Japan

Filed Nov. 23, 1988, Ser. No. 275,498

Claims priority, application Japan, Nov. 30, 1987, 62-302149

Int. Cl.<sup>5</sup> C08L 83/07

U.S. Cl. 524—862

3 Claims

1. In a method for preparing a highly filled silicone rubber powder, said method comprising I. dispersing into water maintained at a temperature of at least 25° C. a liquid silicone rubber composition comprising (A) 100 weight parts of an organopolysiloxane having at least 2 lower alkenyl groups in each molecule, (B) an organohydrogenpolysiloxane having at least 3

silicon-bonded hydrogen atoms, where the said composition contains from 0.5 to 20 moles of siliconbonded hydrogen atoms for each mole of lower alkenyl groups in said organopolysiloxane, (C) an amount of a platinum compound equivalent to from 0.1 to 1,000 parts by weight of platinum per 1,000,000 parts of combined weight of ingredients (A) and (B), and (D) a microparticulate powder having an average particle diameter not exceeding 20 micrometers, and II. recovering said composition from said water in the form of a cured silicone rubber powder, the improvement comprising (1) the addition to said liquid silicone rubber composition of (a) from 20 to 2,000 weight parts of an unreactive, volatile diorganopolysiloxane having a degree of polymerization not exceeding 10 and (b) from 100 to 1000 parts by weight of said microparticulate powder per 100 parts of said organopolysiloxane and (2) subsequently drying said cured powder to remove said diorganopolysiloxane.

4,946,894

## BLEND COMPRISING LARGE PROPORTIONS OF AN EPDM GRAFT TERPOLYMER AND RELATIVELY SMALLER PROPORTIONS OF AN ACRYLATE RUBBER

David E. Henton, and Douglas E. Beyer, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 898,743, Aug. 15, 1986, Pat. No. 4,766,175, which is a continuation of Ser. No. 737,368, May 23, 1985, abandoned. This application Aug. 15, 1988, Ser. No. 232,268

Int. Cl.<sup>5</sup> C08L 51/04, 51/06, 25/12

U.S. Cl. 525—71

8 Claims

1. A rubber reinforced thermoplastic polyblend comprising from 10 to 40 percent by weight of an elastomer and 90 to 60 percent by weight of a matrix polymer wherein the elastomer comprises from 85 to 70 percent based on elastomer weight of a grafted EPDM terpolymer rubber and 15 to 30 percent based on elastomer weight of a grafted acrylate rubber further characterized in that both the grafted superstrate polymers and matrix polymer comprise:  
 from 10 to 90 weight percent of a monovinylidene aromatic monomer selected from the group consisting of styrene,  $\alpha$ -methylstyrene and ring alkyl or halo substituted styrenes;  
 from 10 to 40 weight percent acrylonitrile; and  
 from 0 to 80 percent of a monomer selected from the group consisting of methylmethacrylate, N-phenylmaleimide, maleic anhydride, and N-ethylmaleimide.

4,946,895

## RESINOUS COMPOSITION FOR POWDER COATING

Tadayuki Ohmae; Kentaro Mashita, both of Chiba; Kizuku Wakatsuki, and Toshio Kawakita, both of Osaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Continuation of Ser. No. 232,829, Aug. 16, 1988, abandoned.

This application Sep. 29, 1989, Ser. No. 414,281

Int. Cl.<sup>5</sup> C08L 53/00, 51/06

U.S. Cl. 525—75

8 Claims

1. A resinous composition for powder coating which comprises  
 (A) 80–95 parts by weight of a modified polypropylene in which an unsaturated carboxylic acid or anhydride thereof is grafted onto at least a part of a crystalline random copolymer of (a) 90–99% by weight of propylene and (b) 10–1% by weight of a  $\alpha$ -olefin having 2–10 carbon atoms excluding propylene, said modified polypropylene having a melt index of 10–60 g/10 min. and containing 0.01–5% by weight of said unsaturated carboxylic acid or anhydride thereof,  
 (B) 20–5 parts by weight of at least one ethylene polymer selected from a low density polyethylene, a linear low density polyethylene and a copolymer of ethylene with



- 10% by weight or less of an ester of an unsaturated carboxylic acid or a vinyl ester of a fatty acid,  
 (C) 0.1-10 parts by weight of an oxide or hydroxide of a metal of IIa, IIIa or IVb of the Mendeleev's Periodic Table, and  
 (D) a vinyl cycloalkane polymer having at least six carbon atoms in such an amount that the units of vinyl cycloalkane are 0.001-1.0% by weight of the composition.

4,946,896

## THERMOPLASTIC ELASTOMER COMPOSITION

Tatsuyuki Mitsuno; Hideo Shinonaga, and Akio Daimon, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 46,939, May 5, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 265,845  
 Claims priority, application Japan, May 8, 1986, 61-105667  
 Int. Cl.<sup>3</sup> C08L 23/10, 23/16, 23/26, 33/04

- U.S. Cl. 525-93 11 Claims  
 1. A thermoplastic elastomer composition which comprises (A) 20-80% by weight of a polypropylene resin, (B) 5-38% by weight of an ethylene copolymer having 82-98.7 mol % of an ethylene unit, 1-15 mol % of an ester unit selected from the group consisting of alkyl acrylate and alkyl methacrylate containing an alkyl group of 1-8 carbon atoms and 0.3-3 mol % of an unsaturated dicarboxylic acid anhydride unit and (C) 10-70% by weight of at least one of an ethylene-propylene copolymer rubber and an ethylene-propylene-nonconjugated diene copolymer rubber which contain 50-85 mol % of an ethylene unit and have a Mooney viscosity (ML<sub>1+4</sub> 100° C.) of 20-100 and an iodine value of 20 or less.

4,946,897

## THERMOPLASTIC COMPOSITIONS BASED ON SYNDIOTACTIC POLYMERS OF STYRENE AND POLYPHENYLENE ETHERS

Enrico Albizzati, Arona; Italo Borghi, Ferrara; Franco Fattorini, Cavallasca, and Giovanni Giunchi, Novara, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

Filed Oct. 24, 1988, Ser. No. 261,228  
 Claims priority, application Italy, Oct. 28, 1987, 22422 A/87  
 Int. Cl.<sup>3</sup> C08L 71/12

- U.S. Cl. 525-132 11 Claims  
 1. Compositions comprising: from 50 to 95% by weight of at least one styrene polymer having an essentially syndiotactic structure characterized by an H-NMR spectrum showing chemical shifts of methinic and methylenic protons respectively centered at 1.9 and 1.4 ppm; and  
 from 50 to 5% by weight of at least one polyphenylene ether,  
 with respect to the sum of the weights of the styrene polymer plus the polyethylene ether.

4,946,898

## PROPYLENE POLYMER COMPOSITION

Toshikazu Kasahara, and Hideo Fnnabashi, both of Ichihara, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 265,034  
 Claims priority, application Japan, Nov. 11, 1987, 62-282995  
 Int. Cl.<sup>3</sup> C08L 23/10, 23/16; C08F 297/08

- U.S. Cl. 525-240 13 Claims  
 1. A propylene polymer composition comprising:  
 60 to 94% by weight of a propylene homopolymer having (a) an intrinsic viscosity ( $[\eta]$ ) of 0.5 to 5 dl/g, (b) a xylene soluble content at ordinary temperature (Xs) of not more than 3% by weight, and a difference ( $\Delta[\eta]$ ) between an intrinsic viscosity ( $[\eta]$ ) of xylene insoluble portion at the ordinary temperature and an intrinsic viscosity ( $[\eta]$ ) of xylene soluble portion at the ordinary temperature of not more than 0.5 dl/g, (c) an isotactic pentad fraction (IP)

falling within the range represented by the following equation:

$$IP \geq -0.624[\eta] + 97.5,$$

and (d) a crystallization temperature ( $T_c$ ) falling within the range represented by the following equation:

$$T_c \geq -2.33[\eta] + 116.0; \text{ and}$$

6 to 40% by weight of a propylene-ethylene random copolymer having (e) an intrinsic viscosity ( $[\eta]$ ) of not less than 2.8 dl/g and (f) an ethylene content of 30 to 80% by weight.

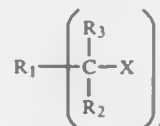
4,946,899

## THERMOPLASTIC ELASTOMERS OF ISOBUTYLENE AND PROCESS OF PREPARATION

Joseph P. Kennedy; Judit E. Puskas; Gabor Kaszas, and William G. Hager, all of Akron, Ohio, assignors to The University of Akron, Akron, Ohio

Filed Dec. 16, 1988, Ser. No. 285,207  
 Int. Cl.<sup>3</sup> C08F 255/10

- U.S. Cl. 525-244 12 Claims  
 1. A living polymerization process for preparing linear or star-shaped block copolymers of isobutylene and another monomer comprising polymerization isobutylene alone or with another monomer at a temperature of about -10° C. to -90° C. in an anhydrous system of said isobutylene or another monomer, a mixed solvent, initiator and a metal halide selected from the metals of tin, titanium, aluminum, boron, said polymerization system being capable of producing an electron pair donor initiator having the formula:



in which  $R_1$ ,  $R_2$  and  $R_3$  are alkyl, aryl, or aralkyl groups and can be the same or different and  $X$  is a carboxyl, alkoxyl, hydroxyl or halogen group, and  $i$  is a positive whole number, said mixed solvent being formed of at least one hydrocarbon or haloalkane with or without an electron donor pair solvent having a donor number of about 15 to 50, when  $X$  is carboxyl or alkoxyl; the mixed solvent being a mixture of hydrocarbon and haloalkane with or without said electron donor pair solvent with said hydrocarbon or haloalkane and when  $X$  is hydroxyl or halogen, the mixed solvent must contain an electron pair donor solvent of 15 to 50 donor number when said polymerization of another monomer occurs in the presence of the electron pair donor solvent, the mixed solvent and living polyisobutylene, said another monomer being selected from at least one of styrene, and its halo or alkyl styrenes, indene and alkylated indenenes.

4,946,900

## HETEROGENEOUS COPOLYMER OF VINYLIDENE FLUORIDE AND CHLOROTRIFLUOROETHYLENE PROCESS OF PREPARATION OF THE HETEROGENEOUS COPOLYMER

Jean Blaise, Lyon, and Patrick Kappler, Ecully, both of France, assignors to Atochem, Paris, France

Division of Ser. No. 146,814, Jan. 22, 1988, Pat. No. 4,851,479.  
 This application Apr. 14, 1989, Ser. No. 339,173  
 Claims priority, application France, Feb. 3, 1987, 87 01283  
 Int. Cl.<sup>3</sup> C08F 259/08

- U.S. Cl. 525-276 6 Claims  
 1. A process for preparing a heterogeneous copolymer of vinylidene fluoride and chlorotrifluoroethylene, comprised of nodules of a homogeneous copolymeric elastomer of vinyli-

dene fluoride and chlorotrifluoroethylene dispersed in a matrix and chemically bonded thereto, said process comprising copolymerizing vinylidene fluoride and chlorotrifluoroethylene in a first stage, and without interruption, thereafter homopolymerizing vinylidene fluoride in a second stage, wherein the amount of chlorotrifluoroethylene residues in the heterogeneous copolymer is from about 5-15 percent by weight.

4,946,901

## POLYMERIZABLE COMPOSITIONS, PROCESS FOR THE PREPARATION THEREOF, AND USE THEREOF AS DENTAL COMPOSITIONS

Günther Lechner, Frieding; Klaus Ellrich, Wörthsee; Rainer Guggenberger, and Oswald Gasser, both of Seefeld, all of Fed. Rep. of Germany, assignors to ESPE Stiftung & Co. Produktions- und Vertriebs KG, Seefeld, Fed. Rep. of Germany  
 Continuation of Ser. No. 130,080, Dec. 8, 1987, abandoned. This application May 4, 1989, Ser. No. 348,078

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642212

Int. Cl.<sup>3</sup> C08F 265/06; A61K 6/08  
 U.S. Cl. 525-305 14 Claims

1. Polymerizable compositions in combination having a (meth)acrylic acid ester base and containing an insoluble organic filler, which is an organic non-swelling precipitation polymer combustible without leaving any residue as formed from at least one of the group consisting of acrylic acid esters and methacrylic acid esters and other copolymerizable monomers, and which provides precipitation polymers with 60 to 100 mol % of the (meth)acrylic acid esters being bi or polyfunctional,  
 said organic precipitation polymers having the following properties:  
 (a) they consist of substantially irregular agglomerate or secondary particles having a grain size in a range of 0.2 to 200  $\mu$ m,  
 (b) the weight average of the grain size of said secondary particles is in a range of 5 to 100  $\mu$ m,  
 (c) said secondary particles are formed from primary particles having a grain size in a range of 0.05 to 2  $\mu$ m, and  
 (d) the BET surface area is in a range of 5 to 300 m<sup>2</sup>/g.

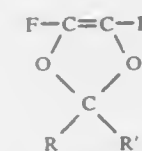
4,946,902

## PROCESS FOR THE STABILIZATION OF FLUOROPOLYMERS

Paul G. Bekiarian, Claymont, Del.; Marlin D. Buckmaster, and Richard A. Morgan, both of Vienna, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 27, 1988, Ser. No. 199,443  
 Int. Cl.<sup>3</sup> C08F 8/32

- U.S. Cl. 525-326.2 24 Claims  
 1. A process for improving the high temperature stability of a melt-processible copolymer of at least two comonomers selected from the group consisting of tetrafluoroethylene; chlorotrifluoroethylene;  $R_1CF=CF_2$ , where  $R_1$  is a primary fluoroalkyl group with 1-5 carbon atoms;  $R_2OCF=CF_2$ , where  $R_2$  is  $R_1$  or a primary fluoroalkyl group containing ether oxygen and 4-12 carbon atoms; and a fluorodioxole having the following formula



where each one of  $R$  and  $R'$ , independently is fluorine or the trifluoromethyl group; said process comprising at least one cycle of the following sequential steps:

- (a) contacting said copolymer for a period of at least 15 minutes at a temperature between about 25° C. and 200° C. with at least a stoichiometric amount, based on the con-

centration of -COOH and -COF groups, of an anhydrous or aqueous stabilizing agent selected from the group consisting of

- (1) bases selected from organic amines having a boiling point at normal pressure of at most about 130° C., and  
 (2) tertiary alcohols with up to 8 carbon atoms, to form an intermediate;  
 (b) isolating and drying the intermediate at a temperature between about 70° C. and 150° C.;  
 (c) converting the dried intermediate to a copolymer having improved thermal stability by contacting the intermediate with fluorine at a temperature between 20° C. and the lowest temperature at which the copolymer exhibits a solid state transition, whether first order or second order, and  
 (d) removing excess fluorine and volatile by-products from the reaction product and recovering the copolymer.

4,946,903

## OXYFLUOROPOLYMERS HAVING CHEMICALLY REACTIVE SURFACE FUNCTIONALITY AND INCREASED SURFACE ENERGIES

Joseph A. Gardella, Jr., and Terrance G. Vargo, both of Buffalo, N.Y., assignors to The Research Foundation of State University of NY, Albany, N.Y.

Filed Mar. 27, 1989, Ser. No. 328,852  
 Int. Cl.<sup>3</sup> C08F 8/26, 8/00

- U.S. Cl. 525-326.4 23 Claims  
 1. An oxyfluoropolymer comprising a fluoropolymer in which up to about 98 percent of the surface fluorine atoms to depths from about 10 to about 100 Å are permanently substituted with hydrogen and oxygen or oxygen-containing groups of which from about 3 to about 30 percent of the substituted fluorine is replaced with oxygen or oxygen-containing groups and from about 70 to about 97 percent is substituted with hydrogen atoms, the morphological and hydrophobic properties of the oxyfluoropolymer remaining substantially unchanged from those of said fluoropolymer while wettability with respect to low surface tension liquids and surface free energy ( $\gamma_s$ ) as determined through critical surface tension ( $\gamma_c$ ) are increased.

4,946,904

## ADDITIVES FOR CEMENT

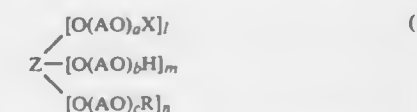
Shin-ichi Akimoto; Susumu Honda, both of Tokyo, and Tohru Yasukobchi, Kanagawa, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,699

Claims priority, application Japan, May 15, 1987, 62-117036  
 The portion of the term of this patent subsequent to Aug. 7, 2007, has been disclaimed.  
 Int. Cl.<sup>3</sup> C08F 210/14

U.S. Cl. 525-327.8 8 Claims

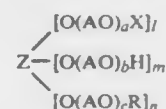
1. An additive for cement comprising, as the effective component, a copolymer of a polyoxyalkylene compound represented by the following formula (1) and maleic anhydride, a hydrolyzed product of the copolymer, or a salt of the hydrolyzed product;



wherein  $B$  represents a residue of a compound having from 2 to 8 hydroxy groups;  $AO$  represents an oxyalkylene group having from 2 to 18 carbon atoms;  $X$  represents an unsaturated hydrocarbon group having from 2 to 5 carbon atoms or an unsaturated acyl group having from 2 to 5 carbon atoms;  $R$  represents hydrocarbon group having from 1 to 40 carbon atoms; represents 0 to 1,000;  $b$  represents 0 to 1,000; represents 0 to 1,000;

l represents 1 to 7, m represents 0 to 2; and n represents 1 to 7;  $l+m+n=2$  to 8,  $m/(l+n) \leq \frac{1}{2}$ , and  $al+bm+cn \geq 1$ .

4. A cement composition containing a cement and a copolymer of a polyoxyalkylene compound represented by the following formula (I) and maleic anhydride, a hydrolyzed product of the copolymer, or a salt of the hydrolyzed product;



wherein Z represents a residue of a compound having from 2 to 8 hydroxy groups; AO represents an oxyalkylene group having from 2 to 18 carbon atoms; X represents an unsaturated hydrocarbon group having from 2 to 5 carbon atoms or an unsaturated acyl group having from 2 to 5 carbon atoms; R represents hydrocarbon group having from 1 to 40 carbon atoms; a represents 0 to 1,000; b represents 0 to 1,000; c represents 0 to 1,000; l represents 1 to 7, m represents 0 to 2; and n represents 1 to 7;  $l+m+n=2$  to 8,  $m/(l+n) \leq \frac{1}{2}$ , and  $al+bm+cn \geq 1$ .

4,946,905

#### PREPARATION OF AGE-RESISTING POLYMERS BY REACTIONS INVOLVING USE OF AMINOMERCAPTANS

Arthur H. Weinstein, Hudson, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 471,076, Mar. 1, 1983, Pat. No. 4,760,181, which is a continuation of Ser. No. 286,494, Jul. 24, 1981, abandoned, which is a continuation of Ser. No. 144,153, Apr. 28, 1980, abandoned, which is a continuation of Ser. No. 50,021, Jun. 18, 1979, abandoned, which is a continuation of Ser. No. 845,001, Oct. 25, 1977, abandoned, which is a continuation-in-part of Ser. No. 712,551, Aug. 9, 1976, abandoned. This application Feb. 16, 1988, Ser. No. 156,493

Int. Cl.<sup>5</sup> C08C 19/22

U.S. Cl. 525—350

9 Claims

1. A process for producing a polymer self-resistant to aging by an addition reaction, which process comprises interacting a polymeric substrate containing at least one reactable double bond per polymer molecule with from 0.1 to 10 parts by weight of an aminomercaptan selected from the group consisting of N-(4-anilino-phenyl)-β-mercaptopropionamide and N-(4-anilino-phenyl)-α-mercaptoacetamide in the presence of a free radical catalyst, wherein the polymeric substrate is polybutadiene.

4,946,906

#### PROCESS FOR PRODUCING POLYOXYMETHYLENE-POLYURETHANE TYPE ALLOY

Noriyoshi Yano, Zushi, and Toshihiko Fujita, Yokohama, both of Japan, assignors to Nippon Polyurethane Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 7/145,562, Jan. 19, 1988, abandoned. This application Jun. 5, 1989, Ser. No. 361,221

Int. Cl.<sup>5</sup> C08L 59/00

U.S. Cl. 525—399

15 Claims

1. A process for producing a polyoxymethylene-polyurethane alloy, which comprises allowing a polyisocyanate compound, a short chain polyol with a molecular weight of 62 to 350, and a long chain polyol with a number-average molecular weight of 400 to 5,000, to react with each other in the presence of at least one polyoxymethylene polymer.

4,946,907

#### CURABLE THERMOSETTING PREPOLYMERIZED IMIDE RESIN COMPOSITIONS

Anthony J. Kinloch, Bishops Stortford, and Stephen J. Shaw, Saffron Walden, both of England, assignors to The Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

PCT No. PCT/GB83/00350, § 371 Date Aug. 21, 1984, § 102(e) Date Aug. 21, 1984, PCT Pub. No. WO84/02528, PCT Pub. Date Jul. 5, 1984

Continuation of Ser. No. 645,311, Aug. 21, 1984, abandoned. This PCT application Dec. 23, 1983, Ser. No. 106,998

Claims priority, application United Kingdom, Dec. 24, 1982, 8236849

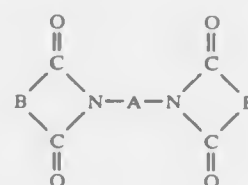
Int. Cl.<sup>5</sup> C08L 79/08; C08F 22/40

U.S. Cl. 525—422

8 Claims

1. A method for preparing a curable thermosetting prepolymerized imide resin composition comprising chemically reacting, at a temperature below 150° C., a liquid mixture of a carboxy-terminated polybutadiene/acrylonitrile (CTBN) and a co-reactant comprising

a. at least one N,N'-bisimide of an unsaturated carboxylic acid of general formula I



wherein B represents a divalent radical containing a carbon-carbon double bond and A represents a divalent radical having at least two carbon atoms, or

b. the imide resin reaction product of at least one N,N'-bisimide of general formula I and at least one primary organic diamine or organic hydrazide, or

c. the imide resin reaction product of at least one N,N'-bisimide of general formula I, at least one monoimide, and at least one organic hydrazide, to yield a curable thermosetting prepolymerized imide resin composition containing copolymerized CTBN and co-reactant, said composition being curable at a temperature between 100° C. and 350° C. to a fully cross-linked polyimide matrix containing a dispersion of phase separated solid particles of copolymerized CTBN and co-reactant, said matrix having a lap shear strength at 20° C. greater than that of a fully cross-linked polyimide cured from the co-reactant alone.

4,946,908

#### BISMALEIMIDE COMPOSITIONS CONTAINING HIGH GLASS TRANSITION TEMPERATURE AND SOLUBLE REACTIVE OLIGOMERS AND COMPOSITES PREPARED THEREFROM

Sung G. Chu; Harold Jabloner, and Tuyen T. Nguyen, all of Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.

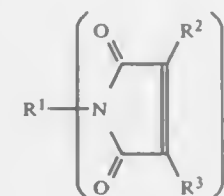
Filed Jul. 15, 1987, Ser. No. 73,667

Int. Cl.<sup>5</sup> C08L 77/06, 79/08

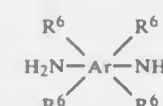
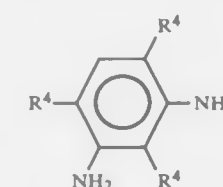
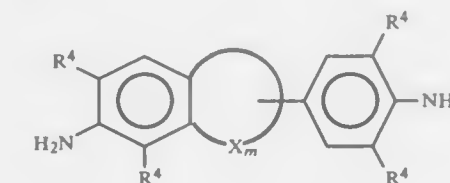
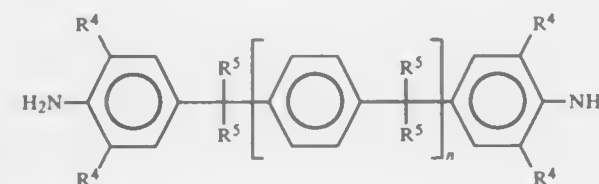
U.S. Cl. 525—426

9 Claims

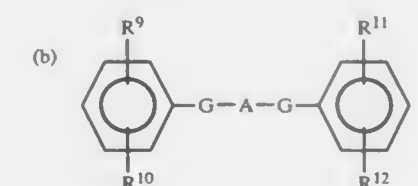
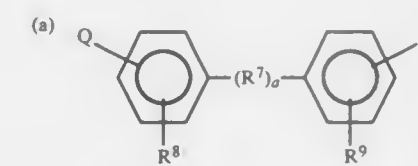
1. A thermosetting resin composition comprising a mono- or multifunctional maleimide, a terminally unsaturated polyimide, polyamide or polyimideamide oligomer and a reactive diluent, said mono- or multi-functional maleimide having the formula



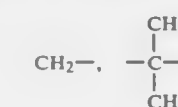
where R<sup>1</sup> is the residuum of an aryl, alkylaryl, or alkylamine; R<sup>2</sup> is hydrogen, halogen, aryl, or lower alkyl group of from 1 to about 10 carbon atoms; R<sup>3</sup> is hydrogen, halogen, aryl or lower alkyl group of from 1 to about 10 carbon atoms; and n is an integer of from 1 to about 10; said terminally unsaturated polyimide, polyamide or polyimideamide oligomer prepared by reaction of (a) a diamine or mixture thereof selected from the group consisting of the formulae



where R<sup>4</sup> is an alkyl, aryl, alkylaryl, halogen or hydrogen; R<sup>5</sup> is methyl or lower alkyl; n is 0 to 4; x is methylene and m is 3 to 6; Ar is aryl or alkylaryl; and R<sup>6</sup> is alkyl, aryl, alkylaryl, or halogen and the four R<sup>6</sup> groups are on adjacent carbon atoms to the two amine groups and such R<sup>6</sup> groups may be the same or different; (b) a dicarboxylic acid or reactive derivative thereof or mixture thereof and (c) an unsaturated organic compound having a group reactive with whichever of (a) or (b) is used in excess wherein if (a) is used in excess than said unsaturated organic compound is selected from maleic anhydride, its halide, alkyl, alkylaryl or aryl derivative; unsaturated alkyl halide; unsaturated acid chloride; unsaturated sulfonyl chloride; and if (b) is used in excess then said unsaturated organic compound is selected from unsaturated primary or secondary amine, unsaturated alcohol and unsaturated sulfide; and said reactive diluent being soluble in the mixture of said oligomer and said maleimide and selected from materials having formula VI or VII, below:



wherein in formula VI R<sup>7</sup> represents one of the radical



—SO<sub>2</sub>—, —SO—, —S— and —O—; a is 0 to 1; and each Q is independently —OH, —NH<sub>2</sub>, —SH, or hydrogen, and are in the same or different and R<sup>8</sup> and R<sup>9</sup> are unsaturated alkyl groups having one to eight carbon atoms and may be the same or different, and wherein the Formula VII, R<sup>9</sup> and R<sup>11</sup> are unsaturated alkyl or aryl groups and may be the same or different, R<sup>10</sup> and R<sup>12</sup> are hydrogen, or alkyl or aryl ether groups; each Q is independently —OH, —NH<sub>2</sub>, —SH or hydrogen and G is —O— or —S— or —NH—, and A is the residuum of a dihalide, said composition being a liquid at 60° to 100° C. with a viscosity of between about 10,000 and 100,000 centipoises (cps) at 100° C.

4,946,909

#### PROCESS FOR PRODUCTION OF QUASI-RANDOM COPOLYMERS FROM HOMOPOLYMERS USING ARYL PHOSPHORYL AZIDE(S)

Himangshu R. Bhattacharjee, Randolph, and Yash P. Khanna, Cedar Knolls, both of N.J., assignors to ALLIED-SIGNAL INC., Morris Township, Morris County, N.J.

Filed Nov. 3, 1988, Ser. No. 266,539

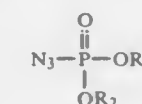
Int. Cl.<sup>5</sup> C08L 77/00; C08K 5/51

U.S. Cl. 525—432

20 Claims

1. A process for forming random copolymers which comprises the steps of:

A. forming an intimate mixture of two or more polyamides and one or more aryl phosphoryl azide compound in an amount sufficient to promote formation of said random copolymers, said azide compound of the formula:



wherein:

R<sub>1</sub> is selected from the group consisting of phenyl or phenyl substituted with one or more substituents which are inert under the process conditions; and

R<sub>2</sub> is selected from the group consisting of R<sub>1</sub> substituents, alkyl, haloalkyl, hydrogen, and metal and non-metal cations; and

B. heating said mixture for a period of time sufficient to produce the desired amount of random copolymer.



**4,946,910**  
**NOVEL NON-IONIC POLYURETHANE RESINS**  
**HAVING POLYETHER BACKBONES IN**  
**WATER-DILUTABLE BASECOATS**

Thomas G. Savino, Northville; Thomas C. Balch, West Bloomfield; Alan L. Steinmetz, Milford; Sergio E. Balatin, West Bloomfield, and Nicholas Caiozzo, St. Clair Shores, all of Mich., assignors to BASF Corporation, Inmont Division, Clifton, N.J.

Division of Ser. No. 77,353, Jul. 24, 1987, Pat. No. 4,794,147.

This application Dec. 22, 1988, Ser. No. 288,434

Int. Cl.<sup>5</sup> C08L 75/04

U.S. Cl. 525—440

42 Claims

1. A basecoat composition for spraying or depositing onto a metal or plastic substrate comprising:

(1) a laterally stabilized polyurethane resin comprising the reaction product of:

(a) at least one organic compound having two or more reactive hydrogen functionalities;

(b) a nonionic stabilizer prepared by the reaction of:

(i) a polyether having at least one active hydrogen group

with a first polyisocyanate compound to produce a partially capped isocyanate intermediate; and

(ii) a compound having at least one active amine hydrogen and at least two active hydroxyl groups; and

(c) at least one second polyisocyanate compound;

(2) a cross-linking agent;

(3) a grind resin; and

(4) a pigment component.

**4,946,911**  
**EPOXY RESIN AND WATER BORNE COATINGS**  
**THEREFROM**

Duane S. Treybig, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 22, 1989, Ser. No. 354,948

Int. Cl.<sup>5</sup> C08G 59/44, 59/45

U.S. Cl. 525—514

51 Claims

1. An uncured composition which is the composition resulting from

(1) reacting

(a) a compound containing an average of more than one vicinal epoxide group per molecule with

(b) at least one unsaturated imide having a reactive hydrogen atom attached to the imide nitrogen atom

in amounts which provide a ratio of moles of component (b) per epoxide group contained in component (a) of from about 0.01:1 to less than about 1:1; and

(2) reacting the product of step (A) with

(c) at least one of

(i) at least one compound containing only one phenolic hydroxyl group,

(ii) at least one secondary amine, or

(iii) a combination of (i) and (ii)

in an amount such that the resulting product contains a percent epoxide value of not greater than about 1.5 percent by weight.

**4,946,912**  
**BLOCK COPOLYMER AND COMPOSITIONS**

Jubeiji Kawabata; Toshinori Sugie, both of Takaishi; Fumihiko Kobata, Izumi; Hitoshi Izutsu, Kumatori, and Manabu Chiba, Izumi-ohsu, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Continuation of Ser. No. 140,203, Dec. 31, 1987, abandoned, which is a division of Ser. No. 929,372, Nov. 12, 1986, Pat. No. 4,734,470. This application Jun. 6, 1989, Ser. No. 363,387

Claims priority, application Japan, Nov. 13, 1985, 60-252857; Mar. 5, 1986, 61-48110; May 30, 1986, 61-125232

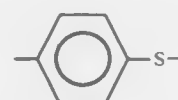
Int. Cl.<sup>5</sup> C08L 81/02

U.S. Cl. 525—537

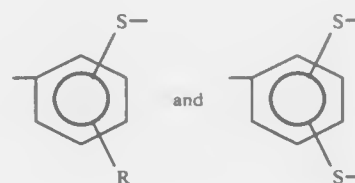
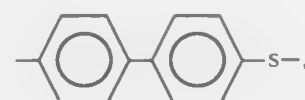
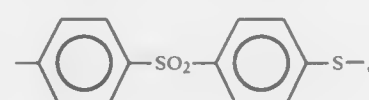
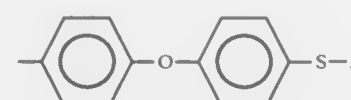
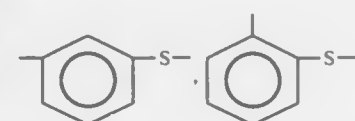
6 Claims

1. A resin composition comprising a block copolymer composed of polyphenylene sulfide seg-

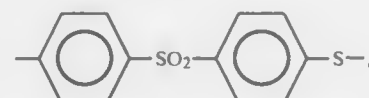
ments and aromatic sulfide sulfone polymer segments, said polyphenylene sulfide segments consisting of at least 70 mole % of recurring structural units of the formula



and not more than 30 mole % of one or more recurring structural units selected from the group consisting of

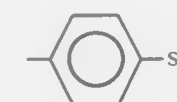


wherein R is an alkyl group, a nitro group, a phenyl group, an alkoxy group, a carboxylic acid group or a metal carboxylate group, said aromatic sulfide sulfone polymer segments consisting of recurring units of the formula

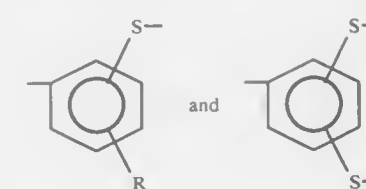
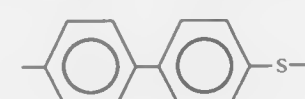
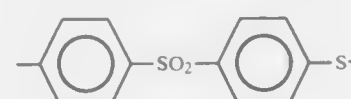
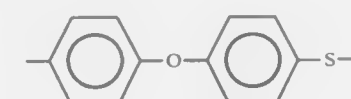
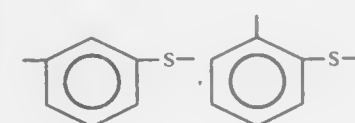


wherein said polyphenylene sulfide segments have a logarithmic viscosity, determined at 206° C. in alpha-chloronaphthalene solution at a polymer concentration of 0.4 g/100 ml of solution and calculated in accordance with the equation logarithmic viscosity = ln (relative viscosity)/polymer concentration, of 0.03 to 0.08 and wherein said aromatic sulfide sulfone polymer segments have a logarithmic viscosity, determined at 30° C. in a 3:2, by weight, phenol/1,1,2,2-tetrachloroethane solution at a polymer concentration of 0.5 g/100 ml of solution and calculated by the equation logarithmic viscosity = ln (relative viscosity)/polymer concentration, of 0.05 to 1.0; and

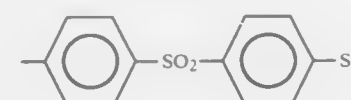
at least one member selected from the group consisting of polyphenylene sulfide and aromatic sulfide sulfone polymer, wherein said polyphenylene sulfide consists of at least 70 mole % of recurring structural units of the formula



and not more than 30 mole % of one or more recurring structural units selected from the group consisting of



wherein R is an alkyl group, a nitro group, a phenyl group, an alkoxy group, a carboxylic acid group or a metal carboxylate group, and wherein said aromatic sulfide sulfone polymer consists of recurring structural units of the formula



**4,946,913**  
**PIEZOELECTRIC COPOLYMERS OF VINYLIDENE**  
**FLUORIDE AND TRIFLUOROETHYLENE**

Patrick Kappler, Ecullly, France, assignor to Atochem, Paris, France

Filed Dec. 1, 1988, Ser. No. 278,836

Claims priority, application France, Dec. 8, 1987, 87 17084

Int. Cl.<sup>5</sup> C08F 214/22

U.S. Cl. 526—87

6 Claims

1. A process for preparation of a copolymer of vinylidene fluoride and trifluoroethylene having a heterogeneous structure and having piezoelectric properties and an elevated maximum temperature of use, and a total molar content of trifluoroethylene of less than about 30%, which comprises copolymerizing in an aqueous suspension, vinylidene fluoride and trifluoroethylene in the presence of a protection colloid and a polymerization initiator at a temperature between about 30° and about 70° C. under a pressure between about 50 and about 110 bars, in a polymerization zone wherein a mixture of vinylidene fluoride and a trifluoroethylene in molar proportions of

vinylidene fluoride is between about 67 and about 54% and the trifluoroethylene is from about 33 to about 46% is present at the beginning of the polymerization, the vinylidene fluoride is progressively added to the polymerization zone in the course of reaction, in proportions such that the molar quantity of vinylidene fluoride added is from about 145 to about 180% of the number of moles or vinylidene fluoride present at the beginning of the polymerization.

**4,946,914**  
**MODIFIED CHROMIUM-CONTAINING CATALYST**  
**COMPOSITION FOR POLYMERIZING**  
**ALPHA-OLEFINS**

J. T. T. Hsieh, Warren, N.J., assignor to Mobile Oil Corporation, New York, N.Y.

Division of Ser. No. 56,039, May 28, 1987, Pat. No. 4,801,572.

This application Oct. 24, 1988, Ser. No. 261,651

Int. Cl.<sup>5</sup> C08F 4/24, 10/02

U.S. Cl. 526—106

48 Claims

1. In a process of preparing a polymer by polymerizing at least one C<sub>2</sub>-C<sub>10</sub> alpha-olefin in the presence of a supported chromium compound-containing catalyst composition, which is activated by heating it in an oxidizing atmosphere, wherein the chromium compound is CrO<sub>3</sub> or any compound of chromium calcinable to CrO<sub>3</sub> under the catalyst activation conditions, an improvement comprising polymerizing the polymer in the presence of a modified catalyst composition obtained by combining the supported catalyst composition with a catalyst modifier which is an oxide of an element of Group IIA of the Periodic Chart of the Elements, containing at least about 0.5% by weight of water.

**4,946,915**  
**METHOD FOR PREPARING LIGHT-COLORED**  
**INDENE-COUMARONE RESIN**

Hisatake Sato, and Masaharu Makino, both of Yokohama, Japan, assignors to Nippon Oil Company Ltd., Japan

Filed Dec. 22, 1988, Ser. No. 288,468

Claims priority, application Japan, Dec. 29, 1987, 62-332279

Int. Cl.<sup>5</sup> C08F 4/14

U.S. Cl. 526—237

4 Claims

1. A method for preparing a light-colored indene-coumarone resin which comprises the step of polymerizing an aromatic coal fraction raw material having a boiling point of 140° to 240° C. in the presence of a Friedel-Crafts catalyst in a polymerization reactor in which the amount of oxygen is restricted to 15 ml or less with respect to 100 g of said aromatic coal fraction raw material oil at room temperature, wherein said Friedel-Crafts catalyst is selected from the group consisting of boron trifluoride, aluminum chloride, boron-trifluoride-phenol complex compounds and boron trifluoride-dialkyl ether complex compounds.

4,946,916

POLYAMPHOLYTE COMPOSITIONS PROCESSING  
HIGH DEGREE OF ACID, BASE, OR SALT  
TOLERANCE IN SOLUTION

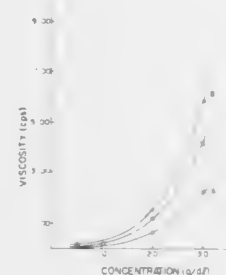
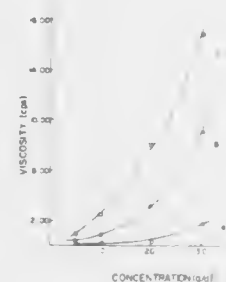
Dennis G. Peiffer, East Brunswick, and Roberg D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 81,682, Aug. 5, 1987, Pat. No. 4,837,288, which is a division of Ser. No. 826,229, Feb. 5, 1986, Pat. No. 4,710,555, which is a continuation-in-part of Ser. No. 688,238, Jan. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 560,543, Dec. 12, 1983, abandoned. This application Dec. 23, 1988, Ser. No. 288,888

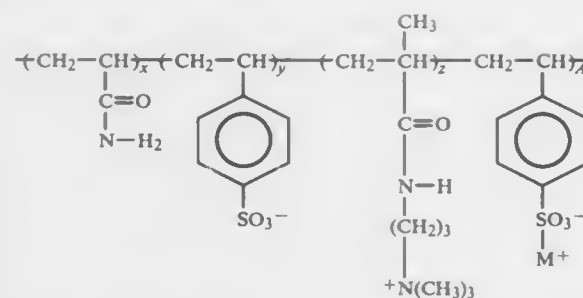
The portion of the term of this patent subsequent to Jul. 24, 2001, has been disclaimed.

U.S. Cl. 526—240 Int. Cl.<sup>5</sup> C08F 228/02

1 Claim



1. A terpolymer having the formula:



wherein x is about 1 to about 50 mole %, y is about 1 to about 50 mole %, z is about 1 to about 50 mole %, y is equal to z, A is about 1 to about 25 mole %, wherein A, y and z are less than 50 mole % and the ratio of A/y+z is about 0.01 to about 15, and M is selected from the group consisting of amines and a metallic cation being selected from the group consisting of lead, iron, aluminum, Groups IA, IIA, IB and IIB of the Periodic Table of Elements.

4,946,917

4-[(METH)ACRYLAMIDOMETHYL]-PYRAZOLES AND  
-ISOXAZOLES, THEIR PREPARATION AND THEIR USE

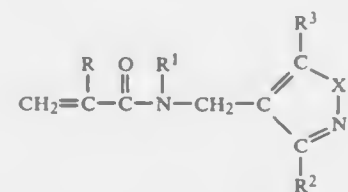
Kaspar Bott, Mannheim; Bernhard Nick, Ludwigshafen, and Guenther Schulz, Bad Dürkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 360,987, Jun. 2, 1989. This application Dec. 29, 1989, Ser. No. 459,346

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819456

U.S. Cl. 526—260 Int. Cl.<sup>5</sup> C08F 26/06, 126/06, 226/06

2 Claims



where R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and X independently of one another have the following meanings: R is hydrogen or methyl, R<sup>1</sup> is hydrogen, methyl or ethyl, R<sup>2</sup> and R<sup>3</sup> may be identical or different and are each alkyl of 1 to 6 carbon atoms or unsubstituted or methyl, t-butyl, or phenyl substituted aryl of 6 to 20 carbon atoms and X is oxygen or an NR<sup>4</sup> group, where R<sup>4</sup> is hydrogen or a radical having the meanings of R<sup>2</sup> or R<sup>3</sup>.

4,946,918

## SYNTHETIC RESIN COMPATIBILIZER

Saburo Akiyama; Susumu Honda; Shin-ichi Akimoto, all of Tokyo, and Tohru Yasukochi, Kanagawa, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,764

Claims priority, application Japan, Nov. 6, 1987, 62-279300

U.S. Cl. 526—271 Int. Cl.<sup>5</sup> C08F 122/04

6 Claims



where Z is a residue of a compound having from 2 to 8 hydroxyl groups; AO is an oxyalkylene group having from 2 to 18 carbon atoms; R<sup>1</sup> is an unsaturated hydrocarbon group having from 2 to 5 carbon atoms; R<sup>2</sup> is a hydrocarbon or acyl group having from 1 to 40 carbon atoms; a is from 0 to 1,000; b is from 0 to 1,000; c is from 0 to 1,000; l is from 1 to 8; m is from 0 to 2; and n is from 0 to 7; l+m+n=2 to 8; al+bm+cn=1 to 1,000, and m/(l+n)≤1/2.

4,946,919

BORON CERAMICS FROM CARBORALATED  
DIACETYLENE POLYMERS

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 90,999, Aug. 31, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 273,089

U.S. Cl. 526—285 Int. Cl.<sup>5</sup> C08F 38/00

12 Claims

1. An organoboron preceramic polymer having a backbone comprised of repeating units having at least one carborane group and an acetylenic bond contained in the backbone of said polymer.

4,946,920

POLYSILAZANES, PROCESSES FOR THEIR  
PREPARATION, CERAMIC MATERIALS WHICH  
CONTAIN SILICON NITRIDE AND CAN BE PREPARED  
FROM THEM, AND PREPARATION THEREOF

Tilo Vaahs, Kelkheim; Hans-Jerg Kleiner, Kronberg; Marcellus Peuckert, and Martin Brück, both of Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,402

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741059

U.S. Cl. 528—33 Int. Cl.<sup>5</sup> C08G 77/04

9 Claims

1. A process for the preparation of a polymeric silazane, which comprises reacting a compound of the formula RSiCl<sub>2</sub>-NR'-SiCl<sub>2</sub>R, in which R is C<sub>1</sub>-C<sub>4</sub>-alkyl, vinyl or phenyl and R' is C<sub>1</sub>-C<sub>4</sub>-alkyl, with at least 6.7 moles of ammonia per mole of said compound of the formula RSiCl<sub>2</sub>-NR'-SiCl<sub>2</sub>R in a solvent at temperatures from -80° C. to +70° C.

4,946,921

## ALKALI-SOLUBLE ORGANOPOLYSILOXANE

Akihiko Shirahata, and Yoshimi Fukutani, both of Chiba, Japan, assignors to Toray Silicone Company Limited, Tokyo, Japan

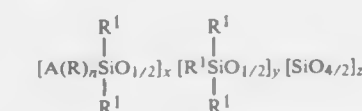
Filed May 11, 1989, Ser. No. 350,371

Claims priority, application Japan, May 18, 1988, 63-121426

U.S. Cl. 528—39 Int. Cl.<sup>5</sup> C08G 77/00

8 Claims

1. Alkali-soluble organopolysiloxane with a molecular weight of 500 to 500,000 and having the following general formula



in the formula, A is a hydroxyphenyl group; R is an alkylene group having 1 to 4 carbon atoms; r is zero or one; R<sup>1</sup> is an alkyl group having 1 to 4 carbon atoms; x and z are positive numbers; y is zero or a positive number; x, y, and z have values such that their ratios are 0.3≤(x+y)/z≤4; and zero≤y/x≤5.

4,946,922

INTERNAL MOLD RELEASE AGENTS FOR  
POLYISOCYANURATE SYSTEMS

John W. Reisch, Guilford, and Michael M. Emmett, Durham, both of Conn., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 3, 1989, Ser. No. 347,110

U.S. Cl. 528—76 Int. Cl.<sup>5</sup> C08L 75/04

20 Claims

1. An active hydrogen composition comprising:  
(A) an organic polyol having a molecular weight of from about 100 to about 4,000 wherein at least about 40 percent of the available hydroxyl groups are primary, and  
(B) from about 0.5 to about 10 pph of (A) of a polyamide

formed from the reaction of a C<sub>2</sub> to C<sub>30</sub> aliphatic monocarboxylic acid and a relatively high molecular weight amine terminated polyether.

4,946,923

S-ALKYL THIOCARBAMATE BASE RESIN, PLASTIC  
LENS COMPRISING THE RESIN, AND PROCESS FOR  
MAKING THE LENS

Teruyuki Nagata; Koju Okazaki, both of Fukuoka; Nobuyuki Kajimoto, Kanagawa; Tohru Miura, Kanagawa; Yoshinobu Kanemura, Kanagawa, and Katsuyoshi Sasagawa, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 310,618

Claims priority, application Japan, Feb. 18, 1988, 63-033873; Feb. 19, 1988, 63-035119; Feb. 22, 1988, 63-037516; Feb. 22, 1988, 63-037526

U.S. Cl. 528—76 Int. Cl.<sup>5</sup> C08G 75/00

24 Claims

1. A process for producing an S-alkyl thiocarbamate base resin comprising reacting at least one polyisocyanate compound with at least one hydroxyl containing mercapto compound wherein the mole ratio of said polyisocyanate compound to said hydroxyl containing mercapto compound is from about 0.5 to about 3.0 moles of functional isocyanate groups per mole of functional (SH+OH) group, except for the combination of polyisocyanate compounds having no sulfur atoms and hydroxyl-containing-mercapto compounds having no sulfur atoms other than the mercapto group.

4,946,924

SECONDARY ISOPROPYL AMINE DERIVATIVES OF  
POLYOXYALKYLENE DIAMINES AND TRIAMINES

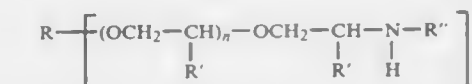
George P. Speranza, Austin; Jiang-Jen Lin, Round Rock, and James H. Templeton, Austin, all of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Division of Ser. No. 135,798, Dec. 21, 1988, abandoned. This application Oct. 31, 1988, Ser. No. 264,643

U.S. Cl. 528—111 Int. Cl.<sup>5</sup> C08G 59/50

15 Claims

1. A curable epoxy resin composition comprising:  
(a) a vicinal epoxy resin having an epoxide equivalency of about 0.8 to about 1.2, and  
(b) a curing amount of an epoxy resin curing agent represented by the formula:



wherein R is the nucleus of an oxyalkylation susceptible polyhydric alcohol containing 2 to 12 carbon atoms and 2 or 3 hydroxy groups, R' is hydrogen or methyl, at least one of R'' is isopropyl and the remainder of R'' is hydrogen or isopropyl, n is a number sufficient to impart a molecular weight of about 200 to 400 to the molecule, and m is a positive integer having a value of 2 or 3.



4,946,925

## BRIDGE BIS(CYCLOHEXYLAMINE) CURING AGENTS FOR EPOXY RESINS

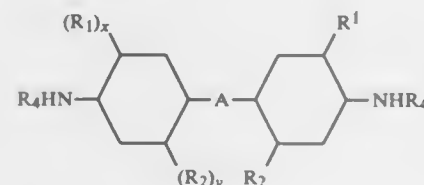
Herbert F. Strohmayer, Allentown; Jeremiah P. Casey, Emmaus, and Peter A. Lucas, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation of Ser. No. 301,568, Jan. 25, 1989. This application Dec. 1, 1989, Ser. No. 444,492  
Int. Cl.<sup>5</sup> C08G 59/50

U.S. Cl. 528—122

22 Claims

1. A polyepoxide resin comprising the reaction product of a glycidyl polyether of a polyhydric phenol having terminal 1,2-epoxy groups cured with a bridged dicyclohexylamine represented by the formula:

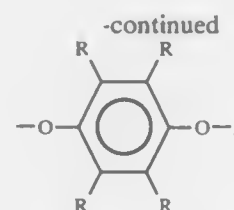


wherein

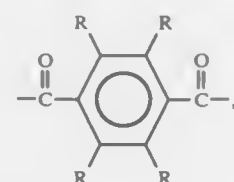
A is —CH<sub>2</sub>—, t,0210R<sub>1</sub> is C<sub>1-3</sub> alkylR<sub>2</sub> is C<sub>1-6</sub> alkylR<sub>3</sub> is C<sub>1</sub> or C<sub>2</sub> alkylR<sub>4</sub> is H or C<sub>1-4</sub> alkyl

x is 0 or 1 and

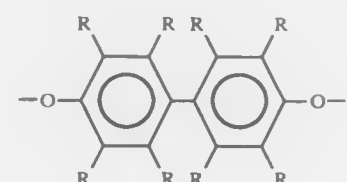
y is 0 or 1



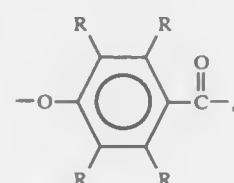
III



IV



V



VI

wherein each R is a chemically inert substituent.

4,946,927

## PREPARATION OF AROMATIC POLYCARBONATES, AROMATIC POLYESTER CARBONATES AND AROMATIC POLYESTERS WITH ORGANIC PHASE COMPRISING MIXTURE OF HYDROCARBONS

Wolfgang Ebert; Rolf-Volker Meyer; Rolf Dhein, and Udo Oels, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Mar. 30, 1989, Ser. No. 331,313

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1988, 3812049

Int. Cl.<sup>5</sup> C08G 64/04

U.S. Cl. 528—198

7 Claims

1. A process for the preparation of aromatic polycarbonates, aromatic polyester carbonates and aromatic polyesters by the known two phase interface process in the presence of an aqueous and an organic phase by the reaction of diphenols with at least one member selected from the group consisting of phosphene and aromatic dicarboxylic acid dihalides characterized in that the organic phase comprise a mixture of from 5 to 95% by weight of aromatic hydrocarbons and from 95 to 5% by weight of at least one member selected from the group consisting of alkane and cycloalkane.

4,946,928

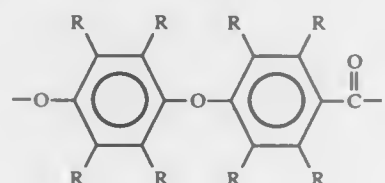
## CURABLE RESIN FROM CYANATE AROMATIC ESTER AND PROPARGYL AROMATIC ETHER

Roy J. Jackson, and Anthony M. Pigneri, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.  
Filed Feb. 15, 1989, Ser. No. 310,127Int. Cl.<sup>5</sup> C08G 67/00

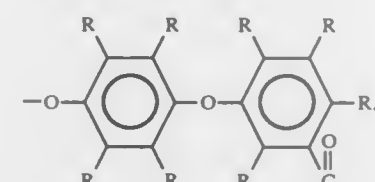
U.S. Cl. 528—205

20 Claims

1. A curable resin composition comprising  
(a) a cyanate aromatic ester monomer, prepolymers thereof or prepolymers of the ester monomer and an amine; and  
(b) a propargyl aromatic ether monomer.



I



II

4,946,929

## BIOERODIBLE ARTICLES USEFUL AS IMPLANTS AND PROSTHESES HAVING PREDICTABLE DEGRADATION RATES

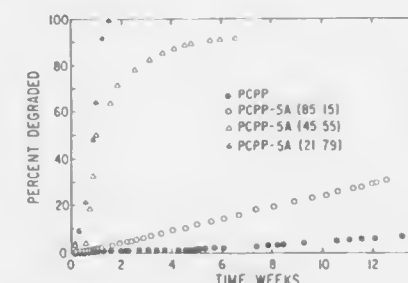
Patricia D'Amore, Brookline; Kam W. Leong, Cambridge, and Robert S. Langer, Somerville, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 836,932, Mar. 6, 1986, abandoned, which is a division of Ser. No. 702,168, Feb. 15, 1985, Pat. No. 4,886,870, and a continuation-in-part of Ser. No. 613,001, May 21, 1984, which is a continuation-in-part of Ser. No. 477,710, Mar. 22, 1983, abandoned. This application Jun. 15, 1987, Ser. No. 62,298

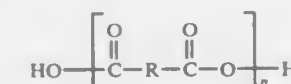
Int. Cl.<sup>5</sup> C08G 63/06, 65/38

U.S. Cl. 528—206

7 Claims



1. A method of forming an implantable article and implantation in vivo comprising the steps of:  
forming an implantable article from a biocompatible, bioerodible, hydrophobic, purified polyanhydride composition of the formula



wherein R is an organic group and n is at least 2, said polyanhydride being characterized by biocompatibility that results in minimal tissue irritation when implanted in vasculature and degrading by hydrolysis at predictable and constant rates into non-toxic residues after introduction in vivo; and

locating said article in a subject at a preselected site, said article dimensions, configuration, and composition being selected to produce an implant having the required structure and physical properties to provide a desired function at the preselected site.

4,946,930

BIAXIALLY ORIENTED POLYOXYMETHYLENE FILM  
Kenji Takasa, Yokosuka, and Satoshi Iijima, Kamakura, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jul. 20, 1988, Ser. No. 221,602

Claims priority, application Japan, Jul. 21, 1987, 62-179923; Jan. 25, 1988, 63-12586

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

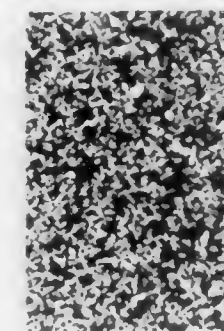
Int. Cl.<sup>5</sup> C08G 2/24

U.S. Cl. 528—230

7 Claims

1. A biaxially oriented film formed of a film forming composition comprising a polyoxymethylene polymer in which the major constituent of the main chains of said polymer each consists substantially of repeating units of oxymethylene group —CH<sub>2</sub>—O—, said film being characterized in that, when said film is remelted at a temperature above the melting point of said film and the resulting melt is recrystallized isothermally at

140° C. into a solid film form, the number of polyoxymethylene spherulites at the surface of the resulting film would be at least



50 per 0.1 mm<sup>2</sup> area of the resulting film surface, as measured with a polarizing microscope through cross-polarizers.

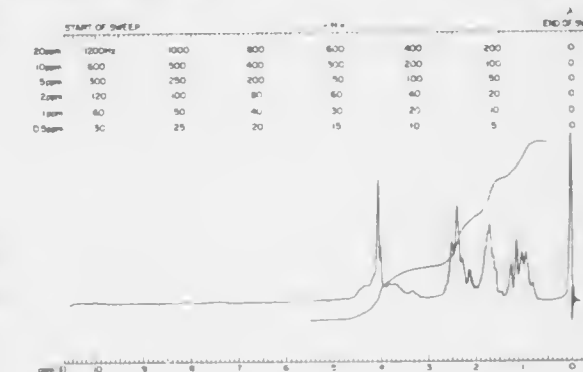
4,946,931

## POLYMERS CONTAINING CARBOXY-ORTHO ESTER AND ORTHO ESTER LINKAGES

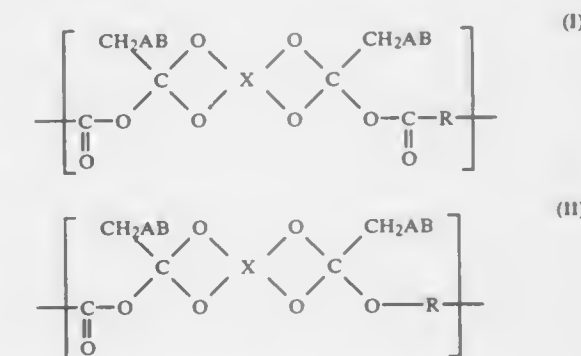
Jorge Heller, Woodside; Steve Y. W. Ng, San Francisco, and Donald W. H. Penhale, Menlo Park, all of Calif., assignors to Pharmaceutical Delivery Systems, Inc., Menlo Park, Calif.  
Filed Jun. 14, 1989, Ser. No. 366,125Int. Cl.<sup>5</sup> C08G 2/00

U.S. Cl. 528—230

18 Claims



1. A polymer containing at least one of the following mer units (I) and (II)



wherein X is a quadrivalent organic grouping, A and B are independently selected from the group consisting of hydrogen and lower alkyl, and R is hydrocarbyl or containing 1 to 4 oxy groups, and may be either aliphatic or aryl, unsubstituted or substituted with one or more lower alkyl, amino, nitro or halogen moieties.

4,946,932

## WATER-DISPERSIBLE POLYESTER BLENDS

Waylon L. Jenkins, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 279,673

Int. Cl.<sup>5</sup> C08G 63/02

U.S. Cl. 528—272

17 Claims

1. A method of preparing water-dispersed polymer blends, comprising the steps of:

- (i) preparing an aqueous polymerization mixture by adding to water, a water-dispersible sulfonate group-containing polyester or polyesteramide, one or more  $\alpha,\beta$ -unsaturated monomers and a polymerization initiator said polyester or polyesteramide consisting essentially of repeat units from (a) at least one difunctional aromatic, saturated aliphatic or saturated alicyclic dicarboxylic acid;
- (b) from about 4 to about 25 mole percent, based on a total of all acid, hydroxyl and amino equivalents being equal to 200 mole percent, of at least one difunctional sulfonate monomer containing at least one metal sulfonate group attached to an aromatic nucleus wherein the functional groups are hydroxy, carboxyl or amino; and
- (c) at least one glycol or a mixture of a glycol and a diamine having two -NRH groups, the glycol containing two -CH<sub>2</sub>-OH groups, and
- (ii) polymerizing said monomers to provide said water-dispersed polymer blend.

4,946,933

## ELASTOMERIC POLYAMIDE HOT MELT ADHESIVE FROM LOW MOLECULAR WEIGHT POLYOXYETHYLENE DIAMINE

George P. Speranza, and Wei-Yang Su, both of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Feb. 27, 1989, Ser. No. 316,200

Int. Cl.<sup>5</sup> C08G 69/34

U.S. Cl. 528—339.3

11 Claims

1. A process for preparing a polyamide useful as a hot melt adhesive having a wide range of softening points comprising the steps of:

- mixing and reacting
- (1) a polyoxyethylene amine having an average molecular weight of about 148 to about 230 and mixtures thereof;
- (2) a dimer acid having greater than or equal to 36 carbons, and
- (3) a short chain dicarboxylic acid at a temperature of 170°–280° C. for a time period of from about 2 to 10 hours, admixing said polyoxyalkylene amine, dimer and short chain dicarboxylic acid in amounts sufficient to provide a molar ratio of total amine present to acid present of from about 0.8:1.0 to about 1.25:1.0, and recovering the resulting polyamide reaction product.

4,946,934

## POLYAMIDE FROM 3,5-DIAMINO-T-BUTYLBENZENE

David J. Fenoglio, Wheaton; Douglas E. Fjare; Edwin F. Morrello, both of Naperville, and Neal R. Nowicki, St. Charles, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 28, 1988, Ser. No. 212,510

Int. Cl.<sup>5</sup> C08G 69/32

U.S. Cl. 528—349

4 Claims

1. An at least partially soluble, film-forming polyamide or copolyamide made from 3,5-diamino-t-butylbenzene and a compound selected from the group consisting of organic diacids, diesters and diacyl chlorides.

## FLUORINE-CONTAINING AROMATIC COMPOUND, PROCESS FOR PREPARING THE SAME AND USE THEREOF

Yohnosuke Ohsaka; Tsutomu Kobayashi, and Motonobu Kubo, all of Osaka, Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Apr. 4, 1988, Ser. No. 177,446

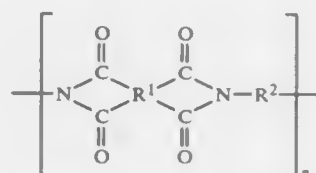
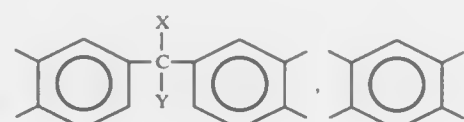
Claims priority, application Japan, Apr. 3, 1987, 62-82592; Apr. 20, 1987, 62-97013; Jul. 30, 1987, 62-191323; Jan. 12, 1988, 63-4500

Int. Cl.<sup>5</sup> C08G 69/26

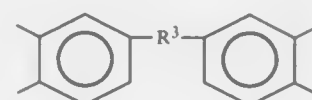
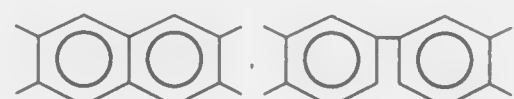
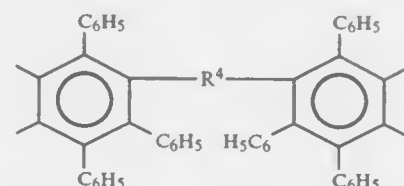
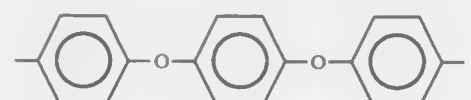
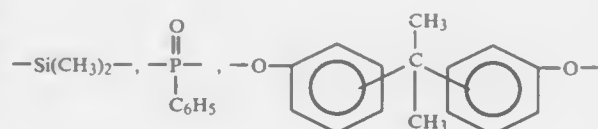
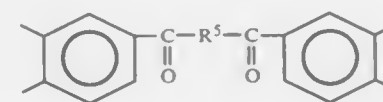
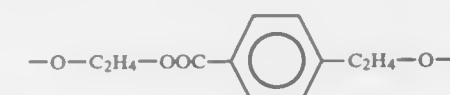
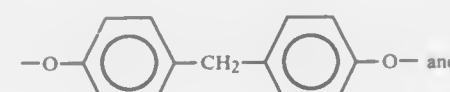
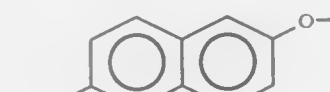
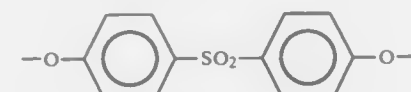
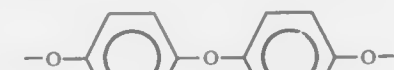
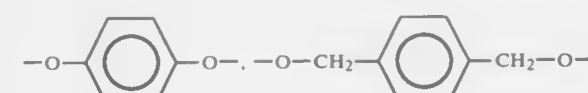
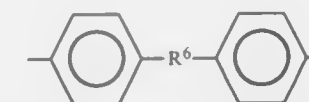
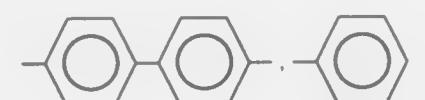
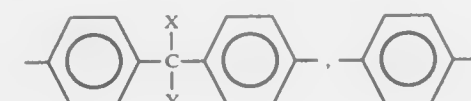
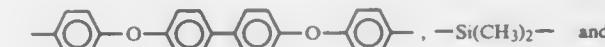
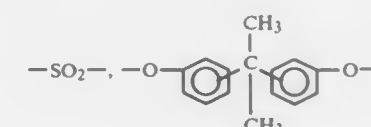
U.S. Cl. 528—353

4 Claims

1. A fluorine-containing polyimide of the formula:

wherein R<sup>1</sup> is selected from the group consisting of

(i)

wherein R<sup>3</sup> is —O—, —CO—, —SO<sub>2</sub>—, —C(CH<sub>3</sub>)<sub>2</sub>—, —C(CF<sub>3</sub>)<sub>2</sub>—,wherein R<sup>4</sup> is —C<sub>6</sub>H<sub>4</sub>—, —C<sub>6</sub>H<sub>4</sub>O—C<sub>6</sub>H<sub>4</sub>— or —C<sub>6</sub>H<sub>4</sub>O—C<sub>6</sub>H<sub>4</sub>— andwherein R<sup>5</sup> isR<sup>2</sup> is selected from the group consisting ofwherein R<sup>6</sup> is —O—, —CO—, —S—, —CH<sub>2</sub>—, —C(CH<sub>3</sub>)<sub>2</sub>—, —C(CF<sub>3</sub>)<sub>2</sub>—,wherein R<sup>7</sup> is —O—, —SO<sub>2</sub>—, —CH<sub>2</sub>—, —CO—, —C(CH<sub>3</sub>)<sub>2</sub>— or —S—, with the proviso that when R<sup>1</sup> is group (i), R<sup>2</sup> is group (ii), and with the further proviso that at least one of R<sup>1</sup> and R<sup>2</sup> contains a group of the formula:

wherein X is



in which R<sub>f</sub> is a perfluoroalkyl group having 1 to 10 carbon atoms, R<sub>f</sub>' is a perfluoroalkyl group having 1 to 12 carbon atoms, p is an integer of 1 to 3, q is an integer of 0 to 3, r is 0 or 1, s is an integer of 0 to 5 and t is an integer of 0 to 5, and Y is X, a hydrogen atom, an alkyl group having 1 to 8 carbon atoms or a fluoroalkyl group having 1 to 8 carbon atoms, and n is an integer not less than 10.

4,946,936

## FLUORINATED POLYMERS AND COPOLYMERS CONTAINING PERFLUOROPOLYETHERS BLOCKS

Giovanni Moggi, and Giuseppe Marchionni, both of Milan, Italy, assignors to Ausimont S.r.l., Milan, Italy

Filed Dec. 8, 1988, Ser. No. 281,536

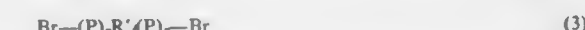
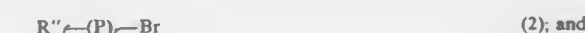
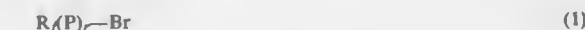
Claims priority, application Italy, Dec. 10, 1987, 22929 A/87

Int. Cl.<sup>5</sup> C08G 67/02, 61/00

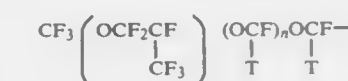
U.S. Cl. 528—392

3 Claims

1. Polymeric product containing a perfluoropolyether sequence and sequences of fluoroolefinic units or of mixed fluoroolefinic and olefinic units, said product being represented by one of the formulae:



where r indicates the total number of monomeric units P deriving from one or more (fluoro)olefines and ranging from 5 to 5,000, and where R<sub>f</sub>, R<sub>f</sub>' and R<sub>f</sub>'' are perfluoropolyether blocks respectively of the formulae:





1. Ricin E2 in purified form substantially free of ricin D and Ricin E1, wherein said ricin E2 is prepared from ricin E by separation from ricin E1, and said ricin E2 has the following characteristics:

- (a) less toxic in vitro than ricin E1;
- (b) a molecular weight as determined by nonreduced SDS-PAGE of approximately 60 Kd;
- (c) is the minor component of ricin E isotoxin;
- (d) has the isoelectric focusing pattern shown in FIG. 10A; and
- (e) has a lower affinity for binding to Cibacron Blue F3GA than E1.

2. Ricin E1 in purified form substantially free of ricin D and ricin E2, wherein said ricin E1 is prepared from ricin E by separation from ricin E2, and said ricin E1 has the following characteristics:

- (a) greater in vitro cytotoxicity than ricin E2;
- (b) a molecular weight of about 58 Kd as determined by nonreduced SDS-PAGE;
- (c) is the major component of ricin E isotoxin;
- (d) has the isoelectric focusing profile shown in FIG. 10A; and
- (e) has a higher affinity for binding to Cibacron Blue F3GA than E2.

4,946,944

## PROCESS FOR THE SELECTIVE EXTRACTION OF METALLOPROTEINS FROM WHEY BY ADSORPTION AND ELUTION

Jacques Frankinet, Vannes; André Peyrouset, Orsay, and Francois Spring, Pyrénées Atlantiques, both of France, assignors to ENTREMONT S.A. and NATIONALE ELF AQUITAINE, both of, France

Continuation of Ser. No. 205,828, Jun. 13, 1988, abandoned.

This application Aug. 21, 1989, Ser. No. 396,821

Claims priority, application France, Jun. 19, 1987, 87 08843

Int. Cl.<sup>5</sup> A23J 1/20; A61K 37/14

U.S. Cl. 530—400

6 Claims

1. A process for the selective extraction of only metalloproteins selected from the group consisting of lactoferrin and lactoperoxidase from whey, by adsorption on a porous inorganic support in the form of solid particles, followed by elution of the metalloproteins thus adsorbed by means of solutions, wherein the walls of the said particles are coated with a layer of diethylaminoethyl-dextran having a carboxylic or sulphonic acid groups.

4,946,945

## IMMUNOTHERAPY AGENTS FOR TREATMENT OF IGE MEDIATED ALLERGIES

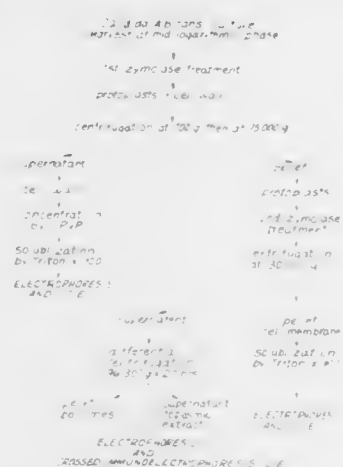
Aristo Wojdani, Los Angeles, Calif., assignor to Allergy Immunotechnologies, Inc., Newport Beach, Calif.

Filed Jun. 23, 1987, Ser. No. 65,310

Int. Cl.<sup>5</sup> C07K 17/00; A61K 39/35, 37/00

U.S. Cl. 530—402

15 Claims



1. A protein conjugate useful in allergy immunotherapy comprising an allergen conjugated to biological response modifiers (BRM) which are fungal immunopotentiators.

4,946,946

## PRODUCTION OF LOW ASH LIGNIN

Peter R. Fields, Stockton-on-Tees, and Pudens L. Ragg, Spennymoor, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 21, 1988, Ser. No. 260,995

Int. Cl.<sup>5</sup> C07G 1/00

U.S. Cl. 530—500

10 Claims

1. A process for the production of lignin by precipitation from an aqueous solution containing it in which the solution is acidified and agitated at a temperature in the range 10° to 100° C., the solution being treated with sufficient acid to produce a pH in the range 1.8 to 4 thereby precipitating the lignin; and the precipitated lignin is then separated from accompanying liquid, wherein the lignin-containing solution and the acid are introduced by simultaneous cocurrent flow into an agitated mixing region, the precipitated lignin is separated not more

than 60 minutes after precipitation and the separated lignin is subsequently washed.

4,946,947

## WATER-SOLUBLE AZO COMPOUNDS CONTAINING A BENZOTIAZOL-1-YL PHENYL MOIETY AS A DIAZO COMPONENT WHICH CARRY A FIBER-REACTIVE GROUP OF THE VINYL SULFONE SERIES

Hartmut Springer, and Kurt Hussong, both of c/o Hoechst Aktiengesellschaft, P.O. Box 80 02 20, D-6230 Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 169,831, Mar. 17, 1988, abandoned.

This application Jun. 5, 1989, Ser. No. 361,225

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708767

Int. Cl.<sup>5</sup> C09B 62/085, 62/51; D06P 1/382, 1/384

U.S. Cl. 534—635

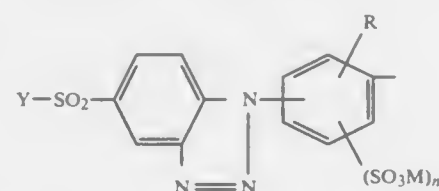
10 Claims

1. A water-soluble azo compound which corresponds to the formula 1:



(1)

in which D is a group of the formula 2:



in which

Y is vinyl or a group of the formula



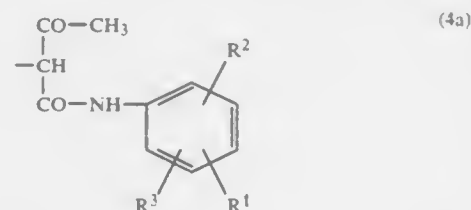
in which

X is a substituent which is eliminated by means of an alkali with formation of the vinyl group.

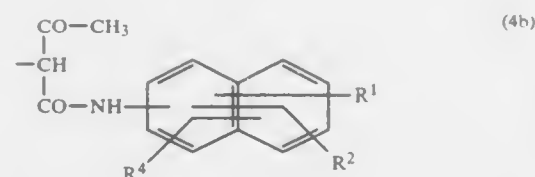
R is hydrogen, hydroxy, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, carboxy or halogen, n is the number zero or 1,

M is hydrogen or an alkali metal, and the free bond from the benzene ring to the azo group is bound in the meta- or para-position to the one nitrogen atom of the benzotriazole radical;

K is a radical selected from radicals of the formulae (4a)–(4i), (4k), (4m), (4n), (4p)–(4t), (4v) or (4w)

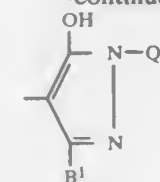


(4a)

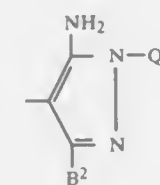


(4b)

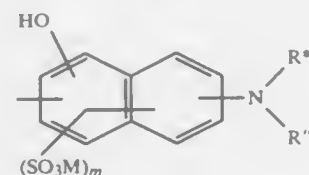
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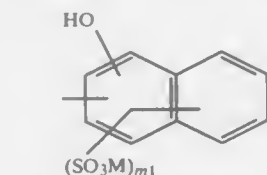
(4c)



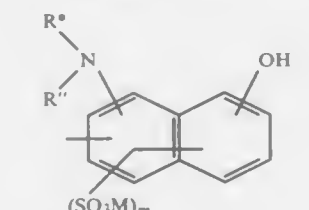
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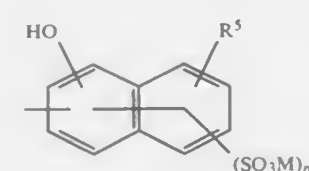
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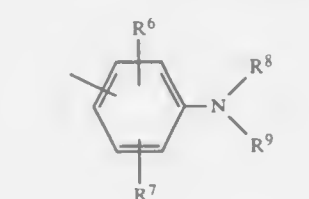
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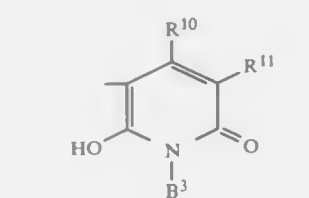
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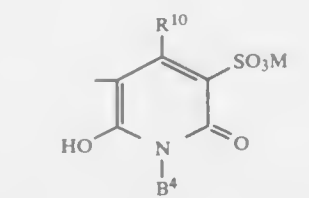
(4h)



(4i)

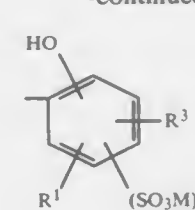


(4j)

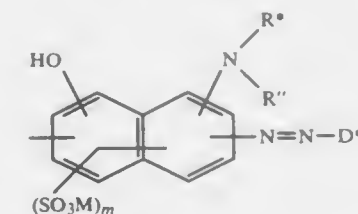


(4k)

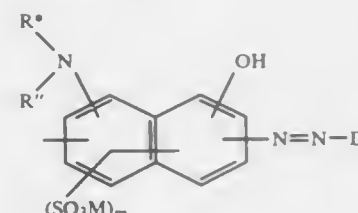
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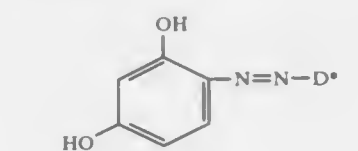
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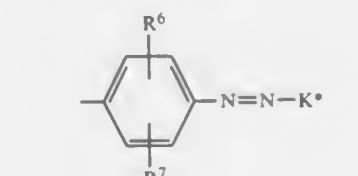
(4m)



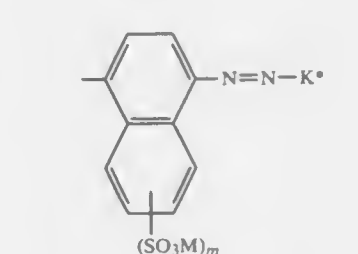
(4n)



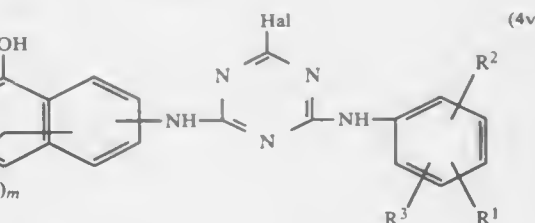
(4o)



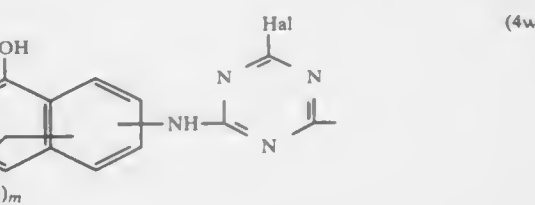
(4p)



(4q)



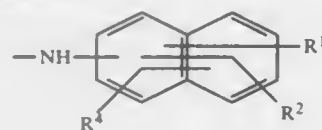
(4r)



(4s)



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wherein:

R<sup>1</sup> is hydrogen, carboxy or sulfo or a group of the formula —SO<sub>2</sub>—Y where Y has one of the above-mentioned meanings;

R<sup>2</sup> is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chlorine, bromine, carboxy or sulfo;

R<sup>3</sup> is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chlorine or bromine;

R<sup>4</sup> is hydrogen, sulfo or carboxy;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> may have meanings which are identical to one another or different from one another;

B<sup>1</sup> is alkyl having 1 to 4 carbon atoms, carboxy, carbalkoxy having 2 to 5 carbon atoms, carbamoyl or phenyl which is unsubstituted or substituted by substituents selected from sulfo, carboxy, methyl, ethyl, methoxy, ethoxy and chlorine;

B<sup>2</sup> is alkyl having 1 to 4 carbon atoms, carbalkoxy having 2 to 5 carbon atoms, carbamoyl or phenyl which is unsubstituted or substituted by 1 or 2 substituents selected from alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chlorine, bromine and sulfo;

Q is phenyl which is unsubstituted or substituted by 1, 2 or 3 substituents selected from chlorine, bromine, methyl, ethyl, methoxy, ethoxy, carboxy, sulfo and alkanoylamino or by a group of the formula —SO<sub>2</sub>—Y, where Y has one of the above-mentioned meanings, or by said group —SO<sub>2</sub>—Y and by 1, 2 or 3 of those substituents mentioned, or is a naphthyl which is unsubstituted or substituted by 1, 2 or 3 sulfo groups or by 1, 2 or 3 sulfo groups and by an alkyl having 1 to 4 carbon atoms, an alkoxy having 1 to 4 carbon atoms, a chlorine, an alkanoylamino having 2 to 5 carbon atoms or a group of the formula —SO<sub>2</sub>—Y where Y has one of the above-mentioned meanings;

R\* is hydrogen, alkyl having 1 to 4 carbon atoms or alkyl having 1 to 4 carbon atoms substituted by a phenyl;

R'' is hydrogen or an alkyl having 1 to 4 carbon atoms which is unsubstituted or substituted by a phenyl, or is phenyl which is unsubstituted or substituted by one or two substituents selected from alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chlorine, bromine and sulfo;

R<sup>5</sup> is phenylureido, alkanoylamino having 2 to 5 carbon atoms, alkenoylamino having 3 to 5 carbon atoms, benzoylamino or benzoylamino substituted by substituents selected from chlorine, methyl, methoxy, nitro, sulfo and carboxy;

R<sup>6</sup> is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, sulfo, carboxy, carbalkoxy having 2 to 5 carbon atoms, halogen or alkoxy having 1 to 4 carbon atoms substituted by a hydroxy, acetyloxy, carboxy, carbamoyl, cyano or halogen;

R<sup>7</sup> is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, halogen, cyano, trifluoromethyl, alkoxy having 1 to 4 carbon atoms substituted by a hydroxy, acetyloxy, carboxy, carbamoyl, cyano or halogen, or is alkanoylamino having 2 to 5 carbon atoms unsubstituted or substituted by chlorine, bromine, alkoxy having 1 to 4 carbon atoms, phenoxy, phenyl, hydroxy, carboxy or sulfo, or is alkenoylamino having 3 to 5 carbon atoms unsubstituted or substituted by chlorine, bromine, carboxy or sulfo, or is benzoylamino unsubstituted or substituted in the benzene ring by substituents selected from chlorine, methyl, and sulfo, or is alkylsulfonyl having 1 to 4 carbon atoms or is phenylsulfonyl unsubstituted or substituted in the benzene ring by substituents selected

from chlorine, methyl and sulfo, or is alkylsulfonylamino having 1 to 4 carbon atoms which is unsubstituted or substituted by hydroxy, sulfo, chlorine, bromine or alkoxy having 1 to 4 carbon atoms, or is phenylsulfonylamino which is unsubstituted or substituted in the benzene ring by substituents selected from chlorine, methyl and sulfo; or is carbamoyl or carbamoyl monosubstituted or disubstituted on the nitrogen atom by 1 or 2 substituents selected from alkyl having 1 to 4 carbon atoms, alkyl having 1 to 4 carbon atoms substituted by hydroxy, sulfo, carboxy, sulfato or phenyl, cycloalkyl having 5 to 8 carbon atoms, phenyl and phenyl substituted by substituents selected from chlorine, sulfo, methyl, methoxy and carboxy; or is sulfamoyl or sulfamoyl monosubstituted or disubstituted on the nitrogen atom by 1 or 2 substituents selected from alkyl having 1 to 4 carbon atoms, alkyl having 1 to 4 carbon atoms substituted by hydroxy, sulfo, carboxy, sulfato or phenyl, cycloalkyl having 5 to 8 carbon atoms, phenyl and phenyl substituted by substituents selected from chlorine, sulfo, methyl, methoxy and carboxy; or is ureido or ureido monosubstituted or disubstituted on the terminal nitrogen atom by 1 or 2 substituents selected from alkyl having 1 to 4 carbon atoms, alkyl having 1 to 4 carbon atoms substituted by hydroxy, sulfo, carboxy, sulfato or phenyl, cycloalkyl having 5 to 8 carbon atoms, phenyl and phenyl substituted by substituents selected from chlorine, sulfo, methyl, methoxy and carboxy;

R<sup>8</sup> is hydrogen or alkyl having 1 to 4 carbon atoms unsubstituted or substituted by hydroxy, sulfo, carboxy, sulfato or phenyl, or is alkenyl having 2 to 4 carbon atoms unsubstituted or substituted by a carboxy, sulfo, chlorine or bromine, or is cycloalkyl having 5 to 8 carbon atoms;

R<sup>9</sup> is hydrogen or alkyl having 1 to 4 carbon atoms unsubstituted or substituted by hydroxy sulfo, carboxy, sulfato or phenyl, or is alkenyl having 2 to 5 carbon atoms unsubstituted or substituted by a carboxy, sulfo, chlorine or bromine, or is cycloalkyl having 5 to 8 carbon atoms or is phenyl unsubstituted or substituted by substituents selected from chlorine, sulfo, methyl, methoxy and carboxy, or is a naphthyl unsubstituted or substituted by 1, 2 or 3 sulfo or by 1, 2 or 3 sulfo and by a chlorine, an alkoxy having 1 to 4 carbon atoms, an alkyl having 1 to 4 carbon atoms, an alkanoylamino having 2 to 5 carbon atoms or a benzoylamino unsubstituted or substituted by sulfo;

R<sup>8</sup> and R<sup>9</sup> are, together with the nitrogen atom, morpholino or piperazino;

R<sup>10</sup> is hydrogen or alkyl having 1 to 4 carbon atoms or alkyl having 1 to 4 carbon atoms substituted by alkoxy having 1 to 4 carbon atoms or by cyano;

R<sup>11</sup> is hydrogen, sulfo, sulfoalkyl having 1 to 4 carbon atoms, cyano or carbamoyl;

R\*, R'', R<sup>1</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup> and R<sup>11</sup> may have meanings which are identical to one another or different from one another;

B<sup>3</sup> is hydrogen or alkyl having 1 to 6 carbon atoms or alkyl having 1 to 6 carbon atoms substituted by phenyl, sulfo or sulfophenyl;

B<sup>4</sup> is hydrogen, alkyl having 1 to 4 carbon atoms, alkyl having 1 to 4 carbon atoms which is substituted by an alkoxy having 1 to 4 carbon atoms, a sulfo, a carboxy, a sulfato, an acetylamino, a benzoylamino or a cyano; or is alkenyl having 2 to 4 carbon atoms, cyclohexyl, phenyl or phenyl substituted by substituents selected from carboxy, sulfo, benzoylamino, acetylamino and chlorine;

k is the number zero or 1 and where k=zero the group represents hydrogen;

m is the number 1 or 2;

m<sub>1</sub> is the number 1, 2 or 3;

D\* is a group of the formula (2) as defined above, or is phenyl unsubstituted or substituted by 1, 2 or 3 substituents selected from alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, chlorine, bromine, hy-

droxy, carboxy, sulfo, carbamoyl, sulfamoyl, alkanoylamino and a group —SO<sub>2</sub>—Y where Y has one of the above-mentioned meanings, or is a naphthyl substituted by 1, 2 or 3 sulfo or by 1 or 2 sulfo and 1 or 2 groups of the formula —SO<sub>2</sub>—Y where Y has one of the above-mentioned meanings, or by one group —SO<sub>2</sub>—Y;

D and D\* may have meanings which are identical to one another or different from one another;

K\* is a group corresponding to one of the above formulae (4a) to (4m), and K and K\* may have meanings which are identical to one another or different from one another;

Hal is fluorine or chlorine; and

M has one of the above-mentioned meanings.

4,946,948

# MONO AND DISAZO COMPOUNDS BASED ON B-HYDROXY-NAPHTHOIC ACID DERIVATIVES OR ACETOACETARYLIDE DERIVATIVES CONTAINING LONG-CHAIN ALKYL ESTER OR ALKYLAMIDE RADICALS

Stefan Hari, Reinach, and Fridolin B bler, Marly, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,349

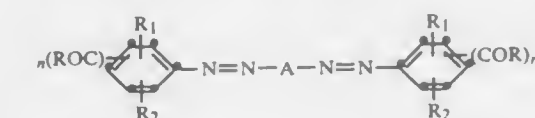
Claims priority, application Switzerland, Sep. 7, 1988, 3363/88; Mar. 30, 1989, 1160/89

Int. Cl.<sup>3</sup> C09B 29/10, 33/147, 33/153; D06P 3/79

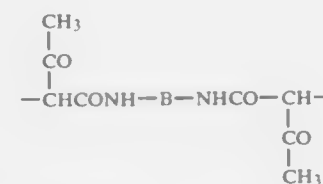
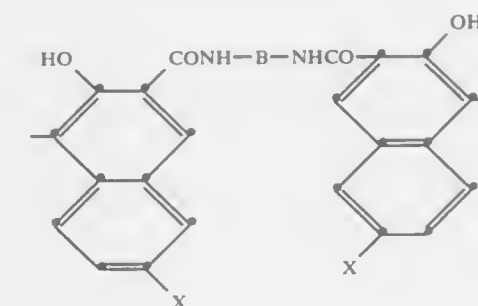
U.S. Cl. 534—651

11 Claims

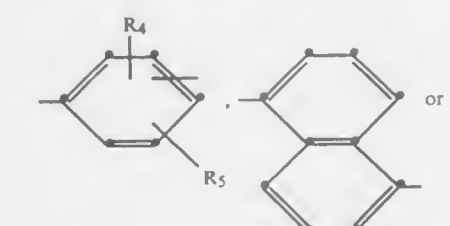
I. A compound of formula I:



wherein R is a radical of the formula —OR<sub>3</sub> or —NHR<sub>3</sub>, A is a radical of formula II or III:



B is a radical of the formula

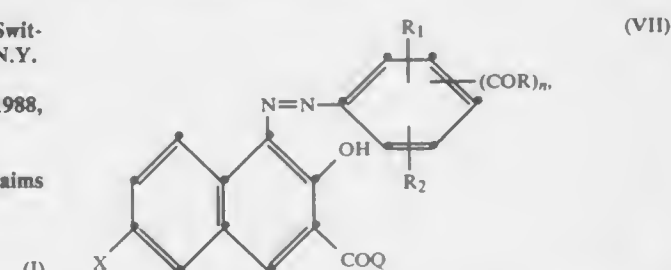


-continued



n is the number 1 or 2, R<sub>1</sub> is —H or —Cl, R<sub>2</sub> is —H, halogen, —NO<sub>2</sub>, —CN, C<sub>1</sub>—C<sub>4</sub> alkyl, C<sub>1</sub>—C<sub>4</sub> alkoxy, —CF<sub>3</sub>, C<sub>2</sub>—C<sub>5</sub> alkoxy, carbonyl or —CONH—phenyl, —NHCO—phenyl or phenoxy which is unsubstituted or substituted on the phenyl ring by one or two chlorine atoms or one or two methyl, methoxy or ethoxy groups, R<sub>3</sub> is alkyl containing at least 10 C atoms, R<sub>4</sub> and R<sub>5</sub> are each independently of the other —H, halogen, —NO<sub>2</sub>, —CN, —CF<sub>3</sub>, C<sub>1</sub>—C<sub>4</sub> alkyl or C<sub>1</sub>—C<sub>4</sub> alkoxy, R<sub>6</sub> is —H, —Cl, —Br, —CH<sub>3</sub> or —OCH<sub>3</sub> and X is —H, —Br, —OCH<sub>3</sub>, —CN or —NO<sub>2</sub>.

8. A compound of formula VII:



wherein n is the number 1 or 2, R is a radical of the formula —OR<sub>3</sub> or —NHR<sub>3</sub>, R<sub>1</sub> is —H or —Cl, R<sub>2</sub> is —H, halogen, —NO<sub>2</sub>, —CN, C<sub>1</sub>—C<sub>4</sub> alkyl, C<sub>1</sub>—C<sub>4</sub> alkoxy, —CF<sub>3</sub>, C<sub>2</sub>—C<sub>5</sub> alkoxy, carbonyl or —CONH—phenyl, —NHCO—phenyl or phenoxy which is unsubstituted or substituted on the phenyl ring by one or two chlorine atoms or one or two methyl, methoxy or ethoxy groups, R<sub>3</sub> is alkyl containing at least 10 C atoms, X is —H, —Br, —OCH<sub>3</sub>, —CN or —NO<sub>2</sub> and Q is —OH or halogen.

4,946,949

# POLYMERIZABLE AROMATIC-AZO-ALIPHATIC COMPOUNDS AND POLYMERS MADE THEREFROM

Richard A. Wolf, and Alan E. Platt, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 24, 1988, Ser. No. 211,194

Int. Cl.<sup>3</sup> C07C 107/52, 107/04; C08G 63/00

U.S. Cl. 534—885

13 Claims

1. An azo compound comprising:  
(1) an azo group;  
(2) an aromatic moiety bonded to one nitrogen atom of said azo group, said aromatic moiety having a polymerizable olefin substituent; and  
(3) an aliphatic hydrocarbyl moiety bonded to the other nitrogen atom of said azo group

wherein the olefin moiety comprises no more than about 6 carbon atoms; the aromatic moiety is a carbocyclic group with no more than about 10 carbon atoms; and the aliphatic hydrocarbyl moiety comprises no more than about 12 carbon atoms, said aromatic moiety and aliphatic hydrocarbyl moiety being chosen such that said azo group has a half-life of at least about 6 hours at about 130° C. and a half-life of no more than about 20 minutes at 375° C.

4,946,950

## INOSITOL GLYCOSIDE

2-O-BETA-L-ARABINOPYRANOSYL-MYO-INOSITOL  
Yukihiko Hara; Kazuo Okushio, both of Shizuoka, and Kanzo Sakata, Shimizu, all of Japan, assignors to Mitsui Norin Co., Ltd., Tokyo, Japan

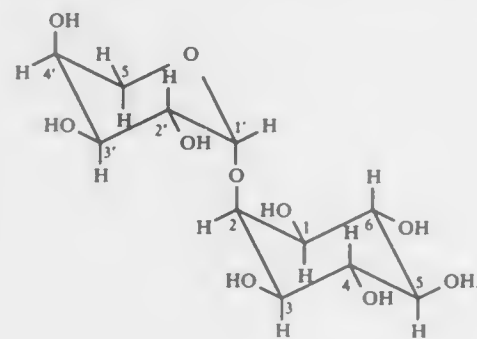
Filed Feb. 8, 1988, Ser. No. 153,850

Claims priority, application Japan, Feb. 23, 1987, 62-37726  
Int. Cl.<sup>5</sup> C07H 15/20; A61K 31/70

U.S. Cl. 536—4.1

2 Claims

1. A glycoside of inositol which is substantially pure 2-O-beta-L-arabinopyranosyl-myo-inositol expressed by the structural formula:



4,946,951

## 2'-DEOXY-5-FLUOROURIDINE DERIVATIVES

Yukio Tada; Atsuhiko Uemura; Mitsugi Yasumoto, all of Honjyo; Setsoo Takeda, Tokushima; Hitoshi Saito, Tokushima, and Norio Unemi, Tokushima, all of Japan, assignors to Taiho Pharmaceutical Co., Ltd., Tokyo, Japan

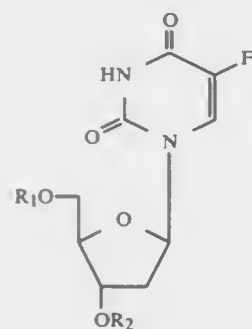
Filed Jul. 29, 1988, Ser. No. 225,984

Claims priority, application Japan, Jul. 31, 1987, 62-193192  
Int. Cl.<sup>5</sup> C07H 19/073; A61K 31/70

U.S. Cl. 536—23

22 Claims

1. A 2'-deoxy-5-fluorouridine derivative represented by the formula



wherein:

one of R<sub>1</sub> and R<sub>2</sub> is a benzyl group which may have 1, 2 or 3 substituents selected from the group consisting of C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, C<sub>1</sub>-C<sub>3</sub> halogenated alkyl group, halogen atom, hydroxyl group and nitro group on the phenyl ring, and the other constitutes an amino acid residue having 2 to 20 carbon atoms, or a salt thereof.

4,946,952

## PROCESS FOR ISOLATING NUCLEIC ACIDS

Hansruedi Kiefer, Riehen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 1, 1988, Ser. No. 175,885

Claims priority, application Switzerland, Apr. 24, 1987, 1573  
Int. Cl.<sup>5</sup> C07H 21/04, 21/02, 21/00

U.S. Cl. 536—27

6 Claims

1. A process for isolating nucleic acids from a bacterial cell lysate, which process comprises:

- preparing a bacterial cell lysate;
- centrifuging the lysate to sediment cellular debris and to produce a clear supernatant;
- treating the clear supernatant with an excess of an aqueous solution containing at least 60% by volume of a water-soluble ketone selected from the group consisting of acetone, 2-butanone, 2-pentanone, 3-pentanone and 3-methylcyclopentanone, to produce a mixture containing precipitated nucleic acids; and
- separating the precipitated nucleic acids from the mixture, thereby isolating the nucleic acids from the extract.

4,946,953

## FINE CELLULOSE PARTICLES AND PROCESS FOR PRODUCTION THEREOF EMPLOYING COAGULATED VISCOS

Shigeru Okuma; Kanji Yamagishi; Masami Hara, all of Hofu; Keizo Suzuki, Osaka; Toshihiro Yamamoto, Hofu, and Hideo Yoshidome, Kishiwada, all of Japan, assignors to Kanebo, Ltd., Tokyo and Kanebo Rayon, Ltd., Osaka, both of Japan

Filed Oct. 13, 1987, Ser. No. 107,973

Claims priority, application Japan, Oct. 16, 1986, 61-244044;  
Aug. 27, 1987, 62-21354

Int. Cl.<sup>5</sup> C08L 1/06; C08B 16/00; C08J 3/16

U.S. Cl. 536—57

14 Claims



- Fine crosslinked cellulose particles, wherein
  - said cellulose particles are composed substantially of a regenerated cellulose crystalline phase and a non-crystalline cellulose phase,
  - crosslinkage exists among the cellulose molecular chains in the non-crystalline phase,
  - said cellulose particles have a crystallinity, determined by X-ray diffractometry, of 5 to 35%,
  - said cellulose particles consist substantially of spherical to elongated spherical particles having an average particle diameter of not more than 300 μm,
  - said cellulose particles have an exclusion limit molecular weight by polyethylene glycol of not more than 4,000, and
  - said cellulose particles have a fractionation index (F) of at least 0.85, wherein fractionation index (F) is defined by the following formula

$$F = \frac{V_E - V_D}{V_D}$$

wherein V<sub>D</sub> is the elution volume (ml) of blue dextran having a molecular weight of 2 million eluted, and V<sub>E</sub> is the elution volume (ml) of ethylene glycol eluted.

4,946,954

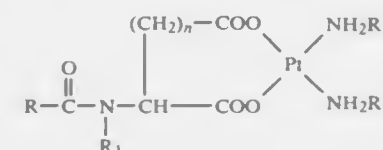
## PLATINUM PHARMACEUTICAL AGENTS

Abdolhossen Talebian, Herndon; Dianna C. Green, Falls Church, both of Va., and Philip S. Schein, Bryn Mawr, Pa., assignors to Georgetown University, Washington, D.C.  
Continuation-in-part of Ser. No. 297,368, Jan. 17, 1989, which is a continuation-in-part of Ser. No. 143,761, Jan. 14, 1988, which is a continuation-in-part of Ser. No. 74,825, Jul. 17, 1987, abandoned. This application Jan. 26, 1989, Ser. No. 301,773  
Int. Cl.<sup>5</sup> C07H 15/00, 23/00

U.S. Cl. 536—121

14 Claims

1. A compound of the formula



wherein n is 0 or 1 and when n is 1, R<sub>1</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl, R is non-substituted higher alkyl or mono or disaccharide or a derivative of a mono or disaccharide, when n is 0, R<sub>1</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl, R is H, halogen, non-substituted C<sub>1</sub>-20 alkyl, aryl, aralkyloxy, mono or disaccharide, or a derivative of a mono or disaccharide, and R<sub>2</sub> and R<sub>3</sub> are selected from the group consisting of hydrogen, C<sub>1</sub>-4 alkyl or R<sub>2</sub> and R<sub>3</sub> together are linked to adjacent carbon atoms on a four, five or six membered ring structure, or R<sub>2</sub> and R<sub>3</sub> together form a fused or bicyclic ring with adjacent carbon atoms, or R<sub>2</sub> and R<sub>3</sub> together are an alkylene group to form a ring of from 4 to 8 members; with the proviso that R and R<sub>1</sub> cannot both be hydrogen when n=0, or a pharmaceutically acceptable salt thereof.

4,946,955

## METHOD FOR THE PREPARATION OF POLYCYCLIC 1,3-THIAZOLIDINES

Akira Hosomi, Nagasaki, Japan, assignor to Toray Silicone Company Limited, Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,470

Claims priority, application Japan, Sep. 11, 1987, 62-227986  
Int. Cl.<sup>5</sup> C07D 513/08

U.S. Cl. 544—234

15 Claims

1. A method for preparation of polycyclic 1,3-thiazolidines, the method comprising reacting a fluoride ion source, in a solvent, with an onium salt synthesized by the reaction of a nitrogenous heteroaromatic compound having at least one tertiary nitrogen atom in an unsaturated ring, said nitrogen atom being attached to an adjacent carbon atom by a double bond, with halomethyl trimethylsilylmethyl sulfide, the halo-methyl trimethylsilylmethyl sulfide being selected from a group consisting of chloromethyl trimethylsilylmethyl sulfide, bromomethyl trimethylsilylmethyl sulfide, or iodomethyl trimethylsilylmethyl sulfide.

15. The method of claim 1 wherein the nitrogenous heteroaromatic compound is selected from the group consisting of pyridine, 3,5-lutidine, quinoline, isoquinoline, phthalazine, and phenanthridine.

4,946,956

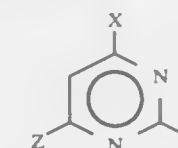
## ARYLENE DIAMINE SUBSTITUTED PYRIMIDINES

Edward L. Wheeler, Watertown; Franklin H. Barrows, Watertown, and Robert J. Franko, Beacon Falls, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.  
Filed Sep. 21, 1988, Ser. No. 247,143  
Int. Cl.<sup>5</sup> C07D 239/02

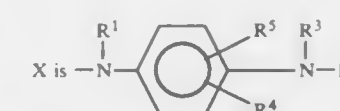
U.S. Cl. 544—323

2 Claims

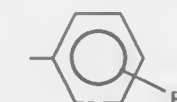
1. A compound of the formula (I):



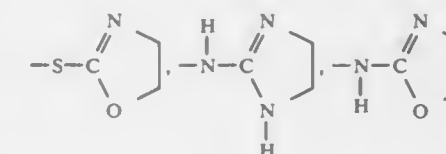
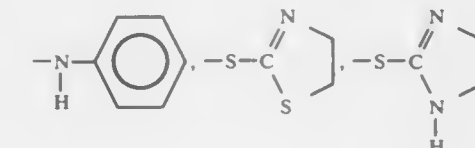
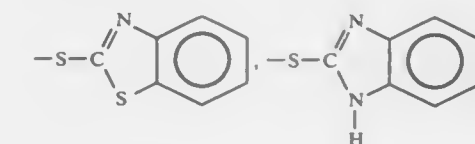
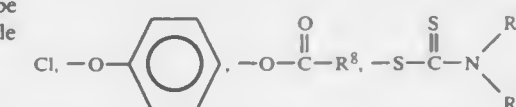
in which



R<sup>1</sup> is hydrogen, C<sub>1</sub>-C<sub>11</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, phenyl or phenyl substituted with C<sub>1</sub>-C<sub>4</sub> alkyl or phenyl;  
R<sup>2</sup> is C<sub>1</sub>-C<sub>11</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl or

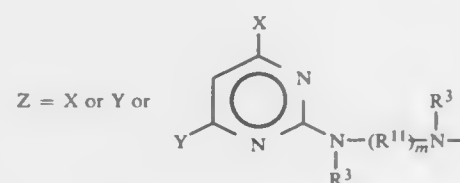


R<sup>3</sup> is hydrogen, phenyl or C<sub>1</sub>-C<sub>11</sub> alkyl when R<sup>1</sup> is hydrogen;  
R<sup>4</sup> is hydrogen or C<sub>1</sub>-C<sub>8</sub> alkyl;  
R<sup>5</sup> is hydrogen or C<sub>1</sub>-C<sub>8</sub> alkyl;  
R<sup>6</sup> is hydrogen, C<sub>1</sub>-C<sub>11</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy  
Y is X, hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, —SH, SR<sup>7</sup>, —OH, OR<sup>7</sup>,



R<sup>7</sup> is C<sub>1</sub>-C<sub>12</sub>;  
R<sup>8</sup> is C<sub>1</sub>-C<sub>11</sub>;  
R<sup>9</sup> and R<sup>10</sup> are C<sub>1</sub>-C<sub>4</sub> alkyl





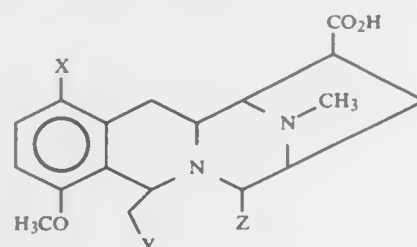
$R^{11}$  is  $C_2$ - $C_{10}$  linear alkyl;  $C_5$ - $C_{10}$  cycloalkyl or  $C_7$ - $C_9$  phenylalkyl;  
 $m$  is 2-6  
 If  $Y \neq X$  then  $R_6$  can be hydrogen.

4,946,957

## ANTI-TUMOR DC-52 DERIVATIVES

Hiromitsu Saito, Sagami-hara; Yoichi Uosaki; Akira Sato, both of Machida; Tadashi Hirata, Yokohama; Makoto Morimoto, Shizuoka, and Tadashi Ashizawa, Numazu, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan  
 Division of Ser. No. 207,639, May 25, 1988, Pat. No. 4,879,386.  
 This application Aug. 30, 1989, Ser. No. 400,883  
 Claims priority, application Japan, Oct. 1, 1986, 61-233801  
 Int. Cl.<sup>5</sup> C07D 471/180, 498/22; A61K 31/495  
 U.S. Cl. 544—342 1 Claim

1. Derivatives of DC-52 represented by the formula:



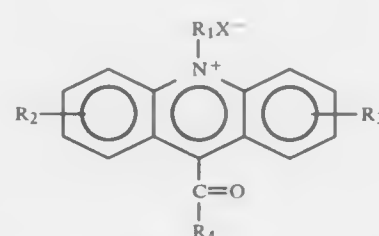
wherein X is chlorine, bromine, iodine, hydroxyl, formyl, hydroxyiminomethyl, cyano, nitro, amino or lower alkanoylamino; and Y and Z represent —O— in the form of —Y—Z—, and pharmacologically acceptable salts thereof.

4,946,958

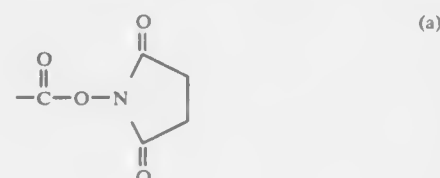
## CHEMILUMINESCENT ACRIDINIUM LABELLING COMPOUNDS

Anthony K. Campbell, Cardiff; James S. Woodhead, Machen, and Ian Weeks, Cardiff, all of United Kingdom, assignors to The Welsh National School of Medicine, Cardiff, United Kingdom  
 Continuation of Ser. No. 865,957, May 19, 1986, abandoned, which is a continuation of Ser. No. 448,191, Dec. 9, 1982, abandoned. This application Sep. 26, 1988, Ser. No. 251,954  
 Claims priority, application United Kingdom, Dec. 11, 1981, 8137522  
 Int. Cl.<sup>5</sup> C07D 219/04; C07K 15/28  
 U.S. Cl. 546—104 7 Claims

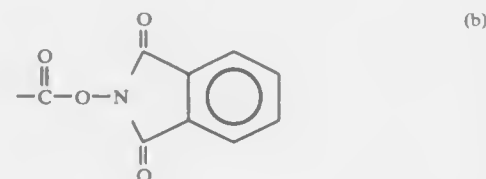
1. A chemiluminescent labelling compound for use in the labelling of substances of biological interest, said compound being capable of undergoing a light emitting reaction and defined by the formula:



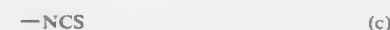
wherein  $X^-$  is an anion,  
 $R_1$  is a substituent selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl and aryl,  
 $R_2$  and  $R_3$  are substituents selected from the group consisting of hydrogen, amino, carboxyl, hydroxyl, alkoxy, nitro and halide, and  
 $R_4$  is a substituted phenoxy moiety, with a reactive group capable of reacting with a substance of biological interest being attached, either directly or by means of an alkyl group, to the aryl portion of said phenoxy moiety, said reactive group being selected from the group consisting of:



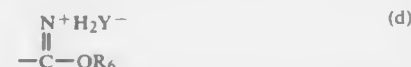
(a)



(b)



(c)



(d)

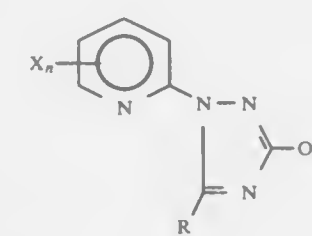
wherein  $R_6$  has the same definition as  $R_1$ , and Y is a halide,  
 (e) —halide, and  
 (f) —azide.

4,946,959

## METHOD OF PREPARING

5-ALKYL-1-(2-PYRIDINY)-1H-1,2,4-TRIAZOL-3-OLS  
 Charles E. Whitten, Plymouth, Mass., and R. Garth Pews, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.  
 Continuation of Ser. No. 228,632, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 27,582, Mar. 18, 1987, abandoned, which is a division of Ser. No. 840,359, Mar. 17, 1986, Pat. No. 4,681,943, which is a continuation-in-part of Ser. No. 676,892, Nov. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 465,743, Feb. 11, 1983, abandoned. This application Jul. 13, 1989, Ser. No. 379,401  
 Int. Cl.<sup>5</sup> C07D 401/04  
 U.S. Cl. 546—276 7 Claims

1. A method of preparing, in a high yield, a compound of the formula



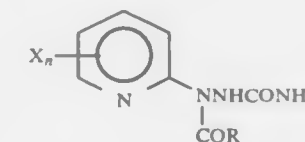
wherein

R represents  $C_1$ - $C_4$  alkyl;  
 each X independently represents Cl, F, Br,  $NO_2$ ,  $C_1$ - $C_4$  alkyl,  $NH_2$ , mono- or dialkylamino wherein each alkyl contains from 1 to 4 carbon atoms,  $C_1$ - $C_4$  alkoxy,  $C_1$ - $C_4$  alkylthio,  $C_1$ - $C_4$  alkylsulfinyl,  $C_1$ - $C_4$  alkylsulfonyl, CN,  $CF_3$ ,  $CCl_3$ , phenoxy or substituted phenoxy of the formula



wherein

each Z independently represents Cl, F, Br,  $NO_2$ , CN,  $C_1$ - $C_4$  alkoxy,  $C_1$ - $C_4$  alkylthio with the proviso that when either n is 2 or 3, all X groups are sterically compatible with each other and all Z groups are sterically compatible with each other; and  
 each n independently represents an integer of from 0 to 3, inclusive; said method comprising contacting an inorganic base with a compound of the formula



wherein

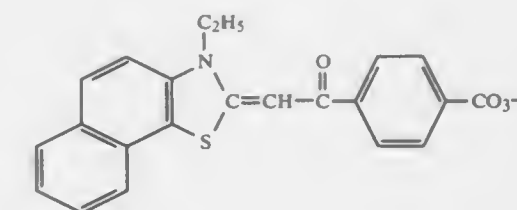
X, n and R are as defined above, in the presence of a secondary alcohol solvent at atmospheric pressure and a temperature of from about 20° C. to the reflux temperature of the reaction mixture for a period of from about one half hour to about 24 hours and recovering the desired product.

4,946,960

## PERESTER COMPOUNDS

John R. Wade, Otley; Rodney M. Potts, Leeds, and Michael J. Pratt, Menston, all of United Kingdom, assignors to Vickers PLC, London, United Kingdom  
 Continuation of Ser. No. 902,046, Aug. 26, 1986, abandoned, which is a continuation of Ser. No. 607,774, May 7, 1984, abandoned. This application Oct. 9, 1987, Ser. No. 107,889  
 Claims priority, application United Kingdom, May 9, 1983, 8312721  
 Int. Cl.<sup>5</sup> C07D 277/60, 277/84, 417/00  
 U.S. Cl. 548—150 1 Claim

1. A perester compound having the general formula:

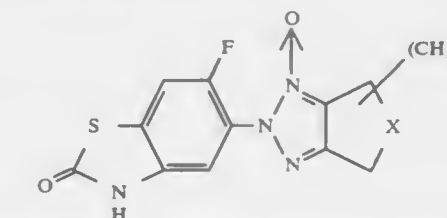


4,946,961

## BENZOTHAZOLONES, AND THEIR PRODUCTION AND USE

Masayuki Enomoto, Takarazuka; Eiki Nagano, Tokyo; Toru Haga, Takarazuka; Kouichi Morita, and Ryo Sato, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan  
 Division of Ser. No. 131,742, Dec. 11, 1987. This application Jun. 29, 1989, Ser. No. 373,197  
 Claims priority, application Japan, Dec. 11, 1986, 61-296041  
 Int. Cl.<sup>5</sup> C07D 417/14  
 U.S. Cl. 548—159 1 Claim

1. A compound of the formula:



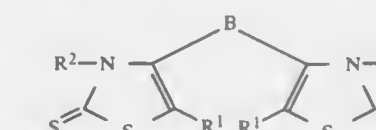
wherein X is a  $C_1$ - $C_4$  alkylene group which may be substituted with at least one methyl or a — $OCH_2$ — group and n is an integer of 0, 1 or 2.

4,946,962

## BIS(THIAZOLINETHIONES)

Steven J. Heilmann, N. St. Paul; Larry R. Krepski, White Bear Lake; Jerald K. Rasmussen, Stillwater, all of Minn.; Alan R. Katritzky, and Richard D. Tarr, both of Gainesville, Fla., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Division of Ser. No. 843,078, Mar. 24, 1986, abandoned. This application May 23, 1989, Ser. No. 356,000  
 Int. Cl.<sup>5</sup> C07D 417/04, 417/06, 417/10, 417/12  
 U.S. Cl. 548—187 5 Claims

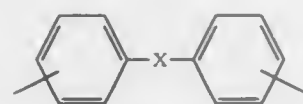
1. A compound having the formula



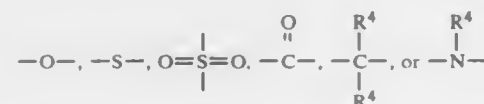
III

wherein

$R^1$  is hydrogen, a lower alkyl group having 1 to 4 carbon atoms, or an aryl group having 5 to 12 ring atoms,  
 $R^2$  is hydrogen, an alkyl group of 1 to 20 carbon atoms, or an aryl group of 5 to 12 ring atoms,  
 B is a carbon to carbon single bond, a branched or straight chain alkylene group having 1 to 20 carbon atoms that can be interrupted by one or more non-adjacent oxygen or sulfur atoms, an arylene group having 5 to 12 ring atoms, or a arene group of 6 to 20 atoms, or



wherein X is a branched or straight chain alkylene group of 1 to 4 R<sup>4</sup>



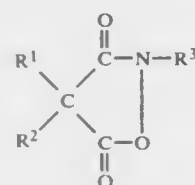
wherein R<sup>4</sup> is independently H or a lower alkyl group.

**4,946,963**  
**COMPOUNDS FOR THE CONTROL OF**  
**HYPERLIPIDEMIA USING N-SUBSTITUTED**  
**ISOXAZOLIDINE-3,5-DIONES**

Robert A. Izydore, Durham, and Iris H. Hall, Chapel Hill, both of N.C., assignors to The University of North Carolina at Chapel Hill, Durham, N.C.

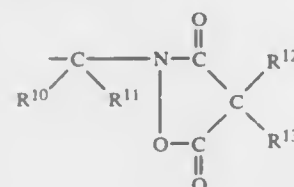
Continuation-in-part of Ser. No. 119,864, Nov. 13, 1987, abandoned. This application Oct. 31, 1988, Ser. No. 264,695  
Int. Cl.<sup>5</sup> C07C 103/30

U.S. Cl. 548—243 4 Claims  
1. An isoxazolidine-3,5-dione having hypolipidemic activity and the structural formula:



wherein

R<sup>1</sup> and R<sup>2</sup> are each an alkyl of 1 to 4 carbons;  
R<sup>3</sup> is an alkoxybenzoyl group containing from 1 to 3 alkoxy groups wherein the alkoxy groups have from 1 to 4 carbon atoms, an alkylbenzoyl group wherein the alkyl group has from 1 to 4 carbons, a halobenzoyl group, or a group



where together R<sup>10</sup> and R<sup>11</sup> form a C<sub>3</sub> to C<sub>7</sub> alkylene group, and R<sup>12</sup> and R<sup>13</sup> are each an alkyl from 1 to 4 carbon atoms,

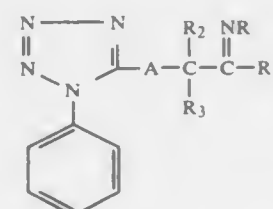
the pharmaceutically acceptable salts, and mixtures thereof.  
4. The compound 2-(3,4,5-trimethoxybenzoyl)-4,4-diethylisoxazolidine-3,5-dione.

**4,946,964**  
**PHOTOGRAPHIC COMPOUNDS**

Roger A. Boggs, Wayland; John B. Mahoney, Tewksbury; Avinash C. Mehta, Belmont; William C. Schwarzel, Billerica, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 846,584, Mar. 31, 1986, Pat. No. 4,743,533.  
This application Dec. 11, 1987, Ser. No. 131,911  
Int. Cl.<sup>5</sup> C07D 257/04

U.S. Cl. 548—251 6 Claims  
1. A compound represented by the formula



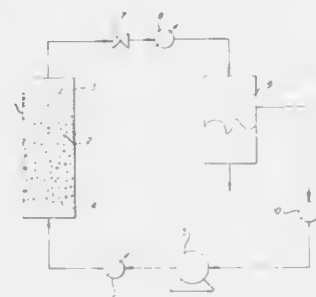
wherein A is sulfur or selenium; R is —OH, —OR<sub>4</sub>, —NH<sub>2</sub>, —NHR<sub>5</sub> or —NR<sub>4</sub>R<sub>6</sub>; R<sub>1</sub> is hydrogen, alkyl, —NH<sub>2</sub>, phenyl or naphthyl; R<sub>2</sub> and R<sub>3</sub> are each independently hydrogen, alkyl, benzyl or phenyl; R<sub>4</sub> is —CONHR<sub>7</sub>, —COR<sub>7</sub>, —COOR<sub>7</sub> or —SO<sub>2</sub>R<sub>7</sub>; R<sub>5</sub> is —COR<sub>7</sub>, —COOR<sub>7</sub> or —SO<sub>2</sub>R<sub>7</sub>; R<sub>6</sub> is —COR<sub>7</sub>, —COOR<sub>7</sub> or —SO<sub>2</sub>R<sub>7</sub>; and R<sub>7</sub> is alkyl, phenyl, naphthyl, tolyl, benzyl or cyclohexyl.

**4,946,965**  
**PROCESS FOR DRYING SOLID PHOTOGRAPHIC**  
**ADDENDA**

Frank M. Jahnke, Rochester, and Carl B. Richenberg, Batavia, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 313,557, Feb. 22, 1989, abandoned. This application Jan. 23, 1990, Ser. No. 469,703  
Int. Cl.<sup>5</sup> C07D 231/22; C07C 235/00, 235/38

U.S. Cl. 548—365 12 Claims



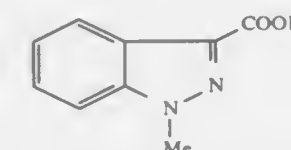
2. A method of treating a solid photographic addendum to remove occluded organic liquid therefrom, said organic liquid being present in an amount of from about 0.04 parts to about 2 parts per part by weight of said solid addendum; which method comprises the steps of:

- (1) contacting said solid photographic addendum in particulate form with an extractant composed of carbon dioxide in liquid form or in the form of a supercritical fluid for a time sufficient to extract said organic liquid, said solid addendum being insoluble in said extractant and said organic liquid being soluble in said extractant;
- (2) recovering said solid addendum in a substantially dry state.
- (3) separating said organic liquid from said extractant; and
- (4) recycling said extractant to step (1).

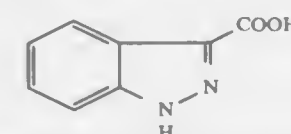
**4,946,966**  
**1-METHYLINDAZOLE-3-CARBOXYLIC ACID PROCESS**  
Francis D. King, and Thomas W. Ramsay, both of Harlow, England, assignors to Beecham Group P.L.C., Brentford, England

Filed Dec. 20, 1988, Ser. No. 287,109  
Claims priority, application United Kingdom, Dec. 22, 1987, 8729801

Int. Cl.<sup>5</sup> C07D 231/56 7 Claims  
U.S. Cl. 548—372  
1. A process for the preparation of a compound of formula (I):



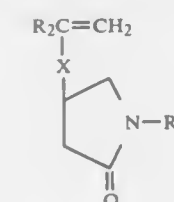
which comprises the reaction of a methylating agent with a compound of formula (IV):



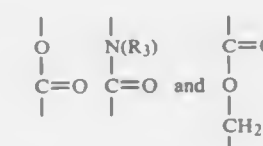
in a non-aqueous polar solvent in which is dissolved an alkali metal alkoxide, in an inert atmosphere.

**4,946,967**  
**POLYMERIZABLE DERIVATIVES OF**  
**5-OXO-PYRROLIDINECARBOXYLIC ACID**  
Robert B. Login, Oakland; John J. Merianos, Middletown; Gary Dandreaux, Bloomfield, and Jenn S. Shih, Paramus, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.  
Filed Nov. 3, 1988, Ser. No. 266,183  
Int. Cl.<sup>5</sup> C07D 207/09, 207/08

U.S. Cl. 548—531 6 Claims  
1. A compound having the molecular formula



wherein R<sub>2</sub> is H or CH<sub>3</sub>, R<sub>1</sub> is H or a hydrocarbon radical having from 1 to 20 carbon atoms selected from the group consisting of alkyl, alkenyl, aryl, aralkyl and alkaryl, X is selected from the group of

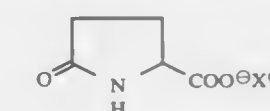


having the exact orientation shown and where R<sub>3</sub> is hydrogen or methyl.

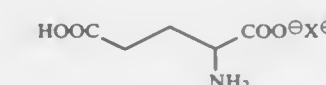
**4,946,968**  
**METHOD OF PREPARING ALKALI METAL SALTS OF**  
**2-PYRROLIDONE-5-CARBOXYLIC ACID**  
Hans-Peter Krimmer, Frankfurt; Karlheinz Drauz, and Hans Rimmel, both of Freigericht, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 17, 1988, Ser. No. 258,740  
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735263

Int. Cl.<sup>5</sup> C07D 207/28 4 Claims  
U.S. Cl. 548—534  
1. A method of preparing alkali metal salts of L-2-pyrrolidone-5-carboxylic acid of the formula



in which X<sup>+</sup> signifies an alkali metal ion, said method consisting of heating an alkali metal salt of L-glutamic acid of the formula



in which X<sup>+</sup> signifies the corresponding alkali metal ion in bulk to a temperature between about 210° C. and 270° C. until the water produced by the intramolecular condensation has been completely eliminated.

**4,946,969**  
**PROCESS OF PREPARING GAMMA-TERPINENE**  
**DIADDUCTS**

David W. Parker, Holland, Pa., assignor to Union Carbide Corporation, Wayne, N.J.

Filed Nov. 4, 1988, Ser. No. 266,979  
Int. Cl.<sup>5</sup> C07D 407/04

U.S. Cl. 549—237 11 Claims  
1. A method for preparing diadducts of a Diels-Alder dienophile and gamma-terpinene which comprises heating in the absence of iodine a mixture of gamma-terpinene and about two molar equivalents of the Diels-Alder dienophile based upon the moles of gamma-terpinene at a temperature between about 155° C. and the boiling point of the mixture for a time sufficient to react substantially all of the gamma-terpinene.

**4,946,970**  
**SUPPRESSION OF TRIMELLITIC ANHYDRIDE DUST**  
Michael R. Green, Geneva; Chang M. Park, and Adel B. Abdul-Malek, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 2, 1988, Ser. No. 279,430  
Int. Cl.<sup>5</sup> C07D 307/77

U.S. Cl. 549—245 37 Claims  
1. A trimellitic anhydride (TMA) composition having a reduced tendency to form TMA dust which composition comprises solid TMA treated with at least one organic compound wherein said organic compound is applied to the surface of said solid TMA and wherein the organic compound is both liquid and substantially non-volatile at normal ambient temperatures and pressures and wherein the organic compound does not contain an anhydride functionality; the TMA being present in an amount within the range of about 90 wt. % to about 99.999 wt. %, based on the total weight of the composition, and the organic compound being present in an amount within the range of about 0.001 wt. % to about 10 wt. %, based on the total weight of the composition.



4,946,971

## 6-SULFONYL CHROMANS

Robert Ramage, Edinburgh, Scotland, assignor to Wendstone Chemicals PLC, London, England

Filed Apr. 20, 1988, Ser. No. 184,007

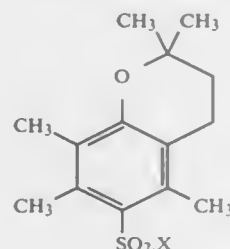
Claims priority, application United Kingdom, Apr. 28, 1987, 8710065

Int. Cl.<sup>5</sup> C07D 311/70

U.S. Cl. 549—408

2 Claims

1. A compound having the structural formula



wherein X is halogen.

4,946,972

## PROCESS FOR DISTILLATION OF 2,2,3,3-TETRAFLUOROXYETANE

Yohnosuke Ohsaka, Ibaraki, and Shoji Takaki, Takatsuki, both of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Jan. 23, 1989, Ser. No. 299,353

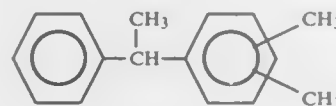
Claims priority, application Japan, Jan. 23, 1988, 63-12997

Int. Cl.<sup>5</sup> C07D 305/04

U.S. Cl. 549—511

4 Claims

1. A process for distillation of a mixture comprising 2,2,3,3-tetrafluoroxyetane, which process comprises distilling the mixture comprising 2,2,3,3-tetrafluoroxyetane in a metallic distillation column in the presence of at least one additive compound selected from the group consisting of nitromethane, nitroethane, nitrobenzene and



4,946,973

## STERESELECTIVE EPOXIDATION OF CYCLIC 4-HYDROXY OLEFINS

Walter C. Frank, Holland, Pa., assignor to Union Carbide Corporation, Princeton, N.J.

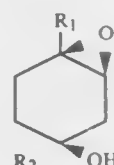
Filed Sep. 20, 1988, Ser. No. 247,057

Int. Cl.<sup>5</sup> C07D 301/14

U.S. Cl. 549—525

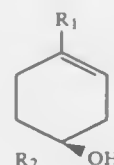
37 Claims

1. A method for the stereoselective synthesis of a cyclic epoxy alcohol having formula:



wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and are hydrogen or hydrocarbyl having from 1 to about 6 carbon atoms, said method comprising:

contacting a cyclic hydroxy olefin having formula:



with peroxydicarboximide acid; in a reaction mixture maintained at a pH greater than about 6 comprising an organic solvent inert with respect to the conditions of contacting; for a period of time effective to result in cis-epoxidation of said hydroxy olefin.

4,946,974

## OPTICALLY ACTIVE DERIVATIVES OF GLYCIDOL

Karl B. Sharpless, Brookline; Janice M. Klunder, Somerville, both of Mass., and Tetsuo H. Onami, Fukushima, Japan, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

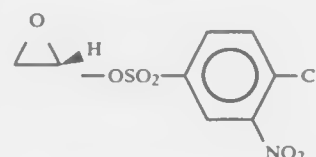
Filed Oct. 1, 1986, Ser. No. 913,936

Int. Cl.<sup>5</sup> C07D 303/16

U.S. Cl. 549—551

8 Claims

1. A compound of the formula



produced from allylic alcohol and recrystallized to high enantiomeric purity.

4,946,975

## PROCESS FOR MAKING METHYLCYCLOPENTADIENYL MANGANESE TRICARBONYL COMPOUNDS

Feng-Jung Wu; Bruce C. Berris, and Donald R. Bell, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jan. 12, 1990, Ser. No. 464,312

Int. Cl.<sup>5</sup> C07F 13/00

U.S. Cl. 556—47

15 Claims

1. A process for making a cyclopentadienyl manganese tricarbonyl compound said process comprising:

- forming a mixture comprising manganese acetate/a bis-cyclopentadienyl manganese compound/an alkyl aluminum compound/and an ether under an inert atmosphere in a mole ratio of about 0.25–0.55/0.45–0.55/0.50–2.1/0.50–2.1, further characterized in that the mole ratio of ether to aluminum alkyl compound is 0.75–1.25/1.0,
- reacting said mixture under carbon monoxide pressure at a temperature of about 65–175° C. until the carbonylation reaction is substantially complete and
- recovering said cyclopentadienyl manganese tricarbonyl compound.

4,946,976

## CORDIERITE COMPOSITION AND METHOD OF PRODUCTION

John F. Terbot, Mobile, Ala., and Richard F. Hill, Chagrin Falls, Ohio, assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 911,221, Sep. 24, 1986, Pat. No. 4,835,298. This application Nov. 28, 1988, Ser. No. 276,807

Int. Cl.<sup>5</sup> C07F 5/06

U.S. Cl. 556—173

2 Claims

1. A stable, homogeneous mixed liquid alkoxide comprising:

a magnesium metal alkoxide; an aluminum metal alkoxide; a silicon tetraalkoxide; wherein the molar ratio of magnesium alkoxide to aluminum alkoxide is greater than 1:2.

4,946,977

## METHOD FOR THE PREPARATION OF ORGANOSILANES CONTAINING METHACRYLOXY OR ACRYLOXY GROUPS

Günther Bernhardt, Sankt Augustin; Jürgen Amort, Troisdorf; Margret Haas, Cologne; Horst Hanisch, Hennef, and Heinz Kragl, Troisdorf, all of Fed. Rep. of Germany, assignors to Huels Troisdorf AG, Cologne, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,317

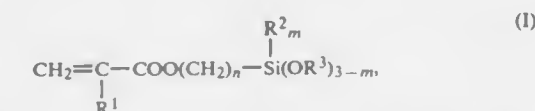
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732356

Int. Cl.<sup>5</sup> C97F 7/08, 7/18

U.S. Cl. 556—440

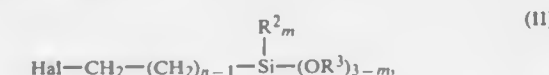
15 Claims

1. A method for the preparation of an organosilane containing a methacryloxy or an acryloxy group, of the general Formula I

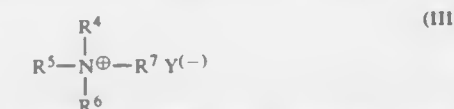


in which R<sup>1</sup> is a hydrogen atom or a methyl group, R<sup>2</sup> an alkyl moiety of 1 to 4 carbon atoms, R<sup>3</sup> an alkyl group with to 4 carbon atoms, or an alkoxyalkyl group with a total of 2 to 4 carbon atoms, m represents 0 or 1 or 2, and n represents 1, 3 or 4, comprising:

reacting at a temperature of from 80 to 130° C. an alkali methacrylate or acrylate with a halogen alkylsilane of the general Formula II



in which R<sup>2</sup>, R<sup>3</sup>, m and n are as defined above and Hal represents, chlorine or bromine, in the presence of a catalyst being a quaternary ammonium salt of the general Formula III



in which Y<sup>(-)</sup> is a halide ion, sulfate ion or phosphate ion and R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are identical or different alkyl groups with 1 to 37 carbon atoms, the sum of all carbon atoms amounting to between 10 and 40.

4,946,978

## METHOD OF DIRECT PROCESS PERFORMANCE IMPROVEMENT VIA CONTROL OF SILICON MANUFACTURE

Roland L. Halm, Madison, Ind., and Oliver K. Wilding, Jr., Louisville, Ky., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 22, 1986, Ser. No. 944,317

The portion of the term of this patent subsequent to Nov. 7, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C07F 7/16

U.S. Cl. 556—472

18 Claims

1. A method of improving the performance of a process for the manufacture of alkylhalosilanes, said process comprising, contacting an alkylhalide with silicon, at a temperature of 250° C. to 350° C., in the presence of tin or tin compounds, and copper or copper compounds, wherein there is at least also present, 25 to 2500 parts per million based on the silicon in the

reaction mass, of a phosphorous promoter, which method comprises controlling the level of the phosphorous promoter in the silicon by incorporating a non-volatile phosphorous compound in the molten mass of the silicon after the removal of the molten mass of the silicon from the reaction zone of the furnace in which the silicon is produced.

4,946,980

## PREPARATION OF ORGANOSILANES

Roland L. Halm, Madison; Kirk M. Chadwick, Hanover, both of Ind., and Brian R. Keyes, Salt Lake City, Utah, assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 258,950, Oct. 17, 1988, abandoned. This application Nov. 6, 1989, Ser. No. 432,005

Int. Cl.<sup>5</sup> C07F 7/08

U.S. Cl. 556—978

17 Claims

1. A process for preparing more highly alkylated silanes having the formula,



wherein each R is independently selected from a group consisting of methyl, ethyl, and n-propyl; each R<sup>i</sup> is independently selected from a group consisting of hydrogen atoms, alkyl, substituted alkyl, alkenyl, aryl, and alkaryl groups; a has a value of 1, 2, 3, or 4, b has a value of 0, 1, 2, or 3, and the sum of a + b is 4 or less; and X is an independently selected halogen atom, said process comprising:

(A) contacting a halide of silicon, having the formula,



wherein R<sup>i</sup>, b, and X are defined above; with an alkyl halide, having the formula,



wherein R and X are defined above, in the presence of a metal which serves as a halogen acceptor and a sufficient quantity of a catalyst effective in improving exchange of said R groups from the alkyl halide with said halogen atoms X of said halide of silicon to yield said more highly alkylated silanes;

(B) reacting the halide of silicon with the alkyl halide in the presence of the metal and the catalyst at a temperature greater than about 150° C. to form the more highly alkylated silanes and a halide of the metal; and

(C) isolating and separating the more highly alkylated silane.

4,946,981

CERTAIN 2-(2-SUBSTITUTED  
BENZOYL)-1,3-CYCLOHEXANEDIONES

Charles G. Carter, San Francisco; David L. Lee, Martinez; William J. Michaely, Richmond, and Gary W. Kraatz, San Jose, all of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 880,370, Jun. 30, 1986, Pat. No. 4,780,127, which is a continuation-in-part of Ser. No. 772,593, Sep. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 634,408, Jul. 31, 1984, abandoned, which is a continuation-in-part of Ser.

No. 587,331, Mar. 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 532,869, Sep. 16, 1983, abandoned, which is a continuation-in-part of Ser. No. 464,251, Feb. 9, 1983, abandoned, which is a continuation-in-part of Ser. No. 361,658, Mar. 25, 1982, abandoned, said Ser. No. 880,370, Continuation-in-part of Ser. No. 752,707, is a

continuation-in-part of Ser. No. 640,791, Aug. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 566,077, Dec. 27, 1983, abandoned, which is a continuation-in-part of Ser. No. 532,882, Sep. 16, 1983, abandoned, said Ser. No. 880,370, Continuation-in-part of Ser. No. 804,026, is a

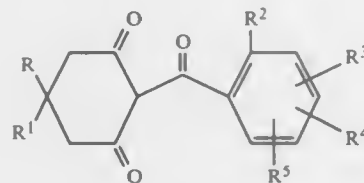
continuation-in-part of Ser. No. 683,899, Dec. 20, 1984, abandoned, said Ser. No. 880,370, Continuation-in-part of Ser. No. 802,135, is a continuation-in-part of Ser. No. 683,900, Dec. 20, 1984, abandoned, said Ser. No. 880,370, Continuation-in-part of Ser. No. 802,134, is a continuation-in-part of Ser. No. 683,884, Dec. 20, 1984, abandoned, said Ser. No. 880,370, Continuation-in-part of Ser. No. 872,067. This application Jun.

27, 1988, Ser. No. 211,782

The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 255/50, 229/54, 323/33, 309/29, 233/76, 49/792 U.S. Cl. 558—415 7 Claims

1. Compound having the structural formula



wherein

R and R<sup>1</sup> are hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, R<sup>a</sup>OC(O)—, where R<sup>a</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>2</sup> is C<sub>1</sub>-C<sub>4</sub> alkoxy; and

R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> independently are (1) hydrogen; (2) halogen; (3) C<sub>1</sub>-C<sub>4</sub> alkyl; (4) C<sub>1</sub>-C<sub>4</sub> alkoxy; (5) trifluoromethoxy; (6) cyano; (7) nitro; (8) C<sub>1</sub>-C<sub>4</sub> haloalkyl; (9) R<sup>b</sup>SO<sub>n</sub>— wherein R<sup>b</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, phenyl, benzyl, —NR<sup>d</sup>R<sup>e</sup> wherein R<sup>d</sup> and R<sup>e</sup> independently are hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; and n is the integer 0, 1 or 2;



wherein R<sup>c</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl and R<sup>f</sup> is hydrogen; (11) R<sup>c</sup>/C(O) wherein R<sup>f</sup> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy; (12) —NR<sup>g</sup>R<sup>h</sup> wherein R<sup>g</sup> and R<sup>h</sup> independently are hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or (13) R<sup>3</sup> and R<sup>4</sup> together can form a ring structure with two adjacent carbon atoms of the phenyl ring; and their salts.

4,946,982

## FUEL COMPOSITION

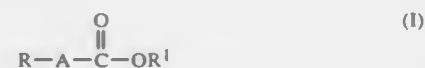
Thomas H. Johnson, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 225,997, Jul. 29, 1988. This application Mar. 20, 1989, Ser. No. 325,801

Int. Cl.<sup>5</sup> C07C 257/00

U.S. Cl. 560—158 20 Claims

1. A compound comprising a poly(olefin)-N-substituted-carbamate of formula I



in which R is a poly(olefin) chain having an average molecular weight of from about 500 to about 9,900; R<sup>1</sup> is a hydrocarbyl or substituted hydrocarbyl group containing up to 20 carbon atoms; and A is derived from an N-substituted amino group in which the substituent is a hydrocarbyl or substituted hydrocarbyl group containing up to 20 carbon atoms.

4,946,983

PROCESS FOR THE ACYLATION OF  
N,N-DIALLYLANILINE OR A MIXTURE OF  
N,N-DIALLYLANILINE AND N-ALLYLANILINE

Jean-Pierre Denis, Doyet; Jean-Roger Desmurs, Communay, and Jean-Pierre Leconve, Caluire, all of France, assignors to Rhone Poulenc Chimie, Courbevoile, France

Filed Dec. 23, 1988, Ser. No. 288,873

Claims priority, application France, Dec. 23, 1987, 87 18012 Int. Cl.<sup>5</sup> C07C 231/00

U.S. Cl. 564—143 16 Claims

1. A process for the preparation of N-allyl-N-acylaniline, comprising the step of placing an N,N-diallylaniline or a mixture of N-mono and N,N-diallylanilines in contact with a carboxylic acid halide for a period of time sufficient to produce said N-allyl-N-acylaniline.

4,946,984

ALKOXYLATION USING A CALCIUM SULFATE  
CATALYST

Charles F. Hauser, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 30, 1988, Ser. No. 251,430

Int. Cl.<sup>5</sup> C07C 41/03

U.S. Cl. 568—618 26 Claims

1. A process for preparing an alkoxylation product mixture having a narrow distribution of alkoxylation species comprising contacting an organic compound having at least one active hydrogen with an alkylene oxide in which the mole ratio of reacted alkylene oxide per active hydrogen is at least about 4 in the presence of a catalytically effective amount of a catalyst consisting essentially of calcium sulfate under alkoxylation conditions sufficient to provide a product mixture characterized by having at least one alkoxylation species which constitutes about 20 to 40 weight percent of the product mixture; the weight percent of the product mixture having three or more oxyalkylene units than the average peak alkoxylation species is less than about 12 weight percent of the mixture; the alkoxylation species having one oxyalkylene group more than that of the most prevalent species and the alkoxylation species having one oxyalkylene group less than that of the most prevalent species are present in a weight ratio to the most prevalent species of about 0.6:1 to 1:1.

4,946,985

CATALYZED PROCESS FOR THE PREPARATION OF  
OXYDIPHTHALIC ANHYDRIDES

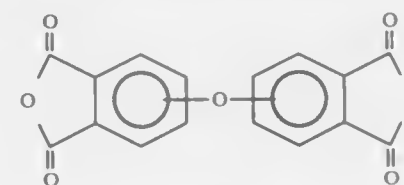
Jeffrey S. Stults, Grand Island, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Dec. 14, 1988, Ser. No. 284,219

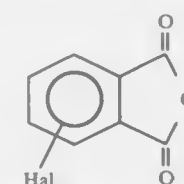
Int. Cl.<sup>5</sup> C07D 307/89

U.S. Cl. 549—241 22 Claims

1. A process for the preparation of a diphtalic ether dianhydride of the formula



comprising reacting a halophthalic anhydride of the formula



where Hal is F or Br, with water and an alkali metal compound selected from the group consisting of potassium fluoride, cesium fluoride, and potassium carbonate in the presence of a copper catalyst selected from the group consisting of elemental copper, cuprous oxide, cupric oxide, copper chromite, copper (I) triflate-benzene complex, copper (II) triflate, stabilized copper (I) bromide, copper sulfate, cupric tetrafluoroborate, and cuprous benzoate and mixtures thereof.

4,946,986

## CYCLOHEXENE DERIVATIVES

Yasuyuki Tanaka; Haruyoshi Takatsu; Kiyohumi Takeuchi, all of Tokyo, and Yuji Tamura, Saitama, all of Japan, assignors to Dainippon Ink and Chemicals, Tokyo, Japan

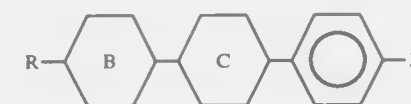
Filed Feb. 27, 1989, Ser. No. 315,874

Claims priority, application Japan, Feb. 29, 1988, 63-47041; Apr. 15, 1988, 63-91739; Jul. 26, 1988, 63-184527; Jan. 18, 1989, 64-7656

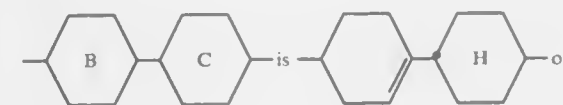
Int. Cl.<sup>5</sup> C07C 127/00

U.S. Cl. 558—411 5 Claims

1. A compound represented by the general formula:



wherein R is a straight-chained alkyl group having 1-9 carbon atoms;



and X is a cyano group.

4,946,987

## N-NAPHTHOYLGLYCINE DERIVATIVES

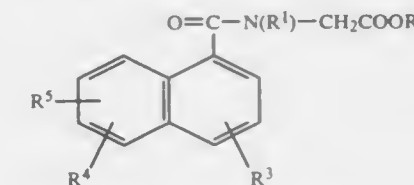
Kazimir Sestanj, St. Laurent; Nedumparambil A. Abraham, Dollard des Ormeaux; Francesco Bellini, Monnt Royal, and Adi Treasurywala, Point Claire, all of Canada, assignors to Ayerst, McKenna & Harrison, Inc., St. Laurent, Canada

Continuation of Ser. No. 17,943, is a division of Ser. No. 845,230, Mar. 28, 1986, Pat. No. 4,705,882, which is a division of Ser. No. 756,139, Jul. 17, 1985, Pat. No. 4,600,724, which is a division of Ser. No. 530,457, Sep. 9, 1983, Pat. No. 4,568,693, which is a division of Ser. No. 321,306, Nov. 13, 1981, Pat. No. 4,439,617. This application Jun. 20, 1988, Ser. No. 209,153 Claims priority, application Canada, Mar. 2, 1981, 372119 The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 103/84

U.S. Cl. 558—415 1 Claim

1. A compound of the formula



wherein R<sup>1</sup> is lower alkyl, lower alkenyl or phenylmethyl; R<sup>2</sup> is a substituent at position 4, 5 or 8 of the naphthalene ring, the substituent being selected from the group consisting of lower alkyl, lower alkoxy, halo, cyano, nitro and trihalomethyl, and R<sup>3</sup> and R<sup>4</sup> each is hydrogen; or R<sup>3</sup> and R<sup>4</sup> each is a substituent at different positions of the naphthalene ring, the positions selected from positions 3 to 7 and the substituents being selected from the group consisting of lower alkyl, lower alkoxy, halo, trihalomethyl, (lower)-alkoxy(lower)alkoxy, phenylmethoxy and phenylmethoxy substituted on the phenyl portion with a lower alkyl, lower alkoxy, halo or trihalomethyl and R<sup>5</sup> is hydrogen; or R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> each is a substituent at different positions selected from positions 4, 5 and 6 of the naphthalene ring, the substituent being selected from the group consisting of lower alkoxy, halo and trihalomethyl; and R is hydrogen or lower alkyl.

4,946,988

PROCESS FOR THE PREPARATION OF  
α-L-ASPARTYL-L-PHENYLALANINE METHYL ESTER  
HYDROCHLORIDE BY USE OF ISOLATED N-FORMYL  
L-ASPARTIC ANHYDRIDE

John B. Hill, Woodstock, and Yefim Gelman, Arlington Hts., both of Ill., assignors to The NutraSweet Company, Deerfield, Ill.

Filed Jul. 14, 1988, Ser. No. 219,613

Int. Cl.<sup>5</sup> C07C 101/02

U.S. Cl. 560—41 26 Claims

1. A method of preparing α-APM hydrochloride, which comprises the steps of:

- formylating L-aspartic acid in a reaction mixture of formic acid and acetic anhydride to yield N-formyl-L-aspartic anhydride;
- isolating said N-formyl-L-aspartic anhydride;
- coupling said N-formyl-L-aspartic anhydride with L-phenylalanine at an effective temperature, said coupling carried out in the presence of an amount of added acetic acid sufficient to reduce the viscosity of said reaction mixture so that said reaction mixture is stirrable and in the presence of a suitable amount of an alkyl ester, a hindered alcohol or mixture thereof, to yield α, β-N-formyl-L-aspartyl-L-phenylalanine isomers;
- deformylating said isomers by adding an effective amount of hydrochloride acid.



a (a) C<sub>1-10</sub> alkyl optionally substituted with a group X;  
(b) C<sub>6-10</sub> aryl or C<sub>7-11</sub> araalkyl wherein the aryl moiety is

UMI

optionally substituted with a group X and optionally contains 1 to 2 heteroatoms selected from N, O or S;  
 (c) C<sub>5-8</sub> cycloalkyl optionally substituted with X;  
 (d) C<sub>2-10</sub> alkenyl optionally substituted with a group X;  
 (e) C<sub>2-10</sub> alkynyl optionally substituted with a group X;  
 (f) C<sub>1-5</sub> alkoxy;  
 (g) C<sub>1-5</sub> alkylthio;  
 provided that R<sub>1</sub> and R<sub>2</sub> are not identical;  
 X is H, C<sub>1-6</sub> alkyl, C<sub>1-5</sub> alkoxy, halogen, C<sub>1-5</sub> acyloxy, C<sub>1-5</sub> acylamino, C<sub>1-5</sub> acyl, nitro or trialkylsiloxy;  
 which comprises: treating (I) with an acid anhydride and the conjugate base of the acid anhydride in an organic solvent selected from isopropyl acetate, hexanes, heptanes, toluene, or tetrahydrofuran.

4,946,998

# HYDROGENATION OF METHYLENEDIANILINE TO PRODUCE

**BIS(PARA-AMINOCYCLOHEXYL)METHANE**  
 Jeremiah P. Casey, Emmaus, and Michael J. Fasolka, Pennsylvania, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.  
 Continuation of Ser. No. 821,629, Jan. 23, 1986, Pat. No. 4,754,070. This application Feb. 10, 1988, Ser. No. 154,662. The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> C07C 209/72

U.S. Cl. 564—451

12 Claims

1. In a process for the catalytic hydrogenation of impure bis(4-aminophenyl)methane containing oligomers to a liquid bis(4-aminocyclohexyl)methane containing from about 15 to 40% by weight of the trans,trans- isomer, the improvement which comprises effecting the catalytic hydrogenation of bis(4-aminophenyl)methane in the presence of a catalyst system consisting essentially of rhodium and ruthenium, the weight ratio of rhodium to ruthenium, based on metal content being from about 2-12 weight parts rhodium per weight part ruthenium.

4,946,999

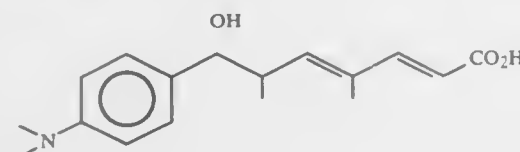
# NOVEL INTERMEDIATES FOR SYNTHESIS OF TRICHOSTATIC ACID OR TRICHOSTATIN A, AND PROCESSES FOR PREPARING TRICHOSTATIC ACID AND TRICHOSTATIN A

Koshi Koseki, Yokohama, and Kenji Mori, Tokyo, both of Japan, assignors to Japan Tobacco Inc., Tokyo, Japan  
 Filed Feb. 22, 1989, Ser. No. 313,505  
 Claims priority, application Japan, Mar. 4, 1988, 63-49595  
 Int. Cl.<sup>5</sup> C07C 229/00

U.S. Cl. 562—452

2 Claims

1. (E,E)-7-(4'-dimethylaminophenyl)-7-hydroxy-4,6-dimethylhepta-2,4-dienoic acid represented by the following formula [13]:



4,947,000

# AROMATIC PHOSPHINE OXIDE COMPOUND

Hiroshi Meguro; Hiroshi Ohrai, and Kazuaki Akasaka, all of Sendai, Japan, assignors to Tosoh Corporation, Yamaguchi, Japan  
 Filed Mar. 3, 1988, Ser. No. 163,544  
 Claims priority, application Japan, Apr. 22, 1987, 62-97577  
 Int. Cl.<sup>5</sup> C07F 9/53

U.S. Cl. 568—14

1 Claim

1. Diphenyl-1-pyrenylphosphine oxide.

4,947,001

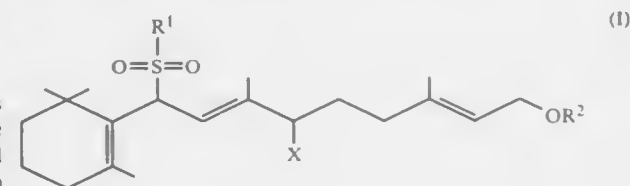
# PROCESS FOR PRODUCING HALOGENATED SULFONE

Takashi Onishi; Toshiki Mori; Shigeaki Suzuki, all of Kurashiki; Michio Takigawa, Takatsuki, and Kazuo Yamamoto, Kurashiki, all of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan  
 Filed Jun. 12, 1989, Ser. No. 364,154  
 Claims priority, application Japan, Jun. 27, 1988, 63-160465  
 Int. Cl.<sup>5</sup> C07C 149/00

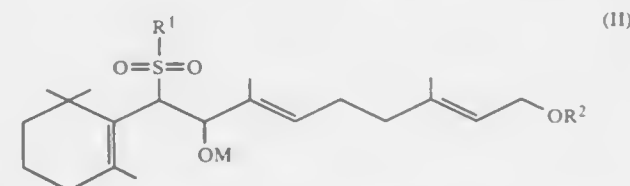
U.S. Cl. 568—28

11 Claims

1. A process for preparing a halogenated sulfone of the general formula (I)



wherein R<sup>1</sup> represents a phenyl group which may be substituted with at least one member of the group consisting of lower alkyl, halogen and lower alkoxy, R<sup>2</sup> represents a lower acyl group, and X represents a halogen atom, characterized by reacting a halogenating agent with a salt of a hydroxysulfone of the following general formula (II)



wherein R<sup>1</sup> and R<sup>2</sup> have the same meanings as defined above and M represents Li or MgY where Y represents a halogen atom, in the presence of an etheral solvent.

4,947,002

# NOVEL TRICYCLIC KETONES AND FRAGRANCE COMPOSITIONS CONTAINING SAME

Georg Fräter, Uster, and Urs Müller, Gossau, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.  
 Filed Nov. 2, 1988, Ser. No. 266,036  
 Claims priority, application Switzerland, Nov. 12, 1987, 4425/87

U.S. Cl. 568—373

Int. Cl.<sup>5</sup> C07C 49/317

5 Claims

1. A compound of the formula

whereby the neopentylidimethylcarbinol is reacted with the hydrogen peroxide in the presence of the sulfuric acid.

4,947,005

# PREPARATION OF 1,1,2-TRIALKOXYETHANES

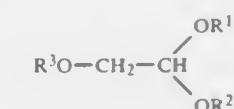
Dieter Koeffer, Weinheim, and Werner Bertleff, Viernheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
 Filed Aug. 25, 1989, Ser. No. 398,715  
 Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831327

Int. Cl.<sup>5</sup> C07C 41/48

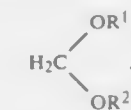
U.S. Cl. 568—600

4 Claims

1. In a process for preparing a 1,1,2-trialkoxyethane of the formula



where R<sup>1</sup> to R<sup>3</sup> are each independently of the others C<sub>1</sub>-C<sub>20</sub> alkyl or cycloalkyl, or R<sup>1</sup> and R<sup>2</sup> may be linked together to form a 5-, 6- or 7-membered ring, by reacting a formaldehyde dialkyl acetal of the formula



where R<sup>1</sup> and R<sup>2</sup> are each as defined above, or a compound which is capable of forming a formaldehyde dialkyl acetal under the reaction conditions, with carbon monoxide, hydrogen and an alcohol R<sup>3</sup>OH under superatmospheric pressure at elevated temperature in the presence of a catalyst composed of a cobalt carbonyl compound and a promoter, the improvement which comprises using as the promoter an alkali metal, alkaline earth metal or ammonium salt of a protogenic compound having an acid constant K<sub>a</sub> of from 10<sup>-2</sup> to 10<sup>-14</sup>, an alkali metal or alkaline earth metal hydroxide or an aminocarboxylic acid.

4,947,006

# PROCESS FOR PREPARING FLUORINATED CONJUGATED OLEFINIC PRODUCTS AND NEW PRODUCTS THUS OBTAINED

Antonio Marraccini, Dormelletto; Antonio Pasquale, and Tiziana Fiorani, both of Novara, all of Italy, assignors to AUSIMONT S.r.l., Milan, Italy  
 Filed Jun. 29, 1989, Ser. No. 372,828  
 Claims priority, application Italy, Jun. 30, 1988, 21162 A/88  
 Int. Cl.<sup>5</sup> C07C 43/17

U.S. Cl. 568—685

6 Claims

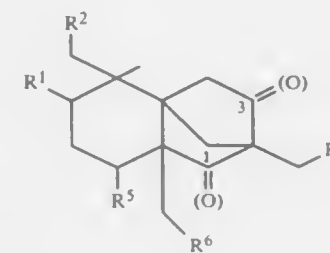
1. New fluorinated conjugated olefinic products having the formula:



(A)

wherein:

R<sub>x</sub> is either a linear or branched perhalogenated alkyl radical, a perhaloalkyl-monoether radical or a perhaloalkyl-polyether radical containing from 1 to 10 carbon atoms and wherein the halo are fluorine atoms or fluorine and chlorine atoms, and  
 m is a numeral within the range of from 2 to 10.



wherein:

the symbols R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> represent hydrogen or methyl, with the proviso that only one of R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> represents methyl, and, when either or both R<sup>5</sup> and R<sup>6</sup> represent methyl, then R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> represent hydrogen; and,  
 either the symbol (=O) on the carbon designated by the number 1 or the symbol (=O) on the carbon designated by the number 3, represents a keto group, such that when the group is present on carbon 1, then carbon 3 may contain a methyl group.

4,947,003

# PROCESS FOR THE HYDROFORMULATION OF OLEFINICALLY UNSATURATED ORGANIC REACTANTS USING A SUPPORTED AQUEOUS PHASE CATALYST

Mark E. Davis; Juan P. Arhancet, and Brian E. Hanson, all of Blacksburg, Va., assignors to Virginia Tech Intellectual Properties, Inc., Blacksburg, Va.  
 Filed Nov. 28, 1988, Ser. No. 276,730  
 Int. Cl.<sup>5</sup> C07C 45/50

U.S. Cl. 568—454

26 Claims

1. A process for the hydroformylation of a liquid phase olefinically unsaturated organic reactant in the carbon number range from about 3 to about 30, which comprises steps for  
 a. contacting and reacting said olefinically unsaturated organic reactant with a mixture of carbon monoxide and hydrogen, under hydroformylation conditions, in the presence of an effective amount of a heterogeneous catalyst comprising a solid surface having immobilized thereon a solution of one or more rhodium complexes in a polar solvent, said solution characterized as essentially immiscible with said olefinically unsaturated organic reactant phase, and  
 b. separating the catalyst from the resulting reaction mixture.

4,947,004

# METHOD FOR PRODUCING

**1,1,3,3-TETRAMETHYLBUTYL HYDROPEROXIDE**  
 Shuji Suyama; Mitsukuni Kato, both of Aichi; Jun Takada, Chita, and Hiroshi Okada, Tokoname, all of Japan, assignors to Nippon Oil and Fats Company, Ltd., Japan  
 Filed Apr. 4, 1989, Ser. No. 332,983  
 Claims priority, application Japan, Dec. 15, 1987, 62-315181  
 Int. Cl.<sup>5</sup> C07C 179/02

U.S. Cl. 568—568

1 Claim

1. A method for producing 1,1,3,3-tetramethylbutyl hydroperoxide, comprising adding dropwise, at a temperature of 0-30° C. 1 mol of neopentylidimethylcarbinol alone or in the form of a mixture consisting of 100(exclusive)-50% by weight of neopentylidimethylcarbinol and less than 50% by weight of diisobutylene to an aqueous solution containing a mixture of 0.5-2 mols of sulfuric acid and 1-3 mols of hydrogen peroxide,



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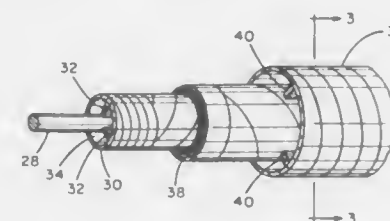
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## ELECTRICAL

4,947,007  
**SUPERCONDUCTING TRANSMISSION LINE SYSTEM**  
 Michael W. Dew, La Jolla, and Richard L. Creedon, San Diego,  
 both of Calif., assignors to General Atomics, San Diego, Calif.  
 Filed Nov. 8, 1988, Ser. No. 268,598  
 Int. Cl.<sup>5</sup> H01B 12/00

U.S. Cl. 174—15.5

10 Claims



1. A superconducting transmission line system for transferring electrical power over long distances, said system comprising:

- a superconducting transmission line extending from a first location where electrical power is supplied to said line to a second location where electrical power is taken from said line, said line including an inner tube, a superconducting core positioned inside said tube and spaced from the inner surface of said inner tube with said core and said inner tube defining a passageway for a cryogenic liquid the boiling temperature of which is above the superconducting transition temperature of said core;
- a plurality of spaced support means holding said transmission line, the portion of said transmission line extending between a pair of adjacent support means being lower than the parts of said line held by said pair of adjacent support means;
- a cryogenic liquid in said passageway with at least a portion of said core being immersed in said liquid; and
- a regenerator for the cryogenic liquid mounted on each of said pair of support means, each regenerator being connected to said transmission line and each regenerator functioning to reliquefy gasses resulting from boiling of said cryogenic liquid in said portion of said transmission line whereby gasses resulting from boiling of the cryogenic liquid due to conductive or radiative heat transfer percolate to the regenerators where the gasses are reliquefied and returned to the transmission line to maintain the superconductive core below its transition temperature.

4,947,008  
**SWITCH DEVICE**  
 Hiroyuki Sato, and Yujiro Shimoyama, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan  
 Filed Mar. 17, 1988, Ser. No. 170,920  
 Claims priority, application Japan, Jun. 1, 1987, 62-83186[U]  
 Int. Cl.<sup>5</sup> H01H 21/00

U.S. Cl. 200—6 R

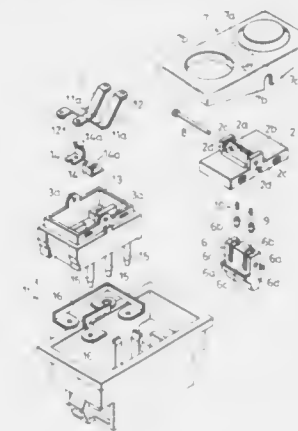
10 Claims

1. A switch device, comprising:
- a casing having defined therein two mutually aligned holes;
  - an electrical contact assembly including a fixed contact;
  - a conductor plate pivotally mounted within said casing;
  - a switch operating member including an actuator element and an operating element,
- the switch operating member being mounted to the casing so as to pivot about a pivot axis extending between the mutually aligned holes, said actuator element having a through-hole having a top and a bottom end formed therein extending in a direction perpendicular to the pivot axis, said bottom end of said through-hole is adjacent to and faces said conductor plate mounted in said casing there being a

predetermined clearance between the bottom end of the through-hole and said conductor plate;

an actuator bar having a first end and a second end received in said through-hole of said actuator element for sliding therein, said first end of the said bar extending partially out the bottom end of said through-hole, and being of such a length as to span said predetermined clearance while said second end of said bar is slidably disposed in said through-hole; and

a spring having a first end and a second end received in said



through-hole of said actuator element, wherein said first end is operatively coupled with said second end of said bar;

wherein said operating element has a pressing projection which is formed thereon to complementarily match said top of said through-hole in said actuator element, said pressing projection has an end which is operatively coupled to said second end of said spring in said through-hole to press against said second end of said actuator bar to urge said first end of said actuator bar to contact said conductor plate.

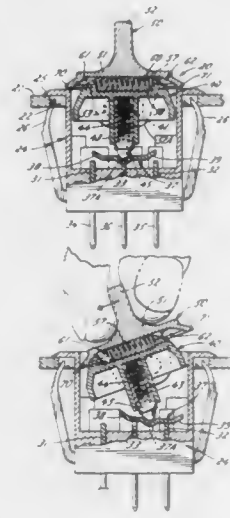
4,947,009  
**CONSCIOUS EFFORT SAFETY SWITCH**  
 Thomas F. Osika, Valparaiso, and John A. Stuhlmacher, Crown Point, both of Ind., assignors to McGill Manufacturing Company, Inc., Valparaiso, Ind.  
 Continuation-in-part of Ser. No. 308,734, Feb. 9, 1989, which is a continuation-in-part of Ser. No. 114,129, Oct. 28, 1987, Pat. No. 4,870,230. This application Sep. 1, 1989, Ser. No. 401,944  
 Int. Cl.<sup>5</sup> H01H 3/20

U.S. Cl. 200—43.16

3 Claims

1. A safety switch comprising a body having a pair of spaced switch contacts each movable between first and second states, each of said contacts normally being disposed in said first state, a manually movable switch actuator having a neutral position in which said actuator leaves each of said contacts in said first state, said actuator being movable in one direction from said neutral position to a first actuated position in which the actuator changes one of said contacts from said first state to said second state, said actuator being movable in the opposite direction from said neutral position to a second actuated position in which the actuator changes the other of said contacts from said first state to said second state, a latch mounted on said actuator, said latch being movable with said actuator between said positions, said latch being movable in one direction relative to said actuator between a centered latched position and a first unlatched position and being movable in the opposite direction relative to said actuator from said latched position to a second unlatched position, means biasing said latch toward said latched position and away from each of said unlatched positions, said latch being positively engageable with said body when said latch is in said latched position and said actuator is

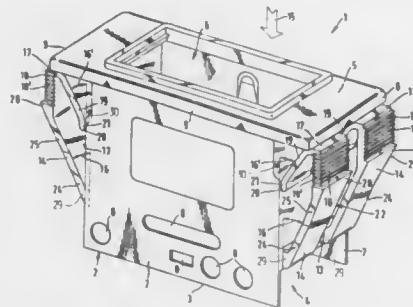
in said neutral position and acting to prevent movement of said actuator from said neutral position to either of said first and second actuated positions, and said latch being operable when in said first unlatched position to permit movement of said



actuator from said neutral position to said first actuated position and being operable when in said second unlatched position to permit movement of said actuator from said neutral position to said second actuated position.

**4,947,010**  
**ELECTRICAL EQUIPMENT HOUSING**  
Konrad Heydner, and Oswald Onderka, both of Altdorf, Fed. Rep. of Germany, assignors to Ellenberger & Poensgen GmbH, Altdorf, Fed. Rep. of Germany  
Filed Feb. 24, 1989, Ser. No. 314,805  
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 8802459[U]

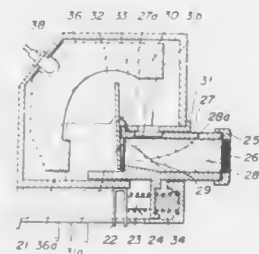
Int. Cl.<sup>5</sup> H01H 9/02  
U.S. Cl. 200—296 13 Claims



1. A housing for electrical equipment, for insertion into an installation opening of a switching panel, comprising:  
a housing body which can be pushed through the installation opening in an insertion direction;  
a covering wall connected to said housing body and extending generally transversely to the insertion direction, said covering wall including a collar which projects outwardly beyond the housing body in a direction which is transverse to the insertion direction, such that said collar limits insertion of said housing body into the installation opening;  
a plurality of lugs connected to said housing body; each of said lugs being resiliently biased toward an initial position relative to said housing body;  
said housing body having a pair of side walls, each of said

pair of side walls supporting an end of at least one corresponding one of said plurality of lugs at an acute angle thereto, said acute angle opening in a direction which is generally opposite to that of said insertion direction;  
each of said plurality of lugs having a free end extending to a location which is adjacent to said collar of said covering wall;  
each of said lugs having a toothed detent surface in the vicinity of the respective said free end for securing said housing body within the installation opening; and  
each of said plurality of lugs having a supporting bar connected to said free end, each said supporting bar having a supporting end, and each said supporting bar extending from said free end inwardly toward an adjacent one of said pair of side walls; each said supporting end being resiliently engageable with an adjacent one of said pair of side walls when said housing body is in the installed position; and wherein each of said supporting bars extend toward an adjacent one of said pair of side walls at an acute angle which opens in a direction which is generally opposite to the insertion direction.

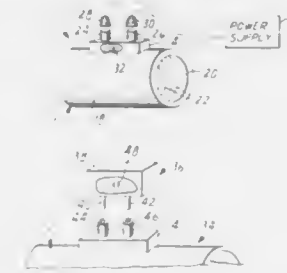
**4,947,011**  
**ILLUMINATED SWITCH DEVICE**  
Tsuyoshi Muranoi, and Akinori Ito, both of Furukawa, Japan, assignors to Ainos Electric Co., Ltd., Tokyo, Japan  
Filed Aug. 24, 1989, Ser. No. 398,107  
Claims priority, application Japan, Dec. 6, 1988, 63-158047[U]  
Int. Cl.<sup>5</sup> H01H 9/00  
U.S. Cl. 200—314 1 Claim



1. In an illuminated switch device having a case including a single light source and an operating knob provided with an indicator adapted to be illuminated in different selective colors by a light from said light source; the improvement comprising a light transmissive member fixed to said operating knob, means in said case for slidably mounting said operating knob therein, said operating knob having first and second openings at positions perpendicular to each other, a shutter rotatably supported to said case and adapted to selectively open and close said first and second openings by reciprocation of said operating knob, and transparent color filters having a light transmissivity provided in light paths passing through said first and second openings.

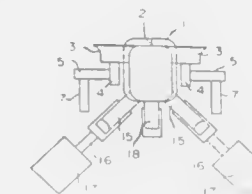
**4,947,012**  
**ELECTROFUSION MARKER**  
Joe T. Minarovic, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed May 19, 1989, Ser. No. 354,466  
Int. Cl.<sup>5</sup> H05B 3/58  
U.S. Cl. 219—535 15 Claims  
1. A device for coupling two elongated members and electronically marking the coupled joint, comprising:  
a hollow, thermoplastic fitting member having an inner wall; resistance means for heating said fitting member when said resistance means is connected to an external power sup-

ply, whereby said fitting member becomes fused around the elongated members; and



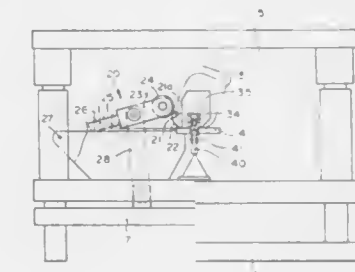
means connected to said resistance means for creating a resonant circuit.

**4,947,013**  
**APPARATUS FOR THE GUIDING OF CAN BODIES OF A NON-CIRCULAR CROSS-SECTION**  
Hans Rölli, St. Blaise, Switzerland, assignor to Fael S.A., Saint-Blaise, Switzerland  
Filed Apr. 5, 1989, Ser. No. 333,245  
Claims priority, application Switzerland, Apr. 29, 1988, 1614882  
Int. Cl.<sup>5</sup> B23K 11/00  
U.S. Cl. 219—64 7 Claims



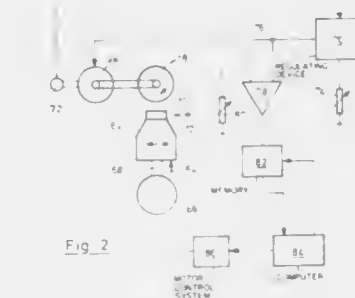
1. An apparatus for the guiding in a machine of can bodies having a non-circular cross-section and specifically a cross-section having rounded corners, which cross-section is variable in an axial direction of the can, in which machine longitudinal edges of can bodies which are fed by a feeding mechanism are interconnected at an end of a path of feed by producing a longitudinal seam during which the edges of the bodies are maintained by guiding members in an overlapping state as required for such longitudinal seam, said apparatus comprising respective pluralities of rollers located at each oppositely located rounded corner of a can body for supporting the can body symmetrically and operative for guiding the can body in an area of the machine at which the edges are to be welded together, each of which rollers are supported on roller supports movable toward and away from the can body axis, and force controlling means for providing a controllable force which can be kept at a constant value to maintain said rollers in a pressing position which is automatically adjustable laterally relative to the direction of feed to maintain a constant pressing force against the can body as the can body cross-section varies in the direction of feed.

**4,947,014**  
**METHOD AND APPARATUS FOR PRODUCING CAN BODIES OF A NON-CIRCULAR CROSS-SECTION**  
Hans Rölli, St. Blaise, and Jakob Müller, Enges, both of Switzerland, assignors to Fael S.A., Saint-Blaise, Switzerland  
Filed Oct. 19, 1988, Ser. No. 259,772  
Claims priority, application Switzerland, Oct. 22, 1987, 4138/87  
Int. Cl.<sup>5</sup> B23K 11/00  
U.S. Cl. 219—64 19 Claims



1. A method of producing can bodies of a non-circular cross-section from planar blanks of which the oppositely located edges of the blank will be interconnected in a longitudinal seam, said blanks having an outer contour corresponding to the can bodies to be produced and being deformed in a deforming station by means of bending tools for respectively producing a plurality of can body sidewalls such that the edges to be interconnected are positioned opposite each other, comprising the steps of moving the blanks stepwise by means of a conveying apparatus through said deforming station in which at least one bend of the blank is produced by a respective one of a set of a plurality of bending tools being arranged one after the other in the direction of movement of the conveying apparatus and working simultaneously stepwise during each stop interval of the conveying apparatus such that a plurality of sidewalls is consecutively produced on the same blank, and then conveying the deformed blanks by said conveying apparatus to a working station located after the deforming station for interconnecting free longitudinal edges of each deformed blank by producing a longitudinal seam.

**4,947,015**  
**PROCESS FOR THE CONTROL OF THE FEED MOTION AND TOUCH-ON MOTION OF A GRINDING WHEEL**  
Horst Lach, Dammstr. 6, D-6450 Hanau, Fed. Rep. of Germany  
Filed Aug. 24, 1988, Ser. No. 236,065  
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 3728390  
Int. Cl.<sup>5</sup> B23H 5/04  
U.S. Cl. 219—69.2 10 Claims



7. Device for controlling step-by-step feed motion of a

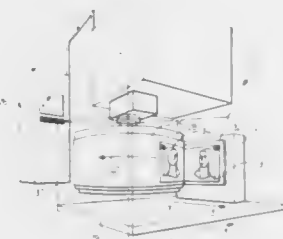


grinding tool which is moved backward and forward relative to a workpiece surface, and for controlling relative touch-on motion between the grinding tool and the workpiece or a measuring sensor, wherein for each backward and forward motion of the grinding tool a sequence of measured values of at least one mode of operating data of a rotary drive of the grinding tool is each time recorded, which values change with the friction torque acting upon the grinding tool, and a feed motion occurs as soon as all measured values in a sequence remain on that side of a limiting value on which a maximum friction torque assigned to this limiting value is not exceeded, and wherein during the touch-on motion, a sequence of measured values of at least one mode of operating data of the rotary drive of the grinding tool is recorded, which values change with the friction torque acting upon the grinding wheel, and the touch-on motion is terminated as soon as the measured values reach a limited value corresponding to a predetermined maximum friction torque, said device comprising a rotating drivable grinding tool, a rotary drive for the grinding tool, a workpiece chuck device, a controllable motion drive, including a stepping motor, for altering the relative position between grinding tool and workpiece, and a control circuit means for controlling the stepping motor during the touch-on and/or feed motion dependent upon a previously measured current supplied to, or the power consumption of, the rotary drive of the grinding tool.

**4,947,016**  
**METHOD AND APPARATUS FOR DUPLICATING STEEL**  
**INTAGLIO PRINT ELEMENTS USING**  
**ELECTRO-EROSION MACHINING**

Olivier Puyplat, Paris, France, assignor to Banque de France, Puteaux, France

Filed Dec. 20, 1988, Ser. No. 287,408  
Claims priority, application France, Dec. 21, 1987, 87 17815  
Int. Cl.<sup>5</sup> B23H 7/00, 9/06  
U.S. Cl. 219—69.17 13 Claims

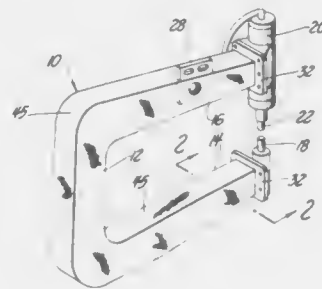


1. A method of duplicating steel intaglio print elements, the method comprising the following steps in succession:
  - (a) engraving a copper artmodel according to a desired print, but slightly deeper than required for obtaining said desired print;
  - (b) utilizing the engraved copper artmodel to produce a copper counterpart by electroforming;
  - (c) machining the face of the copper counterpart opposite to its engraved face to define a reference plane; and
  - (d) using the copper counterpart as an electrode in an electro-erosion machining bench in which a steel workpiece to be machined is disposed and presents a cylindrical side face whose axis is parallel to the reference plane, with machining taking place step by step over successive zones by virtue of relative displacements between said workpiece and said electrode during which said axis remains parallel to said reference plane, until intaglio print elements having the desired surface state are obtained.

**4,947,017**  
**COMPOSITE WELD GUN AND METHOD OF MAKING SAME**

Scott A. Beck, Fenton, and Harry E. Messerly, Grand Blanc, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 3, 1989, Ser. No. 331,719  
Int. Cl.<sup>5</sup> B23K 11/30  
U.S. Cl. 219—86.25 6 Claims

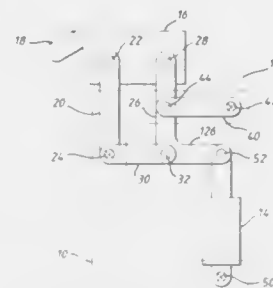


1. A weld gun having at least one structural element that is adapted to support a welding electrode, said element comprising:
  - a hollow core, and
  - a composite jacket on said core comprising at least one layer of carbon fabric, unidirectional carbon fibers in areas of tension or compression, an abrasion resistant outer fabric over the carbon covering, and a resin for binding the composite.

**4,947,018**  
**RETRACTING ROCKER UNIT**

William H. Cooley, 40 St. Nicholas Drive, Shepperton, Middlesex; Ralph Hart, 70 Great Tattenhams, Epsom Downs, Surrey, KT18 5SD, and Peter E. Harding, Ilfracombe, all of England, assignors to Harcross Engineering (Barnstaple) Limited, Devon; William H. Cooley, Middlesex and Ralph Hart, Surrey, all of, England

Filed Sep. 21, 1989, Ser. No. 410,642  
Claims priority, application United Kingdom, Sep. 27, 1988, 8822618  
Int. Cl.<sup>5</sup> B23K 11/30  
U.S. Cl. 219—86.25 7 Claims



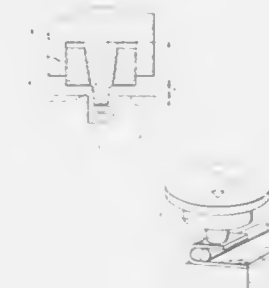
1. A rocker unit for moving a tool between two extreme positions, the tool having from either position an initial movement in one direction and a final movement in another direction at substantially right angles to said one direction, the rocker unit comprising:
  - a support having three fixed pivots,
  - a tool head having to pivot points thereon and having at one side thereof a tool,
  - a first support link extending between one of said pivot

points on the tool head adjacent the tool and one of said fixed pivots on the support,  
a second support link connected at one end to the other of said pivot points on the tool head,  
a first control link connected to said one fixed pivot on the support and to a pivot at the other end of the second support link,  
a second control link connected between a second of said fixed pivots on the support and a pivot intermediate the ends of the second support link,  
a power unit connected to the third of said fixed pivots on the support and with a link such that operation of the power unit from one of said extreme positions initially causes substantially axial movement of the second support link and rotation of the tool head about the one pivot point, the control links affecting subsequent movement of the second support link to cause the head to thereafter move bodily at substantially right angles to the initial axial movement.

**4,947,019**  
**COMPOSITE ELECTRODE FOR RESISTANCE WELDING**

Kazutoyo Akiyama; Takesi Kimura, both of Hekinan; Yoshiharu Terada, Okazaki; Hiromasa Hasegawa, Ageo; Naotake Okabe, Tokyo, and Hiroshi Yamaguchi, Higashi-Murayama, all of Japan, assignors to Nippondenso Co., Ltd, Kariya and Mitsui Mining & Smelting Co., Ltd., Tokyo, both of, Japan

Filed Dec. 23, 1988, Ser. No. 289,915  
Int. Cl.<sup>5</sup> B23K 9/24  
U.S. Cl. 219—119 8 Claims

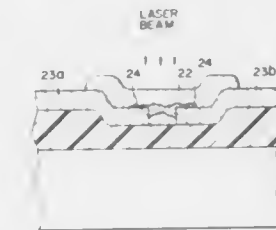


1. A composite electrode for resistance welding comprising an electrode made of a high-melting point metal or alloy, an electrode holder made of a copper alloy and an intermediate member made of a copper alloy, screw portions respectively formed in the periphery of said intermediate member and in said electrode holder so as to engage with each other, said intermediate member being screwed into said electrode holder by means of said screw portions so that said intermediate member is detachably mounted in said electrode holder, said electrode being made undetachable from said intermediate member by providing a tapered surface on said electrode so that its diameter increases toward the rear end of said electrode holder and providing a tapered surface on said intermediate member corresponding to said tapered surface of said electrode so that, when pressure is applied to said electrode, the contact between the end surface of said electrode and the opposing surface of said electrode holder bears welding loads and said tapered surfaces cause said end surface of said electrode to be pressed against the opposing surface of said electrode holder.

**4,947,020**  
**TRIMMING ELEMENT FOR MICROELECTRIC CIRCUIT**

Kaoru Imamura, Kawasaki, and Wataru Takahashi, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 18, 1989, Ser. No. 298,131  
Claims priority, application Japan, Jan. 20, 1988, 63-10293  
Int. Cl.<sup>5</sup> B23K 76/00  
U.S. Cl. 219—121.65 20 Claims



1. A trimming element comprising:
  - a first electrode formed of conductive material;
  - a second electrode formed of conductive material and disposed separately from said first electrode to face said first electrode;
  - a medium section formed partly in contact with said first and second electrodes and formed of material which creates a conductive alloy layer together with said conductive material when said medium section is heated, said first and second electrodes and said medium section being exposed such that a portion of said first and second electrodes and said medium section are adapted to directly receive a laser beam; and
  - supporting means for mechanically supporting said first and second electrodes and said medium section.

**4,947,021**  
**METHOD AND APPARATUS FOR TIG WELDING**

Elliott K. Stava, Brecksville, Ohio, assignor to The Lincoln Electric Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 138,854, Dec. 29, 1987, Pat. No. 4,861,965. This application May 30, 1989, Ser. No. 358,655  
Int. Cl.<sup>5</sup> B23K 9/09  
U.S. Cl. 219—130.51 33 Claims



1. In a device, driven by a direct current power supply having a positive output and negative output, for causing an alternating current to flow between the workpiece member and electrode member in an arc welding system, said device comprising: an inductive reactor having a tap, first and second opposite ends and a common core, means for connecting said tap to one of said members, means for connecting the other of said members to one of said power supply outputs, a first power switch, means for connecting said first power switch between

the first end of said reactor and one of said power supply outputs having a first polarity, a second power switch, means for connecting said second power switch between the second end of said reactor and the one of said power supply outputs having a second polarity, said switches each having a conductive state allowing flow of current through said reactor in a like direction from said positive output to said negative output, and a control means for said first and second switches, said control means including signal means for shifting between a first condition providing energy from said power supply to said reactor with said first switch in its conductive state and said second switch in its non-conductive state to pass current through said reactor between said first end and said tap to magnetize said core and a second condition supplying energy by said reactor with said second switch in its conductive state and said first switch in its non-conductive state to cause current flow through said reactor between said tap and said second end of said reactor as said common core is demagnetized, the improvement comprising: a power control switch means for controlling the input energy from said direct current power supply to said inductive reactance and between said workpiece member and said electrode member during said first condition, means for sensing an arc parameter during said first condition, means for comparing said sensed parameter to a reference signal to provide an error signal and means for adjusting said power control switch means in accordance with said error signal.

4,947,022

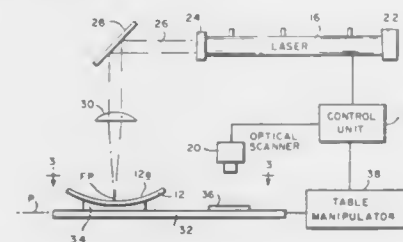
## LASER ENGRAVING METHOD

Melvin G. Ostroff, Gardner, and Steven K. Ostroff, Acton, both of Mass., assignors to Standard Chair of Gardner, Inc., Gardner, Mass.

Filed Aug. 4, 1989, Ser. No. 393,715  
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.68

6 Claims



1. An article of manufacture having a curved surface with a design laser engraved thereon, said design having varying line widths and depths resulting from a shifting of the focal point of the laser beam between positions above, at and below said surface.

4,947,023

## METHOD AND APPARATUS FOR ROLL DULLING BY PULSE LASER BEAM

Katsuhiko Minamida, and Junya Suehiro, both of Sagami, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan  
PCT No. PCT/JP88/00194, § 371 Date Oct. 18, 1988, § 102(e)  
Date Oct. 18, 1988, PCT Pub. No. WO88/06504, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 24, 1988, Ser. No. 305,121  
Claims priority, application Japan, Feb. 24, 1987, 62-40777; Feb. 24, 1987, 62-40778; Mar. 14, 1987, 62-59860; Dec. 11, 1987, 62-313620; Feb. 3, 1988, 63-22038

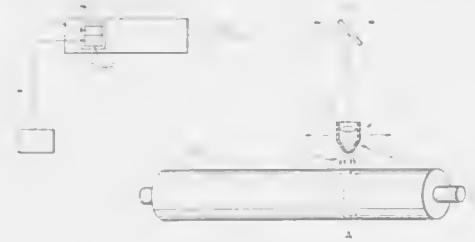
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.68

16 Claims

1. A method for roll-dulling by a pulse laser, in which a continuous wave solid state laser is changed to a pulsed laser by Q-switching, and the roll surface is dulled by said pulsed laser, said method being characterized in that when said pulse laser power is output the cavity loss of a laser oscillator during

a pulse off is decreased in accordance with a drop in a power output of a radio-frequency signal applied to a Q-switch and a surplus accumulation of excited molecules in the laser resonator.



4,947,024

## WELDING APPARATUS COATED WITH SPATTER-RESISTANT AND ELECTRICALLY CONDUCTIVE FILM

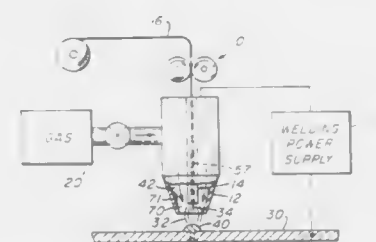
Stephen L. Anderson, Traverse City, Mich., assignor to Alcotec Wire Co., Traverse City, Mich.

Filed Sep. 11, 1989, Ser. No. 405,868

Int. Cl.<sup>5</sup> B23K 9/26

U.S. Cl. 219—137.61

24 Claims



1. A welding contact tip comprising:

(a) an elongated hollow metal body having an external surface, said body defining a longitudinal passageway extending between an electrode receiving end and an electrode discharge end spaced longitudinally from said receiving end, a portion of said body adjacent said passageway comprising an internal surface for guiding a wire electrode along the length thereof; and

(b) a coating on at least a portion of said external surface or said internal surface, said coating comprising a film of a spatter-resistant substance selected from the group consisting of sulfides, selenides, and carbides of tungsten, titanium, zirconium, tantalum, vanadium, chromium, and hafnium; and a metal selected from the group consisting of tungsten, molybdenum, nickel, osmium, platinum, palladium, and ruthenium.

4,947,025

## PORTABLE ELECTRIC WATER HEATER FOR OUTDOOR USE

Gregory A. Alston, 917 Tabb Lakes Dr., Tabb, Va. 23602, and Kirt R. Catron, 355 Old Quarry Way, Boiesel, Id. 83709

Filed Jun. 22, 1988, Ser. No. 210,316

Int. Cl.<sup>5</sup> H05B 1/02; F24H 1/06, 1/16; B05B 1/24

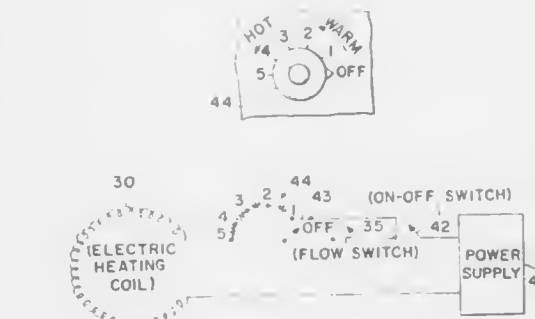
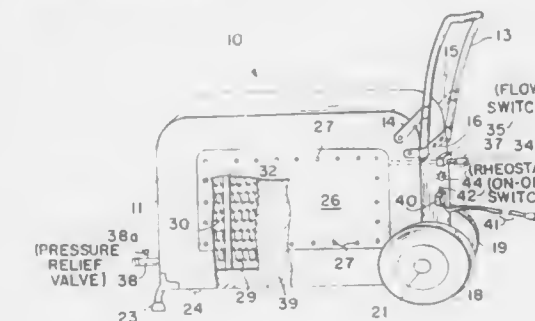
U.S. Cl. 219—303

8 Claims

1. A portable electric water heater comprising:

a housing;  
a coiled water conducting tube disposed within said housing;

electric heating means adapted to be connected through an on/off switch to an external power supply and contained within said housing;  
said heating means being disposed in heat exchange relationship with said coiled water conducting tube;  
water inlet means connected to one end of said coiled water conducting tube and extending through said housing to the exterior thereof;  
water outlet means connected to the other end of said coiled water conducting tube and also extending through said housing to the exterior thereof;  
said water outlet means extending from the bottom area of said coiled water conducting tube to facilitate draining the water from said coiled water conducting tube for storage of said heater;  
a rheostat for selectively varying the current supplied to said electric heating means to thereby regulate the temperature of the heated water flowing through said coiled water conducting tube;  
a pressure relief pop-off valve on said water outlet to relieve any excessive steam that might develop in said coiled water conducting tube;



thermal insulation means lining said housing and spaced from said coiled water conducting tube to insulate said housing from heat generated by said electric heating means;

said electric heating means including an electric circuit having an electrical conductor leading from said on/off switch and in direct connection with said rheostat means to engage the minimum current setting position of said rheostat means, a flow control switch disposed in series with said rheostat in said electric circuit, said electrical conductor being arranged to by-pass said flow control switch and permit minimum current flow through said electric circuit to effect preheating or warming of said water conducting coil when said flow switch is in the open position due to lack of water flow therethrough; means, including a handle, attached to said water heater to facilitate manual movement thereof; and  
at least one access door removably attached to said housing, said access door being of adequate size to permit installation and maintenance of said coiled water conducting tube and said electrical heating means.

4,947,026

## TOWEL HEATING AND MOISTENING

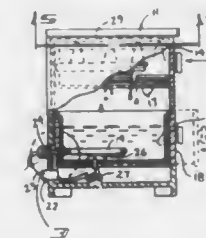
Raymond C. Groom, and Judy B. Groom, both of Rte. 2, Box 121, Piquette, Miss. 39466

Filed Apr. 17, 1989, Ser. No. 339,212

Int. Cl.<sup>5</sup> F22B 1/28

U.S. Cl. 219—401

3 Claims



1. A towel heating and moistening apparatus for heating and moistening towels wherein said apparatus comprises a cabinet structure including an upper first compartment member overlying a second compartment member, said first compartment member including a central through-extending cavity securing a tray therein, said tray including a matrix of apertures for support of said towels on said tray, said second compartment member including a water reservoir with a heating member extending into said reservoir to enable water contained within said reservoir to be heated into steam and directed through said matrix of apertures to heat and moisten said towels, and wherein said first compartment member and said second compartment member are slidably and reciprocally mounted within said cabinet structure, and wherein said second compartment member includes a heating member extending into said reservoir, and said heating member controlled by a thermostatic member, and wherein said second compartment member includes a lining of impermeable stainless steel material, and wherein said heating member further includes a plurality of legs extending rearwardly of said second compartment member and slidably receivable within a socket, said socket fixedly secured to a rear wall of said cabinet structure and wherein said socket enables selective communication of said legs with an electrical energy source, and further including a fluid pickup member extending through a floor of said second compartment member and said pickup secured to a flexible hose, said flexible hose directed rearwardly of said first and second compartment members between said first and second compartment members and the rear face of the cabinet structure and in fluid communication with a spray manifold.

4,947,027

## SYSTEM FOR IDENTIFYING AUTHORIZED USE OF CREDIT CARDS

Cecelia K. Golightly, 1382 Cherry Hill Rd., Mendota Heights, Minn. 55118

Filed Feb. 2, 1988, Ser. No. 151,427

Int. Cl.<sup>5</sup> G06L 7/04

U.S. Cl. 235—448

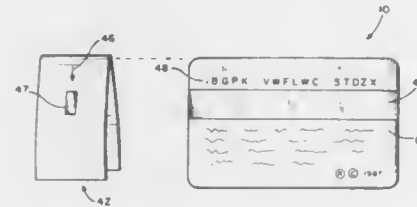
10 Claims

1. A system for indicating a bearer of a credit card as its authorized cardholder, the system comprising:

a plurality of credit cards issued to cardholders, each credit card being embossed with a first set of raised characters indicating an account number and a supplemental set of raised characters which have a one to one correspondence with each digit of the account number;  
an account data file for each account number comprising identification data with respect to a cardholder, the identification data being also known or determinable by the cardholder, the account number, a cardholder identification code comprising the account number, a character selected by the cardholder from the set of supplemental



characters and the digit in the account number corresponding to the selected character; and means for matching the account number appearing on a presented credit card with its respective account data file and for comparing a supplemental character identified



from the presented credit card by the bearer with the selected supplemental character appearing in the card-holder identification code; whereby a match indicates the bearer as being the card-holder and lack of a match indicates the bearer is not the cardholder.

4,947,028

## AUTOMATED ORDER AND PAYMENT SYSTEM

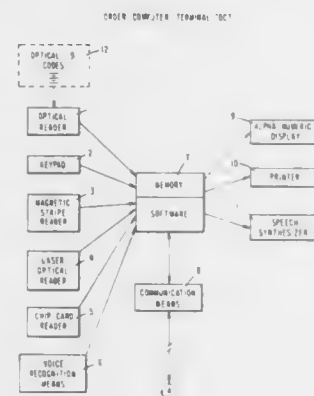
Jonathan M. Gorog, Falls Church, Va., assignor to Arbor International, Inc., Vienna, Va.

Filed Jul. 19, 1988, Ser. No. 221,536

Int. Cl.<sup>5</sup> G06F 1/08

U.S. Cl. 235—381

14 Claims



1. An automated order and payment system which comprises:

- A remote programmable data input/output means adapted to optically scan identification code information, and further adapted to accept credit card information obtained from the stored information on credit cards;
- A communication means integral to said remote programmable data input/output means;
- A memory means integral to such remote programmable data input/output and communication means that allows the storage of computer programs and information derived from printed or transmitted identification code information that has been optically scanned;
- A central data processing means with communications capability adapted to receive information from a plurality of remote programmable data input/output means; and
- Additional communication means allowing the remote data processing means to communicate with external data bases for credit authorization and product/service ordering purposes.

4,947,029

## CLEANING DEVICE FOR INFORMATION RECORDING MEDIUM

Hideo Kurihara, Tokyo; Kenichi Suzuki; Kazuo Minoura, both of Yokohama; Keiji Ohkoda, Tokyo; Hitoshi Kurihara, Yoril, and Yoshihiro Kurasawa, Ogano, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitama, both of Japan

Continuation of Ser. No. 923,034, Oct. 24, 1986, abandoned.

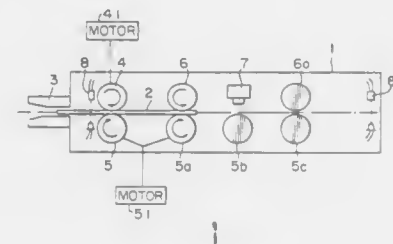
This application Sep. 19, 1989, Ser. No. 409,993

Claims priority, application Japan, Nov. 1, 1985, 60-244189; Nov. 1, 1985, 60-244190; Nov. 1, 1985, 60-244191; Nov. 5, 1985, 60-246286; Nov. 6, 1985, 60-247127; Nov. 7, 1985, 60-248122; Jun. 5, 1986, 60-129175

Int. Cl.<sup>5</sup> G11B 3/58; A46B 13/02

U.S. Cl. 235—475

32 Claims



1. A cleaning device for cleaning a recording surface of an information recording medium, comprising: a cleaning member having a cleaning surface adapted to be abutted against the recording surface; hold means for holding said cleaning member; drive means for moving the cleaning surface of said cleaning member; means for moving said cleaning member relative to the recording surface; and a brush abutting against the recording surface, wherein said brush comprises a conductive material and is grounded.

4,947,030

## ILLUMINATING OPTICAL DEVICE

Kazuhiro Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

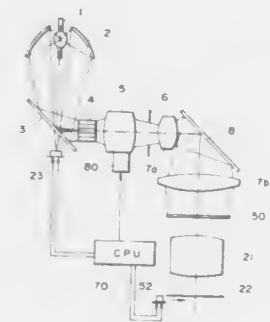
Continuation of Ser. No. 253,894, Oct. 5, 1988, abandoned, which is a continuation of Ser. No. 865,453, May 21, 1986, abandoned. This application Mar. 22, 1989, Ser. No. 326,439

Claims priority, application Japan, May 22, 1985, 60-108438; Sep. 2, 1985, 60-192094

Int. Cl.<sup>5</sup> F21V 7/08, 13/00; G02B 9/00

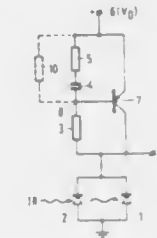
U.S. Cl. 250—201.1

31 Claims



19. An illumination optical device for illuminating a plane, said device comprising: a light source for emitting light;

an illumination optical system for irradiating the plane with the light from said light source, said illumination optical system having first and second movable lenses and an actuator for moving said first and second lenses to change an illuminance distribution on the plane while maintaining a focal length of said illumination optical system substantially constant.



has a second main electrode coupled to the node between the first resistor and the light-sensitive element.

4,947,031

## SAMPLING STREAK TUBE WITH ACCELERATING ELECTRODE PLATE HAVING AN OPENING

Musubu Koishi; Yutaka Tsuchiya; Katsuyuki Kinoshita, and Yoshinori Inagaki, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Dec. 29, 1988, Ser. No. 291,893

Int. Cl.<sup>5</sup> H01J 31/50

U.S. Cl. 250—213 VT

15 Claims

1. A sampling streak tube for use in an optical waveform observing apparatus in which a waveform of an incident light beam having a repetitive frequency is to be observed, the sampling streak tube comprising:

- a photocathode to which the incident light beam is applied to emit a corresponding electron beam;
- an accelerating electrode for accelerating said electron beam emitted by said photocathode, said accelerating electrode being in the form of a plate having an opening through which said electron beam passes;
- deflecting electrodes for deflecting in a predetermined direction said electron beam passed through said accelerating electrode;
- sampling means for sampling said electron beam while being deflected by said deflecting electrodes; and
- electron detecting means for detecting a sampled portion of said electron beam sampled by said sampling means.

4,947,032

## DETECTION CIRCUIT FOR A LIGHT-SENSITIVE ELEMENT WHICH IS SUBSTANTIALLY INSUSCEPTIBLE TO AMBIENT LIGHT LEVEL

Abraham Janssens, Breda, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Apr. 7, 1989, Ser. No. 334,962

Claims priority, application Netherlands, Apr. 13, 1988, 8800954

Int. Cl.<sup>5</sup> H01J 40/14

U.S. Cl. 250—214 B

5 Claims

1. A circuit for a light-sensitive element, comprising a first resistor arranged in series with the light-sensitive element between a first and a second point of constant potential, wherein the circuit further includes a transistor and a series arrangement of a second resistor and a capacitor, in that the end of the first resistor which is not connected to the light-sensitive element is coupled to the first point of constant potential via the series arrangement of the second resistor and the capacitor and the end of the first resistor which is not connected to the light sensitive element is also coupled to a control electrode

4,947,033

## VOLTAGE/FREQUENCY CONVERTER AND ITS USE IN AN OPTICAL WAVE GUIDE TRANSMISSION ARRANGEMENT

Jürgen Kordts, Norderstedt, and Gerald K. G. Finck, Bad Schwartau, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

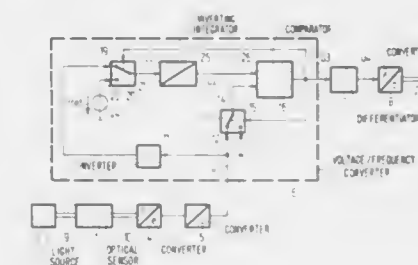
Filed Dec. 16, 1988, Ser. No. 286,574

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1988, 3800265

Int. Cl.<sup>5</sup> H01J 40/14

U.S. Cl. 250—214 R

6 Claims



1. Voltage/frequency converter with a first change-over switch (13) which supplies in its first position a measurement voltage and in its second position a reference voltage to a first input (15) of a comparison circuit (16), and with a second change-over switch (20) which supplies in its first position a first signal to be integrated and in its second position a second signal to be integrated via an integrator (22, 34) to the second input (26) of the comparison circuit which generates pulses dependent on the measurement voltage and which sets the two change-over switches into their first position when the voltage supplied by the integrator is equal to the reference voltage, and into their second position when the value supplied by the integrator is equal to the measurement voltage, characterized in that one of the signals to be integrated is derived from the measurement voltage.

4,947,034

## APERTURELESS NEAR FIELD OPTICAL MICROSCOPE

Hemantha K. Wickramasinghe, Chappaqua, and Clayton C. Williams, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1989, Ser. No. 344,621

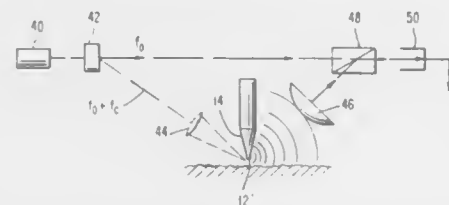
Int. Cl.<sup>5</sup> H01J 3/14

U.S. Cl. 250—216

25 Claims

1. An apertureless near field optical microscopy method of measuring the optical properties of a surface of a sample comprising the steps of: disposing a tip having an end in proximity to the sample surface;

applying a first dither motion at a first frequency for causing the tip and sample surface to undergo relative motion toward and away from each other in a direction substantially normal to the plane of the sample surface; applying simultaneously a second dither motion at a second frequency for causing the tip and sample surface to un-



dergo relative motion in a direction substantially parallel to the plane of the sample surface; illuminating the end of the tip with optical energy; and detecting the light scattered from the end of the tip and the sample surface at a frequency related to said first frequency and said second frequency for measuring optical properties of the sample surface.

4,947,035

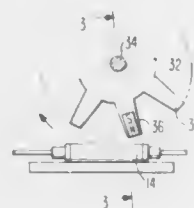
**FIBER OPTIC TRANSDUCER USING FARADAY EFFECT**  
Brian J. Zook; Clifford R. Pollock, and Jeffrey A. Morris, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Aug. 8, 1988, Ser. No. 229,317

Int. Cl.<sup>5</sup> G02F 1/01

U.S. Cl. 250—225

21 Claims



1. An optical transducer including:

a Faraday rotator material;

means directing linearly polarized light through said rotator material, said rotator producing a rotation in the angle of polarization of said light;

permanent magnet means adjacent said rotator material and located to produce a biasing magnetic field in said rotator material to bias the rotation of the angle of polarization of said light;

target means having a parameter to be monitored, said target means modulating said magnetic field in said rotator material to change the rotation of the angle of polarization of said light; and

means responsive to said change in the rotation of the angle of polarization to produce an output electrical signal corresponding to said target parameter.

4,947,036

**SELF-MONITORING OPTICAL SENSOR HAVING A RATIOMETRIC OUTPUT SIGNAL**

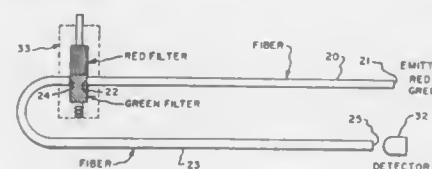
Joseph D. Pokorski, Depew; Geoffrey M. Rhodes, Orchard Park, and George W. Tregay, Amherst, all of N.Y., assignors to Conax Buffalo Corporation, Buffalo, N.Y.

Continuation-in-part of Ser. No. 915,115, Oct. 3, 1986, abandoned. This application Oct. 20, 1988, Ser. No. 240,600

Int. Cl.<sup>5</sup> G01J 3/50

U.S. Cl. 250—226.1

34 Claims



1. Fiber optic sensor apparatus, comprising:

light generating means for generating a first light having a spectral distribution centered at a first wavelength and for generating a second light having a spectral distribution centered at a second wavelength different from said first wavelength;

first optical transmission means for transmitting said first and second lights from said light generating means to a second location distant from the location of said light generating means;

transducer means operatively arranged at said second location to receive the lights transmitted by said first optical transmission means, said transducer means having a member mounted for movement within a range of movement and operatively arranged in the paths of said first and second lights, the position of said member being determined by the magnitude of a parameter to be measured, said transducer means being operable to modify the intensities of said first and second lights as a function of the position of said member in such a manner that the sum of such modified light intensities will be substantially constant throughout the range of movement of said member;

second optical transmission means for transmitting such modified first and second lights from said transducer means to a third location;

detecting means operatively arranged at said third location to measure the intensities of such modified first and second lights transmitted by said second optical transmission means and to generate signals as a function of such measured intensities; and

processing means operatively arranged to determine the optical continuity and sealed integrity of the optical path between said light generating means and said detector, and to indicate a fault in said path in the event of either a discontinuity in said path or the admission of extraneous light to said path.

4,947,037

**OPTICAL SENSING SYSTEM WITH LIGHT PULSES**

Philip J. Nash, Somerset, and Christopher Lamb, Dorset, both of England, assignors to Plessey Overseas Limited, Ilfrd-Essex, England

Filed Apr. 12, 1989, Ser. No. 337,088

Claims priority, application United Kingdom, Jun. 14, 1988, 8814067

Int. Cl.<sup>5</sup> H01J 5/16; G01B 9/02

U.S. Cl. 250—227.11

11 Claims

1. An optical sensing system comprising a light source coupled to a switching element and a plurality of optical sensors having a partially reflective discontinuity between adjacent sensors, the plurality of optical sensors being coupled to detector means, the switching element being arranged to provide, in operation, light pulse trains in succession in a defined time

spaced order, the time spaced order of light pulse trains being such that primary pulses in a primary light pulse train are provided at a primary time period spacing at least equivalent to twice an inherent transit time period of light pulses to the end of each contiguous length of optical sensors whilst at least one intermediate pulse in an intermediate light pulse train is provided at an intermediate time period with respect to primary



light pulses, the intermediate time period being equivalent to a fixed fraction of the primary time period plus an inherent transit time period for light pulses across one sensor wherein respective primary and intermediate light pulses are respectively spaced and have a pulse length such that interaction between a reflected light pulse from a primary light pulse and a reflected light pulse from an intermediate light pulse is prevented.

4,947,038

**PROCESS AND ARRANGEMENT FOR OPTICALLY MEASURING A PHYSICAL QUANTITY**

Albert Wiesmeier, Merkligen, and Manfred Griesinger, Leonberg, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 398,259

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3828651

Int. Cl.<sup>5</sup> H01J 5/16

U.S. Cl. 250—227.23

13 Claims



1. A process for measuring a physical quantity comprising the steps of:

(a) forming an effective light flux  $I_1$  having a spectral distribution  $S(\lambda)$  between wavelengths  $\lambda_1$  and  $\lambda_2$  and a reference light flux  $I_2$  having a spectral distribution  $R(\lambda)$  from an exit light flux having a wide-band spectral distribution  $E(\lambda)$  between wavelengths  $\lambda_{min}$  and  $\lambda_{max}$ , wherein  $\lambda_{min} < \lambda_1 < \lambda_2 < \lambda_{max}$ ;

(b) tuning the spectral distribution  $S(\lambda)$  of the effective light flux  $I_1$  and the spectral distribution  $R(\lambda)$  of the reference light flux  $I_2$  so that

$$\int_{\lambda_1}^{\lambda_2} \lambda \cdot S(\lambda) d\lambda \cdot \int_{\lambda_{min}}^{\lambda_{max}} R(\lambda) d\lambda = \int_{\lambda_1}^{\lambda_2} S(\lambda) d\lambda \cdot \int_{\lambda_{min}}^{\lambda_{max}} \lambda \cdot R(\lambda) d\lambda;$$

(c) impressing a power modulation on the effective light flux  $I_1$  in a monotonic relationship with changes in the physical quantity; and

(d) forming a ratio  $I_1/I_2$  of a luminous power of the effective light flux  $I_1$  to that of the reference light  $I_2$  to obtain the physical quantity.

4,947,039

**FLAT STATIONARY FIELD LIGHT BEAM SCANNING DEVICE**

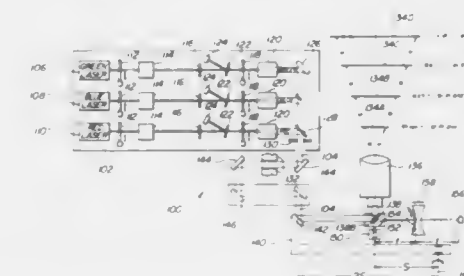
John A. Lawson; John C. Butler, both of Centerville; Richard Sutera, Dayton; Lawrence C. Calhoun, Lebanon; Danny Potts, Dayton; Larry E. Price, Kettering; Robert G. Wolfe, Xenia, all of Ohio; Joseph D. Knox, Westford, Mass., and Paavo Loosberg, Scarborough, Canada, assignors to Eotron Corporation, Dayton, Ohio

Filed Oct. 17, 1988, Ser. No. 258,649

Int. Cl.<sup>5</sup> H01J 3/14

U.S. Cl. 250—236

19 Claims



1. A light beam scanning device comprising:

first light source means for providing a scanning light beam; a flat stationary scanning surface to be scanned by said light beam;

lens means for focusing said light beam onto said flat stationary scanning surface;

galvanometer mirror means for repetitively scanning said light beam across said flat stationary scanning surface in a first fast scan direction; and

pivoting mirror means for receiving said light beam from said first light source means and scanning said light beam onto said galvanometer mirror means in a second slow scan direction perpendicular to said first fast scan direction to thereby raster scan said light beam onto said flat stationary scanning surface through said lens means, said pivoting mirror means comprising a pivot arm mounted for rotation about an axis through one end thereof and a scanning mirror fixedly mounted to an end of said pivot arm opposite to said one end, said pivot arm pivotally moving said scanning mirror about said axis to slow scan said light beam.

4,947,040

**THERMAL DECAY TIME LOGGING METHOD AND TOOL**

Mehrzad Mahdavi, and Shivakumar Sitaraman, both of Houston, Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Continuation of Ser. No. 380,694, Jul. 14, 1989, abandoned, which is a continuation of Ser. No. 915,301, Oct. 3, 1986, abandoned. This application Dec. 20, 1989, Ser. No. 455,807

Int. Cl.<sup>5</sup> G01V 5/10

U.S. Cl. 250—266

20 Claims

1. A borehole logging method for determining a characteristic representative of porosity of a formation surrounding the borehole, comprising the steps of:

(a) irradiating said formation surrounding the borehole from a location within the borehole with a burst of neutrons,

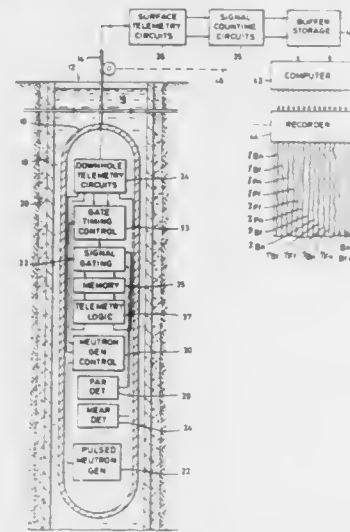
(b) detecting at a near detector indications of the concentration of the diffused thermal neutrons following said burst of neutrons and generating near count rate signals as a function of time in response thereto,

(c) detecting at a far detector indications of the concentration of the diffused thermal neutrons following said burst of neutrons and generating far count rate signals as a function of time in response thereto,

(d) subjecting said near count rate signals to a filtering pro-



cess to generate a near impulse count rate amplitude having a reduced dependency on the effects of diffusion, (e) subjecting said far count rate signals to a filtering process to generate a far impulse count rate amplitude having a reduced dependency on the effects of diffusion; and

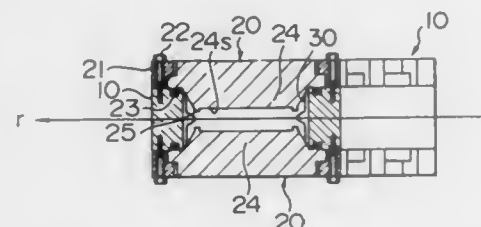


(f) determining the ratio of near to far count rate amplitudes as a characteristic proportional to the porosity of the formation.

4,947,041

**ANALYZER TUBE FOR MASS SPECTROMETRY**  
Shunroku Taya, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 19, 1988, Ser. No. 195,809  
Claims priority, application Japan, May 25, 1987, 62-127792  
Int. Cl.<sup>5</sup> H01J 49/30  
U.S. Cl. 250—298 4 Claims



1. An analyzer tube for mass spectrometry comprising: a body tube having a central axis, along which an accelerated ion beam runs and a part of which extends along an arc; a pair of windows provided in the respective opposite side walls of said body tube, said windows facing each other; and a pair of magnetic poles, each provided on a respective one of said windows to cover it, each of said magnetic poles projecting at one end portion thereof into an interior of said body tube though the respective one of said windows, the projecting end portion being so tapered that not only a cross sectional shape along said central axis, but also a cross-sectional shape along any direction perpendicular to said central axis presents an inverted trapezoid; wherein said analyzer tube has a configuration which enables an increase in exhaust conductance while substantially preventing generation of ion noise; and wherein said projecting end portions are provided at oppo-

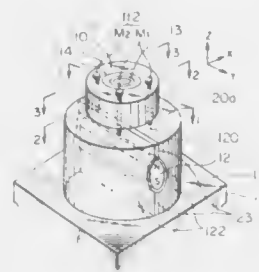
site side edge portions thereof with ridges extending parallel to said central axis.

4,947,042

**TUNNEL UNIT AND SCANNING HEAD FOR SCANNING TUNNELING MICROSCOPE**

Tadashi Nishioka, Takao Yasue, and Hiroshi Koyama, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 14, 1989, Ser. No. 366,175  
Claims priority, application Japan, Dec. 13, 1988, 63-312825; Mar. 13, 1989, 1-57809  
Int. Cl.<sup>5</sup> H01J 37/26  
U.S. Cl. 250—306 42 Claims



1. A tunnel unit for a scanning tunneling microscope comprising:  
a specimen stage having a plurality of pole pieces joined together via a joint member formed of a non-magnetic material, and a specimen placing surface where said plurality of pole pieces and said joint member are exposed;  
a permanent magnet rotatably inserted within said specimen stage where said plurality of pole pieces are joined;  
a scanning head disposed above said specimen placing surface of said specimen stage extending across said exposed joint member;  
a piezoelectric element fixed to said scanning head;  
a probe mounted on said piezoelectric element; and  
screw means formed of a magnetic material and rotatably engaging said scanning head, said screw means contacting said specimen placing surface of said specimen stage to support said scanning head above said specimen placing surface of said specimen stage.

4,947,043

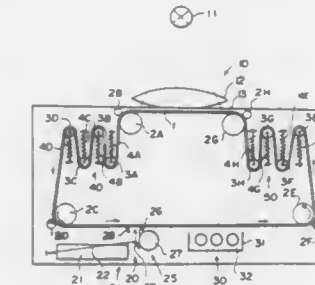
**RADIATION IMAGE RECORDING AND READ-OUT APPARATUS**

Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 26, 1988, Ser. No. 248,748  
Claims priority, application Japan, Sep. 25, 1987, 62-241395  
Int. Cl.<sup>5</sup> G03B 42/08  
U.S. Cl. 250—327.2 4 Claims

1. A radiation image recording and read-out apparatus comprising:  
(i) an endless belt provided with a stimutable phosphor layer,  
(ii) a conveyance means for conveying and circulating said endless belt applied around said conveyance means,  
(iii) an image recording section provided to face said endless belt for exposing said stimutable phosphor layer to a radiation carrying an image to have the radiation image stored on said stimutable phosphor layer,  
(iv) an image read-out section facing said endless belt and provided with a stimulating ray irradiation means for irradiating stimulating rays to said stimutable phosphor layer carrying said radiation image stored thereon, and a photoelectric read-out means for obtaining electric image signals by reading out light emitted by said stimutable phosphor layer in proportion to the stored radiation en-

ergy when said stimutable phosphor layer is exposed to the stimulating rays, and  
(v) an erasing section provided to face said endless belt for eliminating the radiation energy remaining on said stimutable phosphor layer prior to image recording on said



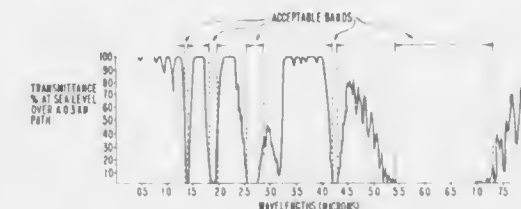
stimulable phosphor layer after the radiation image is read out therefrom at said image read-out section, wherein said conveyance means is provided with adjustment sections capable of variably adjusting a length of conveyance of said endless belt, said adjustment sections being provided at least at two positions.

4,947,044

**METHOD AND APPARATUS FOR COVERTLY VIEWING A TARGET USING INFRARED RADIATION**

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 20, 1989, Ser. No. 325,934  
Int. Cl.<sup>5</sup> G02F 1/25  
U.S. Cl. 250—330 9 Claims



1. A method for covertly viewing a target using transmission of infrared radiation through an atmosphere having given atmospheric conditions, comprising the steps of:  
illuminating a target with only a selected frequency band of infrared radiation having the least effective transmittance properties of all frequencies of infrared radiation in said given atmospheric conditions; and  
detecting reflection of said selected frequency band of infrared radiation from said target.

4,947,045

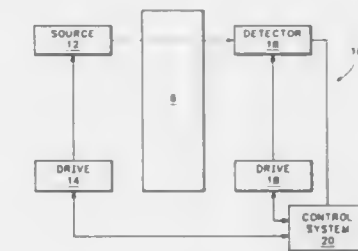
**SYSTEM FOR INSPECTING LARGE SIZE STRUCTURAL COMPONENTS**

Albert S. Birks, Columbus, Ohio, and James R. Skorpik, Kennewick, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Jan. 9, 1989, Ser. No. 294,785  
Int. Cl.<sup>5</sup> G01N 23/02  
U.S. Cl. 250—360.1 12 Claims

1. A system for use in conducting nondestructive testing of containment walls for the structural defects, said system comprising:  
(a) a mobile radiation source constructed and arranged for movement along one side of a containment wall;  
(b) a mobile radiation detector constructed and arranged for

movement along the other side of said wall on a path substantially parallel to said mobile source; and  
(c) a control unit operative for coordinating the movement of said source and detector so that said source and said



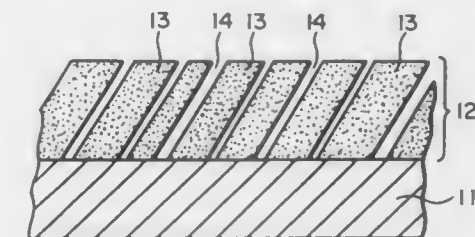
detector are advanced together and maintained in substantial alignment with one another, and for recording readings taken by said detector as a function of distance traveled by said source and detector along said wall.

4,947,046

**METHOD FOR PREPARATION OF RADIOGRAPHIC IMAGE CONVERSION PANEL AND RADIOGRAPHIC IMAGE CONVERSION PANEL THEREBY**

Katsuchi Kawabata, Yokohama, and Kuniaki Nakano, Hachioji, both of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,908  
Claims priority, application Japan, May 27, 1988, 63-129996  
Int. Cl.<sup>5</sup> G21K 4/00  
U.S. Cl. 250—484.1 20 Claims



6. A radiographic image conversion panel comprising a support and a layer of photostimulable phosphor formed thereon, said layer of photostimulable phosphor comprising separate, oblong, prismatic crystals formed at particular inclination with respect to the normal direction of the support.

4,947,047

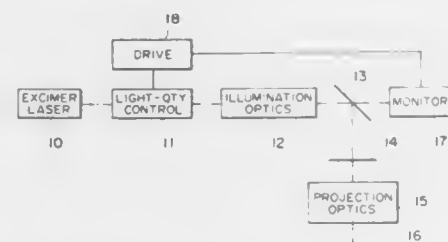
**EXPOSURE SYSTEM WITH EXPOSURE CONTROLLING ACOUSTOOPTIC ELEMENT**

Masato Muraki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1988, Ser. No. 151,550  
Claims priority, application Japan, Feb. 5, 1987, 62-25263  
Int. Cl.<sup>5</sup> G01J 1/32  
U.S. Cl. 250—492.2 19 Claims

3. An exposure system for optical lithography comprising:  
a pulsed laser for emitting a pulsed laser beam;  
an optical system for exposing a workpiece with a pulsed laser beam emitted from said pulsed laser for printing a circuit pattern on the workpiece, said optical system comprising an acoustooptic element for modulating the intensity of a received laser beam;  
a monitoring system comprising means for receiving a portion of the pulsed laser beam from said pulsed laser and for

monitoring the amount of exposure with respect to the workpiece; and



control means for controlling said acoustooptic element in accordance with the monitoring by said monitoring system.

4,947,048

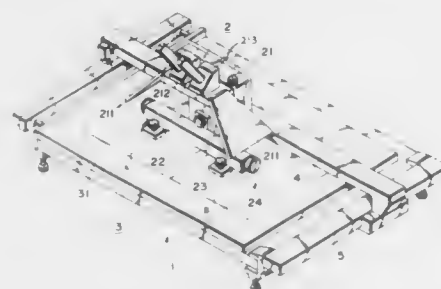
### STEREOSCOPIC PHOTOGRAPHIC MEASURING DEVICE

Shunji Murai, Hachio, and Akishige Shirasawa, Tokyo, both of Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan  
Filed Jun. 28, 1989, Ser. No. 372,608

Claims priority, application Japan, Jun. 29, 1988, 63-161895  
Int. Cl.<sup>5</sup> G01C 11/12

U.S. Cl. 250—558

3 Claims



1. A stereoscopic photographic measuring device, characterized in that it comprises a table for receiving a set of stereoscopic photographs thereon, and an optical system body constructed for movement in two-dimensional directions relative to said table, that said table has a plane coordinate reading means provided thereon for reading coordinates of the stereoscopic photographs while said optical system body has provided thereon a stereoscope unit for observing the stereoscopic photographs in a stereoscopic vision, first and second cursors disposed within a range wherein said first and second cursors can be observed by way of said stereoscope unit, and a distance adjusting means for adjusting a distance between said first and second cursors, and that said stereoscopic photographic measuring device further comprises a switch means for selectively changing over data read in by said first cursor and said plane coordinate reading means and data read in by said second cursor and said plane coordinate reading means and outputting the same to a data processing device.

4,947,049

### FILM HANDLING MEANS FOR A PHOTOGRAPHIC PRINTER

Richard J. Backus, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

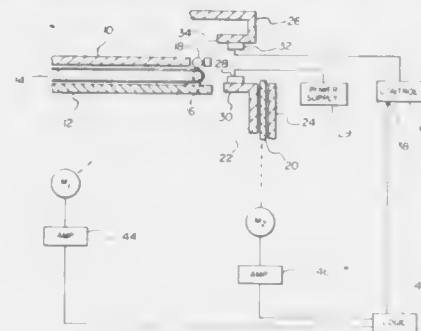
Filed Feb. 2, 1989, Ser. No. 305,830  
Int. Cl.<sup>5</sup> G01N 21/86; G01V 9/04

U.S. Cl. 250—561

9 Claims

1. Apparatus for receiving and handling a film strip having a predetermined maximum length, said apparatus comprising:

means defining a space for receiving the film strip;  
film transport means actuatable for moving the film strip into said space;  
means for detecting the insertion of the end of the film strip



into said space and for indicating the presence of a film strip of abnormal length in said space; and  
means for actuating said transport means to move the film strip into said space in response to detection of insertion of the end of said film strip into said space.

4,947,050

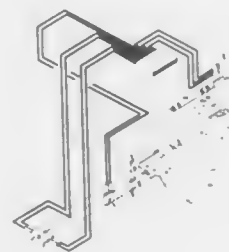
### SENSOR BRACKET FOR MAGNETIC TAPE CARTRIDGE DRIVE

Michael J. Kennedy, Los Gatos, Calif., assignor to Qincor Corporation, San Jose, Calif.

Filed Jul. 11, 1989, Ser. No. 379,241  
Int. Cl.<sup>5</sup> G06K 7/10

U.S. Cl. 250—570

3 Claims



1. A sensor bracket for a magnetic tape cartridge drive comprising:

a U-shaped bracket;  
first means located on said bracket for resiliently retaining means for sensing holes located in a tape in a tape cartridge inserted in said drive;  
second means located on said bracket for resiliently retaining means for sensing the condition of a write protect means located in said cartridge; and  
third means located on said bracket in a plane orthogonal to said first means for resiliently retaining a light source for operating said first means.

4,947,051

### STARTER PROTECTOR FOR AN ENGINE

Kyohei Yamamoto, and Akira Morishita, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

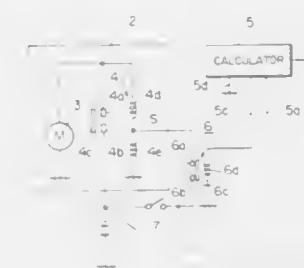
Filed Dec. 27, 1988, Ser. No. 289,894

Claims priority, application Japan, Jan. 22, 1988, 63-12897;  
Jan. 22, 1988, 63-7406

Int. Cl.<sup>5</sup> F02N 17/00

U.S. Cl. 290—38 R

6 Claims



1. A starter protector for an engine comprising:  
a switching circuit which is connected between a battery and a starter of an engine; and  
a calculating circuit which measures the frequency of ripples which are superimposed on a component of the flow of power to the starter from the battery and which controls said switching circuit so as to cut off the supply of power from the battery to the starter when the frequency of the ripples that are measured exceeds a prescribed value.

4,947,052

### COAXIAL ENGINE STARTER

Shuzoo Isozumi, Himeji City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

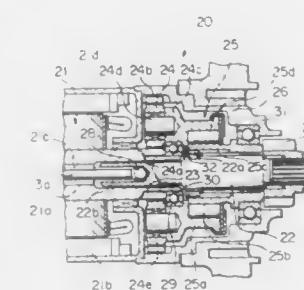
Filed Jan. 13, 1989, Ser. No. 296,660

Claims priority, application Japan, Jan. 13, 1988, 63-6122

Int. Cl.<sup>5</sup> F02N 15/00

U.S. Cl. 290—48

1 Claim



ing a clutch inner member including a front end surface which abuts against a rear end surface of said pinion when output rotary shaft is moved rearward;  
a bearing disposed at a small-diameter step portion formed adjacent to the front end of said sun gear in the outer peripheral portion of said armature rotary shaft and inserted into a clutch outer member; and  
a spacer portion interposed between the rear end surface of said clutch inner member of said over-running clutch and the side surface of said bearing for transmitting an axial impact applied to said clutch inner member also to said bearing.

4,947,053

### HIGH DC VOLTAGE POWER SUPPLY FOR MOTOR VEHICLE ELECTRICAL SYSTEM

Robert W. Campbell, Donald O. Raff, both of Anderson, Ind., and David W. Caldwell, Lapeer, Mich., assignors to General Motors Corporation, Detroit, Mich.

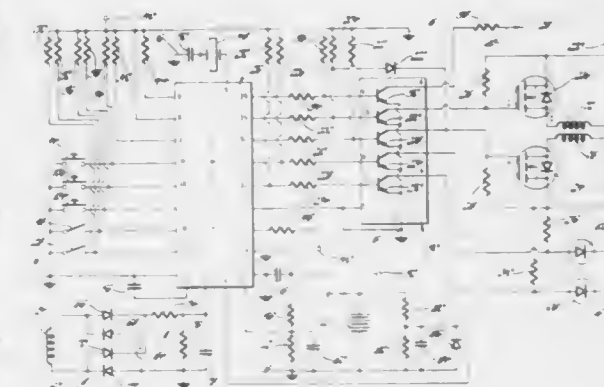
Continuation of Ser. No. 50,999, May 15, 1987, Pat. No. 4,780,619, which is a continuation-in-part of Ser. No. 897,023, Aug. 15, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 254,348

The portion of the term of this patent subsequent to Nov. 25, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> H02P 9/26

U.S. Cl. 307—10.1

5 Claims



1. For a motor vehicle electrical system of the type providing a low DC voltage with respect to ground and including a storage battery for providing standby power at the low DC voltage, a motor driven generator for producing a low three-phase AC voltage, and

a three-phase rectifier for converting the low three-phase AC voltage to the low DC voltage for charging the battery and supplying various low DC voltage loads, the combination comprising:

a three-phase autotransformer of the voltage step-up type for transforming the low three-phase AC voltage put out by the generator to provide a high three-phase AC voltage where the autotransformer is unrelated to the production of the low DC voltage;

a three-phase full-wave rectifier for rectifying the high three-phase AC voltage put out by the autotransformer to provide a high DC voltage; and

a high DC voltage load having a pair of ungrounded terminals across which the high DC voltage is applied such that with respect to ground the voltage at one terminal of the load is above ground and the voltage at the other terminal of the load is below ground thereby to reduce the voltage available for inadvertent discharge from either terminal of the load to ground by up to approximately one-half the voltage that would otherwise be available for inadvertent discharge from the ungrounded terminal of the load to ground if one terminal of the load was grounded.



4,947,054

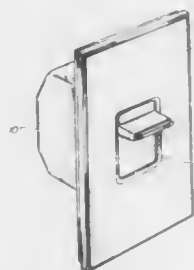
## SLIDING DIMMER SWITCH

Woodie Flowers, Weston, Mass., and Gary Bryde, Catasauqua, Pa., assignors to Lutro Electronics Co., Inc., Coopersburg, Pa.

Continuation-in-part of Ser. No. 225,974, Jul. 29, 1988, abandoned. This application Mar. 31, 1989, Ser. No. 332,254  
Int. Cl.<sup>5</sup> H01C 10/38; H05B 37/02

U.S. Cl. 307—125

48 Claims



1. A dimmer-and-switch system for controlling power to an electrical load, in which

- (a) said dimmer comprises a sliding member positionable linearly along a first direction for determining the power provided to said load,
- (b) said switch comprises a pushbutton-actuated switch and means for transmitting a force applied to said pushbutton to actuate said switch, and
- (c) said pushbutton moves with said sliding member along said first direction and is actuated by being pushed in a second direction, substantially normal to said first direction, whereby said force can actuate said switch regardless of the position of said sliding member.

4,947,055

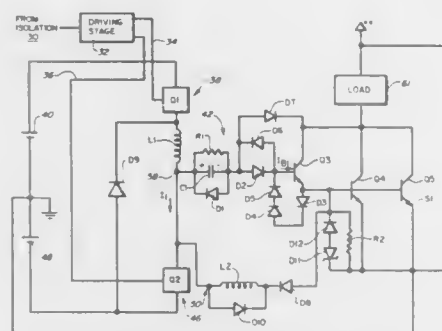
## BASE DRIVE CIRCUIT FOR DARLINGTON-CONNECTED TRANSISTORS

Sampat S. Shekhawat, and P. John Dhyanchand, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
Filed Jan. 13, 1989, Ser. No. 296,676

Int. Cl.<sup>5</sup> H03K 17/04, 17/60

U.S. Cl. 307—254

11 Claims



1. A drive circuit for rapidly switching driver and driven transistors each having a control electrode and a pair of main current electrodes and connected in a Darlington configuration whereby the control electrode of the driven transistor is coupled to one of the main current electrodes of the driver transistor and the other of the main current electrodes of the driver transistor is coupled to one of the main current electrodes of the driven transistor, comprising:

- a first controllable switch coupled to the control electrode of the driver transistor and operable to selectively apply a

first polarity voltage to the driver and driven transistors to turn on same;

an inductor coupled to the first controllable switch and the control electrode of the driver transistor;

a second controllable switch coupled to the control electrode of one of the driver and driven transistors and operable to selectively apply a second polarity voltage to the one transistor to turn off the driver and driven transistors;

means for controlling the controllable switches and operative at the beginning of a turn on sequence to close the controllable switches and thereby establish current flow through the inductor and operative following the beginning of the turn on sequence for opening the second controllable switch while maintaining the first switch closed so that the current flow through the inductor is provided to the driver transistor to turn on same.

4,947,056

## MOSFET FOR PRODUCING A CONSTANT VOLTAGE

Toshikatsu Jinbo, Tokyo, Japan, assignor to NEC Corporation, Japan

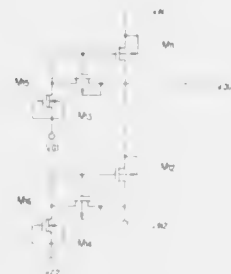
Filed Apr. 10, 1989, Ser. No. 335,933

Claims priority, application Japan, Apr. 12, 1988, 63-90518

Int. Cl.<sup>5</sup> H03K 3/01; G06G 7/10

U.S. Cl. 307—296.8

4 Claims



1. A circuit for producing a constant voltage: comprising, first and second MOSFETs connected in series and each having one conduction type;

bias means connected between gate and drain for each of said first and second MOSFETs; and

first and second voltage sources connected to said first and second MOSFETs, respectively;

wherein said bias means produces potential differences equal to threshold levels of a MOSFET, whereby a wide range of a stabilized output voltage is produced at a connecting point of said first and second MOSFETs.

4,947,057

## ADJUSTABLE TEMPERATURE VARIABLE OUTPUT SIGNAL CIRCUIT

Walter S. Czarnocki, Schaumburg; Peter W. Harper, Crystal Lake; Kevin S. Moran, Algonquin, and Steven W. Alexander, Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 94,953, Sep. 9, 1987, Pat. No. 4,854,167.

This application May 1, 1989, Ser. No. 345,815

Int. Cl.<sup>5</sup> H01L 27/16

U.S. Cl. 307—310

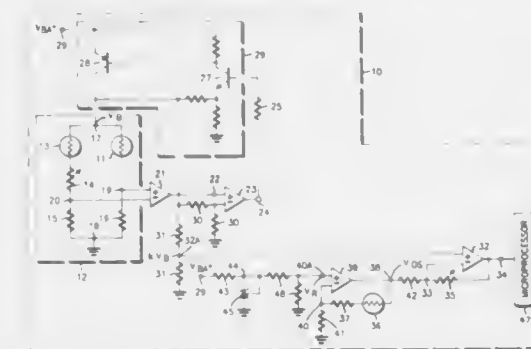
1 Claim

1. A method for adjusting a circuit for producing a desired temperature varying output signal having a predetermined DC offset, the circuit comprising:

- an amplifier having inverting and noninverting input terminals and an output terminal at which said output signal, related to the difference between signals at the input terminals, is provided;
- a fixed, substantially nontemperature varying, nonzero reference signal provided at one of the amplifier input terminals;

a temperature variable resistor and a first nontemperature variable resistor connected in series between another one of the amplifier input terminals and the amplifier output terminal; and

a second nontemperature variable resistor connected from said another one of said input terminals to a fixed reference potential, said first and second resistors being adjustable,



the method comprising:

first adjusting the magnitude of said second nontemperature variable resistor to adjust the amount of temperature variation of said output signal; and

then adjusting the magnitude of said first nontemperature variable resistor to adjust the DC offset of the output signal without affecting the previously adjusted temperature variation of the output signal.

4,947,058

## TTL CURRENT SINKING CIRCUIT WITH TRANSIENT PERFORMANCE ENHANCEMENT DURING OUTPUT TRANSITION FROM HIGH TO LOW

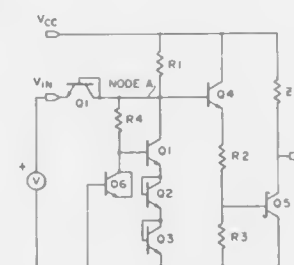
Roy L. Yarbrough, Hiram, and Julio R. Estrada, South Portland, both of Me., assignors to Fairchild Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 3, 1988, Ser. No. 202,237

Int. Cl.<sup>5</sup> H03K 17/16, 19/013

U.S. Cl. 307—443

16 Claims



1. In a TTL current sinking circuit having an output current sinking transistor means for sinking current from an output node, an input base drive transistor element coupled for driving the output current sinking transistor means in response to high and low level potential input signals at an input base node of the input base drive transistor element, and a voltage clamping network operatively coupled between the input base node and low potential for maintaining a clamping voltage level at the input base node, the improvement comprising:

transient voltage difference component means operatively coupled in series with the voltage clamping network, said transient voltage difference component means being coupled directly to the input base node and being constructed and arranged to add a transient potential difference to the voltage clamping network and transiently increase the

voltage at the input base node to a level above the clamping voltage level during transition from low to high level potential at the input base node for speeding up transition from high to low level potential at the output node.

4,947,059

## METHOD OF DIVIDING AN INPUT-OUTPUT LINE BY DECODING

Chang-Hyun Kim, Seoul, Rep. of Korea, assignor to Samsung Electronics Co. Ltd., Suwon, Rep. of Korea

Filed Feb. 1, 1989, Ser. No. 305,278

Claims priority, application Rep. of Korea, May 19, 1988, 88-5596[U]

Int. Cl.<sup>5</sup> H03K 19/096

U.S. Cl. 307—449

3 Claims



1. Apparatus for dividing an input/output line coupled to a sense amplifier which is driven by the status of a bit line pair connected to said sense amplifier, the apparatus comprising:

a sub-input/output line connected to said bit line pair through corresponding first MOS transistors; and

a main input/output line connected to output nodes of said sub input/output line through corresponding second MOS transistors.

4,947,060

## HIGH SPEED COMPLIMENTARY OUTPUT STAGE UTILIZING CURRENT STEERING TRANSISTORS AND A SINGLE CURRENT SOURCE

Barry A. Hoberman, Mountain View, and William E. Moss, Sunnyvale, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

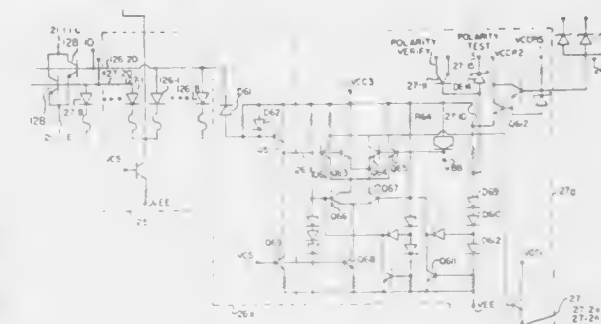
Division of Ser. No. 715,141, Mar. 22, 1985, Pat. No. 4,814,646.

This application Mar. 17, 1989, Ser. No. 325,402

Int. Cl.<sup>5</sup> H03K 19/086, 19/003

U.S. Cl. 307—467

2 Claims



1. An output stage for receiving an input signal and providing complementary output signals, comprising:

first and second power terminals for application therebetween of an operating potential;

an input terminal for receiving an input signal having first and second states;

a noninverting output terminal for providing a noninverted output signal;

an inverting output terminal for providing an inverted output signal;

a first output transistor having first and second electrodes defining the ends of its main conduction path, and a control electrode whose potential relative to said second electrode controls the conductivity of said transistor;

means coupling said first electrode of said first output transistor to said first power terminal;

means coupling said second electrode of said first output transistor to said noninverting output terminal;

a first current steering transistor having first and second electrodes defining the ends of its main conduction path, and a control electrode whose potential relative to said second electrode controls the conductivity of said transistor;

means coupling said first electrode of said first current steering transistor to said second electrode of said first output transistor;

a second output transistor having first and second electrodes defining the ends of its main conduction path, and a control electrode whose potential relative to said second electrode controls the conductivity of said transistor;

means coupling said first electrode of said second output transistor to said first power terminal;

means coupling said second electrode of said second output transistor to said inverting output terminal;

a second current steering transistor having first and second electrodes defining the ends of its main conduction path and a control electrode whose potential relative to said second electrode controls the conductivity of said transistor;

means coupling said first electrode of said second current steering transistor to said second electrode of said second output transistor;

means coupling in common said second electrode of said first current steering transistor and said second electrode of said second current steering transistor;

a current source, having first and second terminals, for providing pull down current to said first and second output transistors;

means coupling said first terminal of said current source to said commonly connected second electrodes of said current steering transistors;

means coupling said second terminal of said current source to said second power terminal; and

circuit means, coupled to said input terminal and to said control electrodes of said first and second current steering transistors, for turning on the one of said first and second current steering transistors which is coupled to the one of said inverting and noninverting output terminals which is undergoing a high voltage to low voltage transition and for turning off the other of said first and second current steering transistors in response to a change of state of an input signal received at said input terminal.

4,947,061

## CMOS TO ECL OUTPUT BUFFER CIRCUIT

Peter C. Metz, Emmaus, and Robert L. Pritchett, Bath, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 13, 1989, Ser. No. 310,407

Int. Cl.<sup>5</sup> H03K 19/092, 19/086, 19/003, 17/10

U.S. Cl. 307—475

10 Claims

1. An output buffer circuit comprising:

a first MOS transistor in a first branch of the circuit;

a second MOS transistor in a second branch of the circuit;

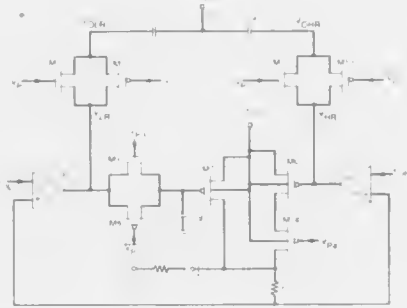
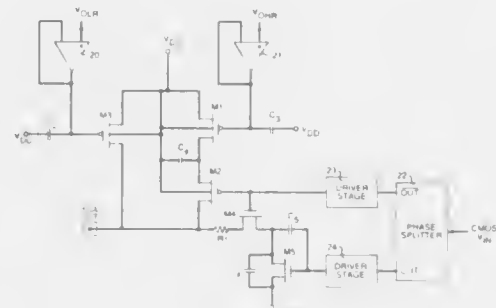
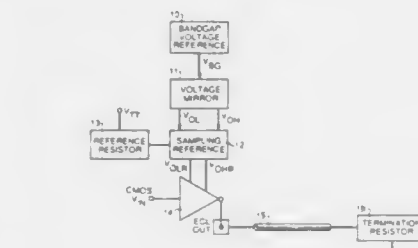
a third MOS transistor in said second branch of the circuit and coupled to turn on and off the current through said second branch;

the two branches being coupled in parallel so that the output voltage of the first branch when current in the second branch is turned off provides one voltage level for an emitter coupled logic circuit connected to the output of the branches, and the output voltage of the two branches when the current in the second branch is turned on pro-

vides another voltage level of the emitter coupled logic circuit connected to the output;

said transistors being integrated into a single semiconductor chip;

a resistor external to said chip of supplying reference voltages to said output buffer circuit; and



a reference circuit including feedback loops to separate operational amplifiers for establishing high and low reference voltages applied to the output buffer in accordance with voltages across said external resistor.

4,947,062

## DOUBLE BALANCED MIXING

Scott M. Weiner; Donald A. Neuf, both of Wantagh, and Steven J. Spohrer, Kings Park, all of N.Y., assignors to Adams Russell Electronics Co., Inc., Waltham, Mass.

Filed May 19, 1988, Ser. No. 196,040

Int. Cl.<sup>5</sup> G06G 7/00; H03B 19/00

U.S. Cl. 307—529

43 Claims

17. A double balanced mixer comprising

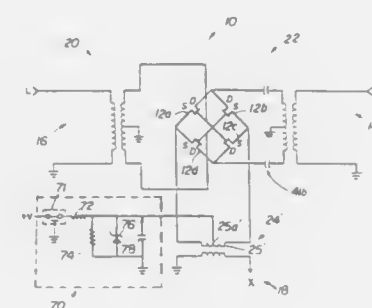
a plurality of transistors, each transistor being adapted to operate in the microwave frequency range and including an input electrode, a control electrode, and an output electrode, said plurality of transistors being arranged in a ring configuration with the control electrodes of a first

pair of said transistors being interconnected and the control electrodes of a second pair of said transistors being interconnected,

circuitry for coupling an input signal having a frequency within a predetermined frequency band in the microwave frequency range to the input electrode of said ring of transistors and for producing a 180° relative phase difference between the input signal applied to the input electrodes of first transistors of the first and second pairs of transistors and the input signal applied to the input electrodes of second transistors of the first and second pairs of transistors,

circuitry for coupling a local oscillator signal to the control electrodes of said ring of transistors and for producing a 180° relative phase difference between the local oscillator signal applied to the control electrodes of said first pair of transistors and the local oscillator signal applied to the control electrodes of said second pair of transistors,

circuitry for applying a predetermined electrical potential to at least one of the control, input, or output electrodes of each one of said transistors to bias the plurality of transistors in their linear operating regions, transistors, and



a local oscillator port adapted to receive the local oscillator signal as an unbalanced local oscillator signal,

said local oscillator signal coupling circuitry including circuitry for transforming the unbalanced local oscillator signal to a balanced signal and for coupling a first component of said balanced local oscillator signal to the control electrodes of said first pair of transistors and a second component of said balanced local oscillator signal, 180° out of phase with the first component, to the control electrodes of said second pair of transistors,

said transforming and coupling circuitry including circuitry for maintaining the 180° phase difference between the first and second local oscillator signal components over a predetermined local oscillator signal frequency band,

whereby said ring of transistors produces at said output electrodes an output signal having a frequency which is a function of the frequencies of the input signal and the local oscillator signal for input signals within the predetermined frequency band, and

circuitry for coupling said output signal from said output electrodes to an output port.

4,947,063

## METHOD AND APPARATUS FOR REDUCING TRANSIENT NOISE IN INTEGRATED CIRCUITS

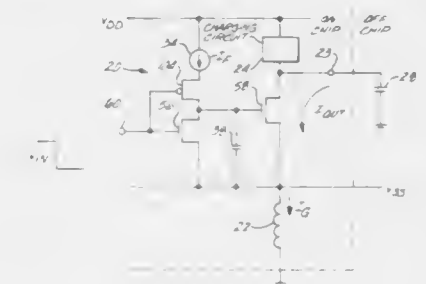
Timothy G. O'Shaughnessy, Norco; David K. Chung, Lake Elsinore; Richard W. Hull, Laguna Hills; Kenneth W. Ouyang, Huntington Beach; Victor G. Pierotti, Anaheim, and Joseph A. Souza, Costa Mesa, all of Calif., assignors to Western Digital Corporation, Irvine, Calif.

Continuation of Ser. No. 107,496, Oct. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 35,602, Apr. 7, 1987, abandoned, and Ser. No. 67,467, Jun. 26, 1987, abandoned. This application Feb. 26, 1988, Ser. No. 161,469

Int. Cl.<sup>5</sup> H03K 4/26, 5/01, 17/16

U.S. Cl. 307—572

85 Claims



1. A circuit for reducing the level of transient noise generated during switching at the output of an integrated circuit that drives a capacitive load, the circuit comprising:

output driver switch means turned on and off to charge and discharge the load to one of two binary voltage levels;

a package inductance in circuit between the load and a power supply potential external to the integrated circuit; and

means for controlling the current through the package inductance during operation of the switch means in ramp shaped fashion for the entire transition interval from one binary level to the other, in which the switch means and controlling means comprise a transconductance device having end terminals connected between the capacitive load and the package inductance, an input terminal responsive to voltage which controls the current through the transconductance device, a capacitor connected across the input terminal and one of the end terminals of the transconductance device, and a fixed current source for charging the capacitor.

4,947,064

## SEMICONDUCTOR DEVICE HAVING A TIME DELAY FUNCTION

Chang-Hyun Kim, Seoul, and Won-Tae Choi, Busan, both of Rep. of Korea, assignors to SamSung Electronic Co., Ltd., Suwon, Rep. of Korea

Filed Feb. 23, 1989, Ser. No. 313,893

Claims priority, application Rep. of Korea, Jun. 9, 1988, 1988-6916

Int. Cl.<sup>5</sup> H03K 19/094

U.S. Cl. 307—594

20 Claims

1. A semiconductor device having a time delay function comprising:

a first complementary metal-oxide-semiconductor (CMOS) inverter including a first P-channel transistor and a first N-channel transistor serially connected with said first P-channel transistor;

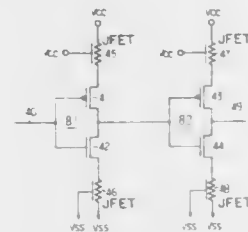
an input terminal connected to gates of said first P-channel and N-channel transistors and receiving an input signal;

a first voltage source terminal supplied with a positive power source;

a first junction field effect transistor (JFET) connected between a source of said first P-channel transistor and said



- first voltage source terminal, a gate of said first N-channel JFET being connected to said first voltage source terminal;
- a second voltage source terminal supplied with a reference power source;
- a second junction field effect transistor connected between a source of said first N-channel transistor and said second voltage source terminal, a gate of said second JFET being connected to said second voltage source terminal;
- a second complementary metal-oxide-semiconductor (CMOS) inverter including a second P-channel transistor and a second N-channel transistor serially connected to said second P-channel transistor;



- an output terminal connected to drains of said second P-channel and N-channel transistors and producing a predetermined time delay signal;
- a third junction field effect transistor connected between a source of said second P-channel transistor and said first voltage source terminal, a gate of said third JFET being connected to said first voltage source terminal; and
- a fourth junction field effect transistor connected between a source of said second N-channel transistor and said second voltage source terminal, wherein drains of said first P-channel and N-channel transistors are connected to gates of said second P-channel and N-channel transistors.

#### 4,947,065 STATOR ASSEMBLY FOR AN ALTERNATING CURRENT GENERATOR

Robert W. Ward, Robert E. Campbell, and William E. Boys, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 22, 1989, Ser. No. 410,782  
Int. Cl.<sup>5</sup> H02K 15/12

U.S. Cl. 310—44

4 Claims

1. A stator for an alternating current generator comprising, a one-piece molded stator core having an annular yoke portion and a plurality of integral circumferentially spaced and radially inwardly extending teeth, the spaces between the teeth defining circumferentially spaced slots, a stator coil winding carried by said core having conductor portions located in said slots, said core being molded and comprised of iron powder that has a particle size in a range of about 10 to 250 microns, said particles being bound together by a thin coating of thermoplastic

material that coats the particles and electrically insulates the particles from each other, said core by weight, having a range of iron powder of about 95 to 99.2 percent and a weight range of thermoplastic material of about 5 to 0.8 percent.

#### 4,947,066 HIGH SPEED VARIABLE RELUCTANCE MOTOR WITH EQUAL TOOTH RATIOS

Bogdan A. Ghibu, Fullerton, and Michael F. Bent, Monrovia, both of Calif., assignors to Servo Products Co., Pasadena, Calif.

Filed Nov. 1, 1988, Ser. No. 265,728  
Int. Cl.<sup>5</sup> H02K 37/04

U.S. Cl. 310—49 R

24 Claims



1. A variable reluctance motor with low torque ripple, suitable for operation as a servomotor, comprising:
- a stator having a body and a plurality of teeth formed on poles projected from the body;
- a rotor having a plurality of teeth and mounted for motion relative to the stator; and
- means for electromagnetically exciting the stator teeth to provide magnetic motive force to the rotor;
- wherein the rotor teeth and the stator poles are equally spaced, and a stator tooth ratio, being the ratio of the width of the tip of a stator tooth to the width of the gap between stator teeth, is substantially equal to a rotor tooth ratio, being the ratio of the width of the tip of a rotor tooth to the width of the gap between rotor teeth; and
- wherein the rotor tooth ratio is in the range of about 0.70 to about 0.90.

#### 4,947,067 VIBRATOR/DAMPENER HAVING MAGNETIC SUSPENSION AND SERVO-CONTROL ALONG THREE AXES

Helmuth Habermann, and Pierre Lemerle, both of Vernon, France, assignors to Societe de Mecanique Magnetique S.A., Saint-Marcel, France

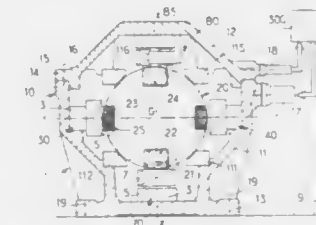
Filed Apr. 6, 1989, Ser. No. 335,099

Claims priority, application France, Apr. 20, 1988, 88 05242  
Int. Cl.<sup>5</sup> H02K 7/09; B06B 1/04; F16C 39/06; G05B 11/01  
U.S. Cl. 310—51

17 Claims

1. A combination vibration generator and dampener having magnetic suspension with servo-control along three axes, comprising: a hollow outer body fixed to a structure whose vibration is to be controlled; an inner body which is essentially spherical in shape and which is disposed inside the hollow outer body; six active magnetic bearing elements diametrically disposed in pairs on three axes XX', YY', ZZ' defining an orthogonal frame of reference and serving to hold the inner spherical body inside the hollow outer body without direct contact with the hollow outer body; at least three position detectors for detecting the position of the inner body relative

to the hollow outer body; at least one vibration detector device for detecting vibration forces on the structure whose vibration is to be controlled; and servo-control apparatus coupled to said at least three position detectors and said at least one vibration detector device, for receiving information from the position detectors and from the vibration detector device and controlling the supply of power to the six active magnetic bearing elements in order to control the movement of the inner body in such a manner as to either set up reaction forces on the outer body tending to generate vibration in the structure or to cancel vibration forces detected on the structure, depending on requirements.



#### 4,947,068 MOTOR FOR WHIRLPOOL BATHS

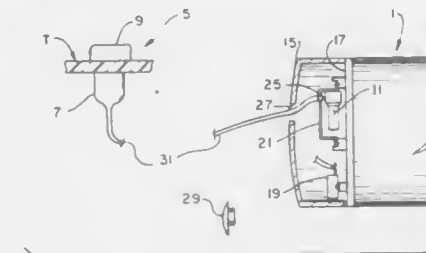
Dennis Howard, and Raymond D. Heilman, both of Florissant, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Mar. 30, 1989, Ser. No. 331,619

Int. Cl.<sup>5</sup> H02K 11/00; H02J 1/00

U.S. Cl. 310—71

2 Claims



1. A dynamoelectric machine for driving a water pump used with a whirlpool bath to inject water, under pressure, into the bath, the machine having a housing including an end shield, windings comprising a stator and electrical terminals for interconnecting the windings with an external power source, and the whirlpool bath including an air activated on/off switch for energizing the dynamoelectric machine, a manually operable plunger proximally located to the bath and tubing extending between the plunger and the switch to transmit air pressure changes from the plunger to the switch to operate the switch, means for selectively interconnecting said on/off switch with said dynamoelectric machine, the housing having a detachable cover for exposing the end shield, and said interconnecting means including a bracket for attaching a switch element of the electric switch adjacent to the end shield when the cover is removed, means for admitting the tubing into the housing for interconnection with the switch element, said cover having an opening therein and the admitting means including a plug for the opening, said plug normally closing the opening but being removable to allow the tubing to be inserted through the opening and connected to the switch element, and jumper means for changing electrical connections inside the housing between the stator windings and the external power source to accommodate the on/off switch in the circuit formed by the windings and the external power source, the jumper means including jumper wires interconnecting electrical terminals within the housing by which a circuit is formed between the stator wind-

ings and the external power source, said jumpers being routeable to reconfigure the circuit to include the switch element.

#### 4,947,069 LOW POWER MAGNETIC TAPE REEL MOTOR AND BRAKE ASSEMBLY

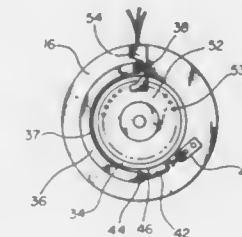
Frederic F. Grant, Bellflower, Calif., assignor to Datatape, Inc., Pasadena, Calif.

Filed Jun. 8, 1989, Ser. No. 364,047

Int. Cl.<sup>5</sup> H02K 7/10

U.S. Cl. 310—77

3 Claims



1. In a web handling apparatus, a low power motor and brake assembly comprising:

- a motor including a motor housing, a motor shaft rotatably mounted by said motor housing, a rotor fixedly mounted on said shaft and a stator rotatably mounted relative to said rotor; wherein said rotor and stator are enclosed by said motor housing;
- a brake including a brake drum fixedly mounted on an extension of said shaft external to said motor housing and a brake band normally biased into engagement with said drum; said brake band being pivotably mounted at one end on said motor housing by a pivot member and at said band's other end by means of a spring; and
- a linkage connected between said stator and said brake band, and extending through an arcuate slot in said motor housing such that when electrical power is applied to said stator, a reactive force, between said rotor and said stator, causes said stator to rotate relative to said rotor, thereby causing said linkage to disengage said brake band from said brake drum.

#### 4,947,070 CONTROL APPARATUS

Grayham Hill, and Philip Tittler, both of Preston, England, assignors to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 53,546, May 26, 1987, abandoned, and Ser. No. 850,433, Apr. 8, 1986, abandoned, and Ser. No. 638,774, Aug. 8, 1984, abandoned. This application Jun. 24, 1988, Ser. No. 212,082

Claims priority, application United Kingdom, Aug. 9, 1983, 8321376

Int. Cl.<sup>5</sup> H02K 7/06; G05G 1/00

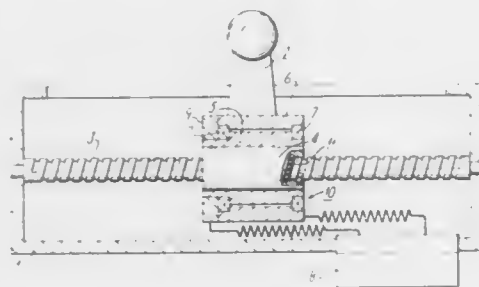
U.S. Cl. 310—80

5 Claims

1. Control apparatus for enabling, in a manual control mode, an operator, and in an automatic control mode, an automatic control system, to control associated apparatus to which, in use, the control apparatus is connected, comprising:

- a support member,
- a lead-screw fixedly attached to said support member,
- a drive assembly including a rotary stepper motor having a rotor fixed to a ball-nut engaged upon the lead-screw and forming a recirculating ball-screw assembly therewith and a stator fixed to a hand control member,
- output means coupled to the drive assembly indicative of the position of the drive assembly relative to the lead-screw, and,
- motor energization means connected to said motor for selecting the position of the drive assembly relative to the lead-screw, and,

tively energizing windings thereof, said control apparatus being arranged so that in the manual mode in use the drive assembly is moveable axially with respect to the lead-screw by means of the hand control member resulting in corresponding rotation of the rotor and ball-nut with respect to the stator and lead-screw respectively whereupon the windings of the motor are so energized by the motor energization means that said rotation is selectively



opposed to provide the operator with a feeling of resistance to movement of the hand control member, and so that in use in the automobile mode the drive assembly is moveable axially with respect to the lead-screw in response to energization of the windings of the motor by the motor energization means with corresponding rotation of the rotor and ball-nut with respect to the stator and lead screw respectively.

4,947,071

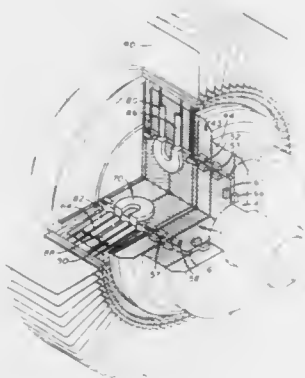
**HIGH SPEED DC MOTOR**

Craig Clarke, P.O. Box 505, Twenty-Nine Palms, Calif. 92277  
Continuation-in-part of Ser. No. 10,003, Feb. 2, 1987,  
abandoned. This application Jan. 30, 1988, Ser. No. 154,334

Int. Cl.<sup>5</sup> H02K 31/00

U.S. Cl. 310—177

27 Claims

**1. A DC motor comprising:**

- a stator having a central rotor cavity and containing a stator set of electromagnets facing inward in a circumferential path about the rotor cavity;
- a rotor rotatably mounted in the central rotor cavity, the rotor having a rotor set of magnets, each magnet of the rotor set of magnets having at least one pole facing outward in a circumferential path about the periphery of the rotor and aligned with the electromagnets of the stator sets of electromagnet;
- a source of current to each electromagnet of the stator set of electromagnets;
- rotor position sensing means for each electromagnet of the stator set of electromagnets for sensing the position of

points on the rotor with regard to corresponding points on the stator; and

- switching means between the source of current and each electromagnet of the stator set of electromagnets and operably connected to a corresponding rotor position sensing means for alternatively controlling current to selected electromagnets, the switching means energizing the electromagnets to be of a pole to attract the pole of the magnets of the rotor set of magnet when the magnets of the rotor set of magnets approach the electromagnet and energizing the electromagnets to be of a pole to repel the pole of the magnets of the rotor set of magnets when the magnets of the rotor set of magnets recedes from the electromagnets as the rotor rotates.

4,947,072

**STATOR WINDING FOR TWO-POLE DYNAMOELECTRIC INDUCTION MACHINES**  
William J. Watkins, and Randal A. Oyster, both of Troy, Ohio,  
assignors to A.O. Smith Corporation, Milwaukee, Wis.

Filed Oct. 21, 1988, Ser. No. 260,595

Int. Cl.<sup>5</sup> H02K 3/00, 1/00; H02P 1/32

U.S. Cl. 310—179

5 Claims



1. A two pole polyphase dynamoelectric machine, comprising a polyphase multi-layered winding including a separate phase winding for each phase, each phase winding having a pair of series connected coil units wound and connected to form two poles for said phase, each coil unit being wound and connected as essentially an effective full pitch winding, and switch means connected to said windings and having a first state connecting said winding with one coil unit of one phase connected with a coil unit of a different phase in a start connection for starting the dynamoelectric machine and a second state connecting the coil units in each phase in parallel to establish a double delta connection for running of the dynamoelectric machine after said starting, control means actuating the switch means to said first state for establishing said start connection and actuating the switch means to establish said second state, and said coil units being wound as a concentric winding and with the coils of said units wound and connected to function as a full pitch winding.

4,947,073

**SAW CHANNELIZED FILTERS**

Robert B. Stokes, Torrance; Kuo-Hsiung Yen, Manhattan Beach, and Kei-Fung Lau, Harbor City, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Feb. 4, 1988, Ser. No. 152,127

Int. Cl.<sup>5</sup> H01L 41/04

U.S. Cl. 310—313 R

8 Claims

1. A surface acoustic wave (SAW) channelizer with narrow-band frequency response, comprising:  
a SAW channelizer having a substrate, a wide-band input transducer array for receiving an input signal and an output transducer array for providing a plurality of narrowband output signals derived from the input signal; and  
an in-line SAW device for preprocessing the input signal before coupling to the channelizer, to provide a desired narrowband frequency response, the in-line SAW device being a tapped delay line, providing signals that are phase-

shifted by selected amounts to simulate operation of the channelizer in a higher diffraction order, and therefore with greater frequency discrimination, without the need for large input transducer offsets in the channelizer; and wherein

the tapped delay line provides a plurality of outputs hav-



ing incremental phase differences corresponding to a fixed number of wavelengths at a nominal or center frequency of the device, the input transducers of the channelizer are located on the arc of a circle, and the output transducers are located on an arc passing through the center of the circle.

4,947,074

**PIEZOELECTRIC ELEMENT DRIVE CIRCUIT**

Masashi Suzuki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 120,400, Nov. 13, 1987, abandoned.

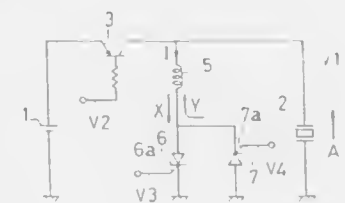
This application Nov. 27, 1989, Ser. No. 443,091

Claims priority, application Japan, Nov. 15, 1986, 61-272335; Nov. 20, 1986, 61-277946

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—316

13 Claims



1. A drive circuit for a piezoelectric element comprising:  
a first external signal source;

a charge circuit including a direct-current power source, a switching means, and a piezoelectric element connected in series for charging the piezoelectric element in response to a signal from said first external signal source so as to operate said piezoelectric element and to produce a first polarity in said piezoelectric element with a high potential side and a low potential side;

an inductor, one end of which is connected at the connecting point of said switching element and said piezoelectric element, forming a resonant circuit with said piezoelectric element;

a switching circuit connected between the other end of said inductor and the connecting point of said direct-current power source and said piezoelectric element;

a second external signal source connected to said switching circuit, said switching circuit allowing a current flow in only one direction selected in response to a signal from said second external signal source so as to transfer the charge supplied by said drive circuit and stored in said

piezoelectric element so that said piezoelectric element is charged to an opposite polarity to said first polarity; and, a third external signal source connected to said switching circuit, said switching circuit allowing a current flow only in a direction opposite to said one direction in response to a signal from said third external signal source so as to reversely transfer the charge on said piezoelectric element so that said piezoelectric element is again operated and charged in said first polarity.

4,947,075

**PIEZOELECTRIC INSERT WITH SIDE ELECTRIC CONNECTION CLIPS**

Bernard Maury, Jean-Claude Walter, Christian Cognasse, and Peter Graham, all of Bonneville, France, assignors to Horlogerie Photographique Francaise Societe anonyme, Bonneville, France

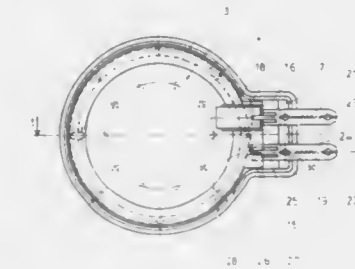
Filed Mar. 23, 1989, Ser. No. 327,768

Claims priority, application France, Apr. 1, 1988, 88 04732

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—324

5 Claims



1. Electroacoustic insert with piezoelectric membrane, whose vibrating element is formed of a membrane which has a piezoelectric material layer with electrodes and is held in position at its periphery in an insert case, the case comprising a base body with a central cavity whose periphery forms a bearing surface for the membrane periphery, the case further comprising a cover connected by its periphery to the base body with an internal recess communicating with the outside through at least one orifice, the periphery of the cover comprising an inner annular relief bearing on the membrane periphery and holding it applied against the periphery of the cavity of the base body, electric conductors providing the electric connection between the electrodes of the membrane and output terminals of the insert, the membrane comprising at least one peripheral radial excrescence zone, off-centered radially and projecting from the zone defined by the bearing surfaces of the membrane in the insert case, surface conducting elements insulated from each other and in contact with their corresponding electrode connecting their corresponding electrode and said radial excrescence together, wherein:

said radial excrescence is housed inside the case in respective excrescences of the case portions,

at least two clip shaped connectors each comprising at least one upper leg and at least one lower leg, are in resilient abutment with their upper leg bearing on the upper face of said membrane and with their lower leg bearing on the lower face of said membrane, in the radial excrescence zone of the membrane,

said connectors being respectively in contact with the corresponding end of respective conducting surface elements for providing electric connection of the electrodes, said connectors are held in position in the case and each comprises an external tongue forming a terminal for connection of the insert and an internal portion in the form of a clip, wherein the clips of the connectors are urged by the insert case, the case body and the cover tending to close up the clip legs towards each other during assembly of the insert.



4,947,076

## PIEZO ELECTRIC MOTOR

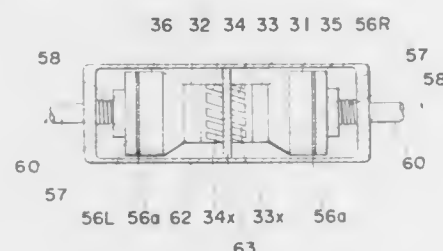
Akio Kumada, Tokyo, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan  
Continuation of Ser. No. 168,575, Mar. 7, 1988, abandoned, which is a continuation of Ser. No. 910,264, Sep. 19, 1986, abandoned, which is a continuation of Ser. No. 650,458, Sep. 14, 1984, abandoned. This application Dec. 16, 1988, Ser. No. 285,394

Claims priority, application Japan, Sep. 16, 1983, 58-169364; Sep. 16, 1983, 58-169366

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—323

7 Claims



1. A piezoelectric motor comprising movable means having a first flat surface, vibration means formed by the combination of at least one bendable, twisting vibration member and at least one piezoelectric element acting to longitudinally vibrate through expansion and compression, said twisting vibration member having a plurality of vanes slantingly extending toward a supporting member so that said twisting vibration member is vibrated in a bending and twisting manner with the same frequency as the frequency of the vibration of said piezoelectric element, said vibration means having a second flat surface which vibrates spirally as the resultant motion between the twisting vibration of the twisting vibration member and expansion-compression vibration of said piezoelectric element and which surface is adapted to abut with the first flat surface so that the movable means can be driven by the spiral mode vibration of the second flat surface due to face-to-face contact between the first flat surface and the second flat surface, said movable means being a rotor supported on a shaft on which a coil spring is mounted for adjusting the contacting force of the rotor with the vibration means.

4,947,077

## DRIVE APPARATUS AND MOTOR UNIT USING THE SAME

Takeo Murata, Yokohama, Japan, assignor to JGC Corporation, Tokyo, Japan  
PCT No. PCT/JP87/00576, § 371 Date Jul. 29, 1988, § 102(e) Date Jul. 29, 1988, PCT Pub. No. WO88/04492, PCT Pub. Date Jul. 16, 1988

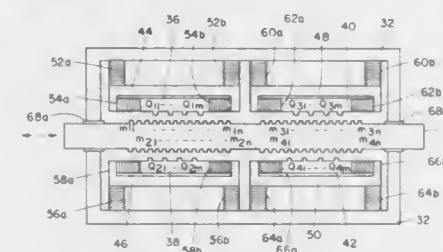
PCT Filed Jul. 31, 1987, Ser. No. 249,186

Claims priority, application Japan, Dec. 3, 1986, 61-286756; Dec. 12, 1986, 61-295044

Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—328

20 Claims



1. A motor unit which consists of: a moving part having a plurality of magnetic heads of multipole structure disposed

along a moving direction thereof at respective predetermined intervals; a stator having a plurality of drive apparatuses which are disposed at respective prearranged intervals along the moving direction of said moving part to oppose said magnetic heads in a non-contact manner and which are provided with magnetic heads of a multipole structure opposing the moving part so as to drive said moving part; each of said drive apparatuses having two multilayer type piezoelectric actuators, having respective moving directions, said moving directions being perpendicular to each other and being driven by respective alternating current signals in synchronism with each other and having a displacement synthesizing mechanism which synthesizes the displacement of said actuators and which outputs the resultant displacement as a motion of said magnetic heads; and said drive apparatuses being driven by a multiphase alternating current power source to vibrate said magnetic heads substantially in a moving direction of said moving part, thereby causing said moving part to move along a curve or linearly.

4,947,078

## SEALED BEAM HEADLAMP

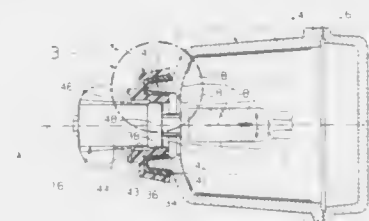
Lawrence M. Rice; Thomas E. Persing, and Thomas J. Baldauf, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 5, 1989, Ser. No. 361,082

Int. Cl.<sup>5</sup> H01J 5/54; H01K 1/46

U.S. Cl. 313—113

5 Claims



1. A sealed beam headlamp comprising a reflector having a body portion the rear end of which is formed with a circular opening for receiving a light bulb assembly and the front end of which is closed by a light controlling lens, said light bulb assembly including a plug member formed with a spherical portion of a predetermined diameter and having a light bulb supported thereby, an annular flange integrally formed with and projecting axially outwardly from said rear end of said body portion of said reflector and surrounding said circular opening, a ring-like socket member having an annular groove formed therein for receiving said annular flange, a sealing cement located in said groove for bonding said socket member to said flange, a cylindrical support surface located in said socket member and having a diameter substantially equal to said predetermined diameter of said spherical portion of said plug member so as to allow the latter to be located in said cylindrical support surface and be moved axially and pivoted about said spherical portion for adjustment of the bulb filament relative to the reflector, and a sealing cement bonding said plug means to said socket member after adjustment of said light bulb filament relative to said reflector.

4,947,079

## NOTCH CUTTING CIRCUIT WITH MINIMAL POWER DISSIPATION

Robert A. Black, Jr., Brooklyn Park, and Arlon D. Kompelien, Cross Lake, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 31, 1988, Ser. No. 239,193

Int. Cl.<sup>5</sup> H05B 41/14; H01J 17/36

U.S. Cl. 315—205

19 Claims

1. Apparatus for receiving an alternating waveform having

positive and negative half cycles at a first terminal, producing a "notched" waveform therefrom and supplying the "notched" waveform to a second terminal comprising:

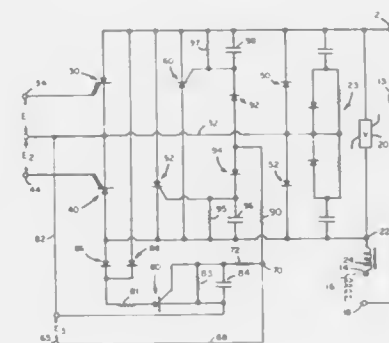
first unidirectional switch means operable when "on" to conduct current from the first terminal to a third terminal, the first switch means having an input to receive control signals operable to turn the first switch means "on" and "off";

second unidirectional switch means operable when "on" to conduct current from the second terminal to the third terminal, the second switch means having an input to receive control signals operable to turn the second switch means "on" and "off";

first unidirectional conductive means connected to conduct current from the third terminal to the first terminal;

second unidirectional conductive means connected to conduct current from the third terminal to the second terminal;

third unidirectional switch means operable when "on" to conduct current from the first terminal to the second terminal, the third switch means having an input to receive control signals operable to turn the third switch means "on";



fourth unidirectional switch means operable when "on" to conduct current from the second terminal to the first terminal, the fourth switch means having an input to receive control signals operable to turn the fourth switch means "on"; and

control means connected to the inputs of the first, second, third and fourth switch means to supply the control signals thereto so that (1) during a positive half cycle, current flows from the first terminal to the second terminal through the first switch means and the second conductive means for a first time period and thereafter current flow is stopped from the first terminal to the second terminal for a second time period and thereafter current again flows from the first terminal to the second terminal through the third switch means for a third time period, and (2) during a negative half cycle current flows from the second terminal to the first terminal through the second switch means and the first conductive means for a fourth time period and thereafter current flow is stopped from the second terminal to the first terminal for a fifth time period and thereafter current again flows from the second terminal to the first terminal through the fourth switch means for a sixth time period.

4,947,080

## APPARATUS FOR ROTATING AN ELECTRODELESS LIGHT SOURCE

Charles H. Wood, and Wayne Johnson, both of Rockville, Md., assignors to Fusion System Corporation, Rockville, Md.  
Continuation-in-part of Ser. No. 201,660, May 23, 1988, abandoned. This application Aug. 9, 1989, Ser. No. 391,011  
Int. Cl.<sup>5</sup> H01J 61/30, 65/04

U.S. Cl. 315—248

21 Claims



9. A microwave-generated light source comprising a lamp envelope mounted within a microwave cavity and means for rotating said envelope about an axis, wherein said means for rotating said envelope comprises:

- (a) an electric motor operatively associated with said envelope, said motor having a hollow shaft;
- (b) an elongated stem attached to said envelope and extending within said hollow shaft; and
- (c) means for securing said stem within said hollow shaft.

4,947,081

## DUAL INSULATION OXYNITRIDE BLOCKING THIN FILM ELECTROLUMINESCENCE DISPLAY DEVICE

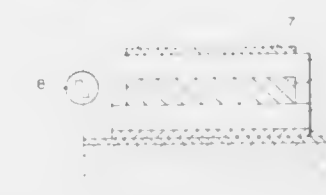
Tsunemi Ohiwa, Osaka; Keiichiro Uenae, Kyoto; Souichi Ogawa, Kobe; Katsumi Takiguchi, Ikeda, and Masaaki Yoshitake, Uji, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Feb. 24, 1989, Ser. No. 318,052

Claims priority, application Japan, Feb. 26, 1988, 63-44959  
Int. Cl.<sup>5</sup> H05B 33/22

U.S. Cl. 313—509

4 Claims



1. A dual insulation thin film electroluminescence device comprising a transparent electrode layer, a first insulation layer, a light emitting layer superimposed on said first insulation layer, a second insulation layer superimposed on said light emitting layer, and a back electrode layer, said electroluminescence device further comprising a tantalum oxynitride layer between said transparent electrode layer and said first insulation layer.

4,947,082

## SEALING ARRANGEMENT FOR A LAMP HOUSING

Alan P. French, Farmdale, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 6, 1989, Ser. No. 319,592

Int. Cl.<sup>5</sup> H01R 4/48, 9/09

U.S. Cl. 313—318

3 Claims

1. In combination with a lamp housing having a lamp socket assembly mounted therein and supporting a flexible printed circuit for providing electrical current to a lamp bulb contained in said lamp socket assembly, the improvement wherein

said lamp housing and said lamp socket assembly each independently support an annular gasket which engages the flexible printed circuit outboard of an electrical connection between



said lamp socket assembly and said flexible printed circuit so as to seal said electrical connection from dust and moisture at opposite sides of said printed circuit.

4,947,083

# PICTURE DISPLAY DEVICE WITH INTERFERENCE SUPPRESSION MEANS

Gerrit Bosch; Tjebbe R. Pasma, and Albertus A. S. Sluyterman, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 919,910, Oct. 16, 1986, abandoned.

This application Jan. 13, 1988, Ser. No. 145,651

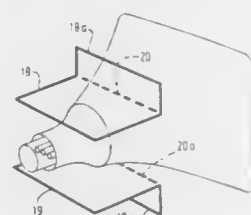
Claims priority, application Netherlands, Oct. 25, 1985, 8502918; Sep. 23, 1986, 8602397

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> H01J 29/06

U.S. Cl. 315—8

6 Claims



1. A picture display device having a display tube with a rear part which accommodates a device for generating at least one electron beam and a front part which comprises a display phosphor screen, said display device also being provided with an electromagnetic deflection unit mounted around the display tube for deflecting an electron beam across the display screen and including a line deflection coil and a field deflection coil which, when energized, generate magnetic interference fields having at least a dipole component, comprising an interference suppression coil system having two interference suppression coils which are provided symmetrically relative to the plane of symmetry of the line deflection coil on the outer surface of the rear part of the display tube which are oriented, in such a manner, and in operation are energizable in such a manner, that, measured at a predetermined distance from the display device, at least the strength of the dipole component is below a desired standard.

4,947,084

# CATHODE RAY TUBE FOR STORING AND REPRODUCING ELECTRICAL SIGNALS

Claude Piaget, Montgeron, France, assignor to U.S. Philips Corporation, New York, N.Y.

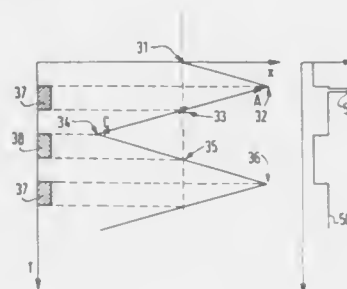
Continuation of Ser. No. 185,287, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 925,582, Oct. 31, 1986, abandoned. This application Jun. 19, 1989, Ser. No. 368,961

Claims priority, application France, Feb. 28, 1986, 8602822

Int. Cl.<sup>5</sup> H01J 31/06, 31/58

U.S. Cl. 315—8.51

8 Claims



1. An apparatus for storing and reproducing an electrical signal, said apparatus comprising:

- a vacuum tube including a faceplate supporting an arrangement of first and second charge transfer device matrices for temporarily storing charges representing the signal, said matrices being juxtaposed along a common boundary extending in a predefined direction;
- an electron gun for producing an electron beam directed toward said faceplate to effect charge storage in said first and second charge transfer device matrices;
- first deflection means which deflect the electron beam across the faceplate in first and second reciprocal directions transverse to the common boundary of the charge transfer device matrices;
- second deflection means which deflect the electron beam across the faceplate transversely to the first and second reciprocal directions in response to the instantaneous magnitude of the signal; and
- read circuitry means electrically connected to the charge transfer device matrices which respond to the occurrence of a triggering signal to effect reading of the charges stored in the first and second charge transfer device matrices during substantial periods preceding and succeeding the occurrence of the triggering signal.

4,947,085

# PLASMA PROCESSOR

Koichiro Nakanishi; Hiroki Ootera; Minoru Hanazaki, and Toshihiko Minami, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 25, 1988, Ser. No. 173,147

Claims priority, application Japan, Mar. 27, 1987, 62-75116; Mar. 30, 1987, 62-77133; Mar. 30, 1987, 62-77134; May 1, 1987, 62-106409; May 6, 1987, 62-111512; Jun. 18, 1987, 62-150153

Int. Cl.<sup>5</sup> H05H 1/18, 1/30; H01L 21/306

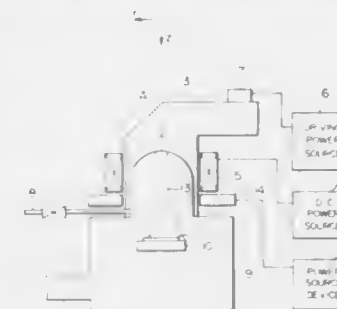
U.S. Cl. 315—111.41

10 Claims

1. A plasma processor for establishing an electron cyclotron resonance driven plasma in a reaction gas for treating a substrate disposed in the processor comprising:

- a chamber containing a plasma generation region in which a plasma is generated and a reaction region in which a substrate is disposed by the plasma;
- magnetostatic field generation means for generating a magnetostatic field in the chamber;
- electromagnetic electric field formation means for generating an electric field generally perpendicular to the magnetostatic field; and

moving magnetic field generation means for generating a moving magnetic field intersecting the magnetostatic field between said magnetostatic field generation means and a substrate disposed in said chamber for deflecting the plasma across the substrate during treatment of the sub-



strate by the plasma in said chamber including a permanent magnet disposed outside said chamber for generating a magnetic field in the plasma generation region of said chamber and means for rotating said permanent magnet around said chamber to produce the moving magnetic field, whereby the substrate is uniformly treated.

4,947,086

# SYSTEM FOR LIGHTING FLUORESCENT LAMPS

Fumikazu Nagano, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

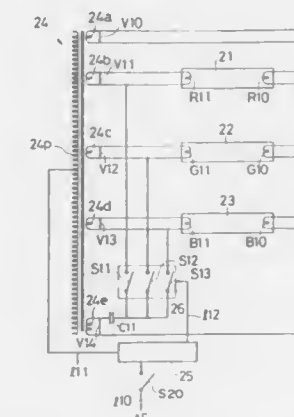
Filed Feb. 10, 1988, Ser. No. 154,328

Claims priority, application Japan, Feb. 10, 1987, 62-29331

Int. Cl.<sup>5</sup> H05B 37/00

U.S. Cl. 315—251

8 Claims



1. A system for sequentially lighting a plurality of fluorescent lamps comprising:

- filament voltage supply means for supplying a filament voltage to each said fluorescent lamps;
- starting voltage supply means for developing a starting voltage sufficient to cause illumination of said fluorescent lamps;
- a single switching circuit for sequentially and periodically connecting said starting voltage developed by said starting voltage supply means to said fluorescent lamps to cause the cyclic illumination thereof;
- said starting voltage supply means including a transformer having a primary winding and a single starting voltage secondary winding connected to said single switching circuit so as to develop a starting voltage sufficient to cause illumination of said fluorescent lamps.

4,947,087  
LAMP-LIGHTING DEVICE  
Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

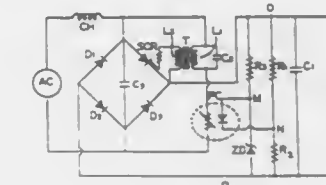
Filed Apr. 12, 1988, Ser. No. 182,866

Claims priority, application Japan, Apr. 18, 1987, 62-95934

Int. Cl.<sup>5</sup> H05B 39/08

U.S. Cl. 315—307

4 Claims



1. A device for lighting an incandescent lamp, comprising: a full-wave rectifier composed partially or entirely of thyristor(s), said full-wave rectifier having both an input terminal connected with an AC source and an output terminal connected with an incandescent lamp; smoothing means connected in parallel with the incandescent lamp; means to monitor the voltage across the incandescent lamp, and means to control the conduction angle of the thyristor(s) dependently on the magnitude of the voltage, said controlling means being operable in association with said monitoring means, said controlling means is arranged between the full-wave rectifier and the incandescent lamp, and said controlling means keeps the voltage across the incandescent lamp approximately constant by decreasing the conduction angle of the thyristor(s) when the voltage across the incandescent lamp exceeds a prescribed level, or by increasing the conduction angle of the thyristor(s) when the voltage across the incandescent lamp decreases the prescribed level.

4,947,088

# METHOD AND APPARATUS FOR CONTROLLING REEL TENSION

Toshiro Kisakibaru; Tsuguo Gotoh, both of Tokyo, and Kazunori Obuchi, both of Fukuoka, all of Japan, assignors to Yaskawa Electric Mfg. Co., Ltd., Kitakyushu, Japan

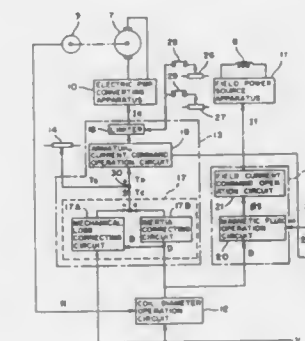
Continuation of Ser. No. 776,971, Sep. 12, 1985, Pat. No. 4,720,661. This application Jan. 14, 1988, Ser. No. 143,807

Claims priority, application Japan, Jan. 14, 1984, 59-4274

Int. Cl.<sup>5</sup> H02P 7/06; B65H 59/38

U.S. Cl. 318—6

18 Claims



1. A method for controlling the reel tension of a reel driving apparatus by a plurality of DC motors each having a field



system and an armature in which the field system of at least one of said plurality of said DC motors is controlled so that the ratio of the field magnetic flux to the coil diameter of the reel becomes constant, the armature current of said one DC motor being controlled by an electric power converting equipment, and said reel driving apparatus being controlled so as to keep a constant reel tension, the method comprising the steps of:

selecting the ratio of the field magnetic flux to the coil diameter from a group consisting of a maximum setting value, and at least one other setting value below said maximum setting value;

limiting maximum value of the operating armature current, when said selected ratio of the field magnetic flux to the coil diameter is less than said maximum setting value, to a value lower than the sum of the armature current, below rated current, and the inertia compensation current corresponding to the rate of change of the take-up speed; and controlling the field system so as to maintain said selected ratio of the field magnetic flux to the coil diameter.

7. An apparatus for controlling the reel tension of a reel driving apparatus driven by a DC motor having a field system and an armature in which the field system of said DC motor is controlled so that the ratio of the field magnetic flux to the coil diameter of the reel becomes constant, the armature current of said DC motor being controlled by an electric power converting equipment, and said reel driving apparatus being controlled so as to keep a constant reel tension, the apparatus comprising:

a coil diameter arithmetic operation circuit to calculate the coil diameter from the take-up speed and the rotating speed of the motor;

a constant setting device to select the ratio of the field magnetic flux to the coil diameter from a group consisting of a maximum setting value, and at least one other setting value below said maximum setting value;

a field current command circuit which obtains a magnetic flux command from the coil diameter, derived from said coil diameter arithmetic operation circuit 1, and from the ratio of the field magnetic flux to the coil diameter which was selected by said constant setting device, and thereafter converts said magnetic flux command to a field current and then outputs said field current to a field power source apparatus as a field current command;

a tension compensating circuit to obtain an amount of inertia compensation and an amount of mechanical loss compensation from the coil diameter, derived from said coil diameter arithmetic operation circuit, and from the take-up speed, and to obtain a tension compensation quantity by summing both of said compensation amounts;

an armature current command arithmetic operation circuit to add a desired tension from a tension setting device and said tension compensation quantity, and to output said added value as an armature current command; and

limiter means responsive to said armature current command arithmetic operation circuit to limit the maximum value of the operating armature current, when said selected ratio of the field magnetic flux to the coil diameter is less than said maximum setting value, to a value lower than the sum of the armature current, below rated current, and the inertia compensation current corresponding to the rate of change of the take-up speed.

4,947,089

#### APPARATUS FOR SELECTIVELY CONTROLLING A PLURALITY OF ELECTRIC MOTORS

Donald B. Abel, Appleton, Wis., assignor to Abel Manufacturing Co., Inc., Appleton, Wis.

Filed Oct. 30, 1989, Ser. No. 434,805

Int. Cl.<sup>5</sup> G01G 19/34, 11/12

U.S. Cl. 318—34

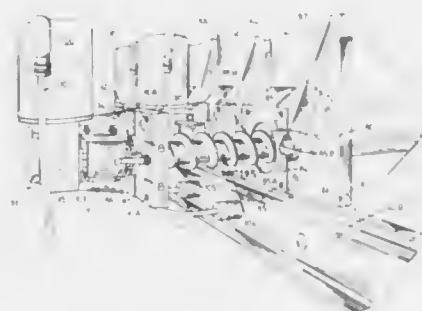
18 Claims

1. An apparatus for selectively controlling a plurality of electric motors for driving individual work objects, comprising:

means for selecting individual electric motors which includes a first electric switch and a second electric switch,

and wherein the second electric switch selects the electric motor to be actuated, and wherein the first and second electric switches acting in various combinations provide signals which vary the speed of the electric motor selected, and which provide on/off control for the electric motor selected;

signal generating means coupled to the selecting means for generating a predetermined signalling sequence in response to the selection of an individual electric motor, the signal generating means coupled with each of the electric motors;



a variable speed motor drive coupled with the signal generating means and with each of the electric motors, the variable speed motor drive selectively driving the individual electric motors at predetermined speeds in response to the signalling sequence received from the signal generating means; and

means coupled with the selecting means for sensing the work performed by each of the work objects whereby an operator manually moves the first switch to selected positions in response to information produced by the sensing means to vary the speed of the electric motor selected.

4,947,090

#### CONTROL FOR RECIPROCATING PART IN A MACHINE TOOL

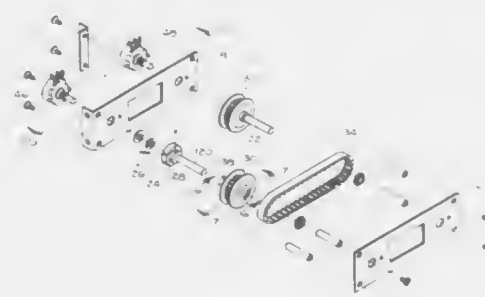
Joseph A. Armond, River Grove, and Juanito Rodenas, Carol Stream, Ill., assignors to Electro-Matic Products Co., Chicago, Ill.

Filed Jun. 22, 1989, Ser. No. 370,198

Int. Cl.<sup>5</sup> H02K 33/00

U.S. Cl. 318—282

14 Claims



1. Apparatus for controlling a machine having a reciprocating table, and reversible electrical driving means for driving the table in each of opposite directions, and an electrical source and circuit for energizing the driving means, comprising,

a pair of potentiometer units, one associated with each direction of movement of the table,

(a) each potentiometer unit including an adjustable traverse potentiometer and a manually adjustable remote potentiometer,

(b) the traverse potentiometer and remote potentiometer in each unit being operable for producing a first voltage and a second voltage respectively, in the corresponding direction of movement,

the traverse potentiometers being progressively adjusted by the table in response to movement of the table and capable of varying the respective voltages corresponding to the movement of the table,

the remote potentiometers being manually adjustably preset, and operably associated in circuit with the corresponding traverse potentiometers, and

a pair of reversing means, one associated with each direction of movement of the table, and each being operable in response to the first voltage reaching a predetermined value relative to the second voltage in the corresponding direction of movement of the table, for reversing the driving means and, simultaneously therewith, thereby reversing the direction of movement of the table.

7. Apparatus for controlling a machine having a reciprocable table movable throughout a normal maximum range, and a plurality of reversible electrical driving means for driving the table in each of opposite directions, and an electrical source and circuit for energizing the driving means, and the machine having control means for predetermining the movement of the table throughout the range,

said apparatus comprising,

a manually actuated adjustable first electrical control component operable for automatically predetermining a shorter range of movement of the table, less than said maximum range, and

a manually actuated adjustable second electrical control component operable for de-energizing the first component and controlling movement beyond the ends of the shorter range.

9. Apparatus for controlling a machine having a reciprocable table and means for driving the table in each of its opposite directions, the driving means having a normal speed, and a slow speed, for driving the table in corresponding speeds, the machine having first and second circuit portions for controlling the driving means respectively in normal and slow speeds, the apparatus comprising:

means actuated by the table and operable for reversing the driving means and thereby reversing the movement of the table at the end of the movement in each direction, at predetermined end points and thereby predetermining a maximum range of movement,

first means for energizing the first circuit portion and thereby energizing the driving means at said normal speed at a middle portion of said maximum range, and second means for energizing the second circuit portion and thereby energizing the driving means at said slow speed at second points spaced inwardly from the end points,

whereby to provide said slow speed of movement of the table at the ends of said maximum range and thereby reversing the movements of the table while the table is moving at said slow speed,

said second means for energizing including elements operable for predetermining the points of reversal of the table at said slow speed, that are adjustable independently of each other and independently of said first means for energizing.

12. Apparatus for controlling a machine having a reciprocable table and electrical means for driving the table in each of opposite directions, comprising,

a traverse control unit and remote control unit, separate from each other and each being a mechanically self-contained unit, and the units being adapted to be mounted on the machine at mutually remote positions,

the control units each including potentiometers, and electrical connections operably interconnecting the potentiometers in the two control units,

the traverse control unit having a main shaft extending therefrom adapted to be rotated by the table,

a plurality of potentiometers mounted to the shaft, individually operably related to respective opposite directions of movement of the table, and the shaft being operable upon

rotation thereof for actuating the plurality of potentiometers.

4,947,091

#### DEVICE FOR PREVENTING A COIL OF A BRUSHLESS MOTOR FROM BURNING

Toshiaki Fukuoka, Yonago, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 30, 1989, Ser. No. 428,690

Claims priority, application Japan, Oct. 31, 1988, 63-274827

Int. Cl.<sup>5</sup> H02H 7/08

U.S. Cl. 318—434

4 Claims



1. In a device for preventing a coil of a brushless motor from burning, said device comprising: an output circuit for supplying current to the coil; a constant current source; a capacitor means which is charged by current supplied from said constant current source; and a pulse signal generating means for generating a pulse signal in synchronization with the rotation of a rotor of the motor, said device further comprises:

a first discharge means for discharging said capacitor means when receiving the pulse signal from said pulse signal generating means;

a control circuit for deactivating said output circuit when the voltage level of said capacitor means is raised to a first predetermined level, and for activating said output circuit when the voltage level of said capacitor means is lowered to a second predetermined level, said second predetermined level being lower than said first predetermined level;

a detecting means which is activated when the voltage level of said capacitor means is higher than a third predetermined level, said third predetermined level being higher than said first predetermined level;

a circuit means which has a first state, and a second state, said circuit means changing its state from said first state to said second state when said detecting means is activated; and

a second discharge means for discharging said capacitor means when said circuit means is in said second state.

4,947,092

#### SOLID STATE WINDSHIELD WASH AND WIPE CONTROLLER

Ali M. Nabha, Dearborn, and John C. Dock, Rochester, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 26, 1989, Ser. No. 457,119

Int. Cl.<sup>5</sup> B60S 1/08

U.S. Cl. 318—444

10 Claims

1. A windshield wiper drive motor and washer pump motor controller system furnishing an intermittent wipe mode of operations with selectable variable delay periods between successive wiping cycles, a first-wipe-before-delay mode, a wipe-after wash mode and a mist mode of operation of said

wiper motor, said wiper motor being energized from a source voltage of electrical potential difference and having a motor switch which mechanically couples to the wiper motor, the motor switch providing digital voltage signals in response to movement of a rotor of the wiper motor, said variable delay periods being selected using a double pole selector switch operable from an OFF to an ON position through a range of selectable delay period positions wherein one of the poles of the selector switch cooperates with and changes the resistance value of an adjustable resistance device which controls the time delay period during which the wiper motor is de-energized between successive wiping cycles in the intermittent wipe mode of operation thereof, said wipe-after wash mode being initiated by a wash switch connected at one side to one side of said source voltage of potential difference and at another side to one side of said washer pump motor to activate



the washer pump motor upon actuation of said wash switch, and said mist mode being initiated by a mist switch which causes the wiper motor to make a wipe cycle, said system comprising:

- means for driving said wiper motor in response to adjustment of the double pole selector switch, activation of the wash switch or the mist switch;
- means for braking said wiper motor in response to delay periods established by adjusting the double pole selector switch, deactivating the double pole selector switch, the wash switch or the mist switch;
- short circuit protection circuit coupled between said wiper motor driving means and said wiper motor braking means for braking the wiper motor in response to an input and output of the wiper motor being shorted; and
- means for protecting said system from reverse directed source voltage currents.

4,947,093

**SHOCK RESISTANT WINCHESTER DISK DRIVE**  
Ericson M. Dunstan, Port Hueneme; Dennis Hogg, Simi Valley; John E. Scura, Thousand Oaks, and Ming-Goei Sheu, Simi Valley, all of Calif., assignors to Micropolis Corporation, Chatsworth, Calif.

Filed Nov. 25, 1988, Ser. No. 276,299  
Int. Cl.<sup>5</sup> G05B 13/00

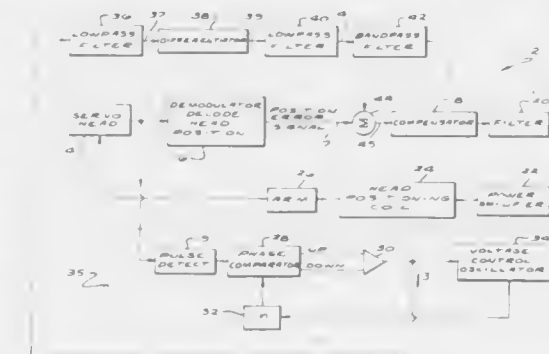
U.S. Cl. 318—560

21 Claims

1. A shock resistant hard disk drive storage system comprising:

- a plurality of magnetic disks;
- a plurality of magnetic heads for performing input and output operations on said magnetic disks;
- at least one of said magnetic heads being a servo head;
- a head positioning assembly supporting said magnetic heads;
- at least one of said magnetic disks including servo pulse signals encoded thereon;
- servo control circuitry for opposing shifts in the location of said servo head;
- phase-locked loop means including a voltage controlled oscillator, and comparator circuit means for applying a control voltage to control the frequency of said oscillator

in accordance with pulses read from said magnetic disk by said servo head; and  
signal processing means for filtering and differentiating said control voltage, and for feeding it into said servo control circuitry;



an output of said phase-locked loop means indicates angular acceleration of said disks as sensed by said servo head, and is employed to counteract the effect of the same angular acceleration on said head positioner assembly.

4,947,094

**OPTICAL GUIDANCE SYSTEM FOR INDUSTRIAL VEHICLES**

Robert D. Dyer; Eugene A. Eschbach, both of Richland; Jeffrey W. Griffin, Kennewick, all of Wash.; Michael A. Lind, Durham, Oreg.; Erville C. Buck, Eugene, Oreg., and Roger L. Buck, Springfield, Oreg., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Jul. 23, 1987, Ser. No. 77,701  
Int. Cl.<sup>5</sup> G05D 1/00

U.S. Cl. 318—587

10 Claims



1. An automatically guided vehicle system comprising:  
a vehicle including at least one steerable wheel;  
a track mounted above said vehicle and parallel to its intended path, said track being constructed and arranged to emit light having a range of wavelengths distinct from the ambient light;  
an optical system on said vehicle constructed and arranged to receive light emitted from said track and project an image of a segment of said track;  
a light-sensitive device positioned to receive said image and constructed and arranged to detect the position of said image;  
means for generating a first electrical signal dependent on said position;  
means for converting said first electrical signal to a steering signal;  
servo means for converting said steering signal into movements of said steerable wheel.

4,947,095

**EXPERT SYSTEM OF MACHINE TOOL EQUIPPED WITH NC UNIT**

Hideaki Kawamura; Takao Sasaki, both of Tokyo, and Takashi Endou, Yamanashi, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

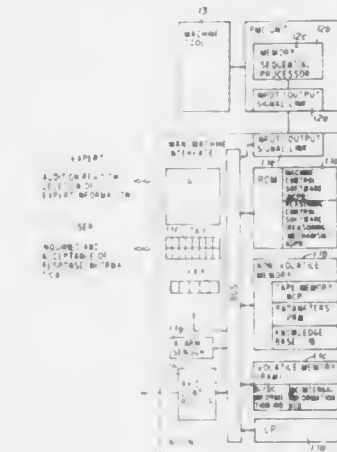
PCT No. PCT/JP88/00965, § 371 Date May 17, 1989, § 102(e)  
Date May 17, 1989, PCT Pub. No. WO89/03073, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 22, 1988, Ser. No. 358,384

Claims priority, application Japan, Sep. 22, 1987, 62-238273  
Int. Cl.<sup>5</sup> G05B 19/18

U.S. Cl. 318—569

5 Claims



1. An expert system of a machine tool equipped with an NC unit, characterized by provision of a knowledge base storing expert knowledge regarding investigation of causes of various failures, a reasoning mechanism for deducing the cause of a failure based on the expert knowledge stored in the knowledge base, and conversational means for inputting the expert knowledge to the knowledge base, deleting and modifying the expert knowledge, and for conversing with the reasoning mechanism when failure diagnosis is performed;

wherein the knowledge base stores knowledge for extracting digital input/output information, which is exchanged by the NC unit and the machine tool, as well as information internally of the NC unit;

the reasoning mechanism discriminating the causes of failures in the NC unit and machine tool based on said information automatically extracted by said expert knowledge when a failure occurs.

4,947,096

**METHOD AND APPARATUS FOR CONTROLLING MULTIPLE ENGINE AIRCRAFT**

Barton H. Snow, Wyoming, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 715,569, Mar. 25, 1985, Pat. No. 4,787,201.  
This application Sep. 2, 1988, Ser. No. 240,020

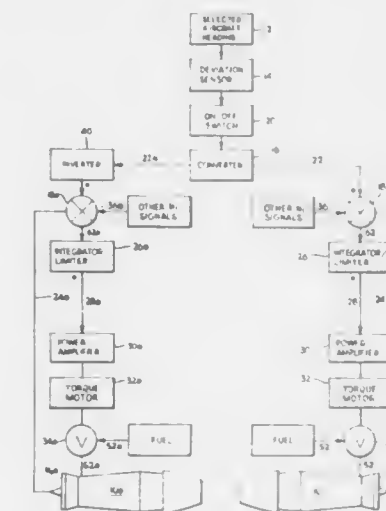
Int. Cl.<sup>5</sup> B64C 13/16

U.S. Cl. 318—586

10 Claims

1. In an aircraft including two engines positioned on opposite sides of the longitudinal axis of said aircraft, and a rudder for steering control, apparatus for improving flight efficiency, comprising:

means for setting a rudder angle in pursuit of a preselected heading;  
means for sensing said rudder angle; and



means for varying the thrust of at least one engine in response to said rudder angle to reduce said rudder angle and maintain said preselected heading.

4,947,097

**AUTOMATIC SWITCHING OF MOTION CONTROL WITH TACTILE FEEDBACK**

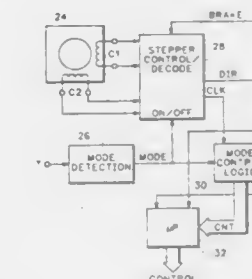
Douglas K. Tao, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Jun. 12, 1989, Ser. No. 364,274

Int. Cl.<sup>5</sup> H02P 8/00

U.S. Cl. 318—696

4 Claims



1. An apparatus for automatic switching between two modes of motion control comprising:

- a control knob having an insulative portion and a conductive portion;
- means for detecting when an operator contacts the control knob to generate a mode control signal having one of two states according to the portion of the control knob contacted; and
- means for controlling the motion of the apparatus as a function of the mode control signal and the movement of the control knob by the operator.



**4,947,098**  
**REGULATOR MECHANISM FOR A TWO-SPEED MOTOR**  
 Robert C. Vlasak, Dallas, Tex., assignor to Lennox Industries, Inc., Carrollton, Tex.  
 Filed May 26, 1988, Ser. No. 199,205  
 Int. Cl.<sup>5</sup> H02P 7/48  
 U.S. Cl. 318—775 4 Claims



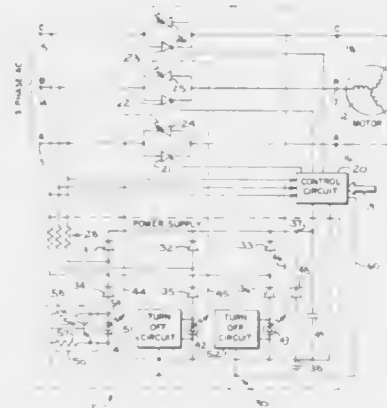
1. In an apparatus of the type including (i) a single-phase motor having operative and inoperative states, first, second and third primary windings, first and second secondary windings, a run capacitor and first and second speeds, (ii) control means for providing control signals representing requests for operation of said motor at said first and second speeds, and (iii) first and second power lines, said first, second and third primary windings being connected at a common node, said first primary winding also being connected to said first power line, said first and second secondary windings being connected to said first power line, said run capacitor being connected to said second power line, an improved regulating means comprising, in combination:

- a C1 energizable contactor, coupled to said control means, having at least a first C1 contact connected to one of said first and second power lines; and
- a C2 energizable contactor, coupled to said control means, having a first C2 contact, a second C2 contact, a third C2 contact, a fourth C2 contact, and a fifth C2 contact, said first C2 contact of said C2 energizable contactor interposing said second primary winding, opposite said common node, and said second line and defining a first interconnection point between said first C2 contact and said second primary winding, said second C2 contact interposing said third primary winding, opposite said common node, and said second power line, said third C2 contact interposing said first power line and said first interconnection point, said fourth C2 contact interposing said first secondary winding, opposite said first power line, and said run capacitor, said fifth C2 contact interposing said second secondary winding, opposite said first power line, and said run capacitor;

said first and fourth C2 contacts being normally closed and said second, third and fifth C2 contacts being normally open;

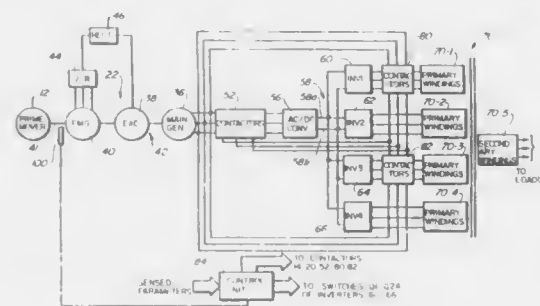
said C1 and C2 energizable contactors cooperating to define cycle/configure means, responsive to said control means, for cycling said motor between said inoperative state and said operative state and for selectively configuring said primary windings, said secondary windings, and said power lines in said operative state so as to provide first speed operation and second speed operation of said motor in response to said control means.

**4,947,099**  
**MOTOR CONTROLLER WITH OPTICAL SCR'S**  
 Richard D. Marasch, Germantown, Wis., assignor to Allen-Bradley Company, Inc., Milwaukee, Wis.  
 Filed Jan. 30, 1989, Ser. No. 303,344  
 Int. Cl.<sup>5</sup> H02P 5/40  
 U.S. Cl. 318—809 10 Claims



1. An apparatus for controlling an electric motor comprising:
- a first unidirectional electrical switch coupling the motor to a source of electricity and being activated by an electrical signal to apply electricity from the source to the motor;
  - a second unidirectional electrical switch connected in inverse parallel relationship to said first unidirectional electrical switch and being optically activated to apply electricity from the source to the motor;
  - a control circuit for electrically activating the first unidirectional electrical switch;
  - a light emitter coupled to the source of electricity with light from the emitter optically coupled to activate said second unidirectional electrical switch; and
  - a switch element providing a shunt path for current to bypass said light emitter when the motor is turned off thereby preventing said light emitter from emitting light.

**4,947,100**  
**POWER CONVERSION SYSTEM WITH STEPPED WAVEFORM INVERTER HAVING PRIME MOVER START CAPABILITY**  
 P. John Dhyanchand, and Vietson Nguyen, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
 Filed Oct. 16, 1989, Ser. No. 421,830  
 Int. Cl.<sup>5</sup> F02N 11/04  
 U.S. Cl. 322—10 8 Claims



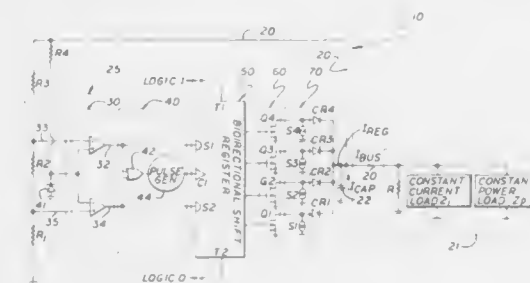
1. A power conversion system utilizing a generator having armature windings and coupled to a prime mover wherein the power conversion system is operable in a generating mode to convert motive power developed by the prime mover into electrical power and in a starting mode to convert electrical power into motive power.

power developed by a source of AC power into motive power for starting the prime mover, comprising:

- a rectifier having an output coupled to a DC link;
- first and second inverters each coupled to the DC link;
- a transformer including first and second sets of primary windings and a set of secondary windings wherein the second set of primary windings is coupled to an output of the second inverter;

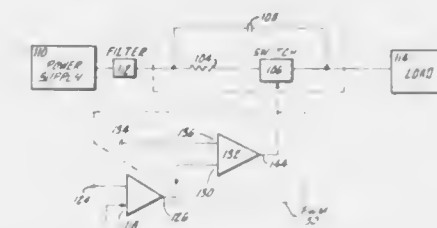
means operable in the generating mode for coupling the rectifier to the generator armature windings and the first set of primary windings to an output of the first inverter and operable in the starting mode for coupling the source of AC power to the set of secondary windings, the first set of primary windings to the rectifier and the output of the first inverter to the generator armature windings; and means for controlling the inverters in the generating mode to convert DC power on the DC link into fixed frequency AC power which is developed in the set of secondary windings and for controlling the first inverter in the starting mode whereby AC power induced in the first set of primary windings due to application of AC power to the set of secondary windings is converted into DC power on the DC link and the DC power is converted into AC power at a controlled frequency by the first inverter and is applied to the generator armature windings.

**4,947,101**  
**DIGITAL SWITCHING VOLTAGE REGULATOR**  
 Michael J. McVey, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Sep. 11, 1988, Ser. No. 244,186  
 Int. Cl.<sup>5</sup> G05F 1/46  
 U.S. Cl. 323—272 16 Claims



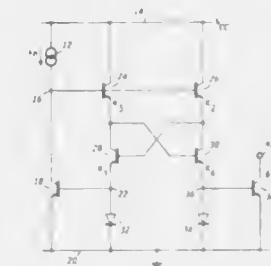
1. An improved digital switching voltage regulator comprising:
- control circuit means for providing a first output voltage and at least one shift pulse when the voltage across a load operatively coupled to said regulator departs from a voltage regulation window by crossing an upper threshold voltage and for providing a second output voltage and at least one shift pulse when the voltage across said load departs from said regulation window by crossing a lower threshold voltage, said regulation window being defined by said upper and lower threshold voltages;
  - bi-directional shift register means for generating a set of control voltages in response to said first or said second output voltage of said control circuit means and said shift pulse; and
  - switchable current source means for providing a current to said load in response to said set of control voltages.

**4,947,102**  
**FEEDBACK LOOP GAIN COMPENSATION FOR A SWITCHED RESISTOR REGULATOR**  
 John P. Ekstrand, Palo Alto, and Kevin Holsinger, Menlo Park, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.  
 Filed Nov. 8, 1988, Ser. No. 269,194  
 Int. Cl.<sup>5</sup> G05F 1/46  
 U.S. Cl. 323—293 15 Claims



1. A switched resistor regulator, comprising resistive means; switch means for switching said resistive means into and out of electrical connection; means responsive to a signal for controlling the operation of said switch; and means for altering said response to said signal to be nonlinear.

**4,947,103**  
**CURRENT MIRROR HAVE LARGE CURRENT SCALING FACTOR**  
 Behrooz Abdi, Chandler; Eric Main, and John E. Hanna, both of Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.  
 Filed Sep. 13, 1989, Ser. No. 406,493  
 Int. Cl.<sup>5</sup> G05F 3/26  
 U.S. Cl. 323—316 4 Claims



1. A current mirror comprising:
- first circuit means responsive to an applied input current supplied to a first terminal thereof for providing a current at a second terminal thereof that is substantially equal in magnitude to said input current, said first circuit means including a first transistor having an emitter base and collector being coupled to said first terminal and said base being coupled to said second terminal, and first diode means coupled between said base and said emitter of said first transistor;
  - second circuit means responsive to a current sourced to a first terminal thereof for providing a current at an output terminal the magnitude of which is substantially equal to the magnitude of said current sourced thereto; and
  - circuit scaling means responsive to said current provided at said second terminal for providing a current that is sourced to said second circuit means the magnitude of which is scaled with respect to said input current, said circuit scaling means including a plurality of transistors the emitter areas of which are scaled with respect to each other with a pair of said plurality of transistors having

$$Y = [1 \cdot \{y(0)^2 + 3 \cdot \{y(T)^2 + y(2T)^2\} + y(3T)^2\}]^{\frac{1}{2}}$$



where,  $y(t-nT)$  is expressed as  $y(nT)$ , on the basis of four sampling values  $y$ 's of said quantity of AC electricity at the time which precedes  $nT$  ( $n=0, 1, 2, 3$ ) from the predetermined sampling time  $t$ .

4,947,110

# TEST APPARATUS TO CHECK CONDITIONS AND CHARACTERISTICS OF POWER AND COMMUNICATION NETWORKS

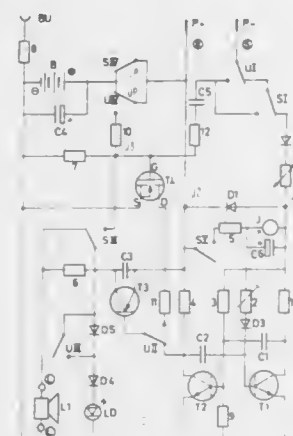
Heinz Laass, Pfungstadt, Fed. Rep. of Germany, assignor to TACO Tafel GmbH, Esslingen, Fed. Rep. of Germany  
Filed Feb. 1, 1989, Ser. No. 305,300

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805755; Oct. 14, 1988, 3835001

Int. Cl.<sup>5</sup> H04B 3/46; G01R 31/02

U.S. Cl. 324—133

17 Claims



1. Test apparatus to check or test the condition or network characteristics of electrical networks, selectively, for continuity;

transmission characteristics;  
signals thereon,

said test apparatus having

an audio frequency generator (T1, T2, 1-4, 9);

an audio reproducer (L1);

a local battery (B);

test terminals (P+, P-) for connection to the network to be checked or tested; and

switch means (S, U) for selectively interconnecting the test terminals and to the audio reproducer, and wherein, in accordance with the invention, the apparatus includes a protective circuit (C5, 12, D1, D2, K, TF, I, II) included in circuit with the test terminals (P+, P-), and at least one of: the tone generator, the audio reproducer;

an audio amplifier (T3, T4) coupled to the audio reproducer (L1, L); and

wherein

(a) if continuity through the network, when connected between the test terminals (P+, P-) is to be determined and, further, if continuity is established, the resistance between the test terminals is to be determined, the switch means connect the audio frequency generator (T1, T2, 1-4, 9) to the test terminals (P1, P2), the audio frequency generator to the local battery (B) to energize the audio frequency generator, and the audio frequency generator to the audio reproducer, whereby the audio frequency generator will operate at frequencies determined by the resistance of the network and, upon open circuit of the network, will be inoperative, and no tone will be reproduced;

(b) to test transmission of a-c frequencies through the test terminals (P+, P-) into the network, the switch means (U, S) selectively connect the audio

frequency generator (T1, T2, 1-4, 9) to the test terminals;

the audio frequency generator to the local battery (B) for energizing the audio frequency generator and to transmit audio frequencies into the network to permit monitoring of said audio frequencies transmitted into the network and to determine if the audio frequencies are propagated therethrough; and

(c) to test propagation through the test network of audio frequencies transmitted therein, the switch means selectively connect the audio tone receiver including the amplifier to said test terminals (P1, P2), and interrupt connection from the frequency generator (T1, T2, 1-4, 9) to the tone receiver and to at least one test terminal.

4,947,111

# TEST FIXTURE FOR MULTI-GHZ MICROWAVE INTEGRATED CIRCUITS

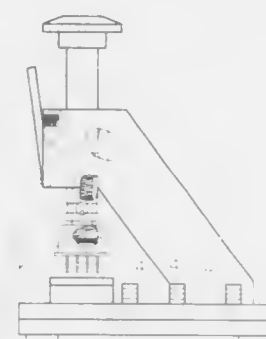
Roger H. Higman, and Gilbert Perkins, both of Palm Bay, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Apr. 6, 1989, Ser. No. 334,147

Int. Cl.<sup>5</sup> G01R 31/02

U.S. Cl. 324—158 F

24 Claims



1. A device for supporting and enabling access to signal conductors of a microwave integrated circuit-containing package, so as to permit testing of the operation of the circuit comprising:

a housing containing conductive material and having a first and second surfaces and through which a plurality of cylindrical bores extend between said first and second surfaces, said bores passing through said conductive material and being arranged in a pattern that matches that of the signal conductors of said package;

sleeves of dielectric material inserted into said plurality of cylindrical bores; and

a plurality of pogo-pins inserted into respective ones of said cylindrical bores so as to be surrounded by said sleeves of dielectric material and forming with the conductive material of said housing respective capacitive reactances of sections of microwave transmission line between said first and second surfaces of said housing, such that the impedance thereof effectively matches the impedance through said signal conductors of said package, and further including a plate containing conductive material, said plate having a plurality of apertures through conductive material of said plate, said apertures being arranged in said pattern, and said plate being positioned against said first surface of said housing such that said pattern of apertures therethrough is aligned with the pattern of cylindrical bores through said housing, and wherein the cross section of a respective aperture is larger than that of a conductor of said package, so that when a package is placed on said plate, a respective conductor thereof is surrounded by a dielectric region, as it passes through an aperture to en-

gage a respective one of said pogo pins, and forms a transmission line through said plate having an impedance which effectively matches the impedance of a respective section of transmission line through said housing.

4,947,112

# APPARATUS AND METHOD FOR TESTING PRINTED CIRCUIT BOARDS

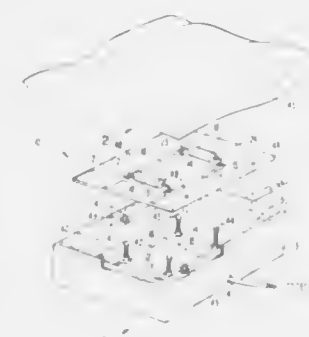
Howard N. Gaston, and Walter W. Jones, Jr., both of Benton, Ark., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 28, 1989, Ser. No. 387,055

Int. Cl.<sup>5</sup> G01R 31/02

U.S. Cl. 324—158 F

5 Claims



1. Apparatus for testing a circuit on a printed circuit (PC) board, the board having a circuit layout which includes a plurality of plated through holes and circuit paths connecting selected of said plated through holes, said circuit comprising a plurality of electrical components, the components having leads which are inserted through predetermined holes on the PC board, said apparatus comprising:

means for firmly holding said components on the PC board before the components are soldered to the board;

a test board having a circuit layout identical to said circuit layout of the PC board;

a plurality of test probes extending through predetermined plated through holes on the test board, said test probes being soldered to the test board establishing electrical connections between predetermined test probes via circuit paths on the test board;

means for bringing said test probes into contact with leads of said components located on the PC board whereby electrical interconnections between said components are established via said test probes and circuit paths on said test board; and

means connected to said test probe for testing said circuit on the PC board.

4,947,113

# DRIVER CIRCUIT FOR PROVIDING PULSES HAVING CLEAN EDGES

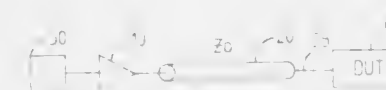
Wayne R. Chism, Greeley, and Philip N. King, Fort Collins, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 31, 1989, Ser. No. 332,243

Int. Cl.<sup>5</sup> G01R 31/02; H03K 5/12, 19/092

U.S. Cl. 324—158 R

7 Claims



1. A method for use in both in-circuit and functional circuit board testing, for providing clean edged logic pulse signals

4,947,114

# METHOD OF MARKING SEMICONDUCTOR CHIPS AND MARKABLE SEMICONDUCTOR CHIP

Günter Schindlbeck, München, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

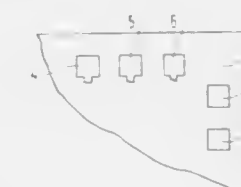
Filed May 24, 1982, Ser. No. 381,052

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1981, 3123031

Int. Cl.<sup>5</sup> G01R 31/00; H01L 23/48

U.S. Cl. 324—158 R

3 Claims



1. Semiconductor chip, comprising a semiconductor substrate having a surface, at least one metal contact-type surface disposed on the surface of the substrate, and optically recognizable markings applied to said at least one metal contact-type surface for indicating at least one definite feature of the chip.

4,947,115

# TEST PROBE ADAPTER

John A. Siemon, Watertown, and Brian E. Reed, New Hartford, both of Conn., assignors to The Siemon Company, Watertown, Conn.

Division of Ser. No. 202,956, Jun. 6, 1988, Pat. No. 4,883,430.

This application Jan. 5, 1989, Ser. No. 293,891

Int. Cl.<sup>5</sup> G01R 1/06, 31/02; H01R 13/639

U.S. Cl. 324—158 P

2 Claims

1. A test probe adapter for connecting to an electrical device, comprising:

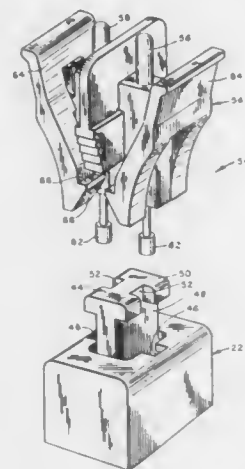
an insulative housing having a top and a bottom;  
a pair of spring-activated electrically conductive test posts, said test posts extending outwardly from said top and bottom of said housing;

a pair of biased hinged levers positioned on opposed surfaces of said housing, said levers each having a top end and a bottom end;

hook means, positioned near the bottom end of each lever, for grasping a surface of the electrical device;

ramp means positioned at the bottom end of each lever for

pivotably displacing said hook means to allow engagement with the surface of the electrical device; and



registration means for preventing axial movement of the test probe adapter relative to the electrical device.

4,947,116

#### INDUCTIVE SPEED SENSOR EMPLOYING PHASE SHIFT

Warren W. Welcome, Tarzana, and Daniel R. Sparks, Temple City, both of Calif., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.

Filed Sep. 2, 1988, Ser. No. 240,782

The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> G01P 3/48, 3/60

U.S. Cl. 324—173

13 Claims



1. A speed detector apparatus for use in combination with a tone wheel having multiple metal teeth, the detector apparatus and tone wheel being adapted for relative displacement, comprising:

- an oscillator including a first inductive sensing coil adapted to be positioned adjacent to passing teeth on said tone wheel to thereby change inductance, the oscillator having a first output signal having a frequency determined at least partly by the inductance of said first coil;
- a tuned circuit interconnected with said oscillator and including a second inductive sensing coil, said tuned circuit being driven by said oscillator to provide a second output signal and said second inductive sensing coil being adapted to be positioned adjacent to passing teeth on said tone wheel to thereby change inductance;
- said first and said second inductive sensing coils being offset from one another relative to the passing teeth on the tone wheel such that their respective said changes of inductance are relatively out of phase;
- the phase of said second output signal relative to said first output signal shifting cyclically as a function of the rela-

tive positioning of said teeth to the respective said first and second sensing coils during said relative displacement of said tone wheel; and means coupled to said oscillator and said tuned circuit for detecting a predetermined condition of the phase shift between said first and said second output signals and thereby providing timing reference signals recurring at intervals representative of the relative speed of the tone wheel.

4,947,117

#### NONDESTRUCTIVE DETECTION OF AN UNDESIRABLE METALLIC PHASE, T<sub>1</sub>, DURING PROCESSING OF ALUMINUM-LITHIUM ALLOYS

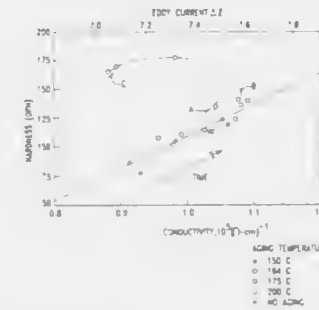
Ott. Buck, Ames, Iowa; David J. Bracci, Maryland Heights, Mo.; David C. Jiles, Ames, Iowa; Lisa J. H. Brasche, Nevada, Iowa; Jeffrey E. Shield, Ames, Iowa, and Leonard S. Chumbley, Ames, Iowa, assignors to Iowa State University Research Foundation, Ames, Iowa

Filed Jan. 3, 1989, Ser. No. 293,120

Int. Cl.<sup>5</sup> G01N 27/80; G01R 33/12

U.S. Cl. 324—227

8 Claims



1. A nondestructive method of detecting undesirable metallic T<sub>1</sub> phase in aluminum-lithium alloys comprising: measuring hardness and conductivity of multiple reference samples of an alloy each of said multiple reference samples at different degrees of aging from one another; determining the correlating increase of hardness and conductivity of said multiple reference samples associated with increased degree of aging of said samples; measuring hardness and conductivity of an alloy to be tested; and using said measurements of hardness and conductivity of multiple reference samples as a standard of correlation between increasing hardness and conductivity measurements associated with increased aging and detecting whether said hardness measurements or said conductivity measurements of said alloy tested deviated from the standard in order to detect the presence of T<sub>1</sub> phase.

4,947,118

#### DIGITAL SQUID SYSTEM ADAPTIVE FOR INTEGRATED CIRCUIT CONSTRUCTION AND HAVING HIGH ACCURACY

Norio Fujimaki, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 21, 1988, Ser. No. 273,592

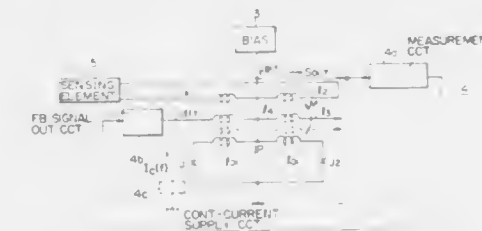
Int. Cl.<sup>5</sup> G01R 33/035

U.S. Cl. 324—248

36 Claims

1. A SQUID system comprising: a first SQUID including first and second Josephson junctions, a first superconducting line connecting the first and second Josephson junctions and having an inductance component, and a first superconducting magnetically coupled line connected to a sensing element and magnetically coupled to the first superconducting line, said sensing element supplying a current to be measured represent-

ing a quantity proportional to a flux quantum, and sending the current through the first superconducting magnetically coupled line; and a bias circuit, connected to the first superconducting line at a first injection point therein, for supplying a bias current to the first SQUID through the first injection point, said first SQUID having a predetermined threshold characteristic which is asymmetrical with respect to a coordinate defined by the current to be measured and the bias current, and defines whether the Josephson junctions are in a superconducting state or in a voltage output state,



said bias current supplied from the bias circuit comprising pulses which are alternately positive polarity pulses and negative polarity pulses, and have a first frequency, and said threshold characteristic and the bias current being defined to output an output signal from the first injection point and including pulses having a frequency equal to the first frequency, the number of the output pulses being proportional to the current to be measured or depending on the current to be measured and a polarity of the output pulse corresponding to a polarity of the current to be measured.

4,947,119

#### MAGNETIC RESONANCE IMAGING AND SPECTROSCOPY METHODS

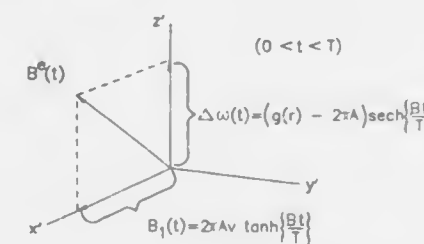
Kamil Ugurbil, Maple Plain, and Michael Garwood, Minneapolis, both of Minn., assignors to University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 209,533, Jun. 21, 1988, abandoned. This application Aug. 14, 1989, Ser. No. 394,237

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—307

11 Claims



1. A method of slice selective excitation of a sample under the influence of a spin aligning constant B<sub>0</sub> gradient field comprising the steps of:

- (a) providing a coil proximate said sample; and
- (b) exciting said coil to produce an adiabatic excitation pulse to apply a B<sub>1</sub> field to said sample, said pulse generated to include an initial segment including a frequency sweep to cause the spins in said sample to rotate away from alignment with the B<sub>0</sub> field according to their resonance frequency within the B<sub>0</sub> gradient field, and a subsequent segment having a decaying B<sub>1</sub> amplitude with zero frequency modulation, said B<sub>1</sub> amplitude decaying according to a predetermined function to provide optimal B<sub>1</sub> insensitivity by spin-locking over as large a variation of B<sub>1</sub> magnitude as possible.

4,947,120

#### QUANTITATIVE NUCLEAR MAGNETIC RESONANCE IMAGING OF FLOW

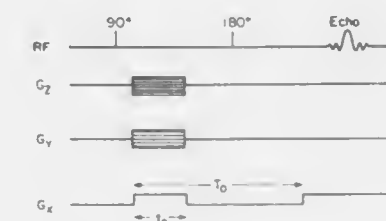
Lawrence R. Frank, Newton, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 5, 1988, Ser. No. 152,760

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—309

39 Claims



1. A method of generating an image of structure and fluid flow within a body using magnetic resonance comprising: forming a representation of a body having static structure and fluid flow using magnetic resonance; applying a phase dependent filter to the representation to generate a first representation of the static structure and a second separate representation of the fluid flow; generating separate images of static structure and fluid flow within the body from the first and second representations; color encoding at least the image of fluid flow; and combining the separated images to form a single image of both the static structure and fluid flow.

4,947,121

#### APPARATUS AND METHOD FOR ENHANCED MULTIPLE COIL NUCLEAR MAGNETIC RESONANCE (NMR) IMAGING

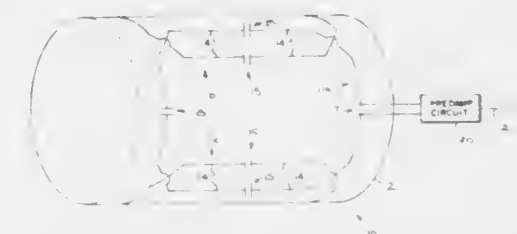
Cecil E. Hayes, Wauwatosa, Wis., assignor to General Electric Company, Milwaukee, Wis.

Division of Ser. No. 234,360, Aug. 19, 1988, Pat. No. 4,885,541. This application Dec. 5, 1989, Ser. No. 446,277

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—322

2 Claims



1. A method for combining nuclear magnetic resonance (NMR) signals from M separate NMR receiver coils to produce a composite image represented by a plurality of picture elements (pixels), where M represents a number greater than one which is the number of separate receiver coils, the method comprising the steps of:

- (a) acquiring a plurality of noise data samples n<sub>i</sub> from each coil (i) of the M receiver coils during a time period when no NMR signal is present, in which each noise data sample is represented by:

$$n_i = N_i e^{j\phi_i}$$

- (b) producing a set of noise products by computing cross products of the noise data samples for each combination (i,j) of the M receiver coils, and averaging all of the cross



products for each said combination, the set of noise products being represented by;

$$\langle N_i N_j \cos(\phi_i - \phi_j) \rangle$$

where the brackets  $\langle \rangle$  denote an average over the plurality of noise data samples for each combination (i,j);

- (c) acquiring separate raw imaging data simultaneously from each of the M receiver coils when an NMR signal is present;
- (d) transforming the raw image data from each of the M receiver coils into separate spatial domain images for each of the M receiver coils, where each spatial domain image includes a plurality of spatial domain image pixels, each spatial domain image pixel being represented by a magnitude  $S_i$  and a phase  $\theta_i$  for each receiver coil (i); and
- (e) computing each pixel in the composite image on a pixel by pixel basis by performing the steps of:
- (f) forming a noise matrix  $p_{ij}$  according to the formula;

$$p_{ij} = \langle N_i N_j \cos(\phi_i - \phi_j) \rangle \cos(\theta_i - \theta_j),$$

- for each combination (i,j) of the M receiver coils;
- (g) inverting the noise matrix to produce  $p^{-1}$ ; and
- (h) computing each pixel in the composite image according to the formula;

$$\text{COMPOSITE SIGNAL} = \sqrt{S \cdot (p^{-1}) \cdot S^T},$$

where S represents a one dimensional vector formed from the  $S_i$  magnitudes from each receiver coil (i) of the M receiver coils.

4,947,122

#### METHOD AND APPARATUS FOR ADJUSTING A BIMETAL TRIP ELEMENT

Horst Ruemenapf, and Gerhard Rathenow, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

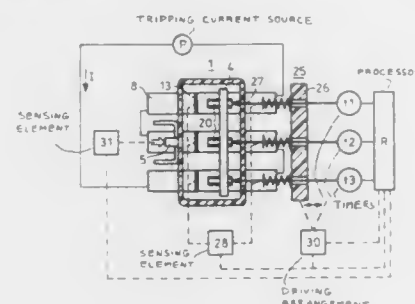
Filed Mar. 22, 1989, Ser. No. 326,913

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3810043

Int. Cl.<sup>5</sup> G01R 31/32

U.S. Cl. 324—417

5 Claims



1. A method of adjusting a bimetal trip element in an electric switching device having at least one bimetal strip securely fixed on one side, a tripping shaft to be pressurized by the unlatched end of the bimetal strip and an adjusting screw, the method comprising the steps of:

- (a) supplying an auxiliary force and pressurizing the tripping shaft with said auxiliary force at a location which interacts with the bimetal strip, until a part to be restrained by the tripping shaft is released, and measuring a path required for the release and the force, and storing variables related to the path and the force in a processor;
- (b) screwing the adjusting screw into place with a screw tool means having a turning angle, said screw tool means being

- controllable by the processor until contact is made with the bimetal strip, and subsequently being slackened back in accordance with a computational value calculated as a function of the measured variables determined in step (a);
- (c) heating the bimetal strip in a current-dependent heating, and measuring the time from the start of the heating until contact is made between the bimetal strip and adjusting screw and storing said time in the processor;
- (d) measuring, in case of a continued heating of the bimetal strip, according to step (c), a tripping time in the processor and storing said tripping time; and
- (e) correcting the setting of the adjusting screw with the screw tool means by an amount calculated based on the determined measured values, according to steps (c) and (d).

4,947,123

#### BATTERY STATE MONITORING APPARATUS

Yukihiko Minezawa, Anjo, Japan, assignor to Aisin Aw Co., Ltd., Anjo and Kabushiki Kaisha Shinsangyokaiatsu, Tokyo, both of, Japan

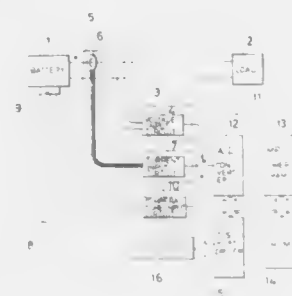
Filed Nov. 23, 1988, Ser. No. 274,569

Claims priority, application Japan, Nov. 30, 1987, 62-302443

Int. Cl.<sup>5</sup> G01N 27/46

U.S. Cl. 324—427

8 Claims



1. A battery state monitoring apparatus comprising: voltage measuring means for measuring terminal voltage of a battery;
- current measuring means for measuring charging and discharging current of said battery;
- temperature measuring means for measuring temperature of said battery;
- arithmetic means for receiving measurement values outputted by said voltage measuring means, said current measuring means and said temperature measuring means and for computing remaining battery life; said arithmetic means for performing a temperature correction including adder circuit means for increasing said computed remaining battery life based on said temperature correction when said battery is in a charging state; and
- remaining life display means for displaying said computed remaining battery life computed by said arithmetic means.

4,947,124

#### METHOD FOR CHARGING A NICKEL-CADMIUM ACCUMULATOR AND SIMULTANEOUSLY TESTING ITS CONDITION

Franz Hauser, Unterhaching, Fed. Rep. of Germany, assignor to Habra Elektronik GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 333,605

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1988, 3811371

Int. Cl.<sup>5</sup> G01N 27/416; H02J 7/04

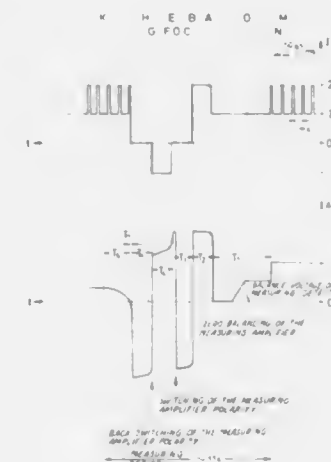
U.S. Cl. 324—430

27 Claims

1. A method for charging and simultaneously testing the condition of a nickel-cadmium accumulator using a pulsing DC charging current of rectangular pulse shape including periods

of low current intensity and periods of high current intensity, with cyclically intervening measuring phases including discharging intervals of relatively short duration, wherein the accumulator voltage is measured at the beginning of each high current-intensity period and at a preselected interval after the beginning of the respective period, and the difference of the thus measured voltage values is used for controlling the charging process, the method comprising for each measuring phase the steps of:

- a. providing a charging current pulse to be a rectangular pulse with a nominal current intensity  $I_N$ ;
- b. before the end of the charging current pulse of the nominal current intensity  $I_N$ , measuring the accumulator voltage (test O) and storing the measured accumulator voltage as a balancing voltage;
- c. charging thereafter the accumulator with a higher current intensity for a preselected period ( $T_2$ ) of about 1 to 2 seconds, the higher current intensity being higher than  $I_C$  which is the capacity of the accumulator, the higher current intensity being higher than the nominal current intensity, the accumulator voltage being measured about 0.2 sec after the beginning and at the end of this period ( $T_2$ ) (tests A and B);
- d. subsequently interrupting the current to the accumulator



- for a preselected period ( $T_3$ ) of about 1 to 2 seconds, the accumulator voltage being measured about 0.2 sec. after the beginning and at the end of this period ( $T_3$ ) (tests C and D);
- e. putting the accumulator under load with a load current of the magnitude  $-I_C$  for a preselected load period ( $T_4$ ) of about 1 to 2 seconds, the accumulator voltage being measured immediately before the beginning, about 0.2 seconds after the beginning, and at the end of the load period ( $T_4$ ) (tests E, F and G);
- f. subsequently interrupting again the accumulator current for a preselected period ( $T_5$ ) of about 1 to 2 seconds, the accumulator voltage being measured about 0.2 seconds after the beginning of this period ( $T_5$ ) (test H);
- g. resuming the charging operation with a subsequent charging current pulse;
- h. determining the respective internal resistances of the accumulator from the measured voltage values and the associated current intensities, and
- i. the internal resistances determined in one measuring phase are interrelated with one another, and the interior resistances determined in corresponding tests of successive measuring phases are interrelated with one another, to result in data relating to the condition, the use, the charging state, the temperature and the type of the accumulator.

4,947,125

#### METHOD AND DEVICE FOR DETERMINING OXYGEN IN GASES

Olivier De Pous, Chene-Bougeries, Switzerland, assignor to Honda Motor Co., Ltd., Tokyo, Japan

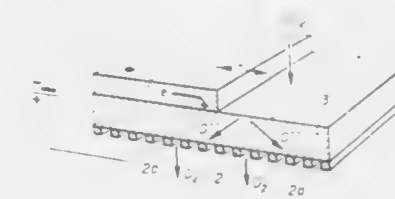
Filed Sep. 18, 1986, Ser. No. 908,714

Claims priority, application European Pat. Off., Oct. 1, 1985, 85810452.4

Int. Cl.<sup>5</sup> G01N 27/62

U.S. Cl. 324—459

9 Claims



1. A dry electrolytic cell sensor for determining the oxygen content of a sample gas without the use of a reference gas, the sensor comprising:

- (a) first electrode means acting as an anode, for the conversion of  $O^{2-}$  ions to  $O_2$  gas, said anode being formed from a porous electroconductive material which is not conductive of ions;
  - (b) second electrode means, acting as a cathode, for the conversion of  $O_2$  to  $O^{2-}$  ions, said cathode being formed from a nonporous electroconductive material which is not conductive of ions;
  - (c) solid electrolyte means for conducting  $O^{2-}$  ions between said anode and said cathode, the electrolyte separating said electrode means and being impermeous to the passage of  $O_2$ , and the electrodes being positioned in electronic contact with the electrolyte;
  - (d) power means for applying a DC voltage across said electrode means;
- wherein the anode and cathode are positioned on opposite facing sides of the electrolyte, and said electrolyte is from 50 to 500  $\mu m$  in thickness;
- wherein the nonporous cathode material is shaped so as to expose said electrolyte directly to a sample gas, an area of sample gas/electrolyte contact being defined by a cathode/electrolyte junction boundary line;
- wherein the ionic resistance of said electrolyte is not greater than  $10^3$  ohm/cm of said cathode/electrolyte junction boundary line;
- wherein the voltage applied by said power means is from 0.2 to 12 volts/cm of said cathode electrolyte junction boundary line;
- and wherein the electrolyte is heated to a temperature such that the internal resistance of the electrolyte to the flow of  $O^{2-}$  ions is about a tenth or less than the resistance associated with  $O_2$  ionization,
- so that the current flowing across the electrode means of the sensor is controlled by the rate of ionization of said  $O_2$  gas at the cathode area of contact.

4,947,126

#### GROUND FAULT CURRENT RECTIFICATION AND MEASURING CIRCUIT

William E. May, Lawrenceville; William A. King, Lithonia, and Jerry M. Green, Dunwoody, all of Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

Filed Apr. 4, 1989, Ser. No. 333,208

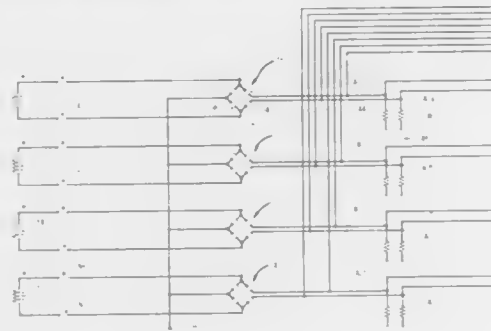
Int. Cl.<sup>5</sup> G01R 31/14

U.S. Cl. 324—509

19 Claims

1. An apparatus for producing a rectified signal corresponding to a current, the current alternating between a first voltage range and a second voltage range, the apparatus comprising:

means for producing a first signal representative of the alternating current; and  
 means for rectifying the first signal to produce a power source, the means for rectifying including:  
 a series connection of a first rectifying element, a first impedance element, a second impedance element and a second rectifying element, wherein the first rectifying element is connected to the first impedance element at a first junction, the first impedance element is connected to the second impedance element at a reference junction, and the second impedance element is connected to the second rectifying element at a second junction;



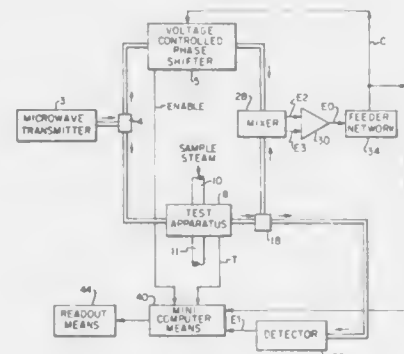
the means for producing a first signal representative of the alternating current being connected to the first rectifying element at a first input terminal and the second rectifying element at a second input terminal such that a second signal is produced at the first junction when the potential of the first input terminal is higher than the potential of the reference junction and a third signal is produced at the second junction when the potential of the second input terminal is higher than the potential of the reference junction.

**4,947,127**  
**MICROWAVE WATER CUT MONITOR**  
 David A. Helms; Gregory J. Hatton; Michael G. Durrett, all of Houston; Earl L. Dowty, Katy, and John D. Marrelli, Houston, all of Tex., assignors to Texaco Inc., White Plains, N.Y.  
 Filed Feb. 23, 1989, Ser. No. 314,337  
 Int. Cl.<sup>5</sup> G01R 27/02

U.S. Cl. 324—640 6 Claims  
 1. A petroleum stream microwave water cut monitor comprising:

test cell means for containing a reference petroleum multi-phase fluid sample and for having a sample stream of a petroleum stream flowing through it,  
 source means for transmitting microwave energy,  
 first antenna means connected to the source means for transmitting microwave energy into the petroleum sample stream or the reference sample,  
 second antenna means for receiving microwave energy that has passed through the petroleum sample stream or the reference sample and providing the received microwave energy as test microwave energy,  
 detector means connected to the second antenna means for detecting the power of the test microwave energy and providing a power signal corresponding thereto, and  
 indicator means connected to the second antenna means, to the source means and to the detector means for providing

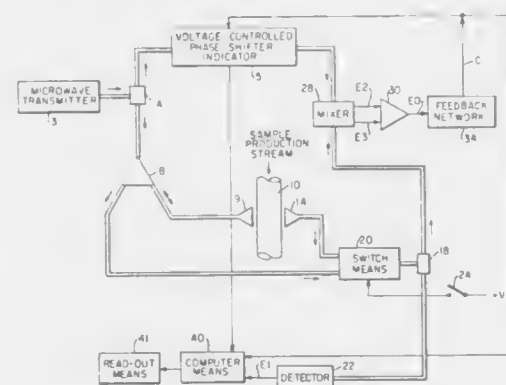
an indication of the water cut of the petroleum stream in accordance with the power signal and the phase difference between the transmitted microwave energy and the received microwave energy.



ence between the transmitted microwave energy and the received microwave energy.

**4,947,128**  
**CO-VARIANCE MICROWAVE WATER CUT MONITORING MEANS AND METHOD**  
 Gregory J. Hatton; David A. Helms; Michael G. Durrett; John D. Marrelli, all of Houston, and Joseph D. Stafford, Bellaire, all of Tex., assignors to Texaco IJN Inc., White Plains, N.Y.  
 Filed Feb. 23, 1989, Ser. No. 314,338  
 Int. Cl.<sup>5</sup> G01R 27/32

U.S. Cl. 324—640 10 Claims

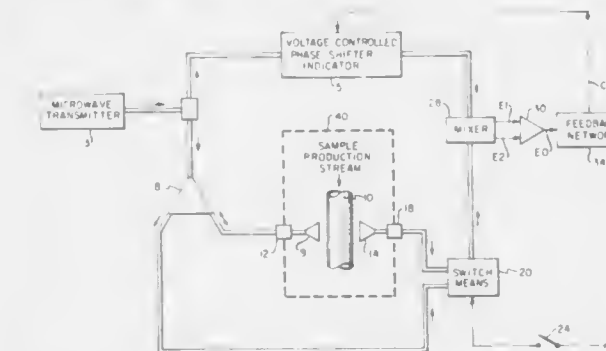


1. A petroleum stream microwave water cut monitor comprising:  
 test cell means for having a petroleum stream flowing through it while permitting microwave energy to enter the test cell means,  
 source means for providing microwave energy,  
 antenna means for providing the petroleum stream flowing in the test cell means with microwave energy and for receiving reflected microwave energy back from the stream in the test cell means,  
 circulating means connected to the source means and to the antenna means for providing the microwave energy from the source means to the antenna means and for providing reflected microwave energy from the antenna means as test microwave energy,  
 detector means connected to the circulating means for the

detecting the intensity of the test microwave energy and providing an intensity signal corresponding thereto, and  
 indicator means connected to the source means and to the detector means for providing an indication of the watercut of the petroleum stream in accordance with the intensity signal and the phase difference between the source provided microwave energy and the test microwave energy.

**4,947,129**  
**PETROLEUM STREAM MICROWAVE WATERCUT MONITOR**  
 David A. Helms, and John D. Marrelli, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.  
 Filed Dec. 5, 1988, Ser. No. 280,079  
 Int. Cl.<sup>5</sup> G01N 22/04

U.S. Cl. 324—640 8 Claims



1. A petroleum stream microwave watercut monitor comprising:

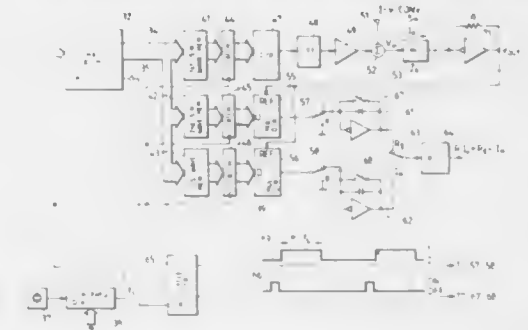
test cell means for having a petroleum stream flowing through it while permitting microwave energy to enter the test cell means,  
 source means for transmitting microwave energy,  
 antenna means for irradiating the stream flowing in the test cell means with microwave energy and for receiving reflected microwave energy back from the stream in the test cell means,  
 isolator means connected to the antenna means for passing microwave energy to and from the antenna means while isolating the antenna means from extraneous energies that may arise in the water cut monitor so as to prevent an accidental explosion due to those extraneous energies,  
 circulating means connected to the source means and to the isolator means for providing the microwave energy from the source means to the antenna means through the isolator means and for providing reflected microwave energy from the antenna means by way of the isolator means to be provided as test microwave energy, and  
 indicator means for providing an indication of the watercut of the petroleum stream in accordance with the phase difference between the transmitted microwave energy and the test microwave energy.

**4,947,130**  
**IMPEDANCE MEASURING APPARATUS**  
 Hitoshi Kitayoshi, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan  
 Filed Dec. 14, 1988, Ser. No. 284,352  
 Claims priority, application Japan, Dec. 23, 1987, 62-328276; Jan. 6, 1988, 63-1070; Mar. 9, 1988, 63-57150  
 Int. Cl.<sup>5</sup> G01R 23/16, 27/28

U.S. Cl. 324—650 13 Claims

13. An impedance measuring apparatus for measuring the impedance of a measuring object, comprising:  
 a phase accumulator for producing an accumulative output;  
 digital sine-wave generating means for generating a first digital sine wave, a second digital sine wave and a digital cosine wave based on the accumulative output;

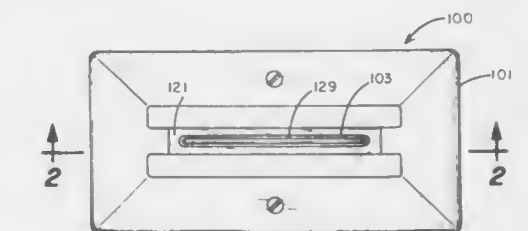
a D-A converter, coupled to said digital sine-wave generating means, for converting the first digital sine wave into a first analog signal which is supplied to the measuring object, the measuring object producing a measured output in response to the first analog signal;  
 multiplying type D-A conversion means for multiplying the measured output by the second digital sine wave to obtain a second analog signal, and for multiplying the measured



output by the digital cosine wave to obtain a third analog signal; and  
 integrating means for integrating the second and third analog signals for a period of time which is an integral multiple of the sine wave period to produce first and second integrated outputs which are components of the impedance of the measuring object.

**4,947,131**  
**CAPACITANCE BAR SENSOR**  
 William N. Mayer, White Bear Lake, Minn.; Roger Oestreich, River Falls, Wis., and Daniel W. Mayer, St. Paul, Minn., assignors to Modern Controls, Inc., Minneapolis, Minn.  
 Filed Apr. 21, 1989, Ser. No. 341,493  
 Int. Cl.<sup>5</sup> G01B 7/08

U.S. Cl. 324—671 6 Claims



1. A capacitance sensor for measuring thickness variations in film materials passed over and in contact with a relatively smooth housing surface, comprising  
 (a) a housing plate having an upper surface comprising said relatively smooth surface, and having an elongate slot therethrough opening into an enlarged recess extending through the bottom of said housing plate, said housing plate being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade;  
 (b) a sensor support plate affixed to said housing plate in said enlarged recess, said support plate being constructed of an insulator material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade, said material also having a dielectric temperature characteristic so as to produce a capacitance change with temperature no greater than  $1 \times 10^{-5}$  picofarads per degree centigrade;  
 (c) a sensor affixed to said sensor support plate, said sensor having an upstanding elongate portion sized smaller than



- said elongate slot, said upstanding portion being positioned centrally in said slot and having an upper surface projecting at least to said housing plate upper surface, said sensor being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade;
- (d) a bottom plate affixed against the lower side of said housing plate, said bottom plate being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade, said bottom plate further having at least one enlarged opening there-through aligned beneath said sensor support plate and said sensor; and
- (e) electrical conductor means for electrically contacting said sensor, said conductor means passing through said at least one enlarged opening.

4,947,132

# METHOD FOR DETECTING THICKNESS VARIATIONS IN THE WALL OF A TUBULAR BODY WHICH CONDUCTS ELECTRICITY

Alain Charoy, Echiroilles, France; Jacques Vermot-Gaud, Perly, Switzerland; Jean-Louis Prost, Geneva, Switzerland; Michel Kornmann, Grand Lancy, Switzerland, and Dieter Gold, Vion, France, assignors to Battelle Memorial Institute, Geneva, Switzerland

PCT No. PCT/CH87/00153, § 371 Date Jul. 25, 1988, § 102(e) Date Jul. 25, 1988, PCT Pub. No. WO88/04028, PCT Pub. Date Jun. 2, 1988

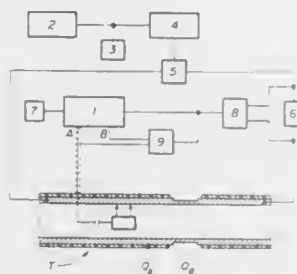
PCT Filed Nov. 18, 1987, Ser. No. 236,227

Claims priority, application Switzerland, Nov. 25, 1986, 4710/86

Int. Cl.<sup>5</sup> G01R 27/16

U.S. Cl. 324—699

4 Claims



1. Method for detecting thickness variations in a wall of a tubular body which is made of an electrically conducting material, comprising:
- supplying a reference alternating current to one face of the wall of this tube
  - measuring, on the other face, a signal which represents an evolution of a characteristic voltage of an electrical field between two electrodes which are spaced apart longitudinally from one another,
  - rejecting a part of the measured signal which is out of phase with the reference alternating current, and
  - varying at least one of the parameters from the group consisting of the distance between the electrodes, the longitudinal position of the two electrodes along the aforesaid body, and the frequency of the energization current.

4,947,133

# METHOD AND APPARATUS FOR AUTOMATIC SIGNAL LEVEL ADJUSTMENT

Louis D. Thomas, Cardiff, Wales, assignor to National Research Development Corporation, London, England

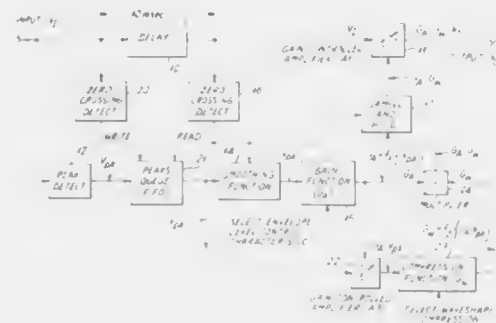
Filed Jan. 19, 1988, Ser. No. 145,099

Claims priority, application United Kingdom, Jan. 22, 1987, 8701365

Int. Cl.<sup>5</sup> H03K 5/08; H03G 3/00, 3/10

U.S. Cl. 328—168

15 Claims



1. Apparatus for automatic signal level adjustment comprising:
- control means for forming a first control signal which is a function of a weighted sum of a predetermined number, greater than one, of consecutive half cycle peak magnitudes of an input signal, whereby the first control signal is dependent on a frequency content of the input signal, and
  - processing means for operating on the input signal using a first control transfer function which varies in accordance with the first control signal to provide an output signal which at least partly depends on the first control signal.

4,947,134

# LIGHTWAVE SYSTEMS USING OPTICAL AMPLIFIERS

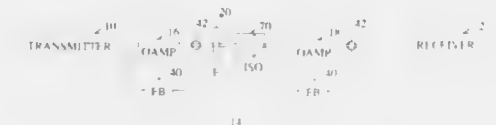
Nils A. Olsson, New Providence, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Oct. 30, 1987, Ser. No. 115,143

Int. Cl.<sup>5</sup> H01L 15/00; H01S 2/20

U.S. Cl. 330—4.3

19 Claims



1. In an optical communication system including a transmitter having a single longitudinal mode source for generating an optical radiation signal at a first optical frequency, a receiver of said signal, and a fiber optic communication link for carrying said signal from said transmitter to said receiver, amplification apparatus comprising
- a plurality of semiconductor optical amplifiers of said signal arranged in tandem within said link, each of said amplifiers having no significant degree of gain saturation and having a plurality of passbands at different frequencies and generating spontaneous emission noise within said passbands, said first frequency being located in one of said passbands, and
  - frequency selective filter means for reducing the amount of said noise, generated in any one of said amplifiers outside said one passband, which is amplified in another of said amplifiers,
- each of said amplifiers having a gain spectrum which exhibits a gain maximum at a frequency  $f_m$  which is greater than

said first frequency so that each of said amplifiers experiences a lower noise figure than it would if said first frequency were equal to  $f_m$ .

4,947,135

# SINGLE-ENDED CHOPPER STABILIZED OPERATIONAL AMPLIFIER

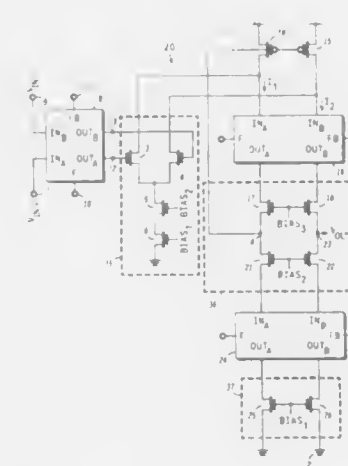
Dejan Mijuskoiv, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 28, 1989, Ser. No. 386,060

Int. Cl.<sup>5</sup> H03F 1/02, 3/16

U.S. Cl. 330—9

10 Claims



1. An operational amplifier having an improved offset error voltage, comprising:
- an output terminal;
  - a differential input stage having noninverting and inverting inputs coupled for receiving first and second input signals;
  - first switching means coupled between said differential input stage and the first and second input signals for alternately transposing the coupling of the first and second input signals to said noninverting and inverting inputs of said differential input stage at a predetermined frequency; and
  - output means coupled to said differential input stage and coupled to said output terminal for providing an output signal, said output means having first and second current paths and further having first and second currents responsive to the first and second input signals, wherein the first and second currents are alternately transposed in said first and second current paths at the predetermined frequency.

4,947,136

# VARIABLE GAIN DISTRIBUTED AMPLIFIER

David R. Helms, Liverpool, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,678

Int. Cl.<sup>5</sup> H03F 3/60

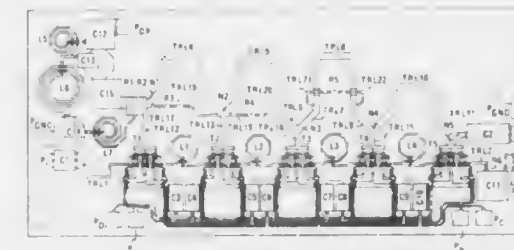
U.S. Cl. 330—54

8 Claims

1. A variable gain distributed amplifier comprising
- (A) a signal input terminal for application of signals to the distributed amplifier;
  - (B)  $m$  segmented dual gate field effect transistors (SDGFETs), each similarly subdivided into  $n$  selectively activated segments,
- each SDGFET having source, drain, and signal gate electrodes common to all segments with corresponding manifolds, and a control gate electrode divided into  $n$  segments disposed between the signal gate electrode and the drain electrode; and  $n$  control gate terminals, each control gate terminal selectively activating an associated segment of the SDGFET,
- each SDGFET segment having a predetermined width to

effect a desired increment in SDGFET transconductance ( $G_m$ ) when activated, the signal gate manifold to source capacitance ( $C_{GS}$ ) and the drain manifold to source capacitance ( $C_{DS}$ ) remaining constant and substantially unaffected by segment inactivation;

- (C) a first wideband low pass transmission line means for propagating signals from said signal input terminal to said successive signal gate manifolds at which power division occurs,
- said first transmission line means consisting of  $m$  successive shunt capacities to signal ground provided by the signal gate to source capacitances ( $C_{GS}$ ) of said SDGFETs, and ( $m-1$ ) serial first inductances interconnecting said signal gate manifolds in succession to effect a more wideband response and higher cut-off frequency;
- (D) a signal output terminal for the distributed amplifier;



- (E) a second wideband low pass transmission line means into which signals from said successive drain manifolds are constructively combined for propagation to said signal output terminal,
- said second transmission line means comprising  $m$  successive shunt capacities to signal ground provided by the drain to source capacitances ( $C_{DS}$ ) of said SDGFETs, and ( $m-1$ ) serial second inductances interconnecting  $m$  nodes in succession, to each of which a corresponding drain manifold is coupled to effect a more wideband response and higher cut-off frequency; and
- (F) a control network connected to said control terminals of said SDGFETs for selectively activating corresponding segments in each of said SDGFETs to effect equal  $G_m$ s in each SDGFET, the state of activation of said SDGFETs having a minimum effect upon the phase response of said distributed amplifier.

4,947,137

# PASSIVE FREQUENCY STANDARD

Giovanni Busca, Bevaix, and Leland Johnson, La Chaux-de-Fonds, both of Switzerland, assignors to Oscilloquartz S.A., Neuchatel, Switzerland

Filed Feb. 28, 1989, Ser. No. 316,835

Claims priority, application France, Feb. 29, 1988, 88 02593

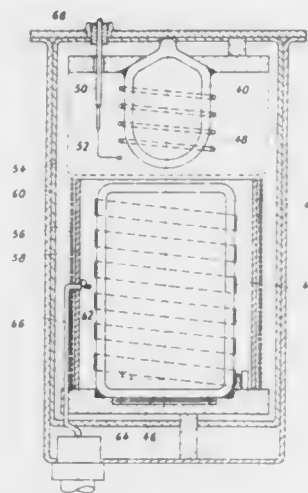
Int. Cl.<sup>5</sup> H01S 1/06; H03B 17/00; H03L 7/26

U.S. Cl. 331—94.1

14 Claims

1. A passive frequency standard comprising storage means, subjected to a uniform static magnetic field, for storing atomic or molecular elements in gaseous form, inversion means for producing elements within the storage means having a first energy state, interrogation means for stimulating at predetermined frequency a transition of energy level of the elements having said first energy level and slave means for controlling the predetermined frequency of said interrogation means as a function of a signal de-

pending from the radiation emitted by said stimulated transition, said interrogation means comprising a helicoi-



dal resonator and said storage means being situated within said helicoidal resonator.

4,947,138

## MICROWAVE OSCILLATOR DEVICES

Stewart B. Jones, Poynton, England, assignor to U.S. Philips Corp., New York, N.Y.

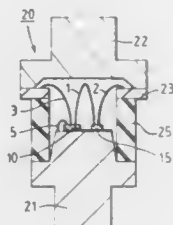
Filed Jun. 5, 1989, Ser. No. 361,526

Claims priority, application United Kingdom, Jun. 22, 1988, 8814889.5

Int. Cl.<sup>5</sup> H03B 5/18, 7/14

U.S. Cl. 331-96

14 Claims



1. A microwave oscillator device comprising a transistor body having first and second main electrodes and a control electrode, a microwave device envelope comprising an electrically insulating surround within which the transistor body is mounted on a base of the envelope, and electrical connections between the electrodes of the transistor body and electrical terminals of the device, of which a first terminal is provided by the base and of which a second terminal is carried by the surround, the connection to the second main electrode comprising in series at least first and second lengths of wire, the connection to the control electrode comprising a third length of wire, the second and third lengths of wire forming inductors in a feedback path between the control electrode and the second main electrode, characterised in that the envelope comprises an upper bonding area which is present adjacent the top of the surround and which is electrically connected to the second terminal, and a lower bonding area which is present adjacent the base and which is electrically insulated from the first terminal, in that the first main electrode is connected to the first terminal, in that the first length of wire extends to the lower bonding area, and the second length of wire extends from the lower bonding area to the upper bonding area, and the third length of wire extends to the upper bonding area, and

in that the connection of both the second and third lengths to the second terminal provides a dc coupling via the inductive feedback path in which the inductance of the connection between the second main electrode and the second terminal is higher than the inductance of the connection between the control electrode and the second terminal.

4,947,139

## VERY LOW INPUT POWER OSCILLATOR WITH IMPROVED AMPLITUDE STABILITY

John R. Tavis, Mariposa, Calif., assignor to Tavis Corporation, Mariposa, Calif.

Filed Jun. 13, 1989, Ser. No. 365,416

Int. Cl.<sup>5</sup> H03B 5/12; H03L 5/00

U.S. Cl. 331-109

5 Claims



1. An improved low power consumption amplitude stabilized oscillator circuit comprising:

- a sine wave oscillator having a first transistor pair with emitter and collector electrodes connected in push-pull arrangement, with the emitter electrodes connected across a primary winding of a transformer and with the collector electrodes connected across a secondary winding of the transformer, and further having a capacitive element connected across the secondary winding, the oscillator producing a sinusoidal output signal;
- a synchronous full wave phase sensitive demodulator means including a second switching transistor pair with emitter and collector electrodes connected in push-pull arrangement, connected to the oscillator for receiving sinusoidal signals representative of the amplitude of the output signal and producing a full wave D.C. rectified signal;
- a high frequency filter means connected to the demodulator means for smoothing the rectified signal to provide a control voltage;
- a reference signal source providing constant DC reference voltage; and
- an amplifier means connected to the filter means for comparing the control voltage to the DC reference voltage and producing a control signal output to the oscillator.

4,947,140

## VOLTAGE CONTROLLED OSCILLATOR USING DIFFERENTIAL CMOS CIRCUIT

Hisao Tateishi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 2, 1989, Ser. No. 415,689

Claims priority, application Japan, Sep. 30, 1988, 63-246379

Int. Cl.<sup>5</sup> H03K 3/354

U.S. Cl. 331-113 R

5 Claims

1. A voltage controlled oscillator comprising a differential circuit composed of first and second MOS transistors each having a drain connected to a gate of the other MOS transistor and each having a source connected to a constant current source, a capacitor connected to couple between the sources of said first and second MOS transistors, a first current mirror circuit having an input connected to the drain of said first MOS transistor and an output connected to said second MOS transistor, and a second current mirror circuit having an input con-

nected to the drain of said second MOS transistor and an output connected to said first MOS transistor, and a current



value of said current sources being controlled to change an oscillation frequency.

4,947,141

## OSCILLATOR NETWORK FOR RADIO RECEIVER

Simon Atkinson, Kent, and Francis Carr, Wiltshire, both of United Kingdom, assignors to Flessey Overseas Limited, Ilford, England

PCT No. PCT/GB88/00574, § 371 Date May 17, 1989, § 102(e) Date May 17, 1989, PCT Pub. No. WO89/00791, PCT Pub. Date Jan. 26, 1989

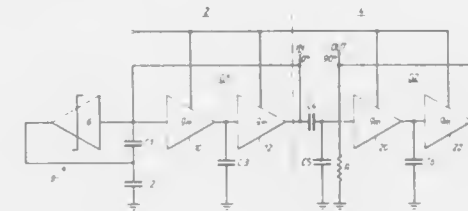
PCT Filed Jul. 18, 1988, Ser. No. 335,087

Claims priority, application United Kingdom, Jul. 17, 1987, 8716884

Int. Cl.<sup>5</sup> H03B 5/24

U.S. Cl. 331-135

5 Claims



1. A sinewave oscillator circuit fabricated as an integrated circuit, the oscillator comprising a main amplifier having its output coupled to its input in a feedback loop which includes a reactive network providing a required phase shift to sustain oscillations, the reactive network comprising a first capacitive means and a gyrator, the gyrator comprising a first amplifier whose output is coupled to a second capacitive means and to the input of a second amplifier amplifier, whose output is coupled in a feedback loop to the input of the first amplifier.

4,947,142

## ATTENUATION CONTROLLING BY MEANS OF A MONOLITHIC DEVICE

Reza Tayrani, 104 Pemmacook Rd., Tewksbury, Mass. 01876

Filed Dec. 23, 1987, Ser. No. 137,242

Int. Cl.<sup>5</sup> H01P 1/22

U.S. Cl. 333-81 A

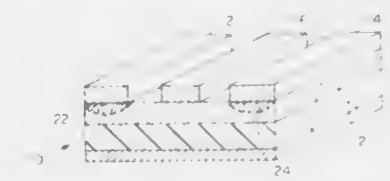
4 Claims

1. A monolithic device for controlling the transmission of RF energy comprising:

- a buffer layer having a predetermined conductivity, said buffer layer disposed on a semi-insulating substrate;
- doped regions selectively implanted in the buffer layer along two lateral lines, wherein the doped regions have a conductivity greater than the conductivity of the buffer layer;
- respective ground conductors disposed along each said lateral lines of doped regions to form an ohmic contact between each of said ground conductors and a respective one of said doped regions; and
- a signal conductor disposed directly on the buffer layer

between said ground conductors to form a Schottky contact between said signal conductor and said buffer layer;

a common ground plate, said semi-insulating substrate separating said buffer layer from said common ground plate, said semi-insulating



4,947,143

## MULTI-PORT POWER DIVIDER-COMBINER

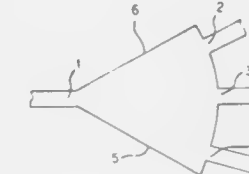
Mohamed D. Abouzahra, Burlington, Mass., and Kuldip C. Gupta, Boulder, Colo., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 23, 1989, Ser. No. 356,307

Int. Cl.<sup>5</sup> H01P 5/12

U.S. Cl. 333-125

9 Claims



1. A power divider/combiner comprising: electrical energy transport means, having an arcuate boundary region of substantially constant radius for transporting electrical energy; a first port, disposed substantially at the center of curvature of the arcuate boundary region, and lying at a boundary of the electrical energy transport means and in electrical communication therewith; and a plurality of second ports, disposed around the arcuate boundary region and in electrical communication therewith; wherein the electrical energy transport means and each of the ports includes a planar energy conductor element disposed parallel to a ground conductor and the ports are coplanar.

4,947,144

## DISTRIBUTION DEVICE FOR DISTRIBUTING VERY HIGH DATA RATE DIGITAL SIGNALS

Yves Le Nobaic, Plouaret, France, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed May 4, 1989, Ser. No. 347,449

Claims priority, application France, May 4, 1988, 88 05993

Int. Cl.<sup>5</sup> H01P 5/12

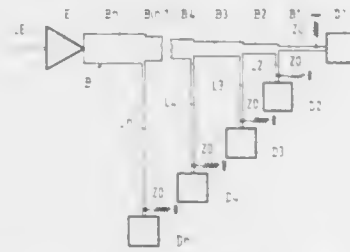
U.S. Cl. 333-128

17 Claims

1. A distribution device for distributing very high data rate digital signals to a plurality of digital signal processing circuits, the device comprising:



a digital transmitter;  
a distribution bus having a varying impedance and defining a plurality of adjacent bus lengths of different impedances, each said length being constant in width and having an arbitrary length, each successive said bus length having a reduced width compared to the immediately preceding bus length, the widest bus length being connected to the



digital transmitter, each change in width between two successive said bus lengths defining a respective junction, and  
a plurality of branch lines each having an arbitrary length and coupling a respective said junction with a respective said digital signal processing circuit, at least one said branch line having a length different from the length of a second said branch line.

4,947,145

**REMOTE-CONTROLLED CIRCUIT BREAKER**

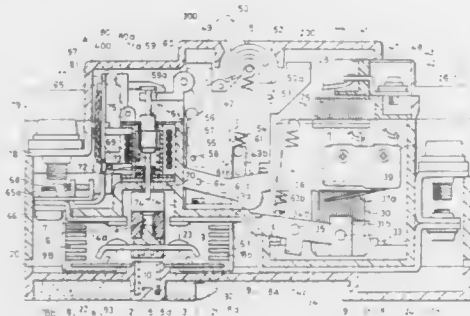
Hirotohi Ohishi; Tatunori Ikeda, and Manabu Sogabe, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,351

Claims priority, application Japan, Oct. 6, 1988, 63-252314  
Int. Cl.<sup>5</sup> H01H 73/00

U.S. Cl. 335—14

2 Claims



1. A remote-controlled circuit breaker comprising:  
a casing;  
a fixed contact fixedly mounted to said casing;  
a movable contact movably mounted to said casing to move in and out of contact with said fixed contact;  
an electromagnetic unit comprising an electromagnetic coil and a fixed iron core which are fixedly mounted to the casing and a movable iron core movably mounted to the casing to be attracted to the fixed iron core;  
a control lever which is pivotally mounted to the casing to actuate the movable contact into and out of contact with the fixed contact;  
operation means, including an operation handle, for releasably holding said control lever, said operation means forming a toggle and holding said control lever in a position for moving said movable contact out of contact with said fixed contact when said operation handle is in a first position and releasing said control lever to allow a prede-

termined rotation thereof when said operation handle is in a second position;  
an overcurrent tripping unit for causing said operation means and said control lever to actuate to move said movable contact out of contact with said fixed contact when a current greater than a predetermined value flows through said circuit breaker; and  
a switch which is connected in series with the electromagnetic coil, and linked to said operation handle in a manner to open when the operation handle is thrown to an OFF position, and to close when the operation handle is thrown to an ON position.

4,947,146

**ELECTROMAGNETIC CONTACTOR**

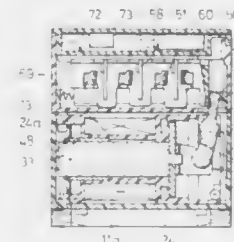
Yasuo Ichimura; Hidetoshi Matsushita; Kenji Kawasaki, and Youichi Aoyama, all of Osaka, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan and Klöckner-Moeller Elektrizitäts-GmbH, Bonn, Fed. Rep. of Germany

Filed Mar. 8, 1989, Ser. No. 320,546

Int. Cl.<sup>5</sup> H01H 67/02

U.S. Cl. 335—131

6 Claims



1. An electromagnetic contactor comprising:  
an electromagnetic block including:  
an armature having a plunger part with first and second axially spaced ends, and a pole-contacting part mounted on only one of said ends of said plunger part,  
a bobbin carrying a coil wound thereon and having an axial through-hole, said plunger part being inserted in said through-hole for displacement in an axial direction,  
an inner yoke disposed around a peripheral portion of said coil and having a first end portion opposing said pole-contacting part of said armature,  
an outer yoke having a second end portion opposing said inner yoke in axially spaced relation to said first end portion of said inner yoke for restricting said displacement of said pole-contacting part of said armature, and a third end portion extending substantially perpendicularly toward said plunger part of said armature, said third end portion having a width dimension extending in a direction parallel to said axial direction,  
a permanent magnet interposed between said inner and outer yokes in a direction laterally of said axial direction, and  
a magnetic cylinder of an axial length larger than said width dimension of said third end portion of said outer yoke and of an inner diameter slightly larger than an outer diameter of said plunger part, said magnetic cylinder being of continuous structure in its circumferential direction and inserted into said axial through-hole of said bobbin from an end of said bobbin disposed adjacent said third end portion whereby said magnetic cylinder is disposed laterally between said outer yoke and said plunger part for slidably guiding said plunger,  
a coupling means coupled to said armature of said electromagnetic block for axial displacement therewith, and  
a contact block including  
a group of stationary contacts, and  
a group of movable contacts coupled to said coupling means for making and breaking contact with said stationary contacts in response to said axial displacement

of said armature, one of said groups of contacts being spring loaded.

4,947,147

**HIGH VOLTAGE TRIP MECHANISM FOR SIGN SEGMENTS**

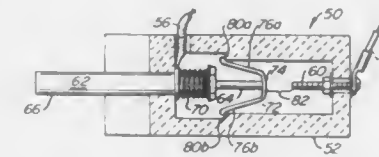
Robert W. Minogue, 25200 Carlos Bee Blvd., #379, Hayward, Calif. 94542

Filed Dec. 11, 1989, Ser. No. 448,788

Int. Cl.<sup>5</sup> H01H 61/00, 71/14

U.S. Cl. 337—18

2 Claims



1. An apparatus for resetably shunting a failed electroluminescent tube in response to an electrical potential established by failure of said tube, said apparatus comprising:  
a fireproof, dielectric enclosure having a closed interior and an exterior;  
a first electrical contact electrically communicated to one terminal of said electroluminescent tube, said first electrical contact extending into the interior of said enclosure;  
an actuating member interior of said enclosure mounted for movement towards and away from a position of electrical communication with said first electrical contact;  
a second electrical contact electrically communicated through said enclosure to a second terminal of said electroluminescent tube;  
means for biasing said actuating member towards said position of electrical communication with said first electrical contact;  
a bimetallic latching member coupled to said actuating member, said bimetallic latching element having a first end attached to said actuating member proximate an end of said actuating member adjacent said first electrical contact, and a second end contacting said closed interior of said enclosure;  
said enclosure defining at least one ledge for receiving and holding said second end of said bimetallic member;  
said ledge positioned to maintain a separation of said actuating member from said first electrical contact at a preselected distance enabling the electrical potential to establish an arc across said separation whereby when said electroluminescent tube fails, said arc heats said bimetallic member to cause said member to release from said ledge permitting said actuating member to move responsive to said bias to shunt the circuit between said first and second terminals.

4,947,148

**ELECTRICAL CUT-OFF DEVICE**

Francis D. MacDonald, 22 Glenhill Place, Guelph, Ontario, Canada (N1E 4G7)

Filed May 11, 1989, Ser. No. 350,561

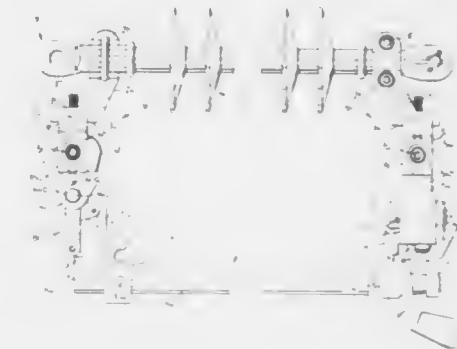
Int. Cl.<sup>5</sup> H01H 71/10, 71/20

U.S. Cl. 337—172

19 Claims

1. An electrical cut-off device for electrically connecting a pair of power lines interconnected by a substantially horizontally mounted insulator comprising:  
a pair of conductive terminals each for receiving one of said power lines, each of said terminals including securing means on one end thereof, said securing means securing each of said terminals to one end of said insulator so that said terminals extend downwardly therefrom to define outwardly and inwardly facing sides, one of said terminals having a passageway formed therein having an open end

in the outwardly facing side thereof, said passageway extending steeply downwards from said open end when said one terminal is extending downwardly from said insulator, said passageway being shaped at the other end thereof to define a bearing surface;  
releasable latch means located on the other of said terminals; and



a fusible link connectable in a substantially horizontal operative position between said one and other terminals to connect electrically said terminals, one end of said fusible link including means for slidably engaging in said passageway when said means is aligned with said open end, said fusible link being pivotal in said passageway when said means is positioned at the other end of said passageway to engage releasably the other end of said fusible link with said latch means.

4,947,149

**ELECTRICAL FUSE WITH IMPROVED CASING**

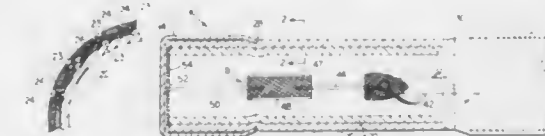
Robert M. Pimpis, Dover; Richard T. Oakes, South Hampton, both of N.H.; Michael D. Ellery, Newburyport, Mass., and Edward J. Knapp, Jr., Stratham, N.H., assignors to Gould, Inc., East Lake, Ohio

Filed Sep. 27, 1989, Ser. No. 413,453

Int. Cl.<sup>5</sup> H01H 85/14, 85/38

U.S. Cl. 337—246

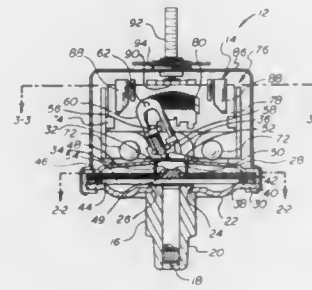
27 Claims



1. An electrical fuse comprising  
a fuse casing including a preformed inner structural tube and an outer layer formed in place thereon,  
a pair of terminals at the ends of said fuse casing, and  
a fusible element inside said casing and connected to said terminals,  
wherein said outer layer includes reinforcing fibers around said inner tube and resin bonding said fibers together, wherein said reinforcing fibers are multiple-filament reinforcing yarns that have been braided in a tubular shape around said inner tube, and said resin impregnates said yarns, said tubular shape having a hollow portion, said inner tube being within said hollow portion of said tubular shape.

**4,947,150**  
**PRESSURE SENDER**  
 Henry Wasserstrom, Chicago, Ill., assignor to Stewart Warner Corporation, Chicago, Ill.  
 Filed Feb. 15, 1989, Ser. No. 311,651  
 Int. Cl.<sup>5</sup> H01L 10/10  
 U.S. Cl. 338—42

8 Claims



1. A pressure sender, for use in a pressure monitoring electrical circuit, to be placed in communication with a fluid line under pressure to sense the pressure in the fluid line, said pressure sender comprising:

- a means for tapping into the fluid line to place said pressure sender in fluid communication with the fluid line;
- a diaphragm in air tight communication with the means for tapping into the fluid line, said diaphragm being constructed to deflect in response to pressure changes in the fluid line;
- a means for restricting the deflection of said diaphragm so that equivalent pressures in the fluid line always result in equivalent deflections of the diaphragm;
- an electrical contact positioned a distance from a side of said diaphragm opposite to that which faces said tapping means;
- a means for placing said electrical contact in mechanical communication with said diaphragm for displacing said electrical contact a distance proportional to the deflection of said diaphragm;
- a thick film variable resistor, having electrically conductive and electrically non-conductive portions, fixedly mounted to be in electrical communication with said electrical contact so that as said electrical contact is displaced by said diaphragm said electrical contact follows a path along said electrically conductive portion of said thick film variable resistor in proportion to the deflection of said diaphragm, to engender a corresponding electrical resistance;
- a means for providing electrical contact between said thick film variable resistor and an outer terminal by which the pressure sender is connected to the pressure monitoring electrical circuit and for mechanically securing said thick film variable resistor in place; and
- an electrically non-conductive holder mounted substantially perpendicular to said diaphragm, said holder being provided with tabs which define a channel within which said thick film variable resistor is positioned so that said electrically conductive portion of said variable resistor is in electrical communication with said electrical contact.

**4,947,151**  
**WHEEL MOUNTED MOTION AND TAMPERING ALARM**  
 Jerome C. Rosenberger, 10502 Acacia La., Fairfax, Va. 22032  
 Filed Mar. 24, 1989, Ser. No. 328,304  
 Int. Cl.<sup>5</sup> G08B 13/00

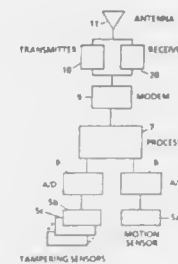
U.S. Cl. 340—426

20 Claims

1. A tampering and theft alarm system for a vehicle having at least a pneumatic tire, said system comprising:
- (a) a vehicle unit mounted within a pneumatic tire of a vehicle and including means for detecting an unauthorized

movement of the vehicle and generating an alarm signal in response to the unauthorized movement of the vehicle, a first transmitter for transmitting the alarm signal, a first receiver for receiving an enabling or disabling signal, means responsive to the enabling or disabling signal for enabling or disabling, respectively, said detecting means, and a first power source operably connected to said detecting means, said first transmitter, said first receiver and said enabling or disabling means;

(b) a control unit remote from the vehicle and including a second receiver for receiving the alarm signal from said first transmitter, alarm means operably connected to said

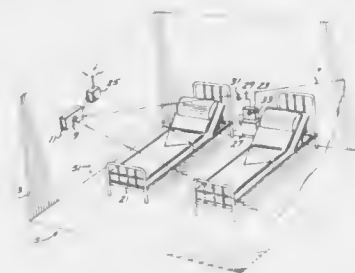


second receiver for being responsive to the received alarm signal, a second transmitter for transmitting the enabling or disabling signal to said vehicle unit, and a second power source operably connected to said second receiver, said alarm means, and said second transmitter;

(c) whereby when the detecting means is enabled by the enabling signal from said control unit and when said detecting means detects unauthorized movement of the vehicle, said vehicle unit transmits an alarm signal to said control unit thereby activating said alarm means and warning a person in the vicinity of said control unit of the unauthorized movement of the vehicle.

**4,947,152**  
**PATIENT MONITORING SYSTEM**  
 Harry A. Hodges, Escondido, Calif., assignor to Mesa Vista Hospital, San Diego, Calif.  
 Filed Feb. 10, 1986, Ser. No. 827,894  
 Int. Cl.<sup>5</sup> G08B 25/00  
 U.S. Cl. 340—573

22 Claims



1. A patient monitoring system for automatically activating a nurse call system, comprising:

- passive energy detecting means including a sensing element adapted for location on a wall in a hospital room remotely of any bed in the room whereby such bed may be moved independently of the sensing element, operative to generate an alert signal in response to a change in ambient energy resulting from intrusion by a patient into an alarm zone spaced above any bed in the room and extending from the sensing element generally horizontally across the room in a fan-shaped pattern of sufficient breadth that a

bed located at substantially any point in the room is at least partially under the zone;

nurse call activating means responsive to the alert signal to activate the nurse call system; and

signal carrying means to carry the alert signal from the detecting means to the nurse call activating means.

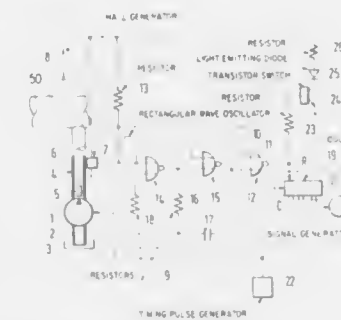
**4,947,153**  
**APPARATUS FOR MONITORING THE FLOW OF FLUID FROM A METERING PUMP**  
 Hermann Berger, Heidelberg, Fed. Rep. of Germany, assignor to ProMinent Dosiertechnik GmbH, Heidelberg, Fed. Rep. of Germany

Filed Aug. 29, 1989, Ser. No. 400,581  
 Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 3829512

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—608

14 Claims



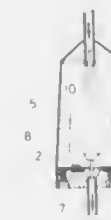
1. Apparatus for monitoring the flow of a liquid in an upwardly extending outlet of a metering pump which admits into the outlet metered quantities of liquid at preselected intervals, comprising a signal emitting sensor adjacent said outlet; a non-floating actuator provided in said outlet and operative to rise in said outlet from an inoperative position at least in response to the first of a series of successive admissions of liquid into said outlet to thereby induce the emission by said sensor of a presence indicating signal which persists until said actuator reassumes said inoperative position; evaluating means including alarm signal generating means; and an oscillator having input means connected with said sensor and output means connected with said evaluating means and arranged to transmit to said evaluating means signals with a delay, which equals or approximates one of said preselected intervals, only when the signal from said sensor persists for the duration of said delay.

**4,947,154**  
**ALARM DEVICE FOR DRIPPING INJECTION**  
 Feng-Lin Hwang, No. 21, Pa Te Rd., Chi Tu District, Keelung City, Taiwan

Filed Aug. 15, 1989, Ser. No. 393,728  
 Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—624

2 Claims



1. An alarm device for dripping injection which comprises:

a socket placed in the bottom part of a dripping liquid barrel, having connection to a touch switch;

a plug and power lead connected to said socket from a separate action box or a patient's room call assembly;

a float barrel located between a fluid inlet tube and an outlet tube in the dripping liquid barrel, said float barrel moving up or down vertically and comprising a barrel body with a bottom mid part having stuffing body, an upper guide arm, having stuffing body, and having a lower guide arm; said barrel body having a preset buoyancy in the fluid pool formed in said dripping liquid barrel, said upper guide arm having a cone-shaped upper half connected to said barrel body at its lower half, said said guide arm being inserted into the inlet tube for guiding vertical up or down movement for the barrel body and for adjusting inlet flow of the injection fluid; the bottom mid part of said float barrel provided with said stuffing body and lower guide arm, so that as injection fluid is near empty, said float barrel when losing support of the fluid pool is guided to descend to accurately block opening of the outlet tube with its stuffing body and, at the same time, the bottom floor of said float barrel touches a touch switch;

said touch switch placed in the lower part of the dripping liquid barrel, comprising a seat block, PC board, a resilient buttoned sheet containing a plurality of buttons, and press sheet; said block which, cylindrical in form, has an outlet and outlet tube provided in the center and, on the upper periphery outside the outlet, has two rings of fillisters provided, and an annular concavity provided therebetween whose dimension is adapted to said PC board for getting it positioned there; said PC board which, annular in form, has at least two copper foil circuits on the board surface, of which any two circuits if closed by a button of said buttoned sheet will cause power source of the action box to be actuated; the buttons on said buttoned sheet which, can take position by the resilient nature of said buttoned sheet, and will be overcome under a proper small amount of pressure to make its touching point in contact with circuits of said PC board thus to have the circuits closed; said buttoned sheet, which is provided with two rings of ridges on the bottom back face in addition to the two rings of fillisters on upper periphery of said seat block, pressed to be engaged with said seat block such that said PC board is sealed entirely away from the injection fluid; said press sheet comprising a touch board which has some holes cut on the board surface in number same as said buttons for them the protrude and has inner and outer packing rings and a hole ring provided on the board back face, combined with said seat block by means of three screw bolts provided on its sheet back face to pass three combination holes provided in said seat block and be locked securely by screws and rendered water-proof; and wherein the alarm device for dripping injection will send out alarming signals automatically as the injection fluid is used up and the fluid level drops allowing said float to move downward to cause said circuits to be closed.

**4,947,155**  
**LEAKAGE RESISTANCE DETECTOR AND ALARM CIRCUIT**

David E. Morrow, Richmond Hill, Canada, assignor to Electronic Surveillance Corporation, Markham, Canada  
 Filed Jun. 24, 1988, Ser. No. 211,243  
 Int. Cl.<sup>5</sup> G08B 21/00

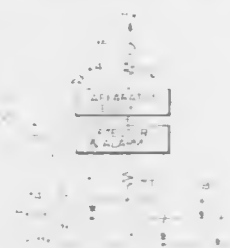
U.S. Cl. 340—650

9 Claims

1. In a leakage resistance detector and alarm circuit for signalling an alarm status when a sensed voltage exceeds a predetermined minimum voltage after a predetermined maximum time period during which said sensed voltage continues to exceed said minimum voltage, the improvement comprising:



means for automatically varying the predetermined maximum time period in accordance with the sensed voltage



and decreasing said time period as a function of the magnitude of said sensed voltage.

4,947,156

## HANDWRITTEN CHARACTER INPUT DEVICE

Takefumi Sato, and Kusuki Mori, both of Yamatokoriyama, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan Continuation of Ser. No. 210,139, Jun. 14, 1988, abandoned, which is a continuation of Ser. No. 797,891, Nov. 14, 1985, abandoned. This application Oct. 4, 1989, Ser. No. 418,824 Claims priority, application Japan, Nov. 16, 1984, 59-242604 Int. Cl.<sup>5</sup> G09G 3/02

U.S. Cl. 340—707

5 Claims



1. A handwritten character input device comprising: a dot-matrix display panel having dot coordinates; input means for generating magnetic flux; a tablet having detection coordinates corresponding to the dot coordinates of said display panel, said tablet being positioned next to said display panel and being responsive to magnetic flux from said input means; and coordinate conversion means for selectively permitting manual adjustment of said dot coordinates by a desired amount such that said dot coordinates are shifted vertically and laterally with respect to their corresponding detection coordinates; said dot coordinates on said dot-matrix display panel being selectively shifted to compensate for certain characteristics of a user of said handwritten character input device, said certain characteristics being at least parallax due to an altitude or posture of the user and a deviation in detection said magnetic flux due to the tilt of the input means.

4,947,157

APPARATUS AND METHODS FOR PULSING THE ELECTRODES OF AN ELECTROPHORETIC DISPLAY FOR ACHIEVING FASTER DISPLAY OPERATION  
Frank J. Di Santo, North Hills, and Denis A. Krusos, Lloyd Harbor, both of N.Y., assignors to 501 CopyTele, Inc., Huntington Station, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,598

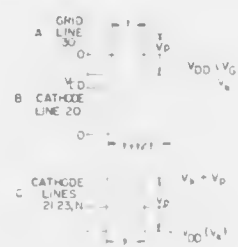
Int. Cl.<sup>5</sup> G09G 3/00

U.S. Cl. 340—787

20 Claims

1. Apparatus for driving an electrophoretic display in a write mode, which display is of the type having a plurality of grid lines insulated from a plurality of cathode lines with said grid

and cathode lines positioned perpendicular to one another to provide an X-Y matrix, and said display having an anode electrode, said display enabling a picture to be displayed on said cathode by selectively accessing intersecting grid and cathode lines each indicative of a pixel and varying the bias between said lines to cause said particles to migrate to said anode for each selected intersection, the improvement in connection therewith comprising:



means coupled to said grid line to provide a grid pulse on said line of a given duration and of a given polarity and amplitude indicative of a write bias for said grid line; means coupled to a selected intersecting cathode line associated with said grid line and selected according to a pixel to be written and to provide a cathode pulse to said cathode line of an opposite polarity to said grid pulse and commencing at the start of said grid pulse but having a longer duration than said given duration whereby said cathode pulse is present when said grid pulse terminates.

4,947,158

## METHOD AND APPARATUS FOR FILLING IN AN INNER REGION OF A PATTERN

Hiroshi Kanno, Shiroishi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 7, 1988, Ser. No. 164,901

Claims priority, application Japan, Mar. 13, 1987, 62-58508 Int. Cl.<sup>5</sup> G09G 1/00

U.S. Cl. 340—747

9 Claims



1. A method for filling a region inside a closed loop line of a pattern with pixel data having values identical to those of pixel data forming the loop line, comprising the following steps of: storing pixel data in an image memory; sequentially extracting one pixel datum of a pixel to be processed from the image memory, together with pixel data of its neighboring pixels by scanning the image memory at least one time, wherein the extracting step extracts four pixel data of pixels adjacent to said one pixel to be processed on the image memory in addition to said one pixel;

performing a logical operation for deciding whether or not a value of said one pixel datum should be changed to a value of the pixel datum identical to those of the pixel data forming the loop line, by using values of the pixel data of the neighboring pixels in addition to the value of said one pixel datum, wherein the image memory has a bit map of N rows and M columns, and wherein the logical operation is for deciding whether or not the following conditional expression is satisfied;

$$E + ((D + G) \times (C + F)) = 1$$

where a pixel datum E is a datum to be processed, a pixel datum C is positioned one column after and one row before the pixel datum E on the bit map, a pixel datum D is positioned one column before the pixel datum E, a pixel datum F is positioned one column after the pixel datum E, and a pixel datum G is positioned one column before and one row after the pixel datum E, and where a symbol + and × represent logical OR and AND operations, respectively; and

storing a result of the logical operation in a related storage region of the image memory in place of said one pixel datum.

4,947,159

## POWER SUPPLY APPARATUS CAPABLE OF MULTI-MODE OPERATION FOR AN ELECTROPHORETIC DISPLAY PANEL

Frank J. Di Santo, North Hills, and Denis A. Krusos, Lloyd Harbor, both of N.Y., assignors to 501 CopyTele, Inc., Huntington Station, N.Y.

Filed Apr. 18, 1988, Ser. No. 182,436

Int. Cl.<sup>5</sup> G09G 3/00

U.S. Cl. 340—787

17 Claims



1. In an electrophoretic display of the type having an anode electrode associated with an X-Y matrix manifesting grid and cathode electrodes to provide a display by causing pigment particles to be transported to said anode electrode during a Write Mode according to drive signals applied between said grid and cathode electrodes, the improvement therewith comprising:

constant current source means coupled to said anode electrode to provide a constant current to said anode electrode during said Write Mode and of a given polarity necessary to transport said particles to said anode electrode.

4,947,160

## MULTIPLEXED THIN FILM ELECTROLUMINESCENT EDGE EMITTER STRUCTURE AND ELECTRONIC DRIVE SYSTEM THEREFOR

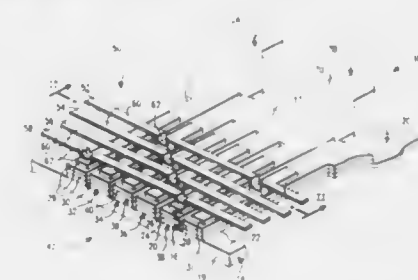
David Leksell, Oakmont, and Juris A. Asars, Murrysville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 343,697, Apr. 24, 1989, Pat. No. 4,899,184. This application Sep. 12, 1989, Ser. No. 408,391

Int. Cl.<sup>5</sup> G09G 3/00

U.S. Cl. 340—805

9 Claims



1. A second electrical source operable to generate a plurality of second electrical signals, each said second electrical signal including a positive signal portion and a negative signal portion, said second electrical source being operable to provide said plurality of second electrical signals to a thin film electroluminescent (TFEL) edge emitter structure connecting means, comprising:

positive current source means for receiving a positive amplitude input signal and shaping said positive amplitude input signal to form a positive signal portion; negative current source means for receiving a negative amplitude input signal and shaping said negative amplitude input signal to form a negative signal portion; a plurality of parallel channels each including a positive channel portion and a negative channel portion; said positive current source being connected with said plurality of parallel channel positive channel portions and said negative current source being connected with said plurality of parallel channel negative channel portions; each of said plurality of parallel channel positive channel portions being operable to receive said positive signal portion at an input thereto and each of said plurality of parallel channel negative channel portions being operable to receive said negative signal portion at an input thereto; means for causing the positive signal portion present at a particular channel positive channel portion to be outputted therefrom and thereafter causing the negative signal portion present at said individual channel negative channel portion to be outputted therefrom; and means for combining said positive and negative signal portions outputted from said particular channel positive and negative channel portions to form an individual second electrical signal.

4,947,161

## LIGHT BAR

Dean L. Dahnert, Fort Atkinson, Wis., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Division of Ser. No. 931,184, Nov. 17, 1986, Pat. No. 4,810,044.

This application Jan. 30, 1989, Ser. No. 302,784

Int. Cl.<sup>5</sup> G09G 3/14

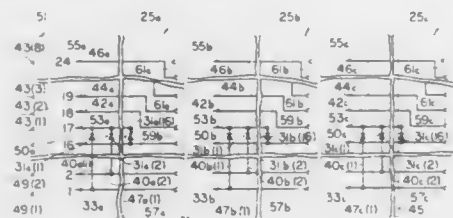
U.S. Cl. 340—815.03

5 Claims

1. A printed circuit board comprising:  
a. a plurality of first circuits, each first circuit including a light emitting device and having a separate source connector;  
b. a terminal circuit commonly joined to said first circuits and having a sink connector, whereby each first circuit

extends between said sink connector and a separate one of said source connectors;

- c. a branch circuit extending from each source connector and terminating in a further connector; and  
d. at least one first and second connector on said printed circuit board, and a conductor extending between said first and second connectors,



said second connector having the same position with respect to said further connectors that said sink connector has with respect to said source connectors, to enable external connections to said printed circuit board,

whereby said light emitting devices may be energized by the application of a voltage between said sink connector and the source connector to which the corresponding first circuit is connected.

4,947,162

# TERMINAL DEVICE FOR A MONITORING AND CONTROL SYSTEM

Tetsuo Kimura, Tokyo, Japan, assignor to Nittan Company, Ltd., Tokyo, Japan

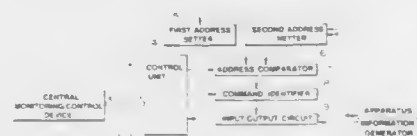
Filed Feb. 13, 1989, Ser. No. 309,302

Claims priority, application Japan, Feb. 17, 1988, 63-32906

Int. Cl.<sup>5</sup> G08B 17/00

U.S. Cl. 340—825,080

7 Claims



1. A terminal device adapted to effect transmission and receipt of information through address polling from a central monitoring and control device, comprising:

- first address setting means in which an address having a predetermined number of bits is preset;  
comparing means for comparing address data sent from said central monitoring and control device with said address having the predetermined number of bits and set in said first address setting means;  
second address setting means in which, when said address data sent from said central monitoring and control device coincides with said address set in said first address setting means, a new address having a fewer number of bits than that of said address set in said first address setting means is sent from said central monitoring and control device and is set,  
wherein after the new address is set in said second address setting means, said central monitoring and control device effects polling on the basis of said new address.

## 4,947,163 ELECTRONIC SECURITY SYSTEM WITH CONFIGURABLE KEY

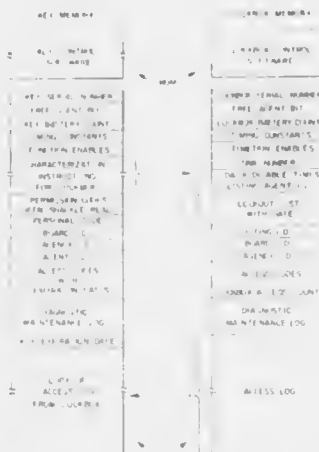
Walter G. Henderson, Corvallis; John Q. Archer, II, Salem; Gerald R. Daum, Salem; George A. Ellison, Salem; John E. Gray, Salem; Wayne F. Larson, Salem; Rockne M. Olds, Salem; Jerry P. Scansen, Portland; John W. Sherman, Corvallis, and Edgar J. Urein, Newberg, all of Oreg., assignors to Supra Products, Inc., Salem, Oreg.

Continuation of Ser. No. 192,834, May 11, 1988, abandoned, which is a division of Ser. No. 15,864, Feb. 17, 1987, Pat. No. 4,766,746, which is a continuation-in-part of Ser. No. 831,601, Feb. 21, 1986, Pat. No. 4,727,368, which is a continuation-in-part of Ser. No. 814,364, Dec. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 788,072, Oct. 16, 1985, abandoned. This application Sep. 11, 1989, Ser. No. 405,043

Int. Cl.<sup>5</sup> E05B 49/00

U.S. Cl. 340—825.31

9 Claims



1. A method of producing an electronic key for an electronic lock system comprising the steps:  
providing a key circuit with the capability to perform N different operations; and  
electronically inhibiting certain operations of the key circuit so that a user can operate the key to select operation of one of only M different operations, where M is less than N.

4,947,164

# FLIGHT PATH RESPONSIVE WIND SHEAR ALERTING AND WARNING SYSTEM

Charles D. Bateman, Bellevue, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Jan. 21, 1988, Ser. No. 146,317

Int. Cl.<sup>5</sup> G08B 23/00

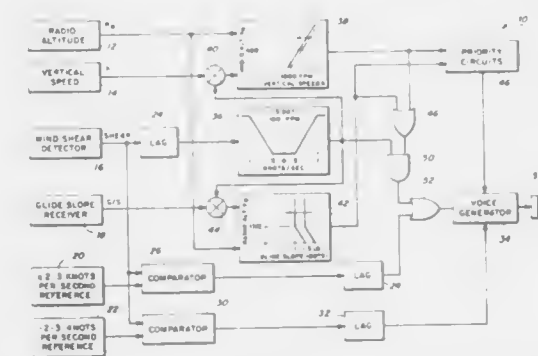
U.S. Cl. 340—968

6 Claims

1. A wind shear responsive alerting system for an aircraft comprising:

- means for receiving a signal representative of the deviation of the aircraft from the glideslope;  
means for receiving a signal representative of wind shear;  
means responsive to the glideslope deviation representative signal for providing a message to the pilot of the aircraft when the aircraft descends below the glideslope by a predetermined amount; and  
means responsive to the wind shear representative signal for reducing the amount of deviation below the glideslope required to provide a message to the pilot when the wind shear representative signal exceeds a predetermined value, wherein said glideslope deviation signal responsive means is operative to provide a first message when the aircraft descends below the glideslope by said predetermined amount and said wind shear signal responsive means is

operative to provide a second different message to the pilot when the wind shear representative signal exceeds



said predetermined value and said glideslope deviation representative signal exceeds said reduced amount of deviation.

4,947,165

# WINDSHEAR DETECTION FOR AIRCRAFT USING TEMPERATURE LAPSE RATE

Terry L. Zweifel, 7250 N. 30th Dr., Phoenix, Ariz. 85023

Continuation of Ser. No. 103,486, Sep. 30, 1987, abandoned. This application Sep. 20, 1989, Ser. No. 410,038

Int. Cl.<sup>5</sup> G08B 23/00

U.S. Cl. 340—968

3 Claims



1. A wind shear detection apparatus for an aircraft comprising:

- aircraft sensing means for providing output signals indicative of the altitude, total air temperature, and the air speed of said aircraft;  
means responsive to said altitude signal for providing a gating signal for each occurrence of a selected descent altitude increment of the altitude of said aircraft;  
means responsive to said gating signal, said total air temperature signal, and said air speed signal for providing an output signal representative of the empirical temperature lapse rate during each of said descending increments;  
means for counting successive gating signals corresponding to said descent altitude increments when said empirical temperature lapse rate is less than a first selected temperature lapse rate, and providing a first signal indicative of a count thereof in excess of a first selected count value;  
means for counting successive gating signals corresponding to said descent altitude increments when said empirical temperature lapse rate is greater than a second selected temperature lapse rate, and providing a second signal indicative of a count thereof in excess of a second selected count value;  
means responsive to said first and second signals for providing a third output signal representative of the condition that during descent of said aircraft (i) said empirical temperature lapse rate was less than said first selected temper-

ature lapse rate followed by (ii) said empirical temperature lapse rate being greater than said second selected temperature lapse rate; and

said first selected temperature lapse rate being selected such that said first signal indication represents an unstable atmospheric condition, and said second selected temperature lapse rate being selected such that said third output signal indication represents a high probability that said aircraft is experiencing a microburst atmospheric condition.

4,947,166

# SINGLE TRACK ABSOLUTE ENCODER

Sidney A. Wingate, Concord, and Gregory J. Rust, Arlington, both of Mass., assignors to Dynamics Research Corporation, Wilmington, Mass.

Continuation-in-part of Ser. No. 158,319, Feb. 22, 1988, Pat. No. 4,906,992. This application May 11, 1988, Ser. No. 193,245

Int. Cl.<sup>5</sup> H03M 1/24

U.S. Cl. 341—13

22 Claims

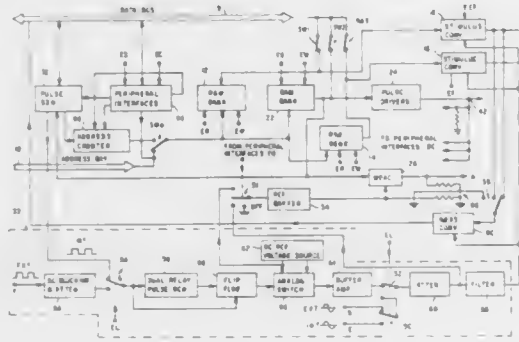


1. An absolute encoder providing a code of length N representative of absolute angular position comprising:

- a disc mounted for rotation about an axis, said disc having a single circumferential serial code track having a plurality n of binary segments, whereby each combination of a predetermined number N-2 of adjacent segments creates a code unique to said code track, where  $n=2^{N-2}$ , each representative of a particular one of a plurality of angular sectors that subtend  $2\pi/2^{N-2}$  radians;  
said disc further having one circumferential clock code track having a plurality 2n of alternating binary segments defining a clock code;  
means for reading said clock code track to produce a clock signal indicative of the transition of said clock code;  
means for reading said serial code track in response to said clock signal to produce a plurality of first code signals of length N-2, each representative of a particular one of said plurality of angular sectors;  
means responsive to said clock signal for providing a plurality of second code signals for each said first code signal, each representative of a partition of the corresponding one of said plurality of first code signals into a finer angular sector within each said angular sector; and  
means coupled to said first and to said second code signals to provide said code of length N representative of the rotary position of said disc.

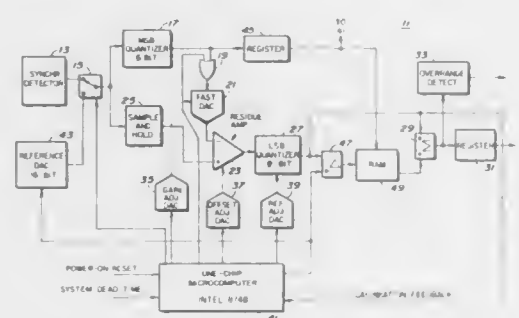


## 10 Claims



1. Apparatus for generating synchro/resolver stimulus signals, comprising:
- interface means for providing digital signals and for providing a plurality of control signals;
  - memory means connected to the interface means and responsive to a first of the control signals so that digital signals corresponding to synchro/resolver shaft angle position data provided by the interface means are written into said memory means;
  - the memory means being responsive to a second of the plurality of control signals so that said data signals are sequentially read out of said memory means at a rate corresponding to a function of synchro/resolver shaft angle versus time; and
  - converter means connected to the interface means and to the memory means and responsive to a third of the plurality of control signals for converting the signals read out of the memory means into synchro/resolver stimulus signals.

## 11 Claims

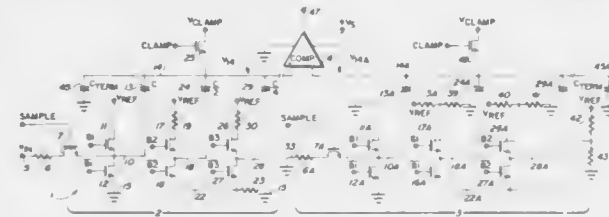


1. In a successive sub-ranging analog-to-digital conversion circuit having an adaptive error correction circuit, the improvement characterized in that:
- an input circuit for receiving analog data input signals and

analog test input signals and for selectively communicating said input signals to the analog-to-digital conversion circuit;

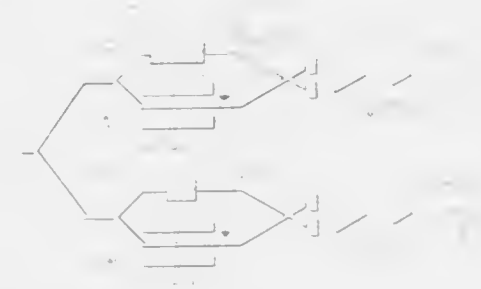
- a test circuit connected to the input circuit, said test circuit being operative to generate error correction signals to correct for errors in the operation of the analog-to-digital converter circuit, said test circuit comprising:
- control circuitry for generating a series of digital test signals, each of said test signals corresponding to an amplitude sub-range;
  - a first digital-to-analog converter for receiving said series of digital test signals and generating a respective series of corresponding analog test signals, said analog test signals being communicated to said input circuit; and
  - comparison circuitry for comparing each of the series of digital test signals with a corresponding first digital output signals from the analog-to-digital converter circuit, and for generating a digital error correction signal representative of the differences therebetween;
- a first memory storage device connected to said test circuit for storing the digital error correction signals corresponding to each of the respective series of digital test signals, said error correction signals being stored at memory locations addressable upon receipt of second digital output signals from said analog-to-digital converter circuit; and
- summing circuitry for generating third digital output signals by adding said digital error correction signals received from the first memory storage device to said first digital output signals received from the analog-to-digital converter circuit when analog data input signals are received at the input circuit.

## 20 Claims



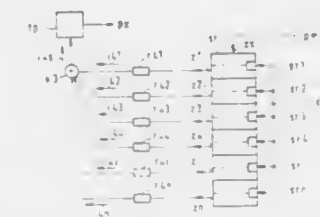
1. A method of improving the offset voltage of an analog-to-digital converter including a first CDAC and a second CDAC, the method comprising the steps of:
  - (a) turning on first and second FETs to charge a first charge summing conductor in the first CDAC to a first reference voltage and to charge a second charge summing conductor in the second CDAC to the first reference voltage, respectively;
  - (b) turning on a first sampling FET in the first CDAC, while the first and second FETs are on and charging a most significant capacitor in the first CDAC through the first sampling FET to an analog input voltage;
  - (c) turning the first and second FETs off by means of a control signal with a turn-off transition time, the first and second FETs each exhibiting substantially nonlinear parasitic capacitances and substantially nonlinear voltage-current properties;
  - (d) during step (c)
    - i. causing parasitic currents produced by the turning off of the first FET as a result of the nonlinear parasitic capacitances and the nonlinear voltage-current properties thereof to flow through a plurality of capacitors in the

## 21 Claims



1. An optical analog-to-digital converter including an plurality of conversion channels, each of said channels comprising:
  - a. an interferometer including first and second arms and first and second output ports, said first arm including a non-linear optical material which phase shifts a first optical signal passing through said first arm based on an intensity of light passing through said first arm;
  - b. means for applying a second optical signal to said interferometer such that said second optical signal is divided between and passes through said first and second arms;
  - c. first and second detectors for detecting an output signal from said first and second output ports respectively; and
  - d. a differential circuit coupled to said first and second detectors for generating a digital signal dependent upon the phase difference between output signals from said first and second output ports detected by said first and second detectors.

### 13 Claims



1. A circuit that averages a pulse-density-modulated signal, comprising:
- a shift register having n stages, said shift register having a serial input and a clock input, and having an output from each of said n stages, said serial input being fed with said pulse-density-modulated signal, said clock input being fed with a clock signal;
  - a summer fed with n state signals, each of said state signals being assigned to and dependent on the state of the output of one of said n shift register stages, said summer providing a sum output signal responsive to said state signals; and
  - a low-pass filter having an input and an output, said input connected to the sum output from said summer, said low-pass filter providing the averaged signal at its output.

## 5 Claims

lower bit digital/analog converter, said multi-bit digital data having fewer bits than said input digital data and corresponding to the plurality of lower bits of input digital data, and said multi-bit digital data comprising components for correcting an error emerging from said upper-bit digital/analog converter.

4,947,173

## SEMICONDUCTOR INTEGRATED CIRCUIT

Keisuki Okada, Sumitaka Takeuchi, and Masatoshi Kimura, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

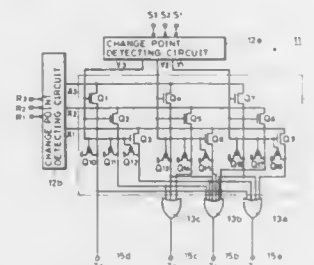
Filed Sep. 8, 1988, Ser. No. 241,877

Claims priority, application Japan, Sep. 9, 1987, 62-225547

Int. Cl.<sup>3</sup> H03M 1/36

U.S. Cl. 341-160

20 Claims



1. A semiconductor integrated circuit for providing a product of first and second analogue signals as digital output data, comprising:

- a first comparator group having a plurality of comparators for comparing said first analogue signal with a reference potential,
- a second comparator group having a plurality of comparators for comparing said second analogue signal with a reference potential, and
- means including a multiplying and encoding circuit for receiving outputs of said first and second comparator groups and for converting the outputs to digital data of a binary code corresponding to the product of said first and second analogue signals.

4,947,174

## VEHICLE SHIELD

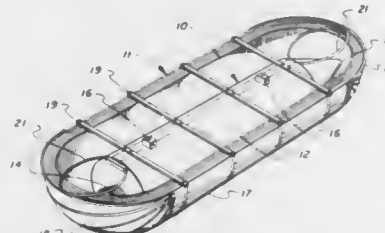
Theodore H. Lehman, Las Cruces, N. Mex., and William P. Manning, Tulsa, Okla., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 24, 1969, Ser. No. 802,310

Int. Cl.<sup>3</sup> H01Q 17/00; B64G 1/22, 1/54

U.S. Cl. 342-3

1 Claim



1. A radar attenuator shield for an attitude stabilized space vehicle comprising:

- a shell having a smooth completely convex surface for containing said vehicle,
- said shell having an opening and having a shape such that the mid-portion is one half of a cylindrical tubular form and each of the ends is one fourth of a spherical form,

said shell being made of a material comprising of a plurality of spaced apart attenuator sheets and reflective sheets, said cylindrical tubular form having an interior radius equal to at least the overall diameter of said vehicle and a length such that said vehicle is contained within said shield, and struts disposed across said opening to secure said vehicle within the shell.

4,947,175

## RADAR RANGE

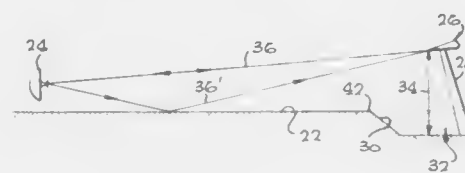
Denys D. Overholser, Roswell, N. Mex., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Dec. 27, 1983, Ser. No. 565,325

Int. Cl.<sup>3</sup> G01S 7/40

U.S. Cl. 342-165

12 Claims



1. An improved radar range comprising a ground plane; support means for supporting a target a selected height above said ground plane; transmitting means for directing for a selected period of time an electromagnetic wave at said target; means for increasing the time required for the portion of said electromagnetic wave scattered off said target toward said ground plane to return to said target; and receiving means for receiving for a selected period of time the portion of said electromagnetic wave that is backscattered by said target.

4,947,176

## MULTIPLE-BEAM ANTENNA SYSTEM

Shigehito Inatsune, Yoshimasa Ohashi, Takahiko Fujisaka, and Michimasa Kondo, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

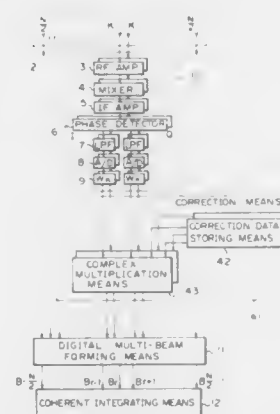
Filed Jun. 8, 1989, Ser. No. 363,490

Claims priority, application Japan, Jun. 10, 1988, 1-144301; Feb. 3, 1989, 63-25101

Int. Cl.<sup>3</sup> G01S 13/00

U.S. Cl. 342-173

7 Claims



1. A holographic multiple-beam antenna system capable of forming a plurality of beams at one time in different directions, comprising:

- an antenna array having a plurality of element antennas arranged in a predetermined configuration;
- a plurality of receiver means each connected to the corre-

sponding one of said element antennas for phase-detecting the signal received by said corresponding element antenna so as to output a digital complex signal which includes amplitude information and phase information; a plurality of correction means each adapted to receive the digital complex signal output from the corresponding receiver means and operable to correct the received digital complex signal on the basis of correction data preset in accordance with changes in characteristics of amplitude and/or phase that have occurred in the receiving path from said element antenna to said receiver means corresponding thereto, thereby removing the amplitude and/or phase errors from the digital complex signal; and multiple-beam forming means adapted to receive the corrected digital complex signals output from said plurality of correction means and to perform signal processing for forming a plurality of beams, whereby amplitude and/or phase errors occurring in the receiving paths are removed from the digital complex signals to enable highly accurate beams to be formed.

4,947,177

## NARROW BAND CORRELATOR AND NOISE CANCELLOR

Noel O. Fothergill, LaSerra, Italy, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Oct. 6, 1978, Ser. No. 952,248

Claims priority, application Canada, Apr. 11, 1978, 300839

Int. Cl.<sup>3</sup> G01S 7/292; H04B 1/10

U.S. Cl. 342-378

9 Claims



1. A signal processor comprising:

- (a) input means for receiving a narrow bandwidth signal to be detected combined with a first noise signal at one input terminal, and said signal to be detected combined with a second noise signal at a second input
- (b) adding means for providing a sum of the signals received at said terminals,
- (c) subtracting means for providing a difference signal of the signals received at the respective said input terminals,
- (d) multiplying means for providing a product signal of the sum and difference signals,
- (e) means for half wave rectifying the product signal to two rectified signals of opposite polarity, and for inverting the positive polarity rectified signal,
- (f) means for individually squaring the signal from each of said input terminals,
- (g) means for summing the inverted positive polarity rectified signal with a corresponding squared signal, and the negative polarity rectified signal with a corresponding squared signal, and
- (h) second adding means for adding the summed signals together.

4,947,178

## SCANNING ANTENNA

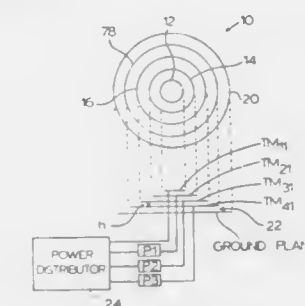
Lotfollah Shafai, 604 Kilkenny Drive, Winnipeg, Manitoba, Canada (R3T 3E1)

Filed May 2, 1988, Ser. No. 189,012

Int. Cl.<sup>3</sup> H01Q 1/38, 3/34

U.S. Cl. 343-700 MS

6 Claims



1. A scanning antenna, which comprises: a plurality of concentric antenna elements arranged in resonant modes so that each resonates at a different azimuthal mode and is functional to produce a radiated circular polarized field, and phase shift means operatively connected to said plurality of antenna elements to effect phase shifts between azimuthal modes so as to steer a combined antenna beam consisting of the individual beams provided by each antenna element, said field for the nth mode of said elements being expressed by the relationships:

$$E_{\theta} = f_n(\theta) e^{jn\phi}$$

$$E_{\phi} = g_n(\theta) e^{jn\phi}$$

where  $f_n(\theta)$  and  $g_n(\theta)$  are the  $\theta$ -dependent expressions of the radiated field, whereby for  $n=1$ , the radiation peak is along the  $\theta=0$  direction and for  $n>1$ , the radiated field is conical in shape and produces a null along the  $\theta=0$  direction, and as  $n$  increases, the beam peak moves towards larger  $\theta$  values.

4,947,179

## ANTENNA FOR A RADIO CONTROLLED TIMEPIECE

Wolfgang Ganter, Schramberg, and Arthur Kopf, Schramberg-Sulgen, both of Fed. Rep. of Germany, assignors to Junghans Uhren GmbH, Schramberg, Fed. Rep. of Germany

Filed May 17, 1989, Ser. No. 353,026

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3817943[U]; Dec. 23, 1988, 8815967

Int. Cl.<sup>3</sup> H01Q 1/12

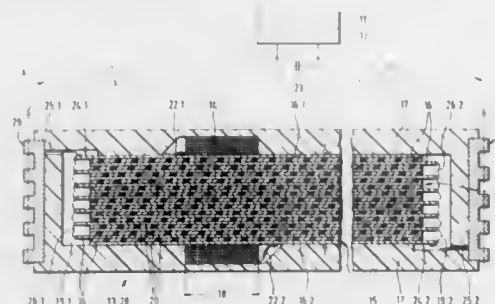
U.S. Cl. 343-718

24 Claims

1. An antenna for a small radio timepiece comprising a



flexible core disposed within a coil, said core and coil embedded within a flexible enclosure, whereby the antenna can be



bent into different configurations in a direction transversely of a longitudinal axis of the antenna.

4,947,180

## FM ANTENNA

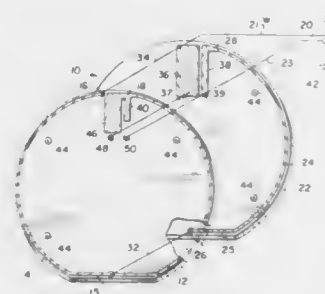
Larry Schotz, Mequon, Wis., assignor to Terk Technologies Corporation, New Rochelle, N.Y.

Filed Jun. 14, 1989, Ser. No. 365,805

Int. Cl.<sup>3</sup> H01Q 1/38, 7/00

U.S. Cl. 343—743

16 Claims



1. An antenna comprising:
  - a) an electrically insulating substrate;
  - b) an electrically conductive loop element on one side of said substrate, said loop element having first and second terminals which are adjacent each other;
  - c) an electrically conductive tap element on an opposite side of said substrate, said tap element extending substantially parallel to said loop element and having a length equal to approximately one half of the length of said loop element, said tap element having a third terminal which is diametrically opposite said first and second terminals of said loop element, said third terminal being electrically connected to said loop element, said tap element having a fourth terminal which is adjacent said second terminal of said loop element;
  - d) a first large capacitor plate connected to said first terminal;
  - e) a second large capacitor plate connected to said second terminal and electrically insulated from said first large capacitor plate, said first and second capacitor plates facing each other and forming a first capacitor connected between said first and second terminals;
  - f) a first small capacitor plate connected to said fourth terminal; and
  - g) a second small capacitor plate connected to said second terminal and electrically insulated from said first small capacitor plate, said first and second small capacitor plates facing each other and forming a second capacitor connected between said second and fourth terminals.

4,947,181

## ASYMMETRICAL BICONICAL HORN ANTENNA

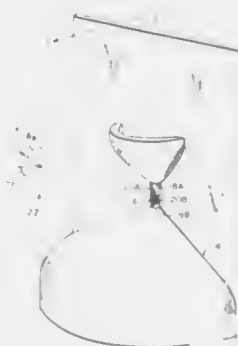
Kenneth W. Duncan; George S. Hardie, both of Santa Barbara, Calif.; Robert Jobsky, Amherst, Mass.; Michael J. Maybell, and Steven T. Wada, both of Santa Barbara, Calif. assignors to Raytheon Company, Lexington, Mass.

Filed Dec. 19, 1988, Ser. No. 285,919

Int. Cl.<sup>3</sup> H01Q 13/04

U.S. Cl. 343—773

5 Claims



1. An antenna comprising:
  - (a) a backplane;
  - (b) an upper section having a portion shaped as a cone split along a centerline from the base of the cone to the tip, said upper section mounted to the backplane;
  - (c) a lower section having a portion shaped as a cone split along a centerline from the base of the cone to the tip, said lower section larger than the upper section, and said lower section mounted to the backplane along the centerline with the tip of the lower section facing the tip of the upper section; and
  - (d) a waveguide passing through the backplane between the tip of the upper section and the tip of the lower section.

4,947,182

## METHOD OF FEEDING ELECTROMAGNETIC POWER FROM AN ANTENNA ELEMENT

Mats R. Andersson, Gothenburg, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

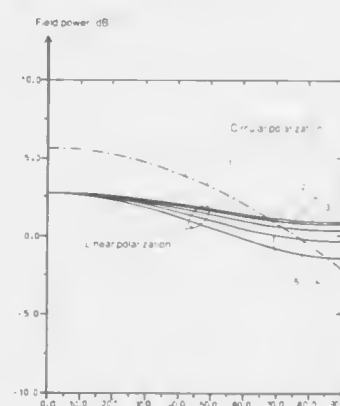
Filed Jul. 5, 1989, Ser. No. 375,595

Claims priority, application Sweden, Sep. 27, 1988, 8803418

Int. Cl.<sup>3</sup> H01Q 3/24, 1/28

U.S. Cl. 343—876

2 Claims



1. Method of selecting the polarization mode of an electromagnetic field transmitted from an antenna element, (2), which is arranged on a planar electrically conductive surface, out of

a linear polarization mode constituted either by a first polarization component (M1) or a second polarization component (M2), said first and second components being perpendicular to each other and parallel to said planar surface, and a circular polarization mode constituted by said first and second polarization components (M1, M2) together, the direction of said electromagnetic field having a certain elevational angle ( $\theta$ ) measured from a line perpendicular to said planar surface and an azimuth angle ( $\alpha$ ) measured from a fixed reference line on said surface, comprising the steps of:

- (a) selecting said circular polarization mode for the transmitted field from said antenna element when the elevational angle ( $\theta$ ) of said direction is less than a given angle ( $\theta_0$ ), and
- (b) selecting said linear polarization mode for the transmitted field from said antenna element when said elevational angle ( $\theta$ ) is greater than said given angle.

4,947,183

## EDGE TYPE THERMAL PRINTHEAD

Masanori Yagino, Toyonaka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

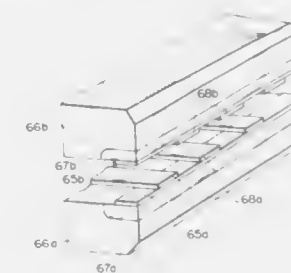
Filed Nov. 14, 1988, Ser. No. 270,784

Claims priority, application Japan, Nov. 14, 1987, 62-174338; Nov. 14, 1987, 62-287922

Int. Cl.<sup>3</sup> G01D 9/00

U.S. Cl. 346—76 PH

23 Claims



1. A thermal printhead assembly comprising:
  - a first substrate having a first main surface and a first main end surface;
  - a first array of heat-producing elements formed spaced apart from each other at a first predetermined pitch on said first main surface of said first substrate extending along and located close to said first main end surface;
  - a first electrode pattern formed on said first main surface of said first substrate and electrically connected to said first array of heat-producing elements;
  - a second substrate having a second main surface and a second main end surface;
  - a second array of heat-producing elements formed spaced apart from each other at a second predetermined pitch on said second main surface of said second substrate extending along and located close to said second main end surface;
  - a second electrode pattern formed on said second main surface of said second substrate and electrically connected to said second array of heat-producing elements;
 wherein said first and second substrates are fixedly attached together with their first and second main surfaces facing each other and said first and second main end surfaces aligned to define a combined array of said first and second arrays such that the heat-producing elements of said first array and the heat-producing elements of said second array are alternately arranged substantially at an equal interval; and
- further comprising a first plurality of IC chips mounted on said first surface of said first substrate and a second plurality of IC chips mounted on said second main surface of said second substrate and wherein said first substrate is formed with a second plurality of openings to receive

therein said second plurality of IC chips and said second substrate is formed with a first plurality of openings to receive therein said first plurality of IC chips.

4,947,184

## ELIMINATION OF NUCLEATION SITES IN PRESSURE CHAMBER FOR INK JET SYSTEMS

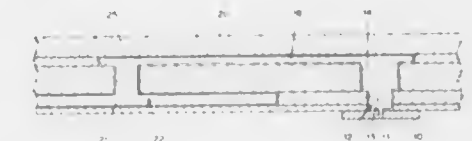
Edward R. Moynihan, Plainfield, N.H., assignor to Spectra, Inc., Hanover, N.H.

Continuation-in-part of Ser. No. 158,656, Feb. 22, 1988, abandoned. This application Jun. 9, 1989, Ser. No. 364,806

Int. Cl.<sup>3</sup> B41J 2/17, 2/045

U.S. Cl. 346—1.1

12 Claims



1. A pressure chamber for an ink jet system comprising a chamber formed by a plurality of wall segments, a supply of ink in the chamber having a selected surface energy, first aperture means extending through a wall segment and communicating with an ink jet orifice, second aperture means extending through a wall segment and communicating with an ink supply duct, and a layer of xylene polymer coating material forming a smooth, continuous, impermeable coating conforming to the configuration of the wall segments of the chamber, the coating being mechanically wettable by the ink, thereby eliminating nucleation sites for bubble formation when ink containing dissolved air within the chamber is subjected to a reduced pressure.

8. A method for preparing a pressure chamber for an ink jet system for use with ink having a selected surface energy comprising forming a chamber having a plurality of wall surfaces and having a first aperture for communication with an ink jet orifice and a second aperture for communication with an ink supply duct, and introducing a xylene coating material into the chamber so as to deposit a smooth, continuous coating of the material conforming to the wall surfaces of the chamber, the coating being mechanically wettable by the ink used with the system.

4,947,185

## THERMAL PRINTING SYSTEM WITH AUTOMATIC CRUMBLED PAPER RELEASE

Susumu Mitsushima, Ise; Kiyoshige Ishiyama, Mie; Takeshi Okuno, Mie, and Hiromitsu Ogita, Mie, all of Japan, assignors to Shinko Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,399

Claims priority, application Japan, Jun. 21, 1988, 63-81123[U]; Aug. 13, 1988, 63-106524[U]

Int. Cl.<sup>3</sup> G01D 15/10

U.S. Cl. 346—76 PH

5 Claims

1. A thermal printing system comprising:
  - a lower frame, an upper frame capable of being opened and closed with respect to said lower frame, a platen disposed at either one of said lower frame and upper frame, a pair of pinch rollers disposed on levers by support pins so as to be swingably urged by a resilient force and being oppositely faced with respect to each other so that both rollers of the pair are urged to press the surface of said platen from opposite sides, and wherein printing is performed by squeezing a paper sheet therebetween when said pair of pinch rollers are in a resiliently depressed state;
  - said thermal printing system further comprising a depression/release lever actuated in connection with a user's opening and closing of said upper frame with respect to

said lower frame, whereby an opening between said pair of pinch rollers is widened against said resilient force so



that a paper sheet in a crumpled state can be removed therefrom.

4,947,186

#### APPARATUS AND METHOD FOR A UV LASER IMAGE RECORDER

Ancel R. Calloway, Huntington Beach, and Jay H. Berman, San Pedro, both of Calif., assignors to The Aerospace Corporation, El Segundo, Calif.

Filed Sep. 22, 1988, Ser. No. 247,787

Int. Cl.<sup>3</sup> G01D 9/00, 15/14; H03F 7/00

U.S. Cl. 346—1.1

2 Claims



2. The process of developing an image in a processless electron recording medium (PERM) comprising the steps of:

- generating discrete light pulses from a laser;
- adjusting the duration and intensity of the light pulses so as to form a pulsed beam of ultraviolet light;
- applying the ultraviolet light to the PERM so as to expose the PERM; and
- adjusting the duration of the exposure, so as to develop red or blue color pixels.

4,947,187

#### INK JET PRINTER NOZZLE CLOGGING-PREVENTIVE DEVICE

Fusao Iwagami, Nara, Japan, assignor to Sharp Corporation, Osaka, Japan

Continuation of Ser. No. 166,712, Mar. 11, 1988, abandoned.

This application Jan. 18, 1989, Ser. No. 298,840

Claims priority, application Japan, Mar. 11, 1987, 62-56124

Int. Cl.<sup>3</sup> G01D 15/16; B41J 3/04

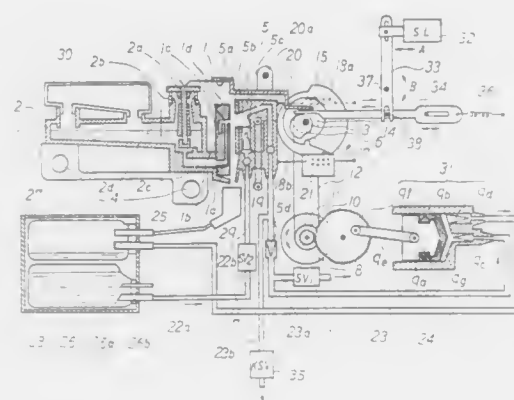
U.S. Cl. 346—1.1

7 Claims

1. An ink jet printer clogging-preventive device for positioning a carriage at a non-travel position when printing is not being performed by said printer and for covering a printing

head installed on the carriage with a cap member at the non-travel position, said device comprising:

- a moving mechanism including a cap member placed oppositely to the printing head of the carriage at said non-travel position and movable in a direction away from or near to said printing head and a drive source to move said cap member toward the printing head;
- a first opening/closing means to open and close an ink passage connected from said printing head to an ink supply tank when the printing head is covered with said cap member;
- a switching means to switch the inside of the cap member to a closed condition or to an atmospherically open condition when the printing head is covered with said cap member;
- a pump means connected to the inside of said cap member for providing a negative internal pressure in said cap member when the printing head is covered with said cap member;
- a maintenance liquid supply means to supply a maintenance liquid into said cap member;
- a second opening/closing means to open and close said maintenance liquid supply means;



a control means to control said moving mechanism, said first opening/closing means, said switching means, said pump means, said maintenance liquid supply means, and said second opening/closing means; and

a directing means to direct a recovery operation of a nozzle in the printing head if air enters said nozzle;

wherein said control means allows

- a first motion by which the cap member is moved toward the printing head for a non-printing condition with the printer power on and for a normal short-term printer power-off condition so as to cause the printing head to be covered with said cap member;
- a second motion by which the cap member is moved toward the printing-head for a long-term power-off condition, such as for printer transportation or for long-period printer stoppage or storage so as to cause the printing head to be covered with the cap member, and so as to cause the maintenance liquid supply means to be actuated to cause the cap member to be filled with the maintenance liquid; and
- a third motion by which, following said second motion and for a nozzle recovery condition, a negative internal pressure of the cap member is provided by the pump means so as to cause bubbles in the nozzle to be discharged.

#### 4,947,188 THERMAL HEAD AND THERMAL RECORDING APPARATUS USING THE SAME

Mineo Nozaki, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 184,887, Apr. 21, 1988, abandoned.

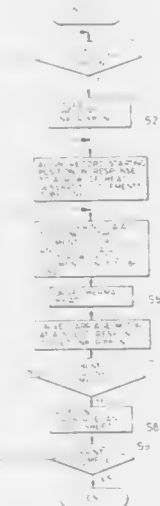
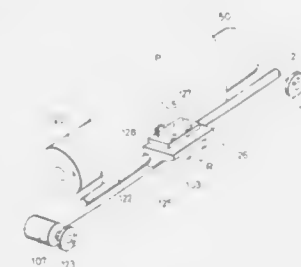
This application Nov. 14, 1989, Ser. No. 436,138

Claims priority, application Japan, Apr. 27, 1987, 62-101879; Apr. 27, 1987, 62-101880; Apr. 28, 1987, 62-103004; Apr. 28, 1987, 62-103005

Int. Cl.<sup>3</sup> G01D 15/10

U.S. Cl. 346—76 PH

28 Claims



1. A thermal recording apparatus for transferring ink of a thermal transfer medium to a recording medium so as to record an image on the recording medium, comprising:

- a thermal head having a plurality of parallel rows of heat generating elements at predetermined intervals;
- scanning means for relatively scanning said thermal head and the recording medium so as to perform image recording;
- setting means for selecting the type of thermal transfer medium to be used; and
- drive means for selecting and driving a row of heat generating elements in correspondence with the selected thermal transfer medium.

4,947,189

#### BUBBLE JET PRINT HEAD HAVING IMPROVED RESISTIVE HEATER AND ELECTRODE CONSTRUCTION

Hilarion Braun, Xenia, and Michael F. Baumer, Dayton, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1989, Ser. No. 350,887

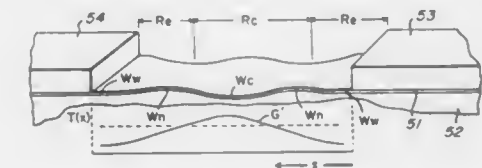
Int. Cl.<sup>3</sup> B41J 2/05

U.S. Cl. 346—140 R

7 Claims

1. In a bubble jet print head of the kind having ink drop ejection assemblies including heater elements formed of elec-

trically resistive material and respective address and reference electrode pairs formed of electrically conductive material and having electrode ends coupled to spaced terminal regions of said heater elements, an improved drop ejector assembly construction, for reducing expansion/contraction damage,



wherein said heater elements have a resistance to current flow between said electrodes that first increases and then decreases gradually from each of said terminal regions to the element midpoint between said terminal regions, whereby a moderated temperature gradient is achieved along the length of said heater elements between said terminal regions.

4,947,190

#### INK JET RECORDING APPARATUS COMPRISING MECHANISM FOR CONVEYING SHEET-LIKE CLEANING MEDIUM TO A RECORDING REGION, DISCHARGE RECOVERY TREATMENT METHOD EMPLOYED IN THE SAME, AND CLEANING SHEET ALSO EMPLOYED IN THE SAME

Nobutoshi Mizusawa, Sagami, Ryoichi Ebinuma, Hiratsuka, and Yuji Chiba, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

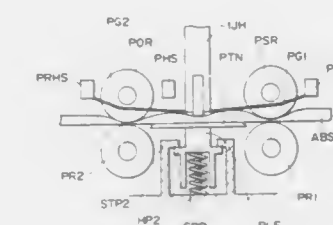
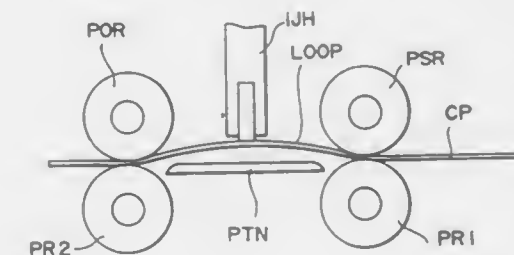
Filed Nov. 10, 1989, Ser. No. 269,679

Claims priority, application Japan, Nov. 11, 1987, 62-283089; Nov. 11, 1987, 62-283090; Nov. 11, 1987, 62-283091; Dec. 2, 1987, 62-303287; Dec. 2, 1987, 62-303288; Nov. 9, 1988, 63-281395

Int. Cl.<sup>3</sup> G01D 15/18; B41J 2/165

U.S. Cl. 346—140 R

30 Claims



1. An ink jet recording apparatus including operational modes, said modes comprising:

- a non-contact print mode in which a recording head records an image on a recording medium by selectively discharging ink, said recording medium being conveyed into a recordable region, wherein said recording head is opposed to but not in contact with said recording medium at a predetermined interval; and
- a contact cleaning mode in which a cleaning sheet, which



has been conveyed into said recordable region by using at least a part of a conveyance route for said recording medium, is brought into contact with said recording head to clean said recording head and is then discharged from said recordable region.

4,947,191

## INK JET RECORDING APPARATUS

Minoru Nozawa, Hiratsuka; Yutaka Koizumi, Tokyo; Toshihiro Mori, Hiratsuka, and Atsushi Saito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 276,302, Nov. 25, 1988, abandoned.

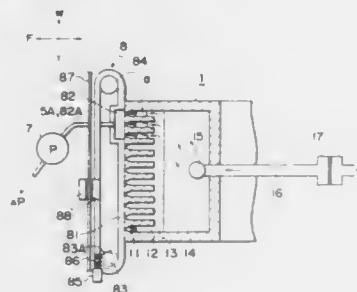
This application Sep. 21, 1989, Ser. No. 411,202

Claims priority, application Japan, Nov. 27, 1987, 62-297793; Nov. 27, 1987, 62-297793

Int. Cl.<sup>5</sup> G01D 15/18

U.S. Cl. 346—140 R

65 Claims



1. An ink jet recording apparatus comprising: an ink jet head having plural openings for discharging ink; partial capping means for covering a part of said plural discharging openings; and suction means for sucking the ink from said part of discharging openings through said partial capping means.

4,947,192

## MONOLITHIC SILICON INTEGRATED CIRCUIT CHIP FOR A THERMAL INK JET PRINTER

William G. Hawkins, Webster, and Cathie J. Burke, Brighton, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 164,669, Mar. 7, 1988, abandoned. This application Apr. 7, 1989, Ser. No. 336,624

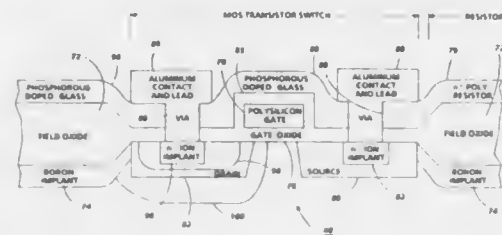
Int. Cl.<sup>5</sup> B41J 2/05

U.S. Cl. 346—140 R

4 Claims

1. A thermal ink jet printing module comprising an ink channel structure with a plurality of nozzles at one end and an ink supply at the other end, said structure fixedly adjoined to an integrated circuit which contains driver logic and resistive ink heating elements formed on the surface of a common silicon wafer, said circuit comprising, a p-type silicon substrate with a patterned field oxide layer

grown on said substrate, followed by gate oxide growth to form a gate oxide layer, at least one transistor switch having a source and drain region formed on said substrate surface said drain region comprising a lightly doped n-type drift region and an n<sup>+</sup> ion implanted region laterally displaced from the drift region, said transistor switch having an n-type polysilicon gate formed upon said gate oxide layer and in close physical proximity to said source and drain regions, and



conductive vias contacting said source and drain regions at said n<sup>+</sup> ion implanted region, said vias providing electrical connection between said transistor switch and said resistive elements whereby said n<sup>+</sup> ion implanted region in at least the drain region creates a carrier depletion region upon application of input signals to the vias resulting in a reduction in the electric field at the gate-drain p-n junction.

4,947,193

## THERMAL INK JET PRINthead WITH IMPROVED HEATING ELEMENTS

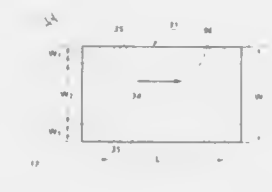
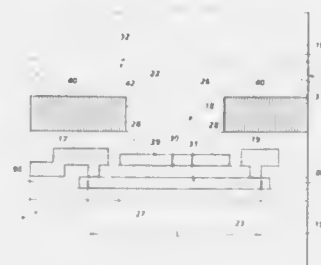
Narayan V. Deshpande, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 1, 1989, Ser. No. 346,056

Int. Cl.<sup>5</sup> B41V 2/05

U.S. Cl. 346—140 R

7 Claims



1. An improved thermal ink jet printhead having a plurality of droplet emitting nozzles, heating elements and addressing electrodes, and ink flow directing channels, the channels communicating with an ink manifold and with the nozzles, each heating element having an active region which contacts the ink and the addressing electrodes connecting to each heating element, so that selective application of electrical signals to the addressing electrodes cause the heating elements to eject and propel ink droplets from the nozzles to a recording medium, wherein the improvement comprises:

said heating elements having a resistive material layer that has a uniform thickness of at least 0.5  $\mu\text{m}$  and has non-uniform sheet resistance in a direction transverse to the

direction of current flow therethrough which is produced by the electrical signals, the non-uniform sheet resistance being of such predetermined value and location to provide a substantially uniform temperature profile along the transverse direction to the current flow, at a location near a center section of the active region of the heating element, so that the energy consumption required by the heating elements to eject a droplet is reduced and the temperature excursions of the heating element is minimized, thereby extending the life of heating elements.

4,947,194

## LIQUID INJECTION RECORDING APPARATUS HAVING TEMPERATURE DETECTING MEANS IN A LIQUID PASSAGE

Masayuki Kyoshima, Hiratsuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

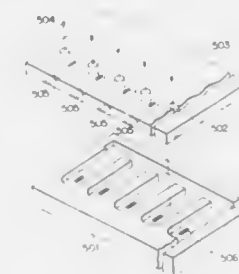
Continuation of Ser. No. 117,526, Nov. 6, 1987, abandoned. This application Aug. 11, 1989, Ser. No. 394,267

Claims priority, application Japan, Nov. 6, 1986, 61-264997

Int. Cl.<sup>5</sup> B41J 2/05, 2/195

U.S. Cl. 346—140 R

24 Claims



1. A liquid injection recording head comprising: a plurality of liquid passages each in communication with a corresponding orifice for discharging liquid, a plurality of energy generating members on a substrate, each said energy generating member corresponding to one of said liquid passages for generating energy used to discharge the liquid through said corresponding orifice, a plurality of temperature detecting elements on a cover plate secured to said substrate to form said liquid passages, each said temperature detecting element being disposed on an inner surface of one of said liquid passages substantially opposed to said corresponding energy generating member for individually detecting the temperature of the liquid in each said liquid passage, and heating means for individually heating the liquid in each said liquid passage in accordance with the temperature of the liquid detected by said corresponding temperature detecting element.

4,947,195

## LED PRINTER

James T. Flynn, and Yee S. Ng, both of Fairport, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 3, 1989, Ser. No. 375,153

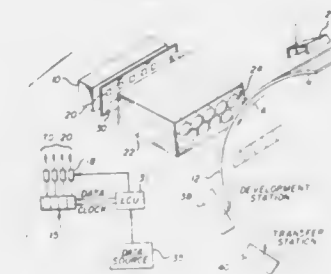
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346—155

17 Claims

1. A non-impact printer apparatus comprising a photoconductive recording medium having an electrostatic charge; a recording head having a plurality of light producing recording elements adapted to be selectively activated for recording on the recording medium; a lens array including a plurality of gradient index fiber optic elements for focusing light from the recording elements

onto the recording medium, the recording medium being located at the image plane of the lens array; and



a diffusion plate means located at the object plane of the lens array for diffusing light from the recording elements.

4,947,196

## CAMERA APPARATUS FOR MAGNETICALLY RECORDING ON FILM

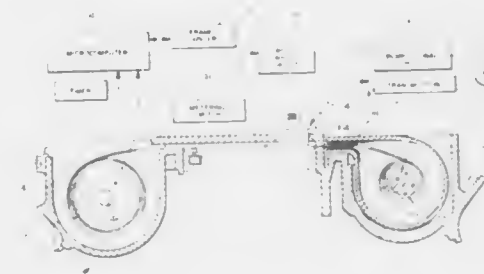
Michael L. Wash, Pittsford, and Conrad Diehl, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 254,906, Oct. 7, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 423,578

Int. Cl.<sup>5</sup> G03B 17/24

U.S. Cl. 354—76

7 Claims



1. A photographic still camera including a camera body for receiving a film cartridge and means for exposing film contained in the film cartridge, the film having a magnetic recording area and the cartridge having a lip for exiting film from the cartridge and orienting the cartridge within the camera body, said camera comprising: a magnetic recording head positioned in said body adjacent the lip of the cartridge for recording information on the film; and flexure means for movably supporting and constraining said head to motion in predetermined directions.

4,947,197

## SIMPLE CAMERA FOR USE WITH FILM CASSETTE HAVING FILM-EXPOSURE STATUS INDICATOR

David C. Smart, Rochester, and Dennis E. Baxter, East Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 14, 1989, Ser. No. 407,170

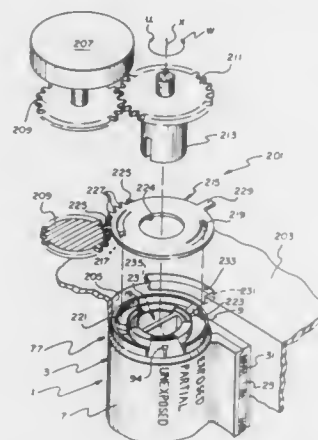
Int. Cl.<sup>5</sup> G03B 1/00

U.S. Cl. 354—214

8 Claims

1. A photographic camera to be used with a film cassette having a film-exposure status indicator movable from an unexposed position for providing a visible indication that a filmstrip within the cassette is unexposed, to a partly exposed position for providing a visible indication that the filmstrip is only

partly exposed, and to an exposed position for providing a visible indication that exposure of the filmstrip is completed, wherein said camera includes film drive means for changing a state of the filmstrip relative to the cassette and is characterized in that:





**4,947,203**  
CAMERA SYSTEM FOR ALTERNATELY INDICATING  
EXPOSURE TIME DATA, APERTURE VALUE DATA  
AND OVERRIDE DATA

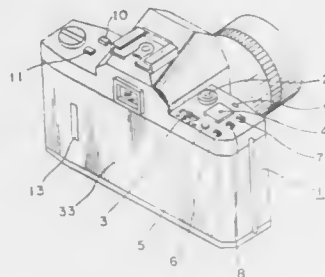
Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Osaka; Takeo Hoda, Sakai; Masaaki Nakai, Nara; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 220,066, Jul. 15, 1988, Pat. No. 4,860,046, which is a division of Ser. No. 43,758, Apr. 29, 1987, Pat. No. 4,763,144, which is a division of Ser. No. 888,600, Jul. 23, 1986, Pat. No. 4,712,904, which is a division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914. This application Feb. 13, 1989, Ser. No. 309,654

Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-139600; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453  
Int. Cl.<sup>5</sup> G03B 17/18

U.S. Cl. 354—475

6 Claims



1. A camera adapted to function with stored data, comprising:

- first means for storing exposure time data;
- second means for storing aperture value data;
- third means for storing override data;
- first means for normally indicating the stored aperture value data and also capable of indicating the stored override data in place of the aperture value data;
- second means for indicating the stored exposure time data; and
- means for disabling said second indicating means while said first indicating means is indicating the stored override data.

**4,947,204**  
PHOTOGRAPHIC PRINTER

Azuchi Endo, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 4, 1989, Ser. No. 417,166

Claims priority, application Japan, Oct. 4, 1988, 63-250710

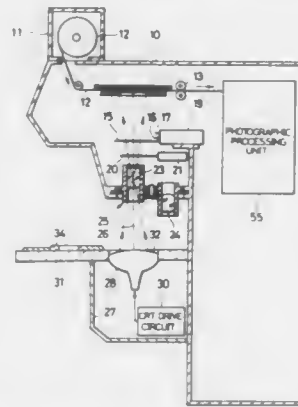
Int. Cl.<sup>5</sup> G03B 27/72, 27/80

U.S. Cl. 355—20

3 Claims

1. A photographic printer comprising:
- a CRT having a fluorescent screen;
  - a video image printing system for making a print of a video image displayed on said fluorescent screen of said CRT;
  - means for selectively displaying one of a video image and a light beam from said CRT;
  - a film image printing system using said CRT as a light source for making a print from a film; and

defocusing means for defocusing an electron beam by which said fluorescent screen of said CRT is stimulated to emit



illumination light without rasters when said CRT is used in said film image printing system.

**4,947,205**  
METHOD OF AND APPARATUS FOR POSITIONING  
PHOTOGRAPHIC ORIGINALS IN A COPYING STATION  
Gerhard Benker, Pullach; Wilhelm Nitsch; Bernd Payrhammer, both of Munich; Volker Weinert, Taufkirchen; Helmut Treiber, and Ulrich Klaueter, both of Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

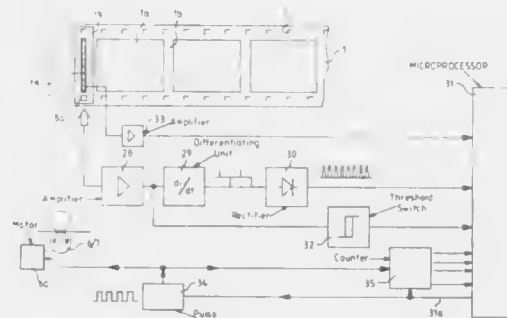
Filed Sep. 29, 1989, Ser. No. 415,065

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833732

Int. Cl.<sup>5</sup> G03B 27/52, 27/32; G01N 21/86; G01V 9/04

U.S. Cl. 355—41

32 Claims



1. A method of positioning coherent originals of a strip of photosensitive material, comprising the steps of conveying said photosensitive material between a first location and a second location of a predetermined path for a first time, said path having a portion in which said originals are to be temporarily positioned for an operation; measuring a predetermined parameter of each of a plurality of segments of said photosensitive material during the first passage between said locations to obtain predetermined values suitable for determining position coordinates of said originals; establishing a first position coordinate for each of said segments; calculating a second position coordinate for each of said originals using said predetermined values and said first position coordinates; conveying said pho-

**4,947,207**  
APPARATUS FOR EXPOSING PHOTOGRAPHIC  
MATERIALS

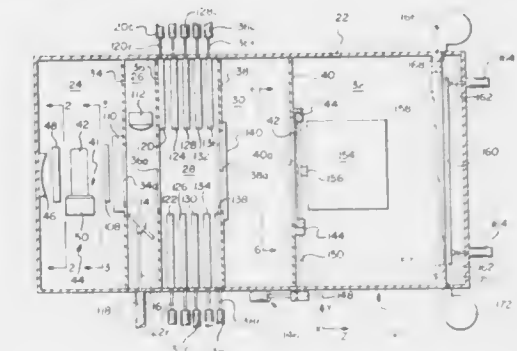
Kevin P. McGuire, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.J.

Filed Dec. 5, 1988, Ser. No. 279,629

Int. Cl.<sup>5</sup> G03B 27/72

U.S. Cl. 355—71

7 Claims



1. Apparatus for exposing photographic materials, including: an elongate opaque housing; baffles dividing said housing into a plurality of compartments disposed serially along said housing; a source of light of constant intensity and color temperature located in a first of said compartments; means for mounting photographic material for exposure in said housing remotely from said first compartment; said housing being adapted to prevent light other than from said source, being incident on said mounting means; each of said baffles having an aperture to allow light to pass from one compartment to the next, said apertures being aligned so that light from said source can reach the photographic material without reflection; and a shutter controlling passage of light out of said first compartment through the aperture in the baffle between the first compartment and its adjacent compartment.

**4,947,208**  
PROCESS CARTRIDGE AND IMAGE FORMING  
APPARATUS USING SAME

Teruo Komatsu; Ichiro Ohsawa, both of Yokohama; Shinji Goto; Nobukazu Adachi, both of Tokyo; Takashi Goto, Zushi, and Junichi Asano, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,250

Claims priority, application Japan, Dec. 22, 1987, 62-324647

Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—200

23 Claims

1. An image forming apparatus including separable first and second portions and usable with a process cartridge detachably mountable into said image forming apparatus:

- said first portion including,
  - a first supporting portion for detachably mounting and movably supporting the process cartridge which contains a photosensitive member and process means actable on said photosensitive member, and
  - a second supporting portion for movably supporting optical means for producing light information to be projected onto said photosensitive member; and
- said second portion of said image forming apparatus including,
  - first positioning means for supporting a positioning portion

tosensitive material between said locations for a second time; and positioning each of said originals in said portion of said path during the second passage between said locations, the positioning step being performed using said second position coordinates, and the positioning step including compensating for differences in movement of the photosensitive material during the first and second passages between said locations.

**4,947,206**  
COPYING APPARATUS

Masazumi Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

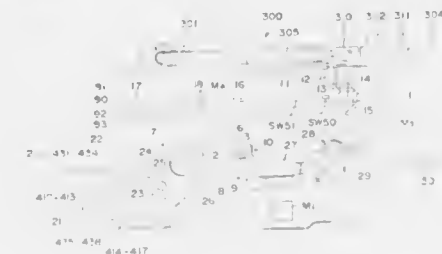
Filed Dec. 22, 1988, Ser. No. 288,134

Claims priority, application Japan, Dec. 25, 1987, 62-333395

Int. Cl.<sup>5</sup> G03B 27/52

U.S. Cl. 355—55

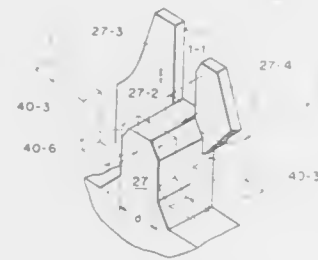
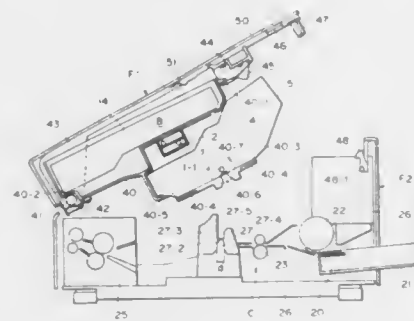
11 Claims



1. A copying apparatus having a paper size automatic selection function for automatically selecting papers of any desired size in a plurality of available sizes, said copying apparatus comprising:

- a photosensitive member;
- an image forming means for forming an image of an original document on said photosensitive member to transfer the image onto a copy paper;
- a plurality of paper supply means each accommodating a plurality of copy papers for supplying the copy papers one at a time to said image forming means;
- an original size detecting means for detecting the size of the original document to be copied;
- a copy paper size detecting means for detecting the size of the copy papers accommodated in said paper supply means;
- a magnification selecting means for selecting a desired magnification ratio;
- a first reference table for indicating a relationship among sizes of original documents based on an inch system of unit, magnification ratios and sizes of copy papers based on the inch system of unit;
- a second reference table for indicating a relationship among sizes of original documents based on a metric system of unit, magnification ratios and sizes of copy papers based on the metric system of unit;
- a table selecting means for selecting either one of said reference tables; and
- a control means for determining the size of copy papers appropriate to the detected size of the original document and the selected magnification ratio on the basis of the selected reference table to thereby select the paper supply means accommodating the copy papers of the desired size.

for said photosensitive member of the process cartridge, and



second positioning means for supporting a positioning portion for said optical means.

4,947,209

#### COPYING MACHINE CONTROL APPARATUS

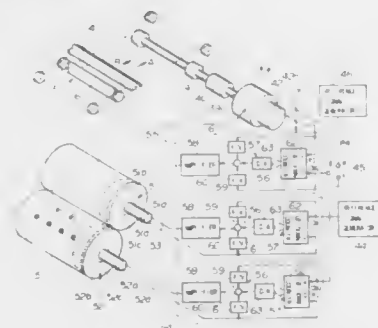
Satoru Maeno; Norio Fukuyama, and Tetsuo Ohishi, all of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan

Filed May 15, 1989, Ser. No. 351,766

Claims priority, application Japan, May 18, 1988, 63-121483  
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—204

4 Claims



1. In a copying machine control apparatus, said control apparatus comprising:

photoconductive drum driven rotatively by a first driving means to form an electrostatic latent image corresponding to an original;

scanning means provided movably with an operation of said photoconductive drum in a linear to and fro direction along the original and driven by a second driving means to apply illumination thereto;

first control means for supplying a first driving signal to said first driving means, in which said first driving signal is composed of frequency difference between a first refer-

ence pulse train for actuating said first driving means and a pulse train indicated by number of revolutions outputted from a first pulse encoder coupled to said first driving means;

second control means for supplying a second driving signal to a second driving means to operate said scanning means, in which said second driving signal is composed of a frequency difference between said first reference pulse train for actuating said second driving means and a pulse train indicated by number of revolutions outputted from a second pulse encoder coupled to said second driving means;

switching means for changing said first reference pulse train to a second reference pulse train to generate said second driving signal, in which a frequency of said second reference pulse train is higher than that of said first reference pulse train;

position controller provided in said first and second control means to generate a position control signal so that number of revolutions of said first and second driving means are harmonized with the said first reference pulse train, in which said position control signal is composed of a deviation between a total number of said first reference pulse train and each total number of said pulse trains outputted from said first and second pulse encoders, respectively;

speed controller provided in said first and second control means to generate a speed control signal which is composed of a frequency difference between a frequency of said first reference pulse train and each frequency of said pulse trains outputted from said first and second pulse encoders, respectively, and said speed controller adds said speed control signal to said position control signal to generate a driving signal which actuates said first and second driving means, respectively.

4,947,210

#### MULTI-COLOR COPYING MACHINE

Kenzo Nagata; Kazuhiro Araki, and Hirohisa Miyamoto, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 27, 1988, Ser. No. 212,247

Claims priority, application Japan, Jul. 1, 1987, 62-164164  
Int. Cl.<sup>5</sup> G03G 21/00

U.S. Cl. 355—218

2 Claims

1. A copying machine comprising:

a photosensitive member;

support means for supporting an original to be copied;

scanning means, which is movable under said support means from a start position to an end position, for scanning the original supported on the support means and projecting the scanned image of the original onto said photosensitive member thereby completing a single scanning operation to form an electrostatic latent image on said photosensitive member corresponding to the original;

eraser means for erasing the electrostatic latent image on the photosensitive member;

first developing means adapted to accommodate therein a mass of developer of first color for developing the electrostatic image on the photosensitive member with the first color developer;

second developing means adapted to accommodate therein a mass of developer of second color for developing the electrostatic image on the photosensitive member with the second color developer;

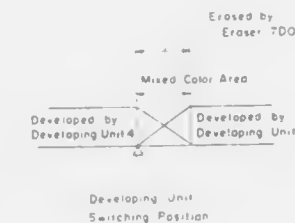
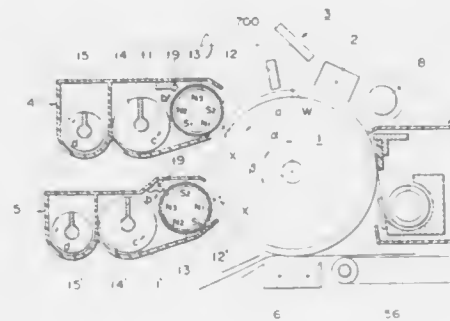
data input means for inputting a single input data which specifies a desired position located between the start position and the end position;

command input means for inputting a copy start command;

first control means for driving the first developing means and scanning means in response to the copy start command so as to partially develop the electrostatic latent image, formed by the scanning operation, from the start

position to the desired position with the first color developer;

second control means for stopping the operation of the first developing means and starting the operation of the second developing means in accordance with said single input data thereby completing the development of the electro-



static latent image formed by the single scanning operation from the desired position to the end position with the second color; and

third control means for operating said erasing means in accordance with said single input data so as to erase a predetermined range in the scanning direction with reference to said desired position.

4,947,211

#### DEVELOPING DEVICE

Taizo Ono; Yoshihiro Katayama, both of Hirakata, and Toshi Saitoh, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kodama, Japan

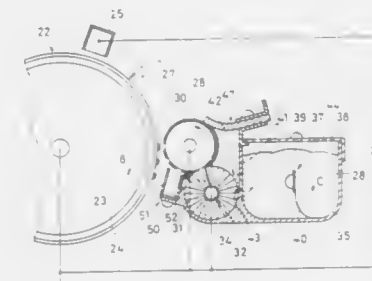
Filed Jul. 7, 1989, Ser. No. 376,569

Claims priority, application Japan, Dec. 2, 1986, 61-287015; Dec. 4, 1986, 61-289221; Dec. 4, 1986, 61-289222; Jan. 12, 1987, 62-4370; Jan. 12, 1987, 62-4371; Jan. 12, 1987, 62-4372

Int. Cl.<sup>5</sup> G03G 15/08

U.S. Cl. 355—265

19 Claims



1. A developing device comprising:

an electrophotographic light-sensitive member having an electrostatic latent image,

a developer storing means for storing developer therein, developer carrying means for carrying developer to said

electrophotographic light-sensitive member from said developer storing means comprising an endless-type developer carrying member and a second supplying means including a cylindrical elastic member contacting said developer carrying member for supplying developer to said developer carrying member and for returning superfluous developer at least adjacent to a contact part of said rotating cylindrical elastic member and said developer carrying means on the downstream portion from said contact part of said developer storing means,

first supplying means installed in said developer storing means for supplying said developer to said developer carrying means, and

developer returning means for returning developer from said developer carrying means to said developer storing means.

4,947,212

#### DEVELOPING APPARATUS WITH COLOR DEPENDENT TONER SUPPLY VOLTAGE

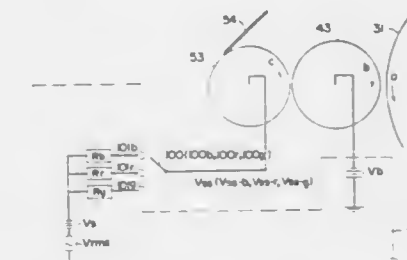
Akihito Ikegawa; Hiroshi Mizuno; Hiroshi Murasaki, and Kouichi Etou, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 18, 1988, Ser. No. 195,155

Claims priority, application Japan, May 19, 1987, 62-122850  
Int. Cl.<sup>5</sup> G03G 15/06

U.S. Cl. 355—265

8 Claims



1. An electrophotographic copying apparatus comprising: a main body;

a developing means, removably mounted on said main body, provided with a developing device having a developing sleeve which holds carriers on the outer surface thereof and a toner cartridge including a toner supply roller which confronts the developing sleeve; and

an electric power source means for respectively supplying a predetermined bias voltage to said developing sleeve and said toner supply roller so as to generate different predetermined electric potentials between said developing sleeve and said toner supply roller according to different colors of toner contained in said toner cartridge to be used.

4,947,213

#### PROJECTION COPYING APPARATUS

Shinji Murata; Kazuhiko Onuki, both of Tokyo; Masami Maetani, Ohmiya, and Kazuhide Sugiyama, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 196,795, May 17, 1988, abandoned, which is a continuation of Ser. No. 857,056, Apr. 29, 1986, abandoned. This application Dec. 13, 1989, Ser. No. 449,144

Claims priority, application Japan, May 16, 1985, 60-105293; May 16, 1985, 60-105294; May 16, 1985, 60-105295; May 23, 1985, 60-111215

Int. Cl.<sup>5</sup> G03G 21/00; G03B 13/28

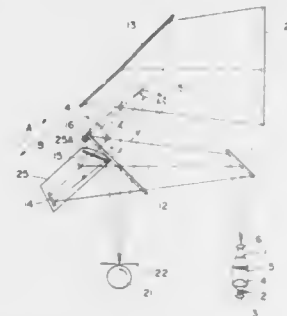
U.S. Cl. 355—271

17 Claims

1. A projection copying apparatus comprising: an image-forming lens;

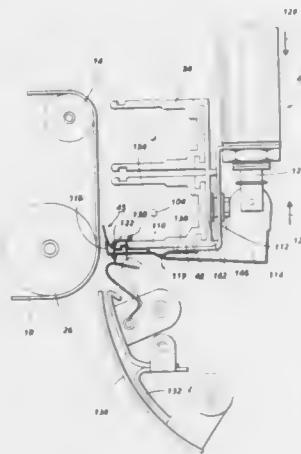


- a first reflection member disposed opposed to said image-forming lens to reflect the light transmitted through the lens;
- a second reflection member disposed in an optical path of reflection light by said first reflection member and movable in a direction transverse to said reflection light path;
- a third reflection member disposed in an optical path of reflection light by said second reflection member and movable in the same direction as said second reflection



- member, an optical path of reflection light by said third reflection member intersecting the optical path of incident light to said second reflection member;
- a photosensitive medium for receiving the light reflected by the third reflection member; and
- driving means for moving said second reflection member and said third reflection member in the direction inclined at a predetermined angle with respect to the optical path of the incidence light to said second reflection member.

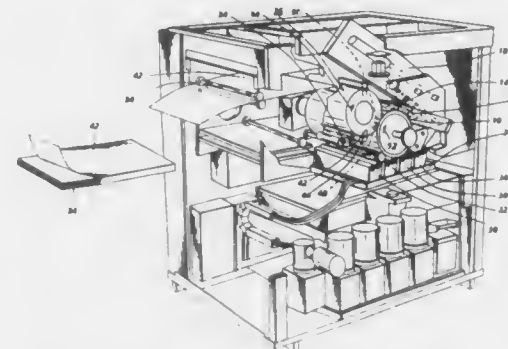
**4,947,214**  
**TRANSFER APPARATUS**  
 Douglas J. Baxendell, Rochester; Michael J. Cortash, Walworth; William G. Osbourne, Webster, all of N.Y., and Robert L. Thompson, Downingtown, Pa., assignors to Xerox Corporation, Stamford, Conn.  
 Filed Jan. 10, 1989, Ser. No. 295,427  
 Int. Cl.<sup>5</sup> G03G 15/00, 15/16  
 U.S. Cl. 355—274



1. An apparatus for transferring a developed image from a moving photoconductive surface to a moving copy sheet of a selected size, including:
- means for charging the copy sheet to attract the developed image from the photoconductive surface to the copy sheet; and
- means, adapted to move from a non-operative position spaced from the copy sheet to an operative position con-

tacting the copy sheet, for pressing the copy sheet into contact with at least the developed image on the photoconductive surface in the region of said charging means to substantially eliminate any spaces between the copy sheet and the developed image, said pressing means, in response to the selected size of the copy sheet, being adjustable to extend from at least one side of the copy sheet to at least the other side of the copy sheet in a direction substantially normal to the direction of movement of the copy sheet.

**4,947,215**  
**TRANSFER APPARATUS**  
 Thomas C. Chuang, West Chester, Pa., assignor to Xerox Corporation, Stamford, Conn.  
 Filed Nov. 15, 1989, Ser. No. 436,845  
 Int. Cl.<sup>5</sup> G03G 15/16  
 U.S. Cl. 355—274



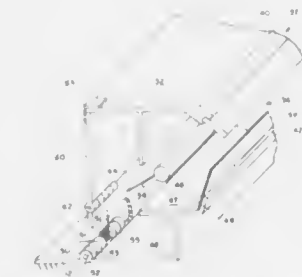
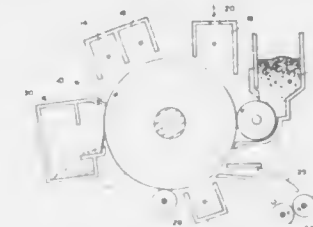
1. An apparatus for transferring a liquid image from an image support surface to a sheet, including:
- a deformable cylindrical member comprised of a dielectric material, said cylindrical member being deformed to define a transfer area when pressing the sheet against the image support surface;
- means, disposed interiorly of said cylindrical member in the region of the transfer area, for tacking the liquid image to the image support surface; and
- means, disposed interiorly of said cylindrical member in the region of the transfer area adjacent said tacking means, for transferring the liquid image from the image support surface to the sheet.

**4,947,216**  
**CLEANING BLADE ASSEMBLY FOR ELECTROPHOTOGRAPHY APPARATUS**  
 Tyrone N. Surti, 424 Harding Industrial Dr., Nashville, Tenn. 37211  
 Filed Feb. 21, 1989, Ser. No. 312,687  
 Int. Cl.<sup>5</sup> G03G 21/00

- U.S. Cl. 355—299
1. A cleaning device for an electrophotographic copying device wherein an electrophotographic latent image formed on the surface of a photosensitive member is moved past a series of processing stations including a developing station at which said latent image is developed with a toner to form a toner image, a transfer station at which said toner image is transferred to a copying material, and a cleaning station at which toner is removed from said photosensitive surface, comprising:
- support means for support of said processing stations;
- a cleaning housing pivotally mounted on said support means, said cleaning housing having a reservoir therein and an aperture extending longitudinal along said housing in communication with said reservoir to direct spent toner particles therein;
- a wiper blade secured to said housing adjacent to said upper longitudinal surface and extending therefrom, said blade

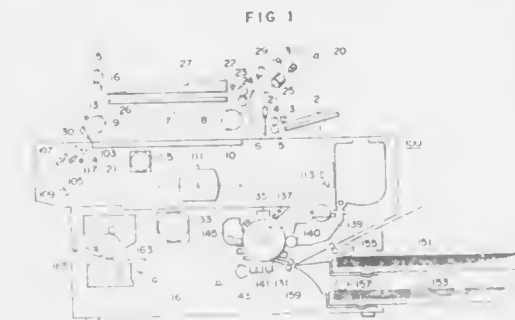
14 Claims

including a cleaning edge disposed for contact with the surface of said photosensitive member and for application of a predetermined pressure to said photosensitive surface responsive to said contact for cleaning said toner from said photosensitive surface; and



biasing means for biasing said blade against said surface of said photosensitive member for maintaining said predetermined pressure between said blade and said photosensitive surface.

**4,947,217**  
**IMAGE FORMING APPARATUS WITH CONTROL MECHANISM TO CORRECT ANY ABERRATION IN STOPPING POSITION OF ORIGINAL DOCUMENT**  
 Koichi Murakami, Yokohama, and Takeshi Honjo, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 21, 1988, Ser. No. 260,570  
 Claims priority, application Japan, Oct. 29, 1987, 62-271833  
 Int. Cl.<sup>5</sup> G03G 21/00  
 U.S. Cl. 355—317

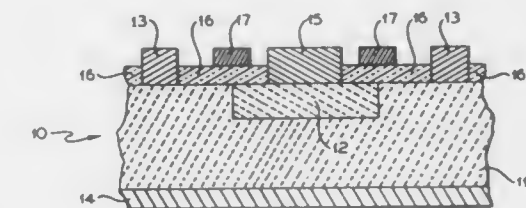


1. An image forming apparatus comprising:
- original document feeder means for feeding an original document to a predetermined position and for stopping the same thereat;
- signal generator means for generating pulse signals periodically in synchronism with the feeding of the original document;
- counter means for counting the number of pulse signals generated from said signal generator means during a period of time from occurrence of an instruction for an operation stop of said original document feeder means to an actual operation stop thereof;

image forming means for forming an image of the original document on a recording material; and

control means for controlling said image forming means in accordance with a counting value of said counter means so as to control the position of the image to be formed on said recording material.

**4,947,218**  
**P-N JUNCTION DIODES IN SILICON CARBIDE**  
 John A. Edmond, Apex, and Robert F. Davis, Raleigh, both of N.C., assignors to North Carolina State University, Raleigh, N.C.  
 Filed Nov. 3, 1987, Ser. No. 116,446  
 Int. Cl.<sup>5</sup> H01L 29/90  
 U.S. Cl. 357—13



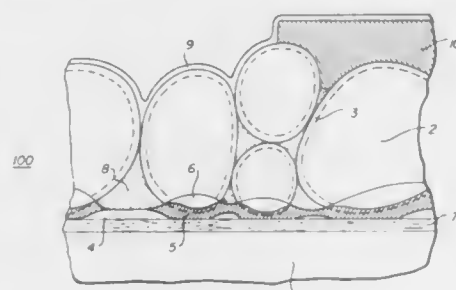
1. A planar diode suitable for operation under conditions of higher temperatures, higher power levels, and under higher radiation density than diodes formed from other semiconductor materials and comprising:
- a doped silicon carbide substrate having a first conductivity type;
- a doped well of silicon carbide within said substrate having the opposite conductivity type from said doped silicon carbide substrate, said doped well forming a p-n junction with said substrate, with portions of said p-n junction being adjacent the surface of said substrate;
- an insulation layer on said surface of said silicon carbide substrate and positioned over said p-n junction at said surface;
- an ohmic contact upon said substrate;
- an ohmic contact upon said well; and
- a conductor separate from either of said ohmic contacts and positioned upon the insulation layer directly above the p-n junction for permitting a separate potential to be applied directly to said portions of the p-n junction adjacent said surface of said substrate to thereby prevent the depletion zone adjacent the well from substantially expanding in a direction parallel to the surface of the diode.

**4,947,219**  
**PARTICULATE SEMICONDUCTOR DEVICES AND METHODS**  
 Marcus Boehm, Plainsboro, N.J., assignor to Chronar Corp., Princeton, N.J.  
 Filed Jan. 6, 1987, Ser. No. 860  
 Int. Cl.<sup>5</sup> H01L 29/06, 27/14, 31/00  
 U.S. Cl. 357—20

1. A particulate semiconductor device comprising a substrate with a metallic layer thereupon;

15 Claims

a barrier layer between said metallic layer and said substrate;  
a particulate layer of particles upon said metallic layer;



an alloy of said metallic layer and said particles between said substrate and said particulate layer; and  
a further layer upon said particulate layer.

4,947,220

# YOKED, ORTHOGONALLY DISTRIBUTED EQUAL REACTANCE AMPLIFIER

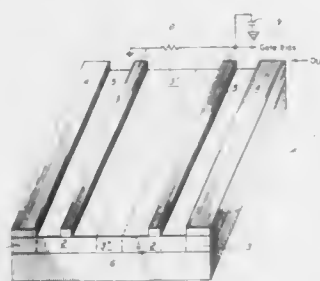
Max N. Yoder, 6512 Truman La., Falls Church, Va. 22043

Filed Aug. 27, 1987, Ser. No. 89,892

Int. Cl.<sup>3</sup> H01L 29/48, 29/161; H03F 3/16

U.S. Cl. 357—22

12 Claims



1. A Field Effect Transistor device comprising:  
one or more field effect transistor stages formed in a semiconductor monolith;  
each stage of said stages comprising a source, a drain, and a gate;  
said source and said gate of said each stage constituting the input portion of said each stage;  
said drain and said gate of said each stage constituting the output portion of said each stage;  
the geometry of said device, and the forming of said device in said semiconductor monolith, being effective to cause said input portion and said output portion of said each stage to be mirror images of one another;  
whereby said geometry and said forming of said device in said monolith is effective to cause the phase velocity of wave propagation in said input and said output stages of said each stage to be substantially identical, whereby to eliminate phase cancellation between said input portion and said output portion of said each stage.

4,947,221

# MEMORY CELL FOR A DENSE EPROM

Roger G. Stewart, Hillsborough Township, Somerset County; Alfred C. Iprl, Hopewell Township, Mercer County, and Louis S. Napoli, Hamilton Township, Mercer County, all of N.J., assignors to General Electric Company, Schenectady, N.Y.

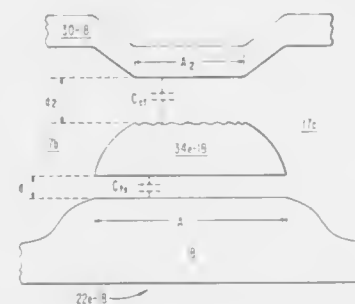
Continuation of Ser. No. 803,005, Nov. 29, 1985, abandoned.

This application Dec. 10, 1986, Ser. No. 940,167

Int. Cl.<sup>3</sup> H01L 29/78, 29/34

U.S. Cl. 357—23.5

1 Claim



1. A transistor memory cell comprising:  
a substrate having spaced source and drain regions and a channel region therebetween;  
a first insulating layer disposed on said channel region;  
a floating gate disposed on said first insulating layer and coterminous with said channel region in the width axis of the transistor to form a first capacitor having a first capacitance with said substrate;  
a second insulating layer disposed on said floating gate; and  
a control gate disposed on said second insulating layer coterminous with said floating gate in the length axis of the transistor to form a second capacitor having a second capacitance with said floating gate, said second capacitance being less than said first capacitance, and wherein said first capacitor has a greater effective area and smaller spacing than said second capacitor.

4,947,222

# ELECTRICALLY PROGRAMMABLE AND ERASABLE MEMORY CELLS WITH FIELD PLATE CONDUCTOR DEFINED DRAIN REGIONS

Manzur Gill, Rosharon, and Sebastiano D'Arrigo, Houston, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 219,529, Jul. 15, 1988. This application Jul. 26, 1989, Ser. No. 385,846

Int. Cl.<sup>3</sup> H01L 29/78, 29/40; G11C 11/34

U.S. Cl. 357—23.5

17 Claims



1. First and second electrically erasable and programmable memory cells formed at a face of a semiconductor layer of a first conductivity type, comprising:  
first and second source regions formed in said layer at said face to be of a second conductivity type opposite said first conductivity type and to be spaced apart;  
a field plate conductor insulatively disposed adjacent said face and laterally spaced from and between said first and second source regions; an inversion region disposed in said layer adjacent said field plate conductor and inverted

from said first conductivity type to said second conductivity type upon application of a predetermined voltage to said field plate conductor;

a first channel region defined in said layer between said first source region and said inversion region, a second channel region defined in said layer between said second source region and said inversion region, each channel region comprising floating gate and control gate subchannel regions;  
a drain contact region adjoining region for selective connection to a drain read voltage source;  
first and second floating gate conductors insulatively disposed adjacent respective ones of said first and second source regions so as to be capable of being programmed thereby, each said floating gate conductor further insulatively disposed adjacent a respective floating gate subchannel region to control the conductance thereof; and  
a control gate conductor insulatively disposed adjacent said control gate subchannel regions to control the conductance thereof and further insulatively disposed adjacent said floating gate conductors for the programming and erasure of said floating gate conductors.

4,947,224

# SOLID STATE IMAGE SENSING DEVICE WITH PHOTODIODE TO REDUCE SMEARING

Takao Kuroda, Ibaraki; Toshihiro Kuriyama, Nagaokakyō; Kenja Horii, Ohtsu, and Hiroyuki Mizuno, Takarazuka, all of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Continuation of Ser. No. 788,873, Oct. 18, 1985, abandoned.

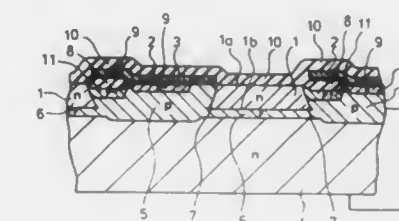
This application Sep. 26, 1988, Ser. No. 251,026

Claims priority, application Japan, Oct. 18, 1984, 59-220016; Mar. 29, 1985, 60-63369

Int. Cl.<sup>3</sup> H01L 27/14

U.S. Cl. 357—30

3 Claims



1. A solid state image sensing device comprising:  
a semiconductor substrate having at least a surface layer on one conductivity type;  
at least one photoelectric converting region having a conductivity type opposite said surface layer for converting photoenergy to electric charges and storing said electric charges formed in said surface layer of said substrate, said photoelectric converting region being shaped to have a larger horizontal section at a lower portion than at an upper portion to reduce smearing phenomena;  
at least one charge transfer means for transferring said electric charges stored in photoelectric converting region; and  
at least one transfer gate formed between said photoelectric converting region and said charge transfer means.

4,947,225

# SUB-MICRON DEVICES WITH METHOD FOR FORMING SUB-MICRON CONTACTS

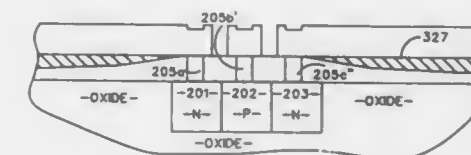
Frank Z. Custode, Norco, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 856,877, Apr. 28, 1986, abandoned. This application Jul. 15, 1987, Ser. No. 73,591

Int. Cl.<sup>3</sup> H01L 29/72

U.S. Cl. 357—34

5 Claims



4,947,223

# SEMICONDUCTOR DEVICES INCORPORATING MULTILAYER INTERFERENCE REGIONS

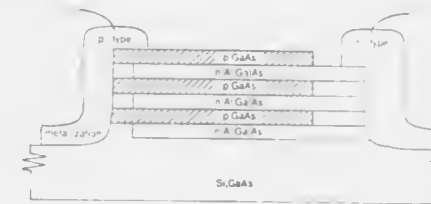
Robert M. Biefeld, Albuquerque; Timothy J. Drummond, Tijeras; Paul L. Gourley, and Thomas E. Zipperian, both of Albuquerque, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 31, 1987, Ser. No. 91,560

Int. Cl.<sup>3</sup> H01L 27/14, 31/00

U.S. Cl. 357—30

7 Claims



1. An electrically tunable semiconductor device comprising:  
a monolithically incorporated multilayer optical interference region comprising a series of alternating n- and p-layers having indices of refraction which differ from each other;  
a first electrical contact consisting of a metallization region in direct physical and electrically conductive contact with said n-layers, and not in physical or electrically conductive contact with said p-layers; and  
a second electrical contact consisting of a second metallization region in direct physical and electrically conductive contact with said p-layers, and not in physical or electrically conductive contact with said n-layers.

1. A sub-micron bipolar device comprising in combination:  
a substrate;  
an active region delineated by insulation;  
a collector, a base adjacent to the collector, and an emitter adjacent to the base in the active region comprising a body with the collector and emitter oppositely doped relative to the base;  
said insulation embedding the body except for the tops of the collector, base and emitter;  
doped polysilicon electrodes extending upwardly from the tops of the collector, base and emitter, respectively and said electrodes each having a top;  
said insulation comprising low temperature oxide substan-



tially embedding the electrodes except for the tops thereof and at least covering the remaining portions of the active region, and spin on glass over the low temperature oxide for planarization;  
the tops of said electrodes comprising contacts, each with a cross section having maximum dimensions in the range 0.25 micron; and,  
metal interconnect conductors extending over at least one of the low temperature oxide and spin on glass to the tops of the electrodes, respectively.

4,947,226

## BILATERAL SWITCHING DEVICE

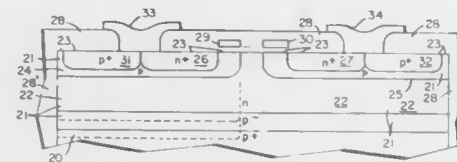
Jack S. T. Huang, Plymouth, and Per N. Forsell, Minneapolis, both of Minn., assignors to Hoenywell, Inc., Minneapolis, Minn.

Continuation of Ser. No. 130,143, Dec. 8, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 319,831

Int. Cl.<sup>3</sup> H01L 29/74, 29/747, 27/02

U.S. Cl. 357—38

30 Claims



1. A bilateral switching device having a gate region and first and second terminating regions each of which can serve as an anode and a cathode thereof, said switching device, if electrically energized, being capable of conducting, as a primary current flowing therethrough, a load current flowing between said first and second terminating regions which can be established by providing a signal beyond an initial value to said gate with said load current after such establishment having a magnitude substantially independent of such signal over a substantial range of signal values, and which after such establishment can be ended by providing an alternative signal value to said gate, said device comprising:

- a semiconductor material body of a first conductivity type and a first conductivity, except in selected characteristic regions thereof, and having a first major surface;
- a plurality of said characteristic regions intersecting said first major surface in a first major surface portion, including first and second characteristic regions, which are spaced apart from one another in said semiconductor material body and so spaced apart in said first major surface portion, said plurality of characteristic regions each being of a second conductivity type and of a second conductivity in selected portions thereof to result in each forming a corresponding characteristic region pn junction with other portions of said semiconductor body material, where a portion of each such junction is on a side of its associated characteristic region that is opposite said first major surface portion;
- a plurality of selected contact portions in said semiconductor material body each intersecting said first major surface portion, including first and second contact portions, with each of said plurality of contact portions being part of a corresponding one of said plurality of characteristic regions but of a third conductivity greater than said second conductivity of those remaining portions of its corresponding said characteristic region, said first contact portion being in said first characteristic region and said second contact portion being in said second characteristic region;
- a plurality of selected interior regions in said semiconductor material body each intersecting said first major surface portion, including first and second interior regions, with each of said plurality of interior regions being contained within a corresponding one of said plurality of character-

istic regions through being surrounded thereby in said semiconductor material body to form a corresponding interior region pn junction about that interior region also intersecting said first major surface portion and having a portion thereof paralleling said portion of its corresponding said characteristic region pn junction but separated therefrom by a control resistive portion of that characteristic region located therebetween, and with each such interior region being spaced apart from other portions of said semiconductor material body outside its corresponding said characteristic region to result in also being spaced apart from such other portions of said semiconductor material body by a separating space in said first major surface portion which is also in its corresponding said characteristic region, said first interior region being within said first characteristic region and said second interior region being within said second characteristic region, said plurality of interior regions each being of said first conductivity type with said first terminating region including at least portions of said first interior region and said first contact portion and with said second terminating region including at least portions of said second interior region and said second contact region; and

said gate region being formed of a conductive material and located across an electrical insulating material from at least a portion of that said separating space occurring in said first selected region, and with conductivities of each control resistive portion, lengths in total of said interior region pn junctions in said first major surface adjacent a said separating space, thicknesses of said control resistive regions and widths of said separating spaces together having values which permit signals at said gate region to establish and end load currents as aforesaid.

4,947,227

## LATCH-UP RESISTANT CMOS STRUCTURE

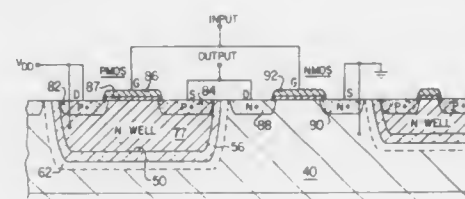
Clarence W. Teng, Plano, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Sep. 16, 1985, Ser. No. 776,553

Int. Cl.<sup>3</sup> H01L 27/02

U.S. Cl. 357—42

6 Claims



1. A CMOS structure having improved latch-up immunity, comprising:
- a substrate having a crystalline surface portion on which MOS devices are formed;
  - a well of polycrystalline semiconductor material disposed within said substrate and having an upper surface approximately coplanar with the surface of said substrate, said well having tapered sidewalls;
  - a layer of isolating material entirely separating said semiconductor material from said substrate;
  - an MOS transistor of a first conductivity type formed in said well of semiconductor material; and
  - an MOS transistor of a second conductivity type formed in said surface portion of said substrate.

4,947,228

## INTEGRATED CIRCUIT POWER SUPPLY CONTACT

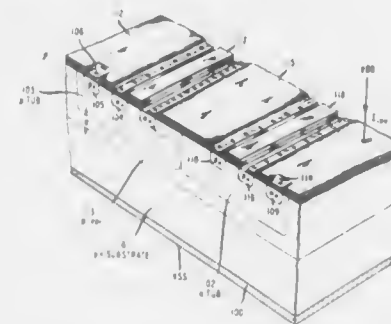
Thaddeus J. Gabara, Lehigh County, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 20, 1988, Ser. No. 246,713

Int. Cl.<sup>3</sup> H01L 27/02

U.S. Cl. 357—42

19 Claims



1. An integrated circuit comprising:
- a semiconductor substrate having a given conductivity type and relatively low resistivity;
  - an epitaxial layer formed on the front side of said substrate and having a significantly higher resistivity than that of said substrate;
  - at least one doped tub region formed in said epitaxial layer;
  - at least one highly doped contact region having said given conductivity type formed in said epitaxial layer;
  - and field effect transistors having source regions of the opposite conductivity type formed in said epitaxial layer and connected to said highly doped contact region;
  - and further comprises a conductive layer formed on the back side of said substrate, with means for connecting said conductive layer to a power supply voltage, characterized in that said integrated circuit has a given number of power supply voltage bondpads on the front side of said substrate for connection to external package terminals, wherein the operation of said integrated circuit requires a number of power supply bondpads greater than said given number but for the flow of current through said conductive layer, said substrate, and said at least one highly doped contact region to said source regions.

4,947,229

## SEMICONDUCTOR INTEGRATED CIRCUIT

Yutaka Tanaka, Yokohama; Toshiki Morimoto, Kawasaki, and Seiji Watanabe, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

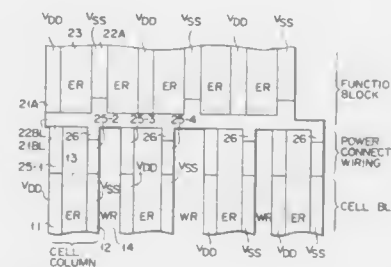
Filed Nov. 23, 1987, Ser. No. 123,969

Claims priority, application Japan, Jan. 9, 1987, 62-2977

Int. Cl.<sup>3</sup> H01L 23/535, 27/118

U.S. Cl. 357—45

6 Claims



1. A semiconductor integrated circuit comprising:
- a functional block including a plurality of first and second power source wiring layers arranged substantially parallel

to one another and formed to extend in a predetermined direction, a plurality of element regions each located between adjacent pairs of said first and second power source wiring layers, and a third power source wiring layer structure having upper and lower layers respectively connected to said first and second power source wiring layers;

a cell block including a plurality of cell column areas each having fourth and fifth power source wiring layers arranged parallel to each other and formed to extend in said predetermined direction an element region located between said fourth and fifth power source wiring layers, and a plurality of wiring regions, each located between adjacent cell column areas; and

first and second interconnection members formed to extend in said predetermined direction, to connect said lower and upper layers of said third power source wiring layer structure to said fourth and fifth power source wiring layers.

4,947,230

## BASE-COUPLED TRANSISTOR LOGIC

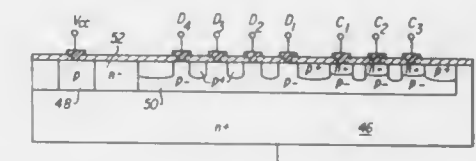
Ashok K. Kapoor, Palo Alto, Calif., assignor to Fairchild Camera & Instrument Corp., Mountain View, Calif.

Filed Sep. 14, 1984, Ser. No. 650,660

Int. Cl.<sup>3</sup> H01L 27/02

U.S. Cl. 357—46

13 Claims



1. A monolithic transistor logic circuit, comprising:
- a p-type base layer formed on a substrate;
  - an n-type collector region formed on said substrate and disposed in an operative relationship with said base layer so as to form an output terminal of the logic circuit;
  - an n-type emitter region disposed in operative relationship with said base layer; and
  - at least one Schottky diode formed on said base layer, and comprising an input terminal for the logic circuit.

4,947,231

## INTEGRATED STRUCTURE WITH ACTIVE AND PASSIVE COMPONENTS ENCLOSED IN INSULATING POCKETS AND OPERATING AT HIGHER THAN THE BREAKDOWN VOLTAGE BETWEEN EACH COMPONENT AND THE POCKET CONTAINING IT

Sergio Palara, Acicastello; Mario Paparo, San Giovanni La Punta, and Roberto Pellicano, Reggio Calabria, all of Italy, assignors to SGS-Thomson Microelectronics s.r.l., Milan, Italy

Filed Oct. 18, 1988, Ser. No. 259,254

Claims priority, application Italy, Oct. 30, 1987, 22474 A/87

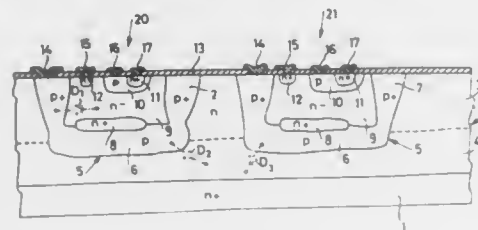
Int. Cl.<sup>3</sup> H01L 27/04

U.S. Cl. 357—48

4 Claims

1. An integrated circuit structure formed by a plurality of circuit components each of which is included in an insulated pocket defined within a respective surrounding doped insulating band formed in an oppositely-doped semiconductor substrate biased with a substrate voltage and has opposed ends biased with respective higher and lower voltages, the arrangement being such as to define a first breakdown voltage between each insulating band and the substrate and a second breakdown voltage between the same insulating band and the circuit component contained therein, the first breakdown voltage being much higher than the second breakdown voltage, wherein each insulating band is biased with a band voltage provided by

the respective component and comprised between said higher and lower voltages of the respective component, said band



voltage differing from said higher voltage by a value greater than the difference between said higher voltage and the substrate voltage.

4,947,232

## HIGH VOLTAGE MOS TRANSISTOR

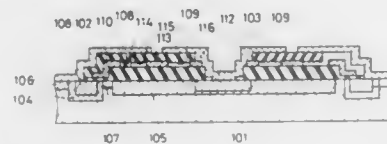
Tsutomu Ashida, Yamatokoriyama; Kiyotoshi Nakagawa, Nara; Katsumasa Fujii, Nara, and Yasuo Torimaru, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan. Continuation of Ser. No. 41,653, Apr. 21, 1987, abandoned, which is a continuation of Ser. No. 801,870, Nov. 26, 1985, abandoned, which is a continuation of Ser. No. 532,089, Sep. 14, 1983, abandoned, which is a continuation of Ser. No. 246,062, Mar. 20, 1981, abandoned. This application Nov. 28, 1988, Ser. No. 277,440.

Claims priority, application Japan, Mar. 22, 1980, 55-37702; Mar. 22, 1980, 55-37703.

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—53

3 Claims



1. A metal oxide semiconductor device of a high voltage type which prevents field concentration near the edge of a gate electrode, eliminates a reverse field plate effect and provides for stable driving operation of said device comprising in cross section:

- a semiconductor substrate comprising an upper surface having a conductivity of a first type;
- a source region having a conductivity of a second type opposite to that of said semiconductor substrate formed in the surface of said substrate;
- a drain region having a conductivity of said second type opposite to that of said semiconductor substrate formed in the surface of said substrate apart from said source region;
- a gate channel region having the same conductivity type as said semiconductor substrate connected to said source region within said substrate;
- a field dope region positioned adjacent and outside said gate channel region at the surface of said substrate having a conductivity the same as said first type;
- a high resistance region of said second type conductivity disposed substantially at the surface of said substrate between said source and drain regions connected to said drain region and separated by a portion of said substrate from said gate channel region;
- a continuous insulating layer overlying a portion of said source region, a portion of said gate channel region, said high resistance region and a portion of said drain region;
- a drain electrode connected to said drain region having a

field plate layer portion extending radially inwardly from said drain electrode;

a source electrode connected to said source region, said gate channel region and said field dope region, having a field plate layer portion extending radially inwardly from said source electrode;

a gate electrode formed above said gate channel region within said continuous insulating layer having a portion of said continuous insulating layer interpositioned between said gate electrode and said substrate; and

a high resistance covering layer substantially overlying said high resistance region so as to provide said high resistance region with a constant electric field and to eliminate influence by external charges, said continuous insulating layer being interposed between said high resistance covering layer and said high resistance region, said high resistance covering layer having first and second terminal end portions of low resistance connecting said high resistance covering layer by said first end to said drain electrode and by said second end to said source electrode through said respective radially extending field plate layer portion extension or directly to said gate electrode.

4,947,233

## SEMI-CUSTOM LSI HAVING INPUT/OUTPUT CELLS

Akira Aso, Tokyo, Japan, assignor to Nec Corporation, Tokyo, Japan.

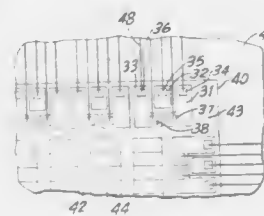
Filed Oct. 26, 1987, Ser. No. 113,831

Claims priority, application Japan, Oct. 24, 1986, 61-254315

Int. Cl.<sup>5</sup> H01L 27/02

U.S. Cl. 357—65

7 Claims



1. A semiconductor integrated circuit comprising:  
a semiconductor chip;

a functional circuit formed in a central portion of said semiconductor chip;

a plurality of input/output cells formed on a peripheral portion of said semiconductor chip and including at least one buffer selected from input, output and input/output buffers; and

conductive layers wiring said circuit elements to form input and/or output buffers and forming a plurality of bonding pads, connection paths between said bonding pads and said input and/or output buffers and electrical connection between said input and/or output buffers and said functional circuit, two bonding pads being formed on each of selected ones of said input/output cells for external connection thereof, and one of said two bonding pads on each of said selected input/output cells being disposed between a respective edge of said semiconductor chip and said buffer and the other of said two bonding pads on each of said selected input/output cells being disclosed between said buffer and said functional circuit so as to form two lines of said bonding pads along each edge of said semiconductor chip as a whole.

4,947,234

## SEMICONDUCTOR COMPONENT WITH POWER MOSFET AND CONTROL CIRCUIT

Josef Einzinger, Unterschleissheim; Ludwig Leipold, Munich; Jeno Tihanyi, Munich, and Roland Weber, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany.

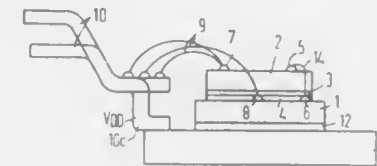
Filed Sep. 22, 1987, Ser. No. 99,577

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1986, 3632199.

Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357—68

21 Claims



1. A semiconductor component comprising:  
a power MOSFET having a separate semiconductor body including a first main surface and a second main surface, and a gate terminal and a source terminal;
- an integrated control circuit for controlling the MOSFET, the integrated control circuit being integrated in a separate semiconductor body having a first main surface and a second main surface, the control circuit also having a control input, a supply voltage terminal, and a control output;
- a plurality of housing connections, a first one of the housing connections being connected to the control input, a second one of the housing connections being connected to the source terminal, a third one of the housing connections being connected to the supply voltage terminal, and the control output of the control circuit being connected to the gate terminal;
- an insulating layer for mechanically coupling the second main surface of the semiconductor body of the control circuit with the first main surface of the semiconductor body of the MOSFET, wherein the semiconductor body of the control circuit is mechanically coupled to the semiconductor body of the MOSFET; and
- a cooling body to which the second main surface of the semiconductor body of the MOSFET is fastened, and a fourth one of housing connections being connected to the cooling body.

4,947,235

## INTEGRATED CIRCUIT SHIELD

Norman J. Roth, Kokomo, Ind.; Robert J. Wallace, Southfield, and Domenica N. Hartman, Plymouth, both of Mich., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Feb. 21, 1989, Ser. No. 312,800

Int. Cl.<sup>5</sup> H01L 11/00, 15/00

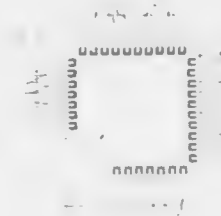
U.S. Cl. 357—68

6 Claims

1. An electrically conductive tape suitable for electrically interconnecting a plurality of bonding sites on a monolithic integrated circuit chip, the electrically conductive tape comprising:

- a plurality of electrically conductive strips having a first end and a second end, said strips being integral with the electrically conductive tape at said first end, said second end provides the bonding site for electrical connection between said electrically conductive strips and the monolithic integrated circuit chip;
- and an electrical shield having a first end and a second end, said electrical shield being integral with the electrically conductive tape at said first end and said second end, said electrical shield being maintained at a predetermined, primarily constant, electrical potential with the monolithic integrated circuit chip, and said electrical shield

having a portion disposed over a predetermined region of the monolithic integrated circuit chip, said portion being sufficiently large to shield electromagnetic interference



generated from electromagnetic generating components on the monolithic integrated circuit yet not so large as to shield the entire monolithic integrated circuit.

4,947,236

## SEMICONDUCTOR DEVICE

Toru Suga, Tokyo, and Kazuhiko Inoue, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan.

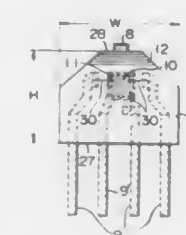
Filed Dec. 1, 1988, Ser. No. 278,317

Claims priority, application Japan, Dec. 2, 1987, 62-303372

Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357—68

16 Claims



1. A semiconductor device for a Hall sensor positioned near a motor coil, comprising:

- a molded resin package formed in substantially a rectangular form;
- a pellet for a Hall element disposed inside said package;
- a Hall sensor bonding plate on which said pellet is fixed;
- a plurality of lead terminals which are disposed at one end near said pellet, the other ends of said lead terminals being formed to extend from said package to the exterior; and
- means for electrically connecting said pellet to said lead terminals;
- wherein said molded resin package includes a first end face from which said lead terminals are drawn out;
- a second end face opposite to the first end face;
- a first surface lying on the side on which said pellet is fixed;
- a second surface lying on the side opposite to the side on which said pellet is fixed; and
- an inclined portion for disposition adjacent said motor coil formed in at least one of a first edge portion made by the second end face and the first surface and a second edge portion made by the second end face and the second surface.



4,947,237

# LEAD FRAME ASSEMBLY FOR INTEGRATED CIRCUITS HAVING IMPROVED HEAT SINKING CAPABILITIES AND METHOD

Marzio Fusaroli, Milan, Italy, assignor to SGS Thomson Microelectronics, srl, Italy

Continuation of Ser. No. 809,505, Dec. 16, 1985, abandoned.

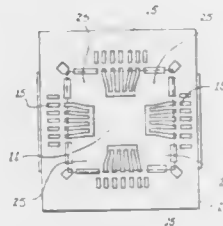
This application Oct. 1, 1987, Ser. No. 106,016

Claims priority, application Italy, Dec. 18, 1984, 241125 A/84

Int. Cl.<sup>3</sup> H01L 23/48

U.S. Cl. 357—70

4 Claims



1. A semiconductor integrated circuit package including a package housing partially enclosing a lead frame having leads extending from four sides of said package housing, comprising, in combination:

- central flag means in said lead frame for supporting a semiconductor chip, said flag means having four corners, said a package housing enclosing said central flag means of said lead frame, said package housing having four corners; and
- heat spreading means in said lead frame for conducting heat from said semiconductor chip, said heat spreading means being integral with said central flag means and extending from at least one of said four corners of said package housing and extending out of said package housing on two adjacent sides of said package housing, said heat spreading means increasing in width with distance from said central flag means.

4,947,238

# SUBMOUNT FOR SEMICONDUCTOR LASER ELEMENT

Mitsuo Ishii; Seichi Nagai; Kazuyoshi Hasegawa, and Toshio Tanaka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

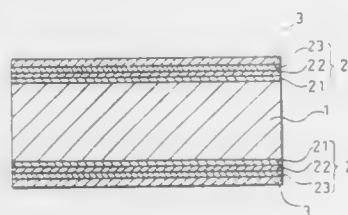
Filed May 1, 1989, Ser. No. 345,163

Claims priority, application Japan, May 23, 1988, 63-126623

Int. Cl.<sup>3</sup> H01L 23/48, 39/02

U.S. Cl. 357—71

5 Claims



1. A submount for a semiconductor laser element comprising:

- a substrate having a surface;
- a barrier layer disposed on the surface of said substrate, said barrier layer including a plurality of layers successively deposited on said substrate, the outermost layer of said barrier layer being one of Au and Ag; and
- an alloy solder layer comprising about 65 weight percent Sn, about 25 weight percent Ag, and about 10 weight percent Sb disposed on said outermost surface of said barrier layer

for attachment of a semiconductor laser element to the submount.

4,947,239

# SWING-DRIVEN SOLID-STATE IMAGING DEVICE WITH ELASTIC SUSPENSION MECHANISM FOR IMAGE SENSOR

Yuu Kondou, and Tomio Ono, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

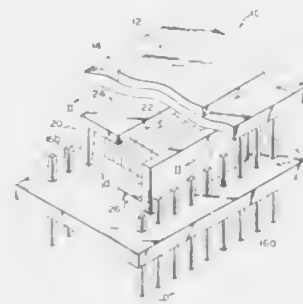
Filed Mar. 6, 1989, Ser. No. 319,103

Claims priority, application Japan, Mar. 31, 1988, 63-78710

Int. Cl.<sup>3</sup> H01L 23/12, 29/78, 27/14; H04N 3/14

U.S. Cl. 357—74

19 Claims



1. A displacement generating arrangement for shifting a solid-state imaging device periodically relative to incident image light, said arrangement comprising:

- (a) a substrate;
- (b) plate means provided spacially above said substrate, for mounting thereon said imaging device;
- (c) suspension means, provided between said substrate and said plate means, for elastically supporting said plate means above said substrate; and
- (d) swing-driver means, coupled to said substrate and said plate means, for receiving an externally supplied electric drive signal and for causing cyclic displacement such that said plate means vibrates in a desired vibration mode.

4,947,240

# METHOD AND CIRCUIT APPARATUS FOR COMBINING TWO TELEVISION SIGNALS

Michael Hausdörfer, Mühlthal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

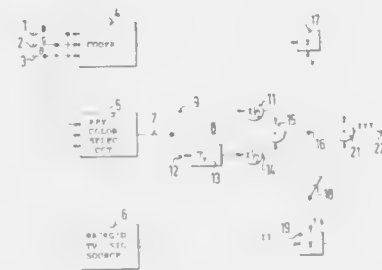
Filed Mar. 20, 1989, Ser. No. 325,777

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810328

Int. Cl.<sup>3</sup> H04N 9/74

U.S. Cl. 358—22

9 Claims



1. Method for combining a foreground television signal with a background television signal by the chromakey procedure comprising the steps of:

- deriving a first decision signal from the foreground television signal by reference to a color selection signal thereof;

4,947,242

# WHITE BALANCE CONTROL WITH ADJUSTING MEANS RESPONSIVE TO IMAGE BRIGHTNESS CHANGE

Teruo Hieda, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,957

Claims priority, application Japan, May 25, 1987, 62-125819

Int. Cl.<sup>3</sup> H04N 9/73, 9/04

U.S. Cl. 358—29

15 Claims



4,947,241

# TRAINING SIGNAL FOR MAINTAINING THE CORRECT PHASE AND GAIN RELATIONSHIP BETWEEN SIGNALS IN A TWO-SIGNAL HIGH DEFINITION TELEVISION SYSTEM

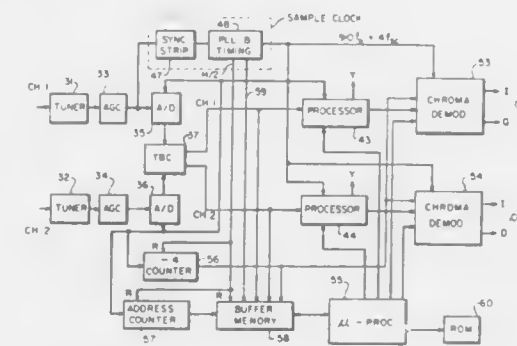
Carlo Basile, New York; Alan P. Cavallerano, Ossining, and Mikhail Tsinker, Riverdale, all of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 224,203, Jul. 22, 1988, abandoned, which is a division of Ser. No. 57,880, Jun. 2, 1987, abandoned, and a continuation-in-part of Ser. No. 59,664, Jun. 8, 1987, which is a continuation of Ser. No. 856,622, Apr. 25, 1986, Pat. No. 4,694,338. This application May 1, 1989, Ser. No. 346,323

Int. Cl.<sup>3</sup> H04N 9/65

U.S. Cl. 358—23

5 Claims



1. In a high definition television (HDTV) system for transmitting and receiving a wide aspect ratio picture as a plurality of television signals comprising a first signal corresponding to a center portion of said wide aspect ratio picture and a second signal corresponding to at least one side panel portion of said wide aspect ratio picture, and wherein said first and second signals each comprise chrominance signals and are transmitted at a transmitter over separate paths and are combined to reproduce said wide aspect ratio picture at a receiver, the improvement comprising:

- means located at said transmitter for encoding a training signal on each of said first and second signals, said training signal comprising a color subcarrier portion;
- reference means located at said receiver for providing a reference corresponding to said training signal as transmitted;
- means located at said first receiver for detecting said training signals from each of said first and second signals thereby providing third and fourth signals respectively which represent said training signal as received over said first and second paths respectively;
- means located at said receiver for processing each of said third and fourth signals with respect to said reference so as to generate a plurality of coefficients corresponding to differences between said third and fourth signals; and
- means coupled to said processing means, for utilizing said coefficients to demodulate said respective chrominance signals.

1. An image sensing apparatus comprising:

- (a) color image pickup means for converting an optical image into a plurality of electrical color signals;
- (b) adjusting means for automatically adjusting a white balance between said color signals in accordance with a color temperature of an object to be photographed at a predetermined response characteristics; and
- (c) control means responsive to a change in brightness information of the object for variably controlling said response characteristic of said adjusting means.

8. An image sensing apparatus comprising:

- (a) color image pickup means for converting an optical image into a plurality of electrical color signals;
- (b) adjusting means for automatically adjusting a white balance between said color signals in accordance with a color temperature of an object to be photographed at a predetermined response characteristic; and
- (c) control means responsive to a change in the brightness information in said optical image for controlling said response characteristic of said adjusting means such that said response characteristic is once fast, and then gradually slows down.

12. An image sensing apparatus comprising:

- (a) color image pickup means for converting an optical image into a plurality of electrical color signals;
- (b) adjusting means for automatically adjusting a white balance between said color signals in accordance with a color temperature of an object to be photographed at a predetermined response characteristic;
- (c) recording means for processing and recording the color signals produced from said image pickup means; and
- (d) control means for variably controlling said response characteristic of said adjusting means in relation to a recording operation of said recording means, said control means controlling said response characteristic such that at first said response characteristic is fast, and after that, said response characteristic slows down gradually.

4,947,243

# METHOD OF AND ARRANGEMENTS FOR CODING AND DECODING COLOR TELEVISION SIGNALS USING A SEPARATE SERIES ARRANGEMENT OF A LOW-PASS FILTER AND A VERTICAL TEMPORAL FILTER FOR EACH COLOR DIFFERENCE SIGNAL

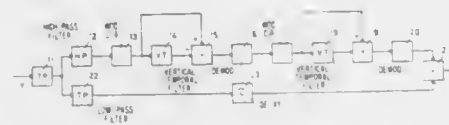
Broder Wendland, Waltrop, and Michael Silverberg, Beckum, both of Fed. Rep. of Germany, assignors to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt, Max Grundig Holland, Stiftung & Co. KG, Furth, Fed. Rep. of Germany  
Filed Mar. 3, 1989, Ser. No. 319,009

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1988, 3807248

Int. Cl.<sup>5</sup> H04N 9/64

U.S. Cl. 358—31

9 Claims



1. An arrangement for coding color television signals, comprising:
    - means for providing a luminance signal and first and second color difference signals;
    - a three-dimensional filter circuit coupled to receive said luminance signal, for providing a filtered luminance signal;
    - first and second three-dimensional sub-filters coupled to receive said first and second color difference signals, respectively, for providing filtered color difference signals, said first and second sub-filters each being constituted by a series arrangement of a low-pass filter and a combined vertical-temporal filter;
    - a quadrature modulator for converting said filtered color difference signals into a modulated chrominance signal; and
    - an adder circuit for adding together said filtered luminance signal and the modulated chrominance signal;
- characterized in that the passband of the combined vertical-temporal filter coupled to receive said first color difference signal is less than the passband of the combined vertical-temporal filter coupled to receive said second color difference signal.

4,947,244

# VIDEO SELECTION AND DISTRIBUTION SYSTEM

Robert B. Fenwick, Los Altos Hills; Larry L. Peden, Monte Sereno; Robert Snyder; John W. McMains, both of Saratoga, and Jeffrey R. Gile, San Mateo, all of Calif., assignors to On Command Video Corporation, Santa Clara, Calif.

Filed May 3, 1989, Ser. No. 346,778

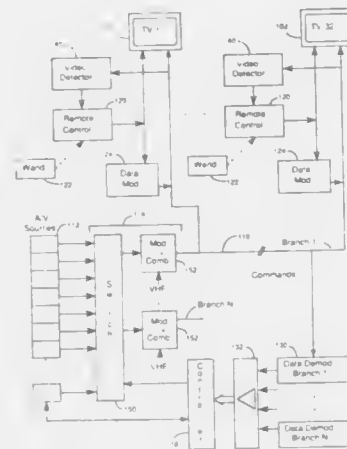
Int. Cl.<sup>5</sup> H04N 7/167

U.S. Cl. 358—86

7 Claims

1. A video distribution system for transmitting selected video programs to a number of independently controlled video monitors, comprising:
  - a multiplicity of video monitors arranged in a plurality of groups, each said group of video monitors being coupled to a distinct transmission medium;
  - a multiplicity of video sources of video signals;
  - video switch means responsive to setup signals for coupling specified ones of said video sources to specified ones of said video monitors; said video switch means including frequency multiplexer means coupled to said transmission mediums for transmitting video signals from said specified video sources to the video monitors in each said group in distinct frequency bands on one of said transmission mediums;
  - program selection means associated with each said video monitor for generating video connection requests, each

said video connection request specifying a video source to be connected to a specified video monitor; and each video monitor within each of said groups including tuning means for receiving and displaying the video signal in a distinct one of said frequency bands on the transmission medium coupled to said video monitor; and control means, coupled to said video switch means and said program selection means, for receiving said video connection requests, responding to each said video connection request by generating and transmitting corresponding setup signals to said video switch means, and for preventing any of a predefined set of said video sources from being simultaneously connected to two video monitors; wherein said video switch means couples specified video sources to specified video monitors by transmitting the video signals from said specified video sources on the transmission mediums and frequency bands corresponding to said specified video monitors; said control means including status means for storing infor-



mation denoting which of said video sources, if any, is coupled to each of said video monitors and for denoting which of said video sources are not coupled to any of said video monitors; said control means further including menu generating means coupled to said status means for generating a menu display image representing a set of currently available video sources which are not coupled to any of said video monitors; said video switch means including means coupled to said menu generating means for transmitting said menu display image to said video monitors in a predefined frequency band on each of said transmission mediums; and each said program selection means including means for generating video connection requests which specify a video source selected from said currently available video sources represented by said menu display image; whereby said program selection means cannot generate a video connection request specifying a video source that is already coupled to another one of said video monitors.

4,947,245

# IMAGE PICKING-UP AND PROCESSING APPARATUS

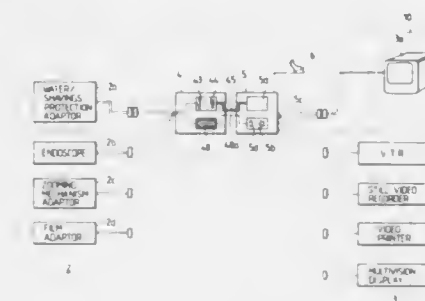
Ichirou Ogawa; Kouzou Yoshimura, both of Kanagawa; Kenzou Ueshima, and Shinichi Nishimoto, both of Kyoto, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Kabushiki Kaisha Morita Seisakusho, Kyoto, both of, Japan  
Filed May 22, 1989, Ser. No. 354,993

Claims priority, application Japan, May 23, 1988, 63-125312; Jul. 19, 1988, 63-180860

Int. Cl.<sup>5</sup> A61B 1/04

U.S. Cl. 358—98

20 Claims



1. An image picking-up and processing apparatus, comprising:
  - a transmission and conversion section comprising an image sensor for detecting input light which carries first image information of an object, a first objective lens for focusing said input light on said image sensor, and a first light guide for transmitting illumination light to illuminate said object, a front end portion of said transmission and conversion section having a structure enabling detachable connection to an interchangeable image picking-up section;
  - a control section comprising a control unit for controlling said image sensor, and producing an image signal on the basis of an output signal from said image sensor, a light source for emitting said illumination light, and a second light guide for transmitting said illumination light from said light source to said first light guide; and
  - an interchangeable image processing section for processing said image signal to reproduce second image information in a desired form, said image processing section being detachably connected to said control section.

4,947,246

# COLOR ENDOSCOPE APPARATUS INCLUDING COLOR LIGHTING CONTROL

Katsuya Kikuchi, Tochiga, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 22, 1989, Ser. No. 369,934

Claims priority, application Japan, Jun. 29, 1988, 63-159514

Int. Cl.<sup>5</sup> A61B 1/06; H04N 7/18

U.S. Cl. 358—98

8 Claims



1. A frame-sequential scanning type endoscope apparatus comprising:
  - light source means including; a lamp for sequentially pro-

ducing a pulsatory light series in synchronism with a frame-sequential scanning operation of the endoscope apparatus; and a light chopper having a disk with first to third slots formed in its peripheral portion, red, green, and blue color filters mounted, respectively, on the corresponding first to third slots, the positions of said first and second slots being juxtaposed with each other with respect to the position of the third slot, said first to third slots each has the substantially same width, whereby red, green, and blue light pulses each having substantially same duration time are produced from the light chopper under the condition that a time interval between the red and green light pulses is shorter than at least another time interval between the red and blue light pulses; light conducting means for sequentially receiving the red, green, and blue light pulses from the light source means at one end thereof and for successively projecting from the other end thereof the received three color light pulses onto an object under medical examination; image sensing means positioned near the other end of the light conducting means, for sequentially receiving light pulses reflected from the illuminated object under medical examination so as to successively produce red, green, and blue image signals of the illuminated object; and image signal processing means for processing the red, green, and blue image signals derived from the image sensing means so as to obtain one complete color endoscope signal of the illuminated object.

4,947,247

# DISPLACEMENT MEASUREMENT APPARATUS AND METHOD FOR AN AUTOMATED FLOW ROTAMETER

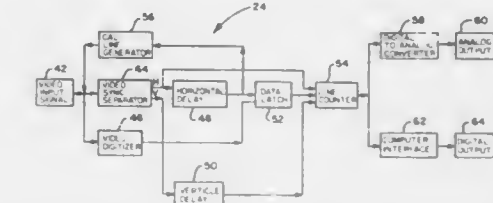
Theodore B. Farver, Windsor Locks, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 20, 1989, Ser. No. 369,084

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—107

9 Claims



1. Apparatus for measuring the linear displacement of a physical target adapted to move in a predetermined direction in response to changes in a process condition, comprising:
  - a camera mountable near the target for generating a composite video signal including the target and a region extending along said predetermined direction from the target;
  - a video signal converter associated with the camera, including:
    - means for separating the video signal into horizontal and vertical digital data points associated with arbitrary horizontal and vertical axes in the camera, the horizontal data points and the vertical data points being spaced apart by a horizontal unit pitch and a vertical unit pitch, respectively;
    - orientation means for aligning one of the arbitrary axes with the predetermined direction of target movement;
    - calibration means for establishing a quantitative relation between the unit pitch of the video signal data points along said one aligned axis and a known distance along said predetermined direction;
    - means for counting the number of digital data points between a reference position of the target and a displaced position of the target on said aligned axis along said predetermined direction, and



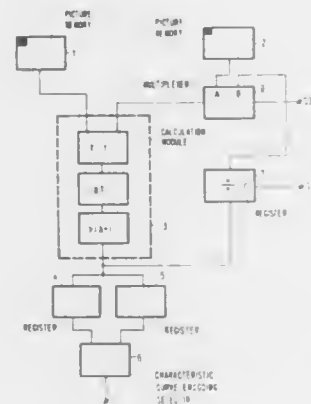
means responsive to the calibration means and the means for counting, for generating a converter output signal commensurate with said displaced position of the target.

**4,947,248**  
**HYBRID ENCODER FOR VIDEO SIGNALS**  
 COMPRISING A MOTION ESTIMATOR AND AN INTER-INTRAFRAME ENCODING SELECTOR WHICH COMPRISE A COMMON CALCULATION MODULE  
 Klaus Hienewadel, and Gerald Weth, both of Nuremberg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 5, 1989, Ser. No. 333,485  
 Claims priority, application Fed. Rep. of Germany, Apr. 6, 1988, 3811535

Int. Cl.<sup>5</sup> H04N 7/12  
 U.S. Cl. 358—135

6 Claims



1. A hybrid encoder for video pictures in which neighboring pixels of an actual video picture are combined into a plurality of actual sub-blocks, which encoder comprises a motion estimator and an inter-intraframe encoding selector, wherein said motion estimator and said inter-intraframe encoding selector comprise a common calculation module.

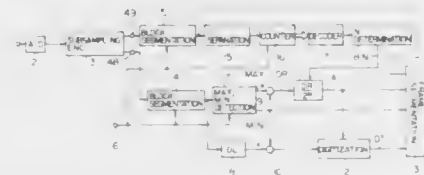
**4,947,249**  
**APPARATUS IN WHICH SUBSAMPLING AND BLOCK CODING ARE BOTH EMPLOYED FOR CODING DIGITAL VIDEO DATA**

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,515  
 Claims priority, application Japan, Oct. 14, 1988, 63-259141; Oct. 25, 1988, 63-268894; Oct. 28, 1988, 63-272298

Int. Cl.<sup>5</sup> H04N 7/12  
 U.S. Cl. 358—135

5 Claims



1. A highly efficient coding apparatus for coding digital video data in a format composed of blocks of digital video data representing plural picture elements and allowing compression of the video data, comprising:  
 means for receiving the digital video data represented by

respective picture element data of a predetermined number of bits,  
 means constituting at least one of said plural picture elements for each of said blocks as an elementary picture element while the remaining picture elements of the respective block constitute subject picture elements thereof,  
 means for predicting values of data representing said subject picture elements,  
 means for detecting predictive errors of the predicted values relative to the real values of the subject picture element data,  
 means for generating flag data when each said predictive error is greater than a threshold value,  
 Gating means responsive to said flag data for gating said elementary picture element data and the subject picture element data for which the respective predictive errors are greater than the threshold value,  
 means for detecting maximum and minimum values of the picture element data in each of said blocks,  
 means for generating dynamic range information for each said block from said maximum and minimum values for the respective block,  
 means for generating modified digital video data for each said block as the difference between each of the output data of said gating means and one of said maximum and minimum values for said respective block,  
 means for encoding modified digital video data with a variable digitized bit number determined by said flag data for said respective block so as to provide coded data of bit length which is varied so as to maintain substantially constant the amount of said coded data for each said respective block, and  
 transmitting means for transmitting at least said coded data and said flag data.

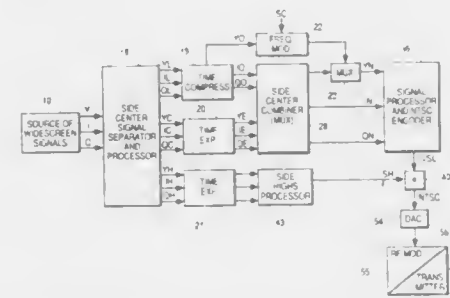
**4,947,250**  
**NOISE REDUCTION APPARATUS FOR A WIDESCREEN VIDEO SIGNAL PROCESSING SYSTEM**

John G. N. Henderson, Princeton, N.J., assignor to General Electric Company, Princeton, N.J.

Filed Sep. 7, 1989, Ser. No. 404,024  
 Claims priority, application United Kingdom, Nov. 11, 1988, 8826465

Int. Cl.<sup>5</sup> H04N 7/04  
 U.S. Cl. 358—141

7 Claims



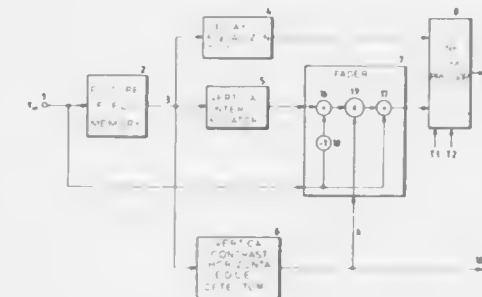
1. Video signal encoding apparatus comprising:  
 means for providing a television type signal representative of a widescreen image having side panel information, main panel information and an image aspect ratio greater than that of a standard television image; and  
 means for frequency modulating an auxiliary subcarrier with said side panel information.

**4,947,251**  
**SUPPRESSION OF FLICKER EFFECTS IN A TELEVISION RECEIVER**  
 Christian Heintschel, Braunschweig, Fed. Rep. of Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany

Filed Nov. 29, 1988, Ser. No. 277,227  
 Claims priority, application Fed. Rep. of Germany, Dec. 2, 1987, 3740826

Int. Cl.<sup>5</sup> H04N 7/01, 11/20, 5/208  
 U.S. Cl. 358—166

7 Claims



1. Apparatus in a television receiver for flicker suppression in the processing of a received television signal wherein each complete picture is composed of two interlaced picture fields transmitted in succession, comprising:

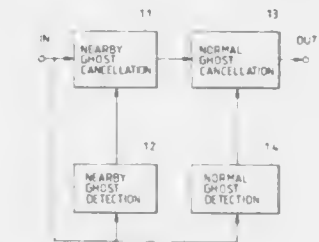
first signal converting means (2, 17, 4, 8) for converting a said received video signal into a first derived video signal having the same vertical scan frequency and transmitting a full complement of television lines in an interval equal to the picture field interval of said received video signal, said first converting means including means (2, 17) for combining, by deinterlaced line sequencing, each pair of successive picture fields into a single field of a vertically progressive sequence of a full complement of television lines;  
 second signal converting means (5, 4, 8) for converting said received video signal into a second derived video signal having the same vertical scan frequency and transmitting a full complement of television lines in an interval equal to the picture field intervals of said received video signal, said second converting means including means (5) for deriving from each picture field of said received video signal a set of lines derived from the lines of said field for interleaving between the lines of said field and means for sequencing said lines of said field and said derived set of lines in interleaved sequence;  
 time compression means (8) for cooperating as part of said combining means of said first signal converting means and of said line sequencing means of said second converting means for respectively providing said first and second derived video signals of the same vertical scan frequency as said received video signal and containing in each field a progressively sequenced full complement of television lines; and  
 means for detecting (6) the presence of substantially horizontally running vertical-contrast edges in the content of each said picture field of said received video signal and for relative fading (7) of said first and second derived video signals dependent upon the detection of a said edge, in such a manner that said first derived video signal will be predominant at a final output of said apparatus when no said edge is being detected and said second derived video signal will be predominant at said output when a said edge is being detected.

**4,947,252**  
**GHOST CANCELING APPARATUS**  
 Michio Kobayashi, Reiji Kobayashi, and Tatsuya Shiki, all of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan

Filed Mar. 22, 1989, Ser. No. 327,055  
 Claims priority, application Japan, Mar. 22, 1988, 63-67560; Jun. 29, 1988, 63-161264

Int. Cl.<sup>5</sup> H04N 5/213, 9/64  
 U.S. Cl. 358—167

10 Claims



1. A ghost canceling apparatus for a television signal comprising:

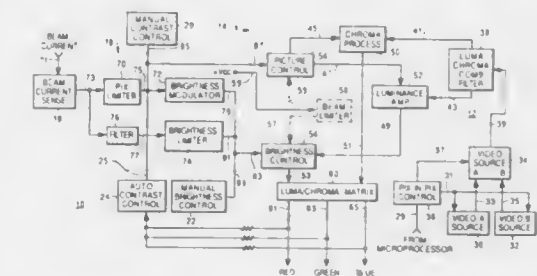
an input terminal for receiving a television signal;  
 nearby ghost canceling means having a transversal filter for producing a dummy nearby ghost component by passing the received television signal through said transversal filter, said nearby ghost canceling means producing a first composite television signal of said dummy nearby ghost component with the received original television signal;  
 means for detecting a nearby ghost in accordance with a predetermined reference waveform contained in the received television signal, said nearby ghost detecting means supplying a tap gain to said transversal filter of said nearby ghost canceling means;  
 normal ghost canceling means having a transversal filter for producing a dummy normal ghost component by passing said first composite television signal generated by said nearby ghost canceling means through said transversal filter, said normal ghost canceling means producing a second composite television signal of said normal ghost component with said first composite television signal; and  
 means for detecting a normal ghost in accordance with a predetermined reference waveform contained in the received television signal, said normal ghost detecting means supplying a tap gain to said transversal filter of said normal ghost canceling means.

**4,947,253**  
**BRIGHTNESS MODULATOR FOR CLOSED LOOP COMPENSATION OF BLACK LEVEL**  
 Charles B. Neal, Zionsville, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 18, 1989, Ser. No. 339,847  
 Int. Cl.<sup>5</sup> H04N 5/52, 5/57, 5/228, 5/68

U.S. Cl. 358—174

21 Claims



1. A pix in pix video control circuit, comprising:  
 first and second sources for video signals;

a gain controllable video amplifier for the video signals;  
a video source selector for feeding the first and second video signals to the video amplifier to form a primary picture from one of the video sources with an inset secondary picture from the other of the video sources;  
means for developing a contrast control signal related to picture intensity;  
a contrast control circuit coupled to the video amplifier and responsive to the contrast control signal for developing a video gain control signal to adjust the contrast of the video signal by varying the gain; and  
a brightness modulator responsive to the contrast control signal for adjusting the brightness of the video signal inversely with the contrast.

4,947,254

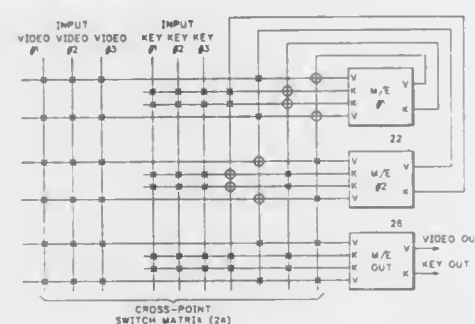
**LAYERED MIX EFFECTS SWITCHER ARCHITECTURE**  
John Abt, Nevada City, and Richard S. Bannister, Grass Valley, both of Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Apr. 27, 1989, Ser. No. 345,057

Int. Cl.<sup>5</sup> H04N 5/268, 5/262, 9/74

U.S. Cl. 358—181

3 Claims



1. A layered mix effects switcher architecture comprising:  
a plurality of means for mixing video signals together, each mixing means layering a plurality of video signals together according to associated key signals for each video signal to form a composited video signal and an associated composited key signal; and  
means for combining the composited video signals from the plurality of mixing means according to the associated composited key signals to produce a layered video signal and associated layered key signal.

4,947,255

**VIDEO LUMINANCE SELF KEYS**

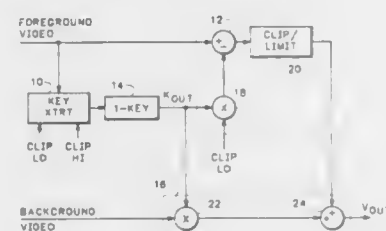
Richard A. Jackson, Nevada City, and Richard S. Bannister, Grass Valley, both of Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Sep. 19, 1988, Ser. No. 245,472

Int. Cl.<sup>5</sup> H04N 5/272

U.S. Cl. 358—183

8 Claims



1. A keyer comprising:  
means for extracting a key signal from an input video signal as a function of a clip level that defines one extreme of a transition region for the key signal; and

means for shaping the input video signal using the key signal and the clip level to produce a shaped input video signal.

4,947,256

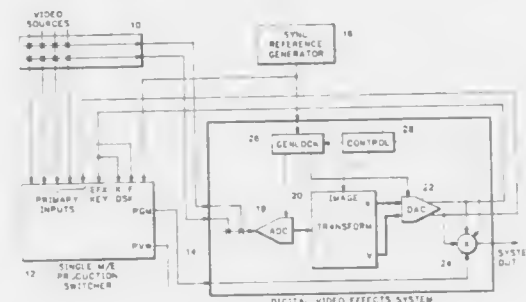
**ADAPTIVE ARCHITECTURE FOR VIDEO EFFECTS**  
David G. S. Wood, Grass Valley, and Mark Baldassari, Penn Valley, both of Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Apr. 26, 1989, Ser. No. 344,189

Int. Cl.<sup>5</sup> H04N 5/272, 5/262, 9/74

U.S. Cl. 358—183

5 Claims



1. An adaptive architecture for video effects comprises:  
a production switcher for combining a plurality of video input signals as a function of key input signals to produce a composited video signal having the combined video input signals in layers, the layering of the video input signals in the composited video signal being a function of the point along a video path through the production switcher at which the video input signals are combined;  
a video effects system for transforming one of the plurality of video input signals to produce a transformed video signal, the transformed video signal being inserted into the video path for combination with other video input signals at a point that is a function of the desired layer within the composited video signal at which the transformed video signal is to appear; and  
means for varying the timing for the transformed video signal so that the transformed video signal is synchronized with a video signal in the video path at the point where the transformed video signal is inserted into the video path.

4,947,257

**RASTER ASSEMBLY PROCESSOR**

Antonio Fernandez, Brooklyn, N.Y.; Hugo P. Gaggion, Randolph, N.J.; Martin J. Jaquez, San Diego, Calif.; John D. Robbins, Mountain Lakes, and E. Scott Soper, Morristown, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Oct. 4, 1988, Ser. No. 253,269

Int. Cl.<sup>5</sup> H04N 5/262

U.S. Cl. 358—183

15 Claims

1. A processor for producing a high definition television image comprising  
first input means for simultaneously receiving in real time a plurality of full motion video signals,  
second input means for receiving one or more still image video signals,  
a memory system including storage means for storing a raster array of pixel locations in which a group of overlapping windows are defined, and  
output means for outputting a composite high definition television signal for forming a high definition television image comprising a plurality of real time full motion video sub-images corresponding to said plurality of full motion video signals and occupying a plurality of said windows and one or more still sub-images corresponding to said one

or more still image video signals and occupying one or more of said windows,  
said memory system further including transfer means in communication with said storage means for simultaneously transferring in real time data comprising said plurality of full motion video signals and said one or more still image video signals from said first and second input means into said storage means at pixel locations defined by



said windows to form frames of said high definition television signal and for transferring in real time data comprising said frames of said high definition television signal out of said storage means to said output means,  
wherein said first input means includes video image processing means for said full motion video signals and said second input means including still image interface means for enabling said still image video signals to access said memory system.

4,947,258

**IMAGE TRANSDUCING APPARATUS**

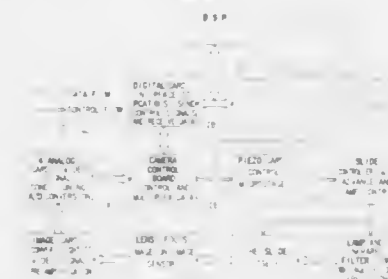
Clifford Hersh, Berkeley, Calif., assignor to Array Technologies, Inc., Oakland, Calif.

Filed Oct. 26, 1988, Ser. No. 262,820

Int. Cl.<sup>5</sup> H04N 3/14

U.S. Cl. 358—213.28

4 Claims



1. An image transducing apparatus comprising:  
means defining an object plane for supporting a fixed object to be imaged in an image plane;  
lens means for focusing the image of said object upon said image plane;  
photoelectric array transducing means having a first resolution and comprising a plurality of congruent, discrete, spaced apart transducing elements, arranged in an array, in said image plane for providing an electrical signal representative of the light intensity thereon;  
means for mechanically displacing said photoelectric array transducing means in said image plane, in two axes, in a plane parallel to said image plane, from a first position to a plurality of subsequent positions, wherein the distance from one position to an immediate adjacent position is less

than the dimension of a transducing element along the direction of said displacement;  
means for generating a first signal for moving said photoelectric array transducing means from one position to an intermediate position, approximately one-half the distance to an immediate adjacent subsequent position;  
means for receiving said first signal and for generating a second signal which is a first derivative thereof;  
means for receiving said second signal and for generating a third signal which is the absolute value thereof;  
one-shot means for receiving said third signal and for generating a fourth signal which is a one-shot shot clock signal, having a time constant approximately one-half the rate of said first signal;  
sample and hold means for receiving said fourth signal and said first signal and for generating a fifth signal therefrom; and  
means for combining said first and fifth signals to produce an output signal to control the movement of said photoelectric array transducing means  
means for generating an electrical signal from each transducing element of said photoelectric array at each of said subsequent positions; and  
means for combining said electrical signals from each of said subsequent positions to form an electrical representation of the image of said object having a second resolution greater than said first resolution.

4,947,259

**IMAGE SIGNAL COMPRESSING DEVICE**

Yuji Katsuta, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

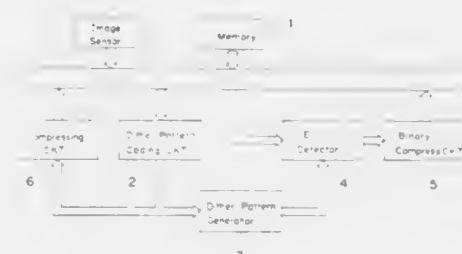
Filed Jul. 20, 1988, Ser. No. 222,091

Claims priority, application Japan, Jul. 22, 1987, 62-184124

Int. Cl.<sup>5</sup> H04M 1/41

U.S. Cl. 358—426

11 Claims



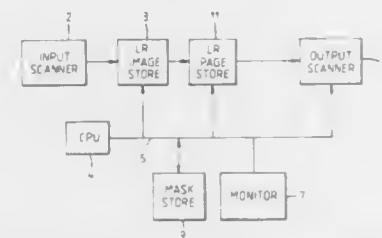
1. An image compressing apparatus, comprising:  
means for dividing a binary image signal into predetermined areas and for converting the binary image signal into codes corresponding to predetermined patterns, one for each predetermined area,  
means for detecting a difference between the patterns corresponding to the codes and the binary image signal, for each predetermined area;  
multi-digit compressing means for compressing said codes; and  
binary compressing means for compressing said difference.



**4,947,260**  
**METHOD AND APPARATUS FOR GENERATING COMPOSITE IMAGES**  
 Alastair Reed, British Columbia, Canada; Peter W. Stansfield, and Martin Rosen, both of Hertfordshire, England, assignors to Crosfield Electronics Limited, London, England  
 Filed Jun. 16, 1989, Ser. No. 366,982  
 Claims priority, application United Kingdom, Jun. 16, 1988, 8814288

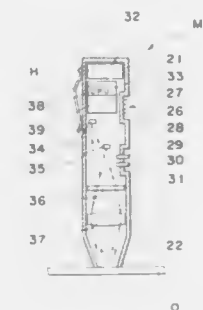
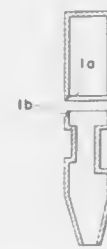
Int. Cl.<sup>5</sup> H04H 1/40  
 U.S. Cl. 358—447

6 Claims



1. A method of generating a composite image on a record medium at a first resolution resulting from two subsidiary images defined by pixels at a second resolution lower than said first, the method comprising generating an array of control data at said second resolution, said control data indicating the relative locations of said subsidiary images in said composite image at said first and second resolutions, generating data defining said composite image at said second resolution under the control of said control data, interpolating said second resolution composite image up to said first resolution, the relative locations of said subsidiary images at the first resolution being determined in accordance with said control data, and causing said first resolution composite image to be recorded on said record medium.

an output port for removably connecting external devices with said memory function section; and  
 operating keys for operating said image input device;

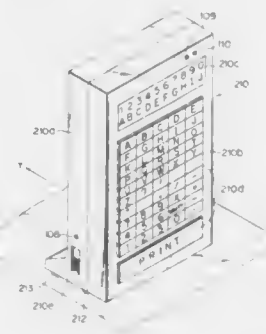


said image forming optical means having a portion for receiving interchangeable lenses by removably attaching and detaching said lenses to said portion.

**4,947,262**  
**HAND-HELD MANUALLY SWEEPING PRINTING APPARATUS**  
 Hiroshi Yajima, Hamura; Masaki Hayashi, Tokyo; Takashi Satoh, Higashiyama, and Masaharu Shioya, Hamura, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan  
 Continuation of Ser. No. 298,832, Jan. 18, 1989, abandoned, which is a continuation of Ser. No. 59,610, Jun. 8, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 339,871  
 Claims priority, application Japan, Jun. 11, 1986, 61-135181; Dec. 11, 1986, 61-189811[U]

Int. Cl.<sup>5</sup> H04N 1/21  
 U.S. Cl. 358—296

29 Claims



1. A hand-held electronic apparatus, including:  
 a manually manipulatable housing, said housing comprising:  
 input means for producing image information signals while said housing is manually swept across a material having image information to be copied;  
 memory means for storing the image information signals derived from said input means;  
 printing means for printing image information on a printing

**4,947,261**  
**PORTABLE IMAGE INPUT DEVICE**  
 Toshio Ishikawa, Nara, and Yukio Kurata, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Jul. 7, 1988, Ser. No. 216,268  
 Claims priority, application Japan, Jul. 8, 1987, 62-170118; Jul. 18, 1987, 62-179711; Jul. 18, 1987, 62-179712

Int. Cl.<sup>5</sup> H04N 1/21

U.S. Cl. 358—473

14 Claims

1. An image input device of a portable type, comprising:  
 a light source for emitting light onto an information medium;  
 image forming optical means for collecting said light emitted by said light source when reflected from said information medium and directing said light reflected from said information medium;  
 photo-electric converting means for developing an image signal representative of an image on said information medium as reflected by said light and directed by said image forming optical means;  
 a memory function section having a solid state memory element for storing said image signal from said photo-electric converting means;

medium while said housing is manually swept across said printing medium;  
 printer-driving means for driving said printing means in response to the image information signals when read out from said memory means;  
 position-detecting means for detecting the relative position of said housing while being swept across either of said material or said printing medium, and for producing a position signal every time said housing is swept over a predetermined distance, said position signal representing the position of said housing with respect to either of said material or said printing medium;  
 control means for controlling said printer-driving means in synchronism with the position signal produced by said position-detecting means, so as to cause said printing means to print the image information on said printing medium in the same manner as said image information is formed on said material to be copied; and  
 addressing means for designating an area of said memory means in response to the signal produced by said position-detecting means as an image information signal from said input means is written in designated areas of said memory means, and for designating an area of said memory means ahead of the signal produced by said position-detecting means when said image information signal is read out from said memory means and supplied to said printer-driving means, so that image information is printed on said printing medium in correspondence with the signal produced by said position-detecting means.

**4,947,263**  
**IMAGE SIGNAL SELECTOR FOR TELEVISION RECEIVER COMBINED WITH VIDEO CASSETTE RECORDER**

Jin H. Yun, Kyungsangbuk, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

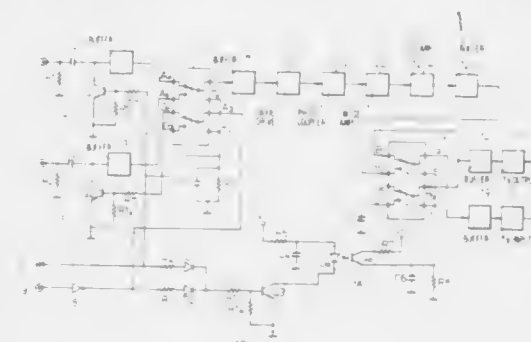
Filed Jul. 20, 1988, Ser. No. 221,896

Claims priority, application Rep. of Korea, Jul. 31, 1987, 1987/12877

Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358—335

6 Claims



1. A switching device for use with an interconnected assembly of a VCR, a TV receiver and an external apparatus, each of which is operative to generate an image signal, said assembly further comprising selection means for selecting one of said image signals, said switching device comprising:

VCR and external image signal controls for respectively generating signals in response to selection of one of the VCR image signal and the image signal of the external apparatus;  
 first and second integrated circuits, each said integrated circuit comprising first, second and third inputs, first and second outputs, a first internal switch for completing a circuit between the first output and a selected one of said first and second inputs, a second internal switch for selectively completing a circuit between said second output and said third input and first and second control terminals

for controlling the first and second internal switches respectively;  
 VCR input means for selectively delivering the VCR image signal to the first input of the first integrated circuit;  
 first muting means connecting the external image signal control and the VCR input means for selectively muting the VCR image signal;  
 external input means for selectively delivering the image signal from the external apparatus to the second input of first integrated circuit;  
 second muting means connecting the second output of the first integrated circuit and the external input means for selectively muting the image signal of the external apparatus;  
 control circuit means connecting the control terminals of the first integrated circuit to the image signal controls of the VCR and external apparatus and to the first muting means;  
 an image signal insulation means connecting the first output of the first integrated circuit and the second input of the second integrated circuit for receiving signals from a selected one of the VCR and the external apparatus in accordance with orientation of the first internal switch of the first integrated circuit, the image signal insulation section being operative to amplify the selected signal;  
 TV input means for delivering the TV image signal to the first and third inputs of the second integrated circuit;  
 image output means for delivering a selected signal from the first output of the second integrated circuit and to the TV receiver;  
 photocoupler means connecting the VCR and external image signal controls to the control terminals of the second integrated circuit for controlling the internal switches of the second integrated circuit;  
 whereby upon selection of the TV image signal, the first control terminal of the second integrated circuit operates the first internal switch thereof for completing the circuit between the first input and the first output thereof and thereby completing the circuit between the TV input means and the image output means; and  
 whereby upon selection of one of the VCR image signal and the external image signal, the VCR and external image signal controls operate the first internal switch of the first integrated circuit to complete the circuit between the selected one of the VCR and external inputs and the first output thereof thereby completing a circuit from the selected input and the image signal output.

**4,947,264**  
**SYNCHRONIZING CIRCUIT FOR A VIDEO DISC PLAYBACK DEVICE**

Sadayuki Narusawa, Hamamatsu, Japan, assignor to Yamaha Corporation, Shizuoka, Japan  
 Continuation of Ser. No. 915,071, Oct. 3, 1986, abandoned. This application Aug. 1, 1989, Ser. No. 388,726

Claims priority, application Japan, Oct. 7, 1985, 60-221784; Oct. 7, 1985, 60-221788; May 2, 1986, 61-102653; Jun. 6, 1986, 61-131156

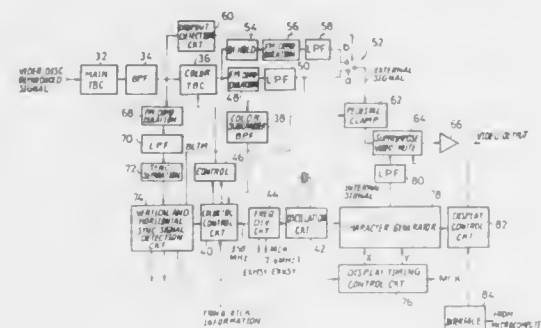
Int. Cl.<sup>5</sup> H04N 5/76, 5/95

U.S. Cl. 358—337

5 Claims

1. A video disc playback device comprising:  
 a first processing system for reproducing and processing a video signal recorded on a disc;  
 a second processing system for processing and superimposing an internal video signal on the video signal reproduced from the disc;  
 timing window establishing means for establishing a timing window including an expected timing of a synchronizing signal of said first processing system;  
 detection means for detecting the occurrence of said synchronizing signal in said window; and

control means for controlling said second processing system to synchronize with said expected timing if the synchro-



nizing signal of said first processing system has occurred in said window.

4,947,265

# APPARATUS AND METHOD FOR RECORDING OR REPRODUCING STILL VIDEO AND AUDIO INFORMATION AND HAVING AFTER RECORDING EDITING CAPABILITY

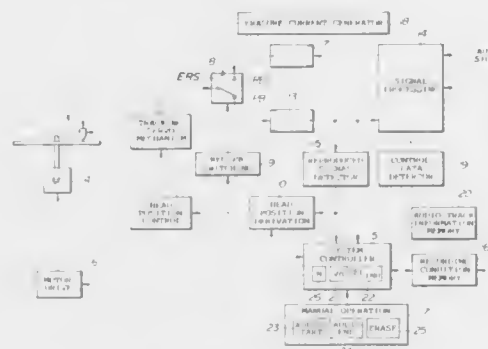
Toshitada Hayashi, Tokyo; Heihachi Ide, Kanagawa, and Kohichi Sano, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,394  
Claims priority, application Japan, Jun. 11, 1987, 62-145892;  
Jun. 12, 1987, 62-146420

Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358-341

9 Claims



1. A recording and reproducing apparatus for use with a recording medium having a plurality of mutually separated data recording regions, each being identified by a unique identification number and having a capacity of recording either one field of video data or a given period of audio data, comprises:

- first means for recording video data together with a first identification number on a selected one of the data recording regions; and
- second means, which is operatively connected to the first means and triggered in an after recording mode, for recording on another selected one of the data recording regions audio data together with a second identification number and an identification of at least one data recording region to constitute a group to be reproduced in synchronism with each other.

4,947,266

# IMAGE PROCESSING SYSTEM

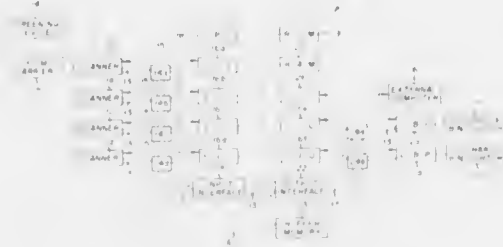
Yutaka Watanabe, Masaaki Ito, and Hideaki Kusano, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 12, 1988, Ser. No. 256,637  
Claims priority, application Japan, Oct. 13, 1987, 62-257888;  
Oct. 13, 1987, 62-257889; Oct. 13, 1987, 62-257890

Int. Cl.<sup>5</sup> H04N 1/00

U.S. Cl. 358-408

21 Claims



1. An image processing system comprising:  
a plurality of image readers each of which optically reads images and produces a corresponding image signal for each image;  
printing means for forming images on sheets in accordance with said image signals;  
sorting means connected to said printing means, provided with a plurality of discharge paper bins, and adapted to sort sheets on which the images have been printed by said printing means;  
switching means for connecting an arbitrarily selected one of said image readers to said printing means and consequently effecting transfer of said image signal produced from said selected image reader to said printing means;  
allocation means for allocating said discharge paper bins of said sorting means to respective image readers so that each of said image readers has a discharge paper bin allocated to it; and  
control means for controlling said sorting means in such a manner during the formation of an image by said printing means based on said image signal that sheets on which said images have been printed are stored into the discharge paper bin allocated to the image reader which has produced said image signal.

4,947,267

# IMAGE READING APPARATUS

Hisaji Masaki, and Hideo Takaki, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1989, Ser. No. 333,041  
Claims priority, application Japan, Apr. 6, 1988, 63-084259;  
Jun. 20, 1988, 63-149997

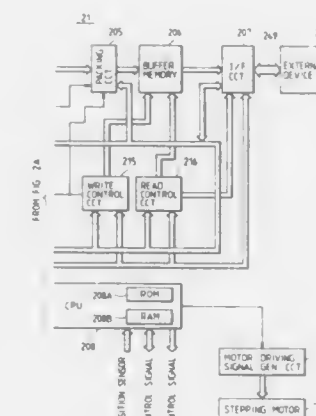
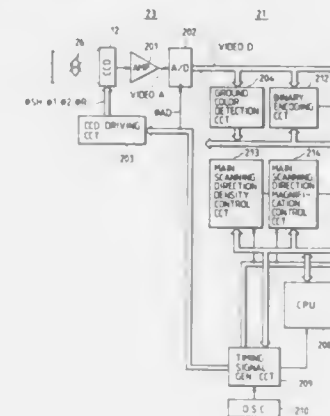
Int. Cl.<sup>5</sup> H04M 1/40

U.S. Cl. 358-426

8 Claims

1. An image reading apparatus comprising:  
reading means for scanning an original image and outputting an analog image signal;  
converting means for converting the analog image signal output from said reading means into multi-value data consisting of a plurality of bits in units of pixels;

changing means for changing the number of bits of the multi-value data output from said converting means; and



packing means for linking the multi-value data sequentially output from said changing means and packing such data into a predetermined number of bits of data.

4,947,268

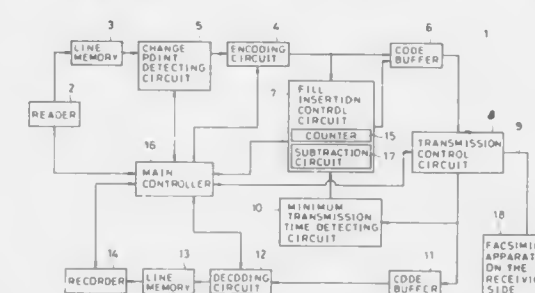
# DATA TRANSMISSION SYSTEM

Takashi Nakajiri, Masayuki Hachinoda, both of Nara; Masafumi Matsumoto, Asuka-Murakoshi, and Matabira Kotani, Senohigashi, all of Japan, assignors to Sharp Kabushiki Kaisha, Abeno, Japan

Filed Oct. 28, 1988, Ser. No. 264,156  
Claims priority, application Japan, Oct. 31, 1987, 62-276282  
Int. Cl.<sup>5</sup> H04N 1/419

U.S. Cl. 358-426

4 Claims



1. A data transmission system, comprising:

a transmitter which has functions for encoding image data and transmitting it as one unit data; and  
a receiver which is connected to the transmitter over a communication line and has functions for sending its minimum transmission time to the transmitter and receiving one unit data from the transmitter;

said transmitter comprising:

- minimum transmission time detecting means for detecting the minimum transmission time of the receiver connected to the transmitter;
- subtraction means for calculating a deviation for each said one unit data by subtracting for each said one unit data the time required for transmitting the one unit data from the minimum transmission time detected by said minimum transmission time detecting means;
- accumulating means for cumulatively storing a sum of the deviations calculated by said subtraction means for a plurality of said one unit data; and
- addition means for adding null information to the transmitted one unit data only when said sum of the deviations for a plurality of said one unit data is less than zero.

4,947,269

# IMAGE REPRODUCTION APPARATUS CAPABLE OF DIVIDING AN IMAGE INTO PARTS FOR REPRODUCTION ON RESPECTIVE SHEETS

Masanori Yamada, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

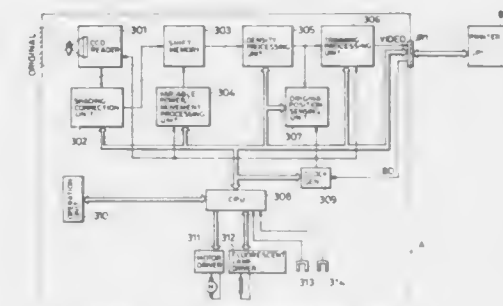
Continuation of Ser. No. 289,526, Dec. 27, 1988, abandoned, which is a continuation of Ser. No. 31,048, Mar. 27, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 372,193

Claims priority, application Japan, Mar. 31, 1986, 61-73107;  
Mar. 31, 1986, 61-73108

Int. Cl.<sup>5</sup> H04M 1/40

U.S. Cl. 358-448

30 Claims



1. An image reproduction apparatus comprising:  
output means for outputting image data representing an original image;  
designation means for designating an arbitrary area of the original image; and  
reproduction means for reproducing an image on the basis of the image data, said reproduction means being operable to divide the image of the area designated by said designation means into plural areas and reproducing images of the plural areas on different recording materials, respectively.

4,947,270

# VIDEO CASSETTE REWIND APPARATUS

Lewis Paynter, III, Wellington, St. George, Bermuda (6E02)  
Filed Mar. 10, 1988, Ser. No. 166,399

Int. Cl.<sup>5</sup> G11B 5/008

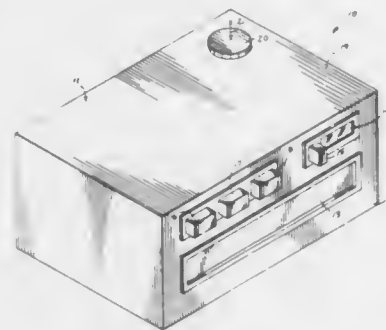
U.S. Cl. 360-14.1

1 Claim

1. A video tape cassette rewind apparatus for rewinding and processing video tape comprising,  
a cabinet enclosure formed with an access opening and support means for accepting said video tape cassette,  
drive means underlying said support means for advancing or



rewinding said video tape along a path within said video tape cassette, processing means including selectively operative editing means for editing portions of said video tape, counter means operatively associated with said drive means to provide visual accounting of video tape length advanced passed said processing means, said process means further includes a cleaner head means with an applicator brush secured thereto for providing application of a video tape cleaning solution onto a surface of a video tape as it is progressed past said applicator brush, said cleaner head means further includes a conduit opera-



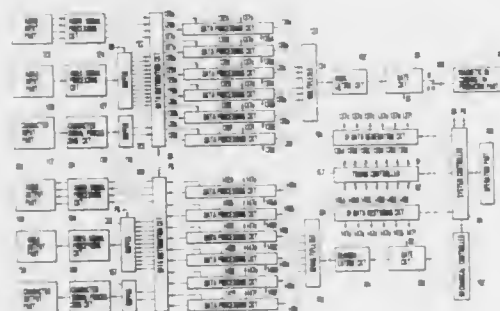
tively associated with a reservoir for accepting a quantity of video tape cleaning solution therein, said reservoir is accessed through a removable cap wherein said reservoir is directed through an upper top face of said video cassette rewind apparatus to said cap overlying said reservoir above the surface of said top face for providing convenient access to said reservoir, said editing means comprises an electro-magnet positioned adjacent said tape path selectively operative by an on/off switch for selectively erasing predetermined portions of said video tape, and said apparatus further includes switching means for energizing or de-energizing said apparatus to enable advancing or rewinding of tape within said video tape cassette.

4,947,271

**MULTI-CHANNEL RECORDING APPARATUS**  
Tadayoshi Nakayama, and Tsutomu Fukatsu, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 29, 1987, Ser. No. 116,058  
Claims priority, application Japan, Nov. 5, 1986, 61-261843  
Int. Cl.<sup>3</sup> G11B 5/09

U.S. Cl. 360—19.1

6 Claims



1. A recording apparatus comprising:  
(a) recording means for recording signals by forming many parallel tracks in an n number (n: an integer which is at

least 2) of recording areas longitudinally extending on a tape-shaped recording medium;  
(b) input means for receiving main information;  
(c) recording signal forming means for forming, from said main information, recording signals in an m number of channels (m: an integer which is at least 1 but is less than n);  
(d) adding means for adding, to each of said recording signals of said m channels, sub-information including a first data which indicates whether the number m is 1 or more than 2; and  
(e) means for supplying said recording means with said recording signals of the m number of channels so that the recording signals of said m channels are recorded by said recording means in an m number of areas among said n number of areas.

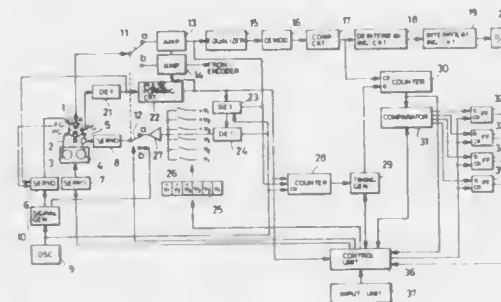
4,947,272

**SIGNAL REPRODUCING DEVICE WHICH OFFSETS THE TRACKING ERROR SIGNAL FOR A DIGITAL TAPE PLAYER**

Seiichi Yokozawa, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan  
Filed Mar. 16, 1988, Ser. No. 169,252  
Claims priority, application Japan, Mar. 30, 1987, 62-79188; Mar. 30, 1987, 62-79189  
Int. Cl.<sup>3</sup> G11B 5/584, 15/467

U.S. Cl. 360—77.15

1 Claim



1. A signal reproducing device comprising:  
a head assembly for tracing tracks on which predetermined digital data and tracking pilot signals have been recorded, said head assembly being larger in tracking width than said tracks;  
means for detecting a pilot signal from a reproduction output of said head assembly to form a tracking error signal;  
means for counting digital data errors in said reproduction output of said head assembly;  
means for comparing an output of said counting means with predetermined reference values;  
means for adding a predetermined offset signal to said tracking error signal according to an output of said comparing means; and  
a servo circuit for controlling tracking conditions of said head assembly according to an output of said addition circuit.

4,947,273

**AUTOLOADING, INTERCHANGEABLE-MEDIA, DISK-DRIVE APPARATUS**

derard D. Benz, Portola Valley, Calif., assignor to Texor Corporation, San Francisco, Calif.  
Filed Nov. 21, 1988, Ser. No. 274,385  
Int. Cl.<sup>3</sup> G11B 17/08

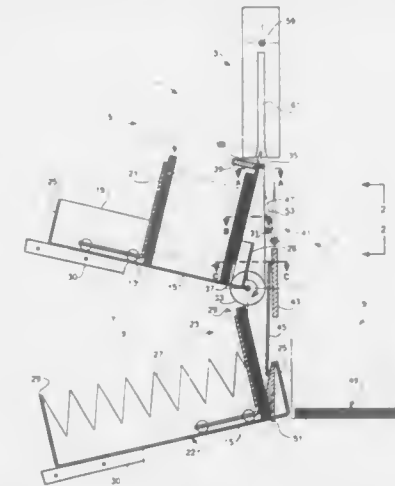
U.S. Cl. 360—98.06

25 Claims

1. An autoloading disk drive apparatus for accepting an input plurality of interchangeable-media disks in the form of an input stack of such disks, for sequentially removing each of

said disks from said stack, for carrying out read-write data operations thereon, and for placing selected ones of said disks in an output stack, comprising:

a support frame;  
a disk drive mounted on said support frame for sequentially receiving each one of said input disks within a disk insertion slot therewithin, and for carrying out data operations on a disk so received;  
an input tray means mounted on said support frame for containing said input stack of disks and for advancing said stack as each disk is removed therefrom;  
disk transport means mounted on said support frame for removing an input disk from one end of said input stack, for advancing said input disk along an input axis to said disk drive, and for inserting said input disk in said drive; drive positioning means mounted on said support frame for



positioning said drive in an input position in which said disk insertion slot is generally aligned with said input axis to receive said input disk, and for moving said drive away from said input position to an output position in which said disk insertion slot is generally aligned with an output axis displaced from said input axis for ejection of said input disk from said drive to an output stack or a reject stack;  
control means, coupled to said disk transport means and said drive positioning means, for initiating and controlling a sequence of operations in which an input disk is removed from said input stack, is transported to and inserted within said disk drive, data operations are carried out on said input disk, said drive positioning means is operated to cause said drive to transit to said output position to eject said input disk and to return to said input position to receive a subsequent disk.

4,947,274

**RESILIENTLY MOUNTED CRASH STOP AND MAGNETIC LATCH FOR A VOICE COIL ACTUATOR**  
Shawn E. Casey, San Jose, and Terence H. West, Aptos, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

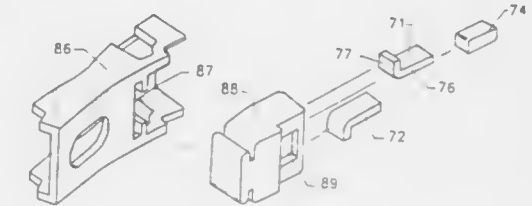
Continuation of Ser. No. 220,329, Jul. 19, 1988, Pat. No. 4,890,176. This application Dec. 21, 1989, Ser. No. 454,191  
Int. Cl.<sup>3</sup> G11B 21/22

U.S. Cl. 360—105

9 Claims

1. A magnetic latch for a disc drive system having a head positioner assembly for positioning a plurality of transducer heads relative to a recording media located within a disc housing, the head positioner assembly being movable with respect to the disc housing, the magnetic latch including:  
a bumper stop fixably mounted to the housing for limiting the head positioner assembly's movement in one direction;

a strike plate carried by the head positioner assembly that is formed of a magnetic material; and  
magnet means supported in the bumper stop for magnetically engaging the strike plate to latch the head positioner assembly against the bumper stop when the drive is not in



use, including a compliant element that extends beyond the magnet in the bumper stop toward the strike plate to insure that the magnet means firmly engages the strike plate while preventing the strike plate from hitting the magnet.

4,947,275

**DETACHABLE HEAD-LOAD BEAM SLIDER ARM FOR DISK DRIVE**

Sigmund Hinlein, Sudbury, Mass., assignor to Digital Equipment Corp., Maynard, Mass.  
Filed Mar. 23, 1988, Ser. No. 172,288  
Int. Cl.<sup>3</sup> G11E 5/48, 5/50

U.S. Cl. 360—104

24 Claims



1. An assembly for mounting a head in a disk drive, comprising:  
a detachable arm having a generally planar proximal end and a distal end adapted to carry the head, and  
a mounting arm including a resilient clamp for releasably engaging and securing said planar proximal end between said clamp and the mounting arm.

4,947,276

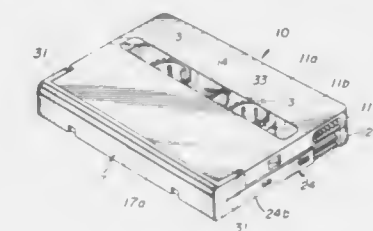
**MAGNETIC TAPE CASSETTE WITH REMAINING TAPE INDICATOR**

Hiroshi Meguro, Miyagi, Japan, assignor to Sony Corporation, Tokyo, Japan  
Filed Sep. 9, 1985, Ser. No. 773,868  
Claims priority, application Japan, Sep. 19, 1984, 59-142516[U]

Int. Cl.<sup>3</sup> G11B 23/087

U.S. Cl. 360—132

4 Claims



1. A magnetic tape cassette comprising:

a cassette casing housing a pair of tape reels onto which magnetic tape is wound;  
a transparent window formed in one surface of said cassette casing so as to show the interior of said cassette casing;  
a transparent bearing sheet disposed within said cassette casing between said tape reels and an inner surface of said transparent window; and  
an opaque bearing sheet disposed between an opposite surface of said cassette casing and said tape reels, said opaque bearing sheet being so colored as to provide good color contrast with the color of said magnetic tape.

4,947,277

# SYSTEM FOR CHECKING THE OPENING AND CLOSING FUNCTION OF CASSETTE COVER

Kazuo Kubota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 212,380, Jun. 27, 1988, Pat. No. 4,899,245.

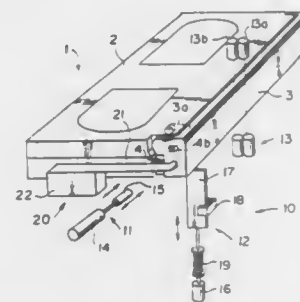
This application Aug. 25, 1989, Ser. No. 398,551

Claims priority, application Japan, Jul. 1, 1987, 62-164688

Int. Cl.<sup>5</sup> G11B 33/00

U.S. Cl. 360-137

4 Claims



1. A cassette cover lock mechanism testing system for checking a videotape cassette for an opening and closing function of a cassette cover which is mounted on a cassette casing to be movable between a closed position and an open position and is urged toward the closed position by a closing spring, the cassette casing being provided with a lock mechanism having a lock member which is movable between a locking position in which it is engaged with the cassette cover in the closed position to lock the cassette cover to the closed position, and a lock releasing position in which it releases the cassette cover, and a locking spring which normally urges the lock member toward the locking position,

said system comprising a lock releasing means for urging the lock member toward the lock releasing position, a cover opening means for urging the cover toward the open position, and a position detecting means for detecting the position of the cover.

4,947,278

# REMOTE SENSING POWER DISCONNECT CIRCUIT

Edward L. Nichols, III, Annapolis, Md., assignor to Smart House Limited Partnership Limited, Upper Marlboro, Md.

Filed Jun. 23, 1989, Ser. No. 370,761

Int. Cl.<sup>5</sup> H07H 3/16

U.S. Cl. 361-46

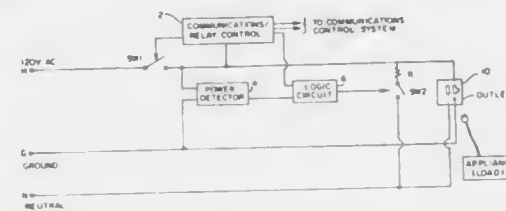
9 Claims

1. A remote sensing power disconnect circuit for applying a ground fault to a power line in response to a power fault condition occurring during the supply of power to a load connected to said power line, comprising:

power connecting means for applying power to said load in response to a power signal indicating that said load is to be energized;

power detector means for detecting whether power is being supplied to said load; and

means for applying a ground fault to said power line when said power detector means detects that power is being



supplied to said load but said power signal does not indicate that said load is to be energized.

4,947,279

# MINIATURE CONTINUOUS TAPE LOOP CARTRIDGE HAVING TAPE WITHDRAWING OPENING

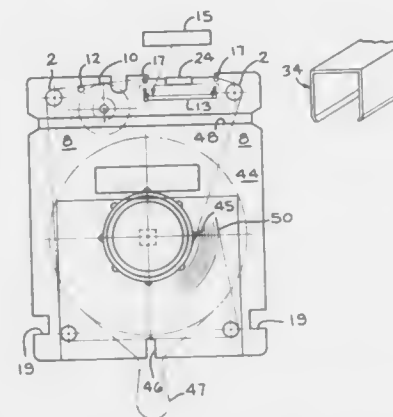
Bernard A. Cousino, Fort Myers, Fla., assignor to Cousino Microloop Corporation, Toledo, Ohio

Filed Jun. 8, 1988, Ser. No. 204,212

Int. Cl.<sup>5</sup> G11B 23/027

U.S. Cl. 360-132

11 Claims



1. A tape cartridge for holding an endless coil of tape comprising, in combination, a cartridge base and a mating cartridge cover, a disk for supporting the tape mounted for rotation in said base, said base and said cover having a front and a rear, first guide means for guiding a portion of the tape parallel to the front of said base and cover, said front having an opening therein to allow transducing of said tape, second guide means for guiding a portion of the tape parallel to the rear of said base and cover and an editing slot defined at said rear, whereby a portion of the tape may be pulled through said editing slot to edit the tape or correct tape feed out.

4,947,280

# ROTARY MAGNETIC REPRODUCING APPARATUS WITH DISC SENSING LOGIC

Kazuo Okada, and Yoshiaki Nakayama, both of Minato, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 145,702, Jan. 15, 1988, Pat. No. 4,819,093, which is a continuation of Ser. No. 781,540, Sep. 30, 1985, abandoned. This application Sep. 6, 1988, Ser. No. 240,280

Claims priority, application Japan, Oct. 2, 1984, 59-206701; Oct. 2, 1984, 59-206702; Oct. 2, 1984, 59-206705

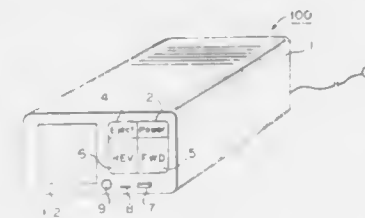
Int. Cl.<sup>5</sup> G11B 5/012

U.S. Cl. 360-137

9 Claims

1. A rotary magnetic reproducing apparatus wherein a magnetic head is moved in the radial direction of a magnetic disc rotating in a disc pack to thereby perform reproducing, comprising:

a mechanism for moving said magnetic head in one of a forward direction and a reverse direction by the operation of one of a forward switch and a reverse switch; and



means for giving a warning when said reverse switch is operated during reproduction of a first track or said forward switch is operated during reproduction of a last track.

4,947,281

# SURGE SUPPRESSION MODULE

William C. Boteler, Bridgeport, Conn., assignor to Hubbell Incorporated, Orange, Conn.

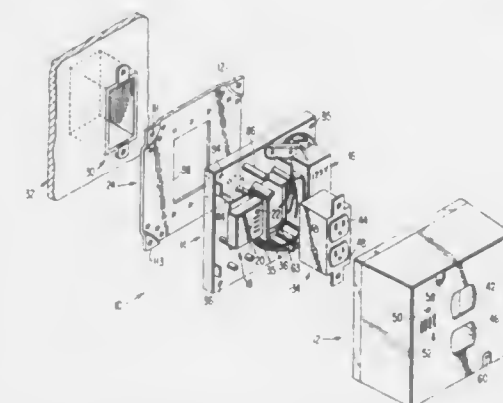
Continuation of Ser. No. 168,418, Mar. 15, 1988, abandoned.

This application Nov. 17, 1989, Ser. No. 437,613

Int. Cl.<sup>5</sup> H02H 9/04

U.S. Cl. 361-56

26 Claims



1. A surge suppressing module for providing transient voltage surge protection between electrical wires of a power circuit of any current rating located in an electrical outlet box and a conventional plug of an electrical device, the combination comprising:

only one female wiring device electrically coupled in series between the electrical wires of the power circuit and the plug, said wiring device being conventional and having at least one female socket for receiving the plug therein;

a support member having means for coupling said support member to the outlet box;

a surge suppressing element having a voltage rating of 125 volts, 250 volts, or 125/250 volts, said surge suppressing element being a separate and independent replaceable unit from said conventional female wiring device;

first means on said support member for coupling said surge suppressing element to said support member;

second means on said support member for coupling said conventional female wiring device to said support member;

a cover having an open aperture therein, and means, on said support member and said cover, for coupling said cover to said support member with said aperture coaxially aligned with said female socket on said female wiring device;

the electrical wires of the power circuit, extending directly between (a) said conventional female wiring device and

said surge suppressing element and (b) the power circuit, for electrically connecting the power circuit directly to said conventional female wiring device and said surge suppressing element, whereby, the conventional plug can pass through said aperture and directly engage said female socket of said conventional female wiring device.

4,947,282

# THYRISTOR VALVE WITH IMPROVED GATE PULSE GENERATING SCHEME

Sumio Kobayashi, Kokubunji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 17, 1988, Ser. No. 169,471

Claims priority, application Japan, Mar. 19, 1987, 62-62525

Int. Cl.<sup>5</sup> H02H 5/24

U.S. Cl. 361-91

9 Claims



1. A thyristor valve circuit comprising:

at least one thyristor valve to be protected from an overvoltage exceeding a predetermined protection level and including a plurality of series-connected thyristors;

inhibit level detecting means, connected to said thyristor valve, for generating an inhibit signal when a voltage applied to said thyristors exceeds a predetermined inhibit level which is lower than the predetermined protection level; and

gate pulse generating means, connected to said thyristor valve and inhibit level detecting means, for generating gate pulses to trigger said thyristors when the inhibit signal is not generated, and inhibiting generation of the gate pulses when the inhibit signal is generated, wherein when variation in the turn-on overvoltage of said thyristors falls within  $\pm X\%$  of the rated value thereof, the predetermined trigger inhibit level is set not larger than  $100\%-X\%$  of the predetermined protection level.

4,947,283

# SOLENOID DRIVE CIRCUIT

Hiromi Kono, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,267

Claims priority, application Japan, Jul. 10, 1987, 62-105955[U]

Int. Cl.<sup>5</sup> H01H 47/32

U.S. Cl. 361-154

6 Claims

4. A solenoid drive circuit, for driving a solenoid which consists of a first end coupled to a power supply and a second end, comprising:

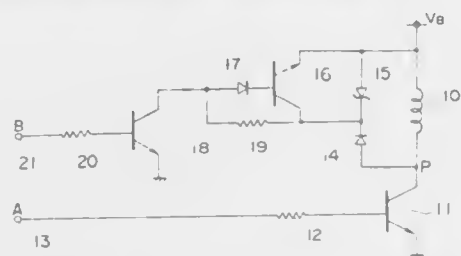
a drive transistor coupled to said second end of said solenoid for allowing current to flow through said solenoid in response to a first level state of a drive signal, whereby said drive signal consists of a starting period of said first level state and a holding period which periodically alternates between said first level state and a second level state; a series circuit of a Zener diode and a diode coupled in



parallel with said solenoid via said first and second ends respectively;

a first NPN switching transistor, coupled to said first end of said solenoid and a connection point intermediate said Zener diode and said diode for selectively providing a bypass path around said Zener diode; and

a second switching transistor, coupled to said first NPN switching transistor for switching said first NPN switch-



ing transistor off in order to inhibit said bypass path in response to a first voltage level of a control signal, said control signal assuming said first voltage level for a time period extending from the last transition from said second level state to said first level state of said drive signal during said holding period to a predetermined time after the end of said holding period whereby current flowing through said solenoid falls immediately at the end of said holding period.

4,947,284

#### FIELD-INSTALLABLE HEAVY DUTY UNDERVOLTAGE RELEASE

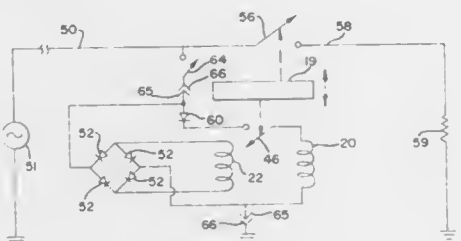
Todd Munyon, Cedar Rapids, Iowa, and Chris Toarmina, St. Louis, Mo., assignors to Square D Company, Palatine, Ill.

Filed Mar. 6, 1989, Ser. No. 320,022

Int. Cl.<sup>5</sup> H02H 3/24; H01H 83/00

U.S. Cl. 361—92

13 Claims



1. An undervoltage tripping unit for resettable power line circuit breaker means having line and load terminal means adapted for connection to a line and a load and a release member coupled to open said circuit breaker means when moved in a given direction to a tripping position, said tripping unit comprising:

solenoid means including plunger means operable between extended and retracted positions and configured for engagement with said release member so as to move said release member to said tripping position responsive to movement of said plunger means to said extended position, spring biasing means for urging said plunger means to said extended position, coil means disposed to attract said plunger means to said retracted position, and connection means for connecting said coil means to said line, terminal means including switching means for varying the excitation of said coil means and operable to a given excitation condition when said plunger means is in said extended position and to a lower excitation condition when said plunger means is in said retracted position, said given and lower excitation conditions being chosen so that a

power line voltage above a given reset voltage will energize said coil means to retract said plunger means from said extended to said retracted position and so that said plunger means will remain in said retracted position at a tripping voltage below said reset voltage, and wherein said coil means includes a holding coil and a booster coil disposed about said plunger means and said switching means is configured to selectively energize said booster coil over a range of plunger means positions from said extended position to a point closely proximate to said retracted position.

4,947,285

#### REVERSING CIRCUIT FOR DIRECTION REVERSAL IN DIRECT CURRENT DRIVES

Anton Happach, Munich, Fed. Rep. of Germany, assignor to Schaltbau Gesellschaft mbH, Munich, Fed. Rep. of Germany

PCT No. PCT/EP87/00421, § 371 Date Mar. 8, 1989, § 102(e)

Date Mar. 8, 1989, PCT Pub. No. WO88/02179, PCT Pub.

Date Mar. 24, 1988

PCT Filed Jul. 31, 1987, Ser. No. 332,451

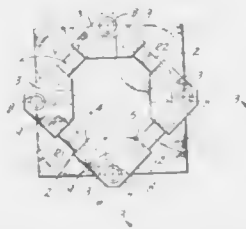
Claims priority, application Fed. Rep. of Germany, Sep. 9,

1986, 3630657

Int. Cl.<sup>5</sup> H02J 1/00; H01H 5/00

U.S. Cl. 361—245

4 Claims



1. A reversing circuit for reversing an operating direction of a DC drive system, comprising four single-pole relays (V1, V2, R1, R2) each including a solenoid (1) for moving a two-pole contact bridge (2), and fixed contacts (4,5) connected to exterior terminals (8), characterized in that said four single-pole relays (V1, V2, R1, R2) are arranged in a square configuration, and that four contact pieces (3) for electrically connecting said exterior terminals (8) to said fixed contacts (4,5) are arranged between the solenoids (1) of two respective ones of said four single-pole relays (V1, V2, R1, R2) in a common plane in a square configuration.

4,947,286

#### MULTILAYER CAPACITOR DEVICE

Toshimi Kaneko; Hidetoshi Yamamoto, and Hiromichi Sakai, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Aug. 3, 1989, Ser. No. 388,982

Claims priority, application Japan, Aug. 11, 1988, 63-106638[U]

Int. Cl.<sup>5</sup> H01G 4/34, 3/06

U.S. Cl. 361—321

5 Claims

1. A multilayer device of the type including a sintered body obtained by laminating and cofiring a plurality of ceramic green sheets made of dielectric material and having inner electrodes formed on major surfaces of the sheets, comprising:

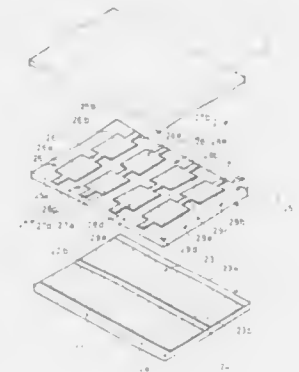
a sintered body;

a plurality of first inner electrodes formed so as to extend between first and second side surfaces of said sintered body and respectively spaced apart from each other by a respective space region having a predetermined width on the same plane;

at least one second inner electrode having a plurality of electrode portions for taking up capacitance and being overlapped with one side of said first inner electrodes

through a ceramic layer and extending in such a direction as to intersect said first inner electrodes and to be led out to third and fourth side surfaces of said sintered body;

a first outer electrode provided on at least one of the first and second side surfaces of said sintered body and electrically connected to the first inner electrodes; and



at least one pair of second outer electrodes formed on the third and fourth side surfaces of said sintered body and electrically connected to said second inner electrode; portions other than the electrode portions for taking up capacitance of said second inner electrode being formed to have a smaller width than that of each of the electrode portions for taking up capacitance.

4,947,287

#### CAPACITOR COOLING ARRANGEMENT

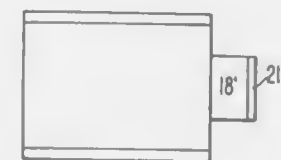
Richard J. Hoppe, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 30, 1988, Ser. No. 277,945

Int. Cl.<sup>5</sup> H01G 4/10; H05K 7/20

U.S. Cl. 361—321

19 Claims



1. A multilayer ceramic capacitor, comprising a plurality of ceramic capacitor plates, each having a circumference, and means operatively arranged between opposing plates of the plurality of capacitor plates so as to be electrically insulated from the plates and extending in a direction perpendicular to a direction defined by stacking of the plurality capacitor plates for conducting heat from the capacitor plates, wherein the heat conducting means extend beyond only a portion of the circumference of each of the capacitor plates to effect heat transfer from inside the capacitor to outside the capacitor.

4,947,288

#### PRINTED CIRCUIT BOARD FOR MOUNTING IN A BACKPLANE

Torbjörn R. Olsson, Tullinge; Björn T. Kassman, Haninge; Karl Gustaf Olsson, Stockholm; Stig C. Ernolf, Sollentuna; Per-Ove Nilsson, Bandhagen; Rolf I. B. Kjellsson, Hagersten, and Lars H. Widoff, Karlstad, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Aug. 31, 1989, Ser. No. 401,165

Claims priority, application Sweden, Oct. 12 1988, 8803634

Int. Cl.<sup>5</sup> H01R 23/68

U.S. Cl. 361—413

6 Claims



1. A printed circuit board provided with electrical contact devices mounted on a back plane of a card frame so as to form a magazine in which printed circuit cards can be inserted perpendicularly to said back plane, said circuit cards having electrical contact devices which correspond to said contact devices on said printed circuit board, said printed circuit board forming an electrical connecting unit for said circuit cards located on said back plane of the magazine, wherein said printed circuit board is a self-supporting and stiffening construction in the form of a sandwich element, said sandwich element comprising a spacer element which is bonded adhesively to said printed circuit board and to a bottom plate.

4,947,289

#### LATCH MECHANISM FOR A PLUG-IN CARTRIDGE OR THE LIKE

Ernest R. Dynie, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Oct. 19, 1989, Ser. No. 424,033

Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361—415

4 Claims



1. The combination of a printed circuit board (PCB), a face plate attached to one end of said PCB and a latching mecha-

nism for use in aiding the insertion of said PCB into a mating apparatus, for securing said PCB in said mating apparatus, and for aiding the extraction of said PCB from said mating apparatus, said combination characterized by:

said latching mechanism comprising: a body portion; a pair of walls extending from said body portion, facing portions of said walls having means for rotatably mounting said latching mechanism on opposite faces of said face plate, the facing portions of said walls also having facing channels snap locatable onto detents on said opposite faces of said face plate to resiliently latch said latching mechanism when said PCB is fully inserted into said mating apparatus; a camming portion projecting from an end of said body portion, said camming portion adapted to engage a projection on said mating apparatus; and an actuating portion providing leverage for said camming portion; said camming portion and said actuating portion cooperating to function as a lever, said camming portion adapted to engage an inside surface of said projection to establish a first engagement about which said latching mechanism is levered to overcome an insertion force, and adapted to engage an outside surface of said projection to establish a second engagement about which said latching mechanism is levered to overcome an extraction force.

4,947,290

# RAIL MOUNTING DEVICE FOR AN ELECTRICAL EQUIPMENT

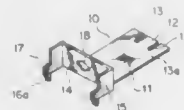
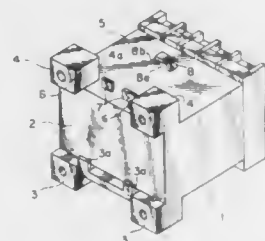
Shigeharu Ootsuka, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1989, Ser. No. 413,007

Claims priority, application Japan, Sep. 29, 1988, 63-242539 Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361-417

7 Claims



1. A rail mounting device for mounting a rail to electrical equipment, comprising:  
a case of the electrical equipment and a movable claw made of a resilient material;  
said case including  
a recess formed in a bottom surface of said case for fitting a rail thereinto;  
a stationary claw protruding into said recess from a first side of said recess;  
a pair of protruding portions formed on a side surface of said case and integrally extending along a second side of said recess;  
a pair of projections projecting inwardly from opposing surfaces of said pair of protruding portions;  
at least one receiving shelf provided on said side surface of said case between said pair of protruding portions; and  
an engaging projection formed on said side surface and having a through hole therethrough;  
said movable claw including

an abutting portion having a tongue at one end thereof, said tongue being engaged with said engaging projection;  
a receiving piece portion having an inverted U-shape which is formed by bending the other end of said abutting portion upwardly at a right angle to said one end of said abutting portion, said receiving piece portion having leg pieces at both lateral ends thereof bent such that a distance between said leg pieces is generally equal to a distance between said opposing surfaces of said pair of protruding portions on said side surface; and  
fitting portions respectively formed at tip ends of said leg pieces of said receiving piece portion.

4,947,291

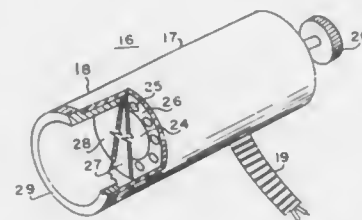
# LIGHTING DEVICE

Kevin McDermott, 196 Phillips Dr., Hampstead, Md. 21074  
Filed Jun. 17, 1988, Ser. No. 208,218

Int. Cl.<sup>5</sup> F21V 9/00

U.S. Cl. 362-19

25 Claims



1. A lighting device for projecting radiant energy onto an on-site surface for direct viewing by the human eye of multi-colored information thereon and for compatible simultaneous operation of an on-site night vision imaging system in viewing on-site as well as off-site reflectors and sources of radiant energy, said device embodied in a housing having an exit aperture for projection of said radiant energy as light and having a means for supplying electrical power responsive to a user, wherein the improvement comprises:

- (a) an incandescent lamp for the emission of light in a broad band of radiant energy wavelengths;
- (b) an array of electronic lamps comprising a multiplicity of light emitting diodes for the emission of light in at least one selected narrow band of radiant energy wavelengths within the visible spectrum to enhance said viewing of multicolored information, said array of electronic lamps operative simultaneously with said incandescent lamp;
- (c) an optical filter for the absorption of infrared emissions of said radiant energies;
- (d) a rheostat, responsive to said user, for electrical dimming of said projected radiant energy by reducing the intensity levels of said incandescent and electronic lamp radiant energy emissions, said rheostat of use in the range of high level intensities for conserving said electrical power and reducing said absorption of infrared energies and buildup of heat in said lighting device; and
- (e) an optical filtering subassembly for transmission of said radiant energies and light to said exit aperture, which comprises:  
at least two polarizing filters arranged for successive transmission of said radiant energies and light; and  
means for differential rotation of the polarization planes of said polarizing filters, responsive to said user for optical dimming of said projected radiant energy, said optical dimming for use in the range of low level intensities of said projected radiant energy for the preservation and improved stability of the color composition of said visible spectrum required for said viewing of multicolored information.

4,947,292

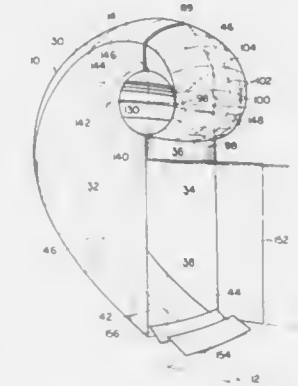
# LIGHTING SYSTEM

John A. Vlah, 14330 Georgia Rd., Middlefield, Ohio 44062  
Filed Nov. 8, 1988, Ser. No. 268,711

Int. Cl.<sup>5</sup> F21Y 8/00, 7/12

U.S. Cl. 362-32

24 Claims



1. A reflector for directing light from a source toward an outlet area comprising a reflector body having an inner reflective surface, said reflector body having a continuous longitudinal profile including:

- (a) a first substantially circular arc having a first arc radius;
- (b) a second substantially circular arc which substantially continues said first arc and which has a second arc radius longer than said first arc radius such that said first and second arc radii have a ratio of lengths of substantially  $\frac{1}{2}(1+\sqrt{5})$ ;
- (c) a third substantially circular arc which substantially continues said second arc and which has a third arc radius longer than said second arc radius such that said second and third arc radii have a ratio of lengths of substantially  $\frac{1}{2}(1+\sqrt{5})$ ;
- (d) a fourth substantially circular arc which substantially continues said third arc and which has a fourth arc radius longer than said third arc radius such that said third and fourth arc radii have a ratio of lengths of substantially  $\frac{1}{2}(1+\sqrt{5})$ ; and
- (e) a parabolic arc which continues said fourth substantially circular arc.

4,947,293

# CARGO VEHICLE PERIMETER CLEARANCE LIGHTING SYSTEM

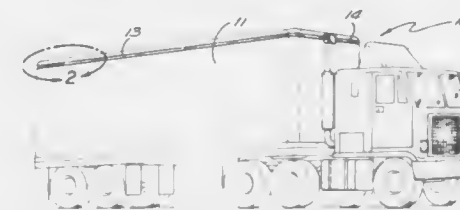
Glenn M. Johnson, 1146 Longwood Ave., Los Angeles, Calif. 90019, and Derek R. Gallardo, 9594 1/2 West Olympic Blvd., Beverly Hills, Calif. 90212

Filed Mar. 3, 1989, Ser. No. 318,709

Int. Cl.<sup>5</sup> F21Y 8/00

U.S. Cl. 362-32

3 Claims



1. In a highway cargo vehicle including at least one chassis mounted container body drawn by a tractor unit, said container body having a standard elongated recessed indentation extending adjacent to a roof line of said body, the combination comprising:

at least one light guide in strip form mounted within said

elongated indentation, said light guide having a solid core of polyfilmer material having a first index of refraction and a cladding being composed of polytetrafluorethylene having a second index of refraction, said light guide being of generally rectangular cross-section mounted with a broad side of said cross-section facing outward;  
means for illuminating one end of said light guide over said cross-section;  
and mode forming means associated with said light guide including the physical cross-sectional dimensions of said light guide and a predetermined ratio of said first and second indices of refraction thereby effecting longitudinal light flux propagation within said light guide and lateral light flux emission from said outward facing broad side of said light guide.

4,947,294

# HEADLAMP ASSEMBLY

Paul D. Van Duyn; Robert C. House, II, and Leslie H. Hallgarth, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

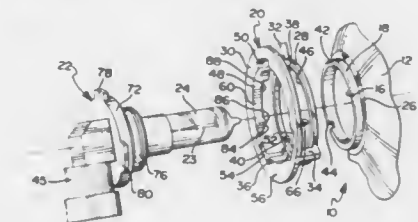
Continuation of Ser. No. 342,211, Apr. 24, 1989, abandoned.

This application Oct. 10, 1989, Ser. No. 430,831

Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 362-61

4 Claims



1. In combination, a vehicle headlamp assembly including a plastic reflector formed with a parabolic reflecting surface and a circular socket formed in said reflecting surface and adapted to receive a light bulb of a replacement light bulb assembly from the rear of said reflector, an annular flange integrally formed with and projecting axially outwardly from the rear end of said reflector and concentrically surrounding said socket, an annular seating surface lying in a plane substantially perpendicular to the axis of said socket surrounding said flange, a plastic retainer located at the rear of said reflector and forming a permanent part thereof for positioning said light bulb assembly in a predetermined position relative to said opening, and a replaceable light bulb assembly having a lamp smaller in diameter than said opening and having three circumferentially spaced retainer members projecting radially outwardly therefrom, said retainer including an inner ring member and an outer ring member spaced axially from each other in parallel planes and being integrally interconnected by circumferentially spaced ribs so as to define an open circular space with an axial dimension sufficient to accommodate said retainer members on said light bulb assembly, the major diameter of said outer ring member being larger than the major diameter of said inner ring member, said outer ring member having three access slots formed therein for selectively receiving said three retainer members of said replaceable bulb assembly and having a stop formed thereon, said inner ring member surrounding said flange and being bonded to said seating surface at the rear end of said reflector and having a tab means projecting radially inwardly from said inner ring member and cooperating with slot means in said annular flange for rotationally orientating said inner ring member relative to said socket, said access slots upon receiving said retainer members of said light bulb assembly permitting said retainer members to move into said open space between the ring members from the rear thereof after which said light bulb assembly is rotated into engagement with said stop to orient said light bulb assembly



rotationally with respect to said reflector, and ramp portions serving as press means formed on said outer ring member for continually engaging and pressing said retainer members inwardly towards said socket when said light bulb assembly is rotated so as to orient said light bulb axially with respect to said reflector.

4,947,295

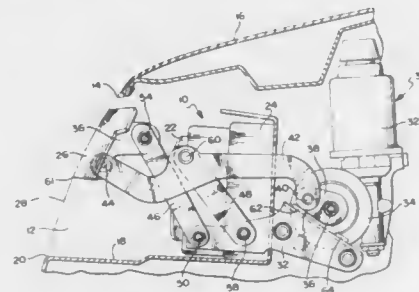
**ACTUATOR MECHANISM FOR A HEADLAMP COVER**  
William E. Carrell, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 319,600, Mar. 6, 1989, abandoned. This application Jan. 8, 1990, Ser. No. 461,851

Int. Cl.<sup>5</sup> B60Q 1/04

U.S. Cl. 362—64

4 Claims



1. In combination with the front end of a vehicle having an opening in which a headlamp is located in a fixed position for projecting a beam of light forwardly of the vehicle, a headlamp cover located in said opening and movable between a lowered position wherein the headlamp is concealed and a raised position wherein the headlamp is exposed for projecting said beam of light forwardly of said vehicle, an actuator mechanism carried by said vehicle for moving said headlamp cover between said lowered position and said raised position, said actuator mechanism including a motor connected to an output shaft, a crank rigidly mounted on said output shaft for rotation therewith and a linkage connected between said headlamp cover and said crank so that upon initial rotation of said crank when said headlamp cover is in said lowered position the lower edge of the headlamp cover is pivoted rearwardly towards the headlamp and upon continued rotation of the crank the headlamp cover is translated upwardly and rearwardly towards the headlamp followed by a rotation of the headlamp cover so as to position said headlamp cover above said headlamp.

4,947,296

**SUN VISOR FOR AUTOMOTIVE VEHICLE**

Kazuo Takeuchi, Atsugi, and Masamitsu Matsuki, Sagami-hara, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 1, 1989, Ser. No. 430,141

Claims priority, application Japan, Nov. 11, 1988, 63-147459[U]

Int. Cl.<sup>5</sup> B60J 3/00

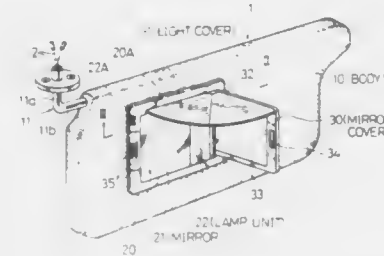
U.S. Cl. 362—135

8 Claims

1. A sun visor for an automotive vehicle comprising:

- (a) a sun visor body;
- (b) a vanity mirror attached to said sun visor body;
- (c) a lamp unit attached to said sun visor body;
- (d) a mirror cover pivotally supported on said sun visor body, for covering said vanity mirror and said lamp unit simultaneously when pivoted closed horizontally; and
- (e) a folding light cover disposed spreading between upper edges of said vanity mirror and said lamp unit and an upper edge of said mirror cover, for covering said vanity

mirror and said lamp unit from above when said mirror cover is pivoted open, said folding light cover being



folded along at least one folding line when said mirror cover is pivoted closed.

4,947,297

**COMPACT FLUORESCENT LAMP FIXTURE**

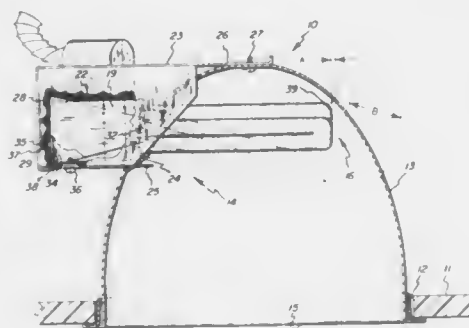
James B. Druffel, Rosendale, and P. Peter Abdollahi, Poughkeepsie, both of N.Y., assignors to Staff Lighting Corporation, Highland, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,98

Int. Cl.<sup>5</sup> F21S 1/02

U.S. Cl. 362—147

10 Claims



1. A lighting fixture particularly adaptable for ease in relamping comprising in combination:

- (a) a hollow open end dome reflector in said fixture;
- (b) said dome reflector having a transverse aperture therein;
- (c) a housing member associated with said dome reflector and covering said transverse aperture;
- (d) a bracket member in said housing with pivotal connections attaching said bracket to said housing such that said bracket member is angularly rotatable about said connections;
- (e) at least one elongated lamp bulb unit retained in said bracket member to extend transversely into said dome reflector through said transverse aperture to be angularly rotatable about said pivotal connections of said bracket member to said housing so that an end part of said lamp bulb unit rotates towards the open end of said dome reflector for manual relamping purposes; and
- (f) releasably securing latch means in said housing and capable of engaging said bracket member to latch said bracket and releasably secure said lamp bulb unit in an optimum light reflecting position in said dome reflector, said latch means being releasable to allow manual rotation of said lamp bulb unit retained in said bracket member for relamping purposes.

4,947,298

**BED LIGHTING APPARATUS**

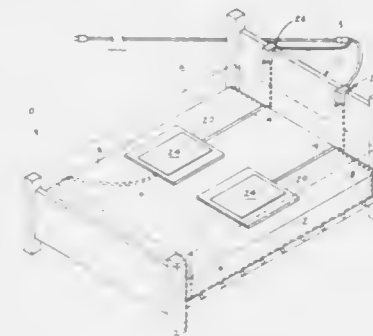
John L. Stephen, 811 Breatwood Way, Simpsonville, S.C. 29681

Filed Aug. 21, 1989, Ser. No. 396,317

Int. Cl.<sup>5</sup> A47B 23/06, 97/00

U.S. Cl. 362—130

5 Claims



1. A bed lighting apparatus in combination with a bed including a head board, a plurality of spaced elongate side frame rails supporting a box spring and overlying mattress, the apparatus comprising,

- a light bar means for securement to at least one of said side frame rails, and
- switch pad means in electrical association with said light bar means for completing an electrical circuit when a force is removed from application to an upper surface of said mattress, and

a further switch member mounted on said head board for manually disconnecting electrical energy to the switch pad means, and

wherein said light bar means comprises a generally "U" shaped elongate member defined by a forward wall mounting a series of light members thereon, and a top wall spaced from and parallel to a bottom wall, wherein each wall is orthogonally and integrally secured to the forward wall, and a top wall lip directed downwardly from a forward edge of said top wall, and a bottom wall lip directed upwardly from a forward edge of the bottom wall, and forward wall defining a channel of an internal complementary configuration of an external configuration defined by the frame rail.

4,947,299

**HOLOGRAPHIC DECORATIVE LAMP**

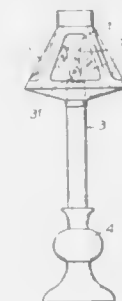
Ming-Hung Lin, No. 2, Lane 429, Fu-chin Street, Taipei 10583, Taiwan

Filed Jan. 2, 1990, Ser. No. 459,632

Int. Cl.<sup>5</sup> F21L 19/00; G02B 5/32

U.S. Cl. 362—161

5 Claims



1. A holographic decorative lamp comprising:

an illuminator having a torch formed on a top portion of the illuminator;

a base for holding and supporting said illuminator thereon; a shade shielding said torch of said illuminator having a transparent portion or an opening formed in the shade for transmitting light therethrough; and

at least a holographic film pre-recorded with a plurality of holograms of said torch of said illuminator, said holographic film embedded in said opening of said shade or coated on said transparent portion of said shade, whereby upon an illumination of said torch, a plurality of images of said torch will be viewed through said holographic film for decorative and illumination purposes.

4,947,300

**CHARACTER AND NUMERAL DISPLAYING DEVICE**

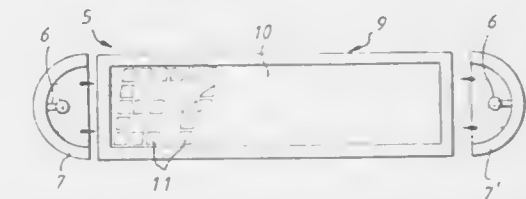
Hung S. Wen, 5th Fl., No. 87, Sunchiang Road, Taipei, Taiwan

Continuation-in-part of Ser. No. 292,994, Jan. 3, 1989. This application Dec. 4, 1989, Ser. No. 444,933

Int. Cl.<sup>5</sup> F21L 7/00

U.S. Cl. 362—183

8 Claims



1. A character and numeral displaying device comprising: a power supply means, and

a lamp means (5) comprising:

a light source (6) disposed on one side of a body (9) of said lamp means;

a reflecting mirror (8) disposed on the other side of the body (9) of said lamp means for reflecting the light rays from said light source;

a parabolic mirror (7) disposed in the light source which is placed at the focal point of said parabolic mirror such that the light rays from the light source are reflected and projected parallelly into the body (9) of the lamp means; a displaying device (11) comprising a plurality of characters and numerals, each being composed of dot matrixes (matrix units) of the same shape, an inner surface of said displaying device being corrugated for effecting multiple refraction of the light rays; a plurality of shades (14) of suitable shape placed at appropriate positions on each of the dot matrixes for displaying the desired characters and numerals; a transparent rectangular press plate (10) pressly covering over said displaying device (11) for holding purpose; and a very thin planar refracting plate (12) flatly placed below the displaying device (11) in the body of the lamp means, the outer surface thereof having a large number of stripes with right-angled serrations and arranged parallel to the light rays from an light source, the inner surface thereof being smooth for multiple refraction of an light rays from the light source so as to produce even and bright illuminating light rays for displaying the characters and numerals.

4,947,301

**NEON TUBE ELECTRODE HOUSING**

Charles Steele, 2615 Hauser Blvd., Los Angeles, Calif. 90016

Filed May 4, 1989, Ser. No. 347,474

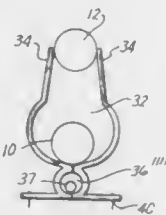
Int. Cl.<sup>5</sup> F21S 3/02

U.S. Cl. 362—219

12 Claims

1. A housing for a neon tube, said tube having a linear extent with a predetermined cross-sectional diameter and at least one of its end being bent back 180 degrees to extend parallel to said

linear extent for a predetermined distance, and capped by an electrode terminal and an electrical conduit connecting said terminal to a source of power, said housing comprising a pair of walls, each of said walls being formed of an insulating shapeable material and having a base securable to a planar surface, each of said walls extending upwardly from its base to present an upper edge parallel to the edge of the other wall and spaced



therefrom by a distance equal to the cross-sectional diameter of the tube to define with the other wall a first cavity extending along and surrounding said electrode and an adjacent portion of the neon tube for a predetermined distance, and at least one of said walls further defining a second cavity parallel to the first cavity and adapted to carry the electrical conduit from the electrode terminal to a predetermined destination.

4,947,302

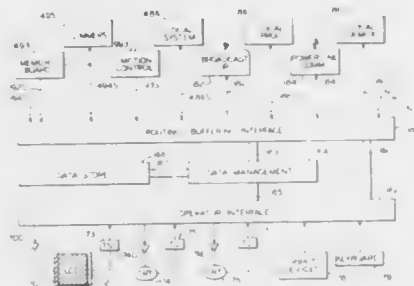
#### IMPROVEMENTS TO CONTROL SYSTEMS FOR VARIABLE PARAMETER LIGHTING FIXTURES

Michael Callahan, 40 W. 94th St., New York, N.Y. 10025  
Continuation of Ser. No. 250,316, Sep. 28, 1988, Pat. No. 4,894,760, which is a continuation-in-part of Ser. No. 66,790, Jun. 25, 1987, Pat. No. 4,797,795, which is a continuation of Ser. No. 750,873, Jul. 1, 1985, Pat. No. 4,697,227, which is a continuation-in-part of Ser. No. 443,127, Nov. 19, 1982, Pat. No. 4,527,198. This application Oct. 18, 1989, Ser. No. 423,363 The portion of the term of this patent subsequent to Jul. 2, 2002, has been disclaimed.

Int. Cl.<sup>5</sup> F21M 7/00

U.S. Cl. 362-233

20 Claims



1. A control system for a lighting system, said lighting system including: a plurality of light projectors, said projectors each generating a beam suitable for entertaining lighting and illuminating a common area, and each of a plurality of said plurality of projectors provided with means to vary a plurality of parameters of said beam, such as the azimuth, elevation, size, shape, color, or focus of said beam, said control system comprising:

- (a) at least one first controller, said first controller adapted to the requirements of the control of said plurality of parameters of said beam, said first controller comprising at least:
- (i) at least one memory capable of storing a plurality of first value sets for each of a plurality of said light projectors, each of said first value sets corresponding to desired adjustments of said plurality of parameters of said beam of at least one of said projectors in at least one desired lighting effect;
- (ii) at least one means adapted for entering at least one of said

first value sets corresponding to desired adjustments of said plurality of parameters for at least one of said projectors, said means adapted for entering operable from a location remote from said projector;

- (iii) means, coupled with said means adapted for entering and with said memory, cooperating with said means for entering to store said first value set entered by said means for entering in said memory, and further for identifying at least one desired lighting effect with which said first value set should be associated;
- (iv) means, coupled with said short-term memory, for producing at an output of said first controller, said first value sets corresponding to said desired adjustments of said beam associated with a specified lighting effect;
- (b) means to conform for each of said plurality of light projectors, said means to conform located remotely from said first controller, having at least one input, and cooperating with said means to vary to produce said desired adjustments of said beam parameters when provided with a corresponding first value set via said input;
- (c) serial data transmission means for coupling at least said output of said first controller with said input of each of a plurality of said means to conform via a common serial data transmission means such that first value sets for each of a plurality of said projectors may be transmitted from said output of said first controller to said input of said means to conform of the appropriate projectors; the improvement wherein said control system further includes:
- (d) means, coupled with said means to conform and with said serial data transmission means for maintaining at least one of said first value sets other than a first value set corresponding to the current adjustments of said beam parameters;
- (e) means for determining at least the next lighting effect desired in a sequence;
- (f) means for transferring, responsive to said means for determining and cooperating with said means for producing, means for coupling, and means for maintaining, for transferring said first value sets associated with at least said next lighting effect determined from said first controller to said means for maintaining via said serial data transmission means;
- (g) means, operable from a location remote from said means to conform, for initiating the adjustment of said beam parameters by said means to conform so as to correspond to said first value sets transferred to said means for maintaining, said initiation separate from and subsequent to said transfer.

4,947,303

#### GLARE CONTROL LAMP AND REFLECTOR ASSEMBLY AND METHOD FOR GLARE CONTROL

Myron K. Gordin, and Jim L. Drost, both of Oskaloosa, Iowa, assignors to Musco Corporation, Oskaloosa, Iowa  
Continuation-in-part of Ser. No. 44,335, Apr. 30, 1987, Pat. No. 4,816,974, which is a continuation-in-part of Ser. No. 865,086, May 19, 1986, abandoned, which is a continuation of Ser. No. 687,864, Dec. 31, 1984, abandoned. This application Feb. 10, 1989, Ser. No. 308,750

Int. Cl.<sup>5</sup> F21K 7/00

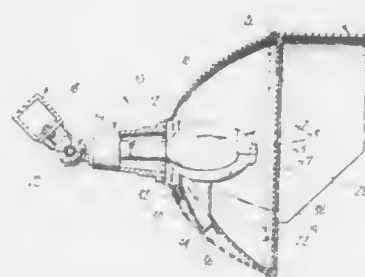
U.S. Cl. 362-261

12 Claims

1. A method of selectively controlling light from a luminaire assembly unit which includes a lamp mounted in a reflector having a reflecting surface, for light target areas and surrounding environment having different glare, spill light, and lighting halo problems, while at the same time still permitting effective utilization of said luminaire assembly unit for the production of maximum uniform, quality, composite, wide scale lighting of the selected light target area comprising:

- determining the precise lighting requirements and glare problems including, but not limited to, glare, lighting halo, and lighting spill of a particular light target area;

determining the desired lighting characteristic of each luminaire assembly so that the lighting for the target area will reduce the precise glare problems by selectively and compositely reducing at least one of glare, lighting halo, and lighting spill, while still directing, reflecting, and redirecting increased amounts of usable light to said target area; and adapting the lamp and reflector lighting and reflecting prop-



erties of each luminaire assembly unit to produce lighting with the desired lighting characteristics but without undesired significant upwardly directed stray light, glare, or light spill by selectively incorporating, as needed, a reflector visor to extend from the perimeter of said reflector, a second reflector visor extending from the reflected visor, an inner visor insert means generally within the second reflector visor, and selectively altering a portion of the reflecting surface of said reflector.

4,947,304

#### UNDERWATER LAMP HAVING WATERTIGHT ELECTRICAL CONNECTION

Thomas B. Payne, and Ernest M. Schmidt, both of Salina, Kans., assignors to UTE Corp, Salina, Kans.

Filed Jul. 10, 1989, Ser. No. 377,620

Int. Cl.<sup>5</sup> F21V 31/00

U.S. Cl. 362-267

15 Claims



- 1. An underwater lighting apparatus comprising: a lamp having a filament, an envelope surrounding the filament, and a pair of contacts extending through the envelope; electrical connection means for electrically connecting the contacts to a source of electrical power, the electrical connection means including a socket assembly provided with a base having a pair of terminals, the base including a front surface on which the lamp is adapted to be retained

and a rear surface opposite the front surface, means for removably retaining the lamp on the front surface of the socket assembly with the contacts disposed in surface contact with the terminals, and a pair of insulated wires extending from the rear surface of the socket assembly; a watertight enclosure surrounding the lamp and the socket assembly, the enclosure including a transparent casing having an open axial end, a closure member retained in the open axial end, and means for removing the closure member from the open axial end of the casing to permit replacement of the lamp in the socket assembly; a ballast assembly including a hollow ballast member extending between the closure member and the socket assembly; and a watertight sleeve extending between the front surface of the socket assembly and the closure member, the pair of insulated wires passing within the watertight sleeve from the socket assembly through the closure member.

4,947,305

#### LAMP REFLECTOR

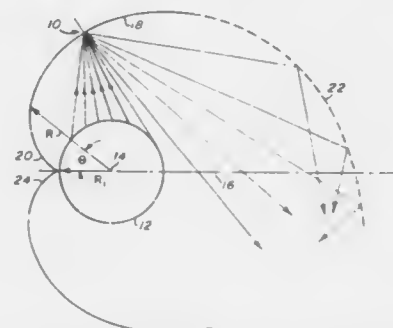
William D. Gunter, Jr., San Jose, Calif., assignor to Vector Technical Group, Inc., Santa Clara, Calif.

Filed May 19, 1989, Ser. No. 354,447

Int. Cl.<sup>5</sup> F21V 7/09

U.S. Cl. 362-297

14 Claims



1. A lamp reflector for use with a light source that has a circular cross-section from which light is emitted about the circumference thereof and that emitted light is desired to be directed forward of the light source, said lamp reflector comprising:

- a light reflecting surface having a transverse cross-section in the plane of the circular cross-section of the light source, and
- at least one spiral curve in the transverse cross-section of the light reflecting surface, said spiral curve beginning behind the light source and curving thereabout with an ever increasing radius of curvature, whereby light striking the spiral curve is reflected around the light source in the direction of the increasing radius of curvature and forwardly thereof.

4,947,306

#### SUPPORT MEMBER FOR A HEADLAMP ASSEMBLY

Michael E. O'Shaughnessy, Fort Wayne, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 28, 1989, Ser. No. 386,166

Int. Cl.<sup>5</sup> F21M 3/18

U.S. Cl. 362-421

4 Claims

1. A support member for interconnecting a headlamp to a mounting bracket for selective adjustable movement of said headlamp about a vertical aim axis and a horizontal aim axis, said mounting bracket being fixed to said motor vehicle and having a first longitudinally adjustable ball pivot and a fixed ball pivot the centers of both of which are located along said vertical aim axis, a second longitudinally adjustable ball pivot on said mounting bracket and having its center located along



said horizontal aim axis, said support member being a unitary member having socket means for receiving said fixed ball pivot and said first and second ball pivots, and means for removably



connecting said head lamp to said support member, said means including a pair of shaft members accessible from above the headlamp.

4,947,307

#### ADJUSTABLE RECESSED LOUVERS FOR GRADE MOUNTED LIGHT FIXTURE

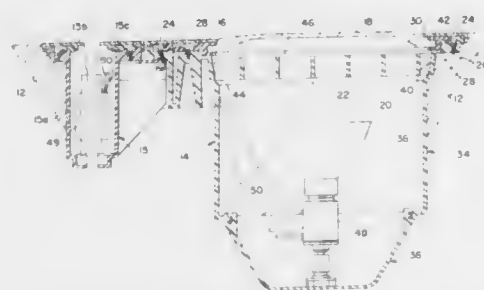
Homesto D. Quigley, Florence, Ky., assignor to Hubbell Incorporated, Orange, Conn.

Filed Mar. 23, 1989, Ser. No. 327,548

Int. Cl.<sup>5</sup> F21V 17/02

U.S. Cl. 362—325

15 Claims



1. A directional louver assembly for a light fixture, comprising:

a plurality of louver members arranged in a pattern for deflecting light from the light fixture in a desired direction, said louver members being thin strip-like elements of approximately equal width, each of said louver members having opposite ends substantially located at points on a single circle in a plane to define a circular lateral periphery; and

coupling means for connecting said louver members together, said coupling means including a plurality of transverse slots spaced apart along each of said louver members, each of said slots having at least one projection frictionally engaging a portion of one of said louver members received therein;

whereby said circular lateral periphery of said louver members permits rotational adjustment of said louver members about an axis perpendicular to said plane of said circle within the light fixture to adjust the direction of the light deflected by said louver members.

4,947,308

#### HIGH POWER SWITCHING POWER SUPPLY

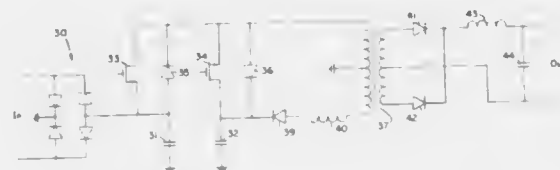
Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Apr. 17, 1989, Ser. No. 338,327

Int. Cl.<sup>5</sup> H02M 3/335

U.S. Cl. 363—16

8 Claims



1. Switching power supply converting input voltage into output signal, comprising:

- a node;
- a capacitive means coupled to ground for storing a DC voltage having an opposite polarity to the input voltage;
- a switching means for successively applying the input voltage and DC voltage to the node;
- a transformer means having a first winding coupled to the node and ground, a second winding coupled to ground for providing a charging signal and a third winding for providing the output signal; and
- a rectifying means for applying the charging signal to the capacitive means.

4,947,309

#### METHOD AND MEANS FOR CONTROLLING A BRIDGE CIRCUIT

Ragnar Jonsson, Kyrkobacksvagen 5, S-271 00 Ystad, Sweden  
PCT No. PCT/SE87/00581, § 371 Date Jul. 20, 1989, § 102(e)  
Date Jul. 20, 1989, PCT Pub. No. WO88/04491, PCT Pub. Date Jun. 16, 1988

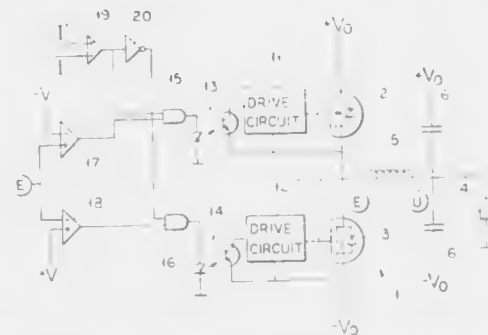
PCT Filed Oct. 8, 1987, Ser. No. 375,025

Claims priority, application Sweden, Dec. 9, 1986, 8605266

Int. Cl.<sup>5</sup> H02M 3/335, 7/5387

U.S. Cl. 363—17

10 Claims



1. A method for controlling a bridge circuit for providing current or power to a load, said bridge circuit comprising one or several legs, each comprising two semiconductor members connected in series between positive and negative power supply rails, each semiconductor member comprising a switchable member for conducting current to or from the load in the forward direction of the semiconductor member under control of a control drive circuit, and a flywheel diode for conducting current in the opposite direction, the method comprising the steps of:

- connecting an LC-circuit between the bridge circuit and the load;
- monitoring the bridge voltage (E) of the connection between the semiconductor members and the current (I) through the inductance of the LC-circuit;
- supplying a firing pulse to one of said switchable members of

said semiconductor members for initiating the conduction thereof;

terminating the conduction of said switchable member when the current (I) through the inductance exceeds a preset value (I'), whereupon the current of the inductance continues to flow another way through the flywheel diode of the opposite semiconductor member and consequently the bridge voltage (E) changes polarity a first time to the opposite rail polarity until the magnetic energy of the inductance has been terminated resulting in a second change of polarity of the bridge voltage (E) towards the first rail polarity,

sensing the change of the polarity of the bridge voltage (E) towards the first rail polarity or otherwise detecting that the bridge or inductance current is zero and supplying another firing pulse at or after said change.

4,947,310

#### PARALLEL OPERATING SYSTEM FOR ALTERNATE CURRENT OUTPUT CONVERTERS

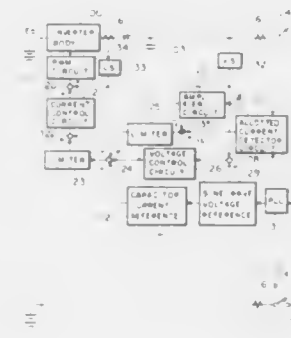
Takao Kawabata, and Jyoji Kawai, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed May 25, 1989, Ser. No. 356,683

Claims priority, application Japan, May 30, 1988, 63-133073

Int. Cl.<sup>5</sup> H02M 7/5387

U.S. Cl. 363—71

15 Claims



1. In a parallel converter system for operating a plurality of sine-wave converters in parallel, each thereof including a filter, with outputs thereof connected to a common bus and a share of a load current allotted to each, said parallel operating system for alternate current converters comprising, for each converter:

- a converter body executing conversion of an instantaneous current control type by means of an arm of each phase constituting the converter body performing a plurality of switching operations during one cycle time to thereby control an instantaneous value of an output current;
- means for establishing a sine-wave output voltage reference synchronized with a load bus voltage;
- means for determining a share of a load current to be borne by each converter based on a detected value of the load current and providing a first signal corresponding to said determined value; and
- voltage control means for detecting an error between the load bus voltage and said sine-wave output voltage reference and providing a second signal for correcting said error, wherein a sum of said first signal and second signal is provided as a current command value for said converter.

4,947,311

#### ELECTRICAL POWER CONVERSION CIRCUIT

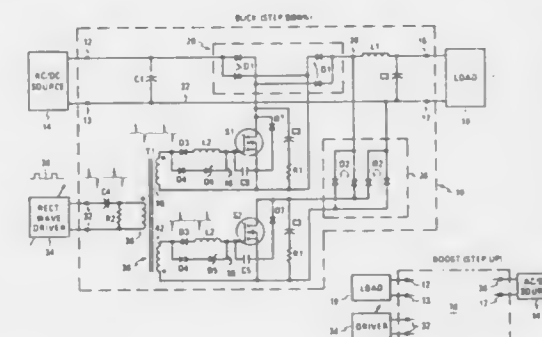
William A. Peterson, Vestal, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Nov. 16, 1989, Ser. No. 437,242

Int. Cl.<sup>5</sup> H02M 7/00

U.S. Cl. 363—124

18 Claims



1. An electrical power conversion circuit having a variable voltage conversion ratio comprising,

- (A) a first pair of terminals consisting of a first and a second terminal and a second pair of terminals consisting of a third and a fourth terminal, one pair of terminals being for connection to a source of supply voltage and the other pair of terminals being for connection to a load, said second terminal and said fourth terminal being connected together at a first node;
- (B) a first bidirectionally conducting switching circuit, comprising a first semiconductor switch having an insulated, voltage controlled, commutating gate, source and drain electrodes, said first switching circuit providing charge storing capacity between gate and source electrodes and including a first Zener diode serially connected to said gate poled to prevent leakage of stored charge until its breakdown voltage is exceeded, said first switching circuit being connected between said first terminal and a second node;
- (C) an energy storing inductor connected between said second node and said third terminal;
- (D) a second bidirectionally conducting switching circuit, comprising a second semiconductor switch having an insulated, voltage controlled, commutating gate, source and drain electrodes, said second switching circuit providing charge storing capacity between gate and source electrodes and including a second Zener diode serially connected to said gate poled to prevent leakage of stored charge until its breakdown voltage is exceeded, said second switching circuit being connected between said first and said second nodes;
- (E) means for supplying a single train of pairs of short duration control pulses having a given period for each pulse pair, the first pulse being of opposite polarity to the second pulse of each pair and the interval between pulses of each pair being adjustable and less than said pulse pair period to establish a desired conduction duty cycle for said switches; and
- (F) means for generating two simultaneous trains of pairs of short duration pulses from said single train for controlling the conduction periods of said semiconductor switches comprising:
  - a pulse transformer having a primary winding to which said first train is coupled, and a pair of matched, mutually independent, secondary windings, one secondary winding being connected in one polarity via said first Zener diode between the gate and drain electrodes of the first semiconductor switch and the other secondary winding being connected in the reverse polarity via said

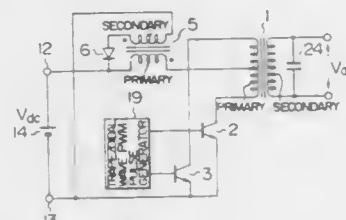
second Zener diode between the gate and drain electrodes of the second semiconductor switch, the pulse pairs in said secondary windings providing adequate voltage to successively initiate conduction, said charge storing capacity maintaining conduction, and upon exceeding the Zener breakdown voltage to remove said charge and terminate conduction, whereby the first semiconductor switch is turned "on" as the second semiconductor switch is turned "off" and vice-versa, avoiding any significant period during which both semiconductor switches are "on" or both semiconductor switches are "off".

#### 4,947,312 NON-RESONANCE TYPE AC POWER SOURCE APPARATUS

Tosiaki Tsuruoka, Tsu; Tatsuo Maeoka, Kobe, and Masafumi Nakamura, Tsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Apr. 25, 1989, Ser. No. 342,881  
Claims priority, application Japan, Apr. 28, 1988, 63-106391; Jun. 9, 1988, 63-142146; Jun. 22, 1988, 63-153937; Jul. 27, 1988, 63-187218

Int. Cl.<sup>5</sup> H02M 7/538  
U.S. Cl. 363—134

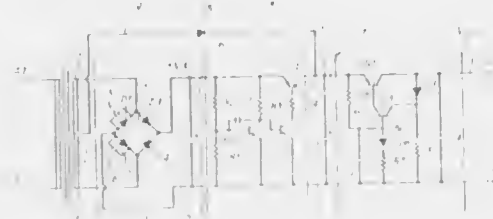
10 Claims



1. A non-resonance type AC power source apparatus comprising:
  - a DC power source;
  - a transformer having primary and secondary windings, said primary winding being provided with an intermediate tap; first and second switching element connected in inverse-series across said primary winding of said transformer;
  - an inductance element having a series connection of a reset winding and a regenerative diode; said DC power source and said inductance element being connected in series between said intermediate tap of said primary winding and a junction of said first and second switching elements;
  - a filtering capacitor connected in parallel with a selected one of said primary and secondary windings of said transformer; and
  - means for applying a time-ratio-modulated high frequency pulse to said first and second switching elements alternately at every half period of an output period of said transformer, said output period being set to be longer than a period of said high frequency pulse,
  - said high frequency pulse being time-ratio-modulated by a trapezoidal wave obtained by causing a capacitor to be charged and discharged, respectively, through two current sources connected respectively in series and in parallel with said capacitor and capable of being selectively turned on and off.

4,947,313  
DIRECT CURRENT POWER SUPPLY  
Tomio Nakamura, Kuki, Japan, assignor to Mitsuoka Electric Manufacturing Co., Ltd., Tondabayashi, Japan  
Continuation of Ser. No. 204,374, Jun. 9, 1988, abandoned. This application Dec. 19, 1989, Ser. No. 453,161  
Claims priority, application Japan, Jun. 13, 1987, 62-147689  
Int. Cl.<sup>5</sup> H02M 7/04; G05F 5/00  
U.S. Cl. 363—143

8 Claims



1. A direct current power supply converting alternating current to direct current and deriving a direct current output from an alternating current input, comprising:
  - a power transformer having a secondary winding with a single center tap and a plurality of output terminals;
  - a plurality of corresponding rectifying circuit systems connected to the output terminals one of which rectifies a voltage across the entire secondary winding and an other of which rectifies respective voltages across terminals of said secondary winding to said center tap to thereby use the entire secondary winding and produce a voltage less than that across the entire secondary winding;
  - a voltage-detecting circuit detecting a predetermined level of an input alternating current voltage including a voltage divider connected to said secondary winding, and means, connected to an output of the voltage divider, for producing a state change based on a voltage from said output of the voltage divider; and
  - a switching circuit, opening and closing paths to corresponding ones of said rectifying circuits in response to the detecting of a predetermined level that is done by the voltage-detecting circuit for selecting a proper rectifying circuit out of the plurality of rectifying circuits in response to a variation of the amplitude of the input alternating current voltage so as to suppress a variation of an output voltage wherein said switching circuit includes a transistor switch using a PNP Transistor and a diode connected to switch a positive output of said proper rectifying circuit,
  - said transistor switch disposed between a terminal for the positive output of said proper rectifying circuit system and an output of the positive side, and
  - said diode coupled between the center tap of the secondary winding of the power transformer and said output of the positive side to form an outflow circuit of a center-tapped-type single-phase full-wave-rectifying circuit system when the input alternating current voltage is high.

4,947,314  
OPERATION CONTROL SYSTEM  
Satoshi Sumida, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 19, 1988, Ser. No. 196,061  
Claims priority, application Japan, May 21, 1987, 62-124607  
Int. Cl.<sup>5</sup> G06F 15/46

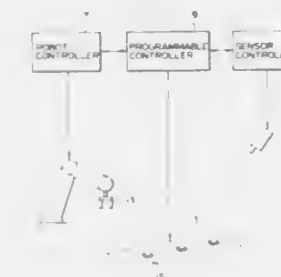
U.S. Cl. 364—140

13 Claims

1. An operation control system for a plurality of items of equipment which have a function for receiving an operational command and sending back an operational response corresponding to the operational command, and have a function of

executing a series of tasks in association with each other, comprising:

- operational graph storage means for storing an operational graph in which unit operation data groups are arrayed in accordance with an execution order of tasks, based on task progress states of said items of equipment;
- state-interpretation means for receiving the operational responses from said items of equipment and interpreting operational states of said items of equipment;



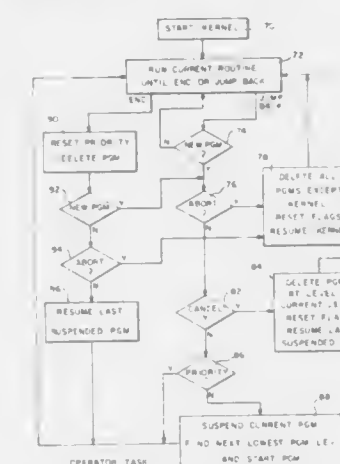
status table storage means for storing the interpretation result of the operational state from said state interpretation means; and  
operational graph interpretation means for sequentially selecting the unit operation data arrayed in said operational graph storage means, based on the interpretation results of the operational states of said items of equipment, as written in said status table storage means with reference to said status table storage means.

4,947,315  
SYSTEM FOR CONTROLLING INSTRUMENT USING A  
LEVELS DATA STRUCTURE AND CONCURRENTLY  
RUNNING COMPILER TASK AND OPERATOR TASK  
Stephen A. Sokolow, Menlo Park; Urs Steiner, and John R. Lewis, both of Sunnyvale, all of Calif., assignors to Finnigan Corporation, San Jose, Calif.

Continuation of Ser. No. 937,355, Dec. 3, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 314,282  
Int. Cl.<sup>5</sup> G06F 9/44, 9/38

U.S. Cl. 364—200

19 Claims



1. A method of controlling an instrument which performs a cyclic process under control of a programmed computer, said computer including input means, comprising the steps of:
  - defining two tasks concurrently running in said computer: an operator task for running an instrument control program, and a compiler task for receiving and compiling instrument control programs;
  - defining a levels data structure for storing a reference to each instrument control program compiled by said com-

piler task, said levels data structure denoting the order in which said referenced programs were compiled;  
performing, in said compiler task, the steps of:
 

- receiving and compiling instrument control programs input by a user of said instrument via said input means;
- denoting the existence of unexecuted, successfully compiled user input instrument control programs generated via said receiving and compiling step, including adding a reference to each successfully compiled instrument control program to said levels data structure;

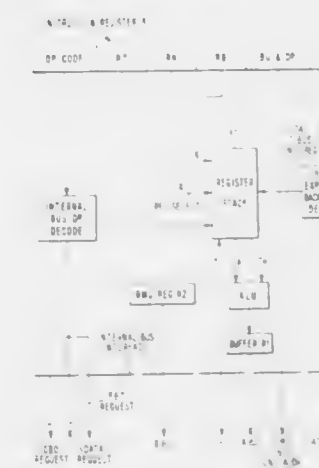
 performing, in said operator task, the steps of:
 

- whenever a currently running instrument control program performs a jump back at the end of an instruction loop and said compiler task has denoted in said levels data structure the existence of at least one unexecuted, successfully compiled user input instrument control program, automatically suspending said currently running instrument control program and then automatically beginning execution of one of said unexecuted, successfully compiled user input instrument control programs;
- resuming execution of the last suspended instrument control program when said currently running instrument control program finishes executing and there are no unexecuted, compiled user input instrument control programs denoted in said levels data structure by said compiler task;
- deleting the reference to said currently running instrument control program from said levels data structure when said instrument control program is finished executing; and
- beginning execution of another successfully compiled user input instrument control program when said currently running instrument control program finishes executing and there is at least one more unexecuted, successfully compiled user input instrument control program denoted by said compiler task in said levels data structure.

4,947,316  
INTERNAL BUS ARCHITECTURE EMPLOYING A  
SIMPLIFIED RAPIDLY EXECUTABLE INSTRUCTION  
SET  
Dale E. Fisk; Lawrence W. Pereira, both of San Jose, Calif., and George Radin, Piermont, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Dec. 29, 1983, Ser. No. 566,925  
Int. Cl.<sup>5</sup> G06F 13/38

U.S. Cl. 364—200

12 Claims



1. An internal bus architecture for a high speed digital electronic computing system including a central processing unit



second data processor means responsive to said received data for maintaining cumulative rejected item data for a plurality of accounts, wherein said second data processor means includes: means for converting received data into a format compatible with said second processor means and means for assembling converted data into a plurality of rejected item categories organized by customer account number.

4,947,322

## METHOD OF MANAGING LAYOUT OF GOODS

Tadashi Teama, Sagami-hara; Kichizo Akashi, Ebina; Tetsuo Kusuzaki, Kawasaki; Shouji Igeta, Yokohama; Isao Tsushima, Yamato, and Norihisa Komoda, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

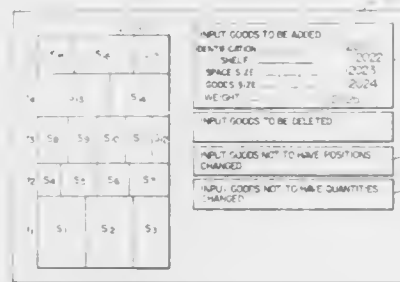
Filed Apr. 19, 1988, Ser. No. 183,669

Claims priority, application Japan, Apr. 20, 1987, 62-95108; Jul. 17, 1987, 62-176996

Int. Cl. G06F 15/21

U.S. Cl. 364-401

10 Claims



1. A method of determining a goods layout on gondolas in a store, said method comprising the step of:

- displaying on a display screen of a display device sales data for each of the goods on each gondola in the store based on information in a floor layout file having stored therein layout information about the gondolas in the store, a goods layout file having stored therein layout information about the goods on each gondola in the store, and a sales file having stored therein sales data for each of the goods on each gondola in the store, thereby permitting determination of whether there exists a gondola whose layout of goods should be modified;
- designating a gondola determined as a result of step (a) as a gondola whose layout of goods should be modified, and displaying on the display screen a goods layout of the goods on the designated gondola, based on information stored in the goods layout file and sales data for each of the goods on the designated gondola, based on information stored in the sales file, thereby permitting determination of goods to be deleted from or added to the designated gondola;
- designating goods determined in step (b) to be deleted from or added to the designated gondola; and
- automatically determining a new goods layout for the designated gondola, based on information in the goods layout file and the sales file and knowledge in a knowledge base of rules for determining a goods layout based on characteristics of goods.

4,947,323

## METHOD AND APPARATUS FOR MEASURING SMALL SPATIAL DIMENSIONS OF AN OBJECT

Lewis M. Smith, Tullahoma, Tenn., assignor to University of Tennessee Research Corporation, Knoxville, Tenn.

Continuation of Ser. No. 866,233, May 22, 1986, abandoned. This application Nov. 8, 1988, Ser. No. 270,490

Int. Cl. G06F 15/42

U.S. Cl. 364-413.13

12 Claims

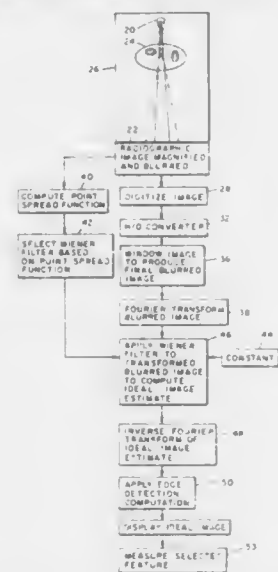
1. A method of measuring a small spatial dimension of an object, said small spatial dimension being too small to enable production of an image of the dimension having visually meaningful size information by a conventional radiographic technique in which the object containing the dimension is placed as near as possible to a radiation sensitive surface, the method comprising:

placing the object between a radiation source and the radiation sensitive surface so that radiation emitted from the

source produces a radiographic image of the object on the radiation sensitive surface;

positioning the object in a spaced relationship with the radiation sensitive surface so that a blurred magnified radiographic image of the object and the small spatial dimension is produced on the radiation sensitive surface when radiation is emitted from the radiation source, the spacing being sufficient to blur and substantially obscure the image of the small spatial dimension to the extent that the image of the small spatial dimension is substantially unmeasurable by direct visual measurement;

emitting radiation from the radiation source so that the blurred magnified image of the object including an image



of the substantially obscured and unmeasurable small spatial dimension is produced on the radiation sensitive surface;

digitizing the blurred magnified image to produce a digitized image;

filtering the digitized image based on a blur function which is determined according to the source-to-film distance, the object-to-film distance, and the configuration of the radiation source to remove the blur from the digitized image and produce a magnified clear image estimate;

detecting an outline of the small spatial dimension in the magnified clear image estimate; and measuring the small spatial dimension in the magnified clear image estimate from the detected outline.

4,947,324

## STEERING CONTROL SYSTEM FOR MOVING VEHICLE

Kenji Kamimura, and Sadachika Tsuzuki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 362,630

Claims priority, application Japan, Jun. 17, 1988, 63-149619

Int. Cl. G06F 15/50

U.S. Cl. 364-424.02

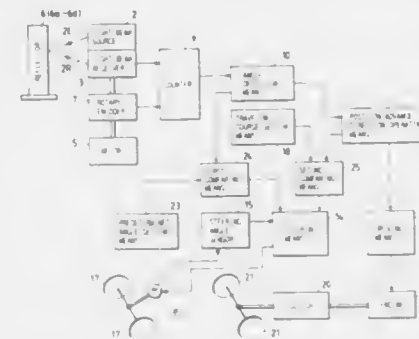
10 Claims

1. A steering control system for use in a moving vehicle wherein a light beam emitted from the moving vehicle is scanned in all the different azimuthal directions around the moving vehicle, and the light reflected by reflecting means disposed at at least three positions apart from and around the moving vehicle, respectively, is received in order by a beam receiver means mounted on the moving vehicle and rotating in a horizontal plane, whereby positional information of the moving vehicle is detected on the basis of the output of the beam receiver means so that the moving vehicle is traveled On the basis of the positional information along a straight traveling course and the succeeding turning course,

comprising means for detecting differential azimuths between two adjoining light-reflecting means centering around the moving vehicle;

means for controlling steering of the moving vehicle in a straight traveling course based on the differential azimuths;

means for fixing the steering angle of the moving vehicle at a predetermined angle at the time when the moving vehicle



positions at a switching point where a straight traveling course is to be changed into a turning course;

detection means for detecting a substantial coincidence of any one of azimuths of the respective light-reflecting means viewed from the moving vehicle with a predetermined angle which has been set so as to be compared with the azimuth; and

means for releasing the fixation of the steering angle in response to a detection signal of the detection means.

4,947,325

## DIAGNOSTIC SYSTEM FOR ROTATIONAL SPEED SENSORS IN DRIVE TRAIN OF FOUR WHEELS DRIVE VEHICLE HAVING CENTRAL DIFFERENTIAL DEVICE

Yasunari Iwata, Toyota; Selichi Nishikawa, Toyokawa, and Yuji Ichikawa, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

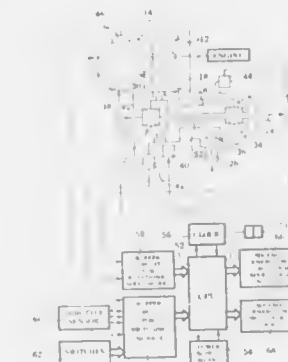
Filed Jun. 7, 1989, Ser. No. 362,794

Claims priority, application Japan, Jun. 14, 1988, 63-146364

Int. Cl. G01M 19/00; G01P 3/04

U.S. Cl. 364-424.03

5 Claims



1. In a four wheels drive vehicle comprising an engine, a transmission, a front wheel drive shaft, a rear wheel drive shaft, a central differential device having an input rotational member adapted to be driven by said engine through said transmission and two output rotational members adapted to drive said front wheel drive shaft and said rear wheel drive shaft, respectively, under distribution of rotational power

supplied to said input rotational member between said two output rotational members, a first rotational speed sensor for detecting rotational speed of one of said two output rotational members of said central differential device, and a second rotational speed sensor for detecting rotational speed of either said input rotational member or the other of said two output rotational members of said central differential device,

a diagnostic system for detecting failure of at least said first rotational speed sensor, comprising:

a first means for comparing an output signal of said first rotational speed sensor with an output signal of said second rotational speed sensor to detect a first condition that the rotational speed detected by said first rotational speed sensor is lower than the rotational speed detected by said second rotational speed sensor, and

a second means operable when said first condition was detected to detect if the rotational speed detected by said first rotational speed sensor is below a threshold value therefor while the rotational speed detected by said second rotational speed sensor is above a threshold value therefor over a first predetermined period so as thereby to determine a failure of said first rotational speed sensor.

4,947,326

## REAR WHEEL STEER ANGLE CONTROL SYSTEM FOR VEHICLE

Kazunori Mori, Ebina, and Namio Irie, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

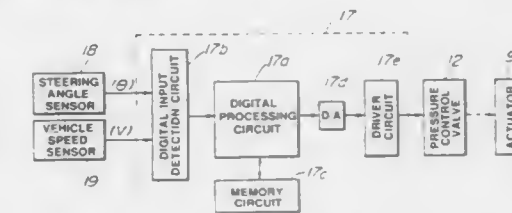
Filed Nov. 30, 1988, Ser. No. 277,745

Claims priority, application Japan, Nov. 30, 1987, 62-299892; Dec. 28, 1987, 62-330283; Dec. 28, 1987, 62-330282

Int. Cl. B62D 5/06

U.S. Cl. 364-424.05

12 Claims



1. A rear wheel steer angle control system for vehicle, comprising:

- actuating means for steering rear wheels of the vehicle in response to a control signal;
- means for sensing a steering wheel angle of the vehicle;
- means for sensing a vehicle speed of the vehicle; and
- controlling means connected with said steering wheel angle sensing means and said vehicle speed sensing means for controlling a rear wheel steer angle  $\delta_r$  with respect to a front wheel steer angle  $\delta_f$  by producing a control signal representing said rear wheel steer angle in accordance with a mathematical relationship expressed as:

$$\frac{\delta_r(s)}{\delta_f(s)} = \frac{K + T_1 \cdot s}{1 + T_2 \cdot s}$$

where  $\delta_r(s)$  is the Laplace transform of said rear wheel steer angle  $\delta_r$ ,

$\delta_f(s)$  is the Laplace transform of said front wheel steer angle  $\delta_f$ ,

s is a complex variable,

K, T1, and T2 are first, second and third control parameters given by:

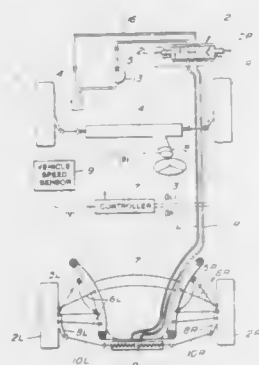
$$K = \frac{C_1 \{aMV^2 + C_2 l_0(l_3 - b)\}}{C_2 \{bMV^2 + C_1 l_0(l_3 + a)\}}$$



## 7 Claims

$$72 = \frac{V(bMl_3 + D)}{bMV^2 + C_1 l_0(l_3 + a)}$$

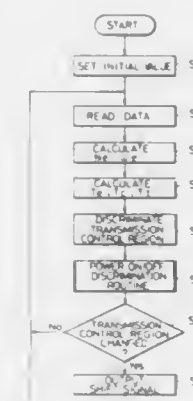
## 9 Claims



### 3 Claims

[illegible]

U.S. Cl. 364-424.1

[illegible]

Int. Cl.<sup>5</sup> B60K 41/08, 41/18

U.S. Cl. 364-424.1 14 Claims

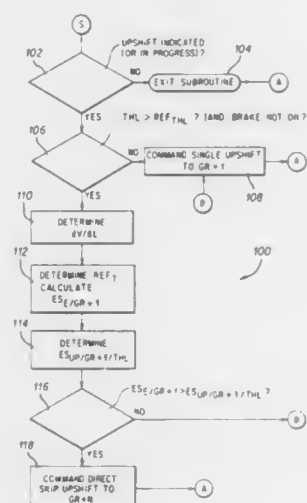
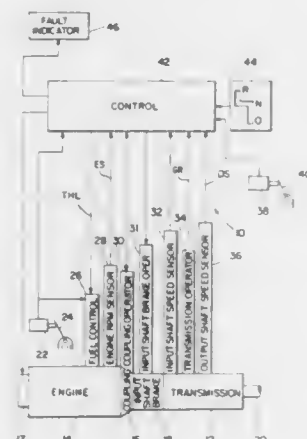
said processing unit having means for defining a subroutine effective upon sensing conditions at which an upshift from

the currently engaged rear ratio is normally required, effective to:

determine an estimated value of continuing vehicle acceleration;

determine if, during a reference period of time, conditions at which an upshift from the next higher gear ratio (GR+1) is required will occur if an upshift to the next higher gear ratio is performed and the vehicle continues to accelerate at at least said estimated value of continuing vehicle acceleration;

compare the position of the throttle controlling means to a throttle position reference value, and

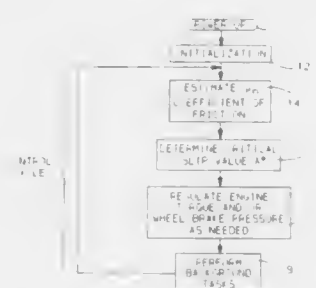


(i) if the position of the throttle controlling means does not exceed said reference value, command an upshift to the next higher gear ratio (GR+1), and

(ii) if the position of the throttle control exceeds said throttle position reference value and it is determined that during said reference period of time conditions at which an upshift from the next higher gear ratio is required will occur if an upshift to said next higher gear ratio is performed and the vehicle continues to accelerate at at least said estimated value of continuing vehicle acceleration, command a direct skip upshift to a gear ratio (GR+N, where N equals a whole number greater than one) higher than the next higher gear ratio, otherwise command an upshift to the next higher gear ratio (GR+1).

**4,947,332**  
**ROAD SURFACE ESTIMATION**  
Youssef A. Ghoneim, Mt Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Sep. 27, 1989, Ser. No. 413,039  
Int. Cl.<sup>5</sup> B60T 8/32  
U.S. Cl. 364—426.03

4 Claims



1. A traction control method for a vehicle having a pair of wheels driven through a differential, the wheels traveling over a road surface having a coefficient characteristic where a tractive force, related to the amount of slip between each wheel and the road surface, exists between each wheel and the road surface, the method comprising the steps of:

measuring an amount of slip between each of the driven wheels and the road surface;

measuring wheel acceleration of each driven wheel;

measuring vehicle acceleration;

determining, for each driven wheel, a coefficient of friction between the wheel and the road surface as a predetermined function of (i) the measured vehicle acceleration and (ii) the measured acceleration of the wheel decreased by the measured acceleration of the other driven wheel of the driven wheel pair;

determining, for each driven wheel, a critical value of slip where the rate of change in the ratio of the determined coefficient of friction to the measured wheel slip is minimum, the critical value of slip corresponding to the value of measured wheel slip where the tractive force is maximized;

detecting, for each driven wheel, an incipient spin condition where the measured wheel slip is greater in magnitude than the determined critical slip value; and

limiting, for each driven wheel for which an incipient spin condition has been detected, the speed of the wheel to limit the slip of the wheel to the determined critical slip value.

**4,947,333**  
**BATCH MAILING SYSTEM**  
Ronald P. Sansone, Weston; Richard A. Connell, Wilton, both of Conn.; Patricia Corsetti, Pelham, N.Y.; Donald T. Dolan, Ridgefield, and George G. Gelfer, West Redding, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.  
Continuation of Ser. No. 849,622, Apr. 9, 1986, abandoned, which is a continuation of Ser. No. 813,445, Dec. 26, 1985, abandoned. This application Nov. 14, 1989, Ser. No. 436,941  
Int. Cl.<sup>5</sup> G06F 15/20  
U.S. Cl. 364—464.02

25 Claims

1. A system for processing a batch of mail pieces wherein at least some said mail pieces are comprised of a combination of an envelope and an insert; said system comprising:

means for accounting;

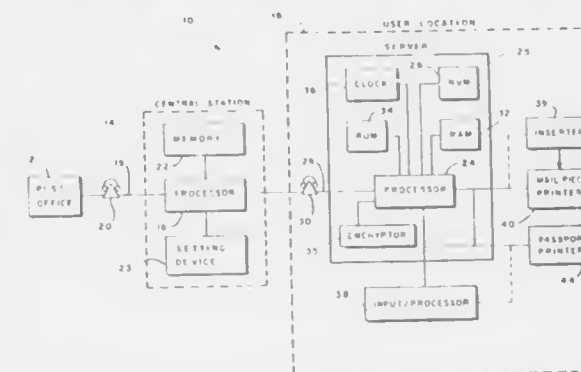
first means, in communication with said accounting means,

for printing postage data on a statement sheet to print a verifiable statement on said statement to enable verification of payment of postage for said batch of mail pieces;

means for generating mail data;

second means for printing, in communication with said mail

data generating means and said accounting means, for printing postage data and said mail data upon each mail piece of said batch of mail pieces; and



means for inserting an insert into at least one of said envelopes, said inserting means being in communication with said accounting means.

**4,947,334**  
**HELICOPTER CONTROL SYSTEMS**  
Colin P. Massey, Sherborne, and David R. Haddon, Bridport, both of England, assignors to Westland Helicopters Limited, England  
Filed Mar. 27, 1989, Ser. No. 328,619  
Claims priority, application United Kingdom, Mar. 31, 1988, 8807676

Int. Cl.<sup>5</sup> G06F 15/16

U.S. Cl. 364—433

8 Claims

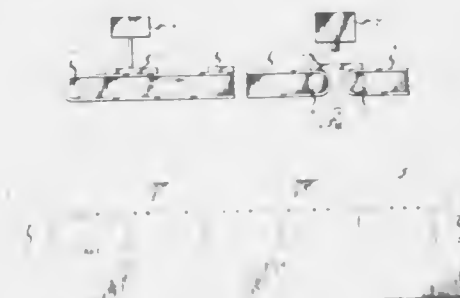


1. A helicopter having at least one engine for driving a main sustaining rotor and an anti-torque tail rotor each comprising a plurality of rotor blades, a flight control system comprising a flight control computer for receiving pilot flight control input signals and generating output signals for adjusting the pitch of the main and tail rotor blades, an engine control computer for receiving a pilot engine control input signal and generating output signals for controlling the speed of rotation of an engine output shaft, and an integrated flight and engine control computer receiving said output signals from the flight control computer, a signal representative of engine state information and signals representative of helicopter flight state information, said integrated flight and engine control computer including helicopter and engine mathematical models for predicting the torque required from the engine to maintain substantially a constant datum speed of rotation of the main sustaining rotor and generating output signals for summing with the pilot engine control input signal to the engine output shaft to meet the

predicted torque requirement and for summing with the pilot flight control input signals to the flight control computer to adjust said signals if the engine cannot respond quickly to meet the predicted torque demand or the predicted torque demand is greater than that available.

**4,947,335**  
**IDENTIFICATION OF WORKPIECE INFORMATION**  
Frank H. Blichington, Richmond, Va., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
Filed Sep. 12, 1988, Ser. No. 243,346  
Int. Cl.<sup>5</sup> G06F 7/00; G06K 7/00  
U.S. Cl. 364—468

6 Claims



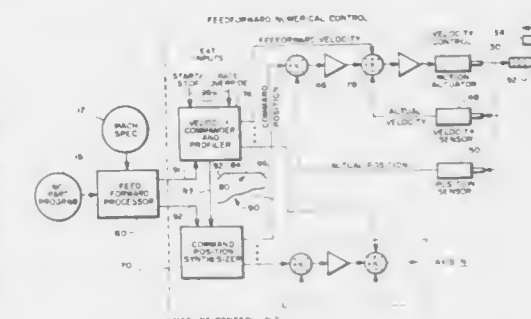
1. A method of fabricating printed circuit board panels, including providing numerical information concerning said printed circuit board panels as they move along a conveying means, comprising the steps of

drilling a pattern of holes in the printed circuit board panels, said pattern comprising a binary form of the numerical information; and

optically addressing said information by means of a video camera as the printed circuit board panels move along the conveying means, the camera being coupled to a random access memory and a microprocessor also being coupled to the memory such that the information from the camera is written in the memory, and the microprocessor addresses the information, at alternate intervals.

**4,947,336**  
**MULTIPLE AXIS MOTION CONTROL SYSTEM**  
Stanley G. Froyd, 5537 Calle Arena, Carpinteria, Calif. 93013  
Filed Apr. 15, 1988, Ser. No. 181,820  
Int. Cl.<sup>5</sup> G06F 15/00  
U.S. Cl. 364—474.3

9 Claims



1. The system of claim 3 wherein each actuator further has associated therewith:

a velocity sensor means for generating an actual velocity signal with respect to the associated actuator; and

means for summing the command velocity and actual velocity signals generated with respect to the associated actua-



tor for producing a velocity control signal for application to that actuator.

processing the digital data points according to the selected tests and predetermined display parameters in order to

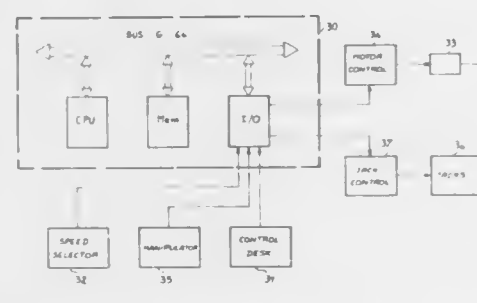
4,947,337

**DEVICE FOR THE DISTRIBUTION OF LARGE NUMBERS OF ELEMENTS ON TRAYS**  
Hervé Reamot, Dijon; Claude Bredillet, Fontaine les Dijon, and Pierre Brisville, Arc sur Tille, all of France, assignors to Compagnie Européenne de Composants Electroniques LCC, Courbevoie, France

Filed Apr. 26, 1988, Ser. No. 186,307  
Claims priority, application France, Apr. 29, 1987, 87 06105  
Int. Cl.<sup>3</sup> B07C 5/02, 9/00

U.S. Cl. 364—478

7 Claims



1. A device for the distribution of a large number of number of elements on an arranging tray housed in a container, comprising:

means for creating a mechanical action to distribute said elements wherein said mechanical action is transmitted to said container for a predetermined time,  
means for recording parameters of said mechanical action, and means for storing said parameters wherein said means for recording said parameters and storing said parameters constitute a learning mode; and  
means for enabling the automatic functioning of said distribution according to said recorded parameters.

4,947,338

**SIGNAL IDENTIFICATION METHOD**

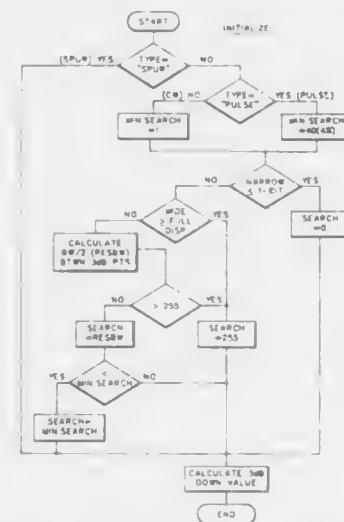
Robert S. Vistica, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 22, 1986, Ser. No. 899,272  
Int. Cl.<sup>3</sup> G01R 23/16

U.S. Cl. 364—485

9 Claims

1. A signal identification method comprising the steps of: selecting one or more tests to apply to digital data points stored in a display memory having a plurality of sequential display memory addresses, the tests being selected from a plurality of tests arranged in a hierarchy according to an operating mode selected from a plurality of operating modes, the digital data points being stored such that each sequential display memory address represents a particular sequential frequency and the value of the digital data point stored at each sequential display memory address represents an amplitude value for the represented frequency, the digital data points representing a frequency spectrum for an acquired input signal; and



identify the acquired input signal according to the selected operating mode.

4,947,339

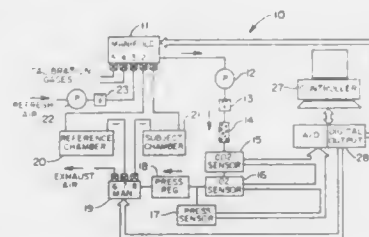
**METHOD AND APPARATUS FOR MEASURING RESPIRATION, OXIDATION AND SIMILAR INTERACTING BETWEEN A SAMPLE AND A SELECTED COMPONENT OF A FLUID MEDIUM**

Jan Czekajewski, 4348 Shire Cove Rd., Columbus, Ohio 43220, and Leif B. Neenerfelt, Galloway, Ohio, assignors to Jan Czekajewski, Columbus, Ohio

Filed Dec. 1, 1988, Ser. No. 278,599  
Int. Cl.<sup>3</sup> G06F 15/46; G01N 31/00

U.S. Cl. 364—497

14 Claims



1. Apparatus for determining a rate at which a sample consumes or produces a selected component of a fluid medium, said apparatus comprising:

- a reference chamber adapted to house a first quantity of a reference fluid medium;
- a sample chamber adapted to house a sample and a second quantity of the reference fluid medium; and wherein the sample interacts with said second quantity of the reference fluid medium to produce a sample fluid medium;
- a sensor which generates a plurality of reference and sample signals, each of said reference and sample signals being substantially proportional in strength to a quantification of the selected component relative to the reference and sample fluid media, respectively;
- means for alternately circulating the reference and sample fluid media from their respective chambers to the sensor and back to their respective chambers; and
- a processor adapted to receive the reference signals and the sample signals generated by the sensor and to calculate the rate at which the sample consumes or produces the selected component in accordance with a formula which

employs the reference signals to compensate for a drift in the sensor.

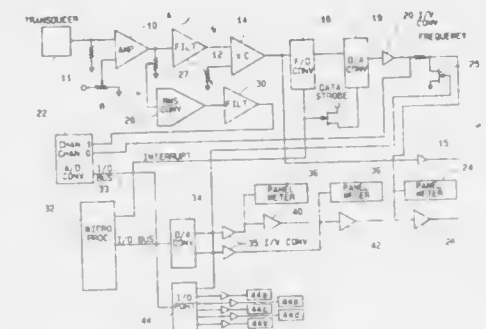
4,947,340

**INSTRUMENT FOR THE MEASUREMENT AND DETERMINATION OF CHEMICAL PULSE COLUMN PARAMETERS**

Norman J. Marchant, and John P. Morgan, both of Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Aug. 31, 1988, Ser. No. 238,661  
Int. Cl.<sup>3</sup> G06F 15/20

U.S. Cl. 364—500

19 Claims



1. An instrument adapted to determine chemical pulse column parameters, said pulse column having a column pulser which generates a pressure pulse the parameters of which are transformed by a transducer into a set of voltage signals, said instrument comprising:

- means for receiving said voltage signals induced by pulses emitted by said column pulser and for splitting said signals into first and second components;
- means for processing said first signal component to determine the frequency of said signals and for generating a pulse signal frequency;
- means for processing said second signal component of the pulse induced signals into a root mean square equivalent value; and
- means for processing said pulse signal frequency and said root mean square equivalent, for calculating specified pulse column operating parameters therefrom and for comparing said calculating parameters against preset parameter limits.

4,947,341

**METHOD OF PREDICTING FATIGUE LIFETIMES OF METALLIC STRUCTURES**

M. Carl Shine, Mountainview, Calif., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Mar. 15, 1988, Ser. No. 168,502  
Int. Cl.<sup>3</sup> G01M 5/00

U.S. Cl. 364—508

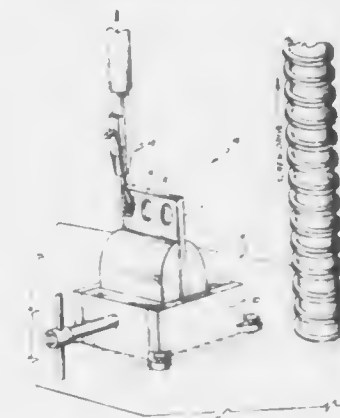
6 Claims

1. Method of determining lifetime  $N_f$  number of cycles to failure of a metallic structure which comprises the following steps:

- measure displacement rate versus stress for the structure at a predetermined temperature,
- determine transition between grain boundary creep displacement and matrix creep displacement from the measurements obtained in (a),
- determine matrix creep displacement rate versus stress from the measurements obtained in (a),
- measure amount of creep displacement to rupture (CDR) in a steady state matrix creep displacement region at said predetermined temperature,
- measure stress relaxation over a time period from a predetermined initial stress in a matrix creep displacement

region, this time being sufficiently long to permit creep rate to drop by at least one order of magnitude,

(f) plot a creep displacement versus time curve from (c) and (e) above and calculate matrix creep displacement per cycle (CPS) by integrating area under said curve,



(g) calculate number of cycles to failure ( $N_f$ ) for the measured load and temperature conditions using the formula:

$$N_f = \frac{CDR}{CPS}$$

4,947,342

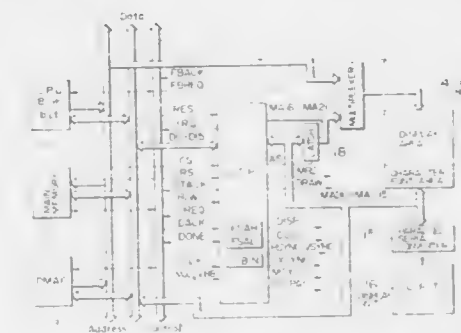
**GRAPHIC PROCESSING SYSTEM FOR DISPLAYING CHARACTERS AND PICTURES AT HIGH SPEED**

Koyo Katsura, Hitachi, Ltd.; Shigeru Matsuo, Hitachi, Ltd.; Shigeaki Yoshida, Sayama; Hiroshi Takeda, Kodaira, and Hisashi Kaziwara, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Hitachi, both of, Japan

Filed Sep. 9, 1986, Ser. No. 905,173  
Claims priority, application Japan, Sep. 13, 1985, 60-201549  
Int. Cl.<sup>3</sup> G06F 5/01

U.S. Cl. 364—518

18 Claims



1. A graphic processing system, comprising:  
output means for outputting graphic information, wherein said output means includes a plurality of pixels arranged in a plural-dimensional configuration, and wherein said output means outputs said graphic information by controlling rates of said plurality of pixels in correspondence to character font patterns supplied thereto;  
memory means, connected to said output means, including a first area for storing information indicating the states of pixels to be outputted from said output means and a second area for storing character font patterns of characters, wherein each of said character font patterns includes

information indicating the states of a number of said plurality of pixels;  
 coded information supplying means for supplying coded information designating a character;  
 dedicated processor means for responding to said coded information from said coded information supplying means to thereby determine an address of a corresponding character font pattern stored in said second area of said memory means based on said coded information and transfer the corresponding character font pattern at said address to a predetermined storage position corresponding to a predetermined output position of said output means; and  
 means for supplying said corresponding character font pattern from said predetermined storage position of said first memory area to said predetermined output position of said output means thereby causing said output means to control the states of said pixels in accordance with said corresponding character font pattern.

4,947,343

# DOCUMENT PROCESSING SYSTEM FOR DETECTING AN OVERLAP IN TWO CHARACTERS

Takashi Amari, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 170,252, Mar. 18, 1988, abandoned.

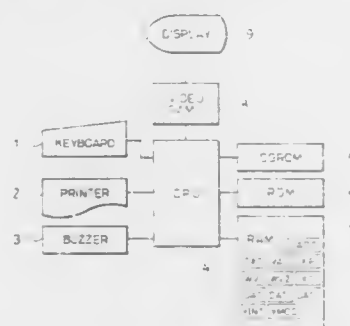
This application Dec. 11, 1989, Ser. No. 449,322

Claims priority, application Japan, Mar. 23, 1987, 62-065690; Mar. 23, 1987, 62-065691

Int. Cl.<sup>5</sup> G06F 15/04

U.S. Cl. 364-518

10 Claims



1. A document processing system comprising:  
 a display pattern memory for storing a pattern to be displayed;  
 a display unit for displaying the pattern stored in said display pattern memory;  
 reference character pattern store means for storing a reference character pattern corresponding to the pattern stored in said display pattern memory;  
 read-out reference character pattern store means for storing a reference character pattern corresponding to a display pattern read from said display pattern memory;  
 superposition determination means for determining, based on a predetermined operation and in parallel with development of a pattern in said display pattern memory, whether there is a superposition between reference character patterns read from said reference character pattern store means and written in said read-out reference character pattern store means; and  
 indication means for indicating the determination made by said superposition determination means.

## 4,947,344 METHOD OF ROTATING IMAGE DATA IN A PARTITIONED DISPLAY BUFFER

Yasumasa Hayashi, Fujisawa; Katsumasa Oka, Chigasaki, and Hiroshi Satoh, Yamoto, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

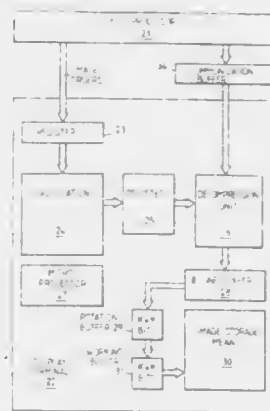
Continuation of Ser. No. 80,268, Jul. 31, 1987, abandoned. This application May 17, 1989, Ser. No. 364,550

Claims priority, application Japan, Sep. 12, 1986, 61-214232

Int. Cl.<sup>5</sup> G06F 15/02

U.S. Cl. 364-518

4 Claims



1. A method of rotating image data representing a source rectangle area of a document by a specified rotation angle, said source rectangle area having a source edge and a source edge area adjacent the source edge, said source rectangle area comprising a plurality of lines, each line extending in a direction parallel to the source edge, said image data comprising a plurality of words, each word consisting of K bits of data extending along a line of the source rectangle area in the direction parallel to the source edge, said method comprising the steps of:

partitioning a storage means by at least first and second boundaries separated from each other by K bits in a bit direction perpendicular to the boundaries, said storage means comprising a plurality of lines of storage, each line extending in the bit direction, groups of K bits on a line forming a word, said storage means having a destination rectangle area corresponding to the source rectangle area, said destination rectangle area having a destination edge parallel to and spaced from the boundaries, said destination edge corresponding to the source edge;  
 calculating the number M of bits between the destination edge and the first boundary of the storage means;  
 storing image data representing the source edge area in a K-line buffer, said

buffer having K lines of storage and having first and second boundaries, the first boundary of the K-line buffer corresponding to the first boundary of the storage means, the second boundary of the K-line buffer corresponding to the second boundary of the storage means, each line of the K-line buffer extending in a line direction parallel to the boundaries of the K-line buffer, said K-line buffer being partitioned into blocks, each block having a size of K×K bits,  
 each word of image data being stored on one line of the K-line buffer, said source edge being spaced from the first boundary of the K-line buffer by M lines in a direction perpendicular to the line direction;  
 reading data from a block of the K-line buffer in groups of K bits in a direction perpendicular to the line direction; and  
 storing each group of K bits in the storage means between the first and second boundaries of the storage means.

## 4,947,345 QUEUE MANAGEMENT SYSTEM FOR A MULTI-FUNCTION COPIER, PRINTER, AND FACSIMILE MACHINE

Elizabeth M. Paradise, Pittsford, and Edwin R. Monkelbaan, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 25, 1989, Ser. No. 384,628

Int. Cl.<sup>5</sup> G06F 15/00

U.S. Cl. 364-519

9 Claims



1. An queue management process for a multi-mode machine having copying, printing, and facsimile transmission and reception modes for processing copy, print, and facsimile jobs, said machine including a printer for making prints in response to a demand for copies, prints, and prints of facsimile transmissions; a job printing queue, and a job holding queue, comprising the steps of:

- in one machine mode, inserting all copy, print, and facsimile jobs in said printing queue with said jobs being arranged for printing by said printer in said printing queue in the order in which said jobs are received; and
- in a second operating mode
  - inserting all copy and print jobs in said printing queue with said jobs being arranged for printing by said printer in said printing queue in the order in which said jobs are received;
  - inserting all facsimile jobs not to be printed in said job holding queue with said facsimile jobs being arranged in said holding queue in order in which said facsimile jobs are received;
  - transferring at least one of said facsimile jobs from said holding queue to said printing queue;
  - interrupting the printing order of any of said copy and print jobs currently in said printing queue and placing said one facsimile job transferred from said job holding queue ahead of any of said copy and print jobs in said printing queue whereby said one facsimile job is printed first; and
  - following printing of said one facsimile job, resuming printing of the next one of said copy and print jobs remaining in said printing queue.

4,947,346

# WORD PROCESSOR DISPLAYING INSTRUCTIONS BY MONITORING USER'S KEY OPERATIONS

Shin Kamiya, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 201,640, Jun. 2, 1988, abandoned. This application Nov. 29, 1989, Ser. No. 443,819

Claims priority, application Japan, Jun. 29, 1987, 62-161510

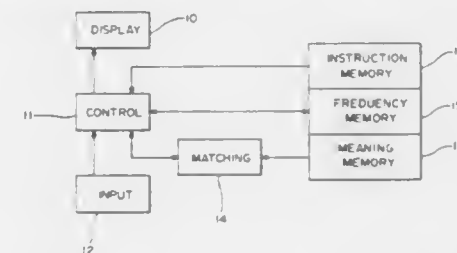
Int. Cl.<sup>5</sup> G06F 3/02

U.S. Cl. 364-521

5 Claims

1. A word processor comprising  
 a key input means having a plurality of keys,  
 a display means for displaying data,  
 a control means programmed to perform many word processing operations in response to signals outputted from

said key input means according to specified sequences in which said keys are operated, each of said word processing operations having a reference minimum number associated therewith,  
 a result storing means connected to said control means for incrementing, whenever said keys of said key input means are operated for one of said word processing operations, a frequency number representing the number of times said keys were previously operated for said one of said word processing operations, and



a judging means connected to said control means for, judging whether said frequency number exceeds the corresponding one of said reference minimum numbers associated with said one of said word processing operations, said control means being further programmed to automatically cause said display means to display, if said judging means determines that said frequency number exceeds said corresponding one of said reference minimum numbers, the identity of one of said word processing operations and information related to said one of said word processing operations.

4,947,347

# DEPTH MAP GENERATING METHOD AND APPARATUS

Hitoshi Sato, Utsunomiya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

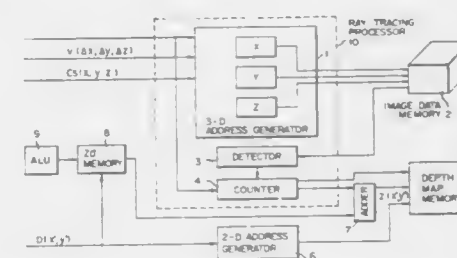
Filed Sep. 16, 1988, Ser. No. 245,152

Claims priority, application Japan, Sep. 18, 1987, 62-234415

Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 364-522

13 Claims



1. A depth map generating apparatus comprising:  
 a depth map memory for storing a depth map;  
 three-dimensional (3D) region setting means for setting in 3D coordinates a 3D region of a given shape enclosing an object in 3D image data;  
 first processing means for acquiring through a coordination computation a first distance measured in a desired view direction from a projection plane, a position of said projection plane being set in accordance with said desired view direction, said first direction measured to a surface of said 3D region, and said first processing means acquiring said first distance for each corresponding pixel on said projection plane;  
 second processing means for acquiring through ray tracing a second distance measured in said desired view direction from said surface of said 3D region to a surface of said



object, the second processing means acquiring a second distance for each corresponding pixel on said projection plane; and  
third processing means for adding said first and second distances for each corresponding pixel on said projection plane and writing resultant data in said depth map memory.

4,947,348

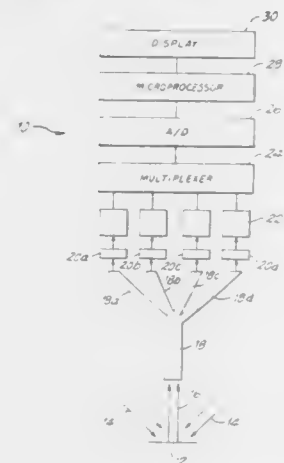
**DENSITOMETER METHOD AND SYSTEM FOR IDENTIFYING AND ANALYZING PRINTED TARGETS**  
Robert D. Van Arsdell, Wappingers Falls, N.Y., assignor to Kollmorgen Corporation, Simsbury, Conn.

Filed Mar. 25, 1987, Ser. No. 30,735

Int. Cl.<sup>5</sup> G06F 9/00

U.S. Cl. 364—523

18 Claims



17. A densitometer system for recognizing the type of target in a multi-color printing process comprising:  
measuring means for measuring the red, green, blue and visual optical densities of a selected target;  
comparison means for determining from said measured optical densities whether an overprint has been measured, whereupon,  
(i) an overprint density value storage means stores the measured red, green and blue optical densities at  $T_r$ ,  $T_g$ ,  $T_b$ , respectively,  
(ii) an overprint check means determines whether an overprint has been measured and separately measures and stores the first down color red, green and blue optical densities and the second down color red, green and blue optical densities,  
(iii) a percent trap means determines percent trap from said measured optical densities of said overprint and said first and second down colors, and  
(iv) a percent trap display means displays the percent trap.

4,947,349

**MONITORING SYSTEMS IN SEQUENTIAL PROGRAM CONTROL ARRANGEMENTS**

Yukio Munenaga, Higashihiroshima, and Tomoji Izumi, Hattukaichi, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed May 25, 1988, Ser. No. 198,575

Claims priority, application Japan, May 25, 1987, 62-127574

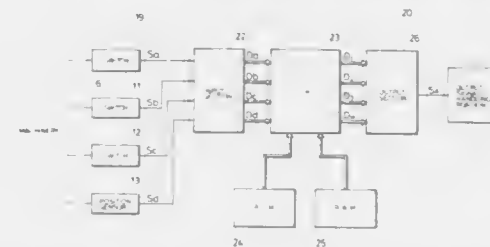
Int. Cl.<sup>5</sup> G06F 15/46, 11/28

U.S. Cl. 364—551.01

5 Claims

1. A monitoring system comprising:  
operation detecting means for detecting operating states of a plurality of components in a sequential program control arrangement for controlling machinery,  
said components comprising an outlet component which causes a change in an effective action of the machinery and input components, wherein said output component

causes the change when the input components are in respective predetermined operating states,  
memory means for storing reference operating states of said components, which are predetermined as normal operating states obtained sequentially under a normal operation of the machinery at every operation step in which a change in the operating states arises, therein in the form of reference operating states at sequential check steps,  
difference detecting means connected to both the operation detecting means and the memory means for detecting a difference between an actual operating state detected by said operation detecting means with the reference operating state stored in said memory means,  
difference detection control means for causing said difference detecting means to compare the actual operating states detected successively by said operation detecting means with the reference operating states at corresponding check steps respectively, then after a first check step at which the difference between the actual operating state and the reference operating state compared with each



other is detected by the difference detecting means, to compare the actual operating state corresponding to the first check step with the reference operating state at each of check steps between the first check step and a second check step ahead of the first check step by a predetermined step number, wherein said second check step is selected such that the reference operating state at the second check step includes the change in the effective action of the machinery caused by the output element, and further after a third check step between the first and second check steps at which the reference operating state is coincident with the actual operating state corresponding to the first check step, to compare the actual operating states detected successively by said operation detecting means after the actual operating state corresponding to the first check step with the reference operating states at check steps ahead of the third check step respectively; and checking means for checking the operation of the machinery based on the difference detected by said difference detecting means.

4,947,350

**TACTICAL ROUTING SYSTEM AND METHOD**

Declan G. Murray, and John H. Powell, both of Preston, England, assignors to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 193,223, May 11, 1988, abandoned, which is a continuation of Ser. No. 846,078, Mar. 31, 1986, abandoned. This application Nov. 30, 1989, Ser. No. 443,861

Claims priority, application United Kingdom, Apr. 1, 1985, 8508489

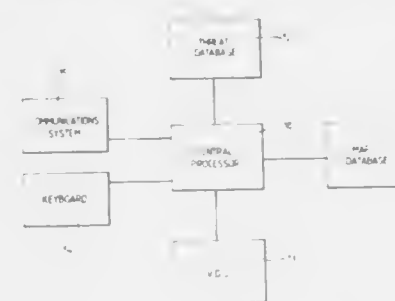
Int. Cl.<sup>5</sup> G06F 15/50

U.S. Cl. 364—554

6 Claims

1. A method of determining the probability of a vehicle failing to reach an end point from a start point by maneuvering along a selected route between the start point and end point through a domain containing a predetermined distribution of threats, said method comprising the steps of:  
(i) dividing said selected route into a plurality of straight line segments,

- (ii) determining the probability of failing to survive given threats encountered along each of said segments in turn having regard to a length of each straight line segment and the proximity of the line segment to said threats in the domain,  
(iii) combining the probabilities of failing to survive the



given threats for each line segment of the selected route so as to determine the probability of the vehicle failing to reach the end point along the path connecting the segments of the selected route.

- (iv) displaying said probability of the vehicle failing to reach the end point along the selected route in the domain, and  
(v) displaying said selected route in relation to said domain.

4,947,351

**ULTRASONIC SCAN SYSTEM FOR NONDESTRUCTIVE INSPECTION**

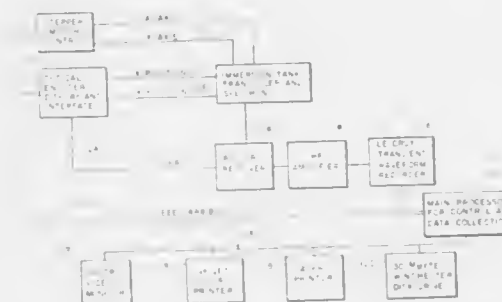
Thomas J. Moran, Huber Heights; Charles F. Buynak, Kettering, and Richard W. Martin, Springboro, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 6, 1988, Ser. No. 191,303

Int. Cl.<sup>5</sup> G06F 15/20; G01N 9/24

U.S. Cl. 364—507

22 Claims



1. A reflected energy process for optimized nondestructive ultrasonic acoustic mapping of internal details, including subsurface defects, within a workpiece comprising the steps of:  
illuminating a selected portion of said workpiece with an acoustic energy raster of scan lines that include pulses of ultrasonic frequency acoustic energy of first time interval separation along said raster scan lines;  
sensing the ultrasonic frequency ringing waveform energy return echoes from said workpiece received pulses of acoustic energy during an echo time interval following each illuminating pulse;  
sampling selected points of said ringing waveform during a plurality of number identifiable data acceptance window gates of second time interval width and third time interval successive separations during each said echo time interval following said illuminating pulses, said sampling including

digitizing a predetermined number of waveforms values within each window gate time interval;  
generating from said plurality of waveform values in each window gate, and using a predetermined value consolidation algorithm, a pixel value that is representative of said plurality of waveform values in the window gate;  
assembling the pixel values from similar member identifiable window gates in each echo time interval into video images, each image thereby describing the acoustic energy reflection pattern from a plane of different subsurface depth in said workpiece;  
adjusting, from a viewing of said video images, the parameters of said process including the workpiece portion selected for illumination, the duration and amplitude of said illuminating pulses, the number of digitized waveform values in each window gate, the duration of said first second and third time intervals and said value consolidation algorithm to obtain a better view of selected details including said subsurface defects in said workpiece;  
repeating said illuminating, sensing, sampling, generating, assembling, and adjusting steps until optimum views of selected workpiece details obtain;  
recording the pixel values and locations comprising said optimum views.

4,947,352

**TEMPERATURE COMPENSATION IN DIFFERENTIAL PRESSURE LEAK DETECTION**

Anthony Jenkins, Fowlmere, England, assignor to Ion Track Instruments, Inc., Burlington, Mass.

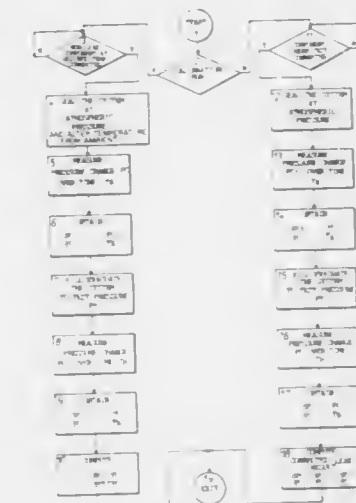
Filed Mar. 25, 1988, Ser. No. 173,077

Claims priority, application United Kingdom, Mar. 26, 1987, 8707231

Int. Cl.<sup>5</sup> G06F 15/32; G01M 3/32; G01K 13/00

U.S. Cl. 364—558

4 Claims

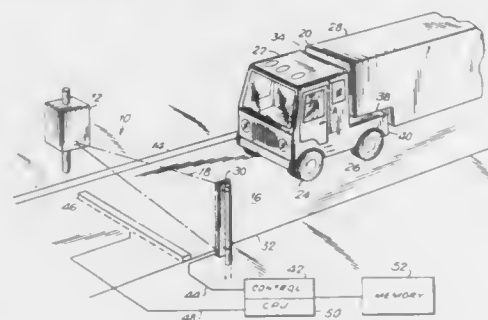


sealing the calibration vessel;  
generating and storing a signal corresponding to the rate of change of pressure in the calibration vessel to determine  $(dP_2/dt)$ ;  
computing a ratio,  $C$ , of  $(dP_2/dt)$  divided by  $(dP_1/dt)$ ;  
filling the test vessel with air to prevailing atmospheric pressure  $P_1$ ;  
sealing the test vessel;  
generating and storing a signal corresponding to the rate of change of pressure in the test vessel to determine  $(dP_1/dt)$ ;  
altering the volume of air in the test vessel to achieve the test pressure  $P_7$ ;  
generating and storing a signal corresponding to the rate of change of pressure in the test vessel to determine  $(dP_7/dt)$ ; and  
generating a signal corresponding to the actual leak rate from the test vessel by subtracting from the measured rate of pressure change  $(dP_7/dt)$  the product of the ratio  $C$  multiplied by the measured rate of pressure change  $(dP_1/dt)$ .

4,947,353

**AUTOMATIC VEHICLE DETECTING SYSTEM**  
Thomas J. Quinlan, Jr., Beach Haven Terrace, N.J., assignor to Automatic Toll Systems, Inc., Teterboro, N.J.  
Filed Sep. 12, 1988, Ser. No. 243,295  
Int. Cl.<sup>5</sup> G08G 1/017, 1/02, 1/04  
U.S. Cl. 364—562

9 Claims

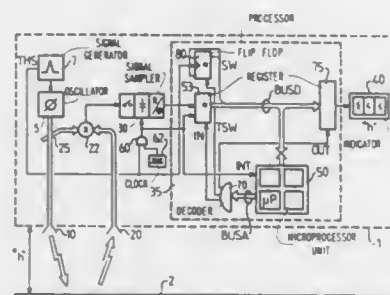


1. An automatic vehicle detecting system comprising:  
laser means positioned at one side of a roadway for continuously directing a laser beam of coherent light across the roadway so as to intercept the path of an object moving along the roadway;  
elongated photoelectric means positioned vertically on an opposite side of said roadway from said laser means for detecting a presence and absence of said laser beam and providing a first output signal indicative thereof;  
said laser means repeatedly sweeping said laser beam along the length of said photoelectric means at regular intervals such that a detected absence of said laser beam along a predetermined incremental length of said photoelectric means is indicative of a corresponding vertical dimension of an object on said roadway and intercepting said laser beam;  
treadle means extending across a surface of said roadway between said laser means and said photoelectric means for detecting a horizontal length of an object moving over said treadle means and providing a second output signal indicative of said horizontal length; and  
control means receiving said first output signal and said second output signal for deriving a count of objects successively intercepting said laser beam.

**MEASURING APPARATUS FOR DETECTING THE DISTANCE "H" TO AN OBJECT**  
Serge Hethuin, Meudon, France, assignor to U.S. Philips Corporation, New York, N.Y.  
Filed Oct. 11, 1988, Ser. No. 255,812  
Claims priority, application France, Oct. 16, 1987, 87 14289  
Int. Cl.<sup>5</sup> G01S 13/34

U.S. Cl. 364—562

3 Claims



1. A measuring apparatus for detecting the distance  $h$  to an object, said apparatus comprising transmitting means for transmitting toward the object a wave having frequency modulated periods, receiving means for receiving a reflection of the wave from the object, mixing means coupled to the transmitting and receiving means for forming a beat frequency signal including information representative of the distance  $h$ , means for producing a plurality of samples of said beat frequency signal for each of said periods, and a processor for producing a signal representative of the distance  $h$ , characterized in that the processor comprises means for:

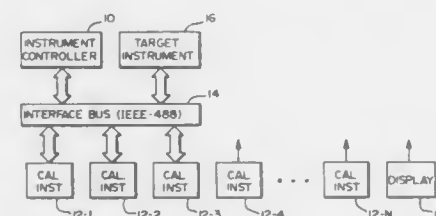
- producing from  $p$  previous samples during one of said periods adjustable coefficients  $a_i$  representing the predicted value of a present sample;
- producing an error signal representative of the difference between the value of the present sample and the predicted value of said sample;
- adjusting the values of the coefficients  $a_i$  to minimize the magnitude of the error signal;
- determining from the adjusted coefficients  $a_i$  a power density spectrum for the beat frequency signal; and
- determining from the power density spectrum the distance  $h$ .

4,947,355

**MODULAR ELECTRONIC INSTRUMENT SYSTEM HAVING AUTOMATED CALIBRATION CAPABILITY**  
Henricus Koeman, Edmonds, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.  
Filed May 5, 1988, Ser. No. 190,582  
Int. Cl.<sup>5</sup> G06F 15/20; G01R 35/00

U.S. Cl. 364—571.01

22 Claims



1. A modular electronic instrument calibration system, comprising:  
an instrument to be calibrated having associated therewith a characteristics file including calibration information;

one or ore calibration instruments connectable to said instrument to be calibrated, each of said calibration instruments having associated therewith a characteristics file including resource capability information; and  
control means for automatically deriving requirements for calibration from said calibration information, and matching said requirements with said resource capability information.

4,947,356

**AIRCRAFT CABIN NOISE CONTROL APPARATUS**  
Stephen J. Elliott, Winchester, and Philip A. Nelson, Southampton, both of England, assignors to The Secretary of State for Trade and Industry, London, England  
PCT No. PCT/GB87/00442, § 371 Date Feb. 10, 1989, § 102(e) Date Feb. 10, 1989, PCT Pub. No. WO87/07974, PCT Pub. Date Dec. 30, 1987

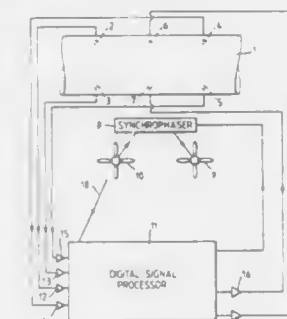
PCT Filed Jun. 23, 1987, Ser. No. 312,709

Claims priority, application United Kingdom, Jun. 23, 1986, 8615315

Int. Cl.<sup>5</sup> H04R 27/00; B64C 11/50

U.S. Cl. 364—574

8 Claims



1. Cabin noise control apparatus for an at least two propeller or fan driven aircraft, said apparatus comprising:  
a plurality of transducers located inside a cabin of said aircraft;  
a signal processor means for receiving and analyzing signals from said plurality of transducers wherein said signal processor means computes an estimate of the gradient of the sum of the means square outputs of the transducers with respect to the phase relationship  $\theta_m$  between a reference propeller or fan and each other propeller or fan and causes the synchronizer to increment  $\theta_m$  by an amount dependent on the value of the gradient in order to minimize the sum of the mean square outputs of the transducers; and  
a synchronizer for varying, during flight, the phase relationship between a reference propeller or fan of the aircraft and at least one of the other propellers or fans of the aircraft in response to the output from said signal processor.

4,947,357

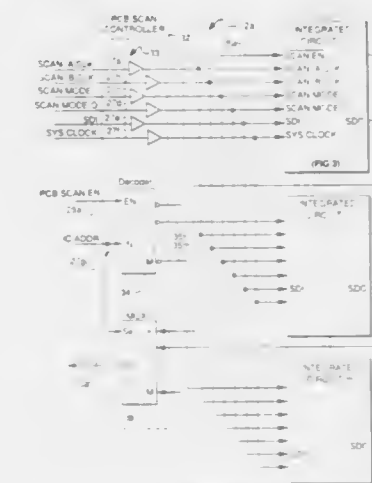
**SCAN TESTING A DIGITAL SYSTEM USING SCAN CHAINS IN INTEGRATED CIRCUITS**  
W. Kem Stewart, Woburn; Lester M. Crudele, Groton; Jonathan L. Miller, Chestnut Hill; Marco E. Riera, Woburn, and Bruce E. Schurmann, N. Andover, all of Mass., assignors to Stellar Computer, Inc., Newton, Mass.  
Filed Feb. 24, 1988, Ser. No. 159,898  
Int. Cl.<sup>5</sup> G01R 31/28, 15/12; G06F 11/00

U.S. Cl. 371—22.3

4 Claims

1. A digital system comprising  
a plurality of integrated circuits disposed on a circuit board, each integrated circuit comprising a plurality of scan chains,  
each said scan chain scanning data from a scan input thereof

to a scan output thereof in response to a scan clock, each said scan input being coupled to a first pad of said integrated circuit, the scan outputs being multiplexed to a second pad of said integrated circuit,  
said second pad of at least one of said plurality of integrated circuits being multiplexed with said second pad of another one of said integrated circuits to a port of said circuit board,



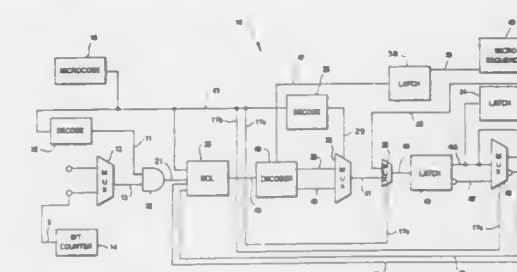
a controller for selecting one of said plurality of integrated circuits for scanning, said controller selecting the second pad of said selected integrated circuit for coupling to said port of said circuit board, and  
said controller further selecting one of said plurality of scan chains in said selected integrated circuit for scanning, said controller coupling said scan clock to said selected scan chain and selecting the scan output of said selected scan chain for coupling to said second pad of said selected integrated circuit.

4,947,358

**NORMALIZER FOR DETERMINING THE POSITIONS OF BITS THAT ARE SET IN A MASK**  
Virginia C. Lamere, Upton; Elaine H. Fite, Northboro, and Francis X. McKeen, Westboro, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.  
Filed Mar. 20, 1989, Ser. No. 325,928  
Int. Cl.<sup>5</sup> G06F 7/00

U.S. Cl. 364—715.04

6 Claims



1. A normalizer, comprising:  
a data input which receives data;  
bit clear logic connected to said data input to receive said data and having a bit position input which receives a bit position signal, said bit clear logic operating to manipulate a bit of said data specified by said bit position signal to produce a manipulated data signal;  
an encoder connected to said bit clear logic to receive said



manipulated data signal, said encoder producing a position signal which indicates the position of at least one of the most significant bit and the least significant bit that is set of said manipulated data signal, said position signal forming an output of said normalizer; and

a feedback loop connected to an output of said encoder and said bit position input of said bit clear logic, said feedback loop receiving said position signal, and generating and feeding said bit position signal to said bit position input; wherein said bit clear logic passes the data to said encoder unmanipulated on a first iteration of said data through said bit clear logic, and manipulates said data on subsequent iterations.

4,947,359

# APPARATUS AND METHOD FOR PREDICTION OF ZERO ARITHMETIC/LOGIC RESULTS

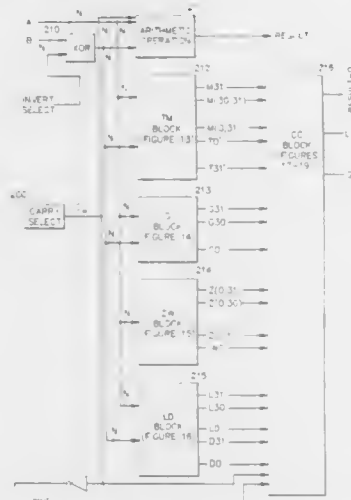
Stamatis Vassiliadis, Vestal; Michael Putrino, Endicott; Ann E. Huffman, Johnson City; Brice J. Feal, Endicott, and Gerald G. Pechanek, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 157,500, Feb. 17, 1988, abandoned. This application May 1, 1989, Ser. No. 346,147

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364—715.09

12 Claims



1. In a computing system including an arithmetic operation unit responsive to a carry-in signal,  $C_{in}$ , for performing an arithmetic operation on a pair of operands, A and B, each of said operands comprising an ordered sequence of N bits, A(i) and B(i), respectively, where  $i=0 \dots N-1$ , and, for each operand, the significance of operand bit i being greater than the significance of any operand bit i+M, where  $M=1 \dots N-1-i$ , and for producing a digital output signal representing a result of said arithmetic operation, wherein an improvement to said computing system is for predicting when said result has a zero magnitude, said improvement comprising:

a digital logic circuit responsive to said operands for producing a sequence of intermediate result signals by a first algebraic combination of operand A with operand B, said sequence of intermediate result signals containing a first ordered sequence of intermediate result signals including a sequence of transmit terms, a second ordered sequence of intermediate result signals including half-sum terms, a generate term, and transmit terms, and a third ordered sequence of intermediate result signals including a sequence of half-sum terms; and

condition code prediction means connected to said digital logic circuit for generating a condition code signal based upon a second algebraic combination of said carry-in signal with said sequence of intermediate result signals and for providing an indication whether the magnitude of said

result equals zero, said indication being provided substantially simultaneously with said result.

4,947,360

# LOW FREQUENCY DIGITAL NOTCH FILTER

Nigel P. Dyer, Chiswick, England, assignor to Plessey Overseas Limited, Ilford Essex, United Kingdom

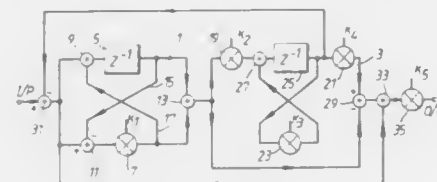
Filed Aug. 8, 1986, Ser. No. 895,020

Claims priority, application United Kingdom, Aug. 28, 1985, 8521378

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.07

8 Claims



1. A low frequency digital notch filter comprising: an input node;

an all-pass network first filter stage having an input and an output, said input being connected to said input node, the first filter stage including at least one first delay element and at least one first coefficient multiplier for multiplication by a coefficient  $K_1$ , the first delay element and first coefficient multiplier being interconnected in such a way as to provide a transfer function  $A(z)$  for the first stage as follows:

$$A(z) = (z^{-n} + K_1) / (1 + K_1 z^{-n}), \text{ where } n \leq 1;$$

a second filter stage having an input and an output, the input of the second filter stage being coupled to the output of the first filter stage, the second filter stage including a second delay element and three second coefficient multipliers for multiplication by coefficients  $K_2$ ,  $K_3$  and  $K_4$  respectively, the second delay element and second multipliers being so interconnected that the transfer function  $B(z)$  for the second stage is as follows:

$$B(z) = [(K_3 + K_2 K_4 z^{-n} - 1) / (1 - K_3 z^{-n})], \text{ where } n \geq 1;$$

a filter output node coupled to the output of the second filter stage; and

a feedforward line coupled between said input node and said output node for summing the filter input with the output of the second stage, whereby to provide a notch characteristic at a desired frequency.

4,947,361

# NARROWBAND PARAMETER ESTIMATOR

Patrick J. Smith, Salt Lake City; Scott R. Bullock, West Jordan, and Jeffery Mac Thornock, Layton, all of Utah, assignors to Unisys Corporation, Blue Bell, Pa.

Filed Sep. 28, 1988, Ser. No. 250,795

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.09

10 Claims

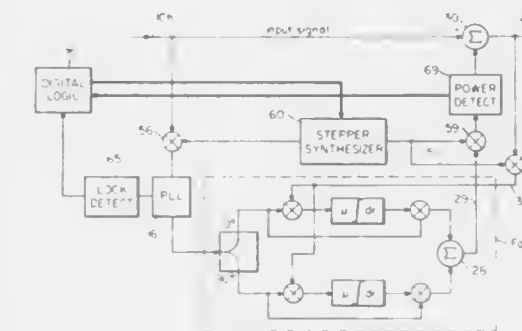
3. Apparatus for recording the frequency of the sub-bands of a wideband input signal in which resides a narrowband interference tone comprising:

(a) means for receiving said wideband input signal and its accompanying interference tones;

(b) means for stepping the frequency of a synthesizer through said wideband input signal to locate sub-bands in which interference tones reside;

(c) phase/frequency-lock loop means for locking onto an interference tone residing in one of said sub-bands;

(d) said phase/frequency-lock loop means including a voltage controlled oscillator (VCO) which provides a reference tone that is phase related to said interference tone once lock is achieved;



(e) two-weight adaptive filter means for adjusting phase and amplitude of said reference tone to match the phase and amplitude of said interference tone;

(f) means for nullifying said interference tone by subtracting said matched tone from the said input signal;

(g) means for conveying the resulting "difference" signal to said adaptive filter as an error feedback control signal for weight update.

4,947,362

# DIGITAL FILTER EMPLOYING PARALLEL PROCESSING

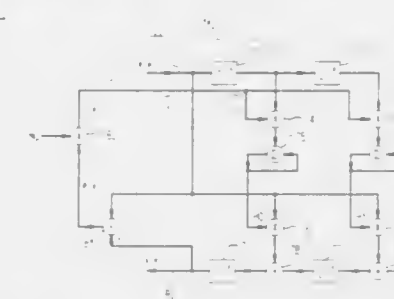
Tuan H. Bui, Piscataway, N.J., assignor to Harris Semiconductor Patents, Inc., Melbourne, Fla.

Filed Apr. 29, 1988, Ser. No. 187,869

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.19

25 Claims



1. A digital filter comprising:

a first delay line formed of one or more equal-period first delay units in series, each delay unit having an input and an output with the output of one delay unit of a pair of adjacent delay units being coupled to the input of the other of the pair, and the input of a first delay unit of the first delay line serving as a first input of the filter;

a second delay line formed of one or more equal-period second delay units in series, each second delay unit having an input and an output, the output of one second delay unit of a pair of adjacent second delay units being coupled to the input of the other of the pair and the output of a last delay unit of the second delay line serving as an output of the filter;

a plurality of adders, each adder having first and second inputs and an output, one of the adders having the first input serving as a second input of the filter and an output connected to an input of a first delay unit of said second delay line and the remaining adders each having a first input and the output coupled between an output and an

input of respective pairs of adjacent delay units of said second delay line;

a plurality of first multipliers, each having a first input and an output, the first input of each of the first multipliers being connected to an output of a separate delay unit of the first delay line;

a plurality of second multipliers, each having first and second inputs and an output, the output of each of the second multipliers being connected to the second input of a separate one of said plurality of adders;

a plurality of accumulators, each having first and second inputs and an output, the first inputs of each accumulator being coupled to an output of a separate one of the first multipliers and an output and the second input of each accumulator being coupled to a first input of a separate one of the second multipliers; and

the input of the first delay unit of the first delay line is coupled to a second input of each of the second multipliers.

4,947,363

# PIPELINED PROCESSOR FOR IMPLEMENTING THE LEAST-MEAN-SQUARES ALGORITHM

Tim A. Williams, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 12, 1988, Ser. No. 283,101

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.19

8 Claims



4,947,364

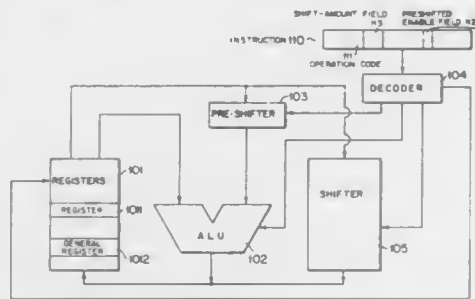
## METHOD IN A COMPUTING SYSTEM FOR PERFORMING A MULTIPLICATION

Michael J. Mahon, San Jose, and Allen Baum, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 790,581, Oct. 23, 1985. This application Aug. 9, 1989, Ser. No. 392,177  
Int. Cl.<sup>3</sup> G06F 7/52

U.S. Cl. 364—757

4 Claims



1. In a computing system including a plurality of registers, an instruction decoder coupled to the plurality of registers, an arithmetic logic unit coupled to the plurality of registers and to the instruction decoder, and a preshifter, coupled to the plurality of registers, to the instruction decoder and to the arithmetic logic unit, a method for performing a multiplication of a multiplier and a multiplicand, the multiplier being divided into a plurality of equal length sections, each section comprising "n" bits, where "n" is an integer greater than one, the method comprising the steps of:

- placing the multiplicand in a first register from the plurality of registers;
- clearing to zero a second register from the plurality of registers; and
- for each section from the plurality of sections, starting with a first section containing high order bits of the multiplier and proceeding to a last section of the multiplier containing low order bits of the multiplier, performing the following substeps,
  - if the low order bit of a current section is a "1", adding the contents of the first register to the contents of the second register via the arithmetic logic unit;
  - for every bit in the current section that is a "1", other than the low order bit current section, performing a shift-and-add operation by shifting, via the preshifter, the contents of the first register by an amount equal to the number of bit places the bit is to the left of the low order bit of the current section and by adding, via the arithmetic logic unit, the preshifted contents of the first register to the contents of the second register; and
  - for every section from the plurality of sections that does not contain low order bits of the multiplier, shifting the contents of the second register "n" bits to the left.

4,947,365

## NETWORK PATH TRACE APPARATUS AND NETWORK PATH TRACE METHOD

Yoshio Masubuchi, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 21, 1988, Ser. No. 222,255

Claims priority, application Japan, Jul. 23, 1987, 62-184105

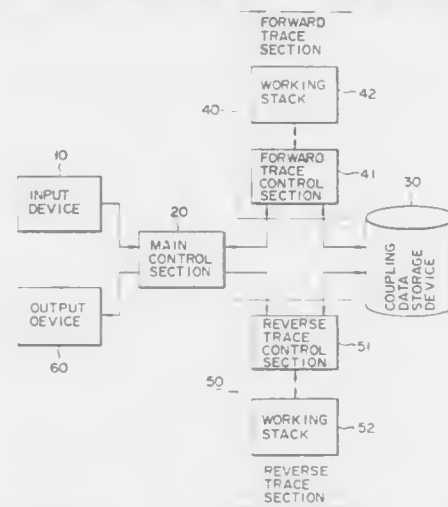
Int. Cl.<sup>3</sup> G06F 13/00

U.S. Cl. 364—900

8 Claims

1. A path trace apparatus comprising: coupling data storage means for storing data representing a coupling relationship between elements constituting a network;

input means for inputting data specifying start, middle and end elements of a path to be traced; forward trace means for inspecting said data representing said coupling relationship between said middle and end elements in said network to trace the path coupling said middle and end elements in a forward direction in said network, said forward direction being defined as a direction from said middle elements toward said end element; reverse trace means for inspecting said data representing said coupling relationship between said middle and start elements in said network to trace the path coupling said



middle and start elements in a reverse direction in said network, said reverse direction being defined as a direction from said middle element toward said start element; main control means for controlling said forward trace means and said reverse trace means in such a way as to cause said forward trace means to trace the path coupling said middle and end elements, and to cause said reverse trace means to trace the path coupling said middle and start elements; and output means for outputting an information representing that said path between said start and end elements is coupled under the control of said main control means.

4,947,366

## INPUT/OUTPUT CONTROLLER INCORPORATING ADDRESS MAPPED INPUT/OUTPUT WINDOWS AND READ AHEAD/WRITE BEHIND CAPABILITIES

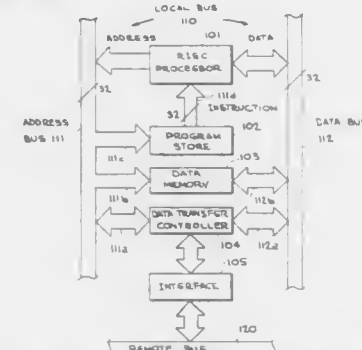
William M. Johnson, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 2, 1987, Ser. No. 104,722

Int. Cl.<sup>3</sup> G06F 13/00, 3/00

U.S. Cl. 364—900

57 Claims



1. An input/output controller for transferring data to and from a first bus, to which a first set of high performance devices, including at least one central processing unit ("CPU"), is attached, and a second bus to which a second set of relative

lower performance devices is attached, wherein the transferring of data to and from said first and second buses facilitates communication between said first and second set of devices while preventing the performance of said first set of devices from being effected by the relatively lower performance of said second set of devices comprising:

- control means, coupled to said first bus and to said second bus, including at least one address mapped input/output port means, for providing direct access to said second set of devices by said CPU;
  - means for interconnecting said first bus to said control means; and
  - means for interconnecting said second bus to said control means;
- wherein said input/output port means comprises means for performing address translation between a first bus address supplied to the input/output port means and a second bus address to be output to said second bus from the input/output port means.

4,947,367

## SYSTEM FOR CONVERTING DIGITAL DATA FROM MAGNETIC TAPE FORMAT APPARATUS AND METHOD FOR CONVERTING A SEQUENTIALLY ACCESSIBLE MAGNETIC TAPE DATA FORMAT TO DIRECTLY ACCESSIBLE WRITE-ONCE DISK DATA FORMAT TO WORM OPTICAL DISK FORMAT

Christopher Y. Chang, Medfield, and Leo C. Sherwin, Marlboro, both of Mass., assignors to EMC Corporation, Hopkington, Mass.

Filed Mar. 28, 1988, Ser. No. 173,981

Int. Cl.<sup>3</sup> G06F 7/22, 7/24, 3/06; G06E 1/02

U.S. Cl. 364—900

10 Claims



1. Apparatus for storing data from a first format in a storage media having a second data format according to external control signals wherein said second data format comprises a sequentially addressable space having a first end and a second end selected from the maximum and minimum address value of said sequentially addressable space comprising:

- means for storing first format data blocks and having a maximum capacity;
- means for storing a record map including information packet associated with said first format data blocks and having a maximum capacity wherein said information packet includes at least one of a record map header, a file mark, an inter block gap, a block relocation, a corrupted data and an erase data information packet;
- control means for directing the transfer of data to said storage media in sequence beginnings at the first available location from said first end, and for directing the transfer of non-data information to said storage media in sequence

beginning at the first available location from said first location, wherein said data and non-data information are interspersed on said storage media; and address means for generating and storing on said media beginning at the first available location from said second end, the storage medium address wherein said data and said non-data related information are stored; said control means includes means for generating a record map, said record map comprising a plurality of said information packets, comprising at least one of: said record map header including a recording block address code, an offset value, a contiguous byte count and a disk identifier; said corrupt data information packet having a corrupt code, size of corrupted data and size of good data code; said erase data information packet having an erase data code and a size of erase data code corresponding to the number of data entries; and said block relocation information packet having a block relocation code, a last block address code, a next block address code, a last offset code, a next offset code, a previous byte count code, a next byte count code, a last disk identification code, and a next disk identification code, wherein said media units comprise write-once read-many optical disks.

4,947,368

## LOOKAHEAD BUS ARBITRATION SYSTEM WITH OVERRIDE OF CONDITIONAL ACCESS GRANTS BY BUS CYCLE EXTENSIONS FOR MULTICYCLE DATA TRANSFERS

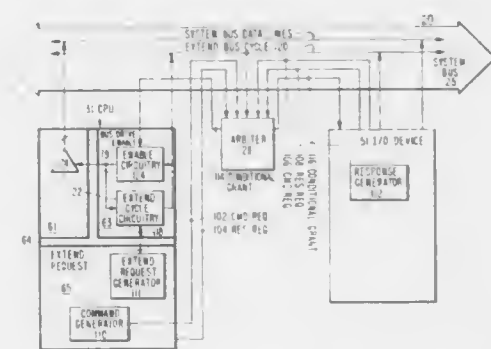
Darrel D. Donaldson, Lancaster, and Richard B. Gillett, Jr., Westford, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed May 1, 1987, Ser. No. 44,490

Int. Cl.<sup>3</sup> G06F 13/14, 13/36, 13/42, 15/16

U.S. Cl. 364—900

16 Claims



1. A responder node coupled to a commander request line, a responder request line, and a grant line corresponding exclusively to the responder node, and coupled to each of a plurality of other nodes by a pended bus, wherein a node becomes a transmitter in order to transfer a message, including a command or including return data, on the pended bus during one or more cycles of the bus, wherein a commander node initiates a transaction on the pended bus by making a command transfer, wherein a responder node completes the transaction on the pended bus by making a return data transfer in response to the command transfer, and wherein a node can access the pended bus after the commander node initiates a transaction and before the responder node completes the transaction, the responder node comprising:

- responder bus request means, coupled to the responder request line, for generating a responder bus request and



transmitting the responder bus request on the responder request line at times when return data is to be transferred from the responder node onto the bus;  
 extend request means for generating an extend request for the responder node at times when the responder node requires more than one bus cycle to transfer a message;  
 extend cycle means, coupled to the extend request means, for activating an extend bus cycle signal when the responder node becomes a transmitter at times when the extend request for the responder node is present; and  
 bus access means, coupled to the grant line, for obtaining control of the pended bus to enable the responder node to become a transmitter during an initial access cycle, in response to receipt of a conditional bus grant on the grant line, at times when an extend bus cycle signal is not activated by any of the other nodes, and for maintaining control of the pended bus to enable the responder node to remain the transmitter during bus cycles succeeding the initial access cycle at times when the extend bus cycle signal is activated by the responder node.

4,947,369

# MICROWORD GENERATION MECHANISM UTILIZING A SEPARATE BRANCH DECISION PROGRAMMABLE LOGIC ARRAY

Nandor G. Thoma, Boca Raton; Victor S. Moore, Pompano Beach, and Wayne R. Kraft, Coral Springs, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

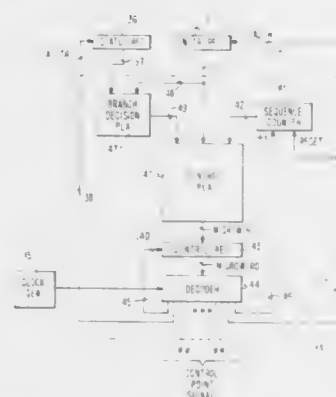
Continuation of Ser. No. 452,554, Dec. 12, 1982, abandoned.

This application Oct. 4, 1989, Ser. No. 416,881

Int. Cl.<sup>3</sup> G06F 9/42

U.S. Cl. 364—900

6 Claims



1. In a microprogram digital system wherein a sequence of microwords are used to control the execution of each system instruction, an improved microword generation mechanism comprising:

- primary programmable logic array means responsive to the system instructions for producing the appropriate microword sequences for non-branch type system instructions;
- condition indicator circuitry for supplying indicator signals indicating whether the results of arithmetic and logic operations in the system meet certain types of conditions;
- a condition testing programmable logic array responsive to the condition field of a conditional branch type system instruction for testing the appropriate indicator signal or signals and producing an affirmative decision signal if the specified condition is met;
- and a branch code programmable logic array responsive to the affirmative decision signal for producing a branch type microword sequence.

## 4,947,370 WORD PROCESSOR FOR SIMULTANEOUSLY DISPLAYING AND SCROLLING DOCUMENTS AND THE CORRESPONDING TITLES

Kazunori Sugitani, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 41,622, Apr. 22, 1987, abandoned,

which is a continuation of Ser. No. 534,313, Sep. 21, 1983,

abandoned. This application Mar. 10, 1989, Ser. No. 320,874

Claims priority, application Japan, Sep. 27, 1982, 57-166684

Int. Cl.<sup>3</sup> G06F 3/153

U.S. Cl. 364—900

12 Claims

TITLE OF DOCUMENT	LABEL	LIST OF DOCUMENT
DOCUMENT 3	A	1 2 3 4
DOCUMENT 2	A	a β γ 8
DOCUMENT 1	B	a β γ 8
DOCUMENT 5	C	a l u e
DOCUMENT 4	D	a i u e

1. An information processor having first memory means for storing plural documents and a title corresponding to each of the documents, said information processor reading out the plural documents from said first memory means, said information processor comprising:

- input means including recall instruction means for generating an instruction for recalling the plural documents and the title corresponding to each of the plural documents from said first memory means and scroll instruction means for generating a scroll instruction for scrolling the plural documents recalled by said recall instruction means;
- recall control means responsive to an instruction generated by said recall instruction means for recalling from said first memory means a portion of each of the plural documents and the title corresponding to each of the plural documents;
- second memory means for storing the plural documents and the title corresponding to each of said documents recalled by said recall control means;
- display means for simultaneously displaying the plural documents and the title corresponding to each of the documents read out from said second memory means; and
- scroll control means responsive to an instruction generated by said scroll instruction means for simultaneously scrolling to another new portion of the plural documents succeeding the portion of the plural documents as initially displayed by said display means.

4,947,371

## ANALOG DYNAMIC MEMORY CIRCUIT

Tomohiko Suzuki, Tokyo, Japan, assignor to Addams Systems Inc., Tokyo, Japan

Filed Mar. 29, 1989, Ser. No. 330,206

Claims priority, application Japan, Jul. 19, 1988, 63-179462

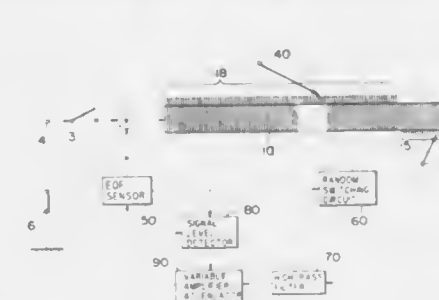
Int. Cl.<sup>3</sup> G11C 27/00

U.S. Cl. 365—45

8 Claims

1. An analog dynamic memory circuit comprising a feedback loop including a time delay element with a variable delay time, an adding circuit having an output connected to said time delay element and receiving as input an analog signal and the output of said time delay element, and time delay control means which changes the delay time of said time delay element every time said analog signal completely circulates said feedback loop, said time delay control means changing the delay time of said time delay element so that tuned sinusoidal noise

signals having frequencies equal to integer multiples of the inverse of the delay time of said time delay element do not add,



thereby preventing amplification of said tuned sinusoidal noise signals.

4,947,372

## OPTICAL INFORMATION MEMORY MEDIUM FOR RECORDING AND ERASING INFORMATION

Nagaaki Koshino, Yokohama; Mlyozo Maeda; Yasuyuki Goto, both of Atsugi; Itaru Shibata, Tokyo; Kenichi Utsumi, Sagami; Akira Ushioda, Atsugi; Ken-ichi Itoh, Yamato, and Kozo Sueishi, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 341,285, Apr. 21, 1989, abandoned,

which is a continuation of Ser. No. 803,294, Dec. 2, 1985,

abandoned. This application Nov. 30, 1989, Ser. No. 443,860

Claims priority, application Japan, Dec. 5, 1984, 59-255672;

Dec. 5, 1984, 59-255673; Dec. 28, 1984, 59-274502; Dec. 28,

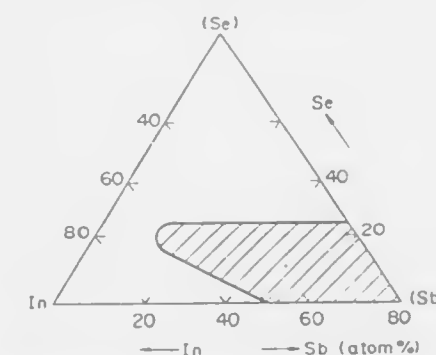
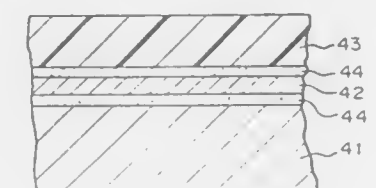
1984, 59-274537; Jan. 19, 1985, 60-6669; Jan. 19, 1985, 60-6671;

Jan. 19, 1985, 60-6670; Mar. 30, 1985, 60-67983

Int. Cl.<sup>3</sup> G11C 13/00; G11B 7/26

U.S. Cl. 365—106

8 Claims



1. An optical information memory medium including a substrate, comprising:

- a thin memory film, formed on the substrate including 35-45 atom% of Indium (In) and 55-65 atom% of antimony (Sb), capable of selectively forming two stable crystalline states, the memory film having a first crystalline state when information has been recorded and a second crystalline state when information has been erased, the first crystalline state having a first reflectivity by irradiating the memory film with an optical energy beam having a first intensity for a first time period such that the entire

thickness of the memory film is fused at the portion irradiated, and the second crystalline state having a second reflectivity lower than the first reflectivity by irradiating the memory film with an optical energy beam having a second intensity less than or equal to the first intensity for a second time period longer than the first time period.

4,947,373

## DYNAMIC RAM

Yasunori Yamaguchi, Tokyo; Katsuyuki Sato, Kodaira; Jun Mitake, Musashino; Hitoshi Kawaguchi, Yokohama; Masahiro Yoshida, Tachikawa; Terutaka Okada, Ohme; Makoto Morino, Akishima; Tetsuya Saeki; Yosuke Yukawa, both of Ohme, and Osamu Nagashima, Kodaira, all of Japan, assignors to Hitachi Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Dec. 17, 1987, Ser. No. 134,355

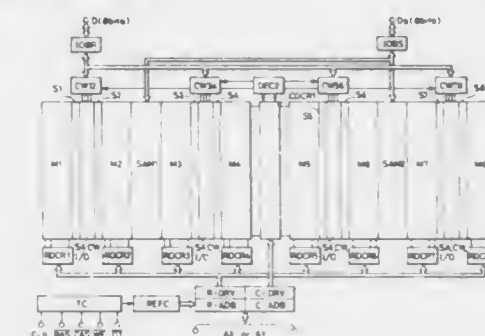
Claims priority, application Japan, Dec. 17, 1986, 61-298710;

Mar. 27, 1987, 62-71508

Int. Cl.<sup>3</sup> G11C 13/00

U.S. Cl. 365—189.04

11 Claims



1. A dual port semiconductor memory comprising:  
 a memory cell array including a plurality of word lines, a plurality of data lines and a plurality of memory cells coupled to intersections of said word lines and data lines such that said memory cells have control terminals thereof coupled to the word lines and data input/output terminals thereof coupled to the data lines;

a random access input/output circuit coupled to said memory cell array to provide random access to said memory cell array in accordance with addresses supplied from an external terminal coupled to said random access input/output circuit;

a first serial access data register coupled to said data lines of said memory cell array;

a second serial access data register coupled to said data lines of said memory cell array;

means coupled to said first and second serial access data registers to permit transfer of data between said data lines and either one of said first and second serial access data registers;

a serial input/output circuit;

means for coupling said first and second serial access registers to said serial input/output circuit; and

means for controlling the connection of the first and second serial access data registers to said data lines and to said serial input/output circuit so that said data previously transferred to one of said first and second serial access data registers is transferred to said serial input/output circuit registers is coupled to said data lines to allow information transfer between said data lines and said other of said first and second serial access data registers.

4,947,374

# SEMICONDUCTOR MEMORY DEVICE IN WHICH WRITING IS INHIBITED IN ADDRESS SKEW PERIOD AND CONTROLLING METHOD THEREOF

Tomohisa Wada, and Shuji Murakami, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

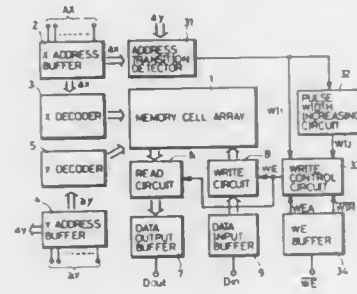
Filed May 6, 1988, Ser. No. 191,115

Claims priority, application Japan, May 12, 1987, 62-115292; Nov. 26, 1987, 62-297977

Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—195

17 Claims



1. A semiconductor memory device comprising: a plurality of memory cells, selecting means responsive to a plurality of column line and row line address signals externally applied for selecting any of said plurality of memory cells, corresponding column line and row line address signals being offset in time by an address skew time period, writing means for writing data to a memory cell selected by said selecting means, a plurality of address transition detecting means responsive to each of said plurality of column line and row line signals for generating one-shot pulses, first signal generating means responsive to the one-shot pulses from said plurality of address transition detecting means for generating a first pulse signal, second signal generating means responsive to said first pulse signal for increasing the pulse width of said first pulse signal to exceed said address skew time period and outputting the same as a second signal, and write inhibiting means responsive to said second signal from said second signal generating means for rendering said writing means inactive during second signal pulse.

4,947,375

# ADDRESSING OF REDUNDANT COLUMNS AND ROWS OF AN INTEGRATED CIRCUIT MEMORY

Jean Marie Gaultier, Rousset sur Arc, and Jean Devin, Aix en Provence, both of France, assignors to Thomson Semiconducteurs, Paris, France

Filed Mar. 2, 1988, Ser. No. 163,270

Claims priority, application France, Mar. 3, 1987, 87 02835

Int. Cl.<sup>3</sup> G11C 8/00

U.S. Cl. 365—200

1 Claim

1. An integrated circuit memory comprising an array of memory cells arranged in lines and columns, each line of memory cells addressable by means of a line address and each column of memory cells addressable by means of column address, said memory further comprising at least one redundant group of cells comprising a redundant line of cells and a redundant column of cells, with means for connecting said redundant line in replacement of a line of the array if said line of the array comprises at least a defective cell, and means for connecting said redundant column in replacement of a column of the array if said column of the array comprises at least one defective cell, said memory further comprising for each group of a redundant line and column and storing means capable of storing either an address of a defective line or an address of a

defective column but not both, said memory further comprising enabling means for

either enabling memorization in said storing means of the address of a given line and enabling selection of a first connecting path allowing replacement of said given line by said redundant line,

or enabling memorization in said storing means of the address of a given column and enabling selection of a second connecting path allowing replacement of said given column by said redundant column wherein said enabling means comprise a fusible link, the state of the fuse defining which memorization and selection in enabled, wherein a memory cell is addressable by means of N bits of



4,947,376

# CHARGE-TRANSFER SENSE AMPLIFIER FOR DRAM AND OPERATING METHOD THEREFOR

Kazutami Arimoto, and Kiyohiro Furutani, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,253

Claims priority, application Japan, Jul. 2, 1987, 62-167163

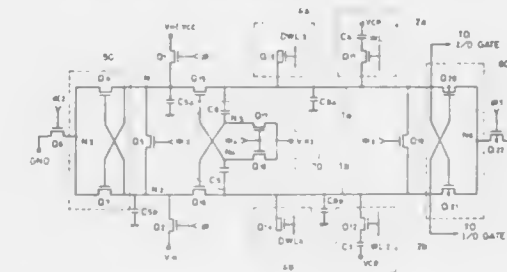
Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—205

7 Claims

1. A charge-transfer sense amplifier receiving complementary signals on a pair of signal lines, comprising a flip-flop type latch circuit with a pair of latching nodes for amplifying a differential signal between said pair of signal lines; a pair of switching elements each having a source-drain connected between a respective one of said pair of signal lines and a corresponding one of said latching nodes of said latch circuit; and precharge elements for precharging said latching nodes to a predetermined first potential, each of said switching elements having a control gate;

coupling capacitances respectively connected between the control gate of each element in one line of said pair of signal lines and the other line of said pair of signal lines in a cross-coupled configuration, and



means synchronized to the precharging of said latching nodes, for precharging the control gates of said pair of switching elements to a predetermined second potential different from and a value relative to said predetermined first potential sufficient to bring said switching elements into substantially a cut-off state.

4,947,377

# SEMICONDUCTOR MEMORY DEVICE HAVING IMPROVED SENSE AMPLIFIER ARRANGEMENT

Seiichi Hannai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

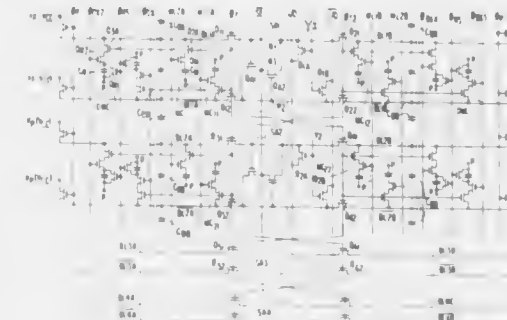
Filed Apr. 15, 1988, Ser. No. 181,950

Claims priority, application Japan, Apr. 15, 1987, 62-92909

Int. Cl.<sup>3</sup> G11C 7/02

U.S. Cl. 365—208

4 Claims



1. A semiconductor memory device comprising a plurality of memory cells arranged in a plurality of columns running in parallel, said columns being alternately classified into a first group of columns and a second group of columns according to their locations, each of said first group of columns including a first sense amplifier, a first bit line pair arranged on one side of said first sense amplifier, a second bit line pair arranged on the other side of said first sense amplifier, a first means for operatively connecting said first bit line pair to said first sense amplifier, and second means for operatively connecting said second bit line pair to said first sense amplifier, said second group of columns including a second sense amplifier, a third bit line pair arranged on one side of said second sense amplifier, a fourth bit line pair arranged on the other side of said second sense amplifier, third means for operatively connecting said third bit line pair to said second sense amplifier, and fourth means for operatively connecting said fourth bit line pair to said second sense amplifier, each of said first bit line pairs being positioned adjacently to each of said third bit line pairs in parallel, each of said second bit line pairs being positioned adjacently to each of said fourth bit line pairs; means for activating said first and second sense amplifiers simultaneously during a sensing period and

control means for controlling said first to fourth means in a first state that said first and third means are enabled and said second and fourth means are disabled during said sensing period and a second state that said second and fourth means are enabled and said first and third means are disabled during said sensing period.

4,947,378

# MEMORY ELEMENT EXCHANGE CONTROL CIRCUIT CAPABLE OF AUTOMATICALLY REFRESHING A DEFECTIVE ADDRESS

Toshikatsu Jinbo, and Hiroyuki Kobatake, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

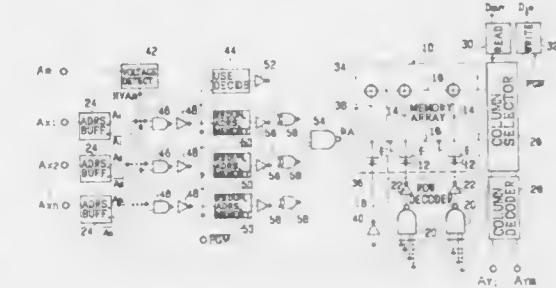
Filed May 16, 1988, Ser. No. 194,615

Claims priority, application Japan, May 15, 1987, 62-119718

Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—222

9 Claims



1. In a memory device including a memory matrix composed of non-volatile memory elements and coupled to data read/write means, a redundant memory array additionally provided to the memory matrix and used in place of defective memory elements of the memory matrix, and address input circuit receiving a given address and coupled to the memory matrix so as to bring a non-volatile memory element of the memory matrix designated by the given address into a condition accessible by the data read/write means, a memory element exchange circuit storing a defective address indicative of a defective non-volatile memory element of the memory matrix, the memory element exchange circuit being coupled to the address input circuit so as to receive the given address and also coupled to the redundant memory array, the memory element exchange circuit operating in such a manner that when the given address designates the defective non-volatile memory element of the memory matrix, the memory element exchange circuit brings the defective non-volatile memory element into a condition not accessible by the data read/write means, and the redundant memory array into a condition accessible by the data read/write means, the improvement comprising the memory element exchange circuit which includes a redundant address memory circuit, the redundant address memory circuit including a non-volatile memory element for storing said defective address of the memory matrix, an output circuit connected to said defective address storing non-volatile memory element for generating an output signal corresponding to the content of said defective address storing non-volatile memory element, and in input circuit connected to said defective address storing non-volatile memory element and said output circuit for receiving the content of said defective address storing non-volatile memory element through said output circuit so as to write the same content as that which was stored in and read from said defective address storing non-volatile memory element into said defective address storing non-volatile memory element when a new data is written to the memory matrix by said data read/write means.

wherein said memory matrix is composed of FAMOS memory cells and said defective address storing non-volatile memory element is composed of a FAMOS memory cell

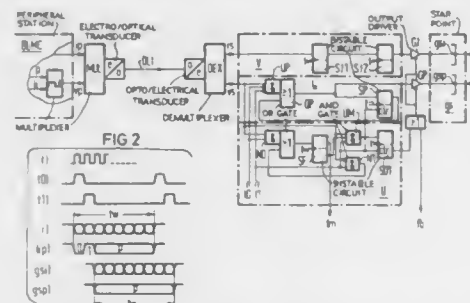


1. In a star network having a plurality of non-distinct periph-

eral stations, each connectable to a star point through which all communication between said peripheral stations must pass, the improvement of a system for limiting the penetration of peripheral station transmission faults throughout said star network, said system comprising:

means at each peripheral station for generating channel state signals and communication data signals at an output thereof, said channel state signals identifying whether a transmission channel of said peripheral station is in a busy condition;

transmission line means associated with each peripheral



station, accepting said channel state signals and said communication data signals from the associated peripheral station, for serially transmitting therethrough said channel state and said communication data signals; and

isolation means at said star point, accepting the signals transmitted through said transmission line means, for connecting said transmission line means to said star point in response to said channel state signals whenever said channel state signals indicate a busy condition and for disconnecting said transmission line means from said star point whenever said channel state signals do not indicate a busy condition.

4,947,386

**FIXED GAIN FIXED LOSS AMPLIFICATION SYSTEM**  
Joseph P. Preschutti, State College, Pa., assignor to AMP Incorporated and Broadband Networks, Inc., both of Harrisburg, Pa.

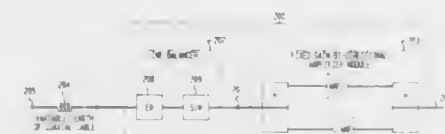
Division of Ser. No. 116,481, Nov. 2, 1987. This application Jun. 2, 1989, Ser. No. 360,580

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> H03H 11/06; H04L 5/14

U.S. Cl. 370—26

7 Claims



1. A device for balancing losses in a coaxial transmission path of a bidirectional network having an inbound and an outbound frequency band comprising

a line balancer circuit including an equalizer circuit for equalizing the loss of a fixed amount of coaxial cable, and simulator circuit means for providing a variable amount of loss for simulating a variable amount of coaxial cable, and a bidirectional amplifier having a fixed gain across said inbound and outbound frequency bands and connected to said line balancer circuit,

said simulator circuit means being adjustable so that the sum of the losses provided by the coaxial transmission path, the equalizer circuit and the simulator circuit means are equal in magnitude to the fixed gain of the bidirectional ampli-

fier across the inbound and outbound frequency bands of the network.

4,947,387

**SWITCHING NODE FOR SWITCHING DATA SIGNALS TRANSMITTED IN DATA PACKETS**

Eberhard Knorpp, deceased, late of Bleberach/Riss (by Gustav Knorpp, executor); Peter Rau, Munich, and Anton Kammerl, Grobenzell, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

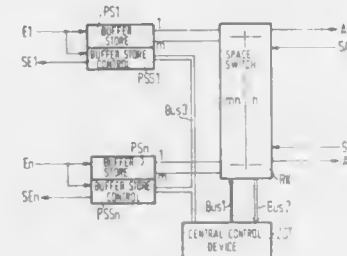
Filed Nov. 10, 1988, Ser. No. 269,519

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738177

Int. Cl.<sup>3</sup> H04Q 11/04

U.S. Cl. 370—60

3 Claims



1. A switching node for switching data signals transmitted in data packets each of which includes an address signal, said switching node comprising:

at least one coupling element which has a plurality n of input lines and a plurality n of output lines selectively coupled to said input lines via a space switch; and

a plurality n of buffer stores each being respectively connected between a particular one of said input lines and said space switch, and in each of which a plurality k of data packets occurring sequentially on the particular input line are storable before being routed further to an output line indicated by the address signal contained in the particular data packet, wherein:

said space switch has a plurality m×n of input terminals connected respectively to the corresponding m output terminals of said n buffer stores, and a plurality n of output terminals connected respectively to said n output lines; and

the buffer stores each have a plurality m—k of output terminals connected respectively to the corresponding m input terminals of said space switch for each particular buffer store via which m data packets stored in the particular buffer store can be routed further to m different output lines by being simultaneously suppliable to the m input terminals of said space switch.

4,947,388

**CELL SWITCHING SYSTEM OF ASYNCHRONOUS TRANSFER MODE**

Hiroshi Kowahara, Kodaira; Mineo Ogino, Hanno; Takahiko Kozaki, Koganei; Noboru Endo, Hachioji, and Yoshito Sakurai, Yokohama, all of Japan, assignors to Hitachi, Ltd. and Link Laboratory, Inc., both of Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,282

Claims priority, application Japan, Apr. 6, 1988, 63-82909

Int. Cl.<sup>3</sup> H04Q 11/04

U.S. Cl. 370—60

7 Claims

5. A packet switching system in which a plurality of fixed-length reception packets each composed of a header portion and a data portion are received respectively through a plurality of input lines, and each of the reception packets is selectively

4,947,389

**MULTI-CHANNEL RING ARCHITECTURE FOR DISTRIBUTED NETWORKS**

Kai Y. Eng, Shrewsbury Township, Monmouth County, and Mark J. Karol, Fair Haven, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 6, 1989, Ser. No. 362,185

Int. Cl.<sup>3</sup> H04L 12/00

U.S. Cl. 370—85.12

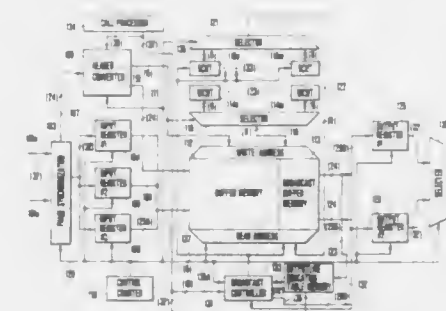
9 Claims

transmitted onto one of a plurality of output lines as a transmission packet after conversion of the header portion of the reception packet, and in which each reception packet is transmitted to selected ones of said output lines in the case where the reception packet is a broadcast packet, said packet switching system comprising:

first interface means connected to said plurality of input lines, for receiving packets inputted from each of said input lines, and for outputting each of said packets with its header portion and data portion separated from each other;

buffer memory means connected to said first interface means and having a first buffer area including a plurality of buffer areas corresponding to said output lines for accumulating the header-converted packets correspondingly to said output lines and a second buffer area for accumulating the header-converted broadcast packets to be broadcast to said selected ones of said plurality of output lines;

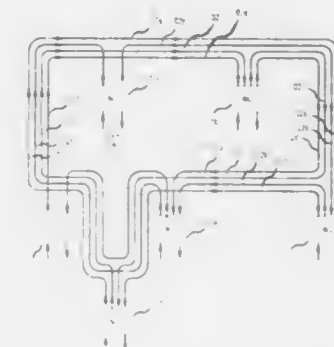
packet writing means connected to both of said first interface means and said buffer memory means, for generating converted header portions to be given to respective transmission packets in accordance with the contents of the header portions of the respective reception packets outputted from said first interface means, and for writing said transmission packets each composed of the converted header portion and the data portion of the corresponding



reception packet outputted from said first interface means into said first or second buffer area in accordance with said contents of the header portions by individually generating in a sequence plural writing addresses corresponding to storage locations in said respective buffer areas;

packet reading means connected to said buffer memory means, for reaching said transmission packets successively from said first buffer area of said buffer memory means correspondingly to said output lines and for reading said broadcast packet from said second buffer area of said buffer memory means at a predetermined frequency;

second interface means connected between said buffer memory means and said plurality of output lines, for temporarily storing said transmission packets successively read from said first buffer area of said buffer memory means and for transmitting said temporarily stored transmission packets parallelly onto said plurality of output lines; and broadcast packet generating means connected to operate in synchronism with said packet reading means for reproducing a plurality of broadcast packets from the broadcast packet read from said second buffer area of said buffer memory means and for supplying said plurality of reproduced broadcast packets, instead of the transmission packets read from said first buffer area, onto said second interface means at predetermined timing determined in accordance with the contents of the header portion of said broadcast packet.



1. A communications network comprising:

a communications medium for supporting a plurality of communications channels, each channel comprising at least one communications link and each communication link of a channel located in a different section of the channel; and

a plurality of Network Interface Units (NIUs) disposed along the communications medium in a predetermined sequence such that (1) each NIU is arranged to transmit directly to at least a first other NIU in the network via a separate communication link and to receive directly from at least a second other NIU via a separate communications link, (2) at least one of the plurality of NIUs is arranged not to transmit directly to at least one other NIU of the network, and (3) at least two NIUs of the network are arranged as "express NIUs" which, in addition to being arranged to transmit directly to at least a first other NIU and to receive directly from at least a second other NIU via separate communication links, are each arranged to transmit directly to at least one additional NIU via at least a separate additional link and to receive directly from at least one additional NIU via at least a separate additional link, and a separate number of NIUs are disposed in sequence along the communications medium between each express NIU and each of the other NIUs to which that express NIU is arranged to transmit directly to or receive directly from, the number of NIUs disposed along the medium between at least one of said express NIUs and at least one other NIU to which said express NIU is arranged to transmit directly or from which said express NIU is arranged to receive directly being different from the number of NIUs disposed along the communications medium between at least one other express NIU and any other NIU to which the other express NIU is configured to directly transmit or from which the other NIU is configured to directly receive.



**4,947,390**  
**METHOD FOR DATA TRANSFER THROUGH A BRIDGE TO A NETWORK REQUIRING SOURCE ROUTE INFORMATION**

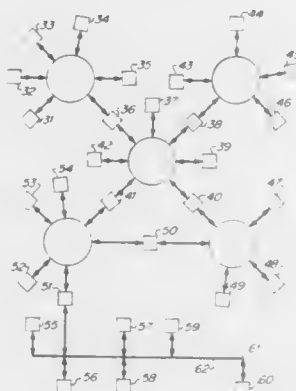
David B. Sheehy, Roseville, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 22, 1989, Ser. No. 327,202

Int. Cl.<sup>5</sup> H04J 3/24

U.S. Cl. 370—85.13

13 Claims



1. A method for handling data frames (71,81) by a bridge (51) between a first network (61) which does not require route information within data frames (81) and a second network (21,22,23,24,25) requiring route information (74) within data frames (71), the method comprising the steps of:

- receiving a first data frame (81) from the first network (61), the first data frame (81) having a first destination address (72);
- when the first destination address (72) addresses a station (31-54) on the second network (21,22,23,24,25) and the bridge (51) has route information (74) to the station (31-54) on the second network (21,22,23,24,25), performing the following substeps:
  - adding first route information (74) to the first data frame (81) to create a first modified data frame, and
  - sending the first modified data frame out on the second network (21,22,23,24,25); and,
- when the first destination address (72) addresses a station (31-54) on the second network (21,22,23,24,25) and the bridge (51) does not have route information (74) to the station (31-54) on the second network (21,22,23,24,25), initiating a route discovery process to discover a route to the station (31-54) on the second network (21,22,23,24,25).

**4,947,391**  
**ARRANGEMENTS FOR PRODUCING AND RECOGNIZING INFORMATION IDENTIFYING NON-OCCUPIED TRANSMISSION PATHS IN A DIGITAL TRANSMISSION SYSTEM**

Dieter Schwarz, and Hans-Dieter Kauschke, both of Nuremberg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 275,643, Nov. 22, 1988, which is a continuation of Ser. No. 887,581, Jul. 18, 1986, abandoned. This application Sep. 13, 1989, Ser. No. 406,983

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3526020

Int. Cl.<sup>5</sup> H04J 3/12

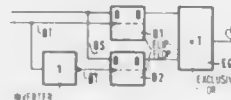
U.S. Cl. 370—110.1

1 Claim

1. Apparatus for recognizing a periodic signal pattern, the apparatus being for use in a digital transmission system which includes: a currently operating system for transmitting useful time-division multiplexed information in a plurality of time-division multiplex frames having a prescribed format; and a stand-by system for replacing the currently operating system in

case of disturbance, the periodic signal pattern being distributed over respective ones of the time-division multiplex frames and identifying non-occupied transmission paths in such a way that neither frame alignment, nor system alarm words, nor the useful information mimics the periodic signal pattern, the apparatus comprising:

- first and second D flip-flops including respective:
  - preparatory D-inputs coupled to receive a digital input signal;
  - clock inputs, the clock input of the first D flip-flop being coupled to receive an operating clock signal, the



clock input of the second D flip-flop being coupled to receive an inverted version of the operating clock signal;

- Q inputs;
  - an exclusive OR gate having first and second inputs coupled to the Q outputs of the first and second D flip-flops, respectively;
- whereby, under the control of the operating clock, said exclusive OR gate outputs one of first and second logic levels, according to whether the received signal is the periodic signal pattern or the system alarm words or some other signal.

**4,947,392**  
**MALFUNCTION DIAGNOSTIC APPARATUS FOR VEHICLE CONTROL SYSTEM**

Shunichi Wada, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

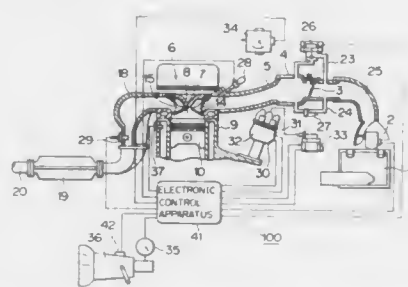
Filed Sep. 22, 1988, Ser. No. 247,544

Claims priority, application Japan, Sep. 22, 1987, 62-238113

Int. Cl.<sup>5</sup> G06E 11/28

U.S. Cl. 371—16.3

7 Claims



- A malfunction diagnostic apparatus for a vehicle control system, comprising:
  - detecting means for detecting a malfunction state of a vehicle control system;
  - memory means for storing information representing the detected malfunction state;
  - memory output means for outputting information, representing the detected malfunction state, stored in said memory means;
  - timer means for counting a period of time since said detecting means last detected the malfunction state;

inhibiting means for inhibiting said memory output means from outputting malfunction state information stored in said memory means only when the period of time counted by said timer means exceeds a fixed period of time; means for producing an inhibition release signal; and means for disabling said inhibiting means in response to the produced inhibition release signal so that said memory output means can output information, representing the detected malfunction state, stored in said memory means.

**4,947,393**  
**ACTIVITY VERIFICATION SYSTEM FOR MEMORY OR LOGIC**

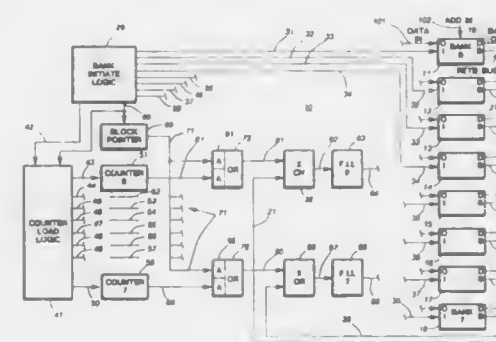
Richard F. Paul, Ludington, Mich.; Larry L. Byers, Apple Valley, and Wayne A. Michaelson, Circle Pines, both of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Sep. 12, 1988, Ser. No. 242,565

Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371—16.1

16 Claims



- Logic checking circuits for continuously monitoring memory or logic output, comprising:
  - a plurality of cards containing logic or memory elements, each of said elements having means for raising a busy return signal during a processor requested logic operation requiring access to said logic or memory elements, counter means adapted to be set to a predetermined count for generating predict busy signals which occur during the request operation,
  - gating means for comparing said predict busy signals with said return busy signal,
  - fault indicating means coupled to the output of said gating means for verifying proper response activity of said logic or memory elements.

**4,947,394**  
**SPARE CHANNEL MONITOR CIRCUIT**  
 Masahiro Nakajima, and Satoshi Kashiwaba, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 285,985

Claims priority, application Japan, Dec. 17, 1987, 62-317509

Int. Cl.<sup>5</sup> G06F 11/30

U.S. Cl. 371—20.1

5 Claims

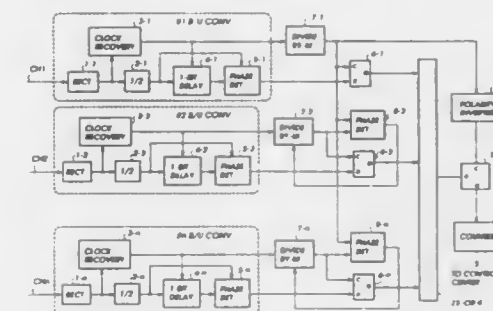
- A circuit for monitoring N spare channels of a digital transmission system which transmits bipolar test signals through said spare channels during idle state and data bit streams through one or more of said spare channels in the event of a fault in a regular channel of said system, where N is an integer greater than unity, comprising:
  - N bipolar-to-unipolar converter means connected respectively to said spare channels, each of said bipolar-to-unipolar converter means including means (1, 2, 4) for converting the bipolar test signal of the connected spare channel to a corresponding RZ (return-to-zero) signal and converting the RZ signal to a corresponding NRZ (non-return-to-zero) signal, and a phase detector means (5) for

recovering a sequence of binary digits from successive instants of said NRZ signal;

N clock recovery circuits (3-1, . . . 3-n) associated respectively with said N bipolar-to-unipolar converter means for recovering clock pulses at unit intervals from the RZ signals of the associated bipolar-to-unipolar converter means;

N counter means (7-1, . . . 7-n) respectively connected to said clock recovery circuits (3-1, . . . 3-n) for generating low frequency clock pulses at intervals M times greater than said unit intervals, where M is an integer greater than unity;

N bistable means (6-1, . . . 6-n) respectively associated with



said phase detector means (5-1, . . . 6-n), each of said bistable means transferring a logic value of binary digits from the associated phase detector means to an output terminal in response to an edge of the low frequency clock pulse generated by the associated counter means and holding the transferred logic value at said output terminal until an opposite logic value of said binary digits appears simultaneously with the occurrence of a subsequent clock instant of the last-mentioned low frequency clock pulse; and

means (9, 10, 11) for detecting a mismatch between signals from the output terminals of said N bistable means in response to said low frequency clock pulses generated by one of said counter means.

**4,947,395**  
**BUS EXECUTED SCAN TESTING METHOD AND APPARATUS**

Philip W. Bullinger, Thomas L. Langford, II, and John W. Stewart, all of Wichita, Kans., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 10, 1989, Ser. No. 308,917

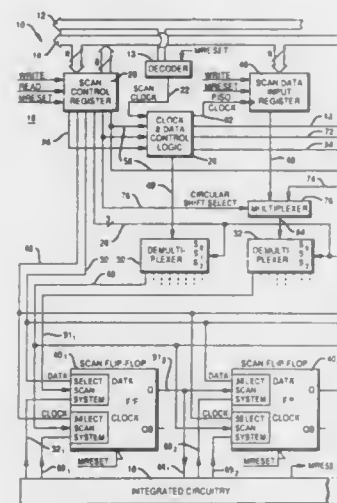
Int. Cl.<sup>5</sup> G01R 31/28

U.S. Cl. 371—22.3

12 Claims

- For use in a digital integrated circuit having an address decoder and a data bus, a test circuit comprising:
  - a control register connected to the data bus for receiving a scan path control word;
  - scan clock means for generating a scan clock signal in response to a write instruction to a preselected address decoded by the decoder;
  - scan data input register means connected to the data bus for receiving a scan data word therefrom;
  - the scan data input register having a shifted serial output responsive to said scan clock signal for outputting said scan data word as a sequence of serial bits;
  - scan path selection means connected to said scan data register means and responsive to said scan path control word for selecting a scan path communicating said sequence of serial bits to an output thereof;
  - assembling means connected to said output of said scan path selection means for assembling said sequence of serial bits into a scan test word for testing a portion of the integrated circuit;

means connected to said assembling means for scanning said scan test word into said portion of the integrated circuit; output means connected to said portion of the integrated circuit for receiving a test response to said scan test word therefrom; and



output register means connected to said output means for storing said test response and transmitting said test response to the data bus.

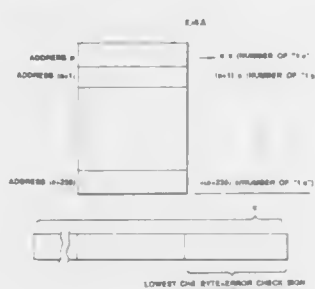
#### 4,947,396 METHOD AND SYSTEM FOR DETECTING DATA ERROR

Kimotoshi Shin, Akishima, and Yukiko Okumura, Mitaka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 19, 1988, Ser. No. 285,934  
Claims priority, application Japan, Mar. 7, 1988, 63-53095  
Int. Cl.<sup>3</sup> G06F 11/10

U.S. Cl. 371—40.1

17 Claims



1. A method for detecting a data error, comprising; a first step of calculating a first error detection sign for each of said first blocks through execution of a first calculation of dividing a data storage region of a memory into a plurality of first blocks and adding together data stored at respective addresses of each of the first blocks, and holding said calculated first error check sign;
- a second step of calculating a second error sign for each of said second blocks through execution of a second calculation of dividing the data storage region of said memory into a plurality of second blocks, applying weights that are different for different addresses to the associated numbers of "1's" or "0's" of data stored at the addresses in each of the second blocks and adding together the results for each

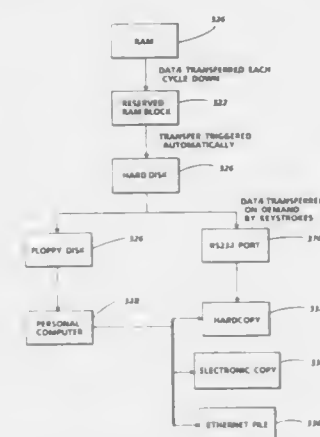
of the second blocks, and holding the calculated second error check sign; and a third step of executing said first and second calculations at a predetermined time to obtain new first and second error check signs, and executing detection of the data error through comparison of said new first error check sign with the corresponding first error check sign previously held and through comparison of said new second error check sign with the corresponding second error check sign previously held.

#### 4,947,397 JOB SCHEDULER DIAGNOSTICS

Elliot J. Sobel; Joseph L. Fillon, both of Rochester, and Douglas F. Sundquist, Victor, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 2, 1988, Ser. No. 264,772  
Int. Cl.<sup>3</sup> G01R 31/28; G06F 11/00  
U.S. Cl. 371—16.4

9 Claims



1. In an image processing apparatus having image processing means for forming an image, a controller for directing the operation of the image processing means, the controller including a random access memory, a second memory, and means for detecting controller faults, a portion of the random access memory allocated to store controller status information, said portion of the random access memory including previous apparatus cycle down state information and current job imaging process completion information, the method of saving information for diagnosing the controller comprising the steps of:

periodically loading controller status information into said portion of the first memory, detecting a pre-determined controller fault, and automatically transferring the control status information from said portion of the random access memory into the second memory in response to the detection of said pre-determined controller fault.

#### 4,947,398 LASER DEVICE WITH WAVELENGTH STABILIZATION CONTROL AND METHOD OF OPERATING THE SAME

Kenichi Yasuda; Hitoshi Wakata, and Hajime Nakatani, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 29, 1989, Ser. No. 372,834  
Claims priority, application Japan, Oct. 20, 1988, 63-262877; Jan. 13, 1989, 1-4767; Feb. 14, 1989, 1-32768  
Int. Cl.<sup>3</sup> H01S 3/10

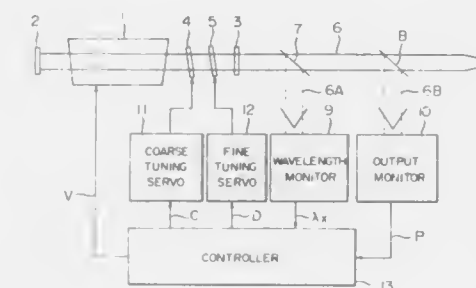
U.S. Cl. 372—29

21 Claims

1. A method of controlling a laser device having an oscillator optical cavity for generating a laser beam, and means for

controlling the wavelength and output power of the laser beam generated by the oscillator optical cavity, comprising:

- (a) initializing parameters of the laser device before a laser oscillation of the oscillator optical cavity is started afresh, said parameters including a parameter K which takes a first and a second value indicating a cold and a hot state of the laser device, respectively, wherein the value of parameter K is set at the first value indicative of the cold state of the laser device at the initializing step (a);
- (b) determining whether the laser device is in the hot or the cold state from a current value of said parameter K;
- (c) starting the laser oscillation and preparing the laser device for supplying the laser beam to an exterior optical system when the laser device is determined to be in a cold state at said device state determining step (b), wherein, before supplying the laser beam generated by the laser device to the exterior optical system, the wavelength and the output power level of the laser beam generated by the laser device are controlled to a predetermined wavelength and a predetermined target output power level, respectively, by said means for controlling;
- (d) setting said parameter K at the second value indicative of a hot state of the laser device when the wavelength and the output power level of the laser beam generated by the laser device are controlled to the predetermined wavelength and the predetermined target output power level, respectively, whereat the laser beam generated by the



laser device begins to be supplied to the exterior optical system to be utilized therein:

- (e) controlling the wavelength and the output power of the laser beam, generated and supplied by the laser device, to the predetermined wavelength and the predetermined target output power level, respectively, by said controlling means, wherein the controlling step (e) directly succeeds said state determining step (b) omitting steps (c) and (d) when the laser device is determined to be in the hot state at said state determining step (b);
- (f) determining, when the laser oscillation is stopped, a time length during which the laser oscillation is stopped;
- (g) resetting said parameter K to the first value indicative of the cold state of the laser device when the time length determined at said time determining steps (f) exceeds a predetermined time length; and
- (h) repeating said time determining step (f) and said parameter resetting step (g), to reset said parameter K to the first value indicative of the cold state of the laser device whenever the time during which the laser oscillation has been stopped exceeds said predetermined time length, wherein, when laser oscillation is restarted without a power source to the laser device being turned off, said state determining step (b) is resumed, to be succeeded directly by said controlling step if the value of the parameter K is not reset to the first value indicative of the cold state of the laser device at the repeating step (h).

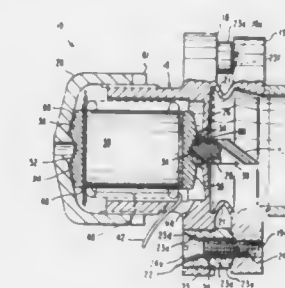
#### 4,947,399 LASER MIRROR DISPLACEMENT DEVICE

John C. Sheldon, Brea, and Dennis M. Hienyusu, Granada Hills, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 4, 1984, Ser. No. 647,001  
Int. Cl.<sup>3</sup> H01S 3/13

U.S. Cl. 372—29

14 Claims



1. A displacement device for uniformly moving an optical element positioned within a laser cavity and along an axis therein comprising: container means coupled to an end of the laser cavity and positioned exterior thereto;
- a piezoelectric stack including laminations of piezoelectric material extending generally along the axis of said stack and axially movable by an amount corresponding to a desired axial movement of said optical element;
- first and second mounting means within said container means coupled to respective ends of said stack for support thereof, said first and second mounting means being respectively closer to and further from said optical element and the cavity;
- axial displacement means associated with said second mounting means and sealing said optical element from said container means and said piezoelectric stack for enabling axial movement of said stack and transmission of the stack movement to said optical element without permitting contamination thereof; and
- excitation means for applying an electric field to said stack for varying its length.

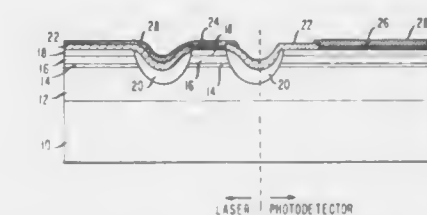
#### 4,947,400 LASER-PHOTODETECTOR ASSEMBLAGE

Nitoy K. Dutta, Colonia, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 26, 1989, Ser. No. 371,474  
Int. Cl.<sup>3</sup> H01S 3/19; H01L 31/12

U.S. Cl. 312—50

3 Claims

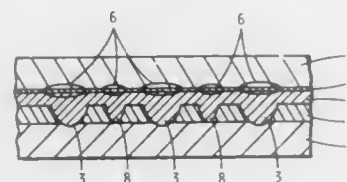


1. A semiconductor apparatus comprising a laser-oscillator area and a light-detecting area comprising a substrate, a buffer layer disposed on said substrate, an undoped active layer disposed on said buffer layer, a doped cladding layer disposed on said undoped active layer, a doped contact layer disposed on said doped cladding layer, said laser-oscillator area comprising a first channel and said light detecting area comprising a sec-



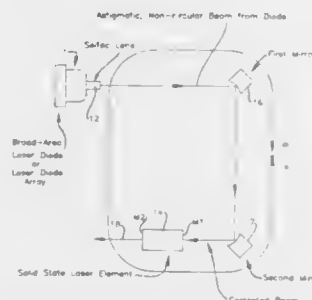
ond channel, said first and second channels being side-by-side on said substrate and having a depth which extends through said contact layer, said cladding layer, said undoped active layer and into said buffer layer, a semi-insulating doped layer disposed in each channel, a dielectric layer disposed on said contact layer and on said semi-insulating doped layers in said channels, said undoped active layer being both the light emitting region for the laser and the absorbing region for the photo-detector.

**4,947,401**  
**SEMICONDUCTOR LASER ARRAY**  
Susumu Hinata, and Yoshito Seiwa, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 31, 1989, Ser. No. 304,170  
Claims priority, application Japan, Feb. 1, 1988, 63-21622  
Int. Cl.<sup>5</sup> H01S 3/19  
U.S. Cl. 372—50 19 Claims



1. In a semiconductor laser array the combination comprising, an active semiconductor layer sandwiched between first and second semiconductor cladding layers, said first cladding layer being of a first conductivity type and said second cladding layer being of a second conductivity type different from said first conductivity type, discontinuous semiconductor current blocking layer means associated with said cladding layers for defining individual laser stripes in the active layer, and a semiconductor substrate of said first conductivity type disposed under at least part of said first cladding layer and contacting said current blocking layer, said discontinuous current blocking layer means including a plurality of portions alternating relatively widely and narrowly spaced apart to form a plurality of corresponding alternately relatively wide and relatively narrow active portions of said active layer.

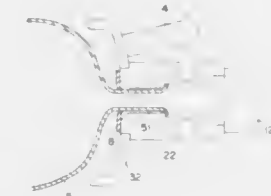
**4,947,402**  
**TWO-MIRROR SHAPING OF A NON-CIRCULAR OPTICAL PUMPING BEAM AND LASERS USING SAME**  
Thomas J. Kane, Palo Alto, Calif., assignor to Lightwave Electronics Corporation, Mountain View, Calif.  
Filed Apr. 25, 1988, Ser. No. 185,466  
Int. Cl.<sup>5</sup> H01S 3/091  
U.S. Cl. 372—70 14 Claims



1. A method of shaping a beam of light rays emanated from a horizontally elongated source, to pump a laser gain medium, comprising the steps of:  
reflecting said beam in a first reflection off a mirror having

a horizontally concave surface at a non-normal angle in the plane of incidence, and reflecting said beam in a second reflection off a mirror having a horizontally concave surface at a non-normal angle in the plane of incidence, to de-magnify the horizontal dimension of the beam relative to its vertical dimension and thereby differentially focus rays in the horizontal and vertical planes to reduce the degree of elongation of the source image to improve laser pumping efficiency and gain at said laser gain medium.

**4,947,403**  
**GAS LASER TUBE HAVING A SUPPORTED CATHODE**  
Hiroyuki Ishihara, and Makoto Kinoshita, both of Tokyo, Japan, assignors to NEC Corporation, Japan  
Filed Jun. 30, 1989, Ser. No. 374,298  
Claims priority, application Japan, Jun. 30, 1988, 63-87422[U]; Dec. 13, 1988, 63-161927[U]  
Int. Cl.<sup>5</sup> H01S 3/097, 3/03  
U.S. Cl. 372—87 14 Claims

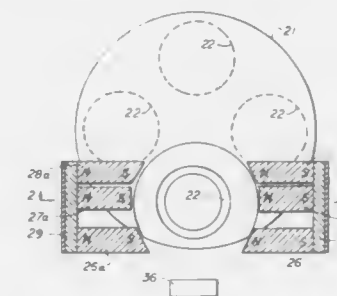


7. A gas laser tube comprising:  
a housing having first and second ends, the first end including a hollow metal member having an inner surface;  
first and second mirrors positioned at the first and second ends of the housing to form an optical resonator;  
a discharge tube positioned within the housing;  
a cathode positioned within the housing around at least a portion of the discharge tube, the cathode including a connecting portion disposed inside the hollow metal member; and  
an electrically-conductive spring mechanically connected between the cathode and the hollow metal member.

**4,947,404**  
**MAGNET STRUCTURE FOR ELECTRON-BEAM HEATED EVAPORATION SOURCE**  
Charles W. Hanks, c/o Electron Beam Technology, 3661 Willowick Dr., Ventura, Calif. 93003-1051  
Continuation-in-part of Ser. No. 121,152, Nov. 16, 1987, Pat. No. 4,835,789. This application May 22, 1989, Ser. No. 355,440  
The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> H01J 37/305  
U.S. Cl. 373—14 22 Claims

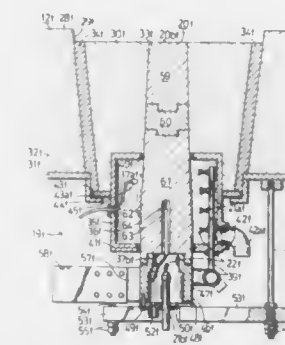
1. An evaporation source apparatus comprising a crucible containing said source having a generally horizontal surface, an electron beam source displaced from said crucible, and means for directing electrons in a path from said source to said crucible comprising  
a first plurality of discrete magnets of a first polarity positioned horizontally and spaced apart from each other on a first side of said crucible and on a first side of said path, and  
a second plurality of discrete magnets of a second polarity

opposite said first polarity positioned horizontally and spaced apart from each other on a second side of said crucible and a second side of said path opposite said first side,



all of said magnets being on the same side of said source as said crucible.

**4,947,405**  
**DC ARC FURNACE**  
Takeshi Okada, Gifu, Japan, assignor to Daidotokushijo Kabushikikaisha, Japan  
Filed May 24, 1989, Ser. No. 356,147  
Int. Cl.<sup>5</sup> H05B 7/00  
U.S. Cl. 373—72 10 Claims

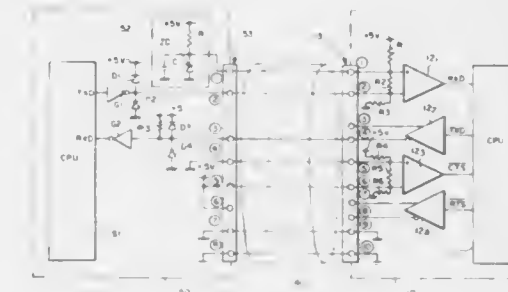


1. A DC arc furnace comprising:  
(a) a furnace having upper and bottom portions,  
(b) an upper electrode mounted in the upper portion of said furnace,  
(c) a bottom electrode in the shape of a tapered cylinder with an upper smaller diameter and a lower larger diameter mounted in said bottom portion of said furnace, said bottom electrode being extruding, at the lower portion thereof, downward through said bottom, said lower portion having plural ring rising stripes on the outer circumferential surface thereof, and  
(d) spray nozzles arranged in the surroundings of said lower portion for spraying a mist of cooling water against said lower portion.

**4,947,406**  
**COMMUNICATION INTERFACE**  
Tatuo Yokoyama, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Aug. 25, 1987, Ser. No. 89,142  
Claims priority, application Japan, Aug. 29, 1986, 61-204845  
Int. Cl.<sup>5</sup> H04L 25/10  
U.S. Cl. 375—7 4 Claims

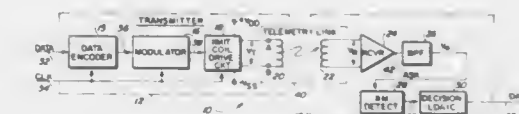
1. A communication interface comprising  
a first apparatus which receives and transmits data respectively by voltage difference between two lines,

a second apparatus which receives and transmits binary data, and  
a cable which connects said first and second apparatus and serves to transfer data therethrough between said first and second apparatus,  
said first apparatus having an interface circuit which includes  
a receiver circuit with two input terminals for receiving data addressed to said first apparatus as voltage differences at said input terminals,  
a transmitter circuit with two output terminals for transmitting data from said first apparatus as voltage differences at said output terminals, and



a first grounding terminal,  
said second apparatus including  
an output gate which is connected through said cable to one of said two input terminals of said receiver circuit and serves to output binary data signals,  
a constant-voltage circuit which is connected through said cable to the other of said two input terminals of said receiver circuit and serves to output a predetermined constant voltage,  
an input gate which is connected through said cable to one of said two output terminals of said transmitter circuit, and  
a second grounding terminal which is connected through said cable to said first grounding terminal.

**4,947,407**  
**SAMPLE-AND-HOLD DIGITAL PHASE-LOCKED LOOP FOR ASK SIGNALS**  
Sergiu Silviu, La Crescenta, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.  
Filed Aug. 8, 1989, Ser. No. 391,215  
Int. Cl.<sup>5</sup> H03D 1/00  
U.S. Cl. 375—94 26 Claims



1. In a communication channel between an implanted device and a non-implanted device wherein an amplitude shift keyed (ASK) data signal is generated in one and received in the other of said implanted and non-implanted devices, a first binary state being indicated within said generated ASK data signal by the presence of a carrier signal, and a second binary state being indicated within said generated ASK data signal by the absence of said carrier signal, said generated ASK data signal comprising a data stream of binary bits, where each binary bit comprises a prescribed number of periods of said carrier signal during which said generated ASK data signal assumes either said first or second binary state, demodulation apparatus for demodulating said received ASK data signal comprising:  
means for generating a clock signal that is phase-locked with

the carrier signal of said received ASK data signal when said carrier signal is present within said received ASK data signal, and that is phase-locked to the carrier signal that was most recently present within said received ASK data signal when said carrier signal is absent from said received ASK data signal; and

decision means synchronized with said clock signal for: (1) determining whether said received ASK data signal indicates a first binary state, and if so for how many periods of said clock signal said first binary state continues, and (2) determining whether said received ASK data signal indicates a second binary state, and if so for how many periods of said clock signal said second binary state continues; whereby said data stream of binary bits within said generated ASK data signal can be recreated from said received ASK data signal by said demodulation apparatus.

4,947,408

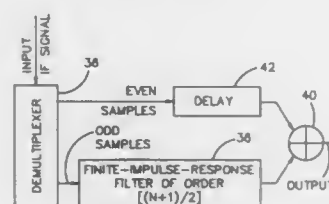
**DIGITAL CARRIER DEMODULATOR EMPLOYING COMPONENTS WORKING BEYOND NORMAL LIMITS**  
Ramin Sadr, Westlake Village, and William J. Hurd, La Canada, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 12, 1989, Ser. No. 350,813

Int. Cl.<sup>3</sup> H03D 1/06

U.S. Cl. 375-94

10 Claims



9. In a digital carrier demodulator having an input thereto comprising a digital sample stream at a frequency  $F$ , the method of employing filters therein designed to work at a frequency less than  $F$  comprising the steps of:

- demultiplexing the digital sample stream into odd and even digital sample streams each at a frequency of  $F/2$ ;
- passing the even digital sample stream through a finite-impulse-response filter having an input thereto and  $N$  taps to output data therefrom and being of order  $[(N+1)/2]$  and capable of working only at a frequency less than  $F$ ;
- passing the other of the digital sample streams through a shift register for a time of (in sampling periods)  $[(N+1)/2] + r$ , where  $r$  is a pipeline delay through the finite-impulse-response filter; and
- adding outputs of the finite-impulse-response filter and the shift register.

4,947,409

**APPARATUS FOR CORRECTING FREQUENCY IN A COHERENT RECEIVER**

Alex K. Raith, Kista; Bo G. Hedberg, Vällingby, and Jan-Erik Stiernvall, Sollentuna, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 24, 1989, Ser. No. 356,205

Int. Cl.<sup>3</sup> H04L 27/06

U.S. Cl. 375-97

5 Claims

1. An apparatus for correcting errors in a frequency of a signal which is received by a coherent receiver associated with a radio communication installation for transmitting digital information, comprising:

receiving means for receiving said frequency of said received signal;

frequency synthesizer means for generating a mixing signal corresponding to said frequency;

first calculating means for calculating a frequency error in a frequency of said mixing signal at predetermined time intervals;

first generating means coupled between said receiving means and said first calculating means for intermittently generating a first control signal to said frequency synthesizer means, said first control signal being dependent upon a previous value of said first control signal and said frequency error calculated by said first calculating means, said first control signal prompting a correction of said frequency of said mixing signal;

second generating means coupled between said first generating means and said first calculating means for generating a second control signal having a magnitude representing a phase error corresponding to a remaining part of a frequency correction calculated by said first calculating means, said remaining part not being corrected during the correction of said frequency of said mixing signal;

first accumulating means coupled to said second generating means for receiving said second control signal and for repetitively producing, at predetermined time intervals, a first accumulated sum of a value of said second control signal; and

phase shift means coupled between said first accumulating means and said first calculating means for executing a phase shift of a baseband signal formed in said receiver, said phase shift including a current value of said first accumulated sum, wherein said remaining part of said frequency correction is carried out by a frequency change in said baseband.

4,947,410

**METHOD AND APPARATUS FOR COUNTING WITH A NONVOLATILE MEMORY**

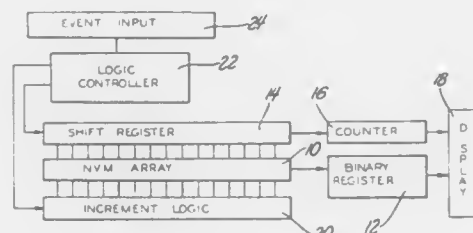
Raymond Lippmann, Ann Arbor; Michael J. Schnars, Clarkston, and Paul L. DuBois, Flint, all of Mich., assignors to General Motors Corporation, Detroit and Delco Electronics Corp., Kokoma, both of Mich.

Filed Feb. 23, 1989, Ser. No. 314,024

Int. Cl.<sup>3</sup> G01C 22/00; H03K 21/40

U.S. Cl. 377-26

1 Claim



1. The method of counting events in a nonvolatile memory comprising the steps of:

setting a first memory location to a first state for the first event,

incrementing the count at each event by setting another memory location to the same state as the first location so that the number of serial locations in each state depends upon the number of events, when a preset number of locations all attain the same state and further events occur, setting the first location to a second state and then repeating the incrementing step,

generating an output pulse when each of the preset number of locations has changed state twice,

counting the output pulses in binary fashion so that each binary count represents twice the preset number,

loading the contents of the memory locations into corresponding serial volatile memory locations,

shifting the count states through the volatile locations to produce a serial output signal,

counting the states in the signal representing recorded events,

adding the preset number to the count when the first location is in said second state to obtain the serial count total, and

adding the serial count total to the binary count.

4,947,411

**PROGRAMMABLE CLOCK FREQUENCY DIVIDER**

Taketora Shiraishi, and Yukihiko Shimazu, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

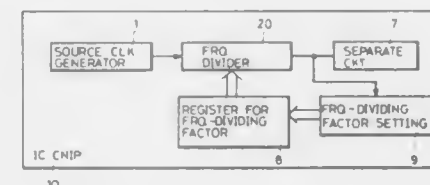
Filed Nov. 20, 1987, Ser. No. 123,553

Claims priority, application Japan, Nov. 20, 1986, 61-278330

Int. Cl.<sup>3</sup> H03K 21/00; G06F 1/04

U.S. Cl. 377-47

5 Claims



1. A programmable clock frequency divider installed in a semiconductor integrated circuit using as an operation timing signal a basic signal produced from a source clock having a fixed frequency supplied from a source clock supply, said frequency divider being used to generate said basic clock signal, said semiconductor integrated circuit being adapted to operate in accordance with a program stored in a program storing device, said programmable clock frequency divider comprising:

a frequency dividing factor register means for storing source clock frequency-dividing factor data for preparing said basic clock signal in response to a frequency dividing factor signal output from said frequency-dividing factor register means, said frequency-dividing factor register means being responsive to said program storing device so that said frequency-dividing factor data is capable of being rewritten by the program stored in said program storing device, and

frequency dividing circuit means coupled to said source clock supply and said register means for frequency-dividing said source clock signal in accordance with the frequency-dividing factor signal from said frequency-dividing factor register means so as to derive a desired basic clock signal.

4,947,412

**X-RAY DETECTOR FOR CT SCANNERS**

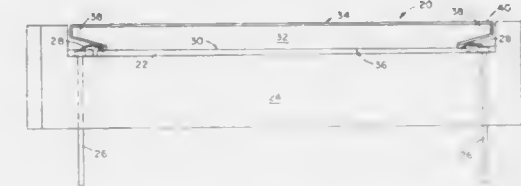
Rodney A. Mattson, Mentor, Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 260,403, Oct. 20, 1988. This application Nov. 23, 1988, Ser. No. 275,782

Int. Cl.<sup>3</sup> G01T 1/24

U.S. Cl. 378-19

10 Claims



- A medical diagnostic scanner comprising:
  - a source of ionizing radiation for projecting ionizing radiation across an examination region;
  - a plurality of ionizing radiation detectors disposed across the examination region from the radiation source, each ionizing radiation detector including:
    - a scintillation crystal having an overhanging cross portion, having a first length and a lower portion having a second length wherein the first length is longer than the second length, the scintillation crystal defining an ionizing radiation receiving face along a length of the cross portion and a second face disposed generally parallel to the ionizing radiation receiving face across the lower portion;
    - a photodiode having a photosensitive face that has at least one lead wire connected adjacent one end of the photosensitive face, the photosensitive face being coupled in an optically transmissive relationship with the second face of the scintillation crystal such that the scintillation crystal cross portion is displaced from and overhangs a portion of the diode photosensitive face adjacent the lead wire.

4,947,413

**RESOLUTION DOUBLING LITHOGRAPHY TECHNIQUE**

Tatiana E. Jewell, Bridgewater, and Donald L. White, Springfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 26, 1988, Ser. No. 224,522

Int. Cl.<sup>3</sup> G21K 5/00

U.S. Cl. 378-34

21 Claims

1. A lithography system for exposing patterns consisting of regular lines and spaces on a wafer surface, the system comprising

- an illumination source;
- a mask containing at least one pattern with a predetermined period  $p$  which is illuminated by said illumination source, a Fraunhofer diffraction pattern including a 0-order,  $\pm$  first order and a plurality of higher-order beams being created by the illumination passing through the at least one pattern, and
- an imaging system with a predetermined magnification factor  $m$  disposed between the mask and the wafer for creating the Fourier transform of said illuminated mask and directing the illumination towards the wafer surface,



characterized in that

the imaging system includes a spatial filter positioned at the Fourier transform plane of said imaging system, said spatial filter including a central obscuration capable of providing resolution doubling on the wafer surface of said predetermined mask period.

4,947,414

# BONE DENSITOMETER

Jay A. Stein, Framingham, Mass., assignor to Hologic, Inc., Waltham, Mass.

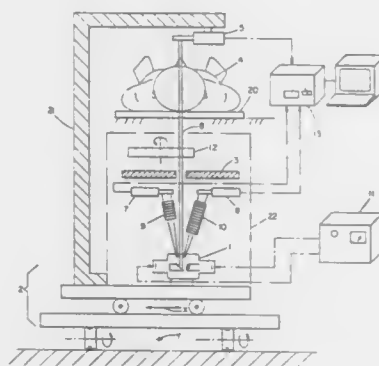
Filed Jul. 14, 1986, Ser. No. 885,098

The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G01N 23/06

U.S. Cl. 378—55

3 Claims



1. A bone densitometer for measuring density of bone in a patient who is held in fixed position, comprising an x-ray tube having a power supply means for applying alternate high and low voltage levels to said x-ray tube, a pencil beam collimator arranged to form and direct a pencil beam of x-rays through the patient and detector means, on an opposite side of the patient, aligned with the collimator to detect x-rays attenuated by the patient and produce an output signal in response to said x-rays, said x-ray tube, means for driving said pencil beam collimator and detector means in unison in an X-Y raster scan pattern relative to the patient, scanning over portions of the patient having bone and adjacent portions having only flesh, means to insert into the beam a "bone-line" calibration material at least once per scan line for a period during which the pencil beam moves not more than about one beam width, and signal processing means responsive to the output signal of said detector means to provide a calibrated representation of bone density of the patient.

4,947,415

# FLASH X-RAY APPARATUS

Carl B. Collins, Richardson, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed May 9, 1986, Ser. No. 861,491

Int. Cl.<sup>3</sup> H01J 35/22

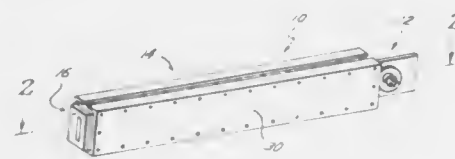
U.S. Cl. 378—122

35 Claims

17. An X-ray head comprising:

- a base of insulating material; electrode assembly mounted on the base and having
- an anode having an elongated discharge surface,
- a cathode having an elongated discharge surface,
- the anode and cathode discharge surfaces being spaced apart generally equidistant to define a discharge gap therebetween and being dimensioned and oriented so that each electrode has a similar impedance;
- a pair of foil conductors cast integral in the base and respectively connected to the anode and cathode, the impedance

of the foil conductors approximating the impedance of the electrodes; and



means defining a sealable chamber around the electrode assembly, including an aperture for emitting X-ray fluence from the discharge gap.

4,947,416

# SCANNING EQUALIZATION RADIOGRAPHY WITH STATIONARY EQUALIZATION DETECTOR

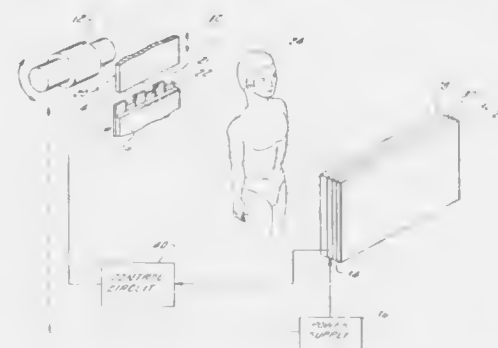
James A. McFaul, Waukesha; Gary S. Keyes, Hartland, and David L. McDaniel, Dousman, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Oct. 21, 1988, Ser. No. 260,769

Int. Cl.<sup>3</sup> G21K 5/10

U.S. Cl. 378—146

8 Claims



1. X-ray exposure equalization apparatus in a system including a source of an X-ray beam; means for selectively moving the X-ray beam in a first direction to scan the beam through a plurality of slices extending through an object; and means receiving the scanned x-ray beam to record an image of the object, wherein the apparatus comprises:

- means for selectively attenuating each of a plurality of discrete portions of said x-ray beam;
- means for detecting the radiation level of each of the discrete beam portions, said radiation level detecting means comprising means responsive to x-ray radiation and supported between the object and the image recording means so that movement of the scanned x-ray beam relative to the radiation level detecting means and the image recording means is the same;
- said radiation level detecting means comprising a first chamber wall, a second chamber wall spaced apart from said first chamber wall to define an ionization region therebetween, and a gas contained within said ionization region, said first chamber wall including a plurality of parallel first electrodes contacting said gas and extending in a second direction perpendicular to said first direction, said second chamber wall including at least one second electrode contacting said gas and extending in said first direction;
- means coupled to said plurality of parallel first electrodes and to said at least one second electrode for creating a potential difference across said ionization region; and
- control means for maintaining the radiation level of each beam portion within a specified range comprising a plural-

ity of signal summing means, each for generating an output signal representing the sum of the input signals thereto, each respective output signal from each respective signal summing means being coupled to control a corresponding one of said attenuating means, and switch means for coupling each of a selected number of said first electrodes to each of said signal summing means to controllably group said first electrodes into a plurality of active zones corresponding to said beam portions, each coupled first electrode providing an input signal, and for varying said selected number of coupled first electrodes to vary said active zones in corresponding relationship with variations in the distance between said beam source and said image recording means.

4,947,417

# ADJUSTING ARRANGEMENT FOR RADIO-DIAGNOSTIC EQUIPMENT

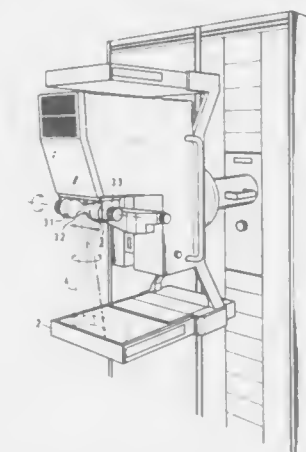
Garry Hartwell, Troy, Va., assignor to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Filed Dec. 16, 1988, Ser. No. 285,485

Int. Cl.<sup>3</sup> G21K 1/02

U.S. Cl. 378—147

6 Claims



1. Radio diagnostic equipment for radiographic mammal diagnostics having an adjusting arrangement arranged in the ray path of an X-ray source which has an adjustable element, one side of the adjustable element being arranged in a direction towards the effective ray beam for adjusting the effective ray beam emitted by the X-ray source, wherein:

- said adjustable element is essentially cylinder-shaped and rotatably supported around its longitudinal axis with an arc-shaped cut-out extending from said one side unsymmetrically with respect to its axis of rotation, so that the effective ray beam is able to be adjusted so as to have an arc-shape which is similar to an arc-shaped examination object.

4,947,418

# EMERGENCY TRAUMA BOARD

Stephen J. Barr, and Melody T. Barr, both of Rte. 1, Box 98, both of Troy, Ill. 62294

Filed Feb. 21, 1989, Ser. No. 313,066

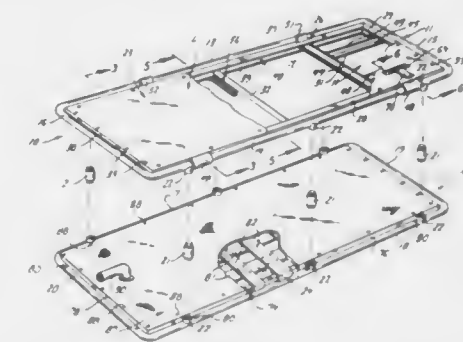
Int. Cl.<sup>3</sup> G03B 1/42, 1/44; A61G 3/02, 1/01

U.S. Cl. 378—177

31 Claims

1. An emergency trauma board for handling trauma victims during emergency transfer, diagnosis and treatment, comprising a first light transparent panel having a first patient support surface and means for positioning X-ray plates on the underside thereof, a first main frame for said first panel, a second fluid permeable panel having a second patient support surface, a second main frame for said second panel, and means intercon-

necting said first and second frames in substantially parallel spaced relationship with said patient support surfaces normally



being in horizontal extending and spaced position relative to each other.

4,947,419

# CONTAINER FOR PHOTOSENSITIVE MATERIAL

Manfred Schmidt, Kirchheim, and Reimund Kluge, Unterhaching, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

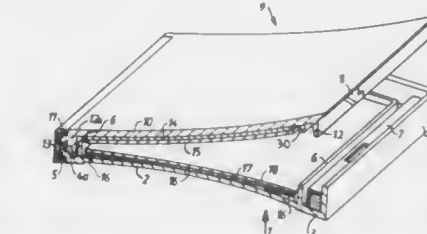
Filed Aug. 10, 1983, Ser. No. 522,115

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1982, 3230287

Int. Cl.<sup>3</sup> G03B 42/04

U.S. Cl. 378—187

22 Claims



1. A cassette for photosensitive material, particularly x-ray film, comprising:

- (a) a pair of cooperating members movable between an open position, and a closed position in which said members define a closed compartment for photosensitive material;
- (b) a pair of cooperating magnetic elements arranged to flank photosensitive material in said compartment in said closed position; and
- (c) a plurality of discrete connecting elements connecting one of said magnetic elements with one of said members in such a manner as to permit relative movement of said one magnetic element and said one member, each connecting element including a first connecting portion which engages said one magnetic element but not said one member, and each connecting element further including a second connecting portion which engages said one member but not said one magnetic element, each connecting element also including an intermediate connecting portion connecting the respective first and second portions with one another, and each of said intermediate portions being constituted by a flexible foil having a first edge which faces one side of said compartment, and a second edge which faces the opposite side of said compartment and is spaced from the respective first edge, the first portion of each connecting element being located in the region of the first edge of the respective intermediate portion, and the second portion of each connecting element being located in the region of the second edge of the respective interme-

diate portion so that the first and second portions of each connecting element are offset from one another, each connecting element being secured to said one magnetic element exclusively at the respective first portion, and to said one member exclusively at the respective second portion.

4,947,420

## COMMUNICATION SYSTEM

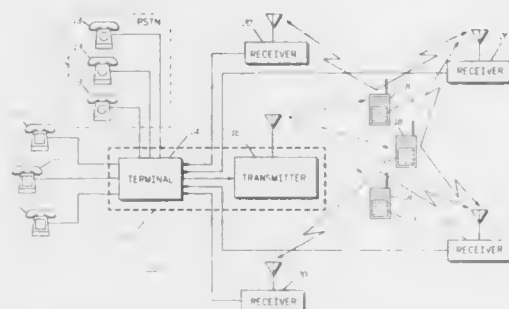
John I. Stahl, Coral Springs; David J. Michalak, Plantation, and Klaus Knapp, Coral Springs, all of, assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 28, 1989, Ser. No. 345,056

Int. Cl.<sup>5</sup> H04Q 7/00

U.S. Cl. 379-57

6 Claims



1. A communication system, comprising:
  - at least one selective call radio having an address,
  - at least one communicating means for use by untrained users to initiate a call, said communicating means being assigned to at least one selective call radio, wherein said assigned selective call radio may be addressed when said call is initiated,
  - a central switching unit coupled to said communicating means including:
    - means for identifying said communicating means when said call is initiated,
    - means for addressing the assigned selective call radio upon initiation of said call,
    - means for establishing communication between said communicating means and said assigned selective call radio.

4,947,421

## CALL WAITING ARRANGEMENT PROVIDING OPTIONS TO BOTH A SUBSEQUENT CALLING PARTY AND TO THE CALLED PARTY

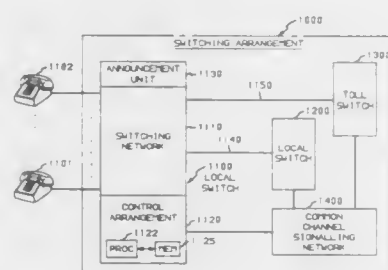
Liane C. Toy, and Wing N. Toy, both of Glen Ellyn, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 23, 1987, Ser. No. 137,040

Int. Cl.<sup>5</sup> H04M 3/50

U.S. Cl. 379-67

11 Claims



1. A method of processing a call from a calling communication station to a called communication station comprising in response to said call, determining whether call waiting is

assigned to said called station and said called station is busy, in response to a determination that call waiting is assigned to said called station and said called station is busy, signaling to prompt a caller for a request to interrupt an ongoing call at said called station and to prompt a caller for an auto-callback request, in response to receipt of an interrupt request from said calling station, transmitting an interrupt signal to said called station, after said transmitting, establishing a connection between said calling and called stations only in response to receipt of a signal from said called station, and in response to receipt of an auto-callback request from said calling station and to a return to an idle status of said called station, initiating a new call between said called and calling stations.

4,947,422

## PERSONALIZED TELEPHONE FOR AUTOMATIC ACCESS TO OPERATOR SERVICES

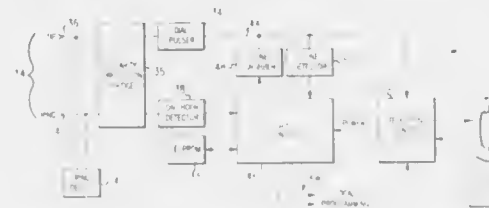
Benjamin A. Smith, Celeste, and Steven W. Burnett, Richardson, both of Tex., assignors to Digital Telecommunications Systems, Inc., Dallas, Tex.

Continuation of Ser. No. 164,505, Mar. 7, 1988, abandoned. This application Oct. 26, 1989, Ser. No. 427,972

Int. Cl.<sup>5</sup> H04M 1/274

U.S. Cl. 379-200

52 Claims



1. A telephone set, comprising:
  - an interface for connecting said telephone set to a telephone line;
  - a handset for converting electrical signals to audio signals and for converting audio signals to electrical signals for transmission over said telephone line;
  - a detector for detecting predetermined dialed information which universally defines a toll call;
  - a receiver for receiving dialed digits representative of a destination defined as a primary destination, and for storing said primary destination digits;
  - a processor responsive to said detection of said predetermined dialed information for outpulsing over said telephone line a digit sequence representative of an alternate destination; and
  - said processor causing an outpulsing of said stored digits of said primary destination over said telephone line for placing a user of said telephone set in communication with a called party associated with said stored digits.

4,947,423

## COMMUNICATION APPARATUS WITH FACILITIES FOR CHANGING TO A PULSE OR DIAL MODE

Tsunehiro Watanabe, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1988, Ser. No. 291,777

Claims priority, application Japan, Jan. 11, 1988, 63-4311

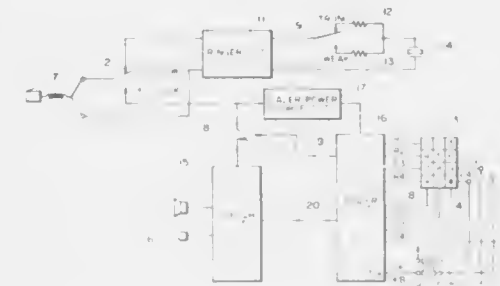
Int. Cl.<sup>5</sup> H04M 1/31, 1/50

U.S. Cl. 379-353

7 Claims

1. A communication apparatus comprising:
  - dialing means having a first mode for dialing a pulse dial signal and a second mode for sending a tone dial signal;

switching means for changing over a mode of said dialing means between said first and second modes; key input means; and control means for temporarily changing over the first mode



4,947,424

## SHUTTER MECHANISM FOR TELEPHONE DIRECTORY

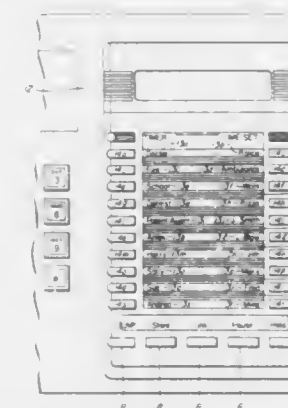
Gad J. Shaanan, Westmount; George V. Lenaerts, London; Ian D. Buchanan, London, and Anthony M. Smith, London, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 19, 1989, Ser. No. 424,032

Int. Cl.<sup>5</sup> H04M 1/274

U.S. Cl. 379-355

8 Claims



1. A shutter mechanism for a telephone directory that stores telephone numbers to be dialed by the push of a single button, said directory comprising a plurality of such buttons, each button of said plurality of buttons having a physical space associated therewith for entry of a descriptive label, said shutter mechanism comprising:
  - a first, approximately planar, surface for providing said physical space for said descriptive labels;
  - a second, approximately planar, surface overlying said first surface, in a plane approximately parallel to said first surface and spaced apart therefrom;
  - said second surface being divided into a plurality of alternating opaque and transparent sections such that when said first surface is in a first position, relative to said second surface, said physical spaces are aligned with the transparent sections of said second surface, and when said first surface is in a second position, relative to said second surface, said physical spaces are aligned with the opaque

sections of said second surface, and the contents of said physical spaces are not visible.

4,947,425

## ECHO MEASUREMENT ARRANGEMENT

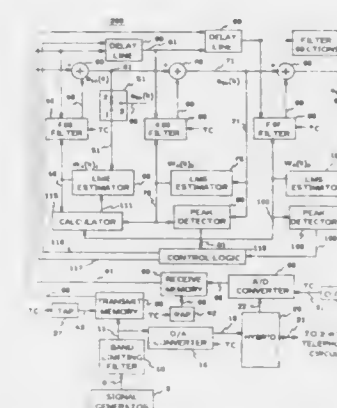
Fredrick Grizmal, Lincroft; Barnet M. Schmidt, Oradell, and George Sultana, Oakhurst, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 27, 1989, Ser. No. 428,081

Int. Cl.<sup>5</sup> H04B 3/23

U.S. Cl. 379-410

10 Claims



4. A filter circuit for ranging and converging on each of a plurality of echoes occurring at respective locations along a communications line comprising

means for storing in a memory samples of a signal that is being transmitted to said communications line and samples of a signal that is being simultaneously received from said communications line, and

a plurality of filtering means each having a respective group of filter coefficients, each of said filtering means being arranged to generate a filtered signal by sequentially and iteratively filtering respective overlapping sequences of said transmitted signal samples supplied to its input, a first one of said filtering means receiving at another input a respective sequence of said received signal samples and other ones of said filtering means each receiving at its other input an error signal outputted by a respective preceding one of said filtering means, said first one of said filtering means generating its error signal as a function of the value of its respective filtered signal and a respective one of said received signal samples and each of said other ones of said filtering means generating its error signal as a function of the value of its respective filtered signal and the value of the error signal that it receives at its other input, each of said filtering means converging on a respective one of said echoes by changing the values of its respective coefficients as a function of the current value of the error signal that it generates and freezing said values when the value of said error signal that it generates reaches a minimum.



4,947,426

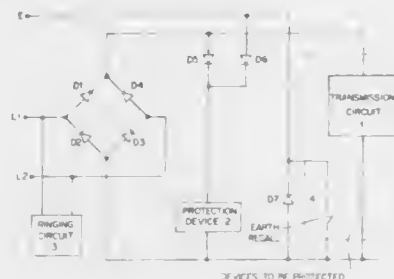
## TELEPHONE PROTECTION CIRCUIT

Frederick D. Montano, Chatswood, Australia, assignor to Standard Telephone and Cables Pty. Ltd., Alexandria, Australia  
PCT No. PCT/AU87/00097, § 371 Date Oct. 19, 1988, § 102(e)  
Date Oct. 19, 1988, PCT Pub. No. WO87/06787, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 13, 1987, Ser. No. 294,554  
Claims priority, application Australia, Apr. 30, 1986, PH 5681  
Int. Cl. H04M 1/74

U.S. Cl. 379-412

8 Claims



1. A protection circuit for telephone equipment including a transmission circuit connected to a telephone line having an earth wire and a subscriber line comprising first and second wires, the protection circuit comprising

- a polarity guard having a pair of input terminals connected to the subscriber line and a pair of output terminals connected to the transmission circuit,
- a first diode forward biased with respect to a first said output terminal,
- a protection device in parallel with the transmission circuit and in series with the first diode,
- a second diode connecting the earth wire to a first terminal of the protection device adjacent the first diode to pass, via a first surge path which includes the protection device but which does not include the first diode, surges of a first polarity between the earth wire and the polarity guard, and
- a third diode connecting the earth wire to a second terminal of the protection device remote from the first diode to pass, via a second surge path between the earth wire and the polarity guard which includes both the protection device and the first diode, surges of the opposite polarity from those surges passed by the second diode.

4,947,427

## PROTECTION ARRANGEMENT FOR A TELEPHONE SUBSCRIBER LINE INTERFACE CIRCUIT

Reinhard W. Rosch, Richmond, and Stanley D. Rosenbaum, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

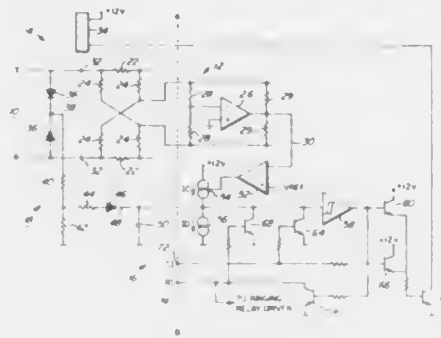
Continuation of Ser. No. 60,190, Jun. 10, 1987, abandoned. This application Oct. 12, 1989, Ser. No. 423,501  
Int. Cl. H02H 3/20; H04M 7/00

U.S. Cl. 379-412

17 Claims

1. A protection arrangement for a telephone subscriber line interface circuit connected via feed resistors to a telephone subscriber line, comprising:
- switching means for coupling the feed resistors to the line;
  - voltage sensing means;
  - current sensing means;
  - means for coupling the voltage sensing means to the line and for coupling the current sensing means to the feed resistors, whereby the voltage sensing means is responsive to voltage on the line and the current sensing means is responsive, when the switching means is closed, to current on the line; and
  - control means for closing the switching means in normal operation and for opening the switching means in re-

sponse to a voltage on the line determined by the voltage sensing means to exceed a predetermined threshold and in



response to a current on the line determined by the current sensing means to exceed a predetermined threshold.

4,947,428

## PROCESS FOR THE BROADCASTING AND RECEPTION OF ACCESS TITLE CONTROL MESSAGES

Louis Guillou, Bourgbarré; Joseph Blineau, Rennes; Françoise Coutrot, and Vincent Lenoir, both of Seigne, all of France, assignors to Etat Français, représenté par le Ministère des Postes, des Télécommunications et de l'Espace (C.N.E.T.), Issy les Moulineaux and Telediffusion de France S.A., Paris, both of, France

Filed May 12, 1989, Ser. No. 350,793

Claims priority, application France, May 27, 1988, 88 07087  
Int. Cl. H04K 1/00

U.S. Cl. 380-20

12 Claims

1. Process for the broadcasting of access title control messages conditional on broadcast programmes, said titles being held by users forming an audience, a single digital address being allocated to each user, the broadcast programmes being garbled by a service key, said key being held by all users, the access to such a programme being linked with a use status of the service key, said process being characterized in that, for writing an access right in certain titles, it comprises the following operations:

- (a) there is a listing of the users of the audience which have subscribed to the same access right,
- (b) a definition is made of a group including the users having subscribed to said same access right, said user group having the feature of an address with a common part, called a shared address, the address of each user thus being constituted by the shared address belonging to all users of the group and a single subaddress defining this user within the group,
- (c) a general use control message (GCM) is broadcast and is more particularly constituted by:
  - a link information,
  - a first digital field containing an information common to all the users of the audience, said information identify-

4,947,430

## UNDENIABLE SIGNATURE SYSTEMS

David Chaum, 14652 Satton St., Sherman Oaks, Calif. 91403

Filed Nov. 23, 1987, Ser. No. 123,703

Int. Cl. H04L 9/02

U.S. Cl. 380-25

48 Claims



- ing the scheduler service and characterizing the access right to be validated,
- a second field defining a group confirmation, all the data of said two fields being broadcast in uncoded form,
- (d) following said general use control message (GCM) is broadcast at least one shared addressing control message (SACM), which comprises:
  - the shared address of the group of users is specified by the confirmation information contained in the preceding general use control message, said address being transmitted in uncoded form,
  - a link information,
  - a field defining the list of users belonging to the group aimed at for which an access right has to be written, said information being transmitted in uncoded form,
- (e) a field containing a common value of the access right is introduced into any one of the messages (GCM or SACM),
- (f) a redundancy is formed, which guarantees the authenticity of the message,
- (g) a group of users has thus been intrinsically defined by the actual access title control message, as a result of the confirmation information of the general use message and the shared address of the shared addressing control message which follows, said group being modifiable as a function of each common access right to be written through the modification of the confirmation information and the shared address.

4,947,429

## PAY PER VIEW TELEVISION SIGNALING METHOD

Charles B. Bestler, Chicago; Richard W. Clitta, Oak Park, and Paul M. Gosc, Buffalo Grove, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

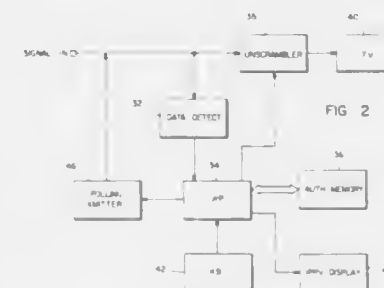
Continuation of Ser. No. 126,452, Nov. 30, 1987, abandoned.

This application Nov. 22, 1989, Ser. No. 442,474

Int. Cl. H04L 9/02

U.S. Cl. 380-20

12 Claims



1. A method of operating a pay per view television system including a head end and a plurality of subscriber terminals, each having unscrambling means operable under control of memory means having a plurality of memory locations for storing program authorization data received from the head end for permitting operation of the unscrambling means based upon a program tag in a transmitted data signal, comprising the steps of:

- transmitting, from said head end, a data signal having a program tag and a pay per view tag identifying a first and a second memory location, respectively, in said subscriber terminals;
- enabling subscribers to directly input authorization data to said second memory location for permitting viewing a television signal in response to said program tag identifying said second memory location independent of intervention by said head end; and
- collecting information from the subscriber terminals to determine the status of the authorization data at said second memory locations.

4,947,431

## HELD MUSIC HISTORY CIRCUIT

Richard S. Stroud; Fred J. Anderson, both of Kokomo; Matthew C. Repogle, Noblesville, all of Ind.; Douglas E. White, Urbana, Ohio; Jeffrey J. Marrah, and Gregory J. Manlove, both of Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Sep. 13, 1989, Ser. No. 406,900

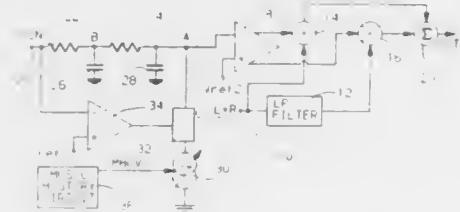
Int. Cl. H04H 5/00

U.S. Cl. 381-13

5 Claims

1. An audio processing circuit for an FM stereo receiver comprising rolloff circuit means for reducing the bandwidth of an audio signal as a function of an input control voltage which is proportional to the amount of ultra sonic noise in the FM stereo signal, means for varying the attack time of said rolloff

circuit as a function of the treble content in said audio signal, whereby the bandwidth of the audio signal is reduced in the



presence of noise unless the audio signal contains sufficient treble content to mask the noise.

4,947,432

## PROGRAMMABLE HEARING AID

Jan T. pholm, Holte, Denmark, assignor to Topholm & Westermann ApS, Vaerloese, Denmark

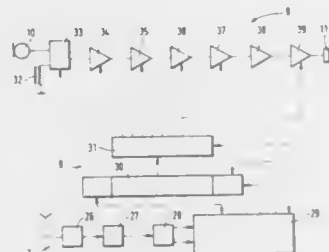
Filed Jan. 22, 1987, Ser. No. 5,976

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1986, 3603204; Dec. 16, 1986, 3642828

Int. Cl.<sup>5</sup> H04R 25/00

U.S. Cl. 381—68.2

15 Claims



1. A remote controlled programmable hearing aid system of the type comprising an amplifier and signal processing section with remotely controllable transfer characteristics, wherein the transfer characteristics at any given time are determined by a group of parameters, said system further comprising user-operable external control unit and a transmitter for wireless transmission of control signals, a hearing aid and a receiver located in said hearing aid for receiving and demodulating said control signals, characterized in that:

said external control unit comprises: a memory (20) for storing a plurality of groups of parameters each for determining a different transfer characteristic of the hearing aid; a control panel with user-operable entry means (2) for randomly accessing and recalling a stored group of parameters from said memory; and a transmitter (4) for transmitting said recalled parameters as control signals; and

said hearing aid contains a hearing aid control unit (8) responsive to demodulated control signals from said receiver for controlling the transfer characteristics of said signal processing section.

# 4,947,433 CIRCUIT FOR USE IN PROGRAMMABLE HEARING AIDS

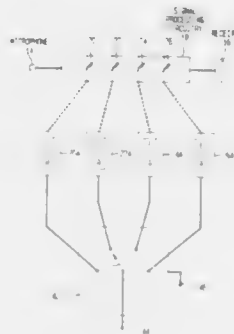
Anton M. Gebert, Union, N.J., assignor to Siemens Hearing Instruments, Inc., Piscataway, N.J.

Filed Mar. 29, 1989, Ser. No. 330,339

Int. Cl.<sup>5</sup> H04R 25/00

U.S. Cl. 381—68

5 Claims



1. A circuit for use in a programmable hearing aid, comprising:

a microphone;  
a receiver;  
signal processing circuitry operatively connected to the microphone and the receiver;  
a plurality of variable electrical elements operatively connected to said circuitry and varying electrical characteristics thereof;

a plurality of means for storing information, each of said storing means being a ring counter which is operatively connected to at least a corresponding one of the variable electrical elements,

having a plurality of states which correspond to electrical values of said at least one corresponding element, and causing said at least one corresponding element to assume said values when in states corresponding thereto,

said storing means changing between states upon receipt of digital pulses;

a first input adapted to receive said digital pulses;  
a multiplexer comprising a ring counter which is operatively connected to said first input and to all of the storing means and selectively directing digital pulses at said first input to individual ones of the storing means; and  
a second input which is connected to said multiplexer.

4,947,434

## ELECTRONIC ATTENUATOR

Hiroyuki Ito, Sakai, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 28, 1989, Ser. No. 329,637

Claims priority, application Japan, Mar. 28, 1988, 63-074195

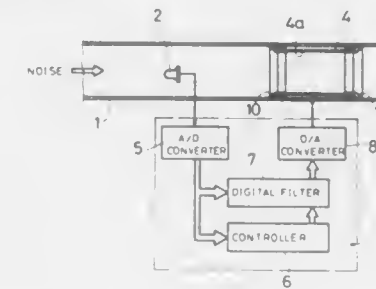
Int. Cl.<sup>5</sup> G10K 11/16

U.S. Cl. 381—71

3 Claims

1. An electronic attenuator comprising:  
a microphone which is installed in a noise transmittable space and which detects a noise and outputs a noise signal corresponding thereto;  
a control circuit which generates a reversal sound signal having a reverse phase and same sound pressure in relation to the noise on the basis of the noise signal output by said microphone; and  
a speaker which receives said reversal sound signal from said

control circuit and emits a reversal sound to said noise transmittable space;



said speaker being disposed so as to surround said noise transmittable space and said speaker having a sheet-like shape with a driver made of a piezoelectric material.

4,947,435

# METHOD OF TRANSFER FUNCTION GENERATION AND ACTIVE NOISE CANCELLATION IN A VIBRATING SYSTEM

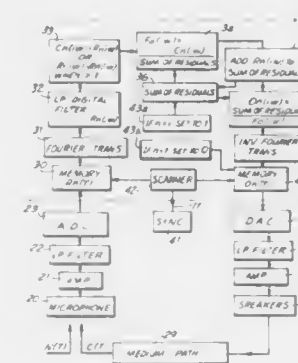
Brian A. Taylor, Felixstowe, England

Filed Mar. 25, 1988, Ser. No. 173,677

Int. Cl.<sup>5</sup> G10K 11/16

U.S. Cl. 381—71

10 Claims



1. A method for the active cancellation of an incident vibration field  $N(i\omega)$  comprising the steps of:

- superposing a cancelling vibration field  $C(i\omega)$  on the incident field to create a residual vibration field  $R(i\omega)$ ;
- operating on the residual field with a transfer function to obtain an updated cancelling field, the transfer function being divided by a reference point into an upstream part  $F(i\omega)$  and a downstream part  $F_o(i\omega)$ ; and
- periodically updating the downstream part  $F_o(i\omega)$  of the transfer function by multiplying the last obtained value  $F_o(i\omega)$  by a factor which is the ratio of a computational value of the last cancelling field  $C_n(i\omega)$  and a computational value for the sum of previous residual fields  $R(i\omega)$ .

4,947,436

# SPEAKER VERIFICATION USING MEMORY ADDRESS

Alan J. Greaves, Ipswich, and Paul C. Millar, Felixstowe, both of Great Britain, assignors to British Telecommunications public limited company, London, England

PCT No. PCT/GB87/00895, § 371 Date Oct. 7, 1988, § 102(e)

Date Oct. 7, 1988, PCT Pub. No. WO88/04772, PCT Pub. Date Jan. 30, 1988

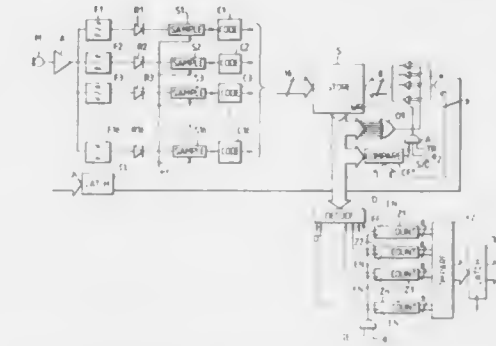
PCT Filed Dec. 9, 1987, Ser. No. 235,896

Claims priority, application United Kingdom, Dec. 17, 1986, 8630118

Int. Cl.<sup>5</sup> G10L 5/06

U.S. Cl. 381—42

18 Claims



1. An apparatus for speaker identification comprising: means for deriving from each of successive simple periods of speech input thereto a digital word representing the frequency spectrum thereof;

a store for storing codewords indicating for each digital word the relative probability of the frequency spectrum corresponding to that word occurring in the speech of known speakers which the apparatus has been trained to identify, the digital word output of the deriving means being connected to the address inputs of the store; and control means responsive, during input of speech by a speaker to be identified, to codewords read out from the store to output, in accordance with a predetermined criterion, data indicating which, if any, of the known speakers is deemed to have been identified.

4,947,437

## STEREO MICROPHONE

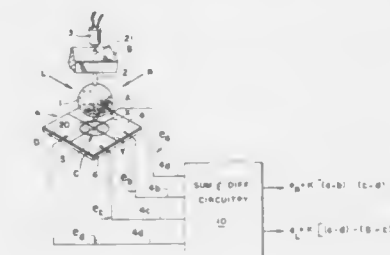
William H. Firebaugh, 655 Baker St., AA111, Costa Mesa, Calif. 92626

Filed Aug. 30, 1989, Ser. No. 400,783

Int. Cl.<sup>5</sup> H04R 5/027

U.S. Cl. 381—26

11 Claims



1. A microphone comprising a ball-like sound-responsive element;  
a suspension attached to said element and constraining it to displacement generally in a plane,



sound waves from an "R" direction in said plane displacing said element therealong in an "R" displacement, and waves from an "L" direction about orthogonal to said "R" direction displacing it therealong in an "L" displacement; translating means to sense said displacements and providing signals containing information distinguishing between displacements in said "R" and "L" directions; and signal processing means having input connections to said translating means and output connections delivering two separate output signals analogous respectively to said "R" and "L" displacements.

4,947,438

# PROCESS FOR THE RECOGNITION OF A CONTINUOUS FLOW OF SPOKEN WORDS

Anedore Paeseler, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

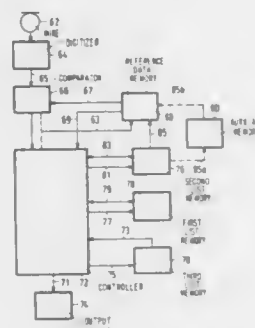
Filed Jul. 11, 1988, Ser. No. 217,535

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723078

Int. Cl.<sup>5</sup> G10L 5/00

U.S. Cl. 381-43

13 Claims



1. A process for the recognition of speech signal derived from a continuous flow of spoken words, which speech signal comprises a temporal sequence of speech values, each of which values specifies a section of the speech signal; comprising:
  - comparing the speech values with predetermined stored reference values, a group of which reference values represents one word of a predetermined vocabulary for forming an initial evaluation value;
  - summing the comparison results over various sequences of combinations of reference values and speech values per sequence whose order is permissible in accordance with a predetermined stored first list containing, for predetermined syntactic categories, at least one assignment per category to a combination of further syntactic categories and/or words for forming a cumulative evaluation value; generating a second list and a third list the second list including references to the reference values of all those words which are compared with the respective next speech value as well as a sequence number per word, and the third list including, for each speech value which has been compared with the last reference value of at least one word, a plurality of entries, each entry including a current sequence number and:
    - (a) a reference to a syntactic category of the first list,
    - (b) a first specification for a sequence of compared words and/or syntactic categories which are assigned to sequences of already compared speech values,
    - (c) a second specification for a sequence of words and/or syntactic categories which can be assigned to subsequent speech values on the basis of the first list,
    - (d) a further sequence number assigned to the respective entry,
    - (e) a first cumulative evaluation value,
    - (f) a second initial evaluation value and
    - (g) a sequence of compared words;
  - determining a new sequence number at least after every

comparison of a new speech value with the last reference value of at least one word, and after each such comparison, searching through the group of entries of the third list associated with the sequence number stored in the second list at this word for such entries in which the sequence contained in the second specification begins with the compared word, and deriving a new entry for each such entry present, for the new group of the third list associated with the new sequence number;

making a first further entry in the new group for each new entry in which the abbreviated sequence contained in the second specification begins with a syntactic category, for which at least one assignment is present in the first list, and, deriving a second further entry for the new group for each of the new and first further entries of the new group for which the second specification contains an empty sequence;

repeating the steps of deriving and making the first and second further entries alternately until, after at least one first further entry, no second further entry occurs; entering a reference to the reference data of the first word of each entry of the new group in which the second sequence begins with a word to be recognized; comparing the next speech value with the reference values of all words contained in the second list; repeating the process steps until the last speech value of the speech signal to be recognized has been processed; checking the last group of the third list for all entries containing: a reference to the syntactic initial category, an empty sequence, and a sequence number; and reading out the sequence of compared words from those entries having the smallest first evaluation value.

4,947,439

# HEARING AID COMPRISING A CONTACT SPRING ARRANGEMENT

Gerhard Buettner, Gossenseebach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

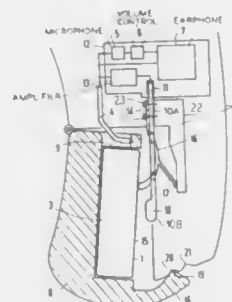
Filed Mar. 6, 1989, Ser. No. 318,968

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1988, 8803428

Int. Cl.<sup>5</sup> H04R 25/00

U.S. Cl. 381-69.2

20 Claims



1. A hearing aid comprising:
  - (a) a housing;
  - (b) a battery compartment member pivotally attached to said housing, said compartment member having a recess adapted for receiving therein a battery, said compartment being adapted to pivot between closed and not closed positions;
  - (c) electrical hearing aid components positioned within said housing;
  - (d) a first contact positioned within said housing and adapted to contact a casing of said battery when said compartment is pivoted to its closed position;
  - (e) a second contact positioned within said housing and adapted to contact a casing of said battery when said compartment is pivoted to its closed position;

adapted to contact a face of said battery in substantially non-wiping relation when said compartment is pivoted to its closed position; and

- (f) an arm positioned within said housing, said arm being biased to extend out from said housing so as to prevent said contacting between said battery and said second contact whenever said battery compartment is in a position other than its closed position.

4,947,440

# SHAPING OF AUTOMATIC AUDIO CROSSFADE

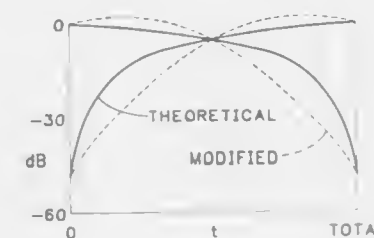
Robert Bateman, Nevada City, and Donald R. Christensen, Grass Valley, both of Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Oct. 27, 1988, Ser. No. 263,293

Int. Cl.<sup>5</sup> H03G 3/00

U.S. Cl. 381-107

5 Claims



1. A method of automatic audio crossfading between a first audio source and a second audio source over a specified time interval comprising the steps of:

computing a gain change value for each audio source as a function of a fractional part of the specified time interval that has been completed and of a difference in gain between the audio sources for a current time increment within the specified time interval using a modified theoretical crossfade function that has a gain level versus time slope at a limit of audibility that avoids apparent snap-on or snap-off of the audio source having a lower gain level at the beginning and end of the specified time interval; adding the respective gain change values to current gains of the respective audio sources to produce new current gain values; applying the new current gain values to the respective audio sources; mixing the respective audio sources to produce an output audio mix; and repeating the computing, adding, applying and mixing steps for subsequent current time increments until the specified time interval is completed.

4,947,441

# BILL DISCRIMINATING APPARATUS

Kazuhiro Hara, Chiba, and Kiyosi Fujii, Tokyo, both of Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed May 15, 1989, Ser. No. 351,522

Claims priority, application Japan, May 20, 1988, 63-123362; May 8, 1989, 1-114677

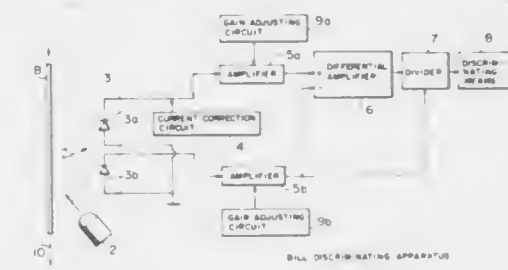
Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382-7

8 Claims

1. A bill discriminating apparatus having at least two color detecting means for photoelectrically detecting light components contained in light transmitted through or reflected by bills to be discriminated and having different wavelengths, said bill discriminating apparatus comprising current correction means for correcting current output from at least one of said at least two color detecting means, at least two amplifying means for amplifying the current output from said at least one of said at least two color detecting means and current output from said other of said at least two color detecting means, gain adjusting means capable of adjusting gain of at least one of said at least

two amplifying means, differential amplifying means for differentially amplifying signals output from said at least two ampli-



fying means and discriminating means for discriminating denominations and/or genuineness of the bills based upon signals output from said differential amplifying means.

4,947,442

# METHOD AND APPARATUS FOR MATCHING FINGERPRINTS

Kazuo Tanaka, and Naoya Ohta, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

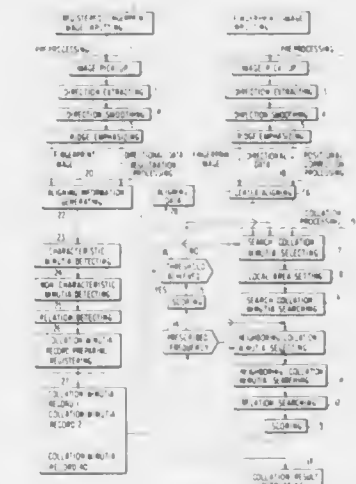
Filed May 24, 1989, Ser. No. 356,047

Claims priority, application Japan, May 24, 1988, 63-127826; May 24, 1988, 63-127827

Int. Cl.<sup>5</sup> G06K 9/62

U.S. Cl. 382-5

4 Claims



1. A method for the matching of input fingerprints with stored records of identified fingerprints, said records comprising collation minutiae of both characteristic and non-characteristic types, comprising:
  - an inputting step to enter an input fingerprint image comprising collation minutiae; and
  - a collating step to check collation minutiae of said input fingerprint image with said collation minutiae already registered in a list of collation minutiae records, said collating step comprising a search collation minutiae selecting step for selecting specific collation minutiae records in succession by referring to said list of collation minutiae records, a local area setting step for setting a position on said input fingerprint image corresponding to a collation position, a searching step for searching collation minutiae, and a detecting step for detecting both characteristic and non-characteristic minutiae.

# 4,947,443 METHOD AND APPARATUS FOR VERIFYING IDENTITY

Brendan D. Costello, "Applan" Willisham Road, Barking Tye, Offton, Suffolk, England (IP6 8HY)  
PCT No. PCT/GB87/00300, § 371 Date Oct. 28, 1988, § 102(e)  
Date Oct. 28, 1988, PCT Pub. No. WO87/07058, PCT Pub.  
Date Nov. 19, 1987

PCT Filed May 7, 1987, Ser. No. 264,964  
Claims priority, application United Kingdom, May 7, 1986,  
86/11074; May 7, 1986, 86/11075

Int. Cl.<sup>5</sup> G06K 9/00  
U.S. Cl. 382-5

7 Claims

CHARACTERISTIC FEATURE	BINARY CODING
A1	0010
A2	0100
A3	0101
A4	0001
A5	0011
A6	0110

7. A method for verifying the identity of a person at a locus to enable an operation to be carried out when that identity has been verified, which method comprises scanning a finger of the person at the locus to provide machine readable identification of the type, location and orientation of the characteristics of the fingerprint of that person and of the ridge counts between each and every one of at least four of the characteristics located during said scanning; comparing that identification with a machine readable record purporting to be that of that person's fingerprint which has been obtained before hand and which is presented by that person to the locus concurrently with his finger so that the existence of the same coincident sequences between at least four of the characteristics in the said identification and in the record can be established; and permitting the operation to occur when such a coincident sequence has been established.

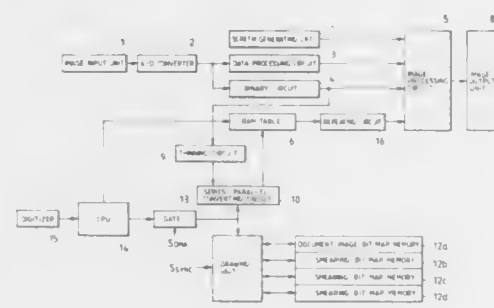
# 4,947,444 IMAGE PROCESSING METHOD AND APPARATUS

Daiji Nagaoka, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,311  
Claims priority, application Japan, Dec. 23, 1987, 62-328060

Int. Cl.<sup>5</sup> G06K 9/00  
U.S. Cl. 382-48

17 Claims



1. A method of image processing, comprising:  
scanning the document image having a plurality of closed

regions for storing the document image in a document image memory means;  
detecting the outline of one of the plurality of closed regions stored in the document image memory means;  
storing a predetermined type of editing in an area of a smearing memory means corresponding to the outline of the detected closed region, said storing step including smearing the area of the smearing memory means corresponding to the outline of the detected closed region; and  
scanning the document for reading the document image from the document image memory means synchronously with the contents of the smearing memory means.

# 4,947,445 SHADING CORRECTION USING VARIABLE SLICING THRESHOLD

Masahiro Sakamoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 706,179, Feb. 27, 1985, abandoned.

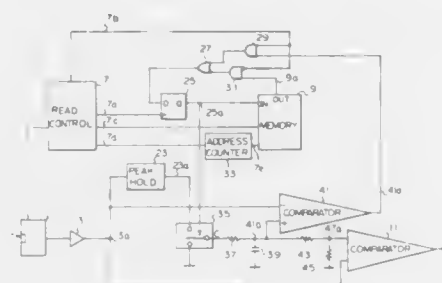
This application May 2, 1988, Ser. No. 188,755

Claims priority, application Japan, Mar. 1, 1984, 59-37342

Int. Cl.<sup>5</sup> G06K 9/38

U.S. Cl. 382-50

9 Claims



1. An image processing apparatus comprising:  
reading means for photoelectrically reading an image;  
a reference member of a reference density;  
detecting means for detecting whether each level of output signals obtained by reading said reference member with said reading means is larger or smaller than a level of a preceding output signal;  
memory means for storing a line of one bit of data, which represent the fact that each level of output signals of said reading means is larger or smaller than a level of a preceding output signal based on a detection result obtained by said detecting means;  
charge-discharge means for charging or discharging a condenser in response to data read out from said memory means; and  
removing means for removing a shading error contained in output signals obtained by reading an original image with said reading means in accordance with a charge voltage of said condenser when the original image is read by said reading means.

# 4,947,446 METHOD AND CIRCUIT FOR FILTERING SIGNALS REPRESENTATIVE OF A PICTURE

Francis Jutand, Cachan, and Alain Artieri, Meylan, both of France, assignors to Etat Français représenté par le Ministre des Postes, Télécommunications et de l'Espace (Centre National d'Etudes des Télécommunications), Issy Les Moulineaux, France

Filed Nov. 8, 1989, Ser. No. 435,282

Claims priority, application France, Nov. 9, 1988, 88 14661

Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382-54

9 Claims

1. Process for two-dimensional filtering of data signals repre-

sentative of pixels of a two-dimensional picture by convolution by a convolution kernel having MxN coefficient, M and N being predetermined integers, comprising the steps of:

- scanning a picture to be processed column per column in successive horizontal bands each having a height equal to an entire fraction of the height of the picture, whereby a representation of the picture as pixels distributed in rows and columns is obtained, each band having a common predetermined number of rows;
- fractionating said picture into mutually adjacent blocks of pixels each having M pixels in each of N mutually adjacent columns, and



- computing the transforms of all pixels in a same block in MxN computing cycles by:  
computing in parallel, during a same computing cycle, all partial convolution products of a single one of the MxN coefficients of the convolution kernel and of the data of all of those pixels which provide a partial product necessary for computation of the transforms of all pixels of the block, in a window of the picture containing the block, the cycle being repeated for each coefficient in turn; and  
summing all the partial products obtained at each cycle, for each pixel of the respective block, and
- repeating step (c) on each of the remaining blocks.

# 4,947,447 METHOD FOR DATA CODING

Shinichiro Miyaoka, Kawasaki; Takayoshi Shiraiishi, Chigasaki, and Ryolchi Sasaki, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 24, 1987, Ser. No. 42,366

Claims priority, application Japan, Apr. 24, 1986, 61-96054; May 30, 1986, 61-123322; Jun. 2, 1986, 61-125788; Dec. 24, 1986, 61-306416

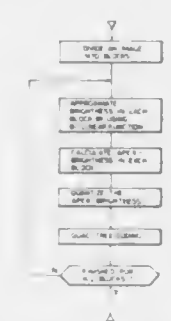
Int. Cl.<sup>5</sup> G06K 9/36

U.S. Cl. 382-56

2 Claims

1. Data coding method wherein image data is divided into blocks, said method comprising the steps of:  
dividing the image data into blocks being not equal in length and in number of picture elements depending on an amount of variation of brightness;  
converting brightness within the divided blocks into data corresponding to an apex of each block using an approximation by a bi-linear function; and  
encoding the converted data into tree-structure data; wherein data within the divided blocks is encoded into tree-structure data so that an index of distortion after encoding/decoding processing is not over a tolerable value;  
wherein a total sum of a square error of a function of approximating the brightness variation within each block and a

difference brightness of each picture element point is used as an index of distortion;  
wherein said bi-linear function is used as a function of ap-



proximating the brightness variation within a block, and a plurality of coefficients of said bi-linear function are quantized and said quantized coefficients is supplied as encoded data of the block.

# 4,947,448 IMAGE INFORMATION SIGNAL TRANSMITTING SYSTEM

Tadayoshi Nakayama, Yokohama; Chikara Sato; Kenichi Nagasawa, both of Kawasaki; Tomohiko Sasatani; Kuji Takahashi, both of Yokohama; Susumu Kozuki, Tokyo, and Katsuji Yoshimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

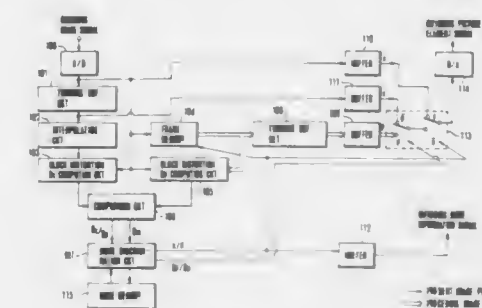
Filed Nov. 21, 1988, Ser. No. 274,660

Claims priority, application Japan, Nov. 22, 1985, 60-263079; Nov. 22, 1985, 60-263081; Nov. 22, 1985, 60-263083; Nov. 22, 1985, 60-263084

Int. Cl.<sup>5</sup> G06K 9/00

U.S. Cl. 382-56

10 Claims



1. A system for transmitting image information signals consisting of information signals corresponding to picture elements, a certain predetermined number of said picture elements consisting each of continuous pictures, comprising:

- picture element data forming means for forming a plurality of picture element data to be transmitted, said picture element data forming means being arranged to receive said image information signals for every one of picture planes and to form said plurality of kinds of picture element data, from the received image information signals for one picture plane, on the basis of a plurality of transmitted picture element forming modes which involve picture elements to be transmitted, which are different from each other, in number contained in a unit picture element block consisting of a predetermined number of picture elements;
- selecting means for selecting a kind of transmitted picture element mode, said selecting means being arranged to divide the received image information signals for one picture plane into said unit picture element blocks and to



select any one kind of the plurality of kinds of transmitted picture element forming modes, for the respective ones of the divided unit picture element blocks, with reference to the transmitted picture element forming mode for an already decided past picture plane; and

(C) transmitted signal forming means for forming one signal to be transmitted, said transmitted signal forming means being arranged to select any one of the transmitted picture element data out of the plurality of kinds of picture element data formed by said transmitted picture element data forming means, on the basis of the kind of transmitted picture element mode selected by said transmitted picture element mode selecting means for every ones of the unit blocks of the received image information signals for one picture plane.

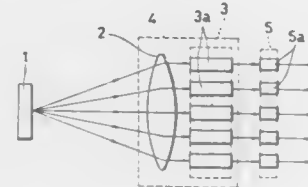
4,947,449

#### APPARATUS FOR SIMULTANEOUSLY EXTRACTING VARIOUS TYPES OF PROJECTION FEATURES OF AN IMAGE

Norman A. Peppers, Belmont; James R. Young, Palo Alto, both of Calif., and Kazuo Katsuki, Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 33,007, Mar. 31, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 342,690  
Int. Cl.<sup>5</sup> G06K 9/20

U.S. Cl. 382—65

3 Claims



1. An apparatus for simultaneously in parallel extracting projection features of an image, comprising:  
means for displaying an image whose projection features are to be extracted;

a multiplier for optically multiplying the image and for forming a plurality of optical images having a substantially identical shape; and

a plurality of means for detecting various types of projection features upon detection of projections from the optical images having substantially the identical shape;

said multiplier comprising a single projection lens spaced apart from a displaying surface of said displaying means, and a plurality of small image formation lenses arranged in correspondence with said plurality of detecting means, said plurality of small image formation lenses being disposed in a planar arrangement between said single projection lens and said plurality of detecting means to form a lens array, said image formation lenses being adapted to form a plurality of pattern images each having an identical shape in vicinities of said plurality of detecting means upon reception of light from said projection lens;

said plurality of detecting means at least including detecting means comprising a plurality of masks having projection slits formed at different positions with respect to the optical images to be projected thereon, and a plurality of single element sensing means, each of which has a single light-receiving surface and each of which respectively correspond to said masks, wherein each projection slit of said masks corresponds to one unit of one projection feature which should be extracted from an optical image, and a plurality of projection slits correspond to one of said projection features, and whereby the plurality of optical images formed by said multiplier are respectively projected onto said light-receiving surfaces of said plurality

of single element sensing means through said projection slits of said masks;

at least one of said plurality of detecting means comprising a plurality of masks having a plurality of stripe-like projection slits extending along a longitudinal direction, said longitudinally-extending stripe-like projection slits shaped and positioned such that their sides are adjacent to others of said longitudinally-extending stripe-like projection slits along a lateral direction when said longitudinally-extending stripe-like projection slits overlap each other with respect to optical images projected to the plurality of masks;

at least another one of the plurality of detecting means comprising a plurality of masks having stripe-like projection slits extending along a lateral direction, said laterally-extending stripe-like projection slits shaped and positioned such that their sides are adjacent to others of said laterally-extending stripe-like projection slits along a longitudinal direction when said laterally-extending stripe-like projection slits overlap each other with respect to optical images projected to the plurality of masks; and

at least still another one of the plurality of detecting means comprising a plurality of masks having stripe-like projection slits extending along an oblique direction, said obliquely-extending stripe-like projection slits shaped and positioned such that their sides are adjacent to others of said obliquely-extending stripe-like projection slits along a direction substantially at a right angle to said oblique direction when said obliquely-extending stripe-like projection slits overlap each other with respect to optical images projected to the plurality of masks.

4,947,450

#### OPTICAL READING APPARATUS

Jean-Marie Billiotte, Noisy Le Grand; Thierry Boulin, Boutigny; Frédéric Basset; Jacques Beauvois, both of Paris, all of France, and Didier Primat, Geneva, Switzerland, assignors to UP Systems, Montreuil, France

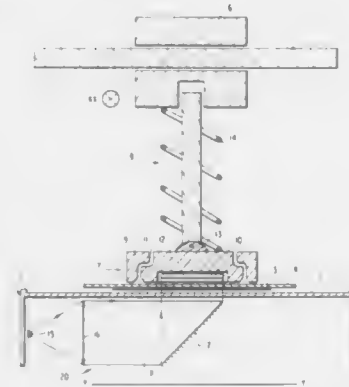
Filed Sep. 8, 1987, Ser. No. 93,679

Claims priority, application France, Sep. 17, 1986, 86 12995

Int. Cl.<sup>5</sup> G06R 9/28

U.S. Cl. 382—68

8 Claims



1. Apparatus for reading optically a scene made up of symbols on a transparent medium, said apparatus comprising:

a transport flat plate adapted to support a scene, an illumination system on one side of said plate adapted to project a substantially parallel light beam (F) toward said scene so as to illuminate at least part of said scene, an optical reader device on the opposite side of said plate, said optical reader device including:

an optical sensor, and

a pneumatic skid adapted to slide on said plate, said skid having a recess in its surface facing said plate, said

sensor being housed in said recess such that said sensor faces said scene without any intervening objective lens, a drive system adapted to move said optical reader device in a plane parallel to said plate.

4,947,451

#### MULTIPLE ACCESSING SATELLITE COMMUNICATION SYSTEM HAVING STANDBY CENTRAL STATION

Hizuru Nawata, Tokyo, Japan, assignor to NEC Corporation, Japan

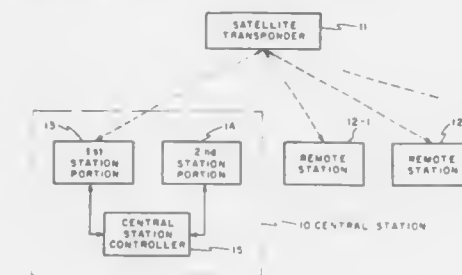
Filed Feb. 22, 1989, Ser. No. 314,047

Claims priority, application Japan, Feb. 23, 1988, 63-40426

Int. Cl.<sup>5</sup> H04B 3/36

U.S. Cl. 455—8

6 Claims



1. A multiple accessing type satellite communication system having a common communication channel interconnecting a central station and a plurality of remote stations through a satellite transponder, said common communication channel being divided into frames each having a predetermined number of time slots, said central station transmitting a broadcasting signal having a timing signal to said remote stations, each of said remote stations receiving said broadcasting signal as a received broadcasting signal and transmitting a packet signal into one of said time slots at a slot timing based on said timing signal derived from said received broadcasting signal;

wherein said central station comprises:

a plurality of station portions installed at different locations and having identifying numbers assigned thereto, one of said station portions being selectively permitted by an enabling signal to operate as an operating station portion to transmit said broadcasting signal; and

central station control means commonly connected to said plurality of station portions for controlling said station portions to deliver said enabling signal to a specific one of said station portions, said central station control means responsive to a notifying signal from said specific station portion currently operating as the operating station portion for delivering an enabling signal to said specific station portion and said enabling signal to another of said station portions;

each of said station portions comprising:

identifying number generating means for generating the own one of said identifying numbers;

signal generating means for generating said broadcasting signal having said timing signal and an identifying portion, said own identifying number being inserted in said identifying portion;

transmitting means enabled by said enabling signal for transmitting said broadcasting signal as a transmitted broadcasting signal;

receiving means for receiving a signal incoming through an antenna to produce a received signal; and

fault deciding means responsive to said received signal for deciding whether or not transmission of said broadcasting signal is carried out normally to produce said notifying signal when the transmission of said broadcasting signal is decided faulty;

wherein each of said remote stations comprises:

detecting means for detecting said identifying number in said

received broadcasting signal as a detected identifying number;

offset generating means responsive to said detected identifying number for generating a timing offset corresponding to said detected identifying number; and

slot timing generating means responsive to said timing offset for generating said slot timing determined by said derived timing signal and said timing offset.

4,947,452

#### MOBILE COMMUNICATION SYSTEM

Seiji Hattori; Akihide Kasukawa, both of Tokyo; Yoshizo Shibano, Osaka; Yoshinobu Kobayashi, Osaka, and Shinji Suzuki, Osaka, all of Japan, assignors to The Tokyo Electric Power Company, Ltd., Tokyo and Sumitomo Electric Industries, Ltd., Osaka, both of Japan

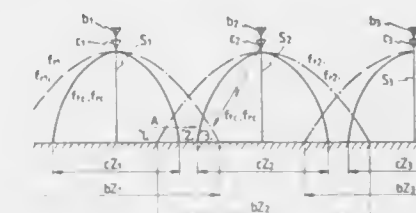
Filed Jan. 11, 1989, Ser. No. 295,817

Claims priority, application Japan, Jan. 14, 1988, 63-6556

Int. Cl.<sup>5</sup> H04A 7/00; H04B 1/00

U.S. Cl. 455—33

10 Claims



1. A mobile communication system including a plurality of signposts for relaying communications between a mobile station and an exchange system when said mobile station is within a predetermined area, said mobile communication system being suitable for inter-connection to a fixed communication network, said mobile communication system comprising:

a plurality of signposts each of which has first and second transmission zones associated therewith, said first zone defining a communication area, the communication areas of adjacent signposts overlapping with each other, said second zone defining a zone switching signal area, the zone switching signal areas of said adjacent signposts not overlapping with each other;

and a transceiver, said transceiver disposed in each of a plurality of mobile stations, said transceiver including means for indicating the presence of the mobile station within any particular one of said zone switching signal areas.

4,947,453

#### TRANSPARENT TONE-IN BAND TRANSMITTERS, RECEIVERS AND SYSTEMS

Joseph P. McGeehan, Corsham, and Andrew Bateman, Bath, both of England, assignors to National Research Development Corporation, London, United Kingdom

Continuation of Ser. No. 890,335, Jul. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 617,733, Jun. 6, 1984, Pat. No. 4,691,375. This application Sep. 2, 1988, Ser. No. 240,452

Claims priority, application United Kingdom, Aug. 2, 1985, 8519545

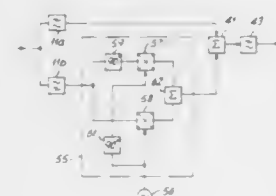
Int. Cl.<sup>5</sup> H04B 1/76

U.S. Cl. 455—47

18 Claims

2. A transmitter for TTIB operation comprising: first and second input terminals receiving first and second signals, respectively, said first signal including a frequency spectrum and said second signal being for use in processing said frequency spectrum;

means, connected to said first and second input terminals to receive said first and second signals, for dividing substantially a complete band of interest of said frequency spectrum of said first signal received by said first input terminal into upper and lower frequency portions, and for frequency translating said upper and lower frequency

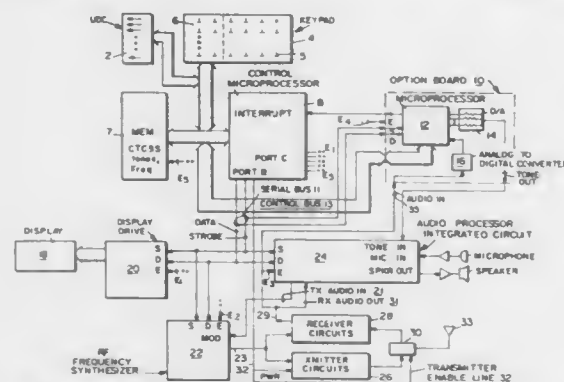


portions by differing amounts to provide an output signal with a notch between the translated upper and lower portions, means for including said second signal received by second input terminal into said notch in said output signal, and means for transmitting said output signal including said second signal.

4,947,454

#### RADIO WITH DIGITALLY CONTROLLED AUDIO PROCESSOR

Terry N. Garner, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.  
Continuation-in-part of Ser. No. 844,158, Mar. 26, 1986, Pat. No. 4,870,699. This application Apr. 17, 1987, Ser. No. 39,245  
Int. Cl.<sup>5</sup> H04B 1/40, 11/16; H04J 3/16  
U.S. Cl. 455—84 55 Claims



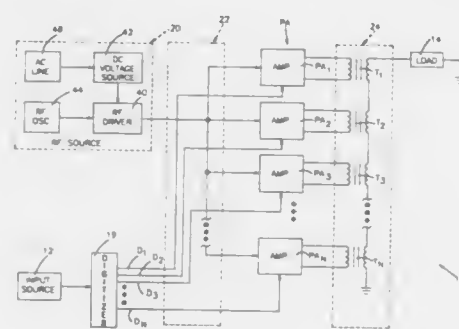
44. A method of operating a digitally-controlled radio communication transceiver including the steps of: transmitting radio frequency signals in a transmit mode and receiving radio frequency signals in a receive mode; modulating said transmitted radio frequency signals with an analog audio input signal in said transmit mode; demodulating said received radio frequency signals to provide output analog audio signals in said receive mode; performing radio control functions and generating a plurality of digital control signals with a digital processor means; alternately processing said audio input signals in analog form and said audio output signals in analog form with an analog audio processor coupled to said digital processor means, including sharing a common analog audio signal

processing path within said audio processor by audio signals processed in the transmit and receive modes; and simultaneously with said alternately processing step, processing channel guard signals with said same audio processor.

4,947,455

#### RF POWER SUPPLY FOR SUPPLYING A REGULATED POWER AMPLIFIED UNMODULATED DRIVE SIGNAL TO AN RF MODULATOR

Hilmer I. Swanson, Quincy, Ill., assignor to Harris Corporation, Melbourne, Fla.  
Filed Nov. 9, 1988, Ser. No. 269,158  
Int. Cl.<sup>5</sup> H04B 17/00; H03C 1/00  
U.S. Cl. 455—115 6 Claims



1. An RF driver power supply for supplying a regulated power amplified unmodulated RF drive signal to an RF modulator in an RF transmitter, comprising:  
an RF oscillator for providing an RF input signal;  
a DC voltage source for providing a DC voltage V;  
a plurality of power amplifiers each having a first input for receiving said input RF signal and each having a second input for receiving a DC voltage signal and each serving to amplify said input RF signal by an amount dependent upon the magnitude of a said DC voltage signal supplied to the second input thereof to provide an amplified RF signal;  
means for applying said input RF signal to each said first input;  
means for combining said amplified RF signals to provide a said unmodulated RF drive signal to be applied to a said RF modulator;  
means for applying said DC voltage V to the second input of at least a first one of said power amplifiers; and  
regulating means for regulating the magnitude of said unmodulated RF drive signal including means for applying a fractional portion of said DC voltage V to the second input of a second one of said power amplifiers with the fractional portion varying as a function of any variation in the magnitude of said unmodulated RF drive signal with respect to a desired magnitude thereof.

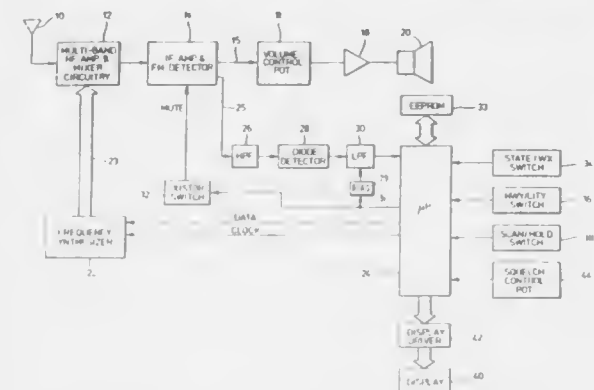
4,947,456

#### SCANNING RADIO RECEIVER

Noel D. Atkinson; William B. Ahlemeyer, both of Indianapolis, and Ben F. McCormick, Noblesville, all of Ind., assignors to Uniden America Corporation, Ft. Worth, Tex.  
Continuation of Ser. No. 245,835, Sep. 16, 1988, abandoned, which is a continuation of Ser. No. 21,008, Mar. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 884,278, Jul. 10, 1986, abandoned. This application Jun. 9, 1989, Ser. No. 366,199  
Int. Cl.<sup>5</sup> H04B 1/16 12 Claims

U.S. Cl. 455—165  
1. A high-speed scanning radio receiver, comprising:  
a radio receiver having an RF amplifier, a mixer, a fre-

quency synthesizer for generation of a local oscillator signal, an IF amplifier, a demodulator, and an audio output stage;  
memory means for storing a plurality of frequency codes corresponding to respective radio channels;  
scan control means for sequentially reading frequency codes from said memory means and for loading said frequency synthesizer with said sequentially read frequency codes;  
squell circuit means for disabling said audio output stage in the absence of a detected signal on any one of the channels corresponding to said sequentially read frequency codes, said squell circuit means including a first filter connected



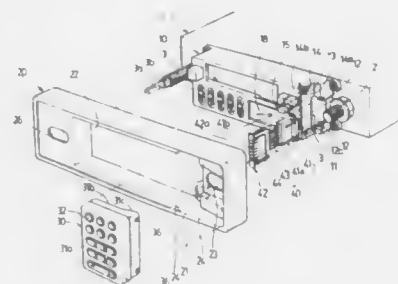
to an output of said demodulator, a noise detector connected to an output of said first filter, said noise detector including a first low pass filter with a time constant less than approximately 0.5 milliseconds, A/D converter means connected to said noise detector for converting at least ten samples of an analog signal to digital values in less than approximately 2 milliseconds, means for determining an average value for said at least ten samples, and means for generating a mute signal when said average value is below a predetermined squell level; and  
means for enabling said scan control means in response to said mute signal.

4,947,457

#### REMOVABLE FUNCTION BOX WITH CONTACT BLOCK ASSEMBLY

Duk W. Shin, Kyungi, Rep. of Korea, assignor to Namsung Electronics Corp., Rep. of Korea  
Filed Dec. 5, 1988, Ser. No. 279,957  
Claims priority, application Rep. of Korea, Oct. 12, 1988, 16738/1988  
Int. Cl.<sup>5</sup> H04B 1/06 17 Claims

U.S. Cl. 455—345



1. An audio set, comprising:  
(A) a main body which is positionable behind a dash board of a car, said main body including a nose piece which extends through the dash board when said main body is positioned behind the dash board;

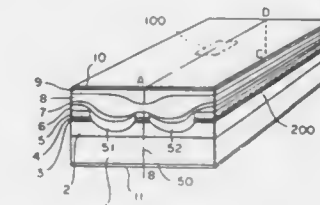
(B) a trim plate which is positionable in front of the dash board, said trim plate including:  
(1) an opening for surrounding said nose piece; and  
(2) a recess;  
(C) bolts for connecting said trim plate and said main body to the dash board, said bolts being located on opposite sides of said nose piece;  
(D) a function box which fits within said recess, said function box being removable from said recess, said function box including:  
(1) a contact member; and  
(2) a corresponding opening; and  
(E) a contact block assembly including:  
(1) a connector pin for electrically connecting said contact member to an electrical component within said main body when said function box is located within said recess; and  
(2) a protective cover which is biased away from said main body so as to cover and protect said connector pin when said function box is removed from said recess.

4,947,458

#### OPTICAL TRANSMITTER UTILIZING A BISTABLE DISTRIBUTED FEEDBACK SEMICONDUCTOR LASER

Ikuo Mito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Filed Jul. 30, 1985, Ser. No. 760,560  
Claims priority, application Japan, Jul. 30, 1984, 59-159823  
Int. Cl.<sup>5</sup> H04B 9/00 8 Claims

U.S. Cl. 455—609



1. An optical transmitter comprising:  
a bistable distributed feedback semiconductor laser means for initiating lasing when an injection current reaches a first lasing threshold value and for terminating lasing when said injection current is decreased to a second lasing threshold value, said semiconductor laser means having a hysteresis characteristic such that said second lasing threshold value is smaller than said first lasing threshold value, said semiconductor laser means operating in a single longitudinal mode;  
biasing means for applying a biasing current less than said second lasing threshold value to said semiconductor laser means; and  
driving means for applying a current pulse to said semiconductor laser means, said current pulse having a peak value, wherein the superposition of said peak value and said biasing current is greater than said first lasing threshold value, said biasing current and said current pulse flowing through the same area of an active layer of said bistable distributed feedback semiconductor laser means for causing radiation of said bistable distributed feedback semiconductor laser means.



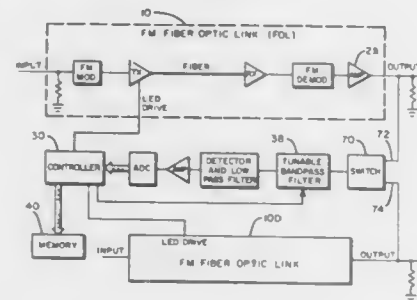
4,947,459

## FIBER OPTIC LINK NOISE MEASUREMENT AND OPTIMIZATION SYSTEM

Larry A. Nelson, and James W. Woods, both of Albuquerque, N. Mex., assigns to Honeywell, Inc., Minneapolis, Minn.  
Filed Nov. 25, 1988, Ser. No. 275,935  
Int. Cl.<sup>5</sup> H04B 10/00

U.S. Cl. 455-612

2 Claims



1. Apparatus for optimizing system performance for use in an FM transmission and signal distribution system which includes at least two fiber optic links both having an output and an input, wherein the transmission and signal distribution system includes a transmitter, comprising:

- (a) means for measuring noise signals coupled to the at least two fiber optic link outputs;
- (b) controlling means coupled to the noise measuring means including:
  - (i) means for generating system performance data proportional to the noise signals measured by the noise measurement means wherein the performance data generated includes data pertaining to fiber optic link loss in the at least two fiber optic links,
  - (ii) means for comparing data pertaining to fiber optic link loss in at least two fiber optic links wherein the comparing means determines the optimum fiber optic link based on the fiber optic link loss data, and provides a comparison control signal consistent therewith;
- (c) means for storing the generated performance data including the data pertaining to fiber optic link loss, wherein the storing means is coupled to the control means; and
- (d) means coupled to the control means and responsive to the comparison control signal for routing signals according to comparisons of the data pertaining to fiber optic link loss.

4,947,460

## CURSOR FOR AN INDUCTIVE SENSOR FOR USE WITH A DIGITIZER BOARD

Wolfgang Jacob-Grinschgl, Munich, and Udo Müller, Unterschleißheim, both of Fed. Rep. of Germany, assigns to Kontron Elektronik GmbH, Fed. Rep. of Germany  
Division of Ser. No. 131,286, Dec. 10, 1987, Pat. No. 4,833,774, which is a continuation of Ser. No. 7,696, Jan. 28, 1987, abandoned, which is a continuation of Ser. No. 783,293, Oct. 2, 1985, abandoned. This application Mar. 9, 1989, Ser. No. 321,434  
Int. Cl.<sup>5</sup> G08C 21/00

U.S. Cl. 178-19

7 Claims

1. A cursor for an inductive sensor comprising:
- (a) a circular, transparent disk having a geometrically circular round radially outwardly facing periphery, and having an end face with a mark at the geometric center of the disk; and

- (b) wire wound directly on and bonded to the round periphery of the disk in a winding space concentrically surrounding the disk to thereby form a coil whose electrical center is substantially coincident with the mark.



rounding the disk to thereby form a coil whose electrical center is substantially coincident with the mark.

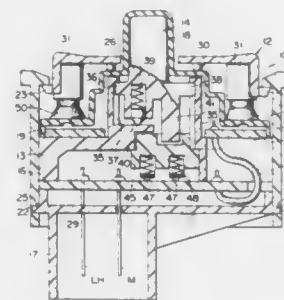
4,947,461

## MULTI-POSITION ELECTRICAL SWITCH

Toshio Yoshioka, Fujieda, and Kiyoshi Nakayama, Shizuoka, both of Japan, assigns to Murakami Kaimeido Co. Ltd., Shizuoka, Japan  
Filed Mar. 3, 1989, Ser. No. 322,779  
Int. Cl.<sup>5</sup> H01H 9/00, 13/70

U.S. Cl. 200-5 R

8 Claims



1. A multi-position electrical switch comprising:
- a casing having a top edge and an inner wall;
  - a control knob supported on said top edge of said casing for tiltable movement in four directions and having a central aperture;
  - a retainer horizontally mounted within said casing and having peripheral surfaces engaging said inner wall of said casing;
  - a conversion knob tiltably supported by said retainer and having an upper portion projecting through said central aperture of said control knob;
  - upper and lower base plates disposed on respective opposite sides of said retainer, each of said upper and lower base plates defining a printed circuit board and having a plurality of fixed connecting contacts; and
  - an insulating elastic sheet having a central portion for covering said upper portion of said conversion knob and opposite side peripheral portions for covering respective top surfaces of the upper base plate, and each peripheral portion including at least one swell, each swell comprising a movable connecting contact corresponding to a respective one of said plurality of fixed connecting contacts of the upper base plate.

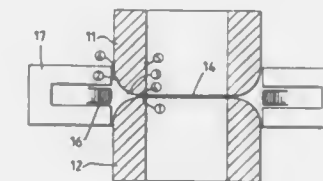
4,947,462

## INDUCTION WELDING APPARATUS AND METHOD

Per H. Moe, Amtmann Bangsgt. 7, Drammen, Norway (N-3000)  
Filed Aug. 26, 1988, Ser. No. 249,549  
Claims priority, application Norway, Nov. 20, 1986, 864655  
Int. Cl.<sup>5</sup> H05B 6/10

U.S. Cl. 219-8.5

10 Claims



1. A combination of an induction welding apparatus and elements to be joined after heating to form a work piece, comprising:

- a pair of elements to be joined, said elements being one of pipe-shaped and rod-shaped, said pair of elements opposing one another with their longitudinal axes being colinear, a narrow gap separating said elements in a fixed relationship. Each said element tapering in cross section toward said gap and said longitudinal axes, the space between said two elements being approximately V-shaped when said two elements are opposed, the apex of said V being directed toward the common axis of said elements;
- a coil encircling the open narrow gap and spaced therefrom, said coil being adapted for direct connection to a voltage at a frequency in the range of 50 to 60 Hz;
- a cover of ferro-magnetic material provided around said coil for guiding the electro-magnetic field created by said coil to the area of said gap, induced currents in said elements being concentrated in said reduced cross section areas, said opposed elements being rapidly heated at said gap when said voltage is applied.

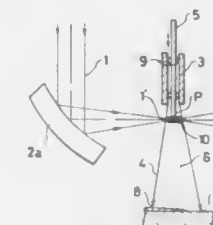
4,947,463

## LASER SPRAYING PROCESS

Jun Matsuda, Takamatsu; Akihiro Utsumi, Kagawa; Munehide Katsumura, Takamatsu; Masafumi Yoneda, Takamatsu, and Tetsuo Yano, Takamatsu, all of Japan, assigns to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan  
Filed Feb. 16, 1989, Ser. No. 310,902  
Claims priority, application Japan, Feb. 24, 1988, 63-41764  
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219-121.85

6 Claims



1. A laser spraying process comprising the steps of:
- irradiating a laser beam with a converging lens or a mirror, thereby forming a high energy density zone on the beam axis;
  - feeding a spraying material to said high energy density zone in a direction of crossing said beam axis;
  - supplying a carrier gas so that a gas to a base surface axis is normal to said base surface and perpendicularly crosses said beam axis, thereby forming said spraying material into fine particles and blowing said fine particles with a stream

of said carrier gas against said base surface to form a film of said fine particles on said base surface.

4,947,464

## HEATING COIL ASSEMBLY FOR AN ELECTROMAGNETIC INDUCTION COOKING ASSEMBLY

Masaya Mori, and Kazunobu Kihira, both of Nagoya, Japan, assigns to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Division of Ser. No. 938,403, Dec. 5, 1986, Pat. No. 4,770,355.  
This application Jan. 29, 1988, Ser. No. 150,281  
Claims priority, application Japan, Dec. 7, 1985, 60-275583; Jan. 8, 1986, 61-2627  
Int. Cl.<sup>5</sup> H05B 6/40

U.S. Cl. 219-10.79

7 Claims



1. A coil assembly comprising:

- a flat shaped coil support base; and
- a spirally wound wire coil on said support base, said wire at a middle part of said coil located approximately halfway between an inner diameter and an outer diameter being flattened relative to the wire at any other part of said coil so that said middle part of said coil is smaller in thickness and larger in coil winding pitch than at any other part of said coil.

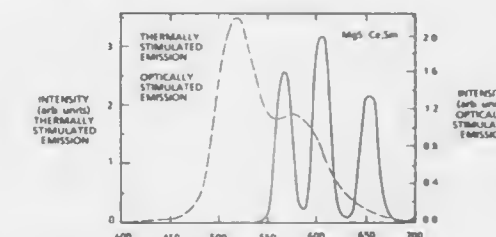
4,947,465

## METHOD OF LASER DISCRIMINATION USING STIMULATED LUMINESCENCE

Veerendra K. Mathur, 3680 Sellman Rd., Beltsville, Md. 20705, and Kishalaya Chakrabarti, 1001 Rockville Pike, Apt. 1314, Rockville, Md. 20852  
Filed Jul. 25, 1989, Ser. No. 385,032  
Int. Cl.<sup>5</sup> C09K 11/08

U.S. Cl. 250-484.1

9 Claims



6. A method of discriminating a near infrared laser from a far infrared laser comprising the steps of:

- (a) doping a MgS phosphor with  $\text{Sm}^{3+}$  and one of the group consisting of  $\text{Ce}^{3+}$ ,  $\text{Eu}^{2+}$  and  $\text{Tb}^{3+}$ ;
- (b) exposing said doped phosphor to charging radiation whereby electrons are trapped by  $\text{Sm}^{3+}$  to form  $\text{Sm}^{2+}$  thereby leaving behind free holes and whereby said free holes are trapped by  $\text{Ce}^{3+}$ ,  $\text{Eu}^{2+}$  or  $\text{Tb}^{3+}$  to form  $\text{Ce}^{4+}$ ,  $\text{Eu}^{3+}$  or  $\text{Tb}^{4+}$ , respectively;
- (c) exposing said charged phosphor from step (b) to an unspecified laser source to cause luminescence of said phosphor indicative of the type of laser source, said unspecified laser source being a near infrared laser if said luminescence is caused by the release of said trapped electrons characterized by  $\text{Ce}^{3+}$ ,  $\text{Eu}^{2+}$  or  $\text{Tb}^{3+}$  emission and said unspecified laser source being a far infrared laser

if said luminescence is caused by the release of said trapped free holes characterized by  $\text{Sm}^{3+}$  emission.

4,947,466

## TENNIS BALL

Kuniyasu Horiuchi, Kobe, and Yoshinobu Makamura, Nishinomiya, both of Japan, assignors to Samitomo Rubber Industries, Ltd., Kobe, Japan

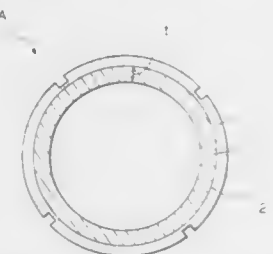
Division of Ser. No. 190,560, May 5, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,129

Claims priority, application Japan, Aug. 5, 1987, 62-69239; Jun. 4, 1988, 63-46406

Int. Cl.<sup>5</sup> A63B 39/00, 69/38

U.S. Cl. 273-61 C

2 Claims



1. A hollow tennis ball comprising:

- (a) a hollow spherical core of elastic material enclosing an interior space;
- (b) a layer of substantially felt-like material applied to the outer surface of said hollow core;
- (c) the overall weight of said ball is between 45 and 54 grams;
- (d) the pressure in said interior space is from 0.0 to 0.4 kg/cm<sup>2</sup> higher than the atmospheric pressure;
- (e) the thickness of said hollow core is between 3.0 and 4.5 mm;
- (f) the hardness of a rubber of said hollow core is between 60 and 75 based on JIS A standard; and
- (g) the rebound of said ball is between 125 and 135 cm when dropped, from a height of 254 cm, onto a concrete base.

4,947,467

## TRAVELING-WAVE TUBE SLOW-WAVE STRUCTURE WITH INTEGRAL CONDUCTIVELY-LOADED BARREL AND METHOD OF MAKING SAME

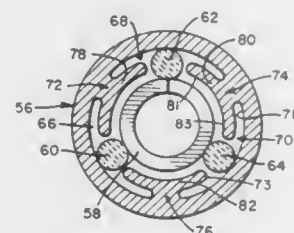
Arthur E. Manoly, 26630 Basswood Ave., Rancho Palos Verdes, Calif. 90274; Otto Sauseng, 1308 Stonewood Ct., San Pedro, Calif. 90732, and John T. Benton, 5401 Cerulean Ave., Garden Grove, Calif. 92645

Filed Mar. 24, 1988, Ser. No. 172,513

Int. Cl.<sup>5</sup> H01J 25/34

U.S. Cl. 315-3.5

9 Claims



5. A method for forming a slow-wave structure assembly having an integral conductively-loaded encasing barrel comprising the steps of:

- mounting an electrically conductive tubular barrel in electrical discharge machining apparatus;
- positioning a machining electrode within said barrel;
- establishing an electrical discharge between said electrode

and a portion of the interior surface of said barrel while providing relative movement between said electrode and said portion of said interior surface to machine a plurality of circumferentially spaced longitudinally extending slots in the interior surface of said barrel; and

securing a subassembly comprising a slow-wave structure and a plurality of longitudinally disposed electrically insulating support rods in contact with the outer surface of said slow-wave structure and circumferentially spaced thereabout within the machined barrel with said support rods disposed within respective ones of said slots, whereby the radially inwardly projecting portions of said barrel between said slots provide integral conductive loading for said slow-wave structure.

4,947,468

## BYPASS TANDEM CHAMBER CHARGE DENSITY MONITOR

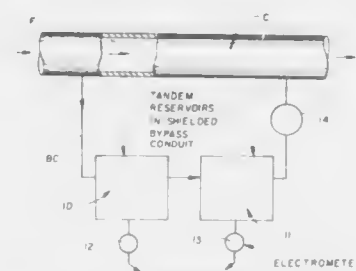
J. Keith Nelson, Schenectady, N.Y., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 20, 1989, Ser. No. 325,932

Int. Cl.<sup>5</sup> G01N 27/60; G01R 29/12; H05F 1/00

U.S. Cl. 324-453

25 Claims



1. In combination with an apparatus for measuring the quantity of static electric charges carried by a fluid flowing through a primary conduit means, wherein a bypass conduit means is provided in a substantially parallel configuration with the primary conduit means for intercepting the flow of fluid therein and is electrically insulated therefrom, wherein a portion of the fluid is temporarily diverted from the primary conduit means into the bypass conduit means, and wherein the charge density of the fluid in the bypass conduit means is continually measured while the fluid is flowing therein at a rate which is less than the rate of the fluid flowing in the primary conduit means; a first reservoir means formed in the bypass conduit means, a second reservoir means formed in the bypass conduit means, laterally spaced from the first reservoir means and in series communication therewith, means for taking a first measurement of the electrical relaxation current associated with the fluid in the first reservoir means and flowing to ground, means for taking a second measurement of the electrical relaxation current associated with the fluid in the second reservoir means and flowing to ground, and means for arithmetic conversion of the first and second measurements into a single measure representative of the charge in the fluid, such that the single measure is independent of both the conductivity of the fluid and of the residence time of the fluid in the first and second reservoirs.

4,947,469

## RESISTIVE FAULT LOCATION METHOD AND DEVICE FOR USE ON ELECTRICAL CABLES

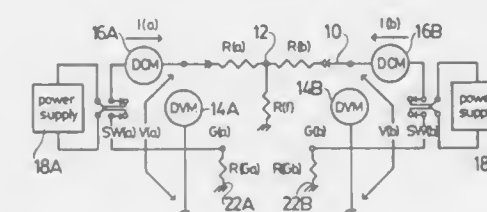
David E. Vokey, Tolland, Conn.; Kenneth N. Sontag, Winnipeg, Canada; John C. Chamberlain, Worcester, and Ronald L. Lavalley, Southbridge, both of Mass., assignors to Automated Light Technologies, Inc., Southbridge, Mass.

Filed Jan. 4, 1989, Ser. No. 293,288

Int. Cl.<sup>5</sup> G01R 31/08

U.S. Cl. 324-523

15 Claims



1. A method of locating a resistive fault between first and second ends of an electrical conductor, comprising:

- (a) applying a DC voltage with respect to ground to the first end of the conductor;
- (b) measuring the steady state DC voltage with respect to ground and current at the first end of the conductor and substantially simultaneously measuring the steady state DC voltage with respect to ground at the second end of the conductor;
- (c) applying a DC voltage with respect to ground to the second end of the conductor;
- (d) measuring the steady state DC voltage with respect to ground and current at the second end of the conductor and substantially simultaneously measuring the steady state DC voltage with respect to ground at the first end of the conductor;
- (e) computing from the measured voltages and currents the resistance of the conductor between the resistive fault and at least one end of the conductor; and
- (f) computing the distance between the resistive fault and at least one end of the conductor from the computed conductor resistance.

4,947,470

## SYSTEM FOR LOCATING LEAKS IN A GEOMEMBRANE-LINED IMPOUNDMENT OR LANDFILL FILLED WITH MATERIAL

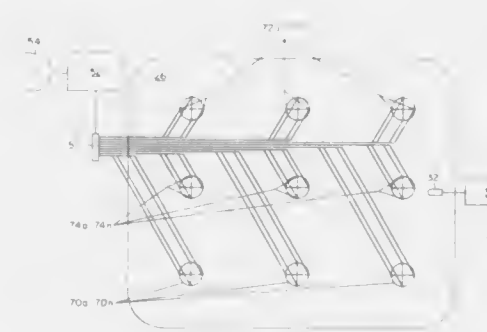
Glenn T. Darilek, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.

Filed Feb. 14, 1989, Ser. No. 311,178

Int. Cl.<sup>5</sup> G01N 27/00

U.S. Cl. 324-557

32 Claims



1. An apparatus for detecting and locating a leak in a landfill containing an electrically conductive liquid-solid mixture of material and having an electrically resistive liner with a lower

surface that is in contact with a material that is also electrically conductive, comprising:

- a means for impressing a voltage difference across said liner such that an electrical current is caused to flow through said leak, and such that an electromagnetic field is created in the vicinity of said leak; and
- at least two detector means for obtaining a total of at least four gradient measurements of said electromagnetic field, each of said measurements being between a first point and a second point in the vicinity of said leak, and each of said measurements being orthogonal to one other of said measurements, said detector means being in fixed and known locations generally parallel and immediately adjacent to said liner.

4,947,472

## IMAGE FORMING APPARATUS WITH ROLL-TYPE RECORDING MATERIAL

Yutaka Maeda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

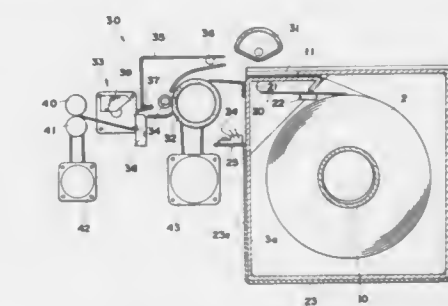
Filed Aug. 31, 1988, Ser. No. 238,820

Claims priority, application Japan, Aug. 31, 1987, 62/133361[U]

Int. Cl.<sup>5</sup> G03B 27/58

U.S. Cl. 355-72

22 Claims



1. In an image forming apparatus for forming images on a roll of recording material, an apparatus for detecting when the radius of said roll of recording material has reached a predetermined value, said apparatus comprising:

- a case accommodating said roll of recording material for having said recording material drawn out therefrom;
- a mount portion for removably supporting said case thereon;
- a movable member movably disposed within said case, said movable member having means for spring-biasing said member against the outermost surface of said roll so that said movable member is movable in accordance with changes in the radius of said roll, said movable member having a length permitting the forward end of said member to move away from the outermost surface of said roll when the radius of said roll reaches a predetermined value;
- a detectable member attached to said movable member; and
- a detecting means provided on said mount portion for detecting that said detectable member has been brought to a predetermined position by movement of said movable member.



4,947,473

## DEVELOPING DEVICE FOR COPIER

Hiroshi Kinashi, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

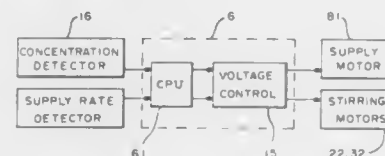
Filed May 12, 1988, Ser. No. 193,501

Claims priority, application Japan, May 28, 1987, 62-82563[U]

Int. Cl.<sup>5</sup> G03G 15/08, 21/00

U.S. Cl. 355—259

3 Claims



1. A developing device for a copier comprising:
  - a developing tank containing stirring rollers for stirring toner therein;
  - a supply rate detecting means for detecting the rate of toner supply into said developing tank; and
  - a control unit for controlling the rate of revolution of said stirring rollers, said control unit causing said stirring rollers to rotate at a slower rate if said supply rate detecting means detects the rate of toner supply into said developing tank to be greater than a preset value and at a faster rate if said supply rate detecting means detects the rate of toner supply into said developing tank to be less than said preset value.

4,947,474

## MECHANISM OF OBSERVATION AND RECORDING OPERATION ON AN OBJECT

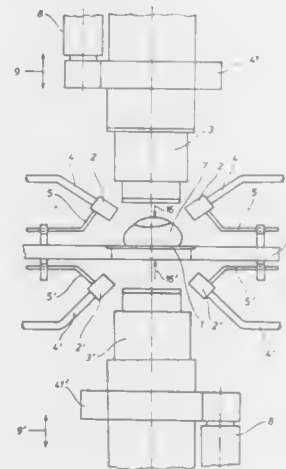
Mathias Zirm, Fallmerayerstrasse 3, Innsbruck, Austria (6020)

Filed Oct. 24, 1988, Ser. No. 261,619

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—93

14 Claims



1. Mechanism for observing operation on an eye having a rear opening opposite the pupil comprising:
  - a microscope slide supporting the eye with the rear opening of the eye downward;
  - means in the area of the rear opening adhering the eye to the microscope slide;
  - means illuminating the eye;
  - observation components directed at the eye from different directions and capable of making pictures of the eye;
  - one of the observation components being directed through

the pupil, and the other observation component being directed through the rear opening, and means presenting the pictures in at least one monitor.

4,947,475

## LIGHT EMITTING DEVICES

Alfred N. Bright, Marlow, England, assignor to Saunders-Roe Development Limited, United Kingdom

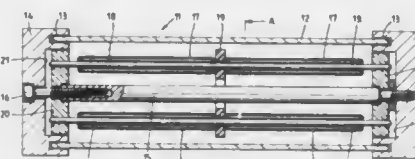
Filed Feb. 24, 1989, Ser. No. 314,843

Claims priority, application United Kingdom, May 26, 1988, 8812496

Int. Cl.<sup>5</sup> F21K 2/00

U.S. Cl. 362—34

8 Claims



1. A light emitting device comprising a transparent tube supported between end caps substantially closing the ends of the tube, at least one annular self luminous light source supported intermediate the ends of a resilient rod located through the light source and between said end caps, and an axial tension bar extending through the tube and retaining the end caps.

4,947,476

## OIL CHECK LIGHT

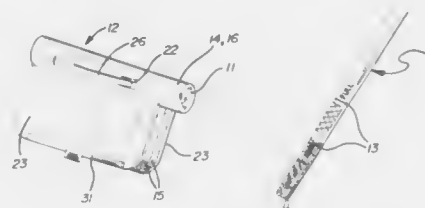
Stephen L. Seaburg, 4021 Cedar Run Rd., Traverse City, Mich. 49684

Filed Aug. 21, 1989, Ser. No. 396,367

Int. Cl.<sup>5</sup> F21V 33/00

U.S. Cl. 362—109

14 Claims



1. A vehicular fluid level monitoring device comprising:
  - (a) a hollow cylindrical member;
  - (b) an outwardly directed light source affixed within said hollow cylindrical member;
  - (c) an electrical lighting circuit containing electrical connectors or wiring and power source sufficient to provide an electrical connection to said outwardly directed electrical light source affixed within said hollow cylindrical member;
  - (d) a means for closing said electrical circuit;
  - (e) a pair of longitudinally aligned, opposed planar members extending outwardly from the hollow cylindrical member;
  - (f) a pair of opposed wiping pads affixed to the interior surfaces of said opposed planar members.

4,947,477

## PARTITIONABLE EMBEDDED PROGRAM AND DATA MEMORY FOR A CENTRAL PROCESSING UNIT

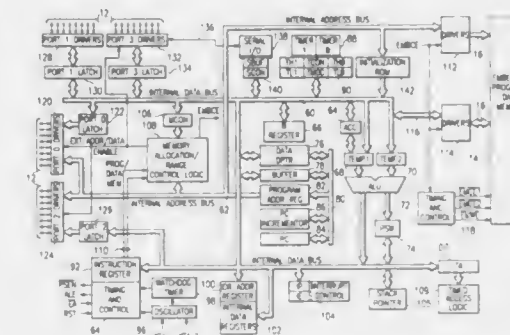
Wendell L. Little, Carrollton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Mar. 4, 1988, Ser. No. 164,097

Int. Cl.<sup>5</sup> G06F 1/00

U.S. Cl. 364—200

8 Claims



1. A microprocessor based system with an embedded memory comprising:
  - a central processor unit with an internal data bus for data transfer and an internal address bus for address transfer, said central processing unit operable to fetch program instructions from a program memory for execution thereof and transfer of data to and from a data memory;
  - a random access memory having a plurality of memory locations each associated with a unique address, said random access memory having an address input for receiving an address and accessing the one of the plurality of memory locations associated therewith, said random access memory having a data input/output for inputting data to the accessed one of said memory locations or outputting data therefrom and a control input for enabling said random access memory to either input data or output data;
  - allocation means for defining a first portion of said random access memory as program memory for interfacing with said central processing unit and for defining a second portion of said random access memory as data memory for interfacing with said central processing unit, the size of said first and second portions variable in response to signals received external to said central processing unit;
  - address interface means for selectively interfacing the address input of said random access memory with the internal address bus of said central processing unit;
  - data interface means for selectively interfacing the data input/output of said random access memory with the internal data bus of said central processing unit; and
  - read/write control interface means for routing control signals from said central processor unit to said random access memory;
- wherein said allocation means comprises:
  - means for storing a partition address, said partition address constituting an address above which all addresses are program instruction addresses associated with program instructions and below which all addresses are data addresses associated with data addresses;
  - means for determining whether addresses on the internal data bus of said central processing unit are instruction addresses or data addresses, in accordance with definitions made by said allocation means;
  - means for controlling said address interface means and said data interface means to said random access memory with said central processor units when addresses are determined to be instruction addresses and have an address less than said partition address or the addresses

are determined to be data addresses and have an address greater than said partition address;

means for controlling said read/write control means to provide a Read only function when said means for determining determines the presence of instruction addresses having an address less than said partition address and to provide a random access mode to either Read or Write data to said random access memory when said means for determining determines that a data address is present having an address greater than said partition address;

said partition address being variable in response to signals received external to said central processing unit;

- and further comprising:
- an external program memory which has an address input and a data output and provides a Read Only function, said external program memory operable in response to control signals received from said central processing unit to output data for interface with the internal data bus to provide a Read Only function to output program instructions to said central processing unit;
  - an external data memory having an address input and a data output for providing a random access function to transfer data to and from the internal data bus in response to control signals and data addresses received from said central processing unit; and
  - steering means for interfacing the internal address bus with the address input of said external program memory and the internal data bus with the data output of said external program memory when said means for determining determines that instruction addresses are present on the internal address bus and the addresses are greater than said partition address;
  - said steering means being operable to interface the internal address bus of said central processing unit to said address input of said external data memory, and the internal data bus of said central processing unit with the data input/output of said external data memory when said means for determining determines that the address on the internal address bus is a data address and the data address is less than said partition address.

4,947,478

## SWITCHING CONTROL SYSTEM FOR MULTIPERSONALITY COMPUTER SYSTEM

Ryozo Maeno, Hamura, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 706,097, Feb. 27, 1985, abandoned.

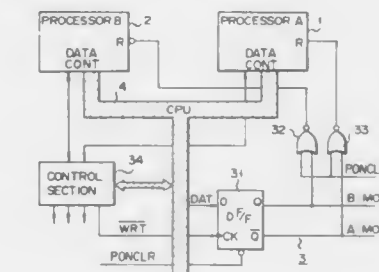
This application Mar. 11, 1988, Ser. No. 170,103

Claims priority, application Japan, Feb. 29, 1984, 59-37556; Apr. 28, 1984, 59-86347

Int. Cl.<sup>5</sup> G06F 1/24

U.S. Cl. 364—200

2 Claims



1. A switching control system for a multipersonality computer system, comprising:
  - n microprocessors operated in respectively different operating systems, each of said n microprocessors using a plural-

ity of common peripheral devices, wherein  $n$  is a positive integer;  
 a common bus connected to said  $n$  microprocessors;  
 means for operating a predetermined one of said  $n$  microprocessors as a specified microprocessor in response to a power-on signal of said multipersonality computer system, said specified microprocessor determining whether an externally supplied microprocessor selection signal specified said specified microprocessor itself or another one of said  $n$  microprocessors and, when said another microprocessor is specified, outputting a switching signal for switching an operation to said another microprocessor; and  
 microprocessor switching means, coupled to respective reset inputs of said  $n$  microprocessors, for controlling an operating state of each of said  $n$  microprocessors, said switching means being responsive to said switching signal, for setting said specified microprocessor in a non-operating state and setting only the one of the  $n$  microprocessors specified by said microprocessor selection signal in an operating state, so that only one of said  $n$  microprocessors is operated at any one time.

4,947,479

# METHOD OF PROCESSING DATA IN A BANKING TERMINAL EMPLOYING THE TOTAL-FIRST HANDLING TECHNIQUE

Rie Kawai, Nagoya; Kanzen Goto, Owariasahi, and Kunio Morimoto, Seto, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 918,917, Oct. 15, 1986, Pat. No. 4,825,051.

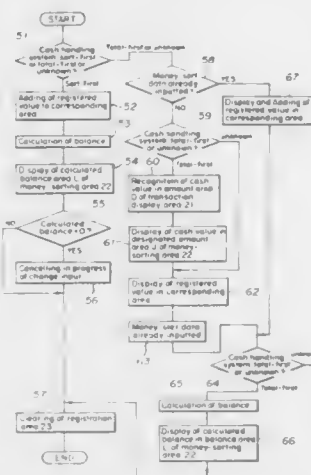
This application Apr. 25, 1989, Ser. No. 343,823

Claims priority, application Japan, Oct. 15, 1985, 60-227702

Int. Cl.<sup>5</sup> G06F 15/30

U.S. Cl. 364-408

12 Claims



1. A method of processing data in a banking terminal which comprises a display unit having a display surface including a transaction display area for indicating contents of a transaction at a bank, a money sorting area including a manual handling area for indicating sorts of money received from a customer, a manual change-disburse area for indicating sorts of money of change to be disbursed, a balance area and a designated amount area used in calculating the balance, said display surface further including a registration area for indicating the data to be subsequently displayed on the transaction area and the money sorting area; a data input unit including a keyboard; a cash handler for automatically calculating the received bills and coins and for automatically disbursing change due; and a controller for the display unit, the data input unit and the cash handler, wherein said method comprises:

first step of determining the priority between data input corresponding to the money-amount of a transaction to be

displayed on said transaction display area and data input corresponding to the sorts of received money to be displayed on said money sorting area;  
 second step of displaying the money amount of said transaction on the designated amount area of said money sorting area in accordance with the money amount of transaction displayed on said transaction display area when it is determined that the data input corresponding to said transaction money amount has priority over the data input corresponding to the sorts of money to be displayed on said money sorting area;  
 third step of displaying the sorts of received money on the manual handling area of said money sorting area;  
 fourth step of summing the data corresponding to the sorts of received money displayed on the manual handling area;  
 fifth step of subtracting the amount displayed on the designated amount area from the sum corresponding to the amount displayed on the manual handling area, and displaying the subtraction result on the balance area of said money sorting area.

10. A method of processing data in a banking terminal which comprises a display unit having a display surface including a transaction display area for indicating contents of a transaction at a bank, a money sorting area including a manual handling area having a plurality of sorting locations for indicating sorts of money received from a customer, a manual change-disburse area having a plurality of sorting locations for indicating sorts of money of change to be disbursed, a balance area and a designated amount area used in calculating the balance, and said display surface further including a registration area for indicating the data to be subsequently displayed on the transaction area and the money sorting area; a data input unit including a keyboard; a cash handler for automatically calculating bills and coins received and for automatically disbursing change due; and a controller for the display unit, the data input unit and the cash handler, said controller including a memory for storing money sort data, wherein said method comprises:

first step of storing money sort data in a location in the memory of said controller when data corresponding to the sorts of received money is inputted to one or more of the manual handling area sorting locations of said money sorting area;

second step of determining the priority between data input corresponding to the money-amount of a transaction and data input corresponding to the sorts of received money in accordance with data stored in the memory when the actual money amount of said transaction is displayed on the transaction display area;

third step of displaying the money amount of said transaction on the designated amount area of said money sorting area in accordance with the money amount of transaction displayed on said transaction display area when it is determined that the data input corresponding to said transaction money amount has priority over the data input corresponding to the sorts of money to be displayed on said money sorting area;

fourth step of displaying the sorts of received money on corresponding locations of the manual handling area of the money sorting area;

fifth step of summing the data corresponding to the sorts of received money displayed on said corresponding locations of the manual handling area;

sixth step of subtracting the amount displayed on the designated amount area from the sum corresponding to the amounts displayed on the manual handling area sorting locations, and displaying the subtraction result on the balance area;

seventh step of displaying the balance on respective sorting locations of the manual change-disburse area of said money sorting area in accordance with the amount displayed on the balance area;

eighth step of summing the data corresponding to the sorts

of respective sorting locations on the manual change-disburse area; and  
 ninth step of subtracting the amount displayed on the respective sorting locations of the manual change-disburse area from the amount corresponding to the sum of the manual handling sorting locations, subtracting the amount displayed on the designated amount area from the subtraction result, and displaying the subtraction result on the balance area.

4,947,480

# MULTICHANNEL SIGNAL ENHANCEMENT

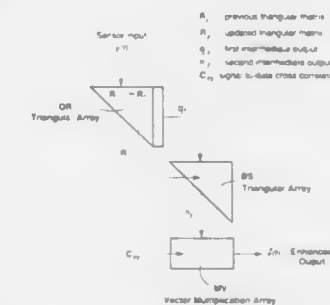
Paul S. Lewis, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 31, 1988, Ser. No. 264,722

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364-572

9 Claims



1. A mixed adaptive filter for generating enhanced signal data from successive sensor input data using a known signal-to-data cross correlation, comprising:

first processor means connected in a first triangular array for rotating second sensor input data into a first stored triangular matrix functionally related to first sensor input data to form a second triangular matrix and having an output column for outputting a first intermediate output;

second processor means connected in a second triangular array for back substituting said first intermediate output into said second triangular matrix to form a second intermediate output; and

third processor means for combining said second intermediate output with said known signal-to-data cross correlation to output said enhanced signal data.

7. A process for generating an enhanced MEG output signal from sensor input data obtained in a single trial run including an evoked response from a selected stimulus, comprising the steps of:

obtaining first sensor data;  
 generating an initial triangular matrix and an autocorrelation matrix from said first sensor data;  
 storing said initial triangular matrix in a corresponding triangular array of data processors;  
 obtaining second sensor data during said selected stimulus;  
 processing said second sensor data through said triangular array in a first direction by updating said initial triangular matrix to form successive triangular matrices by successive rotations and to output successive first intermediate outputs;

successively processing said first intermediate outputs by back substitution with a corresponding one of said successive triangular matrices in a second direction through said triangular array to form successive second intermediate outputs; and

converting said successive second intermediate outputs with said autocorrelation matrix to form said enhanced MEG output signal.

4,947,481

# INFORMATION READER FOR DISK PLAYER

Yuji Ikeda; Takahiro Okajima, and Yasuyuki Tashiro, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 4, 1988, Ser. No. 188,342

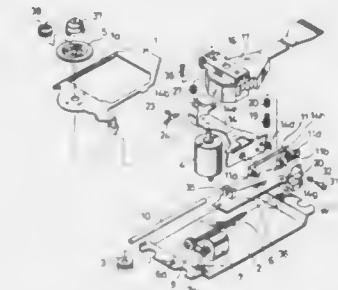
Claims priority, application Japan, May 9, 1987, 62-113174;

May 9, 1987, 62-113175; May 9, 1987, 62-113176

Int. Cl.<sup>5</sup> G11B 3/10

U.S. Cl. 369-215

9 Claims



1. An information reader for a disk player having a turntable for supporting a disk on a surface thereof, said information reader comprising:

a carriage for carrying an optical pickup;  
 a carriage guiding means for guiding said carriage; and  
 a driving means for moving said carriage along said guiding means, said guiding means being constituted by a pair of parallel guiding members extending radially of said turntable, said carriage having a first carrying member in contact with one of said guiding members at two points and a second carrying member rotatably attached at one portion thereof to said first carrying member and in contact at another portion thereof with the other one of said guiding members, said second carrying member having a rotational axis perpendicular to the longitudinal direction of said guiding members, disposed in a guide plane containing said pair of guiding members, and passing through a point where said second carrying member contacts said other guiding member.

4,947,482

# STATE ANALOG NEURAL NETWORK AND METHOD OF IMPLEMENTING SAME

Paul B. Brown, Morgantown, W. Va., assignor to West Virginia University, Morgantown, W. Va.

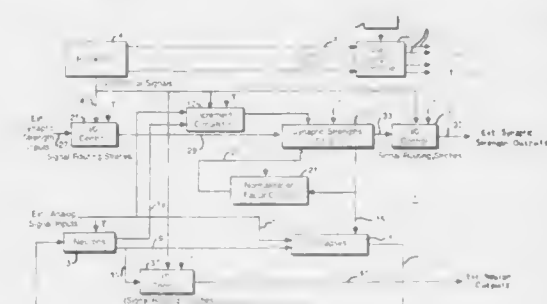
Continuation of Ser. No. 7/064,097, Jun. 18, 1987, abandoned.

This application Jul. 25, 1989, Ser. No. 385,984

Int. Cl.<sup>5</sup> G06G 7/12

U.S. Cl. 364-807

15 Claims



1. A neural network comprising:  
 a plurality of neuron circuits each including an analog circuit for computing an analog neuron output signal from



applied input signals, and neuron memory means for storing the value of said analog neuron output signal;

a plurality of synapse circuits each including an analog circuit for computing an analog synapse output signal from an applied input signal, and an analog synaptic strength signal which, for at least some of the synapse circuits, is variable;

synaptic strength circuits, including for variable synaptic strengths, synaptic strength memory means storing the variable analog synaptic strength signals for selected synapses, and means for modifying said stored variable analog synaptic strength signals;

means interconnecting said neuron and synapse circuits in a selected array of parallel paths, with said analog neuron output signals applied as input signals to selected synapse circuits, and the analog synapse signals applied as input signals to selected neuron circuits, and applying said variable analog synaptic strength signals as applied inputs to selected synapse circuits; and

control means generating clock pulses;

said neuron memory means and said synaptic strength memory means comprising state analog memory devices storing applied analog signals as stored analog signals only in response to selected clock pulses while making the stored analog signals continuously available, each said state analog memory device including an analog storage element having master and slave sample and hold circuits connected in series with the master sample and hold circuit connected to receive the applied signal, and with the slave sample and hold circuit continuously generating an output voltage representative of the stored analog signal, and wherein said master sample and hold circuit is responsive to a first clock pulse in a pair of clock pulses to sample and store said applied signal and said slave sample and hold circuit is responsive to a second clock pulse in said pair of clock pulses subsequent in time to said first clock pulse to sample and store the signal stored in said master sample and hold circuit as the stored analog signal such that said analog circuits repetitively generate said analog neuron output signals, synapse output signals, and synaptic strength signals in successive separate states determined by said pairs of clock pulses using stabilized analog values stored in said slave sample and hold circuits of said state analog memory devices during the previous state determined by the previous pair of clock pulses.

4,947,483

**PROCESS FOR TRANSMISSION OF ANALOG AND/OR DIGITAL INFORMATION, ESPECIALLY WITH AN IN-LINE ARRANGEMENT OF ONE, TWO OR MORE EXCHANGES IN TELECOMMUNICATIONS SYSTEMS**

Josef Dirr, Neufahrner Strasse 5, D-8000 Munchen 80, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 147,455

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1987, 3702202

Int. Cl.<sup>5</sup> H04L 5/06

U.S. Cl. 370—30

21 Claims

1. In a telecommunication system of the kind comprising:

a plurality of subscriber stations each capable of generating electrical output signals representative of information, in a given initial frequency range, and each capable of utilizing electrical input signals in the given initial frequency range to reproduce information represented thereby;

an exchange;

a plurality of subscriber lines, each connecting one subscriber station to the exchange; and

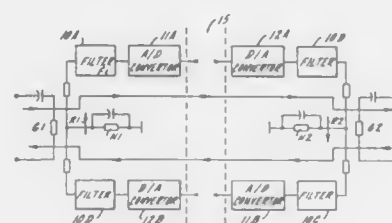
a long distance line connected to the exchange;

the exchange including exchange switching means for connecting each subscriber line to each other subscriber line for local communication and to connect each subscriber line to the long distance line for long distance communication;

the system improvement comprising:

the long distance line comprising two branches, an outgoing branch for transmission of the output signals from a subscriber station as outgoing signals to a distant location and an incoming branch for transmission of incoming signals from a distant location;

said outgoing branch including frequency shifting means for shifting the frequency of an output signal on that branch to produce a frequency shifted outgoing signal;



said outgoing branch further including filter means, interposed between said exchange and said frequency shifting means, for blocking frequency shifted incoming signals;

each subscriber station comprising signal separation means for maintaining input signals separate from output signals; and

each subscriber station comprising demodulator means for demodulating an incoming frequency shifted signal to develop an input signal utilizable for reproduction by the subscriber station.

4,947,484

**PROTOCOL FOR NETWORK HAVING A PLURALITY OF INTELLIGENT CELLS**

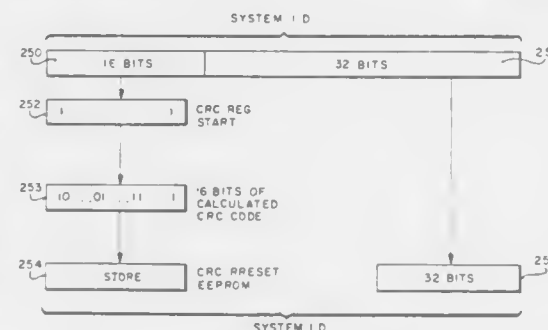
William B. Twitty, Santa Cruz, and Wendell B. Sander, Los Gatos, both of Calif., assignors to Echelon Systems Corporation, Los Gatos, Calif.

Division of Ser. No. 434,566, Nov. 8, 1989, which is a continuation of Ser. No. 119,382, Nov. 10, 1987, abandoned. This application Nov. 8, 1988, Ser. No. 268,933

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371—37.1

10 Claims



1. In a network for sensing, communicating and controlling, where packets are communicated between a plurality of cells, an improved method for including in said packets representa-

tions of a system identification number of N bits comprising the steps of:

including a portion of said N bit identification number in a field within each of said packets;

using the remaining bits of said N bit identification number in the calculation of a cyclic redundancy code (CRC), said CRC calculation including other fields in said packet;

transmitting the results of said CRC calculation with said packet.

4,947,485

**METHOD FOR OBTAINING LOAD-FOLLOWING CAPABILITY IN NATURAL CIRCULATION, FREE-SURFACE SEPARATION BOILING WATER REACTORS**

Willem J. Oosterkamp, Los Gatos, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Jul. 24, 1989, Ser. No. 383,787

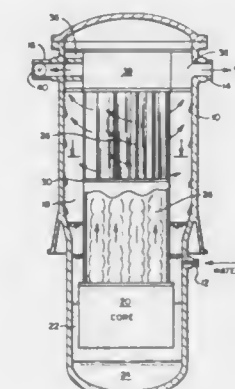
Int. Cl.<sup>5</sup> G21C 7/32; G21D 3/14

U.S. Cl. 376—210

2 Claims

1. In a natural-circulation boiling water reactor (BWR) of the free-surface separation type wherein housed within a reactor pressure vessel (RPV) is a nuclear core which with the RPV defines an annulus region which is in flow communication with a core lower plenum region disposed beneath said nuclear core, a first upper steam dryer assembly connected to a steam outlet in said RPV, a chimney mounted atop said core and in fluid communication with said first upper steam dryer assembly, the region outside of said chimney defining a downcomer region which also is in fluid communication with said chimney, free-surface steam separation occurring within said chimney, and a feedwater inlet disposed in said RPV, the improvement for obtaining load-following capability, which comprises:

a riser extension comprising a plurality of upstanding vanes



comer region in fluid communication with said second upper steam dryer assembly, whereby a fraction of the steam passing through said riser extension will be guided by said vanes to pass into said downcomer region and impinge upon the RPV for separation of liquid water therefrom, and said flow-restricting valve controlling the amount of steam that passes into said second steam dryer assembly.

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## DESIGNS

AUGUST 7, 1990

309,665

## TRAVELER'S JACKET

Elaine Mosley, 5324 3rd Ave. West, Bradenton, Fla. 34209

Filed Nov. 29, 1988, Ser. No. 277,218

Term of patent 14 years

U.S. Cl. D2—190



309,666

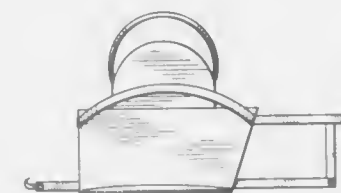
## GARMENT SHIELD

Barbara Gold, 123 Chestnut St., Watertown, N.Y. 13601

Filed Jun. 22, 1988, Ser. No. 210,287

Term of patent 14 years

U.S. Cl. D2—225



309,667

## SHOE UPPER

Michael A. Aveni, Lake Oswego, Oreg., assignor to Nike, Inc.

and Nike International, Ltd., Beaverton, Oreg.

Filed Jun. 30, 1989, Ser. No. 373,488

Term of patent 14 years

U.S. Cl. D2—314



309,668

## SHOE SOLE

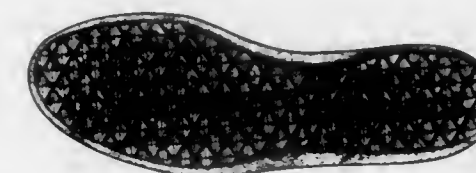
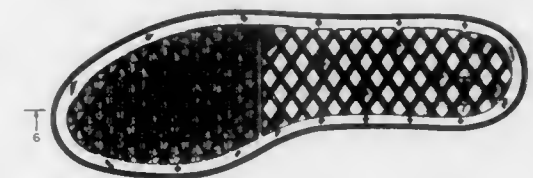
Jules Schneider, New York, N.Y., assignor to What's What, Inc.,

New York, N.Y.

Filed Nov. 17, 1988, Ser. No. 272,657

Term of patent 14 years

U.S. Cl. D2—320



309,669

## SHOE SOLE

Takashi Arai, Kobe, Japan, assignor to Asics Corporation, Kobe, Japan

Filed Oct. 21, 1988, Ser. No. 261,002

Term of patent 14 years

U.S. Cl. D2—320





309,670  
SHOE SOLE

Luiz P. C. Mendonca, Leblon, Brazil, assignor to Candida Andrade Acessorios de Moda Ltda., Rio de Janeiro, Brazil  
Filed Dec. 29, 1987, Ser. No. 139,331  
Claims priority, application Brazil, Jul. 31, 1986, MU 6601251

Term of patent 14 years  
U.S. Cl. D2—321



309,672  
UMBRELLA

William E. Gillespie, 213 - 2025 West 2nd Avenue, Vancouver, British Columbia, Canada (V6J 1J6), and Antonio A. Sarmiento, 2833 E. 21st Avenue, Vancouver, British Columbia, Canada (V5M 2W5)

Filed Jul. 22, 1988, Ser. No. 222,732  
Term of patent 14 years

U.S. Cl. D3—6

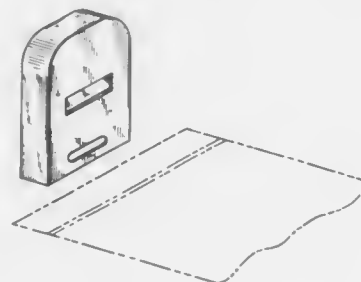


309,673  
BEACH BAG

James E. Alexander, 1481 N. Innsbruck Dr., Fridley, Minn. 55432

Filed Apr. 10, 1987, Ser. No. 36,705  
Term of patent 14 years

U.S. Cl. D3—30.1



309,671

COMBINED HOOD AND SCARF

Eve E. Kassel, 7527 Fanlight Cir., Manlius, N.Y. 13104  
Filed Dec. 8, 1986, Ser. No. 939,469

Term of patent 14 years  
U.S. Cl. D2—515

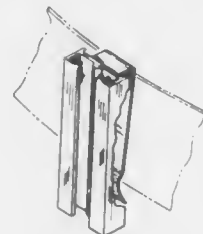


309,674

GUITAR PICK HOLDER

Casey N. Gervase, 33 Longnecker St., Buffalo, N.Y. 14206  
Filed Dec. 2, 1988, Ser. No. 279,133

Term of patent 14 years  
U.S. Cl. D3—30.1

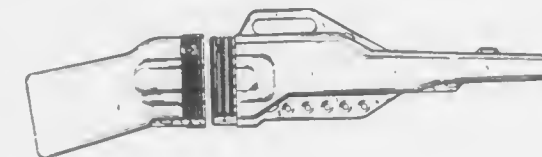


309,675  
HARD COVER GUN CASE

Ronald N. Kolpin, Berlin, Wis., assignor to Kolpin Manufacturing, Inc., Berlin, Wis.

Filed May 24, 1988, Ser. No. 198,317  
Term of patent 14 years

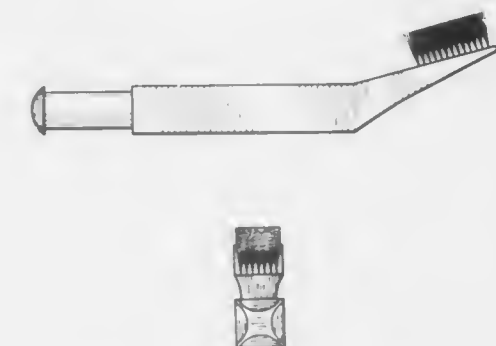
U.S. Cl. D3—30.1



309,678  
DISPOSABLE TOOTHBRUSH

Lynn E. Jones, 7110 C NE. 43rd St., Vancouver, Wash. 98661  
Filed Dec. 10, 1987, Ser. No. 130,978

Term of patent 14 years  
U.S. Cl. D4—104

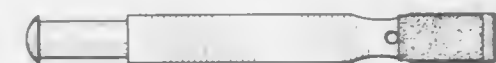


309,676  
EYEGLASS CASE

Yoram Alroy, Tampa, Fla., assignor to Designer Products Est., Vaduz, Liechtenstein

Filed Oct. 21, 1988, Ser. No. 261,472  
Term of patent 14 years

U.S. Cl. D3—34



309,679

PICTURE VIEWER

Peter Ackeret, Kusnacht, Switzerland, assignor to Licinvest AG, Chur, Switzerland

Continuation-in-part of Ser. No. 933,179, Nov. 21, 1986. This application Feb. 24, 1987, Ser. No. 17,797

Claims priority, application World Int. Prop. O., Aug. 25, 1986, DM/007394

Term of patent 14 years  
U.S. Cl. D6—311

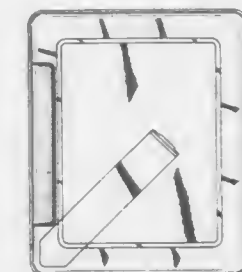


309,677  
PURSE

Willie J. Yelder, and Ethel L. Yelder, both of 2501 Manistique, Detroit, Mich. 48215

Filed Nov. 13, 1986, Ser. No. 930,855  
Term of patent 14 years

U.S. Cl. D3—42



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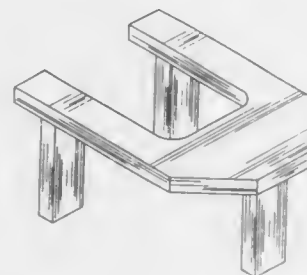
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309,680  
FOOTSTOOL

Charles B. Gusty, 9964 Seminole, Redford, Mich. 48239  
Filed Nov. 10, 1986, Ser. No. 929,654  
Term of patent 14 years  
U.S. Cl. D6—349



309,683  
TABLE

Ruth Solomon, 500 Kingridge Dr., Ballwin, Mo. 63011, and  
Harvey J. Rosenberg, 217 S. Green Trails, Chesterfield, Mo.  
63017  
Filed May 17, 1989, Ser. No. 353,354  
Term of patent 14 years  
U.S. Cl. D6—450



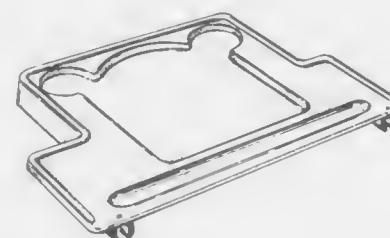
309,681  
STOOL

Ruth Solomon, 500 Kingridge Dr., Ballwin, Mo. 63011, and  
Harvey J. Rosenberg, 217 S. Green Trails, Chesterfield, Mo.  
63017  
Filed May 17, 1989, Ser. No. 353,382  
Term of patent 14 years  
U.S. Cl. D6—351



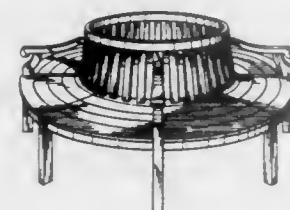
309,684  
ATTACHMENT TRAY FOR A WALKER OR SIMILAR  
ARTICLE

Kathlene M. Kohler, 4351 S. Galapago St., Denver, Colo. 80110  
Filed Jun. 5, 1987, Ser. No. 58,746  
Term of patent 14 years  
U.S. Cl. D6—511

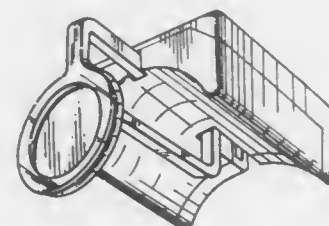


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CIRCULAR SETTEE

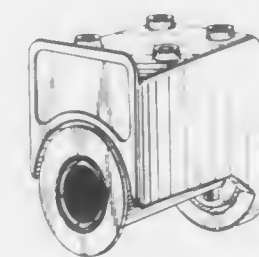
William J. Fisher, Rockland, Me., assignor to Imagineering,  
Inc., Rockland, Me.  
Filed Jan. 12, 1987, Ser. No. 2,184  
Term of patent 14 years  
U.S. Cl. D6—381



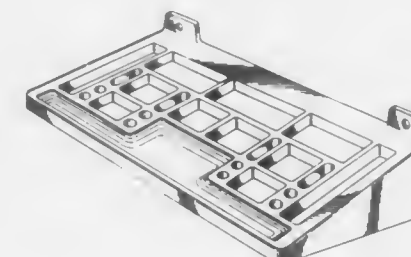
309,685  
HANGER TROLLEY FOR LUGGAGE  
William L. King, Denver, Colo., assignor to Samsonite Corpora-  
tion, Denver, Colo.  
Filed Sep. 25, 1987, Ser. No. 101,332  
Term of patent 14 years  
U.S. Cl. D6—513



309,686  
SUPPORT FOR CLOTHES HANGERS  
William L. King, Denver, Colo., assignor to Samsonite Corpora-  
tion, Denver, Colo.  
Filed Feb. 4, 1988, Ser. No. 152,603  
Term of patent 14 years  
U.S. Cl. D6—513



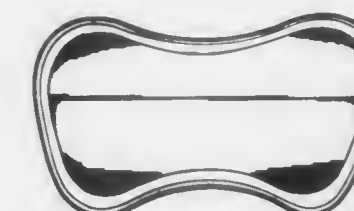
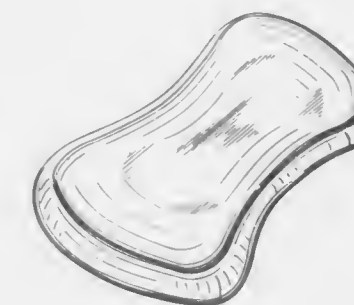
309,687  
TOOL RACK  
Donald Embree, Copley, and David L. Hamann, Cincinnati, both  
of Ohio, assignors to Rubbermaid Incorporated, Wooster,  
Ohio  
Filed Jun. 29, 1988, Ser. No. 213,160  
Term of patent 14 years  
U.S. Cl. D6—567



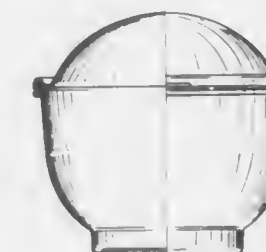
309,688  
CUSHION  
Yoko Hashimoto, Kanagawa, Japan, assignor to Iwaya Corpora-  
tion, Tokyo, Japan  
Filed Apr. 18, 1988, Ser. No. 182,752  
Claims priority, application Japan, Jan. 30, 1988, 63-3581  
Term of patent 14 years  
U.S. Cl. D6—598



309,689  
PILLOW  
Robert Bool, 62 Victoria Street, Balmoral Heights, Queensland,  
4171, Australia  
Filed Oct. 19, 1988, Ser. No. 260,322  
Claims priority, application Australia, Apr. 21, 1988, 1267/88  
Term of patent 14 years  
U.S. Cl. D6—601



309,690  
COMBINED STORAGE CONTAINER AND LID FOR  
LETTUCE OR THE LIKE  
Arthur R. Carlson, East Malvern, Australia, assignor to The  
Decor Corporation Pty. Ltd., Victoria, Australia  
Continuation of Ser. No. 781,355, Sep. 27, 1985, abandoned. This  
application Oct. 26, 1988, Ser. No. 266,274  
Term of patent 14 years  
U.S. Cl. D7—629



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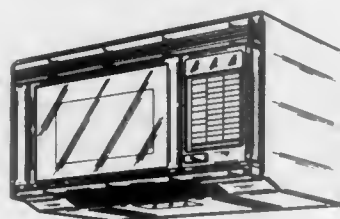
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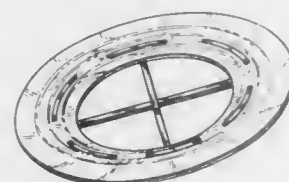
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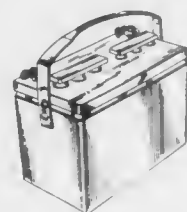
309,691  
MICROWAVE OVEN  
Masafumi Yamagami, and Junichi Saito, both of Osaka, Japan,  
assignors to Sharp Corporation, Osaka, Japan  
Filed Sep. 27, 1988, Ser. No. 250,127  
Claims priority, application Japan, Mar. 31, 1988, 63-13361  
Term of patent 14 years  
U.S. Cl. D7—351



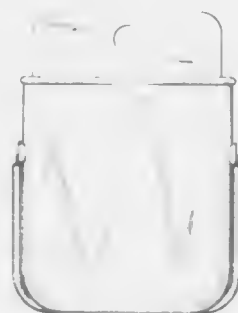
309,692  
PIZZA GRIDDLE  
Everett D. Strand, 4317 Dupont Ave. South, Minneapolis, Minn.  
55409  
Filed Mar. 19, 1987, Ser. No. 27,672  
Term of patent 14 years  
U.S. Cl. D7—354



309,693  
COMBINED INSULATED FOOD AND BEVERAGE  
CONTAINER  
Gabor Kadar, 8628 Darby Ave., Unit B, Northridge, Calif. 91325  
Filed Dec. 22, 1987, Ser. No. 136,749  
Term of patent 14 years  
U.S. Cl. D7—606



309,694  
CUTLERY CENTER  
Jane Ancona, and Bruce Ancona, both of New York, N.Y.,  
assignors to M. Kamenstein, Inc., White Plains, N.Y.  
Filed Jan. 8, 1990, Ser. No. 461,764  
Term of patent 14 years  
U.S. Cl. D7—638



309,695  
CHOP STICK FORK  
Donald Bonasia, 100 N. Clark Dr. #103, Los Angeles, Calif.  
90048  
Filed Dec. 21, 1987, Ser. No. 135,285  
Term of patent 14 years  
U.S. Cl. D7—644



309,696  
HANDLE FOR FLATWARE  
Christopher J. Callinan, Centerport, N.Y., assignor to Regent  
Sheffield, Ltd., Farmingdale, N.Y.  
Filed Dec. 29, 1987, Ser. No. 139,041  
Term of patent 14 years  
U.S. Cl. D7—649



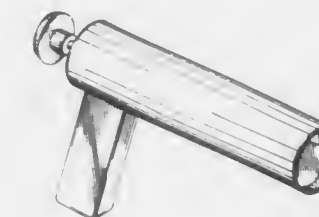
309,697  
CULINARY TOOL FOR SHAPING BISCUITS, ICING OR  
THE LIKE  
Shun SO, 342-344 Kwun Tong Road, 2/F., Block A & B, Chuan  
Yuan Factory Building, Kwun Tong, Kowloon, Hong Kong  
Filed Jun. 29, 1988, Ser. No. 213,986  
Claims priority, application United Kingdom, Jan. 21, 1988,  
1047859  
Term of patent 14 years  
U.S. Cl. D7—672



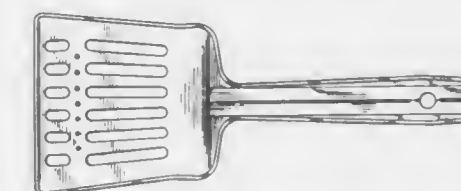
309,698  
CONDIMENT MILL  
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505  
Filed Nov. 10, 1988, Ser. No. 270,107  
Term of patent 14 years  
U.S. Cl. D7—679



309,699  
ICE CREAM DISPENSING DEVICE OR SIMILAR  
ARTICLE  
Kelley O. Adams, 405 E. Carson Dr., Tempe, Ariz. 85282  
Filed Nov. 27, 1987, Ser. No. 126,293  
Term of patent 14 years  
U.S. Cl. D7—681



309,700  
SCOOP  
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries,  
Inc., Valley Forge, Pa.  
Filed Aug. 10, 1988, Ser. No. 230,501  
Term of patent 14 years  
U.S. Cl. D7—692



309,701

## VISE JAW INSERT

F. Craig Newmeyer, Niles, and Roderick L. Nitz, Garrettsville, both of Ohio, assignors to Warren Tool Corporation, Hiram, Ohio

Filed Aug. 31, 1987, Ser. No. 91,073

Term of patent 14 years

U.S. Cl. D8—74



309,702

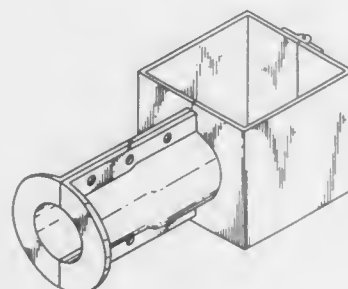
## SAFETY CLAMP ATTACHMENT FOR A HAMMER

Don Hall, 703 Florey St., Kilgore, Tex. 75662

Filed Jun. 25, 1986, Ser. No. 878,475

Term of patent 14 years

U.S. Cl. D8—80



309,703

## SLATE ROOF NAIL REMOVER

Tommy W. Walker, 6022 McNeely Rd., Corryton, Tenn. 37721

Filed Nov. 19, 1987, Ser. No. 122,669

Term of patent 14 years

U.S. Cl. D8—89



309,704

## HINGE WITH COVER THEREFOR

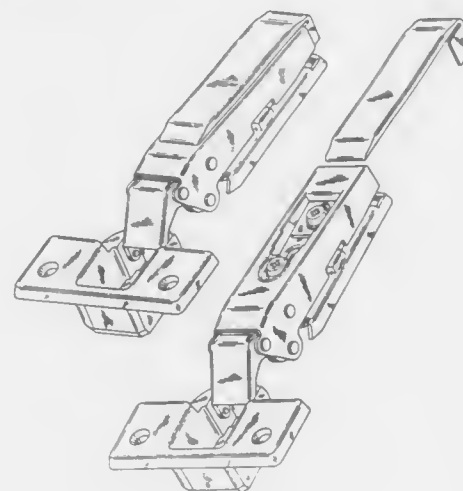
Alfred Grass, Höchst, Austria, assignor to Alfred Grass G.m.b.H., Höchst, Austria

Filed Mar. 7, 1988, Ser. No. 165,132

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1987, 28 467

Term of patent 14 years

U.S. Cl. D8—323



309,705

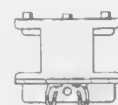
## DROP LIGHT HOLDER

Kenneth H. Rodden, 1845 E. Fox La., Newcastle, Okla. 73065

Filed Aug. 24, 1987, Ser. No. 88,853

Term of patent 14 years

U.S. Cl. D8—373



309,706

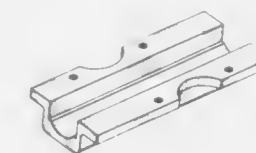
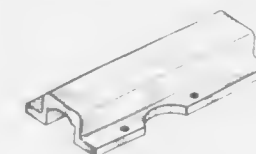
## HANGER BRACKET FOR ATTACHING A FIXTURE TO CEILING HANGER ASSEMBLY

Clarence E. Propp, College Station, Tex., assignor to J. Russell Kerr, Jr., Bryan, Tex.

Filed Aug. 7, 1987, Ser. No. 83,422

Term of patent 14 years

U.S. Cl. D8—373



309,707

## SCANNER HOOK ADAPTOR

Richard D. Barnes, 2156 E. Chester Ridge Dr., High Point, N.C. 27260

Filed Oct. 8, 1987, Ser. No. 105,903

Term of patent 14 years

U.S. Cl. D8—381



309,708

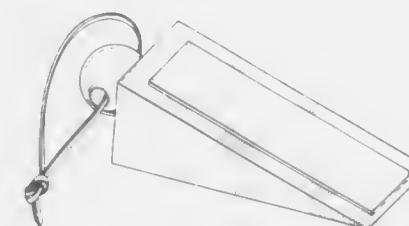
## DOORSTOP

Margery M. Rosa, and Gene Rosa, both of 3-N, 9 Main St., Orleans, Mass. 02653

Filed Sep. 3, 1987, Ser. No. 92,700

Term of patent 14 years

U.S. Cl. D8—402



309,709

## BOTTLE

Seong H. Cho, 892, Dongmun-Ri Seosan-Ub, Seosan-Gun, Chungcheong-Namdo, Rep. of Korea

Filed Oct. 30, 1986, Ser. No. 925,149

Term of patent 14 years

U.S. Cl. D9—351



309,710

## LIDDED CONTAINER

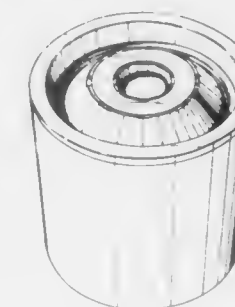
Michael H. Groves, Warwick, England, assignor to Imperial Chemical Industries Public Limited Co., London, England

Filed Aug. 14, 1987, Ser. No. 85,411

Claims priority, application United Kingdom, Feb. 19, 1987, 1040105

Term of patent 14 years

U.S. Cl. D9—352



309,711

## BOTTLE

Frederick N. Biesecker, Boyertown, Pa., assignor to Drug Plastics and Glass Company, Inc., Boyertown, Pa.

Filed Oct. 27, 1987, Ser. No. 116,115

Term of patent 14 years

U.S. Cl. D9—355



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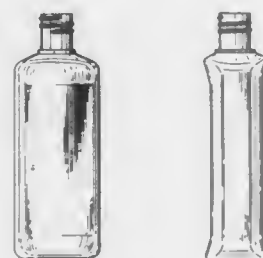
**309,712**  
**COMBINED BOTTLE AND CLOSURE**  
 Edward A. Bezek, Bergenfield, N.J.; David S. Laubach, New York, and Steven P. Walton, Kew Gardens, both of N.Y., assignors to Lever Brothers Company, New York, N.Y.  
 Filed Nov. 10, 1987, Ser. No. 123,613  
 Term of patent 14 years  
 U.S. Cl. D9—377



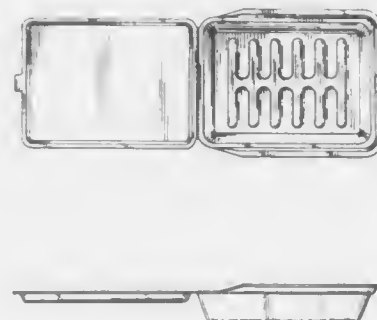
**309,713**  
**BOTTLE**  
 John J. Suetta, Puyallup, Wash., assignor to Northwest Containers, Inc., Tacoma, Wash.  
 Filed Mar. 2, 1987, Ser. No. 20,339  
 Term of patent 14 years  
 U.S. Cl. D9—403



**309,714**  
**BOTTLE**  
 Frederick N. Biesecker, Boyertown, Pa., assignor to Drug Plastics and Glass Company, Inc., Boyertown, Pa.  
 Filed Oct. 27, 1987, Ser. No. 116,112  
 Term of patent 14 years  
 U.S. Cl. D9—404



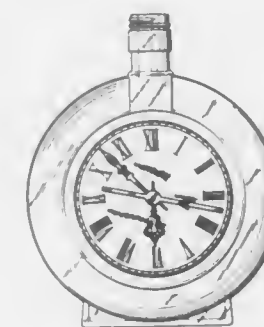
**309,715**  
**PIZZA CONTAINER**  
 Helmut Kuerti, Bedford, N.H., assignor to New England Tray, Ltd., Manchester, N.H.  
 Filed Jul. 18, 1988, Ser. No. 220,822  
 Term of patent 14 years  
 U.S. Cl. D9—424



**309,716**  
**TWO PIECE CONTAINER CAP**  
 Yasuo Umekawa, Chiba, Japan, assignor to Koatsu Gas Kogyo Co., Ltd., Osaka, Japan  
 Filed Apr. 7, 1987, Ser. No. 35,298  
 Term of patent 14 years  
 U.S. Cl. D9—449



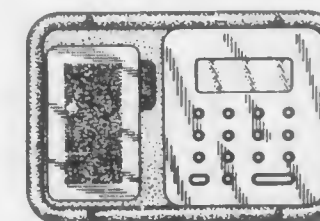
**309,717**  
**BOTTLE CLOCK**  
 Louis Azman, 6501 St. Clair Ave., Cleveland, Ohio 44103  
 Filed May 14, 1987, Ser. No. 49,461  
 Term of patent 14 years  
 U.S. Cl. D10—6



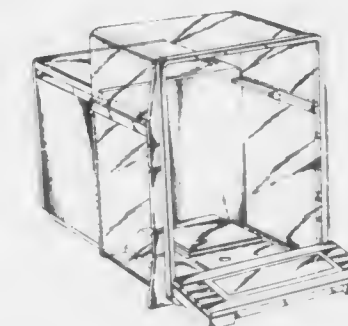
**309,718**  
**GLOBE CLOCK**  
 Ahmad Fotovat, 20134 Leadwell St., #372, Canoga Park, Calif. 91306  
 Filed Jul. 7, 1987, Ser. No. 70,534  
 Term of patent 14 years  
 U.S. Cl. D10—10



**309,719**  
**CLOCK**  
 Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan  
 Filed Jun. 8, 1987, Ser. No. 59,821  
 Claims priority, application Japan, Dec. 11, 1986, 61-49166  
 Term of patent 14 years  
 U.S. Cl. D10—15



**309,720**  
**ANALYTICAL BALANCE**  
 Peter F. Handlbauer, Valence, France; Michel H. Jacot, La Chaux-de-Fonds, Switzerland; Remy Jacquet, Le Locle, Switzerland, and Yves Marmier, La Chaux-de-Fonds, Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland  
 Filed Apr. 28, 1987, Ser. No. 43,293  
 Term of patent 14 years  
 U.S. Cl. D10—91



**309,721**  
**STICK-IN FOR FLORAL ARRANGEMENTS**  
 Daniel Goldman, Dix Hills, N.Y., assignor to Premier Sydel, Ltd., Bohemia, N.Y.  
 Filed Mar. 9, 1987, Ser. No. 23,282  
 Term of patent 14 years  
 U.S. Cl. D11—117



**309,722**  
**CHRISTMAS TREE HOLDER**  
 James W. Boggan, and Tamela L. Boggan, both of 36421 Tinker Rd., Pleasant Hill, Ore. 97455  
 Filed Nov. 7, 1988, Ser. No. 267,923  
 Term of patent 14 years  
 U.S. Cl. D11—130.1



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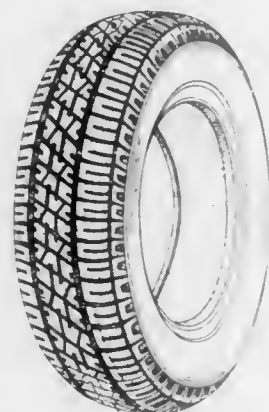
309,723

**TIRE FOR VEHICLES**

Nigel G. Nock; John Martin, both of Birmingham, and David H. Clarke, Walsall, all of England, assignors to SP Tyres UK Limited, Birmingham, United Kingdom

Filed Sep. 25, 1987, Ser. No. 101,158  
Claims priority, application United Kingdom, Mar. 27, 1987, 1041094

Term of patent 14 years  
U.S. Cl. D12—146



309,724

**LIGHTED MUD FLAP**

J. Ben Jurgens, R.R. 2, Box 152A2, Buffalo, Mo. 65622  
Filed Feb. 8, 1988, Ser. No. 153,666

Term of patent 14 years  
U.S. Cl. D12—185

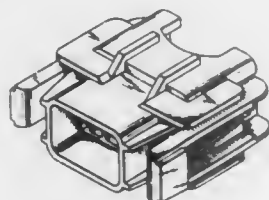


309,725

**ELECTRICAL CONNECTOR**

Thomas R. O'Grady, Fort Wayne, Ind., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Oct. 13, 1987, Ser. No. 107,815  
Term of patent 14 years  
U.S. Cl. D13—133



309,726

**TELEPHONE HANDSET**

Yoshio Sasaki; Hiroyoshi Sato, both of Kawasaki; Iwamasa Nishikado, and Tsuneji Kimeda, both of Yokosuka, all of Japan, assignors to Nitsuko Limited and Nippon Telegraph and Telephone Corporation, both of Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 922,102  
Claims priority, application Japan, May 13, 1986, 61-17655  
Term of patent 14 years  
U.S. Cl. D14—248

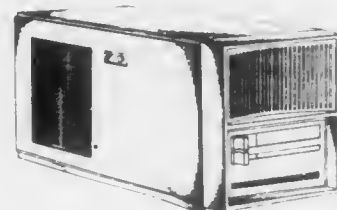


309,727

**COMPUTER HOUSING FOR PERIPHERAL UNITS**

Dennis C. Stead, South Orleans, Mass., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Mar. 30, 1988, Ser. No. 175,139  
Term of patent 14 years  
U.S. Cl. D14—100

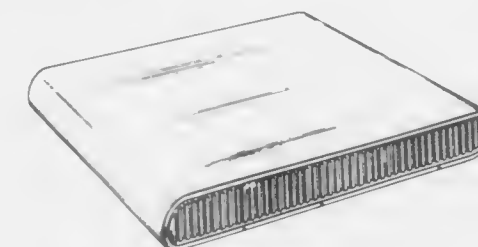


309,728

**PROCESSOR FOR COMPUTER WORK STATION OR SIMILAR ARTICLE**

Michael J. Nuttall, Palo Alto, and Nelson S. Au, Foster City, both of Calif., assignors to Bell & Howell Publication Systems Company, Skokie, Ill.

Filed Sep. 7, 1988, Ser. No. 241,546  
Term of patent 14 years  
U.S. Cl. D14—100



309,729

**DATA ENTRY TERMINAL**

Zenya Tanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 26, 1988, Ser. No. 236,779  
Claims priority, application Japan, Feb. 26, 1988, 63-7386  
Term of patent 14 years  
U.S. Cl. D14—100

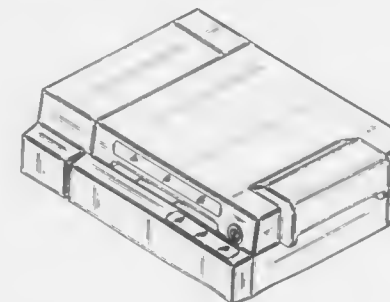


309,730

**READER WITH FEEDER FOR ELECTRONIC FILING SYSTEM**

Tooru Makidera, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Apr. 13, 1987, Ser. No. 37,404  
Claims priority, application Japan, Oct. 17, 1986, 61-41431  
Term of patent 14 years  
U.S. Cl. D14—105

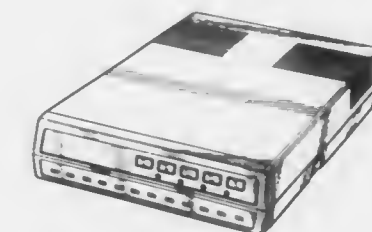


309,731

**MODEM CABINET**

Kazuhito Takai, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 272,251  
Claims priority, application Japan, May 18, 1988, 63-19190[U]  
Term of patent 14 years  
U.S. Cl. D14—107

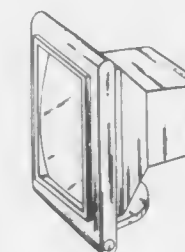


309,732

**INFORMATION DISPLAY MONITOR OR SIMILAR ARTICLE**

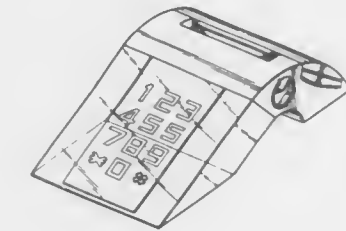
Michael J. Nuttall, Palo Alto, and Nelson S. Au, Foster City, both of Calif., assignors to Bell & Howell Publication Systems Company, Skokie, Ill.

Filed Sep. 7, 1988, Ser. No. 241,548  
Term of patent 14 years  
U.S. Cl. D14—113

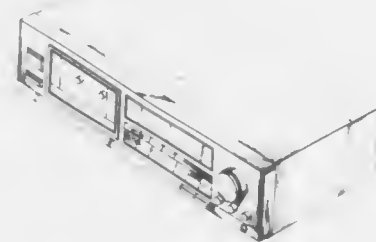




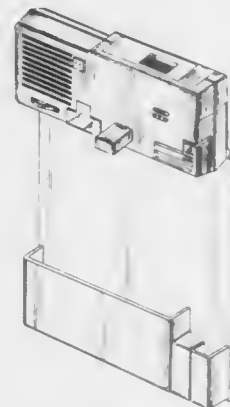
309,733  
TELEPHONE HOUSING  
Walter W. Yuan, 3900 E. Whiteside St., Los Angeles, Calif. 90063  
Filed Oct. 21, 1987, Ser. No. 111,974  
Term of patent 14 years  
U.S. Cl. D14—150



309,735  
TAPE RECORDER  
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Haruki Takita, Hachioji, and Minoru Sube, Hachioji, all of Japan, assignors to Teac Corporation, Tokyo, Japan  
Filed Jun. 21, 1988, Ser. No. 210,648  
Claims priority, application Japan, Jan. 13, 1988, 63-1012  
Term of patent 14 years  
U.S. Cl. D14—164



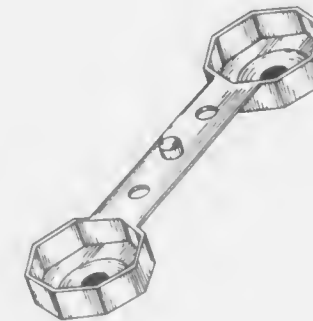
309,734  
COMBINED ELECTRONIC MESSAGE CENTER AND ORGANIZER  
Edward H. Mackin, Atlantic Highlands, N.J., assignor to Maverick Industries, Inc., Union, N.J.  
Filed Oct. 14, 1987, Ser. No. 108,572  
Term of patent 14 years  
U.S. Cl. D14—162



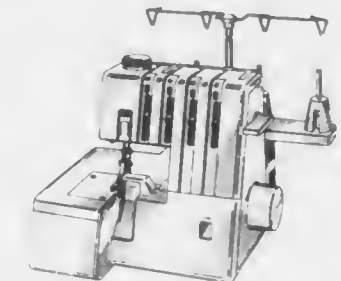
309,736  
AUTOMOBILE RADIO ANTENNA  
Pierre Charet, and Duke Kraai, both of Miami, Fla., assignors to Rally Accessories, Inc., Miami, Fla.  
Filed Jan. 6, 1988, Ser. No. 141,341  
Term of patent 14 years  
U.S. Cl. D14—234



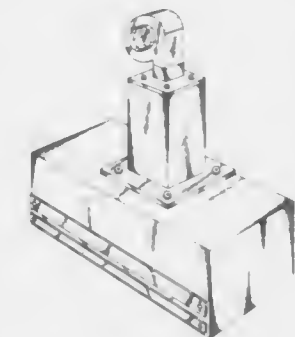
309,737  
STERILIZER CASING FOR A TELEPHONE HANDSET  
Ernest Gohlke, 277 Sherri Dr., Universal City, Tex. 78148  
Filed Jun. 8, 1989, Ser. No. 363,117  
Term of patent 14 years  
U.S. Cl. D14—249



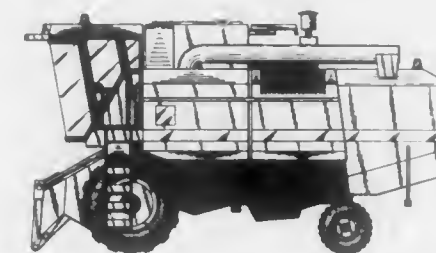
309,739  
SEWING MACHINE  
Kazuo Itoh, Aichi, and Yasuyo Isaji, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan  
Filed Mar. 10, 1988, Ser. No. 166,190  
Term of patent 14 years  
U.S. Cl. D15—69



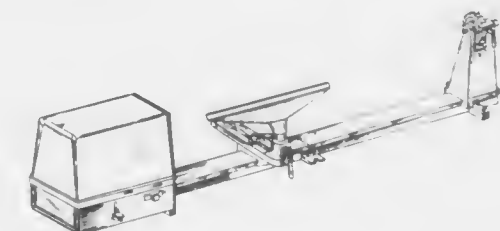
309,740  
MACHINE FOR SEPARATING FABRIC WITH HOT AIR  
Edgar F. Moore, III, 4447 Old Randleman Rd., Greensboro, N.C. 27405  
Filed Sep. 16, 1988, Ser. No. 245,077  
Term of patent 14 years  
U.S. Cl. D15—77



309,738  
SELF-PROPELLED THRESHER  
Gunter Schober, Bautzen; Erhard Noack, Pottschappelitz; Winfried Richter, Singwitz; Horst Pinkan, Wilthen, and Wolf-Carsten Löbel, Malschwitz, all of German Democratic Rep., assignors to VEB Kombinat Fortschritt Landmaschinen, Neustadt, German Democratic Rep.  
Filed Sep. 18, 1986, Ser. No. 909,407  
Claims priority, application German Democratic Rep., Mar. 20, 1986, U5152  
Term of patent 14 years  
U.S. Cl. D15—26



309,741  
WOOD LATHE  
Robert W. Arehart; Raymond W. Peeler; Keith F. Kraus, all of Chicago, Ill., and Roger O. Claghorn, Florissant, Mo., assignors to Emerson Electric Co., St. Louis, Mo.  
Filed Dec. 12, 1988, Ser. No. 283,935  
Term of patent 14 years  
U.S. Cl. D15—130



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## TWO SPINDLE FACETER

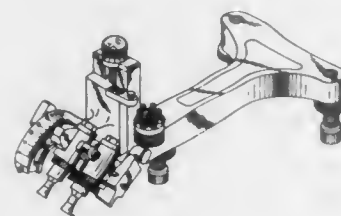
Takahiro Imahashi, 3-21-25, Higashi-Motomachi, Kokubunji, Tokyo, Japan

Filed Mar. 27, 1987, Ser. No. 30,611

Claims priority, application Japan, Nov. 10, 1986, 61-44414

Term of patent 14 years

U.S. Cl. D15-140



309,745

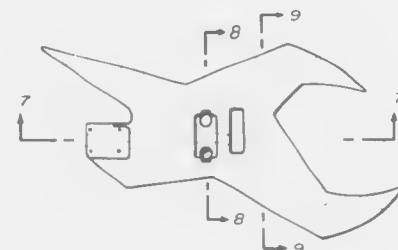
## ELECTRIC GUITAR BODY

Michael M. Matheny, 4531 Heyer Ave., Castro Valley, Calif. 94546

Filed Nov. 9, 1987, Ser. No. 118,633

Term of patent 14 years

U.S. Cl. D17-20



309,743

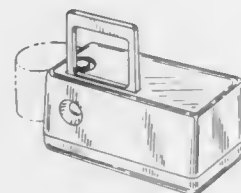
## MINIATURE CAMERA

Kwok Y. Chan, North Point, Hong Kong, assignor to W. Haking Enterprises Limited, North Point, Hong Kong

Filed Aug. 12, 1986, Ser. No. 895,742

Term of patent 14 years

U.S. Cl. D16-200



309,746

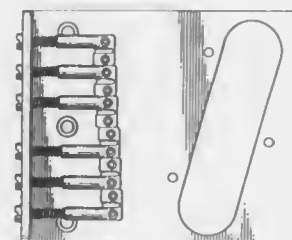
## BRIDGE ASSEMBLY FOR GUITARS

Charles A. Gressett, Jr., Brea, and Charles H. Todd, III, La Habra, both of Calif., assignors to Fender Musical Instruments Corporation, Brea, Calif.

Filed May 6, 1983, Ser. No. 491,104

Term of patent 14 years

U.S. Cl. D17-21



309,744

## ELECTRIC VIOLIN

Anthony D. Stumpf, 13,719 42nd Ave. East, Tacoma, Wash. 98446

Filed Dec. 14, 1987, Ser. No. 132,577

Term of patent 14 years

U.S. Cl. D17-17



309,747

## ELECTRONIC CALCULATOR WITH SOLAR CELL

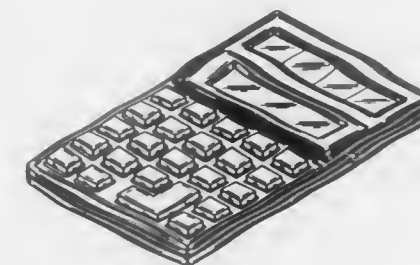
Hiroshi Sakaguchi, and Tadahiko Saimen, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Apr. 30, 1987, Ser. No. 44,451

Claims priority, application Japan, Nov. 5, 1986, 61-43765

Term of patent 14 years

U.S. Cl. D18-7



309,750

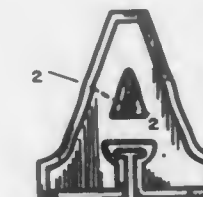
## DISPLAY LETTER OR SIMILAR ARTICLE

Thomas K. Abraham, 1317 University, Lubbock, Tex. 79401

Filed Dec. 22, 1986, Ser. No. 946,276

Term of patent 14 years

U.S. Cl. D18-24



309,748

## ELECTRONIC CALCULATOR

Naoki Kobayashi, Kawasaki, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

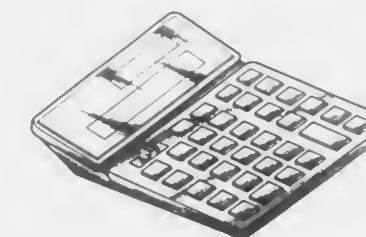
Filed Jun. 15, 1987, Ser. No. 62,822

Claims priority, application Japan, Feb. 6, 1987, 62-4387

The portion of the term of this patent subsequent to Oct. 11, 2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D18-7



309,751

## ELECTRONIC COPYING MACHINE

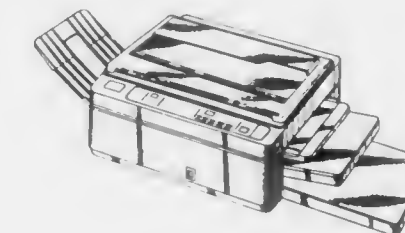
Mikio Kosako; Ritsuko Makihara, and Yoichi Tatsuta, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Apr. 30, 1987, Ser. No. 44,454

Claims priority, application Japan, Nov. 5, 1986, 61-43760

Term of patent 14 years

U.S. Cl. D18-39



309,749

## ELECTRONIC CALCULATOR

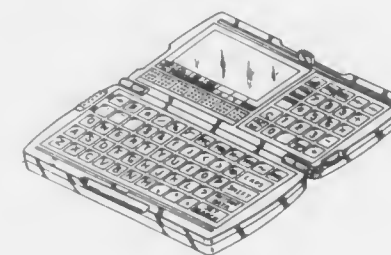
Yukinori Ido, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1987, Ser. No. 111,555

Claims priority, application Japan, May 19, 1987, 62-19745

Term of patent 14 years

U.S. Cl. D18-7



309,752

## TONER CARTRIDGE FOR A COPYING MACHINE

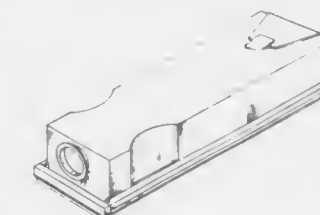
Yoshitake Miyoshi, Ikoma, Japan, assignor to Mita Industries Co., Ltd., Osaka, Japan

Filed Jul. 17, 1987, Ser. No. 75,026

Claims priority, application Japan, Apr. 20, 1987, 62-015550

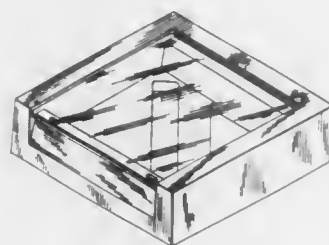
Term of patent 14 years

U.S. Cl. D18-43

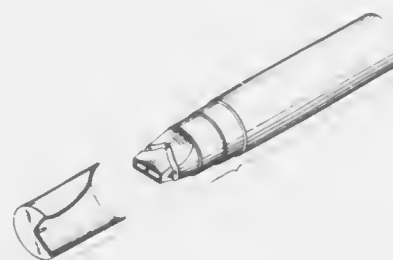




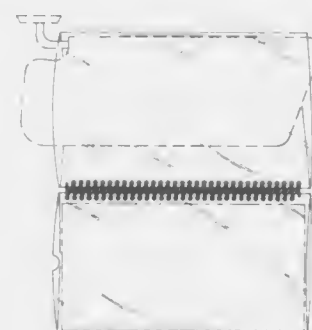
309,753  
**TEST KIT FOR USING HAND TOOLS TO ASSEMBLE OR TAKE APART OBJECTS**  
 Kris Kagelmann-Holtz; Gene Mihleisen, both of Milwaukee, Wis., and Tracy M. Gibbons, Chicago, Ill., assignors to Manpower Inc., Milwaukee, Wis.  
 Filed Feb. 3, 1987, Ser. No. 10,573  
 Term of patent 14 years  
 U.S. Cl. D19—59



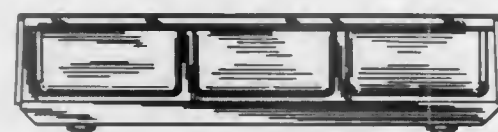
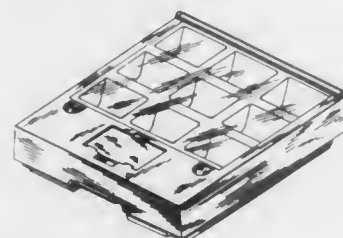
309,755  
**ADHESIVE DISPENSER**  
 Hans Halm, Herne, Fed. Rep. of Germany, assignor to Lingner & Fischer GmbH, Fed. Rep. of Germany  
 Continuation of Ser. No. 858,279, Apr. 29, 1986, which is a continuation of Ser. No. 478,268, Mar. 24, 1983, abandoned.  
 This application Feb. 9, 1988, Ser. No. 154,125  
 Claims priority, application United Kingdom, Jan. 19, 1983, 8301411  
 Term of patent 14 years  
 U.S. Cl. D19—66



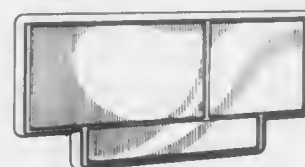
309,756  
**ADVERTISING DISPLAY HOLDER FOR AN AUTOMOBILE SUN VISOR**  
 William P. Lothridge, Lorain, Ohio, assignor to Charles E. Mullinax, Amherst, Ohio  
 Filed Nov. 27, 1987, Ser. No. 126,286  
 Term of patent 14 years  
 U.S. Cl. D20—35



309,754  
**CASE FOR TESTING SMALL PARTS ASSEMBLY SKILLS OR THE LIKE**  
 Kris Kagelmann-Holtz; Gene Mihleisen, both of Milwaukee, Wis., and Tracy M. Gibbons, Chicago, Ill., assignors to Manpower Inc., Milwaukee, Wis.  
 Filed Feb. 3, 1987, Ser. No. 10,572  
 Term of patent 14 years  
 U.S. Cl. D19—59



309,757  
**HOLDER FOR DECALS FOR USE ON AUTOMOBILES**  
 Ilario E. Fabbri, P.O. Box 6035, Oceanside, Calif. 92056  
 Filed Jul. 7, 1988, Ser. No. 216,265  
 Term of patent 14 years  
 U.S. Cl. D20—42



309,758  
**SIMULATIVE KITE**  
 Richard D. Stolk, 1820 Stenton Path, Chesterfield, Mo. 63005  
 Filed Oct. 13, 1987, Ser. No. 107,762  
 Term of patent 14 years  
 U.S. Cl. D21—88



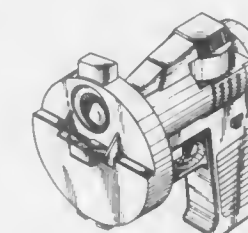
309,760  
**PIERROT DOLL**  
 Koji Murai, Tokyo, Japan, assignor to Pierret de Pierre Co., Ltd., Tokyo, Japan  
 Filed Mar. 17, 1987, Ser. No. 26,990  
 Term of patent 14 years  
 U.S. Cl. D21—173



309,761  
**ANIMAL TOY**  
 Yoko Hashimoto, Kanagawa, Japan, assignor to Iwaya Corporation, Tokyo, Japan  
 Filed Aug. 24, 1987, Ser. No. 88,590  
 Claims priority, application Japan, May 11, 1987, 62-18360  
 Term of patent 14 years  
 U.S. Cl. D21—186



309,759  
**TOY BUBBLE GUN**  
 Kai S. Mak, New Territories, Hong Kong, assignor to Hop Lee Cheong Ind. Co., Ltd., Hong Kong  
 Filed Feb. 21, 1989, Ser. No. 313,147  
 Claims priority, application United Kingdom, Aug. 30, 1988, 1053294  
 Term of patent 14 years  
 U.S. Cl. D21—61



309,762  
**AQUATIC EXERCISER**  
 Joann Carr, 102 E. Ocean Front, Newport Beach, Calif. 92661  
 Filed Nov. 10, 1987, Ser. No. 119,325  
 Term of patent 14 years  
 U.S. Cl. D21—191



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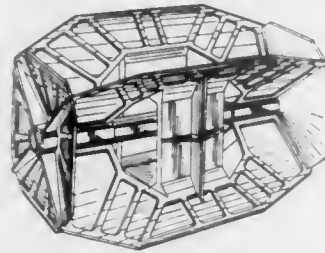
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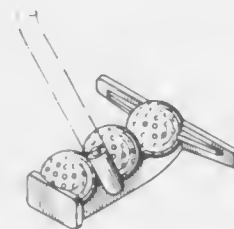
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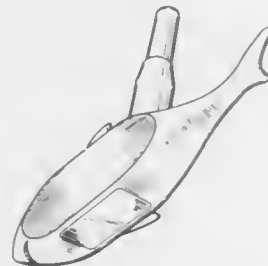
309,763  
**AQUATIC DUMBBELL**  
 Daniel S. Solloway, 928 Linn La., Yukon, Okla. 73099  
 Filed Jul. 22, 1987, Ser. No. 76,194  
 Term of patent 14 years  
 U.S. Cl. D21—197



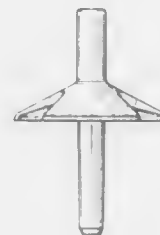
309,766  
**GOLF CLUB HEAD**  
 David T. Pelz, 37 Tamarisk Cir., Abilene, Tex. 79605  
 Filed Sep. 24, 1986, Ser. No. 911,300  
 Term of patent 14 years  
 U.S. Cl. D21—215



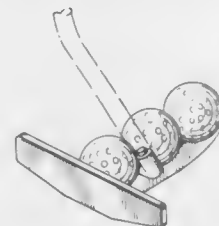
309,764  
**GOLF CLUB HEAD**  
 Barry R. Ryan, Forest Hill, Australia, assignor to BDK Forgings Pty. Ltd., Australia  
 Filed Mar. 19, 1987, Ser. No. 27,783  
 Claims priority, application Australia, Sep. 23, 1986, 6828-86  
 Term of patent 14 years  
 U.S. Cl. D21—215



309,767  
**END PIECE FOR SKI POLE**  
 Patricia Pognat, Sallanches, and Claude Fougereuse, Annecy, both of France, assignors to Sports Booster, Le Fayet, France  
 Filed Mar. 18, 1988, Ser. No. 170,292  
 Claims priority, application France, Sep. 28, 1987, 87 5629  
 Term of patent 14 years  
 U.S. Cl. D21—230



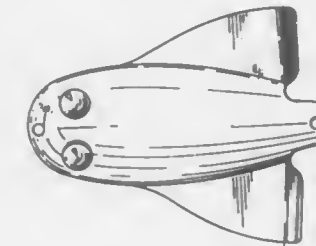
309,765  
**GOLF CLUB HEAD**  
 David T. Pelz, 37 Tamarisk Cir., Abilene, Tex. 79605  
 Filed Sep. 24, 1986, Ser. No. 911,299  
 Term of patent 14 years  
 U.S. Cl. D21—215



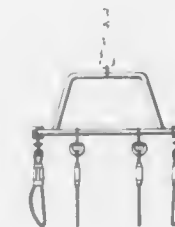
309,768  
**MAGAZINE FOR A FIREARM**  
 Anthony C. Blackshaw, 86 Shaftesbury Road, Carshalton, Surrey, England  
 Filed Dec. 23, 1987, Ser. No. 137,014  
 Claims priority, application United Kingdom, Jun. 25, 1987, 1043082  
 Term of patent 14 years  
 U.S. Cl. D22—108



309,769  
**FISHING LURE**  
 John S. Nicosia, Sr., deceased, late of 25 Acorn St., Burlington, Conn. 06051, and by John S. Nicosia, Jr., executor, 37 Barberry Dr., Burlington, Conn. 06013  
 Filed Mar. 30, 1988, Ser. No. 176,387  
 Term of patent 14 years  
 U.S. Cl. D22—130



309,770  
**FISH CARRIER**  
 William H. Thompson, Box 188 Elkhead Station, Sparta, Mo. 65753  
 Division of Ser. No. 42,965, Apr. 27, 1987. This application Sep. 26, 1989, Ser. No. 412,394  
 Term of patent 14 years  
 U.S. Cl. D22—134



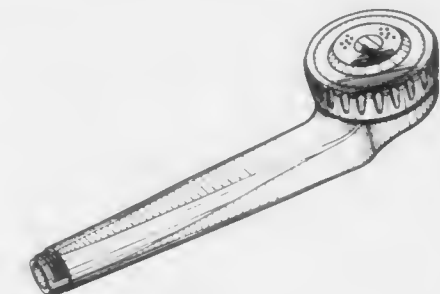
309,771  
**FISH CARRIER**  
 William H. Thompson, Box 188, Elkhead Station, Sparta, Mo. 65753  
 Division of Ser. No. 42,965, Apr. 27, 1987. This application Sep. 26, 1989, Ser. No. 412,393  
 Term of patent 14 years  
 U.S. Cl. D22—134



309,772  
**LAWN SPRINKLER**  
 Malcolm Hastings, Coventry, and John Lang, Bicester, both of England, assignors to Hezelock-ASL Limited, Aylesbury, England  
 Filed Jan. 29, 1987, Ser. No. 67,475  
 The portion of the term of this patent subsequent to Feb. 6, 2004, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D23—216



309,773  
**SHOWER HEAD**  
 Hing Wah Huen, Kowloon, Hong Kong, assignor to Fairform Mfg. Co., Ltd., Hong Kong, Hong Kong  
 Filed Dec. 10, 1987, Ser. No. 131,385  
 Claims priority, application United Kingdom, Aug. 7, 1987, 1044059  
 Term of patent 14 years  
 U.S. Cl. D23—223



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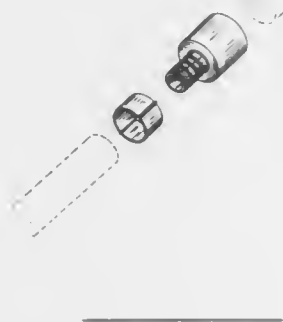
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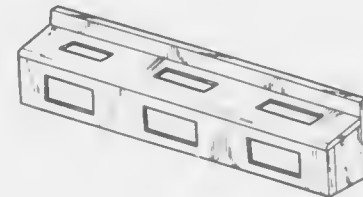
309,774

**TRANSITION COUPLING**  
Will A. Lewis, 408 Locust Ave., SE., Huntsville, Ala. 35801  
Filed May 27, 1986, Ser. No. 867,741  
Term of patent 14 years  
U.S. Cl. D23—262



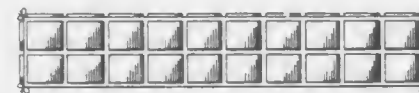
309,776

**WALL HEATER COVER**  
Don C. Rudolph, 29184 King Rd., Romulus, Mich. 48174  
Filed Feb. 8, 1988, Ser. No. 153,852  
Term of patent 14 years  
U.S. Cl. D23—385



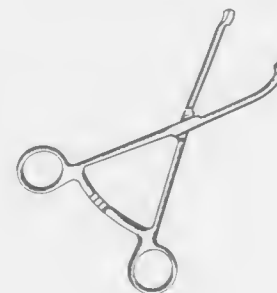
309,777

**FIREPLACE BUMPER PAD**  
Kristy M. Woods, 486 Sherwood Grns., Stone Mountain, Ga. 30087  
Filed Nov. 14, 1988, Ser. No. 270,505  
Term of patent 14 years  
U.S. Cl. D23—403



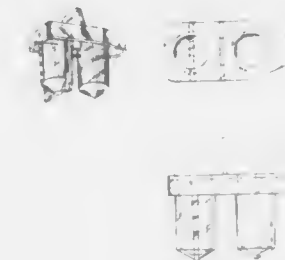
309,778

**MINI-BONE EXTRACTOR**  
Randall J. Torre, 842 S. Clover Ave., San Jose, Calif. 95128  
Filed Apr. 27, 1989, Ser. No. 345,534  
Term of patent 14 years  
U.S. Cl. D24—27



309,779

**DUAL RESERVOIR SAMPLE CUP**  
Michael D'Aquino, Miami, Fla., and Julius Becker, Cincinnati, Ohio, assignors to Baxter International Inc., Deerfield, Ill.  
Filed Jan. 15, 1988, Ser. No. 146,144  
Term of patent 14 years  
U.S. Cl. D24—29



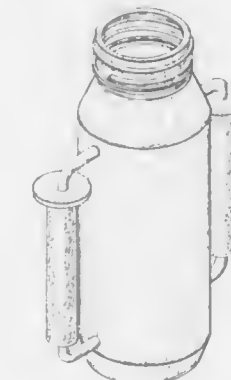
309,782

**BUILDING TOWER**  
Robert E. Beaman, and Willis F. Clark, both of Indianapolis, Ind., assignors to Laughner Brothers, Inc., Indianapolis, Ind.  
Filed Sep. 21, 1987, Ser. No. 98,909  
Term of patent 14 years  
U.S. Cl. D25—6



309,780

**BABY BOTTLE**  
Charles E. Jones, P.O. Box 5088, Carson, Calif. 90746  
Filed Apr. 18, 1988, Ser. No. 182,573  
Term of patent 14 years  
U.S. Cl. D24—47



309,783

**DWELLING**  
Paul-Louis Gastaud, 39 avenue Paul Doumer, 75116 Paris, France  
Filed Dec. 18, 1987, Ser. No. 134,904  
Claims priority, application Hague, Jun. 18, 1987, DM/008797  
Term of patent 14 years  
U.S. Cl. D25—7



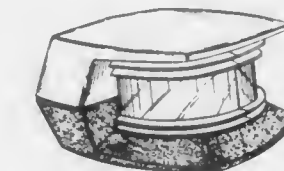
309,781

**BABY BOTTLE**  
Arie Sharon, 1014 Wake Dr., Richardson, Tex. 75081, and Alexander Theodore, 1113 N. Country Club Rd., Muskogee, Okla. 74403, assignors to Arie Sharon, Richardson; Edward R. Melzi, Garland, both of, Tex. and Alexander Theodore, Muskogee, Okla.  
Filed Nov. 28, 1988, Ser. No. 276,560  
Term of patent 14 years  
U.S. Cl. D24—47



309,784

**BOW LIGHT FOR BOATS**  
Warrick M. Whitley, II, Lynn Haven, Fla., assignor to Attwood Corporation, Lowell, Mich.  
Filed Mar. 23, 1987, Ser. No. 29,413  
Term of patent 14 years  
U.S. Cl. D26—28



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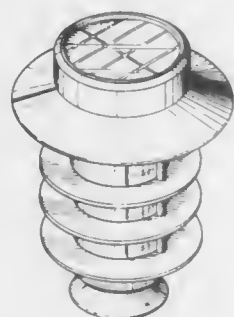
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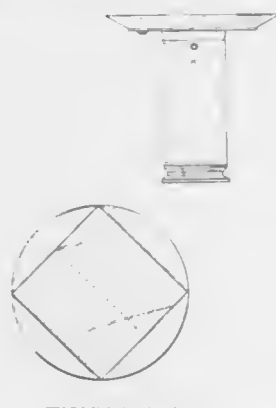
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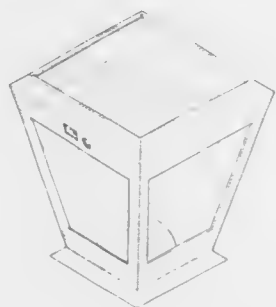
309,785  
SOLAR POWERED LIGHT  
Tseng L. Chien, Suite 8-6, No. 9, San-Min Rd., Taipei, Taiwan  
Filed Dec. 7, 1988, Ser. No. 280,993  
Term of patent 14 years  
U.S. Cl. D26—67



309,786  
SOLAR POWERED LIGHT  
Tseng L. Chien, Suite 8-6, No. 9, San-Min Rd., Taipei, Taiwan  
Filed Dec. 7, 1988, Ser. No. 280,991  
Claims priority, application Taiwan, Oct. 8, 1988, 77305864  
Term of patent 14 years  
U.S. Cl. D26—67



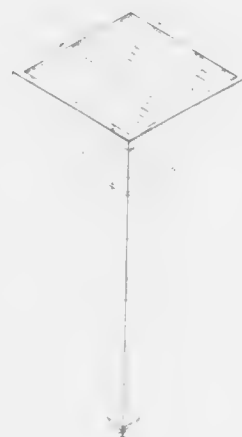
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SOLAR POWERED LIGHT  
Tseng L. Chien, Suite 8-6, No. 9, San-Min Rd., Taipei, Taiwan  
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Claims priority, application Taiwan, Sep. 17, 1988, 77305419  
Term of patent 14 years  
U.S. Cl. D26—67



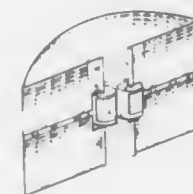
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LAMP  
Walter Koziol, Antioch, Ill., assignor to Modern Home Products Corp., Antioch, Ill.  
Filed May 23, 1988, Ser. No. 197,290  
Term of patent 14 years  
U.S. Cl. D26—67



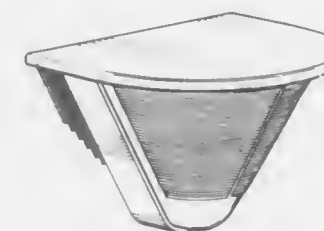
309,789  
SOLAR POWERED WALK LIGHT  
Nunzio A. Luce, 39 Galston Dr., R.D. 4, W. Windsor, N.J. 08691  
Filed Nov. 25, 1988, Ser. No. 275,797  
Term of patent 14 years  
U.S. Cl. D26—68



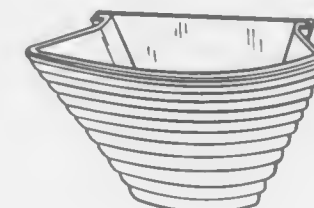
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WALL LAMP  
Mario Botta, Superiore-Cantonicino, Switzerland, assignor to ARTEMIDE S.p.A., Milan, Italy  
Filed Oct. 29, 1987, Ser. No. 114,271  
Claims priority, application Italy, Apr. 29, 1987, 21489/87[U]  
Term of patent 14 years  
U.S. Cl. D26—80



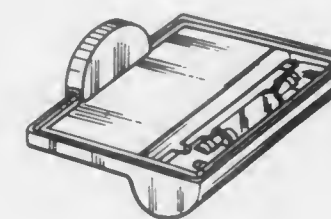
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WALL LAMP  
Marilena Boccato; Gian N. Gigante, both of Treviso, and Antonio Zambusi, Padua, all of Italy, assignors to ZERBETTO S.p.A., Padua, Italy  
Filed Jan. 13, 1988, Ser. No. 143,437  
Claims priority, application Italy, Jul. 15, 1987, 30713/87[U]  
Term of patent 14 years  
U.S. Cl. D26—85



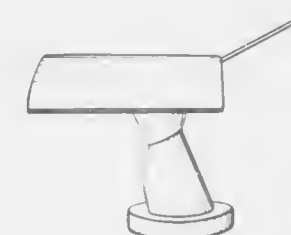
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WALL LAMP  
Angelo Mangiarotti, Milan, Italy, assignor to ARTEMIDE S.p.A., Milan, Italy  
Filed Dec. 5, 1988, Ser. No. 280,621  
Claims priority, application Italy, Jun. 10, 1988, 21407/88[U]  
Term of patent 14 years  
U.S. Cl. D26—85



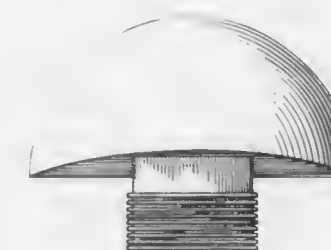
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Gianfranco Frattini, Milan, Italy, assignor to ARTEMIDE S.p.A., Milan, Italy  
Filed Oct. 29, 1987, Ser. No. 114,268  
Claims priority, application Italy, Apr. 29, 1987, 21489/87[U]  
Term of patent 14 years  
U.S. Cl. D26—87



309,794  
WALL LAMP  
Antonio Citterio, Milan, Italy, assignor to ARTEMIDE S.p.A., Milan, Italy  
Filed Oct. 29, 1987, Ser. No. 114,269  
Claims priority, application Italy, Apr. 29, 1987, 21489/87[U]  
Term of patent 14 years  
U.S. Cl. D26—87



309,795  
WALL-MOUNTED LAMP  
Bjorn F. Sahlen, Bildal, Sweden, assignor to Anneli Ljus och Form AB, Stockholm, Sweden  
Filed Jun. 27, 1988, Ser. No. 212,227  
Term of patent 14 years  
U.S. Cl. D26—87





309,796  
LAMP

Walter Koziol, Antioch, Ill., assignor to Modern Homes Products Corp., Antioch, Ill.

Filed May 23, 1988, Ser. No. 197,391

Term of patent 14 years

U.S. Cl. D26—87

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FLOOR LAMP

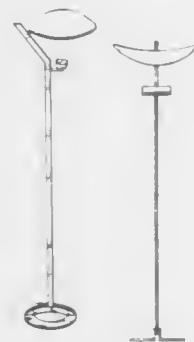
Ernesto Gismondi, Milan, Italy, assignor to ARTEMIDE S.p.A., Milan, Italy

Filed Oct. 29, 1987, Ser. No. 114,267

Claims priority, application Italy, Apr. 29, 1987, 21489/87[U]

Term of patent 14 years

U.S. Cl. D26—107

309,798  
LAMP

Walter Koziol, Antioch, Ill., assignor to Modern Home Products Corp., Antioch, Ill.

Filed May 23, 1988, Ser. No. 197,811

Term of patent 14 years

U.S. Cl. D26—110



## 309,799

## HAIR TREATMENT APPLICATOR

Eugene H. Ouellette, 17 Graham Rd., East Hartford, Conn. 06118

Filed Mar. 3, 1989, Ser. No. 318,932

Term of patent 14 years

U.S. Cl. D28—7



## 309,800

## WAX-APPLICATOR

Hans T. Meelen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 15, 1987, Ser. No. 62,818

Term of patent 14 years

U.S. Cl. D28—10



## 309,801

## CHILD'S HAIR WASHING SUPPORT

Cheryl L. Arneson, 5365 Juniper, Roeland Park, Kans. 66205

Filed Jan. 19, 1988, Ser. No. 145,189

Term of patent 14 years

U.S. Cl. D28—20



## 309,802

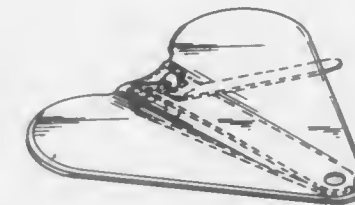
## ENCLOSURE FOR NAIL CLIPPER

Richard B. Yeater, 2602 Woodcreek Dr., Pearland, Tex. 77581

Filed Oct. 17, 1989, Ser. No. 423,121

Term of patent 14 years

U.S. Cl. D28—62



## 309,805

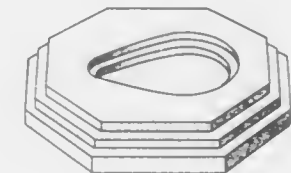
## AEROBIC KNEE PAD

James E. Shelby, San Diego, Calif., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 16, 1987, Ser. No. 26,355

Term of patent 14 years

U.S. Cl. D29—10



## 309,803

## COMBINED DENTAL FLOSSER AND TOOTHPICK

Robert S. Potter, 4108 Esthner St., Wichita, Kans. 67209

Filed Sep. 17, 1987, Ser. No. 99,503

Term of patent 14 years

U.S. Cl. D28—64



## 309,806

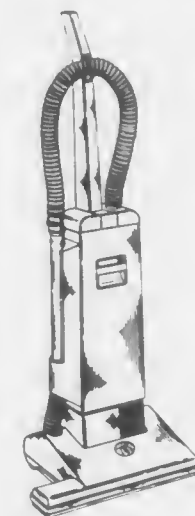
## VACUUM CLEANER

Robert A. Chieda, Westport, Conn., and Robert Romeo, Maplewood, N.J., assignors to TRC Acquisition Corporation, Atlanta, Ga.

Filed May 15, 1987, Ser. No. 51,113

Term of patent 14 years

U.S. Cl. D32—22



## 309,804

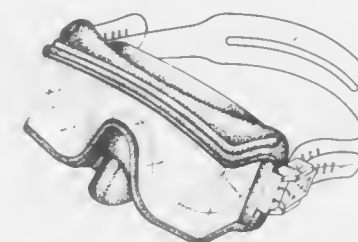
## DIVER'S MASK

John W. Chang, 7th Flr., 218-7 Chung Hsiao E. Rd. Sec. 4, Taipei, Taiwan

Filed Jul. 1, 1988, Ser. No. 214,629

Term of patent 14 years

U.S. Cl. D29—9



309,807

## VACUUM CLEANER

John F. Sovis, Twinsburg; James J. Kopco, Richmond Heights; Jeffrey M. Kalman, Cleveland Heights, and Craig M. Saunders, Sagamore Hills, all of Ohio, assignors to Royal Appliance Manufacturing Co., Cleveland, Ohio  
Filed Sep. 22, 1987, Ser. No. 99,512  
Term of patent 14 years

U.S. Cl. D32—22



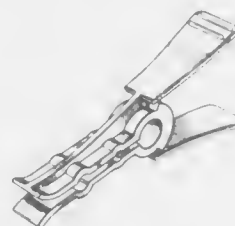
309,809

## CLOTHESPIN

Douglas A. Davidson, Auckland, New Zealand, assignor to Interworld Plastics (N.Z.) Ltd., Papakura, New Zealand  
Filed Oct. 16, 1986, Ser. No. 920,318  
Claims priority, application New Zealand, Apr. 18, 1986, 20425

Term of patent 14 years

U.S. Cl. D32—61



309,810

## FOOT OPERATED WASTE RECEPTACLE

Earl W. Moore, 709 Hemlock La., Lakeland, Fla. 33809  
Filed Aug. 11, 1988, Ser. No. 231,046  
Term of patent 14 years

U.S. Cl. D34—9



309,808

## WALL HAMPER

Pamela Phelps, 30 Quentin Ave., New Brunswick, N.J. 08901, and Roberta White, 511 Algair Ave., North Brunswick, N.J. 08902

Filed May 13, 1988, Ser. No. 193,633

Term of patent 14 years

U.S. Cl. D32—37

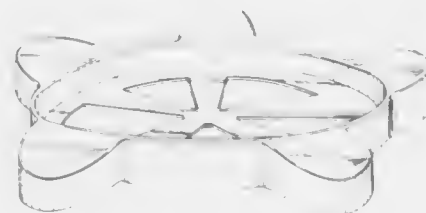


309,811

## BUCKET DOLLY

Vincent J. Terrizzi, P.O. Box 100, Nicktown, Pa. 15762  
Filed Oct. 26, 1987, Ser. No. 113,768  
Term of patent 14 years

U.S. Cl. D34—23

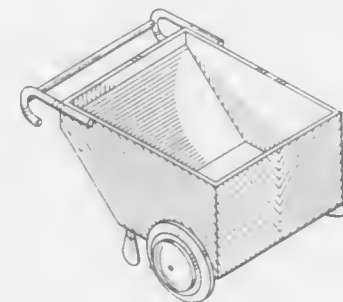


309,812

## CART

Justine A. Wolters, and James A. Wolters, both of 4590 Fawn St., Shingle Springs, Calif. 95682  
Filed Dec. 10, 1987, Ser. No. 130,977  
Term of patent 14 years

U.S. Cl. D34—26

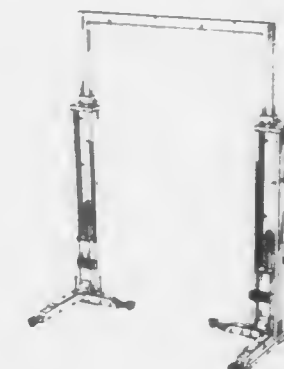


309,814

## VEHICLE LIFT

Shunji Isogai, Hekinan, Japan, assignor to Sugiyasu Industries Co., Ltd., Takahama, Japan  
Filed Dec. 14, 1987, Ser. No. 131,533  
Claims priority, application Japan, Aug. 27, 1987, 62-35018  
Term of patent 14 years

U.S. Cl. D34—28

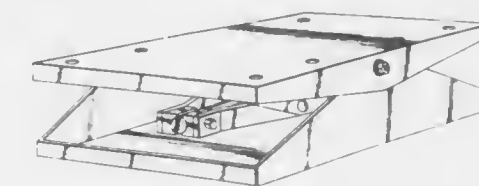


309,815

AUTOMATIC LEVELING UNIT FOR VEHICLE SEATS  
Jan Wallin, Hesse 55, S-781 96, Borlänge, Sweden  
Filed Sep. 9, 1987, Ser. No. 94,793

Claims priority, application Sweden, Mar. 11, 1987, 87-0560  
Term of patent 14 years

U.S. Cl. D34—28



309,816

## DUMP BODY

James G. Morrow, Sr., Manitowoc, Wis., assignor to F. C. Heiden, Manitowoc, Wis.

Filed Mar. 27, 1987, Ser. No. 32,078

Term of patent 14 years

U.S. Cl. D34—28



309,813

## DOLLY EXTENSION FOR MOBILE CART

Eric Gingras, Junction City, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.  
Filed May 31, 1988, Ser. No. 200,295

Term of patent 14 years

U.S. Cl. D34—27



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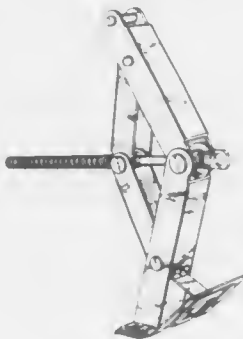
309,817  
CONVEYOR RAIL  
Gordon R. Barkett, 517 Sycamore, Chesterfield, Ind. 46017  
Filed Jun. 11, 1987, Ser. No. 60,438  
Term of patent 14 years  
U.S. Cl. D34—29



309,818  
TRAILER JACK  
Paul R. Bink, Anderson, Ala., assignor to Contax, Inc., Irondale, Ala.  
Filed Nov. 9, 1987, Ser. No. 118,646  
Term of patent 14 years  
U.S. Cl. D34—31



309,819  
PANTAGRAPH-FORM JACK  
Sinnosuke Oshima, No. 1823, Shin-Machi, Tano-Gun, Gunma-Ken, Japan  
Filed Mar. 30, 1988, Ser. No. 176,027  
Term of patent 14 years  
U.S. Cl. D34—31



LIST OF PATENTEEES

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PATENTS WERE ISSUED ON THE 7TH DAY OF AUGUST, 1990

NOTE —Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Aono, Toshiaki; and Sakai, Takeo, to Fuji Photo Film Co., Ltd. Ink recording sheet. 4,946,741, Cl. 428-336.000.

Aoyama, Youichi: See—  
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Applied Power, Inc.: See—  
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APV Chemical Machinery, Inc.: See—  
Loomans, Bernard A.; Kowalczyk, James E.; and Jones, Jerry W., 4,945,807, Cl. 86-1.100.

Arabian American Oil Company: See—  
Carpenter, Sammy, 4,945,758, Cl. 73-86.000.

Arahara, Kohzoh; Fukui, Tetsuro; Fukumoto, Hiroshi; Takasu, Yoshio; Sato, Tadashi; and Kan, Fumitaka, to Canon Kabushiki Kaisha. Printing process using a pH change to transfer a thin layer of ink to a printing plate. 4,945,833, Cl. 101-450.100.

Arai, Takeo; and Nagashima, Toshiharu, to Konica Corporation. Silver halide photographic light-sensitive material and the method of preparing the same. 4,946,769, Cl. 430-539.000.

Araki, Kazuhiro: See—  
Nagata, Kenzo; Araki, Kazuhiro; and Miyamoto, Hirohisa, 4,947,210, Cl. 355-218.000.

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Hattori, Tutomu; Ohno, Masashi; and Aramaki, Shouji, 4,946,503, Cl. 106-14.340.

Arbor International, Inc.: See—  
Gorog, Jonathan M., 4,947,028, Cl. 235-381.000.

Archer, John Q., II: See—  
Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urein, Edgar J., 4,947,163, Cl. 340-825.310.

Arfaei, Ahmad; Berke, Neal S.; Dallaire, Michael P.; and Hicks, Maria, to W.R. Grace & Co.-Conn. Corrosion inhibiting hydraulic cement additives and compositions containing same. 4,946,506, Cl. 106-724.000.

Arhancet, Juan P.: See—  
Davis, Mark E.; Arhancet, Juan P.; and Hanson, Brian E., 4,947,003, Cl. 568-454.000.

Arimoto, Kazutami; and Furutani, Kiyohiro, to Mitsubishi Denki Kabushiki Kaisha. Charge-transfer sense amplifier for dram and operating method therefor. 4,947,376, Cl. 365-205.000.

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Ark International, Inc.: See—  
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Armstrong World Industries, Inc.: See—  
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Arndt, Stefan: See—  
Ziegler, Ewald; Widera, Joerg; Arndt, Stefan; and Simon, Nikolaus, 4,945,877, Cl. 123-472.000.

Array Technologies, Inc.: See—  
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Arrow Fastener Company, Inc.: See—  
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Arroyo, Candido J.; and Gagen, Paul F., to AT&T Bell Laboratories. Cable having non-metallic armoring layer. 4,946,237, Cl. 350-96.230.

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Artieri, Alain: See—  
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Asahi Kogaku Kogyo Kabushiki Kaisha: See—  
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Asano, Junichi: See—  
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Ashida, Tsutomu; Nakagawa, Kiyotoshi; Fujii, Katsumasa; and Torimaru, Yasuo, to Sharp Kabushiki Kaisha. High voltage MOS transistor. 4,947,232, Cl. 357-53.000.

Ashizawa, Tadashi: See—  
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Ashland Oil, Inc.: See—  
Carpenter, William G.; and Dunnivant, William R., 4,946,876, Cl. 523-143.000.

Ashok, Sankaranarayanan; Watson, W. Gary; and Cheskis, Harvey P., to Olin Corporation. Thermal conductivity of substrate material correlated with atomizing gas-produced steady state temperature. 4,945,973, Cl. 164-429.000.

Ashwell, Gareth W. B.; and Ainslie, Benjamin J., to British Telecommunications public limited company. Fabrication of optical waveguide. 4,946,251, Cl. 350-96.340.

Aso, Akira, to NEC Corporation. Semi-custom LSI having input/output cells. 4,947,233, Cl. 357-65.000.

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Asta Pharma AG: See—  
Engel, Jurgin; Kleemann, Axel; Nickel, Bernd; and Szelenyi, Istvan, 4,946,836, Cl. 514-183.000.

Astec Industries, Inc.: See—  
Jakob, Herbert E., 4,946,307, Cl. 404-91.000.

Astra Meditec AB: See—  
Nilsson, Lars A. H., 4,945,950, Cl. 137-798.000.

Astroturf Industries, Inc.: See—  
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Dautartas, Mindaugas F.; Degani, Yimon; Kraetsch, Richard T.; Pimpinella, Richard J.; and Tai, King L., 4,946,236, Cl. 350-96.200.  
Dutta, Niloy K., 4,947,400, Cl. 312-50.000.  
Ejim, Theophilus I., 4,946,544, Cl. 156-616.410.  
Eng, Kai Y.; and Karol, Mark J., 4,947,389, Cl. 370-85.120.  
Gabara, Thaddeus J., 4,947,228, Cl. 357-42.000.  
Gaston, Howard N.; and Jones, Walter W., Jr., 4,947,112, Cl. 324-158.00F.  
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Jewell, Tatiana E.; and White, Donald L., 4,947,413, Cl. 378-34.000.  
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Atkinson, Noel D.; Ahlemeyer, William B.; and McCormick, Ben F., to Uniden America Corporation. Scanning radio receiver. 4,947,456, Cl. 455-165.000.



Atkinson, Simon; and Carr, Francis, to Flessey Overseas Limited. Oscillator network for radio receiver. 4,947,141, Cl. 331-135.000.

Atochem: See—  
Blaise, Jean; and Kappler, Patrick, 4,946,900, Cl. 525-276.000.  
Kappler, Patrick, 4,946,913, Cl. 526-87.000.

Atochem North America, Inc.: See—  
Nishioka, Akinori, 4,946,889, Cl. 524-544.000.

Atsugi Motor Parts Company, Limited: See—  
Tsuruta, Seiji, 4,945,871, Cl. 123-90.550.

Aubry, Jacques A.; and Deguise, Michel, to Aerospatiale Societe Nationale Industrielle. Hydraulic device for individual control of pitch of a rotor blade. 4,946,354, Cl. 416-158.000.

Audi, Josef; Ohlenforst, Hans; and Bergstein, Peter, to Saint-Gobain Vitrage. Rotary tampon printing machine for printing the edge of automobile glazings. 4,945,827, Cl. 101-35.000.

Audley, Gary J.; and Grint, Alan, to British Petroleum Company, p.l.c., The. Production of high surface area carbon fibres. 4,946,663, Cl. 423-447.100.

Audras, Gabriel; and Samanos, Bernard, to Societe des Electrodes & Refractaires Savoie. Protective coatings for the carrier bars of pre-baked anodes and the emerging part of the anodes. 4,946,502, Cl. 106-14.210.

Augurelli, Benito, to Free Shark Italia S.r.l. Variable-trim jacket for subaqueous use. 4,946,313, Cl. 405-186.000.

Aumeric, Laurent, to Ferco International. Driving device for the outward pivoting frame of doors or windows. 4,945,679, Cl. 49-342.000.

Aupic, Bernard; and Tardivat, Jean-Claude, to Compagnie Generale des Etablissements Michelin - Michelin & Cie. Process for the butted connecting of the edges of a rubberized fabric intended for the manufacture of a carcass reinforcement, and the tire with radial carcass reinforcement obtained thereby. 4,946,525, Cl. 156-134.000.

AUSIMONT S.r.l.: See—  
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, 4,947,006, Cl. 568-685.000.  
Moggi, Giovanni; and Marchionni, Giuseppe, 4,946,936, Cl. 528-392.000.

Aussenberg, Nash: See—  
Greenstein, Robert; and Aussenberg, Nash, 4,945,897, Cl. 128-20.000.

Automated Light Technologies, Inc.: See—  
Vokey, David E.; Sontag, Kenneth N.; Chamberlain, John C.; and Lavallec, Ronald L., 4,947,469, Cl. 324-523.000.

Automated Medical Products Corp.: See—  
Greenstein, Robert; and Aussenberg, Nash, 4,945,897, Cl. 128-20.000.

Automatic Toll Systems, Inc.: See—  
Quinlan, Thomas J., Jr., 4,947,353, Cl. 364-562.000.

Avera, Ronald T. Method for producing faux finishes on non-porous surfaces. 4,946,715, Cl. 427-273.000.

Avery International Corporation: See—  
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Aveson, Martha C.: See—  
Blank, Robert G.; Mody, Dhiraj S.; Kenny, Richard J.; and Aveson, Martha C., 4,946,684, Cl. 424-441.000.

AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof.Dr.Dr.h.c. Hans List: See—  
Engel, Gunter; Enko, Alfred; Kreml, Peter W.; and Posch, Uwe, 4,946,545, Cl. 156-623.00R.

Kirchweber, Karl; and Killmann, Irolt, 4,945,873, Cl. 123-188.00M.

Avni, Eitan, to Union Camp Corporation. Composite paper. 4,946,372, Cl. 428-325.000.

AXIS USA, Inc.: See—  
Luciani, Sabatino; and Ponzo, Massimo, 4,946,111, Cl. 242-1.10R.

Ayer, Atul D.; Swanson, David R.; and Kuczynski, Anthony L., to Alza Corporation. Dosage form for treating cardiovascular diseases. 4,946,687, Cl. 424-473.000.

Ayerst, McKenna & Harrison, Inc.: See—  
Sestanj, Kazimir; Abraham, Nedumparambil A.; Bellini, Francesco; and Treasurywala, Adi, 4,945,987, Cl. 558-415.000.

Baader, Ekkehard; Jendralla, Heiner; Kerekjarto, Bela; and Beck, Gerhard, to Hoechst Aktiengesellschaft. Pyridazine 3,5-dihydroxy carboxylic acids and derivatives thereof, the use thereof for hypercholesterolemia. 4,946,841, Cl. 514-247.000.

Babcock-Hitachi Kabushiki Kaisha: See—  
Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.

Babjak, John R.: See—  
Shalati, Mohamad D.; Marquart, James A.; Babjak, John R.; and Harris, Rodney M., 4,946,744, Cl. 428-500.000.

Babler, Fridolin: See—  
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Bach, Helmut: See—  
Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 4,946,758, Cl. 430-259.000.

Bachman, Bonnie J.; Hofstatter, Elizabeth A.; Ritter, Joan M.; and Rubin, Jerry J., to AT&T Bell Laboratories. Method for fabricating or modifying an article comprising the removal of a polymer coating. 4,946,549, Cl. 156-643.000.

Backus, Richard J., to Eastman Kodak Company. Film handling means for a photographic printer. 4,947,049, Cl. 250-561.000.

Badenhorst, Rudolf P.: See—  
Mostert, Roelof J.; and Badenhorst, Rudolf P., 4,946,515, Cl. 148-12.00F.

Baer, Luke. Convertible child support apparatus. 4,946,180, Cl. 280-39.000.

Bailey, Randall E.: See—  
Stoddard, David C. F.; and Bailey, Randall E., 4,946,032, Cl. 206-44.00R.

Bailey, Timothy J.: See—  
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Bain, Kenneth J. D.: See—  
Worship, Leslie A.; Isaacs, Peter; Bain, Steven; and Bain, Kenneth J. D., 4,945,748, Cl. 72-323.000.

Bain, Steven: See—  
Worship, Leslie A.; Isaacs, Peter; Bain, Steven; and Bain, Kenneth J. D., 4,945,748, Cl. 72-323.000.

Baiocchi, Fred: See—  
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Bair, Edward J.: See—  
Parker, Robin Z.; Langhoff, Peter W.; and Bair, Edward J., 4,945,731, Cl. 60-641.150.

Baker Cumins Dermatologicals, Inc.: See—  
Tuttle, Ronald R.; and Thornton, J. R., 4,946,848, Cl. 514-282.000.

Bakker, Johannes, to Shell Oil Company. Filter screen apparatus for the air outlet of a particle production apparatus. 4,946,481, Cl. 55-300.000.

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Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Caiozzo, Nicholas, 4,946,910, Cl. 525-440.000.

Balch, Thomas C.: See—  
Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Caiozzo, Nicholas, 4,946,910, Cl. 525-440.000.

Baldassari, Mark: See—  
Wood, David G. S.; and Baldassari, Mark, 4,947,256, Cl. 358-183.000.

Baldauf, Thomas J.: See—  
Rice, Lawrence M.; Persing, Thomas E.; and Baldauf, Thomas J., 4,947,078, Cl. 313-113.000.

Baldwin, Robert W.; and Byers, Vera S., to Xoma Corporation. Hepatic blocking agents. 4,946,675, Cl. 424-85.910.

Ballard, Gary W.; and Thompson, Kevin D., to Carrier Corporation. Method and apparatus for operating a furnace from a 12V DC battery. 4,946,096, Cl. 236-11.000.

Baltimore Specialty Steels Corporation: See—  
Schumacher, William J.; and Daniels, James A., 4,946,644, Cl. 420-56.000.

Balzars AG: See—  
Bergmann, Erich; and Berger, Manfred, 4,946,747, Cl. 428-653.000.

Banner, Alvin C.; Clemenz, Gary E.; Walton, Ballard E.; and Varea, Frank D., to Globe Products Inc.; and General Motors Corporation. Armature assembly apparatus. 4,945,631, Cl. 29-705.000.

Bannister, Richard S.: See—  
Abt, John; and Bannister, Richard S., 4,947,254, Cl. 358-181.000.  
Jackson, Richard A.; and Bannister, Richard S., 4,947,255, Cl. 358-183.000.

Bannon, Yvonne B.; Corish, John; Corrigan, Owen I.; Geoghegan, Edward J.; and Masterson, Joseph G., to Elan Transdermal Limited. Method for the treatment of withdrawal symptoms associated with smoking cessation and preparations for use in said method. 4,946,853, Cl. 514-343.000.

Banque de France: See—  
Puyplat, Olivier, 4,947,016, Cl. 219-69.170.

Bar-Ilan University: See—  
Sredni, Benjamin; and Albeck, Michael, 4,946,437, Cl. 604-49.000.

Baranyi, Giuseppa: See—  
Ong, Beng S.; Keoshkerian, Barkev; and Baranyi, Giuseppa, 4,946,754, Cl. 430-59.000.

Barboux, Jacques, to Sandvik Tobler S.A. System for rapidly changing clamping jaws on a machine tool. 4,946,177, Cl. 279-123.000.

Bardasz, Ewa A.: See—  
Veazey, Richard L.; and Bardasz, Ewa A., 4,946,626, Cl. 252-392.000.

Barlow, Edward A.: See—  
Johnson, Wade M.; and Barlow, Edward A., 4,946,133, Cl. 251-149.100.

Barlow, Robert W.; Lynch, Thomas M.; and Swanson, Steven E., to GET Products Corporation. Fiber optic splice assembly. 4,946,249, Cl. 350-96.210.

Barnard, John K.; and Brown, David A., to Vita-Mix Corporation; and Flurry International. Agitator for a food mixer and method of use thereof. 4,946,287, Cl. 366-343.000.

Baroid Technology, Inc.: See—  
Tai, Wen-Tong, 4,946,201, Cl. 285-94.000.

Barozzi, Gian P. Compact play-free speed-reducing transmission. 4,946,428, Cl. 475-164.000.

Barr, Jonathan, to Glasstech, Inc. Method and apparatus for glass tempering. 4,946,491, Cl. 65-114.000.

Barr, Melody T.: See—  
Barr, Stephen J.; and Barr, Melody T., 4,947,418, Cl. 378-177.000.  
Barr, Stephen J.; and Barr, Melody T. Emergency trauma board. 4,947,418, Cl. 378-177.000.

Barrish, Joel C.; Kimball, Spencer D.; and Krapcho, John, to E. R. Squibb & Sons, Inc. Benzazepine and benzothiazepine derivatives. 4,946,840, Cl. 514-211.000.

Barrow, Peter: See—  
Van Zyl, Arnold; Duncan, Graham K.; Barrow, Peter; and Thackeray, Michael M., 4,946,664, Cl. 423-600.000.

Barrows, Franklin H.: See—  
Wheeler, Edward L.; Barrows, Franklin H.; and Franko, Robert J., 4,946,956, Cl. 544-323.000.

Barry, Leonard D. Swinging-link rotary loaders. 4,946,328, Cl. 414-334.000.

Barth, Rudolf: See—  
Guilino, Gunther; Barth, Rudolf; and Stetter, Hans, 4,946,270, Cl. 351-169.000.

Bartholomew, Bruce J., to General Dynamics Corporation Convair Division. Fiber optic position transducer. 4,946,275, Cl. 356-4.000.

Bartizal, Dennis C.: See—  
Sandvig, Timothy C.; Bartizal, Dennis C.; and Scholz, Matthew T., 4,946,726, Cl. 428-76.000.

Barton, Jeffrey N.: See—  
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BASF Aktiengesellschaft: See—  
Albert, Bernhard; Kuppelmaier, Harald; and Wagenblast, Gerhard, 4,946,762, Cl. 430-270.000.

Bott, Kaspar; Nick, Bernhard; and Schulz, Guenther, 4,946,917, Cl. 526-260.000.

Frank, Gerhard; Lendle, Hubert; Seyfert, Wilfried; and Stops, Peter, 4,946,029, Cl. 203-29.000.

Koeffler, Dieter; and Bertleff, Werner, 4,947,005, Cl. 568-600.000.

Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 4,946,758, Cl. 430-259.000.

BASF Corporation, Inmont Division: See—  
Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Caiozzo, Nicholas, 4,946,910, Cl. 525-440.000.

Basile, Carlo; Cavallero, Alan P.; and Tsinberg, Mikhail, to North American Philips Corporation. Training signal for maintaining the correct phase and gain relationship between signals in a two-signal high definition television system. 4,947,241, Cl. 358-23.000.

Bass Pro Shops, Inc.: See—  
Morris, John L.; and Martin, Robert L., 4,945,849, Cl. 114-218.000.

Basset, Frederic: See—  
Billiotte, Jean-Marie; Bouin, Thierry; Basset, Frederic; Beauvois, Jacques; and Primat, Didier, 4,947,450, Cl. 382-68.000.

Bateman, Andrew: See—  
McGeehan, Joseph P.; and Bateman, Andrew, 4,947,453, Cl. 455-47.000.

Bateman, Charles D., to Sundstrand Data Control, Inc. Flight path responsive aircraft wind shear alerting and warning system. 4,947,164, Cl. 340-968.000.

Bateman, Robert; and Christensen, Donald R., to Grass Valley Group, Inc., The. Shaping of automatic audio crossfade. 4,947,440, Cl. 381-107.000.

Bathory, Bela I.; Gronbeck, Robert W.; and Lister, Michael, to Davy McKee (Sheffield) Limited. Telescopic drive spindle assembly. 4,945,745, Cl. 72-249.000.

Battelle Memorial Institute: See—  
Birks, Albert S.; and Skorpik, James R., 4,947,045, Cl. 250-360.100.  
Charoy, Alain; Vermot-Gaud, Jacques; Prost, Jean-Louis; Kornmann, Michel; and Gold, Dieter, 4,947,132, Cl. 324-699.000.  
Dyer, Robert D.; Eschbach, Eugene A.; Griffin, Jeffrey W.; Lind, Michael A.; Buck, Erville C.; and Buck, Roger L., 4,947,094, Cl. 318-587.000.

Battrell, Charles F., to Procter & Gamble Company, The. Pressure-sensitive adhesive fastener and method of making same. 4,946,527, Cl. 156-60.000.

Bauer, Hans J.; Bauer, Hans-Peter; and Antoniani, Mario, to Fritz Bauer & Sohne OHG. Gas spring. 4,946,143, Cl. 267-64.110.

Bauer, Hans J.: See—  
Bauer, Hans-Peter; Bauer, Hans J.; Stadelmann, Ludwig; and Mayer, Dieter, 4,946,008, Cl. 188-129.000.

Bauer, Hans-Peter; Bauer, Hans J.; Stadelmann, Ludwig; and Mayer, Dieter, to SUSPA Alldorf Federungstechnik GmbH. Frictional damper. 4,946,008, Cl. 188-129.000.

Bauer, Hans-Peter: See—  
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Bauer, Karl-Heinz: See—  
Stursberg, Bernd; and Bauer, Karl-Heinz, 4,945,752, Cl. 72-442.000.

Baulier, Dominique; Defilippis, Christian; Jami, Jacques; Negre, Bernard; Pierdet, Alain; Negre, Bernard; and Pierdet, Alain, to Regie Nationale des Usines Renault. Process for interpositioning of tools of a body assembly machine. 4,946,089, Cl. 228-45.000.

Baum, Allen: See—  
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Baumer, Michael F.: See—  
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Baxendell, Douglas J.; Cortash, Michael J.; Osbourne, William G.; and Thompson, Robert L., to Xerox Corporation. Transfer apparatus. 4,947,214, Cl. 355-274.000.

Baxter, Dennis E.: See—  
Smart, David C.; and Baxter, Dennis E., 4,947,197, Cl. 354-214.000.

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Susini, Etienne; and Soubrier, Pierre, 4,946,432, Cl. 493-341.000.

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Ebert, Wolfgang; Meyer, Rolf-Volker; Rhein, Rolf; and Oels, Udo, 4,946,927, Cl. 528-198.000.

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Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, 4,946,653, Cl. 422-140.000.

Uhlemann, Hans; Braun, Burkhard; Heusmann, Heinz; Stopp, Gerhard; and Karkossa, Horst, 4,946,654, Cl. 422-140.000.

Bayer, Franz, to Franz Xaver Bayer Isolierglasfabrik KG. Apparatus for converting tubular blanks into spacer frames of multiple-pane windows. 4,945,619, Cl. 29-33.00R.

Beale, William T., to Sunpower, Inc. Leaky gas spring valve for preventing piston overstroke in a free piston stirling engine. 4,945,726, Cl. 60-520.000.

Beamer, Henry E., to General Motors Corporation. Temporary plug for fluid fitting. 4,945,951, Cl. 138-89.000.

Beard, Nigel W.; Phillips, Robert B.; and Stonestreet, Paul R., to VG Instruments Group Limited. Sample treatment apparatus. 4,945,774, Cl. 73-863.110.

Beaulieu, Bryan, to Skyline Displays, Inc. Lightweight overhead beam for portable display structure. 4,945,706, Cl. 52-731.000.

Beauvois, Jacques: See—  
Billiotte, Jean-Marie; Bouin, Thierry; Basset, Frederic; Beauvois, Jacques; and Primat, Didier, 4,947,450, Cl. 382-68.000.

Beck, Earl W.; and Smith, Schuyler B., to Dow Corning Corporation. Silicone mold and elastomer tool life. 4,946,369, Cl. 427-133.000.

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Beck, Scott A.; and Messerly, Harry E., to General Motors Corporation. Composite weld gun and method of making same. 4,947,017, Cl. 219-86.250.

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Becker, Josef; Becker, Hubert; and Becker, Matthias, 4,946,114, Cl. 242-118.100.

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Bekiarian, Paul G.; Buckmaster, Marlin D.; and Morgan, Richard A., to Du Pont de Nemours, E. I., and Company. Process for the setabilization of fluoropolymers. 4,946,902, Cl. 525-326.200.

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Bell, Donald R.: See—  
Wu, Feng-Jung; Berris, Bruce C.; and Bell, Donald R., 4,946,975, Cl. 556-47.000.

Bell, Jonathan; and Blacklin, Peter, to Tate Access Floors, Inc. Composite concrete floor panel. 4,945,701, Cl. 52-601.000.

Bellheimer Metallwerk GmbH: See—  
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Bendarzewski, Robert H., deceased (by Bendarzewski, Alexandra, legal representative); and Zsolnay, Andrew M., to Zsolnay, Andrew M. Precision apparatus for placing filaments. 4,946,538, Cl. 156-361.000.

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Beneventano, Thomas; and Bendett, Raymond M., to Allied-Signal Inc. North finding system. 4,945,647, Cl. 33-321.000.

Benford, Howard L.; Mehta, Hemang S.; and Lindsay, Michael R., to Chrysler Corporation. Method of determining the acceleration of a turbine in an automatic transmission. 4,947,329, Cl. 364-424.100.

Benker, Gerhard; Nitsch, Wilhelm; Payrhammer, Bernd; Weinert, Volker; Treiber, Helmut; and Kluter, Ulrich, to AGFA-Gevaert Aktiengesellschaft. Method of and apparatus for positioning photographic originals in a copying station. 4,947,205, Cl. 355-41.000.

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Liedtke, Larry L.; Mallory, H. Dean; McBride, William R.; Bens, Everett M.; Schadow, Klaus C.; and Boggs, Thomas L., 4,946,522, Cl. 149-36.000.

Benson, W. D.; Cahela, Hollis L.; Kirkland, William N.; and Pidgeon, Anthony D., to Fontaine Fifth Wheel Company. Retractable fifth wheel pull handle. 4,946,183, Cl. 280-434.000.

Bent, Michael F.: See—  
Ghibu, Bogdan A.; and Bent, Michael F., 4,947,066, Cl. 310-49.00R.

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Manoly, Arthur E.; Sauseng, Otto; and Benton, John T., 4,947,467, Cl. 315-3.500.

Benz, Bernard D., to Texor Corporation. Autoloading, interchangeable-media, disk-drive apparatus. 4,947,273, Cl. 360-98.060.

Berchem, Rutger, to Metalpraecis Berchem & Schaberg Gesellschaft für Metallformgebung mit beschränkter Haftung. Joint prostheses especially hip joint prostheses. 4,946,379, Cl. 623-18.000.

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Berg, Sven-Olof; Broden, Ingemar; and Johansen, Odvan, to Pronova AB; and Aktiebolaget SKF. Method for the emptying of a package band and an arrangement for it. 4,946,339, Cl. 414-786.000.

Berger, Hermann, to ProMinent Dosiertechnik GmbH. Apparatus for monitoring the flow of fluid from a metering pump. 4,947,153, Cl. 340-608.000.

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Kalwar, Klaus; Berger, Horst; Berger, Otto; and Gumpert, Fritz, 4,946,568, Cl. 204-164.000.

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Berger, Otto: See—  
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Bergmann, Erich; and Berger, Manfred, to Balzers AG. Machine element and method of making. 4,946,747, Cl. 428-653.000.

Bergstein, Peter: See—  
Audi, Josef; Ohlenforst, Hans; and Bergstein, Peter, 4,945,827, Cl. 101-35.000.

Berke, Neal S.: See—  
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Berman, Jay H.: See—  
Calloway, Ancel R.; and Berman, Jay H., 4,947,186, Cl. 346-1.100.

Berner, John M.; Stender, Eric C.; Campbell, Frank W.; and Alden, Allen J., to Truth Incorporated. Window operator. 4,945,678, Cl. 49-322.000.

Bernhardt, Douglas H.; Matheu, Guillermo R.; Crum, Spencer E.; and Adelman, John T., to Meat Processing Service Corporation, Inc. Method for treating slaughtered animals. 4,946,692, Cl. 426-231.000.

Bernhardt, Gunther; Amort, Jürgen; Haas, Margret; Hanisch, Horst; and Kragl, Heinz, to Huels Troisdorf AG. Method for the preparation of organosilanes containing methacryloxy or acryloxy groups. 4,946,977, Cl. 556-440.000.

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Koeffer, Dieter; and Bertleff, Werner, 4,947,005, Cl. 568-600.000.

Bertolotti, Giovanni. Inclined rotary platform apparatus for physical training, particularly of pre-ski type. 4,946,160, Cl. 272-97.000.

Bertram, James L.; Walker, Louis L.; and Stuart, Van I. W., to Dow Chemical Company, The. Latent catalysts for epoxy-containing compounds. 4,946,817, Cl. 502-154.000.

Bertram, Michael J.: See—  
Wehrly, James D., Jr.; and Bertram, Michael J., 4,945,954, Cl. 140-105.000.

Berube, Gene R., to Protein Databases, Inc. Visualization of proteins on electrophoresis gels using planar dyes. 4,946,794, Cl. 436-86.000.

Beshly, Bahjat S., to Engelhard Corporation. Method of steam reforming methanol to hydrogen. 4,946,667, Cl. 423-648.100.

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Galaj, Stanislas; Besland, Marie-Paule; Wicker, Alain; Gillot, Jacques; and Soria, Raymond, 4,946,592, Cl. 210-490.000.

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Mushardt, Heinrich; Uhlig, Uwe; Lutjens, Peter; Beyer, Horst; and Matysick, Frank, 4,945,888, Cl. 125-11.150.

Bhattacharjee, Himangshu R.; and Khanna, Yash P., to Allied-Signal Inc. Process for production of quasi-random copolymers from homopolymers using aryl phosphoryl azide(s). 4,946,909, Cl. 525-432.000.

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Bichler, David F.: See—  
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Biedenbach, Marita, to Koch, Hubert Josef. Device for planing and molding surface textures in wood boards. 4,945,959, Cl. 144-134.00R.

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Biefeld, Robert M.; Drummond, Timothy J.; Gourley, Paul L.; and Zipperian, Thomas E., to United States of America, Energy. Semiconductor devices incorporating multilayer interference regions. 4,947,223, Cl. 357-30.000.

Bienkowski, Lynda J.: See—  
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Bigolin, Giuseppe. Adjustable bicycle shoe clip including a toothed belt for locking both sides of a cyclist foot. 4,945,787, Cl. 74-534.600.

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Bilgrien, Carl J.: See—  
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Billiotte, Jean-Marie; Bouin, Thierry; Basset, Frederic; Beauvois, Jacques; and Primat, Didier, to UP Systems. Optical reading apparatus. 4,947,450, Cl. 382-68.000.

Billman, Timothy B.; McHugh, Robert G.; and Thrush, Roger L., to AMP Incorporated. Low insertion force circuit panel socket. 4,946,403, Cl. 439-326.000.

Biodeau, Andre E. Windshield wiper unit. 4,945,601, Cl. 15-250.240.

Binzen, Willard; Lee, Chung C.; and Gadsby, David A., to Dravo Wellman, Inc. Extensible and retractable chute. 4,946,018, Cl. 193-25.00C.

Bio Techniques Laboratories, Inc.: See—  
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Bioferon Biochemische Substanzen GmbH & Co.: See—  
von Eichborn, Johann-Friedrich; Obert, Hans-Joachim; and Link, Franz, 4,946,674, Cl. 424-85.500.

Bioresearch, Inc.: See—  
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Biosource Genetics Corporation: See—  
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Bird, Robert E.: See—  
Ladner, Robert C.; Bird, Robert E.; and Hardman, Karl, 4,946,778, Cl. 435-69.600.

Birks, Albert S.; and Skorpik, James R., to Battelle Memorial Institute. System for inspecting large size structural components. 4,947,045, Cl. 250-360.100.

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Bissett, Donald L.; and Chatterjee, Ranjit, to Procter & Gamble Company, The. Photoprotection compositions comprising sorbhydroxamic acid and an anti-inflammatory agent. 4,946,671, Cl. 424-59.000.

Black & Decker Inc.: See—  
Miner, Jonathan L.; Lacher, Vernon R.; Rescigno, Gerald J.; Swim, William B.; Gierke, Martin P.; and Hahn, David A., 4,945,604, Cl. 15-344.000.

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Black, Robert A., Jr.; and Kompelien, Arlon D., to Honeywell Inc. Notch cutting circuit with minimal power dissipation. 4,947,079, Cl. 315-205.000.

Blacklin, Peter: See—  
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Blair, Richard W.; and Grant, Jack R., to Houston Industries Incorporated. Meter box locks. 4,945,738, Cl. 70-161.000.

Blaise, Jean; and Kappler, Patrick, to Atochem. Heterogeneous copolymer of vinylidene fluoride and chlorotrifluoroethylene process of

preparation of the heterogeneous copolymer. 4,946,900, Cl. 525-276.000.

Blake, Terence G. W.; and Lu, Hsindao, to Texas Instruments, Incorporated. Process for making high performance silicon-on-insulator transistor with body node to source node connection. 4,946,799, Cl. 437-41.000.

Blank, Robert G.; Mody, Dhiraj S.; Kenny, Richard J.; and Aveson, Martha C., to American Home Products Corporation. Fast dissolving dosage forms. 4,946,684, Cl. 424-441.000.

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Blitchington, Frank H., to AT&T Bell Laboratories. Identification of workpiece information. 4,947,335, Cl. 364-468.000.

Bloch, Will. Purification of ribotoxins and their conjugates. 4,946,943, Cl. 530-377.000.

Blotenberg, Wilfried, to MAN Gutehoffnungshütte AG. Method of regulation that prevents surge in a turbocompressor. 4,946,343, Cl. 415-27.000.

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Keller, Karl-Heinz; Staab, Mathias; and Blum, Mathias, 4,945,843, Cl. 112-148.000.

Board of Regents, The University of Texas System: See—  
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Boatwright, Derrell W. Assembly for moving and guiding a vehicle onto and off of a bed of a towing vehicle. 4,946,333, Cl. 414-559.000.

Bodolay, William A.; Smith, Richard W.; and Ward, Gregory A., to Package Machinery Company, Bodolay/Pratt Division. Form, fill, seal and separate packaging machine for reclosable containers. 4,945,714, Cl. 53-568.000.

Boegesoe, Klaus P.; and Perregaard, Jens K., to H. Lundbeck A/S. CNS-affecting 6-oxy-3-aminomethyl indanes, compositions thereof, and a method of treating therewith. 4,946,863, Cl. 514-447.000.

Boehm, Marcus, to Chronar Corp. Particulate semiconductor devices and methods. 4,947,219, Cl. 357-20.000.

Boehm, William J., to Connector Manufacturing Company. Electrical terminal connector. 4,946,405, Cl. 439-387.000.

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Falk, R. Aaron, 4,947,170, Cl. 341-137.000.

Pinson, George T., 4,947,044, Cl. 250-330.000.

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Bolton, Wayne A. Dental articulator mounting for dental casts. 4,946,388, Cl. 433-56.000.

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Borden, Inc.: See—  
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Borghi, Angelo: See—  
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Borghi, Italo: See—  
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Borgmann, Michael, to Robert Krups Stiftung & Co. Kg. Cappuccino making adapter for use with coffee makers. 4,945,824, Cl. 99-293.000.

Borgstrom, Alan D.; and Stevens, David R., to Amerace Corporation. Separable connector access port and fittings. 4,946,393, Cl. 439-88.000.

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Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,946,082, Cl. 222-593.000.

Borthwick, Alan D.: See—  
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Bosch, Gerrit; Pasma, Tjebbe R.; and Sluyterman, Albertus A. S., to U.S. Philips Corporation. Picture display device with interference suppression means. 4,947,083, Cl. 315-8.000.

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Boticki, John A., to Fred Knapp Engraving Co., Inc. Snap swivel coupling for fluid flow applications. 4,946,204, Cl. 285-281.000.

Bott, Kaspar; Nick, Bernhard; and Schulz, Guenther, to BASF Aktiengesellschaft. 4-[(meth)acrylamidomethyl]-pyrazoles and -isoxazoles, their preparation and their use. 4,946,917, Cl. 526-260.000.

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Bozman, Gerald P., to International Business Machines Corporation. Arbitral dynamic cache using processor storage. 4,947,319, Cl. 364-200.000.

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Bradburn, Marvin, to Car-Go Corporation. Tire derimmer and method for tire derimming. 4,945,968, Cl. 157-1.170.

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Brandeau, Edward P., to Brandeau, Edward P. Flat cable-connector having improved contact system. 4,945,627, Cl. 29-564.400.

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Buck, Otto; Bracci, David J.; Jiles, David C.; Brasche, Lisa J. H.; Shield, Jeffrey E.; and Chumbley, Leonard S., 4,947,117, Cl. 324-227.000.

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Musil, Joseph E., 4,946,283, Cl. 366-15.000.  
CEM Corporation: See—  
Neas, Edwin D.; and Floyd, Terry S., 4,946,797, Cl. 436-175.000.  
Centocor, Inc.: See—  
Daddona, Peter E.; Pak, Koon Y.; and Nedelman, Mark, 4,946,668, Cl. 424-1.100.  
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Fouassier, Claude E.; Fu, Wen T.; and Hagenmuller, Paul, 4,946,621, Cl. 252-301.40R.  
Ceramdyne, Inc.: See—  
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Ceramics Process Systems Corporation: See—  
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Cerf, Alain A., to Polycerf, Inc. Device and method for applying a static seal, 4,945,709, Cl. 53-450.000.  
Cervin, Robert J.: See—  
Roshdy, Constance E.; Cervin, Robert J.; and Alpern, Marvin, 4,946,043, Cl. 206-63.300.  
Ceskoslovenska akademie ved: See—  
Sulic, Jiri; and Krcova, Zuzana, 4,946,470, Cl. 623-6.000.  
Chabot, Bertin R., Jr. Altered piston timing engine, 4,945,866, Cl. 123-54.00R.  
Chadwick, Kirk M.: See—  
Halm, Roland L.; Chadwick, Kirk M.; and Keyes, Brian R., 4,946,980, Cl. 556-978.000.  
Chakrabarti, Kishalaya: See—  
Mathur, Veerendra K.; and Chakrabarti, Kishalaya, 4,947,465, Cl. 250-484.100.  
Chamberlain, John C.: See—  
Vokey, David E.; Sontag, Kenneth N.; Chamberlain, John C.; and Lavallee, Ronald L., 4,947,469, Cl. 324-523.000.  
Chamberlin, Giles R.; Payne, David B.; and McCartney, David J., to British Telecommunications public limited company. Optical filters, 4,946,245, Cl. 350-96.190.  
Chang, Christopher Y.; and Sherwin, Leo C., to EMC Corporation. System for converting digital data from magnetic tape format apparatus and method for converting a sequentially accessible magnetic tape data format to directly accessible write-once disk data format to worm optical disk format, 4,947,367, Cl. 364-900.000.  
Chang, Daniel G.; Urbantas, Regina L.; and Urbantas, Richard G. Golf ball, golf club and golf shoe scrubber, 4,945,596, Cl. 15-21.200.  
Chang, I. Shan. Portable carrier, 4,946,187, Cl. 280-652.000.  
Chao, Tai-Hsiang; Wilcher, Fiona P.; Ford, Mark R.; and Ringwelski, Andrzej Z., to UOP. Solid phosphoric acid catalyst, 4,946,815, Cl. 502-81.000.  
Chapin, Leo N.: See—  
Miller, William D.; Chapin, Leo N.; and Evans, Joseph T., Jr., 4,946,710, Cl. 427-126.300.  
Chapman, Dwight E.; and Morse, David R., to Borden, Inc. Enamel receptive banner fabric, 4,946,739, Cl. 428-286.000.  
Charles Machine Works, Inc.: See—  
Malzahn, G. Edwin, 4,945,999, Cl. 175-19.000.  
Charoy, Alain; Vermot-Gaud, Jacques; Prost, Jean-Louis; Kornmann, Michel; and Gold, Dieter, to Battelle Memorial Institute. Method for detecting thickness variations in the wall of a tubular body which conducts electricity, 4,947,132, Cl. 324-699.000.  
Chatterjee, Ranjit: See—  
Bissett, Donald L.; and Chatterjee, Ranjit, 4,946,671, Cl. 424-59.000.  
Chaum, David. Undeniable signature systems, 4,947,430, Cl. 380-25.000.  
Chemische Industrie Filiform B.V.: See—  
Ipenburg, Willem, 4,946,040, Cl. 206-603.000.  
Chemische Werke Broekhuys AG: See—  
Jungk, Axel E., 4,946,505, Cl. 106-712.000.  
Chen, Shu-Yuan. Fill valve for toilet tanks, 4,945,944, Cl. 137-403.000.  
Cheng, Alex. Telescopic and collapsible golf cart, 4,946,186, Cl. 280-646.000.  
Chenoweth, Vaughn C.; and Goodsell, Roger C., to Guardian Industries Corp. Non-woven fibrous product, 4,946,738, Cl. 422-284.000.  
Cheski, Harvey P.: See—  
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Chevalier, Donald M. Erosion-control matting and method for making same, 4,946,308, Cl. 405-15.000.  
Chevalier, James L.; Pfeiffer, John D.; and Wright, Leslie R., to A.O. Smith Corporation. Water heater with outer jacket dam, 4,945,892, Cl. 126-373.000.  
Chevron Research Company: See—  
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,989, Cl. 166-268.000.  
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,990, Cl. 166-268.000.  
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Chiba, Manabu: See—  
Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihiro; Izutsu, Hitoshi; and Chiba, Manabu, 4,946,912, Cl. 525-537.000.  
Chiba, Susumu: See—  
Hashimoto, Masamichi; Saegusa, Haruhisa; Chiba, Susumu; Kitagawa, Hironoshin; and Miyoshi, Teruzo, 4,946,780, Cl. 435-101.000.  
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Chilcott, William J., to Fingermatrix, Inc. Full roll fingerprint apparatus, 4,946,276, Cl. 356-71.000.  
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Chism, Wayne R., to Hewlett-Packard Company. Programmatically generated in-circuit test of analog to digital converters, 4,947,106, Cl. 324-73.100.  
Chism, Wayne R.; and King, Philip N., to Hewlett-Packard Company. Driver circuit for providing pulses having clean edges, 4,947,113, Cl. 324-158.00R.  
Cho, Alex, to Aluminum Company of America. Unrecrystallized aluminum plate product by ramp annealing, 4,946,517, Cl. 148-12.70A.  
Choi, Won-Tae: See—  
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Christen, Daniel, to Ciba-Geigy Corporation. Apparatus for making spherical granules, 4,946,359, Cl. 425-222.000.  
Christensen, Donald R.: See—  
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Westra, Lubbert; and Lirette, Brent, 4,945,947, Cl. 137-519.500.  
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Chrysler Corporation: See—  
Benford, Howard L.; Mehta, Hemang S.; and Lindsay, Michael R., 4,947,329, Cl. 364-424.100.  
Nabha, Ali M.; and Dock, John C., 4,947,092, Cl. 318-444.000.  
Chu, Sung G.; Jabloner, Harold; and Nguyen, Tuyen T., to Hercules Incorporated. Bismaleimide compositions containing high glass transition temperature and soluble reactive oligomers and composites prepared therefrom, 4,946,908, Cl. 525-426.000.  
Chuang, Shyue S. Bushing forming machine, 4,946,088, Cl. 228-18.000.  
Chuang, Thomas C., to Xerox Corporation. Transfer apparatus, 4,947,215, Cl. 355-274.000.  
Chugh, Yoginder P.; Alongi, John R.; and Linton, Joey. Mine roof system, 4,946,315, Cl. 405-288.000.  
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Buck, Otto; Bracci, David J.; Jiles, David C.; Brasche, Lisa J. H.; Shield, Jeffrey E.; and Chumbley, Leonard S., 4,947,117, Cl. 324-227.000.  
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O'Shaughnessy, Timothy G.; Chung, David K.; Hull, Richard W.; Ouyang, Kenneth W.; Pierotti, Victor G.; and Souza, Joseph A., 4,947,063, Cl. 307-572.000.  
Chung, Deborah D. L., to UCAR Carbon Technology Corporation. Composites of in-situ exfoliated graphite, 4,946,892, Cl. 524-847.000.  
Chuo Electric Manufacturing Co., Ltd.: See—  
Yogo, Teruaki, 4,945,747, Cl. 72-306.000.  
Churchwell, William C. Complete deer feeder, 4,945,859, Cl. 119-57.910.  
Cianci, James P., to Kendall Company, The. Liquid valve system, 4,946,451, Cl. 604-323.000.  
Ciba-Geigy Corporation: See—  
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Delespesse, Guy, 4,946,788, Cl. 435-240.270.  
Falk, Robert A.; Clark, Kirtland P.; Karydas, Athanasios; and Jacobson, Michael, 4,946,992, Cl. 560-227.000.  
Hari, Stefan; and Babler, Fridolin, 4,946,948, Cl. 534-651.000.  
Maierfisch, Peter; Gehret, Jean-Claude; and Frei, Bruno, 4,946,854, Cl. 514-346.000.  
Pissiotas, Georg; Moser, Hans; and Brunner, Hans-Georg, 4,946,492, Cl. 71-72.000.  
Cincinnati Milacron Inc.: See—  
O'Neal, James I., 4,945,724, Cl. 60-455.000.  
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Bestler, Charles B.; Citta, Richard W.; and Gosc, Paul M., 4,947,429, Cl. 380-20.000.  
Clark, Kirtland P.: See—  
Falk, Robert A.; Clark, Kirtland P.; Karydas, Athanasios; and Jacobson, Michael, 4,946,992, Cl. 560-227.000.  
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Clarke, Michael R.; Troughton, Gary E.; and Walser, Donald C., to Forintek Canada Corporation. Controlled steam drying of veneer sheets, 4,945,652, Cl. 34-12.000.  
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Vatant, Robert, 4,946,141, Cl. 266-246.000.  
Vatant, Robert, 4,946,142, Cl. 266-276.000.  
Clemans, Jim E., to AT&T Bell Laboratories. Crystal growth method in crucible with step portion, 4,946,542, Cl. 156-607.000.  
Clemenz, Gary E.: See—  
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Cliff, John O. Two-boom crawler crane, 4,946,051, Cl. 212-258.000.  
Clorox Company, The: See—  
Fisher, Jeffrey J., 4,946,619, Cl. 252-187.240.  
Clossick, James P., to Cordis Corporation. Torqueable and formable biopsy forceps, 4,945,920, Cl. 128-751.000.

- Clough, Thomas J.; and Sibert, John W., to Ensci, Inc. Process for treating hydrocarbons, 4,946,578, Cl. 208-46.000.  
CMB Packaging (UK) Limited: See—  
Heyes, Peter J.; and Owen, Robert A., 4,946,063, Cl. 220-270.000.  
Coates, William J.; Emmett, John C.; and Slater, Robert A., to Smith Kline & French Laboratories Limited. Novel guanidino pyridazines as cardiac stimulants, 4,946,842, Cl. 514-247.000.  
Coca-Cola Company, The: See—  
Purkapile, Emerson J., 4,946,286, Cl. 366-247.000.  
Coddling, Charles B. Rake and soil conditioner, 4,945,996, Cl. 172-233.000.  
Cogger, John J., to Kolator Water Dynamics, Inc. Computerized water faucet, 4,945,943, Cl. 137-360.000.  
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Maury, Bernard; Walter, Jean-Claude; Cognasse, Christian; and Graham, Peter, 4,947,075, Cl. 310-324.000.  
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Cohen, Joel; and Cohen, Esther R. Medical electrode, 4,945,911, Cl. 128-640.000.  
Cohen, Lewis S.; and Rodrigues, Ivan, to Venture Tape Corp. Insulation with tape adhering surface, 4,946,732, Cl. 428-192.000.  
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Colder Products Company: See—  
Blenkush, Brian J.; and Sturm, Blaine C., 4,946,200, Cl. 285-38.000.  
Coleman, John R., to General Motors Corporation. Center compensating tandem master cylinder with seals in cylinder wall, 4,945,728, Cl. 60-562.000.  
Colgate-Palmolive Company: See—  
Vesborg, Siten, 4,946,080, Cl. 222-500.000.  
Collet-Cassart, Daniel; Magnusson, Carl-Gustav M.; and Masson, Pierre L., to International Institute of Cellular & Molecular Pathology. Method of immunoassay, 4,946,796, Cl. 436-512.000.  
Collette, Jerry R. Dual chamber volatilization system, 4,945,839, Cl. 110-212.000.  
Colligan, Kevin J., to Boeing Company, The. Method and apparatus for confining and collecting dust and particles produced by machine tools, 4,946,322, Cl. 409-137.000.  
Collins, Carl B., to Board of Regents, The University of Texas System. Flash x-ray apparatus, 4,947,415, Cl. 378-122.000.  
Columbia University in the City of New York, The Trustees of: See—  
Reemtsma, Keith; Hardy, Mark A.; and Lau, Henry T., 4,946,438, Cl. 604-53.000.  
Combs, Gary W.: See—  
Jackman, Dennis E.; Combs, Gary W.; and Westphal Dietmar B., 4,946,995, Cl. 564-18.000.  
Combustion Engineering, Inc.: See—  
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Hayes, James K., 4,946,589, Cl. 210-222.000.  
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Gatti, Gaetano; Oldani, Diego; Bottoni, Giuseppe; Confalonieri, Carlo; Gambini, Luciano; and De Ponti, Roberto, 4,946,831, Cl. 514-34.000.  
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Conlyn, Andrew C., Jr.; and Masters, John V. Apparatus for manual operation of vehicle brake and accelerator pedals, 4,946,013, Cl. 192-1.520.  
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Sansone, Ronald P.; Connell, Richard A.; Corsetti, Patricia; Dolan, Donald T.; and Gelfer, George G., 4,947,333, Cl. 364-464.020.  
Conner, Bruce E. Skin cleaner/towel package, 4,946,033, Cl. 206-223.000.  
Connolly, Brian D.; and Osbourne, Michael J. Storage box with locking lid and wall mounting apparatus, 4,946,057, Cl. 220-481.000.  
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Cooley, William H.; Hart, Ralph; and Harding, Peter E., to Harcross Engineering (Barnstable) Limited; Cooley, William H.; and Hart, Ralph. Retracting rocker unit, 4,947,018, Cl. 219-86.250.  
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Cope, Kenneth P.; Maga, Raymond A.; and Hall, Teddy L., to General Motors Corporation. Electrical connector with connector position assurance device, 4,946,395, Cl. 439-352.000.  
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Coral S.p.A.: See—  
Coral, Luciano, 4,946,483, Cl. 55-323.000.  
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Hauser, Jean-Luc; Tomatis, Bernard; and Sainte-Rose, Christian, 4,946,443, Cl. 604-165.000.  
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Cornwell, James H.; and Kukla, William J., to Environmental Research International, Inc. Electromagnetic converter for reduction of exhaust emissions, 4,945,721, Cl. 60-274.000.  
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Cortes, David A., to American Cyanamid Company. 2-azabicyclo[2.2.1]hept-5-ene-2-acetic acid, derivatives thereof and related compounds, process for the preparation of said compounds, and the use of said compounds for the manufacture of N-phosphonomethylglycine, 4,946,993, Cl. 562-17.000.  
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Costanzi, Silvestro; Gussoni, Damiano; Zavattini, Omero, deceased; by Pungiluppi, Clara, heir; by Zavattini, Renato, heir; and Pallini, Luciano, to Enichem Synthesis S.p.A. Silylated U.V. stabilizers containing hindered tertiary amines, 4,946,880, Cl. 524-96.000.  
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Bernhardt, Douglas H.; Matheu, Guillermo R.; Crum, Spencer E.; and Adelman, John T., 4,946,692, Cl. 426-231.000.

Crump, Gregory P.: See—  
Lewis, Garnet; Crump, John G.; and Crump, Gregory P., 4,945,756, Cl. 73-49.200.

Crump, John G.: See—  
Lewis, Garnet; Crump, John G.; and Crump, Gregory P., 4,945,756, Cl. 73-49.200.

Crus, Richard A.; Engles, Robert W.; Haderle, Donald J.; and Herron, Howard W., to International Business Machines Corporation: Method for referential constraint enforcement in a database management system, 4,947,320, Cl. 364-200.000.

Cryo Instruments, Inc.: See—  
Merry, Nir; and Smidebush, Michael, 4,946,460, Cl. 606-24.000.

Crystal Diagnostics, Inc.: See—  
Laugharn, James A.; Hammerton, Denis; and Towle, Timothy W., 4,946,603, Cl. 210-807.000.

Cudennec, Claude: See—  
Lavielle, Gilbert; Hautefaye, Patrick; and Cudennec, Claude, 4,946,833, Cl. 514-81.000.

Cullen, William K.; Lester, Warren E.; and Maurer, Robert J., to Westinghouse Electric Corp.: Robotic arm for delivering a tube plugging tool, 4,945,979, Cl. 165-76.000.

Cunningham, John: Homeostatic lifting and shock-absorbing support system, 4,946,128, Cl. 248-560.000.

Cunningham, Mark A.: See—  
Altman, Gary F.; and Cunningham, Mark A., 4,945,682, Cl. 49-502.000.

Curiel, Yoram, to TSL Incorporated: Method of making a tamper resistant package, 4,945,708, Cl. 53-411.000.

Curtis, Carl D.: See—  
Parsley, Clovis L.; Curtis, Carl D.; Atchison, Marvin D.; Seidle, Brett A.; and Cousineau, Danny R., 4,946,341, Cl. 414-796.700.

Custode, Frank Z., to Rockwell International Corporation: Sub-micron devices with method for forming sub-micron contacts, 4,947,225, Cl. 357-34.000.

Cutright, Edwin L., to Philip Morris Incorporated: Tube holding or guiding apparatus, 4,946,338, Cl. 414-745.100.

Czarnocki, Walter S.; Harper, Peter W.; Moran, Kevin S.; and Alexander, Steven W., to Motorola, Inc.: Adjustable temperature variable output signal circuit, 4,947,057, Cl. 307-310.000.

Czekajewski, Jan; and Nennerfelt, Leif B., to Czekajewski, Jan: Method and apparatus for measuring respiration, oxidation and similar interacting between a sample and a selected component of a fluid medium, 4,947,339, Cl. 364-497.000.

Daddona, Peter E.; Pak, Koon Y.; and Nedelman, Mark, to Centocor, Inc.: Tumor imaging with technetium labelled glucarate, 4,946,668, Cl. 424-1.100.

Daffern, George M.: See—  
Liston, Max D.; Hsei, Paul K.; Dickinson, David G.; Daffern, George M.; and Fetty, James G., 4,946,651, Cl. 422-102.000.

D'Agaro, Raymond: Combination vehicle heating and cooling system, 4,945,977, Cl. 165-43.000.

Dagher, F. Joseph, to DHL Research and Development Corporation: Protective mask, 4,945,574, Cl. 2-9.000.

Dahlmann, Virgil R.; Pirrallo, Karen M.; Talaki, Kelly A.; Zieslesch, Kenneth J.; and Hickling, Robert, to General Motors Corporation: Method and apparatus for ultrasonic inspection, 4,945,766, Cl. 73-598.000.

Dahnert, Dean L., to White Consolidated Industries, Inc.: Light bar, 4,947,161, Cl. 340-815.030.

Daicel Chemical Industries Ltd.: See—  
Goto, Yukihisa; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,946,497, Cl. 71-94.000.

Daido Tokushuko Kabushiki Kaisha: See—  
Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsubara, Toshihiko, 4,946,645, Cl. 420-84.000.

Daidotokushijo Kabushiki Kaisha: See—  
Okada, Takeshi, 4,947,405, Cl. 373-72.000.

Daigo, Kazuo: See—  
Kurokawa, Toshio; and Daigo, Kazuo, 4,946,047, Cl. 210-234.000.

Daikin Industries, Ltd.: See—  
Ito, Hiroyuki, 4,947,434, Cl. 381-71.000.

Izumo, Masanori, 4,946,479, Cl. 55-181.000.

Ohsaka, Yohnosuke; Kobayashi, Tsutomu; and Kubo, Motonobu, 4,946,935, Cl. 528-353.000.

Ohsaka, Yohnosuke; and Takaki, Shoji, 4,946,972, Cl. 549-511.000.

Daimaru, Takashi: See—  
Wada, Toyoji; Daimaru, Takashi; and Itoh, Noriyasu, 4,945,684, Cl. 51-165.770.

Daimler-Benz AG: See—  
Wiesmeier, Albert; and Griesinger, Manfred, 4,947,038, Cl. 250-227.230.

Daimon, Akio: See—  
Mitsuno, Tatsuyuki; Shinonaga, Hideo; and Daimon, Akio, 4,946,896, Cl. 525-93.000.

Dainippon Ink and Chemicals: See—  
Tanaka, Yasuyuki; Takatsu, Haruyoshi; Takeuchi, Kiyohumi; and Tamura, Yuji, 4,946,986, Cl. 558-411.000.

Dainippon Ink and Chemicals, Inc.: See—  
Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihito; Izutsu, Hitoshi; and Chiba, Manabu, 4,946,912, Cl. 525-537.000.

Dainippon Screen Mfg. Co., Ltd.: See—  
Sasada, Shigeru; and Kishida, Yoshihiro, 4,946,234, Cl. 350-6.600.

Daiwa Seiko, Inc.: See—  
Matsubara, Teiji, 4,946,034, Cl. 206-315.110.

Dallaire, Michael P.: See—  
Arfaei, Ahmad; Berke, Neal S.; Dallaire, Michael P.; and Hicks, Maria, 4,946,506, Cl. 106-724.000.

Dallas Semiconductor Corporation: See—  
Little, Wendell L., 4,947,477, Cl. 364-200.000.

Dalo, Dominic N., to General Motors Corporation: Fitting for heat exchanger and method of manufacture thereof, 4,945,983, Cl. 165-173.000.

Daly, Paul D.; and Luchinski, Peter E., to Siemens-Bendix Automotive Electronics L.P.: Extended over temperature operation and controls for ic engine, 4,945,878, Cl. 123-478.000.

Dammel, Ralph: See—  
Doessel, Karl-Friedrich; Dammel, Ralph; and Lingnau, Juergen, 4,946,759, Cl. 430-270.000.

D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., to Massachusetts Institute of Technology: Bioerodible articles useful as implants and prostheses having predictable degradation rates, 4,946,929, Cl. 528-206.000.

Dan, Tapan K.: See—  
Rohatgi, Pradeep K.; Dan, Tapan K.; Arya, S. C.; Prasad, S. V.; Das, S.; Gupta, A. K.; Prasad, B. K.; and Jha, Amol K., 4,946,647, Cl. 420-528.000.

Dana Corporation: See—  
Flotow, Richard A., 4,946,017, Cl. 192-70.300.

Dandreaux, Gary: See—  
Login, Robert B.; Merianos, John J.; Dandreaux, Gary; and Shih, Jenn S., 4,946,967, Cl. 548-531.000.

Daniels, James A.: See—  
Schumacher, William J.; and Daniels, James A., 4,946,644, Cl. 420-56.000.

Daniels, Lewis D.: Convertible boat and vehicle trailer, 4,946,332, Cl. 414-477.000.

Dao, Phat T.: See—  
Scozzafava, Michael; Dao, Phat T.; Robello, Douglas R.; Schildkraut, Jay S.; Willand, Craig S.; and Williams, David J., 4,946,235, Cl. 350-96.340.

Darilek, Glenn T., to Southwest Research Institute: System for locating leaks in a geomembrane-lined impoundment or landfill filled with material, 4,947,470, Cl. 324-557.000.

D'Arrigo, Sebastiano: See—  
Gill, Manzur; and D'Arrigo, Sebastiano, 4,947,222, Cl. 357-23.500.

Das, S.: See—  
Rohatgi, Pradeep K.; Dan, Tapan K.; Arya, S. C.; Prasad, S. V.; Das, S.; Gupta, A. K.; Prasad, B. K.; and Jha, Amol K., 4,946,647, Cl. 420-528.000.

Das, Sathish R., to Carrier Corporation: Wire raceway, 4,945,982, Cl. 165-125.000.

Dassler, Arnold, to Schwaebische Huettenerwerke GmbH: Spindle head assembly, 4,945,620, Cl. 29-39.000.

Datatape, Inc.: See—  
Grant, Frederic F., 4,947,069, Cl. 310-77.000.

Daum, Gerald R.: See—  
Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urein, Edgar J., 4,947,163, Cl. 340-825.310.

Dautaras, Mindaugas F.; Degani, Yinon; Kraetsch, Richard T.; Pimpinella, Richard J.; and Tai, King L., to AT&T Bell Laboratories: Movable fiber optical switch, 4,946,236, Cl. 350-96.200.

David, Maurice J. A.; Marianneau, Michel E. A.; Aebi, Gilbert; and Raye, Pierre, to Stellram S.A.; and Societe Nationale Industrielle et Aerospatiale: Milling cutter with removable inserts, 4,946,318, Cl. 407-42.000.

Davis, Bill E.; and Podsiad, Paul, to Stewart Systems, Inc.: Article sorting switch, 4,946,022, Cl. 198-365.000.

Davis, Charles; and Kennedy, Robert A., to Aaxon Industrial, Inc.: Particulate collection and dewatering means for airborne particulate matter, 4,946,478, Cl. 55-97.000.

Davis, Dennis W., to United Technologies, Inc.: Electro-optic signal processing apparatus, 4,946,264, Cl. 350-486.000.

Davis, Mark E.; Arhancet, Juan P.; and Hanson, Brian E., to Virginia Tech Intellectual Properties, Inc.: Process for the hydroformulation of olefinically unsaturated organic reactants using a supported aqueous phase catalyst, 4,947,003, Cl. 568-454.000.

Davis, Richard C., Jr.: Indwelling urethral catheter system and method, 4,946,449, Cl. 604-256.000.

Davis, Robert F.: See—  
Edmond, John A.; and Davis, Robert F., 4,947,218, Cl. 357-13.000.

Davison, Timothy A.: Vehicle-mounted brush cutter, 4,946,488, Cl. 56-14.900.

Davy McKee (Sheffield) Limited: See—  
Bathory, Bela I.; Gronbech, Robert W.; and Lister, Michael, 4,945,745, Cl. 72-249.000.

Dawson Offshore Pty. Ltd.: See—  
Fielder, Nicholas A. W., 4,945,597, Cl. 15-104.130.

Daxhelet, Xavier: See—  
Gonthier, Francois; Daxhelet, Xavier; LaCroix, Suzanne; Black, Richard J.; and Bures, Jacques, 4,946,250, Cl. 350-96.290.

Day, Fleming H., to Du Pont de Nemours, E. I., and Company: Low temperature finish, 4,946,375, Cl. 428-395.000.

De Staat Der Nederlanden: See—  
Van Wezel, Antonius L.; Hazendonk, Antonius G.; and Beuvery, Eduard C., 4,946,676, Cl. 424-89.000.

Dean, Robert E.: See—  
Walker, Billy R.; Emmons, George B.; and Dean, Robert E., 4,945,749, Cl. 72-356.000.

Deana, Albert A.: See—  
Prugh, John; Deana, Albert A.; and Rooney, Clarence S., 4,946,864, Cl. 514-460.000.

De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., to Orthofix S.r.l.: Self-gradually locking chuck, 4,946,179, Cl. 279-1.05G.

DeBlois, Raymond L.; Stoeffler, Richard C.; McFarlin, David J.; and Fraser, Howard H., Jr., to Carrier Corporation: Horizontal scroll compressor with oil pump, 4,946,361, Cl. 418-55.600.

Dee, Robert J.: See—  
Flemming, J. Peter; and Dee, Robert J., 4,946,100, Cl. 239-1.000.

De Feo, Carlo, to I.P.M. Industria Politecnica Medidionale S.p.A.: Rotating drum magazine for storing and managing coins in telephone sets or dispensers, 4,946,418, Cl. 453-20.000.

Defilippis, Christian: See—  
Baulier, Dominique; Defilippis, Christian; Jami, Jacques; Negre, Bernard; Pierdet, Alain; Negre, Bernard; and Pierdet, Alain, 4,946,089, Cl. 228-45.000.

Degani, Yinon: See—  
Dautaras, Mindaugas F.; Degani, Yinon; Kraetsch, Richard T.; Pimpinella, Richard J.; and Tai, King L., 4,946,236, Cl. 350-96.200.

Deguisse, Michel: See—  
Aubry, Jacques A.; and Deguisse, Michel, 4,946,354, Cl. 416-158.000.

Degussa Aktiengesellschaft: See—  
Kiss, Akos; Kleinschmit, Peter; Volker, Werner; and Halbritter, Gunter, 4,946,622, Cl. 252-301.40F.

Krimmer, Hans-Peter; Drauz, Karlheinz; and Rimmel, Hans, 4,946,968, Cl. 548-534.000.

de Koning, Frank, to van den Elshout, Adrianus W. A. J.: Dog lead, 4,945,861, Cl. 119-109.000.

Delaruelle, Dale H.: See—  
Deno, Milton C.; Smith, Eugene A., Jr.; and Delaruelle, Dale H., 4,946,229, Cl. 303-33.000.

Delco Electronics Corporation: See—  
Roth, Norman J.; Wallace, Robert J.; and Hartman, Domenica N., 4,947,235, Cl. 357-68.000.

Sidner, Diane W.; Yoder, Douglas J.; and Moss, David E., 4,945,769, Cl. 73-727.000.

Stroud, Richard S.; Anderson, Fred J.; Repogle, Matthew C.; White, Douglas E.; Marrah, Jeffrey J.; and Manlove, Gregory J., 4,947,431, Cl. 381-13.000.

Delco Electyronic Corp.: See—  
Lippmann, Raymond; Schnars, Michael J.; and DuBois, Paul L., 4,947,410, Cl. 377-26.000.

Delespese, Guy, to Ciba-Geigy Corporation: Purified immunoglobulin-related factor, novel monoclonal antibodies, hybridoma cell lines, processes and applications, 4,946,788, Cl. 435-240.270.

Dell'Acqua, Silvano, to Nuova Sircop Engineering S.r.l.: Coupling for transmitting rotary motion between a pair of shafts, even when said shafts are off-centered, 4,946,305, Cl. 403-336.000.

Dell'Eva, Mark L.; Yen, Chieh-Yi J.; and George, Jacob, to General Motors Corporation: Laser profiler for high precision surface dimensional grouping apparatus and method, 4,946,281, Cl. 356-376.000.

Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., to Sherman Industries, Inc.: Automated car wash system, 4,946,513, Cl. 134-18.000.

De Marchi, Jean-Louis; and Mabboux, Michel, to Salomon S.A.: Ski boot having an interchangeable sole portion for controlling global wedging angle of the boot, 4,945,659, Cl. 36-117.000.

Demarne, Henri; Filhol, Robert; and Mosse, Madeleine, to Sanofi: Antimicrobial compositions containing benzoic acid derivatives for use as disinfectants, drugs or preservative agents, 4,946,868, Cl. 514-544.000.

Demick, Robert L., to Hoover Universal, Inc.: Vehicle with integrated seat risers, 4,946,216, Cl. 296-63.000.

Dempsey, Barry J., to Astrofurf Industries, Inc.: Drainable artificial turf assembly, 4,946,719, Cl. 428-17.000.

Denis, Jean-Pierre; Desmurs, Jean-Roger; and Lecouve, Jean-Pierre, to Rhone-Poulenc Chimie: Process for the acylation of N,N-diallylaniline or a mixture of N,N-diallylaniline and N-allylaniline, 4,946,983, Cl. 564-143.000.

Denki Kagaku Kogyo Kabushiki Kaisha: See—  
Hashimoto, Masamichi; Saegusa, Haruhisa; Chiba, Susumu; Kitagawa, Hironoshin; and Miyoshi, Teruzo, 4,946,780, Cl. 435-101.000.

Denny, Patrick J.; and Shipley, David G., to Imperial Chemical Industries PLC: Desulphurization, 4,946,660, Cl. 423-230.000.

Deno, Milton C.; Smith, Eugene A., Jr.; and Delaruelle, Dale H., to Harris Corporation: Adaptive air brake control system, 4,946,229, Cl. 303-33.000.

De Ponti, Roberto: See—  
Gatti, Gaetano; Oldani, Diego; Bottoni, Giuseppe; Confalonieri, Carlo; Gambini, Luciano; and De Ponti, Roberto, 4,946,831, Cl. 514-34.000.

De Pous, Olivier, to Honda Motor Co., Ltd.: Method and device for determining oxygen in gases, 4,947,125, Cl. 324-459.000.

Deschenaux, Pierre-Alain: See—  
Jimenez, Antonio; and Deschenaux, Pierre-Alain, 4,945,844, Cl. 112-444.000.

Deshpande, Narayan V., to Xerox Corporation: Thermal ink jet print-head with improved heating elements, 4,947,193, Cl. 346-140.00R.

Designs for Vision: See—  
Feinbloom, Richard E.; and Sacks, Thomas, 4,946,257, Cl. 350-321.000.

Desmurs, Jean-Roger: See—  
Denis, Jean-Pierre; Desmurs, Jean-Roger; and Lecouve, Jean-Pierre, 4,946,983, Cl. 564-143.000.

DeSoto, Inc.: See—  
Devona, James E.; and Shay, Gregory D., 4,946,891, Cl. 524-833.000.

Hawker, Fred D.; Pietryga, Victor E.; Byrd, Robert W.; Wichmann, James; and Nicpon, Patricia A., 4,946,711, Cl. 427-156.000.

Deutsche ITT Industries GmbH: See—  
Pfeifer, Heinrich; Reich, Werner; and Theus, Ulrich, 4,947,171, Cl. 341-143.000.

Devin, Jean: See—  
Gaultier, Jean Marie; and Devin, Jean, 4,947,375, Cl. 365-200.000.

Devona, James E.; and Shay, Gregory D., to DeSoto, Inc.: Semi-continuous emulsion polymerization process, 4,946,891, Cl. 524-833.000.

Dew, Michael W.; and Creedon, Richard L., to General Atomics: Superconducting transmission line system, 4,947,007, Cl. 174-15.500.

Dewald, Lamar R.; and Ryan, William E., to Dow Chemical Company: The chemical analysis probe station, 4,946,652, Cl. 422-104.000.

De Wit, Johannes, to Nestec S.A.: Agglomerates of potato granules, 4,946,704, Cl. 426-637.000.

DeWitt, Carl; and Fink, Gerald A.: Spraying apparatus, 4,946,102, Cl. 239-167.000.

Dhein, Rolf: See—  
Ebert, Wolfgang; Meyer, Rolf-Volker; Dhein, Rolf; and Oels, Udo, 4,946,927, Cl. 528-198.000.

DHL Research and Development Corporation: See—  
Dagher, F. Joseph, 4,945,574, Cl. 2-9.000.

Dhyanchand, P. John; and Nguyen, Vietson, to Sundstrand Corporation: Power conversion system with stepped waveform inverter having prime mover start capability, 4,947,100, Cl. 322-10.000.

Dhyanchand, P. John: See—  
Shekhawat, Sampat S.; and Dhyanchand, P. John, 4,947,055, Cl. 307-254.000.

Diamond, Deborah L.: See—  
Diamond, Sidney; and Diamond, Deborah L., 4,946,292, Cl. 383-127.000.

Diamond, Sidney; and Diamond, Deborah L., to Sidney Diamond: Bag having expanding means therein, 4,946,292, Cl. 383-127.000.

Diasonics, Inc.: See—  
Pell, James W.; Spielmaker, Richard E.; and Zikorus, Arthur W., 4,945,898, Cl. 128-24.00A.

DiBono, Peter A. Telephone cord retraction device. 4,946,010, Cl. 191-12.20R.

Dichtelmuller, Herbert; Moller, Wolfgang; Stephan, Wolfgang; and Schlusner, Hans, to Biotest Pharma GmbH. Method of sterilizing plasma or plasma fractions. 4,946,648, Cl. 422-24.000.

Dickey, Richard F.: See—  
Krofchalk, Gary F.; Dickey, Richard F.; and Hall, Courtney, 4,945,759, Cl. 73-117.300.

Dickinson, David G.: See—  
Liston, Max D.; Hsei, Paul K.; Dickinson, David G.; Daffern, George M.; and Fetty, James G., 4,946,651, Cl. 422-102.000.

Dickman, William M.: See—  
Merle, Thomas C.; and Dickman, William M., 4,946,171, Cl. 273-348.100.

Dickson, Rennie L.; and Smith, Roddie R., to Otis Engineering Corporation. Surface controlled subsurface safety valve. 4,945,993, Cl. 166-321.000.

Dieguez, Jose.: See—  
Lee, Robert G. H.; Hornsey, Derek; Dieguez, Jose.; and Perkins, Arthur S., 4,946,555, Cl. 162-49.000.

Diehl, Conrad: See—  
Wash, Michael L.; and Diehl, Conrad, 4,947,196, Cl. 354-76.000.

Diels, Gaston S. M.: See—  
Janssens, Frans E.; Sommen, Francois M.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,946,843, Cl. 514-253.000.

Diemeer, Martinus B. J., to Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie). Method and device for controlling a beam of light. 4,946,262, Cl. 350-362.000.

Dierberger, James A.: See—  
Pane, Francis C., Jr.; and Dierberger, James A., 4,946,105, Cl. 239-590.300.

Diesel Kiki Co., Ltd.: See—  
Kono, Hiromi, 4,947,283, Cl. 361-154.000.

Dietel, Glenn. Hedge cutting, trimming and pruning tool. 4,945,638, Cl. 30-309.000.

Dietrich, Anton; and Hartig, Klaus, to Leybold Aktiengesellschaft. Apparatus for the application of thin layers to a substrate. 4,946,576, Cl. 204-298.060.

Digital Equipment Corporation: See—  
Donaldson, Darrel D.; and Gillett, Richard B., Jr., 4,947,368, Cl. 364-900.000.

Hinlein, Sigmund, 4,947,275, Cl. 360-104.000.

Lamere, Virginia C.; Fite, Elaine H.; and McKeen, Francis X., 4,947,358, Cl. 364-715.040.

Shine, M. Carl, 4,947,341, Cl. 364-508.000.

Digital Telecommunications Systems, Inc.: See—  
Burnett, Steven W.; and Smith, Benjamin A., 4,947,422, Cl. 379-200.000.

DiGiulio, Peter C.; and Lee, David K., to Pitney Bowes Inc. Communication protocol for a three nodes system having dedicated connections and bit indicating function of exchanged message. 4,947,317, Cl. 364-200.000.

Dimed, Incorporated: See—  
Elliott, Clyde D., 4,946,457, Cl. 606-1.000.

Dirr, Josef. Process for transmission of analog and/or digital information, especially with an in-line arrangement of one, two or more exchanges in telecommunications systems. 4,947,483, Cl. 370-30.000.

Di Santo, Frank J.; and Krusos, Denis A., to 501 CopyTele, Inc. Apparatus and methods for pulsing the electrodes of an electrophoretic display for achieving faster display operation. 4,947,157, Cl. 340-787.000.

Di Santo, Frank J.; and Krusos, Denis A., to 501 CopyTele, Inc. Power supply apparatus capable of multi-mode operation for an electrophoretic display panel. 4,947,159, Cl. 340-787.000.

Ditchburn, Robert W.; and Gouch, Martin P. Sorting. 4,946,045, Cl. 209-576.000.

DLMA Transportation Inc.: See—  
Manning, Donald L., 4,946,189, Cl. 280-688.000.

Do-Huu, Jean-Paul: See—  
Kretschmer, Sylvain; Do-Huu, Jean-Paul; and Micheron, Francois, 4,945,916, Cl. 128-671.000.

Dock, John C.: See—  
Nabha, Ali M.; and Dock, John C., 4,947,092, Cl. 318-444.000.

Dodd, Thomas L.; and O'Steen, David A. Process of treating the scalp and hair. 4,946,678, Cl. 424-581.000.

Doerfler, Ronald W.; Power, Terrill G.; Jones, Stephen R.; and Owens, William R., to Sundstrand Corporation. Magneto-optic current sensor. 4,947,107, Cl. 324-96.000.

Doessel, Karl-Friedrich; Dammel, Ralph; and Lingnau, Juergen, to Hoechst Aktiengesellschaft. Positive radiation-sensitive mixture and radiation-sensitive recording material produced therefrom. 4,946,759, Cl. 430-270.000.

Dolan, Donald T.: See—  
Sansone, Ronald P.; Connell, Richard A.; Corsetti, Patricia; Dolan, Donald T.; and Gelfer, George G., 4,947,333, Cl. 364-464.020.

Dollhausen, Manfred: See—  
Meckel, Walter; Muller-Albrecht, Horst; and Dollhausen, Manfred, 4,946,535, Cl. 156-331.700.

Dompas, John M. A., to Metallurgie Hoboken-Overpelt. Metallic anodes manufactured from molten copper. 4,946,575, Cl. 204-288.000.

Donaldson Company, Inc.: See—  
Monson, Donald R.; LeBlanc, James A.; and Tokar, Joseph C., 4,946,484, Cl. 55-385.200.

Donaldson, Darrel D.; and Gillett, Richard B., Jr., to Digital Equipment Corporation. Lookahead bus arbitration system with override

of conditional access grants by bus cycle extensions for multicycle data transfers. 4,947,368, Cl. 364-900.000.

Donat Flamad Inc.: See—  
Giguere, Jean P., 4,945,680, Cl. 49-468.000.

Doreen Mason: See—  
Key, Sammy D.; and Quintanilla, Martin T., 4,946,188, Cl. 280-661.000.

Dorer, Robert E.; and Belden, Lawrence, to Bissell Health Care Corporation. Progressive static flexion device for phalanges. 4,945,902, Cl. 128-87.00A.

Dorfman, Bella M.: See—  
Kasenga, Anthony F.; and Dorfman, Bella M., 4,946,707, Cl. 427-64.000.

Dorner, Friedrich; and Eibl, Johann, to Immuno Aktiengesellschaft fur Chemisch-Medizinische Produkte. Preparations active against pseudomonas aeruginosa infections and methods of producing them. 4,946,677, Cl. 424-92.000.

Doty, Gerald A., to Gateway Industries, Inc. Retractor with manually-operable remote control for tension-relieving system. 4,946,196, Cl. 280-803.000.

Douglas, Kenneth W., Sr.: See—  
Kaplan, Murray A.; Perrone, Robert K.; Bogardus, Joseph B.; and Douglas, Kenneth W., Sr., 4,946,629, Cl. 424-649.000.

Dow Chemical Company, The: See—  
Bertram, James L.; Walker, Louis L.; and Stuart, Van I. W., 4,946,817, Cl. 502-154.000.

Dewald, Lamar R.; and Ryan, William E., 4,946,652, Cl. 422-104.000.

Falla, Daniel J.; and Berchtold, Peter H., 4,946,616, Cl. 252-75.000.

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Dow Corning Corporation: See—  
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Gordin, Myron K.; and Drost, Jim L., 4,947,303, Cl. 362-261.000.

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Dundas, Dennis L.; and Moore, Eugene L., to Graham Engineering Corporation. Needle assembly for blow molding aseptic bottles. 4,946,366, Cl. 425-536.000.

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Giebel, Gerhard; Berny, Hans-Jurgen; and Siegel, Albrecht, 4,945,593, Cl. 12-12.400.

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Dyer, Nigel P., to Plessey Overseas Limited. Low frequency digital notch filter. 4,947,360, Cl. 364-724.070.

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Dykstra, Gerald L.; Boogaard, Craig; and Brunsting, Rodley, to Industrial Resources of Michigan. Single-pass pallet disassembler with self-adjusting head. 4,945,626, Cl. 29-564.300.

Dymond, Brian: See—  
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Eastman Kodak Company: See—  
Backus, Richard J., 4,947,049, Cl. 250-561.000.

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Wash, Michael L.; and Diehl, Conrad, 4,947,196, Cl. 354-76.000.

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Eaton Corporation: See—  
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Ebara Corporation: See—  
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Ebe, Kazuyoshi: See—  
Ikeda, Takeshi; Nozaki, Akira; and Ebe, Kazuyoshi, 4,946,728, Cl. 428-40.000.

Ebert, Wolfgang; Meyer, Rolf-Volker; Rhein, Rolf; and Oels, Udo, to Bayer Aktiengesellschaft. Preparation of aromatic polycarbonates, aromatic polyester carbonates and aromatic polyesters with organic phase comprising mixture of hydrocarbons. 4,946,927, Cl. 528-198.000.

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Mizusawa, Nobutoshi; Ebinuma, Ryuichi; and Chiba, Yuji, 4,947,190, Cl. 346-140.00R.

Echelon Systems Corporation: See—  
Twitty, William B.; and Sander, Wendell B., 4,947,484, Cl. 371-37.100.

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Eckel, Alan, 4,945,606, Cl. 16-313.000.

Eckert, Robert P.; and Shabtay, Benjamin A., to Unitek Corporation. Case for dispensing orthodontic elastic rings. 4,946,385, Cl. 433-2.000.

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Yoshinaga, Isao; and Edashima, Toshikazu, 4,946,642, Cl. 376-260.000.

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Edmond, John A.; and Davis, Robert F., to North Carolina State University. P-N junction diodes in silicon carbide. 4,947,218, Cl. 357-13.000.

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Edstrom, Soren: See—  
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Eggers, Philip N., to Critikon, Inc. Dual source parenteral infusion system with secondary infusion module. 4,946,439, Cl. 604-67.000.

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Eguchi, Shuji: See—  
Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ibamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.

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Eichmann, Harry A.; and Eichmann, Gieselle. Conveyor belt treatment. 4,946,028, Cl. 198-688.100.

Eininger, Josef; Leipold, Ludwig; Tihanyi, Jenő; and Weber, Roland, to Siemens Aktiengesellschaft. Semiconductor component with power MOSFET and control circuit. 4,947,234, Cl. 357-68.000.

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Eistetter, Klaus: See—  
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Ejima, Theophilus I., to AT&T Bell Laboratories. Crystal growth method. 4,946,544, Cl. 156-616.410.

Eka Nobel AB: See—  
Hakansson, Bo, 4,946,565, Cl. 204-95.000.

Svending, Per J., 4,946,557, Cl. 162-168.300.

Ekberg, Bjarne; and Norrgard, Goran, to Valmet Paper Machinery Inc. Method of cleaning filter discs in a suction drier using ultrasonic vibration. 4,946,602, Cl. 210-785.000.

Eklund, Dan; and Westergard, Sivert, to Valmet Paper Machinery Inc. Coater. 4,945,855, Cl. 118-407.000.

Ekstrand, John A. I., to Interarms Aktiebolag. Arrangement in a luminous dot sighting instrument. 4,945,646, Cl. 33-245.000.

Ekstrand, John P.; and Holsinger, Kevin, to Spectra-Physics, Inc. Feedback loop gain compensation for a switched resistor regulator. 4,947,102, Cl. 323-293.000.

Elan Transdermal Limited: See—  
Bannon, Yvonne B.; Corish, John; Corrigan, Owen I.; Geoghegan, Edward J.; and Masterson, Joseph G., 4,946,853, Cl. 514-343.000.

Electric Power Research Institute, Inc.: See—  
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Yie, Gene G., 4,945,688, Cl. 51-439.000.



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Electronic Surveillance Corporation: See—  
Morrow, David E., 4,947,155, Cl. 340-650.000.

Electropore, Inc.: See—  
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Pimpis, Robert M.; Oakes, Richard T.; Ellery, Michael D.; and Knapp, Edward J., Jr., 4,947,149, Cl. 337-246.000.

Elliott, Clyde D., to Dimed, Incorporated. Defibrillator system with cardiac leads and method for transvenous implantation. 4,946,457, Cl. 606-1.000.

Elliott, Stephen J.; and Nelson, Philip A., to United Kingdom of Great Britain and Northern Ireland. The Secretary of State for Trade and Industry in Her Britannic Majesty's Government of the. Aircraft cabin noise control apparatus. 4,947,356, Cl. 364-574.000.

Ellrich, Klaus: See—  
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Ellwanger, Russell C., to North American Philips Corp., Signetics Division. Method for manufacturing a Schottky-type rectifier having controllable barrier height. 4,946,803, Cl. 437-175.000.

Elmasry, Mohamed A.; Kidnie, Kevin M.; and Zwadlo, Gregory L., to Minnesota Mining and Manufacturing Company. Liquid electrophotographic toners. 4,946,753, Cl. 430-45.000.

Elsaesser, Andreas, to Hoechst Aktiengesellschaft. Radiation-sensitive mixture. 4,946,760, Cl. 430-270.000.

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EMC Corporation: See—  
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Emerson Electric Co.: See—  
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Enhart Industries, Inc.: See—  
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Emmett, Michael M.: See—  
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Emmons, George B.: See—  
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Emmons, William D.: See—  
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Empson, Greg C., administrator: See—  
Jonha, Mohamed A.; Lazowski, Andrew, deceased; Empson, Greg C., administrator; and Vieira, Jose, administrator, 4,945,578, Cl. 4-391.000.

Encon Safety Products, Inc.: See—  
Hewitt, Charles D.; and Specht, Paul B., 4,945,577, Cl. 2-437.000.

Endo, Azuchi, to Fuji Photo Film Co., Ltd. Photographic printer. 4,947,204, Cl. 355-20.000.

Endo, Noboru: See—  
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Endo, Shinobu: See—  
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Eng, Kai Y.; and Karol, Mark J., to AT&T Bell Laboratories. Multi-channel ring architecture for distributed networks. 4,947,389, Cl. 370-85.120.

Engel, Gunter; Enko, Alfred; Krempf, Peter W.; and Posch, Uwe, to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr. Dr. h.c. Hans List. Method of growing homogeneous crystals. 4,946,545, Cl. 156-623.00R.

Engel, Jürgen; Kleemann, Axel; Nickel, Bernd; and Szelenyi, Istvan, to Asta Pharma AG. Nitrogen-containing cyclo-aliphatic compounds having an amino radical and a pyridine radical. 4,946,836, Cl. 514-183.000.

Engelhard Corporation: See—  
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Murphy, Colin R., 4,945,699, Cl. 52-410.000.

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Enichem Synthesis S.p.A.: See—  
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Erickson, Michael E.; and Plichta, Roman T., to Amoco Corporation. Fresh catalyst container. 4,946,066, Cl. 222-23.000.

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Ernst Leitz Wetzlar GmbH: See—  
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Estavoyer, Jacques; and Faivre, Pascal, to Bull S.A. Method for fixing a powdered developer deposited on a sheet, and apparatus for fixing the developer by this method. 4,946,756, Cl. 430-124.000.

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Wu, Feng-Jung; Berris, Bruce C.; and Bell, Donald R., 4,946,975, Cl. 556-47.000.

Ethyl Petroleum Additives, Inc.: See—  
Lam, William Y.; and Liesen, Gregory P., 4,946,610, Cl. 252-48.200.

Etou, Kouichi: See—  
Ikegawa, Akihito; Mizuno, Hiroshi; Murasaki, Hiroshi; and Etou, Kouichi, 4,947,212, Cl. 355-265.000.

Euroceltique, S.A.: See—  
Pollack, William; and Iny, Oliver, 4,946,673, Cl. 424-80.000.

Evans, Joseph T., Jr.: See—  
Miller, William D.; Chapin, Leo N.; and Evans, Joseph T., Jr., 4,946,710, Cl. 427-126.300.

Evans, Mark I.; and Greenwood, Frederick C. Contraceptive and prophylactic device. 4,945,923, Cl. 128-842.000.

Evans, Steven; and Weber, Helmut, to Eastman Kodak Company. Arylidene pyrazolone dye-donor element for thermal dye transfer. 4,946,825, Cl. 503-227.000.

Evenson, Randy, to Multi-Pump, Inc. Dual action piston pump. 4,946,352, Cl. 417-396.000.

Eventoff, Arnold T.: See—  
Buan, Danilo P.; and Eventoff, Arnold T., 4,945,831, Cl. 101-340.000.

Exxon Research and Engineering Company: See—  
Guckes, Terry L.; McHugh, Mark A.; Cozewith, Charles; and Hazelton, Ronald L., 4,946,940, Cl. 528-483.000.

Peiffer, Dennis G.; and Lundberg, Roberg D., 4,946,916, Cl. 526-240.000.

Thaler, Warren A.; Ho, W. S. Winston; and Sartori, Guido, 4,946,594, Cl. 210-651.000.

Eziri, Katsushi: See—  
Kanehira, Koichi; Eziri, Katsushi; Shiono, Manzo; Fujita, Yoshiji; and Yamahara, Johji, 4,946,857, Cl. 514-399.000.

Ezis, Andre, to Ceradyne, Inc. Making hot pressed silicon nitride by use of low density reaction bonded body. 4,946,630, Cl. 264-65.000.

F. Oberdorfer GmbH & Co. KG Industriegebe-Technik: See—  
Vohringer, Fritz, 4,945,952, Cl. 139-383.00A.

Faccioli, Giovanni: See—  
De Bastiani, Giovanni; Faccioli, Giovanni; Aldegheri, Roberto; and Brivio, Lodovico R., 4,946,179, Cl. 279-1.0SG.

Fael S.A.: See—  
Rolli, Hans, 4,947,013, Cl. 219-64.000.

Rolli, Hans; and Muller, Jakob, 4,947,014, Cl. 219-64.000.

Fahim, Mostafa S. Intraprostatic injection of zinc ions for treatment of inflammatory conditions and benign and malignant tumors of the prostate. 4,946,688, Cl. 424-643.000.

Failor, Raymond A.: See—  
Hayton, Eugene; Failor, Raymond A.; and Singleton, Dan, 4,945,582, Cl. 5-67.000.

Fairchild Camera & Instrument Corp.: See—  
Kapoer, Ashok K., 4,947,230, Cl. 357-46.000.

Fairchild Semiconductor Corporation: See—  
Yarbrough, Roy L.; and Estrada, Julio R., 4,947,058, Cl. 307-443.000.

Faivre, Pascal: See—  
Estavoyer, Jacques; and Faivre, Pascal, 4,946,756, Cl. 430-124.000.

Fajula, Francois; Figueras, Francois; Gueguen, Claude; and Dutartre, Roger, to Elf France. Binary zeolitic systems, their synthesis and their utilization. 4,946,580, Cl. 208-120.000.

Falk, R. Aaron, to Boeing Company, The. All optical analog-to-digital converter. 4,947,170, Cl. 341-137.000.

Falk, Robert A.; Clark, Kirtland P.; Karydas, Athanasios; and Jacobson, Michael, to Ciba-Geigy Corporation. Heteroatom containing perfluoroalkyl terminated neopentyl glycols and compositions therefrom. 4,946,992, Cl. 560-227.000.

Falla, Daniel J.; and Berchold, Peter H., to Dow Chemical Company. The. Heat transfer fluids containing dicarboxylic acid mixtures as corrosion inhibitors. 4,946,616, Cl. 252-75.000.

Fanuc Ltd: See—  
Kawamura, Hideaki; Sasaki, Takao; and Endou, Takashi, 4,947,095, Cl. 318-569.000.

Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., to International Flavors & Fragrances Inc. Process for preparing compositions containing unsaturated lactones, products produced thereby and organoleptic uses of said products. 4,946,782, Cl. 435-126.000.

Farmitalia Carlo Erba S.p.A.: See—  
Gatti, Gaetano; Oldani, Diego; Bottoni, Giuseppe; Confalonieri, Carlo; Gambini, Luciano; and De Ponti, Roberto, 4,946,831, Cl. 514-34.000.

Farnum, Charles L.: See—  
Stumpf, Robert C.; Correa, Jose L.; and Farnum, Charles L., 4,946,524, Cl. 156-87.000.

Farrand, Philip F., to Wenger Corporation. Method and system for transcribing musical information including method and system for entering rhythmic information. 4,945,804, Cl. 84-462.000.

Farrar, David; and Dymond, Brian, to Allied Colloids Ltd. Aqueous drilling and packer fluids. 4,946,605, Cl. 252-8.514.

Farraro, John T.: See—  
Escobar, Benjamin A., Jr.; Wahner, Lester J.; Montes, Gilbert; and Farraro, John T., 4,946,520, Cl. 148-432.000.

Farrell, Michael J., to General Motors Corporation. Mounting device for securing a ring gear to a drive drum. 4,945,782, Cl. 74-431.000.

Farver, Theodore B., to Combustion Engineering, Inc. Displacement measurement apparatus and method for an automated flow rotameter. 4,947,247, Cl. 358-107.000.

Fasolka, Michael J.: See—  
Casey, Jeremiah P.; and Fasolka, Michael J., 4,946,998, Cl. 564-451.000.

Fassman, Arnold. Article positioning device. 4,946,342, Cl. 414-798.900.

Fattorini, Franco: See—  
Albizzati, Enrico; Borghi, Italo; Fattorini, Franco; and Giunchi, Giovanni, 4,946,897, Cl. 525-132.000.

Fauls, Sean P. Mythology game having an elevated game board surface representing Mount Olympus. 4,946,168, Cl. 273-241.000.

FBI Brands Ltd.: See—  
Poole, Donald A., 4,946,041, Cl. 236-621.100.

Feal, Brice J.: See—  
Vassiliadis, Stamatis; Putrino, Michael; Huffman, Ann E.; Feal, Brice J.; and Pechanek, Gerald G., 4,947,359, Cl. 364-715.090.

Fearnot, Neal E.; Heggs, Kevin S.; Johnson, William L.; and Stevens, Donald A., to Cook Pacemaker Corporation; and Medical Engineering & Development Institute, Inc. Pacemaker with activity-dependent rate limiting. 4,945,909, Cl. 128-419.0PG.

Feinbloom, Richard E.; and Sacks, Thomas, to Designs for Vision. Telescope having a removable holding ring assembly. 4,946,257, Cl. 350-321.000.

Felgner, Philip L.: See—  
Eppstein, Deborah A.; Felgner, Philip L.; Gadek, Thomas R.; Jones, Gordon H.; and Roman, Richard B., 4,946,787, Cl. 435-240.200.

Felix, Theeuwes: See—  
Roth, Nathan; Yum, Su I.; and Felix, Theeuwes, 4,946,456, Cl. 604-892.100.

Fenoglio, David J.; Fjare, Douglas E.; Morello, Edwin F.; and Nowicki, Neal R., to Amoco Corporation. Polyamide from 3,5-diamino-1-butylbenzene. 4,946,934, Cl. 528-349.000.

Fenwick, Robert B.; Peden, Larry L.; Snyder, Robert; McMains, John W.; and Gile, Jeffrey R., to On Command Video Corporation. Video selection and distribution system. 4,947,244, Cl. 358-86.000.

Ferco International: See—  
Aumerier, Laurent, 4,945,679, Cl. 49-342.000.

Ferland, Pierre: See—  
Recaseus, Joseph; Urffer, Daniel; and Ferland, Pierre, 4,946,665, Cl. 423-608.000.

Fernandez, Antonio; Gaggioni, Hugo P.; Jaquez, Martin J.; Robbins, John D.; and Soper, E. Scott, to Bell Communications Research, Inc. Raster assembly processor. 4,947,257, Cl. 358-183.000.

Ferranti International Signal, plc: See—  
Hepburn, William D., 4,946,090, Cl. 228-121.000.

Ferri, Paul; Maurer, Heinz; Kan, Jennifer; Allers, Harry; and Lackey, Michael, to Lever Brothers Company. Readily openable combination shipping and display carton. 4,946,042, Cl. 206-628.000.

Ferro, Robert M. Beach chair with adjustable back having an air mattress attached thereto. 4,945,587, Cl. 5-419.000.

Fetty, James G.: See—  
Liston, Max D.; Hsei, Paul K.; Dickinson, David G.; Daffern, George M.; and Fetty, James G., 4,946,651, Cl. 422-102.000.

FEV Motorentechnik GmbH & Co. Kg: See—  
Schmitz, Gunter; and Kutz, Hans-Jürgen, 4,945,863, Cl. 123-1.00A.

Fiat Auto S.p.A.: See—  
Martinengo, Adriano, 4,945,789, Cl. 81-55.000.

FiberCom, Inc.: See—  
Muska, Willis M.; and Couch, Philip R., 4,946,247, Cl. 350-96.200.

Fickert, Werner: See—  
Seubert, Bernhard; Fickert, Werner; and Spitaler, Ulrich, 4,946,829, Cl. 514-22.000.

Fidia-Georgetown Institute for the Neurosciences: See—  
Kozikowski, Alan P.; Wroblewski, Jarda T.; and Costa, Erminio, 4,946,839, Cl. 514-210.000.

Fiehler, William R., to Sherwood Medical Company. Blood serum separator tube. 4,946,601, Cl. 210-782.000.

Fielder, Nicholas A. W., to Dawson Offshore Pty. Ltd. Rotary cleaning device. 4,945,597, Cl. 15-104.130.

Fields, Peter R.; and Ragg, Pudens L., to Imperial Chemical Industries PLC. Production of low ash lignin. 4,946,946, Cl. 530-500.000.

Figueras, Francois: See—  
Fajula, Francois; Figueras, Francois; Gueguen, Claude; and Dutartre, Roger, 4,946,580, Cl. 208-120.000.

Filhol, Robert: See—  
Demarne, Henri; Filhol, Robert; and Mosse, Madeleine, 4,946,868, Cl. 514-544.000.

Filion, Joseph L.: See—  
Sobel, Elliot J.; Filion, Joseph L.; and Sundquist, Douglas F., 4,947,397, Cl. 371-16.400.

Finck, Gerald K. G.: See—  
Kordits, Jürgen; and Finck, Gerald K. G., 4,947,033, Cl. 250-214.00R.

Fingermatrix, Inc.: See—  
Chilcott, William J., 4,946,276, Cl. 356-71.000.

Fink, Gerald A.: See—  
DeWitt, Carl; and Fink, Gerald A., 4,946,102, Cl. 239-167.000.

Fink, Randy L.; and Serbin, Bruce J., to General Motors Corporation. Electrical connector with improved sealing arrangement. 4,946,402, Cl. 439-274.000.

Finnigan Corporation: See—  
Sokolow, Stephen A.; Steiner, Urs; and Lewis, John R., 4,947,315, Cl. 364-200.000.

Fiorani, Tiziana: See—  
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, 4,947,006, Cl. 568-685.000.

Firebaugh, William H. Stereo microphone. 4,947,437, Cl. 381-26.000.

Fischer, Michael A.; and Wilkins, Roger S., to Grinnell Corporation. Sight flow indicator. 4,945,948, Cl. 137-559.000.

Fischer, William B. Tool for removing the ball of the femur. 4,946,461, Cl. 606-84.000.

Fish, Donald D., to W. F. Myers Company, Inc. Belt-configured saw for cutting slots into stones having a poly-crystalline diamond cutting surface. 4,945,889, Cl. 125-21.000.

Fish Scales, Inc.: See—  
Majure, James; and Frazier, William N., 4,945,608, Cl. 17-64.000.

Fisher, Gary R.; and Gunst, Ole. Holographic exposure station and film transport. 4,946,258, Cl. 350-321.000.

Fisher, Jeffrey J., to Clorox Company, The. Solubilization of brighter in liquid hypochlorite. 4,946,619, Cl. 252-187.240.

Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, to Vesuvius Crucible Company. One-piece stopper rod 4,946,083, Cl. 222-602.000.

Fishlock-Lomax, Eric G., to Amphoterics International Limited. Shampoo compositions and other mild washing products containing two amphoteric and anionic surfactants. 4,946,136, Cl. 252-546.000.

Fisk, Dale E.; Periera, Lawrence W.; and Radin, George, to International Business Machines Corporation. Internal bus architecture employing a simplified rapidly executable instruction set. 4,947,316, Cl. 364-200.000.

Fite, Elaine H.: See—  
Lamere, Virginia C.; Fite, Elaine H.; and McKeen, Francis X., 4,947,358, Cl. 364-715.040.

Fitzpatrick, Joseph D.: See—  
Kinnebrew, Earl G., II; and Fitzpatrick, Joseph D., 4,946,510, Cl. 134-40.000.

Fjare, Douglas E.: See—  
Fenoglio, David J.; Fjare, Douglas E.; Morello, Edwin F.; and Nowicki, Neal R., 4,946,934, Cl. 528-349.000.

Flanigan, Virgil J.: See—  
Parker, Thomas H.; and Flanigan, Virgil J., 4,946,486, Cl. 55-479.000.

Flemming, J. Peter; and Dee, Robert J. Liquid dispenser 4,946,100, Cl. 239-1.000.

Flessey Overseas Limited: See—  
Atkinson, Simon; and Carr, Francis, 4,947,141, Cl. 331-135.000.

Fletcher, John M. Gravitational separation. 4,946,586, Cl. 209-435.000.

Flomat Limited: See—  
Poulton, Barrie, 4,946,071, Cl. 222-105.000.

Florida Institute of Phosphate Research: See—  
Marten, Jerome H.; and Lloyd, George M., Jr., 4,946,658, Cl. 423-168.000.

Florindez, Augusto. Indexing machine for baking pans. 4,945,825, Cl. 99-353.000.

Flory, Donald M.: See—  
Goubeaux, Carl E.; and Flory, Donald M., 4,946,199, Cl. 285-24.000.

Flotow, Richard A., to Dana Corporation. Angled release clutch system. 4,946,017, Cl. 192-70.300.

Flow Incorporated: See—  
Makler, Michael T., 4,946,849, Cl. 514-313.000.

Flowers, Dervin L.: See—  
Spanjer, Keith G.; and Flowers, Dervin L., 4,946,518, Cl. 148-282.000.

Flowers, Woodie; and Bryde, Gary, to Lutron Electronics Co., Inc. Sliding dimmer switch. 4,947,054, Cl. 307-125.000.

Floyd, David; Kocy, Octavian R.; Monkhouse, Donald C.; and Pipkin, James D., to E. R. Squibb & Sons, Inc. Crystalline anhydrous aztreonam. 4,946,838, Cl. 514-210.000.

Floyd, Terry S.: See—  
Neas, Edwin D.; and Floyd, Terry S., 4,946,797, Cl. 436-175.000.

Fluid Care Industries, Inc.: See—  
Hertzog, Arthur A., 4,946,590, Cl. 210-222.000.

Flurry International: See—  
Barnard, John K.; and Brown, David A., 4,946,287, Cl. 366-343.000.

Flynn, Angela. Cap system for sponge mops. 4,945,599, Cl. 15-244.300.

Flynn, James T.; and Ng, Yee S., to Eastman Kodak Company. LED printer. 4,947,195, Cl. 346-155.000.

Folweiler, Robert C.: See—  
Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., 4,946,490, Cl. 65-32.500.

Fong, Howard L.: See—  
Slaugh, Lynn H.; and Fong, Howard L., 4,946,560, Cl. 203-38.000.

Fontaine Fifth Wheel Company: See—  
Benson, W. D.; Cahela, Hollis L.; Kirkland, William N.; and Pidgeon, Anthony D., 4,946,183, Cl. 280-434.000.

Ford, Mark R.: See—  
Chao, Tai-Hsiang; Wilcher, Fiona P.; Ford, Mark R.; and Ringwelski, Andrzej Z., 4,946,815, Cl. 502-81.000.

Ford Motor Company: See—  
Hickey, John C., 4,946,572, Cl. 204-213.000.

Meussner, Mark A., 4,946,523, Cl. 156-64.000.

Sickafus, Edward N., 4,945,773, Cl. 73-862.590.

Ford New Holland, Inc.: See—  
Cromheecke, Eric L. A.; and Strong, Russell W., 4,946,419, Cl. 460-68.000.

Forintek Canada Corporation: See—  
Clarke, Michael R.; Troughton, Gary E.; and Walker, Donald C., 4,945,652, Cl. 34-12.000.

Forsberg, Matti, to Kone Oy. Procedure and apparatus for separating batches from a stream of logs. 4,946,024, Cl. 198-429.000.

Forsheda AB: See—  
Nordin, Olof; and Andersson, Uno, 4,946,175, Cl. 277-207.00A.

Forssell, Per N.: See—  
Huang, Jack S. T.; and Forssell, Per N., 4,947,226, Cl. 357-38.000.

Forssen, Eric A., to Vestar, Inc. Multiple step entrapment/loading procedure for preparing lipophilic drug-containing liposomes. 4,946,683, Cl. 424-422.000.

Forster, Adrian; Geyer, Stefan; Schulmeyr, Josef; Schmidt, Roland; and Gehrig, Manfred, to Hopfen-Extraktion HVG Bart, Raiser & Co. Process for the extraction of nonpolar constituents from plant material. 4,946,695, Cl. 426-286.000.

Foster, Al, to Wells, James G. Brake activated acceleration override apparatus. 4,946,012, Cl. 192-1460.

Foster, James C.: See—  
Petty-Galis, Jamie L.; and Foster, James C., 4,946,526, Cl. 156-155.000.

Fothergill, Noel O., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Narrow band correlator and noise cancellor. 4,947,177, Cl. 342-378.000.

Fouassier, Claude E.; Fu, Wen T.; and Hagenmuller, Paul, to Centre National de la Recherche Scientifique (CNRS). Luminescent mixed borates based on rare earths. 4,946,621, Cl. 252-301.40R.

Fox Valley Systems, Inc.: See—  
Smrt, Thomas J., 4,946,104, Cl. 239-150.000.

FPPF Chemical Corporation Inc.: See—  
Miller, Robert C., Jr., 4,946,595, Cl. 210-651.000.

Francois, Edgard. Adjustable shoe carousel. 4,946,048, Cl. 211-34.000.

Frank, Gerhard; Lendle, Hubert; Seyfert, Wilfried; and Stops, Peter, to BASF Aktiengesellschaft. Purification of carboxylic esters which contain aldehydes, acetals and/or unsaturated compounds. 4,946,029, Cl. 203-29.000.

Frank, Lawrence R., to Massachusetts Institute of Technology. Quantitative nuclear magnetic resonance imaging of flow. 4,947,120, Cl. 324-309.000.

Frank, Walter C., to Union Camp Corporation. Stereoselective epoxidation of cyclic 4-hydroxy olefins. 4,946,973, Cl. 549-525.000.

Frankinet, Jacques; Peyrouset, Andre; and Spring, Francois, to Entremont S.A.; and National IDF Aquitaine. Process for the selective extraction of metalloproteins from whey by adsorption and elution. 4,946,944, Cl. 530-400.000.

Franklin Sports Industries, Inc.: See—  
Wong, Tak-Ko, 4,946,172, Cl. 273-420.000.

Franko, Robert J.: See—  
Wheeler, Edward L.; Harrows, Franklin H.; and Franko, Robert J., 4,946,956, Cl. 544-323.000.

Franz Xaver Bayer Isolierglasfabrik KG: See—  
Bayer, Franz, 4,945,619, Cl. 29-33.00R.

Fraser, Howard H., Jr.: See—  
DeBlois, Raymond L.; Stoeffler, Richard C.; McFarlin, David J.; and Fraser, Howard H., Jr., 4,946,361, Cl. 418-55.600.

Frater, Georg; and Muller, Urs, to Givaudan Corporation. Novel tricyclic ketones and fragrance compositions containing same. 4,947,002, Cl. 568-373.000.

Frazier, William N.: See—  
Majure, James; and Frazier, William N., 4,945,608, Cl. 17-64.000.

Fred Knapp Engraving Co., Inc.: See—  
Botcki, John A., 4,946,204, Cl. 285-281.000.

Frederick, Gary L., to Constant gain laminar jet angular rate sensing device. 4,945,764, Cl. 73-497.000.

Free Shark Italia S.r.l.: See—  
Augurelli, Benito, 4,946,313, Cl. 405-186.000.

Freeman, Melvin S., to Avery International Corporation. Composite facestocks and liners. 4,946,532, Cl. 156-243.000.

Frei, Bruno: See—  
Maienfish, Peter; Gehret, Jean-Claude; and Frei, Bruno, 4,946,854, Cl. 514-346.000.

French, Alan P., to General Motors Corporation. Sealing arrangement for a lamp housing. 4,947,082, Cl. 313-318.000.

Frencken, Peter H.: See—  
Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Steenhof, Frits A.; Frencken, Peter H.; Nillesen, Antonius H. H. J.; and Van Der Sanden, Cornelis G. L. M., 4,947,380, Cl. 365-238.000.

Fried, Krupp Gesellschaft mit beschränkter Haftung: See—  
von Haas, Rainer, 4,945,793, Cl. 82-161.000.

Friedrich, Karl; and Maly, Dieter-Heinz, to Kramer-Werke GmbH. Working vehicle, especially a loader. 4,946,334, Cl. 414-697.000.

Friese, Hans-Herbert; Kaindl, Gerhard; and Schieferstein, Ludwig, to Henkel Kommanditgesellschaft auf Aktien. Adhesion promoter for leather finishing. 4,946,471, Cl. 8-94.230.

Frisque, Andrew P. Variably curved reflector for projecting luminous lines on an object by a laser beam. 4,946,232, Cl. 350-6.500.

Frito-Lay, Inc.: See—  
Quo, Geoffrey Q.; and Pound, Philip W., 4,945,794, Cl. 83-13.000.

Fritz Bauer & Sohne oHG: See—  
Bauer, Hans J.; Bauer, Hans-Peter; and Antomani, Mario, 4,946,143, Cl. 267-64.110.

Fritze, Hartwig: See—  
Zettler, Karl H.; Klapper, Siegfried; Fritze, Hartwig; and Meyer, Reinhard, 4,946,698, Cl. 426-495.000.

Froyd, Stanley G. Multiple axis motion control system. 4,947,336, Cl. 364-474.300.

Fryszyzyn, Bogdan: See—  
Eager, George S., Jr.; Fryszyzyn, Bogdan; and Thalmann, Ernest H., 4,945,653, Cl. 34-21.000.

FSK Kabushiki Kaisha: See—  
Ikeda, Takeshi; Nozaki, Akira; and Ebe, Kazuyoshi, 4,946,728, Cl. 428-40.000.

Fu, Wen T.: See—  
Fouassier, Claude E.; Fu, Wen T.; and Hagenmuller, Paul, 4,946,621, Cl. 252-301.40R.

Fuchs, Karl-Heinz, to Ing. Erich Pfeiffer GmbH & Co. KG. Dispenser for manually discharging flowable media. 4,946,069, Cl. 222-43.000.

Fudickar, Harald: See—  
Thies, Peter; and Fudickar, Harald, 4,946,541, Cl. 156-580.000.

Fuchrer, Charles, to Stoffel Seals Corporation. Tamper resistant shackle seal. 4,946,210, Cl. 292-318.000.

Fuji Photo Film Co., Ltd.: See—  
Aono, Toshiaki; and Sakai, Takeo, 4,946,741, Cl. 428-336.000.

Endo, Azuchi, 4,947,204, Cl. 355-20.000.

Honda, Kunihiko; Ishiguro, Tadashi; and Fujiyama, Masaaki, 4,946,534, Cl. 156-261.000.

Kubota, Kazuo, 4,947,277, Cl. 360-137.000.

Kurokawa, Toshio; and Daigo, Kazuo, 4,946,047, Cl. 210-234.000.

Maekawa, Yukio; and Hirano, Tsumoru, 4,946,771, Cl. 430-548.000.

Macmota, Kazuo, 4,946,761, Cl. 430-270.000.

Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, 4,946,615, Cl. 252-62.540.

Ogawa, Tadashi, 4,946,772, Cl. 430-567.000.

Okada, Kazuo; and Nakayama, Yoshiaki, 4,947,280, Cl. 360-137.000.

Ono, Toshio; Ogawa, Hiroshi; Mizuno, Chiaki; and Saito, Shinji, 4,946,740, Cl. 428-323.000.

Shimura, Kazuo, 4,947,043, Cl. 250-327.200.

Takahashi, Osamu; Hirano, Tsumoru; and Sakanoue, Seiki, 4,946,770, Cl. 430-545.000.

Yamagami, Hiroyuki, 4,946,767, Cl. 430-505.000.

Fuji Xerox Co., Ltd.: See—  
Nagaoka, Daiji, 4,947,444, Cl. 382-48.000.

Nakamura, Tsuyoshi, 4,946,154, Cl. 270-53.000.

Fujii, Akira: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,947,203, Cl. 354-475.000.

Fujii, Katsumasa: See—  
Ashide, Tsutomu; Nakagawa, Kiyotoshi; Fujii, Katsumasa; and Torimaru, Yasuo, 4,947,232, Cl. 357-53.000.

Fujii, Kiyosi: See—  
Hara, Kazuhiro; and Fujii, Kiyosi, 4,947,441, Cl. 382-7.000.

Fujii, Tetsuya: See—  
Sorimachi, Kenichi; Tozawa, Hirokazu; Fujii, Tetsuya; Itoyama, Seiji; and Miki, Yuji, 4,945,975, Cl. 164-478.000.

Fujikura Ltd.: See—  
Yamada, Takeshi; Onodera, Tsutomu; and Taya, Hiroyuki, 4,945,776, Cl. 73-866.000.

Fujimaki, Norio, to Fujitsu Limited. Digital squid system adaptive for integrated circuit construction and having high accuracy. 4,947,118, Cl. 324-248.000.

Fujimoto, Kuniharu: See—  
Yasumura, Ichiro; and Fujimoto, Kuniharu, 4,945,743, Cl. 72-128.000.

Fujimoto, Takanori; and Hara, Toshiro, to Mitsubishi Denki Kabushiki Kaisha. Fuel controller for an internal combustion engine. 4,945,879, Cl. 123-479.000.

Fujinaga, Minoru: See—  
Higuchi, Seijun; Asakawa, Kenichi; Mizuguchi, Toshinori; and Fujinaga, Minoru, 4,946,748, Cl. 428-644.000.

Fujino, Masahiko: See—  
Miyake, Akio; Kondo, Masahiro; and Fujino, Masahiko, 4,946,837, Cl. 514-206.000.

Fujisaka, Takahiko: See—  
Inatsune, Shigeo; Ohashi, Yoshimasa; Fujisaka, Takahiko; and Kondo, Michimasa, 4,947,176, Cl. 342-173.000.

Fujita, Toshihiko: See—  
Yano, Noriyoshi; and Fujita, Toshihiko, 4,946,906, Cl. 525-399.000.

Fujita, Yoshiji: See—  
Kanehira, Koichi; Eziri, Katsushi; Shiono, Manzo; Fujita, Yoshiji; and Yamahara, Johji, 4,946,857, Cl. 514-399.000.

Fujitsu Limited: See—  
Fujimaki, Norio, 4,947,118, Cl. 324-248.000.

Koshino, Nagaaki; Maeda, Miyojo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueishi, Kozo, 4,947,372, Cl. 365-106.000.

Seto, Fumiaki, 4,946,233, Cl. 350-6.500.

Taniguchi, Yoshiaki; Watanabe, Masaki; and Iizawa, Ryuji, 4,946,001, Cl. 180-79.100.

Fujiwara, Kenichi, to Sumitomo Rubber Industries, Ltd. Radial tire tread pattern having shoulder blocks. 4,945,963, Cl. 152-209.00R.

Fujiyama, Masaaki: See—  
Honda, Kunihiko; Ishiguro, Tadashi; and Fujiyama, Masaaki, 4,946,534, Cl. 156-261.000.

Fujumura, Koh; Higa, Maskatsu; and Aoki, Hisashi, to Casio Computer Co., Ltd. Dual-frequency, dielectric anisotropy liquid crystal optical device. 4,946,260, Cl. 350-346.000.

Fukagai, Toshio, to Ricoh Company, Ltd. Electrophotographic photoconductor having intermediate layer comprising indium oxide. 4,946,766, Cl. 430-60.000.

Fukasawa, Fumio: See—  
Haruyama, Yasuto; Akabane, Hirokazu; and Fukasawa, Fumio, 4,945,732, Cl. 62-256.000.

Fukatsu, Tsutomu: See—  
Nakayama, Tadashi; and Fukatsu, Tsutomu, 4,947,271, Cl. 360-19.100.

Fukuda, Hisashi, to Oki Electric Industry, Co., Ltd. Method of ion implantation. 4,946,706, Cl. 427-35.000.

Fukuda, Kouzo. Air circulating device. 4,945,820, Cl. 98-31.500.

Fukuhara, Nobuhiko; Yoshino, Setsuo; Sone, Satoru; Nakajima, Yoshiyuki; and Makiyuchi, Nobuyoshi, to Mitsui Toatsu Chemicals, Inc. Recombinant plasmid for the expression of L-phenylalanine ammonia-lyase and transformed strain carrying same. 4,946,790, Cl. 435-252.330.

Fukui, Tetsuro: See—  
Arahara, Kohzoh; Fukui, Tetsuro; Fukumoto, Hiroshi; Takasu, Yoshio; Sato, Tadashi; and Kan, Fumitaka, 4,945,833, Cl. 101-450.100.

Fukumoto, Hiroshi: See—  
Arahara, Kohzoh; Fukui, Tetsuro; Fukumoto, Hiroshi; Takasu, Yoshio; Sato, Tadashi; and Kan, Fumitaka, 4,945,833, Cl. 101-450.100.

Fukuoka, Satoru: See—  
Suzuki, Kenji; Takishita, Toshihiko; Fukuoka, Satoru; Hashikawa, Hirokazu; Hayashi, Tsuyoshi; and Ohta, Minemasa, 4,947,384, Cl. 369-279.000.

Fukuoka, Toshiaki, to Matsushita Electric Industrial Co., Ltd. Device for preventing a coil of a brushless motor from burning. 4,947,091, Cl. 318-434.000.

Fukuroi, Takeo; Yoshida, Shinichiro; and Ohmura, Akira, to Yoshida Kogyo K. K. Solar energy collector device. 4,946,512, Cl. 136-248.000.

Fukutani, Yoshimi: See—  
Shirahata, Akihiko; and Fukutani, Yoshimi, 4,946,921, Cl. 528-39.000.

Fukuyama, Norio: See—  
Maeno, Satoru; Fukuyama, Norio; and Ohishi, Tetsuo, 4,947,209, Cl. 355-204.000.

Fulcher, William A.: See—  
Aakre, Stewart C.; Fulcher, William A.; and Johnson, Gary L., 4,946,163, Cl. 273-1.50R.

Fuller, George L. Hemispherical sundial with installation indicia. 4,945,644, Cl. 33-270.000.

Fuller, Mark W.; Robinson, Alan S.; and Werner, John, to Wet Enterprises, Inc. Suspended ball water toy. 4,946,164, Cl. 273-26.00R.

Fuller, William D.; Cohen, Michael P.; Naider, Fred R.; and Goodman, Murray, to Bioresearch, Inc. Urethane-protected amino acid-N-carboxyanhydrides. 4,946,942, Cl. 530-335.000.

Funabashi, Hideo: See—  
Kasahara, Toshikazu; and Funabashi, Hideo, 4,946,898, Cl. 525-240.000.

Funabashi, Shinichi: See—  
Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, 4,946,615, Cl. 252-62.540.

Funk, Jürgen: See—  
Gunter, Michael; Quick, Siegfried; and Funk, Jürgen, 4,945,835, Cl. 102-476.000.

Furuta, Akio; Sato, Kuno; Sato, Kazuo; and Matsuzawa, Tooru, to JGC Corporation. Method for removing mercury from a liquid hydrocarbon. 4,946,596, Cl. 210-679.000.

Furutani, Kiyohiro: See—  
Arimoto, Kazutami; and Furutani, Kiyohiro, 4,947,376, Cl. 365-205.000.

Fusaroli, Marzio, to SGS-Thomson Microelectronics S.r.l. Lead frame assembly for integrated circuits having improved heat sinking capabilities and method. 4,947,237, Cl. 357-70.000.

Fusion System Corporation: See—  
Wood, Charles H.; and Johnson, Wayne, 4,947,080, Cl. 315-248.000.

G. D. Anker GmbH: See—  
Gruber, Heinz, 4,946,314, Cl. 405-260.000.

G.D. Societa' Per Azioni: See—  
Belvederi, Bruno, 4,945,927, Cl. 131-84.100.

Mattei, Riccardo; and Belvederi, Bruno, 4,945,926, Cl. 131-84.100.

Gabara, Thaddeus J., to AT&T Bell Laboratories. Integrated circuit power supply contact. 4,947,228, Cl. 357-42.000.

Gabriel, Charles F.; Kisacky, Randy J.; Mako, John; and Stone, Lawrence A., to International Business Machines Corporation. Pulley for driving a high performance printer. 4,945,828, Cl. 101-93.140.

Gade, George F. Surgical retractor assembly having tissue viability sensor embedded therein. 4,945,896, Cl. 128-20.000.

Gadek, Thomas R.: See—  
Eppstein, Deborah A.; Felgner, Philip L.; Gadek, Thomas R.; Jones, Gordon H.; and Roman, Richard B., 4,946,787, Cl. 435-240.200.

Gadsby, David A.: See—  
Binzen, Willard; Lee, Chung C.; and Gadsby, David A., 4,946,018, Cl. 193-25.000.

GAF Chemicals Corporation: See—  
Login, Robert B.; Merianos, John J.; Dandreaux, Gary; and Shih, Jenn S., 4,946,967, Cl. 548-531.000.

Gagen, Paul F.: See—  
Arroyo, Candido J.; and Gagen, Paul F., 4,946,237, Cl. 350-96.230.

Gaggioni, Hugo P.: See—  
Fernandez, Antonio; Gaggioni, Hugo P.; Jaquez, Martin J.; Robbins, John D.; and Soper, E. Scott, 4,947,257, Cl. 358-183.000.

Gaillard, Christian; and Papineschi, Thierry, to Compagnie Francaise des Etablissements Gaillard. Roundwood highway guardrails. 4,946,138, Cl. 256-13.100.

Galaj, Stanislas; Besland, Marie-Paule; Wicker, Alain; Gillot, Jacques; and Soria, Raymond, to Societe des Ceramiques Techniques Membrane filter. 4,946,592, Cl. 210-490.000.

Galatron S.r.l.: See—  
Orlandi, Alessio, 4,946,134, Cl. 251-208.000.

Gallardo, Derek R.: See—  
Johnson, Glenn M.; and Gallardo, Derek R., 4,947,293, Cl. 362-32.000.

Gallier, Michel, to Marges S.A.R.L. Prefabricated chimney mantel. 4,945,692, Cl. 52-36.000.

Gambini, Luciano: See—  
Gatti, Gaetano; Oldani, Diego; Bottoni, Giuseppe; Confalonieri, Carlo; Gambini, Luciano; and De Ponti, Roberto, 4,946,831, Cl. 514-34.000.



Gamo, Takaharu; Moriwaki, Yoshio; and Iwaki, Tsutomu, to Matsushita Electric Industrial Co., Ltd. Alloy for hydrogen storage electrodes. 4,946,646, Cl. 420-415.000.

Gangloff, Brian E., to Dresser-Rand Company. Valve seat for a plate-type, fluid-control valve. 4,945,946, Cl. 137-516.130.

Ganser-Hydromag: See—  
Ganser, Marco A., 4,946,103, Cl. 239-88.000.

Ganser, Marco A., to Ganser-Hydromag. Electronically controlled fuel injector. 4,946,103, Cl. 239-88.000.

Ganter, Wolfgang; and Kopf, Arthur, to Junghans Uhren GmbH. Antenna for a radio controlled timepiece. 4,947,179, Cl. 343-718.000.

Garcia, Rosa F. Arm/leg board. 4,945,925, Cl. 128-877.000.

Gard, David R., to Monsanto Company. Method of forming condensed phosphates in aqueous solutions. 4,946,662, Cl. 423-314.000.

Gardella, Joseph A., Jr.; and Vargo, Terrance G., to Research Foundation of State University of NY, The. Oxyfluoropolymers having chemically reactive surface functionality and increased surface energies. 4,946,903, Cl. 525-326.400.

Gardner, Richard E., to Cameron Iron Works USA, Inc. Boring tool for machining the interior of narrow neck casing. 4,945,792, Cl. 82-1.200.

Garg, Diwakar; Meuller, Carl F.; Wreccies, Ernest L.; Dyer, Paul N.; and Pellman, Mark A. Wear resistant coating for sharp-edged tools and the like. 4,945,640, Cl. 30-350.000.

Garmon, Jeff P., to Georgia Tech Research Corporation. Optical power isolator. 4,946,239, Cl. 350-96.310.

Garner, Terry N., to General Electric Company. Radio with digitally controlled audio processor. 4,947,454, Cl. 455-84.000.

Garphyttan Haldex AB: See—  
Larsson, Anders M., 4,946,485, Cl. 55-387.000.

Garran, Joseph F., to Vanguard Marketing Group. Sign display kit. 4,946,039, Cl. 206-575.000.

Garrett, Roger L.; and Niknafs, Bahrooz S., to General Motors Corporation. Male circuit board terminal. 4,946,408, Cl. 439-872.000.

Garwood, Michael: See—  
Ugurbil, Kamil; and Garwood, Michael, 4,947,119, Cl. 324-307.000.

Gasser, Oswald: See—  
Lechner, Gunther; Ellrich, Klaus; Guggenberger, Rainer; and Gasser, Oswald, 4,946,901, Cl. 525-305.000.

Gastmann, Gunter, to Cedar Grove Limited. Pane wiper apparatus. 4,945,600, Cl. 15-250.010.

Gaston, Howard N.; and Jones, Walter W., Jr., to AT&T Bell Laboratories. Apparatus and method for testing printed circuit boards. 4,947,112, Cl. 324-158.00F.

Gates, Walter C., Jr.: See—  
Najjar, Mitri S.; and Gates, Walter C., Jr., 4,946,476, Cl. 48-197.00R.

Gateway Industries, Inc.: See—  
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Gatti, Gaetano; Oldani, Diego; Bottoni, Giuseppe; Confalonieri, Carlo; Gambini, Luciano; and De Ponti, Roberto, to Farmitalia Carlo Erba S.p.A. Injectable ready-to-use solutions containing an antitumor anthracycline glycoside. 4,946,831, Cl. 514-34.000.

Gaultier, Jean Marie; and Devin, Jean, to Thomson Semiconducteurs. Addressing of redundant columns and rows of an integrated circuit memory. 4,947,375, Cl. 365-200.000.

Gaviraghi, Giovanni: See—  
Semeraro, Claudio; Micheli, Dino; Pieraccioli, Daniele; Gaviraghi, Giovanni; and Borthwick, Alan D., 4,946,851, Cl. 514-332.000.

GBE International PLC: See—  
Neville, Richard E. G., 4,945,930, Cl. 131-296.000.

Gebert, Anton M., to Siemens Hearing Instruments, Inc. Circuit for use in programmable hearing aids. 4,947,433, Cl. 381-68.000.

Gebr. Bode & Co. GmbH: See—  
Kramer, Hans, 4,945,677, Cl. 49-210.000.

Gebregiorgis, Taddesse: See—  
Peng, Stephen C.; and Gebregiorgis, Taddesse, 4,946,507, Cl. 523-400.000.

GEC-Marconi Limited: See—  
Eastwick, Frank E., 4,946,129, Cl. 248-680.000.

Gehret, Jean-Claude: See—  
Maierfisch, Peter; Gehret, Jean-Claude; and Frei, Bruno, 4,946,854, Cl. 514-346.000.

Gehrig, Manfred: See—  
Forster, Adrian; Geyer, Stefan; Schulmeyr, Josef; Schmidt, Roland; and Gehrig, Manfred, 4,946,695, Cl. 426-286.000.

Gelfer, George G.: See—  
Sansone, Ronald P.; Connell, Richard A.; Corsetti, Patricia; Dolan, Donald T.; and Gelfer, George G., 4,947,333, Cl. 364-464.020.

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Gelman, Yefim: See—  
Hill, John B.; and Gelman, Yefim, 4,946,988, Cl. 560-41.000.

Gendzhonian, Oganess S.: See—  
Alexandrian, Karen V.; Melikian, Karen G.; Alexanian, Akam A.; Saakian, Kamo S.; Lachinian, Levon; and Gendzhonian, Oganess S., 4,945,674, Cl. 47-1.010.

General Atomics: See—  
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General Dynamics Corporation Convair Division: See—  
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General Electric Company: See—  
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,946,082, Cl. 222-593.000.

Bulman, Melvin J.; and Maher, David L., 4,945,809, Cl. 89-7.000.

Cecil, Rebecca J., 4,945,891, Cl. 126-299.00D.

Conrad, George R., 4,946,053, Cl. 215-1.00C.

Crouch, Earl T.; and Siefloff, Ronald F., 4,946,531, Cl. 156-242.000.

Garner, Terry N., 4,947,454, Cl. 455-84.000.

Haaf, William R.; and Lee, Gim F., Jr., 4,946,882, Cl. 524-129.000.

Hayes, Cecil E., 4,947,121, Cl. 324-322.000.

Helms, David R., 4,947,136, Cl. 330-54.000.

Henderson, John G. N., 4,947,250, Cl. 358-141.000.

Lewis, Larry N., 4,946,818, Cl. 502-158.000.

McFaul, James A.; Keyes, Gary S.; and McDaniel, David L., 4,947,416, Cl. 378-146.000.

Oosterkamp, Willem J., 4,947,485, Cl. 376-210.000.

Peterson, William A., 4,947,311, Cl. 363-124.000.

Reeves, James W.; King, Harold B., Jr.; and Childers, William M., 4,946,587, Cl. 209-539.000.

Snow, Barton H., 4,947,096, Cl. 318-586.000.

Stewart, Roger G.; Ipri, Alfred C.; and Napoli, Louis S., 4,947,221, Cl. 357-23.500.

Yeatts, Alfred T., 4,946,563, Cl. 204-15.000.

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Sims, Nathaniel M.; and Welch, James P., 4,945,592, Cl. 5-508.000.

General Motors Corporation: See—  
Altman, Gary F.; and Cunningham, Mark A., 4,945,682, Cl. 49-502.000.

Banner, Alvin C.; Clemenz, Gary E.; Walton, Ballard E.; and Vrecka, Frank D., 4,945,631, Cl. 29-705.000.

Beamer, Henry E., 4,945,951, Cl. 138-89.000.

Beck, Scott A.; and Messerly, Harry E., 4,947,017, Cl. 219-86.250.

Browsalski, Edmund S.; and Nimmo, Philip E., IV, 4,946,015, Cl. 192-1.230.

Brown, David B.; and Gonze, Eugene V., 4,945,882, Cl. 123-489.000.

Campbell, Robert W.; Ruff, Donald O.; and Caldwell, David W., 4,947,053, Cl. 307-10.100.

Carrell, William E., 4,947,295, Cl. 362-64.000.

Coha, Timothy F.; Kostelic, Richard F.; and Rasmussen, Gregory K., 4,945,884, Cl. 123-509.000.

Coleman, John R., 4,945,728, Cl. 60-562.000.

Cope, Kenneth P.; Maga, Raymond A.; and Hall, Teddy L., 4,946,395, Cl. 439-352.000.

Dahlmann, Virgil R.; Pirrallo, Karen M.; Talaki, Kelly A.; Ziellesch, Kenneth J.; and Hickling, Robert, 4,945,766, Cl. 73-598.000.

Dalo, Dominic N., 4,945,983, Cl. 165-173.000.

Dell'Eva, Mark L.; Yen, Chieh-Yi J.; and George, Jacob, 4,946,281, Cl. 356-376.000.

Farrell, Michael J., 4,945,782, Cl. 74-431.000.

Fink, Randy L.; and Serbin, Bruce J., 4,946,402, Cl. 439-274.000.

French, Alan P., 4,947,082, Cl. 313-318.000.

Garrett, Roger L.; and Niknafs, Bahrooz S., 4,946,408, Cl. 439-872.000.

Gergoe, Bela, 4,945,784, Cl. 74-501.50R.

Gergoe, Bela; and Osenkowski, Joseph M., 4,946,211, Cl. 292-336.300.

Ghoneim, Youssef A., 4,947,332, Cl. 364-426.030.

Gibson, Thomas L.; and Abdul, Abdul S., 4,946,000, Cl. 175-251.000.

Gonze, Eugene V.; and Brown, David B., 4,945,880, Cl. 123-478.000.

Gonze, Eugene V.; and Brown, David B., 4,945,881, Cl. 123-486.000.

Gonze, Eugene V.; and Brown, David B., 4,945,885, Cl. 123-520.000.

Goubeaux, Carl E.; and Flory, Donald M., 4,946,199, Cl. 285-24.000.

Griffith, William O., 4,945,617, Cl. 24-633.000.

Joshi, Shrikant M., 4,945,981, Cl. 165-109.100.

Klomp, Edward D., 4,945,868, Cl. 123-65.0PE.

Klomp, Edward D., 4,945,869, Cl. 123-73.00V.

Lee, Jordan R., 4,945,865, Cl. 123-52.00M.

Lippmann, Raymond; Schnars, Michael J.; and DuBois, Paul L., 4,947,410, Cl. 377-26.000.

Myslicki, Robert J.; May, Carl D.; and Rusnell, Douglas L., 4,946,208, Cl. 292-216.000.

O'Shaughnessy, Michael E., 4,947,306, Cl. 362-421.000.

Parsley, Clovis L.; Curtis, Carl D.; Atchison, Marvin D.; Seidle, Brett A.; and Cousineau, Danny R., 4,946,341, Cl. 414-796.700.

Rice, Lawrence M.; Persing, Thomas E.; and Baldauf, Thomas J., 4,947,078, Cl. 313-113.000.

Scholl, Kenneth L., 4,945,817, Cl. 91-505.000.

Sherman, James F., 4,946,429, Cl. 475-210.000.

Sherwood, Carl H.; Meyer, Karen M.; Covert, Charles H.; and Weilnau, Gregory P., 4,946,060, Cl. 220-86.200.

Solomon, James G.; and Rivard, Chester J., 4,945,864, Cl. 123-41.390.

Van Duyn, Paul D.; House, Robert C., II; and Hallgarth, Leslie H., 4,947,294, Cl. 362-61.000.

Vaz, Nuno A.; VanSteenkiste, Thomas H.; and Smith, George W., 4,946,263, Cl. 350-351.000.

Walker, Billy R.; Emmons, George B.; and Dean, Robert E., 4,945,749, Cl. 72-356.000.

Ward, Robert W.; Campbell, Robert E.; and Boys, William E., 4,947,065, Cl. 310-44.000.

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Bannon, Yvonne B.; Corish, John; Corrigan, Owen I.; Geoghegan, Edward J.; and Masterson, Joseph G., 4,946,853, Cl. 514-343.000.

Georg, Aigner. Apparatus for measuring length. 4,945,651, Cl. 33-832.000.

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George, Jacob: See—  
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Georgetown University: See—  
Talebian, Abdolhossen; Green, Dianna C.; and Schein, Philip S., 4,946,954, Cl. 536-121.000.

Georgia Tech Research Corporation: See—  
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Gerber Products Company: See—  
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Gergoe, Bela; and Osenkowski, Joseph M., to General Motors Corporation. Latch control arrangement. 4,946,211, Cl. 292-336.300.

Gerhardy, Lothar: See—  
Roth, Klaus; and Gerhardy, Lothar, 4,945,648, Cl. 33-529.000.

GET Products Corporation: See—  
Barlow, Robert W.; Lynch, Thomas M.; and Swanson, Steven E., 4,946,249, Cl. 350-96.210.

Geyer, Stefan: See—  
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GfK Gesellschaft für Kohleverflüssigung mbH: See—  
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Ghibu, Bogdan A.; and Bent, Michael F., to Servo Products Co. High speed variable reluctance motor with equal tooth ratios. 4,947,066, Cl. 310-49.00R.

Ghoneim, Youssef A., to General Motors Corporation. Road surface estimation. 4,947,332, Cl. 364-426.030.

Giametta, Joseph A. Waste pipe connector. 4,946,203, Cl. 285-189.000.

Gibbons, Ian; Hillman, Robert S.; Robertson, Channing R.; and Allen, Jimmy D., to Biotrack, Inc. Apparatus and method for dilution and mixing of liquid samples. 4,946,795, Cl. 436-179.000.

Gibbs, Anthony, to Walex Products Company. Deodorizing compositions. 4,946,672, Cl. 424-76.100.

Gibson, Thomas L.; and Abdul, Abdul S., to General Motors Corporation. Undisturbed soil sampler. 4,946,000, Cl. 175-251.000.

Giebel, Gerhard; Berny, Hans-Jürgen; and Siegel, Albrecht, to DVSG Engineering und Patentverwaltungs GmbH. Automatic determination of coordinates of the operating path of an adhesive-applying nozzle in an adhesive applicator for a shoe machine. 4,945,593, Cl. 12-12.400.

Gierke, Martin P.: See—  
Miner, Jonathan L.; Lacher, Vernon R.; Rescigno, Gerald J.; Swim, William B.; Gierke, Martin P.; and Hahn, David A., 4,945,604, Cl. 15-344.000.

Giguere, Jean P., to Donat Flamand Inc. Threshold system for a domestic door. 4,945,680, Cl. 49-468.000.

Gile, Jeffrey R.: See—  
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Gill, Manzur; and D'Arrigo, Sebastiano, to Texas Instruments Incorporated. Electrically programmable and erasable memory cells with field plate conductor defined drain regions. 4,947,222, Cl. 357-23.500.

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Gist-Brocades N.V.: See—  
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Giunchi, Giovanni: See—  
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GK Technologies, Inc.: See—  
Walbridge, Van J., 4,946,003, Cl. 182-2.000.

Glang, Siegfried, to Phoenix Aktiengesellschaft. Sealing profile. 4,946,309, Cl. 405-152.000.

Glasstech, Inc.: See—  
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Semeraro, Claudio; Micheli, Dino; Pieraccioli, Daniele; Gaviraghi, Giovanni; and Borthwick, Alan D., 4,946,851, Cl. 514-332.000.

Globe Products Inc.: See—  
Banner, Alvin C.; Clemenz, Gary E.; Walton, Ballard E.; and Vrecka, Frank D., 4,945,631, Cl. 29-705.000.

Goerlich, Dieter, to Webasto AG Fahrzeugtechnik. Soot filtering unit for the exhaust of a diesel internal combustion engine and method for regenerating the filters thereof. 4,945,722, Cl. 60-295.000.

Gofuku, Eishi: See—  
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Charoy, Alain; Vermot-Gaud, Jacques; Prost, Jean-Louis; Kornmann, Michel; and Gold, Dieter, 4,947,132, Cl. 324-699.000.

Golden, Arthur. Multi-purpose hand tool. 4,945,790, Cl. 81-57.140.

Goldfarb, Adolph E. Amusement apparatus for drawing a distorted caricature by tracing an original photograph or the like. 4,945,643, Cl. 33-23.040.

Goldstar Co., Ltd.: See—  
Kim, In J., 4,946,148, Cl. 267-158.000.

Shin, Kyong S., 4,946,600, Cl. 210-758.000.

Yun, Jin H., 4,947,263, Cl. 358-335.000.

Golightly, Cecelia K. System for identifying authorized use of credit cards. 4,947,027, Cl. 235-448.000.

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Goodman, Murray: See—  
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Goodyear Tire & Rubber Company, The: See—  
Magnus, Fredrick L., 4,946,717, Cl. 427-393.500.

Majerus, Norbert; Mills, Harold E.; and Rambacher, John S., 4,946,639, Cl. 264-308.000.

Weinstein, Arthur H., 4,946,905, Cl. 525-350.000.

Wideman, Lawson G.; and Sandstrom, Paul H., 4,946,879, Cl. 524-93.000.

Gordin, Myron K.; and Drost, Jim L., to Musco Corporation. Glare control lamp and reflector assembly and method for glare control. 4,947,303, Cl. 362-261.000.

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Goroditsky, Boris P.; and Sambursky, Alexandr I. Centrifuge drive. 4,946,433, Cl. 494-15.000.

Gorog, Jonathan M., to Arbor International, Inc. Automated order and payment system. 4,947,028, Cl. 235-381.000.

Gorrafa, Adly A., to Du Pont de Nemours, E. I., and Company. Air texturing jet. 4,945,618, Cl. 28-254.000.

Gosc, Paul M.: See—  
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Goto, Kanzen: See—  
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Goto, Shinichi: See—  
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Goto, Shinji: See—  
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Goto, Yukihisa; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, to Daicel Chemical Industries Ltd.

- Pyridine-3-carboxamides having plant growth regulating properties. 4,946,497, Cl. 71-94.000.
- Gotoh, Tsuguo: See—  
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- Gotze, Waldemar: See—  
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- Goubeaux, Carl E.; and Flory, Donald M., to General Motors Corporation. High pressure tube attachment mechanism. 4,946,199, Cl. 285-24.000.
- Gouch, Martin P.: See—  
Ditchburn, Robert W.; and Gouch, Martin P., 4,946,045, Cl. 209-576.000.
- Gould, Inc.: See—  
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- Goulter, Victor H.; and Brown, Brian A., to Pressman, David, a part interest. Holder for hand-carrying plastic bags or supporting same within trash container with bag handle inserted in space under holder. 4,946,065, Cl. 220-404.000.
- Gourley, Paul L.: See—  
Biefeld, Robert M.; Drammmond, Timothy J.; Gourley, Paul L.; and Zipperian, Thomas E., 4,947,223, Cl. 357-30.000.
- Graham Engineering Corporation: See—  
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- Graham, Peter: See—  
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- Grant, Frederic F., to Datatape, Inc. Low power magnetic tape reel motor and brake assembly. 4,947,069, Cl. 310-77.000.
- Grant, Jack R.: See—  
Blair, Richard W.; and Grant, Jack R., 4,945,738, Cl. 70-161.000.
- Grass Valley Group, Inc., The: See—  
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- Bateman, Robert; and Christensen, Donald R., 4,947,440, Cl. 381-107.000.
- Jackson, Richard A.; and Bannister, Richard S., 4,947,255, Cl. 358-183.000.
- Tao, Douglas K., 4,947,097, Cl. 318-696.000.
- Wood, David G. S.; and Baldassari, Mark, 4,947,256, Cl. 358-183.000.
- Grasser, Edmond, to rako electronic-Vertriebsgesellschaft mbH. Electronic control panel and rack therefor for use in data-processing systems and the like. 4,946,397, Cl. 439-532.000.
- Gray, John E.: See—  
Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urein, Edgar J., 4,947,163, Cl. 340-825.310.
- Greaves, Alan J.; and Millar, Paul C., to British Telecommunications public limited company. Speaker verification using memory address. 4,947,436, Cl. 381-42.000.
- Green, Dianna C.: See—  
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- Green, Jerry M.: See—  
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- Green, John W.: See—  
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- Green, Michael R.; Park, Chang M.; and Abdul-Malek, Adel B., to Amoco Corporation. Suppression of trimellitic anhydride dust. 4,946,970, Cl. 549-245.000.
- Greenberg, William M.: See—  
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- Greene, David G., to Steelcase, Inc. Programmable bed for machine tools and the like. 4,946,149, Cl. 269-21.000.
- Greenstein, Robert; and Aussenberg, Nash, to Automated Medical Products Corp. Surgical retractor. 4,945,897, Cl. 128-20.000.
- Greenwood, Frederick C.: See—  
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- Gregorio, Manuel Z.: See—  
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- Greiner, Andreas: See—  
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- Grieb, Hubert, to MTU Motoren- und Turbinen-Union Munchen GmbH. Weapon system. 4,945,811, Cl. 89-8.000.
- Grierson, Jeff G.: See—  
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- Griffith, William O., to General Motors Corporation. Seat belt buckle. 4,945,617, Cl. 24-633.000.
- Grimm, C. Louis; and Sollins, Irving V., to Ivy Laboratories, Inc. Implanter applicator. 4,946,035, Cl. 206-366.000.
- Grinnell Corporation: See—  
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- Grint, Alan: See—  
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- Grzmala, Fredrick; Schmidt, Barnet M.; and Sultana, George, to AT&T Bell Laboratories. Echo measurement arrangement. 4,947,425, Cl. 379-410.000.
- Grob, Benjamin, to Grob, Inc. Ring gear with roll formed teeth. 4,945,783, Cl. 74-460.000.
- Grob, Inc.: See—  
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- Grogan, Richard P., to Calmar, Inc. Tamper evident manually actuated pump sprayer. 4,946,074, Cl. 222-153.000.
- Gronbech, Robert W.: See—  
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- Groom, Judy B.: See—  
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- Groom, Kenneth M.: See—  
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- Groom, Raymond C.; and Groom, Judy B. Towel heating and moistening. 4,947,026, Cl. 219-401.000.
- Grossinger, Israel: See—  
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- Gruber, Heinz, to G. D. Anker GmbH. Rock anchor. 4,946,314, Cl. 405-260.000.
- Grundig E.M.V. Elektro-Mechanische Versuchsanstalt, Max Grundig Holland, Stiftung & Co. KG: See—  
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- GTE Laboratories Incorporated: See—  
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- GTE Products Corporation: See—  
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- Morgan, Ricky D.; and Sylvester, Vito P., 4,945,750, Cl. 72-377.000.
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- Guardian Industries Corp.: See—  
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- Guarino, Luciano: See—  
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- Guckes, Terry L.; McHugh, Mark A.; Cozewith, Charles; and Hazelton, Ronald L., to Exxon Research and Engineering Company. Phase separation processes. 4,946,940, Cl. 528-483.000.
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- Gueguen, Claude: See—  
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- Guest, John D. Tube couplings. 4,946,213, Cl. 285-31.000.
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- Guillou, Louis; Blinneau, Joseph; Coutrot, Francoise; and Lenoir, Vincent, to Etat Francais, represente par le Ministere des Postes, des Telecommunications et de l'Espace (C.N.E.T.); and Telediffusion de France S.A. Process for the broadcasting and reception of access title control messages. 4,947,428, Cl. 380-20.000.
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- Gumpert, Fritz: See—  
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- Gunnerson, Robert E.; and Bruno, Richard C., to Sun-Maid Growers of California. Liquid coating for fruits. 4,946,694, Cl. 426-273.000.
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- Gunter, Michael; Quick, Siegfried; and Funk, Jergen, to Rheinmetall GmbH. Shaped charge projectile. 4,945,835, Cl. 102-476.000.
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- Gunther, William H., Jr., to Gunther International, Ltd. Sheet loading and unloading mechanism. 4,946,157, Cl. 271-163.000.

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- Gupta, Kuldeep C.: See—  
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- Guralnick, Leonard M.: See—  
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- Guruswamy, Vinodhini, to MedTest Systems, Inc. Apparatus and methods for sensing fluid components. 4,946,562, Cl. 204-153.100.
- Gussoni, Damiano: See—  
Costanzi, Silvestro; Gussoni, Damiano; Zavattini, Omero, deceased; Pungiluppi, Clara, heir; Zavattini, Renato, heir; and Pallini, Luciano, 4,946,880, Cl. 524-96.000.
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- H. E. Technology, Ltd.: See—  
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- H. F. & ph. F. Reemtsma GmbH & Co.: See—  
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- H. Lundbeck A/S: See—  
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- Haab, Karl; and Haab, Otto, to Hawa AG. Fitting for sliding doors suspended at a runway rail. 4,945,605, Cl. 16-97.000.
- Haab, Otto: See—  
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- Haaf, William R.; and Lee, Gim F., Jr., to General Electric Company. Compositions of polyphenylene ether, aromatic phosphate, aromatic halogen compound and impact modifier comprising diene polymer. 4,946,882, Cl. 524-129.000.
- Haas, Margret: See—  
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- Habegger Marketing: See—  
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- Habermann, Helmut; and Lemerle, Pierre, to Societe de Mecanique Magnetique S.A. Vibrator/dampener having magnetic suspension and servo-control along three axes. 4,947,067, Cl. 310-51.000.
- Habich, Adolph B.; Hermann, Karl; Hunt, Ronald E.; and Whitehead, Verlon E., to International Business Machines Corporation. Pin transfer adhesive application for surface mount component processes. 4,946,708, Cl. 427-96.000.
- Habra Elektronik GmbH: See—  
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- Hachinoda, Masayuki: See—  
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- Hackmann, Ludger; and Wilken, Josef, to Bramlage Gesellschaft mit beschränkter Haftung. Dispenser for pasty compositions. 4,946,076, Cl. 222-207.000.
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- Hagedorn, Myrna L.: See—  
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- Hager, William G.: See—  
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- Hahn, Paul T., to Eastman Kodak Company. Photographic material with increased exposure latitude. 4,946,765, Cl. 430-504.000.
- Hahn, David A.: See—  
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- Hahn, Thomas W., to Bus Automation, Inc. Automated multiple rip saw feeding apparatus. 4,945,797, Cl. 83-75.500.
- Hapzler, Christian, to Torrington Company, The. Bearing with information sensor. 4,946,295, Cl. 384-448.000.
- Hakanen, Pekka; Lahti, Lassi; Suutari, Jari; Sirkia, Eero; Kallioinen, Timo; Nieminen, Heikki; Alaspaa, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, to Nokia-Mobira Oy. Method of mounting a printed circuit board and securing the earthing to a casing. 4,945,633, Cl. 29-825.000.
- Hakansson, Bo, to Eka Nobel AB. Process for the production of alkali metal chlorate. 4,946,565, Cl. 204-95.000.
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- Hall, Bruce T.; Andrews, Leonard J.; and Folweiler, Robert C., to GTE Laboratories Incorporated. Method for preparing fluoride glasses. 4,946,490, Cl. 65-32.500.
- Hall, Courtney: See—  
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- Hall, Iris H.: See—  
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- Hall, John E. Everitable membrane catheter and method of use. 4,946,440, Cl. 604-95.000.
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- Haller, Henri: See—  
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- Halm, Roland L.; Chadwick, Kirk M.; and Keyes, Brian R., to Dow Corning Corporation. Preparation of organosilanes. 4,946,980, Cl. 556-978.000.
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- Haman, David F., to Outboard Marine Corporation. Marine propulsion device with improved oil seal protection device. 4,946,410, Cl. 440-83.000.
- Hamilton Standard Controls, Inc.: See—  
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Laugharn, James A.; Hammerton, Denis; and Towle, Timothy W., 4,946,603, Cl. 210-807.000.
- Hanazaki, Minoru: See—  
Nakanishi, Koichiro; Ootera, Hiroki; Hanazaki, Minoru; and Minami, Toshihiko, 4,947,085, Cl. 315-111.410.
- Hanisch, Horst: See—  
Bernhardt, Gunther; Amort, Jergen; Haas, Margret; Hanisch, Horst; and Kragl, Heinz, 4,946,977, Cl. 556-440.000.
- Hanks, Charles W. Magnet structure for electron-beam heated evaporation source. 4,947,404, Cl. 373-14.000.
- Hann, Richard A.: See—  
Allen, Simon; Gordon, Paul F.; and Hann, Richard A., 4,946,629, Cl. 252-589.000.
- Hanna, John E.: See—  
Abdi, Behrooz; Main, Eric; and Hanna, John E., 4,947,103, Cl. 323-316.000.
- Hannai, Seiichi, to NEC Corporation. Semiconductor memory device having improved sense amplifier arrangement. 4,947,377, Cl. 365-208.000.
- Hanson, Brian E.: See—  
Davis, Mark E.; Arhancet, Juan P.; and Hanson, Brian E., 4,947,003, Cl. 568-454.000.
- Happach, Anton, to Schaltbau Gesellschaft mbH. Reversing circuit for direction reversal in direct current drives. 4,947,285, Cl. 361-245.000.
- Hara, Kazuhiro; and Fujii, Kiyosi, to Laurel Bank Machine Co., Ltd. Bill discriminating apparatus. 4,947,441, Cl. 382-7.000.
- Hara, Masami: See—  
Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, 4,946,953, Cl. 536-57.000.
- Hara, Noboru: See—  
Teranishi, Masatoshi; Hara, Noboru; Tachi, Katsumi; and Sugita, Hisayasu, 4,946,284, Cl. 366-131.000.



Hara, Shigeo: See—  
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Hara, Toshiro: See—  
Fujimoto, Takanori; and Hara, Toshiro, 4,945,879, Cl. 123-479.000.

Hara, Yukihiko; Okushio, Kazuo; and Sakata, Kanzo, to Mitsui Norin Co., Ltd. Inositol glycoside 2-O-Beta-L-arabinopyranosyl-myoinositol, 4,946,950, Cl. 536-4.100.

Harakka, Pentti: See—  
Suuronen, Lasse; Lappalainen, Teuvo; and Harakka, Pentti, 4,946,086, Cl. 225-4.000.

Harcross Engineering (Barnstable) Limited: See—  
Cooley, William H.; Hart, Ralph; and Harding, Peter E., 4,947,018, Cl. 219-86.250.

Hardcastle, Samuel L.; and Lee, Yit K. Protective cover for hypodermic needle, 4,946,447, Cl. 604-198.000.

Hardie, George S.: See—  
Duncan, Kenneth W.; Hardie, George S.; Jobsky, Robert; Maybell, Michael J.; and Wada, Steven T., 4,947,181, Cl. 343-773.000.

Hardin, Nathaniel A.; and Morgan, George C., to N.A. Hardin 1977 Trust, N.A. Hardin, Trustee. Constant head pump for sonic wave generator used in treating subsurface formations, 4,945,986, Cl. 166-249.000.

Harding, Peter E.: See—  
Cooley, William H.; Hart, Ralph; and Harding, Peter E., 4,947,018, Cl. 219-86.250.

Hardman, Karl: See—  
Ladner, Robert C.; Bird, Robert E.; and Hardman, Karl, 4,946,778, Cl. 435-69.600.

Hardy, Mark A.: See—  
Reemtsma, Keith; Hardy, Mark A.; and Lau, Henry T., 4,946,438, Cl. 604-53.000.

Hari, Stefan; and Babler, Fridolin, to Ciba-Geigy Corporation. Mono and disazo compounds based on b-hydroxy-naphthoic acid derivatives or acetacetaride derivatives containing long-chain alkyl ester or alkylamide radicals, 4,946,948, Cl. 534-651.000.

Harlan, Samuel P., to Homac Mfg. Company. Equipment support pad and method, 4,946,725, Cl. 428-73.000.

Harms, Jürgen; and Biedermann, Lutz. Pedicle screw, 4,946,458, Cl. 606-61.000.

Harms, Margret: See—  
Bruns, Angelika; Gotze, Waldemar; Harms, Margret; and Luthje, Holger, 4,946,751, Cl. 430-5.000.

Harper, Peter W.: See—  
Czarnocki, Walter S.; Harper, Peter W.; Moran, Kevin S.; and Alexander, Steven W., 4,947,057, Cl. 307-310.000.

Harris Corporation: See—  
Deno, Milton C.; Smith, Eugene A., Jr.; and Delaruelle, Dale H., 4,946,229, Cl. 303-33.000.

Higman, Roger H.; and Perkins, Gilbert, 4,947,111, Cl. 324-158.00F.

Swanson, Hilmer I., 4,947,455, Cl. 455-115.000.

Harris, John L. Flush tank water saver, 4,945,581, Cl. 4-325.000.

Harris, Rodney M.: See—  
Shalati, Mohamad D.; Marquart, James A.; Babjak, John R.; and Harris, Rodney M., 4,946,744, Cl. 428-500.000.

Harris Semiconductor Patents, Inc.: See—  
Bui, Tuan H., 4,947,362, Cl. 364-724.190.

Harris, Terrance R.; and Larsen, Darrell R., to American Magotteaux Corporation. Laminar segments for use with comminution equipment, 4,946,110, Cl. 241-182.000.

Harris, Thomas V.: See—  
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,989, Cl. 166-268.000.

Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,990, Cl. 166-268.000.

Harrison, Daniel J.; and Yacobucci, Paul D., to Eastman Kodak Company. Glass-to-polycarbonate adhesive for color filter array, 4,946,827, Cl. 503-227.000.

Harrison, James. Diverter chute assembly for molding machine, 4,946,357, Cl. 425-182.000.

Hart, David, to Steeper (Orthopedic) Limited. Orthoses or prostheses for coordinating limb movement, 4,946,156, Cl. 272-70.000.

Hart, Leroy, to Emhart Industries, Inc. Lockset assembly, 4,945,737, Cl. 70-143.000.

Hart, Ralph: See—  
Cooley, William H.; Hart, Ralph; and Harding, Peter E., 4,947,018, Cl. 219-86.250.

Hartig, Klaus: See—  
Dietrich, Anton; and Hartig, Klaus, 4,946,576, Cl. 204-298.060.

Hartman, Domenica N.: See—  
Roth, Norman J.; Wallace, Robert J.; and Hartman, Domenica N., 4,947,235, Cl. 357-68.000.

Hartwell, Garry, to University of Virginia Alumni Patents Foundation. The. Adjusting arrangement for radio-diagnostic equipment, 4,947,417, Cl. 378-147.000.

Haruyama, Yasuto; Akabane, Hirokazu; and Fukasawa, Fumio, to Sanden Corporation. Refrigerated display case with a damper controlled defrosting mechanism, 4,945,732, Cl. 62-256.000.

Harvey Industries, Inc.: See—  
Ritola, Edward, 4,945,976, Cl. 198-461.000.

Hasebe, Masahiro: See—  
Sakakibara, Shiro; Hasebe, Masahiro; Hattori, Masashi; and Ohara, Shigekazu, 4,946,424, Cl. 474-11.000.

Hasegawa, Hiromasa: See—  
Akiyama, Kazuoto; Kimura, Takeshi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.

Hasegawa, Kazuyoshi: See—  
Ishii, Mitsuo; Nagai, Seiichi; Hasegawa, Kazuyoshi; and Tanaka, Toshio, 4,947,238, Cl. 357-71.000.

Hashikawa, Hirokazu: See—  
Suzuki, Kenji; Takishita, Toshihiko; Fukuoka, Satoru; Hashikawa, Hirokazu; Hayashi, Tsuyoshi; and Ohta, Minemasa, 4,947,384, Cl. 369-279.000.

Hashimoto, Masafumi: See—  
Kotaki, Masahiro; and Hashimoto, Masafumi, 4,946,548, Cl. 156-643.000.

Hashimoto, Masamichi; Saegusa, Haruhisa; Chiba, Susumu; Kitagawa, Hironoshin; and Miyoshi, Teruzo, to Denki Kagaku Kogyo Kabushiki Kaisha. Method for producing sodium hyaluronate by fermentation method, 4,946,780, Cl. 435-101.000.

Hasimoto, Katumi: See—  
Kanamori, Hideo; and Hasimoto, Katumi, 4,946,612, Cl. 252-49.500.

Hastings, Stanley V. Trash bag retainer, 4,946,118, Cl. 248-97.000.

Hatcher, David O., to Posting Equipment Corporation. Support, 4,946,120, Cl. 248-183.000.

Hatton, Gregory J.; Helms, David A.; Durrett, Michael G.; Marrelli, John D.; and Stafford, Joseph D., to Texaco IJN Inc. Co-variance microwave water cut monitoring means and method, 4,947,128, Cl. 324-640.000.

Hatton, Gregory J.: See—  
Helms, David A.; Hatton, Gregory J.; Durrett, Michael G.; Dowty, Earl L.; and Marrelli, John D., 4,947,127, Cl. 324-640.000.

Hattori, Akira, to Yamaguchi Yakuhin Shokai Ltd.; and Japan Capsular Products, Inc. Rhinological diagnostic device, 4,945,919, Cl. 128-736.000.

Hattori, Masashi: See—  
Sakakibara, Shiro; Hasebe, Masahiro; Hattori, Masashi; and Ohara, Shigekazu, 4,946,424, Cl. 474-11.000.

Hattori, Seiji; Kasukawa, Akihide; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, to Tokyo Electric Power Company, Ltd., The; and Sumitomo Electric Industries, Ltd. Mobile communication system, 4,947,452, Cl. 455-33.000.

Hattori, Tutomu; Ohno, Masashi; and Aramaki, Shouji, to Nissan Motor Co., Ltd.; and Nihon Tokushu Toryo Co., Ltd. Rust preventive coating composition, 4,946,503, Cl. 106-14.340.

Hauschild, Werner; and Nitschke, Heinz, to Rieter Machine Works, Ltd. Revolving flat arrangement for a carding machine, 4,945,609, Cl. 19-102.000.

Hausdorfer, Michael, to Robert Bosch GmbH. Method and circuit apparatus for combining two television signals, 4,947,240, Cl. 358-22.000.

Hauser, Charles F., to Union Carbide Chemicals and Plastics Company Inc. Alkoxylation using a calcium sulfate catalyst, 4,946,984, Cl. 568-618.000.

Hauser, Franz, to Habra Elektronik GmbH. Method for charging a nickel-cadmium accumulator and simultaneously testing its condition, 4,947,124, Cl. 324-430.000.

Hauser, Jean-Luc; Tomatis, Bernard; and Sainte-Rose, Christian, to Cordis Corporation. Catheter introducer, 4,946,443, Cl. 604-165.000.

Hausted, Inc.: See—  
Hayton, Eugene; Failor, Raymond A.; and Singleton, Dan, 4,945,582, Cl. 5-67.000.

Hauteclay, Patrick: See—  
Lavielle, Gilbert; Hauteclay, Patrick; and Cudennec, Claude, 4,946,833, Cl. 514-81.000.

Hauville, Francois P. Filter apparatus with improved filtration and saturation level detector, 4,946,480, Cl. 55-270.000.

Havrilla, John R., to Kennedy Van Saup Corporation. Aeration separator, 4,946,044, Cl. 209-474.000.

Hawa AG: See—  
Haab, Karl; and Haab, Otto, 4,945,605, Cl. 16-97.000.

Hawker, Fred D.; Pietryga, Victor E.; Byrd, Robert W.; Wichmann, James; and Nicpon, Patricia A., to DeSoto, Inc. Masking compositions and method for applying the same, 4,946,711, Cl. 427-156.000.

Hawkins, John R.: See—  
Bradshaw, Anthony J.; Morrissy, Raymond T.; Ketchum, Christopher J.; and Hawkins, John R., 4,946,459, Cl. 606-62.000.

Hawkins, William G.; and Burke, Cathie J., to Xerox Corporation. Monolithic silicon integrated circuit chip for a thermal ink jet printer, 4,947,192, Cl. 346-140.00R.

Hawkins, William R.; and Weinstein, Steve, to Texas Instruments Incorporated. Electronic arithmetic learning aid with synthetic speech, 4,946,391, Cl. 434-201.000.

Hay & Forage Industries: See—  
Schrage, Thomas G.; and Unruh, Lavern H., 4,945,719, Cl. 56-341.000.

Hayashi, Kimiaki; Ozaki, Yasuhiko; Yamada, Kenji; Takenaga, Hideyuki; and Inoue, Ichizo, to Tanabe Seiyaku Co., Ltd. Thiophene derivative and process for preparing the same, 4,946,862, Cl. 514-438.000.

Hayashi, Masaki: See—  
Yajima, Hiroshi; Hayashi, Masaki; Satoh, Takashi; and Shioya, Masaharu, 4,947,262, Cl. 358-296.000.

Hayashi, Teruaki: See—  
Motono, Masahiro, 4,946,472, Cl. 8-424.000.

Hayashi, Toshitada; Ide, Heihachi; and Sano, Koichi, to Sony Corporation. Apparatus and method for recording or reproducing still

video and audio information and having after recording editing capability, 4,947,265, Cl. 358-341.000.

Hayashi, Tsuyoshi: See—  
Suzuki, Kenji; Takishita, Toshihiko; Fukuoka, Satoru; Hashikawa, Hirokazu; Hayashi, Tsuyoshi; and Ohta, Minemasa, 4,947,384, Cl. 369-279.000.

Hayashi, Yasumasa; Oka, Katsumasa; and Satoh, Hiroshi, to International Business Machines Corporation. Method of rotating image data in a partitioned display buffer, 4,947,344, Cl. 364-518.000.

Hayashibara, Ken: See—  
Masaki, Kazumi, 4,947,087, Cl. 315-307.000.

Hayashida, Yoshihiro; Nakamura, Yoshihiro; Ishii, Hideaki; and Koshimizu, Naganori, to Tokico Ltd. Tandem master cylinder sleeve, 4,945,729, Cl. 60-562.000.

Hayes, Cecil E., to General Electric Company. Apparatus and method for enhanced multiple coil nuclear magnetic resonance (NMR) imaging, 4,947,121, Cl. 324-322.000.

Hayes, James K., to Combustion Engineering, Inc. High volume permanent magnet filter for removing ferromagnetic impurities, 4,946,589, Cl. 210-222.000.

Hayes, Stephen L.: See—  
Stern, Carl M.; Meckstroth, Richard N.; and Hayes, Stephen L., 4,946,416, Cl. 446-409.000.

Hayton, Eugene; Failor, Raymond A.; and Singleton, Dan, to Hausted, Inc. Patient transport apparatus including independently or simultaneously operable leg and backrest portions, 4,945,582, Cl. 5-67.000.

Hazelton, Ronald L.: See—  
Guckes, Terry L.; McHugh, Mark A.; Cozewith, Charles; and Hazelton, Ronald L., 4,946,940, Cl. 528-483.000.

Hazendonk, Antonius G.: See—  
Van Wezel, Antonius L.; Hazendonk, Antonius G.; and Beuvery, Eduard C., 4,946,676, Cl. 424-89.000.

Healy, William C. Wallet attachment for facilitating withdrawal from a pocket, 4,945,961, Cl. 150-132.000.

Heckert, David C.: See—  
Tsai, Chee-Hway; Heckert, David C.; and Kuznicki, James T., 4,946,701, Cl. 426-597.000.

Hedberg, Bo G.: See—  
Raiih, Alex K.; Hedberg, Bo G.; and Stjernvall, Jan-Erik, 4,947,409, Cl. 375-97.000.

Heep, Dieter; Vogel, Paul; and Schmalz, Joachim, to Waeschle Maschinenfabrik GmbH. Apparatus for feeding bulk material, 4,946,078, Cl. 222-368.000.

Heggs, Kevin S.: See—  
Fearnot, Neal E.; Heggs, Kevin S.; Johnson, William L.; and Stevens, Donald A., 4,945,909, Cl. 128-419.0PG.

Heilman, Raymond D.: See—  
Howard, Dennis; and Heilman, Raymond D., 4,947,068, Cl. 310-71.000.

Heilmann, Steven J.; Krepski, Larry R.; Rasmussen, Jerald K.; Katrietzky, Alan R.; and Tarri, Richard D., to Minnesota Mining and Manufacturing Company. Bis(thiazolinethiones), 4,946,962, Cl. 548-187.000.

Heimke, Gunther; and von Recum, Andreas F., to Clemson University. Percutaneous devices with flanges of variable stiffness, 4,946,444, Cl. 604-175.000.

Heinold, Hans; and Rau, Joseph, to Manfred A. Jennewein. Apparatus for manipulating garment hangers, 4,946,023, Cl. 198-419.100.

Heistand, Robert H., II; and Duquette, Lawrence G., to Dow Chemical Company. The. Preparation of ABO<sub>3</sub> compounds from mixed metal aromatic coordination complexes, 4,946,810, Cl. 501-137.000.

Heitz, Walter; and Greiner, Andreas, to Bayer Aktiengesellschaft. Vinylene copolymer, 4,946,937, Cl. 528-392.000.

Held, Wolfgang; König, Axel; and Puppe, Lothar, to Bayer Aktiengesellschaft. Process for the reduction of the nitrogen oxides in exhaust gases using a zeolite-containing catalyst, 4,946,659, Cl. 423-212.000.

Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., to Pharmaceutical Delivery Systems, Inc. Polymers containing carboxy-ortho ester and ortho ester linkages, 4,946,931, Cl. 528-230.000.

Hellhake, Thomas M. Security support for feeding bottle, 4,946,119, Cl. 248-102.000.

Helms, David A.; Hatton, Gregory J.; Durrett, Michael G.; Dowty, Earl L.; and Marrelli, John D., to Texaco Inc. Microwave water cut monitor, 4,947,127, Cl. 324-640.000.

Helms, David A.; and Marrelli, John D., to Texaco Inc. Petroleum stream microwave watercut monitor, 4,947,129, Cl. 324-640.000.

Helms, David A.: See—  
Hatton, Gregory J.; Helms, David A.; Durrett, Michael G.; Marrelli, John D.; and Stafford, Joseph D., 4,947,128, Cl. 324-640.000.

Helms, David R., to General Electric Company. Variable gain distributed amplifier, 4,947,136, Cl. 330-54.000.

Helms, Israel F., to Brown & Sharpe Manufacturing Company. Gas bearing having an auxiliary reservoir, 4,946,293, Cl. 384-12.000.

Hembree, Richard D.: See—  
Carmin, David E.; and Hembree, Richard D., 4,945,725, Cl. 60-509.000.

Henderson, John G. N., to General Electric Company. Noise reduction apparatus for a widescreen video signal processing system, 4,947,250, Cl. 358-141.000.

Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Elison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rocke M.; Seansen, Jerry P.; Sherman, John W.; and Urcin, Edgar J., to Supra Products, Inc. Electronic security system with configurable key, 4,947,163, Cl. 340-825.310.

Henkel Kommanditgesellschaft auf Aktien: See—  
Friesse, Hans-Herbert; Kaindl, Gerhard; and Schieferstein, Ludwig, 4,946,471, Cl. 8-94.230.

Kohl, Albert; and Seilaz, Leon, 4,945,602, Cl. 15-320.000.

Henry, Harold J.; and Jennusa, Paul M. Reactive force compensator for projectile firing device, 4,945,666, Cl. 42-1.060.

Henson, Kenneth H. Pole gripping ladder stabilizing device, 4,946,004, Cl. 182-206.000.

Henton, David E.; and Beyer, Douglas E., to Dow Chemical Company. The. Blend comprising large proportions of a EPDM graft terpolymer and relatively smaller proportions of an acrylate rubber, 4,946,894, Cl. 525-71.000.

Hentschel, Christian, to Blaupunkt-Werke GmbH. Suppression of flicker effects in a television receiver, 4,947,251, Cl. 358-166.000.

Hepburn, William D., to Ferranti International Signal, plc. Seats between ceramic articles or between ceramic articles and metal articles, 4,946,090, Cl. 228-121.000.

Heraeus Elektroden GmbH: See—  
Simon, Heinrich; and Koch, Reinhard, 4,946,571, Cl. 204-206.000.

Hercules Incorporated: See—  
Chu, Sung G.; Jabloner, Harold; and Nguyen, Tuyen T., 4,946,908, Cl. 525-426.000.

Hermann, Karl: See—  
Habich, Adolph B.; Hermann, Karl; Hunt, Ronald E.; and Whitehead, Verlon E., 4,946,708, Cl. 427-96.000.

Herning, Paul E.: See—  
Kalisher, Murray H.; and Herning, Paul E., 4,946,543, Cl. 156-612.000.

Herrmann, Helmut A., to Schmidt'sche Heissdampf GmbH. Heat exchanger system, 4,945,978, Cl. 165-47.000.

Herron, Howard W.: See—  
Crus, Richard A.; Engles, Robert W.; Haderle, Donald J.; and Herron, Howard W., 4,947,320, Cl. 364-200.000.

Herron, Roy H., Jr., to Ryobi Motor Products Corp. Front caster assembly for canister vacuum cleaner, 4,945,603, Cl. 15-323.000.

Herschler, Wilbert H.; and Westmoreland, Dorothy J., to Rockwell International Corporation. Electrical connector backshell torque tool, 4,945,791, Cl. 81-120.000.

Hersh, Clifford, to Array Technologies, Inc. Image transducing apparatus, 4,947,258, Cl. 358-213.280.

Hertzog, Arthur A., to Fluid Care Industries, Inc. Clamp-on magnetic water treatment device, 4,946,590, Cl. 210-222.000.

Hethuin, Serge, to U.S. Philips Corporation. Measuring apparatus for detecting the distance "H" to an object, 4,947,354, Cl. 364-562.000.

Heusmann, Heinz: See—  
Uhlemann, Hans; Braun, Burkhard; Heusmann, Heinz; Stopp, Gerhard; and Karkossa, Horst, 4,946,654, Cl. 422-140.000.

Hewitt, Charles D.; and Specht, Paul B., to Encon Safety Products, Inc. Ventilated splash goggle, 4,945,577, Cl. 243-77.000.

Hewlett-Packard Company: See—  
Chism, Wayne R., 4,947,106, Cl. 324-73.100.

Chism, Wayne R.; and King, Philip N., 4,947,113, Cl. 324-158.00R.

Mahon, Michael J.; and Baum, Allen, 4,947,364, Cl. 364-757.000.

Sheehy, David B., 4,947,390, Cl. 370-85.130.

Heydner, Konrad; and Onderka, Oswald, to Ellenberger & Poensgen GmbH. Electrical equipment housing, 4,947,010, Cl. 200-296.000.

Heyes, Peter J.; and Owen, Robert A., to CMB Packaging (UK) Limited. Metal can ends with metal pull tabs bonded thereto, 4,946,063, Cl. 220-270.000.

Hickey, John C., to Ford Motor Company. Electroplating of precision parts, 4,946,572, Cl. 204-213.000.

Hickling, Robert: See—  
Dahlmann, Virgil R.; Pirrallo, Karen M.; Talaki, Kelly A.; Zieslesch, Kenneth J.; and Hickling, Robert, 4,945,766, Cl. 73-598.000.

Hickner, Richard A.: See—  
McIntyre, John M.; Rao, Nancy A.; and Hickner, Richard A., 4,946,569, Cl. 204-181.700.

Hicks, E. LaRuth: See—  
Hicks, Lester R.; and Hicks, E. LaRuth, 4,945,822, Cl. 98-41.300.

Hicks, Lester R.; and Hicks, E. LaRuth. Air control apparatus for forced air central air conditioning systems, 4,945,822, Cl. 98-41.300.

Hicks, Maria: See—  
Arfael, Ahmad; Berke, Neal S.; Dallaire, Michael P.; and Hicks, Maria, 4,946,506, Cl. 106-724.000.

Hieda, Teruo, to Canon Kabushiki Kaisha. White balance control with adjusting means responsive to image brightness change, 4,947,242, Cl. 358-29.000.

Hiernerwadel, Klaus; and Weth, Gerald, to U.S. Philips Corporation. Hybrid encoder for video signals comprising a motion estimator and an inter-intraframe encoding selector which comprise a common calculation module, 4,947,248, Cl. 358-135.000.

Higa, Kelvin T., to United States of America, Navy. Preparation of ditertiarybutyltelluride, 4,946,994, Cl. 562-899.000.

Higa, Maskatsu: See—  
Fujimura, Koh; Higa, Maskatsu; and Aoki, Hisashi, 4,946,260, Cl. 350-346.000.

Higashigaki, Yoshiyuki: See—  
Yoshimoto, Yoshikazu; Suzuki, Tomonari; Higashigaki, Yoshiyuki; Nakajima, Shigeo; and Inoguchi, Toshio, 4,946,370, Cl. 427-249.000.

Higeta Shoyu Co., Ltd.: See—  
Udaka, Shigezo; Takagi, Hiroaki; and Kadowaki, Kiyoshi, 4,946,789, Cl. 435-252.300.

Higman, Roger H.; and Perkins, Gilbert, to Harris Corporation. Test fixture for multi-GHz microwave integrated circuits. 4,947,111, Cl. 324-158.00F.

Higuchi, Seijun; Asakawa, Kenichi; Mizuguchi, Toshinori; and Fujinaga, Minoru, to Nippon Steel Corporation. Highly anticorrosive coated steel sheet for fuel vessel and process for production thereof. 4,946,748, Cl. 428-644.000.

Hijikata, Isamu; and Uehara, Akira, to Tokyo Ohka Kogyo Co., Ltd. Plasma reactor. 4,946,537, Cl. 156-345.000.

Hikone, Makoto: See—  
Maeda, Kouzo; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 4,946,194, Cl. 280-777.000.

Hileman, Bennett L.: See—  
Sharma, Ravinder K.; Lytle, William H.; Rogona, Angela, and Hileman, Bennett L., 4,946,376, Cl. 428-620.000.

Hill, Grayham; and Tittler, Philip, to British Aerospace Public Limited Company. Control apparatus. 4,947,070, Cl. 310-80.000.

Hill, John B.; and Gelman, Yefim, to NutraSweet Company, The. Process for the preparation of  $\alpha$ -L-aspartyl-L-phenylalanine methyl ester hydrochloride by use of isolated N-formyl L-aspartic anhydride. 4,946,988, Cl. 560-41.000.

Hill, Richard F.: See—  
Terbot, John F.; and Hill, Richard F., 4,946,976, Cl. 556-173.000.

Hillenburg, Mark W. Chuck with movable jaw halves. 4,946,176, Cl. 279-111.000.

Hillman, Robert S.: See—  
Gibbons, Ian; Hillman, Robert S.; Robertson, Channing R.; and Allen, Jimmy D., 4,946,795, Cl. 436-179.000.

Hillstrom, Warren W.: See—  
Walker, Evan H.; and Hillstrom, Warren W., 4,946,521, Cl. 149-36.000.

Hinata, Susumu; and Seiwa, Yoshito, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser array. 4,947,401, Cl. 372-50.000.

Hinlein, Sigmund, to Digital Equipment Corp. Detachable head-load beam slider arm for disk drive. 4,947,275, Cl. 360-104.000.

Hiramatsu, Takeo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Method of input power on/off discrimination for an automatic vehicular transmission system. 4,947,330, Cl. 364-424.100.

Hirano, Tsumoru: See—  
Mackawa, Yukio; and Hirano, Tsumoru, 4,946,771, Cl. 430-548.000.

Takahashi, Osamu; Hirano, Tsumoru; and Sakanoue, Seiki, 4,946,770, Cl. 430-545.000.

Hirata, Tadashi: See—  
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,946,957, Cl. 544-342.000.

Hirata, Toichi: See—  
Izumi, Eiki; Hirata, Toichi; Nozawa, Yusaku; and Shimotori, Masahiko, 4,945,723, Cl. 60-426.000.

Hiratani, Hajime; Nishimuro, Satoshi; Nakanishi, Koichiro; Ota, Masahiko; and Matsumoto, Hiroshi, to Japan Chemical Research Co., Ltd. Method of suppressing the thermal degradation of urokinase. 4,946,785, Cl. 435-188.000.

Hirayama, Yasuhiko; Ikata, Haruko; Ojima, Satoshi; and Matsuzaki, Hiromi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Artificial intervertebral disc. 4,946,378, Cl. 623-17.000.

Hird, Edwin A. Measurement digitizer. 4,945,650, Cl. 33-763.000.

Hirokane, Junji: See—  
Inui, Tetsuya; Hirokane, Junji; Shibata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, 4,946,730, Cl. 428-64.000.

Hirose Electric Co., Ltd.: See—  
Kawai, Mitsuru; Yoshida, Masaru; and Sasaki, Yoshihiro, 4,946,400, Cl. 439-79.000.

Hirsch, Charles F.; Liesch, Jerrold M.; Salvatore, Michael J.; Schwartz, Robert E.; and Sesin, David F., to Merck & Co., Inc. Antifungal fermentation product and method. 4,946,835, Cl. 514-183.000.

Hirsch, Michael: See—  
Akselrod, Solange; Karin, Jacob; and Hirsch, Michael, 4,945,917, Cl. 128-696.000.

Hirsekorn, Frederick J.; and Emmons, William D., to Rohm and Haas Company. In situ cyclopolymerized vinyl anhydride in polyepoxide. 4,946,875, Cl. 522-170.000.

Hisayasu, Dennis M.: See—  
Sheldon, John C.; and Hisayasu, Dennis M., 4,947,399, Cl. 372-29.000.

Hitachi Cable, Ltd.: See—  
Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ibamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.

Hitachi Construction Machinery Co., Ltd.: See—  
Izumi, Eiki; Hirata, Toichi; Nozawa, Yusaku; and Shimotori, Masahiko, 4,945,723, Cl. 60-426.000.

Hitachi Engineering Co., Ltd.: See—  
Katsura, Koyo; Matsuo, Shigeru; Yoshida, Shigeaki; Takeda, Hiroshi; and Kaziwara, Hisashi, 4,947,342, Cl. 364-518.000.

Hitachi Koki Co., Ltd.: See—  
Kumasaka, Takao; Simazaki, Yuzuru; and Komatsu, Isamu, 4,947,200, Cl. 355-251.000.

Hitachi, Ltd.: See—  
Katsura, Koyo; Matsuo, Shigeru; Yoshida, Shigeaki; Takeda, Hiroshi; and Kaziwara, Hisashi, 4,947,342, Cl. 364-518.000.

Kawai, Rie; Goto, Kanzen; and Morimoto, Kunio, 4,947,479, Cl. 364-408.000.

Kumasaka, Takao; Simazaki, Yuzuru; and Komatsu, Isamu, 4,947,200, Cl. 355-251.000.

Kuwahara, Hiroshi; Ogino, Mineo; Kozaki, Takahiko; Endo, Noboru; and Sakurai, Yoshito, 4,947,388, Cl. 370-60.000.

Mineo, Akira, 4,947,318, Cl. 364-200.000.

Miyaoka, Shinichiro; Shiraiishi, Takayoshi; and Sasaki, Ryoichi, 4,947,447, Cl. 382-56.000.

Saeki, Junichi; Kaneda, Aizo; Tsunoda, Shigeharu; Yoshida, Isamu; and Nishi, Kunihiko, 4,946,633, Cl. 264-40.100.

Sugawara, Katuo; Takahashi, Akio; Ono, Masahiro; and Narahara, Toshikazu, 4,946,734, Cl. 428-209.000.

Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ibamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.

Taya, Shunroku, 4,947,041, Cl. 250-298.000.

Tenma, Tadashi; Akashi, Kichizo; Kusuzaki, Tetsuo; Igeta, Shouji; Tsushima, Isao; and Komoda, Norihisa, 4,947,322, Cl. 364-401.000.

Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.

Hitachi Maxell, Ltd.: See—  
Kumada, Akio, 4,947,076, Cl. 310-323.000.

Ohiwa, Tsunemi; Uenae, Keiichi; Ogawa, Souichi; Takiguchi, Katsumi; and Yoshitake, Masaaki, 4,947,081, Cl. 313-509.000.

Yamaguchi, Satoru; Shimizu, Jojo; Satoh, Kozaburo; and Andoh, Haruo, 4,946,374, Cl. 428-323.000.

Hitachi VLSI Engineering Corp.: See—  
Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.

Ho, W. S. Winston: See—  
Thaler, Warren A.; Ho, W. S. Winston; and Sartori, Guido, 4,946,594, Cl. 210-651.000.

Hobart Corporation: See—  
Vennemeyer, Chris A., 4,946,285, Cl. 366-288.000.

Hobbs, Douglas H., to Shell Oil Company. Reclosable opening device for a container. 4,946,061, Cl. 220-243.000.

Hoberman, Barry A.; and Moss, William E., to Advanced Micro Devices, Inc. High speed complimentary output stage utilizing current steering transistors and a single current source. 4,947,060, Cl. 307-467.000.

Hochrein, Georg: See—  
Olschewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.

Hoda, Takeo: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,947,203, Cl. 354-475.000.

Hodges, Harry A., to Mesa Vista Hospital. Patient monitoring system. 4,947,152, Cl. 340-573.000.

Hodson, Simon, to Concrete Technology Corporation. Cement building material. 4,946,504, Cl. 106-713.000.

Hoechst Aktiengesellschaft: See—  
Baader, Ekkehard; Jendralla, Heiner; Kerekjarto, Bela; and Beck, Gerhard, 4,946,841, Cl. 514-247.000.

Hoechst Aktiengesellschaft: See—  
Braun, Gero; Burg, Karlheinz; and Muck, Karl-Friedrich, 4,946,561, Cl. 203-49.000.

Doessel, Karl-Friedrich; Dammel, Ralph; and Lingnau, Juergen, 4,946,759, Cl. 430-270.000.

Elsaesser, Andreas, 4,946,760, Cl. 430-270.000.

Jendralla, Heiner; Beck, Gerhard; Wess, Gunther; and Kerekjarto, Bela, 4,946,852, Cl. 514-336.000.

Vaahs, Tilo; Kleiner, Hans-Jerg; Peuckert, Marcellus; and Bruck, Martin, 4,946,920, Cl. 528-33.000.

Hoechst Celanese Corp.: See—  
Johnson, Robert E., 4,946,919, Cl. 526-285.000.

Walls, John E.; and Tellechea, Carlos, 4,946,373, Cl. 430-300.000.

Hoehr, Dieter: See—  
Pruess, August-Wilhelm; Hoehr, Dieter; Schug, Kurt-Peter; and Guttman, Hansjuergen, 4,946,609, Cl. 252-35.000.

Hoenywell, Inc.: See—  
Huang, Jack S. T.; and Forsell, Per N., 4,947,226, Cl. 357-38.000.

Hoepf, Michael, to C & E Fein GmbH & Co. Holding device, in particular, for tools or workpieces for industrial robots. 4,946,146, Cl. 267-137.000.

Hoever, Franz-Peter: See—  
Kruger, Bernd-Wieland; Sasse, Klaus; Hoever, Franz-Peter; Nentwig, Gunther; and Behrenz, Wolfgang, 4,946,850, Cl. 514-315.000.

Hoffman, Jacob M., Jr.; Lee, Ling L.; Varga, Sandor L.; and Zaczai, Anthony G., to Merck & Co., Inc. 4-(2-methyl-2-hydroxypropylamino)-5,6-dihydrothieno-[2,3-b]thiopyran-2-sulfonamide-7,7-dioxide. 4,946,859, Cl. 514-432.000.

Hoffman, Keith E.: See—  
Geno, Wayne H.; and Hoffman, Keith E., 4,946,144, Cl. 267-64.270.

Hoffmann, Gunter: See—  
Ott, Willibald; Hoffmann, Gunter; and Jacobs, Werner, 4,945,697, Cl. 52-396.000.

Hoffmann-La Roche Inc.: See—  
Jolidon, Synese; Locher, Rita; Kompis, Ivan; Weiss, Ekkehard; and Wyss, Pierre-Charles, 4,946,847, Cl. 514-229.500.

Kiefer, Hansruedi, 4,946,952, Cl. 536-27.000.

Hofmann, Elsa O. Gameboard apparatus. 4,946,169, Cl. 273-253.000.

Hofstatter, Elizabeth A.: See—  
Bachman, Bonnie J.; Hofstatter, Elizabeth A.; Ritter, Joan M.; and Rubin, Jerry J., 4,946,549, Cl. 156-643.000.

Hogg, Dennis: See—  
Dunstan, Ericson M.; Hogg, Dennis; Scura, John E.; and Sheu, Ming-Goei, 4,947,093, Cl. 318-560.000.

Holland, Eugene A.: See—  
Siegfried, Barry A.; and Holland, Eugene A., 4,946,669, Cl. 424-4.000.

Holmberg, Douglas A. Ventilated greenhouse. 4,945,821, Cl. 98-32.000.

Hologic, Inc.: See—  
Stein, Jay A., 4,947,414, Cl. 378-55.000.

Holsinger, Kevin: See—  
Ekstrand, John P.; and Holsinger, Kevin, 4,947,102, Cl. 323-293.000.

Holsteiner Gas-Gesellschaft mbH: See—  
Loock, Rudolf; and Jebens, Claus, 4,946,312, Cl. 405-129.000.

Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., to SmithKline Beecham Corporation. Phosphonic acid substituted steroids as steroid 5 $\alpha$ -reductase inhibitors. 4,946,834, Cl. 514-119.000.

Holt, Joseph B.: See—  
Dunnead, Stephen D.; Holt, Joseph B.; Kingman, Donald D.; and Munir, Zuhair A., 4,946,643, Cl. 419-12.000.

Holzer, Heinrich: See—  
Wagner, Hans-Dieter; and Holzer, Heinrich, 4,946,364, Cl. 425-72.100.

Homac Mfg. Company: See—  
Harlan, Samuel P., 4,946,725, Cl. 428-73.000.

Homewood, Tony: See—  
Restall, Janet E.; and Homewood, Tony, 4,946,749, Cl. 428-660.000.

Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, to Kawasaki Steel Corporation. Semi-processed non-oriented electromagnetic steel strip having low core loss and high magnetic permeability, and method of making. 4,946,519, Cl. 148-307.000.

Honda Giken Kogyo Kabushiki Kaisha: See—  
Ishige, Yoshiki; Sato, Shoji; Masuda, Hisashi; Ushiki, Yoji; Kumagai, Kiyoshi; Saïda, Junichi; and Minoya, Kiyoshi, 4,946,551, Cl. 156-222.000.

Kaibuki, Shigeo; Watanabe, Shinpei; and Yamamoto, Yasuhiro, 4,945,622, Cl. 29-281.100.

Kamimura, Kenji; and Tsuzuki, Sadachika, 4,947,324, Cl. 364-424.020.

Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.

Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsubara, Toshihiko, 4,946,645, Cl. 420-84.000.

Okazaki, Yoshio, 4,946,193, Cl. 280-769.000.

Honda, Kunihiko; Ishiguro, Tadashi; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Process for the preparation of magnetic recording disk. 4,946,534, Cl. 156-261.000.

Honda Lock Mfg. Co., Ltd.: See—  
Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.

Honda, Masami, to Kabushiki Kaisha Toshiba. Presentation device used in combination with an overhead projector. 4,946,274, Cl. 353-122.000.

Honda Motor Co., Ltd.: See—  
De Pous, Olivier, 4,947,125, Cl. 324-459.000.

Honda, Susumu: See—  
Akimoto, Shin-ichi; Honda, Susumu; and Yasukohchi, Tohru, 4,946,904, Cl. 525-327.800.

Akiyama, Saburo; Honda, Susumu; Akimoto, Shin-ichi; and Yasukohchi, Tohru, 4,946,918, Cl. 526-271.000.

Honeycutt, LeRoy, III, to Reynolds Metals Company. Apparatus for and process of direct casting of metal strip. 4,945,974, Cl. 164-479.000.

Honeywell Inc.: See—  
Black, Robert A., Jr.; and Kompelien, Arlon D., 4,947,079, Cl. 315-205.000.

Nelson, Larry A.; and Woods, James W., 4,947,459, Cl. 455-612.000.

Hong, Sung W.: See—  
Cornell, Robert J.; Wheeler, Edward L.; Mazzeo, Russell A.; and Hong, Sung W., 4,946,881, Cl. 524-100.000.

Hongo, Ichiro: See—  
Saito, Kazuo; Hongo, Ichiro; Mitani, Akio; and Ito, Hiroshi, 4,946,381, Cl. 431-1.000.

Honjo, Takeshi: See—  
Murakami, Koichi; and Honjo, Takeshi, 4,947,217, Cl. 355-317.000.

Hoogland, Jan. Endoscope relay optics. 4,946,267, Cl. 350-465.000.

Hoover Universal, Inc.: See—  
Demick, Robert L., 4,946,216, Cl. 296-63.000.

Hurn, Randy D.; and Green, John W., 4,946,226, Cl. 297-417.000.

Hopfen-Extraktion HVG Bart, Raiser & Co.: See—  
Forster, Adrian; Geyer, Stefan; Schulmeyr, Josef; Schmidt, Roland; and Gehrig, Manfred, 4,946,695, Cl. 426-286.000.

Hoppe, Richard J., to Sundstrand Corporation. Capacitor cooling arrangement. 4,947,287, Cl. 361-321.000.

Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, to Tomei Thushin Kogyo Co., Ltd. Connecting block for telephone. 4,946,401, Cl. 439-224.000.

Horii, Kenju: See—  
Kuroda, Takao; Kuriyama, Toshihiro; Horii, Kenju; and Mizuno, Hiroyuki, 4,947,224, Cl. 357-30.000.

Horii, Satoshi: See—  
Kameda, Yukihiko; and Horii, Satoshi, 4,946,779, Cl. 435-84.000.

Horiuchi, Kuniyasu; and Nakamura, Yoshinobu, to Sumitomo Rubber Industries Ltd. Tennis ball. 4,946,166, Cl. 273-61.000.

Horiuchi, Kuniyasu; and Makamura, Yoshinobu, to Sumitomo Rubber Industries, Ltd. Tennis ball. 4,947,466, Cl. 273-61.000.

Horlogerie Photographique Francaise Societe anonyme: See—  
Maury, Bernard; Walter, Jean-Claude; Cognasse, Christian; and Graham, Peter, 4,947,075, Cl. 310-324.000.

Hornsey, Derek: See—  
Lee, Robert G. H.; Hornsey, Derek; Dieguez, Jose; and Perkins, Arthur S., 4,946,555, Cl. 162-49.000.

Hornung, Thomas F. Combined motor tester and pulse train monitor for stepper motors. 4,945,760, Cl. 73-118.100.

Horton, Richard F., to Massachusetts Institute of Massachusetts. Wavefront analysis for segmented mirror control. 4,946,280, Cl. 356-353.000.

Hoshino, Toyoma: See—  
Kuioka, Kiyoshi; Yamamoto, Ryoichi; Inaba, Koji; and Hoshino, Toyoma, 4,945,661, Cl. 37-67.000.

Hosomi, Akira, to Toray Silicone Company Limited. Method for the preparation of polycyclic 1,3-thiazolidines. 4,946,955, Cl. 544-234.000.

Hour, Jin-rong. Electronic music and sound mixing device. 4,945,805, Cl. 84-610.000.

House, Robert C., II: See—  
Van Duyn, Paul D.; House, Robert C., II; and Hallgarth, Leslie H., 4,947,294, Cl. 362-61.000.

Houston Industries Incorporated: See—  
Blair, Richard W.; and Grant, Jack R., 4,945,738, Cl. 70-161.000.

Howard, Dennis; and Heilman, Raymond D., to Emerson Electric Co. Motor for whirlpool baths. 4,947,068, Cl. 310-71.000.

Hoy, Kenneth L.: See—  
Meschke, Debra J.; and Hoy, Kenneth L., 4,946,824, Cl. 503-216.000.

Hoya Corporation: See—  
Wada, Toyoyi; Daimaru, Takashi; and Itoh, Noriyasu, 4,945,684, Cl. 51-165.770.

HR Textron, Inc.: See—  
Williams, Mark, 4,945,779, Cl. 74-99.00R.

Hsei, Paul K.: See—  
Liston, Max D.; Hsei, Paul K.; Dickinson, David G.; Daffern, George M.; and Fetty, James G., 4,946,651, Cl. 422-102.000.

Hsieh, J. T. T., to Mobile Oil Corporation. Modified chromium-containing catalyst composition for polymerizing alpha-olefins. 4,946,914, Cl. 526-106.000.

Hsiung, Thomas H.: See—  
Perka, Alan T.; Hsiung, Thomas H.; Klosek, Joseph; and Moore, Robert B., 4,946,477, Cl. 48-197.00R.

Hsu, Tung-Fu; and Plumer, Mark J. Device for fastening a wheel cover. 4,946,228, Cl. 301-37.00S.

Huang, Jack S. T.; and Forsell, Per N., to Hoenywell, Inc. Bilateral switching device. 4,947,226, Cl. 357-38.000.

Huang, San Y. Remote control mylar toy aircraft. 4,946,415, Cl. 446-225.000.

Hubbell Incorporated: See—  
Boteler, William C., 4,947,281, Cl. 361-56.000.

Quiogue, Honesto D., 4,947,307, Cl. 362-325.000.

Huddleston, Elwyn G., to Kendall Company, The. Novel crosslinked adhesive system. 4,946,529, Cl. 156-187.000.

Hudson Allen Limited: See—  
Hudson, Geoffrey, 4,947,383, Cl. 369-44.110.

Hudson, Geoffrey, to Hudson Allen Limited. Machine readable markers for cartesian information storage media. 4,947,383, Cl. 369-44.110.

Huels Troisdorf AG: See—  
Bernhardt, Gunther; Amort, Jurgen; Haas, Margret; Hanisch, Horst; and Kragl, Heinz, 4,946,977, Cl. 556-440.000.

Huet, Roger, to Aluminum Company of America. Molded composite armor. 4,945,814, Cl. 89-36.020.

Huffman, Ann E.: See—  
Vassiliadis, Stamatias; Putrino, Michael; Huffman, Ann E.; Feal, Brice J.; and Pechanek, Gerald G., 4,947,359, Cl. 364-715.090.

Hughes Aircraft Company: See—  
McVey, Michael J., 4,947,101, Cl. 323-272.000.

Myers, Terrence L., 4,947,168, Cl. 341-120.000.

Sheldon, John C.; and Hisayasu, Dennis M., 4,947,399, Cl. 372-29.000.

Williams, David A., 4,946,126, Cl. 248-476.000.

Huhta-Koivisto, Esko: See—  
Kroneld, Rolf; Reunanen, Markku; and Huhta-Koivisto, Esko, 4,946,559, Cl. 203-4.000.

Hull, Richard W.: See—  
O'Shaughnessy, Timothy G.; Chung, David K.; Hull, Richard W.; Ouyang, Kenneth W.; Pierotti, Victor G.; and Souza, Joseph A., 4,947,063, Cl. 307-572.000.

Hunt, Donald E., to Pacer Industries, Inc. Electromagnetic fuel injection valve. 4,946,107, Cl. 239-585.000.

Hunt, Ronald E.: See—  
Habich, Adolph B.; Hermann, Karl; Hunt, Ronald E.; and Whitehead, Verlon E., 4,946,708, Cl. 427-96.000.

Hurd, William J.: See—  
Sadr, Ramin; and Hurd, William J., 4,947,408, Cl. 375-94.000.



Hurn, Randy D.; and Green, John W., to Hoover Universal, Inc. Vehicle seat assembly with attitude adjustable armrest. 4,946,226, Cl. 297-417.000.

Hussong, Kurt: See—  
Springer, Hartmut; and Hussong, Kurt, 4,946,947, Cl. 534-635.000.

Hustad, Gerald O., to Oscar Mayer Foods Corporation. Method of forming a reclosable package. 4,945,710, Cl. 53-432.000.

Husting, Thomas J., to Kohler Company. Drain valve activator assembly. 4,945,579, Cl. 4-203.000.

Hutsch, Bruno; and Schmidt, Bernd, to Ringsdorf-Werke GmbH. Graphite tube furnace with specimen support for atomic absorption spectroscopy. 4,946,278, Cl. 356-312.000.

Hwang, Feng-Lin. Alarm device for dripping injection. 4,947,154, Cl. 340-624.000.

I.P.M. Industria Politecnica Medidionale S.p.A.: See—  
De Feo, Carlo, 4,946,418, Cl. 453-20.000.

Ibamoto, Masahiko: See—  
Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ibamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.

ICBT Lyon: See—  
Neyraud, Rene, 4,945,720, Cl. 57-58.360.

Ichikawa, Yuji: See—  
Iwata, Yasunari; Nishikawa, Seiichi; and Ichikawa, Yuji, 4,947,325, Cl. 364-424.030.

Ichimura, Yasuo; Matsushita, Hidetoshi; Kawasaki, Kenji; and Aoyama, Youichi, to Matsushita Electric Works, Ltd.; and Klockner-Moeller Elektrizitats-GmbH. Electromagnetic contactor. 4,947,146, Cl. 335-131.000.

Ichiryu, Takaharu; Ono, Yoshiki; and Ishihara, Hideaki, to Toyo Boseki Kabushiki Kaisha. Novel metal fiber and process for producing the same. 4,946,746, Cl. 428-606.000.

ICI Americas Inc.: See—  
Carter, Charles G.; Lee, David L.; Michaely, William J.; and Kraatz, Gary W., 4,946,981, Cl. 558-415.000.

ICI Australia Operations Proprietary Limited: See—  
Dowing, Richard; Paull, Jolanta; and Vince, David, 4,945,808, Cl. 86-20.120.

Ide, Heihachi: See—  
Hayashi, Toshitada; Ide, Heihachi; and Sano, Kohichi, 4,947,265, Cl. 358-341.000.

Ide, Toshiaki: See—  
Nishimatsu, Masaharu; Shimada, Shigeru; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, 4,946,729, Cl. 428-141.000.

Idemitsu Kosan Company Limited: See—  
Kanamori, Hideo; and Hasimoto, Katumi, 4,946,612, Cl. 252-49.500.

Kaneko, Masato, 4,946,611, Cl. 252-49.600.

Idemitsu Petrochemical Co., Ltd.: See—  
Kasahara, Toshikazu; and Funabashi, Hideo, 4,946,898, Cl. 525-240.000.

Igeta, Shouji: See—  
Tenma, Tadashi; Akashi, Kichizo; Kusuzaki, Tetsuo; Igeta, Shouji; Tushima, Isao; and Komoda, Norihisa, 4,947,322, Cl. 364-401.000.

Ihara Chemical Industry Co., Ltd.: See—  
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takchi, Takayoshi, 4,946,495, Cl. 71-92.000.

Iijima, Satoshi: See—  
Takasa, Kenji; and Iijima, Satoshi, 4,946,930, Cl. 528-230.000.

Iizawa, Ryuji: See—  
Taniguchi, Yoshiaki; Watanabe, Masaki; and Iizawa, Ryuji, 4,946,001, Cl. 180-79.100.

Ikata, Haruko: See—  
Hirayama, Yasuhiko; Ikata, Haruko; Ojima, Satoshi; and Matsuzaki, Hiromi, 4,946,378, Cl. 623-17.000.

Ikeda, Takeshi; Nozaki, Akira; and Ebe, Kazuyoshi, to FSK Kabushiki Kaisha. Adhesive paper for copying. 4,946,728, Cl. 428-40.000.

Ikeda, Tatunori: See—  
Ohishi, Hirotoshi; Ikeda, Tatunori; and Sogabe, Manabu, 4,947,145, Cl. 335-14.000.

Ikeda, Yuji; Okajima, Takahiro; and Tashiro, Yasuyuki, to Pioneer Electronic Corporation. Information reader for disk player. 4,947,481, Cl. 369-215.000.

Ikegawa, Akihito; Mizuno, Hiroshi; Murasaki, Hiroshi; and Etou, Kouichi, to Minolta Camera Kabushiki Kaisha. Developing apparatus with color dependent toner supply voltage. 4,947,212, Cl. 355-265.000.

Ilzyer, Danielle: See—  
Shiloh, Moshe; and Ilzyer, Danielle, 4,946,511, Cl. 136-212.000.

Imai, Yoshio: See—  
Kawamura, Ichiro; and Imai, Yoshio, 4,946,989, Cl. 560-51.000.

Imamura, Kaoru; and Takahashi, Wataru, to Kabushiki Kaisha Toshiba. Trimming element for microelectric circuit. 4,947,020, Cl. 219-121.650.

Immuno Aktiengesellschaft fur Chemisch-Medizinische Produkte: See—  
Dorner, Friedrich; and Eibl, Johann, 4,946,677, Cl. 424-92.000.

Imperial Chemical Industries, Plc: See—  
Allen, Simon; Gordon, Paul F.; and Hann, Richard A., 4,946,629, Cl. 252-589.000.

Carter, Steve; and Thorpe, David, 4,946,873, Cl. 521-185.000.

Denny, Patrick J.; and Shipley, David G., 4,946,660, Cl. 423-230.000.

Fields, Peter R.; and Ragg, Pudens L., 4,946,946, Cl. 530-500.000.

Sugavanam, Balasubramanyam, 4,946,493, Cl. 71-92.000.

Imuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for producing bisphenol A. 4,946,877, Cl. 568-727.000.

In Motion, Inc.: See—  
Calvert, Nathaniel, 4,945,571, Cl. 2-20.000.

Inaba, Koji: See—  
Kuioka, Kiyoshi; Yamamoto, Ryoichi; Inaba, Koji; and Hoshino, Toyoma, 4,945,661, Cl. 37-67.000.

Inagaki, Jitsuo. Cushionlike item with projections attached thereto by strings. 4,945,591, Cl. 5-472.000.

Inagaki, Yoshinori: See—  
Koishi, Musubu; Tsuchiya, Yutaka; Kinoshita, Katsuyuki; and Inagaki, Yoshinori, 4,947,031, Cl. 250-213.0VT.

Inanaga, Satoshi: See—  
Watanabe, Katsuhide; and Inanaga, Satoshi, 4,946,345, Cl. 415-90.000.

Inanobe, Tsutomu; and Tsuchida, Hirofumi, to Olympus Optical Co., Ltd. Finder optical system for single reflex cameras. 4,947,198, Cl. 354-225.000.

Inatsune, Shigeo; Ohashi, Yoshimasa; Fujisaka, Takahiko; and Kondo, Michimasa, to Mitsubishi Denki Kabushiki Kaisha. Multiple-beam antenna system. 4,947,176, Cl. 342-173.000.

Indiana Mills & Manufacturing, Inc.: See—  
Anthony, James R.; Wiseman, Michael A.; and Lortz, Allan R., 4,945,615, Cl. 24-573.500.

Industrial Resources of Michigan: See—  
Dykstra, Gerald L.; Boogaard, Craig; and Brunsting, Rodley, 4,945,626, Cl. 29-564.300.

Industrial Technology Research Institute: See—  
Lo, Shih-Dean, 4,945,815, Cl. 91-234.000.

Ing. Erich Pfeiffer GmbH & Co. KG: See—  
Fuchs, Karl-Heinz, 4,946,069, Cl. 222-43.000.

Innova Development Corporation: See—  
Stern, Carl M.; Meckstroth, Richard N.; and Hayes, Stephen L., 4,946,416, Cl. 446-409.000.

Inoguchi, Toshio: See—  
Yoshimoto, Yoshikazu; Suzuki, Tomonari; Higashigaki, Yoshiyuki; Nakajima, Shigeo; and Inoguchi, Toshio, 4,946,370, Cl. 427-249.000.

Inoue, Ichizo: See—  
Hayashi, Kimiaki; Ozaki, Yasuhiko; Yamada, Kenji; Takenaga, Hideyuki; and Inoue, Ichizo, 4,946,862, Cl. 514-438.000.

Inoue, Kazuhiko: See—  
Suga, Toru; and Inoue, Kazuhiko, 4,947,236, Cl. 357-68.000.

Inoue, Sukejiro, to Canon Kabushiki Kaisha. Electrophotographic one component magnetic toner comprising hydrophobic silica and iron oxide. 4,946,755, Cl. 430-106.600.

Insinoritoimisto Joel Majurinen Ky: See—  
Majurinen, Joel, 4,945,695, Cl. 52-252.000.

Institut Francais du Petrole: See—  
Lessi, Jacques; and Morin, Pierre, 4,945,761, Cl. 73-151.000.

Tholance, Michel; Lessi, Jacques; and Michel, Jean-Paul, 4,945,995, Cl. 166-375.000.

Wittrisch, Christian, 4,945,987, Cl. 166-250.000.

Interairs Aktiebolag: See—  
Ekstrand, John A. I., 4,945,646, Cl. 33-245.000.

Interatom GmbH: See—  
Swars, Helmut, 4,946,822, Cl. 502-439.000.

International Business Machines Corporation: See—  
Bozman, Gerald P., 4,947,319, Cl. 364-200.000.

Crus, Richard A.; Engles, Robert W.; Haderle, Donald J.; and Herron, Howard W., 4,947,320, Cl. 364-200.000.

Fisk, Dale E.; Periera, Lawrence W.; and Radin, George, 4,947,316, Cl. 364-200.000.

Gabriel, Charles F.; Kisacky, Randy J.; Mako, John; and Stone, Lawrence A., 4,945,828, Cl. 101-93.140.

Habich, Adolph B.; Hermann, Karl; Hunt, Ronald E.; and Whitehead, Verlon E., 4,946,708, Cl. 427-96.000.

Hayashi, Yasumasa; Oka, Katsumasa; and Satoh, Hiroshi, 4,947,344, Cl. 364-518.000.

Marinace, John C., 4,945,857, Cl. 118-719.000.

Matino, Haruhiko; Ueki, Toshihiro; Oana, Yasuhisa; and Kajimura, Motoji, 4,946,259, Cl. 350-339.00F.

Thoma, Nandor G.; Moore, Victor S.; and Kraft, Wayne R., 4,947,369, Cl. 364-900.000.

Vassiliadis, Stamatis; Putrino, Michael; Huffman, Ann E.; Feal, Brice J.; and Pechanek, Gerald G., 4,947,359, Cl. 364-715.090.

Wickramasinghe, Hemantha K.; and Williams, Clayton C., 4,947,034, Cl. 250-216.000.

International Flavors & Fragrances Inc.: See—  
Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 4,946,782, Cl. 435-126.000.

International Institute of Cellular & Molecular Pathology: See—  
Collet-Cassart, Daniel; Magnusson, Carl-Gustav M.; and Masson, Pierre L., 4,946,796, Cl. 436-512.000.

Inui, Tetsuya; Hirokane, Junji; Shibata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, to Sharp Kabushiki Kaisha. Method of and photo-mask for manufacturing optical memory element. 4,946,730, Cl. 428-64.000.

Iny, Oliver: See—  
Pollack, William; and Iny, Oliver, 4,946,673, Cl. 424-80.000.

Ioka, Tadashi; Sakane, Katsumi; Suzuki, Toshifumi; Amatsu, Kazunari; and Shimada, Kaoru, to Mazda Motor Corporation. Steering assem-

bly supporting construction of a motor vehicle. 4,946,195, Cl. 280-777.000.

Ion Track Instruments, Inc.: See—  
Jenkins, Anthony, 4,947,352, Cl. 364-558.000.

Iovine, Carmine P.: See—  
Leighton, John C.; and Iovine, Carmine P., 4,946,627, Cl. 252-542.000.

Iowa State University Research Foundation: See—  
Buck, Otto; Bracci, David J.; Jiles, David C.; Brasche, Lisa J. H.; Shield, Jeffrey E.; and Chumbley, Leonard S., 4,947,117, Cl. 324-227.000.

Ipenburg, Willem, to Chemische Industrie Filoform B.V. Device for fitting a connecting nipple on a pouch. 4,946,040, Cl. 206-603.000.

Ipri, Alfred C.: See—  
Stewart, Roger G.; Ipri, Alfred C.; and Napoli, Louis S., 4,947,221, Cl. 357-23.500.

Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., to Chevron Research Company. Polymer containing pendant tertiary alkyl amine groups useful in enhanced oil recovery using CO<sub>2</sub> flooding. 4,945,989, Cl. 166-268.000.

Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., to Chevron Research Company. Polymer containing pendant vinyl ether groups useful in enhanced oil recovery using CO<sub>2</sub> flooding. 4,945,990, Cl. 166-268.000.

Ireland, Ralph. Re-rod cutter and bender. 4,945,751, Cl. 72-384.000.

Irie, Namio: See—  
Mori, Kazunori; and Irie, Namio, 4,947,326, Cl. 364-424.050.

Isaacs, Peter: See—  
Worship, Leslie A.; Isaacs, Peter; Bain, Steven; and Bain, Kenneth J. D., 4,945,748, Cl. 72-323.000.

Iscor Limited: See—  
Mostert, Roelof J.; and Badenhorst, Rudolf P., 4,946,515, Cl. 148-12.00F.

Isert, Hugo. Ball screw mechanism. 4,945,781, Cl. 74-424.80A.

Ishida, Masaaki: See—  
Nakamori, Shigeru; Takagi, Hiroshi; Ishida, Masaaki; Sato, Takaaki; Miwa, Kiyoshi; and Sano, Konosuke, 4,946,781, Cl. 435-115.000.

Ishida, Syuichi; Goto, Shinichi; and Muramatsu, Kimio, to Toyoda Gosei Co., Ltd. Steering wheel. 4,945,786, Cl. 74-552.000.

Ishige, Yoshiki; Sato, Shoji; Masuda, Hisashi; Ushiki, Yoji; Kumagai, Kiyoshi; Saida, Junichi; and Minoya, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for laminating thermoplastic sheets. 4,946,551, Cl. 156-222.000.

Ishiguro, Kuniaki: See—  
Ishikawa, Takuma; Ishiguro, Kuniaki; Matsui, Toshio; and Ozawa, Kazuhito, 4,946,152, Cl. 270-53.000.

Ishiguro, Tadashi: See—  
Honda, Kunihiro; Ishiguro, Tadashi; and Fujiyama, Masaaki, 4,946,534, Cl. 156-261.000.

Ishihara, Hideaki: See—  
Ichiryu, Takaharu; Ono, Yoshiki; and Ishihara, Hideaki, 4,946,746, Cl. 428-606.000.

Ishihara, Hiroyuki; and Kinoshita, Makoto, to NEC Corporation. Gas laser tube having a supported cathode. 4,947,403, Cl. 372-87.000.

Ishihara, Tadayuki: See—  
Sugiyama, Yoshihiko; Kurahashi, Muneshige; Yokoyama, Sakari; and Ishihara, Tadayuki, 4,945,899, Cl. 128-28.000.

Ishii, Hideaki: See—  
Hayashida, Yoshihiro; Nakamura, Yoshihiro; Ishii, Hideaki; and Koshimizu, Naganori, 4,945,729, Cl. 60-562.000.

Ishii, Mitsuo; Nagai, Seiichi; Hasegawa, Kazuyoshi; and Tanaka, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Submount for semiconductor laser element. 4,947,238, Cl. 357-71.000.

Ishikawa, Ichiro; and Kamei, Hiroyoshi, to Sente Creations Co., Ltd. Running toy shooting apparatus. 4,946,417, Cl. 446-430.000.

Ishikawa, Katsukiyo: See—  
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,946,757, Cl. 430-192.000.

Ishikawa, Takuma; Ishiguro, Kuniaki; Matsui, Toshio; and Ozawa, Kazuhito, to Minolta Camera Kabushiki Kaisha. Sorter-finisher. 4,946,152, Cl. 270-53.000.

Ishikawa, Toshio; and Kurata, Yukio, to Sharp Kabushiki Kaisha. Portable image input device. 4,947,261, Cl. 358-473.000.

Ishikawa, Yuichi, to Nippon Seiko Kabushiki Kaisha. Photosetting ferrofluid compositions. 4,946,613, Cl. 252-62.520.

Ishiyama, Kiyoshige: See—  
Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; and Ogita, Hiromitsu, 4,947,185, Cl. 346-76.0PH.

Isobe, Noriyuki: See—  
Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.

Isover Saint-Gobain: See—  
Roth, Klaus; and Gerhady, Lothar, 4,945,648, Cl. 33-529.000.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial engine starter. 4,945,777, Cl. 74-7.00E.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial engine starter. 4,947,052, Cl. 290-48.000.

Izusu Motors Limited: See—  
Kawamura, Hideo, 4,946,097, Cl. 237-2.00A.

Okada, Masaki, 4,946,014, Cl. 192-4.00B.

Ito, Akinori: See—  
Muranoi, Tsuyoshi; and Ito, Akinori, 4,947,011, Cl. 200-314.000.

Ito, Hiroshi: See—  
Saito, Kazuo; Hongo, Ichiro; Mitani, Akio; and Ito, Hiroshi, 4,946,381, Cl. 431-1.000.

Ito, Hiroyuki, to Daikin Industries, Ltd. Electronic attenuator. 4,947,434, Cl. 381-71.000.

Ito, Masaaki: See—  
Watanabe, Yutaka; Ito, Masaaki; and Kusano, Hideaki, 4,947,266, Cl. 358-408.000.

Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Copying apparatus. 4,947,206, Cl. 355-55.000.

Ito, Naruto: See—  
Nishitani, Tutomu; Suzuki, Takio; Kono, Yasuaki; Osako, Tadamasu; Kitamura, Sunao; Sakakibara, Youzou; and Ito, Naruto, 4,945,874, Cl. 123-400.000.

Ito, Syoko, to Kabushiki Kaisha Toshiba. Gas turbine vane. 4,946,346, Cl. 415-115.000.

Ito, Toshio: See—  
Tanahashi, Toshio; Kanamaru, Masanobu; Yasuda, Yushiro; Masubuchi, Masahiko; Ito, Toshio; and Itoh, Kazuhiro, 4,945,867, Cl. 123-65.0VD.

Itoh, Kazuhiro: See—  
Tanahashi, Toshio; Kanamaru, Masanobu; Yasuda, Yushiro; Masubuchi, Masahiko; Ito, Toshio; and Itoh, Kazuhiro, 4,945,867, Cl. 123-65.0VD.

Itoh, Ken-ichi: See—  
Koshino, Nagaaki; Maeda, Miyozo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueishi, Kozo, 4,947,372, Cl. 365-106.000.

Itoh, Noriyasu: See—  
Wada, Toyoy; Daimaru, Takashi; and Itoh, Noriyasu, 4,945,684, Cl. 51-165.770.

Itoyama, Seiji: See—  
Sorimachi, Kenichi; Tozawa, Hirokazu; Fujii, Tetsuya; Itoyama, Seiji; and Miki, Yuji, 4,945,975, Cl. 164-478.000.

Ivanchenko, Andrei F.: See—  
Budyko, Viktor A.; Konovalev, Vladimir V.; Ivanchenko, Andrei F.; Kutsov, Valentin D.; Lastochkin, Boris N.; Krokmal, Vladimir M.; and Zhdan, Nikolai N., 4,945,910, Cl. 128-421.000.

Ivarsson, Sune I.; Smederod, Sten A.; and Larsson, Karl-Erik. Ladder cords for venetian blinds. 4,945,971, Cl. 160-178.300.

Ivy Laboratories, Inc.: See—  
Grimm, C. Louis; and Sollins, Irving V., 4,946,035, Cl. 206-366.000.

Iwagami, Fusao, to Sharp Corporation. Ink jet printer nozzle clogging-preventive device. 4,947,187, Cl. 346-1.100.

Iwaki, Tsutomu: See—  
Gamo, Takaharu; Moriawaki, Yoshio; and Iwaki, Tsutomu, 4,946,646, Cl. 420-415.000.

Iwama, Satoshi: See—  
Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.

Iwata, Yasunari; Nishikawa, Seiichi; and Ichikawa, Yuji, to Toyota Jidosha Kabushiki Kaisha. Diagnostic system for rotational speed sensors in drive train of four wheels drive vehicle having central differential device. 4,947,325, Cl. 364-424.030.

Izu, Noboru: See—  
Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.

Izumi, Eiki; Hirata, Toichi; Nozawa, Yusaku; and Shimotori, Masahiko, to Hitachi Construction Machinery Co., Ltd. Flow control valves for hydraulic motor system. 4,945,723, Cl. 60-426.000.

Izumi, Tomoji: See—  
Munenaga, Yukio; and Izumi, Tomoji, 4,947,349, Cl. 364-551.010.

Izumo, Masanori, to Daikin Industries, Ltd. Apparatus for solvent recovery. 4,946,479, Cl. 55-181.000.

Izutsu, Hitoshi: See—  
Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihiko; Izutsu, Hitoshi; and Chiba, Manabu, 4,946,912, Cl. 525-537.000.

Izydore, Robert A.; and Hall, Iris H., to University of North Carolina at Chapel Hill. The compounds for the control of hyperlipidemia using N-substituted isoxazolidine-3,5-diones. 4,946,963, Cl. 548-243.000.

J. D. Phillips Corporation: See—  
Phillips, James D., 4,945,683, Cl. 51-145.00R.

J. M. Voith GmbH: See—  
Lindenthal, Hans; and Bretzger, Reinhard, 4,946,422, Cl. 464-135.000.

Jabloner, Harold: See—  
Chu, Sung G.; Jabloner, Harold; and Nguyen, Tuyen T., 4,946,908, Cl. 525-426.000.

Jablonski, Thaddeus M.: See—  
Brill, Frank D.; Miller, Benjamin D.; Jablonski, Thaddeus M.; Marsh, Douglas F.; and Marsh, Richard E., 4,946,073, Cl. 222-129.400.

Jackel, Johann, to Luk Lamellen und Kupplungsbau GmbH. Apparatus for damping torsional vibrations. 4,946,420, Cl. 464-7.000.

Jackman, Dennis E.; Combs, Gary W.; and Westphal Dietmar B., to Mobay Corporation. Process for the production of thiocarbonylhydrazide. 4,946,995, Cl. 564-18.000.

Jackson, Richard A.; and Bannister, Richard S., to Grass Valley Group, Inc., The. Video luminance self keyer. 4,947,255, Cl. 358-183.000.

Jackson, Roy J.; and Pigneri, Anthony M., to Shell Oil Company. Curable resin from cyanate aromatic ester and propargyl aromatic ether. 4,946,928, Cl. 528-205.000.

Jacob-Grinschgl, Wolfgang; and Muller, Udo, to Kontron Elektronik GmbH. Cursor for an inductive sensor for use with a digitizer board. 4,947,460, Cl. 178-19.000.

Jacobs, Werner: See—  
Ott, Willibald; Hoffmann, Gunter; and Jacobs, Werner, 4,945,697, Cl. 52-396.000.

Jacobson, Lawrence R., to Dow Corning Corporation. Applicator nozzle for sealant cartridges and the like. 4,946,081, Cl. 222-568.000.

Jacobson, Michael: See—  
Falk, Robert A.; Clark, Kirland P.; Karydas, Athanasios; and Jacobson, Michael, 4,946,992, Cl. 560-227.000.

Jahnke, Frank M.; and Richenberg, Carl B., to Eastman Kodak Company. Process for drying solid photographic addenda. 4,946,965, Cl. 548-365.000.

Jakimowicz, Christopher C.; and Ramey, James H., to National Steel Corporation. Containment fence for runout table. 4,945,746, Cl. 72-251.000.

Jakob, Herbert E., to Astec Industries, Inc. Asphalt pavement recycling apparatus. 4,946,307, Cl. 404-91.000.

James, Robert L.; and Malka, Jacob H., to Allied-Signal Inc. Apparatus for generating synchro/resolver stimulus signals. 4,947,167, Cl. 341-117.000.

Jami, Jacques: See—  
Baulier, Dominique; Defilippis, Christian; Jami, Jacques; Negre, Bernard; Pierdet, Alain; Negre, Bernard, and Pierdet, Alain, 4,946,089, Cl. 228-45.000.

Janome Sewing Machine Co. Ltd.: See—  
Nomoto, Reishi; and Takenoya, Hideaki, 4,945,842, Cl. 112-103.000.

Janssen Pharmaceutica N.V.: See—  
Janssens, Frans E.; Sommen, Francois M.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,946,843, Cl. 514-253.000.

Janssens, Abraham, to U.S. Philips Corp. Detection circuit for a light-sensitive element which is substantially insusceptible to ambient light level. 4,947,032, Cl. 250-214.00B.

Janssens, Frans E.; Sommen, Francois M.; Torremans, Joseph L. G.; and Diels, Gaston S. M., to Janssen Pharmaceutica N.V. 2-(heterocyclalkyl)imidazopyridines. 4,946,843, Cl. 514-253.000.

Japan Capsular Products, Inc.: See—  
Hattori, Akira, 4,945,919, Cl. 128-736.000.

Japan Chemical Research Co., Ltd.: See—  
Hirata, Hajime; Nishimuro, Satoshi; Nakanishi, Koichiro; Ota, Masaichi; and Matsumoto, Hiroshi, 4,946,785, Cl. 435-188.000.

Japan Pet Drugs Co., Ltd.: See—  
Yamabe, Akira; and Yoshida, Ryuichi, 4,946,690, Cl. 424-665.000.

Japan Tobacco Inc.: See—  
Koseki, Koshi; and Mori, Kenji, 4,946,999, Cl. 562-452.000.

Jaquez, Martin J.: See—  
Fernandez, Antonio; Gaggioni, Hugo P.; Jaquez, Martin J.; Robbins, John D.; and Soper, E. Scott, 4,947,257, Cl. 358-183.000.

Jardin, Hans, to Webasto AG Fahrzeugtechnik. Vehicle roof. 4,946,225, Cl. 296-213.000.

Jason, Inc.: See—  
Scheider, Alfred F.; and Warner, R. Brown, 4,945,687, Cl. 51-394.000.

Jebens, Claus: See—  
Loock, Rudolf; and Jebens, Claus, 4,946,312, Cl. 405-129.000.

Jendralla, Heiner; Beck, Gerhard; Wess, Gunther; and Kerekjarto, Bela, to Hoechst Aktiengesellschaft, 4(R)-substituted 6(S)-phenoxymethyl-, 6(S)- $\beta$ -phenylethyl-, and 6(S)- $\beta$ -styryl-tetrahydropyran-2-ones, a highly stereoselective process for their preparation, pharmaceutical products based on these compounds, and their use. 4,946,852, Cl. 514-336.000.

Jendralla, Heiner: See—  
Baader, Ekkehard; Jendralla, Heiner; Kerekjarto, Bela; and Beck, Gerhard, 4,946,841, Cl. 514-247.000.

Jenkins, Anthony, to Ion Track Instruments, Inc. Temperature compensation in differential pressure leak detection. 4,947,352, Cl. 364-558.000.

Jenkins, John P., to Sovex Marshall Limited. Boom conveyor. 4,946,027, Cl. 198-592.000.

Jenkins, Waylon L., to Eastman Kodak Company. Water-dispersible polyester blends. 4,946,932, Cl. 528-272.000.

Jennusa, Paul M.: See—  
Henry, Harold J.; and Jennusa, Paul M., 4,945,666, Cl. 42-1.060.

Jensen, Harold A., to Katana Corporation. Apparatus for the manufacture of block-sealed side-gusseted bags. 4,946,431, Cl. 493-195.000.

Jensen, Jary D.; and Bilgrien, Carl J., to Dow Corning Corporation. Rapidly curable extrudable organosiloxane compositions. 4,946,878, Cl. 523-213.000.

Jepmar Research: See—  
Rampe, John F., 4,946,427, Cl. 474-161.000.

Jernigan, Robert T.: See—  
Murphy, Frank H.; Jernigan, Robert T.; Grierson, Jeff G.; and Wessels, Wayne G., 4,946,939, Cl. 528-421.000.

Jertberg, Jeffrey R.; Jertberg, Robert M.; and vanDinteren, Martin, to Vanberg Enterprises. Adjustable screed support. 4,945,698, Cl. 52-365.000.

Jertberg, Robert M.: See—  
Jertberg, Jeffrey R.; Jertberg, Robert M.; and vanDinteren, Martin, 4,945,698, Cl. 52-365.000.

Jewell, Tatiana E.; and White, Donald L., to AT&T Bell Laboratories. Resolution doubling lithography technique. 4,947,413, Cl. 378-34.000.

JGC Corporation: See—  
Furuta, Akio; Sato, Kunio; Sato, Kazuo; and Matsuzawa, Tooru, 4,946,596, Cl. 210-679.000.

Murata, Takeo, 4,947,077, Cl. 310-328.000.

Jha, Amol K.: See—  
Rohatgi, Pradeep K.; Dan, Tapan K.; Arya, S. C.; Prasad, S. V.; Das, S.; Gupta, A. K.; Prasad, B. K.; and Jha, Amol K., 4,946,647, Cl. 420-528.000.

Jidosha Kiki Co., Ltd.: See—  
Taniguchi, Yoshiaki; Watanabe, Masaki; and Iizawa, Ryuji, 4,946,001, Cl. 180-79.100.

Jiles, David C.: See—  
Buck, Otto; Bracci, David J.; Jiles, David C.; Brasche, Lisa J. H.; Shield, Jeffrey E.; and Chumbley, Leonard S., 4,947,117, Cl. 324-227.000.

Jimenez, Antonio; and Deschenaux, Pierre-Alain, to Mefina SA. Sewing machine. 4,945,844, Cl. 112-444.000.

Jimbo, Toshikatsu, to NEC Corporation. MOSFET for producing a constant voltage. 4,947,056, Cl. 307-296.800.

Jinbo, Toshikatsu; and Kobatake, Hiroyuki, to NEC Corporation. Memory element exchange control circuit capable of automatically refreshing a defective address. 4,947,378, Cl. 365-222.000.

Jobsky, Robert: See—  
Duncan, Kenneth W.; Hardie, George S.; Jobsky, Robert; Maybell, Michael J.; and Wada, Steven T., 4,947,181, Cl. 343-773.000.

Johansen, Odvan: See—  
Berg, Sven-Olof; Broden, Ingemar; and Johansen, Odvan, 4,946,339, Cl. 414-786.000.

John Fluke Mfg. Co., Inc.: See—  
Koeman, Henricus, 4,947,355, Cl. 364-571.010.

Johnson, Gary L.: See—  
Aakre, Stewart C.; Fulcher, William A.; and Johnson, Gary L., 4,946,163, Cl. 273-1.50R.

Johnson, Gerald: See—  
Rivera, James A.; and Johnson, Gerald, 4,946,020, Cl. 198-335.000.

Johnson, Glenn M.; and Gallardo, Derek R. Cargo vehicle perimeter clearance lighting system. 4,947,293, Cl. 362-32.000.

Johnson, James L., Jr. High-speed sailing craft. 4,945,845, Cl. 114-39.100.

Johnson & Johnson Consumer Products, Inc.: See—  
Weissenburger, Edward A., 4,946,389, Cl. 433-142.000.

Johnson & Johnson Medical, Inc.: See—  
Albert, Stephen B.; and Thomas, W. Benjamin, 4,946,070, Cl. 222-52.000.

Albert, Stephen B.; and Thomas, W. Benjamin, 4,946,072, Cl. 222-105.000.

Johnson, Leland: See—  
Busca, Giovanni; and Johnson, Leland, 4,947,137, Cl. 331-94.100.

Johnson, Mark L. Discharge control apparatus for cotton cart basket. 4,946,331, Cl. 414-421.000.

Johnson, Robert E., to Hoechst Celanese Corp. Boron ceramics from carborelated diacetylene polymers. 4,946,919, Cl. 526-285.000.

Johnson, Robert H., Jr. Collapsible gridwork for forming structures by confining fluent materials. 4,945,689, Cl. 52-668.000.

Johnson, Thomas H., to Shell Oil Company. Fuel composition. 4,946,473, Cl. 44-71.000.

Johnson, Thomas H., to Shell Oil Company. Fuel composition. 4,946,982, Cl. 560-158.000.

Johnson, Wade M.; and Barlow, Edward A., to Schneider (U.S.A.) Inc., A Pfizer Co. Hemostasis valve. 4,946,133, Cl. 251-149.100.

Johnson, Wayne: See—  
Wood, Charles H.; and Johnson, Wayne, 4,947,080, Cl. 315-248.000.

Johnson, William L.: See—  
Fearnot, Neal E.; Hegggs, Kevin S.; Johnson, William L.; and Stevens, Donald A., 4,945,909, Cl. 128-419.0PG.

Johnson, William M., to Advanced Micro Devices, Inc. Input/output controller incorporating address mapped input/output windows and read ahead/write behind capabilities. 4,947,366, Cl. 364-900.000.

Jolidon, Synese; Locher, Rita; Kompis, Ivan; Weiss, Ekkehard; and Wyss, Pierre-Charles, to Hoffmann-La Roche Inc. Quinoline derivatives. 4,946,847, Cl. 514-229.500.

Jomha, Mohamed A.; Lazowski, Andrew, deceased; by Empson, Greg C., administrator; and by Vieira, Jose, administrator. Toilet flush control device. 4,945,578, Cl. 4-391.000.

Jones, Gordon H.: See—  
Eppstein, Deborah A.; Felgner, Philip L.; Gadek, Thomas R.; Jones, Gordon H.; and Roman, Richard B., 4,946,787, Cl. 435-240.200.

Jones, Jerry W.: See—  
Loomans, Bernard A.; Kowalczyk, James E.; and Jones, Jerry W., 4,945,807, Cl. 86-1.100.

Jones, Lloyd G., to Mobile Oil Corporation. Method for gravel packing wells. 4,945,991, Cl. 166-278.000.

Jones, Mitchell. Martial arts training device with reactive arms. 4,946,159, Cl. 272-76.000.

Jones, Stephen R.: See—  
Doerfler, Ronald W.; Power, Terrill G.; Jones, Stephen R.; and Owens, William R., 4,947,107, Cl. 324-96.000.

Jones, Stewart B., to U.S. Philips Corp. Microwave oscillator devices. 4,947,138, Cl. 331-96.000.

Jones, Walter W., Jr.: See—  
Gaston, Howard N.; and Jones, Walter W., Jr., 4,947,112, Cl. 324-158.00F.

Jonsson, Ragnar. Method and means for controlling a bridge circuit. 4,947,309, Cl. 363-17.000.

Jonsson, Sigurbjorn A. Snap lock for hook-snood on a line for long-line fishing to change automatically broken snoods. 4,945,671, Cl. 43-44.940.

Joshi, Shrikant M., to General Motors Corporation. Oil cooler. 4,945,981, Cl. 165-109.100.

Judd, Michael R., to National Energy Council. Circulating fluidised bed apparatus. 4,945,656, Cl. 34-57.00A.

Jung, Rolf, to Krauss u. Reichert GmbH & Co. Method and fabric laying machine for exact positioning of a leading edge of a fabric web. 4,946,150, Cl. 270-31.000.

Junghans Uhren GmbH: See—  
Ganter, Wolfgang; and Kopf, Arthur, 4,947,179, Cl. 343-718.000.

Jungk, Axel E., to Chemische Werke Brockhues AG. Process for dyeing concrete. 4,946,505, Cl. 106-712.000.

Jurik, Peter L. Vehicle stabilizing device. 4,946,218, Cl. 296-180.100.

Jutand, Francis; and Artieri, Alain, to Etat Francais represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications). Method and circuit for filtering signals representative of a picture. 4,947,446, Cl. 382-54.000.

K. C. Technical Services, Inc.: See—  
Cosmo, Guy, 4,945,707, Cl. 53-399.000.

Kabushiki Kaisha Morita Seisakusho: See—  
Ogawa, Ichirou; Yoshimura, Kouzou; Ueshima, Kenzo; and Nishimoto, Shinichi, 4,947,245, Cl. 358-98.000.

Kabushiki Kaisha Shinsangyokaihatu: See—  
Minezawa, Yukihiko, 4,947,123, Cl. 324-427.000.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: See—  
Matsui, Kenji; and Yagashita, Tatsuo, 4,946,197, Cl. 280-804.000.

Kabushiki Kaisha Topcon: See—  
Murai, Shunji; and Shirasawa, Akishige, 4,947,048, Cl. 250-558.000.

Kabushiki Kaisha Toshiba: See—  
Honda, Masami, 4,946,274, Cl. 353-122.000.

Imamura, Kaoru; and Takahashi, Wataru, 4,947,020, Cl. 219-121.650.

Ito, Syoko, 4,946,346, Cl. 415-115.000.

Kikuchi, Katsuya, 4,947,246, Cl. 358-98.000.

Kobayashi, Sumio, 4,947,282, Cl. 361-91.000.

Kondou, Yuu; and Ono, Tomio, 4,947,239, Cl. 357-74.000.

Maeno, Ryozo, 4,947,478, Cl. 364-200.000.

Makita, Sadao, 4,946,300, Cl. 400-682.000.

Masubuchi, Yoshio, 4,947,365, Cl. 364-900.000.

Saito, Kazuo; Hongo, Ichiro; Mitani, Akio; and Ito, Hiroshi, 4,946,381, Cl. 431-1.000.

Sato, Hitoshi, 4,947,347, Cl. 364-522.000.

Shin, Kimotsu; and Okumura, Yukiko, 4,947,396, Cl. 371-40.100.

Shirasaka, Toshio, 4,945,767, Cl. 73-610.000.

Suga, Toru; and Inoue, Kazuhiko, 4,947,236, Cl. 357-68.000.

Sumida, Satoshi, 4,947,314, Cl. 364-140.000.

Suzuki, Kaoru, 4,947,172, Cl. 341-145.000.

Tanaka, Yutaka; Morimoto, Toshiki; and Watanabe, Seiji, 4,947,229, Cl. 357-45.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: See—  
Nozaki, Masahiro; and Asai, Junji, 4,945,681, Cl. 49-495.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: See—  
Suzuki, Shinichi; Tanaka, Hiroshi; and Nakamoto, Akira, 4,946,350, Cl. 417-222.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: See—  
Kotaki, Masahiro; and Hashimoto, Masafumi, 4,946,548, Cl. 156-643.000.

Kabushiki Kaisha Yaskawa Denki Seisakusho: See—  
Tonai, Shuichi; and Matsushita, Shigeo, 4,946,337, Cl. 414-744.500.

Kadono, Yukio; Urano, Yoshiaki; and Watanabe, Fumio, to Nippon Shokubai Kagaku Kogyo Co., Ltd.; and Norton Company. Acid gas absorbent composition. 4,946,620, Cl. 252-190.000.

Kadowaki, Kiyoshi: See—  
Udaka, Shigeo; Takagi, Hiroaki; and Kadowaki, Kiyoshi, 4,946,789, Cl. 435-252.300.

Kageyama, Minoru; and Kobayashi, Mikio, to Rheon Automatic Machinery Co., Ltd. Method for producing bread from preserved dough. 4,946,699, Cl. 426-502.000.

Kaibuki, Shigeo; Watanabe, Shinpei; and Yamamoto, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Automatic assembly system for assembling parts to a car body. 4,945,622, Cl. 29-281.100.

Kaim, John W.; and Kaufhold, Horst T., to AMSTED Industries Incorporated. Gravity wedge for slackless railcar connections. 4,946,052, Cl. 213-75.00R.

Kaindl, Gerhard: See—  
Frieze, Hans-Herbert; Kaindl, Gerhard; and Schieferstein, Ludwig, 4,946,471, Cl. 8-94.230.

Kajihara, Kunihito, to Toyomasu, Michio. System for automatically feeding chemical liquids to cooling towers. 4,946,140, Cl. 261-18.100.

Kajima, Toshihiko: See—  
Tomita, Akira; Kajima, Toshihiko; Kawahara, Keizo; and Satomi, Hiroshi, 4,946,752, Cl. 430-18.000.

Kajimoto, Nobuyuki: See—  
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76.000.

Kajimura, Motoji: See—  
Matino, Haruhiro; Ueki, Toshihiro; Oana, Yasuhisa; and Kajimura, Motoji, 4,946,259, Cl. 350-339.00F.

Kajitani, Yoshimi; Ohta, Michiaki; and Miyatani, Takao, to Toyota Jidosha Kabushiki Kaisha. Honing apparatus having electrically operated actuator for relative reciprocating movement between honing head and workpiece. 4,945,685, Cl. 51-165.930.

Kakita, Takao: See—  
Yoshinaga, Junji; Shogaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; and Kato, Yoshiko, 4,946,855, Cl. 514-371.000.

Kaku, Koichi: See—  
Okuda, Masahisa; Nishimura, Atsushi; Kitagawa, Hiroaki, and Kaku, Koichi, 4,946,358, Cl. 425-183.000.

Kalisher, Murray H.; and Herning, Paul E. Method and apparatus for growing films on a substrate. 4,946,543, Cl. 156-612.000.

Kallioinen, Timo: See—  
Hakonen, Pekka; Lahti, Lassi; Suutari, Jari; Sirkia, Eero; Kallioinen, Timo; Nieminen, Heikki; Alaspaa, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, 4,945,633, Cl. 29-825.000.

Kalwar, Klaus; Berger, Horst; Berger, Otto; and Gumpert, Fritz, to Klaus Kalwar. Method of an arrangement for corona treatment. 4,946,568, Cl. 204-164.000.

Kameda, Yukihiko; and Horii, Satoshi, to Takeda Chemical Industries, Ltd. Pseudo-aminosugars, their production and use. 4,946,779, Cl. 435-84.000.

Kamei, Hiroyoshi: See—  
Ishikawa, Ichiro; and Kamei, Hiroyoshi, 4,946,417, Cl. 446-430.000.

Kamimura, Kenji; and Tsuzuki, Sadachika, to Honda Giken Kogyo Kabushiki Kaisha. Steering control system for moving vehicle. 4,947,324, Cl. 364-424.020.

Kamiya, Shin, to Sharp Kabushiki Kaisha. Word processor displaying instructions by monitoring user's key operations. 4,947,346, Cl. 364-521.000.

Kammerl, Anton: See—  
Knorpp, Eberhard, deceased; Rau, Peter; and Kammerl, Anton, 4,947,387, Cl. 370-60.000.

Kamo, Tomoichi: See—  
Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomoichi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.

Kamyr, Inc.: See—  
Prough, J. Robert, 4,946,556, Cl. 162-60.000.

Kan, Fumitaka: See—  
Arahara, Kohzoh; Fukui, Tetsuro; Fukumoto, Hiroshi; Takasu, Yoshio, Sato, Tadashi; and Kan, Fumitaka, 4,945,833, Cl. 101-450.100.

Kan, Jennifer: See—  
Ferreri, Paul; Maurer, Heinz; Kan, Jennifer; Allers, Harry; and Lackey, Michael, 4,946,042, Cl. 206-628.000.

Kanamaru, Masanobu: See—  
Tanahashi, Toshio; Kanamaru, Masanobu; Yasuda, Yushiro; Masubuchi, Masahiko; Ito, Toshio; and Itoh, Kazuhiro, 4,945,867, Cl. 123-65.0VD.

Kanamori, Hideo; and Hasimoto, Katumi, to Idemitsu Kosan Company Limited. Lubricating oil composition for sliding surface and for metallic working and method for lubrication of machine tools using said composition. 4,946,612, Cl. 252-49.500.

Kanda, Ryouji: See—  
Kato, Rentaro; Kanda, Ryouji; and Yosnida, Kiyohiko, 4,946,147, Cl. 267-140.100.

Kane, John M.; and Miller, Francis P., to Merrell Dow Pharmaceuticals Inc. 5-phenyl-3H-1,2,4-triazol-3-ones and their use as anticonvulsants. 4,946,856, Cl. 514-384.000.

Kane, Thomas J., to Lightwave Electronics Corporation. Two-mirror shaping of a non-circular optical pumping beam and lasers using same. 4,947,402, Cl. 372-70.000.

Kanebo, Ltd.: See—  
Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, 4,946,953, Cl. 536-57.000.

Kanebo Rayon, Ltd.: See—  
Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, 4,946,953, Cl. 536-57.000.

Kaneda, Aizo: See—  
Saeiki, Junichi; Kaneda, Aizo; Tsunoda, Shigeharu; Yoshida, Isamu; and Nishi, Kunihiko, 4,946,633, Cl. 264-40.100.

Kanehira, Koichi; Eziri, Katsushi; Shiono, Manzo; Fujita, Yoshiji; and Yamahara, Johji, to Kuraray Co., Ltd. Terpene amino alcohols and medicinal uses thereof. 4,946,857, Cl. 514-399.000.

Kaneko, Masato, to Idemitsu Kosan Co., Ltd. Refrigerator oil containing fluorinated siloxane compounds. 4,946,611, Cl. 252-49.600.

Kaneko, Toshimi; Yamamoto, Hidetoshi; and Sakai, Hiromichi, to Murata Manufacturing Co., Ltd. Multilayer capacitor device. 4,947,286, Cl. 361-321.000.

Kanemura, Yoshinobu: See—  
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76.000.

Kanno, Hiroshi, to Ricoh Company, Ltd. Method and apparatus for filling in an inner region of a pattern. 4,947,158, Cl. 340-747.000.

Kanzaki Paper Manufacturing Co., Ltd.: See—  
Nakamura, Mikio; and Takayama, Yukio, 4,946,823, Cl. 503-260.000.

Kapaan, Hendrikus J.: See—  
Olschewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.

Kaplan, Murray A.; Perrone, Robert K.; Bogardus, Joseph B.; and Douglas, Kenneth W., Sr., to Bristol-Myers Company. Concentrated, stabilized cis-diamminedinitratoplatinum solutions for conversion to cisplatin. 4,946,689, Cl. 424-640.000.

Kapoor, Ashok K., to Fairchild Camera & Instrument Corp. Base-coupled transistor logic. 4,947,230, Cl. 357-46.000.



Kappler, Patrick, to Atochem. Piezoelectric copolymers of vinylidene fluoride and trifluoroethylene. 4,946,913, Cl. 526-87.000.  
 Kappler, Patrick: See—  
 Blaise, Jean; and Kappler, Patrick, 4,946,900, Cl. 525-276.000.  
 Karayannis, Nicholas M.: See—  
 Cohen, Steven A.; Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; and Lee, Sam S., 4,946,816, Cl. 502-126.000.  
 Kardux, Kenneth A.; and Kristo-Nagy, Thomas, to Ohaus Corporation. High-resolution weigher/feeder for fine particulate materials. 4,945,957, Cl. 141-83.000.  
 Karin, Jacob: See—  
 Akselrod, Solange; Karin, Jacob; and Hirsch, Michael, 4,945,917, Cl. 128-696.000.  
 Karkossa, Horst: See—  
 Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, 4,946,653, Cl. 422-140.000.  
 Uhlemann, Hans; Braun, Burkhard; Heusmann, Heinz; Stopp, Gerhard; and Karkossa, Horst, 4,946,654, Cl. 422-140.000.  
 Karol, Mark J.: See—  
 Eng, Kai Y.; and Karol, Mark J., 4,947,389, Cl. 370-85.120.  
 Karydas, Athanasios: See—  
 Falk, Robert A.; Clark, Kirtland P.; Karydas, Athanasios; and Jacobson, Michael, 4,946,992, Cl. 560-227.000.  
 Kasahara, Toshikazu; and Funabashi, Hideo, to Idemitsu Petrochemical Co., Ltd. Propylene polymer composition. 4,946,898, Cl. 525-240.000.  
 Kasai, Hiroshi: See—  
 Taguchi, Tetsuya; Nakao, Yukihiko; and Kasai, Hiroshi, 4,946,700, Cl. 426-520.000.  
 Kasai, Kazumi, to Yoshida Kogyo K.K. Buckle assembly. 4,945,614, Cl. 24-573.100.  
 Kasberger, Peter: See—  
 Konig, Norbert; and Kasberger, Peter, 4,946,108, Cl. 241-78.000.  
 Kasenga, Anthony F.; and Dorfman, Bella M., to GTE Products Corporation. Method for producing an aluminum oxide coated manganese activated zinc silicate phosphor. 4,946,707, Cl. 427-64.000.  
 Kashiwaba, Satoshi: See—  
 Nakajima, Masahiro; and Kashiwaba, Satoshi, 4,947,394, Cl. 371-20.100.  
 Kassman, Bjorn T.: See—  
 Olsson, Torbjorn R.; Kassman, Bjorn T.; Olsson, Karl Gustaf; Ernolf, Stig C.; Nilsson, Per-Ove; Kjellsson, Rolf I. B.; and Widoff, Lars H., 4,947,288, Cl. 361-413.000.  
 Kasukawa, Akihito: See—  
 Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,947,452, Cl. 455-33.000.  
 Kaszas, Gabor: See—  
 Kennedy, Joseph P.; Puskas, Judit E.; Kaszas, Gabor; and Hager, William G., 4,946,899, Cl. 525-244.000.  
 Katana Corporation: See—  
 Jensen, Harold A., 4,946,431, Cl. 493-195.000.  
 Katayama, Yoshihiro: See—  
 Ono, Taizo; Katayama, Yoshihiro; and Saitoh, Toshi, 4,947,211, Cl. 355-265.000.  
 Kato, Akira: See—  
 Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.  
 Kato, Mitsukuni: See—  
 Suyama, Shuji; Kato, Mitsukuni; Takada, Jun; and Okada, Hiroshi, 4,947,004, Cl. 568-568.000.  
 Kato, Rentaro; Kanda, Ryouji; and Yoshida, Kiyohiko, to Tokai Rubber Industries, Ltd. Fluid-filled elastic mounting structure having orifices. 4,946,147, Cl. 267-140.100.  
 Kato, Yasuyoshi: See—  
 Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.  
 Kato, Yoshiko: See—  
 Yoshinaga, Junji; Shogaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; and Kato, Yoshiko, 4,946,855, Cl. 514-371.000.  
 Katritzky, Alan R.: See—  
 Heilmann, Steven J.; Krepski, Larry R.; Rasmussen, Jerald K.; Katritzky, Alan R.; and Tarrl, Richard D., 4,946,962, Cl. 548-187.000.  
 Katsuki, Kazuo: See—  
 Peppers, Norman A.; Young, James R.; and Katsuki, Kazuo, 4,947,449, Cl. 382-65.000.  
 Katsumura, Munehide: See—  
 Matsuda, Jun; Utsumi, Akihiro; Katsumura, Munehide; Yoneda, Masafumi; and Yano, Tetsuo, 4,947,463, Cl. 219-121.850.  
 Katsura, Koyo; Matsuo, Shigeru; Yoshida, Shigeaki; Takeda, Hiroshi; and Kaziwara, Hisashi, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Graphic processing system for displaying characters and pictures at high speed. 4,947,342, Cl. 364-518.000.  
 Katsuta, Yuji, to Sharp Kabushiki Kaisha. Image signal compressing device. 4,947,259, Cl. 358-426.000.  
 Kaufhold, Horst T.: See—  
 Kaim, John W.; and Kaufhold, Horst T., 4,946,052, Cl. 213-75.00R.  
 Kauschke, Hans-Dieter: See—  
 Schwarz, Dieter; and Kauschke, Hans-Dieter, 4,947,391, Cl. 370-110.100.  
 Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihiko; Izutsu, Hitoshi; and Chiba, Manabu, to Dainippon Ink and Chemicals, Inc. Block copolymer and compositions. 4,946,912, Cl. 525-537.000.

Kawabata, Katuichi; and Nakano, Kuniaki, to Konica Corporation. Method for preparation of radiographic image conversion panel and radiographic image conversion panel thereby. 4,947,046, Cl. 250-484.100.  
 Kawabata, Takao; and Kawai, Jyoji, to Mitsubishi Denki Kabushiki Kaisha. Parallel operating system for alternate current output converters. 4,947,310, Cl. 363-71.000.  
 Kawagoe, Kenji, to Nissan Motor Co., Ltd. Vehicle steering control system with derivative gain adjusting capability. 4,947,327, Cl. 364-424.050.  
 Kawagoshi, Hiroshi: See—  
 Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.  
 Kawaguchi, Hitoshi: See—  
 Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeiki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.  
 Kawahara, Keizo: See—  
 Tomita, Akira; Kajima, Toshihiko; Kawahara, Keizo; and Satomi, Hiroshi, 4,946,752, Cl. 430-18.000.  
 Kawai, Jyoji: See—  
 Kawabata, Takao; and Kawai, Jyoji, 4,947,310, Cl. 363-71.000.  
 Kawai, Mitsuru; Yoshida, Masaru; and Sasaki, Yoshihiro, to Hirose Electric Co., Ltd. Surface mounted electrical connector. 4,946,400, Cl. 439-79.000.  
 Kawai, Rie; Goto, Kanzen; and Morimoto, Kunio, to Hitachi, Ltd. Method of processing data in a banking terminal employing the total-first handling technique. 4,947,479, Cl. 364-408.000.  
 Kawakatsu, Akira, to Oki Electric Industry Co., Ltd. Semiconductor integrated circuit fabrication method. 4,946,798, Cl. 437-33.000.  
 Kawakita, Toshio: See—  
 Ohmae, Tadayuki; Mashita, Kentaro; Wakatsuki, Kizuku; and Kawakita, Toshio, 4,946,895, Cl. 525-75.000.  
 Kawamura, Hideaki; Sasaki, Takao; and Endou, Takashi, to Fanuc Ltd. Expert system of machine tool equipped with NC unit. 4,947,075, Cl. 318-569.000.  
 Kawamura, Hideo, to Isuzu Motors Limited. Control system for heating container for use on motor vehicle. 4,946,097, Cl. 237-2.00A.  
 Kawamura, Ichiro; and Imai, Yoshio, to Showa Shell Sekiyu Kabushiki Kaisha. Optically active compound. 4,946,989, Cl. 560-51.000.  
 Kawamura, Yoshimi: See—  
 Kondo, Eiji; Tsuji, Naoki; Matsumoto, Koichi; Kawamura, Yoshimi; Yoshida, Tadashi; and Matsura, 4,946,941, Cl. 530-317.000.  
 Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, to Honda Lock Mfg. Co., Ltd.; and Honda Giken Kogyo Kabushiki Kaisha. Vehicle steering lock device. 4,945,740, Cl. 70-248.000.  
 Kawasaki Jukogyo Kabushiki: See—  
 Manabe, Kyoichi; and Yamashiro, Hideo, 4,946,349, Cl. 417-68.000.  
 Kawasaki Jukogyo Kabushiki Kaisha: See—  
 Tamba, Shinichi; Miyake, Hitomi; and Tanaka, Hiromu, 4,946,482, Cl. 55-320.000.  
 Kawasaki, Kenji: See—  
 Ichimura, Yasuo; Matsushita, Hidetoshi; Kawasaki, Kenji; and Aoyama, Youichi, 4,947,146, Cl. 335-131.000.  
 Kawasaki Steel Corporation: See—  
 Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 4,946,519, Cl. 148-307.000.  
 Sakurada, Ichio; Okabe, Ritsuo; Omura, Takao; Kiyota, Yoshisato; and Takajo, Shigeaki, 4,946,499, Cl. 75-343.000.  
 Sorimachi, Kenichi; Tozawa, Hirokazu; Fujii, Tetsuya; Itoyama, Seiji; and Miki, Yuji, 4,945,975, Cl. 164-478.000.  
 Takahashi, Isao; and Sakaki, Toyokazu, 4,946,528, Cl. 156-187.000.  
 Kawashima, Etsuko: See—  
 Torihata, Takashi; and Kawashima, Etsuko, 4,946,582, Cl. 208-251.00R.  
 Kawashima, Masahiro, to Olympus Optical Co., Ltd. Endoscope having X-ray non-transmitting material. 4,945,894, Cl. 128-6.000.  
 Kawashima, Toshiharu, to Yazaki Corporation. Double-locking device for connector terminals and method of preparing the locking device. 4,946,399, Cl. 439-752.000.  
 Kazama, Yasuo; and Miyazaki, Osahiko, to Nitto Kohki Co., Ltd. Chamfering device. 4,946,323, Cl. 409-178.000.  
 Kaziwara, Hisashi: See—  
 Katsura, Koyo; Matsuo, Shigeru; Yoshida, Shigeaki; Takeda, Hiroshi; and Kaziwara, Hisashi, 4,947,342, Cl. 364-518.000.  
 Kearfott Guidance & Navigation Corp.: See—  
 Roszart, Terry V., 4,945,765, Cl. 73-517.0AV.  
 Keiper Recaro GmbH & Co.: See—  
 Putsch, Peter-Ulrich, 4,946,191, Cl. 280-730.000.  
 Keith, Roger H., to Minnesota Mining and Manufacturing Company. Package having supported gabletop containers for two part composition. 4,946,037, Cl. 206-431.000.  
 Keller, Cyril N. Ice fishing apparatus with heating chamber. 4,945,668, Cl. 43-17.000.  
 Keller, Karl-Heinz; Staab, Mathias; and Blum, Mathias, to Pfaff Industriemaschinen GmbH. Sewing machine workpiece alignment device. 4,945,843, Cl. 112-148.000.  
 Kelsall, Gerrard, to Wickes Manufacturing Company. Inflation valve with actuating lever interlock. 4,946,067, Cl. 222-5.000.  
 Kempa, John. Novelty statue. 4,946,745, Cl. 428-542.200.

Kendall Company, The: See—  
 Cianci, James P., 4,946,451, Cl. 604-323.000.  
 Dye, John F.; and Kolstedt, Mark, 4,945,905, Cl. 128-24.00R.  
 Huddleston, Elwyn G., 4,946,529, Cl. 156-187.000.  
 Kendall McGaw Laboratories, Inc.: See—  
 Richmond, Douglas S., 4,946,448, Cl. 604-247.000.  
 Kendrick, Glen T. Dividing, watering and lighting system for lawns. 4,945,675, Cl. 47-33.000.  
 Kennametal Inc.: See—  
 Lyon, James R.; Morsch, Gary L.; Murray, Gerald D.; and Robinson, James B., 4,946,319, Cl. 407-115.000.  
 Kennedy, Joseph P.; Puskas, Judit E.; Kaszas, Gabor; and Hager, William G., to University of Akron, The. Thermoplastic elastomers of isobutylene and process of preparation. 4,946,899, Cl. 525-244.000.  
 Kennedy, Michael J., to Qincor Corporation. Sensor bracket for magnetic tape cartridge drive. 4,947,050, Cl. 250-570.000.  
 Kennedy, Robert A.: See—  
 Davis, Charles; and Kennedy, Robert A., 4,946,478, Cl. 55-97.000.  
 Kennedy Van Saup Corporation: See—  
 Havrilla, John R., 4,946,044, Cl. 209-474.000.  
 Kenny, Richard J.: See—  
 Blank, Robert G.; Mody, Dhiraj S.; Kenny, Richard J.; and Aveson, Martha C., 4,946,684, Cl. 424-441.000.  
 Keoshkerian, Barkev: See—  
 Ong, Beng S.; Keoshkerian, Barkev; and Baranyi, Giuseppe, 4,946,754, Cl. 430-59.000.  
 Kerckjarto, Bela: See—  
 Baader, Ekkehard; Jendralla, Heiner; Kerckjarto, Bela; and Beck, Gerhard, 4,946,841, Cl. 514-247.000.  
 Jendralla, Heiner; Beck, Gerhard; Wess, Gunther; and Kerckjarto, Bela, 4,946,852, Cl. 514-336.000.  
 Kerley, James J., Jr., to United States of America, National Aeronautics and Space Administration. Robot cable-complaint devices. 4,946,421, Cl. 464-56.000.  
 Kerrison, Ronald L.: See—  
 Miller, Clifton L.; and Kerrison, Ronald L., 4,945,641, Cl. 30-382.000.  
 Kessler, Gerald. Dual durometer rub rail. 4,946,727, Cl. 428-99.000.  
 Ketchum, Christopher J.: See—  
 Bradshaw, Anthony J.; Morrissey, Raymond T.; Ketchum, Christopher J.; and Hawkins, John R., 4,946,459, Cl. 606-62.000.  
 Key, Sammy D.; and Quintanilla, Martin T., to Doreen Mason. Wheel alignment. 4,946,188, Cl. 280-661.000.  
 Keyes, Brian R.: See—  
 Halm, Roland L.; Chadwick, Kirk M.; and Keyes, Brian R., 4,946,980, Cl. 556-978.000.  
 Keyes, Gary S.: See—  
 McFaul, James A.; Keyes, Gary S.; and McDaniel, David L., 4,947,416, Cl. 378-146.000.  
 Khanna, Yash P.: See—  
 Bhattacharjee, Himangshu R.; and Khanna, Yash P., 4,946,909, Cl. 525-432.000.  
 Khelghatian, Habet M.: See—  
 Cohen, Steven A.; Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; and Lee, Sam S., 4,946,816, Cl. 502-126.000.  
 Kidd, Patrick D.; and Sterrett, Terry L., to Ormeo Corporation. Orthodontic O-ring dispenser and method of making. 4,946,386, Cl. 433-18.000.  
 Kidnie, Kevin M.: See—  
 Elmasry, Mohamed A.; Kidnie, Kevin M.; and Zwadlo, Gregory L., 4,946,753, Cl. 430-45.000.  
 Kiefer, Hansruedi, to Hoffmann-La Roche Inc. Process for isolating nucleic acids. 4,946,952, Cl. 536-27.000.  
 Kiener, Heinz: See—  
 Olschewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.  
 Kihira, Kazunobu: See—  
 Mori, Masaya; and Kihira, Kazunobu, 4,947,464, Cl. 219-10.790.  
 Kikuchi, Katsuya, to Kabushiki Kaisha Toshiba. Color endoscope apparatus including color lighting control. 4,947,246, Cl. 358-98.000.  
 Kikuchi, Yuji: See—  
 Kubo, Naoyuki; Senzaki, Kiyoshi; Kikuchi, Yuji; and Yashiro, Tsutomu, 4,946,826, Cl. 503-227.000.  
 Kikutsugi, Toshiharu: See—  
 Takiguchi, Eiji; and Kikutsugi, Toshiharu, 4,945,964, Cl. 152-209.00R.  
 Killmann, Irolt: See—  
 Kirchweber, Karl; and Killmann, Irolt, 4,945,873, Cl. 123-188.00M.  
 Kim, Bok-Kyu. Safety tube assembly for pneumatic tires. 4,945,965, Cl. 152-511.000.  
 Kim, Chang-Hyun, to Samsung Electronics Co. Ltd. Method of dividing an input-output line by decoding. 4,947,059, Cl. 307-449.000.  
 Kim, Chang-Hyun; and Choi, Won-Tae, to Samsung Electronic Co., Ltd. Semiconductor device having a time delay function. 4,947,064, Cl. 307-594.000.  
 Kim, In J., to Goldstar Co., Ltd. Leaf spring for supporting reels of a video tape cassette. 4,946,148, Cl. 267-158.000.  
 Kimball, Spencer D.: See—  
 Barrish, Joel C.; Kimball, Spencer D.; and Krapcho, John, 4,946,840, Cl. 514-211.000.  
 Kimberly-Clark Corporation: See—  
 Ales, Thomas M.; Samida, Jeffrey J.; Arthur, Donald F.; and Wideman, Ronald H., 4,946,539, Cl. 156-495.000.  
 Schmidt, Sheila A., 4,946,454, Cl. 604-385.100.

Kimura, Kunji: See—  
 Sakamoto, Shunji; and Kimura, Kunji, 4,946,230, Cl. 303-113.000.  
 Kimura, Masatoshi: See—  
 Okada, Keisuki; Takeuchi, Sumitaka; and Kimura, Masatoshi, 4,947,173, Cl. 341-160.000.  
 Kimura, Takesi: See—  
 Akiyama, Kazutoyo; Kimura, Takesi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.  
 Kimura, Tetsuo, to Nittan Company, Ltd. Terminal device for a monitoring and control system. 4,947,162, Cl. 340-825.080.  
 Kinashi, Hiroshi, to Sharp Kabushiki Kaisha. Developing device for copier. 4,947,473, Cl. 355-259.000.  
 Kindervater, Christof; and Weissinger, Helmut, to Stamicarbon B.V. Composite for the absorption of energy. 4,946,721, Cl. 428-36.100.  
 King, Francis D.; and Ramsay, Thomas W., to Beecham Group P.L.C. 1-methylindazole-3-carboxylic acid process. 4,946,966, Cl. 548-372.000.  
 King, Harold B., Jr.: See—  
 Reeves, James W.; King, Harold B., Jr.; and Childers, William M., 4,946,587, Cl. 209-539.000.  
 King, James F.; and Winborne, Brodie T., to Winborne Company, Ltd. Suction lifting device. 4,946,335, Cl. 414-736.000.  
 King, Philip N.: See—  
 Chism, Wayne R.; and King, Philip N., 4,947,113, Cl. 324-158.00R.  
 King, William A.: See—  
 May, William E.; King, William A.; and Green, Jerry M., 4,947,126, Cl. 324-509.000.  
 Kingman, Donald D.: See—  
 Dunmead, Stephen D.; Holt, Joseph B.; Kingman, Donald D.; and Munir, Zuhair A., 4,946,643, Cl. 419-12.000.  
 Kinloch, Anthony J.; and Shaw, Stephen J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the. Curable thermosetting prepolymerized imide resin compositions. 4,946,907, Cl. 525-422.000.  
 Kinnebrew, Earl G., II; and Fitzpatrick, Joseph D., to Master's International Corporation. Golf club grip cleaner. 4,946,510, Cl. 134-40.000.  
 Kinoshita, Katsuyuki: See—  
 Koishi, Musubu; Tsuchiya, Yutaka; Kinoshita, Katsuyuki; and Inagaki, Yoshinori, 4,947,031, Cl. 250-213.0VT.  
 Kinoshita, Keichi; Yamashita, Hiroki; Ozawa, Kazuhito; and Matsui, Toshio, to Minolta Camera Kabushiki Kaisha. Paper handling apparatus with a paper stapling function. 4,946,153, Cl. 270-53.000.  
 Kinoshita, Makoto: See—  
 Ishihara, Hiroyuki; and Kinoshita, Makoto, 4,947,403, Cl. 372-87.000.  
 Kinsora, Samuel. Film carriage assembly and method for moving and storing a film platter. 4,946,327, Cl. 414-331.000.  
 Kinugawa, Masumi: See—  
 Ono, Kenichi; Kinugawa, Masumi; Ninomiya, Masakazu; and Suzuki, Atsushi, 4,945,883, Cl. 123-494.000.  
 Kiraly, Louis J.: See—  
 Moscrip, William M.; and Kiraly, Louis J., 4,945,813, Cl. 89-33.100.  
 Kirby, Randall R. Bullet knife with shell sheath/handle. 4,945,639, Cl. 30-329.000.  
 Kirchweber, Karl; and Killmann, Irolt, to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr.Dr.h.c. Hans List. Internal combustion engine with two inlet valves per cylinder. 4,945,873, Cl. 123-188.00M.  
 Kirkland, William N.: See—  
 Benson, W. D.; Cahela, Hollis L.; Kirkland, William N.; and Pidgeon, Anthony D., 4,946,183, Cl. 280-434.000.  
 Kiskey, Randy J.: See—  
 Gabriel, Charles F.; Kiskey, Randy J.; Mako, John; and Stone, Lawrence A., 4,945,828, Cl. 101-93.140.  
 Kisakibaru, Toshiro; Gotoh, Tsuguo; and Ohuchi, Kazunori, to Yaskawa Electric Mfg. Co., Ltd. Method and apparatus for controlling reel tension. 4,947,088, Cl. 318-6.000.  
 Kishida, Yoshihiro: See—  
 Sasada, Shigeru; and Kishida, Yoshihiro, 4,946,234, Cl. 350-6.600.  
 Kiss, Akos; Kleinschmit, Peter; Volker, Werner; and Halbritter, Gunter, to Degussa Aktiengesellschaft. Blue luminescing glasses. 4,946,622, Cl. 252-301.40F.  
 Kitagawa, Hiroaki: See—  
 Okuda, Masahisa; Nishimura, Atsushi; Kitagawa, Hiroaki; and Kaku, Koichi, 4,946,358, Cl. 425-183.000.  
 Kitagawa, Hironoshin: See—  
 Hashimoto, Masamichi; Saegusa, Haruhisa; Chiba, Susumu; Kitagawa, Hironoshin; and Miyoshi, Teruzo, 4,946,780, Cl. 435-101.000.  
 Kitajima, Tomoya; and Suzuki, Akira, to Ricoh Company, Ltd. Distance measuring apparatus of a camera. 4,947,202, Cl. 354-403.000.  
 Kitamura, Sunao: See—  
 Nishitani, Tutomu; Suzuki, Takio; Kono, Yasuaki; Osako, Tadamasu; Kitamura, Sunao; Sakakibara, Youzou; and Ito, Naruto, 4,945,874, Cl. 123-400.000.  
 Kitamura, Takashi: See—  
 Imuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,946,877, Cl. 568-727.000.  
 Kitayoshi, Hitoshi, to Advantest Corporation. Impedance measuring apparatus. 4,947,130, Cl. 324-650.000.  
 Kiyama, Masatoshi: See—  
 Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, 4,946,615, Cl. 252-62.540.

Kiyota, Yoshisato: *See—*  
Sakuranda, Ichio; Okabe, Ritsuo; Omura, Takao; Kiyota, Yoshisato; and Takajo, Shigeaki, 4,946,499, Cl. 75-343.090.

Kjellsson, Rolf I. B.: *See—*  
Olsson, Torbjorn R.; Kassman, Bjorn T.; Olsson, Karl Gustaf; Ernoff, Stig C.; Nilsson, Per-Ove; Kjellsson, Rolf I. B.; and Widoff, Lars H., 4,947,288, Cl. 361-413.000.

Klapper, Siegfried: *See—*  
Zettler, Karl H.; Klapper, Siegfried; Fritze, Hartwig; and Meyer, Reinhard, 4,946,698, Cl. 426-495.000.

Klaus Kalwar: *See—*  
Kalwar, Klaus; Berger, Horst; Berger, Otto; and Gumpert, Fritz, 4,946,568, Cl. 204-164.000.

Kleemann, Axel: *See—*  
Engel, Jurgen; Kleemann, Axel; Nickel, Bernd; and Szelenyi, Istvan, 4,946,836, Cl. 514-183.000.

Kleiner, Hans-Jerg: *See—*  
Vaahs, Tilo; Kleiner, Hans-Jerg; Peuckert, Marcellus; and Bruck, Martin, 4,946,920, Cl. 528-33.000.

Kleinschmit, Peter: *See—*  
Kiss, Akos; Kleinschmit, Peter; Volker, Werner; and Halbritter, Gunter, 4,946,622, Cl. 252-301.40F.

Klockner-Becorit GmbH: *See—*  
Watermann, Willy; and Schulze-Heiming, Herman-Josef, 4,946,316, Cl. 405-302.000.

Klockner-Moeller Elektrizitats-GmbH: *See—*  
Ichimura, Yasuo; Matsushita, Hidetoshi; Kawasaki, Kenji; and Aoyama, Youichi, 4,947,146, Cl. 335-131.000.

Klomp, Edward D., to General Motors Corporation. Two cycle exhaust recycling, 4,945,868, Cl. 123-65.0PE.

Klomp, Edward D., to General Motors Corporation. Two cycle crankcase variable inlet timing, 4,945,869, Cl. 123-73.00V.

Klosek, Joseph: *See—*  
Perka, Alan T.; Hsiung, Thomas H.; Klosek, Joseph; and Moore, Robert B., 4,946,477, Cl. 48-197.00R.

Klueter, Ulrich: *See—*  
Benker, Gerhard; Nitsch, Wilhelm; Payrhammer, Bernd; Weinert, Volker; Treiber, Helmut; and Klueter, Ulrich, 4,947,205, Cl. 355-41.000.

Kluge, Reimund: *See—*  
Schmidt, Manfred; and Kluge, Reimund, 4,947,419, Cl. 378-187.000.

Klunder, Janice M.: *See—*  
Sharpless, Karl B.; Klunder, Janice M.; and Onami, Tetsuo H., 4,946,974, Cl. 549-551.000.

Knapp, Edward J., Jr.: *See—*  
Pimpis, Robert M.; Oakes, Richard T.; Ellery, Michael D.; and Knapp, Edward J., Jr., 4,947,149, Cl. 337-246.000.

Knapp, Klaus: *See—*  
Stahl, John I.; Michalak, David J.; and Knapp, Klaus, 4,947,420, Cl. 379-57.000.

Knapp, Todd K.; and Mikulecky, Harvey W., to Cooper Power Systems, Inc. Connection mechanism for connecting a cable connector to a bushing, 4,946,394, Cl. 439-157.000.

Knetzer, Marvin D. Tool guide, 4,945,799, Cl. 83-745.000.

Knochel, John R.; and Vest, Paul E., to Procter & Gamble Company. The Toilet bar composition containing cationic guar gum, 4,946,618, Cl. 252-117.000.

Knorpp, Eberhard, deceased (by Knorpp, Gustav, executor); Rau, Peter; and Kammerl, Anton, to Siemens Aktiengesellschaft. Switching node for switching data signals transmitted in data packets, 4,947,387, Cl. 370-60.000.

Knorpp, Gustav, executor: *See—*  
Knorpp, Eberhard, deceased; Rau, Peter; and Kammerl, Anton, 4,947,387, Cl. 370-60.000.

Knox, Joseph D.: *See—*  
Lawson, John A.; Butler, John C.; Sutura, Richard; Calhoun, Lawrence C.; Potts, Danny; Price, Larry E.; Wolfe, Robert G.; Knox, Joseph D.; and Loosberg, Paavo, 4,947,039, Cl. 250-236.000.

Knutson, Dale A., to Applied Power, Inc. Electromagnetic valve utilizing a permanent magnet, 4,946,009, Cl. 188-299.000.

Kobashi, Yasuji: *See—*  
Sato, Tadashi; and Kobashi, Yasuji, 4,946,801, Cl. 437-126.000.

Kobata, Fumihiko: *See—*  
Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihiko; Izutsu, Hitoshi; and Chiba, Manabu, 4,946,912, Cl. 525-537.000.

Kobatake, Hiroyuki: *See—*  
Jinbo, Toshikatsu; and Kobatake, Hiroyuki, 4,947,378, Cl. 365-222.000.

Kobayashi, Hisashi; and Silver, Louis S., to Union Carbide Corporation. Method for combustng fuel containing bound nitrogen, 4,946,382, Cl. 431-8.000.

Kobayashi, Michio; Kobayashi, Reichi; and Shiki, Tatsuya, to NEC Home Electronics Ltd. Ghost canceling apparatus, 4,947,252, Cl. 358-167.000.

Kobayashi, Mikio: *See—*  
Kageyama, Minoru; and Kobayashi, Mikio, 4,946,699, Cl. 426-502.000.

Kobayashi, Noboru, to Yamaha Hatsudoki Kabushiki Kaisha. Compact planning type boat, 4,945,852, Cl. 114-363.000.

Kobayashi, Reichi: *See—*  
Kobayashi, Michio; Kobayashi, Reichi; and Shiki, Tatsuya, 4,947,252, Cl. 358-167.000.

Kobayashi, Sumio, to Kabushiki Kaisha Toshiba. Thyristor valve with improved gate pulse generating scheme, 4,947,282, Cl. 361-91.000.

Kobayashi, Tsutomu: *See—*  
Ohsaka, Yohnosuke; Kobayashi, Tsutomu; and Kubo, Motonobu, 4,946,935, Cl. 528-353.000.

Kobayashi, Yoshinobu: *See—*  
Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,947,452, Cl. 455-33.000.

Kobler, Robert J.; Laudig, Ronald C.; and Smith, Tracy L., to AMP Incorporated. Coaxial connector in a housing block, 4,946,392, Cl. 439-63.000.

Koch, Horst: *See—*  
Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 4,946,758, Cl. 430-259.000.

Koch, Hubert Josef: *See—*  
Biedenbach, Marita, 4,945,959, Cl. 144-134.00R.

Koch, Reinhard: *See—*  
Simon, Heinrich; and Koch, Reinhard, 4,946,571, Cl. 204-206.000.

Koch, Roger J.: *See—*  
Cassidy, Daniel G.; and Koch, Roger J., 4,945,588, Cl. 5-451.000.

Kocher, Erich J., to Vilter Manufacturing Corporation. Means to reduce vibration in check valves and stop/check valves caused by pulsating low fluid flow, 4,945,941, Cl. 137-315.000.

Kocy, Octavian R.: *See—*  
Floyd, David; Kocy, Octavian R.; Monkhouse, Donald C.; and Pipkin, James D., 4,946,838, Cl. 514-210.000.

Kodachi, Noboru: *See—*  
Nobusue, Mitsuru; and Kodachi, Noboru, 4,945,635, Cl. 29-890.043.

Koeffler, Dieter; and Bertleff, Werner, to BASF Aktiengesellschaft. Preparation of 1,1,2-trialkoxymethanes, 4,947,005, Cl. 568-600.000.

Koeman, Henricus, to John Fluke Mfg. Co., Inc. Modular electronic instrument system having automated calibration capability, 4,947,355, Cl. 364-571.010.

Kohl, Albert; and Seilaz, Leon, to Henkel Kommanditgesellschaft auf Aktien. Adjustable frame automatic floor cleaning machine, 4,945,602, Cl. 15-320.000.

Kohler Company: *See—*  
Husting, Thomas J., 4,945,579, Cl. 4-203.000.

Kohmann GmbH & Co. KG Maschinenbau: *See—*  
Kohmann, Karl-Heinz, 4,946,430, Cl. 493-58.000.

Kohmann, Karl-Heinz, to Kohmann GmbH & Co. KG Maschinenbau. Apparatus and method for forming at least one fold line in a substantially rigid plastic material, 4,946,430, Cl. 493-58.000.

Koike, Mitsuhiro; and Suzuki, Toshiyuki, to Silver Seiko Ltd. Printing apparatus, 4,946,297, Cl. 400-82.000.

Koishi, Musubu; Tsuchiya, Yutaka; Kinoshita, Katsuyuki; and Inagaki, Yoshinori, to Hamamatsu Photonics Kabushiki Kaisha. Sampling streak tube with accelerating electrode plate having an opening, 4,947,031, Cl. 250-213.0VT.

Koizumi, Yutaka: *See—*  
Nozawa, Minoru; Koizumi, Yutaka; Mori, Toshihiro, and Saito, Atsushi, 4,947,191, Cl. 346-140.00R.

Kojima, Kazuo: *See—*  
Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*  
Suzuki, Masatoshi; Akiba, Shigeyuki; Tanaka, Hideaki; and Utaka, Katsuyuki, 4,946,243, Cl. 350-96.130.

Kokusan Kogyo Kabushiki Kaisha: *See—*  
Tone, Hideo, 4,945,795, Cl. 83-27.000.

Kolator Water Dynamics, Inc.: *See—*  
Cogger, John J., 4,945,943, Cl. 137-360.000.

Kollmorgen Corporation: *See—*  
Van Arsdell, Robert D., 4,947,348, Cl. 364-523.000.

Kolstedt, Mark: *See—*  
Dye, John F.; and Kolstedt, Mark, 4,945,905, Cl. 128-24.00R.

Komai, Makoto: *See—*  
Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.

Komatsu, Atsushi: *See—*  
Kunimatsu, Kaoru; and Komatsu, Atsushi, 4,946,883, Cl. 524-265.000.

Komatsu, Isamu: *See—*  
Kumasaka, Takao; Simazaki, Yuzuru; and Komatsu, Isamu, 4,947,200, Cl. 355-251.000.

Komatsu, Teruo; Ohsawa, Ichiro; Goto, Shinji; Adachi, Nobukazu; Goto, Takashi; and Asano, Junichi, to Canon Kabushiki Kaisha. Process cartridge and image forming apparatus using same, 4,947,208, Cl. 355-200.000.

Komatsubara, Michiro: *See—*  
Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 4,946,519, Cl. 148-307.000.

Komi, Takao: *See—*  
Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, 4,946,615, Cl. 252-62.540.

Komoda, Norihisa: *See—*  
Tenma, Tadashi; Akashi, Kichizo; Kusuzaki, Tetsuo; Igeta, Shouji; Tushima, Isao; and Komoda, Norihisa, 4,947,322, Cl. 304-401.000.

Kompelien, Arlon D.: *See—*  
Black, Robert A., Jr.; and Kompelien, Arlon D., 4,947,079, Cl. 315-205.000.

Kompis, Ivan: *See—*  
Jolidon, Synese; Locher, Rita; Kompis, Ivan; Weiss, Ekkehard; and Wyss, Pierre-Charles, 4,946,847, Cl. 514-229.500.

Komurasaki, Satoshi, to Mitsubishi Denki Kabushiki Kaisha. Acceleration detector with parallel ground paths, 4,945,755, Cl. 73-35.000.

Kondo, Eiji; Tsuji, Naoki; Matsumoto, Koichi; Kawamura, Yoshimi; Yoshida, Tadashi; and Matsuura, Shinzo, to Shionogi & Co., Ltd. Novel glycopeptide antibiotics, 4,946,941, Cl. 530-317.000.

Kondo, Masahiro: *See—*  
Miyake, Akio; Kondo, Masahiro; and Fujino, Masahiko, 4,946,837, Cl. 514-206.000.

Kondo, Michimasa: *See—*  
Inatsune, Shigeo; Ohashi, Yoshimasa; Fujisaka, Takahiko; and Kondo, Michimasa, 4,947,176, Cl. 342-173.000.

Kondo, Tetsujiro, to Sony Corporation. Apparatus in which subsampling and block coding are both employed for coding digital video data, 4,947,249, Cl. 358-135.000.

Kondou, Yuu; and Ono, Tomio, to Kabushiki Kaisha Toshiba. Swing-driven solid-state imaging device with elastic suspension mechanism for image sensor, 4,947,239, Cl. 357-74.000.

Kone Oy: *See—*  
Forsberg, Matti, 4,946,024, Cl. 198-429.000.

Kong, Hua-Shuang: *See—*  
Palmour, John W.; Kong, Hua-Shuang; and Edmond, John A., 4,946,547, Cl. 156-643.000.

Konica Corporation: *See—*  
Arai, Takeo; and Nagashima, Toshiharu, 4,946,769, Cl. 430-539.000.

Kawabata, Katuichi; and Nakano, Kuniaki, 4,947,046, Cl. 250-484.100.

Konig, Axel: *See—*  
Held, Wolfgang; Konig, Axel; and Puppe, Lothar, 4,946,659, Cl. 423-212.000.

Konig, Norbert; and Kasberger, Peter, to Lescha Maschinenfabrik GmbH & Co. KG Apparatus for producing compost, 4,946,108, Cl. 241-78.000.

Kono, Hiromi, to Diesel Kiki Co., Ltd. Solenoid drive circuit, 4,947,283, Cl. 361-154.000.

Kono, Yasuaki: *See—*  
Nishitani, Tutomu; Suzuki, Takio; Kono, Yasuaki; Osako, Tadamasu; Kitamura, Sunao; Sakakibara, Youzou; and Ito, Naruto, 4,945,874, Cl. 123-400.000.

Konovaleko, Vladimir V.: *See—*  
Budyko, Viktor A.; Konovaleko, Vladimir V.; Ivanchenko, Andrei F.; Kutsov, Valentin D.; Lastochkin, Boris N.; Krokhmal, Vladimir M.; and Zhdan, Nikolai N., 4,945,910, Cl. 128-421.000.

Kontron Elektronik GmbH: *See—*  
Jacob-Grinschgl, Wolfgang; and Muller, Udo, 4,947,460, Cl. 178-19.000.

Kooiker, John: *See—*  
Steffens, Charles J.; and Kooiker, John, 4,946,217, Cl. 296-100.000.

Kooiman, Peter. Flow control device, 4,946,130, Cl. 251-95.000.

Kopf, Arthur: *See—*  
Ganter, Wolfgang; and Kopf, Arthur, 4,947,179, Cl. 343-718.000.

Korber AG: *See—*  
Mushardt, Heinrich; Uhlig, Uwe; Lutjens, Peter; Beyer, Horst; and Matsyck, Frank, 4,945,888, Cl. 125-11.150.

Kordts, Jurgen; and Finck, Gerald K. G., to U.S. Philips Corporation. Voltage/frequency converter and its use in an optical wave guide transmission arrangement, 4,947,033, Cl. 250-214.00R.

Kormann, Michel: *See—*  
Charoy, Alain; Vermot-Gaud, Jacques; Prost, Jean-Louis; Kornmann, Michel; and Gold, Dieter, 4,947,132, Cl. 324-699.000.

Korson, Bruce W.: *See—*  
Korson, John A.; and Korson, Bruce W., 4,946,178, Cl. 279-1.00R.

Korson, John A.; and Korson, Bruce W. Chuck and method of chucking, 4,946,178, Cl. 279-1.00R.

Koseki, Koshi; and Mori, Kenji, to Japan Tobacco Inc. Novel intermediates for synthesis of trichostatic acid or trichostatin A, and processes for preparing trichostatic acid and trichostatin A, 4,946,999, Cl. 562-452.000.

Koshimizu, Naganori: *See—*  
Hayashida, Yoshihiro; Nakamura, Yoshihiro; Ishii, Hideaki; and Koshimizu, Naganori, 4,945,729, Cl. 60-562.000.

Koshino, Nagaaki; Maeda, Miyozo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueshiki, Kozo, to Fujitsu Limited. Optical information memory medium for recording and erasing information, 4,947,372, Cl. 365-106.000.

Kostelic, Richard F.: *See—*  
Coha, Timothy F.; Kostelic, Richard F.; and Rasmussen, Gregory K., 4,945,884, Cl. 123-509.000.

Kostuck, Raymond K., to Arizona Board of Regents For and On Behalf of the University of Arizona. Reconfigurable substrate-mode holographic interconnect apparatus and method, 4,946,253, Cl. 350-169.000.

Kotaki, Masahiro; and Hashimoto, Masafumi, to Toyota Gosei Co., Ltd.; Kabushiki Kaisha Toyota Chuo Kenkyusho; and Research Development Corporation of Japan. Dry etching method for semiconductor, 4,946,548, Cl. 156-643.000.

Kotani, Matahira: *See—*  
Nakajiri, Takashi; Hachinoda, Masayuki; Matsumoto, Masafumi; and Kotani, Matahira, 4,947,268, Cl. 358-426.000.

Koten, Jean-Marie: *See—*  
Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, 4,946,083, Cl. 222-602.000.

Kotobuki Sangyo Co., Ltd.: *See—*  
Tsunekawa, Yoshitoshi, 4,947,199, Cl. 354-322.000.

Kovach, Larry J., to W. L. Gore & Associates, Inc. Tissue repair device, 4,946,377, Cl. 623-13.000.

Kowalczyk, James E.: *See—*  
Loomans, Bernard A.; Kowalczyk, James E.; and Jones, Jerry W., 4,945,807, Cl. 86-1.100.

Koyama, Hiroshi: *See—*  
Nishioka, Tadashi; Yasue, Takao; and Koyama, Hiroshi, 4,947,042, Cl. 250-306.000.

Kozaki, Takahiko: *See—*  
Kuwahara, Hiroshi; Ogino, Mineo; Kozaki, Takahiko; Endo, Noboru; and Sakurai, Yoshito, 4,947,388, Cl. 370-60.000.

Kozikowskip, Alan P.; Wroblewski, Jarda T.; and Costa, Erminio, to Fidia-Georgetown Institute for the Neurosciences. Azetidine derivatives, compositions and methods of treating, 4,946,839, Cl. 514-210.000.

Kozuki, Susumu: *See—*  
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, 4,947,448, Cl. 382-56.000.

Kraatz, Gary W.: *See—*  
Carter, Charles G.; Lee, David L.; Michaely, William J.; and Kraatz, Gary W., 4,946,981, Cl. 558-415.000.

Kraetsch, Richard T.: *See—*  
Dautartas, Mindaugas F.; Degani, Yinon; Kraetsch, Richard T.; Pimpinella, Richard J.; and Tai, King L., 4,946,236, Cl. 350-96.200.

Kraft, Wayne R.: *See—*  
Thoma, Nandor G.; Moore, Victor S.; and Kraft, Wayne R., 4,947,369, Cl. 364-900.000.

Kraft, Winfried; Wuerfel, Volker; Siebel, Wolfram; and Maczrhacuser, Heinz, to Ernst Leitz Wetzlar GmbH. Universal object holder for microscopes, 4,946,266, Cl. 350-529.000.

Kragl, Heinz: *See—*  
Bernhardt, Gunther; Amori, Jurgen; Haas, Margret; Hanisch, Horst; and Kragl, Heinz, 4,946,977, Cl. 556-440.000.

Krajicek, Richard W.; and Cradeur, Robert R., to Serv-Tech, Inc. Liquid circulator useful for dispersing sediment contained in a storage tank, 4,945,933, Cl. 134-167.00R.

Kramer, Hans, to Gebr. Bode & Co. GmbH. Swinging and sliding door for a vehicle, especially a motor vehicle, 4,945,677, Cl. 49-210.000.

Kramer-Werke GmbH: *See—*  
Friedrich, Karl; and Maly, Dieter-Heinz, 4,946,334, Cl. 414-697.000.

Krapcho, John: *See—*  
Barrish, Joel C.; Kimball, Spencer D.; and Krapcho, John, 4,946,840, Cl. 514-211.000.

Krasnicki, Edward J.; and Margolis, Donald L., to Welch Allyn, Inc. Single chamber acoustical tonometer, 4,945,913, Cl. 128-647.000.

Krauss u. Reichert GmbH & Co.: *See—*  
Jung, Rolf, 4,946,150, Cl. 270-31.000.

Krcova, Zuzana: *See—*  
Sulc, Jiri; and Krcova, Zuzana, 4,946,470, Cl. 623-6.000.

Krempl, Peter W.: *See—*  
Engel, Gunter; Enko, Alfred; Krempl, Peter W.; and Posch, Uwe, 4,946,545, Cl. 156-623.00R.

Krepski, Larry R.: *See—*  
Heilmann, Steven J.; Krepski, Larry R.; Rasmussen, Jerald K.; Katritzky, Alan R.; and Tarri, Richard D., 4,946,962, Cl. 548-187.000.

Kretschmer, Sylvain; Do-Huu, Jean-Paul; and Micheron, Francois, to Thomson-CSF. Optical device for the simultaneous detection of heart and respiratory movements, 4,945,916, Cl. 128-671.000.

Kreutzer, Karl-Heinz: *See—*  
Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, 4,946,653, Cl. 422-140.000.

Kreye, Luke. Attachment for tractor, 4,945,662, Cl. 37-103.000.

Krimmer, Hans-Peter; Drauz, Karlheinz; and Rammel, Hans, to Degussa Aktiengesellschaft. Method of preparing alkali metal salts of 2-pyrrolidone-5-carboxylic acid, 4,946,968, Cl. 548-534.000.

Kristo-Nagy, Thomas: *See—*  
Kardux, Kenneth A.; and Kristo-Nagy, Thomas, 4,945,957, Cl. 141-83.000.

Krofchak, Gary F.; Dickey, Richard F.; and Hall, Courtney, to Krofchak, Gary F. Vehicle performance monitoring system, 4,945,759, Cl. 73-117.300.

Krokhmal, Vladimir M.: *See—*  
Budyko, Viktor A.; Konovaleko, Vladimir V.; Ivanchenko, Andrei F.; Kutsov, Valentin D.; Lastochkin, Boris N.; Krokhmal, Vladimir M.; and Zhdan, Nikolai N., 4,945,910, Cl. 128-421.000.

Kronberg, James W., to United States of America. Energy. Surface mount component jig, 4,945,953, Cl. 140-105.000.

Kroneld, Rolf; Reunanen, Markku; and Huhta-Koivisto, Esko, to Oy Santasalo-Sohlberg AB. Removal of dissolved volatile impurities from liquid, 4,946,559, Cl. 203-4.000.

Krueger, John W., to Albert Einstein College of Medicine of Yeshiva University. Micromanipulator using hydraulic bellows, 4,946,329, Cl. 414-4.000.

Kruger, Bernd-Wieland; Sasse, Klaus; Hoefer, Franz-Peter; Nentwig, Gunther; and Behrenz, Wolfgang, to Bayer Aktiengesellschaft. Agents for repelling insects and mites, 4,946,850, Cl. 514-315.000.

Krumme, Jens-Peter; Petruzzello, John; and Radtke, Wolfgang, to U.S. Philips Corporation. Method of manufacturing iron garnet layers, 4,946,241, Cl. 350-96.120.

Krusos, Denis A.: *See—*  
Di Santo, Frank J.; and Krusos, Denis A., 4,947,157, Cl. 340-787.000.



Di Santo, Frank J.; and Krusos, Denis A., 4,947,159, Cl. 340-787.000.  
 KTI Group B.V.: See—  
 Nomden, Jan F.; and Van Den Oosterkamp, Paul F., 4,946,750, Cl. 429-17.000.  
 Kubo, Motonobu: See—  
 Ohsaka, Yohnosuke; Kobayashi, Tsutomu, and Kubo, Motonobu, 4,946,935, Cl. 528-353.000.  
 Kubo, Naoyuki; Senzaki, Kiyoshi; Kikuchi, Yuji; and Yashiro, Tsutomu, to Victor Company of Japan, Ltd. Thermal transfer sheet comprising an improved ink layer. 4,946,826, Cl. 503-227.000.  
 Kubota, Kazuo, to Fuji Photo Film Co., Ltd. System for checking the opening and closing function of cassette cover. 4,947,277, Cl. 360-137.000.  
 Kubota Ltd.: See—  
 Murakawa, Masatake; and Yuki, Mikio, 4,945,716, Cl. 56-13.300.  
 Kubota, Yuichi: See—  
 Nishimatsu, Masaharu; Shimada, Shigeru; Ide, Toshiaki; Arika, Hiroyuki; and Kubota, Yuichi, 4,946,729, Cl. 428-141.000.  
 Kuczynski, Anthony L.: See—  
 Ayer, Atul D.; Swanson, David R.; and Kuczynski, Anthony L., 4,946,687, Cl. 424-473.000.  
 Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., to American National Can Company. Apparatus for injection molding and injection blow molding multi-layer articles. 4,946,365, Cl. 425-130.000.  
 Kuioaka, Kiyoshi; Yamamoto, Ryoichi; Inaba, Koji; and Hoshino, Toyoma, to Ube Industries, Ltd. Dredging apparatus. 4,945,661, Cl. 37-67.000.  
 Kukla, William J.: See—  
 Cornwell, James H.; and Kukla, William J., 4,945,721, Cl. 60-274.000.  
 Kulaga, Mark, to Ark International, Inc. Theft resistant rotatable mount for computer consoles and the like. 4,946,127, Cl. 248-551.000.  
 Kumada, Akio, to Hitachi Maxell, Ltd. Piezo electric motor. 4,947,076, Cl. 310-323.000.  
 Kumada, Akira, to Murata Mfg. Co., Ltd. Assembly packaging method for sensor elements. 4,945,634, Cl. 29-854.000.  
 Kumagai, Kiyoshi: See—  
 Ishige, Yoshiki; Sato, Shoji; Masuda, Hisashi; Ushiki, Yoji; Kumagai, Kiyoshi; Saida, Junichi; and Minoya, Kiyoshi, 4,946,551, Cl. 156-222.000.  
 Kumar, Ashok, to United States of America, Army. Ceramic coated strip anode for cathodic protection. 4,946,570, Cl. 204-196.000.  
 Kumasaka, Takao; Simazaki, Yuzuru; and Komatsu, Isamu, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Developing device and multi-color recording apparatus. 4,947,200, Cl. 355-251.000.  
 Kumazaki, Hiroshi, to Toshiba Kikai Kabushiki Kaisha. Vent type injection molding machine. 4,946,356, Cl. 425-135.000.  
 Kume, Takeshi, to T. K. M. Engineering Kabushiki Kaisha. Elevator apparatus with a sectored vertical shaft and a turntable for transferring elevator cages between the individual sectors. 4,946,006, Cl. 187-25.000.  
 Kumiai Chemical Industry Co., Ltd.: See—  
 Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 4,946,495, Cl. 71-92.000.  
 Kumura, Atsuyoshi: See—  
 Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsubara, Toshihiko, 4,946,645, Cl. 420-84.000.  
 Kunimatsu, Kaoru; and Komatsu, Atsushi, to Toray Dow Corning Silicone. Fluororubber compositions exhibiting improved workability and mechanical properties. 4,946,883, Cl. 524-265.000.  
 Kunststofftechnik Rodenberg GmbH & Co. KG: See—  
 Otto, Karl, 4,946,347, Cl. 415-200.000.  
 Kupersmit, Julius B. Cradle construction for shipping containers. 4,946,036, Cl. 206-386.000.  
 Kupersmit, Julius B. Collapsible container having congruent door retaining means. 4,946,091, Cl. 229-122.100.  
 Kuphal, Jeffrey A.; Robeson, Lloyd M.; and Weber, James J., to Air Products and Chemicals, Inc. Blends of poly(propylene carbonate) and poly(methyl methacrylate) and their use in decomposition molding. 4,946,884, Cl. 524-403.000.  
 Kuppelmaier, Harald: See—  
 Albert, Bernhard; Kuppelmaier, Harald; and Wagenblast, Gerhard, 4,946,762, Cl. 430-270.000.  
 Kurabe, Susumu, to Tachi-S Co., Ltd. Air suspension device for vehicle seat. 4,946,145, Cl. 267-131.000.  
 Kurahashi, Muneshige: See—  
 Sugiyama, Yoshihiko; Kurahashi, Muneshige; Yokoyama, Sakari; and Ishihara, Tadayuki, 4,945,899, Cl. 128-28.000.  
 Kuraray Co., Ltd.: See—  
 Kanehira, Koichi; Eziri, Katsushi; Shiono, Manzo; Fujita, Yoshiji; and Yamahara, Johji, 4,946,857, Cl. 514-399.000.  
 Onishi, Takashi; Mori, Toshiaki; Suzuki, Shigeaki; Takigawa, Michio; and Yamamoto, Kazuo, 4,947,001, Cl. 568-28.000.  
 Kurasawa, Yoshihiro: See—  
 Kurihara, Hideo; Suzuki, Kenichi; Minoura, Kazuo; Ohkoda, Keiji; Kurihara, Hitoshi; and Kurasawa, Yoshihiro, 4,947,029, Cl. 235-475.000.  
 Kurata, Yukio: See—  
 Ishikawa, Toshio; and Kurata, Yukio, 4,947,261, Cl. 358-473.000.  
 Kurihara, Hideo; Suzuki, Kenichi; Minoura, Kazuo; Ohkoda, Keiji; Kurihara, Hitoshi; and Kurasawa, Yoshihiro, to Canon Kabushiki

Kaisha; and Canon Denshi Kabushiki Kaisha. Cleaning device for information recording medium. 4,947,029, Cl. 235-475.000.  
 Kurihara, Hitoshi: See—  
 Kurihara, Hideo; Suzuki, Kenichi; Minoura, Kazuo; Ohkoda, Keiji; Kurihara, Hitoshi; and Kurasawa, Yoshihiro, 4,947,029, Cl. 235-475.000.  
 Kurihara, Norimithu: See—  
 Kawano, Minoru; Yamashita, Tatsuhiro; Izu, Noboru; Shibata, Shun-suke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.  
 Kuriyama, Toshihiro: See—  
 Kuroda, Takao; Kuriyama, Toshihiro; Horii, Kenju; and Mizuno, Hiroyuki, 4,947,224, Cl. 357-30.000.  
 Kuroda, Takao; Kuriyama, Toshihiro; Horii, Kenju; and Mizuno, Hiroyuki, to Matsushita Electronics Corporation. Solid state image sensing device with photodiode to reduce smearing. 4,947,224, Cl. 357-30.000.  
 Kurokawa, Toshio; and Daigo, Kazuo, to Fuji Photo Film Co., Ltd. Filter apparatus with stop valve. 4,946,047, Cl. 210-234.000.  
 Kurtz, Karl-Rudolf; Koch, Horst; Telsner, Thomas; and Bach, Helmut, to BASF Aktiengesellschaft. Multilayer, sheet-like, photosensitive recording material. 4,946,758, Cl. 430-259.000.  
 Kusano, Hideaki: See—  
 Watanabe, Yutaka; Ito, Masaaki; and Kusano, Hideaki, 4,947,266, Cl. 358-408.000.  
 Kusano, Shoji: See—  
 Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 4,946,495, Cl. 71-92.000.  
 Kushibiki, Nobuo; Yoshinaga, Yoko; Taniguchi, Naosato; and Kuwayama, Tetsuro, to Canon Kabushiki Kaisha. Method of preparing volume type hologram film. 4,946,533, Cl. 156-249.000.  
 Kuss Corporation: See—  
 Cassidy, Daniel G.; and Koch, Roger J., 4,945,588, Cl. 5-451.000.  
 Kusuzaki, Tetsuo: See—  
 Tenma, Tadashi; Akashi, Kichizo; Kusuzaki, Tetsuo; Igeta, Shouji; Tsushima, Isao; and Komoda, Norihisa, 4,947,322, Cl. 364-401.000.  
 Kuta, LeRoy A.: See—  
 Peickert, Marlin W.; and Kuta, LeRoy A., 4,946,124, Cl. 248-231.800.  
 Kutsov, Valentin D.: See—  
 Budyko, Viktor A.; Konovalenko, Vladimir V.; Ivanchenko, Andrei F.; Kutsov, Valentin D.; Lastochkin, Boris N.; Krokmal, Vladimir M.; and Zhdan, Nikolai N., 4,945,910, Cl. 128-421.000.  
 Kutz, Hans-Jürgen: See—  
 Schmitz, Gunter; and Kutz, Hans-Jürgen, 4,945,863, Cl. 123-1.00A.  
 Kuwahara, Hiroshi; Ogino, Mineo; Kozaki, Takahiko; Endo, Noboru; and Sakurai, Yoshito, to Hitachi, Ltd.; and Link Laboratory, Inc. Cell switching system of asynchronous transfer mode. 4,947,388, Cl. 370-60.000.  
 Kuwahara, Takanori, to Nissan Motor Company, Limited. Knee protector. 4,946,192, Cl. 280-751.000.  
 Kuwayama, Tetsuro: See—  
 Kushibiki, Nobuo; Yoshinaga, Yoko; Taniguchi, Naosato; and Kuwayama, Tetsuro, 4,946,533, Cl. 156-249.000.  
 Kuznicki, James T.: See—  
 Tsai, Chee-Hway; Heckert, David C.; and Kuznicki, James T., 4,946,701, Cl. 426-597.000.  
 Kyoshima, Masayuki, to Canon Kabushiki Kaisha. Liquid injection recording apparatus having temperature detecting means in a liquid passage. 4,947,194, Cl. 346-140.00R.  
 Kyowa Hakko Kogyo Co., Ltd.: See—  
 Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,946,957, Cl. 544-342.000.  
 Laakmann, Hans-Joachim: See—  
 Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, 4,946,653, Cl. 422-140.000.  
 Laass, Heinz, to TACO Tafel GmbH. Test apparatus to check conditions and characteristics of power and communication networks. 4,947,110, Cl. 324-133.000.  
 LaBrecque, James C. Refrigeration. 4,945,733, Cl. 62-278.000.  
 Lach, Horst. Process for the control of the feed motion and touch-on motion of a grinding wheel. 4,947,015, Cl. 219-69.200.  
 Lacher, Vernon R.: See—  
 Miner, Jonathan L.; Lacher, Vernon R.; Rescigno, Gerald J.; Swim, William B.; Gierke, Martin P.; and Hahn, David A., 4,945,604, Cl. 15-344.000.  
 Lachinian, Levon: See—  
 Alexandrian, Karen V.; Melikian, Karen G.; Alexanian, Akam A.; Saakian, Kamo S.; Lachinian, Levon; and Gendzhovian, Ogan S., 4,945,674, Cl. 47-1.010.  
 Lackey, Michael: See—  
 Ferreri, Paul; Maurer, Heinz; Kan, Jennifer; Allers, Harry; and Lackey, Michael, 4,946,042, Cl. 206-628.000.  
 LaCroix, Suzanne: See—  
 Gonthier, Francois; Daxelet, Xavier; LaCroix, Suzanne; Black, Richard J.; and Bures, Jacques, 4,946,250, Cl. 350-96.290.  
 Laderoute, Maurice. Limited use hypodermic syringe. 4,946,441, Cl. 604-110.000.  
 Ladner, Robert C.; Bird, Robert E.; and Hardman, Karl, to Genex Corporation. Single polypeptide chain binding molecules. 4,946,778, Cl. 435-69.600.

Lagori, Agostino; and Cotti, Giacomo. Device for stretching hides, particularly for manufacturing furs and like. 4,945,736, Cl. 69-19.200.  
 Lahti, Lassi: See—  
 Hakanen, Pekka; Lahti, Lassi; Suutari, Jari; Sirkia, Eero; Kallioinen, Timo; Nieminen, Heikki; Alaspää, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, 4,945,633, Cl. 29-825.000.  
 Lake, Stephen P.: See—  
 Pritchard, Alan P.; and Lake, Stephen P., 4,946,804, Cl. 437-228.000.  
 Lakshman, Raj: See—  
 Suthanthiran, Krishnan; and Lakshman, Raj, 4,946,435, Cl. 600-3.000.  
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- Lynn, Lawrence A. Intravenous line coupling device. 4,946,445, Cl. 604-192.000.
- Lyon, James R.; Morsch, Gary L.; Murray, Gerald D.; and Robinson, James B., to Kennametal Inc. Cutting insert and clamping arrangement therefor. 4,946,319, Cl. 407-115.000.
- Lytle, William H.: See—  
Sharma, Ravinder K.; Lytle, William H.; Rogona, Angela; and Hileman, Bennett L., 4,946,376, Cl. 428-620.000.
- Mabboux, Michel: See—  
De Marchi, Jean-Louis; and Mabboux, Michel, 4,945,659, Cl. 36-117.000.
- MacDonald, Francis D. Electrical cut-off device. 4,947,148, Cl. 337-172.000.
- MacMillan Bloedel Limited: See—  
Crittenden, Bradley J., 4,945,711, Cl. 53-449.000.
- Mac Thornock, Jeffery: See—  
Smith, Patrick J.; Bullock, Scott R.; and Mac Thornock, Jeffery, 4,947,361, Cl. 364-724.090.
- Maeda, Kiyoto: See—  
Manabe, Akio; Mizutani, Masato; Maeda, Kiyoto; Ooishi, Tadashi; and Takano, Hirotaka, 4,946,867, Cl. 514-521.000.
- Maeda, Kouzo; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, to Nissan Motor Co., Ltd. Steering wheel construction of motor vehicle. 4,946,194, Cl. 280-777.000.
- Maeda, Miyozo: See—  
Koshino, Nagaaki; Maeda, Miyozo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueishi, Kozo, 4,947,372, Cl. 365-106.000.
- Maeda, Tsuyoshi: See—  
Maruo, Yoshinobu; and Maeda, Tsuyoshi, 4,946,412, Cl. 441-135.000.
- Maeda, Yutaka, to Minolta Camera Kabushiki Kaisha. Image forming apparatus with roll-type recording material. 4,947,472, Cl. 355-72.000.
- Maehara, Kenso, to Ryobi Ltd. Off-set printing machine for printing continuous web. 4,945,830, Cl. 101-217.000.
- Maekawa, Yukio; and Hirano, Tsumoru, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,946,771, Cl. 430-548.000.
- Maemoto, Kazuo, to Fuji Photo Film Co., Ltd. Image-forming layer. 4,946,761, Cl. 430-270.000.
- Maeno, Ryozo, to Kabushiki Kaisha Toshiba. Switching control system for multipersonality computer system. 4,947,478, Cl. 364-200.000.
- Maeno, Satoru; Fukuyama, Norio; and Ohishi, Tetsuo, to Shinko Electric Co., Ltd. Copying machine control apparatus. 4,947,209, Cl. 355-204.000.
- Maecoka, Tatsuo: See—  
Tsuruoka, Tosiaki; Maecoka, Tatsuo; and Nakamura, Masafumi, 4,947,312, Cl. 363-134.000.
- Maerzhauser, Heinz: See—  
Kraft, Winfried; Wuerfel, Volker; Stebel, Wolfram; and Maerzhauser, Heinz, 4,946,266, Cl. 350-529.000.
- Maetani, Masami: See—  
Murata, Shinji; Onuki, Kazuhiko; Maetani, Masami; and Sugiyama, Kazuhide, 4,947,213, Cl. 355-271.000.
- Maga, Raymond A.: See—  
Cope, Kenneth P.; Maga, Raymond A.; and Hall, Teddy L., 4,946,395, Cl. 439-352.000.
- Magdassi, Shlomo, to Med Optics Corporation. Colored contact lens. 4,946,269, Cl. 351-162.000.
- Magee, Arthur W.; Shockley, Richard D.; and Crawford, Michael E., to Long Mile Rubber Company, Inc. Mold for recapping a tire. 4,946,554, Cl. 156-909.000.
- Magill, J. H.; and Merker, R. L., to University of Pittsburgh, The. A process for the catalytic synthesis of polyphosphazenes. 4,946,938, Cl. 528-399.000.
- Magnavox Government and Industrial Electronics Company: See—  
Richeson, William E., 4,945,870, Cl. 123-90.110.
- Magnus, Fredrick L., to Goodyear Tire & Rubber Company, The. Water based preure paint for rubber articles. 4,946,717, Cl. 427-393.500.
- Magnusson, Carl-Gustav M.: See—  
Collet-Cassart, Daniel; Magnusson, Carl-Gustav M.; and Masson, Pierre L., 4,946,796, Cl. 436-512.000.
- Magruder, Judy A.: See—  
Edgren, David E.; Magruder, Judy A.; and Bhatti, Gurdish K., 4,946,685, Cl. 424-472.000.
- Mahdavi, Mehrzad; and Sitaraman, Shivakumar, to Schlumberger Technology Corporation. Thermal decay time logging method and tool. 4,947,040, Cl. 250-266.000.
- Maher, David L.: See—  
Bulman, Melvin J.; and Maher, David L., 4,945,809, Cl. 89-7.000.
- Mahon, Michael J.; and Baum, Allen, to Hewlett-Packard Company. Method in a computing system for performing a multiplication. 4,947,364, Cl. 364-757.000.
- Mahoney, John B.: See—  
Boggs, Roger A.; Mahoney, John B.; Mehta, Avinash C.; Schwarzel, William C.; and Taylor, Lloyd D., 4,946,964, Cl. 548-251.000.
- Matenfisch, Peter; Gehret, Jean-Claude; and Frei, Bruno, to Ciba-Geigy Corporation. 3-aminobenzoylphenylureas useful for controlling parasites and insects that attack domestic animals and livestock. 4,946,854, Cl. 514-346.000.
- Maier, Manfred: See—  
Bluyekuegclue, Melmet-A.; and Maier, Manfred, 4,945,956, Cl. 141-67.000.
- Main, Eric: See—  
Abdi, Behrooz; Main, Eric; and Hanna, John E., 4,947,103, Cl. 323-316.000.
- Maiocchi, Luigi: See—  
Tavazza, Giuseppe; and Maiocchi, Luigi, 4,945,967, Cl. 152-531.000.
- Majerus, Norbert; Mills, Harold E.; and Rambacher, John S., to Goodyear Tire & Rubber Company. The Method for injection molding elongated bodies. 4,946,639, Cl. 264-308.000.
- Majure, James; and Frazier, William N., to Fish Scales, Inc. Fish scaler. 4,945,608, Cl. 17-64.000.



Majunnen, Joel, to Insinoritoimisto Joel Majunnen Ky Arrangement in an intermediate floor or the base floor of a building 4,945,695, Cl. 52-252.000.

Makamura, Yoshinobu: See—  
Horiuchi, Kuniyasu; and Makamura, Yoshinobu, 4,947,466, Cl. 273-61.00C.

Makiguchi, Nobuyoshi: See—  
Fukuhara, Nobuhiro; Yoshino, Setsuo; Sone, Satori; Nakajima, Yoshiyuki; and Makiguchi, Nobuyoshi, 4,946,790, Cl. 435-252.330.

Makino, Masaharu: See—  
Sato, Hisatake; and Makino, Masaharu, 4,946,915, Cl. 526-237.000.

Makita, Sadao, to Kabushiki Kaisha Toshiba Compact electronic apparatus, 4,946,300, Cl. 400-682.000.

Makita, Toshihiko: See—  
Takenouchi, Kenji; Makita, Toshihiko; and Matsumoto, Mitsuru, 4,946,398, Cl. 439-599.000.

Makino, Kenji; Makita, Toshihiko; and Matsumoto, Mitsuru, 4,946,404, Cl. 439-352.000.

Makler, Michael T., to Flow Incorporated. Method for the treatment of malaria, 4,946,849, Cl. 514-313.000.

Mako, John: See—  
Gabriel, Charles F.; Kisacky, Randy J.; Mako, John; and Stone, Lawrence A., 4,945,828, Cl. 101-93.140.

Malka, Jacob H.: See—  
James, Robert L.; and Malka, Jacob H., 4,947,167, Cl. 341-117.000.

Mallory, H. Dean: See—  
Liedtke, Larry L.; Mallory, H. Dean; McBride, William R.; Bens, Everett M.; Schadow, Klaus C.; and Boggs, Thomas L., 4,946,522, Cl. 149-36.000.

Maly, Dieter-Heinz: See—  
Friedrich, Karl; and Maly, Dieter-Heinz, 4,946,334, Cl. 414-697.000.

Malzahn, G. Edwin, to Charles Machine Works, Inc., The. Directional rod pusher, 4,945,999, Cl. 175-19.000.

MAN Gutehoffnungshutte AG: See—  
Blotenberg, Wilfried, 4,946,343, Cl. 415-27.000.

MAN Roland Druckmaschinen AG: See—  
Liebert, Oskar, 4,946,151, Cl. 270-47.000.

Manabe, Akio; Mizutani, Masato; Maeda, Kiyoto; Oishi, Tadashi; and Takano, Hirotsuka, to Sumitomo Chemical Company, Limited. Cyanoacetamide derivative, and plant disease protectant comprising the same as an active ingredient, 4,946,867, Cl. 514-521.000.

Manabe, Kyoichi; and Yamashiro, Hideo, to National Space Development Agency of Japan; and Kawasaki Jukogyo Kabushiki. Water ring vacuum pump, 4,946,349, Cl. 417-68.000.

Manchester, Robert A., to Welbilt Corporation. Fryer filtration system, 4,945,893, Cl. 126-391.000.

Manfred A. Jennewein: See—  
Heinold, Hans; and Rau, Joseph, 4,946,023, Cl. 198-419.100.

Manfredi, Eugene T.; and Miller, Robert E., to Bio Techniques Laboratories, Inc. Novel strain of *Lactobacillus acidophilus*, 4,946,791, Cl. 435-252.900.

Maniatis, Thomas P.; and Myers, Richard M., to President and Fellows of Harvard College. Detection of base pair mismatches using RNAse A, 4,946,773, Cl. 435-6.000.

Maniero, Daniel A.; and Meisner, Edward H., to Gerber Products Company. Cover for pacifiers, 4,946,054, Cl. 215-11.600.

Manlove, Gregory J.: See—  
Stroud, Richard S.; Anderson, Fred J.; Repogle, Matthew C.; White, Douglas E.; Marrah, Jeffrey J.; and Manlove, Gregory J., 4,947,431, Cl. 381-13.000.

Mannes, Karl: See—  
Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, 4,946,653, Cl. 422-140.000.

Mannesmann AG: See—  
Rump, Peter; and Schmitt, Juergen, 4,945,705, Cl. 52-731.000.

Manning, Charles R.; and Pinto, Leroy J., to Assay Technologies, Inc. Integrated exposure monitoring device, 4,946,705, Cl. 427-2.000.

Manning, Donald L., to DLMA Transportation Inc. Rear suspension, 4,946,189, Cl. 280-688.000.

Manning, William P.: See—  
Lehman, Theodore H.; and Manning, William P., 4,947,174, Cl. 342-3.000.

Manoly, Arthur E.; Sauseng, Otto; and Benton, John T. Traveling-wave tube slow-wave structure with integral conductively-loaded barrel and method of making same, 4,947,467, Cl. 315-3.500.

Marasch, Richard D., to Allen-Bradley Company, Inc. Motor controller with optical SCR's, 4,947,099, Cl. 318-809.000.

Marchant, Norman J.; and Morgan, John P., to United States of America, Energy. Instrument for the measurement and determination of chemical pulse column parameters, 4,947,340, Cl. 364-500.000.

Marchionni, Giuseppe: See—  
Moggi, Giovanni; and Marchionni, Giuseppe, 4,946,936, Cl. 528-392.000.

Marcotullio, Armando: See—  
Vettor, Antonio; Passarini, Nello; and Marcotullio, Armando, 4,946,474, Cl. 44-627.000.

Marges S.A.R.L.: See—  
Gallier, Michel, 4,945,692, Cl. 52-36.000.

Margolis, Donald L.: See—  
Krasnicki, Edward J.; and Margolis, Donald L., 4,945,913, Cl. 128-647.000.

Marianneau, Michel E. A.: See—  
David, Maurice J. A.; Marianneau, Michel E. A.; Aebi, Gilbert; and Raye, Pierre, 4,946,318, Cl. 407-42.000.

Marinace, John C., to International Business Machines Corporation. Plasma formation of hydride compounds, 4,945,857, Cl. 118-719.000.

Markowitz, Milton: See—  
Cross, Ramon; Markowitz, Milton; and Selgrath, Louis, 4,945,586, Cl. 5-414.000.

Markussen, Jan, to Novo Nordisk A/S. Novel insulin peptides, 4,946,828, Cl. 514-3.000.

Marocco, Norbert. Cord lock unit for drape or blind assembly, 4,945,970, Cl. 160-178.200.

Marquart, James A.: See—  
Shalati, Mohamad D.; Marquart, James A.; Babjak, John R.; and Harris, Rodney M., 4,946,744, Cl. 428-500.000.

Marquet, Patrice; Lemaire, Jean-Marc; and Dunouvion, Philippe, to Thomson-CSF. Opto-electronic device for detecting and locating a radiant source, 4,946,277, Cl. 356-141.000.

Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, to AUSIMONT S.r.l. Process for preparing fluorinated conjugated olefinic products and new products thus obtained, 4,947,006, Cl. 568-685.000.

Marrah, Jeffrey J.: See—  
Stroud, Richard S.; Anderson, Fred J.; Repogle, Matthew C.; White, Douglas E.; Marrah, Jeffrey J.; and Manlove, Gregory J., 4,947,431, Cl. 381-13.000.

Marrelli, John D.: See—  
Hatton, Gregory J.; Helms, David A.; Durrett, Michael G.; Marrelli, John D.; and Stafford, Joseph D., 4,947,128, Cl. 324-640.000.

Helms, David A.; Hatton, Gregory J.; Durrett, Michael G.; Dowty, Earl L.; and Marrelli, John D., 4,947,127, Cl. 324-640.000.

Helms, David A.; and Marrelli, John D., 4,947,129, Cl. 324-640.000.

Marrero, Thomas R.: See—  
Liu, Henry; and Marrero, Thomas R., 4,946,317, Cl. 406-46.000.

Marriott, Brian M.: See—  
Murphy, Paul F.; and Marriott, Brian M., 4,946,598, Cl. 210-452.000.

Marsden (Proprietary) Limited: See—  
Worship, Leslie A.; Isaacs, Peter; Bain, Steven; and Bain, Kenneth J. D., 4,945,748, Cl. 72-323.000.

Marsh, Douglas F.: See—  
Brill, Frank D.; Miller, Benjamin D.; Jablonski, Thaddeus M.; Marsh, Douglas F.; and Marsh, Richard E., 4,946,073, Cl. 222-129.400.

Marsh, Richard E.: See—  
Brill, Frank D.; Miller, Benjamin D.; Jablonski, Thaddeus M.; Marsh, Douglas F.; and Marsh, Richard E., 4,946,073, Cl. 222-129.400.

Marshall, John, III, to Electropore, Inc. Impedance matching for instrumentation which electrically alters vesicle membranes, 4,946,793, Cl. 435-291.000.

Marshall, William B.; and Brewbaker, James L., to Dow Chemical Company. The Melt processable thermotropic aromatic copolymers, 4,946,926, Cl. 528-193.000.

Marten, Jerome H.; and Lloyd, George M., Jr., to Florida Institute of Phosphate Research. Addition of pyritic materials to feed mix for desulfurization of phosphogypsum, 4,946,658, Cl. 423-168.000.

Martin, John B.: See—  
Pinchuk, Leonard; and Martin, John B., 4,946,466, Cl. 606-194.000.

Martin, Richard W.: See—  
Moran, Thomas J.; Buynak, Charles F.; and Martin, Richard W., 4,947,351, Cl. 364-507.000.

Martin, Robert L.: See—  
Morris, John L.; and Martin, Robert L., 4,945,849, Cl. 114-218.000.

Martinengo, Adriano, to Fiat Auto S.p.A. Device for screwing a self-tapping member into a smooth hole provided in a structure intended to house the member, 4,945,789, Cl. 81-55.000.

Marui, Toshio: See—  
Oishi, Tsukasa; and Marui, Toshio, 4,946,720, Cl. 428-35.400.

Maruo, Yoshinobu; and Maeda, Tsuyoshi, to Nissan Shatai Company, Limited. Swimming aid, 4,946,412, Cl. 441-135.000.

Marusak, Thomas J.: See—  
Schnebly, John T.; Marusak, Thomas J.; and Corey, John A., 4,945,969, Cl. 160-84.100.

Maruyama, Kakuiji, to Nagata Seiki Kabushiki Kaisha. Fabric tensioning device in a double cylinder circular knitting machine, 4,945,734, Cl. 66-149.00R.

Marwitz & Hauser GmbH: See—  
Nowotny, Norbert; and Rosser, Jurgen, 4,946,268, Cl. 351-118.000.

Masaki, Hisaji; and Takaki, Hideo, to Canon Kabushiki Kaisha. Image reading apparatus, 4,947,267, Cl. 358-426.000.

Masaki, Kazumi, to Hayashibara, Ken. Lamp-lighting device, 4,947,087, Cl. 315-307.000.

Masamoto, Kazuhisa: See—  
Gotto, Yukihisa; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,946,497, Cl. 71-94.000.

Masciarelli, Victor J., Jr. Molding method, 4,946,637, Cl. 264-226.000.

Mascotte, Lawrence L. Means for mounting decorative scrolls to a frame, 4,945,703, Cl. 52-663.000.

Mashita, Kentaro: See—  
Ohmae, Tadayuki; Mashita, Kentaro; Wakatsuki, Kizuku; and Kawakita, Toshio, 4,946,895, Cl. 525-75.000.

Mason, Robert J. H. Application of superheated steam, 4,945,654, Cl. 34-23.000.

Massachusetts Institute of Massachusetts: See—  
Horton, Richard F., 4,946,280, Cl. 356-353.000.

Massachusetts Institute of Technology: See—  
Abouzahra, Mohamed D.; and Gupta, Kuldip C., 4,947,143, Cl. 333-125.000.

D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., 4,946,929, Cl. 528-206.000.

Frank, Lawrence R., 4,947,120, Cl. 324-309.000.

Sharpless, Karl B.; Klunder, Janice M.; and Onami, Tetsuo H., 4,946,974, Cl. 549-551.000.

Massey, Colin P., and Haddon, David R., to Westland Helicopters Limited. Helicopter control systems, 4,947,334, Cl. 364-433.000.

Masson, Pierre L.: See—  
Collet-Cassart, Daniel; Magnusson, Carl-Gustav M.; and Masson, Pierre L., 4,946,796, Cl. 436-512.000.

Master's International Corporation: See—  
Kinnebrew, Earl G. II, and Fitzpatrick, Joseph D., 4,946,510, Cl. 134-40.000.

Masters, John V.: See—  
Conlyn, Andrew C., Jr., and Masters, John V., 4,946,013, Cl. 192-1.520.

Masterson, Joseph G.: See—  
Bannon, Yvonne B.; Corish, John; Corrigan, Owen I.; Geoghegan, Edward J.; and Masterson, Joseph G., 4,946,853, Cl. 514-343.000.

Mastro, Anthony V. Multi-use board game, 4,946,170, Cl. 273-258.000.

Masubuchi, Masahiko: See—  
Tanahashi, Toshio; Kanamaru, Masanobu; Yasuda, Yushiro; Masubuchi, Masahiko; Ito, Toshio; and Itoh, Kazuhiro, 4,945,867, Cl. 123-65.0VD.

Masubuchi, Yoshio, to Kabushiki Kaisha Toshiba. Network path trace apparatus and network path trace method, 4,947,365, Cl. 364-900.000.

Masuda, Hisashi: See—  
Ishige, Yoshiki; Sato, Shoji; Masuda, Hisashi; Ushiki, Yoji; Kumagai, Kiyoshi; Saida, Junichi; and Minoya, Kiyoshi, 4,946,551, Cl. 156-222.000.

Masuda, Isamu, to Nihonkenkoshinkenyukai Co., Ltd. Roller massaging apparatus, 4,945,900, Cl. 128-57.000.

Masumoto, Kazuhiro, to Mitsui Petrochemical Industries, Ltd. Apparatus for molding a plastics container, 4,946,368, Cl. 425-525.000.

Matheu, Guillermo R.: See—  
Bernhardt, Douglas H.; Matheu, Guillermo R.; Crum, Spencer E.; and Adelmann, John T., 4,946,692, Cl. 426-231.000.

Mathur, Veerendra K.; and Chakrabarti, Kishalaya. Method of laser discrimination using stimulated luminescence, 4,947,465, Cl. 250-484.100.

Matino, Haruhiro; Ueki, Toshihiro; Oana, Yasuhisa; and Kajimura, Motoji, to International Business Machines Corporation. Color liquid crystal display and method of manufacture, 4,946,259, Cl. 350-339.00F.

Matson, Carl G., to Triangle Engineering of Arkansas, Inc. Lift platform for chairs, 4,946,222, Cl. 297-345.000.

Matsubara, Teiji, to Daiwa Seiko, Inc. Protective case and manual for fishing tackle, 4,946,034, Cl. 206-315.110.

Matsubara, Toshihiko: See—  
Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsubara, Toshihiko, 4,946,645, Cl. 420-84.000.

Matsuda, Jun; Utsumi, Akihiro; Katsumura, Munehide; Yoneda, Masafumi; and Yano, Tetsuo, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Laser spraying process, 4,947,463, Cl. 219-121.850.

Matsuda, Shinpei: See—  
Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.

Matsui, Kenji; and Yamashita, Tatsuo, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Automatic seat belt system, 4,946,197, Cl. 280-604.000.

Matsui, Toshio: See—  
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Kinoshita, Keichi; Yamashita, Hiroki; Ozawa, Kazuhito; and Matsui, Toshio, 4,946,153, Cl. 270-53.000.

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Matsumoto, Koichi: See—  
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Matsumoto, Masafumi: See—  
Nakajiri, Takashi; Hachinoda, Masayuki; Matsumoto, Masafumi; and Kotani, Matahira, 4,947,268, Cl. 358-426.000.

Matsumoto, Mitsuru: See—  
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Matsuoka, Yasuo; and Tsuchiya, Takashi. Method of forming resist pattern and resist processing apparatus used in this method, 4,946,764, Cl. 430-325.000.

Matsushita Electric Industrial Co., Ltd.: See—  
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Gamo, Takaharu; Moriwaki, Yoshio; and Iwaki, Tsutomu, 4,946,646, Cl. 420-415.000.

Ono, Taizo; Katayama, Yoshihiro; and Saitoh, Toshi, 4,947,211, Cl. 355-265.000.

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Matsushita Electric Works, Ltd.: See—  
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Matsushita Electronics Corporation: See—  
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Okuyama, Hiroaki, 4,947,379, Cl. 365-233.500.

Matsushita, Hidetoshi: See—  
Ichimura, Yasuo; Matsushita, Hidetoshi; Kawasaki, Kenji, and Aoyama, Youichi, 4,947,146, Cl. 335-131.000.

Matsushita, Shigeo: See—  
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Matsuura, Shinzo: See—  
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Matsuzaki, Hiromi: See—  
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Matsuzawa, Tooru: See—  
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Matter, Riccardo; and Belveder, Bruno, to G. D. Societa' Per Azioni. Device for feeding strip paper on a dual-rod cigarette manufacturing machine, 4,945,926, Cl. 131-84.100.

Matthews, James J., to Ripley Company, Inc. Adjustable mid-span stripper for wire and cable, 4,945,788, Cl. 81-9.400.

Mattson, Rodney A., to Picker International, Inc. X-ray detector for CT scanners, 4,947,412, Cl. 378-19.000.

Matyja, Krzysztof. Expandable bag, 4,946,290, Cl. 383-10.000.

Matysick, Frank: See—  
Mushardt, Heinrich; Uhlig, Uwe; Lutjens, Peter; Beyer, Horst, and Matysick, Frank, 4,945,888, Cl. 125-11.150.

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Maxwell, Richard; and Pinnell, David L. pH control system for an aqueous liquid reservoir, 4,945,939, Cl. 137-93.000.

May, Carl D.: See—  
Myslicki, Robert J.; May, Carl D.; and Rusnell, Douglas L., 4,946,208, Cl. 292-216.000.

May, William E.; King, William A.; and Green, Jerry M., to Siemens Energy & Automation, Inc. Ground fault current rectification and measuring circuit, 4,947,126, Cl. 324-509.000.

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Ioka, Tadashi; Sakane, Katsumi; Suzuki, Toshifumi; Amatsu, Kazunari; and Shimada, Kaoru, 4,946,195, Cl. 280-777.000.

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Mazzanti, Vincent E. Muzzle brake and method of making the same, 4,945,812, Cl. 89-14.300.

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McCarty, Allan. Eyeglass holder, 4,946,125, Cl. 248-316.700.

McCauley, Christopher J. Double-action vertical wood splitter, 4,945,960, Cl. 144-193.00A.

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Atkinson, Noel D.; Ahlemeyer, William B., and McCormick, Ben F., 4,947,456, Cl. 455-165.000.

McCormick, William H.: See—  
Ponsford, George L.; McCormick, William H.; Council, Malcolm N.; and Carroll, Albert W., 4,945,938, Cl. 137-15.000.

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McFaul, James A.; Keyes, Gary S.; and McDaniel, David L., 4,947,416, Cl. 378-146.000.

McDermott, Kevin. Lighting device. 4,947,291, Cl. 362-19.000.

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McGill Manufacturing Company, Inc.: See—  
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McGuire, Kevin P., to Eastman Kodak Company. Apparatus for exposing photographic materials. 4,947,207, Cl. 355-71.000.

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Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,946,365, Cl. 425-130.000.

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McHugh, Robert G.: See—  
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McKay, Michael L.; Thompson, Ian R.; and Sarich, Ralph T. Method of fuel injection. 4,945,886, Cl. 123-533.000.

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Lamere, Virginia C.; Fite, Elaine H.; and McKeen, Francis X., 4,947,358, Cl. 364-715.040.

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Mealey, Andrew N. Tubular support with inperforate plastic sheet and filter cloth strainer. 4,946,591, Cl. 210-474.000.

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Med Optics Corporation: See—  
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Medical Engineering & Development Institute, Inc.: See—  
Fearnot, Neal E.; Heggs, Kevin S.; Johnson, William L.; and Stevens, Donald A., 4,945,909, Cl. 128-419.0PG.

MedTest Systems, Inc.: See—  
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Meguro, Hiroshi, to Sony Corporation. Magnetic tape cassette with remaining tape indicator. 4,947,276, Cl. 360-132.000.

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Mehta, Hemang S.: See—  
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Alexandrian, Karen V.; Melikian, Karen G.; Alexanian, Akam A.; Saakian, Kamo S.; Lachinian, Levon; and Gendzhonian, Oganess S., 4,945,674, Cl. 47-1.010.

Melton, Ardella R. Shoulder pad and brassiere strap cushion apparatus. 4,945,576, Cl. 2-268.000.

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Merck & Co., Inc.: See—  
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Login, Robert B.; Merianos, John J.; Dandreaux, Gary; and Shih, Jenn S., 4,946,967, Cl. 548-531.000.

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Kane, John M.; and Miller, Francis P., 4,946,856, Cl. 514-384.000.

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Lipp, Charles W.; Merrick, Douglas D.; and Lee, Richard A., 4,946,475, Cl. 48-86.00R.

Merrill, Raymond, Jr. Fiber optic musical instrument digital interface. 4,945,806, Cl. 84-645.000.

Merry, Nir; and Smidebush, Michael, to Cryo Instruments, Inc. Apparatus for cryosurgery. 4,946,460, Cl. 606-24.000.

Merz and Co. GmbH & Co.: See—  
Muller, Werner E. G.; Zahn, Rudolf K.; and Eich, Eckart, 4,946,869, Cl. 514-729.000.

Mesa Vista Hospital: See—  
Hodges, Harry A., 4,947,152, Cl. 340-573.000.

Meschke, Debra J.; and Hoy, Kenneth L., to Union Carbide Chemicals and Plastics Company Inc. Connected branch copolymers, methods for their production, and copying materials including same. 4,946,824, Cl. 503-216.000.

Messerly, Harry E.: See—  
Beck, Scott A.; and Messerly, Harry E., 4,947,017, Cl. 219-86.250.

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Metcalf, Brian W.: See—  
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,946,834, Cl. 514-119.000.

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Lund, William J., 4,945,942, Cl. 137-337.000.

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Garg, Diwakar; Meuller, Carl F.; Wreessies, Ernest L.; Dyer, Paul N.; and Pellman, Mark A., 4,945,640, Cl. 30-350.000.

Meussner, Mark A., to Ford Motor Company. Method and apparatus for use in manufacturing safety glass laminates. 4,946,523, Cl. 156-64.000.

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Sherwood, Carl H.; Meyer, Karen M.; Covert, Charles H.; and Weillnau, Gregory P., 4,946,060, Cl. 220-86.200.

Meyer, Reinhard: See—  
Zettier, Karl H.; Klapper, Siegfried; Fritze, Hartwig; and Meyer, Reinhard, 4,946,698, Cl. 426-495.000.

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Ebert, Wolfgang; Meyer, Rolf-Volker; Dhein, Rolf; and Oels, Udo, 4,946,927, Cl. 528-198.000.

Meyn, Erwin H.: See—  
Ramsey, John K.; and Meyn, Erwin H., 4,946,122, Cl. 248-229.000.

Michael Adell: See—  
Adell, Loren S., 4,946,387, Cl. 433-20.000.

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Michaels, Daniel J. Rapid expansion bullet. 4,945,836, Cl. 102-503.000.

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Paul, Richard F.; Byers, Larry L.; and Michaelson, Wayne A., 4,947,393, Cl. 371-16.100.

Michaely, William J.: See—  
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Michalak, David J.: See—  
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Micheron, Francois: See—  
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Michon, Maurice; and Rigny, Paul, to Commissariat a l'Energie Atomique. Apparatus for the distribution of laser beams used during a selective reaction in a process for isotope separation by lasers. 4,946,567, Cl. 204-157.220.

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Sonimachi, Kenichi; Tozawa, Hirokazu; Fujii, Tetsuya; Itoyama, Seiji; and Miki, Yuji, 4,945,975, Cl. 164-478.000.

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Miller, Clifton L.; and Kerrison, Ronald L. Chain saw safety guard. 4,945,641, Cl. 30-382.000.

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Miller, Francis P.: See—  
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Miller, Jonathan L.: See—  
Stewart, W. Kern; Crudele, Lester M.; Miller, Jonathan L.; Riera, Marco E.; and Schurmann, Bruce E., 4,947,357, Cl. 371-22.300.

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Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 4,946,782, Cl. 435-126.000.

Miller, Michael K., to AmerInd, Inc. Ammunition magazine housing assembly. 4,945,664, Cl. 42-49.010.

Miller, Robert C., Jr., to FPPF Chemical Corporation Inc. Process and apparatus for re-cycling engine coolant. 4,946,595, Cl. 210-651.000.

Miller, Robert E.: See—  
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Miller, Steven R.: See—  
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Miller, William D.; Chapin, Leo N.; and Evans, Joseph T., Jr., to National Semiconductor Corporation. Method for preparing PLZT, PZT and PLT sol-gels and fabricating ferroelectric thin films. 4,946,710, Cl. 427-126.300.

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Miner, Jonathan L.; Lacher, Vernon R.; Rescigno, Gerald J.; Swim, William B.; Gierke, Martin P.; and Hahn, David A., to Black & Decker Inc. Portable blower. 4,945,604, Cl. 15-344.000.

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Landin, Donald T., 4,946,742, Cl. 428-354.000.

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Vallarino, Angelo, 4,946,768, Cl. 430-512.000.

Minogue, Robert W. High voltage trip mechanism for sign segments. 4,947,147, Cl. 337-18.000.

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Mitchell, John. Building module. 4,945,694, Cl. 52-223.00R.

Mitek Surgical Products, Inc.: See—  
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Mito, Ikuo, to NEC Corporation. Optical transmitter utilizing a bistable distributed feedback semiconductor laser. 4,947,458, Cl. 455-609.000.

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Shima, Akihiro; and Susaki, Wataru, 4,946,802, Cl. 437-129.000.

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Wada, Tomohisa; and Murakami, Shuji, 4,947,374, Cl. 365-195.000.



- Yamamoto, Kyohei; and Morishita, Akira, 4,947,051, Cl. 290-38.00R.
- Yasuda, Kenichi; Wakata, Hitoshi; and Nakatani, Hajime, 4,947,398, Cl. 372-29.000.
- Yoshinaga, Isao; and Edashima, Toshikazu, 4,946,642, Cl. 376-260.000.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha: See—  
Hiramatsu, Takeo, 4,947,330, Cl. 364-424.100.
- Okuda, Masahisa; Nishimura, Atsushi; Kitagawa, Hiroaki; and Kaku, Koichi, 4,946,358, Cl. 425-183.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: See—  
Yamashita, Riichiro, 4,946,019, Cl. 194-318.000.
- Mitsubishi Kasei Corporation: See—  
Sato, Tadashige; and Kobashi, Yasuji, 4,946,801, Cl. 437-126.000.
- Mitsubishi Monsanto Chemical Co., Ltd.: See—  
Sato, Tadashige; and Kobashi, Yasuji, 4,946,801, Cl. 437-126.000.
- Mitsubishi Pencil Co., Ltd.: See—  
Uchida, Masaki, 4,946,302, Cl. 401-288.000.
- Mitsui Mining & Smelting Co., Ltd.: See—  
Akiyama, Kazutoyo; Kimura, Takeshi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.
- Mitsui Norin Co., Ltd.: See—  
Hara, Yukihiro; Okushio, Kazuo; and Sakata, Kanzo, 4,946,950, Cl. 536-4.100.
- Mitsui Petrochemical Industries, Ltd.: See—  
Masumoto, Kazuhiro, 4,946,368, Cl. 425-525.000.
- Shiraki, Takeshi; and Yoshimura, Yoshihiro, 4,946,371, Cl. 428-36.900.
- Torihata, Takashi; and Kawashima, Etsuko, 4,946,582, Cl. 208-251.00R.
- Mitsui Toatsu Chemicals, Inc.: See—  
Fukuhara, Nobuhiro; Yoshino, Setsuo; Satori, Nakajima, Yoshiyuki; and Makiguchi, Nobuyoshi, 4,946,790, Cl. 435-252.330.
- Imuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,946,877, Cl. 568-727.000.
- Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76.000.
- Mitsuno, Tatsuyuki; Shinonaga, Hideo; and Daimon, Akio, to Sumitomo Chemical Company, Ltd. Thermoplastic elastomer composition, 4,946,896, Cl. 525-93.000.
- Mitsuoaka Electric Manufacturing Co., Ltd.: See—  
Nakamura, Tomio, 4,947,313, Cl. 363-143.000.
- Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; and Ogita, Hiromitsu, to Shinko Denki Kabushiki Kaisha. Thermal printing system with automatic crumbled paper release, 4,947,185, Cl. 346-76.0PH.
- Mitsutake, Hideaki: See—  
Yaegashi, Hisao; Mitsutake, Hideaki; Yoshinaga, Kazuo; and Miyagawa, Masashi, 4,946,261, Cl. 350-353.000.
- Miura, Tohru: See—  
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76.000.
- Miwa, Kiyoshi: See—  
Nakamori, Shigeru; Takagi, Hiroshi; Ishida, Masaaki; Sato, Takaaki; Miwa, Kiyoshi; and Sano, Konosuke, 4,946,781, Cl. 435-115.000.
- Miwa, Tetsuo: See—  
Nomura, Hiroaki; Akimoto, Hiroshi; and Miwa, Tetsuo, 4,946,846, Cl. 514-258.000.
- Miyagawa, Masashi: See—  
Yaegashi, Hisao; Mitsutake, Hideaki; Yoshinaga, Kazuo; and Miyagawa, Masashi, 4,946,261, Cl. 350-353.000.
- Miyahara, Tadato: See—  
Nakamachi, Ichiro; Yasuzawa, Kunio; Miyahara, Tadato; and Nagata, Takahiro, 4,945,841, Cl. 110-341.000.
- Miyake, Akio; Kondo, Masahiro; and Fujino, Masahiko, to Takeda Chemical Industries, Ltd. Cephem compounds, 4,946,837, Cl. 514-206.000.
- Miyake, Hitomi: See—  
Tamba, Shinichi; Miyake, Hitomi; and Tanaka, Hiromu, 4,946,482, Cl. 55-320.000.
- Miyamoto, Hirohisa: See—  
Nagata, Kenzo; Araki, Kazuhiro; and Miyamoto, Hirohisa, 4,947,210, Cl. 355-218.000.
- Miyaoka, Shinichi; Shiraiishi, Takayoshi; and Sasaki, Ryoichi, to Hitachi, Ltd. Method for data coding, 4,947,447, Cl. 382-56.000.
- Miyatani, Takao: See—  
Kajitani, Yoshimi; Ohta, Michiaki; and Miyatani, Takao, 4,945,685, Cl. 51-165.930.
- Miyazaki, Osahiko: See—  
Kazama, Yasuo; and Miyazaki, Osahiko, 4,946,323, Cl. 409-178.000.
- Miyazawa, Takeshige: See—  
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 4,946,495, Cl. 71-92.000.
- Miyoshi, Teruzo: See—  
Hashimoto, Masamichi; Saegusa, Haruhisa; Chiba, Susumu; Kitagawa, Hironoshin; and Miyoshi, Teruzo, 4,946,780, Cl. 435-101.000.
- Mizoguchi, Yoshiyuki; and Watanabe, Yoshitaka, to Canon Kabushiki Kaisha. Image input apparatus with lens adjustment, 4,946,255, Cl. 350-255.000.
- Mizuguchi, Toshinori: See—  
Higuchi, Seijun; Asakawa, Kenichi; Mizuguchi, Toshinori; and Fujinaga, Minoru, 4,946,748, Cl. 428-644.000.
- Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, to Fuji Photo Film Co., Ltd. Method of preparing kneaded mixture for magnetic coating material, 4,946,615, Cl. 252-62.540.
- Mizuno, Chiaki: See—  
Ono, Toshio; Ogawa, Hiroshi; Mizuno, Chiaki; and Saito, Shinji, 4,946,740, Cl. 428-323.000.
- Mizuno, Hiroshi: See—  
Ikegawa, Akihito; Mizuno, Hiroshi; Murasaki, Hiroshi; and Etou, Kouichi, 4,947,212, Cl. 355-265.000.
- Mizuno, Hiroyuki: See—  
Kuroda, Takao; Kuriyama, Toshihiro; Horii, Kenju; and Mizuno, Hiroyuki, 4,947,224, Cl. 357-30.000.
- Mizusawa, Nobutoshi; Ebinuma, Ryuichi; and Chiba, Yuji, to Canon Kabushiki Kaisha. Ink jet recording apparatus comprising mechanism for conveying sheet-like cleaning medium to a recording region, discharge recovery treatment method employed in the same, and cleaning sheet also employed in the same, 4,947,190, Cl. 346-140.00R.
- Mizutani, Masato: See—  
Manabe, Akio; Mizutani, Masato; Maeda, Kiyoto; Ooishi, Tadashi; and Takano, Hirotaka, 4,946,867, Cl. 514-521.000.
- Mobay Corporation: See—  
Jackman, Dennis E.; Combs, Gary W.; and Westphal Dietmar B., 4,946,995, Cl. 564-18.000.
- Nicola, William J., Jr.; and Miller, Edward A., 4,945,854, Cl. 118-324.000.
- Mobil Oil Corporation: See—  
Ross, Mark S.; and Zahner, John C., 4,946,656, Cl. 422-144.000.
- Mobile Oil Corporation: See—  
Hsieh, J. T. T., 4,946,914, Cl. 526-106.000.
- Jones, Lloyd G., 4,945,991, Cl. 166-278.000.
- Mochizuki, Yuzo: See—  
Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, 4,946,401, Cl. 439-224.000.
- Modern Controls, Inc.: See—  
Mayer, William N.; Oestreich, Roger; and Mayer, Daniel W., 4,947,131, Cl. 324-671.000.
- Mody, Dhiraj S.: See—  
Blank, Robert G.; Mody, Dhiraj S.; Kenny, Richard J.; and Aveson, Martha C., 4,946,684, Cl. 424-441.000.
- Moe, Per H. Induction welding apparatus and method, 4,947,462, Cl. 219-8.500.
- Moggi, Giovanni; and Marchionni, Giuseppe, to Ausimont S.r.l. Fluorinated polymers and copolymers containing perfluoropolyethers blocks, 4,946,936, Cl. 528-392.000.
- Moller, Wolfgang: See—  
Dichtelmuller, Herbert; Moller, Wolfgang; Stephan, Wolfgang; and Schleussner, Hans, 4,946,648, Cl. 422-24.000.
- Monkelbaan, Edwin R.: See—  
Paradise, Elizabeth M.; and Monkelbaan, Edwin R., 4,947,345, Cl. 364-519.000.
- Monkhouse, Donald C.: See—  
Floyd, David; Kocy, Octavian R.; Monkhouse, Donald C.; and Pipkin, James D., 4,946,838, Cl. 514-210.000.
- Monsanto Company: See—  
Gard, David R., 4,946,662, Cl. 423-314.000.
- Monson, Demetrius A. Weight reducing athletic garment, 4,946,453, Cl. 604-312.000.
- Monson, Donald R.; LeBlanc, James A.; and Tokar, Joseph C., to Donaldson Company, Inc. Support for clean room ceiling grid system, 4,946,484, Cl. 55-385.200.
- Montano, Frederick D., to Standard Telephone and Cables Pty. Ltd. Telephone protection circuit, 4,947,426, Cl. 379-412.000.
- Montedipe S.p.A.: See—  
Albizzati, Enrico; Borghi, Italo; Fattorini, Franco; and Giunchi, Giovanni, 4,946,897, Cl. 525-132.000.
- Brichta, Corrado; Vezzoli, Annibale; and Borghi, Angelo, 4,946,871, Cl. 521-149.000.
- Montes, Gilbert: See—  
Escobar, Benjamin A., Jr.; Wahner, Lester J.; Montes, Gilbert; and Farraro, John T., 4,946,520, Cl. 148-432.000.
- Moore, Eugene L.: See—  
Dundas, Dennis L.; and Moore, Eugene L., 4,946,366, Cl. 425-536.000.
- Moore, Robert B.: See—  
Perka, Alan T.; Hsiung, Thomas H.; Klosek, Joseph; and Moore, Robert B., 4,946,477, Cl. 48-197.00R.
- Moore, Victor S.: See—  
Thoma, Nandor G.; Moore, Victor S.; and Kraft, Wayne R., 4,947,369, Cl. 364-900.000.
- Moorman, Stephen E., to Nekoosa Packaging Corporation. Half slotted container lid with self-locking double side panels, 4,946,093, Cl. 229-128.190.
- Moran, Kevin S.: See—  
Czarnocki, Walter S.; Harper, Peter W.; Moran, Kevin S.; and Alexander, Steven W., 4,947,057, Cl. 307-310.000.
- Moran, Thomas J.; Buynak, Charles F.; and Martin, Richard W., to United States of America, Air Force. Ultrasonic scan system for nondestructive inspection, 4,947,351, Cl. 364-507.000.
- Morello, Edwin F.: See—  
Fenoglio, David J.; Fjare, Douglas E.; Morello, Edwin F.; and Nowicki, Neal R., 4,946,934, Cl. 528-349.000.

- Morgan, George C.: See—  
Hardin, Nathaniel A.; and Morgan, George C., 4,945,986, Cl. 166-249.000.
- Morgan, John P.: See—  
Marchant, Norman J.; and Morgan, John P., 4,947,340, Cl. 364-500.000.
- Morgan, Noredin H.: See—  
Seeger, Richard E., Jr.; Morgan, Noredin H.; and Landry, Joseph R., Jr., 4,946,733, Cl. 428-209.000.
- Morgan, Richard A.: See—  
Bekarian, Paul G.; Buckmaster, Marlin D.; and Morgan, Richard A., 4,946,902, Cl. 525-326.200.
- Morgan, Ricky D.; and Sylvester, Vito P., to GTE Products Corporation. Press forging of molybdenum or molybdenum alloy parts, 4,945,750, Cl. 72-377.000.
- Mori, Kazunori; and Irie, Namio, to Nissan Motor Co., Ltd. Rear wheel steer angle control system for vehicle, 4,947,326, Cl. 364-424.050.
- Mori, Kenji: See—  
Koseki, Koshi; and Mori, Kenji, 4,946,999, Cl. 562-452.000.
- Mori, Kusuki: See—  
Sato, Takefumi; and Mori, Kusuki, 4,947,156, Cl. 340-707.000.
- Mori, Masaya; and Kihira, Kazunobu, to Sumitomo Electric Industries, Ltd. Heating coil assembly for an electromagnetic induction cooking assembly, 4,947,464, Cl. 219-10.790.
- Mori, Shigeru: See—  
Oka, Shinya; and Mori, Shigeru, 4,946,298, Cl. 400-605.000.
- Mori, Toshihiro: See—  
Nozawa, Minoru; Koizumi, Yutaka; Mori, Toshihiro, and Saito, Atsushi, 4,947,191, Cl. 346-140.00R.
- Mori, Toshiki: See—  
Onishi, Takashi; Mori, Toshiki; Suzuki, Shigeaki; Takigawa, Michio; and Yamamoto, Kazuo, 4,947,001, Cl. 568-28.000.
- Morimoto, Kunio: See—  
Kawai, Rie; Goto, Kanzen; and Morimoto, Kunio, 4,947,479, Cl. 364-408.000.
- Morimoto, Makoto: See—  
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,946,957, Cl. 544-342.000.
- Morimoto, Toshiki: See—  
Tanaka, Yutaka; Morimoto, Toshiki; and Watanabe, Seiji, 4,947,229, Cl. 357-45.000.
- Morimoto, Toshio: See—  
Nate, Tasuo; Morimoto, Toshio; Oka, Kouichi; and Endo, Shinobu, 4,946,501, Cl. 75-246.000.
- Morimoto, Yoshio: See—  
Imuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,946,877, Cl. 568-727.000.
- Morin, Pierre: See—  
Lessi, Jacques; and Morin, Pierre, 4,945,761, Cl. 73-151.000.
- Morino, Makoto: See—  
Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.
- Morishima, Yasuo: See—  
Goto, Yukihiisa; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,946,497, Cl. 71-94.000.
- Morishita, Akira: See—  
Yamamoto, Kyohei; and Morishita, Akira, 4,947,051, Cl. 290-38.00R.
- Morita, Kouichi: See—  
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,946,961, Cl. 548-159.000.
- Morito Co., Ltd.: See—  
Okano, Shunsuke, 4,945,616, Cl. 24-585.000.
- Moriwaki, Yoshio: See—  
Gamo, Takaharu; Moriwaki, Yoshio; and Iwaki, Tsutomu, 4,946,646, Cl. 420-415.000.
- Mormann, Werner; and Leukel, Gabriele, to Bayer Aktiengesellschaft. Process for the preparation of isocyanates and their use of the preparation of polyisocyanates containing ester groups, 4,946,990, Cl. 560-106.000.
- Morris, James A.: See—  
Farhood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 4,946,782, Cl. 435-126.000.
- Morris, Jeffrey A.: See—  
Zook, Brian J.; Pollock, Clifford R.; and Morris, Jeffrey A., 4,947,035, Cl. 250-225.000.
- Morris, John L.; and Martin, Robert L., to Bass Pro Shops, Inc. Retractable cleat, 4,945,849, Cl. 114-218.000.
- Morris, Robert L.; and Barton, Jeffrey N., to Rorer Pharmaceutical Corporation. Benzothioipyranyl derivatives as HMG-CoA reductase inhibitors, 4,946,860, Cl. 514-432.000.
- Morrissey, Raymond T.: See—  
Bradshaw, Anthony J.; Morrissey, Raymond T.; Ketchum, Christopher J.; and Hawkins, John R., 4,946,459, Cl. 606-62.000.
- Morrow, David E., to Electronic Surveillance Corporation. Leakage resistance detector and alarm circuit, 4,947,155, Cl. 340-650.000.
- Morsch, Gary L.: See—  
Lyon, James R.; Morsch, Gary L.; Murray, Gerald D.; and Robinson, James B., 4,946,319, Cl. 407-115.000.
- Morse, David R.: See—  
Chapman, Dwight E.; and Morse, David R., 4,946,739, Cl. 428-286.000.
- Morton International, Inc.: See—  
Stumpf, Robert C.; Correa, Jose L.; and Farnum, Charles L., 4,946,524, Cl. 156-87.000.
- Moscirp, William M.; and Kiraly, Louis J., to United States of America, Navy. Rapid fire howitzer, 4,945,813, Cl. 89-33.100.
- Moser, Hans: See—  
Pissiotas, Georg; Moser, Hans; and Brunner, Hans-Georg, 4,946,492, Cl. 71-72.000.
- Moss, David E.: See—  
Sidner, Diane W.; Yoder, Douglas J.; and Moss, David E., 4,945,769, Cl. 73-727.000.
- Moss, William E.: See—  
Hoberman, Barry A.; and Moss, William E., 4,947,060, Cl. 307-467.000.
- Mosse, Madeleine: See—  
Demarne, Henri; Filhol, Robert; and Mosse, Madeleine, 4,946,868, Cl. 514-544.000.
- Mostert, Roelof J.; and Badenhorst, Rudolf P., to Iscor Limited. High strength, high toughness steel and method of manufacturing thereof, 4,946,515, Cl. 148-12.00F.
- Motono, Masahiro, to Sansho Seiyaku Co., Ltd.; and Hayashi, Teruaki. Hair-dyeing composition and hair-dyeing method using the same, 4,946,472, Cl. 8-424.000.
- Motorola, Inc.: See—  
Abdi, Behrooz; Main, Eric; and Hanna, John E., 4,947,103, Cl. 323-316.000.
- Czarnocki, Walter S.; Harper, Peter W.; Moran, Kevin S.; and Alexander, Steven W., 4,947,057, Cl. 307-310.000.
- Mijuskovic, Dejan, 4,947,135, Cl. 330-9.000.
- Sharma, Ravinder K.; Lytle, William H.; Rogona, Angela; and Hileman, Bennett L., 4,946,376, Cl. 428-620.000.
- Spanjer, Keith G.; and Flowers, Dervin L., 4,946,518, Cl. 148-282.000.
- Stahl, John I.; Michalak, David J.; and Knapp, Klaus, 4,947,420, Cl. 379-57.000.
- Williams, Tim A., 4,947,363, Cl. 364-724.190.
- Moyer, James D., to Bentley-Harris Manufacturing Company, The. Protective fabric sleeves, 4,946,722, Cl. 428-36.100.
- Moynihan, Edward R., to Spectra, Inc. Elimination of nucleation sites in pressure chamber for ink jet systems, 4,947,184, Cl. 346-1.100.
- MTU Motoren- und Turbinen-Union Munchen GmbH: See—  
Grieb, Hubert, 4,945,811, Cl. 89-8.000.
- Muck, Karl-Friedrich: See—  
Braun, Gero; Burg, Karlheinz; and Muck, Karl-Friedrich, 4,946,561, Cl. 203-49.000.
- Mueller, Richard, to American Hofmann Corporation. Rotor imbalance correction apparatus and method thereof, 4,945,763, Cl. 73-462.000.
- Mukai, Junji: See—  
Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ihamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.
- Muller-Albrecht, Horst: See—  
Meckel, Walter; Muller-Albrecht, Horst; and Dollhausen, Manfred, 4,946,535, Cl. 156-331.700.
- Muller, Gerhard. Device for taking up a line, 4,946,115, Cl. 242-289.000.
- Muller, Jakob: See—  
Rolli, Hans; and Muller, Jakob, 4,947,014, Cl. 219-64.000.
- Muller, Udo: See—  
Jacob-Grinschgl, Wolfgang; and Muller, Udo, 4,947,460, Cl. 178-19.000.
- Muller, Urs: See—  
Frater, Georg; and Muller, Urs, 4,947,002, Cl. 568-373.000.
- Muller, Werner E. G.; Zahn, Rudolf K.; and Eich, Eckart, to Merz and Co. GmbH & Co. Avarol, process for its production, pharmaceutical compositions thereof, and antiviral use of the same, 4,946,869, Cl. 514-729.000.
- Multi-Pump, Inc.: See—  
Evenson, Randy, 4,946,352, Cl. 417-396.000.
- Munenaga, Yukio; and Izumi, Tomoji, to Mazda Motor Corporation. Monitoring systems in sequential program control arrangements, 4,947,349, Cl. 364-551.010.
- Munir, Zuhair A.: See—  
Dunnead, Stephen D.; Holt, Joseph B.; Kingman, Donald D.; and Munir, Zuhair A., 4,946,643, Cl. 419-12.000.
- Munyon, Todd; and Toarmina, Chris, to Square D Company. Field-installable heavy duty undervoltage release, 4,947,284, Cl. 361-92.000.
- Murai, Shunji; and Shirasawa, Akishige, to Kabushiki Kaisha Topcon. Stereoscopic photographic measuring device, 4,947,048, Cl. 250-558.000.
- Murakami Kaimeido Co. Ltd.: See—  
Yoshioka, Toshio; and Nakayama, Kiyoshi, 4,947,461, Cl. 200-5.00R.
- Murakami, Koichi; and Honjo, Takeshi, to Canon Kabushiki Kaisha. Image forming apparatus with control mechanism to correct any aberration in stopping position of original document, 4,947,217, Cl. 355-317.000.
- Murakami, Shuji: See—  
Wada, Tomohisa; and Murakami, Shuji, 4,947,374, Cl. 365-195.000.
- Murakawa, Masatake; and Yuki, Mikio, to Kubota Ltd. Lawn mower, 4,945,716, Cl. 56-13.300.
- Muraki, Masato, to Canon Kabushiki Kaisha. Exposure system with exposure controlling acoustooptic element, 4,947,047, Cl. 250-492.200.
- Muramatsu, Kimio: See—  
Ishida, Syuichi; Goto, Shinichi; and Muramatsu, Kimio, 4,945,786, Cl. 74-552.000.

Muranori, Tsuyoshi, and Ito, Akinori, to Alps Electric Co., Ltd. Illuminated switch device. 4,947,011, Cl. 200-314.000.  
**Muraoka, Hirohide: See—**  
 Yano, Seinosuke; Okamura, Yoshihiro; and Muraoka, Hirohide, 4,946,516, Cl. 148-12.00F.  
**Murasaki, Hiroshi: See—**  
 Ikegawa, Akihito; Mizuno, Hiroshi; Murasaki, Hiroshi; and Etou, Kouichi, 4,947,212, Cl. 355-265.000.  
**Murata Manufacturing Co., Ltd.: See—**  
 Kaneko, Toshimi; Yamanoto, Hidetoshi; and Sakai, Hiromichi, 4,947,286, Cl. 361-321.000.  
 Kumada, Akira, 4,945,634, Cl. 29-854.000.  
 Murata, Shinji; Onuki, Kazuhiko; Maetani, Masami; and Sugiyama, Kazuhide, to Canon Kabushiki Kaisha. Projection copying apparatus. 4,947,213, Cl. 355-271.000.  
 Murata, Takeo, to JGC Corporation. Drive apparatus and motor unit using the same. 4,947,077, Cl. 310-328.000.  
 Murphy, Colin R., to Engineered Construction Components (America). Stress plate. 4,945,699, Cl. 52-410.000.  
 Murphy, Dennis, to Burr-Brown Corporation. Hazardous waste removal devices. 4,945,955, Cl. 141-65.000.  
 Murphy, Frank H.; Jernigan, Robert T.; Grierson, Jeff G.; and Wessels, Wayne G., to Dow Chemical Company. The. High purity polyether polyols. 4,946,939, Cl. 528-421.000.  
 Murphy, James F., to Simplimatic Engineering Company. Multiple position, conveyor mountable workpiece carrier. 4,946,021, Cl. 198-375.000.  
 Murphy, James F., to Simplimatic Engineering Company. Apparatus and method for separating articles on a conveyor. 4,946,025, Cl. 198-459.000.  
 Murphy, James F.; and Wiseman, John A., to Simplimatic Engineering Company. Dunnage handling system. 4,946,340, Cl. 414-758.800.  
 Murphy, Paul F.; and Marmott, Brian M., to Carrier Corporation. Suction strainer and method of assembly. 4,946,598, Cl. 210-452.000.  
 Murray, Declan G.; and Powell, John H., to British Aerospace Public Limited Company. Tactical routing system and method. 4,947,350, Cl. 364-554.000.  
**Murray, Gerald D.: See—**  
 Lyon, James R.; Morsch, Gary L.; Murray, Gerald D.; and Robinson, James B., 4,946,319, Cl. 407-115.000.  
 Murthy, D. V. Krishna; Venuti, Michael C.; and Young, John M., to Syntex (U.S.A.) Inc. Naphthalene anti-psoriasis agents. 4,946,845, Cl. 514-256.000.  
**Musco Corporation: See—**  
 Gordin, Myron K.; and Drost, Jim L., 4,947,303, Cl. 362-261.000.  
 Mushardt, Heinrich; Uhlig, Uwe; Lutjens, Peter; Beyer, Horst; and Matsyck, Frank, to Korber AG. Method of dressing grinding wheels. 4,945,888, Cl. 125-11.150.  
 Musil, Joseph E., to Cedarapids, Inc. Apparatus for and methods of producing a hot asphaltic material. 4,946,283, Cl. 366-15.000.  
 Muska, Willis M.; and Couch, Philip R., to FiberCom, Inc. Fiber optic bypass switch. 4,946,247, Cl. 350-9b.200.  
**Myers, Richard M.: See—**  
 Maniatis, Thomas P., and Myers, Richard M., 4,946,773, Cl. 435-6.000.  
 Myers, Robert E.: See—  
 Myers, William F.; and Myers, Robert E., 4,945,858, Cl. 113-28.000.  
 Myers, Terrence L., to Hughes Aircraft Company. Subranging analog-to-digital converter with calibration. 4,947,168, Cl. 341-120.000.  
 Myers, William F.; and Myers, Robert E. Sanitary animal stall. 4,945,858, Cl. 119-28.000.  
 Myslicki, Robert J.; May, Carl D.; and Rusnell, Douglas L., to General Motors Corporation. Adjustable striker assembly with anti-theft protection. 4,946,208, Cl. 292-216.000.  
 N.A. Hardin 1977 Trust, N.A. Hardin, Trustee: See—  
 Hardin, Nataniel A.; and Morgan, George C., 4,945,986, Cl. 166-249.000.  
 Nabha, Ali M.; and Dock, John C., to Chrysler Corporation. Solid state windshield wash and wipe controller. 4,947,092, Cl. 318-444.000.  
**Nagahara, Yoshiyuki: See—**  
 Inui, Tetsuya; Hirokane, Junji; Shihata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, 4,946,730, Cl. 428-64.000.  
**Nagai, Seiichi: See—**  
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**Nagamatsu, Yasuhiro: See—**  
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**Nagano, Eiki: See—**  
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 Nagano, Fumikazu, to Sharp Kabushiki Kaisha. System for lighting fluorescent lamps. 4,947,086, Cl. 315-251.000.  
**Nagao, Kazuyoshi: See—**  
 Shingaki, Seiichi; Nagao, Kazuyoshi; Takahashi, Yasuo; and Noma, Takashi, 4,946,724, Cl. 428-64.000.  
 Nagaoka, Daiji, to Fuji Xerox Co., Ltd. Image processing method and apparatus. 4,947,444, Cl. 382-48.000.  
 Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Ultrasonic diagnosis apparatus. 4,945,915, Cl. 128-660.070.  
**Nagasawa, Kenichi: See—**  
 Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, 4,947,448, Cl. 382-56.000.  
**Nagashima, Osamu: See—**  
 Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto;

Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.  
**Nagashima, Toshiharu: See—**  
 Arai, Takeo; and Nagashima, Toshiharu, 4,946,769, Cl. 430-539.000.  
**Nagata, Kenzo; Araki, Kazuhiro; and Miyamoto, Hirohisa, to Minolta Camera Kabushiki Kaisha. Multi-color copying machine. 4,947,210, Cl. 355-218.000.**  
**Nagata Seiki Kabushiki Kaisha: See—**  
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**Nagata, Takahiro: See—**  
 Nakamachi, Ichiro; Yasuzawa, Kunio; Miyahara, Tadato; and Nagata, Takahiro, 4,945,841, Cl. 110-341.000.  
 Nagata, Teruyuki; Okazaki, Koji; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, to Mitsui Toatsu Chemicals, Inc. S-alkyl thiocarbamate base resin, plastic lens comprising the resin, and process for making the lens. 4,946,923, Cl. 528-76.000.  
**Nagron Precision Tooling B.V.: See—**  
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**Nahill, George F.: See—**  
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**Naider, Fred R.: See—**  
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 Najjar, Mitri S.; and Gates, Walter C., Jr., to Texaco Inc. Partial oxidation of bituminous coal. 4,946,476, Cl. 48-197.00R.  
 Nakagawa, Katsumi; and Shimizu, Isamu, to Canon Kabushiki Kaisha. Thin film photoelectromotive force element having multi-thin films stacked semiconductor layer. 4,946,514, Cl. 136-258.000.  
**Nakagawa, Kiyotoshi: See—**  
 Ashida, Tsutomu; Nakagawa, Kiyotoshi; Fujii, Katsumasa; and Torimaru, Yasuo, 4,947,232, Cl. 357-53.000.  
**Nakahara, James H.: See—**  
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**Nakai, Masaaki: See—**  
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**Nakajima, Fumito: See—**  
 Tachi, Takahiro; Kato, Akira; Kawagoshi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.  
 Nakajima, Masahiro; and Kashiwaba, Satoshi, to NEC Corporation. Spare channel monitor circuit. 4,947,394, Cl. 371-20.100.  
**Nakajima, Shigeo: See—**  
 Yoshimoto, Yoshikazu; Suzuki, Tomonari; Higashigaki, Yoshiyuki; Nakajima, Shigeo; and Inoguchi, Toshio, 4,946,370, Cl. 427-249.000.  
**Nakajima, Yoshiyuki: See—**  
 Fukuhara, Nobuhiro; Yoshino, Setsuo; Sone, Satoru; Nakajima, Yoshiyuki; and Makiguchi, Nobuyoshi, 4,946,790, Cl. 435-252.330.  
**Nakajiri, Takashi; Hachinoda, Masayuki; Matsumoto, Masafumi; and Kotani, Matabira, to Sharp Kabushiki Kaisha. Data transmission system. 4,947,268, Cl. 358-426.000.**  
**Nakamachi, Ichiro; Yasuzawa, Kunio; Miyahara, Tadato; and Nagata, Takahiro, to Tokyo Gas Company Limited. Apparatus or method for carrying out combustion in a furnace. 4,945,841, Cl. 110-341.000.**  
 Nakamori, Shigeru; Takagi, Hiroshi; Ishida, Masaaki; Sato, Takaaki; Miwa, Kiyoshi; and Sano, Konosuke, to Ajinomoto Co., Inc. Recombinant DNA, bacteria carrying said recombinant DNA and a process for producing L-threonine or L-isoleucine using said bacteria. 4,946,781, Cl. 435-115.000.  
**Nakamoto, Akira: See—**  
 Suzuki, Shinichi; Tanaka, Hiroshi; and Nakamoto, Akira, 4,946,350, Cl. 417-222.000.  
**Nakamura, Masafumi: See—**  
 Tsuruoka, Tosiaki; Maeoka, Tatsuo; and Nakamura, Masafumi, 4,947,512, Cl. 363-134.000.  
 Nakamura, Mikio; and Takayama, Yukio, to Kanzaki Paper Manufacturing Co., Ltd. Heat-sensitive record material. 4,946,823, Cl. 503-200.000.  
**Nakamura, Osamu: See—**  
 Saito, Yuria; Ogino, Isao; Nakamura, Osamu; and Yamamoto, Yoshifumi, 4,946,614, Cl. 252-62.200.  
**Nakamura, Shigeo: See—**  
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 Nakamura, Tomio, to Mitsuoka Electric Manufacturing Co., Ltd. Direct current power supply. 4,947,313, Cl. 363-143.000.  
 Nakamura, Tsuyoshi, to Fuji Xerox Co., Ltd. After-processing apparatus for a copying machine. 4,946,154, Cl. 270-53.000.  
**Nakamura, Yoshihiro: See—**  
 Hayashida, Yoshihiro; Nakamura, Yoshihiro; Ishii, Hideaki; and Koshimizu, Naganori, 4,945,729, Cl. 60-562.000.  
**Nakamura, Yoshinobu: See—**  
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 Nakamura, Yoshinori, to Nissei ASB Machine Co., Ltd. Rotary type blow molding machine. 4,946,367, Cl. 425-526.000.

Nakanishi, Koichiro; Ootera, Hiroki; Hanazaki, Minoru; and Minami, Toshihiko, to Mitsubishi Denki Kabushiki Kaisha. Plasma processor. 4,947,085, Cl. 315-111.410.  
**Nakanishi, Koichiro: See—**  
 Hiratani, Hajime; Nishimuro, Satoshi; Nakanishi, Koichiro; Ota, Masaichi; and Matsumoto, Hiroshi, 4,946,785, Cl. 435-188.000.  
 Nakaniwa, Noriyuki, to Nissan Motor Company, Limited. System and method for detecting knocking in an internal combustion engine. 4,945,876, Cl. 123-425.000.  
**Nakano, Kuniaki: See—**  
 Kawabata, Katsuichi; and Nakano, Kuniaki, 4,947,046, Cl. 250-484.100.  
**Nakao, Yukihiro: See—**  
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**Nakatani, Hajime: See—**  
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**Nakayama, Kiyoshi: See—**  
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 Nakayama, Tadayoshi; and Fukatsu, Tsutomu, to Canon Kabushiki Kaisha. Multi-channel recording apparatus. 4,947,271, Cl. 360-19.100.  
 Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, to Canon Kabushiki Kaisha. Image information signal transmitting system. 4,947,448, Cl. 382-56.000.  
**Nakayama, Yoshiaki: See—**  
 Okada, Kazuo; and Nakayama, Yoshiaki, 4,947,280, Cl. 360-137.000.  
 Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsubara, Toshihiko, to Daido Tokushuko Kabushiki Kaisha; and Honda Giken Kogyo Kabushiki Kaisha. Steel for gears, having high strength, toughness and machinability. 4,946,645, Cl. 420-84.000.  
**Namsung Electronics Corp.: See—**  
 Shin, Duk W., 4,947,457, Cl. 455-345.000.  
 Napadow, Stanley C., to Protectaire Systems Co. Air curtain housing for conveyor mechanism. 4,946,718, Cl. 427-424.000.  
**Napoli, Louis S.: See—**  
 Stewart, Roger G.; Ipri, Alfred C.; and Napoli, Louis S., 4,947,221, Cl. 357-23.500.  
**Narahara, Toshikazu: See—**  
 Sugawara, Katuo; Takahashi, Akio; Ono, Masahiro; and Narahara, Toshikazu, 4,946,734, Cl. 428-209.000.  
**Narld, Philippe M.: See—**  
 Weith, Andre J.; and Narld, Philippe M., 4,946,861, Cl. 514-436.000.  
 Narusawa, Sadayuki, to Yamaha Corporation. Synchronizing circuit for a video disc playback device. 4,947,264, Cl. 358-337.000.  
 Nash, Philip J.; and Lamb, Christopher, to Plessey Overseas Limited. Optical sensing system with light pulses. 4,947,037, Cl. 250-227.110.  
 Nasu, Atsushi. Solvent for paint. 4,946,886, Cl. 524-425.000.  
 Nate, Tasuo; Morimoto, Toshio; Oka, Kouichi; and Endo, Shinobu, to Sumitomo Metal Mining Company Limited. Alloy target for magnetic optical recording. 4,946,501, Cl. 75-246.000.  
**NaTec Mines, Ltd.: See—**  
 Rosar, Edward C.; and Pattengill, Maurice G., 4,946,311, Cl. 405-129.000.  
 Nathoo, Nazim S., to Shell Oil Company. Method for forming pre-formed material. 4,946,640, Cl. 264-316.000.  
**National Elf Aquitaine: See—**  
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**National Energy Council: See—**  
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**National Research Development Corporation: See—**  
 McGeehan, Joseph P.; and Bateman, Andrew, 4,947,453, Cl. 455-47.000.  
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**National Semiconductor Corporation: See—**  
 Miller, William D.; Chapin, Leo N.; and Evans, Joseph T., Jr., 4,946,710, Cl. 427-126.300.  
**National Space Development Agency of Japan: See—**  
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**National Starch and Chemical Investment Holding Corporation: See—**  
 Leighton, John C.; and Iovine, Carmine P., 4,946,627, Cl. 252-542.000.  
**National Steel Corporation: See—**  
 Jakimowicz, Christopher C.; and Ramey, James H., 4,945,745, Cl. 72-251.000.  
**Nava Milano S.p.A.: See—**  
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 Nawata, Hizuru, to NEC Corporation. Multiple accessing satellite communication system having standby central station. 4,947,451, Cl. 455-8.000.  
**NCR Corporation: See—**  
 Bullinger, Philip W.; Langford, Thomas L., II; and Stewart, John W., 4,947,395, Cl. 371-22.300.  
 Neal, Charles B., to RCA Licensing Corporation. Brightness modulator for closed loop compensation of black level. 4,947,253, Cl. 358-174.000.  
 Neas, Edwin D.; and Floyd, Terry S., to CEM Corporation. Microwave-based Kjeldahl method. 4,946,797, Cl. 436-175.000.  
**NEC Corporation: See—**  
 Aso, Akira, 4,947,233, Cl. 357-65.000.  
 Hannai, Seiichi, 4,947,377, Cl. 365-208.000.

Ishihara, Hiroyuki; and Kinoshita, Makoto, 4,947,403, Cl. 372-87.000.  
 Jinbo, Toshikatsu, 4,947,056, Cl. 307-296.800.  
 Jinbo, Toshikatsu; and Kobatake, Hiroyuki, 4,947,378, Cl. 365-222.000.  
 Mito, Ikuo, 4,947,458, Cl. 455-609.000.  
 Nakajima, Masahiro; and Kashiwaba, Satoshi, 4,947,394, Cl. 371-20.100.  
 Nawata, Hizuru, 4,947,451, Cl. 455-8.000.  
 Tanaka, Kazuo; and Ohta, Naoya, 4,947,442, Cl. 382-5.000.  
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**NEC Home Electronics Ltd.: See—**  
 Kobayashi, Michio; Kobayashi, Renchi; and Shiki, Tatsuya, 4,947,252, Cl. 358-167.000.  
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**Nedelman, Mark: See—**  
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**Negre, Bernard: See—**  
 Baulier, Dominique; Deslipis, Christian; Jami, Jacques; Negre, Bernard; Pierdet, Alain; Negre, Bernard; and Pierdet, Alain, 4,946,089, Cl. 228-45.000.  
 Baulier, Dominique; Deslipis, Christian; Jami, Jacques; Negre, Bernard; Pierdet, Alain; Negre, Bernard; and Pierdet, Alain, 4,946,089, Cl. 228-45.000.  
**Nekoosa Packaging Corporation: See—**  
 Moorman, Stephen E., 4,946,093, Cl. 229-128.190.  
 Nelle, Friedrich; Lehner, Heinz; and Nitzsche, Klaus, to Nokia Graetz. Winding apparatus. 4,946,112, Cl. 242-7.140.  
 Nelson, J. Keith, to Electric Power Research Institute, Inc. Bypass tandem chamber charge density monitor. 4,947,468, Cl. 324-453.000.  
 Nelson, Larry A.; and Woods, James W., to Honeywell, Inc. Fiber optic link noise measurement and optimization system. 4,947,459, Cl. 455-612.000.  
**Nelson, Philip A.: See—**  
 Elliott, Stephen J.; and Nelson, Philip A., 4,947,356, Cl. 364-574.000.  
 Nelson, Richard A.: See—  
 Lane, David; and Nelson, Richard A., 4,946,406, Cl. 439-417.000.  
 Nelson, Stephen G. Quick-release gun trigger safety device. 4,945,665, Cl. 42-70.070.  
**Nendl, Edith: See—**  
 Nendl, Joe; and Nendl, Edith, 4,946,696, Cl. 426-383.000.  
 Nendl, Joe; and Nendl, Edith. Process for producing fine patterning in chocolate surfaces. 4,946,696, Cl. 426-383.000.  
**Nennerfelt, Leif B.: See—**  
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**Nentwig, Gunther: See—**  
 Kruger, Bernd-Wieland; Sasse, Klaus; Hoefer, Franz-Peter; Nentwig, Gunther; and Behrenz, Wolfgang, 4,946,850, Cl. 514-315.000.  
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 De Wit, Johannes, 4,946,704, Cl. 426-637.000.  
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**Neuf, Donald A.: See—**  
 Weiner, Scott M.; Neuf, Donald A.; and Spohrer, Steven J., 4,947,062, Cl. 307-529.000.  
 Neumann, Dietmar J.; and Linecker, Josef. Container collapsible to form a flat platform structure. 4,946,214, Cl. 296-10.000.  
 Neville, Richard E. G., to GBE International PLC. Apparatus for expanding and/or drying particulate material. 4,945,930, Cl. 131-296.000.  
**New England Thermoplastics, Inc.: See—**  
 Tayebi, Amad, 4,945,907, Cl. 128-206.120.  
**New Pac Systems AB: See—**  
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**Newman Machine Company, Inc.: See—**  
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**Newman Tonks Security Limited: See—**  
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 Neyraud, Rene, to ICBT Lyon. Thread cabling machine having an improved regulator device. 4,945,720, Cl. 57-58.360.  
**Ng, Steve Y. W.: See—**  
 Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 4,946,931, Cl. 528-230.000.  
**Ng, Yee S.: See—**  
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**NGK Insulators, Ltd.: See—**  
 Shibata, Kazuyoshi, 4,946,577, Cl. 204-427.000.  
**NGK Spark Plug Co., Ltd.: See—**  
 Okuno, Akiyasu; and Watanabe, Masakazu, 4,946,807, Cl. 501-89.000.  
**Nguyen, Tuyen T.: See—**  
 Chu, Sung G.; Jabloner, Harold; and Nguyen, Tuyen T., 4,946,908, Cl. 525-426.000.  
**Nguyen, Vietson: See—**  
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**Nichigo Film Kabushiki Kaisha: See—**  
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 Nichols, Edward L., III, to Smart House Limited Partnership Limited. Remote sensing power disconnect circuit. 4,947,278, Cl. 361-46.000.



Nick, Bernhard: *See—*  
Bott, Kaspar; Nick, Bernhard; and Schulz, Guenther, 4,946,917, Cl. 526-260.000.

Nickel, Bernd: *See—*  
Engel, Jurgen; Kleemann, Axel; Nickel, Bernd; and Szelenyi, Istvan, 4,946,836, Cl. 514-183.000.

Nicola, William J., Jr.; and Miller, Edward A., to Mobay Corporation. Apparatus for the distribution of a foamable reaction mixture upon a moving base. 4,945,854, Cl. 118-324.000.

Nicpon, Patricia A.: *See—*  
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Nihon Kohden Corporation: *See—*  
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Nihon Tokushu Toryo Co., Ltd.: *See—*  
Hattori, Tutomu; Ohno, Masashi; and Aramaki, Shouji, 4,946,503, Cl. 106-14.340.

Nihonkenkoshoinkenkyukai Co., Ltd.: *See—*  
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Niknafs, Bahrooz S.: *See—*  
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Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Steenhof, Frits A.; Frencken, Peter H.; Nillesen, Antonius H. H. J.; and Van Der Sanden, Cornelis G. L. M., 4,947,380, Cl. 365-238.000.

Nilsson, Aston. Apparatus and method for forming and compacting planting mounds. 4,945,663, Cl. 37-118.00A.

Nilsson, Ingvar; and Gunther, William H., Jr., to Svecia Antiqua Limited. Apparatus for producing paper with decorative edges. 4,946,085, Cl. 225-3.000.

Nilsson, Lars A. H., to Astra Meditec AB. Continuous tapping device. 4,945,950, Cl. 137-798.000.

Nilsson, Per-Ove: *See—*  
Olsson, Torbjorn R.; Kassman, Bjorn T.; Olsson, Karl Gustaf; Ernolf, Stig C.; Nilsson, Per-Ove; Kjellsson, Rolf I. B.; and Widoff, Lars H., 4,947,288, Cl. 361-413.000.

Nimmo, Philip E., IV: *See—*  
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Ninomiya, Masakazu: *See—*  
Ono, Kenichi; Kinugawa, Masumi; Ninomiya, Masakazu; and Suzuki, Atsushi, 4,945,883, Cl. 123-494.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*  
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Nippon Oil Company Ltd.: *See—*  
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Nippon Oil and Fats Co., Ltd.: *See—*  
Akimoto, Shin-ichi; Honda, Susumu; and Yasukochi, Tohru, 4,946,904, Cl. 525-327.800.

Akiyama, Saburo; Honda, Susumu; Akimoto, Shin-ichi; and Yasukochi, Tohru, 4,946,918, Cl. 526-271.000.

Suyama, Shuji; Kato, Mitsukuni; Takada, Jun; and Okada, Hiroshi, 4,947,004, Cl. 568-568.000.

Nippon Paint Co., Ltd.: *See—*  
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,946,757, Cl. 430-192.000.

Nippon Pneumatic Manufacturing Co., Ltd.: *See—*  
Yamanaka, Takanobu, 4,945,998, Cl. 173-134.000.

Nippon Polyurethane Industry Co., Ltd.: *See—*  
Yano, Noriyoshi; and Fujita, Toshihiko, 4,946,906, Cl. 525-399.000.

Nippon Seiko Kabushiki Kaisha: *See—*  
Ishikawa, Yuichi, 4,946,613, Cl. 252-62.520.

Nippon Sheet Glass Co., Ltd.: *See—*  
Peppers, Norman A.; Young, James R.; and Katsuki, Kazuo, 4,947,449, Cl. 382-65.000.

Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*  
Kadono, Yukio; Urano, Yoshiaki; and Watanabe, Fumio, 4,946,620, Cl. 252-190.000.

Nippon Steel Corporation: *See—*  
Higuchi, Seijun; Asakawa, Kenichi; Mizuguchi, Toshinori; and Fujinaga, Minoru, 4,946,748, Cl. 428-644.000.

Minamida, Katsuhiko; and Suehiro, Junya, 4,947,023, Cl. 219-121.680.

Yano, Seinosuke; Okamura, Yoshihiro; and Muraoka, Hirohide, 4,946,516, Cl. 148-12.00F.

Nippondenso Co., Ltd.: *See—*  
Ono, Kenichi; Kinugawa, Masumi; Ninomiya, Masakazu; and Suzuki, Atsushi, 4,945,883, Cl. 123-494.000.

Nippondenso Co., Ltd.: *See—*  
Akiyama, Kazutoyo; Kimura, Takesi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.

Nishi, Kunihiko: *See—*  
Saeki, Junichi; Kaneda, Aizo; Tsunoda, Shigeharu; Yoshida, Isamu; and Nishi, Kunihiko, 4,946,633, Cl. 264-40.100.

Nishijima, Kanji: *See—*  
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,946,757, Cl. 430-192.000.

Nishikawa, Seiichi: *See—*  
Iwata, Yasunari; Nishikawa, Seiichi; and Ichikawa, Yuji, 4,947,325, Cl. 364-424.030.

Nishimatsu, Masaharu; Shimada, Shigeru; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, to TDK Corporation. Resin composition and magnetic recording medium employing the composition. 4,946,729, Cl. 428-141.000.

Nishimoto, Shinichi: *See—*  
Ogawa, Ichirou; Yoshimura, Kouzou; Ueshima, Kenzou; and Nishimoto, Shinichi, 4,947,245, Cl. 358-98.000.

Nishimura, Atsushi: *See—*  
Okuda, Masahisa; Nishimura, Atsushi; Kitagawa, Hiroaki; and Kaku, Koichi, 4,946,358, Cl. 425-183.000.

Nishimura, Keiji: *See—*  
Honda, Atsuhito; Komatsubara, Michiro; Matsumura, Ko; and Nishimura, Keiji, 4,946,519, Cl. 148-307.000.

Nishimuro, Satoshi: *See—*  
Hirata, Hajime; Nishimuro, Satoshi; Nakanishi, Koichiro; Ota, Masaichi; and Matsumoto, Hiroshi, 4,946,785, Cl. 435-188.000.

Nishioka, Akinori, to Atochem North America, Inc. Coating composition. 4,946,889, Cl. 524-544.000.

Nishioka, Tadashi; Yasue, Takao; and Koyama, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Tunnel unit and scanning head for scanning tunneling microscope. 4,947,042, Cl. 250-306.000.

Nishitani, Tutomu; Suzuki, Takio; Kono, Yasuaki; Osako, Tadamasu; Kitamura, Sunao; Sakakibara, Youzou; and Ito, Naruto, to Aisan Kogyo Kabushiki Kaisha. Throttle body having interconnecting lever for converting an operational amount of accelerator to an opening of throttle valve. 4,945,874, Cl. 123-400.000.

Nissan Motor Co., Ltd.: *See—*  
Hattori, Tutomu; Ohno, Masashi; and Aramaki, Shouji, 4,946,503, Cl. 106-14.340.

Kawagoe, Kenji, 4,947,327, Cl. 364-424.050.

Kuwahara, Takanori, 4,946,192, Cl. 280-751.000.

Maeda, Kouzo; Shimamura, Munemasa; Omura, Hideo; and Hikone, Makoto, 4,946,194, Cl. 280-777.000.

Mori, Kazunori; and Irie, Namio, 4,947,326, Cl. 364-424.050.

Nakaniwa, Noriyuki, 4,945,876, Cl. 123-425.000.

Sugasawa, Fukashi, 4,947,328, Cl. 364-424.050.

Takeuchi, Kazuo; and Matsuki, Masamitsu, 4,947,296, Cl. 362-135.000.

Nissan Shatai Company, Limited: *See—*  
Maruo, Yoshinobu; and Maeda, Tsuyoshi, 4,946,412, Cl. 441-135.000.

Nissei ASB Machine Co., Ltd.: *See—*  
Nakamura, Yoshinori, 4,946,367, Cl. 425-526.000.

Nitsch, Wilhelm: *See—*  
Benker, Gerhard; Nitsch, Wilhelm; Payrhammer, Bernd; Weinert, Volker; Treiber, Helmut; and Kluefer, Ulrich, 4,947,205, Cl. 355-41.000.

Nitschke, Heinz: *See—*  
Hauschild, Werner; and Nitschke, Heinz, 4,945,609, Cl. 19-102.000.

Nittan Company, Ltd.: *See—*  
Kimura, Tetsuo, 4,947,162, Cl. 340-825.080.

Nitto Chemical Industry Co., Ltd.: *See—*  
Sasaki, Yutaka; Utsumi, Hiroshi; Otani, Masato; and Yamamoto, Shinji, 4,946,819, Cl. 502-214.000.

Nitto Kohki Co., Ltd.: *See—*  
Kazama, Yasuo; and Miyazaki, Osahiko, 4,946,323, Cl. 409-178.000.

Nitzsche, Klaus: *See—*  
Nelle, Friedrich; Lehner, Heinz; and Nitzsche, Klaus, 4,946,112, Cl. 242-7.140.

Niv, Yehuda; Landa, Ben Zion; Grossinger, Israel; Levanon, Moshe; and Adam, Yossi, to Spectrum Sciences. Imaging system. 4,947,201, Cl. 355-256.000.

Niwa, Masatake: *See—*  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Nakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,947,203, Cl. 354-475.000.

Niwa, Sukehisa: *See—*  
Namiki, Kunio; Kumura, Atsuyoshi; Niwa, Sukehisa; and Matsumura, Toshihiko, 4,946,645, Cl. 420-84.000.

NKK Corporation: *See—*  
Yamada, Takao, 4,946,294, Cl. 384-49.000.

NM Laser Products, Inc.: *See—*  
Woodruff, David C., 4,946,256, Cl. 350-269.000.

Nobusue, Mitsuru; and Kodachi, Noboru, to Showa Alumina Kabushiki Kaisha. Method of manufacturing brazable pipes and heat exchanger. 4,945,635, Cl. 29-890.043.

Noda, Minoru: *See—*  
Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, 4,946,401, Cl. 439-224.000.

Nokia Graetz: *See—*  
Nelle, Friedrich; Lehner, Heinz; and Nitzsche, Klaus, 4,946,112, Cl. 242-7.140.

Nokia-Mobira Oy: *See—*  
Hakanen, Pekka; Lahti, Lassi; Suutari, Jari; Sirkia, Eero; Kallioinen, Timo; Nieminen, Heikki; Alaspaa, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, 4,945,633, Cl. 29-825.000.

Noma, Takashi: *See—*  
Shingaki, Seiichi; Nagao, Kazuyoshi; Takahashi, Yasuo; and Noma, Takashi, 4,946,724, Cl. 428-64.000.

Nomden, Jan F.; and Van Den Oosterkamp, Paul F., to KTI Group B.V. Process for generating electricity. 4,946,750, Cl. 429-17.000.

Nomoto, Reishi; and Takenoya, Hideaki, to Janome Sewing Machine Co. Ltd. Embroidering sewing machine. 4,945,842, Cl. 112-103.000.

Nomura, Hiroaki; Akimoto, Hiroshi; and Miwa, Tetsuo, to Takeda Chemical Industries, Ltd. Fused pyrimidines, their production and use. 4,946,846, Cl. 514-258.000.

Nomura, Junji: *See—*  
Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, 4,946,401, Cl. 439-224.000.

Nordico, Inc.: *See—*  
Sheridan, Christopher H.; and Amann, John A., 4,946,617, Cl. 252-91.000.

Nordin, Olof; and Andersson, Uno, to Forsheda AB. Sealing ring for a pipe joint. 4,946,175, Cl. 277-207.00A.

Norrgard, Goran: *See—*  
Ekberg, Bjarne; and Norrgard, Goran, 4,946,602, Cl. 210-785.000.

North American Philips Corporation: *See—*  
Basile, Carlo; Cavallerano, Alan P.; and Tsinberg, Mikhail, 4,947,241, Cl. 358-23.000.

North American Philips Corp., Signetics Division: *See—*  
Ellwanger, Russell C., 4,946,803, Cl. 437-175.000.

North Carolina State University: *See—*  
Edmond, John A.; and Davis, Robert F., 4,947,218, Cl. 357-13.000.

Northern Telecom Limited: *See—*  
Dyrie, Ernest R., 4,947,289, Cl. 361-415.000.

Rosch, Reinhard W.; and Rosenbaum, Stanley D., 4,947,427, Cl. 379-412.000.

Shaanan, Gad J.; Lenaerts, George V.; Buchanan, Ian D.; and Smith, Anthony M., 4,947,424, Cl. 379-355.000.

Norton Company: *See—*  
Butkus, Anthony K., 4,946,487, Cl. 55-523.000.

Kadono, Yukio; Urano, Yoshiaki; and Watanabe, Fumio, 4,946,620, Cl. 252-190.000.

Norwood, Paul J. Double beat bass drum pedal assembly. 4,945,803, Cl. 84-422.100.

Nova Husky Research Corporation: *See—*  
Siska, Paul; Vij, Kewal K.; and Eisenbart, Gyula, 4,946,288, Cl. 374-20.000.

Novak, Peter, to Starrfrasmachinen, AG. Tool store for machine tools. 4,945,628, Cl. 29-568.000.

Novey, Richard T. Hand held remote control for outboard powerheads. 4,946,411, Cl. 440-84.000.

Novich, Bruce E.: *See—*  
Wei, Wen-Cheng; and Novich, Bruce E., 4,946,808, Cl. 501-95.000.

Novo Nordisk A/S: *See—*  
Markussen, Jan, 4,946,828, Cl. 514-3.000.

Nowicki, Neal R.: *See—*  
Fenoglio, David J.; Fjare, Douglas E.; Morello, Edwin F.; and Nowicki, Neal R., 4,946,934, Cl. 528-349.000.

Nowotny, Norbert; and Rosser, Jurgen, to Marwitz & Hauser GmbH. Length-adjustable spectacle temple. 4,946,268, Cl. 351-118.000.

Nozaki, Akira: *See—*  
Ikeda, Takeshi; Nozaki, Akira; and Ebe, Kazuyoshi, 4,946,728, Cl. 428-40.000.

Nozaki, Masahiro; and Asai, Junji, to Toyoda Gosei Co., Ltd.; and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Door weather strip for motor vehicle. 4,945,681, Cl. 49-495.000.

Nozaki, Mineo, to Canon Kabushiki Kaisha. Thermal head and thermal recording apparatus using the same. 4,947,188, Cl. 346-76.0PH.

Nozawa, Minoru; Koizumi, Yutaka; Mori, Toshihiro; and Saito, Atsushi, to Canon Kabushiki Kaisha. Ink jet recording apparatus. 4,947,191, Cl. 346-140.00R.

Nozawa, Yusaku: *See—*  
Izumi, Eiichi; Hirata, Toichi; Nozawa, Yusaku; and Shimotori, Masahiko, 4,945,723, Cl. 60-426.000.

Nuova Sircop Engineering S.r.l.: *See—*  
Dell'Acqua, Silvano, 4,946,305, Cl. 403-336.000.

NutraSweet Company, The: *See—*  
Hill, John B.; and Gelman, Yefim, 4,946,988, Cl. 560-41.000.

O.R. Concepts, Inc.: *See—*  
Poettgen, Robert J., 4,945,924, Cl. 128-849.000.

Oakes, Richard T.: *See—*  
Pimpis, Robert M.; Oakes, Richard T.; Ellery, Michael D.; and Knapp, Edward J., Jr., 4,947,149, Cl. 337-246.000.

Oana, Yasuhisa: *See—*  
Matino, Haruhiro; Ueki, Toshihiro; Oana, Yasuhisa; and Kajimura, Motoji, 4,946,259, Cl. 350-339.00F.

OB Products, Inc.: *See—*  
Young, Thomas A., 4,946,407, Cl. 439-686.000.

Obert, Hans-Joachim: *See—*  
von Eichborn, Johann-Friedrich; Obert, Hans-Joachim; and Link, Franz, 4,946,674, Cl. 424-85.500.

Ocelli, Mario L., to Union Oil Company of California. Chemical conversion processes utilizing catalyst containing crystalline galliosilicate molecular sieves having the erionite-type structure. 4,946,579, Cl. 208-111.000.

Occidental Chemical Corporation: *See—*  
Stults, Jeffrey S., 4,946,985, Cl. 549-241.000.

Oden, Robert R.: *See—*  
Bolton, Carl W.; Oden, Robert R.; and Zukowski, Stanislaw L., 4,945,904, Cl. 606-96.000.

Odom, Jimmie L. Doctor blade system. 4,945,832, Cl. 101-350.000.

Oels, Udo: *See—*  
Ebert, Wolfgang; Meyer, Rolf-Volker; Rhein, Rolf; and Oels, Udo, 4,946,927, Cl. 528-198.000.

Oestreich, Roger: *See—*  
Mayer, William N.; Oestreich, Roger; and Mayer, Daniel W., 4,947,131, Cl. 324-671.000.

Oette, Kurt: *See—*  
Pulverer, Gerhard; Oette, Kurt; and Uhlenbruck, Gerd, 4,946,830, Cl. 514-23.000.

Oeynhausen, Heinrich; and Winkelhake, Ernst, to Siemens Aktiengesellschaft. Shaft-turning device with hydro-mechanical overrunning clutch. 4,946,011, Cl. 192-0.096.

Ogawa, Hiroshi, to Bridgestone Corporation. Radial tire tread for heavy-duty road vehicles having platform depth maintained with wear. 4,945,966, Cl. 152-209.00R.

Ogawa, Hiroshi: *See—*  
Mizuno, Chiaki; Kiyama, Masatoshi; Komi, Takao; Ogawa, Hiroshi; and Funabashi, Shinichi, 4,946,615, Cl. 252-62.540.

Ono, Toshio; Ogawa, Hiroshi; Mizuno, Chiaki; and Saito, Shinji, 4,946,740, Cl. 428-323.000.

Ogawa, Ichirou; Yoshimura, Kouzou; Ueshima, Kenzou; and Nishimoto, Shinichi, to Sumitomo Electric Industries, Ltd.; and Kabushiki Kaisha Morita Seisakusho. Image picking-up and processing apparatus. 4,947,245, Cl. 358-98.000.

Ogawa, Souichi: *See—*  
Ohiwa, Tsunemi; Uenae, Keiichi; Ogawa, Souichi; Takiguchi, Katsumi; and Yoshitake, Masaaki, 4,947,081, Cl. 313-509.000.

Ogawa, Tadashi, to Fuji Photo Film Co., Ltd. Silver halide emulsions and photographic materials. 4,946,772, Cl. 430-567.000.

Ogden Environmental Services, Inc.: *See—*  
Rickman, William S., 4,946,026, Cl. 198-494.000.

Ogden, Stanley D. Integrated flow meter and vacuum gauge and use. 4,945,771, Cl. 73-861.580.

Ogino, Isao: *See—*  
Saito, Yuna; Ogino, Isao; Nakamura, Osamu; and Yamamoto, Yoshifumi, 4,946,614, Cl. 252-62.200.

Ogino, Mineo: *See—*  
Kuwahara, Hiroshi; Ogino, Mineo; Kozaki, Takahiko; Endo, Noboru; and Sakurai, Yoshito, 4,947,388, Cl. 370-60.000.

Ogita, Hiromitsu: *See—*  
Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; and Ogita, Hiromitsu, 4,947,185, Cl. 346-76.0PH.

Ogura Jewel Industry Co., Ltd.: *See—*  
Ogura, Junshiro, 4,945,590, Cl. 5-456.000.

Ogura, Junshiro, to Ogura Jewel Industry Co., Ltd. Valve for fluid mat and apparatus for controlling an attitude assumed by fluid mat. 4,945,590, Cl. 5-456.000.

Oh, Se-Kyung, to Boston University, Trustees of. Process for detecting cancer and for monitoring the effectiveness of cancer therapy. 4,946,774, Cl. 435-7.000.

Ohara, Riichiro: *See—*  
Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.

Ohara, Shigekazu: *See—*  
Sakakibara, Shiro; Hasebe, Masahiro; Hattori, Masashi; and Ohara, Shigekazu, 4,946,424, Cl. 474-11.000.

Ohara, Shigenobu: *See—*  
Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, 4,946,401, Cl. 439-224.000.

Ohashi, Yoshimasa: *See—*  
Inatsune, Shigeho; Ohashi, Yoshimasa; Fujisaka, Takahiko; and Kondo, Michimasa, 4,947,176, Cl. 342-173.000.

Ohaus Corporation: *See—*  
Kardux, Kenneth A.; and Krsto-Nagy, Thomas, 4,945,957, Cl. 141-83.000.

Ohi, Shigeo; Suzuki, Masakazu; and Yamamoto, Toru, to Gunze Limited. Surgical suture. 4,946,467, Cl. 606-228.000.

Ohishi, Hiroto; Ikeda, Tatunori; and Sogabe, Manabu, to Mitsubishi Denki Kabushiki Kaisha. Remote-controlled circuit breaker. 4,947,145, Cl. 335-14.000.

Ohishi, Tetsuo: *See—*  
Maeno, Satoru; Fukuyama, Norio; and Ohishi, Tetsuo, 4,947,209, Cl. 355-204.000.

Ohiwa, Tsunemi; Uenae, Keiichi; Ogawa, Souichi; Takiguchi, Katsumi; and Yoshitake, Masaaki, to Hitachi Maxell, Ltd. Dual insulation oxynitride blocking thin film electroluminescence display device. 4,947,081, Cl. 313-509.000.

Ohkoda, Keiji: *See—*  
Kurihara, Hideo; Suzuki, Kenichi; Minoura, Kazuo; Ohkoda, Keiji; Kurihara, Hitoshi; and Kurasawa, Yoshihiro, 4,947,029, Cl. 235-475.000.

Ohkubo, Kunihiko, to Shimadzu Corporation. Fluorescence spectrophotometer for measuring fluorescent light of a plurality of wavelength conditions. 4,946,279, Cl. 356-318.000.

Ohlenforst, Hans: *See—*  
Audi, Josef; Ohlenforst, Hans; and Bergstein, Peter, 4,945,827, Cl. 101-35.000.

Ohmae, Tadayuki; Mashita, Kentaro; Wakatsuki, Kizuku; and Kawakita, Toshio, to Sumitomo Chemical Company, Ltd. Resinous composition for powder coating. 4,946,895, Cl. 525-75.000.

Ohmura, Akira: *See—*  
Fukuroi, Takeo; Yoshida, Shinichiro; and Ohmura, Akira, 4,946,512, Cl. 136-248.000.

Ohno, Masashi: *See—*  
Hattori, Tutomu; Ohno, Masashi; and Aramaki, Shouji, 4,946,503, Cl. 106-14.340.

Ohrui, Hiroshi: See—  
Meguro, Hiroshi; Ohrui, Hiroshi; and Akasaka, Kazuaki, 4,947,000, Cl. 568-14.000.

Ohsaka, Yohnosuke; Kobayashi, Tsutomu; and Kubo, Motonobu, to Daikin Industries, Ltd. Fluorine-containing aromatic compound, process for preparing the same and use thereof. 4,946,935, Cl. 528-353.000.

Ohsaka, Yohnosuke; and Takaki, Shoji, to Daikin Industries, Ltd. Process for distillation of 2,2,3,3-tetrafluorooxetane. 4,946,972, Cl. 549-511.000.

Ohsawa, Ichiro: See—  
Komatsu, Teruo; Ohsawa, Ichiro; Goto, Shinji; Adachi, Nobukazu; Goto, Takashi; and Asano, Junichi, 4,947,208, Cl. 355-200.000.

Ohta, Kenji: See—  
Inui, Tetsuya; Hirokane, Junji; Shibata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, 4,946,730, Cl. 428-64.000.

Ohta, Michiaki: See—  
Kajitani, Yoshimi; Ohta, Michiaki; and Miyatani, Takao, 4,945,685, Cl. 51-165.930.

Ohta, Minemasa: See—  
Suzuki, Kenji; Takishita, Toshihiko; Fukuoka, Satoru; Hashikawa, Hirokazu; Hayashi, Tsuyoshi; and Ohta, Minemasa, 4,947,384, Cl. 369-279.000.

Ohta, Naoya: See—  
Tanaka, Kazuo; and Ohta, Naoya, 4,947,442, Cl. 382-5.000.

Ohuchi, Kazunori: See—  
Kisakibaru, Toshiro; Gotoh, Tsuguo; and Ohuchi, Kazunori, 4,947,088, Cl. 318-6.000.

Ohyama, Reiko: See—  
Shimizu, Yoshiyuki; and Ohyama, Reiko, 4,946,265, Cl. 350-520.000.

Oishi, Tsukasa; and Marui, Toshio, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha; and Nichigo Film Kabushiki Kaisha. Containers for filthy matter. 4,946,720, Cl. 428-35.400.

Ojima, Satoshi: See—  
Hirayama, Yasuhiko; Ikata, Haruko; Ojima, Satoshi; and Matsuzaki, Hiromi, 4,946,378, Cl. 623-17.000.

Oka, Katsumasa: See—  
Hayashi, Yasumasa; Oka, Katsumasa; and Satoh, Hiroshi, 4,947,344, Cl. 364-518.000.

Oka, Kouichi: See—  
Nate, Tasuo; Morimoto, Toshio; Oka, Kouichi; and Endo, Shinobu, 4,946,501, Cl. 75-246.000.

Oka, Shinya; and Mori, Shigeru, to Sony Corporation. Printing apparatus. 4,946,298, Cl. 400-605.000.

Oka, Yoshio, to Honda Giken Kogyo Kabushiki Kaisha. Utility vehicle having cargo bearing surfaces including a folded seat back. 4,946,193, Cl. 280-769.000.

Okabe, Naotake: See—  
Akiyama, Kazutoyo; Kimura, Takesi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.

Okabe, Ritsuo: See—  
Sakuranda, Ichio; Okabe, Ritsuo; Omura, Takao; Kiyota, Yoshisato; and Takajo, Shigeaki, 4,946,499, Cl. 75-343.000.

Okada, Hiroshi: See—  
Suyama, Shuji; Kato, Mitsukuni; Takada, Jun; and Okada, Hiroshi, 4,947,004, Cl. 568-568.000.

Okada, Kazuo; and Nakayama, Yoshiaki, to Fuji Photo Film Co., Ltd. Rotary magnetic reproducing apparatus with disc sensing logic. 4,947,280, Cl. 360-137.000.

Okada, Keisuke; Takeuchi, Sumitaka; and Kimura, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor integrated circuit. 4,947,173, Cl. 341-160.000.

Okada, Masaki, to Isuzu Motors Limited. Retarder. 4,946,014, Cl. 192-4.00B.

Okada, Takeshi, to Daidotokushijo Kabushikikaisha. DC arc furnace. 4,947,405, Cl. 373-72.000.

Okada, Terutaka: See—  
Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189.040.

Okai, Harumi; and Takada, Yukiya, to Suzuki Motor Company, Ltd. Roof side sealing mechanism for automotive vehicle having a hood attached thereto. 4,946,219, Cl. 296-213.000.

Okajima, Takahiro: See—  
Ikeda, Yuji; Okajima, Takahiro; and Tashiro, Yasuyuki, 4,947,481, Cl. 369-215.000.

Okamura, Yoshihiro: See—  
Yano, Seinosuke; Okamura, Yoshihiro; and Muraoka, Hirohide, 4,946,516, Cl. 148-12.00F.

Okano, Shunsuke, to Morito Co., Ltd. Adjustable closure for overlapping parts. 4,945,616, Cl. 24-585.000.

Okazaki, Koju: See—  
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76.000.

Oki Electric Industry, Co., Ltd.: See—  
Fukuda, Hisashi, 4,946,706, Cl. 427-35.000.

Kawakatsu, Akira, 4,946,798, Cl. 437-33.000.

Okimoto, Paul M. Body cavity specimen collecting and testing apparatus. 4,945,921, Cl. 128-759.000.

Okuda, Masahisa; Nishimura, Atsushi; Kitagawa, Hiroaki; and Kaku, Koichi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Mold mounting apparatus. 4,946,358, Cl. 425-183.000.

Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, to Kanebo, Ltd.; and Kanebo Rayon, Ltd. Fine cellulose particles and process for production thereof employing coagulated viscose. 4,946,953, Cl. 536-57.000.

Okumura, Yukiko: See—  
Shin, Kimitoshi; and Okumura, Yukiko, 4,947,396, Cl. 371-40.100.

Okuno, Akiyasu; and Watanabe, Masakazu, to NGK Spark Plug Co., Ltd. Composite ceramic material reinforced with silicon carbide whiskers. 4,946,807, Cl. 501-89.000.

Okuno, Takeshi: See—  
Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; and Ogita, Hiromitsu, 4,947,185, Cl. 346-76.0PH.

Okushio, Kazuo: See—  
Hara, Yukihiko; Okushio, Kazuo; and Sakata, Kanzo, 4,946,950, Cl. 536-4.100.

Okuyama, Hiroaki, to Matsushita Electronics Corporation. High speed static random access memory circuit. 4,947,379, Cl. 365-233.500.

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O'Leary, Robert K., to Osteotech, Inc. Process for debriding bone. 4,946,792, Cl. 435-268.000.

O'Lenick, Anthony J., Jr., to Siltech Inc. Particulate defoaming compositions. 4,946,625, Cl. 252-358.000.

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Olney, George J., to George J. Olney, Inc. Hydraulic product separator. 4,946,584, Cl. 209-18.000.

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Olsen, LaVerne R. In-line air-bleed valve for hand-operated grease guns. 4,946,077, Cl. 222-256.000.

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Fenwick, Robert B.; Peden, Larry L.; Snyder, Robert; McMains, John W.; and Gile, Jeffrey R., 4,947,244, Cl. 358-86.000.

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Sharpless, Karl B.; Klunder, Janice M.; and Onami, Tetsuo H., 4,946,974, Cl. 549-551.000.

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Heydner, Konrad; and Onderka, Oswald, 4,947,010, Cl. 200-296.000.

O'Neal, James I., to Cincinnati Milacron Inc. Apparatus for collecting hydraulic leakage fluid. 4,945,724, Cl. 60-455.000.

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Onnie, Grant L. Method of making a cardboard composite pattern. 4,946,552, Cl. 156-250.000.

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Sugawara, Katuo; Takahashi, Akio; Ono, Masahiro; and Narahara, Toshikazu, 4,946,734, Cl. 428-209.000.

Ono, Taizo; Katayama, Yoshihiro; and Saitoh, Toshi, to Matsushita Electric Industrial Co., Ltd. Developing device. 4,947,211, Cl. 355-265.000.

Ono, Tomio: See—  
Kondou, Yuu; and Ono, Tomio, 4,947,239, Cl. 357-74.000.

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Oostendorp, Joannes G.: See—  
Lameris, Sophia A.; van Os, Jan L.; and Oostendorp, Joannes G., 4,946,777, Cl. 435-29.000.

Oosterkamp, Willem J., to General Electric Company. Method for obtaining load-following capability in natural circulation, free-surface separation boiling water reactors. 4,947,485, Cl. 376-210.000.

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Nakanishi, Koichiro; Ootera, Hiroki; Hanazaki, Minoru; and Minami, Toshihiko, 4,947,085, Cl. 315-111.410.

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Orlandi, Alessio, to Galatron S.r.l. Pair of cooperating disks to control the delivery of liquid in so-called "screw" valves. 4,946,134, Cl. 251-208.000.

Ormc Corporation: See—  
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Ortiz Bordini, Antonio J. Flooring and/or tiling. 4,945,696, Cl. 52-311.000.

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Goto, Yukihi; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,946,497, Cl. 71-94.000.

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Osika, Thomas F.; and Stuhlmacher, John A., to McGill Manufacturing Company, Inc. Conscious effort safety switch. 4,947,009, Cl. 200-43.160.

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Oris Engineering Corporation: See—  
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Hayashi, Kimiaki; Ozaki, Yasuhiko; Yamada, Kenji; Takenaga, Hideyuki; and Inoue, Ichizo, 4,946,862, Cl. 514-438.000.

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Paciorek, Kazimiera J. L.; and Nakahara, James H., to Ultrastems Defense and Space, Inc. Precursor for AlNBN ceramic and method of use. 4,946,809, Cl. 556-173.000.

Package Machinery Company, Bodolay/Pratt Division: See—  
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Paeseler, Annedore, to U.S. Philips Corporation. Process for the recognition of a continuous flow of spoken words. 4,947,438, Cl. 381-43.000.

Pajtas, Scott R., to Uniroyal Goodrich Tire Company, The. Honeycomb non-pneumatic tire with a single web on one side. 4,945,962, Cl. 152-7.000.

Pak, Koon Y.: See—  
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Palara, Sergio; Paparo, Mario; and Pellicano, Roberto, to SGS-Thomson Microelectronics S.r.l. Integrated structure with active and passive components enclosed in insulating pockets and operating at higher than the breakdown voltage between each component and the pocket containing it. 4,947,231, Cl. 357-48.000.

Pallini, Luciano: See—  
Costanzi, Silvestro; Gussoni, Damiano; Zavattini, Omero, deceased; Pungiluppi, Clara, heir; Zavattini, Renato, heir; and Pallini, Luciano, 4,946,880, Cl. 524-96.000.

Palm, Per-Arne, to Casco Nobel AB. Adhesive stick. 4,946,301, Cl. 401-49.000.

Palmour, John W.; Kong, Hua-Shuang; and Edmond, John A., to Cree Research, Inc. Method of preparing silicon carbide surfaces for crystal growth. 4,946,547, Cl. 156-643.000.

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Pane, Francis C., Jr.; and Dierberger, James A., to United Technologies Corporation. Fuel nozzle for gas turbine engine. 4,946,105, Cl. 239-590.300.

Pannwitz, Karl-Heinz, to Dragerwerk Aktiengesellschaft. Colorimetric gas diffusion testing tube. 4,946,649, Cl. 422-60.000.

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Paradise, Elizabeth M.; and Monkelbaan, Edwin R., to Xerox Corporation. Queue management system for a multi-function copier, printer, and facsimile machine. 4,947,345, Cl. 364-519.000.

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Parker, Jerald V., to United States of America, Energy. Railgun restrick control. 4,945,810, Cl. 89-8.000.

Parker, Kirk P.; Angle gage. 4,945,649, Cl. 33-534.000.

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Parker, Thomas H.; and Flanagan, Virgil J., to H. E. Technology, Ltd. Scrubber system for the removal of contaminants from a fluid stream. 4,946,486, Cl. 55-479.000.

Parsley, Clovis L.; Curtis, Carl D.; Atchison, Marvin D.; Seidle, Brett A.; and Cousineau, Danny R., to General Motors Corporation. Apparatus for dispensing parts. 4,946,341, Cl. 414-796.700.

Partain, Emmett M., III; and Brode, George L., II., to Union Carbide Chemicals and Plastics Company Inc. Delivery systems for pharmaceutical or therapeutic actives. 4,946,870, Cl. 514-777.000.

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Paul, Richard F.; Byers, Larry L.; and Michaelson, Wayne A., to Unisys Corporation. Activity verification system for memory or logic. 4,947,393, Cl. 371-16.100.

Paules, Eugene H.; and Bruggeman, Denis E. Tamper-proof sealing strip with a tear tab and a container. 4,946,723, Cl. 428-43.000.

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Payne, Thomas B.; and Schmidt, Ernest M., to UTE Corp. Underwater lamp having watertight electrical connection. 4,947,304, Cl. 362-267.000.

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Pederson, David F.; and Miller, Steven R., to Pedersen Development Co. Self-energizing brake. 4,946,007, Cl. 188-24.140.

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Peickert, Marlin W.; and Kuta, LeRoy A., to Pollution Control Auto Parts, Inc. Spring clamp and kit to supply hot air to carburetor. 4,946,124, Cl. 248-231.800.

Peiffer, Dennis G.; and Lundberg, Robert D., to Exxon Research and Engineering Company. Novel polyampholyte compositions possess-

ing high degree of acid, base, or salt tolerance in solution. 4,946,916, Cl. 526-240.000.

Pell, James W.; Spielmaker, Richard E.; and Zikorus, Arthur W., to Diasonics, Inc. Power supply. 4,945,898, Cl. 128-24.00A.

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Pellman, Mark A.: See—  
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Peng, Stephen C.; and Gebregiorgis, Tadesse, to Du Pont de Nemours, E. I., and Company. Pigment dispersant resin: reaction product of imidazoline amine and alkylene carbonate. 4,946,507, Cl. 523-400.000.

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Peppers, Norman A.; Young, James R.; and Katsuki, Kazuo, to Nippon Sheet Glass Co., Ltd. Apparatus for simultaneously extracting various types of projection features of an image. 4,947,449, Cl. 382-65.000.

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Peyrouset, Andree: See—  
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Pfaff Industriemaschinen GmbH: See—  
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Pfaunder Companies, Inc., The: See—  
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Pfeffer, John D.: See—  
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Pfeifer, Heinrich; Reich, Werner; and Theus, Ulrich, to Deutsche ITT Industries GmbH. Circuit arrangement for averaging signals during pulse-density D/A or A/D conversion. 4,947,171, Cl. 341-143.000.

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Pharmaceutical Delivery Systems, Inc.: See—  
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Phelps Dodge Industries, Inc.: See—  
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Philip Morris Incorporated: See—  
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Phillips, James D., to J. D. Phillips Corporation. Abrasive belt grinding machine. 4,945,683, Cl. 51-145.00R.

Phillips Petroleum Company: See—  
Skinner, Majorie B., 4,946,641, Cl. 264-540.000.

Whiteside, James D., II; and Bichler, David F., 4,946,655, Cl. 422-143.000.

Phillips, Robert B.: See—  
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Phoenix Aktiengesellschaft: See—  
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Piaget, Claude, to U.S. Philips Corporation. Cathode ray tube for storing and reproducing electrical signals. 4,947,084, Cl. 315-8.510.

Picker International, Inc.: See—  
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Pidgeon, Anthony D.: See—  
Benson, W. D.; Cahela, Hollis L.; Kirkland, William N.; and Pidgeon, Anthony D., 4,946,183, Cl. 280-434.000.

Pieracciolli, Daniele: See—  
Semeraro, Claudio; Micheli, Dino; Pieracciolli, Daniele; Gaviraghi, Giovanni; and Borthwick, Alan D., 4,946,851, Cl. 514-332.000.

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Pierotti, Victor G.: See—  
O'Shaughnessy, Timothy G.; Chung, David K.; Hull, Richard W.; Ouyang, Kenneth W.; Pierotti, Victor G.; and Souza, Joseph A., 4,947,063, Cl. 307-572.000.

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Dautartas, Mindaugas F.; Degani, Yinon; Kraetsch, Richard T.; Pimpinella, Richard J.; and Tai, King L., 4,946,236, Cl. 350-96.200.

Pimpis, Robert M.; Oakes, Richard T.; Ellery, Michael D.; and Knapp, Edward J., Jr., to Gould, Inc. Electrical fuse with improved casing. 4,947,149, Cl. 337-246.000.

Pinchuk, Leonard; and Martin, John B., to Cordis Corporation. Transluminal angioplasty apparatus. 4,946,466, Cl. 606-194.000.

Pinigis, Edward P., to Acushnet Company. Rubber composition for use with potable water. 4,946,593, Cl. 210-500.360.

Pinnell, David L.: See—  
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Pinson, George T., to Boeing Company, The. Method and apparatus for covertly viewing a target using infrared radiation. 4,947,044, Cl. 250-330.000.

Pinto, Leroy J.: See—  
Manning, Charles R.; and Pinto, Leroy J., 4,946,705, Cl. 427-2.000.

Pioneer Electronic Corporation: See—  
Ikeda, Yui; Okajima, Takahiro; and Tashiro, Yasuyuki, 4,947,481, Cl. 369-215.000.

Suzuki, Kenji; Takishita, Toshihiko; Fukuoka, Satoru; Hashikawa, Hirokazu; Hayashi, Tsuyoshi; and Ohta, Minemasa, 4,947,384, Cl. 369-279.000.

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Pioneer Video Corporation: See—  
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Pioneering Technologies, Inc.: See—  
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Pipkin, James D.: See—  
Floyd, David; Kocy, Octavian R.; Monkhouse, Donald C.; and Pipkin, James D., 4,946,838, Cl. 514-210.000.

Pirelli Coordinamento Pneumatici S.p.A.: See—  
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Pirrallo, Karen M.: See—  
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Pissiotas, Georg; Moser, Hans; and Brunner, Hans-Georg, to Ciba-Geigy Corporation. 5-(pyrazol-1-yl)-benzoic acid thiol esters, plant growth regulating compositions and use. 4,946,492, Cl. 71-72.000.

Pistor, Helmut H., to United States of America, Army. Polarizer produced via photographic image of polarizing grid. 4,946,231, Cl. 350-1.100.

Pitney Bowes Inc.: See—  
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DiGiulio, Peter C.; and Lee, David K., 4,947,317, Cl. 364-200.000.

Sansone, Ronald P.; Connell, Richard A.; Corsetti, Patricia; Dolan, Donald T.; and Gelfer, George G., 4,947,333, Cl. 364-464.020.

Pittore, Joseph P.; and Waldron, Bruce J. Child safety strap. 4,946,198, Cl. 280-808.000.

Plaisted, Richard; and Lueptow, Richard M., to Haemonetics Corporation. Disposable manifold and valve. 4,946,434, Cl. 494-29.000.

Platt, Alan E.: See—  
Wolf, Richard A.; and Platt, Alan E., 4,946,949, Cl. 534-885.000.

Plattco Corporation: See—  
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Plessey Overseas Limited: See—  
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Podsiad, Paul: See—  
Davis, Bill E.; and Podsiad, Paul, 4,946,022, Cl. 198-365.000.

Poettgen, Robert J., to O.R. Concepts, Inc. Sterilizable reflective surgical drape. 4,945,924, Cl. 128-849.000.

Pokorski, Joseph D.; Rhodes, Geoffrey M.; and Tregay, George W., to Conax Buffalo Corporation. Self-monitoring optical sensor having a radiometric output signal. 4,947,036, Cl. 250-226.100.

Polaroid Corporation: See—  
Boggs, Roger A.; Mahoney, John B.; Mehia, Avinash C.; Schwarzel, William C.; and Taylor, Lloyd D., 4,946,964, Cl. 548-251.000.

Pollock, William; and Iny, Oliver, to Euroceltique, S.A. Iodine-containing germicidal preparations and method of controlling germicidal activity. 4,946,673, Cl. 424-80.000.

Pollina, Peter J. Method of constructing a masonry structure. 4,946,632, Cl. 264-33.000.

Pollock, Clifford R.: See—  
Zook, Brian J.; Pollock, Clifford R.; and Morris, Jeffrey A., 4,947,035, Cl. 250-225.000.

Pollution Control Auto Parts, Inc.: See—  
Peickert, Marlin W.; and Kuta, LeRoy A., 4,946,124, Cl. 248-231.800.

Polyceff, Inc.: See—  
Cerf, Alain A., 4,945,709, Cl. 53-450.000.

Ponsford, George L.; McCormick, William H.; Council, Malcolm N.; and Carroll, Albert W., to Otis Engineering Corporation. Reels and carriers therefor. 4,945,938, Cl. 137-15.000.

Ponzio, Massimo: See—  
Luciani, Sabatino; and Ponzio, Massimo, 4,946,111, Cl. 242-1.10R.

Poole, Donald A., to FBI Brands Ltd. Easy opening gable top carton. 4,946,041, Cl. 236-621.100.

Porter, Douglas S., to Combustion Engineering, Inc. Method of repairing a seal jointing fitting repair. 4,945,623, Cl. 29-402.070.

Posch, Uwe: See—  
Engel, Gunter; Enko, Alfred; Krempel, Peter W.; and Posch, Uwe, 4,946,545, Cl. 156-623.00R.

Posting Equipment Corporation: See—  
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Potts, Danny: See—  
Lawson, John A.; Butler, John C.; Sutura, Richard; Cathoun, Lawrence C.; Potts, Danny; Price, Larry E.; Wolfe, Robert G.; Knox, Joseph D.; and Loosberg, Paavo, 4,947,039, Cl. 250-236.000.

Potts, Rodney M.: See—  
Wade, John R.; Potts, Rodney M.; and Pratt, Michael J., 4,946,960, Cl. 548-150.000.

Poulton, Barrie, to Flomat Limited. Materials handling equipment. 4,946,071, Cl. 222-105.000.

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Quo, Geoffrey Q.; and Pound, Philip W., 4,945,794, Cl. 83-13.000.

Powell, John H.: See—  
Murray, Declan G.; and Powell, John H., 4,947,350, Cl. 364-554.000.

Powell, Wayne T. Tool and methodology for patching wallboard. 4,945,700, Cl. 52-514.000.

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Doerfler, Ronald W.; Power, Terrill G.; Jones, Stephen R.; and Owens, William R., 4,947,107, Cl. 324-96.000.

Prasad, B. K.: See—  
Rohatgi, Pradeep K.; Dan, Tapan K.; Arya, S. C.; Prasad, S. V.; Das, S.; Gupta, A. K.; Prasad, B. K.; and Jha, Amol K., 4,946,647, Cl. 420-528.000.

Prasad, S. V.: See—  
Rohatgi, Pradeep K.; Dan, Tapan K.; Arya, S. C.; Prasad, S. V.; Das, S.; Gupta, A. K.; Prasad, B. K.; and Jha, Amol K., 4,946,647, Cl. 420-528.000.

Pratt, Michael J.: See—  
Wade, John R.; Potts, Rodney M.; and Pratt, Michael J., 4,946,960, Cl. 548-150.000.

Premji, Gulam: See—  
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Preschutti, Joseph P., to AMP Incorporated; and Broadband Networks, Inc. Fixed gain fixed loss amplification system. 4,947,386, Cl. 370-26.000.

President and Fellows of Harvard College: See—  
Beckwith, Jonathan R.; and Strauch, Kathryn L., 4,946,783, Cl. 435-172.100.

Mariatis, Thomas P.; and Myers, Richard M., 4,946,773, Cl. 435-6.000.

Tabor, Stanley; and Richardson, Charles C., 4,946,786, Cl. 435-194.000.

Pressman, David: See—  
Goulter, Victor H.; and Brown, Brian A., 4,946,065, Cl. 220-404.000.

Pretzer, Wayne R.: See—  
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,989, Cl. 166-268.000.  
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 4,945,990, Cl. 166-268.000.

Prevot, Rene., to E. L. M. Leblanc. Central heating installation with a hot water circuit for domestic usage. 4,946,098, Cl. 237-19.000.

Price, Ernest H. Igniter for detonating an explosive gas mixture within a well. 4,945,984, Cl. 166-63.000.

Price, Larry E.: See—  
Lawson, John A.; Butler, John C.; Suter, Richard; Calhoun, Lawrence C.; Potts, Danny; Price, Larry E.; Wolfe, Robert G.; Knox, Joseph D.; and Loosberg, Paavo, 4,947,039, Cl. 250-236.000.

Price, Patrick S.: See—  
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Primat, Didier: See—  
Billiotte, Jean-Marie; Bouin, Thierry; Basset, Frederic; Beauvois, Jacques; and Primat, Didier, 4,947,450, Cl. 382-68.000.

Prindle, Carl E. Bicycle lock. 4,945,739, Cl. 70-233.000.

Prins, Willem F., to B.V. Machinefabriek Fiege. General cargo crane. 4,946,344, Cl. 414-137.100.

Prinseo, Inc.: See—  
Roe, Stephen L.; Bonnema, Eldon G.; and Seehausen, John L., 4,946,206, Cl. 285-369.000.

Pritchard, Alan P.; and Lake, Stephen P., to British Aerospace Public Limited Company. Aperture forming method. 4,946,804, Cl. 437-228.000.

Pritchett, Robert L.: See—  
Metz, Peter C.; and Pritchett, Robert L., 4,947,061, Cl. 307-475.000.

Pro Power Corporation: See—  
Anderson, Harvey G., 4,945,637, Cl. 30-122.000.

Procter & Gamble: See—  
Tsai, Chee-Hway; Heckert, David C.; and Kuznicki, James T., 4,946,701, Cl. 426-597.000.

Procter & Gamble Company, The: See—  
Battrell, Charles F., 4,946,527, Cl. 156-60.000.  
Bisset, Donald L.; and Chatterjee, Ranjit, 4,946,671, Cl. 424-59.000.  
Knochel, John R.; and Vest, Paul E., 4,946,618, Cl. 252-117.000.  
Michael, Daniel W., 4,945,624, Cl. 252-315.200.  
Stipp, Gordon K.; and Tsai, Chee-Hway, 4,946,702, Cl. 426-599.000.

Productization, Inc.: See—  
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ProMinent Dosiertechnik GmbH: See—  
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Prost, Jean-Louis: See—  
Charoy, Alain; Vermot-Gaud, Jacques; Prost, Jean-Louis; Kornmann, Michel; and Gold, Dieter, 4,947,132, Cl. 324-699.000.

Protectaire Systems Co.: See—  
Napadow, Stanley C., 4,946,718, Cl. 427-424.000.

Protein Databases, Inc.: See—  
Berube, Gene R., 4,946,794, Cl. 436-86.000.

Prough, J. Robert, to Kamy, Inc. Method of oxygen delignifying wood pulp with between stage washing. 4,946,556, Cl. 162-60.000.

Provence, Marc, to Salomon S.A. Cross-country shoe. 4,945,658, Cl. 36-117.000.

Pruess, August-Wilhelm; Hoehr, Dieter; Schug, Kurt-Peter; and Gutman, Hans-Jergen, to Veba Oel Aktiengesellschaft. Engine lubricating oil for diesel engines and process for operating a diesel engine. 4,946,609, Cl. 252-35.000.

Prugh, John; Deana, Albert A.; and Rooney, Clarence S., to Merck & Co., Inc. Novel HMG-CoA reductase inhibitors. 4,946,864, Cl. 514-460.000.

Pruitt, Robert C., to Carolina Slings Co., Inc. Lifting means for a paper roll. 4,946,212, Cl. 294-67.100.

Pulsearch Consolidated Technology Ltd.: See—  
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Pulverer, Gerhard; Oette, Kurt; and Uhlenbruck, Gerd. Agent and method for the prevention of metastases of malignant tumors. 4,946,830, Cl. 514-23.000.

Pungiluppi, Clara, heir: See—  
Costanzi, Silvestro; Gussoni, Damiano; Zavattini, Omero, deceased; Pungiluppi, Clara, heir; Zavattini, Renato, heir; and Pailini, Luciano, 4,946,880, Cl. 524-96.000.

Puppe, Lothar: See—  
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Purkajale, Emerson J., to Coca-Cola Company, The. Liquid pitcher including a mixing and grinding mechanism. 4,946,286, Cl. 366-247.000.

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Kennedy, Joseph P.; Puskas, Judit E.; Kaszas, Gabor; and Hager, William G., 4,946,899, Cl. 525-244.000.

Putrino, Michael: See—  
Vassiliadis, Stamatis; Putrino, Michael; Huffman, Ann E.; Feal, Bruce J.; and Pechanek, Gerald G., 4,947,359, Cl. 364-715.090.

Putsch, Peter-Ulrich, to Keiper Recaro GmbH & Co. Motor vehicle seat with a back rest and air bag assembly. 4,946,191, Cl. 280-730.000.

Puyplat, Olivier, to Banque de France. Method and apparatus for duplicating steel intaglio print elements using electro-erosion machining. 4,947,016, Cl. 219-69.170.

Py, Daniel. Ocular treatment apparatus. 4,946,452, Cl. 604-301.000.

Pyke, Stephen C., to Pyke, Stephen C. Device and method for detection of fluid concentration utilizing charge storage in a MIS diode. 4,947,104, Cl. 324-71.500.

Qincar Corporation: See—  
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Key, Sammy D.; and Quintanilla, Martin T., 4,946,188, Cl. 280-661.000.

Quogue, Honesto D., to Hubbell Incorporated. Adjustable recessed louvers for grade mounted light fixture. 4,947,307, Cl. 362-325.000.

Quo, Geoffrey Q.; and Pound, Philip W., to Frito-Lay, Inc. Method and apparatus for feeding produce items to centrifugal slicers. 4,945,794, Cl. 83-13.000.

R.I.T.A. Corporation: See—  
Goode, Stephen T.; Linton, Robert R., and Baiocchi, Fred, 4,946,832, Cl. 514-53.000.

Racioppi, Richard J. Razor cleaning brushes. 4,945,598, Cl. 15-160.000.

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Fields, Peter R.; and Ragg, Pudens L., 4,946,946, Cl. 530-500.000.

Raia, John A. Water circulating and aerating device for live bait containers. 4,945,672, Cl. 43-57.000.

Raith, Alex K.; Hedberg, Bo G.; and Stjernvall, Jan-Erik, to Telefonaktiebolaget L. M. Ericsson. Apparatus for correcting frequency in a coherent receiver. 4,947,409, Cl. 375-97.000.

rako electronic-Vertriebsgesellschaft mbH: See—  
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Ramage, Robert, to Wendstone Chemicals PLC. 6-sulfonyl chromans. 4,946,971, Cl. 549-408.000.

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Rambacher, Martin K. Football holder for place-kicking. 4,946,165, Cl. 273-55.00B.

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Rampe, John F., to Jepmar Research. Composite rotary drive member and method of its formation. 4,946,427, Cl. 474-161.000.

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Ramsey, John K.; and Meyn, Erwin H., to United States of America, National Aeronautics and Space Administration. Post clamp. 4,946,122, Cl. 248-229.000.

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McIntyre, John M.; Rao, Nancy A.; and Hickner, Richard A., 4,946,569, Cl. 204-181.700.

Rasmussen, Gregory K.: See—  
Coha, Timothy F.; Kostelic, Richard F.; and Rasmussen, Gregory K., 4,945,884, Cl. 123-509.000.

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Knorpp, Eberhard, deceased; Rau, Peter, and Kammerl, Anton, 4,947,387, Cl. 370-60.000.

Rauhanummi, Markku: See—  
Hakanen, Pekka; Lahti, Lassi; Sunitari, Jari; Sirkia, Eero; Kallionen, Timo; Nieminen, Heikki; Alaspaa, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, 4,945,633, Cl. 29-825.000.

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Raytheon Company: See—  
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RCA Licensing Corporation: See—  
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RCM, Ltd., Rubber Consulting & Machinery: See—  
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Reamot, Herve; Bredillet, Claude; and Brisville, Pierre, to Compagnie Europeenne de Composants Electroniques LCC. Device for the distribution of large numbers of elements on trays. 4,947,337, Cl. 364-478.000.

Recaseus, Joseph; Urffier, Daniel; and Ferlanda, Pierre, to Societe Europeenne des Produits Refractaires. Reactive zirconium oxide and its preparation. 4,946,665, Cl. 423-608.000.

Recovery Engineering, Inc.: See—  
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Reed, Alastair; Stansfield, Peter W.; and Rosen, Martin, to Crosfield Electronics Limited. Method and apparatus for generating composite images. 4,947,260, Cl. 358-447.000.

Reed, Brian E.: See—  
Siemon, John A.; and Reed, Brian E., 4,947,115, Cl. 324-158.00P.

Reemtsma, Keith; Hardy, Mark A.; and Lau, Henry T., to Columbia University in the City of New York, The Trustees of. Process for development of acceptance of transplanted organs and tissues. 4,946,438, Cl. 604-53.000.

Reeves, James W.; King, Harold B., Jr.; and Childers, William M., to General Electric Company. Automated gauging apparatus. 4,946,587, Cl. 209-539.000.

Regie Nationale des Usines Renault: See—  
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Reider, Paul: See—  
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Hayashi, Toshitada; Ide, Heihachi; and Sano, Kohichi, 4,947,265, Cl. 358-341,000.  
Sano, Konosuke: See—  
Nakamori, Shigeru; Takagi, Hiroshi; Ishida, Masaaki; Sato, Takaaki; Miwa, Kiyoshi; and Sano, Konosuke, 4,946,781, Cl. 435-115,000.  
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Demarne, Henri; Filhol, Robert; and Mosse, Madeleine, 4,946,868, Cl. 514-544,000.  
Sanshin Kogyo Kabushiki Kaisha: See—  
Suzuki, Takayoshi, 4,946,409, Cl. 440-75,000.  
Sansho Seiyaku Co., Ltd.: See—  
Motono, Masahiro, 4,946,472, Cl. 8-424,000.  
Sansone, Ronald P.; Connell, Richard A.; Corsetti, Patricia; Dolan, Donald T.; and Gelfer, George G., to Pitney Bowes Inc. Batch mailing system, 4,947,333, Cl. 364-464,020.  
SAPAL Societe Anonyme des Plieuses Automatiques: See—  
Torres, Jean, 4,946,016, Cl. 192-48,200.  
Sarfarazi, Faezeh. Intraocular lens, 4,946,469, Cl. 623-6,000.  
Sarich, Ralph T.: See—  
McKay, Michael L.; Thompson, Ian R.; and Sarich, Ralph T., 4,945,886, Cl. 123-533,000.  
Sartori, Guido: See—  
Thaler, Warren A.; Ho, W. S. Winston; and Sartori, Guido, 4,946,594, Cl. 210-651,000.  
Sasada, Shigeru; and Kishida, Yoshihiro, to Dainippon Screen Mfg. Co., Ltd. Light beam deflection scanning method and an apparatus therefor, 4,946,234, Cl. 350-6,600.  
Sasagawa, Katsuyoshi: See—  
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,946,923, Cl. 528-76,000.  
Sasaki, Ryoichi: See—  
Miyaoka, Shinichiro; Shirashi, Takayoshi; and Sasaki, Ryoichi, 4,947,447, Cl. 382-56,000.  
Sasaki, Takao: See—  
Kawamura, Hideaki; Sasaki, Takao; and Endou, Takashi, 4,947,095, Cl. 318-569,000.  
Sasaki, Yoshihiro: See—  
Kawai, Mitsuru; Yoshida, Masaru; and Sasaki, Yoshihiro, 4,946,400, Cl. 439-79,000.  
Sasaki, Yutaka; Utsumi, Hiroshi; Otani, Masato; and Yamamoto, Shinji, to Nitto Chemical Industry Co., Ltd. Phosphorus-antimony-containing catalyst for oxidation, 4,946,819, Cl. 502-214,000.  
Sasatani, Tomohiko: See—  
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, 4,947,448, Cl. 382-56,000.  
Sashin, Donald; and Sternglass, Ernest J., to University of Pittsburgh. Fiber optic coupler, 4,946,238, Cl. 350-96,270.  
Sassa, Robert L., to W. L. Gore & Associates, Inc. Protective electromagnetically transparent window, 4,946,736, Cl. 428-245,000.  
Sasse, Klaus: See—  
Kruger, Bernd-Wieland; Sasse, Klaus; Hoefer, Franz-Peter; Nentwig, Gunther; and Behrenz, Wolfgang, 4,946,850, Cl. 514-315,000.  
Sato, Akira: See—  
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,946,957, Cl. 544-342,000.  
Sato, Chikara: See—  
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, 4,947,448, Cl. 382-56,000.  
Sato, Hiroyuki; and Shimoyama, Yujiro, to Alps Electric Co., Ltd. Switch device, 4,947,008, Cl. 200-6,000.  
Sato, Hisatake; and Makino, Masaharu, to Nippon Oil Company Ltd. Method for preparing light-colored indene-coumarone resin, 4,946,915, Cl. 526-237,000.  
Sato, Hisato. Transhexahydrodrotetraphthalic acid ester derivatives, 4,946,991, Cl. 560-127,000.  
Sato, Hitoshi, to Kabushiki Kaisha Toshiba. Depth map generating method and apparatus, 4,947,347, Cl. 364-522,000.  
Sato, Katsuyuki: See—  
Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, 4,947,373, Cl. 365-189,040.  
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Sato, Ryo: See—  
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Sato, Shoji: See—  
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Sato, Tadashi: See—  
Arahara, Kohzoh; Fukui, Tetsuro; Fukumoto, Hiroshi; Takasu, Yoshio; Sato, Tadashi; and Kan, Fumitaka, 4,945,833, Cl. 101-450.100.

Sato, Tadashige; and Kobashi, Yasuji, to Mitsubishi Monsanto Chemical Co., Ltd.; and Mitsubishi Kasei Corporation. Epitaxial wafer, 4,946,801, Cl. 437-126.000.

Sato, Takaaki: See—  
Nakamori, Shigeru; Takagi, Hiroshi; Ishida, Masaaki; Sato, Takaaki; Miwa, Kiyoshi; and Sano, Konosuke, 4,946,781, Cl. 435-115.000.

Sato, Takefumi; and Mori, Kusuki, to Sharp Kabushiki Kaisha. Hand-written character input device, 4,947,156, Cl. 340-707.000.

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Satoh, Takashi: See—  
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Satomi, Hiroshi: See—  
Tomita, Akira; Kajima, Toshihiko; Kawahara, Keizo; and Satomi, Hiroshi, 4,946,752, Cl. 430-18.000.

Satten, Michael I.: See—  
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Sattler, Gerhard: See—  
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Saulietis, Susan. Quilting template, 4,945,642, Cl. 33-17.00R.

Saunders, Richard: See—  
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Saunders-Roe Development Limited: See—  
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Sauseng, Otto: See—  
Manoly, Arthur E.; Sauseng, Otto; and Benton, John T., 4,947,467, Cl. 315-3.500.

Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Caiozzo, Nicholas, to BASF Corporation, Inmont Division. Novel non-ionic polyurethane resins having polyether backbones in water-dilutable basecoats, 4,946,910, Cl. 525-440.000.

Sawai Pharmaceutical Co., Ltd.: See—  
Yoshinaga, Junji; Shogaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; and Kato, Yoshiko, 4,946,855, Cl. 514-371.000.

Sawicki, Slawomir, to Lohr & Bromkamp GmbH. Angularly movable rolling boot, 4,946,303, Cl. 403-50.000.

Scansen, Jerry P.: See—  
Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urein, Edgar J., 4,947,163, Cl. 340-825.310.

Schadow, Klaus C.: See—  
Liedtke, Larry L.; Mallory, H. Dean; McBride, William R.; Bens, Everett M.; Schadow, Klaus C.; and Boggs, Thomas L., 4,946,522, Cl. 149-36.000.

Schaffer, Norman G. Grass cutter carriage, 4,945,717, Cl. 56-17.200.

Schafft, Ernst, to Bellheimer Metallwerk GmbH. Vertical carousel, 4,945,629, Cl. 29-568.000.

Schaller, Helmut F. K. Stringed musical instrument machine head, 4,945,800, Cl. 84-306.000.

Schaltbau Gesellschaft mbH: See—  
Happach, Anton, 4,947,285, Cl. 361-245.000.

Scharbach, Heinz, to Pfaudler Companies, Inc., The. Weld joint, 4,946,304, Cl. 403-272.000.

Scheider, Alfred F.; and Warner, R. Brown, to Jason, Inc. Rotary finishing tool, 4,945,687, Cl. 51-394.000.

Schein, Philip S.: See—  
Talebian, Abdolhossen; Green, Dianna C.; and Schein, Philip S., 4,946,954, Cl. 536-121.000.

Schembri, John J., to Pacific Bell. Fiber optic distribution system and method of using same, 4,946,244, Cl. 350-96.160.

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Friesse, Hans-Herbert; Kaindl, Gerhard; and Schieferstein, Ludwig, 4,946,471, Cl. 8-94.230.

Schildkraut, Jay S.: See—  
Scozzafava, Michael; Dao, Phat T.; Robello, Douglas R.; Schildkraut, Jay S.; Willand, Craig S.; and Williams, David J., 4,946,235, Cl. 350-96.340.

Schindlbeck, Gunter, to Siemens Aktiengesellschaft. Method of marking semiconductor chips and markable semiconductor chip, 4,947,114, Cl. 324-158.00R.

Schlegel, Felix: See—  
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Schleinker, Matthias; and Lienert, Klaus-Wilhelm, to Dow Chemical Company. The. Preparation of an allyl amine and quaternary diallyl ammonium compounds therefrom, 4,946,996, Cl. 564-296.000.

Schleussner, Hans: See—  
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Schmid, Carl E., to Perkin-Elmer Corp., The. Check valve assembly for corrosive fluids, 4,945,945, Cl. 137-512.000.

Schmidt, Barnet M.: See—  
Grizmal, Fredrick; Schmidt, Barnet M.; and Sultana, George, 4,947,425, Cl. 379-410.000.

Schmidt, Bernd: See—  
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Schmidt, Ernest M.: See—  
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Schmidt, Manfred; and Kluge, Reimund, to AGFA-Gevaert Aktiengesellschaft. Container for photosensitive material, 4,947,419, Cl. 378-187.000.

Schmidt, Roland: See—  
Forster, Adrian; Geyer, Stefan; Schulmeyer, Josef; Schmidt, Roland; and Gehrig, Manfred, 4,946,695, Cl. 426-286.000.

Schmidt, Sheila A., to Kimberly-Clark Corporation. Perineal shield and discharge containment flap, 4,946,454, Cl. 604-385.100.

Schmidt'sche Heissdampf GmbH: See—  
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Schmitt, Juergen: See—  
Rump, Peter; and Schmitt, Juergen, 4,945,705, Cl. 52-731.000.

Schmitt, Marvin M.; and Sela, Richard. Volume-selective water closet flushing system, 4,945,580, Cl. 4-325.000.

Schmitz, Gunter; and Kutz, Hans-Jürgen, to FFV Motorentechnik GmbH & Co. Kg. Process for operating a fuel-burning engine, 4,945,863, Cl. 123-1.00A.

Schnaars, Daniel R. Semi-bulk with liner, 4,946,291, Cl. 383-113.000.

Schnars, Michael J.: See—  
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Schnebley, John T.; Marusak, Thomas J.; and Corey, John A., to Comfortex Corporation. Method and machinery for making a flawless shade product, 4,945,969, Cl. 160-84.100.

Schneider, Karl. Balneo-phototherapeutic treatment process and bath, 4,945,908, Cl. 128-369.000.

Schneider (U.S.A.) Inc., A Pfizer Co.: See—  
Johnson, Wade M.; and Barlow, Edward A., 4,946,133, Cl. 251-149.100.

Schmitzler, Alois. Device for transporting disabled or sick persons, 4,945,583, Cl. 5-82.00R.

Schoch, Daniel A., to Minster Machine Company, The. Monitorable and compensatable feedback tool and control system for a press, 4,945,742, Cl. 72-21.000.

Scholl, Kenneth L., to General Motors Corporation. Axial piston device, 4,945,817, Cl. 91-505.000.

Scholz, Matthew T.: See—  
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Schotz, Larry, to Terk Technologies Corporation. FM antenna, 4,947,180, Cl. 343-743.000.

Schrag, Thomas G.; and Unruh, Lavern H., to Hay & Forage Industries. Square baler having plunger cleanout apparatus, 4,945,719, Cl. 56-341.000.

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Schulze-Heiming, Herman-Josef: See—  
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Schuster, Peter A. Constant level leak detection apparatus and method, 4,945,757, Cl. 73-49.200.

Schvester, Pascal; and Saunders, Richard, to American Air Liquide; and Liquid Air Corporation. Method for preservation of fresh fish or sea-food, 4,946,326, Cl. 426-316.000.

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Schwartz, Russell J.; and Gregorio, Manuel Z., to Sun Chemical Corporation. Disazo pyrazolone pigment compositions, 4,946,508, Cl. 106-496.000.

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Schwarzel, William C.: See—  
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Scozzafava, Michael; Dao, Phat T.; Robello, Douglas R.; Schildkraut, Jay S.; Willand, Craig S.; and Williams, David J., to Eastman Kodak Company. Nonlinear optical waveguide device, 4,946,235, Cl. 350-96.340.

Scribner, Michael E., to Conoco Inc. Use of ultrasonic energy in the transfer of waxy crude oil, 4,945,937, Cl. 137-13.000.

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Segal, David L.: See—  
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Segaud, Christian, to Rhone-Poulenc Chimie. Lubricant dispersions of rare earth halides in an oily medium, 4,946,608, Cl. 252-25.000.

Seidle, Brett A.: See—  
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Seto, Fumiaki, to Fujitsu Limited. Light scanning apparatus, 4,946,233, Cl. 350-6.500.

Seubert, Bernhard; Fickert, Werner; and Spitaler, Ulrich, to Rutger-swerke AG. Process and huminate fraction, 4,946,829, Cl. 514-22.000.

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Shaanan, Gad J.; Lenaerts, George V.; Buchanan, Ian D.; and Smith, Anthony M., to Northern Telecom Limited. Shutter mechanism for telephone directory, 4,947,424, Cl. 379-355.000.

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Shafai, Lotfollah. Scanning antenna, 4,947,178, Cl. 343-700.0MS.

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Shaner, Kenneth H., to GTE Products Corporation. Powder compacting press to control green density distribution in parts, 4,946,634, Cl. 264-40.500.

Sharma, Ravinder K.; Lytle, William H.; Rogona, Angela; and Hileman, Bennett L., to Motorola, Inc. Backside metallization scheme for semiconductor devices, 4,946,376, Cl. 428-620.000.

Sharp Corporation: See—  
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Inui, Tetsuya; Hirokane, Junji; Shibata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, 4,946,730, Cl. 428-64.000.

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Sato, Takefumi; and Mori, Kusuki, 4,947,156, Cl. 340-707.000.

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Shaw, Richard D. Settable systems for the manufacture of refractories and ceramics, 4,946,805, Cl. 501-12.000.

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Kinloch, Anthony J.; and Shaw, Stephen J., 4,946,907, Cl. 525-422.000.

Shay, Gregory D.: See—  
Devona, James E.; and Shay, Gregory D., 4,946,891, Cl. 524-833.000.

Sheehy, David B., to Hewlett-Packard Company. Method for data transfer through a bridge to a network requiring source route information, 4,947,390, Cl. 370-85.130.

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Sheldon, John C.; and Hisayasu, Dennis M., to Hughes Aircraft Company. Laser mirror displacement device, 4,947,399, Cl. 372-29.000.

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Bakker, Johannes, 4,946,481, Cl. 55-300.000.

Hobbs, Douglas H., 4,946,061, Cl. 220-243.000.

Jackson, Roy J.; and Pigneri, Anthony M., 4,946,928, Cl. 528-205.000.

Johnson, Thomas H., 4,946,473, Cl. 44-71.000.

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Slaugh, Lynn H.; and Fong, Howard L., 4,946,560, Cl. 203-38.000.

Shepard, Michael L.; and Snyder, Charles A., II, to Westvaco Corporation. Method of roll nip load measurement, 4,945,772, Cl. 73-862.550.

Sheridan, Christopher H.; and Amann, John A., to Nordico, Inc. Substantially dry cleaning wipe capable of rendering a cleaned surface static free, 4,946,617, Cl. 252-91.000.

Sherman Industries, Inc.: See—  
Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., 4,946,513, Cl. 134-18.000.

Sherman, James F., to General Motors Corporation. Power transmission with a continuously variable speed range, 4,946,429, Cl. 475-210.000.

Sherman, John W.: See—  
Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urein, Edgar J., 4,947,163, Cl. 340-825.310.



Sherwin, Leo C.: See—  
Chang, Christopher Y.; and Sherwin, Leo C., 4,947,367, Cl. 364-900.000.

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Shalati, Mohamad D.; Marquart, James A.; Babjak, John R.; and Harris, Rodney M., 4,946,744, Cl. 428-500.000.

Sherwood, Carl H.; Meyer, Karen M.; Covert, Charles H.; and Weill-nau, Gregory P., to General Motors Corporation. Seal assembly for vehicle filler neck. 4,946,060, Cl. 220-86.200.

Sherwood Medical Company: See—  
Fiehler, William R., 4,946,601, Cl. 210-782.000.

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Dunstan, Ericson M.; Hogg, Dennis; Scura, John E.; and Sheu, Ming-Goei, 4,947,093, Cl. 318-560.000.

Shi, Joseph C. S.; Albers, Edwin W.; and Wilson, Geoffrey R., to Thiele-Kaolin Company. Process for improving the physical and catalytic properties of fluid cracking catalysts. 4,946,814, Cl. 502-62.000.

Shibano, Yoshizo: See—  
Hattori, Seiji; Kasukawa, Akihiko; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,947,452, Cl. 455-33.000.

Shibata, Akira: See—  
Inui, Tetsuya; Hirokane, Junji; Shibata, Akira; Nagahara, Yoshiyuki; and Ohta, Kenji, 4,946,730, Cl. 428-64.000.

Shibata, Itaru: See—  
Koshino, Nagaaki; Maeda, Miyozo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueishi, Kozo, 4,947,372, Cl. 365-106.000.

Shibata, Kazuyoshi, to NGK Insulators, Ltd. Oxygen sensor. 4,946,577, Cl. 204-427.000.

Shibata, Shunsuke: See—  
Kawano, Minoru; Yamashita, Tatsuro; Izu, Noboru; Shibata, Shunsuke; Kurihara, Norimithu; Hara, Shigeo; Kojima, Kazuo; and Takezawa, Masashi, 4,945,740, Cl. 70-248.000.

Shield, Jeffrey E.: See—  
Buck, Otto; Bracci, David J.; Jiles, David C.; Brasche, Lisa J. H.; Shield, Jeffrey E.; and Chumbley, Leonard S., 4,947,117, Cl. 324-227.000.

Shiga, Nobuo, to Sumitomo Electric Industries, Ltd. Apparatus for manufacturing an optical transmission module. 4,946,246, Cl. 350-96.200.

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Login, Robert B.; Merianos, John J.; Dandreaux, Gary; and Shih, Jenn S., 4,946,967, Cl. 548-531.000.

Shiki, Tatsuya: See—  
Kobayashi, Michio; Kobayashi, Reichi; and Shiki, Tatsuya, 4,947,252, Cl. 358-167.000.

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Shima, Akihiro; and Susaki, Wataru, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device fabricating method. 4,946,802, Cl. 437-129.000.

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Ioka, Tadashi; Sakane, Katsumi; Suzuki, Toshifumi; Amatsu, Kazunari; and Shimada, Kaoru, 4,946,195, Cl. 280-777.000.

Shimada, Naoki, to Canon Kabushiki Kaisha. Document processing apparatus. 4,946,299, Cl. 400-306.000.

Shimada, Shigeru: See—  
Nishimatsu, Masaharu; Shimada, Shigeru; Ide, Toshiaki; Arioka, Hiroyuki; and Kubota, Yuichi, 4,946,729, Cl. 428-141.000.

Shimadzu Corporation: See—  
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Shimamura, Munemasa: See—  
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Shimazaki, Yukio: See—  
Tanno, Seikichi; Taketani, Noriaki; Eguchi, Shuji; Asano, Hideki; Shimazaki, Yukio; Takuma, Yuetsu; Ibamoto, Masahiko; and Mukai, Junji, 4,946,242, Cl. 350-96.150.

Shimazu, Yukihiko: See—  
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Shimizu, Isamu: See—  
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Shimizu, Jojo: See—  
Yamaguchi, Satoru; Shimizu, Jojo; Satoh, Kozaburoh; and Andoh, Haruo, 4,946,374, Cl. 428-323.000.

Shimizu, Yoshiyuki; and Ohyama, Reiko, to Nikon Corporation. Microscope whose enlargement magnification is changeable. 4,946,265, Cl. 350-520.000.

Shimotori, Masahiko: See—  
Izumi, Eiki; Hirata, Toichi; Nozawa, Yusaku; and Shimotori, Masahiko, 4,945,723, Cl. 60-426.000.

Shimoyama, Yujiro: See—  
Sato, Hiroyuki; and Shimoyama, Yujiro, 4,947,008, Cl. 200-6.00R.

Shimura, Kazuo, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out apparatus. 4,947,043, Cl. 250-327.200.

Shin, Duk W., to Namsung Electronics Corp. Removable function box with contact block assembly. 4,947,457, Cl. 455-345.000.

Shin, Kimitoshi; and Okumura, Yukiko, to Kabushiki Kaisha Toshiba. Method and system for detecting data error. 4,947,396, Cl. 371-40.100.

Shin, Kyong S., to Goldstar Co., Ltd. Water repurification method of city water and its equipment. 4,946,600, Cl. 210-758.000.

Shine, M. Carl, to Digital Equipment Corporation. Method of predicting fatigue lifetimes of metallic structures. 4,947,341, Cl. 364-508.000.

Shingaki, Seiichi; Nagao, Kazuyoshi; Takahashi, Yasuo; and Noma, Takashi, to Canon Kabushiki Kaisha. Vitreous film and heat-mode optical recording medium using same. 4,946,724, Cl. 428-64.000.

Shinko Denki Kabushiki Kaisha: See—  
Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; and Ogita, Hiromitsu, 4,947,185, Cl. 346-76.0PH.

Shinko Electric Co., Ltd.: See—  
Maeno, Satoru; Fukuyama, Norio; and Ohishi, Tetsuo, 4,947,209, Cl. 355-204.000.

Shinn, Donald E.; and Livingston, Andrew D., to Productization, Inc. Rotary drum dryer with improved premixing assembly. 4,945,657, Cl. 34-128.000.

Shinonaga, Hideo: See—  
Mitsuno, Tatsuyuki; Shinonaga, Hideo; and Daimon, Akio, 4,946,896, Cl. 525-93.000.

Shiono, Manzo: See—  
Kanehira, Koichi; Eziri, Katsushi; Shiono, Manzo; Fujita, Yoshiji; and Yamahara, Johji, 4,946,857, Cl. 514-399.000.

Shionogi & Co., Ltd.: See—  
Kondo, Eiji; Tsuji, Naoki; Matsumoto, Koichi; Kawamura, Yoshimi; Yoshida, Tadashi; and Matsuura, Shinzo, 4,946,941, Cl. 530-317.000.

Shioya, Masaharu: See—  
Yajima, Hiroshi; Hayashi, Masaki; Satoh, Takashi; and Shioya, Masaharu, 4,947,262, Cl. 358-296.000.

Shipley, David G.: See—  
Denny, Patrick J.; and Shipley, David G., 4,946,660, Cl. 423-230.000.

Shirahata, Akihiko; and Fukutani, Yoshimi, to Toray Silicone Company Limited. Alkali-soluble organopolysiloxane. 4,946,921, Cl. 528-39.000.

Shiraishi, Takayoshi: See—  
Miyaoka, Shinichiro; Shiraishi, Takayoshi; and Sasaki, Ryoichi, 4,947,447, Cl. 382-56.000.

Shiraishi, Taketora; and Shimazu, Yukihiko, to Mitsubishi Denki Kabushiki Kaisha. Programmable clock frequency divider. 4,947,411, Cl. 377-47.000.

Shiraki, Takeshi; and Yoshimura, Yoshihiro, to Mitsui Petrochemical Industries, Ltd. Flexible tube of thermoplastic resin having poor melt flowability and production method and apparatus thereof. 4,946,371, Cl. 428-36.900.

Shirasaka, Toshio, to Kabushiki Kaisha Toshiba. Method and system for controlling ultrasonic probe operation. 4,945,767, Cl. 73-610.000.

Shirasawa, Akishige: See—  
Murai, Shunji; and Shirasawa, Akishige, 4,947,048, Cl. 250-558.000.

Shockley, Richard D.: See—  
Magee, Arthur W.; Shockley, Richard D.; and Crawford, Michael E., 4,946,554, Cl. 156-909.000.

Shoda, Isao. Automatic processing head replacement device in wood working machine. 4,945,958, Cl. 144-1.00R.

Shogaki, Takeshi: See—  
Yoshinaga, Junji; Shogaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; and Kato, Yoshiko, 4,946,855, Cl. 514-371.000.

Showa Alumina Kabushiki Kaisha: See—  
Nobusue, Mitsuru; and Kodachi, Noboru, 4,945,635, Cl. 29-890.043.

Showa Shell Sekiyu Kabushiki Kaisha: See—  
Kawamura, Ichiro; and Imai, Yoshio, 4,946,989, Cl. 560-51.000.

Shum, Victor K., to Amoco Corporation. Catalyst for upgrading light paraffins. 4,946,812, Cl. 502-61.000.

Shum, Victor K., to Amoco Corporation. Catalysts for upgrading light paraffins. 4,946,813, Cl. 502-61.000.

Sibert, John W.: See—  
Clough, Thomas J.; and Sibert, John W., 4,946,578, Cl. 208-46.000.

Sick, Erwin; and Penningsfeld, Franz, to Erwin Sick GmbH Optik-Elektronik. Method and apparatus for supplementing the feed solution of hydrocultures with desalinated water. 4,945,676, Cl. 47-62.000.

Sickafus, Edward N., to Ford Motor Company. Force transducer etched from silicon. 4,945,773, Cl. 73-862.590.

Sidner, Diane W.; Yoder, Douglas J.; and Moss, David E., to Delco Electronics Corporation. Semiconductive structure useful as a pressure sensor. 4,945,769, Cl. 73-727.000.

Sidney Diamond: See—  
Diamond, Sidney; and Diamond, Deborah L., 4,946,292, Cl. 383-127.000.

Siegel, Albrecht: See—  
Giebel, Gerhard; Berny, Hans-Jurgen; and Siegel, Albrecht, 4,945,593, Cl. 12-12.400.

Siegenia-Frank KG: See—  
Loos, Horst, 4,945,702, Cl. 52-656.000.

Siegfried, Barry A.; and Holland, Eugene A. Histological fixatives. 4,946,669, Cl. 424-4.000.

Sieloff, Ronald F.: See—  
Crouch, Earl T.; and Sieloff, Ronald F., 4,946,531, Cl. 156-242.000.

Siemens Aktiengesellschaft: See—  
Buettner, Gerhard, 4,947,439, Cl. 381-69.200.

Bueyuekgueclue, Mehmet-A.; and Maier, Manfred, 4,945,956, Cl. 141-67.000.

Einzinger, Josef; Leipold, Ludwig; Tihanyi, Jenő; and Weber, Roland, 4,947,234, Cl. 357-68.000.

Knorpp, Eberhard, deceased; Rau, Peter; and Kammerl, Anton, 4,947,387, Cl. 370-60.000.

Oeynhausen, Heinrich, and Winkelhake, Ernst, 4,946,011, Cl. 192-0.096.

Rau, Peter, 4,947,385, Cl. 370-14.000.

Ruemenapf, Horst; and Rathenow, Gerhard, 4,947,122, Cl. 324-417.000.

Schindlbeck, Gunter, 4,947,114, Cl. 324-158.00R.

Stauner, Jakob, 4,946,209, Cl. 292-256.000.

Unger, Bernhard; and Rauschert, Rainer, 4,947,105, Cl. 324-158.00R.

Siemens-Bendix Automotive Electronics L.P.: See—  
Daly, Paul D.; and Luchinski, Peter E., 4,945,878, Cl. 123-478.000.

Siemens Energy & Automation, Inc.: See—  
May, William E.; King, William A.; and Green, Jerry M., 4,947,126, Cl. 324-509.000.

Siemens Hearing Instruments, Inc.: See—  
Gebert, Anton M., 4,947,433, Cl. 381-68.000.

Siemens-Pacesetter, Inc.: See—  
Silvian, Sergiu, 4,947,407, Cl. 375-94.000.

Siemon Company, The: See—  
Siemon, John A.; and Reed, Brian E., 4,947,115, Cl. 324-158.00P.

Siemon, John A.; and Reed, Brian E., to Siemon Company, The. Test probe adapter. 4,947,115, Cl. 324-158.00P.

Silcox, John: See—  
Lee, Kevin C.; Lee, Charles A.; and Silcox, John, 4,946,735, Cl. 428-220.000.

Siltech Inc.: See—  
O'Lenick, Anthony J., Jr., 4,946,625, Cl. 252-358.000.

Silver, Louis S.: See—  
Kobayashi, Hisashi; and Silver, Louis S., 4,946,382, Cl. 431-8.000.

Silver Seiko Ltd.: See—  
Koike, Mitsuhito; and Suzuki, Toshiyuki, 4,946,297, Cl. 400-82.000.

Silverberg, Harry G., to Bigsby & Kruthers, Inc. Tie display assembly. 4,946,049, Cl. 211-87.000.

Silverberg, Michael: See—  
Wendland, Broder; and Silverberg, Michael, 4,947,243, Cl. 358-31.000.

Silvian, Sergiu, to Siemens-Pacesetter, Inc. Sample-and-hold digital phase-locked loop for ask signals. 4,947,407, Cl. 375-94.000.

Simazaki, Yuzuru: See—  
Kumasaka, Takao; Simazaki, Yuzuru; and Komatsu, Isamu, 4,947,200, Cl. 355-251.000.

Simon, Heinrich; and Koch, Reinhard, to Heraeus Elektroden GmbH. Electrode. 4,946,571, Cl. 204-206.000.

Simon, Nikolaus: See—  
Ziegler, Ewald; Widera, Joerg; Arndt, Stefan; and Simon, Nikolaus, 4,945,877, Cl. 123-472.000.

Simplimatic Engineering Company: See—  
Murphy, James F., 4,946,021, Cl. 198-375.000.

Murphy, James F., 4,946,025, Cl. 198-459.000.

Murphy, James F.; and Wiseman, John A., 4,946,340, Cl. 414-788.800.

Sims, Nathaniel M.; and Welch, James P., to General Hospital Corporation, The. Transport system for portable patient care apparatus. 4,945,592, Cl. 5-508.000.

Singleton, Dan: See—  
Hayton, Eugene; Failor, Raymond A.; and Singleton, Dan, 4,945,582, Cl. 5-67.000.

Sirkia, Eero: See—  
Hakonen, Pekka; Lahti, Lassi; Suutari, Jari; Sirkia, Eero; Kallioinen, Timo; Nieminen, Heikki; Alaspaa, Seppo; Salo, Kari; Halonen, Harri; and Rauhanummi, Markku, 4,945,633, Cl. 29-825.000.

Siska, Paul; Vij, Kewal K.; and Eisenbart, Gyula, to Nova Husky Research Corporation. Dew point analyzer. 4,946,288, Cl. 374-20.000.

Sitaraman, Shivakumar: See—  
Mahdavi, Mehrzad; and Sitaraman, Shivakumar, 4,947,040, Cl. 250-266.000.

SKF GmbH: See—  
Olschewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.

Skinner, Majorie B., to Phillips Petroleum Company. Process of making a gold-colored olefin product. 4,946,641, Cl. 264-540.000.

Skorpik, James R.: See—  
Birks, Albert S.; and Skorpik, James R., 4,947,045, Cl. 250-360.100.

Skyline Displays, Inc.: See—  
Beaulieu, Bryan, 4,945,706, Cl. 52-731.000.

Slater, Robert A.: See—  
Coates, William J.; Emmett, John C.; and Slater, Robert A., 4,946,842, Cl. 514-247.000.

Slaugh, Lynn H.; and Fong, Howard L., to Shell Oil Company. Process for separating alpha and internal olefins. 4,946,560, Cl. 203-38.000.

Slemon, Clarke E.: See—  
Stevens, R. D. Samuel; Cater, Stephen R.; and Slemon, Clarke E., 4,946,566, Cl. 204-157.500.

Slimak, Karen M. Processes for products from true yam. 4,946,703, Cl. 426-637.000.

Sluyterman, Albertus A. S.: See—  
Bosch, Gerrit; Pasma, Tjebbe R.; and Sluyterman, Albertus A. S., 4,947,083, Cl. 315-8.000.

Smart, David C.; and Baxter, Dennis E., to Eastman Kodak Company. Simple camera for use with film cassette having film-exposure status indicator. 4,947,197, Cl. 354-214.000.

Smart House Limited Partnership Limited: See—  
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Smederod, Sten A.: See—  
Ivarsson, Sune I.; Smederod, Sten A.; and Larsson, Karl-Erik, 4,945,971, Cl. 160-178.300.

Smidebush, Michael: See—  
Merry, Nir; and Smidebush, Michael, 4,946,460, Cl. 606-24.000.

Smith, Anthony M.: See—  
Shaanan, Gad J.; Lenaerts, George V.; Buchanan, Ian D.; and Smith, Anthony M., 4,947,424, Cl. 379-355.000.

Smith, Benjamin A.: See—  
Burnett, Steven W.; and Smith, Benjamin A., 4,947,422, Cl. 379-200.000.

Smith, Eugene A., Jr.: See—  
Deno, Milton C.; Smith, Eugene A., Jr.; and Delaruelle, Dale H., 4,946,229, Cl. 303-33.000.

Smith, George W.: See—  
Vaz, Nuno A.; VanSteenkiste, Thomas H.; and Smith, George W., 4,946,263, Cl. 350-351.000.

Smith, Jim W.: See—  
Adams, John R.; Price, Patrick S.; and Smith, Jim W., 4,945,775, Cl. 73-865.800.

Smith Kline & French Laboratories Limited: See—  
Coates, William J.; Emmett, John C.; and Slater, Robert A., 4,946,842, Cl. 514-247.000.

Smith, Lewis M., to University of Tennessee Research Corporation. Method and apparatus for measuring small spatial dimensions of an object. 4,947,323, Cl. 364-413.130.

Smith, Lewis R.; and Thomas, David M., to Burr-Brown Corporation. Dummy/trim DAC for capacitor digital-to-analog converter. 4,947,169, Cl. 341-121.000.

Smith, Patrick J.; Bullock, Scott R.; and Mac Thornock, Jeffery, to Unisys Corporation. Narrowband parameter estimator. 4,947,361, Cl. 364-724.090.

Smith, Richard W.: See—  
Bodolay, William A.; Smith, Richard W.; and Ward, Gregory A., 4,945,714, Cl. 53-568.000.

Smith, Roddie R.: See—  
Dickson, Rennie L.; and Smith, Roddie R., 4,945,993, Cl. 166-321.000.

Smith, Schuyler B.: See—  
Beck, Earl W.; and Smith, Schuyler B., 4,946,369, Cl. 427-133.000.

Smith, Stewart G. Pressure-relieving device and process for implanting. 4,946,436, Cl. 604-8.000.

Smith, Tracy L.: See—  
Kobler, Robert J.; Laudig, Ronald C.; and Smith, Tracy L., 4,946,392, Cl. 439-63.000.

Smith, William H., to Halliburton Company. Method for treating a well bore. 4,946,604, Cl. 252-8.551.

SmithKline Beecham Corporation: See—  
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,946,834, Cl. 514-119.000.

SmithKline Diagnostics, Inc.: See—  
Liston, Max D.; Hsei, Paul K.; Dickinson, David G.; Daffern, George M.; and Fetty, James G., 4,946,651, Cl. 422-102.000.

Smrt, Thomas J., to Fox Valley Systems, Inc. Spraying apparatus with counterweight member. 4,946,104, Cl. 239-150.000.

Smyers, Joseph S., to Minnesota Mining & Manufacturing Co. Cable termination assembly with contact supporting housing and integrally molded strain relief. 4,946,390, Cl. 439-404.000.

Snakenborg, Johannes T., to Stork Screens B.V. Method for providing a design pattern on a metal stencil and metal stencil having a patternable covering layer. 4,946,763, Cl. 430-308.000.

Sneddon, Larry G.; and Mirabelli, Mario G. L., to University of Pennsylvania. Poly(alkenylpentaborane) ceramic precursors. 4,946,713, Cl. 427-226.000.

Snow, Barton H., to General Electric Company. Method and apparatus for controlling multiple engine aircraft. 4,947,096, Cl. 318-586.000.

Snyder, Charles A., II: See—  
Shepard, Michael L.; and Snyder, Charles A., II, 4,945,772, Cl. 73-862.550.

Snyder, Robert: See—  
Fenwick, Robert B.; Peden, Larry L.; Snyder, Robert; McMains, John W.; and Gile, Jeffrey R., 4,947,244, Cl. 358-86.000.

Sobel, Elliot J.; Filion, Joseph L.; and Sundquist, Douglas F., to Xerox Corporation. Job scheduler diagnostics. 4,947,397, Cl. 371-16.400.

Societe de Mecanique Magnetique S.A.: See—  
Habermann, Helmut; and Lemerle, Pierre, 4,947,067, Cl. 310-51.000.

Societe des Ceramiques Techniques: See—  
Galaj, Stanislas; Besland, Marie-Paule; Wicker, Alain; Gillot, Jacques; and Soria, Raymond, 4,946,592, Cl. 210-490.000.

Societe des Electrodes & Refractaires Savoie: See—  
Audras, Gabriel; and Samanos, Bernard, 4,946,502, Cl. 106-14.210.

Societe Europeene des Produits Refractaires: See—  
Recaseus, Joseph; Urffer, Daniel; and Ferlanda, Pierre, 4,946,665, Cl. 423-608.000.

Societe Generale pour les Techniques Nouvelles: See—  
Carpentier, Serge, 4,945,838, Cl. 110-211.000.

Societe Nationale Industrielle et Aerospatiale: See—  
David, Maurice J. A.; Marianneau, Michel E. A.; Aebi, Gilbert; and Raye, Pierre, 4,946,318, Cl. 407-42.000.

Soderlund, Frits; and Edstrom, Soren, to Svenska Rotor Maskiner AB. Rotary screw compressor with a lift valve mounted in high pressure end wall. 4,946,362, Cl. 418-201.200.

Sogabe, Manabu: See—  
Ohishi, Hiroto; Ikeda, Tatunori; and Sogabe, Manabu, 4,947,145, Cl. 335-14.000.

Sokolow, Stephen A.; Steiner, Urs; and Lewis, John R., to Finnigan Corporation. System for controlling instrument using a levels data structure and concurrently running compiler task and operator task. 4,947,315, Cl. 364-200.000.

Sollins, Irving V.: See—

Grimm, C. Louis; and Sollins, Irving V., 4,946,035, Cl. 206-366.000.

Solomon, James G.; and Rivard, Chester J., to General Motors Corporation. Two cycle engine piston lubrication. 4,945,864, Cl. 123-41.390.

Sommen, Francois M.: See—

Janssens, Frans E.; Sommen, Francois M.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,946,843, Cl. 514-253.000.

Sone, Satori: See—

Fukuhara, Nobuhiro; Yoshino, Setsuo; Sone, Satori; Nakajima, Yoshiyuki; and Makiguchi, Nobuyoshi, 4,946,790, Cl. 435-252.330.

Sontag, Kenneth N.: See—

Vokey, David E.; Sontag, Kenneth N.; Chamberlain, John C.; and Lavallee, Ronald L., 4,947,469, Cl. 324-523.000.

Sony Corporation: See—

Hayashi, Toshitada; Ide, Heihachi; and Sano, Kohichi, 4,947,265, Cl. 358-341.000.

Kondo, Tetsujiro, 4,947,249, Cl. 358-135.000.

Meguro, Hiroshi, 4,947,276, Cl. 360-132.000.

Oka, Shinya; and Mori, Shigeru, 4,946,298, Cl. 400-605.000.

Soper, E. Scott: See—

Fernandez, Antonio; Gaggioni, Hugo P.; Jaquez, Martin J.; Robbins, John D.; and Soper, E. Scott, 4,947,257, Cl. 358-183.000.

Soria, Raymond: See—

Galaj, Stanislas; Besland, Marie-Paule; Wicker, Alain; Gillot, Jacques; and Soria, Raymond, 4,946,592, Cl. 210-490.000.

Sorimachi, Kenichi; Tozawa, Hirokazu; Fujii, Tetsuya; Itoyama, Seiji; and Miki, Yuji, to Kawasaki Steel Corporation. Method of oscillation of mold of vertical continuous caster. 4,945,975, Cl. 164-478.000.

Sorrells, David F., to Parker Electronics, Inc. Pressure sensor. 4,945,768, Cl. 73-703.000.

Soubrier, Pierre: See—

Susini, Etienne; and Soubrier, Pierre, 4,946,432, Cl. 493-341.000.

Southwest Research Institute: See—

Darilek, Glenn T., 4,947,470, Cl. 324-557.000.

Souza, Joseph A.: See—

O'Shaughnessy, Timothy G.; Chung, David K.; Hull, Richard W.; Ouyang, Kenneth W.; Pierotti, Victor G.; and Souza, Joseph A., 4,947,063, Cl. 307-572.000.

Sovex Marshall Limited: See—

Jenkins, John P., 4,946,027, Cl. 198-592.000.

Spanjer, Keith G.; and Flowers, Dervin L., to Motorola, Inc. Method for improving the adhesion of a plastic encapsulant to copper containing leadframes. 4,946,518, Cl. 148-282.000.

Sparks, Daniel R.: See—

Welcome, Warren W.; and Sparks, Daniel R., 4,947,116, Cl. 324-173.000.

Specht, Paul B.: See—

Hewitt, Charles D.; and Specht, Paul B., 4,945,577, Cl. 2-437.000.

Spector, George: See—

Olayan, Hamad; and Spector, George, 4,946,158, Cl. 272-70.300.

Vu, Thuan D.; and Spector, George, 4,946,002, Cl. 180-271.000.

Spectra, Inc.: See—

Moynihan, Edward R., 4,947,184, Cl. 346-1.100.

Spectra-Physics, Inc.: See—

Ekstrand, John P.; and Holsinger, Kevin, 4,947,102, Cl. 323-293.000.

Spectrum Sciences: See—

Niv, Yehuda; Landa, Benzion; Grossinger, Israel; Levanon, Moshe; and Adam, Yossi, 4,947,201, Cl. 355-256.000.

Spence, James S.; and Grow, Harry W., to Stanford Technologies, Inc. MTCR rejects analysis and management information system. 4,947,321, Cl. 364-401.000.

Speranza, Donald, to Eaton Corporation. Upshift logic. 4,947,331, Cl. 364-424.100.

Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., to Texaco Chemical Company. Secondary isopropyl amine derivatives of polyoxyalkylene diamines and triamines. 4,946,924, Cl. 528-111.000.

Speranza, George P.; and Su, Wei-Yang, to Texaco Chemical Company. Elastomeric polyamide hot melt adhesive from low molecular weight polyoxyethylene diamine. 4,946,933, Cl. 528-339.300.

Spielmaker, Richard E.: See—

Pell, James W.; Spielmaker, Richard E.; and Zikorus, Arthur W., 4,945,898, Cl. 128-24.00A.

Spine Engineering AB: See—

Larsson, Ove, 4,946,336, Cl. 414-744.200.

Spitaler, Ulrich: See—

Seubert, Bernhard; Fickert, Werner; and Spitaler, Ulrich, 4,946,829, Cl. 514-22.000.

Spohrer, Steven J.: See—

Weiner, Scott M.; Neuf, Donald A.; and Spohrer, Steven J., 4,947,062, Cl. 307-529.000.

Sprecker, Mark A.: See—

Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 4,946,782, Cl. 435-126.000.

Spring, Francois: See—

Frankinet, Jacques; Peyrouset, Andree; and Spring, Francois, 4,946,944, Cl. 530-400.000.

Springer, Hartmut; and Hussong, Kurt. Water-soluble azo compounds containing a benzotriazol-1-yl phenyl moiety as a diazo component

which carry a fiber-reactive group of the vinylsulfone series. 4,946,947, Cl. 534-635.000.

Square D Company: See—

Munyon, Todd; and Toarmina, Chris, 4,947,284, Cl. 361-92.000.

Sredni, Benjamin; and Albeck, Michael, to Bar-Ilan University. Method for the stimulation of bone marrow cells. 4,946,437, Cl. 604-49.000.

Staab, Mathias: See—

Keller, Karl-Heinz; Staab, Mathias; and Blum, Mathias, 4,945,843, Cl. 112-148.000.

Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie): See—

Diemeer, Martinus B. J., 4,946,262, Cl. 350-362.000.

Stadelmann, Ludwig: See—

Bauer, Hans-Peter; Bauer, Hans J.; Stadelmann, Ludwig; and Mayer, Dieter, 4,946,008, Cl. 188-129.000.

Staff Lighting Corporation: See—

Druffel, James B.; and Abdollahi, P. Peter, 4,947,297, Cl. 362-147.000.

Stafford, Joseph D.: See—

Hatton, Gregory J.; Helms, David A.; Durrett, Michael G.; Marrelli, John D.; and Stafford, Joseph D., 4,947,128, Cl. 324-640.000.

Stagg, Theodore O., to Standard Alaska Production Company. Inverted wellbore completion. 4,945,994, Cl. 166-369.000.

Stahl, John I.; Michalak, David J.; and Knapp, Klaus, to Motorola, Inc. Communication system. 4,947,420, Cl. 379-57.000.

Stahlecker, Fritz; and Stahlecker, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Air nozzle for pneumatic false-twist spinning. 4,945,718, Cl. 57-333.000.

Stahlecker, Hans: See—

Stahlecker, Fritz; and Stahlecker, Hans, 4,945,718, Cl. 57-333.000.

Stamcarbon B.V.: See—

Kindervater, Christof; and Weissinger, Helmut, 4,946,721, Cl. 428-36.100.

Weil, Edward D.; and Patel, Navin G., 4,946,885, Cl. 524-415.000.

Stamm, John H., to Wilkinson, Harold N. Tray apparatus for patients. 4,946,058, Cl. 220-23.830.

Standard Alaska Production Company: See—

Stagg, Theodore O., 4,945,994, Cl. 166-369.000.

Standard Chair of Gardner, Inc.: See—

Ostroff, Melvin G.; and Ostroff, Steven K., 4,947,022, Cl. 219-121.680.

Standard Telephone and Cables Pty. Ltd.: See—

Montano, Frederick D., 4,947,426, Cl. 379-412.000.

Stanford Technologies, Inc.: See—

Spence, James S.; and Grow, Harry W., 4,947,321, Cl. 364-401.000.

Stang, Michael A. Container system. 4,946,094, Cl. 224-270.000.

Stannard, James H., to Buttes Gas & Oil Co. Corp. Fabricated pressure vessel. 4,946,056, Cl. 220-3.000.

Stansfield, Peter W.: See—

Reed, Alastair; Stansfield, Peter W.; and Rosen, Martin, 4,947,260, Cl. 358-447.000.

Starrfrachsmachinen, AG: See—

Novak, Peter, 4,945,628, Cl. 29-568.000.

State of Israel, Atomic Energy Commission, Soreq Nuclear Research Center, The: See—

Shiloh, Moshe; and Ilzyer, Danielle, 4,946,511, Cl. 136-212.000.

Stauner, Jakob, to Siemens Aktiengesellschaft. Fast-acting clamping device for releasably connecting two components. 4,946,209, Cl. 292-256.000.

Stava, Elliott K., to Lincoln Electric Company, The. Method and apparatus for TIG welding. 4,947,021, Cl. 219-130.510.

Stebel, Wolfram: See—

Kraft, Winfried; Wuerfel, Volker; Stebel, Wolfram; and Maerzhauer, Heinz, 4,946,266, Cl. 350-529.000.

Steelcase, Inc.: See—

Greene, David G., 4,946,149, Cl. 269-21.000.

Steele, Charles. Neon tube electrode housing. 4,947,301, Cl. 362-219.000.

Steenhof, Frits A.: See—

Van Zanten, Adrianus T.; Veendrick, Hendrikus J. M.; Steenhof, Frits A.; Frencken, Peter H.; Nillesen, Antonius H. H. J.; and Van Der Sanden, Cornelis G. L. M., 4,947,380, Cl. 365-238.000.

Steeper (Orthopedic) Limited: See—

Hart, David, 4,946,156, Cl. 272-70.000.

Steffens, Charles J.; and Kooiker, John, to Steffens Enterprises, Inc. Pickup box covers. 4,946,217, Cl. 296-100.000.

Steffens Enterprises, Inc.: See—

Steffens, Charles J.; and Kooiker, John, 4,946,217, Cl. 296-100.000.

Stein, Jay A., to Hologic, Inc. Bone densitometer. 4,947,414, Cl. 378-55.000.

Steiner Hops Limited: See—

Burkhardt, Ronald J.; and Wilson, Richard J. H., 4,946,691, Cl. 426-106.000.

Steiner, Urs: See—

Sokolow, Stephen A.; Steiner, Urs; and Lewis, John R., 4,947,315, Cl. 364-200.000.

Steinhoff, William. Light-weight anchor. 4,945,850, Cl. 114-304.000.

Steininger, Hans-Peter, to Wilhelm Mende GmbH & Co. Method for the continuous production of chip, fiber-and similar boards. 4,946,635, Cl. 264-120.000.

Steinmetz, Alan L.: See—

Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Caiozzo, Nicholas, 4,946,910, Cl. 525-440.000.

Stellar Computer, Inc.: See—

Stewart, W. Kem; Crudele, Lester M.; Miller, Jonathan L.; Riera, Marco E.; and Schurmann, Bruce E., 4,947,357, Cl. 371-22.300.

Stellram S.A.: See—

David, Maurice J. A.; Marianneau, Michel E. A.; Aebi, Gilbert; and Raye, Pierre, 4,946,318, Cl. 407-42.000.

Stender, Eric C.: See—

Berner, John M.; Stender, Eric C.; Campbell, Frank W.; and Alden, Allen J., 4,945,678, Cl. 49-322.000.

Stephan, Wolfgang: See—

Dichtelmüller, Herbert; Möller, Wolfgang; Stephan, Wolfgang; and Schleussner, Hans, 4,946,648, Cl. 422-24.000.

Stephen, John L. Bed lighting apparatus. 4,947,298, Cl. 362-130.000.

Stern, Carl M.; Meckstroth, Richard N.; and Hayes, Stephen L., to Innova Development Corporation. Vehicle with electronic sounder and direction sensor. 4,946,416, Cl. 446-409.000.

Stern & Leonard Associates: See—

Leonard, George H., 4,946,426, Cl. 474-101.000.

Sternglass, Ernest J.: See—

Sashin, Donald; and Sternglass, Ernest J., 4,946,238, Cl. 350-96.270.

Sterrett, Terry L.: See—

Kidd, Patrick D.; and Sterrett, Terry L., 4,946,386, Cl. 433-18.000.

Stetter, Hans: See—

Guilino, Gunther; Barth, Rudolf; and Stetter, Hans, 4,946,270, Cl. 351-169.000.

Stevens, David R.: See—

Borgstrom, Alan D.; and Stevens, David R., 4,946,393, Cl. 439-88.000.

Stevens, Donald A.: See—

Fearnott, Neal E.; Heggis, Kevin S.; Johnson, William L.; and Stevens, Donald A., 4,945,909, Cl. 128-419.0PG.

Stevens, R. D. Samuch; Cater, Stephen R.; and Slemmon, Clarke E., to Canadian Patents & Development Ltd. Photochemical production of hydrogen peroxide. 4,946,566, Cl. 204-157.500.

Stevens, Robert B. Tamper proof backflow prevention assembly. 4,945,940, Cl. 137-218.000.

Stewart, Jeffrey. Polyene deposition chamber. 4,945,856, Cl. 118-715.000.

Stewart, John V. Bed with rotatable rollers. 4,945,585, Cl. 5-122.000.

Stewart, John W.: See—

Bullinger, Philip W.; Langford, Thomas L., II; and Stewart, John W., 4,947,395, Cl. 371-22.300.

Stewart, Roger G.; Ipri, Alfred C.; and Napoli, Louis S., to General Electric Company. Memory cell for a dense EPROM. 4,947,221, Cl. 357-23.500.

Stewart Systems, Inc.: See—

Davis, Bill E.; and Podsiad, Paul, 4,946,022, Cl. 198-365.000.

Stewart, W. Kem; Crudele, Lester M.; Miller, Jonathan L.; Riera, Marco E.; and Schurmann, Bruce E., to Stellar Computer, Inc. Scan testing a digital system using scan chains in integrated circuits. 4,947,357, Cl. 371-22.300.

Stewart Warner Corporation: See—

Wasserstrom, Henry, 4,947,150, Cl. 338-42.000.

Stiernvall, Jan-Erik: See—

Raitt, Alex K.; Hedberg, Bo G.; and Stiernvall, Jan-Erik, 4,947,409, Cl. 375-97.000.

Stipp, Gordon K.; and Tsai, Chee-Hway, to Procter & Gamble Company. The Low viscosity orange juice concentrates useful for high Brix products having lower pseudoplasticity and greater dispersibility. 4,946,702, Cl. 426-599.000.

Stirnadel, Alfred; and Stirnadel, Ute H., to Stirnadel, Alfred. Medication containing extract substances from plants or plant parts of the species *Leptospermum scoparium*. 4,946,682, Cl. 424-195.100.

Stirnadel, Ute H.: See—

Stirnadel, Alfred; and Stirnadel, Ute H., 4,946,682, Cl. 424-195.100.

Stoddard, David C. F.; and Bailey, Randall E., to Mead Corporation. The Display cooler. 4,946,032, Cl. 206-44.00R.

Stoeffler, Richard C.: See—

DeBlois, Raymond L.; Stoeffler, Richard C.; McFarlin, David J.; and Fraser, Howard H., Jr., 4,946,361, Cl. 418-55.600.

Stoffel Seals Corporation: See—

Fuehrer, Charles, 4,946,210, Cl. 292-318.000.

Stokes, Robert B.; Yen, Kuo-Hsiung; and Lau, Kei-Fung, to TRW Inc. Saw channelized filters. 4,947,073, Cl. 310-313.00R.

Stolz, Robert: See—

Olshewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.

Stone, Lawrence A.: See—

Gahnel, Charles F.; Kiskeya, Randy J.; Mako, John; and Stone, Lawrence A., 4,945,828, Cl. 101-93.140.

Stonestreet, Paul R.: See—

Beard, Nigel W.; Phillips, Robert B.; and Stonestreet, Paul R., 4,945,774, Cl. 73-863.110.

Stopp, Gerhard; Kreutzer, Karl-Heinz; Karkossa, Horst; Mannes, Karl; Laakmann, Hans-Joachim; and Trescher, Viktor, to Bayer Aktiengesellschaft. Process for the simultaneous classification and regulated, continuous discharge of particulate material from fluidized bed reactors. 4,946,653, Cl. 422-140.000.

Stopp, Gerhard: See—

Uhlemann, Hans; Braun, Burkhard; Heusmann, Heinz; Stopp, Gerhard; and Karkossa, Horst, 4,946,654, Cl. 422-140.000.

Stops, Peter: See—

Frank, Gerhard; Lendle, Hubert; Seyfert, Wilfried; and Stops, Peter, 4,946,029, Cl. 203-29.000.

Stork, Josef: See—

Olshewski, Armin; Stolz, Robert; Stork, Josef; Kiener, Heinz; Hochrein, Georg; Benktander, Sven; Haller, Henri; and Kapaan, Hendrikus J., 4,946,296, Cl. 384-448.000.

Stork Screens B.V.: See—

Snakenborg, Johannes T., 4,946,763, Cl. 430-308.000.

Strauch, Kathryn L.: See—

Beckwith, Jonathan R.; and Strauch, Kathryn L., 4,946,783, Cl. 435-172.100.

Stroh, Paul F.; and Gunn, Dennis R. Clamp with adjustably positionable handle. 4,945,801, Cl. 84-314.00N.

Strohmayer, Herbert F.; Casey, Jeremiah P.; and Lucas, Peter A., to Air Products and Chemicals, Inc. Bridge bis(cyclohexylamine) curing agents for epoxy resins. 4,946,925, Cl. 528-122.000.

Strong, Russell W.: See—

Cromheecke, Eric L. A., and Strong, Russell W., 4,946,419, Cl. 460-68.000.

Stroud, Richard S.; Anderson, Fred J.; Reprogle, Matthew C.; White, Douglas E.; Marrah, Jeffrey J.; and Manlove, Gregory J., to Delco Electronics Corporation. Held music history circuit. 4,947,431, Cl. 381-13.000.

Stuart, Van I. W.: See—

Bertram, James L.; Walker, Louis L.; and Stuart, Van I. W., 4,946,817, Cl. 502-154.000.

Stuhlmacher, John A.: See—

Osika, Thomas F.; and Stuhlmacher, John A., 4,947,009, Cl. 200-43.160.

Stults, Jeffrey S., to Occidental Chemical Corporation. Catalyzed process for the preparation of oxydiphthalic anhydrides. 4,946,985, Cl. 549-241.000.

Stumpf, Robert C.; Correa, Jose L.; and Farnum, Charles L., to Morton International, Inc. Applicator and method for applying dry film solder mask on a board. 4,946,524, Cl. 156-87.000.

Sturm, Blaine C.: See—

Blenkush, Brian J.; and Sturm, Blaine C., 4,946,200, Cl. 285-38.000.

Stursberg, Bernd; and Bauer, Karl-Heinz, to Peddinghaus, Rolf. Tool carrier for a punch or stamping machine. 4,945,752, Cl. 72-442.000.

Su, Wei-Yang: See—

Speranza, George P.; and Su, Wei-Yang, 4,946,933, Cl. 528-339.300.

Su, Yung-Fr. Car shielding cover. 4,945,935, Cl. 135-88.000.

Sudamet, Ltd.: See—

Willard, David C., 4,946,806, Cl. 501-88.000.

Suchiro, Junya: See—

Minamida, Katsuhiko; and Suchiro, Junya, 4,947,023, Cl. 219-121.680.

Sueishi, Kozo: See—

Koshino, Nagaaki; Maeda, Miyozo; Goto, Yasuyuki; Shibata, Itaru; Utsumi, Kenichi; Ushioda, Akira; Itoh, Ken-ichi; and Sueishi, Kozo, 4,947,372, Cl. 365-106.000.

Suga, Toru; and Inoue, Kazuhiko, to Kabushiki Kaisha Toshiba. Semiconductor device. 4,947,236, Cl. 357-68.000.

Sugasawa, Fukashi, to Nissan Motor Co., Ltd. Vehicle steering angle control system. 4,947,328, Cl. 364-424.050.

Sugavanam, Balasubramanyam, to Imperial Chemical Industries PLC. Triazole and imidazole compounds. 4,946,493, Cl. 71-92.000.

Sugawara, Katuo; Takahashi, Akio; Ono, Masahiro; and Narahara, Toshikazu, to Hitachi, Ltd. Resin composition for printed circuit board and such board formed by use thereof. 4,946,734, Cl. 428-209.000.

Sugawara, Saburo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Focusing screen. 4,946,252, Cl. 350-167.000.

Sugie, Toshinori: See—

Kawabata, Juheiji; Sugie, Toshinori; Kobata, Fumihiko; Izutsu, Hitoshi; and Chiba, Manabu, 4,946,912, Cl. 525-537.000.

Sugita, Hisayasu: See—

Teranishi, Masatoshi; Hara, Noboru; Tachi, Katsumi; and Sugita, Hisayasu, 4,946,284, Cl. 366-131.000.

Sugitani, Kazunori, to Canon Kabushiki Kaisha. Word processor for simultaneously displaying and scrolling documents and the corresponding titles. 4,947,370, Cl. 364-900.000.

Sugiyama, Kazuhide: See—

Murata, Shinji; Onuki, Kazuhiko; Maetani, Masami; and Sugiyama, Kazuhide, 4,947,213, Cl. 355-271.000.

Sugiyama, Kenji, to Usui Kokusai Sangyo Kaisha Ltd. Device for assembling a connector to a tube. 4,945,621, Cl. 29-237.000.

Sugiyama, Yoshihiko; Kurahashi, Muneshige; Yokoyama, Sakari; and Ishihara, Tadayuki, to Nihon Kohden Corporation. Method of and apparatus for artificial respiration in synchronism with voluntary breathing of a patient. 4,945,899, Cl. 128-28.000.

Sulc, Jiri; and Krcova, Zuzana, to Ceskoslovenska akademie ved. Hard intraocular lens with the shape memory. 4,946,470, Cl. 623-6.000.

Sultana, George: See—

Grizmal, Fredrick; Schmidt, Barnet M.; and Sultana, George, 4,947,425, Cl. 379-410.000.

Sumida, Satoshi, to Kabushiki Kaisha Toshiba. Operation control system. 4,947,314, Cl. 364-140.000.

Sumitomo Chemical Company, Limited: See—

Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,946,961, Cl. 548-159.000.

Manabe, Akio; Mizutani, Masato; Maeda, Kiyoto; Ootshi, Tadashi; and Takano, Hirotaka, 4,946,867, Cl. 514-521.000.

Mitsuno, Tatsuyuki; Shinonaga, Hideo; and Daimon, Akio, 4,946,896, Cl. 525-93.000.

Ohmae, Tadayuki; Mashita, Kentaro; Wakatsuki, Kizuku; and Kawakita, Toshio, 4,946,895, Cl. 525-75.000.



- Takahashi, Junya; and Nakamura, Shigeo, 4,946,865, Cl. 514-467.000.
- Yamamoto, Keisaku; Tanimoto, Yoshio; and Takano, Isao, 4,946,888, Cl. 524-526.000.
- Sumitomo Electric Industries, Ltd.: See—
- Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,947,452, Cl. 455-33.000.
- Mori, Masaya; and Kihira, Kazunobu, 4,947,464, Cl. 219-10.790.
- Ogawa, Ichiro; Yoshimura, Kouzou; Ueshima, Kenzo; and Nishimoto, Shinichi, 4,947,245, Cl. 358-98.000.
- Shiga, Nobuo, 4,946,246, Cl. 350-96.200.
- Sumitomo Metal Industries, Ltd.: See—
- Yasumura, Ichiro; and Fujimoto, Kuniharu, 4,945,743, Cl. 72-128.000.
- Sumitomo Metal Mining Company Limited: See—
- Nate, Tasuo; Morimoto, Toshio; Oka, Kouichi; and Endo, Shinobu, 4,946,501, Cl. 75-246.000.
- Sumitomo Rubber Industries, Ltd.: See—
- Fujiwara, Kenichi, 4,945,963, Cl. 152-209.00R.
- Horiuchi, Kuniyasu; and Nakamura, Yoshinobu, 4,946,166, Cl. 273-61.00C.
- Horiuchi, Kuniyasu; and Makamura, Yoshinobu, 4,947,466, Cl. 273-61.00C.
- Yamada, Kaname, 4,946,167, Cl. 273-232.000.
- Sun Chemical Corporation: See—
- Schwartz, Russell J.; and Gregorio, Manuel Z., 4,946,508, Cl. 106-496.000.
- Schwartz, Russell J.; Gregorio, Manuel Z.; and Zwirgds, Anthony C., 4,946,509, Cl. 106-496.000.
- Sun-Maid Growers of California: See—
- Gunnerson, Robert E.; and Bruno, Richard C., 4,946,694, Cl. 426-273.000.
- Sundquist, Douglas F.: See—
- Sobel, Elliot J.; Filion, Joseph L.; and Sundquist, Douglas F., 4,947,397, Cl. 371-16.400.
- Sundstrand Corporation: See—
- Dhyanchand, P. John; and Nguyen, Vietson, 4,947,100, Cl. 322-10.000.
- Doerfler, Ronald W.; Power, Terrill G.; Jones, Stephen R.; and Owens, William R., 4,947,107, Cl. 324-96.000.
- Hoppe, Richard J., 4,947,287, Cl. 361-321.000.
- Shekhawat, Sampat S.; and Dhyanchand, P. John, 4,947,055, Cl. 307-254.000.
- Sundstrand Data Control, Inc.: See—
- Bateman, Charles D., 4,947,164, Cl. 340-968.000.
- Sunpower, Inc.: See—
- Beale, William T., 4,945,726, Cl. 60-520.000.
- Supra Products, Inc.: See—
- Henderson, Walter G.; Archer, John Q., II; Daum, Gerald R.; Ellison, George A.; Gray, John E.; Larson, Wayne F.; Olds, Rockne M.; Scansen, Jerry P.; Sherman, John W.; and Urcin, Edgar J., 4,947,163, Cl. 340-825.310.
- Surrendi, Dennis C. Collapsible tent and frame therefor, 4,945,936, Cl. 135-98.000.
- Surti, Tyrone N. Cleaning blade assembly for electrophotography apparatus, 4,947,216, Cl. 355-299.000.
- Sury, Kohur N., to Esso Resources Canada Limited. Low temperature bitumen recovery process, 4,946,597, Cl. 210-705.000.
- Susaki, Wataru: See—
- Shima, Akihiro; and Susaki, Wataru, 4,946,802, Cl. 437-129.000.
- Susini, Etienne; and Soubrier, Pierre, to Baxter International Inc. Device for sealing and perforating a thermoplastic film, 4,946,432, Cl. 493-341.000.
- SUSPA Altdorf Federungsstechnik GmbH: See—
- Bauer, Hans-Peter; Bauer, Hans J.; Stadelmann, Ludwig; and Mayer, Dieter, 4,946,008, Cl. 188-129.000.
- Sutera, Richard: See—
- Lawson, John A.; Butler, John C.; Sutera, Richard; Calhoun, Lawrence C.; Potts, Danny; Price, Larry E.; Wolfe, Robert G.; Knox, Joseph D.; and Loosberg, Paavo, 4,947,039, Cl. 250-236.000.
- Suthanthiran, Krishnan; and Lakshman, Raj, to Best Industries, Inc. Flexible sealed radioactive film for radiotherapy, and method of making same, 4,946,435, Cl. 600-3.000.
- Suuronen, Lasse; Lappalainen, Teuvo; and Harakka, Pentti, to Valmet Paper Machinery Inc. Method and apparatus for severing a paper web, particularly perforated paper, 4,946,086, Cl. 225-4.000.
- Suutari, Jari: See—
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- Tayrani, Reza. Attenuation controlling by means of a monolithic device. 4,947,142, Cl. 333-81.00A.
- TDK Corporation. See—
- Nishimatsu, Masaharu; Shimada, Shigeru; Ide, Toshiaki; Anoka, Hiroyuki; and Kubota, Yuichi, 4,946,729, Cl. 428-141.000.
- Tecumseh Products Company. See—
- Richardson, Hubert, Jr., 4,946,351, Cl. 417-363.000.
- Teitelman, Gerry. Paper dispensing device. 4,946,066, Cl. 221-210.000.
- Tektronix, Inc.: See—
- Corrie, Brian L., 4,946,716, Cl. 427-289.000.
- Vistica, Robert S., 4,947,338, Cl. 364-485.000.
- Telediffusion de France S.A.: See—
- Guillou, Louis; Blincau, Joseph; Coutrot, Francoise; and Lenoir, Vincent, 4,947,428, Cl. 380-20.000.
- Telefonaktiebolaget L M Ericsson. See—
- Olsson, Torbjorn R.; Kassman, Bjorn T.; Olsson, Karl Gustaf; Ernlolf, Stig C.; Nilsson, Per-Ove; Kjellsson, Rolf I. B.; and Widoff, Lars H., 4,947,288, Cl. 361-413.000.
- Telefonaktiebolaget L M Ericsson. See—
- Andersson, Mats R., 4,947,182, Cl. 343-876.000.
- Raith, Alex K.; Hedberg, Bo G.; and Stiernvall, Jan-Erik, 4,947,409, Cl. 375-97.000.
- Tellechea, Carlos. See—
- Walls, John E.; and Tellechea, Carlos, 4,946,373, Cl. 430-300.000.
- Telser, Thomas. See—
- Kurtz, Karl-Rudolf; Koch, Horst; Telser, Thomas; and Bach, Helmut, 4,946,758, Cl. 430-259.000.
- Templeton, James H.: See—
- Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., 4,946,924, Cl. 528-111.000.
- Tence, Jean-Francois. See—
- Risler, Pierre; and Tence, Jean-Francois, 4,946,693, Cl. 426-243.000.
- Teng, Clarence W., to Texas Instruments, Incorporated. Latch-up resistant CMOS structure. 4,947,227, Cl. 357-42.000.
- Tenna, Tadashi; Akashi, Kichizo; Kusuzaki, Tetsuo; Igeta, Shouji; Tsushima, Isao; and Komoda, Norihisa, to Hitachi, Ltd. Method of managing layout of goods. 4,947,322, Cl. 364-401.000.
- Tennant, William A.: See—
- Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Plutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,946,365, Cl. 425-130.000.
- Tennstedt, Christer. See—
- Wyon, David; and Tennstedt, Christer, 4,946,220, Cl. 297-180.000.
- Terada, Yoshiharu. See—
- Akiyama, Kazutoyo; Kimura, Takeshi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.
- Teranishi, Masatoshi; Hara, Noboru; Tachi, Katsumi; and Sugita, Hisayasu, to Toyoda Gosei Co., Ltd. Mixing head. 4,946,284, Cl. 366-131.000.
- Terbot, John F.; and Hill, Richard F., to Union Carbide Corporation. Cordierite composition and method of production. 4,946,976, Cl. 556-173.000.
- Terk Technologies Corporation. See—
- Scholtz, Larry, 4,947,180, Cl. 343-743.000.
- Terrill Designs, Inc.: See—
- Salmon, Michael E., 4,946,558, Cl. 202-167.000.
- Texaco Chemical Company. See—
- Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., 4,946,924, Cl. 528-111.000.
- Speranza, George P.; and Su, Wei-Yang, 4,946,933, Cl. 528-339.300.
- Texaco IJN Inc. See—
- Hatton, Gregory J.; Helms, David A.; Durrett, Michael G.; Marrelli, John D.; and Stafford, Joseph D., 4,947,128, Cl. 324-640.000.
- Texaco Inc.: See—
- Helms, David A.; Hatton, Gregory J.; Durrett, Michael G.; Dowty, Earl L.; and Marrelli, John D., 4,947,127, Cl. 324-640.000.
- Helms, David A.; and Marrelli, John D., 4,947,129, Cl. 324-640.000.
- Najjar, Mitri S.; and Gates, Walter C., Jr., 4,946,476, Cl. 48-197.00R.
- Osterloh, William T., 4,946,606, Cl. 252-8.554.
- Texas Instruments, Incorporated. See—
- Blake, Terence G. W.; and Lu, Hsindao, 4,946,799, Cl. 437-41.000.
- Gill, Manzur; and D'Arrigo, Sebastiano, 4,947,222, Cl. 357-23.500.
- Hawkins, William R.; and Weinstein, Steve, 4,946,391, Cl. 434-201.000.
- Teng, Clarence W., 4,947,227, Cl. 357-42.000.

- Texor Corporation. See—
- Benz, Bernard D., 4,947,273, Cl. 360-98.060.
- Thackeray, Michael M.: See—
- Van Zyl, Arnold; Duncan, Graham K.; Barrow, Peter; and Thackeray, Michael M., 4,946,664, Cl. 423-600.000.
- Thaler, Warren A.; Ho, W. S. Winston; and Sartori, Guido, to Exxon Research and Engineering Company. Crosslinked copolymers of aliphatic polyester diols and dianhydrides. 4,946,594, Cl. 210-651.000.
- Thalmann, Ernest H.: See—
- Eager, George S., Jr.; Fryszyzyn, Bogdan; and Thalmann, Ernest H., 4,945,653, Cl. 34-21.000.
- Theus, Ulrich. See—
- Pfeifer, Heinrich; Reich, Werner; and Theus, Ulrich, 4,947,171, Cl. 341-143.000.
- Thiele-Kaolin Company. See—
- Shi, Joseph C. S.; Albers, Edwin W.; and Wilson, Geoffrey R., 4,946,814, Cl. 502-62.000.
- Thies, Peter; and Fudickar, Harald, to C. S. Fudickar KG. Press for forming an endless conveyor belt and for repairing a conveyor belt. 4,946,541, Cl. 156-580.000.
- Tholance, Michel; Lessi, Jacques; and Michel, Jean-Paul, to Institut Francais du Pétrole. Process and device for hydraulically and selectively controlling at least two tools or instruments of a valve device allowing implementation of the method of using said device. 4,945,995, Cl. 166-375.000.
- Thoma, Nandor G.; Moore, Victor S.; and Kraft, Wayne R., to International Business Machines Corporation. Microword generation mechanism utilizing a separate branch decision programmable logic array. 4,947,369, Cl. 364-900.000.
- Thomas, David M.: See—
- Smith, Lewis R.; and Thomas, David M., 4,947,169, Cl. 341-121.000.
- Thomas, Louis D., to National Research Development Corporation. Method and apparatus for automatic signal level adjustment. 4,947,133, Cl. 328-168.000.
- Thomas, Oomman P.; Burt, Earl E., III; and Peffley, Richard D., to Dow Chemical Company, The. Polyisocyanate prepolymers prepared from rigid polyaromatic precursor materials, and polyurethanes prepared therefrom. 4,946,872, Cl. 521-159.000.
- Thomas, W. Benjamin. See—
- Albert, Stephen B.; and Thomas, W. Benjamin, 4,946,070, Cl. 222-52.000.
- Albert, Stephen B.; and Thomas, W. Benjamin, 4,946,072, Cl. 222-105.000.
- Thompson, Ian R.: See—
- McKay, Michael L.; Thompson, Ian R.; and Sarich, Ralph T., 4,945,886, Cl. 123-533.000.
- Thompson, Kevin D.: See—
- Ballard, Gary W.; and Thompson, Kevin D., 4,946,096, Cl. 236-11.000.
- Thompson, Robert L.: See—
- Baxendell, Douglas J.; Cortash, Michael J.; Osbourne, William G.; and Thompson, Robert L., 4,947,214, Cl. 355-274.000.
- Thomson-CSF. See—
- Kretschmer, Sylvain; Do-Huu, Jean-Paul; and Micheron, Francois, 4,945,916, Cl. 128-671.000.
- Marquet, Patrice; Lemaire, Jean-Marc; and Dunouvion, Philippe, 4,946,277, Cl. 356-141.000.
- Thomson Semiconducteurs. See—
- Gautier, Jean Marie; and Devin, Jean, 4,947,375, Cl. 365-200.000.
- Thornton, J. R.: See—
- Tuttle, Ronald R.; and Thornton, J. R., 4,946,848, Cl. 514-282.000.
- Thorpe, David. See—
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- Thrush, Roger L.: See—
- Billman, Timothy B.; McHugh, Robert G.; and Thrush, Roger L., 4,946,403, Cl. 439-326.000.
- Thys-Jacobs, Susan. Method for the treatment of premenstrual syndrome. 4,946,679, Cl. 424-682.000.
- Tihanyi, Jeno. See—
- Einzinger, Josef; Leopold, Ludwig; Tihanyi, Jeno; and Weber, Roland, 4,947,234, Cl. 357-68.000.
- Tittler, Philip. See—
- Hill, Grayham; and Tittler, Philip, 4,947,070, Cl. 310-80.000.
- Toarmina, Chris. See—
- Munyon, Todd; and Toarmina, Chris, 4,947,284, Cl. 361-92.000.
- Tobori, Hiroyuki. See—
- Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.
- Tokai Rubber Industries, Ltd.: See—
- Kato, Rentaro; Kanda, Ryouji; and Yoshida, Kiyohiko, 4,946,147, Cl. 267-140.100.
- Tokar, Joseph C.: See—
- Monson, Donald R.; LeBlanc, James A.; and Tokar, Joseph C., 4,946,484, Cl. 55-385.200.
- Tokico Ltd.: See—
- Hayashida, Yoshihiro; Nakamura, Yoshihiro; Ishii, Hideaki; and Koshimizu, Naganori, 4,945,729, Cl. 60-562.000.
- Tokyo Electric Power Company, Ltd.: See—
- Hattori, Seiji; Kasukawa, Akihito; Shibano, Yoshizo; Kobayashi, Yoshinobu; and Suzuki, Shinji, 4,947,452, Cl. 455-33.000.
- Tokyo Gas Company Limited. See—
- Nakamachi, Ichiro; Yasuzawa, Kunio; Miyahara, Tadato; and Nagata, Takahiro, 4,945,841, Cl. 110-341.000.
- Tokyo Ohka Kogyo Co., Ltd.: See—
- Hijikata, Isamu; and Uehara, Akira, 4,946,537, Cl. 156-345.000.
- Tokyo Tanabe Co., Ltd.: See—
- Tomari, Masazumi; Nagamatsu, Yasuhiro; and Suzuki, Senji, 4,946,844, Cl. 514-254.000.
- Tomari, Masazumi; Nagamatsu, Yasuhiro; and Suzuki, Senji, to Tokyo Tanabe Co., Ltd. Optically active benzoquinolizine compounds, process for preparing same, and antibacterial preparation containing same as active ingredient. 4,946,844, Cl. 514-254.000.
- Tomatis, Bernard. See—
- Hauser, Jean-Luc; Tomatis, Bernard; and Sainte-Rose, Christian, 4,946,443, Cl. 604-165.000.
- Tomb, Richard H. Covered bridge structure. 4,945,594, Cl. 14-1.000.
- Tomei Thushin Kogyo Co., Ltd.: See—
- Hori, Akira; Noda, Minoru; Ohara, Shigenobu; Mochizuki, Yuzo; and Nomura, Junji, 4,946,401, Cl. 439-224.000.
- Tomellini, Garzia D. Obstacle for equestrian sports, made up of modular elements of simple and rapid assembly, for installation on the equestrian field. 4,946,139, Cl. 256-64.000.
- Tomita, Akira; Kajima, Toshihiko; Kawahara, Keizo; and Satomi, Hiroshi, to Toyo Boseki Kabushiki Kaisha. Flexographic cured printing plate comprising a chlorinated polymer and a hydrophilic polymer. 4,946,752, Cl. 430-18.000.
- Tonai, Shuichi; and Matsushita, Shigeo, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Parallel link robot arm. 4,946,337, Cl. 414-744.500.
- Tone, Hideo, to Kokusan Kogyo Kabushiki Kaisha. Apparatus for continuously cutting soft material subject to elongation by tensile force. 4,945,795, Cl. 83-27.000.
- Topholm, Jan, to Topholm & Westermann ApS. Programmable hearing aid. 4,947,432, Cl. 381-68.200.
- Topholm & Westermann ApS. See—
- Topholm, Jan, 4,947,432, Cl. 381-68.200.
- Toray Dow Corning Silicone. See—
- Kunimatsu, Kaoru; and Komatsu, Atsushi, 4,946,883, Cl. 524-265.000.
- Toray Silicone Company Limited. See—
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- Shirahata, Akihiko; and Fukutani, Yoshimi, 4,946,921, Cl. 528-39.000.
- Torihata, Takashi; and Kawashima, Etsuko, to Mitsui Petrochemical Industries, Ltd. Method of removing mercury from hydrocarbon oils. 4,946,582, Cl. 208-251.00R.
- Torimaru, Yasuo. See—
- Ashida, Tsutomu; Nakagawa, Kiyotoshi; Fujii, Katsumasa; and Torimaru, Yasuo, 4,947,232, Cl. 357-53.000.
- Torremans, Joseph L. G.: See—
- Janssens, Frans E.; Sommen, Francois M.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,946,843, Cl. 514-253.000.
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- Torrington Company, The. See—
- Hajzler, Christian, 4,946,295, Cl. 384-448.000.
- Toshiba Kikai Kabushiki Kaisha. See—
- Kumazaki, Hiroshi, 4,946,356, Cl. 425-135.000.
- Tosoh Corporation. See—
- Meguro, Hiroshi; Ohru, Hiroshi; and Akasaka, Kazuaki, 4,947,000, Cl. 568-14.000.
- Toti, Andrew J. Method of forming and assembling decorative awning and building fascia. 4,945,624, Cl. 29-453.000.
- Tots-In-Mind, Inc.: See—
- LaMantia, Mark A., 4,945,584, Cl. 5-97.000.
- Towle, Timothy W.: See—
- Laugharn, James A.; Hammerton, Denis; and Towle, Timothy W., 4,946,603, Cl. 210-807.000.
- Towns, Edward J.; and Brown, Edward M. Tamper indicating screw cap. 4,946,055, Cl. 215-254.000.
- Townsend, Charles E. Sun visor. 4,945,575, Cl. 2-12.000.
- Toy, Liane C.; and Toy, Wing N., to AT&T Bell Laboratories. Call waiting arrangement providing options to both a subsequent calling party and to the called party. 4,947,421, Cl. 379-67.000.
- Toy, Wing N.: See—
- Toy, Liane C.; and Toy, Wing N., 4,947,421, Cl. 379-67.000.
- Toyo Boseki Kabushiki Kaisha. See—
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- Toyo Boseki Kabushiki Kaisha. See—
- Ichiryu, Takaharu; Ono, Yoshiki; and Ishihara, Hideaki, 4,946,746, Cl. 428-606.000.
- Toyo Tire & Rubber Company Limited. See—
- Takino, Hiroshi; Iwama, Satoshi; Ohara, Riichiro; Isobe, Noriyuki; Tobori, Hiroyuki; and Komai, Makoto, 4,946,887, Cl. 524-495.000.
- Toyoda Gosei Co., Ltd.: See—
- Ishida, Syuichi; Goto, Shinichi; and Muramatsu, Kimio, 4,945,786, Cl. 74-552.000.
- Kotaki, Masahiro; and Hashimoto, Masafumi, 4,946,548, Cl. 156-643.000.
- Nozaki, Masahiro; and Asai, Junji, 4,945,681, Cl. 49-495.000.
- Teranishi, Masatoshi; Hara, Noboru; Tachi, Katsumi; and Sugita, Hisayasu, 4,946,284, Cl. 366-131.000.
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- Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; Takahashi, Satoru; and Takehi, Takayoshi, 4,946,495, Cl. 71-92.000.



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Toyota Jidosha Kabushiki Kaisha: See—  
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Triangle Engineering of Arkansas, Inc.: See—  
Matson, Carl G., 4,946,222, Cl. 297-345.000.  
Troke, Jamie T. Computer keyboard holder, 4,946,121, Cl. 248-201.000.  
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Clarke, Michael R.; Troughton, Gary E.; and Walser, Donald C., 4,945,652, Cl. 34-12.000.  
Truth Incorporated: See—  
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Leifeld, Ferdinand, 4,945,610, Cl. 19-105.000.  
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Stokes, Robert B.; Yen, Kuo-Hsiung; and Lau, Kei-Fung, 4,947,073, Cl. 310-313.00R.  
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TSL Incorporated: See—  
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Tsuruta, Seiji, to Atsugi Motor Parts Company, Limited. Hydraulic valve lifter for internal combustion engine, 4,945,871, Cl. 123-90.550.  
Tsuchima, Isao: See—  
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Tuovinen, Frans H.; and Salervo, Aarno T., to Outokumpu Oy. Method for mixing molten iron silicate with ferroalloy slag in order to produce fire-resistant and chemically resistant fiber, 4,946,811, Cl. 501-155.000.

Turchi, Sergio; and Valetto, Alessandro, to Weber S.r.l. Electromagnetically-controlled fuel injection valve for diesel engines, 4,946,106, Cl. 239-585.000.  
Turk, Nathan: See—  
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Tuttle, Ronald R.; and Thornton, J. R., to Baker Cumins Dermatologicals, Inc. Method of treating pruritus with nalmefene and clonidine, 4,946,848, Cl. 514-282.000.  
Twitty, William B.; and Sander, Wendell B., to Echelon Systems Corporation. Protocol for network having a plurality of intelligent cells, 4,947,484, Cl. 371-37.100.  
Twombly, Jeffrey G., to General Signal Corporation. Apparatus and process for automatically calibrating locomotive speedometers as wheel size varies, 4,945,753, Cl. 73-2.000.  
Ube Industries, Ltd.: See—  
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UCAR Carbon Technology Corporation: See—  
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Udaka, Shigezo; Takagi, Hiroaki; and Kadowaki, Kiyoshi, to Higeta Shoyu Co., Ltd. *Bacillus brevis* strains and application thereof, 4,946,789, Cl. 435-252.300.  
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Lawson, John A.; Butler, John C.; Sutura, Richard; Calhoun, Lawrence C.; Potts, Danny; Price, Larry E.; Wolfe, Robert G.; Knox, Joseph D.; and Loosberg, Paavo, 4,947,039, Cl. 250-236.000.

Wong, Tak-Ko, to Franklin Sports Industries, Inc. Safety dart. 4,946,172, Cl. 273-420.000.

Wood, Charles H.; and Johnson, Wayne, to Fusion System Corporation. Apparatus for rotating an electrodeless light source. 4,947,080, Cl. 315-248.000.

Wood, David G. S.; and Baldassari, Mark, to Grass Valley Group, Inc., The. Adaptive architecture for video effects. 4,947,256, Cl. 358-183.000.

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Campbell, Anthony K.; Woodhead, James S.; and Weeks, Ian, 4,946,958, Cl. 546-104.000.

Woodruff, David C., to NM Laser Products, Inc. Right angle shutter or laser beam. 4,946,256, Cl. 350-269.000.

Woods, James W.: See—  
Nelson, Larry A.; and Woods, James W., 4,947,459, Cl. 455-612.000.

Worship, Leslie A.; Isaacs, Peter; Bain, Steven; and Bain, Kenneth J. D., to Marsden (Proprietary) Limited. Apparatus for the manufacture of four-sided sheet metal containers. 4,945,748, Cl. 72-323.000.

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Wright, John T. M., to Pioneering Technologies, Inc. Vessel occluder. 4,946,463, Cl. 606-158.000.

Wright, Leslie R.: See—  
Chevalier, James L.; Pfeiffer, John D.; and Wright, Leslie R., 4,945,892, Cl. 126-373.000.

Wrobel, Jay E., to American Home Products Corporation. Novel spirocyclic imides as aldose reductase inhibitors and antihyperglycemic agents. 4,946,858, Cl. 514-409.000.

Wroblewski, Jarda T.: See—  
Kozikowski, Alan P.; Wroblewski, Jarda T.; and Costa, Erminio, 4,946,839, Cl. 514-210.000.

Wu, Feng-Jung; Berris, Bruce C.; and Bell, Donald R., to Ethyl Corporation. Process for making methylcyclopentadienyl manganese tricarbonyl compounds. 4,946,975, Cl. 556-47.000.

Wu, Matthew. Amusement lighter. 4,946,383, Cl. 431-125.000.

Wuerfel, Volker: See—  
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Wunderatzke, Wilfried, to Akzo N.V. Dome for waste dumps. 4,946,310, Cl. 405-128.000.

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Wyon, David; and Tennstedt, Christer. Ventilated chair or similar device. 4,946,220, Cl. 297-180.000.

Wyss, Pierre-Charles: See—  
Jolidon, Synese; Locher, Rita; Kompis, Ivan; Weiss, Ekkehard; and Wyss, Pierre-Charles, 4,946,847, Cl. 514-229.500.

Xerox Corporation: See—  
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Chuang, Thomas C., 4,947,215, Cl. 355-274.000.

Deshpande, Narayan V., 4,947,193, Cl. 346-140.00R.

Hawkins, William G.; and Burke, Cathie J., 4,947,192, Cl. 346-140.00R.

Ong, Beng S.; Keoshkernan, Barkev; and Baranyi, Giuseppe, 4,946,754, Cl. 430-59.000.

Paradise, Elizabeth M.; and Monkelbaan, Edwin R., 4,947,345, Cl. 364-519.000.

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Xoma Corporation: See—  
Baldwin, Robert W.; and Byers, Vera S., 4,946,675, Cl. 424-85.910.

Yacobucci, Paul D.: See—  
Harrison, Daniel J.; and Yacobucci, Paul D., 4,946,827, Cl. 503-227.000.

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Yagihara, Hiroshi: See—  
Goto, Yukihisa; Masamoto, Kazuhisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,946,497, Cl. 71-94.000.

Yagino, Masanori, to Ricoh Company, Ltd. Edge type thermal print-head. 4,947,183, Cl. 346-76.0PH.

Yajima, Hiroshi; Hayashi, Masaki; Satoh, Takashi; and Shioya, Masaharu, to Casio Computer Co., Ltd. Hand-held manually sweeping printing apparatus. 4,947,262, Cl. 358-296.000.

Yamabe, Akira; and Yoshida, Ryuchi, to Japan Pet Drugs Co., Ltd. Curative and preventive method for aquarium fish. 4,946,690, Cl. 424-665.000.

Yamada, Kaname, to Sumitomo Rubber Industries, Ltd. Golf ball. 4,946,167, Cl. 273-232.000.

Yamada, Kenji: See—  
Hayashi, Kimiaki; Ozaki, Yasuhiko; Yamada, Kenji; Takenaga, Hideyuki; and Inoue, Ichizo, 4,946,862, Cl. 514-438.000.

Yamada, Masanori, to Canon Kabushiki Kaisha. Image reproduction apparatus capable of dividing an image into parts for reproduction on respective sheets. 4,947,269, Cl. 358-448.000.

Yamada, Takao, to NKK Corporation. Bearing apparatus. 4,946,294, Cl. 384-49.000.

Yamada, Takeshi; Onodera, Tsutomu; and Taya, Hiroyuki, to Fujikura Ltd. Method of testing spliced portion of optical fibers. 4,945,776, Cl. 73-866.000.

Yamagami, Hiroyuki, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,946,767, Cl. 430-505.000.

Yamagishi, Kanji: See—  
Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, 4,946,953, Cl. 536-57.000.

Yamaguchi, Hiroshi: See—  
Akiyama, Kazutoyo; Kimura, Takeshi; Terada, Yoshiharu; Hasegawa, Hiromasa; Okabe, Naotake; and Yamaguchi, Hiroshi, 4,947,019, Cl. 219-119.000.

Yamaguchi, Satoru; Shimizu, Jozo; Satoh, Kozaburo; and Andoh, Haruo, to Hitachi Maxell, Ltd. Magnetic recording medium. 4,946,374, Cl. 428-323.000.

Yamaguchi Yakuhin Shokai Ltd.: See—  
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Yamaguchi, Yasunori; Sato, Katsuyuki; Mitake, Jun; Kawaguchi, Hitoshi; Yoshida, Masahiro; Okada, Terutaka; Morino, Makoto; Saeki, Tetsuya; Yukawa, Yosuke; and Nagashima, Osamu, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Dynamic ram. 4,947,373, Cl. 365-189.040.

Yamaha Corporation: See—  
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Yamaha Hatsudoki Kabushiki Kaisha: See—  
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Sakurai, Kenichi; and Ueda, Kazutoshi, 4,945,887, Cl. 123-573.000.

Yamahara, Johji: See—  
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Yamamoto, Hidetoshi: See—  
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Yamamoto, Kazuhisa; and Taniuchi, Tetsuo, to Matsushita Electric Industrial Co., Ltd. Optical harmonic generation device. 4,946,240, Cl. 350-96.190.

Yamamoto, Kazuo: See—  
Onishi, Takashi; Mori, Toshiki; Suzuki, Shigeaki; Takigawa, Michio; and Yamamoto, Kazuo, 4,947,001, Cl. 568-28.000.

Yamamoto, Keisaku; Tanimoto, Yoshio; and Takano, Isao, to Sumitomo Chemical Company Limited. High-hardness rubber composition. 4,946,888, Cl. 524-526.000.

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Yamamoto, Ryoichi: See—  
Kuioka, Kiyoshi; Yamamoto, Ryoichi; Inaba, Koji; and Hoshino, Toyoma, 4,945,661, Cl. 37-67.000.

Yamamoto, Shinji: See—  
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Yamamoto, Toshihiro: See—  
Okuma, Shigeru; Yamagishi, Kanji; Hara, Masami; Suzuki, Keizo; Yamamoto, Toshihiro; and Yoshidome, Hideo, 4,946,953, Cl. 536-57.000.

Yamamoto, Yasuhiro: See—  
Kaibuki, Shigeo; Watanabe, Shinpei; and Yamamoto, Yasuhiro, 4,945,622, Cl. 29-281.100.

Yamamoto, Yoshifumi: See—  
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Yamanaka, Takanobu, to Nippon Pneumatic Manufacturing Co., Ltd. Hydraulic impact tool. 4,945,998, Cl. 173-134.000.

Yamashiro, Hideo: See—  
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Yamashita, Hiroki: See—  
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Yamashita, Hisao: See—  
Tachi, Takahiro; Kato, Akira; Kawaguchi, Hiroshi; Yamashita, Hisao; Kamo, Tomochi; Matsuda, Shinpei; Kato, Yasuyoshi; and Nakajima, Fumito, 4,946,661, Cl. 423-239.000.

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Yamashita, Tatsuro: See—  
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Yang, Shun-Ching. Structure of water tap. 4,946,135, Cl. 251-253.000.

Yano, Noriyoshi; and Fujita, Toshihiko, to Nippon Polyurethane Industry Co., Ltd. Process for producing polyoxymethylene-polyurethane type alloy. 4,946,906, Cl. 525-399.000.

Yano, Seinosuke; Okamura, Yoshihiro; and Muraoka, Hirohide, to Nippon Steel Corporation. Process for producing high toughness, high strength steel having excellent resistance to stress corrosion cracking. 4,946,516, Cl. 148-12.00F.

Yano, Tetsuo: See—  
Matsuda, Jun; Utsumi, Akihiro; Katsumura, Munehide; Yoneda, Masafumi; and Yano, Tetsuo, 4,947,463, Cl. 219-121.850.

Yapp, Martin G., to Airflow Research & Manufacturing Corporation. Centrifugal fan with airfoil vanes in annular volute envelope. 4,946,348, Cl. 415-211.200.

Yarbrough, Roy L.; and Estrada, Julio R., to Fairchild Semiconductor Corporation. TTL current sinking circuit with transient performance enhancement during output transition from high to low. 4,947,058, Cl. 307-443.000.

Yashiro, Tsutomu: See—  
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Yaskawa Electric Mfg. Co., Ltd.: See—  
Kisakibaru, Toshiro; Gotoh, Tsuguo; and Ohuchi, Kazunori, 4,947,088, Cl. 318-6.000.

Yasuda, Kenichi; Wakata, Hitoshi; and Nakatani, Hajime, to Mitsubishi Denki Kabushiki Kaisha. Laser device with wavelength stabilization control and method of operating the same. 4,947,398, Cl. 372-29.000.

Yasuda, Yushiro: See—  
Tanahashi, Toshio; Kanamaru, Masanobu; Yasuda, Yushiro; Masubuchi, Masahiko; Ito, Toshio; and Itoh, Kazuhiro, 4,945,867, Cl. 123-65.0VD.

Yasue, Takao: See—  
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Yasukochi, Tohru: See—  
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Yasumoto, Mitsugi: See—  
Tada, Yukio; Uemura, Atsuhiko; Yasumoto, Mitsugi; Takeda, Setsuo; Saito, Hitoshi; and Unemi, Norio, 4,946,951, Cl. 536-23.000.

Yasumura, Ichiro; and Fujimoto, Kuniharu, to Sumitomo Metal Industries, Ltd. Apparatus for manufacturing electric welded pipes under hot conditions. 4,945,743, Cl. 72-128.000.

Yasuzawa, Kunio: See—  
Nakamachi, Ichiro; Yasuzawa, Kunio; Miyahara, Tadato; and Nagata, Takahiro, 4,945,841, Cl. 110-341.000.

Yazaki Corporation: See—  
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Takenouchi, Kenji; Makita, Toshihiko; and Matsumoto, Mitsuru, 4,946,404, Cl. 439-352.000.

Yeatts, Alfred T., to General Electric Company. Process for manufacturing a selective plated board for surface mount components. 4,946,563, Cl. 204-15.000.

Yen, Chieh-Yi J.: See—  
Dell'Eva, Mark L.; Yen, Chieh-Yi J.; and George, Jacob, 4,946,281, Cl. 356-376.000.

Yen, Kuo-Hsiung: See—  
Stokes, Robert B.; Yen, Kuo-Hsiung; and Lau, Kei-Fung, 4,947,073, Cl. 310-313.00R.

Yie, Gene G., to Electric Power Research Institute, Inc. Nozzle for entraining abrasive granules within a high pressure fluid jet and process of using same. 4,945,688, Cl. 51-439.000.

Yin, E. Thye. Composition, kit and method for assaying heparin and a method for making the composition. 4,946,775, Cl. 435-13.000.

Yoder, Douglas J.: See—  
Sidner, Diane W.; Yoder, Douglas J.; and Moss, David E., 4,945,769, Cl. 73-727.000.

Yoder, Max N. Yoked, orthogonally distributed equal reactance amplifier. 4,947,220, Cl. 357-22.000.

Yodock, Leo J. Highway barrier. 4,946,306, Cl. 404-6.000.

Yogo, Teruaki, to Chuo Electric Manufacturing Co., Ltd. Apparatus for bending elongated materials in any direction. 4,945,747, Cl. 72-306.000.

Yokoyama, Sakari: See—  
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Yokoyama, Tatuo, to Sharp Kabushiki Kaisha. Communication interface. 4,947,406, Cl. 375-7.000.

Yokozawa, Seiichi, to Pioneer Electronic Corporation. Signal reproducing device which offsets the tracking error signal for a digital tape player. 4,947,272, Cl. 360-77.150.

Yoneda, Masafumi: See—  
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Yoshida, Isamu: See—  
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Yoshida, Kiyohiko: See—  
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Yoshida Kogyo K. K.: See—  
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Yoshida Kogyo K.K.: See—  
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Yoshida, Masahiro: See—  
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Yoshida, Tadashi: See—  
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Yoshidome, Hideo: See—  
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Yoshim 'o, Yoshikazu; Suzuki, Tomonari; Higashigaki, Yoshiyuki; Nakajima, Shigeo; and Inoguchi, Toshio, to Sharp Kabushiki Kaisha. Method for the production of carbon films having an oriented graphite structure. 4,946,370, Cl. 427-249.000.

Yoshimura, Katsuji: See—  
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Takahashi, Koji; Kozuki, Susumu; and Yoshimura, Katsuji, 4,947,448, Cl. 382-56.000.

Yoshimura, Kouzou: See—  
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Yoshimura, Yoshihiro: See—  
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Yoshinaga, Isao; and Edashima, Toshikazu, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for handling a measuring instrument for the inside of a nuclear reactor. 4,946,642, Cl. 376-260.000.

Yoshinaga, Junji; Shogaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; and Kato, Yoshiko, to Sawai Pharmaceutical Co., Ltd. Carboxamide derivatives having tetrazole and thiazole rings and their use. 4,946,855, Cl. 514-371.000.

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Yoshinaga, Yoko: See—  
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Young, Frederick M., to Royal Ordnance plc. Explosive projectiles. 4,945,834, Cl. '02-473.000.

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Young, John M.: See—  
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Young, Thomas A., to OB Products, Inc. High current connectors and methods of assembly. 4,946,407, Cl. 439-686.000.

Yukawa, Yosuke: See—  
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Yuki, Mikio: See—  
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Zahn, Rudolf K.: See—  
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Zardi, Umberto, to Ammonia Casale SA. System to reduce energy consumption in heterogeneous synthesis reactors and related reactors. 4,946,657, Cl. 422-148.000.

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Zentner, Gaylen M.: See—  
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Zettler, Karl H.; Klapper, Siegfried; Fritze, Hartwig; and Meyer, Reinhard, to Westfalia Separator AG. Method of precipitating cheese fines from whey. 4,946,698, Cl. 426-495.000.

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Ziegler, Ewald; Widera, Joerg; Arndt, Stefan; and Simon, Nikolaus, to Robert Bosch GmbH. Fuel injection valve. 4,945,877, Cl. 123-472.000.

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Zsolnay, Andrew M.: See—  
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Zukowski, Stanislaw L.: See—  
Bolton, Carl W.; Oden, Robert R.; and Zukowski, Stanislaw L., 4,945,904, Cl. 606-96.000.

Zwadlo, Gregory L.: See—  
Elmasry, Mohamed A.; Kidnie, Kevin M.; and Zwadlo, Gregory L., 4,946,753, Cl. 430-45.000.

Zweifel, Terry L. Windshear detection for aircraft using temperature lapse rate. 4,947,165, Cl. 340-968.000.

Zwirgzdas, Anthony C.: See—  
Schwartz, Russell J.; Gregorio, Manuel Z.; and Zwirgzdas, Anthony C., 4,946,509, Cl. 106-496.000.

Zyma SA: See—  
Weith, Andre J.; and Narld, Philippe M., 4,946,861, Cl. 514-436.000.

501 CopyTele, Inc.: See—  
Di Santo, Frank J.; and Krusos, Denis A., 4,947,157, Cl. 340-787.000.

Di Santo, Frank J., and Krusos, Denis A., 4,947,159, Cl. 340-787.000.



# LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF AUGUST, 1990

NOTE —Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Allen, John B., to Texas Instruments Incorporated. Carrier tracking system. Re. 33,287, Cl. 244-3.110.  
BASF Corporation: See—  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., Re. 33,291, Cl. 521-137.000.  
Bradley, Donald C.; Chudzynska, Halina; and Faktor, Marc M., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Majesty's Government of the. Preparation of meta! alkyls. Re. 33,292, Cl. 556-1.000.  
Canon Kabushiki Kaisha: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
Chudzynska, Halina: See—  
Bradley, Donald C.; Chudzynska, Halina; and Faktor, Marc M., Re. 33,292, Cl. 556-1.000.  
Endo, Makoto: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
Faktor, Marc M.: See—  
Bradley, Donald C.; Chudzynska, Halina; and Faktor, Marc M., Re. 33,292, Cl. 556-1.000.  
General Electric Company: See—  
Modic, Frank J., Re. 33,289, Cl. 428-145.000.  
Grace, Oscar M.: See—  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., Re. 33,291, Cl. 521-137.000.  
Hartman, Robert J.: See—  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., Re. 33,291, Cl. 521-137.000.  
Heyman, Duane A.: See—  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., Re. 33,291, Cl. 521-137.000.  
Hitachi, Ltd.: See—  
Naka, Reishi; and Kuroishi, Kazuyoshi, Re. 33,290, Cl. 521-110.000.

Kashiwagi, Kazuo: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
Kuroishi, Kazuyoshi: See—  
Naka, Reishi; and Kuroishi, Kazuyoshi, Re. 33,290, Cl. 521-110.000.  
Modic, Frank J., to General Electric Company. Transparent membrane structures. Re. 33,289, Cl. 428-145.000.  
Naka, Reishi; and Kuroishi, Kazuyoshi, to Hitachi, Ltd. Rigid polyurethane foam and process for producing the same. Re. 33,290, Cl. 521-110.000.  
Obayashi, Toshio, to Somar Corporation. Automatic laminator. Re. 33,288, Cl. 156-497.000.  
Ono, Satoshi: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., to BASF Corporation. Process for the preparation of white graft polymer dispersions and flame-retardant polyurethane foams. Re. 33,291, Cl. 521-137.000.  
Reichel, Curtis J.: See—  
Ramlow, Gerhard G.; Heyman, Duane A.; Grace, Oscar M.; Reichel, Curtis J.; and Hartman, Robert J., Re. 33,291, Cl. 521-137.000.  
Saito, Yoshihiro: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
Somar Corporation: See—  
Obayashi, Toshio, Re. 33,288, Cl. 156-497.000.  
Texas Instruments Incorporated: See—  
Allen, John B., Re. 33,287, Cl. 244-3.110.  
Toda, Takao: See—  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, Re. 33,293, Cl. 355-45.000.  
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Majesty's Government of the: See—  
Bradley, Donald C.; Chudzynska, Halina; and Faktor, Marc M., Re. 33,292, Cl. 556-1.000.  
Waters, William A. Personal air conditioner. Re. 33,286, Cl. 2-171.300.  
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, to Canon Kabushiki Kaisha. Reader-printer. Re. 33,293, Cl. 355-45.000.

# LIST OF DESIGN PATENTEEES

Abraham, Thomas K. Display letter or similar article. 309,750, 8-7-90, Cl. D18-24.000.  
Akeret, Peter, to Licinvest AG. Picture viewer. 309,679, 8-7-90, Cl. D6-311.000.  
Adams, Kelley O. Ice cream dispensing device or similar article. 309,699, 8-7-90, Cl. D7-681.000.  
Alco Industries, Inc.: See—  
Goetz, Charles R., 309,700, Cl. D7-692.000.  
Alexander, James E. Beach bag. 309,673, 8-7-90, Cl. D3-30.100.  
Alfred Grass G.m.b.H.: See—  
Grass, Alfred, 309,704, Cl. D8-323.000.  
Alroy, Yoram, to Designer Products Est. Eyeglass case. 309,676, 8-7-90, Cl. D3-34.000.  
Ancona, Bruce: See—  
Ancona, Jane; and Ancona, Bruce, 309,694, Cl. D7-638.000.  
Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Cutlery center. 309,694, 8-7-90, Cl. D7-638.000.  
Annell Ljus och Form AB: See—  
Sahlen, Bjorn F., 309,795, Cl. D26-87.000.  
Arai, Takashi, to Asics Corporation. Shoe sole. 309,669, 8-7-90, Cl. D2-320.000.  
Archart, Robert W.; Peeler, Raymond W.; Kraus, Keith F.; and Claghorn, Roger O., to Emerson Electric Co. Wood lathe. 309,741, 8-7-90, Cl. D15-130.000.  
Arneson, Cheryl L. Child's hair washing support. 309,801, 8-7-90, Cl. D28-20.000.  
ARTEMIDE S.p.A.: See—  
Botta, Mario, 309,790, Cl. D26-80.000.  
Citterio, Antonio, 309,794, Cl. D26-87.000.  
Frattini, Gianfranco, 309,793, Cl. D26-87.000.  
Gismondi, Ernesto, 309,797, Cl. D26-107.000.

Mangiarotti, Angelo, 309,792, Cl. D26-85.000.  
Asics Corporation: See—  
Arai, Takashi, 309,669, Cl. D2-320.000.  
Attwood Corporation: See—  
Whitley, Warrick M., II, 309,784, Cl. D26-28.000.  
Au, Nelson S.: See—  
Nuttall, Michael J.; and Au, Nelson S., 309,728, Cl. D14-100.000.  
Nuttall, Michael J.; and Au, Nelson S., 309,732, Cl. D14-113.000.  
Aveni, Michael A., to Nike, Inc.; and Nike International, Ltd. Shoe upper. 309,667, 8-7-90, Cl. D2-314.000.  
Azman, Louis. Bottle clock. 309,717, 8-7-90, Cl. D10-6.000.  
Barnes, Richard D. Scanner hook adaptor. 309,707, 8-7-90, Cl. D8-381.000.  
Baxter International Inc.: See—  
D'Aquino, Michael; and Becker, Julius, 309,779, Cl. D24-29.000.  
BDK Forgings Pty. Ltd.: See—  
Ryan, Barry R., 309,764, Cl. D21-215.000.  
Beaman, Robert E.; and Clark, Willis F., to Laughner Brothers, Inc. Building tower. 309,782, 8-7-90, Cl. D25-6.000.  
Becker, Julius: See—  
D'Aquino, Michael; and Becker, Julius, 309,779, Cl. D24-29.000.  
Bell & Howell Publication Systems Company: See—  
Nuttall, Michael J.; and Au, Nelson S., 309,728, Cl. D14-100.000.  
Nuttall, Michael J.; and Au, Nelson S., 309,732, Cl. D14-113.000.  
Bezek, Edward A.; Laubach, David S.; and Walton, Steven P., to Lever Brothers Company. Combined bottle and closure. 309,712, 8-7-90, Cl. D9-377.000.  
Biesecker, Frederick N., to Drug Plastics and Glass Company, Inc. Bottle. 309,711, 8-7-90, Cl. D9-355.000.  
Biesecker, Frederick N., to Drug Plastics and Glass Company, Inc. Bottle. 309,714, 8-7-90, Cl. D9-404.000.

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Bink, Paul R., to Contax, Inc. Trailer jack. 309,818, 8-7-90, Cl. D34-31.000.  
Blackshaw, Anthony C. Magazine for a firearm. 309,768, 8-7-90, Cl. D22-108.000.  
Boccatto, Marilena; Gigante, Gian N.; and Zambusi, Antonio, to ZER-BETTO S.p.A. Wall lamp. 309,791, 8-7-90, Cl. D26-85.000.  
Boggan, James W.; and Boggan, Tamela L. Christmas tree holder. 309,722, 8-7-90, Cl. D11-130.100.  
Boggan, Tamela L.: See—  
Boggan, James W.; and Boggan, Tamela L., 309,722, Cl. D11-130.100.  
Bonasia, Donald. Chop stick fork. 309,695, 8-7-90, Cl. D7-644.000.  
Bool, Robert. Pillow. 309,689, 8-7-90, Cl. D6-601.000.  
Botta, Mario, to ARTEMIDE S.p.A. Wall lamp. 309,790, 8-7-90, Cl. D26-80.000.  
Bounds, William E. Condiment mill. 309,698, 8-7-90, Cl. D7-679.000.  
Brother Kogyo Kabushiki Kaisha: See—  
Itoh, Kazuo; and Isaji, Yasuyo, 309,739, Cl. D15-69.000.  
Burkett, Gordon R. Conveyor rail. 309,817, 8-7-90, Cl. D34-29.000.  
Callinan, Christopher J., to Regent Sheffield, Ltd. Handle for flatware. 309,696, 8-7-90, Cl. D7-649.000.  
Candida Andrade Accesorios de Moda Ltda.: See—  
Mendonca, Luiz P. C., 309,670, Cl. D2-321.000.  
Carlson, Arthur R., to Decor Corporation Pty. Ltd., The. Combined storage container and lid for lettuce or the like. 309,690, 8-7-90, Cl. D7-629.000.  
Carr, Joann. Aquatic exerciser. 309,762, 8-7-90, Cl. D21-191.000.  
Casio Computer Co., Ltd.: See—  
Ido, Yukinori, 309,749, Cl. D18-7.000.  
Kobayashi, Naoki, 309,748, Cl. D18-7.000.  
Chan, Kwok Y., to W. Haking Enterprises Limited. Miniature camera. 309,743, 8-7-90, Cl. D16-200.000.  
Chang, John W. Diver's mask. 309,804, 8-7-90, Cl. D29-9.000.  
Charet, Pierre; and Kraai, Duke, to Rally Accessories, Inc. Automobile radio antenna. 309,736, 8-7-90, Cl. D14-234.000.  
Chieda, Robert A.; and Romeo, Robert, to TRC Acquisition Corporation. Vacuum cleaner. 309,806, 8-7-90, Cl. D32-22.000.  
Chien, Tseng L. Solar powered light. 309,785, 8-7-90, Cl. D26-67.000.  
Chien, Tseng L. Solar powered light. 309,786, 8-7-90, Cl. D26-67.000.  
Chien, Tseng L. Solar powered light. 309,787, 8-7-90, Cl. D26-67.000.  
Cho, Seong H. Bottle. 309,709, 8-7-90, Cl. D9-351.000.  
Citterio, Antonio, to ARTEMIDE S.p.A. Wall lamp. 309,794, 8-7-90, Cl. D26-87.000.  
Claghorn, Roger O.: See—  
Archart, Robert W.; Peeler, Raymond W.; Kraus, Keith F.; and Claghorn, Roger O., 309,741, Cl. D15-130.000.  
Clark, Willis F.: See—  
Beaman, Robert E.; and Clark, Willis F., 309,782, Cl. D25-6.000.  
Clarke, David H.: See—  
Nock, Nigel G.; Martin, John; and Clarke, David H., 309,723, Cl. D12-146.000.  
Contax, Inc.: See—  
Bink, Paul R., 309,818, Cl. D34-31.000.  
D'Aquino, Michael; and Becker, Julius, to Baxter International Inc. Dual reservoir sample cup. 309,779, 8-7-90, Cl. D24-29.000.  
Davidson, Douglas A., to Interworld Plastics (N.Z.) Ltd. Clothespin. 309,809, 8-7-90, Cl. D32-61.000.  
Decor Corporation Pty. Ltd., The: See—  
Carlson, Arthur R., 309,690, Cl. D7-629.000.  
Designer Products Est.: See—  
Alroy, Yoram, 309,676, Cl. D3-34.000.  
Drug Plastics and Glass Company, Inc.: See—  
Biesecker, Frederick N., 309,711, Cl. D9-355.000.  
Biesecker, Frederick N., 309,714, Cl. D9-404.000.  
Embree, Donald; and Hamann, David L., to Rubbermaid Incorporated. Tool rack. 309,687, 8-7-90, Cl. D6-567.000.  
Emerson Electric Co.: See—  
Archart, Robert W.; Peeler, Raymond W.; Kraus, Keith F.; and Claghorn, Roger O., 309,741, Cl. D15-130.000.  
Fabbri, Ilario E. Holder for decals for use on automobiles. 309,757, 8-7-90, Cl. D20-42.000.  
Fairform Mfg. Co., Ltd.: See—  
Wah, Huen H., 309,773, Cl. D23-223.000.  
Fender Musical Instruments Corporation: See—  
Gressett, Charles A., Jr.; and Todd, Charles H., III, 309,746, Cl. D17-21.000.  
Fisher, William J., to Imagineering, Inc. Circular settee. 309,682, 8-7-90, Cl. D6-381.000.  
Fotovat, Ahmad. Globe clock. 309,718, 8-7-90, Cl. D10-10.000.  
Fougerousse, Claude: See—  
Pugnat, Patricia; and Fougerousse, Claude, 309,767, Cl. D21-230.000.  
Frattini, Gianfranco, to ARTEMIDE S.p.A. Wall lamp. 309,793, 8-7-90, Cl. D26-87.000.  
Gastaud, Paul-Louis. Dwelling. 309,783, 8-7-90, Cl. D25-7.000.  
Gervase, Casey N. Guitar pick holder. 309,674, 8-7-90, Cl. D3-30.100.  
Gibbons, Tracy M.: See—  
Kagelmann-Holtz, Kris; Mihleisen, Gene; and Gibbons, Tracy M., 309,753, Cl. D19-59.000.  
Kagelmann-Holtz, Kris; Mihleisen, Gene; and Gibbons, Tracy M., 309,754, Cl. D19-59.000.  
Gigante, Gian N.: See—  
Boccatto, Marilena; Gigante, Gian N.; and Zambusi, Antonio, 309,791, Cl. D26-85.000.  
Gillespie, William E.; and Sarmento, Antonio A. Umbrella. 309,672, 8-7-90, Cl. D3-6.000.

Gingras, Eric, to Rubbermaid Commercial Products Inc. Dolly extension for mobile cart. 309,813, 8-7-90, Cl. D34-27.000.  
Gismondi, Ernesto, to ARTEMIDE S.p.A. Floor lamp. 309,797, 8-7-90, Cl. D26-107.000.  
Goetz, Charles R., to Alco Industries, Inc. Scoop. 309,700, 8-7-90, Cl. D7-692.000.  
Gohlke, Ernest. Sterilizer casing for a telephone handset. 309,737, 8-7-90, Cl. D14-249.000.  
Gold, Barbara. Garment shield. 309,666, 8-7-90, Cl. D2-225.000.  
Goldman, Daniel, to Premier Sydel, Ltd. Stick-in for floral arrangements. 309,721, 8-7-90, Cl. D11-117.000.  
Grass, Alfred, to Alfred Grass G.m.b.H. Hinge with cover therefor. 309,704, 8-7-90, Cl. D8-323.000.  
Gressett, Charles A., Jr.; and Todd, Charles H., III, to Fender Musical Instruments Corporation. Bridge assembly for guitars. 309,746, 8-7-90, Cl. D17-21.000.  
Groves, Michael H., to Imperial Chemical Industries Public Limited Co. Lidded container. 309,710, 8-7-90, Cl. D9-352.000.  
Gusty, Charles B. Footstool. 309,680, 8-7-90, Cl. D6-349.000.  
Hall, Don. Safety clamp attachment for a hammer. 309,702, 8-7-90, Cl. D8-80.000.  
Halm, Hans, to Lingner & Fischer GmbH. Adhesive dispenser. 309,755, 8-7-90, Cl. D19-66.000.  
Hamann, David L.: See—  
Embree, Donald; and Hamann, David L., 309,687, Cl. D6-567.000.  
Handlbauer, Peter F.; Jacot, Michel H.; Jacquet, Remy; and Marmier, Yves, to Mettler Instrumente AG. Analytical balance. 309,720, 8-7-90, Cl. D10-91.000.  
Hasegawa, Shigeru: See—  
Ito, Masafumi; Hasegawa, Shigeru; Takita, Haruki; and Sube, Minoru, 309,735, Cl. D14-164.000.  
Hashimoto, Yoko, to Iwaya Corporation. Cushion. 309,688, 8-7-90, Cl. D6-598.000.  
Hashimoto, Yoko, to Iwaya Corporation. Animal toy. 309,761, 8-7-90, Cl. D21-186.000.  
Hastings, Malcolm; and Lang, John, to Hozelock-ASL Limited. Lawn sprinkler. 309,772, 8-7-90, Cl. D23-216.000.  
Heiden, F. C.: See—  
Morrow, James G., Sr., 309,816, Cl. D34-28.000.  
Hop Lee Cheong Ind. Co., Ltd.: See—  
Mak, Kai S., 309,759, Cl. D21-61.000.  
Hozelock-ASL Limited: See—  
Hastings, Malcolm; and Lang, John, 309,772, Cl. D23-216.000.  
Ido, Yukinori, to Casio Computer Co., Ltd. Electronic calculator. 309,749, 8-7-90, Cl. D18-7.000.  
Imagineering, Inc.: See—  
Fisher, William J., 309,682, Cl. D6-381.000.  
Imahashi, Takahiro. Two spindle faceter. 309,742, 8-7-90, Cl. D15-140.000.  
Imperial Chemical Industries Public Limited Co.: See—  
Groves, Michael H., 309,710, Cl. D9-352.000.  
Interworld Plastics (N.Z.) Ltd.: See—  
Davidson, Douglas A., 309,809, Cl. D32-61.000.  
Isaji, Yasuyo: See—  
Itoh, Kazuo; and Isaji, Yasuyo, 309,739, Cl. D15-69.000.  
Isogai, Shunji, to Sugiyasu Industries Co., Ltd. Vehicle lift. 309,814, 8-7-90, Cl. D34-28.000.  
Ito, Masafumi; Hasegawa, Shigeru; Takita, Haruki; and Sube, Minoru, to Teac Corporation. Tape recorder. 309,735, 8-7-90, Cl. D14-164.000.  
Itoh, Kazuo; and Isaji, Yasuyo, to Brother Kogyo Kabushiki Kaisha. Sewing machine. 309,739, 8-7-90, Cl. D15-69.000.  
Iwaya Corporation: See—  
Hashimoto, Yoko, 309,688, Cl. D6-598.000.  
Hashimoto, Yoko, 309,761, Cl. D21-186.000.  
Jacot, Michel H.: See—  
Handlbauer, Peter F.; Jacot, Michel H.; Jacquet, Remy; and Marmier, Yves, 309,720, Cl. D10-91.000.  
Jacquet, Remy: See—  
Handlbauer, Peter F.; Jacot, Michel H.; Jacquet, Remy; and Marmier, Yves, 309,720, Cl. D10-91.000.  
Jones, Charles E. Baby bottle. 309,780, 8-7-90, Cl. D24-47.000.  
Jones, Lynn E. Disposable toothbrush. 309,678, 8-7-90, Cl. D4-104.000.  
Jurgens, J. Ben. Lighted mud flap. 309,724, 8-7-90, Cl. D12-185.000.  
Kabushiki Kaisha Toshiba: See—  
Tanabe, Zenya, 309,729, Cl. D14-100.000.  
Kadar, Gabor. Combined insulated food and beverage container. 309,693, 8-7-90, Cl. D7-606.000.  
Kagelmann-Holtz, Kris; Mihleisen, Gene; and Gibbons, Tracy M., to Manpower Inc. Test kit for using hand tools to assemble or take apart objects. 309,753, 8-7-90, Cl. D19-59.000.  
Kagelmann-Holtz, Kris; Mihleisen, Gene; and Gibbons, Tracy M., to Manpower Inc. Case for testing small parts assembly skills or the like. 309,754, 8-7-90, Cl. D19-59.000.  
Kalman, Jeffrey M.: See—  
Sovis, John F.; Kopco, James J.; Kalman, Jeffrey M.; and Saunders, Craig M., 309,807, Cl. D32-22.000.  
Kassel, Eve E. Combined hood and scarf. 309,671, 8-7-90, Cl. D2-515.000.  
Kenny, Jack. Children's toilet bowl adapter. 309,775, 8-7-90, Cl. D23-296.000.  
Kerr, J. Russell, Jr.: See—  
Propp, Clarence E., 309,706, Cl. D8-373.000.  
Kimberly-Clark Corporation: See—  
Shelby, James E., 309,805, Cl. D29-10.000.

Kimeda, Tsuneji: See—  
Sasaki, Yoshio; Sato, Hiroyoshi; Nishikado, Iwamasa; and Kimeda, Tsuneji, 309,726, Cl. D14-248.000.  
King, William L., to Samsonite Corporation. Hanger trolley for luggage. 309,685, 8-7-90, Cl. D6-513.000.  
King, William L., to Samsonite Corporation. Support for clothes hangers. 309,686, 8-7-90, Cl. D6-513.000.  
Koatsu Gas Kogyo Co., Ltd.: See—  
Umekawa, Yasuo, 309,716, Cl. D9-449.000.  
Kobayashi, Naoki, to Casio Computer Co., Ltd. Electronic calculator. 309,748, 8-7-90, Cl. D18-7.000.  
Kohler, Kathlene M. Attachment tray for a walker or similar article. 309,684, 8-7-90, Cl. D6-511.000.  
Kolpin Manufacturing, Inc.: See—  
Kolpin, Ronald N., 309,675, Cl. D3-30.100.  
Kolpin, Ronald N., to Kolpin Manufacturing, Inc. Hard cover gun case. 309,675, 8-7-90, Cl. D3-30.100.  
Kopco, James J.: See—  
Sovis, John F.; Kopco, James J.; Kalman, Jeffrey M.; and Saunders, Craig M., 309,807, Cl. D32-22.000.  
Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, to Sharp Corporation. Electronic copying machine. 309,751, 8-7-90, Cl. D18-39.000.  
Koziol, Walter, to Modern Home Products Corp. Lamp. 309,788, 8-7-90, Cl. D26-67.000.  
Koziol, Walter, to Modern Homes Products Corp. Lamp. 309,796, 8-7-90, Cl. D26-87.000.  
Koziol, Walter, to Modern Home Products Corp. Lamp. 309,798, 8-7-90, Cl. D26-110.000.  
Kraai, Duke: See—  
Charet, Pierre; and Kraai, Duke, 309,736, Cl. D14-234.000.  
Kraus, Keith F.: See—  
Archart, Robert W.; Peeler, Raymond W.; Kraus, Keith F.; and Claghorn, Roger O., 309,741, Cl. D15-130.000.  
Kuerti, Helmut, to New England Tray, Ltd. Pizza container. 309,715, 8-7-90, Cl. D9-424.000.  
Lang, John: See—  
Hastings, Malcolm; and Lang, John, 309,772, Cl. D23-216.000.  
Laubach, David S.: See—  
Bezdek, Edward A.; Laubach, David S.; and Walton, Steven P., 309,712, Cl. D9-377.000.  
Laughner Brothers, Inc.: See—  
Beaman, Robert E.; and Clark, Willis F., 309,782, Cl. D25-6.000.  
Lever Brothers Company: See—  
Bezdek, Edward A.; Laubach, David S.; and Walton, Steven P., 309,712, Cl. D9-377.000.  
Lewis, Will A. Transition coupling. 309,774, 8-7-90, Cl. D23-262.000.  
Licinvest AG: See—  
Ackeret, Peter, 309,679, Cl. D6-311.000.  
Lingner & Fischer GmbH: See—  
Halm, Hans, 309,755, Cl. D19-66.000.  
Lobel, Wolf-Carsten: See—  
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Lothridge, William P., to Mullinax, Charles E. Advertising display holder for an automobile sun visor. 309,756, 8-7-90, Cl. D20-35.000.  
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George, Eric R., H812, Cl. 524-444.000.  
Sherrington, Mark. Cap for bottle. H803, 8-7-90, Cl. 809-435.000.  
Siemer, Darryl D.; and Lewis, Leroy C., to United States of America, Energy. Removal of I, Rn, Xe and Kr from off gas streams using PTFE membranes. H808, 8-7-90, Cl. 423-262.000.  
Suzuki, Kazumi: See—  
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Ohshima, Tekeshi; and Yoshimura, Hideshi, H811, Cl. 514-92.000.  
Tymonko, John M.: See—  
Keifer, David W.; Tymonko, John M.; Felix, Earl D.; and Van Saun, William A., H806, Cl. 71-88.000.  
United States of America  
Army: See—  
Schrivver, John G.; Riffel, William L., Jr.; and Scheible, John D., H805, Cl. 128-201.220.  
Energy: See—  
Dobbins, James C., H804, Cl. 285-345.000.  
Klueh, Ronald L.; and Maziasz, Philip J., H807, Cl. 420-57.000.  
Siemer, Darryl D.; and Lewis, Leroy C., H808, Cl. 423-262.000.  
Van Saun, William A.: See—  
Keifer, David W.; Tymonko, John M.; Felix, Earl D.; and Van Saun, William A., H806, Cl. 71-88.000.  
Wilkinson, Samuel. Biologically active amides. H810, 8-7-90, Cl. 514-15.000.  
Yagihara, Morio: See—  
Andoh, Kazuto; Ishikawa, Takatoshi; Fujimoto, Hiroshi; and Yagihara, Morio, H809, Cl. 430-386.000.  
Yoshimura, Hideshi: See—  
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Ohshima, Tekeshi; and Yoshimura, Hideshi, H811, Cl. 514-92.000.

## CLASSIFICATION OF PATENTS

ISSUED AUGUST 7, 1990

NOTE—First number, class; second number, subclass; third number, patent number

CLASS 2	CLASS 30	601	4,945,701	377	4,945,750	131	4,945,819	489	4,945,882
2	4,945,571	656	4,945,702	384	4,945,751	CLASS 98		494	4,945,883
8	4,945,572	663	4,945,703	442	4,945,752	31.5	4,945,820	509	4,945,884
9	4,945,573	706	4,945,689	CLASS 73		32	4,945,821	520	4,945,885
	4,945,574	731	4,945,704	2	4,945,753	41.3	4,945,822	533	4,945,886
12	4,945,575		4,945,705	3	4,945,754			573	4,945,887
171.3	Re. 33,286		4,945,706	35	4,945,755	CLASS 99			
268	4,945,576	CLASS 53		49.2	4,945,756	276	4,945,823	CLASS 125	
437	4,945,577	17 R	4,945,642	399	4,945,707	293	4,945,824	11.15	4,945,888
		23.04	4,945,643	411	4,945,708	353	4,945,825	21	4,945,889
203	4,945,579	203.14	4,945,645	432	4,945,710	357	4,945,826	CLASS 126	
325	4,945,580		4,945,646	449	4,945,711			110 R	4,945,890
	4,945,581	245	4,945,647	450	4,945,709	CLASS 101		299 D	4,945,891
391	4,945,578	270	4,945,644	459	4,945,713	35	4,945,827	373	4,945,892
		321	4,945,647	459	4,945,712	93.14	4,945,828	391	4,945,893
		529	4,945,648	567	4,945,715	129	4,945,829	CLASS 128	
67	4,945,582	534	4,945,649	568	4,945,714	217	4,945,830	6	4,945,894
82 R	4,945,583	763	4,945,650	CLASS 55		340	4,945,831		4,945,895
97	4,945,584	832	4,945,651	97	4,946,478	350	4,945,832	20	4,945,896
122	4,945,585	CLASS 34		181	4,946,479	450.1	4,945,833		4,945,897
414	4,945,586	12	4,945,652	270	4,946,480	CLASS 102		24 A	4,945,898
419	4,945,587	21	4,945,653	300	4,946,481	473	4,945,834	24 R	4,945,905
442	4,945,589	23	4,945,654	320	4,946,482	476	4,945,835	28	4,945,899
451	4,945,588	23	4,945,655	320	4,946,482	503	4,945,836	57	4,945,900
456	4,945,590	57 A	4,945,656	385.2	4,946,483	CLASS 106		66	4,945,901
472	4,945,591	128	4,945,657	387	4,946,484	14.21	4,946,502	87 A	4,945,902
508	4,945,592	CLASS 36		479	4,946,486	14.34	4,946,503	91 R	4,945,903
		117	4,945,658	523	4,946,487	496	4,946,508	203.29	4,945,906
94.23	4,946,471		4,945,659	CLASS 56		712	4,946,509	206.12	4,945,907
424	4,946,472	120	4,945,660	13.3	4,945,716	713	4,946,505	419 PG	4,945,908
		CLASS 12		14.9	4,946,488	724	4,946,504		4,945,909
12.4	4,945,593	67	4,945,661	17.2	4,945,717	CLASS 110		640	4,945,911
		103	4,945,662	341	4,945,719	110	4,945,837	642	4,945,912
1	4,945,594	118 A	4,945,663	CLASS 57		211	4,945,838	647	4,945,913
69.5	4,945,595	CLASS 42		58.36	4,945,720	212	4,945,839	653 R	4,945,914
		1.06	4,945,666	333	4,945,718	214	4,945,840	660.07	4,945,915
21.2	4,945,596	49.01	4,945,664	CLASS 60		214	4,945,841	671	4,945,916
104.13	4,945,597	70.07	4,945,665	274	4,945,721	341	4,945,841	696	4,945,917
160	4,945,598	100	4,945,667	295	4,945,722	CLASS 75		719	4,945,918
244.3	4,945,599	CLASS 43		426	4,945,723	103	4,945,842	736	4,945,919
250.01	4,945,600	17	4,945,668	455	4,945,724	148	4,945,843	751	4,945,920
250.24	4,945,601	42.39	4,945,669	509	4,945,725	444	4,945,844	759	4,945,921
320	4,945,602	43.12	4,945,670	520	4,945,726	CLASS 81		785	4,945,922
323	4,945,603	44.94	4,945,671	527	4,945,727	39.1	4,945,845	842	4,945,923
344	4,945,604	57	4,945,672	562	4,945,728	90	4,945,846	849	4,945,924
		124	4,945,673	635	4,945,730	102	4,945,847	877	4,945,925
		CLASS 16		641.15	4,945,731	103	4,945,848	CLASS 131	
97	4,945,605	71	4,946,473	CLASS 62		218	4,945,849	84.1	4,945,926
313	4,945,606	627	4,946,474	256	4,945,732	304	4,945,850		4,945,927
		CLASS 47		278	4,945,733	345	4,945,851	270	4,945,928
56	4,945,607	1.01	4,945,674	CLASS 65		345	4,945,852	273	4,945,929
64	4,945,608	33	4,945,675	32.5	4,946,490	363	4,945,853	296	4,945,930
		62	4,945,676	114	4,946,491	CLASS 83		335	4,945,931
102	4,945,609	CLASS 48		149 R	4,945,734	CLASS 118		365	4,945,932
105	4,945,610	86 R	4,946,475	CLASS 66		324	4,945,854	CLASS 134	
234	4,945,611	197 R	4,946,476	114	4,946,491	407	4,945,855	18	4,946,513
		CLASS 24		12 R	4,945,735	715	4,945,856	40	4,946,510
31 R	4,945,612	CLASS 49		CLASS 69		719	4,945,857	64 R	4,945,934
501	4,945,613	210	4,945,677	19.2	4,945,736	CLASS 119		167 R	4,945,933
573.1	4,945,614	322	4,945,678	CLASS 70		28	4,945,858	CLASS 135	
573.5	4,945,615	342	4,945,679	143	4,945,737	57.91	4,945,859	88	4,945,935
585	4,945,616	468	4,945,680	161	4,945,738	108	4,945,860	98	4,945,936
633	4,945,617	495	4,945,681	233	4,945,739	109	4,945,861		
		502	4,945,682	248	4,945,740	CLASS 122		212	4,946,511
254	4,945,618	CLASS 51		456 R	4,945,741	392	4,945,862	248	4,946,512
		145 R	4,945,683	CLASS 71		258	4,946,514	258	4,946,514
33 R	4,945,619	165.77	4,945,684	1	4,945,807	CLASS 86		1 A	4,945,863
39	4,945,620	165.93	4,945,685	20.12	4,945,808	41.39	4,945,864	52 M	4,945,865
237	4,945,621	72	4,946,492	CLASS 89		54 R	4,945,866	13	4,945,937
281.1	4,945,622	92	4,946,493	7	4,945,809	65 PE	4,945,868	15	4,945,938
402.07	4,945,623	93	4,946,494	8	4,945,810	65 VD	4,945,869	93	4,945,939
453	4,945,624	94	4,946,495	14.3	4,945,812	73 V	4,945,870	218	4,945,940
524.1	4,945,625	21	4,945,742	36.02	4,945,814	90.11	4,945,871	315	4,945,941
564.3	4,945,626	128	4,945,743	CLASS 91		90.55	4,945,872	337	4,945,942
568	4,945,627	137	4,945,744	234	4,945,815	146.5 B	4,945,873	360	4,945,943
611	4,945,629	249	4,945,745	473	4,945,816	188 M	4,945,874	403	4,945,944
705	4,945,631	505	4,945,817	CLASS 92		400	4,945,875	512	4,945,945
781	4,945,632	5 R	4,945,818	479	4,945,818	422	4,945,876	516.13	4,945,946
825	4,945,633	486	4,945,819	486	4,945,881	425	4,945,877	519.5	4,945,947
854	4,945,634	486	4,945,819	486	4,945,881	472	4,945,878	559	4,945,948
890.043	4,945,635	486	4,945,819	486	4,945,881	478	4,945,879	613	4,945,949
		486	4,945,819	486	4,945,881	486	4,945,880	798	4,945,950

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CLASS 139	266	4,945,988	38	4,946,031	129.4	4,946,073	360.1	4,947,045	232	4,947,466	
383 A	4,945,952	268	4,945,989	44 R	4,946,032	153	4,946,074	484.1	4,947,046	4,946,167	
CLASS 140	278	4,945,991	63.3	4,946,033	181	4,946,075	492.2	4,947,047	241	4,946,168	
105	4,945,953	310	4,945,992	223	4,946,034	207	4,946,076	558	4,947,048	4,946,169	
4,945,954	321	4,945,993	315.11	4,946,035	256	4,946,077	561	4,947,049	253	4,946,170	
CLASS 141	369	4,945,994	366	4,946,036	368	4,946,078	570	4,947,050	258	4,946,171	
65	4,945,955	375	4,945,995	386	4,946,037	484	4,946,079	348.1	420	4,946,172	
67	4,945,956	CLASS 172	431	4,946,038	500	4,946,080	CLASS 251	425	4,946,173		
83	4,945,957	233	4,945,996	528	4,946,039	568	4,946,081	48	4,946,131	CLASS 277	
CLASS 144	311	4,945,997	603	4,946,040	593	4,946,082	95	4,946,130	199	4,946,174	
134 R	4,945,958	CLASS 173	628	4,946,042	602	4,946,083	129.21	4,946,132	207 A	4,946,175	
193 A	4,945,959	134	4,945,998	46	4,946,579	CLASS 224	149.1	4,946,133	CLASS 279		
CLASS 148	15.5	4,947,007	111	4,946,578	470	4,946,094	208	4,946,134	1 R	4,946,178	
12 F	4,946,515	CLASS 174	120	4,946,580	3	4,946,085	253	4,946,135	1 SG	4,946,179	
12.7 A	4,946,516	19	4,946,581	251 R	4	4,946,086	8.514	4,946,605	111	4,946,177	
282	4,946,517	251	4,946,582	400	4,946,583	CLASS 225	8.551	4,946,606	123	4,946,177	
307	4,946,518	CLASS 175	18	4,946,584	131	4,946,087	25	4,946,607	39	4,946,180	
432	4,946,519	19	4,947,460	166	4,946,585	CLASS 228	35	4,946,608	279	4,946,181	
CLASS 149	36	4,946,521	79.1	4,946,001	435	4,946,586	48.2	4,946,609	402	4,946,182	
4,946,522	271	4,946,002	474	4,946,004	474	4,946,587	49.5	4,946,610	433	4,946,183	
CLASS 150	132	4,945,961	539	4,946,587	121	4,946,090	49.6	4,946,611	434	4,946,183	
CLASS 152	7	4,945,962	576	4,946,045	162	4,946,092	62.2	4,946,612	457	4,946,183	
209 R	4,945,963	206	4,946,003	580	4,946,046	CLASS 229	62.52	4,946,613	652	4,946,187	
511	4,945,964	CLASS 182	85	4,946,588	122.1	4,946,091	62.54	4,946,615	661	4,946,188	
531	4,945,967	206	4,946,004	222	4,946,589	128.19	75	4,946,616	688	4,946,189	
60	4,946,527	CLASS 184	28	4,946,005	234	4,946,590	117	4,946,617	712	4,946,190	
64	4,946,528	25	4,946,006	452	4,946,591	CLASS 232	187.24	4,946,618	730	4,946,191	
87	4,946,529	CLASS 187	474	4,946,592	488	4,947,027	190	4,946,619	751	4,946,192	
134	4,946,530	490	4,946,593	500.36	475	4,947,028	301.4 F	4,946,620	769	4,946,193	
155	4,946,531	CLASS 188	651	4,946,594	381	4,947,029	301.4 R	4,946,621	777	4,946,194	
187	4,946,532	24.14	4,946,007	675	4,946,595	475	314	4,946,622	803	4,946,195	
222	4,946,533	129	4,946,008	709	4,946,596	CLASS 236	358	4,946,623	804	4,946,197	
227	4,946,534	299	4,946,009	741	4,946,597	392	543	4,946,624	808	4,946,198	
242	4,946,535	CLASS 191	741	4,946,598	758	4,946,097	546	4,946,625	24	4,946,199	
243	4,946,536	12.2 R	782	4,946,601	782	4,946,098	589	4,946,626	31	4,946,200	
249	4,946,537	0.096	785	4,946,602	807	4,946,099	134.3 FT	4,946,627	38	4,946,201	
250	4,946,538	1.23	807	4,946,603	CLASS 211	264	13.1	4,946,628	94	4,946,201	
261	4,946,539	1.46	CLASS 212	34	4,946,048	CLASS 238	64	4,946,629	166	4,946,202	
272.2	4,946,540	1.52	CLASS 213	87	4,946,049	CLASS 239	13.1	4,946,630	189	4,946,203	
304.1	4,946,541	4 B	19	4,946,050	1	4,946,100	64	4,946,631	281	4,946,204	
331.7	4,946,542	48.2	258	4,946,051	8	4,946,101	CLASS 261	18.1	319	4,946,205	
345	4,946,543	70.3	75 R	4,946,052	88	4,946,102	18.1	39.5	369	4,946,206	
361	4,946,544	CLASS 193	585	4,946,106	150	4,946,104	CLASS 264	33	4,946,632	CLASS 290	
495	4,946,545	25 C	590.3	4,946,107	167	4,946,105	40.1	40.5	4,946,633	173	4,946,207
497	4,946,546	318	78 R	4,946,108	585	4,946,106	40.1	40.5	4,946,634	216	4,946,208
556	4,946,547	CLASS 194	CLASS 215	4,946,053	590.3	4,946,107	65	120	4,946,635	256	4,946,209
580	4,946,548	335	1 C	4,946,054	78	4,946,108	120	126	4,946,636	318	4,946,210
607	4,946,549	365	11.6	4,946,055	182	4,946,109	126	241	4,946,637	336.3	4,946,211
612	4,946,550	375	254	4,946,055	189 R	4,946,109	302	308	4,946,638	CLASS 294	
616.41	4,946,551	419.1	CLASS 219	8.5	4,947,462	CLASS 242	308	316	4,946,639	67.1	4,946,212
623 R	4,946,552	429	8.5	4,947,463	10.79	1.1 R	310	540	4,946,640	CLASS 296	
643	4,946,553	459	10.79	4,947,464	64	7.14	316	410	4,946,641	10	4,946,214
CLASS 157	1.17	4,945,968	64	4,947,013	69.17	86.5 R	246	276	4,946,642	37.6	4,946,215
CLASS 160	84.1	4,945,969	69.17	4,947,015	86.25	118.1	246	276	4,946,643	37.6	4,946,216
178.2	4,945,970	203	86.25	4,947,016	289	4,946,115	64.11	64.27	4,946,644	100	4,946,217
178.3	4,945,971	CLASS 162	119	4,947,017	3.11	Re 33,287	131	137	4,946,645	180.1	4,946,219
203	4,945,972	49	121.65	4,947,018	54	4,946,116	140.1	158	4,946,646	213	4,946,220
CLASS 164	429	4,946,555	121.68	4,947,019	65	4,946,117	158	21	4,946,647	180	4,946,220
478	4,945,975	167	121.68	4,947,020	97	4,946,118	137	47	4,946,648	184	4,946,221
479	4,945,974	CLASS 200	121.68	4,947,021	102	4,946,119	140.1	158	4,946,649	184	4,946,221
84.1	4,945,969	4	121.85	4,947,022	183	4,946,120	158	21	4,946,650	367	4,946,222
178.2	4,945,970	29	130.51	4,947,023	201	4,946,121	158	21	4,946,651	417	4,946,222
178.3	4,945,971	49	137.61	4,947,024	229	4,946,122	158	21	4,946,652	445	4,946,223
203	4,945,972	38	303	4,947,025	237	4,946,123	158	21	4,946,653	445	4,946,224
CLASS 165	43	4,945,977	401	4,947,026	237	4,946,124	158	21	4,946,654	445	4,946,225
47	4,945,978	181.7	535	4,947,027	237	4,946,125	158	21	4,946,655	445	4,946,226
76	4,945,979	206	3	4,946,056	237	4,946,126	158	21	4,946,656	445	4,946,227
101	4,945,980	213	23.83	4,946,057	237	4,946,127	158	21	4,946,657	445	4,946,228
109.1	4,945,981	228	23.83	4,946,058	237	4,946,128	158	21	4,946,658	445	4,946,229
125	4,945,982	298.06	86.2	4,946,059	237	4,946,129	158	21	4,946,659	445	4,946,230
173	4,945,983	427	90.4	4,946,060	237	4,946,130	158	21	4,946,660	445	4,946,231
CLASS 166	63	4,945,984	243	4,946,061	237	4,946,131	158	21	4,946,661	445	4,946,232
98	4,945,985	153.1	270	4,946,062	237	4,946,132	158	21	4,946,662	445	4,946,233
249	4,945,986	157.5	355	4,946,063	237	4,946,133	158	21	4,946,663	445	4,946,234
250	4,945,987	164	404	4,946,064	237	4,946,134	158	21	4,946,664	445	4,946,235
CLASS 167	43	4,945,977	481	4,946,065	237	4,946,135	158	21	4,946,665	445	4,946,236
47	4,945,978	181.7	210	4,946,066	237	4,946,136	158	21	4,946,666	445	4,946,237
76	4,945,979	206	210	4,946,067	237	4,946,137	158	21	4,946,667	445	4,946,238
101	4,945,980	213	210	4,946,068	237	4,946,138	158	21	4,946,668	445	4,946,239
109.1	4,945,981	228	210	4,946,069	237	4,946,139	158	21	4,946,669	445	4,946,240
125	4,945,982	298.06	210	4,946,070	237	4,946,140	158	21	4,946,670	445	4,946,241
173	4,945,983	427	210	4,946,071	237	4,946,141	158	21	4,946,671	445	4,946,242
CLASS 168	63	4,945,984	210	4,946,072	237	4,946,142	158	21	4,946,672	445	4,946,243
98	4,945,985	153.1	210	4,946,073	237	4,946,143	158	21	4,946,673	445	4,946,244
249	4,945,986	157.5	210	4,946,074	237	4,946,144	158	21	4,946,674	445	4,946,245
250	4,945,987	164	210	4,946,075	237	4,946,145	158	21	4,946,675	445	4,946,246
CLASS 169	43	4,945,977	210	4,946,076	237	4,946,146	158	21	4,946,676	445	4,946,247
47	4,945,978	181.7	210	4,946,077	237	4,946,147	158	21	4,946,677	445	4,946,248
76	4,945,979	206	210	4,946,078	237	4,946,148	158	21	4,946,678	445	4,946,249
101	4,945,980	213	210	4,946,079	237	4,946,149	158	21	4,946,679	445	4,946,250
109.1	4,945,981	228	210	4,946,080	237	4,946,150	158	21	4,946,680	445	4,946,251
125	4,945,982	298.06	210	4,946,081	237	4,946,151	158	21	4,946,681	445	4,946,252
173	4,945,983	427	210	4,946,082	237	4,946,152	158	21	4,946,682	445	4,946,253
CLASS 170	63	4,945,984	210	4,946,083	237	4,946,153	158	21	4,946,683	445	4,946,254
98	4,945,985	153.1	210	4,946,084	237	4,946,154	158	21	4,946,684	445	4,946,255
249	4,945,986	157.5	210	4,946,085	237	4,946,155	158	21	4,946,685	445	4,946,256
250	4,945,987	164	210	4,946,086	237	4,946,156	158	21	4,946,686	445	4,946,257
CLASS 1											

CLASS 310	128	4,947,144	CLASS 351	473	4,947,261	724 09	4,947,361	25	4,947,429
44	4,947,065	CLASS 335	118	4,946,268	CLASS 360	724 19	4,947,362	4,947,430	
49 R	4,947,066	14	4,947,145	14 1	4,947,270	757	4,947,363	CLASS 381	
51	4,947,067	131	4,947,146	19 1	4,947,271	807	4,947,364	13	4,947,431
71	4,947,068	CLASS 337	210	4,946,271	77 15	900	4,947,365	26	4,947,432
77	4,947,069	18	4,947,147	104 06	4,947,272	104	4,947,366	42	4,947,436
80	4,947,070	172	4,947,148	105	4,947,273	105	4,947,367	43	4,947,438
177	4,947,071	246	4,947,149	132	4,947,274	132	4,947,368	68	4,947,433
179	4,947,072	CLASS 338	122	4,946,272	4,947,276	4,947,277	4,947,369	68.2	4,947,432
313 R	4,947,073	42	4,947,150	CLASS 353	4,947,277	4,947,278	4,947,370	69.7	4,947,437
316	4,947,074	CLASS 340	76	4,946,274	4,947,280	CLASS 365	4,947,371	71	4,947,434
323	4,947,076	426	4,947,151	4,947,196	CLASS 361	45	4,947,372	107	4,947,440
324	4,947,075	573	4,947,152	4,947,197	46	106	4,947,373	CLASS 382	
328	4,947,077	608	4,947,153	4,947,198	56	189 04	4,947,374	5	4,947,444
CLASS 312	50	624	4,947,154	4,947,199	91	195	4,947,375	4,947,445	
CLASS 313	113	650	4,947,155	4,947,200	104	205	4,947,376	7	4,947,441
318	4,947,078	707	4,947,156	4,947,201	154	208	4,947,377	48	4,947,444
509	4,947,082	747	4,947,157	4,947,202	245	222	4,947,378	54	4,947,445
CLASS 315	3.5	787	4,947,158	4,947,203	321	233 5	4,947,379	50	4,947,446
8	4,947,467	805	4,947,159	4,947,204	413	238	4,947,380	56	4,947,447
8.51	4,947,083	815 03	4,947,160	4,947,205	415	15	4,946,283	65	4,947,448
111.41	4,947,084	825 080	4,947,161	Re-33,293	417	131	4,946,284	68	4,947,449
205	4,947,085	825 31	4,947,162	4,947,206	19	247	4,946,286	CLASS 383	
248	4,947,079	968	4,947,163	4,947,207	32	288	4,946,285	10	4,946,290
251	4,947,080	200	4,947,164	4,947,208	34	343	4,946,287	61	4,946,289
307	4,947,087	13	4,947,165	4,947,209	61	118	4,947,288	113	4,946,291
CLASS 318	6	117	4,947,166	4,947,210	64	44 11	4,947,382	127	4,946,292
34	4,947,088	120	4,947,167	4,947,211	109	215	4,947,383	CLASS 384	
282	4,947,089	121	4,947,168	4,947,212	130	279	4,947,384	12	4,946,293
434	4,947,091	137	4,947,169	4,947,213	135	49	4,947,385	49	4,946,294
444	4,947,092	143	4,947,170	4,947,214	147	448	4,946,296	448	4,946,295
560	4,947,093	160	4,947,171	4,947,215	161	CLASS 370	4,946,297	CLASS 400	
569	4,947,094	145	4,947,172	4,947,216	183	14	4,947,385	82	4,946,297
586	4,947,095	165	4,947,173	4,947,217	219	26	4,947,386	306	4,946,299
587	4,947,096	3	4,947,174	4,947,218	233	30	4,947,387	605	4,946,298
587	4,947,094	165	4,947,175	4,946,275	261	60	4,947,388	682	4,946,300
696	4,947,097	173	4,947,176	4,946,276	267	85 12	4,947,389	CLASS 401	
775	4,947,098	378	4,947,177	4,946,277	297	85 13	4,947,390	49	4,946,301
809	4,947,099	117	4,947,178	4,946,278	421	110.1	4,947,391	288	4,946,302
CLASS 322	10	700 MS	4,947,179	4,946,279	16	16.1	4,947,392	CLASS 403	
CLASS 323	272	718	4,947,180	4,946,280	17	16.3	4,947,393	50	4,946,303
293	4,947,101	743	4,947,181	4,946,281	71	16.4	4,947,394	272	4,946,304
316	4,947,102	876	4,947,182	4,946,282	124	20.1	4,947,395	336	4,946,305
CLASS 324	1.1	773	4,947,183	4,946,283	134	22.3	4,947,396	CLASS 404	
71 5	4,947,104	13	4,947,184	4,946,284	143	37.1	4,947,397	6	4,946,306
73.1	4,947,106	20	4,947,185	4,946,285	140	40.1	4,947,398	91	4,946,307
96	4,947,107	22.5	4,947,186	4,946,286	200	29	4,947,399	CLASS 405	
117 H	4,947,108	23	4,947,187	4,946,287	140	14	4,947,400	15	4,946,308
132	4,947,109	30	4,947,188	4,946,288	200	72	4,947,401	128	4,946,310
133	4,947,110	34	4,947,189	4,946,289	401	50	4,947,402	129	4,946,311
158 F	4,947,111	38	4,947,190	4,946,290	408	70	4,947,403	152	4,946,309
158 P	4,947,112	42	4,947,191	4,946,291	413.13	87	4,947,404	186	4,946,313
158 R	4,947,113	45	4,947,192	4,946,292	424.02	14	4,947,405	260	4,946,314
173	4,947,114	46	4,947,193	4,946,293	424.03	72	4,947,406	288	4,946,315
227	4,947,115	48	4,947,194	4,946,294	424.05	20	4,946,288	302	4,946,316
248	4,947,116	53	4,947,195	4,946,295	424.05	7	4,947,407	46	4,946,317
282	4,947,117	54	4,947,196	4,946,296	424.05	94	4,947,408	42	4,946,318
307	4,947,118	55	4,947,197	4,946,297	424.05	7	4,947,409	115	4,946,319
309	4,947,119	58	4,947,198	4,946,298	424.05	97	4,947,410	CLASS 409	
327	4,947,120	65	4,947,199	4,946,299	424.05	210	4,947,411	132	4,946,320
412	4,947,121	68	4,947,200	4,946,300	424.05	260	4,947,412	137	4,946,321
427	4,947,122	68	4,947,201	4,946,301	424.05	178	4,947,413	178	4,946,322
430	4,947,123	68	4,947,202	4,946,302	424.05	26	4,947,414	CLASS 410	
453	4,947,124	68	4,947,203	4,946,303	424.05	47	4,947,415	1	4,946,324
459	4,947,125	68	4,947,204	4,946,304	424.05	19	4,947,416	24	4,946,325
509	4,947,126	68	4,947,205	4,946,305	424.05	34	4,947,417	CLASS 411	
523	4,947,127	68	4,947,206	4,946,306	424.05	55	4,947,418	CLASS 414	
557	4,947,128	68	4,947,207	4,946,307	424.05	122	4,947,419	4	4,946,329
640	4,947,129	68	4,947,208	4,946,308	424.05	146	4,947,420	137.1	4,946,344
650	4,947,130	68	4,947,209	4,946,309	424.05	147	4,947,421	331	4,946,327
671	4,947,131	68	4,947,210	4,946,310	424.05	177	4,947,422	334	4,946,328
699	4,947,132	68	4,947,211	4,946,311	424.05	187	4,947,423	401	4,946,330
CLASS 328	168	68	4,947,212	4,946,312	424.05	20	4,947,424	421	4,946,331
CLASS 330	4.3	68	4,947,213	4,946,313	424.05	57	4,947,425	477	4,946,332
9	4,947,134	68	4,947,214	4,946,314	424.05	67	4,947,426	559	4,946,333
54	4,947,136	68	4,947,215	4,946,315	424.05	72	4,947,427	697	4,946,334
CLASS 331	94.1	68	4,947,216	4,946,316	424.05	412	4,947,428	736	4,946,335
96	4,947,138	68	4,947,217	4,946,317	424.05	20	4,947,429	744.2	4,946,336
109	4,947,139	68	4,947,218	4,946,318	424.05	20	4,947,430	745.5	4,946,337
113 R	4,947,140	68	4,947,219	4,946,319	424.05	20	4,947,431	786	4,946,338
135	4,947,141	68	4,947,220	4,946,320	424.05	20	4,947,432	788.8	4,946,339
CLASS 333	81 A	68	4,947,221	4,946,321	424.05	20	4,947,433	796.7	4,946,340
125	4,947,142	68	4,947,222	4,946,322	424.05	20	4,947,434	798.9	4,946,341



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	CLASS 415	520	4,946,700		CLASS 434	161	4,946,427		CLASS 524	251	4,946,964
27	4,946,343	597	4,946,701	201	4,946,391		CLASS 475	93	4,946,379	365	4,946,965
90	4,946,345	599	4,946,702			164	4,946,428	96	4,946,880	372	4,946,966
115	4,946,346	637	4,946,703		CLASS 435	210	4,946,429	100	4,946,881	531	4,946,967
200	4,946,347		4,946,704	6	4,946,773			129	4,946,882	534	4,946,968
211.2	4,946,348			7	4,946,774		CLASS 493	165	4,946,883		CLASS 549
	CLASS 416	2	4,946,705		4,946,775	58	4,946,430	285	4,946,884	237	4,946,969
158	4,946,354	35	4,946,706	21	4,946,776	195	4,946,431	403	4,946,885	241	4,946,985
		64	4,946,707	29	4,946,777	341	4,946,432	415	4,946,886	245	4,946,970
	CLASS 417	96	4,946,708	69.6	4,946,778			495	4,946,887	408	4,946,971
68	4,946,349	98	4,946,709	84	4,946,779		CLASS 494	526	4,946,888	511	4,946,972
222	4,946,350	126.3	4,946,710	101	4,946,780	15	4,946,433	544	4,946,889	525	4,946,973
363	4,946,351	133	4,946,709	115	4,946,781	29	4,946,434	600	4,946,890	551	4,946,974
396	4,946,352	156	4,946,711	126	4,946,782		CLASS 501	833	4,946,891		CLASS 556
410	4,946,353	166	4,946,712	172.1	4,946,783	12	4,946,805	862	4,946,892	1	Re 33.292
	CLASS 418	226	4,946,713	178	4,946,784	88	4,946,806		4,946,893	47	4,946,975
		248.1	4,946,714	188	4,946,785	89	4,946,807		CLASS 525	173	4,946,807
16	4,946,355	249	4,946,715	194	4,946,786	95	4,946,808	71	4,946,894	440	4,946,976
55.6	4,946,361	273	4,946,716	240.27	4,946,787	137	4,946,810	75	4,946,895	472	4,946,977
201.2	4,946,362	289	4,946,717	252.3	4,946,788	155	4,946,811	93	4,946,896	978	4,946,980
	CLASS 419	393.5	4,946,718	252.33	4,946,790		CLASS 502	132	4,946,897		CLASS 558
12	4,946,643			252.9	4,946,791	61	4,946,812	240	4,946,898		
	CLASS 420	17	4,946,719	268	4,946,792	62	4,946,813	276	4,946,899	411	4,946,986
		35.4	4,946,720	291	4,946,793	81	4,946,814	305	4,946,900	415	4,946,981
56	4,946,644	36.1	4,946,721		CLASS 436	126	4,946,815	326.2	4,946,901		4,946,987
84	4,946,645			86	4,946,794	154	4,946,816	326.4	4,946,902		CLASS 560
415	4,946,646			175	4,946,795	158	4,946,817	350	4,946,903	41	4,946,988
528	4,946,647	36.9	4,946,722	179	4,946,796	214	4,946,818	399	4,946,904	51	4,946,989
	CLASS 422	40	4,946,723	512	4,946,796	310	4,946,819	422	4,946,905	106	4,946,990
24	4,946,648	64	4,946,724		CLASS 437	335	4,946,820	426	4,946,906	127	4,946,991
60	4,946,649		4,946,725	33	4,946,798	439	4,946,821	432	4,946,907	158	4,946,982
68.1	4,946,650	73	4,946,726	41	4,946,799		4,946,822	440	4,946,908	227	4,946,992
102	4,946,651	76	4,946,727	65	4,946,800		CLASS 503	514	4,946,909		CLASS 562
104	4,946,652	99	4,946,728	126	4,946,801	200	4,946,823	537	4,946,910	17	4,946,993
140	4,946,653	141	4,946,729	129	4,946,802	216	4,946,824		4,946,911	401	4,946,997
	4,946,654	145	Re 33.289	175	4,946,803	227	4,946,825		4,946,912	452	4,946,999
143	4,946,655	156	4,946,731	228	4,946,804		4,946,826	87	4,946,913	899	4,946,994
144	4,946,656	192	4,946,732				4,946,827	106	4,946,914		CLASS 564
148	4,946,657	199	4,946,733		CLASS 439		CLASS 514	237	4,946,915	18	4,946,995
284	4,946,738	220	4,946,734	63	4,946,392	3	4,946,828	240	4,946,916	143	4,946,983
	CLASS 423	245	4,946,735	79	4,946,400	22	4,946,829	260	4,946,917	296	4,946,986
168	4,946,658	249	4,946,736	88	4,946,393	23	4,946,830	271	4,946,918	451	4,946,998
212	4,946,659	283	4,946,737	157	4,946,394	34	4,946,831	285	4,946,919		CLASS 568
230	4,946,660	286	4,946,738	224	4,946,401	53	4,946,832		CLASS 528	14	4,947,000
239	4,946,661	323	4,946,739	274	4,946,402	81	4,946,833	33	4,946,920	28	4,947,001
314	4,946,662	325	4,946,740	326	4,946,403	119	4,946,834	39	4,946,921	373	4,947,002
447.1	4,946,663	352	4,946,741	352	4,946,404	183	4,946,835	76	4,946,922	554	4,947,003
600	4,946,664	375	4,946,742	387	4,946,405	206	4,946,836	111	4,946,923	568	4,947,004
608	4,946,665	404	4,946,743	417	4,946,406	210	4,946,837	122	4,946,924	600	4,947,005
625	4,946,666	500	4,946,744	532	4,946,407	211	4,946,838	193	4,946,925	618	4,946,984
648.1	4,946,667	532.2	4,946,745	550	4,946,408	229.5	4,946,839	198	4,946,926	685	4,947,006
	CLASS 424	606	4,946,746	586	4,946,396	247	4,946,840	206	4,946,927	727	4,946,877
1	4,946,668	620	4,946,747	599	4,946,397		4,946,841	230	4,946,928		CLASS 600
4	4,946,669	644	4,946,748	752	4,946,398	253	4,946,842	272	4,946,929	3	4,946,435
47	4,946,670	653	4,946,749	84	4,946,409	254	4,946,843	272	4,946,930		CLASS 604
59	4,946,671	660	4,946,750	75	4,946,410	258	4,946,844	319.3	4,946,931	8	4,946,436
76.1	4,946,672		4,946,751	83	4,946,411	282	4,946,845	349	4,946,932	49	4,946,437
80	4,946,673		4,946,752	84	4,946,412	313	4,946,846	353	4,946,933	53	4,946,438
85.5	4,946,674		4,946,753		CLASS 440	315	4,946,847	392	4,946,934	67	4,946,439
85.91	4,946,675		4,946,754		CLASS 441	332	4,946,848	399	4,946,935	95	4,946,440
89	4,946,676		4,946,755			336	4,946,849	421	4,946,936	165	4,946,441
92	4,946,677		4,946,756		CLASS 442	343	4,946,850	483	4,946,937	164	4,946,442
195.1	4,946,681	5	4,946,757	135	4,946,413	346	4,946,851		4,946,938	165	4,946,443
	4,946,682	18	4,946,758		CLASS 443	371	4,946,852		4,946,939	175	4,946,444
422	4,946,683	45	4,946,759		CLASS 444	384	4,946,853		4,946,940	192	4,946,445
441	4,946,684	59	4,946,760		CLASS 445	399	4,946,854		CLASS 530	198	4,946,446
472	4,946,685	60	4,946,761			409	4,946,855	317	4,946,941		4,946,447
473	4,946,686	106.6	4,946,762			432	4,946,856	335	4,946,942	247	4,946,448
	4,946,687	124	4,946,763			436	4,946,857	377	4,946,943	256	4,946,449
581	4,946,688	192	4,946,764			447	4,946,858	400	4,946,944	294	4,946,450
643	4,946,689	259	4,946,765			460	4,946,859	402	4,946,945	301	4,946,451
649	4,946,690	270	4,946,766		CLASS 453	436	4,946,860	500	4,946,946	312	4,946,452
665	4,946,691		4,946,767			438	4,946,861		CLASS 534	323	4,946,453
682	4,946,692		4,946,768		CLASS 454	447	4,946,862	635	4,946,947	385.1	4,946,454
	CLASS 425	300	4,946,769			460	4,946,863	651	4,946,948	892.1	4,946,455
		308	4,946,770			467	4,946,864	885	4,946,949		4,946,456
4 R	4,946,363	325	4,946,771			521	4,946,865		CLASS 536	1	4,946,457
72.1	4,946,364	325	4,946,772			544	4,946,866	4	4,946,950	24	4,946,460
130	4,946,365	350	4,946,773			544	4,946,867	23	4,946,951	61	4,946,458
135	4,946,366	504	4,946,774			729	4,946,868	27	4,946,952	62	4,946,459
182	4,946,367	505	4,946,775			777	4,946,869	57	4,946,953	84	4,946,461
183	4,946,368	512	4,946,776				4,946,870	121	4,946,954	96	4,945,904
222	4,946,369	539	4,946,777				CLASS 521		4,946,955	148	4,946,462
458	4,946,370	545	4,946,778			110	Re 33.290		CLASS 544	158	4,946,463
525	4,946,371	548	4,946,779			137	Re 33.291	234	4,946,956	192	4,946,464
526	4,946,372	567	4,946,780			149	4,946,871	323	4,946,957	194	4,946,465
536	4,94										

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## PATENTS

01	4,945,727	4,945,992	4,946,725	4,947,402	4,946,908	4,945,905
	4,945,872	4,946,010	4,946,787	4,947,404	4,945,845	4,946,049
	4,946,183	4,946,026	4,946,795	4,947,407	4,945,574	4,946,052
	4,946,457	4,946,034	4,946,809	4,947,408	4,945,581	4,946,068
	4,946,976	4,946,059	4,946,845	4,947,437	4,945,585	4,946,073
	4,947,044	4,946,065	4,946,848	4,947,440	4,945,638	4,946,102
02	4,945,994	4,946,066	4,946,931	4,947,449	4,945,646	4,946,104
	4,945,667	4,946,067	4,946,942	4,947,467	4,945,675	4,946,119
04	4,945,576	4,946,070	4,946,943	4,947,484	4,945,709	4,946,127
	4,945,904	4,946,072	4,946,945	4,947,485	4,945,714	4,946,137
	4,945,955	4,946,074	4,946,981	4,947,508	4,945,731	4,946,281
	4,946,253	4,946,126	4,946,994	4,947,518	4,945,756	4,946,286
	4,946,376	4,946,164	4,947,007	4,947,550	4,945,768	4,946,292
	4,946,377	4,946,193	4,947,050	4,947,551	4,945,821	4,946,315
	4,946,518	4,946,224	4,947,060	4,947,563	4,945,839	4,946,326
	4,947,103	4,946,232	4,947,063	4,947,593	4,945,911	4,946,365
	4,947,135	4,946,244	4,947,066	4,947,106	4,945,920	4,946,410
	4,947,165	4,946,256	4,947,069	4,947,113	4,945,925	4,946,451
	4,947,199	4,946,258	4,947,071	4,945,586	4,945,977	4,946,461
	4,947,199	4,946,258	4,947,073	4,945,623	4,945,996	4,946,570
05	4,946,222	4,946,255	4,947,093	4,945,737	4,946,005	4,946,711
	4,947,112	4,946,357	4,947,097	4,945,788	4,946,013	4,946,718
06	4,945,573	4,946,357	4,947,101	4,945,831	4,946,084	4,946,719
	4,945,575	4,946,369	4,947,102	4,945,848	4,946,109	4,946,744
	4,945,624	4,946,380	4,947,116	4,945,945	4,946,162	4,946,812
	4,945,643	4,946,384	4,947,139	4,945,973	4,946,229	4,946,813
	4,945,649	4,946,385	4,947,147	4,946,020	4,946,264	4,946,815
	4,945,650	4,946,386	4,947,152	4,946,050	4,946,449	4,946,816
	4,945,664	4,946,411	4,947,168	4,946,105	4,946,466	4,946,832
	4,945,665	4,946,439	4,947,186	4,946,157	4,946,658	4,946,891
	4,945,693	4,946,448	4,947,225	4,947,111	4,946,934	4,946,934
	4,945,698	4,946,453	4,947,230	4,946,342	4,947,279	4,946,970
	4,945,741	4,946,456	4,947,244	4,946,361	4,947,369	4,946,988
	4,945,762	4,946,460	4,947,254	4,946,426	4,947,420	4,947,055
	4,945,771	4,946,462	4,947,255	4,946,673	4,945,986	4,947,057
	4,945,779	4,946,504	4,947,256	4,946,723	4,946,032	4,947,090
	4,945,791	4,946,522	4,947,256	4,946,794	4,946,053	4,946,254
	4,945,806	4,946,524	4,947,258	4,946,881	4,946,237	4,947,107
	4,945,812	4,946,538	4,947,273	4,946,922	4,946,239	4,947,150
	4,945,825	4,946,543	4,947,274	4,946,956	4,946,289	4,947,287
	4,945,856	4,946,578	4,947,293	4,947,115	4,946,459	4,947,318
	4,945,866	4,946,579	4,947,301	4,946,625	4,947,247	4,947,421
	4,945,893	4,946,591	4,947,305	4,946,814	4,947,281	4,947,429
	4,945,896	4,946,619	4,947,315	4,947,317	4,947,126	4,947,455
	4,945,898	4,946,631	4,947,316	4,947,333	4,947,321	4,945,615
	4,945,901	4,946,643	4,947,320	4,947,369	4,945,587	4,945,639
	4,945,902	4,946,651	4,947,336	4,945,589	4,945,790	4,945,749
	4,945,903	4,946,652	4,947,341	4,945,618	4,945,940	4,945,769
	4,945,921	4,946,683	4,947,364	4,945,840	4,946,007	4,945,782
	4,945,928	4,946,685	4,947,366	4,946,436	4,947,022	4,945,832
	4,945,942	4,946,687	4,947,382	4,946,494	4,945,598	4,945,889
	4,945,943	4,946,694	4,947,390	4,946,736	4,945,909	4,947,026
	4,945,984	4,946,705	4,947,399	4,946,902	4,945,764	4,945,968

4,945,982	4,947,308	4,946,321	4,946,060	4,946,285	4,947,160
4,946,017	4,947,357	4,946,447	4,946,082	4,946,287	4,947,215
4,946,096	4,947,358	4,946,601	4,946,091	4,946,390	4,947,228
4,946,144	4,947,367	4,946,610	4,946,095	4,946,395	4,947,386
4,946,182	4,947,368	4,946,662	4,946,120	4,946,402	4,945,948
4,946,196	4,947,414	4,946,669	4,946,128	4,946,405	4,946,293
4,946,341	4,945,626	4,946,688	4,946,165	4,946,427	4,945,603
4,946,360	4,945,637	4,946,775	4,946,171	4,946,445	4,945,644
4,946,531	4,945,682	4,947,068	4,946,210	4,946,508	4,945,953
4,946,978	4,945,683	4,946,308	4,946,221	4,946,509	4,946,212
4,946,980	4,945,686	4,946,180	4,946,235	4,946,532	4,946,307
4,947,009	4,945,746	4,945,730	4,946,257	4,946,618	4,946,333
4,947,053	4,945,757	4,945,960	4,946,276	4,946,624	4,946,444
4,947,065	4,945,760	4,946,057	4,946,329	4,946,639	4,946,536
4,947,078	4,945,766	4,946,506	4,946,353	4,946,644	4,946,558
4,947,235	4,945,773	4,947,149	4,946,382	4,946,671	4,946,563
4,947,253	4,945,784	4,947,184	4,946,438	4,946,701	4,947,298
4,947,294	4,945,796	4,945,599	4,946,446	4,946,702	4,945,914
4,947,295	4,945,807	4,945,627	4,946,455	4,946,712	4,945,934
4,947,306	4,945,818	4,945,647	4,946,476	4,946,717	4,946,051
4,947,431	4,945,853	4,945,653	4,946,486	4,946,727	4,946,110
4,947,456	4,945,864	4,945,699	4,946,556	4,946,739	4,946,215
4,946,077	4,945,865	4,945,765	4,946,584	4,946,856	4,946,589
4,946,283	4,945,868	4,945,897	4,946,632	4,946,876	4,946,932
4,947,117	4,945,869	4,945,912	4,946,679	4,946,879	4,947,216
4,947,284	4,945,878	4,945,957	4,946,689	4,946,890	4,947,323
4,947,303	4,945,880	4,946,042	4,946,731	4,946,899	Re 33,287
4,945,657	4,945,881	4,946,043	4,946,735	4,946,905	4,945,577
4,945,719	4,945,882	4,946,055	4,946,745	4,947,021	4,945,642
4,945,799	4,945,884	4,946,056	4,946,765	4,947,039	4,945,666
4,945,997	4,945,885	4,946,087	4,946,800	4,947,045	4,945,672
4,946,035	4,945,923	4,946,100	4,946,818	4,947,072	4,945,738
4,946,440	4,945,962	4,946,169	4,946,824	4,947,082	4,945,759
4,946,686	4,945,988	4,946,325	4,946,825	4,947,096	4,945,792
4,946,995	4,946,000	4,946,373	4,946,827	4,947,189	4,945,794
4,947,304	4,946,012	4,946,389	4,946,882	4,947,292	4,945,858
4,947,395	4,946,015	4,946,393	4,946,885	4,947,339	4,945,859
4,945,891	4,946,081	4,946,413	4,946,903	4,947,351	4,945,924
4,946,527	4,946,125	4,946,416	4,946,965	4,947,412	4,945,933
4,946,529	4,946,178	4,946,452	4,946,985	Re 33,286	4,945,938
4,946,697	4,946,189	4,946,478	4,946,992	4,945,669	4,945,939
4,947,307	4,946,208	4,946,500	4,947,034	4,945,822	4,945,954
4,945,947	4,946,211	4,946,513	4,947,035	4,945,937	4,945,989
4,946,291	4,946,216	4,946,540	4,947,036	4,945,999	4,945,990
4,946,475	4,946,217	4,946,542	4,947,049	4,946,331	4,945,991
4,946,975	4,946,226	4,946,549	4,947,062	4,946,510	4,945,993
4,945,733	4,946,263	4,946,594	4,947,136	4,946,530	4,946,022
4,947,058	4,946,319	4,946,595	4,947,157	4,946,604	4,946,030
4,945,604	4,946,320	4,946,617	4,947,159	4,946,641	4,946,037
4,945,701	4,946,327	4,946,626	4,947,192	4,945,703	4,946,061
4,945,754	4,946,328	4,946,627	4,947,193	4,946,267	4,946,159
4,945,931	4,946,351	4,946,656	4,947,195	4,946,716	4,946,176
4,946,094	4,946,414	4,946,684	4,947,196	4,946,849	4,946,188
4,946,168	4,946,429	4,946,782	4,947,197	4,947,104	4,946,201
4,946,421	4,946,507	4,946,792	4,947,207	4,947,163	4,946,352
4,946,496	4,946,523	4,946,835	4,947,214	4,947,338	4,946,387
4,946,521	4,946,552	4,946,838	4,947,241	4,945,640	4,946,391
4,946,562	4,946,572	4,946,858	4,947,250	4,945,704	4,946,473
4,946,681	4,946,630	4,946,870	4,947,257	4,945,717	4,946,520
4,946,778	4,946,738	4,946,875	4,947,297	4,945,750	4,946,526
4,947,080	4,946,809	4,946,909	4,947,302	4,945,836	4,946,554
4,947,278	4,946,878	4,946,914	4,947,311	4,945,846	4,946,560
4,947,291	4,946,894	4,946,916	4,947,345	4,945,854	4,946,569
4,947,465	4,946,910	4,946,919	4,947,348	4,945,979	4,946,606
4,945,584	4,946,926	4,946,940	4,947,359	4,946,018	4,946,640
4,945,592	4,946,949	4,946,967	4,947,397	4,946,044	4,946,655
4,945,601	4,947,017	4,946,997	4,947,468	4,946,170	4,946,678
4,945,606	4,947,024	4,947,134	4,945,690	4,946,184	4,946,708
4,945,673	4,947,092	4,947,167	4,945,712	4,946,198	4,946,715
4,945,694	4,947,329	4,947,219	4,945,721	4,946,236	4,946,799
4,945,739	4,947,331	4,947,221	4,945,797	4,946,249	4,946,817
4,945,907	4,947,332	4,947,313	4,945,979	4,946,289	4,946,872
4,946,033	4,947,393	4,947,353	4,946,004	4,946,272	4,946,911
4,946,348	4,947,410	4,947,362	4,946,149	4,946,306	4,946,924
4,946,431	4,947,476	4,947,389	4,946,335	4,946,324	4,946,928
4,946,434	4,945,571	4,947,400	4,946,375	4,946,366	4,946,933
4,946,441	4,945,668	4,947,413	4,946,403	4,946,372	4,946,939
4,946,465	4,945,678	4,947,425	4,946,406	4,946,392	4,946,982
4,946,468	4,945,706	4,947,433	4,946,547	4,946,408	4,947,040
4,946,469	4,945,725	4,945,810	4,946,587	4,946,477	4,947,098
4,946,480	4,945,751	4,946,280	4,946,797	4,946,544	4,947,128
4,946,487	4,946,124	4,946,710	4,946,963	4,946,590	4,947,128
4,946,490	4,946,133	4,947,174	4,947,218	4,946,598	4,947,129
4,946,553	4,946,163	4,947,175	4,945,582	4,946,599	4,947,222
4,946,593	4,946,200	4,947,223	4,945,588	4,946,634	4,947,227
4,946,603	4,946,206	4,947,458	4,945,617	4,946,667	4,947,161
4,946,637	4,946,254	4,947,480	4,945,631	4,946,668	4,947,415
4,946,732	4,946,484	Re 33,289	4,945,687	4,946,707	4,947,422
4,946,733	4,946,692	4,945,594	4,945,689	4,946,713	4,947,470
4,946,773	4,946,742	4,945,662	4,945,691	4,946,722	4,947,477
4,946,774	4,946,753	4,945,707	4,945,724	4,946,737	4,946,058
4,946,783	4,946,962	4,945,753	4,945,726	4,946,834	4,946,803
4,946,786	4,947,012	4,945,817	4,945,728	4,946,839	4,947,361
4,946,808	4,947,027	4,945,828	4,945,742	4,946,840	4,945,809
4,946,810	4,947,079	4,945,857	4,945,780	4,946,859	4,945,763
4,946,829	4,947,119	4,945,890	4,945,802	4,946,860	4,945,772
4,946,959	4,947,131	4,945,913	4,945,803	4,946,864	4,945,813
4,946,964	4,947,226	4,945,946	4,945,862	4,946,884	4,946,021
4,946,974	4,945,608	4,945,948	4,946,038	4,946,892	4,946,025
4,947,022	4,945,832	4,945,951	4,946,039	4,946,925	4,946,062
4,947,054	4,946,203	4,945,969	4,946,064	4,946,938	4,946,231
4,947,120	4,947,026	4,945,981	4,946,093	4,946,969	4,946,247
4,947,142	4,945,804	4,945,983	4,946,113	4,946,973	4,946,338
4,947,143	4,945,849	4,946,002	4,946,122	4,946,993	4,946,340
4,947,166	4,946,107	4,946,036	4,946,199	4,946,998	4,946,435
4,947,275	4,946,317	4,946,048	4,946,282	4,947,061	4,946,456



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4,946,703		4,945,580	4,946,322	4,947,355	4,945,892	4,946,726
4,946,954		4,945,670	4,946,332	4,945,595	4,945,941	4,946,743
4,947,003		4,945,688	4,946,363	4,945,961	4,945,961	4,947,089
4,947,025		4,945,778	4,946,388	4,946,407	4,946,009	4,947,099
4,947,028		4,945,801	4,946,488	4,946,984	4,946,028	4,947,121
4,947,151		4,945,837	4,946,691	4,947,482	4,946,054	4,947,161
4,947,220	54	4,945,976	4,946,696	4,945,579	4,946,204	4,947,180
4,947,335		4,945,985	4,946,791	4,945,655	4,946,394	4,947,416
4,947,417		4,946,116	4,947,094	4,945,710	4,946,454	4,947,416
			4,947,164			4,946,079

## DESIGN PATENTS

01	309,774	08	309,812	18	309,798	37	309,707	48	309,702
04	309,818		309,684		309,725		309,740		309,706
06	309,699		309,685		309,782	39	309,687		309,737
	309,693		309,686		309,817		309,701		309,750
	309,695	09	309,769	20	309,801	33	309,715		309,765
	309,698		309,799		309,803	34	309,712		309,766
	309,718		309,806		309,682		309,734		309,781
	309,728	12	309,665	23	309,727		309,807		309,802
	309,732		309,676	25	309,708		309,763	51	309,813
	309,733		309,736		309,727		309,808		309,713
	309,745		309,779	26	309,677	36	309,666	53	309,678
	309,746		309,784		309,680		309,668		309,713
	309,757		309,810		309,776		309,671		309,744
	309,762	13	309,777	27	309,673		309,722	55	309,675
	309,778	17	309,741		309,692		309,711		309,753
	309,780		309,788	29	309,681		309,714		309,754
	309,805		309,796		309,683	47	309,703		309,816

## PLANT PATENTS

06	7,290	39	7,291	7,292	42	7,293
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## STATUTORY INVENTION REGISTRATIONS

16	H804	H808	24	H805	34	H806	47	H807	48	H812
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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
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—Corresponding prior U.S. national application filed .....	380.00
—Supplemental search fee, per additional invention .....	150.00
European Patent Office as ISA .....	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA .....	400.00
—Additional examination fee, per additional invention .....	130.00
—ISA not the USPTO .....	600.00
—Additional examination fee, per additional invention .....	200.00
International fees	
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Basic Supplemental fee (for each page over 30) .....	9.00
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Designation fee for 11th and subsequent designations .....	No Charge
Handling fee .....	134.00

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USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA .....	185.00	370.00
USPTO was neither ISA nor IPEA .....	250.00	500.00

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USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
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—For each claim in excess of 20 .....	6.00	12.00
—For each application containing a multiple dependent claim .....	60.00	120.00
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—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on August 11, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,685,151 through 4,686,709  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on August 9, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,397,043 through 4,398,304  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

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beyond 4 years; the fee is due by three years and six months after the original grant .....	4,332,372	06/235,552	6/01/82
\$245.00 .....	4,332,383	06/224,220	6/01/82
"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant .....	4,332,496	06/262,484	6/01/82
\$495.00 .....	4,332,504	06/091,356	6/01/82
"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:	4,332,553	06/229,956	6/01/82
By a small entity (\$1.9(f)) .....	4,332,569	06/244,203	6/01/82
By other than a small entity .....	4,332,587	06/229,049	6/01/82
\$245.00 .....	4,332,594	06/253,493	6/01/82
\$490.00 .....	4,332,610	06/269,773	6/01/82
"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:	4,332,628	06/232,228	6/01/82
By a small entity (\$1.9(f)) .....	4,332,651	06/265,296	6/01/82
By other than a small entity .....	4,332,652	06/280,659	6/01/82
\$495.00 .....	4,332,679	06/226,158	6/01/82
\$990.00 .....	4,332,698	06/226,457	6/01/82
The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:	4,332,728	06/224,129	6/01/82
"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 .....	4,332,730	06/266,579	6/01/82
\$120.00 .....	4,332,753	06/233,371	6/01/82
"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:	4,332,768	06/237,076	6/01/82
By a small entity (\$1.9(f)) .....	4,332,771	06/230,871	6/01/82
By other than a small entity .....	4,332,780	06/241,946	6/01/82
\$60.00 .....	4,332,804	06/246,459	6/01/82
\$120.00 .....	4,332,818	06/242,709	6/01/82
"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable .....	4,332,819	06/241,146	6/01/82
\$550.00 .....	4,332,822	06/229,902	6/01/82
\$60.00 .....	4,332,860	06/256,844	6/01/82
\$120.00 .....	4,332,875	06/229,701	6/01/82
\$120.00 .....	4,332,944	06/281,808	6/01/82
\$60.00 .....	4,332,946	06/250,137	6/01/82
\$120.00 .....	4,332,947	06/230,167	6/01/82
\$120.00 .....	4,332,964	06/264,680	6/01/82
\$60.00 .....	4,333,031	06/240,419	6/01/82
\$120.00 .....	4,333,070	06/231,966	6/01/82
\$60.00 .....	4,592,097	06/577,568	6/03/86
\$120.00 .....	4,592,117	06/700,142	6/03/86
\$120.00 .....	4,592,124	06/627,681	6/03/86
\$120.00 .....	4,592,133	06/717,196	6/03/86
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\$120.00 .....	4,592,145	06/679,365	6/03/86
\$120.00 .....	4,592,152	06/735,683	6/03/86
\$120.00 .....	4,592,153	06/622,441	6/03/86
\$120.00 .....	4,592,156	06/748,103	6/03/86
\$120.00 .....	4,592,157	06/663,225	6/03/86
\$120.00 .....	4,592,162	06/630,679	6/03/86
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\$120.00 .....	4,592,175	06/615,123	6/03/86
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\$120.00 .....	4,592,183	06/552,801	6/03/86
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\$120.00 .....	4,592,236	06/450,013	6/03/86
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\$120.00 .....	4,592,283	06/714,284	6/03/86
\$120.00 .....	4,592,285	06/538,963	6/03/86
\$120.00 .....	4,592,293	06/669,799	6/03/86
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\$120.00 .....	4,592,301	06/611,275	6/03/86
\$120.00 .....	4,592,302	06/669,264	6/03/86
\$120.00 .....	4,592,309	06/655,233	6/03/86
\$120.00 .....	4,592,334	06/672,202	6/03/86
\$120.00 .....	4,592,337	06/764,730	6/03/86
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\$120.00 .....	4,592,356	06/655,414	6/03/86
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\$120.00 .....	4,592,362	06/506,353	6/03/86

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4,332,096	06/268,892	6/01/82
4,332,101	06/228,478	6/01/82
4,332,145	06/232,645	6/01/82
4,332,155	06/217,892	6/01/82
4,332,227	06/258,095	6/01/82
4,332,234	06/249,335	6/01/82
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4,332,356	06/236,673	6/01/82
4,332,361	06/221,535	6/01/82



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4,592,364	06/608,798	6/03/86	4,592,748	6/03/86
4,592,369	06/511,891	6/03/86	4,592,749	6/03/86
4,592,380	06/725,568	6/03/86	4,592,754	6/03/86
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4,592,402	06/544,964	6/03/86	4,592,790	6/03/86
4,592,408	06/788,662	6/03/86	4,592,813	6/03/86
4,592,415	06/659,080	6/03/86	4,592,826	6/03/86
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4,592,422	06/622,750	6/03/86	4,592,836	6/03/86
4,592,428	06/540,162	6/03/86	4,592,837	6/03/86
4,592,429	06/573,293	6/03/86	4,592,840	6/03/86
4,592,431	06/643,802	6/03/86	4,592,844	6/03/86
4,592,432	06/740,434	6/03/86	4,592,846	6/03/86
4,592,435	06/680,306	6/03/86	4,592,867	6/03/86
4,592,439	06/585,573	6/03/86	4,592,871	6/03/86
4,592,444	06/718,981	6/03/86	4,592,902	6/03/86
4,592,451	06/633,326	6/03/86	4,592,906	6/03/86
4,592,455	06/508,794	6/03/86	4,592,908	6/03/86
4,592,456	06/638,741	6/03/86	4,592,911	6/03/86
4,592,463	06/627,990	6/03/86	4,592,919	6/03/86
4,592,464	06/620,875	6/03/86	4,592,936	6/03/86
4,592,477	06/613,874	6/03/86	4,592,938	6/03/86
4,592,479	06/647,115	6/03/86	4,592,953	6/03/86
4,592,480	06/565,737	6/03/86	4,592,970	6/03/86
4,592,485	06/611,512	6/03/86	4,592,976	6/03/86
4,592,491	06/640,699	6/03/86	4,592,976	6/03/86
4,592,492	06/366,430	6/03/86	4,592,988	6/03/86
4,592,497	06/588,896	6/03/86	4,592,995	6/03/86
4,592,498	06/711,381	6/03/86	4,592,999	6/03/86
4,592,503	06/542,744	6/03/86	4,593,018	6/03/86
4,592,506	06/685,145	6/03/86	4,593,021	6/03/86
4,592,514	06/629,679	6/03/86	4,593,022	6/03/86
4,592,515	06/669,151	6/03/86	4,593,023	6/03/86
4,592,524	06/587,406	6/03/86	4,593,027	6/03/86
4,592,525	06/699,284	6/03/86	4,593,028	6/03/86
4,592,528	06/613,061	6/03/86	4,593,029	6/03/86
4,592,536	06/515,395	6/03/86	4,593,030	6/03/86
4,592,548	06/673,413	6/03/86	4,593,031	6/03/86
4,592,549	06/688,177	6/03/86	4,593,032	6/03/86
4,592,552	06/696,401	6/03/86	4,593,040	6/03/86
4,592,553	06/686,469	6/03/86	4,593,045	6/03/86
4,592,562	06/519,677	6/03/86	4,593,060	6/03/86
4,592,569	06/561,715	6/03/86	4,593,090	6/03/86
4,592,576	06/561,062	6/03/86	4,593,096	6/03/86
4,592,579	06/477,772	6/03/86	4,593,109	6/03/86
4,592,582	06/684,020	6/03/86	4,593,120	6/03/86
4,592,587	06/652,140	6/03/86	4,593,134	6/03/86
4,592,589	06/709,989	6/03/86	4,593,136	6/03/86
4,592,592	06/660,729	6/03/86	4,593,143	6/03/86
4,592,596	06/647,230	6/03/86	4,593,147	6/03/86
4,592,603	06/541,588	6/03/86	4,593,162	6/03/86
4,592,605	06/700,617	6/03/86	4,593,164	6/03/86
4,592,607	06/697,248	6/03/86	4,593,169	6/03/86
4,592,635	06/737,778	6/03/86	4,593,172	6/03/86
4,592,648	06/693,774	6/03/86	4,593,176	6/03/86
4,592,650	06/693,902	6/03/86	4,593,179	6/03/86
4,592,661	06/672,193	6/03/86	4,593,193	6/03/86
4,592,664	06/598,817	6/03/86	4,593,207	6/03/86
4,592,671	06/623,020	6/03/86	4,593,212	6/03/86
4,592,673	06/712,263	6/03/86	4,593,223	6/03/86
4,592,679	06/473,588	6/03/86	4,593,225	6/03/86
4,592,680	06/694,443	6/03/86	4,593,236	6/03/86
4,592,684	06/756,573	6/03/86	4,593,237	6/03/86
4,592,695	06/662,578	6/03/86	4,593,238	6/03/86
4,592,696	06/466,345	6/03/86	4,593,239	6/03/86
4,592,701	06/686,472	6/03/86	4,593,277	6/03/86
4,592,711	06/557,053	6/03/86	4,593,288	6/03/86
4,592,718	06/728,452	6/03/86	4,593,310	6/03/86
4,592,724	06/617,274	6/03/86	4,593,314	6/03/86
4,592,727	06/613,687	6/03/86	4,593,326	6/03/86
4,592,728	06/604,608	6/03/86	4,593,350	6/03/86
4,592,740	06/678,062	6/03/86	4,593,355	6/03/86
4,592,741	06/619,876	6/03/86	4,593,370	6/03/86
4,592,742	06/709,127	6/03/86	4,593,376	6/03/86
			4,593,401	6/03/86

Patent Number	Serial Number	Issue Date
4,593,403	06/428,232	6/03/86
4,593,412	06/612,393	6/03/86

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,582,047**, Re. S. N. 07/541,537, Filed June 21, 1990, Cl. 126/369, HIGH HUMIDITY STEAM COOKER WITH CONTINUOUSLY RUNNING CONVEYER, Charles E. Williams, Owner of Record: *Inventor*, Attorney or Agent: Robert W. Faris, Ex. Gp.: 346

**4,587,489**, Re. S. N. 07/539,509, Filed June 18, 1990, Cl. 324/309, A METHOD FOR RAPID ACQUISITION OF NMR DATA, Felix W. Webri, Owner of Record: *GE Medical Systems, Milwaukee, Wis.*, Attorney or Agent: James O. Skarsten, Ex. Gp.: 265

**4,654,244**, Re. S. N. 07/541,133, Filed June 20, 1990, Cl. 428/47, LOOSE-LAY AND ADHERED SURFACE COVERINGS, Donald C. Eckert, et al., Owner of Record: *Armstrong World Industries, Inc., Lancaster, Pa.*, Attorney or Agent: Douglas E. Winters, Ex. Gp.: 158

**4,745,212**, Re. S. N. 07/543,012, Filed June 25, 1990, Cl. 560/130, PROCESS FOR THE PRODUCTION OF ISOCYANATES, Werner Mormann, et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany*, Attorney or Agent: Richard E. L. Henderson, Ex. Gp.: 126

**4,753,106**, Re. S. N. 07/544,420, Filed June 27, 1990, Cl. 73/29, STEAM QUALITY METER, Raul Brenner, et al., Owner of Record: *Kay-Ray/Sensall, Inc., Arlington Heights, Ill.*, Attorney or Agent: Nickolas E. Westman, Ex. Gp.: 265

**4,753,455**, Re. S. N. 007/544,848, Filed June 27, 1990, Cl. 280/663, DOUBLE LINK TYPE SUSPENSION SYSTEM, Takuya Maurakami, et al., Owner of Record: *Nissan Motor Co., Ltd., Yokohama City, Japan*, Attorney or Agent: Robert P. Kananen, Ex. Gp.: 316

**4,756,765**, Re. S. N. 07/544,616, Filed June 27, 1990, Cl. 134/1, LASER REMOVAL OF POOR THERMALLY-CONDUCTIVE MATERIALS, Jamie Woodroffe, Owner of Record: *Avco Everett Research Laboratory Inc., Everett, Mass.*, Attorney or Agent: Mark F. Harrington, Ex. Gp.: 116

**4,758,366**, Re. S. N. 07/541,989, Filed June 6, 1990, Cl. 252/68, POLYHALOGENATED HYDROCARBON REFRIGERANTS AND REFRIGERANT OILS COLORED WITH FLOURESCENT DYES AND METHOD FOR THEIR USE AS LEAK DETECTORS, Manher Parekh, Owner of Record: *H. B. Fuller Automotive Products, Inc., North Shoreview, Minn.*, Attorney or Agent: Joel A. Rothfus, Ex. Gp.: 115

**4,763,915**, Re. S. N. 07/546,197, Filed June 28, 1990, Cl. 280/413, FOLDABLE IMPLEMENT CARRIER, Philip E. Risser, Owner of Record: *J. I. Case Co., Racine, Wis.*, Attorney or Agent: Theodore W. Olds, Ex. Gp.: 316

**4,817,130**, Re. S. N. 07/545,058, Filed June 28, 1990, Cl. 379/88, CALL MANAGEMENT SYSTEM WITH PROTOCOL CONVERTER AND PORT CONTROLLER, James J. Frimmel, Owner of Record: *International Telesystems Co., Reston, Va.*, Attorney or Agent: Laurence J. Marhofer, Ex. Gp.: 261

**4,817,547**, Re. S. N. 07/536,008, Filed June 8, 1990, Cl. 112/457, SEWING MACHINE, Alfred Gaeumann, et al., Owner of Record: *Fritz Gegauf Ag Bernina Naehmaschinen Fabrik, Steckborn, Switzerland*, Attorney or Agent: Paul Devinsky, Ex. Gp.: 247

**4,854,982**, Re. S. N. 07/542,625, Filed June 25, 1990, Cl. 149/109.6, METHOD TO DEMILITARIZE, EXTRACT, AND RECOVER AMONIUM PERCHLORATE FROM COMPOSITE PROPELLANTS USING LIQUID AMMONIA, William S. Melvin, et al., Owner of Record: *United States of America as Represented by the Secretary of the Army*, Attorney or Agent: Freddie M. Bush, Ex. Gp.: 224

**4,859,089**, Re. S. N. 07/534,539, Filed June 6, 1990, Cl. 384/423, RAILWAY TRUCK SIDE BEARING, James F. Wright, Owner of Record: *Inventor*, Attorney or Agent: J. Stewart Brams, Ex. Gp.: 245

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,118,754**, Reexam. No. 90/002,068, Requested June 25, 1990, Cl. 361/355, ELECTRICAL PANEL HAVING MOLDED BASE FAN, J. E. Duggan, Owner of Record: *Siemens Energy & Automation, Inc., Atlanta, Ga.*, Attorney or Agent: Peter A. Luccarelli, Ex. Gp.: 214, Requester: Owner

**4,167,769**, Reexam. No. 90/002,069, Requested June 25, 1990, Cl. 439/717, PANELBOARD HAVING DISTRIBUTED NUETRAL, Roger D. Luke, et al., Owner of Record: *Siemens Energy & Automation, Inc., Atlanta, Ga.*, Attorney or Agent: Peter A. Luccarelli, Ex. Gp.: 322, Requester: Owner

**4,792,717**, Reexam. No. 90/002,070, Requested June 29, 1990, Cl. 313/113, WIDE ANGLE WARNING LIGHT, Robert A. Ferenc, Owner of Record: *Whelen Tech., Inc., Deep River, Conn.*, Attorney or Agent: Mr. Guy Yale, Chilton, Alix & Van Kirk, Ex. Gp.: 264, Requester: Tomar Electronics, Inc., Gilbert, Ariz.

**4,866,329**, Reexam. No. 90/002,071, Requested June 29, 1990, Cl. 313/113, WIDE ANGLE WARNING LIGHT, Robert A. Ferenc, Owner of Record: *Whelen Tech., Inc., Deep River, Conn.*, Attorney or Agent: Mr. Guy Yale, Chilton, Alix & Van Kirk, Ex. Gp.: 264, Requester: Tomar Electronics, Inc., Gilbert, Ariz.

**4,879,181**, Reexam. No. 90/002,072, Requested June 29, 1990, Cl. 428/402, SINTERED SPHERICAL PELLETS CONTAINING CLAY AS A MAJOR COMPONENT USEFUL FOR GAS AND OIL WELL PROPPANTS, Jeremiah J. Fitzgibbon, Owner of Record: *Carbo Ceramics, Inc., Irving, Tex.*, Attorney or Agent: James H. Riley, II, Pravel, Gambrell, et al., Ex. Gp.: 154, Requester: Norton-Alcoa Proppants, Ft. Smith, Ark.

**4,884,694**, Reexam. No. 90/002,073, Requested June 28, 1990, Cl. 206/484, GAS-STERILIZABLE PACKAGE, COVER OF AND ARRANGEMENT FOR PRODUCING THE SAME, Owner of Record: *Karl-Heinz Sengwald, Westf. Fed'l. Republic of Germany*, Attorney or Agent: Michael J. Striker, Ex. Gp.: 244, Requester: Owner

## Patents Available for License or Sale

4,058,943 GLASS BLOCK PANEL, Thomas K. Stein, Wallenstein, Wagner and Hattis, Ltd., 100 South Wacker Dr., Suite 2100, Chicago, Ill. 60606  
4,848,711 DRUM TRANSPORTING ARRANGEMENT, Ronald L. Mandel, 9115 Old State Rd., Evansville, Ind. 47711  
4,826,909 COMPATIBLE POLYMERE BLENDS USEFUL AS MELT ADHESIVE, Ronald L. Mandel, 9115 Old State Rd., Evansville, Ind. 47711

4,907,366 MOSQUITO CONTROL, Sherman Levy, Suite 808 Investment Building, 1511 K Street N.W., Washington, D.C. 20005  
4,929,039 TOOTHBRUSH CABINET FOR HOLDING OF TOOTHBRUSH AND TOOTHPASTE IN BATHROOM, Paul Thomas, 271 Hanakapiai St., Honolulu, Hi. 96825  
4,940,364 CONCRETE CONSTRUCTION UNITS AND MULTI-PLY CONCRETE COMPOSITES, Leonard T-Dlugosz, 4 Minden Dr., Orchard Park, N.Y. 14127

Survey of Registered Practitioners in Patent Cases

Pursuant to 37 CFR 10.11(b), a survey letter was mailed on January 31, 1990 from the Office of Enrollment and Discipline (OED) to all practitioners in patent cases whose last names began with P through S. Enclosed with the letter was a data sheet which should have been completed and returned to OED as soon as possible. All data sheets returned to OED were acknowledged. Failure by a practitioner to submit a completed data sheet within the time period specified in the survey letter will result in the practitioner being removed from the register in accordance with 37 CFR 10.11(b).

If your last name begins with P through S and you did not receive a data sheet or if you returned the data sheet to OED and you did not receive an acknowledgement within three (3) months after returning the data sheet to OED, please contact Shirley B. Rasheed at (703) 557-1728.

June 26, 1990 CAMERON WEIFENBACH, Director  
Office of Enrollment & Discipline

Errata

"All reference to Patent No. 4,940,537 to Charles M. Muisener of Connecticut for 'WATER PURIFICATION SYSTEM' appearing in the Official Gazette of July 10, 1990 should be deleted since no patent was granted."

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of June 9, 1987:

TM 216 1,141,589

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of October 25, 1988:

TM 187 1,187,525

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of November 8, 1988:

TM 162 1,176,511

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of January 31, 1989:

TM 171 1,195,067

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of March 28, 1989:

TM 180 1,194,257

Consequently, the above-identified registrations are still active.

June 29, 1990 PATRICIA M. DAVIS  
Administrator for Trademark Operations

Errata

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of April 11, 1989:

TM 201 1,202,798

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of May 9, 1989:

TM 180 1,200,415

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of May 16, 1989:

TM 197 1,207,412

The following registration number was inadvertently listed in the "Registration Published Under Section 12(c)" section of the Trademark Official Gazette of July 25, 1989:

TM 273 1,253,544

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of September 26, 1989:

TM 241 1,199,153

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of October 10, 1989:

TM 297 1,233,594

June 29, 1990 PATRICIA M. DAVIS  
Administrator for Trademark Operations

Errata

The Registrant of Registration No. 1,601,113 listed in the "Trademark Registrations Issued" and "Index of Registrants" sections of the Trademark Official Gazette of June 12, 1990, at TM 133 and TMI 6, was listed inadvertently.

Consequently, the certificate of registration bearing the above-identified registration number was not issued on the date indicated, and the registration number has been vacated.

The following registration numbers were inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of November 7, 1989:

TM 251 1,247,919  
TM 251 1,248,658  
TM 251 1,248,659

Consequently, the above-identified registrations are still active.

June 29, 1990 PATRICIA M. DAVIS  
Administrator for Trademark Operations

Errata

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of October 31, 1989:

TM 221 1,235,727

The following registration number was inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of January 9, 1990:

TM 175 1,249,774

The following registration numbers were inadvertently listed as cancelled in the "Trademark Registrations Cancelled, Section 8" section of the Trademark Official Gazette of April 10, 1990:

TM 216 1,301,451  
TM 216 1,305,630

Consequently, the above-identified registrations are still active.

In the "Trademark Registrations Issued" section of the Trademark Official Gazette of April 10, 1990, was listed inadvertently:

TM 176 1,590,553

Consequently, the certificate of registration bearing the above-identified registration number was not issued on the date indicated, and the registration number has been vacated.

In the "Trademark Registrations Issued" section of the Trademark Official Gazette of April 24, 1990:

TM 159 1,592,737

Consequently, the certificate of registration bearing the above-identified registration number was not issued on the date indicated, and the registration number has been vacated.

July 2, 1990 PATRICIA M. DAVIS  
Administrator for Trademark Operations

Errata

"All reference to Patent No. 4,926,038 to William L. Ahlgren of Calif. for 'MODULATED MULTI-QUANTUM WELL COLLECTOR FOR HIGDTE PHOTODIODES' appearing in the Official Gazette of May 15, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,941,145 to Christopher B. Cain, et al., of Loveland, Colo. for 'SERIAL DATA FRAME GENERATOR FOR TESTING TELECOMMUNICATIONS CIRCUITS' appearing in the Official Gazette of July 10, 1990 should be deleted since no patent was granted."

DEPARTMENT OF COMMERCE  
Patent and Trademark Office  
37 CFR Part 1  
Time Period for Objection to Publication

Agency: Patent and Trademark Office, Commerce.  
Action: Notice of proposed rulemaking.

Summary: The Patent and Trademark Office (PTO) proposes changing the period within which applicants or parties may object to publication of a decision of the Board of Patent Appeals and Interferences (Board), or any decision of the Commissioner on petition, not otherwise open to public inspection, from two months to "a time specified by the Commissioner." The proposed change would permit setting shorter periods for objection to publication of decisions and is intended to expedite publication of decisions involving issues of important precedential value.

Dates: Comments must be submitted on or before August 24, 1990. No hearing will be held.

Address: Address written comments to Box 8, Commissioner of Patents and Trademarks, Washington, D. C. 20231, marked to the attention of Lee E. Barrett.

For Further Information Contact: Lee E. Barrett by telephone at (703) 557-4035 or by mail marked to his attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D. C. 20231.

Supplementary Information: As presently written, 37 CFR § 1.14(d) allows an applicant or party to an interference two months to object to the publication of decisions of the Board or the Commissioner. The two-month period delays publication of decisions involving significant issues of law, rule interpretation or PTO practice which the Commissioner has determined to be of important and immediate interest to patent practitioners. The PTO proposes changing § 1.14(d) from "two months" to "a time specified by the Commissioner" to permit the Commissioner to set shorter periods to object to publication. If the proposed rule is adopted, the reasonable period will normally be one month.

Other Considerations

The proposed rule change will not have a significant impact on the quality of the human environment or the conservation of energy resources.

The proposed rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. § 3501 *et seq.*

The General Counsel of the Department of Commerce has certified to the Small Business Administration that the proposed rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354) because no increase in fees or paperwork should result from this rule change.

The Patent and Trademark Office has determined that this rule change is not a major rule under Executive Order 12291, the annual effect on the economy will be less than \$100 million. There will be no major increase in costs or prices for consumers, individual industries, Federal, state or local government agencies, or geographical regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The PTO has also determined that this notice has no federalism implications affecting the relationship between the national Government and the states as outlined in Executive Order 12612.

The rule change will not impose a burden under the Paperwork Reduction Act of 1980, 44 U.S.C. § 3501 *et seq.*, since no record keeping or reporting requirements within the coverage of the Act are placed upon the public.

List of Subjects in 37 CFR Part 1

Administrative practice and procedure, Freedom of information, Inventions and patents, Reporting and record keeping requirements.

For the reasons set out in the preamble and pursuant to the authority granted to the Commissioner of Patents and Trademarks by U.S.C. § 6, the Patent and Trademark Office proposes to amend Title 37, Chapter 1, Subchapter A of the Code of Federal Regulations as set forth below. The proposed addition is printed between arrows (▶◀) and the deletions are shown between brackets ([ ]).



Part 1-Rules of Practice in Patent Cases

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

Authority: 35 U.S.C. § 6 unless otherwise noted.

2. Section 1.14 is proposed to be amended by revising paragraph (d) to read as follows:

§ 1.14 Patent application preserved in secrecy.

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(d) Any decision of the Board of Patent Appeals and Interferences, or any decision of the Commissioner on petition, not otherwise open to public inspection shall be published or made available for public inspection if: (1) The Commissioner believes the decision involves an interpretation of patent laws or regulations that would be of important precedent value; and (2)

the applicant, or any party involved in the interference, does not within a time specified by the Commissioner [two months] after being notified of the intention to make the decision public[,] object in writing on the ground that the decision discloses a trade secret or other confidential information. If a decision discloses such information, the applicant or party shall identify the deletions in the text of the decision considered necessary to protect the information. If it is considered the entire decision must be withheld from the public to protect such information, the applicant or party must explain why. Applicants or parties will be given time, not less than twenty days, to request reconsideration and seek court review before any portions of decisions are made public over thier objection. See § 2.27 for trademark applications.

DOUGLAS B. COMER  
Acting Assistant Secretary and  
Commissioner of Patents  
and Trademarks

PATENT NOTICES

Certificates of Correction For Week of August 14, 1990

D. 302,510	4,838,968	4,855,921	4,865,984
D. 302,899	4,840,712	4,856,190	4,866,304
Re. 32,648	4,840,991	4,856,259	4,866,388
4,316,439	4,841,508	4,856,395	4,866,560
4,547,376	4,841,632	4,857,280	4,866,676
4,577,509	4,841,701	4,857,341	4,866,978
4,587,919	4,842,357	4,857,427	4,867,216
4,644,173	4,842,692	4,857,611	4,867,286
4,677,576	4,842,959	4,858,130	4,867,291
4,737,464	4,843,442	4,858,159	4,867,557
4,755,853	4,843,986	4,858,598	4,867,602
4,767,630	4,844,248	4,858,696	4,867,776
4,773,430	4,844,551	4,859,028	4,867,793
4,781,921	4,845,326	4,859,260	4,867,824
4,783,282	4,845,602	4,859,336	4,868,386
4,788,229	4,845,754	4,859,535	4,868,470
4,797,850	4,846,047	4,859,579	4,868,997
4,799,753	4,847,577	4,859,871	4,869,028
4,800,261	4,847,638	4,860,218	4,869,030
4,801,743	4,848,602	4,860,332	4,869,194
4,801,783	4,848,683	4,860,376	4,869,289
4,808,408	4,849,356	4,860,612	4,869,369
4,810,824	4,849,482	4,860,763	4,869,613
4,811,118	4,851,510	4,861,336	4,870,020
4,813,105	4,852,205	4,862,387	4,870,337
4,818,271	4,852,713	4,862,484	4,870,664
4,820,103	4,852,853	4,863,213	4,870,813
4,820,931	4,852,901	4,863,258	4,870,814
4,822,483	4,852,983	4,863,326	4,871,340
4,826,767	4,853,371	4,863,335	4,872,278
4,828,774	4,853,560	4,863,692	4,874,829
4,837,323	4,853,917	4,863,969	4,886,697
4,837,596	4,854,138	4,864,201	4,889,605
4,837,706	4,855,373	4,864,742	4,895,782
4,838,710	4,855,496	4,865,014	4,900,093
4,838,841	4,855,569	4,865,446	4,910,713
4,838,889	4,855,612	4,865,710	

Erratum

In the notice of Certificate of Correction appearing in 1116 OG 37, dated Jul. 7, 1990, delete all reference to Patent No. 4,889,605, since no Certificate was granted.

Disclaimers

4,709,226.—*Lauren A. Christopher*, Hopewell, NJ. CIRCUITRY FOR COMPLEMENTING BINARY NUMBERS. Patent dated Nov. 24, 1987. Disclaimer filed May 18, 1990, by the assignee, RCA Licensing Corporation.

Hereby enters this disclaimer to claims 1 through 4 of said patent.

4,709,465.—*Henry W. Lewis; Jan Vam Roojen*, both of Rockford, Ill. INTERCHANGEABLE SPINDLE-HEAD MILLING SYSTEM. Patent dated Dec. 1, 1987. Disclaimer filed May 31, 1990, by the assignee, The Ingersoll Milling Machine Company.

Hereby enters this disclaimer to all claims of said patent.

4,727,927.—*Stephen E. Popik*, Riverside, Calif. CASTING MACHINE CONTROL. Patent dated Mar. 1, 1988. Disclaimer filed May 14, 1990, by the assignee, Hunter Engineering Company, Inc.

Hereby enters this disclaimer to claims 15 through 19 and 22 through 25 of said patent.

4,778,623.—*Leonardo Guglielmetti*, Bottmingen, Switzerland. FLOURESCENT BRIGHTENERS CONSISTING OF BIS-STYRLBENZENE COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND THEIR USE. Patent dated Oct. 18, 1988. Disclaimer filed Jun. 21, 1990, by the assignee, Ciba-Geigy Corporation.

Hereby enters this disclaimer to claims 16 through 20 of said patent.

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PATENT EXAMINING CORPS

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STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 14, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
<b>CHEMICAL EXAMINING GROUPS</b>	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director. ....	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director. ....	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director .....	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director .....	4-20-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director .....	1-28-87
<b>ELECTRICAL EXAMINING GROUPS</b>	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director .....	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director .....	2-27-87
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ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director. ....	8-22-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director .....	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director .....	1-5-87
<b>MECHANICAL EXAMINING GROUPS</b>	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director .....	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director .....	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director .....	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director .....	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director .....	5-5-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents .....	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents .....	3,370 to 3,384 inclusive

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## REEXAMINATIONS

AUGUST 14, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,841,988 (1337th)

### MICROWAVE HYPERTHERMIA PROBE

Richard W. Fetter, Colgate; Peter D. Gadsby, Cedarburg, both of Wis., and Jeffery L. Kabachinski, Boynton Beach, Fla., assignors to Marquette Electronics Inc., Milwaukee, Wis.

Reexamination Request No. 90/001,850, Sep. 27, 1989.

Reexamination Certificate for Patent No. 4,841,988, issued Jun. 27, 1989, Ser. No. 108,923, Oct. 15, 1987.

Int. Cl.<sup>5</sup> A61N 5/02

U.S. Cl. 128—804



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1, 9 and 16 are determined to be patentable as amended.

Claims 2-8, 10-15 and 17, dependent on an amended claim, are determined to be patentable.

1. In a coaxial microwave probe for interstitial hyperthermia treatment having a conductive inner member extending axially along the length of the probe, a dielectric material surrounding the inner member along substantially its full length, and an outer conductive member surrounding the dielectric material, said outer conductive member having a generally open area defining an effective heating length of the probe to provide a desired heating pattern, the improvement comprising said outer conductive member disposed in a helical pattern along the effective length, said helical pattern defining a variable spaced pitch [to provide] comprising a maximum open area in the center portion of the effective length and smaller open areas axially in both directions therefrom and said helical pattern capable of providing said desired heating pattern having substantial uniformity along said effective heating length.



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## REISSUES

AUGUST 14, 1990

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Re. 33,294

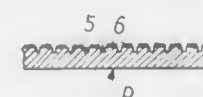
## CASING FOR MAGNETIC TAPE CASSETTE

Tatsuo Fujii, and Shigetomo Takeda, both of Saku, Japan, assignors to TDK Corporation, Tokyo, Japan  
Original No. 4,555,021, dated Nov. 26, 1985, Ser. No. 606,187, May 2, 1984. Application for reissue Apr. 19, 1989, Ser. No. 340,561

Claims priority, application Japan, Jun. 1, 1983, 58-81837[U]  
Int. Cl.<sup>3</sup> B65D 85/671

U.S. Cl. 206—387

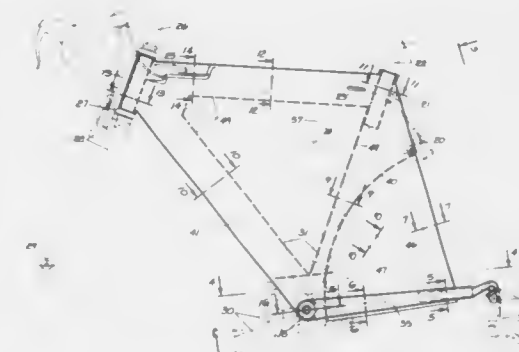
5 Claims



1. A casing for holding a magnetic tape cassette which is formed into a box shape by bending and joining a blank of a transparent plastic plate material which has one surface, constituting the inner surface of a casing, on which grooves and a minutely roughened area are provided except for on a predetermined portion including at least one transparent window and the other surface, constituting the outer surface of said casing, on which printing and/or an uneven surface pattern is provided in a predetermined portion except for said transparent window.

5. A casing for holding a magnetic tape cassette, said casing:
- (a) being formed into a box shape by bending and joining a blank of transparent plastic plate material;
  - (b) having a first surface that constitutes the inner surface of said casing;
  - (c) having a lattice pattern on a portion of said first surface formed by grooves in said first surface;
  - (d) having minutely roughened areas on said first surface in between said grooves;
  - (e) having at least one transparent window where no grooves and no minutely roughened areas are formed;
  - (f) having a second surface that constitutes the outer surface of said casing; and
  - (g) having printing and/or an uneven surface pattern on said second surface except for said transparent window.

frame having the form of (1) an exterior structural skin surface, connected to and extending between said columns and rear fork blades in such a manner that the perimeter edges of said skin define the outline of the frame's geometry from the side view and an airfoil section with a blunt edge at the steering support column, and a sharp edge at the seat support column, and lower rear sides adjacent to the portion of the rear wheel assembly which penetrates the frame's geometry arranged in spaced apart substantially, parallel configuration positioned as closely as possible to the rear wheel assembly, from the plan view, (2) an internal arcuate fender, formed of structural skin, which encloses the portion of the rear wheel assembly which penetrates the frame's geometry, and fits within lower rear sides of said exterior structural skin, and internal reinforcing means which, in combination with said structural skin, form structural members including, (3) tubular members connecting the steering support column and seat support column, and the steering support column and pedal axle support column formed by the addition of an elongate web member secured in a substantially perpendicular manner between opposing interior surfaces, and parallel to the perimeter edge of said structural skin, (4) spaced apart, diverging, tubular members connecting the pedal axle column and cantilever rear fork blades, so arranged as to allow external routing of rear wheel drive chain and external placement of rear wheel drive sprocket(s) and shifting mechanism, formed by an integral outward extension of the lower edge of said exterior structural skin forming



Re. 33,295

## BICYCLE FRAME

James L. Trimble, Natick, Mass., assignor to Trimble Design, Inc., Natick, Mass.

Original No. 4,513,986, dated Apr. 30, 1985, Ser. No. 508,880, Jun. 28, 1983. Application for reissue Apr. 30, 1987, Ser. No. 45,052

Int. Cl.<sup>3</sup> B62K 3/02, 19/02

U.S. Cl. 280—281.1

35 Claims

1. A bicycle frame comprising, in combination, a tubular steering support column formed to rotatably support a handle bar stem and front fork and wheel assembly; a tubular seat support column formed to support a seat post and seat assembly; a tubular pedal axle support column formed to rotatably support a pedal crank and chainwheel assembly; cantilever rear fork blades formed to support a rear wheel assembly, the

top, outside, and bottom surfaces secured to a separately formed inner surface by flanges at the top and bottom, completing a substantially rectangular tube section provided with the pedal axle column and rear fork blade support means at respective ends; (5) elongate reinforcing strips connecting rear, inner ends of said tubular rear fork support members with said seat support column, and at an intermediate position roughly bisecting said rear fender, with a seat support web and connecting member, said reinforcing strips filling a void space between said exterior structural skin and said internal structural skin of fender, (6) an elongate web member connecting seat support column and pedal axle support column secured in a substantially perpendicular manner between opposing inner surfaces of said structural skin, and (7) a web member secured in a substantially perpendicular manner between opposing inner surfaces of said structural skin, placed above and parallel to a line connecting the pedal axle column and rear wheel axle, and connected to the pedal axle support column by a vertical connecting member.

Re. 33,296

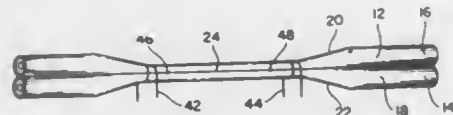
# METHOD OF MAKING A POLARIZATION-INSENSITIVE, EVANESCENT-WAVE, FUSED COUPLER WITH MINIMAL ENVIRONMENTAL SENSITIVITY

David W. Stowe, Medfield, Mass., and Paul M. Kopera, Vernon Hills, Ill., assignors to Gould Inc., Eastlake, Ohio  
Original No. 4,632,513, dated Dec. 30, 1986, Ser. No. 705,044, Feb. 25, 1985. Continuation of Ser. No. 498,436, May 26, 1983, abandoned. Application for reissue Jul. 22, 1988, Ser. No. 222,908

Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—320

35 Claims



21. A polarization-insensitive optical coupler prepared by a method comprising the steps of:

- etching first and second longitudinal segments of first and second single-mode optical fibers so that each fiber has an outer cladding having a low index of refraction relative to the index of refraction of a nearly exposed core of each of the first and second single-mode optical fibers;
- maintaining the first and second single-mode optical fibers in parallel juxtaposition with one another along a portion of each of the first and second longitudinal segments, said maintaining step comprising the substeps of:
  - wrapping portions of the first and second longitudinal segments with a material which will not substantially deform the nearly exposed cores of the first and second single-mode optical fibers;
  - gluing the nearly exposed cores of the first and second single-mode optical fibers together with glue while the nearly exposed cores are wrapped;
  - curing the glue; and
  - unwrapping the nearly exposed cores;
- fusing together the portions of the first and second longitudinal segments maintained in parallel juxtaposition to form a coupling region; and
- rigidly encapsulating the nearly exposed cores of the first and second single-mode optical fibers while maintaining the parallel juxtaposition of the first and second longitudinal segments, said step (d) including the substeps of:
  - placing a tube having ends and having a length substantially the same as the first and second longitudinal segments over the coupling region;
  - gluing the ends of the tube to the first and second single-mode optical fibers with glue to suspend the fibers within the tube; and
  - curing the glue.

Re. 33,297

# METHOD FOR MAKING AN ELECTRICALLY HEATABLE WINDSHIELD

Kevin J. Ramus, Nashville, Tenn., and John D. Youngs, Rockwood, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Original No. 4,654,067, dated Mar. 31, 1987, Ser. No. 823,233, Jan. 28, 1986. Application for reissue Mar. 31, 1989, Ser. No. 332,685

Int. Cl.<sup>5</sup> C03C 17/23; C03B 23/023

U.S. Cl. 65—42

7 Claims

4. A method for making an electrically heatable vehicle windshield of laminated construction, said method comprising the steps of:

applying an opaque ceramic paint to an edge portion of a coat-

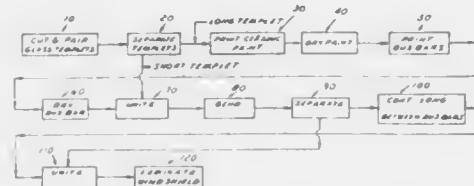
able surface of a selected one of a pair of glass windshield templates;

then drying said paint sufficiently to bond it to said coatable surface;

then applying electrically conductive bus bars to said coatable surface;

then drying said bus bars sufficiently to bond them to said coatable surface;

then uniting said selected template and the other template of said pair of glass windshield templates and bending them to form a shaped windshield pair, the drying steps being sufficient to



avoid sticking of said templates by said paint during said bending step;

then separating said templates of said shaped windshield pair; then applying a transparent, electrically conductive coating on said coatable surface between said bus bars;

then uniting said selected template and the other template of said shaped windshield pair with a laminating interlayer interposed between them, said coatable surface facing said interlayer; and

then laminating said selected template, other template and interlayer to produce a shaped laminated windshield which is heatable by the flow of electrical energy therethrough.

Re. 33,298

# 1-(2-OXYAMINOSULPHONYLPHENYLSULPHONYL)-3-HETEROARYL-UREAS

Hans-Joachim Diehr; Christa Fest, both of Wuppertal; Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Klaus-Helmut Müller, Düsseldorf; Theodor Pfister, Monheim; Uwe Priesnitz, Solingen; Hans-Jochem Riebel, Wuppertal; Wolfgang Roy, Langenfeld; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Original No. 4,666,505, dated May 19, 1987, Ser. No. 769,224, Aug. 23, 1985. Application for reissue Jun. 21, 1989, Ser. No. 369,583

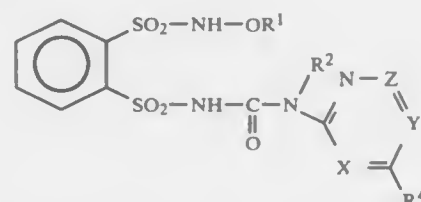
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431929; May 25, 1985, 3518876

Int. Cl.<sup>5</sup> C07D 239/69; A01N 43/54

U.S. Cl. 71—92

11 Claims

1. A 1-(2-oxyaminosulphonylphenylsulphonyl)-3-heteroaryl-urea of the formula



in which

R<sup>1</sup> represents C<sub>1</sub>-C<sub>12</sub>-alkyl which is optionally substituted by fluorine, chlorine, cyano, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-alkylthio, C<sub>1</sub>-C<sub>4</sub>-alkylsulphonyl, C<sub>1</sub>-C<sub>4</sub>-alkylsulphonyl, C<sub>1</sub>-C<sub>4</sub>-alkyl-carbonyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl, C<sub>1</sub>-C<sub>4</sub>-alkylamino-carbonyl or di-[(C<sub>1</sub>-C<sub>4</sub>-alkyl)]-(C<sub>1</sub>-C<sub>4</sub>-alkyl)-amino-carbonyl, or represents C<sub>3</sub>-C<sub>6</sub>-alkenyl which

is optionally substituted by fluorine, chlorine or bromine, C<sub>3</sub>-C<sub>6</sub>-alkenyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl-C<sub>1</sub>-C<sub>2</sub>-alkyl or phenyl-C<sub>1</sub>-C<sub>2</sub>-alkyl which is optionally substituted by fluorine, chlorine, nitro, cyano, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl, or represents benzhydryl, or represents phenyl which is optionally substituted by fluorine, chlorine, nitro, cyano, C<sub>1</sub>-C<sub>4</sub>-alkyl, trifluoromethyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>2</sub>-fluoroalkoxy, C<sub>1</sub>-C<sub>4</sub>-alkylthio, trifluoromethylthio or C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl.

R<sup>2</sup> represents hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl which is optionally substituted by fluorine, chlorine, cyano, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-alkylthio, C<sub>1</sub>-C<sub>4</sub>-alkylsulphonyl, C<sub>1</sub>-C<sub>4</sub>-alkylsulphonyl, C<sub>1</sub>-C<sub>4</sub>-alkyl-carbonyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl, C<sub>1</sub>-C<sub>4</sub>-alkylamino-carbonyl or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)-aminocarbonyl, or represents C<sub>3</sub>-C<sub>6</sub>-alkenyl, C<sub>3</sub>-C<sub>6</sub>-alkenyl or phenyl-C<sub>1</sub>-C<sub>2</sub>-alkyl which is optionally substituted by fluorine, chlorine, nitro, cyano, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-alkoxy-carbonyl.

R<sup>4</sup> represents hydrogen, fluorine, chlorine, bromine, hydroxyl, C<sub>1</sub>-C<sub>4</sub>-alkyl which is optionally substituted by fluorine and/or chlorine, C<sub>1</sub>-C<sub>4</sub>-alkoxy [which is optionally substituted by fluorine and/or chlorine], C<sub>1</sub>-C<sub>4</sub>-alkylthio which is optionally substituted by fluorine and/or chlorine, amino, C<sub>1</sub>-C<sub>4</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)-amino,

X represents nitrogen,

Y represents an optionally substituted methine bridge C-R<sup>5</sup>, R<sup>5</sup> represents hydrogen, fluorine, chlorine, bromine, cyano, formyl, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>3</sub>-alkoxy-carbonyl or C<sub>1</sub>-C<sub>3</sub>-alkyl-carbonyl, and

Z represents an optionally substituted methine bridge C-R<sup>6</sup>, and

R<sup>6</sup> represents hydrogen, fluorine, chlorine, bromine, hydroxyl, C<sub>1</sub>-C<sub>4</sub>-alkyl [which is optionally substituted by fluorine and/or chlorine], C<sub>1</sub>-C<sub>4</sub>-alkylthio which is optionally substituted by fluorine and/or chlorine, amino, C<sub>1</sub>-C<sub>4</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)-amino.

10. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a compound according to claim 1 and a diluent.

Re. 33,299

# FRAGRANCE-RELEASING PULL APART SHEET

Norman P. Sweeny, North Oaks, Minn.; Jack W. Charbonneau, Somerset, Wis., and Orville F. Wlenke, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Original No. 4,720,417, dated Jan. 19, 1988, Ser. No. 924,115, Oct. 31, 1986. Continuation of Ser. No. 680,490, Dec. 11, 1984, abandoned. Application for reissue Jan. 13, 1989, Ser. No. 297,602

Int. Cl.<sup>5</sup> A61L 9/04; B01J 13/00; D01F 1/02; D04H 1/04

U.S. Cl. 428—201

22 Claims

28. A device for exposing a liquid, said device consisting essentially of

- two surfaces of paper, both of said surfaces being surfaces of coated paper, said surfaces being bound by an adhesive composition layer, said coated paper comprising paper which is coated with a resinous binder and white, bone or ivory pigment, and at least one of said surfaces of coated paper having a printed image thereon;
- said adhesive composition layer containing microcapsules with said liquid within the shell of the microcapsules, and
- said microcapsules having an average diameter between 4 and 80 micrometers,

the cohesive strength of the adhesive composition layer being less than the strength of the bond between said adhesive composition and a coated face of said sheets, the tensile rupture strength of said microcapsules being such that the cohesive failure of the adhesive results in breakage of the microcapsules, and the tensile rupture

strength between said two surfaces being at least 4.0 g/cm and less than 90 g/cm at 20° C. and 50% relative humidity.

Re. 33,300

# OXIRANES

Stephen R. Baker, Eversley; William B. Jamieson, Horsell, and Alec Todd, Wokingham, all of England, assignors to Eli Lilly and Company, Indianapolis, Ind.

Original No. 4,665,189, dated May 12, 1987, Ser. No. 635,863, Jul. 30, 1984. Application for reissue Nov. 1, 1989, Ser. No. 430,697

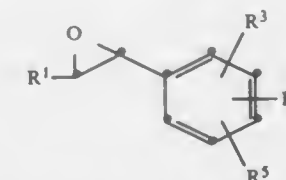
Claims priority, application United Kingdom, Aug. 3, 1983, 8320943

Int. Cl.<sup>5</sup> C07D 405/10, 303/8, 303/12

U.S. Cl. 548—252

2 Claims

1. A compound of the formula



ps in which R<sup>1</sup> is an alkenyl or alkynyl group containing from 10 to 20 carbon atoms and optionally substituted with a phenyl group or phenyl group substituted with 1-3 substituents selected from the group consisting of C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, hydroxy, nitro, cyano, halo, trifluoromethyl, carboxyl, tetrazolyl, and —CONH<sub>2</sub>, [and containing from 5 to 30 carbon atoms,] and R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are each selected from hydrogen, carboxyl, C<sub>2</sub>-C<sub>3</sub>-alkoxycarbonyl, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, hydroxyl, tetrazolyl, tetrazolyl protected with a trityl or benzhydryl group, halo, trifluoromethyl, nitrile, nitro and CONR<sub>2</sub><sup>10</sup>, where each R<sup>10</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl; and salts thereof.

Re. 33,301

# SYNCHRONISM DETECTOR CIRCUIT

Keiichi Oshikiri, and Tooru Nakamura, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

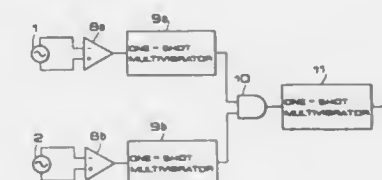
Original No. 4,678,949, dated Jul. 7, 1987, Ser. No. 760,540, Jul. 30, 1985. Application for reissue Jun. 22, 1989, Ser. No. 370,322

Claims priority, application Japan, Nov. 15, 1984, 59-239428

Int. Cl.<sup>5</sup> H03K 5/26

U.S. Cl. 307—527

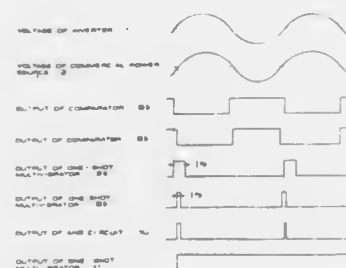
4 Claims



1. A synchronism detector circuit for indicating a state of synchronism between two a.c. voltages comprising:



first and second comparators for detecting zero cross points of said two a.c. voltages, respectively;  
first and second one-shot multivibrators triggered by outputs from said first and second comparators, respectively, for providing pulses having the pulse widths set up in correspondence with the respective synchronous detection allowances;



an AND circuit for providing the logical product of the outputs from said one-shot multivibrators; and  
a third retriggerable one shot multivibrator triggered by the output from said AND circuit and maintaining an altered state so long as there is relative synchronism between said a.c. voltages as determined by the tolerance allowances of said first and second one-shot multivibrators.

## PLANT PATENTS

GRANTED AUGUST 14, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,294

FARRER

William G. Ison, Rte. 1, Box 19, Highway 19, Brooks, Ga. 30205  
Filed Mar. 10, 1988, Ser. No. 166,249

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—47

1 Claim

1. The new and distinct variety of grape plant as described and illustrated.

7,295

AFRICAN QUEEN

William G. Ison, Rte. 1, Box 19, Hwy. 19, Brooks, Ga. 30205  
Filed Mar. 10, 1988, Ser. No. 166,250

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—47

1 Claim

1. The new and distinct variety of grape plant as described and illustrated.

7,296

FRY SEEDLESS

William G. Ison, Rte. 1, Box 19, Hwy. 19, Brooks, Ga. 30205  
Filed Mar. 10, 1988, Ser. No. 166,253

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—47

1 Claim

1. The new and distinct variety of grape plant as described and illustrated.

7,297

AGAPANTHUS ELLAMAE PLANT

Archie A. Amate, 15662 Sunflower La., Huntington Beach, Calif. 92647

Filed Feb. 21, 1989, Ser. No. 313,549

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct variety of Agapanthus plant substan-

tially as shown and described characterized by its ability to reach a height of 14.3 dm when in flower which includes slender glaucous scapes that reach to a maximum height of 12 dm having a hardy upright growth habit along with prominent dark blue-violet flowers being slightly zygomorphic from the cylindrical base and with each flower being composed of six segments arranged in two whorls of three defined by a narrower outer pair, wherein the flowers range from 3.3 to 3.8 cm long and 3.5 to 3.9 cm across at the apex when fully expanded, with leaves being formed having veins closely spaced about 2 mm apart near the center of the leaves which are thick-textured but pliable and reach a maximum length of 6.5 dm having a width of 4 to 5 cm.

7,298

DIEFFENBACHIA PLANT NAMED TIKI

Dan H. Vanderlaan, Lake Worth, and Robert Hartman, Lake Placid, both of Fla., assignors to Hartman Plant Laboratories, Inc., Sebring, Fla.

Filed Jun. 13, 1989, Ser. No. 365,472

Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct cultivar of Dieffenbachia plant named Tiki, as illustrated and described.

7,299

NEPHROLEPSIS EXALTATA NAMED NAPA COTTAGE

Robert D. Herrick, St. Helena, Calif., assignor to Cottage Gardens Nursery, St. Helena, Calif.

Filed Jun. 9, 1989, Ser. No. 368,048

Int. Cl.<sup>5</sup> A01H 9/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct cultivar of *Nephrolepis exaltata* named Napa Cottage, as illustrated and described.

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## PATENTS

GRANTED AUG. 14, 1990

### ERRATA

For CLASS	See PATENT NO.
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401-110 .....	4,947,564
051-283 .....	4,947,598
053-442 .....	4,947,605
056-364 .....	4,947,626
074-733 .....	4,947,687
128-011 .....	4,947,896
144-002 .....	4,947,094
160-133 .....	4,947,937
229-080 .....	4,948,028
239-113 .....	4,948,042
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355-260 .....	4,949,399
356-420 .....	4,949,400



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## PATENTS

GRANTED AUGUST 14, 1990

## GENERAL AND MECHANICAL

4,947,486

## GLOVE LINER APPARATUS

Chi H. Hsuih, Jackson Heights, N.Y., assignor to Fairdon Industrial Limited, Hong Kong, Hong Kong

Filed Jan. 13, 1989, Ser. No. 297,474

Int. Cl.<sup>5</sup> A41D 19/00

U.S. Cl. 2—164



22. A method for manufacturing a glove liner comprising: providing a body portion having an upper section, a lower section, and a medial section therebetween, said body portion having a length of about 150-250 mm, and being substantially tubular in configuration with a uniform width along the entire length of said body portion from said upper section to said lower section of about 40-70 mm, said lower section having an opening therethrough sized to receive the hand of a user;

applying at least one stitch in at least one position on and through said upper section of said body portion in order to form at least two separate finger openings in said upper section;

cutting a first slit into said body portion about 50-90 mm below said finger openings in said upper section; and cutting a second slit into said body portion across from said first slit and about 10-30 mm below said finger openings in said upper section.

4,947,487

## LASER BEAM PROTECTIVE GLOVES

Jeffrey D. Saffer, and Louis A. Profenno, both of Ellsworth, Me., assignors to The Jackson Laboratory, Bar Harbor, Me.

Filed May 4, 1989, Ser. No. 347,069

Int. Cl.<sup>5</sup> A41D 19/00

U.S. Cl. 2—167



1. A protective glove comprising: a glove formed of composite material for close fitting over the fingers and the back and palm of the hand, said composite material comprising a layer of flexible elastic material for tactile sensitivity through the layer, and optically reflective and dispersive particles distributed and embed-

ded within said layer for dispersing incident laser light for avoiding laser burn injuries to the hand of a wearer.

4,947,488

## FOREHEAD GUARD

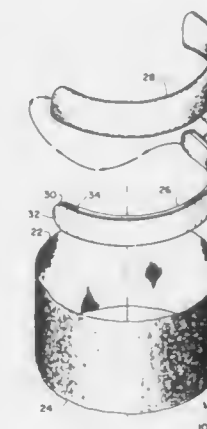
Leslie A. Ashinoff, 1670 Cynron La., East Meadow, N.Y. 11554

Filed Feb. 6, 1990, Ser. No. 476,033

Int. Cl.<sup>5</sup> A42B 1/08

U.S. Cl. 2—181

2 Claims



1. An improved forehead guard comprising the combination of an outer closed loop of a tubular member of stretchable construction material and disposed in unattached relation therein an internal semi-circular member with a foam covering, said internal member having an operative positive with said foam covering thereon pressed from within against the forehead of a user and said tubular member having an operative position with said closed loop portion thereof stretched relative to said internal member to a size so as to be disposed about the back of the head of said user, whereby said forehead guard is held in a protective position on the user's forehead.

4,947,489

## GARMENT SUPPORT

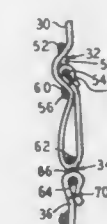
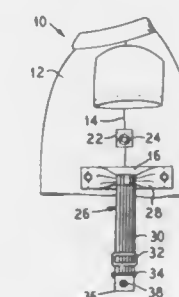
Penny R. Greenwood, 4142 Downers Dr., Downers Grove, Ill. 60515

Filed Mar. 10, 1989, Ser. No. 321,789

Int. Cl.<sup>5</sup> A41F 5/00

U.S. Cl. 2—304

14 Claims



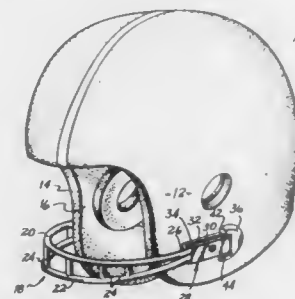
1. A support for a shirt-type garment worn by a person and having a garment side, a central line of the side, and a lower edge, in combination with a diaper having a leg opening for a

leg of the person and an upper edge spaced from said leg opening, said combination comprising:

- a first fastener mounted to said side, spaced from said lower edge and spaced anterior of said central line;
- a second fastener mounted to said side, spaced from said lower edge and spaced posterior from said central line;
- a third fastener mounted to said side between and spaced from said first and second fasteners and spaced from said lower edge a distance greater than the spacing of said first fastener from said lower edge; and
- a T-shaped element including a cross member and a stem depending from said cross member and including a distal end, said cross member including first and second ends, fourth and fifth fasteners respectively mounted spaced from said first and second ends and releasably engageable with said first and second fasteners, respectively, for detachably mounting said T-shaped element to said side of said garment, and a sixth fastener mounted to said distal end of said stem for releasable engagement with said third fastener,

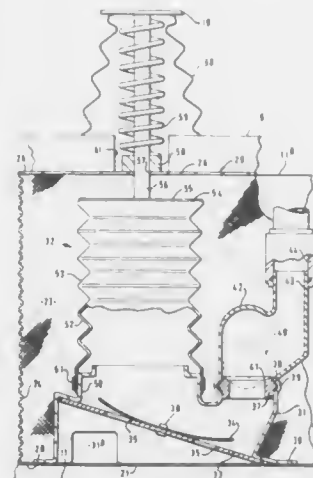
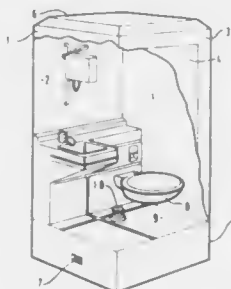
whereby said stem may be looped through said leg opening of said diaper and secure said garment to said diaper.

**4,947,490**  
**FOOTBALL HELMET WITH BREAKAWAY FACE MASK**  
James T. Hayden, 3154 Exon St., Cincinnati, Ohio 45241  
Filed May 15, 1989, Ser. No. 351,935  
Int. Cl.<sup>5</sup> A42B 3/20  
U.S. Cl. 2—424  
9 Claims



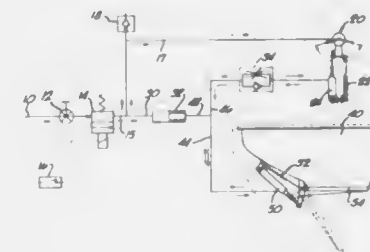
1. A helmet having a breakaway face mask, said helmet having opposite sides, a frontal opening in which the face of a wearer is exposed in use, and a face mask protectively covering at least a portion of said frontal opening,
- said face mask having at least one attaching portion with means for releasably mounting said attaching portion to said helmet,
- said mounting means comprising mating hook-and-pile interengaging means located on the helmet and on the attaching portion of the mask,
- said helmet having an abutment located rearwardly of said attaching portion, said abutment positively preventing the attaching portion of the face mask from moving rearwardly past said abutment in response to a force on said mask,
- the strength of interengagement between the respective mating hook-and-pile means being such that an excessive force, applied from said mask through said attaching portion, which force is not directed toward said abutment will overcome the interengagement of the hook-and-pile means and thereby release the attaching portion from the helmet.

**4,947,491**  
**PUMP**  
Brian Parkinson; Angus J. Bishop, and Richard L. Tagg, all of York, United Kingdom, assignors to Portasil Limited, Huntington York, United Kingdom  
Continuation-in-part of Ser. No. 80,466, Jun. 3, 1987, abandoned. This application Oct. 28, 1987, Ser. No. 114,450  
Claims priority, application United Kingdom, Jun. 27, 1987, 8715150  
Int. Cl.<sup>5</sup> E03D 1/00  
U.S. Cl. 4—321  
16 Claims



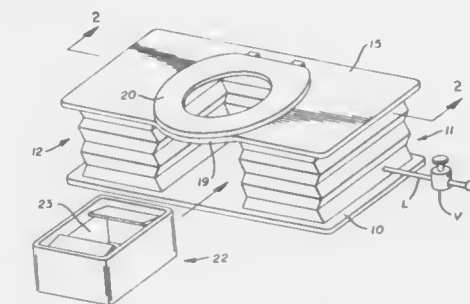
1. A pump and a reservoir in combination, the pump comprising a wall defining a variable volume pumping chamber, at least a major part of the wall comprising a flexible bellow member and a minor part of the wall comprising a rigid member and said chamber having an inlet valve to permit liquid to enter the chamber thereby and an outlet valve to permit liquid to leave the chamber thereby, and operating means to deform the flexible member to vary the volume of the pumping chamber to pump liquid into and out of the chamber, the wall defining the pumping chamber being formed separately from and mounted within a receptacle with a sub-chamber therebetween and the inlet valve being in liquid extracting relationship with said sub-chamber, the receptacle including a wall through which the operating means passes so that a manually engageable operating member is disposed externally of the receptacle and the wall defining the pumping chamber being disposed within the reservoir internally of the receptacle, the reservoir comprising an opening through which said receptacle extends and the opening being closed by the receptacle, the receptacle, being replaceably mounted at least partly within the reservoir and the receptacle being adapted to permit passage of liquid to the sub-chamber from said reservoir.

**4,947,492**  
**SWIVEL NOZZLE FLUSH TOILET SYSTEM**  
Ray T. Vincent, Los Angeles, Calif., assignor to Weber Aircraft, Burbank, Calif.  
Filed Apr. 15, 1988, Ser. No. 182,163  
Int. Cl.<sup>5</sup> E03D 11/08  
U.S. Cl. 4—420  
14 Claims



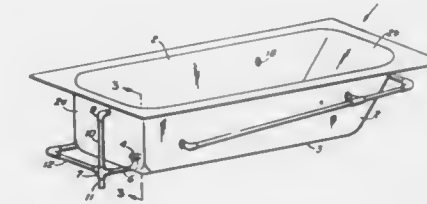
14. A flush toilet system for a toilet bowl comprising: a single nozzle for mounting in the toilet bowl and to one side thereof in a manner to move relative to the toilet bowl, means for supplying fluid to said nozzle, means for causing said nozzle to move in response to flush actuation, and means for moving said nozzle during flushing relative to said toilet bowl in a controlled pattern for directing a stream of fluid progressively over substantially the entire toilet bowl for flushing water from the toilet bowl.

**4,947,493**  
**PATIENT LIFT DEVICE**  
Frank T. Salonica, 41581 Rte. 39, Wellsville, Ohio 43968  
Filed Feb. 7, 1986, Ser. No. 826,922  
Int. Cl.<sup>5</sup> A47K 11/04  
U.S. Cl. 4—476  
3 Claims



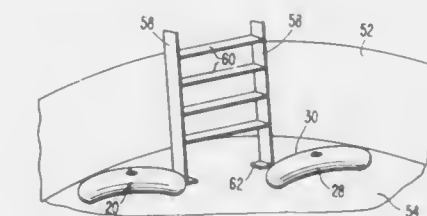
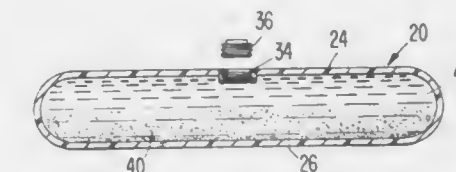
1. A patient lift seat comprising a rigid base and an apertured rigid seat support in oppositely disposed relation to one another, inflatable support enclosures positioned between said rigid base and rigid seat support, means for inflating said support enclosures and raising said rigid seat support in spaced relation to said rigid base, a flexible partition secured between said rigid base and said rigid seat support within said inflatable support enclosures, a removable seat positioned on said apertured rigid seat support, means for inner-connecting said support enclosure and a waste container removably positioned between said inflatable support enclosures.

**4,947,494**  
**VALVE FOR COMBINED DRAIN AND RETURN LINE**  
Gerald W. Moreland, Garden Grove, Calif., assignor to Honiton, Curacao, Australia  
Division of Ser. No. 831,366, Feb. 18, 1986, Pat. No. 4,763,366.  
This application May 27, 1988, Ser. No. 200,048  
Int. Cl.<sup>5</sup> E04H 3/18  
U.S. Cl. 4—492  
9 Claims



4. A housing and valve body combination, adapted for use in a hydrotherapy bathing apparatus comprising: a single valve housing having four separate ports adapted for fluid communication with each of a bath overflow pipe, a bath drain pipe, a pump return line pipe, and a sewer line pipe respectively; and a valve body, movably mounted within said housing to intersect said four ports positions; a first operative position in which said valve body is adapted to connect said drain, return line and overflow to said sewer line; and a second operative position in which said valve body is adapted to connect said overflow to said sewer line and means in at least one of said housing and valve body adapted to connect said drain to said return line when said valve body is in said second mode.

**4,947,495**  
**DEFLECTOR FOR POOL CLEANER IN ABOVEGROUND SWIMMING POOLS**  
Benjamin M. Bost, 13801 N.W. 4th St., Sunrise, Fla. 33325  
Filed May 31, 1989, Ser. No. 359,265  
Int. Cl.<sup>5</sup> E04H 3/18  
U.S. Cl. 4—496  
9 Claims



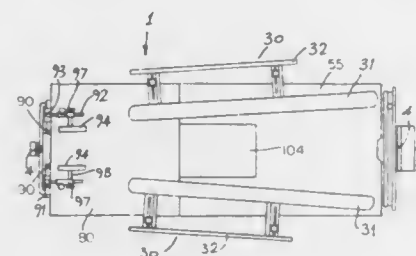
1. In the combination of an aboveground swimming pool having an upstanding pool wall, a ladder having stairs projecting into the pool and abutting against the bottom thereof to permit ingress and egress, and an automatic swimming pool



cleaner movable across the pool bottom for cleaning thereof, the improvement which comprises:

- means for preventing the pool cleaner from becoming stuck against the ladder;
- said means comprising deflection member means removably disposed on the bottom of said pool adjacent the sides of the ladder;
- said deflection member means abutting at one end thereof against the pool wall and at the other end thereof against the sides of said ladder;
- said deflection member means being hollow and being at least partially filled with a composition of sufficient weight to maintain them in their position on the bottom of said pool.

**4,947,496**  
**THERAPEUTIC BED**  
 Patrick J. Connolly, Athlone, Ireland, assignor to Ethos Medical Research Limited, Limerick, Ireland  
 Filed Oct. 31, 1988, Ser. No. 264,973  
 Claims priority, application Ireland, Nov. 2, 1987, 2950/87  
 Int. Cl.<sup>5</sup> A61G 7/008, 7/015; A47C 21/08  
 U.S. Cl. 5—61 **20 Claims**



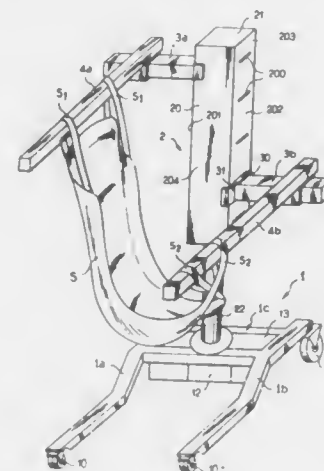
1. A therapeutic bed comprising:
  - a base frame;
  - a patient support platform rotatably supported by said base frame;
  - drive means for oscillating said patient support platform relative to said base frame;
  - a pair of side members for said patient support platform to support and retain a patient on said platform;
  - a support arm for each side member;
  - pivot support means between each support arm and said patient support platform for pivotal movement of said side members from a raised operative position extending upwardly of said patient support platform to a lowered position in which said side members are swung away from said patient support platform; each pivot support means defining a pivot axis extending substantially parallel to a longitudinal axis of said patient support platform; and
  - retaining means for retaining said side members in the raised operative position, said pivot support means being movable transversely of said patient support platform from a first position in which the pivotal movement of said support arm is prevented by said retaining means to a second position in which said support arm is freely pivotable to said lowered position.

**4,947,497**  
**APPARATUS FOR LIFTING PATIENTS**  
 Bernard Marchand, 4 rue Brindejonc des Moulinais, 35400 Saint-Malo, France  
 Filed Oct. 18, 1989, Ser. No. 422,908  
 Claims priority, application France, Oct. 18, 1988, 88 14072; May 3, 1989, 89 06162  
 Int. Cl.<sup>5</sup> A61G 7/14  
 U.S. Cl. 5—86 **12 Claims**

1. Apparatus for lifting patients, in particular for lifting and

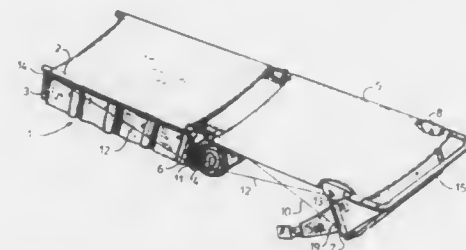
transporting patients in a sitting position or a lying position, the apparatus being of the type comprising:

- a generally U-shaped moving base constituted by two substantially horizontal parallel arms and a transverse element;
- an elevator column mounted on the transverse element having a bottom portion fixed to said transverse element, and a top portion or "column head" formed by a telescopic tube moveable in the vertical direction; and
- support means for supporting the patient; wherein the apparatus includes:



- a pair of lateral bars, one bar extending from each side of the elevator column, each of said bars receiving a substantially horizontal lifting arm which extends in a direction parallel to the arms in the base, and in the same direction as said arms, said lifting arms carrying said support means; and
- mounting and adjustment means connecting the lateral bars to the elevator column, said means serving firstly to fix said arms to the moving column head of the column and secondly to adjust the heights of the positions of said lateral bars relative to the base independently from each other.

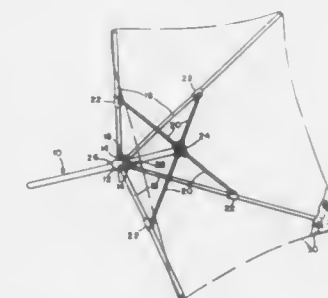
**4,947,498**  
**PORTABLE COLLAPSIBLE BED**  
 Leonardus J. J. Van Bortel, Kloosterstraat 32, Goirle, Netherlands 5051 RD  
 Filed Aug. 7, 1989, Ser. No. 389,975  
 Claims priority, application Netherlands, Mar. 20, 1989, 8900683  
 Int. Cl.<sup>5</sup> A45F 4/02  
 U.S. Cl. 5—113 **5 Claims**



1. A portable collapsible bed, comprising a mainframe having opposite ends and having adjacent each said end leg means, a subframe having opposite ends, one end of said subframe being pivotally connected to one end of said mainframe, said subframe having collapsible leg means spaced a substantial distance from the other said end of said subframe but closer to

said other said end than to said one end of said subframe, means on said leg means of said subframe defining a seating face, means releasably securing said leg means of said subframe in a first position at a substantial angle to said subframe, and means mounting said leg means of said subframe for swinging movement from said first position in a direction away from said one end of said subframe into a second position in which said leg means of said subframe lie against said other end of said subframe.

**4,947,499**  
**PORTABLE BACK REST**  
 Janet M. Rilovich, 8373 El Paseo Grande, La Jolla, Calif. 92037  
 Filed Nov. 24, 1989, Ser. No. 440,907  
 Int. Cl.<sup>5</sup> A47C 20/00  
 U.S. Cl. 5—432 **4 Claims**

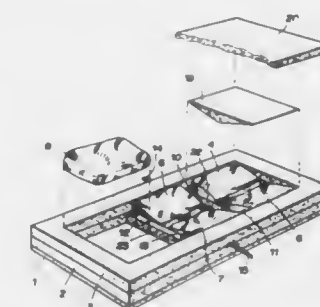


1. A portable back rest which comprises:
  - a thin, elongated base member;
  - a collar slidable along said base member;
  - a plurality of arms pivotally connected to said collar for movement between collapsed dispositions in substantial parallelism to said base member and outwardly angled operative dispositions;
  - a plurality of braces pivotally connected between said base member and said arms at an intermediate position for movement between collapsed dispositions in substantial parallelism to said base member and outwardly-disposed operative arm bracing dispositions;
  - a latch on said base member releasably holding said collar in its operative disposition whereat said arms are in their outwardly-angled dispositions; and
  - flexible material supported only at the ends of said arms.

**4,947,500**  
**THERAPEUTIC MATTRESS, IN PARTICULAR FOR PREVENTING OR CURING DECUBITUS ULCERS**  
 Walter O. Seller, Allschwil, Switzerland, assignor to OBA AG and Hans Völlmin, Switzerland  
 Filed Jul. 11, 1989, Ser. No. 378,137  
 Claims priority, application Switzerland, Aug. 25, 1988, 3164/88  
 Int. Cl.<sup>5</sup> A61G 7/04  
 U.S. Cl. 5—453 **6 Claims**

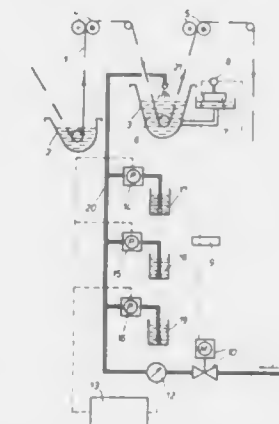
1. Therapeutic mattress, in particular for preventing or curing decubitus ulcers, the mattress having a longitudinal direction and a plane extending in the longitudinal direction and defining an upper surface of said mattress comprising an elastic base layer of hard foam material, a cover layer that is soft as compared to the base layer, said cover layer spaced upwardly from said base layer, a frame layer of elastic material located between the base and cover layers, and a core disposed within said frame layer and extending between said base and cover layers, the core comprises two groups of air-cushions disposed mirror-inverted to one another in relation to a central plane extending in the longitudinal direction of the mattress but perpendicular to the plane thereof, each group comprising three inflatable and deflatable cushions rotatable or pivotable relative to one another, in an inflated state, through an angle of

at least 90°, and transversely of the longitudinal direction said cushions taper downwardly toward said base layer and inwardly toward said central plane, the two groups of air-cush-



ions being operatively connected with a pumping or compressor station, to enable the air-cushions of one group to be inflated and deflated independently of the air-cushions of the other group.

**4,947,501**  
**METHOD AND APPARATUS FOR CONTINUOUS WET-IN-WET PROCESSING**  
 Werner Koch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Bruckner Apparatebau GmbH  
 Filed Aug. 3, 1988, Ser. No. 228,013  
 Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725831  
 Int. Cl.<sup>5</sup> D06B 3/18  
 U.S. Cl. 8—151 **6 Claims**



4. Apparatus for continuous wet-in-wet processing of a length of material (1), containing
  - (a) a treatment bath (3) in which the length of material (1) enters with a certain inlet moisture content (FE) and leaves with an outlet moisture content (FA) which is higher than the inlet moisture content;
  - (b) arrangements for additional dosaging of treatment liquor (6).
 characterised by the following elements of the arrangements for additional dosaging of treatment liquor:
  - (b1) a float which monitors the liquor level,
  - (b2) a potentiometer (8) actuated by the float (7),
  - (b3) an arrangement (9) for comparing the theoretical and actual values which is connected to the potentiometer (8),
  - (b4) a regulable motor valve (10) which is connected to the arrangement (9) for comparing the theoretical and

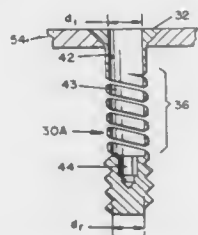
actual values and serves for dosaging of the added quantity of water,  
 (b5) a water meter (12) to measure the quantity of water flowing through the motor valve (10).  
 (b6) a microprocessor (13) connected to the water meter (12) to determine the quantity of additional substances to be added to the quantity of water,  
 (b7) dosaging pumps (14, 15, 16) connected to the microprocessor (13) for dosaging of the additional substances.

**4,947,502**  
**METHOD OF MAKING A DYNAMIC TENSION BONE SCREW**

John A. Engelhardt, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.  
 Division of Ser. No. 255,154, Oct. 7, 1988. This application Mar. 16, 1990, Ser. No. 495,352  
 Int. Cl.<sup>5</sup> B23G 9/00

U.S. Cl. 10—10 R

2 Claims



1. A method of making a dynamic fixation screw comprising the steps of:

providing an elongated screw having a longitudinal axis and an axially aligned head member and a threaded shank;  
 reducing the outer diameter of a predetermined length of the threaded shank and thereby simultaneously forming a distal end member distant from the head member as well as a reduced-diameter intermediate shank portion between said head and distal end members; and boring said head member and said reduced-diameter intermediate shank portion along the longitudinal axis of said screw to a diameter that slightly exceeds the root diameter of the threads in said reduced-diameter intermediate shank portion thereby forming a tension spring integral with and intermediate the head member and the distal end member.

**4,947,503**  
**MOBILE FLOOR TREATING MACHINE**

Donald J. Legatt, St. Michael, Minn., assignor to Advance Machine Company, Plymouth, Minn.

Filed Mar. 7, 1989, Ser. No. 320,176

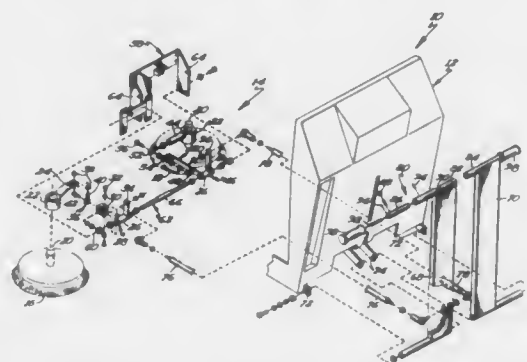
Int. Cl.<sup>5</sup> A47L 11/283, 11/40

U.S. Cl. 15—49.1

15 Claims

1. In a mobile treating machine including rotating, first and second treating members which are manipulated independently of the chassis whereby portions of each treating member contact the surface to be treated with greater pressure than other portions to cause the machine to move forward or rearwardly on the surface while simultaneously treating the surface, with the treating members being located on opposite sides of the longitudinal axis of the machine, a steering mechanism for reducing the effort required to maneuver the machine on the surface comprising, in combination: means for manipulating the treating members independently of each other including means for manipulating the first treating member between a neutral position, a first driving position, and a second driving position, and means for manipulating the second treating member between a neutral position, a first driving position, and a second driving position, with the treating members engaging the surface with equal pressure throughout in their neutral positions, with the outer portions of the treating members

exerting a greater pressure than the inner portions of the treating members in the first driving positions of the first and second treating members, with the inner portions of the treating members exerting a greater pressure than the outer portions of

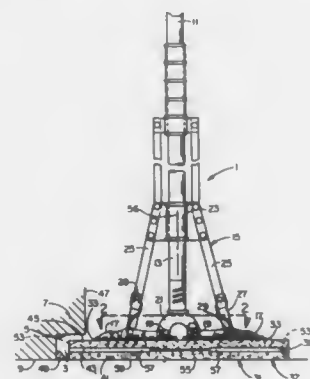


the treating members in the second driving position of the first and second treating members, whereby by manipulating the first and second treating members a directional reaction is produced to cause the machine to move upon the surface.

**4,947,504**  
**SPONGE MOP**  
 Judith D. Ostwald, 2025 Walnut St., Oshkosh, Wis. 54091  
 Filed Aug. 3, 1989, Ser. No. 389,269  
 Int. Cl.<sup>5</sup> A47L 13/12

U.S. Cl. 15—119 A

8 Claims



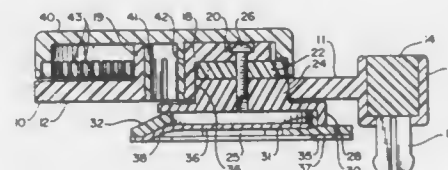
1. An improved sponge mop comprising:  
 a. a handle having a longitudinal axis;  
 b. wangling means attached to the handle for selectively receiving a wangling force and operating between a cleaning mode and a wangling mode; and  
 c. a sponge assembly mounted to the wangling mechanism comprising:  
 i. a pair of backing plates having a predetermined perimeter and mounted to the wangling means for being actuated thereby between the cleaning mode and the wangling mode in response to the wangling force received by the wangling mechanism, the backing plates being generally coplanar when the wangling means is in the cleaning mode and generally parallel and spaced a predetermined distance apart when the wangling means is in the wangling mode;  
 ii. an upper sponge layer attached to the backing plates and having opposed ends that extend for a substantial predetermined distance beyond the perimeter of the wangling means and the backing plates;

iii. a lower sponge layer generally coterminous with the upper sponge layer and having a working surface; and  
 iv. a reinforcement plate interposed between and bonded to the upper and lower sponge layer, and being generally coterminous therewith, the upper and lower sponge layers and the reinforcement plate being generally planar when the wangling means and the backing plates are in the cleaning mode and being folded over into a generally U-shape to form the lower sponge layer working surface into two portions that are in contact with each other when the wangling means is in the wangling mode, the reinforcement plate having sufficient rigidity to transfer the wangling force from the wangling means and the backing plates to the ends of the lower sponge layer that extend beyond the perimeter of the wangling means and the backing plates to squeeze water therefrom when the wangling means is in the wangling mode.

**4,947,505**  
**APPARATUS FOR CLEANING A RECORD DISC**  
 Oliver S. T. C. Hood, Dublin, Ireland, assignor to Ryan Plastics Ireland, Ltd., Waterford, Ireland  
 Continuation of Ser. No. 167,722, Mar. 14, 1988, abandoned, which is a continuation of Ser. No. 839,690, Mar. 14, 1986, Pat. No. 4,759,093. This application Feb. 8, 1989, Ser. No. 308,403  
 Int. Cl.<sup>5</sup> G11B 3/58

U.S. Cl. 15—246

8 Claims



1. A cleaning apparatus for a record disc, comprising a support member having a top side and a bottom side, means for locating the support member relative to the centre of a record disc, a knob mounted on the top side of the support member for rotation about an axis offset from the locating means whereby the support member may be manually rotated about the centre of the disc, a cleaning pad, a holder for the cleaning pad mounted on the bottom side of the support member, the cleaning pad holder also being mounted for rotation relative to the support member about an axis offset from the locating means, and a drive mechanism operative upon manual rotation of the support member about the centre of the disc by the knob to cause rotation of the pad holder relative to the support member.

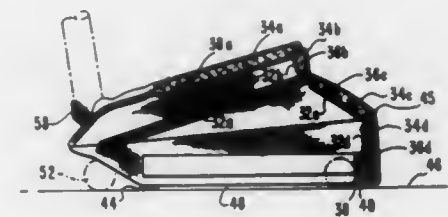
**4,947,506**  
**PORTABLE APPLIANCE COVER**  
 David W. Foster, Germantown, Md., assignor to Soft Vac, Inc., Washington, D.C.  
 Continuation of Ser. No. 223,093, Jul. 22, 1988, Pat. No. 4,876,762. This application Sep. 14, 1989, Ser. No. 407,453  
 Int. Cl.<sup>5</sup> A47L 9/00

U.S. Cl. 15—247

6 Claims

1. A cover for a portable appliance, the appliance including a body section having a bottom surface disposed adjacent a floor when the appliance is in use, a top surface opposite the bottom surface and a side surface between and connecting the top and bottom surfaces, the cover comprising:  
 removable bonnet means for substantially covering one or more of the top surface and side surface of the body section and being capable of absorbing mechanical energy; and  
 retaining means for removably attaching said removable bonnet means to the body section of the appliance, said retaining means being capable of holding said bonnet

means at a fixed spaced relationship to the bottom surface of the body section of the appliance to establish a selected

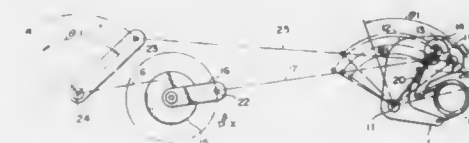


spacing between the cover and the floor when the appliance is disposed on the floor.

**4,947,507**  
**AUTOMOBILE WIPER APPARATUS**  
 Hiroshi Naiki, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Filed Nov. 21, 1988, Ser. No. 274,301  
 Claims priority, application Japan, Nov. 24, 1987, 62-295797  
 Int. Cl.<sup>5</sup> B60S 1/26

U.S. Cl. 15—250.16

1 Claim



1. An automobile wiper device comprising:  
 a wiper and a wiper driving lever secured to a rotary shaft rotatably supported on a vehicle body;  
 a switching lever rotatably supported by a supporting shaft provided in parallel to the rotary shaft of said driving lever, and connected to said wiper and crank arm through a link shaft at a link connecting point; and  
 a turn-over spring installed between said switching lever and driving lever, and rotatably shifts said link shaft between the first position in vicinity to said rotary shaft and the second position distant therefrom;  
 wherein said first and second positions are set up to lie at a lower turning position when the wiper arm is at the full-concealed and semi-concealed positions respectively, and  
 a installing position of the supporting shaft for supporting said switching lever on the driving lever is set up to lie on a bisector of the angle formed by the center of the link shaft of the switching lever and the link connecting point of the crank arm at the first and second positions when the wiper arm is conducted to an upper turning position by said driving lever.



4,947,508

**WIPER ARM, ESPECIALLY FOR MOTOR VEHICLE WINDSHIELD WIPER SYSTEMS**

Kurt Bauer, Ingersheim; Hans Prohaska, Bietigheim-Bissingen, and Eckhardt Schmid, Brackenheim, all of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

PCT No. PCT/EP87/00732, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO89/00936, PCT Pub. Date Feb. 9, 1989

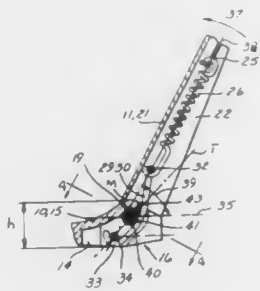
PCT Filed Nov. 26, 1987, Ser. No. 353,651

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724777

Int. Cl.<sup>5</sup> B60S 1/32

U.S. Cl. 15—250.35

3 Claims



1. In a windshield wiper assembly comprising a rigid wiper arm adapted to be mounted at one end for rotary wiping oscillation, an elongate wiper carrying link, pivot means mounting one end of said link upon the other end of said arm for pivotal movement about a pivot axis between a normal wiping position wherein said link is in a general longitudinal alignment with said arm and a tilted position wherein said link is inclined relative to said arm, tension spring means coupled at one end to said link and coupled at its other end to said arm at a location offset from said pivot axis such that the line of action of said spring means passes to one side of said pivot axis to bias said link toward said wiping position and passes to the opposite side of said pivot axis to bias said link to said tilted position;

the improvement wherein said pivot means comprises a pivot pin, a bushing extending substantially the entire length of said pin rotatably receiving said pin and mounted at its opposite ends in said arm, said bushing comprising a hollow cylindrical tube having a longitudinal seam defined by the abutment of two longitudinally extending edges, and means defining a pair of opposed cutout portions extending circumferentially of said tube respectively from said edges to cooperatively define an aperture in one side of said tube exposing said pin and adapted to enable the spring means to contact said pin when said link is in its tilted position.

4,947,509

**SUCTION DISTRIBUTION APPARATUS FOR A SPINNING MACHINE**

Friedrich Dinkelmann, Rechberghausen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Mar. 7, 1989, Ser. No. 320,321

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1988, 3810588

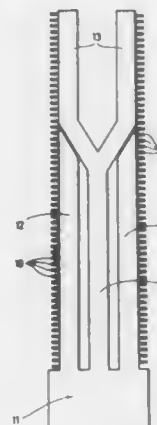
Int. Cl.<sup>5</sup> A47L 5/38

U.S. Cl. 15—301

7 Claims

1. In a spinning machine having a plurality of spinning positions arranged in a row extending longitudinally along one side of the spinning machine, each said spinning position having a suction nozzle thereat, and means for producing suction associated commonly with the suction nozzles, a suction distributing apparatus comprising means for interconnecting the suction nozzles and the suction producing means, said suction nozzles

being interconnected to one another in a plurality of discrete groups each comprising plural adjacent suction nozzles, said interconnecting means including a plurality of intermediate



conduits, each of said intermediate conduits communicating a respective discrete group of adjacent suction nozzles with the suction producing means.

4,947,510

**VACUUM BOX FOR COLLECTING SMALL PARTICLES**

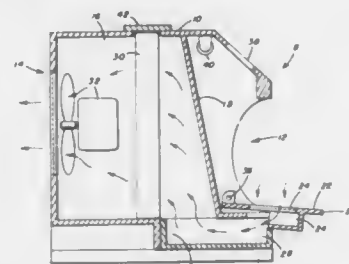
Philip C. English, Rt. 1 Box 136, Fredericksburg, Va. 22401

Filed Apr. 21, 1989, Ser. No. 342,273

Int. Cl.<sup>5</sup> A47L 5/38

U.S. Cl. 15—310

9 Claims



1. A vacuum box for collecting small particles or the like comprising:

a cabinet having a front, a rear and a hollow interior; said front of said cabinet including a substantially horizontal working surface at a lower region thereof; said working surface including air inlet means therethrough; fan means disposed at said rear of said cabinet for the discharge of air from said hollow interior of said cabinet; collection compartment means disposed below said working surface and said air inlet means therethrough with a rear portion of said collection compartment means being disposed within said interior of said cabinet; filter means disposed within said interior of said cabinet between said collection compartment means and said fan means;

said fan means causing the air including the particles produced at said working surface to be drawn downwardly through said air inlet means into said collection compartment means, upwardly from said rear portion of said collection compartment means, and through said filter means;

a substantial portion of the particles remaining in said collection compartment means and a remaining portion of the particles being collected on said filter means; and

means for selectively removing the substantial portion of the particles from said collecting compartment means.

4,947,511

**DEVICE FOR PNEUMATIC DUST REMOVAL OF YARN SUPPLY CARRIERS OF TEXTILE MACHINES**

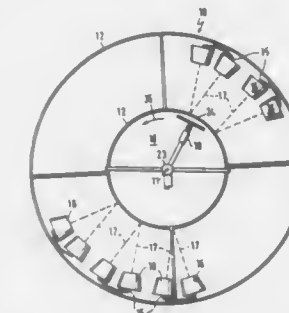
Heinz Brunner, Albstadt-Ebingen, Fed. Rep. of Germany, assignor to Sipra Patententwicklungs- und Beteiligungsgesellschaft mbH, Taifingen, Fed. Rep. of Germany

Filed Mar. 9, 1988, Ser. No. 165,833

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708185

Int. Cl.<sup>5</sup> B65H 49/14

U.S. Cl. 15—312.1



1. A device for pneumatically removing dust from vertically spaced yarn supply carriers and thread guiding organs of textile machines, comprising a plurality of blowers movable relative to the yarn supply carriers and arranged in a vertical direction one after the other and at vertical distances from each other; means for supporting said blowers so said blowers are fixed relative to each other at said vertical distances; drive means for driving said blowers about substantially horizontal axes and including a single common motor for driving all said blowers; and a single endless element which couples said common motor with all said blowers.

4,947,512

**CONVERTIBLE VACUUM CLEANER**

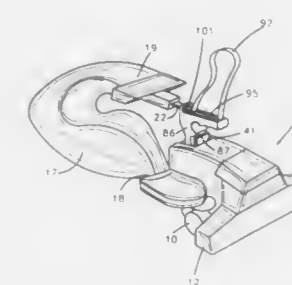
John R. Lackner, North Ridgeville; Stanley E. Grzywna, Elyria; Ralph A. Weber, Richmond Heights, all of Ohio, and Thomas E. Baird, Springfield, Ill., assignors to The Scott Fetzer Company, Westlake, Ohio

Filed Dec. 9, 1988, Ser. No. 282,116

Int. Cl.<sup>5</sup> A47L 5/12

U.S. Cl. 15—329

16 Claims



1. A convertible vacuum cleaner comprising a power unit operable to draw in dirt-laden air and provide an outlet through which said dirt-laden air is exhausted, a handle receiver pivoted on said power unit, an upright handle removably mounted on said receiver for pivotal movement relative to said power unit with said receiver, a dust bag mounted at one

location on said outlet and detachably mounted on said handle at another location, said handle and receiver cooperating to provide an elongated socket and a mating elongated mounting portion structured to extend into said socket with a close fit to detachably connect said handle to said receiver, said mounting portion and said socket providing spaced mating surfaces preventing any substantial lateral movement of said handle relative to said receiver when said mounting portion is positioned in said socket.

4,947,513

**CONNECTOR FOR A CONVERTIBLE BLOWER-VACUUM**

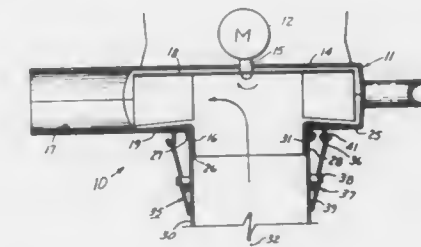
Robert G. Everts, 2050 N. 90th Pl., Chandler, Ariz. 85224

Filed Mar. 29, 1988, Ser. No. 174,552

Int. Cl.<sup>5</sup> A47L 5/14

U.S. Cl. 15—330

5 Claims



a pair of coaxial rims on said body surrounding said intake port, having different diameters so as to form a peripheral groove between them so proportioned and arranged as to receive said free end of said pipe and restrain it from lateral movement;

axial-pull connector means comprising a first part connected to said body and a second part connected to said vacuum pipe, whereby drawing said parts together with said means draws said pipe axially toward and holds it against said body in said groove.

4,947,514

**INTERNAL CONTACT FOR A CHARGING CIRCUIT**

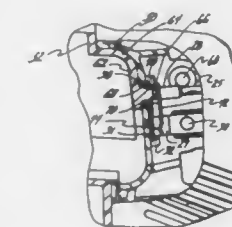
Burton E. Gerke, Jr., Newtown; Michael E. Bitzel, Monroe; Robert Kubicko, Huntington, and Charles Z. Krasznai, Trumbull, all of Conn., assignors to Black & Decker, Inc., Newark, Del.

Filed Jan. 9, 1989, Ser. No. 294,440

Int. Cl.<sup>5</sup> A47L 9/28

U.S. Cl. 15—339

5 Claims



1. A vacuum cleaner regarding assembly comprising:

- a vacuum cleaner including a motor, a housing enclosing said motor, a blower driven by said motor for producing a vacuum, a canister for at least the reception of foreign matter and air drawn into said canister in response to the vacuum produced by said blower, a power source for powering said motor, and electrical wiring interconnecting said motor and said power source;
- a charging unit cooperable with said vacuum cleaner for charging said power source;
- means for disconnecting the flow of electrical power to said motor when said vacuum cleaner and said charging unit are operatively engaged to allow optimum charging of said power source;
- a switch connected electrically to said power source and said motor, said switch having a nonoperable position to prevent the flow of electrical power from said power source to said motor and an operable position to allow the flow of electrical power from said power source to said motor, said disconnecting means comprising a pair of contacts having a first position engaging each other for allowing the flow of electrical power between said power source and said motor when said switch is in said operable position; and
- a protrusion on said charging unit for engaging one of said pair of contacts to move said one of said pair of contacts to a second position disengaging each other for discontinuing the flow of electrical power between said power source and said motor when said switch is in said operable position.

4,947,515

## NOZZLE FOR REMOVING PAINT

Per A. Ivarsson, Nyköping, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

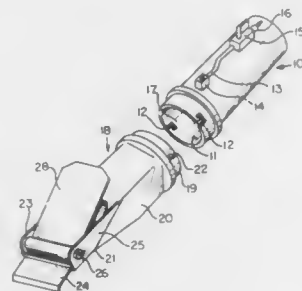
Filed Oct. 6, 1988, Ser. No. 254,104

Claims priority, application Sweden, Oct. 7, 1987, 8703861

Int. Cl.<sup>5</sup> A47L 9/06

U.S. Cl. 15—401

4 Claims



1. A nozzle which via a hose is connected to a vacuum source for removing to a collecting container dissolved and scraped away paint residues from previously painted surfaces comprising a base part (10) connected to the hose, said base part having an opening (11) through which air together with dissolved paint residues are sucked, said base part having a supply means (13) for liquid through which a liquid is supplied to the nozzle in order to promote the transportation of the paint residues through the hose, a control device (15) by means of which the liquid supply to the nozzle can be adjusted, the nozzle further comprising a tool (18) which is exchangeably fastened to the base part (10) and is arranged to mechanically treat the surface from which the paint residues are sucked away, wherein the tool (18) is provided with a scraper (21), wherein the tool (18) includes a device for adjusting the angle of the scraper (24) with respect to the surface.

4,947,516  
LID RETAINER MECHANISM FOR AUTOMATIC WASHER

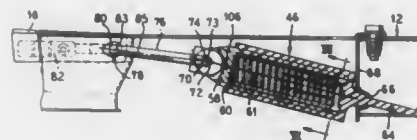
Gerald L. Kretzman, and William H. Gartley, both of St. Joseph Township, Berrien County, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 5, 1988, Ser. No. 253,600

Int. Cl.<sup>5</sup> E05F 1/08

U.S. Cl. 16—289

8 Claims



1. A combination washer/dryer wherein a dryer unit is positioned above a washer unit, a pivotal lid, having a free front edge, being attached to the washer unit and pivotable about a first axis toward the dryer unit, a dryer cabinet having an angled panel below said dryer facing said pivotable lid and a lid retainer mechanism, said lid retainer mechanism comprising:

- an expandable member comprising two parts nested together, each of said two parts having an open end and a closed end, and being nested together at said open ends to form an expandable closed member, said member being pivotally connected at a first end to said lid to pivot about a second axis, a second end of said member being pivotally and slidably received in an aperture in said cabinet;
- a biasing member held in compression along a longitudinal axis within said expandable member continuously urging said two ends of said expandable member apart along said axis of said biasing member;
- a line intersecting said first axis and said second axis, such that when said lid is closed, said line is out of alignment with said biasing member axis and as said lid is opened, said line will first move into alignment with said biasing member axis to compress said biasing member and then will move out of alignment with said biasing member axis so that said lid will be urged upwardly by said biasing member into an open position in engagement with said angled panel.

4,947,517

DEVICE FOR CUTTING LOOSE A BACON- AND/OR FAT LAYER FROM MEAT

Cornelis D. Boekel, Kollenbergweg 2, Amsterdam, Netherlands

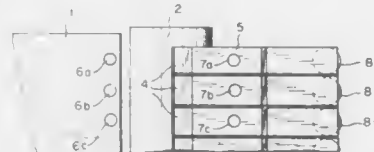
Filed Jan. 12, 1989, Ser. No. 296,158

Claims priority, application Netherlands, Jan. 12, 1988, 8800063

Int. Cl.<sup>5</sup> A22B 17/12

U.S. Cl. 17—1 R

6 Claims



1. An apparatus for cutting a bacon or fat layer from a piece of meat, comprising means defining a first surface for supporting a piece of meat having an underside layer which is to be cut therefrom, means for continuously moving said piece of meat and said underside layer in a linear direction along said first surface, at least one cutter knife disposed in adjustable position above the level of said first surface for severing said layer from the underside of said piece of meat during movement of said

piece of meat along said first surface toward and into engagement with said cutter knife, means defining a second surface disposed in adjustable position above the level of said first surface downstream of said cutter knife for receiving said piece of meat after said layer has been cut therefrom, the layer cut from said piece of meat by said cutter knife passing below said second surface to separate said layer from said piece of meat, ultrasonic sensing means disposed below said first surface upstream of said cutter knife for continuously sensing the position a separation plane between said piece of meat and said layer during the continuous movement of said piece of meat and said layer along said first surface toward said cutter knife, and means responsive to an output signal from said ultrasonic sensing means for adjusting the height of both said cutter knife and said second surface relative to said first surface during the continuous movement of said piece of meat and said layer along said first surface, thereby to assure that said cutter knife and said second surface are each properly positioned relative to the prevailing position of said separation plane as said piece of meat and said underside layer to be cut therefrom are moved into engagement with said cutter knife.

4,947,518

POULTRY SCALDING SYSTEM AND PROCESS

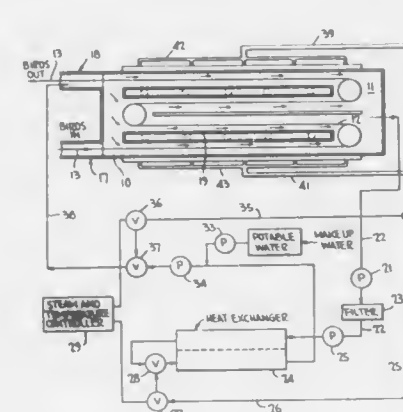
Edward H. Covell, III, P.O. Box 271, Laurel, Del. 19956

Filed Oct. 11, 1989, Ser. No. 419,716

Int. Cl.<sup>5</sup> A22C 21/04

U.S. Cl. 17—11.2

21 Claims



1. A poultry scalding system comprising, an open immersion tank adapted to contain scalding liquid at a predetermined scald temperature, conveyor means positioned above said tank for moving poultry in one direction through said tank from an entrance station to an exit station at said tank while the poultry is immersed in the liquid as the poultry hangs by the legs from said conveyor means, liquid recirculating means connected to said tank for recirculating the liquid at least at said exit station and in a direction opposite said one direction in a given period of time during operation of said conveyor means by removing the liquid at other than said exit station and returning a quantity of liquid to said tank at said exit station, means for replenishing any loss of liquid from said tank, said recirculating means including means for filtering the liquid removed, and means for heating replenished liquid to said scalding temperature before being returned to said tank.

4,947,519  
METHOD AND APPARATUS FOR EVISCERATING SCALLOPS

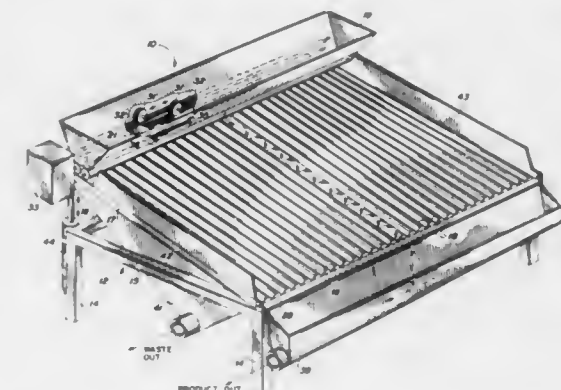
Edgar E. Griffin, Merritt Island, Fla., assignor to Scallop Research, Inc., Merritt Island, Fla.

Filed Jul. 21, 1988, Ser. No. 222,137

Int. Cl.<sup>5</sup> A22C 29/00

U.S. Cl. 17—48

6 Claims



1. A method of mechanically eviscerating the viscera from the meat of the shucked scallop, comprising the steps of: introducing a plurality of scallops at a controlled rate into a series of longitudinally aligned inclined channels, each channel being formed between a bottom roller and side rollers; moving the scallops from side to side down along the channels while rotating the rollers to rotate the scallop about their axes while progressively pinching and successively removing the viscera, and then cleaning the viscera therefrom; and rotating the bottom roller at a rotational speed different than that of the side rollers.

4,947,520

FEED ROLL SENSOR FOR A TEXTILE CARDING MACHINE

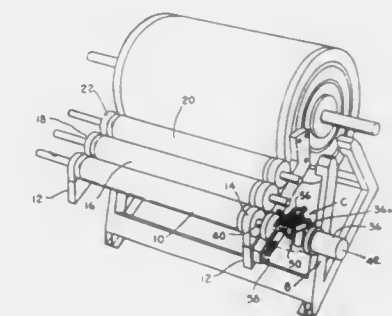
John D. Hollingsworth, Greenville, and Gary H. Rookstool, Simpsonville, both of S.C., assignors to John D. Hollingsworth on Wheels, Inc., Greenville, S.C.

Division of Ser. No. 107,666, Oct. 13, 1987. This application May 16, 1989, Ser. No. 352,367

Int. Cl.<sup>5</sup> D01G 23/06; D01H 5/38

U.S. Cl. 19—105

3 Claims



1. A method of regulating the speed of a textile fiber feed roll which feeds a textile fibrous mass to a textile machine of the type wherein the feed roll is carried by a frame of the machine for rotational motion, and said fibrous mass is fed through a nip defined between said feed roll and a fixed nipping surface comprising:



- (a) rotationally driving said feed roll by a rotational motor drive mounted directly to a shaft of said feed roll;  
 (b) sensing a reaction force on said rotational motor drive in reference to a relatively fixed reference produced by rotating said feed roll to feed said fibrous mass to said textile machine; and  
 (c) generating a control signal responsive to said reaction force as an indication of a quantitative condition of said feed fibrous mass for regulating the speed of said feed roll to feed a prescribed quantity of fiber mass to said machine.

4,947,521

## COMBING MACHINE

Andreas Joerg, Neftenbach, and Giancarlo Mondini, Winterthur, both of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

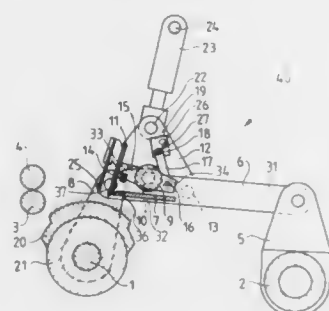
Filed Sep. 19, 1989, Ser. No. 409,365

Claims priority, application Switzerland, Oct. 3, 1988, 03678/88

Int. Cl.<sup>5</sup> D01G 19/16

U.S. Cl. 19—235

13 Claims



1. A combing machine, comprising:  
 a nipper unit containing a bottom nipper and a top nipper; said nipper unit having a closed retracted position and an open advanced position;  
 said nipper unit being movable between said closed retracted position and said open advanced position;  
 a pivot axle for said top nipper;  
 said top nipper being pivotable relative to said bottom nipper about said pivot axle;  
 an additional nipper which is pivotable relative to said bottom nipper in order to clamp, in said open advanced position of said nipper unit, between said bottom nipper and said additional nipper a sliver to be combed;  
 a shaft which extends at a distance from and substantially parallel to said pivot axle of said top nipper;  
 said additional nipper being pivotable relative to said lower nipper about said shaft;  
 said top nipper carrying out pivoting movements relative to said bottom nipper; and  
 means for coupling said additional nipper to said top nipper such that said additional nipper is pivoted by said pivoting movements of said top nipper each time in the opposite direction relative to said bottom nipper.

4,947,522

## MOUNTING ARRANGEMENT FOR A STATIONARY FLAT OF A CARDING MACHINE

Urs Staehli, Turbenthal, Switzerland, assignor to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Apr. 5, 1989, Ser. No. 333,456

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811679

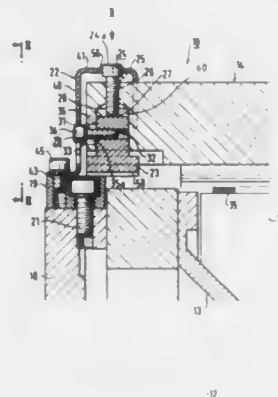
Int. Cl.<sup>5</sup> D01G 15/28

U.S. Cl. 19—104

17 Claims

1. A mounting arrangement for a stationary flat of a carding machine provided with mounting flanges arranged at end faces

of a rotatable carding cylinder possessing an axis of rotation, the stationary flat having end portions, comprising:  
 an adjustment block mounted at each mounting flange which serves as a support;  
 adjustment means for substantially radial displacement of the end portions of the stationary flat relative to the axis of rotation of the rotatable carding cylinder;  
 a clip provided at each of said end portions of said stationary flat in order to retain an associated end portion of the stationary flat at an associated adjustment block;  
 each said clip being defined by a resilient element;  
 each said clip comprising a first limb extending in substantially radial direction with respect to said axis of rotation of said rotatable carding cylinder and supported at an associated mounting flange and a second limb bent away from said first limb;  
 each said second limb partially extending over said stationary flat and bearing upon said stationary flat;



- each said adjustment means comprising an at least substantially radially extending adjusting screw;  
 each said adjusting screw having an end portion which is directed to said rotational axis and bears upon an associated adjustment block;  
 said second limb of each said clip extending from said first limb and over the associated adjusting screw;  
 each said clip comprising a first opening which is located in said second limb at least substantially in alignment with the associated adjusting screw;  
 clamping means extending at least substantially parallel to said axis of rotation of the rotatable carding cylinder; each adjustment block being clampable at the associated end portion of said stationary flat by said clamping means; and  
 each said clip comprising a second opening which is located in said first limb substantially in alignment with said clamping means.

4,947,523

## BAG CLOSURE DEVICES

Edward S. Robbins, III, 459 N. Ct., Florence, Ala. 35630, and Theodore J. Onocki, Westerville, Ohio, assignors to Edward S. Robbins, III, Florence, Ala.

Continuation-in-part of Ser. No. 241,208, Sep. 7, 1988, abandoned, and a continuation-in-part of Ser. No. 352,463, May 16, 1989, abandoned. This application Sep. 5, 1989, Ser. No. 403,464

Int. Cl.<sup>5</sup> B65D 77/10

U.S. Cl. 24—30.5 R

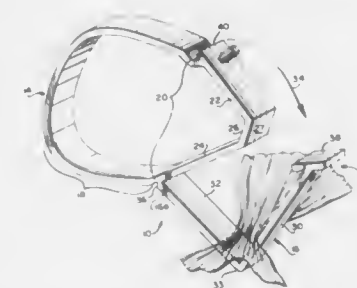
44 Claims

1. A bag closure device comprising:  
 a handle member;  
 a clasp member having one end joined to said handle member so as to allow for relative movements thereof between  
 (i) an opened condition, wherein said clasp and handle members are separated from one another to permit removal and insertion of a bag portion therebetween, and (ii)

a closed position, wherein said handle and clasp members are adjacent to one another so as to capture and thus close said bag portion therebetween; and  
 coupling means collectively provided on the other end of said clasp member and on a corresponding region of said handle member for removably coupling said clasp and handle members to one another in said closed condition thereof, wherein,

said coupling means includes:

- (a) means defining plural paired transverse ledge surfaces spaced apart along an exterior of said handle member at said corresponding location of said handle member, and a latch flange having a pair of finger members associated with said other end of said clasp member and adapted to being engaged with, and supported by, selected ones of said defined pairs of ledge surfaces when



said clasp and handle members are in said closed condition thereby removably coupling said clasp and handle members one to another; and

- (b) slip-preventing means for preventing relative lateral slippage of said coupling means to thereby substantially preclude uncoupling of said clasp and handle members by virtue of such relative slippage, said slip-preventing means including an elongate tongue element formed on one of said clasp and handle members, and an elongate groove formed on the other of said clasp and handle members in facing relationship to said tongue element when said clasp and handle members are in said closed condition, said tongue and groove mating with one another when said clasp and handle members are in said closed condition to prevent slippage therebetween laterally of said mated tongue and groove.

4,947,524

## RESILIENT SHEET-STEEL PAPER CLIP

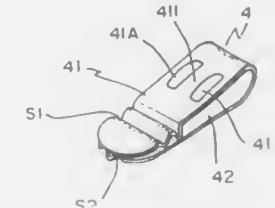
Chin-Fu Chang, No. 166-1, Chang Nan Road, Changhua, Taiwan

Filed Jan. 19, 1990, Ser. No. 467,173

Int. Cl.<sup>5</sup> B42F 1/02

U.S. Cl. 24—67.9

1 Claim



1. A paper clip made of resilient sheet-steel through punching and press work, having an U-shaped configuration including an upper portion and a lower portion, said upper portion comprising two slots defining therebetween a ridge portion, and a transversely corrugated portion vertical to said ridge portion, said lower portion comprising a longitudinally corru-

gated portion, wherein said upper portion has its front end spaced away from the front end of said lower portion when said ridge portion is pressed to recess from the level surface of said upper portion, and said upper portion has its front end closely engaged with the front end of said lower portion when said ridge portion is turned to project over the level surface of said upper portion.

4,947,525

## ZIPPER CLOSURE WITH INTERNAL PEEL SEAL

Donald L. Van Erden, Willwood, Ill., assignor to Zip-Pak Incorporated, Northbrook, Ill.

Filed Mar. 23, 1989, Ser. No. 327,618

Int. Cl.<sup>5</sup> B65D 77/10

U.S. Cl. 24—304

24 Claims



1. A flexible continuous reclosable plastic zipper, comprising in combination:

a female member having a groove and locking jaw means;  
 a male member having a rib for insertion into the groove and being locked therein by said jaw means at a first insertion depth of the rib into the groove;  
 said jaw means moving to a gripping position when the rib is inserted into the groove to a second insertion depth deeper than said first depth;  
 and a peel seal joining bond material between the rib and groove bonding the rib into the groove at a third over-closed insertion depth at least equal to said second depth; one of said rib and groove breaking from the peel seal bond material upon first separation of the rib and groove with the bond material remaining nonadhesive and permitting normal interlocking of the rib and groove after first breaking from the bond material.

4,947,526

## PLASTIC/METAL TABLE SKIRT CLIP AND METHOD OF MANUFACTURE

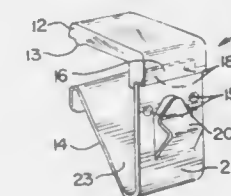
Sam Fogelman, Chicago, Ill., assignor to Midwest Marko, Inc., Chicago, Ill.

Filed Jan. 23, 1989, Ser. No. 299,897

Int. Cl.<sup>5</sup> A44B 21/00

U.S. Cl. 24—336

4 Claims

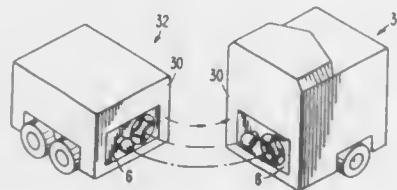


1. A table skirt clip used for fastening a table skirt to a table, comprising a bottom portion composed of a flexible metal, and a top portion composed of a transparent plastic and being positionably adjusted on top of said table, said top portion being fixedly joined to said bottom portion, said top portion allowing viewing of the top of said table therethrough; said bottom portion having a front leg for positioning adjacent to a front edge of said table, a flexible bottom leg for positioning adjacent to a bottom of said table for mounting said clip thereon; and a connecting means located on and integrally formed with said bottom portion; said connecting means hav-

ing at least one opening formed therein to receive an injection of said transparent plastic therethrough so as to secure said plastic top portion to said connecting means and said bottom portion.

**4,947,527**  
**COUPLING SYSTEM FOR MODULAR ARTICLE**  
 Michael R. Hennig, Morris Township, Morris County, N.J.,  
 assignor to Matchbox Toys (USA) Ltd., Moonachie, N.J.  
 Filed Mar. 23, 1989, Ser. No. 327,704  
 Int. Cl.<sup>5</sup> A44B 17/00  
 U.S. Cl. 24—575

9 Claims



1. A system for coupling two parts together, the system comprising:  
 two coupling members each fixable to a respective part, each coupling member comprising:  
 a support piece having a bearing surface,  
 a male element projecting from the support piece and having a central axis;  
 a female element defining a receptacle in the support piece and having a central axis,  
 the central axis of the male element and the central axis of the female element extending substantially parallel to one another,  
 the male element having a substantially cylindrical shank and a rounded tip, the shank and the tip being coaxial with the central axis of the male element, the tip having a diameter greater than that of the shank and being separated from the support piece by the shank,  
 the female element defining an opening having a circumference and being provided with a plurality of radially inwardly extending, resiliently deformable teeth spaced apart around the circumference of the opening and circumscribing a circle having a diameter not greater than the diameter of the shank, the teeth defining a rear surface, each of the coupling members having an open region adjacent the support piece for receiving the tip of the male element of the other coupling member,  
 the shank having a diameter which is greater than the diameter of the circle circumscribed by the teeth, and  
 the shank having a length which is less than the distance between the bearing surface of the support piece and the rear surface defined by the teeth.

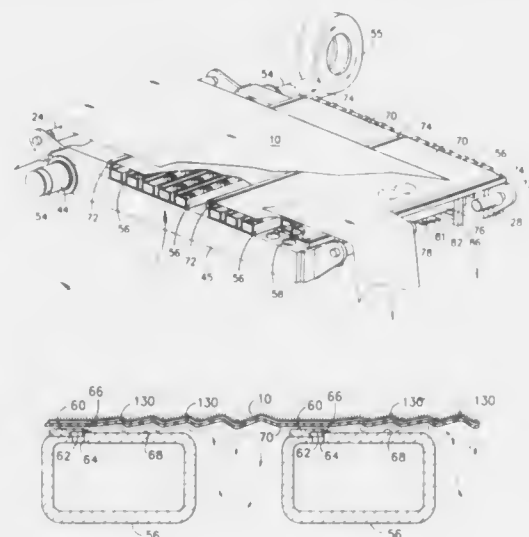
**4,947,528**  
**METHOD AND APPARATUS TO ERECT PILE FIBERS**  
 Louis Dischler, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.  
 Filed Jul. 17, 1989, Ser. No. 380,805  
 Int. Cl.<sup>5</sup> D06C 11/00

U.S. Cl. 26—2 R

25 Claims

1. Method to erect the fibers of a synthetic pile fabric comprising the steps of: supplying a web of pile fabric, heating the pile fabric to a temperature between the heat setting and dyeing temperature of the fabric, supplying the pile fabric over and in contact with a diaphragm, supplying a plurality of

separate air streams against the underside of the diaphragm to create a plurality of waves therein to create waves in the pile



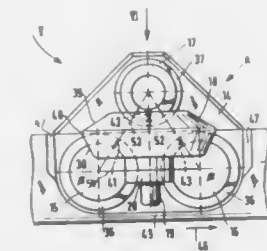
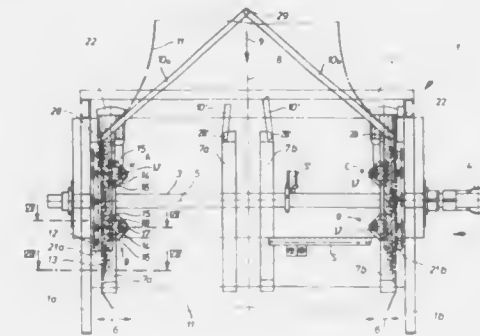
fabric to cause the fibers therein to become erect and supplying the pile fabric with erect fibers to a point of take-up.

**4,947,529**  
**EXPANDER FOR TUBULAR FABRIC**  
 Strudel Werner, Friedrichshafen, and Oliver Hostenkamp, Lindau, both of Fed. Rep. of Germany, assignors to Lindauer Dornier Gesellschaft mbH, Lindau, Fed. Rep. of Germany  
 Filed Aug. 18, 1989, Ser. No. 395,778  
 Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828094  
 Int. Cl.<sup>5</sup> D06C 5/00; B29C 55/28, 53/10; B29D 23/00  
 U.S. Cl. 26—84

7 Claims

1. An expander for tubular fabric, comprising a frame for supporting said expander on both sides, right and left, respectively, at least one roller arrangement (A, B, C, D) on each side of said frame, each roller arrangement including outer guide roller means around which the tubular fabric is laid and which spreads the tubular fabric, drive roller means, drive means for positively rotating said drive roller means, said drive roller means through said tubular fabric for transporting the tubular fabric through said expander, and at least one support roller means arranged for taking up tension applied by said tubular fabric to said guide roller means, said drive roller means (18), with reference to said frame (1), bearing on an inside of said

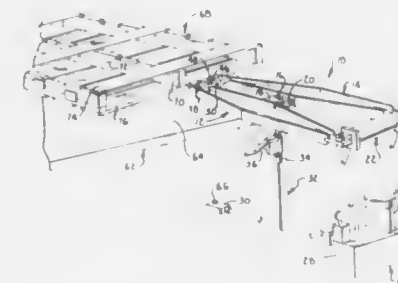
guide roller means (15, 16), said support roller means (17) supporting said drive roller means (18) by bearing against a



circumference of said drive roller means (18) on a side facing away from said guide roller means (15, 16).

**4,947,530**  
**METHOD AND APPARATUS FOR REPAIRING PALLET**  
 Terry L. Gleason, 4035 N. Hydraulic, Wichita, Kans. 67219  
 Division of Ser. No. 194,138, May 16, 1988, Pat. No. 4,845,825.  
 This application May 8, 1989, Ser. No. 348,770  
 Int. Cl.<sup>5</sup> B23P 7/00  
 U.S. Cl. 29—402.14

7 Claims

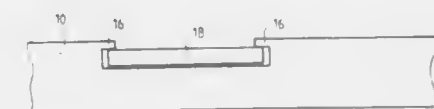


1. A method for repairing a wooden pallet stringer having a break in the stringer, said method comprising the steps of:  
 releasably securing a plate having a plurality of studs projecting outwardly from one side thereof to an elongated, rigid member;  
 moving the member longitudinally of the stringer to position said plate adjacent said break in the stringer with the plate studs directed toward the stringer;  
 positioning a back-up element on the opposite side of said stringer from the plate;  
 applying a clamping force between the member and the back-up element while simultaneously permitting the holding member and said plate to move into alignment with the stringer upon engagement of the plate with the

stringer to press the studs of the plate into wood of the stringer, the plate extending across the break so that some studs enter the wood on one side of the break while other of said studs enter the wood on the opposite side of said break;  
 releasing said clamping force;  
 releasing the plate from said member; and  
 removing the member and element from their respective positions relative to the stringer, the plate remaining secured by said studs repairing the break in the stringer.

**4,947,531**  
**INSERTION METHOD FOR CHIP CARDS**  
 Pierre Brisson, Wassenaar, Netherlands, assignor to Gemplus Card International, Aix en Provence, France  
 Filed Feb. 23, 1989, Ser. No. 314,770  
 Claims priority, application France, Feb. 26, 1988, 88 02352  
 Int. Cl.<sup>5</sup> B23P 11/00; B29C 00/00  
 U.S. Cl. 29—446

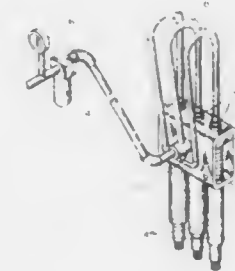
1 Claim



1. A method for the assembly of an integrated circuit micro-module on a chip card comprising:  
 first making the card having a cavity therein with an initial shape at ordinary temperature being that of a basin having a bottom and edges that partially overhang the bottom, at least the edges being formed of a material having shape memorizing properties, the cavity having dimensions that provide for housing the integrated circuit micro-module, the edges overhanging the cavity to such an extent that they prevent the micro-module from being inserted into or going out of the cavity; then plastically deforming the card to push the edges back by a sufficient distance to enable insertion of the micro-module;  
 then inserting the micro-module into the cavity of the card; and finally heating the card to a temperature at which a shape memorizing effect is displayed so as to cause the edges to resume their initial overhanging shape and close the micro-module in the cavity.

**4,947,532**  
**SCALER HOLDER**  
 Edward L. Tucker, 232 S. French Ave., Arlington, Wash. 98223  
 Continuation-in-part of Ser. No. 286,037, Dec. 19, 1988, abandoned. This application Sep. 19, 1989, Ser. No. 409,410  
 Int. Cl.<sup>5</sup> B21C 43/00  
 U.S. Cl. 29—81.14

3 Claims



1. A device for supporting a plurality of scalers or the like for simultaneous usage comprising:  
 a main body element fabricated of rectangular tubing including an upper portion having a plurality of threaded bores

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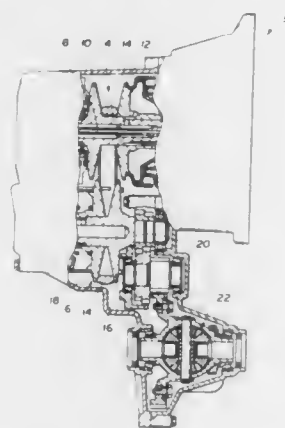
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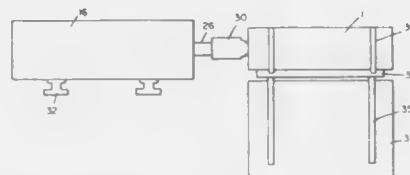
to adjustably receive the scalers having complementary threads and a plurality of bottom bores coaxial with the threaded bores, said bottom bores including bushings to prevent lateral movement of the bottoms of the scalers during use and means for retaining the bushings in their respective bores.

**4,947,533**  
**MANUFACTURING METHOD OF DISK FOR BELT-DRIVEN CONTINUOUSLY-VARIABLE-SPEED DRIVE**  
Katuhiko Taniguchi; Akiharu Nakajima, both of Hamamatsu, and Osamu Kondo, Kosai, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan  
Filed May 12, 1989, Ser. No. 351,018  
Claims priority, application Japan, Jul. 14, 1988, 63-176140  
Int. Cl.<sup>3</sup> B21K 1/42  
U.S. Cl. 29—894  
4 Claims



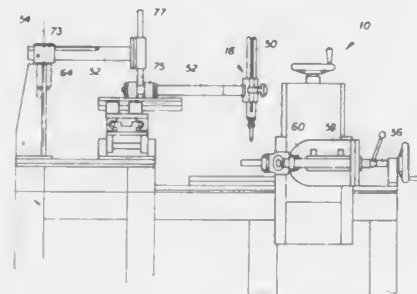
1. A method of manufacturing a disk for a belt-driven continuously-variable-speed drive which controls speed by changing the V-groove width of a pulley consisting of two said disks with opposed tapered sheave surfaces to thereby change the radius of engagement with a metallic belt to change the drive ratio, comprising the steps of: machining the sheave surfaces contacting the metallic belt with a numerical control lathe to form a groove therein which is generally centered about an axis of rotation of the pulley, said groove having a height within a range of 0.8–0.4 microns, and then super finishing the sheave surfaces to generate residual stress on said sheave surfaces.

**4,947,534**  
**APPARATUS AND METHOD FOR SALVAGING CONCENTRIC PIPING MEMBERS**  
William C. Davenport, Power Performance, Inc., 3103 Hwy. 90 East, Broussard, La. 70518  
Continuation-in-part of Ser. No. 251,416, Sep. 30, 1988, abandoned. This application Sep. 7, 1989, Ser. No. 404,201  
Int. Cl.<sup>3</sup> B23P 19/02  
U.S. Cl. 29—426.4  
16 Claims



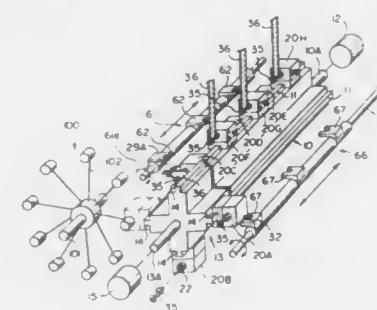
1. A method of salvaging cemented concentric piping members having an outer casing and at least one inner piping member essentially concentrically disposed therein and joined together by at least one essentially concentric concrete portion, comprising the steps of:  
(A) supporting said cemented concentric piping members on a base means;  
(B) providing a ramming means;  
(C) operably coupling a ramming shoe means on said ramming means;  
(D) aligning said ramming shoe means with, and abutting, an end of said cemented concentric piping members;  
(E) ramming said cemented concentric piping members with said ramming means;  
(F) conducting steps (D) and (E) as many times as there are inner piping members; and thereafter  
(G) salvaging said at least one inner piping member and said outer casing.

**4,947,535**  
**METHOD WHICH PROVIDES FOR THE PLACEMENT OF A BIT POINT OF A BIT AT A PREDETERMINED POSITION**  
Dennis Cowles, Broadview Heights, Ohio, assignor to Joy Technologies, Inc., Pittsburgh, Pa.  
Division of Ser. No. 174,599, Mar. 29, 1988, Pat. No. 4,897,904.  
This application Jul. 27, 1989, Ser. No. 386,366  
Int. Cl.<sup>3</sup> B21D 39/03  
U.S. Cl. 29—428  
13 Claims



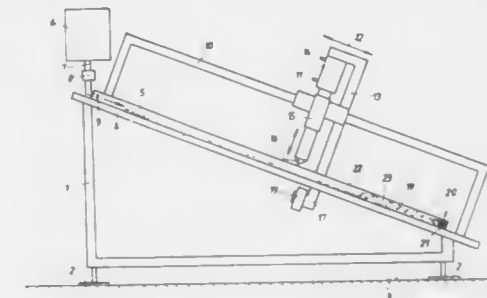
1. A method which provides for the placement of a bit point of a bit at a predetermined position with respect to a rotatable member comprising the steps of:  
burning into a holder a surface which corresponds to a portion of the surface of the member; and  
fixing the holder on the member such that the surface burned into the holder is adjacent the portion of the surface of the member, and the bit point of the bit is capable of being held by the holder at the predetermined position.

**4,947,536**  
**METHOD OF WINDING FILM ON A SPOOL AND LOADING THE SPOOL WITH THE FILM INTO A MAGAZINE**  
Chiaki Suzuki, and Shigehisa Shimizu, both of Kanagawa, Japan, assignors to Fujifilm Photo Film Co., Ltd., Kanagawa, Japan  
Filed May 15, 1989, Ser. No. 351,236  
Claims priority, application Japan, May 13, 1988, 63-116404  
Int. Cl.<sup>3</sup> B23P 19/00  
U.S. Cl. 29—430  
2 Claims



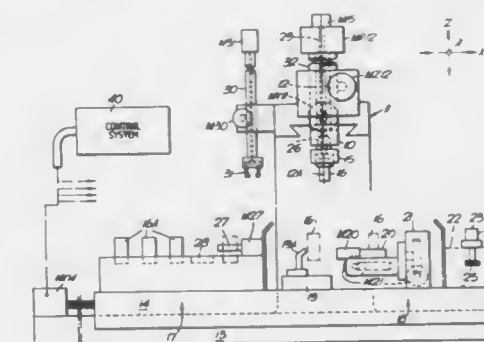
1. A method of winding a photographic roll film around a spool and loading the spool with the film into a film magazine comprising the steps of  
preparing a film winding pallet which has a spool holding shaft which holds a spool and rotates the spool about its longitudinal axis under a force transmitted to the spool holding shaft from outside the film winding pallet, and a film pinch means which is opened and closed under a force transmitted thereto from outside the film winding pallet and pinches a leader portion of a roll film when it is closed,  
positioning the film winding pallet with a spool held on the spool holding shaft in a predetermined film winding station,  
connecting an end of a roll film opposite to said leader portion to the spool,  
thereafter transmitting a rotational force to the spool holding shaft from outside the film winding pallet so that the spool is rotated and the roll film is wound around the spool with the leader portion kept unrolled,  
transmitting a force to the film pinch means from outside the film winding pallet so that the film pinch means is closed and pinches the leader portion of the roll film,  
moving the film winding pallet in the longitudinal direction of the spool, thereby loading the spool with the roll film into a magazine barrel,  
transmitting a force to the film pinch means from outside the film winding pallet so that the film pinch means is opened and releases the leader portion of the roll film,  
causing the spool holding shaft to release the spool, sending to a spool feeding station the film winding pallet which has this delivered the spool with the roll film to a film magazine,  
causing the spool holding shaft of the film winding pallet to hold another spool, and  
returning the film winding pallet with the another spool to said film winding station.

material is introduced from one end into the hollow molding, comprising interrupting the filling step as soon as the hygroscopic material filled into the hollow molding has reached a location of the hollow molding wherein a corner is to be formed; making a bulge in the wall of the hollow molding subsequently forming the inside in the spacer frame; and resuming the introduction of hygroscopic material into the hollow molding after making the bulge in the wall of the hollow molding, until four locations of the sidewall in the hollow molding have been provided with a bulge, and the hollow molding has been completely filled, each said bulge having such an extent that the penetration of hygroscopic material at the thus-constricted internal cross section of the hollow molding is at least made difficult.



low molding after making the bulge in the wall of the hollow molding, until four locations of the sidewall in the hollow molding have been provided with a bulge, and the hollow molding has been completely filled, each said bulge having such an extent that the penetration of hygroscopic material at the thus-constricted internal cross section of the hollow molding is at least made difficult.

**4,947,538**  
**MACHINE TOOL**  
David R. McMurtry, Wotton-Under-Edge, United Kingdom, assignor to Renishaw plc, Gloucestershire, United Kingdom  
Continuation of Ser. No. 803,783, Dec. 2, 1985, Pat. No. 4,706,371, which is a continuation of Ser. No. 473,142, Mar. 7, 1983, abandoned. This application Jun. 23, 1987, Ser. No. 65,564  
Claims priority, application United Kingdom, Mar. 10, 1982, 8206952  
The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.  
Int. Cl.<sup>3</sup> B23Q 3/157  
U.S. Cl. 29—568  
2 Claims



**4,947,537**  
**PROCESS AND APPARATUS FOR FILLING HOLLOW MOLDINGS**  
Peter Lisee, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria  
Filed Jun. 29, 1989, Ser. No. 373,255  
Claims priority, application Austria, Jun. 30, 1988, 1706/88  
Int. Cl.<sup>3</sup> B23P 13/02, 23/06  
U.S. Cl. 29—527.1  
9 Claims  
1. Process for filling hollow moldings, to be bent into spacer frames, with hygroscopic material wherein the hygroscopic

1. A machine tool comprising:  
a headstock;  
a spindle supported on said headstock;  
a first workholder supported on said headstock distinct from said spindle;  
a machining support;  
a second workholder supported on said machining support; means for relatively moving said spindle and said machining support for machining a workpiece held by the second workholder by a tool provided on said spindle;

a magazine for releasably supporting a plurality of workpieces and situated in a position remote from said machining support;

means for relatively moving said headstock and said magazine between positions in which said first workholder is situated respectively adjacent said second workholder and adjacent said magazine;

first releasable gripper means provided on said first workholder, and said first workholder, when situated adjacent said magazine, being positioned relative to said magazine so that a workpiece can be gripped at one end of such workpiece by said first gripper means; and

second releasable gripper means provided on said second workholder, and said second workholder, when situated adjacent said first workholder, being positioned relative thereto so that a workpiece can be gripped at its one end by said first workholder and at its other end by said second workholder;

wherein a workpiece is transferable by means of said first workholder between said magazine and said second workholder independently of said spindle.

4,947,539

# METHOD OF MANUFACTURING ROTOR ASSEMBLY STRUCTURE

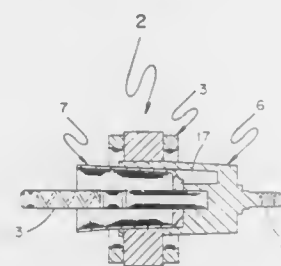
David F. Aussieker, Gerald N. Baker, and Ray E. Busbor, all of St. Louis County, Mo., assignors to Emerson Electric Co., St. Louis, Mich.

Division of Ser. No. 222,033, Jul. 21, 1988, Pat. No. 4,843,705. This application Apr. 24, 1989, Ser. No. 389,257

Int. Cl.<sup>5</sup> H02K 15/02

U.S. Cl. 29—598

7 Claims



1. A method of manufacturing a rotor assembly for an electric motor, said rotor assembly having a central longitudinal axis of rotation about which said assembly is rotated when installed in said motor; said assembly including a rotor core having a stack of annular laminations of suitable ferro-magnetic materials with the inner peripheral wall formed by said stack of annular laminations defining a central opening there-through about said central longitudinal axis, a rotor shaft extending along said central longitudinal axis, a rotor hub between said core and shaft and an oil return tube extending coaxially with said central longitudinal axis comprising the steps of:

forming said rotor core by molding a pair of annular end rings along opposed faces of said stack of annular laminations;

inserting a rotor shaft through the central opening defined by said stack of annular laminations and supporting the shaft in concentrically spaced relation from said inner peripheral wall of said stack of annular laminations so that the longitudinal axis of said shaft extends along said central axis of rotation;

molding a rotor hub between said inner peripheral wall of said stack of annular laminations and said concentrically supported rotor shaft to fix said rotor core to said rotor shaft, said rotor hub being so molded to include a cup-like opening at one end thereof and including the simultaneous molding of a concentric, axially extending mouth portion integral with said rotor hub, said mouth portion extending

axially beyond said rotor core and said rotor hub and forming said oil return tube for said rotor assembly.

4,947,540

# METHOD OF PRODUCING WAVEGUIDE

Yuichi Komachi, Akishima, Japan, assignor to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan

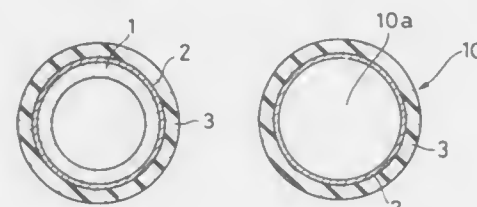
Filed Jul. 20, 1989, Ser. No. 382,288

Claims priority, application Japan, Sep. 1, 1988, 63-216349

Int. Cl.<sup>5</sup> H01P 11/00

U.S. Cl. 29—600

11 Claims



1. A method of producing a waveguide comprising the steps of:

- (a) forming a reflecting layer on an entire outer periphery of a core of glass which is soluble; and
- (b) subsequently dipping said core with said reflecting layer in an etchant to dissolve and remove said pipe, thereby providing the waveguide formed by said reflecting layer, said waveguide having a central bore which is disposed radially inwardly of said reflecting layer and serves as a waveguide path.

4,947,541

# METHOD FOR PRODUCING A THIN FILM HEAD

Atsushi Toyoda, and Shuichi Sawada, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Sep. 1, 1989, Ser. No. 401,130

Claims priority, application Japan, Sep. 2, 1988, 63-220032

Int. Cl.<sup>5</sup> G11B 5/33

U.S. Cl. 29—603

4 Claims



1. A method for producing a thin film head, comprising the steps of:

- forming a lower core on the surface of a wafer;
- coating the lower core with a protection film made of a substance having an ion milling rate lower than that of the lower core;
- grinding the protection film so that the upper surface of the lower core and the upper surface of the protection film are substantially level and smoothly finished;
- milling the protection film and the lower core simultaneously with radiated ion beams upon completion of the grinding step so that the upper surface of the lower core is recessed with respect to the upper surface of the protection film;
- forming a gap layer on the upper surface of the lower core and the upper surface of the protection film; and
- forming an upper core in the recess while maintaining the gap layer between the upper core and the lower core.

4,947,542

# METHOD OF MAKING A CRYSTALLIZED GLASS-BONDED AMORPHOUS METAL MAGNETIC FILM-NON-MAGNETIC SUBSTRATE MAGNETIC HEAD

Mitsuo Satomi, Katano, and Nobuyuki Kaminaka, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 212,141, Jun. 13, 1988, Pat. No. 4,847,983, which is a continuation of Ser. No. 848,829, Apr. 7, 1986, abandoned. This application May 5, 1989, Ser. No. 348,598

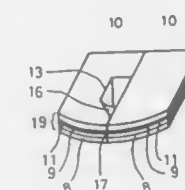
Claims priority, application Japan, Apr. 8, 1985, 60-73877

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G11B 5/42

U.S. Cl. 29—603

1 Claim



1. A method for forming a magnetic head, comprising:
  - (a) providing a first non-magnetic substrate layer having two opposite faces;
  - (b) bonding onto one face of said first non-magnetic substrate layer an amorphous metallic magnetic film layer having an uncovered face;
  - (c) providing a second non-magnetic substrate layer having two opposite faces;
  - (d) bonding onto one face of said second non-magnetic substrate layer a layer of crystallizable glass in an amorphous state, said layer of crystallizable glass having a thickness of 0.1 to 10 μm and an uncovered face; said amorphous metallic magnetic film layer having an elevated crystallizing temperature; said crystallizable glass layer having an elevated softening temperature which is lower than said crystallizing temperature of said amorphous metallic magnetic film layer; said crystallizable glass layer being made of a glass which, when in a crystallized state, has a melting point which is higher than said softening temperature;
  - (e) facially confronting said uncovered face of said amorphous metallic magnetic film layer with said uncovered face of said crystallizable glass layer, thereby covering said uncovered faces and providing a sandwich arrangement having at least four layers;
  - (f) baking said sandwich arrangement at a temperature below the crystallizing temperature of said amorphous metallic magnetic film layer, but sufficiently elevated as to cause crystallization of said crystallizable glass layer, thereby bonding said amorphous metallic magnetic film layer to said second non-magnetic substrate layer with a layer of crystallized glass;
  - (g) dividing said sandwich arrangement into at least two core blocks each comprising said at least four layers, disposed in a respective layer-to-layer connected sandwich arrangement, each layer having two opposite faces and an outer peripheral edge, a length and width extending generally parallel to said faces thereof, and a thickness extending generally perpendicular to said faces thereof; one of said two core blocks being provided in an outer edge portion thereof with a coil window;
  - (h) providing said one core block edgewise in two portions thereof located oppositely perimetricaly adjacent said coil window with one of a layer of gap spacer film and a layer of bonding glass film;
  - (i) providing the other of said two core blocks edgewise in at least one portion thereof spatially corresponding to said

two portions on said one core block with the other of a layer of said gap spacer film and said layer of bonding glass film;

(j) placing said two core blocks in edge to edge confrontation with said layer of gap spacer film confronting said layer of bonding glass film;

(k) heating said two core blocks to a temperature not substantially higher than the baking temperature used in step (f), thereby bonding said two core blocks together at least partially by means of said bonding glass film into a composite block, with said gap spacer film providing a gap between respective edge portions of said amorphous metallic magnetic film layer of said two core blocks; and

(l) profiling an edge of said composite block, including an intersection of said gap therewith to provide a tape running surface on which are exposed a series of at least four connected layers including a first non-magnetic substrate layer, an amorphous metallic magnetic film layer, a crystallized glass layer and a second non-magnetic substrate layer.

4,947,543

# METHOD OF WINDING WIRE ON INNER SURFACE OF CYLINDRICAL MEMBER

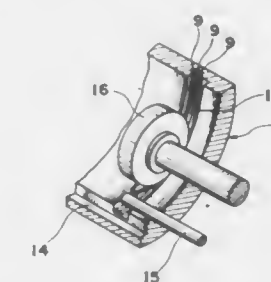
Hiroshi Kawazoe, Hirakata, and Tokuhito Hamane, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 2, 1989, Ser. No. 416,323

Int. Cl.<sup>5</sup> H01F 41/06

U.S. Cl. 29—605

2 Claims



1. A method of forming a coiled wire in an annular groove formed on an inner surface of a cylindrical member, comprising the steps of:

- holding one end portion of a wire discharged from a distal end of a feed nozzle;
- rotating the feed nozzle about one of a pair of connecting pins provided at one end of the cylindrical member so as to wrap the wire around the one of the connecting pins; retaining the wire by a hook pin in the vicinity of a point of intersection between the annular groove and an axial groove which extends from the one end of the cylindrical member so as to intersect with the annular groove;
- rotating the feed nozzle along the annular groove and pressing the wire against a bottom face of the annular groove by a roller at a position disposed downstream in a rotational direction of the feed nozzle so as to not only feed the wire to the annular groove but wind the wire in the annular groove through a predetermined number of turns; and
- wrapping the wire around the other one of the connecting pins in a state where the wire is retained at the point of intersection by the roller.



4,947,544

**METHOD OF MANUFACTURING FLUID PRESSURE SENSOR**

Norio Iwakiri, Kyoto; Hideyuki Bingo, Uji, and Hideji Tugui, Kyoto, all of Japan, assignors to Ormon Tateisi Electronics Co., Kyoto, Japan

Division of Ser. No. 136,623, Dec. 22, 1987, Pat. No. 4,845,322.

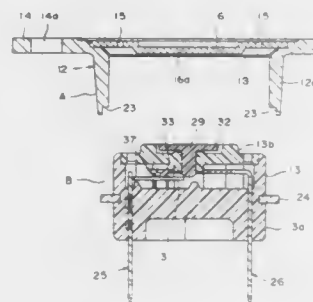
This application Mar. 22, 1989, Ser. No. 327,102

Claims priority, application Japan, Dec. 22, 1986, 198012; Dec. 23, 1986, 307512; Dec. 23, 1986, 198086; Jul. 30, 1987, 117706; Aug. 1, 1987, 118283

Int. Cl.<sup>5</sup> H01H 11/00

U.S. Cl. 29—622

2 Claims



1. A method for assembling a pressure sensor having a pressure receiving element and switch means which operates in response to movement or actuation of the pressure receiving element, comprising in order:

- preparing a pressure receiving member by installing the pressure receiving element in a pressure receiving case in which the pressure receiving element is housed;
- testing the prepared pressure receiving member to determine its suitability for use in the assembled pressure sensor;
- preparing a main sensor body comprising the switch means and a switch base member on which the switch means is installed;
- testing the prepared main sensor body to determine its suitability for use in pressure sensor; and
- assembling the suitable pressure receiving member and the suitable main sensor body together to form the pressure sensor.

4,947,545

**AUTOMATED BURN-IN SYSTEM**

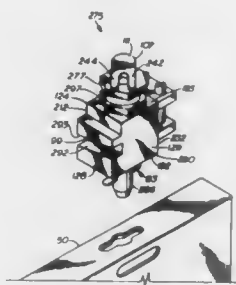
Robert L. Gussman, Houston, Tex., assignor to Reliability Incorporated, Houston, Tex.

Continuation-in-part of Ser. No. 57,255, Jun. 1, 1987. This application May 24, 1988, Ser. No. 198,064

Int. Cl.<sup>5</sup> B23P 21/00

U.S. Cl. 29—705

21 Claims



1. Apparatus for automatically inserting and removing a burn-in board in a chamber, said burn-in board being used for burning-in integrated circuits, comprising:

means for grasping the burn-in board;  
means connected to said grasping means, for displacing said grasping means angularly to lock said grasping means onto the burn-in board; and  
means for displacing said grasping means linearly to insert the burn-in board into and remove the burn-in board from a connector in said chamber.

4,947,546

**METHOD OF MAKING A CABLE ASSEMBLY**

Joseph M. Bowling, Carlisle, and Matthew T. Miller, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 28, 1989, Ser. No. 329,470

Int. Cl.<sup>5</sup> H01R 43/04

U.S. Cl. 29—861

10 Claims



1. In a method of terminating a connector on the end of a cable having a first end and a second end, a first connector being terminated on said first end, wherein said method is performed by an automated machine, the steps comprising:

- Loading a second connector into a connector holder;
- Fanning out the wires of said cable and loading said wires into a planar stack;
- Taking a wire from an end of said stack;
- Determining the desired terminal of said second connector which is to receive said wire;
- Positioning said desired connector terminal and said wire inserter into mutual alignment;
- Positioning said wire in alignment between said connector terminal and said wire inserter;
- Inserting said wire into said desired terminal by actuating said wire inserter;
- Verifying that said wire was properly inserted by determining that continuity exists therebetween and indicating an improper termination, if present; then
- Repeating steps (c) through (i) until all wires are taken from said stack;
- Testing all terminals of said second connector for shorts, and indicating such shorts, if present;
- Removing said cable and attached first and second connectors.

4,947,547

**METHOD OF MANUFACTURING A CAMSHAFT**

Lukas Matt, Eschen, Liechtenstein, assignor to Etablissement Supervis

Division of Ser. No. 194,385, May 16, 1988, Pat. No. 4,903,543.

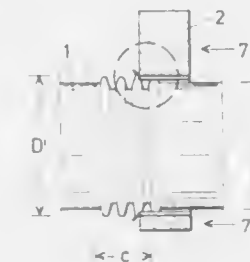
This application Nov. 22, 1989, Ser. No. 440,884

Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717190

Int. Cl.<sup>5</sup> B23P 15/00

U.S. Cl. 29—888.1

2 Claims



1. A method of manufacturing a camshaft having a plurality of cams, each cam defining a recess for receiving the shaft, the recess having at least one radially inwardly extending projection, comprising preparing a first portion of increased diameter on the shaft by rolling bead-like material displacements, forcing a cam over the increased diameter portion of the shaft in a material-displacing operation, preparing a second portion of increased diameter in the same manner as but spaced apart from the first increased diameter portion, forcing another cam onto the second increased diameter portion of the shaft in a material-displacing operation, and repeating this sequence until all cams are mounted on the shaft.

4,947,548

**METHOD OF MAKING A HEAT EXCHANGER FOR CONDENSING FURNACE**

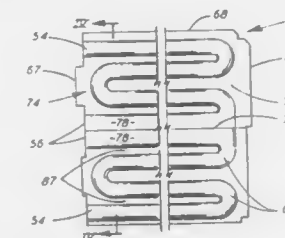
Richard M. Bentley, Camillus, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 126,072, Nov. 27, 1987, Pat. No. 4,848,314, which is a division of Ser. No. 11,372, Feb. 6, 1987, Pat. No. 4,738,307, which is a continuation of Ser. No. 778,115, Sep. 20, 1985, abandoned. This application Jul. 3, 1989, Ser. No. 375,637

Int. Cl.<sup>5</sup> B21D 53/02

U.S. Cl. 29—890.039

4 Claims



1. A method of fabricating a condensing heat exchanger for a gas-fired warm air condensing furnace, comprising the steps of:

- providing a single flat engineering metal sheet having a dividing line between opposite ends thereof for apportioning said single flat engineering metal sheet into two portions;
- laminating said flat engineering metal sheet with a layer of corrosion resistant sheet material so that said laminated engineering metal sheet is thermally conductive;
- forming a mirror image flow path pattern in each portion of said laminated engineering metal sheet apportioned by the dividing line;
- folding each portion of said laminated engineering metal

sheet along the dividing line so that said mirror image flow path pattern in one half is in registration with the other mirror image flow path pattern in the other portion to form a condensing flow passage with the layer of corrosion resistant sheet material on the inner surface of the condensing heat exchanger; and  
sealing selected edge portions of the folded laminated engineering metal sheet to form a fluid-tight condensing heat exchanger.

4,947,549

**FIBER ACCESS TOOL**

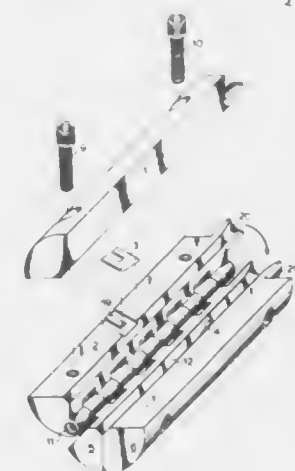
Michael Genovese, Hani Nassar, both of Hickory, and Terry Morgan, Conover, all of N.C., assignors to Slec Corporation, Hickory, N.C.

Filed May 30, 1986, Ser. No. 868,525

Int. Cl.<sup>5</sup> H02G 1/12

U.S. Cl. 30—90.8

11 Claims



1. A tube slitting tool, comprising:

- first and second blocks each having a groove in a face thereof;
- securing means for mounting said blocks to each other in a closed position, the grooves forming a passage through which a tube is passable in the closed position; and
- first and second spaced apart blades mounted on the blocks so as to extend into the interior of the passage at an angle of 180 degrees with respect to each other in a common plane containing the longitudinal axis of the passage, said first and second blades not diametrically opposed by any blade, said first and second blades being on opposite sides of a plane perpendicular to the longitudinal axis of the passage, when the blocks are in the closed position.

4,947,550

**GUIDEBAR WITH OIL CHANNELS**

Gerhard Wenzel, Gavle, Sweden, assignor to Sandvik AB, Sandviken, Sweden

Filed Mar. 21, 1989, Ser. No. 326,878

Claims priority, application Sweden, Mar. 24, 1988, 8801086

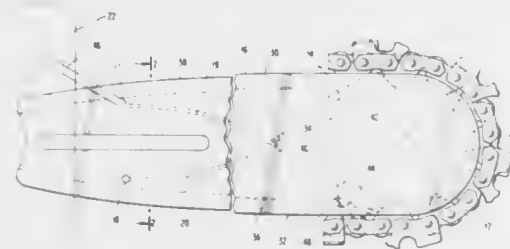
Int. Cl.<sup>5</sup> B23D 59/04, 59/00; B25F 3/00; B23Q 11/12

U.S. Cl. 30—123.4

7 Claims

1. A guidebar for chainsaws comprising a middle plate and two outer plates all welded together, front ends of said outer plates defining a nose of said guidebar, a front end of said middle plate terminating rearwardly of said front ends of said outer plates to define a space between said outer plates, a toothed nose sprocket mounted in said space for guiding a sawchain from an upper edge to a lower edge of said guidebar, at least one oil channel formed in said middle plate and extend-

ing forwardly to a discharge opening disposed in said middle plate at a lower rear side of said space, the discharge direction of said discharge opening having a forward component and a

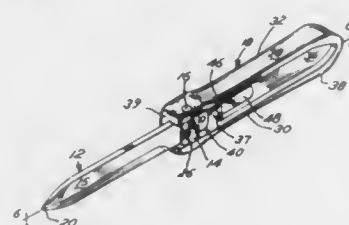


laterally downward component for applying oil to a lower portion of said sprocket and to a portion of said lower edge of said guidebar disposed rearwardly of said sprocket.

**4,947,551**  
**LATERALLY FOLDABLE LOCK KNIFE**  
David Deisch, 71200 CR 7, Nappanee, Ind. 46550  
Filed Jan. 28, 1989, Ser. No. 372,912  
Int. Cl.<sup>5</sup> B26B 3/00

U.S. Cl. 30—161

4 Claims



1. A laterally folding knife comprising a handle, a knife blade having first and second opposite flat surfaces and a proximal end, means connecting said knife blade proximal end to said handle for allowing pivotal movement of the knife blade between a retracted position wherein said blade first flat surface is positioned adjacent to said handle with said second flat surface exposed, and an extended operative position wherein said blade is longitudinally aligned with said handle, means carried by said handle for locking said blade into both of its said retracted and extended positions, wherein said blade proximal end includes a notch, said proximal end notch being spaced from said handle when said blade is in its said extended position, said locking means having a first protrusion for engaging said notch to lock said blade in its said retracted position.

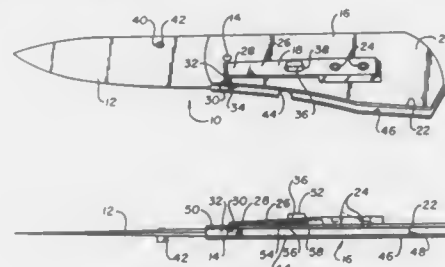
**4,947,552**  
**FOLDING KNIFE WITH POSITIVE LOCK**  
Gary L. Barnes, New Windsor, Md., assignor to Barnes International Cutlery, New Windsor, Md.  
Filed May 8, 1989, Ser. No. 349,044  
Int. Cl.<sup>5</sup> B26B 1/04

U.S. Cl. 30—161

7 Claims

1. A positive locking folding knife comprising:  
a knife blade,  
a handle, said blade having a tang with a pivotal connection to said handle,  
said tang having notches extending radially from said pivotal connection on one side of said tang,  
a resilient bridge beam spring having a thicker end attached to a side of said handle,  
said bridge having a resilient thinner area raised from

contact with said side, said bridge having a free end terminating  
said bridge having a free end terminating in an inwardly directed foot,  
said foot engaging one of said notches when said blade is in its open position,

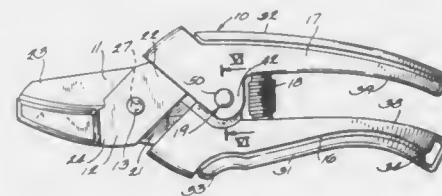


said foot engaging another of said notches when said blade is in its closed position, and  
lift means to lift said foot from said notches and out of the path of said tang when rotation between open and closed positions is desired.

**4,947,553**  
**SNIPS HAVING BUTTON LOCKING MECHANISM**  
Roy B. Bendickson, Merrill, and Robert A. Seaton, Wausau, both of Wis., assignors to Fiskars Oy Ab, Helsinki, Finland  
Continuation-in-part of Ser. No. 227,982, Aug. 3, 1988, Pat. No. D. 305,090. This application Nov. 14, 1988, Ser. No. 271,201  
Int. Cl.<sup>5</sup> B26B 13/00

U.S. Cl. 30—262

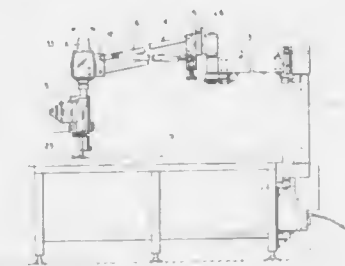
8 Claims



1. A hand tool, comprising:  
a pair of jaws;  
a pivot uniting said jaws for scissor movement about said pivot;  
a pair of handles for actuating said jaws;  
means for resiliently biasing said jaws to an open position; and  
a releasable locking mechanism for securing said jaws in a closed position, including a pair of offset, inwardly directed, first and second projections on said handles having respective first and second holes therethrough configured to become coaxially aligned with each other when said jaws assume a closed position, and means disposable in said holes for holding said jaws in a closed position against the force of said jaw biasing means,  
wherein said holding means comprises a button mechanism disposed in said first hole for movement in a direction transverse to said scissor movement, said first projection having a radially inwardly extending flange disposed in said first hole thereof on which said button mechanism is movably mounted, and wherein said first projection further comprises means, which coacts with said flange, for substantially preventing rotation of said button mechanism within said first hole.

**4,947,554**  
**CLOTH CUTTING APPARATUS**  
Yasuo Katumata, Yokohama, Japan, assignor to KM Cloth Cutting Machine Co., Ltd., Japan  
Filed Jan. 23, 1989, Ser. No. 299,769  
Claims priority, application Japan, Jan. 22, 1988, 63-5891[U]  
Int. Cl.<sup>5</sup> B26B 27/00, 19/04; B24B 7/00; B23Q 3/00  
U.S. Cl. 30—275.4

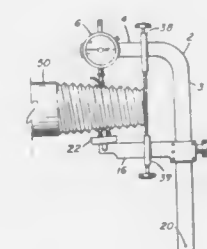
4 Claims



1. A cloth cutting apparatus comprising:  
a first arm rotatably connected to a pillar, said first arm rotatable in a horizontal plane;  
a second arm rotatably connected to said first arm at a support member, and comprising two substantially parallel arm members, said second arm rotatable in a horizontal plane;  
a means for cutting cloth movably connected to said second arm, said cutting means moveable within a vertical plane defined by said second arm;  
a cylinder and piston assembly connected between said second arm and said support member for defining a force for supporting the second arm; and  
means for selectively adjusting the contact pressure of the cutting means by altering the connection point of the cylinder and piston assembly relative to said support member.

**4,947,555**  
**HAND HELD PITCH DIAMETER GAUGE**  
Charles H. Allen, III, Franklin Park, Pa., assignor to Allen Gauge & Tool Company, Pittsburgh, Pa.  
Filed Feb. 10, 1989, Ser. No. 310,050  
Int. Cl.<sup>5</sup> G01B 3/40  
U.S. Cl. 33—199 R

58 Claims

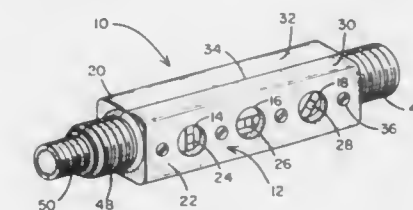


1. A pitch diameter gauge comprising:  
a. a gauge body;  
b. a first arm attached to said body and extending perpendicular outward therefrom;  
c. a second arm attached to said body and extending perpendicular outward therefrom along a same side as said first arm, with said second arm spaced from and substantially parallel to said first arm, and with one of said first arm or said second arm adjustable along said body and including means for locking said adjustable arm to said body in a desired location;  
d. a single ball contact connected to one of said arms in a

manner which permits movement of said single ball with respect to the other of said arms in a plane parallel to said arms and along a line perpendicular to both arms;  
e. a base pivotally mounted near an end of the other of said arms and having a pair of spaced ball contacts mounted thereto along a surface opposite said associated arm, with said single ball contact and said pair of ball contacts either both oriented toward each other or both oriented away from each other, with said pair of ball contacts positioned along a line parallel to a longitudinal axis of said associated arm, with said base pivotable about an axis perpendicular to a plane parallel to said first and second arms, and with said pivot axis of said base located in a line extending perpendicular to said first and second arms through said single ball contact and passing between said pair of ball contacts;  
f. an indicator means mounted to said gauge; and  
g. moveable means connecting said single ball contact to said indicator means, whereby movement of said single ball contact is detected by said indicator means.

**4,947,556**  
**PLUMBER'S LEVEL**  
Todd F. Pell, 868 Winterberry Ct., Woodbury, Minn. 55125  
Filed Jan. 31, 1990, Ser. No. 473,057  
Int. Cl.<sup>5</sup> G01C 9/28  
U.S. Cl. 33—370

6 Claims



1. A plumber's level for aligning vertical and horizontal runs of piping comprising:  
(a) a housing block having first and second ends, a longitudinal axis and a plurality of viewing ports formed in at least one side surface thereof;  
(b) at least one cylindrical stub formed at said first end, said stub having an outer diameter of a predetermined size and being threaded in accordance with a standard convention; and  
(c) a liquid filled tubular vial spirit level bubble disposed in each of said plurality of viewing ports, said vial in one of said ports being parallel to said longitudinal axis and the vial in another of said viewing ports being perpendicular to said longitudinal axis.

**4,947,557**  
**COORDINATE MEASURING MACHINE**  
Vladas-Algis A. Gapsbis, Vilnius; Kyastutis P. Dzidolikas, Kaunas; Juozas-Stasis Kumetaitis, and Albinas J. Kasparaitis, both of Vilnius, all of U.S.S.R., assignors to Vilnussky Filial Experimentalnogo Nauchno-Issledovatel'skogo Instituta, Vilnius, U.S.S.R.  
PCT No. PCT/SU88/00107, § 371 Date Jan. 4, 1989, § 102(e) Date Jan. 4, 1989, PCT Pub. No. WO88/08955, PCT Pub. Date Nov. 17, 1988  
PCT Filed May 10, 1988, Ser. No. 299,830  
Claims priority, application U.S.S.R., Dec. 5, 1987, 4242410  
Int. Cl.<sup>5</sup> G01B 7/03

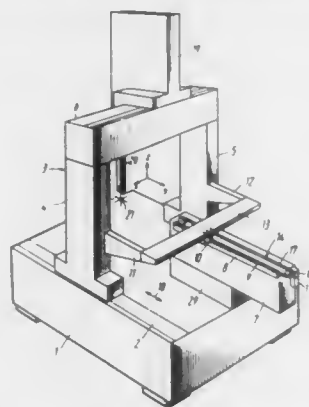
U.S. Cl. 33—503

14 Claims

1. A coordinate measuring machine, comprising a base (1), a portal (3) displacing along guides (2) located on the base (1) and embracing the measurement zone, a rigid cross member (13) associated with posts (4, 5) of the portal 3, a mechanism



(14) for actuating the portal (3), interacting with the rigid cross member (13), and a measuring system for displacement of the portal (3), having a measurement scale (8) connected with the base (1), and a measuring head (10) associated with the rigid cross member (13), characterized in that it has a post (7) to arrange the measuring system of displacement of the portal (3),



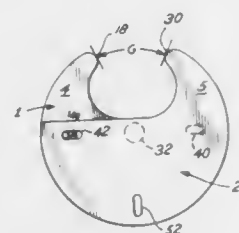
which is mounted on the base (1) equidistant from the posts (4, 5) of the portal (3) and which carries the measurement scale (8) of the measuring system of displacement of the portal (3) in a manner that the straight line, which is the extension of the longitudinal axis of the measurement scale (8), crosses the measurement zone.

**4,947,558**  
**HAND HELD MEASURING DEVICE**  
William G. Cummins, 40 West, 781 Norris Rd., Aurora, Ill. 60506

Filed Aug. 2, 1989, Ser. No. 388,970  
Int. Cl.<sup>5</sup> G01B 3/16, 3/40

U.S. Cl. 33—797

4 Claims



- I. A measuring device comprising:
- a first semi-round plate element having at least one contact point;
  - a second semi-round plate element having at least one contact point, the outer configuration and the size of each plate element being substantially the same;
  - means for pivotally connecting said first plate element to said second plate element wherein the contact points for said first and second plate elements oppose each other to define adjustable reference points for measurement;
  - at least one graduated scale on said first plate element operatively associated with the contact points of the first and second plate elements;
  - at least one graduated scale on said second plate element operatively associated with the contact points of the first and second plate elements;
  - means on the second plate element for indicating a selected graduation on said first plate element scale and the associated indicating means cooperate to define the relative dimension between the contact points; and
  - means on the first plate element for indicating a selected graduation on said second plate element scale whereby said second plate element scale and indicating means

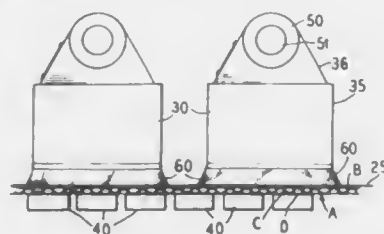
cooperate to define the relative dimension between the contact points.

**4,947,559**  
**AIR PRESS SYSTEM**  
Peter Basler, Verona; Robert Lancaster, Berlin, both of N.J., and Gunther Weiskopf, New York, N.Y., assignors to Bobst, SA, Lausanne

Filed Apr. 6, 1989, Ser. No. 334,601  
Int. Cl.<sup>5</sup> F26B 19/00

U.S. Cl. 34—70

9 Claims



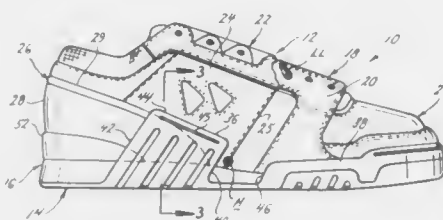
1. An air press for drying corrugated cardboard, said press comprising a frame, a plurality of heating means arranged along the length of the frame for drying web material being transported thereover, a continuous belt for moving the web material over the plurality of heating means, a plurality of individual plenums, each of said plenums having a chamber under pressure and with a peripheral edge, said plenums being mounted on the frame with the peripheral edges facing the belt and each plenum having means including brushes on the peripheral edge of the chambers engaging the belt for maintaining the pressure in the chamber on said belt to urge the belt into contact with the web material.

**4,947,560**  
**SPLIT VAMP SHOE WITH LATERAL STABILIZER SYSTEM**  
Rory W. Fuerst, Menlo Park, Calif., and James E. Granville, San Antonio, Tex., assignors to Kaepa, Inc., San Antonio, Tex.

Filed Feb. 9, 1989, Ser. No. 308,254  
Int. Cl.<sup>5</sup> A43B 7/18, 7/14

U.S. Cl. 36—88

11 Claims



I. In a split vamp shoe:

- an upper including a lower vamp section, an upper vamp section having an upwardly extending front edge, a heel section and a toe section and an instep section in the area corresponding generally to the arched middle portion of the foot, said vamp sections having means for adjusting the fit of said sections independently of each other and said sections defining a hinge zone adjacent said front edge facilitating movement of said vamp sections relative to each other;
- an outsole including a body portion extending lengthwise of the upper and having a rear end and a front end and an instep area in the area corresponding generally to the

arched middle portion of the foot and a first set of opposed, upwardly extending side portions extending generally over the instep area and extending into and operatively attached to the instep section of the upper and having a rear edge spaced forwardly from the rear end of the outsole and a front edge generally adjacent the front edge of the upper vamp section and further defining said hinge zone and providing lateral stiffening and support for the instep section of the upper above the instep area of the outsole; and

- a midsole disposed between said upper and said outsole and attached to said outsole.

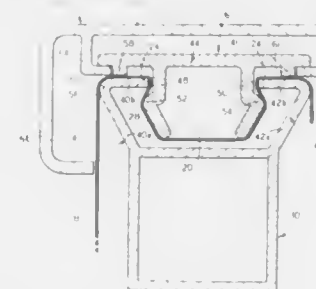
**4,947,561**  
**FRAME FOR CLOTH OR ARTISTIC CANVASES**  
Thierry Delacroix, Paris, and Pascal Lefebvre, Levallois Perre, both of France, assignors to Cabinet Beau, Paris, France

Filed Jan. 23, 1989, Ser. No. 300,675  
Claims priority, application France, Jan. 26, 1988, 88 00876; Dec. 7, 1988, 88 16082

Int. Cl.<sup>5</sup> D06C 3/08

U.S. Cl. 38—102.91

8 Claims



1. A frame comprising a plurality of rectilinear sections assembled to form a predetermined polygonal shape, said rectilinear sections comprising channel members (10, 12, 14) having several sides, each channel member having at least one longitudinal groove (20) along one of the sides thereof, said groove being suited for receiving the edge of a cloth (28) mounted on said frame, and an elongated tensioning means (26) extending around the entire frame and held securely in said groove (20), wherein said tensioning means is an endless band, the cross-sectional width of which is substantially equal to the width of said groove (20), wherein each of said channel members (10, 12, 14) further comprises a track portion (16) substantially opposite said at least one groove, and slides (40) running along said track.

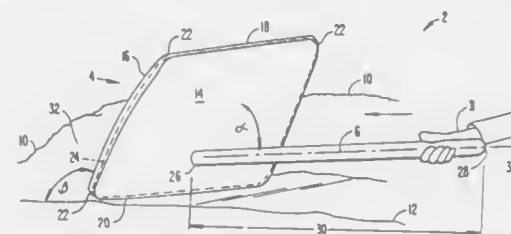
**4,947,562**  
**SELF-LOADING SNOW REMOVAL TOOL**  
James W. Williamson, P.O. Box 93, Tahoe City, Calif. 95730

Filed Jan. 25, 1989, Ser. No. 301,425

Int. Cl.<sup>5</sup> E01H 5/00

U.S. Cl. 37—197

11 Claims



1. A hand operated self-loading tool for removing snow from a surface by pushing and pulling the tool, comprising:

a blade including first and second faces, and first and second spaced apart edges, each edge defining a substantially rounded cross-section, the blade defining a neutral plane; a handle attached to the first face, at an angle of about 65° to about 85° with respect to the neutral plane;

the handle permitting a user to push or pull the blade to remove snow from the surface, the second face pushing the snow when the second edge is opposite the surface, the first face pulling the snow when the first edge is opposite the surface;

said angle between the handle and the blade causing the snow being removed to press against the second face and maintain the second edge of the blade opposite the surface while pushing the tool when the handle is substantially parallel to the surface, and said angle causing the snow being removed to press against the first face and maintain the first edge of the blade opposite the surface while pulling the tool when the handle is substantially parallel to the surface.

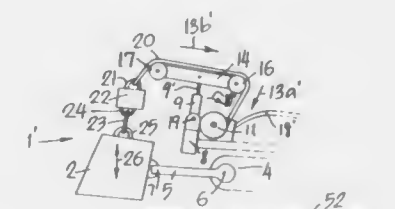
**4,947,563**  
**VEHICLE PLOW-SUSPENSION SHOCK-ABSORBER**  
Paul T. Pfister, Jr., R.R. 3, Box 568, Spruce Run Rd., Glen Gardner, N.J. 08826

Filed Feb. 20, 1990, Ser. No. 481,635

Int. Cl.<sup>5</sup> E01H 5/06

U.S. Cl. 37—231

14 Claims



1. A motor vehicle plow-device for attenuating shock to a vehicle's vehicular support structure when a suspension means is mounting a plowing blade structure thereon, comprising in combination: a plowing blade structure having a predetermined large mass, substantially upwardly-extending suspension means mounted on said plowing blade structure for substantially downwardly suspending the plowing blade structure when the plowing blade structure is in a lifted suspended state and through which said plowing blade structure is alternately intermittently raised to a suspended position upward from and intermittently lowered from a suspended position downwardly to a predetermined plowing non-suspended position, and said suspension means including a vehicular mounting means for mounting of the suspension means on a retraction means mounted on and supported by vehicular support structure of a motor vehicle such that the retraction means mounted and supported on a vehicular support structure is alternately intermittently actuatable to lower the plowing blade structure downwardly from a suspended position toward or to a non-suspended position and alternately intermittently actuatable to raise the plowing blade structure upwardly from a non-suspended position to or toward a suspended position, the improvement comprising said suspension means including separate opposite upper and lower ends jointly include opposing first and second compressing structures respectively, and a resilient means compressibly mounted therebetween such that said resilient means becomes compressed when said upper and lower ends move apart from one-another while said plowing blade structure is in a lifted or suspended state and such that said resilient means becomes expanded when said upper and

lower ends move toward one-another, whereby intermittent shocks of intermittent gravitational pull on predetermined large mass of the plowing blade structure in a lifted state for a motor vehicle's vehicular support structure mounting the vehicular mounting means during movement of the motor vehicle over rough or bumpy terrain is attenuated by intermittent compressions of the resilient means resulting from the intermittent shocks.

4,947,564

## INFORMATIONAL TRACKING CALENDAR

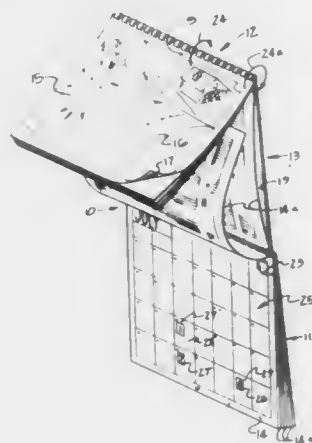
James S. Reece, and Jonathan T. Reece, both of 420 N. Harding, Wichita, Kans. 67208

Filed May 22, 1989, Ser. No. 354,807

Int. Cl.<sup>5</sup> G09D 3/00

U.S. Cl. 40—110

9 Claims



1. A calendar for orienting selected sheets upon the happening of an event comprising:

- (a) a lower portion comprising a plurality of sheets wherein each sheet represents a selected period of time;
- (b) an upper portion comprising a plurality of sheets containing printed information thereupon said sheets having a length and width;
- (c) a center portion having a length and width substantially the same as one of said plurality of sheets;
- (d) loose-leaf means for binding said plurality of sheets in said upper portion to said center portion so that said plurality of sheets extend over said center portion and said plurality of sheets maintain a selected sequence; and,
- (e) loose-leaf means for binding said plurality of sheets in said lower portion to said center portion,

whereby a selected sheet of said lower portion can be exposed by positioning said preceding sheets of said lower portion to said center portion and wherein a selected sheet from said upper portion can be positioned on top of said preceding sheets from said lower portion on said center section.

4,947,565

## PICTURE FRAMING ASSEMBLY

Clyde E. Shadwell, Rte. 5, Box 245D, Bemidji, Minn. 56601

Filed Feb. 7, 1989, Ser. No. 307,350

Int. Cl.<sup>5</sup> A47G 1/06

U.S. Cl. 40—152

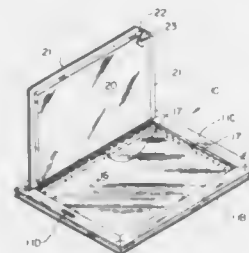
1 Claim

1. In a rectangular picture frame having a front and rear surface and a conventional recessed cross section for accommodating a rigid transparent sheet, a mat, a picture to be displayed in the frame and a rigid backing sheet, all seated therein, the improvement which provides for convenient accessibility to and closure of the recessed cross section for quickly mounting and changing the picture to be displayed, which comprises:

- a. a rectangular transparent sheet seated in the recessed cross

section of the frame and semi-permanently mounted to the frame,

- b. a rectangular, rigid backing sheet seated in the recessed cross section of the frame rearwardly of the transparent sheet, hinged to the frame along one edge thereof by means of adhesive tape extending across the joint between the edge of the backing sheet and the frame, and releasably secured to the frame along the other edges thereof by means of adhesive tape extending across the joint between the frame and the backing sheet,



- c. a rectangular mat seated in the recessed cross section of the frame between the transparent sheet and the backing sheet having an adhesive strip on the surface of the mat facing the backing sheet for releasably securing the picture to be displayed to the mat, and

- d. means providing for access to one corner of the backing sheet for swinging the backing sheet about the hinged edge thereof, thereby exposing the picture, said means consisting of the rectangular backing sheet having a triangular corner section removed.

4,947,566

## PHOTOGRAPH MAILING UNIT

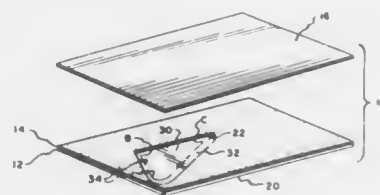
Michael D. Hoebel, 116 Calvin Ct. North, Tonawanda, N.Y. 14150

Continuation of Ser. No. 616,707, Jun. 4, 1984, abandoned. This application Oct. 28, 1988, Ser. No. 266,218

Int. Cl.<sup>5</sup> A47G 1/06; G09F 1/12

U.S. Cl. 40—158.1

1 Claim



1. A postal card assembly for mailing and displaying a photograph, said assembly comprising:

- a relatively rigid panel of card material having a writing surface on one side thereof and including a central portion and a marginal portion, said relatively rigid panel being provided with a frangible tearline positioned along the perimeter of said central portion so as to permit said central portion to be separated by hand from the marginal portion and to be moved relative to the marginal portion between a first condition at which said central and marginal portions are coplanar and a second condition at which said central portion extends angularly from said one side of said relatively rigid panel, said central portion provided an easel;

- a coating of a pressure sensitive adhesive layer upon the other side of said panel so as to cover no more than said marginal portion thereof so that when said photograph is

operatively placed into contact with said other side of said panel, said central portion does not adhere to said photograph and said boundary portion can be separated by hand from said marginal portion as aforesaid for providing an easel; and

- a protective releasable backing sheet positioned in contact with said adhesive coating, and which is removed prior to positioning a photograph onto the panel.

4,947,567

## LABEL TAPE

Klaus-Dieter Hermann, Ritterweg 17, D-6932 Hirschhorn, Fed. Rep. of Germany

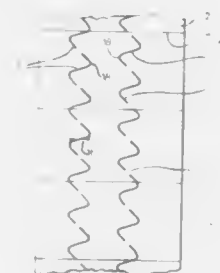
Filed Jan. 27, 1989, Ser. No. 302,432

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802341

Int. Cl.<sup>5</sup> G09F 3/03

U.S. Cl. 40—299

5 Claims



1. A label tape comprising, self-adhesive labels sticking on a carrier strip, said labels being separated from each other by cuts running mainly transverse to a longitudinal axis of the label tape and being subdivided each into sections by at least two cutting lines in form of periodic curves running in a longitudinal direction of the label tape, and having spaced peaks wherein the height of the labels measured in longitudinal direction of the label tape is greater than the periodic length of the cutting lines, with the height of a label being aliquant to the periodic length of the cutting lines, with the form of the cutting lines being chosen such that parts of the cutting lines confine an angle of not more than 90 degrees, with the curves of the cutting lines of the label tape being staggered in longitudinal direction, and with the curve of one cutting line differing from the curve of the other cutting line along the length of the labels such that peaks of each cutting line face towards the other cutting line at locations spaced from the peaks of the other cutting line.

4,947,568

## WIRE IDENTIFICATION DEVICE

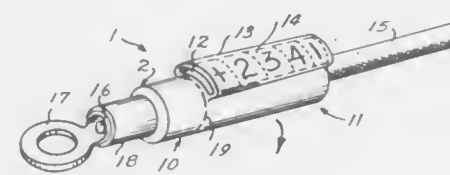
Alfredo De Barbieri, 3812 Fort Worth Ave., Alexandria, Va. 22304

Filed Dec. 14, 1988, Ser. No. 284,376

Int. Cl.<sup>5</sup> G09F 3/00

U.S. Cl. 40—316

12 Claims



1. An identification device for an electrical wire, comprising:

- a cylindrical left portion adapted to be mounted on a wire to be identified;
- a cylindrical right portion severably attached to said left

portion and adapted to be severed and slid transversely over the left portion to frictionally engage the left portion, said right portion comprising engaging means for frictionally engaging said left portion when the right portion is slid over the left portion;

an identifying portion connected to the right portion, and for visibly displaying identification means.

4,947,569

## DIALING CARD FOR TELEPHONES

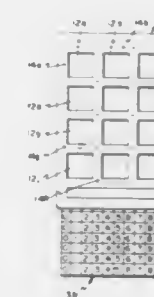
Paul B. Brooks, 4102 Peakland Pl., and Robert E. Flippin, 1822 Clayton Ave., both of Lynchburg, Va. 24503

Filed Jan. 4, 1989, Ser. No. 293,500

Int. Cl.<sup>5</sup> G09F 3/00

U.S. Cl. 40—337

6 Claims



1. A card universally programmable to facilitate the dialing of a selected one of a plurality of telephone numbers on a telephone having a given number of dialing elements disposed in a fixed arrangement, said selected one telephone number having a selected sequence of characters, said card having a plurality of openings therethrough of a number and arrangement corresponding respectively to said given number and said fixed arrangement of the telephone dialing elements, each of said openings having a region which is adjacent to said opening and bearing a unique color to identify only that opening and the corresponding dialing element of the telephone from all other of the given number of dialing elements of the telephone, and a number of separable indicia elements each bearing one of said unique colors wherein said plurality of separable indicia elements are removably connected to the card, said number of indicia elements being sufficiently large so that there is at least one indicia element bearing each unique color, and means for receiving and mounting said indicia elements in an order programmed in accordance with said given sequence of characters of said selected one telephone number.

4,947,570

## DISPLAY UNIT

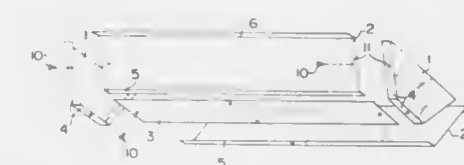
Proctor May, Mississauga, Canada, and Jack Hughes, New York, N.Y., assignors to Wesco Promotions, Inc., Toronto, Canada

Filed Dec. 22, 1988, Ser. No. 289,988

Int. Cl.<sup>5</sup> G09F 13/00

U.S. Cl. 40—553

14 Claims

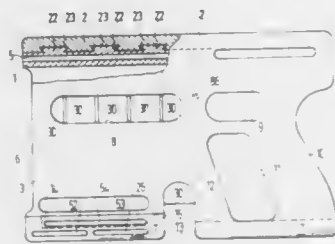


1. A display unit adapted to be suspended between grid members of a suspended ceiling, said unit comprising, at least



five translucent panels including two side panels, tow end panels, and a bottom panel, said end panels having first flanges supporting said side and bottom panels, said side panels having second flanges for supporting said bottom panel and third flanges adapted to fit between said grid members and support said unit wherein, at least one of said panels displays a message.

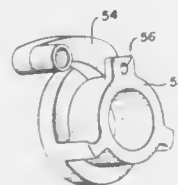
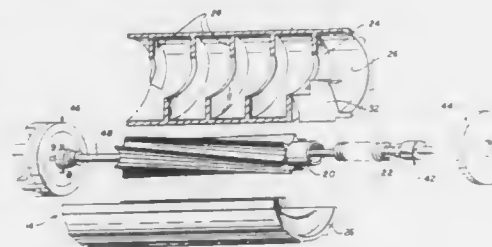
**4,947,571**  
**SELF-LOADING PISTOL**  
Ernst Kitzmann, Niederringel 63, 4540 Lengerich, Fed. Rep. of Germany  
Filed May 13, 1988, Ser. No. 193,709  
Claims priority, application Fed. Rep. of Germany, May 13, 1987, 3716009  
Int. Cl.<sup>5</sup> F41A 9/38, 9/68  
U.S. Cl. 42—15



1. A self-loading pistol including:
  - a frame having a rearward pistol portion defining a pistol handle (10) and a forward pistol portion including upper and lower frame parts (2 and 7) and spaced parallel side walls (3) and (3) extending between said frame parts (2 and 7);
  - a barrel (1) attached to said upper part frame (2), a magazine receiving space (6) defined by a lower surface of said barrel (1) and an upper surface of said lower frame part (7) and between said side walls (3) and (4), and by a contact surface (12) on said pistol handle (10);
  - a plurality of magazines (30) adapted to be disposed in said space (6) and arranged next to each other and parallel to a longitudinal direction defined by said barrel (1), each magazine including a plurality of cartridges (30') arranged parallel to said longitudinal direction and spring means (30'') biasing said cartridges (30') for successive movement to said barrel (1);
  - fastening means between adjacent sides (42,43) of said magazines (30) for unitary movement thereof along the longitudinal direction;
  - each magazine (30) having a rear surface (42) and a front surface (43), each magazine (30) having its rear surface (42) facing said contact surface (12) and its front surface (43) facing the rear surface (42) of the next magazine (30-2);
  - the rear end of said magazine receiving space adjacent said contact strip (12) having a top portion defining a cartridge chamber communicating with the barrel bore (5) and a lower portion defining a magazine ejection cavity (13) through which an empty magazine is discharged;
  - a magazine conveyor device on said lower frame part (7) for moving said plurality of magazines (30) along the longitudinal direction toward said contact surface (12);
  - said conveyor device having slide means (16) being manually reciprocated relative to said lower frame part (2);
  - said conveyor device including a flat spring (20) having a free end (21) for lifting each magazine (30) into said cartridge chamber as it slides against contact surface (12);
  - a stop element (86) on said contact strip (12) adapted to define the limit of lifting movement of said each magazine (30-1) into said cartridge chamber;
  - said free end (21) engaging said stop element (86) to retain said each magazine (30-1) in firing position until released by said free end (21) as it moved away from said element

(86) whereby said each magazine (30-1) permitted to discharge through the ejection cavity (13).

**4,947,572**  
**LARGE CAPACITY AMMUNITION MAGAZINE**  
Michael K. Miller, and Warren D. Stockton, both of 405 E. 19th St., Bakersfield, Calif. 93305  
Division of Ser. No. 260,052, Oct. 20, 1988, Pat. No. 4,888,898.  
This application Aug. 11, 1989, Ser. No. 392,550  
Int. Cl.<sup>5</sup> F41C 25/10; F41D 10/12, 10/24  
U.S. Cl. 42—49.01

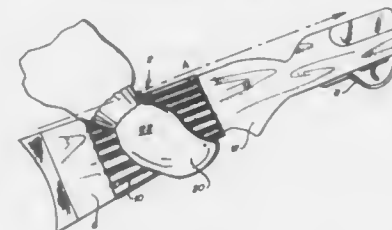


1. An ammunition magazine for a gun, said magazine being of an elongated, generally cylindrical configuration, said magazine comprising an outer housing, a drive member for ammunition cartridges rotatably mounted within said outer housing, a drive spring strong enough to rotate said drive member within said housing even when said magazine is filled with cartridges, manual spring winder means for said drive spring mounted on said magazine, said winder means including a spring winding handle, means to pivotally mount said handle on said winder means on an axis parallel to and spaced away from the axis of said generally cylindrical magazine, said handle being so mounted that said spring winding handle may be extended radially outward from said magazine to provide greater leverage and to facilitate winding of said drive spring and to allow said spring to be manually wound in a continuous motion without release of said spring winding handle, said spring winding handle being curved in the planes of its motion on its said axis so that said spring winding handle may be radially retracted into said winder means when not in use so that said spring winding handle does not extend radially beyond the diameter of said magazine, and said winder means including a recess for receiving said spring winding handle when so retracted.

**4,947,573**  
**GUN STOCK MITTEN**  
Eric Bischoff, 4225 E. 182nd St., Prior Lake, Minn. 55372  
Filed Aug. 18, 1989, Ser. No. 395,662  
Int. Cl.<sup>5</sup> F41C 27/00; A41D 13/10  
U.S. Cl. 42—106

1. A gun stock sleeve with mitten for a right or left handed person carrying a shotgun, rifle, firearm or gun having a shoulder stock and a fore-end handgrip while in adverse weather conditions, comprising:
  - (a) an adjustable gun stock sleeve for fitting about and encircling multiple places on a gun, one place comprising the

- shoulder stock and another comprising the fore-end hand grip;
- (b) a mitten for covering said person's left or right trigger hand; and
- (c) means for quickly releasably attaching the mitten to the sleeve in a wearer selected location and orientation so that



the covered trigger hand may hold and carry the gun in any selected orientation while yet permitting quick withdrawal of the hand from the mitten without assistance of the person's other hand and grasping the trigger, sighting and shooting the gun without interference by the gun stock mitten and sleeve.

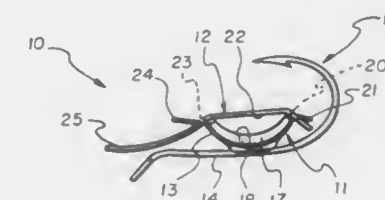
**4,947,574**  
**SPRING LOADED FISH HOOK ASSEMBLY**  
William Tapley, Woodhull St., Forestport, N.Y. 13338  
Filed Dec. 7, 1989, Ser. No. 447,569  
Int. Cl.<sup>5</sup> A01K 83/02  
U.S. Cl. 43—36



1. A latching, spring loaded, double-acting fish hook assembly comprising:
  - (a) a single strand of spring wire having a bend providing first and second legs extending from the bend to respective first and second terminal ends;
  - (b) first and second fish hooks each having a shank portion and a curved portion terminating in a sharp point;
  - (c) a first attachment member to which each of a portion of said first leg adjacent said first terminal end and said shank portion of said first hook are fixedly attached, thereby fixedly connecting said first leg to said first hook;
  - (d) a second attachment member to which each of a portion of said second leg adjacent said second terminal end and said shank portion of said second hook are fixedly attached, thereby fixedly connecting said second leg to said second hook;
  - (e) said wire being formed with a 360° loop to provide a torsion spring having unflexed and flexed positions wherein said first and second legs are in relatively widely and closely spaced, positions, respectively; and
  - (f) a unitary catch and trigger mechanism including a loop portion pivotally connecting said mechanism to one of said attachment members, a catch arm and a trigger arm extending in opposite directions from said loop portion, said mechanism and said first and second attachment members being so constructed and arranged, relative to said legs and said hooks, that when said legs are in said relatively closely spaced position said catch arm may be

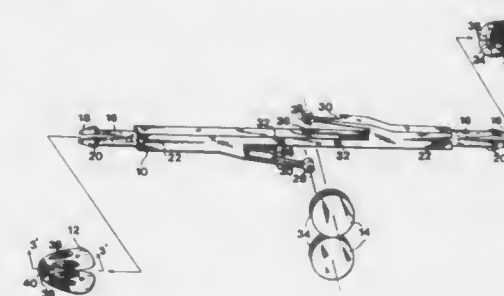
engaged with the other of said attachment members and said trigger arm extends in substantially parallel, spaced relation to the one of said hooks, attached to said one of said attachment means, movement of said trigger arm toward said one of said hooks releasing said catch arm from said other attachment member and permitting movement of said legs toward said relatively widely spaced position under the biasing force of said torsion spring.

**4,947,575**  
**BAIT HOLDER**  
Nick A. Yerkovich, 7439 S. 300 East, Midvale, Utah 84047  
Filed Nov. 14, 1988, Ser. No. 270,824  
Int. Cl.<sup>5</sup> A01K 83/06  
U.S. Cl. 43—44.4



1. A bait holder for retaining live bait therein, said bait holder being connectable to fishing hooks of the type having a solid, elongated shank, said bait holder comprising:
  - (a) a saddle member connectable to the fish hook shank, said saddle member having a support section, and a bait gripping section formed of a material having a friction gripping surface for frictionally gripping onto an item of live bait without puncturing or physically injuring the live bait, said bait gripping section being affixed to said support section;
  - (b) a bait retaining member having a bait gripping section formed of a material having a friction gripping surface for frictionally gripping onto the item of live bait without puncturing or physically injuring the live bait, said bait retaining member being manually attachable to said saddle member to define a closable loop; and
  - (c) a tab on said saddle member manually insertable into means defining a hole in said bait retaining member for removably connecting said bait retaining member to said saddle member in a manner to define said closable loop around the live bait positioned upon said saddle member.

**4,947,576**  
**FISH HOOK DISGORGER**  
Harold L. Hull, 401 Canyon Way, Sp. 43, Sparks, Nev. 89434, and Donnell J. Ekins, 4540 River Haven Dr., Reno, Nev. 89909  
Filed Mar. 27, 1989, Ser. No. 328,633  
Int. Cl.<sup>5</sup> A01K 97/00  
U.S. Cl. 43—535



1. A fish hook disgorger comprising: a shaft member, fishing

line engaging and disengaging members, means for retaining a hook, line locking means, said engaging and disengaging members being first and second knobs mounted at a first and second ends of said shaft, said knobs being hollow and having an interior chamber open at a first end and open at a second end of said knobs, said knobs having longitudinal slits extending along a side of said knobs and for the entire length of said knobs and opening into said knob chambers, said slits having a longitudinal center line extending in the same plane as the center line of a first and second groove beginning near a first and second end of said shaft member providing fishing line guide means, said grooves leading into said line locking means, said slits increasing longitudinally from a longitudinal center of said slits to a first end of said slits and to a second end of said slits, said slits having a first and second position said first position being closed with said second position being open, said second position being accomplished by the insertion of a fishing line, and said slits returning to said first position when said fishing line is captured in said interior chamber.

**4,947,577**  
**FISHING LURE CONTAINER**  
Wilfred Abbot, 18 Ronald Dr., Lancaster, N.Y. 14086  
Continuation-in-part of Ser. No. 220,837, Jul. 19, 1988, Pat. No. 4,813,173. This application Mar. 20, 1989, Ser. No. 326,022  
Int. Cl.<sup>5</sup> A01K 97/06  
U.S. Cl. 43—57.1 14 Claims



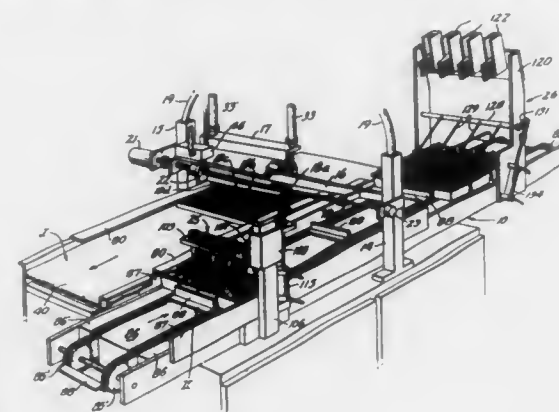
1. A lure container having means to facilitate folding, said container comprising a flexible main panel, at least two tiers of transparent tubes, and a panel closure means, said transparent tubes all comprising at least one opened end movably sealed or closed by closure caps, said closure caps being spring loaded in order to facilitate easy removal of a lure therefrom, said tubes having said opened ends to permit insertion and removal of a lure housed within each tube, said tubes when said container is in an open position being obliquely positioned in relation to the tubes in the next adjacent tier of tubes, each of said tubes when said container is in a folded position being interspersed between the tubes positioned in a row above or below it, said panel closure means also having means to suspend said lure container when said lure container is in an open position.

**4,947,578**  
**CONTROLLED RELEASE SYSTEM FOR INSECT ATTRACTANT**  
Douglas G. Anderson, Lakeville, and Keith D. Lokkesmoe, Burnsville, both of Minn., assignors to Ecolab Inc., St. Paul, Minn.  
Filed Jun. 16, 1989, Ser. No. 368,042  
Int. Cl.<sup>5</sup> A01M 1/20  
U.S. Cl. 43—131 27 Claims



1. A controlled release device for a volatile liquid insect attractant composition, which device comprises:  
(a) an enclosure for the volatile attractant composition, said enclosure having an aperture;  
(b) a volatile insect attractant comprising ethanol, a volatile ester or a mixture thereof held within said enclosure; and  
(c) a membrane permeable to the attractant vapor covering said aperture;  
wherein the device releases the attractant vapor at a rate of at least about 0.02 gm/hr.

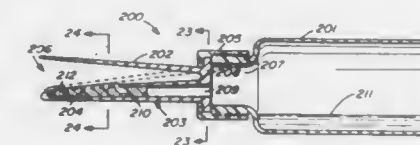
**4,947,579**  
**COMPUTER OPERATED AUTOMATIC SEEDLING PLANT TRANSPLANTING MACHINE**  
Richard Harrison; Deborah Harrison, both of Calverton, and Peter B. Zuhoski, Jr., Wading River, all of N.Y., assignors to Welton Steel Corporation, Welton, W. Va.  
Filed Oct. 19, 1988, Ser. No. 259,795  
Int. Cl.<sup>5</sup> A01C 00/00; A01G 00/00  
U.S. Cl. 47—1.01 34 Claims



1. A seedling pick-up and release device comprising a frame, a picking head guided with respect to said frame for vertical reciprocating strokes between upper and lower limits of picking-head reciprocation with respect to said frame, a picking slide guided on said picking head for vertical reciprocating strokes between upper and lower limits of picking-slide reciprocation with respect to said head, plural flexible prongs carried in spaced array by said picking slide and projecting downwardly below said picking slide, each of said prongs in unstressed condition extending in its own curvilinear course,

guide means forming part of said head and individually guiding the lower ends of said prongs in substantially parallel vertically oriented array when said picking slide is in its upper limit of reciprocation with respect to said head; whereby, in the course of a downward stroke of said picking slide with respect to said head, the lower ends of said prongs will clear said guide means and embark on the respective curvilinear courses of their unstressed condition, and further whereby, in the course of an upward stroke of said picking slide with respect to said head, the lower ends of said prongs will be retracted into the substantially parallel vertically oriented array determined by said guide means; and selectively operable means for actuating said head and slide strokes in such timed relation that the slide downstroke follows the head downstroke for a seedling pickup and the slide upstroke follows the head upstroke for a seedling discharge.

**4,947,580**  
**MANUAL DEVICES AND METHODS FOR SELECTIVE APPLICATION OF CHEMICAL SUBSTANCES TO PLANTS**  
James E. Moore, 555 Riviera Dr., Naples, Fla. 33940  
Continuation-in-part of Ser. No. 111,046, Oct. 20, 1987, abandoned, which is a division of Ser. No. 844,119, Mar. 26, 1986, Pat. No. 4,716,677. This application Jan. 5, 1989, Ser. No. 293,925  
Int. Cl.<sup>5</sup> A01M 21/00  
U.S. Cl. 47—1.5 4 Claims

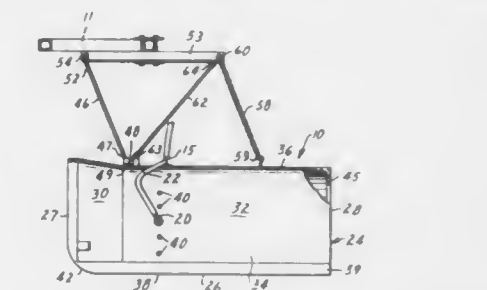


1. A method of using a hand-held applicator assembly for selectively and accurately applying liquid herbicide to a chosen plant without application to surrounding plants, said applicator assembly comprising a squeeze bottle made of a resilient material and having a threaded outlet, a pair of elongated tongs attached to said outlet by a threaded connector and providing a fully-shielded and elongated application zone between spaced distal portions of said tongs for accepting a portion of said chosen plant, an elongated applicator pad supported within said application zone by one of said tongs, and means for channeling said liquid herbicide from said bottle to said pad wherein at least one of said tongs is sufficiently resilient to press said portion of said chosen plant against said pad when said tongs are squeezed together by the thumb and a finger of a human hand while said bottle is held by said hand and to return said tongs to their original spaced positions when the squeezing is discontinued, said method comprising the steps of:

- (a) filling said squeeze bottle with liquid herbicide;
- (b) manipulating said bottle to cause said liquid herbicide to flow from said bottle and through said channeling means and into said applicator pad;
- (c) the thumb and a finger of said hand squeezing said tongs together to completely shield said applicator pad containing said liquid herbicide, while said hand holds and guides said applicator assembly among said surrounding plants to reach said chosen plant;
- (d) said thumb and finger then allowing said tongs to separate and receive a selected portion of said chosen plant into said application zone;
- (e) pressing said portion of said chosen plant against said pad to apply said liquid herbicide to said portion of said chosen plant; and
- (f) releasing said portion of said chosen plant and withdrawing said assembly with said tongs again squeezed together,

all without any of said liquid herbicide having been applied to any portions of said surrounding plants, wherein the tong supporting the applicator pad is hollow and is rotatable with respect to the other tong which is resilient, and said method further comprises the step of rotating the hollow tong so that said applicator pad is positioned towards and then away from the resilient tong.

**4,947,581**  
**SPRAY SHIELD ASSEMBLY**  
Steven W. Clausen, Clontarf Township, Swift County, and William A. Schwendemann, Jr., Cashel Township, Swift County, both of Minn., assignors to C.A.P., Inc., Benson, Minn.  
Filed Mar. 23, 1989, Ser. No. 327,558  
Int. Cl.<sup>5</sup> B05B 1/20  
U.S. Cl. 47—1.7 17 Claims



1. A spray shield assembly adapted to be connected to a support frame moved over plants growing from the earth in parallel rows to temporarily enclose the plants while liquids are sprayed onto them, said spray shield assembly comprising:  
liquid distribution means including means for defining an inlet adapted to be coupled to a source of liquid under pressure, at least two liquid outlet nozzles having outlet ends, and means for distributing liquid from said inlet to said outlet nozzles;  
an elongate resiliently flexible polymeric shield having a longitudinal axis, axially spaced front and rear ends, and defining a channel opening through one side and said front and rear ends in which channel the plants are temporarily positioned as the shield is moved over them, said shield comprising a leading portion converging axially from adjacent the front end toward said second end of said shield, and a generally semi cylindrical portion extending from the end of said leading portion opposite the front end of the shield toward the rear end of said shield, said semi cylindrical portion having a generally cylindrically concave inner surface, a convex outer surface, opposite side parts joined by a top part between said side parts, spaced edges generally parallel to said axis that define the open side of the channel, and an array of openings through each of said side parts with the openings in each array each disposed at a different distance from the adjacent edge;  
means attached to said top part for suspending said shield from the support frame with said edges adjacent the earth; and  
means for mounting each of said outlet nozzles in one of the through openings in a different one of said arrays to position the nozzles with their outlet ends projecting from the inside surface of the spray shield to direct spray in generally opposite directions at desired orientations relative to the edges and thereby to the plants along the rows.



4,947,582

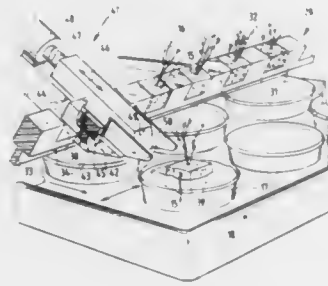
## APPARATUS AND METHOD FOR PLANTING OUT PLANTS

Visser, Anthony, 's-Gravendeel, Netherlands, assignor to Visser 's-Gravendeel Holding B.V., Netherlands  
Division of Ser. No. 68,351, Jul. 1, 1987, abandoned. This application Jul. 13, 1989, Ser. No. 379,255  
Claims priority, application Netherlands, Jul. 7, 1986, 86-01765

Int. Cl.<sup>5</sup> A01G 00/00

U.S. Cl. 47—101

11 Claims



1. Apparatus for planting out plants comprising a plurality of open top containers which have tops that lie substantially in a first plane, a holder of pieces of substrate having plants growing therein, said holder including an upper surface lying substantially in a second plane inclined to said first plane, and a reciprocating pushing element movable along a path which is inclined at an acute angle to said first plane.

4,947,583

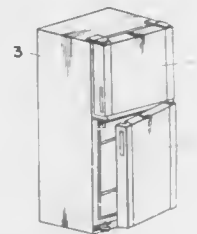
## OPENING/CLOSING DEVICE OF A DOOR MEMBER

Yoshio Inui, Nara; Masayoshi Osaka, Nara; Mitsuo Tanaka, Sakai, and Masao Miyamoto, Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed May 5, 1989, Ser. No. 347,924  
Claims priority, application Japan, May 10, 1988, 63-114248; Jun. 22, 1988, 63-154055; Sep. 24, 1988, 63-239362; Nov. 21, 1988, 63-294150; Dec. 5, 1988, 63-307718; Dec. 5, 1988, 63-307168; Dec. 5, 1988, 63-158352[U]; Dec. 5, 1988, 63-158259[U]; Dec. 5, 1988, 63-158260[U]; Dec. 26, 1988, 63-329930; Dec. 29, 1988, 63-169228[U]

Int. Cl.<sup>5</sup> E05D 15/50

U.S. Cl. 49—193

17 Claims



1. An opening/closing device for a door member which comprises:  
a pair of right and left hinge pins protrudingly provided at the opposite right and left side portions of either one of the door member and a main body on which said door member is mounted;  
a fixed plate provided in the other one of said door member and said main body, engaging grooves being defined in said fixed plate for detachably engaging said hinge pins from the opening side of the door member;  
a pair of latch plates rotatably provided at the opposite right and left side portions of said fixed plate, a latch groove being defined in each of said latch plates, each of said latch

grooves opening to the outer diameter side of said latch plate so that said latch plate is detachably engaged by said latch groove with said hinge pin to restrict the hinge pin in said engaging groove; and  
coupling means provided between said pair of latch plates for obstructing rotation of said one latch plate in association with the rotation of said other latch plate in a restriction-releasing direction;  
said coupling means including a pair of links each pivotally fixed to said fixed plate in a vicinity of said right and left latch plate and, a coupling link coupling one end portion of said pair of links,  
wherein a lock groove consisting of a slide guide portion and a stopper portion is formed generally in a nonlinear-shaped configuration in either one of said link and said latch plate, and a lock pin is protrudingly provided in the other one of said link and said latch plate for restricting rotation of the latch plate through engagement with said lock groove.

4,947,584

## AUTOMATIC DOOR BOTTOM

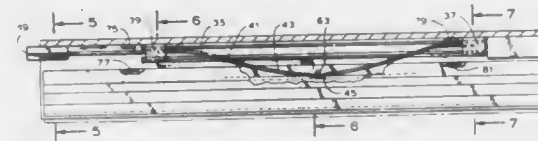
Elias Wexler, Scarsdale, N.Y., assignor to Zero International Inc., Bronx, N.Y.

Filed Sep. 27, 1988, Ser. No. 250,271

Int. Cl.<sup>5</sup> E06B 7/20

U.S. Cl. 49—307

12 Claims



1. An automatic door bottom comprising:  
(a) an inverted U-shaped channel having facing longitudinal rib members formed internally thereof dividing said channel into upper and lower internal sections, wherein said upper internal section is disposed along the closed portion of said U-shaped channel and said lower internal section is disposed along the open portion of said channel;  
(b) a drop bar assembly having first and second ends, wherein said drop bar assembly is disposed within said lower internal section, and wherein said drop bar assembly includes a flexible sealing element;  
(c) an adjustable length pushrod assembly mounted within said upper internal section of said channel and releasably held therein by a holding block, said assembly including a pushrod having first and second ends, wherein said second end extends out of one end of said upper section of said channel and wherein said second end is capable of sliding with respect thereto; said pushrod being located in said channel above the second end of said drop bar assembly;  
(d) spring means engaged with said first end of said pushrod and interconnected with said drop bar assembly to form a unitary assembly held in said channel by said holding block, said drop bar assembly and said flexible sealing element being forced partially out of said lower internal section of said channel when a force is applied to said second end of said pushrod driving it into said channel to actuate said spring means; and  
(e) first and second interactive magnet means, wherein said first magnet means is mounted in a fixed position in said upper internal section against movement and adjacent said pushrod and said second magnet means is connected to said drop bar assembly, beneath said first magnet means, said first and second interactive magnet means being of like polarity to repel each other, whereby when a force is applied to said second end of said pushrod to actuate said spring means said second end of said drop bar assembly is forced out of the channel into contact with a door sill

before said first end of the drop bar assembly due to the repulsion of said fixed magnet means.

4,947,585

## EXTERIOR DOOR CONSTRUCTION

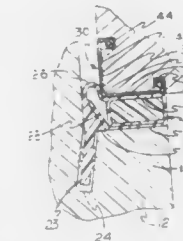
Norbert J. Guetle, Jr., Cincinnati, Ohio, assignor to Pease Industries, Inc., Fairfield, Ohio

Continuation-in-part of Ser. No. 143,543, Jan. 13, 1988, abandoned. This application Nov. 7, 1988, Ser. No. 268,096

Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 49—478

9 Claims



1. A door for hinged mounting in a frame including a lock side jamb, a hinge side jamb, a top jamb and a sill cooperating to define a door opening, each of said jambs including a stop establishing the closed position of a door mounted in said frame, and each of said lock side and top jambs being provided with magnetic weather stripping mounted to overlie said stop portion thereof,

(a) said door having at least the peripheral portions of the top and lock side edges made of non-magnetic material,  
(b) said door having a face designated for engagement with said stops such that said top and lock side edges interfit with said top and lock side jambs in the closed position of said door,  
(c) clip-like trim means of relatively hard magnetic metal having a vertical portion extending in enclosing relation with the corner of the lock side edge and the face of said door and having a horizontal portion extending in enclosing relation with the corner of the top edge and the face of said door for magnetically sealing engagement with said weather stripping,  
(d) each said trim means portion being a strip of said metal having in cross section a substantially L-shaped configuration providing said strip with two sides, said strip having a flange along the outer edge of each of the two sides of said L-shape extending inwardly of said L-shape,  
(e) said face and edges of said door each having a groove therein positioned to receive a respective said flange of said trim means, each of said flanges including an inwardly-curved edge portion having a total width equal to slightly more than the width of, and being compressed between the sides of, said groove in which the flange is received to secure said trim means to said door, and  
(f) the areas of said door face and edges enclosed by said strips being relieved to a sufficient extent to cause the outer surfaces of said strips to be substantially coplanar with the adjacent surfaces of said face and edge portions of said door.

4,947,586

## WINDOW SEAL AND GUIDE FOR FLUSH MOUNTED WINDOWS

Gerard Mesnel, Carrieres-sur-Seine, and Francois Mesnel, Neuilly-sur-Seine, both of France, assignors to Mesnel S.A., Carrieres-sur-Seine, France

Continuation-in-part of Ser. No. 24,527, Mar. 11, 1987, Pat. No. 4,843,763, which is a continuation-in-part of Ser. No. 885,731, Jul. 21, 1986, which is a division of Ser. No. 612,178, May 21, 1984, abandoned. This application Jul. 28, 1988, Ser. No. 225,161

Claims priority, application France, May 19, 1983, 83 08267; May 11, 1984, 84 07260; Mar. 19, 1986, 86 03886; Nov. 25, 1987, 87 16334

Int. Cl.<sup>5</sup> E06B 3/00

U.S. Cl. 49—488

6 Claims



1. A sealing and guiding element for the guiding and weathersealing of a movable window contained in a frame, comprising:

an extruded elastomer with metal backing comprising a first U-shaped part forming a grip suitable to be fitted on the frame of the movable window and a second U-shaped part turned the opposite way round to said first part and acting as a guiding and weathersealing member for the movable window, said second U-shaped part having a bight with a flexible resilient hinge positioned directly in said bight, wherein said hinge permits a dual freedom of movement to said second part, on the one hand pivoting in relation to the said first part and, on the other hand, in translation substantially in the plane of movement of the moveable window.

4,947,587

## CHAMBER FOR ABRASIVE POWDER DESCALING THE SURFACE OF A STRIP

Jury V. Lipukhin, Cherepovets, ploschad Metallurgov, 5, kv. 15; Leonid I. Danilov, Cherepovets, ulitsa Vereshchagina, 51, kv. 8; Anatoly N. Subbotin, Cherepovets, prospekt Pobedy, 120, kv. 14; Eduard A. Garber, Cherepovets, ulitsa M. Gorkogo, 85, kv. 17, and Viktor I. Abramenko, Cherepovets, prospekt Pobedy, 79, kv. 37, all of Vologodskaya oblast, U.S.S.R.

PCT No. PCT/SU88/00037, § 371 Date Oct. 14, 1988, § 102(e) Date Oct. 14, 1988, PCT Pub. No. WO88/06065, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 17, 1988, Ser. No. 294,487

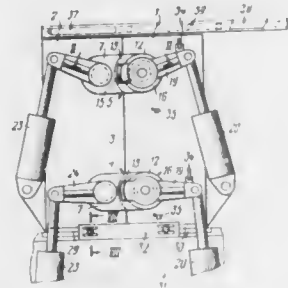
Claims priority, application U.S.S.R., Feb. 18, 1987, 4192538  
Int. Cl.<sup>5</sup> B21B 45/06

U.S. Cl. 51—17

2 Claims

1. A chamber for abrasive powder descaling of the surface of a strip comprising two halves of said chamber with means for closing said halves, sealing, drawing the halves apart along a plane of abutment along which the two halves mate, and departing of at least one half from the abutment plane, the chamber including at least two mechanisms for compacting the abrasive powder, each having two shafts secured in supports in different halves of the chamber with levers connected to hydraulic power cylinders for turning the shafts, CHARACTERIZED in that each means for closing, sealing and drawing the two halves of the chamber apart along the abutment plane comprises a ring secured on the support of one of the shafts of the mechanism for compacting the abrasive powder capable of

turning by said hydraulic power cylinder relative to the support and having two cams separated by a slot and arranged at a side of the support of the other shaft of the same mechanism for compacting the abrasive powder, said support provided



with two annular recesses divided by a slot to receive the cams, the lever of the shaft whose support is used for accommodating the ring having a pusher capable of movement by a drive to the slot between the cams.

4,947,588

## GRINDING TOOL

Johann Steger, Brunico, Italy, assignor to Birfield Trasmissioni S.p.A., Italy

Filed Jul. 13, 1987, Ser. No. 72,548

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623408

Int. Cl.<sup>5</sup> B24D 7/00

U.S. Cl. 51—206 R

6 Claims



2. A disposable grinding tool for attachment to a grinding tool carrier and a grinding machine, for rotation about an axis, the tool comprising an axially extending core member consisting essentially of ceramic material and having a first end and a second end, an axially extending threaded bolt projecting centrally from said second end for attachment of the tool to the tool carrier, one end of the bolt being permanently embedded and fixed in the ceramic material of the core member at said second end, an abutment member formed on said second end and surrounding said bolt for engaging the tool carrier when the tool is in use, said core member having an axially extending outer circumferential surface and at least two part-cylindrical preformed segments of a ceramically bonded grinding material, each segment extending around approximately 90 degrees of the core member circumference with an equal distance between them, said core member having at least two abutments extending transversely of the axis of said core member and extending inwardly of the outer circumferential surface extending from the second end of said core member and spaced from the first end of said core member, each of said segments having a first end located in the plane of the first end of said core and a second end spaced in the axial direction of said core

member from the first end and contacting one of said abutments, said segments being permanently fixed to the core member by an adhesive, said segments projecting radially outwardly from the circumferential surface in the region of the first end of said core member and in combination with the circumferential surface forming grooves between circumferentially adjacent said segments.

4,947,589

## SANDBLASTING VALVING DEVICE

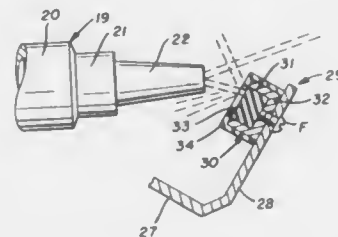
Fred Zwicker, Canfield, Ohio, assignor to Truman's Inc., Ohio Corporation, Canfield, Ohio

Filed Jul. 24, 1989, Ser. No. 383,730

Int. Cl.<sup>5</sup> B24C 3/02

U.S. Cl. 51—410

3 Claims



1. An improvement in a sandblasting valve device having a main body member, a grip portion and a nozzle support portion thereon, a wear tube removably positioned in said nozzle support portion, a nozzle communicating with said wear tube, a trigger on said nozzle support portion, the improvement comprising: a valve support, a valve element assembly on an end of said valve support comprising an annular seal holder having a cavity of a known diameter and depth, a resilient sealing plug of a matching diameter and depth positioned in said seal holder, a resilient apertured cap positioned over and around said seal holder exposing said resilient sealing plug therein, means for mounting said valve support on said trigger for movement toward and away from said nozzle and means for rotating said annular seal holder, sealing plug and apertured cap about its axis on said mounting means.

4,947,590

## METHOD FOR THE PRECISION WORKING OF CROWNED TOOTH FLANKS ON PARTICULARLY HARDENED GEARS

Udo Schapp, Wessling, and Josef Lohrer, Munich, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany

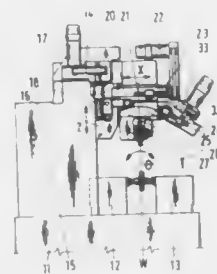
Filed Oct. 12, 1988, Ser. No. 256,685

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734652; Jul. 12, 1988, 3823560

Int. Cl.<sup>5</sup> B23F 19/06

U.S. Cl. 51—287

11 Claims



1. In a method for the precision working of crowned tooth

flanks on toothed workpieces while the toothed workpiece is undergoing a two-flank abutment with a toothed tool having abrasive surface means on its tooth flanks, namely, a surface which does not have any uniformly directed cutting edges and is in the form of a coating of hard material granules, axes of the tool and the workpiece being crossed at a crossed-axes angle ( $\phi$ ), the tool carrying out at least one back and forth feed movement and at least one of a continuously occurring plunge feed and a discontinuously occurring plunge feed movement in the sense of a center-distance reduction relative to the workpiece, the feed movement occurring perpendicularly with respect to a common normal to the tool and workpiece axes and at a diagonal angle ( $\epsilon$ ) inclined with respect to the workpiece axis, and following the final plunge feed whereat the desired center distance is reached, at least one further feed movement (X) being carried out without plunge feed, the improvement wherein the tool, during at least one feed movement (X) without plunge feed and only following the final plunge feed, carries out a tilting movement about an axis which is at least approximately tangent to the rolling cylinder of the tool (T) and is directed both perpendicularly with respect to the common normal (N) and also perpendicularly with respect to the workpiece axis.

4,947,591

## DRY PAINT STRIPPING METHOD

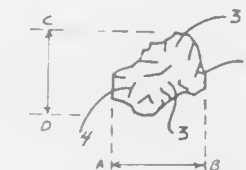
Lon F. Risley, Banning, Calif., assignor to Avonite, Inc., Belen, N. Mex.

Filed Jan. 9, 1990, Ser. No. 462,191

Int. Cl.<sup>5</sup> B24B 1/00

U.S. Cl. 51—320

9 Claims



1. Method of removing paint from a painted structure comprising impacting said painted structure with particles of an acrylic-containing unsaturated polyester, said acrylic-containing unsaturated polyester comprising a polymerized composition of about 30 to about 40 wt % polyol, about 40 to about 45 wt % maleic anhydride, about 10 to about 20 wt % methyl methacrylate and about 5-20% styrene.

4,947,592

## PARTICLE BLAST CLEANING APPARATUS

Daniel L. Lloyd, Mason; Newell D. Crane, Cincinnati, and David E. Moore, Milford, all of Ohio, assignors to Cold Jet, Inc., Cincinnati, Ohio

Filed Aug. 1, 1988, Ser. No. 227,090

Int. Cl.<sup>5</sup> B24C 7/00

U.S. Cl. 51—436

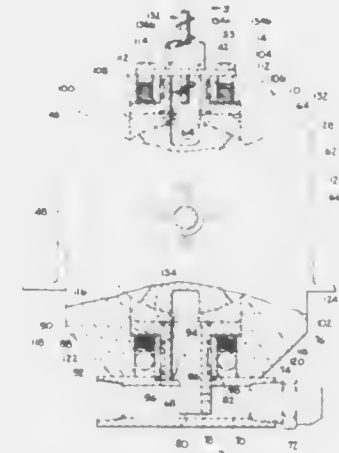
44 Claims

1. An improved particle blast cleaning apparatus featuring sublimable pellets as the particulate matter, said apparatus comprising:

- (a) a source of sublimable pellets;
- (b) a housing defining an internal cavity, having spaced pellet receiving and discharge stations;
- (c) means for radially transporting said pellets, said radial transport means being disposed within said internal cavity, said radial transport means having at least one pellet transport cavity disposed in the circumferential surface of said radial transport means which is alternately radially alignable with said receiving station and with said discharge station;
- (d) mechanical flow means for mechanically assisting the

flow of said pellets to said transport cavity at said receiving station, said mechanical flow means including:

- (i) a shank,
- (ii) means for rotating said shank,
- (iii) at least one agitating member mounted to said shank, and



(iv) at least on helical surface mounted to said shaft;

(e) a discharge nozzle; and

(f) means for supplying a pressurized transport gas adjacent said discharge station for conveying said pellets from said discharge station to said discharge nozzle.

4,947,593

## VENTILABLE CURTAIN WALL LINKED BY VENTILATING COUPLERS

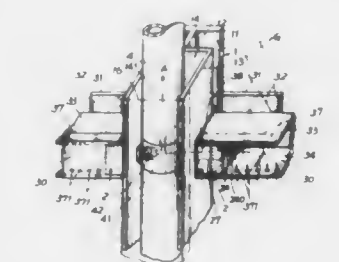
Po-Pang Kuo, P.O. Box 10160, Taipei, Taiwan

Filed Sep. 19, 1989, Ser. No. 409,349

Int. Cl.<sup>5</sup> E04B 1/00, 1/70

U.S. Cl. 52—105

4 Claims



1. A ventilable curtain wall comprising:

- a plurality of vertical beams secured to a building framework each vertical beam having at least a longitudinal vertical groove formed in a first external portion of said vertical beam for inserting a glass sheet in said vertical groove and having a vertical U-shaped groove formed in a first internal portion facing interior of a building, at least a pair of bolt holes formed in two vertical side walls of said vertical beam, and a vertical cover shielding said U-shaped groove;
- a plurality of horizontal beams each horizontal beam having at least a longitudinal horizontal groove formed in a second external portion of said horizontal beam for securing the glass sheet therein and having a horizontal U-shaped groove formed in second internal portion facing the interior of the building, and a horizontal cover drilled with a plurality of ventilating holes therein shielding the horizon-



tal U-shaped groove confining a horizontal ventilating channel in said horizontal beam;  
 a ventilating coupler prefixed on each said vertical beam by a hollow bolt and engageable with said horizontal U-shaped groove for securing said horizontal beam on said vertical beam; and  
 a ventilating pipe inserted in said vertical U-shaped groove in each said vertical beam having joint means fluidically communicated with said hollow bolt of said coupler and said ventilating channel in said horizontal beam, so that a ventilating system is formed in said curtain wall through said ventilating holes, said ventilating channel in said horizontal beam, said hollow bolt of said coupler and said ventilating pipe in said vertical beam.

4,947,594

# DEVICE FOR ADJUSTING AND FIXEDLY SECURING WINDOW FRAMES AND DOOR CASES OR THE LIKE IN WALL OPENINGS

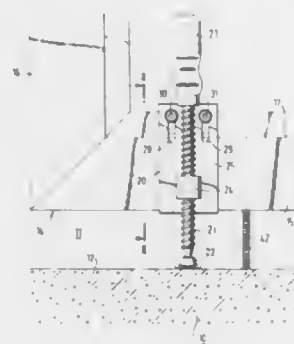
Thomas Theobald, Widdern; Manfred Kross, Iserlohn, and Hans J. Plumer, Hemer, all of Fed. Rep. of Germany, assignors to ITW-Ateco GmbH, Norderstedt, Fed. Rep. of Germany  
 Filed Jan. 23, 1989, Ser. No. 299,373

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801475

Int. Cl.<sup>5</sup> E04F 21/00

U.S. Cl. 52—126.4

9 Claims



1. A device for adjusting and fixedly securing a window frame, door case, or the like, having a predetermined length dimension as defined along a longitudinal axis extending between first and second opposite ends thereof, with respect to a side wall surface of a wall opening, comprising:

fixture plate means, having a load supporting surface disposed parallel to said side wall surface of said wall opening and engaged in surface-to-surface contact with a surface of said window frame, door case, or the like, such that said window frame, door case, or the like, is slidably adjustable with respect to said fixture plate means and said side wall surface of said wall opening along the entire length of said window frame, door case, or the like, in a first direction extending along said longitudinal axis thereof;

nut means fixedly mounted upon said fixture plate means; and

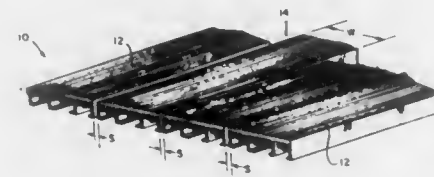
a threaded shaft rotatably adjustable within said nut means and having one end thereof engageable with said side wall surface of said wall opening so as to adjustably support said fixture plate means, and said window frame, door case, or the like, supported thereby, at a predetermined position relative to said side wall surface of said wall opening in a second direction perpendicular to said first direction.

4,947,595

# EXTRUDED DECKING HAVING COOLING FEATURE Willard O. Doads, Indianapolis, and James A. Kiphart, Greenfield, both of Ind., assignors to Metalmark Corporation, d/b/a Midamerica Extrusions, Indianapolis, Ind. Filed May 10, 1989, Ser. No. 350,010 Int. Cl.<sup>5</sup> B44D 5/08

U.S. Cl. 52—177

11 Claims



1. A deck comprising: a base including a plurality of horizontally situated supporting members and a plurality of planks fixed to the supporting members defining a surface of the deck, each of the planks comprising:

an extruded metal unit including:

a horizontal element having an upper surface, a lower surface, and two parallel edges defining outer boundaries of the upper surface,

a plurality of supporting elements depending from the lower surface each of the plurality of supporting elements including a horizontal projection at a lower end of each element for supporting the plank with respect to the supporting members, and

a plurality of additional elements depending from the lower surface for maximizing the area of the lower surface to enhance heat transfer from the plank to the surrounding environment,

two of the plurality of supporting elements of each plank depending from the lower surface being contiguous to the two parallel edges, and a pair of additional supporting elements being situated between the supporting elements depending from the two parallel edges, the horizontal projections at a lower end of each additional supporting element being directed toward each other to form a throat; and

a T-shaped anchor member including a head and a stem, the head being engaged in the throat with the stem extending downwardly therefrom adjacent to said supporting member, and means coupling the anchor member to the supporting member, to fix the horizontal projections at a lower end of each additional supporting element to said supporting members, the stem of the T-shaped anchor member including an inclined foot at a lower end thereof, the foot engaging a shoulder on the supporting member for biasing the plank downwardly against the supporting member.

4,947,596

# CLOSURE FOR ROOF VENT

Jerry D. Kight, 312 S. Spring St., Claxton, Ga. 30417  
 Filed May 22, 1989, Ser. No. 354,865

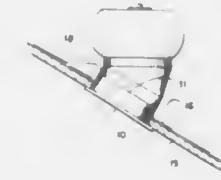
Int. Cl.<sup>5</sup> E02D 29/14

U.S. Cl. 52—202

8 Claims

1. A closure, for a roof vent or the like, said roof vent including a pipe extending through an opening in the roof and means carried by said pipe above the roof for preventing entry of weather and small animals, said closure including a core receivable within said pipe of said roof vent, said core being dimensioned to be received within said pipe, said core being formed of a flexible elastomeric material, and a mounting plate,

said core being fixed to said mounting plate so that said mounting plate provides rigidity to said core, said core being sufficiently elastic to be retained within said pipe by the inherent elastic force of said elastomeric material.



4,947,597

# WINDOW MOUNTING ASSEMBLY

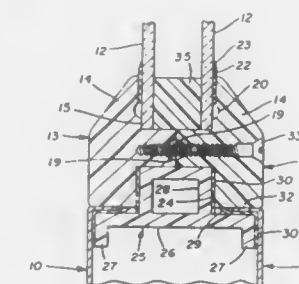
Ralph G. Simpson, Hendersonville, Tenn., assignor to Western Reserve Plastics, Gallatin, Tenn.

Filed Nov. 13, 1989, Ser. No. 435,978

Int. Cl.<sup>5</sup> E06B 1/30, 5/00

U.S. Cl. 52—208

4 Claims



1. A mounting assembly for a glass window pane in a receiving opening within a door comprises: a pair of identical extrusion members and an innerbar extrusion; both of said members being extruded plastic resin material; said identical extrusion members registrable together to form a glass receiving channel, and a mounting channel; said identical extrusion members having a fixation rib extending therefrom, means for sealing a portion of said identical extrusion members to said glass panel and means for securing said extrusion members together; said innerbar extrusion member comprising a base portion with oppositely disposed downturned flanges and an upstanding registration body member thereon; said innerbar extrusion member secured partially within and extending from said receiving opening; means for resiliently sealing said innerbar extrusion member within said receiving opening and against said identical extrusion members; said mounting channel engageable on said upstanding registration body; and identical extrusion members registrable together on said innerbar extrusion member.

4,947,598

# METHOD FOR GRINDING THE SURFACE OF A SEMICONDUCTOR WAFER

Mitsuo Sekiya, Tokyo, Japan, assignor to Disco Abrasive Systems, Ltd., Tokyo, Japan

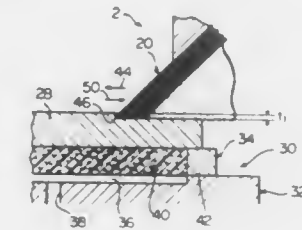
Filed Apr. 19, 1983, Ser. No. 486,464

Claims priority, application Japan, Apr. 23, 1982, 57-68161

Int. Cl.<sup>5</sup> B24B 1/00

U.S. Cl. 51—283 R

20 Claims



1. A method for grinding the surface of a semiconductor wafer wherein a rotary blade made of bonded super abrasive is used for said grinding comprising:

carrying out an initial blade dressing step prior to said wafer grinding, said blade dressing step comprising grinding a dresser made of bonded alundum-type abrasive with said rotary blade; and thereafter

mounting the wafer on a holding member, disposing said rotary blade made of bonded super abrasive so that its axis of rotation is generally perpendicular to the wafer surface, rotating said rotary blade and grinding the wafer surface with the rotating blade by relatively moving the rotating blade and the holding member in a direction generally perpendicular to the axis of rotation;

the blade being made of bonded diamond abrasive and the diamond abrasive having a grain size corresponding to a U.S. mesh number of 1200 to 100.

4,947,599

# TRUSSED GIRDER WITH PRE-TENSION MEMBER THEREIN

Osamu Sadahiro, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan

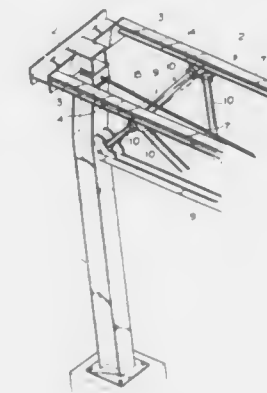
Filed May 24, 1989, Ser. No. 356,441

Claims priority, application Japan, May 26, 1988, 63-129221

Int. Cl.<sup>5</sup> E04B 1/24; E04C 3/10

U.S. Cl. 52—226

14 Claims



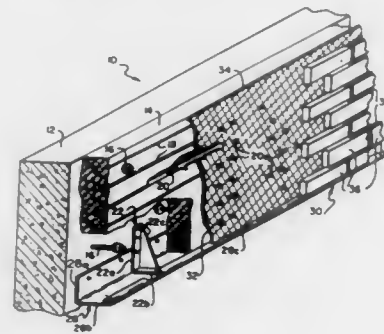
1. A trussed girder to be positioned between a pair of columns, the trussed comprising:

a pair of upper chord members;

a lower chord member disposed below the upper chord

members so as to form a space of triangular cross-section between the pair of upper chord members and the lower chord members, three vertices of the space of triangular cross-section being formed by the pair of upper chord members and the lower chord member; and  
 a pre-tension member extending longitudinally within the space of triangular cross section, both ends of the pre-tension member being fixed to corresponding columns, whereby a compressive force is exerted on the lower chord member as tension is exerted on the pre-tension member.

**4,947,600**  
**BRICK WALL COVERING**  
 William H. Porter, P.O. Box 249, Saugatuck, Mich. 49453  
 Filed May 22, 1989, Ser. No. 355,326  
 Int. Cl.<sup>5</sup> E04F 13/00  
 U.S. Cl. 52—235 24 Claims

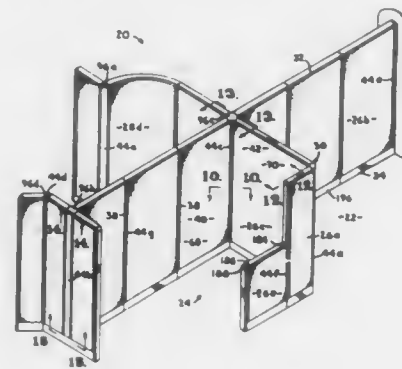


1. A brick wall covering comprising:  
 an insulating sheet affixed over an inner surface thereof to a base wall, said insulating sheet having a plurality of spaced, linear slots in an outer surface thereof;  
 adhesive means disposed over the outer surface of said sheet; spacer/support means inserted in the slots of said sheet and extending through said adhesive means;  
 a plurality of bricks engaging said adhesive means and maintained in position thereby, wherein said bricks are positioned between in a spaced manner and supported by said spacer/support means and wherein grout is disposed between adjacent bricks; and  
 support means attached to said base wall adjacent to and in contact with a lower portion of said sheet and a bottom row of bricks for providing support therefor.

**4,947,601**  
**WALL PANEL TRIM SYSTEM AND METHOD**  
 Robert L. McGuire, Kansas City, Mo., assignor to Glen O'Brien Movable Partition Co., Inc., Kansas City, Mo.  
 Filed Jul. 18, 1989, Ser. No. 382,536  
 Int. Cl.<sup>5</sup> E04H 1/00  
 U.S. Cl. 52—239 29 Claims

1. A wall panel system, which includes:  
 (a) a pair of panels each including:  
 (1) an upper edge;  
 (2) a lower edge;  
 (3) opposite side edges;  
 (4) opposite faces;  
 (5) an upwardly-open channel extending longitudinally along a respective panel upper edge;  
 (6) a supporting leg extending downwardly from a respective lower edge and associated with a respective side edge;  
 (b) an upper connecting member including a pair of legs each adapted for mounting in a respective channel;  
 (c) a lower connecting bracket adapted to interconnect said legs;

(d) a trim system including:  
 (1) a pair of edge caps each releaseably mounted on a respective panel upper edge and each including an end;  
 (2) an intersection cap adapted for releaseably mounting on said edge caps over an inner-section of said panels;  
 (e) each said intersection cap including:  
 (1) a cap cover including upper and lower surfaces; and  
 (2) a cap mounting clip positioned under said cap cover and including a base with an upper surface and a leg projecting outwardly from said base;



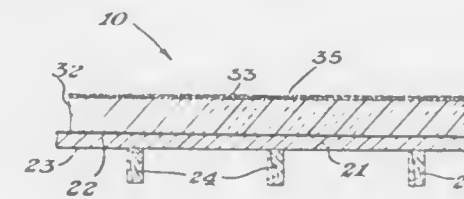
(f) clip mounting means mounting said clip on said cap cover with said base upper surface against said cap cover lower surface and said leg in spaced relation below said cap lower surface whereby an outwardly open cap cover slot is formed between said cap cover lower surface and said leg; and  
 (g) said cap cover slot being adapted to receive one of said edge cap ends so that said cap cover slot being adapted to receive one of said edge cap ends so that a portion of said edge cap end adjacent said end underlies the portion of said cap cover lower surface forming said slot.

**4,947,602**  
**WARP AND CURL RESISTANT WOOD PLATFORM MATTING**  
 Anthony D. Pollasky, 9920 N. 190th St., Forest Lake, Minn. 55025  
 Filed Jul. 26, 1988, Ser. No. 205,869  
 Int. Cl.<sup>5</sup> E04F 13/08  
 U.S. Cl. 52—385 17 Claims



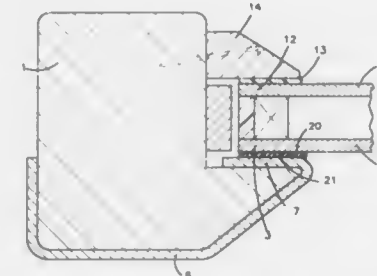
1. A matt for covering a portion of a floor, comprising: a first bottom hardboard layer having a bottom surface and a top surface, a second middle hardboard layer having a bottom surface and a top surface and the bottom surface of the middle layer adhered to the top surface of the bottom layer, a plurality of interlocking wood tiles, the tiles adhered to the top surface of the middle layer, and reduction trim pieces secured to and extending around the perimeter of the first and second layers.

**4,947,603**  
**UNITARY FOAM/GRAVEL ROOF**  
 Alois Goertz, 4 Retford Ave., Cranford, N.J. 07016  
 Continuation-in-part of Ser. No. 97,059, Sep. 16, 1987. This application Oct. 17, 1988, Ser. No. 258,624  
 Int. Cl.<sup>5</sup> E04B 7/00, 5/00  
 U.S. Cl. 52—309.4 12 Claims



1. A method of preparing a roof consisting of:  
 applying and affixing to an air and water vapor permeable roof deck, an unbroken layer of sprayed closed cell foam material covering the entire surface of said deck; and  
 directly applying upon said foam layer a layer of gravel sufficient to prevent ultraviolet light deterioration of the foam.

**4,947,604**  
**SEALANT WITH UNIFORM SPACER PARTICLES**  
 Michael S. Sylvester, W. Hill Dr., Gates Mills, Ohio 44040  
 Filed Apr. 25, 1988, Ser. No. 185,482  
 Int. Cl.<sup>5</sup> E04B 1/62  
 U.S. Cl. 52—398 4 Claims

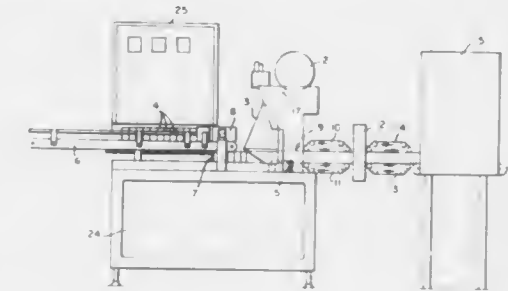


1. The combination of an insulating glass unit, sash, and stops in which the sealant between the edge faces of one sheet of the insulating glass unit and the sticking of the sash contains from 1/2% to 2% by weight of spacer particles which are of substantially uniform diameter and are from 0.020 to 0.125 inch in diameter and are capable of crushing at points of stress concentration before the one sheet of glass of the insulating glass unit with which the sealant is in contact will break.

**4,947,605**  
**SHRINK-WRAPPING APPARATUS AND METHOD**  
 Harold E. Ramsey, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
 Filed Nov. 10, 1988, Ser. No. 269,848  
 Int. Cl.<sup>5</sup> B65B 9/08, 53/02  
 U.S. Cl. 53—442 9 Claims

7. A method of forming a shrink-wrapped package from polyolefin film comprising  
 (a) forming the film into a tube with overlap of the film edges;  
 (b) sealing statically the edges of the film together in the tube area for a preselected length sufficient to accommodate a preselected number of articles;  
 (c) heat sealing near one end of the tube and separating the

film at the seal to form a front end of one package and a back end of another;  
 (d) moving a preselected number of articles in one or more single-file arrays into registry with the other end of the tube;  
 (e) pushing the articles into the tube while free of upper and lower compression beyond the beginning of the static seal so that the forward end of the first article is just short of the heat seal;



(f) transporting the resulting filled tube section with upper and lower compression through a first stage thereby providing movement of said filled tube section a preselected distance and then, after a heat seal has been formed for the next package and thereby providing heat sealing and separation of the other end of the wrapped package, through a second stage; and  
 (g) heat shrinking the film around the resulting wrapped package in the second stage, said heat shrinking being effected by a flow of hot air above and below said wrapped package.

**4,947,606**  
**VISION PANEL ASSEMBLY**  
 Jack C. La See, 308 West Cedar, Abbotsford, Wis. 54405  
 Filed Mar. 12, 1990, Ser. No. 491,521  
 Int. Cl.<sup>5</sup> E06B 3/70  
 U.S. Cl. 52—455 2 Claims



1. In combination with a fire-resistant door having a rectangular opening therein, a fire-resistant vision panel assembly mounted in said opening and including a pair of similar rectangular metallic frame members and a rectangular fire-resistant transparent glass vision panel, nut and bolt assemblies clamping the frame members against the periphery of the vision panel and against opposite surfaces of the door adjacent the periphery of the opening therein, each frame member being comprised of elongate frame elements, each including a web portion having a pair of flanges extending angularly therefrom, a decorative shield unit for covering the frame members of said vision panel assembly, including a pair of generally rectangular-shaped shield frames formed of aluminum, each shield frame comprised of elongate frame elements, a plurality of adhesive elements disposed between and en-



gaging and securing each aluminum shield frame in overlying relation to one of said frame members, and decorative veneer elements having adhesive surfaces overlying and being secured to said shield frame members.

4,947,607

# SUSPENDED CEILING CONSTRUCTION AND COMPRESSION STRUT THEREFOR

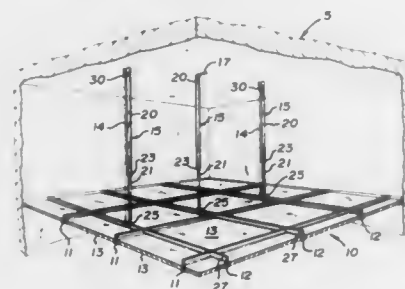
Henry G. Stein, Avon, Ohio, assignor to USG Interiors, Inc., Chicago, Ill.

Filed Jan. 23, 1989, Ser. No. 299,792

Int. Cl.<sup>5</sup> E06B 3/54

U.S. Cl. 52—484

15 Claims



1. A suspended ceiling construction comprising: a plurality of grid members suspended below a superstructure; and at least one compression strut assembly extending between said superstructure and one of said grid members, said compression strut assembly comprising an elongated, tubular outer strut member having an inner surface and an elongated inner strut member in axial, telescoping relationship with said outer strut member, a first end of said inner strut member disposed within said outer strut member; locking means fixed to the first end of said inner strut member, said locking means engaging the inner surface of the outer strut member and allowing axial extension of the compression strut assembly but preventing axial contraction thereof, said locking means comprising a resilient disk spring clip having edges biting into the inner surface of the outer strut member.

4,947,608

# WATERTIGHT FASTENER

Barry G. Donaldson, Yorktown, N.Y., and Joseph H. Newman, West Orange, N.J., assignors to Tishman Research Corporation, New York, N.Y.

Continuation of Ser. No. 159,108, Feb. 23, 1988. This application Aug. 17, 1989, Ser. No. 395,024

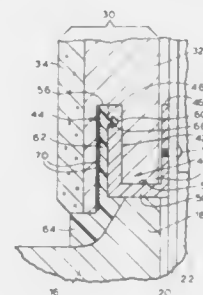
Int. Cl.<sup>5</sup> E04B 1/38

U.S. Cl. 52—509

10 Claims

1. In combination: (A) a prefabricated surround panel defining at the base thereof intermediate the front and back thereof a peripherally-opening groove; (B) a fixture disposed below said panel; and (C) a watertight fastener for mounting said surround panel on a wall comprising: (i) a rigid support member having a mounting portion and a surround-receiving portion, said mounting portion being secured to the wall and said surround-receiving portion being within said peripheral groove of said surround panel; and (ii) A unitary one piece non-metal resilient seal member having an elongate body portion and at one end a sealing portion, said body portion and said surround-receiv-

ing portion extending into said peripheral groove of said surround panel, and said sealing portion extending inter-



mediate said surround panel and said fixture to form a watertight seal therebetween.

4,947,609

# TOP OUT PANEL MOUNTING CLIP FOR VINYL SIDING

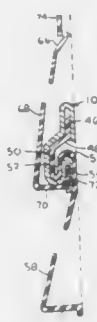
Charles A. Champagne, 6731 Desert Rose La., Houston, Tex. 77087

Filed Jul. 10, 1989, Ser. No. 377,483

Int. Cl.<sup>5</sup> E04D 1/34

U.S. Cl. 52—545

10 Claims



1. A clip for installing building siding top out panels between an upper most siding panel and a soffit, said clip comprising: a strip of metal material having seven contiguous portions defining two vertically spaced and downwardly opening channels and an intermediate portion conforming to a profile of an upper most siding panel, said channels respectively gripping an overlying upper edge portion of said upper most siding panel and a bottom edge portion of a top out panel whereby said top out panel is secured in place without face nailing.

4,947,610

# METHOD AND APPARATUS FOR BUILDING A BRICK WALL

Robert Koerner, 1130 E. 3rd St., Coal City, Ill. 60416

Filed Apr. 13, 1989, Ser. No. 337,801

Int. Cl.<sup>5</sup> E04C 1/10

U.S. Cl. 52—585

22 Claims

1. A brick wall of reduced thickness having tensile strength, comprising a plurality of bricks placed one above the other, including a first brick, a second brick in place above said first brick, and holding means to hold said first brick from movement downwardly away from said second brick and said second brick from movement upwardly away from said first brick, wherein said first brick includes a top wall facing upwardly, said second brick includes a bottom wall facing downwardly in facing relationship with at least a portion of said top wall of said first brick, a first recess in said first brick opening

to said top wall thereof, a second recess in said second brick opening to said bottom wall thereof, said first and second recesses being axially aligned, said holding means including said first and second recesses, a coupling member having a first projecting element for insertion into said first recess and a second projecting element for insertion into said second recess, said first and second projecting elements having retention means to retain said projecting elements in said recesses when received therein, said first and second bricks having spaced apart side walls extending normal to said top wall of said first brick and said bottom wall of said second brick, said side walls being spaced apart a preselected relatively short distance to provide a reduced thickness brick, said preselected distance said side walls of said bricks are spaced apart is preselected to provide room for a single recess centered therebetween having a preselected cross-sectional dimension in the direction said side walls are spaced apart, such preselected cross-sectional dimension of said recess being substantially about one-half of the distance between the respective edges of said recess nearest respective ones of said spaced apart side walls and respective ones of said side walls, said preselected distance said side walls of said bricks are spaced apart being less than three and three-fourths inches such dimension being substantially the thickness between side walls of standard bricks used in making an ordinary brick wall lacking tensile strength.

forming one of recesses and through holes in the poured mixture; and drying the poured material to form a board.

4,947,612

# BRACING SYSTEM

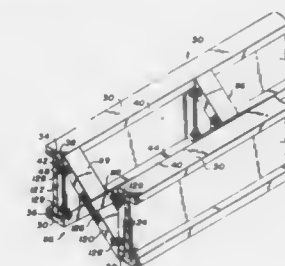
John W. R. Taylor, 33887 Gilmour Drive, Abbotsford, Canada V2S 6B4; John M. Palmer, 6570 - 148th Street, Surrey, Canada V3S 3C6, and Emanuel Butkovsky, 202 - 1111 Haro Street, Vancouver, Canada V6E 1E3

Filed May 2, 1988, Ser. No. 189,204

Int. Cl.<sup>5</sup> E04C 3/02

U.S. Cl. 52—693

18 Claims



1. A cross brace for connection to a pair of parallel I-beam joists each comprising a pair of beam members interconnected by a web, said cross brace comprising: elongate brace members assembled to form an X-shaped array; a pair of reinforcement members extending between the outer ends of said brace members; and means for connecting said brace members to one another and to said reinforcement members; opposite ends of said reinforcement members together with the outer ends of said brace members defining outwardly-open angular recesses of substantially right-angled cross-section for snugly receiving said beam members.

4,947,613

# RETAINING DEVICE

Siegfried Fricker, Wurmberger Strasse 30-34, 7135 Wiernsheim, Fed. Rep. of Germany

Division of Ser. No. 143,422, Jan. 13, 1988, Pat. No. 4,869,042.

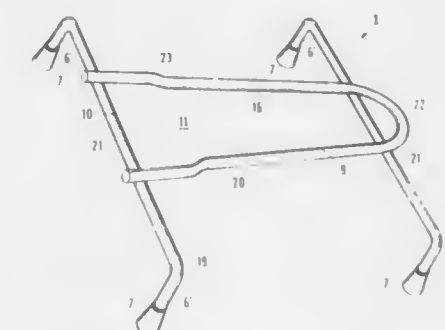
This application Jun. 15, 1989, Ser. No. 366,685

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1987, 3700695

Int. Cl.<sup>5</sup> E04G 21/14

U.S. Cl. 52—704

8 Claims



4,947,611

# A WALL MATERIAL, AND METHOD OF PREPARING A WALL MATERIAL OF SOILS AND VEGETABLE MATERIALS

Michio Otsuka, 23-8, 3-Chome, Ooizumigakuen-cho, Nerima-ku, Tokyo, Japan

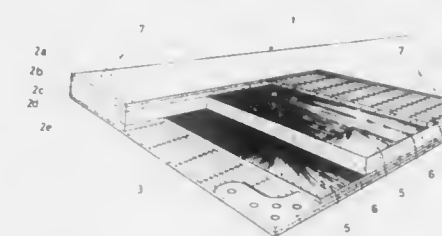
Filed Jan. 23, 1989, Ser. No. 300,433

Claims priority, application Japan, Jan. 22, 1988, 63-12178

Int. Cl.<sup>5</sup> E04C 1/04; C08G 18/12

U.S. Cl. 52—590

5 Claims



1. A wall board structure formed by the steps of: pulverizing vegetable material including one or more of straw, chaff, bamboo, wood and palm material, such that pulverized the material has a maximum dimension of from 1 to 3 mm; mixing a substantially equal quantity of clay to the pulverized material; adding fibrous material to the mixture, the fibrous vegetable material including one or more of palm material fibers, hemp fibers, wood fibers and shredded straw, the fibrous material having a length of from 3 to 5 cm; pouring the mixture of pulverized material, clay and added fibrous material into a form having mold portions for

1. A retaining device which can be cast into concrete, such as concrete slabs, to facilitate handling and transportation of the concrete, comprising:

- (a) an anchoring foot adapted to be positioned in association with a concrete form or the like prior to concreting, said anchoring foot comprising a wire stirrup having opposed legs which define a recess and form opposite tongues, said legs being mounted on supporting members in such a manner that said opposite tongues of said stirrup converge toward each other in a direction toward one end of said foot, said tongues being spaced from each other near the end of said foot so as to define a relatively enlarged recess,
- (b) a separate transport stay adapted to be attached to said anchoring foot, said stay being smaller in width than the width of said enlarged recess and formed with at least one pair of aligned grooves in the sides thereof, said stay being initially positioned in said enlarged recess and then moved in a direction toward the converging opposite tongues which resiliently frictionally engage said grooves to assemble said stay on said foot,
- (c) said attachment being such that said stay extends away from said anchoring foot and outwardly of the subsequently concreted surface so as to provide means by which the concrete can be handled and transported.

4,947,614

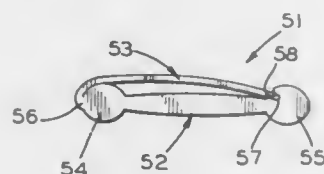
**ONE-PIECE SELF-COVERING TERMINATION BAR**  
Robert L. Mayle, 601 N. Stone St., Suite #15, P.O. Box 1380, Fremont, Ohio 43420

Filed Nov. 15, 1988, Ser. No. 271,726

Int. Cl.<sup>5</sup> E04F 19/02

U.S. Cl. 52—717.1

2 Claims



1. A termination bar adapted to cover an edge of a sheet of roofing material abutting a roof surface, comprising:
- a longitudinally extending, generally planar body having a pair of generally parallel, longitudinally extending edges, each said edge of said planar body being thicker than a central portion of said body and adapted to engage a surface to form a sealing line when pressure is applied to said planar body;
  - a generally longitudinally extending cover having a pair of generally parallel, longitudinally extending edges;
  - a hinge pivotally connecting one edge of said cover to one edge of said planar body;
  - a first fastener means formed on the other edge of said cover as a generally outwardly extending male fastener, said male fastener being an outer edge of said cover; and
  - a second fastener means formed on the other edge of said planar body as a longitudinally extending groove opening toward said one edge of said planar body and cooperating with said first fastener means to maintain said cover superposed on said planar body.

4,947,615

**MODULAR BUILDING CONSTRUCTION**  
Charles M. Peacock, Midhurst, Canada, assignor to Building With Logs Limited, Canada

Division of Ser. No. 26,279, Mar. 16, 1987, Pat. No. 4,869,036.

This application Aug. 17, 1989, Ser. No. 395,344

Int. Cl.<sup>5</sup> E04B 2/02

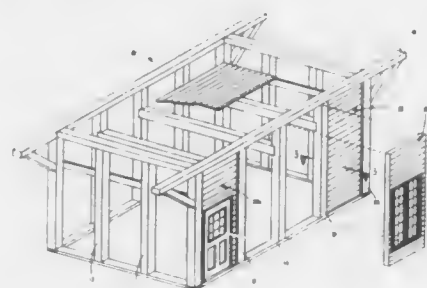
U.S. Cl. 52—745

9 Claims

1. A method of erecting a wall area on a building structural frame having adjacent exposed support columns defining opposed faces, the method comprising the steps of:

forming a panel from a plurality of stacked planks and with a pair of edges;

attaching a pair of uprights to said panel at a respective one of said pair of edges to define a module with an outer surface defined on each of said uprights;



positioning said module between a pair of said support columns with each of said outer surfaces aligned with a respective face in such a manner that the support columns remain exposed, so as to enable said panel to co-operate with said exposed columns to give said wall area an appearance of piece en piece log construction.

4,947,616

**TOOL FOR USE IN MOUNTING A JOIST HANGER**

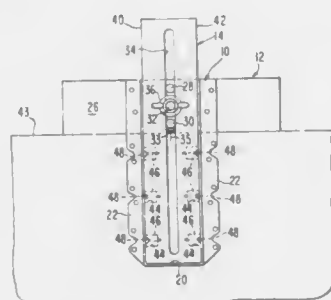
Steven W. Sorton, 1341 Haskell, Berkeley, Calif. 94702

Filed May 22, 1989, Ser. No. 355,720

Int. Cl.<sup>5</sup> E04D 15/00

U.S. Cl. 52—749

14 Claims



1. A tool for mounting a metallic joist hanger to a header comprising:
- a first member having a lower surface adapted to rest in an operative position on the upper face of a header to the side face of which a hanger is to be secured; and
  - a second member coupled with the first member and extending downwardly therefrom, said second member adapted to be located adjacent to a side face of the header when the beam member is in said operative position, said second member having magnetic structure thereon for magnetically coupling a joist hanger thereto to allow the joist hanger to be positioned adjacent to the side face of the header when the second member is adjacent to said side face, whereby fasteners can be used to secure the joist hanger in place on the side face of the header as the first member remains in said operative position.

4,947,617

**APPARATUS FOR THE PRODUCTION OF HINGE-LID PACKS FOR CIGARETTES**

Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

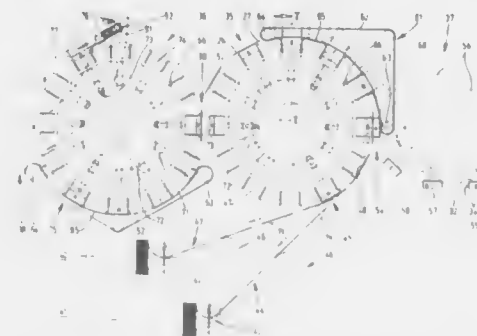
Filed Jan. 19, 1989, Ser. No. 299,156

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802644

Int. Cl.<sup>5</sup> B65B 19/20, 49/12

U.S. Cl. 53—234

20 Claims



1. In an apparatus for producing hinge-lid packs, especially for cigarettes, from a pack blank which is foldable around a cigarette block during transport in a generally circular path by rotating folding turrets; said pack blanks together with said cigarette block, being held in radially extending pockets of a folding turret; said pack blanks being foldable by means of folding members of fixed location connected to said folding turret, whereby said folding members fold blank portions against said cigarette block; said blank portions being in the form of inside side tabs and outside side tabs; the inside side tabs being folded against the cigarette block in a first step, and then the outside side tabs being folded against the inside tabs in a second step; first and second successive said folding turrets being provided for carrying out these first and second folding steps; the improvement wherein said folding members comprise: side folders (66) assigned to said pockets (47, 74) of each said folding turret (36, 36), said side folders (66) functioning to fold said inside side tabs (22, 23; 24, 25) and said outside side tabs (26, 27; 28, 29); and means for moving said side folders (66) in a radial direction relative to said pack blank (12) during the rotational movement of said folding turrets (35, 36).

4,947,618

**BAG SEALING DEVICE**

Werner Schneider, Hohenahr, and Walter Baur, Gruendau, both of Fed. Rep. of Germany, assignors to Rovema Verpackungsmaschinen GmbH, Fernwald, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,873

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3732033

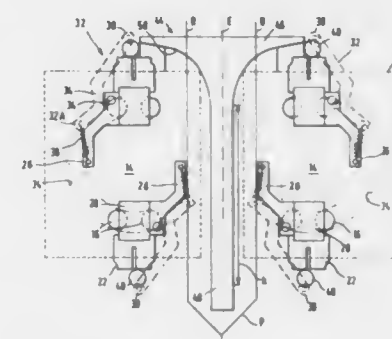
Int. Cl.<sup>5</sup> B65B 51/30, 9/12, 9/20

U.S. Cl. 53—373

14 Claims

1. In a device for the cross-welding of sealable tubular foil material having inserted therein at spaced intervals deposits of bulky fill material, said device comprising at least two oppositely arranged, swingably mounted sealing jaws respectively engaged in closed cam guideways which are a mirror image of each other relative to a plane of symmetry, said cam guideways being located on opposite sides of the plane of symmetry, means for forcibly moving said sealing jaws along said cam guideways such that they clamp there between, over a path extending along the plane of symmetry, an area of the tubular foil material not having any fill material therein and then swing away from the foil material and travel to the next area thereof not having any fill material therein, the improvement wherein compressing members are positioned on said sealing jaws for

travel therewith in front of said sealing jaws such that said compressing members compress the foil material at last over a portion of the foil material that is engaged by said sealing jaws, which portion has an area that is predetermined by a width of said sealing jaws, said sealing jaws each having a plurality of



4,947,619

**WATER HEATER PACKAGE CONSTRUCTION AND METHOD**

Bruce W. Mattingly, Louisville, and Roger J. Coates, Cox's Creek, both of Ky., assignors to Soltech, Inc., Shelbyville, Ky.

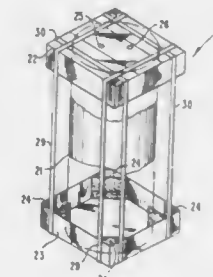
Division of Ser. No. 307,322, Feb. 6, 1989, Pat. No. 4,881,641.

This application Jun. 12, 1989, Ser. No. 364,150

Int. Cl.<sup>5</sup> B65B 13/02

U.S. Cl. 53—399

3 Claims

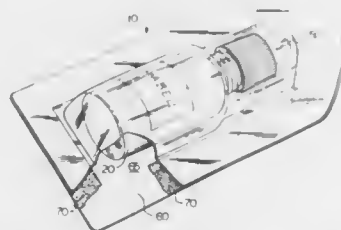


1. A method of packaging a water heater comprising the following steps:
- providing only four generally rectangular panels arranged into a plurality of sections;
  - laminating one of said sections in each of said panels with a reinforcing layer of material;
  - folding each of said panels so as to define a center area and two sides disposed on opposite sides of said center area;
  - selecting a first of two of said folded panels for a top support assembly and the other two of said folded panels for a bottom support assembly,
  - turning said first two folded panels relative to each other so that said reinforcing layers of material overlap each other and said four sides depend downwardly without any relative overlap forming two pairs of opposed side,
  - orienting the other two folded panels relative to each other so that said reinforcing layers of material overlap each other and said four sides extend upwardly without any relative overlap forming two pairs of opposed side.



placing said water heater into said bottom support such that said water heater rests on said overlapping reinforcing layers of material and said four sides extend upwardly around the four outer sides of said water heater; attaching said top support assembly to the top of said water heater such that said overlapping reinforcing layers of material are secured to the top of said water heater and said four sides depend downwardly around the outer surface of said water heater; and banding said top and bottom supports to said water heater by a plurality of tightened bands which extend over and around said top and bottom supports.

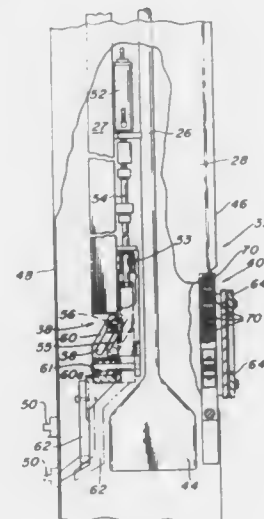
**4,947,620**  
**METHOD OF PACKAGING AND STERILIZING A PHARMACEUTICAL PRODUCT**  
 Douglas V. Carter, Lenoir, N.C., assignor to Extrusion, Inc., Lenoir, N.C.  
 Continuation of Ser. No. 137,436, Dec. 23, 1987, Pat. No. 4,805,377. This application Nov. 21, 1988, Ser. No. 273,605. The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.  
 Int. Cl.<sup>3</sup> B65B 55/02  
 U.S. Cl. 53—425 10 Claims



1. A method of preparing and sterilizing a pharmaceutical package comprising a semi-rigid squeeze-type bottle containing a selected pharmaceutical liquid product, said method including the steps of:

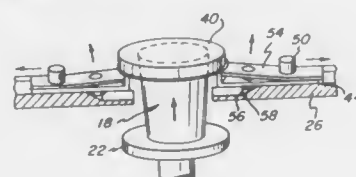
- filling a resilient polymeric bottle with the selected pharmaceutical product to the point that said bottle is filled to capacity so as to eliminate any residual air in the bottle or the bottle neck, said bottle formed of a material that will withstand sterilizing temperatures of 121° C. without deforming and with substantially no leakage of vapor through the walls thereof;
- inserting a plug-type cannula adapter in the neck of each bottle while forcing out excess liquid and maintaining the bottle completely filled, said adapter being of the type used for connecting the pharmaceutical package to a cannula or other such medical apparatus;
- capping the bottles with a cap and inserting a washer formed of a non-toxic, resilient material between the inner surface of the top wall of the cap and the rim of the bottle to absorb pressures developed by expansion of said bottle and prevent deformation of the cap and bottle during subsequent steam-sterilization, thus eliminating leakage therebetween;
- forming a package by inserting said bottle into an individual blister pack formed of a prescribed polymeric material suitable for use in a steam-sterilization procedure and sealing said blister pack along the open side thereof with a closure lid made from a non-woven textile material having the characteristics of being steam-permeable and capable of withstanding and remaining sealed to said polymeric material during a steam-sterilization procedure;
- sterilizing said package at temperatures of at least 121° C. and pressures of greater than 15 pounds per square inch.

**4,947,621**  
**VERTICAL FORM/FILL/SEAL MACHINE FOR MAKING THREE SIDE FIN POUCHES**  
 William C. Christine, Nazareth, and George J. Herschman, Bath, both of Pa., assignors to Tripart, Ltd., Nazareth, Pa.  
 Filed Nov. 18, 1988, Ser. No. 274,084  
 Int. Cl.<sup>3</sup> B65B 9/20, 9/08  
 U.S. Cl. 53—451 18 Claims



1. A vertical form, fill, seal machine for producing filled three side fin pouches comprising: means for forming a sheet of thermoplastic material into a sleeve having a folded edge portion and a side sealed edge portion; means for moving the formed sleeve down the outside of a filling tube; means for spreading apart the sleeve between said folded edge portion and said side sealed edge portion so that equal lengths of thermoplastic material may be subsequently sealed together, said spreading means further comprising means for engaging the folded edge of said sleeve and selectively releasing the engaging means while the sleeve moves, and means for clamping the side sealed edge portion of said sleeve, said clamping means including at least one pair of rollers for clamping said side edge portion therebetween; means for sealing shut said sleeve between said folded edge portion and said side sealed edge portion; means for filling said sleeve through the filling tube; means for sealing said sleeve shut after filling thereby forming the filled three side fin pouch; and means for separating the filled three side fin pouch from said sleeve.

**4,947,622**  
**APPARATUS AND METHOD FOR PLACING EXPANSIBLE LIDS ON CONTAINERS**  
 Ronald V. Danforth, West Springfield, Mass., and Medric H. Pleau, Vernon, Conn., assignors to Packaging Systems International, Inc., Ellington, Conn.  
 Filed May 19, 1989, Ser. No. 354,471  
 Int. Cl.<sup>3</sup> B65B 7/28  
 U.S. Cl. 53—487 17 Claims

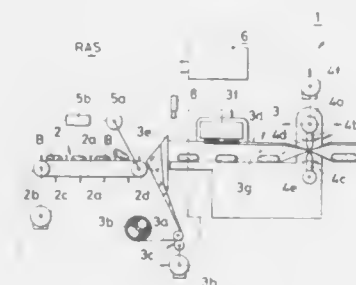


15. In a method for sealing a container with an elastomeric

lid having a transverse wall and a depending sidewall, the steps comprising:

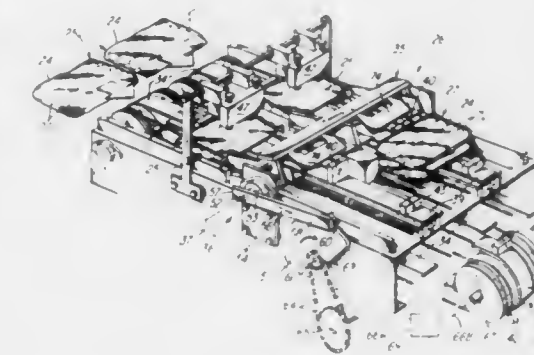
- placing a lid on a multiplicity of stretching fingers extending inwardly of a cavity, said stretching fingers having upstanding lips at their inner ends engaging the inside surface of said lid and stripper blades thereon with their inner ends movably supported thereon for vertical movement relative to said stretching fingers;
- moving said stretching fingers outwardly relative to said cavity initially to stretch said lid;
- moving a container upwardly against the transverse wall of the stretched lid; and
- effecting further movement of said stretching fingers to cause the inner ends of said stripper blades to move upwardly relative to said stretching fingers and move the sidewall of said lid off the lips on said stretching fingers, whereby the sidewall of said lid contracts against the sidewall of said associated container and effects sealing of the upper end thereof.

**4,947,623**  
**WRAPPING METHOD**  
 Hiroshi Saito, and Nobuhiko Saito, both of Saitama, Japan, assignors to Gorika Giken Co., Ltd., Saitama, Japan  
 Filed Jan. 30, 1989, Ser. No. 303,218  
 Int. Cl.<sup>3</sup> B65B 57/10  
 U.S. Cl. 53—493 1 Claim



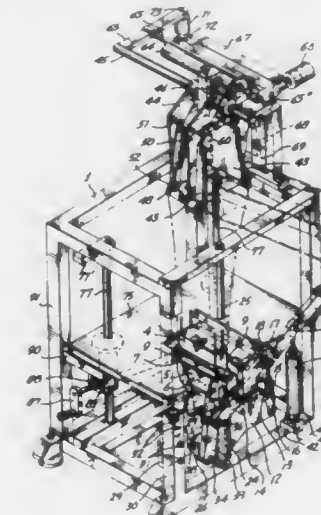
1. A wrapping machine comprising: a conveyor driven by a conveyor motor for moving products at a predetermined speed to a film feed section where said products are forwarded into a tube of film formed by sealingly bonding lateral edges of a continuous sheet of film fed from a roll of film, said tube of film being cut by melt-cutting blades wherein a film feeding operation and a center sealing operation conducted in said film feed section are powered by a first motor; a second motor powering said melt-cutting blades in said top sealing section; wherein said first and second motors are different from said conveyor motor; an encoder generating rotary angle signals, said encoder connected to a rotary shaft that rotates in synchronism with rotation of said conveyor; and a detector generating cut-in warning signals based on said detector detecting objects in a danger zone provided before and after cutting marks; and an electric controller, one of whose outputs being applied to said first motor to drive said first motor is synchronism with said conveyor on the basis of logical coupling of powers while another output is applied to said second motor so that operation of said melt-cutting blades is temporarily halted when said cut-in warning signal is generated and wherein normal melt-cutting operation is subsequently resumed at a cutting mark after a faulty one.

**4,947,624**  
**ARTICLE PROCESSING MACHINE AND METHOD OF MAKING SAME**  
 James E. Cones, Sr., Cincinnati, and James M. Phelps, Blankenbush, both of Ohio, assignors to Planet Products Corporation, Cincinnati, Ohio  
 Filed May 8, 1989, Ser. No. 349,174  
 Int. Cl.<sup>3</sup> B65B 35/50  
 U.S. Cl. 53—540 30 Claims



1. In an article processing machine comprising moving means for moving articles and stacking means for stacking said articles in pairs during movement through said machine, the improvement wherein said stacking means comprises a pivoted ramp assembly adapted to be pivoted to scoop thereon articles from said moving means and pivoting means for pivoting said ramp assembly, said ramp assembly being adapted to be pivoted by said pivoting means to receive and scoop thereon in a serial manner alternate articles from said moving means and elevate same thereabove, and sliding means for sliding each elevated article from said ramp assembly onto an associated alternate article disposed on said moving means to define a stacked pair of articles.

**4,947,625**  
**BAG-FORMING AND FILLING APPARATUS AND PROCESS**  
 Donald R. Zike, 4106 Laura La., Yakima, Wash. 98908  
 Filed Nov. 14, 1988, Ser. No. 270,932  
 Int. Cl.<sup>3</sup> B65B 9/14  
 U.S. Cl. 53—459 14 Claims



1. A process for making bags which comprises providing a

1. A wheel rake system comprising, in combination, a wheeled transport frame and articulated wheel rake means mounted thereon, said rake system being characterized in that:

- (a) said wheeled transport frame comprises a pair of longitudinally disposed side rails having a pair of cross members extending therebetween and axle shaft means with transport wheels journaledly mounted for rotation thereon coupled to and supporting said transport frame;
- (b) said articulated wheel rake means includes a pair of individual wheel rake assemblies operatively mounted one

UMI



on either side of said wheeled transport frame and with wheel rake assembly articulation means coupling each of said wheel rake assemblies to said transport frame and arranged to accommodate pivotal folding of each of said wheel rake assemblies outwardly to a working position and inwardly to a transport position;

(c) each of said wheel rake assemblies comprises an elongated support beam, a plurality of longitudinally spaced-apart tined wheel rakes coupled to said elongated support beam and including wheeled rake support means arranged for adjustably positioning the working height of said wheel rakes along said elongated support beam;

(d) each of said elongated support beams being pivotally coupled to said wheeled transport frame at a rearward pivotal mounting point adjacent the rear ends of said elongated support beams and said wheeled transport frame respectively, and arranged for arcuate pivotal outward rotational movement about said pivotal mounting point, at least one laterally extending support arm assembly pivotally secured to said transport frame forwardly of said rearward pivotal mounting point between said wheeled transport frame and each of said elongated support beams for determining and controlling the outward pivotal rotational position of said elongated support beam relative to said wheeled transport frame;

(e) each of said lateral support arm assemblies comprising a pair of cooperating telescopically engaged length adjustable support braces with opposed ends of each of said support arm assemblies being pivotally secured to said elongated support beam and a cross member of said wheeled transport frame respectively, with the adjusted length of each of said support arm assemblies operating to determine the extent of outward angular rotational movement of said elongated support beam relative to said wheeled transport frame to thereby vary the working width of the wheel rake system;

(f) said wheel rake transport means further comprising:

(1) a wheel rake support crank shaft with an upper end segment, a lower end segment, and an intermediate segment therebetween, and with the said upper segment being pivotally engaged with said elongated support beam, and with said lower segment journaledly supporting one of said tined wheel rakes thereon; and

(2) a threaded wheel rake height control shaft, a tined rake height adjust actuating arm comprising first and second angularly disposed arm elements joined together at an apex and with the apex zone having pin means rotatably engaged with one of said elongated support beams for coupling each of said actuating arms thereto, and with the outer end of the first one of said angularly disposed arm elements of each height adjust actuating arm having a laterally outwardly extending support pin secured thereto for underlying, engaging and supporting the intermediate segment of said wheel rake support crank shaft thereover, and with the outer end of said second height adjust actuating arm being pivotally coupled to a threaded wheel rake height control shaft mounted for adjustable longitudinal positioning along said elongated support arm, the arrangement being such that the longitudinal position of said height control shaft along said elongated support arm determines the angular position of each of said height adjust actuating arm elements and thus the height of each of said tined wheel rakes from the ground surface.

4,947,632

## CAP SPINNING MACHINE

Louis Vignon, Chemin de Vincy 5, CH-1201 Geneva, Switzerland (CH-1201)

Filed Feb. 27, 1989, Ser. No. 315,571

Claims priority, application Switzerland, Feb. 29, 1988, 742/88

Int. Cl.<sup>5</sup> D01H 7/66, 13/00

U.S. Cl. 57—74

7 Claims



1. Cap spinning machine, with a series of rotatable spindles (3), each of these being associated with respectively one cap-shaped thread guide member (7) rotatable about the spindle axis, with a drive means (5) for rotating the spindles (3) and with a belt (12) in contact with whorls (11) arranged on the thread guide members (7), means (13, 14, 15) for urging the belt (12) against the whorls (11) with an adjustable force, said means for urging being shiftable between two end positions in one of which said force is maximum and in the other of which said force is minimum, and means responsive to shut off of said machine to shift said means into said end position of maximum force.

4,947,633

## PROCESS AND AN ARRANGEMENT FOR PRODUCING PACKAGES TO BE USED AS FEEDING PACKAGES FOR TWISTING

Fritz Stahlecker, Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed Feb. 17, 1989, Ser. No. 311,731

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805338

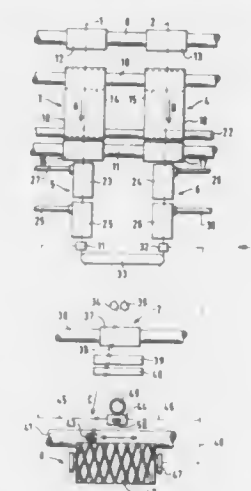
Int. Cl.<sup>5</sup> D01H 1/115, 13/16; B65H 63/024

U.S. Cl. 57—86

22 Claims

1. A process for producing packages for use as feeding packages for a subsequent twisting operation, comprising: drafting two slivers by passing them through respective drafting units, passing said slivers through respective false twisting devices arranged downstream of said drafting units to thereby form two separate prestrengthened yarn components, winding the two yarn components onto a package side-by-side one another without being twisted together to thereby form a prestrengthened double yarn package for a subsequent twisting operation which will twist the two yarn components together, and selectively cutting said yarn components in the event of breakage of at least one of said yarn components such that the lengths of the two yarn components are at least approximately the same, thereby facilitating location of ends of the yarn components on the package for a subsequent piecing operation.

5. Apparatus for producing packages for use as feeding packages for a subsequent twisting operation, comprising: drafting means for drafting two slivers, false twisting devices arranged downstream of said drafting means to thereby form two separate prestrengthened yarn components, winding means for winding the two yarn components onto a package side-by-side one another without being twisted



together to thereby form a prestrengthened double yarn package for a subsequent twisting operation which will twist the two yarn components together. and cutting means for selectively cutting said yarn components in the event of breakage of at least one of said yarn components such that the lengths of the two yarn components are at least approximately the same, thereby facilitating location of ends of the yarn components on the package for a subsequent piecing operation.

4,947,634

## RING SPINNING OR RING TWISTING MACHINE

Wilhelm Stürwald, Stuttgart, Fed. Rep. of Germany, assignor to SKF Textilmaschinen-Komponenten GmbH, Fed. Rep. of Germany

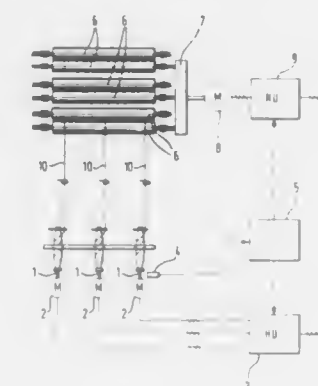
Filed May 25, 1989, Ser. No. 356,685

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822420

Int. Cl.<sup>5</sup> D01H 1/244, 1/26

U.S. Cl. 57—93

6 Claims



1. A ring spinning machine comprising: a plurality of spindles; a plurality of asynchronous motors, each of said spindles

being driven by a respective one of said asynchronous motors; at least one auxiliary apparatus; at least one reluctance motor, adapted for driving said at least one auxiliary apparatus; means for producing a first drive voltage having a variable characteristic; means for producing an auxiliary drive voltage having a variable characteristic; means for connecting said first voltage to said asynchronous spindle drive motors; means for connecting said auxiliary drive voltage to said at least one reluctance motor; and means for controlling the means for producing a first drive voltage and the means for producing an auxiliary drive voltage such that the ratio of the rotational speeds of the reluctance motor and the asynchronous motors remains constant.

4,947,635

## YARN SPLICE

Claudio Speranzin; Roberto Badiali, both of Pordenone, and Luciano Bertoli, Salò, all of Italy, assignors to Officine Savio S.p.A., Pordenone, Italy

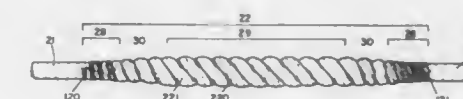
Division of Ser. No. 439,320, Nov. 4, 1982, Pat. No. 4,720,966. This application Oct. 8, 1987, Ser. No. 105,703

Claims priority, application Italy, Aug. 3, 1982, 83430 A/82

Int. Cl.<sup>5</sup> D02G 3/22; B65H 69/06

U.S. Cl. 57—202

18 Claims



1. Homogeneous splice for yarns having coupled wound tracts of single yarns having tail ends, said tracts of single yarns having in at least one tract of the splice, a number of twists which is less than the number of twists of the coupled yarn in the same tract, and a reciprocal centripetal thrust as between the two single yarns due to induced lengthwise shrinkage.

4,947,636

## METAL WIRE CORD FOR ELASTOMER REINFORCEMENT

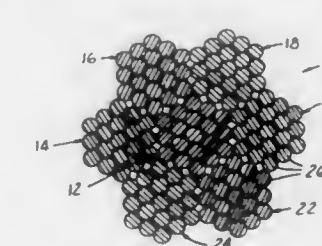
Italo M. Sinopoli, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 13, 1989, Ser. No. 309,166

Int. Cl.<sup>5</sup> D02G 3/48

U.S. Cl. 57—218

30 Claims

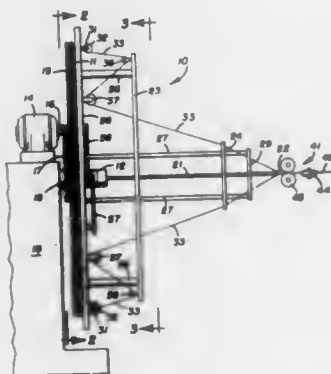


1. A metal cord for reinforcing elastomers and the like comprising: a plurality of wire strands, including a center strand and multiple peripheral strands concentrically surrounding said center strand, each of said center and peripheral strands including multiple individual filaments of similar constant diameter having

identical strand lay direction and length, a hexagonally close-packed longitudinally uniform polygonal cross sectional outline, and having filaments in concentric layers in which each individual filament is tangential to all adjacent surrounding filaments, said peripheral strands being tangential to said center strand and having a predetermined cord lay direction the same as said strand lay direction and a predetermined lay length with respect to said center strand, said cord being of substantially uniform cross sectional dimension throughout its length.

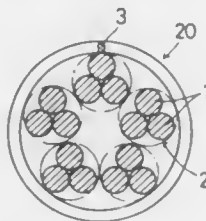
**4,947,637**  
**METHOD AND APPARATUS FOR MAKING MULTISTRAND SUPERCONDUCTING CABLE**  
John M. Royet, Oakland, and Rollin A. Armer, Orinda, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 14, 1989, Ser. No. 322,875  
Int. Cl.<sup>5</sup> H01B 13/02, 12/08; D07B 3/06  
U.S. Cl. 57—311 11 Claims



1. The method of making a multistrand Rutherford-type cable, comprising:
  - (a) winding a plurality of wire strands helically and in a single layer around a fixed forming mandrel,
  - (b) twisting selected of said strands in one direction about the lengths thereof and twisting selected of said strands in the opposite direction, about the lengths thereof, all prior to winding said strands around said mandrel,
  - (c) flattening said helically wound strands into a flat multistrand ribbon having two generally flat sides, two edges and two layers of strands.
6. Apparatus for making multi-strand cable comprising:
  - a generally planar turret having an axis,
  - means mounting said turret for rotation about its axis,
  - turret drive means for rotating said turret,
  - a plurality of spool holders mounted on said turret with each spool holder being rotatable about an axis parallel to said turret axis,
  - a plurality of spools of wire mounted in selected of said spool holders,
  - a fixed forming mandrel positioned axially of and spaced from said turret,
  - guide means mounted on said turret for rotation therewith for guiding wires from said spools to said fixed forming mandrel,
  - spool drive means for rotating selected of said spool holders in one direction about their axes and for rotating selected others of said spool holders in the opposite direction about their axes.

**4,947,638**  
**STEEL CORD FOR REINFORCING RUBBER**  
Akira Nagamine, Kenichi Okamoto, and Hidekazu Nakata, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Filed Dec. 13, 1989, Ser. No. 450,106  
Claims priority, application Japan, Dec. 16, 1988, 63-318884  
Int. Cl.<sup>5</sup> D02G 3/48; D60C 9/00; D07B 1/06  
U.S. Cl. 57—212 2 Claims



1. A steel cord for reinforcing rubber, comprising a plurality of strands twisted together, said each strand comprising two to four element wires twisted together, said strands and said element wires being twisted in the same direction so that the product  $k$  of the twisting ratio of the cord and that of said strand which is given by the following formula will be 1.025 to 1.05, said cord having the elongation coefficient  $E'$  [= Young's modulus of elasticity  $\times$  transverse sectional area of the cord (kgf/0.1% elongation)] of 6.0 to 11.0 after having been covered with rubber by vulcanizing, the formula being:

$$k = \frac{\sqrt{(\pi D_1)^2 + P_1^2}}{P_1} \times \frac{\sqrt{(\pi D_2)^2 + P_2^2}}{P_2}$$

wherein:

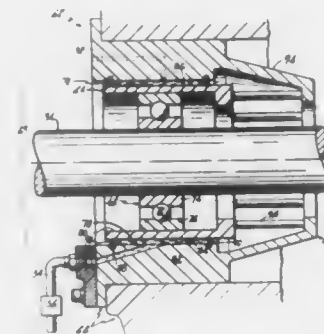
- $P_1$  is the lay length of strand (mm)
- $P_2$  is the lay length of cord (mm)
- $D_1$  is the diameter of the circle connecting the centers of the strands (mm)
- $D_2$  is the diameter of the circle connecting the centers of the element wires (mm).

**4,947,639**  
**APPARATUS AND METHOD FOR SUPPORTING A ROTATING SHAFT IN A ROTARY MACHINE**  
David H. Hibner, Colchester; Dennis F. Buono, Manchester; Kurt M. Dembeck, Vernon, and Roy D. Franceschet, North Haven, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 12, 1988, Ser. No. 193,449  
Int. Cl.<sup>5</sup> F02G 3/00  
U.S. Cl. 60—39.02 10 Claims

1. A method of operating a rotary machine which includes a stator assembly and rotor shaft extending axially in the machine, the rotor shaft being rotatable about an axis of rotation at a first speed and a second speed, the machine having a bearing which engages the shaft and which is supported by a support system which includes a spring support extending in the machine for supporting the bearing and a circumferentially continuous damping chamber disposed circumferentially about the bearing for damping vibrations in the shaft, comprising: flowing a pressurized damping medium to the damping chamber and from the chamber at rates which insure the damper is filled with damping medium at the first speed of the shaft to activate the damper, the damping medium having a viscous damping characteristic which damps vibrations in the shaft and a stiffness characteristic that transmits vibratory forces from the shaft through the damping medium to the stator structure; and,

blocking the flow of damping medium to the damping chamber and allowing flow from the chamber to inactivate the damper at the second speed of the shaft such that the damping chamber is empty of damping medium to such an extent that the medium has no stiffness characteristic to transmit vibratory forces from the rotating shaft to the

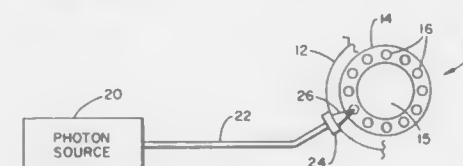


stator structure and has no viscous damping characteristic to provide damping by the medium to the rotor shaft; wherein the method of operating the engine provides a support system having a mechanical spring and viscous damper to support the shaft at the first speed and removes the viscous damper from the support system at the second speed.

**4,947,640**  
**GAS TURBINE ENGINE PHOTON IGNITION SYSTEM**  
Jimmy D. Few, and James W. L. Lewis, both of Tullahoma, Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.

Continuation of Ser. No. 043,177, Apr. 27, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,101  
Filed Feb. 28, 1989, Ser. No. 317,101  
Int. Cl.<sup>5</sup> F02G 1/005 37 Claims

U.S. Cl. 60—39.06



1. A method of igniting a hydrocarbon fuel comprised of droplets of hydrocarbon fuel, comprising the steps of: providing the hydrocarbon fuel as an air/fuel spray comprised of droplets of hydrocarbon fuel; generating electromagnetic energy having one or more wavelengths primarily within a range of approximately 185 nm to approximately 400 nm; and directing the energy into the air/fuel spray such that one or more droplets absorb the energy and are heated, fragmented and ignited thereby.

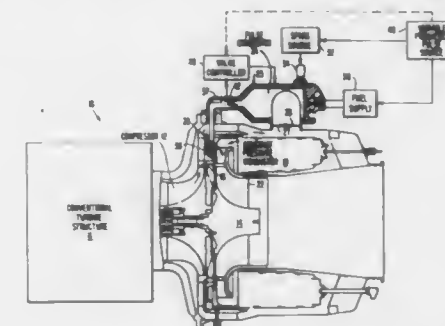
**4,947,641**  
**PULSE ACCELERATING TURBINE**  
Colin Rodgers, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 23, 1988, Ser. No. 210,376  
Int. Cl.<sup>5</sup> F02C 7/27 18 Claims

1. A self-starting turbine engine comprising: a turbine having a rotor which rotates in response to gas impinging on turbine blades contained in the rotor; a compressor rotatably driven by the turbine, for compressing gas which is drawn into the compressor and providing an output of compressed gas; a constant pressure combustor, coupled to a fuel supply and

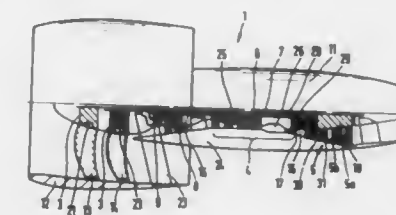
to the output of the compressor, for burning fuel delivered to the combustor and providing pressurized gas combustion products at an end of the combustor, the constant pressure gas output directing the gas combustion products against the turbine blades of the rotor to cause rotation; and

a pulse combustor, coupled to a fuel supply and to the output of the compressor for providing compressed gas to a



combustion chamber of the pulse combustor, an ignitor for periodically igniting a mixture of fuel and gas within the pulse combustor for providing pulses of pressurized combustion products as an output of the pulse combustor, the output of the pulse combustor being directed against the turbine blades of the rotor, and wherein the output of the pulse combustor is such that a pressure buildup within the pulse combustor is enhanced upon ignition of a gas fuel mixture within the pulse combustor.

**4,947,642**  
**PROPFAN TURBO-ENGINE**  
Hubert Grieb, Germering, and Helmut-Arnd Geldel, Karlsfeld, both of Fed. Rep. of Germany, assignors to MTU Motoren- und Turbinen-Union München GmbH, Fed. Rep. of Germany  
Filed Apr. 7, 1989, Ser. No. 334,533  
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1988, 3812027  
Int. Cl.<sup>5</sup> F02K 3/072; F02C 3/067  
U.S. Cl. 60—226.1 9 Claims



1. A propfan turbo-engine having two contra-rotating propfan rotors and a gas turbine, which includes a gas generator and a working turbine, the working turbine having inner and outer contra-rotating turbine rotors equipped with blades and each mounted at one of two concentric shafts, these concentric shafts extending radially inside the gas generator through the gas turbine, and each concentric shaft being connected with one propfan rotor respectively, these propfan rotors being arranged upstream of the gas turbine and being surrounded by a shroud wherein an intermediate-pressure compressor, disposed on an immediate-pressure compressor shaft, is coupled by gear means, with an exterior shaft, of the two concentric shafts, which drives a rear propfan rotor of the propfan rotors, and wherein the outer turbine rotor, which is coupled with the



exterior shaft, has one turbine nozzle more than the inner turbine rotor.

**4,947,643**  
**ACTIVE GEOMETRY CONTROL SYSTEM FOR GAS TURBINE ENGINES**

Robert R. Pollak, North Palm Beach; Syed J. Khalid, Palm Beach Gardens, and Juan A. Marcos, Jupiter, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 20, 1988, Ser. No. 246,765  
Int. Cl.<sup>5</sup> F02K 1/17; F02C 9/54  
U.S. Cl. 60—236

10 Claims



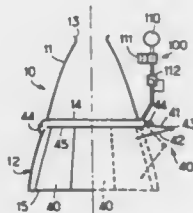
1. A system for controlling power from an engine in an aircraft, said engine having a compressor affixed to a spool driven by a turbine and having variable gas path components including variably positioned vanes having selectable values, and a burner for generating hot exhaust gases, said system comprising:

means for receiving aircraft parameter signals;  
means for receiving signals indicative of the variable gas path component values and burner fuel flow;  
scheduling means responsive to said aircraft parameter signals and said gas path component value signals for anticipating contemporary values of said burner fuel flow and at least one variable gas path component; and  
control means responsive to said scheduling means, for providing, in response to signals indicative of a selected engine power level, signals to engine components to select a magnitude of said burner fuel flow synchronously with selected variable gas path component values.

**4,947,644**  
**DIVERGING PORTION OF DISCONTINUOUS CURVATURE FOR A ROCKET ENGINE NOZZLE**  
Eric Hermant, Vernon, France, assignor to Societe Europeenne de Propulsion, Suresnes, France

Filed Jun. 30, 1988, Ser. No. 213,345  
Claims priority, application France, Jul. 20, 1987, 87 10243  
Int. Cl.<sup>5</sup> F02K 1/28; B63H 25/46  
U.S. Cl. 60—257

23 Claims



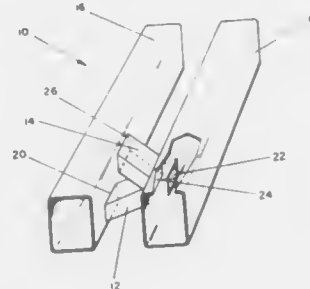
1. A diverging portion with curvature discontinuity for the nozzle of a rocket engine through which a main flow of gas is ejected, the diverging portion comprising a first length consti-

tuted by a first surface of revolution about the nozzle axis and having a curved profile in axial section, a second length constituted by a second surface of revolution about the nozzle axis and having a curved profile in axial section, the curvature discontinuity defined in the zone where said first length and said second length meet, and a controlled injection device disposed to inject a controlled quantity of an additional gas into the diverging portion in the same direction as the main flow of gas ejected by the nozzle, the additional gas injected in a direction non-tangential to the surface of the diverging portion, wherein said controlled injection device injects a substantial quantity of additional gas into the diverging portion only after the rocket engine has been operated for a predetermined length of time.

**4,947,645**  
**EXHAUST EFFICIENCY INCREASING APPARATUS**  
Joseph H. Pemberton, 801 E. Main, Artesia, N. Mex. 88210  
Filed Jul. 31, 1989, Ser. No. 388,240  
Int. Cl.<sup>5</sup> F02B 27/02

U.S. Cl. 60—313

13 Claims



1. An apparatus for increasing exhaust efficiency for an internal combustion engine having two banks of cylinders, a left bank and a right bank, there being a separate exhaust conduit from each bank of cylinders, a left exhaust conduit and a right exhaust conduit, respectively, the apparatus comprising:  
first means for communicating from the left exhaust conduit to the right exhaust conduit, said first communicating means extending from a position on the left conduit a selected distance from the left cylinder bank to a preselected position on the right exhaust conduit, said preselected position on the right exhaust conduit being further from the right cylinder bank than the selected position on the left exhaust conduit is from the left cylinder bank;  
second means for communicating from the right exhaust conduit to the left exhaust conduit, said second communicating means extending from a position on the right conduit a selected distance from the right cylinder bank to a preselected position on the left exhaust conduit, said preselected position on the left exhaust conduit being further from the left cylinder bank than the selected position on the right exhaust conduit is from the right cylinder bank; and  
means for positioning said first and second means on the exhaust conduits a predetermined distance from the cylinder banks.

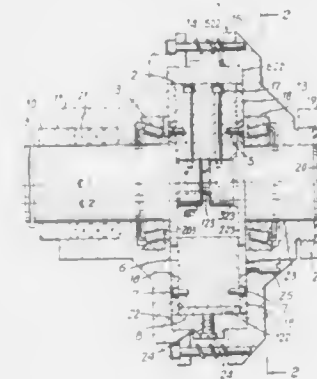
**4,947,646**  
**RADIAL VANE HYDRAULIC MACHINE**  
Erwin Lenz, 180 Cabrini Blvd., New York, N.Y. 10033  
Filed Sep. 2, 1988, Ser. No. 240,036  
Int. Cl.<sup>5</sup> F04C 2/344

U.S. Cl. 60—484

14 Claims

1. A positive displacement hydraulic rotator unit, reversible in direction of rotation and capable of being used as a fluid driver unit or as a fluid driven motor, in a hydraulic power transmission system, the rotator unit comprising a housing

defining a substantially cylindrical internal chamber having an internal cylindrical surface, the internal chamber being centered about a first central axis; a rotor rotatably mounted within the chamber and rotatable about a second axis parallel to the first central axis but radially displaced therefrom; and an intake opening and an exhaust opening into the chamber through the internal cylindrical surface, the intake and exhaust openings being angularly displaced thereabout; the rotor comprising a plurality of at least three arcuate core segments so juxtaposed one to the other as to define three radially extending centrally interconnected blade channels between the core segments, and a core segments connecting structure for rigidly securing the core segments together; rotor blades, having transverse side surfaces, slidably held within the blade channels so as to be radially reciprocally movable there within, the transverse sides of the core segments and of the blades being substantially coplanar; the core segment connecting structure comprising a front flange and a rear flange, the flanges being secured to the respective opposite transverse sides of the core



segments, the flanges being substantially concentric with the core segments; blade pins; and annular ring having a plurality of elongated holes therethrough, the holes being elongated in a radial direction, the ring being pinned to each of the blades by said blade pins extending through such elongated holes and into openings in the transverse side surfaces of the blades, to interconnect the several blades so that the blades and the annular ring are guided to rotate and to move radially as a single unit during rotation of the rotor; the largest radial dimension of the flanges being smaller than the inner diameter of the annular ring; and a circumferentially extending sealing surface secured to the radially outwardmost portion of each blade member, the blade members being so positioned and dimensioned as to maintain the sealing surface in sealable contact with the inner cylindrical surface and the inlet and outlet openings always separated by at least one rotor blade; and a mechanical energy conducting member, secured concentrically to the core and extending axially outside of the unit to transmit mechanical energy.

**4,947,647**  
**ENERGY STORAGE AND GENERATION HYDRO WELL APPARATUS**  
Robert K. Jensen, 14990 Echo Dr., Golden, Colo. 80401  
Filed Jan. 4, 1990, Ser. No. 460,821  
Int. Cl.<sup>5</sup> F03B 13/10

U.S. Cl. 60—659

5 Claims

1. An energy storage and generation apparatus comprising:  
a vertical tube extending downward into a body of water with an upper opening near the surface of the water to permit a flow of water into said upper opening and down said vertical tube;  
air induction means suitable for introducing a stream of air bubbles into the water flowing down the vertical tube;  
a separation chamber located at the lower end of said verti-

cal tube adapted to separate the air from the flow of water emerging from the lower end of the vertical tube;  
an exhaust tube extending upward from the lower portion of said separation chamber with an upper opening located below the surface of the body of water;  
a number of orifices to allow streams of air bubbles to be introduced into said exhaust tube to induce a flow of water from said separation chamber through said exhaust tube;



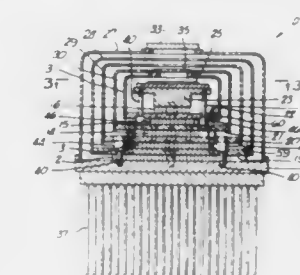
air compression means adapted to supply ambient air to said orifices;  
a tube extending from the upper portion of said separation chamber to said orifices, adapted to supply air from said separation chamber to said orifices; and  
generator means adapted to produce power from the flow of water through said exhaust tube.

**4,947,648**  
**THERMOELECTRIC REFRIGERATION APPARATUS**  
Robert W. Harwell, Redondo Beach, and William M. Simon, Los Angeles, both of Calif., assignors to Microluminetics, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 208,284, Jun. 17, 1988, Pat. No. 4,833,889. This application May 22, 1989, Ser. No. 355,168  
Int. Cl.<sup>5</sup> F25B 21/02

U.S. Cl. 62—3.2

13 Claims



1. A solid state refrigeration apparatus for cooling an optical radiation detector, comprising:

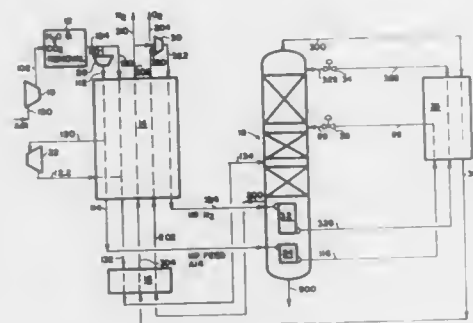
a plurality of generally flat thermoelectric cooling arrays of progressively smaller areas, the optical radiation detector being located adjacent the smallest array;  
a plurality of generally flat, thermally-conducting plates interleaved with, and in thermal contact with, the plurality of thermoelectric cooling arrays, wherein the plates have progressively smaller areas like the corresponding cooling arrays such that the plates and the arrays together form a generally pyramidal shape; and  
a plurality of generally cup-shaped heat shields of progres-

sively smaller size, each shield attached to, and in thermal contact with, a separate thermally-conducting plate, wherein the heat shields are arranged in a nested relationship, with each shield and associated plate enclosing any smaller heat shields and plates; wherein aligned apertures are formed in the plurality of heat shields, to provide an optical path from the exterior of the apparatus to the optical radiation detector located adjacent the smallest thermoelectric cooling array, within an innermost shield of the plurality of heat shields; and wherein each of the thermally-conducting plates includes a thin, electrically-insulating substrate associated with a separate one of the plurality of cooling arrays.

**4,947,649**  
**CRYOGENIC PROCESS FOR PRODUCING LOW-PURITY OXYGEN**  
Rakesh Agrawal, Allentown, and Steven R. Auil, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.  
Filed Apr. 13, 1989, Ser. No. 337,518  
Int. Cl.<sup>5</sup> F25J 3/04

U.S. Cl. 62—11

12 Claims



1. An improved air separation process for the generation of a low-purity, high pressure oxygen stream and a high pressure nitrogen rich stream utilizing a single pressure distillation column which comprises compressing air to an elevated pressure to form a compressed air stream, removing impurities that freeze at cryogenic temperatures; splitting the compressed air stream into two fractions, the first fraction being further cooled and introduced to the single pressure distillation column for separation and the second fraction compressed and used to effect reboil in the single pressure distillation column by passage through a condenser/evaporator, whereby a low purity, high pressure gaseous oxygen stream is recovered as a bottom fraction and a high pressure nitrogen rich product recovered as an overhead fraction, the improvement which comprises:

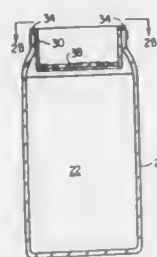
- further compressing the second fraction after the compressed air stream is split into two fractions to an elevated pressure and thus forming a high pressure second fraction;
- condensing the high pressure second fraction in said condenser/evaporator near the bottom of the single pressure distillation column for effecting reboil;
- expanding the resulting high pressure condensed second fraction and charging to a middle portion of the single pressure distillation column for separation;
- recovering a nitrogen rich product from the top of the single pressure distillation column;
- compressing and cooling a portion of the nitrogen rich product to form a compressed and cooled nitrogen rich product;
- condensing said portion of the compressed and cooled nitrogen rich product in a second condenser/evaporator for effecting reboil in the column to form a condensed nitrogen stream;

- expanding the condensed nitrogen stream; and,
- introducing the expanded nitrogen rich product stream into the top of the single pressure distillation column for providing high purity reflux.

**4,947,650**  
**METHOD AND APPARATUS FOR LIQUID CRYOGEN PRESSURIZATION OF CONTAINERS OF PARTICULATES**  
Russell W. Blanton, Acton; J. Eric Taylor, Topsfield, and Thornton Stearns, Winchester, all of Mass., assignors to Vacuum Barrier Corporation, Woburn, Mass.  
Filed Sep. 8, 1988, Ser. No. 404,655  
Int. Cl.<sup>5</sup> F17C 7/02

U.S. Cl. 62—50.1

5 Claims

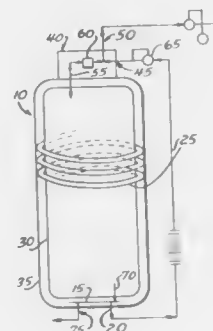


1. In a method of producing a pressurized sealed container of particulate material in which a metered flow of a desired amount of liquid cryogen is directed into an unsealed container of said particulate material immediately before the container is sealed, the improvement comprising providing a liquid cryogen retainer, positioned within said unsealed container above said particulate material, to receive said metered flow of cryogen, and directing said flow of liquid cryogen to said retainer, and capping said container, whereby eruption from said container of said particulate material caused by penetration of said particulate material by said liquid cryogen, is substantially prevented.

**4,947,651**  
**PRESSURE BUILDING CIRCUIT FOR A CONTAINER FOR LOW TEMPERATURE FLUIDS**  
Timothy Neeser, Savage; Duane Preston, and Michael Lutgen, both of New Prague, all of Minn., assignors to Minnesota Valley Engineering, Inc., New Prague, Minn.  
Filed Apr. 7, 1989, Ser. No. 335,192  
Int. Cl.<sup>5</sup> F17C 9/04

U.S. Cl. 62—50.4

9 Claims



1. A pressure building circuit for a double-walled tank containing a low pressure fluid, said tank having an opening at the

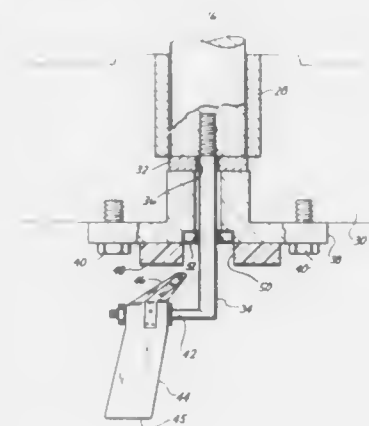
upper portion thereof to supply gas therefrom to a use line, said circuit comprising:

- a pressure building coil communicating the lower portion of said tank with said upper portion opening and said use line, said coil disposed between the walls of said tank in contact with the outer wall thereof to vaporize said low temperature fluid by heat transfer to maintain pressure in the vapor portion of said tank; and,
  - an orifice of reduced diameter interposed between said pressure building coil and said upper portion opening to establish a pressure gradient therebetween, thereby to divert a selected quantity of gas from said coil directly to said use line during periods of high demand,
- whereby the pressure building coil will normally supply gas to the upper portion of the tank to maintain gas pressure therein but will assist in supplying gas to said use line during high demand periods.

**4,947,652**  
**ICE LEVEL CONTROL FOR FLAKE-ICE MAKER**  
Henio R. Arcangeli, 459 21st Pl., Santa Monica, Calif. 90402  
Filed Apr. 17, 1989, Ser. No. 338,847  
Int. Cl.<sup>5</sup> F25C 1/14

U.S. Cl. 62—71

19 Claims



1. A flake-ice icemaker of the type having a housing, a refrigerated surface in said housing, a rotary scraper for scraping ice from said refrigerated surface and discharging the scraped ice into an underlying ice bin;

- said rotary scraper driven by a vertical rotary drive shaft electrically grounded to a common ground with a control circuit connected for controlling rotation of said scraper;
- a sensing arm attached to said drive shaft for sweeping a path in said ice bin; and
- switch means actuable upon contact of said arm means with accumulated ice in said ice bin for completing an electrical circuit through said drive shaft thereby to interrupt operation of the icemaker.

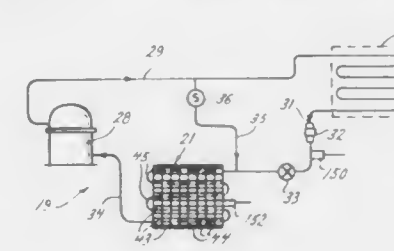
**4,947,653**  
**ICE MAKING MACHINE WITH FREEZE AND HARVEST CONTROL**  
Donald D. Day, Chesterfield, and Delbert J. Potter, St. Peters, both of Mo., assignors to Hussmann Corporation, Bridgeton, Mo.  
Filed Jun. 26, 1989, Ser. No. 371,588  
Int. Cl.<sup>5</sup> F25C 5/10

U.S. Cl. 62—73

29 Claims

1. An ice maker comprising:
- evaporator means including ice forming means thereon;
  - cooling means including compressor means and condenser means for cooling said evaporator means to freeze ice on said ice forming means in a normal refrigeration cycle, and

including means for defrosting said evaporator means to harvest ice from said ice forming means in a harvest cycle; first means for sensing a temperature correlating to the temperature of said evaporator means during the refrigeration cycle;

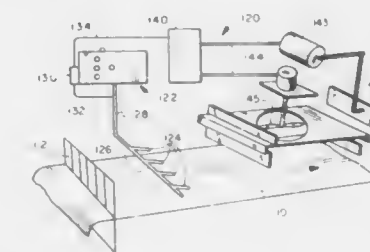


second means for sensing a temperature correlating to the condensing capacity of said condenser means during the refrigeration cycle; and means responsive to said first and second means for controlling the length of the refrigeration cycle of said cooling means.

**4,947,654**  
**LIQUID CRYOGEN FREEZER WITH IMPROVED VAPOR BALANCE CONTROL**  
Brian Evan Sink, Orland Park; Gary D. Lang, Naperville, and Benjamin Zyer, Orland Park, all of Ill., assignors to Liquid Carbonic Corporation, Chicago, Ill.  
Filed Nov. 30, 1989, Ser. No. 444,015  
Int. Cl.<sup>5</sup> F25D 17/04

U.S. Cl. 62—186

12 Claims



1. A cryogenic freezer apparatus for food products, comprising:

- a thermally insulated enclosure having an entrance opening and an exit opening;
- conveyor means for conveying products through said enclosure, from said entrance to said exit openings;
- cryogen injecting means in said enclosure, responsive to a cryogen control signal for introducing liquid cryogen in said enclosure, with cryogen vapor being produced thereby;
- blower means in said enclosure to direct cryogen vapor away from said enclosure opening, the output of said blower means being controllable by a blower control signal;
- injection control means coupled to said injecting means, for generating a cryogen control signal;
- blower control means coupled to said blower means to control the output thereof in response to a blower control signal; and
- coupling means coupled to said cryogen control signal and to said blower control means for providing a blower control signal responsive to said cryogen control signal, so that output of the blower means is increased with increasing cryogen injection to limit the outflow of cryogen



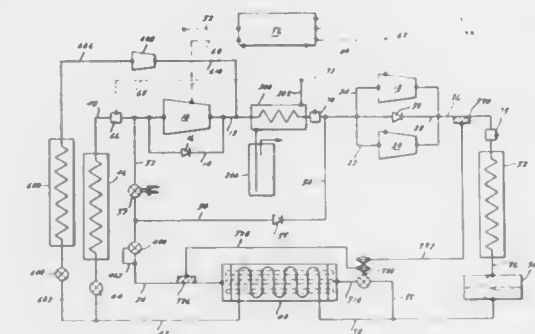
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vapor passing through said enclosure opening to a preselected amount needed to prevent intrusion of the ambient environment through the enclosure opening, despite the increasing volume of cryogen vapor generated in said enclosure, and so that output of the blower means is decreased with decreasing cryogen injection to ensure that the preselected cryogen outflow is maintained at said opening to prevent intrusion of the ambient environment therethrough.

**4,947,655**  
**REFRIGERATION SYSTEM**  
David N. Shaw, Unionville, Conn., assignor to Copeland Corporation, Sidney, Ohio  
Division of Ser. No. 863,593, May 15, 1986, Pat. No. 4,787,211, which is a continuation-in-part of Ser. No. 636,068, Jul. 30, 1984, Pat. No. 4,594,858, which is a continuation of Ser. No. 569,886, Jan. 11, 1984, abandoned. This application Oct. 31, 1988, Ser. No. 265,402

Int. Cl.<sup>3</sup> F25B 5/00, 1/10  
U.S. Cl. 62—200

4 Claims

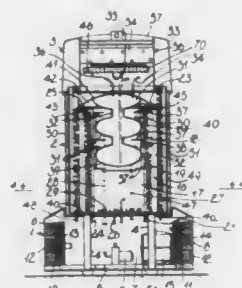


1. A refrigeration circuit having improved system control, comprising:  
first stage compressor means;  
second stage compressor means;  
a condenser;  
an evaporator;  
conduit means bearing a compressible refrigerant interconnecting said first stage compressor means, said second stage compressor means, said condenser, and said evaporator, in series in a closed loop, in that order;  
motors for driving said compressor means;  
an economizer operatively disposed between said condenser and evaporator and including an expansion valve for normally expanding a portion of the condensed refrigerant from said closed loop downstream of said condenser for subcooling refrigerant flowing to said evaporator;  
means for feeding said expanded portion of refrigerant to an inter-stage point between the outlet of said first stage compressor means and the inlet of said second stage compressor means;  
a first sensor for sensing second stage discharge temperature; and  
control means responsive to excess second stage discharge temperature as sensed by said first sensor for actuating said expansion valve to a further open position to cause overfeeding of said economizer and hence reduction of said second stage discharge temperature.

**4,947,656**  
**INTEGRATED APPARATUS FOR PRODUCING WARM WATER**  
Cesare Alvisi, San Bonifacio, Italy, assignor to Italcim S.r.l., Verona, Italy

Filed Jul. 5, 1989, Ser. No. 376,495  
Claims priority, application Italy, Jul. 28, 1988, 84959 A/88  
Int. Cl.<sup>3</sup> F25B 27/00  
U.S. Cl. 62—235.1

23 Claims



1. An integrated apparatus for producing warm water, comprising in combination:  
a heat pump, said heat pump comprising a compressor, a condenser, an expansion valve, an evaporator, a refrigerating fluid and a heat pump piping system, said compressor, said condenser, said expansion valve and said evaporator being connected in series by said heat pump piping system, said heat pump piping system conveying said refrigerating fluid,  
a boiler, said boiler comprising a heating element and a furnace, said heating element providing heat to said furnace,  
at least one greenhouse effect heat source, said at least one greenhouse effect heat source providing heat,  
a first water piping system conveying water, said first water piping system being arranged in heat transfer contact with said condenser of said heat pump, said first water piping system also being arranged in heat transfer contact with said furnace of said boiler,  
a second water piping system conveying water, said second water piping system being arranged in heat transfer contact with said furnace of said boiler,  
wherein said apparatus further comprises an evaporator chamber, said evaporator of said heat pump being arranged inside said evaporator chamber, said furnace of said boiler being arranged to provide heat to said evaporator arranged in said evaporator chamber, said at least one greenhouse effect heat source being arranged to provide heat to said evaporator arranged in said evaporator chamber.

**4,947,657**  
**AUXILIARY AIR CONDITIONING APPARATUS AND METHOD FOR AIR CONDITIONED VEHICLES**  
John F. Kalmbach, 9805 Gray Blvd., Tex. 78758  
Filed Jun. 5, 1989, Ser. No. 362,036  
Int. Cl.<sup>3</sup> F25B 27/00

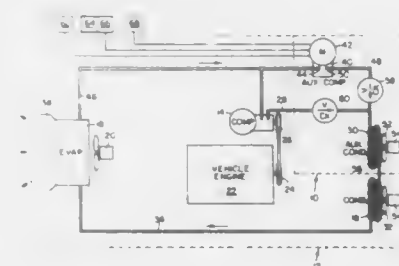
U.S. Cl. 62—236

5 Claims

1. An auxiliary refrigerated air conditioning apparatus for vehicles and the like having a vehicle electrical system and a primary refrigerated air conditioning system that includes a primary compressor powered by a self-contained vehicle engine for compressing a suitable refrigerant, a primary condenser connected to the primary compressor for condensing the compressed refrigerant, a primary evaporator connected to the primary condenser for evaporating the refrigerant, an evaporator blower for circulating for evaporating to supply cooled air to a refrigerated air distribution system in the vehicle, and a return line for returning the evaporated refrigerant

to the primary compressor, the auxiliary air conditioning apparatus comprising:

- A. auxiliary compressor means connected to the return line and to the primary condenser for receiving low pressure refrigerant from the primary evaporator, compressing the refrigerant, and supplying compressed refrigerant to the primary condenser when the primary compressor is not operating;
- B. an auxiliary compressor electric motor connected to the auxiliary compressor means for powering the auxiliary compressor means, the electric motor being adapted to operate on a suitable alternating current;
- C. primary compressor check valve means connected between the primary condenser and the primary compressor for preventing the flow of refrigerant from the auxiliary compressor to the primary compressor when the auxiliary compressor is operating;



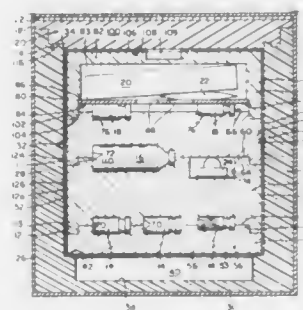
- D. auxiliary compressor check valve means connected between the primary condenser and the auxiliary compressor for preventing the flow of refrigerant from the primary compressor to the auxiliary compressor when the primary compressor is operating;
- E. auxiliary condenser blower means for circulating air past the primary condenser when the auxiliary compressor is operating;
- F. control means for controlling the operation of the auxiliary compressor electric motor and for controlling the operation of the auxiliary condenser blower means; and
- G. ignition-on relay means included in the control means and connected for receiving a control signal from the vehicle electrical system, the ignition-on relay means for preventing the auxiliary compressor from operating when said control signal is received.

**4,947,658**  
**SHIPPING CONTAINER**  
Warren J. Wheeler, Seattle; James C. Lutz, Hilliard, and Jeffrey F. Delys, Edmonds, all of Wash., assignors to NeoRx Corporation, Seattle, Wash.

Filed Aug. 22, 1989, Ser. No. 397,007  
Int. Cl.<sup>3</sup> F25D 3/08

U.S. Cl. 62—372

24 Claims



1. A shipping container for safely shipping vials, bottles and

other vessels of material with at least a first vessel to be maintained in a frozen state and at least a second vessel to be maintained in an unfrozen state during shipment using a pre-frozen refrigerant material, comprising:

- an insulated chest with four sidewalls and a bottom end wall of insulating material defining a closable interior space with an open top, said chest interior space having a central compartment and a refrigerant well immediately below said central compartment, said refrigerant well being sized to receive a predetermined amount of the pre-frozen refrigerant material therein sufficient to maintain the first vessel in a frozen state for a selected shipment duration, said chest having a tray support within said chest interior space positioned at about an interface between said refrigerant well and said central compartment;
- a first tray removably positioned within said chest central compartment and having lower and upper faces and a wall of insulating material therebetween, said first tray being supported by said tray support to position said lower first tray face at said interface, immediately above said refrigerant well and the pre-frozen refrigerant material received therein, said tray support maintaining said first tray at a fixed position against downward travel toward said refrigerant well during shipment even should the pre-frozen refrigerant material melt, sublime or otherwise change state as heat is absorbed, and thereby change in shape or size, said first tray upper face supporting the first vessel at a fixed distance above said refrigerant well, said first tray wall having a thickness of insulating material sized to permit sufficient heat transfer therethrough to maintain the first vessel in a frozen state during said selected shipment duration, but to sufficiently limit heat transfer during said selected shipment duration to approximately only that needed to maintain the first vessel in the frozen state during said selected shipment duration so as to prolong the refrigerant action of the pre-frozen refrigerant material and minimize the refrigerant material needed;
- a second tray removably positioned within said chest central compartment and having lower and upper faces and a wall of insulating material therebetween, said second tray operatively engaging and being supported by said first tray above said first tray in fixed position against downward travel within said chest central compartment during shipment and said second tray operatively engaging and holding said first tray in fixed position against upward travel within said chest central compartment during shipment, said second tray lower face being held in juxtaposition with said first tray upper face, said second tray upper face supporting the second vessel at a fixed distance above said refrigerant well, said second tray wall having a thickness of insulating material sized to sufficiently limit heat transfer therethrough to maintain the second vessel in an unfrozen state during said selected shipment duration, but to permit sufficient heat transfer to maintain said second vessel in a refrigerated state within a desired limited range of temperatures during said selected shipment duration; and
- an insulated lid removably positionable to close said chest open top and thereby close said chest interior space, said lid operatively engaging and holding said second tray in fixed position against upward travel within said chest central compartment during shipment, whereby packed within the same shipping container, the first vessel is maintained in a frozen state and the second vessel is maintained in an unfrozen state during shipment using a single supply of a pre-frozen refrigerant material in a predetermined amount, and the first and second vessels are held in stationary position within said chest as the refrigerant material changes shape or size within said refrigerant well.

4,947,659

**FABRIC SEVERING DEVICE FOR CIRCULAR KNITTING MACHINE**

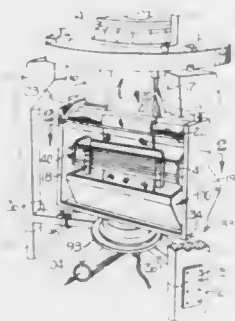
Thomas W. Tyler, Davidson County, N.C., assignor to Adele Knits, Winston-Salem, N.C.

Filed Apr. 10, 1989, Ser. No. 335,421

Int. Cl.<sup>5</sup> D04B 35/10, 1/00

U.S. Cl. 66—147

8 Claims



1. In a circular knitting machine including a rotatable needle cylinder, a frame extending beneath said needle cylinder and rotatable therewith, fabric tensioning roll means supported on said frame and rotatable in timed relationship to rotation of said needle cylinder to withdraw the knit fabric in a flattened condition as the fabric is produced by the knitting machine, the combination therewith of means for periodically severing a predetermined length of the fabric in a transverse direction while the fabric extends downwardly from said fabric tensioning roll means, said fabric severing means including a hot wire positioned below said fabric tensioning roll means, support means carried by said frame for engaging opposite end portions of said hot wire to normally maintain said hot wire extending transversely of and out of the path of travel of the flattened fabric extending downwardly from said fabric tensioning roll means, operator means for imparting horizontal movement to said hot wire support means and to move said hot wire against and through the fabric to thereby transversely sever a length of the fabric, wherein said operator means includes solenoid means operatively connected to said hot wire for moving the same against and through the knit fabric, and upper and lower pressure applying rods positioned above and below said hot wire, said pressure applying rods being resiliently supported at opposite ends and being engageable with the fabric when said hot wire moves against and through the knit fabric.

4,947,660

**APPARATUS FOR CONTINUOUS TREATMENT, PREFERABLY DYEING, OF TEXTILE MATERIAL IN ROPE FORM**

Hans-Ulrich von der Eltz, Frankfurt am Main, and Wilhelm Christ, Michelbach/Bilz, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany Division of Ser. No. 250,924, Sep. 29, 1988, Pat. No. 4,885,814.

This application Oct. 3, 1989, Ser. No. 416,597

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1987, 3733219

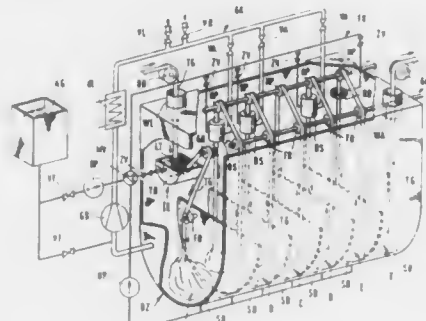
Int. Cl.<sup>5</sup> D06B 3/28

U.S. Cl. 68—62

15 Claims

1. Apparatus for continuously treating textile material made of synthetic and/or natural fibers in continuous rope form with aqueous treatment liquor, the apparatus comprising a jet dyeing machine having a self-contained treatment zone and a recirculating gas stream generated by actuation of a jet system, the kinetic energy of which provides a propulsive force for continuously transporting the textile material through the self-contained treatment zone, a textile material inlet for introducing the textile material into the self-contained treatment zone, a textile material outlet for removing textile material

from the treatment zone, a line connecting the recirculating gas stream to the treatment zone, a blower in the line for generating and compressing the gas stream, a heat exchanger in the line for controlling the temperature of the gas stream, liquor recycle means for recycling treatment liquor drawn from the treatment zone back into the treatment zone including a circulating pump and a make-up reservoir connected to introduce additional treatment liquor into the recycle, and the



treatment zone including impregnating means for applying treatment liquor to the textile material and an aerodynamically active jet arrangement having at least one transport jet for moving the textile material through the treatment zone, and a plurality of storage spaces in the treatment zone in which the textile material dwells and through which the textile material passes as it travels through the treatment zone in a generally tensionless state.

4,947,661

**DETACHABLE TYPE CARBORNE ELECTRONIC APPARATUS**

Tomoji Yoshida, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

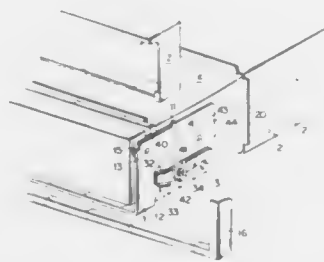
Filed Oct. 20, 1988, Ser. No. 260,538

Claims priority, application Japan, Oct. 21, 1987, 62-161058[U]

Int. Cl.<sup>5</sup> E05B 65/00; G12B 9/00

U.S. Cl. 70—57

7 Claims



1. A detachable type carborne electronic apparatus comprising: a bracket fixed to a car and having a side wall; an engaging projection provided on an inner surface of said side wall of said bracket; an apparatus body which can be slidably inserted into and removed from said bracket, and which has a side surface corresponding to said side wall of said bracket; a handle located near a front surface of said apparatus body and supported for pivotal movement about a first pivot axis between a received position in which the handle is received along a peripheral portion of said apparatus body and a rising position in which the handle extends to the front of the apparatus body, said handle having a grip portion, and having a first pushing part provided near said

4,947,663

**SECURITY DEVICE FOR DEAD BOLT DOOR LOCK**  
Elmer R. Yeager, 7892 Sailboat Key Blvd., Unit 602, South Pasadena, Fla. 33707

Filed Mar. 8, 1990, Ser. No. 490,311

Int. Cl.<sup>5</sup> E05B 63/00

U.S. Cl. 70—416

6 Claims

grip portion with respect to said first pivot axis and a second pushing part provided on an opposite side of said first pivot axis from said grip portion; and a catch lever having a hook portion and supported on said side surface of said apparatus body for pivotal movement about a second pivot axis between a catch position in which said hook portion engages a rear end of said engaging projection to releasably fix said apparatus body to the car and a release position in which said hook portion is free of engagement with said rear end of said engaging projection, said catch lever having opposed first and second pushed parts at respective positions thereon near said handle with respect to said second pivot axis and having said hook portion on a side of said second pivot axis opposite from said handle, said catch lever being forcibly maintained at said catch position by pushing motion of said first pushing part on said first pushed part when said handle is located at said received position, and being forcibly maintained at said release position by pushing motion of said second pushing part on said second pushed part when said handle is located at said rising position.



4,947,662

**ELECTRONIC LOCKING DEVICE**

Juan A. Imedio, San Sebastian, Spain, assignor to Talleres de Escoriza, S.A., Spain

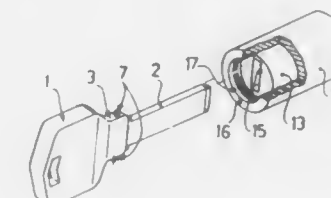
Filed May 24, 1989, Ser. No. 356,334

Claims priority, application Spain, Jun. 1, 1988, 8801728

Int. Cl.<sup>5</sup> E05B 19/00

U.S. Cl. 70—395

4 Claims



1. In an electronic locking device comprising a key and a lock, the improvement comprising:

- (a) a drive head (1) on the key, the drive head having an electronic circuit (12) therein;
- (b) a blade (2) on the key,
- (c) a stator (14) in the lock, the stator having a rotor (13), the stator surrounding the rotor (13), the stator having an annular extension (16) with an interior wall, the interior wall having an electronic circuit corresponding to the electronic circuit in the drive head, the corresponding electronic circuit having fixed contacts (17) therein;

the key having an intermediate zone (3) with edges, the edges having retractile contacts (7) charged by means of springs (8) in corresponding housings (9), in which said retractile contacts (7) are joined to conducting plates (11) that extend through the head (1) from the electronic circuit (12) and on the insertion and turn of the key in the lock, the retractile contacts (7) come into contact with the fixed contacts (17) of the corresponding electronic circuit in the interior wall of the annular extension (16) of the stator (14).

1. In a door and lock assembly comprising a door having opposite sides, a frame defining an opening adapted to be closed by said door, and a bolt in said door to be displaced into said frame to lock said door thereto, a pivotable control knob on said door on one side of the same and coupled to said bolt to control displacement of the same, said knob being pivotable between limits at first and second positions, said bolt being displaced into said frame in correspondence with the first position of the knob and out of said frame in correspondence with said second position, and means pivotable into and out of a position of interference with respect to the pivoting of said knob and adapted, when in a position of interference, to brace said knob in said first position to lock said bolt in said frame, said means including a pivot defining a pivot axis, said knob including a contact surface for engagement with said means, said means including a rigid structure pivotable on said axis to a position between said axis and said contact surface, said structure having a length substantially corresponding to the distance between said axis and said contact surface with said knob in said first position, said means being on the same side of the door as said knob and spaced in entirety from the other side of the door, the improvement in which said interfering pivotal means comprises:

- (a) a flap having a length sufficient from said pivot axis therein to reach the point of interference contact with said contact surface of said control knob in said first position, a line from said pivot axis to said point of interference contact making substantially a 90° angle with said contact surface, said flap also having an opening extending through said flap, the axis of said opening being perpendicular to the longitudinal axis of said flap;
- (b) a threaded bolt having a head of greater diameter than the remainder of the bolt, said bolt being adapted to fit through said flap opening and to serve as the pivoting means for said flap;
- (c) an opening in the surface of said lock assembly whose center coincides with the pivotal point of said flap and adapted to receive the threads of said threaded bolt; and
- (d) a coiled spring adapted to surround a portion of the said threaded bolt, to fit into the opening in said flap and when compressed within the opening in said flap to press a portion of said flap against the surface of said lock assembly in which said lock assembly opening is located, whereby friction is created between said flap and said lock assembly surface.



4,947,664

## LOCK CYLINDER

Martin Lindmayer, Böblingen, and Klaus Claar, Sindelfingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

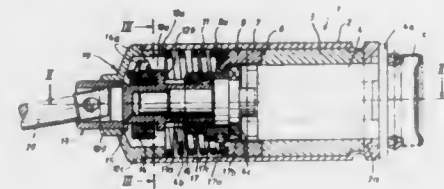
Filed Aug. 14, 1989, Ser. No. 393,229

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827418

Int. Cl.<sup>7</sup> E05B 63/00

U.S. Cl. 70—422

16 Claims



1. A lock cylinder having a cylinder housing in which a cylinder core is rotatably disposed and which can be locked to the cylinder housing by spring-loaded tumblers upon withdrawal of a key from a key duct at an open end of the cylinder core;

a bearing sleeve enclosing the cylinder housing; the cylinder housing being rotationally fixed to the bearing sleeve;

an overload coupling means;

a rotary connecting element arranged behind the cylinder core, at an end opposite the open end, and connected by a separating coupling means to the cylinder core;

the separating coupling means being responsive to a forced mechanical disengaging movement, caused by a relative rotation of the cylinder core with respect to the bearing sleeve, wherein the separating coupling means is permanently engaged during rotating movements of the cylinder core with respect to the rotationally fixed cylinder housing irrespective of whether the cylinder core is a locked or unlocked condition, and

the separating coupling means is forced into a disengaged arrangement from an overload rotation of the cylinder housing with respect to the bearing sleeve, when the disengaging operation is concluded before a certain opening rotational angle of the cylinder core is reached.

4,947,665

## APPARATUS FOR THE ELECTRICAL CONTROL OF AN IN-LINE DRAWING MACHINE

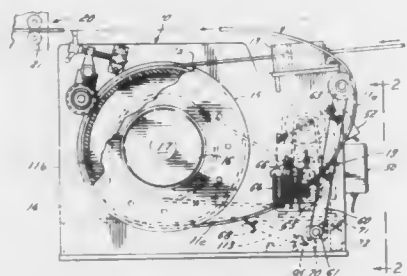
Richard A. Alcock; Scott A. Alcock, both of Roscoe, and Michael J. Yankalits, Rockford, all of Ill., assignors to Rockford Manufacturing Group, Inc., Roscoe, Ill.

Filed Mar. 23, 1989, Ser. No. 327,522

Int. Cl.<sup>7</sup> B21C 1/12

U.S. Cl. 72—17

10 Claims



1. An apparatus for drawing a length of wire through a die and for supplying the wire to a using station, said apparatus comprising:

a support,

a drum rotatably mounted on said support, said drum having an entrance end portion for receiving the wire from the die and having an exit end portion from which the wire is supplied to the using station, there being a coil of wire wrapped around said drum between entrance and exit end portions and said coil being composed of a number of wraps in a single layer,

a variable speed drive mechanism for rotating said drum thereby drawing wire onto said entrance end portion and to supply wire off of said exit end portion, said drive mechanism comprising:

a motor,

an input pulley connected to be rotated by said motor,

an output pulley connected to rotate said drum, and

an endless belt connected between said pulleys to transmit rotation from said input pulley to said output pulley,

at least one of said pulleys being adjustable in effective diameter and operable when adjusted to change the speed of said output pulley and said drum,

a sensing arm mounted for oscillation about a pivot on said support and engaging the wire being supplied from the exit end portion of said drum to said using station in such a manner as to form such wire into a loop, said arm increasing the size of said loop when pivoted in one direction and permitting the size of said loop to decrease when pivoted in the opposite direction,

means for biasing said arm in said one direction, and

electromechanical means for changing the effective diameter of said at least one pulley and thereby changing the speed of said drum response to pivoting of said arm and without a pull-back force occurring at said arm as a result of said change in diameter.

4,947,666

## METHOD AND APPARATUS FOR BENDING AN ELONGATE WORKPIECE

Albert L. Hametner, Seattle, and Larry L. Trammell, Federal Way, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 16, 1988, Ser. No. 245,455

Int. Cl.<sup>7</sup> B21C 51/00

U.S. Cl. 72—37

19 Claims

13. A method of producing an elongate workpiece that has been bent to a desired configuration, comprising:

(a) bending a workpiece using a sequence of bend instructions,

(b) carrying out a first data collection and generating first information representative of the actual configuration of the workpiece,

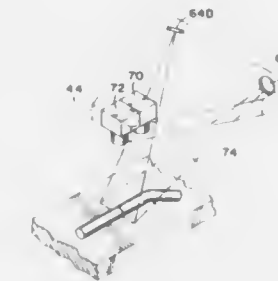
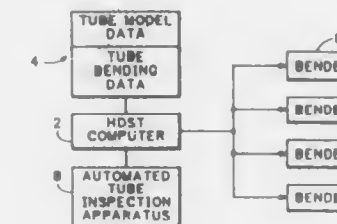
(c) comparing the first information with information representative of the desired configuration,

(d) using the result of the comparison to estimate the location and orientation of the workpiece and determine an optimum path for scanning the workpiece,

(e) using a position sensor to carry out a second data collection, by transporting the position sensor along the optimum path, and generate second information representative of the actual configuration of the first workpiece,

(f) comparing the second information with the information representative of the desired configuration and, if the comparison indicates that the workpiece conforms to the

desired configuration within a predetermined tolerance, bending at least one additional workpiece using said se-



quence of bend instructions, and otherwise adjusting the bend instructions.

4,947,667

## METHOD AND APPARATUS FOR REFORMING A CONTAINER

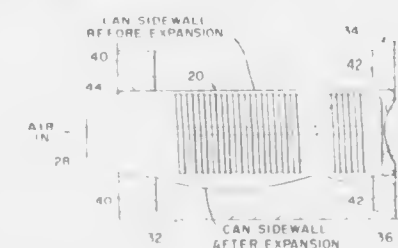
Ronald W. Gunkel, Lower Burrell; Robert A. Cargnel, Export; James R. Morran, Apollo, and Edward P. Patrick, Murrysville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jan. 30, 1990, Ser. No. 472,020

Int. Cl.<sup>7</sup> B21D 26/14

U.S. Cl. 72—56

40 Claims



1. A method for outwardly expanding a sidewall of a generally cylindrically shaped portion of an electrically responsive, metallic body, comprising the steps of:

retaining at least a first portion of the metallic body, disposing a coil of electrically conductive material inside the retained metallic body with the outer diameter of the coil adjacent inside surfaces of a portion of the sidewall to be expanded,

energizing the coil to create an electromagnetic force sufficient to expand at least a portion of the sidewall of the metallic body adjacent the coil outwardly of the original generally cylindrical shape in an unrestricted area, and introducing a fluid between the coil and the inside surface of the metallic body during expansion of the sidewall to maintain at least positive gauge pressure throughout expansion of the sidewall.

4,947,668

## ROLLING MILLING TOOL

Alfred Ostertag, Celle, Fed. Rep. of Germany, assignor to Wilhelm Hegenscheidt GmbH, Erkelenz, Fed. Rep. of Germany

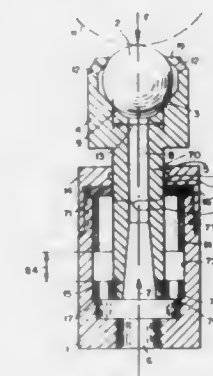
Filed Jan. 8, 1989, Ser. No. 364,691

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 8809823; European Pat. Off., Jan. 10, 1989, 89100291.7

Int. Cl.<sup>7</sup> B21B 27/10; B24B 39/02, 39/04

U.S. Cl. 72—75

27 Claims



1. A burnishing and deep rolling tool, comprising roller means for performing a rolling operation, roller head means including a hydrostatic bearing socket for rotatably supporting, guiding and holding said roller means, said hydrostatic bearing socket forming a hydrostatic bearing for said roller means, fluid duct means leading into said hydrostatic bearing for connecting said hydrostatic bearing to a source of pressurized fluid, and wherein said hydrostatic bearing socket comprises a chamber for each of said roller means, said chamber having a chamber diameter widening section, a chamber diameter reducing section forming a rim (19) for retaining said roller means, said rim extending around an axially outer end of said hydrostatic bearing socket, and pressure relief means (12, 66) leading into said chamber diameter widening section in said hydrostatic bearing socket for an effective pressure relief on said roller means when said roller means clears a contact with said hydrostatic bearing socket.

4,947,669

## APPARATUS FOR PROVIDING TUBING WITH AT LEAST ONE INTERNAL SPIRAL FIN

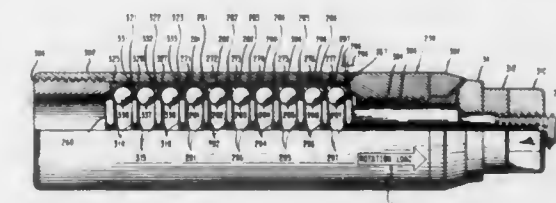
Francis J. Fuchs, Jr., Naples, Fla., assignor to R. Gale Rhodes, Jr., Rumson, N.J., a part interest

Filed Oct. 13, 1989, Ser. No. 421,505

Int. Cl.<sup>7</sup> B21C 37/20

U.S. Cl. 72—77

10 Claims



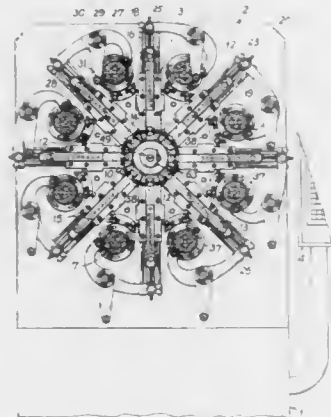
1. Apparatus for providing the internal portion of tubing with at least two internal spiral grooves to provide said tubing internal portion with at least one internal spiral fin, comprising: spinner means provided with at least two external spiral ridges; mounting means for mounting said spinner means rotatably, said spinner means and said mounting means for being positioned internally of said tubing;

upon relative movement of said tubing with respect to said spinner means in a predetermined direction, said internal portion of said tubing engaging said spiral ridges and imparting rotation to said spinner means to cause said spiral ridges to engage and provide said tubing internal portion with said internal spiral grooves and thereby said internal spiral fin; and

said mounting means including a multi-stage ball bearing assembly mounted internally thereof and having an axis extending in said predetermined direction and including a plurality of axially aligned ball bearings, each ball bearing including inner and outer ball tracks and a plurality of spherical balls which roll between said ball tracks, predetermined ones of said outer ball tracks displaced axially with respect to said inner ball tracks in said predetermined direction to provide relief space in said predetermined direction between said predetermined outer ball tracks and the spherical balls which roll therein, upon said rotation being imparted to said spinner means said spinner means engaging and imparting rotation load in said predetermined direction to said multi-stage ball bearing assembly and said axial displacement of said outer ball tracks with respect to said inner ball tracks distributing said rotation load substantially equally between said ball bearings.

4,947,670

UNIVERSAL AUTOMATIC SPRING-MAKING MACHINE  
Chin-Tu Wu, P.O. Box 10160, Taipei, Taiwan  
Filed Nov. 7, 1989, Ser. No. 432,884  
Int. Cl.<sup>5</sup> B21F 3/027, 3/10, 11/00, 35/02  
U.S. Cl. 72—130 4 Claims



1. An automatic spring-making machine comprising: a frame;
- a gear box transmission system mounted on said frame having a plurality of gears driven by a first variable-speed driving motor and radially disposed on a panel of said gear box transmission system around a central chuck for feeding spring wire therethrough;
- a plurality of sets of tool guiding means radially disposed on said panel of said gear box transmission system for radially sliding a plurality of forming tools as driven by said gear box transmission system through a plurality of sets of crank means;
- each said crank means including: a crank handle pivotally mounted on a central shaft fixed on said panel having a first handle end rotatably mounted with a crank roller operatively biased by a cam fixed on a cam disk secured to a gear shaft of said gear of the gear box transmission system, and having the other handle end rotatably mounted with a side shaft connected with a bolt secured to said slide of said tool guiding means, whereby upon a rotation of said gear to rotate said cam, said cam roller will be biased to let said side shaft acting said bolt and said

slide for radially moving said forming tool for processing the spring;

- a spring-wire feeding system having at least a pair of feeding rollers driven by a second variable-speed driving motor for feeding a spring wire through a chuck formed in a center portion of said panel protruding frontwardly and perpendicular to said panel and injecting the spring wire frontwardly from the chuck to be processed by said forming tools, said spring wire being fed in a direction towards said chuck perpendicular to a plane of said panel of said gear box transmission system;
- a microprocessor controller respectively sensing the rotation speed of said first motor of said gear box transmission system and said second motor of said spring-wire feeding system and respectively converting the rotation speed of said motors into a linear length data shown on a screen on said controller, and operatively controlling the rotation speed and running time of both said motors, said microprocessor controller including a first photo-sensed detector for sensing a rotation speed of said first driving motor of said gear box transmission system, and a second photo-sensed detector for sensing a rotation speed of said second driving motor of said spring-wire feeding system; and
- at least an auxiliary pneumatic controller having a pneumatic motor and a cylinder rod provided with a probe thereon for measuring a length of a spring product, the improvement which comprises: said tool guiding means including a slide base pivotally secured on said panel, a tool slide slidably held and radially moving in a longitudinal groove formed in said slide base, said slide normally restored by at least a tension spring secured between said slide and said slide base, a forming tool holder having the forming tool secured on one end portion of said holder pivotally secured on a supporting base secured to said slide, said tool holder and said forming tool pivotally biased frontwardly and backwardly generally perpendicular to a plane of said panel of said gear box transmission system; and said forming-tool holder including a biasing roller formed on an outer portion thereof to be operatively impacted by a biasing block formed on a side portion of said tool guiding means for biasing the tool holder and the tool frontwardly from said panel of said gear box transmission system for gradually guiding or deflecting the spring wire into a desired orientation or shape, whereby upon a feeding of a spring wire through said feeding system and upon a rotation of said driving motors, the spring wire will be sequentially curved, bent, and cut by said plurality of forming tools each tool radially moving in said tool guiding means as controlled by said microprocessor controller and said auxiliary pneumatic controller.

4,947,671

DEVICE FOR MANUFACTURING CONICAL POLES  
Wictor C. O. Lindström, P.O. Box 208, Furulund, Sweden  
S-244 02

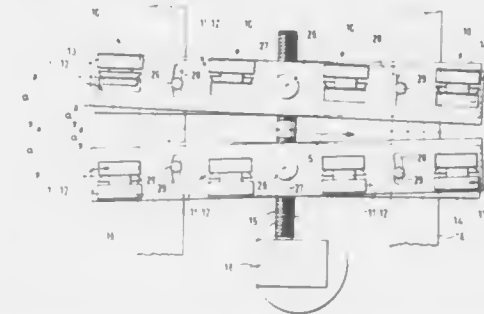
Filed Jul. 13, 1989, Ser. No. 379,360  
Claims priority, application Sweden, Jul. 15, 1988, 8802645  
Int. Cl.<sup>5</sup> B21D 5/08, 5/12

U.S. Cl. 72—181

3 Claims

1. A device for manufacturing a conical pole member by roll-forming sheet metal, comprising: a conveyor path along which said sheet metal is transported; and
- a plurality of roll-forming groups provided on either side of a longitudinal center line defined by said conveyor path, each said roll-forming group one side being displaceable towards and from each other roll-forming group during roll formation and including at least one forming roll pivotally mounted on a frame member, wherein at least first and second of said roll-forming groups on one said side are pivotally mounted about an axis substantially perpendicular to said longitudinal center line and at re-

spective desired angular positions so that said first group roll-forms sheet metal conveyed thereto at the first angle relative to said center line, and said second group roll-

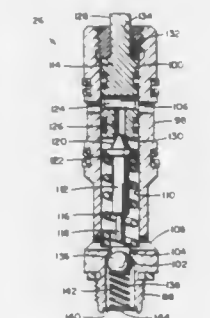
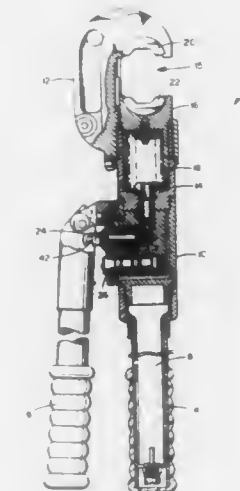


forms sheet metal conveyed thereto at a second angle relative to said center line, said first angle being variable relative to said second angle.

4,947,672

HYDRAULIC COMPRESSION TOOL HAVING AN IMPROVED RELIEF AND RELEASE VALVE  
Gennaro L. Pecora; John B. Hoover, both of Manchester, N.H.; Steven M. Garramone, Upper Saddle River, N.J., and Henry Cielesz, Norwalk, Conn., assignors to Burudy Corporation, Norwalk, Conn.

Filed Apr. 3, 1989, Ser. No. 332,839  
Int. Cl.<sup>5</sup> B21J 9/12 18 Claims  
U.S. Cl. 72—453.16



1. A hydraulic compression tool having a body, a first han-

dle with a fluid reservoir, a second handle, and a compression head having a clamping section, a cylinder, and a ram movably mounted with said cylinder; said body comprising:

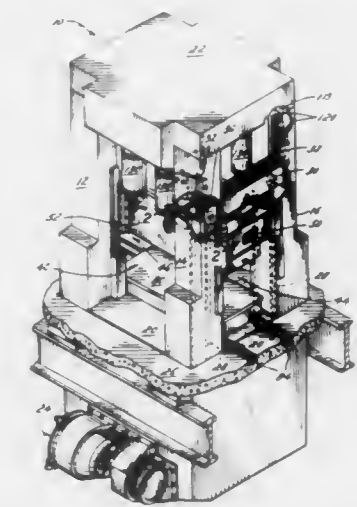
- body frame means;
- first conduit means for supplying fluid from said fluid reservoir to said cylinder;
- hydraulic pump means connected to said first conduit means for forcing fluid into said cylinder;
- second conduit means for returning fluid from said cylinder to said fluid reservoir; and
- a combined hydraulic fluid relief/release valve connected to said second conduit means for controlling the flow of fluid in said second conduit means, said valve comprising a valve frame means having a center chamber means with a first inlet aperture means, a second inlet aperture means and a third outlet aperture means;
- first gate means at said first inlet aperture means; and
- plunger means movably mounted in said center chamber means, said plunger means having a first plunger member and a second plunger member and forming a second gate means therebetween, said second gate means being located between said second inlet aperture means and said third outlet aperture means, said valve having a first closed position, a second open position and a third relief position, said first closed position substantially preventing fluid from returning from said cylinder to said fluid reservoir, said second open position allowing fluid in said cylinder to return to said fluid reservoir, and said third relief position allowing a limited amount of fluid to return to said fluid reservoir to prevent a predetermined maximum pressure at said cylinder from being exceeded whereby said valve can allow fluid pressure in said cylinder to be increased to advance said ram towards said clamping section, allow fluid pressure in said cylinder to be released to allow said ram to be retracted from said clamping section, and allow a relief of fluid pressure in said body to prevent the tool from exceeding a predetermined maximum pressure in said cylinder and thereby prevent damage to the tool.

4,947,673

REMOVABLE SLIDE PRESSES  
Robert Baranski, Chicago, Ill., assignor to Connell Limited Partnership, Boston, Mass.  
Filed Apr. 13, 1989, Ser. No. 337,314  
Int. Cl.<sup>5</sup> B21D 37/10 14 Claims

U.S. Cl. 72—456

14 Claims



1. In a power press assembly the combination comprising: a main frame having a plurality of spaced apart opposing



uprights and a crown, said main frame including four spaced apart opposing uprights, each of said uprights being disposed vertically with respect to said press bed, each of said uprights is a hollow column for supporting the press and through which said drive means extends, said uprights having a plurality of guide channels disposed thereon for guiding said movable crossheads through a predetermined range of motion and said plurality of guide channels are symmetrically disposed in paired arrangement upon the uprights and receive guide flange means on the respective movable crossheads;

a press bed disposed beneath and opposite said crown;

at least one pair of movable crossheads guided in and bridging the opening between said frame uprights above at least one slide mechanism;

drive means attached to said movable crossheads for reciprocating said slide mechanism toward and away from said press bed;

said slide mechanism being narrower than the crossheads and removably coupled to said movable crossheads.

4,947,674

## LIMIT SWITCH CALIBRATION SYSTEM

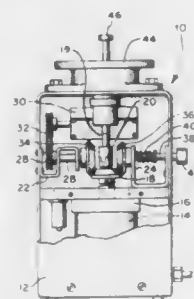
Kevin L. Strain, Camanche, Iowa, and Jack A. Huizenga, Fulton, Ill., assignors to Commonwealth Edison, Chicago, Ill.

Filed Sep. 7, 1988, Ser. No. 241,699

Int. Cl.<sup>5</sup> G01W 1/18

U.S. Cl. 73-1 D

21 Claims



1. A limit switch calibration checking device for a limit switch assembly of the type having at least one upper limit switch, at least one lower limit switch, and a limit switch mechanism that controls the upper and lower limit switches in response to movement of at least one input member, said calibration checking device comprising:

- a drive member adapted to engage the input member to drive the input member;
- a motor coupled to the drive member such that the motor is operative to move the drive member;
- means for indicating travel of the drive member as an aid to calibration of the limit switch assembly; and
- means for controlling the motor to cause the motor to stop automatically in response to switching of a selected one of the limit switches.

4,947,675

## UNIDIRECTIONAL PIPE LINE PROVER

Robert A. Webb, Casey, Ill., assignor to Marathon Oil Company, Findlay, Ohio

Filed Nov. 14, 1988, Ser. No. 271,131

Int. Cl.<sup>5</sup> G01R 25/00

U.S. Cl. 73-3

12 Claims

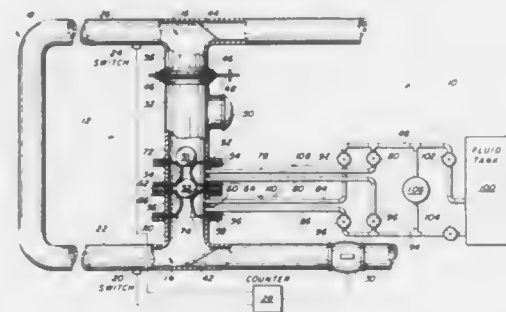
1. In a unidirectional pipe line prover having an inlet, a calibrated prover section, an outlet and an interchange conduit connecting the inlet and outlet, wherein fluid flowing through the prover pushes a calibration sphere through the prover section, the improvement comprising:

- first and second annular sphere support means in the inter-

change conduit positioned radially outwardly of a central axis of the conduit;

the second sphere support means being upwardly spaced from the first sphere support means; and

means for radially moving the annular sphere support means toward and away from the central axis of the interchange conduit.



conduit so as to enlarge and reduce the transverse area of the sphere support means;

the first and second support means, when in enlarged condition, being able to support a calibrating sphere, and when in reduced condition allowing the sphere to pass through the interchange conduit.

4,947,676

## PNEUMATIC BALL DROP CHECKER DEVICE AND METHOD

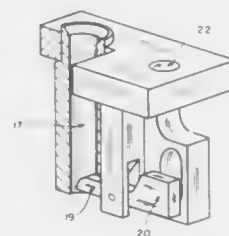
Larry Zimmerman, Rte. 1, Box 252, Alton, Ill. 62002, and John Miller, P.O. Box 115, Hecker, Ill. 62248

Filed Apr. 3, 1989, Ser. No. 331,738

Int. Cl.<sup>5</sup> G01B 13/00

U.S. Cl. 73-37.5

6 Claims



1. A pneumatic sensing device comprising:
- (a) a base having a drop tube receiving hole therein for receiving the top of a drop tube;
  - (b) a drop tube having a cylindrical inner shaft, the top of said drop tube being attached to said base at said receiving hole and the bottom of said drop tube having a first slot therein;
  - (c) an essentially L-shaped sensor bracket perpendicularly attached to the bottom of said base, the long leg of said bracket having a proximity switch port therein and the short leg of said bracket having a sensor arm pivotably attached thereto;
  - (d) a means for attaching said sensing device to a work place;
  - (e) a means for pneumatically sensing rotation of the sensor arm.

4,947,677

## SAW DETERMINATION OF SURFACE AREA OF THIN FILMS

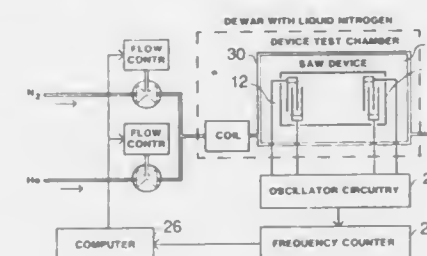
Gregory C. Frye, Stephen J. Martin, and Antonio J. Ricco, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 5, 1988, Ser. No. 253,642

Int. Cl.<sup>5</sup> G01N 15/08

U.S. Cl. 73-38

5 Claims



1. A method of determining an adsorption isotherm of a thin film using a piezoelectric substrate having a surface, said method comprising the steps of:
- coating said thin film on said surface of said substrate;
  - applying an adsorbate to said film;
  - generating a surface acoustic wave along said coated surface, the acoustic wavelength of said surface acoustic wave being greater than the thickness of said film;
  - measuring the change in frequency of said surface acoustic wave to determine the adsorption/desorption isotherm of said adsorbate on said film; and
  - determining the mass/surface area of said film by applying the BET model to said isotherm.

4,947,678

## METHOD FOR MEASUREMENT OF VISCOSITY CHANGE IN BLOOD OR THE LIKE AND SENSOR THEREOF

Tomoshige Hori, Kitamoto; Yasuhiko Shiinoki, Tokyo, and Kensuke Itoh, Kodaira, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Hokkaido, Japan

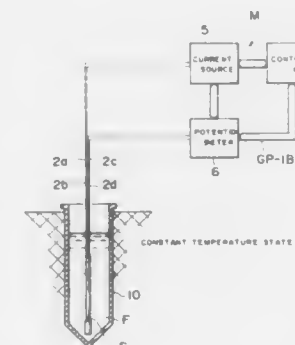
Filed Mar. 6, 1989, Ser. No. 319,192

Claims priority, application Japan, Mar. 7, 1988, 63-53082; Mar. 18, 1988, 63-64776

Int. Cl.<sup>5</sup> C01N 25/18

U.S. Cl. 73-54

5 Claims



1. A method of measurement of viscosity changes in blood or the like, comprising:

- (1) providing an electrically conductive sensor which is electrically heatable by passing an electric current there-through and having means for determining the voltage impressed on said sensor by said electric current;

- (2) immersing said sensor in said blood;
- (3) applying an electric current to said sensor;
- (4) measuring the current applied to the sensor and the voltage impressed on said sensor by said electric current, and calculating therefrom a sensor temperature of at least one of the average sensor temperature and the surface temperature of the sensor;
- (5) measuring the temperature of said blood;
- (6) calculating the difference between the sensor temperature and said blood temperature; and
- (7) detecting changes in the said difference, whereby the changes in the viscosity of the said blood are correspondingly detected.

4,947,679

APPARATUS FOR DETERMINING RESIN GEL TIME

Robert L. McGee, Midland; David J. Nowak, Auburn; Gordon D. McCann, and Frank L. Saunders, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1989, Ser. No. 341,465

Int. Cl.<sup>5</sup> G01N 11/10

U.S. Cl. 73-64.1

28 Claims



1. An apparatus for determining the gel time of thermoset resins comprising:
- a disposable vial made of a heat resistant, relatively inexpensive material such that said disposable vial can be discarded after a single test;
  - a disposable spindle for insertion into said vial being made of a material which is resistant to torsional twisting, is heat resistant and is relatively inexpensive such that said spindle can be discarded after a single test;
  - a locking collar releasably secured to said disposable vial for mounting said vial in a conventional viscometer heater and for locking said vial against rotation with respect thereto; and
  - a spindle adaptor releasably receiving said disposable spindle and including means for securing said spindle adaptor to the spindle mount of a conventional viscometer.

4,947,680

## SEPARATION OF VARIABLES IN AN ION GAP CONTROLLED ENGINE

John A. McDougal, 14388 Harbor Island, Detroit, Mich. 48215

Filed Feb. 14, 1989, Ser. No. 310,742

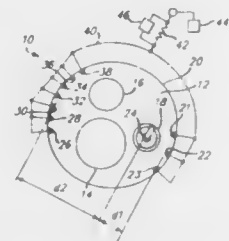
Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73-116

27 Claims

1. In an internal combustion engine having at least one combustion chamber and ignition means for igniting successive

charges supplied to said chamber, ionization gap means for detecting the arrival of a flame front propagated within said chamber from the ignition of a charge contained in said cham-



ber, said ionization gap means including a plurality of electrodes for detecting the arrival of said flame front at more than one location in said chamber, each of said locations being generally equidistantly spaced from said ignition means.

4,947,681

# SYSTEM AND METHOD FOR FACILITATING CORRECT GEAR MESHING AND CLUTCH ENGAGEMENT IN VEHICLES

Jonathan Young, Fremont, Calif., assignor to Paccar Inc., Bellevue, Wash.

Filed May 12, 1989, Ser. No. 351,426

Int. Cl.<sup>5</sup> G01M 19/00

U.S. Cl. 73—118.1

9 Claims



1. A method to facilitate smooth gear meshing in vehicles that require substantially synchronized mating transmission gear speeds for gear meshing, comprising the steps of: ascertaining rotational speed of the vehicle drive shaft and automatically selecting a recommended gear based on the available transmission gear ratios; calculating the ideal engine rpm based on said selected recommended gear; and informing the driver of said recommended gear and said ideal engine rpm, whereby the operator adjusts the engine rpm to substantially match said ideal engine rpm to smoothly engage the vehicle in said recommended gear.

4,947,682

# METHOD OF LOCATING OIL AND GAS HORIZONS USING A WELLBORE HEAT FLOW LOG

Roger N. Anderson, New York, N.Y., and Colin F. Williams, Menlo Park, Calif., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Filed Mar. 13, 1989, Ser. No. 322,790

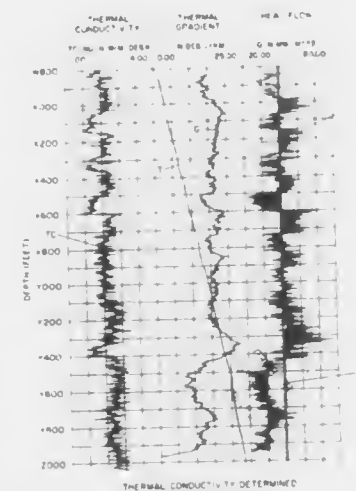
Int. Cl.<sup>5</sup> E21B 47/06

U.S. Cl. 73—154

6 Claims

1. A method of locating oil and gas horizons in a wellbore comprising the steps of obtaining by thermal logging temperatures at successive intervals in the wellbore and establishing

from said temperatures thermal gradients for said intervals free of drilling-induced thermal disturbances, identifying the mineral abundances surrounding the wellbore at each of said intervals, establishing ideal thermal conductivities for said mineral abundances based on assumptions that sand-rich formations have high thermal conductivities and are water-bearing and



that shale-rich formations have low conductivities, determining an ideal heat flow at each interval by multiplying the thermal gradient at such interval by the ideal thermal conductivity of the mineral abundances at the interval, determining the average ideal heat flow for all of the intervals, and identifying the zones of the wellbore exhibiting anomalous ideal heat flows that are higher than the average heat flow.

4,947,683

# PULSED ULTRASONIC DOPPLER BOREHOLE FLUID MEASURING APPARATUS

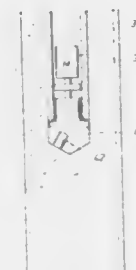
John W. Minear, and Randy Gold, both of Houston, Tex., assignors to Halliburton Logging Services, Inc., Houston, Tex.

Filed Aug. 3, 1989, Ser. No. 389,134

Int. Cl.<sup>5</sup> E21B 47/10

U.S. Cl. 73—155

17 Claims



1. For use in a well borehole, a fluid flow measuring apparatus comprising: (a) a tool housing adapted to be lowered into a flowing well on a logging cable extending into the well; (b) means for centering said housing in the flowing well to direct well fluid adjacent to said housing into an annular flow space around said housing; (c) ultrasonic pulse transmitter means supported by said housing to transmit a pulse downwardly from said housing into fluid flowing in said well so that the pulses transmitted thereby are exposed to reflective entrained surfaces in the flowing fluid for reflection thereby; and (d) pulse receiving means supported by said housing for

receiving reflected pulses from entrained surfaces in the flowing fluid wherein the pulses so received encode fluid velocity in a Doppler shift.

4,947,684

# SYSTEM AND PROCESS FOR DETECTING PROPERTIES OF TRAVELLING SHEETS IN THE MACHINE DIRECTION

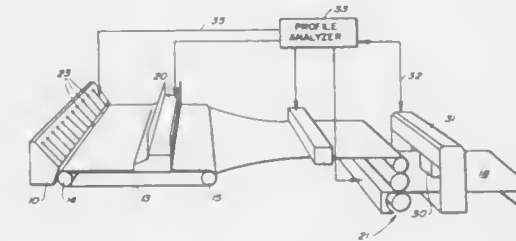
Ramesh Balakrishnan, Stanford, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Jan. 27, 1989, Ser. No. 303,477

Int. Cl.<sup>5</sup> G01N 33/34, 33/44

U.S. Cl. 73—159

11 Claims



1. A method for determining machine-directional variations in a property of a traveling sheet during production, comprising the steps of: traversing the travelling sheet with a scanning sensor and taking measurements of a property of the sheet at a plurality of slice locations; estimating variations in cross-directional measurement values based upon actual measurements at the plurality of slice locations; and then, determining machine-directional variations in the sheet property at each slice location by calculating the difference between the actual measured value and the estimated cross-directional variation for that slice location.

4,947,685

# SYSTEM FOR MEASURING THE REPEAT LENGTH OF A MOVING WEB

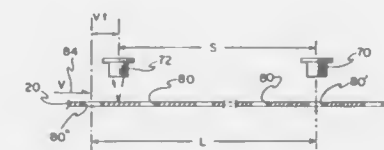
Robert M. Montgomery, Indialantic, Fla.; Robert A. Dessert, and Dinesh G. Punater, both of Dayton, Ohio, assignors to AM International, Inc., Chicago, Ill.

Filed Oct. 6, 1989, Ser. No. 418,047

Int. Cl.<sup>5</sup> G01B 11/04

U.S. Cl. 73—159

12 Claims



1. A method of measuring a repeat length L of a web moving along a web path, comprising the steps of: forming a plurality of detectable marks along the length of the web, said marks being formed at a nominal repetitive length interval along the web; a nominal value for said repeat length being selected such that said nominal repeat length is an integer multiple of said length interval; positioning along the web path first and second detectors

separated by a known distance S, each detector sensitive to movement there past of one of said detectable marks; measuring the speed of the moving web V; detecting with said first detector the movement of a mark there past; detecting with said second detector the next movement of a mark there past; measuring the time interval t separating said detections; and calculating the repeat length according to the relation  $L = S + Vt$ .

7. Apparatus for measuring a repeat length L of a moving web, comprising:

a frame;  
path defining means connected to said frame for defining a web path;  
means for advancing the web along said web path;  
mark forming means for forming a plurality of detectable marks along the length of the web, said marks being formed at a nominal repetitive length interval along the web, whereby a nominal value for said repeat length is selected such that said nominal repeat length is an integer multiple of said length interval;  
first and second detectors mounted to said frame and located along said web path, said detectors separated by a known distance S, each detector sensitive to movement there past of one of said detectable marks;  
means for measuring the speed of the moving web V;  
control means connected to said first and second detectors and said web speed measuring means, said control means operating in response to detection by said first detector of the movement of a mark there past, and detection by said second detector of the next movement of a mark there past, to: measure the time interval t separating said detections; and calculate the repeat length according to the relation  $L = S + Vt$ .

4,947,686

# METHOD AND APPARATUS FOR DETERMINING WEB TENSION SETTING

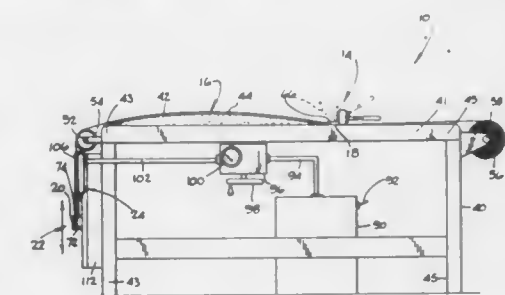
Richard H. Wendell, Golden, and Tracy J. Fowler, Denver, both of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Mar. 6, 1989, Ser. No. 319,656

Int. Cl.<sup>5</sup> G01L 5/04

U.S. Cl. 73—159

3 Claims



1. An apparatus for determining the width variation in a length of plastic web under different longitudinal tension conditions comprising:

(a) a generally horizontally oriented web support surface having a front edge and a rear edge and having a central longitudinal axis extending between said front and rear edges and having a transverse dimension at least as great as the unstressed transverse dimension of said web, said web support surface having a generally convex side profile having a relatively higher central portion and relatively lower end portions, said web support surface being a smooth surface having a relatively low coefficient of friction and being provided with a plurality of closely spaced, longitudinally extending lines for facilitating the



initial deployment of the length of web to be tested with the longitudinal extending edges of the web positioned parallel to the central longitudinal axis of the web support surface;

- (b) a first transversely extending clamping means positioned proximate to said rear edge of said web support surface and fixedly mounted thereon for fixedly clampingly holding a portion of said length of plastic web against said web support surface, said first clamping means being adapted to provide a uniform clamping force across the entire width of said engaged portion of said web;
- (c) roll means for rollingly supporting a portion of said web hereon fixedly mounted proximate said front edge of said web support surface with the uppermost surface of said roll means positioned approximately at the same elevation as said front edge portion of said support surface;
- (d) a second, transversely extending clamping means positioned below said roll means for uniformly, clampingly engaging a portion of said web across the entire width thereof, said second clamping means being selectively longitudinally displaceable for enabling a uniform longitudinal stress to be applied to said web;
- (e) second clamping means mounting means for mounting said second clamping means in transversely fixed, longitudinally displaceable relationship with said web;
- (f) force applying means for applying a selectable amount of force against said second clamping means in a longitudinal direction whereby a selectable longitudinal tension is provided in said web; and
- (g) web width measuring means for measuring the width of said length of web at a selected portion thereof.

4,947,687

**DRIVE SYSTEM COMPRISING A VARIABLE SPEED DRIVING MOTOR, AN ADJUSTABLE HYDROSTATIC TRANSMISSION AND A GEAR-CHANGING MEANS**  
Stefan Martini, Ulm; Wolfgang Reistle, Langenau, and Thomas Sommer, Blaustein, all of Fed. Rep. of Germany, assignors to Hydromatik GmbH, Fed. Rep. of Germany

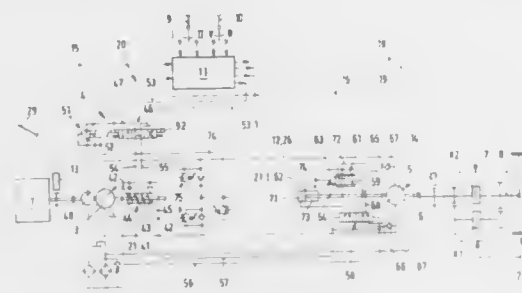
Filed Mar. 9, 1988, Ser. No. 165,775

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1987, 3707495

Int. Cl.<sup>5</sup> F16H 47/04

U.S. Cl. 74—733.1

15 Claims



1. A drive system comprising a driving motor the speed of which can be varied by means of an operating member, an adjustable hydrostatic transmission comprising a pump and a hydraulic motor with a variable delivery and/or intake volume and a transmission ratio, a change-speed gear, especially one that can be shifted under load, following the hydrostatic transmission, a control means associated with the hydrostatic transmission, and an operating element for initiating a gear change, wherein said control means has associated with it means for determining a direction of power transmission between the driving motor and the change-speed gear, said control means comprising two control devices, the said first of

which effects the gear change and the second sets throughputs of the pump and/or the hydraulic motor, said first control device being an electronic control device; whereby after initiation of a gear change into a lower gear when the direction of power transmission is from the change-speed gear to the driving motor said control means changes the transmission ratio of the hydrostatic transmission so as to reduce the output speed of the hydraulic motor; and whereby the shifting of the change-speed gear takes place no sooner than when the direction of transmission takes place from the driving motor to the change-speed gear.

4,947,688

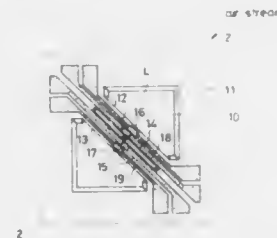
**FLOW VELOCITY SENSOR**

Shinji Yagawara, and Wasaburo Ohta, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Aug. 15, 1989, Ser. No. 394,415

Claims priority, application Japan, Aug. 31, 1988, 63-216743  
Int. Cl.<sup>5</sup> G01F 1/68

U.S. Cl. 73—204.26

7 Claims



1. A flow velocity sensor for measuring a flow velocity of a fluid, comprising: a base disposed in a flow of said fluid flowing in a predetermined flow direction; a first elongating member connected to and extending above the base in the flow of said fluid, said first elongating member being defined with at least a first edge at a downstream end thereof; first heating means provided on the first elongating member at least along said first edge for generating heat; first heat detecting means provided on the first elongating member in a vicinity of the first heating means at a side away from the first edge, said first heat detecting means comprising a first metal oxide which absorbs oxygen when heated, desorbs oxygen when cooled, and changes resistivity responsive to absorption and desorption of oxygen; a second elongating member connected to and extending above the base in the flow of said fluid at a downstream side of the first elongating member, said second elongating member at least having a second edge at an upstream end thereof, said second edge being substantially aligned with said first edge in the predetermined flow direction at a downstream side of the first edge; second heating means provided on the second elongating member at least along the second edge; and second heat detecting means provided on the second elongating member in a vicinity of the second heating means at a side away from the second heating means, said second elongating member comprising a second metal oxide which adsorbs oxygen when cooled, desorbs oxygen when heated, and changes resistivity responsive to adsorption and desorption of oxygen.

4,947,689

**CAPACITIVE LIQUID SENSOR**

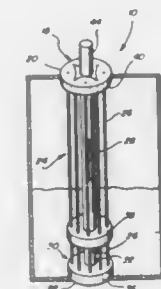
Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098

Filed Jan. 13, 1989, Ser. No. 297,113

Int. Cl.<sup>5</sup> G01F 23/26; G08B 21/00

U.S. Cl. 73—304 C

12 Claims



1. A capacitive sensor assembly for placement in a container to determine the level of substance therein, said assembly comprising: sensing means (18) having a first and second end (22) for measuring the level of substance between said first and second end; said sensing means including measurement capacitance means (24) extending between said first and second ends comprising at least two parallel conductive members to establish an electrical capacitance representative of level, and reference capacitance means (30) connected at said second end (22) comprising at least two parallel conductive members to establish an electrical capacitance representative of dielectric constant; measuring means (34) responsive to said level capacitance for producing a reference signal representing dielectric constant and reference capacitance for producing a level signal representing level of the substance said measuring means (34) including reference timing means (48) connected to said reference capacitance means (30) for producing a reference signal having a timing component indicative of said reference capacitance, and level timing means (50) independent from said reference timing means (30) and connected to said measurement capacitance means (24) for producing a level signal having a timing component indicative of said level capacitance.

4,947,690

**ACCELEROMETERS ADAPTED FOR EFFICIENT CONNECTION AND DISCONNECTION**

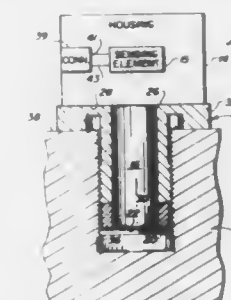
Lester G. Cleveland, San Juan Capistrano, Calif., assignor to Allied-Signal Inc., Morris Township, N.J.

Filed Jun. 29, 1989, Ser. No. 374,403

Int. Cl.<sup>5</sup> G01H 11/06; G01P 15/08

U.S. Cl. 73—654

9 Claims



1. An accelerometer adapted for facile securement to a support structure, comprising: a housing structure that contains a sensing element; a shaft rigidly secured to or integral with said housing structure; said shaft extending to a distal end thereof in a direction away from said housing structure; said shaft having a

cylindrical portion between said housing structure and said distal end;

- a bolt-like member coaxial with said cylindrical portion and having a hole which extends in said direction from a first end to a second end of said member; said cylindrical portion extending through said hole and said member being easily rotatable about said portion; said member being adapted for engagement with a torquing tool and having an outer surface which is adapted for engagement with said support structure; and means for retaining said member in a substantially fixed axial position relative to said cylindrical portion whereby if said member is displaced in either axial direction, said shaft and said housing structure are carried therewith.

4,947,691

**HIGH PRESSURE SHOWER GAUGE FOR PAPERMAKING MACHINE**

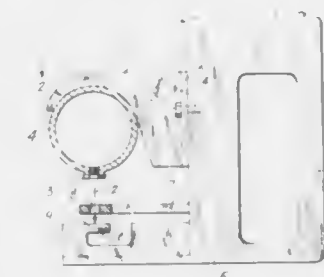
Gary V. Schultz, Kimberley, Wis., assignor to Appleton Mills, Appleton, Wis.

Filed Apr. 14, 1989, Ser. No. 339,104

Int. Cl.<sup>5</sup> G01L 9/04

U.S. Cl. 73—753

14 Claims



1. A gauge for measuring the pressure of a stream of fluid being discharged from a nozzle, said nozzle being connected to a conduit containing said fluid under pressure, said apparatus comprising a body, an arm extending laterally outward from said body and disposed to engage said conduit, and pressure sensing means spaced from said arm and disposed in the path of the fluid being discharged from said nozzle for measuring the pressure of said stream, aligning means for affecting perpendicular alignment of the fluid stream with said sensing means, said aligning means comprising an aligning member extending laterally outward from said body and having an opening to receive the fluid stream.

4,947,692

**APPARATUS FOR DETECTING POSITIONAL CHANGES IN RELATION TO A VERTICAL REFERENCE DIRECTION IN BUILDINGS OR IN BUILDING SUBSOIL**  
Jakob Koppel, Würenlos, Switzerland, assignor to Gesellschaft Zur-Förderung der Industrieorientierten Forschung An den Schweizerischen, Zurich, Switzerland

Filed Mar. 29, 1989, Ser. No. 329,959

Claims priority, application Switzerland, Mar. 30, 1988, 209/88

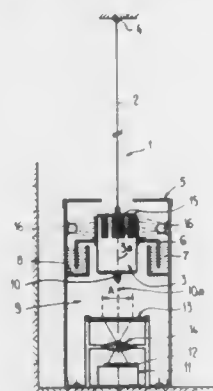
Int. Cl.<sup>5</sup> G01M 5/00

U.S. Cl. 73—786

10 Claims

1. Apparatus for detecting positional changes in relation to a vertical reference direction in buildings or in building subsoil, comprising: a plumb wire defining said reference direction, said plumb wire being anchored at one end; a plumb body connected to the other end of said plumb wire, and means for determining positional changes in the building or

in the building subsoil relative to said plumb body by generating electrical signals characteristic of said positional changes, wherein said determining means in turn comprises means for emitting laser light and photoelectric means for receiving light emitted by said emitting means, said photoelectric



means generating actual-value signals on the basis of the respective position of the incident light beam, which corresponds to the positional change of the building or building subsoil relative to the reference direction, and said emitting means being supplied with power by at least one photo element which is mounted on said plumb body and is irradiated by at least one stationary light source.

4,947,693

## DISCRETE STRAIN SENSOR

Nicholas C. Szuchy, Babylon, and Anthony Caserta, Huntington, both of N.Y., assignors to Grumman Aerospace Corporation, New York, N.Y.

Continuation of Ser. No. 263,554, Oct. 27, 1988, abandoned, which is a continuation of Ser. No. 83,940, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 845,325, Mar. 28, 1986, abandoned. This application Jul. 13, 1989, Ser. No. 379,374

The portion of the term of this patent subsequent to Mar. 29, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> G01L 1/24

U.S. Cl. 73—800

19 Claims



1. A fiber optic load sensor for sensing a load applied to a corresponding structural surface, comprising a length of fiber optic material of a selected thickness attachable to the surface, said fiber optic material being connectable to a light source and to a light detector, said fiber optic material having curved portions, said curved portions each having a curve length and curve period, said curved portions each being deformable so that the curve radius and curve period are variable in response to the load applied to the surface, said fiber optic material thickness and curve radius being selected such that light passing through said fiber optic material is actuated in linear relation to the instantaneous deformation of the fiber over a substantial range of load applied to the surface.

4,947,694

## VIBRATING FORCE SENSOR

Richard G. Kirman, Walsall, and Sally A. Spencer, Halesowen, both of United Kingdom, assignors to W & T Avery Limited, England

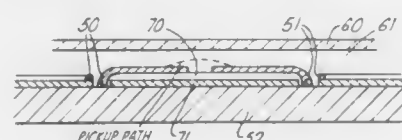
Filed Mar. 9, 1989, Ser. No. 321,190

Claims priority, application United Kingdom, Mar. 16, 1988, 8806214

Int. Cl.<sup>5</sup> G01L 1/10

U.S. Cl. 73—862.59

9 Claims



9. A vibrational force sensor, comprising: a strip having three coplanar beams of equal width spaced side by side; capacitive means including three drive electrodes, one associated with each beam, for driving the beams into flexural vibration in a plane normal to the common plane of the beams; capacitive means including detect electrodes for detecting changes in the frequency of the flexural vibrations of the beam in response to changes in tension applied to the sensor; a feedback oscillator circuit, an output of which is connected to said drive electrodes so as to supply a sinusoidal output signal to two of said drive electrodes and the antiphase of said output signal to the other one of said drive electrodes; and an input of which is connected to said detect electrodes; and means for generating a weight reading from said output signal.

4,947,695

## APPARATUS FOR CONTROLLING A STAR WHEEL FOR POSITIONING SPECIMEN CONTAINERS

Willy Lohr, Glinsterweg 75, D-7547 Wildbad, Fed. Rep. of Germany

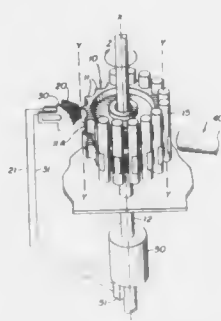
Filed Dec. 19, 1989, Ser. No. 452,624

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 8816086[U]

Int. Cl.<sup>5</sup> G01N 1/00

U.S. Cl. 73—863.01

8 Claims



1. In apparatus including a star wheel having a cylindrical periphery provided with a plurality of recesses spaced apart around the periphery and a plurality of radially outwardly projecting vanes interposed between successive recesses for precisely positioning a respective specimen container in each recess, a shaft supporting the star wheel for rotation about a central axis, and an electrically controlled motor coupled to the shaft for rotating the star wheel in steps in a given direction of rotation for bringing each specimen container in turn to a defined position, the improvement wherein each said vane has a radially outwardly facing surface which is at least partially light reflective, and said apparatus further comprises at least two sensor arrays each comprising a light transmitter and a

light receiver, said sensor arrays being angularly offset from one another by a defined angle about the central axis and each said sensor array being disposed adjacent the path of movement of said vanes during rotation of said star wheel so that when a respective vane is opposite a respective sensor array, light emitted by said light transmitter will be reflected by said at least partly light reflective surface to said light receiver to cause said light receiver to produce an electrical signal, and a control circuit connected for controlling the rotation of said motor in response to the electrical signals produced by said light receivers of said sensor arrays, said sensor arrays being positioned and said control circuit being operative such that an electrical signal produced by said light receiver of a first one of said sensor arrays causes a reduction in the rate of rotation of said motor and an electrical signal produced by said light receiver of a second one of said sensor arrays causes said motor to stop at a defined angular position corresponding to the defined position of a respective specimen container.

4,947,696

## BELLOW PUMP FOR GAS TEST TUBE

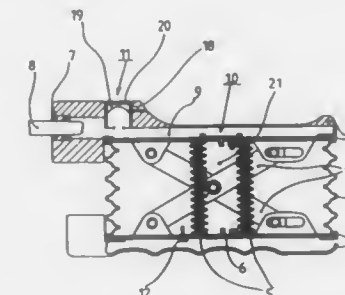
Kai-Uwe Fehlauer, Lubeck, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Apr. 26, 1989, Ser. No. 343,788

Int. Cl.<sup>5</sup> G01N 1/14

U.S. Cl. 73—864.34

15 Claims



1. A pump for connection to gas test tubes for effecting complete gas sampling intake strokes, comprising two handle plates, a bellows connected between said handle plates and defining a gas space between said handle plates and said bellows, the handle plates being mounted for movement in opposite directions relative to each other and between first and second positions corresponding to complete expansion and compression of the bellows respectively, means biasing said handle plates in a direction of movement towards the first position which expands the bellows and thereby effects a sampling stroke, an intake passage connected into said gas space and having a gas test tube connection, an intake valve in said intake passage between said gas test tube connection and said gas space, means mounting said intake valve closing the intake passage in a direction towards said gas space, intake valve actuating means connected with at least one of said handle plates and arranged to open said intake valve sufficiently for enabling the initiation of a complete gas sampling stroke and for maintaining said inlet valve open during the gas sampling stroke only on completion of movement of the handle plates to the second position corresponding to complete compression of the bellows.

4,947,697

## SYSTEM FOR MEASURING FORCE VERSUS POSITION OF A FLIGHT CONTROLLER IN AN AIRCRAFT OR FLIGHT SIMULATOR

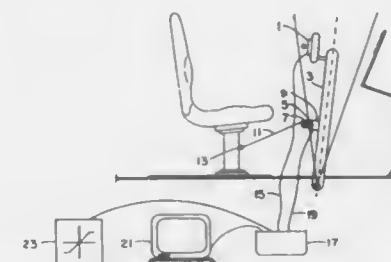
Robert W. Prentice, Montreal, Canada, assignor to CAE Electronics Ltd., Montreal, Canada

Filed Jan. 28, 1989, Ser. No. 372,714

Int. Cl.<sup>5</sup> G01M 17/06; G01L 5/22

U.S. Cl. 73—865.9

5 Claims



1. A system for measuring the change in position, resulting from an applied force, of an aircraft or flight simulator flight controller, with respect to a fixed aircraft or flight simulator reference position; said system comprising: means for measuring said change in position; means for measuring said applied force comprising a six-axis force transducer to provide three independent orthogonal linear force components and three independent orthogonal torque components; and means for calculating the net applied force resulting from said six measured forces.

4,947,698

## ROTATIONAL TO LINEAR ACTUATOR

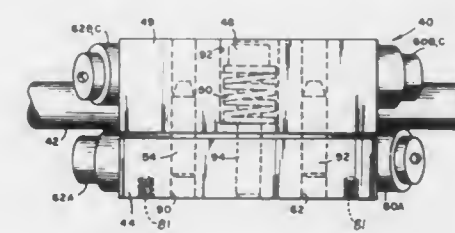
Kevin J. Dodds, Edina, and Isaac Kaminer, New Hope, both of Minn., assignors to Zero-Max Industries Inc., Minneapolis, Minn.

Continuation of Ser. No. 214,705, Jul. 1, 1988, abandoned. This application May 24, 1989, Ser. No. 355,211

Int. Cl.<sup>5</sup> F16H 19/02

U.S. Cl. 74—25

10 Claims



1. An improved device for translating rotational movement of a threadless shaft into linear movement of the device comprising: a mounting block being in a fixed radial position relative to the axis of said shaft and an adjusting block, said adjusting block being radially movable relative to the axis of said shaft, said mounting block and said adjusting block being assembled together to provide an axial bore, said blocks further being spaced from and out of contact with each other, opposed surfaces of each of said blocks being on single lanes, each of which is disposed substantially parallel to the other; a plurality of roller bearings at each end of the device, said plurality consisting of two roller bearings at each end of



the adjusting block and one roller bearing at each end of the mounting block, each of the roller bearings being skewed with respect to the threadless shaft; fastening means including at least two spaced-apart tensioning means, each of which is disposed on opposite sides of the axis of said shaft, said fastening means unrestrainably urging the roller bearings on said blocks against said shaft in a direction normal to the axis of said shaft; and means solely on said mounting block for attaching a load thereto.

4,947,699

## WORM REDUCTION GEAR ASSEMBLY

Viktor Zupancic, Cesta v Gorica 10/d, YU-61111 Ljubljana, Yugoslavia

Continuation-in-part of Ser. No. 905,273, Sep. 8, 1986, Pat. No. 4,774,848. This application Sep. 23, 1988, Ser. No. 249,424

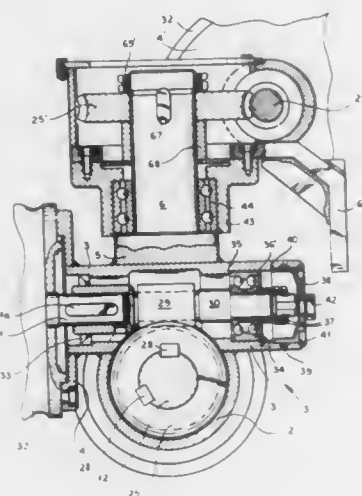
Claims priority, application Yugoslavia, Sep. 10, 1985, 1418/85

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16H 1/16

U.S. Cl. 74—425

9 Claims



## 1. A worm reduction gear assembly, comprising:

a housing formed with:

- a first generally cylindrical tube having a first axis and opposite open axial ends,
- a second generally cylindrical tube connected laterally to said first tube and having a second axis orthogonal to the axis of said first tube and offset therefrom in a direction perpendicular to both of said axes, said second tube being open axially at least at one of the ends of said second tube, and

respective circular flanges formed on each of said open ends and lying in respective planes perpendicular to said axes;

a worm wheel shaft extending along said first axis and rotatable therearound;

a worm wheel keyed to said worm wheel shaft in said first tube intermediate the ends thereof;

a worm shaft extending along said second axis and rotatable therearound in said second tube;

a worm keyed to said worm shaft in said second tube between the ends thereof and meshing with said worm wheel;

centering bushes received in said first tube flanking said worm wheel;

respective first bearings interposed between said worm wheel shaft and said bushes for journaling said worm

wheel shaft in said first tube, said first tube being formed with inwardly open grooves opening toward said bushes; circular seals in said grooves sealing between said bushes and said first tube;

respective second bearings in said second tube flanking said worm and journaling said worm shaft in said second tube; and

a shaft stub formed on said housing substantially perpendicular to both of said axes.

4,947,700

## CONTINUOUSLY VARIABLE TRANSMISSION SYSTEM AND LONG TRAVEL TORSION DAMPER THEREFOR

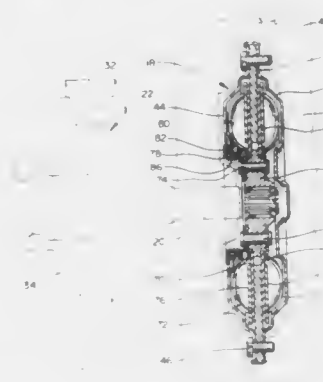
John M. Kern, Ithaca; Donald E. Freyburger, Freeville; Karl F. Schneider, and Romas B. Spokas, both of Ithaca, all of N.Y., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed May 3, 1988, Ser. No. 189,766

Int. Cl.<sup>5</sup> F16D 3/66, 3/80

U.S. Cl. 74—445

24 Claims



1. A long travel vibration damper assembly to transmit torque between a torque input member and a torque output member comprising a housing, generally circular input means within said housing and adapted for operative connection to the torque input member for rotation therewith, said input means having a plurality of uniformly spaced tabs extending radially therefrom, hub means adapted for operative connection to the torque output member and having a plurality of spaced arms corresponding to said tabs, said tabs and arms being generally aligned and defining a plurality of annularly disposed chambers, spacer means having portions disposed within said chambers and movable therein relative to said tabs and arms, a set of multiple rate spring means, disposed between each adjacent pair of said arms and tabs, each multiple rate spring means including a plurality of spring means disposed in parallel relation and of different rates such as to allow large angular displacements between said torque input member and said torque output member, and each multiple rate spring means of each said set of multiple rate spring means being spaced apart from an adjacent multiple rate spring means of said set by one of said spacer means portions, and a viscous medium substantially filling said housing and substantially surrounding said tabs, hub means, spacer means and spring means and operative through shear forces to provide viscous damping resistance to said large relative angular displacements between said torque input member and said torque output member, said housing being effectively sealed to define a cavity to contain said viscous medium therein while permitting rotational connections to said torque input member and to said torque output member.

4,947,701

## ROLL AND PITCH PALM PIVOT HAND CONTROLLER

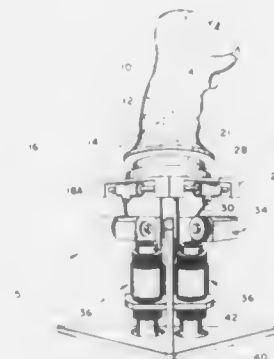
Jeffrey W. Hegg, North Redington Beach, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 11, 1989, Ser. No. 392,543

Int. Cl.<sup>5</sup> B64C 13/04

U.S. Cl. 74—471 XY

15 Claims



1. A two-axis hand controller apparatus including a human interface to simulate feel parameters for use in a vehicle having a pitch axis and a roll axis comprising:

- (a) a control grip having a hollow space and a base end;
- (b) a first support surface;
- (c) a universal joint having two degrees of freedom, having a center shaft member with top and bottom ends affixed rigidly at bottom end to the first support surface and having roll axis and pitch pivot axis members attached within the center of the hollow space so as to provide dual palm pivot points;
- (d) a rigid connecting member attached at a first end to the control grip base and having a second end;
- (e) a swash plate having first and second surfaces and an opening wherein the first surface is rigidly affixed to the second end of the rigid connecting member and positioned so as to accept the top end of the shaft member through the opening without contact into the hollow space, and further wherein the swash plate is flexibly engaged to the first support surface by apparatus including at least four linear bearings wherein two of the linear bearings are disposed along the pitch axis and the other two are disposed along the roll axis, wherein each of the linear bearings is further connected to a flexible coupling, and wherein the flexible coupling is further connected to the transducer means which includes a pick-off device, so as to allow for control of the human interface feel parameters with full grip displacement; and
- (f) transducer means attached between the swash plate and the first support surface so as to provide electrical signals responsive to movements in the pitch and roll axes without cross-coupling from one axis to the other.

4,947,702

## INDUSTRIAL ROBOT

Hisao Kato, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 18, 1989, Ser. No. 353,609

Claims priority, application Japan, Jun. 14, 1988, 63-146270

Int. Cl.<sup>5</sup> B25J 18/00; F16H 25/20

U.S. Cl. 74—479

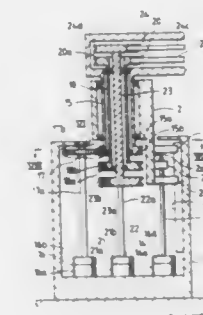
5 Claims

1. An industrial robot, comprising:

- a base body;
- a lift shaft provided on said base body;
- a first horizontal arm having one end thereof which is provided on said lift shaft;
- a second horizontal arm having one end thereof which is

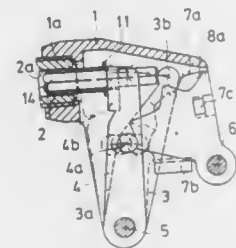
rotatably coupled to the other end of said first horizontal arm;

- a hand provided on the other end of said second horizontal arm;
- a lift drive unit provided on said base body for moving said lift shaft vertically;
- first, second and third transmission mechanisms each of which is provided in said base body and including a spline transmission shaft held vertically and a driving gear slidably engaged with said spline transmission shaft;
- a first rotary shaft which is rotatably held by and coaxial with said lift shaft, said first rotary shaft having a first driven gear engaged with said driving gear of said first transmission mechanism at a lower end thereof, said first horizontal arm being secured to an upper end of said first rotary shaft;
- a second rotary shaft having an upper end thereof which is rotatably supported on the other end of said first horizontal arm, and a lower end thereof to which one end of said second horizontal arm is secured;
- a first belt-laid transmission unit for operating said second rotary shaft;



- a first transmission shaft having an upper end thereof to which said first belt-laid transmission unit is provided, and a second driven gear at a lower end thereof, said second driven gear being engaged with said gear of said second transmission mechanism, said first transmission shaft being rotatably held by and coaxial with said lift shaft;
- an intermediate transmission shaft which is rotatably coaxially supported by said second rotary shaft;
- a hand rotating shaft for supporting said hand, which is rotatably supported on the other end of said second horizontal arm;
- a second belt-laid transmission unit for operating said hand rotating shaft through said intermediate transmission shaft;
- a second transmission shaft which is rotatably coaxially supported in said lift shaft, said second transmission shaft having an upper end thereof to which said second belt-laid transmission unit is provided, said second transmission shaft having a third driven gear at a lower end thereof, which is engaged with said gear of said third transmission mechanism; and
- first, second and third drivers mounted on said base body for driving said first, second and third transmission mechanisms, respectively.

**4,947,703**  
**OPERATING MECHANISM FOR A MULTISPEED BICYCLE HUB**  
 Eduard Bergies, Graz, Austria, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany  
 Filed Jul. 6, 1989, Ser. No. 375,900  
 Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823385  
 Int. Cl.<sup>5</sup> F16C 1/10  
 U.S. Cl. 74—501.5 R 18 Claims



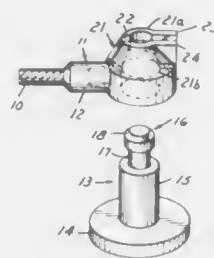
1. An operating mechanism to be used in combination with a multi-speed bicycle hub, said multi-speed bicycle hub having a hub shaft (2) with a hub shaft axis and two ends, a hub sleeve (22) being rotatably mounted on said hub shaft (2) about said hub shaft axis, gear means (24) being accommodated within said hub sleeve (22), at least one driving wheel (26) being in driving connection with an input member (2) of said gear means (24), at least one output member (30) of said gear means (24) being in driving connection with said hub sleeve (22), said hub shaft (2) having an axially extending hub shaft bore (2a) open towards at least one of said ends, said hub shaft bore (2a) accommodating two speed change members (11,14) extending along said hub shaft bore (2a) and being in control connection with said gear means (24), a first one (11) of said speed change members (11,14) being tubular and a second one (14) of said speed change members (11,14) extending coaxially within said first speed change member (11), both said speed change members (11,14) having a respective end portion adjacent said one end of said hub shaft (2).

said operating mechanism having a support frame (1) adapted to be fixed with respect to said one end of said hub shaft (2), cam means (8,7) being pivotally mounted on said support frame (1) about a cam pivot axis (6), said cam means (8,7) being adapted for operative connection with an actuating switch (40) by transmission means (38), said cam means (8,7) being further adapted for acting upon said end portions of both said speed change members (11,14), such as to shift said speed change members (11,14) in response to pivotal movement of said cam means (8,7) about said cam pivot axis (6), said cam means (8,7) comprising two cam tracks (8a,7a) adjacent one another in the axial direction of said cam pivot axis (6) and being connected for common rotation about said cam pivot axis (6), a first one (8a) of said cam tracks (8a,7a) being adapted for acting upon said first speed change member (11) and a second one (7a) of said cam tracks (8a,7a) being adapted for acting onto said second speed change member (14).

**4,947,704**  
**SNAP ON STRAND ASSEMBLY**  
 Donald J. Gokee, Bowling Green, Ohio, assignor to Babcock Industries Inc., Fairfield, Conn.  
 Filed Aug. 24, 1989, Ser. No. 398,143  
 Int. Cl.<sup>5</sup> F16C 1/10  
 U.S. Cl. 74—502.4 3 Claims

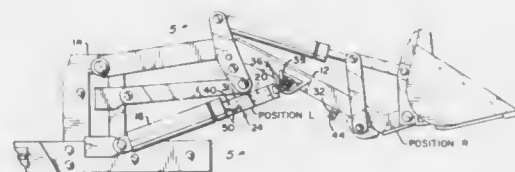
1. A snap on strand assembly comprising a molded plastic body, a connecting strand having an end molded in situ in said plastic body,

said end of said strand embedded in said plastic body being enlarged, a connector element having a base flange, a cylindrical portion and a head, said plastic body including a cylindrical opening which closely engages said cylindrical portion on said connector element.



said plastic body including a frustoconical portion extending therefrom and a diametral slot dividing the frustoconical portion into two portions that snap below the head of the connector element, said body having spaced radial tabs extending from the frustoconical portions to facilitate insertion of a tool for expanding the two portions to remove the body from the connector element.

**4,947,705**  
**METHOD AND APPARATUS FOR MAINTAINING A LOAD RAISING LINKAGE IN A RAISED POSITION**  
 Steve K. Yates, Scotland, Pa., and Tracy M. Darland, Cheshire, England, assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.  
 Continuation of Ser. No. 351,082, May 12, 1989, abandoned.  
 This application Mar. 5, 1990, Ser. No. 488,502  
 Int. Cl.<sup>5</sup> B66C 23/88  
 U.S. Cl. 74—529 3 Claims



1. Apparatus for maintaining a load raising linkage in a raised position, comprising:  
 power means for raising and lowering the linkage;  
 a U-shaped locking member pivotally connected to the load raising linkage, said locking member being movable between a lock position and an unlock position, said locking member having a bottom portion with a slot formed therein and two opened sidewall portions having aligned apertures formed therein;  
 an anchor fixedly attached to the linkage, said slot of said locking member being capable of receiving said anchor, said anchor having an aperture formed therein, said anchor apertures and said sidewall apertures being aligned in response to said slot receiving said anchor in the unlock position; and  
 means comprising a locking pin releasably carried by the locking member for engaging the anchor aperture and the sidewall apertures for maintaining the locking member in the unlock position and for engaging the sidewall apertures and the power means for maintaining the locking member in the lock position.

**4,947,706**  
**FLYWHEEL WITH A TORSIONAL DAMPER**  
 Mitsuhiro Umeyama; Hiroshi Itoh; Hiroaki Nimura, all of Toyota, and Kenichi Yamamoto, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Filed Sep. 4, 1987, Ser. No. 93,573  
 Claims priority, application Japan, Sep. 5, 1986, 61-135608[U]; Sep. 8, 1986, 61-136577[U]; Sep. 25, 1986, 61-145869[U]; Feb. 23, 1987, 62-24230[U]; May 12, 1987, 62-69680[U]; May 13, 1987, 62-70151[U]  
 Int. Cl.<sup>5</sup> F16F 15/10  
 U.S. Cl. 74—574 26 Claims



1. A flywheel with a torsional damper comprising:  
 two means for defining inertia moments;  
 a first spring mechanism directly connecting said two inertia moment defining means;  
 a second spring mechanism; and  
 a friction mechanism, said friction mechanism being provided in series with said second spring mechanism, said series combination of said second spring mechanism and said friction mechanism being arranged parallel to said first spring mechanism between said two inertia moment defining means.

**4,947,707**  
**ARRANGEMENT FOR DECOUPLING THE TORSIONAL VIBRATIONS IN A GEAR TRANSMISSION**  
 Reinhard Koenneker, Moensheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Sep. 19, 1988, Ser. No. 245,641  
 Claims priority, application Fed. Rep. of Germany, Oct. 19, 1987, 3735335  
 Int. Cl.<sup>5</sup> F16F 15/10  
 U.S. Cl. 74—574 13 Claims



1. An arrangement for decoupling torsional vibrations in a gear transmission comprising a driving gear, a driven gear, a

decoupling gear set means meshing with both the driving and driven gear, said decoupling gear set means including three split gears arranged coaxially adjacent one another and mutually stressed by spring means, one of said gears being a left split gear, another a center gear and still another a right split gear, the spring means being in the form of drawspring means arranged in apertures of the center gear and disposed tangentially thereto which are suspended with their one spring ends at the left split gear and with the other spring ends at the right split gear, wherein the drawspring means are coil springs having two bent-off spring ends whose suspension points are disposed eccentrically to the longitudinal axis of the coil springs;

**4,947,708**  
**BICYCLE PEDAL**  
 Jean-Pierre Lacombe, Chavanod, France, assignor to BG Innovations (Societe a Responsabilite Limitee de Droit Francais), Seynod, France  
 Filed Jul. 18, 1989, Ser. No. 381,572  
 Claims priority, application France, Jul. 28, 1988, 88 10525  
 Int. Cl.<sup>5</sup> G05G 1/14  
 U.S. Cl. 74—594.6 13 Claims



1. A bicycle pedal, comprising:  
 a pedal body lying generally in a pedal plane and formed with a forward extremity having an abutment fixed to said body and engageable with a front edge of a plate on a cyclist's shoe generally complementary to said abutment, said abutment projecting upwardly from said plane and being formed with a rearwardly facing arcuate segment having at an upper edge, a rearwardly projecting ledge adapted to overhang said plate, said rearwardly facing arcuate segment having an axis located generally toward a center of said body;  
 means at a rear end of said body for pivotally connecting said pedal body to an end of a crank arm of a bicycle whereby said pedal can pivot about a pedal axis relative to said crank arm;  
 a pivot piece engaged with said body and pivotal relative to said body about a pivot axis perpendicular to said plane and disposed substantially at a forwardmost generatrix of said rearwardly facing arcuate segment; and  
 a lever pivotally mounted on said pivot piece for swinging movement about a lever axis parallel to said pedal axis at a rear end of the pedal and having an upper portion formed with a forwardly projecting protuberance engageable over a rear edge of said plate generally complementary to said lever, said body forming an opening and being formed unitarily at its forward end with said abutment and said means at said rear end of said body for pivotally connecting said pedal body to an end of said crank arm of said bicycle is a bar receiving a pivot shaft defining said pedal axis, said bar being formed with a forwardly facing surface constituted by a forwardly facing arcuate segment centered on an axis thereof coinciding with said generatrix and said pivot axis and perpendicular to said plane, said pivot piece comprising an upwardly turned projection interfitting with said body and delimited forwardly by a

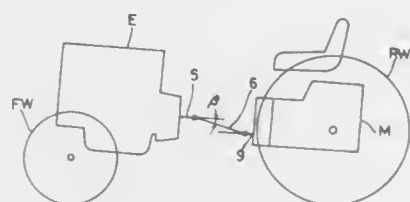


branch having a posterior surface in the form of another arcuate segment complementary to said forwardly facing surface and sliding therealong.

**4,947,709**  
**PROPELLER SHAFT TRANSMISSION STRUCTURE FOR A TRACTOR**  
Hirofumi Iritani, Sakai, Japan, assignor to Kubota, Ltd., Osaka, Japan

Filed Nov. 4, 1988, Ser. No. 267,013  
Claims priority, application Japan, Nov. 4, 1987, 62-278803; Apr. 22, 1988, 63-100535

Int. Cl.<sup>5</sup> F16H 35/00  
U.S. Cl. 74—640



1. A propelling power transmission system for a tractor comprising:

- An engine disposed at a rearwardly downward slant forwardly of a driver's section and at a forward position of a main frame and including an engine output shaft extending rearwardly;
- a transmission disposed at a rearwardly downward slant rearwardly of said driver's section and at a rearward position of said main frame and including a transmission input shaft extending forwardly in a lower region thereof, said transmission input shaft being positioned at a lower level than the engine output shaft;
- a propeller shaft disposed at a rearwardly downward slant so as to operatively interconnect the transmission input shaft and the engine output shaft through bent joints;
- a main clutch device provided in the transmission and including an input member positioned at a higher level than the transmission input shaft; and
- a gear transmission mechanism for transmitting the drive from the transmission input shaft to the clutch device.

**4,947,710**  
**HAIR SCULPTURING RAZOR**  
M. David Rudd, Sr., Paducah, Ky., assignor to W. Ralph Bean, Eldorado, Ill., a part interest

Division of Ser. No. 163,089, Mar. 2, 1988, Pat. No. 4,887,356. This application Sep. 25, 1989, Ser. No. 411,839

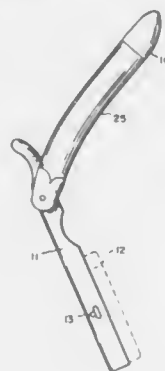
Int. Cl.<sup>5</sup> B21K 21/00

U.S. Cl. 76—119

5 Claims

1. A method of preparing dulled razors comprising placing the cutting edge of a regularly sharpened razor on a dulling tool and lightly tapping the razor to dull the cutting edge, said

dulling tool comprising a metal bar having an uniformly spaced series of lands and groves cut into said bar, the ratio of



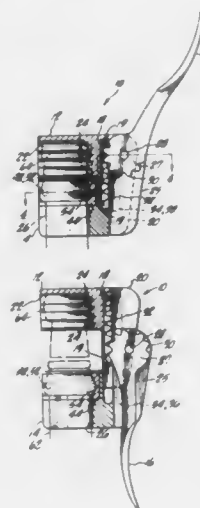
the aggregate widths of the lands to the length of the groved section being from 20 to 75 percent.

**4,947,711**  
**CHAMPAGNE BOTTLE OPENER**  
Ben F. Giebler, 3670 El Camino, San Bernardino, Calif. 92404  
Filed Jan. 11, 1989, Ser. No. 295,888

Int. Cl.<sup>5</sup> B67B 7/06

U.S. Cl. 81—3.37

9 Claims

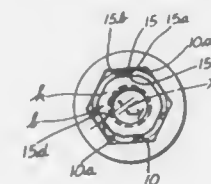


1. In a device for controlled removal or insertion of a cork from and into a champagne bottle having a neck and a circumferential rib thereon, the device comprising a first member having a U-shaped channel to fit laterally onto the neck of the champagne bottle; a second member having a U-shaped channel to fit laterally onto the head of the cork; and means for separating the first and second members under leverage; the improvement comprising a plurality of sharp-edged annular ridges formed on the interior of said U-shaped channel in said second member, said ridges designed and constructed to be slidable onto the head of the cork and to slightly deform and thereby securely grip the head of the cork when the device is mounted thereon.

**4,947,712**  
**SOCKET DEVICE**  
Robert C. Brosnan, 15516 Wenhaven Dr., Chagrin Falls, Ohio 44022  
Continuation-in-part of Ser. No. 137,072, Dec. 23, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 240,958

Int. Cl.<sup>5</sup> B25B 13/50

4 Claims



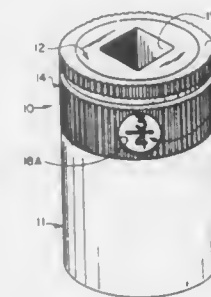
1. A socket for a socket-type wrench for removing damaged bolts or nuts comprising a tubular body having a continuous interior wall defining a chamber therein adapted to receive the head of a damaged bolt or nut, a recess in said body adapted to receive a driving means of a wrench to effect a driving connection therebetween, shoulder means comprising first and second walls formed integral at one end with the continuous wall, said first wall being perpendicular to said continuous wall and projecting into said chamber, said second wall projecting angularly from said continuous wall into said chamber and connecting at its inner end with the inner end of the first wall to form crest means fixed relative to said continuous wall, said crest means adapted to be releasably partially embedded into said bolt head or nut, wherein said wrench is rotated to rotate said socket in a direction to release said bolt or nut from its securing environment.

**4,947,713**  
**ELASTOMERIC SLEEVE ON REARWARD PORTION OF WRENCH SOCKET TO FACILITATE RECOGNITION AND SELECTION OF THE SOCKET**  
Robert L. Arnold, Lancaster, Pa., assignor to Easco Hand Tools, Inc., Hunt Valley, Md.

Filed Dec. 4, 1985, Ser. No. 804,533  
Int. Cl.<sup>5</sup> B25B 13/06

U.S. Cl. 81—121.1

21 Claims



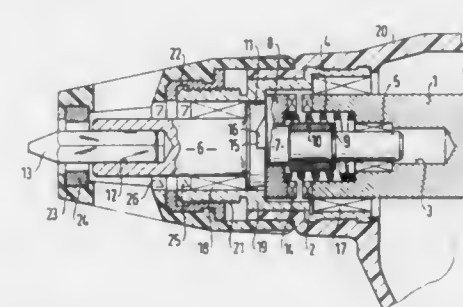
1. In combination with a wrench socket having respective forward and rearward portions, an elastomeric sleeve secured on the rearward portion of the socket, the sleeve having an outer diameter provided with knurls for facilitating a manual rotation of the socket, said sleeve further having a recess formed therein, and indicia means disposed in the recess on the sleeve for facilitating convenient recognition of the socket.

**4,947,714**  
**LOW-NOISE SCREWING TOOL COUPLING**  
Martin Fluri, Luterbach, Switzerland, assignor to Scintilla Aktiengesellschaft, Solothurn, Switzerland  
Filed Nov. 16, 1988, Ser. No. 272,542

Int. Cl.<sup>5</sup> B25B 23/157

U.S. Cl. 81—475

6 Claims



1. Motor driven screwing tool comprising a housing provided with an annular front end part acting as a depth stop; a drive shaft supported for rotation in said housing in a fixed axial position relative thereto; an output shaft supported for rotation in said housing and being axially displaceable between said annular front end part and a front end surface of said drive shaft; a screw bit attached to a front end surface of said output shaft and projecting through said annular front end part; a coupling including a first coupling element formed by an annular outer portion of said front end surface of the drive shaft, a second coupling element in the form of a coupling ring which is supported for rotation and axial displacement on said output shaft, and a third coupling element in the form of a first shoulder on said output shaft; cam-like coupling members provided on said first coupling element and on opposing end surfaces of said coupling ring, each of said coupling elements having a sloping cam surface and an axially directed stop surface; a spring arranged between a central portion of said first coupling element and said coupling ring to urge the same in axial direction against said third coupling element and to disengage coupling members of the coupling ring and of the first coupling element when said annular front end part is pressed against a support; a shoulder means provided on said output shaft between said first coupling element and said coupling ring at a distance from said third coupling element to limit the axial displacement of said coupling ring to the axial length of the sloping cam surface of the third coupling element whereby during rotation of the drive shaft in the screwing-in direction the sloping cam surfaces of the coupling ring slide on the sloping cam surfaces of the third coupling element until the coupling ring is displaced in an axial direction to abutment against said second shoulder while during rotation in the reverse direction the coupling ring remains in engagement with the axially directed stop surfaces of said third coupling element.

**4,947,715**  
**METHOD AND APPARATUS FOR CUTTING AN ASPHERIC SURFACE ON A WORKPIECE**  
Buford W. Council, Jr., Ruskin, Fla., assignor to Citycrown, Inc., Tampa, Fla.

Division of Ser. No. 276,230, Nov. 22, 1988. This application Sep. 20, 1989, Ser. No. 410,148  
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

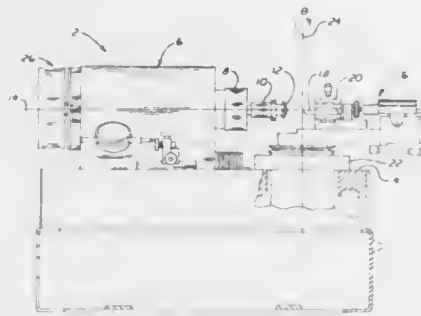
Int. Cl.<sup>5</sup> B23B 5/36, 1/00

U.S. Cl. 82—1.11

6 Claims

1. A lathe for cutting an aspheric surface on a workpiece, said lathe comprising

a lathe bed;  
 a headstock mounted to said lathe bed;  
 a spindle carried by said headstock for supporting and rotating a workpiece holder and a workpiece carried thereby about an axis extending longitudinally through said spindle, with a surface of said workpiece facing axially outwardly of said spindle and said workpiece holder, said workpiece holder being mounted to said spindle for movement relative to said spindle along said spindle axis;  
 a tool support mounted to said lathe bed and having a pivot axis generally normal to said spindle axis, said tool holder being adapted to move a forming tool mounted in said tool holder in contact with said workpiece and along an arc of predetermined radius about an axis that is generally transverse to said spindle axis and intermediate said workpiece surface and said headstock;  
 means for selectively moving said workpiece holder relative to said spindle along said spindle axis in response to an actuating signal such that the distance between said form-



ing tool movement axis and said workpiece surface varies selectively between a first distance  $R_1$  and a second distance  $R_2$ ;  
 means for providing a signal indicative of the angular position of said workpiece holder during rotation of said spindle and workpiece holder about said spindle axis;  
 signal integrating means for integrating said signals indicating said forming tool holder angular position along said arc and said angular position of said workpiece holder about said spindle axis and for generating an actuating signal for controlling said axial movement of said workpiece holder relative to said spindle, said actuating signal having a waveform defining said axial movement of said workpiece holder in the y direction along said spindle axis as

$$y = K(\sin^N \phi)A,$$

where K is a scale factor, N is a non-negative number,  $\phi$  is the angle of rotation of a predetermined point on said workpiece about said spindle axis and

$$A = \sqrt{r^2 \cos^2 \theta + s^2 + 2rs} - \sqrt{r^2 \cos^2 \theta + s^2 + 2rs \cos \theta}$$

where  $\theta$  is the angular position of said cutting tool along said arc of movement, r is the average of  $R_1$  and  $R_2$ , and s equals the difference between  $R_1$  and  $R_2$ , whereby the workpiece holder and any workpiece held thereby are moved axially in a predetermined relationship both with the rotation of the workpiece holder about the spindle axis and with movement of the tool holder along its arc of movement to cut a predetermined aspheric surface on the workpiece.

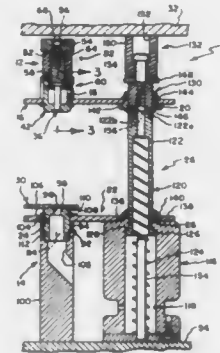
4,947,716

## PUNCH AND DIE SYSTEM

S. Arthur Whistler, Orchard Park, N.Y., assignor to S. B. Whistler & Sons, Inc., Akron, N.Y.  
 Division of Ser. No. 92,311, Sep. 1, 1987, Pat. No. 4,843,931.  
 This application Apr. 17, 1989, Ser. No. 338,863  
 Int. Cl.<sup>5</sup> B26F 1/14

U.S. Cl. 83—98

5 Claims



1. In a punch mechanism for punching a slug from a workpiece and comprising a punch means having a punch end, die means having a die opening, said punch means and said die means being relatively movable for driving said punch end through said workpiece and into said die opening for creating said slug, said guide means for aligning said punch end and said die opening during relative movement of said punch means and said die means, the improvement for reducing the tendency for said slug to be pulled out of said die opening during withdrawal of said punch end from within said die opening, due to a vacuum condition tending to be created at the interface of said punch end and said slug, which comprises:

fluid passage means extending through said punch end for placing said interface in flow communication with fluid source means disposed remotely of said punch end, and said fluid source means tends to reduce the occurrence of said vacuum condition, said guide means defines a cavity for movably receiving a portion of said punch means, said fluid source means is defined at least in part by a portion of said cavity unoccupied by said punch means, said unoccupied portion of said cavity is increased and reduced in size incident to said driving and withdrawal of said punch end relative to said die opening, respectively, one-way valve means is provided for placing said unoccupied portion of said cavity in flow communication with the atmosphere while being increased in size, and said fluid passage means includes one-way valve means for placing said interface in flow communication with said unoccupied portion of said cavity while being reduced in size.

4,947,717

## PUNCH AND DIE SYSTEM

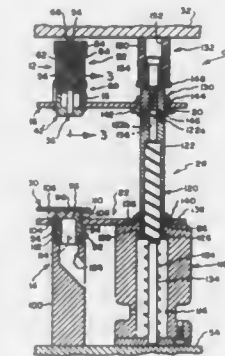
S. Arthur Whistler, Orchard Park, N.Y., assignor to S. B. Whistler & Sons, Inc., Akron, N.Y.  
 Division of Ser. No. 92,311, Jan. 9, 1987, Pat. No. 4,843,931.  
 This application Apr. 17, 1989, Ser. No. 339,516  
 Int. Cl.<sup>5</sup> B26F 1/14

U.S. Cl. 83—138

5 Claims

1. A punch element comprising a body having opposite end portions defining oppositely facing punch tip portions and axially aligned mounting openings extending into said body one through each of said end portions, said mounting openings

are formed as a single opening extending through said body, and a mounting recess is formed in said body in communication



with said single opening essentially equidistant from said end portions.

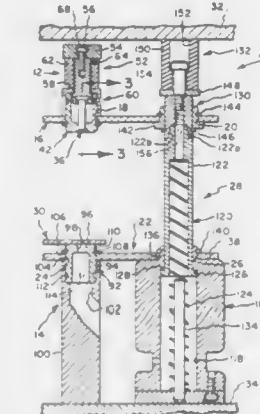
4,947,718

## PUNCH AND DIE SYSTEM

S. Arthur Whistler, Orchard Park, N.Y., assignor to S. B. Whistler & Sons, Inc., Akron, N.Y.  
 Division of Ser. No. 92,311, Sep. 1, 1987, Pat. No. 4,843,931.  
 This application Apr. 17, 1989, Ser. No. 339,316  
 Int. Cl.<sup>5</sup> B26F 1/14

U.S. Cl. 83—138

5 Claims



1. A punch assembly comprising in combination:

punch means including a punch element and a punch driver, said punch element having opposite ends defining oppositely facing punch tip portions and having mounting means disposed intermediate said opposite ends, said punch driver having an end removably cooperating with said mounting means to support said punch element and alternatively position said punch tip portions to project in a direction away from said punch driver, said end of said punch driver includes an axially extending screw threaded projection, and said mounting means of said punch element includes aligned screw threaded mounting opening extending one through each of said end portions thereof for alternately threadably receiving said screw threaded projection;

punch guide means for slidably supporting said punch means for reciprocating movement relative thereto in punching and stripping directions; and

a resiliently deformable stripper means acting on said punch driver for resiliently opposing movement of said punch means in said punching direction.

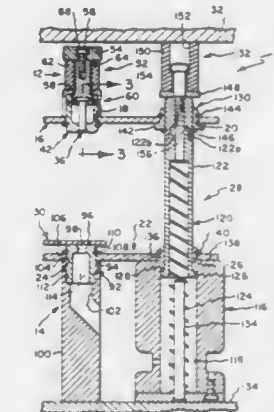
4,947,719

## PUNCH AND DIE SYSTEM

S. Arthur Whistler, Orchard Park, N.Y., assignor to S. B. Whistler & Sons, Inc., Akron, N.Y.  
 Division of Ser. No. 92,311, Sep. 1, 1987, Pat. No. 4,843,931.  
 This application Apr. 17, 1989, Ser. No. 339,715  
 Int. Cl.<sup>5</sup> B26F 1/14

U.S. Cl. 83—138

13 Claims



1. A punch assembly comprising in combination:

a guide means formed with a guide opening extending therethrough;  
 a spring device including a spring and first and second end constraints engaging opposite ends of said spring, said spring device having a lengthwise extending opening;  
 a side wall portion extending between and connected to said guide means and said second constraint, said side wall portion transversely bounding a cavity disposed in communicating alignment with said guide opening and said lengthwise extending opening;

a punch element sized and shaped for slidable receipt within said guide opening and for loose fit receipt within said cavity, said punch element is in the form of a body having opposite end portions defining oppositely facing punch tip portions and having axially aligned mounted openings extending into said body one through each of said end portions thereof;

a punch driver extending through said lengthwise extending opening and into said cavity, said driver having a first end connected to said first constraint and a second end loosely received within said cavity and removably connected to said punch element, said spring tends to bias said second end into engagement with said second constraint, and said second end of said driver carries means removably received within said mounting openings for releasably attaching said punch element to said driver and alternatively positioning said punch tip portions within said guide opening.

4,947,720

## DIE IMPROVEMENT

Conrad L. Howe, Greene, Ark., assignor to Emerson Electric Co., St. Louis, Mo.  
 Filed Sep. 5, 1989, Ser. No. 402,670  
 Int. Cl.<sup>5</sup> B26F 1/00

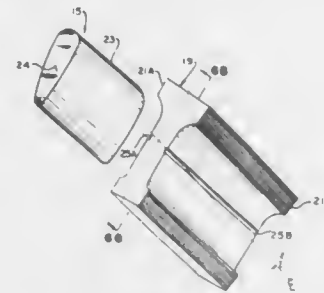
U.S. Cl. 83—146

5 Claims

1. In a punch press die for manufacturing a part from a strip of material fed into the press, the die having a cavity therein into which a punch travels to stamp out material from the strip, the improvement wherein the die has opposing side walls forming the cavity with each side wall having a longitudinal groove formed therein, the respective grooves being angularly offset throughout their length with respect to a predetermined axis of their respective side wall, the annular offset of one groove being offset in an opposite direction to that of the other



groove, the grooves having a single co-planar point which lies on the intersection of two transverse planes, and the predetermined angular offset of the oppositely directed grooves being sufficient to cause slidable wedging groove engagement of stamped out material peripheral portions which are comple-



mentary to the grooves in order to remove stamped out material which would otherwise adhere to the face of the punch during the punching operation, thereby to prevent "slugging" and damage to the die as the punch repetitively strikes the strip of material.

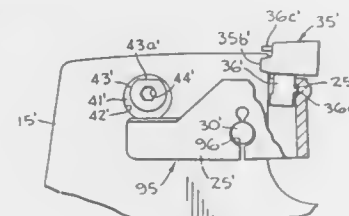
4,947,721

**CIRCULAR SAW BLADE HAVING REMOVABLE TEETH**  
Donald Anderson, P.O. Box 886, Crooked River Ranch, Ore. 97760

Division of Ser. No. 85,019, Aug. 13, 1987, Pat. No. 4,879,936.  
This application Jul. 21, 1989, Ser. No. 383,051  
Int. Cl.<sup>5</sup> B27B 33/12

U.S. Cl. 83-843

2 Claims



2. A circular saw blade comprising:

- (a) a disc having a periphery;
- (b) a tooth retaining member pivotally mounted on said disc along the periphery thereof;
- (c) a tooth disposed between said disc and said retaining member and extending radially from said disc beyond the periphery thereof;
- (d) said retaining member being pivotally movable between a tooth retaining position and a position removed from the tooth retaining position;
- (e) cam locking means mounted on said disc adjacent said retaining member for releasably locking said retaining member to said disc in the tooth retaining position; and
- (f) means interconnecting said disc and said tooth retaining member for mounting said tooth retaining member on said disc for pivotal movement relative to said disc;
- (g) said tooth retaining member being made of spring steel;
- (h) said means for mounting said tooth retaining member on said disc for pivotal movement being a pivot pin;
- (i) aligned openings formed in said disc and said tooth retaining member in which said pivot pin is rotatable;
- (j) said cam locking means releasably locking said retaining member in the tooth retaining position urges said pivot pin to be tightened by engagement with the walls surrounding said aligned openings and said pivot pin being released from the walls surrounding said aligned openings when

said cam locking means releases said retaining member from the tooth retaining position.

4,947,722

**MUSIC BOX ARRANGEMENTS FOR CAKES, TOYS, ORNAMENTS, AND THE LIKE**

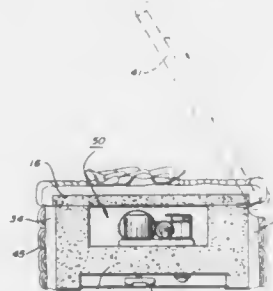
Fredric J. Lewis, 54 Hampden Rd., Rochester, N.Y. 14610

Filed May 24, 1989, Ser. No. 356,341

Int. Cl.<sup>5</sup> G10F 1/06

U.S. Cl. 84-95.2

5 Claims



1. A music box arrangement comprising a rigid enclosure structure having side wall sections defining a sound chamber, at least one music playing mechanism mounted within said chamber and being adapted to produce musical sounds therein, said mechanism being arranged to direct said musical sounds to the inner surfaces of said wall sections without intervening objects therebetween, said wall sections being formed of "STYROFOAM" material for enhancing the sound quality of the musical sounds.

4,947,723

**TONE SIGNAL GENERATION DEVICE HAVING A TONE SAMPLING FUNCTION**

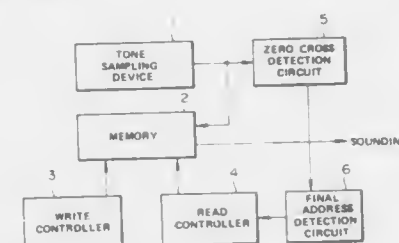
Susumu Kawashima, and Yasuji Uchiyama, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan  
Filed Jan. 5, 1988, Ser. No. 141,422

Claims priority, application Japan, Jan. 7, 1987, 62-1209; Jan. 7, 1987, 62-1210; Jan. 7, 1987, 62-1211

Int. Cl.<sup>5</sup> G10H 1/057, 1/46, 7/02

U.S. Cl. 84-603

24 Claims



11. A tone signal generation device comprising: tone sampling means for sampling a tone signal; memory means, capable of both reading and writing, for storing waveshape sample data; write control means for writing waveshape sample data of the tone signal sampled by said tone sampling means into said memory means; read control means for reading out said waveshape sample data written in said memory means, in response to completion of writing of said waveshape sample data in said memory means, to reproduce the sampled tone signal, and means for providing a tone signal corresponding to said

waveshape sample data read out from said memory means upon said completion of writing.

4,947,724

**ELECTRIC MUSIC INSTRUMENT WITH THE CAPABILITY OF MEMORIZING AND PRODUCING DIFFERENT MUSICAL SCALES**

Katsuhiko Hirano; Masahiko Koike, and Hiroyuki Toda, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Continuation of Ser. No. 125,394, Nov. 25, 1987, abandoned.

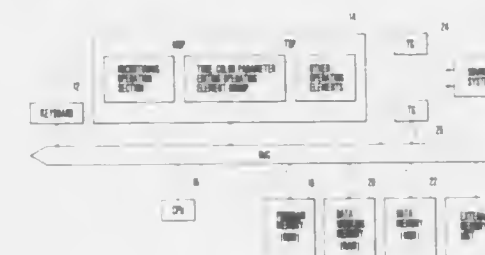
This application Oct. 5, 1989, Ser. No. 418,907

Claims priority, application Japan, Nov. 28, 1986, 61-283356; Jan. 17, 1987, 62-8676

Int. Cl.<sup>5</sup> G10C 3/12; G10H 1/053, 7/00

U.S. Cl. 84-631

7 Claims



1. An electronic musical instrument comprising: a keyboard having a plurality of keys; a plurality of tone generating means for generating at least two tone signals in response to operation of a key among said plurality of keys; a pitch designating means for designating a pitch of a musical tone to be produced; a plural pitch data generating means for generating at least two pitch data with different scale characteristics based on said designated pitch; and a musical tone generating means for generating at least two musical tone signals having tone colors and pitches based on said at least two pitch data responsive to an operation of said key, so that said at least two musical tone signals have said different scale characteristics.

4,947,725

**ELECTRONIC DRUM**

Yoshio Nomura, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

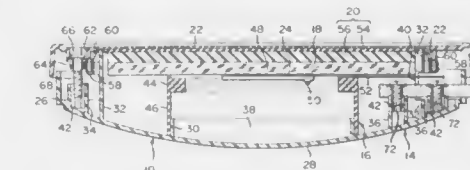
Continuation of Ser. No. 66,696, Jun. 24, 1987, abandoned. This application Nov. 29, 1989, Ser. No. 443,805

Claims priority, application Japan, Jun. 30, 1986, 61-98963[U]

Int. Cl.<sup>5</sup> G10H 3/12

U.S. Cl. 84-723

25 Claims



1. An electronic drum comprising: a shell having an opening portion at one end and a closing portion the other end; a strikable member adapted to be struck, said strikable member being located at said opening portion of said shell; means for preventing said strikable member from coming out from said opening portion of said shell; a cushioning member having a substantially cylindrical con-

figuration and located within said shell and sandwiched between said strikable member and said closing portion of said shell, said cushioning member including a bellows-like urging section for urging said strikable member in a direction toward said opening portion of said shell and a cushioning section which is elastically deformable to allow said strikable member to move toward said closing portion of said shell when a force transmitted from said strikable member is larger than a predetermined value; and

means, mounted within said cushioning member and on said strikable member, for picking up vibration of said strikable member which is produced when said strikable member is struck, and for generating an electrical signal corresponding to the vibration.

4,947,726

**ELECTRONIC MUSICAL INSTRUMENT AND STRING DEVIATION SENSOR ARRANGEMENT THEREFOR**

Yojiro Takabayashi, Shizuoka, Japan, assignor to Yamaha Corporation, Shizuoka, Japan

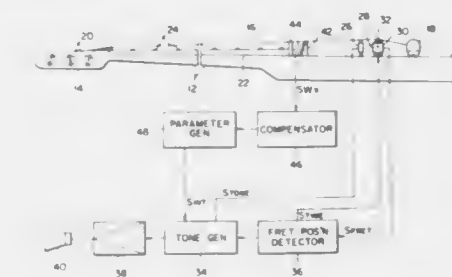
Filed Mar. 31, 1988, Ser. No. 176,328

Claims priority, application Japan, Apr. 3, 1987, 62-83289; Apr. 3, 1987, 62-83290

Int. Cl.<sup>5</sup> G10H 3/00, 1/00

U.S. Cl. 84-743

21 Claims



1. An electronic musical instrument comprising: (a) a body portion; (b) a plurality of fret members located at predetermined spacings on said body portion; (c) a string stretched over said body portion; (d) anchoring means installed on said body portion for anchoring one end of said string; (e) probing means located between said anchoring means and said plurality of fret members, engaging said string and attaching to said body portion for being movable with the string in a lateral direction of said body portion; and (f) string deviation detecting means connected to said probing means for detecting an amount of lateral movement of said probing means corresponding to the lateral movement of the string caused by a player's performance and producing a signal variable with an amount of deviation of said string in said lateral direction.

4,947,727

**FISHING NET TWINE AND A FISHING NET MADE THEREOF**

Atsushi Momoi, Akoo, Japan, assignor to Momoi Fishing Net Mfg. Co., Ltd., Hyogo, Japan

Filed Sep. 9, 1985, Ser. No. 774,097

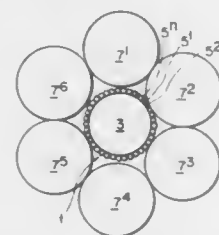
Int. Cl.<sup>5</sup> A01K 73/00; D02G 3/22, 3/36, 3/44

U.S. Cl. 87-12

58 Claims

1. A fishing net twine, comprising: a single first yarn comprising a plurality of multiple filaments and a monofilament which are stranded together, said monofilament being thicker than each of said multiple filaments; and

a second yarn comprising a plurality of monofilaments which are stranded together with said single first yarn, said monofilaments of said second yarn being thicker than each of said multiple filaments of said single first yarn.



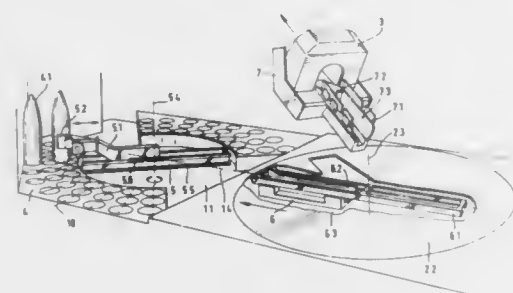
11. A fishing net comprising the fishing net twine defined in claim 1.

**4,947,728**  
**COMBAT VEHICLE, ESPECIALLY ARMORED**  
**HOWITZER**

Peter Muhlhausen, Ahnatal, and Ernst Tripp, Vellmar, both of Fed. Rep. of Germany, assignors to Wegmann & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Mar. 7, 1989, Ser. No. 320,015  
Claims priority, application Fed. Rep. of Germany Mar. 8, 1988, 3807424

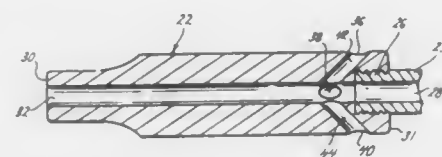
Int. Cl.<sup>5</sup> F41A 9/11  
U.S. Cl. 89—46 7 Claims



1. In a combat vehicle having an interior space having a center and including a floor, and an exterior including a turret and a heavy weapon mounted thereon for elevated and lowered movement, at least one ammunition magazine in the interior space adjacent the center for storing shells in an upright position, and means for feeding the shells to the weapon one at a time, the improvement wherein the feeding means comprises: conveying means for removing one shell from the at least one ammunition magazine comprising a frame, means mounting the frame for rotation about an axis perpendicular to the floor for movement from a pick-up position to a transfer position, rails on the frame disposed parallel to the floor, an arm slidably mounted on the rails for movement therealong parallel to the floor, means mounted on the arm for gripping a shell and pivotable from a first position wherein the shell is upright to a second position wherein the shell is aligned with the length of the vehicle, wherein the gripping means is operative in the first position to grip a shell when the frame is in the pick-up position and is operative in the second position to release a shell when the frame is in the transfer position, a shell tray, means mounting the shell tray for sliding movement parallel to the floor between a receiving position wherein the shell tray receives a shell released by the gripping means and a holding position, means for rotating the shell tray about an axis perpendicular to the floor from the holding position to an azimuth position parallel to a bore of the weapon, a loading tray parallel to the bore, means for elevating the shell tray to transfer the shell to

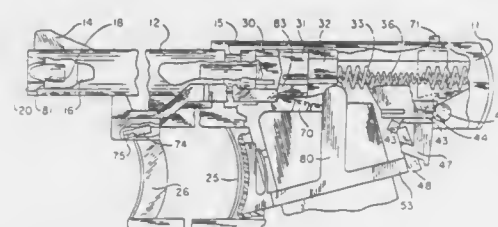
the loading tray and means for elevating the loading tray to align the shell with the bore for sliding movement therein.

**4,947,729**  
**SPIN STABILIZING GUN**  
Timothy Downey, 4310 Sinnwell Dr., St. Louis, Mo. 63123  
Filed Jun. 19, 1989, Ser. No. 367,551  
Int. Cl.<sup>5</sup> F41A 21/36  
U.S. Cl. 89—14.3 8 Claims



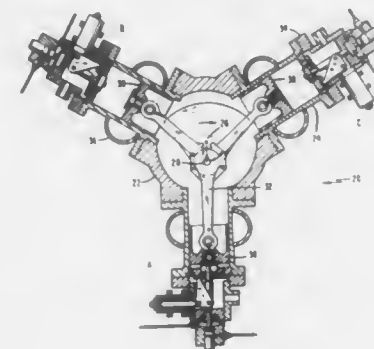
1. For an apparatus for firing a projectile having a barrel with a breech end and a muzzle end through which the projectile passes, an attachment for securing to the breech end, said attachment having a bore therethrough to form an extension of the barrel of the apparatus and comprising a means for spin-stabilizing the projectile comprising a plurality of pressure relief means circumferentially and symmetrically spaced about the bore, the plurality of pressure relief means being a series of 4 ports, at least one of which is located on the top surface of the attachment, the diameter of each port being approximately pi times one-quarter of the inside diameter of the barrel.

**4,947,730**  
**FIRING MECHANISM FOR POLYMER WEAPON**  
**APPARATUS**  
David E. Byron, Casselberry, Fla., assignor to Red Eye Arms, Inc., Winter Park, Fla.  
Continuation of Ser. No. 148,094, Jan. 28, 1988, abandoned, which is a continuation of Ser. No. 682, Jan. 5, 1987, abandoned, which is a division of Ser. No. 702,635, Feb. 4, 1985, Pat. No. 4,703,826. This application Mar. 10, 1989, Ser. No. 320,872  
Int. Cl.<sup>5</sup> F41C 17/00, 19/00  
U.S. Cl. 89—146 3 Claims



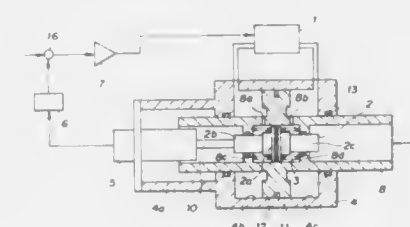
1. A weapon apparatus comprising:  
a barrel;  
a slidably mounted bolt;  
a slidably mounted hammer having a sear latching mechanism in its path of travel;  
a slidably-mounted locking block adjacent to the bolt to lock the bolt;  
a trigger bar with an integral extending cantilever-shaped leaf spring biasing member for biasing said trigger bar forwardly, and having an upwardly extending disconnector protruding into the path of the hammer; and  
a trigger adjacent to said trigger bar.

**4,947,731**  
**MULTICYCLINDER SELF-STARTING UNIFLOW**  
**ENGINE**  
Barry Johnston, 2423 Pickwick Rd., Baltimore, Md. 21207  
Continuation-in-part of Ser. No. 177,915, Mar. 31, 1988. This application Jan. 5, 1989, Ser. No. 293,591  
Int. Cl.<sup>5</sup> F01B 1/06; F01L 21/04, 25/04  
U.S. Cl. 91—229 44 Claims



1. A mechanism for ensuring self-starting of a multicylinder, single crankshaft, reciprocating piston engine with at least three cylinders evenly distributed around a common crankshaft, providing a rotational output solely upon provision thereto of a supply of an expandable working fluid at a predetermined initial condition, comprising:  
speed-responsive first means that forcibly adjusts its position in correspondence with an output speed of the engine; and  
second means for controlling the start and stop of an inflow of said expandable working fluid at said initial condition, into individual engine cylinders in a prescribed sequence, as a function of the position of each individual piston with respect to its top dead center (TDC) during a working stroke, in correspondence with said position of said first means, comprising a pressure-responsive and inertially-actuated relief valve means located in each piston for enabling evacuation of residual working fluid from the corresponding cylinder while the piston is moving from its bottom dead center BDC to a first piston position.

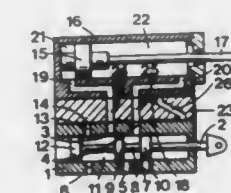
**4,947,732**  
**ELECTRO-HYDRAULIC SERVO ACTUATOR WITH**  
**FUNCTION FOR ADJUSTING RIGIDITY**  
Ako Hidenobu, Ogaki, Japan, assignor to Teijin Seike Co., Ltd., Osaka, Japan  
Filed Dec. 12, 1988, Ser. No. 283,309  
Claims priority, application Japan, Mar. 28, 1988, 63-073831  
Int. Cl.<sup>5</sup> F15B 13/16  
U.S. Cl. 91—363 R 4 Claims



3. An electro-hydraulic servo actuator with function for adjusting rigidity comprising:  
an electro-hydraulic transducing means which transduces an electric signal into a hydraulic signal;

an actuator of a cylinder type which is operated by said electro-hydraulic transducing means;  
a position detector which detects a position of an output member of said actuator to emit a positional electric signal;  
an adder which compares said positional signal from said position detector with a command signal to emit a deviation signal;  
said deviation signal from said adder being applied to said electro-hydraulic transducing means; and  
a hydraulic-electric transducing means which is a bias piston disposed within an actuator rod of said cylinder type actuator and which floats in response to a differential pressure within said cylinder, and said piston is connected to said position detector.

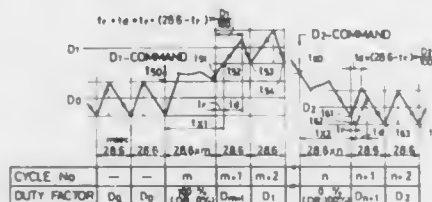
**4,947,733**  
**VALVE SUBPLATE FOR ALTERNATIVE**  
**DOUBLE-ACTING OR SINGLE-ACTING OPERATION OF**  
**CYLINDER**  
Jean-Pierre Ramillon, Perly, Switzerland, assignor to Honeywell Lucifer S.A., Carouge, Switzerland  
Filed Oct. 31, 1988, Ser. No. 264,359  
Claims priority, application European Pat. Off., Nov. 19, 1987, 87810677  
Int. Cl.<sup>5</sup> F15B 13/00  
U.S. Cl. 91—466 5 Claims



1. In apparatus for controlling a piston disposed in a cylinder closed at each end, this cylinder being controlled by a valve with two outlet orifices, adapted to connect at least one of the spaces located on each side of the piston alternatively to a source of fluid under pressure and to an exhaust conduit; the improvement comprising means permitting selectively to cause the other space to communicate either alternatively with the source of pressure and an exhaust conduit, or continuously with an exhaust conduit, the valve having a flat surface through which open the two outlet orifices, the valve comprising an internal conduit opening also through this flat surface, this conduit being connected to the exhaust conduit of the valve, means permitting connecting the valve to the cylinder in two different positions in which one of said spaces is connected either to the internal conduit of the valve or to one of its outlet orifices, the last-named means comprising an intermediate plate by which the valve is mechanically connected to the cylinder, this plate having passages extending from one of its surfaces to its other surface to cause the outlet orifices of the valve to communicate with said spaces of the cylinder, the surface of this latter having a flat portion through which open two conduits leading respectively to each of said spaces, said plate being so shaped as to be adapted to occupy two different positions between the cylinder and the valve, the passages of the plate being so disposed as to ensure the communication between one of the spaces of the cylinder either with the internal conduit of the valve or with one of its outlet orifices, according to the position occupied by the plate.



**4,947,734**  
**METHOD OF DUTY-RATIO CONTROL FOR HYDRAULICALLY ACTUATED SLIP CONTROL LOCK-UP CLUTCH AND TRANSMISSION**  
 Kenjiro Fujita, Kusatsu; Tetsuo Ozaki, Gamagori, and Takeo Hiramatsu, Nagakakyo, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Apr. 11, 1988, Ser. No. 180,169  
 Claims priority, application Japan, Apr. 20, 1987, 62-97020; Mar. 18, 1988, 63-65037  
 Int. Cl.<sup>3</sup> B60K 41/02, 41/04, 41/22; F16H 61/14  
 U.S. Cl. 91—471 6 Claims



1. In a hydraulic control method that includes changing duty ratio, for introducing pressurized oil into an oil passage connected to a hydraulically-operated load device, from a first duty ratio corresponding to a first oil pressure value to a second duty ratio corresponding to a second oil pressure value, thereby changing the time-based average oil pressure inside said oil passage from the first oil pressure value to the second oil pressure value greater than said first oil pressure value, the improvement comprising:

changing said duty ratio from said first duty ratio to said second duty ratio via a third intermediate duty ratio corresponding to a third oil pressure value which is greater than said second oil pressure value; and  
 maintaining said third intermediate duty ratio for a period of m cycles from issuance of a command of changing said first duty ratio to said second duty ratio, wherein m is an integer and satisfies the following relations:

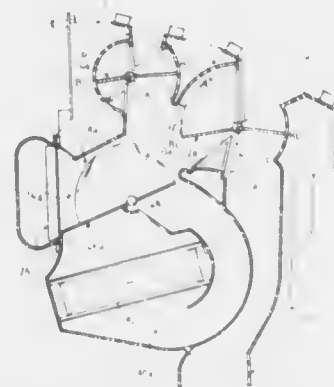
$0 < t \times 1 - (\text{single duty cycle time}) \times m < (\text{single duty cycle time})$ ;

wherein  $t \times 1$  denotes a correction time which is obtained as corresponding to a duty ratio variation ( $\Delta D1$ ) between said first duty ratio and said second duty ratio by using a predetermined duty ratio-correction time characteristic curve, said duty ratio-correction time characteristic curve representing the relation between a duty ratio variation and a time which is required for oil pressure in the oil passage to vary from a value corresponding to a duty ratio obtained before the duty ratio variation to a value corresponding to a duty ratio obtained after the duty ratio variation, by supplying said oil passage with oil pressure corresponding to said third intermediate duty ratio.

**4,947,735**  
**DISTRIBUTION BOX FOR A HEATING AND/OR AIR CONDITIONING APPARATUS, ESPECIALLY FOR AN AUTOMOTIVE VEHICLE**  
 Jean Guillemin, Elancourt, France, assignor to Valeo, Paris, France  
 Filed May 22, 1989, Ser. No. 354,995  
 Claims priority, application France, May 27, 1988, 88 07121  
 Int. Cl.<sup>3</sup> B60H 1/00 10 Claims

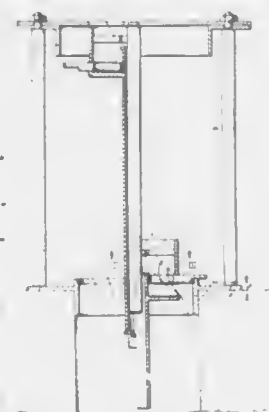
1. A distribution box for a heating and/or air conditioning apparatus, particularly for an automotive vehicle, wherein the distribution box comprises at least one fresh air inlet duct defining an inlet section, a plurality of air outlet ducts, means associated with said inlet and outlet ducts for regulating the distribution and temperature of air delivered through the outlet ducts, a feed duct of bent configuration for supplying fresh air, said feed duct defining an outlet section and further defining a direction of flow for said fresh air that is substantially tangen-

tial with respect to a direction of flow of the air in the said at least one inlet duct, the inlet section of the or each inlet duct being connected with the outlet section of the feed duct, the distribution box further comprising a distribution grid extend-



ing across said inlet section of the said inlet duct or ducts, the distribution grid comprising a plurality of spaced vanes positioned in said grid with respect to each other to divide the air flowing therethrough into a plurality of air streams that are controllably different from each other.

**4,947,736**  
**CHIMNEY CAP UNIT FOR EXTINGUISHING A STARTING CHIMNEY FIRE**  
 Wiebe Koning, Veneweg 172, 7946 LM Wanneperveen, Netherlands  
 Filed Jun. 9, 1989, Ser. No. 363,776  
 Int. Cl.<sup>3</sup> F23L 11/00 2 Claims



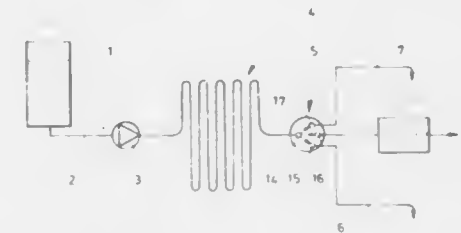
1. Chimney cap unit including a chimney cap for extinguishing a starting chimney fire comprising:  
 means for closing the passage during the chimney fire except for a restricted opening having first and second portions, said closing means being outside the flow of flue gases during normal operating conditions with no fire; and  
 means for controlling the passage of the flue gases through the first portion of the restricted opening in response to the temperature of the flue gases.

**4,947,737**  
**TWIN-CHAMBERED STOPPERING ARRANGEMENT FOR, AND METHOD OF, RIDDLING FERMENTED BOTTLED WINES, PARTICULARLY CHAMPAGNES**  
 Ernest Gladstone, 721 Ave. O, Brooklyn, N.Y. 11230  
 Filed May 17, 1989, Ser. No. 352,991  
 Int. Cl.<sup>3</sup> C12H 1/22 15 Claims



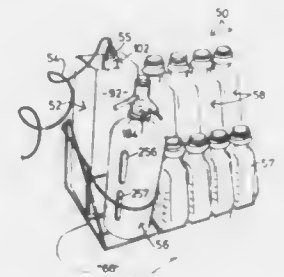
1. A twin-chambered stoppering arrangement for riddling fermented, bottled wines, comprising:  
 (a) an insert friction-tightly inserted into a neck of a bottle of wine to undergo fermentation within the bottle with concomitant production of sediment to be riddled from the wine;  
 (b) a head integral with the insert and located exteriorly of the neck;  
 (c) said insert and said head bounding a first, interior chamber, said first chamber extending along a longitudinal direction through the insert and the head between a pluggable opening on the head and a constantly-open opening on the insert;  
 (d) a crown removably mounted on the head, said crown having crown walls which bound a second chamber and which are movable from a retracted to an extended position;  
 (e) a movable plug mounted on the crown walls for joint movement therewith along the longitudinal direction from an unplugged position in which the plug is remote from the pluggable opening when the crown walls are in the retracted position, to a plugged position in which the plug closes the pluggable opening when the crown walls are in the extended position;  
 (f) said second chamber communicating with the first chamber in the unplugged position and having a volumetric capacity sufficient for collecting virtually all the sediment flowing through the first chamber and into the second chamber when the bottle is inverted in the unplugged position of the plug;  
 (g) a holder for holding the crown walls in the retracted position and the plug in the unplugged position during sediment collection, said holder being releasable for moving the crown walls to the extended position and for simultaneously moving the plug to the plugged position after sediment collection, thereby sealing the collected sediment within the second chamber and sealing the sediment-free wine in the bottle; and  
 (h) said crown and the sediment collected therein being removable from the head.

**4,947,738**  
**APPARATUS FOR PREPARING HOT BEVERAGES**  
 Arthur Eugster, Romanshorn, Switzerland, assignor to Arthur Eugster AG, Romanshorn, Switzerland  
 Filed Aug. 25, 1988, Ser. No. 236,538  
 Claims priority, application European Pat. Off., Sep. 16, 1987, 87113567  
 Int. Cl.<sup>3</sup> A47J 31/46 17 Claims



1. Apparatus for preparing hot beverages, particularly espresso, comprising a water container, a heater, and a multi-way valve disposed downstream of said heater and operable to supply hot water or hot steam produced in said heater to individual preparation devices such as a coffee filter or a foaming nozzle, said valve comprising ceramic discs mounted in sealing engagement with and rotatable relative to one another and provided with respective distribution passages, said ceramic discs having mutually incorporating surfaces, said surfaces of at least two of the ceramic disc being formed with grease pockets that are recessed and which facilitate a sliding displacement of the ceramic discs relative to one another and accommodate grease.

**4,947,739**  
**HOME SODA DISPENSING SYSTEM**  
 Charles R. Owen, Maumelle, Ark., assignor to Charlie O Company, Inc., Oklahoma City, Okla.  
 Filed Feb. 17, 1989, Ser. No. 311,769  
 Int. Cl.<sup>3</sup> A23F 3/00; B67D 5/60 88 Claims



1. A soda fountain system comprising:  
 a source of high pressure carbon dioxide gas comprising a pressure vessel and a regulator valve assembly associated with said vessel for selectively discharging low pressure carbon dioxide gas;  
 a seltzer dispenser adapted to be partially filled by a user with water and thereafter pressurized with low pressure carbon dioxide gas by interconnection with said regulator assembly, said seltzer dispenser comprising a seltzer bottle for containing gas and liquid and a seltzer discharge valve for selectively outputting seltzer from said bottle, said discharge valve adapted to be threadably coupled to said bottle and comprising:  
 low pressure gas inlet valve for pressurizing said bottle;

a low pressure output spout for discharging seltzer from the bottle;  
 a normally blocked communication orifice selectively permitting fluid flow communication between said bottle and said output spout; and,  
 lever valve means normally blocking said communication orifice for actuating said bottle;  
 hose means adapted to be selectively coupled between said regulator valve assembly and said low pressure inlet valve to pressurize said bottle;  
 a plurality of syrup containers, each containing a different flavor of syrup concentrate, for providing a source of syrup to be mixed with seltzer; and,  
 rack means adapted to be disposed upon a supporting surface and comprising a pair of compartments for conveniently receiving and storing said source and said seltzer dispenser, and at least one adjacent shelf for conveniently storing one or more of said syrup containers.

4,947,740

## POPCORN POPPER

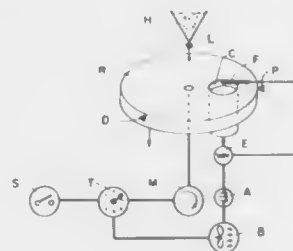
Michael G. Strawser, 3620 S. 121 E. Ave., Tulsa, Okla. 74146, and William M. Sands, 2401 S. 107 E. Ave., Tulsa, Okla. 74129

Filed Feb. 16, 1990, Ser. No. 481,573

Int. Cl.<sup>5</sup> A23L 1/18

U.S. Cl. 99—323.6

20 Claims



1. Apparatus for making popcorn from kernels of corn comprising:  
 a frame;  
 lower and upper flat, horizontal, spaced-apart members supported on said frame;  
 an intermediate flat member sandwiched between said lower and upper members and journaled for rotation about a fixed vertical axis and having an orifice therethrough at a radial distance from said axis to define a movable chamber of predetermined volume;  
 a kernel inlet passage through said upper member at said radial distance from said axis;  
 means in constant communication with said kernel inlet passage for dispensing kernels therethrough into said orifice;  
 an air inlet passage through said lower member at said radial distance from said axis and angularly displaced from said kernel inlet passage;  
 a popped corn outlet passage through said upper member at said radial distance from said axis and aligned with said air inlet passage;  
 means for driving said intermediate member to sequentially align said orifice with said kernel inlet passage and with said air inlet and popped corn outlet passages;  
 means for interrupting said driving means to sequentially maintain said orifice in alignment with said kernel inlet passage and with said air inlet and popped corn outlet passages for preselected periods of time;  
 means for blowing air into said air inlet passage, through said orifice and out of said popped corn outlet passage and for blowing popped corn out of said orifice and through said popped corn outlet passage;  
 means disposed in said air inlet passage for supporting ker-

nels dispensed into said orifice without blocking the flow of air through said orifice;  
 means for heating the air blowing through said air inlet passage to a preselected temperature; and  
 means for activating said blowing means for a preselected period of time after said orifice is aligned with said air inlet passage and for activating said heating means for a preselected period of time after said blowing means is activated.

4,947,741

## AUTOMATIC FOOD COOKING MACHINE

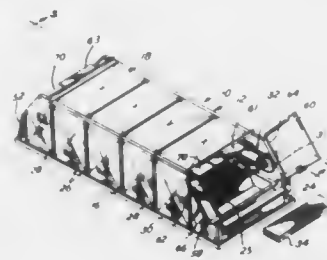
Dean Gongwer, Wakarusa, Ind., assignor to Nelgo Manufacturing, Inc., Wakarusa, Ind.

Filed Apr. 27, 1989, Ser. No. 343,794

Int. Cl.<sup>5</sup> A47J 37/04

U.S. Cl. 99—345

4 Claims



1. An automatic cooking machine having a frame, a housing supported on said frame, said housing having a pair of spaced side walls, an interconnecting top wall and bottom wall, and a pair of end walls, a heating means disposed in said housing for elevating the temperature therein to allow cooking of food products, carrying means disposed in said housing above said heating means for holding food products to be cooked by the heating means, conveyor means disposed in the housing for transporting the carrying means in a spaced relationship over said heating means, said housing having an access opening over said end wall at each end of the housing, a door means connected to said housing adjacent each said access opening for spanning the opening when in its closed position, each door means having an upper edge spaced from said top wall when in its said closed position to define a vent opening, one said access opening constituting means for accessing said conveyor to attach said carrying means to the conveyor, another said access opening constituting means for accessing said conveyor to detach said carrying means from the conveyor.

4,947,742

## BEAN-CURD MANUFACTURING APPARATUS

Seitaro Nishibayashi, 2-36-1-910, Minamiohtsuka, Toshima-ku, Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 379,984

Claims priority, application Japan, Sep. 30, 1988, 63-246540

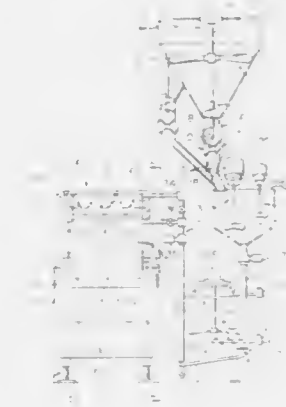
Int. Cl.<sup>5</sup> A23C 3/02; A23J 1/00; A23L 1/20

U.S. Cl. 99—483

6 Claims

1. A tofu manufacturing apparatus comprising a raw material tank containing soybean powder, a soy milk generator vessel connected to the raw material tank, a soy milk boiling caldron connected to the soy milk generator vessel, a suction means to suck boiled soy milk from the soy milk boiling cal-

dron, a control container for receiving soy milk from the suction means, a squeeze means is disposed between the suction



means and the control container, and a tofu forming tank for receiving soy milk from the control container.

4,947,743

## APPARATUS FOR FEEDING A MASS OF PARTICULATE OR FIBROUS MATERIAL

Douglas B. Brown, Oakville, Canada, and Henri Malys, Paris, France, assignors to Stake Technology Limited, Canada

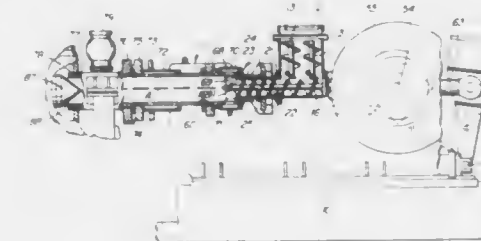
Filed Feb. 21, 1989, Ser. No. 312,923

Claims priority, application Canada, Feb. 19, 1988, 559312

Int. Cl.<sup>5</sup> B30B 7/00, 15/30, 3/00, 1/26

U.S. Cl. 100—45

16 Claims



1. Apparatus for feeding a mass of material comprised of solid particles and/or fibres, including a conduit provided with screw conveyor means, reciprocating annular piston means coaxial with and disposed in said conduit and around the screw conveyor means, first drive means for driving said screw conveyor means, and second drive means for driving the annular piston means in reciprocating fashion coaxially with the axis of the screw conveyor means, wherein said second drive means includes:

- a motor driven, transverse crankshaft operatively associated with a fly wheel;
- first connecting rod pivotably secured at one end thereof to the crankshaft, and at the other end thereof to a reciprocating support mounted for a linear, reciprocating movement in a direction parallel with the axis of the screw conveyor means;
- mounting means fixedly securing the piston means to said reciprocating support;
- a second connecting rod operatively connecting said crankshaft with a counterbalance support movable relative the axis of the crankshaft in opposed sense to the movement of said reciprocating support to counter balance vibrations generated by the reciprocating support.

4,947,744

## SCREEN PRINTING METHOD

Heino Petersen, Wabern, Switzerland, assignor to Eltex Elektrostatik GmbH, Weil am Rhein, Fed. Rep. of Germany

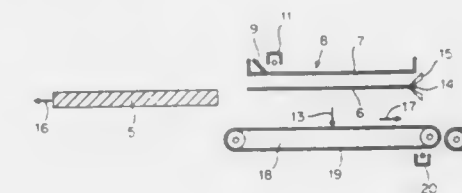
Filed Mar. 29, 1989, Ser. No. 330,600

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811143

Int. Cl.<sup>5</sup> B41M 1/12

U.S. Cl. 101—129

11 Claims



11. A screen printing method comprising the steps of: laying out a flat article to be printed on a printing table lowering a screen with a stencil having printing ink on an upper surface against said article so that a lower surface of said stencil contacts said article; scraping a squeegee over the upper surface of said stencil to force ink through said screen and onto said article; lifting said stencil from said article; removing the printed article from said table; moving an ionizing electrode along with said squeegee; and supplying said electrode with direct-current voltage; said ionizing electrode having a plurality of individual electrodes alternately subjected to a positive and to a negative direct-current voltage so that one electrode in one pair of electrodes is adjacent to two electrodes in another pair; said printing table being moved along with said article to be printed in one direction to a location between said stencil and a continuous conveyor belt; securing a front edge of said article in relation to said direction of motion with a gripper while said table is removed in an opposite direction after lowering said stencil and printing said article; dropping said article under its own weight onto said conveyor belt for removal in another direction corresponding to the direction of motion of said conveyor belt; said ionizing electrode moving always at the same speed as said squeegee; said ionizing electrode being as long as said squeegee; said direct-current voltage being a substantially high voltage between 2 and 10 kV; an additional ionizing electrode associated with said conveyor belt; said additional ionizing electrode being positioned below said conveyor belt and having a lower section perpendicular to said one direction and said direction of motion of said conveyor belt.

4,947,745

## APPLICATION OF VARNISH TO SHEETS OF PAPER OR CARD

John P. Cintolo, Bulleen, Australia, assignor to Spicers Paper Limited, Victoria, Australia

Filed Dec. 22, 1988, Ser. No. 288,089

Claims priority, application Australia, Dec. 24, 1987, P16069/87

Int. Cl.<sup>5</sup> B41F 7/04, 7/26, 31/10

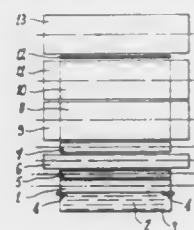
U.S. Cl. 101—142

8 Claims

1. A printing press including:  
 a water duct,  
 a water duct roller having an outer surface, said roller being located to rotate with its outer surface partly immersed in liquid carried by said water duct,  
 a vibrator roller having an outer surface located to cooperate in use with said water duct roller,  
 an oscillator roller located to cooperate in use with said vibrator roller,  
 a plate cylinder,  
 a printing plate carried by the plate cylinder,

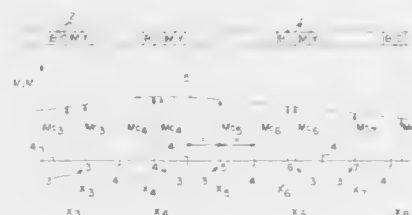


at least one damper roller located to cooperate in use with the printing plate carried by the plate cylinder, a blanket cylinder, a printing blanket on the blanket cylinder, said plate cylinder located to cooperate in use with the printing blanket on the blanket cylinder, an impression cylinder located to cooperate in use with said blanket cylinder, whereby in use with liquid picked up from the water duct by the water duct roller, is transferred from the water duct



roller to cover the outer surface of the vibrator roller, is transferred successively from the vibrator roller to the oscillator roller, to the at least one damper roller, to the printing plate, to the printing blanket, and from the printing blanket to a sheet of paper-based material passing between the blanket cylinder and the impression cylinder, and wherein the vibrator roller and the at least one damper roller are the same width as said sheet and at least the oscillator roller, the plate cylinder, the blanket cylinder and the impression cylinder are wider than said sheet.

**4,947,746**  
**PRINT CONTROL STRIP**  
Willi Jeschke, Heidelberg, and Gerhard Löffler, Walldorf, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Fed. Rep. of Germany  
Continuation of Ser. No. 136,030, Dec. 21, 1987. This application Dec. 14, 1989, Ser. No. 450,407  
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643721  
Int. Cl.<sup>5</sup> B41F 5/16, 31/04  
U.S. Cl. 101—211 15 Claims

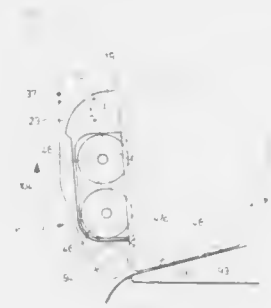


1. Print control strip image production means for producing an image on printing plates, the image on the printing plate being for indicating the printing condition of a printing press, the printing press being operable to print at least both a first ink of a first color and a second ink of a second color, the second color being substantially different from the first color, the printing press having a first printing plate extending across the printing press for receiving and for transferring to a print receiving material the first ink of the first color, the printing press also having a second printing plate extending across the printing press for receiving and for transferring to the print receiving material the second ink of the second color, the printing press additionally having a first plurality of ink metering devices for metering the application of the first ink into the printing press, the first plurality of ink metering devices extending sequentially across the printing press, the printing press also having a second plurality of ink metering devices for

metering the application of the second ink into the printing press, the second plurality of ink metering devices also extending sequentially across the printing press, the positioning of the first and second pluralities of ink metering devices defining ink zones of the printing press extending sequentially across the printing press, the ink zones of the printing press being separated from one another by ink zone boundaries, said print control strip image production means comprising:

an image bearing medium having thereon a multiplicity of measurement field images;  
a first set of said multiplicity of measurement field images comprising:  
a first single color solid tone image of a solid tone field corresponding to the first ink; and  
a second single color solid tone image of a solid tone field corresponding to the second ink;  
said first single color solid tone image and said second single color solid tone image being positioned on said image bearing medium adjacent and touching one another;  
each of said first set of measurement field images being located transversely on said image bearing medium at a position for producing a solid tone measurement field image on the first and second printing plates, which first set spans across one of the ink zone boundaries; and  
a second set of said multiplicity of measurement field images comprising:  
a first single color halftone image of a halftone field corresponding to the first ink; and  
a second single color halftone image of a halftone field corresponding to the second ink;  
said first single color halftone image and said second single color halftone image being positioned on said image bearing medium adjacent and touching one another;  
each of said second set of measurement field images being located transversely on said image bearing medium at a position for producing a halftone measurement field image on the first and second printing plates, which second set spans across one of the ink zone boundaries; and  
said first and second sets of measurement field images being alternately disposed across said image bearing medium.

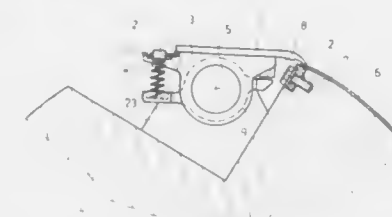
**4,947,747**  
**HAND-HELD LABELING DEVICE WITH PIVOTALLY MOUNTED FRONT PLATE**  
Klaus-Dieter Hermann, Ritterweg 17, D-6932 Hirschhorn, Fed. Rep. of Germany  
Continuation of Ser. No. 181,301, Apr. 13, 1988, abandoned.  
This application Aug. 21, 1989, Ser. No. 396,290  
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3712963  
Int. Cl.<sup>5</sup> B41F 1/02; B41K 5/02  
U.S. Cl. 101—288 15 Claims



1. A hand-held labeling device comprising:  
a housing;

a printing mechanism including at least one type band extending between a setting wheel disposed at a top of said printing mechanism and a wheel disposed at a bottom of said printing mechanism;  
means mounting said printing mechanism within said housing for enabling movement therein from a position at which said type band engages an inking attachment to a position at which the type band imprints a label carried within said housing;  
front plate means, pivotally mounted to said housing, for enclosing said printing mechanism within the housing and, when pivoted, enabling access to said printing mechanism;  
inking means, disposed within said housing and including at least one ink roller, for inking said type band; and  
means mounting said inking means behind said front plate for enabling movement of said ink roller from a first position at which the ink roller engages said type band to a second position enabling said printing mechanism to imprint the label, said movement occurring between said printing mechanism and said front plate, said means mounting said inking means comprising a rocking lever pivotally mounted to said housing, and a front plate extension having pivot-and-slot guide means, engaging said rocking lever, for enabling a portion of said rocking lever to be disposed within said printing mechanism when the inking means is disposed in the second position, said pivot-and-slot means being configured for enabling said rocking lever portion to be disposed between the printing mechanism setting wheel and the printing mechanism wheel when the inking means is disposed in the second position.

**4,947,748**  
**SHEET GRIPPER ON SHEET-FED ROTARY PRINTING PRESSES**  
Hans-Peter Hiltwein, Philippsburg, and Willi Becker, Bammertal, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany  
Filed Jun. 26, 1989, Ser. No. 371,281  
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821324  
Int. Cl.<sup>5</sup> B41F 21/10  
U.S. Cl. 101—409 4 Claims



1. In a sheet-fed rotary printing press, a sheet gripper having a gripper finger, a gripper spring, a gripper housing and a gripper support, the gripper finger being swingable, in operating phase with the printing press, under the action of said gripper spring, into engagement with the gripper support and, against the action of the gripper spring, out of engagement with the gripper support, support means for the gripper spring comprising a pair of counter-bearings, the gripper spring being supported at one end thereof against one of said counter-bearings which is mounted on the gripper finger and, at the other end thereof, against the other of said counter-bearings on which is mounted said gripper housing, the invention further comprising holding means separable from one another for fixing at least one of the counter-bearings, said holding means being disposed on the counter-bearing as well as on a part of the printing press wherein the counter-bearing is mounted, said separable holding means being formed of an inner locking part and an outer locking part forming a bayonet lock, at least one of said locking parts having projections and the other of said locking parts having holding surfaces for said projections, said

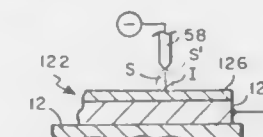
projections and said holding surfaces being engageable with one another by a movement of one of said locking parts against the action of the gripper spring and by a partial rotation of said one locking part.

**4,947,749**  
**PRINTING MEMBER FOR A PRESS WITH DAMPENING**  
Thomas E. Lewis, E. Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Presstek, Inc., Hudson, N.H.  
Division of Ser. No. 234,475, Aug. 19, 1988. This application Sep. 21, 1989, Ser. No. 410,720  
Int. Cl.<sup>5</sup> B41N 1/08; B41C 1/10  
U.S. Cl. 101—459 10 Claims



1. A method of making a printing member for a press with dampening comprising the steps of forming on a metal body an exposed surface which is cleaned and polished sufficiently to render it oleophilic due to surface tension, and heating said surface at selected image points thereon without contacting said surface and without penetrating through said body to create tiny surface fissures at said image points which render said surface hydrophilic at said image points.

**4,947,750**  
**PRINTING MEMBER FOR A PRESS WITH DAMPENING**  
Thomas E. Lewis, Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Presstek, Inc., Hudson, N.H.  
Division of Ser. No. 234,475, Aug. 19, 1988, Pat. No. 4,911,075.  
This application Sep. 21, 1989, Ser. No. 410,604  
Int. Cl.<sup>5</sup> B41N 1/08; B41C 1/10  
U.S. Cl. 101—459 16 Claims



1. A method for making a printing member for a press with dampening comprising the steps of forming a metal body with an exposed oxidized surface having a grained surface structure which renders said surface hydrophilic, and heating said body surface at selected image points thereon without contacting said surface and without penetrating through said body so that there is a transformation of said surface structure which renders said surface oleophilic at said image points.

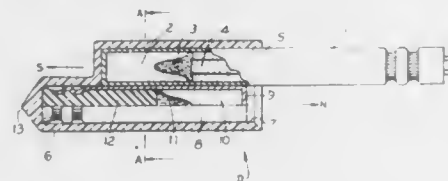
4,947,751

**MULTI-DIRECTIONAL INITIATOR FOR EXPLOSIVES**  
David L. Kennedy, Rosanna, Australia; Donald C. True, and David M. Welsh, both of Brownsburg, Canada, assignors to Imperial Chemical Industries, PLC, London, England  
Filed Feb. 3, 1989, Ser. No. 305,922

Claims priority, application United Kingdom, Feb. 3, 1988, 8802328

Int. Cl.<sup>5</sup> F42B 3/10; C06C 5/04  
U.S. Cl. 102—305

2 Claims



1. A method of detonating a column of cap-sensitive water-gel, emulsion or pneumatically-loaded ANFO explosive so as to provide a sustained full order uniform velocity detonation wave in the column from the point of initiation substantially simultaneously towards both ends of the column, said method comprising locating a plurality of initiators at a selected point within said column, the initiators being oriented in different directions towards opposite ends of the column, and detonating the initiators substantially simultaneously.

4,947,752

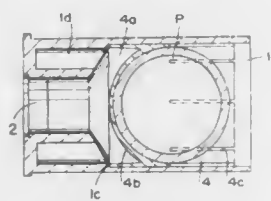
**AMMUNITION FOR PROPELLING LOW PRESSURE, LOW WEIGHT BULKY PROJECTILES**  
Pierre Richert, Montigny Les Metz, France, assignor to Verney Carron, France

Filed Apr. 11, 1989, Ser. No. 336,248

Claims priority, application France, Apr. 13, 1988, 88 05255

Int. Cl.<sup>5</sup> F42B 5/02  
U.S. Cl. 102—430

8 Claims



1. Ammunition comprising:  
a cylindrical shell with: an internal bore at one end for holding at least one projectile;  
a concentric chamber within an opposite end of the cylindrical shell wherein the concentric chamber has a constant internal diameter proceeding toward said internal bore along its full length, smaller than an internal diameter of the internal bore, the concentric chamber opening at its forward end into said internal bore;  
a cartridge charged with a pyroxylin powder inserted in the concentric chamber; and,  
a primer charged with a fulminating compound inserted in the cartridge, wherein the fulminating compound is sufficient to completely ignite the pyroxylin powder.

4,947,753

**STUN GRENADE**

William P. Nixon, III, P.O. Box 17082, Memphis, Tenn. 38187-0082

Filed Jul. 14, 1989, Ser. No. 379,648

Int. Cl.<sup>5</sup> F42B 27/00

11 Claims



1. A stun grenade for producing a non-lethal explosion, said stun grenade comprising, in combination:

- (a) an elongated grenade body having a hollow interior, an open first end, and a closed second end;
- (b) ignitor fuse means for creating an ignition spark when activated, said ignitor fuse means being attached to said open first end of said grenade body; said ignitor fuse means including a hard, heavy fuse body constructed of metal;
- (c) explosive means positioned within said interior of said grenade body at said second end thereof for exploding when said ignitor fuse means creates said ignition spark; and
- (d) isolation means positioned within said interior of said grenade body between said first and second ends thereof for isolating said explosive means from said fuse body.

4,947,754

**SYSTEM AND METHOD FOR PENETRATING ORBITING TARGETS**

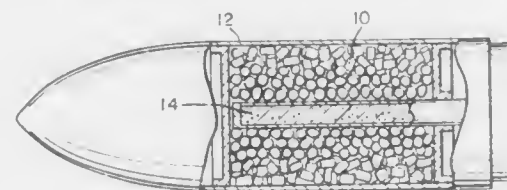
Edward W. LaRocca, Placentia, Calif., assignor to General Dynamics Corporation, Pomona Division, Pomona, Calif.  
Continuation of Ser. No. 130,858, Dec. 10, 1987, abandoned.

This application Aug. 18, 1989, Ser. No. 396,774

Int. Cl.<sup>5</sup> F42B 15/24

U.S. Cl. 102—489

4 Claims



1. A projectile system for penetrating an orbiting target, comprising:  
a container;  
a plurality of pellets in said container, said pellets being of a material capable of subliming under predetermined outer space operating conditions;

transport means for transporting said container into outer space into the path of an orbiting target; and  
release means for releasing the pellets in the path of the moving target such that the relative velocity between the pellets and the target is sufficient for the pellet to penetrate the target on impact.

- 4. A method of penetrating an orbiting target in outer space comprising the steps of:  
conveying a plurality of pellets into outer space in a warhead to a predetermined location, the pellets being of a material capable of subliming under typical outer space conditions; and  
releasing the pellets from the container into the path of a selected orbiting target such that the relative velocity between the target and the pellets is at least sufficient for the pellets to penetrate the target on impact.

4,947,755

**BULLET HAVING SECTIONS SEPARABLE UPON IMPACT**

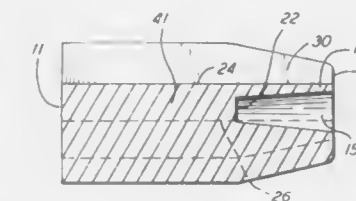
Thomas J. Burczynski, P.O. Box 248, Odessa, N.Y. 14869

Filed Dec. 1, 1989, Ser. No. 444,394

Int. Cl.<sup>5</sup> F42B 12/34

U.S. Cl. 102—506

13 Claims



1. A bullet comprising a body of malleable material having front and back ends, symmetrical about a central, longitudinal axis, having an outer periphery defined by a substantially cylindrical base portion extending from said back end of said body for a first portion of the axial length thereof, and a nose portion extending integrally from said base portion for the remainder of the axial length of said body, to said front end thereof, said nose portion tapering from the diameter of said base portion to a smaller diameter at said front end, and a hollow cavity extending from said front end into said nose portion, said cavity being symmetrically formed about said central axis and terminating within said body, and at least three parting lines extending longitudinally from said front end to said back end from said outer periphery radially inwardly and substantially axially parallel to said central axis, said parting lines defining opposing surfaces in mutual contact but physically unattached, said opposing surfaces terminating radially inwardly within said body and outside said cavity a distance sufficient to prevent separation of said body is separate portions during flight, but insufficient to prevent such separation upon impact with a fluidic target, whereby upon impact with such target said body separates into a plurality of separate portions with those portions laterally adjacent said parting lines separating from one another to travel separately and create a plurality of impinging pressure zones within said target.

4,947,756

**LAYING RAILWAY TRACK**

Peter G. Küsel, P.O. Box 73019, Lynwood Ridge 0040 (0040), and Joachim Rose, Pretoria, both of South Africa, assignors to Peter G. Küsel, Pretoria, South Africa

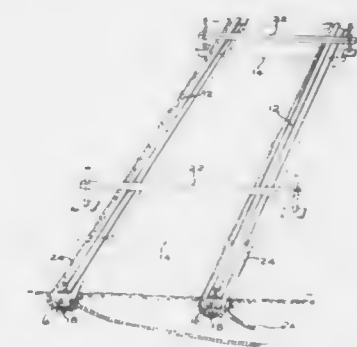
Filed Aug. 17, 1989, Ser. No. 395,258

Claims priority, application South Africa, Aug. 18, 1988, 88/6117

Int. Cl.<sup>5</sup> E01B 1/00

U.S. Cl. 104—2

2 Claims



1. A method of laying railway track including the steps of supporting rails at a predetermined gauge and horizontal and vertical alignment, locating flexible tubular elements under the rails, constraining the tubular elements with shuttering and filling the tubular elements with aggregate, after the tubular elements are placed in position under the rails, until the aggregate creeps around the feet of the rails.

4,947,757

**METHOD AND MACHINE ARRANGEMENT FOR WORKING IN A TRACK SWITCH SECTION**

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

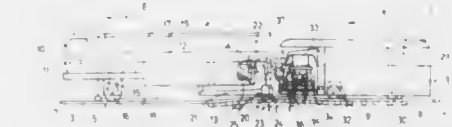
Filed Jan. 31, 1989, Ser. No. 304,792

Claims priority, application Austria, Feb. 23, 1988, 448/88

Int. Cl.<sup>5</sup> E01B 29/17

U.S. Cl. 104—7.2

14 Claims



1. A method of working a main track and a laterally adjacent track in a track switch section in tandem, each track comprising two rails fastened to ties supported on ballast and longer ties connecting the tracks in the track switch section, which comprises the steps of

- (a) intermittently moving a track leveling, lining and tamping machine with lifting tools and vertically and laterally adjustable, vibratory tamping tools along the main track,
- (b) lifting the main track with the lifting tools to a desired level at respective ones of the longer ties under the control of a reference system,
- (c) tamping ballast under the lifted ties with the tamping tools,
- (d) moving a switch leveling and tamping machine with lifting tools along the laterally adjacent track and, in the same operating stage,
  - (1) lifting at least one of the rails of the laterally adjacent track with the lifting tools of the switch leveling and tamping machine, and



- (2) tamping ballast under at least a portion of the longer ties at the laterally adjacent track, and  
 (e) completing the ballast tamping under any not previously tamped ties or portions of the longer ties in a subsequent operating stage, the two machines being simultaneously operated under control of a common electrical control.

4,947,758

# HIGH PERFORMANCE CHAIN FOR AUTOMATED TRANSPORT SYSTEM

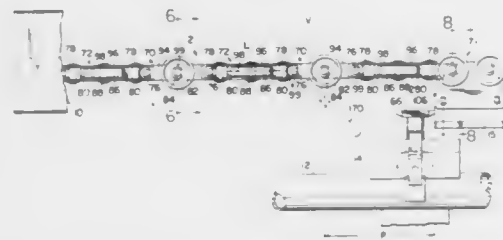
Richard Kuchta, Tolland, Conn., assignor to Gerber Garment Technology, Inc., Tolland, Conn.

Filed Jan. 6, 1989, Ser. No. 362,828

Int. Cl.<sup>3</sup> B61B 13/02, 10/02

U.S. Cl. 104—172.5

20 Claims



17. A chain having a length for use in an automated transport system for moving free traveling trolleys running along a rail, said chain comprising:

a plurality of vertically disposed links and horizontally disposed links arranged end to end with one another to form a chain length;  
 each of said vertically disposed links and said horizontally disposed links having a longitudinal axis and having opposite distal ends and each being comprised of two thin spaced apart plates extending generally parallel to the link longitudinal axis;

linkages connected to and positioned between the adjacently opposed distal ends of adjacent ones of said vertically and horizontally disposed links between said two plates of each of said plurality of links to connect said adjacent ones of said links to one another and to fix said two spaced apart plates of each of said vertically and horizontally disposed links in spatial relationship with one another;  
 said vertically disposed links each including an axle extending generally transversely of each said vertical link longitudinal axis, which said axle having a finished outer bearing surface;

said vertically disposed links each carrying two vertically disposed wheels each having through openings arranged about each wheel center forming journals through which said axle carried by each of said vertically disposed links is rotatably received;

said vertically disposed wheels o: each of said vertically disposed links being positioned laterally of and on opposite sides of said two spaced apart plates comprising of each of said vertically disposed links;

said vertically disposed wheels further being formed from a self-lubricating material thereby substantially decreasing journal friction between said axle carried by each of said vertically disposed links and each journal of said vertically disposed wheels; and  
 said of horizontally disposed links each comprising an axle extending transversely of each horizontal link longitudinal axis, which said axle having a finished external bearing surface;

said horizontal link including a horizontally disposed wheel having a through opening arranged about the horizontally disposed wheel center forming a journal for rotatably receiving said axle carried by each of said horizontally disposed links;

said horizontally disposed wheel being formed from a self-

lubricating material thereby substantially reducing the amount of journal friction occurring between the horizontally disposed wheel journal and said axle carried by each of said horizontally disposed links.

4,947,759

# PROXIMITY CONTROL SYSTEM

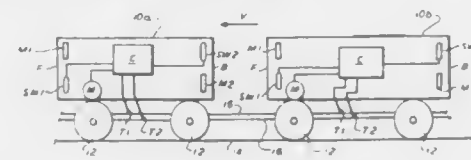
Robert J. Uhl, Wayne, N.J., assignor to Tele Engineering, Inc., Newfoundland, N.J.

Filed Dec. 2, 1988, Ser. No. 278,852

Int. Cl.<sup>3</sup> B60L 23/34

U.S. Cl. 104—299

34 Claims



25. A vehicle comprising:

a vehicle body having front end back ends;

a drive means for propelling said body;

a motor mounted in said body operatively connected to said drive means;

a first magnet mounted on said front end at a first position;

a second magnet mounted on said back end at a second position;

a first magnetic reed switch mounted on said front end at a position congruent with said second position on said back end;

a second magnetic reed switch mounted on said back end at a position congruent with said first position on said front end;

two electrical contacts mounted on and extending from said body;

an electric circuit connected to said motor, said two contacts, and said first and second switches;

said circuit having means for applying voltages on said contacts to said motor to operate said motor and for removing said voltages from said motor in response to an additive magnetic field from another vehicle body causing the closure of said first switch when said voltage has one polarity and the closure of said second switch when said voltage has a polarity opposite to said one polarity and said first magnet and said second magnet are positioned in a manner that their polarizations are being antiparallel to one another, with each magnet being positioned with respect to the adjacent switch at its end, such that the magnetic field of said each magnet directly influences the operation of said adjacent switch at its end, so that the field of the first magnet at the front end of one body and the field of the second magnet at the back end of another body in proximity combine to form an additive effect on the adjacent switches thereof.

4,947,760

# ARTICULATED FLAT CAR

Richard W. Dawson, and Ronald P. Sellberg, both of Naperville, Ill., assignors to Trailer Train Company, Chicago, Ill.

Continuation of Ser. No. 110,118, Oct. 19, 1987, abandoned.

This application Aug. 15, 1989, Ser. No. 394,285

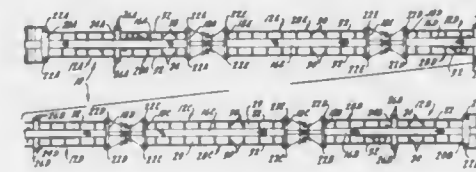
Int. Cl.<sup>3</sup> B61D 17/00; B60P 3/40, 1/64

U.S. Cl. 105—03

22 Claims

1. An articulated flat car for carrying lading containers at a single level comprising first and second platforms supported at one end by end trucks and at the other end by trucks shared with an adjacent platform, and at least one intermediate platform supported on trucks shared with adjacent platforms, said platforms connected by articulated connections between adjacent platforms, said platforms having outer container retention

means positioned adjacent opposite ends thereof, and additional container retention means fixedly attached only to alternate platforms intermediate said outer container retention means.



4,947,761

# STUB AXLE TRUCK

Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Continuation of Ser. No. 116,775, Nov. 5, 1987, Pat. No. 4,883,000, which is a continuation-in-part of Ser. No. 716,764, Sep. 16, 1985, abandoned, and a continuation-in-part of Ser. No. 853,562, Apr. 18, 1986, Pat. No. 4,718,351. This application Aug. 25, 1989, Ser. No. 398,416

Int. Cl.<sup>3</sup> B61F 15/00, 5/26; B61C 13/00

U.S. Cl. 105—4.4

16 Claims



1. A stub axle truck comprising:

a truck frame;

two pairs of opposed inverted U-shaped openings on said frame, each U-shaped opening having an open end;

a pair of wheels each being mounted to a hollow stub axle; each axle traversing a pair of U-shaped openings;

a bearing means including an inner and outer bearing member mounted on said stub axle to form a unit for rotatably connecting a respective end of a stub axle to a respective U-shaped opening;

steering means mounted on said stub axle as part of said unit for connecting a steering link to said wheel; and

a removable fastener extending across said open-end of said opening for removably retaining said axle, steering means and bearing means in a respective U-shaped opening and allowing removal of said axles, steering means and bearing means as a unit along an axis transverse to the axis of said stub axle.

4,947,762

# MODULAR INTERIOR FOR RAILROAD PASSENGER CARS

Leopold Perzl, Gallen; August Zortea, Rorschach, and Kurt Anderegg, Rheineck, all of Switzerland, assignors to Inventio AG, Switzerland

Filed Oct. 11, 1988, Ser. No. 255,821

Claims priority, application Switzerland, Oct. 12, 1987, 03989/87

Int. Cl.<sup>3</sup> B61D 45/00; A47H 1/00; B60Q 1/00; B60R 11/00

U.S. Cl. 105—329.1

5 Claims

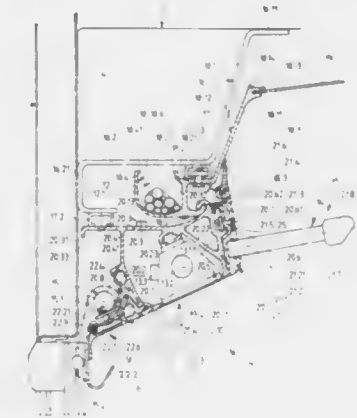
1. A modular interior for a passenger carrying car comprising:

a modular cable duct unit having a covering surface and

adapted to support a cable bundle and including means for attaching to a car body;

a modular illumination unit having a covering surface, and means for illuminating and including means for attaching to the car body and to said modular cable duct unit;

a modular baggage repository unit having a covering surface



and means for retaining baggage and including means for attaching to said modular illumination unit; and  
 a modular window shade unit having a covering surface and roller type window shade and including means for attaching to said modular illumination unit whereby said modular units form an assembly unit joined to the car body with said covering surfaces visible to the interior of the car.

4,947,763

# TABLE WITH HEIGHT-ADJUSTABLE AND TILTBOARD BOARD

Hans G. Piorek, Wiesbaden, Fed. Rep. of Germany, assignor to OKA-Buermoebel Oskar Kasper, Buermoebelfabrik, Marienberg, Fed. Rep. of Germany

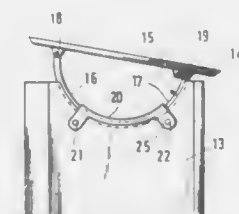
Filed Apr. 3, 1989, Ser. No. 332,552

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 8805679[U]

Int. Cl.<sup>3</sup> A47F 5/12

U.S. Cl. 108—8

16 Claims



1. A table with a height-adjustable and tiltable board, comprising:

a supporting device of vertical cheek elements, each cheek element having a top and a semi-circular recess defining at least one semi-circular groove defining a guiding path extending longitudinally along the top of the cheek element, and at least two fixable rods fastened by two hinges to said board and guided in the guiding paths of said cheek elements, characterized in that

said rods are circularly curved in a vertical plane, said guiding paths extend circularly in a vertical plane at each cheek element and have a circular contour for supporting at least a portion of each of said two rods,

the rods are in pivotable engagement with one end of said board, and further comprising means for varying the distance between the two hinges.

**4,947,764**  
**PROTECTION AND SECURITY APPARATUS AND METHOD**

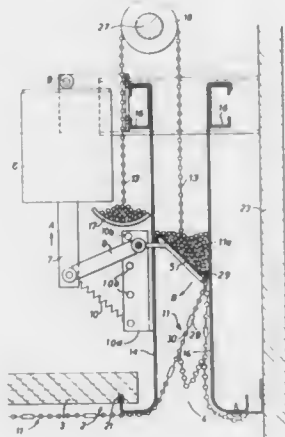
Eduard Rohr, Mägenwil, Switzerland, assignor to Ed Rohr AG, Mägenwil, Switzerland  
Filed Mar. 15, 1989, Ser. No. 324,236

Claims priority, application Switzerland, Apr. 5, 1988, 1249/88

Int. Cl.<sup>5</sup> E05G 5/02

U.S. Cl. 109—3

14 Claims



1. A system for enhancing or ensuring security against an attack in a defined space comprising a flexible net (11); retaining means (5) for retaining the flexible net at a top region of the space; pull-up or raising means (13) coupled to the flexible net; a lifting mechanism (18) coupled to the pull-up or raising means for lifting the net towards the top region of the space and towards said retaining means (5); a triggering or releasing mechanism (6, 9) coupled to the retaining means and abruptly releasing the flexible net for dropping into the space and covering an attacker in the space; and wherein the upwardly confined space comprises a building structure having a dropped or double ceiling (2, 3); and wherein the retaining means (5) are located within the dropped or double ceiling.

**4,947,765**  
**SECURITY APPARATUS AND METHOD OF USING SAME**

Frederick F. Bledess, Hickory Hills, Ill., assignor to National Bulletproof, Inc., Hickory Hills, Ill.

Filed Apr. 25, 1989, Ser. No. 343,007

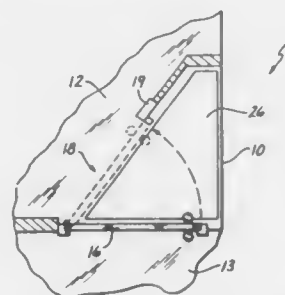
Int. Cl.<sup>5</sup> E05G 3/00

U.S. Cl. 109—6

8 Claims

1. A security vestibule for providing controlled access from a common access area to a protected area by an authorized individual comprising: enclosure means having a floor and a set of stationary walls for helping to control access from one of the areas to the other one of the areas; means defining a substantially triangularly shaped space within said enclosure means for receiving an individual; passageway means in said enclosure means for permitting

ingress and egress into and out of said space by said individual; said first passageway and said second passageway converging at one of said stationary walls; a single common latchable closure; means for swingably mounting said common latchable closure to said enclosure to permit said closure to move from a first closed position blocking said first passageway to a second closed position blocking said second passageway; said triangularly shaped space being dimensioned to receive at least one individual but preventing more than one individual from traversing through said space from one of said



areas to the other one of said areas when said closure is disposed within said space; access control means for preventing said closure from moving from one closed position to another closed position; means for determining the weight of individuals present within said enclosure means to be an approximate equivalent to a predetermined weight of one individual; and latching means responsive to said means for determining weight from enabling said access control means to permit said closure to move from one closed position to the other closed position whereby an individual within said space may egress into one of the areas.

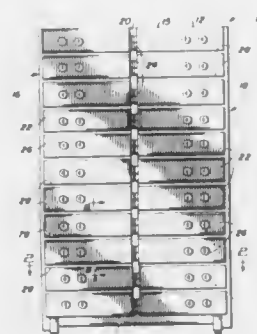
**4,947,766**  
**SAFE DEPOSIT BOX CONSTRUCTION**  
William S. Collier, Jr., 17 Lake Padgett Dr., Land of Lakes, Fla. 34639

Filed Jun. 16, 1989, Ser. No. 367,373

Int. Cl.<sup>5</sup> E05G 1/00

U.S. Cl. 109—56

10 Claims



1. A safe deposit box construction, comprising in combination: top wall, bottom wall, rear wall, and left and right side walls joined together to define a substantially rectangular construction having an opened front, said side walls including paired slots in a front portion of said side walls, said front portion of said side walls each comprising a face portion and a side portion in which said slot is positioned;

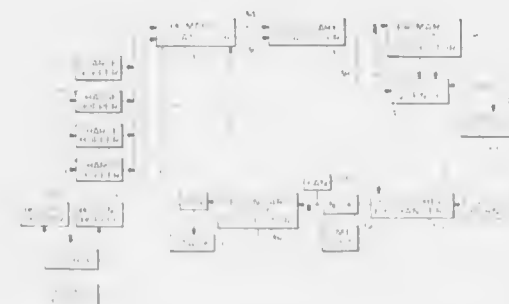
a plurality of removable shelves for insertion between said side walls which define a plurality of boxes, a side portion of said shelves engaging into said side paired slots in said side wall, said side portion of said shelves which engages into said slots comprising a pair of arms which engages into said slots in said face portion and said side portion; means for removably securing said shelves between said side walls; a plurality of doors hingedly connected to one of said side walls for closure about said opened front, said doors including a lock for engaging the other of said side walls; and means for interconnecting adjacent said doors, wherein, one of said shelves between adjoining said boxes may be removed and adjacent said doors thereof interconnected to create a box of a size equal to the adjoining boxes.

**4,947,767**  
**DUAL CHAMBER VOLATILIZATION SYSTEM**  
Jerry R. Collette, P.O. Box 1482, Englewood, Fla. 34295-1482  
Division of Ser. No. 295,055, Jan. 6, 1989. This application Jan. 16, 1990, Ser. No. 465,024

Int. Cl.<sup>5</sup> F23B 5/00

U.S. Cl. 110—212

4 Claims



1. A system for removing volatilizable organic contaminants from solid materials comprising: a primary volatilizer having an inlet end and an outlet end; a first reflux gas line connected to said primary volatilizer inlet end; a hot oil heat exchanger having a hot oil outlet and an oil inlet; a hot oil line connected to supply hot oil from said hot oil heat exchanger hot oil outlet to said primary volatilizer outlet end for indirect heating of solid materials without combustion of said materials; a return oil line connected to return oil from said primary volatilizer inlet end to said hot oil heat exchanger oil inlet; said primary volatilizer having a gas outlet at said outlet end; said inlet end of said primary volatilizer having an inlet for solid materials having volatilizable organic contaminants therein; a secondary volatilizer having an inlet end and an outlet end; said secondary volatilizer having a gas inlet at said inlet end and a gas outlet at said outlet end; said secondary volatilizer having a furnace disposed at said inlet end; said furnace having a burner having inlets for fuel and oxidizer; said outlet end of said primary volatilizer connected to deliver solid material to said inlet end of said secondary volatilizer; said gas outlet of said primary volatilizer connected to deliver gas to said gas inlet of said secondary volatilizer; said hot oil heat exchanger having a gas inlet and a gas outlet; a second reflux gas line connected to deliver reflux gas from

said secondary volatilizer to said gas inlet of said hot oil heat exchanger; said gas outlet of said hot oil heat exchanger connected to said first reflux gas line to said primary volatilizer inlet end.

**4,947,768**  
**SMOKE PURIFIER APPARATUS FOR CHIMNEYS**  
Luigi Carboni, Via Argentero 2, I-10126 Torino, Italy, assignor to Luigi Carboni and Luciano Bonansa, both of Turin, Italy  
Filed May 5, 1989, Ser. No. 348,027

Int. Cl.<sup>5</sup> F23B 5/00; F23C 9/00; F23G 7/06

U.S. Cl. 110—214

10 Claims



1. A smoke purifier apparatus for chimneys and the like, comprising an intake, a suction chamber for additional air located in the intake center, ducts traversing said intake communicating said suction chamber with the surrounding ambient, a combustion chamber located downstream of said intake and said suction chamber, an igniter member arranged within said combustion chamber and including a thermic element heated to a high temperature, and an outlet connection extending downstream of said combustion chamber, said intake and combustion chamber being so shaped as to form in their whole a venturi tube having a throat section located at the transition between said intake and combustion chamber, and said air suction chamber opening in said throat section of the venturi tube formed by the intake and the combustion chamber, whereby suction of additional air takes place due to the venturi effect, without need for additional mechanical suction means.

**4,947,769**  
**APPARATUS FOR COMBUSTION OF SOLID PARTICULATE FUEL**  
Oliver J. Whitfield, 4206 - 242nd St. SW., Mountlake Terrace, Wash. 98043

Continuation-in-part of Ser. No. 325,270, Mar. 17, 1989, abandoned. This application Jun. 27, 1989, Ser. No. 372,836

Int. Cl.<sup>5</sup> F23G 5/00, 5/12, 5/44, 7/00

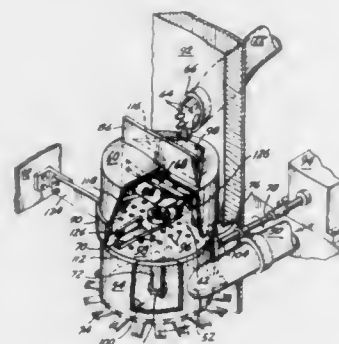
U.S. Cl. 110—259

18 Claims

1. An apparatus for the combustion of solid particulate fuel comprising: a stationary grate including a perforated plate for receiving said solid particulate fuel; displaceable means positioned in a plane above said grate, movement of said displaceable means displacing spent solid particulate fuel from said stationary grate, said displaceable means including a rotatable member; and a burning cap positioned over said stationary grate, said burning cap defining a combustion chamber above said



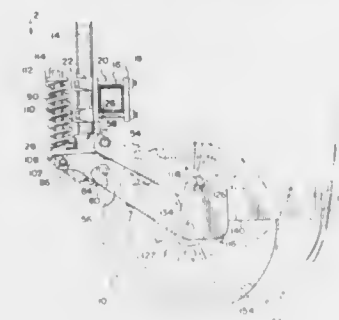
stationary grate, said burning cap including a baffle that divides said combustion chamber into a primary half and



a secondary half, said burning cap also including an aperture for allowing said solid particulate fuel to be introduced into said primary half.

**4,947,770**  
**COULTER AND FERTILIZER APPLICATOR LINKAGE ARRANGEMENT**  
Mark Johnston, Macomb, Ill., assignor to Yetter Manufacturing Company, Colechester, Ill.  
Filed Jul. 7, 1989, Ser. No. 377,232  
Int. Cl.<sup>5</sup> A01C 23/02; A01B 35/28  
U.S. Cl. 111—121

4 Claims

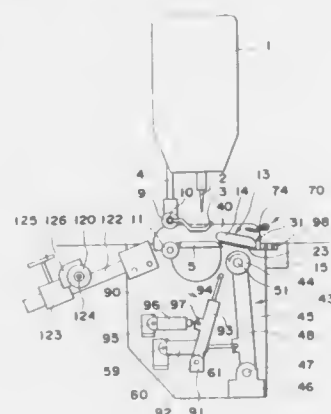


1. A coulter disc and fertilizer applicator mounting arrangement including a vertical support bar adapted to be rigidly attached directly to an agricultural tool bar and mounted perpendicular thereto, a mounting block formed as an integral element rotatably supported on said vertical support bar, said mounting block including an integral mounting collar extending outwardly therefrom adapted to receive and to rotate about said vertical support bar, an integral support element having a pair of bores disposed horizontally therethrough spaced in vertical relation to each other and an integral flange member extending outwardly from said mounting block defining an aperture therethrough; a first pivot arm having a leading end and a distal end and means pivotally connecting said first pivot arm through one of said bores to said mounting block at said leading end of said first pivot arm, a second pivot arm having a leading end and a distal end and means pivotally connecting said second pivot arm through the other of said bores to said mounting block at a pivot point between said ends of said second pivot arm and positioned so as to lie generally parallel to said first pivot arm, a connector plate pivotally connected to said distal end of said first pivot arm and said connector plate pivotally connected to said distal end of said second pivot arm, a coulter disc connected to said second pivot arm and said connector plate, a support arm rigidly attached to and extending from said connector plate, a fertilizer applicator

mounted on said support arm and connectable to a source of fertilizer for dispensing fertilizer into a trench created by said coulter disc, a pressure rod extending through said aperture in said integral flange member and pivotally connected to said leading end of said second pivot arm remote from said connector plate, said pivot point of said second pivot arm disposed between said pressure rod and said connector plate and biasing means connected between said integral flange member of said mounting block and said pressure rod adapted to resist upward movement of said coulter disc such that said mounting block, said first and second pivot arms and said connector plate are connected so as to form a parallel linkage arrangement to which said coulter disc and fertilizer applicator are connected such that as said coulter disc, through said second pivot arm, pivots about said pivot point, said support arm and fertilizer applicator also pivot so that said coulter disc and said fertilizer applicator maintain the same relative relationship with the ground regardless of vertical travel.

**4,947,771**  
**SEWING MACHINE**  
Nobuji Miyachi, and Keniti Miyake, both of Kyoto, Japan, assignors to Hams Corporation, Kyoto, Japan  
Filed Sep. 8, 1988, Ser. No. 241,576  
Claims priority, application Japan, Sep. 12, 1987, 62-229223  
Int. Cl.<sup>5</sup> D05B 35/04  
U.S. Cl. 112—141

2 Claims



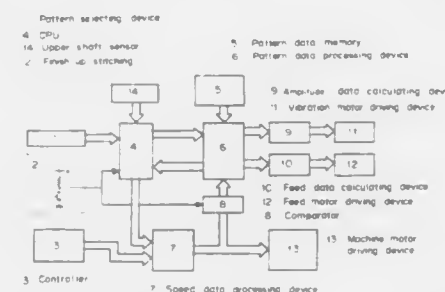
1. A sewing machine for making a threefold hem in each of the legs of a pair of trousers, which comprises:

- a sewing needle;
- a folding guide rod formed by a round rod and having a straight rod section and a curved rod section extending from one end of said straight rod section in a generally J-shaped configuration, said folding guide rod being positioned forwardly of said needle relative to the stitching direction in which the hem is moved past said needle, said straight rod section being slidably mounted on said sewing machine for being slidable in a direction orthogonal to a line along which stitching is formed as the hem is moved in the stitching direction;
- means for moving said folding guide rod from a position in which said curved rod section is spaced laterally of said line with the open part of the curve facing toward said line to a position in which said curved rod section is closer to said line, whereby when the bottom edge of a trouser leg which has been once folded back on itself is engaged in said curved section, said folding guide rod can be moved inwardly toward said line for folding the once folded bottom edge of the trouser leg into a threefold hem;
- a detecting plate positioned above said folding guide rod for engaging the trouser leg being stitched and being movable by the seam in the trouser leg for detecting the passage of

the seam over said folding guide rod as the trouser leg is being stitched; and  
stitching operation means to which said detecting plate is connected and connected to said sewing needle to operate said sewing needle upon said detecting plate detecting the initial passage of the seam for causing the sewing machine to initiate a stitching operation from a predetermined position ahead of the seam and after one complete revolution of the trouser leg and upon the detection of further passage of the seam by the detecting plate, causing the sewing machine to terminate the stitching operation at a location a predetermined distance past said predetermined position.

**4,947,772**  
**FINISH-UP STITCHING CONTROL IN AN ELECTRONIC SEWING MACHINE**  
Eiji Murakami, and Akira Orii, both of Tokyo, Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan  
Filed Nov. 2, 1988, Ser. No. 266,384  
Claims priority, application Japan, Nov. 6, 1987, 62-279081  
Int. Cl.<sup>5</sup> D05B 69/26, 19/00  
U.S. Cl. 112—262.1

4 Claims



3. A method of controlling operation of a sewing machine comprising the steps of selecting at least one pattern from a plurality of different patterns that includes a pattern of finish-up stitches, stored in a memory of a pattern selecting device; selecting a finish-up stitch pattern upon a selected pattern being completely stitched by actuating a finish-up selecting switch; generating a machine speed reduction signal in response to the actuation of the finish-up stitch selecting switch; comparing an actual rotation speed of the machine with a reference rotation speed in response to actuation of the finish-up stitch selecting switch and generating a first signal upon the actual rotation speed being higher than the reference rotation speed; and reading out the finish-up stitch pattern from the memory of the pattern selecting device in response to the first signal upon the rotation speed of the machine being reduced to the reference rotation speed.

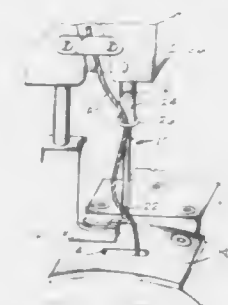
**4,947,773**  
**THREAD GUIDE RING FOR A NEEDLE BAR**  
Ferdinand H. Jean Blanc, 201 Main St., Harrison, Id. 83833  
Filed Jul. 20, 1989, Ser. No. 384,170  
Int. Cl.<sup>5</sup> D05B 55/00

U.S. Cl. 112—302

12 Claims

1. For use in a sewing machine, a needle bar comprising: an elongated body having a lower end portion including a lower end surface, a needle receiving socket penetrating said end surface and extending axially upwardly into said lower end portion, a laterally extending set screw opening in said lower portion, intersecting the needle receiving socket, and in which a set screw may be received for applying a clamping pressure on a needle positioned within the needle receiving socket, an inclined side surface intersecting the end surface and truncating the lower end portion of the needle bar, and a circumferential groove

extending about the lower end portion of the needle bar in the region of the inclined side surface; and  
a split ring within said groove, said ring surrounding the

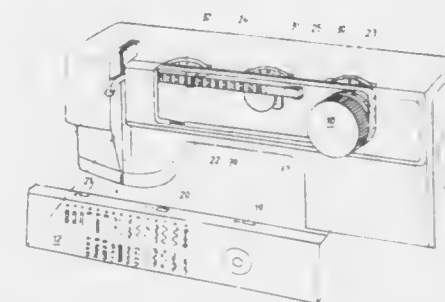


lower end portion of the needle bar, with said inclined surface and a confronting solid portion of the ring spaced laterally outwardly from said inclined side surface forming a thread guiding eye.

**4,947,774**  
**TAPE INDICATOR FOR RECOMMENDED STITCH VALUES FOR A SELECTED SEAM**  
Karl I. F. Rendahl, and Börje G. S. Törnqvist, both of Huskvarna, Sweden, assignors to Husqvarna Aktiebolag, Huskvarna, Sweden  
Continuation of Ser. No. 192,467, May 10, 1988, abandoned.  
This application Sep. 1, 1989, Ser. No. 401,984  
Claims priority, application Sweden, May 25, 1987, 8702191  
Int. Cl.<sup>5</sup> D05B 3/02

U.S. Cl. 112—444

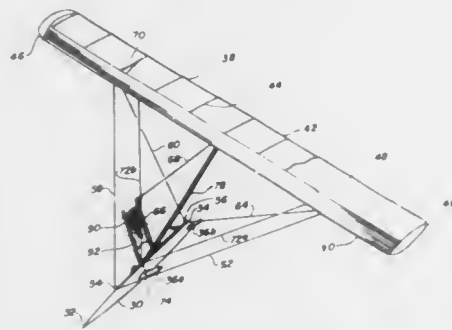
5 Claims



1. In a sewing machine having a panel (12) having a back and being marked with symbols (11) for different seam types and with a marker arrangement (13) for such symbols, types and controls for seam-type selection (10), stitch width (16) and stitch length (17) of which the seam-type selection control is in driving engagement with a flap (24) of the marker arrangement for moving it between said symbols independently of the setting for the stitch width or stitch length, the improvement comprising an indicator (22) located at at least the stitch width or the stitch length controls (16,17) indicating recommended values for setting those controls for a selected seam, said indicator (22) having the shape of a tape applied on a wheel (23) as well as on supporting surfaces, said wheel being connected to and activated by the selection control.

**4,947,775**  
**WATER AIR INTERFACE VEHICLE**  
 Robert M. Bamford, 1555 Parway Dr., Glendale, Calif. 91206  
 Filed May 12, 1988, Ser. No. 192,934  
 Int. Cl.<sup>3</sup> B63H 9/00  
 U.S. Cl. 114—39.1

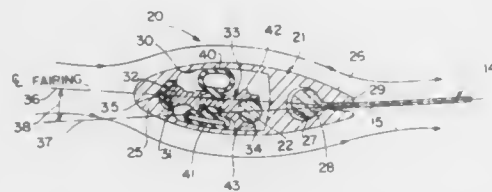
21 Claims



1. A water-air interface vehicle that supports and propels a payload and which has at any moment a windward and a leeward side, said vehicle comprising:
  - (a) a long narrow hull having a plane of symmetry and a longitudinal axis in that plane of symmetry, and a bow and a stern, said hull partially supporting said vehicle, in the water at low speeds by displacing a volume of water of equal weight,
  - (b) a plurality of hydrofoils symmetrically attached to said hull, partially supporting the vehicle and resisting lateral loads on other parts of the vehicle at high speeds relative to the water,
  - (c) an airfoil having a tip element on each of the two ends of its span and a plane of symmetry perpendicular to its span, said airfoil partially supporting and providing thrust to propel said vehicle through the water,
  - (d) an airfoil positioning means disposed between said hull and said airfoil locating the airfoil offset to the leeward side of the hull with one tip element further to the leeward and lower than the other,
  - (e) means to articulate said airfoil relative to the hull about an axis nearly parallel to the hull's longitudinal axis and a near vertical instantaneous axis,
  - (f) means to support the leeward tip element of the airfoil, providing vehicle roll resistance in addition to that provided by the hull, and
  - (g) a payload supporting means which locates the payload on the windward side of the hull.

**4,947,776**  
**CAMBERED FORESTAY FAIRING**  
 Carleton Peterson, 6801 E. Menlo St., Mesa, Ariz. 85207  
 Filed Oct. 31, 1988, Ser. No. 264,530  
 Int. Cl.<sup>3</sup> B63H 9/06  
 U.S. Cl. 114—102

6 Claims

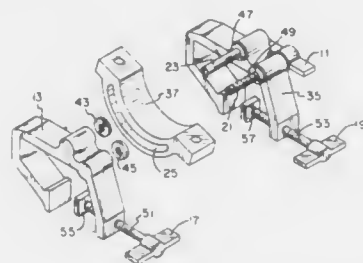


1. A streamline fairing have a forward cavity surrounding the forestay of a sailboat and attached to the luff of the sailboat's forestay which can be held at a desired camber angle with respect to the said forestay when sailing on the port tack,

as well as at the opposite camber angle on the sailboat's starboard tack, by means of toggle action between said forestay, said forestay, a toggle mounted with the forward cavity of the fairing, and the fairing itself;  
 one end of said toggle having a cylindrical shape coated in a cylindrical depression at the forward end of the forward cavity of the fairing which allows it to rotate within said cavity allowing the other end of the toggle to swing from one side of the cavity to the other side;  
 the aft end of said toggle has a cylindrical depression which keeps the forestay on the center line of said toggle and allows rotation therebetween;  
 the aerodynamic loads on the forestay adapted to pull the sail away from said forestay putting said fairing in tension and said toggle in compression forcing said toggle to one side of said fairing or the other whereby to maintain equilibrium, the force of the sail passes through the center line of said forestay placing the center line of said fairing at a cambered angle with the leading edge of said forestay;  
 an expandable tube is installed on each side of said toggle which, when expanding one tube and reducing the other, forces said toggle off dead center to the proper side of said fairing to obtain the desired camber angle;  
 said cylindrical shaped forward end of said toggle and the said cylindrical depression of said fairing is separated by a cylindrical elastomer to reduce torsional friction therebetween.

**4,947,777**  
**ADJUSTABLE DOWNRIGGER MOUNTING DEVICE**  
 Ronald L. Yoder, Topeka, Ind., assignor to Universal Consolidated Methods, Inc., Topeka, Ind.  
 Continuation-in-part of Ser. No. 176,400, Mar. 31, 1988. This application Nov. 7, 1988, Ser. No. 267,801  
 Int. Cl.<sup>3</sup> B63B 17/00; A01K 91/00  
 U.S. Cl. 114—221 R

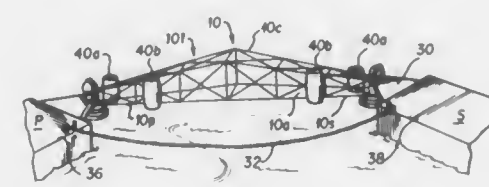
14 Claims



1. A device for mounting a downrigger to a sidewall portion of a boat comprising:
  - a base having a generally flat planar surface for receiving and supporting a downrigger;
  - clamping means comprising first and second C-clamps removably fastenable to a sidewall portion of a boat for fastening the base to the boat; and
  - means for adjustably coupling the base and clamping means together at selected relative angular orientations including a threaded member which passes slidably through one of the C-clamps and threadably engages the other of the C-clamps, and further comprising an alignment pin extending generally parallel to the threaded member, passing through a portion of the base and slidably engaging each of the C-clamps.

**4,947,778**  
**BARGE CONNECTING APPARATUS**  
 Willard F. Fahrner, 2255 Holly Oaks River Dr., Jacksonville, Fla. 32211  
 Filed Jan. 6, 1989, Ser. No. 294,002  
 Int. Cl.<sup>3</sup> B63B 21/62  
 U.S. Cl. 114—248

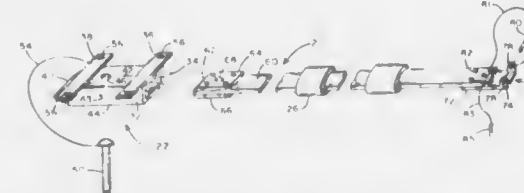
23 Claims U.S. Cl. 114—263



1. An apparatus for attaching waterborne vessels for movement, comprising:
  - an attachment means mounted forward from the bow of each of said waterborne vessels coincident with the longitudinal centerline of each of said waterborne vessels' hull;
  - a bridge element;
  - means for pivotally connecting each end of said bridge element to a corresponding said attachment means mounted on each of said waterborne vessels;
  - and pivot limiting means for maintaining the attached said waterborne vessels and said bridge element in an appropriate alignment.

**4,947,779**  
**WATERCRAFT TOW BAR**  
 James E. Grinde, 2401 - 147th Ln. N.E., Anoka, Minn. 55303  
 Filed May 1, 1989, Ser. No. 345,974  
 Int. Cl.<sup>3</sup> B63B 21/58  
 U.S. Cl. 114—250

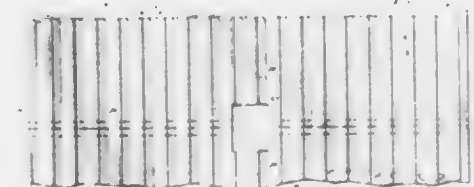
18 Claims



1. Apparatus for coupling a relatively small auxiliary watercraft to the stern of a larger towing vessel, said auxiliary watercraft having tie point means at its bow, said vessel including a stern transom, comprising in combination:
  - (a) a tubular socket attachable to said transom, said socket having a latch pin-receiving aperture passing therethrough;
  - (b) an elongated, longitudinally incompressible but vertically resilient bar member of a predetermined length and having a latch pin-receiving aperture on a first end thereof and a coupling means connected to a second end thereof for mating with said bow tie point means, said bar member exhibiting a predetermined spring constant and said first end being insertable into said tubular socket for constraining rotation of said bar member about a vertical axis; and
  - (c) a coupling pin insertable through said pin-receiving aperture of said socket and said bar member when aligned.

**4,947,780**  
**MODULAR FLOATING STRUCTURES AND METHODS FOR MAKING**  
 Arnold A. Flan, 3605 Conway Gardens Rd., Orlando, Fla. 32812  
 Filed Apr. 28, 1988, Ser. No. 187,267  
 Int. Cl.<sup>3</sup> B63B 35/38

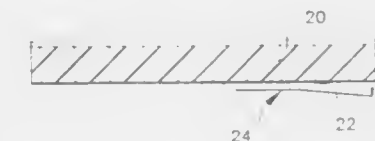
33 Claims



1. A method for fabricating a buoyant module for a dock, float or similar buoyant structure, and which module is interconnectable with adjacent modules into a larger construction, said method comprising the steps of:
  - providing a buoyant member having several faces;
  - forming grooves in at least one face of said buoyant member, said grooves extending across said one face;
  - suspending structural rods in some of said grooves;
  - coating the other faces of said buoyant member with a protective sheet;
  - thereafter pumping a layer of fiber-reinforced concrete over said one face, into said grooves and around each rod, extending said layer to a predetermined thickness above said one face, and then letting said layer set into interconnecting relation with said rods and said one face; and
  - attaching first interconnectable whalers against at least a portion of the periphery of said layer.

**4,947,781**  
**ATTACHMENT FOR IMPROVING THE RIDE OF SMALL MARINE PLEASURE CRAFT**  
 Ralph S. Norman, 6253 Rancho Hills Dr., San Diego, Calif. 92139  
 Filed Aug. 26, 1988, Ser. No. 237,523  
 Int. Cl.<sup>3</sup> B63B 1/22  
 U.S. Cl. 114—285

15 Claims



13. In a small marine pleasure craft, such as a jet ski, having a ride plate centered generally horizontally along the longitudinal axis of the hull of the craft adjacent the aft end of the hull, the improvement comprising a hydroplane lift surface on the ride plate inclined downwardly and rearwardly along the longitudinal axis of the hull at an angle in the order of from about 3° to about 6°, said lift surface having a width in the order of from about 4 to about 6 inches and a length in the order of about 2½ to 3 inches.



4,947,782

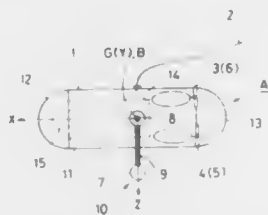
## REMOTELY OPERATED VEHICLE

Yasuo Takahashi, Yokohama, Japan, assignor to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan  
Filed Aug. 17, 1989, Ser. No. 394,896

Claims priority, application Japan, Aug. 30, 1988, 63-213659  
Int. Cl.<sup>3</sup> B63B 39/02; B63G 8/26

U.S. Cl. 114—312

4 Claims



1. A remotely operated vehicle comprising a vehicle body; at least three thrusters arranged in the longitudinal direction of said vehicle body; a pendulum connected to said vehicle body, wherein the center of gravity of said vehicle body excluding said pendulum and the center of buoyancy of said vehicle body including said pendulum are set in agreement with each other, said pendulum being provided so that said pendulum can be turned around an axis extending in the lateral direction of said vehicle body and passing through said center of gravity of said vehicle body.

4,947,784

## APPARATUS AND METHOD FOR TRANSFERRING WAFERS BETWEEN A CASSETTE AND A BOAT

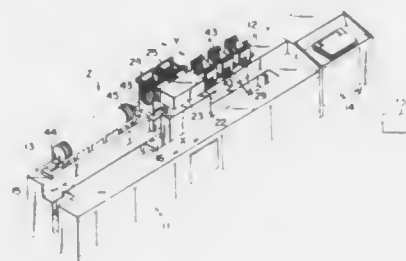
Hironobu Nishi, Sagami, Japan, assignor to Tel Sagami Limited, Kanagawa, Japan

Filed Dec. 7, 1988, Ser. No. 281,026

Claims priority, application Japan, Dec. 7, 1987, 62-308920  
Int. Cl.<sup>3</sup> B65G 65/30

U.S. Cl. 414—404

18 Claims



1. An apparatus for transferring wafers, comprising: taking out means for taking out a first array of wafers held in a same direction from a cassette, and then a second array of wafers from a cassette; turning means for turning the wafers of said first array and the wafers of said second array; and combining means for combining the wafers of said first array and the wafers of said second array so that those surfaces of the wafers of said first array, on which patterns are formed, oppose those surfaces of the wafers of said second array on which patterns are formed.

4,947,785

## IMPROVEMENTS IN OR RELATING TO BOAT HULLS

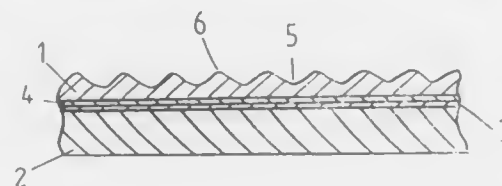
Alexander Milne, Newcastle-upon-Tyne, United Kingdom, assignor to International Paint public limited Company, United Kingdom

Filed Dec. 28, 1988, Ser. No. 290,989

Int. Cl.<sup>3</sup> B63B 5/24

U.S. Cl. 114—357

19 Claims



1. A process for the production of a boat hull or part thereof, comprising applying a continuous layer 5 to 500 microns thick of a non-biocidal antifouling material which does not release a poison for marine organisms but which resists the adhesion of marine fouling organisms to a mould so that it forms a continuous outermost layer of the boat hull, applying layers of curable resin to the mould and curing the resin in the mould.

4,947,786

## OVERHEATED-AXLE INDICATOR DEVICE

Raymond L. Maynard, 14935 Holmes St., Omaha, Nebr. 68137, and Donald D. Neltzke, 640 N. 46th St. (Apt. 4), Omaha, Nebr. 68132

Filed May 15, 1989, Ser. No. 351,531

Int. Cl.<sup>3</sup> G01K 11/06

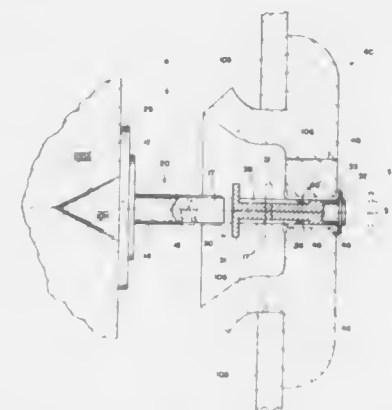
U.S. Cl. 116—218

11 Claims

1. In combination with the terminal region of a vehicular axle-assembly extending longitudinally along a central-axis and

comprising an axle having an endward opening that confronts an annular hubcap surrounding said central-axis, an overheated-axle indicator device comprising:

- (A) a temperature responsive gauge and means to removably attach said gauge to the axle adjacent the endward opening thereof, said gauge comprising:
- (i) a longitudinally extending housing having a front-end and also having a rear-end extending into the axle endward opening, and
  - (ii) a button at the housing front-end and being attached to a rearwardly extending stem that is surrounded by a compression-spring, and said stem being welded adjacent the housing rear-end with a fusible link whereby an overheated axle will melt the link and thereby enabling the compression-spring to propel the button forwardly away from the gauge housing and toward said annular hubcap;



- (B) a centrally-open plug removably attached within the hubcap annulus, said plug having a frontal-end and at its central-opening carrying a tubular fitting that surrounds said central-axis and that is provided with a spring means; and
- (C) extending along said central-axis and being slidably surrounded by the plug tubular fitting, a plunger having a trail-end confronting the gauge button and having a lead-end located adjacent the plug frontal-end, said fitting spring means preventing said plunger from sliding along said central-axis until an overheated-axle forwardly propels the gauge button against the plunger whereupon the plunger is moved into an indicating position wherein the lead-end of the plunger extends forwardly beyond the plug frontal-end.

4,947,787

## APPARATUS FOR THE ELECTROSTATIC LACQUERING OF PRINTING CIRCUIT BOARDS

Klaus Grah, Klengenstr. 70a, D-5650 Sollingen 1; Günter Korten, Richrath Str. 206, D-4010 Hilden, and Werner Schauf, Melanchthonstr. 43, D-5650 Sollingen 1, all of Fed. Rep. of Germany

Division of Ser. No. 260,147, Oct. 20, 1988, Pat. No. 4,900,580.  
This application Aug. 10, 1989, Ser. No. 392,817

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735798; Jun. 24, 1988, 3821278

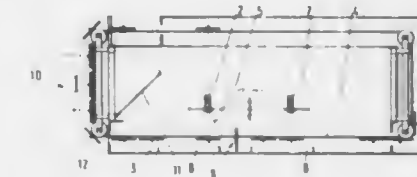
Int. Cl.<sup>3</sup> B05C 5/00

U.S. Cl. 118—64

6 Claims

1. An apparatus for the lacquering of printed circuit boards having: a lacquering station; a drying oven inside a substantially dust-free chamber; and a conveying system which conveys the printed circuit boards past the lacquering station, through the oven, and out of the chamber, wherein a turning station (6) for the printed circuit boards (3) suspended from the

conveying system (4), and a second lacquering station (7) are disposed downstream of the first lacquering station (2) and



immediately upstream of the inlet opening of the drying oven (9).

4,947,788

## DEVELOPMENT STATION HAVING TONER MONITOR

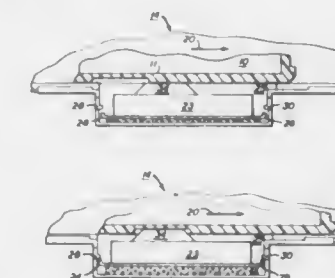
Lawrence A. Hill, Arthur S. Kroll, and Ralph E. Williams, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,938

Int. Cl.<sup>3</sup> G03G 15/06

U.S. Cl. 118—653

4 Claims



1. A replaceable development station usable for developing electrostatic images in an apparatus having a toner concentration monitor movable in first and second opposed directions and means for slidably receiving said development station in third and fourth opposed directions substantially normal to the first and second directions; said development station comprising:

- a housing containing a development mixture of toner and carrier particles and including a wall normal to the first and second directions when the station is slid into the receiving means; and
- a recess defined in said wall for receiving the toner concentration monitor, a recess being defined by a thinned region of the wall such that the toner concentration monitor is separated from the developer mixture in the development station housing by a wall region substantially thinner than the general thickness of said wall.

4,947,789

## APPARATUS FOR VAPORIZING MONOMERS THAT FLOW AT ROOM TEMPERATURE

Ingo Hussla, Hanau am Main, and Jochen Ritter, Laubach, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau 1, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,077

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833232

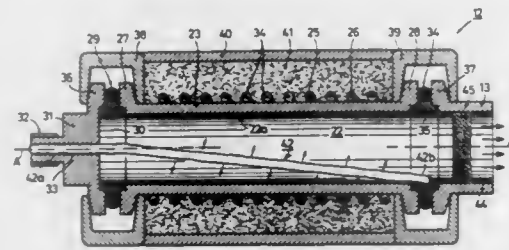
Int. Cl.<sup>3</sup> C23C 16/00

U.S. Cl. 118—715

9 Claims

1. Apparatus for the evaporation of monomers which are liquid at room temperature and have a low vapor pressure in the production of thin coatings containing silicon and oxygen by chemical vapor deposition in a vacuum on substrates, said apparatus comprising:

a mass flow regulator for adjusting the flow of the monomer, an evaporator comprising an evaporating chamber having an entry end, an exit end, and a wall surface extending therebetween, said entry end comprising a conduit connected to the output of said mass flow regulator, said exit



and being connected to said vacuum, said evaporator further comprising means for heating said chamber, and a body having capillary action disposed in said chamber, said body having one end connected to the conduit, said body having a free surface spaced at a distance from the wall surface and in line of sight of the wall surface.

**4,947,790**  
**ARRANGEMENT FOR PRODUCING A GAS FLOW WHICH IS ENRICHED WITH THE VAPOR OF A LOW-VOLATILE SUBSTANCE**

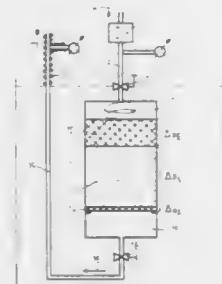
Georg Gärtner, Aachen; Peter Janiel, Würselen, and Hans Ran, Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 10, 1989, Ser. No. 295,716

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1988, 3801147

Int. Cl.<sup>5</sup> C23C 16/00  
U.S. Cl. 118—715

16 Claims



1. A heatable arrangement for producing a gas flow which is enriched with the vapour of a low-volatile, pulverulent substance, and which gas flow comprises an inert gas, the arrangement comprising:

- a vessel having an interior space (12) for holding a powder bed
- a powder bed (13) comprising said low-volatile pulverulent substance positioned in said interior space
- a feed pipe (6) for the gas flow and
- a discharge pipe (19) for discharging the enriched gas flow into a reactor,
- the feed and discharge pipes each having a valve and the pipes ending in the vessel in such a manner that when the arrangement is operative, the gas flows through the powder bed,
- the vessel (1) and the discharge pipe (19) being provided in a thermostatically controlled bath (2),
- the powder bed (13) including at least one additional solid inert component,
- the interior space (12) having two walls which are arranged transversely of the gas flow (4, 16) and are formed by a gas

inlet plate (10) and a gas outlet plate (14) both of said plates (10, 14) being gas permeable porous plates the outer walls of the interior space being impermeable to gas, characterized in that, the cross-sectional area of the interior space (12) is at least a hundred times larger than the cross-sectional area of the feed and discharge pipes (6, 19), the gas inlet plate (10), is arranged between the orifice of the feed pipe (6) and the powder bed (13), the gas outlet plate (14) is arranged between the powder bed (13) and the orifice of the discharge pipe (19), at least one of the two plates is movable in a manner such, that, the arrangement being operative, it is pressed into the powder bed (13), the thickness of the gas inlet plate (10), the thickness of the gas outlet plate (14), the pore size of the two plates (10, 14) and the spacing between the two plates (10, 14) or the thickness of the powder bed (13), respectively, in the interior space (12) are chosen such that, the arrangement being operative, the pressure drop in the gas inlet plate (10) exceeds the pressure drop in the powder bed (13), the pressure drop in the powder bed (13) is much higher than the pressure drop in the gas outlet plate (14), and the pressure drop in the gas outlet plate (14) is much less than the pressure in the reactor.

**4,947,791**  
**ARTIFICIAL REEF SYSTEM**

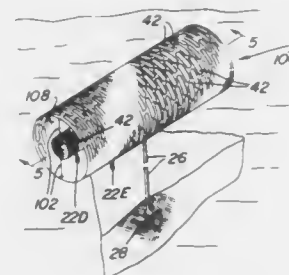
James E. Laier, 2620 Wagon Wheel Dr., Mobile, Ala. 36609; Joe W. Ruffer, 5406 Spring Dr., and William H. Brenner, 6020 Oak Harbor Ct., both of Mobile, Ala. 36693

Continuation-in-part of Ser. No. 234,438, Aug. 19, 1988, abandoned. This application May 12, 1989, Ser. No. 351,245

Int. Cl.<sup>5</sup> A01K 61/00

U.S. Cl. 119—3

18 Claims

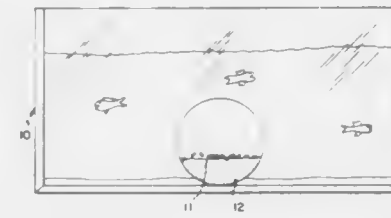


1. An artificial reef for location in a body of water to form a haven for marine life and into and out of which fish can swim, said reef comprising a plurality of walled enclosures, anchoring means for maintaining at least two of said walled enclosures at different elevations within said body of water and for permitting said at least two of said walled enclosures to move independently with respect to each other, each of said enclosures being buoyant and including an interior volume defined by a wall portion in the form of a plastic mesh fabric having a large plurality of openings therein, each of said openings being uninterrupted by any impervious member or surface and being sufficiently large to enable fish to swim therethrough into and from said interior volume, each of said enclosures being anchored by said anchoring means so that it floats completely below the surface of said body of water below a surface region whereat wave propagation takes place.

**4,947,792**  
**DECORATIVE SURFACE COATING**  
Kevin F. Kaminski, 325 Union St., Linwood, Mass. 01525  
Filed Apr. 13, 1989, Ser. No. 337,563  
Int. Cl.<sup>5</sup> A01K 63/04

U.S. Cl. 119—5

4 Claims U.S. Cl. 119—17



1. An improved aquarium comprising a suitable tank having a bottom and transparent side walls for the transmission of light waves through the aquarium which is adapted to be filled with water, a granular coating material for use in decorating at least a portion of the bottom surface of the aquarium that is provided for the display of live fish or the like, said coating being formed of a plurality of substantially uniformly sized small insoluble solid particles of an extruded plastic compound, each of said particles having a shiny surface characteristic and having a body with an opalescent property that reflects an iridescent light from the individual particles, said compound being formed of a resin mixture that includes about 30% of acrylic platelets with about 70% of a polycarbonate, said acrylic being dispersed in a random pattern of platelets throughout the mass of the polycarbonate resin whereby said platelets of the acrylic component of said individual particles cooperate with the polycarbonate phase of the body of the particles to reflect ripples of light waves that result from the motion of the fish or other specimen on display in the aquarium as they move through the water to produce an interesting ever changing iridescent light display which enhances the interest in the overall display set up in the aquarium.

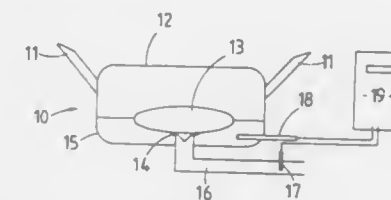
**4,947,793**  
**METHOD AND MEANS OF DETERMINING MILK YIELD FROM AN ANIMAL**

Murray W. Woolford, 57 Berkley Avenue, and Robert A. Sherlock, 1 Dorothy Place, both of Hamilton, New Zealand  
Filed Dec. 22, 1988, Ser. No. 288,275

Claims priority, application New Zealand, Dec. 22, 1987, 223032

Int. Cl.<sup>5</sup> A01J 7/00  
U.S. Cl. 119—14.17

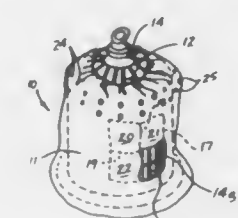
9 Claims U.S. Cl. 119—29



1. A method of measuring milk yield of an animal being machine milked using milking machinery in which valve means is operative to extract milk, with minimal entrained air, from a claw of a teat cup cluster at substantially constant pressure differential across a seat of the valve means, wherein said method comprises:  
detecting the total time during milking the valve means is open; and  
translating such total time elapsed into a measurement of the yield of milk from the animal during milking.

**4,947,794**  
**DISPOSABLE BIRDCAGE COVER ARRANGEMENT**  
Margaret K. Baldwin, 3703 Kerwin, Memphis, Tenn. 38128  
Filed Apr. 4, 1989, Ser. No. 333,066  
Int. Cl.<sup>5</sup> A01K 29/00

4 Claims



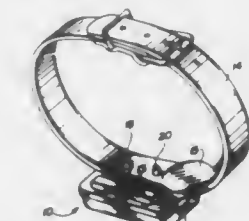
1. A disposable birdcage cover for securement about an elongate birdcage comprising,  
a flexible transparent tubular member including an upper continuous edge defining an open upper end,  
a lower continuous edge spaced from and parallel to said upper edge defining an open lower end,  
and  
first and second securement means positioned adjacent the upper and lower edges respectively for securement of said tubular member adjacent the upper and lower surfaces of the birdcage, and  
wherein the first and second securement means include a respective first and second elastomeric gathering band interlaced through the tubular member wherein the first and second gathering bands are parallel to each other and to the upper and lower edges, and  
further including a plurality of selectively removable sections for selective removal of a section to provide access to a door of the birdcage, the sections comprising a first, second, third, and fourth rectangular section defined by a perforated rectangle and a first and second bisecting perforated line wherein the first and second bisecting perforated line are orthogonal to each other and to opposed sides of the perforated rectangle.

**4,947,795**  
**BARKING CONTROL DEVICE AND METHOD**  
Gregory J. Farkas, Tucson, Ariz., assignor to Tri-Tronics Inc., Tucson, Ariz.

Filed Jun. 29, 1989, Ser. No. 374,287

Int. Cl.<sup>5</sup> A61N 1/00

23 Claims



1. A method of control of barking by a dog, comprising the steps of:  
(a) sensing a barking episode by the dog;  
(b) producing and applying to the dog an electroshock stimulus of a low initial intensity which is sufficient to get the dog's attention, in response to the sensing of step (a);  
(c) continuing to sense any further barking episodes by the dog, and if other barking episodes occur, each before a preselected time interval elapses, then producing further electroshock stimulus in response to each episode, respec-



tively, whereby the intensity of each further electroshock stimulus is increased in accordance with the number of the further barking episodes;  
(d) repeating steps (a) through (c) if no other barking episode occurs before the preselected time interval elapses.

4,947,796

## DOG FEEDER APPARATUS

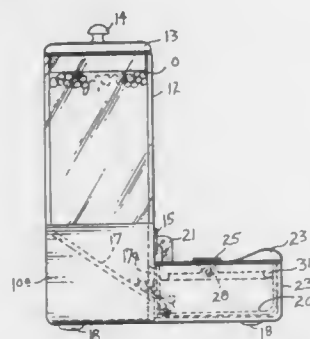
Joseph F. Robinette, 5823 F Rd., Bark River, Mich. 49807

Filed Oct. 11, 1988, Ser. No. 255,954

Int. Cl.<sup>5</sup> A01K 5/00, 7/00

U.S. Cl. 119—51.5

7 Claims



1. A pet feeder apparatus for providing a supply of dry food to respective troughs and moisturizing said dry food from one of said troughs wherein said apparatus comprises, a support member for releasably securing a fluid tank and a food hopper therewithin, said fluid tank including an outlet nozzle for providing a predetermined level of fluid within a fluid trough wherein said fluid trough underlies said nozzle, and said food hopper including a diverting plate positioned at a lowermost portion of said food hopper for diverting food from interiorly of said hopper to a food trough communicating with said diverting plate, said food trough and said fluid trough positioned adjacent each other and separated by a common divider wall integrally formed to said support member, and moisturizing means for selectively communicating said fluid trough and said food trough to enable fluid to enter said food trough from said fluid trough, and wherein said moisturizing means includes a manually manipulatable valve, and said valve is formed within a recess, and said recess is formed within said common divider wall.

4,947,797

## DISPOSAL BIRD FEEDER

Robert H. Lawrence, Jr., 299 Cecilia Dr., Memphis, Tenn. 38117

Filed Jun. 7, 1988, Ser. No. 203,127

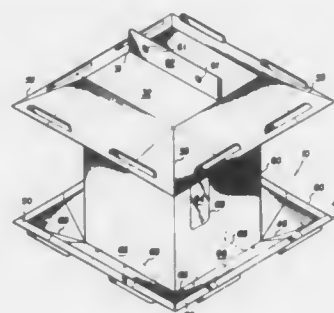
Int. Cl.<sup>5</sup> A01K 39/00

U.S. Cl. 119—52.2

14 Claims

1. A disposable bird feeder, comprising:  
a. housing means constructed from a single blank for forming a container for bird seed having first and second opposing ends and a plurality of side walls, said first end being adapted for suspending said container therefrom, said housing means including at least one tab member integrally formed in at least one of said plurality of side walls of said housing means;  
b. trough means foldably coupled to said housing means second end for dispensing said bird seed and forming a perch, said trough means includes a first panel member having a central portion fixedly coupled to said housing means, said first panel member being unfoldably deployable from a first positional location to a second positional location; said first panel member when in (1) said first positional location substantially completely encompassing

an outer contour of a lower portion of said housing means and in substantially contiguous contact therewith, and (2) said second positional location extending radially outward from each of said plurality of housing sidewalls; and,  
c. roof means foldably coupled to said housing means first end for shielding said dispensed bird seed, said roof means includes a second panel member having a central portion fixedly coupled to said housing means, said second panel



member is unfoldably deployable from a first positional location to a second positional location; said second panel member when in (1) said first positional location substantially completely encompassing an outer contour of an upper portion of said housing means and in substantially contiguous contact therewith, and (2) said second positional location extending radially outward from each of said plurality of housing sidewalls.

4,947,798

## FEED PAN FOR PIGS AND PIGLETS

Mark De Wispelaere, Maldegem, Belgium, assignor to Elite N.V., Maldegem, Belgium

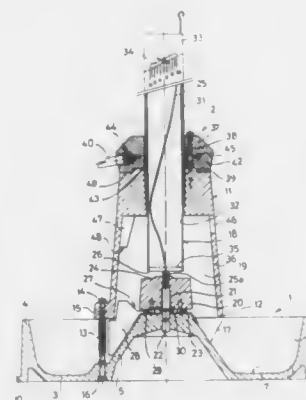
Filed Jun. 23, 1989, Ser. No. 370,639

Claims priority, application Netherlands, Jul. 4, 1988, 8801692

Int. Cl.<sup>5</sup> A01K 5/00, 39/00

U.S. Cl. 119—53

11 Claims



1. A device for feeding animals, in particular pigs and piglets, comprising a feed pan, said feed pan being provided with a raised peripheral wall and in the center with an elevation in the form of a truncated cone, a superstructure fixed on the feed pan, said superstructure comprising an extension piece situated coaxially above the elevation and being essentially the shape of a largely hollow, round tower having an outer wall and being open at the bottom, such that between the bottom edge of the extension piece and the elevation there is an annular feed fall-out aperture, and feed supply means for supplying feed to the feed pan, said feed supply means being located mainly

inside the extension piece and comprising a feed supply channel which opens coaxially above the elevation and a rotor situated coaxially between the feed supply channel and the elevation and having vanes extending radially through the feed fall-out aperture, said feed supply means further comprising a closing element situated coaxially between the feed supply channel and the rotor, said closing element being rotatable about its axis and being movable in the axial direction between an upper position in which it rests against the bottom end of the feed supply channel and closes said channel, while it lies free from the rotor, and a lower position at distance from the bottom end of the feed supply channel, in which the closing element opens the feed supply channel and is coupled to the rotor so that the closing element can function as a rotating feed distribution element.

4,947,799

## APPARATUS FOR GROOMING ANIMALS

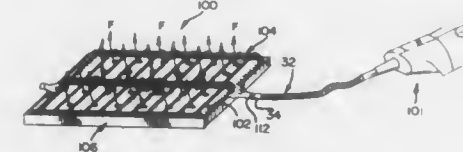
Susan Parker, 7240 Dixon, Forest Park, Ill. 60130

Filed Oct. 11, 1988, Ser. No. 256,320

Int. Cl.<sup>5</sup> A01K 29/00; F26B 13/00

U.S. Cl. 119—83

11 Claims



1. An apparatus for drying wet animals comprising: a generally planar grate for supporting said animal; grate support means for supporting said grate at a given short standoff distance above a supporting surface; a warm air-receiving unit configured immediately to underlie said grate and having opposing major top and bottom walls defining therebetween a cavity-forming space, and a plurality of air passage apertures through said top wall communicating with said space; said grate support means including downwardly extending leg-forming means affixed to said grate and configured to extend into engagement with said supporting surface outward of the periphery of said unit; releasable retention means for securing said warm air-receiving unit to said grate; connector means for connection to a source of warm air under pressure; and warm air inlet means communicating between said connector means and said interior space of said unit for admitting warm air to said space to provide an upward flow of air through said apertures directed at the lower body portions of an animal supported above said warm air-receiving unit by said grate.

4,947,800

## ANIMAL HOLDING CHUTE WITH MEANS FOR MOVING ANIMAL'S HEAD

Wilford L. Widney, Rt. 1, Box 27, Watonga, Okla. 73772

Filed Sep. 15, 1989, Ser. No. 407,889

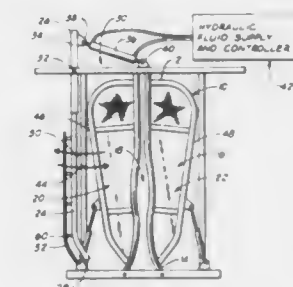
Int. Cl.<sup>5</sup> A62D 3/00

U.S. Cl. 119—98

16 Claims

1. An improvement in an animal holding chute having an upper end, a lower end, a first side, a second side and a forward end, a head opening being formed in the forward end of the animal chute wherein the head opening is sized and adapted to accommodate the animal's head whereby the animal's neck is disposed through the head opening with the animal's head extending a distance from the head opening when the animal is supported in the animal holding chute in an operating position of the animal holding chute, the improvement being adapted to facilitate access to the animal's jugular vein in the animal's neck and to substantially stabilize the animal's head and neck area in a bent position, the improvement comprising:  
a head bar having a first end and a second end;

means for movably supporting the head bar near the forward end of the animal holding chute; and  
means for moving the head bar to a storage position wherein the head bar is spaced a distance from the head opening and for moving the head bar to an operating position, the head bar engaging the animal's head as the head bar is



4,947,801

## ANIMAL TETHERING APPARATUS FOR USE IN VEHICLES

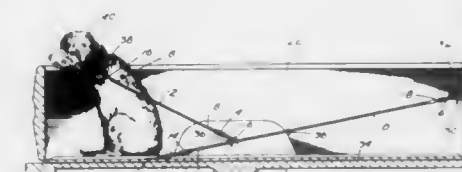
Sammie K. Glass, 13387 Concow Rd., Oroville, Calif. 95965

Filed Apr. 24, 1989, Ser. No. 342,030

Int. Cl.<sup>5</sup> A01K 3/00

U.S. Cl. 119—120

5 Claims



1. An animal tethering apparatus in combination with a cargo bed of a vehicle, and which comprises:  
a main cable means having a first end and a second end with each said end having an openable connector means affixed thereto;  
a first fixture means attached at a front end of said cargo bed; a second fixture means attached to a bottom panel of said cargo bed adjacent a rear end of said cargo bed; said first fixture means and said second fixture means each receiving one of said openable connector means of said main cable means, whereby said main cable means is retained in a generally taut position centrally longitudinally aligned between two sides of said cargo bed;  
stop means, said stop means being adjustably attached to said main cable means between said first end and said second end of said main cable means;  
a secondary cable means having a first and a second end; said first end of said secondary cable means having an openable connector means affixed thereto, for removably attaching to a restraint device affixed to an animal; said second end of said secondary cable means having an openable connector means affixed thereto, and removably attached to said main cable means; so as

to allow said attached openable connector means to slide on said main cable means towards and away from said first end and said second end of said main cable means with said sliding of said openable connector means of said secondary cable means being restricted in movement by said stop means;

said secondary cable means being of a length to prohibit said animal when attached by said secondary cable means to said main cable means from escaping said cargo bed of said vehicle;

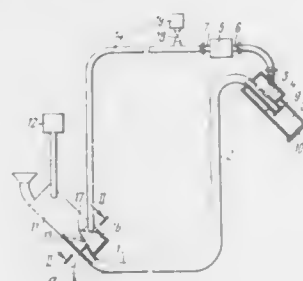
there being at least one shock absorbing means affixed in-line between the first end and second end of at least one said cable means.

4,947,802

**APPARATUS FOR VACUUM CONVEYANCE AND AEROSOL TREATMENT OF POULTRY**  
Vladimir I. Fisinin; Vladimir I. Filonenko; Viktor G. Shol; Anatoly M. Balakhonov; Anatoly P. Tolkachev, and Sergei A. Vorobiev, all of Moskovskaya, U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatel'skiy, Moskovskaya, U.S.S.R.

Filed Mar. 1, 1989, Ser. No. 317,635  
Claims priority, application U.S.S.R., Mar. 4, 1988, 438773[1];  
Jul. 11, 1988, 4445005[1]  
Int. Cl.<sup>3</sup> A01K 29/00; B65G 53/00  
U.S. Cl. 119—160

5 Claims



1. An apparatus for the vacuum conveyance and aerosol treatment of poultry, comprising:
  - an elevator pipe having a first and a second end, said second end being perforated about an outer surface;
  - a receiving pipe mounted at one end of said first end of said elevator pipe so that an aerosol chamber, defined by an intermediate portion of said receiving pipe between said one end and an other end of said receiving pipe, is maintained in an inclined position with respect to a ground surface and communicates with said elevator pipe, said aerosol chamber having an input portion that communicates with said other end for the insertion of poultry into said aerosol chamber and an output portion having ports defined therein, said output portion communicates with said one end;
  - an aerosol generator in fluid communication with said aerosol chamber to spray poultry within said aerosol chamber with an aerosol;
  - a vacuum chamber in fluid communication with said perforated second end of said elevator pipe;
  - a vacuum source communicating with said vacuum chamber through a vacuum pipe and communicating with said ports through a pressure pipe, said vacuum source creating a vacuum in said vacuum chamber that draws the poultry through said receiving and elevator pipes, and wherein said vacuum source discharges air into said aerosol chamber through said pressure pipe and said ports to prevent aerosol from escaping from said aerosol chamber; and
  - a discharge pipe connected to said second end, said discharge pipe having vacuum valves allowing the poultry to be discharged from said apparatus.

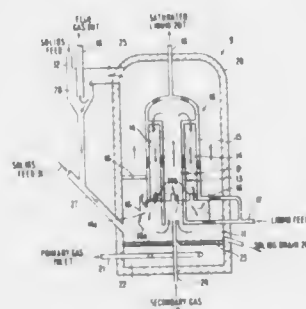
4,947,803  
**FLUIDIZED BED REACTOR USING CAPPED DUAL-SIDED CONTACT UNITS AND METHODS FOR USE**

Frederick A. Zenz, Garrison, N.Y., assignor to HRI, Inc., Lawrenceville, N.J.

Filed May 8, 1989, Ser. No. 348,848  
Int. Cl.<sup>3</sup> F22B 1/00

U.S. Cl. 122—4 D

20 Claims



1. A fluidized bed gas-solids reactor, comprising:
  - (a) an enclosure vessel having a reaction chamber provided in its lower portion containing a dense phase fluidized bed of particulate solids material;
  - (b) means for feeding fresh particulate solids material into the fluidized bed in the reaction chamber;
  - (c) a riser-downcomer unit having a central riser passage-way flow connected to a concentric outer downcomer passageway, said unit extending substantially vertically within said vessel with the downcomer passageway exit being located near the upper level of the fluidized bed, and being configured for directing downflowing particulate solids from the downcomer passageway back to the fluidized bed, said riser downcomer unit including dual concentric compartments each forming heat exchange panel means provided on its adjacent walls for containing a liquid;
  - (d) distributor means for introducing primary gas upwardly into the fluidized bed, and means for introducing secondary gas upwardly into the central riser passageway; and
  - (e) a cyclone separator flow connected to the vessel upper end portion for outward passage of gases and entrained solids therethrough, whereby particulate solids can be fed into the fluidized bed and circulated in dilute phase through the riser-downcomer unit passageways in heat exchange relation with the panel walls and liquid therein, and the particulate solids collected in the gasolids cyclone separator can be recycled back to the fluidized bed.

4,947,804

**FLUIDIZED BED STEAM GENERATION SYSTEM AND METHOD HAVING AN EXTERNAL HEAT EXCHANGER**  
Iqbal F. Abdulally, Randolph, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.

Filed Jul. 28, 1989, Ser. No. 386,181  
Int. Cl.<sup>3</sup> F22B 1/00

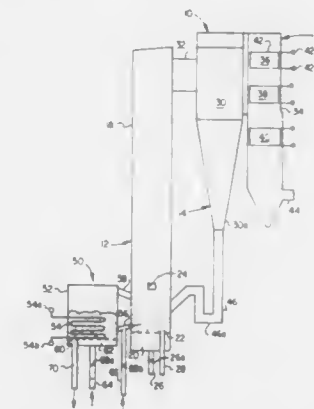
U.S. Cl. 122—4 D

11 Claims

1. A fluidized bed steam generation system including a furnace section, a fluidized bed of particulate material including fuel formed in said furnace section, a separating section for receiving a mixture of entrained particulate material and flue gases from the combustion of said fuel from the fluidized bed in said furnace section and separating said entrained particulate material from said flue gases, a heat recovery section for receiving said separated flue gases, means for passing said separated particulate material from said separating section back into the fluidized bed in said furnace section, an external heat exchanger disposed adjacent said furnace section housing, first

conduit means connecting said furnace section to said external heat exchanger for passing particulate material from said furnace section to said external heat exchanger, second conduit means connecting said external heat exchanger to said furnace section for permitting said material to flow from said external heat exchanger back to said furnace section, and means for passing water in a heat exchange relation to the particulate material in said furnace section and in said external heat exchanger, and to the separated flue gases in said heat recovery section for adding heat to said water and converting it to steam.

7. A method of generating steam comprising the steps of fluidizing a bed of particulate material including fuel in a furnace section, the flue gases from the combustion of said fuel



from the fluidized bed entraining said particulate material, separating said entrained particulate material from said flue gases, passing said separated flue gases through a heat recovery section, passing said separated particulate material back into the fluidized bed in said furnace section, connecting said furnace section to an external heat exchanger for passing particulate material from said furnace section to said external heat exchanger, connecting said external heat exchanger to said furnace section for permitting said particulate material to flow from said external heat exchanger back to said furnace section, passing water in a heat exchange relation to the particulate material in said furnace section and in said external heat exchanger and to the separated flue gases in said heat recovery section for adding heat to said water and converting it to steam.

4,947,805

**COOLABLE PLUNGER PISTON FOR INTERNAL COMBUSTION ENGINES**

Eduard Steppat, Kirchheim/Teck, and Thomas Letsch, Plüderhausen, both of Fed. Rep. of Germany, assignors to Mahle GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/EP88/00455, § 371 Date Sep. 22, 1989, § 102(e)  
Date Sep. 22, 1989, PCT Pub. No. WO88/09433, PCT Pub. Date Dec. 1, 1988

PCT Filed May 21, 1988, Ser. No. 411,483  
Claims priority, application Fed. Rep. of Germany, May 26, 1987, 3717767

Int. Cl.<sup>3</sup> F01P 1/04

U.S. Cl. 123—41.35

3 Claims

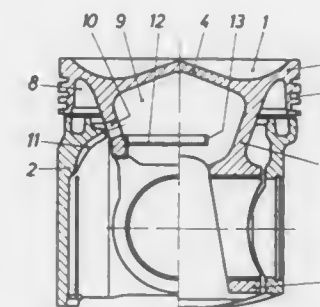
1. A coolable plunger piston for an internal combustion engine comprising:
  - an upper portion having a piston head;
  - said piston head having externally radially an annular side section;
  - said annular side section having annular piston grooves;
  - an inner annular side support which extends at a distance into said piston head within the external annular side section;

a piston shaft having an interior area and being connected only to said upper portion;

at least one radial aperture leading directly into the interior area of the piston shaft which is open toward the end of the piston shaft, and said radial aperture being located in the inner annular side support;

said piston shaft having an inner surface;

a channel section on the inner surface of the piston shaft, said channel section extending to the piston axis, said channel section provided with an opening in the direction of the piston axis, and being curved in the longitudinal direction of the piston;



said channel section having an end leading to the piston head and discharging into said at least one radial aperture of the inner annular side support;

said channel section extending in a curved fashion in a radial plane stretching through the piston axis in such a way that the cooling oil, injected in the form of a jet, after an approximately tangential intake into the one end of the channel section which originates on the inner surface of the piston shaft, strikes the radial aperture of the annular side support in an approximately vertical fashion; and wherein said piston head is coolable at least in the section lying inside the inner annular side support by means of oil injected from a crankcase into the piston.

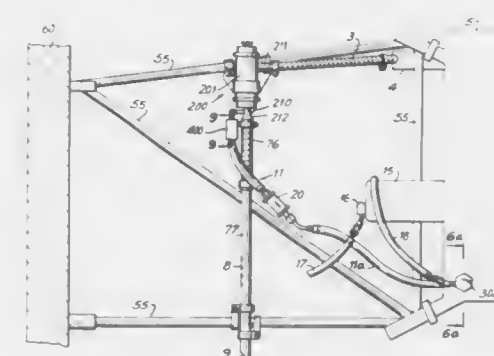
4,947,806

**ENGINE BREATHER OIL RECOVERY SYSTEM**  
Stephen R. Speer; Jan G. Norton, both of Spokane, and James D. Wilson, Greenacres, all of Wash., assignors to Machen, Inc., Spokane, Wash.

Filed May 3, 1989, Ser. No. 346,797  
Int. Cl.<sup>3</sup> F01M 13/00

U.S. Cl. 123—41.86

14 Claims



1. An engine breather oil recovery system, for use with reciprocating engines having an oil breather and an oil reservoir recovery system, comprising:
  - (a) an engine breather outlet from the engine;



- (b) a vapor and oil separator device in fluid flow connection with the engine breather outlet;
- (c) a motive flow suction means in fluid flow connection between the separator device and the engine, so as to provide a substantially continuous pressure drop between the separator device and the engine oil reservoir;
- (d) an engine fluid system in parallel with the separator device; and (e) an engine driven pump in fluid flow connection with such other engine fluid system, wherein the motive force for the motive flow suction means is provided by the fluid from the engine pump.

4,947,807

## INTERNAL COMBUSTION ENGINE

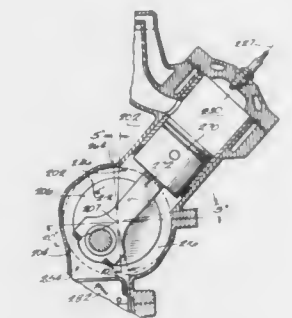
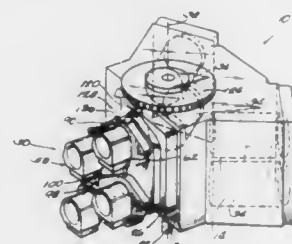
John D. Flaig, Libertyville; Gene F. Baltz, Lake Villa; Henry C. Billingsley; David H. Hartke, both of Waukegan; James A. Holcomb, Wildwood; Chester G. DuBois, Zion, all of Ill., and Dale L. Taipale, Delafield, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Division of Ser. No. 742,583, Jun. 7, 1985, Pat. No. 4,757,792, which is a continuation-in-part of Ser. No. 728,145, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 508,941, Jun. 29, 1983, abandoned. This application May 2, 1988, Ser. No. 188,952

Int. Cl.<sup>5</sup> F02B 13/00

U.S. Cl. 123—52 MV

26 Claims



1. An internal combustion engine comprising a crankcase adapted to rotatably support a crankshaft having an axis, said crankcase defining a plurality of crankcase chambers and including a generally flat manifold mounting surface including a therein a first series of inlet openings aligned in the direction of the crankshaft axis, and a second series of inlet openings aligned in the direction of the crankshaft axis, said first and second series of inlet openings being laterally offset with respect to the direction of the crankshaft axis, and said inlet openings of said first and second series each being respectively adapted to feed air to one of said crankcase chambers and each having a minor dimension parallel to the crankshaft axis, and a major dimension transverse to the crankshaft axis, said inlet openings in said first series each having a portion overlapping said inlet openings of said second series and said inlet openings

in said second series each having a portion overlapping said inlet openings of said first series.

4,947,808

## IGNITING DEVICE FOR ENGINE

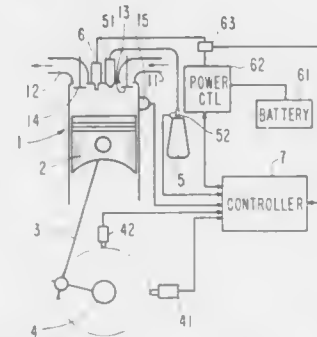
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 290,587

Claims priority, application Japan, Dec. 26, 1987, 62-330902 Int. Cl.<sup>5</sup> F02P 3/10

U.S. Cl. 123—145 A

10 Claims



1. An igniting device for an engine having a combustion chamber and piston and including a thermally insulating material, comprising:

a glow plug disposed in the combustion chamber and heatable by electric power;

an engine speed sensor connected to the engine, detecting a rotational speed of the engine;

a top dead center sensor connected to the engine, detecting a top dead center position of the piston;

a combustion chamber wall temperature sensor connected to the combustion chamber, detecting a wall temperature of the combustion chamber;

timing means for setting a timing for energizing said glow plug based on signals from said engine speed sensor and said top dead center sensor; and

energizing means for energizing said glow plug at the timing set by said timing means when the wall temperature detected by said combustion chamber wall temperature sensor is lower than a preset temperature.

4,947,809

## IGNITION BOOT

Bryan W. Hocking, East Keilor, Australia, assignor to GSA Controls Pty. Ltd., Melbourne, Australia

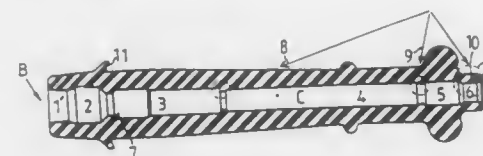
PCT No. PCT/AU87/00351, § 371 Date Jul. 15, 1988, § 102(e) Date Jul. 15, 1988, PCT Pub. No. WO88/02940, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 16, 1987, Ser. No. 241,984

Claims priority, application Australia, Oct. 17, 1986, 08558 Int. Cl.<sup>5</sup> F01L 15/00

U.S. Cl. 123—169. PA

11 Claims



1. An ignition boot for a spark plug located in a spark plug receiving cavity of a cylinder comprising a spark plug receiving aperture at one end and sealing means located peripherally at or adjacent the spark plug receiving aperture and urgable against wall(s) of the spark plug receiving cavity thereby

substantially preventing ingress of dust or moisture to the spark plug.

4,947,810

## METHOD AND ARRANGEMENT FOR IMPROVING THE STARTING ABILITY OF AN INTERNAL COMBUSTION ENGINE, WHEN AN ATTEMPT TO START THE ENGINE HAS FAILED

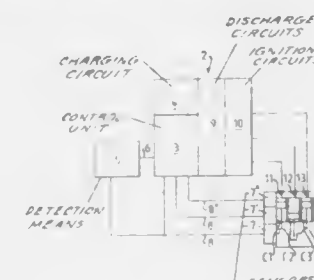
Per Gillbrand, Mariefred; Hans Johansson, and Jan Nytomt, both of Åmål, all of Sweden, assignors to Saab-Scania Aktiebolag, Sweden

Filed Aug. 25, 1988, Ser. No. 236,663

Claims priority, application Sweden, Aug. 28, 1987, 8703329 Int. Cl.<sup>5</sup> F02P 9/00

U.S. Cl. 123—179 BG

8 Claims



1. A method for improving the starting ability of an internal combustion engine of the type including a spark-plug equipped ignition system, the method comprising the steps of detecting at least one of the state of when an attempt to start the engine has failed and the state of the engine having come to a virtual standstill after having been rotating; generating a state-of-engine signal corresponding to at least one of the foregoing states of the engine; and responsive to said state-of-engine signal producing a close succession of sparks across spark plugs of the engine, so as to burn-off any deposits on said plugs.

4,947,811

## FLOATING VALVE STEM SEAL

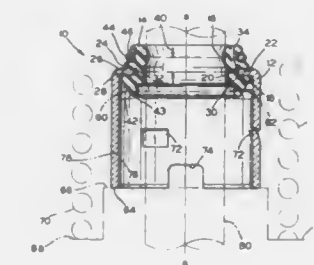
J. Dudley Binford, Richmond, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Jun. 30, 1989, Ser. No. 373,421

Int. Cl.<sup>5</sup> F01C 3/08

U.S. Cl. 123—188 P

8 Claims



1. In a valve stem seal assembly adapted for securement to a valve guide of an internal combustion engine, said assembly including a rigid shell defining a longitudinal axis and having an endwall containing a first aperture, an annular resilient seal body disposed within said shell, said body having a second aperture defining an interior annular lip adapted to provide continuous sealing engagement with an axially reciprocating valve stem, said seal body further having an exterior circumferential groove, said groove defining a pair of parallel, radially extending side walls, said groove further defining a bot-

tom, wherein said seal body is supported in said first aperture by said circumferential groove; an improvement comprising a radial float annulus defined by a predetermined amount of radial clearance between said first aperture and said bottom of said groove, wherein the circumference of said first aperture is greater than the circumference of said bottom of said groove, wherein said predetermined radial clearance is adapted to accommodate a specified amount of radial offset between said reciprocating valve stem and said valve guide to avoid distortion of said seal body, and wherein said seal body further comprises a guide sealing member extending generally longitudinally of said body, said member being axially spaced from said endwall and adapted to sealingly engage a radial top surface of said valve guide.

4,947,812

## POSITIVE CRANKCASE VENTILATION SYSTEM

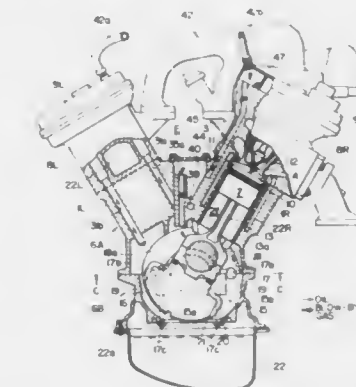
Yasushi Inoue, and Shigeki Nakatani, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 13, 1989, Ser. No. 406,341

Claims priority, application Japan, Sep. 13, 1988, 63-230737 Int. Cl.<sup>5</sup> F02M 25/00

U.S. Cl. 123—193 C

13 Claims



1. A positive crankcase ventilation system for a V-type internal combustion engine having a cylinder block which is provided with elongated first and second cylinder banks set at an angle to each other and a crankcase formed in a bottom thereof, said first and second cylinder banks being, respectively, provided with first and second rows of cylinders offset in a lengthwise direction in which a crankshaft of the internal combustion engine extends relative to each other, said positive crankcase ventilation system comprising:

- a series of reinforcing bulk heads, each said reinforcing bulk head being integral with a main bearing assembly holding a crankshaft of said internal combustion engine for reinforcing a structure of said cylinder block including said main bearing assembly;
- at least one oil return passage formed in said cylinder block on one end of each said row of cylinders for returning oil into an oil pan attached to said bottom of said cylinder bank therethrough;
- a blow-by gas discharge passage formed in said cylinder block on one end of each said row of cylinders for discharging blow-by gases out of said crankcase therethrough; and
- an air introduction passage formed in said cylinder block at the middle of and by one side of each said row of cylinders for introducing filtered air into said crankcase therethrough.

4,947,813

# METHOD FOR CONTROLLING THE ROTATIONAL SPEED OF A THERMAL ENGINE

Grigory Y. Vainshtein, Volkovsky prospekt, 110, kv. 65; Anatoly V. Kozlov, 12-ya Krasnoarmeiskaya ulitsa, 21, kv. 23, both of Leningrad; Vladimir I. Marakin, Novosibirsky raion, poselok Krasnoobsk, 49, kv. 6, Novosibirskaya oblast, and Jury F. Khaimin, Volkovsky prospekt 110, kv. 106, Leningrad, all of U.S.S.R.

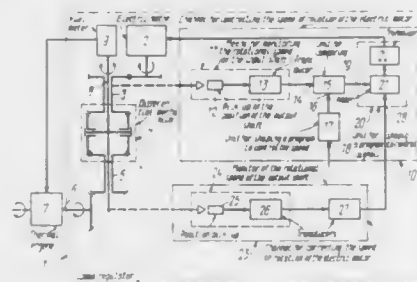
PCT No. PCT/SU87/00056, § 371 Date Jan. 13, 1989, § 102(e) Date Jan. 13, 1989, PCT Pub. No. WO88/08924, PCT Pub. Date Nov. 17, 1988

PCT Filed May 14, 1987, Ser. No. 302,599

Int. Cl.<sup>5</sup> F02D 11/10

U.S. Cl. 123—352

2 Claims



1. A method for controlling the rotational speed of a thermal engine comprising the following steps: presetting the rotational speed of said thermal engine; shaping a control signal based on the rotational speed of said thermal engine to control a speed of rotation of an electric motor, said control signal being shaped according to a rotational speed of an input shaft of a differential mechanism kinematically linked with said electric motor and said thermal engine, said thermal engine having a fuel metering member kinematically linked with an output shaft of the differential mechanism; and simultaneously shaping a correction signal for the speed of rotation of the electric motor at transient operating conditions, said correction signal for said rotational speed of the electric motor at transient operating conditions being shaped on the basis of the speed of rotation of the output shaft of the differential mechanism.

4,947,814

# RETRACTABLE THROTTLE STOP

Tibor J. Villanyi, Columbus, and John D. Crofts, Edinburgh, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Feb. 14, 1989, Ser. No. 309,874

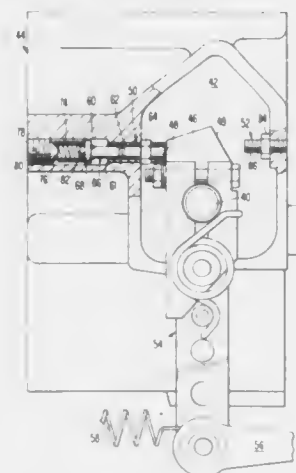
Int. Cl.<sup>5</sup> F02D 9/02

U.S. Cl. 123—396

7 Claims

1. A throttle stop assembly for use on an internal combustion engine fuel pump having a throttle shaft and throttle shaft stop element integrally attached to the throttle shaft for rotation between an idle position in which minimal fuel is supplied to the engine and a full throttle position in which maximum fuel is supplied to the engine and having a throttle lever assembly attached to the throttle shaft by a throttle lever mounting bolt assembly adapted to move the throttle shaft between its idle and full throttle positions in response to a throttle control, said throttle stop assembly comprising a full throttle stop means positioned to engage the throttle stop means positioned to engage the throttle stop element to define the full throttle position of said throttle shaft stop element, said full throttle stop means including piston means engaging said throttle shaft

stop element to bias the throttle shaft toward its idle position but being ineffective to move said throttle shaft to its idle



position except when the throttle lever mounting bolt assembly has malfunctioned.

4,947,815

# SYSTEM FOR REGULATED DOSING OF COMBUSTION AIR INTO INTERNAL COMBUSTION ENGINE

Cornelius Peter, Ottersweiler, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00404, § 371 Date Mar. 13, 1989, § 102(e) Date Mar. 13, 1989, PCT Pub. No. WO88/02064, PCT Pub. Date Mar. 24, 1988

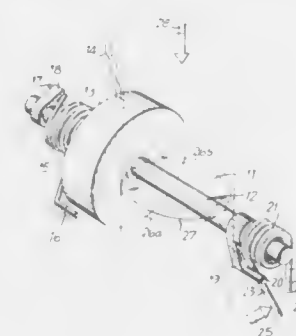
PCT Filed Sep. 4, 1987, Ser. No. 347,801

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1986, 3631283

Int. Cl.<sup>5</sup> F02D 9/02, 11/10

U.S. Cl. 123—399

7 Claims



1. Device for the controlled metering of combustion air in an internal combustion engine, comprising a combustion air channel (10), a throttle valve (11) arranged in the combustion air channel (10), which throttle valve (11) is fastened to a rotatable regulating shaft (12), and comprising a first restoring spring (15) which is fastened on one side in a stationary manner and introduces a torque in the regulating shaft in a permanent engagement with the regulating shaft, which torque is directed in the closing direction of the throttle valve, characterized in that there is an electromotive torque producing element in the form of an actuator which is connected with the regulating shaft so as to be fixed with respect to rotation relative to it, in that the throttle valve (11) can be guided by means of the restoring spring (15) into a rest position of the smallest opening ( $\alpha_r > 0$ ) against a stop which is spring-loaded by means of a counter-spring (21), and in that the electromotive actuator can

be controlled for the complete closing of the throttle valve in such a way that it produces a torque which is directed opposite the torque for the maximum opening of the throttle valve.

4,947,816

# CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH IMPROVED CONTROL CHARACTERISTICS AT TRANSITION OF ENGINE DRIVING CONDITION

Shinpei Nakaniwa, and Naoki Tomisawa, both of Isezaki, Japan, assignors to Japan Electronic Control Systems Company, Limited, Isezaki, Japan

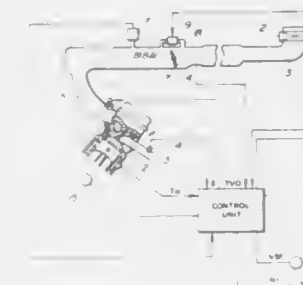
Filed Oct. 25, 1988, Ser. No. 261,887

Claims priority, application Japan, Oct. 27, 1987, 62-269467

Int. Cl.<sup>5</sup> F02D 41/10; F02P 5/15

U.S. Cl. 123—422

13 Claims



1. A control system for an internal combustion engine, comprising: means for monitoring engine driving condition representative parameters including an engine speed representative parameter, an engine load representative parameter and an intake air flow path area representative parameter; means for monitoring an engine revolution cycle to produce engine position data representative of stroke positions of respective engine cylinders; means, periodically operated at a known time, for deriving intake air flow path area variation data on the basis of said intake air flow path area representative parameter; means for deriving time difference data between a time of derivation of said intake air flow path variation data and an open time of intake valves of respective engine cylinders on the basis of said engine position data and said known time; means for deriving a basic fuel demand for each engine cylinder at an open time of an associated intake valve on the basis of said engine speed representative data, said engine load representative data, said intake air flow path area variation data and said time difference data; and means for controlling engine operation on the basis of said basic fuel demand.

4,947,817

# SYSTEM AND METHOD FOR CONTROLLING FUEL COMBUSTION FOR AN INTERNAL COMBUSTION ENGINE

Kou Ido, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jan. 13, 1989, Ser. No. 296,815

Claims priority, application Japan, Jan. 13, 1988, 63-3692

Int. Cl.<sup>5</sup> F02P 5/04

U.S. Cl. 123—425

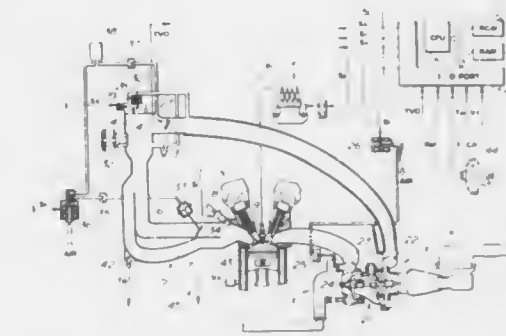
11 Claims

1. A system for controlling fuel combustion for an internal combustion engine, comprising: (a) first means for detecting an engine operating condition; (b) second means for setting and storing basic control values into a plurality of maps, each of said basic control values defined for controlling a fuel combustion state according to said engine operating condition and each of said maps

being prepared therein for each fuel having a different octane number;

(c) third means for setting a control value defined for controlling said combustion state on the basis of a basic control value retrieved from one of said maps according to said engine operating condition;

(d) fourth means for selecting and using one of said maps



which corresponds to a fuel having an octane number exceeding a predetermined value whenever said engine is started irrespective of an engine fuel actually used; and (e) fifth means for deriving a control value defined for controlling said fuel combustion state on the basis of a selected basic control value and operating a parameter associated with a combustion state on the basis of said selected control value.

4,947,818

# INTERNAL COMBUSTION ENGINE WITH DEVICE FOR WARNING OF MALFUNCTION IN AN AIR-FUEL RATIO CONTROL SYSTEM

Tatsuyoshi Kamohara; Tadashi Sugino; Toshio Suematsu, and Satomu Nishimura, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

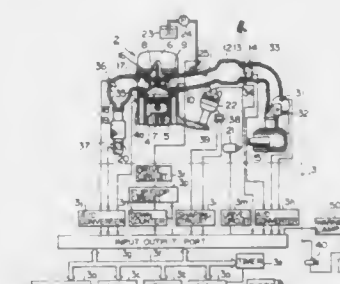
Filed Mar. 28, 1989, Ser. No. 330,319

Claims priority, application Japan, Apr. 28, 1988, 63-108089; Jun. 16, 1988, 63-149094

Int. Cl.<sup>5</sup> F02D 41/22, 41/14

U.S. Cl. 123—479

21 Claims



1. An internal combustion engine comprising: an engine body having a plurality of cylinders; an intake system having a throttle valve for controlling an amount of air introduced into respective cylinders in the engine body; an exhaust system having upstream portions separately connected to respective cylinders of the engine body for a removal of resultant exhaust gas therefrom, and a common downstream portion; means for supplying an amount of fuel into the intake system for providing a combustible mixture;



a first determining means, for determining a target value of the air-fuel ratio matching the operation conditions;  
 a calculating means for calculating an amount of fuel to be supplied to the engine by the fuel supply means to obtain the target air-fuel ratio;  
 air-fuel ratio sensor means arranged in the exhaust system at said common downstream portion for detecting an air-fuel ratio of the combustible mixture;  
 correction means, responding to a difference between the target air-fuel ratio obtained by the first determining means and the air-fuel ratio detected by the sensor means, for obtaining a correction value indicating a correction to be applied to the amount of fuel calculated by said calculating means, the corrected amount of fuel being supplied by the fuel supply means;  
 second determining means for determining a predetermined sampling period;  
 detecting means for detecting, for each sampling period, a condition of the engine in which the exhaust gas from the cylinders can reach the air-fuel ratio sensor means without being substantially mixed, and;  
 third determining means responding to a change in the correction value during that period, caused by the engine when in the non-mixing condition, for determining that a malfunction related to the air-fuel ratio control has occurred in the engine.

4,947,819

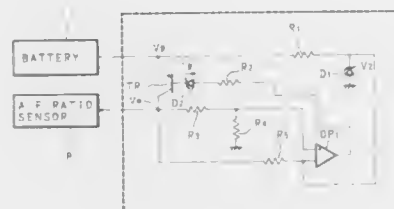
# AIR-FUEL RATIO CONTROLLER OF INTERNAL COMBUSTION ENGINE

Toshihisa Takahashi; Masanobu Uchinami, both of Himeji; Ryoji Nishiyama, Amagasaki; Seiya Kominami, and Shinichi Nishida, both of Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,652  
 Claims priority, application Japan, Mar. 8, 1988, 63-55247  
 Int. Cl.<sup>5</sup> F02D 41/14

U.S. Cl. 123-489

1 Claim



1. An air-fuel (A/F) ratio controller of an internal combustion engine comprising:  
 an A/F ratio sensor which is composed of the following: an oxygen-concentration detecting element for generating electric signals responsive to the oxygen concentration of the exhaust gas of said engine, and a heater which heats said oxygen-concentration detecting element to a predetermined temperature;  
 a controller for executing feedback control of a quantity of fuel to be supplied to said engine in accordance with electric signals generated by said oxygen-concentration detecting means so that the A/F ratio of the fuel-mixed vapor to be supplied to said engine can be predetermined A/F ratio; and  
 a constant voltage circuit for maintaining voltage to be supplied to said heater constant; wherein said constant-voltage circuit is composed of the following: a Zener diode for lowering supply voltage to a predetermined voltage level, an operational amplifier whose one input terminal receives voltage from said Zener diode and whose other input terminal receives voltage representing the voltage to be supplied to said heater, and a transistor

for adjusting said voltage to be supplied to said heater by applying base voltage received from said operational amplifier.

4,947,820

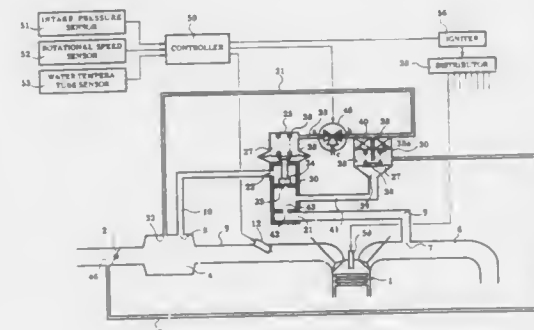
# COMBUSTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE ADAPTABLE TO ON AND OFF OF EXHAUST GAS RECIRCULATION

Naoto Kushi, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Feb. 8, 1989, Ser. No. 307,752  
 Claims priority, application Japan, Feb. 8, 1988, 63-26810  
 Int. Cl.<sup>5</sup> F02M 25/07

U.S. Cl. 123-571

11 Claims



6. For an internal combustion engine having an intake passage, an exhaust passage, and an exhaust gas recirculation system including an exhaust gas recirculation passage for recirculating exhaust gas from said exhaust passage to said intake passage, an exhaust gas recirculation control valve powered by a difference between atmospheric pressure and intake pressure in said intake passage for variably throttling said exhaust gas recirculation passage, and an exhaust gas recirculation on-off valve selectively put on or off so as, when put on, to supply said intake pressure to said exhaust gas recirculation control valve and, when put off, to interrupt supply of said intake pressure to said exhaust gas recirculation control valve,

a combustion control system comprising:

- first means for determining a basic quantity of engine control parameter according to said intake pressure,
- second means selectively put on and off so as, when put on, to modify said basic quantity of engine control parameter so as thereby to provide a modified quantity of engine control parameter for adaptation to operation of the engine with exhaust gas recirculation and, when put off, to undo such modification to the basic quantity of engine control parameter, and
- third means for delaying the putting on and off of said second means from the time point of putting on and off of said exhaust gas recirculation on-off valve for a variable time duration determined according to the difference between atmospheric pressure and intake pressure of the engine in such a manner that said variable time duration is smaller as said difference is larger.

4,947,821

# IGNITION SYSTEM

Masato Somiya, Anjo, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 15, 1989, Ser. No. 311,292  
 Claims priority, application Japan, Feb. 18, 1988, 63-36358;  
 Jul. 20, 1988, 63-180829

U.S. Cl. 123-606

13 Claims

1. An ignition system comprising:

an ignition coil having primary winding means and a secondary winding,  
 first switching means for supplying current to the primary winding means in one direction,  
 second switching means for supplying current to the primary winding means in the other direction,  
 current detection means for detecting the current flowing in the primary winding means,  
 a control circuit for turning on and off the first and second

4,947,823

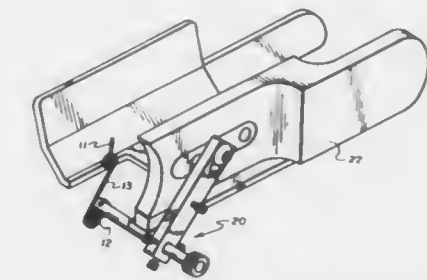
# ARROW REST FOR ARCHERY BOWS

Marlow W. Larson, Ogden, Utah, assignor to Browning, Morgan, Utah

Filed Nov. 14, 1988, Ser. No. 270,056  
 Int. Cl.<sup>5</sup> F41B 5/00

U.S. Cl. 124-41.1

4 Claims



1. In an arrow rest adapted for mounting in association with the handle riser of an archery bow to support the shaft of an arrow with the longitudinal axis of the arrow transverse to the sighting window of said riser, said assembly including a holder for an arrow shaft, a base support for attachment to structure associated with said handle riser, and connection means for maintaining said holder in physical association with said base support, the improvement comprising:

said connection means being fashioned as a resilient post element with a substantially stable at-rest position, wherein the longitudinal axis of said post element intersects the horizontal plane containing said longitudinal axis of said arrow shaft, said post element being flexible in all directions normal its and longitudinal axis;  
 said post being spatially arranged with respect to said base support to permit the unimpeded movement of said post in all said directions in response to launching of an arrow from said holder.

4,947,824

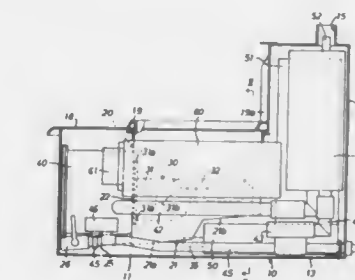
# PULSE COMBUSTION FAT FRYER OF THE TABLE TYPE

Susumu Ejiri, Toyoake; Makoto Kimura, Inazawa; Yasuhiko Tabuchi, Sapporo, and Nobuyoshi Yokoyama, Toyoake, all of Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

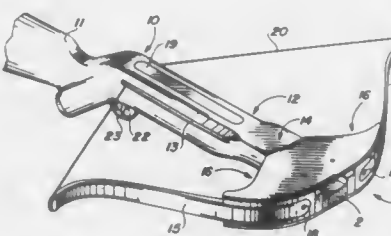
Filed Sep. 8, 1989, Ser. No. 404,509  
 Claims priority, application Japan, Sep. 12, 1988, 63-119573  
 Int. Cl.<sup>5</sup> A47J 27/00

U.S. Cl. 126-391

4 Claims



1. A pulse combustion fat fryer of the table type comprising a box-type cabinet having a front compartment and an upright rear compartment located at the rear end of said front compartment, an open-top vessel assembled within the front compartment of said cabinet to store an amount of liquid such as



1. A crossbow stabilizer comprising a pair of spring blocks slidably provided in said crossbow, an arrow stabilizer block carried by said spring blocks and a pair of coil springs having one end carried by said spring blocks, respectively, with the opposite end of said coil springs attached to the crossbow, for biasing said arrow stabilizing block against an arrow loaded in the crossbow.

cooking oil or other fluid medium to be heated, said vessel having a front wall and a bottom wall the front part of which is located adjacent a bottom plate of said cabinet and the rear part of which is spaced upward from said bottom plate, a pulse combustion burner mounted to said vessel and having a combustion chamber secured at its inlet end to the front wall of said vessel and immersed in the liquid in said vessel, and a tailpipe connected at one end thereof to an exhaust port of said combustion chamber in such a manner the great part of said tailpipe is immersed in the liquid and being extended outwardly from said vessel,

wherein an air intake muffler and an exhaust muffler are vertically disposed in parallel within the upright rear compartment of said cabinet, an air chamber casing is secured to the front wall of said vessel to supply fresh air into said combustion chamber therethrough, said air chamber casing being connected to said air intake muffler to be supplied with the fresh air, an exhaust decoupler is located in a space between the rear part of said bottom wall of said vessel and the bottom plate of said cabinet, said exhaust decoupler having an inlet, connected to an exhaust end of said tailpipe and an outlet in communication with said exhaust muffler, and an electric equipment box is housed in a space between a side wall of said vessel and a side plate of said cabinet to contain therein electric equipments necessary for control of operation of said burner.

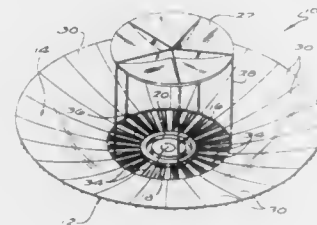
4,947,825

**SOLAR CONCENTRATOR - RADIATOR ASSEMBLY**  
Michael P. Moriarty, Simi Valley, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 11, 1989, Ser. No. 405,165  
Int. Cl.<sup>5</sup> F24J 2/18

U.S. Cl. 126-439

8 Claims



1. A combined solar concentrator and radiator assembly, comprising:

- a solar concentrator having a substrate with first and second sides, said first side defining a reflector surface for reflecting incident solar radiation to a predetermined location, said substrate including a plurality of generally interleaved panels supported on a frame for movement between an extended deployed configuration and a relatively collapsed stowed configuration;
- a thermal power generator unit driven by the solar radiation reflected by said reflector surface; and
- a radiator for dissipating heat from said generator unit, said radiator including a radiator surface disposed over at least a portion of said second side of said substrate, and means for coupling said radiator surface in heat transfer relation

with said generator unit, said coupling means including a plurality of heat pipes each having an inboard end coupled to said generator unit, an outboard end coupled to said radiator surface, and an intermediate flexible joint segment to accommodate movement of said panels between said deployed and stowed configurations.

4,947,826

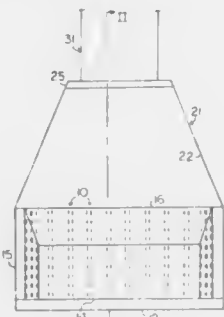
**CHIMNEY AND FIREPLACE CONSTRUCTION**

Joseph J. Miceli, 7902 Limoges Dr., Jacksonville, Fla. 32210  
Filed Jan. 12, 1990, Ser. No. 464,329

Int. Cl.<sup>5</sup> F24B 7/00

U.S. Cl. 126-529

15 Claims



1. In a fireplace construction having a firebox, a smoke chamber and a chimney, the improvement comprising:  
a plurality of elongated, vertical air chambers located in the firebox, each said air chamber having an upper end and a lower end, and each said air chamber being open only at the upper end, said lower end of each said air chamber being closed, where said upper end of each said air chamber opens into the interior of the fireplace construction; where the air contained within said air chambers rises into the interior of the fireplace construction when heated and is replaced by relatively cooler air drawn only from the interior of the fireplace construction.

4,947,827

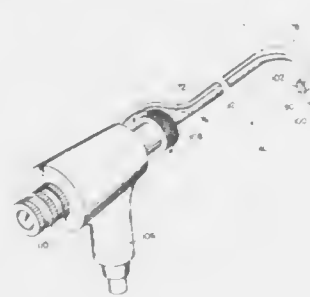
**FLEXIBLE ENDOSCOPE**

Eric Opie, deceased, late of Brier, Wash. (by Elizabeth J. Terry, executrix); Fred E. Silverstein, and David R. Kreft, both of Seattle, Wash., assignors to Opielab, Inc., Seattle, Wash.  
Filed Dec. 30, 1988, Ser. No. 292,473

Int. Cl.<sup>5</sup> A61B 1/00

U.S. Cl. 128-4

41 Claims



1. An endoscope comprising:  
an insertion tube for inserting into a human body;  
a handle coupled to said insertion tube, said handle remaining outside said human body, said insertion tube being rotatably coupled to said handle for rotation about the longitudinal axis of said insertion tube;  
a tubing extending from a tip portion of said insertion tube,

exiting at an end region of said insertion tube and entering said handle; and  
a control member means for permitting a user to selectively rotate said insertion tube about its longitudinal axis while maintaining said handle in a stationary position.

4,947,828

**ENDOSCOPE CONNECTOR**

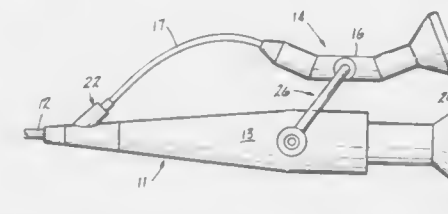
George J. Carpenter, Southbridge, Mass.; Walter P. Siegmund, Windham, Conn., and John M. Smith, Southbridge, Mass., assignors to Schott Fiber Optics, Southbridge, Mass.

Filed Apr. 17, 1989, Ser. No. 338,900

Int. Cl.<sup>5</sup> A61B 1/06

U.S. Cl. 128-6

16 Claims



1. In combination, a plurality of endoscopes comprising:  
a primary or parent endoscope including a first control handle and a cooperating first shaft means,  
a secondary or companion endoscope including a second control handle and a cooperating second shaft means, connector means joining the first and second control handles, and  
light means having a single light source for illuminating said first and second shaft means, said connector means providing a housing for said light means.

4,947,829

**MODULAR BLADE LARYNGOSCOPE**

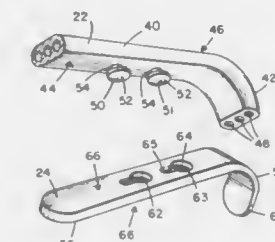
James R. Bullard, 707 Somerset Way, Augusta, Ga. 30909

Filed May 10, 1988, Ser. No. 192,334

Int. Cl.<sup>5</sup> A61B 1/06

U.S. Cl. 128-11

9 Claims U.S. Cl. 128-25 R



1. An instrument for accessing a target area including a blade, the blade comprising:

- shaft means positionable proximate the target area of a patient, said shaft means having a relatively curved distal section for cooperatively supporting a distal section of a leaf means thereon and at least one fiber optic image bundle for viewing a target area; and

4,947,830

**SHOCK WAVE GENERATOR FOR EXTRACORPOREAL LITHOTRIPSY**

Manfred Rattner, Grossenseebach, and Benedikt Hartinger, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

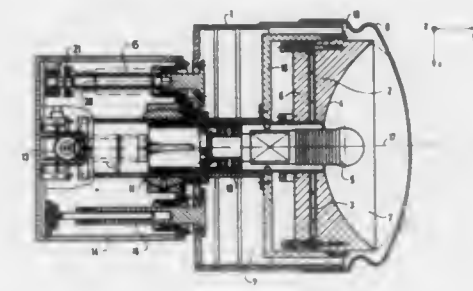
Filed Jan. 19, 1989, Ser. No. 298,755

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1988, 8801989[U]

Int. Cl.<sup>5</sup> A61B 8/00, 17/22

U.S. Cl. 128-24 A

8 Claims



1. A shock wave generator for extracorporeal lithotripsy comprising:

- a housing;
- a shock wave source in said housing, said shock wave source having a central longitudinal axis and including means for focusing shock waves to a focus disposed on said longitudinal axis;
- a flexible sack covering an end of said housing adapted for contact with the body of a patient, and defining a coupling volume on combination with said housing and said shock wave source;
- an acoustic coupling fluid filling said coupling volume; and
- means for adjustably mounting said shock wave source relative to said housing for permitting pivoting of said longitudinal axis independently of the position said housing and said sack thereby to adjust the location of said focus relative to said housing and said sack while maintaining said sack in contact with said patient.

4,947,831

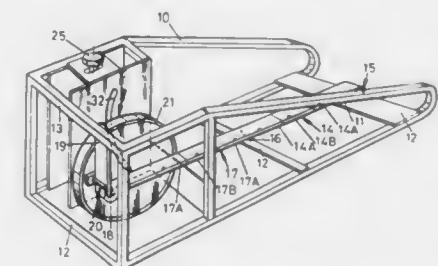
**CPM LEG EXERCISING MACHINE**

Ronald A. Crabtree, 40 Stairhaven Road, Allerton, Liverpool, L19 7NN, United Kingdom

Filed Jun. 13, 1988, Ser. No. 205,823

Int. Cl.<sup>5</sup> A61H 1/02

9 Claims



1. An exercising machine comprising a frame, a thigh support pivoted to the frame, a calf support extending transversely to the calf support and pivoted thereto, a rotor carried by the frame, and means for driving said rotor, the foot support pivotally attached to the rotor, the pivotal axis of the foot support



being spaced from the axis of rotation of the rotor and from the axis of pivoting of the foot support to the calf support, and the axes of pivoting of said thigh, calf and foot supports being parallel to each other and to the axis of rotation of the rotor such that upon driving of said rotor the knee and ankle joints are subjected to angular displacement.

4,947,832

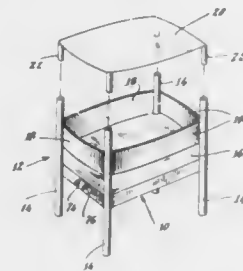
# **APPARATUS AND METHOD FOR TREATING OR RELIEVING COLICKY INFANTS**

Avrum H. Blitzer, 37 Brookside Blvd., West Hartford, Conn. 06107

Continuation-in-part of Ser. No. 935,405, Nov. 26, 1986, abandoned. This application Nov. 23, 1987, Ser. No. 123,928 Int. Cl.<sup>5</sup> A61H 1/00

U.S. Cl. 128—33

20 Claims



1. Apparatus for treating or relieving colicky infants by simulating an intra-uterine environment experienced prior to birth by an unborn child in a womb comprising:

a frame for use in a bed adapted for having a mattress positioned thereon on which an infant with colic can be rested, said frame having a longitudinal direction, a series of upwardly and downwardly movable elements, said elements being arranged along the longitudinal direction of said frame, and distributed drive means acting on said movable elements for producing repetitive and sequential upward and downward motion by said movable elements of about 6 mm to about 10 mm for producing regular, repetitive, predetermined, uniformly advancing traveling sine-wave-like motion progressive in the longitudinal direction of said frame and having frequency in the range of about 7 to about 20 cycles per minute.

4,947,833

# **BED-TYPE ROLLER MASSAGING MACHINE**

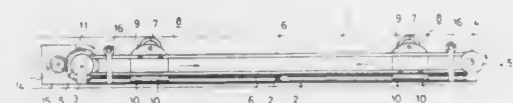
Yoshikiyo Yamasaki, Osaka, Japan, assignor to Kabushiki Kaisha Fuji Iryoki, Osaka and Kabushiki Kaisha Japan Health, Sakai, both of Japan

Filed Dec. 23, 1988, Ser. No. 289,904

Int. Cl.<sup>5</sup> A61H 15/00

U.S. Cl. 128—52

5 Claims



1. A bed-type massaging apparatus, comprising: a frame including a pair of generally parallel and sidewardly-spaced side rails extending in the longitudinal direction of the apparatus, each of said side rails being split into a pair of elongate first and second rail parts which are normally aligned and have adjacent inner ends joined together by a hinge structure which defines a substantially horizontal hinge axis which extends transversely substantially

through the center of the apparatus so that the apparatus can be folded into an upper part and a lower part;

first and second drive shaft respectively disposed adjacent and extending generally transversely between respective said first and second rails parts adjacent the outer ends thereof, each of said shafts having a pair of drive wheels mounted thereon adjacent opposite ends thereof so as to be disposed adjacent opposite sides of the apparatus;

a pair of flexible endless driving elements disposed adjacent opposite sides of the apparatus and respectively engaged with the driving wheels associated with the respective side of the apparatus for drivingly rotatably coupling the first and second shafts together, said endless driving elements including elongate flexible upper and lower reaches which extend generally longitudinally of the apparatus; a single drive motor, and means drivingly coupling said drive motor to one of said shafts to effect rotational driving thereof;

a first massaging device extending transversely between and movably supported on said first rail parts for movement therealong in the longitudinal direction of the apparatus, and a second massaging device extending transversely between and being movably supported on the second rail parts for movement therealong substantially in the longitudinal direction of the apparatus;

each of said massaging devices including an elongate generally cylindrical roller supported for rotation about a generally horizontal axis which extends transversely of the apparatus, both of said rollers disposed for contacting a body of a user simultaneously, and a pair of support carriers which rotatably support opposite ends of the roller and are respectively longitudinally movably engaged with the respective rail parts; and

means for longitudinally moving said first and second massaging devices in opposite directions and for effecting simultaneous massaging of upper and lower portions of the body; comprising first means coupling the support carriers of said first massaging device to the upper reaches of the endless driving elements, and second means coupling the support carriers of said second massaging device to the lower reaches of the endless driving elements, whereby said carriers are simultaneously reciprocated back-and-forth along the respective rail parts in response to energization of the drive motor.

4,947,834

# **DEVICE FOR TREATING HUMAN EXTREMITIES**

Holger Kartheus; Hanns Pietsch; Andreas Hogrefe, all of Hamburg; Harald Bargsten, Ahlerstedt; Berndt Voss, Norderstedt, and Vignir Arnason, Ahrensburg, all of Fed. Rep. of Germany, assignors to Belersdorf AG, Hamburg, Fed. Rep. of Germany Filed Feb. 1, 1989, Ser. No. 305,432

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804016

Int. Cl.<sup>5</sup> A61H 9/00

U.S. Cl. 128—64

11 Claims

1. A device for treating human extremities by intermittent compression, comprising: at least one sleeve adapted to fit around a patient's limb; a plurality of flexible inflatable chambers attached to said sleeve and arranged in series thereon to be successively inflated; a valve associated with each said inflatable chamber, each said valve having a supply volume communicating with its associated chamber and an inlet for inflating air to said supply volume, and each of said valves other than that associated with the last chamber of said series having an outlet from its supply volume connected to the inlet to the supply volume of the valve of the next chamber in said series, a control volume separate from said supply volume and a pneumatically operated valve member arranged to close off said supply volume outlet when a predetermined pressure differential prevails between said supply volume and said control volume and means for supplying a control pressure to each of said control volumes, whereby when inflating air is supplied

to the first chamber of the series through its respective valve inlet with all said valve outlets closed by said control pressure, said first chamber inflates until the pressure therein, and in its associated valve supply volume, rises to overcome said pressure differential and cause said valve member to open said outlet to enable the next chamber in the series to be inflated through its respective valve supply volume while keeping said first chamber inflated, and so on until all said chambers are inflated, wherein the sleeve comprises a foot portion includ-

ing an instep portion and a shin portion, a transition area joining the foot portion without interruption to the shin portion of the sleeve between the instep portion and the shin portion, an excision to leave the heel of the patient uncovered provided in the transition portion of the sleeve between the foot portion and the shin portion, and one of said chambers situated at a distal extremity of the shin portion of the sleeve extending in one piece into the foot portion and over substantially the whole foot portion.



ing an instep portion and a shin portion, a transition area joining the foot portion without interruption to the shin portion of the sleeve between the instep portion and the shin portion, an excision to leave the heel of the patient uncovered provided in the transition portion of the sleeve between the foot portion and the shin portion, and one of said chambers situated at a distal extremity of the shin portion of the sleeve extending in one piece into the foot portion and over substantially the whole foot portion.

4,947,835

# **ADJUSTABLE SPLINT ASSEMBLY**

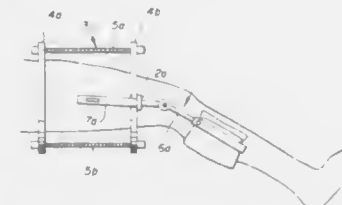
George R. Hepburn, Severna Park, and Dror Paley, Baltimore, both of Md., assignors to Dynasplint Systems, Inc., Baltimore, Md.

Filed Apr. 5, 1989, Ser. No. 333,395

Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 128—84 R

15 Claims



1. An adjustable splint assembly comprised of an adjustable splint device and a fixator device, said adjustable splint device comprising a distal strut and a proximal strut pivotably connected to said distal strut, one of said struts having at one end a pivotably mounted head portion defining a cam surface, an adjustable biasing means mounted within the other strut and biased into engagement with said cam surface for applying a quantifiable force tending to align or approximate said distal and proximal struts, said fixator device comprising a right ring and a left ring, two or more surgical wires for implanting through a bone, with said wires connected at each end to the periphery of the right ring and crossing each other substantially near the center axis of said right ring, two or more surgical wires similarly connected to and crossing within the left ring, means for connecting said surgical wires to the right ring

1. In an exerciser apparatus for stimulating the muscles of a rider thereof, the exerciser having bicycle-like pedals supported by rotatable arms, the pedals disposed to be contacted by the rider so that the rotatable arms are rotatable by the muscles of the rider, the improvement comprising:

stimulator means for generating electrical impulses; switching means for activating the stimulator means, the switching means comprising at least one array of switches arranged in an arc of a circle disposed in a plane parallel to the rotating planes of the rotatable arms; switch actuating means supported by at least one of the rotatable arms for sequentially actuating the switches of the switching means as the rotatable arms are rotated; and electrode means for applying impulses from the stimulator means to selected muscles of the rider.

4,947,836

# **EXERCISER WITH MUSCLE STIMULATION**

Charles J. Laenger; Henry L. Hughes, and Thomas C. Burk, all of Tulsa, Okla., assignors to Hillcrest Medical Center, Tulsa, Okla.

Continuation of Ser. No. 99,092, Sep. 21, 1987, Pat. No.

4,809,696. This application Jan. 23, 1989, Ser. No. 300,831

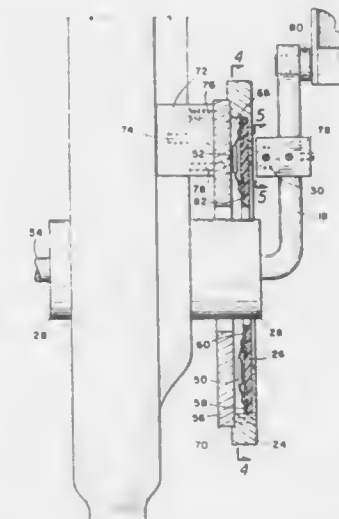
The portion of the term of this patent subsequent to Mar. 7,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61N 1/02, 1/36

U.S. Cl. 128—419 R

6 Claims



4,947,837

## METHOD OF BLOOD FLOW IMAGING

Koichi Sano, Sagami-hara; Tetsuo Yokoyama, Tokyo, and Hideaki Kozumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

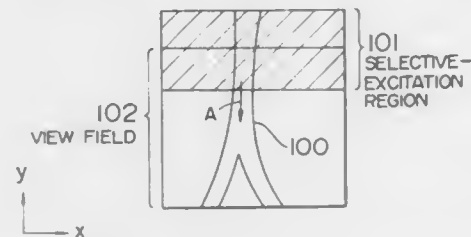
Continuation of Ser. No. 149,503, Jan. 28, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 379,674

Claims priority, application Japan, Jan. 30, 1987, 62-18385

Int. Cl.<sup>5</sup> A61B 5/055

U.S. Cl. 128—653 AF

20 Claims



1. A method of imaging blood flows by means of a magnetic resonance imaging apparatus which includes means for generating a static magnetic field and gradient magnetic fields, means for generating a high-frequency (RF) magnetic field, means for detecting magnetic resonance signals from a body under test, and means for implementing an image-reproducing computation on the detected signals, said method comprising the steps of:

- exciting selectively a partial region of said test body including a blood vessel portion;
- measuring resonance signals by utilizing spins flowing out of said excited region; and
- imaging a blood vessel system based on blood flow information included in the measured resonance signals, wherein said partial region is set to a region which includes a region formed by extending a view field plane and is outside of the view field.

4,947,838

## SHELL-LIKE ORTHOPEDIC BRACE

Donato Giannetti, Via Virgilio Melandri, 184/E, Roma, Italy (00155)

Filed Feb. 27, 1989, Ser. No. 315,805

Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 128—80 R

14 Claims



1. A shell-like orthopedic brace for application to a specific limb of a patient, said orthopedic brace comprising in combination:

- a first rigid half-shell form having front and rear edges, said

first half-shell form being dimensioned to conform to the lateral side of said specific limb of the patient;

a second rigid half-shell form having front and rear edges, said second half-shell form being dimensioned to conform to the medial side of the specific limb of the patient for cooperative functional relationship with said first half-shell form, said second half-shell form being substantially a mirror-image of said first half-shell form and engageable therewith, said front edges of said first and second half-shell forms being engaged in abutting contact to each other at the front of the leg and said rear edges of said first and second half-shell forms being engaged in abutting contact to each other at the rear of the leg;

each said half-shell form comprising, in turn;

- one or more channel portions extending longitudinally along the shell form;

- air holes positioned along said channel portions in the shell and opening therethrough;

- support means of a soft material for attachment to each said half-shell form and for filling the interstice between said shell forms and said patient;

- each said support means secured by said channel portions of the half-shell forms; and

- means to maintain said two half-shell forms together in abutment around the specific limb of the patient,

whereby, upon securing said orthopedic brace to said limb of the patient, the limb is securely supported by a lightweight, stable and well-ventilated brace.

4,947,839

## ORTHOPEDIC CASTING MATERIAL HAVING REDUCED TACK AND REDUCED SLIP

James L. Clark, and Ali Ozsahin, both of Tulsa, Okla., assignors to Carapace, Tulsa, Okla.

Filed Aug. 18, 1988, Ser. No. 233,597

Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 128—90

7 Claims

1. An orthopedic casting material comprising a fabric coated or impregnated with a combination of a reactive fluid polyisocyanate prepolymer which hardens when said resin is wetted with water and detackifier mixture comprising an oil which is immiscible with said prepolymer and polymeric micro-powder, said polymeric micropowder comprising a fluorocarbon polymer powder having an average particle size of no more than about 1 micron.

4,947,840

## BIODEGRADABLE TEMPLATES FOR THE REGENERATION OF TISSUES

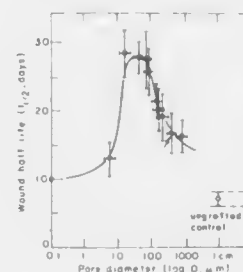
Ioannis V. Yannas, Newton; Elaine Lee, Medford, and Ariel Ferdman, Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 21, 1987, Ser. No. 87,772

Int. Cl.<sup>5</sup> A61L 15/00; A61F 2/10

U.S. Cl. 128—156

12 Claims



1. A method of delaying or arresting contraction of skin bordering a wound site and promoting tissue regeneration,

4,947,842

## METHOD AND APPARATUS FOR TREATING TISSUE WITH FIRST AND SECOND MODALITIES

Jose A. Marchosky, Creve Coeur; Christopher J. Moran, Town & Country, both of Mo., and Neal E. Fearnot, West Lafayette, Ind., assignors to Medical Engineering and Development Institute, Inc.

Continuation-in-part of Ser. No. 247,769, Sep. 22, 1988, which is a continuation-in-part of Ser. No. 193,167, May 2, 1988, which is a continuation-in-part of Ser. No. 112,628, Oct. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 697,697, Feb. 4, 1985, Pat. No. 4,719,919, which is a continuation of Ser. No. 459,708, Jan. 21, 1983, abandoned. This application Feb. 13, 1989, Ser. No. 310,541

Int. Cl.<sup>5</sup> A61F 7/12

U.S. Cl. 128—401

24 Claims



1. Apparatus for treating tissue, comprising:

- an elongated member interstitially implantable in said tissue and having a distal end for interstitially penetrating said tissue;
- a passageway longitudinally positioned in said member for positioning a first modality in said member, said first modality for providing a first treatment of said tissue; and
- a second modality positioned about said distal end and responsive to said first modality for providing a second treatment of said tissue.

4,947,843

## CARDIAC INSULATOR

John T. Wright, Conifer, and Donald P. Elliott, Denver, both of Colo., assignors to Pioneering Technologies, Inc., Wheat Ridge, Colo.

Filed Feb. 21, 1989, Ser. No. 313,602

Int. Cl.<sup>5</sup> A61F 7/12

U.S. Cl. 128—401

12 Claims

1. A cardiac insulator having a generally rectangular configuration, having dimension up to about 10 inches by 8 inches, defining:

- (a) a first excrescence means (4) constructed and configured so as to insulate the portion of the posterior myocardium which lies between the lower left pulmonary vein and the inferior vena cava when the cardiac insulator is in use positioned about a human heart;
- (b) a first recess means (5) so formed and configured to avoid interference with the lower left pulmonary vein when the cardiac insulator is in use positioned about a human heart;
- (c) a second recess means (6) so formed and configured to avoid interference with the vena cava when the cardiac insulator is in use positioned about a human heart;
- (d) a second excrescence means 7 constructed so as to insulate the lateral portion of the right atrium when the car-

comprising applying a biodegradable material with a pore size of between about 9 μm and 630 μm, a pore volume fraction of greater than about 80%, and a biodegradation rate sufficient to significantly delay or arrest the rate of wound contraction such that the time it takes a wound to contract to one-half of its original area is greater than approximately 15 days.

4,947,841

## NEONATAL MUCUS EXTRACTOR

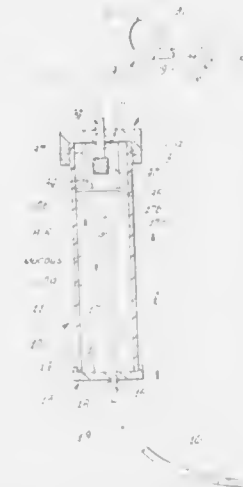
Raymond C. Ng, 5238 Dona Maria La., La Canada, Calif. 91011

Filed Nov. 18, 1988, Ser. No. 273,022

Int. Cl.<sup>5</sup> A61M 16/00

U.S. Cl. 128—207.14

9 Claims

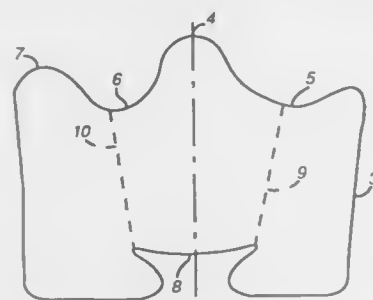


1. In a suctioning device for use in removal of fluid mucous from the trachea and nostrils of a newborn infant, to prevent aspiration of such fluid into the infant's lungs before first breath, the combination comprising:

- (a) a vertically, longitudinally upright container having a bottom wall with an opening therein to pass mucous into the container via a tubular catheter, and a top cap including permanently attached hanger means extending into said container and with an opening therein to pass suction air from the container interior toward a suction mouthpiece,
- (b) baffle means in the container to intercept upward flow of mucous toward the top cap, the baffle means extending generally laterally in the container,
- (c) a duct in the container to receive flow of mucous via said opening in the bottom wall, the duct having an outlet end located to eject mucous in a generally downward direction in the container,
- (d) and a filter above the baffle, to filter air being sucked from the container interior toward the mouthpiece via the top cap opening, the filter located proximate the top cap and in alignment with the suction tubing,
- (e) said hanger means suspended the baffle means and filter from the top cap to be located above said duct, said top cap being removable to allow quick access to said baffle means and filter, and pour out of mucous.



diac insulator is in use positioned about the human heart; and  
(e) a third recess means (8) so formed and configured to allow the insulator to flex and fold when the cardiac insulator is in use positioned about the human heart;



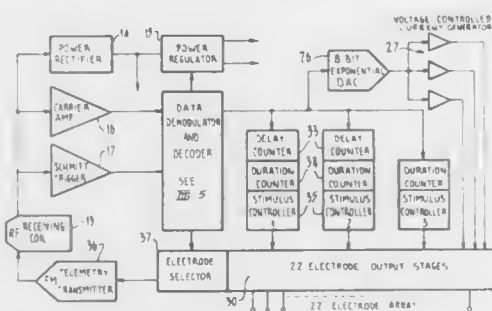
the cardiac insulator comprising at least one layer means of flexible polymeric foam membrane so configured as to thermally insulate substantially all of the posterior and lateral surfaces of the myocardium from the pericardial cavity, and to insulate both left and right phrenic nerves from the effects of cold substances or devices placed between the myocardium and said insulator.

#### 4,947,844 RECEIVER/STIMULATOR FOR HEARING PROSTHESIS

Hugh J. McDermott, Kilda, Australia, assignor to The University of Melbourne, Parkville, Australia  
Filed Sep. 6, 1985, Ser. No. 773,057  
Claims priority, application Australia, Sep. 7, 1984, PG7007  
Int. Cl.<sup>5</sup> A61N 1/32

U.S. Cl. 128—421

8 Claims



1. In a prosthetic device including several electrodes by means of which electrical stimulation is achieved, the improvement comprising, means controlling the delivery of electrical stimulus current to each of said electrodes in a series of spaced pulses, each spaced pulse being separated by an interval of zero current which has a duration longer than each spaced pulse, the waveform of said stimulus current comprising a series of said spaced pulses of one polarity followed by an equal number of said spaced pulses of opposite polarity whereby the sum of all the electrical charge transferred through each electrode is approximately zero at the end of a stimulating current waveform.

#### 4,947,845 METHOD OF MAXIMIZING CATHETER LONGEVITY IN AN IMPLANTABLE MEDICATION INFUSION SYSTEM

Mark W. Davis, Newbury Park, Calif., assignor to Pacesetter Infusion, Ltd., Sylmar, Calif.  
Filed Jan. 13, 1989, Ser. No. 297,506  
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.  
Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—637

21 Claims



1. A method of enhancing the period of time that an implanted intraperitoneal catheter used for the delivery of therapeutic medication will operate in a patient without encountering significant blockage, comprising:  
determining in a patient the level of at least one parameter from the group of parameters consisting of blood triglyceride level, blood cholesterol level, the level of insulin dosage per day, and mean blood glucose (MBG) level;  
comparing the determined level of said at least one parameter with a predetermined maximum value for said at least one parameter to determine whether said at least one parameter is greater than said predetermined maximum value or not; and  
providing an indication of increased risk of catheter blockage if said at least one parameter is greater than said predetermined maximum value.

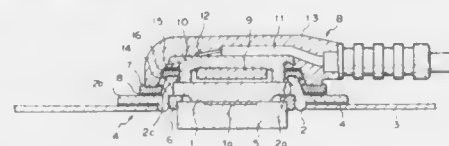
#### 4,947,846 WATERPROOF ELECTRODE DEVICE FOR A LIVING BODY

Toshiyuki Kitagawa, Chiba, and Namio Katoh, Ichikawa, both of Japan, assignors to TDK Corporation, Tokyo, Japan  
PCT No. PCT/JP88/00560, § 371 Date Feb. 6, 1989, § 102(e) Date Feb. 6, 1989, PCT Pub. No. WO88/09643, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 10, 1988, Ser. No. 353,622  
Claims priority, application Japan, Jun. 13, 1987, 62-91071[U]; Jun. 13, 1987, 62-91072[U]  
Int. Cl.<sup>5</sup> A61B 4/408

U.S. Cl. 128—640

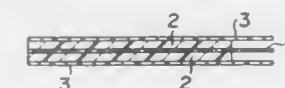
8 Claims



1. A water-proof electrode device comprising:  
an ECG electrode including  
an electrode,  
an electrode base of a magnetic material, said electrode fixed on said electrode base, and  
an electrode case accommodating said electrode and electrode base with said electrode exposed for detecting signals from a living body;

a connector for electrically connecting said electrode to a recording device including  
a permanent magnet magnetically attracted to said electrode base, and  
a connector main body accommodating said permanent magnet; and  
water penetration prevention seal members made of a closed-cell type foam material interposed between said electrode case and said connector main body to preclude entry of water between the case and main body.

4,947,847  
ELECTRICALLY CONDUCTIVE ADHESIVE  
Kozo Nakao, and Susumu Hirokawa, both of Niigata, Japan, assignors to Kyowa Gas Chemical Industry Co., Ltd., Tokyo, Japan  
Division of Ser. No. 819,146, Jan. 15, 1986, Pat. No. 4,842,768.  
This application Aug. 3, 1988, Ser. No. 227,988  
Claims priority, application Japan, Jan. 16, 1985, 60-5488  
Int. Cl.<sup>5</sup> A01B 1/00; A61B 15/04  
U.S. Cl. 128—640

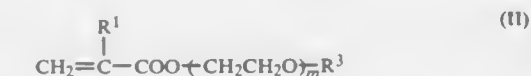


1. A biomedical electrode comprising an electrically-conductive adhesive, formed by polymerizing and cross-linking  
(a) a radically polymerizable ionic unsaturated monomer soluble in a mixture of a water-soluble polyhydric alcohol with water,  
(b) a trialkoxysilylalkyl (meth)acrylate represented by the general formula I:



wherein R<sup>1</sup> denotes hydrogen atom or methyl group, R<sup>2</sup> an alkyl group of 1 or 2 carbon atoms, and n an integer of the value of 2 or 3, and

(c) a (meth)acrylate represented by the general formula II:

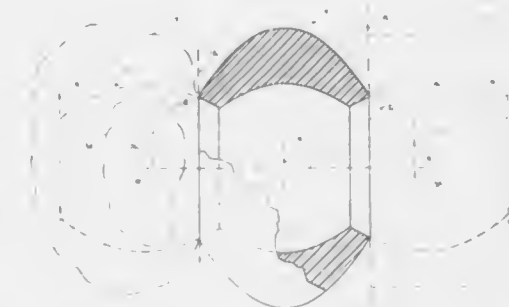


wherein R<sup>1</sup> denotes the same meaning as defined above, R<sup>3</sup> hydrogen atom or an alkyl group of 1 to 4 carbon atoms, and m an integer of the value of 1 to 23, in the presence of

(d) a water-soluble polyhydric alcohol and (e) water, wherein the amount of (a) said radically polymerizable ionic unsaturated monomer is in the range of 10 to 40% by weight, that of (b) said trialkoxysilylalkyl(meth)acrylate of said general formula I in the range of 0.05 to 1% by weight, that of (c) said (meth)acrylate of said general formula II in the range of 2 to 30% by weight, that of (d) said water-soluble polyhydric alcohol in the range of 10 to 80% by weight, and that of (e) said water in the range of 5 to 40% by weight based on the total amounts, and wherein said radically polymerizable ionic unsaturated monomer is at least one member selected from the group consisting of unsaturated organic carboxylic acids, unsaturated organic sulfonic acids, and salts thereof.

4,947,848  
DIELECTRIC-CONSTANT CHANGE MONITORING  
Tex Yuki, Baker, Oreg., assignor to Spatial Dynamics, Ltd., Baker, Oreg.  
Filed Jan. 22, 1985, Ser. No. 693,388  
Int. Cl.<sup>5</sup> A61B 5/05  
U.S. Cl. 128—653 R

4 Claims



1. A method for monitoring time-based changes in the apparent nominal dielectric constant which characterizes a defined space utilizing a bidirectionally radiating electromagnetic device which has a known radiation axis, and which is energizable to produce, along such axis, a pair of symmetrically axially spaced, defined-power-characteristic radiation volumes, said method comprising:

positioning the device so as to place one of such volumes in a condition substantially completely and congruently embracing such a defined space, and other volume in a condition substantially completely within a body of material having a nominal dielectric constant which is substantially the same as such apparent nominal dielectric constant; and

with the device energized, monitoring in such a body of material over time electromagnetic radiation changes that occur in such other volume thereby to determine apparent nominal dielectric constant changes then taking place in the defined space.

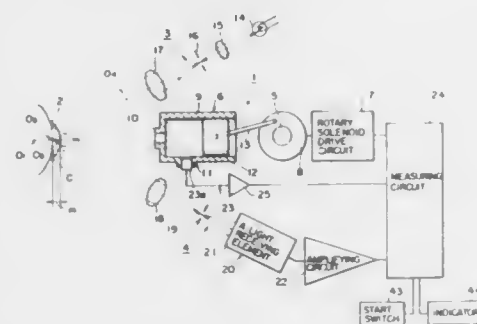
4,947,849  
NON-CONTACT TYPE TONOMETER  
Susumu Takahashi, and Fumio Ohtomo, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Japan  
Division of Ser. No. 743,417, Jun. 11, 1985, abandoned. This application Jul. 20, 1987, Ser. No. 75,543  
Claims priority, application Japan, Jun. 12, 1984, 59-119099  
Int. Cl.<sup>5</sup> A61B 3/16

U.S. Cl. 128—648

3 Claims

1. A non-contact type tonometer comprising:  
fluid generating means for generating a pulse of pressurized fluid, and for discharging said pulse of pressurized fluid toward a cornea of an eye to be tested to transfigure the cornea from convexity to a predetermined transfiguration shape, said fluid generating means including a cylinder, said cylinder having a nozzle with a tip portion extending toward the cornea, a piston reciprocally disposed within said cylinder, and driving means for reciprocally moving said piston to pressurize said fluid and discharge said pressurized fluid through said nozzle toward the cornea; cornea transfiguration detecting means for opto-electrically detecting the occurrence of said predetermined transfiguration shape of the cornea;

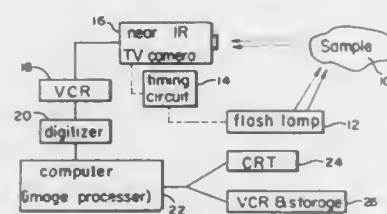
pressure detecting means, responsive to said cornea transfiguration detecting means, for directly detecting the pressure of said pulse of fluid when the cornea assumes said predetermined transfiguration shape; and intraocular pressure deducing means for determining the intraocular pressure of the eye in accordance with said detected pressure of said fluid pulse;



wherein said driving means includes linear motor and a source of electrical current for powering said motor, and said pressure detecting means includes means for measuring the level of said source of electrical current and means for determining said detected fluid pressure in accordance with said measured level of electrical current.

**4,947,850**  
**METHOD AND APPARATUS FOR IMAGING AN INTERNAL BODY PORTION OF A HOST ANIMAL**  
Jane Vanderkool, and David Wilson, both of Philadelphia, Pa., assignors to Trustees of the University of Pennsylvania, Philadelphia, Pa.

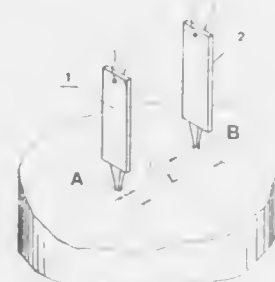
Filed Mar. 11, 1988, Ser. No. 166,710  
Int. Cl.<sup>5</sup> A61B 5/00  
U.S. Cl. 128—654 18 Claims



1. A method for imaging oxygen-containing internal body portion of a host animal which comprises:
  - (a) adding and mixing into a body fluid of the host animal a phosphorescent composition compatible with said body fluid, the phosphorescence of said composition being quenchable with oxygen in said body portion;
  - (b) irradiating said body portion with a pulse of light of a wavelength and for a time sufficient to effect phosphorescence of said composition to be omitted as light from said body portion, which phosphorescence decays with time;
  - (c) scanning across said body portion to detect said emitted light and the decay of said emitted phosphorescence across said body portion;
  - (d) relating any variations in said decay across said body portion to variations in structure of said body portion based on oxygen contained by the body portion; and
  - (e) displaying an image of said variations in structure of said body portion based on oxygen contained by said body portion.

**4,947,851**  
**METHOD AND DEVICE FOR ACOUSTIC TESTING OF ELASTICITY OF BIOLOGICAL TISSUES**  
Armen P. Sarvazyan; Viktor Ponomarev, both of Pushchino, U.S.S.R.; Dusan Vucelic; Goran Popovic, both of Belgrade, Yugoslavia, and Akiva Veksler, Pushchino, U.S.S.R., assignors to Institute for Physical Chemistry, Belgrade, Yugoslavia and Institute for Biological Physics of the USSR Academy of Science, Moscow, U.S.S.R.

Filed Aug. 18, 1988, Ser. No. 234,330  
Claims priority, application Yugoslavia, Feb. 19, 1988, 325/88  
Int. Cl.<sup>5</sup> A61B 8/00  
U.S. Cl. 128—660.02 6 Claims



1. A method for non-invasive acoustic testing of elasticity of soft biological tissues by transmitting and receiving acoustic waves, comprising the steps of:
  - providing a probe including one transmitting flexural bimorphous transducers and two receiving flexural bimorphous piezotransducers all having contact tips and mounted to a body of said probe so that vectors of displacement of flexural oscillations in the transmitting and receiving piezotransducers have a direction which coincides with a line connecting the contact tips of said piezotransducers;
  - applying said probe to a tissue being tested so that said contact tips of said piezotransducers are pressed against said tissue with a standardized force adjusted in said probe within a predetermined range;
  - exciting a pulse of tangential deformation on a surface of said tissue by said transmitting piezotransducer;
  - detecting a surface wave propagating in the tissue from the transmitting piezotransducer to the receiving piezotransducers;
  - determining the time elapsed between the transmitting and receipt of an acoustic pulse travelling across the surface of the tissue; and
  - converting a value of the elapsed time determined into a value of a velocity of the surface wave.

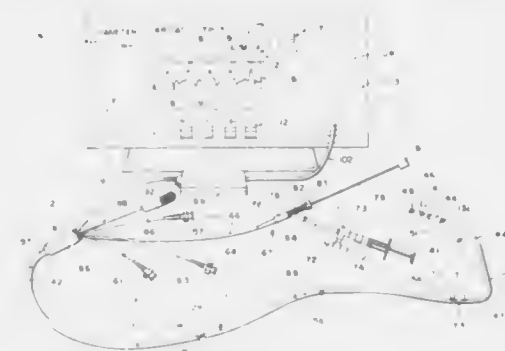
**4,947,852**  
**APPARATUS AND METHOD FOR CONTINUOUSLY MEASURING VOLUMETRIC BLOOD FLOW USING MULTIPLE TRANSDUCER AND CATHETER FOR USE THEREWITH**

Menahem Nassi; Paul D. Corl, both of Palo Alto; Ronald G. Williams, Menlo Park; Mark W. Cowan, Fremont, and Jerome Segal, Palo Alto, all of Calif., assignors to Cardiometrics, Inc., Mountain View, Calif.

Filed Oct. 5, 1988, Ser. No. 254,317  
Int. Cl.<sup>5</sup> A61B 8/12  
U.S. Cl. 128—662.06 24 Claims

1. In an apparatus for measuring volumetric flow of a liquid in a vessel having a wall and having an axis extending longitudinally of the vessel parallel to the vessel wall, a flexible catheter adapted to be disposed in the vessel, first and second ultrasonic transducers carried by the catheter on one side of the catheter and facing the wall of the vessel so that respective first and second transducers from the transducers each approximately cross the longitudinal axis of the vessel, the first trans-

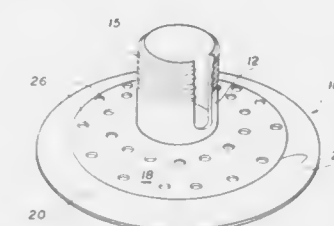
ducer beam being inclined at an angle with respect to the longitudinal axis of the vessel, the second transducer beam being inclined in a direction which is generally perpendicular to the longitudinal axis of the vessel and instrumentation means connected to the first and second ultrasonic transducers in



conjunction with said instrumentation means whereby the first transducer measures the velocity profile of the flow of the liquid in the vessel by Doppler shift measurement and the second transducer in conjunction with said instrumentation means measures at least a portion of the diameter of the vessel and the velocity profile of the flow of the liquid in the vessel.

**4,947,853**  
**SENSOR SUPPORT BASE AND METHOD OF APPLICATION**

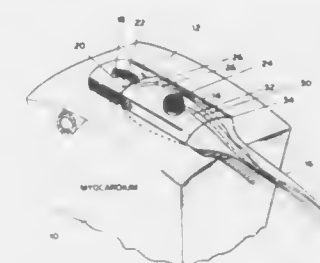
Edward H. Hon, 11 Bradbury Hills Rd., Bradbury, Calif. 91010  
Continuation-in-part of Ser. No. 915,130, Oct. 12, 1986, which is a continuation-in-part of Ser. No. 780,398, Sep. 26, 1985, and a continuation-in-part of Ser. No. 858,713, May 2, 1986, abandoned. This application Nov. 9, 1987, Ser. No. 118,441  
Int. Cl.<sup>5</sup> A61B 8/00  
U.S. Cl. 128—662.03 46 Claims



1. A sensor support adapted to be adhesively attached to a patient comprising a support base, said support base having an upper surface and a lower surface and having an opening therein to receive a removable pressure transducer sensor, and said support base having a first relatively rigid inner portion surrounding the opening and a distinct second relatively flexible outer portion attached to at least a portion of the periphery of said relatively rigid portion being substantially more flexible than the inner portion.

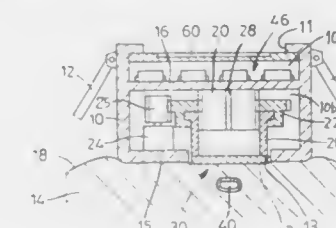
**4,947,854**  
**EPICARDIAL MULTIFUNCTIONAL PROBE**  
Raphael S. Rabinovitz; Craig J. Hartley, and George P. Noon, all of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Filed Sep. 13, 1988, Ser. No. 243,915  
Int. Cl.<sup>5</sup> A61B 8/12  
U.S. Cl. 128—662.04 6 Claims



1. A multifunctional biological sensorprobe comprising:
  - a probe body of a biocompatible, nonbioreactive material;
  - a first piezoelectric crystal that both receives and transmits signals partially embedded in said probe body with one exposed face at an angle between about 30° and about 60° at the outer surface of said probe body for measuring blood flow velocity in a vessel;
  - lead wires extending from said first piezoelectric crystal;
  - a second piezoelectric crystal that both receives and transmits signals partially embedded in said probe body with one face in a flush manner to the outer surface of said probe body for measuring muscle thickening; and
  - lead wires extending from second piezoelectric said crystal.

**4,947,855**  
**BLOOD PRESSURE MEASURING APPARATUS**  
Hifumi Yokoe, Kosai, and Chikao Harada, Nagoya, both of Japan, assignors to Colin Electronics Co., Ltd., Japan  
Filed Feb. 16, 1989, Ser. No. 310,898  
Int. Cl.<sup>5</sup> A61B 5/021  
U.S. Cl. 128—672 5 Claims



1. A blood pressure measuring apparatus comprising:
  - a housing detachably set on a body surface of a subject;
  - a cylindrical member accommodated in said housing;
  - a pressure sensor secured to one of axial ends of said cylindrical member, said pressure sensor being opposed to said body surface when said housing is set on said body surface, said pressure sensor being pressed against said body surface so as to detect pulse wave produced from an arterial vessel of said subject, said pressure sensor generating a pulse wave signal representing the detected pulse wave;
  - pressing means for pressing said pressure sensor against said body surface by moving said cylindrical member toward said body surface, said pressing means comprising (a) an externally threaded member secured to said housing and having an axis, said axis being substantially perpendicular



to said body surface when said housing is set on said body surface, (b) an internally threaded member engaged with said externally threaded member and having a multiplicity of outer teeth formed in an outer circumference thereof, (c) a motor having an output shaft, and (d) a pinion secured to said output shaft of said motor and engaged with said outer teeth of said internally threaded member, the other axial end of said cylindrical member being fitted on said externally threaded member and engaged with said internally threaded member such that said cylindrical member is coaxial with said externally and internally threaded members,

said pressing means further comprising (e) a means for guiding said cylindrical member along said axis of said externally threaded member without causing rotation of said cylindrical member about said axis, and (f) a means for permitting said internally threaded member to be rotated relative to said cylindrical member on said externally threaded member and thereby be moved together with said cylindrical member along said axis, whereby said pressure sensor secured to said cylindrical member is moved along said axis toward or away from said body surface without rotation of said pressure sensor about said axis when said motor is operated and consequently said internally threaded member is rotated on said externally threaded member and thereby is moved along said axis; control means for determining an optimum pressing force of said pressing means based on said pulse wave signal, and controlling said pressing means to press said pressure sensor against said body surface with said optimum pressing force, said controlling means determining a blood pressure in said arterial vessel based on the pulse wave signal supplied from said pressure sensor pressed with said optimum pressing force; and said pressing means and said control means being accommodated in said housing.

4,947,856

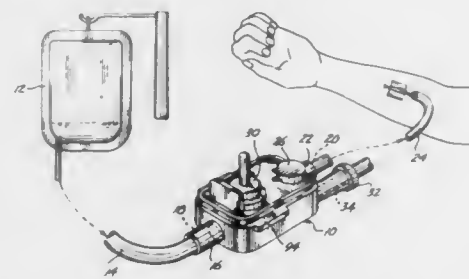
#### FLUID PRESSURE MONITORING AND FLOW CONTROL APPARATUS

Robert W. Beard, Placerville, Calif., assignor to Abbott Laboratories, Abbott Park, Ill.

Filed Oct. 26, 1988, Ser. No. 262,887  
Int. Cl. A61B 5/0215

U.S. Cl. 128—673

18 Claims



1. An apparatus for monitoring fluid pressure and controlling flow in a fluid line, said apparatus comprising:
  - (a) a base having an upper surface, an inlet port, and a first outlet port, said upper surface including a channel formed therein in fluid communication with said inlet port and said first outlet port, said inlet and first outlet ports being adapted to connect to the fluid line;
  - (b) a flexible membrane having a planar configuration while relaxed, said membrane overlying the channel in said upper surface of said base, said membrane being resiliently deformable from the relaxed planar configuration to a deformed configuration in which said membrane is curvedly deformed to block fluid flow through said channel;

- (c) means for sealing said membrane to said upper surface of said base;
- (d) means for selectively deforming said membrane from its relaxed planar configuration to its deformed curved configuration; and
- (e) pressure sensing means in fluid communication with said channel for sensing fluid pressure in the fluid line, said pressure sensing means being disposed within said base.

4,947,857

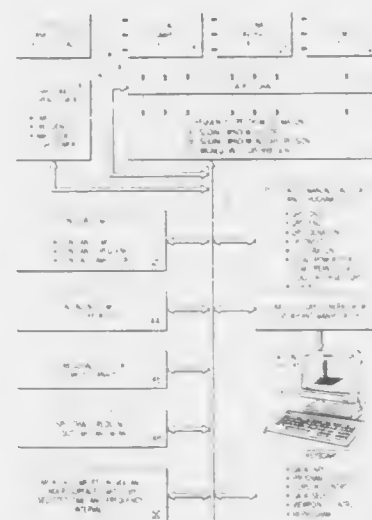
#### METHOD AND APPARATUS FOR ANALYZING AND INTERPRETING ELECTROCARDIOGRAMS USING SPECTRO-TEMPORAL MAPPING

David E. Albert, McAlester, and Paul Lander, Norman, both of Okla., assignors to Corazonix Corporation, Oklahoma City, Okla.

Filed Feb. 1, 1989, Ser. No. 305,293  
Int. Cl. A61B 5/04

U.S. Cl. 128—696

28 Claims



1. The system for evaluating an electrocardiogram (ECG) of a patient which comprises:
  - means for calculating from the ECG and storing digital data defining a three dimensional graphic surface representative of the spectral frequency of the ECG in which the first axis is the time domain of the ECG, the second axis is the frequency domain, and the third axis is representative of the amplitude or power domain;
  - means for displaying the surface in a three dimensional visually discernible presentation; and
  - means for producing visually discernible indicia on the surface selected to reveal predetermined characteristics of the HRECG useful in medically evaluating the patient.

4,947,858

#### METHOD AND APPARATUS FOR DATA COMPRESSION IN AN ECG MONITORING SYSTEM

Nancy C. Smith, McMinnville, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

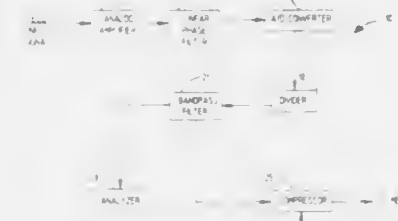
Filed Jan. 31, 1989, Ser. No. 305,258  
Int. Cl. A61B 5/04

U.S. Cl. 128—696

15 Claims

1. A method for compressing a sequence of input signals including analog ECG beats, comprising the steps of:
  - (a) conditioning an input analog ECG beat into digital data by sampling and digitizing said input ECG beat;
  - (b) identifying a QRS peak and a QRS region in said conditioned input ECG beat;

- (c) selectively sub-sampling said conditioned input ECG beat by
  - (i) dividing said QRS region into a plurality of sub-regions, said sub-regions being generally centered about said QRS peak; and by
  - (ii) selectively sub-sampling said sub-regions at different ratios; and
  - (d) encoding a sub-sampled input beat.



4,947,859

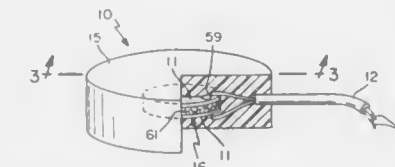
#### BIO-ACOUSTIC SIGNAL SENSING DEVICE

James E. Brewer, Maplewood, and Mark W. Kroll, Minnetonka, both of Minn., assignors to Chert Medical, Inc., Edina, Minn.

Filed Jan. 25, 1989, Ser. No. 301,796  
The portion of this patent subsequent to Jan. 16, 2004, has been disclaimed.  
Int. Cl. A61B 5/02

U.S. Cl. 128—715

21 Claims



1. A sound sensor apparatus for reception of bio-acoustic signals from the body of a patient and being for use with a medical diagnostic device, comprising:
  - a. a unitary and flexible containment structure consisting entirely of a pliable, homogeneous polymeric material which is substantially acoustically matched to the human body, and being for conforming placement to contact the patient body surface;
  - b. sound sensing means embedded and enclosed within said containment structure, said sound sensing means being constructed and arranged to receive and convert bio-acoustic signals to electrical signals; and
  - c. connection means communicatively linked to said sound sensing means for transmitting said electrical signals to the medical diagnostic device.

4,947,860

#### NON-INVASIVE METHOD AND APPARATUS FOR MEASURING MIXED VENOUS CARBON DIOXIDE PRESSURE (PvCO<sub>2</sub>) AND OTHER PHYSIOLOGICAL VARIABLES

Joseph Fisher, 113 Franmore Cir., Thornhill, Ontario, Canada (L4J 3B9), assignor to Joseph Fisher, Thornhill, Canada

Filed Sep. 29, 1986, Ser. No. 912,969  
Claims priority, application Canada, Oct. 10, 1985, 492766  
Int. Cl. A61B 5/08

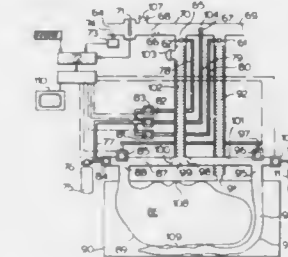
U.S. Cl. 128—719

19 Claims

1. A method of determining the mixed venous PCO<sub>2</sub>

(PvCO<sub>2</sub>), the method of determining the mixed venous PCO<sub>2</sub> (PvCO<sub>2</sub>) comprising the steps of:

- (a) measuring the PCO<sub>2</sub> of the gases inhaled (PICO<sub>2</sub>) exhaled by the patient under controlled conditions without re-breathing
- (b) causing the patient to inhale a test gas containing at least a small concentration of CO<sub>2</sub> and continuing to measure



- the PCO<sub>2</sub> of the inspired and expired gases, the patient taking at least two breaths without re-breathing
- (c) determining the PCO<sub>2</sub> of the inspired gases (Pi) and the end tidal PCO<sub>2</sub> of expired gases (PECO<sub>2</sub>)
- (d) determining the differences between the end tidal PCO<sub>2</sub> and inspired PCO<sub>2</sub> under control and test conditions, relating these differences to the inspired PCO<sub>2</sub> to determine the mixed venous PCO<sub>2</sub> (PvCO<sub>2</sub>).

4,947,861

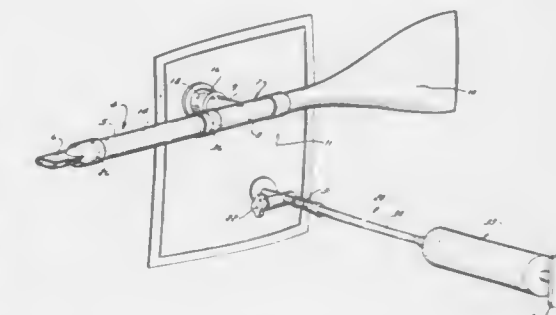
#### NONINVASIVE DIAGNOSIS OF GASTRITIS AND DUODENITIS

Lyle H. Hamilton, 1034 N. 124th Street, Wauwatosa, Wis. 53226

Filed May 1, 1989, Ser. No. 345,843  
Int. Cl. A61O 5/08

U.S. Cl. 128—719

9 Claims



1. A method of noninvasive testing for presence of *Campylobacter pylori* in the gastrointestinal tract of a patient, characterized by the steps of:
  - A. ingestion by the patient of a quantity of urea;
  - B. after an interval of not substantially less than 10 minutes following ingestion of urea, production by the patient of a sample of expired alveolar air by exhalation;
  - C. directing the expired alveolar air, as it issues from the patient, to flow past and in intimate contact with breath dehydration means for removing water from said expired air but preserving ammonia that may be present therein, comprising a desiccant body to alkaline hygroscopic material, and thus producing a dehydrated alveolar air sample with and an unchanged ammonia content; and
  - D. conducting at least a portion of the dehydrated alveolar air sample into contact with a sensor and producing with the sensor a perceptible signal in response to the presence of ammonia in that sample.

8. A subassembly adapted for incorporation in breath collection apparatus of the type comprising a mouthpiece into which a patient exhales to provide a breath sample, a storage bag in which the breath sample is collected and which has an inlet fitting for connection with said mouthpiece, an inlet valve associated with said inlet fitting through which exhaled breath is permitted to enter the storage bag but whereby escape of air from that bag is prevented, and an outlet fitting comprising a further valve that provides for controlled withdrawal of air from the storage bag for delivery to a sensor, said subassembly providing for the preservation of ammonia that may be present in air exhaled by the patient and collected in the storage bag and being characterized by:

- A. a duct for directing exhaled breath from the mouthpiece towards said storage bag,
  - (1) said duct having an inlet end at which said mouthpiece is connectable and
  - (2) having an opposite outlet end that is connectable with said inlet fitting;
- B. a body of solid state desiccant material in said duct, said desiccant material
  - (1) defining a network of small air passages that cooperate to provide the material with a large surface area per unit of its gross volume and
  - (2) comprising hygroscopic alkaline means for removing water without reacting with any ammonia that may be present,
 so that exhaled breath which has passed through said desiccant material in flow towards the storage bag comprises a dehydrated breath sample that is substantially free from water vapor;
- C. check valve means in said duct, near one of said ends thereof, permitting flow of air through the duct in a forward direction from its inlet end towards its outlet end but preventing flow of air therethrough in the opposite direction; and
- D. means in said duct, near the other of said ends thereof, cooperating with said check valve means for confining said body of material in the duct and permitting flow of air through the duct in said forward direction.

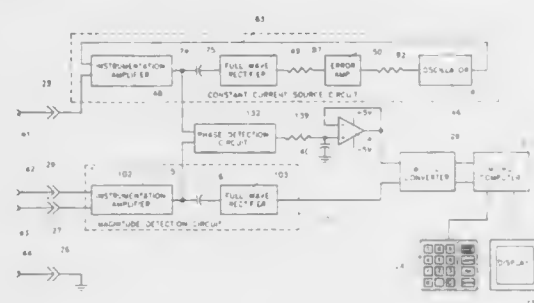
4,947,862

## BODY COMPOSITION ANALYZER

Kevin A. Kelly, Columbus, Ohio, assignor to Danninger Medical Technology, Inc., Columbus, Ohio  
Filed Oct. 28, 1988, Ser. No. 263,867  
Int. Cl. A61B 5/05

U.S. Cl. 128-734

7 Claims



1. A body composition analyzer comprising:
  - four electrodes for connection to a patient;
  - a constant current source circuit connected to one of the electrodes, the constant current source circuit comprising: an oscillator providing an output to the one of the electrodes;
  - an instrumentation amplifier connected to the object of the oscillator; and
  - a full wave rectifier connected to the output of the instru-

mentation amplifier and supplying an error signal to the oscillator;

a magnitude detection circuit connected to two of the electrodes for measuring the current from the electrodes;

a phase detection circuit connected to receive two signals, one signal from the constant current source circuit and the other signal from the magnitude detection circuit, the phase detection circuit measuring the phase shift between the two signals; and

microcomputer means connected to the phase detection circuit and the magnitude detection circuit for measuring resistance and reactance of the patient and converting measurements to an indication of the amount of body fat.

4,947,863

## ENERGY-DISSIPATING, SAFETY BLOOD COLLECTION TUBE HOLDER

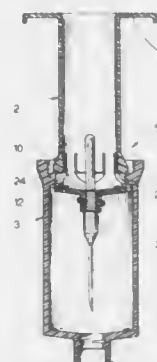
Terry M. Haber; Clark B. Foster, both of El Toro, and William H. Smedley, Lake Elsinore, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Aug. 30, 1988, Ser. No. 238,119

Int. Cl. A61B 5/14

U.S. Cl. 128-764

22 Claims



1. A shielded syringe comprising:
  - a hollow inner cylinder having proximal and distal ends;
  - a hypodermic needle cannula supported at and extending outwardly from the distal end of said inner cylinder, said cannula also communicating with the interior of said inner cylinder;
  - an outer protective sleeve having an open proximal end and an opening in a substantially closed distal end, said outer sleeve being coaxially aligned with and axially advanceable relative to said inner cylinder from a retracted position, where said cannula projects outwardly through the opening in the distal end of said outer sleeve for penetrating the tissue of a patient, to an extended position, where said cannula is surrounded and shielded by said sleeve;
  - means for locking said outer sleeve in the axially extended position relative to said inner cylinder; and
  - means for decelerating said outer sleeve and damping the locking forces generated when said sleeve is advanced to and locked in the axially extended position, so as to prevent needle cannula whiplash and the possible splattering of the patient's blood, said decelerating and damping means including first surface means extending from said inner cylinder and first radial projection means extending from said outer sleeve, said first surface means being pivotally attached to said inner cylinder so as to be engaged and rotated into the hollow interior of said inner cylinder by the first radial projection means of said outer sleeve when said sleeve is advanced to the axially extended position.

4,947,864

## GUIDEWIRE EXCHANGE CATHETER

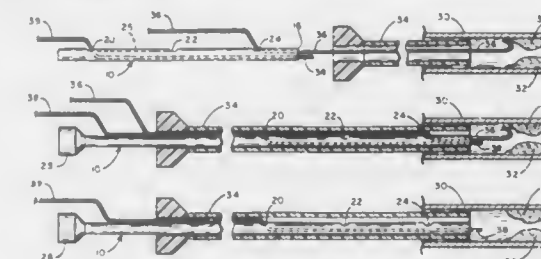
Rick L. Shockey, Eagan, and Mark A. Rydell, Golden Valley, both of Minn., assignors to Schoelder (U.S.A.), Inc. A Pfizer Company, Minneapolis, Minn.

Division of Ser. No. 322,363, Mar. 13, 1989. This application Feb. 22, 1990, Ser. No. 482,907

Int. Cl. A61B 5/00

U.S. Cl. 128-772

1 Claim



1. A method for exchanging a first guidewire used with a guide catheter disposed within the vascular system of a living body for a second guidewire comprising the steps of:

- (a) providing an elongated flexible plastic tubular member having a proximal end and a distal end with a first lumen extending the entire length thereof and having at least three spaced-apart apertures longitudinally aligned a relatively short distance from said distal end and extending through the side wall of said tubular member to said first lumen, with a slit extending through said wall to said first lumen between the most proximal and second-most proximal ones of said spaced-apart apertures;
- (b) placing the distal end of said second guidewire through said most proximal aperture in said tubular member and advance the distal end of said second guidewire to said distal end of said tubular member;
- (c) inserting the proximal end of said first guidewire through the distal end of said tubular member through a portion of said first lumen and out the most distal one of said aperture;
- (d) advancing said tubular member in the distal direction down said first guidewire while restraining movement of said first guidewire until said distal end of said tubular member is close to the distal end of said first guidewire in said vascular system;
- (e) withdrawing said first guidewire from said guide catheter;
- (f) restraining longitudinal movement of said second guidewire while pulling said tubular member proximally such that a portion of said second guidewire passes through said slit and until said second-most proximal aperture is visible beyond the proximal end of said guide catheter; and
- (g) releasing the proximal end of said second guidewire and removing the remaining distal portion of said tubular member from said guide catheter and from said second guidewire leaving said second guidewire in place within said guide catheter.

4,947,865

## SENSOR SUPPORT PLATE WITH DETACHABLE RING

Edward H. Hon, Bradbury; Edward D. Hon, San Francisco, and Robert W. Hon, Los Altos, all of Calif., assignors to The Hon Group, Encino, Calif.

Continuation-in-part of Ser. No. 118,441, Nov. 9, 1987, which is a continuation-in-part of Ser. No. 915,120, Oct. 2, 1986, which is a continuation-in-part of Ser. No. 780,398, Sep. 26, 1985, abandoned, and a continuation-in-part of Ser. No. 858,713, May 2, 1986, abandoned, and a continuation-in-part of Ser. No. 163,859, Mar. 3, 1988. This application Oct. 17, 1988, Ser. No. 258,554

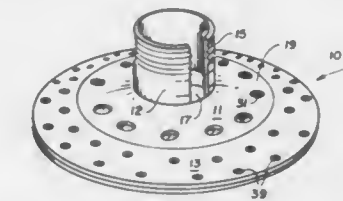
Int. Cl. A61B 5/103

U.S. Cl. 128-778

28 Claims

1. A sensor support comprising a support base, having: an

opening therein, for supporting a transducer sensor and support base having a relatively rigid inner portion with an opening therethrough such that a transducer can be reversibly



passed through the base, and a relatively flexible outer ring portion non integral with the inner portion and which is removably attached to at least a portion of the periphery of said relatively rigid inner portion.

4,947,866

## MEDICAL ELECTRICAL LEAD

Joseph F. Lessar, Coon Rapids; Duane L. Rosenberg, Columbia Heights; Robert E. Kraska, Minneapolis; James M. Speckien, Vadnais Hts., and James E. Upton, New Brighton, all of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

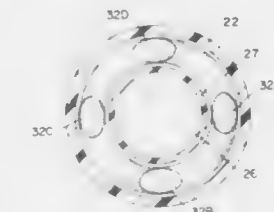
Division of Ser. No. 156,145, Feb. 16, 1988, Pat. No. 4,860,446.

This application May 19, 1989, Ser. No. 354,656

Int. Cl. A61N 1/05

U.S. Cl. 128-784

4 Claims



1. A medical electrical lead comprising:
  - an elongated insulative sheath fabricated of a polyether urethane;
  - an elongated coiled conductor, located within said polyether urethane sheath;
  - an electrode coupled to a distal end of said elongated coiled conductor; and
  - an electrical connector coupled to a proximal end of said elongated conductor; and
  - wherein said elongated coiled conductor comprises a coiled wire of a first alloy including cobalt, molybdenum or chromium, provided with a coating of a second metal selected from the group consisting of platinum, titanium, niobium or tantalum.

4,947,867

## SURGICAL CLOTHING AND LABELING MEANS THEREFOR

William F. Keeton, 135 Woodchase Ct., Atlanta, Ga. 30319  
Filed Sep. 15, 1988, Ser. No. 244,280

Int. Cl. A61F 13/00

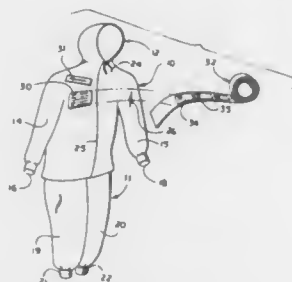
U.S. Cl. 128-846

9 Claims

1. Patient protection apparatus, for use in protecting a patient scheduled for surgery, comprising a disposable surgical gown, said gown including a shirt having at least one opening therein for allowing access to the body of the patient, said gown being formed of a disposable material and easily cuttable for providing access to the body of the patient through said



gown, and labelling means receivable selectively on said gown and the patient for identifying the patient and located for



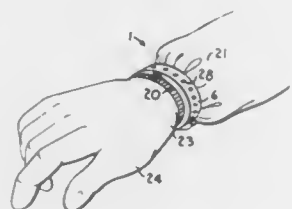
providing additional information about the location of the surgery.

4,947,868

**PROTECTIVE CUFF APPARATUS FOR SURGERY**  
Arnold Schoolman, Kansas City, Mo., assignor to Schoolman Scientific Corporation, Kansas City, Mo.  
Filed Aug. 8, 1988, Ser. No. 229,510  
Int. Cl.<sup>3</sup> A61G 9/16

U.S. Cl. 128—847

15 Claims



1. A cuff apparatus for use by a medical practitioner or the like during a procedure wherein contaminants may be released into the air; said apparatus for producing a zone of negative pressure near the hands of the practitioner to draw airborne contaminants in the proximity of the hands into said apparatus; said apparatus comprising:

- (a) cuff means adapted to be secured in close proximity to the hands of the practitioner such that the hands of the practitioner are fully usable in a medical procedure and are exposed to ambient air; said cuff means including at least one aperture therein;
- (b) suction pump means for inducing a negative pressure for drawing air therethrough; and
- (c) conduit means for flow connecting said apparatus of said cuff means to said suction pump means where air is drawn through said aperture to thereby draw airborne contaminants in the proximity of said hands of said practitioners into said apparatus.

4,947,869

**PATIENT RESTRAINT DEVICE**  
Oliver J. Grant, 7312 S. Scherrei Dr., Franklin, Wis. 53132  
Filed Jan. 22, 1990, Ser. No. 468,202  
Int. Cl.<sup>3</sup> A61F 13/00

U.S. Cl. 128—874

7 Claims

1. A patient restraint device for restraining invalid patients and the like, comprising:
- a generally unitary vest body having two face portions merging at shoulder portions, and having a neck opening formed between said shoulder portions;
  - each of said face portions having a distal edge portion formed at the ends of said face portions furthest removed from said neck opening;
  - each of said face portions terminating at said distal edge

portion in horizontal straps, two such straps for each of said face portions, one at each side edge thereof; said distal edge portion of one of said face portions being longer than said distal edge portion of the other of said face portions; and



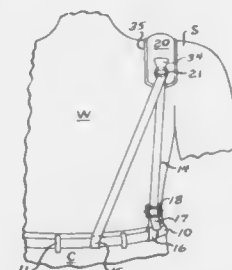
an opening formed in said face portion having the longer of the two distal edge portions, adapted to receive said two straps from said face portion having the shorter of the two distal edge portions.

4,947,870

**ACROMIOCLAVICULAR SUPPORT**  
Angelo C. Larcher, 8036 S. Western Ave., Chicago, Ill. 60620  
Filed Jun. 6, 1988, Ser. No. 161,113  
Int. Cl.<sup>3</sup> A61F 5/04, 5/00

U.S. Cl. 128—875

18 Claims



1. A shoulder support for providing downward pressure upon an acromioclavicular separation of the shoulder of a wearer to substantially immobilize and permit healing of an acromioclavicular joint, said support comprising a shoulder pad adapted for seating over the shoulder extending from front and back of a wearer, strap connecting means on opposite sides of said pad, and strap means for the front and back of said wearer extending from said strap connecting means to a lateral member adapted for connecting said strap means around the torso of the wearer, said strap means being adjustable to draw said pad under tension toward said lateral member for securely holding said pad over said joint, said strap means are slidably securable on said lateral member.

4,947,871

**PROCESS THE SURGICAL CORRECTION OF AMETROPIA OF ONE OR BOTH EYES OF LIVING BEINGS**

Hans R. Grieshaber, Schaffhausen, Switzerland, assignor to Grieshaber & Co. AG Schaffhausen, Schaffhausen, Switzerland

Filed Jul. 18, 1988, Ser. No. 220,803

Claims priority, application Switzerland, Aug. 10, 1987, 3056/87

Int. Cl.<sup>3</sup> A61F 9/00

U.S. Cl. 128—898

3 Claims



1. Process for the surgical correction of ametropia, particularly such ametropia in the optical system of one or both eyes of living beings, which is dependent on a corneal curvature, comprising the following steps:

- (a) determining the refraction of the individual ametropic eye;
- (b) determining a corneal curvature of the eye;
- (c) calculating a correction radius (r) of the corneal curvature from a value of the corneal curvature determined in the step (b);
- (d) calculating a grinding depth, whilst taking into account the corneal curvature and correction radius (r) determined in the steps (b) and (c);
- (e) determining the optical center (Z) of the cornea; and
- (f) grinding or polishing the cornea in its optical curvature region for a displacement of the focal point in the retinal plane correcting the ratio of the optical axis to the refractive force.

4,947,872

**METHOD FOR FORMING GROUPS OF FILTER CIGARETTES IN A PACKETING MACHINE**  
Antonio Gamberini, Bologna, Italy, assignor to G.D. S.p.A., Bologna, Italy

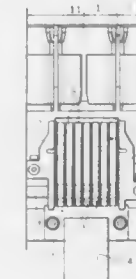
Filed Jul. 1, 1987, Ser. No. 69,404

Claims priority, application Italy, Jul. 15, 1986, 3463 A/86

Int. Cl.<sup>3</sup> A24C 5/35

U.S. Cl. 131—28.3

5 Claims



1. A method for forming groups of filter cigarettes in a packaging machine, each group being fed into a relative advancement pocket of a conveyor and consisting of a plurality

of superposed layers fed into said relative pocket by pusher means, said method comprising the step of exerting on each layer of cigarettes during said layer's entry into said pocket two different successive transverse compressive actions, the first of which causes said cigarettes of each of said layers to substantially approach each other transversely, and the second of which is more forceful than the first and is applied only to said filters.

4,947,873

**MICRO-COMPUTER CONTROLLED FULLY AUTOMATIC LIGHTING UNIT**

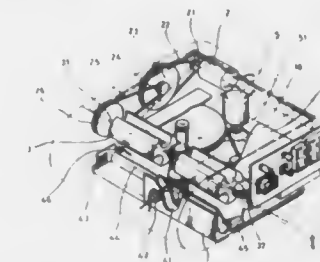
Chin C. Wang, No. 54, Hsing Noag Rd., Hsin Sheng Li, Pei Doou Chen, Chang Hua Hsien, Taiwan

Filed Jul. 31, 1989, Ser. No. 386,949

Int. Cl.<sup>3</sup> F23Q 2/00, 7/00

U.S. Cl. 131—329

5 Claims



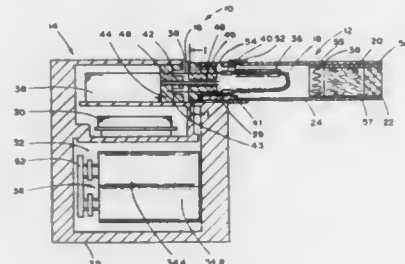
1. A microcomputer-controlled fully automatic lighting unit comprising

- a body having a top cover which has a flange at its front edge to facilitate the push and lifting of the top cover, and a front panel thereon on which a master switch, selector, counter, indicator, power indicator, and trouble indicator are provided and electrically connected to a circuit board constructed inside said body;
- a carrier plate inclinedly constructed inside said body in manner that the inner space of said body will be divided and separated into an upper part and a lower part; said upper part being able to accommodate a plurality of unpacked individual cigarettes;
- a first transmission line including a motor, a first turning wheel directly connected to said motor at the end of a turning axle of said motor, a second turning wheel being remotely connected to said first turning wheel with a first belt, a third turning wheel being co-axial with and smaller in diameter than said second turning wheel, and a fourth turning wheel being remotely connected to said third turning wheel with a second belt;
- two impellers being co-axially coupled in a manner that one end of the axle which couples said impellers will connect to said fourth turning wheel of said first transmission line; said impellers having a plurality of arched grooves formed on their outer surfaces and being located substantially at a position close to the lower end of said inclined carrier plate in a manner that cigarettes on said carrier plate will fall down into the arched grooves naturally;
- a cigarette containing portion generally located under said impellers, having a longitudinal axis parallel to the axis which couples said impellers and having an upward opened round groove longitudinally with a bottom and sidewalls formed in said containing portion, an electric eye installed at the midway of the sidewalls of said round groove, a guide plate provided outside one of said sidewalls to form an elongated passage between it and said sidewall permitting a rack to move forward and backward therein, an electric-heatable wire contained in a backboard attached to said rack at its rear end toward said first trans-

mission line, and two contact switches provided one at each end of said elongated passage; and  
a second transmission line including a motor, a first turning wheel directly connected to said motor at the end of a turning axle of said motor, a second turning wheel being remotely connected to said first turning wheel with a first belt, a third turning wheel being co-axial with and smaller in diameter than said second turning wheel, a fourth turning wheel being remotely connected to said third turning wheel with a second belt, and a gear driven by said fourth turning wheel and being able to engage with said rack.

**4,947,874**  
**SMOKING ARTICLES UTILIZING ELECTRICAL ENERGY**

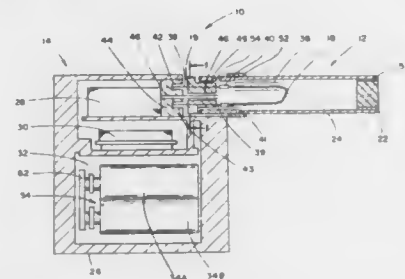
Johanny L. Brooks; Donald L. Roberts, both of Winston-Salem, and Jerry S. Simmons, Rural Hall, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.  
Filed Sep. 8, 1988, Ser. No. 242,086  
Int. Cl.<sup>5</sup> A24D 1/00; A24F 1/00, 47/00; A61M 16/00  
U.S. Cl. 131—329 202 Claims



1. A cigarette for use with a source of electrical power comprising:
  - (a) an electrical resistance heating element having a surface area greater than 1 m<sup>2</sup>/g;
  - (b) aerosol forming substance carried by the heating element prior to use; and
  - (c) tobacco.

**4,947,875**  
**FLAVOR DELIVERY ARTICLES UTILIZING ELECTRICAL ENERGY**

Johanny L. Brooks; Donald L. Roberts, both of Winston-Salem, and Jerry S. Simmons, Rural Hall, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.  
Filed Sep. 8, 1988, Ser. No. 242,083  
Int. Cl.<sup>5</sup> A24F 1/00, 47/00  
U.S. Cl. 131—330 136 Claims

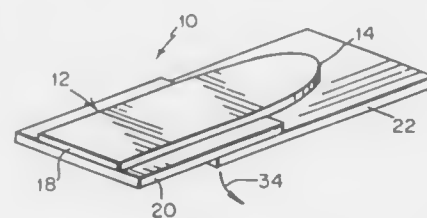


1. A disposable portion of a flavor delivery article containing a flavor substance for use with a source of electrical power comprising:
  - (a) an electrical resistance heating element having a surface area greater than 1 m<sup>2</sup>/g; and

- (b) aerosol forming substance carried by the heating element prior to use.

**4,947,876**  
**INSTANT NAIL POLISH KIT**  
Jean Larsen, 1539 Stonybrook Rd., Stonybrook, N.Y. 11790  
Filed Feb. 17, 1989, Ser. No. 311,963  
Int. Cl.<sup>5</sup> A45D 29/00

U.S. Cl. 132—73 6 Claims



1. An instant nail polish kit which comprises:
  - a plurality of thin and flat colored bodies, for adhering to fingernails and providing color for said fingernails, each body being provided with a rounded end for substantially mating engagement with a cuticle of a fingernail of a finger and an opposite, square end, and a bottom surface provided with an adhesive;
  - a first paper strip and a second paper strip adhered to said bodies, for mounting and protecting said bodies prior to employment on said fingernails;
  - the first and second paper strips each having first and second opposite end portions and being located together with a second end portion of the first strip overlapping a non-adhesive surface provided on a first end portion of the second strip;
  - said body being adhered to upper surfaces of said first and second paper strips with said square end aligned flush with the first end of said first paper strip and with said rounded end of said body protruding beyond the second end portion of the first paper strip to overlap and adhere to said surface of said second paper strip, the second end portion of the second paper strip protruding beyond the rounded end of said body and providing finger tab means for peeling said second paper strip off said rounded end of said body.

**4,947,877**  
**HAIR REPLACEMENT METHOD**  
Seymour Meyer, 495 E. Shore Rd., New York, N.Y. 11024, and Harvey J. Russo, 315 E. 65th St., New York, N.Y. 10021  
Filed Feb. 10, 1989, Ser. No. 308,490  
Int. Cl.<sup>5</sup> A41G 3/00

U.S. Cl. 132—201 7 Claims

1. A process for converting, with hair, bare or sparse areas of the skin which, after cleansing and preparing said areas, comprises the steps of:
  - (a) applying to a patch in said bare or sparse area, a film-forming solution of a pressure-sensitive silicone-based medical adhesive to form a coating on said patch;
  - (b) adhering a swatch of hair fibers to the resulting film patch by pressure embedding and adhering said fibers;
  - (c) drying the film patch with said adhered hair;
  - (d) applying a second coat of said adhesive at the patch areas where said hair is adhered forming surfaces;
  - (e) drying said second coat with an air stream;
  - (f) coating the surfaces of the hairy patches of adhesive with collodion and drying said surfaces to seal same with collodion; and
  - (g) repeating said applying, drying and coating steps (a)-(f)

in adjacent bare or sparse patches until the skin areas are covered with hair to a desired density and fullness.

**4,947,878**  
**COMPOSITIONS AND METHODS FOR THE TREATMENT OF HAIR**  
Harold R. Crews, Pembroke Pine, Fla.; Roy M. Evans, Jr., and Joseph O. Robert, both of Memphis, Tenn., assignors to Pre-emptive Marketing, Inc., Memphis, Tenn.  
Filed Mar. 18, 1987, Ser. No. 27,564  
Int. Cl.<sup>5</sup> A61K 7/09

U.S. Cl. 132—203 13 Claims



1. A composition for reductively cleaving the cysteine disulfide bonds of hair to render the hair relatively malleable, said composition comprising an aqueous solution containing from about 6 weight percent to about 14 weight percent cysteine and from about 4 weight percent to about 8 weight percent sucrose, said solution having a pH of from about 8 to about 10.

**4,947,879**  
**CONTAINER FOR FLUENT MATERIAL**  
Allan Costa, Old Westbury, N.Y., and Roger Costa, Somerset, Mass., assignors to Empire Plastic Packaging, Ltd., Farmingdale, N.Y.  
Filed Apr. 7, 1989, Ser. No. 334,323  
Int. Cl.<sup>5</sup> A45D 40/30

U.S. Cl. 132—218 11 Claims



1. A method of providing an annular lip within a container neck, the method comprising the steps of:
  - providing a said container, the container including an annular neck portion having an inner wall;
  - providing a closure for said container, the closure including a plug which is adapted to fit within said container neck portion, an outer closure portion which remains external to the container when the closure is in place, an annular lip-forming member at an inner end of said plug, and breakable coupling means between said lip-forming member and said plug;
  - said closure being dimensioned with respect to the container

neck portion to cause said lip-forming member to form an interference fit with said inner wall of the container neck portion when the plug is fully seated within said neck portion; and  
fitting the closure to the container to cause said interference fit between the lip-forming member and the inner wall of the container neck portion;  
whereby said coupling means can be subsequently broken to the closure to be removed from the container while leaving the lip-forming member fitted within said container neck portion.

**4,947,880**  
**DENTAL FLOSSING DEVICE**  
Emanuel B. Tarrson, and Dane Marie, both of Chicago, Ill., assignors to John O. Butler Company, Chicago, Ill.  
Filed Jul. 27, 1988, Ser. No. 224,668  
Int. Cl.<sup>5</sup> A61C 15/00

U.S. Cl. 132—329 18 Claims

6. A unitary one-piece dental flossing cord made exclusively of monofilament fibers, said cord being woven from a plurality of individual monofilament strands, said woven cord having physical dimensions and the physical dimensions being compressed in an end portion of said cord to form it into a leader of a diameter which is reduced with respect to a diameter of said woven cord, said strands in said end portion sticking together in a unified mass after said compression and without an addition of any other material to said monofilament, and an end section of said end portion being permanently shaped to bend back upon itself to form a hook on an end of said unified mass, said end section of said hook being long enough to thread said leader through spaces in the dental area of the mouth.

**4,947,881**  
**METHOD OF CLEANING USING HYDROCHLOROFLUOROCARBONS**  
Hillel Magid, Williamsville; Richard E. Eibeck, Orchard Park; Michael Van Der Puy, Cheektowaga, and Chien C. Li, East Aurora, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Feb. 24, 1989, Ser. No. 315,069  
Int. Cl.<sup>5</sup> C23G 5/028; B08B 3/08

U.S. Cl. 134—40 21 Claims

1. A method of cleaning a surface of a substrate which comprises treating said surface with a solvent comprising a compound of the formula



wherein a + e ranges from 1 to 4, b + f equals 2, c + g ranges from 0 to 3, d is from 1 to 4, a + b + c = 3, and e + f + g = 3, said solvent being a solvent for contaminants on said surface and said treatment removing said contaminants from said surface.

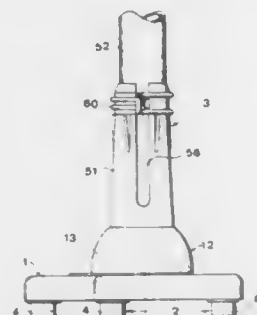
**4,947,882**  
**CRUTCHES, WALKING STICKS, AND THE LIKE**  
Daniel Levasseur, 64 Route du Rosemont La Planchette, 90200 Giromagny, France  
Filed Dec. 5, 1988, Ser. No. 279,634  
Claims priority, application France, Sep. 30, 1988, 88 12937  
Int. Cl.<sup>5</sup> A61H 3/02; A45B 1/00

U.S. Cl. 135—84 6 Claims

1. A walking stick, or the like, comprising a riser, a foot defining a supporting polygon, a ball-and-socket joint connecting the riser to the foot, resilient means for maintaining said riser in a determined position relative to said foot, such that when the foot rests on substantially horizontal ground and said resilient means are in the holding position, said riser remains in a substantially vertical position, said supporting polygon being defined by five end pieces disposed substantially at the vertices of a pentagon, said resilient means comprising a ring of resilient

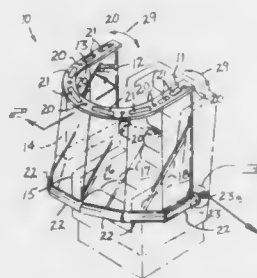


material substantially in the form of a truncated cone including a small base, a large base, a void interior defining an opening in the small base of the cone which surrounds and imprisons that portion of the riser which is closest to said joint, and an opening in the large base of the cone which is fixed to the foot around said socket of the joint, and wherein said means for



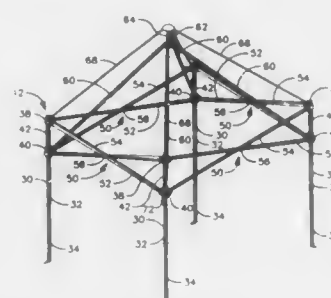
fixing the ring to the foot are constituted by a shoulder forming an integral portion of said foot and defining the ball-receiving socket in the center thereof, said shoulder being resiliently deformable, and a sleeve surrounding said shoulder, said sleeve including an annular groove in its outside face suitable for imprisoning a complementary shaped portion of the ring.

**4,947,883**  
**INFANT SUN SHADE APPARATUS**  
Kay L. Mayo, 3625 N. 350 East, Huntington, Ind. 46750  
Filed Mar. 29, 1989, Ser. No. 330,210  
Int. Cl.<sup>7</sup> E04H 15/04  
U.S. Cl. 135—90



1. An infant sun shade apparatus comprising,
  - a flexible and malleable channel of a finite length including an upper surface spaced above an underlying lower surface,
  - and
  - a plurality of transparent sun shades of a predetermined width depending downwardly from the channel,
  - and
  - a flexible rope member extending through individual securement members formed to the lowermost edges of the individual sun shade and extending beyond the sun shades for alignment of the lowermost edges of the sun shades wherein the rope is defined by terminal ends extending beyond the sun shades.

**4,947,884**  
**COLLAPSIBLE CANOPY WITH AUTO ERECT ROOF SUPPORT STRUCTURE**  
James P. Lynch, 13 S. Field, Lakewood, Colo. 80226  
Filed May 24, 1989, Ser. No. 356,111  
Int. Cl.<sup>7</sup> E04H 15/18  
U.S. Cl. 135—97



17. In a collapsible canopy shelter including an expandable framework structure having a plurality of legs interconnected by scissor assemblies wherein each scissor assembly has one portion pivotally connected to top ends of its associated legs and another portion pivotally connected to a slide bracket on each of its associated legs whereby the scissor assemblies open and close and the slide brackets move toward and away from the top ends of the legs as the framework is expanded from a collapsed state to an expanded state and including a flexible covering extending across the framework to define a roof. Therefore, the improvement comprising a plurality of roof support members pivotally connected to one another at first ends thereof to form a central apex portion of said covering and pivotally connected at second ends thereof opposite said first ends to respective ones of said slide brackets whereby movement of the slide brackets toward the top ends of their respective legs operates to elevate said central apex portion.

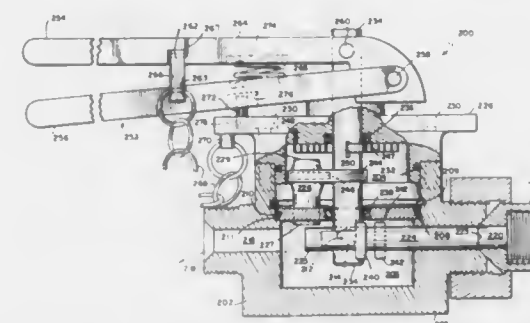
**4,947,885**  
**BRINE MONITOR**  
Paul R. Hart, The Woodlands, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.  
Filed Jul. 27, 1989, Ser. No. 386,545  
Int. Cl.<sup>7</sup> B01D 17/04  
U.S. Cl. 137—5

9 Claims  
1. In a petroleum refinery desalter a method for measuring the hydrocarbon content of the effluent brine from said desalter comprising disposing a probe within said effluent brine to detect and quantitatively measure an electrical charge therein and to direct an output electrical signal incorporation to said electrical charge to means for adding a pre-determined amount of a chemical compound to the fluid contents of said desalter, the amount of said chemical compound being infinitely variable in proportion to variations in said output electrical signal.

**4,947,886**  
**TEMPERATURE ACTUATED FLOW CONTROL DEVICE**  
Lee A. Grove, Elkhart, Ind., assignor to Remote Controls, Inc., Mishawaka, Ind.  
Continuation-in-part of Ser. No. 341,474, Apr. 21, 1989, Pat. No. 4,884,595. This application Oct. 25, 1989, Ser. No. 427,255  
Int. Cl.<sup>7</sup> F16K 11/18, 31/64; F16L 55/14  
U.S. Cl. 137—72

27 Claims  
10. A flow control device, comprising a valve having a valve body, the valve body having a plate mounted therein which divides the valve body into first and second portions which define first and second valve chambers, respectively, first collapsible tubing having an upstream end and a downstream end, the downstream end of the first collapsible tubing re-

ceived in a hole in the plate and opening to the second valve chamber, the first collapsible tubing extending from the plate into the first valve chamber, an upstream end of the first collapsible tubing opening into the first valve chamber, the valve having an inlet for coupling to a source of pressurized fluid and which opens into the first valve chamber to provide pressurized fluid to the first valve chamber from the source of pressurized fluid, the valve having an outlet for coupling to downstream devices, a shaft extending into the valve body and through at least portions of the first and second valve chamber, a portion of the shaft which extends through the first valve chamber having a member mounted thereon for pinching the first collapsible tubing shut when the shaft is in a first position

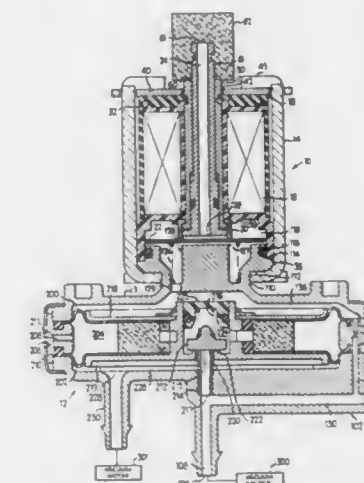


which causes a decrease in the downstream pressure in the first collapsible tubing so that the pressure of the fluid in the first chamber collapses the first collapsible tubing to shut the valve off, a spring coupled to the shaft and to the valve body to rotate the shaft from its first position to a second position which moves the member out of pinching engagement with the first collapsible tubing to permit the first collapsible tubing to uncollapse to open the valve, a fusible link coupled to the shaft and to the valve body for preventing the shaft from rotating from its first position, the fusible link melting when the temperature to which the valve is exposed reaches or exceeds a predetermined temperature which releases the shaft for rotation wherein the spring rotates the shaft from its first position to its second position to open the valve.

**4,947,887**  
**PROPORTIONAL SOLENOID VALVE**  
Clarence D. Fox, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.  
Division of Ser. No. 102,998, Sep. 30, 1987, which is a continuation of Ser. No. 761,906, Aug. 2, 1985, Pat. No. 4,715,396, which is a continuation of Ser. No. 645,191, Aug. 29, 1984, Pat. No. 4,534,375, which is a continuation of Ser. No. 349,488, Feb. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 311,820, Oct. 16, 1981, abandoned. This application Sep. 25, 1989, Ser. No. 411,916  
Int. Cl.<sup>7</sup> F16K 31/06; F15C 3/00  
U.S. Cl. 137—82

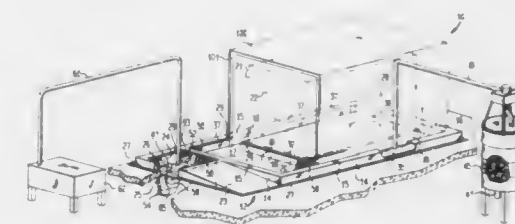
5 Claims  
1. A method of manufacturing a proportional electromechanical valve having an electrical winding with a central flux axis, a plurality of magnetic segments one of which is a generally cylindrical segment, an end segment, an annular non-magnetic seat member, a magnetic closure means, and a housing means defining a fluid chamber, in which the relative pressure within said fluid chamber bears a known, fixed relationship to the flux in said electrical winding, comprising the steps of: assembling the magnetic segments to form a magnetic flux circuit, said generally cylindrical segment defining a fluid passage aligned with said flux axis; positioning said non-magnetic seat member near one end of said generally cylindrical segment whereby a central opening for said fluid passage is defined; positioning said magnetic closure means adjacent said central opening for movement relative to said fluid passage; enclosing said central opening and said closure means with said housing means to define a fluid path between the

other end of said cylindrical segment and said fluid chamber, said housing means including means defining a cylindrical guide adjacent said non-magnetic seat member to receive said magnetic closure means and to constrain the motion thereof substantially parallel to the longitudinal axis of said fluid passage between a position against said annular non-magnetic seat member and a position displaced therefrom; mounting at least one of said magnetic segments for translation with respect to an adjacent segment to adjust the



extent of an air gap between the translatable segment and the adjacent segment; applying a predetermined electrical signal to said electrical winding; making a pressure available at said other end of said cylindrical segment which is positive relative to the pressure in said chamber; and translating the movable segment to alter said air gap and to produce a desired relative pressure in said fluid chamber for said predetermined electrical signal.

**4,947,888**  
**TOXIC FLUID AND VAPOR HANDLING APPARATUS**  
Thomas Tanner, One Deer Run Ct., East Brunswick, N.J. 08816  
Filed Jun. 13, 1989, Ser. No. 365,429  
Int. Cl.<sup>7</sup> B67D 5/32; F16K 31/02; F17D 5/00  
U.S. Cl. 137—312



1. A chemical spill containment system comprising:
  - a chemical spill trapping means for containing liquid chemicals and for draining the liquid chemicals into a first location, said trapping means including a vapor conduit surrounding said trapping means, said conduit having a plurality of vent openings therein for discharging chemical vapors within said trapping means to a vapor processing unit before they are expelled to the environment as well as protecting a user that is exposed to the environment around the trapping means;
  - a liquid chemical receptacle mounted at the first location;

a drain means for draining liquids from the trapping means into the receptacle;  
 a holding tank;  
 means including a pump connected to said receptacle for moving liquid from the receptacle into the holding tank; and  
 a liquid sensing means for detecting the presence of liquid in the receptacle and for energizing the means for moving liquid from the receptacle into the holding tank.

4,947,889

**METHOD OF MEASURING FLOW RATE AND FLOW METER FOR USE IN SAID METHOD AS WELL AS APPARATUS FOR CONTROLLING FLOW RATE OF LIQUID USING SAID FLOW METER**

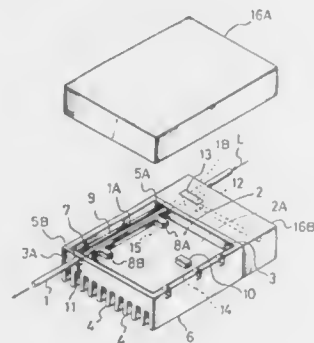
Kouichi Ishikawa, Hiroshi Mihira, Noriyuki Kimura, and Masao Yamaguchi, all of Kyoto, Japan, assignors to Stec Inc., Kyoto, Japan

Filed Apr. 14, 1989, Ser. No. 337,926

Claims priority, application Japan, Nov. 22, 1988, 63-295261  
 Int. Cl.<sup>3</sup> G05D 9/12

U.S. Cl. 137—486

9 Claims



1. An apparatus for controlling a flow rate of a liquid, comprising:

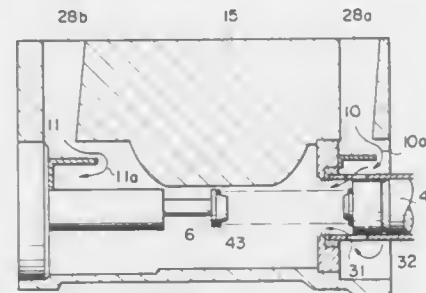
a liquid tank;  
 means for sending out the liquid from said liquid tank including a conduit;  
 a flow meter disposed along the conduit from said liquid tank;  
 a valve disposed on a downstream side of said flow meter; said flow meter being adapted to cool a part of the conduit through which the liquid passes by means of an electronic cooling element, said flow meter having a first temperature-detecting element mounted on a surface of said conduit in an upstream uncooled portion of the conduit, a second temperature-detecting element mounted on a surface of said electronic cooling element, and a third temperature-detecting element mounted on said surface of the conduit cooled at a position downstream of said first temperature-detecting element;

whereby a flow rate of the liquid passing through said conduit is determined on the basis of a difference between a temperature detected by said third temperature-detecting element and a temperature detected by said second temperature-detecting element while controlling said electronic cooling element so that a difference between a temperature detected by said first temperature-detecting element and the temperature detected by the second temperature-detecting element may amount to an appointed value, and an openness of said valve is regulated by a signal from said flow meter to supply the liquid in an appointed flow rate.

4,947,890  
**FLOW CONTROL VALVE WITH DIRT PROTECTION**  
 Mamoru Sumida; Hironobu Fukata; Takeji Yoshida, and Osamu Matsumoto, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Aug. 18, 1989, Ser. No. 395,390  
 Claims priority, application Japan, Aug. 19, 1988, 63-206676  
 Int. Cl.<sup>3</sup> F16K 31/06

U.S. Cl. 137—546

6 Claims

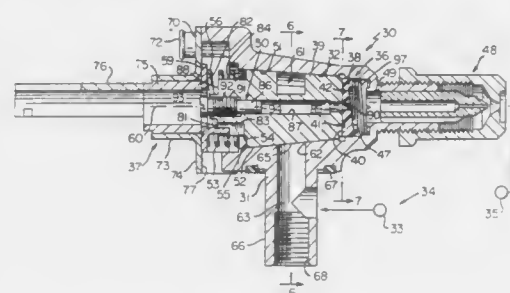


1. A combustion air flow control valve for a throttle bypass passage of an internal combustion engine, comprising:  
 a hollow cylinder (32; 34; 35) having an open end (33) and an air flow port (31; 35c) formed in a circumferential wall thereof;  
 a solenoid coil (40) disposed around said cylinder; a valve member (41; 44) slidable within said cylinder in response to an amount of power supplied to said solenoid coil for adjusting an opening area of said air flow port to control the flow rate of air flowing through said air flow port and said open end of said cylinder; and  
 protective means disposed in association with an air flow path including said air flow port and said open end of said cylinder for preventing any foreign matter entrained in the air flow from becoming lodged in a clearance defined between said hollow cylinder and said valve member, and attentantly impeding the sliding movement of the valve member.

4,947,891  
**FUEL CONTROL DEVICE, FUEL CONTROL SYSTEM USING THE DEVICE AND METHOD OF MAKING THE DEVICE**  
 Francis S. Genbauffe, Irwin, Pa., assignor to Robertshaw Controls Company, Richmond, Va.  
 Division of Ser. No. 227,764, Aug. 3, 1988, Pat. No. 4,862,917, which is a division of Ser. No. 73,811, Jul. 15, 1987, Pat. No. 4,779,643. This application Jul. 12, 1989, Ser. No. 378,972  
 The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.  
 Int. Cl.<sup>3</sup> F16K 5/12, 5/16

U.S. Cl. 137—599.2

18 Claims



1. In a fuel control device comprising a housing means having a passage therethrough for interconnecting a fuel

source with a main burner means, a throttle valve means disposed in said passage for throttling fuel flow through said passage to said burner means, and selector means operatively interconnected to said throttle valve means to operate the same, said throttle valve means comprising a pair of members one of which is substantially stationary and the other of which is rotatable relative to said one member, said one member having a face and having aperture means interrupting said face thereof and passing therethrough, said other member having a face means disposed in sliding engagement with said face of said one member for controlling the effective opening of said aperture means for fuel flow therethrough, said selector means being operatively interconnected to said other member to rotate the same relative to said one member and thereby control the flow of fuel through said passage, said other member having an opening interrupting said face means thereof and being adapted to overlap said aperture means in various positions therewith for controlling said fuel flow therethrough, the improvement wherein said other member comprises a generally conical plug valve member having an axis of rotation and having an end surface disposed substantially transverse to said axis and comprising said face means thereof, and a spring means carried by said housing means and acting on said one member to tend to force said face of said one member to tend to force said face of said one member.

4,947,892

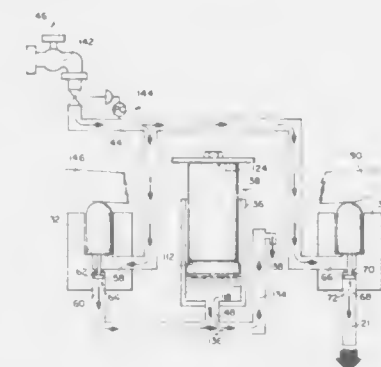
**X-RAY SOLUTION MIXING MACHINE**

John Muse, 5636 Dover St., Chino, Calif. 91710

Filed Oct. 3, 1989, Ser. No. 416,586

Int. Cl.<sup>3</sup> F16K 21/18

U.S. Cl. 137—624.11



1. A liquids metering device comprising:

(a) a first valve having a first valve inlet, a first valve outlet, and a first valve throat which connects the first valve inlet and the first valve outlet in fluid communication, the first valve also having a first valve closure means for alternatively opening and closing the first valve to liquid flow;  
 (b) a second valve having a second valve inlet, a second valve outlet, and a second valve throat which connects the second valve inlet and the second valve outlet in fluid communication, the second valve also having a second valve closure means for alternatively opening and closing the second valve to liquid flow;  
 (c) a vertical hydraulic cylinder having a cylinder base and cylinder sides, the cylinder also having a cylinder base opening disposed proximate to the cylinder base (2) to allow liquids to flow into and out of the cylinder;  
 (d) a hydraulic piston disposed within the hydraulic cylinder such that the hydraulic piston is capable of sliding up and down within the hydraulic cylinder between a lower-most piston position which is above the cylinder base opening (4) and an upper-most piston position;  
 (e) sealing means for preventing the escape of liquid from between the hydraulic piston and the walls of the cylinder;

(f) bleed means for allowing a controlled rate of liquid to flow out of the hydraulic cylinder;  
 (g) first conduit means for connecting in fluid communication a source of liquids to the inlets of the first and second valves;  
 (h) second conduit means for connecting in fluid communication the outlet side of the first valve to the cylinder base opening;  
 (i) first valve manual opening means for opening the first valve when the hydraulic piston is proximate to the lower-most piston position;  
 (j) first valve linking means for closing the first valve when the hydraulic piston is proximate to the upper-most piston position;  
 (k) second valve first linking means for opening the second valve when the hydraulic piston is proximate to the upper-most piston position; and  
 (l) second valve second linking means for closing the second valve when the hydraulic piston is proximate to the lower-most piston position; wherein the bleed means is chosen so that, when the cylinder is filled with liquid with the piston in its upper-most position and the first valve is then closed to liquid flow, the weight of the piston evacuates the liquid from the cylinder in a controlled and reproducible time period.

4,947,893

**VARIABLE FORCE SOLENOID PRESSURE REGULATOR FOR ELECTRONIC TRANSMISSION CONTROLLER**

15 Claims Ellsworth S. Miller, Rochester Hills; Michael Slavin, Caseville, and Ching C. Ling, Plymouth, all of Mich., assignors to Lectron Products, Inc., Rochester Hills, Mich.

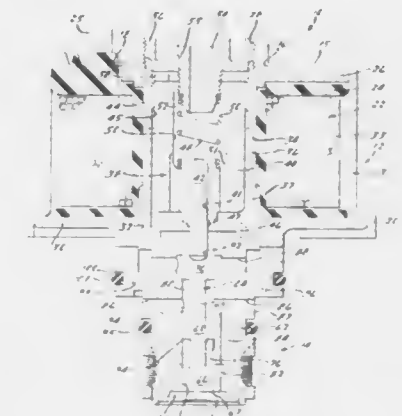
Continuation of Ser. No. 316,998, Feb. 28, 1989, abandoned.

This application Feb. 5, 1990, Ser. No. 474,251

Int. Cl.<sup>3</sup> F15B 13/044

U.S. Cl. 137—625.65

23 Claims



1. A variable force solenoid valve assembly for controllably reducing a fluid inlet pressure to an outlet control pressure in response to an electrical input signal, comprising:

a solenoid assembly having a movable armature assembly adapted to translate within said solenoid assembly in response to said electrical input signal;  
 a valve body defining an outlet port and a central bore axially aligned with said armature assembly adapted to fluidly communicate with said outlet port, said valve body coupled to said solenoid assembly;  
 a spool valve disposed within said valve body central bore and secured to said armature assembly for translational movement therewith, said spool valve having a central stem and first, second and third lands radially extending from said stem so as to define first, second and third chambers within said valve body central bore, said first chamber



ber provided between said first and second spool valve lands, said second chamber defined by a surface of said first land opposite said central stem and said valve body central bore, and said third chamber being defined between said second and third spool valve lands;  
 first passage means for communicating fluid at said inlet pressure to said first chamber;  
 second passage means for communicating fluid at said outlet control pressure to said second and third chambers;  
 first flow restriction means associated with said first spool valve land for controllably restricting fluid communication between said first chamber and said second passage means;  
 third passage means for fluidly connecting said second passage means to said third chamber and said outlet port; and  
 second flow restriction means associated with said third spool valve land for restricting the flow of fluid and said outlet control pressure within said third chamber.

4,947,894

# FLOW AMPLIFIER IN HYDRAULIC STEERING SYSTEM OF A TRANSPORT VEHICLE

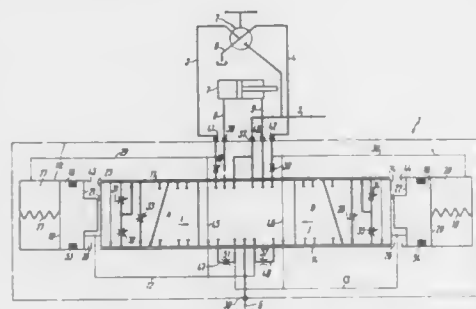
Valery Y. Obidin, Moscow, U.S.S.R., assignor to Nauchno-Proizvodstvennoe Obiedinenie, U.S.S.R.

Filed Nov. 26, 1985, Ser. No. 801,802

Int. Cl.<sup>5</sup> F15B 13/042

U.S. Cl. 137—625.66

2 Claims



1. In a hydraulic steering system of a transport vehicle having a flow amplifier, said flow amplifier comprising:
  - a three-position hydraulically operated spool-type directional control device made as a three-position hydraulically operated single-spool hydraulic directional control valve provided with internal hydraulic pilot lines;
  - a sleeve of said three-position hydraulically operated hydraulic directional control valve;
  - said spool valve having end faces and capable of assuming, in the course of travelling in said sleeve, the crossover (central) position, or two operating positions according to its position in said sleeve of the three-position hydraulically operated hydraulic directional control valve;
  - external portholes made in said sleeve of the three-position hydraulically operated hydraulic directional control valve and adapted for communication with external hydraulic pilot lines of said hydraulic steering system;
  - said internal hydraulic pilot lines connected, when in said crossover position, to said external portholes;
  - a first and a second pilot choke adapted for control of the position assumed by said spool valve and for passing the pilot flow of hydraulic fluid from aforesaid hydraulic pilot lines to said power hydraulic lines of the hydraulic steering system;
  - a first and a second intensifying choke adapted for passing additional amplified flows of hydraulic fluid;
  - a first and a second regulating choke adapted for maintaining equal differential pressure on said pilot and intensifying chokes;
  - said first and second pilot, intensifying and regulating chokes

made in said sliding spool valve with a possibility of varying their restriction areas along the direction of travel of said sliding spool valve;  
 said hydraulically operated hydraulic directional control valve provided with two plungers having outside and inside end faces, and with two internal hydraulic pilot lines for said plungers;  
 said plungers spring-actuated on said outside end faces thereof;  
 said internal hydraulic pilot lines of said plungers, communicating with said respective external portholes for connection to said external hydraulic pilot lines of the hydraulic steering system;  
 each of said plunger axially traversable for interacting, through said inside end face thereof, with said respective end face of said sliding spool valve;  
 one or the other of said internal hydraulic pilot lines disconnected from said respective external porthole and connected to the input of the first or second intensifying choke in one or the other of the operating positions of said sliding spool valve, respectively.

4,947,895

# ELECTROMAGNETIC VALVE

Douglas C. Lillicrap, Chester, England, assignor to The Electricity Council, London, England

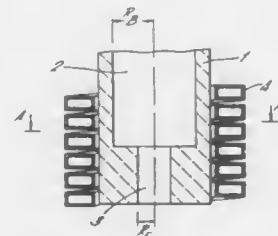
Filed Apr. 21, 1989, Ser. No. 341,780

Claims priority, application United Kingdom, Apr. 25, 1988, 8809693

Int. Cl.<sup>5</sup> F15C 1/04

U.S. Cl. 137—807

4 Claims



1. An electromagnetic valve, for use in discharge of molten metal from a container, comprising a body providing a discharge passage having a first end adjacent the container and a free end, the passage being adapted for flow of molten metal therethrough from the container under the action of gravity; an electrical induction coil located about the passage; and means for supplying a high frequency electric current to the coil to cause the coil to provide an alternating magnetic field which induces electric currents in molten metal in the passage, interaction between the field and the currents providing a force which urges the molten metal away from the wall of the passage towards the axis thereof, the passage being stepped to provide a first portion of radius  $R_B$  adjacent the container and a second portion of smaller radius  $R_E$  extending from the first portion to the free end of the passage.

4,947,896

# LARYNGOSCOPE

Robert L. Bartlett, 149 Rudder Ct., Lexington, S.C. 29072

Filed Nov. 4, 1988, Ser. No. 267,131

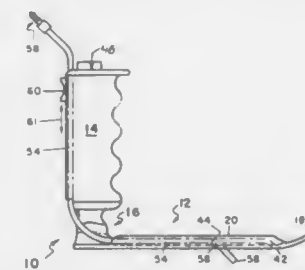
Int. Cl.<sup>5</sup> A61B 1/26

U.S. Cl. 128—11

24 Claims

1. A laryngoscope for use with a patient to obtain improved unobstructed viewing of the patient's tracheal process, said laryngoscope comprising:
  - blade means for being inserted into the mouth of a patient, said blade means having a tip, a cross-section with a compound curvature, including at least one convex surface on one side of said blade means, lateral gull wing members

angled back towards said convex side, and a corresponding concave surface on an opposite side of said blade means, said concave surface forming a viewing passageway into a patient's throat, with the patient's tongue received on said side having said at least one convex surface; and  
 handle means, attached to said blade means for permitting



manipulation of said blade means including controlled introduction thereof into the mouth of a patient with said side having said at least one convex surface oriented for engagement with the tongue of such patient;  
 wherein said side having said at least one convex surface is relatively roughened for enhanced frictional engagement thereof with the patient's mount for improved unobstructed viewing of the patient's tracheal process.

4,947,897

# METHOD FOR PRODUCING A FABRIC MADE FROM THERMOPLASTIC MELT IMPREGNATED TOW

Edwin K. Binnarsley, Wilmington, Del., and James M. Batman, Coopersburg, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

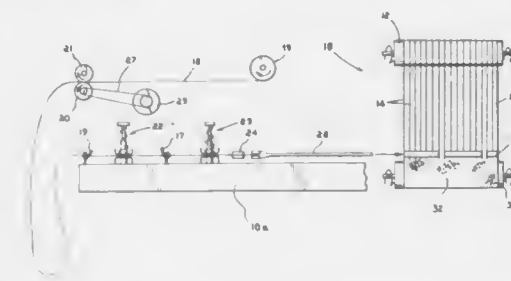
Division of Ser. No. 848,866, Apr. 7, 1986, Pat. No. 4,816,327.

This application Jan. 24, 1989, Ser. No. 301,399

Int. Cl.<sup>5</sup> D03D 47/34, 47/14

U.S. Cl. 139—445

1 Claim



1. A method for producing woven fabrics from flat warp and weft tapes of continuous filaments impregnated with polymer on a power driven loom having warp and weft directions comprising: feeding weft tapes in a twistless manner from a rotatable supply package to said loom with variable speed feeding means; inserting said weft tapes in the weft direction through a warp shed of said warp tapes with a driven movable rapier, said variable speed feeding means being synchronized with the movement of said rapier; and tensioning and guiding said warp and weft tapes to maintain each of said warp and weft tapes in such a manner that a line parallel to the surface of and perpendicular to the longitudinal axis of each of the tapes is in the plane of the fabric throughout the fabric, said warp and weft tapes having edges that are abutting substantially throughout the fabric.

4,947,898

# WEFT THREAD SUPPLY VIA TWO ACCUMULATORS

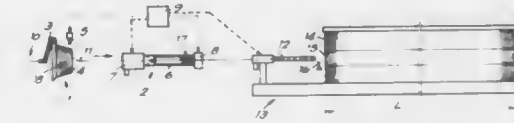
Frank Ampe, Leffinge-Middelkerke; Jozef Verhulst, Zillebeke, and Frans Wallegem, Passendale, all of Belgium, assignors to Picanol N.V., Belgium

Filed Nov. 3, 1988, Ser. No. 267,092

Claims priority, application Belgium, Nov. 5, 1987, 8701253

Int. Cl.<sup>5</sup> D03D 47/34

9 Claims



1. A method for supplying weft thread to be inserted into the shed of a weaving machine, comprising the steps of leading the weft thread from a thread supply successively through two thread accumulators, intermittently releasing from said first one of said accumulators, at an insertion, a length of thread equal to the insertion length; accumulating said thread in the second accumulator; beginning insertion of thread into the shed by drawing off the thread accumulated in said second accumulator; when said thread accumulated in said second accumulator is drawn off, continuing the insertion by drawing off thread from the first accumulator until a predetermined length equal to the insertion length has been inserted into the shed, wherein said second accumulator has a lower draw-off resistance than said first accumulator, and wherein the beginning of the insertion is determined by said second accumulator and the end of the insertion is determined by said first accumulator.

4,947,899

# HOOK STRUCTURE FOR NEGATIVE DOBBY LOOMS

Gianluigi Cremonesi, Ponte Nossia, Italy, assignor to Fimtextile Fabbbrica Italiana Macchinario Tessile S.p.A., Ponte Nossia, Italy

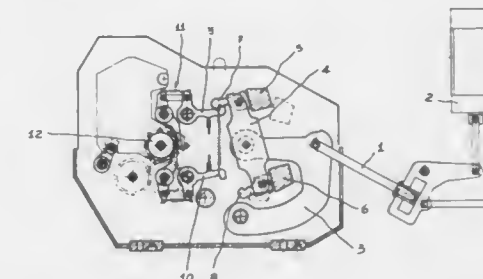
Filed Apr. 21, 1986, Ser. No. 853,955

Claims priority, application Italy, Apr. 24, 1985, 20488 A/85

Int. Cl.<sup>5</sup> D03C 1/06

U.S. Cl. 139—71

3 Claims

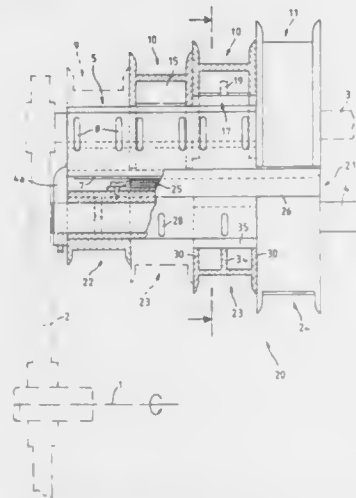


1. In a negative dobby for forming the warp shed in weaving looms comprising movable heald frames, pivotal rockers interconnected to said heald frames, a pair of movable cross members to impart rocking movements to the rockers, which control the movement of the heald frames, hooks having pivot points remote from ends thereof to which movement is imparted by said cross members on the ends of said rockers, crooks cooperating with said hooks and means reading the pattern of the fabric to be woven operating said crooks, the improvement wherein the rear end of said hooks, onto which press the movable cross members, is shaped to facilitate oscillation of said hooks about said pivot point only when said hooks engage with said crooks.

**4,947,900**  
**WINDING TEMPLATE FOR COILS DRAWABLE INTO**  
**THE STATOR OF AN ELECTRICAL MACHINE**  
 Franz Vesper, Kanalstrasse 16, 7960 Ravensburg, Fed. Rep. of Germany

Filed Apr. 7, 1989, Ser. No. 334,541  
 Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812728

Int. Cl.<sup>5</sup> B21F 3/04  
 U.S. Cl. 140—92.1 4 Claims



1. Winding template assembly for use with a coil winding machine having a carrier bar and a coil-removing carrier bar parallel to and spaced from the carrier bar, said winding template assembly comprising:

- an elongated central piece having a longitudinal axis and an orifice defined longitudinally therethrough, said orifice being longitudinally coaxially receivable over the carrier bar;
- a pair of separate first and second template halves, said first template half including a plurality of detachable individual semicircular first template parts with semicircular surfaces having various radii of curvature, said first template parts being coil-winding template parts with a wire chamber defined on the semicircular surfaces, and each coil-winding template part having a central-piece-receiving groove for being received on said central piece in a direction substantially perpendicular to the longitudinal axis of said central piece, said second template half including a plurality of semicircular surfaces, said second template half being a coil-removing template half with coil-supporting chambers defined on the semicircular surfaces of said second template half; and
- means for individually varying the distance between said elongated central piece and each one of said plurality of coil-winding template parts for varying the distance between the wire chambers and the carrier bar for varying the size of a coil winding.

**4,947,901**  
**STRAP TENSIONING AND CUT OFF TOOL**  
 James K. Rancour, St. Cloud, and Lester N. Smith, Annandale, both of Minn., assignors to Malco Products, Inc., Annandale, Minn.

Filed Feb. 6, 1989, Ser. No. 306,299  
 Int. Cl.<sup>5</sup> B21F 9/00

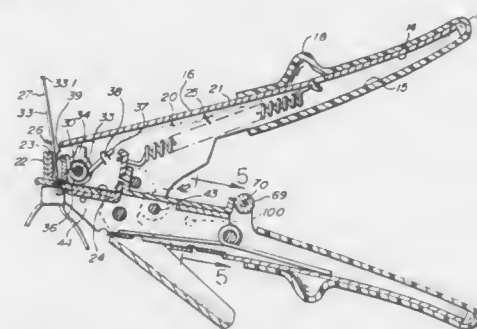
U.S. Cl. 140—93.2 13 Claims

1. A tensioning and cut off tool for applying a strap to a bundle and wherein the strap has a locking collar and a free end, comprising

- a pair of swingable handles pivotally connected together, the handles having rear ends to be manually gripped and swung, and also having front ends with strap engaging

means for gripping and tensioning the strap as the handles are swung toward each other, a cut off blade movably mounted on a portion of one of the handles to move against the strap for cutting the strap,

one of the handles having a quick, release operating mechanism connected with the blade for moving the blade against the strap when released, said operating mechanism releasing in response to a predetermined force manually applied to the handles as tension is applied to the strap, and said mechanism operating the blade when released to move the blade with a snap action to suddenly cut the strap, and



one of said handles including a support arm defining said blade mounting portion, said quick release operating mechanism including a pressure lever tiltably connected to the support arm, said pressure lever tilting on the support arm to produce movement of the blade for cutting the strap and the mechanism also including a pressure responsive releasable retainer normally retaining the pressure lever against tilting with respect to the support arm and releasing the lever for tilting when a predetermined pressure is applied on the lever causing swinging of the handle and resulting in predetermined pressure on the strap.

**4,947,902**  
**DEVICE FOR TWISTING WIRES FOR CONNECTING RODS**

Peter Lehmann, Kirchdorf, and Heinrich Glaus, Niederwangen, both of Switzerland, assignors to Styner & Bienz AG, Niederwangen, Switzerland

Filed May 22, 1989, Ser. No. 354,778  
 Claims priority, application Switzerland, May 24, 1988, 81032/88

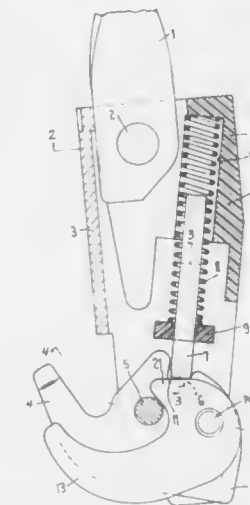
Int. Cl.<sup>5</sup> B21F 15/04

U.S. Cl. 140—119 13 Claims

1. A device for turning at least one wire loop so as to twist a plurality of wires, the device comprising:

- a knurled rod;
- a handle surrounding the knurled rod, the handle having an opening formed therein through which the knurled rod extends;
- the handle and the knurled rod being configured such that when the handle is pulled, the knurled rod rotates;
- a binding hook operatively connected to the knurled rod for rotation therewith, the binding hook including a portion adapted to hook under each said wire loop, whereby rotation of the knurled rod results in rotation of the binding hook, rotation of each wire loop hooked by the binding hook and twisting of the wires to be connected; and

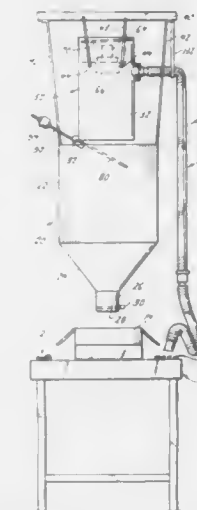
a release mechanism for allowing the binding hook to disengage the wire loops, the release mechanism being actuated



by the twisted wires when a desired tightness of connection is attained.

**4,947,903**  
**MATERIAL RECOVERY APPARATUS**  
 Robert H. Beckwith, 246 Vista Oak Ct., Ballwin, Mo. 63021  
 Filed Oct. 21, 1988, Ser. No. 261,170  
 Int. Cl.<sup>5</sup> B65B 1/16

U.S. Cl. 141—67 23 Claims

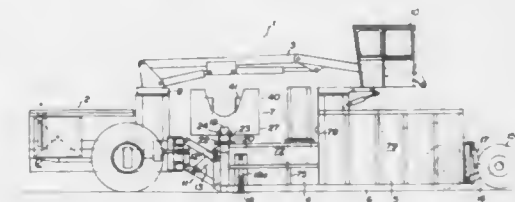


1. A loose material recovery apparatus comprising: an overhead bin for containing said material, said bin having a storage chamber for storing the material; a vacuum assembly above the storage chamber, said vacuum assembly further comprising a container having a side wall and a bottom door, an actuating member, and a motor; means for mounting the motor to said container and spaced above said bottom door to define a storage compartment therebetween within said container; the sidewall of the container being substantially impervious to the passage of said material therethrough; a suction hose connected to said container and communicating with said compartment, said suction hose directing the material to be recovered to said compartment; means for mounting said bottom door for movement between a closed position for retaining said material in said compartment, and an

open position allowing said material to fall from said compartment into said bin storage chamber; said motor, when energized, creating a vacuum in said compartment with said bottom door closed, means for mounting said actuating member to said container for movement in response to energizing said motor, and means in response to movement of said actuating member with said motor energized for closing said bottom door; whereby, with said motor energized the door closes and a vacuum is created within said compartment for drawing material to be recovered into said compartment.

**4,947,904**  
**APPARATUS FOR STACKING BOLTS**  
 Michael Dika, Box 117, Rycroft, Alberta, Canada T0H 3A0  
 Filed Dec. 12, 1989, Ser. No. 448,918  
 Int. Cl.<sup>5</sup> B27L 1/00

U.S. Cl. 144—2 Z 24 Claims



12. A bolt forming and stacking assembly for processing cut trees to form an elongated, linear stack of bolts, said trees lying with their axes generally perpendicular to the longitudinal axis of the stack to be created, comprising:

- means for grasping the butt end of a tree and advancing the stem longitudinally;
- means for de-limbing and cutting the advancing stem to form bolts of substantially equal length;
- means for receiving the de-limbed bolts, as they are produced, and positioning them adjacent ground surface in generally perpendicular relation to the longitudinal axis of the stack being created;
- means for biasing the bolts rearwardly out of the positioning means while maintaining their orientation; and
- means for collecting the bolts, as they are biased out of the positioning means, and depositing them on the ground in the form of a stack as aforesaid, said collecting means being positioned contiguously and rearwardly of the receiving means whereby the bolts being biased are forced into the base of the stack being collected, said collecting means being adapted to confine the bolts therein at their ends.

**4,947,905**  
**FLOW RATE LIMITING DEVICE FOR AN AUTOMATIC SHUT-OFF LIQUID DISPENSING NOZZLE**  
 Leonard R. Nitzberg, 1413 Buckeye Ln., Knoxville, Tenn. 37919, and Paul D. Manhardt, 1008 Tokalon Dr., Knoxville, Tenn. 37922  
 Continuation-in-part of Ser. No. 21,399, Mar. 4, 1987. This application Apr. 20, 1987, Ser. No. 40,278  
 Int. Cl.<sup>5</sup> B65B 57/04

U.S. Cl. 141—206 4 Claims

- 1. An automatic shut-off fuel dispensing nozzle with a flow rate limiting means, said nozzle comprising:
  - a body having an inlet through which a liquid such as fuel is supplied to said nozzle and an outlet, and defining an internal flow passage along which said liquid flows from said inlet to said outlet;
  - a spout communicating with said outlet and capable of being inserted into a tank through an opening therein for dispensing said liquid, said spout being provided with a vacuum relief opening on the exterior of said spout at a loca-



tion normally positioned within said tank during dispensing operations;

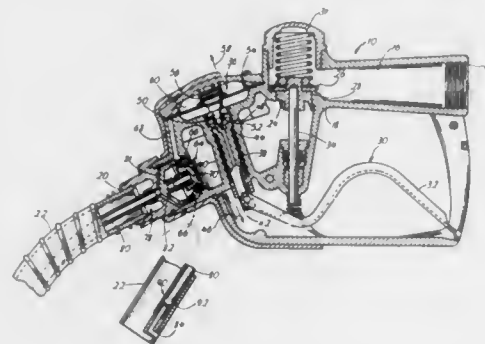
a valve mounted in said body for controlling the flow of liquid through said passage;

a manually operated means controlling the operation of said valve such that liquid flows through said nozzle only when said valve is opened;

venturi vacuum generating means positioned proximate said flow passage for developing a vacuum of magnitude proportionate to the rate of flow of liquid past said vacuum generating means;

a vacuum operated release means mounted in fluid communication with said vacuum generating means and serving to release said manually operated means to close said valve for automatic shut-off of the liquid flow through said nozzle when the vacuum magnitude proximate said release means reaches a preselected threshold level;

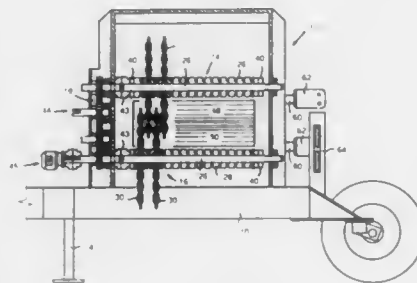
vacuum relief means mounted in fluid communication with said vacuum relief opening of said spout, said relief means defining a vacuum relief conduit for providing fluid communication between the ambient atmosphere and said vacuum generating means and said release means, and adapted to automatically operate the vacuum operated release means when the level of liquid being dispensed in said tank constricts said opening of said vacuum relief



means whereby the vacuum generated by said vacuum generating means is not relieved and acts against said release means to cause an automatic shut-off of liquid flowing through said passage; and

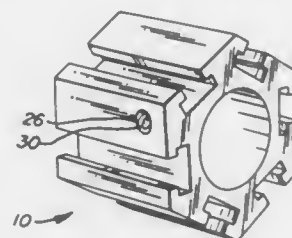
flow rate limiting means for selectively restricting the capacity of said vacuum relief means to relieve said vacuum generated by said venturi vacuum generating means, whereby said vacuum generated by said vacuum generating means is not relieved when the flow rate of said liquid through said nozzle reaches a preselected threshold flow rate such that said release means serves to release said manually operated means to close said valve for automatic shut-off of said liquid flow through said nozzle, said flow rate limiting means including a first member movably mounted in said spout so as to be movable from a first position whereby said conduit is substantially unobstructed by said first member to a second position whereby said first member at least partially occludes said vacuum relieve conduit, and includes a second member operatively associated with said first member and disposed to intercept the flow of said liquid through said spout, whereby said flow of liquid through said spout acting upon said second member moves said first member into said first position whereby said first member at least partially occludes said conduit.

**4,947,906**  
**DEBARKER**  
Hartwig F. T. Schroeder, Natal, South Africa, assignor to H L & H Timber Products, Johannesburg, South Africa  
Filed Jan. 23, 1989, Ser. No. 299,635  
Int. Cl.<sup>5</sup> B27L 1/00  
U.S. Cl. 144—206 J 7 Claims



1. Debarking apparatus including a housing, two elongated rotors which are mounted for rotation in the housing with their axes parallel to and spaced apart from each other in a common plane, flexible flail elements on each of the rotors with the lengths of the flail elements and their positions on the rotors being such that the circumferential paths of rotation of the flail elements on one rotor overlap and pass between those on the other rotor, means for driving the rotors in rotation, and guide means on the housing for guiding elongated timber members in a direction substantially perpendicular to said common plane and between the rotors to be delimbed and debarked by the flail elements in their zone of overlap.

**4,947,907**  
**BALANCING OF TOOLING FOR A WOOD LATHE**  
Kenneth R. Anselm, Rt. #1, Box 162, La Center, Ky. 42056  
Filed Mar. 9, 1989, Ser. No. 322,192  
Int. Cl.<sup>5</sup> B27G 13/08; F16F 15/22; B23C 5/12; F16C 3/22  
U.S. Cl. 144—224 2 Claims



1. Apparatus for balancing tooling for a wood lathe, comprising:

a T-slot cylinder having a throughbore for longitudinally receiving an arbor of a wood lathe;

said cylinder having a series of at least four angularly adjacent faces arranged in diametrically opposite pairs, extending about the outer periphery thereof, each said face extending from end to end on said cylinder and having a T-slot formed therein for removable securement of at least one knife holder therein, each said face thereby being divided into two bands on rotationally opposite side of a mouth of a respective said T-slot;

a pair of tapped holes provided along respective radii of said cylinder, one each through two diametrically opposite ones of said faces, respectively near opposite ends of said cylinder; and

a respective first threaded fastener threadedly received in

each said tapped hole for protruding into said throughbore for securing the cylinder to an arbor;

said T-slot cylinder being received on said arbor at an axially intermediate site thereon;

said first threaded fasteners securing said cylinder on said arbor;

said arbor having an eccentricity so as to have a bow extending in one radial direction;

a dynamic balancer comprising a tubular cylindrical collar having a longitudinal throughbore longitudinally receiving said arbor;

said collar being disposed adjacent one said end of said cylinder;

at a location intermediate two opposite ends of said collar, said collar being provided with a plurality of radially directed, equiangularly spaced tapped holes intersecting said throughbore of said collar;

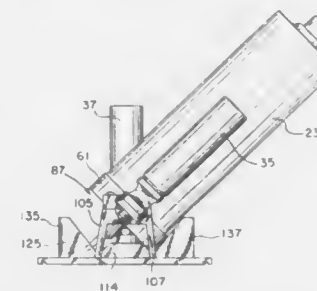
a second threaded fastener threadedly received in a selected one of said tapped holes in said collar and tightened against said arbor for rotationally, transversely and axially fixing said collar on said arbor, said selected one of said tapped holes in said collar being one confronting said bow in said arbor, whereby said second threaded fastener, upon being tightened against said arbor, tends to counteract said eccentricity.

**4,947,908**  
**METHOD AND TOOL FOR FORMING BISCUIT JOINTS**  
Michael L. O'Banion, Westminster, and Scott D. Price, Pylesville, both of Md., assignors to Black & Decker, Inc., Newark, Del.

Filed Jan. 31, 1990, Ser. No. 473,248  
Int. Cl.<sup>5</sup> B27F 7/00; B27C 5/02

U.S. Cl. 144—353

22 Claims



19. A method for forming a joint between two workpieces with a tool comprising a motor for driving an elongated bit, a base assembly, and a motor housing pivotally mounted to the base assembly for rotation about an axis transverse to the bit, said method comprising with steps of:

locating the base assembly on a first workpiece;

pivoting the housing relative to the base assembly about the rotational axis for sweeping the bit through an opening in the base assembly and the distal bit tip through an arc to form a first slot in the first workpiece having a width equal to the diameter of the bit and a radiused bottom defined by the radius between the rotational axis and the distal bit tip;

locating the base assembly on a second workpiece;

pivoting the housing relative to the base assembly about the rotational axis for sweeping the bit through the opening and the distal bit tip through an arc to form a second slot in the second workpiece having a width equal to the diameter of cutter and a radiused bottom defined by the radius from the rotational axis to the distal bit tip;

applying glue in the slots;

partially inserting a wafer in the first slot; and

inserting a portion of the wafer protruding from the first slot

into the second slot to form a joint between the two workpieces.

**4,947,909**  
**PROCESS AND APPARATUS FOR OPTIMIZING VOLUME OF BOARDS CUT FROM A LOG**  
Brian T. Stroad, Richmond, Canada, assignor to CAE Machinery Ltd., Vancouver, Canada  
Filed Feb. 14, 1989, Ser. No. 310,776  
Int. Cl.<sup>5</sup> B27B 1/00; B27C 9/00  
U.S. Cl. 144—357 17 Claims



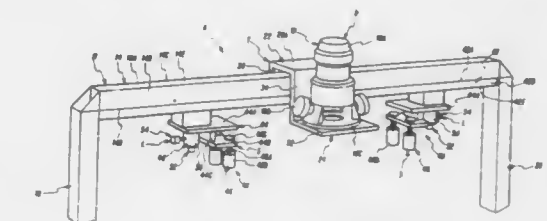
3. A process of cutting a cant to optimize volume recovery from a log wherein said horizontal face is the top face, comprising the steps of:

scanning the log to determine optimum cut surface profile for the top face,

conveying the log past a top cutting head to cut the top face, and

controlling relative vertical movement of the top cutting head to produce the predetermined optimum cut surface profile for the top face of the log.

**4,947,910**  
**CUTTING TOOL GUIDE ASSEMBLY AND METHOD OF USING SAME**  
Raymond P. Reneau, 701 N. Saint Marys St. #27, San Antonio, Tex. 78205  
Continuation-in-part of Ser. No. 166,260, Mar. 10, 1988, Pat. No. 4,840,209. This application Jun. 19, 1989, Ser. No. 367,761  
Int. Cl.<sup>5</sup> B27M 1/00; B27C 5/10  
U.S. Cl. 144—371 25 Claims



1. A cutting tool guide assembly for guiding a cutting tool over a workpiece for making a precise cut on the workpiece, comprising:

a singular elongate rail member;

a trolley mounted for movement along the length of said rail member, said trolley supporting the cutting tool to one side of said rail member for cutting operations on the workpiece;

said trolley member includes:

a trolley member housing mounted about said rail member for movement along the length of said rail member;

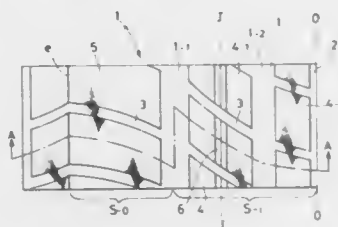
bearing means with said trolley member housing and interposed between said trolley member housing and said rail member for enhanced aligned movement of said trolley member housing along said rail member; and,

securing member affixed to said rail member for securing said rail member with the workpiece.

# 4,947,911

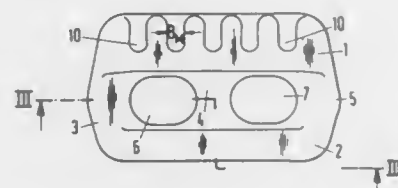
## PNEUMATIC RADIAL TIRE SUITABLE FOR USE AT HIGH SPEED

Hisao Ushikubo, and Teruyuki Tominaga, both of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan  
Filed Dec. 15, 1987, Ser. No. 133,406  
Claims priority, application Japan, Dec. 26, 1986, 61-308740  
Int. Cl.<sup>5</sup> B60C 11/11  
U.S. Cl. 152—209 R 8 Claims



1. A 4-wheel vehicle pneumatic tire for use at high speed travel comprising: a cylindrical tread; a pair of sidewalls extending radially inward from both ends of the tread; a radial carcass extending from a radially inner end portion of one sidewall to a radially inner end portion of the other sidewall through the tread; and an inextensible belt layer arranged on the crown portion of the carcass; said cylindrical tread being formed with a plurality of straight grooves extending in a circumferential direction to the tire, a plurality of transverse grooves extending from the center of the tread to each lateral end in an undulated pattern, blocks partitioned by said straight grooves and said transverse grooves, wherein said blocks comprise a narrow groove extending parallel to the straight groove extending in the circumferential direction at a position where a width of the block is substantially bisected and, said narrow groove has a depth in the range of 0.5 to 2 mm and having a width wider than said depth but less than the width of the block it is located within, wherein said tire is a 4-wheel vehicle tire.

4,947,912  
STUD OR WEB LINK FOR TIRE CHAINS  
Erhard A. Weidner, Aalen-Unterkochen, Fed. Rep. of Germany, assignor to RUD-Kettenfabrik Rieger & Dietz GmbH U. Co., Aalen, Fed. Rep. of Germany  
Filed Jun. 6, 1988, Ser. No. 203,246  
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719751  
Int. Cl.<sup>5</sup> B60C 27/20, 27/08  
U.S. Cl. 152—243 18 Claims



1. A stud or web link for tire chains, with at least one receiving orifice for the connection of connecting links, with a tire-facing link part and with a ground-facing link part, wherein at least one side face (8,9) of the ground-facing link part (1) defines a plurality of troughs (10) extending substantially throughout the length of said at least one side face and serving for enlarging the side face (8,9), said ground-facing link part not including any lateral projections, said troughs (10) arranged on the at least one side face (8,9) are open at their ends confronting the contact face (11),

but closed at their ends confronting the at least one receiving orifice (6,7).

4,947,913  
PNEUMATIC RADIAL TIRE PROFILE  
Kazuyuki Kaba, Hiratsuka; Ken Takahashi, Atsugi, and Masashi Kida, Chigasaki, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan  
Filed Aug. 29, 1988, Ser. No. 237,469  
Int. Cl.<sup>5</sup> B60C 3/00  
U.S. Cl. 152—454 2 Claims



1. A pneumatic radial tire comprising a carcass layer and a belt layer provided thereon, wherein in a radial cross-section of said tire, the profile of an outer sidewall surface of said tire from a lateral tread edge to a boundary point where said sidewall is adapted to contact a rim consists of plural straight lines, wherein the straight line in the sidewall portion corresponding to the maximum width of said tire is substantially perpendicular to the axis of rotation of said tire and each intersection at which said straight lines meet with each other is formed so as to protrude in the outward direction of the cross-section of said tire and corresponds to a position which is discontinuous with respect to the internal rigidity of the tire.

4,947,914  
AIRPLANE TIRE  
Hiroyuki Noma; Kazuo Oda, and Takao Otani, all of Hyogo, Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
Continuation of Ser. No. 45,218, Apr. 30, 1987, abandoned, which is a continuation of Ser. No. 770,240, Aug. 28, 1985, abandoned. This application Mar. 31, 1989, Ser. No. 332,361  
Claims priority, application Japan, Aug. 29, 1984, 59-181433; Feb. 25, 1985, 60-37266  
Int. Cl.<sup>5</sup> B60C 9/22  
U.S. Cl. 152—531 5 Claims

1. An airplane tire which consists essentially of a pair of bead cores, a carcass of cords arranged at an angle of 60° to 90° with respect to an equator plane of said tire, said carcass of cords having ends turned up and fixed around said bead cores; a belt layer of a width Wb having cords arranged outside a crown part of said carcass, said cords of said belt layer being inclined with each other at an angle of from 0° to 30° with respect to said equator plane of said tire and which intersect between plies of said belt layer; and a band of cords of a width Wa arranged radially above said belt layer outside said crown part of said carcass, said cords of said band being arranged at an angle not greater than 5° to the tire circumferential direction, said cords of said tire band having a higher modulus of tensile elasticity than said cords of said tire belt layer, wherein said cords of said carcass and said belt layer are

comprised of substantially the same nylon fiber materials having a modulus of tensile elasticity not greater than 1000 kg/mm<sup>2</sup>, said width Wa of said band of cords being 20 to

extending substantially parallel to the mid-circumferential plane of the tire and having a width lying within the range of 40% to 70% of the width of the second group of layers.



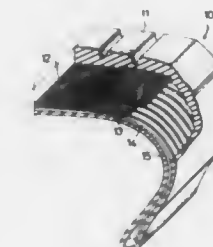
90% of said width Wb of said belt layer whereas the cores of said band layer and said belt layer are comprised of substantially different materials compositionally.

4,947,915  
RADIAL PLY TIRE  
Tharamel P. K. Panikkar, Sutton Coldfield, and Stephen Barlow, Stoke on Trent, both of England, assignors to Dunlop Limited, United Kingdom  
PCT No. PCT/GB88/00171, § 371 Date Dec. 7, 1988, § 102(e) Date Dec. 7, 1988, PCT Pub. No. WO88/06981, PCT Pub. Date Sep. 22, 1988  
PCT Filed Mar. 7, 1988, Ser. No. 269,540  
Claims priority, application United Kingdom, Mar. 12, 1987, 8705926  
Int. Cl.<sup>5</sup> B60C 9/22, 9/28  
U.S. Cl. 152—531 14 Claims



1. A radial aircraft tire comprising a tread, a radial ply carcass anchored to at least one bead core in each bead region of the tire and a tread reinforcement comprising three groups of layers of cord reinforcing fabric; the first, radially inner, group comprising at least two layers of parallel cords extending at a bias angle lying in the range 15 degrees to 60 degrees relative to the mid-circumferential plane of the tire, each layer being at opposite bias to the adjacent layer, and the width of the first group of layers being less than the contact width of the tire tread under the scheduled load and inflation pressure of the tire; a second group of layers, positioned radially outwards of the first group, and comprising at least two layers of parallel cords extending substantially parallel to the mid-circumferential plane of the tire, and the width of the second group of layers being greater than the width of the first group of layers; and a third group of layers, positioned radially outwards of the second group, comprising at least two layers of parallel cords

4,947,916  
PNEUMATIC RADIAL TIRE HAVING BELT REINFORCEMENTS  
Yasuhiro Ishikawa, Hiratsuka; Hiroyuki Kaidoo, Yokohama; Sadakazu Takei, and Shuji Takahashi, both of Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan  
Filed Dec. 23, 1988, Ser. No. 289,129  
Claims priority, application Japan, Dec. 24, 1987, 62-325559  
Int. Cl.<sup>5</sup> B60C 9/26  
U.S. Cl. 152—536 4 Claims



1. A pneumatic radial tire comprising:  
(a) a tire body; and  
(b) at least an upper belt ply and a lower belt ply built in contiguous relation in said tire body, one of said upper and lower plies being formed of an aromatic polyamide fiber cord, and the other being formed of a steel wire cord, each of said aromatic polyamide fiber and steel cords having a rubber composition coated on both sides thereof, said composition being comprised of:  
(1) 100 parts by weight of a rubber;  
(2) 2-4.5 parts by weight of sulfur;  
(3) 0.5-3 parts by weight of resorcinol, a precondensate thereof or a combination thereof;  
(4) 1-5 parts by weight of hexamethoxymethylmelamine; and  
(5) 0.05-0.5 part by weight of a cobalt compound derived from an organic acid.

4,947,917  
RADIAL TIRE FOR MOTORCYCLE  
Hiroyuki Noma, Kobe; Tadao Kouno, Sakaishi, and Kazuo Kadomaru, Ibaragi, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan  
Filed Mar. 15, 1989, Ser. No. 323,802  
Claims priority, application Japan, Mar. 15, 1988, 63-61126; Jan. 24, 1989, 1-16559  
Int. Cl.<sup>5</sup> B60C 9/18  
U.S. Cl. 152—536 2 Claims

1. A radial motorcycle tire comprising:  
a pair of bead cores one disposed in each bead portion of the tire;  
a carcass ply extending between the bead portions and turned up at the edge portions thereof around the bead cores; and  
a breaker disposed radially outside said carcass ply and comprising a first ply lying adjacent to the carcass ply and a second ply lying radially outside the first ply, said carcass ply composed of cords having an elastic modulus MC of 250 to 600 kgf/sw.mm and arranged radially at an angle of 70 to 90 degrees to the tire equator; said first ply of the breaker composed of cords having an elastic modulus MB1 of 450 to 1100 kgf/sq.mm and arranged at an angle of 10 to 30 degrees to the tire equator;



said second ply of the breaker composed of aromatic polyamide cords having an elastic modulus MB2 of 650 to 1600 kgf/sq.mm and arranged at an angle of 10 to 30 degrees to the tire equator;



said elastic modulus MB2 of the second ply cords being larger than said elastic modulus MB1 of the first ply cords and  
the first elastic modulus MB1 of the first ply cords being larger than said elastic modulus MC of the carcass ply cords.

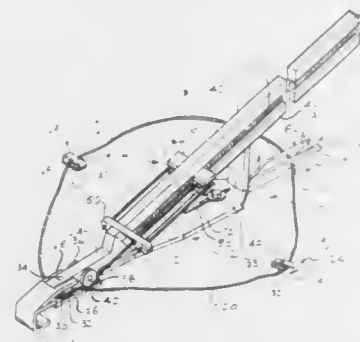
#### 4,947,918 TIRE CHANGER

Jacob J. Unrau, Box 617, Ile des Chenes, Manitoba, Canada  
R0A 0T0

Filed Aug. 16, 1989, Ser. No. 394,671  
Int. Cl.<sup>5</sup> B60C 25/08

U.S. Cl. 157—1.22

10 Claims



1. A tire changing apparatus for removing and installing pneumatic tires on a wheel, comprising:  
a base;  
wheel engaging means on the base for engaging the wheel from one side thereof with the base located on said one side, and operative to limit movement of the base with respect to the wheel;  
two tools, each including an arm, a bead deflecting means at an outer end of the arm and adjustment means for adjusting the lengths of the tool arms between the bead deflecting means and the pivot means, the adjustment means comprising a slot extending along each arm and slideably engaged with the pivot means;  
pivot means pivotally mounting the tools on the base for operative engagement with said one side of the wheel; and  
tool driving means carried by the base for pivoting the tools in opposite directions on the base.

#### 4,947,919 AUTOMATED TIRE MOUNTING AND INFLATION SYSTEM

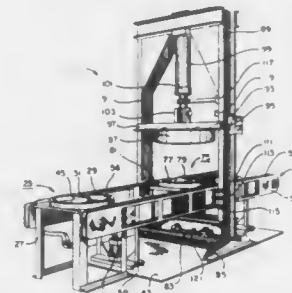
Patrick M. Timlin, P.O. Box 297, Justin, Tex. 76247

Filed Aug. 29, 1989, Ser. No. 400,100

Int. Cl.<sup>5</sup> B60C 25/135

U.S. Cl. 157—1.24

7 Claims



1. An automated tire mounting and inflation system for mounting and inflating tubeless tires of the type having upper and lower tire beads between the opposing flanges of a selected wheel rim, the system comprising:  
a main frame;  
a tire mounting station on said main frame;  
mounting means located at said tire mounting station for seating an uninflated tire on a wheel rim with the tire upper and lower beads between the rim flanges;  
a conveyor including transport means mounted on a frame for receiving and transporting an uninflated tire which has previously been mounted on a wheel rim at said tire mounting station;  
an inflation station located downstream of said mounting station on said main frame for inflating said uninflated tire as said uninflated tire and rim are conveyed past said inflation station on said conveyor;  
lift means for alternately lifting said conveyor frame to engage said uninflated tire and wheel rim on an upper surface of said conveyor and for lowering said conveyor frame when said inflation station is reached to disengage said uninflated tire and wheel rim, whereby said uninflated tire and wheel rim are properly positioned at said inflation station;  
inflation means located at said inflation station for inflating said tire on said wheel rim; and  
wherein said inflation means includes a base having a wheel rim supporting surface with a central aperture connected to an air supply line, the inflation means also including an inflation bell having a cylindrical lower surface which is adapted to contact a portion of the tire sidewall when the tire and wheel rim are received on the wheel rim supporting surface to thereby isolate an inflatable region of the tire, whereby air can be supplied through the central aperture to inflate the tire.

#### 4,947,920 QUADRAFOLDABLE VEHICULAR WINDSHIELD SUNSHADE

Horst Moll, 1106 Scott St., Boise, Id. 83705

Filed Oct. 24, 1988, Ser. No. 261,419

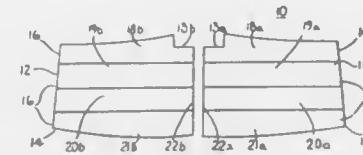
Int. Cl.<sup>5</sup> A47H 5/00

U.S. Cl. 160—84.1

18 Claims

1. A foldable vehicular windshield sunshade which comprises:  
a pair of planar cardboard panels each having a longitudinal length approximately equal to one half the length of the vehicle windshield and a width approximately equal to the width of the windshield, each of said panels having an exterior surface and interior surface where said exterior surface is defined as the sun facing surface, each of said panels further having three creases disposed parallel to a

longitudinal center line, the convex side of each crease being located on said exterior surface and being equidis-



tance from one another and the two edges which define the panels longitudinal length, thereby providing a quad-r foldable panel.

#### 4,947,921 LIFT LOCK AND TILT DEVICE FOR A VENETIAN BLIND

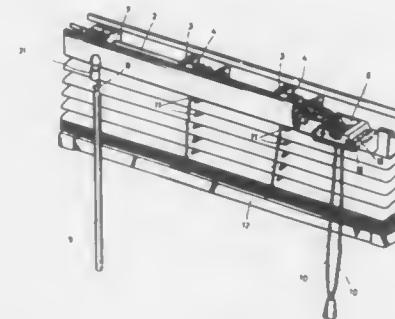
Huang Chun-cheng, Taipei, Taiwan, assignor to Teh Yor Industrial Co., Ltd., Taiwan

Filed Dec. 13, 1989, Ser. No. 449,976

Int. Cl.<sup>5</sup> E06B 9/38

U.S. Cl. 160—176.1

8 Claims



1. In a venetian blind having a headrail with an opening at a bottom thereof and a lift lock component fitted in said opening, said lift lock comprising:  
a housing having a forked flange at a base thereof and a plurality of teeth between the ends of said flange, whereby to form inner notches between adjacent teeth as well as outer notches between each side tooth and said flange,  
a first pin bent into a U-shape and having two legs inserted into said outer notches from one end of said housing through another end thereof,  
a second straight pin selectively inserted into either one of said inner notches adjacent to one lateral side or another of said inner notches adjacent to the other lateral side of said housing,  
a guide roll rotatably secured on said housing,  
and a floating roll having a rough surface freely rotatably contained in said housing.

#### 4,947,922 TENSIONING STRETCHED-CANVAS FRAME AND METHOD FOR USE

John Stobart, Townhouse #23, Union Wharf, Boston, Mass. 02109

Filed Feb. 7, 1989, Ser. No. 307,789

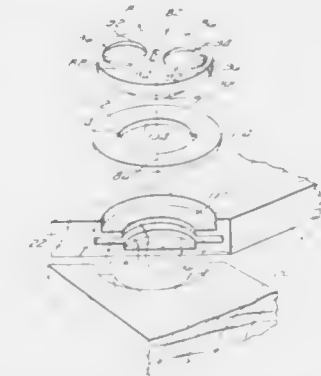
Int. Cl.<sup>5</sup> D06C 3/08

U.S. Cl. 160—374.1

6 Claims

1. An expansive frame apparatus comprising:  
a plurality of frame members each having end portions disposed in an abutted orientation to an adjacent member to frame an area;  
a central bore formed at said end portion of each frame member, which central bore aligns with a corresponding

central bore in the corresponding end portion of an adjacent frame member;  
a middle cavity formed coaxial with said central bore at said end portion of each frame member, which middle cavity aligns with a corresponding middle cavity in the corresponding end portion of an adjacent frame member;  
a counter bore formed coaxial with said central bore and middle cavity at said end portion of each frame member, which counter bore aligns with a corresponding counter bore in the corresponding end portion of an adjacent frame member;  
biasing means, fitting between adjacent frame members and extending into said central bore and counter bore thereon, whereby said biasing means, when rotated, is adapted to exert a camming force on said frame members, thereby forcing the frame members apart from abutting contact;  
wherein each of said plurality frame members end portions are mitered to abut corresponding end portions of an adjacent frame member in a complementary fashion, wherein said biasing means comprises a biasing member having a cam portion and a biasing wheel portion rigidly affixed to said cam portion;



- a plurality of camming surfaces affixed to said cam portion and adapted to exert said camming force on said frame members when said biasing means is rotated;  
a cam-opposing surface formed on said central bore, said cam opposing surface shaped to provide a camming interface between said central bore and said camming surfaces on said cam portion for forcing the frame members apart from abutting contact;  
finger hold means disposed on said biasing wheel of said biasing means for applying a force couple to said biasing wheel to rotate said biasing means;  
a rigid disk complementary to and receivable in said middle cavities in said end portions of said frame members, wherein said rigid disk and said middle cavity are cooperatively configured so that said rigid disk fits tightly within said middle cavities, thereby insuring that adjacent frame members will not twist relative to one another; and  
a clearance aperture centrally located on said rigid disk, shaped to receive through complementary features of said clearance aperture said cam portion and said camming surfaces of said biasing means, and thereby allow said cam portion to be received into said central bore.

#### 4,947,923 METHOD AND APPARATUS FOR EVAPORATIVE PATTERN CASTING

Leslie D. Rikker, 15441 Betty Ann La., Oak Forest, Ill. 60452

Filed Apr. 14, 1988, Ser. No. 181,443

Int. Cl.<sup>5</sup> B22C 9/04, 15/10, 15/28

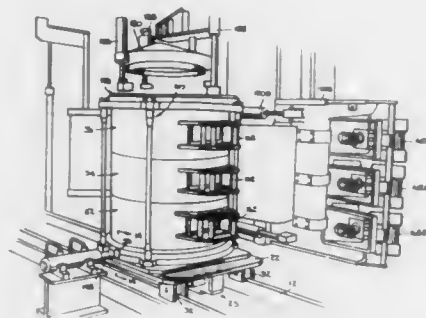
U.S. Cl. 164—5

95 Claims

1. A method for evaporative pattern casting comprising the steps of:

inserting a pattern of an object to be cast and adapted to be gasified on contact with molten metal into a container; supplying an unbound molding medium into said container and disposing said molding medium around said pattern, said step of disposing comprising dispensing said molding medium into said container and compacting said molding medium around said pattern in predetermined partial volumes of substantially the total volume of said container; said step of compacting comprising at least compacting substantially each of said predetermined partial volumes one at a time whereby, during at least part of the disposing step, substantially only one of said partial volumes is compacted at a time; displacing said pattern in said compacted molding medium with molten metal thereby forming a metal casting and releasing gaseous material from the evaporation of said pattern; allowing the casting to cool; and removing the casting from said container.

23. Apparatus for forming evaporative pattern castings comprising:



means for inserting a pattern to be gasified on contact with molten metal of an object to be cast into a container; means for supplying an unbound molding medium into said container and disposing said molding medium around said pattern in a time period, said means for disposing comprising means for dispensing said molding medium into said container and means for compacting said molding medium around said pattern in predetermined partial volumes of substantially the total volume of said container, said means for compacting comprising means for at least compacting substantially each of said predetermined partial volumes of substantially the total volume of said container one at a time whereby, during at least part of the time period, substantially only one of said partial volumes is compacted at a time; means for displacing said pattern with molten metal thereby forming a metal casting and releasing gaseous material from the evaporation of said pattern; and means for removing the casting, once cooled, from said container.

4,947,924

#### METAL-CERAMIC COMPOSITE AND METHOD OF PRODUCING THE SAME

Yoshiyasu Morita; Manabu Seguchi; Kazuo Okamura; Fuminori Hikami; Koichiro Ishihara, and Katsutoshi Hara, all of Amagasaki, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 37,381, Apr. 10, 1987, abandoned, which is a division of Ser. No. 917,208, Oct. 9, 1986, abandoned. This application Mar. 1, 1989, Ser. No. 317,086

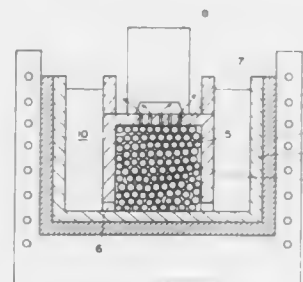
Int. Cl.<sup>3</sup> B22D 19/14, 19/02

U.S. Cl. 164—97

3 Claims

1. A method of producing a cobalt-based metal-ceramic composite comprising: enclosing ceramic particles having a

specific gravity of less than one-half of the cobalt-based metal in a chamber provided with at least one opening at a lower portion thereof and a vent hole on an upper portion thereof, said chamber being enclosed within and spaced from a vessel having heating means,



placing solid metal in a space between said chamber and said vessel, heating said solid metal to melt it, said molten metal being introduced into the chamber through said opening.

4,947,925

#### MEANS AND TECHNIQUE FOR FORMING THE CAVITY OF AN OPEN-ENDED MOLD

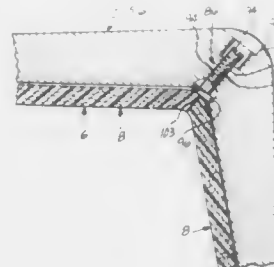
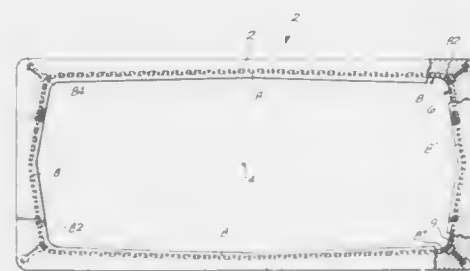
Frank E. Wagstaff, Veradale, and David A. Fort, Spokane, both of Wash., assignors to Wagstaff Engineering, Inc., Spokane, Wash.

Filed Feb. 24, 1989, Ser. No. 314,984

Int. Cl.<sup>3</sup> B22D 11/00

U.S. Cl. 164—459

95 Claims



50. In the cavity of an open ended mold for casting metal ingot by the step of feeding the metal in molten condition through the cavity along an axis extending between the end openings of the mold,

an annular support which is formed about the axis adjacent the peripheral wall of the cavity in a plane extending perpendicular to the axis,

a plurality of individually discrete wall-defining members which are clamped together on the support to form a casting ring, the aperture of which has an angulated cross

sectional outline at the inner peripheral surface of the ring, and means securing the ring about the axis in the aforesaid plane so that when the molten metal transmigrates through the cavity along the axis, the ring confers an angulated cross sectional outline on the molten metal mass corresponding to that at the inner peripheral surface of the ring.

4,947,926

#### INVESTMENT COMPOUND FOR USE IN PRECISION CASTING MOLD

Sekiya Ogino, Kyoto, and Mikinori Nishimura, Shiga, both of Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

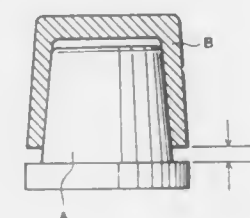
Continuation of Ser. No. 224,531, Jul. 22, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 425,514

Claims priority, application Japan, Jul. 27, 1987, 62-188361

Int. Cl.<sup>3</sup> B22C 1/00

U.S. Cl. 164—519

1 Claim



1. A method of precision casting titanium or titanium alloy comprising the steps of:

mixing a binder with at least one of MgO powder and Al<sub>2</sub>O<sub>3</sub> powder to form an investment compound, said at least one of MgO and Al<sub>2</sub>O<sub>3</sub> powder having a grain size of 100 μm or less and being 20–40% by weight of the investment compound;

kneading the investment compound with water;

embedding a wax pattern in the investment compound;

allowing said water to react with said investment compound to expand said investment compound; and

firing the investment compound with the wax pattern embedded therein to effect a lost-wax process and expand a mold thus formed;

whereby expansion of said mold compensates for dimensional errors caused by shrinkage of the titanium or titanium alloy.

4,947,927

#### METHOD OF CASTING A REACTIVE METAL AGAINST A SURFACE FORMED FROM AN IMPROVED SLURRY CONTAINING YTTRIA

Robert A. Horton, Chesterland, Ohio, assignor to PCC Airfoils, Inc., Cleveland, Ohio

Filed Nov. 8, 1989, Ser. No. 433,526

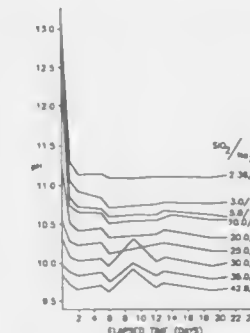
Int. Cl.<sup>3</sup> B22C 1/02

U.S. Cl. 164—517

20 Claims

1. A method of casting an article of a reactive metal, said method comprising the steps of forming a slurry containing water, a binder, a source of hydroxyl ions, and yttria, said source of hydroxyl ions being sufficient to result in said slurry having a pH of at least 10.2 six days after initially mixing the slurry, forming a mold containing a surface area formed from

the slurry, and conducting a molten reactive metal into the mold, said step of conducting a molten reactive metal into the



mold including engaging the surface area formed from the slurry with the molten reactive metal.

4,947,928

#### VAV SYSTEM COORDINATOR

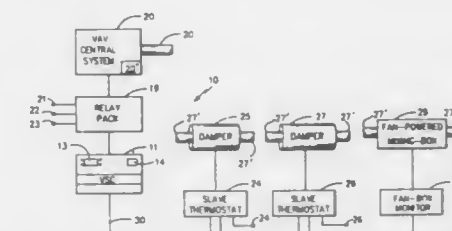
Edward Parker, and Jeffrey L. Parker, both of Jacksonville, Fla., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 15, 1988, Ser. No. 284,601

Int. Cl.<sup>3</sup> F24F 3/00, 7/00

U.S. Cl. 165—22

84 Claims



1. In a system for monitoring and controlling the condition of air in each of a plurality of zones when using a unit operating in a heating or cooling mode and having a fan to supply heated or cooled conditioned air to each zone via a main duct and secondary ducts through a zone damper means in zone ducts communicating with each zone and operated by a damper control means, at least one said zone having zone heating means controlled by said damper control means, means for controlling and coordinating the operation of said unit with said damper control means and respective said zone damper means and respective said zone heating means, said means comprising a programmable system controller means receiving information from each said damper controller means, said system controller means including program means such that said unit is operable only in preselected allowable modes during respective distinct time periods and inoperable in such preselected modes in other time periods, means for determining the condition of air in each said zone and supplying such information to said programmable system controller means, said system controller means operating said unit in accordance with its programming, the condition of air in each zone and in accordance with information received from each damper controller means to control said unit in said preselected allowable modes during respective distinct time periods.

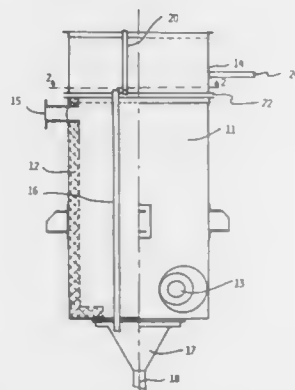


4,947,929

**APPARATUS FOR CARBON PULP REACTIVATION**  
 Peter J. Stewart, 1822 Albany Highway, Maddington, Australia  
 Filed Mar. 25, 1987, Ser. No. 30,714  
 Claims priority, application Australia, Mar. 27, 1986, PH5247  
 Int. Cl.<sup>5</sup> F26B 3/14

U.S. Cl. 165—66

13 Claims



1. A heat exchanger, for processing a material fluid particulate comprising:

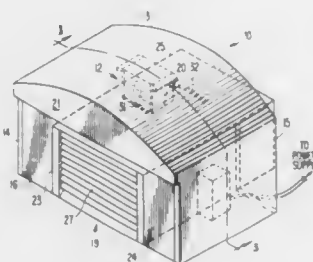
- (a) a heating chamber;
- (b) heating means for heating said heating chamber;
- (c) a hopper mounted above the heating chamber and supported in spaced relation to said heating chamber;
- (d) a delivery chamber mounted below said heating chamber, said delivery chamber being provided with an outlet;
- (e) injection means for injecting a metered quantity of a cooling liquid into the fluid particulate material prior to its discharge from the outlet at the outlet of said delivery chamber;
- (f) a source of cooling liquid connected to said injection means; and
- (g) a set of flow passageways supported from the hopper and extending from the hopper through the heating chamber to open into the delivery chamber, said flow passageways not being fixed to the heating chamber or delivery chamber.

4,947,930

**HEAT BONNET FOR HEAT PUMP**  
 Charles H. McCrary, Rte. 2, Box 225, Gaston, S.C. 29053  
 Filed Sep. 11, 1989, Ser. No. 405,865  
 Int. Cl.<sup>5</sup> F25B 29/00

U.S. Cl. 165—47

4 Claims



1. A heat bonnet, for providing a supplementary source of heat for a conventional heat pump having an exterior casing exposed to outside air and an inside air coil and an outside air coil mounted within said exterior casing, which comprises: an enclosure means for confining air between said enclosure means and said heat pump exterior casing while allowing

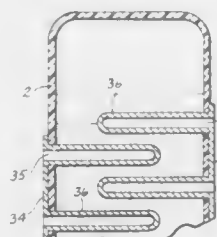
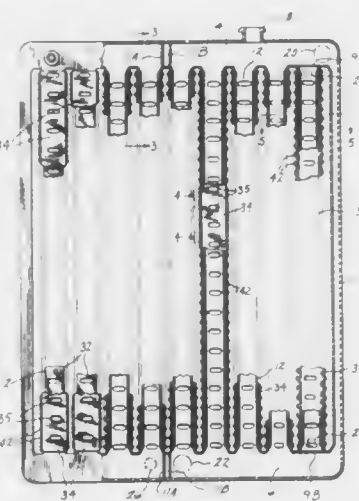
outside air to flow to said outside air coil and inside air to flow to said inside air coil, and  
 a heating means, mounted inside said enclosure means, for heating said confined air and thereby warming said heat pump exterior casing, supplementing the heat otherwise available to said outside air coil of said heat pump during heating cycles.

4,947,931

**PLASTIC VEHICULAR RADIATOR-CONDENSER WITH METAL COOLING INSERTS**  
 Richard L. Vitacco, 1653 Thurston Ave., Racine, Wis. 53405  
 Filed Dec. 28, 1989, Ser. No. 458,414  
 Int. Cl.<sup>5</sup> F28D 1/00

U.S. Cl. 165—148

1 Claim



1. A heat exchanger comprising an upper header, a lower header, and a plurality of tubular chambers extending and defining flow paths therebetween, said tubular chambers being spaced from each other to further define open spaces therebetween; said headers and tubular chambers forming a substantially planar member having a front face and a rear face on opposed sides thereof; each said tubular chamber having a front surface and a rear surface lying substantially in said front and rear faces of said heat exchanger, respectively, and having at least one cooling strip attached to its front or rear surface by means of baffles penetrating said surface and projecting into said tubular chamber; said cooling strips extending at least partially around said tubular chambers and into the space between adjacent tubular chambers, said portion of said strips extending into said space between adjacent tubular members having formed thereon louvers for enhancing heat transfer from said strip.

4,947,932

**PHOSPHATE COMPOUND THAT IS USED IN A MICROBIAL PROFILE MODIFICATION PROCESS**  
 Richard S. Silver, Allentown, and Pamela M. Bunting, Cheswick, both of Pa., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 23,070, Mar. 6, 1987, Pat. No. 4,906,557. This application Sep. 27, 1989, Ser. No. 413,030  
 Int. Cl.<sup>5</sup> E21B 43/22; C12N 1/12; C12R 1/01

U.S. Cl. 166—246

1 Claim

1. In a process of microbial enhanced oil recovery comprising injecting a bacteria into a wellbore within a formation, and injecting into said wellbore a nutrient source to cause said bacteria to grow and selectively plug said formation, the improvement comprising using as said nutrient source a nutrient medium that is capable of flowing downhole into a petroleum reservoir and is capable of providing a metabolizable source of phosphate for microorganisms without precipitating on contact with connate water, said nutrient medium comprising a triphosphosphate.

4,947,933

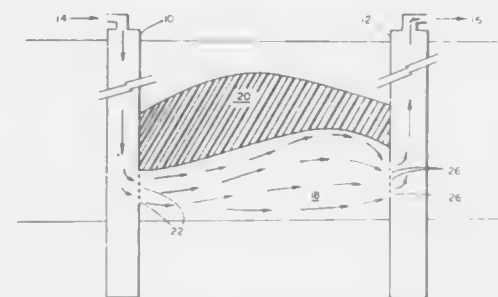
**TEMPERATURE ACTIVATED POLYMER FOR PROFILE CONTROL**

Lloyd G. Jones, and Winston R. Shu, both of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 3, 1989, Ser. No. 292,845  
 Int. Cl.<sup>5</sup> E21B 33/138, 43/22, 43/24

U.S. Cl. 166—263

24 Claims



1. A method to minimize well recompletions in a perforated production well in a reservoir or formation containing a heavy oil comprising:

- (a) injecting via said well into an upper producing interval in said formation a temperature activated gellable composition where said interval has obtained a temperature in excess of 200° F. which is sufficient to activate said composition which comprises a polymer, a phenolic compound, and an aldehyde producing compound that decomposes to yield formaldehyde thereby forming a phenolic resin in situ which aldehyde producing compound is a member selected from the group consisting of trioxane, tetraoxane, polyoxymethylene, other similar aldehyde producing compounds, and mixtures thereof; and
- (b) allowing said composition to remain in the productive interval for a time sufficient for components of the gellable composition to activate and form a rigid gel as a result of the polymer cross-linking with said phenolic resin which gel closes pores in the upper producing level.

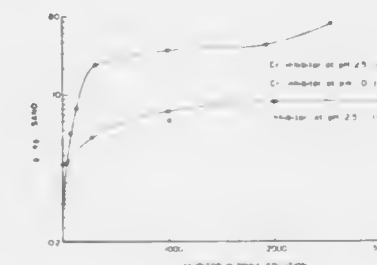
4,947,934

**METHOD OF INCREASING RETENTION OF SCALE INHIBITOR IN SUBTERRANEAN FORMATIONS**  
 John Hen, Skillman, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 130,492, Dec. 9, 1987, abandoned. This application Feb. 2, 1989, Ser. No. 305,055  
 Int. Cl.<sup>5</sup> E21B 43/12

U.S. Cl. 166—279

5 Claims



1. A method for inhibiting scale in a well penetrating a subterranean formation for the production of fluids from the formation comprising:

- (a) dissolving polymeric inhibitor comprising an alpha, beta-ethylenically unsaturated carboxylic acid having a molecular weight range of about 500 to 10,000 and a polyvalent cation in an aqueous solution having a pH effective to form a water-soluble complex of the inhibitor and the polyvalent cation wherein the equivalent ratio of polyvalent cation to inhibitor is less than or equal to 0.5 in said aqueous solution; and
- (b) injecting said inhibitor, polyvalent cation aqueous solution into the formation about the well and allowing natural conditions in the formation to raise the pH of the solution in an amount sufficient to cause controlled precipitation and increased deposition of the scale inhibitor in situ in the form of a water-soluble polyvalent cation inhibitor complex.

4,947,935

**KILL FLUID FOR OIL FIELD OPERATIONS**  
 Robert D. Sydansk, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Jul. 14, 1989, Ser. No. 380,057  
 Int. Cl.<sup>5</sup> E21B 43/00

U.S. Cl. 166—295

27 Claims

1. A process employing a kill fluid to substantially reduce the volumetric flow of formation fluid into a wellbore penetrating a formation containing said formation fluid below an earthen surface, comprising:

- admixing components of a continuous flowing gel at the surface comprising a water-soluble carboxylate-containing polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and an aqueous solvent for said polymer and said complex;
- crosslinking said polymer and said complex to form said gel, wherein said kill fluid comprises said gel;
- placing a volume of said kill fluid in said wellbore sufficient to create a hydrostatic head which exerts a kill fluid pressure against said formation fluid substantially equal to or greater than the formation fluid pressure and thereby substantially reduces the volumetric flow of said formation fluid into said wellbore;
- performing an oil field operation after placing said volume of said kill fluid in said wellbore; and
- removing said gel from said wellbore to substantially restore the volumetric flow of said formation fluid into said wellbore.

**4,947,936**  
**WELL UNIT DYNAMOMETER INSTALLATION MEANS AND METHOD**

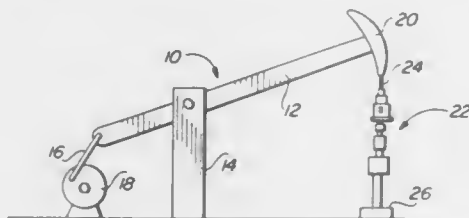
David E. Ellwood, Iraan, Tex., assignor to Marathon Oil Company, Findlay, Ohio

Filed Jun. 14, 1989, Ser. No. 366,565

Int. Cl.<sup>5</sup> E21B 19/00, 41/00

U.S. Cl. 166—379

21 Claims



1. A spacer mounted on a polish rod which is connected to a reciprocal rod string of a well unit having a rod clamp attached to the polish rod and a carrier bar located below the rod clamp, said spacer comprising:

means for vertically transmitting well unit operating loads; means for allowing ready installation of the spacer on and removal of the spacer from the polish rod in order to expose a portion of the polish rod for mounting a load measuring means thereon, the portion of the polish rod covered by the spacer being substantially equal to the length of the load measuring means to be installed on the polish rod; and means for locking the spacer in place as mounted on the polish rod.

10. A method of mounting load measuring means onto the polish rod of a well unit having a polish rod connected to a reciprocal rod string, a rod clamp attached to the polish rod and a carrier bar located below the rod clamp, comprising the steps of:

mounting a first spacer on the polish rod between the carrier bar and the polish rod clamp so that the portion of the polish rod covered by the first spacer is substantially equal to the length of the load measuring means to be installed on the polish rod; operating the well unit, with the first spacer functioning to vertically transmit well unit operating loads; relieving the load of the rod string from the carrier bar; removing the first spacer from the polish rod after the step of relieving and without substantially moving the polish rod; and installing the load measuring means on the polish rod between the carrier bar and the polish rod clamp.

**4,947,937**  
**SPRING-OPERATED TAMBOUR APPARATUS**  
Floyd A. Searer, and Ralph Searer, both of Elkhart, Ind., assignors to FAS Industries, Inc., Elkhart, Ind.

Filed Mar. 24, 1989, Ser. No. 328,384

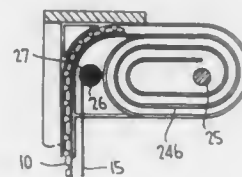
Int. Cl.<sup>5</sup> E06B 9/08

U.S. Cl. 160—133

6 Claims

1. A tambour door opening/closing apparatus, comprising: a tambour door having a longitudinal axis and moving between open and closed positions along said longitudinal axis under the restraint of a frame guiding opposed sides of said door; a constant spring mounted to said tambour door and having at least a section thereof extending generally along said longitudinal axis to assist in moving said tambour door between said opened and closed positions; and a fixed rod mounted between the frames guiding opposed

sides of said door and a spool rotatably mounted on said rod and wherein said spring is coiled around said spool



and the exposed end of said constant spring is attached to said tambour door.

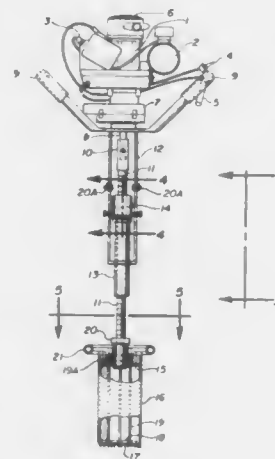
**4,947,938**  
**HOLE CUTTER FOR GOLF COURSE GREENS**  
James E. Fricke, R.D. 1, Box 59, Denver, Pa. 17517, and Ivan L. Stoltzfus, 124 Meadow Creek Rd., New Holland, Pa. 17557

Filed Jul. 8, 1988, Ser. No. 222,063

Int. Cl.<sup>5</sup> E21B 12/06; A01B 45/00

U.S. Cl. 172—22

5 Claims



1. A machine for cutting holes in golf course greens comprising in combination:

- a threaded drive shaft;
- a motor adapted to rotate the drive shaft and positioned at the top end of the drive shaft;
- a sod cutter mounted at the bottom of the drive shaft and adapted to rotate with the drive shaft and cut a plug of soil from a golf green;
- a clutch adapted to engage and disengage the threads on the threaded drive shaft;
- an ejector plate adapted to fit inside said cutter and to press against said plug when said clutch is engaged, whereby said threaded drive shaft forces said cutter out of the hole while leaving the cut plug behind;
- an elongated plug ejector cylinder concentrically encasing the drive shaft and having said clutch mounted on the upper end of said cylinder, said clutch and said ejector cylinder adapted to apply pressure against said ejector plate and force said drive shaft to move upwardly when the clutch is engaged to said threaded drive shaft and to float free when said clutch is disengaged; and
- a vertical frame member fixed with respect to the motor adapted to support the plug ejector cylinder as said drive shaft moves up and down along the axis of said plug ejector cylinder.

**4,947,939**  
**STRUCTURE OF MOTORIZED SCREW BOLT DRIVING TOOL**

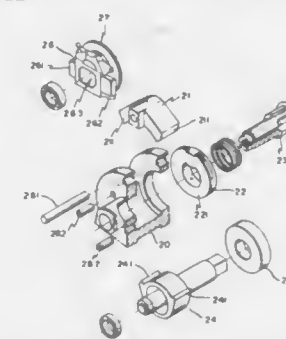
Wonder Hung, No. 51, Lane 2, Chang Lu Road, Sec. 5, Lu Kang Chen, Changhua Hsien, Taiwan

Filed Nov. 20, 1989, Ser. No. 438,262

Int. Cl.<sup>5</sup> B23Q 5/00; B60K 41/20

U.S. Cl. 173—12

1 Claim



1. A motorized screw bolt driving tool, including: a centrifugal element mounted on a rear bearing in a rear flange and having fins at both lateral sides connected by a spring therebetween, a spindle comprising an axle having an arch-shaped projection peripherally disposed at its rear end defining therewith two retaining edges with a rolling ball mounted on such an arch-shaped projection; a brake socket having a pair of unitary pins extending therefrom along axial direction; a swivel element having two pin holes for insertion therein of the two pins of said brake socket, a boring bore through its central axis, a notch on its top surface, a through-hole through said notch and in parallel with said boring bore; a brake element having a pin hole thereon for insertion therethrough of a lock pin to secure to said swivel element in said notch; a spindle holder received in said swivel element to hold said spindle therein; a front bearing, a front flange and a socket respectively mounted on the axle of said spindle to smoothen the rotation of said axle; wherein revolving of said centrifugal element drives said brake socket to disengage from said swivel element permitting said brake element to swing in said notch of said swivel element so that said spindle can be driven to rotate clockwise or counter-clockwise for further operation in turning a screw bolt or nut.

**4,947,940**  
**APPARATUS AND METHOD FOR REMOVING OIL SPOTS FROM A SURFACE**

Maylon E. Dickey, Rte. 1, Box 746, Hayti, Mo. 63851, and Billy R. Dickey, 8180 Breeze Dr., N. Fort Meyers, Fla. 33917

Filed Jan. 18, 1989, Ser. No. 298,471

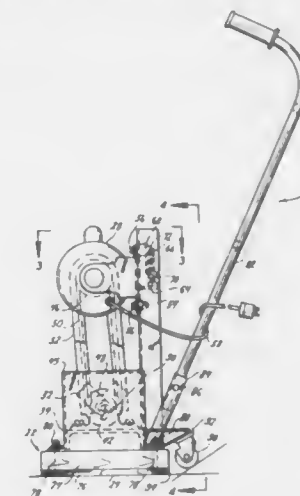
Int. Cl.<sup>5</sup> E02D 7/18

U.S. Cl. 173—49

6 Claims

1. A vibrator apparatus adapted for rubbing absorbent granules against a surface, such as a concrete floor, to remove oil spots and the like from the surface, the apparatus comprising a platen having a generally flat lower face for engaging the surface, roller means mounted on the platen, and means for vibrating the platen to rub the granules against the surface, the roller means being positioned adjacent an edge of the platen and generally above the lower face so that tilting the apparatus toward said edge causes the roller means to contact the surface and elevate the lower face above the surface for enabling the apparatus to roll, the vibrating means comprising an eccentrically weighted shaft rotatably mounted on the platen and means for rotating the eccentrically weighted shaft to cause the platen to vibrate, the eccentrically weighted shaft comprising at least two eccentric weights mounted on the shaft and

projecting radially therefrom at axially spaced locations, at least one of the eccentric weights being rotatable relative to the shaft to adjust the relative angular orientation of the eccentric weights, and means for releasably locking the relatively



rotatable eccentric weight relative to the shaft at incremental positions around the shaft, whereby adjustment of the relative angular orientations of the eccentric weights alters the vibrating motion of the platen.

**4,947,941**  
**SINGLE-STROKE PNEUMATIC APPARATUS**  
Vadim B. Sudnashnikov, and Andrei A. Zelentsov, both of Novosibirsk, U.S.S.R., assignors to Institut Gornogo Dela Sibirskogo Otdeleniya Akademii Nauk SSSR, Novosibirsk, U.S.S.R.

PCT No. PCT/SU86/00103, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03079, PCT Pub. Date May 5, 1988

PCT Filed Oct. 21, 1986, Ser. No. 242,187

Int. Cl.<sup>5</sup> B23B 45/16

U.S. Cl. 173—134

2 Claims



1. A single-stroke pneumatic apparatus, comprising a hollow cylindrical frame (1) in the forward end of which is mounted a tool (9); a striker (2) mounted for reciprocation back and forth so as to define front (3) and rear (4) chambers at the forward and rear ends of said frame (1) which alternately communicate with a line of compressed gaseous fluid and with the atmosphere via frame inlet (5,7) and outlet (6,8) ports, respectively, made in said frame (1); a directional flow control sleeve (10)



coaxially mounted for a slidable movement between two extreme positions with respect to said frame when said control sleeve is moved into either of its extreme positions for opening and closing said frame inlet (5,7) and outlet (6,8) ports, while the directional flow control sleeve (1) is fitted outside the frame (1) for axial displacement and defines axial internal longitudinal passages (11,12) through which compressed gaseous fluid is periodically supplied into the front chamber (3) through the inlet ports (5) and front radial holes (13) and rearward radial holes (14,15) made respectively in the forward and rearward ends of the directional flow control sleeve (10) and alternatively covered by the frame (1) so that at one extreme position of the directional flow control sleeve (1) the forward chamber (3) communicates through its outlet ports (6) with the atmosphere, while the rearward chamber (4) receives compressed gaseous fluid through the inlet ports (7) and at the other extreme position of the directional flow control sleeve (10) the frontward chamber (3) communicates through its inlet ports (5) with a compressed gaseous fluid, while the rearward chamber (4) communicates through its outlet ports (8) with the atmosphere.

4,947,942

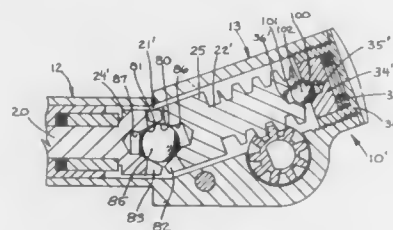
**ANGLE DRIVE FOR A SURGICAL POWER TOOL**  
Paul S. Lightle, Kalamazoo, and Lawrence R. Milks, Hickory Corners, both of Mich., assignors to Stryker Corporation, Kalamazoo, Mich.

Filed Jan. 31, 1989, Ser. No. 304,567

Int. Cl.<sup>5</sup> A61C 1/02

U.S. Cl. 173-163

16 Claims



1. An angle drive for a surgical power tool, comprising:  
a surgical tool housing;  
driving and driven shafts rotatably supported end to end in said housing, said shafts having rotational axes which cross at an obtuse angle;  
means for fixedly positioning said driving shaft for rotation in said housing;  
means for rotatably driving said driving shaft;  
opposed bevel gears on the adjacent ends of said shafts, said bevel gears being enmeshed for driving said driven shaft from said driving shaft;  
means for driving a surgical bit from said driven shaft;  
means rotatably supporting said driven shaft in said housing, said driven shaft supporting means including means piloting the adjacent end of said driven shaft on the adjacent end of said driving shaft, said piloting means comprising opposed recesses disposed coaxially in the adjacent ends of said shafts and a ball received in said recesses in said shafts and being sandwiched for relative rotation between the adjacent ends of said shafts, said recesses being conical, said ball contacting the wall of each said recess with only a line contact, said conical recesses each continuing axially and radially outward to form the radially inner faces of teeth of the opposed bevel gears, said line contact being circular and extending along said radially inner faces of said teeth of the corresponding bevel gear such that the contact line of each recess with the ball is circumferentially broken by gaps between the teeth of the corresponding bevel gear, the diameter of said ball exceeding the diameter of a said recess at the roots of the corresponding bevel gear teeth.

4,947,943

**FISHERMAN'S GEAR-STORING ICE AUGER**

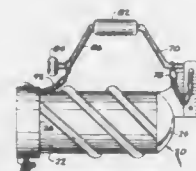
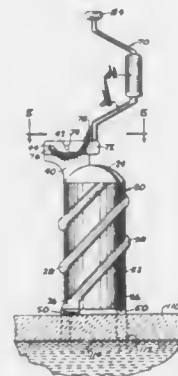
John Litwak, 428 Dock St., P.O. box 0607, Schuylkill Haven, Pa. 17972-0607

Filed Feb. 6, 1989, Ser. No. 307,319

Int. Cl.<sup>5</sup> E21B 10/44

U.S. Cl. 175-18

4 Claims



1. An ice auger comprising:  
a hollow tubular body defining an axis, the body being open on one end and substantially closed on an opposite end, the body including a flange protruding from the closed end;  
a handle having a shaft part and a grip part, the handle being attachable to the body at a first position relative to the body, in said first position the handle extending generally along the axis away from the body, and one of the shaft part and the grip part being eccentric to the axis, the handle having a strap engageable with the flange on said body in either of two opposite orientations, the strap being substantially perpendicular to the axis, whereby the handle is operable manually to turn the body around the axis; and  
means on said body for attaching the handle at a second position, wherein the handle is disposed along an outside surface of the body generally parallel to the axis and spaced from the axis, said handle being pivotable on the closed end of the body between said first position and said second position;  
means for locking the handle in at least one of said first and second positions;  
a plurality of cutters mounted on the open end of the body and directed at least partly axially away from the body; whereby the auger is operable to cut an ice core when the handle is in the first position and to carry articles inside the body when the handle is in the second position.

4,947,944

**DEVICE FOR STEERING A DRILLING TOOL AND/OR DRILL STRING**

Trevellia M. Colman; Alfred E. W. Fletcher, both of Pretoria, South Africa, and Bernhard Prevedel, Hanover, Fed. Rep. of Germany, assignors to Preussag Aktiengesellschaft, Hanover, Fed. Rep. of Germany

PCT No. PCT/DE88/00359, § 371 Date Feb. 15, 1989, § 102(e) Date Feb. 15, 1989, PCT Pub. No. WO88/10355, PCT Pub. Date Dec. 29, 1988

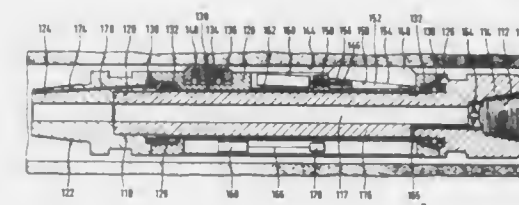
PCT Filed Jun. 14, 1988, Ser. No. 327,961

Claims priority, application South Africa, Jun. 16, 1987, 87/4318; Jun. 16, 1987, 87/4319

Int. Cl.<sup>5</sup> E21B 7/08, 7/10

U.S. Cl. 175-73

18 Claims



1. An apparatus for steering a drilling tool along a wall of a drilling bore, comprising:  
an inner pipe rotatable about a longitudinal axis;  
an outer pipe mounted rotatably on said inner pipe and coaxial with said inner pipe, said outer pipe being formed with an outer surface facing the wall of the bore and being provided with a plurality of slots spaced angularly from one another in said outer pipe, each of said slots having a respective bottom;  
a respective wedge slidable axially in the respective slot and having a guiding surface spaced from the bottom of the respective slot, said guiding surface being inclined to said axis;  
a respective motor operatively connected with each of said wedges for sliding the respective wedge axially in the respective slot; and  
a respective shoe having a respective inner portion received in each of said slots and formed with a shoe bottom inclined complementary to said guiding surface of the respective wedge and in a constant contact with said guiding surface, each of said shoes being radially movable upon sliding of the respective wedge by the respective motor and protruding beyond said peripheral wall of said outer pipe.

4,947,945

**RELATING TO CUTTER ASSEMBLIES FOR ROTARY DRILL BITS**

Nigel D. Griffin, Whitminster, England, assignor to Reed Tool Company Limited, England

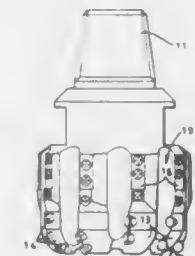
Filed Mar. 10, 1989, Ser. No. 321,772

Claims priority, application United Kingdom, Mar. 11, 1988, 8805789

Int. Cl.<sup>5</sup> E21B 10/46, 10/52

U.S. Cl. 175-409

19 Claims



1. A cutter assembly, for a rotary drill bit, comprising a preform cutting element mounted on a carrier, the carrier being formed from a material containing at least about 50% tungsten metal.

4,947,946

**HOPPER GATE OPENING AND CLOSING DEVICE FOR AN AUTOMATIC WEIGHING APPARATUS**

Satoshi Konishi; Masahiko Tatsuoka, both of Shiga, and Toshiyuki Komatsu, Nara, all of Japan, assignors to Ishida Scales Mfg. Co. Ltd., Kyoto, Japan

Filed Sep. 13, 1989, Ser. No. 406,773

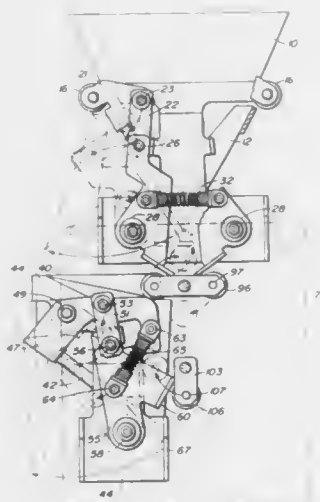
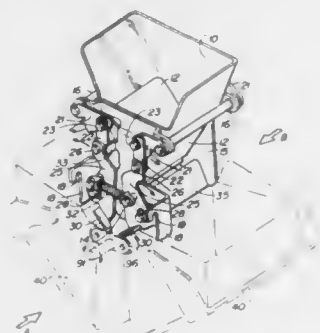
Int. Cl.<sup>5</sup> G01G 13/18, 13/24

U.S. Cl. 177-105

10 Claims

1. A hopper gate operating assembly for an automatic weighing apparatus, said assembly comprising,  
a motor having a shaft,  
an elongated member securely attached to said shaft and extending perpendicularly therefrom,  
a first linkage system and a second linkage system each attached to a hopper gate at one end and having a contact part formed at the other end such that said gate is opened if said contact part is pushed and displaced, and  
a contact, piece attached to said elongated member distal from said shaft so as to move along a circular path if said shaft is rotated, said contact piece being disposed proximal

to said contact part of at least one of said linkage systems such that said contact piece pushes and displaces said one



proximal contact part if said shaft is rotated in a specified direction.

4,947,947

#### SLIVER MEASURING APPARATUS WITH OVERLOAD RELIEF

Homer S. White, Durham, N.C., assignor to Myrick-White, Inc., Durham, N.C.

Filed Nov. 27, 1989, Ser. No. 441,242

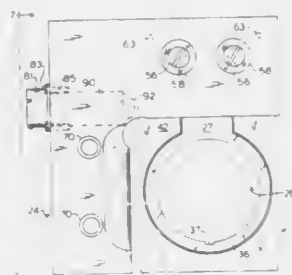
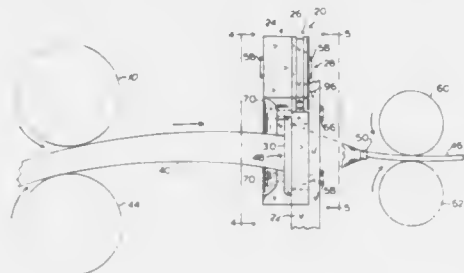
Int. Cl.<sup>5</sup> G01G 23/02, 23/06, 3/14; G01L 5/04

U.S. Cl. 177—153

11 Claims

1. An apparatus for measuring the unit weight of sliver as it passes through a trumpet, comprising:
  - (a) an integral plate member having a first end portion, a second end portion having a central opening for mounting a trumpet and a central portion of reduced cross-section joining said first and second end portions;
  - (b) a trumpet for passing sliver, said trumpet being mounted in said second end portion and operative to deflect said central portion when sliver is passed therethrough;
  - (c) means for supporting said plate member first end portion to maintain said trumpet in a first position in the absence of an overload on the trumpet and in response to an overload on the trumpet to allow said trumpet to move to a second position to avoid excess strain on said plate central portion and after said overload has passed to permit said trumpet to move back to its first position; and
  - (d) detection and signaling means operative when sliver is passed through said trumpet in the absence of an overload on the trumpet and during vibration of said base to detect deflection in said central portion imposed by passing of

sliver through said trumpet and by vibration of said lower portion and to develop therefrom a measuring voltage



substantially indicative of the deflection imposed on said trumpet in the absence of said vibration as an indication of said unit weight.

4,947,948

#### CONTROL DEVICE FOR DIFFERENTIAL SPEED STEERING OF A VEHICLE

Heinrich Dückinghaus, Bielefeld, Fed. Rep. of Germany, assignor to Claas OHG, Harzewinkel, Fed. Rep. of Germany

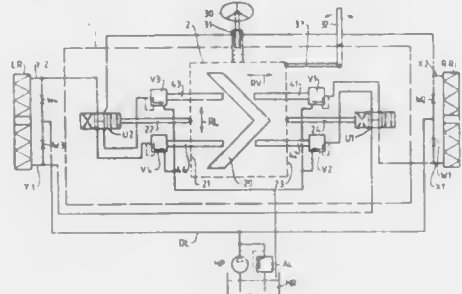
Filed Jul. 18, 1989, Ser. No. 381,343

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825670

Int. Cl.<sup>5</sup> B62D 11/04

U.S. Cl. 180—6.7

17 Claims



1. A control device for differential speed steering of a vehicle, comprising:
  - a spool valve movable in two directions in each of two degrees of freedom;
  - four control valves assigned in pairs to said spool valve; reversing valves;
  - control connectors connected to outputs of said control valves for regulating the forward and reverse movements of a right and left driving element by means of respective steering and drive control positions of the spool valve via the reversing valves, which cause a steering reversal in a forward-reverse movement sense,

wherein the spool valve directly activates the reversing valves in accordance with the forward-reverse drive control position and the spool valve is displaceable in one of the degrees of freedom by turning of the steering wheel and in a second of the degrees of freedom by pivoting of a drive lever.

4,947,949

#### MOTOR-DRIVEN TYPE POWER ASSISTED STEERING CONTROL APPARATUS

Mitsuharu Morishita; Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

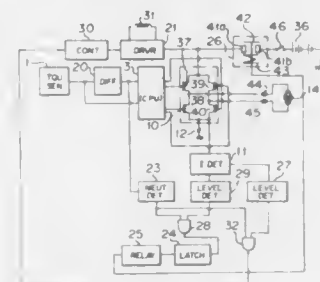
Filed Apr. 26, 1989, Ser. No. 343,310

Claims priority, application Japan, May 13, 1988, 63-117388

Int. Cl.<sup>5</sup> B62D 5/04

U.S. Cl. 180—79.1

3 Claims



1. A motor-driven power assisted steering control apparatus including a steering torque sensing means (1) for detecting a steering torque, a motor (14) connected to a steering shaft via a clutch to exert an auxiliary steering force on the steering shaft, a control means for controlling said motor in correspondence to an output from said steering torque sensing means, said apparatus being characterized by:

- a torque neutral point detecting means (23) for detecting a neutral point of steering torque,
- means (11) for sensing a current flowing in said motor,
- a first level detecting means (27) for detecting when said motor current exceeds a first level, and
- a second level detecting means (29) for detecting when said motor current exceeds a second level which is greater than the first level,
- means (32, 30, 21) responsive to the torque neutral point detecting means and the first level detecting means for reducing a current flowing in said clutch when the motor current exceeds the first level and the steering torque value is at other than the neutral point, and
- means (28, 24, 25, 26) responsive to the torque neutral point detecting means and the second level detecting means for interrupting the current flowing in said clutch and said motor when the motor current exceeds the second level and the steering torque value is at other than the neutral point.

4,947,950

#### VEHICLE SPEED CONTROL DEVICE

Richard P. Heintz, Kalamazoo, Mich., assignor to The Deacelerator Corporation, Kalamazoo, Mich.

Filed Feb. 10, 1989, Ser. No. 309,274

Int. Cl.<sup>5</sup> B60K 31/10

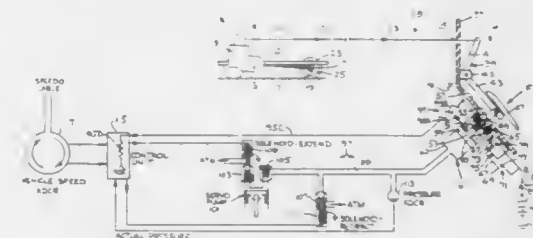
U.S. Cl. 180—176

9 Claims

1. A vehicle speed control unit for use in a vehicle having a variable speed engine, drive train means connecting said engine to a drive wheel therefor, a movable foot pedal movable against a normal amount of resistance, and throttle means on said engine responsive to movement of said foot pedal for

increasing and decreasing engine speed and, consequently, vehicle speed, comprising:

- a vehicle speed transducer means responsive to vehicle speed for generating a signal in response to vehicle speeds in excess of a predetermined speed;
- resistance means operatively responsive to said signal from said vehicle speed transducer means for effecting a sudden increase in a resistance force resisting movement of said foot pedal at a moment in time when said vehicle speed is at a specific value of said predetermined speed and a vehicle operator is applying a force to said movable foot pedal sufficient to overcome said normal amount of resistance to foot pedal movement but insufficient to overcome said increased resistance to foot pedal movement to cause said throttle means to produce a vehicle speed equal to said predetermined speed, said resistance force being sufficient to overcome said vehicle operator force to urge said foot pedal in a direction to cause said throttle means to reduce vehicle speed whenever said vehicle speed



- exceeds said specific value, said resistance means including an actuator piston supported for slidable reciprocal movement between first and second positions respectively spaced from and closely adjacent said foot pedal, and position control means for controlling the position of said actuator piston between said first and second positions in response to a range of vehicle speeds at and just slightly below said predetermined speed;

- piston engagement means provided on said foot pedal for engaging directly against said actuator piston when said actuator piston is in said second position closely adjacent said foot pedal; and
- coupling means cooperable with said actuator piston and said piston engagement means for selectively releasably coupling said actuator piston directly to said piston engagement means when said actuator piston is in said second position engaged against said piston engagement means and for transferring said reciprocal movement of said actuator piston to said foot pedal to increase and decrease the vehicle speed.

4,947,951

#### PRESSURE RESPONSIVE AND ELECTRICALLY CONTROLLABLE FLOW CONTROL APPARATUS

Laurence L. Miller, West Lafayette, Ind., assignor to TRW Inc., Lyndhurst, Ohio

Filed Aug. 1, 1988, Ser. No. 226,723

Int. Cl.<sup>5</sup> B62D 5/08

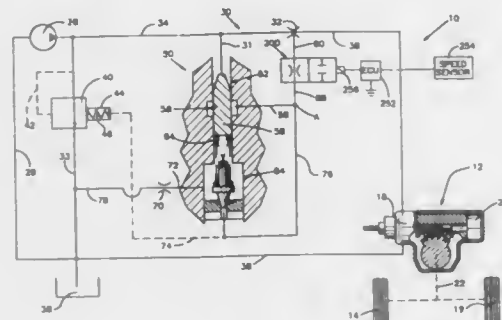
U.S. Cl. 180—143

13 Claims

1. An apparatus for use in a power steering system having a hydraulic pump and a power steering motor which is operable to turn steerable vehicle wheels in response to operation of a power steering control valve, said apparatus comprising:
  - means for providing a signal indicative of at least one vehicle operating parameter;
  - main conduit means for conducting fluid from the pump to the power steering control valve;
  - bypass valve means for bypassing fluid from said main conduit means, said bypass valve means being urged toward an open condition;



first pilot valve means for, when open, communicating fluid pressure in said main conduit means to said bypass valve means to urge said bypass valve means toward a closed condition;  
second pilot valve means responsive to said signal indicative of at least one vehicle operating parameter for, when



#### 4,947,953 DRIVE SPEED CONTROL SYSTEM FOR A MOTOR VEHICLE HAVING A CONTINUOUSLY VARIABLE TRANSMISSION

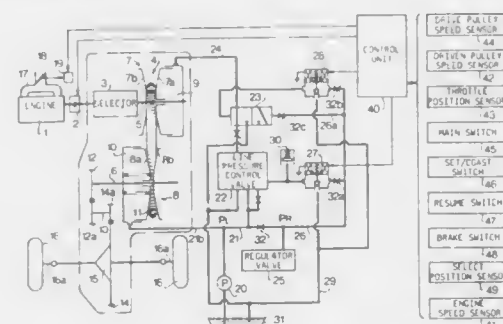
Yoshihiko Morimoto, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,801

Claims priority, application Japan, Aug. 31, 1987, 62-217550  
Int. Cl.<sup>3</sup> B60K 31/04

U.S. Cl. 180—179

9 Claims



5. A drive speed control system for a motor vehicle having an engine with a throttle valve, a continuously variable transmission, a transmission ratio control system for the transmission, and a cruise control system for controlling speed of said vehicle to a desired cruising speed, comprising:

the cruise control system having a coasting switch for producing a coasting signal during cruising controlled by the cruise control system;  
an actuator responsive to the coasting signal for closing the throttle valve;  
means responsive to said coasting signal for downshifting said transmission by a value;

the continuously variable transmission having a drive pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating said disc of the driven pulley, and a belt engaged with both pulleys, a hydraulic circuit having a pump for supplying oil to both said hydraulic cylinders, said transmission ratio control system having desired transmission ratio providing means responsive to an actual transmission ratio and engine load and the desired cruising speed for producing a desired transmission ratio, and a transmission ratio control valve for controlling the oil supplied to the cylinder of said drive pulley to change the transmission ratio to the desired transmission ratio, and said value is a predetermined value and is added to said actual transmission ratio; and

said predetermined value is a function of the actual transmission ratio and speed of the driven pulley.

1. A slow speed cruising control apparatus for controlling a cruising speed of an automobile, comprising:

a setting means for determining a slow speed cruising mode and for maintaining a set cruising speed,  
a detecting means for detecting the amount of depression of a brake pedal by the driver of the automobile and for producing a signal which increases as a function of an increasing amount of depression of said brake pedal,  
an actuator for driving a throttle valve for regulating the cruising speed of the automobile by changing the degree of opening of said throttle valve,  
a speed sensor for detecting the cruising speed of the automobile,  
a controller for controlling said actuator, said controller decreasing the degree of opening of said throttle valve as a function of an increasing signal from said detecting means and said controller resuming said set cruising speed in the absence of a signal from said detecting means,  
a range sensor for detecting a preceding automobile or an

obstacle and for producing an output signal which corresponds to the distance therebetween, and  
an alarm means for generating an alarm on the basis of the output signal of said range sensor.

open, communicating said main conduit means and said bypass valve means; and  
relief valve means connected in fluid communication with said first and second pilot valve means for, when open, venting pressure to prevent the occurrence of an excessive fluid pressure condition.

#### 4,947,952

**SLOW SPEED CRUISING CONTROL APPARATUS**  
Yasuya Kajiwara, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

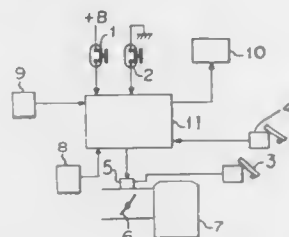
Filed Aug. 11, 1989, Ser. No. 392,318

Claims priority, application Japan, Sep. 5, 1988, 63-221915;  
Sep. 5, 1988, 63-221916; Sep. 5, 1988, 63-221917; Sep. 5, 1988, 63-221918

Int. Cl.<sup>3</sup> B60K 31/00

U.S. Cl. 180—178

6 Claims



#### 4,947,954 ACCELERATION-SLIPPAGE CONTROLLER FOR AN AUTOMOBILE

Kozo Fujita, and Kiyotaka Ise, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

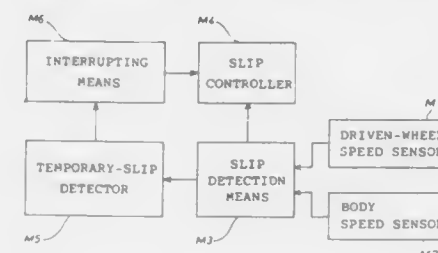
Filed Feb. 13, 1989, Ser. No. 309,156

Claims priority, application Japan, Feb. 19, 1988, 63-37778

Int. Cl.<sup>3</sup> B60K 28/16; B60T 8/32, 8/58

U.S. Cl. 180—197

8 Claims



1. A control system for controlling acceleration slippage on a driven wheel of an automobile comprising:  
a driven-wheel speed sensor for sensing a speed of the driven wheel;  
a body speed sensor for sensing a body speed of the automobile;  
a slippage detection means for detecting an occurrence of acceleration slippage of the driven wheel using the driven-wheel speed and the body speed and making a slippage-start judgment when the occurrence of acceleration slippage of the driven wheel is detected;  
a slippage controller for starting an acceleration-slippage control according to a starting condition that is based on the slippage-start judgment and for terminating the acceleration-slippage control according to a normal terminating condition that is not directly connected to the occurrence of acceleration-slippage;  
an instantaneous-slippage detector for determining whether the detected slippage is instantaneous; and  
an interrupting means for terminating the acceleration-slippage control when the detected slippage is determined to be instantaneous.

#### 4,947,955

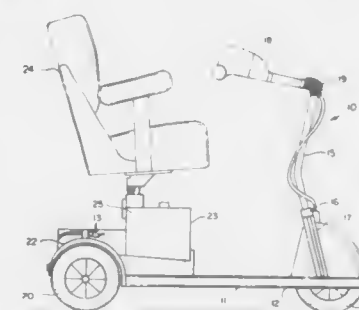
**PERSONAL VEHICLE HAVING A TAKE-APART FRAME**  
Robert C. Hopely, Jr., Gibbstown, N.J., assignor to Electric Mobility Corp., Sewell, N.J.

Filed Jan. 13, 1989, Ser. No. 296,805

Int. Cl.<sup>3</sup> B62D 61/08

U.S. Cl. 180—216

15 Claims



9. A frame for a personal vehicle comprising a front frame section having a first rear end, a rear frame section having a front end, means on said first rear end for longitudinally receiving a transversely projecting portion of said rear frame section spaced rearwardly of said front end thereof, and means on said

front frame section forwardly of said first rear end for detachably connecting said rear frame section to said front frame section when said transversely projecting portion has been received in said receiving means such that a majority of said rear frame section is disposed within an area defined on said front frame section extending forwardly from said first rear end.

#### 4,947,956

**HYDROSTATIC TRANSMISSIONS SYSTEM FOR AN ARTICULATED VEHICLE**

John W. Henline, Lisbon, N. Dak., assignor to Clark Equipment Company, South Bend, Ind.

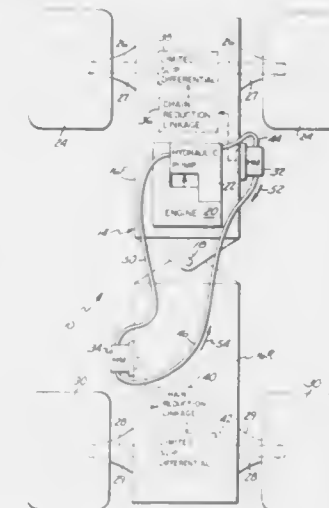
Continuation of Ser. No. 107,784, Oct. 13, 1987, abandoned.

This application Dec. 21, 1989, Ser. No. 455,940

Int. Cl.<sup>3</sup> B60K 17/358

U.S. Cl. 180—235

4 Claims



1. A hydrostatic drive vehicle, including:

a forward closed transmission case;  
a rearward closed transmission case;  
pivot means for pivotally connecting the forward transmission case directly to the rearward transmission case;  
a forward pair of wheels rotatably mounted to the forward transmission case;  
a rearward pair of wheels rotatably mounted to the rearward transmission case;  
a first primary drive hydraulic motor mounted to the forward transmission case;  
a second primary drive hydraulic motor mounted to the rearward transmission case;  
a first drive linkage mounted within the forward transmission case and coupling the first hydraulic motor to the forward pair of wheels;  
a second drive linkage mounted within the rearward transmission case and coupling the second hydraulic motor to the rearward pair of wheels;  
an engine mounted to an exterior portion of one of the forward and rearward transmission cases;  
a reversible, variable displacement, primary drive hydraulic pump mounted to an exterior portion of one of the forward and rearward transmission cases and coupled to the engine; and  
hydraulic hoses coupling the first and second hydraulic motors to the hydraulic pump in a series hydraulic circuit.

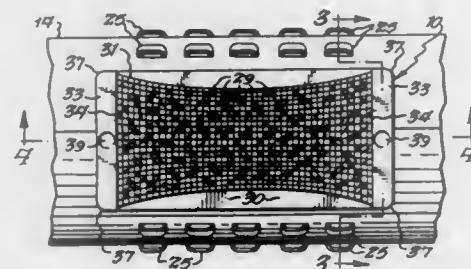
**4,947,957**  
**REGENERABLE DESICCANT CARTRIDGE FOR**  
**AUTOMOTIVE MUFFLER**

John S. Callen, Buffalo, and Samuel A. Incorvia, Tonawanda, both of N.Y., assignors to Multiform Desiccants, Inc., Buffalo, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,146  
Int. Cl.<sup>3</sup> F01N 1/24

U.S. Cl. 181-258

20 Claims



1. A regenerable cartridge for an automotive muffler having an exhaust gas conduit therein comprising a tubular wire mesh sleeve having opposite end portions, adsorbent material provided in said sleeve, an elongated metal base plate for attachment to said conduit, opposite end portions on said base plate, means for fixedly securing said opposite end portions of said sleeve to said opposite end portions of said base plate for causing said sleeve to lie in contiguous relationship to said base plate and stabilize said sleeve against distortion.

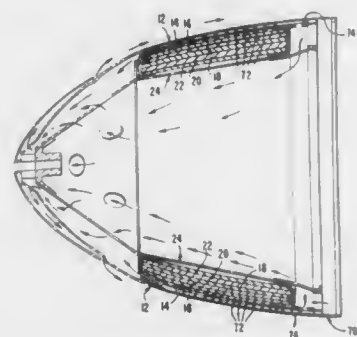
**4,947,958**  
**SOUND ATTENUATING LAMINATE INSTALLATION**  
**FOR JET AIRCRAFT ENGINES**

Stephen J. Snyder, West Hills, Calif., assignor to UAS Support, Inc., Geneva, Switzerland

Continuation-in-part of Ser. No. 106,618, Oct. 6, 1987, Pat. No. 4,848,514. This application Apr. 5, 1989, Ser. No. 333,345  
Int. Cl.<sup>3</sup> F01N 1/24

U.S. Cl. 181-296

11 Claims



1. A method for attenuating sound energy produced by a jet aircraft engine having an anti-icing system comprising wall portions defining passages therebetween through which hot air flows, such method comprising the steps of:

forming a multilayered laminate including said anti-icing system and a backing sheet with a plurality of intermediary layers therebetween; and  
disposing means for transmitting acoustical energy through said anti-icing system to said intermediary layers, said means for transmitting acoustical energy maintaining said acoustical energy in substantial fluid isolation from the hot air flowing through said anti-icing system.

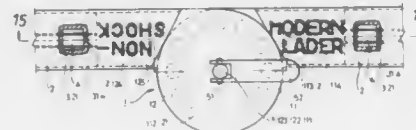
**4,947,959**  
**FOLDING LADDER**

Haison Yuen, 2-1, Jinlon Rd., Joe-Ay Village, Yen-Pu Shian, Pintung Hsien, Taiwan

Filed Mar. 14, 1989, Ser. No. 323,392  
Int. Cl.<sup>3</sup> E06C 1/28, 7/08

U.S. Cl. 182-22

6 Claims



1. A folding ladder comprising:  
a plurality of hinged joints, each said hinged joint consisting of a male hinge, a female hinge and a coupling means for selectively coupling said male hinge and said female hinge immovably together, said hinges both being made of an electrically insulating material and having a common center axis,

said male hinge having a male arm with two sides in which insignia has been indented, a cylindrical member at an end of said male arm having opposite circular faces with the center axis through said circular faces, and a plurality of protruding hemispheres set concentrically and evenly spaced on said circular faces about the center axis,

said female hinge having a female arm with two sides in which insignia has been indented, opposed circular members at an end of said female arm having inner faces separated by a distance sufficient to receive said cylindrical member therebetween and with the center axis through said inner faces, and a plurality of indented hemispheric holes set concentrically and evenly spaced in said inner faces about the center axis which receive a corresponding said hemisphere when said cylindrical member is received between said circular members;

uprights made of extruded aluminum tubes and provided with rung holes along one tube side, said uprights having open ends in which a said arm of one of said male and female hinges is received to join one said upright to another by a said hinged joint, said ends also including indented insignia pressed therein after insertion of said arm and corresponding to and mating with the insignia of said arm at locations overlying said insignia of said arm whereby said arm is securely held in said end by the indented insignia of said end; and

rungs made of extruded aluminum tubes with lengthwise protruding lines set along the length thereof to prevent slipping, said rungs being received in opposed rung holes of parallel said uprights.

**4,947,960**  
**CONNECTING ELEMENT**

Guenther Krause, Alsfeld, Fed. Rep. of Germany, assignor to Krause-Werk GmbH & Co. KG, Alsfeld, Fed. Rep. of Germany

Filed Aug. 30, 1989, Ser. No. 400,556

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 8811069[U]

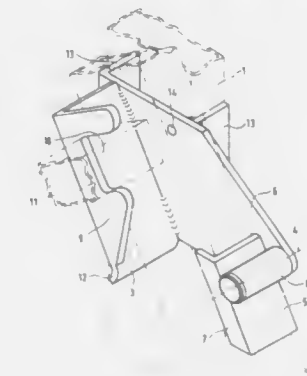
Int. Cl.<sup>3</sup> E06C 1/32, 7/50

U.S. Cl. 182-26

12 Claims

1. A connecting element for connecting first and second ladder elements, with the connecting element being fastened to a first sidepiece of the first ladder element and including clamping elements for a second sidepiece of the second ladder element, the clamping elements being constructed like a flat contact plate inclined with respect to the longitudinal axis of the first sidepiece and like a swivel plate pivotal about an axis

arranged perpendicularly with respect to the longitudinal axis of the first sidepiece, the contact plate and the swivel plate



being mounted on a bearing plate fastened on the first side-piece.

**4,947,961**  
**STEP FOR ATTACHMENT TO A WHEEL OR BUMPER**

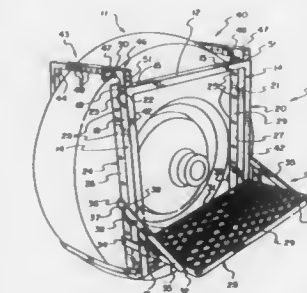
Frank Dudley, 581 S. Eighth St., Eklo, Nev. 89801

Filed Nov. 28, 1989, Ser. No. 443,128

Int. Cl.<sup>3</sup> B60R 3/00; E06C 5/24

U.S. Cl. 182-92

5 Claims



1. A portable step apparatus for removable connection to a vehicle for providing a stable platform for supporting a person while working on said vehicle, the apparatus comprising:

a support frame assembly means having a pair of side supporting frame members held in a spaced-apart relationship by frame bracing means, and  
at least one step adjustment means rigidly attached to at least one of said side supporting frame members,  
step assembly means having a step frame having a back surface, a first and second side surface and a top surface, at least one of said side surfaces including a hook member, and at least one bracing member extending from at least one of said side surfaces,  
means for attaching said step bracing means to said step adjustment means to prevent relative movement therebetween, and  
means for attaching the support frame assembly means to a vehicle,

whereby, said step assembly means can be slidably attached to said side supporting frame members and said step adjustment means such that said at least one hook member and said back surface of said step frame form a U-shaped channel which can attach to said at least one step adjustment member and at least one of said side supporting frame members in slidable relationship, and whereby said

means for attaching said step bracing to said step adjustment means allows said step assembly means to be fixed to said support frame assembly means at a plurality of predetermined locations to prevent relative movement therebetween.

**4,947,962**  
**ADJUSTABLE SCAFFOLD SUPPORT**

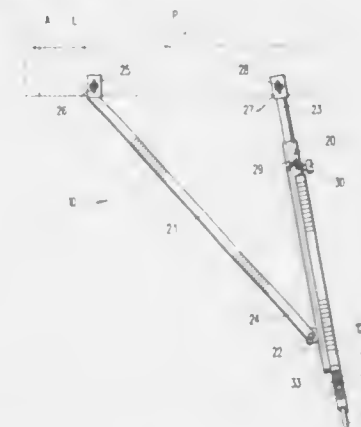
Steve M. Helsper, 9712 McConnell Rd., Woodstock, Ill. 60098

Filed Aug. 21, 1989, Ser. No. 396,094

Int. Cl.<sup>3</sup> B27B 21/00; B25H 1/06

U.S. Cl. 182-182

14 Claims



2. An adjustable scaffold support, comprising:  
a vertical guide member defining an elongated vertical guide track;  
an extension member slidably received in said guide track;  
a plurality of generally horizontal grooves axially spaced along said extension member;  
a pair of axially aligned grooves in said guide member;  
a resilient spring steel clamp on said guide member disposed for frictional engagement with said axially aligned grooves and a selected one of said horizontal grooves for securing said extension member in a selected adjusted position with respect to said guide member;  
first clamping means on an upper end of said extension member for engagement with a scaffold member;  
and  
frame means connected to said guide member for securing said guide member in a vertical orientation.

**4,947,963**  
**OIL SUPPLY RESERVOIR**

Wilho V. Aho, Jr., West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 11, 1989, Ser. No. 350,869

Int. Cl.<sup>3</sup> F16N 17/06

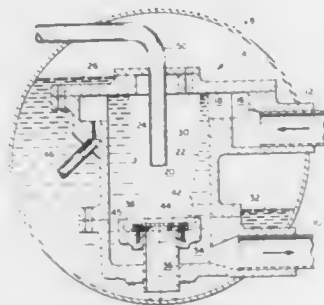
U.S. Cl. 184-6

15 Claims

1. A vented oil supply reservoir for an aircraft comprising:  
an oil supply line to exterior equipment;  
an oil return line from exterior equipment;  
a swirl vessel including a substantially cylindrical chamber having an axis, oil injection nozzles in fluid communication with said oil return line for projecting oil into said chamber in a tangential manner, an axially located vent line within said cylindrical chamber in fluid communication with the interior of said chamber, and an outlet opening peripherally located within said cylindrical chamber in fluid communication with the said oil supply line;  
an oil tank;  
said swirl vessel located within said oil tank;  
a drain opening at one end of said cylindrical chamber in fluid communication with the interior of said oil tank;



said vent line in fluid communication with the exterior of said oil tank; and



at least one oil make up line in fluid communication with the interior of said oil tank and with a low pressure zone of said injection nozzles.

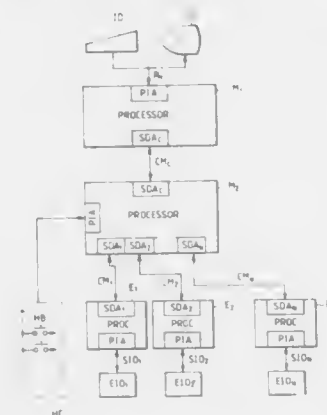
**4,947,964**  
**DOOR DRIVE APPARATUS WITH LOCKING MECHANISM FOR ELEVATORS**  
Josef Husmann, Lucerne, Switzerland, assignor to Inventio AG, Switzerland  
Filed Mar. 13, 1989, Ser. No. 322,959  
Claims priority, application Switzerland, Mar. 18, 1988, 01051/88  
Int. Cl.<sup>3</sup> B66B 13/00  
U.S. Cl. 187—52 LC



1. A door drive apparatus with locking mechanism for elevators having a car door movable by a drive means and in the door opening zone of floors connectable through a coupling mechanism with a shaft door, wherein the coupling mechanism includes an entraining parallelogram linkage mounted on a car door section and two coupling rollers respectively positioned at each shaft door, the drive means includes a drive motor mounted above the car driving a connecting gear which drives a drive belt which is connected with the car door through an actuating lever and fixes the car door in the closed and in the open positions, and the locking mechanism includes a pivotally mounted car door bolt which is monitored by a safety contact, is arrestable at an abutment, is locked by its own weight in a retaining position and which is urgeable into a releasing position by a control roller running up onto a control cam, comprising:  
an actuating lever pivotally mounted on an elevator car door and having one end articulately connected with a

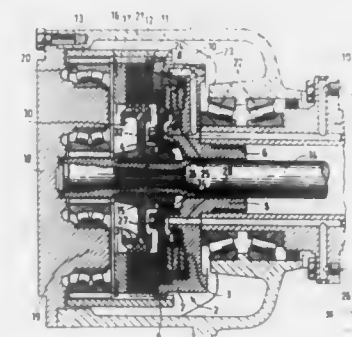
drive means for the car door and an opposite end coupled to an entraining parallelogram linkage;  
said entraining parallelogram linkage including a rigid cam and a movable cam, said movable cam having a rigid cam carrier and a ramp cam spaced from said rigid cam carrier by spring means, said ramp cam being compressible parallelly with respect to said rigid cam carrier, a control cam for a locking mechanism of the car door is connected to said ramp cam and a control roller is mounted on a car door bolt, and said car door bolt is pivotally mounted on a base plate for mounting the entraining parallelogram linkage on the car door; and  
a pair of spaced apart abutments on the car door for limiting the pivotal movement of said actuating lever and defining open and closed positions of the linkage for coupling the car door to the shaft door thereby transmitting the movement of the car door to the shaft door.

**4,947,965**  
**GROUP-CONTROL METHOD AND APPARATUS FOR AN ELEVATOR SYSTEM WITH PLURAL CAGES**  
Soshiro Kuzunuki, Katsuta; Yuzo Morita, Hitachi; Kenzi Yoneda, Katsuta; Takaaki Ueshima, Katsuta; Toshimitsu Tobita, Katsuta, and Atsuya Fujinn, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Feb. 27, 1989, Ser. No. 315,918  
Claims priority, application Japan, Feb. 3, 1988, 63-47471  
Int. Cl.<sup>3</sup> B66B 1/18  
U.S. Cl. 187—127



1. A group-control method for an elevator system with plural elevator cages serving plural floors, in which when a hall call is generated, evaluation values of all of group-controlled cages with respect to the generated hall call are calculated by a predetermined evaluation function and the generated hall call is allotted to an adaptive cage, which has the most desired one of the calculated evaluation values,  
characterized in  
that there is established in accordance with a position of a cage such a first floor zone for the cage that a hall call generated within the zone is to be preferentially allotted to the cage, and  
that the evaluation function includes evaluation indexes of at least two control items of a waiting time and the first zone.

**4,947,966**  
**VEHICLE GEARBOX WITH INCORPORATED BRAKE**  
Martin Huff, Tettnang, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Fed. Rep. of Germany  
PCT No. PCT/EP87/00556, § 371 Date Mar. 16, 1989, § 102(e)  
Date Mar. 16, 1989, PCT Pub. No. WO88/02324, PCT Pub. Date Apr. 7, 1988  
PCT Filed Sep. 29, 1987, Ser. No. 335,968  
Int. Cl.<sup>3</sup> F16D 65/24  
U.S. Cl. 188—170

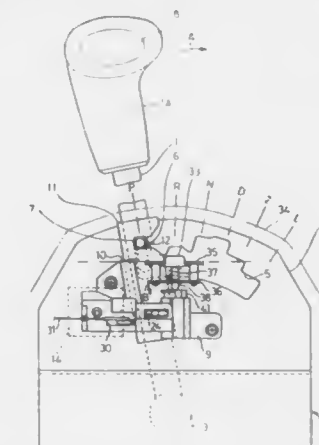


1. A vehicle transmission, of a planetary design, having an integrated service and parking brake with inner brake discs (12) being supported by a central shaft (14) and outer brake discs (11) being non-rotationally supported by a ring gear (13) connected via a ring-gear support (2), having an annular collar (7) and an inner hub collar (3), with a hub support (1), a service-brake annular piston (9) being actuable toward said brake discs (11, 12) by pressure provided by a service-brake pressure line (10) against a force provided by recoil spring means (29) for engaging the brake, angularly disposed pressure spring means (23) forcing said service-brake annular piston (9) against said brake discs, and a brake releasing annular piston (25) being independently actuable away from said brake discs via a separate brake releasing pressure line (28),

wherein said service-brake annular piston (9) is a stepped piston located in said outer annular collar (7) and forms therewith a service brake annular cylinder (8) which, when activated by said service brake pressure line, engages the brake, and said brake releasing annular piston (25) abuts against said service-brake annular piston (9) via a radial collar (24) and forms therewith a chamber facing said ring-gear support (2) which accommodates said pressure spring means (23),

said pressure spring means abuts against said ring-gear support (2) and said brake releasing annular piston (25) and is preloaded so that it can overcome the force exerted by said recoil spring means (29) and bias said service-brake annular piston to engage the brake, and said braking release annular piston (25) is guided by said inner hub collar (3) of said ring-gear support (2) and forms with an intermediate ring (26) attached to said inner hub collar (3), said brake releasing annular cylinder (27) which communicates with said brake releasing pressure line (28) whereby activation of said brake releasing annular cylinder compresses said pressure spring means (23) and prevents said pressure spring means from engaging the brake.

**4,947,967**  
**LOCKING APPARATUS FOR SHIFT LEVER IN AUTOMATIC TRANSMISSION**  
Shozo Kito, Aichi; Shoichi Harada, Gifu; Hajime Imai, and Tadao Muramatsu, both of Aichi, all of Japan, assignors to Kabushiki Kaisha Tokai-Rika-Deoki-Seisakusho and Toyota Jidosha Kabushiki Kaisha, both of Japan  
Filed Nov. 1, 1988, Ser. No. 265,445  
Claims priority, application Japan, Nov. 5, 1987, 62-169320  
Int. Cl.<sup>3</sup> B60K 41/26  
U.S. Cl. 192—4 A



1. A locking apparatus for a shift lever of an automatic transmission of a vehicle to permit said shift lever to become operable under predetermined conditions, comprising:

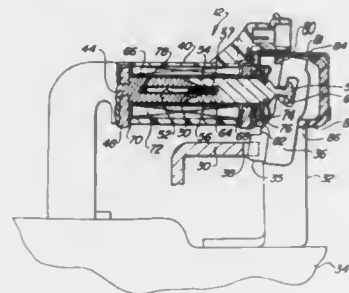
- (a) detent means for inhibiting said shift lever from shifting to a vehicle driving position, at which said automatic transmission is set at a vehicle driving position, when said shift lever is set at a vehicle non-driving position, said detent means being movable between a shift-lever operating position and a lock position;
  - (b) a lock member being movable together with said detent means between said lock position and said shift-lever operating position, at said shift lever non-driving position at which said automatic transmission is set in a vehicle non-driving position;
  - (c) shift-lever releasing means for moving said detent means from said lock position to said shift-lever operating position to allow said shift lever to be shifted;
  - (d) electrically operated means for holding said lock member to keep said detent means at said lock position and for releasing said held lock member in response to an electrical signal based on predetermined conditions thereby to make said shift-lever releasing means inoperable;
  - (e) manual release means for releasing said held lock member and for allowing said shift lever to be shifted even when said shift-lever releasing means has not been made operable by said electrically operated means;
- whereby, said shift lever is able to be shifted to enable said vehicle to be moved even when said electrically operated means is operable.

**4,947,968**  
**TRANSMISSION MOUNTED SOLENOID INTERLOCK DEVICE**  
Michael Slavin, Caseville; Charles A. Detweiler, Durand; Ellsworth S. Miller, Rochester Hills, and Charles R. Martus, Troy, all of Mich., assignors to Lectron Products, Inc., Rochester Hills, Mich.  
Filed May 1, 1989, Ser. No. 345,788  
Int. Cl.<sup>3</sup> B60K 41/26, 41/28  
U.S. Cl. 192—4 A

1. A transmission solenoid interlock device for motor vehi-

cle having a pivotable transmission mounted shift actuating lever remotely coupled to an operator actuated gear shift lever, comprising:

- a mounting bracket adapted to be secured to an outer surface of a transmission in close proximity to said shift actuating lever;
- a tubular housing secured to said mounting bracket;
- a pole piece axially disposed within said housing;
- an armature axially disposed within said housing and movable between a first position displaced from said pole piece to a second position attracted toward said pole piece;



- a solenoid winding attracting said armature to said second position through energization of said winding;
- a locking member operatively coupled for pivotable motion with said armature so as to engage at least one engaging notch provided in said shift actuating lever when said armature is in said second position;
- spring means urging said armature to said first position; and
- installation alignment means associated with said mounting bracket for permitting alignment of said locking member and said at least one engaging notch without energization of said solenoid winding.

4,947,969

## CENTER LOAD CLUTCH BRAKE

James K. Tarlton, Sr., Auburn, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Oct. 10, 1989, Ser. No. 418,565

Int. Cl.<sup>5</sup> F16D 67/02

U.S. Cl. 192—13 R

13 Claims



1. A clutch brake apparatus comprising:
  - a pair of opposed covers secured together to define an internal cavity therebetween, said covers including outer friction surfaces, said friction surface on each said cover adapted to be frictionally engaged during use by an associated drive line component;
  - a pair of outer washers disposed between said covers in said cavity, each of said outer washers having a reduced thickness portion formed adjacent the outer periphery thereof, said reduced thickness portions being oriented so as to define an annular groove between said outer washers;
  - an inner brake washer disposed between said covers in said

cavity, each of said outer washers having means for engaging said inner brake washer for rotation therewith; and spring means disposed within said annular groove to urge said outer washers into engagement with said covers.

4,947,970

## DUAL CLUTCH CONTROL SYSTEM

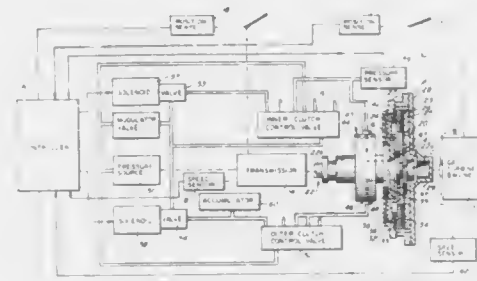
Alan L. Miller, Chicago, Ill.; Susan W. Schultz, Boxford, Mass., and William P. Umlauf, Schererville, Ind., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Nov. 8, 1988, Ser. No. 268,786

Int. Cl.<sup>5</sup> F16D 43/284; B60K 41/02

U.S. Cl. 192—0.076

20 Claims



1. A control system for use in a vehicle drive train which includes an engine having a throttle associated therewith, a transmission having a control associated therewith, a clutch unit for transmitting torque from said engine to said transmission, engine speed sensing means for developing an engine speed signal, and clutch control means for controlling the torque transmitted by said clutch unit as a function of at least one torque control signal applied thereto, said control system comprising:
  - throttle position sensing means for developing a throttle signal corresponding to the position of said throttle, and controller means responsive to said throttle signal for applying said torque control signal to said clutch control means, said controller means including engine speed set point means for developing a speed set point signal and adjustment means for developing a torque adjustment signal in response to a comparison of the speed set point signal and the engine speed signal, said controller being responsive to advancing movement of said throttle toward a more open position to effect control of said clutch unit to utilize rotating inertia torque of said engine for more rapid vehicle acceleration.

4,947,971

## CONTROL SYSTEM FOR A CLUTCH FOR A MOTOR VEHICLE

Hiroshi Tanaka, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 301,559

Claims priority, application Japan, Feb. 16, 1988, 63-33197

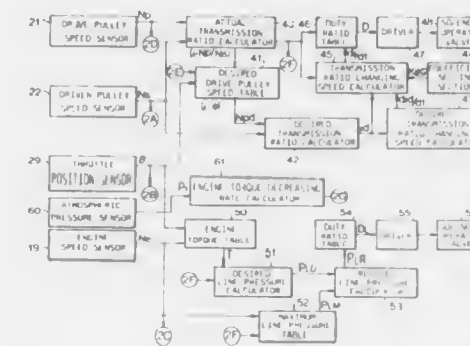
Int. Cl.<sup>5</sup> B60K 41/02

U.S. Cl. 192—0.033

5 Claims

1. In a system for controlling a clutch for a motor vehicle having an engine, the system having engine speed detecting means for detecting engine speed and for producing a corresponding engine speed signal, and calculating means responsive to the engine speed signal for calculating torque of the clutch at starting of the vehicle and for producing a corresponding clutch torque signal for controlling actual torque of the clutch, the improvement in the system comprising
  - atmospheric pressure detecting means for detecting actual atmospheric pressure and for producing a corresponding actual atmospheric pressure signal,
  - compensating means responsive to the actual atmospheric pressure signal for reducing the torque of the clutch without disengaging the clutch, upon decreasing of the actual

atmospheric pressure, via said calculating means, for controlling the clutch so as to keep engine speed of an engine



stall point substantially constant independent of change of the actual atmospheric pressure.

4,947,972

## AXIALLY FRANGIBLE AUTOMATIC TORQUE LIMITING CLUTCH

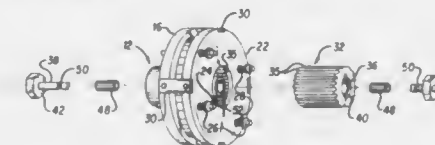
Bruce K. Lea, 2324 Venetia Rd., Mobile, Ala. 36605

Filed Aug. 3, 1989, Ser. No. 389,331

Int. Cl.<sup>5</sup> F16D 7/02, 3/14

U.S. Cl. 192—56 R

8 Claims



1. An axially frangible, automatic torque limiting mechanical clutch, comprising:
  - an input shaft,
  - said input shaft fixedly attached to a primary input plate,
  - a secondary input plate,
  - said secondary input plate rotatably affixed to and biased toward said primary input plate by means of frictional limit adjusting bolts contained adjacent the periphery of said primary and said secondary input plates,
  - at least one friction plate,
  - said at least one friction plate assembled between said primary input plate and said secondary input plate,
  - said at least one friction plate rotatably affixed to an output shaft,
  - said output shaft concentrically cooperating with said input shaft,
  - said input and said output shaft each containing a concentric axial bore,
  - said bore providing for the insertion of an axial bolt,
  - said axial bore is of a larger diameter than said axial bolt and is fitted with a sleeve,
  - the inside diameter of said sleeve closely cooperating with the diameter of said axial bore,
  - the outside diameter of said sleeve closely cooperating with the diameter of said axial bore, whereby
  - an axial bolt of predetermined size and tensile strength is installed within said larger diameter axial bore and said sleeve,
  - thus preventing excessive play between said axial bolt and said larger diameter axial bore.

4,947,973

## COOLING DEVICE FOR PULL TYPE CLUTCH

Hiroshi Takeuchi, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Neyagawa, Japan

PCT No. PCT/JP88/00808, § 371 Date Apr. 14, 1989, § 102(e)

Date Apr. 14, 1989, PCT Pub. No. WO89/02545, PCT Pub.

Date Mar. 23, 1989

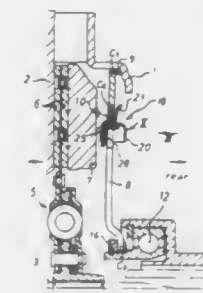
PCT Filed Aug. 15, 1988, Ser. No. 369,554

Claims priority, application Japan, Sep. 11, 1987, 62-139675[U]

Int. Cl.<sup>5</sup> F16D 13/72

U.S. Cl. 192—70.12

2 Claims



1. In a pull-type clutch having a diaphragm spring with a plurality of slits and enlarged notches at outer peripheral ends of said slits,
  - a clutch cover fixed on a flywheel and having an outer fulcrum for said diaphragm spring,
  - a pressure plate movable in an axial direction and in contact with an intermediate fulcrum of said diaphragm spring,
  - a release bearing movable in said axial direction and engaged with an inner fulcrum of said diaphragm spring for releasing the pressure plate from a clutch disc by pulling said inner fulcrum of said diaphragm spring,
  - a cooling device for said clutch, said cooling device comprising:
    - an air induction body for inducing cooling air mounted on a release bearing face of said diaphragm spring,
    - a plurality of air scoops opening in a rotation direction of said clutch and formed on said induction body,
    - a plurality of washer arranged on a pressure plate side of said diaphragm spring,
    - said washers and said induction body being joined to each other through said notches of said diaphragm spring,
    - said diaphragm spring being held between said induction body and said washers.

4,947,974

## FAST FILL HYDRAULIC CLUTCH

Alfred S. Smemo, Dubuque, and Donald O. Johannsen, Sherrill, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 15, 1988, Ser. No. 144,847

Int. Cl.<sup>5</sup> F16D 25/063

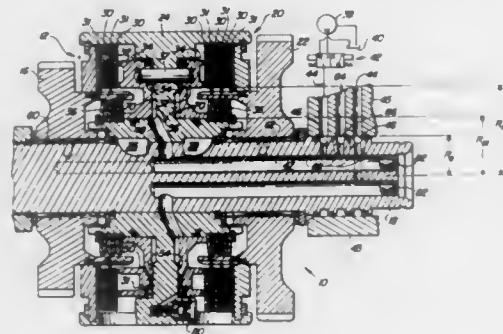
U.S. Cl. 192—85 AA

6 Claims

1. A fluid actuated clutch, comprising:
  - a drive shaft having a central longitudinal axis around which the drive shaft is rotated;
  - a clutch drum mounted to the drive shaft, the clutch drum forming a hydraulic cylinder;
  - a fluid delivery conduit formed in the drive shaft for directing a hydraulic signal to the cylinder;
  - a piston movably positioned in the cylinder for movement between an activated position and a deactivated position in response to the hydraulic signal;
  - a spring operatively associated with the piston, the spring having a biasing force driving the piston into the deactivated position;
  - a driven member operatively coupled to the piston;
  - means operatively positioned between the piston and the



driven member for transferring rotational motion between the piston and the driven member; and  
 a sealing assembly forming a seal between the hydraulic cylinder and the piston, the sealing assembly comprising a ring having a center that intersects the longitudinal axis of the drive shaft, the ring having an inner radius that defines a fluid containing portion of the cylinder when the piston is in the deactivated position, the fluid containing portion being radially inward from the inner radius of the ring,



whereby rotation of the drive shaft and the fluid containing portion of the cylinder creates an axial load on the piston opposing the biasing force on the piston by the spring, the inner radius of the ring being located at a distance radially outward from the longitudinal axis so that the axial load does not exceed the biasing force of the spring, the ring stops forming the seal between the hydraulic cylinder and the piston when the piston is in the activated position.

4,947,975

## RELEASE BEARING MECHANISM OF A CLUTCH

Hiromi Tojima, Neyagawa, Japan, assignor to Kabushiki Kaisha Dalkin Seisakusho, Neyagawa, Japan  
 PCT No. PCT/JP88/00505, § 371 Date Jan. 31, 1989, § 102(e) Date Jan. 31, 1989, PCT Pub. No. WO88/09883, PCT Pub. Date Dec. 15, 1988

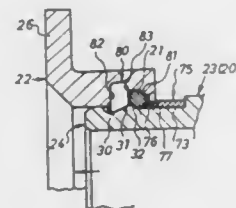
PCT Filed May 25, 1988, Ser. No. 336,352

Claims priority, application Japan, Jun. 4, 1987, 62-86857[U]; Jun. 4, 1987, 62-86858[U]; Feb. 9, 1988, 63-15912[U]

Int. Cl.<sup>5</sup> F16D 23/14

U.S. Cl. 192—98

5 Claims



1. A release bearing mechanism of a clutch comprising:  
 a release bearing to which an operation mechanism is connected for applying an operation force in an axially outward direction of the clutch thereto, said release bearing including an inner race provided with an axially inwardly extending generally cylindrical extension having a generally cylindrical outer peripheral surface;  
 a partially cylindrical lever plate having a generally cylindrical inner peripheral surface surrounding said generally cylindrical outer peripheral surface of said extension and fixed to a diaphragm spring;  
 one of said generally cylindrical surfaces being provided with a first ring escape groove, a substantially tapered

guide portion extending axially and radially outwardly from a bottom surface of said ring escape groove and a first ring fitting portion adjacent to and axially outward said guide portion;  
 the other of said generally cylindrical surfaces being provided with a second ring escape groove and second ring fitting portion adjacent to and axially outward of said second ring escape groove;  
 a radially elastically deflected connecting ring interposed between said generally cylindrical surfaces;  
 a ring pushing means for axially pushing said connecting ring from said second ring fitting portion to said second ring escape groove in said other generally cylindrical surface;  
 both of said ring escape grooves having depth which permits axially relative movement between said lever plate and said extension when said connecting ring is accommodated in either of said grooves; and  
 said fitting portions being adapted to fit to said connecting ring at radially opposite directions and axially opposite directions, respectively.

4,947,976

## RELEASE ARRANGEMENT FOR A MOTOR VEHICLE CLUTCH

Bernhard Limbacher, Niederwerrn, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG

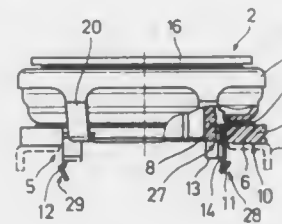
Filed Mar. 23, 1989, Ser. No. 328,090

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810369

Int. Cl.<sup>5</sup> F16D 19/00

U.S. Cl. 192—98

8 Claims



1. Release arrangement for a clutch arranged in a drive line between an engine and a gear of a motor vehicle, comprising a release bearing (2) with a bearing part (16) rotatable in operation about a rotation axis (2a), a bearing part (17) not rotatable in operation and a bearing housing (8, 9, 19) guiding the non-rotatable bearing part (17),  
 a release fork (1) having on mutually opposite sides of the rotation axis (2a) one end (1a) for pivotable mounting on a housing of the gear and another end (1b) for a force introduction of an actuating device, and rests on the bearing housing (8, 9, 19) on both sides of a line (4) of connection of the two ends (1a, 1b) on opposite sides of the rotation axis (2a),  
 wherein the bearing housing (8, 9, 19) carries, on both sides of the connection line (4) of the two ends (1a, 1b) of the release fork (1), retaining noses (11, 12) which are resilient substantially radially with respect to the rotation axis (2a), which noses engage with axial play behind the release fork (1) on a side axially remote from the release bearing (2).

4,947,977

## APPARATUS FOR SUPPLYING ELECTRIC CURRENT AND COMPRESSED AIR

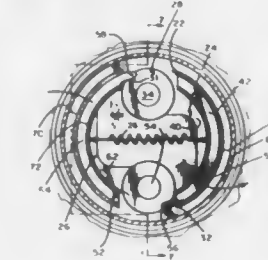
William S. Raymond, 14413 Tipperary Cir., Wichita, Kans. 67230

Filed Nov. 25, 1988, Ser. No. 275,946

Int. Cl.<sup>5</sup> F16D 43/06

U.S. Cl. 192—103 B

10 Claims



1. A clutch means comprising a first generally semi-circular clutch body terminating at one end into a first lug means having a first lug aperture and a first lug recess terminating at another end into a first tongue, said first generally semi-circular clutch body having a structure defining a first web support means integrally bound to an arcuate first flange means having a first upper arcuate flange surface and a first lower arcuate flange surface; a first outer clutch pad means attached to said first upper arcuate flange surface and a first inner clutch pad means attached to said first lower arcuate flange surface; a second generally semi-circular clutch body terminating at one end into a second lug means having a second lug aperture and a second lug recess and terminating at another clutch body having a structure defining a second web support means integrally bound to an arcuate second flange means having a second upper arcuate flange surface and a second lower arcuate flange surface; a second outer clutch pad means attached to said second upper arcuate flange surface and a second inner clutch pad means attached to said second lower arcuate flange surface; at least one spring means connected to said first generally semi-circular clutch body and to said second generally semi-circular clutch body for biasing said first clutch body and said second clutch body together in a circular configuration; said first tongue seats into said second lug recess and said second tongue seats into said first lug recess when said first clutch body and said second clutch body are biased together in contact; said arcuate first flange means is off-set from said first web support means; and said arcuate second flange means is off-set from said second web support means.

4,947,978

## CONVEYOR SYSTEM AND METHOD OF CONVEYING

Arthur B. Rhodes, 3347 Camp Ground Rd., Louisville, Ky. 40211

Filed May 1, 1989, Ser. No. 345,364

Int. Cl.<sup>5</sup> B65G 17/00

U.S. Cl. 198—341

7 Claims

1. A conveyor system comprising:  
 an endless conveyor track defining an endless conveying path;  
 means for moving the conveyor track;  
 a predetermined fixed number of load carrying units movable with the conveyor track;  
 a first accumulation area as a predetermined location along the length of the conveying path at said first area wherein some of the load carrying units are to be accumulated into a group;  
 means for counting the number of load carrying units in the first accumulation area;  
 a second accumulation area at another predetermined location along the length of the conveying path spaced a distance from the first accumulation area in which at said

second area some of the load carrying units are to be accumulated into a group;  
 means for counting the number of load carrying units in the second accumulation area;  
 calculating means for storing the count of the number of load carrying units in the first and second accumulation areas;  
 means for selectively engaging the load carrying units to the conveyor track for movement therewith and disengaging the individual load carrying units from the conveyor track at said first and said second accumulation areas;  
 said calculating means determining the total number of the load carrying units in the accumulation areas and determining the total number of load carrying units moving on the conveyor track, and thereby, determining the number



of load carrying units moving between said accumulation areas;  
 means operatively interconnecting said calculating means and the engaging-disengaging means to selectively disengage the load carrying units from the conveyor track at one of the first and the second accumulation areas when the number of load carrying units moving with the conveyor track between the accumulation areas is greater than a predetermined number stored in the calculating means; and  
 said engaging-disengaging means engaging the load carrying units to the conveyor track at one of the first and the second accumulation areas when the number of load carrying units moving with the conveyor track between the accumulation areas is less than said predetermined number stored in the calculating means.

4,947,979

## TRANSFER APPARATUS

M. Warren Martin, Saline, and Lawrence H. Weber, Ypsilanti, both of Mich., assignors to R & B Machine Tool Company, Saline, Mich.

Filed Sep. 14, 1988, Ser. No. 244,833

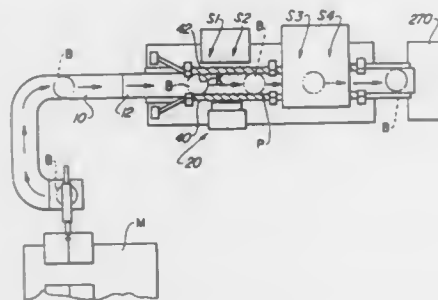
Int. Cl.<sup>5</sup> B65G 15/00

U.S. Cl. 198—343.1

16 Claims

1. Apparatus for transferring articles, comprising: a base, a slide disposed on the base for reciprocating, back and forth movement and a pair of oppositely rotating article-engaging screws disposed on the slide for movement relative thereto and spaced apart to engage the articles therebetween, said screws having a pitch and speed and direction of rotation so coordinated with the speed, direction and timing of reciprocation of

said slide as to transfer articles in succession along a path with a predetermined dwell of each article at one or more locations



along the path while the article remains engaged by the rotating screws.

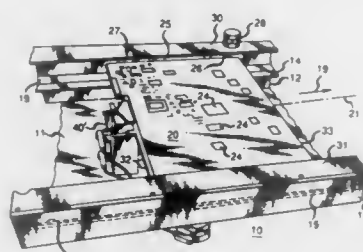
**4,947,980**  
**METHOD AND APPARATUS FOR STOPPING AND CLAMPING SUBSTRATES**

Christopher M. Helmstetter, West Trenton, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Mar. 2, 1989, Ser. No. 318,084  
Int. Cl.<sup>3</sup> B65G 47/00

U.S. Cl. 198—345.3

10 Claims



1. A clamp device for articles traveling in a path comprising: base means for such device mountable along said path, clamp means borne by said base means and adapted when in such path to clamp an article stopped in its travel in said path and to subsequently release said article, and means to shift such clamp means between out and in positions therefor relatively toward and away from said base means and at which, respectively, said clamp means is interposed in said path to so clamp and release said article and said clamp means is withdrawn from said path to clear said device, said device being portable, and such base means including magnetic clamp means for clamping said device by magnetic force in place by any one of an indefinite number of locations therefor along said path for such articles.

**4,947,981**  
**APPARATUS FOR INVERTING ARTICLES**  
Wolfgang C. Dorner, Oconomowoc, and Kenneth N. Hansen, Waukesha, both of Wis., assignors to Dorner Mfg. Corp., Hartland, Wis.

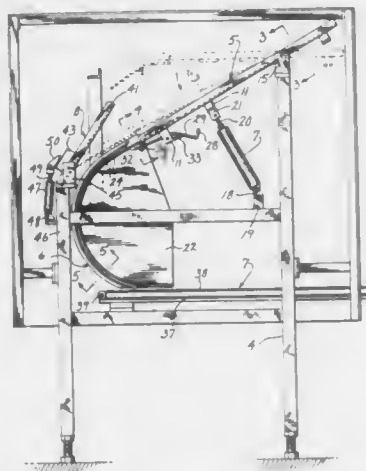
Filed Apr. 13, 1989, Ser. No. 337,652  
Int. Cl.<sup>3</sup> B65G 47/44

U.S. Cl. 198—360

17 Claims

1. An apparatus for conveying and inverting articles, comprising a receiving chute mounted for movement between a receiving position and an inclined discharge position, said receiving chute disposed to receive an article when in the receiving position, operating means for moving the receiving chute between said receiving position and said discharge position, curved inverting chute means having an inlet end dis-

posed to receive articles from said receiving chute when said receiving chute is in the discharge position and having an outlet end, said inverting chute means being constructed and arranged to invert articles as the articles pass from said inlet end to the outlet end, releasable stop means connected to said receiving chute and having an obstructing position disposed to prevent said article from sliding from said receiving chute as the receiving chute is moved toward said inclined discharge



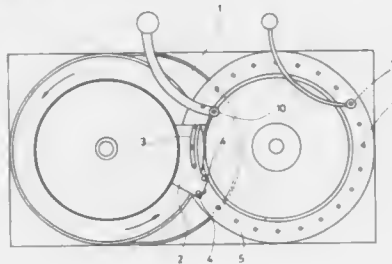
position, release means for automatically moving said stop means from the obstructing position to a non-obstructing position, and reject chute means mounted for movement between a storage position and an operative inclined position wherein said reject chute means is aligned with said receiving chute when the receiving chute is in the inclined discharge position, whereby said article will pass from said receiving chute to said reject chute means.

**4,947,982**  
**DEVICE FOR AUTOMATICALLY SUPPLYING SCREWS**  
Yukio Miyaki, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 562,480, Dec. 19, 1983, abandoned.  
This application Dec. 20, 1985, Ser. No. 810,845  
Claims priority, application Japan, Dec. 23, 1982, 57-232220  
Int. Cl.<sup>3</sup> B65G 27/00

U.S. Cl. 198—391

7 Claims



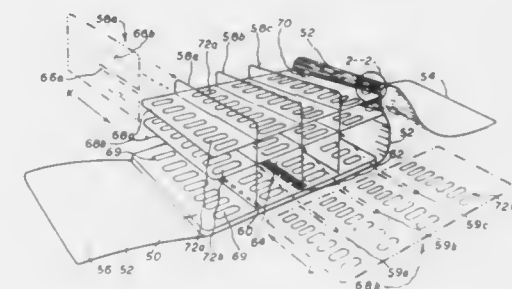
1. A device for automatically supplying articles comprising: a parts feeder;  
a flat transfer plate having a top, a bottom and an edge, said plate including means for supporting said parts on a flat surface;  
a conveyance passage in said flat transfer plate extending completely through said plate from said top to said bottom and opening in said edge said conveyance passage being operatively positioned adjacent to said parts feeder for receiving and conveying a number of articles in a

crowded manner, said conveyance passage including a receiving end and a delivery end;  
said means for supporting said parts on a flat surface including supporting said parts not located in said conveyance passage;  
a conveyance plate disposed adjacent to and below said conveyance passage for receiving said articles dropped downwardly of the conveyance passage at the delivery end thereof and conveying the same to a delivery position;  
said conveyance plate including a plurality of apertures disposed therethrough for receiving individual articles;  
removal means for removing articles not inserted in said apertures off of the conveyance plate; and  
discharge means for delivering said articles out of the apertures at a discharge position.

drain including a U-trap below a point of connection between the down tube with the up tube; and including means for causing lateral deflection of a flow from the up tube at a point outside the heating vessel.

**4,947,984**  
**PACKAGING CASES INCORPORATING ELEVATING MECHANISM FOR DISPLAYING CONTENTS**  
Lauren Kaufman, and Harrison Kaufman, both of 1228 Montgomery St. Apt. #5, San Francisco, Calif. 94133  
Filed Nov. 13, 1989, Ser. No. 435,285  
Int. Cl.<sup>3</sup> B65D 85/20, 85/57, 85/67  
U.S. Cl. 206—44.12

22 Claims

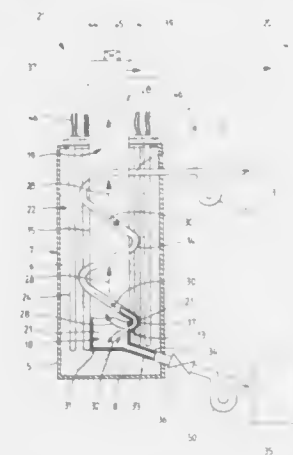


**4,947,983**  
**DISTILLING APPARATUS**  
Walter Jost, Quittenweg 17, 7300 Esslingen, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 357,327  
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818844

Int. Cl.<sup>3</sup> B01D 1/02, 1/06, 3/04  
U.S. Cl. 202—163

12 Claims



1. A still, comprising: a heating device, means defining an inlet for medium to be distilled, means defining an outlet for vapor, means defining a distillation space between the inlet and the vapor outlet, means defining a drain extending from a bottom part of the distillation space for components separated from the medium, and a heating vessel holding a heating medium so that same is heated by said heating device; wherein said means defining said distillation space includes a down tube extending downwards in the heating vessel and connected at a top end thereof with said inlet, an up tube extending upwards towards the vapor outlet, and means defining a connection for providing fluid communication between said up tube and said down tube at locations below said vapor outlet and said inlet, respectively; said up and down tubes being arranged in said heating vessel to be surrounded by said heating medium, and said drain including a U-trap below said connection between the down tube and the up tube.

11. A still, comprising: a heating device; means defining an inlet for medium to be distilled; means defining an outlet for vapor; means defining a distillation space between the inlet and the vapor outlet; means defining a drain extending from a bottom part of the distillation space for components separated from the medium; a heating vessel holding a heating medium so that same is heated by said heating device; a down tube extending downwards in the heating vessel and connected at a top end thereof with said inlet; and an up tube extending upwards towards the vapor outlet; said up and down tubes being arranged to be surrounded by said heating medium, and said

1. A holder for objects, comprising:  
a base having an upper surface,  
a plurality of partitions hingedly attached to said base at spaced locations such that said partitions can be positioned upright so as to be orthogonal to said base and parallel to each other, or folded down so as to lie at no greater than an acute angle to said base and parallel to each other,  
at least one shelf attached to said partitions at a corresponding location on each partition, said location being spaced from said base at a given height such that said shelf will be parallel to said base whether said partitions are upright or folded down,  
said shelf having a plurality of slots therein so as to be able to hold a corresponding plurality of objects of at least said given height in said respective slots,  
such that

when said partitions are upright, said shelf will be spaced from said base at a given height and will hold said objects, when positioned in said respective slots in said shelf, upright for easy selection and removal, and  
when said partitions are folded down, said shelf will be closer to said base than said given height, and said objects, when positioned in said slots in said shelf, will be held close to said base at no greater than an acute angle to said base for compact storage, protection, and transportation.

**4,947,985**  
**CHEESE SAMPLING TRAY**  
Donald L. Crabtree, Plano, Tex., and Sandra L. Natoli, Mason, Ohio, assignors to Bongrain International (American) Corporation, Mountainside, N.J.

Continuation of Ser. No. 295,062, Jan. 3, 1989, abandoned. This application Feb. 12, 1990, Ser. No. 478,750  
Int. Cl.<sup>3</sup> B65D 5/46, 5/64

U.S. Cl. 206—44.12

10 Claims

1. A food display and serving appliance comprising:  
a tray having a rectangular base panel and four upwardly extending peripheral panels including a front panel, a rear panel, and two opposite side panels; and  
a cover of clear plastic material closely receivable over said tray and having walls consisting of a rectangular top wall substantially coextensive with said base panel of said tray,



and downwardly extending peripheral cover walls consisting of a front cover wall and two opposite side cover walls, said cover being receivable over said tray with said cover walls substantially coextensively overlying said front panel and said side panels, said cover being further comprised of a handle, said handle comprising a clear plastic tab adhesively fixed to said top wall at a position adjacent said front cover wall.

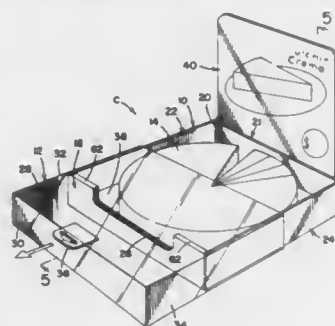
4. A combined food display and serving appliance comprising:

a cardboard blank form adapted to be folded about pivotable folding lines to erect a tray having a rectangular base panel and four upwardly extending peripheral panels, said blank form comprising a rectangular base panel having a front edge, a rear edge, two opposite side edges, first slot means associated with and parallel to said front edge, and second slot means associated with and parallel to said rear edge;

a pair of opposing elongated rectangular side panels connected to said base panel at a pair of pivotal side folding lines coextensive with said two opposite side edges;

flap members including a flap member connected to each longitudinal end of each of said elongated rectangular side panels at a pivotal flap folding line;

an elongated rectangular front panel connected to said base panel at a pivotal front folding line extending along and coextensive with said front edge of said base panel, said front panel having a free longitudinal edge parallel to said



front folding line, a pair of longitudinally extending closely spaced side-by-side first internal folding lines substantially bisecting and forming said front panel into first and second front panel members connected by narrow front edge strip means, and first tab means at said free longitudinal edge, said front panel being adapted to be folded along said front folding line and along said pair of first internal folding lines, with said first tab means being adapted to register with and be inserted into said first slot means in an interlocking relationship, to form said front panel into double wall form with said first and second front panel members spaced apart to form a first narrow slot-shaped passageway therebetween;

a rectangular rear panel connected to said base panel at a pivotal rear folding line extending along and substantially coextensive with said rear edge of said base panel, said rear panel having a free longitudinal edge parallel to said rear folding line, a pair of longitudinally extending closely spaced side-by-side second internal folding lines substantially bisecting and forming said rear panel into first and second rear panel members connected by narrow rear edge strip means, and second tab means associated with said free longitudinal edge of said rear panel, said rear panel being adapted to be folded along said rear folding line and along said pair of second internal folding lines, with said second tab means being adapted to register with and be inserted into said second slot means in an interlocking relationship, to form said rear panel into double wall form with said first and second rear panel members spaced

apart to form a second narrow slot-shaped passageway therebetween;

said flap members being adapted to be folded inwardly at their respective said pivotal flap folding lines for insertion into the adjacent open ends of the said first and second slot-shaped passageways between the said front panel members and between the said rear panel members to connect the said side panels to said front and rear panels; and,

a transparent cover member having a rectangular top wall substantially coextensive with said base panel of said cardboard blank form, and cover walls consisting of a rectangular front cover wall and two opposite side cover walls.

10. A food display and serving appliance comprising:

a tray having a rectangular base panel and four upwardly extending peripheral panels including a front panel, a rear panel, and two opposite side panels; and

a cover closely receivable over and slidable along said tray and having walls consisting of a transparent rectangular top wall substantially coextensive with said base panel of said tray and downwardly extending peripheral cover walls consisting of a front cover wall and two opposite side cover walls;

said rear panel of said tray being comprised of two closely spaced rear panel members joined at their top edges by narrow top connector strip means provided with a spaced pair of aligned slot-shape apertures for receiving tab extensions of a display panel to mount it on said rear panel in upstanding position on said tray, the rearmost one of said rear panel members having projections extending upwardly beyond the said connector strip means of said rear panel and coextensive with the said slot shape apertures therein to engage and further support the said display panel in said upstanding position.

4,947,986

#### APPARATUS FOR INTRODUCING A METERED QUANTITY OF PRODUCT INTO A VESSEL

Patrick J. M. Ballu, Reims, France, assignor to Tecnomat, France

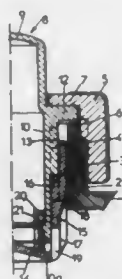
Filed May 3, 1989, Ser. No. 346,713

Claims priority, application France, May 4, 1988, 88 05976

Int. Cl.<sup>5</sup> B65D 25/08; B67D 5/56

U.S. Cl. 206—221

10 Claims



1. A container apparatus adapted for use with a vessel that includes a neck that defines an orifice which communicates with an interior of the vessel and which provides an external threaded engagement means, said container apparatus being capable of containing a metered quantity of liquid product and delivering the metered quantity of liquid product through the orifice and into the interior of the vessel without spilling, said container apparatus comprising:

a clamping collar having first threaded engagement means for threaded engagement with the external threaded engagement means of said neck so as to move said clamping means along said neck toward and away from said vessel, and

a capsule device having an interior in which the metered

quantity of liquid product is stored, said capsule device comprising first and second parts,

said first part including a bottom and a generally cylindrical side wall which defines a sealing flange, a second threaded engagement means and a free end, said first part being connectable to said clamping collar so as to be rotatable therewith, and

said second part including a bottom and a generally cylindrical side wall which extends around a portion of the side wall of said first part, said side wall of said second part defining an external locking means which can lock with said neck when inserted therein and a third threaded engagement means which engages with said second threaded engagement means, said side wall of said second part including drainage slots, said free end of said wall of said first part being in sealing contact with said bottom of said second part to prevent liquid flow through said drainage slots when liquid product is to be retained in the interior of said capsule device,

said second part being located in said orifice when said clamping collar is engaged with said threaded engagement means of said neck of said vessel, said second and third threaded engagement means and said locking means (a) causing said first and second parts to separate when said clamping collar is rotated relative to said neck and towards said vessel, thereby moving the free end of said second part to open said drainage slots and allow said metered quantity of liquid product to flow from said capsule device into the interior of said vessel by gravity, said sealing flange contacting said neck to close said orifice therein, and (b) causing said first and second parts to move together when said clamping collar is rotated relative to said neck and away from said vessel.

4,947,987

#### READY ACCESS HANG-UP STORAGE AND RETRIEVAL DEVICE FOR ARTICLES OF WEAR

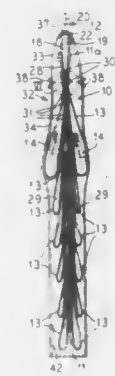
Kathleen C. Keenan, 6644 S. Kolin, Chicago, Ill. 60629

Filed Jul. 24, 1989, Ser. No. 383,638

Int. Cl.<sup>5</sup> A45C 3/12, 13/00; B65D 33/14, 35/22

U.S. Cl. 206—292

19 Claims



12. A storage and retrieval device for articles of wear, which are difficult, or impossible, to hang on a conventional hanger, comprising:

a suspension panel having an upper end portion with an upwardly facing shoulder; means associated with said shoulder for supporting said panel vertically;

a plurality of overlapping flexible, depending loops mounted on said panel and opening sidewardly for article storage and retrieval; and

a removable generally tubular washable fabric dust cover complementary to and enclosing said device and having an upper end with a shoulder complementary to and supported on said upwardly facing shoulder, and said

cover having an access opening vertically therealong, and means for reclosably fastening said opening.

4,947,988

#### PALLET CONTAINER HAVING INNER CONTAINER SURROUNDED BY AN OUTER HOUSING OF LATTICE BARS

Udo Schutz, Ruckersteg 4, D-5418 Selters, Fed. Rep. of Germany

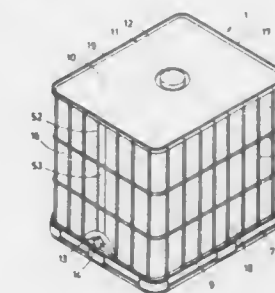
Filed Jan. 12, 1989, Ser. No. 296,126

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1988, 3819911

Int. Cl.<sup>5</sup> B65D 19/00, 90/20

U.S. Cl. 206—386

13 Claims



1. A pallet container with a flat pallet, an exchangeable inner container of a synthetic resin with an upper filling port and a lower discharge means, an outer housing secured to the pallet and surrounding the inner container, the outer housing comprising vertical and horizontal rigid metal lattice bars having inner surfaces in contact with an outer wall of said container, said housing comprising four vertical wall sections, said horizontal lattice bars being disposed on the inner side of said vertical lattice bars, and horizontal continuously extending grooves preformed in said inner container, said horizontal lattice bars being disposed in said preformed grooves and outer surfaces of said container between said grooves being in contact with said vertical lattice bars.

6. A pallet container with a flat pallet, an exchangeable inner container of a synthetic resin with an upper filling port and a lower discharge means, an outer housing secured to the pallet and surrounding the inner container, the outer housing comprising vertical and horizontal rigid metal lattice bars having inner surfaces in contact with an outer wall of said container, said housing comprising four vertical wall sections, said horizontal lattice bars being disposed between said inner container and said vertical lattice bars and being in the form of flat strips.

11. A pallet container with a flat pallet, an exchangeable inner container of a synthetic resin with an upper filling port and a lower discharge means, an outer housing secured to the pallet and surrounding the inner container, the outer housing comprising vertical and horizontal rigid metal lattice bars having inner surfaces in contact with an outer wall of said container, said housing comprising four vertical wall sections, and means for releasably securing at least one said wall section of said housing for horizontal movement relative to at least one other said wall section, thereby to permit lateral opening of said housing to permit lateral removal therefrom of said inner container.

4,947,989

#### VIDEO TAPE BOX ADVERTISING SHOWCASE COVER SLEEVE

Azor R. Horton, P.O. Box 246, Inkster, Mich. 48141

Filed Jun. 22, 1989, Ser. No. 370,200

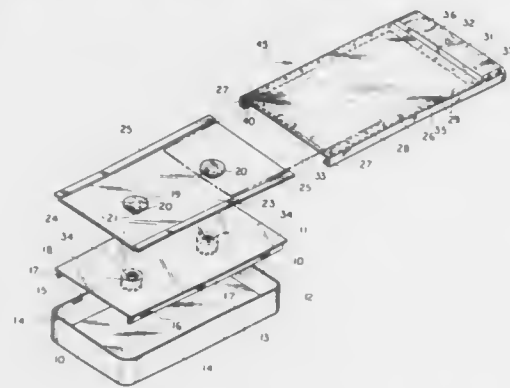
Int. Cl.<sup>5</sup> B65D 85/672

U.S. Cl. 206—387

5 Claims

1. In a video cassette storage box provided with a rectangu-

lar-shaped base section defining a cassette cavity and a displaceable lid having an outside face and an inside face presenting opposite end and side edges to secure the lid to the base section in a closed position, the improvement comprising: an adaptor plate disposed atop said outside face of the displaceable lid; fastening means for affixing said adaptor plate to the outside face of said displaceable lid; a display assembly comprising a substantially planar cover sleeve including a transparent window extending throughout the majority of the surface area of said cover sleeve and a border segment surrounding said window;



attaching means on said cover sleeve engageable with said adaptor plate to permit the removeable mounting of said display assembly to the adaptor plate; a plurality of lighting elements serially spaced about the periphery of said transparent window within said border segment; and an electrical power supply housed within said display assembly including an electrical conductor communicating with said lighting elements and switch means operable to illuminate the lighting elements, whereby upon activation of said switch means, said lighting elements are illuminated to draw visual attention to said display assembly and any printed material viewable through said window.

4,947,990

## PACKAGE OF ABRASIVE MATERIALS

Ronny Klemets, Jeppo, Finland, assignor to KWH Mirka Ltd., Jeppo, Finland  
PCT No. PCT/FI87/00165, § 371 Date May 25, 1989, § 102(e) Date May 25, 1989, PCT Pub. No. WO88/04265, PCT Pub. Date Jan. 16, 1988

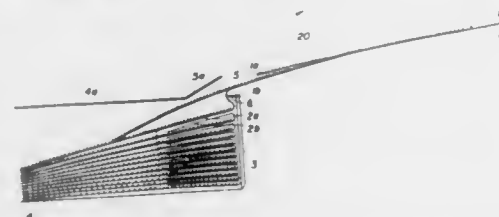
PCT Filed Dec. 10, 1987, Ser. No. 360,892

Claims priority, application Finland, Dec. 10, 1986, 865039

Int. Cl.<sup>5</sup> B65D 85/67

U.S. Cl. 206—409

5 Claims



1. A self adhesive abrasive material packaging arrangement, comprising: a plurality of self adhesive abrasive elements, each abrasive element having an abrasive-coated face and an opposite abrasive free side; a carrying band, said plurality of self adhesive abrasive elements forming a bundle, said carrying band passing along one side of said bundle in loops between

each abrasive element, an upper portion of each loop being fixed to the abrasive-free side of the corresponding abrasive element positioned above said each loop and a lower portion of each loop lying free between said upper portion of each loop and the abrasive-coated face of a corresponding abrasive-coated element of said bundle, lying below said each loop; and, a box having walls surrounding said bundle, said box having an upper opening adjacent and substantially parallel to a side edge of said bundle, said box having a substantially horizontal edge portion adjacent said opening, said edge portion projecting inwardly from a vertical side wall of said box adjacent said carrying band on said one side of said bundle, said edge portion preventing more than the uppermost abrasive element from being dispensed at one time.

4,947,991

## NON-SKID BEVERAGE AND/OR FOOD HOLDER

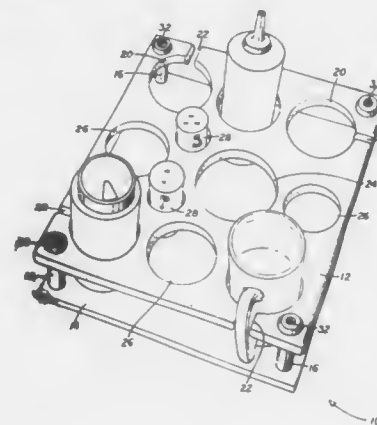
Richard B. Snell, Longwood, Fla., assignor to Sea Rose II, Altamonte Springs, Fla.

Filed Apr. 21, 1989, Ser. No. 341,365

Int. Cl.<sup>5</sup> B65D 71/00

U.S. Cl. 206—427

13 Claims



1. A beverage and/or food holder principally constituted by first and second planar members, each of generally rectangular configuration, a first of said planar members having a plurality of apertures formed therein, in each of which apertures, a container for a beverage or the like can be placed, said planar members being maintained in a spaced apart, essentially parallel relationship by the use of columnar members utilized at or near the corners of said planar members, and four protruding non-skid members utilized on the underside of said second planar member, adjacent the corners thereof, to resist displacement of said beverage/food holder along a surface upon which it has been placed, even though such surface be of convex contour.

6. A beverage and/or food holder principally constituted by first and second planar members, each of generally rectangular configuration, a first of said planar members having a plurality of apertures formed therein, in each of which apertures, a container for a beverage or the like can be placed, said planar members being maintained in a spaced apart, essentially parallel relationship by the use of columnar members utilized at or near the corners of said planar members, said beverage/food holder being reversible, being usable with either said first or said second planar member in the uppermost position, and with a plurality of protruding non-skid members being utilized on the side of each planar member that faces away from the other planar member.

8. A reversible beverage and/or food holder principally constituted by first and second planar members, each of generally rectangular configuration, a first of said planar members having a plurality of apertures formed therein, in each of which apertures, a container for a beverage, food item or the

like can be placed, said planar members being maintained in a spaced apart, essentially parallel relationship by the use of columnar members utilized at or near the corners of said planar members, the ends of said columnar members in each instance being in touching contact with the near or adjacent sides of said planar members, and a plurality of somewhat protruding non-skid feet attached to the non-adjacent side of each of said planar members, so that irrespective of which planar member of said holder is uppermost at a given moment, a plurality of said feet will be in place to resist said holder skidding along a surface upon which it has been placed.

4,947,992

## STORAGE AND/OR TRANSPORTATION CASE

Gerhard Schäfer, Neunkirchen, Fed. Rep. of Germany, assignor to Fritz Schäfer Gesellschaft mit beschränkter Haftung, Neunkirchen, Fed. Rep. of Germany

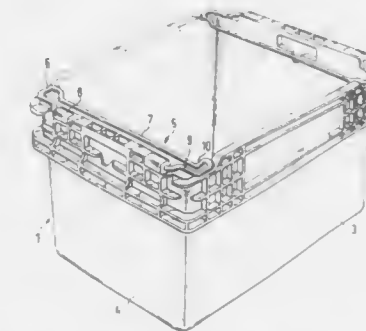
Filed Mar. 22, 1989, Ser. No. 327,336

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 8803932[U]

Int. Cl.<sup>5</sup> B65D 21/04

U.S. Cl. 206—506

11 Claims



1. Storage and/or transportation case, comprising: longitudinal and transverse walls inclined inwardly from an upper opening to a base of the case; and two U-shaped handle stirrups having end segments, the stirrups being supported by the end segments at opposite sides of the case in horizontal mutually aligned swivel bearings which are provided at the upper edge of the case, the handle stirrups being foldable downwardly against an outer side of the walls so that a plurality of empty cases are placeable one inside the other, the stirrups also being pivotable inwardly and placeable on the upper edge of the case so as to form stacking supports so that cases may be stacked one on top of the other, the stirrups having horizontal parts bent towards the case center so as to fix a stacked case in one direction, and further parts are bent down vertically at a right angle to the stirrup handle so as to fix the stacked cases in a direction transverse to the one direction, each of the horizontal stirrup parts (9) being arranged between a swivel bearing (8) and a portion (6) of the stirrup which can be placed on top on the upper edge (11) of the case, and spaced from a middle portion (7) of the stirrup which forms a support for the stacked case.

4,947,993

## CONTAINER

Norm Brumfi, Montvale, and Douglas Graham, Boonton, both of N.J., assignors to Kathryn Nicolosi, Moorestown, N.J.

Filed Jul. 31, 1989, Ser. No. 387,753

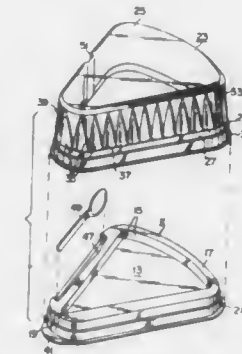
Int. Cl.<sup>5</sup> A45C 11/20

U.S. Cl. 206—551

5 Claims

1. A container assembly for single servings of products comprising a base having side walls extending upwardly from its outer periphery defining a central depression for holding the products, said base side walls including a top peripheral wall generally parallel to the base, means defining an elongated slotted opening in the top peripheral wall of said side wall for

a utensil such as a fork or spoon, a cover having a top and side walls of a shape and configuration complementing the base and base side walls, means defining an offset in the cover side wall



providing an abutment surface overlying the slotted opening for the utensil to hold the same in place when the cover is applied to the base.

4,947,994

## CONTAINER WRAPPER, AND METHODS AND APPARATUS FOR MAKING SAME

Reginald W. Newsome, Richmond, Va., assignor to Scepter Manufacturing Company Limited, Don Mills, Ontario, Canada

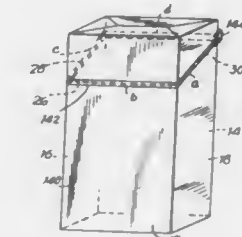
Continuation of Ser. No. 198,502, May 25, 1988, abandoned.

This application Jun. 30, 1989, Ser. No. 374,640

Int. Cl.<sup>5</sup> B65D 5/54, 5/62

U.S. Cl. 206—606

17 Claims



1. A container product including (1) an inner member having a plurality of side walls forming a parallelepiped such that all of said side walls are substantially parallel to a single longitudinal axis, at least two of said walls being subdivided along a parting line so that said container product is subdivided into first and second relatively movable parts, said parting line defining a plane which is oblique to said single longitudinal axis, and (2) an outer wrapper wrapped around the outside of said inner member so that said outer wrapper overlaps itself and is sealed to itself at all of its edges in order to completely enclose said first and second parts with all of said outer wrapper material being completely outside of said inner member, said outer wrapper including (a) a web member having inner and outer surfaces, and (b) a tear strip adhered to one of said surfaces and superimposed on said parting line, said container product being made by a process comprising the steps of: supplying said inner member in the form of said parallelepiped; separately supplying said outer wrapper; and wrapping said outer wrapper around said inner member so that said tear strip is superimposed on said parting line, and so that when said outer wrapper is subsequently torn



along said tear strip, the remaining portions of said outer wrapper tend to remain on said first and second parts.

#### 4,947,995 COIN INLET

Norio Eguchi, Oyama, Japan, assignor to Universal Co., Ltd., Tochigi Prefecture, Japan

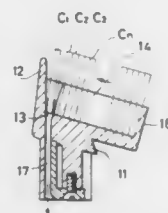
Filed Mar. 9, 1989, Ser. No. 321,288

Claims priority, application Japan, Mar. 30, 1988, 63-42243[U]

Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—49.1

3 Claims



1. A coin inlet comprising an elongated storing recess capable of accommodating a plurality of coins in a stack wherein the coin faces are longitudinally aligned at an incline to a slot for inserting coins one by one, the storing recess having a lower end against which the last coin of the stack rests prior to pushing the stack towards the slot and an upper end adjacent the slot.

#### 4,947,996

##### UNITARY ARTICLE HOLDER/DISPLAY

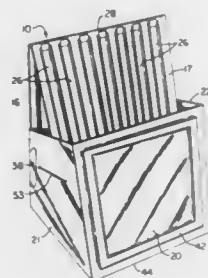
Howard J. Harris, 860 Lafayette St., Denver, Colo. 80218

Filed May 9, 1988, Ser. No. 191,686

Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—50

10 Claims



1. An article holder for receiving and displaying loose leaf materials, such as, pamphlets and the like, said holder comprising a unitary sheet of material which is foldable from a flat condition into an upstanding front pocket section and a rear support section, said front pocket section having a generally rectangular, upright front panel, a horizontal bottom panel and opposite upright side panels extending rearwardly from said front panel; said rear support section foldable into a generally triangular configuration including a pair of upright support panels having a first common fold line therebetween and a rear bottom panel extending horizontally between said support panels, said side panels extending rearwardly from said front panel along opposite sides of said support panels including first connecting means for connecting said side panels to said rear support section, said front and rear bottom panels terminating in free edges in confronting relation to one another and second securing means along said free edges of said bottom panels for securing said bottom panels together.

#### 4,947,997 HANGER FOR POOL CUES

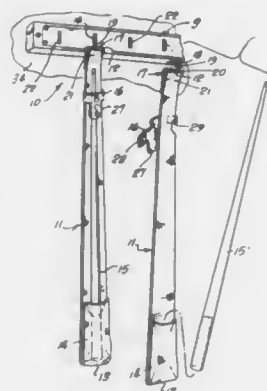
Fred C. Dinger, 12147 E. Lakeland, Sp. #75, Santa Fe Springs, Calif. 90670

Filed Mar. 30, 1989, Ser. No. 330,794

Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—68

7 Claims



1. A hanger for pool cues, billiard cues and the like, said hanger being insertable and removable from a rack, said hanger comprising:

an elongated, cue holding portion having a top and a bottom and including a pocket at the bottom and a holding member near the top;

a hook member affixed at the top thereof for insertion into a rack member, said hook member comprising a T-shaped member having a vertical rod and a horizontal holdable rod; and

a rack member having a plurality of slots therein matable with said hook member, said slots being longer than the length of said horizontal holdable rod, and said slots having an opening therebehind so that one of said horizontal holdable rods may be inserted through a slot and turned to be securely held thereby and wherein the horizontal holdable rod may also be turned freely so that it may be removed from the slot.

#### 4,947,998

##### IMPLEMENT ORGANIZER

Donald W. Smeller, 1225 W. View Dr., Wenatchee, Wash. 98801

Filed Aug. 24, 1989, Ser. No. 398,227

Int. Cl.<sup>5</sup> A47F 7/00; B65D 90/04

U.S. Cl. 211—70.6

18 Claims



1. An implement organizer, said organizer comprising: a lid defining a plurality of holes, slots and notches for passing implements through said lid in a generally vertical orientation, said lid including a pair of tapered peripheral walls doubled back on each other; a nest defining a plurality of cup means for receiving ends of said implements; and

means for separating and supporting said lid and said nest in a stable and generally vertically spaced orientation.

#### 4,947,999

##### LINER STRUCTURE FOR SHELVES, DRAWERS, AND THE LIKE

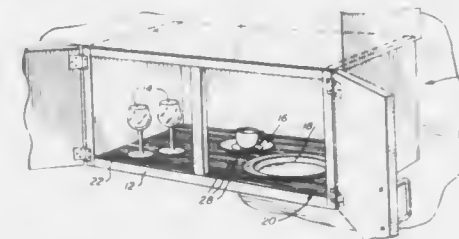
Harold G. Warp, 1100 N. Cicero Ave., Chicago, Ill. 60651

Filed Jan. 23, 1989, Ser. No. 299,393

Int. Cl.<sup>5</sup> A47F 5/00

U.S. Cl. 211—183

13 Claims



1. In combination:

a shelf having a flat, horizontally disposed, upwardly facing, surface for the placement of articles to be stored/displayed in a free standing position; and

a liner structure comprising a sheet of flexible material having a web with a substantially flat bottom side facially engaging the flat shelf support surface and means extending upwardly from said web and defining an integral raised pattern on a top side of the web to provide a reduced substantially horizontal surface area for supporting articles in a free standing position and for allowing air flow beneath the articles supported on said sheet top side, whereby said web and means defining said raised pattern cooperatively define a collection area for any moisture from articles supported on said liner structure and, by reason of the horizontal situation of said liner on said shelf, any water collected spreads out substantially evenly in said collection area to avoid contact with articles supported on the liner.

#### 4,948,000

##### CONTAINER SHROUDS

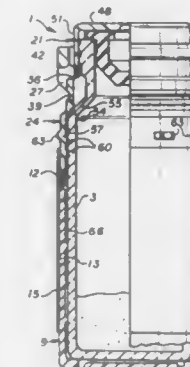
Richard W. Grabenkort, 102 Carriage Rd., Barrington, Ill. 60010

Filed Nov. 20, 1987, Ser. No. 123,387

Int. Cl.<sup>5</sup> B65D 23/08, 81/62

U.S. Cl. 215—12.2

15 Claims



12. In combination, a cylindrical vial having a substantially uniform cylindrical surface portion; a generally cylindrical shroud formed of resilient material and snugly engaging said vial cylindrical surface portion; spacer means comprising at least one helical rib integrally molded on the inner periphery of

said shroud and having inner distal portions engaging the vial cylindrical surface portion; said inner distal portions defining an area approximately 2% of the area of said shroud inner periphery from which said spacer means project; said spacer means being of such size and arrangement between the vial outer periphery and the shroud inner periphery that the outer shroud periphery is cylindrical and taut, free of depressions.

#### 4,948,001

##### INTERRUPTED THREADS ON A PLASTIC BOTTLE FINISH

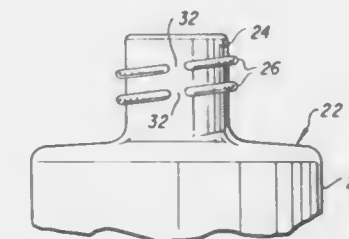
Earl D. Magly, Crystal Lake, Ill., assignor to Continental Can Company, Inc., Norwalk, Conn.

Filed Oct. 18, 1989, Ser. No. 423,348

Int. Cl.<sup>5</sup> B65D 1/02, 23/00, 41/04

U.S. Cl. 215—31

10 Claims



1. A plastic container having a blow molded neck finish including a radially outwardly formed hollow thread which weakens said neck finish against axial collapse when axially loaded, said container having been blow molded in a split mold and having diametrically opposite parting lines, said container neck finish being axially strengthened by having said thread interrupted between and remote from said parting lines to provide axial beam strength in said neck finish remote from said parting lines.

#### 4,948,002

##### PACKAGE EXHIBITING IMPROVED CHILD RESISTANCE WITHOUT SIGNIFICANTLY IMPEDING ACCESS BY ADULTS

Del M. Thornock, Concord; James R. Goldberg, Novato, both of Calif.; Ronald W. Kock, Wyoming, Ohio; Robert A. Paul, Fairfield, Ohio; Peter W. Hamilton, Cincinnati, Ohio, and William Willhite, Jr., Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 29, 1988, Ser. No. 291,926

Int. Cl.<sup>5</sup> B65D 55/02

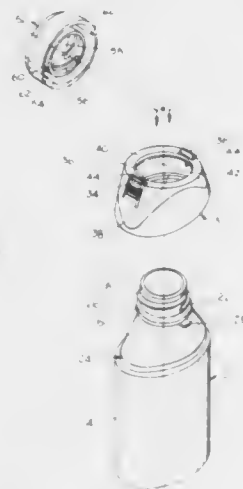
U.S. Cl. 215—221

28 Claims

1. A package suitable for storing and dispensing potentially dangerous material, said package being resistant to opening by children yet readily openable by adults, said package comprising:

- (a) a bottle for containing said potentially dangerous material, said bottle having a base portion and a finish portion having an external thread extending about its periphery;
- (b) a collar secured in fixed relation over said base portion of said bottle, said collar including at least one resiliently deformable pushbutton having an exposed surface contour which generally conforms to the exterior surface contour of the adjacent portions of said collar to minimize the chance of inadvertent depression thereof when said collar is grasped, said pushbutton having a vertical extension projecting above the uppermost surface of said collar, the uppermost end of said pushbutton being inwardly movable relative to the rest of said collar when a squeezing force is applied to said uppermost end of said pushbutton; and
- (c) a closure having at least one skirt and including means for rotatably and releasably securing said closure to said bottle, said closure also having at least one interlocking

tooth on the innermost surface of said skirt, said interlocking tooth being so shaped and positioned that it will deflect said vertical extension of said resiliently deformable pushtab when said closure is rotatably secured onto said finish portion of said bottle, but will prevent removing



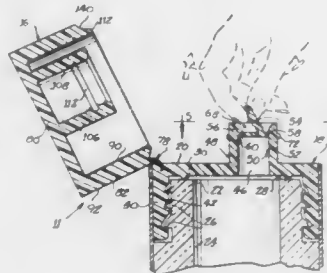
said closure from said neck portion of said bottle by rotating said closure in the reverse direction unless said resiliently deformable pushtab on said collar is first depressed to disengage said pushtab vertical extension from said interlocking tooth.

**4,948,003**  
**CONTAINER AND CLOSURE WITH INTERNAL TAMPER INDICATION**  
Daniel R. Munoz, Vernon Hills, Ill., assignor to Kraft, Inc., Glenview, Ill.

Filed Jan. 26, 1989, Ser. No. 302,474  
Int. Cl.<sup>5</sup> B65D 55/02

U.S. Cl. 215—237

1 Claim



1. A tamper-evident closure assembly for a container having a finish opening comprising:  
a base member including means for securement to the bottle finish, means for forming a liquid-tight seal to the bottle finish, spout means for forming an upwardly extending spout having an outer surface and an internal bore through which contents of the container are discharged;  
a cap member including an end wall and an annular skirt depending from an outer periphery thereof, a cylindrical internal collar depending from the end wall and disposed within the annular skirt so as to be at least partially enclosed thereby, and said collar having an internal recess dimensioned to receive at least a portion of said spout therein, with the collar in direct contact with the outer

surface of the spout to close the spout internal bore without protruding therein;  
hinge means for directly joining the cap to the base member with the cap hingedly mounted for movement between an open position remote from said spout and a closed position with said internal collar engaging said spout;  
said internal collar and said spout having releasable locking means which are separated upon opening of the cap and which maintain the cap endwall spaced from said spout means when the cap closes the spout; and  
a frangible seal integrally formed with the pour spout and joined thereto through a frangible ring, and pull tab means integrally formed with the frangible seal to facilitate rupture of the frangible ring, thereby allowing removal of the seal from the spout.

**4,948,004**  
**REFUSE CONTAINER**  
Robert H. Chich, Mequon, Wis., assignor to DCI Marketing, Milwaukee, Wis.

Filed Mar. 22, 1989, Ser. No. 327,005  
Int. Cl.<sup>5</sup> B65D 25/00

U.S. Cl. 220—1 T

15 Claims



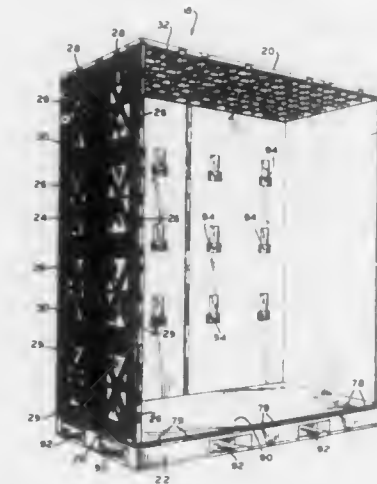
1. A refuse container for securing a replaceable bag in a predetermined operative attitude comprising:  
a vessel having a sidewall which defines an internal cavity, and a mouth;  
means for puncturing the replaceable bag borne by the sidewall and disposed in close proximity to the mouth, the puncturing means securing the bag in a predetermined operative attitude relative to the internal cavity,  
said puncturing means including an opening formed in the sidewall and communicating with the internal cavity, said opening defined by a peripheral edge having spaced top and bottom portions and opposed, spaced apart end portions, said puncturing means also including a puncturing member defined by the top portion of the peripheral edge and disposed in substantially the same plane as the sidewall,  
the bottom portion of the peripheral edge defining a restraining member positioned in close proximity to the puncturing member and disposed in substantially the same plane as the sidewall, and  
said puncturing member and restraining member disposed substantially centrally in said opening and spaced inwardly of said opposed end portions of said opening.

**4,948,005**  
**KNOCK-DOWN SHIPPING AND STORAGE CONTAINER**  
Richard K. Garton, Fort Wayne, Ind.; Ronald E. Ernberger, Grand Rapids, Ohio; Gordon B. Graef, Fort Wayne, Ind.; Louis Vigliotti, Jr., Fort Wayne, Ind., and Barry W. Worman, Fort Wayne, Ind., assignors to North American Van Lines, Inc., Fort Wayne, Ind.

Filed Feb. 7, 1989, Ser. No. 307,627  
Int. Cl.<sup>5</sup> B65D 7/00

U.S. Cl. 220—1.5

26 Claims



1. A knock-down container for transportation and storage comprising:  
a cover;  
a base;  
a plurality of side panels positioned between said cover and said base, said side panels comprising vertical edges having interlocking means integrally formed within said side panels for coupling two of said adjacent side panels, said interlocking means being universal such that any two of said side panels can be coupled in at least two different relative positions: a first position defined by two of said side panels being relatively perpendicular to form a corner joint, and a second position defined by two of said side panels being relatively coplanar to form an abutting joint, said interlocking means comprising a first joint in each of said relative positions extending along the interlocked vertical edges forming a tortuous path for water thereby rendering the joint water resistant;  
a first coupling means located near a lower edge of said side panels for coupling said side panels to said base; and  
a second coupling means located near an upper edge of said side panels for coupling said side panels to said cover;  
said side panels forming with said base and cover second and third joints, respectively, forming tortuous paths for water thereby rendering the second and third joints water resistant.

**4,948,006**  
**CONTAINER WITH METALLIC COVER AND METHOD OF MANUFACTURING THE SAME**  
Mitsuo Okabe, Yokohama; Kimiaki Hyakutome, and Hideto Akiba, both of Sayama, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

PCT No. PCT/JP87/00936, § 371 Date Sep. 1, 1988, § 102(e) Date Sep. 1, 1988, PCT Pub. No. WO88/04262, PCT Pub. Date Jun. 16, 1988

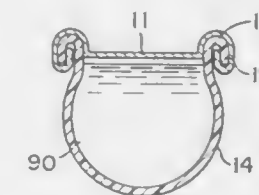
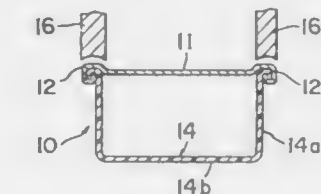
PCT Filed Dec. 2, 1987, Ser. No. 236,527

Claims priority, application Japan, Dec. 2, 1986, 61-287438; May 14, 1987, 62-117723; Jul. 22, 1987, 62-183156

Int. Cl.<sup>5</sup> B65D 41/42; B21D 51/32

U.S. Cl. 220—67

24 Claims



2. A method of manufacturing a container with a metallic cover comprising the steps of filling a plastic container body (14) with a content, sealing the container body (14) by roll-seaming a peripheral edge (12) of a metallic cover (11) around a flanged portion (15) of the container body (14), and heating the container body (14) at a temperature above a glass transition point and below a melting point of the container body (14) so as to form the container body (14) in substantially a spherical shape.

9. An apparatus for manufacturing a container with a metallic cover comprising a cavity structure (104, 124) provided with an upper edge portion (103, 123) upwardly extending from an upper end (102, 122) of an outer periphery of the cavity structure, a plug (106, 126) for pressing a plastic sheet into the cavity (104, 124), and a clamp (105, 125) for abutting against the upper edge portions (103, 123) of the cavity for clamping the plastic sheet, the upper edge portion (103, 123) of the cavity (104, 124) upwardly extending with an inclination of  $5 < \theta < 40^\circ$ , and the distance between the upper end (102, 122) of the outer periphery of the cavity structure and the inner peripheral surface of the clamp (105, 125) being representable by  $5 \text{ mm} < l < 10 \text{ mm}$ .

13. A container with a metallic cover comprising a container body having a plastic flanged portion and a metallic cover said flanged portion, wherein the container body is molded of a plastic sheet blank including a polyethylene-terephthalate layer and an olefin layer having a degree of crystallization of 10–40% by an air or vacuum pressure formation technique.

14. A container with a metallic cover comprising a container body having a plastic flanged portion and a metallic cover having a peripheral edge which is roll-seamed around and with said flanged portion, wherein the container body is molded of a plastic sheet blank including a polyethylene-terephthalate layer, an olefin layer and an ethylene-vinyl alcohol copolymer layer having a degree of crystallization of 10–40% by an air or vacuum pressure formation technique.



**4,948,007**  
**UNDERGROUND STORAGE TANK OF**  
**CORROSION-RESISTANT MATERIALS WITH**  
**INTERNAL STEEL RIB**

Robin Berg, Hudson, Wis., and John Burwell, Eagan, Minn.,  
 assignors to Xerxes Corporation, Minneapolis, Minn.

Filed Jun. 22, 1989, Ser. No. 370,038  
 Int. Cl.<sup>5</sup> B65D 6/34, 8/08

U.S. Cl. 220—5 A

5 Claims



1. A storage tank designed for installation underground, said tank comprising a first shell of resinous material defining an interior and having an internal diameter, said shell having affixed, to its interior, a plurality of reinforcement ribs, each said rib comprising a ring comprised of a steel alloy having an external diameter and a longitudinal thickness, the external diameter of said ring being substantially equal to the internal diameter of said tank, said rib bearing, at two points intersected by a single diameter of the rib, openings formed through the longitudinal of said rib, said openings being in fluid communication with said shell interior.

**4,948,008**  
**CAN END HAVING A PULL TAB CONNECTED TO A**  
**PULL-UP MEMBER WHICH CAN BE USED AS A PLUG**  
 Jaw-Shyong Wu, No. 15-3, Ming-Li St., W. Dist., Tai-Chung City; Yun-Terng Wang, No. 50-3, Chung-Shin Rd., Puu-Li Chen, Nantu Hsien; Hann-Chang Wu, No. 85, Pei-Chern St., Puu-Li Chen, Nantu Hsien, and Jiin-Tsong Shieh, No. 5, Sec. 1, Shi-An Rd., Puu-Li Chen, Nantu Hsien, all of Taiwan

Filed Aug. 28, 1989, Ser. No. 398,894

Int. Cl.<sup>5</sup> B65D 41/32

U.S. Cl. 220—212

8 Claims



1. A can having two closed ends defining a chamber, one of said can ends having an opening of a predetermined shape; a pull tab detachably sealing said opening; and a pull-up member attached to said pull tab, said pull tab being capable of being detached from said can end by pulling up said pull-up member so as to give access to said chamber; the improvements comprising said pull-up member, which is of the same shape in

cross section as said opening, said pull-up member comprising a bottom portion positioned adjacent said can end and a tapered insert portion extending upward from said bottom portion, said bottom portion being connected to said pull tab, said insert portion including a means for retaining one of a consumer's fingers;

whereby said opening of said can end can be resealed by plugging said insert portion of said pull-up member into said opening after said pull tab is detached from said can end.

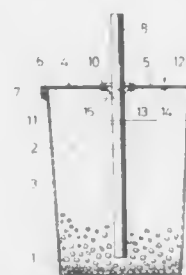
**4,948,009**  
**STRAW-INSERTABLE LID FOR PAPER CUP**  
 Takashi Sawatani, 7-19, 1-chome, Kisaichiyamate, Katano-shi, Osaka, Japan

Filed Dec. 28, 1989, Ser. No. 458,555

Int. Cl.<sup>5</sup> B65D 54/00

U.S. Cl. 220—229

5 Claims



1. A straw-insertable lid for a paper-cup, comprising: a top plate portion (5), with an upper and a lower surface, for covering an opening (4) at an upper end of a paper cup (3) in which a beverage (2) such as tea, coffee, a soft drink fruit juice, or the like, a sherbet-like beverage of any of these beverages, or the like can be accommodated singly or together with crushed ice (1);

a peripheral side wall portion (7) which is disposed around an outer peripheral edge of said top plate portion (5) in such a manner as to project downward and is fitted with an outer periphery of a rim (6) of said paper cup (3); at least one slit (9) for the insertion of a straw (8) there-through and provided in said top plate portion (5); and a protruding outer ring (10) formed on both said upper and lower surfaces of said top plate portion (5) around said slit (9);

wherein said lid is formed of natural rubber including Latex.

**4,948,010**  
**WASTE LIQUID COLLECTION AND DISPOSAL**  
**APPARATUS**

E. Todd Wiggins, Rt. 4 Box 1099-80, Edmond, Okla. 73034

Filed Apr. 7, 1989, Ser. No. 334,630

Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 220—85 S

4 Claims

1. A waste liquid collecting and disposal apparatus, comprising:

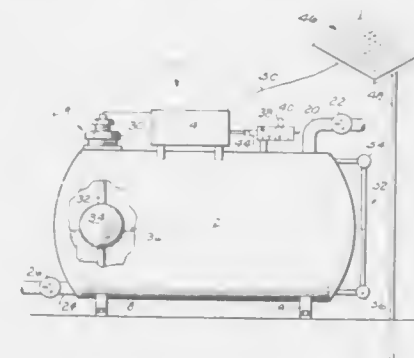
a fluid tight tank having upper and lower limits; liquid inlet and outlet pipe means communicating with the interior of said tank adjacent its upper and lower limits, respectively, for movement of liquid into and out of the tank;

valve means connecting a source of gas under greater than atmospheric pressure with said tank;

float means including a vertically moveable float within said tank for monitoring the quantity of liquid in said tank;

magnetic switch means disposed at the respective upper and lower limit of float movement; and,

electric circuit means connecting a source of electrical energy with said magnetic switch means for operating said



valve means in response to predetermined positions of said float.

**4,948,011**  
**METHOD AND APPARATUS FOR DESTACKING**  
**CONTAINERS**

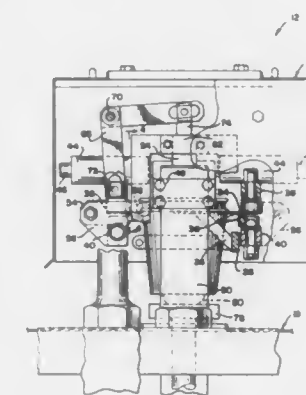
Martin J. Mueller, Palm Harbor, Fla., and Martin Mueller, Sr., Wonderlake, Ill., assignors to Osgood Industries, Inc., Oldsmar, Fla.

Filed Dec. 30, 1988, Ser. No. 292,555

Int. Cl.<sup>5</sup> B65G 59/06

U.S. Cl. 221—1

6 Claims



stack receiving means for receiving at least one nested stack of said containers;

upper jaw means positioned in operative association with each said stack of said containers for destacking the lowermost container from each said stack;

lower jaw means positioned in operative association with each said stack of said containers for destacking the lowermost container from each said stack;

jaw actuating means for sequentially actuating said upper jaw means and said lower jaw means so that:

(1) said lower jaw means is positioned for engagement with the lowermost container in each said stack, and said upper jaw means is positioned for engagement with the next lowermost container in each said stack;

(2) said lowermost jaw means is moved downwardly relative to each said stack to thereby destack the lowermost container therefrom while each said stack is held in position against movement by said upper jaw means; and

(3) said upper and lower jaw means are moved outwardly, then inwardly, relative to each said stack to thereby

position said lower jaw means for engagement with said next lowermost container in each said stack, and to position said upper jaw means for engagement with the container thereabove; and

jaw mounting means for mounting said upper jaw means for vertically fixed movement inwardly and outwardly relative to each said stack, and for mounting said lower jaw means for movement inwardly and outwardly relative to each said stack independently of said upper jaw means, and for mounting said lower jaw means for vertical movement relative to said upper jaw means.

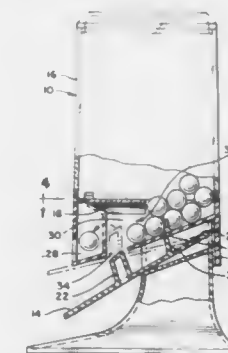
**4,948,012**  
**DISPENSER FOR SOLID COMESTIBLES**  
 Robert R. Saediker, Sr., Winnetka, and Robert R. Saediker, Jr., Northfield, both of Ill., assignors to Chicago Show Printing Company, Morton Grove, Ill.

Filed Nov. 30, 1988, Ser. No. 278,049

Int. Cl.<sup>5</sup> B65H 3/60

U.S. Cl. 221—195

10 Claims



1. A dispenser for solid comestibles comprising:

a reservoir mounted on a base for containing said solid comestibles;

a port for accessing said solid comestibles;

a channel formed in said base interposed between said port and said reservoir, said channel receiving and guiding said comestibles to a predetermined position within said channel from one or more directions;

a partition wall disposed above said channel for selectively directing said solid comestibles into said channel, said partition wall permitting the movement of said comestibles into said channel from one or more directions within said reservoir;

a lever for displacing said solid comestibles at said predetermined position in said channel in an upward direction from said channel into said port;

a tab on said lever for agitating said comestibles within said reservoir and inhibiting the movement of said comestibles within said channel when said lever is in an operable position;

a rectangular projection on said lever to displace said comestibles from said channel into said port when said lever is in said operable position, said rectangular projection having an angular surface for directing said comestibles into said port, and said rectangular projection forming a bottom portion of said channel when said lever is in a non-operable position.

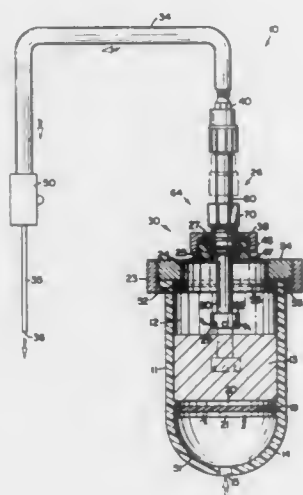
4,948,013

METHOD AND APPARATUS FOR DISPENSING  
POWDERED PESTICIDE

John E. Thomas, River Falls, Wis., and Hareesh C. Lakhan, Eagan, Minn., assignors to Ecolab Inc., St. Paul, Minn.  
Continuation-in-part of Ser. No. 49,710, May 13, 1987, Pat. No. 4,867,341. This application Apr. 14, 1989, Ser. No. 339,055  
Int. Cl.<sup>3</sup> B67B 7/00

U.S. Cl. 222—1

11 Claims



1. An apparatus for dispensing powdered pesticide comprising:

- (a) a hollow housing having an upper and lower chamber, an inlet orifice being in fluid communication with said lower chamber, and an outlet orifice being in fluid communication with said upper chamber;
  - (b) a transverse porous media positioned within said housing so as to separate said housing into said upper chamber and said lower chamber, said pesticide being contained within said upper chamber;
  - (c) adjustment means for adjusting the position of said outlet orifice within said upper chamber; and
  - (d) means for inletting pressurized air through said inlet orifice, into said lower chamber, wherein said air blows through said porous media and fluidizes said powdered pesticide in said upper chamber, wherein said pressurized air from said inlet orifice directs particles into said outlet orifice, the particles to be dispensed being particles which are fluidized so as to be proximate said outlet orifice.
2. A method for dispensing powdered pesticide comprising the steps of:
- (a) placing a quantity of powdered pesticide in an upper chamber of a dispenser, said pesticide being supported upon a porous media which forms a bottom for said upper chamber;
  - (b) adjusting an outlet relative to the level of said pesticide;
  - (c) supplying pressurized air to a lower chamber of said dispenser, so as to fluidize said powdered pesticide in said upper chamber by airflow through said porous media and into said upper chamber; and
  - (d) blowing pesticide particles having a particle size smaller than a predetermined size through said outlet, wherein particles having a particle size larger than a predetermined size remain in said upper chamber.

4,948,014

## TWO PIECE VALVED FLUID DISPENSER

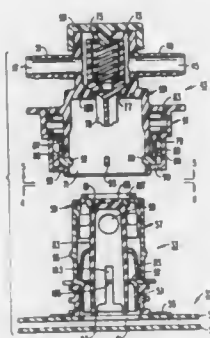
Christopher C. Rutter, Oakland, and Lee H. Laiterman, Los Gatos, both of Calif., assignors to Rapak, Inc., Hayward, Calif.

Filed Oct. 26, 1988, Ser. No. 263,007

Int. Cl.<sup>3</sup> B65D 35/00

U.S. Cl. 222—83

5 Claims



2. A dispenser for attachment to a bag for dispensing fluid therefrom, comprising:

- a first assembly adapted for attachment to said bag, said first assembly including a first fluid valve resiliently closed,
- a second assembly adapted for fitting onto said first assembly, said second assembly including a second fluid valve resiliently closed,
- means including cooperative latching elements on said first and second assemblies for holding said first and second assemblies together in a manner that there said first and second valves are opened in order to form a fluid path from a bag, through the first assembly and out of said second assembly, wherein said holding means comprises:
  - a first of said latching elements including a ring carried by said second assembly and having a plurality of resilient fingers extending therefrom along an outside wall of said second assembly, each of said plurality of fingers terminating in a protrusion that extends through an aperture of said second assembly outside wall,
  - a second of said latching elements including means provided as part of an outside wall surface of said first assembly for capturing said resilient finger protrusions when the first and second assemblies are urged together, thereby to hold said first and second assemblies together, and
  - manually actuatable means provided as part of said second assembly and normally preventing said finger protrusions from disengaging from said capturing means for allowing a disengagement thereof in a manner to permit removal of said second assembly from said first assembly, and
  - means responsive to said first and second assemblies being latched together for extending into a bag to which the first assembly is attached, thereby to prevent a bag wall from closing off a fluid opening into the first assembly.

4,948,015

CARTON EQUIPPED WITH LIQUID POURING-OUT  
DEVICE

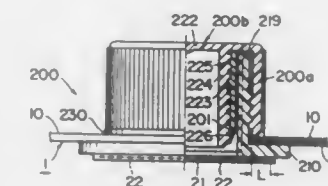
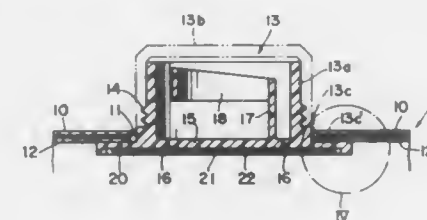
Ryoichi Kawajiri, Kawasaki; Hiroshi Uematsu, Setagaya, and Takahisa Kato, Kyoto, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Filed Sep. 21, 1988, Ser. No. 247,371

Claims priority, application Japan, Sep. 24, 1987, 62-145729  
Int. Cl.<sup>3</sup> B65D 17/00, 33/00

U.S. Cl. 222—107

6 Claims



1. A carton to be filled with a liquid, comprising:
  - a liquid-impermeable carton container having a wall structure in which a mounting aperture is provided, said carton container having a gas barrier layer; and
  - a liquid pouring device fixed to said wall structure at a position of said mounting aperture, said pouring device having a cylindrical spout, a partition wall formed integrally across the bottom of the spout and an annular flange formed integrally with the spout around said partition wall, said partition wall and said annular flange extending in substantially the same plane, the spout being fitted in said mounting aperture with said annular flange firmly attached to the inner surface of said wall structure, said pouring device having therein breaking means for breaking said partition wall, said partition wall and said annular flange having a common planar inner surface and form a shallow circular recess in which a gas barrier film is fitted and bonded;
  - wherein the gas barrier layer of said carton container and the gas barrier film are overlapped in a peripheral area of said mounting aperture when viewed in an outside-to-inside direction with respect to said wall structure.

4,948,016

## LAMINATED MATERIALS CONTAINER

Wayne L. Summons, Littleton, and Lester G. Burch, Arvada, both of Colo., assignors to Sashco, Inc., Commerce City, Colo. Division of Ser. No. 895,128, Aug. 11, 1986, Pat. No. 4,776,458. This application Sep. 9, 1988, Ser. No. 242,472

The portion of the term of this patent subsequent to Oct. 11, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B67D 5/38

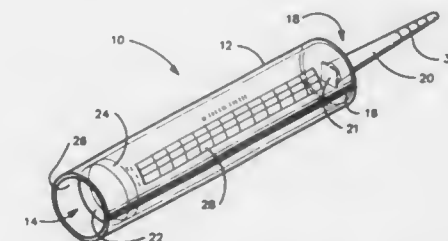
U.S. Cl. 222—158

6 Claims

1. A container in combination with a compound having organic solvent components, said container for storage and use of said compound, comprising:
  - a tubular housing having a hollow interior and a surrounding side wall for holding a material having an organic solvent component, said side wall formed out of an inner

lining of first high barrier transparent plastic material facing said interior to contact material placed therein and an outer sleeve of a second transparent plastic material different from said first high barrier transparent plastic material such that said side wall is transparent around its circumference;

first closure means on a first end of said tubular housing for enclosing said first end said first closure means including an end wall having a dispensing nozzle in fluid communication with said hollow interior;



second closure means in spaced relation to said first closure means for enclosing a second end of said tubular housing said second closure means including a movable wall slideably received in said tubular housing whereby forced movement of the movable wall toward said end wall will expel the contained material from said nozzle, and said outer sleeve fabricated of a material selected from transparent and rigid plastic materials and selected to approximately match the index of refraction of said compound to be held by the container.

4,948,017

## ROTARY FEEDER

Dieter Heep, Bergatreute; Paul Vogel, Weingarten, and Gerhard Reichert, Ravensburg, all of Fed. Rep. of Germany, assignors to Waeachle Maschinenfabrik GmbH, Ravensburg, Fed. Rep. of Germany

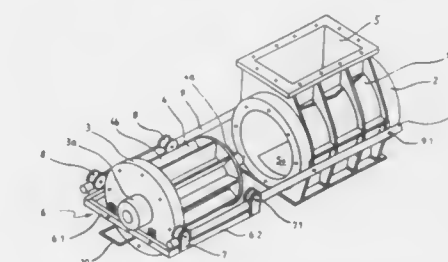
Filed May 23, 1989, Ser. No. 356,178

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818145

Int. Cl.<sup>3</sup> G01F 11/10

U.S. Cl. 222—368

16 Claims



1. A rotary feeder, comprising:
  - a housing defining an interior space and including first and second lateral bearing caps;
  - a rotary member adapted for accommodation within said interior space of said housing and having a shaft, said rotary member defining a center axis and having an axial length;
  - first bearing means for fixedly supporting said shaft in one of said bearing caps and second bearing means for loosely supporting said shaft in the other one of said bearing caps;
  - a carriage connected to said first bearing cap and being



movable in direction of said center axis by at least said axial length; and  
guide means for guiding said carriage during its movement along the center axis.

#### 4,948,018 NOZZLES

Robert W. Tansley, Warwickshire, and Andrew C. Bentley, Banbury, both of United Kingdom, assignors to General Foods, Ltd., Oxon, England

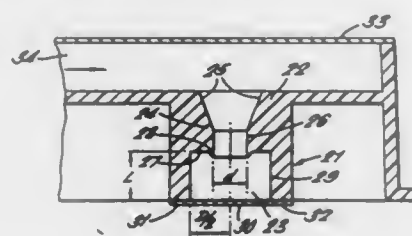
Filed Mar. 15, 1989, Ser. No. 324,352

Claims priority, application United Kingdom, Mar. 21, 1988, 8806667

Int. Cl.<sup>5</sup> B67B 7/24

U.S. Cl. 222—541

3 Claims



1. A sealed beverage package containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, said package having a nozzle formed therein which comprises an outlet aperture and a body, said body having a throat portion, said throat portion having side walls which converge at least along part of the length thereof; a cylindrical bore, beginning at the point where said throat terminates, extending to said outlet aperture said cylindrical bore terminating adjacent a shoulder, said shoulder also lies within the outlet aperture; a drip lip for avoiding dripping of said beverage, on said shoulder being adjacent to the outlet of said bore; and said outlet aperture having the width or diameter, D, and the length of the bore of the nozzle, L, being related by the following equation:

$$L \geq D/2$$

wherein the outlet aperture is sealed by a rupturable seal of aluminium foil or a laminated material which has appropriate deadfold characteristics so that on rupturing the seal to form an outlet from the package it will remain folded in the bore of the nozzle.

#### 4,948,019

#### COLLAPSIBLE CLOTHES HANGER

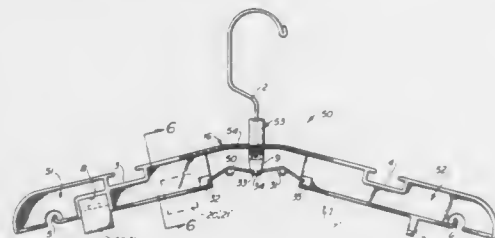
Roland K. Rodum, 2870 Cobb St., NE., Marietta, Ga. 30068

Filed Mar. 31, 1989, Ser. No. 332,526

Int. Cl.<sup>5</sup> A47G 25/40, 25/14

U.S. Cl. 223—94

5 Claims



5. A hanging apparatus for hanging garments and the like, said apparatus comprising:

a hook element for supporting the hanging apparatus from a bar or the like;

a hub portion to which is connected said hook element;

a first arm member and a second arm member, said first arm member and said second arm member being connected to said hub portion by flexible means for allowing pivotal movement of said arm members relative to said hub portion;

a spring means for biasing said first arm member and said second arm member to an open position wherein said first and second arm members are spread apart from one another;

said spring means yielding to pressure on said arm members to move said arm members to a closed position wherein the first and second arm members are close together in approximate abutment; and

releasable latching means for releasably retaining said first and second arm members in said closed position, said releasable latching means comprising, at least, a prong member connected to and protruding from said first arm member;

prong engaging means associated with said second arm for engaging said prong member when said arm members are in said closed position, said engagement inhibiting relative movement of said prong member and said prong gripping means in a first direction, being the open arm direction; and

means for disengaging the engagement of said prong member and said prong engaging means, said means for disengagement effecting relative movement of said prong member and said gripping assembly in a direction at an angle to said first direction,

whereby said arm members are returned to said open position by action of said spring means upon release of said retention by said latching means.

#### 4,948,020

#### BICYCLE CARRIER-SEAT COVER DEVICE

Kenneth C. Smith, 308 - 1760 Ellis Street, Kelowna, B. C. V1Y 2B4, Canada

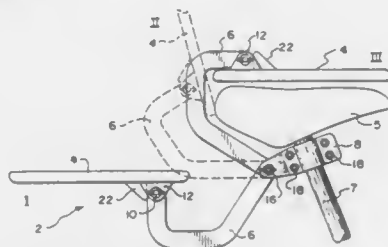
Filed Mar. 13, 1989, Ser. No. 322,009

Claims priority, application Canada, Jul. 22, 1988, 572829

Int. Cl.<sup>5</sup> B62J 7/04

U.S. Cl. 224—31

7 Claims



1. A convertible bicycle carrier-seat apparatus for a bicycle having a seat which comprises:

(a) attachment means adapted to be removably secured to a seat post of a bicycle;

(b) swing means, and first connection means releasably securing said swing means at one end thereof to the attachment means in non-pivotable positions, whereby said swing means can be pivoted through a first relatively horizontal position, a second upwardly angled position, and a third upright position in a vertical plane and is adapted to be releasably secured in any one of said positions by said first connection means; and

platform means, and second connection means releasably securing said platform means to an end of said swing means opposite the attachment means in non-pivotable positions, said platform means being adapted to pivot through the same vertical planes as the swing means, and

adapted to be releasably secured in a first relatively horizontal position, a second relatively upright position relative to the swing means, and a third inverted horizontal position whereat the platform means is disposed over the bicycle seat, by said connection means.

#### 4,948,021

#### SPARE-TIRE MOUNT BICYCLE RACK

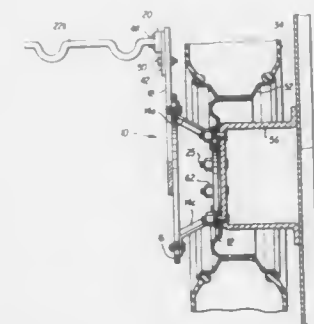
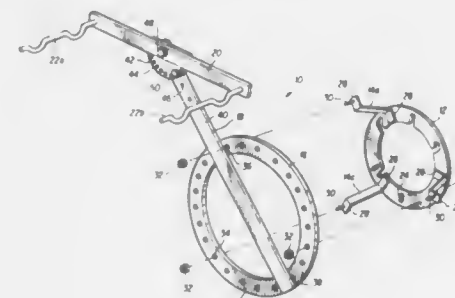
Kevin R. Murphy, 2 Lynnhaven Executive Park; Eddie M. Atkinson, 2585 Elon Dr., and James Phillips, 2610 Potters Rd., all of Virginia Beach, Va. 23452

Filed Feb. 1, 1989, Ser. No. 304,640

Int. Cl.<sup>5</sup> B62D 43/00

U.S. Cl. 224—42.13

10 Claims



1. A vehicle mountable bicycle rack for mounting a bicycle on spare-tire-mounting lug bolts attached to the exterior of a motor vehicle body said bicycle rack comprising:

an inner mounting hub for defining a plurality of circularly-arranged holes spaced to fit lug bolts of wheels on the motor vehicle;

a pedestal for attaching a main support arm to said inner mounting hub said pedestal comprising at least one spoke affixed at an inner end thereof to said inner hub for extending axially relative to said circularly-arranged holes;

the main support arm having an inner end portion attached to an outer end of said at least one spoke to extend radially relative to said circularly-arranged holes; and a bicycle support arm attached to an outer end portion of said main support arm for supporting a bicycle;

said pedestal including an attachment means attached to said at least one spoke allowing said main support arm to be separated from said inner mounting hub and to be reattached thereto at a different angle relative thereto without changing the position of said inner mounting hub to said lug bolts;

whereby, when said bicycle rack is mounted on a motor vehicle a bicycle can be mounted on the support arm at a selected angle relative to the inner mounting hub and the motor vehicle body from lug bolts mounted on the exterior of the vehicle body while a spare tire is also mounted on the lug bolts and the main support arm can be removed and reattached to the inner hub so as to change the angle

#### 4,948,022

#### CONTAINER FOR CD OR CASSETTE COVERS

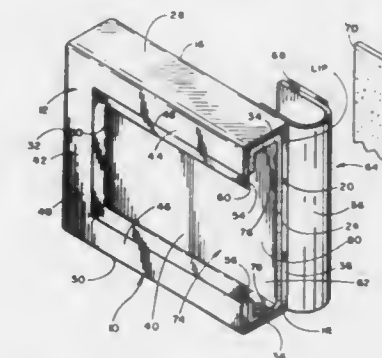
Robert J. VanDyke, 290 S. 1300 E., Springville, Utah 84663

Filed Aug. 7, 1989, Ser. No. 390,388

Int. Cl.<sup>5</sup> B60R 7/06

U.S. Cl. 224—42.42

1 Claim



1. A holder comprising:

(A) a unitary, one-piece body which includes

(1) a rectangular back portion having sides, first and second ends, a first planar surface and a rear planar surface, said rectangular back portion including

(a) sides and ends,

(b) a length dimension defined between said back portion ends,

(c) a width dimension defined between said back portion sides, and

(d) a thickness dimension defined between said first planar surface and said rear planar surface,

(2) two rectangular side portions each connected to one of said back portion sides and extending forwardly of said back portion first surface, each rectangular side portion including

(a) sides and ends,

(b) a width dimension defined between said rectangular side portion sides, and

(c) a length dimension defined between said rectangular side portion ends,

(3) a rectangular bottom portion connected to said first back portion end and extending forwardly of said front planar surface, said body bottom portion including

(a) sides and ends,

(b) a width dimension defined between said bottom portion sides, and

(c) a length dimension defined between said bottom portion ends,

(4) a bottom lip section connected to said bottom portion and extending in a lip plane parallel to said back portion first surface and being spaced therefrom,

(5) a lip side section connected to each side portion and extending in said lip plane to be co-planar with said bottom lip section, each lip side section having

(a) a first side connected to one side of one of said rectangular side portions,

(b) a second side located remotely from said first side, and

(c) a width measured between said first and second sides,

(6) an apron connected to each lip section, each apron including a sloping surface which slopes toward the back portion front surface from said lip plane, the aprons connected to said lip side sections sloping toward each other and being spaced apart and intersecting the apron con-

- necting to said bottom lip section to form a continuous apron about said side and bottom lip portions,
- (7) said side portions, said back portion second end, said lip side sections and the aprons connected to each lip side section all including a top edge with all of said top edges lying in a common plane and forming a body open end,
- (8) a flexible hinge flap connected at one end thereof to said second back portion end and including a first surface located adjacent to said back portion rear planar surface and a second surface;
- (B) a mounting assembly which includes
- (1) a first hook-and-loop fastener element mounted on said hinge flap second surface, and
- (2) a second hook-and-loop fastener element adapted to be mounted on a dashboard of a vehicle subadjacent to a slot for receiving CD or cassette recording elements, and
- (3) said first and second hook-and-loop fastening elements co-operating to mount said body adjacent to said slot with said body open end in position subadjacent to said slot; and
- (C) an insert means for adjusting the size of said body to accommodate CD or cassette recording elements of various sizes, said insert means including
- (1) a rear section which includes
- (a) sides and ends,
- (b) a width dimension measured between said insert means rear section sides and which is approximately equal to but slightly less than the width dimension of said rectangular back portion,
- (c) a length dimension measured between said insert means rear section ends and which is approximately equal to but slightly less than the length dimension of said rectangular back portion, and
- (d) said insert means rear section being in removable abutting contact with said rectangular back portion,
- (2) two side sections, each insert means side section including
- (a) sides and ends,
- (b) a width dimension measured between said insert means side section sides, and which is less than the width dimension of said body side portions,
- (c) a length dimension measured between said insert means side section ends, and which is less than the length dimension of said body side portions and is equal to the length dimension of said insert means rear section, and
- (d) said insert means side sections being in removable abutting contact with said body side portions,
- (3) two front sections, each insert means front section including
- (a) sides and ends,
- (b) a width dimension defined between said insert means front section sides which is less than the width dimension of said body lip sections,
- (c) a length dimension defined between said insert means front section ends and which is equal to the length of said insert means rear section, and
- (d) said insert means front sections being in removable abutting contact with said body lip sections, and
- (4) a bottom section which includes
- (a) sides and ends,
- (b) a width dimension defined between said insert means bottom section sides and which is less than the width of said body bottom portion width,
- (c) a length dimension defined between said insert means bottom section ends and which is less than said body bottom portion length, and
- (d) said insert means bottom section being in removable abutting contact with said body bottom portion,
- (5) said insert means rear section, said insert means side sections and said insert means front sections all having one of the ends thereof co-planar with said body portion top edges, and each of said insert means sections being remov-

able from said body independently of other insert means sections, and

(6) said insert means rear section, said insert means side sections and said insert means front sections all having thickness dimensions which are essentially equal to the thickness dimension of said body rear portion.

4,948,023

## FLUID STORING AND SUPPLY MEANS

Gordon R. Tripp, 40 Piedmont Road, Sherwood, Durban, Natal Province, South Africa

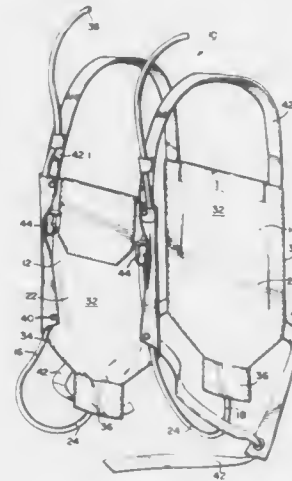
Filed Dec. 2, 1988, Ser. No. 278,815

Claims priority, application South Africa, Dec. 7, 1987, 87/9158

Int. Cl.<sup>5</sup> A45F 3/16

U.S. Cl. 224—148

19 Claims



1. A fluid storing and supply means, which comprises: two fluid storing means of flexible material, each fluid storing means defining an outer pouch defined by two opposing walls and an outer peripheral edge along the edge of said walls, and an inner fluid container suspended from the outer pouch;
- harnessing means in the form of elongate flexible elements secured to the two outer pouches near the outer peripheral edges thereof, at least one elongate flexible element permitting the outer pouches to be suspended from a person's shoulders and be disposed on the chest and on the opposite upper back of the person and at least two elongate flexible elements permitting tightening of the outer pouches around the person's chest and opposite upper back and causing simultaneous outward tensioning of the walls of the outer pouches, causing the walls abutting the person's body to conform to the shape of said chest and upper back; and
- an elongate fluid conduit extending from the operative lowest level of each outer pouch when harnessed on a person's body, being sufficiently long to reach the person's mouth to permit the consumption of fluid contained within said inner fluid container.

4,948,024

## MOVABLE LOAD PLATFORM FOR A VEHICLE

Joseph G. Warner, 33828 Stonewood, Sterling Heights, Mich. 48077, and Robert M. Petrovich, 26116 Powers, Dearborn, Mich. 48125

Filed Jul. 14, 1989, Ser. No. 381,557

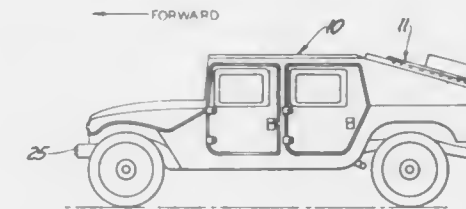
Int. Cl.<sup>5</sup> B60Q 9/042; 414 462, 463, 466

U.S. Cl. 224—310

11 Claims

1. A load bearing device on a sloped surface of a vehicle, comprising:

- a pair of parallel rails mounted on the sloped surface, the rails each having one end higher on the sloped surface than the other end;
- a platform translatable up and down the sloped surface along the rails;
- a single axle extending transversely of the platform and pivotally supporting the platform, the platform and axle moving relative to one another in a direction along the rails as the platform translates along the rails;



- a wheel on either end of the axle for rolling within channels formed by the rails;
- manually releasable holding means for preventing translation of the platform along the rail, the holding means including a lock mechanism mounted to the axle so that the axle rotates within the holding means, the lock mechanism movable relative to the platform in concert with the axle.

4,948,025

## APPARATUS FOR BREAKING GLASS SHEETS SCORED ON ONE SIDE

Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

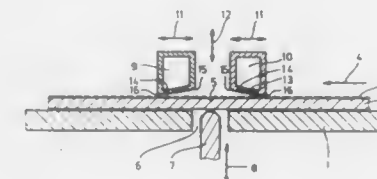
Filed Dec. 12, 1988, Ser. No. 283,556

Claims priority, application Austria, Apr. 25, 1988, 1051/88

Int. Cl.<sup>5</sup> C03B 33/033

U.S. Cl. 225—104

8 Claims



1. Apparatus for breaking glass sheets scored on one side, comprising means defining a horizontal supporting surface, elongated means movable vertically relative to said supporting surface to contact and press upwardly on a said glass sheet from below on the side of said glass sheet opposite a score line which is parallel to and directly over said elongated means, and a pair of elongated abutments disposed above said glass sheet on opposite horizontal sides of said elongated means and parallel to said elongated means and to each other, said abutments being hollow and being adapted to be connected to a source of pressurized gaseous medium, said abutments having air outlet ports oriented toward said glass sheet, the under sides of the abutments facing the glass sheet being oblique and each having a bottom edge nearest said elongated means which is at a higher level than a bottom edge farthest from said elongated means.

4,948,026

## APPARATUS FOR MOUNTING AND/OR SOLDERING OR CEMENTING ELECTRONIC COMPONENTS, IN PARTICULAR SMD COMPONENTS, ON PRINTED CIRCUIT BOARDS

Adalbert Fritsch, Haus Nr. 46, D-8455 Kastl, Fed. Rep. of Germany

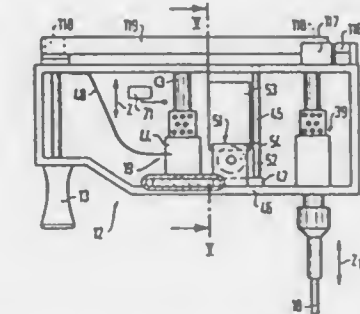
Filed Apr. 18, 1989, Ser. No. 340,123

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1988, 3813096

Int. Cl.<sup>5</sup> B23K 37/047

U.S. Cl. 228—6.2

25 Claims



1. An apparatus for mounting and soldering or cementing SMD components on printed circuit boards, having a first carrier for at least one circuit board and a second carrier for the component, the first and second carriers being displaceable relative to one another parallel to the plane of the circuit board and transverse thereto, and having a magazine for the components, wherein said second carrier, displaceable parallel to the plane of the printed circuit board in two directions of displacement (X, Y) transverse to one another, has associated with it, for at least one of the two directions of displacement (X, Y), a respective brake which can be operated as desired or is operated when there is physical contact between the displaceable carrier, the component and the printed circuit board, and that said second carrier displaceable transverse to the plane of the printed circuit board has associated with it, for its displacement direction (Z) transverse to the plane of the printed circuit board is a brake for arresting it in a position in which there is physical contact between the displaceable carrier, the component and the printed circuit boards.

4,948,027

## DEVICE FOR RETAINING AN ATTACHMENT MEMBER

Sachihito Yamashita; Hiideo Nakamura, and Masayuki Enomoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

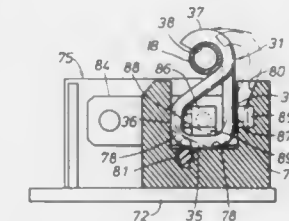
Filed Aug. 3, 1989, Ser. No. 389,290

Claims priority, application Japan, Aug. 24, 1988, 63-110839

Int. Cl.<sup>5</sup> B23K 37/04

U.S. Cl. 228—44.3

5 Claims



1. A device for retaining an attachment member having a first engagement portion for engagement with an outer circumferential surface of a rod-like member at its one end and a



second engagement portion for engagement with another member at its other end, comprising:

- a receptacle for receiving a main part of said attachment member with some play;
- elastic means for retaining said main part of said attachment member at its first position for keeping said rod-like member and said first engagement portion from interfering with each other when said rod-like member is brought into a preliminary position for engagement with said first engagement portion after said attachment member is received in said receptacle; and
- pressure means for bringing said attachment member to its second position for engaging said first engagement portion with said rod-like member against a biasing force of said elastic means.

4,948,028

# **VARIABLE SIZE ENVELOPE WITH SINGLE CLOSURE FLAP**

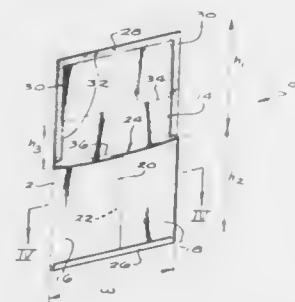
Robert S. Vollowitz, Agoura Hills, Calif., assignor to Avery International Corporation, Pasadena, Calif.

Filed Feb. 3, 1989, Ser. No. 306,838

Int. Cl.<sup>5</sup> B65D 27/14

U.S. Cl. 229—80

29 Claims



1. A variable size envelope comprising a front panel joined to at least one rear panel to form a pocket and a closure flap joined to said front panel, said closure flap having a height approximately equal to a height of said rear panel, said closure flap having a first fold line adjacent a top of said rear panel, said closure flap adapted to be folded along said first line to provide a flat, small envelope of approximately uniform thickness facilitating processing through printing and copying equipment, said closure flap having a second fold line located between a top of said closure flap and said top of said rear panel, said envelope adapted to be unfolded from said small envelope so that said closure flap may be folded along said second fold line to provide a flat, large envelope larger in size than said small envelope.

4,948,029

# **METHOD OF BONDING TWO BODIES**

Jan Haisma, and Andries R. Miedema, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 19, 1989, Ser. No. 368,442

Claims priority, application Netherlands, Jun. 28, 1988, 8801638

Int. Cl.<sup>5</sup> B23K 1/20, 20/12, 20/24, 20/16

U.S. Cl. 228—112

5 Claims

1. A method of bonding together two bodies, said method comprising:

- (a) applying a thin metallic layer of two different metals on opposing surfaces of said bodies, each metallic layer being formed of a different metal, the atomic volume ratio of said metals being approximately 1.9 or more, and said two metals being capable of forming an amorphous alloy,

- (b) slightly polishing said thin metallic layer to activate the surfaces of said thin metallic layer,
- (c) wringing in contact with the resultant actuated surfaces of said thin metallic layers and holding said thin metallic layers, while in contact with each other, to a temperature sufficient to cause the metals containing metallic layers to form an amorphous alloy.

4,948,030

# **BOND CONNECTION FOR COMPONENTS**

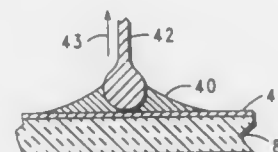
Marc K. Chason, Schaumburg; Michael J. Onystok, Bloomington, and Nathan P. Bellin, Chicago, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 30, 1989, Ser. No. 304,052

Int. Cl.<sup>5</sup> B23K 1/20; H05K 3/34

U.S. Cl. 228—118

1 Claim



1. A method of attaching a first electrical conductor having a non-wettable solder resist on a surface thereof, to a surface of a second substantially planar electrical conductor, said method comprised of the steps of:

- at least partially melting said first conductor and said non-wettable solder resist together in a predetermined area forming a molten spheroid on said first conductor;
- solidifying said first conductor and said non-wettable solder resist forming a solid wettable spheroid; and
- applying a bonding agent to said solid wettable spheroid and to the surface of said second substantially planar electrical conductor.

4,948,031

# **PROCESS FOR BONDING ALUMINUM WITH CADMIUM AND PRODUCT THEREOF**

Charles E. De Clerck, Great River, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

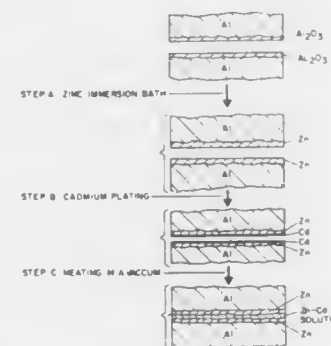
Continuation of Ser. No. 928,425, Nov. 10, 1986, abandoned.

This application Jan. 19, 1988, Ser. No. 147,021

Int. Cl.<sup>5</sup> B23K 35/26; H01P 1/00

U.S. Cl. 228—194

16 Claims



1. A process for joining surfaces of first and second aluminum members of a high frequency electrical device, said surfaces having an aluminum oxide layer thereon, said process comprising the steps of:

- (a) dissolving and removing completely the aluminum oxide layer from the surface of each of said first and second

- members to be joined and replacing each of the aluminum oxide layers with a layer consisting essentially of zinc;
- (b) plating at least one of the zinc layers with a non-alloy cadmium;
- (c) assembling and retaining together said first and second aluminum members so that the surfaces to be joined are held in contact with one another and placing said aluminum members in a vacuum; and
- (d) heating the members while in the vacuum thereby forming a bond between said first and second aluminum members.

15. A high frequency electrical device comprising:

- first and second aluminum members each having the aluminum oxide layer on at least one surface thereof replaced with a zinc layer; and
- a solution layer comprising cadmium and zinc located between and bonded to the zinc layers whereby the members are bonded together.

4,948,032

# **FLUXING AGENT**

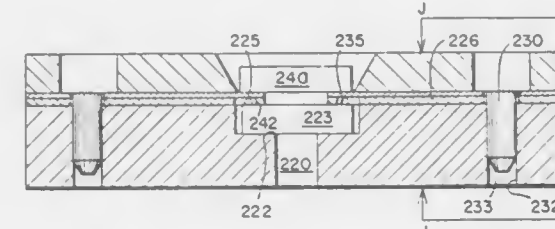
Thomas J. Dunaway, St. Louis Park; Richard K. Spielberger, Maple Grove, and Lori A. Dicks, New Hope, all of Minn., assignors to Atmel Corporation, San Jose, Calif.

Filed Nov. 21, 1988, Ser. No. 274,428

Int. Cl.<sup>5</sup> B23K 35/363

U.S. Cl. 228—223

12 Claims



1. A fluxing agent comprising:

- (a) 45 to 55% by weight of peanut oil; and
- (b) 45 to 55% by weight of water-white rosin.

9. A method of bonding a conductive element with solder, comprising the steps of:

- (a) placing solder and a fluxing agent on a surface of an element to be bonded, said fluxing agent comprising 45 to 55% by weight of peanut oil and about 45 to 55% by weight of water-white rosin; and
- (b) heating to a temperature of between about 250–400° C. wherein charring of the fluxing agent is minimized.

4,948,033

# **MOISTURE RESISTANT CONTAINER**

Hampton L. Halsell, II, Fort Smith, Ark.; William W. Galloway, Memphis, Tenn., and David H. Shults, Spartanburg, S.C., assignors to The Mead Corporation, Dayton, Ohio

Filed Nov. 10, 1986, Ser. No. 929,501

Int. Cl.<sup>5</sup> B65D 5/18

U.S. Cl. 229—23 R

16 Claims

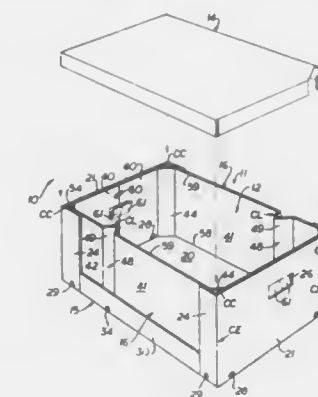
1. A container formed from foldable sheet material comprising an erected body member and a pair of erected liner members, said body member including:

- a bottom panel having opposed sides and opposed ends;
- a pair of end panels foldably joined to the opposed ends of said bottom panel and having a prescribed box height and defining hand openings therein; and
- a pair of side flaps foldably joined to opposite side edges of said bottom panel and having a flap height less than said prescribed box height;

and each of said liner members having a height substantially that of said prescribed box height and including:

- at least one end section lying against one of said end panels of said body member and defining a hand opening therein;
- at least one side section lying against one of said side flaps on said erected body member; and
- at least one foldable column section connected to said side section, vertically oriented and projecting interiorly of said erected container;

said erected container defining an open top cavity therein with said end sections on said liner members overlying said end panels on said body member with said hand openings in registration and with said side flaps overlying a portion of said side sections in said liner members adjacent said bottom panel whereby said side sections and said column sections project beyond said side flaps; and adhesive means bonding said end panels on said body member to said end sections on said liner members and said side flaps on said body member to said side sections on said liner members to maintain said column sections in an erected position.



each of said liner members including one of said end sections sized to correspond generally to one of said end panels on said body member; including first and second of said side sections foldably connected to opposite ends of said end section and adapted to extend along opposite sides of said erected container; including one of said foldable column sections foldably connected to the end of said first side section opposite said end section; and including an edge flap foldably joined to that side of said one of said column sections opposite said first side section, said first and second side sections sized so that a portion of said second side section on one of said liner members overlaps both said erected column section and a portion of said first side section in the other of said liner members in the vicinity of said column section in the other of said liner members, said adhesive means bonding said edge flaps to the overlapped portions of said second side sections and bonding said second side sections to said first side sections in the vicinity of said one of said column section.

4,948,034

# **CARD CALENDAR**

Charles A. Rohloff, P.O. Box 400, Territorial Rd., Evansville, Wis. 53536

Filed Sep. 29, 1989, Ser. No. 415,198

Int. Cl.<sup>5</sup> B65D 27/00

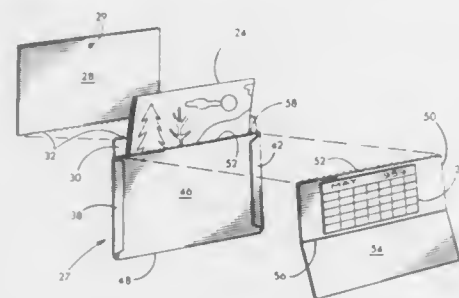
U.S. Cl. 229—92.8

9 Claims

1. A card calendar comprising:

- (a) a paper blank including a card panel having an upper edge, a seal panel adjacent to the card panel along a score line, an envelope back panel adjacent to the seal panel along a fold line, an envelope front panel adjacent to the envelope back panel along a fold line, and a calendar panel adjacent to the envelope front panel along a score line, wherein the envelope front panel is folded to overlie the

envelope back panel and affixed to the envelope front panel to form an envelope pocket;



- (b) a card adapted to fit within the envelope pocket and removably affixed to the card panel; and  
(c) a calendar affixed to the calendar panel.

4,948,035

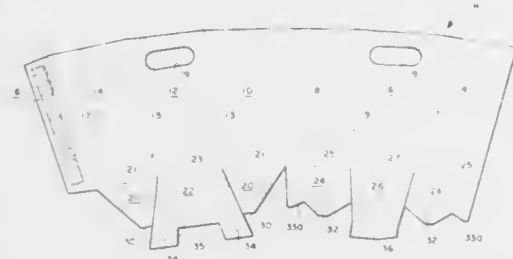
**CONTAINER END CLOSURE ARRANGEMENT**  
Donald F. Wischoff, Fulton, N.Y., assignor to Container Corporation of America, Clayton, Mo.

Filed Jan. 16, 1990, Ser. No. 466,001

Int. Cl.<sup>5</sup> B65D 5/10

U.S. Cl. 239—110

15 Claims



1. An end closure arrangement for a hexagonal container formed from a unitary blank of foldable sheet material and comprising:

- first, second, and third pairs of opposed side wall panels foldably joined to each other along longitudinal fold lines to provide a tubular structure open at a lower end;
- a pair of inner closure flaps foldably joined to lower ends of respective first side wall panels and disposed to extend inboardly therefrom toward each other;
- a first intermediate closure flap foldably joined to a lower end of one of second side wall panels and disposed to extend inboardly therefrom below said inner closure flaps;
- a pair of second intermediate closure flaps foldably joined to lower ends of respective third side wall panels and disposed to extend inboardly therefrom below said first intermediate closure flap;
- an outer closure flap foldably joined to a lower end of the other of said second side wall panels and disposed to extend inboardly therefrom;
- said outer closure flap having an outboard portion disposed below portions of said second intermediate closure flaps and having an inboard portion disposed above a portion of said first intermediate closure flap to provide interlocking engagement between said closure flaps to close the lower end of said container;
- each of said closure flaps being free from direct connection to adjacent closure flaps.

**WRAPPER OR SLEEVE TYPE PACKAGE WITH POCKET AND FLAP LOCK**

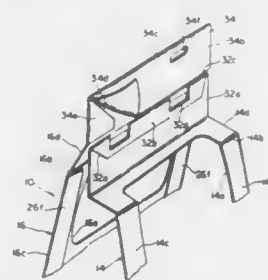
Robert S. Loughman, Horseheads, N.Y., assignor to F. M. Howell & Co., Elmira, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,404

Int. Cl.<sup>5</sup> B65D 5/46

U.S. Cl. 229—117.14

10 Claims



1. A wrapper type package of paperboard or the like for providing a laterally encompassing wrap package for articles, comprising an elongated blank of paperboard material or the like having a bottom panel, a pair of opposite side panels integrally joined to the bottom panel along a pair of parallel transverse fold lines to extend upwardly from the bottom panel in laterally encompassing relation to the article to be contained therein, the side panels being disposed immediately adjacent each other at their uppermost edges when in use position and having a pocket panel joined along a fold line to the uppermost edge of one of said side panels and folded along a zone thereof intermediate the juncture with said side panel and an opposite edge thereof to define a downwardly opening pocket formation between confronting portions of the pocket panel, and a tuck flap panel joined to the other of said side panels along the uppermost edge thereof along a transverse fold line and foldable upon itself to define a base flap subpanel and a folded flap subpanel collectively forming a tuck flap, the tuck flap being insertable into the pocket formation and having abutment edge portions at opposite end regions of said folded flap subpanel confronting an entrance portion of said pocket formation and said pocket panel including intercept edge portions paralleling and located immediately adjacent said abutment edge portions when said tuck flap is fully inserted in said pocket to lie in intercepting confrontational relation with said abutment edge portion restraining the folded flap subpanel against withdrawal from said pocket formation.

4,948,037

**FLEXIBLE PLIABLE RETAINING PACKAGE FOR FLOWERS AND PLANTS**

Lambertus A. M. van den Hoogen, 3, Antoniusstraat, NL-5408 AM Volkel, Netherlands

Filed Apr. 28, 1988, Ser. No. 221,785

Claims priority, application Netherlands, Sep. 2, 1986, 8602213

Int. Cl.<sup>5</sup> B65D 5/24

U.S. Cl. 229—125.38

15 Claims

1. A packaging container for transport and display of flowers and plants, constructed for retaining water for keeping the flowers and plants fresh and for adding if desired a support characterized in that said container is made of a quadrangular sheet of water resistant cardboard folded along creased folding lines, which are in crossform and diagonal over a surface of the sheet, such that four side planes (2), standing up to a variable degree around a square bottom surface (1) are formed, said side planes (2) being connected to each other by inwardly fold flaps (3), creating in a middle of said planes an almost quadrangular empty space having a height adapted to a height of the side planes (2), while said side planes (2) are provided with perforated small holes (4) near to an edge in an upper part of said

planes, a string (5) being pulled through said small holes, to the effect that said container is kept either entirely collapsed or folded outwardly in a desired position by said string, which is



put through said holes in said holes (2) and kept at a defined place through said holes and said container being formed by folding the container into a vase and further comprising a flower or plant placed into the vase.

4,948,038

**FRESHNESS-PRESERVING CONTAINER**

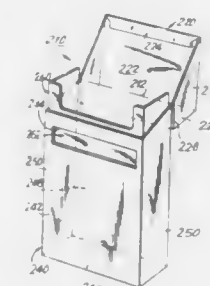
Robert E. Moeller, New Milford, N.J., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Apr. 11, 1989, Ser. No. 336,418

Int. Cl.<sup>5</sup> B65D 43/16, 85/10

U.S. Cl. 229—146

16 Claims



1. A freshness-preserving container having a container height and comprising:

- a lid member and a base member, said lid member and said base member each having a front wall and a back wall parallel to said front wall, the back walls of said lid member and base member being connected along a hinge line, said lid member and said base member being pivotable about said hinge line between a closed position in which said front walls of said lid member and said base member are next to each other and an open position in which said front walls of said lid member and said base member are spaced apart, said lid member and said base member each having respective side walls, said front and back walls of said lid member being wider than said front and back walls of said base member for enabling the side walls of the lid member to overlap the respective side walls of the base member when said lid and base members are in said closed position, said front wall of said lid member having an inward facing surface thereon disposed toward said back wall of said lid member, said front wall of said base member having an outward facing surface thereon disposed away from said back wall of said base member, and said inward and outward facing surfaces being next to and facing each other when said lid and base members are in said closed position; and
- freshness-preserving means between said inward and outward facing surfaces for preserving the freshness of con-

tents of said container when said lid and base members are in said closed position.

4,948,039

**PLASTIC BOX**

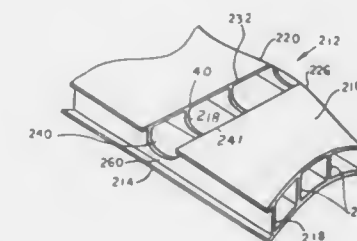
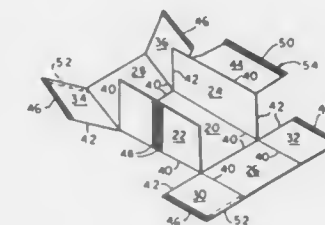
David A. Amatangelo, 3911 Ridgewood Dr., Erie, Pa. 16506

Filed May 26, 1989, Ser. No. 357,209

Int. Cl.<sup>5</sup> B65D 5/22, 25/00

U.S. Cl. 229—198

11 Claims



1. A returnable container adapted to be assembled to contain a product, said container adapted to be folded flat when empty for economical storage and shipment, said container comprising a flat panel having a first sheet on one side and a second sheet on the opposite side, said first sheet and said second sheet being held in spaced parallel relation to one another by a plurality of spaced connecting webs integrally connected to said first sheet and to said second sheet, said container having at least a bottom, a first side, a second side, a first end and a second end, said first sheet being cut along first lines between said bottom, said first side, said second side, said first end and said second end, said first end and said second end each having removable first fastening means attached thereto, said first side and said second side each having removable second fastening means attached thereto, said removable first fastening means adapted to be attached to said removable second fastening means of said first side and said second side whereby said first end and said second end may be attached to said first side and to said second side holding said container in a closed position.

4,948,040

**AIR CONDITIONING SYSTEM**

Toyohiro Kobayashi, Shizuoka; Nobuo Otsuka, Kamakura, both of Japan; Peter Thompson, and Larry J. Stratton, both of Cypress, Calif., assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 60,496, Jun. 11, 1987, Pat. No. 4,795,088. This application Dec. 27, 1988, Ser. No. 290,463

Int. Cl.<sup>5</sup> F24F 7/00

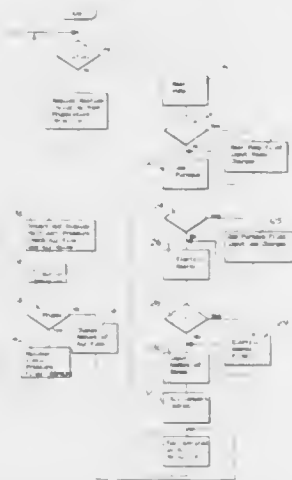
U.S. Cl. 236—49.3

5 Claims

1. An air conditioning system comprising:  
a warm or cool air generating source unit,



a capacity variable blower connected to the air generating source unit,  
 ducts in fluid communication with the blower to distribute warm or cool air,  
 dampers installed in the ducts for adjusting the air flow,  
 pressure sensors for measuring air flow volume outputted by the air generating source unit,  
 a central thermostat comprising a liquid crystal display which displays data on the thermostat, a plurality of operator controlled switches for the operator to input information, the liquid crystal display displaying the inputted information,  
 a control system having a microcomputer electrically connected to the operator controlled switches to receive the operator inputted information, a plurality of output devices connected to the microcomputer which are ener-



gized in response to specific input information, a first memory for storing initially inputted information and a second memory for storing programs and tables, the control system being operatively connected to the air generating source unit, fan, dampers, pressure sensors and thermostat with the operator actively interacting with the system by a question and answer dialog,  
 a communication means for transmitting data between the control system and central thermostat, and  
 control means on the central thermostat to bypass the control system enabling the operator to directly control the air generating source unit, fan, and dampers by means of the operator controlled switches with the operator inputted information and status of the air generating source unit, fan, damper, pressure sensors and thermostat being selectively displayed on the liquid crystal display.

4,948,041

#### THERMOSTATIC GARDEN HOSE PROTECTION DEVICE

John P. McCauley, 3040 Aloma Avenue, Apartment B-8, Winter Park, Fla. 32792

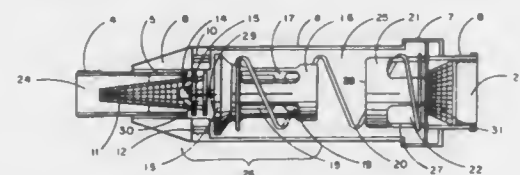
Continuation of Ser. No. 145,966, Jan. 20, 1988, abandoned. This application Mar. 3, 1989, Ser. No. 319,829  
 Int. Cl.<sup>3</sup> G05D 23/12

U.S. Cl. 236—93 A

4 Claims

1. A thermostatic device for protecting lawn and garden hoses and other fluid conduits from rupturing due to pressure build-up caused by temperature increase comprised of:  
 an inlet port attachable to a hose, exterior house spigot or other attachments;  
 a housing attached to said inlet port, said housing having a chamber containing a temperature-sensitive mechanism;  
 an outlet port attachable to a hose, spray nozzle or other attachments;

means for opening and closing the outlet port  
 said temperature-sensitive mechanism having apertures in the sides and exit end to allow unimpeded flow of fluid through the outlet port when the outlet port is open, said temperature-sensitive mechanism having fluid release ports bypassing the outlet port when the outlet port is closed and temperature responsive means of opening and closing said fluid release ports communicating with said chamber; and



whereby when the outlet port is closed so that no fluid is flowing through the device, once the fluid stagnant in the device reaches a predetermined level, said temperature-sensitive mechanism will cause the fluid release ports to open and allow said fluid to flow out of the release ports until the temperature of the fluid is below a predetermined temperature at which time the release ports are closed.

4,948,042

#### COMPRESSED AIR SPRAY GUN ADAPTED FOR USE WITH MORE THAN ONE CANISTER

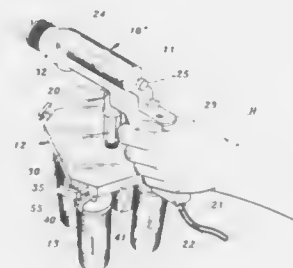
Rex D. Tench, Rt. 1, Box 183, Stanley, N.C. 28164, and Elmer J. Hager, Rt. 2, Box 756, Denver, N.C. 28037

Filed Jul. 21, 1989, Ser. No. 384,403

Int. Cl.<sup>3</sup> B05B 7/30, 7/04

U.S. Cl. 239—113

10 Claims



1. An improved compressed air spray gun comprising a spray head unit having a nozzle outlet, a compressed air connection means adapted for communicatively connecting to a compressed air line, and a fluid inlet means adapted for communicatively connecting to a fluid line or fluid holding canister and adapted to draw liquid upwardly therethrough by a vacuum draw and mix with compressed air to be discharged from the nozzle outlet, an integral mounting block having upper and lower faces and peripheral side edge portions and an outlet on the upper face in a medial portion thereof and extending into said mounting block, said outlet communicatively connected to said fluid inlet means of said spray head unit, said mounting block including therein a plurality of radially extending passageways, extending into and through said mounting block and intersecting at said medial portion of said mounting block, and communicatively connecting at their intersection point thereof with said outlet on the upper face of said mounting block, a plurality of fluid inlet ports positioned on the lower face of said mounting block in spaced relation to each other and to said peripheral side edge portions, said fluid inlet ports extending into said mounting block and communicating with respective ones of said radially extending passageways, a plurality of depending fluid holding canisters having connection means for removable connection and communication to a spray head unit

or fluid line to allow fluid or paint contained in said canister to be drawn upward by vacuum, said canisters being individually and removably connected by said connection means to individual ones of said fluid inlet ports so that a fluid flow path is established from each of said canisters through a respective passageway communicating therewith and into said spray head unit, and a valve means positioned in each of said radially extending passageways for controlling the amount of fluid which can be delivered from an individual fluid holding canister into the mounting block, whereby the flow of fluid from each of said canisters can be selectively regulated to spray singly or in combination the fluids contained within each canister.

4,948,043

#### WAX-PELLET THERMOSTAT

Yoshikazu Kuze, 31-3, Higashimagome 1-chome, Ohta-ku, Tokyo, Japan

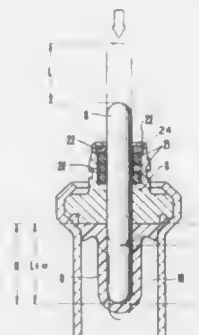
Continuation of Ser. No. 235,930, Aug. 24, 1988, abandoned, which is a division of Ser. No. 60,447, Jun. 11, 1987, Pat. No. 4,828,167. This application Jul. 20, 1989, Ser. No. 383,260

Claims priority, application Japan, Jun. 12, 1986, 61-134821; Nov. 6, 1986, 61-262744; Mar. 10, 1987, 62-52883

Int. Cl.<sup>3</sup> F01P 7/16

U.S. Cl. 236—34.5

5 Claims



1. A thermostat comprising:

a housing having a valve seat,  
 a piston disposed within said housing,  
 a guide member slidably mounted around said piston,  
 a valve secured to said guide member for moving into and out of said valve seat,  
 a coil spring for biasing said valve against and housing,  
 a diaphragm secured to said guide member at a lower portion thereof, said diaphragm having an axial pocket for slidably receiving the lower portion of said piston,  
 a heat conductive cylinder secured to said guide member and surrounding said diaphragm with a cavity,  
 wax disposed in said cavity of said cylinder, said wax expanding when heated so as to cause said diaphragm and said guide member to slidably move upwards along said piston thereby moving said valve into said valve seat against the bias of said coil spring, and  
 a seal device provided in said guide member at a top portion thereof around said piston, said seal device comprising a movable separator plate slidably mounted on said piston, a pair of O-rings provided adjacent to opposite sides of said movable separator plate, and a fixed cover for compressing the O-rings, each O-ring having a circular cross section and being deformable so that when deformed the O-rings provide a reliable sealing effect.

said guide member and said diaphragm being arranged so as to form a gap therebetween around said piston when said wax is in a cooled and unexpanded state, said gap having a predetermined capacity so as to accumulate coolant which may enter between said guide member and said piston through said seal device due to the vacuum generated in said diaphragm, and wherein said guide member

and said diaphragm are arranged so as to discharge accumulated coolant from said guide member when said wax is in a heated and expanded state, said discharge being caused by a part of said diaphragm entering into and filling said gap, said seal device being arranged so as to allow for the discharge of coolant from said gap.

4,948,044

#### ELECTRONIC DIGITAL THERMOSTAT HAVING AN IMPROVED POWER SUPPLY

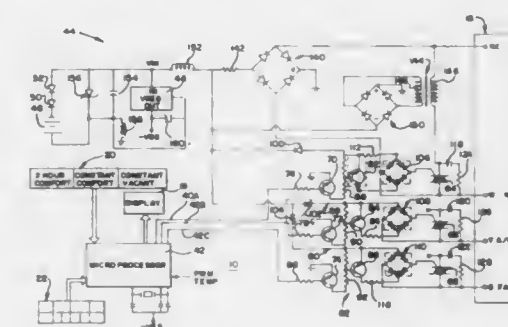
Joseph J. Cacciatore, Westmont, Ill., assignor to Harper-Wyman Company, Lisle, Ill.

Filed Aug. 21, 1989, Ser. No. 396,522

Int. Cl.<sup>3</sup> F23N 5/20

U.S. Cl. 236—46 R

6 Claims



1. A power supply circuit for providing operating power for a programmable electronic digital thermostat including a controlled semiconductor switch connected in series with an external alternating current (AC) voltage source comprising:  
 first rectifier means coupled across said controlled semiconductor switch for rectifying said external AC voltage to produce a first direct current voltage;  
 a transformer having a primary winding and a secondary winding, said primary winding connected in series with said controlled semiconductor switch and said external AC voltage source;  
 second rectifier means connected across said secondary winding for rectifying the alternating current to produce a second direct current voltage;  
 regulator means for providing a predetermined supply voltage for the programmable electronic digital thermostat; said regulator means having input means coupled to said first and second rectifier means; said first and second direct current voltages being applied to said regulator input means; and said regulator means having output means for providing said predetermined supply voltage;  
 first inductance means connected in series and connected to said regulator input means for filtering said first and second direct current voltages; and  
 capacitance means and second inductance means coupled in series between said regulator input means and ground potential for filtering said first and second direct current voltages.

4,948,045

#### HEATING AND AIRCONDITIONING CONTROL SYSTEM

Harry A. Romano, Naples, Fla., assignor to Robert J. Karr and J. Harold Martin, both of Marco Island, Fla., part interest to each

Filed Jan. 13, 1989, Ser. No. 296,703

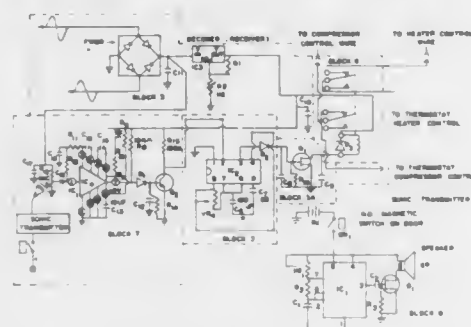
Int. Cl.<sup>3</sup> G05D 23/00

U.S. Cl. 236—51

10 Claims

1. A heating and airconditioning remote control device comprising  
 an infrared or sonic transmitting means coupled to a door or

window whereby said means emits an infrared or sonic signal when said door or window is open, an infrared or sonic receiving means coupled to a relay means whereby said receiving means receives said signal and energizes said relay means, said relay means coupled to a thermostat which controls the operation of a heating and/or airconditioning system, said relay disconnects said thermostat when energized,



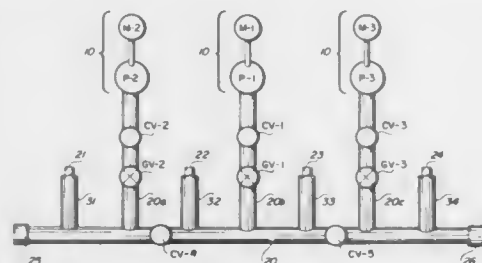
wherein said transmitting means includes a switch coupled to an infrared or sonic transmitter, attached to a door or window frame, and a magnet attached to a door or window aligned with said switch causing said switch to be open whenever said door or window is closed, upon opening said door or window, said magnet moves away from said switch causing said switch to close.

#### 4,948,046 THREE WATER PUMP ARRANGEMENT FOR FOUNTAIN DISPLAY

Gunter Przyslawik, 5230 Tamiami Ct., Cape Coral, Fla. 33904  
Filed May 25, 1989, Ser. No. 356,464  
Int. Cl.<sup>5</sup> B05B 17/08

U.S. Cl. 239—17

3 Claims

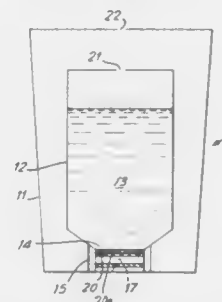


1. A fountain display comprising a plurality of at least four nozzles each connected at spaced intervals along a length of pipe, a plurality of at least three pumps each independently connected at a separate entry point to the length of pipe for supplying liquid under pressure to the pipe and nozzles, a one-way check valve lying between each one of the pumps and the pipe, and an additional one-way check valve located in the pipe between the entry points in the pipe leading to two of the pumps supplying liquid under pressure to the pipe and nozzles.

4,948,047  
**AIR FRESHENER WITH MICROPOROUS MEMBRANE**  
Anthony R. Zembrod, Covington, Ky., assignor to Drackett Company, Cincinnati, Ohio  
Filed Aug. 12, 1988, Ser. No. 231,759  
Int. Cl.<sup>5</sup> A61L 9/12

U.S. Cl. 239—34

5 Claims



1. A dispenser for dispensing a liquid fragrance composition at a substantially constant rate comprising:  
(a) a container for containing said liquid fragrance composition, said container having an orifice through which said composition may flow;  
(b) means for supporting said container in a position such that said orifice is beneath said liquid fragrance composition; and  
(c) a liquid permeable, microporous membrane secured within said orifice, said microporous membrane enabling said liquid fragrance composition to flow therethrough at a predetermined rate, said microporous membrane continually in contact with said liquid fragrance composition during the useful life of said dispenser, said liquid fragrance composition appearing, upon attainment of steady state equilibrium conditions, in liquid form on the exterior surface of said membrane and evaporating therefrom, the composition of said liquid form being at a given point in time substantially the same as that of the liquid fragrance composition remaining within the container, wherein the membrane is one through which the fragrance composition passes via liquid phase transmission and the character of the fragrance does not vary with time.

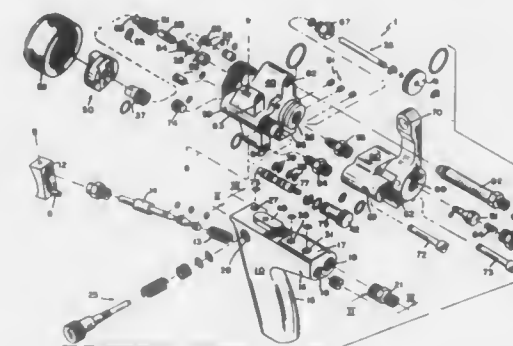
4,948,048  
**COMPACT SPRAY GUN**  
James E. Smith, St. Petersburg, Fla., assignor to Graves Spray Supply, Inc., Clearwater, Fla.  
Division of Ser. No. 150,142, Jan. 29, 1988, Pat. No. 4,848,665, which is a division of Ser. No. 330,460, Mar. 30, 1989. This application Nov. 14, 1989, Ser. No. 436,026  
Int. Cl.<sup>5</sup> B05B 7/12

U.S. Cl. 239—71

5 Claims

1. A spray gun apparatus for applying at least two components to a work piece comprising:  
a housing,  
a needle valve for controlling dispensing of a first component and having a packing seal, for sealing said needle valve in a first bore in said housing,  
a spool valve for controlling dispensing of a second component and having O-ring seals for sealing said spool valve in a second bore in said housing,  
said needle valve including a packing cartridge which is adjustable by turning a needle valve seat threadably received in said first bore, and

said spool valve including a first part, including said O-rings restricting the fluid flow from said amplifier chamber to seals, separable from a second part to allow said first part thereby restrict the pressure decay in said amplifier chamber.



to be separately removed without complete disassembly of the gun.

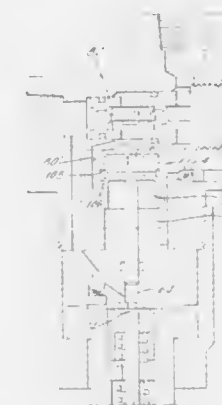
#### 4,948,049 RATE CONTROL IN ACCUMULATOR TYPE FUEL INJECTORS

Eric S. Brisson, Ladlow, and John B. Cavanaugh, West Springfield; Jeffrey P. DiCarb, Holyoke; Ross S. Karlson, Woburn, all of Mass., assignors to AIL Corporation, Columbia, S.C.

Filed Feb. 24, 1989, Ser. No. 316,255  
Int. Cl.<sup>5</sup> F02M 47/02

U.S. Cl. 239—91

7 Claims



1. An accumulator injector comprising an injection nozzle having a valve spring-biased toward a closed position, an accumulator chamber for connection with a source of pressurized fuel, said accumulator chamber communicating with said nozzle with the pressurized fuel therein acting to urge said valve toward an open position, an amplifier chamber in communication with the source of pressurized fuel, the end of said valve being subjected to the pressure in said amplifier chamber, an amplifier piston assembly for boosting the pressure in said amplifier chamber and in said accumulator chamber, a duct for introducing a pressurized fluid into and draining said fluid from said amplifier piston assembly, and valve means associated with said duct for controlling fluid flow through said duct into and out of said amplifier piston assembly to selectively effect either a boosting of the pressure in said amplifier chamber and said accumulator chamber to charge said accumulator chamber with high pressure fuel, or a relief of the pressure in said amplifier chamber, thereby permitting said valve to open under the influence of the pressurized fuel in said accumulator chamber, and means for controlling the rate of injection through said nozzle, said latter means comprising means for

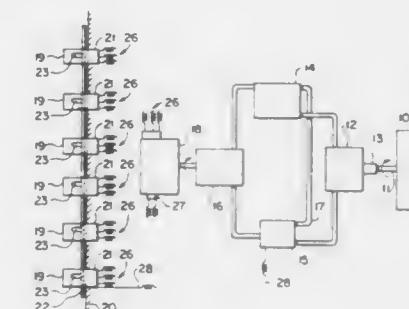
#### 4,948,050 LIQUID ATOMIZING APPARATUS FOR AERIAL SPRAYING

Jules J. C. Picot, Simcoe Court, Fredericton, N.B. E3B 2W9, Canada

Filed Feb. 6, 1989, Ser. No. 306,425  
Int. Cl.<sup>5</sup> B64D 1/18

U.S. Cl. 239—171

7 Claims



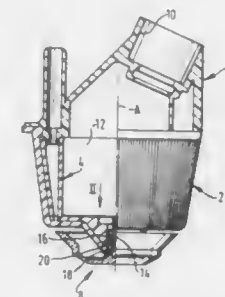
1. A liquid atomizing apparatus for aerial spraying comprising:  
a rotatable atomizer;  
a variable speed AC electric motor for driving said atomizer;  
an AC generator for producing electric power to drive said electric motor at a speed related to the speed of said generator; and  
variable speed drive means for connection between said generator and a power take-off of an engine of an aircraft used for aerial spraying, said drive means including means for controllably varying the speed of a motor means, said motor means controllably varying the speed of said generator relative to the speed of said engine.

4,948,051  
**ROTARY ELEMENT FOR LIQUID DISTRIBUTION**  
David C. Gill, Bristol, Great Britain, assignor to Nomix Mfg. Co. Ltd., Bristol, England  
Continuation of Ser. No. 59,104, Jun. 8, 1987, abandoned. This application Apr. 26, 1989, Ser. No. 344,430  
Claims priority, application United Kingdom, Jun. 12, 1986, 8614355

Int. Cl.<sup>5</sup> B05B 3/10

U.S. Cl. 239—223

12 Claims



1. A rotary element for rotation about a rotary axis to distribute a liquid, the element comprising:  
a liquid receiving surface having a central recess for receiving a liquid, the recess having an outer peripheral wall, a planar surface extending from the peripheral wall and



lying substantially perpendicular to the rotary axis, the planar surface having an outer periphery, a plurality of side surfaces extending from the outer periphery of the planar surface and lying substantially parallel to the rotary axis, a flat end face which extends perpendicular to the rotary axis and adjoins the side surfaces, and a plurality of oblique corner faces which extend from the end face to the planar surface and which lie oblique to the rotary axis, respective ones of the corner faces, respective adjacent side surfaces and the planar surface substantially meeting each other at a respective corner of the planar surface.

4,948,052

# REVERSIBLE GEAR OSCILLATING SPRINKLER WITH CAM CONTROLLED SHIFT RETAINER

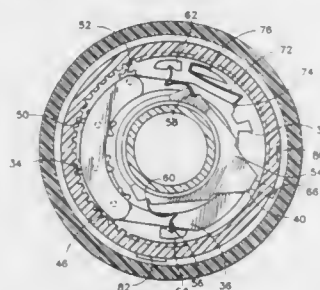
Edwin J. Hunter, 5551 Codorniz Rd., Rancho Santa Fe, Calif. 92067

Filed Apr. 10, 1989, Ser. No. 335,849

Int. Cl.<sup>3</sup> B05B 3/16

U.S. Cl. 239—242

26 Claims



1. An oscillating sprinkler unit, comprising: a sprinkler head mounted for rotation about a first axis; drive means comprising a carrier and alternately operable terminal gear means on said carrier and shiftable with said carrier to alternately engageable driving positions within said drive means for driving said sprinkler head in alternate directions; shifting arm means pivotally moveable between alternate shifting positions by shoulder means carried by said drive means for shifting said carrier between said alternately engageable positions; and cam means on said carrier, and follower means slideably engaging said cam means for biasing and retaining said carrier in a selected one of said alternately engageable positions until shifted therefrom by said shifting arm means.

4,948,053

# PAINT SPRAY NOZZLE

John W. Hufgard, Novelty, Ohio, assignor to AccuSpray, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 101,563, Sep. 28, 1987, Pat. No. 4,905,905. This application Jan. 9, 1989, Ser. No. 294,746

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

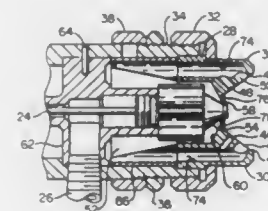
Int. Cl.<sup>3</sup> B05B 1/26

U.S. Cl. 239—301

15 Claims

1. A spray nozzle for use with air atomizable liquids comprising: means forming an air chamber having an outlet end; fluid nozzle valve having a conical taper penetrating said air chamber and extending to and coaxially aligned with a central circular aperture in the outlet end of said air chamber; means for delivering a liquid to said central aperture for

atomization by air exiting said air chamber through said central aperture; at least two pattern adjusting nozzles disposed adjacent to the central aperture of said air chamber, said nozzles being located on diagonally opposite sides of said central aperture; means for adjusting the flow rate of air through said nozzles; and



means for providing laminar air flow through to central aperture, the outlet end of said air chamber has a converging down stream frusto-conical shape which terminates at said central aperture, said air chamber further including means of increasing down stream cross-sectional area for air flow toward the outlet end of the chamber for further enhancing the laminar flow of the atomizing air toward said aperture.

4,948,054

# PNEUMATIC DRYWALL TEXTURE BAZOOKA

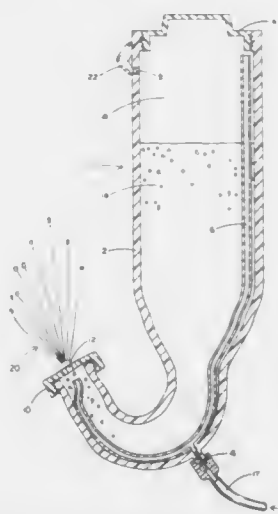
Gregory B. Mills, Santa Ana, Calif., assignor to Behr Process Corporation, Santa Ana, Calif.

Filed Mar. 7, 1989, Ser. No. 319,959

Int. Cl.<sup>3</sup> B05B 7/14

U.S. Cl. 239—325

3 Claims



1. A portable spraying apparatus form spraying a homogeneous material comprising a hollow substantially cylindrical, J-shaped body having a top, first end and a lower, second end; a removable first cap attached to said first end of said body; a removable second cap attached to said second end of said body, said second cap having a discharge orifice there-through; a chamber formed within said body between said first and second caps, wherein a lower portion of said chamber receives said material to be sprayed and in an upper portion of said chamber, between said material and said first cap, there is formed an air pocket; an air nipple connected to said body, said air nipple having

an end extending out from said body for connectin with an air supply; air tubing located inside said body and in communication with said air nipple, said air tubing having a first portion extending to said air pocket and a second portion extending toward said second end of said body; and a control hole located near said first end of said body and in communication with said air pocket, whereby when said body is filled with material to be sprayed and air is supplied to said air tubing, said air pocket is pressurized and thereby urges said material towards said discharge orifice, and air exits said second portion of said air tubing adjacent said discharge orifice to inject air at the discharge orifice to expand and atomize the material which is being discharged.

4,948,055

# FUEL INJECTOR

Bryan L. Belcher, Warwick; David W. Wrightham, Leicester, and Kenneth G. Page, Warwick, all of England, assignors to Rolls-Royce plc, London, England

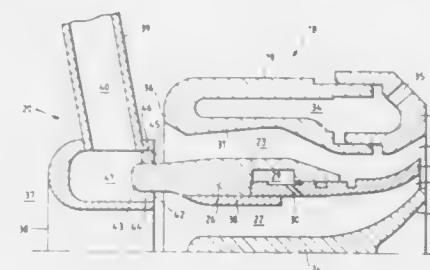
Filed May 17, 1989, Ser. No. 352,952

Claims priority, application United Kingdom, May 27, 1988, 8812589

Int. Cl.<sup>3</sup> F02C 7/22; B05B 7/06

U.S. Cl. 239—419.5

6 Claims



1. A fuel injector suitable for a gas turbine engine comprising a main body portion having an upstream end and a downstream end, said upstream end being operationally in communication with a region of air at high pressure, said main body portion having at least one passage therein interconnecting said upstream and downstream ends thereof so as to provide an air flow through said main body portion which exhausts from said downstream end thereof, means adapted to direct fuel into said air flow so as to provide intermixing therewith, and steam injection means located in the region of the upstream end of said main body portion, said steam injection means being so configured and arranged as to operationally permit said air flow through said at least one passage from said region of air at high pressure and optionally direct steam into said at least one passage, the total exhaust area of said steam injection means being less than the total inlet area of said at least one passage and the total pressure of steam at the exhaust outlet of said steam injection means when steam is exhausted therefrom being higher than the pressure operationally within said at least one passage so that at least the majority of steam so directed enters said at least one passage, a portion of said injector main body cooperating with said steam injection means to define said steam outlet from said steam injector.

4,948,056

# COLLOID MILL WITH COOLED ROTOR

Edward D'Errico, 4465 Douglas Ave., Bronx, N.Y. 10471

Filed Jan. 23, 1989, Ser. No. 300,308

Int. Cl.<sup>3</sup> B02C 23/18

U.S. Cl. 241—67

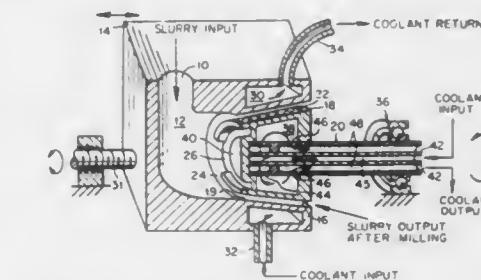
5 Claims

1. A colloid mill comprising: a stator with a milling face, a rotor formed as a frusto-conical shell having its conical wall surface positioned immediately adjacent to said stator milling

face and adapted for rotation relative thereto, so that a substantially annular passage is defined between said stator face and said conical surface through which a slurry is passed for milling;

inlet and outlet means for slurry, located, respectively, forwardly and rearwardly of the rotor: the rotor shell having front and rear walls extending transversely thereof;

a tubular rotary shaft extending in sealing engagement through the rear wall into the rotor and being fixed at a front end to the front wall thereby to support the rotor and defining with the rotor an annular coolant chamber; a coolant fluid inflow conduit mounted coaxially within the tubular shaft thereby defining a space between said conduit and said tubular shaft forming a coolant fluid outflow;



a first plurality of coolant inflow holes in said conduit and in said tubular shaft communicating with said annular chamber at a location adjacent the front wall; a second plurality of coolant outflow holes in said tubular shaft communicating with said annular chamber at a location adjacent the front wall; a second plurality of coolant outflow holes in said tubular shaft communicating with said annular chamber at a location adjacent the rear wall; and, a solid annular ring in said duct between said first plurality of coolant inflow holes and said second plurality of coolant outflow holes arranged to prevent coolant fluid flowing directly along the shaft from the coolant inflow holes to the coolant outflow holes.

4,948,057

# DEVICE AND PROCESS TO GUIDE, HOLD AND CONVEY A YARN DURING BOBBIN REPLACEMENT

Dietmar Greis, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

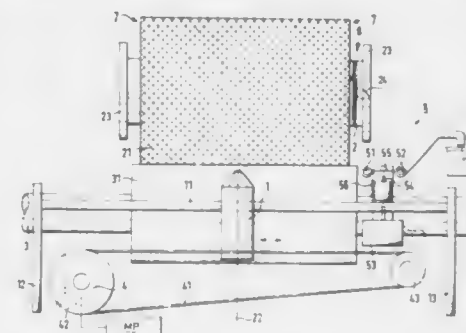
Filed Oct. 11, 1988, Ser. No. 255,551

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1987, 3734478

Int. Cl.<sup>3</sup> B65H 54/02

U.S. Cl. 242—18 R

19 Claims



1. A process for replacing a full bobbin on a spinning and

winding machine which has a traversing yarn guide for guiding a continuously fed yarn onto a bobbin holder in a cross-wound pattern, comprising the following steps:

- traversing said yarn guide in a winding zone until said bobbin reaches a predetermined diameter;
- moving said yarn and said yarn guide into a lateral area adjacent to said winding zone when said bobbin reaches said predetermined diameter;
- retaining said yarn and said yarn guide in said lateral area;
- severing said yarn adjacent said winding zone;
- removing said full bobbin and replacing it with an empty bobbin holder;
- moving said yarn and said yarn guide into said winding zone;
- winding said yarn onto said bobbin holder; and
- controlling the movements of said yarn guide by a microprocessor-controlled stepping motor.

4,948,058

**APPARATUS AND METHOD FOR WINDING YARN**  
Reinhardt Behrens; Hans-Jochen Busch, both of Remscheid, Fed. Rep. of Germany, and Reinhard Zimmermann, Charlotte, N.C., assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

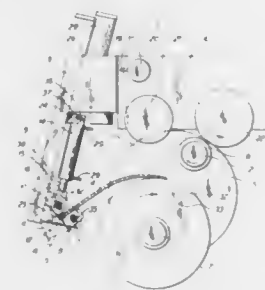
Filed Jul. 24, 1989, Ser. No. 384,553

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825854

Int. Cl.<sup>5</sup> B65H 67/048

U.S. Cl. 242—18 A

11 Claims



1. An apparatus for continuously winding a high speed running yarn onto bobbins serially delivered to a winding position and without yarn stoppage or loss of yarn between bobbin changes, and comprising

a bobbin revolver mounting at least two bobbin receiving spindles having parallel axes, and means for sequentially rotating the bobbin revolver so that each of the spindles may be alternatively moved between a winding position and a doffing position,

means for traversing the yarn across a bobbin which is mounted on a spindle in the winding position, and while rotatably driving such bobbin,

yarn change-over means which is operable upon the revolver moving a rotating full bobbin from the winding position to the doffing position and moving an empty bobbin from the doffing position to the winding position, for transferring the running yarn being wound on a rotating full bobbin at the doffing position onto the empty bobbin at the winding position, and so as to sever the yarn and leave a free yarn end on the rotating bobbin, and

means for contacting the surface of the rotating full bobbin at the doffing position along a contact line which is located at or immediately upstream of the most narrow gap between the surface of the rotating full bobbin and that of the empty bobbin, with said contact line extending along at least a portion of the surface of the rotating full bobbin in a direction parallel to the axis thereof, and so as to press the free yarn end onto the surface of the rotating full bobbin at said contact line and thereby prevent the free yarn end from contacting and becoming entangled with

the empty bobbin then being wound at the winding position, said contacting means comprising a sheet-like plate having a free edge, means pivotally mounting said plate about a pivotal axis which is parallel to the axes of said spindles and such that the plate in its area of said free edge is adapted to contact the surface of the rotating full bobbin along said contact line, and such that said plate and the surface of the rotating full bobbin converge toward each other at an acute angle when viewed in the direction of rotation of the full bobbin.

4,948,059

**TENSIONING DEVICE FOR A FISHING LINE**

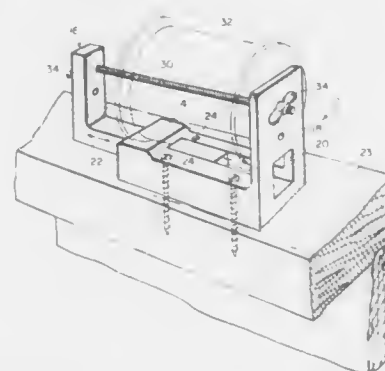
Laurence G. Lewitt, 69 The Circle, Glen Head, N.Y. 11545

Filed Nov. 2, 1989, Ser. No. 430,280

Int. Cl.<sup>5</sup> B65H 59/04, 49/20

U.S. Cl. 242—156

8 Claims



1. A tensioning device for a fishing line, comprising:

- a base member having two outwardly extending arms, one of which is adjustable toward and away from the other, said base member further containing a slot extending therethrough and said adjustable arm being "L"-shaped so that one leg can travel within said slot;
- means for securing said base member to a stationary structure;
- means for rotatably supporting a take off spool of bulk fishing line between said arms of said base member; and
- means for applying resistance to the take off spool during rotation to keep the fishing line under tension when transferred onto a fishing reel by one person, so that the fishing reel will have a neat, taut, tightly drawn fishing line that will not tangle when eventually used.

4,948,060

**AUTOMATIC WEB ROLL HANDLING SYSTEM FOR SPLICING**

Robert S. Kurz, Franklin; Alexander Jesensky, Hopkinton; Raymond W. Johnson, Norfolk; Tamas Hetenyi, Concord; Geoffrey C. Grigg, Milford; Stephen C. Dangel, Bedford; John W. Clifford, Ashland, and Richard A. Butler, Jr., Marion, all of Mass., assignors to Butler Automatic, Inc., Canton, Mass.

Filed Sep. 12, 1988, Ser. No. 243,521

Int. Cl.<sup>5</sup> B65H 19/12

U.S. Cl. 242—58.1

11 Claims

1. A web roll handling system comprising a roll loading section, a plurality of splicers and at least one robotic vehicle arranged to travel back and forth along a floor between the loading section and the plurality of splicers, each splicer having a roll supporting turret with arms carrying roll chucks, said turret being movable to position the chucks at a selected elevation above the floor to pick up a web roll from said at least one vehicle when that vehicle travels to that splicer, said loading section including means for loading a roll onto said at least one

vehicle, said at least one vehicle including a lift table for engaging a web roll from below and supporting the roll centerline at



the same elevation above the floor as the elevation above the floor of the splicer roll chucks when they are positioned to pick up a web roll from said at least one vehicle.

4,948,061

**FLYING SPLICE UNWINDER**

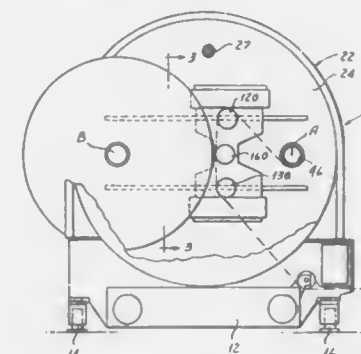
Leonard C. Krimsky, Englewood, N.J., and Henk Van Rietschoten, Blooming Grove, N.Y., assignors to Worldwide Converting Machinery, Allendale, N.J.

Filed Aug. 29, 1988, Ser. No. 238,033

Int. Cl.<sup>5</sup> B65H 19/18

U.S. Cl. 242—58.3

33 Claims



1. Apparatus for continuously unwinding web material from a roll being unwound and from a fresh roll including in combination, a turret, first means on said turret for supporting a roll being unwound, second means on said turret for supporting a fresh roll, a bumper roll mechanism comprising a bumper roll for splicing the trailing end of said roll being unwound to the leading end of said fresh roll without interrupting the operation of unwinding said web from said roll being unwound and means mounting said bumper roll mechanism on said turret movement relative to said second supporting means between first position at which said bumper roll mechanism and said second supporting means are relatively remote from each other so that a fresh roll can be loaded on said second supporting means with the web being unwound passing between said bumper roll and said fresh roll and a second position at which said bumper roll mechanism and said second supporting means are relatively adjacent to each other so that a splicing operation can take place by said bumper roll moving said web being unwound into contact with the web on said fresh roll.

4,948,062

**STERILE FILM DISPENSER FOR APPLANATING TONOMETER**

Paul J. Mahar, and Katie Mahar, both of 417 Gleewood Ct., Youngstown, Ohio 44512

Filed Oct. 31, 1989, Ser. No. 429,370

Int. Cl.<sup>5</sup> B65H 20/36; A61B 03/16

U.S. Cl. 242—67.3 R

5 Claims



1. A sterile film band dispensing device for use on a applanating tonometer having a microscope head having a predetermined engagement area comprises, a pair of oppositely disposed dispensing and retrieval spools, means for securing said spools to said applanating tonometer, a sterile film band of transparent material removably positioned within said dispensing spool, a guide sleeve secured in spaced relation to said dispensing spool for receiving said sterile film material within, means for defining a guide path for engagement film of said sterile film band with said microscope head, means for advancing said sterile film band from said dispensing spool through said guide sleeve and over said microscope head.

4,948,063

**FILM CASSETTE**

John J. Niedospial, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 2, 1989, Ser. No. 415,750

Int. Cl.<sup>5</sup> G03B 17/26

U.S. Cl. 242—71.1

5 Claims

1. A film cassette wherein (a) a spool is rotatable within the cassette shell, (b) a convoluted film roll whose outermost convolution comprises a film leader is coiled about said spool, (c) a pair of flanges are coaxially arranged on said spool to normally radially confine said film roll coiled about the spool within respective skirted peripheries of said flanges to prevent said film leader from substantially uncurling into an annular space between said skirted peripheries and an interior curved wall of said cassette shell, and (d) a film stripper is received between said film leader and the next-inward convolution of said film roll to remove successive sections of the leader from said flanges responsive to rotation of said spool in a film unwinding direction, to allow the leader to enter an essentially non-curving light-tight passageway to the exterior of said cassette shell, characterized in that:

film flattening means is formed integrally with said interior curved wall of the cassette shell and projects from the curved wall into said annular space, only in the vicinity of said film stripper and said non-curving passageway, for supporting successive sections of said film leader substantially flat to facilitate initial and subsequent movement of the leader into the non-curving passageway; and said flanges are sufficiently flexible to allow said film leader

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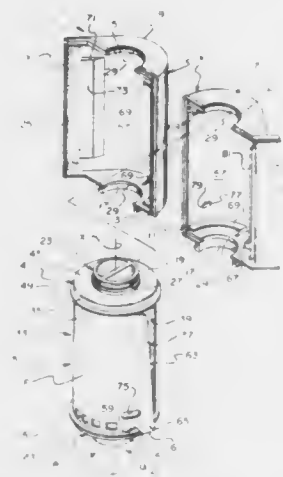
14

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to flex the flanges away from one another at their skirted peripheries, when said spool is rotated in the film unwind-



ing direction with said film stripper received between the leader and the next-inward convolution of said film roll, to free successive sections of the leader from the flanges.

4,948,064

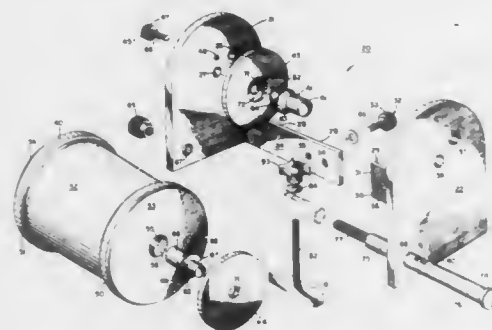
## UNIVERSAL SPOOL SUPPORT SYSTEM

Neil Richard, 1234 New Haven Ave., Milford, Conn. 06460

Filed Dec. 19, 1988, Ser. No. 286,233

Int. Cl.<sup>3</sup> B65H 49/00

U.S. Cl. 242—106



1. A support system for rotationally securely retaining a variety of product bearing spools, said support system comprising:

- A. a first support plate,
- B. a second support plate positioned in juxtaposed, spaced, cooperating relationship with the first support plate;
- C. support means for rotationally mounting at least one product bearing spool to the support plates; and
- D. each of the support plates comprising at least two shaft receiving holes, each being aligned with a shaft receiving hole of the opposed support plate, thereby forming at least two pair of juxtaposed, spaced, facing, substantially aligned shaft receiving holes, to enable the support system of the present invention to securely rotationally retain product bearing spools of varying diameters.

4,948,065

## CABLE REEL

Arnold E. Zelmin, Vällingby, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

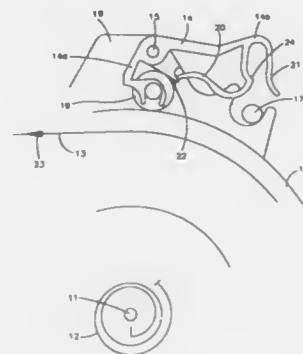
Filed Nov. 16, 1988, Ser. No. 271,633

Claims priority, application Sweden, Dec. 1, 1987, 8704803

Int. Cl.<sup>3</sup> B65H 75/48

U.S. Cl. 242—107.6

3 Claims



1. In a cable reel comprising a rotatable drum (10) from which a cable is wound on and off a spring (12) for biasing the reel to wind up the cable, said spring being tightened during winding off of the cable, and a brake for preventing drum rotation in the winding-up direction and operable to release the drum in order to wind up the cable by means of the spring, the improvement wherein a catch assembly (17,21,24) is provided to catch the brake in its released position and means actuable by the torque of the spring (12) to apply the brake when said torque exceeds a predetermined value, the spring (12) being connected between the rotatable drum (10) and means for mounting the brake.

4,948,066

## RETRACTOR FOR SEAT BELTS

Kenjiro Matsumoto, Osaka, and Kazuta Tsukahara, Ibaraki, both of Japan, assignors to Ashimori Industry Co., Ltd., Osaka, Japan

PCT No. PCT/JP87/00971, § 371 Date Aug. 12, 1988, § 102(e) Date Aug. 12, 1988, PCT Pub. No. WO88/04245, PCT Pub. Date Jun. 16, 1988

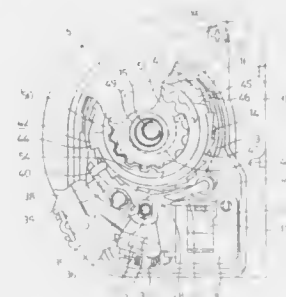
PCT Filed Dec. 11, 1987, Ser. No. 249,187

Claims priority, application Japan, Dec. 12, 1986, 61-296347

Int. Cl.<sup>3</sup> A62B 35/00; B65H 75/48

U.S. Cl. 242—107.4 A

2 Claims



1. A retractor for seat belts, having a spindle supporting a webbing take-up shaft thereon, said spindle being rotatably supported on a retractor body in a direction of winding of the webbing, an inertia sensitive actuator means responsive to sudden vehicle acceleration and deceleration and a locking means including a clutch member rotatably mounted relative to said spindle and biased in a direction of winding the web-

bing, and a locking member connected to said clutch member, said clutch member being rotated synchronously with said spindle by the inertia means actuated in an emergency, said locking member being positioned to restrain the rotation of the spindle in the direction of unwinding the webbing characterized in that it comprises:

- a synchro gear arranged to be rotated synchronously with said spindle;
- a lever mounted on the clutch member of said locking means so as to turn freely and engageable with the synchro gear;
- a spring member for biasing the lever in the direction of engagement of the lever with said synchro gear;
- a control cam for engaging said lever with the synchro gear when the webbing is pulled out nearly in full length and for disengaging said lever from the synchro gear when the webbing is rewound by some degree; and
- transmission means for reducing the rotational speed of said spindle and transmitting the reduced rotational speed to the control cam, said transmission means including a planetary gear mechanism, the planetary gear mechanism being arranged to drive said control cam whereby the retractor functions as an emergency locking retractor until the webbing is pulled out to the full length of the webbing and is changed from an emergency locking retractor state to an automatic locking retractor state and is thereafter changed from the automatic locking retractor state to the emergency locking retractor state when the webbing is rewound by a predetermined amount thereafter.

4,948,067

## TEXTILE YARN CREEL

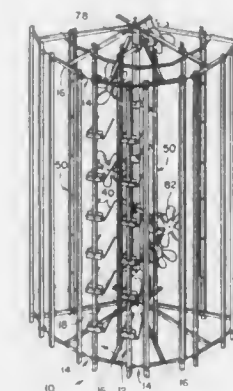
Alan Gutschmit, Troy, N.C., assignor to Alandale Industries, Inc., Troy, N.C.

Filed Dec. 5, 1989, Ser. No. 446,201

Int. Cl.<sup>3</sup> B65H 49/14

U.S. Cl. 242—131

9 Claims



1. A textile yarn creel for compactly and adjustably supporting a plurality of yarn packages for feeding yarns therefrom to a textile knitting machine or like textile apparatus, said creel comprising a plurality of yarn package supporting means each including frame means, at least one longitudinal yarn package supporting member having a plurality of yarn package mounting locations therealong, and means for mounting said yarn package supporting member at selectively variable positions on said frame means; and means for selectively connecting the plurality of said frame means in an annular arrangement with their respectively associated yarn package supporting members oriented in axial relation to the annular arrangement and generally parallel spaced relation to one another and with their yarn package mounting locations facing radially inwardly of the annular arrangement.

4,948,068

## CIRCULATION CONTROL SLOTS IN HELICOPTER YAW CONTROL SYSTEM

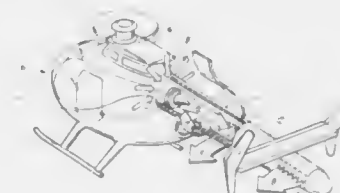
James R. VanHorn, Scottsdale, Ariz., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed May 12, 1988, Ser. No. 193,018

Int. Cl.<sup>3</sup> B64C 27/82

U.S. Cl. 244—17.19

9 Claims



1. An anti-torque and yaw control system for a helicopter having a tail boom generally oriented perpendicular to the down wash of the helicopter main rotor when in the hovering mode, comprising:

- at least one linear nozzle having an opening extending longitudinally in said tail boom and disposed to discharge a jet of fluid tangentially to the surface of said tail boom so as to produce a thin layer of fluid flow;
- at least one means to produce at least one vortex intermediate the ends of said jet discharge from said at least one linear nozzle so as to intercept said fluid flow at said at least one vortex;
- a jet thruster located in the distal end of said tail boom and capable of directing fluid to opposite sides of said tail boom so as to produce variable side forces on said tail boom; and
- means to supply fluid to both said at least one linear nozzle and said jet thruster.

4,948,069

## DEVICE FOR STEERING THE NOSE WHEEL TRAIN OF AN AIRCRAFT LANDING GEAR

Jacques Veaux, Chatillon; Michel Derrien, Versailles, and Jean-Pierre Hainaut, La Queue En Brie, all of France, assignors to Messier-Hispano-Bugatti, Montrouge, France

Filed Aug. 11, 1989, Ser. No. 392,583

Claims priority, application France, Aug. 22, 1988, 88 11100

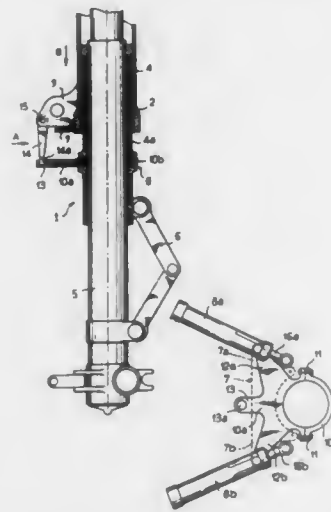
Int. Cl.<sup>3</sup> B64C 25/50

U.S. Cl. 244—50

5 Claims

1. A device for steering the wheels fitted to the bottom end of the leg of the nose landing gear of an aircraft, said wheels being steered about the axis of said leg, said leg comprising a strut, a tube mounted to rotate inside the strut and projecting outside the strut, a rod slidably mounted inside the tube and carrying the wheels at its free end, and a scissor linkage for constraining the tube and the rod to rotate together, wherein the device comprises at least one actuator situated in a plane substantially perpendicular to the axis of the leg, the end of the actuator rod being hinged to a side lug for rotating the tube, and the actuator cylinder being hinged to two parallel plates extending perpendicularly to the axis of the leg, with one of the

plates being fixed to the strut and with the other plate being rotatably mounted about the tube and being prevented from



rotating relative to the strut by means of a dog fixed to the strut.

4,948,070

## INFLATABLE EXTERNAL FUEL TANK

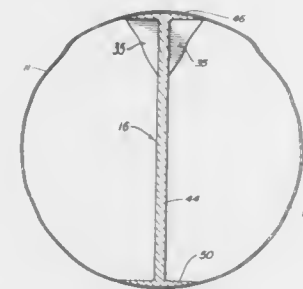
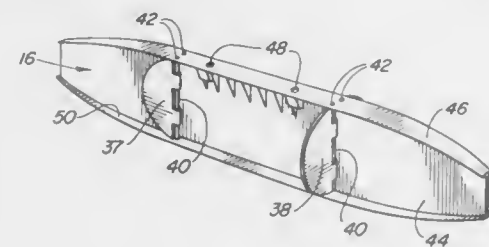
Richard R. Lyman, Bountiful, Utah, assignor to TRE Corporation, Los Angeles, Calif.

Filed Apr. 27, 1987, Ser. No. 43,154

Int. Cl.<sup>5</sup> B64D 37/06

U.S. Cl. 244—135 R

13 Claims



1. A collapsible tank for carrying liquid, comprising: a generally planar central support member having top and bottom edges and a substantially planar surface; and a flexible skin completely enclosing the support member and attached to the support member at said edges, said skin being collapsible from an expanded condition in which there is a liquid-carrying space between the skin and the support member to a collapsed condition in which the skin

is adjacent the substantially planar surface of the support member, whereby the tank in the collapsed condition has a nestable storage ratio of at least 4:1.

4,948,071

## DEPLOYMENT SYSTEM FOR PARACHUTE

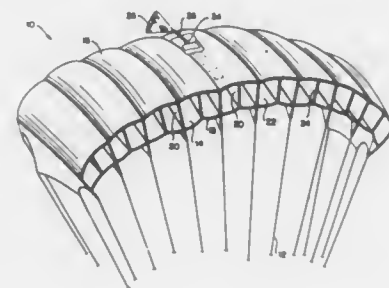
Clyde M. Summers, III, Cummings, Ga., assignor to Glide Path International, Inc., Chamblee, Ga.

Filed Apr. 12, 1989, Ser. No. 337,087

Int. Cl.<sup>5</sup> B64D 17/52

U.S. Cl. 244—149

19 Claims



1. A canopy deployment system for a parachute, comprising: a parachute canopy including forward and rear portions thereof; a pilot chute having a suspension line; means for securing one end of said suspension line to said forward portion of said canopy; means for securing the opposite end of said suspension line to said pilot chute; means adjacent said rear portion of said canopy defining a guide for receiving said suspension line and from which said pilot chute and a portion of said suspension line may extend prior to and upon deployment of said canopy, said suspension line securing means at said forward portion and said guide at said rear portion being spaced one from the other a predetermined distance relative to said suspension line such that front-to-back opening of said canopy upon deployment of the parachute relatively displaces said securing means and said guide away from one another to locate at least the major portion of said suspension line forwardly of said guide, thereby drawing the pilot chute into close proximity to said guide.

4,948,072

## SEGMENTED VECTORING CRUISE NOZZLES

Douglas Garland, Rexdale, and Joseph E. Farbridge, Thornhill, both of Canada, assignors to Boeing of Canada Ltd., Downsview, Canada

Filed Feb. 8, 1989, Ser. No. 307,810

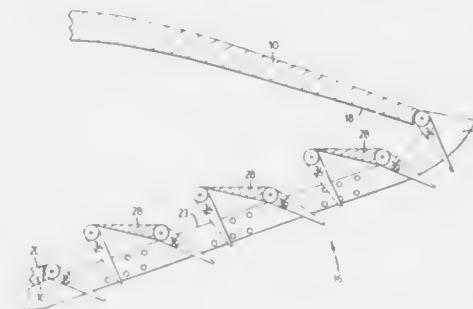
Int. Cl.<sup>5</sup> B64C 29/00

U.S. Cl. 244—23 D

19 Claims

1. A thrust vectoring structure for use in a VSTOL Aircraft having a pressurized gas generator and at least one generally rearwardly facing outlet fluidly communicating with said pressurized gas generator and through which pressurized gas is discharged to provide thrust for said aircraft, and in which said outlet has an opening defined by a top, a bottom and sides extending between said top and said bottom, said top and said bottom having respective top and bottom edges toward the rear of said aircraft, said top extending rearwardly of said bottom, said thrust vectoring structure comprising: at least one generally horizontal divider extending between said sides of said opening, said divider having a forwardly facing front edge and a rearwardly facing rear edge; a plurality of front and rear flaps; said front flaps being

mounted adjacent said top and front edges, said rear flaps being mounted adjacent said rear and bottom edges; each of said flaps having a leading edge and a trailing edge and being rotatable about an axis adjacent and generally parallel to said leading edge, the rotational axis of each of said front flaps being rearward and above the rotational axis of one of said rear flaps; said flaps being rotatable from a horizontal thrust position wherein said trailing edges of said flaps extend generally rearwardly, to a vertical thrust position wherein said trailing edges of said flaps extend generally downwardly; in said horizontal position said trailing edge of each of said



rear flaps extend rearwardly of said leading edge of the front flap immediately thereabove to define a generally horizontal thrust nozzle therebetween; and, in said vertical position, the trailing edge of each of said front flaps depends below the leading edge of the rear flap immediately therebelow to define a generally vertical thrust nozzle therebetween, and each of said dividers and said flaps mounted adjacent thereto define a spacing channel below each of said dividers, said spacing channels being interspersed between said vertical thrust nozzles, said spacing channels having means for enabling entrainment of ambient air into said pressurized gas being discharged from said nozzles.

4,948,073

## TURNOUT WITH CLOSING FROG

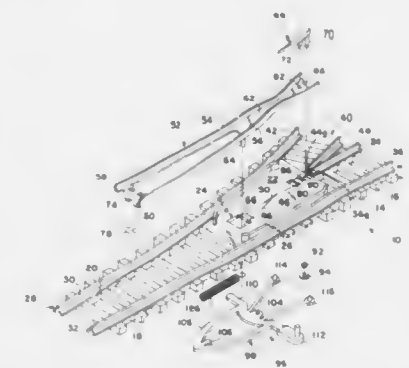
Clarence K. Edwards, Medford, and Lawrence D. Edwards, Eagle Point, both of Oreg., assignors to Kadet Metal Products, Co., Medford, Oreg.

Filed Oct. 24, 1988, Ser. No. 261,221

Int. Cl.<sup>5</sup> E01B 7/00

U.S. Cl. 246—415 A

17 Claims



11. In a model railroad turnout assembly for selectively directing a model train to one of plural track pairs, an improved switching mechanism comprising: an entry track including a pair of spaced apart entry rails; plural, branching discharge tracks, each including a pair of spaced apart discharge rails, the adjacent rails of the dis-

charge tracks having ends intermediate the other rails of the discharge tracks, said adjacent rails extending along lines which intersect at a point between said entry rails beyond the ends of said adjacent rails; a switch element having a pair of blades spaced apart a lesser distance than said entry rails, said blades having points at one end of the switch element which points are shiftable with said switch element into a contacting relationship with one only of said rails of said entry track, the other end of said switch element being located adjacent said discharge track ends and including a web having a connecting bore extending therethrough and a notch located therein at the other end of said switch element, said switch element being yieldingly biased to a datum position each of said blades being a single continuous rail extending from one end to the other end of the switch element; a roadbed element carrying said entry track, said discharge tracks and said switch element thereon, and having a bore extending therethrough underlying said notch in said switch element; and a generally triangular shaped frog, extending between said discharge track ends and said point of intersection, which is shiftable by said switch element in the same lateral direction of movement as the switch element with the apex of the triangular shape contacting a selected blade to provide a continuous rail segment between a selected entry track rail and a selected discharge track rail, and which includes a pivot pin located on the underside thereof at one end thereof, said pivot pin extending downwardly through said switch element notch and said bore in said roadbed element and a connecting pin located on the underside of said frog adjacent said pivot pin, said connecting pin extending downwardly through said connecting bore in said switch element.

4,948,074

## FLUSH MOUNTED GAUGE FOR INSTRUMENT PANELS OF DIFFERENT THICKNESSES

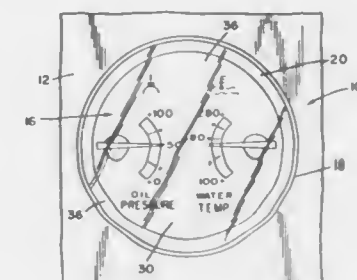
Everett L. Bramhall, Jr., Manchester, N.H., assignor to Comp-ton Manufacturing Co., Inc., Manchester, N.H.

Filed Aug. 28, 1989, Ser. No. 399,768

Int. Cl.<sup>5</sup> G12B 9/00

U.S. Cl. 248—27.7

10 Claims



1. A gauge for use with an instrument panel having a front surface, a rear surface, and an opening therethrough, the panel opening having a given shape and being of a given dimension, the gauge comprising an enclosure for the gauge mechanism, said enclosure comprising a front surface and a side wall having a given depth which terminates at an outwardly extending flange, said front surface having substantially said given shape and said given dimension so as to be adapted to fit snugly within the panel opening, gasket means situated between the rear surface of the panel and said flange, said gasket means having a central opening therein of substantially said given shape and dimension and being adapted to surround said side wall and substantially seal said flange to the rear surface of the panel, the combined thickness of the panel and the gasket



means being substantially equal to said given depth and means for fastening said flange and said gasket means to the rear surface of the panel, such that said front surface of the gauge enclosure is substantially coplanar with the front surface of the panel.

4,948,075

# RETENTION RING ASSEMBLIES FOR SUPPORTING REFUSE BAGS

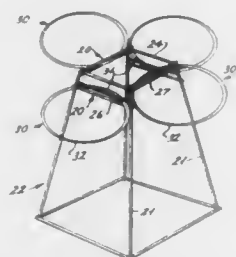
Johnny G. Allen, 603 Cedar Ave., P.O. Box 3667, Albany, Ga. 31706

Filed Jul. 17, 1989, Ser. No. 380,447

Int. Cl.<sup>5</sup> A63B 55/04

U.S. Cl. 248—97

10 Claims



1. An apparatus for retaining refuse bags in an open and vertically elevated orientation with respect to a support structure comprising a bracket assembly having at least one pair of upper and lower vertically spaced bracket members, spacer means for spacing said bracket members in horizontally offset relationship with respect to one another so that said upper bracket member is in closer proximity to the support structure than said lower bracket member, at least one ring element having first and second arcuate segments, said first arcuate segment being smaller than said second arcuate segment, said first arcuate segment of said ring element being selectively seated between said upper and lower bracket members so that said second arcuate segment is cantilevered outwardly therefrom so that a refuse bag may be selectively supported by said ring element.

4,948,076

# SPEAKER SUPPORT STAND

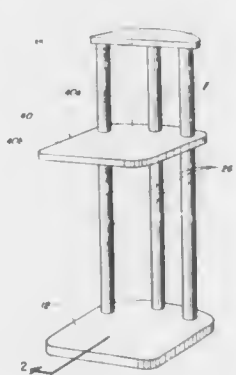
K. Drew Sumrell, 127 Oaks Dr.; Don R. Blair, P.O. Box 206, and Dave Johnson, Rte. 5, Box 625, all of Boone, N.C. 28607

Filed Oct. 2, 1989, Ser. No. 392,584

Int. Cl.<sup>5</sup> A47G 29/00

U.S. Cl. 248—125

14 Claims



1. A speaker support structure for elevating and supporting a speaker comprising:

- (a) a base;
- (b) at least three support dowels attached to the base and extending upwardly from the base, the dowels including a first support dowel located laterally between second and third support dowels that are both spaced forward of the first support dowel;
- (c) a support shelf extending forwardly from the support dowels and adjustable vertically along the support dowels, the support shelf having openings corresponding to the support dowels such that the support dowels can be inserted through the corresponding support shelf opening allowing the support shelf to be vertically adjustable along the support dowels; and
- (d) wherein the support shelf tends to pivot about the support dowels when a speaker is placed on the support shelf, causing a locking action at the support shelf openings and the dowel supports which prevents the support shelf from moving downward on the dowel supports.

4,948,077

# LAUNDRY BUGGY

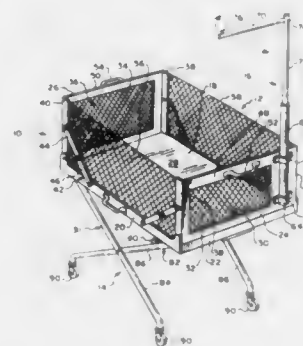
Anthony J. Gonzalez, 1735 N. Pulaski, Chicago, Ill. 60639

Filed Feb. 6, 1989, Ser. No. 306,496

Int. Cl.<sup>5</sup> A47K 1/04

U.S. Cl. 248—129

14 Claims



1. A laundry buggy which is collapsible to a small space, such as that of a large attache case, and which is erectable into a basket assembly with a supporting leg structure, said laundry buggy including a basket assembly and a detachable leg assembly, said basket assembly comprising a bottom wall, a first end wall pivotally connected to an upper side of the bottom wall adjacent one end thereof, a second end wall pivotally connected to an upper side of said bottom wall adjacent the other end thereof, said end walls being pivotable toward each other and downwardly over said bottom wall to form a collapsed basket assembly and each having side edge, a piece of flexible material being fixed to and between each pair of opposed side edges of said end walls, and forming flexible side wall of said basket assembly and being collapsible to a position underneath said end walls when they are collapsed downwards, said detachable leg assembly comprising first and second U-shaped leg formations each including a first leg that is pivotably connected to a second leg of the other leg formation and an upper bight-forming bar, first and second U-in-cross-section snap-type clamps fixed respectively to the underside of said bottom wall of said basket assembly adjacent each end thereof for snap-fittingly receiving the bight-forming bar of one of said leg formations for fixing said leg assembly in an upright erect position to the underside of said basket assembly, and first and second U-in-cross-section clamps mounted to the underside of said bottom wall adjacent each side thereof, each of said clamps being adapted to receive at least one leg of one of said leg formations of said leg assembly therein once the leg formations are collapsed to lie flat adjacent each other whereby said leg assembly and said basket assembly will take up a minimum

amount of space when collapsed and releasably connected together to facilitate easy carrying of the then formed compact assembly.

4,948,078

# ARTICLE SUPPORT

Mayra Dumenigo, 530 W. Park Dr., Apt. 190 104, Miami, Fla. 33172

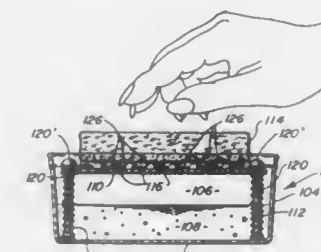
Continuation-in-part of Ser. No. 272,391, Nov. 17, 1988,

abandoned. This application Sep. 1, 1989, Ser. No. 402,063

Int. Cl.<sup>5</sup> A47K 5/08

U.S. Cl. 248—176

4 Claims



1. A container for holding liquid therein and comprising:
  - a. a hollow interior bounded by a floor and a wall means secured to and upstanding from a periphery of said floor for defining boundaries of said hollow interior,
  - b. said wall means including an upper peripheral edge defining an open mouth spaced from and oppositely disposed to said floor,
  - c. a platform having an exposed outer surface for support of an object thereon, said platform movably mounted within said hollow interior in spaced relation to said open mouth and said floor and being congruently configured to said floor and dimensioned to be disposed in spaced relation from an inner surface of said wall means, said platform further comprising a plurality of apertures formed therein for passage of liquid flow therethrough to the object on said exposed outer surface,
  - d. support means movably supporting said platform within said hollow interior and including a plurality of springs mounted within said hollow interior and extending upwardly from said floor into supporting relation with said platform,
  - e. retaining means mounted within said hollow interior and including one post formed in each of four corners of said floor and extending upwardly through a receiving opening in a corresponding corner of said platform and dimensioned to pass through said platform along the length of said post, said springs being concentrically mounted in surrounding relation one each of said post,
  - f. each of said posts comprising an enlarged head portion formed on an outer end thereof and being sufficiently dimensioned to prevent passage of said platform therebeyond, said head portions including a pin extending inwardly from an underportion thereof and dimensioned to be disposed in frictional, retaining engagement within the interior of an upper end of each of said posts, said head portions being removable therefrom,
  - g. said platform positionable between a normal outer position and an inner position, said inner position defined by contact of said platform and an object thereon with liquid within said container substantially adjacently positioned relative to the floor, said normal outer position defined by a spaced disposition of said platform and the object thereon from liquid within said container, and
  - h. a plurality of projections formed on said platform and extending outwardly therefrom said outer exposed surface and collectively dimensioned to support the object thereon in spaced relation from said exposed surface of said platform whereby air can flow between said outer

exposed surface and an undersurface of the object in drying relation thereto.

4,948,079

# SOAP DRYING STAND

Goncalves Baeta, 26 Cavell Avenue, Toronto, Ontario, Canada M4K 1L6

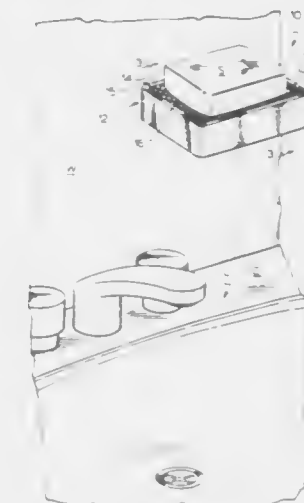
Continuation-in-part of Ser. No. 73,278, Jul. 14, 1987,

abandoned. This application Oct. 31, 1988, Ser. No. 264,880

Int. Cl.<sup>5</sup> A47K 5/00

U.S. Cl. 248—309.1

21 Claims



1. A soap stand for use with a bar of soap comprising means for supporting a bar of soap, said support means including a support arrangement having an open bottom and a water absorbing substrate engaged by said support arrangement to expose a water evaporation surface of said water absorbing structure to freely circulating ambient air via said open bottom, said water absorbing substrate having a water absorbing surface positioned for contact with water on a lower surface of a bar of soap placed on said support means to strip the water from the lower surface of the bar of soap, said water absorbing substrate to a side thereof opposite said water absorbing surface defining said water evaporation surface of a size sufficient to effect transfer of the stripped water to said ambient air in contact with said evaporation surface during normal use of the soap holder.

4,948,080

# BICYCLE DRINK HOLDER

Stephen W. Jack, 4818 Orchard Ave., San Diego, Calif. 92107

Filed Aug. 11, 1988, Ser. No. 230,906

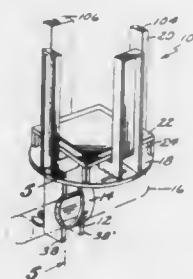
Int. Cl.<sup>5</sup> B62J 11/00

U.S. Cl. 248—311.2

9 Claims

1. A collapsible container holder for use in combination with a cylindrical member, said drink holder comprising:
  - a connecting post having a first end and a second end, said connecting post having a mounting recess formed adjacent said first end, said mounting recess sized for receipt of a cylindrical member, and an engaging aperture formed adjacent said second end;
  - an adjustable strap mounted to said connecting post, said adjustable strap having a substantially straight portion and an arcuate portion, said arcuate portion having adjustment notches formed therein, said adjustment notches positioned to cooperate with said engaging aperture for releasable restraint of said cylindrical member within a receiving bore defined together by said adjustable strap and said post;

- a base mounted to said second end of said post;  
a platform mounted upon and spaced apart from said base, said platform and base together defining a storage cavity; and



a plurality of retaining arms selectively mounted to said base for radial adjustment, and retaining arms defining a cavity for receipt of a container and sized to be selectively detached from said base and inserted within said storage cavity, thereby allowing rearrangement of said collapsible container into a compact configuration.

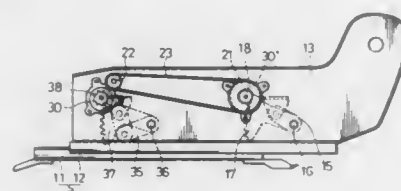
4,948,081

## HEIGHT ADJUSTING DEVICE FOR AUTOMOTIVE SEAT

Susumu Hatta, Akishima, Japan, assignor to Tachi-S Company, Ltd., Tokyo, Japan  
Filed Aug. 3, 1989, Ser. No. 388,881  
Int. Cl.<sup>3</sup> E04G 3/00

U.S. Cl. 248—396

6 Claims



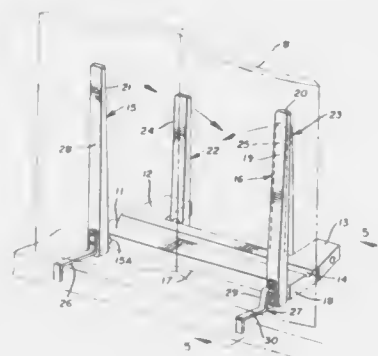
1. A height adjusting device for an automotive seat having a seat frame of the seat mounted therein so as to be adjustable in height, comprising:

- a pair of upstanding brackets erected upon said seat frame;
- a forward height adjusting mechanism adapted for height adjustment of a forward part of said seat frame; said forward height adjusting mechanism being provided with a first non-reversible brake device;
- a rearward height adjusting mechanism adapted for height adjustment of a rearward part of said seat frame; said rearward height adjusting mechanism being provided with a second non-reversible brake device;
- a first sprocket wheel connected with said rearward height adjusting mechanism via said second non-reversible brake device;
- a second sprocket wheel rotatably provided in vicinity of said forward height adjusting mechanism;
- an endless chain extended between said first and second sprocket wheels;
- a first gear provided in a coaxial relation with said second sprocket wheel for simultaneous rotation therewith;
- a second gear connected with said forward height adjusting mechanism via said first non-reversible brake device; and
- a switch-over gear interposed and displaceable between said first and second gears such as to permit selective engagement of said switch-over gear with one of said first and second gears.

4,948,082  
**FOLDABLE BOOK HOLDER**  
Sam Pagano, 1632 Squaw Creek Dr., Girard, Ohio 44420  
Filed Jul. 3, 1989, Ser. No. 375,041  
Int. Cl.<sup>3</sup> A47B 97/00

U.S. Cl. 248—460

7 Claims



1. A foldable book holder to support and hold books in open displayed manner comprises a support base, oppositely disposed leg portions extending from said base, first and second pairs of spaced pivotally attached arms extending from said base, each arm of said pairs has a tapered surface said tapered surfaces of each pair of said arms abutting when said arms are in folded flat position against said base, means for spacing one of said arms in each of said pair in relation to said base at a point of pivotal attachment thereto, a book clip secured to each of said arms in said first pair at said point of pivotal attachment to said base.

4,948,083

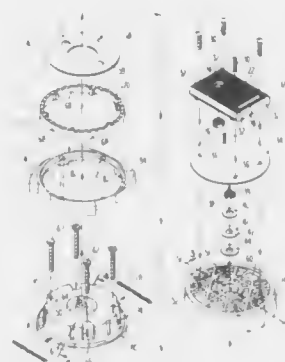
**SWIVEL BASE MOUNT FOR DOWNRIGGER**  
Thomas F. McNaney, Jr., Newtown Square, and Rudolph Effinger, Feasterville, both of Pa., assignors to Penn Fishing and Tackle Mfg. Co., Philadelphia, Pa.

Filed Apr. 17, 1989, Ser. No. 339,088

Int. Cl.<sup>3</sup> F16M 13/00

U.S. Cl. 248—514

20 Claims



1. A swivel base mount for mounting a fishing apparatus on a boat, comprising:

- a swivelable top plate having means for mounting thereon a fishing apparatus;
- a bottom plate having means for attachment to a boat;
- a shaft rotatably connecting the top plate in axial alignment above the bottom plate;
- a first engaging means associated with the top plate and disposed toward the bottom plate;
- a second engaging means associated with the bottom plate

disposed toward and in spaced engageable alignment with the first engaging means; and  
a means for moving one engaging means into engagement with the other engaging means to lock the angle of rotation between the top and bottom plates, and for selectively moving said one engaging means out of engagement with the other engaging means to allow the top plate to swivel in relation to the bottom plate; the means for moving comprising an adjusting ring coaxial with and rotatable around the bottom plate, disposed under and in contact with the second engaging means, and having camming means defined by contacting surfaces of the adjusting ring and the second engaging means for moving the second engaging means into or out of engagement with the first engaging means when the adjusting ring is rotated.

4,948,084

## SELF SEALING CONTAINER

Howard R. Mullin, Atherton, Calif., and Thomas R. Leonard, 947 Calle Los Aceitunos, Camarillo, Calif. 93010, assignors to Thomas R. Leonard, Camarillo, Calif.

Filed Nov. 21, 1985, Ser. No. 800,444

Int. Cl.<sup>3</sup> F16M 13/00

U.S. Cl. 248—523

16 Claims



1. A self sealing container for use in holding a tree erect while supplying said tree with water, the container comprising a blend of ethylene-vinyl acetate and high density polyethylene.

4,948,085

## INTERNAL MIRROR FOR MOTOR VEHICLES

Bernhard Mittelhäuser, Am Krähenberg, 3002 Wedemark 2, Fed. Rep. of Germany

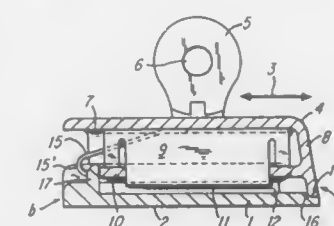
Filed Dec. 15, 1988, Ser. No. 284,914

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 8716620[U]

Int. Cl.<sup>3</sup> B60V 1/02

U.S. Cl. 248—549

10 Claims



1. An internal mirror for a motor vehicle, including a plate that is secured to the vehicle and serves to hold the mirror proper, and also including a detachable part in the form of a mirror base for a mirror housing that accommodates a mirror body, with said mirror base being adapted to be pressed in one direction onto said plate, which for this purpose is provided on

opposite sides with parallel undercuts that extend in the direction in which said base is pressed onto said plate; said mirror further comprises:

- a projection disposed on said plate;
- abutment means provided on said plate remote from said projection thereof, with said abutment means extending in a direction transverse to the direction in which said mirror base is pressed directly onto said plate for vibration-proof mounting thereof; and
- a spring that is connected with and within said mirror base, which is hollow, with said spring having bent edges that engage said undercuts of said plate; said spring is also provided with a tongue that extends in the direction in which said base is pressed onto said plate, with said tongue having a hook-like end which, when said mirror base is mounted directly on said plate, is bent toward said plate and catches against said projection thereof; to be able to release and pull said base off said plate, in a direction opposite to the direction in which said base is pressed onto said plate, said hook-like end of said tongue is capable of being raised from and over said projection of said plate; said mirror base is provided with side walls that extend essentially parallel to the direction in which said base is pressed onto and pulled off said plate, and with one end wall that is provided remote from said hook-like tongue end and extends essentially transverse to said side walls; when said mirror base is mounted directly on said plate, said side walls and said end wall extend toward said plate, with said side walls resting against said plate, and said end wall resting against said abutment means of said plate; said mirror base and said spring both having a predetermined configuration;
- said spring having a crosspiece that is disposed between two side legs on which are provided said bent edges that engage said undercuts of said plate, with said crosspiece of said spring being provided with cutouts to form said tongue;
- said side walls and said one end wall of said mirror base integrally merging into one another, with that end of said base in the region of said hook-like tongue end and remote from said one end wall being open to make said hook-like end accessible; and
- said mirror base being provided with extensions between which said spring is held.

4,948,086

## SUPPORT APPARATUS

Richard Buol, 670 Gregory La., Ste. A102, Pleasant Hill, Calif. 94523, and Jonathan M. Buol, Pleasant Hill, Calif., assignors to Richard Buol, Pleasant Hill, Calif.

Filed Nov. 13, 1989, Ser. No. 436,074

Int. Cl.<sup>3</sup> F16M 11/00

U.S. Cl. 248—676

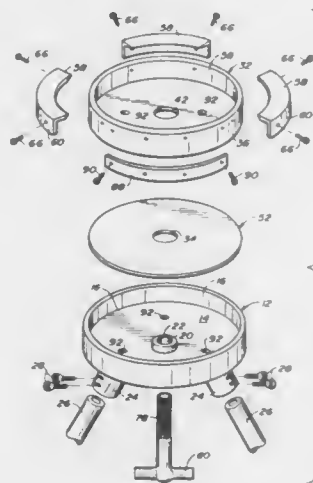
12 Claims

1. Apparatus for supporting equipment such as a baseball pitching machine and for allowing selective rotational movement of said equipment in a pre-determined plane, said equipment including a base, said base having a bottom and an outer peripheral portion and defining a threaded receptacle extending upwardly from said bottom, said apparatus comprising, in combination:

- a first support member having a planar upper surface and a circular-shaped inner peripheral wall extending upwardly from said planar upper surface and defining a first recess therewith, said first support member further defining a first aperture;
- a second support member positioned in said first recess, said second support member having a bottom surface and an outer peripheral wall closely adjacent to said inner peripheral wall, said second support member defining a second recess for receiving said equipment base and a second aperture in at least partial registry with said first aperture;
- a flat lubricator element disposed between said first and second support members having opposed outer surfaces in



engagement with said first support member upper surface and said second support member bottom surface to facilitate relative movement therebetween;



means for attaching said equipment base to said second support member in said second recess; and threaded fastener means extending through said apertures and in engagement with said base threaded receptacle.

4,948,087

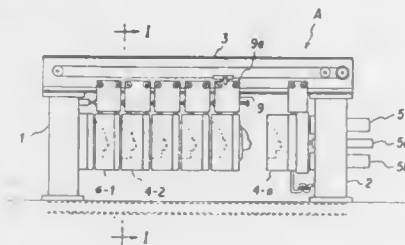
#### APPARATUS FOR PRESSURE MOLDING CERAMIC ARTICLES

Masanobu Hisaeda; Satoru Saitou, and Masahiro Ogata, all of Kitakyushu, Japan, assignors to Toto Ltd., Fukuoka, Japan  
Filed Feb. 21, 1989, Ser. No. 313,101

Claims priority, application Japan, Mar. 2, 1988, 63-49992  
Int. Cl.<sup>5</sup> B28B 1/26

U.S. Cl. 249—113

4 Claims



1. An apparatus for pressure molding ceramic articles comprising:

- a frame structure supporting a hydraulic cylinder at one longitudinal end thereof and including a molding box supporting member at the other longitudinal end thereof, a piston and piston rod being reciprocally mounted in the cylinder,
- a plurality of molding boxes which are mounted in parallel longitudinally on said frame structure, each of the molding boxes having a flat bottom in a horizontal plane, said molding boxes being interposed between the piston rod and said molding box supporting member, each of said molding boxes comprising a core mold and an outer mold on respective sides thereof, said core mold and said outer mold each defining together with, respectively, an outer mold of one adjacent molding box and a core mold of another adjacent molding box, a pair of adjacent split molds, a pressure mold cavity being defined in each of said split molds when closed, each of said cavities having a bottom surface thereof inclined longitudinally and laterally relative to a horizontal plane, each of said each split molds further having a passage for supplying a slip into said pressure mold cavity, said passage communicating

with the lowermost extremity of said bottom surface of said pressure mold cavity, each of said passages passing through the respective split mold and being longitudinally aligned and in communication with the respective passages of the adjacent pair of split molds when the split molds are closed, and

- a plurality of shock-absorbing and mold-separating spring means a respective one of which is disposed between each pair of adjacent mold boxes, whereby, upon generation of a clamping force by said hydraulic cylinder, said clamping force is transmitted to all of said split molds sequentially from the most adjacent split mold to the most remote split mold relative to said hydraulic cylinder by way of said spring means to define said pressure mold cavities and place the passages of the respective split molds into communication with each other, and, upon releasing of said clamping force of said hydraulic cylinder, said clamping force is released from all of said split molds and all the split molds are opened simultaneously by means of the compression force of said springs enabling simultaneous access to ceramic articles molded in all the respective cavities.

4,948,088

#### SHUTTERING APPARATUS

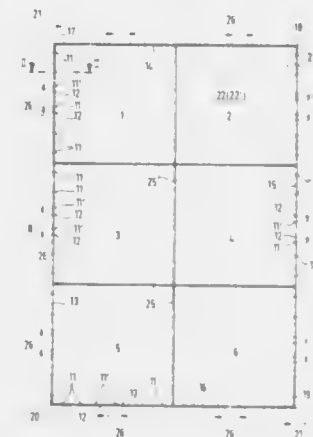
Artur Schwörer, Wullenstetten, Fed. Rep. of Germany, assignor to Peri-Werk Artur Schwoerer GmbH & Co. KG, Weissenhorn, Fed. Rep. of Germany  
Filed Nov. 22, 1988, Ser. No. 274,545

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1987, 3739635

Int. Cl.<sup>5</sup> E04G 9/02

U.S. Cl. 249—196

20 Claims



1. A shuttering panel comprising: a planar wall having a rectangular shape; first, second, third and fourth sidewalls extending around said planar wall; said shuttering panel being divided into a plurality of grid elements having boundary sides with at least some of said boundary sides forming portions of said sidewalls; wherein equispaced points are distributed along each said sidewall and wherein an array of bores having a layout and being formed in said sidewall for each boundary side of a grid element coincident with a sidewall, said array comprising first bores disposed at some, but not all of said equispaced points and second bores disposed at positions displaced relative from at least some of said equispaced points not having first bores thereat, all said arrays of bores being of the same layout and arranged in a continuously repeating sequence around said shuttering panel.

4,948,089

#### CONCRETE MOLD WITH ARRANGEMENT FOR MOUNTING TUBULAR COMPONENTS

Rolf Knödel, Kelkheim; Frithjof Schimpff, Wiesbaden; Wolfgang Bergenthal, Neu-Isenburg/Zeppelinheim, and Thomas Zander, Langen/Hessen, all of Fed. Rep. of Germany, assignors to Wayss & Freytag Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
PCT No. PCT/EP87/00487, § 371 Date Jun. 27, 1988, § 102(e)  
Date Jun. 27, 1988, PCT Pub. No. WO88/02049, PCT Pub. Date Mar. 24, 1988

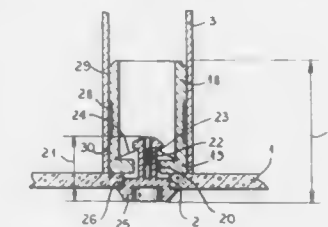
PCT Filed Aug. 27, 1987, Ser. No. 192,282

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629030

Int. Cl.<sup>5</sup> B28B 23/00

U.S. Cl. 249—86

6 Claims



1. In An apparatus for making a switch tie from prestressed concrete, said apparatus comprising: wall means defining a mold cavity and including at least one wall provided with bores; a nipple received in at least one of said bores and anchored therein, said nipple having a pair of axially spaced stop collars separated by a shank narrower than said collars, one of said collars being braced against a first surface of said at least one wall opposite a second surface thereof bounding said cavity; a hollow pin receiving said nipple and anchored thereby to said wall, said pin being detachable from said nipple and having an inwardly extending formation retained in place by the other of said stop collars; and resilient means between said other of said stop collars and said pin for urging said one of said collars against said first surface, said pin being received in a tubular element adapted to be embedded in the concrete so that said tubular element surrounds and hugs said pin and is retained thereby in said cavity.

4,948,090

#### INDUCTION TYPE AUTOMATIC-CONTROLLED FLUID FAUCET

Chge-San Chen, No. 45, Sec. 4, Tzu Chiang Rd, Shan Chung City, Taipei Hsien, Taiwan

Filed Sep. 27, 1989, Ser. No. 413,226

Int. Cl.<sup>5</sup> F16K 31/06

U.S. Cl. 251—30.03

5 Claims

1. In an induction type automatically controlled fluid faucet having a valve body including a fluid inlet port, a fluid outlet port, a valve chamber interposed between said inlet port and said outlet port, a valve in said valve chamber for controlling flow from said inlet port to said outlet port, said valve having a valve seat and a valve member extending across said valve seat and dividing said valve chamber into an inlet side and an outlet side, said valve member being movable into and out of engagement with said valve seat to prevent and to permit flow between said inlet port and said outlet port, said valve member having a control port therein communicating between said inlet side and said outlet side of said valve chamber, and a valve stem mounted in said inlet side of said valve chamber for reciprocation into and out of engagement with said control port of said valve member, said valve member being moved by fluid pressure within said inlet side of said valve chamber into

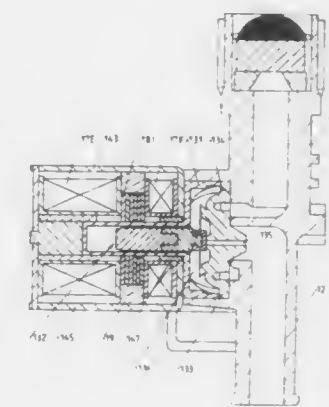
engagement with said valve seat when said valve stem is moved into engagement with said control port;

improved means for controlling the reciprocal movement of said valve stem, wherein:

said valve stem comprises an elongated body having one end composed of magnetic material and the other end thereof composed of non-magnetic material, said valve stem body being mounted in said valve chamber with said non-magnetic end adjacent said control port of said valve member for axial reciprocation into and out of engagement with said control port;

a first permanent magnet assembly having a central bore therein, said first magnet assembly being mounted with said central bore thereof coaxially aligned with the path of reciprocation of said valve stem body and adjacent said magnetic end of valve stem body when said non-magnetic end of said valve stem body is in engagement with said control port;

a first electromagnetic solenoid mounted coaxially along the path of reciprocation of said valve stem body near the end of said path remote from said control port, said magnetic end of said valve stem body extending partially within said first solenoid when said valve stem body is at said end of said path;



- a second permanent magnet extending axially into said first solenoid from the end thereof opposite the end of entry of said valve stem body into said first solenoid; and current control means connected to the winding of said first solenoid and adapted to apply a first momentary electric current to said winding of said first solenoid in a first direction to cause said first solenoid to generate a magnetic field attracting said valve stem body to enter said first solenoid and moving said non-magnetic end of said valve stem body out of engagement with said control port, said control current means being further adapted to apply a second momentary electric current to said winding of said first solenoid in a direction opposite to said first direction to cause said first solenoid to generate a magnetic field repelling said valve stem body away from said first solenoid and moving said non-magnetic end of said valve stem body into engagement with said control port, said valve stem body being held within said first solenoid by said second permanent magnet after the end of said first current, said non-magnetic end of said valve stem body being held in engagement with said control port by the action of said first permanent magnet on said magnetic end of said valve stem body after the end of said second current.

4,948,091

## MOTOR-OPERATED VALVE

Ikumi Satoh; Jun Nakano; Riichiro Harada; Tatsuhiko Koba, all of Iruma; Yuichi Fujita, Ichikawa, and Kazumi Shima, Sakura, all of Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka and Toyo Engineering Corporation, Tokyo, both of Japan

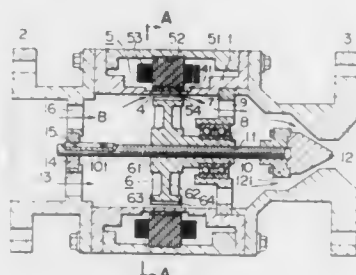
Filed Feb. 16, 1990, Ser. No. 481,049

Claims priority, application Japan, Feb. 17, 1989, 1-39125; Dec. 22, 1989, 1-33890

Int. Cl. F16K 31/08

U.S. Cl. 251—65

17 Claims



1. A motor-operated valve comprising a stator provided outside of a nonmagnetic tubular member, with stator coils concentratedly wound around a plurality of magnetic poles and a plurality of permanent magnets secured to an arcuate surface of each magnetic pole, said permanent magnets being magnetized into a number of pole-pairs arranged at a constant pitch, a rotor rotatably supported in said tubular member, said rotor comprising an outer annular portion, a rim portion and a boss portion, a number of induction teeth being formed along the circumference of said outer annular portion at a pitch equal to the pitch of the pole-pairs of the permanent magnets such that the total number of said teeth is selected to be different from the total number of the pole-pairs of the permanent magnets by an amount equal to an even number, a threaded valve operating shaft securing a valve member at an end engaging to said rotor, and a mechanism including a rotation-preventing means provided in said valve with said rotor for converting the rotating movement of said rotor into a linear movement moving a valve member provided at an end of an operating shaft.

4,948,092

## COMBINED CHECK VALVE AND FLUID PRESSURE RELIEF VALVE

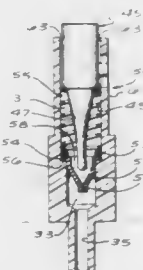
Thomas A. Kasper, Agoura Hills; William G. Lucas, Los Angeles, and Gus A. Singas, Newbury Park, all of Calif., assignors to Royce Medical Company, Westlake Village, Calif.

Filed Mar. 7, 1990, Ser. No. 489,965

Int. Cl. F16K 15/18, 15/20

U.S. Cl. 251—82

20 Claims



1. A combined check valve and fluid pressure relief valve assembly comprising:  
a valve body having a passage therethrough;

said valve body being constructed of a molded piece of substantially rigid material;

said valve body having a first cylindrical bore extending from an inlet port opening of the valve to a second cylindrical bore and the second cylindrical bore extending to an outlet port opening of the valve;

said second bore having a cross-sectional area less than said first bore;

said valve body having a substantially "J"-shaped groove extending from said inlet port opening;

a duckbill valve, molded from a single piece of resilient material in a generally cylindrical hollow shape, having a pair of lips disposed in a converging relationship and adjacent to each other, side walls interconnecting the lips and defining an open end facing said inlet port, and an outwardly extending flange located around said open end; a cylindrical relief valve actuator loosely mounted within said valve body, said actuator having a substantially wide diameter outer end extending outwardly from said valve body for actuation by a user's finger;

said valve actuator tapering downward to form a stem, with a reduced diameter at the end of said valve actuator in an axial direction, passing through a coil compression spring member and extending proximate to the lips of said duckbill valve, and including a guide and retention knob member on said actuator interfitted with different sections of said "J"-shaped groove for assembling and securing said valve actuator within said valve body;

said compression coil spring member mounted between said actuator and said duckbill valve within said valve body and biasing said actuator away from said duckbill valve, with said retention knob member in said "J"-shaped groove guiding said actuator;

said valve assembly including means for opening said duckbill valve by the end of said actuator when said actuator is depressed by a user's finger to permit fluid to escape past said actuator; and

pressurizing means being removably mounted to said valve body and extending over the inlet port, said J-shaped groove and said knob, for applying fluid pressure to said inlet port around said actuator and opening the lips of said duckbill valve for fluid flow from said pressurizing means through said duckbill valve without actuating said valve.

4,948,093

## SOLENOID VALVE

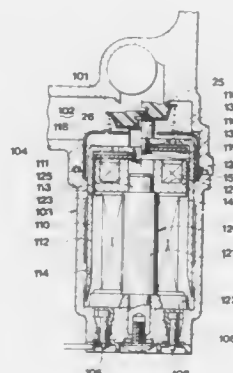
Toshimitsu Sugawara, Hanamaki; Takeshi Iinuma, Iwate, and Tadashi Suzuki, Morioka, all of Japan, assignors to Toboku Mikuni Kogyo Kabushiki Kaisha, Iwate, Japan

Filed Oct. 4, 1989, Ser. No. 417,081

Int. Cl. F16K 31/06

U.S. Cl. 251—129.15

11 Claims



1. A solenoid valve comprising:  
a valve body for opening and closing a passage;

a housing;  
a plunger movably housed in said housing and connected to said valve body to move said valve body to open and close said passage, said plunger being cup-shaped and having a bottom wall and a cylindrical side wall;  
a core located in said plunger and provided with a first solenoid, said core and said cylindrical side wall forming a first magnetic path;  
a support member connected to said core and positioned near to said bottom wall, said support member being provided with a second solenoid to which a lower electric current is applied than is applied to said first solenoid;  
a contact member located in said plunger and connected to said plunger and able to be inclined relative to said bottom wall, said contact member being able to come into tight contact with said support member, and said contact member and said support member forming a second magnetic path; and  
a spacer provided between said plunger and said contact member to form a space therebetween.

4,948,094

## OUTLET VALVES

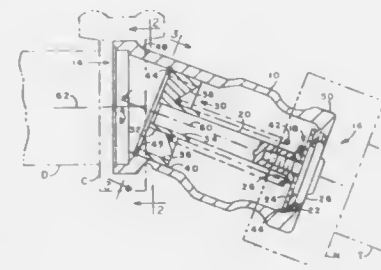
Richard L. Fahl, Fairfield, Ohio, assignor to Dover Corporation, New York, N.Y.

Filed Aug. 9, 1989, Ser. No. 392,084

Int. Cl. F16K 1/00

U.S. Cl. 251—149.6

5 Claims



1. An outlet valve adapted for attachment to a tote tank having an outlet conduit comprising  
a unitary housing defining a fluid flow path therethrough said fluid flow path having an inlet end and an outlet end and a valve seat adjacent the outlet end of the fluid flow path, the inlet end of the fluid flow path being at an inlet end of said housing and the outlet end of the fluid flow path being at an outlet end of said housing,  
a poppet assembly disposed within said housing and having sealing means adapted to sealingly engage said valve seat, said poppet assembly further having a central stem extending from said sealing means towards said inlet end,  
a bridge member having a central hub in which said stem is slidably mounted,  
said bridge member further comprising an outer rim slidably received by said bore and a plurality of spokes interconnecting the rim and hub,  
spring means acting between said bridge member and said sealing means for urging said sealing means to a closed position in which it is in sealing engagement with said valve seat,  
said housing having a central bore defining the fluid flow path at its inlet end, said bridge member being slidably received in said bore from the inlet end of the fluid flow path,  
said inlet end of the housing having a connector flange which facilitates attachment of the valve to the outlet conduit of a tote tank,  
said outlet end of the housing having a coupling flange which facilitates attachment of a dry disconnect coupler to the valve,  
releasable means for holding said bridge member in said bore

in a position in which the spring means maintains said sealing means in its closed position,  
said releasable means comprising  
a groove formed in said bore and  
a snap ring removably inserted in said groove, said snap ring projecting inwardly of the bore and being engaged by said rim to position the bridge member against the action of said spring means,  
whereby, upon release of said holding means, the internal components of the valve may be removed for cleaning thereof, as well as to enable cleaning of the flow path defining surface of the housing.

4,948,095

## SHUT-OFF VALVE

Daniel N. Campau, Grand Rapids, Mich., assignor to Flow-Rite Controls, Ltd., Grand Rapids, Mich.

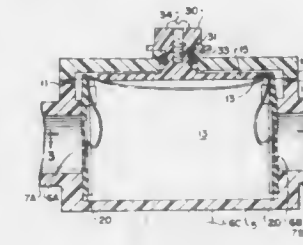
Continuation of Ser. No. 195,810, May 19, 1988, abandoned.

This application Apr. 26, 1989, Ser. No. 344,000

Int. Cl. F16K 5/04

U.S. Cl. 251—180

9 Claims



1. A shut-off valve for use in a low pressure fluid system, comprising:  
a hollow body defining an interior chamber and having a top, a bottom and a cylindrical sidewall with at least two ports; and  
valve means for selectively permitting or preventing flow through said chamber, said valve means comprising a rotatable member adapted to carry thin, curved elastomeric flaps and cantilevered leaf springs for urging said flaps into sealing contact with said sidewall to thereby close said ports; and  
stops attached to said body top for limiting the rotation of said rotatable member.

4,948,096

## VALVE STEM AND GASKET WITH IMPROVED CLEANING CAPABILITY

Darold S. Alderman, Watertown, Wis., assignor to AMCA International Corporation, Charlotte, N.C.

Filed Nov. 13, 1989, Ser. No. 435,119

Int. Cl. F16K 1/46

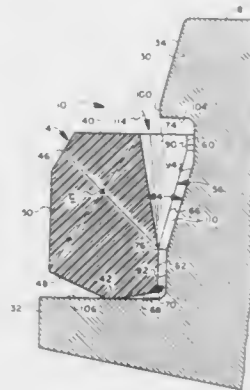
U.S. Cl. 251—357

25 Claims

1. A valve stem and gasket assembly, comprising:  
a valve stem having a body having an inner end for connection to an actuator and an opposed outer end portion having a free end;  
a first, smaller flange carried on said body adjacent the outer end, having an outer peripheral wall and a spaced apart second, larger flange also carried on said body, between said first flange and said body inner end;  
an annular gasket carried on said body, between said first and second flanges, said gasket made of a resilient material and having a bore wall defining a central opening so as to be mountable on said valve stem by passing the first flange through the central opening thereof with the gasket there-



upon being held captive between said first and second flanges;  
said first flange having an outer periphery for contacting said gasket bore wall during mounting of said gasket on said valve stem, said outer periphery being formed so as to converge toward said body outer end;  
at least a portion of said gasket bore wall extending between first, outer and second, inner continuous annular faces of



said gasket disposed adjacent said first and second flanges when said gasket is mounted on said valve stem;  
said gasket bore wall converging toward said outer face of said gasket, with said outer face abutting said outer flange when said gasket is mounted on said valve stem; and  
said gasket inner and outer faces spaced apart by a distance less than the spacing between said valve stem inner and outer flanges so as to allow movement of said gasket between said inner and outer flanges.

4,948,097

#### METHOD AND APPARATUS FOR INSTALLING TRANSMISSION LINES

Michael H. Reeve, and Stephen A. Cassidy, both of Ipswich, England, assignors to British Telecommunications public limited company, London, England

Continuation-in-part of Ser. No. 848,950, Apr. 7, 1986, Pat. No. 4,691,896, which is a continuation of Ser. No. 551,640, Nov. 8, 1983, abandoned. This application Aug. 19, 1987, Ser. No. 86,849

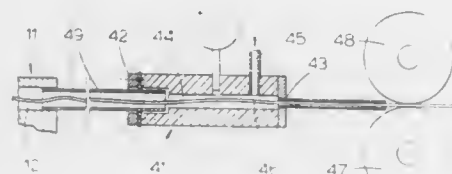
Claims priority, application United Kingdom, Nov. 8, 1982, 8231840; Aug. 4, 1983, 8309671

The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B65A 59/00

U.S. Cl. 254-134.4

19 Claims



1. A method of installing a lightweight and flexible transmission line into and along a length of previously installed tubular pathway between first and second ends of the pathway, said method comprising the steps of:

injecting a gaseous medium within said pathway toward said second end at a flow velocity substantially higher than the rate at which said transmission line is to be advanced therealong;

inserting a free end of said transmission line into said pathway; and  
propelling said transmission line through said tubular pathway by continuing said injecting step so as to produce viscous drag forces distributed along the advancing length of the transmission line then disposed within the pathway while the transmission line advances at a velocity substantially less than the gaseous flow velocity until said free end of the transmission line reaches said second end of pathway.

4,948,098

#### CHAIN HOIST

Yosaku Nishimura, Osaka, Japan, assignor to Vital Kogyo Kabushiki Kaisha, Osaka, Japan

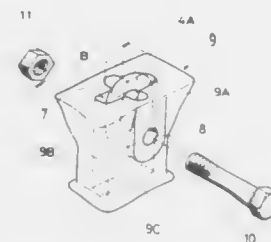
Filed Feb. 7, 1990, Ser. No. 476,617

Claims priority, application Japan, Dec. 14, 1987, 62-190444[U]

Int. Cl.<sup>5</sup> F16G 15/00

U.S. Cl. 254-372

2 Claims



1. A lever-operated chain hoist in which a cargo chain wheel is pivoted in a main body frame formed of a pair of side plates having a spacing between the side plates to receive the chain wheel therebetween, the chain wheel being rotated by a lever device and a link chain being wound on the cargo chain wheel to be wound up or let off and having a load end and a free end, comprising:

a slip-out preventing member linked to the free end portion of the link chain;

the slip-out preventing chain member being a monoblock casting metal block excelling in impact resistance having an upper end face formed as a planiform surface of greater width than the spacing between said side plates forming the main body frame;

the metal block having a slot opening through the middle portion of said upper end face for inserting an endmost link of the link chain therein;

a stopping bolt;

a bolt insertion hole extending through the metal block for inserting the stopping bolt therein;

the slot receiving the endmost link at said free end of the link chain in inserted relation therein, and said stopping bolt being inserted into a side portion of said metal block through said insertion hole and through said endmost link to secure said free end of the link chain thereto;

a nut for securing said bolt in said metal block; and  
the metal block having a middle portion defining a grip portion narrower transversely than said upper end face and a slide-preventive protrusion in a hoist portion thereof.

4,948,099

#### COVER FOR A POST MADE OUT OF BOX SECTION FOR ENCLOSURES ESPECIALLY THOSE MADE OUT OF WOVEN FENCING

Werner Brand, Hagen; Gerhard Rohr, Schwerte; Heinz Werner, Warstein, and Holger Schwarzfeller, Düsseldorf-Eller, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Dortmund; Schwarzfeller Draht + Zaun GmbH, Düsseldorf, both of, Fed. Rep. of Germany and Zaun GmbH, Düsseldorf, both of, Fed. Rep. of Germany

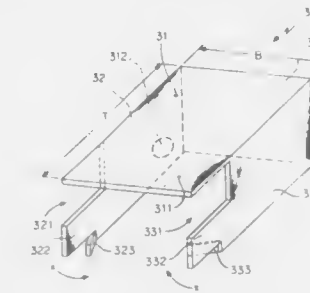
Filed Apr. 4, 1989, Ser. No. 333,110

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815348

Int. Cl.<sup>5</sup> B21F 27/00

U.S. Cl. 256-47

8 Claims



1. A cap with a cover for covering a post having an axis and a rectangular-shaped cross-section with a width and depth for holding woven fencing having longitudinal rods, comprising: a sheet metal blank forming said cap; said cover being a component of said sheet metal blank and being securable to said post; said cover having a width equal to the width of said post and having a depth greater than the depth of the post; said cap having an excess portion extending beyond the depth of the post with cut-outs along a section of an edge adjacent to the post; sections connected to said cover and having free ends adjacent to said cut-outs; said free ends of said sections having jogs extending from said cover along the axis of the post and matching cross-sections of said longitudinal rods in said fencing; said sections having excess portions with slits to form webs extending to bases of said excess portions.

4,948,100

#### STAIR RAIL FOR TODDLERS

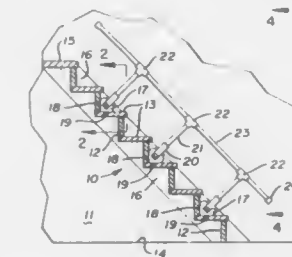
Larry L. Stevens, P.O. Box 137, Williamsfield, Ohio 44093

Filed Oct. 23, 1989, Ser. No. 424,929

Int. Cl.<sup>5</sup> E04H 17/14

U.S. Cl. 256-65

6 Claims



1. A mounting device for use in mounting a hand rail on a stairway having at least one stair rail and plurality of alternate tread and riser sections, the ends of said tread and riser sections engaging said stair rail, said mounting device comprising: a heart-shaped mounting plate having a peripheral edge with right angular surface positioned against a pair of said alternate tread and riser sections with said mounting plate engaging said

stair rail, a fastener positioned through an aperture in said heart-shaped mounting plate inwardly of said peripheral edge for securing said mounting plate to said stair rail, an angularly disposed tubular socket on said heart-shaped mounting plate so that a post for supporting said hand rail can be positioned in said tubular socket on said heart-shaped mounting plate.

4,948,101

#### APPARATUS FOR MAKING DIVERGENT CUTS CHAMFERED RELATIVE TO A CUTTING SURFACE BY MEANS OF TORCH CUTTING

Leo Larikka, Takkatie 7a, 00370 Helsinki, Finland

PCT No. PCT/FI87/00161, § 371 Date May 26, 1989, § 102(e)

Date May 26, 1989, PCT Pub. No. WO88/04212, PCT Pub. Date Jun. 16, 1988

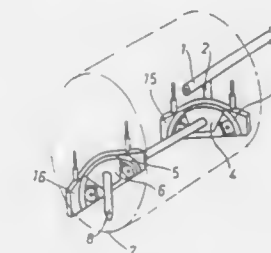
PCT Filed Dec. 7, 1987, Ser. No. 360,895

Claims priority, application Finland, Dec. 8, 1986, 864980

Int. Cl.<sup>5</sup> B23K 7/04

U.S. Cl. 266-55

6 Claims



1. An apparatus for making divergent cuts chamfered relative to a cutting surface by means of torch cutting in the internal cutting of cylindrical sheets, said apparatus comprising a torch (8) mounted on a fastening arm (2) at the end of a carrier arm (1), said carrier arm (1) being adapted to be axially movable and rotatable around its axis, wherein the fastening arm (2) at the end of the carrier arm (1) is fitted with a transverse support arc (3) provided with an element (4) movable along an arcuate path and fitted with a longitudinal support arc (5), the latter being provided with a mounting plate (6) for torch (8), said mounting plate being movable along an arcuate path, whereby the radii of the arcuate paths of support arcs (3, 5) are equal and their centers are equally distant from each other.

4,948,102

#### METHOD OF PREPARING HIGH-PURITY METAL AND ROTARY COOLING MEMBER FOR USE IN APPARATUS THEREFOR

Ryotatsu Otsuka; Shigemi Tanimoto, and Kazuo Toyoda, all of Sakai, Japan, assignors to Showa Aluminum Corporation, Osaka, Japan

Division of Ser. No. 137,213, Dec. 22, 1987, Pat. No. 4,854,968.

This application Oct. 20, 1988, Ser. No. 260,092

Claims priority, application Japan, Dec. 25, 1986, 61-313247; Dec. 25, 1986, 61-313248; Dec. 25, 1986, 61-313249

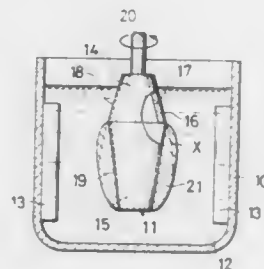
Int. Cl.<sup>5</sup> C22B 9/02

U.S. Cl. 266-205

1 Claim

1. A hollow rotary cooling member for use in an apparatus for preparing a high-purity metal by immersing the cooling member in a molten metal containing eutectic impurities and rotating the cooling member while supplying a cooling fluid to the interior of the cooling member, whereby the high-purity metal as purified is caused to crystallize out on the peripheral surface of the cooling member at a portion thereof present under the surface of the molten metal, the portion present under the molten metal surface having an upper part providing a non-deposition area, wherein at least one of the inner and outer surfaces of the peripheral wall thereof is covered with a

heat insulating material, and a lower part providing a high-purity metal deposition area, the non-deposition area having a

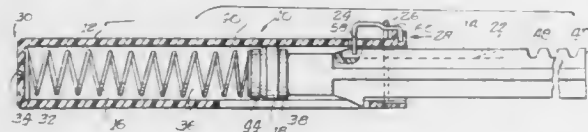


portion flaring outwardly and downwardly and the deposition area having a portion tapering downwardly and inwardly.

4,948,103

**SPRING-LOADED DAMPENING ACTUATOR**  
Patrick J. Bowden, Peotone, Ill., and Beryl S. Doyle, Howell, Mich., assignors to Illinois Tool Works, Inc., Chicago, Ill.  
Filed Jan. 30, 1989, Ser. No. 303,825

Int. Cl.<sup>3</sup> B60G 11/56; E05F 3/00; F16F 9/50, 11/00  
U.S. Cl. 267—34 17 Claims



1. A spring-loaded dampening actuator, comprising:
  - a cylindrically-shaped body member comprising a chamber, an open front end, and an endwall having a vent hole;
  - a piston rod disposed within said body member so as to project partially outwardly from said chamber of said body member through said open front end of said body member, said piston rod having a front end and a rear end, said piston rod having a circular plate formed integrally adjacent said front end of said piston rod, a cylindrically-shaped connecting member extending longitudinally axially from said circular plate, and a disc formed integrally with said connecting member and being disposed parallel to said plate in an axially spaced apart relationship;
  - sealing means disposed around said connecting member of said piston rod and sandwiched between said circular plate and said disc;
  - a compressed coil spring disposed within said chamber of said body member and extending between said endwall of said body member and said disc of said piston rod so as to tend to bias said piston rod outwardly of said chamber of said body member;
  - said sealing means having an outer peripheral portion thereof engaging an inner peripheral sidewall portion of said body member only when a biasing force is applied to said piston rod by said coil spring so as to move said piston rod in a first direction out of said chamber of said body member at a controlled rate of speed; and
  - said sealing means being provided with an annular groove, defined between said outer peripheral portion thereof and an inner peripheral portion thereof which surrounds said connecting member of said piston rod, which imparts a predetermined amount of radial flexibility to said sealing means so as to permit said outer peripheral portion thereof to be disengaged from said inner peripheral sidewall portion of said body member, when said piston rod is moved in a second direction, opposite to said first direction, into said chamber of said body member, as a result of radially inward compression of said outer peripheral portion of said sealing means so that air trapped within said chamber of said body member is allowed to escape through said

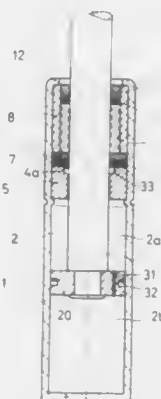
vent hole and only between said outer peripheral portion of said sealing means and said inner peripheral sidewall portion of said body member at the axial location defined within said chamber of said body member within the vicinity of said sealing means of said piston rod, thereby facilitating a quick contraction of said actuator at an undampened higher rate of speed.

4,948,104  
GAS SPRING

Winfried Wirges, Koblenz, Fed. Rep. of Germany, assignor to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany  
Filed May 17, 1989, Ser. No. 352,558

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 8806642

Int. Cl.<sup>3</sup> F16F 9/36  
U.S. Cl. 267—64.11 21 Claims



1. A method of assembling a gas spring, said gas spring comprising a cylinder member (1) having an axis and defining a cavity therein, and further comprising a piston rod (3) axially extending through at least one end of said cylinder member (1), said piston rod member (3) extending through a piston rod guiding and sealing group (5, 4, 7, 8, 9, 10) adjacent to said at least one end of said cylinder member (1), said piston rod guiding and sealing group (5, 4, 7, 8, 9, 10) including two axially spaced sealing arrangements (4, 5, 7; 9, 10), namely an axially outer sealing arrangement (9, 10) and an axially inner sealing arrangement (4, 5, 7) axially fixed with respect to said cylinder member (2), said sealing arrangements (4, 5, 7; 9, 10) being in sliding contact with an external surface of said piston rod member (3), a lubricant chamber (11) being provided axially between said two sealing arrangements (9, 10; 4, 5, 7) adjacent to said external surface of said piston rod member (3), said lubricant chamber (11) containing a lubricant agent, a working chamber (2) being provided within said cavity adjacent to said axially inner sealing arrangement (4, 5, 7), said working chamber (2) containing a volume of pressurized gas, said axially inner sealing arrangement (4, 5, 7) being a pressure-resistant sealing arrangement capable of maintaining the pressure of said volume of pressurized gas at a level exceeding the pressure within said lubricant chamber (11), said piston rod member (3) being connected with a piston unit (20) inside said cavity, said method comprising the following steps:
  - (a) inserting said piston rod member (3) with said piston unit (20) into said cavity;
  - (b) inserting said axially inner sealing arrangement (4, 5, 7) into said cavity and axially fixing said axially inner sealing arrangement (4, 5, 7) with respect to the said cylinder member (1) against axial movement thereof by inserting a support sleeve (8) along the inner wall sur-

- face of said cylinder member (1) and providing abutment means (12) adjacent the axially outer end of said cylinder member (1) abutting against the axially outer end of said support sleeve (8), said abutment means (12) being free of overlapping with the inner cross-sectional area of said support sleeve (8);
- (c) introducing a gas into said working chamber (2) across said axially inner sealing arrangement (4, 5, 7) such as to provide said volume of pressurized gas within said working chamber (2);
- (d) introducing said lubricant agent into said lubricant chamber (11);
- (e) closing said lubricant chamber (11) by said axially outer sealing arrangement (9, 10) by inserting a sealing member (9) into said support sleeve (8) and thereupon inserting an annular closure member (10) into said support sleeve (8), such that said sealing member (9) is free of axial abutment against said support sleeve (8) in the axial inward direction and is supported in the axial outward direction by said closure member (10).

4,948,105

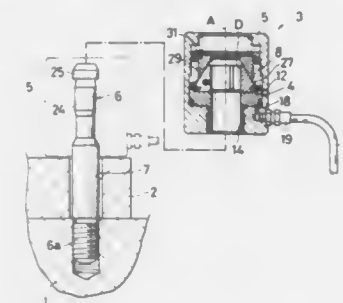
HYDRAULIC CLAMP

Keitaro Yonezawa, Amagasaki, Japan, assignor to Kabushiki Kaisha Kosmek, Hyogoken, Japan

Filed Nov. 1, 1988, Ser. No. 265,224

Claims priority, application Japan, Nov. 9, 1987, 62-282665; Dec. 28, 1987, 62-335141; Jan. 25, 1988, 63-8768; Feb. 2, 1988, 63-13155

Int. Cl.<sup>3</sup> B23Q 3/02  
U.S. Cl. 269—32 10 Claims



1. A hydraulic clamp including a hydraulic cylinder, comprising:
  - a clamping actuating oil chamber, a piston and a clamping means arranged in order between a first end of a cylinder body of said hydraulic cylinder and a second end thereof; said clamping means being constructed so that at least a clamping means output portion, provided at the second end side, can be shifted expansively and contractively between an advanced clamping position and a retracted unclamping position at predetermined different distances from an axis of the hydraulic cylinder, the clamping means being adapted to be displaceable between an unclamped position and a clamped position along the axis of the hydraulic cylinder in the advance position, said clamping means being adapted to be urged to the retracted position by a means for retracting the same and to be pushed to the advanced position by a cam member having a slant surface for advancing the clamping means, an allowable stroke of said piston within the cylinder body being not less than a value obtained by the sum of a clamping actuation lift distance for clamp actuation and a clamping means advancing lift distance for advancing the clamping means, said clamping means being further adapted to be advanced by the cam member from the retracted position to the advanced position under a clamping means advancing actuation condition upon the piston being actuated from the first end side of the cylinder body to the second end

side thereof through the clamping means advancing lift distance, and said clamping means being also adapted to be pushed from the unclamped position to the clamped position by a piston output portion moving together with the piston under the clamping actuation condition upon the piston being actuated toward the second end side of the cylinder through the clamping actuation lift distance at the second end side beyond the clamping means advancing lift distance.

4,948,106

FOOD CUTTING APPARATUS

Ronald Popell, and Alan Backus, both of Los Angeles, Calif., assignors to Popell Industries, Inc., Beverly Hills, Calif.

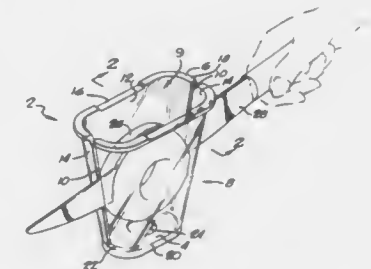
Continuation of Ser. No. 906,594, Sep. 9, 1986, Pat. No. 4,807,862, which is a continuation-in-part of Ser. No. 848,631, Apr. 4, 1986, abandoned. This application Aug. 24, 1988, Ser. No. 236,025

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> B26D 7/02

U.S. Cl. 269—87.2

3 Claims



1. An apparatus for cutting an article of food comprising a base, a lip and a chamber defined by walls extending between said base and said lip for holding an article of food, a pair of slots disposed in said walls being adapted to receive a cutting utensil, an aperture disposed in said base adapted to allow insertion of an implement into said chamber in order to remove an article of food from said chamber, and a protective plate element removably disposed in said chamber and extending parallel to the plane of said base in order to protect said base from a cutting utensil.

4,948,107

PNEUMATIC LIFT JACK

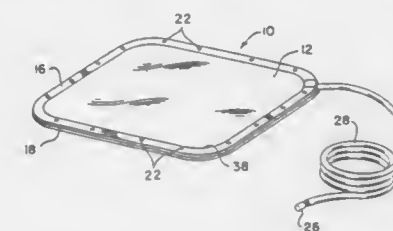
Roy L. Orndorff, Jr., Kent, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 770,460, Aug. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 714,766, Mar. 22, 1985, abandoned. This application Sep. 18, 1989, Ser. No. 408,820

Int. Cl.<sup>3</sup> B66F 3/24

U.S. Cl. 254—93 HP

3 Claims



1. A pneumatic jack consisting of a pair of flat separate



sheets with each sheet having separate peripheral edges, said sheets made of an elastomeric material, rigid framing means encompassing the entire peripheral edges of said sheets which include the entire periphery of said sheets, each of said sheets on being encompassed by said framing means around the entire periphery of said sheets to provide each of said sheets with separate exterior surfaces and an interior surfaces, said rigid framing means joins said flat sheets into a unitary whole, valve means in communication with said interior surfaces of said pair of sheets whereby a source of fluid is operative to inflate said jack to an enlarged shape, said framing means includes a pair of spaced framing members that are coextensive with said entire peripheral edges of said sheets but disposed on said exterior surfaces of said sheets to provide said spacing of said framing members, and said sheets and said framing members are generally polygonal in plan configuration with arcuate corners, said framing members being positioned on said sheets and coupled together for tilting as a unitary whole to permit said framing members to contact the ground to resist rolling of said pneumatic jack.

4,948,108

## CIRCUIT BOARD SUPPORT DEVICE

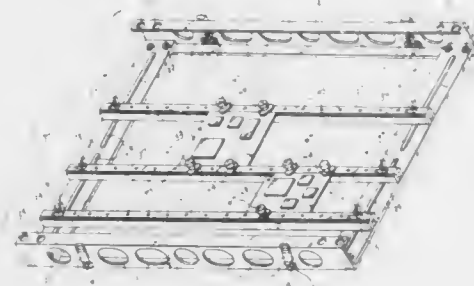
Harold M. Sullivan, Ontario, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed May 23, 1988, Ser. No. 197,229

Int. Cl.<sup>5</sup> B25B 1/20

U.S. Cl. 269—903

4 Claims



## 1. A circuit board support device, comprising:

side support means for providing vertical clearance and support having a series of apertures to facilitate handling and permit increased ventilation therethrough; said side support means further comprises a pair of elongate C shaped channels, having a top surface, a bottom surface and a side surface, said side surface having a multiplicity of apertures therethrough to permit increased ventilation, said bottom surface having a pair of bolt apertures at each end of said elongate C shaped channel to facilitate bolted attachment of said cross support means, said top surface having a pair of bolt head clearance apertures at each end of said elongate C shaped channel to facilitate placement of a circuit board support device atop another circuit board support device;

cross support means, attached to said side support means, for rigidly joining said side support means; wherein said cross support means further comprise a pair of coplanar cross supports, each having a pair of elongate colinear slots near their center, and each having a pair of bolt apertures at each end to facilitate rigid attachment to said elongate C shaped channel;

circuit board support means, supported by said cross support means, for providing a raised level of support; wherein said circuit board support means further comprises a multiplicity of U shaped channel members having a pair of sides and a base surface adjustable attachable to said pair of said elongate coplanar cross supports, said U shaped

channel members having a series of internally threaded apertures along said base surface; circuit board fastening means, supported by said circuit board support means, for rigidly fastening a circuit board to said circuit board support means; wherein said circuit board fastening means further comprises a multiplicity of thumb bolts, each screwable securing a wing clamp into said internally threaded apertures of said U shaped channel members; and

a circuit board secured to said U shaped channel member by said thumb bolt and said wing clamp.

4,948,109

## METHOD AND SYSTEM OF ASSEMBLING AND ADDRESSING INDIVIDUALIZED COMPOSITE PRINTED PRODUCTS

Godber Petersen, Augsburg, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Feb. 8, 1989, Ser. No. 308,411

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805915

Int. Cl.<sup>5</sup> B41F 13/54

U.S. Cl. 270—1.1

20 Claims



## 1. Method of assembling and addressing individualized composite printed products (119), particularly newspapers, magazines or the like, individually selected inserts or sections, having

means (101, 103) for retaining a plurality, each, of different inserts or sections (100, 102); and a computer-controller (5, 112),

said method comprising, in accordance with the invention, the step of

receiving, from a product mixing and storage means (104), under control of the computer-controller (112), selected ones of the inserts or sections (100, 102) from said retaining means (101, 103) to generate intermediate products (115); wherein

the computer-controller (112) controls the selection of the respective inserts or sections (101, 102) in accordance with stored data identifying receiver addresses and specific inserts or sections to be delivered to specific receiver addresses to generate said intermediate products associated with said specific addresses;

coding, by coding means (105), the intermediate products (115) with a receiver address distribution sequence code, representative of predetermined sequences or patterns of receiver addresses for delivery of the products to the receiver addresses in accordance with the predetermined receiver address sequence or pattern;

retaining the intermediate products (115) in an intermediate product retaining means (106, 117);

merging each of said intermediate products (115) with identical common product sections (118) received from a common product delivery means (108) while retaining said predetermined sequence or pattern of the receiver addresses, to obtain said composite printed product (119); and

addressing the composite printed product (119) by applying a delivery address to the composite printed product in accordance with receiver addressed in said predetermined sequence or pattern as represented by the coding of the intermediate products.

4,948,110

## TRANSFERRING-OUT FACILITY

Helmut Singer, Bad Essen, Fed. Rep. of Germany, assignor to Kolbus GmbH & Co. KG, Rahden, Fed. Rep. of Germany

Continuation of Ser. No. 210,394, Jun. 23, 1988, abandoned.

This application Nov. 22, 1989, Ser. No. 440,663

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1987, 3721391

Int. Cl.<sup>5</sup> B65H 39/02

U.S. Cl. 270—58

20 Claims



1. A transferring-out facility for guiding printed sheets from the transport channel of a collating machine, said sheets bearing against an edge guide as they are transported forward in the transport channel by means of pusher dogs on an inclined transport surface, wherein a plurality of clamping systems are arranged at equal distances from one another, on axes perpendicular to the collating machine transport surface, the clamping systems being drivable by a chain drive in a manner such that the clamping systems execute an orbiting movement in synchronism with the collating machine pusher dogs and such that the clamping systems can be moved into the path on which the printed sheets are moving, the said clamping systems in part extending through the collating machine transport surface,

each of the clamping systems being formed by a leading clamping device and a trailing clamping device, each of said clamping devices comprising an upper clamping plunger and a lower clamping plunger which cooperate as a spring biased pair in order to clamp the printed sheets, one clamping device acting on the printed sheet in the region of the leading edge, and the other clamping device acting on the printed sheet in the region of the trailing edge thereof, the regions of contact of the clamping devices with the printed sheet defining a line parallel to the lengthwise edge of the printed sheet, the said clamping devices being positioned relative to the pusher dog in a manner such that the trailing clamping device contacts the printed sheet in front in the direction of sheet movement of the pusher dog which is causing motion of the sheet, the chain drive defining a first track segment which runs parallel to the path of motion of the pusher dogs, this first track segment being contiguous with a second track segment which diverges from the path of motion of the pusher dogs while following the inclined transport surface, the inclined transport surface having an aperture which corresponds to the path followed by the clamping devices,

through which aperture the lower clamping plunger extend, and within which aperture the lower clamping plungers move in the course of their orbiting movement, means for normally holding the upper clamping plungers clear of the surfaces of the printed sheets, first control means for permitting the upper clamping plungers to be lowered onto the printed sheets in synchronism with continuously moving pusher dogs under the influence of the spring biasing,

and second control means for causing the upper clamping plungers to be raised in the region of the second track segment thus releasing the printed sheets.

4,948,111

## METHOD AND APPARATUS FOR INCORPORATING BACKING BOARDS IN THE PRINTED PAPER STACK OF A PRINTING PRESS

Elmer R. Thomsen, 1021 NE. 135th Ave., Portland, Oreg. 97230

Filed Oct. 11, 1988, Ser. No. 255,244

Int. Cl.<sup>5</sup> B65H 43/00

U.S. Cl. 270—59

31 Claims



1. The method of incorporating a plurality of backing boards into a stack of printed paper sheets as the stack is formed at the outfeed end of a printing press, wherein the printing press delivers blank paper sheets one at a time to a printing station and then the printed paper sheets are delivered one at a time from the printing station to a stacking station at the outfeed end of the press to form a stack from the opposite direction and wherein the backing boards are delivered to the stack one at a time from the outfeed end of a board inserter, the method comprising placing a barrier at the outfeed end of the board inserter to prevent printed sheets from the printing press from entering the outfeed end of the board inserter during delivery of printed sheets to the stack at the stacking station, and then after the last sheet of each group of a predetermined number of sheets has been deposited at the stacking station simultaneously removing said barrier and stopping the delivery of a next succeeding paper sheet to the stack momentarily while a backing board is delivered from the outfeed end of the board inserter to the stack at the stacking station of the printing press.

4,948,112

## FOLDING MACHINE IN A ROTARY PRESS

Manabu Sato; Kazutoshi Nomi; Yasuo Morita, and Yukikazu Shoji, all of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,968

Claims priority, application Japan, Nov. 11, 1987, 62-284766

Int. Cl.<sup>5</sup> B65H 39/08

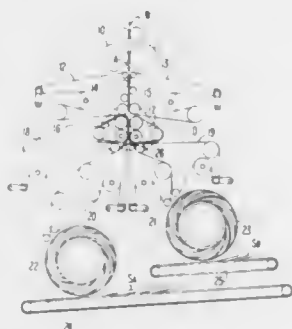
U.S. Cl. 270—60

6 Claims

1. A distributing device for feeding sheets in succession in a sheet feed direction and distributing the successively fed sheets in directions different from said sheet feed direction, said device comprising:

conveying means for feeding sheets in the sheet feed direc-

tion, said conveying means comprising a first pair of coacting endless conveyor belts;  
 a distributor section including a pair of coacting endless distributor belts disposed downstream of said first pair with respect to the sheet feed direction for receiving sheets fed by said conveying means and for feeding the received sheets in a central sheet feed direction, and a triangular guide disposed at a downstream side of a said pair of coacting endless distributor belts with respect to said central sheet feed direction, said triangular guide having a pair of guide surfaces intersecting at an apex of said triangular guide from guiding therealong respective ones of sheets discharged from said pair of coacting distributor belts,  
 said distributor belts having respective uneven portions defined along the lengths thereof and which uneven por-



tions are in meshing engagement with one another, each of the uneven portions being a thick portion of a respective said distributor belt and a thin portion of the respective said distributor belt which is thinner than said thick portion wherein the thick portion of one of said distributor belts coacts with the thin portion of the other of said distributor belts while the thin portion of said one of said distributor belts coacts with the thick portion of said other of said distributor belts; and  
 two second pairs of coacting endless belts disposed downstream of said distributor section with respect to the direction in which sheets are guided by the guide surfaces of said triangular guide, each of said second pairs of coacting endless belts being associated with a respective one of the guide surfaces of said triangular guide for distributing sheets which have been guided therealong in a respective direction of distribution.

4,948,113

## LIGHTTIGHT FILM-DELIVERY BOX

Steven R. Lippold, Oakfield, and Matthew M. Branca, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 31, 1989, Ser. No. 304,085

The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.

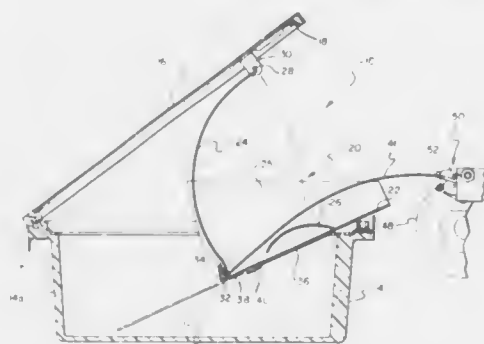
Int. Cl.<sup>5</sup> B65H 7/00

U.S. Cl. 271—8.1

10 Claims

1. In a lighttight box for delivering a photosensitive sheet to a workstation, the improvement comprising:
  - (a) said box having a major surface movable between a first closed lighttight position and a second box-opening position;
  - (b) an internal tray arranged for carrying a photosensitive sheet with a forwardly facing peripheral edge extending beyond and raised relative to a corresponding edge of said tray; and
  - (c) a linkage, coupling said movable major surface and said tray, responsive to movement of said major surface from its closed position to its box-opening position, for pushing said tray, respectively, from an initial position wherein the

photosensitive sheet is internal to said box to a final sheet-delivery position wherein the photosensitive sheet is ex-



ternal to said box for delivering the forwardly facing edge of the sheet to a workstation in advance of and raised relative to a corresponding edge of said tray.

4,948,114

## METHOD AND APPARATUS FOR HANDLING LEAVES OF SHEET MATERIAL

Kenneth A. Bowman, and John D. Rolfe, both of Bristol, England, assignors to DRG (UK) Limited, Avon, England

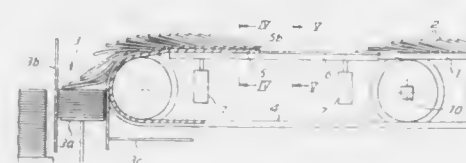
Filed Nov. 18, 1988, Ser. No. 272,856

Claims priority, application European Pat. Off., Nov. 19, 1987, 87117064.3

Int. Cl.<sup>5</sup> B65H 29/18

U.S. Cl. 271—202

18 Claims



1. Apparatus for handling leaves of sheet material, said apparatus comprising conveyor means for transporting successive leaves to the delivery end thereof; at least one take-along mechanism comprising a rotatable take-along belt with at least one engagement region, which is guided adjacent a conveying region of the conveyor means, for engaging leaves on a length of the conveyor means and for causing said leaves to be moved with a different velocity from that of the conveyor means so as to separate said leaves from succeeding leaves; and displacement means for displacing said engagement region transverse to the direction of movement thereof so as to engage said leaves.

4,948,115

## APPARATUS FOR DISPENSING A PRESELECTED MIX OF PAPER CURRENCY OR THE LIKE

Fredric W. Burger, Cherry Hill, N.J., assignor to Brandt, Inc., Bensalem, Pa.

Filed Aug. 29, 1988, Ser. No. 238,032

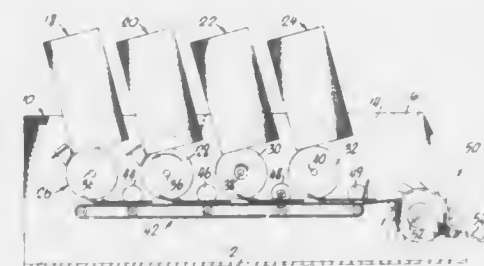
Int. Cl.<sup>5</sup> B65H 5/02

U.S. Cl. 271—273

16 Claims

1. Apparatus for feeding sheets along a predetermined path including in combination:
  - a housing,
  - an elongated assembly in said housing for feeding sheets along said path in the direction of the length of said assembly from one end to the other end thereof,
  - an opening in said housing adjacent to one of the longitudinal edges of said assembly,

said assembly comprising upper idler means,  
 means mounting said upper idler means in a fixed position in said housing,  
 lower conveyor means,  
 means for driving said lower conveyor means,  
 means mounting said lower conveyor means for pivotal movement around an axis extending in the direction of the



length of said assembly between an operative position at which it cooperates with said idler means to feed documents along said path and an inoperative position remote from said idler means at which said path is accessible through said opening and releasable means for normally retaining said lower conveyor means in said operative position.

4,948,116

## IMPACT-ABSORBING SAFETY MATTING SYSTEM FOR A CHILDREN'S PLAY MAT

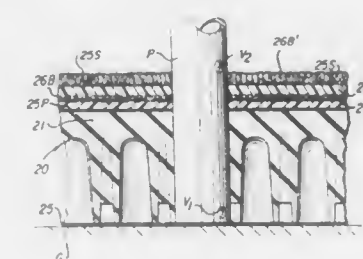
Thomas M. Vaux, 437 Tenth Ave. W., Kirkland, Wash. 98033  
 Division of Ser. No. 152,817, Feb. 5, 1988, Pat. No. 4,846,457, which is a continuation-in-part of Ser. No. 767,718, Apr. 23, 1986, Pat. No. 4,727,697, which is a continuation of Ser. No. 364,811, Apr. 2, 1982, abandoned. This application Jul. 10, 1989, Ser. No. 377,188

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A47G 9/06

U.S. Cl. 272—3

15 Claims



1. A children's play mat, for placement on a base, comprising:
  - a surface layer having a bottom and outer edges;
  - an array of air-filled cells affixed to the bottom of the surface layer;
  - rib means, extending from the bottom of the surface layer, for defining the array of air-filled cells;
  - sealer and aggregate spread over the surface layer and the base immediate to edges of the children's play mat;
  - a plurality of median rib means, extending a shorter distance from the bottom of the surface layer than the defining rib means, for giving added support against a strong blow striking the surface layer and the array of air-filled cells affixed thereto; and
  - at least one void area means, arranged in place of at least one

of the plurality of median rib means, for facilitating cutting of the children's play mat through the surface layer.

4,948,117

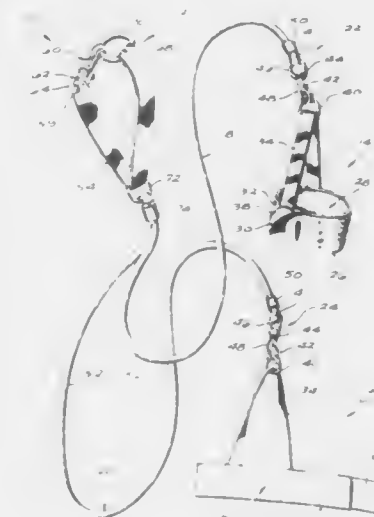
## SWIM BAND

Douglas L. Burke, 133 Syracuse Walk, Long Beach, Calif. 90803  
 Filed Feb. 21, 1989, Ser. No. 312,688

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272—71

19 Claims



1. An apparatus for in-place swimming whereby a swimmer is tethered to a stationary point located adjacent to a swimming area, the apparatus comprising:

- a first harness removably attachable to the swimmer at a first location on one lower extremity of the swimmer, wherein the first harness comprises first belt means adapted to be releasably secured around the swimmer at the first location, the first belt means having a first flexible strap attached thereto and supporting a first ring-like member;
- a second harness removably attachable to the swimmer at a second location on the other lower extremity of the swimmer, wherein the second harness comprises second belt means adapted to be releasably secured around the swimmer at the second location, the second belt means having a second flexible strap attached thereto and supporting a second ring-like member;
- means for anchoring the apparatus to the stationary point located adjacent to the swimming area;
- a first elongated elastic band having attached at an end thereof a first clasp for detachably engaging the first harness, wherein the first clasp comprises a first hook-like member in releasable engagement with the first ring-like member, the first hook-like member being attached to a base portion of a third ring-like member, the third ring-like member provided means for joining the first clasp to the first elastic band;
- a second elongated elastic band having attached at an end thereof a second clasp for detachably engaging the second harness, wherein the second clasp comprises a second hook-like member in releasable engagement with the second ring-like member, the second hook-like member being attached to a base portion of a fourth ring-like member, the fourth ring-like member providing means for joining the second clasp to the second elastic band; and
- means for connecting the first and second elastic bands to the anchoring means.



**4,948,118**  
**SUPPORT APPARATUS FOR WATER EXERCISE AND THERAPY**

Louis Miraglia, W. 308 Cleveland, Spokane, Wash. 99205  
Filed Nov. 18, 1988, Ser. No. 273,095  
Int. Cl.<sup>5</sup> A63B 31/00

U.S. Cl. 272-71

6 Claims



1. Apparatus for supporting a user in a pool of water comprising

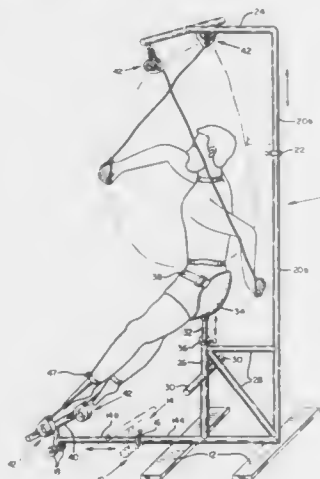
- a lineal rail mounted above the pool of water, said rail having an underside and track means adapted to support wheels thereon;
- a trolley having wheels and operatively associated with said rail whereby the wheels of said trolley are supported and guided by said track means of said rail;
- support means having one end thereof connected to said trolley and the other end adapted to receive and support a user so that lineal movement by the user in the pool of water along the line of said rail results in lineal movement of said trolley along said rail as the user is supported in the pool of water;
- brake means having a brake arm rotably mounted to said trolley and a brake pad fixed to said brake arm which contacts the underside of the rail when said brake means is applied, thereby braking said trolley.

**4,948,119**  
**SWIMMING MOTION EXERCISE MACHINE**  
Richard T. Robertson, Jr., 1210 N.W. 19th Ave., Portland, Oreg. 97209

Filed Mar. 30, 1987, Ser. No. 31,756  
Int. Cl.<sup>5</sup> A63B 69/10

U.S. Cl. 272-71

13 Claims



1. An exercise device comprising:

- seat means for supporting a user in a generally vertical orientation and, while supporting the user in said orientation, permitting the user's arms to move in a rotary pattern about the shoulders and the user's legs to move in an

oscillatory pattern about the hips while depending downwardly from the hips;

- means for yieldably imposing resistance to the movement of the user's arms when the user is supported by said seat means in said orientation and said arms are moved in a rotary pattern about the shoulders; and

- means for yieldably imposing resistance to the movement of the user's legs when the user is supported in said orientation by said seat means and said legs are moved in an oscillatory pattern about the hips while depending downwardly from the hips.

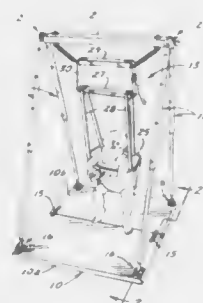
**4,948,120**  
**PORTABLE, SELF-SUPPORTING, BABY CARRIER APPARATUS**

Deborah Krueger, 6504 Oak Hollow La., Charlotte, N.C. 28212, and Damon Snyder, 2081 Edgewater Ct., Lexington, Ky. 40502

Filed Jun. 20, 1989, Ser. No. 369,067  
Int. Cl.<sup>5</sup> A63G 9/00

U.S. Cl. 272-85

16 Claims



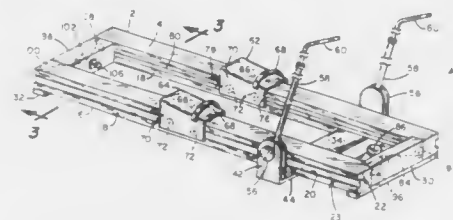
1. A portable baby carrier apparatus having enhanced stability and being easily collapsible for storage comprising a base comprising a plurality of panels hingedly interconnected for movement between an extended, open position and a folded, collapsed, storage position, a support frame carried by the base and comprising a headbar and a plurality of support legs, each leg having an upper end portion connected to the headbar and a lower end portion connected to the base so that when the base is collapsed from its extended, open position to its folded, collapsed, storage position, the frame will collapse into a compact storage position, and baby carrier means suspended from the headbar.

**4,948,121**  
**EXERCISE MACHINE**  
Gary R. Haaheim, Chaska; Paul M. Theisen, Shakopee, and Karl N. Ketter, Roseville, all of Minn., assignors to Fitness Master, Inc., Chanhassen, Minn.

Continuation of Ser. No. 245,366, Sep. 16, 1988, abandoned. This application Mar. 3, 1989, Ser. No. 318,533  
Int. Cl.<sup>5</sup> A63B 69/18

U.S. Cl. 272-97

18 Claims



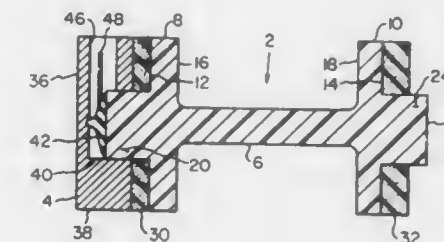
1. An improved adjustable exercise machine, comprising:

**4,948,123**  
**QUICK RELEASE DUMBBELL AND BARBELL EXERCISE EQUIPMENT**

Michael N. Schook, 121 Lycoming Dr., Coraopolis, Pa. 15108  
Filed Dec. 18, 1989, Ser. No. 451,887  
Int. Cl.<sup>5</sup> A63B 21/075

U.S. Cl. 272-123

20 Claims



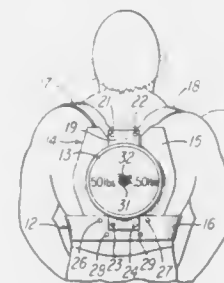
- a frame assembly having two elongate parallel rails each having at least one sidewall with an elongate groove with an elongate recess therein forming a sidewall track and a bottom with an elongate groove with an elongate recess therein forming a bottom track;
- a pair of opposing arm pole mechanisms adjustably attached to the bottom track elongate groove to permit transverse and longitudinal adjustment of the mechanisms with respect to the rails; and,
- a pair of foot skates with at least one roller attached to each skate and said at least one roller of each skate securely and moveably mounted in one of the sidewall tracks.

**4,948,122**  
**ATHLETIC WEIGHT HARNESS**  
Darren L. Andrews, Sr., 2165 Malvern Ave., Dayton, Ohio 45406

Filed Jul. 24, 1989, Ser. No. 383,415  
Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-119

11 Claims



1. An athletic weight harness to be worn on the torso of a bodybuilder, the harness comprising:

- a belt;
- a torso-protecting shield, the lower part of which is firmly secured to the belt and the upper part of which extends upwardly therefrom, whereby the shield covers a central part of one surface of the thorax of a user and extends horizontally on both sides of the median plane of the thorax, the shield comprising a main member and a rigid plate joined to the main member and extending substantially the entire vertical dimension of the central portion of the shield;

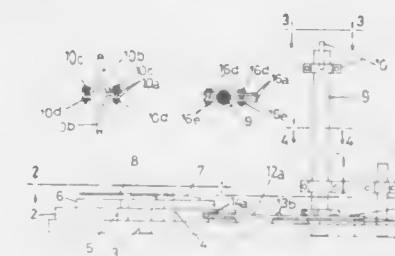
- first and second side straps having upper ends attached to the upper part of the shield at first and second locations, respectively, laterally spaced from the median plane of the bodybuilder to fit over the shoulders of the bodybuilder, the shoulder straps having ends attached to the belt at third and fourth locations, respectively, laterally spaced from the median plane of the bodybuilder, the effective lengths of the shoulder straps being adjustable to allow the harness to fit bodybuilders having thoraxes of different sizes; and

- a weight-supporting post rigidly attached to the plate along a line substantially midway between the sides of the shield, the post being located, vertically, in the central region of the shield and projecting outwardly therefrom, the diameter of the post being small enough to accommodate the central opening of a standard, annular disk and large enough to provide controlled support of the disk weight.

**4,948,124**  
**EXERCISE MACHINE AND TOY**  
Azmy W. Ghaly, 2122, 24, Av. S., Mpls., Minn. 55406  
Filed Aug. 7, 1989, Ser. No. 390,112  
Int. Cl.<sup>5</sup> A63B 21/015, 22/14, 22/20

U.S. Cl. 272-132

6 Claims

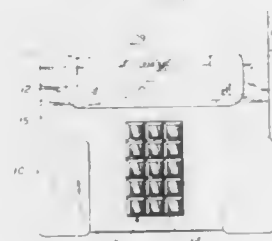


1. An exercise machine comprising:

- a base board, said base board having in its top surface first, second and third spaced pivot apertures, said second aperture being between said first and third apertures;
- a primary pivot pin mounted in said first pivot aperture;
- a disc centrally mounted on said primary pivot pin, said disc having separate means for retaining each foot of the user, and said disc further having secondary pivot pins on each side of said primary pivot pin;
- a pivot shaft mounted in said second pivot aperture;
- a cross bar attached to and extending from opposite sides of

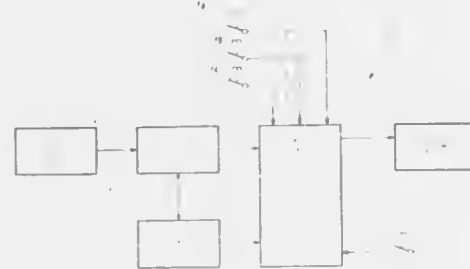
said pivot shaft, the opposite ends of said cross bar having pivot pins;  
 a pair of linkage members, each linkage member connecting a pivot pin on said cross bar to a respective secondary pivot pin on said disc;  
 a handle assembly mounted on said shaft above the plane of the disc a sufficient distance for the user to stand on the disc and grasp the handle assembly;  
 a post mounted in said third aperture; and  
 a clamping assembly connecting said pivot shaft with said post, said clamping assembly being adjustably tightenable about said pivot shaft such that the frictional resistance to rotation of the pivot shaft may be adjusted, whereby a user may stand on said disc and rotate the handle against the frictional resistance of the clamping assembly such that rotation of the handle causes rotation of the disc.

**4,948,125**  
**ELECTRONIC SCOREKEEPER FOR DICE GAME**  
 Robert J. Mayes, 701 Grattan, Stockton, Calif. 95205  
 Continuation-in-part of Ser. No. 174,704, Mar. 29, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 404,121  
 Int. Cl.<sup>5</sup> A63B 67/00  
 U.S. Cl. 273-1 ES 6 Claims



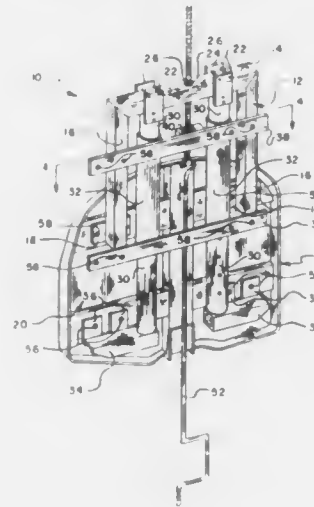
1. A two person poker dice game scorekeeping device for recording as an individual round the winner of any single roll of dice, and for counting as a game event, the winner of two out of three sequential rolls of dice, said device comprising:  
 a. exterior switch activation means manually operable by each player, for scoring an individual round won by either player, mounted on a casing module;  
 b. illuminating light means for each player for the recording of an individual round won;  
 c. digital display means for each player for recording as a single game event the winner of two out of three consecutive rounds;  
 d. computerized logic circuitry means comprising in combination:  
 I. clock subsystem means consisting of a plurality of synchronized D-type flip flops in respective logic High and Low states, each connected to their respective NAND and AND gates whereby input from said switch activating means causes said flip flops to change logic states and to pass a signal through their respective logic gates to the respective illuminating light means or digital display means;  
 II. switch clearing D-type flip flops and logic gate means in, switch activation with said clock subsystem means, whereby one of said light means is activated upon activation of an exterior switch activation means upon the winning of a single roll of dice, and further whereby any and all light means so lit are extinguished upon activation of any one exterior switch two out of three sequential times of exterior switch activation, and still further when any lit light means are extinguished the digital display means connected to the exterior switch which has been activated two out of three consecutive times, counts one unit for the winner of that event.

**4,948,126**  
**EVENT ADJUDICATOR AND INTERFACE**  
 Malcolm J. Drummond, 10 Purkiss St., Cannington, Australia 6107  
 PCT No. PCT/AU86/00168, § 371 Date Feb. 10, 1987, § 102(e) Date Feb. 10, 1987, PCT Pub. No. WO86/07277, PCT Pub. Date Dec. 18, 1986  
 PCT Filed Jun. 11, 1986, Ser. No. 23,808  
 Claims priority, application Australia, Jun. 13, 1985, PH1017  
 Int. Cl.<sup>5</sup> A63F 9/22  
 U.S. Cl. 273-1 GC 7 Claims



1. An event adjudicator for adjudicating which event of a plurality of local and remote events occurred first, such as in a television quiz program, the event adjudicator comprising:  
 (a) a first event registering means having a plurality of switches disposed to be actuated by participants to register the local events;  
 (b) at least one second event registering means for registering the remote events and having:  
 (i) an optical type sensor means arranged to be detachably attached to a television screen of a television unit to detect changes in the luminance of a portion thereof associated with the remote events;  
 (ii) a pulse detector connected to the sensor means to detect changes in the luminance of said portion, the pulse details having at an output an active signal when the sensor means detected high luminance;  
 (iii) a missing pulse detector connected to the pulse detector, the missing pulse detector having at an output an active signal when the sensor means detects low luminance for a continuous period of time greater than half the period of the field rate of the television unit, the missing pulse detector being connected to the pulse detector to reset same upon such detection of low luminance;  
 (c) an adjudicator means having:  
 (i) an edge triggered flip flop having a plurality of inputs and outputs in equal numbers, one of said inputs being connected to the output of the pulse detector of the corresponding one of the or each second event registering means to adjudicate the or each remote event;  
 (ii) a plurality of filter means connected between said switches and the remainder of said inputs to AC couple said inputs to convert the registered local events into short duration electrical signal to adjudicate said local events and  
 (iii) a logic gate connected to at least said outputs corresponding to said switches, the logic gate being connected to inhibit the edge triggered flip flop upon the occurrence of one of the local events; and  
 d. a display means connected to each of the said outputs to indicate when said outputs become active.

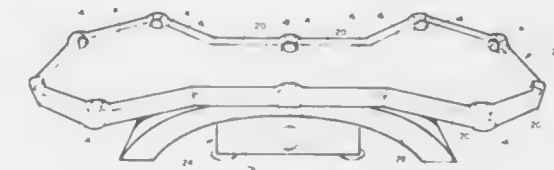
**4,948,127**  
**HEIGHT ADJUSTABLE BASKETBALL BACKBOARD MOUNTING ASSEMBLY**  
 Mark Willard, 13320 33rd Ave. N., Plymouth, Minn. 55441  
 Filed Mar. 9, 1988, Ser. No. 165,925  
 Int. Cl.<sup>5</sup> A63B 63/08  
 U.S. Cl. 273-1.5 R 8 Claims



1. An adjustable backboard mounting assembly to which a basketball backboard having a hoop and a lower edge may be mounted, said adjustable backboard mounting assembly being mountable to a support frame positioned adjacent a basketball court such that said hoop is elevated at a height above said court, said backboard mounting assembly comprising:  
 a pair of laterally spaced apart fixed generally vertical first glide members;  
 a bracket member for attaching said first glide members to the support frame comprising a vertically spaced pair of horizontal bars, each being connected to both first glide members;  
 a pair of laterally spaced apart movable generally vertical second glide members, each second glide member being mounted for slideable movement relative to one of said first glide members, each said second glide member having a length and being oriented generally parallel to said first glide member to which said second glide member is connected;  
 a frame member comprising a first horizontal cross member disposed above and spanning across the top of and connected to both said second glide members and extending laterally beyond said second glide members at each end and slidable therewith relative to the first glide members, and a vertical support member depending generally vertically downward from each end of the horizontal cross member, said horizontal cross member, both vertical support members and both pairs of said glide members lying in a common plane;  
 adjustment means for moving said frame member and said second glide members relative to the first glide members, said adjustment means being connected between said horizontal cross member and said bracket member and permitting the frame member to be selectively moved in a vertical direction upwardly away from the court and downwardly toward the court;  
 mounting means for mounting the backboard to said mounting assembly such that the first and the second glide members do not extend substantially below the lower edge of the backboard when the frame member is moved upwardly away from the court, and such that said mounting means does not interfere with or obstruct the vertical movement of the second glide member over the entire length of the second glide member, comprising mounting

tabs secured to the lower ends of said vertical members and said second pair of glide members;  
 whereby the adjustment means may be used to selectively move the frame member and second glide members up or down relative to the first glide members and the support member, thereby selectively raising or lowering the height of the hoop relative to the court.

**4,948,128**  
**POKER POOL TABLE**  
 George B. Emery, II, 4435 Osprey St., San Diego, Calif. 92107;  
 George B. Emery, III, 31561 Tablerock Dr., South Laguna, and Charles Conner, 23732 Hillcrest Dr., Laguna Niguel, both of Calif. 92677  
 Filed Jan. 13, 1989, Ser. No. 296,625  
 Int. Cl.<sup>5</sup> A63B 71/00  
 U.S. Cl. 273-11 R 7 Claims



1. A pool table comprising:  
 a horizontally oriented table top having a predetermined perimeter configuration;  
 a plurality of pool ball pockets positioned around the perimeter of said table top;  
 bumper rails positioned around the perimeter of said table top, said bumper rails extending between each successive pair of pool ball pockets;  
 a ball return storage unit;  
 ball return means connecting said pool ball pockets in said ball return units;  
 a first set of pool balls each having its own electronic name tag, each said electronic name tag being an iron oxide mixture having specific weight different from the other and being placed in each said interior of the pool ball; and  
 said ball return means comprising an electronic reader system for identifying each pool ball passing through said system.

**4,948,129**  
**APPARATUS FOR ENTRAPPING ERRANT TENNIS BALLS**  
 Joseph A. Bartasius, 3713 Valley Park Way, Lake Worth, Fla. 33467  
 Continuation-in-part of Ser. No. 300,589, Jan. 23, 1989, Pat. No. 4,895,366. This application Sep. 25, 1989, Ser. No. 412,119  
 Int. Cl.<sup>5</sup> A63B 61/00  
 U.S. Cl. 273-29 B 8 Claims

1. An entrapment apparatus for regulation tennis balls comprising:  
 (A) a vertical ball confining structure bordering a playing field, said structure comprising a ball-repulsing surface facing said field,  
 (B) a longitudinal meshwork spaced from said surface and suspended on the side thereof of said field,  
 (1) said meshwork comprising a plurality of interconnected horizontal and vertical strands,  
 (2) said strands defining openings large enough to permit passage of one of said balls, and  
 (3) said meshworks comprising upper and lower horizontal edges thereof,  
 (C) a plurality of flexible barrier strips comprising upper and lower horizontal edges thereof,  
 (1) said strips being positioned between said meshwork and said wall,



- (2) said strips being impervious to the passage there-through of a tennis ball, and  
 (3) the upper edge of each of said strips being fastened lengthwise to one of said horizontal strands and the lower edges of said strips hanging free to a position blocking a horizontal plurality of said openings,

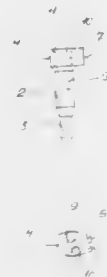


**4,948,131**  
**VIBRATION DAMPENING RACKET**  
 Motoyasu Nakanishi, Fujishi, Japan, assignor to Kabushiki Kaisha Sigel, Tokyo, Japan  
 Filed May 15, 1989, Ser. No. 354,460  
 Claims priority, application Japan, May 14, 1988, 63-117980  
 Int. Cl.<sup>5</sup> A63B 49/00, 53/14  
 U.S. Cl. 273—73 R 25 Claims



- (D) supporting means projecting from an elevated portion of said structure, and  
 (E) means fastening said upper edge to said supporting means whereby balls will be allowed to pass through said meshwork and will rebound from said wall and will be deflected downwardly by said strips and come to rest on a surface between said meshwork and said wall.

**4,948,130**  
**GOLF TEE**  
 Sten A. O. Rydberg, Klövhultsvägen 21, 343 00 Almhult, Sweden  
 Filed Aug. 12, 1988, Ser. No. 231,529  
 Claims priority, application Sweden, Aug. 12, 1987, 8703130  
 Int. Cl.<sup>5</sup> A63B 57/00  
 U.S. Cl. 273—33 8 Claims



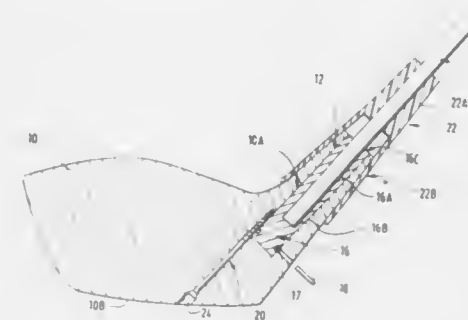
1. A device for supporting a golf ball on a substrate such as the tee area of a golf course, said device having a shaft for penetrating the substrate, a head disposed on one end of the shaft and provided with a support surface for receiving and supporting a ball, said head having a first planar surface thereon, said head having means including external connection members for repeated engaging and disengaging corresponding external connection members on another substantially identical device to interconnect two substantially identical devices in parallel with each other, said external connection members being located on said first planar surface, each of said connection members having a groove and a projection having a shape that fits into a groove on a substantially identical device.

1. A racket for playing tennis or similar ball games comprising  
 (a) a frame which has an annular ball hitting part and a bar type stem part having two ends, one end attached to said ball hitting part and the other end having a grip part thereon,  
 (b) a net which is extended across said ball hitting part,  
 (c) a hole which is provided on a straight bar part between said grip part and said ball hitting part of the stem part of said frame and which is open at least at its one end,  
 (d) at least one cover which is attached to the opening of said hole, and  
 (e) a vibration absorbing member which is accommodated in said hole,  
 wherein said vibration absorbing member comprises at least one buffer layer of a gel material which is fixed to be deformable in said hole, and at least one mass member for weighing said racket which is supported by said buffer layer so that said mass member does not come in contact with the internal surfaces of said hole and cover.

**4,948,132**  
**GOLF CLUB**  
 Norman W. Wharton, Nunnery Lodge, Euston Road, Thetford, Norfolk IP24 2QB, United Kingdom  
 Continuation of Ser. No. 70,077, Jul. 6, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 310,475  
 Claims priority, application United Kingdom, Nov. 6, 1986, 8626524; Jan. 23, 1987, 8701488  
 Int. Cl.<sup>5</sup> A63B 53/02  
 U.S. Cl. 273—80.1 13 Claims

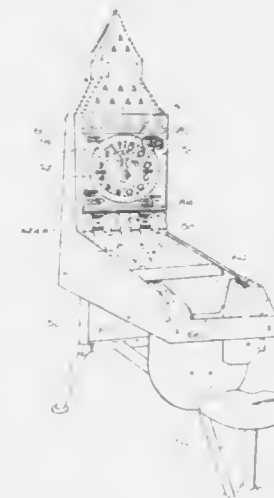
1. A golf club comprising a club head, a shaft assembly, the shaft assembly having a generally cylindrical lower end portion mounted in a round bore defined in said club head, wherein a major portion of the shaft assembly defines a first longitudinal axis and the lower end portion defines a second longitudinal axis which is inclined with respect to the first longitudinal axis such that the orientation of the head with respect to the first longitudinal axis is dependent on the rotational position of the shaft assembly with respect to the head, first means operable for securing said club head and shaft assembly temporarily in any relative orientation, and second means operable for securing said club head and shaft assembly permanently in a selected relative orientation, said shaft assembly comprising a shaft having a grip at one end thereof and a bush secured to the shaft at the other end thereof, the bush alone defining the second longitudinal axis, said bush including

a sleeve having a longitudinal bore housing said other end of the shaft and said bush having an outer surface engaging said



bore in the head, the outer surface defining an axis which is inclined with respect to the axis of the bore in the sleeve.

**4,948,133**  
**MACHINES FOR GAMING, AMUSEMENT, EDUCATION AND THE LIKE**  
 Arthur E. Helm, Southport, and Stuart J. Keane, Leeds, both of England, assignors to Elton Fabrications Limited, Merseyside, England  
 Continuation-in-part of Ser. No. 119,339, Nov. 10, 1987, abandoned. This application Jun. 8, 1989, Ser. No. 362,928  
 Claims priority, application United Kingdom, Nov. 12, 1986, 8627053  
 Int. Cl.<sup>5</sup> A63F 7/06  
 U.S. Cl. 273—85 G 6 Claims



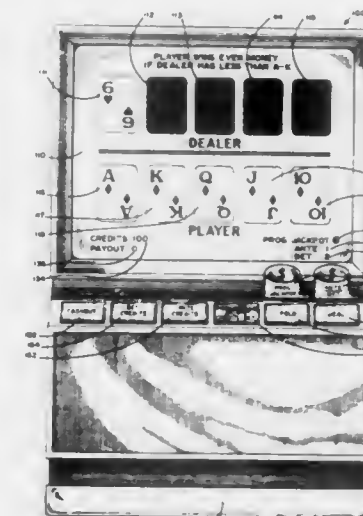
1. A gaming machine, the play of which involves the skill of the player in propelling or dropping a component which thereafter moves freely with the object of arriving at a predetermined location or one of a plurality of predetermined locations, which gives an indication of the player's performance, comprising in combination:

- (a) a component,  
 (b) means for defining said location or locations,  
 (c) means for detecting the arrival of said component at said location or one of said locations,  
 (d) means for totaling the player's performance based upon each arrival of the component at said location or one of said locations and displaying a player score representative of said player performance,  
 (e) machine starting means for starting the play of said game,  
 (f) standard setting means comprising an accumulating

means for displaying said game elapsed play time against which the player's performance is measured and which begins accumulating immediately after starting operation of the machine, and

- (g) indication means for indicating when either the accumulating means or the totaling means reaches a predetermined final level,  
 the improvement which comprises that said standard setting means is a clock face and said accumulating means comprises a first hand which moves in time around the clock face upon starting of the machine, and said totaling means comprises a second clock hand which sweeps around said clock face at a speed determined by the player's performance.

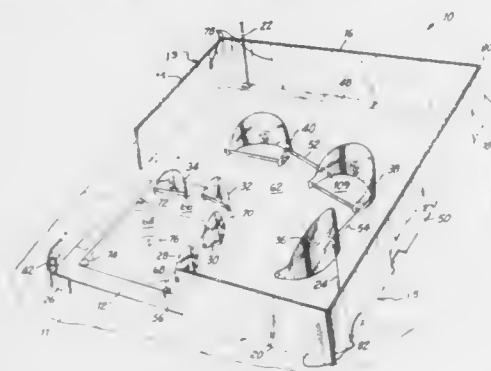
**4,948,134**  
**ELECTRONIC POKER GAME**  
 James P. Suttle, Las Vegas, Nev., and Daniel A. Jones, Louisville, Ky., assignors to Caribbean Stud Enterprises, Inc., Las Vegas, Nev.  
 Division of Ser. No. 218,152, Jul. 13, 1988, which is a continuation-in-part of Ser. No. 182,374, Apr. 18, 1988, Pat. No. 4,836,553. This application Nov. 27, 1989, Ser. No. 443,884  
 The portion of the term of this patent subsequent to Jan. 6, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> A63F 1/00  
 U.S. Cl. 273—85 CP 38 Claims



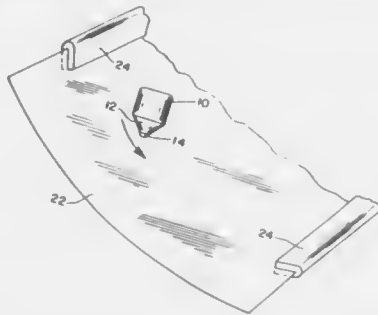
1. A method of playing a poker game on an electronic device comprising the steps of:

- (a) a player anteing a first bet means,  
 (b) electronically displaying a predetermined number of cards representing a player's hand and a dealer's hand,  
 (c) the player either folding in which case the player loses his first bet means, or betting a second bet means,  
 (d) electronically comparing the player's hand to the dealer's hand using poker rank as the criterion for comparison,  
 (e) if the dealer's hand is not at least a predetermined rank, the player wins a preselected amount based on the player's first bet means and the player keeps his second bet means,  
 (f) if the dealer's hand is at least a predetermined rank, and the dealer's hand is higher than the player's hand, the player loses both his first bet means and his second bet means,  
 (g) if the dealer's hand is at least a predetermined rank, and the player's hand is higher than the dealer's hand, then the player wins a first predetermined amount on his first bet means and the player wins a second predetermined amount on his second bet means based on the type of poker hand combination that the player has.

**4,948,135**  
**BASEBALL GAME**  
 Philip A. Follety, Jr., 144 Crescent Ave., Waldwick, N.J. 07463  
 Filed Feb. 17, 1989, Ser. No. 312,623  
 Int. Cl.<sup>5</sup> A63F 7/20  
 U.S. Cl. 273-90 7 Claims



and manipulating the member so that the spinning top continually moves downwardly,



including the step of producing a whirring sound by the spinning top, the sound being caused by the provision of a slot in the rounded member, the edges of the slot engaging the surface of the member as the top spins.

**4,948,137**  
**TETHERED PLAYING DEVICE**  
 Marcial Alvarez, 357 Sycamore St., Rahway, N.J. 07065  
 Filed May 19, 1989, Ser. No. 354,381  
 Int. Cl.<sup>5</sup> A63B 69/22; A01K 50/02  
 U.S. Cl. 273-413 5 Claims



1. A baseball game comprising:  
 a playing field having a relatively flat surface, including an outfield area and an infield area and having areas for a first base and a second base and a third base and a home base;  
 a ball for holding in the fingers of one hand of a game player so as to be pitched by that game player;  
 a bat for holding in the fingers of a game player so as to hit the pitched ball;  
 a plurality of outfield fence portions for engaging a ball hit by a bat;  
 a plurality of infield player pieces and outfield player pieces, disposed on said playing field, and representing, respectively, the first, second and third baseman, the shortstop, and the left, center and right fielder, wherein each said player piece comprises:  
 an upright wall member held in a fixed end position and including opposite end portions; and  
 a ribbon member having opposite end portions fixedly connected respectively to the wall opposite end portions, whereby a pocket is formed disposed towards home base, said ribbon member disposed nearer home base and said upright wall member disposed nearer said outfield fence portions, said ribbon member repelling a ball upon contact therewith, and absorbing its energy such that any ball hit into said pocket and subsequently contacting said ribbon member is more apt to be retained in said pocket; and  
 a pair of elongate barrier ribbon members, each said barrier ribbon member having opposite end portions, one of said barrier ribbon members fixedly connecting between the center fielder and the left fielder and the other of said barrier ribbon members fixedly connecting between the center fielder and the right fielder, each of said barrier ribbon members operable to repel a hit ball upon contact therewith.

**4,948,136**  
**SPINNING TOP GAME**  
 Edmund Hildebrandt, 6 Cedar St., Clinton, Mass. 01510  
 Filed May 22, 1989, Ser. No. 354,840  
 Int. Cl.<sup>5</sup> A63B 67/14; A63H 1/28  
 U.S. Cl. 273-109 3 Claims

1. The method for keeping a spinning top in continuous spinning action that comprises providing a co-planar surface member upon which to spin the top, wherein said surface is manually manipulatable, and a top having a rounded element on which it spins,  
 spinning the top with the rounded element engaging the surface of the member,

1. A tethered playing device, comprising:  
 a tethered line having ends connectible to spaced uprights to thereby define a fixed piece of said line between the uprights when said line is connected to said uprights;  
 a playing ball;  
 means for supporting said playing ball on said tethered line; and  
 elongated means attached to said line between said ends and extending outwardly from said line for manually manipulating said tethered line to move said playing ball.

**4,948,138**  
**DEVICE FOR MAINTAINING GAME STATE AUDIT TRAIL UPON INSTANTANEOUS POWER FAILURE**  
 Logan L. Pease, and William Wells, both of Reno, Nev., assignors to IGT, Reno, Nev.  
 Continuation of Ser. No. 447,358, Dec. 6, 1982, abandoned. This application Oct. 21, 1985, Ser. No. 789,356  
 Int. Cl.<sup>5</sup> A63B 71/00; A63F 7/06  
 U.S. Cl. 273-138 A 5 Claims

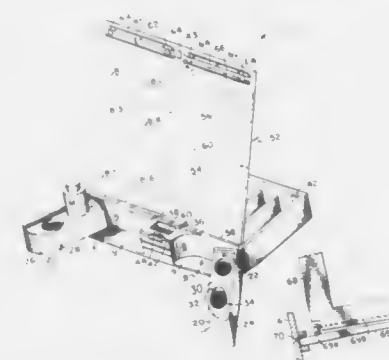
1. A look-ahead state saving device for processor controlled interactive electronic game played by a game player, operated from a game power source, and having an operating cycle including a plurality of discrete sequential interactive game states accompanied by interactive game state dependent data, comprising:  
 a nonvolatile solid state memory for providing a continually updated audit trail of interactive game states and accompanying interactive game state related data characterizing the interaction of a game player and the game for a particular interactive game state;

means for continually producing a reset signal for resetting said memory;  
 comparator means for detecting a game power source level less than that of a game operating reference level;  
 means for producing a game interrupt signal wherein game operation is interrupted at a current interactive game state in response to comparator detection of a game power source level less than the game operating reference level;



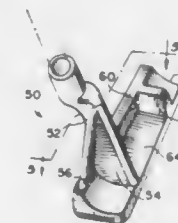
means for producing a memory freeze signal to prevent memory reset, said signal being produced a preselected time interval after production of said game interrupt signal in response to comparative detection of said game power source level less than the game operating reference level, wherein said interactive game state and accompanying interactive state related data are retained in said memory after completion of a current game state whereby said retained interactive game state and interactive state related data provide for error free resumption of game play.

**4,948,139**  
**BINGO GAME BOX**  
 Robert Heeszel, P.O. Box 432, Clearlake Oaks, Calif. 95423  
 Filed Feb. 19, 1988, Ser. No. 157,965  
 Int. Cl.<sup>5</sup> A45C 11/36; A63F 9/00; B65D 85/20  
 U.S. Cl. 273-148 A 18 Claims



18. A device to facilitate the playing of plural games, comprising, in combination:  
 a case having an interior within which game playing implements are stored, said case including,  
 a lid means for gaining access to said interior,  
 means for increasing the surface area of said lid means to form an enlarged planar playing surface formed from upper and lower playing surfaces which are pivotally interconnected with said lower playing surface connected to said case remote from said pivotal interconnection, and  
 means for supporting said enlarged playing surface area above said case interior while allowing access to said interior to facilitate playing plural games.

**4,948,140**  
**GOLF CLUB HEAD WITH DUAL TRIANGULAR HOSEL**  
 Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204  
 Continuation-in-part of Ser. No. 304,261, Jan. 31, 1989, abandoned. This application Dec. 4, 1989, Ser. No. 445,790  
 Int. Cl.<sup>5</sup> A63B 53/02, 53/04  
 U.S. Cl. 273-169 12 Claims



8. A putter type golf club head comprising:  
 a shaft socket structured to receive a golf club shaft; a club head body including a heel, toe, ball striking face, a top ridge adjacent to and located above said ball striking face, a rear wall behind said ball striking face, a rearwardly extending lower flange having an upper surface thereon, a hosel structure having a first triangular member positioned on said top ridge above said ball striking face and in a plane parallel to said ball striking face, and a second triangular member located on said upper surface of said rearwardly extending lower flange and positioned perpendicular to said ball striking face;  
 said first and second triangular members being integrally formed perpendicular to each other and each having a common vertical side;  
 and a complementary weight located adjacent said toe on the club head opposite said hosel structure.

**4,948,141**  
**GOLF GAME FACILITY**  
 Vernon H. Newman, 107 Hazel Road, Lakes Entrance, Victoria 3909, Australia  
 PCT No. PCT/AU87/00442, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO88/04944, PCT Pub. Date Jul. 14, 1988  
 PCT Filed Dec. 23, 1987, Ser. No. 378,198  
 Claims priority, application Australia, Dec. 24, 1986, PHO9673  
 Int. Cl.<sup>5</sup> A63B 67/02, 69/36  
 U.S. Cl. 273-176 FA 6 Claims



6. A golf-practice facility for the practicing of driving golf balls to a desired distance, said golf-practice facility comprising:  
 a plurality of arenas substantially trapezoidal in plan and substantially rectangular in vertical longitudinal section arranged side-by-side,  
 said arenas extending fan-wise from a common access area and each providing a self-sufficient practice or playing area for one or more players,  
 each arena including an off-ground target cage substantially open at an inner or tee-off end,



the cage being defined by a floor, a roof, an outer end wall, and side walls diverging from the inner to the outer end, all of furlable, tensionable netting, the floor being inclined to provide a rolling surface for balls falling to the floor at the outer end to return to a player at the tee-off end, the cage including at or near its outer end a target positioned to intercept in full flight a ball driven from the tee-off end, means for raising or lowering the target by a player using the facility according to the range of shot to be practiced, and access means for gaining access to said common access area from outside of the facility.

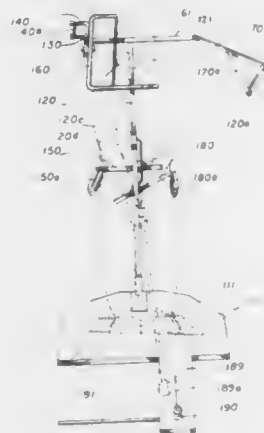
4,948,142

## GOLD POSITION TRAINING DEVICE

Donald J. Taber, 400 SW. 18th Ct., Pompano Beach, Fla. 33060  
Continuation-in-part of Ser. No. 324,739, Mar. 17, 1989,  
abandoned. This application Nov. 22, 1989, Ser. No. 441,326  
Int. Cl.<sup>5</sup> A63B 69/36

U.S. Cl. 273—183 B

4 Claims



1. An apparatus for assisting a golfer to develop a proper position and swing for his golf club, comprising in combination:

- a platform (111);
- vertical support means (120) attached to the platform (111);
- first hip positioning means (150) extending horizontally from said vertical support means (120);
- second hip positioning means (180) extending in a generally opposite direction horizontally from said vertical support means (120);
- neck contacting means (161) supported by neck positioning means (160) extending from said vertical support means (120), and
- swing control limiter means (140) including a bounded open portion extending from said vertical support means (120) which defines an opening through which the golfer's hands can pass at the top of the backswing.

4,948,143

## GOLF BALL

Steven Aoyama, Marion, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Jul. 6, 1989, Ser. No. 376,395

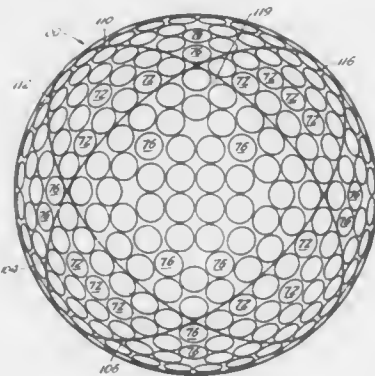
Int. Cl.<sup>5</sup> A63B 37/14

U.S. Cl. 273—232

13 Claims

13. A golf ball having a spherical surface with a plurality of dimples therein and four parting lines which do not intersect any dimples, said four parting lines corresponding to four great circular paths which are located by locating and connecting a midpoint of each edge of an octahedron which has been in-

scribed in said spherical surface, each of said four great circular paths having a diameter equal to said spherical surface



diameter and each of said four great circular paths intersecting six midpoints.

4,948,144

## GAME PLAYING APPARATUS

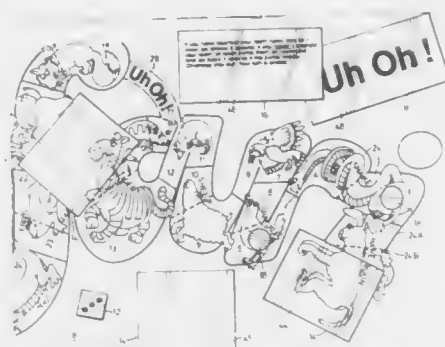
Raymond Armstrong, 12 Reiman Road, Toronto, Ontario, Canada M5P 2Y5

Filed Jan. 23, 1989, Ser. No. 299,579

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—249

21 Claims



1. Game playing apparatus comprising:

a playing surface including a representation of a path comprising a plurality of discrete spaces arranged sequentially along the path, and for each of a plurality of the discrete spaces, a representation of a first portion of a respective object which is divided into first and second portions; and a set of playing pieces, each bearing on a front side thereof, a representation of one of said second portions of an object, and adapted for advancement along the path whereby, when the playing piece is placed on a space adjacent a space bearing the first portion of an object, a complete object is formed from these first and second portions.

4,948,145

## MARKET INVESTING GAME APPARATUS AND METHOD OF PLAY

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 9, 1989, Ser. No. 309,634

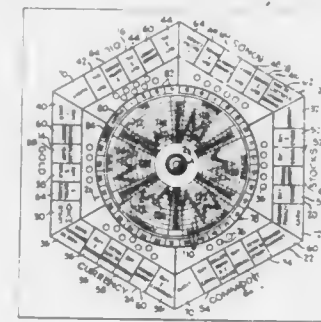
Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—256

7 Claims

2. A game for a plurality of players comprising in combination:

- a board;
  - a pathway on the board;
  - the pathway including spaces containing directions on play of the game including directions permitting a player to make purchases;
  - a spinner for determining by chance, the price, within a certain predefined range, at which purchases may be made;
  - the spinner also simultaneously indicating a price, within a certain predefined range, different from the purchase price, at which sales may be made; and
  - means separate from the pathway for marking each occurrence of an event to determine the duration of play of the game.
3. A method of playing a game comprising the steps of:



providing a board having areas representing different categories of investments, a peripheral path divided into spaces containing play directions, and a number of spots in each area indicating the number of available units in each investment category;

allocating a predetermined number of distinguished markers to each player for use on either the path spaces or the spots;

permitting each player to use more than one of the markers, up to a predetermined maximum number of the markers, on the path; and

requiring that a player have a marker available for placement on an open spot in the investment category in which the player wishes to make a purchase and further requiring the player to leave the marker on the spot until the purchased unit is sold.

4,948,146

## APPARATUS AND METHOD OF PLAYING A MENU ITEM COLLECTING GAME

Carol D. Snyder, East Aurora, N.Y., and Jeffrey D. Breslow, Highland Park, Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 6, 1989, Ser. No. 307,384

Int. Cl.<sup>5</sup> A63F 3/00

U.S. Cl. 273—273

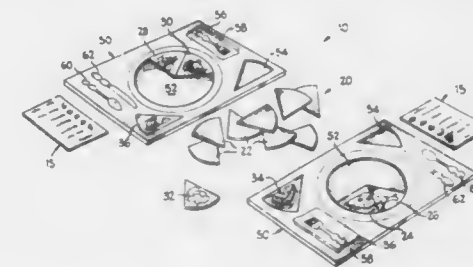
11 Claims

1. A game for a number of players comprising in combination:

- a plurality of playing pieces having a back side and a front side;
- each of the pieces having identical size and shape; the back side of all of the playing pieces being visually identical;
- the front side of the playing pieces depicting an item to be collected by the players;
- a list allocated to each player indicating a variety of items to be collected during play of the game;

each list being different from every other list; one item being common to every list; and other items being common to some but not all of the lists.

6. The method of playing a game comprising the steps of: allocating a different list calling for a variety of items to each player;



supplying a plurality of playing pieces having a common backside and depicting items to be collected by the players on the front side;

placing all of the pieces face down in a central pile; and each player, in turn, picking a piece in an attempt to obtain the items required by the allocated list.

4,948,147

## SOCCER TARGET

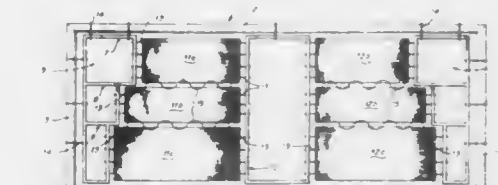
Michel Pallanca, 18 Boulevard de Cimiez Le Castel 1, 06000 Nice, France

Continuation-in-part of Ser. No. 276,364, Nov. 23, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 442,540

Claims priority, application France, Nov. 24, 1987, 87 16540  
Int. Cl.<sup>5</sup> A63B 63/00; F41J 1/10

U.S. Cl. 273—402

8 Claims



1. Target and ball return means for training of players practicing a sport involving shooting a ball toward a goal having a pair of uprights (3,4) and a horizontal crossbar (2) supported by said uprights (3,4), comprising:

- a dimensionally adjustable central frame (10);
- at least one dimensionally adjustable target (5,6,7,8,9);
- at least one net (11, 12) for causing rebound of any incident ball which misses said at least one target;
- means (14) for suspending at least said central frame (10) and said at least one target, side-by-side, by respective peripheral edges of each from said horizontal crossbar (2) and for attaching at least one of said target and said net along a peripheral edge thereof to one of said uprights (3,4); and
- means (13) for fastening adjacent peripheral edges of said central frame (10), net (11,12) and target to each other, thereby covering substantially all of an opening defined below said horizontal crossbar and between said goal uprights (3,4).

4,948,148

**DART GAME SCORING SYSTEM**

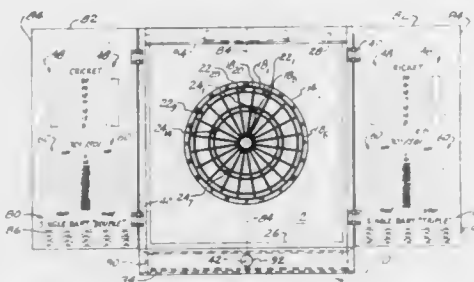
Robert J. G. Danielson, 755 E. Virginia Way, No. 34, Barstow, Calif. 92311

Filed Jun. 23, 1989, Ser. No. 370,465

Int. Cl.<sup>5</sup> F41J 1/16

U.S. Cl. 273—408

14 Claims



1. A scoring system for a dart game apparatus having a target and a plurality of darts for shooting at selected regions of the target, each of the regions having an associated scoring value for generating a corresponding game score value when a dart hits that region of the target, the system comprising:

- (a) a supply of markers for use by players of the game; and  
(b) a scoring panel comprising:

(i) a modular pattern of marker positions on the scoring panel, the positions forming at least two distinct array segments;

(ii) a pattern of score keeping indicia on the scoring panel, each of the indicia being associated with one of the marker positions, the indicia defining a scoring increment for each of the array segments, the increments being in a fixed ratio; and

(iii) means for releasably holding one or more of the markers in association with a selected marker position,

wherein a player's score is indicated by the position of markers in the segments as a summation of the position of each marker in its segment multiplied by the scoring increment of that segment.

4,948,149

**NET POSTS FOR BALL GAMES**

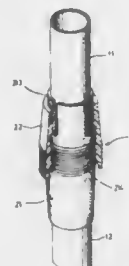
Joe Lin, No. 158, Sec. 2, Chang-Pin Rd., Pei-Tun District, Taichung, and Grace Liao, No. 8, Alley 4, Lane 324, Sec. 4, Cheng-Kung Rd., Nei-Hu District, Taipei, both of Taiwan

Filed Jun. 23, 1989, Ser. No. 370,795

Int. Cl.<sup>5</sup> A63B 61/02; F16B 7/14

U.S. Cl. 273—411

2 Claims



1. A portable net post for ball games comprising:  
a plurality of hollow tubes which are of different diameters for fitting one into the other;

an adaptor comprising an outer screwed sleeve member and an lining press member, wherein the lining press member is of hollow cylindrical shape, one end thereof being securely fitted over one end of one hollow tube and the

other end being formed with a plurality of spaced apart press plates, the outer wall of the intermediate section thereof being formed with threads; the outer screwed sleeve member is of cylindrical shape with the inner wall of one end thereof formed with threads which engage the threads on the lining press member and the other end being shaped into a tapered opening, such that the hollow tubes of different diameters can be fitted one over the other and the adjacent hollow tubes can be securely connected by means of the adaptors.

4,948,150

**VOLLEYBALL PRACTICE SYSTEM**

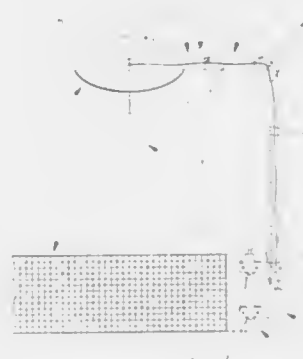
Richard E. Daly, Jr., 2432 Thomas St., Flint, Mich. 48504, and Richard Holland, 5770 Cobb Rd., Lapeer, Mich. 48446

Filed Jul. 11, 1989, Ser. No. 378,586

Int. Cl.<sup>5</sup> A63B 69/00

U.S. Cl. 273—411

29 Claims



1. A volleyball practice device, utilizing a volleyball, an attachment point, and a floor, comprising:

retaining means for holding the volleyball;

a resilient backstop extending essentially horizontally and having a centrally located orifice;

a flexible funicular rod one end of which is attached to said retaining means and the other end of which passes upward through said orifice of said backstop terminating on the attachment point; and

supporting means attached to said backstop for suspending said backstop an adjustable distance from the floor.

4,948,151

**ROTARY END FACE SEAL ASSEMBLY**

Peter Janzen, and Raymond Metcalfe, both of Chalk River, Canada, assignors to Atomic Energy of Canada Limited, Ontario, Canada

Filed Oct. 10, 1986, Ser. No. 917,522

Int. Cl.<sup>5</sup> F16J 15/38

U.S. Cl. 277—27

17 Claims

1. A rotary end face seal comprising:

(a) a pair of sealing members in relatively rotatable sealing proximity,

(b) each of said members defining a generally radially arranged annular sealing surface, said annular sealing surfaces being in face-to-face sealing proximity with one another during use to separate a zone of higher fluid pressure from a zone of lower fluid pressure while allowing relative rotation between said sealing surfaces,

(c) one of said sealing members comprising a composite ring including a pair of annular rings which are interlocked together, with one of said rings being of a relatively weak

and/or deformable material and having said sealing surface thereon while the other of said rings is of a relatively strong material and is arranged to contact and structurally support the relatively weak and/or deformable ring along a region of contact, with an annular interface being defined by the region of contact between said annular rings, which interface is located such that any fluid seeping into the interface from said zone of higher fluid pressure tends to loosen the interlocked relation between said rings and/or to create stress and deformation of the weaker and/or more deformable ring, and wherein the improvement comprises:

(d) passage means associated with said interface to reduce the action of any such fluid seeping into the interface from the zone of higher fluid pressure and to allow for the

two facing surfaces is provided in a first area with at least one helical groove separating ridges from one another that imparts a pumping action toward a space to be sealed, and in which said at least one helical groove is preceded, on the side remote from said sealed space, by a preliminary seal which is disposed in a second area, the improvement wherein said preliminary seal includes a ring magnet having a pole member defining a pole surface which is separated by a narrow gap from the other one of the two facing surfaces in said second area, the facing surfaces on opposite sides of said gap being cylindrical and smooth; wherein a ferrofluid is disposed in said gap; and wherein said gap has a radial width D1 which is substantially identical to the radial distance D2 between said ridges, on one hand, and said other facing surface, on the other.

4,948,153

**METAL GASKET**

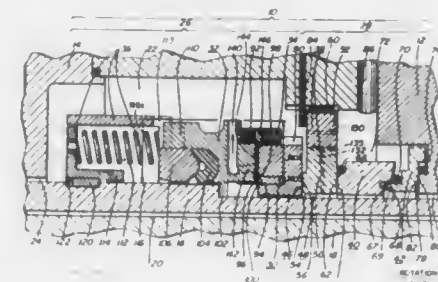
Masakatsu Takahashi; Hiroo Buseki, and Hidetoshi Kimura, all of Kanagawa, Japan, assignors to Nippon Reinz Co., Ltd., Kanagawa, Japan

Filed Jun. 23, 1989, Ser. No. 370,881

Int. Cl.<sup>5</sup> F02F 11/00; F16J 15/00

U.S. Cl. 277—235 B

4 Claims



presence of a relatively higher pressure differential between said zones while at the same time providing for lower stress or deflection of the weaker and/or more deformable ring and/or a reduced tendency for the interlocked relation thereof with the stronger ring to be loosened;

(e) said passage means including a plurality of interconnecting grooves extending within said interface and formed in at least one of said annular rings and which grooves communicate with passages extending from the interface to the zone of lower pressure to drain off any fluid pressure acting within said interface, the passage means within and away from said interface to the zone of lower fluid pressure presenting substantially less resistance to fluid flow than is encountered by any fluid seeping into said interface from the zone of higher fluid pressure.

1. A metal gasket comprising a metal plate defining an opening therethrough for allowing fluid to pass through the gasket, and through-holes extending therethrough which are relatively small compared to said opening and are sized to receive bolts, and said metal plate having an inner peripheral flat portion surrounding said opening, an outer peripheral flat portion spaced radially outwardly of said inner peripheral flat portion with respect to said opening, and a raised portion extending around the entire circumference of said opening and connected between said peripheral flat portions, said raised portion including an intermediate flat portion of the metal plate disposed in a plane spaced axially from a plane in which said opening lies, a first frusto-conical portion of the metal plate extending between said intermediate flat portion and said inner peripheral flat portion, and a second frusto-conical portion of the metal plate extending between said intermediate flat portion and said outer peripheral flat portion, and said second frusto-conical portion being inclined at an angle with respect to the plane in which said opening lies that is smaller than that at which said first frusto-conical portion is inclined.

4,948,152

**SHAFT SEAL**

Gerhard Kilthau, Mannheim; Karl H. Spies, Birkenau; Rolf Vogt, Oftersheim; Peter Freilaender, Mannheim, and Toni Seethaler, Gornheimertal, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstrasse, Fed. Rep. of Germany

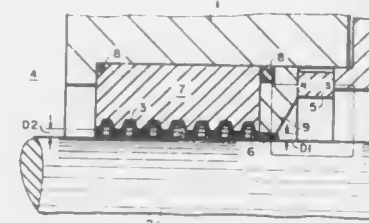
Filed Jan. 30, 1989, Ser. No. 303,820

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1988, 3804844

Int. Cl.<sup>5</sup> F16J 15/40

U.S. Cl. 277—80

3 Claims



1. In a seal for the interstice between facing surfaces of two relatively rotatable machine parts, in which at least one of the

4,948,154

**STERILE CART COVER**

Elie Guggenheim, 150 Park Dr., San Antonio, Tex. 78212

Filed May 24, 1989, Ser. No. 356,171

Int. Cl.<sup>5</sup> B65D 65/26

U.S. Cl. 280—79.3

13 Claims

1. A cart cover for a cart supporting packages of sterile material stored thereon, said cart cover comprising:

a top panel;

a bottom panel;

a first side panel interconnecting said top panel and said bottom panel;

a second side panel interconnecting said top panel and said bottom panel;

at least one front panel connected to said top panel and releasably connected to said first side panel and said sec-

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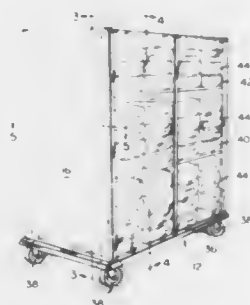
14

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UMI



ond side panel for access to an interior of an enclosure defined by the cart cover; and  
at least one rear panel connected to said top panel and interconnecting said first side panel and said second side panel,



said second side panel being releasably secured to said bottom panel.

4,948,155

# APPARATUS FOR EXTENDING AND RETRACTING THE REAR WHEELS OF A TRAILER

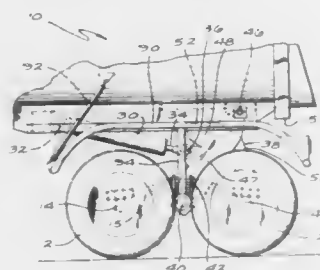
Fred T. Smith, and Fred P. Smith, both of Alpine, Utah, assignors to Redwood Reliance Sales Company, Cotati, Calif.

Filed Feb. 3, 1989, Ser. No. 306,781

Int. Cl.<sup>5</sup> B60P 1/18; B62D 27/04, 53/06

U.S. Cl. 280—149.2

33 Claims



8. Apparatus for use in providing a controlled displacement of pairs of rear wheels of a trailer between retracted and extended positions, the trailer having a body tiltable upwardly at its forward end, comprising

a member operatively coupled to the trailer at a first position for pivotable movement relative to the trailer about the first position as a fulcrum and operatively coupled to the rear wheels at a second position for pivotable movement relative to the trailer about the second position as a fulcrum, and

drive means movable between first and second positions and operatively coupled to the member for pivoting the member about the first position of the member as a fulcrum in accordance with the operation of the drive means between the first and second positions,

the member being pivotable, during the upward tilting of the forward end of the body, about the second position of the member as a fulcrum to a position engaging the axle of the rear wheel in the pair and being thereafter pivotable about the axle of such rear wheel as a fulcrum during the continued upward tilting of the forward end of the body.

## 4,948,156 STANDING LIFT AND SUPPORT FOR WHEELCHAIR USER

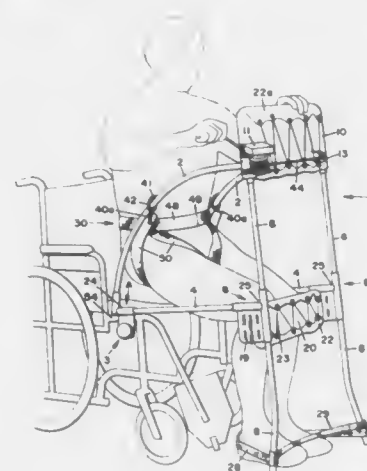
Glenn D. Fortner, Durango, Colo., assignor to Legg-On, Wichita, Kans.

Filed Mar. 13, 1989, Ser. No. 323,566

Int. Cl.<sup>5</sup> A61G 7/14

U.S. Cl. 280—304.1

21 Claims



1. A device for assisting a person in moving to and from a standing position comprising a harness means for at least partially supporting the torso of the person during the movement, a frame including arcuate track means at each side of the person for supporting and guiding the path of said harness means during such movement, track follower means supported by and movable along each of said arcuate track means, motive means carried by said frame and connected to said track follower means for moving the track follower means along said track means, means for connecting said harness means to said track follower means at each side of the person whereby the movement of said track follower means along said arcuate track means raises and lowers said harness in a corresponding arcuate path.

## 4,948,157 CONNECTION MEANS BETWEEN ADJACENT ARTICULATED SEGMENTS OF AN OMNIBUS

Hubert Thudt, Puchheim/Bahnhof, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany

Filed Nov. 17, 1987, Ser. No. 121,477

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640759

U.S. Cl. 280—494

Int. Cl.<sup>5</sup> B60D 1/00

14 Claims



1. An articulated omnibus comprising a plurality of articulated segments including a traction vehicle drivable on a roadway and at least one trailer connected to the traction vehicle for being towed thereby, means releasably interconnecting adjacent segments for relative articulated movement, said means comprising a towbar having one end rotatably connected to one of the interconnected articulated segments and a hitch pin at the other end of the towbar, the other of the segments including a hitch in which said hitch pin is supported for pivotal movement around a vertical axis and means supporting said towbar from said other segment for pivotal movement about a horizontal axis disposed between said hitch pin and the rotatable connection of the towbar to said one segment so that said adjacent segments are capable of relative pitching and rotatable movements, said other segment including a floor frame, said means which supports said towbar from said other segment comprising horizontal pins pivotally connecting said towbar to said floor frame.

4,948,158

## SKI BINDING

Vladimir S. Makarenko, prospekt Kultury, II, korpus I, kv. 279, Leningrad, U.S.S.R.

Continuation of Ser. No. 23,120, Dec. 12, 1986, abandoned. This application Mar. 14, 1989, Ser. No. 325,047

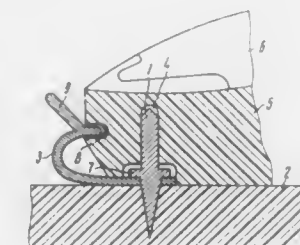
Claims priority, application U.S.S.R., Apr. 24, 1985, 3878643

The portion of the term of this patent subsequent to Jun. 7, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A63C 9/18

U.S. Cl. 280—615

7 Claims



1. A ski binding comprising:  
rest pins mounted on a ski;  
holes in a toe portion of a sole of a boot for receiving corresponding rest pins thereon;  
a bracket-shaped blade spring engaged with at least one rest pin, said spring restraining upward vertical movement of the toe portion of the boot;  
a stop limiting upward vertical movement of the free end of

said spring, said stop being constructed as a recess in a front surface of the toe portion of the sole of the boot.

4,948,159

## SAFETY SKI BINDING

Roland Jungkind, Garmisch-Partenkirchen, Fed. Rep. of Germany, assignor to Marker Deutschland GmbH, Eschenlohe, Fed. Rep. of Germany

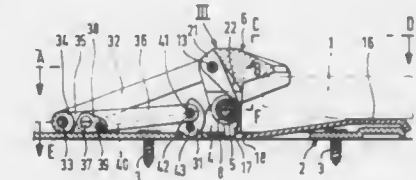
Filed Jan. 18, 1989, Ser. No. 298,417

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1988, 3801213

Int. Cl.<sup>5</sup> A63C 9/082

U.S. Cl. 280—632

12 Claims



1. A releasable safety ski binding for retaining a ski boot on a ski, said binding comprising:  
a base plate attachable to a ski,  
an axle mounted on said base plate, said axle being transverse to the axis of said ski and parallel to the surface thereof, a cam surface on said axle,  
a boot holder mounted on said axle for rotational and axial movement thereon, said boot holder dimensioned to hold said ski boot laterally and from above and having a boot holding position and a boot release position,  
first spring means operable to bias said boot holder into rotation about said axle toward said boot holding position, second spring means disposed between said axle and said boot holder operable to bias said boot holder to a central position on said axle,  
a locking mechanism movable between a first position and a second position,  
a release member engaging said locking mechanism for holding said locking mechanism in said first position and releasing said locking mechanism to said second position, pin means for connecting said locking mechanism to said boot holder, said pin means being secured to said locking mechanism and received in slot means in said boot holder such that said boot holder is pivotally movable to a small extent from said boot holding position when said locking mechanism is in said first position, said boot holder being in said boot holding position when said locking mechanism is in said first position and said boot holder being in said boot release position when said locking mechanism is in said second position,  
control lever means rotatably and axially movable on said pin means for controlling release of said release member, said control lever means operable to release said release member after predetermined rotation thereof,  
said control lever having a first lever end engaging said cam surface on said axle and a second end operative to engage said boot holder, wherein said boot holder engages said second lever end and imparts rotational movement to said control lever when said boot holder moves from said boot holding position, and  
means for axially moving said control lever along said pin means as said boot holder moves along said axle, wherein said first lever end moves along said cam surface which imparts rotational movement to said control lever as said boot holder moves from said central position.

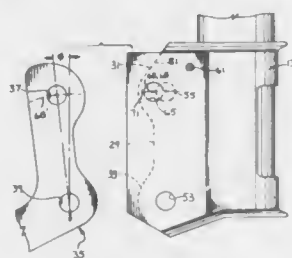
4,948,160  
METHOD AND APPARATUS FOR MODIFYING WHEEL  
ALIGNMENT IN STRUT TYPE SUSPENSION  
David L. Barry, 14681 W. Barton Lake Dr., Vicksburg, Mich.  
49097

Filed Jan. 17, 1989, Ser. No. 297,418

Int. Cl.<sup>5</sup> B62D 17/00

U.S. Cl. 280—661

20 Claims



1. A wheel alignment repair assembly for effecting a modified but non-adjustable wheel alignment in a vehicle suspension of the kind having a wheel support member, a strut mounted on the vehicle, said strut having a flange protruding laterally therefrom, said flange having a free edge, said flange and wheel support member having holes therethrough alignable for attachment of said wheel support member to said flange of said strut, said repair assembly comprising:

a repair piece having a primary plate, a raised boss on said primary plate, said boss defining a step on said repair piece, said step having a shape complementary to said free edge of said flange for maintaining a snug contacting relationship with said free edge of said flange, said repair piece being substantially wider laterally than said strut flange by an amount approximately equal to the lateral width of said raised boss, said width of said raised boss being substantially greater than the height of said step defined thereby; and

means for securing said repair piece to said flange with said step in said snug contacting relationship with said free edge, said repair piece, when secured on said flange, protruding laterally substantially beyond said flange free edge by an amount approximately equal to said width of said boss, said boss extending laterally from said flange free edge and terminating at a lateral free edge which is spaced substantially and laterally from said flange free edge, said boss providing lateral structural reinforcement of said flange at said flange free edge.

4,948,161  
SUSPENSION SYSTEM FOR A DIRIGIBLE WHEEL OF  
MOTOR VEHICLE

Hiroshi Tonomura, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Mar. 30, 1989; Ser. No. 330,805

Claims priority, application Japan, Apr. 31, 1988, 63-79948

Int. Cl.<sup>5</sup> B60G 3/20

U.S. Cl. 280—675

5 Claims

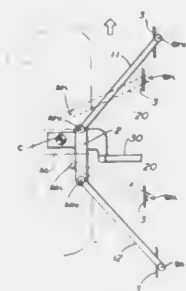
1. A suspension system for a dirigible wheel of a motor vehicle having a vehicle body with a longitudinal axis and a dirigible wheel with a center, comprising:

a wheel carrier with an axle rotatably supporting the dirigible wheel, said wheel carrier having a lower portion and an upper portion;

first means for connecting said lower portion of said wheel carrier with the vehicle body; and

second means for connecting said upper portion of said wheel carrier with the vehicle body, said second means having a first axle side mounting portion and a second axle side mounting portion mounted on said upper portion of said wheel carrier, said first and second axle side mounting portions of said second means being disposed on opposite

sides of the wheel center in the longitudinal direction of the vehicle body with a middle portion which is substan-



tially equidistant from said axle side mounting portions being displaced from the center of the wheel in the longitudinal direction of the vehicle body.

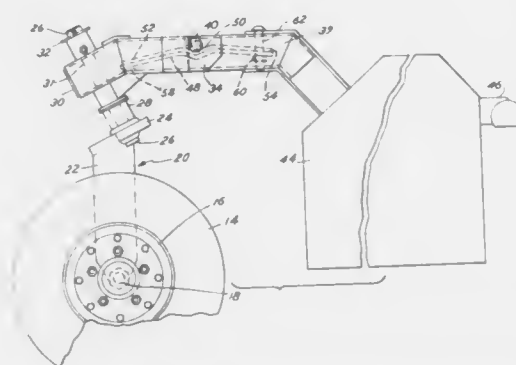
4,948,162  
TAIL WHEEL SPRING ARM ASSEMBLY  
James E. McCanse, Oregon, Ill., assignor to M & W Gear Company, Gibson City, Ill.

Filed Feb. 9, 1989, Ser. No. 309,599

Int. Cl.<sup>5</sup> B60G 3/16

U.S. Cl. 280—699

1 Claim



1. An improved tail wheel spring arm assembly for a farm implement and other apparatus comprising, in combination:

a. running gear including a wheel having an axle, a yoke assembly attached to the axle to permit the wheel to rotate about the axle, said yoke assembly including an upstanding shaft for attachment to a spring arm means;

b. spring arm means comprising a first pair of opposed generally parallel, laterally extending plates spaced one from the other and defining at one end a mean for a pivotal attachment to the shaft, said spring arm means further including a second pair of opposed generally parallel spaced plates arranged in opposed relation to the first pair of plates and pivotally connected to the first pair of plates by pin means such that the plates are pivotal in pairs, one with respect to the other, said second pair of plates being attached to the implement;

c. a leaf spring having opposite ends the implement and the shaft engaging the opposite ends respectively, said leaf spring having an intermediate portion adjustably biased against the pin means connecting the pairs of plates, whereby the spring means positively biases the running gear towards the ground; and

d. adjustable biasing means for engaging one end of the spring with the implement.

4,948,163  
DAMPING CHARACTERISTICS VARIABLE  
HYDRAULIC SHOCK ABSORBER FOR AUTOMOTIVE  
SUSPENSION SYSTEM WITH VEHICULAR ATTITUDE  
SUPPRESSING CAPABILITY

Shigeru Kikushima; Fumiyuki Yamaoka; Shinobu Kakizaki, and Junichi Emura, all of Kanagawa, Japan, assignors to Atsugi Motor Parts Company, Limited, Kanagawa, Japan

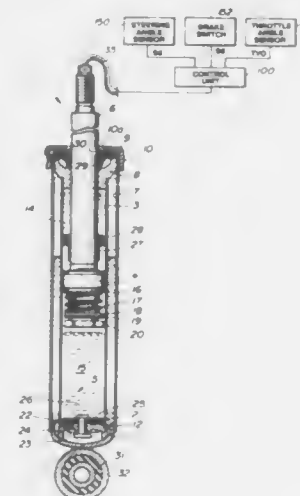
Filed May 30, 1989, Ser. No. 359,091

Claims priority, application Japan, May 31, 1988, 63-73101[U]; May 31, 1988, 63-73102[U]; Nov. 4, 1988, 63-144279[U]

Int. Cl.<sup>5</sup> B62D 6/06; B60G 17/00

U.S. Cl. 280—707

24 Claims



1. An automotive suspension system comprising:  
a shock absorber disposed between a vehicle body and a suspension member rotatably supporting a road wheel, said shock absorber including a cylinder tube connected to one of said vehicle body and said suspension member and defining an internal space, a piston disposed within said internal space for dividing said internal space into first and second chambers and connected to the other of said vehicle body and said suspension member for relative movement with respect to said cylinder tube, said first and second chambers being filled with a working fluid;  
a fluid communication means for establishing fluid communication between said first and second chambers with a limited fluid flow rate for generating a damping force against relative motion between said piston and said cylinder tube;  
a valve means associated with said fluid communication means for controlling flow restriction of said fluid communication means, said valve means being variable of flow restriction characteristics for varying damping characteristics of said shock absorber;  
a first sensor means for monitoring fluid pressure in said first chamber for producing a piston stroke indicative signal indicative of magnitude of piston stroke;  
a second sensor means for monitoring a vehicular body attitude change for producing a vehicular attitude change indicative signal having a signal representative of vehicular attitude change;  
an actuating means, associated with said valve means and responsive to a control signal, for controlling said valve means for adjusting flow restriction characteristics according said said control signal; and  
a controlling means, receiving said piston stroke indicative signal, for controlling said actuating means for controlling damping characteristics depending upon the vehicle driving condition, said controlling means operating in a first operational mode while said vehicular attitude change indicative signal value is smaller than a predetermined

attitude change criterion and a second mode while said attitude change indicative signal value is greater than or equal to said attitude change criterion, said controlling means, operating in said first operational mode, outputting said control signal alternating damping characteristics at least between a first harder damping characteristics and a second softer damping characteristics in depending upon piston stroke direction in each vibration cycle, and operating in said second operational mode, outputting control signal for suppressing attitude change irrespective of piston stroke direction.

4,948,164  
ACTIVELY CONTROLLED SUSPENSION SYSTEM WITH  
COMPENSATION OF DELAY IN PHASE IN CONTROL  
SYSTEM

Senao Hano; Naoto Fukushima; Yukio Fukunaga; Yohsuke Akatsu; Masaharu Satoh, and Itaru Fujimura, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

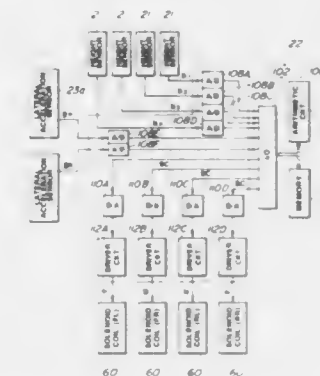
Filed Jan. 30, 1989, Ser. No. 302,975

Claims priority, application Japan, Jan. 29, 1988, 63-10556; Jul. 28, 1988, 63-188332[U]

Int. Cl.<sup>5</sup> B60G 11/26

U.S. Cl. 280—707

16 Claims



1. An actively controlled suspension system for an automotive vehicle, comprising:

a cylinder disposed between a vehicle body and a suspension member which rotatably supports a road wheel, said cylinder defining a variable pressure working chamber filled with a pressure medium for generating a damping force resisting against relative displacement between said vehicle body and said suspension member, said pressure of said pressure medium being variable between a predetermined maximum value and a predetermined minimum value across a predetermined neutral value;

a pressure source circuit means connected to said working chamber for supplying the pressure medium and including a pressure source feeding pressurized pressure medium through said circuit;

a pressure control valve disposed between said pressure source and said working chamber, said pressure control valve being capable of varying valve positions between a first mode for increasing pressure if said pressure medium within said working chamber, a second mode for decreasing pressure in said pressure within said working source, and a third mode for maintaining said pressure in said pressure medium constant;

a first acceleration sensor for monitoring an acceleration exerted on a first position of the vehicle body to cause vehicular attitude change and producing a first sensor signal indicative thereof;

a second acceleration sensor oriented at a second position



which is longitudinally distanced from said first acceleration sensor, for monitoring said acceleration exerted on the second position of the vehicle body and producing a second sensor signal indicative thereof; and  
a controller means for receiving said first and second acceleration sensor signals for deriving a suspension control signal for operating said pressure control valve at one of said first, second and third mode positions for regulating vehicular attitude on the basis of said first and second signals.

4,948,165

**PROPORTIONING VALVE ASSEMBLY FOR AN ACTIVELY CONTROLLED SUSPENSION SYSTEM**  
Kenro Takahashi, Naohiko Inoue, and Masahiro Tsukamoto, all of Kanagawa, Japan, assignors to Nissan Motor Company, limited, Yokohama, Japan

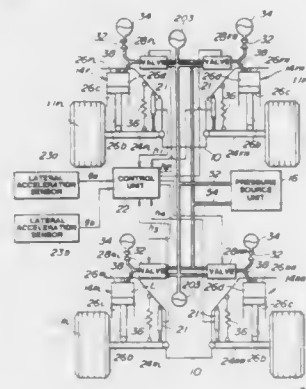
Filed Jan. 26, 1989, Ser. No. 303,339

Claims priority, application Japan, Jan. 26, 1988, 63-13642; Jan. 29, 1988, 63-10554[U]

Int. Cl.<sup>5</sup> B60F 17/00; B60G 11/16

U.S. Cl. 280—707

18 Claims



15. An actively controlled suspension system comprising:  
a hydraulic cylinder disposed between a vehicular body and a suspension member rotatably supporting a vehicular wheel, said hydraulic cylinder defining an internal space with a piston disposed therein, said piston being attached to said vehicular body and said suspension member via a piston rod, said piston rod being thrustingly received into a working chamber, said working chamber being variable of pressure for varying suspension characteristics;  
a hydraulic circuit connecting a pressurized working fluid source to said working chamber, said hydraulic circuit including a first line connected to an outlet of said pressurized working fluid source, a second line connected to an inlet of said pressurized working fluid source for returning working fluid therethrough, and a third line connected to said working chamber;  
a proportioning valve assembly disposed between a pressurized fluid source and an hydraulic cylinder for adjusting fluid pressure in a working chamber in said hydraulic cylinder, said proportioning valve assembly operating in a first mode in response to vibration energy for absorbing vibration energy for maintaining said fluid pressure in said working chamber and in a second mode for adjusting said fluid pressure in said working fluid for varying characteristics of said hydraulic cylinder, comprising:  
a valve housing defining a first port connected to a pressurized working fluid source to receive pressurized working fluid therefrom, a second port connected to said pressurized working fluid source for returning the working fluid thereto, and a third port connected to a hydraulic cylinder for fluid communication therewith for adjusting working fluid pressure in said hydraulic cylinder;  
a first valve means having one end facing a first chamber to

be exerted a pilot pressure representative of a desired pressure in said hydraulic cylinder, and the other end facing a second chamber to be exerted a feedback pressure which is fed back from said third port, said first valve body being movable according to a pressure difference between said pilot pressure and said feedback pressure for selectively establishing fluid communication between said first, second and third ports of said valve housing, said first, second and third ports of said valve housing, said first valve body solely operative in response to a pressure difference between said pilot pressure and said feedback pressure for maintaining said fluid pressure in said working chamber constant at the pressure of said first chamber in said first mode;

a fluid path means defining a fluid path extending from said first port to said first chamber and from said first chamber to said second port;

a second valve means associated with said fluid path for providing flow restriction at a predetermined magnitude for generating said pilot pressure within said first chamber, said second valve means being operative in said second mode for adjusting said pilot pressure, and said second valve means including an electrically operable actuator means receiving a control signal to drive a valve member at a position corresponding to a value of said control signal for adjusting said pilot pressure at a pressure corresponding to said control signal value; and

an electric circuit means for supplying said control signal to said actuator of said second valve means, said electric circuit means including means for causing phase advance compensating lag in said first valve means in response to variations of said pilot pressure in said second mode operation;

an actuator associated with said second valve means for controlling position of said second valve means for adjusting said pilot pressure at a desired value; and

control means for monitoring vehicular attitude change of said vehicular body for producing a control signal depending upon monitored magnitude of attitude change for suppressing the attitude change, said control means supplying said control signal to said actuator for operating the latter to adjust the position of said second valve means.

4,948,166

**VEHICULAR HEIGHT REGULATION SYSTEM WITH VARIABLE SENSITIVITY DEPENDING UPON VEHICLE DRIVING CONDITION**

Takanobu Kaneko, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

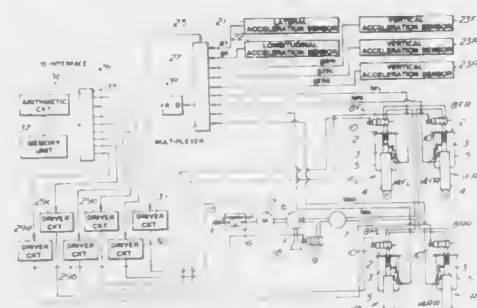
Filed Nov. 25, 1988, Ser. No. 275,985

Claims priority, application Japan, Nov. 24, 1987, 62-295874

Int. Cl.<sup>5</sup> B60G 17/00

U.S. Cl. 280—707

23 Claims



1. A vehicle height regulation system comprising:  
a suspension system interposed between a vehicle body and  
a suspension member rotatably supporting a vehicular

- wheel, said suspension system including a variable pressure chamber filled with a working fluid for producing a suspension force for suspending said vehicle body on said suspension member;  
a fluid circuit including a pressurized working fluid source and connected to said variable pressure chamber to adjust pressure in said variable pressure chamber and thereby adjust suspension force to be produced by said variable pressure chamber;  
a first sensor monitoring vehicular body height level to produce a first sensor signal representative thereof;  
a second sensor monitoring a preselected vehicular driving parameter representative of an instability factor of said vehicle body in terms of a vehicular body attitude change to produce a second sensor signal; and  
a controller means for setting a target vehicular height range with respect to a predetermined target height level, said target vehicular height range variable in accordance with variation of a second sensor signal value such that when said second sensor signal indicates a greater magnitude of vehicular body attitude change, said target vehicular height range is set to a wide range and when said second sensor signal indicates a smaller magnitude of vehicular attitude change, said target vehicular body height range is set to a narrow range, and for controlling said fluid circuit to adjust said suspension force to maintain vehicular height within said target vehicular height range on the basis of said first sensor signal.

4,948,167

ALL-TERRAIN VEHICLE

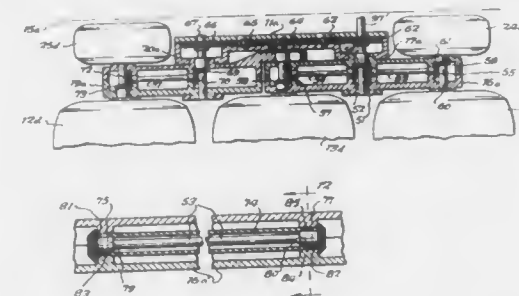
John F. Kopczyński, 1671 Sweeney St., North Tonawanda, N.Y. 14120

Division of Ser. No. 319,127, Mar. 3, 1989. This application Oct. 25, 1989, Ser. No. 426,218

Int. Cl.<sup>5</sup> B60G 11/18

U.S. Cl. 280—721

7 Claims



1. A vehicle comprising a vehicle body, first and second bogies, first and second longitudinally spaced axles on said vehicle body mounting central portions of each of said first and second bogies, respectively, for pivotal movement, each of said bogies having inner and outer ends, means mounting an outer wheel for rotation on each outer end of each of said first and second bogies, means mounting an inner wheel on the inner end of said second bogie, linkage means coupling said inner ends of said first and second bogies for causing said first and second bogies on said side of said vehicle to pivot in unison, and drive means in each of said first and second bogies for positively driving all of said inner and outer wheels, said drive means including torsion bar means for permitting relative motion between certain of said wheels.

4,948,168

**GAS BAG CUSHION KNEE RESTRAINING SYSTEM FOR MOTOR VEHICLES**

Heinz-Dieter Adomeit, Berlin, and Roland Breaner, Schwäbisch Gmünd both of Fed. Rep. of Germany, assignors to TRW Repa GmbH, Fed. Rep. of Germany

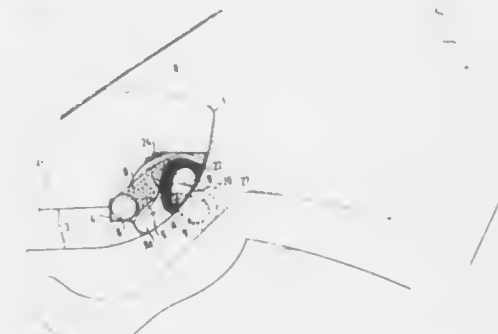
Filed Mar. 29, 1989, Ser. No. 329,981

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1988, 3810688

Int. Cl.<sup>5</sup> B60R 21/045, 21/16

U.S. Cl. 280—732

23 Claims



1. A gas bag cushion restraining system for motor vehicles having a gas bag inflatable by a gas generator, a knee cushion mounted in a lower region of the vehicle dashboard and activating means for activating said gas generator in an emergency situation to develop gas for inflating said gas bag, wherein said knee cushion is mounted movable between a retracted rest position and an activated position advanced towards the knees of a vehicle occupant, said gas developed by said gas generator, when activated, producing an expansion pressure a portion of which is used to drive said knee cushion from its rest position to its activated position, said knee cushion being lockable in its activated position by force-locking elements which are formed on each side of said knee cushion on two lateral guide elements which are arranged spaced apart from each other and above each other and of which a first one is supported on the vehicle bodywork and a second one is connected to said knee cushion, said force-locking elements being formed on said first lateral guide element by teeth spaced apart longitudinally thereof and having teeth flanks which form repelling ramps for the force-locking elements of said second lateral guide element, said lateral guide element under the action of the load acting in the event of activation on said knee cushion and directed inclined upwardly in the direction of travel being moved into mechanical interlock with each other, but when the load is removed being moved out of engagement with each other under the action of said repelling ramps of said teeth.

4,948,169

**STORAGE APPARATUS FOR FLATBED TRAILERS**

Lloyd A. Amundson, 29453 Culver La., Junction City, Oreg. 97448

Filed Sep. 6, 1989, Ser. No. 403,392

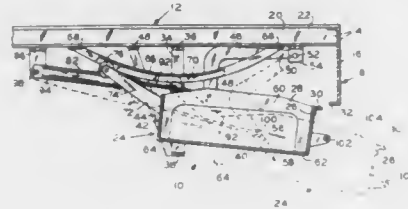
Int. Cl.<sup>5</sup> B62D 25/20

U.S. Cl. 280—769

11 Claims

1. A storage apparatus in combination with a flatbed trailer having a framework which includes longitudinal side rails, spaced transverse cross members, and mounting members rigidly attached thereto, the storage apparatus comprising:  
a. a storage box, having a front and a rear which are oriented parallel to the longitudinal side rails of the flatbed trailer, the front being closer to the side rail and the back being more distant from the side rail;  
b. a first support means for supporting the storage box in an up, traveling position beneath the flatbed trailer, said first support means formed to structurally and rigidly engage

with the framework of the trailer so as to completely support the weight of the storage box and contents in said up, traveling position, said first support means including a front support member in the form of a lip attached horizontally on, and extending outwardly from, the front of said storage box so as to engage on top of an inwardly extending flange of the side rail of the trailer, said engagement of the front support member on the flange of the side rail supporting the front of the storage box, and a rear



support member, rigidly attached to the trailer framework and extending downwardly to engage the rear of the storage box so as to support the rear of the storage box; c. a second support means, separate from the first support means, for supporting the storage box while in transition between the up, traveling position and a down, loading and unloading position, said second support means formed to pivotally engage with the framework of the trailer so as to support the weight of the storage box and contents during said transition.

4,948,170

#### GUIDE RAIL FOR PASSIVE SEAT BELT SYSTEM AND FABRICATION METHOD THEREOF

Katsuyasu Ono, Kanagawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

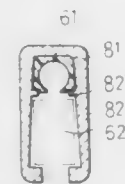
Filed Mar. 1, 1988, Ser. No. 162,516

Claims priority, application Japan, Mar. 2, 1987, 62-45277

Int. Cl.<sup>3</sup> B60R 21/10

U.S. Cl. 280—804

22 Claims



1. In a guide rail for guiding a movable anchor upon driving the movable anchor by a drive member, the improvement wherein the guide rail comprises a first guide portion for slidably guiding the movable anchor and a second guide portion combined as a unitary member with the first guide portion and adapted to slidably guide the drive member, the first and second portions are formed of discrete members, and the second guide portion is made of a material softer than the first guide portion;

wherein the first portion comprises a first section made of a steel sheet and a second section made of a steel sheet; the first section is formed in a substantially P-shape as viewed in a transverse cross-section thereof, thereby presenting a longer side wall, a top wall extending substantially at a right angle from one end of the longer side wall, and a shorter side wall extending substantially at a right angle from one end of the top wall, which is distal from the longer side wall, and substantially in parallel with the longer side wall and bent in parallel with the top wall toward the longer side wall; and the second section is

formed in a substantially L-shape as viewed in a transverse cross-section thereof, fixed at one of legs thereof on the shorter side wall of the first section and extending at the other leg thereof toward the longer side wall of the first section.

4,948,171

#### ACCELERATION SENSOR FOR SAFETY SYSTEMS AND/OR SEAT BELT SYSTEMS IN MOTOR VEHICLES

Walter Knabel, Murnau/Staffelsee; Josef Mayer, Unterschleissheim; Stephan Wentker, Dachau, and Walter Notar, Unterschleissheim, all of Fed. Rep. of Germany, assignors to Autoliv-Kolb, GmbH & Co., Dachau, Fed. Rep. of Germany

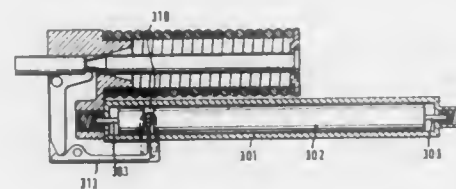
Filed Aug. 5, 1988, Ser. No. 228,999

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1987, 3726576; Sep. 3, 1987, 3729518; Sep. 17, 1987, 3731289

Int. Cl.<sup>3</sup> B60R 22/40

U.S. Cl. 280—806

5 Claims



1. An acceleration sensor for safety systems in motor vehicles, including seat belt systems such as buckle-connected tighteners, wherein a sensor mass is guided for a displacement and generally retained in a position of rest by retaining means but is displaced from its position of rest when the vehicle experiences a predetermined critical acceleration to cause actuation of the safety system, characterized in that the sensor mass is mounted on an axle having journals whose ends protrude from opposite ends of the sensor mass and extend into aligned bores formed in opposite walls of a housing,

generally hat-shaped cap members being fitted over the ends of said journals extending through the bores, each said hat-shaped member having a rim flange at its end which receives a said journal end and being positioned in the vicinity of a stop member fixed to the vehicle, and,

a compression spring being positioned between each rim flange and its adjacent stop member to hold rims against the walls of the housing when said sensor mass is in its position of rest.

4,948,172

#### COMBINED CLIP BOARD AND PEN HOLDER

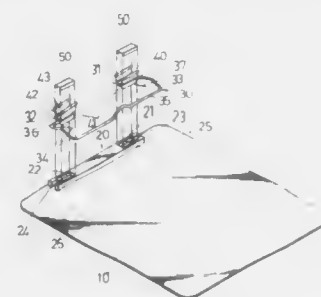
Shih-Ho Chang, No. 2-12, Chang-Lu Rd., Changhau City, Taiwan

Filed Jan. 17, 1989, Ser. No. 297,963

Int. Cl.<sup>3</sup> B42F 9/00

U.S. Cl. 281—45

1 Claim



1. A clip board comprising

a board having a top side, a bottom side and two opposing transverse sides,

an elongated clip mounting member integrally formed on and projecting from said top side adjacent to one of said transverse sides, said clip mounting member having a groove means which opens at a top side thereof and which extends longitudinally therein,

an insert means which is in the form of a U-shaped plate inserted in said groove means, said insert means having two upward extending portions which are open upward, a bend rod clip having a board engaging portion to engage with said board, two bend arm portions on two sides of said engaging portions, and two opposing end portions extending inwardly from said arm portions, said opposing end portions being received in said groove means,

two coil springs respectively provided around said opposing end portions, each of said coil springs having a board engaging portion which is threaded through said board and is then bent to be engaged with said bottom side of said board,

said upward extending portions of said insert means confining a channel means above said coil springs and being adapted to clamp therebetween releaseably a pencil or the like, and

a cover means inserted in said insert means above said coil springs, said cover means cooperating with said upward extending portions of said insert means to confine said channel means.

4,948,173

#### RECORD KEEPING ASSEMBLY HAVING LOCATING POSTS AND PEEL STRIP

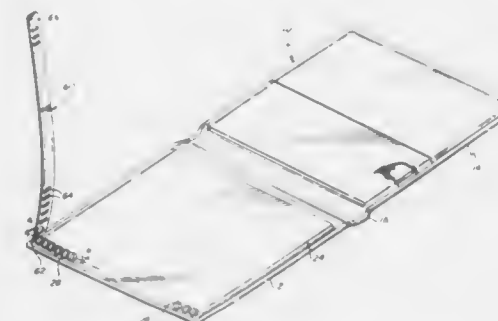
Daniel A. Hincks, Burlington; William T. Hincks, Madison, and Robert W. Hincks, Farmington, all of Conn., assignors to Data Management, Inc., Farmington, Conn.

Filed Sep. 28, 1989, Ser. No. 414,521

Int. Cl.<sup>3</sup> B41L 3/00

U.S. Cl. 282—29 B

12 Claims



1. In a record keeping assembly, the combination comprising:

(a) a base member having a panel with a multiplicity of upstanding locating elements spaced in a row along the length of one side thereof;

(b) a shingled assembly having a series of overlapping elongated sheets each having a multiplicity of apertures adjacent one side thereof through which said locating elements extend, thereby mounting said shingled assembly on said base member with said sheets extending across said panel;

(c) a flexible peel strip having one end secured to said panel adjacent said one side and at one end of said row of locating elements, said peel strip extending across said panel adjacent said one side and below said sheets of said shingled assembly, the other end of said strip projecting beyond the other end of said row of locating elements and the adjacent edge of said panel, said peel strip being adapted to be gripped by said projecting other end and

lifted upwardly to peel the portion of said sheets overlying said strip from said locating elements, said peel strip being adapted to bend and flex during said lifting and peeling.

4,948,174

#### FINANCIAL DATA PROCESSING SYSTEM

Eric A. Thomson, Newport Beach, Calif., and Stanley M. Josephson, Dallas, Tex., assignors to Remittance Technology Corporation, Irvine, Calif.

Continuation of Ser. No. 183,776, Apr. 20, 1988, abandoned.

This application Aug. 24, 1989, Ser. No. 399,376

Int. Cl.<sup>3</sup> B42D 15/00

U.S. Cl. 283—58

2 Claims



1. An integrated billing document comprising two portions, one portion being an invoice or billing document, and the other portion being a check document,

the invoice document comprising a printed invoice indicating a matter billed, and including in human readable form a billing entity's name and address, a customer's name and address, the customer's account number at the billing entity, and the total dollar amount due, and

the check document being in the form of a bank check having a first side and a second side with the first side having printed thereon in human readable form the customer's name and address as the payer, the bank name and address of the payer's bank and the payer's bank account number,



the account number of the customer/payer at the billing entity,  
the dollar amount due as indicated on the invoice document, and  
the matter billed as indicated on the invoice document, the first side having printed thereon in machine readable form  
the payer's bank transit/routing number,  
the payer's bank account number,  
the dollar amount to be paid, and  
the payer's account number at the billing entity,  
the first side of the check document further having date and signature portions left blank to be added by the payer at the time the check document is signed by the payer, and the second side of the check document having printed thereon  
the endorsement of the billing entity including the name of the billing entity,  
the name of the billing entity's depository bank,  
the account number of the billing entity at the depository bank, and  
the transit/routing number of the depository bank.

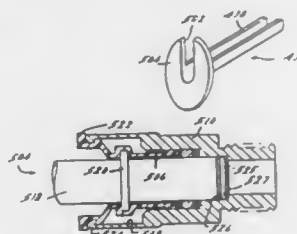
4,948,175

**SWIVELABLE QUICK CONNECTOR ASSEMBLY**  
Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.  
Division of Ser. No. 251,038, Sep. 26, 1988, which is a continuation of Ser. No. 127,532, Dec. 2, 1987, which is a continuation of Ser. No. 748,307, Jun. 24, 1985, which is a division of Ser. No. 360,201, Mar. 22, 1982, which is a continuation-in-part of Ser. No. 201,711, Oct. 29, 1980. This application Jun. 2, 1989, Ser. No. 360,548

Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 285—39

6 Claims



1. A connector assembly for use in communicating a fluid media, said assembly comprising:  
a conduit;  
a housing;  
a retainer element;  
a sealing element;  
said conduit being generally tubular shaped and including a first axially-extending portion having a relatively smooth cylindrical exterior surface and disposed adjacent the terminal end of said conduit, a second axially-extending portion of enlarged diameter disposed axially outwardly from said first axially-extending portion and adapted for engagement with said retainer element, a third axially-extending portion disposed axially outwardly from said second axially-extending portion and having an outer diameter smaller than the outer diameter of said second axially-extending portion;  
said sealing element being of an annular configuration and disposed in axial registry with said first axially-extending portion of said conduit and having an inner diameter sealing engaged with the exterior surface thereof;  
said housing having an axial bore adapted for receiving at least a portion of said conduit, said bore including a first portion communicable with a fluid passage and adapted to receive the terminal end of said conduit, a second portion adapted for sealing engagement with the outer diameter of said sealing element, and a third portion adapted to opera-

tively receive said retainer element, said third portion having means defining at least one radially extending surface cooperable with said retainer element for securing the same within said bore and preventing disassembly of said conduit from said housing;  
said retainer element including at least one relatively deformable portion extending substantially parallel to the axis of said conduit, at least one relatively non-axially deformable portion extending between the axially outer-side of said second axially-extending portion of said conduit and said radially-extending surface of said housing and thereby maintaining said retainer element within said bore and preventing withdrawal of said conduit from said housing, and said relatively deformable portion of said retainer element being sufficiently long and deformable to allow sufficient radial movement of said relatively non-axially deformable portion to permit said non-axially deformable portion to be biased radially outwardly by said second axially-extending portion of said conduit as said conduit is inserted into said bore, and to cause said relatively non-axially deformable portion to snap radially inwardly adjacent the axially outer side of said second axially-extending portion when said conduit is positioned in place within said bore; and  
including a removable tool free of attachment to said housing and slidable axially of said conduit for causing said relatively non-axially deformable portions of said retainer element to move out of engagement with said second axially-extending portion of said conduit to permit said conduit to be withdrawn from said housing.

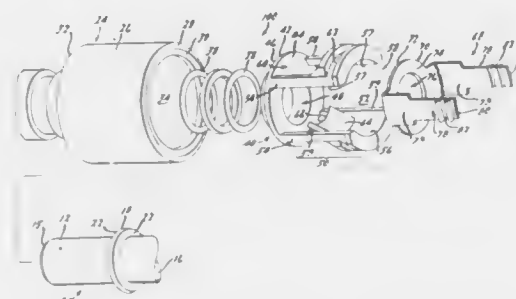
4,948,176

**SWIVELABLE QUICK CONNECTOR ASSEMBLY**  
Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.  
Filed Sep. 14, 1987, Ser. No. 96,676

Int. Cl.<sup>5</sup> F16L 35/00

U.S. Cl. 285—93

23 Claims



1. A fluid conveying connector assembly comprising separable first and second connector members adapted for axial mating engagement, characterized by lock means for locking the connector members together in mated relation, indicating means for indicating said members are fully mated, and an annular flange on one of said first or second connector members to drive against the indicating means, said lock means being associated with at least one of said first or second connector members and operating to constrain said indicating means for axial movement between a first position and a second position in response to one of said first and second connector members moving axially toward the other of said first or second axial connector members, said first and second positions representing, respectively, the unmated and mated positions of the connector members, and said lock means being operable to lock the connector members together only when the indicating means has reached said second position.

4,948,177

**LAMINATED FITTING FOR HEAT EXCHANGER**  
Dominic N. Dalo, Buffalo, and Peter G. Wolf, Tonawanda, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

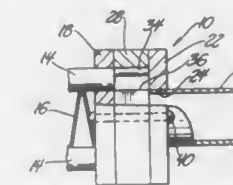
Division of Ser. No. 213,748, Jun. 30, 1988. This application

Apr. 3, 1989, Ser. No. 332,201

Int. Cl.<sup>5</sup> F16L 47/02

U.S. Cl. 285—132

4 Claims



1. A fitting for coupling to a flat tube serpentine heat exchanger comprising; a flat tube, tube coupling means comprising a first flat plate of uniform thickness having perforation means shaped to conform to and receive said flat tube, spacer means comprising a second flat plate of uniform thickness having an opening communicating with the perforation means and a margin surrounding the opening, the spacer means being bonded at its margin to the first plate, a third flat plate of uniform thickness beyond the margin of the second plate and having a port in communication with the opening in the spacer means, and tubular conduit means secured to the port in the third plate, whereby a fluid flow passage is provided between the conduit means and the perforation means, and the margin of the spacer means having inwardly extending stop means partially covering both the perforation means and the port to prevent both the flat tube and the conduit means from extending into the tube coupling means past the respective first plate and third plate to facilitate their proper assembly.

4,948,178

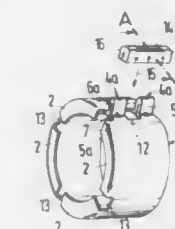
**HOSE FITTING WITH DEFORMABLE SLEEVE**  
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany  
Filed Jun. 26, 1989, Ser. No. 371,745

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1983, 3822041

Int. Cl.<sup>5</sup> F16L 33/20

U.S. Cl. 285—242

6 Claims



1. A sleeve for securing one end of a tubular member to the end portion of a hose, comprising a radially inwardly deformable tubular body arranged to surround the end portion of the hose and to urge the end portion against the one end of the tubular member as a result of radially inward deformation thereof, said body having a substantially axially parallel slot and including two marginal portions flanking said slot; and at least one bridge extending across said slot externally of said body and including two sections each of which is integral with a different one of said marginal portions, said sections extending substantially radially outwardly from said body and the connection between said at least one bridge and at least one of said marginal portions being a separable connection to permit

widening of said slot preparatory to separation of deformed body from the end portion of the hose, said at least one bridge further including means for coupling said sections to each other and said coupling means comprising a hood which confines said sections.

4,948,179

**QUICK CONNECT FITTING FOR SMOOTH WALL CONDUIT**

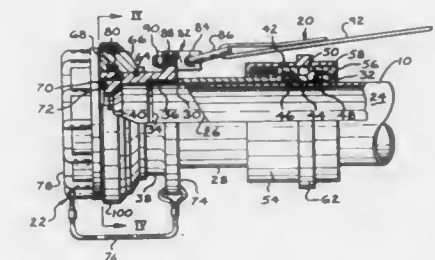
Ernest F. Kulikowski, Albion; Brian A. Mack, Horton, and Paul J. E. Fournier, Jackson, all of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Jul. 17, 1989, Ser. No. 380,395

Int. Cl.<sup>5</sup> F16L 37/18

U.S. Cl. 285—316

3 Claims



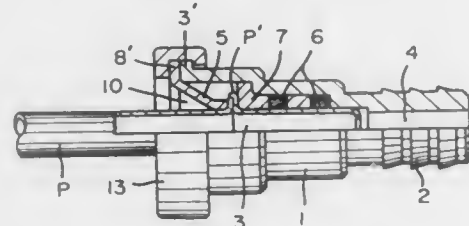
1. A quick connect fitting to be installed over the end of a smooth wall conduit adapted to be connected to a standard adapter mounted on the end of a hose line for placing the conduit in fluid communication with the hose line, comprising, in combination, a tubular body having an axial passage extending therethrough between a conduit connection end and an adapter attachment end, coupling means defined on said body adjacent said attachment end for coupling said body to a standard adapter, latch means located adjacent said conduit connection end adapted to engage with the smooth cylindrical surface of the associated conduit for maintaining the associated conduit and said body connected in fluid communication, said latch means comprising a plurality of circumferentially spaced spherical ball detents mounted in said body radially displaceable thereto, a plurality of circumferentially spaced oval shaped slots formed in said body adjacent said conduit connection end each having a longitudinal length extending in the same direction as said passage and said length being greater than the diameter of said ball detents, one of said ball detents being located in each of said slots, a latch sleeve slidably mounted on said conduit attachment end axially displaceable between lock and release positions, an inner conical surface defined on the interior of said sleeve converging in the direction of movement of said sleeve when moving toward said release position, a spring interposed between said body and said sleeve biasing said sleeve toward said lock position, said slots' length permitting limited linear rolling displacement of said balls within said slots as said sleeve is displaced toward said lock position, said sleeve conical surface engaging said ball detents wedging and maintaining said ball detents in engagement with the associated conduit surface when said sleeve is in said lock position and permitting radial displacement of said detents when said sleeve is in said release position to disengage said detents and the conduit surface, and sealing means disposed within said axial passage establishing a fluid seal with the conduit surface.

4,948,180

**CONNECTOR FOR TUBE OF SMALL DIAMETER**  
Masayoshi Usui, and Kazunori Takikawa, both of Numazu, Japan, assignors to Usui Kokusai Sangyo Kaisha Ltd., Japan  
Filed Aug. 22, 1989, Ser. No. 396,958  
Int. Cl.<sup>3</sup> F16L 39/00

U.S. Cl. 285—319

7 Claims



1. A connector for a tube having a small diameter and opposed first and second ends, said tube further including an outwardly swelling annular portion in proximity to the first end of the tube, said connector comprising:

a body defining a generally tubular wall having opposed front and rear axial ends, an axially extending communication hole formed in the front axial end of the tubular wall, a large stepped chamber formed in the rear axial end of the tubular wall of the body and communicating with the communication hole at the front end of the body, said chamber being dimensioned to receive the outwardly swelling annular portion of the tube, a jaw wall protruding outwardly from the rear end of the tubular wall, and annular seal means mounted in the chamber for providing sealing between the tube and the body, the seal means including a central aperture for receiving the first end of the tube and being dimensioned to be abutted by the outwardly swelling annular portion of the tube spaced from the first end thereof;

at least one socket member for engaging a side of the outwardly swelling annular portion of the tube facing the second end of the tube and thereby retaining the first end of the tube in the socket, said socket member including a base mounted against the rear axial end of the body and at least one resilient claw wall having a front end protruding forwardly from the base of the socket member such that the front end of the resilient claw wall extends into the chamber of the body, the length of each said claw wall being selected such that the front end thereof engages the outwardly swelling annular portion of the tube and retains the outwardly swelling annular portion of the tube against the annular sealing means; and

a retaining member comprising an annular wall engaging a face of the base of the socket member opposite the body and a plurality of axially extending claw walls extending axially over the outer periphery of the socket member and the jaw wall of the base, each said engaging claw wall including a forward end portion bent radially inwardly into tight engagement with a forwardly facing portion of the jaw wall for securely retaining the socket member against the rear axial end of the body.

4,948,181

**ROTO CAM LATCH**

Timothy R. Pritchard, Grants Pass, Oreg., assignor to Environmental Container Systems, Inc., Grants Pass, Oreg.  
Continuation of Ser. No. 90,025, Aug. 27, 1987, Pat. No. 4,844,518. This application Mar. 3, 1989, Ser. No. 319,122  
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.  
Int. Cl.<sup>3</sup> E05C 9/00

U.S. Cl. 272—28

9 Claims

1. A locking latch for a container having an interior, an exterior, a first part and a second part, said first part formed by

a wall having an interior, an exterior and a catch mounted on the interior of said wall, and said second part formed by a container wall having an interior and an exterior, said locking latch mounted generally on the interior of said wall of said second part in a position to engage and draw the catch towards the locking latch when said first part and said second part of said container are joined, said locking latch comprising:

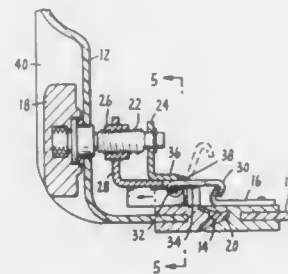
a threaded shaft having a first end and a second end, and a longitudinal axis passing through said first end and said second end of the threaded shaft, said first end being supported by the wall of said second part of said container;

a means for supporting said threaded shaft at the second end thereof;

a means for rotating said threaded shaft movable from the exterior of said container;

a threaded receiver mounted on said threaded shaft and adapted to travel on said threaded shaft toward said first end of said threaded shaft when said means for rotating is rotated in one direction, and toward said second end of said threaded shaft when said means for rotating is rotated in an opposite direction;

a slidable bracket having a first end, a second end and a generally planar top surface, said first end of said slidable



bracket attached to said threaded receiver, and said slidable bracket adapted to slidably move parallel to the longitudinal axis of said threaded shaft;

a movable latch member attached to said second end of said slidable bracket, said movable latch member having a first and a second end, and a top surface and bottom surface, said first end of said movable latch member being formed to engage said catch such that said bottom surface of said first end contacts the catch, and said second end of said movable latch member being attached to said second end of said slidable bracket such that said first end of said movable latch member may be moved in the same direction as the slidable bracket and rotated up out of or down towards the planar top surface of said slidable bracket;

a means for moving said movable latch member up out of the planar top surface of said slidable bracket; and,

means mounted over said planar top surface of said slidable bracket between said first and second ends of said slidable bracket for guiding said bracket for movement parallel to the longitudinal axis of the threaded shaft and contacting said top surface of said movable latch member to force said movable latch member down into the planar top surface of said slidable bracket when said first end of said slidable bracket moves away from said barrier means.

4,948,182

**COVER LOCKING APPARATUS FOR A RECORD MEDIUM PLAYER**

Akira Ishikawa, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

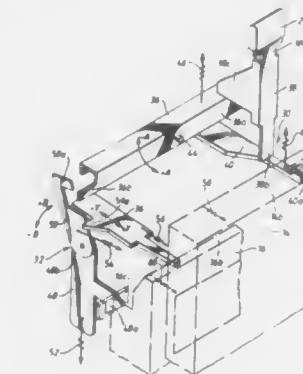
Filed Oct. 24, 1988, Ser. No. 261,199

Claims priority, application Japan, Oct. 30, 1987, 62-166509[U]

Int. Cl.<sup>3</sup> E05C 7/06

U.S. Cl. 292—30

6 Claims



1. A cover locking apparatus for a record medium player having two covers movably attached to the player under a bias, comprising:

a lock assembly including a first lock member correspondingly to one cover and a second lock member correspondingly to the other cover;

engaging means on each cover for interacting with the first and second lock members, respectively, for engaging the covers in a closed positions wherein the covers are held against the bias; and

lock release means including only a single manual release member for releasing both the covers from the closed position.

4,948,183

**DOOR LOCKING DEVICE FOR VEHICLES**

Shinjiro Yamada, Nirasaki, Japan, assignor to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

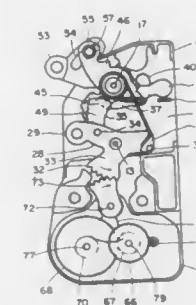
Filed Dec. 21, 1989, Ser. No. 454,609

Claims priority, application Japan, Dec. 21, 1988, 63-322960

Int. Cl.<sup>3</sup> E05C 3/26

U.S. Cl. 292—199

1 Claim



1. A door locking device for vehicles, comprising a device body having a recess on the front side thereof, a mounting space on the rear side thereof and a mounting member at the lower portion thereof; a latch and a ratchet supported in said recess so that, when a striker fixed to a chassis engages said latch to turn the latch counter-clockwise, said ratchet disengageably engages said latch to prevent said latch from being reversely turned; an opening lever supported pivotally in said

mounting space for connecting to a door handle; a locking lever supported in said mounting space so that said locking lever can be turned between an unlocking position in which said opening lever and said ratchet are engaged with each other, and a locking position in which said opening lever and said ratchet are disengaged from each other, and having a first fan-shaped gear portion; an actuator provided on said mounting member, adapted to switch said locking lever from a locking position to an unlocking position, and vice versa, and having a motor, reduction gears, a one-way clutch and an output shaft which are supported on a frame, wherein said output shaft is provided in parallel with a central shaft of said locking lever; a case attached to said mounting member and sealing said actuator so that only said output shaft of said actuator extends through said case to project from a rear side of said device body; and a second fan-shaped gear portion mounted fixedly on said output shaft and meshed with said first gear portion.

4,948,184

**MOTOR VEHICLE DOOR LOCK**

Bernd Weyerstall, Wuppertal; Klaus Claar, Sindelfingen, and Jan Schilling, Gechingen, all of Fed. Rep. of Germany, assignors to Bomoro Bocklenberg & Motte GmbH & Co. KG, Wuppertal and Daimler-Benz AG, Stuttgart, both of, Fed. Rep. of Germany

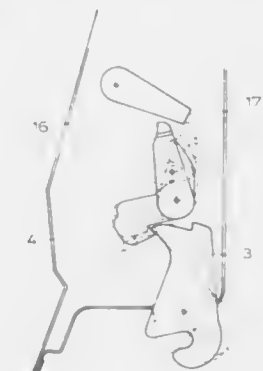
Filed Jan. 17, 1989, Ser. No. 297,397

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1988, 3801581

Int. Cl.<sup>3</sup> E05C 3/26

U.S. Cl. 292—216

5 Claims



1. Motor vehicle door lock comprising a pivotally mounted locking catch, a pivotally mounted pawl, said pawl blocking the locking catch in a preliminary locking position and a main locking position, and a locking mechanism for operating the locking catch and pawl, said locking mechanism having at least one release lever for swinging the pawl into a release position freeing the locking catch, and means for retaining the pawl in said release position, independent of further operation of the release lever, until said locking catch has been shifted from said main locking position and has passed the preliminary locking position, and for freeing said pawl from its release position thereafter, said means for retaining being operative only when said pawl is moved into said release position with the locking catch in its main locking position

said means for retaining comprising a blocking lever pivotally mounted for swinging into a blocking position in a path of movement of at least one of the pawl and a component coacting with said pawl, such that said pawl is retained in said release position when said blocking lever is in said blocking position;

said blocking lever including a stop arm which projects into the path of movement of at least one of the locking catch and a drive pin on the locking catch, whereby said block-



ing lever is swung by displacement of said stop arm, from said blocking position into a position in which the pawl is freed; wherein said blocking lever comprises a multipart construction which includes a transmission lever for interacting with one of said pawl and said component, and a reversing lever, said reversing lever comprising said stop arm.

4,948,185

## HATCH COVER ASSEMBLY

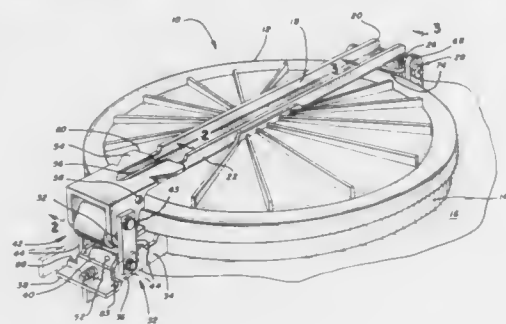
Roy W. Miller, Highland, Ind., assignor to Pullman Leasing Company, Chicago, Ill.

Filed Aug. 21, 1989, Ser. No. 396,138

Int. Cl.<sup>5</sup> E05C 15/00

U.S. Cl. 292—256,5

5 Claims



1. A hatch cover assembly for a railway car having a deck, coaming mounted thereon, a hatch cover mounted for movement to a closed position covering the coaming and an open position uncovering said coaming, and means for limited movement of the hatch cover to open position spaced from the deck to prevent damage thereto, and latching means swingable to locking association with the cover to hold the cover in closed position and pivotal to an unlocked position toward the deck, and means for limiting the pivotal movement of the latching means to prevent said locking means from striking and damaging the deck comprising a bracket with upwardly facing surfaces flanking said latching means and engageable therewith upon downward movement thereof.

4,948,186

## LIFTING MEANS FOR A PAPER ROLL

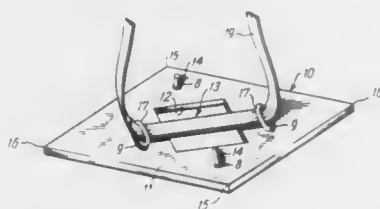
Robert C. Pruitt, Newberry, S.C., assignor to Carolina Slings Co., Inc., Hardeeville, S.C.

Continuation-in-part of Ser. No. 340,447, Apr. 19, 1989. This application Jul. 25, 1989, Ser. No. 384,569

Int. Cl.<sup>5</sup> B65H 49/00; B66C 1/16

U.S. Cl. 294—67.1

14 Claims



14. The combination including a roll of paper having an upper edge and lower edge, said roll of paper being received on a cylindrical core, said core having a pair of opposed open ends and a hollow interior extending from one open end of said core to the other open end of said core, the ends of said core

respectively terminating adjacent to the edges of said roll of paper, wherein the improvement comprises:

- a rigid metal support plate having a flat upper surface for being removeably received on the lower edge of said roll of paper when said plate is disposed in a lifting position adjacent to said lower edge of said roll of paper;
- a pair of spaced opposed metal strap receiving loops fixedly mounted by their lower portions to said plate, said loops extending above said upper surface of said plate and having upper portions in a common plane spaced above said upper surface of said plate, said loops defining opposed aligned elongated openings spaced from each other;
- a flexible strap having a lower portion passing through said openings and a remaining portion of sufficient length that it will pass through the hollow portion of said core, when said plate is disposed adjacent to said lower edge of said roll of paper and adjacent to one end of said core, and an end portion of said strap protrudes outwardly beyond the other end of said core, a portion of said strap between said loops extending generally in a plane above said flat upper surface of said plate; and
- the space between said loops being sufficient for both of said loops to be received in the interior of said core when said plate is received against said lower edge of said roll of paper.

4,948,187

## CRANE OPERATED LIFTING APPARATUS

Klaus Blaseck, Ehlershausen, Fed. Rep. of Germany, assignor to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hannover, Fed. Rep. of Germany

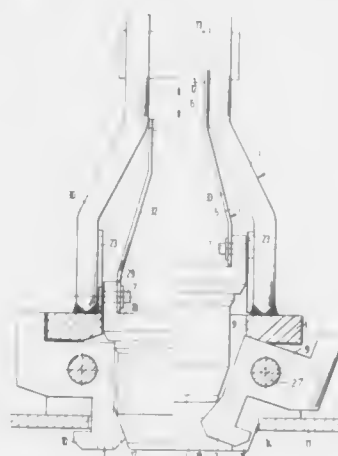
Filed Mar. 15, 1989, Ser. No. 322,931

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808644

Int. Cl.<sup>5</sup> B66C 1/54, 1/66

U.S. Cl. 294—95

16 Claims



1. A conveying means for remotely gripping and safely moving objects by means of a crane, comprising a first holding member to be grasped by a crane hook and movable pawls adapted to be moved back and forth between first and second limit positions by a driving member, the pawls engaging the object in their first limit position and releasing the same in their second limit position, wherein a second movable holding member is provided which is connected to the driving member, the two holding members being movable with respect to each other, the pawls being moved into one of the first and second limit positions when the hook grasps and pulls the second holding member, and the pawls being moved into the other of the first and second limit positions when the hook releases the second holding member, the two holding members being movable with respect to each other in such a manner that one of the two, selectively, can be grasped by the hook, the two holding

members being embodied by U-shaped saddles and the second holding member is both movable in a direction along a center axis of the first holding member and tiltable with respect to a center axis of the first holding member, the two holding members each being made of two plates which are interconnected by a connecting member located at a distance from the driving member, the connecting members of the first and second holding members having mutually matching shapes such that they are in engagement with each other in the second limit position.

4,948,188

## SNOW SHOVEL

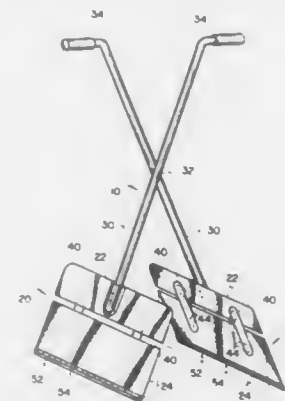
Stephen D. Haslam, 3910 W. Erie Ave. Apt. B-1, Lorain, Ohio 44053

Filed Oct. 16, 1989, Ser. No. 421,822

Int. Cl.<sup>5</sup> A01B 1/22; E01H 5/02

U.S. Cl. 294—54.5

20 Claims



1. A manually operated snow shovel comprising a first substantially flat blade and a second blade substantially identical thereto and operating in opposition thereto, said blades disposed at the ends of mutually crossing pivoted elongate handles, each said handle having a long axis thereof, and wherein each said blade comprises a blade section proximal a corresponding said handle and a blade section distal said corresponding handle, said distal blade section being pivotably connected to said proximal blade section so as to have a pivot axis that is substantially perpendicular to the long axis of said handle and said distal blade section is biased by a biasing means that urges it to be a coplanar with said proximal blade section.

4,948,189

## SEAT SLIDE ASSEMBLY

Takami Terada, Toyota; Saburo Suzuki, Tokoname; Sadao Ito, Toyooka, and Masayuki Yamazaki, Himi, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 23, 1989, Ser. No. 327,496

Claims priority, application Japan, Mar. 24, 1988, 63-038971[U]

Int. Cl.<sup>5</sup> B60N 2/06

U.S. Cl. 296—65.1

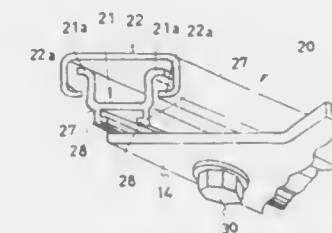
6 Claims

1. A seat slide assembly, attached to a base surface, comprising:

- an upper rail portion for fixedly attaching to the seat;
- a lower rail portion including a generally horizontal base having upper and lower sides and right and left edges, a pair of spaced flanges upwardly projecting from the upper side at the respective right and left edges, slidably engaging the upper rail portion, and a pair of spaced flanges downwardly depending from the lower side at the respective right and left edges;
- a nut member having top and bottom surfaces and an outer peripheral surface, the top surface of said nut member fixed to the lower side of the base of said lower rail por-

tion, and the outer peripheral surface encircled by a groove;

a tongue portion projecting inwardly from each of said downwardly depending flanges of said lower rail portion,



said tongue portions inserted in the outer peripheral surface of the nut member, including means for engaging said groove; and a bolt member threadably engaging said nut member for attaching the assembly to the base surface.

4,948,190

## LOCKING FLAPPER TYPE LATCH FOR CRANE HOOK

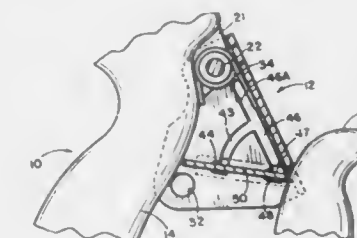
Charles E. Lucas, Tulsa, Okla., assignor to The Crosby Group, Inc., Tulsa, Okla.

Filed Jul. 24, 1989, Ser. No. 383,707

Int. Cl.<sup>5</sup> B66C 1/36

U.S. Cl. 294—82.2

5 Claims



5. A gate latch attachable to a hook for pivotal movement that is normally biased to close a mouth of said hook, said latch comprising:

- a U-shaped body defining a right side and a left side extending rearwardly from a front side;
- a prevent member having a pivot leg means and a spaced guide leg means, at least one of said pivot leg means and said guide leg means having a narrow portion and a wide portion;
- transversely aligned arcuate slot means in each said right and left sides with a radial recess at each end of at least one of said arcuate slot means, said arcuate slot means of a width to receive only said narrow portion and each said recess of a size to receive said narrow portion and said wide portion; and
- spring means to normally bias said prevent member transversely of said U-shaped body such that when said wide portion is in said radial recess, said prevent member is locked in a non-rotative mode.

**4,948,191**  
**PROTECTOR FOR A ROOF AND WINDOWS OF A MOTOR VEHICLE**

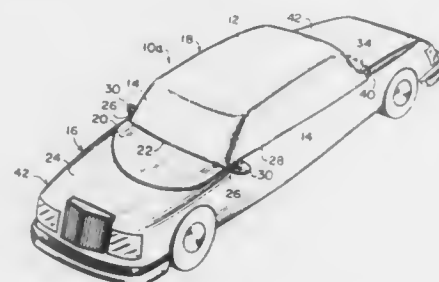
Dac-Bau Cao, 652B W. Main St., Tustin, Calif. 92680

Filed Nov. 20, 1989, Ser. No. 438,242

Int. Cl.<sup>5</sup> B60J 11/00

U.S. Cl. 296—95.1

5 Claims



1. A protector for a roof and windows of a motor vehicle, said protector comprising:

- a crown formed from a sheet of flexible waterproof material sized to cover the roof and windows of the motor vehicle;
- a weighted front brim member affixed to the front edge of said crown to serve as a decorative piece on the hood of the motor vehicle and as a front anchor to keep the front part of said crown in place over the roof and windows of the motor vehicle;
- a pair of elastic loops, each affixed to one side edge of said crown near said front brim member to be hooked onto one side view mirror of the motor vehicle to serve as an auxiliary front anchor to keep the front part of said crown in place over the roof and windows of the motor vehicle;
- an elastic band affixed to the rear edge of said crown to serve as a rear anchor to keep the rear part of said crown in place over the roof and windows of the motor vehicle.

**4,948,192**  
**WINDSHIELD COVER APPARATUS**

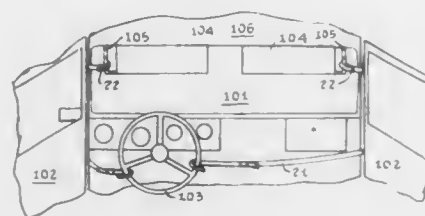
Jay M. Sohne, 202 Oak Forest Ter., Euless, Tex. 76039

Filed May 2, 1989, Ser. No. 346,191

Int. Cl.<sup>5</sup> B60J 1/20

U.S. Cl. 296—95.1

1 Claim



1. A windshield cover apparatus for use with a vehicle having a windshield; a steering wheel; a pair of front doors and a pair of sun visors suspended from the roof of the vehicle by support arms wherein the apparatus consists of:

- a cover unit comprising a generally rectangular cover member dimensioned to overlie the vehicle windshield; and,
- a securing unit comprising an upper and a lower pair of adjustable strap members secured on one end proximate the corners of the generally rectangular cover member and provided on their other ends with a hook element which is adapted to engage a selected one among the steering wheel and sun visor support arms of said vehicle; wherein, the combined length of the upper pair of strap

members are relatively short and are dimensioned to engage the respective nearest support arms of the sun visors via their respective hook elements; and,

wherein the combined length of the lower pair of strap members are longer than the upper pair of strap members, and one of the pair of lower strap members is substantially longer than the other lower strap member such that the hook elements on the respective lower strap members will engage the opposite sides of the vehicle steering wheel.

**4,948,193**  
**SLIDABLE TRUCK COVER ASSEMBLY**

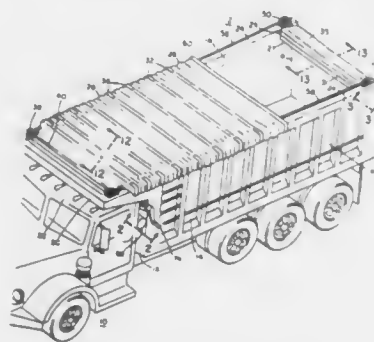
Robert C. Weaver, Port Matilda, Pa., assignor to Robert C. Weaver, Port Matilda; Robert Semion, State College; John H. Imbt, State College and Marlin K. Gingrich, State College, all of, Pa.

Continuation of Ser. No. 139,444, Dec. 30, 1987, Pat. No. 4,858,984, which is a continuation-in-part of Ser. No. 888,001, Jul. 22, 1986, Pat. No. 4,725,090. This application Jul. 25, 1989, Ser. No. 384,650

Int. Cl.<sup>5</sup> B60P 7/03

U.S. Cl. 296—100

15 Claims



1. A slidable truck cover assembly for covering the open bed of a truck having side, front and rear walls, comprising front pulleys mounted to the front portion of the truck bed, an axle connecting the front pulleys, rear pulleys mounted to the rear portion of the truck bed, cables extending between the front pulleys and the rear pulleys in looping relationship, a plurality of slats extending between said cables and attached thereto in a slipping relationship, cable connecting means for connecting the cables to a slat, a tarpaulin attached to the slats, the tarpaulin having side portions that extend over the side walls of the truck, a lateral tarpaulin support mounted on the end of each slat over the tarpaulin and extending downwardly over and adjacent to the side walls of the truck for holding the side portions of the tarpaulin close to the side walls of the truck, and bi-directional rotating means for rotating the axle.

**4,948,194**  
**FLEXIBLE ROOF FOR A CONVERTIBLE MOTOR VEHICLE, PROVIDED WITH A SAFETY HOOK FOR THE REAR ARCH OF THE ROOF FRAME**

Enrico Dogliani, Pecetto, Italy, assignor to Industrie Pininfarina S.p.A., Turin, Italy

Filed Jul. 11, 1989, Ser. No. 378,146

Claims priority, application Italy, Jul. 11, 1988, 53292/88[U]

Int. Cl.<sup>5</sup> B60J 7/00

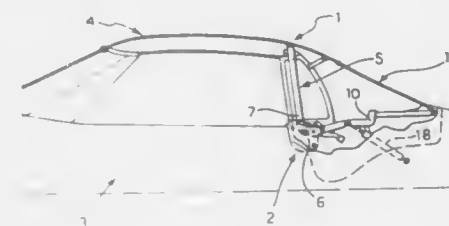
U.S. Cl. 296—108

4 Claims

1. A flexible roof for convertible motor vehicles which is

movable between an extended position in which it covers the passenger compartment of a motor vehicle and a folded, non-covering position, the flexible roof comprising:

- a pivoted framework for connection to the body of the motor vehicle;
- a flexible fabric cover associated with the framework;
- a main arched structure which forms part of the framework and is articulated at its ends to respective supports connected to the motor vehicle body, the main structure being movable between a vertical position in which the roof is extended and a horizontal position in which the roof is folded, the ends each carrying an anchoring pin and a bracket;



- a rear arched member which forms part of the framework and is articulated at its ends to the bracket, the arch being movable between a horizontal position and a vertical position substantially beside that of the main arch structure, the rear arch carrying a catch device which can engage the anchoring pin of the main arch structure when the rear arch is in its vertical position; and
- the roof being characterized in that it includes a hook mounted on each support, the hook engaging the anchoring pin when the main arch structure is in the vertical position so as to prevent the main arch structure from pivoting, the hook being released from the anchoring pin by the catch device of the rear arch when the catch device engages the anchoring pin so as to enable the structure and the arch to pivot freely together.

**4,948,195**  
**GAP CLOSER FOR AUTOMOBILE SEATS**

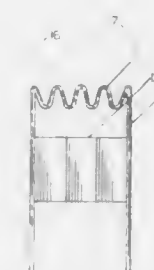
William W. Saunders, 2537 Navarra Dr., Carlsbad, Calif. 92089

Filed Aug. 11, 1989, Ser. No. 392,593

Int. Cl.<sup>5</sup> A47D 15/00

U.S. Cl. 297—182

1 Claim



1. A gap closer for the space between the front seats of an automobile and the console wherein the improvement comprises:

- (a), two spaced flat vertical cardboard or plastic closed at the top by a horizontal accordion pleated portion forming a first wedge;
- (b) a second wedge longitudinally slidable within the first wedge said second wedge formed by two spaced flat vertical cardboard or plastic members closed at the top by a horizontal accordion pleated portion;
- (c), the inside spacing between the vertical walls of said

wedges being adjustable due to the horizontal accordion pleated portions, which is determined by adhesively joined blocks of a compressible elastomer material inserted between said vertical members;

- (d), the individual blocks of elastomer material covered on each end with an adhesive coating that is protected during shipping by a peel-off layer of non-adhesive material;
- (e), the first and second wedges joined longitudinally to provide a structure of a desired total length to fit a specific installation.

**4,948,196**  
**PROTECTIVE BEAM FOR AUTOMOBILE SIDE DOORS**

Yuko Baba, and Tatsuo Ichikawa, both of Yokohama, Japan, assignors to Hashimoto Forming Industry Co., Ltd., Yokohama, Japan

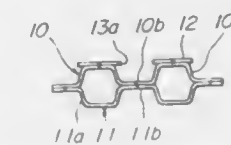
Filed Jun. 20, 1988, Ser. No. 208,598

Claims priority, application Japan, Jun. 23, 1987, 62-97253[U]

Int. Cl.<sup>5</sup> B60J 5/04

U.S. Cl. 296—188

7 Claims



1. A protective beam for an automobile side door, comprising a main body which includes a pair of elongate steel sheet members of corrugated cross-section with alternately arranged ridge portions and groove portions, the ridge and groove portions of one steel sheet member being opposed to the ridge and groove portions of another steel sheet member, respectively, ridge portions of said one steel sheet member being oriented in opposite directions to extend from opposite, ridge portions of said another steel sheet member, the steel sheet members being integrally connected to each other along the opposite groove portions such that a hollow space is defined by each pair of the opposite ridge portions of the steel sheet members, said hollow space having a height which is substantially twice that of each of said ridge portions, at least one of the steel sheet members having at least one longitudinal end region of a predetermined length, said corrugated cross section of sheet members being substantially identical and uniform, except at said longitudinal end region; said opposite ridge portions of said pair of steel sheet members forming side edges of said protective beam; said longitudinal end region being of a one-piece construction with said at least one of the steel sheet members to terminate at one longitudinal end thereof, each ridge portion of said at least one steel sheet member having a predetermined height along said end region, said predetermined height (i) gradually decreasing toward said one longitudinal end to form a generally flat mounting seat to be secured to a predetermined location of the door and (ii) being smaller along its entire extent than a width of each ridge portion of said at least one steel sheet member, wherein said main body has a reinforcing plate which is secured to said steel sheet members such as to bridge said ridge portions.

**4,948,197**  
**CHILD SHAMPOOING CHAIR**

Dayna L. Sansing, 29500 Heathercliff #79, Malibu, Calif. 90265

Continuation-in-part of Ser. No. 329,199, Mar. 27, 1989, abandoned. This application Sep. 20, 1989, Ser. No. 409,762

Int. Cl.<sup>5</sup> A47C 1/06, 3/34

U.S. Cl. 297—194

1 Claim

1. A child shampooing chair comprising: a substantially planar seat section adapted to connect with the buttocks of a child;

- a substantially planar back section connected by a pivot joint

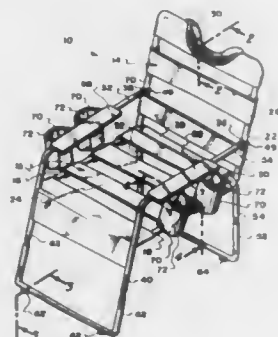


to said seat section, said back section assuming a transverse location to said seat section, said back section adapted to connect with the back of a child, said back section being adjustably movable to various inclined positions relative to said seat section;

a leg assembly attached to said seat section, said leg assembly being adjustable in length to change the distance of said seat section from a supportive surface;

said back section having a free upper edge adapted to contact with the neck of a child, said free upper edge including a recess, said recess including a resilient pad;

a pair of spaced apart arm member assemblies connected between said back section and said seat section, each said arm member assembly comprising a pair of arm members movable relative to each other to permit adjusting movement of said back section relative to said seat section with pivoting occurring through said pivot joint, each said arm member assembly including locking means for fixing the



established position of said back section relative to said seat section, a said arm member of each said arm member assembly being pivotally connected to said back section so as to permit limited pivoting movement therebetween as said back section is moved to the various inclined positions, each said arm member assembly including a planar armrest defining a horizontally disposed planar surface, said planar surfaces of said arm member assemblies being in alignment and in a single horizontal plane, each said planar armrest being movably mounted on its respective said pair of arm members; and

at least one container support device being fixedly secured to each said armrest member assembly, each said container support device includes a plurality of recesses, a said recess is to facilitate connection with a separate container such as a bottle of shampoo, each said recess has a longitudinal center axis, each said longitudinal center axis being inclined relative to vertical establishing a non-perpendicular position relative to said single horizontal plane.

4,948,198

## KNEE-TILT CHAIR CONTROL

Philip Crossman, Holland; Kenneth C. Hybarger, Belmont; Bryan H. Zeeuw, Lowell, and David A. Young, Grand Rapids, all of Mich., assignors to Leggett & Platt, Incorporated, Carthage, Mo.

Filed Oct. 14, 1988, Ser. No. 258,172

Int. Cl. A47C 3/026

U.S. Cl. 297—304

21 Claims

1. A chair comprising

a base,

a spindle extending vertically from the base,

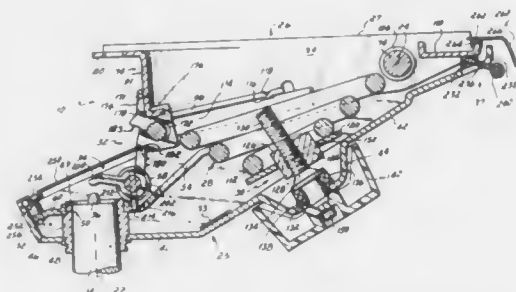
a knee-tilt chair control mounted atop said spindle, said control comprising

a base plate, said base plate having a spindle mount located at the rear of said base plate and a horizontal pivot axis at the front of said base plate,

a chair seat plate mounted upon said base plate for pivoted movement about said horizontal pivot axis,

a low profile, conical helical compression spring located between said base plate and seat plate and operable to bias said seat plate to an at-rest position relative to said base plate, said spring being supported from said base plate and located between said horizontal pivot axis at the front of said base plate and said spindle mount at the rear of said base plate,

said low profile, helical compression spring having a large diameter coil at one end and a small diameter coil at the opposite end, said small diameter coil of said spring



being movable through said large diameter coil in the course of fully compressing said spring during tilting movement of said chair seat plate relative to said base plate,

said small diameter coil of said spring being supported from said chair base plate,

said large diameter coil being at least partially surrounded by and contained within a striker, said striker being engageable with said chair seat plate to limit tilting of said chair seat plate relative to said base plate, and extending through a hole in said striker, and said striker being fixedly secured to said chair seat plate.

4,948,199

## FORCE-LIMITING ENERGY ABSORBER ON A SAFETY BELT DEVICE

Hermann Weller, Alfdorf-Burgholz, Fed. Rep. of Germany, assignor to TRW Repa GmbH, Fed. Rep. of Germany

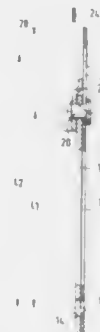
Filed Jan. 17, 1989, Ser. No. 297,765

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801858

Int. Cl. A62B 35/04

U.S. Cl. 297—472

3 Claims



1. A force-limiting energy absorber for safety belt systems comprising two end fittings, a plurality of stretch members which are connected in series between a first one and a second one of said end fittings and adapted to be stretched under tensile load form the belt system through a predetermined

desired extension length, each of said stretch members defining an opening surrounded by a flat boarder portion deformable under tensile load, a stretch-limiting element having a first end connected to said first end fitting and a second end provided with a longitudinally extending slot, said slot having a length which corresponds to said predetermined desired extension length, and a pin connected with a second one of said end fittings and engaging into said slot, said first end fitting and said first end of said stretch-limiting element each having an opening for joint connection to a fitting or motor vehicle part, the other of said end fittings being provided with a belt webbing securing fitting.

4,948,200

## BRAKE PRESSURE SETTING DEVICE

Heinz Leiber, Oberriexingen, and Manfred Stelner, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

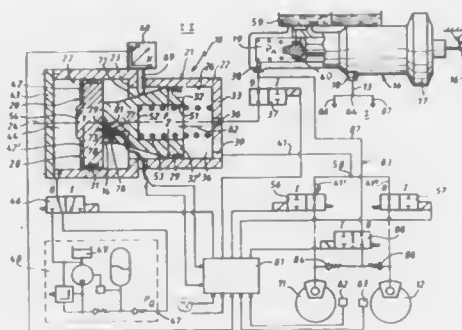
Filed Apr. 17, 1989, Ser. No. 339,110

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812830

Int. Cl. B60T 8/32, 8/40, 13/10; G05D 13/00

U.S. Cl. 303—115

20 Claims



1. Brake pressure setting system for vehicle brakes for stabilizing dynamic behavior of a road vehicle by its brake installation including a control for brake pressure build-up, brake pressure retention and brake pressure reduction phases wherein said vehicle has at least two driven wheels and a wheel brake for each of said driven wheels;

the wheel brakes of the two driven vehicle wheels being combined in a static brake circuit;

a pressure modulator means with an electrically drivable inlet control valve means connecting said pressure modulator means to an outlet pressure space of a brake unit when said inlet valve means is in a basic position and disconnecting said pressure modulator means when said valve means is in a shut off position;

said pressure modulator means being designed as a stepped cylinder with two bore steps of different diameters and with a stepped piston means in said bore steps;

said stepped piston having two flanges with diameters that correspond to the different diameters of the bore steps;

said stepped piston means being displaceable in said bore steps in a pressure tight manner;

said flanges each forming axially movable boundaries of a modulation chamber and a control pressure space, respectively;

said modulation chamber being bounded by the smaller diameter piston step of said two different diameter steps and connected via the pressure inlet control valve means when in a basic position to the outlet pressure space of the brake unit as well as being permanently connected to a section of a main brake pipe of the static brake circuit which branches off to the wheel brakes;

said pressure modulator means being provided with a return spring which urges the modulator piston means into a

basic position associated with a maximum volume of the modulation chamber;

said control pressure space being bounded by the larger diameter piston step of said two different diameter piston steps and alternatively connected by an electrically drivable function control valve means to a high pressure outlet of an auxiliary pressure space when the function control valve is in a basic position, or to a non-pressurized container of said auxiliary pressure source when the function valve is in another position;

wherein said stepped piston is displaceable by connection of the high pressure into said control pressure space and against the force of said return spring and pressure present in the modulation chamber, into an end position corresponding to a minimum volume of the modulation chamber and to a maximum volume of the modulation chamber;

two electrically controllable brake pressure control valves means, each individually associated with one of the wheel brakes;

wherein said pressure control valve means are driven at least one of individually and jointly from a basic position opening a connection between the particular wheel brake and the main brake pipe allowing for brake pressure build-up and pressure reduction phases of said wheel brake(s), into an alternative shut off position for closing said connection so as to maintain brake pressure at said wheel brake(s);

an electronic control unit means which generates output signals for triggering the brake pressure control valves means, the function control valve means and the inlet control valve means in response to output signals from wheel rotational speed sensors, characteristic of motion behavior of the vehicle wheels;

wherein, when a spin tendency appears at least at one of the driven vehicle wheels, the electronic control unit means generates output signals to cause the brake pressure control valves means of the at least one driven vehicle wheel to move to a shut off position to maintain brake pressure at the wheel brakes, and to move the function control valve means into a position causing pressure relief of the control pressure space of the pressure modulator by said connection to a non-pressurized container, when at least one of lower limiting values  $\lambda_{A1}$  and  $b_{A1}$  of at least one of the drive slip  $\lambda_A$  and the wheel peripheral acceleration  $b_A$  are exceeded, these lower limiting values being lower than threshold values  $\lambda_{A2}$  and  $b_{A2}$  beyond which the use of a drive slip control system becomes necessary;

wherein when at least one of a higher response threshold value(s)  $\lambda_{A2}$  and  $b_{A2}$  are reached, the electronic control unit means generates a first output signal for switching the pressure inlet control valve means into a shut off position disconnecting the modulation chamber from the output pressure space; and a second output signal which switches back the at least one of the two brake pressure control valves means associated with a wheel with the tendency to spin, into its basic position and a third output signal which switches the function control valve means into its basic position causing the control pressure space to be connected to the pressure outlet of the auxiliary pressure source; and wherein

after the spin tendency has decayed, the electronic control unit means generates that combination of output signals which switches back all the valves means to their basic positions.

4,948,201

**RUBBER CRAWLER**

Noriaki Furuta, Kanagawa, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

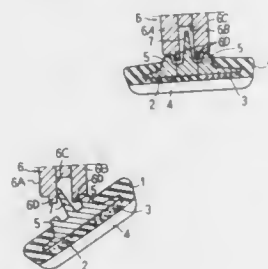
Filed Mar. 27, 1989, Ser. No. 328,987

Claims priority, application Japan, Mar. 25, 1988, 63-39416[U]

Int. Cl.<sup>5</sup> B62D 55/08

U.S. Cl. 305—56

2 Claims



1. A rubber crawler adapted to be used in combination with a track roller, the track roller comprising a pair of coaxial wheels having mutually facing inner surfaces spaced from each other a predetermined distance thereby to form a space having a lateral dimension, parallel to the axis of the wheel, corresponding to said distance, the rubber crawler comprising a crawler body comprised of rubber, a plurality of cores embedded in the crawler body perpendicularly to the longitudinal direction of the crawler body, a pair of guide rails laterally spaced for contact with and rolling thereon of the respective wheels of the track roller, said pair of guide rails being formed on each of said cores and protruding upwardly therefrom above a surface of the crawler body which faces away from a ground contacting surface of the crawler body, and formed on each of said cores between said pair of guide rails a guide protrusion, the guide protrusion protruding upwardly from the core above said surface of the crawler body which faces away from said ground contacting surface, the guide protrusion protruding substantially further than said pair of guide rails and being so dimensioned as to be received in said space between said wheels and to be retained in said space by contact with said inner surface of either of said wheels when the rubber crawler travels obliquely on a slope and, consequently, assumes a lateral orientation oblique to the axis of the wheels.

4,948,202

**TWIST-TIE DISPENSER APPARATUS AND METHOD**

James R. Helseth, Minnetonka, Minn., assignor to Twist-Ease, Inc., Minneapolis, Minn.

Filed Aug. 11, 1989, Ser. No. 392,766

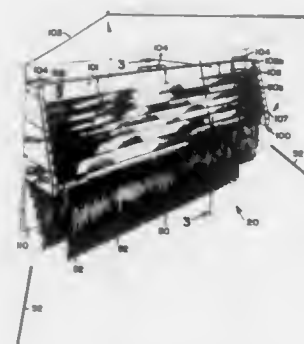
Int. Cl.<sup>5</sup> A47F 3/02

U.S. Cl. 312—35

13 Claims

1. A dispenser for twist-ties, comprising:  
(a) a precut sheet of twist-tie material, said sheet comprising a plurality of twist-ties in side-by-side alignment, said twist-ties having a first end and a second end, said twist-ties having a perforation proximate said second end;  
(b) a rod, said precut sheet of twist-tie material cooperatively engaging said rod, wherein a force applied to said first end of said twist-ties detaches said twist-ties at said

perforation and said second end of said twist-tie remains engaged with said rod; and



(c) a frame, said frame cooperatively engaging said rod and arranged and configured wherein said first ends of said twist-ties are exposed.

4,948,203

**LIGHTED DISPLAY CASE**

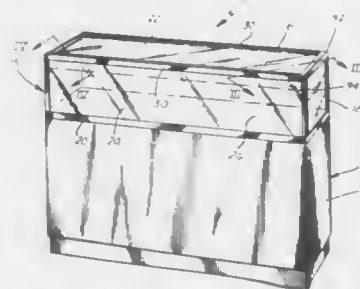
Douglas D. Amstutz, Muskegon, and Ronald A. Vanderboegh, Twin Lakes, both of Mich., assignors to Amstore Corporation, Muskegon, Mich.

Continuation of Ser. No. 161,902, Feb. 29, 1988, Pat. No. 4,886,329. This application Aug. 17, 1989, Ser. No. 395,090

Int. Cl.<sup>5</sup> A47B 43/00

U.S. Cl. 312—140

9 Claims



1. A showcase having a frame and a transparent window member resting on said frame, said frame comprising:  
a one-piece frame member including first and second portions joined at a corner, each of said frame portions having a planar front vertical surface, an upper horizontal surface, a lower horizontal surface below said upper horizontal surface, and an interconnecting vertical surface extending below said upper horizontal surface and said lower horizontal surface, said front vertical surface being continuous but bent at said corner, said upper, lower, and interconnecting surfaces abutting one another at said corner, said front surface, said top surface, and said interconnecting surface defining a downwardly opening channel;  
connector means at said corner for interconnecting said lower horizontal surfaces in fixed relationship to maintain said frame portions in fixed angular relationship;  
a corner post extending downwardly from said corner, said corner post having a top portion within said downwardly opening channel; and  
securing means for securing said top portion of said corner post within said channel.

4,948,204

**DISPLAY CABINET CONSTRUCTION**

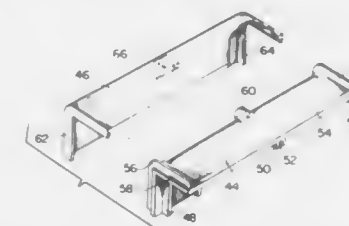
John D. Kilmartin, III, Providence, R.I., assignor to International Packaging Corporation, Pawtucket, R.I.

Filed Sep. 21, 1989, Ser. No. 410,086

Int. Cl.<sup>5</sup> A47F 3/00

U.S. Cl. 312—140

9 Claims



1. A display cabinet construction comprising:  
a. spaced, substantially parallel, top and bottom walls;  
b. spaced, substantially parallel first and second side walls extending substantially between said top and bottom walls in substantially perpendicular relation thereto;  
c. a cross wall extending substantially between said top and bottom walls in substantially perpendicular relation thereto; and  
d. four corner elements joining said top and bottom walls to said first and second side walls and operative for positioning said cross wall relative to said top and bottom walls and said first and second side walls, said corner elements each comprising a longitudinally elongated right angle inner piece and a longitudinally elongated right angle outer piece, said right angle inner pieces and said right angle outer pieces each having inner and outer sides and each comprising first and second substantially perpendicular disposed main walls, each of said corner elements further comprising retaining means snap receivable in interfitting engagement for retaining the inner and outer pieces thereof in a predetermined closely spaced, mating relation wherein the outer side of the inner piece thereof faces the inner side of the outer piece thereof and wherein the first and second main walls of the inner piece thereof are in closely spaced substantially parallel relation to the first and second main walls, respectively, of the outer piece thereof so that the main walls of the inner and outer pieces cooperate to define a pair of elongated, substantially perpendicularly disposed channels, one of said top or bottom walls and one of said first or second side walls being received in snug engagement in the channels of each corner element for joining the one of said top or bottom walls and the one of said first or second side walls received therein in substantially perpendicular relation, each of said corner elements further comprising positioning means on the inner side of the inner piece thereof for positioning said cross wall in substantially perpendicular relation to said top and bottom walls and said first and second side walls.

4,948,205

**DESK WITH CONCEALED WIRE STORAGE**

James O. Kelley, Spring Lake, Mich., assignor to Sligh Furniture Co., Holland, Mich.

Filed Mar. 8, 1989, Ser. No. 320,701

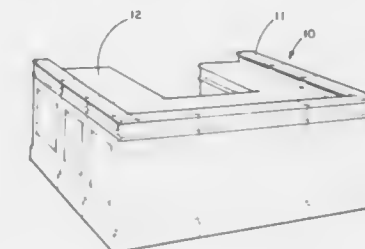
Int. Cl.<sup>5</sup> A47B 17/00

U.S. Cl. 312—196

19 Claims

1. An article of furniture having a top providing a work surface, wherein the improvement comprises:  
a half-wall structure extending above said work surface and defined by horizontally spaced parallel inner and outer panels forming at least one side of said article of furniture, and providing a storage space between said panels;  
a cover movably secured to said half-wall structure and forming a top closure for said storage space, said inner

panel having a horizontal access slot between said work surface and said cover;  
accessory bracket means for supporting desk accessories above the surface of the desk, the accessory bracket means being mounted in the storage receptacle and extending through the slot to support the desk accessories; and  
terminal means for supporting the accessory bracket means by engagement with coupling means on the accessory bracket means, the terminal means being secured to the



interior of said half-wall structure opposite said slot, the terminal means having a hook portion opening downwardly, and said coupling means having a mating hook portion engageable with said terminal hook portion in an upwardly rotated position of said coupling means hook portion, said coupling means also having an adjustable abutment extendable after engagement of said terminal and mating hook portions to prevent back-rotation of said bracket means toward a disengaging position.

4,948,206

**REFRIGERATOR DOOR ASSEMBLY WITH DECORATIVE FRONT TRIM PANELS**

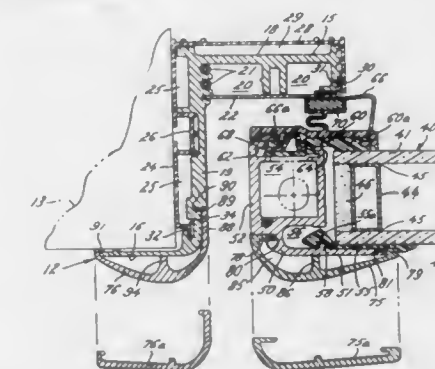
James Fitzpatrick, Chicago, Ill., assignor to Ardeo, Inc., Chicago, Ill.

Filed Dec. 2, 1988, Ser. No. 279,017

Int. Cl.<sup>5</sup> A47B 96/00

U.S. Cl. 312—296

26 Claims



26. A refrigerator door frame assembly mountable in an opening of a refrigerator cabinet for supporting a plurality of insulated glass doors each having a glass unit made up of a plurality of glass panes disposed in side by side relation with an air space therebetween comprising a metallic structural frame member, said frame member having a web portion positionable along the periphery of said cabinet opening and a front wall positionable against said cabinet adjacent said opening, a trim panel detachably mountable on said frame member in overlying relation to said front wall for providing the desired finished appearance of said frame assembly when viewed from a front side thereof, said trim panel having an inwardly extending retaining flanges at opposed ends thereof for releasable engagement with said frame member, and said frame member web portion being formed with a notch for receiving one of said trim panel retaining flanges.



4,948,207

## ADJUSTABLE SUPPORT ASSEMBLY

Joyce A. Rolls, Floyd Knobs, Ind.; Clarence W. Denham, and Nicholas Okruch, Jr., both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 24, 1989, Ser. No. 426,587

Int. Cl.<sup>5</sup> A47B 57/00

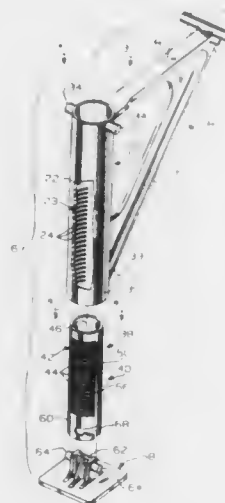
U.S. Cl. 312—306

Int. Cl.<sup>5</sup> A47B 88/00

6 Claims

U.S. Cl. 312—344.1

8 Claims



4,948,208

## GUIDE OR RUNNER SYSTEMS FOR ACCOMMODATING TRANSLATIONAL MOVEMENT

Wolfgang Schubert, Lustenau, Austria, assignor to Grass AG, Höchst, Austria

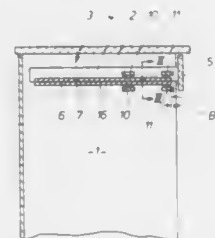
Filed Feb. 13, 1989, Ser. No. 310,209

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829404; Oct. 11, 1988, 3834581

Int. Cl.<sup>5</sup> A47B 88/00

U.S. Cl. 312—344.1

8 Claims



1. A guide system for drawers, comprising a mounting rail for attachment to a piece of furniture; a drawer rail for attachment to a drawer and supported by the mounting rail for translational movement relative thereto, one of said mounting and drawer rails having a recess, and the other of said mounting and drawer rails having at least one limb which projects into said recess; first and second magnet means of like polarity operable to transfer the drawer load from said drawer rail to said mounting rail, said first magnet means being mounted within said recess and said second magnet means being mounted on said limb facing said first magnet means with at least one gap therebetween; and overload means associated with said mounting rail which engages laterally in a support channel associated with said drawer rail with a vertical clearance.

4,948,209

## VSCF STARTER/GENERATOR SYSTEMS

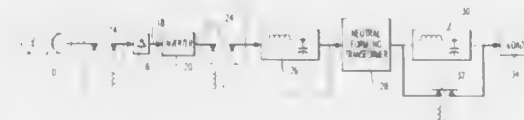
Donal E. Baker, American Township, Allen County, and Jack W. Ogden, Fort Shawnee, both of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 1, 1989, Ser. No. 304,620

Int. Cl.<sup>5</sup> F02N 11/04, 11/08

U.S. Cl. 322—10

14 Claims



1. A variable speed, constant frequency starter/generator system comprising:  
a dynamoelectric machine, electrically connected to a first multiple phase bus;  
a first multiple phase rectifier;  
a second multiple phase rectifier;  
a pair of DC link conductors;  
means for electrically connecting said first and second multiple phase rectifiers to said DC link conductors;  
an inverter for converting a DC voltage on said DC link conductors to a floating multiple phase AC voltage on a second multiple phase bus;  
a transformer for converting said floating, multiple phase AC voltage on said second multiple phase bus, to a ground-referenced, multiple phase AC voltage, and for converting an externally supplied three phase AC voltage to a pair of phase displaced three phase voltages;  
means for alternatively connecting said first multiple phase

1. In a refrigerator having an outer case and an inner liner forming an interior compartment with a bottom wall comprising:

- a bottom shelf in the compartment,
- a connector member secured to the bottom surface of the shelf,
- a shelf support bracket secured to the connector member, said bracket having a hollow cylindrical sleeve with an interior circumferential surface, said surface having a first longitudinal portion with an array of inwardly directed elongated tooth projections along and substantially perpendicular to the longitudinal axis of the sleeve and a second longitudinal smooth portion adjacent the first portion, and
- a brace supported on the compartment bottom wall and having an outside diameter slightly smaller than the inside diameter of the sleeve and having a circumferential outer surface, said surface having a first longitudinal portion with an array of outwardly directed elongated tooth projections along and substantially perpendicular to the longitudinal axis of the brace and a second longitudinal smooth portion adjacent the first portion, said projections on the first portion being complementary to the projections on the interior surface of the sleeve,

whereby insertion of the brace into the sleeve with the tooth projections of the brace and sleeve in alignment with the smooth portions of the brace and sleeve allows relative longitudinal movement between the brace and sleeve and rotation of the brace and sleeve relative to each other engages the projections of the brace and sleeve to prevent relative longitudinal movement between the brace and sleeve.

bus to at least one of said multiple phase rectifiers for generator operation of said dynamoelectric machine, or for connecting said first multiple phase bus to said second multiple phase bus for starter operation of said dynamoelectric machine; and  
means for alternatively connecting said transformer to said second multiple phase bus for generator operation of said dynamoelectric machine, or for connecting a first one of said phase displaced three phase voltages to said first multiple phase rectifier and for connecting a second one of said phase displaced three phase voltages to said second multiple phase rectifier for starter operation of said dynamoelectric machine.

4,948,210

## INFRARED ZOOM ILLUMINATOR

Robert A. Simms, Phoenix, Ariz., assignor to Murasa International, Long Beach, Calif.

Filed Jun. 20, 1988, Ser. No. 208,457

Int. Cl.<sup>5</sup> G02B 27/02

U.S. Cl. 350—1.4

14 Claims



1. A portable infrared zoom illuminator including in combination:  
a housing having a light exit opening therein;  
an infrared laser light source mounted in said housing;  
a power supply located in said housing;  
switch means selectively interconnecting and disconnecting said light source and said power supply;  
focusing lens means comprising a cylindrical micro lens of gradient index material mounted in said housing between said light source and the light exit opening in said housing; and  
means coupled with said lens means for moving said lens moved toward and away from said light source to change the focus of light exiting from said light exit opening in said housing from a predetermined maximum divergence to the narrow collimated width of the beam of light produced by said infrared laser light source.

4,948,211

## METHOD AND APPARATUS FOR OPTICAL IMAGING USING A SMALL, FLAT, REFLECTING SURFACE

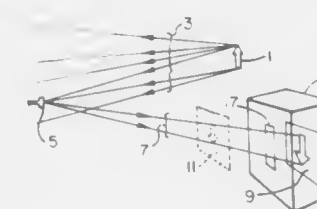
Thomy H. Nilsson, Charlottetown, Canada, assignor to Canadian Patents and Development Ltd., Ottawa, Canada

Continuation-in-part of Ser. No. 87,309, Aug. 20, 1987, abandoned. This application Feb. 2, 1989, Ser. No. 305,095

Int. Cl.<sup>5</sup> G02B 5/18; G03B 19/00

U.S. Cl. 350—162.11

6 Claims



4. An optical imaging apparatus for forming an image of an object, comprising:  
an optically reflecting pinhead surface, of a substantially point size in relation to the wavelength of the said light located with respect to the said pinhead surface to direct

a set of beams of light from the said object onto the said optically reflecting pinhead surface to reflect the said set of beams of light along predetermined optical paths, light receiving means provided in a plane located in the said optical paths for receiving the said set of beams of light reflected back from the said surface which light forms the image of the said object on the said plane, and limiting means for preventing any beams of light which do not follow the said optical paths from falling on the light receiving means.

4,948,212

## OPTICAL PROCESSING IN III-V AND II-VI COMPOUND SEMICONDUCTORS

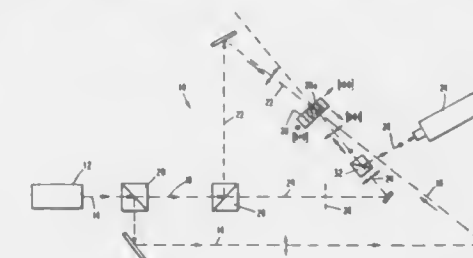
Li-Jen Cheng, La Crescenta, and Gregory O. Gheen, Pasadena, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Aug. 22, 1988, Ser. No. 234,519

Int. Cl.<sup>5</sup> G02F 1/29; G03H 1/22

U.S. Cl. 350—3.64

44 Claims



1. An optical processor including a semi-insulating single crystal of a III-V material and having a 43m crystal symmetry, said single crystal cleaved to form a slab having a front surface and a rear surface separated by side surfaces and oriented such that two input writing beams of electromagnetic radiation generated by one coherent source, incident on opposite surfaces and at least one of which writing beams is encoded with information, and a reading beam of electromagnetic radiation generated by said coherent source, incident on either the same surface as one of said writing beams or on a surface perpendicular thereto, interact within said crystal to produce an output beam of electromagnetic radiation, said output beam having modified information encoded thereon.

4,948,213

## BEAM SCANNER

Shin-ya Hasegawa, Atsugi; Fumio Yamagishi, Ebina; Hiroyuki Ikeda, Yokohama, and Shigetake Iwata, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 27, 1989, Ser. No. 329,327

Claims priority, application Japan, Mar. 25, 1988, 63-072633; Jan. 28, 1989, 01-018559

Int. Cl.<sup>5</sup> G02B 26/10

U.S. Cl. 350—3.71

11 Claims

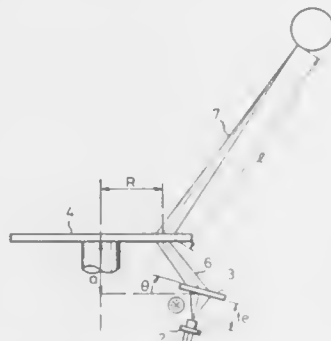
11. A light beam scanning apparatus comprising:  
a rotatable holographic disk having a hologram for diffracting beams and being constructed by an interference of a reference wave and an objective wave wherein both the reference wave and the objective wave are divergent spherical waves emitted from point light sources and wherein the reconstruction wave is incident upon the holographic disk at a reconstruction point at an incident angle  $\theta_i$  given by the following equation:

$$R/\cos \theta_d = \cos \theta_i - \cos \theta_d \dots$$

$$\sin \theta_i = S/R \sqrt{(F_1^2 + R^2)}$$

wherein

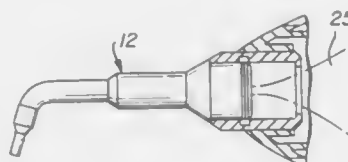
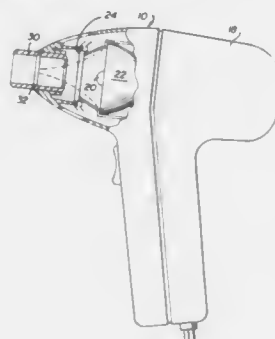
R is a distance between the axis of rotation of the holographic disk and the reconstruction point;  
l is a focal length of the hologram;  
 $\theta_i$  is an incident angle of the reconstruction wave;  
 $\theta_d$  is a diffraction angle of the reconstruction wave by the hologram;



S is a ratio between the wavelength ( $\lambda_1$ ) of the construction wave and the wavelength ( $\lambda_2$ ) of the construction wave ( $S = \lambda_2 / \lambda_1$ );

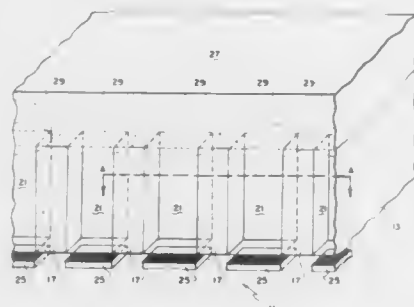
F<sub>1</sub> is a normal distance between the point light source of the reference wave and the holographic disk.

**4,948,215**  
**DENTAL LIGHT-CURING LAMP UNIT WITH INTERCHANGEABLE AUTOFOCUS LIGHT GUIDES**  
Joshua Friedman, 13 Fairfield Ct., Ridgefield, Conn. 06877  
Filed Aug. 10, 1989, Ser. No. 392,023  
Int. Cl.<sup>5</sup> G02B 6/14  
U.S. Cl. 350—96.10 5 Claims



1. Assembly of a plural number of interchangeable autofocus optic light guides for use in a single dental light-curing unit having a housing for a source of radiant energy such as a lamp, a reflector partially surrounding said source of energy so as to converge reflected radiant energy to a preselected focal spot along a preselected optic axis and chuck means adapted to hold a single autofocus light guide in a fixed position along said optic axis upon insertion into said chuck means, with each into focus optic light guide comprising an optic rod of a diameter corresponding to a preselected photocurable surface area with the diameter of each rod being different from one another, a flange surrounding each rod adjacent one end thereof for abutting said chuck means in the inserted position and for establishing a fixed position for each rod relative to the preselected focal spot and wherein each rod has a proximal end for forming a light-receiving surface for incident radiant energy reflected from said lamp with the proximal end of each rod being spaced a predetermined distance from the position of each flange such that the surface area of radiant energy incident upon said light-receiving surface corresponds to the diameter of the optic rod independent of the light guide selected and with each optic rod having a head surrounding the proximal end thereof with said flange extending from said head and means for removably inserting the head into said chuck means.

**4,948,214**  
**STEP-INDEX LIGHT GUIDE AND GRADIENT INDEX MICROLENS DEVICE FOR LED IMAGING**  
David P. Hamblen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Jul. 10, 1989, Ser. No. 377,641  
Int. Cl.<sup>5</sup> G02B 6/00  
U.S. Cl. 350—413 9 Claims



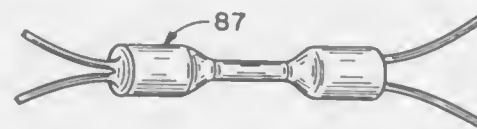
1. A method of manufacturing a step-index light guide and gradient index microlens device comprising:  
a. providing a host material which is opaque to light;  
b. forming a multiplicity of channels in said host material;  
c. depositing a low refractive index film on the surface of said channels;  
d. filling said channels with a high refractive index material;  
e. providing a substrate;  
f. forming a multiplicity of gradient index microlenses in said substrate; and,  
g. bonding said substrate to said host material, with each of said microlenses being in optical alignment with a corresponding one of said channels.

**4,948,216**  
**OPTICAL DEVICES HAVING LAYERS OF LOW MOLECULAR WEIGHT ORGANIC MATERIALS AND METHODS FOR MAKING**  
John C. Brazas, Jr., and Delwyn E. Macbelle, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Nov. 21, 1988, Ser. No. 273,785  
Int. Cl.<sup>5</sup> G02B 6/12; C07D 209/48; B05D 3/00; C03G 15/04  
U.S. Cl. 350—96.11 8 Claims

1. An optical device comprising a support having thereon a transparent amorphous layer of a low molecular weight organic compound, said layer having a glass transition temperature above about 50° C.

6. A method of making an optical device comprising a support having thereon a transparent amorphous layer of a low molecular weight organic compound, said layer having a glass transition temperature above about 50° C., said method comprising the step of vacuum depositing said organic compound onto said support.

**4,948,217**  
**OPTIC COUPLER**  
Donald B. Keck, Big Flats, N.Y.; Donald R. Lyons, Stanford, Calif., and Daniel A. Nolan, Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.  
Division of Ser. No. 765,652, Aug. 15, 1985, Pat. No. 4,799,949.  
This application Jan. 23, 1989, Ser. No. 300,961  
Int. Cl.<sup>5</sup> G02B 6/26  
U.S. Cl. 350—96.15 32 Claims



1. A fiber optic coupler comprising an elongated body of matrix glass, said body having two endfaces, said matrix glass being relatively easily etched in a given acid, a plurality of optical fibers extending longitudinally through said body and protruding from at least one endface thereof, said fibers having at least a core and an outer layer of cladding glass that is more resistant to being etched in said given acid than said matrix glass, the refractive index of said cladding glass being greater than that of said matrix glass, the diameters of said central region and of said elongated body and of said optical fibers in said central region being smaller than the diameters thereof at the endfaces of said body and said optical fibers being more closely spaced at said central region than at said endfaces.

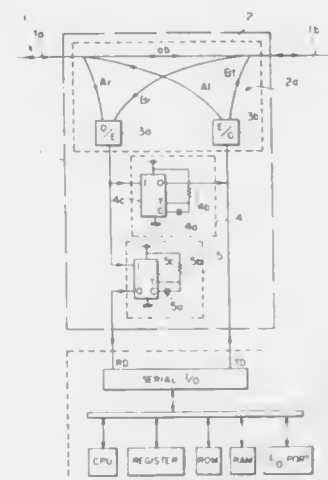
**4,948,218**  
**OPTOELECTRONIC DEVICE FOR AN OPTICAL COMMUNICATION SYSTEM**  
Toyohiro Kobayashi, and Shouji Mukohara, both of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 12, 1989, Ser. No. 378,976  
Claims priority, application Japan, Jul. 14, 1988, 63-175912; Aug. 5, 1988, 63-195654  
Int. Cl.<sup>5</sup> G02B 6/28  
U.S. Cl. 350—96.16 10 Claims

1. An optoelectronic device for connecting to each other ports of a plurality of bidirectional optical data transmission lines of an optical communication system which includes signal generator means for generating optical pulse signals that are transmitted through the optical data transmission lines said optoelectronic device comprising:

pass-through optical coupler means for optically connecting ports of a plurality of optical data transmission lines of said optical communication system to each other, said pass-through optical coupler means including optical fiber means connecting said ports of the optical transmission lines to each other;

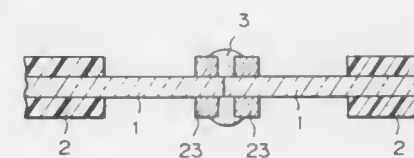
optical-to-electrical transducer means for converting optical pulses into corresponding electrical pulses; receiving optical coupler means for optically connecting said ports of the optical data transmission lines to an input of said optical-to-electrical transducer means, to supply to said optical-to-electrical transducer means said optical pulse signals that are generated by said signal generator means, transmitted through the optical data transmission lines, and outputted from said ports of the data optical

transmission lines, said receiving optical coupler means including optical fiber means connecting said ports of the optical data transmission lines to the input of the optical-to-electrical transducer means; electrical-to-optical transducer means for converting electrical pulses into corresponding optical pulses; transmitting optical coupler means for optically connecting an output of said electrical-to-optical transducer means to said ports of the optical data transmission lines, to inject into said ports of the optical transmission lines optical pulse signals outputted from said electrical-to-optical transducer means, said transmitting optical coupler means including optical fiber means connecting the output of



said electrical-to-optical transducer means to said ports of the optical transmission lines; and first pulse width fixing means having an input and an output electrically coupled, respectively, to an output of said optical-to-electrical transducer means and to an input of said electrical-to-optical transducer means, for producing electrical pulses of a first predetermined fixed width in response to electrical pulses supplied thereto from said optical-to-electrical transducer means, wherein said first predetermined fixed width of the pulses produced by the first pulse width fixing means is smaller than a pulse width of said optical pulse signals that are generated by said signal generator means and transmitted through the optical data transmission lines.

**4,948,219**  
**METHOD OF CONNECTING OPTICAL FIBERS AND CONNECTION AIDS AND FIBER HOLDERS EMPLOYED THEREWITH, AND OPTICAL WAVEGUIDE MODULES EMPLOYING SAME**  
Minoru Seino, Atsugi, and Naoyuki Mekada, Hadano, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Filed Mar. 18, 1988, Ser. No. 170,320  
Claims priority, application Japan, Mar. 20, 1987, 62-64168; May 25, 1987, 62-125730; Jul. 20, 1987, 62-180542; Nov. 17, 1987, 62-288459  
Int. Cl.<sup>5</sup> G02B 6/36, 7/26  
U.S. Cl. 350—96.20 29 Claims



5. A method for connecting optical fibers to optical wave-



guides by butting and adhering, comprising providing each optical fiber with a connection aid having a hole into which the fiber is inserted and secured and from which hole a tip portion of the fiber slightly protrudes, and applying an adhesive to a gap between an end surface of the waveguide substrate and an opposed end surface of the connection aid.

4,948,220

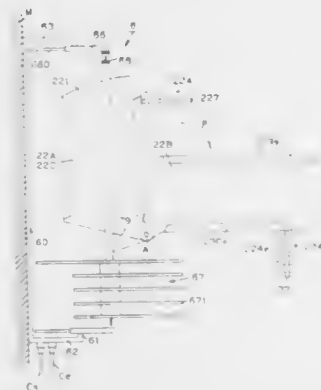
# MODULE FOR DISTRIBUTING AND CONNECTING OPTICAL FIBERS

Robert D. Violo, Villejuie; Robert Calevo, L'Hay les Roses, and Didier, M. Suillerot, Paris, all of France, assignors to Societe Anonyme de Telecommunications, Paris, France  
Filed Jun. 16, 1989, Ser. No. 367,037

Claims priority, application France, Jun. 20, 1988, 88 08237  
Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.2

15 Claims



1. A module for distributing and connecting first and second optical fibers, said module comprising a box with an openable front face, plural fiber loop supports substantially flat and movable which are laid out parallel with said front face of the box, plural means respectively attached to the supports for connecting said first optical fibers to said second optical fibers respectively, translating means slidably mounted in said box for translating said supports together substantially perpendicular to said front face, from the inside to the outside of said box, and turning means rotatively mounted on said translating means, for turning said supports together towards the outside of said box and around an axis of rotation substantially parallel with said front face, each of said supports being pivotably mounted on said turning means around a pivoting axis perpendicular to said support.

4,948,221

# ATHERMALIZED OPTICAL HEAD

Thomas E. Yates, Caledonia, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 30, 1988, Ser. No. 238,225

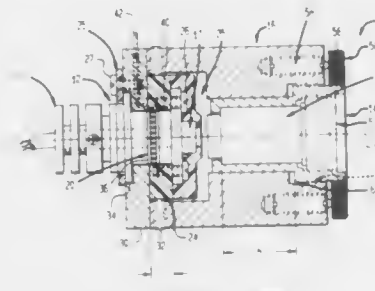
Int. Cl.<sup>5</sup> G02B 6/36, 7/26

U.S. Cl. 350—96.20

9 Claims

1. An athermalized optical head comprising: a light source disposed along an optical axis of said optical head, said light source including a laser diode; a first mounting means for said light source; optical means disposed along said axis in a position to receive a light beam from said source, said optical means including a collimator lens; a second mounting means for said optical means; and

support means for receiving said first and second mounting means and for maintaining said light source at a substantially constant distance from said optical means in a predetermined range of ambient temperatures.



4,948,222

# OPTICAL FIBER UNIT ASSEMBLY PACKAGE

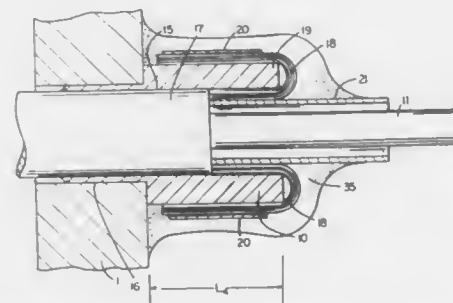
Michael Corke, Mendon; David E. Haynes, Milford; David W. Stowe, Medfield; Stillman Shaw, III, Bellingham, and Joseph E. Vigant, Milford, all of Mass., assignors to Aster Corporation, Milford, Mass.

Filed Dec. 5, 1988, Ser. No. 280,033

Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20

7 Claims



1. An optical fiber unit assembly package comprising: a protective body having a lid and defining a volume, optical fiber cable entry means penetrating said body, at least one optical fiber cable extending through said entry means and defining a conduit for an optical fiber, means for anchoring said optical fiber cable within said entry means, means for clamping an optical fiber extending through said conduit at a point within the package beyond said means for anchoring in a manner to isolate an internal optical fiber unit assembly associated with said optical fiber within said volume from tensile forces applied externally upon said fiber; and means for securely mounting optical fiber units within said volume.

4,948,223

# FIBER OPTIC SWITCH

John C. Anderson, Janetville, and John C. Goodwin, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 16, 1989, Ser. No. 367,331

Claims priority, application Canada, Dec. 21, 1988, 586587

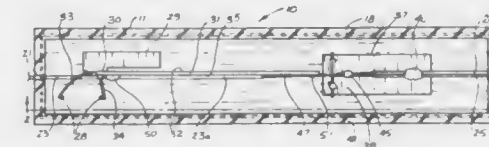
Int. Cl.<sup>5</sup> G02B 6/36

U.S. Cl. 350—96.20

33 Claims

1. In a fiber optic switch of the type including at least one stationary light conducting fiber and a mobile light conducting

fiber having an end movable between a transmitting position aligned with the stationary fiber and a non-aligned position, a substrate having a smooth surface, means affixing an end portion of the stationary fiber to said substrate surface with a slight downward flex between said affixing means and said substrate surface to provide engagement of a portion of the circumferential surface of the fiber at the end of the fiber with said substrate surface, an actuator for movement in a plane above and substantially parallel to said substrate surface for moving the movable end of the fiber relative to said substrate surface



between said positions, and means affixing said mobile fiber to a point on said actuator with a slight downward flex between said point and said substrate surface to provide engagement of a portion of the circumferential surface at the end of the mobile fiber with said substrate surface whereby said end portion of said fiber of said mobile fiber is in sliding contact with said substrate surface during movement and whereby the engagement of said fibers with the substrate surface provides accurate vertical alignment of the ends of the light carrying cores of the mobile and stationary fibers when in the transmitting position.

4,948,224

# CONNECTOR FOR OPTICAL FIBERS AND THE LIKE

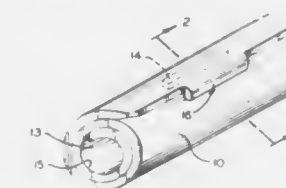
Henry J. Modrey, 3546 South Ocean Blvd. 190 720, Palm Beach, Fla. 33480

Filed Feb. 21, 1989, Ser. No. 317,208

Int. Cl.<sup>5</sup> G02B 6/38

U.S. Cl. 350—96.21

8 Claims



1. A connector system for optical fibers and other pressure sensitive conductors, comprising: a generally elongated resilient hollow cylindrical connecting member defining a hollow passageway therethrough; means for expanding and contracting the cross-sectional diameter of said hollow passageway between a first, enlarged, diameter and a second, reduced diameter, respectively, said means for expanding and contracting being integrally connected to said connecting member; said means for expanding is comprised of a second generally elongated bifurcated cylindrical female expansion member integrally associated with said cylindrical connecting member in parallel relationship with said hollow passageway in combination with a cylindrical male expansion member, said cylindrical female expansion member defining a generally hollow interior adapted to receive said

male expansion member, said male expansion member having an outer diameter greater than the internal diameter of said hollow passageway of said cylindrical expansion member;

wherein when said male expansion member is disposed within said female expansion member, the cross-sectional diameter of said hollow passageway is forced to assume said first, enlarged, diameter, and when said male expansion member is removed from male/female engagement within said female expansion member, the cross-sectional diameter of said hollow passageway is forced to assume said second, reduced, diameter, said second, reduced diameter forming a relatively tight gripping force directed generally radially inwardly against the optical fiber or other pressure sensitive conductor or conductors being gripped.

4,948,225

# NONLINEAR OPTICAL ARTICLE FOR MODULATING POLARIZED LIGHT

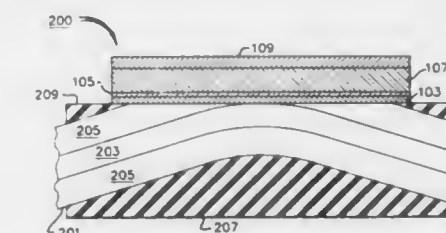
Christopher B. Rider, Michael Scozzafava, and Jay S. Schildkraut, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 11, 1989, Ser. No. 419,984

Int. Cl.<sup>5</sup> G02B 6/00; B32B 9/04; B05D 5/06; F21V 9/14

U.S. Cl. 350—96.34

20 Claims



1. An optical article capable of modulating the reflection of electromagnetic radiation comprising a reflective metal layer having a thickness in the range of from 100 to 1000 Å comprised of at least one metal having work function in the range of from 2.5 to 4.5 eV, means for directing polarized electromagnetic radiation to and acting as a support for said reflective metal layer, a dielectric medium capable of exhibiting a change in its refractive index as a function of an applied electrical potential gradient overlying said reflective metal layer, and means for variably applying an electrical potential to a surface of said dielectric medium remote from said reflective metal layer, characterized in that said dielectric medium is comprised of a poled polymeric layer exhibiting a glass transition temperature of at least 50° C. and a second order polarization susceptibility greater than 10<sup>-9</sup> electrostatic units and a protective layer having a thickness of less than 0.1 μm consisting essentially of at least one of a metal oxide and a metal fluoride is interposed between said reflective metal layer and said poled polymeric layer.

4,948,226

## LENS ALIGNMENT APPARATUS FOR USE IN A PROJECTION TELEVISION

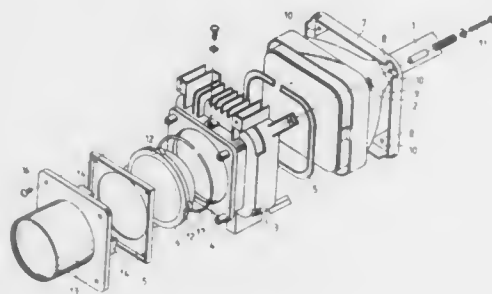
Yukio Ozaki, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,417

Claims priority, application Japan, Apr. 6, 1988, 63-45662[U] Int. Cl.<sup>5</sup> G02B 7/02

U.S. Cl. 350—245

3 Claims



1. A lens alignment apparatus for use in a projection television having a fluorescent screen including a tube and a projection tube mounting frame comprising:

- a first lens having a periphery adapted to be mounted on the projection tube mounting frame in front of the fluorescent screen of the tube;
- a lens frame having a periphery for receiving said first lens;
- a plurality of contactors provided on one of the peripheries of said first lens and said lens frame; and
- a plurality of guide members provided on the other of said peripheries of said first lens and said lens frame, said guide members being perpendicularly inclined from said lens frame with respect to the circumference of said lens frame and being adapted to contact said contactors when said first lens is received in said lens frame to align said first lens with said lens frame upon rotation of said first lens relative to said lens frame.

4,948,227

## APPARATUS FOR OPERATIVELY CONNECTING CAM RING AND ASSOCIATED MEMBER ACTUATED THEREBY

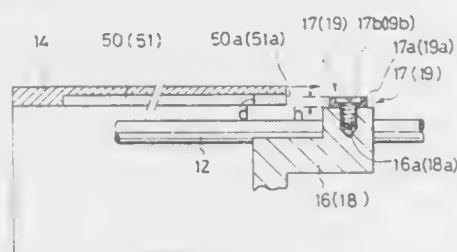
Hatuichi Takeyasu, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,865

Claims priority, application Japan, Oct. 12, 1987, 62-155799[U]; Oct. 12, 1987, 62-155800[U] Int. Cl.<sup>5</sup> G02B 7/02

U.S. Cl. 350—255

19 Claims



1. An apparatus for a lens barrel having a rotatable cam ring with at least one cam groove and at least one movable member which has an association pin engaged in said at least one cam groove, said association pin and said at least one cam groove comprising means for moving said at least one movable member along said at least one cam groove in accordance with the rotation of said cam ring, said cam ring having first and second

axially spaced end faces, said at least one cam groove comprising first and second ends and a non-linear groove extending between said ends, one of said ends of said at least one cam groove comprising means extending into one of said end faces of said cam ring, said at least one movable member together with said association pin are adapted to be fitted into said non-linear cam groove from said one of said ends of said at least one cam groove extending into said one of said end faces of said cam ring.

4,948,228

## OPTICAL IMAGE ROTATORS

Andrew P. Keens, Middlesex, England, assignor to Thorn Emi plc, London, England

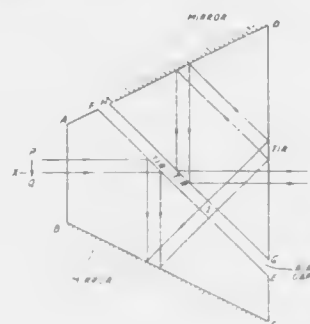
Filed Sep. 2, 1988, Ser. No. 239,993

Claims priority, application United Kingdom, Sep. 5, 1987, 8720923

Int. Cl.<sup>5</sup> G02B 5/30, 5/04

U.S. Cl. 350—397

11 Claims



1. An optical image rotating device comprising an input surface, a plurality of reflective surfaces for reflecting light entering the device through said input surface, at least one of said reflective surfaces bearing a layered polarizing material, and the device also comprising an output surface, the layered polarizing material being arranged to impose a predetermined polarization effect between light entering the device at said input surface and leaving the device at said output surface, the device being rotatable, the optical axes of the input and output beams being parallel with the axis of rotation of the device.

4,948,229

## OPTICAL SWITCHES USING FERROELECTRIC LIQUID CRYSTALS

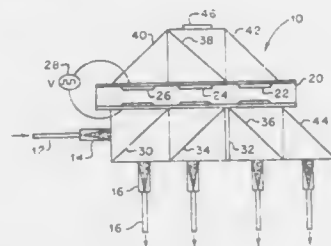
Richard A. Soref, Newton Centre, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 169,910, Mar. 18, 1988. This application Feb. 15, 1989, Ser. No. 311,016

Int. Cl.<sup>5</sup> G02R 6/32

U.S. Cl. 350—96.18

11 Claims



1. An optical switch comprising: four light input paths for receiving optical signals and four light output paths for transmitting the optical signals;

4,948,231

## LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF MANUFACTURING THE SAME

Shigeo Aoki, Habikino; Yasuhiro Ugal, Yao; Katsumi Miyake, Nara, and Kotaro Okamoto, Hino, all of Japan, assignors to Hosiden Electronics Co. Ltd., Osaka, Japan

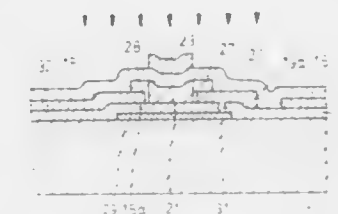
Continuation of Ser. No. 812,885, Dec. 4, 1985, abandoned. This application Jan. 18, 1989, Ser. No. 300,688

Claims priority, application Japan, Apr. 9, 1984, 59-70440

Int. Cl.<sup>5</sup> G02F 1/13

U.S. Cl. 350—334

7 Claims



4,948,230

## OBJECTIVE LENS DRIVING APPARATUS

Akihiro Kasahara, Charlottesville, Va.; Akira Yamada, Yokohama, Japan; Katsutoshi Wada, Kawasaki, Japan, and Hideo Yamasaki, Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 137,825, Dec. 24, 1987, abandoned.

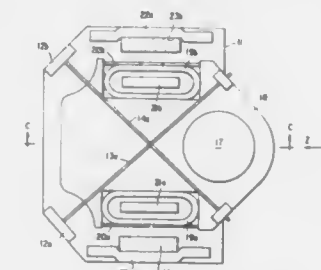
This application Mar. 9, 1989, Ser. No. 320,800

Claims priority, application Japan, Dec. 26, 1986, 61-315374; Dec. 30, 1987, 62-299756

Int. Cl.<sup>5</sup> G02B 7/02

U.S. Cl. 350—255

15 Claims



1. An objective lens driving apparatus comprising: an objective lens;

- a movable unit having a center of gravity for supporting said objective lens;
- means for moving said movable unit with respect to a stationary unit in a direction of an optical axis of said objective lens;
- a pair of means for rotating said movable unit being provided on symmetrical positions with respect to the center of gravity;
- a first supporting-rod pair for supporting said movable unit with respect to said stationary unit, said first supporting-rod pair comprising two supporting rods disposed in parallel with each other within a plane being in parallel with the optical axis of said objective lens;
- a second supporting-rod pair for supporting said movable unit with respect to said stationary unit, said second supporting-rod pair comprising two supporting rods disposed in parallel with each other within a plane being different from the plane of said first supporting-rod pair, and being in parallel with the optical axis of said objective lens; and
- said first and second supporting-rod pairs being disposed such that an intersecting line of the planes including respectively said first and second supporting-rod pairs passes through said movable unit.

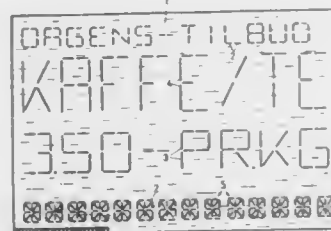
1. A liquid crystal display device comprising first and second transparent substrates closely spaced apart and facing each other, a liquid crystal sealed between said transparent substrates, a plurality of display electrodes made of ITO arranged in rows and columns on the inner surface of said first transparent substrate, thin film transistors formed on said first transparent substrate and each having a drain connected to one of said display electrodes, first source buses formed of the same material as said display electrodes and extending along corresponding columns of said display electrodes, each said source bus having source electrodes of said thin film transistors integrally formed therewith adjacent corresponding ones of said display electrodes, an opaque metal layer formed on said first transparent substrate and under each said thin film transistor, an insulating layer formed between each said metal layer and said thin film transistor, second source buses of the same material as said opaque metal layers formed integrally therewith to extend under said insulating layer along respective ones of said first source buses and connected thereto through holes formed in said insulating layer, and a transparent common electrode formed on and substantially over the entire inner surface of said second transparent substrate, said thin film transistors being selectively controlled for switching to apply a voltage between selected display electrodes and said common electrode for display,

said thin film transistors each including a semiconductor layer which extends between the corresponding display electrode and the source electrode, opposite marginal edges of said semiconductor layer partly overlying said display electrode and said source electrode on the side thereof opposite said first transparent substrate, a gate insulating film formed on said semiconductor layer entirely on the side thereof opposite said first transparent substrate, and a gate electrode formed on said gate insulating film,

each of said thin film transistors including a pair of gaps which are defined respectively between the opposite ends of said gate electrode and said display electrode and the source electrode when viewed in a direction perpendicular to said first transparent substrate, the width of each of said gaps being less than the thickness of said semiconductor layer, portions of said semiconductor layer overlying said display electrode and source electrode being ohmic layers having implanted ions of a concentration higher than an impurity concentration of a channel region of said semiconductor layer under said gate electrode, said channel region having the same length as the width of said gate electrode.

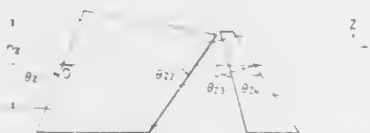


4,948,232  
DEVICE FOR THE PRESENTATION OF INFORMATION  
WITH ROLLABLE PLASTIC SUBSTRATE  
Alf Lange, Kurva, 5, N-0495 Oslo 4, Norway  
PCT No. PCT/NO84/00058, § 371 Date Aug. 13, 1985, § 102(e)  
Date Aug. 13, 1985, PCT Pub. No. WO85/02703, PCT Pub.  
Date Jun. 20, 1985  
Continuation of Ser. No. 770,876, Aug. 13, 1985. This PCT  
application Dec. 13, 1984, Ser. No. 378,476  
Claims priority, application Norway, Dec. 16, 1983, 834642  
Int. Cl.<sup>5</sup> G02F 1/133; G09G 3/18, 3/36  
U.S. Cl. 350—334 3 Claims



3. Information display apparatus, comprising:  
a plurality of liquid crystal display elements, each element having a first de-energized, essentially transparent and invisible state for visual observation therethrough, and a second energized, visible state in response to an energizing signal for forming a visible alpha-numeric character portion while allowing visual observation therethrough around said alpha-numeric portion;  
a flexible, thin sheet of transparent flexible plastic for supporting said liquid crystal display elements permanently, said support means having a rolled storage and transport orientation, and, an unrolled operating orientation, said liquid crystal display elements being arranged on said support means to display desired information formed by said alpha-numeric characters;  
essentially invisible flexible conducting means extending along said transparent support means and rollable therewith between said storage and operating orientations, said conducting means individually connecting with said liquid crystal display elements so that each element can be selectively de-energized and energized to form a specific alpha-numeric character; and,  
port means connected to said conducting means for the input of specific energizing signals for selective, controllable activation of each liquid crystal display element.

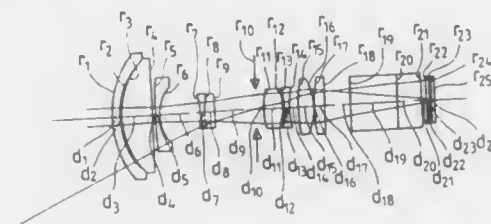
4,948,233  
BEAM SHAPING OPTICAL SYSTEM  
Koichi Maruyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 702,737, Feb. 19, 1985, abandoned.  
This application Jun. 28, 1988, Ser. No. 212,613  
Claims priority, application Japan, Feb. 20, 1984, 59-30887; Mar. 12, 1984, 59-46748  
Int. Cl.<sup>5</sup> G02B 5/04  
U.S. Cl. 350—421 9 Claims



1. An afocal anamorphic optical system for shaping a beam of light, comprising:  
a first prism having a first face adapted to receive an incident

light beam including an incident ray, and a second face positioned relative to said first face and operative to refract the light beam, the incident ray defining an optical axis and a first angle with said first face, the optical axis defining a second angle with said second face, the light beam having a first maximum width, defined by a distance from the optical axis in a first plane perpendicular to said first face and containing the optical axis; and  
a second prism having a third face, defining a third angle with the optical axis, positioned relative to said second face and operative to receive the light beam refracted from said second face, and a fourth face, defining a fourth angle with the optical axis, positioned relative to said first face and operative to refract the light beam to define an emergent light beam including an emergent ray comprising light from the incident ray, the emergent ray comprising light from the incident ray, the emergent ray disposed colinear with said optical axis, the emergent beam having a second maximum width, unequal to said first width, defined by a distance from said optical axis in said first plane.

4,948,234  
ZOOM LENS SYSTEM  
Sinichi Mibara, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Filed Nov. 16, 1989, Ser. No. 437,163  
Claims priority, application Japan, Nov. 18, 1988, 63-290051  
Int. Cl.<sup>5</sup> G02B 15/15, 9/64  
U.S. Cl. 350—423 8 Claims



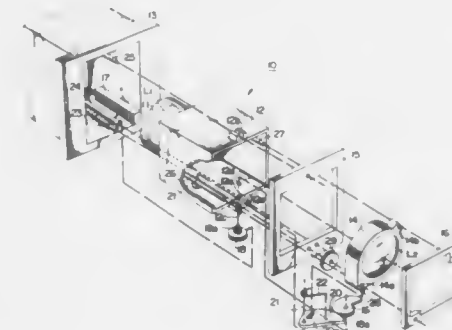
1. A zoom lens system comprising, in the order from the object side, a first lens unit having positive refractive power, a second lens unit having negative refractive power, and movable along the optical axis for varying focal length, a third lens unit having negative refractive power and movable along the optical axis for varying focal length but in a locus different from that of said second lens unit, and a fourth lens unit having positive refractive power and always kept fixed, said first lens unit consisting of a negative meniscus lens element having a convex surface on the object side and as positive lens element, said second lens unit consisting of a single negative meniscus lens element having a convex surface on the object side, said third lens unit consisting of a negative lens element and a positive lens element, and said zoom lens system being so designed as to satisfy the following conditions (1) and (2):

$$1.0 < (r_{21} + r_{22}) / (r_{21} - r_{22}) < 2.5 \quad (1)$$

$$f_H^{0.36} f_T^{0.64} < f_E < f_H^{0.1} f_T^{0.9} \quad (2)$$

wherein the reference symbols  $r_{21}$  and  $r_{22}$  represent radii of curvature on the object side surface and the image side surface of the second lens unit, the reference symbol  $f_E$  designates focal length of the zoom lens system as a whole when total magnification of the second lens unit and the third lens unit is set at 1, and the reference symbols  $f_H$  and  $f_T$  denote focal lengths of the zoom lens system as a whole at the wide position and tele position respectively thereof.

4,948,235  
ZOOMING MECHANISM FOR ZOOM LENS  
Hiroshi Akitake, Hachioji, Japan, assignor to Olympus Optical Company Ltd., Japan  
Filed Jul. 13, 1988, Ser. No. 218,701  
Claims priority, application Japan, Jul. 13, 1987, 62-175306; Jul. 16, 1987, 62-177784  
Int. Cl.<sup>5</sup> G02B 15/00  
U.S. Cl. 350—429 39 Claims



1. A zooming mechanism for a zoom lens including a plurality of lens groups, comprising:  
a zooming frame movable in a direction of an optical axis with respect to a stationary member and carrying at least one lens group;  
drive means for moving the zooming frame in the direction of the optical axis;  
a carrier frame carrying another zoom lens group and supported by a support member within the zooming frame for movement back and forth in the direction of the optical axis;  
means for deriving a rotational drive responsive to the movement of the zooming frame in the direction of the optical axis;  
and means responsive to said for deriving a rotational drive means to cause a non-linear movement of the carrier frame.

4,948,236  
SOFT-FOCUS LENS SYSTEM  
Hiroyuki Hirano, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 17, 1989, Ser. No. 311,919  
Claims priority, application Japan, Feb. 19, 1988, 63-36623  
Int. Cl.<sup>5</sup> G02B 13/20, 9/08, 9/18, 9/36  
U.S. Cl. 350—431 11 Claims

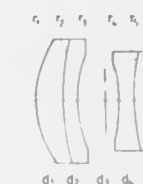
1. A soft-focus lens system comprising, in order from the object side:  
a front lens group consisting of a positive first lens and a negative second lens; and  
a rear lens group consisting of a negative third lens and a positive fourth lens;  
said lens system satisfying the following conditions:  
(1)  $0.25 < r^{PF} / f < 0.45$   
(2)  $0.2 < P < 0.5$   
(3)  $15 < \nu_1 - \nu_2 < 30$   
wherein

$r^{PF}$  is the radius of curvature of the first surface of the front group;

$f$  is the focal length of the overall system;

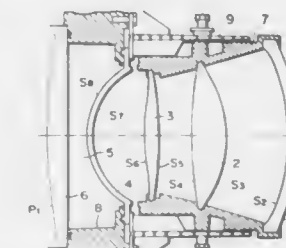
$P$  is the Petzval sum of the overall system when the focal length of the overall system is calculated as 1.0;

$\nu_1$  is the Abbe number of the positive lens element in the front group; and



$\nu_2$  is the Abbe number of the negative lens element in the front group.

4,948,237  
PROJECTION LENS SYSTEM  
Koji Hirata, Yokohama; Kyobei Fukuda, Fujisawa; Hiroki Yoshikawa, Hiratsuka; Shigeru Mori, Chigasaki; Masayuki Muranaka, Yokohama; Isao Yoshizaki, Yokohama; Shigeru Inaoka, Yokohama, and Hiroshi Jitsukata, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Apr. 29, 1988, Ser. No. 188,482  
Claims priority, application Japan, Dec. 9, 1987, 62-309604; Apr. 8, 1988, 63-85070  
Int. Cl.<sup>5</sup> G02B 13/18  
U.S. Cl. 350—432 21 Claims



1. A projection type television lens system comprising, successively from a screen side, a first lens group including a meniscus lens which is convex on the screen side, a second lens group including a positive lens which is convex on both sides, a third lens group including a lens which is centrally convex on

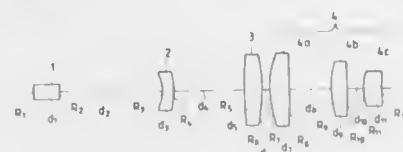
both sides and has a weak, positive refracting power, and a fourth lens group including a negative lens which is concave on the screen side, said projection type television lens system satisfying the following conditions:

$$\begin{aligned} 0.06 < f_0/f_1 < 0.17 \\ 0.82 < f_0/f_2 < 0.87 \\ 0.31 < f_0/f_3 < 0.43 \\ -0.75 < f_0/f_4 < -0.54 \end{aligned}$$

where,

$f_0$ : focal length of the entire lens system  
 $f_1$ : focal length of the first lens group  
 $f_2$ : focal length of the second lens group  
 $f_3$ : focal length of the third lens group  
 $f_4$ : focal length of the fourth lens group

**4,948,238**  
**OPTICAL PROJECTION SYSTEM**  
 Nobuhiro Araki, Yokohama; Takeo Sato, Kawasaki; Koichi Kawata, Tokyo; Noboru Nomura, Kyoto, and Keisuke Koga, Osaka, of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Mar. 10, 1989, Ser. No. 321,683  
 Claims priority, application Japan, Mar. 11, 1988, 63-58739; Feb. 22, 1989, 1-42381; Feb. 22, 1989, 1-42349  
 Int. Cl.<sup>5</sup> G02B 9/34, 13/18  
 U.S. Cl. 350—469



1. An optical projection system comprising:
  - a first lens means, a second lens means, and a third lens means, each consisting of a single lens element, arranged successively in a direction of travel of a ray, the first lens means having a predetermined negative refracting power, the second lens means having a predetermined negative refracting power, the third lens means having a predetermined positive refracting power;
  - a fourth lens means consisting of a plurality of lens elements which follows the third lens means in the direction of travel of the ray and which has a predetermined positive refracting power;
- wherein at least one surface of the first, second, third, and fourth lens elements is aspherical, and wherein the following conditions (1), (2) and (3) are satisfied:

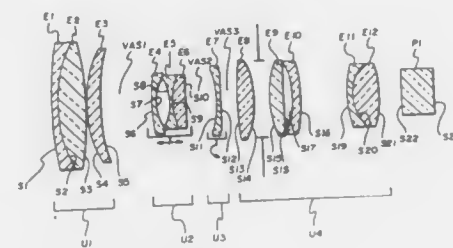
$$4f < f_3 < 20f \quad (1)$$

$$0.65 < (f_4/d_{34}) < 1.40 \quad (2)$$

$$10f < R_5 \quad (3)$$

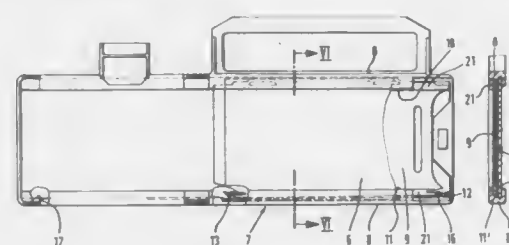
where the character "f" denotes a focal length of the optical projection system, the character "f<sub>3</sub>" denotes a focal length of the third lens means, the character "f<sub>4</sub>" denotes a focal length of the fourth lens means, the character "d<sub>34</sub>" denotes a distance between a rear principal point of the third lens means and a front principal point of the fourth lens means, and the character "R<sub>5</sub>" denotes a radius of curvature of a front surface of the third lens means.

**4,948,239**  
**ZOOM LENS**  
 Lee R. Estelle, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
 Filed Jun. 19, 1989, Ser. No. 367,910  
 Int. Cl.<sup>5</sup> G02B 15/14, 9/64  
 U.S. Cl. 350—470



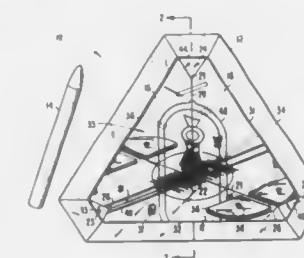
1. A zoom lens comprising:
  - at least ten elements arranged in four units including from front-to-rear:
    - a first positive unit facing the long conjugate and movable for focussing, said positive unit consisting of a cemented doublet followed by a single element;
    - a first negative unit movable for zooming, said negative unit consisting of a negative element and a negative doublet concave toward each other;
    - a second negative unit movable for zooming, said second negative unit consisting of a single negative lens component; and
    - a second positive stationary unit at the end of said zoom lens facing the short conjugate, said second unit consisting of a fixed positive lens component, an aperture stop and a PETZVAL lens.

**4,948,240**  
**SUN VISOR FOR MOTOR VEHICLES**  
 Michael Zipperle, Mühlstr. 8, D-7140 Ludwigsburg, Fed. Rep. of Germany  
 Filed Jul. 28, 1988, Ser. No. 225,254  
 Claims priority, application European Pat. Off., Mar. 9, 1988, 88103694  
 Int. Cl.<sup>5</sup> G02B 27/00; B60J 3/00  
 U.S. Cl. 350—606



1. A sun visor for motor vehicles comprising:
  - a mirror;
  - a plastic slider adapted for displacement for covering and uncovering said mirror, said slider having two edge zones extending in the direction of displacement;
  - a plastic holder for said mirror and slider, said holder having a guide rail receiving one of each of said edge zones of said slider; and
  - means provided on said slider at an edge zone of the slider for frictional engagement with said holder whereby said slider is retained on said holder.

**4,948,241**  
**DEVICE FOR CREATING A VARIETY OF VISUAL IMAGES**  
 Mark Setteducati, New York, N.Y., assignor to Tedco, Inc., Hagerstown, Ind.  
 Filed Mar. 11, 1988, Ser. No. 167,247  
 Int. Cl.<sup>5</sup> G02B 27/08  
 U.S. Cl. 350—618



3. A device for creating a variety of visual images, comprising:
  - three substantially identical triangular walls having a common vertex, any two of said walls sharing a common edge, said walls each having inner reflective surfaces which mutually define a pyramidal reflective cavity;
  - image creating means for manually applying a variety of visible images directly to the inner surface of any of said three walls;
  - each of said walls being orthogonal to the other of said walls; and wherein
  - at least one triangular planar subsurface has an inner reflective surface which intersects a pair of said walls and has a first vertex intersected by the common edge between the pair of said walls.

**4,948,242**  
**VEHICLE REARVIEW MIRROR ASSEMBLY**  
 John P. Desmond; Thomas P. Flynn, both of Newbridge; Thomas D. Gaffney, Bray; James P. Campbell, Drogheda; Parick J. Lawlor, Dublin; John J. McCormack, Newbridge, and Molyneux, Keith W., Kildare, all of Ireland, assignors to Donnelly Mirrors Limited, Ireland  
 Filed Mar. 17, 1989, Ser. No. 325,679  
 Claims priority, application Ireland, Mar. 22, 1988, 849/88  
 Int. Cl.<sup>5</sup> G02G 5/08  
 U.S. Cl. 350—637



38. A vehicle rearview mirror assembly comprising:
  - a casing;
  - a mirror fixed on said casing, said mirror having a full reflectance mode and a partial reflectance mode;
  - mounting means disposed within said casing;
  - means for pivotally connecting said casing and said mount-

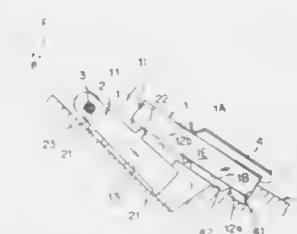
ing means for pivotal movement of said casing and said mirror as a unit relative to said mounting means;

actuation means coupling said casing to said mounting means;

drive means including electric motor means for operating said actuation means to pivot said casing and mirror as a unit between said full reflectance mode and said partial reflectance mode relative to said mounting means;

said electric motor means including a reversible d.c. motor and electric circuit means for energising said motor, said electric circuit means including switch means for deenergising said motor in said full reflectance and said partial reflectance modes; said motor being connected between first and second comparator circuits; one input of each comparator circuit being connected to a common reference voltage, a second input to said first comparator circuit being connected to said switch means for deenergising said electric motor, and a second input of said second comparator circuit being connected to a signal supply means for changing the reflectance mode of said mirror.

**4,948,243**  
**MIRROR-ANGLE ADJUSTING ARRANGEMENT**  
 Taizo Saito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Jan. 25, 1989, Ser. No. 301,063  
 Claims priority, application Japan, Feb. 19, 1988, 63-20650[U]  
 Int. Cl.<sup>5</sup> G02B 5/08  
 U.S. Cl. 350—639



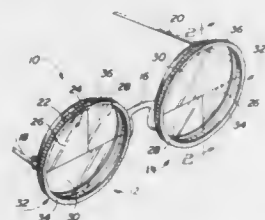
1. A mirror-angle adjusting arrangement, comprising:
  - a mirror having a plurality of sides;
  - a support structure for said mirror, said support structure having a surface with at least a first portion which contacts a section of one side of said mirror; and
  - means for adjusting an angle of said mirror, said adjusting means being movably positioned between at least a second portion of said surface of said support structure and said one side of said mirror, said adjusting means being movable along at least said support structure second portion and comprising means for contacting said mirror such that said angle of said mirror, with respect to at least said support structure surface second portion, varies with movement of said adjusting means.

**4,948,244**  
**ROTATABLE, MULTI-FOCUS EYE GLASSES**  
 Billy R. Jones, #23 Saddle Club Dr., Midland, Tex. 79703  
 Filed Jun. 29, 1989, Ser. No. 373,251  
 Int. Cl.<sup>5</sup> G02C 7/08

- U.S. Cl. 351—57
1. Eyeglasses having rotatable multiple lens holders; each of said holders having a lens frame by which a lens body is supported; a main frame by which the eye glasses are adapted to be worn by a person; said main frame includes a fixed support member circumferentially extending and rotatably receiving said lens frame therewithin; said lens body has multiple lens formed thereon;
  - means connected to said lens frame for imparting relative rotation thereto relative to the main frame, whereby rotation of the lens frame brings a selected lens of the lens



body into alignment with the eye; said lens frame is captured within the circumferentially extending lens holder that is supported on said main body, said lens frame having an outer rim that can be rotated to thereby rotate the lens body within said lens holder of said main frame;



there are a pair of said lens bodies and said lens frames, each said lens frame has an outer peripheral edge portion attached to an outer cog; a gear simultaneously engaging each of the outer cogs; whereby, rotation of the gear concurrently imparts rotation into each said lens body.

4,948,245

## HYDROGEL CONTACT LENS

Ronald G. Seger, Mountain View, and Donald O. Mutti, San Jose, both of Calif., assignors to CooperVision, Inc., Palo Alto, Calif.

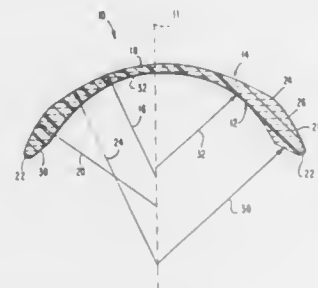
PCT No. PCT/US87/01981, § 371 Date Apr. 14, 1988, § 102(e) Date Apr. 14, 1988, PCT Pub. No. WO88/01398, PCT Pub. Date Feb. 25, 1988

Continuation-in-part of Ser. No. 896,456, Aug. 14, 1986, Pat. No. 4,820,038. This PCT application Aug. 13, 1987, Ser. No. 219,039

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G02C 7/04

U.S. Cl. 351—160 H

46 Claims



1. A soft contact lens comprising:
  - a body of hydrogel lens material having a water content at least 50% of total weight,
  - said body having a low minus power configuration,
  - said body having an anterior surface, a posterior surface, an anterior central optical zone, a peripheral edge, and a peripheral zone generally between said optical zone and said peripheral edge,
  - said body having a diameter about 14.0 mm,
  - said body having a center thickness in cross section between about 0.07 mm and 0.08 mm, and
  - said peripheral zone having a thickness in cross section greater than said center thickness of said body,
  - said peripheral zone of said posterior surface being concave,
  - said posterior surface being formed by molding, base casting, cast-moulding or spin casting said material to the desired surface shape with an ultra-smooth surface finish which is virtually devoid of the scratch markings associated with

the formation of soft contact lens surfaces by lathing and polishing.

4,948,246

## LEADING-VEHICLE DETECTION APPARATUS

Takashi Shigematsu, Mishima, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 22, 1989, Ser. No. 313,065

Claims priority, application Japan, Feb. 22, 1988, 63-38895

Int. Cl.<sup>5</sup> G01C 3/08

U.S. Cl. 356—5

11 Claims



1. A leading-vehicle detection apparatus mounted on a detecting vehicle to detect distance information about a leading vehicle where both the detecting vehicle and the leading vehicle are moving, the apparatus comprising:
  - a transmitter for transmitting a series of waves and a receiver for receiving reflections of said transmitted waves from leading objects;
  - distance-information detection means for detecting a distance between the detecting vehicle and the leading objects according to time differences between wave transmission by the transmitter and reflected wave reception by the receiver;
  - distance-information selection means for selecting detected distance information relating to those leading objects reflecting the transmitted wave which have a speed relative to the speed of the detecting vehicle that is less than or equal to a predetermined value;
  - comparison-pattern storage means for storing vehicle inherent wave-reflection patterns as comparison patterns; and
  - matching-pattern detection means for comparing the distance information selected by the distance-information selection means with the comparison patterns, and using the distance information matching the comparison patterns to determine the leading vehicle's position.

4,948,247

## HIGH SPEED STROBOSCOPE SYSTEM FOR VISUALLY OBSERVING DYNAMIC PROPERTIES BY MOVING OBJECTS OF VARIOUS CHARACTERISTICS

James M. Lapeyre, P.O. Box 50699, New Orleans, La. 70150

Filed Sep. 21, 1988, Ser. No. 247,269

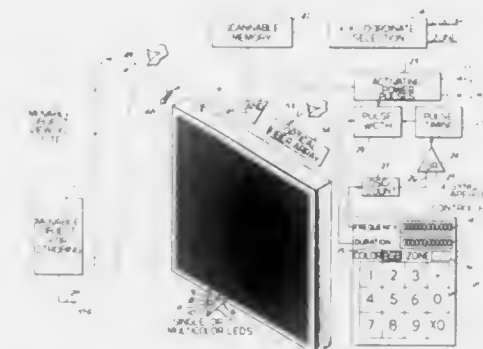
Int. Cl.<sup>5</sup> G01P 3/40

U.S. Cl. 356—23

21 Claims

1. An improved stroboscope system comprising in combination,
  - solid state light emitting means responsive to emit light over discrete time durations defined by the presence of input activating pulses of a predetermined duration,
  - strobing control means providing said input activating pulses to said light emitting means timed to occur in response to synchronizing signals to produce light flashes having a duration substantially that of the activating pulses,
  - means for directing said light flashes onto a movable object with a light intensity permitting an observer to view a moving part of the object in a movable phase thereof related to the synchronization pulses as if stationary comprising a patterned array of individual light emitting ele-

ments and means for processing said activating pulses to predetermined ones of the elements in said array, and



4,948,248

## BLOOD CONSTITUENT MEASURING DEVICE AND METHOD

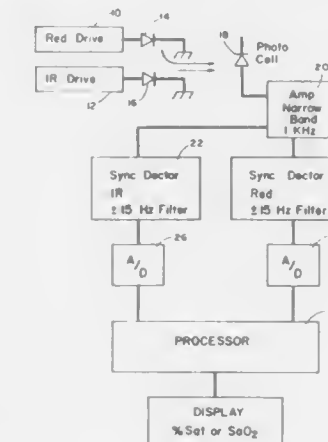
Thomas F. Lehman, Broken Arrow, Okla., assignor to Invivo Research Inc., Winter Park, Fla.

Continuation of Ser. No. 223,231, Jul. 22, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 449,154

Int. Cl.<sup>5</sup> G01N 33/48

U.S. Cl. 356—40

4 Claims



1. A method of detecting the oxygen saturation in the blood of living tissue, comprising:
  - (a) sequentially passing light of red frequency through the living tissue;
  - (b) sequentially passing light of infrared frequency through the living tissue;
  - (c) detecting the amplitude of light of red frequency transmitted through the tissue and providing electrical signals in response to such amplitude;
  - (d) detecting the amplitude of light of infrared frequency transmitted through the tissue providing electrical signals in response to such amplitude; and
  - (e) instantaneously and electronically plating said red light produced electrical signals against said infrared light produced electrical signals to obtain an output signal responsive to a slope of such plotted signals such that said slope is an indication of the oxygen saturation of blood in the tissue.

4,948,249

## HEADLIGHT AIMING AND LIGHT PATTERN TESTING APPARATUS AND METHOD

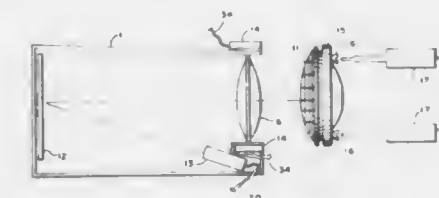
Ross E. Hopkins, Emporia, and John J. Humbard, Pittsburg, both of Kans., assignors to Hopkins Manufacturing Corporation, Emporia, Kans.

Filed Jun. 23, 1987, Ser. No. 65,573

Int. Cl.<sup>5</sup> G01J 1/00

U.S. Cl. 356—121

3 Claims



1. A method of aiming a vehicle headlight comprising:
  - focusing a light beam from a vehicle headlight with a lens onto a surface;
  - centering the headlight and lens relative to one another with light intensity sensors;
  - sensing the intensity of the focused light beam in each cell in a matrix of cells overlying the focused light beam and generating for each of said cells a pixel, i.e., an electrical signal indicative of the position of the cell and the intensity of a light beam in the cell; and
  - comparing a sufficient number of pixels to determine the location of the brightest pixel in the beam, determining light intensity at the brightest pixel, calculating at least two established light intensity levels relative to the intensity at the brightest pixel, and scanning pixels to determine the location of two pixels each having one of the calculated intensity levels and having an established geometrical relationship to each other.

4,948,250

## ATOMIC ABSORPTION SPECTROPHOTOMETER

Konosuke Oishi, Mito; Hideaki Koizumi, and Masataka Koga, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 18, 1984, Ser. No. 621,464

Claims priority, application Japan, Jun. 16, 1983, 58-108911

Int. Cl.<sup>5</sup> G01J 3/42

U.S. Cl. 356—307

5 Claims



1. An atomic absorption spectrophotometer which comprises:
  - a light source for emitting sample light absorbed by an atom to be analyzed and reference light not absorbed by said atom;
  - radiation means for sequentially radiating said two kinds of light to an analysis sample with a predetermined time interval;
  - photoelectric conversion means for photoelectrically converting the light passing through said analysis sample; and
  - calculation processing means for separating the electric signals from said photoelectric conversion means into a sample signal and a reference signal, and for calculating the absorbency from approximate mean values of two time adjacent signals of one of said sample signals and said reference signals, and from the signals of the other of said

sample signals and said reference signals at the same time as said mean values.

4,948,251

**OPTICAL HETERODYNE MEASURING APPARATUS**  
Michio Kondo, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 12, 1989, Ser. No. 351,091

Claims priority, application Japan, May 16, 1988, 63-64319[U]

Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—349

10 Claims



1. An optical heterodyne measuring apparatus wherein two linearly polarized reference beams having different frequencies, and two linearly polarized measuring beams identical with the reference beams are obtained from a laser beam or beams which is/are transmitted from a laser source to a measuring portion of the apparatus through a fixed-polarization-plane optical fiber, and a measurement of a subject is effected based on a difference between a beat frequency of the reference beams, and a beat frequency of the measuring beams which varies depending upon a parameter of the subject which is to be measured, comprising:

optical means for obtaining two reference beams whose beat phases are different from each other by 180° and two measuring beams whose beat phases are different from each other by 180°;  
a first pair of photosensors receiving said two reference beams and producing two electric reference beat signals;  
a second pair of photosensors receiving said two measuring beams and producing two electric measuring beat signals;  
first differentially amplifying means receiving said reference beat signals and producing a differentially amplified output; and  
second differentially amplifying means receiving said measuring beat signals and producing a differentially amplified output.

4,948,252

**SUB-TAU PHASE MODULATION IN A FIBER-OPTIC ROTATION SENSOR**

Allen C. Cekorich, Temple City, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 24, 1989, Ser. No. 356,272

Int. Cl.<sup>5</sup> G01B 9/02

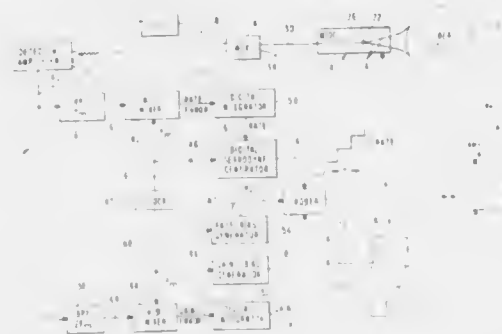
U.S. Cl. 356—350

20 Claims

1. An apparatus for closed-loop phase modulation to measure rate and control phase modulator gain errors in an electrical signal representing the phase difference between first and second light signals from lightwaves counterpropagating in an interferometric rotation sensor including a closed light path with a phase modulation means therein comprising:

means for producing a serrrodyne signal responsive to a rate

signal derived from said electrical phase-difference signal at a first frequency;  
means for producing a rate bias signal consisting of a periodic square wave having said first frequency;  
means for producing a gain bias signal consisting of a sequence of step-voltage transitions at the ends of successive equal intervals of time equal to half the period of said serrrodyne signal;



means for summing said serrrodyne signal, said rate bias signal, and said gain bias signal to produce a summed phase modulation signal;  
means for multiplying said summed phase modulation signal with a gain signal derived from said electrical phase-difference signal at a second frequency twice said first frequency to produce a gain-multiplied summed phase modulation signal; and  
means for applying said gain-multiplied summed phase modulation signal to said phase modulation means.

4,948,253

**INTERFEROMETRIC SURFACE PROFILER FOR SPHERICAL SURFACES**

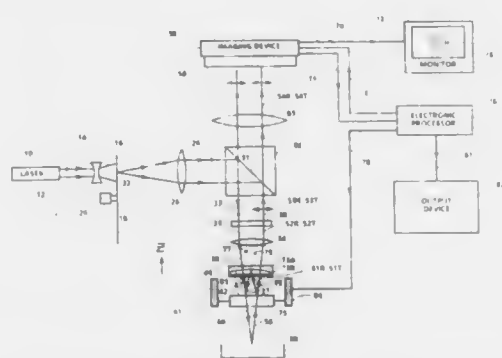
James F. Biegen, Middletown, Conn., assignor to Zygo Corporation, Middletown, Conn.

Filed Oct. 28, 1988, Ser. No. 264,262

Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—351

36 Claims



1. An interferometric profiler capable of measuring accurately the topography of a spherical test surface, said profiler comprising a light source of linearly polarized electromagnetic radiation; means optically aligned with said light source and disposed so as to have light from said linearly polarized light source impinge thereon to form a linearly polarized extended second light source; an optical system comprising a first lens and a beamsplitter disposed so as to collect and direct a first linearly polarized light beam produced from light from said extended second light source; a first quarter-wave phase retardation plate disposed in the path of said first linearly polarized

light beam for converting said first linearly polarized light beam into a circularly polarized light beam; a second lens disposed in the path of said circularly polarized light beam for focusing said circularly polarized light beam onto a spherical test surface and a spherical reference surface of an interferometer; wherein said spherical reference surface is defined by the interior interface of a doublet lens system, the elements of said doublet having matched indices of refraction and complementary spherical radii of curvature, said doublet having zero power; said spherical reference surface having a coating thereon which forms an unobscuring reference surface for said spherical reference surface; said interferometer comprising a reference arm within which is located said spherical reference surface and a second quarter-wave phase retardation plate for converting said circularly polarized light beam into a second linearly polarized light beam, and a test arm within which is located said spherical test surface and a third quarter-wave phase retardation plate on which is located a beamsplitter surface for dividing said second linearly polarized light beam into test wavefronts and reference wavefronts and directing said test wavefronts and reference wavefronts onto said spherical test surface and said spherical reference surface, respectively; means for varying the relative distance between said spherical test surface and said spherical reference surface; means for recombining said test wavefronts and reference wavefronts after they have interacted separately with said spherical test surface and said spherical reference surface to produce an interference pattern; means for imaging said spherical test surface and said spherical reference surface onto the photosensitive elements of an imaging device; means for optically isolating said imaged spherical test surface and said spherical reference surface and said interference pattern; means for converting said test wavefronts and reference wavefronts into a third linearly polarized light beam which has its polarization vector rotated relative to said first linearly polarized light beam; means disposed in the path of said third linearly polarized light beam for directing said third linearly polarized light beam to said imaging device; means for sensing said interference pattern; means associated with said imaging device for viewing said imaged spherical test surface and said spherical reference surface and said interference pattern; and means operatively connected to said imaging device output for processing the output of said imaging device to profile the topography of said test surface.

4,948,254

**LIGHT WAVE INTERFERENCE LENGTH-MEASURING APPARATUS**

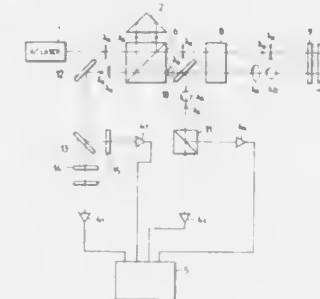
Akira Ishida, Tsukuba, Japan, assignor to Research Development Corporation of Japan, Tokyo, Japan

Filed Oct. 13, 1988, Ser. No. 256,942

Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—358

5 Claims



1. A light wave interference displacement measurement apparatus which uses two beams of different wavelengths of coherent light comprising:

a light source (7) for causing two coherent light beams having a first wavelength  $\lambda_a$  and a second wavelength  $\lambda_b$ ,

respectively, incident upon a common light path for measuring at least the length of said light path;

an optical element (6) for splitting at least one beam from said light source into a reference light path and a light path of length to be measured, and for combining the same;

a movable light reflector means (1) arranged in said light path of length to be measured to reflect the incident light on a substantial incident light path;

separation means (10, 6'), arranged in the vicinity of said optical element for splitting and combining, to separate reflected light from said movable light reflector means into separate beams of said first and second wavelengths, respectively;

a first light detector means (4) for detecting a phase difference  $\delta_a$  resulting from the combination of the reflected beam of the first wavelength from the movable light reflector means and the beam from the reference light path;

a second light detector means (4) for detecting a phase difference  $\delta_b$  resulting from the combination of the reflected beam of the second wavelength from the movable light reflector means and a reference beam; and

signal processing means (5) for calculating, from the phase differences  $\delta_a$  and  $\delta_b$  detected by said first and second light detector means, an error resulting from an apparent moving distance of said movable light reflector means and a flicker of the atmosphere in order to detect the true displacement of said movable light reflector means.

4,948,255

**OPTICAL SENSING DEVICE**

Masanori Watanabe, Tenri, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

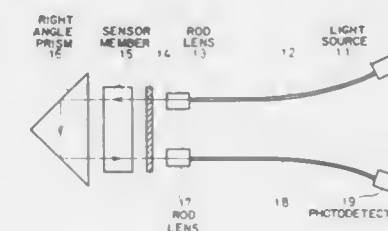
Filed Nov. 21, 1985, Ser. No. 800,399

Claims priority, application Japan, Nov. 21, 1984, 59-247678

Int. Cl.<sup>5</sup> G02F 1/01

U.S. Cl. 356—367

4 Claims



1. An optical sensing device comprising:

a sensor member that causes the phase retardation to vary in accordance with physical values applied thereto, said sensor member being a material which varies its birefringence when said physical values are applied thereto;

a polarizer positioned on one side of the sensor member, said polarizer having a polarization axis; and

an optical element positioned on a side of the sensor member opposite to the polarizer, said optical element being provided with two total reflection surfaces causing a beam path to invert itself by 180°, said two total reflection surfaces being disposed at generally 90° with respect to each other thereby forming a generally right angle, wherein a phase bias of substantially 90° is imparted by the reflections from said two total reflection surfaces to orthogonally polarized beams generated in the birefringent material incident on the optical element whereby optical sensitivity is enhanced, said beam passing through said polarizer before and after inversion by said optical element such that intersections of these beam paths with said polarizer established a reference axis, the reference axis passing through both intersections of the beam paths and being generally perpendicular to general directions in



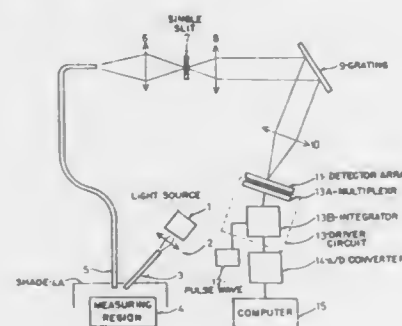
which said beam paths move, said polarization axis being located at an angle other than 0° and 90° with respect to said reference axis.

4,948,256

**OPTICAL FIBER TYPE COLORIMETER**  
Chin-Ru Lin; Yuch-Joy Dong, and Jinn-Trong Wu, all of Hsin Chu Hsien, Taiwan, assignors to Industrial Technology Research Institute, Hsin Chu Hsien, Taiwan  
Filed Sep. 6, 1988, Ser. No. 240,195  
Int. Cl.<sup>5</sup> G01J 3/42

U.S. Cl. 356—328

5 Claims



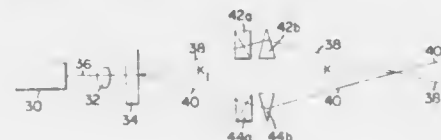
1. An optical fiber colorimeter comprising:
  - a light source for generating a light beam;
  - a first optical fiber;
  - a first lens interposed between said light source and said first optical fiber, said first optical fiber and said first lens positioned so as to direct said light beam into said fiber;
  - a sample placed at a 45° angle from an exit end of said first optical fiber so as to have said light beam incident on a surface thereof;
  - a shade for defining a measuring region around said sample;
  - a second optical fiber perpendicular to the sample, positioned so as to receive light scattered from the surface;
  - a second lens interposed between an exit end of said second optical fiber and a front side of a single slit;
  - a diffraction grating;
  - a third lens positioned after a backside of said single slit for directing light passing through said slit toward said diffraction grating;
  - a detector array;
  - a fourth lens for focusing light diffracted by said grating onto said detector array which converts a spectrum from the grating to electronic signals;
  - a driver circuit including a multiplexer and a high speed integrator; and
  - an analog/digital (A/D) converter connecting said driver circuit to a computer which analyzes the electronic signals;
2. said optical fiber colorimeter able to measure a chrominance of the sample and a value obtained is used as a reference standard, to be stored in the computer, which will be used for later comparisons thereby making it unnecessary to consider chromatic differences due to surroundings.

4,948,257

**LASER OPTICAL MEASURING DEVICE AND METHOD FOR STABILIZING FRINGE PATTERN SPACING**  
Stanley L. Kaufman, Minneapolis; Frank D. Dorman, Golden Valley; Daniel C. Bjorkquist, New Brighton, and Miles R. Finn, Minneapolis, all of Minn., assignors to TSI Incorporated, St. Paul, Minn.  
Continuation of Ser. No. 96,925, Sep. 14, 1987, abandoned. This application Jun. 23, 1989, Ser. No. 372,223  
Int. Cl.<sup>5</sup> G01C 9/02

U.S. Cl. 356—354

25 Claims



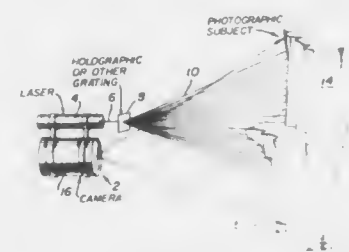
1. A method of stabilizing fringe pattern spacing in a laser optical measuring instrument, wherein the fringe pattern spacing is formed by intersecting laser beams, the beams each having a wavelength and a direction, and wherein the fringe pattern spacing varies with the wavelengths and directions of the beams, comprising the step of: altering the direction of at least one of the beams automatically in response to changes in the wavelength of that beam through use of a dispersive element, whereby variations in the fringe pattern spacing due to the wavelength change are eliminated without movement of said dispersive element to provide a stabilized fringe pattern spacing.

4,948,258

**STRUCTURED ILLUMINATION SURFACE PROFILING AND RANGING SYSTEMS AND METHODS**  
Frank M. Caimi, Vero Beach, Fla., assignor to Harbor Branch Oceanographic Institute, Inc., Ft. Pierce, Fla.  
Filed Jun. 27, 1988, Ser. No. 211,586  
Int. Cl.<sup>5</sup> G01B 11/24

U.S. Cl. 356—376

8 Claims



1. A structured illumination method for determining characteristics of a surface which comprises:
  - projecting a beam of collimated rays from a ray source along a longitudinal axis,
  - converting said beam into a divergent array of spaced dots of said rays in a predetermined pattern by passage of said beam through a holographic grating that intersects said longitudinal axis,
  - projecting at least a portion of said divergent array of spaced dots onto a test surface remote from said grating a distance of  $R_p + dR$ ,
  - forming an image of the pattern of dots reflected from said test surface in recorder means that substantially intersects said longitudinal axis at a distance  $R_F + dR$  along said axis from said test surface, with the proviso that  $R_p$  shall not equal  $R_F$ ,
  - projecting a similar divergent array of spaced dots onto a datum surface remote from said grating a distance of  $R_p$ ,

forming an datum image of the pattern of dots reflected from said datum surface in recorder means that substantially intersects said longitudinal axis at a distance  $R_F$  along said axis from said test surface,

comparing the positions of said dots in said test image to the positions of the respective dots in said datum image to obtain values of the displacements of individual dots in said test image from the respective individual dots in said datum image, and

using said individual dot displacement values to determine one or more characteristics of said surface.

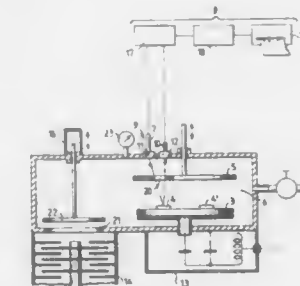
4,948,259

**METHOD AND APPARATUS FOR MONITORING LAYER EROSION IN A DRY-ETCHING PROCESS**  
Knut Enke, Johannesburg; Ingo Hussla, Hanau, and Gerhard Lorenz, Alzenau, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany  
Filed Jun. 30, 1989, Ser. No. 373,883  
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1989, 3901017

Int. Cl.<sup>5</sup> G01B 11/06

U.S. Cl. 356—382

14 Claims



1. A method for monitoring layer erosion of layers on at least one substrate in a dry-etching process, having a first electrode that electrically contacts the substrate to be etched and a second electrode that is located above the first electrode, both electrodes being situated inside a process chamber, comprising the steps of: placing an optical photometer outside of the process chamber and reflecting a light beam off of the substrate in the process chamber by means of the photometer, signals output by the optical photometer being amplified by an electrical circuit and being edited and displayed by means of a Fourier transformation.

4,948,260

**METHOD AND APPARATUS FOR EXAMINING HAIRINESS OF YARN**  
Ernst Felix, Uster, and Hans Wampfler, Zurich, both of Switzerland, assignors to Zellweger Uster Ltd., Uster, Switzerland  
Continuation of Ser. No. 939,692, Dec. 9, 1986, abandoned. This application Feb. 7, 1989, Ser. No. 320,828  
Claims priority, application Switzerland, Dec. 17, 1985, 05 370/85

Int. Cl.<sup>5</sup> G01B 11/00

U.S. Cl. 356—429

10 Claims



9. Apparatus for sensing the hairiness of yarn as such yarn is

being fed along a yarn path extending through a measuring gap, said apparatus comprising

light supplying means on one side of said gap for transmitting a collimated beam of light across said gap along an optical path which intersects said yarn path, said light supplying means including a lens component exposed on its output surface to the atmosphere of said gap;

first light blocking means beyond said yarn path in said optical path for blocking light from said light supplying means which is not deflected from said beam;

light receiving lens means beyond said first light blocking means or receiving light deflected out of said beam by particles of foreign matter and by fiber fragments at the surface of the yarn;

second light blocking means beyond said light receiving lens means, said light receiving lens means forming on said second light blocking means an image of said lens component of said light supplying means so that light deflected from said beam by particles of foreign matter on said exposed surface of said lens component will be blocked by said second light blocking means; and

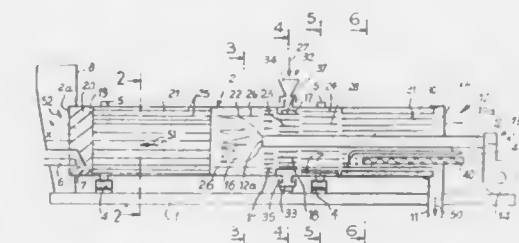
detector means beyond said second light blocking means, said light receiving lens means directing light deflected from said light beam by fiber fragments at the surface of said yarn onto said detector means so that the amount of light detected will provide an indication of the hairiness of the yarn.

4,948,261

**DEVICE FOR PREPARING BITUMINOUS COATED PRODUCTS, CONSISTING OF A DRUM**  
Gay Marconnet, Rive de Gier, France, assignor to Ermont C. M., Lorette, France  
Filed Jun. 13, 1989, Ser. No. 365,389  
Claims priority, application France, Jun. 13, 1988, 88 07856  
Int. Cl.<sup>5</sup> B28C 5/46

U.S. Cl. 366—25

4 Claims



1. Device for preparing bituminous coated products from virgin aggregates, recycled bituminous mixes and liquid bitumen, comprising
  - (a) a cylindrical main drum mounted for rotation about an axis (XX') of said main drum and inclined relative to a horizontal plane;
  - (b) a device for supplying virgin aggregates in a cold and moist state, via an upper inlet end of said main drum; and
  - (c) a burner penetrating inside said main drum via a lower outlet end of said main drum and emerging inside a flame zone remote from inlet and outlet ends of said main drum, such that hot gases arising from a flame of said burner and said virgin aggregates circulate in opposite directions;
  - (d) said main drum comprising a mixing zone situated between said flame zone and said outlet end of said main drum, in which mixing zone an internal wall of said main drum is provided with vanes for mixing solid materials circulating inside said main drum with liquid bitumen introduced at an inlet of said mixing zone and a zone for introducing recycled bituminous mixes into said main drum located between said flame zone and said mixing zone;

(c) a second drum of smaller diameter than a diameter of said main drum arranged inside and coaxially with said main drum, raising vanes being fixed on an internal wall of said second drum for raising solid materials circulating inside said main drum, so as to form a dense screen of materials isolating said mixing zone from said flame zone, as a result of said solid materials being raised and then falling back down over an entire section of said second drum when said main drum is rotated.

4,948,262

# ROTARY MIXING AND STRAINING APPARATUS

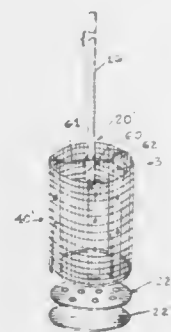
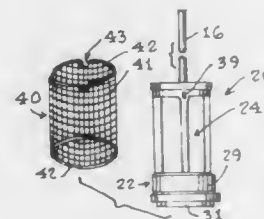
Floyd Tomé, Jr., 106 Julian Ave., Marietta, Ohio 45750

Filed Jun. 22, 1989, Ser. No. 369,971

Int. Cl.<sup>3</sup> B01F 5/12, 7/18, 7/32

U.S. Cl. 366—129

3 Claims



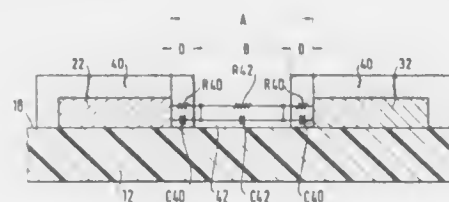
1. A rotary mixing and straining apparatus for liquids confined in a receptacle wherein the apparatus comprises:  
a rotary power unit in the form of a conventional rotary power tool;  
a shaft unit including a shaft member having a first end and a second end wherein said first end is adapted to be operatively engaged with said rotary power tool; and,  
a mixing head unit comprising a mixing head member including a generally cylindrical open framework member attached to the second end of the shaft member and a generally cylindrical screen member operatively attached to the outer periphery of the framework member wherein, the framework member comprises:  
a cylindrical core element secured to the second end of the shaft member and provided with a plurality of radial arm elements which support and suspend a plurality of generally vertically disposed paddle elements in a generally cylindrical configuration; and wherein, each of the paddle elements are provided with fluid apertures.

4,948,263  
DEW-POINT SENSOR  
Rainer Herrmann, Steinen, and Dieter Funken, Lörrach, both of Fed. Rep. of Germany, assignors to Endress u. Hauser GmbH u. Co., Maulburg, Fed. Rep. of Germany  
Filed Jun. 9, 1988, Ser. No. 204,628  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, 3720189

Int. Cl.<sup>3</sup> G01N 25/68

U.S. Cl. 374—28

4 Claims



1. A dew-point sensor for a dew-point measuring device for measuring the water dew-point in gases, comprising:  
a sensor surface which is exposed to the gas to be measured;  
means for cooling said sensor surface to a dew-point temperature at which water vapor condenses on said sensor surface;  
a first electrode structure having a first electrode portion mounted on said sensor surface;  
a second electrode structure having a second electrode portion mounted on said sensor surface at a uniform distance of less than 50  $\mu$ m from said first electrode portion;  
a moisture-insensitive insulating layer covering said first electrode portion and said second electrode portion and having a thickness smaller than said uniform distance between said first and second electrode portions to maintain a gap between said electrode portions; and  
whereby the insulating layer forms a parallel capacitance-resistance in series with the capacitance-resistance between the electrodes and the electrode resistance such that formation of condensed droplets fill the gap between electrode portions to cause a large change of the impedance or capacitance between the two electrode structures when the dew-point temperature is reached.

4,948,264

# APPARATUS FOR INDIRECTLY DETERMINING THE TEMPERATURE OF A FLUID

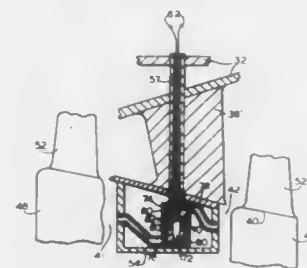
Richard B. Hook, Jr., 10 Hollywood Dr., Burnt Hills, N.Y. 12027

Filed Jul. 7, 1986, Ser. No. 882,564

Int. Cl.<sup>3</sup> G01K 1/16, 7/02

U.S. Cl. 374—144

1 Claim



1. In a prime mover of the type having an outer casing for containing a motive fluid; and, further with respect to the flow of motive fluid, having at least one row of stationary guide vanes disposed within the outer casing and at least one annular row of upstream rotating blades and at least one row of down-

stream rotating blades with the guide vanes disposed therebetween; an apparatus for measuring the temperature of the motive fluid on the upstream side of the stationary guide vanes comprising:

- a shell having a fluid inlet and a fluid outlet;
- a thermally conductive body disposed in the shell;
- a passageway disposed between the shell and the thermally conductive body and connecting the fluid inlet with the fluid outlet;
- a cavity formed within the thermally conductive body;
- temperature measuring means disposed within the cavity in the thermally conductive body; and, wherein the stationary guide vanes include a radially inner annular diaphragm; the shell being disposed within the diaphragm and having the fluid inlet communicating with the upstream side of the annular diaphragm and the fluid outlet communicating with the downstream side of the annular diaphragm.

and suspended therefrom, said bag maintained in a bag open position when said frame is opened providing thereby a top bag opening, said frame having on its frame upper surface an adhesive means for securing said frame in a folded closed position after use, said frame upper surface also containing fold means upon which said frame can be folded upon itself to seal said bag, when in an open position, said frame having outside dimensions slightly larger than an opening of a container in which it is to be used and wherein at least two flaps are located on and extend outwardly from said frame, said flaps flexibly attached to or extensions of said frame at a location at substantially right angles to and different from frame locations containing said fold means on said frame.

4,948,267

# PRODUCT DISPLAY STORAGE PACKAGE

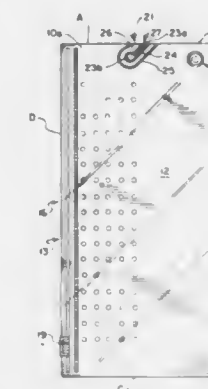
Nicholas Kaldenbaugh, Charlestown, Mass., assignor to Foot-Joy, Inc., Brockton, Mass.

Filed Aug. 24, 1988, Ser. No. 235,581

Int. Cl.<sup>3</sup> B65D 33/16

U.S. Cl. 383—63

3 Claims



4,948,265  
CONTAINER BAG  
Charles S. Futerman, c/o 14 Aylmer Parade, London, N2 0PF, United Kingdom

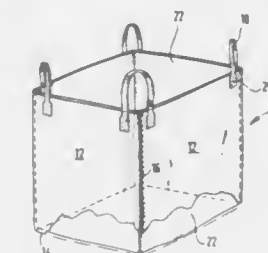
Filed Mar. 3, 1989, Ser. No. 318,597

Claims priority, application United Kingdom, Mar. 4, 1988, 8805162; Apr. 21, 1988, 8809403

Int. Cl.<sup>3</sup> B65D 30/04, 33/06

U.S. Cl. 383—6

7 Claims



1. A container bag which comprises a body of flexible material containing one or more side seams and being provided with lifting loops comprising a circular woven inner lining disposed within the body, said lining being of sufficient strength and thickness to enhance the strength of the bag.

4,948,266

# DISPOSABLE RECEPTACLE

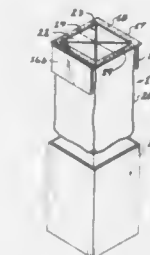
David M. Bencic, 2422 Batavia-Oakfield Townline Rd., Batavia, N.Y. 14020

Filed Jun. 12, 1989, Ser. No. 364,147

Int. Cl.<sup>3</sup> B65D 33/02, 33/14, 33/18

U.S. Cl. 383—34

14 Claims



1. A disposable waste bag unit comprising in combination an upper frame means, a flexible bag, and adhesive means, said flexible bag attached to a bottom surface of said frame means

1. A hangable flexible plastic pouch comprising  
a. a body having two rectangular opposing pouch panels of essentially the same shape and size forming four sides with two being longer and two being shorter;  
b. securing means for securing the panels together along three (3) sides of which two are shorter sides and one is a longer side;  
c. a closure means along the fourth longer side capable of being readily and repeatedly opened and closed;  
d. ventilation holes in one of said panels; and  
e. hanger means formed in the body for hanging the pouch.

4,948,268

# PLASTIC FILM BAG WITH INTEGRAL PLASTIC FILM TIE ELEMENT, AND ASSOCIATED FABRICATION METHODS

Gary L. Rutledge, Dallas, Tex., assignor to John C. Marrelli, Tustin, Calif.

Division of Ser. No. 117,209, Nov. 4, 1987, Pat. No. 4,854,735. This application Mar. 10, 1989, Ser. No. 321,719

Int. Cl.<sup>3</sup> B65D 33/28

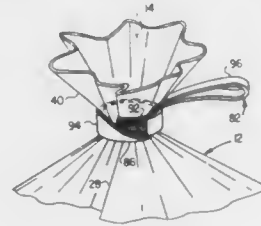
U.S. Cl. 383—72

16 Claims

1. A plastic film bag comprising:  
an open upper end;  
a closed lower end;  
a pair of opposite side edge portions each defined by a plurality of plastic film layers;  
a pair of opposite side walls interconnecting said side edge portions and said lower end; and  
an elongated plastic film tie element having an inner end side surface portion including an inner end edge of said tie element and abutting one of said opposite side edge portions adjacent said upper bag end, a substantial part of said



side surface portion, including a section thereof closely adjacent said inner end edge, laterally overlying and being weldingly intersecured with at least two plastic film layers of said one of said side edge portions with sufficient strength to permit a remaining free outer end portion of said tie element to be passed around an upper end portion of the bag to form a loop therearound, passed through the



loop, and then firmly pulled to tighten the loop and close the bag without separating the welded end portion of the tie element from the bag, said plastic film tie element having a sufficient limpness and deformability to cause the tightened loop to frictionally engage the upper bag end and hold it closed when said remaining free outer end portion of said tie element is released.

4,948,269

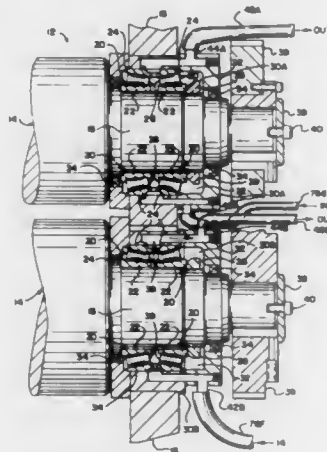
# BEARING TEMPERATURE REGULATION AND LUBRICATION SYSTEM

James T. Hamilton, 328 Sycamore Dr., Naperville, Ill. 60540  
Filed Jul. 11, 1989, Ser. No. 378,050

Int. Cl.<sup>5</sup> F16C 37/00

U.S. Cl. 384—467

20 Claims



2. A bearing temperature regulation system comprising:  
a fluid, said fluid being capable of being heated or cooled;  
bearing housing means for enclosing one or more bearings;  
said housing means having a hollow fluid chamber for the passage of said fluid therethrough and in fluid communication with said bearings;  
said hollow fluid chamber having inlet means and outlet means for the passage of said fluid through said hollow fluid chamber;  
thermostat means for sensing the temperature of said fluid after said fluid has passed through said housing means, and for selectively controlling the operation of a fluid-cooling circulation loop and a fluid circulation and heating loop;  
a pump for pumping said fluid through said hollow fluid chamber and through said fluid-cooling circulation loop or said fluid circulation and heating loop;  
said fluid-cooling circulation loop being in communication with said hollow fluid chamber and said pump, and including chiller means for cooling said fluid and at least one

solenoid valve in communication with said thermostat means for selectively controlling the flow of chilled fluid through said hollow fluid chamber;

said fluid circulation and heating loop being in communication with said hollow fluid chamber and said pump, and including a heater means for heating said fluid, and at least one solenoid valve in communication with said thermostat means for selectively controlling the flow of fluid from the circulation and heating loop through said hollow fluid chamber;

said thermostat means responding to a fluid temperature reading above a preselected value to open said at least one solenoid valve of the fluid-cooling circulation loop, and closing said at least one solenoid valve of the fluid circulation and heating loop to circulate chilled fluid through said hollow fluid chamber and around said bearings to absorb heat from said bearings;

said thermostat means responding to a fluid temperature reading below a preselected value to open said at least one solenoid valve of the fluid circulation and heating loop and closing said at least one solenoid valve of the fluid-cooling circulation loop to circulate fluid from said circulation and heating loop through said hollow fluid chamber and around said bearings to transfer heat to said bearings.

4,948,270

# OIL FLUSHING ADAPTER

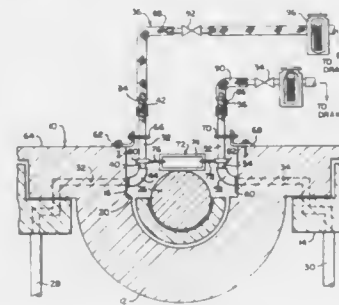
Paul G. Minard, Winter Springs; Robert C. Hurman, Tampa, both of Fla., and William A. Weiland, Chance, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 16, 1989, Ser. No. 422,260

Int. Cl.<sup>5</sup> F16C 33/10

U.S. Cl. 384—399

20 Claims



1. An oil flushing adapter for a rotor bearing mounted in a bearing support ring having at least one pair of opposed oil outlets disposed on opposite sides of a rotor, the adapter comprising:

a first conduit having two open opposite axial ends;  
a second conduit having two open opposite axial ends;  
one end of the first conduit being in communication with one of the oil outlets and one end of the second conduit being in communication with the other oil outlet;  
first means for connecting the first conduit to the bearing support ring;  
second means for connecting the second conduit to the bearing support ring;  
the first and second connecting means being substantially coplanar; and  
extension means, disposed between the oil outlets and the first and second connector means, for pushing the one end of the first and second conduits towards the corresponding oil outlets.

4,948,271

# BEARING STRUCTURE WITH IMPROVED LUBRICATING SEALS FOR SUPPORTING SHAFT ELEMENT

Masao Nanotani, and Masaaki Matsumoto, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan  
Division of Ser. No. 301,941, Jan. 26, 1989, Pat. No. 4,919,551.

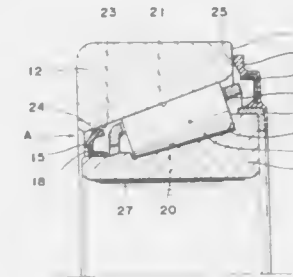
This application Nov. 15, 1989, Ser. No. 436,789

Claims priority, application Japan, Jan. 26, 1988, 63-15586

Int. Cl.<sup>5</sup> F16C 33/78

U.S. Cl. 384—473

3 Claims



1. A bearing structure for supporting a shaft element, comprising:

a housing having a forward end and a rear end and a hollow interior;  
a forward rolling element bearing at the forward end of said housing and a rear rolling element bearing at the rear end of said housing for supporting a shaft element within said housing between said bearings, each of said bearings being constituted by an inner ring having a race surface, and outer ring having a race surface, a plurality of rolling elements which roll on the race surface of said inner ring and the race surface of said outer ring, a cage which retains said rolling elements at even intervals in the circumferential direction of said bearing, a first seal having a lip portion and a supporting portion with said supporting portion mounted on one of said rings at one axial end of said bearing with said lip portion resiliently engaging a sealing surface on the other of said rings at said one axial end of said bearing in a direction axially outwardly of said bearing and movable axially inwardly to be separated from said sealing surface by pressure of a lubricating oil axially inwardly of said bearing, and a second seal having a further lip portion and a further supporting portion with said further supporting portion mounted on one of said rings at the other axial end of said bearing and with said further lip portion resiliently engaging a sealing surface on the other of said rings at the other axial end of said bearing in a direction axially inwardly of said bearing and movable axially outwardly to be separated from said further sealing surface by pressure of a lubricating oil axially outwardly of said bearing, said bearings each having said one axial end facing toward the interior of said housing and having said other axial end facing outwardly of said housing;  
a lubricating oil reservoir outside of one end of said housing; said housing having an oil drainage passage extending from just beneath the bearing at the other end of said housing to said oil reservoir and having an oil supply passage from said oil reservoir into the hollow interior of said housing between said bearings.

4,948,272

# PLASTIC HOUSING THRUST BEARING WITH COMPLETE SEALING

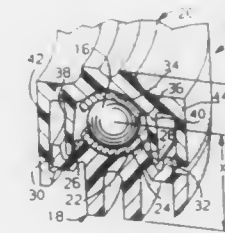
Keith A. Stowe, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 28, 1989, Ser. No. 329,454

Int. Cl.<sup>5</sup> F16C 19/30, 33/76

U.S. Cl. 384—607

3 Claims



1. A bearing having a circular complement of rolling elements arranged about an axis of said bearing for supporting an axial load, comprising,

a first, generally annular housing molded of a rigid plastic with an integrally molded first pathway for supporting one side of said rolling elements, said first pathway further being bordered by an inner, radially and axially sloping seal surface, and an outer, radially and axially sloping seal surface, said seal surfaces further being integrally molded to said first housing of the same rigid plastic, and,  
a second, generally annular housing also molded of a rigid plastic with an integrally molded second pathway for supporting the other side of said rolling elements, said second pathway further being bordered by an inner and outer pair of generally cylindrical, integrally molded sealing flanges of the same rigid plastic, said inner and outer sealing flanges further being sufficiently long and thin to be partially flexible, with the terminal edges of said flanges contacting the respective inner and outer sloping seal surfaces of said first housing with an axial and radial interference sufficient to in turn assure continuous sealing interface therebetween,  
whereby complete sealing of said rolling elements is assured with a minimal number of components.

4,948,273

# DRIVE MECHANISM FOR A MINIATURE PRINTER

Chikao Tezuka; Yukihiko Hanaoka, and Hiroyuki Nakayama, all of Shiojiri, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 781,593, Sep. 30, 1985, Pat. No. 4,787,761. This application Apr. 27, 1988, Ser. No. 186,844

Claims priority, application Japan, May 13, 1985, 60-100778

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

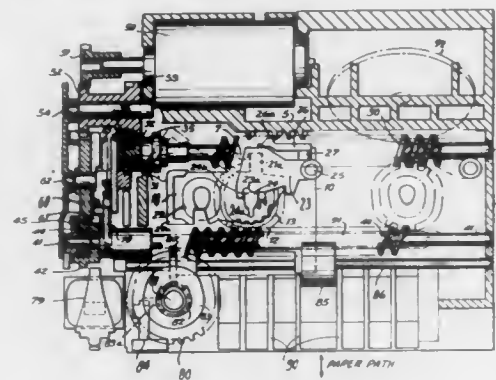
Int. Cl.<sup>5</sup> B41J 1/22

U.S. Cl. 400—185

32 Claims

1. A drive mechanism useful in miniature printers and the like, the drive mechanism comprising;  
a frame;  
a motor mounted on the frame;  
a first rotatable worm gear and a second rotatable worm gear supported parallel to one another on the frame;  
worm wheel means in mesh with both of the first and second worm gears;  
print wheel means coupled to the worm wheel means, the print wheel means comprising a plurality of print characters each of which is operable for printing an image of itself on a print line of a recording medium;

drive means for coupling rotary motion from the motor to each of the worm gears; and



control means for selectively operating the drive means, whereby each worm gear can be caused to selectively rotate and stop independently of the other.

4,948,274

## RIBBON FEED MECHANISM

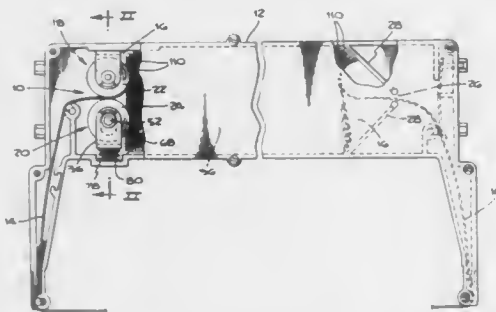
Robert S. Mannino, Chatsworth, Calif., assignor to Sercomp Corporation, Chatsworth, Calif.

Filed Jan. 12, 1989, Ser. No. 296,528

Int. Cl.<sup>5</sup> B41J 32/00

U.S. Cl. 400—196.1

17 Claims



1. An improved ribbon feed mechanism used to fold a printing ribbon inside a cartridge-type container and to move the ribbon for printing, comprising:

- a first retainer support mounted inside said container;
- a single drive roller of uniform outside diameter attached to a first shaft rotatably and removably mounted to said first retainer support mounted inside said container;
- a second retainer support mounted inside said container;
- a single idler roller of uniform outside diameter attached to a second shaft rotatably and removably mounted to said second retainer support mounted inside said container, said ribbon being disposed between said rollers; and
- spring means for biasing said idler roller against said drive roller in order to facilitate gripping of said ribbon by said rollers, each of said retainer supports having a pair of stripping means attached thereto located above and below each of said rollers for stripping said ribbon from said rollers after said ribbon has been fed inside said container in order to facilitate folding of said ribbon into a plurality of folds, said ribbon feed mechanism having a predetermined distance between each of said retainer supports and said uniform outside diameter of a corresponding adjacent one of said rollers in order to further facilitate folding of said ribbon, said single drive and idler rollers of uniform

outside diameter being adapted to grip said ribbon in order to provide increased pulling force on said ribbon.

4,948,275

## RIBBON RE-INKING DEVICE

Matthaus W. J. Kuhn, Randburg; Douglas A. Schoeman, Johannesburg, and Stephanus J. Le Roux, Aerorand, all of South Africa, assignors to Technical Systems Engineering CC, South Africa

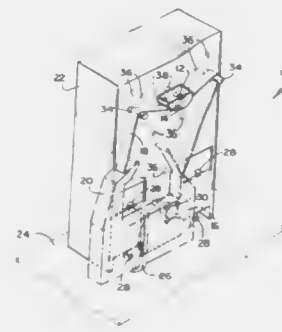
Filed Apr. 27, 1989, Ser. No. 344,227

Claims priority, application South Africa, Apr. 28, 1988, 88/3048; Oct. 4, 1988, 88/7440

Int. Cl.<sup>5</sup> B41J 31/14

U.S. Cl. 400—200

11 Claims



1. A ribbon re-inking device comprising a support, an ink reservoir having at least one dispensing outlet adapted to conduct ink from the reservoir and apply it to a ribbon to be re-inked, drive means for displacing a ribbon past the dispensing outlet of the ink reservoir thereby to permit the ink to be dispensed from the ink reservoir via the dispensing outlet and applied to the ribbon, means for mounting the ink reservoir on the support for displacement between an inoperative position wherein release of ink via the dispensing outlet is prevented, and at least one static operative dispensing position, and detection means operable to detect when the ink reservoir is in its operative dispensing position, the drive means being responsive to the detection means and the detection means being operable to energize the drive means to cause displacement of the ribbon past the dispensing outlet upon displacement of the ink reservoir to its operative dispensing position, the detection means including a lever on the support and a cam provided on a portion of the ink reservoir, the cam cooperating with the lever and being operable to displace the lever when the ink reservoir is rotated.

4,948,276

## TYPEWRITER, PRINTER OR THE LIKE AND RIBBON CASSETTE THEREFOR

Johannes Haftmann, Schwabach, and Rudolf Schmeikal, Hemhofen, both of Fed. Rep. of Germany, assignors to TA Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 363,979

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819782

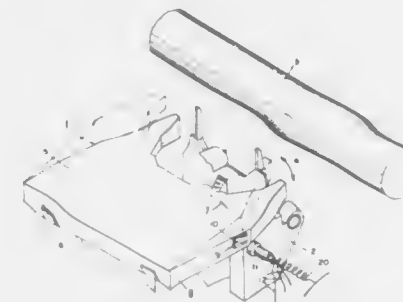
Int. Cl.<sup>5</sup> B41J 35/28

U.S. Cl. 400—208

5 Claims

1. An electronically controlled printer having an exchangeable ribbon cassette having a base comprising in combination: an identifying magnetic coding including at least one bistable magnetic element located at a defined radial distance from a pivot path on said cassette; said pivot point being located on said cassette base facing away from the printing area; means for pivoting said cassette between a lowered position

of rest and an elevated printing or work position and for pivoting around said pivot point on said cassette; a sensory means disposed at said defined radial distance from cassette pivot point, and disposed upon a portion of said printer other than said cassette;



wherein said sensory means is located adjacent to said identifying coding on said cassette; and wherein an electrical output signal is generated in response to the movement of said identifying coding with respect to said sensor which senses a changing magnetic field.

4,948,277

## ROTATING SEAL WITH INTEGRATED MAGNETIC ENCODER FOR A BEARING WITH INFORMATION SENSORS

Denis Alf, Annecy, assignor to The Torrington Company, Torrington, Conn.

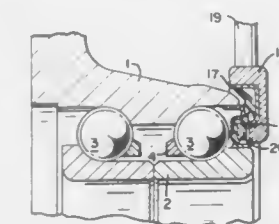
Filed Dec. 13, 1989, Ser. No. 450,095

Claims priority, application France, Jan. 20, 1989, 89 00649

Int. Cl.<sup>5</sup> F16C 32/00

U.S. Cl. 384—448

4 Claims



1. A bearing comprising: a fixed ring; a rotatable ring radially spaced from the fixed ring to provide an annulus between said rings; a seal positioned at least partially in said annulus, the seal comprising an elastomer molded onto an annular brace, the brace having a radially extending annular support forming a thrust surface and an axially extending cylindrical support, the elastomer having portions extending along the axially outside surface of the annular support of the brace, and along the cylindrical support of the brace; an encoder ring mounted on said seal and having an axially extending surface in contact with the elastomer on the cylindrical support and having a radially extending surface in contact with the elastomer on the annular support; and retainers on said encoder axially extending surface which engages the elastomer on the cylindrical support to axially, radially, and angularly retain the encoder; and a sensor facing the encoder.

4,948,278

## REPLACEABLE RIBBON GUIDE FOR DOT MATRIX PRINTERS

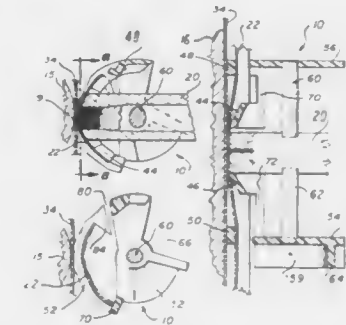
William M. Schiffmacher, Eagle Vail, Colo., and B. Franklin Griffin, Jr., Alexandria, Va., assignors to Aspen Ribbons, Inc., Lafayette, Colo.

Filed Sep. 15, 1989, Ser. No. 407,758

Int. Cl.<sup>5</sup> B41J 35/04

U.S. Cl. 400—248

16 Claims



1. A replaceable ribbon guide pivotally mounted on pivot pins extending from opposite sides of a dot matrix printhead which is traversable along a path parallel to a platen and including means for selectively shifting said ribbon guide to any one of selected number of positions about the pivot pins, said ribbon guide comprising:

- a central body portion having first and second ends;
- pivot means formed at each of said first and second ends for pivotally mounting said ribbon guide on the pivot pins;
- a spaced pair of faceted ring segments adjacent and spaced inward from said ends, respectively of said body portion to support a ribbon so that it is formed into flat segments as it passes through said ribbon guide to bring one of the ribbon segments along the width of the ribbon into parallel relationship with said print head so that a select ribbon segment will be struck at a right angle by the printhead;
- annular support members, having a faceted outer surface, spaced outwardly, respectively, from each of said ring segments; and
- a slit in each of said support members through which the ribbon can be passed for releasably securing it to said ribbon guide.

4,948,279

## BIDIRECTIONAL PRINTING DEVICE

Keiichi Ikoma, Nara; Shizuo Nakai, Tenri; Tomokazu Obata, Yamatokoriyama, and Kenji Miwa, Kitakatsuragi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 4, 1989, Ser. No. 347,208

Claims priority, application Japan, May 9, 1988, 63-113290

Int. Cl.<sup>5</sup> B41J 19/30

U.S. Cl. 400—323

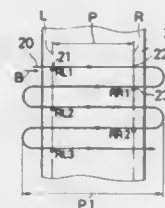
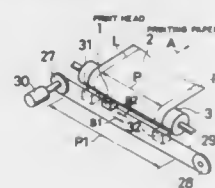
11 Claims

1. A bidirectional printing device which performs line by line printing bidirectionally by printing means from a predetermined print start position to a predetermined print end position on a medium, the bidirectional printing being performed in response to one of two types of print start signals, a first type of print start signal being a left print start signal and a second type of print start signal being a right print start signal, one of the two types of print start signals being produced for every line to be printed as the printing means reaches the respective print start positions, the bidirectional printing device including:

- control means for determining if the current print start signal is of the same type of print start signal as the preceding



print start signal, for judging that trouble has occurred to the print start signal if two consecutive determined signals



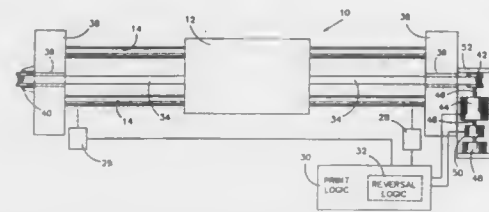
are of the same type, and thereafter for enabling printing in both directions if trouble fails to be judged.

#### 4,948,280 SERIAL PRINTER CARRIAGE DRIVE WITH BALLISTIC REBOUND REVERSAL

Royden C. Sanders, Jr., R.R. #2, Wilton, N.H. 03086; John L. Forsyth, So. Lyndeborough, N.H., and John P. Conant, Milford, N.H., assignors to Royden C. Sanders, Jr., Wilton, N.H.  
Filed Apr. 12, 1989, Ser. No. 336,840  
Int. Cl.<sup>5</sup> B41J 19/30

U.S. Cl. 400—323

28 Claims



1. A system, for a bi-directional motor drive which drives a member in an oscillatory motion between two end points, for increasing the speed of direction reversal of the member comprising:

- a selectively engageable ballistic rebound means for transferring energy of the moving member in one direction into a resilient member and for retransmitting energy absorbed by said resilient member back into the moving member in a direction opposite said one direction when engaged; and
- an electrically operated clutch for selectively engaging and disengaging said ballistic rebound means adjacent the end points to achieve the desired said energy transfers.

#### 4,948,281 KEYBOARD PROTECTED AGAINST VANDALISM AND SPILL

Arend Werner, Boeblingen, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.  
Filed Oct. 4, 1989, Ser. No. 416,815  
Claims priority, application European Pat. Off., Dec. 17, 1988, 88121198.1

U.S. Cl. 400—472

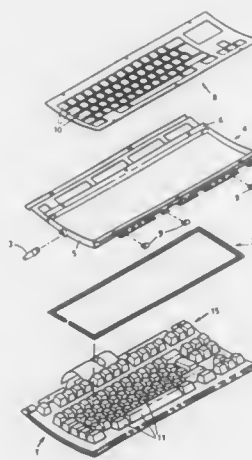
Int. Cl.<sup>5</sup> B41J 5/10

7 Claims

1. Keyboard having a housing comprising apertures for keys, said apertures being arranged in a pattern of rows and

columns and said housing (1) having including a base plate stem-like chimneys (17) protruding and forming said apertures, said chimneys being open to the top of the keyboard and being adapted for carrying keys (18), each of said keys having an umbrella or cone-like cap with a base edge (19) and a top edge (20), the base edge being wider than both the top edge and the opening of said chimney.

(a) a grid plate (8) having openings (10) arranged in the same pattern as said keys are arranged on said keyboard housing.



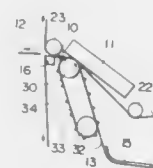
- each of said openings in said grid plate having a size less than the size of the base edges (19) and greater than the size of the top edges (20) of each associated key cap,
- said size of said openings in said grid plate being chosen such that when said grid plate is placed over the key caps each key is secured against removal from its associated chimney,
- said grid plate being fixed to said housing.

#### 4,948,282 DRIVE DEVICE FOR A THERMAL TRANSFER PRINTER

Seiji Koike; Yukihiko Hiroaki; Motonobu Hamada, and Takahiko Ohata, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan  
Filed Dec. 26, 1985, Ser. No. 813,584  
Claims priority, application Japan, Dec. 25, 1984, 59-278593  
Int. Cl.<sup>5</sup> B41J 11/30

U.S. Cl. 400—616.2

16 Claims



9. A thermal transfer printer comprising:

- a supply pulley for a mount having a plurality of labels thereon;
- a platen roller fixedly mounted on a shaft;
- a thermal head which is contacted with said platen roller by a predetermined pressure;
- first means for guiding the mount between said thermal head and said platen roller;
- second means for rotating said shaft, thereby feeding the mount between said platen roller and said thermal head;

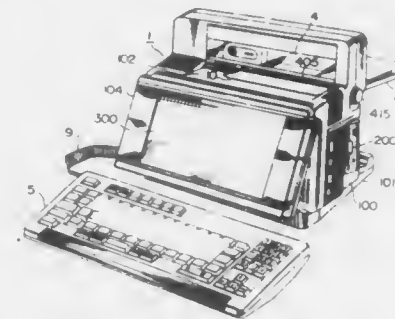
- a first pair of sprocket belt pulleys journaled on said shaft outboard of said platen roller for free rotation relative to said shaft and, hence, the mount;
- a second pair of sprocket belt pulleys located upstream of said first pair of sprocket belt pulleys and outboard of the path of the mount, said second pair of sprocket belt pulleys also being journaled for free rotation relative to the mount; and
- a pair of sprocket belts, each one of said sprocket belts being trained over one of said first pair of sprocket belt pulleys and a corresponding one of said second pair of sprocket belt pulleys and being positioned to engage sprocket holes in a corresponding edge of the mount.

#### 4,948,283 APPARATUS FOR PROCESSING AND PRINTING DOCUMENT

Katsumi Imaizumi, Kitaibaraki; Keiji Kamio, Hitachi, and Kazuhiko Nishiyama, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Taga Engineering Ltd., Hitachi, both of Japan  
Filed Nov. 3, 1988, Ser. No. 266,984  
Claims priority, application Japan, Nov. 4, 1987, 62-277456  
Int. Cl.<sup>5</sup> B41J 13/10

U.S. Cl. 400—647.1

3 Claims



- A document processing and printing apparatus having a main body frame, comprising:
  - an input unit for inputting character data and control commands;
  - an external storage unit;
  - a display unit;
  - a print-output unit; and
  - a control circuit unit for editing document data on the basis of inputs supplied from said input unit, for making said external storage store the data therein, for making said display unit display the data thereof and for making said print-output unit perform printing;
 wherein in said apparatus, said external storage unit, said display unit and said print-output unit are integrally combined together and incorporated in said main body frame; wherein said main body frame includes a top surface providing a generally horizontal, flat first paper supply guide surface; wherein said print-output unit includes
  - pairs of paper supply rollers disposed at the rear of said first paper supply guide surface, each pair of said paper supply rollers defining therebetween a paper supply plane flush with said first paper supply guide surface,
  - a flat platen juxtaposed with said pairs of paper supply rollers and directed upwards, said flat platen having an upper surface flush with said first paper supply guide surface,
  - a paper supply guide plate tiltably disposed at the rear of said first paper supply guide surface a having an upper surface which guides recording paper,
  - wherein said upper surface of said paper supply guide plate defines a second paper supply guide surface flush with said first paper supply guide surface, and
  - a carriage mechanism and a recording head carried by said

carriage mechanism and disposed above said flat platen and directed downward to face said flat platen, said carriage mechanism moving said recording head along said flat platen, and means interposing an ink ribbon between said flat platen and said recording head.

#### 4,948,284 WRITING INSTRUMENT WITH SYSTEM FOR SELECTING LOTTO NUMBERS

Horst Lingott, Wilhelm Haspel Str. 59/1, D-7032 Sindelfingen, Fed. Rep. of Germany  
PCT No. PCT/DE87/00363, § 371 Date Apr. 15, 1988, § 102(e) Date Apr. 15, 1988, PCT Pub. No. WO88/01237, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 14, 1987, Ser. No. 187,518

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627728

Int. Cl.<sup>5</sup> A63F 3/06; A63B 71/06

U.S. Cl. 401—195

15 Claims



- A writing implement in combination with an arrangement for selecting numbers and a visual display for selected numbers, comprising:
  - electronic random generator means having a circuit and display volume adapted to a number of digits;
  - display means for respectively displaying one number;
  - a battery;
  - a metal disk having a contact spring, the battery being arranged so as to rest against the contact spring;
  - a writing cartridge having a rear end on which the metal disk is placed, and a front end;
  - a metal sleeve arranged so as to fix the metal disk and the writing cartridge in a cooperative position; and
  - an electrical circuit means for electrically connecting the display means through the battery with the random generator means.

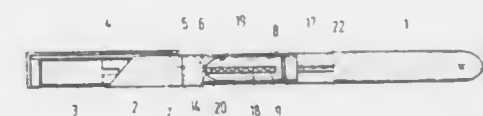
#### 4,948,285 BALL POINT PEN WITH TWO CARTRIDGES

Ludwig Schleif, Aloys' Schreiber-Str. 6, Buhl, Fed. Rep. of Germany  
Filed Dec. 22, 1988, Ser. No. 289,221  
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744100

Int. Cl.<sup>5</sup> B43K 29/00, 27/12, 24/12, 24/14

U.S. Cl. 401—195

1 Claim



- A writing instrument in the form of a ball-point pen having two ink cartridges which, through turning of the shaft, can be alternately brought into writing position, said writing instrument comprising means defining a space provided at the rear of the shaft to accommodate stamping mechanisms, in combination with
  - (a) a longitudinally extending barrel forming the shaft of said ballpoint pen;
  - (b) a longitudinally extending guide tube mounted within said barrel, said guide tube having two oppositely dis-

posed lateral, longitudinally extending slots and two oppositely disposed lateral, longitudinally extending rails, said slots and said rails being displaced from one another.

(c) a pair of slides slidably mounted in said guide tube to be moved towards and away from the writing position, each slide consisting of a semicylindrical segment having a nose thereon extending into one of said slots of said guide tube, a pair of recesses engaging said rails of said guide tube, and an extension on the writing position side on which a tube is mounted surrounded by a coil spring biasing said slide away from the writing position onto which tube an ink cartridge is mounted; and

(d) a generally tubular switching casing rotatably surrounding said guide tube, said switching casing having downwardly facing curved switching cam surfaces engaging a portion of each of said slides, said cam surfaces including a first portion engaging one of said slides when said slide is in a retracted position and a second portion engaging said other slide when said other slide is in the writing position, so that rotation of said casing causes said first portion of said cam surfaces to move the respective slide downwardly against said biasing means into the writing position as said second portion of said cam surfaces allows said other slide to move upwardly away from the writing position, said switching casing further having a bore alignable with a bore in a protective sleeve surrounding said casing and a holder for the attachment of an accessory device;

wherein said switching casing is a tube and the curved switching cam surface of said switching casing is formed by sectioning said casing at an angle inclined relative to a longitudinal axis thereof, said switching cam surface having a V-shaped notch at an apex thereof for arresting said nose of each of said slides.

4,948,286

#### ORDERING MEANS FOR DOCUMENT FILES OR THE LIKE

Jorg Hofmann, Kreuzwertheim, Fed. Rep. of Germany, assignor to Gudrun Hofmann and Raimond Hofmann, both of Kreuzwertheim, Fed. Rep. of Germany

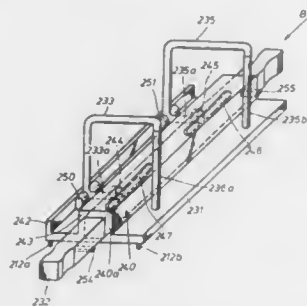
Filed Mar. 28, 1988, Ser. No. 173,974

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 3712097; Apr. 16, 1987, 3713044

Int. Cl.<sup>5</sup> B42F 13/14, 13/32

U.S. Cl. 402—34

16 Claims



1. A filing device for document files, comprising:  
a base plate whose upper surface defines spaced-apart first and second planes, said first plane defining at least two openings;  
at least two stationary sheet retainers projecting upright from said second plane;  
at least one movable sheet retainer having ends adapted to pass through said openings to engage at least a portion of said stationary sheet retainers;  
a locking member whose lower surface defines spaced-apart first and second planes sized to overlie at least a portion of

said first and second planes of said base plate, said first plane of said locking member including at least one through guide slot inclined with respect to a longitudinal axis of said locking member and sized to receive there-through a portion of a said movable sheet retainer;  
guide means, disposed on said upper surface of said base plate, for receiving and restricting movement of said locking member relative to said base plate substantially along the longitudinal axis of said locking member;  
longitudinal movement of said locking member with respect to said base plate locking and unlocking a said moveable sheet retainer passing therethrough for closing and opening the filing device.

4,948,287

#### BEARING BALL FOR A THREE-POINT CONNECTING DEVICE

Paul Herchenback, and Norbert Müller, both of Ruppichterth, Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Fed. Rep. of Germany

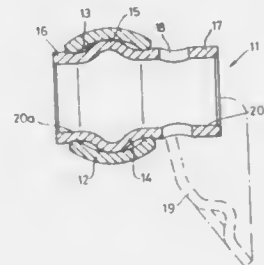
Filed Jul. 28, 1989, Ser. No. 387,240

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831677

Int. Cl.<sup>5</sup> B25G 3/00

U.S. Cl. 403—13

3 Claims



1. A bearing ball for a coupling pin on an agricultural implement for connecting the implement to the three-point connecting device of a tractor, which ball is designed as a hollow member into which a cylindrical tube which may be attached to the coupling pin is inserted, the bearing ball, in the coupled condition, being accommodated in the hook jaw of a hook belonging to the three-point connecting device, wherein both ends of the cylindrical tube project from the bearing ball, the cylindrical tube in its central region has been provided with a radially outwardly extending formation which contacts the inner wall of the bearing ball in a force-free way and supports the bearing ball from the inside, and the bearing ball is rotatable relative to the cylindrical tube but is not axially movable relative thereto.

4,948,288

#### LOCKING ARRANGEMENT FOR A MACHINE PART ON A SHAFT

Stephen Medgvesy, Welsikon, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 21, 1989, Ser. No. 383,862

Claims priority, application Switzerland, Aug. 8, 1988, 2999/88

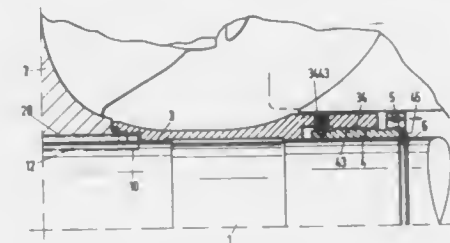
Int. Cl.<sup>5</sup> F16B 1/00

U.S. Cl. 403—24

20 Claims

1. A locking arrangement comprising  
a first sleeve for slidable mounting on a shaft;  
a second sleeve for telescopically fitting with said first sleeve;

means for releasably connecting said sleeves together in coaxial relation; and



a stop for positioning in a groove of the shaft and against an end of said second sleeve remote from said first sleeve.

4,948,289

#### SUPPORT FRAME CORNER CONNECTOR

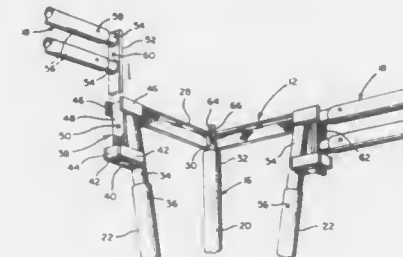
Drew E. Dellinger, P.O. Box 471, Milton, Fla. 32572

Filed Mar. 7, 1989, Ser. No. 319,715

Int. Cl.<sup>5</sup> F16B 9/00

U.S. Cl. 403—246

11 Claims



1. A leg assembly to be used in erecting a tent about whose outer periphery a plurality of leg assemblies are spaced with at least one horizontal marginal side rail extending between and removably interconnecting each pair of peripherally adjacent leg assemblies, said leg assembly including an upstanding leg structure having upper and lower end portions, said lower end portion being adapted to be supported from a suitable upwardly facing support surface, said upper end portion including a pair of upwardly opening and generally horizontally outwardly facing side rail seat structures spaced about said upper end portion and facing outwardly therefrom in different horizontal directions, each of said seat structures defining vertically extending elongated abutment surface means, having upper and lower end portions, facing generally horizontally outwardly in the corresponding direction and an upwardly opening generally vertical sleeve portion including a first wall surface generally coextensive with the lower end portion of said abutment surface means, the upper end portion of each abutment surface means including a pair of parallel, opposite side, vertically elongated and outstanding flanges projecting outwardly from said abutment surface means in said corresponding direction and spaced appreciably above the corresponding sleeve portion each abutment surface means, outstanding flanges and the corresponding sleeve portion being adapted to coact with a depending flange carried by the adjacent end of a corresponding side rail for support of said side rail adjacent end from said leg assembly with the lower end portion of said depending flange downwardly received in said sleeve portion, the upper portion of said depending flange secured between said outstanding flanges and substantially the full length of said depending flange abuttingly opposing said abutment surface means.

4,948,290

#### T-CONNECTION BETWEEN TWO PROFILES, PARTICULARLY CROSS-BAR PROFILE AND POST PROFILE OF A FACADE

Pieter Janssen; Guenter Bock, both of Bielefeld, and Helmut Scheuer, Enger, all of Fed. Rep. of Germany, assignors to Schüco International GmbH & Co., Bielefeld, Fed. Rep. of Germany

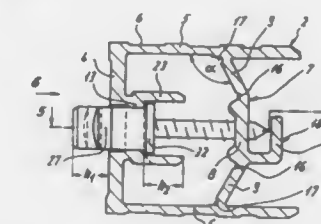
Filed Mar. 24, 1989, Ser. No. 329,126

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1989, 3809951

Int. Cl.<sup>5</sup> B25G 3/00

U.S. Cl. 403—255

10 Claims



1. A T-connection between two profiles, particularly a cross-bar profile and a post profile of a facade each having an inner chamber, the connection comprising a U-shaped connector located in said inner chamber of one of said profiles, said connector having an end plate provided with a guiding opening and having two opposite edges and two plate-shaped legs extending from said opposite edge of said end plate near inner surfaces of said one profile; a flange bolt guided in said guiding opening of said connector in a non-rotatable manner and extending into said inner chamber of another one of said profiles through an opening in a wall of the other profile so as to be fixed relative to the latter, said flange bolt having a portion extending outwardly beyond said end plate and provided with at least one holding recess, said connector having a toggle lever-like bridge web extending between said plate-shaped legs and provided with a threaded opening; and a clamping screw extending through said threaded opening of said bridge web and having a head abutting against said end wall, said bridge web having a central web part and web parts which are connected with said legs and extend at an obtuse angle relative to the latter, said threaded opening for said clamping screw being provided in said central web part.

4,948,291

#### CONNECTING PANEL FOR MECHANICALLY JOINING A NUMBER OF COMMUNICATION COMPONENTS ARRANGED SIDE-BY-SIDE

Max Hundseder, Puchheim, and Peter Otto, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 8, 1988, Ser. No. 241,866

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 8712232

Int. Cl.<sup>5</sup> B25G 3/00

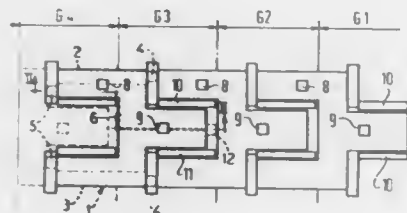
U.S. Cl. 403—301

2 Claims

1. An assembly for mechanically joining a plurality of components in a series of side-by-side pairs of components, said assembly comprising for each pair of components:  
a connecting plate having two spaced lateral sections and a center section all connected to a middle section with said lateral sections extending from said middle section in a direction opposite said center section;  
said center section having an opening therein and one of said lateral sections having an opening therein;  
each of said lateral sections having an exposed end having a tab, said center section having an exposed end having a tab and said middle section having two spaced exposed edges each having a tab;



guide rails and pockets disposed on a base of each of said components at positions to receive each connecting plate with the tabs disposed in said pockets and the center section of each plate disposed between said guide rails and between the lateral sections of an adjacent plate; and two catch noses projecting from said base of each component positioned so that one catch nose on one component



in each pair of side-by-side components is received in said opening in said center section of said connector plate and one catch nose on the other component in each pair of side-by-side components is received in said opening in said one lateral section of said connector plate so that each side of each component in each pair of side-by-side components is held against a side of the other component in the pair.

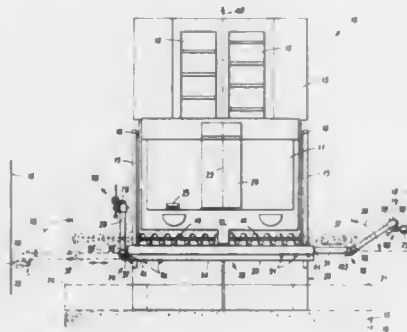
4,948,292

**PAVING MACHINE HAVING TRANSVERSELY AND LONGITUDINALLY ADJUSTABLE GRADE SENSORS**  
Matthew B. Haven, Cedar Rapids, and Joseph E. Musil, Ely, both of Iowa, assignors to Cedarapids, Inc., Cedar Rapids, Iowa

Filed Jul. 24, 1989, Ser. No. 384,392  
Int. Cl.<sup>5</sup> E01C 19/48

U.S. Cl. 404—84

12 Claims



1. A grade reference system for a paving machine, the paving machine being of the type including a tractor unit, a screed assembly disposed across the rear of the tractor unit, and a pair of laterally spaced screed pull arms attached to the screed assembly and extending from the screed forward along the outside of the tractor unit and being pivotally supported at the forward ends of the screed pull arms at a screed pull point on each side of the tractor unit, the grade reference system comprising:

means for supporting a grade sensor on at least one side of the tractor unit with respect to the screed pull arms and intermediate between a leading edge of the screed assembly and the screed pull point, the grade sensor supporting means including means for pivotally adjusting the position of the grade sensor in a substantially horizontal circular path of a predetermined radius about a vertical pivot axis over a range between an extended position from the pivot axis transversely outward from a center through the tractor unit and screed assembly and a retracted position

forward of the pivot point by the distance of the predetermined radius; and means for adjusting the position of the pivot axis transversely of the centerline through the screed assembly.

4,948,293

**CONNECTOR APPARATUS AND METHOD FOR MANUFACTURING AN IRRIGATION APPARATUS**  
Allan L. Smith, P.O. Box 428, Exeter, Calif. 93221

Filed Aug. 30, 1988, Ser. No. 238,139

Int. Cl.<sup>5</sup> A01G 25/00

U.S. Cl. 405—36

8 Claims



1. A method of manufacturing irrigation tubing, adapted to mount sprinklers, for substantially permanent installation in an area wherein a plurality of plants are arranged in predetermined spaced relation, the method comprising the steps of manufacturing said tubing in a length sufficient to extend along a plurality of said plants arranged in said predetermined spaced relation; calculating an allowance for variations as to length of the tubing under ambient thermal conditions; and marking points of reference on the tubing for the positioning of said tubing relative to the plants in said area taking said variation allowance into consideration.

4,948,294

**CONTROL DEVICE FOR UNDERGROUND DRAINAGE AND IRRIGATION NETWORK**  
Francois Mercier, Montréal, Canada, assignor to Innotag Inc., Montréal, Canada

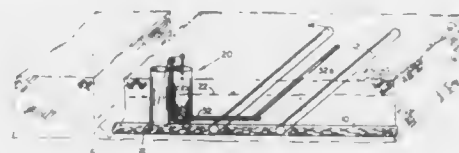
Continuation-in-part of Ser. No. 313,495, Feb. 22, 1989, Pat. No. 4,890,955. This application Nov. 17, 1989, Ser. No. 437,618

Claims priority, application United Kingdom, Feb. 22, 1988, 8804009

Int. Cl.<sup>5</sup> E02B 11/00, 13/00

U.S. Cl. 405—37

19 Claims



1. A control device for use with an underground irrigation network formed of a main conduit line and of adjacently disposed water permeable secondary conduit lines, comprising: a head control stand means disposed at a predetermined location of said network; said stand means comprising a vertically extending housing defining a water-receiving chamber; water level sensing means being mounted in said chamber; valve means associated with said stand means and mounted on a water supply pipe for supplying water to said network, said valve means being actuatable in response to said water level sensing means; and water table level measuring means disposed between two

adjacent secondary conduit lines of said network; said measuring means being remotely associated with said water level sensing means in said stand means to open or close said valve means and thereby maintain an underground water table between said two adjacent lines at a level adequate for optimal plant growth.

4,948,295

**PIPE FOR WATERING PLANTS**

Arnold Pramsoler, Feldweg 6, A-6111 Volders, Austria

PCT No. PCT/AT86/00042, § 371 Date Jan. 13, 1987, § 102(e)

Date Jan. 13, 1987, PCT Pub. No. WO86/06578, PCT Pub.

Date Nov. 20, 1986

Continuation of Ser. No. 15,857, Jan. 13, 1987, abandoned. This

PCT application May 13, 1986, Ser. No. 277,456

Int. Cl.<sup>5</sup> A01G 25/06; E02B 13/00

U.S. Cl. 405—44

3 Claims



1. A method for watering plants, particularly for watering the roots of plants which are buried in the soil, comprising: providing at least one section of a water feed pipe of substantially circular cross section with inner and outer surfaces and a longitudinal axis, said water feed pipe defining a region of a series of orifices enabling water to be forced through the feed pipe, said orifices being located on a parallel line to the longitudinal axis of the feed pipe; covering the orifices with a layer of water permeable fibrous material on the outer surface of the feed pipe; positioning the feed pipe with the fibrous material covering the orifices coaxially within a water impervious casing pipe which defines at least one longitudinal slit, said casing pipe completely enclosing, except for the longitudinal slit, the feed pipe; orienting the casing pipe in such a way that said longitudinal slit, along the entire feed pipe, is located directly in line with the series of orifices of the water feed pipe; burying the casing pipe in the soil in relatively close proximity of the roots of the plants to be watered which the longitudinal slit of the casing pipe remains aligned with the series of orifices of the water feed pipe; and forcing pressurized water through said feed pipe so that the water flows along the entire feed pipe and out through said orifices to permeate said layer of fibrous material and flow through said longitudinal slit to provide a water supply to the surrounding soil and the roots of the plants to be watered; said alignment of the orifices of the water feed pipe with the longitudinal slit of the casing pipe providing easy orientation when connecting separate sections of pipe and reducing the risk of siltation by allowing for an easily regulated, straight line flow of water from the water feed pipe to the surrounding soil while allowing the layer of fibrous material to prevent roots and/or soil from entering the feed pipe.

4,948,296

**SWIMMING POOL CONSTRUCTION**

Tom Salter, New South Wales, Australia, assignor to Huntia Pty. Ltd., New South Wales, Australia

Filed Dec. 18, 1987, Ser. No. 135,023

Int. Cl.<sup>5</sup> B28B 1/16; E02D 27/00; E04B 1/16; E04H 4/02  
U.S. Cl. 405—55

3 Claims



1. A method of constructing a swimming pool of a concrete layer and a glass reinforced plastic layer comprising: (a) excavating a suitable pool cavity having a surface; (b) casting in situ the concrete layer wherein the casting is accomplished by applying a concrete composition having minimal reinforcement, which reinforcement provides no structural significance to the concrete layer, to the surface of the cavity, the concrete layer being at least 80mm thick and incapable of meeting load carrying requirements of the swimming pool; (c) allowing the concrete layer to cure thereby providing for a weak bond strength between the cured concrete layer and the layer of glass reinforced plastic applied thereto; and then (d) applying in situ to the cured concrete layer the layer of glass reinforced plastic having a thickness of 5mm such that the bond strength between the layer of glass reinforced plastic and the cured concrete layer is weaker than the tensile or compressive strength of the layer of glass reinforced plastic so that cracks caused in the cured concrete layer by ground movements and drying shrinkage are not propagated to the layer of glass reinforced plastic due to the weaker bond strength between the layer of glass reinforced plastic and the cured concrete layer, and such that the combined structural strength of the concrete layer and the layer of glass reinforced plastic is sufficient to meet the load carrying requirements of the swimming pool.

4,948,297

**CORRECTION METHOD FOR CONTAMINATED SITES**

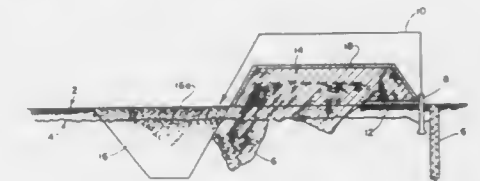
Joseph W. Fleming, 8381 Post Rd., Allison Park, Pa. 15101

Filed Jul. 24, 1989, Ser. No. 383,666

Int. Cl.<sup>5</sup> B09B 1/00; C02F 11/02

U.S. Cl. 405—128

12 Claims



1. A method for decontaminating contaminated soil sites, said method comprising the steps of: (a) introducing biological contaminant-consuming micro-organisms into a body of water which is adjacent the contaminated soil site; (b) moving a portion of contaminated soil located along a first side of said body of water into said body of water; (c) permitting said micro-organisms to biologically decontaminate said portion of contaminated soil in order to form a portion of decontaminated soil;

- (d) moving said portion of decontaminated soil to a second side of said body of water to form shore material of decontaminated soil at said second side; and
- (e) repeating steps (b) through (d) until substantially all portions of contaminated soil are decontaminated by said micro-organisms.

4,948,298

# PROCESS FOR RESTORING CHANNELS THREATENING TO COLLAPSE, IN PARTICULAR PROFIED CHANNELS

Rudolf Hayden, Altmünster, Austria, assignor to Allgemeine Baugesellschaft-A. Porr Aktiengesellschaft, Vienna, Austria  
PCT No. PCT/AT87/00014, § 371 Date Nov. 3, 1987, § 102(e)  
Date Nov. 3, 1987, PCT Pub. No. WO87/05365, PCT Pub.  
Date Sep. 11, 1987

PCT Filed Mar. 2, 1987, Ser. No. 124,854

Claims priority, application Austria, Mar. 3, 1986, 547/86  
Int. Cl.<sup>5</sup> E03F 3/06; F16L 1/00

U.S. Cl. 405—154 20 Claims

1. A process for the rehabilitation of damaged, accessible, slippable and non-slippable sewers of any cross-sectional shape, comprising the steps of:
- introducing an impermeable inner shell into the damaged sewer;
  - loosening the damaged sections of the sewer wall by a liquid cutter jet; and
  - filling and stabilizing the spaces between said inner shell and said sewer wall with at least one filling material selected from the group consisting of mortars and suspensions.

4,948,299

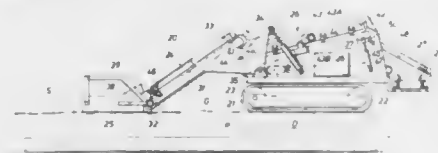
# PADDING MACHINE

Thomas J. Cronk, Jr., and Ronnie C. Burrows, both of P.O. Box 11189, Odessa, Tex. 79760

Filed May 9, 1989, Ser. No. 350,011

Int. Cl.<sup>5</sup> E02F 1/00; B07B 9/02

U.S. Cl. 405—179 23 Claims



18. A pipeline padding machine, comprising a vehicle adapted to be moved along the side of a ditch in which a pipeline has been laid and over spoil which has been removed from the ditch and laid along the side thereof,
- a first conveyor which is mounted on and extends lengthwise of the vehicle,
  - means at the forward end of the first conveyor for removing a layer of the spoil and delivering it onto the first conveyor during forward movement of the vehicle,
  - said first conveyor being inclined upwardly from its forward to its rearward end and arranged to move the spoil in a rearward direction,
  - means including a screen arranged for receiving spoil from the first conveyor and moving that portion of the spoil which does not pass the screen over the rear end of the screen,
  - a second conveyor which is mounted on and extends lengthwise of the vehicle beneath the screen for receiving spoil which passes therethrough and arranged to move it in a forward direction; and
  - a third conveyor mounted on the vehicle for receiving spoil from the forward end of the second conveyor and extending laterally of the vehicle for moving the spoil in a lateral direction into the ditch.

4,948,300

# MULTIPLE SECTION PIER AND INSTALLATION ASSEMBLY

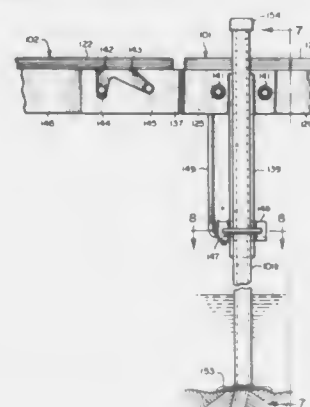
Norman E. Bateson, Culver, Ind., assignor to Norson Industries, Inc., Culver, Ind.

Filed May 16, 1988, Ser. No. 194,452

Int. Cl.<sup>5</sup> E02B 3/20

U.S. Cl. 405—220

70 Claims



1. A multiple section pier and installation assembly, comprising:
- a generally planar elongated first pier section having a first end and a second end oppositely disposed with respect to said first end,
  - a pair of support legs mounted to opposite sides of said first pier section adjacent said second end thereof in generally perpendicular relation therewith,
  - first connecting means mounted to said first end of said first pier section and adapted to be detachably connected to an on-shore location or a previously installed pier section,
  - second pier section connecting means mounted to said second end of said first pier section,
  - a generally planar elongated second pier section having a first end and a second end oppositely disposed with respect to said first end of said second pier section,
  - third connecting means mounted to said first end of said second pier section and adapted to be hingedly coupled to said second connecting means,
  - fourth connecting means mounted to said second end of said second pier section, and
  - a pair of vertically extending support legs mounted to opposite sides of said second pier section adjacent said second end thereof in generally perpendicular relation therewith;
- a dolly,
- said dolly including a chassis and a pier section support member,
- said second pier section being supported on said pier section support member,
- pier section hold down means mounted at one end of said pier section support member,
- clamping means adjacent a second end of said support member,
- said support member being pivotally mounted to said dolly chassis for rotation about an axis which is interposed between the first and second ends of said support member,
- said pier section hold down means being releasably secured to said third connecting means, and
- said clamping means being releasably secured to said second end of said second pier section;
- a dolly locator,
- said dolly locator being adapted to be positioned on said first pier section,
- stop means on said first pier section for limiting travel of said dolly locator in the direction of said second end of said first pier section to a selected position adjacent said second end of said first pier section,

transverse alignment means on said dolly locator for positioning said dolly locator at a selected transverse location on said first pier section, and

guide means on said dolly locator cooperative with said dolly for receiving and positioning said dolly at a selected location on said first pier section during installation of said second pier section;

whereby, alignment of said second pier section with said first pier section and registry of the respective second and third connecting means of said first and second pier sections during installation of said second pier section is facilitated.

4,948,301

# DEVICE COMPRISING A VALVE FOR INJECTING GROUT AROUND OR INSIDE A TUBULAR PILE DRIVEN INTO THE GROUND

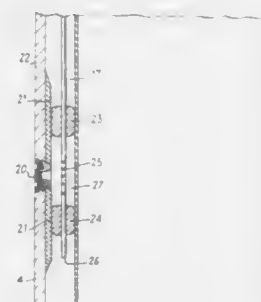
Jean-Paul Geffriaud, Paris, and Herve Barthelemy, Croissy-Sur-Seine, both of France, assignors to Soletanche, Nanterre, France

Continuation-in-part of Ser. No. 72,535, Jul. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 770,721, Aug. 29, 1985, abandoned. This application Feb. 21, 1989, Ser. No. 313,205

Claims priority, application France, Aug. 31, 1985, 84 13500  
Int. Cl.<sup>5</sup> F02D 5/54

U.S. Cl. 405—244

17 Claims



1. A device for injecting ground around a tubular pile driven into the ground, wherein said tubular pile has a given diameter and is formed by a tubular wall of a given wall thickness defining the inside and outside of said tubular pile, comprising:
- a grout feed channel capable of being driven into the ground with said tubular pile disposed inside said tubular wall having a diameter which is small relative to the diameter of said tubular pile;
  - a check valve connected to said grout feed channel at a position along said tubular wall and extending through the thickness of said tubular wall so as to communicate from said grout feed channel through the outside of said tubular wall; and
  - an injection device inserted in said grout feed channel having one plug which is fitted in said grout feed channel and located above said check valve so as to inject grout under pressure through said injection device and said check valve to the outside of said tubular wall.

4,948,302

# DISCHARGE APPARATUS FOR BROKEN-OFF FASTENER PARTS

Stephen R. Tarling, Hatfield, England, assignor to Avdel Systems Limited, Welwyn Garden, England

Filed Feb. 3, 1989, Ser. No. 305,649

Claims priority, application United Kingdom, Feb. 5, 1988, 8802580

Int. Cl.<sup>5</sup> B65G 51/08

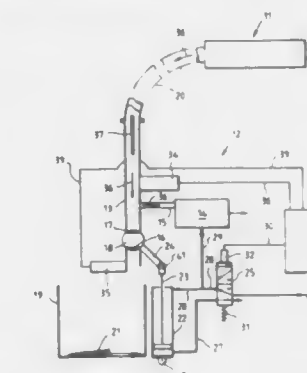
U.S. Cl. 406—17

9 Claims

1. Discharge apparatus for discharging broken-off fastener

parts from a fastener installation apparatus, which discharge apparatus comprises:

- a passageway having one end connected to said fastener installation apparatus, whereby broken-off fastener parts are conveyed along said passageway away from the fastener installation apparatus;



- air-exhaust means connected to the passageway for causing a flow of air therealong to assist in said conveying of broken-off fastener parts;
- and discharge valve means normally sealing the passageway against the entry of air through the discharge valve means but openable intermittently to allow the discharge of a broken-off fastener part from the passageway.

4,948,303

# PNEUMATIC TUBE CARRIER

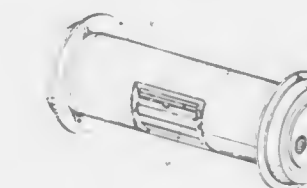
Gregory G. Good, Mill Creek, Wash., assignor to Washington Security Products, Inc., Lynnwood, Wash.

Filed Nov. 2, 1988, Ser. No. 266,397

Int. Cl.<sup>5</sup> B65G 51/06

U.S. Cl. 406—186

5 Claims



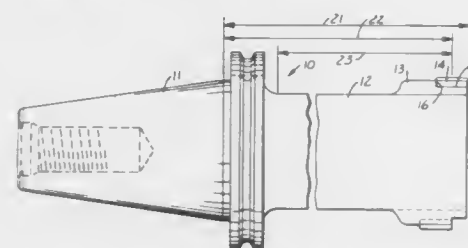
1. A container for use in a pneumatic transfer device or the like comprising:
- a main cylindrical container having a longitudinal hinge parallel to the axis and a latch means substantially diametrically opposite thereof whereby the container opens flat for loading or unloading;
  - a second, auxiliary container within the main container adjacent the interior surface of the hinge of the main container, said auxiliary container opening and closing simultaneously with the opening and closing of the main container.



4,948,304  
**ADJUSTABLE TOOL GUIDE AND DRIVER FOR A BIT**  
 Tsunemi Kobayashi, Miki, Japan, assignor to Kobayashi Gimlet Mfg. Co., Ltd., Hyogo, Japan  
 Filed Dec. 11, 1987, Ser. No. 131,557  
 Claims priority, application Japan, May 26, 1987, 62-79503[U]  
 Int. Cl.<sup>3</sup> B23B 45/06  
 U.S. Cl. 408—16 4 Claims

1. An adjustable tool guide and driver for a bit comprising: a base having an opening provided therethrough; a single elongated hollow driver support portion; a support axle for pivotally coupling said driver support portion to said base such that one end of said two open ends of said driver support portion is adjacent said opening in said base; and
- a driver slidably and rotatably provided in said driver support portion, said driver comprising a drive shaft extending longitudinally of the driver support portion and having one end adjacent said opening in said base and another end of said shaft adjacent another end of said driver support portion, a holder portion slideable in said driver support portion and for holding said bit provided on said one end of said drive shaft and a handle provided on said another end of said drive shaft, said drive shaft being further slideably supported at said one end by said driver support portion and at said another end by said holder portion sliding in said driver support portion.

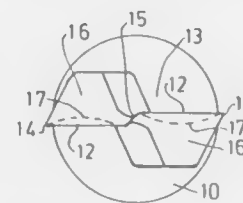
4,948,305  
**BORING BAR**  
 Lee Reiterman, Royal Oak, Mich., assignor to GTE Valenite Corporation, Troy, Mich.  
 Filed Dec. 23, 1988, Ser. No. 289,078  
 Int. Cl.<sup>3</sup> B26D 1/00  
 U.S. Cl. 408—224 4 Claims



1. Boring bar comprising body shaft, eight integral circumferentially spaced insert pockets projecting radially beyond the radius of said shaft, axially extending chip clearance gullets between each of said pockets, each of said pockets having an insert seating face for establishing its effective radial cutting position in progressive increments from minimum to maximum in circumferential succession following the direction of rotation, each pocket having an insert end seating wall for establishing its axial cutting position in progressive backward incre-

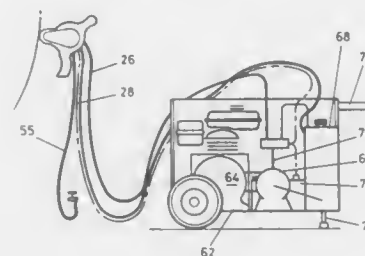
ments from axial first to last in said circumferential succession, and each pocket having an inset side seating wall for establishing its circumferential cutting position in equal circumferential progression, eight identical indexable cemented carbide cutting inserts, each insert having a negative radial rake being mounted in a respective pocket whereby the radial increments of said inserts are in the order of 0.003" to 0.005" and the axial increments of said inserts are in the order of 0.025" to 0.040".

4,948,306  
**DRILL**  
 Karl Wiedner, Ingelfingen, Fed. Rep. of Germany, and Katsumi Shinjo, Osaka, Japan, assignors to Aldof Wurth GmbH & Co. KG, Fed. Rep. of Germany  
 Filed Aug. 5, 1988, Ser. No. 229,568  
 Claims priority, application Fed. Rep. of Germany, Aug. 8, 1987, 8710882[U]; Japan, Apr. 26, 1988, 63-103358  
 Int. Cl.<sup>3</sup> B23B 51/02  
 U.S. Cl. 408—227 12 Claims



1. A drill with a solid shank and a drilling bit, the drilling bit having two primary cutting edges, two flutes and two secondary cutting edges, the primary edges being in projection substantially parallel to one another and forming a drill point with a tip angle as seen from a direction perpendicular to the shank, the flutes extending alongside the drilling bit substantially in the longitudinal direction of the drill and being arranged diametrically opposite one another, each flute forming one of the secondary cutting edges, wherein a transverse dimension of the drill point defined by a distance between the secondary cutting edges in a direction parallel to a direction of projection of the primary cutting edges is greater than a corresponding transverse dimension in a direction transverse thereto, and wherein a tip of the drill adjacent the drill point has a maximum transverse dimension greater than a diameter of the solid shank.

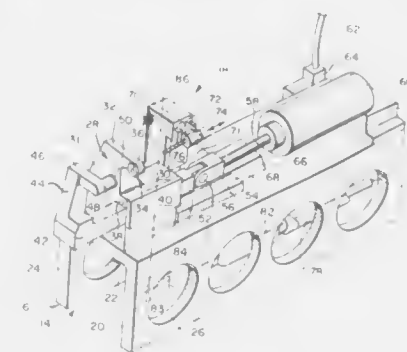
4,948,307  
**STRIPPING DEVICE**  
 Alan Dodds, 111 Alcobia Street, Kamo, Whangarei, New Zealand  
 Filed Apr. 13, 1989, Ser. No. 337,322  
 Claims priority, application New Zealand, Apr. 18, 1988, 224279  
 Int. Cl.<sup>3</sup> B23C 3/16  
 U.S. Cl. 409—136 17 Claims



1. A rotary stripping device for stripping boat hulls comprising a tool housing, a rotary stripping tool head mounted in the housing having a horizontal axis about which the head is rotatable and being capable of stripping a band of material from a

surface to be stripped, drive means for the tool head, housing-mounted means to determine the depth of strip and flushing liquid delivery means for directing liquid toward the tool head, said tool head being a cylindrical cutter block having a plurality of individual cutting teeth arranged on the block to share the load, said teeth being helically mounted on said block, said adjustable housing-mounted means comprising a pair of independently adjustable arcuate skids captively mounted at one end to said housing arcuately extending around each side of said head with said teeth therebetween, then back to and adjustably mounted at the other end to said housing, the disposition of said teeth on said block providing a radius of cut when said device is actuated, each of said skids being adjustable to lie in advance of the radius of cut.

4,948,308  
**AUTOMATED LIMITED ACCESS DRILLING SYSTEM**  
 Ottavio Giannuzzi, Baldwin, and Christopher J. Scheuing, Commack, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.  
 Filed May 2, 1988, Ser. No. 188,936  
 Int. Cl.<sup>3</sup> B23B 47/18  
 U.S. Cl. 408—97 6 Claims

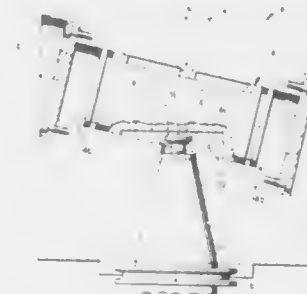


1. An offset drilling tool comprising: a main support member; slide means secured to the member for sliding relative to the support member; a drill housing mounted to the slide means; a right angle drill head extending from the drill housing for receiving a drill bit; motor means mounted to the support member and having a shaft for undergoing simultaneous rotational and linear motions; a plurality of interconnected right angle drive means passing through the housing and connected at a first end thereof to the drill head; and means connected between a second end of the drive means and the shaft for coupling linear motion to the drill housing and simultaneous rotation to the drill head resulting in linear motion of the drill bit toward and away from a work piece while the bit rotates.

4,948,309  
**CLAMPING MEANS FOR MACHINE TOOL HOLDERS**  
 Paul W. Newland; Anthony Kornilov, both of Warren, and Walter H. Kelm, Mt. Clemens, all of Mich., assignors to Carboly Inc., Warren, Mich.  
 Filed Sep. 7, 1989, Ser. No. 405,141  
 Int. Cl.<sup>3</sup> B23C 5/26  
 U.S. Cl. 409—234 14 Claims

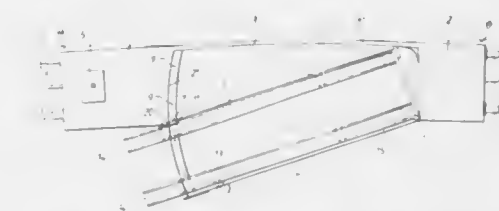
1. A clamping mechanism for releasably securing a tooling adaptor in a tool clamp block comprising: a generally cylindrical member having a longitudinal axis and an eccentric slot formed in the direction of said longitudinal axis and including means for engaging the tooling

adaptor in said cylindrical member; and means for moving the cylindrical member in the direction of said longitudinal



nal axis whereby the tooling adaptor is drawn into and secured within the tool clamp block.

4,948,310  
**RAIL VEHICLE FOR TRANSPORTING ROAD SEMI-TRAILERS**  
 Robert M. Ord, Weybridge, England, assignor to Tiphook Plc., United Kingdom  
 Filed May 10, 1989, Ser. No. 350,002  
 Int. Cl.<sup>3</sup> B65P 1/00; B60P 3/06  
 U.S. Cl. 410—1 10 Claims

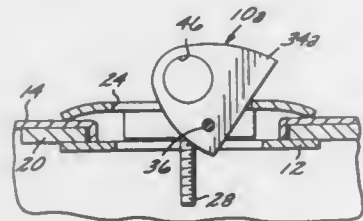


1. In a rail vehicle for transporting a load comprising a body having first and second end body portions each provided with a rail suspension unit and joined to each other by a longitudinal member, an intermediate body portion connected between the first and second end body portions and comprising a rectangular load receiving platform, one end of which is hinged at one corner to the first body portion and the other end of which contact the second body portion through a sliding bearing whereby to enable the load receiving platform to be laterally pivoted about the hinge to an open position and permit loading and unloading of the vehicle from the side, the improvement comprising the sliding bearing including vertical bearing means on the second body portion and the intermediate body portion, the longitudinal member being prestressed to maintain the vertical bearing means in contact.

4,948,311  
**TIE DOWN FITTING**  
 Frank H. St. Pierre, 27732 W. Moonridge La., Castaic, Calif. 91310, and Jack D. Jensen, P.O. Box 7895, Newport Beach, Calif. 92658  
 Continuation-in-part of Ser. No. 73,005, Jul. 13, 1987, Pat. No. 4,762,449. This application Aug. 1, 1988, Ser. No. 226,838  
 The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

- Int. Cl.<sup>3</sup> B60P 7/06; F16B 21/00  
 U.S. Cl. 410—107 10 Claims
1. A tie down assembly for mounting to a vehicle cargo bed side wall having a horizontal section provided with a stake hole, the assembly comprising: a lower plate means having an opening and dimensioned for passage through the stake hole and manipulation into engagement with the underside of the side wall section;

upper plate means for engagement with the upper side of the section and including an opening aligned with the opening in the lower plate means;  
 retainer means aligned with the openings in the upper and lower plate means for projection above the upper side of the upper plate means, and carried by the upper plate



means for pivotal movement into the openings in the upper and lower plate means in a recessed position relative to the upper plate means; and  
 fastener means engaged upon the upper plate means for threadably engaging the lower plate means whereby the upper and lower plate means are tightly urged against the section upper side and underside, respectively.

4,948,312

## FASTENING ELEMENT WITH GUIDE MEMBER

Peter Jochum, Dürre Wiese, Austria, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

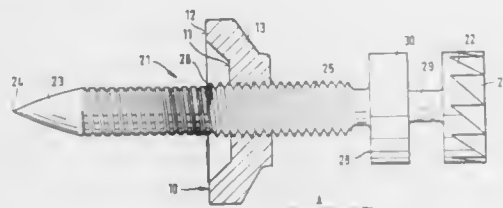
Filed Apr. 20, 1989, Ser. No. 341,133

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813245

Int. Cl.<sup>5</sup> F16B 15/00, 31/00

U.S. Cl. 411—5

6 Claims



1. A fastening element to be driven into hard receiving material such as metals comprising an axially elongated member having a leading end to be inserted first into the receiving material and a trailing end, said member having a head at the trailing end thereof including means for engagement with a device for rotationally driving said member, an axially elongated shank extending from the leading end to adjacent the trailing end, said shank having a tip at the leading end, a guide member mounted on said shank between the leading and trailing ends, said shank being threaded along at least an axially extending section from adjacent the trailing end toward the leading end, wherein the improvement comprises that said guide member has a cup-like shape with an opening formed by the cup-like shape facing toward the leading end of said member, said guide member comprising a base in threaded engagement with and encircling said shank and having a radially outer edge, said base being axially spaced at a distance A from the trailing end of said member when said fastening element is arranged to be driven into a receiving material, and a radially outer annular section projecting radially outwardly from said annular edge of said base and axially toward the leading end from said base, said annular section having an end surface extending transversely of the axial direction and facing toward the leading end with said end surface spaced axially from said base toward the leading end.

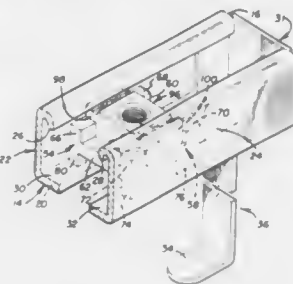
4,948,313  
 NUT PLATFORM FOR FRAMING CHANNELS  
 Thomas J. Zankovich, Long Beach, Calif., assignor to Wesanco, Inc., La Mirada, Calif.

Filed Nov. 23, 1988, Ser. No. 275,774

Int. Cl.<sup>5</sup> F16B 27/00

U.S. Cl. 411—85

14 Claims



1. In a device for securing a structural member to a generally U-shaped longitudinally extending channel member having a longitudinal axis therealong, first and second ends, a bridge section, and two generally parallel sidewall sections connected together by said bridge section, said sidewall sections each having a respective lip extending inwardly laterally towards the respective other sidewall section and bending towards and ending a spaced distance from said bridge section; a first nut having a generally central threaded opening therein and oppositely extending lateral arms adapted for positioning beneath said lips, said arms having respective means for engaging with each of said respective lips; and a bolt adapted to be threaded into said threaded opening, an improvement comprising:

a support member positionable between said bridge section and said lips and between said sidewall sections, said support member having a pair of lateral sides, each positionable adjacent and facing a respective one of said sidewall sections, a pair of ends alignable transverse to said longitudinal axis and a first cavity generally orthogonal to said lateral sides and to said ends, said first cavity being positionable in facing relation to said lips, said first cavity being adapted to retain said first nut with said lateral arms beneath said lips, said lateral sides being positionable sufficiently close to said sidewall sections to prevent sufficient rotation of said support member, when positioned with its lateral sides adjacent said sidewall sections, to align said lateral sides transverse to said longitudinal axis; end caps blocking off said first and second ends of said channel member; and

wherein said support member has a second cavity facing oppositely from said first cavity, said support member being selectively positionable with said second cavity in facing relation to said lips, said second cavity being adapted to hold a second nut having a generally central threaded opening therein and oppositely extending lateral arms, said second nut being of a different size than said first nut, in such a manner that the arms of the second nut extend beneath said lips.

4,948,314

## SCREW FASTENER

Mutsuo Kurosaki, Yokohama, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Jul. 5, 1989, Ser. No. 375,638

Claims priority, application Japan, Jul. 8, 1988, 63-90514[U]

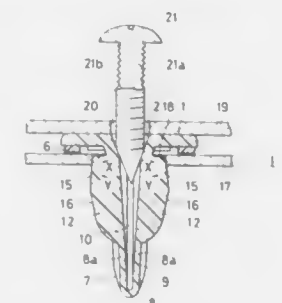
Int. Cl.<sup>5</sup> F16B 37/04

U.S. Cl. 411—182

7 Claims

1. A screw grommet, comprising:  
 a flange having a screw insertion hole; and  
 a sack-like body integral with said flange and adapted to be

inserted through a hole defined within an object to be fastened,  
 said sack-like body having an internal axial screw guide channel communicating with said screw insertion hole defined within said flange for receiving and guiding a screw inserted into said screw insertion hole of said flange, and further having a plurality of axially extending hill-like portions formed upon outer peripheral portions thereof and axially spaced from said flange so as to form slit-like gaps between upper transverse, radially extending ends of each hill-like portion and a lower surface of said flange, said screw grommet being used to fasten said object by inserting said sack-like body through said hole formed within said object such that said object is in contact with said lower surface of said flange while inner sidewall portions of said hole defined within said object are in



contact with said hill-like portions of said sack-like body so as to be disposed radially outwardly of said transverse ends of said hill-like portions of said sack-like body as well as said slit-like gaps, inserting said screw through said screw insertion hole of said flange and into said screw guide channel of said sack-like body, and then rotating said screw so as to cause advancement of said screw within said screw guide channel while tapping inner wall surface portions of said screw guide channel by means of a thread formed upon the outer periphery of said screw, whereby said hill-like portions of said sack-like body are expanded radially outwardly with respect to each other, and with increased flexibility as permitted by said slit-like gaps, such that other surfaces of said hill-like portions can engage lower surface portions of said object and thereby fixedly secure said object between said radially expanded hill-like portions of said sack-like body and said flange.

4,948,315

## SLIP LOCK PIN AND CAP

Andreas A. Limberis, 24BA Norre Gade, St. Thomas, V.I. 00802

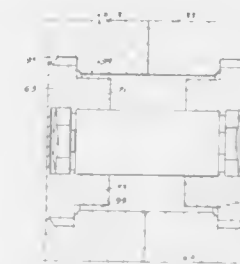
Continuation-in-part of Ser. No. 29,070, Mar. 23, 1987,

abandoned. This application Apr. 5, 1989, Ser. No. 333,659

Int. Cl.<sup>5</sup> F16B 21/00

U.S. Cl. 411—349

3 Claims



1. A slip lock pin and cap for fastening two or more juxtaposed objects together, wherein  
 each of said objects has an outer surface and an opening

extending therethrough, each of the openings of the two outermost of said objects has an enlarged portion extending inwardly of said objects from said outer surface and a reduced portion extending from said enlarged portion through said object, there being a shoulder between said enlarged portion and said reduced portion, said openings being alignable with one another for receiving said slip lock pin and cap therewithin, and including —

a pin body insertable within said openings, said pin body having locking means on its opposite ends for lockingly engaging said shoulders of said two outermost objects for preventing separation of said objects from one another when said pin body is rotated a predetermined amount in said openings, the mid-portion of said pin body being of substantially elongate cylindrical configuration and said locking means including a pair of ears on each end of said pin body which protrude transversely of said mid-portion of said pin body, said ears at each end of said pin body being spaced diametrically opposite one another;

cap means adapted to be mounted on said opposite ends of said pin body when said pin body has been rotated said predetermined amount, said cap means including a body having an outer surface and an inner surface on the side opposite said outer surface, and including an opening in said body of said cap means extending inwardly thereof from said inner surface of said cap means, said cap means opening receiving said opposite ends of said pin body therewithin when said pin body has been rotated to engage said shoulders with said locking means, said cap means having anti-rotation means disposed thereon comprising extended portions protruding from said inner surface on opposite sides of said cap means opening for extending into said openings in said objects on opposite sides of said pin body when said cap means is mounted thereon for preventing rotation of the respective ones of said openings in said objects such that the outer surfaces of said cap means are substantially flush with said outer surfaces of said objects;

a groove around said pin body near each terminal end thereof, and a correlatively shaped portion around the periphery of said opening in said cap means inwardly of said inner surface of said cap means for releasably lockingly engaging said groove of the respective end of said pin body and preventing removal of said cap means from said pin body; and

inwardly extending recesses in the outer end faces of said ends of said pin body, and thin walled portions in the outer surfaces of said cap means adjacent said recesses when said cap means is mounted on said pin body, for permitting rotation of said correlatively shaped portions of said cap means out of said grooves of said pin body for releasing said releasably locking engagement of said cap means from said pin body.

4,948,316

## QUICK ACTION FASTENER ASSEMBLY

John A. Duran, Glendora; Robert Young, Burbank, and Peter Chang, North Hollywood, all of Calif., assignors to Avibank Mfg., Inc., Burbank, Calif.

Division of Ser. No. 196,900, May 17, 1988, Pat. No. 4,865,500, which is a continuation of Ser. No. 927,320, Nov. 4, 1986, abandoned. This application Jan. 30, 1989, Ser. No. 280,631

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16B 21/18

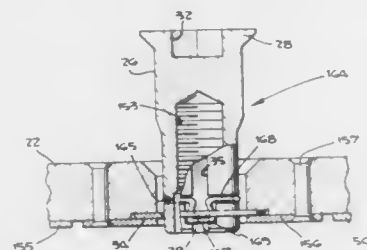
U.S. Cl. 411—353

14 Claims

1. In a fastener assembly for joining a panel to a sub-panel comprising a receptacle assembly having a threaded stud secured to the undersurface of the subpanel, a bolt having an enlarged head at one end and a nose at the other end, said nose

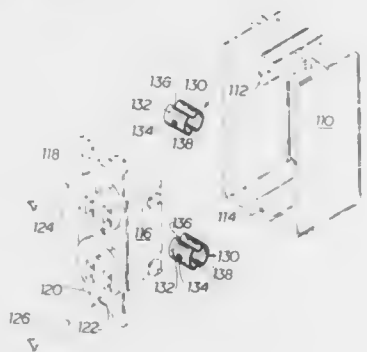


being adapted to extend through a countersunk opening in said panel coaxially aligned with an opening in said sub-panel with the stud of said receptacle assembly coaxially aligned with both of said openings, said bolt being threaded for threaded engagement to said stud, the improvement which comprises: a retainer having indexing means extending inwardly toward the central longitudinal axis thereof; said bolt having guide means extending longitudinally along the outer surface thereof receiving therein said indexing means for guiding said retainer along the body of said bolt;



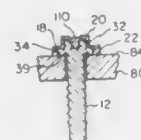
a plate secured to the underside of said panel trapping said retainer between the panel and said plate; and restraining means associated with said bolt for arresting the downward movement of said retainer along said guide means and for stopping the upward movement of said retainer along said guide means thereby retaining said bolt of said panel in an up or extracted position when said bolt is disengaged from said stud.

**4,948,317**  
**METHOD AND DEVICE FOR ELECTRICAL FITTING STABILIZATION**  
Carl Marinaro, 219 Oakvale Blvd., Butler, Pa. 16001  
Filed May 1, 1989, Ser. No. 345,310  
Int. Cl.<sup>5</sup> F16B 43/00; H02G 3/08  
U.S. Cl. 411—535



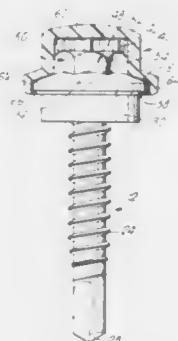
1. A deformable shim for slidable securement on the shank of a mounting screw of an electrical accessory, between a mounting tab of the accessory and a utility box, including: a body member having oppositely-facing first and second spaced-apart bearing surfaces; the body member having integral deformable means interconnecting the bearing surfaces; and the deformable means being adapted to deform generally inwardly toward the screw shank in response to force applied equally against the bearing surfaces by inward manipulation of the mounting screw as an incident of installing the accessory on the utility box.

**4,948,318**  
**NON-CORROSIVE HEADED COMPOSITE FASTENERS AND A METHOD OF PRODUCING THE SAME**  
Donald A. Nottelmann, East Bend; Norman G. Wallace, Statesville, and Joseph E. Stager, Charlotte, all of N.C., assignors to Textron, Inc., Providence, R.I.  
Filed Apr. 3, 1989, Ser. No. 332,718  
Int. Cl.<sup>5</sup> F16B 19/00, 33/00, 43/00  
U.S. Cl. 411—377



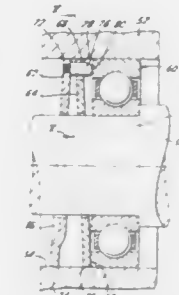
1. A composite fastener comprising a metal fastener having a shank with an entrant end and an integral insert having a bottom surface, said bottom surface of said insert having a greater outer diameter than the diameter of said shank, said insert including a plurality of upwardly extending longitudinal risers attached thereto having upper surfaces, wherein each of said riser upper surfaces is tapered downwardly and inwardly toward a longitudinal axis which is coincident with the axis of said shank, said risers adapted to receive a frusto spherical tipped shuttle pin therebetween; and a non-corrosive head made of an extrudable material encapsulating said insert.

**4,948,319**  
**SCREW/CAP ASSEMBLIES AND THEIR MANUFACTURE**  
Robert H. Day, Berkshire, and George D. Hewison, Hampshire, both of England, assignors to UTW Limited, Berkshire, England  
Filed Sep. 7, 1989, Ser. No. 403,959  
Claims priority, application United Kingdom, Sep. 7, 1988, 8821023; Jul. 7, 1989, 8915638  
Int. Cl.<sup>5</sup> F16B 19/00, 33/00  
U.S. Cl. 411—377



1. A screw/cap assembly, comprising: a screw having a head at one end; an initially separate cap mounted upon said head of said screw; protrusion means defined upon a first one of said two screw head and cap components so as to engage the second one of said two screw head and cap components and thereby space said screw head and cap components with respect to each other in order to define an adhesive reservoir space therebetween; and adhesive means disposed within said adhesive reservoir for fixedly securing said cap upon said screw head.

**4,948,320**  
**PREVENTING MOVEMENT OF AN ARTICLE ALONG A SHAFT OR BORE**  
Ronald F. Hamblin, Luton, England, assignor to Skf (U K) Limited, Luton, England  
Division of Ser. No. 815,566, Jan. 2, 1986, Pat. No. 4,887,919.  
This application Aug. 30, 1989, Ser. No. 400,491  
Claims priority, application United Kingdom, Jan. 8, 1985, 8500396  
Int. Cl.<sup>5</sup> F16B 2/00  
U.S. Cl. 411—511

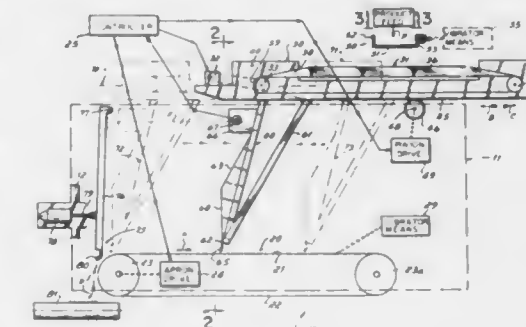


1. An assembly comprising a housing having a bore with a longitudinal axis, an article which is positioned in the bore and a device which is also positioned in the bore and which prevents movement of the article along the bore in the direction from the article to the device, the device comprising a first element disposed entirely within said bore and frictionally engaging an interior wall of said bore which element during assembly can be moved along the bore and then caused to adopt a position in which it engages the article at one or more locations and engages the bore at two or more locations without deformation of said bore, said element having a minor axis no greater than the diameter of said bore and having a major axis greater than the diameter of said bore, the two or more locations of engagement with the bore lying in a first plane extending perpendicular to a second plane in which lies the longitudinal axis of the bore, the first plane forming an angle with a third plane extending perpendicular to the longitudinal axis of the bore which is greater than zero but no greater than  $\tan^{-1}\mu$ , where  $\mu$  is the coefficient of friction between the bore and the element wherein the device includes a second element having the same dimensional relationships with respect to the bore as the first element, the first and second elements not engaging each other, the second element engaging the article at one or more locations and engaging the bore at two or more locations, the two or more locations of engagement of the second element with the bore lying in a fourth plane forming an angle with the third plane which is no greater than  $\tan^{-1}\mu$ , the first and the third and the fourth planes converging with one another with the third plane lying between the first and fourth planes.

**4,948,321**  
**AUTOMATED STORAGE SYSTEM**  
Edwin L. Wilding, and Mike W. Tyler, both of Louisville, Ky., assignors to Griffin & Company, Louisville, Ky.  
Filed Jan. 27, 1989, Ser. No. 303,548  
Int. Cl.<sup>5</sup> B65G 43/08, 47/19, 47/24  
U.S. Cl. 414—288

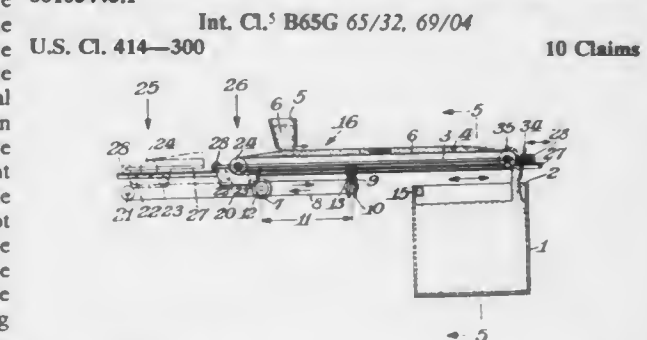
14. Apparatus for gently transferring fragile particulate product into an elongated horizontally disposed bin having a floor, said apparatus including: a product shuttle mounted for movement along and above said bin, a product conveyor on said shuttle for receiving product and for discharging product into said bin, at least one travelling dam extending into said bin toward said floor, said dam having a first inclined dam face portion, a second further inclined dam face portion and a

third vertically inclined face portion, said dam face portions for receiving and guiding fragile particulate product dropped thereon.



said dam disposed beneath said shuttle, and means for moving said shuttle, conveyor and dam such that product is discharged onto at least said first or second inclined dam face portion gently at a low angle of incidence.

**4,948,322**  
**PROCESS AND APPARATUS FOR PRODUCTION OF UNIFORMLY DISCHARGED PARTICLE FLOW**  
Uwe Kunstmann, Robdorf, Fed. Rep. of Germany, assignor to Carl Schenck AG, Fed. Rep. of Germany  
Filed Jan. 26, 1989, Ser. No. 302,762  
Claims priority, application European Pat. Off., Apr. 6, 1988, 88105443.1  
Int. Cl.<sup>5</sup> B65G 65/32, 69/04  
U.S. Cl. 414—300



1. Apparatus for the production of a flow of particles for uniform discharge into a hopper over the width thereof, such as fibers consisting of cellulose-containing or mineral-containing materials or fibers, chips or mixtures consisting of such particles provided with binders for the production of boards from these materials, the apparatus including a feeding device constantly operating during a hopper charging procedure and extending above the hopper transversely to the longitudinal axis of the hopper, a stationary feed arranged to the side of the hopper for supplying particles to the feeding device, the feeding device having a horizontal endless belt conveyor with a discharge end above the hopper and cart means connected to shift the belt conveyor toward and away from the hopper, drive means connected to constantly drive the belt conveyor and to shift the cart means and conveyor toward and away from the hopper, a gear ratio between the drive means and cart means and the drive means and belt conveyor of at least 1:1, and guide means near the discharge end of the belt conveyor for guiding particles into the hopper as they are dropped from the discharge end of the conveyor.

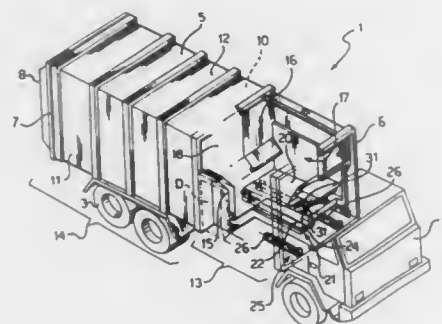
4,948,323

**SIDE-LOADING REFUSE COLLECTION WAGON**  
 Giorgio Gasparini, Milan, Italy, assignor to Bergomi S.p.A., Milan, Italy

Filed Jan. 20, 1988, Ser. No. 208,473  
 Claims priority, application Italy, Jun. 23, 1987, 21002 A/87  
 Int. Cl.<sup>5</sup> B65F 3/02

U.S. Cl. 414-408

7 Claims



1. A side-loading refuse collection wagon comprising:  
 a chassis;  
 a cab;  
 a body, said body extending along the chassis behind the cab in a longitudinal direction and having a flat bed portion;  
 a longitudinally extending guide rail fixed to the flat bed;  
 a hopper movably mounted on said guide rail;  
 said body having a first portion of rectangular cross-section in a plane perpendicular to said longitudinal direction and a second portion wherein a reduced cross-section is produced by a recess in a side of said body; and  
 a bin hoisting and tilting mechanism mounted in the recess, said recess having a right trapezoidal cross-sectional shape in a plane perpendicular to said longitudinal direction with a right angle side occupying a short portion of the flat bed and an oblique side located below an inlet opening through which the refuse from the bin is deposited into said hopper, whereby access to said hopper is improved.

4,948,324

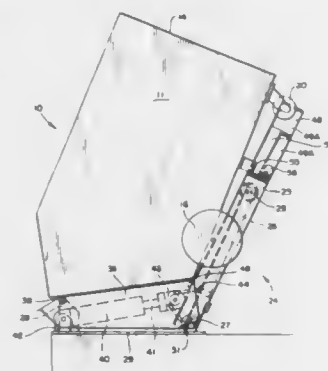
**CONTAINER EMPTYING APPARATUS, ASSEMBLY AND METHOD**

Kurt W. Niederer, Charlotte, N.C., assignor to Toter, Inc., Statesville, N.C.

Filed Jan. 14, 1989, Ser. No. 366,789  
 Int. Cl.<sup>5</sup> B60P 1/16; B65F 3/04

U.S. Cl. 414-415

26 Claims



1. An apparatus for lifting and tipping a container off of a supporting surface in order to dump contents therefrom, the container being of the type having a bottom wall and upright side walls, one of said side walls being a front wall the upper

extent of which side walls define an opening, said apparatus comprising:

- (a) engagement means for engaging the bottom of the container;
  - (b) first support means carrying said engagement means for supporting the bottom of said container through a first range of lifting and tipping movement upwardly from the supporting surface;
  - (c) second support means cooperating with said first support means for contacting and supporting the forward side wall of said container through a second range of lifting and tipping movement subsequent to said first lifting and tipping movement;
  - (d) actuator means operatively connected to said first and second support means for powering said first and second movement segments;
- whereby said first range of lifting and tipping movement is defined by a first movement segment wherein said forward side wall is not in contact with said second support means and whereby said second range of lifting and tipping movement is defined by a second movement segment wherein the container is tipped to an angle sufficient to empty the contents therefrom;
- wherein said first support means comprises a plate adapted to be positioned under said container when said container is positioned on the supporting surface; and
- wherein said plate includes first and second telescoping elements, wherein said plate extends as said container is lifted upwardly through said second movement segment and retracts as said container is lowered downwardly through said second movement segment.

4,948,325

**CONTROL APPARATUS FOR A LOADING-MOVING SYSTEM**

Graham L. Hodgetts, Mars, Pa., assignor to Rolflor Industries, Evans City, Pa.

Continuation of Ser. No. 238,062, Aug. 30, 1988, abandoned.  
 This application Nov. 22, 1989, Ser. No. 440,443  
 Int. Cl.<sup>5</sup> B65G 67/02

U.S. Cl. 414-527

10 Claims



1. A load moving system comprising  
 a flexible conveyor element extending between a front wind-up roll and a back wind-up roll,  
 drive means for winding the conveyor element selectively onto the respective rolls, and  
 control means for automatically terminating operation of the drive means when the conveyor element has travelled a predetermined amount, the control means including a follower positioned to engage an outer surface portion of the conveyor element which is wound on one of said rolls, carrier means for the follower, means mounting the carrier means for movement radially inwardly and outwardly with respect to said one roll under the influence of the follower as the amount of the conveyor element on said one roll decreases and increases, a control device for terminating operation of the drive means, and a connection between the carrier means and the control device for operating the control device to terminate the drive means when the carrier means attains a predetermined radial position relative to said one roll determined by the amount of conveyor element wound on the one roll.

the system comprises a loading and unloading system for a vehicle having a vehicle body with a bed, a front wall and a back opening through which the vehicle is loaded and unloaded, and wherein the conveyor element extends along the bed of the vehicle,  
 the drive means being hydraulic motors,  
 the control device comprises a three-way hydraulic valve having an inlet for receiving pressure fluid from a fluid source, outlets connected with the respective motors, a valve spool with a position connecting the inlet with one of the outlets, a second position connecting the inlet with the other outlet, and a third neutral position isolating the inlet from both of the outlets, and manual means for selectively moving the spool from the neutral position into the first and second positions, the carrier means through said connection being adapted to return the spool to the neutral position when the carrier means attains the first and second radial positions.

4,948,326

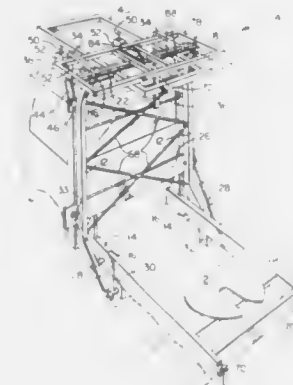
**LOAD LIFTING ATTACHMENT MOUNTED ON A TRUCK FRAME**

Henry Bedard, 1001 - 47 Agnes Street, New Westminster, British Columbia, Canada V3L 1E2

Continuation of Ser. No. 53,053, May 22, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 312,315  
 Int. Cl.<sup>5</sup> B60P 1/54

U.S. Cl. 414-541

3 Claims



1. In combination with a motor vehicle having a forward cab, a frame extended rearwardly of said cab and a fifth wheel coupling means for coupling and towing a trailer, a load lifting attachment comprising:

- (a) a pair spaced support beams pivotally mounted at first ends thereof on opposed sides of said frame between said cab and said coupling means in close proximity to said cab for pivotal movement between a beam axis extending transversely through said frame;
- (b) a fork lift tiltable mounted between second ends of said beams for pivotal movement about a tilt axis extending parallel to said beam axis, said fork lift comprising:
  - (i) a pair of parallel spaced fork lift booms, normally extending upright when said attachment is in said lowered position and said fork lift is not tilted; and
  - (ii) parallel spaced fork members mounted to said booms for linear travel therealong, said fork members being rotatable relative to said booms between an operative position in which said fork members extend rearwardly of said frame when said attachment is in said lowered position and an inoperative storage position displaced through an angle of substantially 180° degrees from said operative position;
- (c) means for tilting said fork lift about said tilt axis; and
- (d) means for rotating said beams about said beam axis between a lowered position whereat said second ends of said beams are supported by said frame and said fork lift ex-

tends rearwardly of said frame, and a raised position whereat a substantial portion of said frame behind said cab extends rearwardly clear of the region beneath said beams and said fork lift.

4,948,327

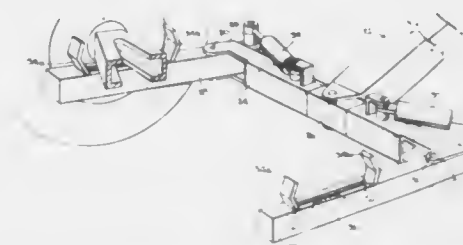
**TOWING APPARATUS FOR COUPLING TO TOWED VEHICLE UNDERCARRIAGE**

Theodore P. Crupi, Jr., 197 Lamberts Ln., Staten Island, N.Y. 10314

Filed Sep. 28, 1988, Ser. No. 250,702  
 Int. Cl.<sup>5</sup> B60P 3/12

U.S. Cl. 414-563

19 Claims



1. Apparatus adapted to be disposed on a first motor vehicle for lifting a second motor vehicle at least partly from the ground whereby the first motor vehicle can tow the second motor vehicle, comprising:

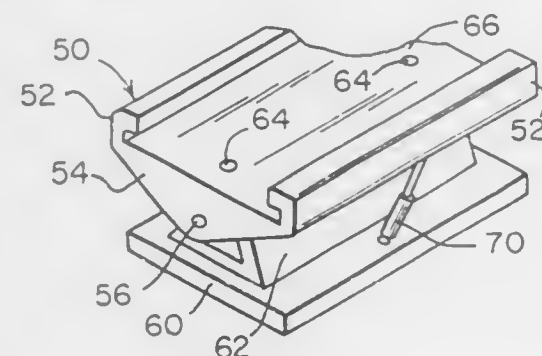
- first arm means pivotable about a first pivot point on the first motor vehicle and extending toward the rear of said first motor vehicle;
- first force supplying means coupled to said first arm means and further coupled to the first motor vehicle for providing a force to said first arm means to move the first arm means about the first pivot point, thereby raising a rearward end of said first arm means; and further comprising
- second arm means coupled to the rearward end of the first arm means and disposed transverse to said first arm means and having two ends, respective third arm means being disposed pivotally at said ends of said second arm means for movement in a substantially horizontal plane and extending rearwardly, second force supplying means for causing movement of said third arm means, each of said third arm means further including at least two retaining means disposed thereon and extending upwardly and spaced an adjustable distance apart for engaging an undercarriage portion of the second motor vehicle to be towed between said retaining means, adjusting means comprising active third force supplying means being provided for adjusting the distance between said retaining means to accommodate said undercarriage portion, said retaining means being operated by said third force supplying means in opposite directions, said third force supplying means being disposed on said third arm means, at least one of said retaining means on each third arm means being movably disposed on said third arm means, said first force supplying means moving said first arm means whereby when said undercarriage portion of the second motor vehicle is engaged by said third arm means between the retaining means, said first force supplying means can be activated to raise said first, second and third arm means and at least partly lift said second motor vehicle from the ground for towing.



**4,948,328**  
**QUICK ATTACH BUCKET SYSTEM FOR BACKHOES AND THE LIKE**  
Ronald S. Busch, 2342 Buffalo Ave., Ventura, Calif. 93003  
Filed Oct. 16, 1989, Ser. No. 421,664  
Int. Cl.<sup>3</sup> E02F 3/32

U.S. Cl. 414—723

5 Claims



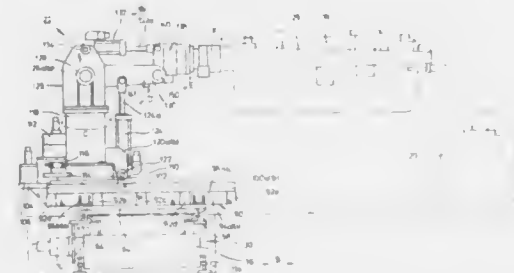
1. In a backhoe or the like having a mounting plate connecting the support arm and control linkage of said backhoe with the bucket or other working implement, an improved mounting plate which permits mounting of the bucket in the normal or reverse positions and is adapted for attachment to a bucket angling device comprising:

- a) a narrow rectangular back plate having flat, parallel front and back faces and a pair of tapered cylindrical holes extending therethrough;
- b) a pair of symmetrical mounting plate arms each comprising a flat plate attached along a narrow inside edge thereof to the front face of said back plate and extending perpendicularly therefrom, said mounting plate arms being parallel to each other and parallel to opposite edges of said back plate and separated from each other a distance greater than half the width of said back plate, said cylindrical holes being located between said mounting plate arms;
- c) said mounting plate arms being approximately rectangular and having outside edges that are substantially parallel to the front face of said back plate, one corner of the outside edge of each of said mounting plate arms being substantially rectangular and having a single cylindrical hole adjacent said one corner whereby the single cylindrical holes in both of said mounting plate arms are directly opposite each other, the other corner of the outside edge of each of said mounting plate arms being tapered smoothly toward the front face of said back plate and having a plurality of cylindrical holes adjacent the outside edge spaced from each other from a point near the center of said outside edge along the tapered corner whereby the plurality of cylindrical holes in both said mounting arms are directly opposite each other;
- d) the back face of said back plate being adapted to contact the outside surface of thrust plate means located on the back of said bucket with the tapered cylindrical holes in said back plate being aligned with cylindrical holes through the back of said bucket whereby said back plate is secured to said bucket by means of bolt means passed through said aligned cylindrical holes; and
- e) said mounting plate arms being adapted to be connected to said backhoe whereby a support arm of said backhoe is connected at said one corner by said single cylindrical hole in said mounting arms, and a control arm of said backhoe is connected at said other corner by one of said plurality of cylindrical holes in said mounting arms.

**4,948,329**  
**ROBOT APPARATUS**  
Genzo Fuse, Hiroshi Miwa, and Yoshinobu Kawasaki, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 117,229, Nov. 6, 1987, Pat. No. 4,875,823. This application Apr. 25, 1989, Ser. No. 342,744  
Claims priority, application Japan, Nov. 8, 1986, 61-226157; Nov. 20, 1986, 61-277611; Nov. 25, 1986, 61-180598  
Int. Cl.<sup>3</sup> B25J 5/02

U.S. Cl. 414—735

10 Claims



1. An apparatus for assembling a product at a work station, said apparatus comprising:

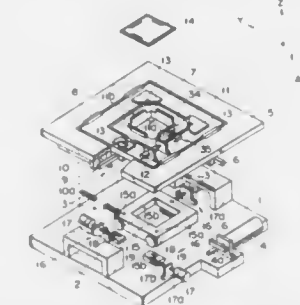
- a robot including an attachment member;
- an arm swingably mounted on said attachment member;
- a wrist mechanism mounted on said arm;
- a connecting member interconnecting said attachment member and said wrist mechanism, said connecting member including an actuator and a link coupled thereto for displacing said wrist mechanism with said actuator, wherein said actuator includes a cylinder and said link includes a piston rod of said cylinder;
- a running mechanism for displacing said robot in a first prescribed direction, said running mechanism including a base table, at least one displaceable running table, and first drive means for moving said at least one displaceable running table a predetermined distance back and forth along said base table in a direction transverse to said work station, said at least one displaceable running table being stationarily mounted to a plurality of sliding members; and
- means for displacing said robot in a second prescribed direction, said means including a mounting member by which said robot is mounted on said at least one displaceable running table, and second drive means for slidably moving said mounting member a predetermined distance back and forth along said means for displacing in a direction parallel to said work station, and wherein said base table, said at least one displaceable running table and said drive means are disposed in a pit defined in a floor on which said apparatus is disposed.

**4,948,330**  
**ALIGNMENT STAGE DEVICE**  
Takehiko Nomura, and Ryoichi Suzuki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Feb. 3, 1989, Ser. No. 305,761  
Claims priority, application Japan, Feb. 8, 1988, 63-26790; Feb. 12, 1988, 63-30405; May 31, 1988, 63-132994  
Int. Cl.<sup>3</sup> B65G 47/24; B23Q 1/18; G02B 21/26; H01L 21/68  
U.S. Cl. 414—749

15 Claims

- 1. An alignment stage device comprising:
  - a base;
  - a first stage, supported on the base and movable along a first axis on a horizontal plane;
  - a second stage, supported on the first stage and movable along a second axis, perpendicular to the first axis; and
  - a third stage, provided with stands on which a work piece is

mounted, and guided relative to the second stage, said third stage being rotatable around an axis perpendicular to that plane on which the third stage is positioned; wherein when the first stage is moved, the second and third stages are moved along the first axis and when the second stage is moved, the third stage is moved along the second

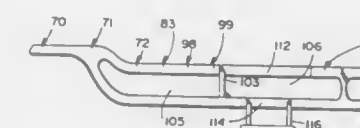


axis and wherein the first and second stages are rectangular frames each having a center opening, such that said first and second stages are capable of being arranged with one of said stages being disposed within the center opening of the other, with the third stage being arranged in the center opening of the stage disposed within the center opening of the other.

**4,948,331**  
**HIGH PRESSURE INDUSTRIAL TURBINE CASING**  
Daniel R. Roy, Carlisle; Wingming O. Chow, Fitchburg, and William A. Schofield, Sterling, all of Mass., assignors to General Electric Company, Schenectady, N.Y.  
Filed Jul. 31, 1989, Ser. No. 387,204  
Int. Cl.<sup>3</sup> F01D 17/00, 25/24

U.S. Cl. 415—20

41 Claims



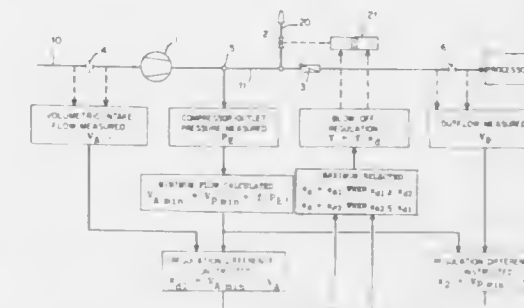
1. A method of fabricating a high pressure turbine casing for a turbine driven by a high pressure fluid, and adapted to be stocked for subsequent customization to provide selected fluid characteristic when they become known, comprising the steps of:

- forming a general purpose incomplete casing having a closed chamber between an inner and outer wall and extending axially along a significant length of said casing;
- retaining said casing in stock pending definitization of the fluid requirements of said casing for its application; and
- subsequently customizing said casing by:
  - locating one or more axial locations at which the high pressure fluid will in operation provide desired characteristics;
  - machining a slot through said inner wall and an opening through said outer wall at said one or more axial locations;
  - securing one or more barriers between said inner and outer walls adjacent said one or more slots to separate said chamber into one or more additional chambers; and
  - providing connection means at said one or more locations from the outside of said casing.

**4,948,332**  
**METHOD OF PREVENTING SURGE IN A TURBOCOMPRESSOR BY REGULATING BLOW-OFF**  
Wilfried Blotenberg, Dinslaken, Fed. Rep. of Germany, assignor to MAN Gutehoffnungshütte AG, Oberhausen, Fed. Rep. of Germany  
Filed Mar. 9, 1989, Ser. No. 321,519  
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810717  
Int. Cl.<sup>3</sup> F04D 27/02

U.S. Cl. 415—27

16 Claims



1. A method for preventing surges in a turbocompressor supplying a downstream processor with a gaseous medium by regulating blow-off, comprising the steps: measuring continuously compressor volumetric intake flow and compressor outlet pressure, said compressor volumetric intake flow having a first minimum dependent on the compressor outlet pressure; opening at least one blow-off valve to ensure that volumetric intake flow of the compressor remains above a surge limit when the compressor volumetric intake flow drops to or below said first minimum and to a value that is still permissible and above the surge limit of the compressor volumetric intake flow; measuring flow to said downstream processor in vicinity of the processor intake; and opening said blow-off valve when said flow to said processor drops below a permissible second minimum value, said compressor intake flow being measured in vicinity of the compressor intake and being a separately measured flow from said flow to said processor; operating disturbances originating at the processor side being detected first by said step of measuring flow to said processor, and disturbances originating at the compressor side being detected first by said step of measuring said compressor volumetric intake flow.

**4,948,333**  
**AXIAL-FLOW TURBINE WITH A RADIAL/AXIAL FIRST STAGE**  
Hans-Peter Meer, Unterbözberg, and Ueli Wieland, Wettingen, both of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

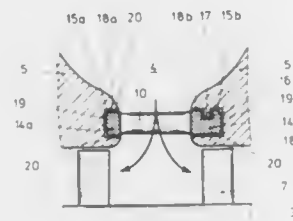
Filed Jun. 28, 1989, Ser. No. 372,456  
Claims priority, application Switzerland, Aug. 3, 1988, 2938/88  
Int. Cl.<sup>3</sup> F01D 5/00

U.S. Cl. 415—93

3 Claims

- 1. An axial-flow turbine having a first stage designed as a radial/axial stage, comprising:
  - an outer casing,
  - an inner casing,
  - a vane carrier having annular recesses therein fixed to said inner casing, and
  - a rotor fitted with rotor blades,
  - a toroidal or spiral inlet flow housing,
  - a radial vane row having radial vanes mounted in said vane carrier and supplied from the inlet flow housing,

said radial vanes having at their two ends root plates with free end faces, said radial vanes being bladed in the annu-



lar recesses in the vane carrier by means of the root plates, and the free end faces of the root plates are of a curved design.

4,948,334

# DISPLACEMENT TYPE ROTARY INDUCTION-BLOWER MACHINE

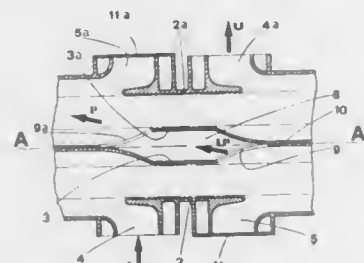
Giuseppe Colombi, Roncole Verdi, Italy, assignor to Esam S.p.A., Parma, Italy

Filed Apr. 19, 1989, Ser. No. 340,889

Claims priority, application Italy, Jul. 15, 1988, 40117A/88 Int. Cl.<sup>5</sup> F04D 1/10

U.S. Cl. 415—167.1

4 Claims



1. A displacement type rotary induction-blower machine comprising:  
at least one vaned impeller having an axis and a plurality of vanes;  
a casing formed from a first half-shell (2) and a second half-shell that combine to create an annular channel internally of which the vanes of the impeller rotate;  
an inlet port and an outlet port defined by the first half-shell of the casing and located respectively at entry and exit ends of the channel;  
a rim defined by the exterior of the second half-shell, that serves to create a single outward-facing half-chamber and is aligned with both of the inlet and outlet ports of the first half-shell at the same time so as to have an outline which, when projected through a direction parallel with the axis of the impeller onto the first half-shell, circumscribes both ports completely.

4,948,335

# TURBINE MOISTURE REMOVAL SYSTEM

George J. Silvestri, Jr., Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 30, 1988, Ser. No. 292,275

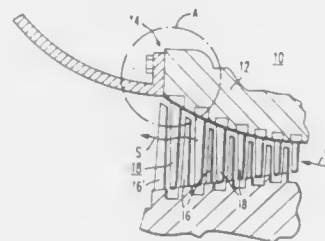
Int. Cl.<sup>5</sup> F01D 25/32

U.S. Cl. 415—169.2

8 Claims

1. A water extraction system for a steam turbine comprising: an annular channel circumscribing an inner wall of the turbine adjacent a low pressure blade row, said channel

extending through the turbine wall and defining a wall face in one end of the turbine wall facing said channel; an annular water collection slot formed in said wall face; a plurality of bores extending through said wall from said collection slot to an outer surface of said wall; and



pump means connected to said bores adjacent said outer surface of said wall for suctioning water from said collection slot.

4,948,336

# MECHANICAL SHAFT SEAL

Duane Mosure, Poplar Grove, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

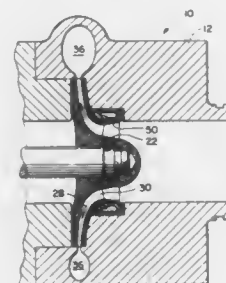
Continuation-in-part of Ser. No. 131,103, Dec. 10, 1987,

abandoned. This application May 4, 1989, Ser. No. 351,306

Int. Cl.<sup>5</sup> F04D 29/08

U.S. Cl. 415—172.1

9 Claims



1. In an aircraft fuel pump having a housing with an impeller between an inlet and an outlet, an improved seal for preventing leakage between the impeller and the housing, comprising:  
an annular ring loosely received to float within a cylindrical opening in said housing and disposed around a cylindrical portion of said impeller, said ring having an outer diameter which is less than the housing cylindrical opening inner diameter, and  
a radially extending annular flange which seats on a radially extending shoulder at the inlet side of the cylindrical opening to provide a seal over substantially the entire width of the flange, wherein said ring inner diameter has a diametral clearance over the impeller cylindrical portion less than or equal to five thousandths of an inch.

4,948,337

# AIRCRAFT ENGINE PROPULSOR BLADE PITCH SENSING

Anthony N. Martin, Simsbury, and Robert G. Bartle, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 1, 1989, Ser. No. 345,938

Int. Cl.<sup>5</sup> B64C 11/44

U.S. Cl. 416—3

4 Claims

1. A mechanism for determining pitch angle of a blade located on an aircraft engine propulsor, said mechanism comprising:

means for generating a magnetic field;  
first and second magnetic field fluctuation inducers located on said propulsor and revolving about the axis of rotation of said propulsor for causing fluctuations in said magnetic field;  
a magnetic field-to-signal converter located on an engine section adjacent to said propulsor responsive to said fluctuations in said magnetic field for providing a signal indicative of said fluctuations and;

fluid, said duct means being located internally of said shroud member, and partially defined by at least one abutment portion so that in operation, the flow of cooling fluid through said duct means provides cooling of said abutment portion, said duct means additionally being provided with at least one cooling fluid exhaust port so located and configured as to exhaust said cooling fluid from said duct means in such a direction to provide a flow of said cooling fluid over an external region of said at least one abutment portion to provide additional cooling of that abutment portion.

4,948,339

# PROPELLER BLADE COUNTERWEIGHT

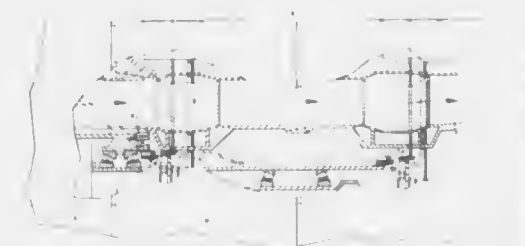
Arthur P. Adamson, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Jan. 23, 1989, Ser. No. 299,930

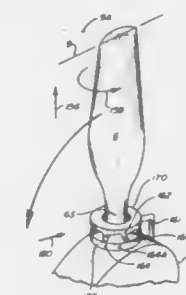
Int. Cl.<sup>5</sup> B64C 11/34

U.S. Cl. 416—145

14 Claims



a mechanical linkage responsive to changes in the pitch angle of said blade for changing the relative circumferential distance between said first and second magnetic field fluctuation inducers, wherein said relative circumferential distance is a monotonic function of the pitch angle of the blade, whereby said fluctuations vary as a monotonic function of the pitch angle of said blade.



4,948,338

# TURBINE BLADE WITH COOLED SHROUD ABUTMENT SURFACE

Brian J. Wickerson, Derby, England, assignor to Rolls-Royce plc, London, England

Filed Aug. 21, 1989, Ser. No. 396,058

Claims priority, application United Kingdom, Sep. 30, 1988, 8823022

Int. Cl.<sup>5</sup> F01D 5/22, 5/18

U.S. Cl. 416—92

12 Claims



1. A fail-safe mechanism for an aircraft propeller, comprising:  
(a) a propeller blade having a shank and an axis therein;  
(b) a first bearing race annular about the shank and having two or more surfaces which are generally helical about the axis;  
(c) a second, generally helical, bearing race fastened to the shank, which is not parallel with the first bearing race; and  
(d) a plurality of bearing rollers between the first and second bearing races, which experience displacing forces during operation because of the lack of parallelism between the first and second bearing races.

4,948,340

# ABOVE-GROUND STORAGE SYSTEM

Stuart G. Solomon, and David C. Whitman, both of San Jose, Calif., assignors to LRS, Inc., South El Monte, Calif.

Continuation of Ser. No. 233,314, Aug. 17, 1988, Pat. No.

4,890,983. This application Sep. 29, 1989, Ser. No. 414,828

Int. Cl.<sup>5</sup> F04B 49/04

U.S. Cl. 417—41

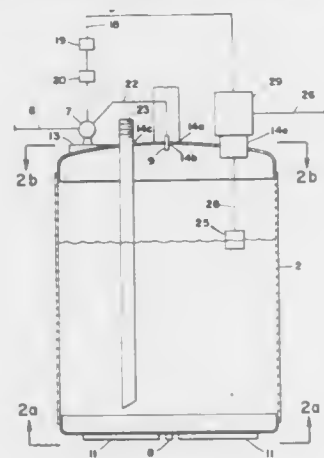
10 Claims

1. A waste oil storage vessel for preventing entry of waste oil into the environment comprising:  
(a) an inner tank;  
(b) an outer tank, said inner tank contained within said outer tank, said outer tank having a volume greater than a volume of said inner tank, said inner and said outer tanks forming an annulus therebetween;  
(c) an air-operated pump having a liquid inlet, a liquid outlet and an air supply line, said liquid outlet discharging into said inner tank through a tank liquid inlet; and  
(d) a float valve in said air supply line, said float valve in an open position when a float within said inner tank is in contact with a liquid and said inner tank contains a first volume, said float valve moving to a closed position when

1. A turbine aerofoil blade provided at one of its extents with means for its attachment to the periphery of a rotatable disc and at its opposite extent with a shroud member, said shroud member being provided with portions having surfaces which are adapted to abut corresponding surfaces on corresponding portions of the shroud members of similar operationally adjacent turbine aerofoil blades, duct means interconnecting at least one of said abutment portions with a source of cooling



said tank is filled to a second volume greater than said first volume, said float valve remaining in said closed position



until said tank is drained to a third volume, said third volume less than said second volume.

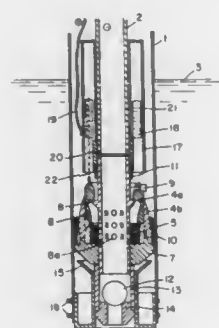
4,948,341

# WATER PUMPING SYSTEM INCLUDING A SUCTION RAM

Ivan J. Cyphelly, CH-1588 Cudrefin, Switzerland  
Filed May 13, 1988, Ser. No. 193,707  
Int. Cl.<sup>5</sup> F04F 7/00

U.S. Cl. 417—104

9 Claims



1. A water pumping system for a pit such as a well or a borehole, including a feeding unit to be installed above the ground surrounding the pit and a suction ram assembly having a lower end to be immersed into water partially filling the pit, said suction ram assembly having a ram valve and a foot valve and being connected to said feeding unit through a feeding hose and a riser pipe at respective lower ends thereof, said riser pipe being concentrically and spacedly located within said feeding hose, said foot valve being arranged between said lower end of said riser pipe and an outer space at said lower end of said suction ram assembly for controlled water flow from said outer space to said riser pipe, and said ram valve being arranged between said riser pipe and said feeding hose above said lower end of said riser pipe for controlled water flow from said feeding hose to said riser pipe, wherein said ram valve comprises two axially spaced valve portions each having an axially sliding annular sleeve part coaxially surrounding said riser pipe, each sleeve part having a valve face associated with a corresponding valve seat formed on said riser pipe, said riser pipe being provided with openings to said feeding hose located axially between said associated valve seats, and wherein said feeding hose comprises a funnel-shaped sleeve clamped thereto at said lower end thereof, said funnel-shaped sleeve receiving said lower end of said riser pipe including said suction ram

assembly, whereby lifting said riser pipe above ground simultaneously lifts said ram valve and said foot valve, and whereby said feeding hose subsequently becomes vented from any water column contained therein.

4,948,342

# METHOD AND DEVICE FOR AUTOMATIC CIRCULATION IN A WASTE WATER PUMP STATION

Folke Landquist, Balsta, Sweden, assignor to Flygt AB, Solna, Sweden

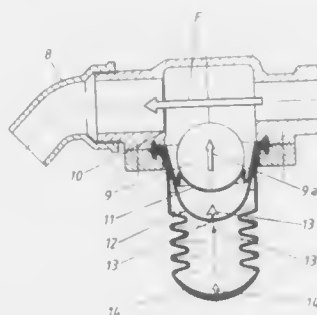
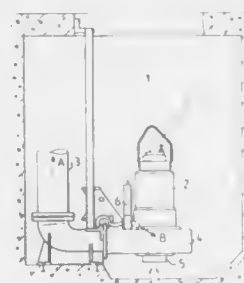
Filed Nov. 29, 1989, Ser. No. 443,611

Claims priority, application Sweden, Feb. 21, 1989, 8900597

Int. Cl.<sup>5</sup> F04B 49/02

U.S. Cl. 417—279

13 Claims



10. In combination:

- a cylinder part with a flow channel connected to the pressure side of a pump and having an outlet nozzle and a seat in said flow channel;
- a bellows sealingly attached to said part and containing a sealingly connected diaphragm and valve cup; and
- a valve element located within said diaphragm and movable from a first position to a second position against said seat depending on the flow in said channel.

4,948,343

# SLANT-PLATE TYPE COMPRESSOR WITH ADJUSTABLY POSITIONABLE DRIVE SHAFT

Shigemi Shimizu, Sakai, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Mar. 23, 1989, Ser. No. 327,727

Claims priority, application Japan, Mar. 23, 1988, 63-37069[U]

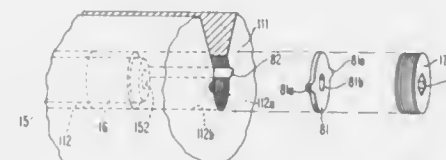
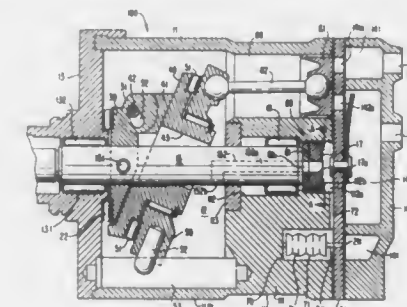
Int. Cl.<sup>5</sup> F04B 1/26

U.S. Cl. 417—222 S

7 Claims

1. In a slant-plate type compressor, said compressor comprising a compressor housing including a cylinder block, said cylinder block including a plurality of peripherally disposed cylinders and a central bore formed therethrough, a crank chamber enclosed within said cylinder block at a location forward of said cylinders, said compressor housing including a

suction chamber and a discharge chamber formed therein, a piston slidably fitted within each of said cylinders, a drive mechanism coupled to said pistons to reciprocate said pistons within said cylinders, said drive mechanism including a drive shaft rotatably supported in said housing, an inner axial end surface of said drive shaft rotatably supported in said central bore, said drive mechanism further including coupling means for coupling said drive shaft to said pistons such that rotary motion of said drive shaft is converted into reciprocating motion of said pistons in said cylinders, said central bore further including a rearward portion having a threaded interior surface, said compressor further including an adjustable screw member screwed into said threaded rearward portion of said central bore, said inner axial end surface of said drive shaft disposed adjacent said screw member, the axial position of said screw member adjustable by rotating said screw member in



said threaded portion to thereby adjust the axial position of said drive shaft within said central bore, the improvement comprising:

- a rotation preventing means for preventing rotation of said screw member due to rotation of said drive shaft, said rotation preventing means including a spacing member disposed between said inner axial end surface of said drive shaft and said screw member, said spacing member including at least one radial projection formed at a peripheral surface thereof, said rotation preventing means further including at least one depression formed on an interior surface of said central bore and corresponding to said radial projection of said spacing member, said radial projection fitting into said depression to prevent rotation of said spacing member and further preventing rotational motion of said drive shaft from being transferred to said screw member.

4,948,344

# CONTROLLED VORTEX REGENERATIVE PUMP

John E. Cygnor, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 17, 1989, Ser. No. 422,424

Int. Cl.<sup>5</sup> F04B 49/00

U.S. Cl. 417—279

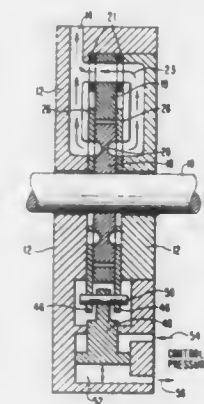
15 Claims

- 1. A lateral channel regenerative pump comprising: a housing;
- a shaft extending into said housing having an axis;
- a rotor secured to said shaft including a ring of rotor blade compartments;
- intake and discharge ports disposed in an adjacent relation-

ship on opposite sides of a diametral plane that includes said shaft axis;

a pair of substantially identical channel plates each having a central slot shaped opening having a major axis lying in said diametral plane and a pair of arcuate slotted openings on opposite sides of said major axis, one end of one arcuate opening being at said inlet port and one end of the other arcuate opening being at said discharge port;

said channel plates being positioned on said shaft and mounted for sliding movement relative to the housing in a direction parallel to the major axis of said central slot shaped opening;



the arcuate slotted openings being aligned with and providing lateral channels on opposite sides of said rotor so that when the central slot shaped opening is at one position on said rotor shaft the arcuate slotted openings are aligned with the path of said blade compartments to provide maximum pump capacity and when the central slot shaped opening is at a different position, the arcuate slotted openings are eccentric relative to the rotor blade compartments to provide a lateral channel of reduced effectiveness and thereby to reduce the pump capacity and input power requirements.

4,948,345

# VARIABLE CAPACITY COMPRESSOR HAVING A WIDENED VARIABLE RANGE OF CAPACITY

Nobuyuki Nakajima, Konan, Japan, assignor to Diesel Kiki Corp., Ltd., Tokyo, Japan

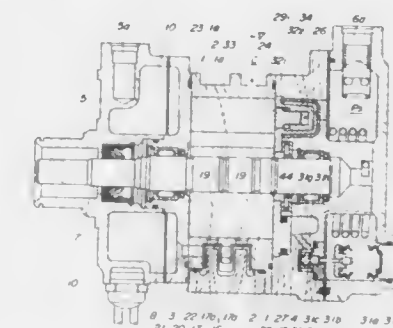
Filed May 8, 1989, Ser. No. 348,713

Claims priority, application Japan, May 9, 1988, 63-111796

Int. Cl.<sup>5</sup> F04B 49/00

U.S. Cl. 417—295

7 Claims



7. In a variable capacity compressor having a suction chamber, a discharge pressure chamber, a cylinder, a rotor rotatably received within said cylinder, a plurality of vanes carried by said rotor, a pair of diametrically opposite compression spaces defined between said cylinder and said rotor, compres-

sion chambers being defined between adjacent vanes within said compression spaces, a control element being rotatable substantially in response to a difference between low pressure supplied from said suction chamber and control pressure created from high pressure supplied from said discharge pressure chamber for varying compression starting timing in said compression spaces and hence the capacity of said compressor, said control element having a pair of diametrically opposite cut-out portions formed therein, each of said cut-out portions having an upstream end with respect to rotational direction of said rotor, wherein a compression stroke is started in associated one of said compression spaces when each of said vane passes said downstream end of each of said cut-out portion, said control element having a pair of pressure-receiving portions, each defining a first chamber supplied with low pressure from said suction chamber and a second chamber in which said control pressure is created, said pressure-receiving portions each being rotatable in response to said difference between said low pressure within said first chamber and said control pressure within said second chamber, for causing rotation of said control element, said pressure-receiving portions each being arranged slightly downstream of said downstream end of each of said cut-out portions,

the improvement comprising capacity-reducing means arranged in one of said pressure-receiving portions and being operable in response to said control pressure for causing pressure within one of said compression chambers in associated one of said compression spaces into immediately following one of said compression chambers when said control element is in such an extreme position as to minimize the capacity of said compressor.

#### 4,948,346 FUEL PUMP MOUNT FOR REDUCTION OF VIBRATION TRANSMISSION

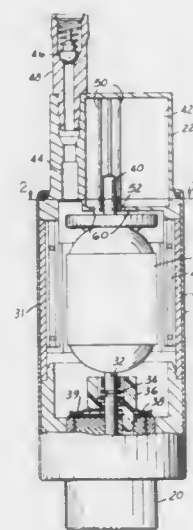
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed May 18, 1989, Ser. No. 353,758

Int. Cl.<sup>5</sup> F04C 29/06

U.S. Cl. 417—312

5 Claims



1. An electrically driven fuel pump for installation in a fuel tank of a vehicle which comprises:

- (a) a pump housing to be mounted in a vehicle fuel tank and having a fuel inlet and a fuel outlet,
- (b) a motor armature for rotation in said housing between said inlet and said outlet,
- (c) a rotary pump adjacent said inlet to be driven by said armature,

- (d) first means rotatably connecting an axis shaft on one end of said armature to said rotary pump, and
  - (e) a second means for mounting the other end of an axis shaft of said armature comprising elongate flexible means depending from one end of the interior of said housing having an interior recess to radially capture said other end of said axis shaft,
- whereby said second means will flex to accommodate eccentric motion of said armature due to vibration and unbalance without transfer of said motion to said housing.

#### 4,948,347 FLUID COMPRESSOR

Takayoshi Fujiwara, Kawasaki, and Yoshinori Sone, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

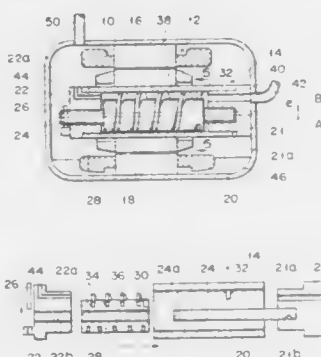
Filed Jul. 7, 1989, Ser. No. 376,515

Claims priority, application Japan, Jul. 8, 1988, 63-170696

Int. Cl.<sup>5</sup> F04B 29/00

U.S. Cl. 417—356

8 Claims



1. A fluid compressor comprising:

- a case;
- a cylinder arranged in the case and having a suction end and a discharge end;
- a first bearing fixed within the case, for rotatably supporting and air-tightly closing one end of the cylinder;
- a second bearing slidably engaging with and air-tightly closing another end of the cylinder;
- a support shaft coupling the first and second bearings together, said support shaft extending through the cylinder in parallel to an axis of the cylinder while being eccentric to the axis of the cylinder;
- a cylindrical rotating body located within the cylinder, said rotating body extending in parallel to the axis of the cylinder and being supported by the support shaft to be rotatable while part of the rotating body is in contact with an inner circumferential surface of the cylinder, said rotating body having a spiral groove on the outer circumferential surface thereof, said groove having pitches narrowed gradually with a distance from the suction end toward the discharge end of the cylinder;
- a spiral blade fitted in the spiral groove to be slidable, substantially in the radial direction of the rotating body, having an outer surface in tight contact with the inner circumferential surface of the cylinder, and dividing a space defined between the inner circumferential surface of the cylinder and the outer circumferential surface of the rotating body into a plurality of operating chambers; and
- drive means for rotating the cylinder and the rotating body, to thereby cause a fluid, drawn into the cylinder from the suction end thereof, to sequentially transfer toward the discharge end of the cylinder through the operating chambers.

#### 4,948,348 IMMERSION PUMP, ESPECIALLY FOR LOW-BOILING FLUIDS

Robert Doll, St. Benediktstr. 1, 8044 Uetersen/Bremer; Werner Wiedemann, Walter-Meibner-Str. 8, 8046 Garching 40, and Hartmut Berndt, Königsteinstr. 11, 8000 München 40, all of Fed. Rep. of Germany

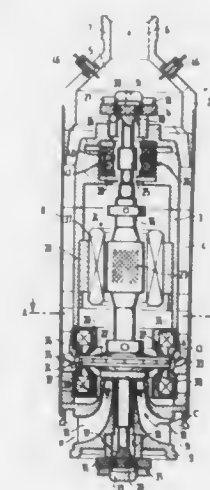
Filed May 4, 1988, Ser. No. 190,029

Claims priority, application Fed. Rep. of Germany, May 7, 1987, 3715216

Int. Cl.<sup>5</sup> F04B 17/02

U.S. Cl. 417—365

10 Claims



1. An immersion pump having a support for a shaft and an impeller wheel mounted to the shaft comprising, at least one controllable electromagnet in direct electromagnetic contact with the impeller wheel that acts in an axially supporting manner to directly axially position said impeller wheel, said pump including at least one radial hole through the pump's exterior which connects sealed areas above the impeller wheel with the outside of the pump.

#### 4,948,349 PUMP AND VALVE APPARATUS

Yoshinobu Koiwa, 172-14, Kotehashicho, Chiba-shi, Chiba-pref., Japan, assignor to Yoshinobu Koiwa; Kabushiki Kaisha Little Rock, both of Chiba; Kelbin Co., Ltd., Tokyo and Shuichi Fujimori, Fuji Shawa, all of Japan

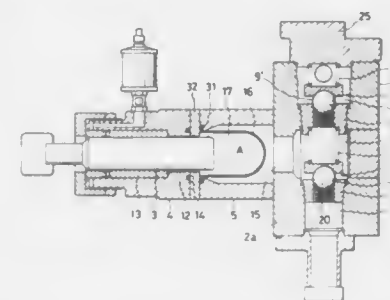
Filed Sep. 21, 1988, Ser. No. 247,869

Claims priority, application Japan, Sep. 22, 1987, 62-237996

Int. Cl.<sup>5</sup> F04B 9/10

U.S. Cl. 417—383

12 Claims



1. A pump apparatus for pumping a fluid comprising: a valve box having a valve chamber inlet, a valve chamber outlet and a valve chamber therebetween; an inlet valve seat provided in said valve chamber inlet, said inlet valve seat having a generally concave surface with a

plurality of fluid passages therein through which the fluid passes, said plurality of fluid passages straining said fluid to prevent large solid pieces in said fluid from passing therethrough, said fluid passages having outlets which are distributed around the generally concave surface of the inlet valve seat, said concave surface having an outer edge, some of the outlets being positioned at different distances from the outer edge of the concave surface than other outlets of the plurality of fluid passages;

- a valve-piece movable toward and away from said inlet valve seat to respectively close and open said plurality of fluid passages;
- a pressure action chamber positioned adjacent said valve box and in fluid communication therewith;
- a pressure force member positioned in said pressure action chamber and dividing said pressure action chamber into a valve chamber side and a cylinder side, said cylinder side of the pressure action chamber containing an action medium; and
- a reciprocable member movable in a cylinder adjacent the cylinder side of the pressure action chamber, said reciprocable member being movable to transmit changes in volume of said cylinder side to said pressure force member to thereby move said pressure force member, movement of said pressure force member upon reciprocation of said reciprocable member in one direction causing said valve-piece to move to close said plurality of fluid passages and causing fluid in said valve chamber to be discharged therefrom, and movement of said reciprocable member in a direction opposite to said one direction causing said valve-piece to move to open said plurality of fluid passages and causing fluid to be drawn into said valve chamber through said plurality of fluid passages.

#### 4,948,350 HOSE PUMP

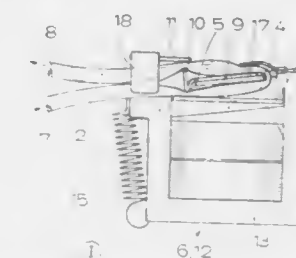
Walter Olbrisch, and Wolfgang Suttner, both of Bielefeld, Fed. Rep. of Germany, assignors to Suttner GmbH & Co. KG, Fed. Rep. of Germany

Filed Aug. 30, 1989, Ser. No. 400,543

Int. Cl.<sup>5</sup> F04B 43/08

U.S. Cl. 417—474

20 Claims



1. Hose pump, in particular for metering devices in water treatment units, with a pump casing and with a hose for the medium to be pumped that runs through the pump casing in a closed manner, resting on a support wall of the pump casing; wherein compression elements are provided for squeezing off the hose in at least two places, and a drive is provided for opening and closing the compression elements in a specific sequence so as to convey a specific volume of liquid through said hose; wherein the hose is arranged in an essentially stationary manner between the support wall and a compression plate with the hose being sharply bent around an end of the compression plate, which serves as a first compression element, creating a bend in the hose of about 180° and squeezing it off, and a second compression element is disposed on the other end of the compression plate opposite the support wall; and wherein the compression plate with the second compression element are movable back and forth by the drive in a pumping movement between a first pump position and a second pump position, the first pump position being at a greater distance



from the support wall than the second pump position; and wherein the relative positions of the compression plate and second compression element with respect to the support wall cause, in the first pump position, the hose to be essentially relaxed without the hose being squeezed-off by the second compression element, and on the way from the first pump position to the second pump position, first the second compression element and then the compression plate to squeeze off the hose.

4,948,351

# **PRESSURE SEWER PUMPING SYSTEM WITH CHECK VALVE ARRANGEMENT**

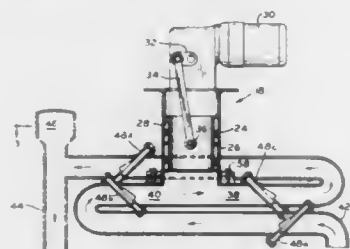
Richard L. Williams, 9180 Parker Rd., Harrod, Ohio 45850

Filed Mar. 15, 1989, Ser. No. 323,957

Int. Cl.<sup>5</sup> F04B 21/02

U.S. Cl. 417—565

12 Claims



1. A pressure sewer system comprising:

- a collection sump;
- a piston pump having a housing including an inlet, an outlet, and a cylinder, a piston including a plurality of circumferential shoulders and a plurality of resilient ring means, each of said resilient ring means located between a pair of adjacent said shoulders disposed in said cylinder, said resilient ring means for sealing rolling engagement with said cylinder and piston when said piston travels in said cylinder;
- a serpentine intake conduit connecting said sump to said pump inlet, said intake conduit including a plurality of return bends;
- a serpentine discharge conduit connected to said outlet, said discharge conduit including a plurality of return bends;
- a first plurality of check valves disposed in said intake conduit, at least one of said return bends of said intake conduit positioned between each adjacent pair of said check valves; and
- a second plurality of check valves disposed in said discharge conduit, at least one of said return bends of said discharge conduit positioned between each adjacent pair of said check valves.

4,948,352

# **ROTOR UNIT WITH PERIPHERAL PROJECTIONS AND CLEARANCES FOR CENTRIFUGAL DEFLECTION**

Koichihiro Hirosawa, Kariya, and Makoto Shirai, Toyohashi, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 16, 1988, Ser. No. 245,622

Claims priority, application Japan, Sep. 25, 1987, 62-241329; Sep. 25, 1987, 62-147262[U]

Int. Cl.<sup>5</sup> F01C 1/10, 19/00, 21/08

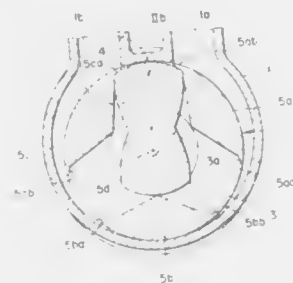
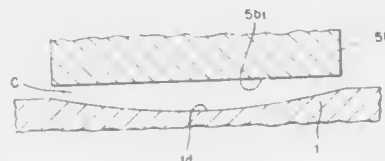
U.S. Cl. 418—109

7 Claims

1. A rotor unit comprising a hollow housing member, an outer rotor member rotatably carried within the housing member and an inner rotor member disposed inside the outer rotor member and rotatably carried by a rotary shaft which is eccentric with respect to a rotary shaft associated with the outer rotor member, a clearance being defined between the

opposing surfaces of the housing member and the outer rotor member at rest in a manner such that the clearance is greater at the center the clearance being at a minimum at opposite ends of the outer rotor member, as viewed in the axial direction of the rotary shaft of the outer rotor member, than at its opposite ends or the entire periphery of the outer rotor member.

4. A rotor unit comprising a hollow housing member, an outer rotor member rotatably carried within the housing member and including at least three sector-shaped sections, each sector configuration defined by two radii and one arc segment of the outer rotor as view in a plane perpendicular to a rotary shaft associated with the outer rotor member and which are



symmetrical to each other with respect to the rotary shaft, the sector-shaped sections being disposed so that their centers are located outside the rotary shaft, and an inner rotor member disposed inside the outer rotor member and rotatably carried by a rotary shaft which is eccentric with respect to the rotary shaft associated with the outer rotor member and configured for meshing engagement with the sector-shaped sections of the outer rotor member; and projections formed adjacent to the respective ends of an arc which defines the sector configuration and extending away from the sector-shaped section and protruding away from a plane surface containing the radii which define the sector configuration.

4,948,353

# **METAL CATALYST CARRIER BODY HAVING A SHORTENED JACKET TUBE AND A METHOD OF PRODUCING THE SAME**

Wolfgang Maus, and Theodor Cyron, both of Bergisch Gladbach, Fed. Rep. of Germany, assignors to EMITEC Gesellschaft für Emissionstechnologie mbH, Lohmar, Fed. Rep. of Germany

Filed Jan. 15, 1988, Ser. No. 144,503

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1987, 3701052

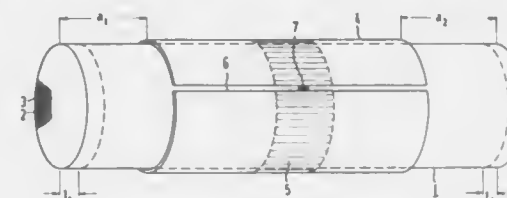
Int. Cl.<sup>5</sup> F01N 3/15

U.S. Cl. 422—180

13 Claims

1. Metal catalyst carrier body assembly, comprising a metal catalyst carrier body having a given length, two end surfaces and a honeycomb structure formed of textured metal sheets through which gas can flow, a jacket tube surrounding said honeycomb structure and being shorter than said given length, at least a portion of said end surfaces being brazed up to a given

part of said given length, said jacket tube having ends each being disposed at a distance from a respective one of said end



surfaces which is greater than said given part of said given length.

4,948,354

# **EXTRUSION HEAD FOR PRODUCING SHEET MATERIAL REINFORCED INTERNALLY WITH CLOSE-PACKED CORDS**

Diego Minaudo, Rome, Italy, assignor to Bridgestone/Firestone, Inc., Akron, Ohio

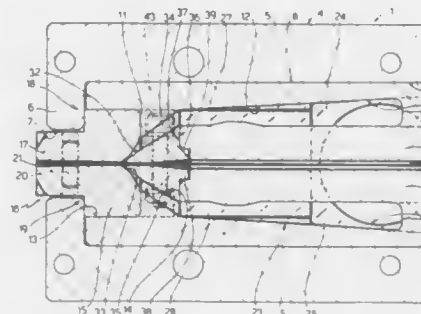
Filed Apr. 17, 1989, Ser. No. 338,670

Claims priority, application Italy, Apr. 27, 1988, 67386 A/88

Int. Cl.<sup>5</sup> B29C 47/02

U.S. Cl. 425—114

7 Claims



1. An extrusion head for producing sheet material reinforced internally with close-packed cords; said extrusion head comprising a die for said internally-reinforced sheet material, and a cord guide insert comprising a first and second element arrangement contacting and one on top of the other; wherein said cord guide insert also comprises an intermediate element between said first and second elements, said elements together defining a cord output facing said die and having a plurality of output holes arranged in a row, and two cord inputs arranged one on top of the other each having a plurality of input holes arranged in a row, first channels connecting first alternating ones of said output holes with the input holes of one row, and second channels connecting second alternating ones of said output holes with the input holes of the other row, said first and second channels converging inside said cord guide insert for guiding said cords from said two input rows of holes to said output row of holes.

4,948,355

# **HOT/COLD PRESS FORMING APPARATUS FOR THERMOFORMABLE MATERIALS**

Frederick L. Knoll, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 52,622, May 20, 1987, Pat. No. 4,789,328. This application Aug. 18, 1988, Ser. No. 233,639. The portion of the term of this patent subsequent to Dec. 6, 2005, has been disclaimed.

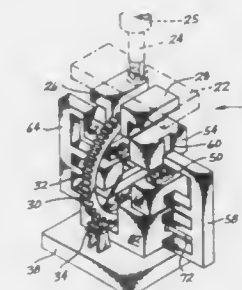
Int. Cl.<sup>5</sup> B29C 51/20

U.S. Cl. 425—517

13 Claims

1. An apparatus for forming and shaping a workpiece made of thermoformable material, which comprises:

- (a) a base means;
- (b) a positioning means supported by said base means;
- (c) a tray means for supporting a raw workpiece, said tray means being supported by said positioning means;
- (d) a first pair of forming means supported by said base means;
- (e) a press platen means;
- (f) a second pair of forming means moved by said press platen means;



4,948,356

# **TOOLING FOR SEALING BLOW MOLDED BOTTLE**

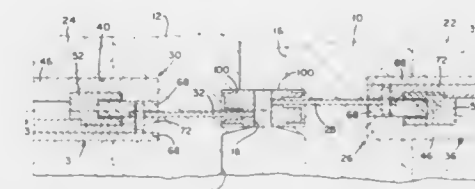
Dennis L. Dundas, Dover; Eugene L. Moore; Paul M. Oles, both of York, and Milton Briggs, Dallastown, all of Pa., assignors to Graham Engineering Corporation, York, Pa.

Filed Jul. 19, 1989, Ser. No. 382,775

Int. Cl.<sup>5</sup> B29C 49/42

U.S. Cl. 425—522

24 Claims



1. A mold for blow molding an article from a parison, the mold including a pair of mold halves defining a cavity when closed; and first parison sealing tooling including a drive member movable between two positions, a sealing blade mounted in one of the mold halves and movable between an extended position within the cavity and a retracted position outwardly of the extended position, and a force multiplying drive operatively connecting the drive member to the sealing blade.

4,948,357

# **DRAPED PARISON BLOW MOLDING APPARATUS**

Richard C. Legge, Pittsford, and George F. Arp, Fairport, both of N.Y., assignors to John D. Brush & Co., Inc., Rochester, N.Y.

Division of Ser. No. 868,294, May 28, 1986, Pat. No. 4,828,786. This application Apr. 10, 1989, Ser. No. 335,576

Int. Cl.<sup>5</sup> B29C 49/04

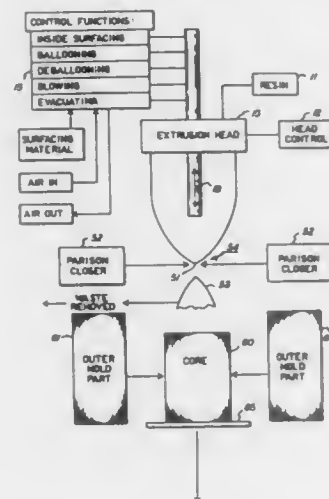
U.S. Cl. 425—522

21 Claims

1. Apparatus for blow molding a deep, double-walled box formed from a single parison, said blow molding apparatus including an extrusion head, a core shaped to form an inside

wall of said box, and outer mold parts shaped to form an outside wall of said box, said blow molding apparatus comprising:

- said core being positioned below said extrusion head so that a lower region of said parison can descend to engage an upper region of said core;
- a holder arranged on said upper region of said core for holding a closed lower region of said parison so that a portion of the weight of said descending parison rests on said upper region of said core, as said parison continues to descend from said extrusion head;
- a programmable controller for said extrusion head, said controller being programmed for descending said parison down over said core so that a leading region of said pari-



son drapes down around said sides of said core to form an inner wall of said box, an inversion region of said parison drapes down to a lower region of said core to form an open end of said box, and a succeeding region of said parison drapes around said leading region to form an outer wall of said box;

- means for closing said outer mold parts around said core to surround said parison draped over said core and enclose said draped parison in a cavity formed between said core and said outer mold parts; and
- means for blowing said parison to form said deep, double-walled box to the shape of said cavity between said core and said outer mold parts.

4,948,358

## DIE CLAMPING APPARATUS

Yuki Kushibe, and Hiroshi Sato, both of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 235,969, Aug. 24, 1988, abandoned.

This application Aug. 18, 1989, Ser. No. 396,767

Claims priority, application Japan, Sep. 11, 1987, 62-226408; Sep. 29, 1987, 62-245600

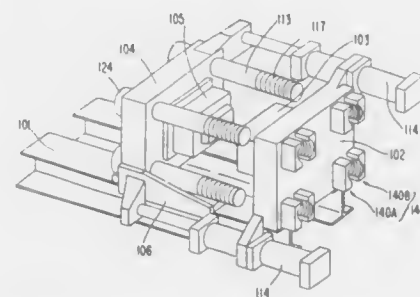
Int. Cl.<sup>5</sup> B29C 45/66

U.S. Cl. 425-574

6 Claims

1. In a die clamping apparatus including a fixed die plate for holding a fixed die, a movable die plate for holding a movable die, means for actuating said movable die plate to advance or retreat with respect to said fixed die plate, guide means guiding advance and retreat movements of said movable die plate, and tie bars for performing a die clamping operation by being fixedly coupled to said fixed die plate after said movable die plate has moved toward said fixed die plate and the fixed die and the movable die have closed to form a mold, the improvement wherein:

said movable die plate and said advance/retreat movement guide means are separately formed, and are pin-coupled



together so that said movable die plate is rotatable relative to said guide means.

4,948,359

## MOLD HOLDING AND POSITIONING MEANS FOR USE WITH WAX INJECTOR

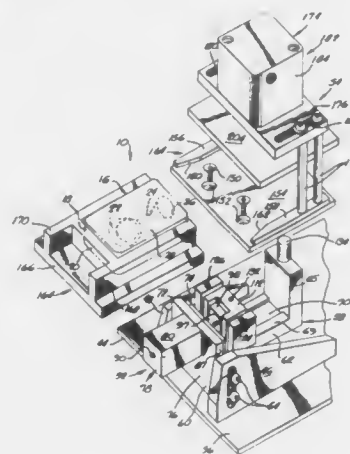
Shozui Yasui, Tokyo, Japan, assignor to M. Yasui & Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1987, Ser. No. 131,510

Int. Cl.<sup>5</sup> B29C 45/04

U.S. Cl. 425-576

9 Claims



1. In mold holding and positioning apparatus including an adjacent wax injector machine having a wax injection nozzle for forcing liquid wax into a flexible mold, a flexible mold having a pattern cavity in said mold wherein a sprue hole is defined projecting inwardly from an exterior surface of said mold connected with said cavity by a channel, said flexible mold being formed into two halves along a generally horizontal cut, said apparatus includes a generally flat base, mold positioning means mounted upon said base, said means including a piston horizontally shiftable in reverse directions so that as it moves in one direction it moves toward said wax injector, vertically adjustable mold holding means above said mold positioning means and mounted thereon to receive said flexible mold and position said sprue hole of said mold vertically in general alignment with said nozzle, said holding means including pressure pattern means activatable to exert downward pressure on said mold to maintain said halves together during wax injection, and horizontally shiftable with said mold positioning means for engagement of said sprue hole with said nozzle, the improvement comprising:

universal coupling means connecting said mold positioning means and said vertically adjustable mold holding means adapted to allow limited 365° relative movement therebetween and to permit turning said mold about said nozzle to

assure tight sealing engagement therewith as said mold positioning means moves into engagement with said nozzle.

4,948,360

## GAS RESONANCE DEVICE

Alan A. Wells, Ely, England, assignor to The Haser Company Limited, Inverness, England

Continuation of Ser. No. 117,783, Nov. 6, 1987, abandoned. This application Aug. 25, 1989, Ser. No. 398,306

Claims priority, application United Kingdom, Nov. 6, 1986, 8626562

Int. Cl.<sup>5</sup> F23C 11/00

U.S. Cl. 431-1

4 Claims



1. A thermally driven gas resonance device comprising: an elongated resonance tube (3), said resonance tube having a first end portion and a second end portion and expanding in cross-section along its length from said first end portion to said second end portion; a pulsed heat source (2), said heat source being located at said first end portion of said resonance tube; and means for triggering oscillations in a gas in said resonance tube, wherein said resonance tube has an ogival shape in longitudinal section such that, when viewed in cross-section, said walls of said resonance tube are curved; wherein said heat source and said means for triggering said oscillations in said gas in said resonance tube are both formed by a pulsed heat source, said pulsed heat source having a pulse repetition frequency corresponding to a resonant frequency of said gas resonance tube; wherein said pulsed heat source includes: a valve (10) having an input side and an output side; means for supplying a mixture of air and one of an inflammable gas and vapour, to said input side of said valve; a flame trap (11), said flame trap being located downstream of said output side of said valve; and an ignitor (14), said ignitor being located in said resonance chamber downstream of said flame trap initially to ignite said mixture in said first end portion of said resonance tube.

4,948,361

## PORTABLE AMUSEMENT LIGHTER

Matthew Wu, 1F., No. 10-3, Lane 180, Tzu Cheang St., Pel Tou District, Taipei, Taiwan (R.O.C.)

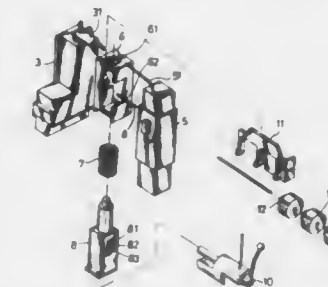
Filed Nov. 22, 1989, Ser. No. 440,182

Int. Cl.<sup>5</sup> F23Q 3/00

U.S. Cl. 431-125

1 Claim

1. A portable amusement lighter, including a gas storage cylinder having a gas discharge valve and a lever for controlling said valve, a gas controller propeller means including a pin rod, a spark producing means, a plurality of face wheels each having a gear and means for driving said gears, means includ-



said gear driving means by said pin rod and to operate said spark producing means.

4,948,362

## ENERGY CONSERVING PROCESS FOR CALCINING CLAY

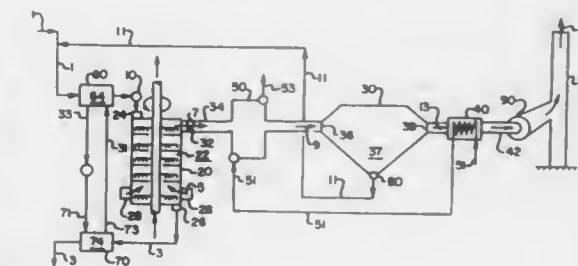
David P. Baird, Macon, Ga., assignor to Georgia Kaolin Company, Inc., Union, N.J.

Filed Nov. 14, 1988, Ser. No. 270,176

Int. Cl.<sup>5</sup> F27B 15/02; F27D 17/00

U.S. Cl. 432-14

18 Claims



1. An energy conserving process for calcining a clay comprising:

- feeding a dry pulverized clay powder as feed material to a calciner to be calcined therein;
- passing the clay powder to be calcined through the calciner in direct heat exchange contact with a hot calcining gas passing therethrough whereby the clay powder is sufficiently heated to calcine substantially all of the clay powder passing through the calciner and the hot calcining gas is somewhat cooled;
- removing the calcined clay powder from the calciner and discharging the calcining gas from the calciner;
- subjecting the calciner discharge gas to electrostatic precipitation to clean the calciner discharge gas prior to venting the calciner discharge gas to the atmosphere whereby at least a substantial portion of calcined clay powder entrained in the calciner discharge gas is removed therefrom; and
- collecting the hot calcined clay powder separated from the gas during electrostatic precipitation and mixing the collected hot calcined clay powder with the clay feed material being supplied to the calciner without substantially cooling the collected hot calcined clay powder prior to mixing with the feed material;
- passing the calciner discharge gas in heat exchange relationship with at least a portion of a cooling fluid prior to subjecting the calciner discharge gas to electrostatic precipitation so as to preheat the cooling fluid and partially cool the calciner discharge gas and thereafter subsequent to subjecting the calciner discharge gas to electrostatic



precipitation passing the preheated cooling fluid in heat exchange relationship with the cleaner calciner discharge gas whereby the cleaned calciner discharge gas is further cooled.

4,948,363

## QUICK-CHANGE COOLING LINE

Alfredo Poloni, Redipuglia, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

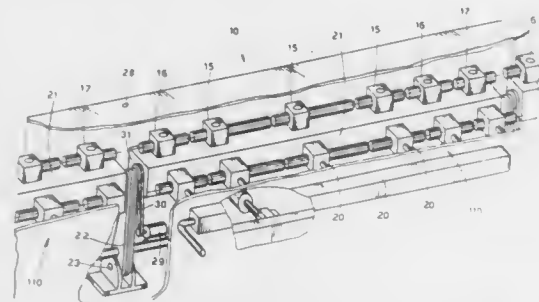
Filed Nov. 7, 1988, Ser. No. 268,249

Claims priority, application Italy, Nov. 23, 1987, 83493 A/87

Int. Cl.<sup>3</sup> F27D 15/02

U.S. Cl. 432—77

12 Claims



1. A quick-change cooling line located downstream from a finishing unit which is adapted to cool round or ribbed wire rod, comprising:

a plurality of segments each comprising at least two tubular conduits, wherein said at least two tubular conduits comprise a cooling assembly and an assembly for performing cleaning with water; and

means for moving each said segment between a cooling position wherein said at least two tubular conduits of the segment are coaxial with a rolling axis of the finishing unit and a maintenance position wherein the segment is accessible for maintenance.

4,948,364

## LIME KILNS

Jeffery L. Thompson, 3059 Old Stone Dr., Birmingham, Ala. 35243

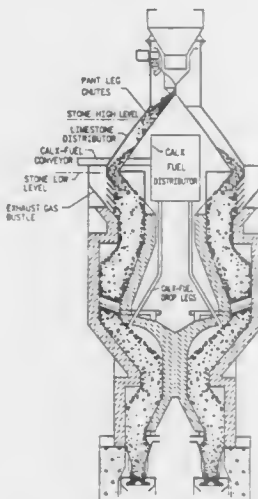
Continuation of Ser. No. 873,170, Jun. 10, 1986, abandoned.

This application Sep. 9, 1988, Ser. No. 243,136

Int. Cl.<sup>3</sup> F28D 15/00

U.S. Cl. 432—98

4 Claims



4. A multi-incline annular shaft kiln comprising:  
(a) a generally vertical shaft kiln having an annular flow path

therethrough, said flow path being defined by an annular inner wall and an annular outer wall to accommodate the continuous downward movement of a particulate solids charge, and the countercurrent flow of gas;

(b) an upper inlet for receiving particulate feed;

(c) an upper gas exhaust outlet;

(d) a lower gas inlet;

(e) a lower solids outlet; and

(f) means for causing larger and smaller particles of said charge to reverse radial position along said flow path, said means including an inner wall having two sections sloping radially outwardly in the downward direction and an outer wall having one section sloping radially inwardly in the downward direction, said outer wall sloping section being positioned along said flow path between said two inner walls sloping sections.

4,948,365

## HIGH-TEMPERATURE, GAS-BURNING FURNACE

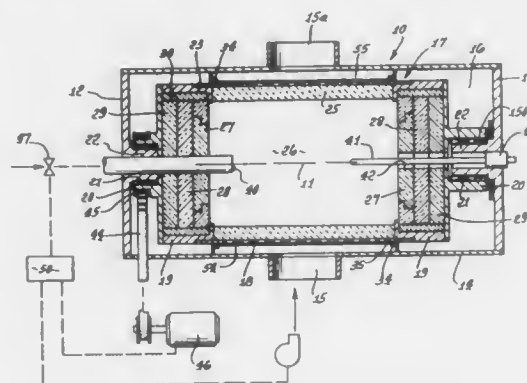
Walter W. Yuen, Santa Barbara, Calif., assignor to Zond Systems, Inc., Techachapi, Calif.

Filed May 24, 1989, Ser. No. 357,371

Int. Cl.<sup>3</sup> F27B 7/08

U.S. Cl. 432—103

12 Claims



1. Furnace apparatus comprising, in combination:

(a) a rotor, and means to rotate the rotor, the rotor having opposite ends,

(b) a substantially cylindrical, porous ceramic bed carried by the rotor, the bed having an axis of rotation, the bed surrounding and defining an interior combustion zone, and thermal insulation means substantially closing said opposite ends of the rotor, said ends axially spaced apart,

(c) a housing into which the rotor and bed are received, and having an inlet for air to pass sidewardly through the rotating bed via one side thereof to be preheated and then to pass into said interior zone,

(d) fuel inlet means for supplying fuel to said combustion zone to mix with air therein for combustion in said zone,

(e) and the housing having an outlet to discharge hot combustion products which have passed sidewardly through said porous bed via another side thereof to pre-heat same for subsequent rotation into the path of the air to pass therethrough,

(f) the bed thickness predetermined to provide regeneration, at over 1,000° C.

4,948,366

## ADHESIVE BOND STRENGTH CONTROL FOR ORTHODONTIC BRACKETS

Jerold S. Horn, Azusa, and Henrick K. Gille, Monrovia, both of Calif., assignors to Unitek Corporation, Monrovia, Calif.

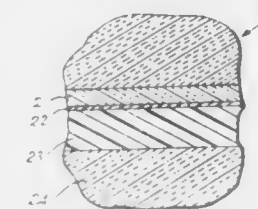
Continuation of Ser. No. 067,243, Jun. 26, 1987, abandoned.

This application Aug. 3, 1989, Ser. No. 390,426

Int. Cl.<sup>3</sup> A01N 1/02; A61C 3/00

U.S. Cl. 433—9

47 Claims



1. A method for controlling bond strength between an inorganic substrate and an acrylate or methacrylate resin comprising the steps of:

contacting the inorganic substrate with a composition comprising a mixture of an organofunctional silane coupling agent comprising a methacryl group which is reactive with the resin and an organosilane coupling agent which is not reactive with the resin; and

reacting the resin with the organofunctional silane coupling agent on the substrate for providing an average bond strength less than the bond strength obtained when only the silane coupling agent comprising a methacryl group is applied to the base of such a substrate.

4,948,367

## ORTHODONTIC ACCESSORIES AND METHOD OF APPLYING THE SAME

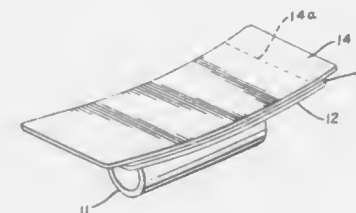
Martin Haas, Stow, Ohio, assignor to Summit Orthodontic Services, Inc., Cuyahoga Falls, Ohio

Filed Jun. 17, 1988, Ser. No. 208,113

Int. Cl.<sup>3</sup> A61C 3/00

U.S. Cl. 433—9

1 Claim



1. A method of orthodontic treatment for affixing an orthodontic accessory directly to the teeth of the patient, comprising the steps of:

(a) determining the proper location of an orthodontic accessory;

(b) obtaining said orthodontic accessory having an orthodontic attachment, said attachment being contiguous with a base, said base carrying a pressure sensitive adhesive protected on one side by a removable backing;

(c) removing a portion of said removable backing from said orthodontic accessory thereby exposing said pressure sensitive adhesive;

(d) positioning said orthodontic accessory in mating juxtaposition with a tooth of the patient;

(e) applying force to said orthodontic accessory in the direction of the tooth to which the accessory is juxtaposed, thereby effecting a bond between said accessory and the tooth;

(f) repositioning the orthodontic accessory to achieve opti-

mum placement by applying force to the orthodontic accessory in a direction away from the tooth;

(g) adjusting the location of the accessory; and

(h) removing the remaining protective backing and applying force to the accessory in the direction of the tooth at the accessory's new location.

4,948,368

## MIXING DEVICE FOR USE IN DENTISTRY

Alexander Kanotscher, Högenauerstrasse 3, A-5280 Braunau am Inn, Austria

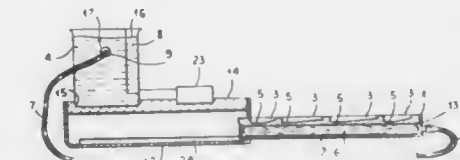
Filed Feb. 21, 1989, Ser. No. 313,653

Claims priority, application Australia, Feb. 18, 1988, A393

Int. Cl.<sup>3</sup> A61G 1/14

U.S. Cl. 433—77

12 Claims



1. A mixing device for molding compositions for use in dentistry, comprising:

a support formed with an upwardly open tray;

a mixing plate extending across said tray and formed with a multiplicity of upwardly open mixing troughs adapted to receive different compositions, each of said troughs having at least one downwardly opening throughgoing passage;

a mat of a bibulous wicking material received in said tray and underlying said plate whereby moisture can be communicated to said troughs from said mat through said passages;

a liquid container on said support at a level above said tray; a conduit connecting said container with said tray for feeding a moistening liquid to said mat from said container; and

an adjustable flow controller along said conduit for controlling flow of said liquid from said container to said tray.

4,948,369

## CONNECTOR ASSEMBLY

Matthew A. Braccio, and David W. Gross, both of Cherry Hill, N.J., assignors to General Electric Company, East Windsor, N.J.

Filed May 19, 1987, Ser. No. 51,431

Int. Cl.<sup>3</sup> H01R 13/639

U.S. Cl. 439—347

11 Claims

1. An interface connector for connecting one unit to a second unit comprising:

an active connector structure coupled to said one unit including:

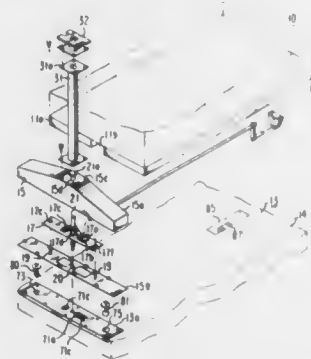
a connector bracket with at least one mating coupler half extending from said connector bracket,

a screw having a reduced diameter portion, a threaded portion and a tapered tip portion with the reduced diameter portion passing through the center of said connector bracket to allow free rotation of the screw and coupling of the screw to the connector bracket with the threaded and tapered tip portions protruding from said connector bracket, and

a push rod assembly, coupled to said screw and extending to a point of said one unit remote from said screw, for engaging a remote socket in said second unit, and first and second alignment devices aligned parallel to each other and to said screw; and

a passive connector structure on the second unit including:

a floating nut adapted to receive and engage the threads of said screw,  
a mating coupler half adapted to mate with said one coupler half,  
a remote socket located at a point remote from said floating nut for being engaged by said push rod assembly, and third and fourth alignment devices adapted to receive and contact said first and second alignment devices, whereby



when said one unit is adjacent said second unit and said alignment devices provide alignment, said screw tapered tip is placed through the floating nut for engagement of the threads of the screw with the threads of said nut, and the screw is turned the connector bracket with said one coupler half is driven so as to mate with the mating coupler half and said push rod assembly engages said remote socket.

4,948,370

**TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION**  
Kenichi Yamada, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 15, 1989, Ser. No. 408,131

Claims priority, application Japan, Sep. 24, 1988, 63-240431; Sep. 24, 1988, 63-240432; Sep. 24, 1988, 63-240433; Sep. 24, 1988, 63-240434

Int. Cl.<sup>5</sup> F16H 11/02

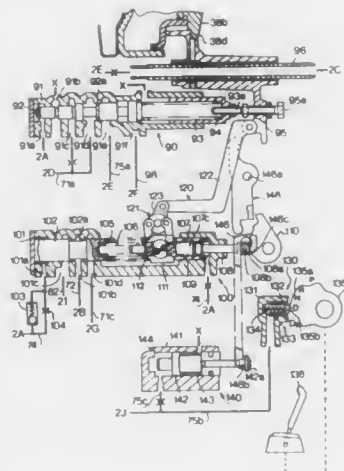
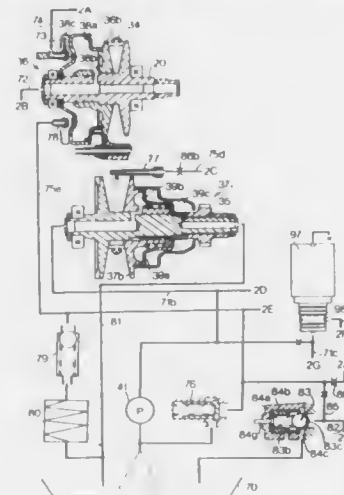
U.S. Cl. 474-28

4 Claims

1. An improved control system for a continuously variable transmission for transmitting the power of an automotive engine to driving wheels of a vehicle, the system comprising a drive pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable disc and a hydraulic cylinder for operating the disc, a belt engaged with both pulleys, a hydraulic circuit having a pump for supplying oil to both the hydraulic cylinders, a transmission ratio control valve having a plunger slidably mounted in a valve body, a spool slidably mounted in the valve body for controlling the oil supplied to the cylinder of the drive pulley and the oil drained from the cylinder to change the transmission ratio, and at least one spring provided between the plunger and the spool, a drain passage for draining the oil in the hydraulic cylinder of the drive pulley through the transmission ratio control valve and shifting means for shifting the plunger of the transmission ratio control valve in accordance with depression of an accelerator pedal of the vehicle, wherein the improvement comprises:

a check valve provided in the drain passage,  
the check valve having a cylindrical spool slidably mounted in a body, a ball provided in the spool, a spring provided for urging a ball to close a drain port;  
the cylindrical spool being arranged to be shifted against the spring so as to close the drain port;

an actuating member slidably mounted in the body so as to shift the cylindrical spool;  
detector means for detecting the locking of wheels of the vehicle and for producing a wheel lock signal;



shift locking means responsive to the lock signal for actuating the actuating member to shift the cylindrical spool so as to close the drain port, whereby the draining of the oil in the cylinder of the drive pulley is stopped.

4,948,371

**SYSTEM FOR TRAINING AND EVALUATION OF SECURITY PERSONNEL IN USE OF FIREARMS**  
Howard F. Hall, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 25, 1989, Ser. No. 343,988

Int. Cl.<sup>5</sup> F41C 3/00

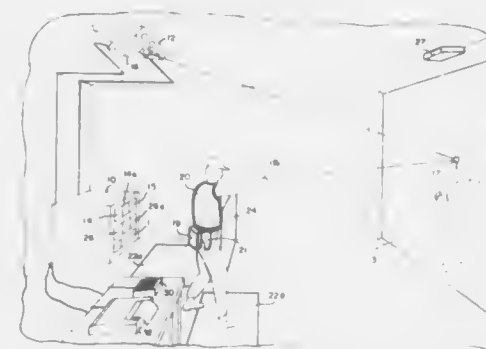
U.S. Cl. 434-21

9 Claims

1. An interactive video projection system for realistic training and evaluation of security personnel armed with a portable infrared laser handgun to be used under prescribed security procedures in life-threatening and security scenarios comprising

a laser disc player for reading out recorded video programs of training scenarios and alternate scenarios to which the process of reading out for display may conditionally branch and subbranch to any level of programming de-

sired based upon action of the trainee, including the handling of said laser handgun,  
a large-screen projector for life-size display of video scenarios being read out of said laser disc player,  
a control computer programmed for interactive control of branching and subbranching in the readout of said recorded video programs and other effect that enhance the scenario based upon said action of the trainee in handling said laser handgun, including



means for detecting when said handgun has been drawn from a holster,  
means for detecting when said handgun has been fired at an adversary in said scenario,  
means for detecting whether the trainee has advanced or retreated from said screen, and  
means for detecting whether the trainee has taken cover whenever an adversary in said scenario fires at the trainee.

4,948,372

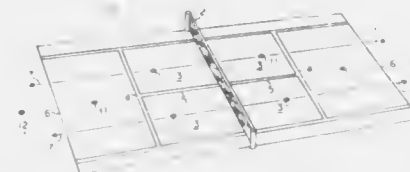
**TENNIS INSTRUCTIONAL AID AND METHOD**  
Duane Stotland, 1813 Lemhl, Boise, Id. 83705

Filed Mar. 10, 1989, Ser. No. 321,387

Int. Cl.<sup>5</sup> G09B 19/00; A63B 69/38

U.S. Cl. 434-247

12 Claims



1. A tennis instructional aid which comprises:

a tennis court, including a tennis playing surface having a net, a service line and a service box; and  
a plurality of position locating indicia being attached to particular points on the tennis playing surface which correspond to the most statistically probable distance behind the net that a ground stroked tennis ball will impact with the playing surface and to the statistically optimum hitting position behind the net for a player returning the ground stroked tennis ball, for indicating the relative positioning of a tennis player with respect to the location of the bounce of a ground stroked tennis ball.

4,948,373

**STRUCTURAL MODEL OF THE HUMAN CRANIOMANDIBULAR SYSTEM**

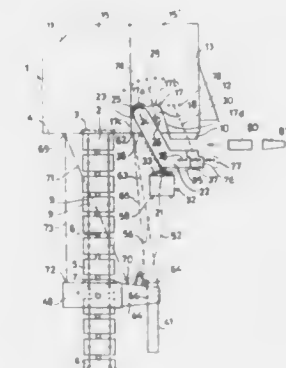
Paul A. Engels, Kopslaan 26, 2082 EJ Santpoort-Zuid, Netherlands

Filed May 12, 1989, Ser. No. 351,064

Int. Cl.<sup>5</sup> G09B 23/30

U.S. Cl. 434-270

9 Claims



1. A structural model of the human craniomandibular system, comprising:

a cranium part (1),  
a flexible column formed by a plurality of vertebra parts comprising seven cervical vertebra parts (2-5), the vertebra parts being interconnected by at least two elastic bands (9) each attached in at least one point (9') to each of the vertebra parts, and by universal couplings (5), the first or top cervical vertebra part (2) supporting the cranium part (1) in such a manner as to allow for a rotational movement only,  
the cranium part (1) being provided in opposite side faces (15, 15') with cavities (17) open to the bottom and open to the side, and serving as bearing surfaces,  
there being provided a mandible part (21) having top or end faces (24) adapted to cooperate with said bearing surfaces and form a joint for movement of the mandible part (21) relative to the cranium part (1), according to several degrees of freedom,  
there being further provided a hyoid part (32) having a bow (33) at the top, and  
a sternum part (41),  
a pair of clavicle parts (44, 45) on either side of said sternum and coupled therewith by means of universal couplings (42, 43) as well as  
a pair of scapula parts (48, 49), coupled with a respective clavicle part by means of universal couplings (46, 47),  
the aforementioned parts being interconnected by a plurality of resilient members, arranged pairwise, to wit  
(28, 29) between fixation points (26) at the upper portions (23) of the mandible element (21) and the side faces (15') of the cranium part (1),  
(30, 31) between the lower portions (22) of the mandible part and the side faces (15') of the cranium part (1),  
(35, 36) between attachment points (e.g. 37) on the lower portion (22) of the mandible part (21), extending through a bow (33) provided on the hyoid part (32), and attachment points (e.g. 38) on the bottom face of the cranium part (1),  
(52, 53) between the hyoid part (32) and the sternum part (41),  
(56) between attachment points (58) on the lower face of the cranium part (32), extending through bows (e.g. 54) provided on the clavicle parts (44, 45) and attachment points (e.g. 59) on the scapula parts (48, 49),  
(63, 67) between attachment points (e.g. 62) on the lower



face of the cranium part (1) and the sternum part (41) and attachment points (e.g. 64) at the sternum part (41), (65, 68) between the last mentioned attachment point (e.g. 62) on the cranium part and attachment points (e.g. 66) on the clavicle parts (44, 45), (71, 74) between attachment points (e.g. 69) on the cranium part (1) and attachment points (70) on the scapula parts (44, 45) and (73, 75) between last mentioned attachments points (e.g. 69) on the cranium part and attachment points (e.g. 72) on the scapula parts (48, 49).

4,948,374

# ASSEMBLY FOR ELECTRICALLY CONNECTING CONDUCTIVE PATHS OF A FIRST BODY TO CONDUCTIVE PATHS OF A SECOND BODY

David P. Carter, Watlington, England, assignor to Dowty Electronic Components Limited, Cheltenham, United Kingdom

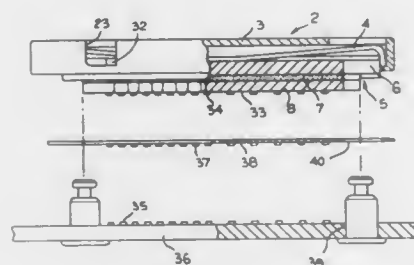
Filed Apr. 18, 1989, Ser. No. 339,988

Claims priority, application United Kingdom, Apr. 21, 1988, 8809402; Sep. 17, 1988, 8821901

Int. Cl.<sup>3</sup> H01R 9/09

U.S. Cl. 439—67

18 Claims



1. A connector assembly which enables conductive paths on each side of a first body to be electrically connected to the conductive paths of a second body, including:  
at least two spigot members, each of which engages with a surface of the first body, and protrudes therethrough, and having a groove formed therein;  
at least two connecting members, each connecting member comprising a cover member into which a resilient member and a displaceable member are assembled; and wherein each of the cover member, resilient member and displaceable member are provided with a cooperating orifice which forms a passageway shaped to cooperate with the groove in a respective spigot member,  
wherein in order to effect electrical connection between the conductive paths each spigot member is inserted into a respective passageway; and each connecting member is moved relative to the spigot members so that the grooves and passageways cooperate with one another to clamp each second body to the first body, and thereby effect electrical connection between respective conductive paths by enabling the connecting members to be mounted with respect to both sides of the first body with a single set of spigot members.

4,948,375

# ADAPTOR ASSEMBLY FOR CIRCUIT BOARDS

Howard Lawrence, 49, Evelyn Crescent, Shirley, Southampton, Hampshire, England SO1 5JS, and Andrew J. Horsfield, 26, Spring Close, Air Oak, Hampshire, England

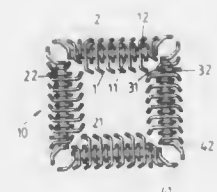
Filed Aug. 19, 1988, Ser. No. 234,153

Claims priority, application United Kingdom, Aug. 25, 1987, 8720017; Dec. 10, 1987, 8728857; Dec. 10, 1987, 8728858; Dec. 10, 1987, 8728859

Int. Cl.<sup>3</sup> H01R 9/09

U.S. Cl. 439—72

26 Claims



1. For use with a circuit board of the kind comprising a substantially rigid board of which at least the major surfaces are of electrically insulating material, which carries on at least one of its major surfaces a pattern of electrically conductive lands constituted by at least one of electrically conductive strips and electrically conductive pads, and which has, extending through the board and underlying the electrically conductive lands, a multiplicity of mutually spaced holes, a kit of parts for the assembly of an adaptor for effecting electrical connection between the leads of a surface mounted component and electrically conductive lands of the circuit board, which kit of parts comprises a multiplicity of wire wrap contact pins each suitable for insertion in a hole in, and for effecting electrical contact with an electrically conductive land of, a circuit board and each having, integral with the trailing end of the pin and extending laterally with respect to its axis, a footprint forming lateral arm which, when the pin is engaged in said hole, bears against a major surface of the circuit board and is adapted to constitute a footprint of an adaptor to which footprint a surface mounted component can be soldered, said multiplicity of wire wrapping comprising at least two groups of wire wrap pins, the footprint forming lateral arms of the pins of each group being identical with one another and the footprint forming lateral arms of the pins of one group differing from the footprint forming lateral arms of the pins of the other group, to the footprint forming lateral arms of the pins of said groups being of such shapes that an adaptor having an array of footprints appropriate for any one of a plurality of surface mounted components having arrays of leads differing from one another can be assembled on a circuit board by selecting from said groups wire wrap pins having appropriate footprint forming lateral arms, and by inserting the selected wire wrap pins in holes in the circuit board and positioning the footprint forming lateral arms of the selected wire wrap pins on a major surface of the board in accordance with a predetermined pattern.

4,948,376

# CONNECTOR

Cornelis Penning, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

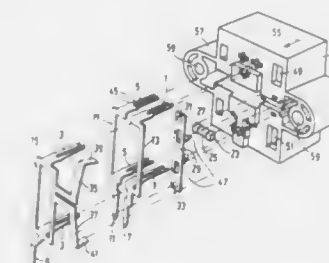
Filed Sep. 27, 1989, Ser. No. 413,353

Claims priority, application Netherlands, Oct. 5, 1988, 8802434

Int. Cl.<sup>3</sup> H01R 13/70

U.S. Cl. 439—188

6 Claims



1. A connector comprising an electrically insulating housing comprising at least two connection elements formed from an electrically conductive material each of which comprises two first contact members and a connection member as well as two electrically parallel arranged normally closed switches each of which in the closed condition constitutes an electric connection between on the one hand one of the connection elements and on the other hand a first terminal of a resistance element the second terminal of which is electrically conductively connected to another of the connection elements, each one of said switches comprising an operating member which cooperates with a plug having second contact members which are capable of cooperating with the first contact members, all this in such a manner that when the plug is inserted into the housing one of the two switches is opened, characterized in that at least the part of each connection element which comprises the first contact members is formed from one piece of sheet material, that an electrically conductive switching plate likewise formed from one piece of sheet material is connected to the first terminal of the resistance element and comprises a first switching contact of each of the two switches and that the second switching contact of each of the two switches forms a unitary structure with said part of one of the connection elements.

4,948,377

# SUBMERSIBLE ELECTRICAL CONNECTOR

James L. Cairns, 2348 Kentucky Ave., Mims, Fla. 32754

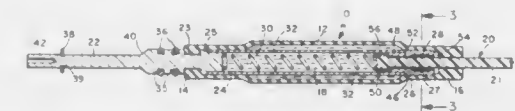
Continuation of Ser. No. 157,645, Feb. 18, 1988, abandoned.

This application Jul. 17, 1989, Ser. No. 383,293

Int. Cl.<sup>3</sup> H01R 4/60

U.S. Cl. 439—200

3 Claims



1. A receptacle for submersible connector, comprising:  
a receptacle shell;  
a fluid-filled flexible bladder assembly disposed in said receptacle shell defining a first, outer chamber;  
a plurality of first ports opening into said outer chamber;  
a plurality of electrical socket assemblies disposed in said bladder assembly, each of said socket assemblies comprising an outer sheath defining a second, inner chamber having two ends, and a second port opening into one end of said inner chamber, each of said second ports being in alignment with a respective first port;  
each of said socket assemblies including a stopper movably

disposed in said chamber, said stopper including an elongate tip, said stopper being movable between a first position in which said tip protrudes through said second port into the respective, aligned first port and a second position in which said tip is retracted from said first and second ports into said inner chamber;  
first seal means in said bladder assembly surrounding said first ports for receiving said tip in said first position and for exerting a radially constrictive sealing force on said tip to seal said first chamber; and  
second seal means surrounding each of said second ports for exerting a radially constrictive sealing force on said tip to seal said second chambers.

4,948,378

# WATERPROOF ELECTRICAL CONNECTOR ASSEMBLY

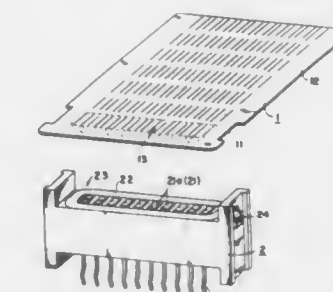
Haruo Hoshino, Chiba, Japan, assignor to Thomas & Betts Corporation, Bridgewater, N.J.

Filed Mar. 2, 1989, Ser. No. 317,895

Int. Cl.<sup>3</sup> H01R 13/52

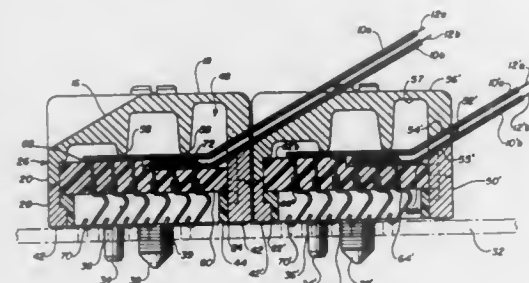
U.S. Cl. 439—271

7 Claims



1. A waterproof connector assembly, comprising:  
a board (1) having opposite surfaces and including a plurality of conductors (11) thereon, said conductors (1) being exposed at one of said board surfaces, said conductors (1) being covered with a waterproof, insulating film (12), a window (13) being formed through said film (12) of size to expose selective portions of all conductors through said window (13), said window (13) being disposed fully within the edges of said board;  
a housing (2) supporting a plurality of contacts (21) in electrical engagement with said exposed conductors;  
a compressible member (22) supported by said housing and circumscribing said contacts, said compressible member (22) being disposed between said board and said housing; and  
a holding member (3) supported by said housing and including a resilient portion for resiliently urging said board toward said housing (2), thereby causing electrical engagement between said conductors (1) and said contacts (21) and compressing said member (22) between said housing (2) and said board (1) to provide a waterproof seal around the engaged conductors (1) and contacts (21).

**4,948,379**  
**SEPARABLE, SURFACE-MATING ELECTRICAL CONNECTOR AND ASSEMBLY**  
 Robert F. Evans, Camp Hill, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
 Filed Mar. 17, 1989, Ser. No. 324,940  
 Int. Cl.<sup>5</sup> H01R 9/07, 9/09  
 U.S. Cl. 439—329 8 Claims



1. An electrical connector for connecting an electrical circuit-bearing substrate with a multi-wire flexible electrical cable having a plurality of parallel conductors across its width, the connector comprising:

a connector housing in the form of a parallelepiped having a ramp joining a first face and a second face by truncating one corner of the connector housing, the parallelepiped having an internal cavity, the internal cavity accessed through an opening in a third face of the connector housing opposite to the first face of the connector housing, the internal cavity also accessed through an angled chute in a fourth face opposite to the second face of the connector housing, the angled chute to such dimensions to permit passage of a multi-wire flexible cable into the internal cavity, the angle of the ramp and the angle of the chute being about the same as measured with respect to the third face of the connector housing, and the distance from the third face to the chute on the fourth face corresponding to the distance from the third face to the ramp on the second face;

a terminal block positioned within the internal cavity and adapted for attachment to one end of a flexible cable; an array of electrical contacts supported by the terminal block, one end of the contacts protruding from the terminal block and extending through the opening in the third face for engagement with the electrical circuit-bearing substrate, the other end of the contacts protruding from the terminal block for attachment with one end of the multi-wire flexible cable;

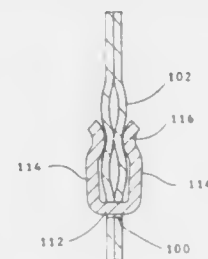
whereby a plurality of such connector housings could be located adjacent one another so that the ramp of one such connector housing acts to guide and support the flexible cable of another such connector housing.

**4,948,380**  
**DUAL CONTACT ELECTRICAL TERMINAL**  
 James L. Dale, Atlanta, Ga., assignor to AMP Incorporated, Harrisburg, Pa.  
 Filed Oct. 2, 1989, Ser. No. 416,294  
 Int. Cl.<sup>5</sup> H01R 4/24 9 Claims

1. An electrical terminal for establishing an electrical interconnection between a wire and a planar member, the terminal comprising:

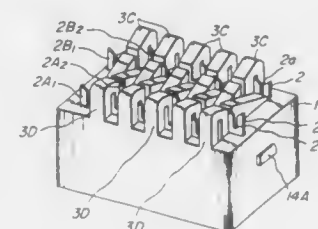
a folded plate like member having two parallel legs extending from a reversely bent intermediate section; a pair of quick disconnect ears folded arcuately upwardly from the edges of one of the legs adjacent the reversely bent intermediate section, the edges of the ears being juxtaposed to the surface of the one leg; an insulation displacement slot at the end of each of the legs,

the slots in the two legs being aligned, the cross sectional area of the legs between the quick disconnect ears and the insulation displacement slot being substantially constant,



whereby a planar member can be inserted between the edges of the ears and the one leg and a wire may be terminated between the two aligned slots establishing parallel current paths between the planar member and the wire.

**4,948,381**  
**INSULATION-PIERCING CONNECTOR**  
 Yukio Saito, and Akio Yamada, both of Utsunomiya, Japan, assignors to Daiichi Denshi Kogyo Kabushiki Kaisha, Japan  
 Filed Dec. 20, 1988, Ser. No. 287,383  
 Claims priority, application Japan, Dec. 25, 1987, 62-197170; Oct. 7, 1988, 63-253419  
 Int. Cl.<sup>5</sup> H01R 4/24 8 Claims



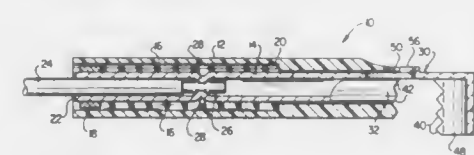
1. An insulation-piercing connector including a connector body made of an insulating material, a plurality of contacts made of a resilient conductive metal, each consisting of a contact element to be connected to a contact of a mating connector, a fixing element carried by said connector body and a U-shaped piercing terminal element extending from a surface of said connector body and embracing a wire between legs of the U-shaped element, said contacts being arranged staggered in at least two rows, and a cover made of an insulating material and formed with terminal element receiving grooves for receiving the U-shaped elements of said contacts, and when said cover is covered onto said connector body, said cover forcing wires into the U-shaped elements and embracing the wires between the cover and said connector body, wherein surfaces of said connector body for embracing the wires in conjunction with said cover are raising inclination surfaces from a side of the U-shaped piercing elements in one row positioned above the U-shaped piercing elements in the other row to form alternately reversely inclined surfaces, and surfaces of said cover for embracing the wires are inclination surfaces auxiliary with said alternately inclined surfaces of the connector body, said inclined surfaces of said connector body and said cover being provided at their highest portions with piercing assisting projections, thereby elongating torn lengths of coating when a flat cable is used.

**4,948,382**  
**MINIATURE INSULATION DISPLACEMENT ELECTRICAL CONTACT**  
 Gary R. Marpoe, Jr., Kernersville, and Edward LeRoy Pentz, Greensboro, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.  
 Filed Dec. 6, 1988, Ser. No. 280,753  
 Int. Cl.<sup>5</sup> H01R 4/24 19 Claims



1. A contact terminal for establishing an insulation displacement interconnection to an insulated conductor, comprising: two parallel plates, each plate having a slot extending inwardly from one end thereof; two sidewalls, each sidewall extending transversely past one edge of each plate, the plates and the sidewalls extending upwardly from a common base; a plurality of embossments projecting arcuately from a planar section of the sidewall, sheared edges of the embossments being adjacent opposite faces of each plate, each sheared edge being adjacent to a peripheral edge on each end thereof, each peripheral edge remaining joined to the sidewall, each plate being held in position between embossments on opposite sides thereof.

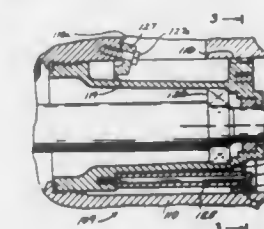
**4,948,383**  
**ELECTRICAL CLAMP**  
 Laramie W. Tompkins, 1004 W. County Line Rd., Royse City, Tex. 75089  
 Filed Sep. 12, 1989, Ser. No. 406,160  
 Int. Cl.<sup>5</sup> H01R 4/48 14 Claims



1. An electrical clamp for releasably securing an electrical cable to a battery terminal, comprising: a handle; a conducting member slidably engaged with said handle, having a first end operatively securable to an electrical cable, and a second end extending from said handle; a contact surface disposed at said second end of said conducting member, said contact surface facing said handle and being operative to engage a first portion of a battery terminal; spring means, operatively engaging said handle and said

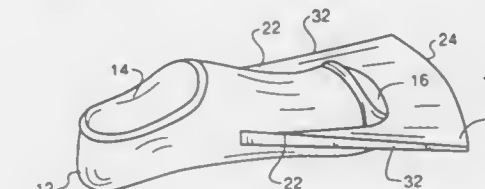
conducting member, for resisting the longitudinally outward movement of said conducting member relative to said handle; and a bearing surface for engaging a second portion of said battery terminal, said bearing surface opposing said contact surface and being moveable with said handle.

**4,948,384**  
**MARINE PROPULSION DEVICE ANODE ARRANGEMENT**  
 Gerald F. Bland, Glenview; Martin J. Mondek, Wonder Lake, and Lawrence E. Zdanowicz, Waukegan, all of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.  
 Filed May 12, 1989, Ser. No. 350,936  
 Int. Cl.<sup>5</sup> B63H 1/14 6 Claims



6. A marine propulsion device comprising a gear housing adapted to be mounted on the transom of a boat, a bearing housing supported by said gear housing and including two angularly spaced rearward surfaces, bearing means supported by said bearing housing, a propeller shaft supported by said bearing means and adapted to have mounted thereon a propeller, a mounting bracket having therein an aperture, a sacrificial anode, means for removably securing said said bracket to said rearward surfaces of said bearing housing, and means on said bracket and connected to said anode for support thereof.

**4,948,385**  
**TRAINING FIN DEVICE FOR SWIMMING**  
 Martin P. Hall, 800 Bear Gulch Rd., Woodside, Calif. 94062  
 Filed Dec. 30, 1988, Ser. No. 292,468  
 Int. Cl.<sup>5</sup> A63B 31/10 12 Claims



1. A training fin for swimming, comprising: a foot section having an enclosure means for retaining a user's foot to the fin, the foot section having a predetermined surface area defined by that portion of the foot section which directly covers the foot and specifically excluding any overhang of the foot section; and a tail section attached to the foot section, the tail section surface area being between 0.5 and 1.0 times the surface area of the foot section.



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## CHEMICAL

4,948,386  
MIDDLE DISTILLATE CONTAINING STORAGE  
STABILITY ADDITIVE

Rodney L. Sung, Fishkill; Benjamin J. Kaufman, Hopewell Junction, both of N.Y., and Karol J. Thomas, Norwalk, Conn., assignors to Texaco Inc., White Plains, N.Y.

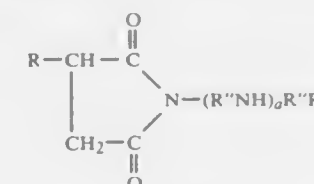
Filed Nov. 7, 1988, Ser. No. 267,947  
Int. Cl.<sup>3</sup> C10L 1/18, 1/22

U.S. Cl. 44—57

18 Claims

1. A middle distillate hydrocarbon composition characterized by its stability in the presence of air comprising a major portion of a middle distillate hydrocarbon oil and a minor effective stabilizing portion, as an additive, of the product prepared by reaction of

(i) a hydrocarbyl-substituted mono- or bis-succinimide bearing polyamine

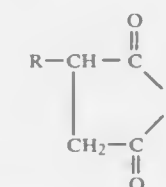


wherein

R is an alkenyl group containing about 8-400 carbon atoms;

R'' is a divalent hydrocarbon group selected from the group consisting of alkylene, alkarylene, aralkylene, cycloalkylene, arylene, alkenylene, and alkynylene;

R' is —NH<sub>2</sub>, —NHR'' or a hydrocarbyl-substituted succinimide group



R''' is a hydrocarbon group selected from the group consisting of alkyl, alkaryl, aralkyl, alkenyl, alkynyl, cycloalkyl, and aryl;

a is an integer 1-8 with

(ii) an organic polycarboxylic acid R\* (COOH)<sub>x</sub>

wherein

x is an integer 3-6; and

R\* is a hydrocarbon group derived by removing a-1 hydrogen atoms from an alkyl, alkaryl, aralkyl, cycloalkyl, aryl, alkenyl, or alkynyl hydrocarbon group

thereby forming product; and recovering said product.

4,948,387  
SYNTHESIS GAS BARRIER AND REFRACTORY  
SUPPORT

Michael C. Martin, Houston, Tex., and Erwin A. Reich, Stamford, Conn., assignors to Texaco Inc., White Plains, N.Y.

Filed Nov. 24, 1989, Ser. No. 440,836  
Int. Cl.<sup>3</sup> C10J 3/86

U.S. Cl. 48—62 R

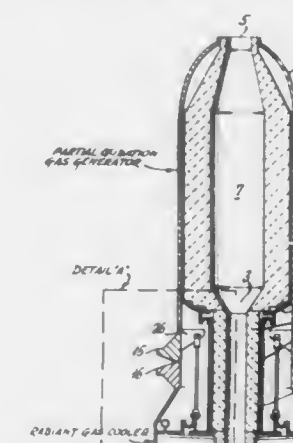
9 Claims

1. In combination, a first vertical cylindrical shaped elongated high temperature steel pressure vessel provided with a retracted internal lower head containing an exit passage along the central longitudinal axis of said vessel and an upper head containing a coaxial inlet passage for the insertion of a downwardly discharging burner, said first vessel being the exterior shell of a refractory lined reaction zone of a partial oxidation

gas generator for the production of synthesis gas, reducing gas, or fuel gas;

a second vertical cylindrical shaped elongated high temperature steel pressure vessel being the exterior shell of a gas cooler for cooling the hot raw effluent gas steam from said reaction zone;

connecting means for joining the lower end of said first vessel to the upper end of said second vessel to provide vertical coaxial alignment along the central longitudinal axis of each vessel; a vertical cylindrical annular shaped elongated refractory throat coaxial with said first and second vessels and extending therebetween for the free passage of said hot raw effluent gas stream from said reaction zone to said gas cooler; a concentric coaxial



vertical steel cylindrical gas barrier surrounding along its length the outside diameter of said refractory throat, said gas barrier including a horizontal annular shaped bottom flange comprising inward and outward portions, wherein said inward portion serves as a shelf for supporting said refractory throat;

means for connecting said cylindrical gas barrier to said first vessel; and

top and bottom flexible joint sealing means located between the cylindrical gas barrier and a stagnant annular zone radially disposed from said cylindrical gas barrier; wherein substantially no raw effluent gas stream passing through said refractory throat escapes into said stagnant annular zone.

4,948,388  
DIAMOND COMPACTS AND PROCESS FOR MAKING  
SAME

Alfred E. Ringwood, Redhill, Australia, assignor to The Australian National University, Australia

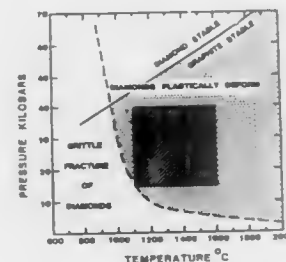
Continuation of Ser. No. 882,937, Jun. 19, 1986, Pat. No. 4,874,398. This application Sep. 27, 1988, Ser. No. 250,259  
Claims priority, application Australia, Aug. 24, 1984, PG6772/84; PCT Int'l Appl., Aug. 23, 1985, AU85/00201  
Int. Cl.<sup>3</sup> B24D 3/02

U.S. Cl. 51—308

1 Claim

1. A diamond compact comprised of 60 to 95 volume percent of diamond crystals which have been plastically deformed so that they form a rigid framework structure in which contacts between diamond crystals occur over surfaces, said surfaces arising from plastic deformation of the diamond crystals during formation of the compact under pressure and temperature conditions within the graphite stability field, said diamond framework structure being bonded substantially wholly by metallic phases comprised of metals not forming

carbides in the presence of carbon,, said phases having a melting point greater than 1600° C., said compact comprising less



than about 2% volume of graphite and possessing a compressive strength greater than 10 kbars.

4,948,390

### GAS CHROMATOGRAPH HAVING CYRO BLAST COOLINGS

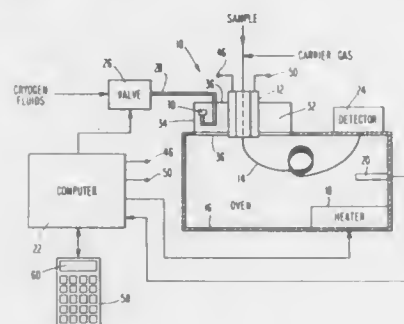
Kenneth J. Klein; Wei J. Song, both of Wilmington, Del., and Michael Thompson, Coatesville, Pa., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 22, 1989, Ser. No. 355,934

Int. Cl. B01D 15/08

U.S. Cl. 55—20

20 Claims



1. A method for performing a chromatographic separation of a given compound wherein said compound and a carrier gas are passed through an injection port and onto a column and wherein a portion of said column is contained in an oven, comprising the steps of:

- heating said injection port in response to a first control signal;
- sensing the temperature of said injection port and for generating a first temperature signal representative of the temperature of said injection port;
- heating said oven in response to a second control signal;
- sensing the temperature of said oven and for generating a second temperature signal representative of the temperature of said oven;
- simultaneously cooling said injection port and said column, by directing a flow of cryogen fluid through a volume, said volume located proximate said injection port and said column;
- providing a valve for controlling the flow of cryogen fluid in response to a third control signal; and
- controlling the temperature during said chromatographic separation by receiving said first and second temperature signals, and generating said first, second and third control signals in relation to said first and second temperature signals, so that the temperature in said injection port and said oven are maintained at a desired level.

### COMPRESSED AIR MODIFIER

Antonio Sola, Lot 31 Badgery's Creek Road, Bringelly, New South Wales 2171, Australia

PCT No. PCT/AU87/00277, § 371 Date Jun. 20, 1988, § 102(e)

Date Jun. 20, 1988, PCT Pub. No. WO88/01195, PCT Pub.

Date Feb. 25, 1988

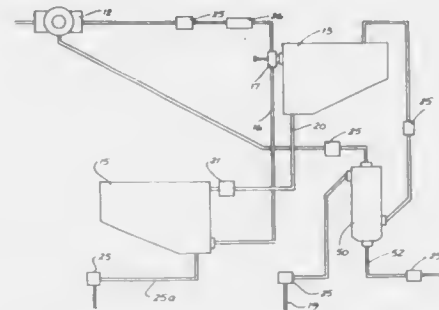
PCT Filed Aug. 19, 1987, Ser. No. 241,961

Claims priority, application Australia, Aug. 19, 1986, PH7456

Int. Cl. B01D 47/00

U.S. Cl. 55—21

6 Claims



5. A method of introducing a mixture of vaporized liquid chemical agent in air which comprises: combining a liquid chemical agent with compressed air of a predetermined pressure and introducing such into an air/liquid chemical agent mixing chamber; spraying the combined air and chemical liquid, in a non-vapor phase, into said mixing chamber in dependence upon changes in pressure within said mixing chamber; vaporizing said liquid chemical agent in said mixing chamber; producing turbulence in, and extracting airborne liquid chemical agent droplets from, said chamber by baffle means, removing liquid chemical agent formed by said droplet extraction from said mixing chamber; and passing a mixture of vaporized liquid chemical agent and air out of said mixing chamber.

4,948,391

### PRESSURE SWING ADSORPTION PROCESS FOR GAS SEPARATION

Yutaka Noguchi, Osaka, Japan, assignor to Vacuum Optics Corporation of Japan, Tokyo, Japan

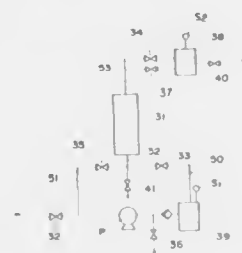
Filed May 12, 1989, Ser. No. 351,201

Claims priority, application Japan, May 12, 1988, 63-115200; Aug. 12, 1988, 63-201357; Sep. 30, 1988, 63-246828; Oct. 24, 1988, 63-268905; Nov. 11, 1988, 63-285088

Int. Cl. B01D 53/04

U.S. Cl. 55—26

8 Claims



1. A process for selectively separating a desired gas component from a gas mixture of two or more gas components, which comprises the steps of:

- (1) introducing the gas mixture under pressure into a cylinder having therein an adsorption column of an adsorbent which selectively adsorbs thereon at least one gas compo-

nent other than the desired gas component from an inlet of the cylinder, to allow the adsorbent near the inlet to selectively adsorb the gas component other than the desired gas component and to form a zone of adsorbed gas in the column;

- (2) keeping the introduction of the gas mixture into the cylinder under conditions such that the gas mixture flows through the column to move the front of the adsorbed gas zone forwards;
- (3) collecting the desired gas component having passed through the column from an outlet of the cylinder;
- (4) terminating the introduction of the gas mixture into the cylinder;
- (5) terminating the collection of the desired gas component;
- (6) discharging a portion of the pressurized gas mixture remaining in the cylinder; and
- (7) returning a portion of the collected gas component back into the cylinder at an intermittently varying rate to flow through the column in the direction opposite to the direction of the movement of the gas mixture in the step (2), to desorb the gas component having been adsorbed on the adsorbent of the adsorption column and purge away the desorbed gas component from the cylinder.

4,948,392

### HEAT INPUT FOR THERMAL REGENERATIVE DESICCANT SYSTEMS

William F. Rush, Park Ridge, Ill., assignor to Institute of Gas Technology, Chicago, Ill.

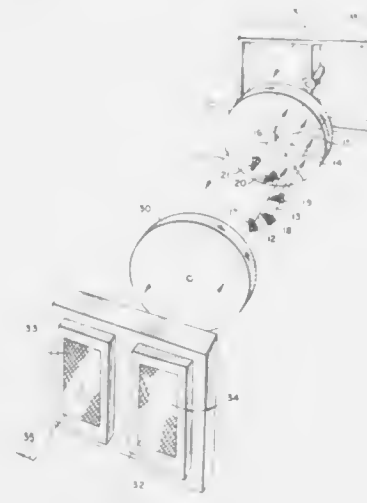
Filed Jul. 25, 1989, Ser. No. 385,225

Int. Cl. B01D 53/06

U.S. Cl. 55—34

32 Claims U.S. Cl. 55—40

2 Claims



1. A method of heating a regeneration stream in a thermal regenerative desiccant system having a process stream and a regeneration stream through which a desiccant means passes, said desiccant means rotating to cyclically pass through said process stream and said regeneration stream, said regeneration stream providing heat required for regeneration of said desiccant means, said process comprising the steps of:

- (a) separately heating each of a plurality of regeneration stream adjacent radial segments to a generally constant heat flux by a plurality of independently controlled heat sources, each said heat source providing heat to one of said regeneration stream adjacent radial segments;
- (b) reducing the total heat provided to said regeneration stream when required to meet heat requirements for regeneration of said desiccant means by applying reduced heat only to a first segment of said plurality of regeneration stream adjacent radial segments, said first segment first contacting said desiccant means as it rotates from said process stream to said regeneration stream, applying fur-

ther reduced heat to said first segment when required to meet heat requirements for regeneration of said desiccant means until no heat is supplied to said first segment of said regeneration stream;

- (c) then when required to obtain the reduction in said total heat provided to meet heat requirements for regeneration of said desiccant means, applying reduced heat only to an adjacent second segment of said plurality of regeneration stream adjacent radial segments next contacting said desiccant means as said desiccant means continues rotation through adjacent said second regeneration stream radial segment, applying further reduced heat to said second segment when required to meet heat requirements for regeneration of said desiccant means until no heat is supplied to said second segment of said regeneration stream; and
- (d) continuing sequentially applying reduced heat to meet heat requirements for regeneration of said desiccant means to further adjacent segments of said plurality of regeneration stream segments until said regeneration heat required has been provided.

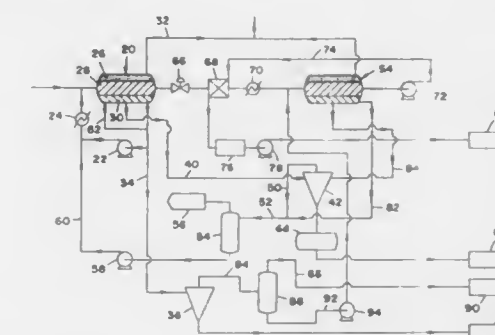
4,948,393

### METHOD OF SEPARATING OIL, WATER, SAND, AND GAS FROM PRODUCED FLUIDS

John E. Hodson, Reading, England, and Michael D. Chalmers, Aberdeen, Scotland, assignors to Chevron Research Company, San Francisco, Calif.

Filed Jul. 7, 1989, Ser. No. 376,728

Int. Cl. B01D 19/00



1. A method of separating fluids produced from a production well into separate components of oil, gas, water, and sand comprising flowing production fluid containing oil, water, gas, and sand from a production location toward a first stage separator, prior to flowing said production fluid to said first stage separator mixing said production fluid with heated produced water obtained from the effluent of said first stage separator and having a temperature of between about 120° C. to 160° C. in sufficient amount to heat said production fluid to between about 50° C. to 80° C., flowing said heated production fluid into said first stage separator to permit a first stage separation of the production fluid into a primarily gas component, a primarily oil-gas-water-sand component and a primarily produced water-sand component, continuing to separate substantial portion of produced water from the produced water-sand component in said first stage separator and passing a portion of said produced water to a first heater to heat said produced water to between about 120° C. to 160° C., continuing to mix said heated produced water with said production fluids prior to passing said production fluid to said first stage separator, removing gas from said first stage separator, and removing sand from said first stage separator, removing the oil-gas-water-sand component from said first stage separator, reheating said oil-gas-water-sand component to a temperature of between about 80° C. to 110° C., flowing said reheated oil-gas-



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water-sand component to a second stage separator, separating said oil-gas-water-sand into a gas component, a produced water component, a sand component and an oil component, removing gas from said second stage separator, removing sand from said second stage separator, removing oil from said second stage separator, removing produced water from said second stage separator, passing said removed oil in heat exchange contact with said oil-gas-water-sand component prior to flowing said oil-gas-water-sand component into said second stage separator and circulating a portion of the produced water effluent from said second stage separator and combining said portion of produced water with the produced water from said first stage separator prior to heating the produced water to between about 120° C. to about 160° C. for mixing with produced fluids coming from said production well.

4,948,394

PROCESS AND DEVICE FOR COMPRESSING AND  
TRANSPORTING A GAS CONTAINING A LIQUID  
FRACTION

Alexandre Rojey, Garches, France, assignor to Institut Francais  
du Pétrole, Rueil Malmaison, France

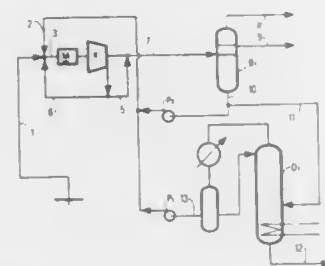
Filed Sep. 9, 1985, Ser. No. 773,575

Claims priority, application France, Sep. 7, 1984, 84 13757

Int. Cl.<sup>5</sup> B01D 53/14

U.S. Cl. 55—48

17 Claims



1. A process for compression and transportation of a gas containing a liquid hydrocarbon fraction, characterized by having the following stages in combination: (a) introduction into said gas of a liquid hydrocarbon fraction including a polar solvent, (b) transfer of the resulting two-phase gas-liquid mixture to a compressor, (c) compression of said mixture in said compressor and recovery of at least a part of the liquid hydrocarbon fraction contained in said gas during the same stage, (d) reintroduction of at least part of the liquid hydrocarbon fraction collected in stage (c) into the compressed gas-liquid mixture downstream of said compressor, the remaining part of said liquid hydrocarbon fraction being recycled at a point upstream of said compressor, and (e) transportation of said compressed gas-liquid mixture resulting from stage (d) to a receiving site; stage (a) being effected before or after stage (b).

4,948,395

CHIRAL SEPARATION MEDIA

Daniel W. Armstrong, Rolla, Mo., assignor to Advanced Separations Technologies Inc., Whippany, N.J.

Filed Sep. 12, 1989, Ser. No. 406,141

Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 55—67

9 Claims

1. A composition for separation of optical isomers in a gas chromatographic column, said composition comprising a permethylated hydroxy ether of cyclodextrin having about 10% to about 75% of the hydroxyl groups of the cyclodextrin substituted with hydroxy ether side chains and substantially all of the hydroxyl groups of the hydroxy ether of cyclodextrin substituted with methyl groups.

9. A method for separation of compounds by means of gas chromatography comprising:

(a) passing a mixture of compounds having different struc-

ture through a column packed with a permethylated hydroxy ether of cyclodextrin; and  
(b) eluting separated individual compounds from said column.

4,948,396

COMPOUND VORTEX FILTERING APPARATUS

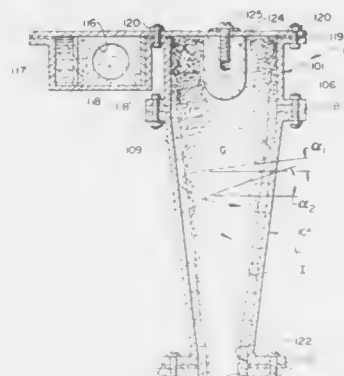
Walter K. Barnes, Embleton, and John M. Separovich, Kardinya, both of Australia, assignors to Cleanair Engineering Pty. Ltd., Australia

Continuation-in-part of Ser. No. 299,801, Dec. 1, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 400,700

Int. Cl.<sup>5</sup> B01D 45/12

U.S. Cl. 55—92

13 Claims



1. Apparatus for filtering a gas stream to remove solid, liquid or gaseous contaminants entrained therein, the apparatus comprising:

- a primary cyclone vessel having (1) a wall forming an elongated cavity with a substantially circular cross-section, (2) inlet means for independently feeding the gas stream and a stream of liquid filter medium in the same direction, tangentially into the cavity at one end thereof, with the stream of liquid in contact with the wall of the vessel, thereby imparting to the gas stream and the liquid filter medium a cyclonic/rotary motion to form a compound vortex having an outer liquid strata in contact with the wall of the vessel and an inner gaseous strata moving in the same direction, whereby at least a substantial proportion of the contaminants are transferred from the gaseous strata to the liquid strata to form a liquid filter medium contaminants mixture and a filtered gas stream, and (3) single outlet means at the other end of the vessel for discharging the filtered gas stream/liquid filter medium contaminants mixture from the primary cyclone vessel, and
- a secondary cyclone vessel having means for separating the filtered gas stream from the liquid filter medium/contaminants mixture.

4,948,397

METHOD, MEANS AND DEVICE FOR SEPARATION OF  
PARTICULATE MATTER FROM A CARRIER MEDIUM

Prabhat Kumar, C-5/16, Safdarjung Development Area, New Delhi-110016, India

Continuation of Ser. No. 153,985, Feb. 9, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 383,294

Int. Cl.<sup>5</sup> B01D 46/04

U.S. Cl. 55—96

13 Claims

13. A method of separating particulate matter and a stream of gases from a carrier medium comprising the steps of: moving the carrier medium through a carrier medium inlet, on at least one housing, into an interior portion of said housing by the use of a draft inducing means connectable to said housing, an exit portion is in fluid communication

4,948,399

CORONA ELECTRODE FOR DUST-COLLECTING  
ELECTROSTATIC PRECIPITATOR

Rainer Reuffurth, Offenbach, and Hermann Koy, Alzenau-Albstadt, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

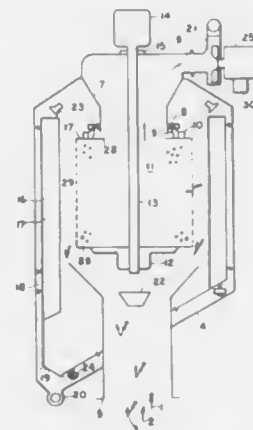
Filed May 12, 1989, Ser. No. 351,622

Claims priority, application Fed. Rep. of Germany, May 17, 1988, 3816717

Int. Cl.<sup>5</sup> B03C 3/00

U.S. Cl. 55—148

6 Claims



the rotatable body and deflected towards at least one baffle housing in said interior portion while the separated stream passes through apertures on the body in an inner portion of said rotatable body, in fluid communication with said exit portion, so as to be moved towards the exit portion, said apertures being larger in size than the particulate matter and define said impacting surfaces.

4,948,398

MULTI-CANDLE FIBER MIST ELIMINATOR

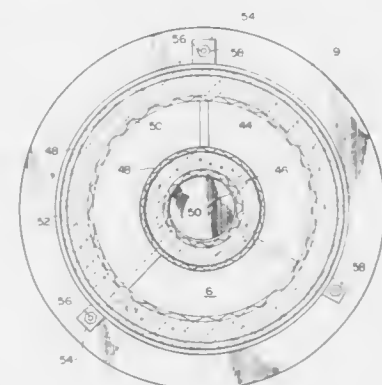
Lazarus Thomaides, North Wales, and Steven I. Taub, Narberth, both of Pa., assignors to Ceco Filters, Inc., Conshohocken, Pa.

Filed Apr. 28, 1989, Ser. No. 345,158

Int. Cl.<sup>5</sup> B01D 46/00

U.S. Cl. 55—97

20 Claims



1. A fiber bed mist eliminator useful for the removal of aerosols of less than 3 microns, as a liquid phase, from a moving gas stream, the fiber bed mist eliminator comprising:

- at least two independent, radially spaced and concentrically disposed fiber bed elements, each fiber bed element having an opened upper and lower end forming substantially vertical independent channels, and
- baffle means, comprised of gas impervious material, horizontally disposed at the upper and lower ends of the fiber bed mist eliminator, closing the bottom of one channel and the top of an adjacent channel, for forcing an aerosol-containing gas stream to pass through not more than one of the fiber bed elements.

4,948,400

SEPARATION MEMBRANES AND PROCESS FOR  
PREPARING THE SAME

Yasuharu Yamada, Nobuyuki Furukawa, and Masaya Furukawa, all of Kitakyushu, Japan, assignors to Nippon Steel Chemical Co., Ltd., Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,995

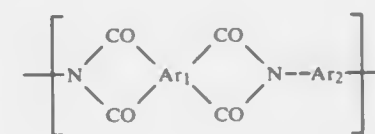
Claims priority, application Japan, Jun. 30, 1988, 63-162991; Apr. 28, 1989, 63-107287

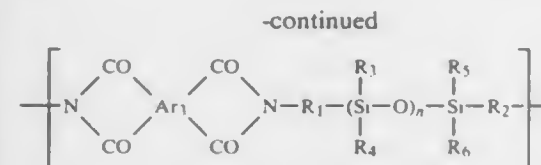
Int. Cl.<sup>5</sup> B01D 53/22, 71/64

U.S. Cl. 55—158

11 Claims

1. Polyimide-based separation membranes made from polyimides having repeating units of the general formulas (A) and (B)





wherein Ar<sub>1</sub> and Ar<sub>3</sub> are tetravalent aromatic radicals containing at least one aromatic ring, Ar<sub>2</sub> is a divalent aromatic radical containing at least one aromatic ring, R<sub>1</sub> and R<sub>2</sub> are divalent organic radicals, R<sub>3</sub> to R<sub>6</sub> are monovalent hydrocarbon radicals, and n is an integer from 1 to 50 with the mole ratio of (A) to (B) falling in the range of 5/95 to 95/5.

4,948,401

# GAS MIXTURE SEPARATOR UTILIZING PRESSURE MODULATION

Jun Izumi, Nagasaki; Seiichi Tanabe, and Kazuaki Ohshima, both of Tokyo, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

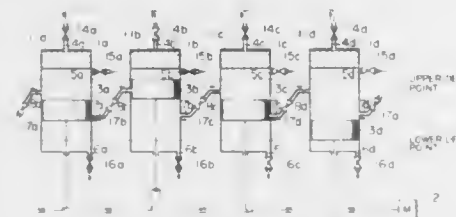
PCT No. PCT/JP87/00944, § 371 Date Aug. 1, 1988, § 102(e) Date Aug. 1, 1988, PCT Pub. No. WO88/04195, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 7, 1987, Ser. No. 243,040

Claims priority, application Japan, Dec. 8, 1986, 61-292038 Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—180

4 Claims



1. In a gas mixture separator utilizing pressure modulation wherein pressure in at least two cylinders is modulated by a reciprocating piston in each cylinder, each piston dividing the respective cylinder into an upper chamber and a lower chamber, an adsorbent with pressure dependent adsorptivity disposed in said upper chamber at each cylinder between the respective piston and cylinder head, an inlet connected to each cylinder for process gas to be separated, and an outlet connected to each cylinder for unadsorbed gas between the adsorbent and cylinder head, the improvement comprising:

second outlet connected to each cylinder for desorbed gas disposed between the piston and adsorbent of each cylinder;

a second inlet for each cylinder connected to the lower chamber thereof;

a passage means connecting said second outlet of one cylinder to said second inlet of another of the cylinders for transferring desorbed gas therebetween; and

means for reciprocating said pistons out of phase with respect to each other so that during the forward stroke of the piston toward the adsorbent in said one cylinder desorbed gas in said upper chamber of said one cylinder passes through said outlet thereof, through said passage means and through said inlet of said another cylinder.

4,948,402

# MODULAR AIR SCRUBBER SYSTEM

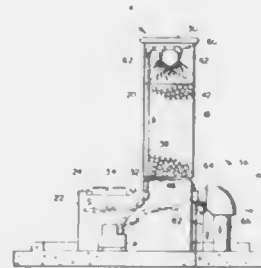
H. Forbes Davis, Tallavast, Fla., assignor to Davis Water & Waste Industries, Inc., Tallavast, Fla.

Filed Dec. 9, 1988, Ser. No. 281,746

Int. Cl.<sup>5</sup> B01D 47/00

U.S. Cl. 55—233

26 Claims



17. A free standing, self-contained, modular scrubber tower for use in an air treatment system, said tower including an L-shaped plastic housing including an upper portion and a lower portion, the upper portion including a column of contact media, and the lower portion including a scrubber solution reservoir; a submersible pump located in said reservoir; said tower further including air inlet and outlet means, liquid inlet and outlet means, and means for discharging scrubbing solution onto said contact media for flow in a direction opposite the flow of air to be treated; said tower further including a removable cover in said upper portion for access to said contact media.

4,948,403

# FILTER SYSTEM FOR THE REMOVAL OF ENGINE EMISSION PARTICULATES

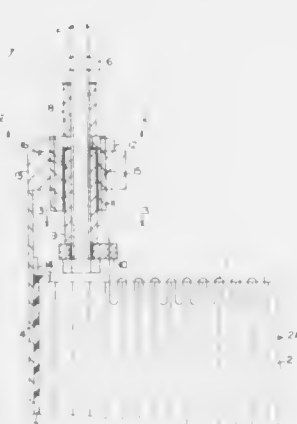
Gerhard Lepperhoff, Eschweiler, and Georg Lüttemeyer, Würselen, both of Fed. Rep. of Germany, assignors to FEV Motortechnik GmbH & Co. KG, Aachen, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,112

Int. Cl.<sup>5</sup> B01D 46/00

U.S. Cl. 55—282

4 Claims



1. A filter system for removing particulates from exhaust gases of an internal combustion engine, in particular a diesel engine, comprising at least one filter frame including a filter member in the configuration of a honeycomb of a porous filter material having generally parallel inlet and outlet passages for the gases, particulates for the gases being trapped on some of the surfaces of said inlet passages, said outlet passages being plugged closed at the gas intake side of said filter member, said inlet passages having inlet openings facing said gas intake side

and being plugged closed at a side opposite said gas intake side, electric resistance heating means comprising a plurality of spaced-apart heating elements each having loop-shaped wire portions extending into several of said inlet openings at said gas intake side for heating and igniting the trapped particulates, a connector element spaced a predetermined distance from said intake side, said element being connected to an electric power supply and being connected to said heating elements, means for mounting said element on said filter frame for movement in directions parallel to said intake side and in a direction toward and away from said intake side while maintaining said predetermined distance for thereby maintaining the positioning of said wire portions relative to said inlet openings.

4,948,404

# LIQUID NITROGEN BY-PRODUCT PRODUCTION IN AN NGL PLANT

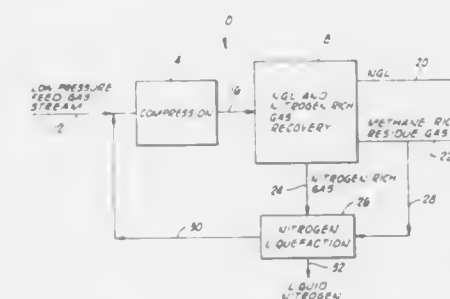
Bradley W. Delong, West Columbia, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 3, 1989, Ser. No. 389,325

Int. Cl.<sup>5</sup> F25J 3/06

U.S. Cl. 62—23

16 Claims



1. In a method of recovering natural gas liquids and removing nitrogen from a natural gas feed stream wherein said feed stream is compressed to a super-atmospheric pressure, sub-cooled and separated into at least a natural gas liquid stream, a methane-rich product gas stream and a nitrogen-rich gas stream, the improvement whereby said nitrogen-rich gas stream is liquefied comprising the steps of:

(a) compressing said nitrogen-rich gas stream to a super-atmospheric pressure at which nitrogen in said stream can be condensed;

(b) chilling said compressed nitrogen-rich gas stream whereby portions of the nitrogen and other components in said stream are condensed by passing said stream in an indirect heat exchange relationship with a methane refrigerant gas stream;

(c) expanding a portion of said methane-rich product gas stream to reduce the temperature thereof;

(d) utilizing said expanded methane-rich product gas stream as said refrigerant gas stream in step (b); and then

(e) recycling said expanded product gas stream to said feed stream.

4,948,405

# NITROGEN REJECTION UNIT

Max W. Thompson, Lake Jackson, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 26, 1989, Ser. No. 456,393

Int. Cl.<sup>5</sup> F25J 3/02

U.S. Cl. 62—24

13 Claims

1. A process for separating nitrogen from methane in a distillation system employing a high pressure (HP) fractionator and a low pressure (LP) fractionator, said process comprising the steps of:

(a) sufficiently cooling at least a portion of feedstream, essentially free of heavy hydrocarbons, comprising a gaseous

nitrogen-methane mixture at a pressure of at least 400 psia so as to provide an at least partially condensed feed stream;

(b) separating said at least partially condensed feed stream in a first phase separator and withdrawing from said first phase separator a first stream comprising gaseous nitrogen-methane and a second stream comprising liquid nitrogen-methane, wherein said first stream is enriched in nitrogen and said second stream is enriched in methane;

(c) sufficiently cooling said first stream so as to provide an at least partially condensed first stream and introducing said at least partially condensed first stream into a middle portion of said HP fractionator;

(d) sufficiently expanding said second stream so as to provide an at least partially vaporized second stream and introducing said at least partially vaporized second stream into a lower portion of said HP fractionator, wherein said at least partially condensed first stream and said at least partially vaporized second stream are simultaneously fractionated in said HP fractionator at conditions sufficient to produce a third stream predominately comprising gaseous nitrogen and a fourth stream predominately comprising liquid methane;

(e) sufficiently cooling said third stream so as to provide a partially condensed third stream;

(f) separating said partially condensed third stream in a second phase separator and withdrawing from said second phase separator a fifth stream predominately comprising liquid nitrogen and a sixth stream predominately comprising gaseous nitrogen;

(g) introducing said fifth stream into said HP fractionator as a liquid reflux;

(h) sufficiently cooling said sixth stream so as to provide an at least partially condensed sixth stream;

(i) separating said at least partially condensed sixth stream in a third phase separator and withdrawing a seventh stream predominately comprising liquid nitrogen and an eighth stream predominately comprising gaseous nitrogen from said third phase separator;

(j) introducing said seventh stream into a middle portion of said LP fractionator;

(k) expanding at least a portion of said eighth stream in an expander prior to introducing said eighth stream into an upper portion of said LP fractionator;

(l) recovering an overhead stream from said LP fractionator as a nitrogen product stream;

(m) withdrawing a bottom stream from said LP fractionator; and

(n) combining said bottom stream with said fourth stream to form a hydrocarbon product gas stream.



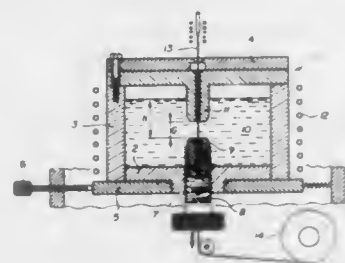
4,948,406

**APPARATUS AND PROCESS FOR FORMING AN OPTICAL FIBRE COVERED BY A METALLIC SLEEVE**  
 Michel Kornmann, Grand-Lancy, Switzerland, assignor to Battelle Memorial Institute, Carouge/GE, Switzerland  
 PCT No. PCT/CH87/00167, § 371 Date Aug. 12, 1988, § 102(e)  
 Date Aug. 12, 1988, PCT Pub. No. WO88/04284, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 9, 1987, Ser. No. 249,188  
 Claims priority, application Switzerland, Dec. 13, 1986, 4959/86

Int. Cl.<sup>5</sup> C03C 25/04  
 U.S. Cl. 65—3.11

14 Claims



1. A process for depositing on a freshly drawn optical fiber of the diameter  $d$  a protective aluminum metal sleeve, according to which this fiber, in a symmetrically centered manner, is passed through two dies with a truncated nose piece partially wetted by melted metal, one of which being the supplying means and the other one being the receiving means, and being vertically and coaxially superposed opposite one another and immersed in a melted-aluminum bath at a distance from one another that is sufficient for having the melted metal come in contact with the fiber in the space located between the plane faces of the nose pieces of the dies and solidifying by contact with the fiber to form said protective sleeve, characterized in that, since the dies are axially movable with respect to one another, they are first reunited by means of their plane face, then the metal is liquidified, the fiber is set into circulation through the dies at a speed of 5 to 200 m/min. and these dies are progressively separated from one another until the distance between the dies, a value  $G$  is between 0.5 and 5 mm, the distance  $D-d$  between the fiber and the bore of the dies being 50 to 750  $\mu\text{m}$ , such that said sleeve is formed, the thickness of the sleeve being 10 to 150  $\mu\text{m}$ .

4,948,407

# **PROTON EXCHANGE METHOD OF FORMING WAVEGUIDES IN LINBO<sub>3</sub>**

Jeffrey B. Bindell, South Whitehall Township, Lehigh County; James T. Cargo, Bethlehem; Ronald J. Holmes, Greenwich Township, Berks County, and Michael C. Hughes, Lehigh Township, Northampton County, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 189,914, May 3, 1988, abandoned. This application Nov. 29, 1989, Ser. No. 443,808

Int. Cl.<sup>5</sup> H01L 21/306; C03C 4/10  
 U.S. Cl. 65—3.14

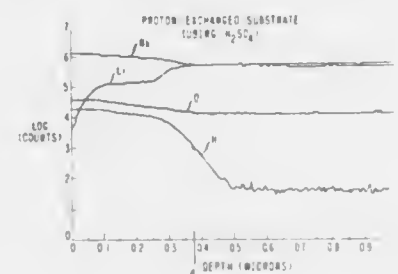
6 Claims

1. A method of forming optical waveguides comprising the steps of:

- providing an optical substrate of the composition  $\text{LiNbO}_3$  or  $\text{LiTaO}_3$ , said substrate being defined as having a top major surface for forming optical waveguides therein;
- masking the top major surface of the substrate provided in step (a) such that the unmasked areas delineate the regions of desired optical waveguiding;
- immersing the masked substrate of step (b) in a full strength sulfuric acid bath of a predetermined temperature  $t$  sufficient to provide for exchange between protons in the sulfuric acid and lithium in the optical substrate;
- removing the exchanged substrate from the bath after a

predetermined period of time  $T$  sufficient to provide an exchange to a predetermined depth  $d_1$  into said substrate from said top major surface;

(e) removing the mask from said top major surface; and



(f) heating said exchanged substrate at an elevated temperature and for a period of time sufficient to effect a migration of the exchanged protons to an annealed depth  $d_2$  greater than the exchanged depth  $d_1$ , said annealed depth determined to be sufficient to provide optical waveguiding.

4,948,408

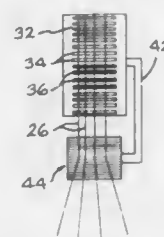
**STRAND DEFLECTOR FOR A WIDE BAND MAT**  
 Larry J. Huey, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Nov. 1, 1989, Ser. No. 430,212

Int. Cl.<sup>5</sup> C03B 37/02

U.S. Cl. 65—9

18 Claims



1. In a continuous strand mat production apparatus including a multiple orifice bushing, a pull wheel defining an axis and having an internal oscillating spoked wheel and a conveyor, the improvement comprising,

- a member disposed for oscillation with said spoked wheel about said axis of said pull wheel, and
- a deflector plate coupled to said member, said deflector plate having a solid surface oriented at an acute angle to strands of fibers exiting tangentially from said pull wheel, said surface defining discontinuities having higher and lower surface regions.

4,948,409

# **MULTIPLE SEGMENT SPINNER**

Vaughn C. Chenoweth, Coldwater, Mich.; Doyle Gieselmann, Munster, Ind., and Vernon L. Wainwright, Albion, Mich., assignors to Guardian Industries Corp., Northville, Mich.

Filed Aug. 18, 1989, Ser. No. 395,509

Int. Cl.<sup>5</sup> C03B 37/04, 37/095

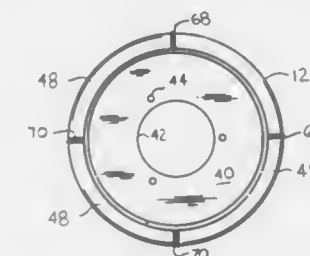
U.S. Cl. 65—15

3 Claims

1. A disposable, substantially circular spinner of finite useful life comprised of an axially extending side wall having a plurality of discrete, defined holes therein through which fibers may be formed by centrifugal force by rotation of said spinner and having a cross-sectional configuration capable of containing

molten fiberizable material therein such that all fibers formed must emanate from said discrete holes in said side wall, and

selectively configured to slidably receive said end portion of said insert.



wherein said spinner is formed of a plurality of segments extending axially to form said side wall of said circular spinner.

4,948,410

# **CHECK VALVE ASSEMBLY FOR GLASS FORMING MACHINERY**

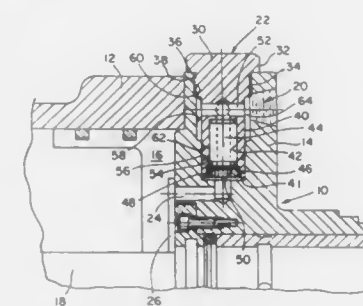
Richard A. Gorski, W. Suffield, Conn., assignor to Emhart Industries, Inc., Towson, Md.

Filed Oct. 10, 1989, Ser. No. 419,223

Int. Cl.<sup>5</sup> C03B 9/14

U.S. Cl. 65—261

2 Claims



1. A machine for forming a gob of molten glass into a glass container comprising

- a pneumatic cylinder including a cylindrical housing and a head closing one end of said cylindrical housing,
- an operating air line for directing air through said head into said cylindrical housing including an inlet conduit communicating with the exterior surface of said head and an inlet port communicating with the interior surface of said head, and
- a check valve assembly for connecting said inlet conduit to said inlet port including
  - an insert having a head portion at one end, a threaded section adjacent to said head portion and a reduced diameter cylindrical portion at the other end,
  - a check valve bore extending axially into said cylindrical end portion,
  - a check valve in said check valve bore,
  - means for securing said check valve in said bore, said securing means having an axially extending bore there through,
  - insert conduit means extending from said check valve bore to the exterior surface of said reduced diameter cylindrical portion,
  - an insert receiving bore in said head having a threaded portion for threadedly receiving said insert, said insert receiving bore being selectively sized to define with a portion of said reduced diameter cylindrical portion proximate the location where said insert conduit means communicate with said exterior insert surface a manifold for connecting said inlet conduit and said check valve conduit means, said insert receiving bore being

4,948,411

# **GLASS MELTING FURNACE FOR GLAZING ENVIRONMENTALLY HAZARDOUS WASTES**

Helmut Pieper, Helmut Sorg, and Hartmut Zecher, all of Lohr/Main, Fed. Rep. of Germany, assignors to Sorg GmbH & Co. KG, Lohr/Main, Fed. Rep. of Germany

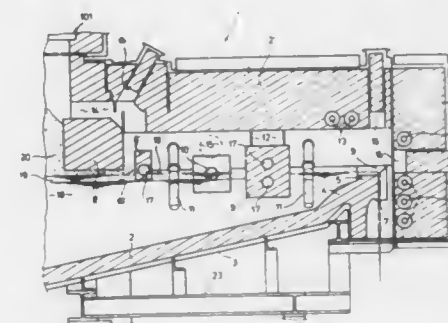
Filed Jan. 30, 1989, Ser. No. 303,841

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1988, 3841918

Int. Cl.<sup>5</sup> C03B 5/03, 5/20

U.S. Cl. 65—342

10 Claims



1. Glass melting furnace having a melting section and a withdrawal section bounded by side walls of refractory material and extending to an outer end remote from said melting section, and, in operation, a molten glass layer having a surface, a molten layer of undissolved sulfates, and a batch of material to be melted succeeding one another from the bottom up in the melting section, the withdrawal section being separated from the melting section by a first dividing wall extending downwardly into the furnace interior and terminating at a distance from the furnace floor, a second dividing wall being disposed for the formation of an underside glass passage in the withdrawal section, and a glass outlet formed by an overflow edge at the outer end of the withdrawal section, wherein the first dividing wall terminates above the surface of the molten glass for retaining most of the batch and forming a batch layer on top of the molten layer of undissolved sulfates and in the withdrawal part, between the first dividing wall and the second dividing wall, at the level of the undissolved sulfate layer, at least one closable withdrawal opening is disposed through one of said side walls for withdrawing undissolved sulfates, said withdrawal opening having a bottom boundary whose height is adjustable, whereby it can be adjusted to obtain a molten sulfate layer of desired thickness.

4,948,412

# **METHOD OF FUSION SPLICING SINGLE-MODE OPTICAL FIBERS USING AN ARC DISCHARGE**

Takeshi Yamada, Sakura; Yasukuni Osato, Narashino, both of Japan; Masao Suzuki, New York, N.Y.; Okosu Watanabe, Chiba, and Osamu Kawata, Mito, both of Japan, assignors to Fujikura Ltd. and Nippon Telegraph and Telephone Corporation, both of Tokyo, Japan

Filed Sep. 5, 1985, Ser. No. 772,950

Int. Cl.<sup>5</sup> C03B 23/20; G02B 6/255

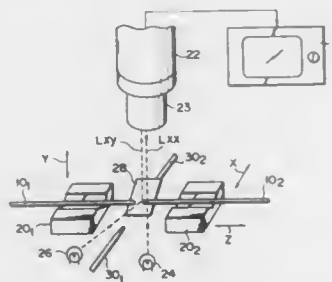
U.S. Cl. 65—4.21

5 Claims

1. A method of fusion splicing single-mode optical fibers, comprising the steps of:

- arranging two single-mode optical fibers in opposed relation along a line;
- aligning the axes of cores of the opposed optical fibers relative to one another thereby forming a splice region;

measuring an offset distance (D) between axes of the optical fibers when the axes of the cores of the fibers are aligned; determining, according to the distance D, an optimum time over which an arc discharge is to be applied to the splice region of the optical fibers, using an inverse relation between the distance D and the discharge time thereby



reducing obliquity of the cores after the optical fibers are fusion spliced and enhancing light transmission efficiency of the spliced fibers, while preserving at least a minimum level of mechanical strength of said splice region; and applying an arc discharge to the splice region of the optical fibers according to the determined optimum arc discharge time.

4,948,413

#### PHYSIOLOGICALLY ACTIVE AGENT FOR AGRICULTURE USE

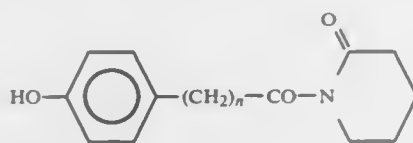
Yoshio Maekawa, Miki; Osamu Yagyu, Kakogawa; Hironori Mizuno, Kakogawa; Minoru Okumura, Kakogawa; Shigeru Isoda, Kakogawa, and Kaoru Yagi, Himeji, all of Japan, assignors to Taki Chemical Co., Ltd., Kakogawa, Japan  
Filed May 16, 1988, Ser. No. 195,731  
Claims priority, application Japan, Jun. 4, 1987, 62-141149; Dec. 8, 1987, 62-311634

Int. Cl.<sup>5</sup> A01N 3/02, 59/00, 11/08

U.S. Cl. 71-65

3 Claims

1. A soil amending agent comprising a mixture of 2-piperidone and an N-acyllactam compound represented by the formula:



wherein n is 1 or 2, and wherein the molar ratio of 2-piperidone to N-acyllactam compound is in the range from 0.1:1 to 10:1.

4,948,414

#### 3-FLUOROPYRIDYL-2-OXY-PHENOXY DERIVATIVES HAVING HERBICIDAL ACTIVITY

Rolf Schurter, Binningen, and Peter J. Diel, Riehen, both of Switzerland, assignors to Ciba-Gelgy Corporation, Ardsley, N.Y.

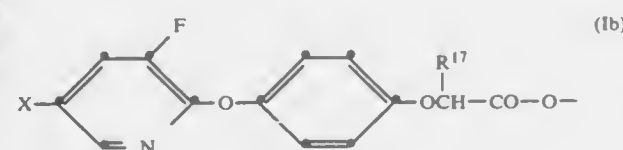
Continuation of Ser. No. 150,345, Jan. 29, 1988, abandoned, which is a division of Ser. No. 844,407, Mar. 26, 1986, Pat. No. 4,740,235. This application Dec. 12, 1988, Ser. No. 284,766  
Claims priority, application Switzerland, Apr. 1, 1985, 1401/85

Int. Cl.<sup>5</sup> C07F 9/58; A01N 43/40

U.S. Cl. 71-86

7 Claims

1. A 3-fluoropyridyl-2-oxy-phenoxy derivative which corresponds to the formula Ib



wherein

G is a C<sub>1</sub>-C<sub>3</sub>alkylene-bridge that is unsubstituted or substituted by methyl,  
X is chlorine or trifluoromethyl,  
p is 0 or 1,  
R<sup>14</sup> and R<sup>15</sup> are independently of each other C<sub>1</sub>-C<sub>4</sub>alkyl and R<sup>17</sup> is hydrogen or methyl.

5. A herbicidal and plant-growth regulating composition comprising, as active ingredient, a herbicidally and plant-growth regulatingly effective amount of a 3-fluoropyridyl-2-oxy-phenoxy derivative of the formula Ib according to claim 1, together with inert carrier material.

4,948,415

#### AGENTS FOR REGULATING PLANT GROWTH

Michael Keil, Freinsheim; Dieter Jahn, Edingen-Neckarhausen; Dieter Kolassa, Ludwigshafen; Ulrich Schirmer, Heidelberg; Rainer Becker, Bad Dürkheim; Johann Jung, and Wilhelm Rademacher, both of Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 876,759, Jun. 20, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 305,611

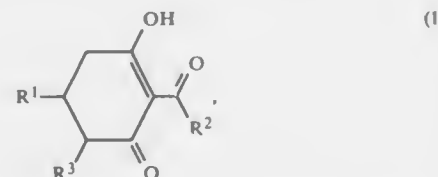
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522213

Int. Cl.<sup>5</sup> A01N 43/78, 43/02; C07D 277/24, 263/34

U.S. Cl. 71-90

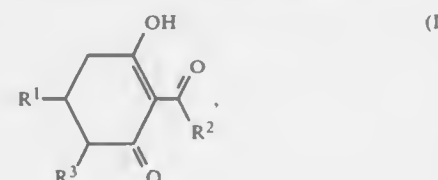
6 Claims

1. A composition for regulating plant growth, containing an effective amount of at least one cyclohexenone derivative of the formula



where R<sup>1</sup> is a thiazole group which may contain up to 3 substituents from the group consisting of alkyl, alkenyl, alkoxy, alkoxyalkyl or alkylthio, each of 1 to 6 carbon atoms, cyclohexyl, cyclohexoxy, phenyl which is unsubstituted or substituted by methyl, chloro or methoxy, phenoxy which is unsubstituted or substituted by methyl, chloro or methoxy, halogen, nitro or dialkylamino, R<sup>2</sup> is alkyl of 1 to 4 carbon atoms, alkoxyalkyl of 1 to 4 carbon atoms, cyclopropyl, benzyl, phenylethyl or acyloxyalkyl of up to 6 carbon atoms, and R<sup>3</sup> is hydrogen, alkoxy-carbonyl of 2 to 5 carbon atoms or cyano, or a salt thereof, and a liquid or solid carrier.

5. A cyclohexenone derivative of the formula



where R<sup>1</sup> is a thiazole group which may contain up to 3 substituents from the group consisting of alkyl, alkenyl, alkoxy, alkoxyalkyl or alkylthio, each of 1 to 6 carbon atoms, cyclohexyl, cyclohexoxy, phenyl which is unsubstituted or substituted by methyl, chloro or methoxy, phenoxy which is unsubstituted or substituted by methyl, chloro or methoxy, halogen, nitro or dialkylamino, R<sup>2</sup> is alkyl of 1 to 4 carbon atoms, alkoxyalkyl of 1 to 4 carbon atoms, cyclopropyl, benzyl, phenylethyl or acyloxyalkyl of up to 6 carbon atoms, and R<sup>3</sup> is hydrogen, alkoxy-carbonyl of 2 to 5 carbon atoms or cyano, or a salt thereof.

4,948,416

#### PHENYL-SUBSTITUTED SULFONAMIDES

Robert J. Pasteris, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

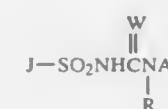
Division of Ser. No. 911,428, Sep. 25, 1986, Pat. No. 4,842,639, which is a continuation-in-part of Ser. No. 716,351, Mar. 29, 1985, abandoned, which is a continuation-in-part of Ser. No.

663,555, Oct. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 607,989, May 7, 1984, abandoned. This application Mar. 27, 1989, Ser. No. 328,684  
Int. Cl.<sup>5</sup> C07D 239/42, 401/12, 405.12, 409.12, 417/12; C07F 9/6512; A01N 43/54

U.S. Cl. 71-91

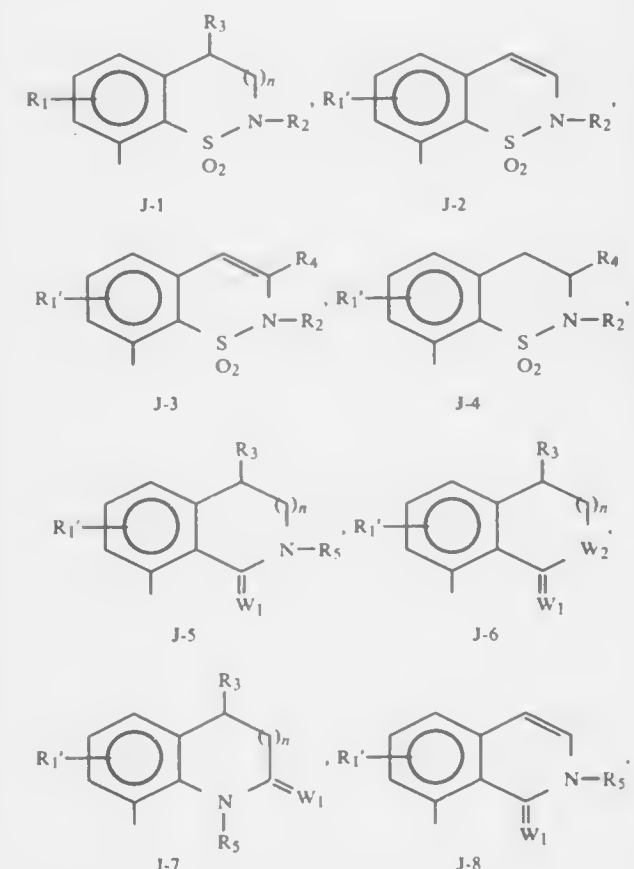
59 Claims

1. A compound of the formula:

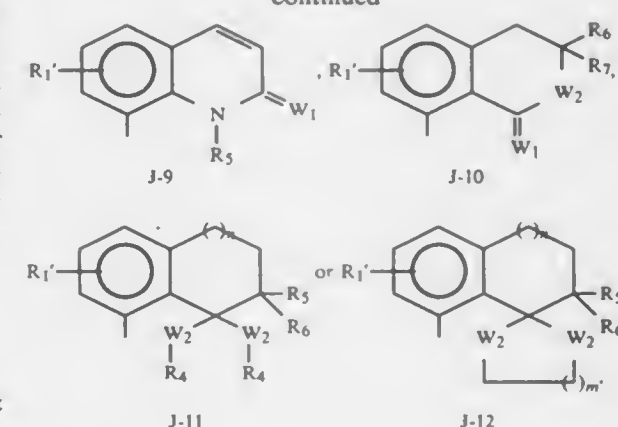


wherein

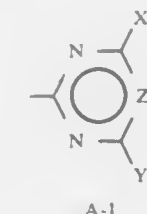
J is



-continued



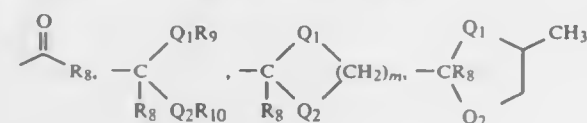
n is 0 or 1;  
W is O or S;  
W<sub>1</sub> is S;  
W<sub>2</sub> is O or S;  
R is H or CH<sub>3</sub>;  
R<sub>1</sub> is H, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> haloalkyl, halogen, nitro, C<sub>1</sub>-C<sub>6</sub> alkoxy, SO<sub>2</sub>NR<sub>6</sub>, C<sub>1</sub>-C<sub>6</sub> alkylthio, C<sub>1</sub>-C<sub>6</sub> alkylsulfenyl, C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl, CN, CO<sub>2</sub>R<sub>6</sub>, C<sub>1</sub>-C<sub>6</sub> haloalkoxy, C<sub>1</sub>-C<sub>6</sub> haloalkylthio, NH<sub>2</sub>, C<sub>1</sub>-C<sub>6</sub> alkylamino, di(C<sub>1</sub>-C<sub>6</sub> alkyl)amino, Si(CH<sub>3</sub>)<sub>2</sub>(C<sub>1</sub>-C<sub>4</sub> alkyl), Si(CH<sub>3</sub>)<sub>2</sub>-phenyl or C<sub>1</sub>-C<sub>3</sub> alkyl substituted with C<sub>1</sub>-C<sub>3</sub> alkoxy, C<sub>1</sub>-C<sub>3</sub> alkylthio, C<sub>1</sub>-C<sub>3</sub> alkylsulfenyl, C<sub>1</sub>-C<sub>3</sub> alkylsulfonyl, SO<sub>2</sub>NR<sub>6</sub>, NO<sub>2</sub>, CN, CO<sub>2</sub>R<sub>6</sub>, C<sub>1</sub>-C<sub>3</sub> haloalkoxy or C<sub>1</sub>-C<sub>3</sub> haloalkylthio;  
R<sub>6</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> cyanoalkyl, methoxy or ethoxy;  
R<sub>6</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>3</sub>-C<sub>4</sub> alkenyl; or  
R<sub>6</sub> and R<sub>6</sub> may be taken together as -(CH<sub>2</sub>)<sub>3</sub>-, -(CH<sub>2</sub>)<sub>4</sub>-, -(CH<sub>2</sub>)<sub>5</sub>- or -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-;  
R<sub>6</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, C<sub>2</sub>-C<sub>4</sub> haloalkyl, C<sub>2</sub>-C<sub>3</sub> cyanoalkyl, C<sub>5</sub>-C<sub>6</sub> cycloalkyl, C<sub>4</sub>-C<sub>7</sub> cycloalkyl or C<sub>2</sub>-C<sub>4</sub> alkoxyalkyl;  
R<sub>6</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;  
R<sub>6</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;  
R<sub>6</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;  
R<sub>6</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, C<sub>1</sub>-C<sub>3</sub> haloalkoxy, C<sub>1</sub>-C<sub>3</sub> haloalkyl, C<sub>1</sub>-C<sub>3</sub> alkylthio, C<sub>1</sub>-C<sub>3</sub> haloalkylthio, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino, halogen or NO<sub>2</sub>;  
R<sub>6</sub> is H, R<sub>6</sub> is SR<sub>11</sub>, SO<sub>2</sub>R<sub>11</sub>, OR<sub>11</sub>, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)OR<sub>11</sub>, (CO)<sub>2</sub>R<sub>11</sub>, C(O)NR<sub>12</sub>R<sub>18</sub>, C(O)NRA, C(S)SR<sub>11</sub>, NH<sub>2</sub>, NR<sub>12</sub>R<sub>18</sub>, OH, CN, P(O)R<sub>13</sub>R<sub>14</sub>, P(S)R<sub>13</sub>R<sub>14</sub>, Si(CH<sub>3</sub>)<sub>2</sub>R<sub>15</sub>, L or C(O)L;  
R<sub>6</sub> is H or CH<sub>3</sub>;  
R<sub>6</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl;  
R<sub>6</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl;  
R<sub>6</sub> is H or CH<sub>3</sub>;  
R<sub>6</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, Cl or Br;  
A is



X is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, F, Cl, Br, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, amino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino or C<sub>3</sub>-C<sub>5</sub> cycloalkyl;  
Y is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub>



alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino, C<sub>3</sub>-C<sub>4</sub> alkenyloxy, C<sub>3</sub>-C<sub>4</sub> alkynyloxy, C<sub>2</sub>-C<sub>3</sub> alkylthioalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, azido, cyano,



or N(OCH<sub>3</sub>)CH<sub>3</sub>;

m is 2 or 3;

Q<sub>1</sub> and Q<sub>2</sub> are independently O or S;

R<sub>8</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;

R<sub>9</sub> and R<sub>10</sub> are independently C<sub>1</sub>-C<sub>3</sub> alkyl;

Z is CH, CCH<sub>3</sub>, CC<sub>2</sub>H<sub>5</sub>, CCl or CBr;

R<sub>11</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>3</sub>-C<sub>10</sub> alkoxyalkoxyalkyl, C<sub>2</sub>-C<sub>10</sub> alkenyl, C<sub>4</sub>-C<sub>10</sub> alkenylalkenyl, C<sub>3</sub>-C<sub>10</sub> epoxyalkyl, C<sub>2</sub>-C<sub>10</sub> alkynyl, C<sub>4</sub>-C<sub>10</sub> alkynylalkynyl, C<sub>4</sub>-C<sub>10</sub> alkynylalkenyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>4</sub>-C<sub>7</sub> cycloalkylalkyl or



when R<sub>11</sub> is C<sub>3</sub>-C<sub>6</sub> cycloalkyl or C<sub>4</sub>-C<sub>7</sub> cycloalkylalkyl it may optionally be substituted by C<sub>1</sub>-C<sub>4</sub> alkyl, 1 to 3 atoms of Cl or F or 1 Br; when R<sub>11</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>2</sub>-C<sub>10</sub> alkenyl or C<sub>2</sub>-C<sub>10</sub> alkynyl it may optionally be substituted by one or more halogens and/or by (R<sub>17</sub>)<sub>m'</sub>, where m' is 2, the values of R<sub>17</sub> may be identical or different;

R<sub>11'</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>3</sub>-C<sub>10</sub> alkoxyalkoxyalkyl, C<sub>3</sub>-C<sub>10</sub> alkenyl, C<sub>5</sub>-C<sub>10</sub> alkenylalkenyl, C<sub>3</sub>-C<sub>10</sub> epoxyalkyl, C<sub>3</sub>-C<sub>10</sub> alkynyl, C<sub>5</sub>-C<sub>10</sub> alkynylalkynyl, C<sub>5</sub>-C<sub>10</sub> alkynylalkenyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>4</sub>-C<sub>7</sub> cycloalkylalkyl or



when R<sub>11'</sub> is C<sub>3</sub>-C<sub>6</sub> cycloalkyl or C<sub>4</sub>-C<sub>7</sub> cycloalkylalkyl it may be optionally substituted by C<sub>1</sub>-C<sub>4</sub> alkyl, 1 to 3 atoms of Cl or F or 1 Br; when R<sub>11'</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>3</sub>-C<sub>10</sub> alkenyl or C<sub>3</sub>-C<sub>10</sub> alkynyl, it may optionally be substituted by one or more halogens and/or by (R<sub>17</sub>)<sub>m'</sub>, where m' is 2, the values of R<sub>17</sub> may be identical or different;

m' is 1 or 2;

R<sub>12</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl;

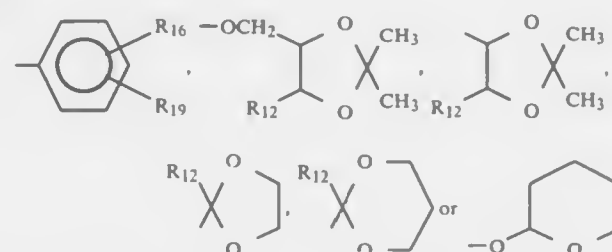
R<sub>13</sub> and R<sub>14</sub> are independently C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkylthio;

R<sub>15</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, benzyl or

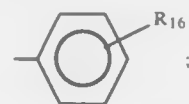


R<sub>16</sub> is H, F, Cl, Br, CH<sub>3</sub>, OCH<sub>3</sub>, NO<sub>2</sub>, CN, SCH<sub>3</sub>, SO<sub>2</sub>CH<sub>3</sub> or CF<sub>3</sub>;

R<sub>17</sub> is OR<sub>18</sub>, OC(O)R<sub>18</sub>, P<sup>+</sup>R<sub>9</sub>R<sub>10</sub>R<sub>15</sub>, P<sup>+</sup>(C<sub>6</sub>H<sub>5</sub>)<sub>3</sub>, OC(O)NR<sub>12</sub>R<sub>18</sub>, OSO<sub>2</sub>R<sub>18</sub>, OP(O)R<sub>13</sub>R<sub>14</sub>, P(O)R<sub>13</sub>R<sub>14</sub>, SR<sub>19</sub>, SOR<sub>19</sub>, SO<sub>2</sub>R<sub>18</sub>, SCN, CN, SP(O)R<sub>13</sub>R<sub>14</sub>, SP(S)R<sub>13</sub>R<sub>14</sub>, N<sup>+</sup>R<sub>12</sub>R<sub>15</sub>R<sub>18</sub>, NR<sub>12</sub>R<sub>18</sub>, NR<sub>12</sub>C(O)R<sub>18</sub>, NR<sub>12</sub>C(O)OR<sub>18</sub>, NR<sub>12</sub>C(O)NR<sub>12</sub>R<sub>18</sub>, NR<sub>12</sub>SO<sub>2</sub>R<sub>18</sub>, NR<sub>12</sub>P(O)R<sub>13</sub>R<sub>14</sub>, NR<sub>12</sub>P(S)R<sub>13</sub>R<sub>14</sub>, NO<sub>2</sub>, C(O)R<sub>18</sub>, C(O)OR<sub>18</sub>, C(O)NR<sub>12</sub>R<sub>18</sub>, SeR<sub>18</sub>, naphthyl, L,



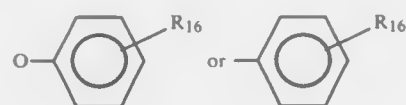
R<sub>18</sub> is H, C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>1</sub>-C<sub>10</sub> haloalkyl, C<sub>2</sub>-C<sub>10</sub> alkenyl, C<sub>2</sub>-C<sub>10</sub> alkynyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl or



R<sub>18'</sub> is C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>1</sub>-C<sub>10</sub> haloalkyl, C<sub>3</sub>-C<sub>10</sub> alkenyl, C<sub>3</sub>-C<sub>10</sub> alkynyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl or



R<sub>19</sub> is H, F, Cl, Br, CH<sub>3</sub>,

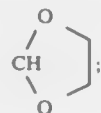


and

L is pyridinyl, thienyl, furanyl, 4,5-dihydrofuranyl, pyrrolyl, oxazolyl, 4,5-dihydrooxazolyl, thiazolyl, isoxazolyl, oxadiazolyl, pyrazolyl, triazolyl, imidazolyl, 4,5-dihydroimidazolyl, thiadiazolyl, morpholinyl, triazinyl, 1,3-dioxolanyl, tetrahydropyranyl or pyrimidinyl, and these heterocycles may optionally be substituted by 1-4 CH<sub>3</sub>, 1-2 OCH<sub>3</sub>, SCH<sub>3</sub>, Cl, N(CH<sub>3</sub>)<sub>2</sub> or CN or L is a 5- or 6-membered lactone, lactam or cycloalkanone which may optionally be substituted by 1-4 CH<sub>3</sub> groups;

provided that

(a) when W is S, then R is H, J is J<sub>1</sub>, J<sub>2</sub>, J<sub>3</sub> or J<sub>4</sub>; A is A-1, Z is CH, and Y is CH<sub>3</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, CH<sub>2</sub>OCH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, CF<sub>3</sub>, SCH<sub>3</sub>, OCH<sub>2</sub>CH=CH<sub>2</sub>, OCH<sub>2</sub>C=CH, OCH<sub>2</sub>CF<sub>3</sub>, OCH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>, CH(OCH<sub>3</sub>)<sub>2</sub> or



(b) when X is F, Cl or Br, then Z is CH and Y is OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, NH<sub>2</sub>, NHCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub> or OCF<sub>2</sub>H;

(c) when R<sub>3</sub> is CH<sub>3</sub>, then n is 0;

(d) when J is J-1 or J-2 and R<sub>2</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl, then R<sub>1</sub> and R<sub>1'</sub> are other than H, F, Cl, Br, CH<sub>3</sub>, OCH<sub>3</sub>, CF<sub>3</sub>, OCF<sub>2</sub>H, or SCH<sub>3</sub> or X is other than CH<sub>3</sub>, OCH<sub>3</sub>, OCH<sub>2</sub>CH<sub>3</sub>, F, Cl, Br, OCF<sub>2</sub>H, CH<sub>2</sub>Cl, CH<sub>2</sub>Br, CH<sub>2</sub>F, cyclopropyl or CF<sub>3</sub> or Y is C<sub>3</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkoxy, C<sub>4</sub> haloalkoxy, C<sub>4</sub> haloalkylthio, C<sub>3</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>4</sub>-C<sub>5</sub> alkoxyalkoxy, C<sub>2</sub>-C<sub>3</sub> alkylamino, di(C<sub>2</sub>-C<sub>3</sub> alkyl)amino, C<sub>4</sub> alkenyloxy, C<sub>4</sub> alkynyloxy, C<sub>3</sub>-C<sub>5</sub> alkylthioalkyl, C<sub>2</sub>-C<sub>4</sub> haloalkyl, C<sub>2</sub>-C<sub>4</sub> alkynyl, C(O)R<sub>8</sub> or N(OCH<sub>3</sub>)CH<sub>3</sub>;

(e) the total number of carbon atoms in R<sub>2</sub> does not exceed 13; (f) when X is C<sub>3</sub>-C<sub>5</sub> cycloalkyl, then Y is CH<sub>3</sub>, CH<sub>2</sub>CH<sub>3</sub>, OCH<sub>3</sub>, OCH<sub>2</sub>CH<sub>3</sub>, CH<sub>2</sub>OCH<sub>3</sub>, OCF<sub>2</sub>H, SCF<sub>2</sub>H, OCH<sub>2</sub>CF<sub>3</sub>, CF<sub>3</sub>, OCH<sub>2</sub>CH=CH<sub>2</sub>, OCH<sub>2</sub>C=CH, NHCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub> or CH(OCH<sub>3</sub>)<sub>2</sub>;

(g) when R<sub>1</sub> or R<sub>1'</sub> is para to the sulfonylurea bridge than R<sub>1</sub> or R<sub>1'</sub> are H, CH<sub>3</sub>, F, Cl, Br or OCH<sub>3</sub>; and

(h) when X or Y is OCH<sub>2</sub>CH<sub>2</sub>F or OCH<sub>2</sub>CHF<sub>2</sub> then R<sub>2</sub> is other than C<sub>5</sub> alkyl, CH<sub>3</sub>OCH<sub>2</sub>CH<sub>2</sub>, C<sub>2</sub>H<sub>5</sub>OCH<sub>2</sub>CH<sub>2</sub> or C<sub>1</sub>-C<sub>4</sub> alkyl substituted with 1-3 atoms of F, Cl or Br;

(i) when X or Y is OCH<sub>2</sub>CH<sub>2</sub>F, OCH<sub>2</sub>CHF<sub>2</sub> or OCH<sub>2</sub>CF<sub>3</sub>, then the other is not di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino C<sub>1</sub>-C<sub>3</sub> alkylamino or N(OCH<sub>3</sub>)CH<sub>3</sub>;

(j) when X or Y is OCF<sub>2</sub>H, then Z is CH<sub>3</sub>; and

(k) when R<sub>17</sub> and the bridging nitrogen of a cyclic sulfonamide are attached to the same carbon, then R<sub>17</sub> is other than OH, SH, OC(O)R<sub>18</sub>, OC(O)NR<sub>12</sub>R<sub>18</sub>, OSO<sub>2</sub>R<sub>18</sub>, OP(O)R<sub>13</sub>R<sub>14</sub>, OSi(CH<sub>3</sub>)<sub>2</sub>R<sub>15</sub>, SP(O)R<sub>13</sub>R<sub>14</sub>, SP(S)R<sub>13</sub>R<sub>14</sub>, NR<sub>12</sub>R<sub>18</sub> or N<sup>+</sup>R<sub>12</sub>R<sub>15</sub>R<sub>18</sub>;

and their agriculturally suitable salts.

34. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

4,948,417

#### HERBICIDAL SUBSTITUTED TRIAZOLINONES

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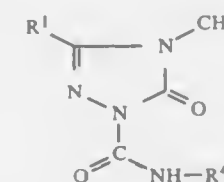
Filed Jun. 29, 1988, Ser. No. 212,835

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722821

Int. Cl. C07D 249/12; A01N 43/653

U.S. Cl. 71-92

1. A substituted triazolinone of the formula



in which

R<sup>1</sup> is C<sub>1</sub>-4-alkyl, and

R<sup>4</sup> is C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-cycloalkyl, C<sub>2</sub>-C<sub>8</sub>-alkynyl or is phenylalkyl with 1 to 7 carbon atoms in the straight-chain or branched alkyl part, which are each optionally substituted on the phenyl by identical or different substituents selected from the group consisting of fluorine, chlorine, bromine, hydroxyl, cyano, nitro, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, methoxy, ethoxy, methylthio, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, trifluoromethylsulphanyl, trifluoromethylsulphonyl, methylsulphanyl, methylsulphonyl, acetyl, propionyl, methoxycarbonyl, ethoxycarbonyl, cyclohexyl and phenoxy.

4,948,418

#### 2,3-DIHYDROBENZO[B]THIOPHENES

Joseph E. Semple, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

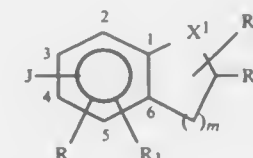
Division of Ser. No. 202,086, Jun. 2, 1988, Pat. No. 4,881,967, which is a continuation-in-part of Ser. No. 943,365, Dec. 10, 1986, abandoned. This application Aug. 30, 1989, Ser. No. 402,178

Int. Cl. A01N 43/707, 43/90, 43/12; C07D 409/04

U.S. Cl. 71-92

29 Claims

1. A compound of the formula



wherein,

R is H, Cl, F, C<sub>1</sub>-C<sub>2</sub> alkyl or C<sub>1</sub>-C<sub>3</sub> alkoxy;

R<sub>1</sub> is H, F, Cl, Br, CH<sub>3</sub>, OCH<sub>3</sub>, CN, CF<sub>3</sub>, OCF<sub>3</sub> or OCF<sub>2</sub>H;

X<sup>1</sup> is S;

R<sub>2</sub> is H, CH<sub>3</sub> or CH<sub>2</sub>CH<sub>3</sub>;

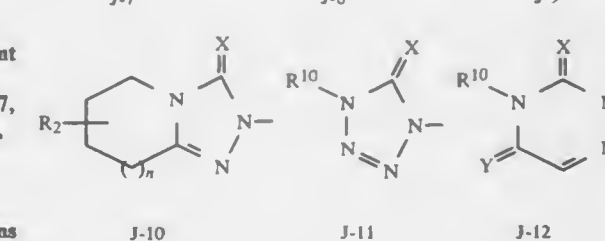
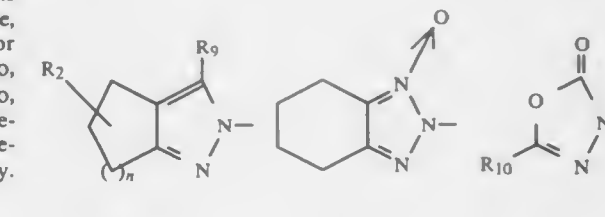
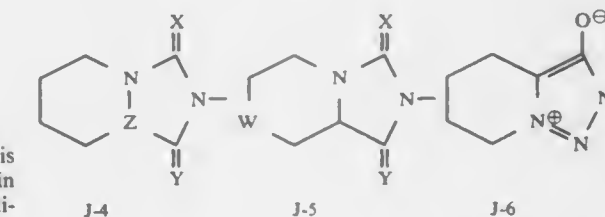
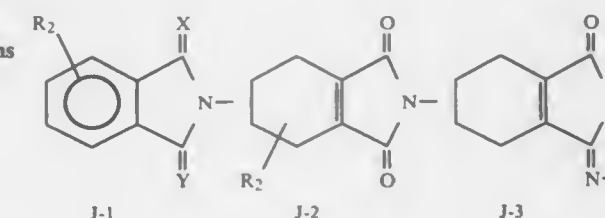
R<sub>3</sub> is H, C<sub>1</sub>-C<sub>4</sub> haloalkyl, CR<sub>2</sub>R<sub>7</sub>CN, CN, CR<sub>2</sub>R<sub>4</sub>R<sub>7</sub>, COCl, COR<sub>4</sub>, C(NOR<sub>6</sub>)R<sub>2</sub>, CO<sub>2</sub>R<sub>4</sub>, CONR<sub>4</sub>R<sub>2</sub>, CHR<sub>2</sub>OH, CO<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>Si(CH<sub>3</sub>)<sub>3</sub>, CONR<sub>2</sub>SO<sub>2</sub>CH<sub>3</sub>, CHR<sub>2</sub>CO<sub>2</sub>R<sub>4</sub>, CONHCH(CH<sub>3</sub>)CONHCH(CH<sub>3</sub>)CO<sub>2</sub>CH<sub>3</sub>, CHR<sub>2</sub>COR<sub>4</sub>, CHR<sub>2</sub>OSO<sub>2</sub>(C<sub>1</sub>-C<sub>4</sub> alkyl), CHR<sub>2</sub>OC(O)R<sub>4</sub>, CHR<sub>2</sub>OC(O)N(R<sub>2</sub>)<sub>2</sub>, CHR<sub>2</sub>OC(O)N(R<sub>2</sub>)OCH<sub>3</sub>, CHR<sub>2</sub>OC(O)N(R<sub>2</sub>)Ph, HC=CH<sub>2</sub> or C<sub>1</sub>CH<sub>3</sub>;

R<sub>4</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>3</sub>-C<sub>6</sub> alkynyl, C<sub>2</sub>-C<sub>4</sub> haloalkenyl, phenyl, C<sub>1</sub>-C<sub>4</sub> alkyl-phenyl, C<sub>3</sub>-C<sub>6</sub> alkoxyalkyl or (CH<sub>2</sub>CH<sub>2</sub>O)<sub>6</sub>R<sub>2</sub>;

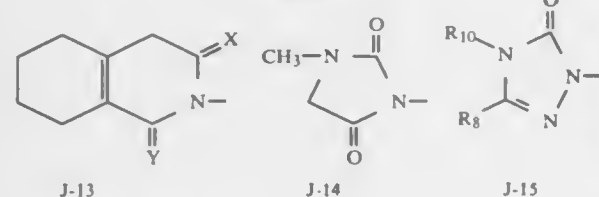
b=1 to 6;

m is 1; n is 1 or 2;

J is



-continued



wherein

X and Y each is O or S;

Z is C or N;

W is S or SO<sub>2</sub>;R<sub>6</sub> is H, C<sub>1</sub>-C<sub>5</sub> alkyl, allyl, propargyl, benzyl, CH<sub>2</sub>CO<sub>2</sub>CH<sub>3</sub> or CH<sub>2</sub>CO<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>;R<sub>7</sub> is H or CH<sub>3</sub>;R<sub>8</sub> is Cl, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> haloalkyl;R<sub>9</sub> is Cl, F, Br, CH<sub>3</sub>, CN, OCH<sub>3</sub>, SCH<sub>3</sub> or SO<sub>2</sub>CH<sub>3</sub>;

and

R<sub>10</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> haloalkyl.

15. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

4,948,419

## HERBICIDAL PYRIDINE SULFONAMIDES

Mary A. Hanagan, Newark, and Barry A. Wexler, Wilmington, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 94,701, Sep. 14, 1987, Pat. No. 4,838,926, which is a continuation-in-part of Ser. No. 943,137, Dec. 18, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 310,385

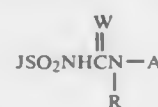
The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.<sup>7</sup> A01N 43/66, 43/68; C07D 401/12, 401/14

U.S. Cl. 71-93

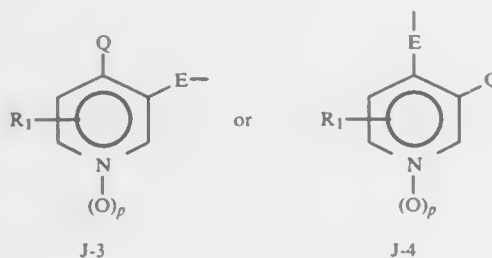
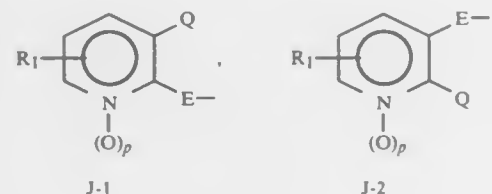
36 Claims

1. A compound having the formula I:



wherein

J is

R is H or CH<sub>3</sub>;E is a single bond or CH<sub>2</sub>;W is O, S or NR<sub>x</sub>;

p is 0 or 1;

R<sub>x</sub> is H, OH, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> haloalkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, C<sub>1</sub>-C<sub>3</sub> haloalkoxy, allyloxy, propargyloxy or NR<sub>y</sub>R<sub>z</sub>;R<sub>y</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>z</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;

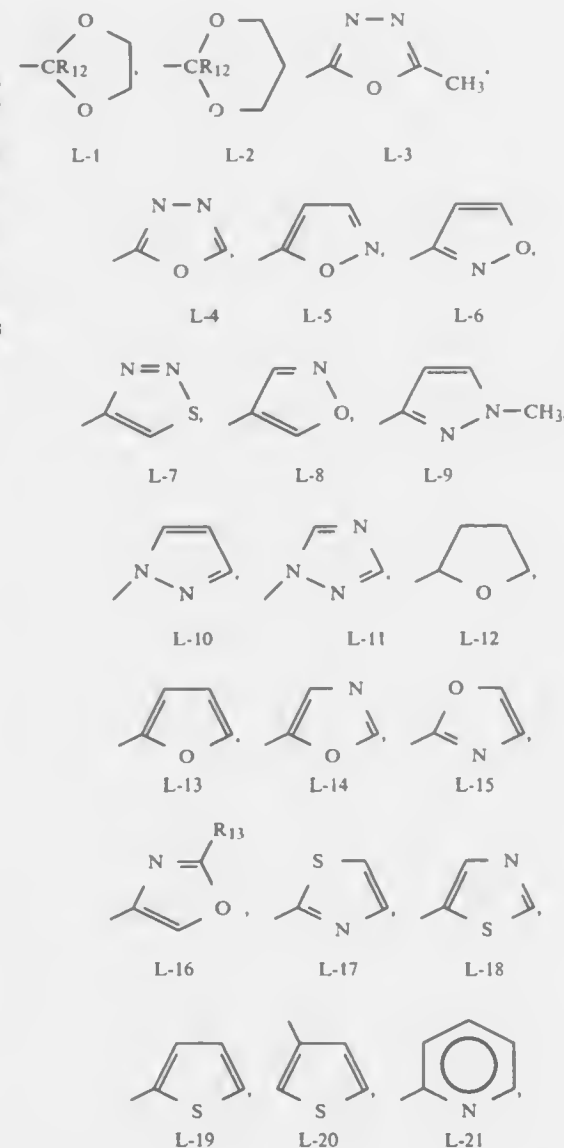
R<sub>1</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> haloalkyl, halogen, nitro, C<sub>1</sub>-C<sub>3</sub> alkoxy, SO<sub>2</sub>NR<sub>d</sub>R<sub>e</sub>, C<sub>1</sub>-C<sub>3</sub> alkylthio, C<sub>1</sub>-C<sub>3</sub> alkylsulfinyl, C<sub>1</sub>-C<sub>3</sub> alkylsulfonyl, CN, CO<sub>2</sub>R<sub>c</sub>, C<sub>1</sub>-C<sub>3</sub> haloalkoxy, C<sub>1</sub>-C<sub>3</sub> haloalkylthio, amino, C<sub>1</sub>-C<sub>2</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino, L or C(O)NR<sub>d</sub>R<sub>e</sub>;

R<sub>a</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> cyanoalkyl, methoxy or ethoxy;R<sub>b</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>3</sub>-C<sub>4</sub> alkenyl; orR<sub>a</sub> and R<sub>b</sub> may be taken together as -(CH<sub>2</sub>)<sub>3</sub>, -(CH<sub>2</sub>)<sub>4</sub>-, -(CH<sub>2</sub>)<sub>5</sub>- or -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-;

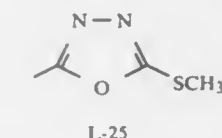
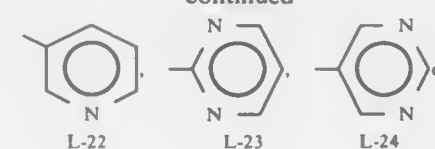
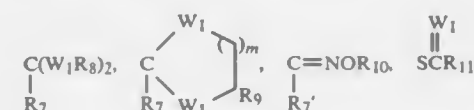
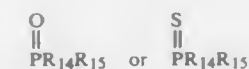
R<sub>c</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, C<sub>2</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>2</sub> cyanoalkyl, C<sub>5</sub>-C<sub>6</sub> cycloalkyl, C<sub>4</sub>-C<sub>7</sub> cycloalkyl, C<sub>1</sub>-C<sub>4</sub> alkoxyalkyl;

R<sub>d</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>e</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;

L is



-continued

Q is C<sub>1</sub>-C<sub>4</sub> alkyl substituted with R<sub>2</sub>;R<sub>2</sub> is OR<sub>3</sub>, S(O)<sub>n</sub>R<sub>4</sub>, CO<sub>2</sub>R<sub>4</sub>, CONR<sub>5</sub>R<sub>6</sub>,CN, NO<sub>2</sub>.

R<sub>3</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>3</sub>-C<sub>4</sub> haloalkenyl, C<sub>3</sub>-C<sub>4</sub> haloalkynyl, C<sub>2</sub>-C<sub>4</sub> alkylcarbonyl, C<sub>2</sub>-C<sub>4</sub> haloalkylcarbonyl, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl, C<sub>2</sub>-C<sub>4</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>4</sub> alkylthioalkyl or C<sub>2</sub>-C<sub>4</sub> cyanoalkyl;

R<sub>4</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>3</sub>-C<sub>4</sub> haloalkenyl, C<sub>3</sub>-C<sub>4</sub> haloalkynyl, C<sub>2</sub>-C<sub>4</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>4</sub> alkylthioalkyl or C<sub>2</sub>-C<sub>4</sub> cyanoalkyl;

R<sub>5</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> alkynyl, C<sub>2</sub>-C<sub>4</sub> haloalkyl, C<sub>3</sub>-C<sub>4</sub> haloalkenyl, C<sub>3</sub>-C<sub>4</sub> haloalkynyl, C<sub>2</sub>-C<sub>4</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>4</sub> alkylthioalkyl or C<sub>2</sub>-C<sub>4</sub> cyanoalkyl;

R<sub>6</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sub>5</sub> and R<sub>6</sub> may be taken together to form -CH<sub>2</sub>-, -CH<sub>2</sub>-CH<sub>2</sub>-, -CH<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>- or -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-;

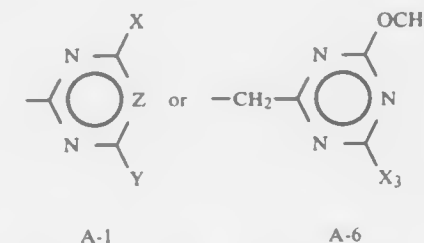
R<sub>7</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> haloalkyl;R<sub>8</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, Cl or CN;R<sub>9</sub> is C<sub>1</sub>-C<sub>2</sub> alkyl;R<sub>10</sub> is H or CH<sub>3</sub>;R<sub>11</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl or C<sub>3</sub>-C<sub>4</sub> alkynyl;R<sub>12</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>1</sub>-C<sub>4</sub> alkylamino or di(C<sub>1</sub>-C<sub>4</sub> alkyl)-amino;W<sub>1</sub> is I or S;

n is 0, 1 or 2;

m is 1 or 2;

R<sub>12</sub> is H or CH<sub>3</sub>;R<sub>13</sub> is H or CH<sub>3</sub>;R<sub>14</sub> and R<sub>15</sub> are independently C<sub>1</sub>-C<sub>2</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> alkoxy,C<sub>1</sub>-C<sub>2</sub> alkylthio, NHCH<sub>3</sub> or N(CH<sub>3</sub>)<sub>2</sub>;

A is



X is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>2</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>2</sub>-C<sub>5</sub>

alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino or di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino;

Y is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>2</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino, C<sub>3</sub>-C<sub>4</sub> alkenyloxy, C<sub>3</sub>-C<sub>4</sub> alkynyloxy, C<sub>2</sub>-C<sub>5</sub> alkylthioalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfinylalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfonylalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>3</sub>-C<sub>5</sub> cycloalkyl, azido, cyano,

or N(OCH<sub>3</sub>)CH<sub>3</sub>;

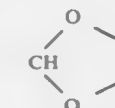
i is 2 or 3;

Q<sub>1</sub> and Q<sub>2</sub> are independently O or S;R<sub>f</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>g</sub> and R<sub>h</sub> are independently C<sub>1</sub>-C<sub>3</sub> alkyl;

Z is N;

and their agriculturally suitable salts; provided that

(1) when W is S, then R is H, E is a single bond, A is A-1, and Y is CH<sub>3</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, CH<sub>2</sub>OCH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, CF<sub>3</sub>, SCH<sub>3</sub>, OCH<sub>2</sub>CH=CH<sub>2</sub>, OCH<sub>2</sub>C=CH<sub>2</sub>, OCH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>, CH(OCH<sub>3</sub>)<sub>2</sub> or



(2) when the total number of carbon atoms of X and Y is greater than four, then the combined number of carbons of R<sub>1</sub> and Q is less than or equal to six;

(3) when Y is CN then Q is other than CH<sub>2</sub>OCH<sub>3</sub> or CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub>;

(4) when J is J-1, A is A-1, R<sub>1</sub> is H, Q is CH<sub>2</sub>OR<sub>3</sub> and both of X and Y are selected from CH<sub>3</sub>, OCH<sub>3</sub> or OCH<sub>2</sub>CH<sub>3</sub>, then R<sub>3</sub> is other than C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> haloalkyl.

13. A composition suitable for controlling the growth of undesired vegetation which comprises a herbicidally effective amount of a compound of claim 1 and a diluent, surfactant, or mixtures thereof.

4,948,420

## HERBICIDAL ARYLOXY PHENOXY ACYL MALONATES

Tamás Kórmives; Ferenc Dutka, both of Budapest; István Barta, Paty; István Jablonkai, Budapest; Ágnes Hulesch, Budapest; Ferenc Blhari, Budapest; Gyula Elfert, Dunaharaszti; Péter Bohus, Budapest; Katalin Tromfos, Budapest; Ágnes Mészáros née Szekrenyesi, Budapest, and István Küronya, Budapest, all of Hungary, assignors to Budapesti Vegyiművek and MTA Kozmóti Médiai Kutató Intézet, both of Budapest, Hungary

Continuation-in-part of Ser. No. 910,892, Sep. 23, 1986, Pat. No. 4,765,825. This application Aug. 12, 1988, Ser. No. 231,883

Claims priority, application Hungary, Oct. 1, 1985, 3798/85; Jun. 27, 1986, 3798/85

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

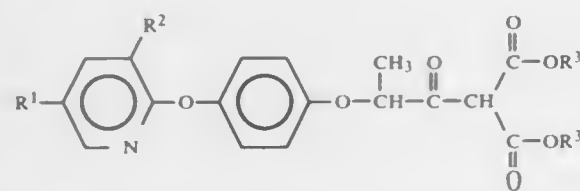
Int. Cl.<sup>7</sup> C07D 213/57, 213/643; A01N 43/40

U.S. Cl. 71-94

4 Claims

1. A compound of the Formula (I)





wherein

R<sup>1</sup> is hydrogen, halogen, trifluoromethyl, trifluoromethoxy or cyano;  
R<sup>2</sup> is hydrogen, halogen, or methyl; and  
R<sup>3</sup> is C<sub>1</sub> to C<sub>4</sub> alkyl, and the R<sup>3</sup> substituents may be the same or different.

4. A method for controlling weeds which comprises the step of applying to a plant site in need of said treatment, an herbicidally effective amount of the compound of the Formula (I) defined in claim 1.

4,948,421

#### PHENOXYPROPIONIC ACID ESTER DERIVATIVES AS HERBICIDES

Sinzo Someya, Tokorozawa; Seigo Koura, Nerima; Mikio Ito, Tokuyama; Yoichi Kitamura, Sin-nan-yoo; Hiroyuki Watanabe, Sin-nan-yoo, and Kenji Tsuzuki, Sin-nan-yoo, all of Japan, assignors to Tosoh Corporation, Yamaguchi and Agro-Kanesho Co., Ltd., Tokyo, both of Japan

Filed Apr. 20, 1988, Ser. No. 184,052

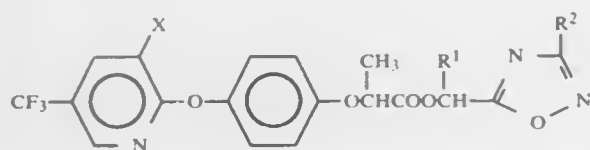
Claims priority, application Japan, Apr. 20, 1987, 62-97043; Aug. 20, 1987, 62-207172; Oct. 23, 1987, 62-267110

Int. Cl.<sup>5</sup> A01N 43/40; C07D 405/00, 401/00, 409/00

U.S. Cl. 71-94

9 Claims

1. A phenoxypropionic acid ester derivative of the formula:



where X is H or Cl, R<sup>1</sup> is H or CH<sub>3</sub>, and R<sup>2</sup> is H or C<sub>1-4</sub> alkyl.

9. A method of selectively inhibiting the growth of weeds of the Gramineae family from an area containing such weeds and also containing broadleaf plant crops without significantly damaging said broadleaf crops comprising applying to said area a herbicidally effective amount of the compound of claim 1.

4,948,422

#### METHOD OF MANUFACTURING SUPERFINE MAGNETIC METAL POWDER

Akinori Yoshizawa, Nakanodaini Corpo No. 1102, 24-16, Nakano 5-chome, Nakano-ku, Tokyo 164; Tomoo Maeda, and Masayuki Yamato, both of Tokyo, all of Japan, assignors to Akinori Yoshizawa and Nippon Kokan Kabushiki Kaisha, both of Tokyo, Japan

PCT No. PCT/JP88/00545, § 371 Date Feb. 2, 1989, § 102(e) Date Feb. 2, 1989, PCT Pub. No. WO88/10002, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 6, 1988, Ser. No. 309,552

Claims priority, application Japan, Jun. 10, 1987, 62-144825

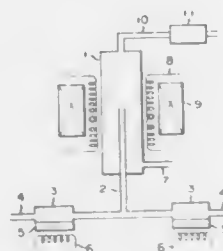
Int. Cl.<sup>5</sup> B22F 9/28

U.S. Cl. 75-348

18 Claims

1. A method of manufacturing a superfine magnetic metal powder comprising reacting at least one gaseous metal halide selected from the group consisting of iron, cobalt and nickel halides with hydrogen gas in a reaction region while supplying to said reaction region, an active gas having a higher reactivity

with said gaseous metal halide than the reactivity of hydrogen gas with said gaseous metal halide whereby said metal of said



gaseous metal halide is reduced and forms said superfine magnetic metal powder.

4,948,423

#### ALLOY PREPARATION OF HYDROGEN STORAGE MATERIALS

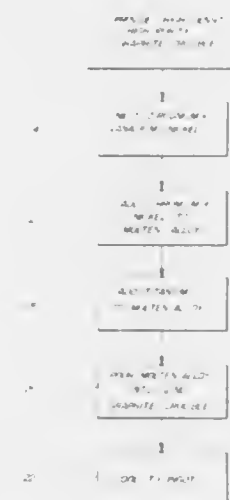
Michael A. Fetcenko, Royal Oak; Steven P. Sumner, and Joseph LaRocca, both of Warren, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Jul. 21, 1989, Ser. No. 382,599

Int. Cl.<sup>5</sup> C21C 7/10

U.S. Cl. 75-10.14

11 Claims



1. A method for the vacuum induction melting preparation of a multi-component, highly alloyed hydrogen storage material comprising at least titanium, zirconium, vanadium, nickel, chromium and at least one modifier element selected from the group consisting of manganese, aluminum, molybdenum, copper, tungsten, iron, silicon, tin, zinc and combinations thereof, said alloy being adapted for use as the negative electrode material of rechargeable electrochemical, hydrogen storage cells, said method comprising the steps of:

- providing a high density, high purity graphite crucible;
- providing electrochemically operative amounts of zirconium and vanadium-nickel alloy in said high density, high purity graphite crucible;
- vacuum induction melting said zirconium and said vanadium-nickel alloy in said graphite crucible;
- adding electrochemically operative amounts of nickel, chromium, titanium and modifier element to the molten zirconium-vanadium-nickel alloy, while heating said molten zirconium-vanadium-nickel alloy to a temperature sufficient to melt said nickel, chromium, titanium and

modifier to form a molten hydrogen storage alloy material; and  
(e) pouring said molten hydrogen storage alloy material from said high density, high purity graphite crucible into a water cooled graphite ingot mold.

4,948,424

#### LOW VOLTAGE SWITCHING APPARATUS SINTER CONTACT MATERIAL

Wolfgang Haufe, Hessdorf, and Bernard Rothkegel, deceased, late of Nuremberg, both of Fed. Rep. of Germany (by Rita G. Rothkegel, Bianca Rothkegel and Matthias Rothkegel, heirs.), assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 17, 1989, Ser. No. 438,514

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1988, 3838951

Int. Cl.<sup>5</sup> C22L 29/12

U.S. Cl. 75-234

19 Claims

1. In a sinter contact material containing silver (Ag), tin oxide (SnO<sub>2</sub>), bismuth oxide (Bi<sub>2</sub>O<sub>3</sub>), and copper oxide (CuO) and produced from an intraoxidized alloy powder of the metals silver, tin, bismuth, and copper, wherein the tin oxide is contained in parts by weight of 4 to 12% and the ratio of parts by weight of tin oxide to bismuth oxide is between 8:1 and 12:1 and tin oxide to copper oxide is between 8:1 to 12:1 in the intraoxidized alloy powder, the improvement comprising: at least zirconium oxide (ZrO<sub>2</sub>) is present.

4,948,425

TITANIUM CARBO-NITRIDE AND CHROMIUM CARBIDE-BASED CERAMICS CONTAINING METALS  
Tadahiko Watanabe; Tsuyoshi Doutsu, both of Tosu; Osamu Yagishita, Oomuta; Hideki Yamamoto, Oomuta, and Yukio Kai, Oomuta, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 334,219

Claims priority, application Japan, Apr. 9, 1988, 63-87778

Int. Cl.<sup>5</sup> C22C 29/04

U.S. Cl. 75-238

7 Claims

1. A titanium carbo-nitride and chromium carbide-based ceramic containing metals prepared by sintering a powder mixture obtained by adding 0.05 to 40 percent by weight of one or more elements selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, iron, cobalt, nickel, and silicon to a basic component that consists of titanium carbo-nitride containing different ratios of carbon and nitrogen and 1 to 30 percent by weight of chromium carbide.

4,948,426

#### SINTERING METAL POWDER AND A PROCESS FOR MAKING A SINTERED METAL PRODUCT

Yutaka Kato, Tachikawa, and Yoshio Kijima, Setagaya, both of Japan, assignors to Sumitomo Metal Mining Company Limited, Japan

Filed Jan. 22, 1990, Ser. No. 468,274

Claims priority, application Japan, Oct. 17, 1989, 1-269730

Int. Cl.<sup>5</sup> B22F 1/00

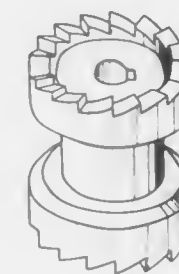
U.S. Cl. 419-23

13 Claims

3. A process for making a sintered metal product comprising:

- preparing a mixture of (i) a metal powder consisting of metal particles having a particle diameter distribution including a plurality of peaks and having the following characteristics:
  - The larger of the two particle diameters defining every adjoining two of said peaks has a ratio of between 5 and 10 to the smaller;
  - The height of one of every adjoining two of said peaks has a ratio of between 1 and 5 to that of the other that is not higher than said one peak;
  - The particle diameter defining one of every adjoining

two of said peaks which is not higher than the other is smaller than that defining said other peak; and  
(d) The particle diameter defining the highest of said peaks is between 30 and 80 microns, and (ii) a binder;



4,948,427

#### PROCESS FOR PREPARING INK FOR INK JET PRINTER

Yasuo Yamagishi, Zama; Toshiaki Narusawa; Norio Sawatari, both of Sagami, and Katsuji Ebisu, Isehara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

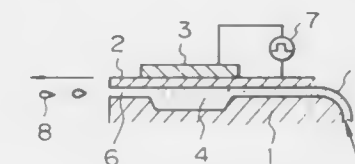
Continuation of Ser. No. 113,409, Oct. 27, 1987, abandoned, which is a continuation of Ser. No. 779,567, Sep. 24, 1985, abandoned. This application May 30, 1989, Ser. No. 358,459

Claims priority, application Japan, Sep. 28, 1984, 59-202070

Int. Cl.<sup>5</sup> C09D 11/02

U.S. Cl. 106-20

25 Claims



1. A process for preparing an ink before its introduction into a drop-on-demand type ink jet printer comprising: dissolving a water soluble dye in a solvent comprising water to present an ink solution; and  
applying sonic vibration to the ink solution during the dissolving of the dye into the solvent to remove gas entrained into the ink solution with the dye.

4,948,428

#### GROUTING COMPOSITION AND METHOD FOR GROUTING CONDUITS IN WELL BORES

Andrew Liao, Houston, Tex., assignor to Barold Technology, Inc., Houston, Tex.

Filed Sep. 14, 1988, Ser. No. 244,846

Int. Cl.<sup>5</sup> C04B 26/00

U.S. Cl. 106-628

33 Claims

1. A pumpable grout composition comprising from about 15 to about 30% by weight of a water swellable clay and an aqueous mixture comprising from about 1.5 to about 15.5 grams per liter of said mixture of a hectorite, from about 3.0 to about 11.0 grams per liter of said mixture of an alkali metal tetraborate, from about 1.6 to about 9.4 grams per liter of said mixture of an alkali metal carbonate and from about 1.6 to about 16 grams per liter of said mixture of an alkali metal chloride.

4,948,429

**METHOD OF CONTROLLING AIR ENTRAINMENT IN CONCRETE COMPOSITIONS**

Ahmad Arfaei, Milford, N.H., assignor to W. R. Grace &amp; Co.-Conn., Lexington, Mass.

Filed Jan. 14, 1989, Ser. No. 366,908

Int. Cl.<sup>3</sup> C04B 24/00

U.S. Cl. 106—659

14 Claims

1. A method of preparing an air entrained cementitious composition comprising the sequential steps of:

a. preparing an aqueous hydraulic cement-based slurry by admixing water, a hydraulic cement, an air entraining plasticizer, and a defoamer selected from the group consisting of acetylenic diols and reaction products thereof with alkylene oxides; and

b. increasing the air content of the said composition by adding to said composition an effective air-entraining amount of a second air entraining agent.

4,948,430

**ORE PELLETS CONTAINING CARBOXYMETHYLHYDROXYETHYLCELLULOSE AND SODIUM CARBONATE**

Bruce E. Banyai; Denis E. LaSota, and Dennis L. Strunk, all of Wilmington, Del., assignors to Aqualon Company, Wilmington, Del.

Filed Jun. 15, 1989, Ser. No. 366,597

Int. Cl.<sup>3</sup> C08L 1/08, 126

U.S. Cl. 75—321

4 Claims

1. An ore pellet dry mixture containing on a weight basis at least about 0.022% of a binder composition of sodium carboxymethylhydroxyethylcellulose and sodium carbonate.

4,948,431

**PATCH BINDER AND METHOD FOR ROAD SURFACE REPAIR**

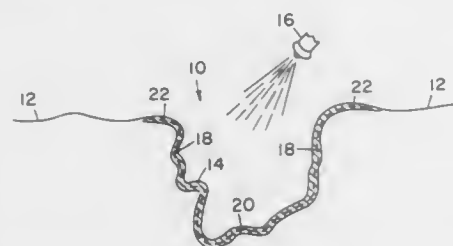
Paul D. Strickland, 2685 S. Dayton Way, Denver, Colo. 80231, and Paul C. Doran, 13146 Warren Cir., Lakewood, Colo. 80228

Filed Mar. 29, 1989, Ser. No. 330,056

Int. Cl.<sup>3</sup> C08L 95/00

U.S. Cl. 106—273.1

8 Claims



1. A mixture for use as a repair patch binder, comprising:
- (a) Toluene, in the percentage by weight range of 64 to 70;
  - (b) Cyclohexanone, in the percentage by weight range of 12 to 14;
  - (c) N-methylpyrrolidone, in the percentage by weight range of 12 to 14;
  - (d) a surfactant, in the percentage by weight range of 4.5 to 5.5; and
  - (e) a black dye, in the percentage by weight range of 2 to 3.

4,948,432

**METHOD FOR MANUFACTURING A ROTOR FOR USE IN A PROGRESSIVE CAVITY PUMP**

James K. Leach, Long Beach, Calif., assignor to Pacific Alloy Castings, Inc., South Gate, Calif.

Filed Nov. 4, 1988, Ser. No. 267,384

Int. Cl.<sup>3</sup> C21D 5/04

U.S. Cl. 148—3

12 Claims



1. A method for manufacturing a rotor for use in a progressive cavity pump, in which the rotor comprises an elongated metal bar having a helical recess formed in its outer surface and progressing along the length of the rotor, the method comprising casting the metal bar generally in the shape of the rotor with said helical recess being formed in the outer surface of the resulting casting, the casting being formed from an abrasion-resistant white cast iron meeting the specifications for ASTM designation A 532; annealing the casting; and thereafter machining the outer surface of the annealed casting to the finished shape of the rotor so the helical recess is formed with a smooth outer surface with dimensions and a pitch sufficient for use of the rotor in a progressive cavity pump; and thereafter heat-treating the rotor to increase the strength and hardness of the rotor for providing a finished rotor suitable for use in a progressive cavity pump.

4,948,433

**PROCESS FOR PREPARATION OF THIN GRAIN ORIENTED ELECTRICAL STEEL SHEET HAVING EXCELLENT IRON LOSS AND HIGH FLUX DENSITY**

Shozaburo Nakashima; Katsuro Kuroki, and Kiyoshi Ueno, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

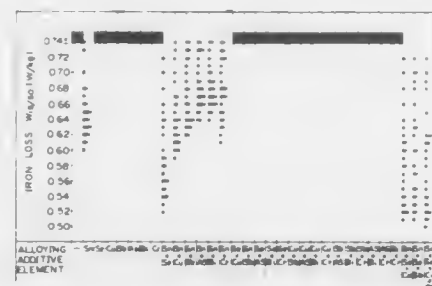
Filed Nov. 8, 1988, Ser. No. 268,404

Claims priority, application Japan, Nov. 10, 1987, 62-282060; Oct. 7, 1988, 63-251996

Int. Cl.<sup>3</sup> H01F 1/04

U.S. Cl. 148—111

2 Claims



1. In a process for the preparation of a thin grain oriented electrical steel sheet having a reduced iron loss and a high flux density, which comprises subjecting a silicon steel slab comprising 0.050 to 0.120% by weight of C, 2.8 to 4.0% by weight of Si and 0.05 to 0.25% by weight of Sn, to a high-temperature treatment, hot-rolling the silicon steel slab, annealing the rolled steel sheet at a temperature of at least 920° C. for at least 30 seconds before final cold rolling, rolling the annealed steel sheet at a reduction ratio of 81 to 95% at final cold rolling to obtain a final thickness of 0.05 to 0.25 mm, subjecting the steel sheet to decarburization annealing, coating an anneal separating agent on the steel sheet and subjecting the steel sheet to finish annealing, the improvement wherein the starting silicon

slab further comprises up to 0.035% by weight of S and 0.005 to 0.035% by weight of Se, with the proviso that the total amount of S and Se is in the range of 0.015 to 0.060% by weight, 0.050 to 0.090% by weight of Mn, with the proviso that the Mn content is in the range of  $\{1.5 \times [\text{content } (\% \text{ by weight}) \text{ of S} + \text{content } (\% \text{ by weight}) \text{ of Se}]\}$  to  $\{4.5 \times [\text{content } (\% \text{ by weight}) \text{ of S} + \text{content } (\% \text{ by weight}) \text{ of Se}]\}$  by weight, 0.0050 to 0.0100% by weight of N, and  $\{27/14 \times \text{content } (\% \text{ by weight}) \text{ of N} + 0.0030\}$  to  $\{27/14 \times \text{content } (\% \text{ by weight}) \text{ of N} + 0.0150\}$  % by weight of acid-soluble Al, with the balance comprising Fe and unavoidable impurities.

4,948,434

**METHOD FOR MANUFACTURING NI-FE ALLOY SHEET HAVING EXCELLENT DC MAGNETIC PROPERTY AND EXCELLENT AC MAGNETIC PROPERTY**

Tadashi Inoue, and Tomoyoshi Ohkita, both of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

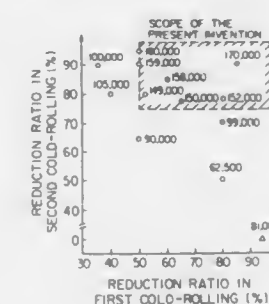
Filed Mar. 14, 1989, Ser. No. 324,232

Claims priority, application Japan, Apr. 1, 1988, 63-78153

Int. Cl.<sup>3</sup> C21D 8/12; C22F 1/10

U.S. Cl. 148—120

10 Claims



5. The method for manufacturing a Ni-Fe alloy sheet having excellent Dc magnetic properties and excellent AC magnetic properties, comprising the sequential steps of: providing a material consisting essential of:

nickel	from 76 to 81 wt. %,
molybdenum	from 3 to 5 wt. %,
copper	from 1.5 to 3.0 wt. %,
boron	from 0.0015 to 0.0050 wt. %,

and

the balance being iron and incidental impurities, where, the respective contents of sulfur, phosphorus, carbon, oxygen and nitrogen as said incidental impurities being:

up to 0.002 wt.% for sulfur,  
up to 0.0006 wt.% for phosphorus,  
up to 0.02 wt.% for carbon,  
up to 0.003 wt.% for oxygen, and  
up to 0.0015 wt.% for nitrogen;  
hot-working said material to form a Ni-Fe alloy sheet;  
cold-rolling said alloy sheet at a reduction ratio of from 50 to 98%;  
annealing said cold-rolled alloy sheet at a temperature of from 780° to 950° C;  
cold-rolling said annealed alloy sheet at a reduction ratio of from 75 to 98%, and  
annealing said twice cold-rolled alloy sheet at a temperature of from 950° to 1,200° C;  
to form an alloy sheet having the excellent DC magnetic properties of an initial magnetic permeability of at least 147,000, a maximum magnetic permeability of at least 280,000 and a coercive force of up to 0.009 (Oe) and the excellent AC magnetic properties of an effective magnetic

permeability of at least 19,000 and a Br/Bm ratio of at least 0.90.

4,948,435

**METHOD FOR INHIBITING STRESS CORROSION CRACKING**

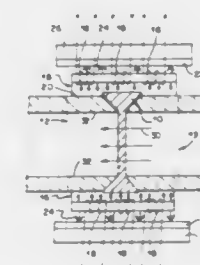
Thomas M. Butler, 7564 Clarence Ave., Palisades, N.Y. 13142, and David Santic, 236 E. 6 St., New York, N.Y. 10003

Filed Jan. 4, 1988, Ser. No. 140,547

Int. Cl.<sup>3</sup> C21D 9/50

U.S. Cl. 148—127

8 Claims



1. A method for the inhibition of intergranular stress corrosion cracking adjacent to a welded joint in an austenitic stainless steel workpiece, comprising the steps of: selectively subjecting a first surface of said welded joint and the workpiece areas adjacent thereto that are normally subject to localized residual compressive stress to radiant heat emanating from an external source of radiant heat disposed in closely spaced proximity thereto, maintaining a flow of cooling fluid past a second surface of said welded joint disposed in spaced relation with said first surface and the workpiece area adjacent to said second surface that are normally subject to localized residual tensile stress, regulating the quantum of applied radiant heat and the quantum of said cooling fluid to create a temperature differential across said first and second surfaces of said welded joint and the workpiece areas adjacent thereto of a magnitude sufficient to create a localized thermal stress in excess of the localized residual compressive yield stress on said first surface and areas adjacent thereto and in excess of the localized residual tensile yield stress on said second surface and areas adjacent thereto, and cooling said first and second surfaces of said welded joint and areas adjacent thereto to ambient temperature to markedly reduce the magnitude of the residual compressive stress on said first surface and workpiece areas adjacent thereto and to markedly reduce the magnitude of the residual tensile stress on said second surface and workpiece areas adjacent thereto.

4,948,436

**THIN-FILM SOLAR CELL ARRANGEMENT**

Wilfried Juergens, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich

Filed Dec. 23, 1988, Ser. No. 288,857

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1988, 3803519

Int. Cl.<sup>3</sup> H01L 31/05, 31/075

U.S. Cl. 136—249

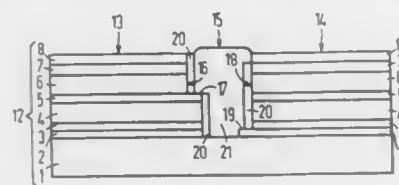
3 Claims

1. A thin-film solar cell device comprising at least one first solar cell and one second solar cell of the pin-type or nip-type that are arranged relative to one another as a tandem cell, each comprising a p-layer, an i-layer, an n-layer, and contact layers suitable for a module structure comprising series interconnection, wherein the first and second solar cells are located relative to one another such that neighboring layers of the first



solar cell and of the second solar cell are of the same conductivity type and are provided as a single, common layer; p-layers of the first solar cell and of the second solar cell, as well as n-layers of the first solar cell and of the second solar cell, are electrically connected to one another in a parallel circuit, and further including a plurality of series-interconnected tandem cells of such construction, wherein the first solar cell and the second solar cell in every tandem cell includes a parallel end connection provided with the means for providing series interconnection, and wherein:

- the tandem cells are provided in a layer format;
- grooves that separate the individual tandem cells from another are provided in the layer format;
- the grooves extend perpendicularly relative to the layers



- and comprise a first step at a first side wall of the groove, said common layer lying at a surface of said first step;
- the first side wall of the groove is covered with an insulator layer that is structured such that it leaves the surface of the first step uncovered but covers all other layers;
  - the grooves further comprise a second step at a second side wall that lies opposite the first side wall, the contact layer facing away from the surface of the layer format lying at a surface of said second step;
  - the second side wall of the groove is covered with an insulator layer that is structured such that the contact layers are uncovered but all other layers are covered; and
  - the grooves are filled with an electrically conductive material which provides electrical conduction between said common layer and said contact layers.

4,948,437

#### PROCESS FOR THE HEAT-AFTER TREATMENT OF A PIG IRON PORT

Horst Metzler, Tuttlingen, Fed. Rep. of Germany, assignor to Schwabische Huttenwerke GmbH, Fed. Rep. of Germany  
Filed Feb. 11, 1988, Ser. No. 155,040

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1987, 3704679

Int. Cl.<sup>5</sup> C21D 5/00

U.S. Cl. 148—138

1 Claim

1. A process for the heat-after treatment of a part made from iron, containing:

- carbon in an amount of 3.62 to 3.68 weight %;
- silicon in an amount not exceeding 2.10 weight %;
- manganese in an amount of 0.70 to 0.85 weight %;
- phosphorus in an amount of less than 0.080 weight %;
- sulfur in an amount of less than 0.095 weight %;
- chromium in an amount of 0.18 to 0.25 weight %;
- copper in an amount of 0.30 to 0.45 weight %;
- molybdenum in an amount of 0.30 to 0.45 weight %; and
- iron in an amount of 92.045 to 94.9 weight %; comprising the steps of:

- heating said part to a temperature of from 650 to 720° C. over a period of about 180 minutes;
- maintaining said part at that temperature for about 30 minutes; and then
- slowly cooling it to 250° C. in an annealing furnace to produce a pearlitic structure without carbide precipitation.

4,948,438

#### INTERMOLECULAR COMPLEX EXPLOSIVES

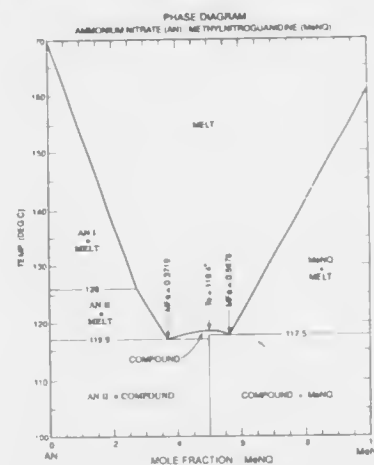
Michael A. Patrick, Shalimar, and Stephen A. Anbert, Niceville, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 13, 1989, Ser. No. 435,636

Int. Cl.<sup>5</sup> C06G 33/08

U.S. Cl. 149—38

13 Claims



1. A melt/cast explosive composition comprising about 20 to 100 wt. % of a binary complex of ammonium nitrate and methylnitroguanidine in a molar ratio of about 0.55:1 to 1.35:1.

4,948,439

#### COMPOSITION AND PROCESS FOR INFLATING A SAFETY CRASH BAG

Donald R. Poole, Woodinville, and Michael A. Wilson, Bothell, both of Wash., assignors to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Continuation-in-part of Ser. No. 278,848, Dec. 2, 1988, Pat. No. 4,909,549. This application Jan. 9, 1990, Ser. No. 462,476

Int. Cl.<sup>5</sup> C06B 31/28

U.S. Cl. 149—46

19 Claims

11. A pyrotechnic mixture useful to generate substantially non-toxic combustion products including a gas to inflate a crash bag, said pyrotechnic mixture comprising at least one tetrazole compound containing hydrogen in the molecule or a triazole compound containing hydrogen in the molecule, each in admixture with at least one oxygen containing oxidizer compound and at least one metal oxide so as to produce, upon combustion, a substantially non-toxic primary gas mixture and easily filterable solids.

4,948,440

#### EMULSION BLASTING AGENT PREPARATION SYSTEM

William E. Cribb, Point Claire; John R. Chiles, Thornhill, both of Canada; William B. Evans, Gosford, Australia, and Ralph H. Derry, Otterburn Park, Canada, assignors to C-1-L Inc., North York, Ontario, Canada

Filed Oct. 3, 1988, Ser. No. 252,538

Claims priority, application Canada, Oct. 5, 1987, 548645

Int. Cl.<sup>5</sup> D03D 23/00

U.S. Cl. 149—109.6

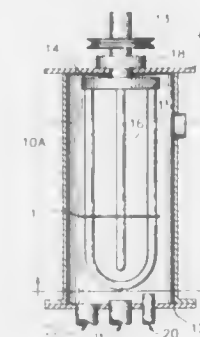
4 Claims

1. A continuous method for the manufacture of a water-in-oil explosive emulsion precursor comprising a discontinuous aqueous oxidizer salt phase and a continuous oil phase comprising the steps of:

- forming an oxidizer salt solution;
- forming a liquid organic fuel and emulsifier mixture;
- proportionally introducing said salt solution and said

liquid organic fuel and emulsifier mixture into an emulsifying blender and mixing in order to form a water-in-oil emulsion, the said blender comprising:

- a vertical cylindrical tank closed at its upper and lower ends;
- a rotatable, externally drive beater/agitator mounted vertically within said tank and extending over the length of the said cylindrical tank;



- fluid inlet ports extending through the said lower closed end for the introduction of the said salt solution and organic fuel; and
- at least one outlet port extending through the said cylindrical tank vertical wall close to an upper end of said cylindrical tank; and
- collecting the resultant emulsion from the said blender.

4,948,441

#### METHOD AND APPARATUS FOR FABRICATION OF AN OPENABLE CONTAINER LID

Norman E. Peck, Houston, Tex., assignor to Rampart Packaging Inc., Williamsburg, Va.

Filed Aug. 15, 1988, Ser. No. 232,067

Int. Cl.<sup>5</sup> B32B 31/20

U.S. Cl. 156—69

5 Claims



1. A method of joining thermoplastic lid stock placed upon a thermoplastic container flange to said flange in a reopenable manner, said method comprising the following steps of:
- heating opening definition means with thermal energy supplied from heater means,
  - moving the heated opening definition means downward into contact with the lid stock causing a failure zone opening to be melted into the lid stock, and
  - maintaining the opening definition means in contact with the lid stock until the lid stock is heat-sealed to the container flange.

4,948,442

#### METHOD OF MAKING A MULTIWELL TEST PLATE

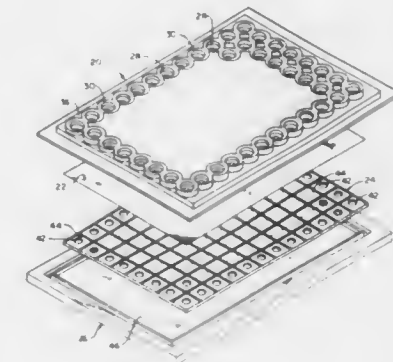
Roy Manns, Belmont, Mass., assignor to Polyfiltronics, Inc., Rockland, Mass.

Filed Jun. 18, 1985, Ser. No. 745,877

Int. Cl.<sup>5</sup> B32B 31/16

U.S. Cl. 156—73.1

5 Claims



1. Method of making a micro-titre filter plate having a substantially flat, thermoplastic culture tray with a plurality of wells arranged in a regular array, said wells extending between open ends on opposite flat surfaces of said tray, and a substantially flat, thermoplastic harvester tray having a like plurality of openings therethrough, said method comprising the steps of:
- circumscribing each of said openings on one, surface of said harvester tray with one of a mating groove and ridge;
  - circumscribing each of said wells on one surface of said culture tray with the other of said mating groove and ridge;
  - positioning a filtration sheet across all of said openings on said one surface of said harvester tray;
  - positioning said harvester tray with respect to said culture tray with said one surface of each adjacent the other so that each said opening is adjacent and registered with each said well, and said filtration sheet is disposed between said harvester tray and said culture tray;
  - compressing the positioned trays and filtration sheet perpendicularly to the planes of said trays until the top edge of each said ridge is substantially in contact with the interior surface of each said groove; and
  - thermally bonding each said top edge of each said ridge with each said interior surface of each said groove, thereby to form a fluid-impervious wall circumscribing the juncture of each registered well and opening.

4,948,443

#### PLASTIC LAMINATE REPAIR

Lawrence Speer, 16678 Chibiabos Trail, Doylestown, Ohio 44230

Filed Feb. 22, 1989, Ser. No. 314,187

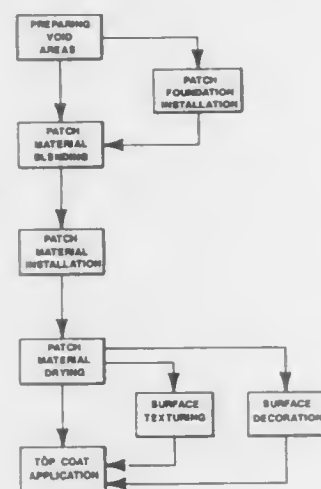
Int. Cl.<sup>5</sup> B32B 35/00

U.S. Cl. 156—94

10 Claims

1. A process for restoring plastic laminate structures having unwanted void areas in the surface thereof comprising the steps of:
- cleaning the void areas preparatory to their filling;
  - thereafter filling the void areas with patch materials; and
  - applying protective topcoatings to the exposed surface of the fillings,
- wherein said cleaning comprises removing loose and adventitious material from said voids, and
- wherein said patch materials comprise (1) a member selected from the group consisting of vinyl acetate/acrylic copoly-

mers, vinyl acetate homopolymers, and mixtures of vinyl acetate/acrylic copolymers with said vinyl acetate homo-



polymers, together with (2) inert mineral powders, and (3) color pigments; and wherein further, said topcoatings are polyurethane polymers.

4,948,444

#### PROCESS FOR PRODUCTION OF A BUNDLE OF HOLLOW SEMI-PERMEABLE FIBERS

Richard A. Schutz, Mulhouse, and Patrick Paris, Tournefeuille, both of France, assignors to Societe Lyonnaise des Eaux, Paris, France

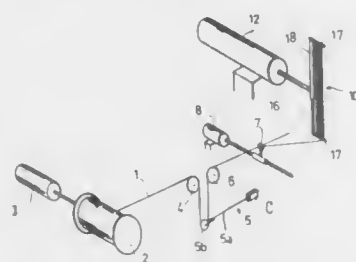
Filed Sep. 23, 1988, Ser. No. 248,879

Claims priority, application France, Sep. 23, 1987, 87 13251

Int. Cl.<sup>3</sup> B01D 63/02, 67/00, 69/08

U.S. Cl. 156—168

6 Claims



1. A process for producing a bundle of hollow, semi-permeable fibers from at least one filament (1) comprising winding said filament around a support member having two take-up edges spaced from and parallel to a winding axis so as to form a plurality of superposed layers thereon, conferring upon said filament during winding an alternating transverse movement of an amplitude decreasing in successive layers so as to produce a winding on said support member of a predetermined profile corresponding to said support member, retracting the edges of said support member and removing said wound filament from said support member to form a bundle having a profile corresponding to said support member and curved ends.

#### 4,948,445 METHOD AND APPARATUS FOR MAKING A CORRUGATED FIBERBOARD HONEYCOMB STRUCTURE

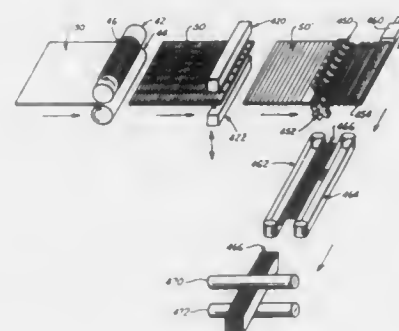
Ronald D. Hees, 1757 Lakewood Dr., Rt. 7, Gaylord, Mich. 49735

Filed Oct. 28, 1988, Ser. No. 264,023

Int. Cl.<sup>3</sup> B32B 31/18

U.S. Cl. 156—196

24 Claims



1. A method of forming cellular core structures from corrugated fiberboard comprising the steps of:

- (1) providing a starting material in the form of a plurality of flat sheets of single wall corrugated board of rectangular configuration in plan view each having identical predetermined length and width dimensions, said board having top and bottom flat facings and one corrugated inner member disposed between and glued to the inner surfaces of said flat facings the flutes of said inner member extending parallel to one of said dimensions;
- (2) feeding said sheets endwise one at a time in the direction of the longitudinal dimension of said flutes into a die cutting station;
- (3) die cutting and crease-lining of said sheets seriatim in said die cutting station to impart to each said sheet (a) a parallel array of evenly spaced direct lines extending perpendicular to said flute-feed direction from side edge to the other side edge of each sheet, each said die cut line being defined by an alternating series of very long die cuts and very short die cuts individually spaced from one another along said die cut line by very short uncut sheet material connecting portions to thereby form a plurality of strips of said sheet material intermittently integrally joined by said uncut sheet material connecting portions, the dimension of each strip in the direction of sheet feed being only slightly greater than the desired final thickness dimension of the honeycomb cellular core structure to be made from the die cut sheet, and (b) an array of crease lines extending parallel to said flute-feed direction and arranged in pairs spaced apart in the direction of said die cut lines and closely flanking each of said uncut connecting portions,
- (4) then feeding each as so die cut and crease-lined endwise in the direction of longitudinal dimension of the flutes therein, into a gluing station and thereon individual glue spots in a predetermined pattern to outer surface of at least one of said top and bottom facings between selected pairs of crease lines which are to be juxtaposed to a of the outer surface of the facing opposite said one facing of a juxtaposed strip having no glue spot applied thereto, and
- (5) then forming from said die cut, crease-lined and glue-spotted sheets a plurality of stacks of adhesively bonded honeycomb-formable strips of said sheet material by juxtaposing the face of one strip having glue spots thereon to the face of another strip having no glue spots thereon with the glue spots of the second strip alternating lengthwise of the strip with the glue spots of the first strip.

4,948,446

#### HEAT-SENSITIVE TRANSFERRING MEDIUM OF DELAYED SENDING TYPE

Takashi Yamahata, Yamato Koriyama, and Tadatoshi Ohtsu, Hirakata, both of Japan, assignors to General Company Limited, Osaka, Japan

Continuation of Ser. No. 702,079, Feb. 15, 1985, abandoned.

This application Dec. 24, 1986, Ser. No. 945,804

Claims priority, application Japan, Feb. 24, 1984, 59-33857

Int. Cl.<sup>3</sup> B41M 5/26

U.S. Cl. 156—234

3 Claims

1. A process of delayed sending recording which comprises sending a heat-sensitive transferring medium and a receiving paper at different speeds such that the sending speed of the heat-sensitive transferring medium is slower than that of the receiving paper, and the heat-sensitive transferring medium being composed of:

- (a) a substrate,
- (b) a heat-melting ink layer which overlays said substrate, and
- (c) an overcoating layer mainly composed of a resin and/or a wax and overlying the transferring-side surface of the heat-melting ink layer.

4,948,447

#### METHOD OF MANUFACTURING LIGHTWEIGHT COMPOSITE GLASS-PLASTIC LENSES

Louis G. Clarke, Hopewell, and Clifford G. Gruschow, Petersburg, both of Va., assignors to BCGS, Inc., Charlotte, N.C.

Filed Feb. 21, 1989, Ser. No. 312,181

Int. Cl.<sup>3</sup> B32B 31/12

U.S. Cl. 156—273.3

5 Claims

1. The process of manufacturing a composite plastic-glass lens having a glass component and a plastic lens component that contains unreacted double bonds comprising the steps of: subjecting said plastic lens component to ultraviolet rays for a time and temperature duration sufficient to eliminate said unreacted double bonds and to reduce its thermal coefficient of expansion; and subsequently adhering said glass lens component to said plastic lens component.

4,948,448

#### METHOD OF MANUFACTURING MOISTURE RESISTANT CORRUGATED FIBERBOARD

Lennart Tengqvist, Stockholm, Sweden, assignor to Lacani AB, Fagersta, Sweden

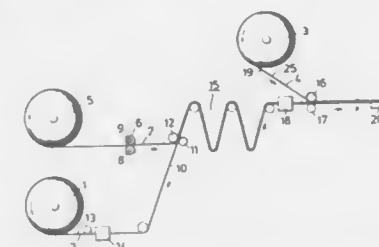
Filed Nov. 25, 1988, Ser. No. 275,976

Claims priority, application Sweden, Nov. 27, 1987, 8704754

Int. Cl.<sup>3</sup> B31F 1/20; B32B 31/12

U.S. Cl. 156—292

18 Claims



1. A method of manufacturing a moisture-resistant corrugated paperboard, particularly board intended for the manufacture of boxes, comprising an outer, planar liner, an inner planar liner and a corrugated floating disposed between said liners, and in which board the liners and floating consist of paper which includes a rosin size, the method comprising the steps of: totally impregnating, throughout the whole of its thickness, paper (5) which will be made into said corrugated floating (7), with a first suspension which includes a plastic suspension and starch; drying said impregnated paper; then

corrugating, between heated rolls, said dried impregnated paper intended for the floating; coating and at least partially impregnating additional paper (1, 3), which will provide said liners, at least with respect to the surface (2, 4) of at least one of said liners (10, 25) which is intended to face away from the floating (7), with a second suspension which includes a plastic suspension and starch; and adhesively bonding respective liners (10; 25) to the corrugated floating (7).

4,948,449

#### EPOXY RESIN COMPOSITION

Kent S. Tarbutton, Lake Elmo; Janis Robins, St. Paul, and John C. Tangen, Glenwood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 205,330, Jun. 10, 1988, abandoned, which is a division of Ser. No. 132,709, Dec. 11, 1987, Pat. No. 4,772,645, which is a continuation of Ser. No. 860,511, May 7, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 313,352

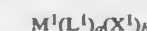
Int. Cl.<sup>3</sup> C09J 5/02

U.S. Cl. 156—307.3

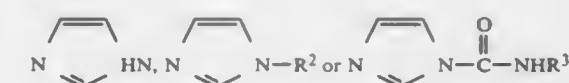
21 Claims

1. A method for adhering a first substrate to a second substrate comprising the steps of coating said first substrate with a storage-stable, thermally-curable, one part epoxy resin composition comprising a curable glycidyl ether epoxide resin; a curative amount of an aliphatic or non-aromatic cyclic polyol having about 2 to 18 carbon atoms, at least two hydroxy groups of said polyol being primary or secondary, and said polyol being free of strong acid groups, and free of electron-withdrawing substituents and large groups which cause steric hindrance in the  $\alpha$ -position in relation to the carbon atoms attached to the methylol groups of the polyol; said epoxide resin and said polyol being present in amounts such that the hydroxyl to epoxide ratio is about 0.5:1 to 1:1 and a catalytic amount of an imidazole compound selected from

(a) compounds represented by the formula



where  $M^1$  is  $Ni^{++}$ ,  $Cu^{++}$ , or  $Co^{++}$ ,  $L^1$  is



where  $R^2$  is alkyl having 1 to 18 carbon atoms, cyanoalkyl having 1 to 4 carbon atoms, phenyl, or substituted phenyl, and  $R^3$  is alkylene having 1 to 18 carbon atoms, phenyl, or substituted phenyl,

$X^1$  is  $-R^4(COO^-)_2$  where  $R^4$  is phenyl, naphthyl, or  $C_mH_{2m-1}$ , where  $m$  is 0, 1, or 2, or  $X^1$  is  $-R^5(COO^-)_e$

where  $R^5$  is phenyl or naphthyl and

$e$  is 3, 4, or 5, or

$X^1$  is an anion of a strong inorganic acid,

$a$  is 2, 4 or 6, and

$b$  is 0.5, 0.67, 1, or 2 depending on the valence of  $X^1$ ;

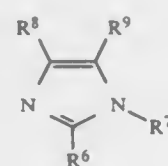
(b) compounds represented by the formula



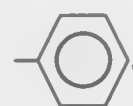
where

$L^2$  is

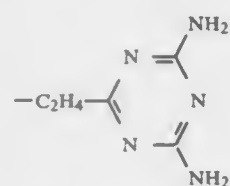




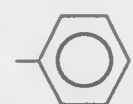
where  
R<sup>6</sup> is —H, —C<sub>n</sub>H<sub>2n+1</sub> or



n being a number of from 1 to 16,  
R<sub>7</sub> is —H, —CH<sub>3</sub>, —C<sub>2</sub>H<sub>5</sub>, —C<sub>2</sub>H<sub>4</sub>CN, or



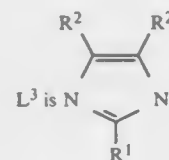
R<sup>8</sup> is —H, —CH<sub>3</sub>, —C<sub>2</sub>H<sub>5</sub>, —CH<sub>2</sub>OH, or



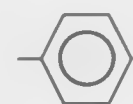
R<sup>9</sup> is —H or —CH<sub>2</sub>OH  
X<sup>2</sup> is —R<sup>4</sup> (COOH)<sub>2</sub> where R<sup>4</sup> is phenyl, naphthyl, or  
C<sub>m</sub>H<sub>2m-1</sub> where m is 0, 1, or 2, or  
X<sup>2</sup> is —R<sup>5</sup> (COOH)<sub>e</sub> where  
R<sup>5</sup> is phenyl or naphthyl and  
e is 3, 4, or 5, or  
X<sup>2</sup> is isocyanuric acid; (c) compounds represented by the  
formula

M<sup>3</sup>(L<sup>3</sup>)<sub>e</sub>

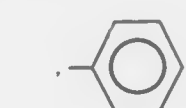
where  
M<sup>3</sup> is Ni<sup>++</sup>, Cu<sup>++</sup>, Co<sup>++</sup>, Zn<sup>++</sup>, Cu<sup>+</sup>, or Ag<sup>+</sup>,  
L<sup>3</sup>



where  
R<sup>1</sup> is —H,

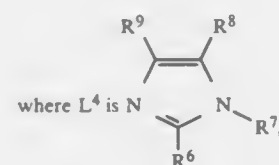


or C<sub>n</sub>H<sub>2n+1</sub>, n being a number of from 1 to 16, and  
each R<sup>2</sup> is —CH<sub>3</sub>

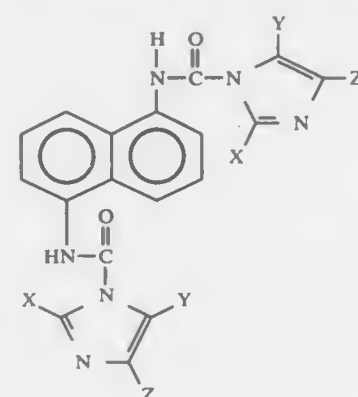


or —CH<sub>2</sub>OH, e is 1 or 2;  
(d) compounds represented by the formula

L<sup>4</sup>



where R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup> are the same as for compound  
(b); and  
(e) a compound represented by the formula



wherein X, Y and Z may be the same or different, and  
each may be hydrogen, a lower alkyl or aryl having 1–12  
carbon atoms, halo or nitro and said imidazole being  
insoluble in said epoxide resin at temperatures of about 25°  
to 35° C.; and said resin composition having a pot life of at  
least 3 days at 22° C. and at least 12 hours at 35° C., con-  
tacting said second substrate with said coated first sub-  
strate, and heating said substrates to a temperature in the  
range of 100° to 200° C. to cure said composition and bond  
said substrates together.

4,948,450

#### METHOD OF MAKING AN ADHESIVE LABEL

Hans-Ulrich Hürter, and Dieter Frenkler, both of Schwelm, Fed.  
Rep. of Germany, assignors to Jackstadt GmbH, Wuppertal,  
Fed. Rep. of Germany  
Division of Ser. No. 84,592, Aug. 1, 1987. This application Oct.  
6, 1988, Ser. No. 253,904

Claims priority, application Fed. Rep. of Germany, Sep. 2,  
1986, 3629770; Sep. 16, 1986, 3631397

Int. Cl.<sup>5</sup> B32B 7/00

U.S. Cl. 156—310

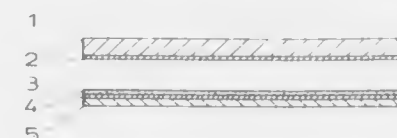
9 Claims

1. A method for making an adhesive label having the follow-  
ing layers in order: a printing carrier; a solvent-free isocyanate-  
terminated polyurethane primer; an adhesive layer and a cover  
layer, said method consisting essentially of:

in a first step, applying the adhesive layer consisting essen-  
tially of a polyacrylate dispersed in water onto the cover  
layer and pre-drying the adhesive layer on said cover  
layer;

in a second step, applying the primer to the backside of the  
printing carrier; and  
in a third step, immediately following said second step and

the exterior surface of the evaginated tubular lining material  
being interposed between the pipe line and the lining material,  
said apparatus comprising an induction pipe provided at a front  
end thereof with a fastener for annularly fixing the tubular  
lining material, a pressure container connected to a rear end of



approximately 1–5 seconds after the application of the  
primer to the backside of the printing carrier, applying the  
adhesive layer onto the primer to connect the cover layer  
with the printing carrier.

4,948,451

#### AUTOMATIC CARPET STRIPPING APPARATUS AND METHOD

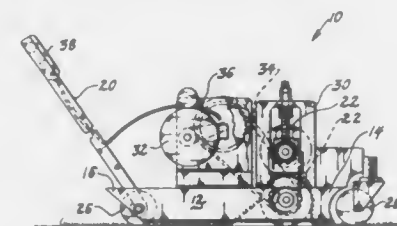
Mark S. Foltz, 1650 Lake Grove Rd., Petoskey, Mich. 49770

Filed Aug. 4, 1989, Ser. No. 389,801

Int. Cl.<sup>5</sup> B32B 31/18; A47L 11/12

U.S. Cl. 156—344

10 Claims



7. A method for stripping material adhering to a supporting  
surface from said surface comprising the steps of:  
cutting the material on the surface into one or more elon-  
gated strips;  
freeing a short section of one end of one of said elongated  
strips;  
feeding the freed end of said strip between a set of clamping  
driven rollers so that said strip of material is separated  
from said supporting surface at approximately a right  
angle to said supporting surface as it passes between said  
driven rollers; and  
driving said rollers counterclockwise to each other to "pull"  
said strip therebetween.

4,948,452

#### APPARATUS FOR LINING PIPE LINES INCLUDING LIQUID SEAL MEANS

Akio Morinaga, Fujisawa; Isaburo Yagi, Amagasaki; Hideo  
Maruyama, Osaka, and Akifumi Yamamoto, Takatsuki, all of  
Japan, assignors to Tokyo Gas Co., Ltd., Tokyo and Ashimori  
Industry Co., Ltd., Osaka, both of Japan

Division of Ser. No. 236,995, Aug. 26, 1988, Pat. No. 4,883,557.

This application Aug. 1, 1989, Ser. No. 387,770

Claims priority, application Japan, Aug. 26, 1987, 62-212464

Int. Cl.<sup>5</sup> B29C 63/36

U.S. Cl. 156—382

5 Claims

1. An apparatus for lining pipe lines wherein a flexible tubu-  
lar lining material provided on the inner surface thereof with a  
binder and on the outer surface thereof with an air-impervious  
coating is inserted into a pipe line, with the front end of the  
lining material being fixed annularly to one end of the pipe line  
to form a turning point of evagination, and allowed to advance  
within the pipe line while moving the turning point of evagina-  
tion forwards from one end to the other end of the pipe line to  
turn the tubular lining material inside out under fluid pressure  
thereby applying the evaginated lining material onto the inner  
surface of the pipe line over its full length with the binder on

the induction pipe and comprised of a front enlarged part  
forming a confined space for producing a pressurized gas and  
a rear elevated toward part, liquid seal means isolating the  
confined space from open air and partially filling the pressure  
container and an inlet for introducing a compressed gas, which  
is formed in the induction pipe and/or the pressure container.

4,948,453

#### MAILING MACHINE BASE WITH A REMOVABLY MOUNTED FLUID SUPPLY

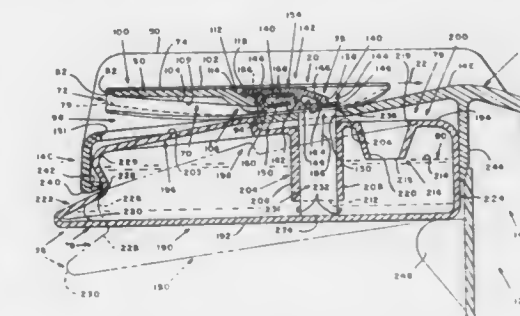
John R. Nobile, Fairfield, and William Ross, Darien, both of  
Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed May 19, 1989, Ser. No. 354,041

Int. Cl.<sup>5</sup> B43M 5/04

U.S. Cl. 156—441.5

12 Claims



1. A mailing machine base comprising:

(a) a housing including an upper wall and a depending skirt  
wall, the housing including at least one bracket spaced  
below the upper wall and apart from the skirt wall,  
(b) a hollow container made of a resilient plastic material,  
the container having a side wall, and the container and  
housing being relatively dimensioned such that the con-  
tainer may be removably mounted on the at least one  
bracket against a resilient force exerted by the container's  
side wall on the housing's skirt wall.

4,948,454

# PROCESS AND APPARATUS FOR THE APPLICATION OF A NON-ADHESIVE INSULATING TAPE TO AN ELECTRIC COIL WINDING

Ernst Arnold, Buchs, Switzerland, assignor to Meteor AG, Rueschlikon, Switzerland

Division of Ser. No. 175,258, Mar. 30, 1988, Pat. No. 4,869,763.

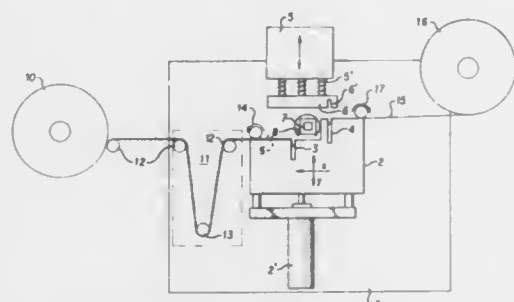
This application Apr. 28, 1989, Ser. No. 344,898

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710639

Int. Cl.<sup>5</sup> B65H 39/16

U.S. Cl. 156-443

8 Claims



1. Apparatus for the application of a nonadhesive insulating strip to the winding of an electrical coil, in particular as intermediate, cover and/or shielding insulation, comprising:

means for drawing a piece of a single sided adhesive tape from a first supply roll and applying said first piece to a first contact surface of a first pressure head;

means for moving said first pressure head from a rest position into a working position, in which it adhesively bonds the adhesive tape to the winding of a coil;

means for drawing a nonadhesive insulating strip from at least one second supply roll and bringing the nonadhesive insulating strip to a support surface of a second pressure head;

means or subsequently displacing said second pressure head from its rest position into a first working position, in which it bonds the nonadhesive insulating strip to the adhesive tape;

means for winding the adhesive tape together with the insulating strip onto the coil;

means for cutting said nonadhesive insulating tape when said means for displacing said second pressure head subsequently pivots the second pressure head into a second working position, after which a residual of the nonadhesive insulating strip is wound together with the adhesive tape onto the coil; and,

means for cutting the adhesive tape so that said means for winding winds a projecting end of the adhesive tape onto the coil.

4,948,455

## TAPE SPLICER

George M. Woodley, Shrewsbury, Mass., assignor to King Instrument Corporation, Westboro, Mass.

Division of Ser. No. 157,322, Feb. 17, 1988. This application

Dec. 30, 1988, Ser. No. 292,548

Int. Cl.<sup>3</sup> B31F 5/06; B65H 69/06

U.S. Cl. 156-497

10 Claims

1. A splicing tape dispenser-applicator for sequentially and repeatedly dispensing an adhesive splicing tape from a supply roll thereof, severing a predetermined length of said splicing tape, and applying said severed length of splicing tape to the abutting ends of two tapes to be spliced that are disposed on a splicing tape assembly, said dispenser-applicator comprising:

a splicer block (723) having at least two air ports and means for connecting said air ports to a source of vacuum;

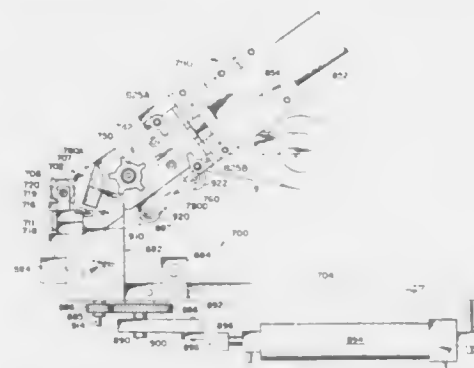
means for supporting said splicer block in a fixed position;

a splicing tape feeder assembly attached to said splicer block,

said feeder assembly comprising a rotatable multi-faced tape-transporting wheel (742) for feeding splicing tape from a supply roll and delivering said splicing tape to a splicing tape pickup point, and a rotatable multi-toothed ratchet wheel (750) coupled to said tape-transporting wheel so that rotation of said ratchet wheel will result in rotation of said tape-transporting wheel;

means mounting said tape-transporting wheel and said ratchet wheel to said splicer block so that both of said wheels are capable of rotation relative to said splicer block;

a slide plate assembly comprising a slide plate (792) mounted for reciprocal movement relative to said splicer block between an extended position and a retracted position, and first and second pawls pivotally attached to said slide plate, said pawls being spaced from one another in position to engage and rotate said ratchet wheel as said slide plate undergoes reciprocal movement relative to said splicer block, said first pawl being mounted so that it can yield only in a first direction and said second pawl being mounted so that it can yield only in a second opposite direction, whereby (a) when said slide plate moves from said extended position to said retracted position said first pawl will rotate said ratchet wheel a selected amount and (b) when said slide plate moves from said retracted position to said extended position said second pawl will rotate said ratchet wheel another selected amount;



a plurality of air passageways in said tape-transporting wheel with each of said air passageways leading to an opening in a different one of the faces of said tape-transporting wheel, said air-passageways and said air ports being arranged so that said air-passageways are sequentially brought into communication with said at least two air ports as said tape-transporting wheel is indexed by said pawls during reciprocation of said slide plate, said air-passageways and air ports being arranged so that (a) when said slide plate is disposed in its said extended position, suction is applied simultaneously to at least several successive faces of said tape-transporting wheel commencing with a first face, whereby said suction will hold a splicing tape to said at least several faces, and (b) as said slide plate is moved to and from its said retracted position, the application of suction to said first face will be terminated so as to free a predetermined length of splicing tape from said first face; an actuator (852) having a cylinder and an operating member adapted for reciprocal axial movement relative to said cylinder, said operating member being connected to said splicer block;

an actuator mounting member (854) connecting said actuator cylinder to said slide plate assembly, whereby when said actuator is operated to reciprocate said operating member, said cylinder and said slide plate will reciprocate relative to said splicer block with said slide plate moving to its said extended position when said operating member

4,948,457

## DIFFUSION BONDING OF ALUMINUM AND ALUMINUM ALLOYS

Graham A. Cooper, and Ian E. Bottomley, both of Preston, United Kingdom, assignors to British Aerospace PLC, London, United Kingdom

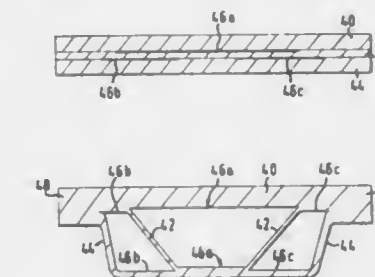
Filed Jun. 30, 1989, Ser. No. 373,492

Claims priority, application United Kingdom, Jul. 1, 1988, 8815663

Int. Cl.<sup>3</sup> B44C 1/22; C23F 1/00; C03C 15/00, 25/06

U.S. Cl. 156-629

20 Claims



is extended and to its said retracted position when said operating member is retracted;

a tape transfer assembly comprising a bearing block (882) fixed in relation to said splicer block, a tape transfer arm (887) having a tape-holding and applying face, at least one opening in said tape-holding and applying face, means communicating with said at least one opening for applying a suction force to a splicing tape disposed on said tape-holding and applying face (910), and means rotatably mounting said tape transfer arm to said bearing block so that said tape transfer arm is capable of pivotal movement between a tape-receiving position wherein said tape holding and applying face is disposed to receive and hold by suction a length of splicing tape fed by said tape-transporting wheel, and a tape-applying position wherein said tape-receiving and applying face is spaced from said tape-transporting wheel and is disposed to press a severed piece of splicing tape to the abutting ends of two tapes to be spliced; and

splicing tape cutter means having a cutter blade (709) and cutter actuator means (706) for reciprocating said cutter blade between a retracted position and an extended position, said tape cutter means being adapted to sever a splicing tape at a point between said tape-transporting wheel and said tape applicator arm when said cutter blade is extended from its said retracted position to its said extended position.

4,948,456

## CONFINED LATERAL SELECTIVE EPITAXIAL GROWTH

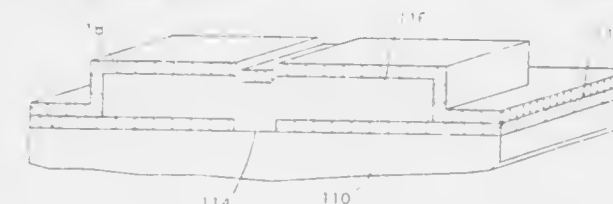
Peter J. Schubert, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Jun. 9, 1989, Ser. No. 364,399

Int. Cl.<sup>3</sup> C30B 23/04, 25/04; H01L 21/308

U.S. Cl. 156-611

3 Claims



1. A method for forming laterally grown epitaxial silicon comprising the following steps:

providing a single crystal silicon substrate;

forming a first layer of dielectric material on a surface of said substrate;

patterning said first layer of dielectric material so as to provide a seed hole in said layer of dielectric material wherein said underlying single crystal silicon is exposed;

forming a layer of a sacrificial material upon said patterned first layer of dielectric material and within said seed hole; forming a second layer of dielectric material over and around said layer of sacrificial material so that said first and second layers of dielectric material substantially surround said layer of sacrificial material yet a portion of said underlying sacrificial material is exposed;

removing said layer of sacrificial material so as to form a cavity having walls defined by said first and second layers of dielectric material and so as to expose said single crystal silicon substrate within said seed hole, said cavity being characterized by an aspect ratio no greater than about 8 to 1 for a height of said cavity no greater than about 1 micron; and

selectively growing epitaxial silicon from said single crystal silicon substrate through said seed hole and within said cavity.

4,948,458

## METHOD AND APPARATUS FOR PRODUCING MAGNETICALLY-COUPLED PLANAR PLASMA

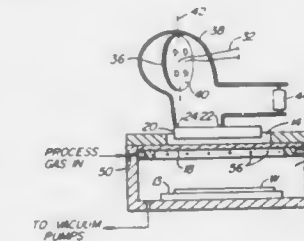
John S. Ogle, Milpitas, Calif., assignor to LAM Research Corporation, Fremont, Calif.

Filed Aug. 14, 1989, Ser. No. 393,504

Int. Cl.<sup>3</sup> H01L 21/306; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156-643

24 Claims



17. A method for treating article with a plasma, said method comprising:

placing the article within an enclosure;

introducing a process gas to the enclosure at a controlled pressure; and

resonating a radiofrequency current in a substantially planar coil located outside the enclosure proximate a dielectric shield formed in the enclosure, whereby a planar plasma substantially parallel to the coil is formed inside the enclosure.



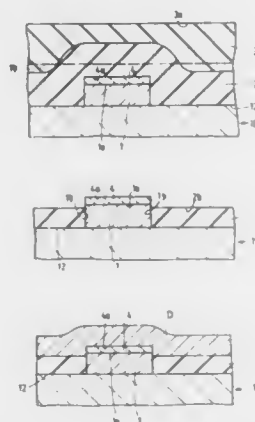
4,948,459

# METHOD OF ENABLING ELECTRICAL CONNECTION TO A SUBSTRUCTURE FORMING PART OF AN ELECTRONIC DEVICE

Josephus M. F. G. van Laarhoven; Leendert de Bruin, and Anton P. M. van Arendonk, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Jan. 4, 1989, Ser. No. 293,274

Claims priority, application United Kingdom, Jan. 20, 1988, 8801172

Int. Cl.<sup>3</sup> B44C 1/22; C03C 15/00, 25/06; C23F 1/02  
U.S. Cl. 156—643 9 Claims



1. A method of enabling electrical connection to a substructure forming part of an electronic device, which method comprises the steps of providing an aluminum-containing electrically conductive level on a surface of the substructure, depositing an insulating layer so as to cover the aluminum-containing electrically conductive level, providing a photosensitive resist layer on the insulating layer and using a plasma etching step to etch away insulating material so as to expose an electrically conductive surface to enable electrical connection to be made to the aluminum-containing electrically conductive level, which method is characterized in that a layer of another conductive material which is free of aluminum is provided on the aluminum-containing electrically conductive level prior to covering the aluminum-containing electrically conductive level with insulating material so that the plasma etching step exposes an electrically conductive surface of the layer of the another conductive material which masks the aluminum-containing electrically conductive level to prevent catalytic reaction between the aluminum and constituents in the plasma, wherein the step of altering the constituents of the plasma during the plasma etching step is carried out.

4,948,460

# METHOD OF PRODUCING HEAD CORE SLIDER FOR RIGID MAGNETIC DISK DRIVE, UTILIZING LASER-INDUCED ETCHING

Hideto Sandaiji, Kasugai; Fuminori Takeya, Nagoya, and Nobuhiro Terada, Kasugai, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Sep. 20, 1989, Ser. No. 409,946

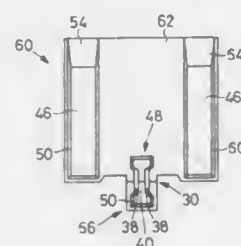
Claims priority, application Japan, Sep. 24, 1988, 63-239244  
Int. Cl.<sup>3</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06

U.S. Cl. 156—630 16 Claims

1. A method of producing a head core slider for a rigid magnetic disk drive, including a slider body and a yoke portion formed as an integral part of the slider body, said slider body having a pair of spaced-apart parallel air bearing portions having a predetermined height, while said yoke portion having a track portion for sliding contact with a magnetic recording medium, the yoke portion and the slider body cooperating to form a closed magnetic path having a predetermined magnetic

gap which is open in a top surface of said track portion, said method comprising the steps of:

preparing a first ferrite block which gives said slider body, and a second ferrite block which gives said yoke portion; butting and bonding together said first and second ferrite blocks into a ferrite bar having a sliding surface on which said air bearing portions and said track portion are to be formed; forming, by laser-induced etching, at least two parallel track-defining grooves in said sliding surface of said ferrite bar, such that said at least two track-defining grooves extend across an interface between said first and second



ferrite blocks, said at least two track-defining grooves defining therebetween said track portion having a predetermined width in a direction perpendicular to a direction of extension of said grooves;

applying a pattern of etching mask to said sliding surface of said ferrite bar, so as to cover portions of said sliding surface which correspond to said air bearing portions and said track portion; and

chemically etching the masked sliding surface of said ferrite bar, and thereby forming said air bearing portions, and a track protrusion which includes said track portion, such that said air bearing portion and said track protrusion have a same height.

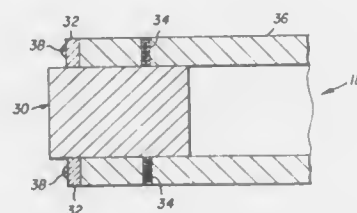
4,948,461

# DRY-ETCHING METHOD AND PLASMA

Dilip K. Chatterjee, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1989, Ser. No. 422,205

Int. Cl.<sup>3</sup> B44C 1/22; C03C 15/00, 25/06; C23F 1/00  
U.S. Cl. 156—643 9 Claims



1. In a method of removing material from a non-metallic substrate by reactive ion etching using an etching plasma containing a reactive fluorine-containing gas, the improvement comprising incorporating into said plasma atoms or ions of a metal having an atomic weight of at least about fifty-eight (58).

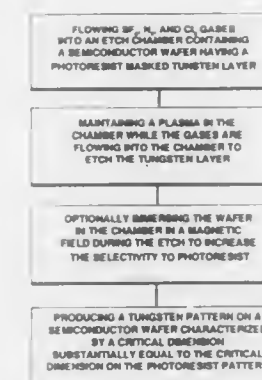
4,948,462

# TUNGSTEN ETCH PROCESS WITH HIGH SELECTIVITY TO PHOTORESIST

Rebecca Rossen, Palo Alto, Calif., assignor to Applied Materials, Inc., Santa Clara, Calif.

Filed Oct. 20, 1989, Ser. No. 424,486

Int. Cl.<sup>3</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06  
U.S. Cl. 156—643 25 Claims



1. A process for etching a tungsten layer on a semiconductor wafer through a patterned photoresist layer which is highly selective to photoresist and which will not laterally etch portions of the tungsten layer beneath the patterned photoresist layer which process comprises:

- flowing SF<sub>6</sub>, N<sub>2</sub>, and Cl<sub>2</sub> gases into an etch chamber containing said semiconductor wafer; and
- maintaining a plasma in said chamber during said gas flow;

to thereby etch said tungsten layer while maintaining a good profile in said etched tungsten layer.

4,948,463

# MAGNETIC BARRIER PAPER

Homan B. Kinsley, Jr., Powhatan, Va., assignor to James River Corporation, Richmond, Va.

Filed Mar. 10, 1989, Ser. No. 321,313

Int. Cl.<sup>3</sup> D21H 13/36

U.S. Cl. 162—138 9 Claims

- Magnetic barrier paper, comprising 30–94% by weight low hysteresis iron powder having a hysteresis value of not more than about 5 parts per thousand, 3–67% by weight pulp fibers, and 3–10% latex effective to bind said pulp and powder.

4,948,464

# ACRYLAMIDE-2-ACRYLAMIDO-2-METHYLPROPANE-SULFONIC ACID POLYMERS AS FORMATION AIDS IN WET LAID NONWOVENS PRODUCTION

Paul F. Richardson, Glen Ellyn; Suzanne N. Dunn, Naperville, and John A. Romberger, Oak Park, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Sep. 5, 1989, Ser. No. 402,417

Int. Cl.<sup>3</sup> D21H 13/10, 17/42

U.S. Cl. 162—157.1 2 Claims

1. An aqueous slurry comprising a plurality of synthetic fibers and from 0.1–10 percent by weight based on the weight of the fibers of a water-soluble acrylamide polymer dispersant containing at least 5 percent by weight of 2-acrylamido-2-methylpropanesulfonic acid units, said polymer having an RSV of at least 10.

4,948,465

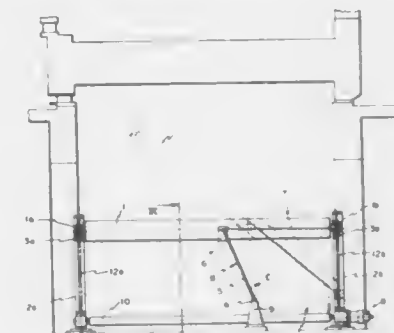
# METHOD AND APPARATUS FOR FACILITATING THE REPLACEMENT OF AN ENDLESS PRESS FELT IN A PAPER AND BOARD MAKING MACHINE

Mauri Rantala, Nokia, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed May 15, 1989, Ser. No. 352,531

Claims priority, application Finland, May 23, 1988, 882416  
Int. Cl.<sup>3</sup> D21F 3/00 12 Claims

U.S. Cl. 162—199



1. In a paper and board making machine including an endless press felt and a roll having a first and a second end, an apparatus for facilitating the replacement of the endless felt comprising:

a roll support positioned within a section between the two ends of the roll and against a mantle surface of the roll for supporting the roll; means for shifting the first end of the roll around a fulcrum provided by said roll support from an initial position wherein the first end of the roll is in contact with the felt to a felt replacement position wherein the first end of the roll is away from the felt, the shifting movement being in a direction transverse to the longitudinal axis of the roll; said means for shifting and said roll support being structured and arranged to cooperate for moving the second end of the roll around the fulcrum in the direction opposite to that of the first end movement and transverse to the longitudinal axis of the roll.

4,948,466

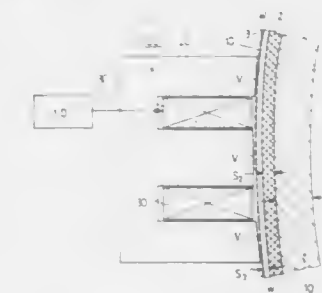
# METHOD FOR HEATING A CYLINDER OR ROLL WITH AN ELECTRICALLY CONDUCTIVE CERAMIC OUTER LAYER

Jyrki Jaakkola, Korpiolahti, Finland, assignor to Valmet Paper Machinery Inc., Finland

Filed Apr. 13, 1989, Ser. No. 337,635

Claims priority, application Finland, Apr. 13, 1988, 881711  
Int. Cl.<sup>3</sup> D21F 3/00 15 Claims

U.S. Cl. 162—207



1. Method for heating an outer face of a cylinder or roll in

direct contact with a paper or paperboard web pressed there-against, comprising the steps of

inductively heating the outer cylinder or roll face from outside a mantle of the cylinder or roll, by using a magnetic field, whereby a heating effect based upon eddy currents is produced in an outer layer of the cylinder or roll,

providing as said outer layer, an outer layer of electrically conductive ceramic material, whereby said resistive heating effect is concentrated in said outer layer, restricting depth of penetration of said heating effect in a radial direction of the cylinder or roll to be heated by at least one of the steps of

choosing thickness of said ceramic outer layer, and choosing electrical frequency of said induction heating, and/or

choosing said ceramic material of said outer layer so that the cylinder or roll face has necessary strength properties both in view of wear resistance and in view of thermal shock caused by said heating effect.

4,948,467

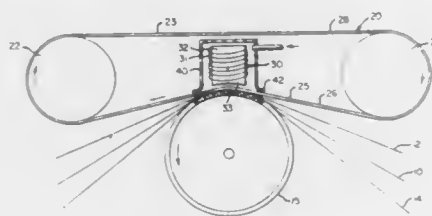
**EXTENDED NIP PRESS WITH INDUCED REPULSION**  
Richard W. Creagan, Kirkland, Canada, assignor to The Black Clawson Company, Middletown, Ohio

Filed May 17, 1989, Ser. No. 353,289

Int. Cl.<sup>3</sup> D21F 3/02

U.S. Cl. 162—358

3 Claims



1. An extended nip press for a papermaking machine through which a web of paper passes between a forming felt and a backing roll for the extraction of water therefrom, the improvement comprising:

a belt formed of a electric current conducting nonferrous material,

means positioning said belt for applying pressure to said felt against said backing roll,

a relatively fixed magnetic flux induction coil positioned in close flux-inducing and non-contacting relation to said belt on a side thereof opposite from said felt, and means applying a direct current to said coil to induce a repulsion force in said belt by inducing a current flow in said belt for urging said belt against said felt.

4,948,468

**OIL SHALE RETORT APPARATUS**  
Adam A. Reeves, Grand Junction, Colo.; Earl L. Mast, Norman, Okla., and Melvin J. Greaves, Littleton, Colo., assignors to The New Paraho Corporation, Lakewood, Colo.

Filed Feb. 22, 1989, Ser. No. 313,987

Int. Cl.<sup>3</sup> C10B 1/04

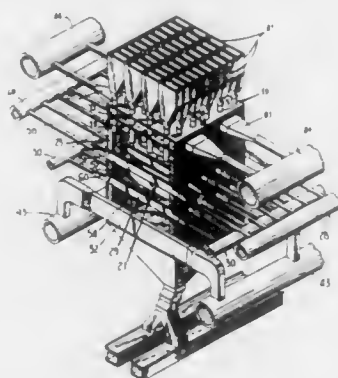
U.S. Cl. 202—93

41 Claims

1. Retorting apparatus comprising a kiln having a substantially rectangular cross section and adapted to have a bed of rock of mixed sizes and shapes descend as a moving bed continuously and generally vertically therethrough by gravity, means for delivering gas to the kiln for effecting heating of the rock to its destructive distillation temperature in a pyrolysis zone, means for delivering said rocks into said kiln above said pyrolysis zone consisting of a plurality of feed bins and a plurality of vertically extending circular feed tubes maintained substantially continuously full of rock and extending down-

wardly toward said pyrolysis zone, said tubes being substantially uniform in diameter and geometrically arranged so that imaginary lines connecting the centers of each adjacent group of three tubes form approximately equilateral triangles, said rock descending through the tubes and dispersing outwardly at differential rates proportional to the particle sizes, the rock from each tube interacting with the rock from adjacent tubes and with the kiln walls to form a plurality of uniformly and symmetrically disposed differentially permeable generally vertical paths, or "rock chimneys", through the descending bed of rock across the entire cross section of the kiln which offer least resistance to upward flow of gases through the descending rock, said rock chimneys being formed one at substantially the center of each equilateral triangle, said tubes being sized and arranged to form at least one rock chimney for each six square feet of kiln cross section.

32. In a retort of the type comprising a vertical kiln adapted to have a bed of rock of mixed sizes and shapes descend continuously and generally vertically therethrough by gravity, means for delivering gas to said kiln to effect heating of the



descending rock to its retorting temperature in a pyrolysis zone, and means for delivering the rock to the kiln above the pyrolysis zone; the improvement wherein the gas delivery means comprises a plurality of elongated distributors extending across the kiln and provided with a plurality of spaced orifices along the length thereof, said distributors, being open at their ends for the reception of gas, a divider in each of said distributors at substantially the midpoint thereof forming a center baffle blocking the flow of gas therethrough, a horizontal baffle in at least some of said distributors on either side of said center baffle and below said orifices, each said horizontal baffle sloping downwardly toward said center baffle and having a terminal end spaced from said center baffle, a plurality of orifices in said horizontal baffles, whereby gas entering the ends of said at least some distributors flows below the horizontal baffles in a direction toward said center baffles, some of the gas passing upwardly through the orifices in said horizontal baffles and the remainder between the terminal end of said horizontal baffles and said center baffles, said gas exiting said distributors through the orifices therein.

4,948,469

**SEPARATION OF FORMIC ACID FROM DIOXANE BY EXTRACTIVE DISTILLATION WITH AMIDES**

Lloyd Berg, and Richard R. Rall, both of 1314 S. Third Ave., Bozeman, Mont. 59715, assignors to Lloyd Berg, Bozeman, Mont.

Filed Dec. 5, 1988, Ser. No. 279,918

Int. Cl.<sup>3</sup> B01D 3/40; C07C 53/02; C07D 319/12

U.S. Cl. 203—51

2 Claims

1. A method for recovering dioxane from mixtures of dioxane and formic acid which comprises distilling a mixture of dioxane and formic acid in a rectification column in the presence of about one part of an extractive agent per part of diox-

ane - formic acid mixture, recovering dioxane as overhead product and obtaining the formic acid and the extractive agent from the stillpot, wherein said extractive agent comprises dimethylformamide and at least one material selected from the group consisting of dodecanedioic acid, malic acid, butoxypropanol, diethylene glycol ethyl ether acetate, propoxypropanol, dipropylene glycol methyl ether, isophorone, cyclohexanone, 2-methoxyethyl ether, dipropylene glycol dimethyl ether, propylene glycol dimethyl ether, ethyl phenyl acetate, and diethylene glycol ethyl ether.

4,948,470

**EXTRACTIVE DISTILLATION OF ALKANE/CYCLOALKANE FEED EMPLOYING MIXED SOLVENT**

Fu M. Lee, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 12, 1989, Ser. No. 378,739

Int. Cl.<sup>3</sup> B01D 3/40

U.S. Cl. 203—51

20 Claims



1. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of a mixture of

(a) at least one N-alkyl-2-pyrrolidone, wherein said alkyl group contains 1-3 carbon atoms per molecule, and

(b) cyclotetramethylene sulfone;

wherein said extractive distillation process produces (i) an overhead product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

11. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of a mixture of

(a) at least one N-alkyl-2-pyrrolidone, wherein said alkyl group contains 1-3 carbon atoms per molecule, and

(b) cyclotetramethylene sulfone, and

(c) about 0.1-10 weight-% water;

wherein said extractive distillation process produces (i) an overhead product which contains a smaller volume per-

centage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

4,948,471

**SEPARATION OF 4-METHYL-2-PENTANONE FROM FORMIC OR ACETIC ACID BY EXTRACTIVE DISTILLATION WITH SULFOLANE**

Lloyd Berg, 1314 S. 3rd Ave., Bozeman, Mont. 59715, and George Benta, Bozeman, Mont., assignors to Lloyd Berg, Bozeman, Mont.

Filed Aug. 1, 1989, Ser. No. 387,814

Int. Cl.<sup>3</sup> B01D 3/40; C07C 51/44

U.S. Cl. 203—51

4 Claims

1. A method for recovering 4-methyl-2-pentanone from mixtures of 4-methyl-2-pentanone and formic acid which comprises distilling a mixture of 4-methyl-2-pentanone and formic acid in a rectification column in the presence of about one part of an extractive agent per part of the 4-methyl-2-pentanone-formic acid mixture, recovering 4-methyl-2-pentanone as overhead product and obtaining the extractive agent and the formic acid from the stillpot, wherein said extractive agent comprises sulfolane.

4,948,472

**EXTRACTIVE DISTILLATION OF HYDROCARBON MIXTURES EMPLOYING MIXED SOLVENT**

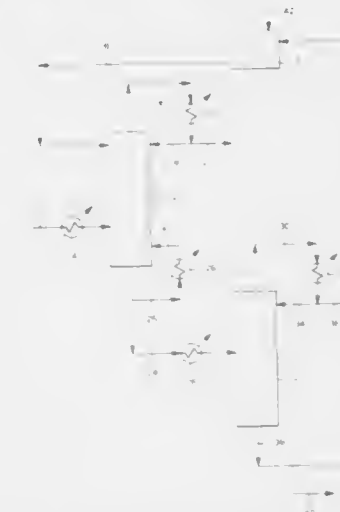
Fu Ming Lee, and Ronald E. Brown, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 12, 1989, Ser. No. 378,734

Int. Cl.<sup>3</sup> B01D 3/40

U.S. Cl. 203—55

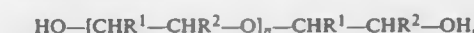
20 Claims



1. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of a mixture of

(a) at least one N-alkyl-2-pyrrolidone, wherein the alkyl group contains 1-3 carbon atoms per molecule, and

(b) at least one glycol compound having the general chemical formula of





wherein n can be 0, 1, 2, 3, or 4, and R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of hydrogen and the methyl group;

wherein said extractive distillation process produces (i) an overhead product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

15. In a process for separating at least one cycloalkane containing 5-10 carbon atoms per molecule from at least one close-boiling alkane by extractive distillation of a feed consisting essentially of said at least one cycloalkane and said at least one alkane, the improvement which comprises employing a solvent consisting essentially of a mixture of

- at least one N-alkyl-2-pyrrolidone, wherein the alkyl group contains 1-3 carbon atoms per molecule,
- at least one glycol compound having the general chemical formula of



wherein n can be 0, 1, 2, 3, or 4, and R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of hydrogen and the methyl group, and

- about 1-3 weight-% water;

wherein said extractive distillation process produces (i) an overhead product which contains a smaller volume percentage of said at least one cycloalkane and a larger volume percentage of said at least one alkane than said feed, and (ii) a bottoms product which contains said solvent and a larger volume percentage of said at least one cycloalkane and a smaller volume percentage of said at least one alkane than said feed; and wherein said at least one cycloalkane is separated from said solvent and recovered from said bottoms product.

- about 1-3 weight-% water.

4,948,473

#### SURFACTANT SENSING ELECTRODE FOR POTENTIOMETRIC TITRATIONS

Martin A. Phillippi, Pleasanton, Calif., assignor to The Clorox Company, Oakland, Calif.

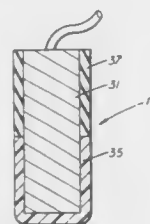
Continuation-in-part of Ser. No. 108,196, Oct. 13, 1987, Pat. No. 4,810,331. This application Feb. 2, 1989, Ser. No. 305,998

The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 27/46

U.S. Cl. 204-153.2

16 Claims



1. A coated-wire electrode for potentiometrically titrating anionic, cationic, nonionic and amphoteric surfactants in an aqueous medium, comprising:

- an electrically-conductive core member;
- a semipermeable membrane which coats the core member, the membrane comprising a semipermeable matrix including a polymer, a plasticizer and an ion-exchange material

consisting essentially of DMB or DSB in suitable proportions to be surfactant sensitive.

4,948,474

#### COPPER ELECTROPLATING SOLUTIONS AND METHODS

Momcilo Miljkovic, Hummelstown, Pa., assignor to Pennsylvania Research Corporation, University Park, Pa. Continuation of Ser. No. 237,582, Aug. 26, 1988, abandoned, which is a division of Ser. No. 98,254, Sep. 18, 1987, Pat. No. 4,786,746. This application Aug. 28, 1989, Ser. No. 401,557

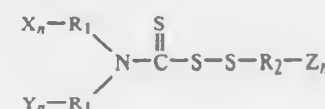
Int. Cl.<sup>5</sup> C25D 3/38

U.S. Cl. 204-52.1

19 Claims

1. An aqueous copper electroplating solution comprising:

- a water soluble copper salt;
- a free acid; and
- a brightener of the formula:



wherein

R<sub>1</sub> and R<sub>2</sub> are each an alkylene containing from 2 to 8 carbon atoms, an arylene, an alkylarylene, an arylalkylene or a heterocyclic group containing at least one nitrogen atom in its ring structure;

x, y and z are each hydrogen or a water-solubilizing group; and

n is an integer of from 1 to 4, with the proviso that when R<sub>1</sub> is a heterocyclic group, x, y and z are each hydrogen and R<sub>2</sub> is an alkylene of from 2 to 8 carbon atoms, an arylene, an alkylarylene or an arylalkylene;

when R<sub>2</sub> is a heterocyclic group, x, y and z are each hydrogen and R<sub>1</sub> is an alkylene containing from 2 to 8 carbon atoms, arylene, alkylarylene or arylalkylene;

when x or y is a water-solubilizing group, R<sub>2</sub> is an alkylene containing from 2 to 8 carbon atoms, arylene, alkylarylene or arylalkylene and z is hydrogen;

when z is a water-solubilizing group, R<sub>1</sub> is an alkylene containing 2 to 8 carbon atoms, arylene, alkylarylene or arylalkylene and when x and y are both water-solubilizing groups they may be the same or different.

4,948,475

#### ION BARRIER LAYER ON METALS AND NONMETALS

Richard Doetzer, and Georg Iwantschew, both of Nuremberg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 250,947

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732805

Int. Cl.<sup>5</sup> C25D 3/44

U.S. Cl. 204-58.5

9 Claims

1. A method for the production of an ion barrier layer on a surface of a metallic material or on an electroconductive surface of a nonmetallic material, comprising the step of electrodepositing an aluminum layer on the surface of the metallic material or on the electroconductive surface of the nonmetallic material from an aprotic, oxygen-free, anhydrous aluminum-organic complex salt electrolyte of the general formula M<sup>+</sup>X<sup>-</sup>.2AlR<sub>3</sub>.nLsm, wherein:

- M<sup>+</sup> is an alkali metal ion or a quaternary onium ion,
- X<sup>-</sup> is a halogen ion,
- R is an alkyl radical,
- Lsm is an aromatic solvent molecule, and
- n=0 to 12 moles.

4,948,476

#### HYBRID CHROMIUM RECOVERY PROCESS

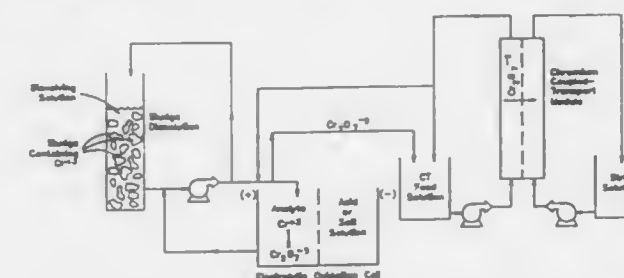
David R. Kamperman, and Dwayne T. Friesen, both of Bend, Oreg., assignors to Bend Research, Inc., Bend, Oreg.

Filed Jul. 20, 1989, Ser. No. 384,153

Int. Cl.<sup>5</sup> C25B 1/00

U.S. Cl. 204-89

28 Claims



1. A method of recovering chromium values from chromium-containing waste comprising:

- providing an electrolytic oxidation cell having at least one anode and at least one cathode and divided into at least one anode side and at least one cathode side by at least one anion exchange membrane, said cathode side having an electrically conductive solution and said anode and cathode being connected to a DC power source;
- providing a coupled transport module with a polymeric membrane containing a chromium(VI) liquid complexing agent and having a feed side and a strip side;
- contacting said chromium-containing waste with a dissolving acid to form an acidic chromium(III)-containing anolyte solution;
- directing said acidic chromium(III)-containing anolyte solution to each anode side of said electrolytic oxidation cell;
- providing sufficient potential from said DC power source to at least partially oxidize chromium(III) in said acidic chromium(III)-containing anolyte solution to chromium(VI) to form a coupled transport feed solution;
- transferring said coupled transport feed solution to the feed side of said membrane of said coupled transport module; and
- directing a strong base strip solution to the strip side of said membrane of said coupled transport module, thereby extracting chromium(VI) in a strip solution from said chromium-containing waste.

4,948,477

#### INTEGRATED LUNAR MATERIALS MANUFACTURING PROCESS

Michael A. Gibson, and Christian W. Knudsen, both of Houston, Tex., assignors to Carbotech, Inc., Houston, Tex.

Filed Nov. 6, 1987, Ser. No. 118,414

Int. Cl.<sup>5</sup> C25B 1/02

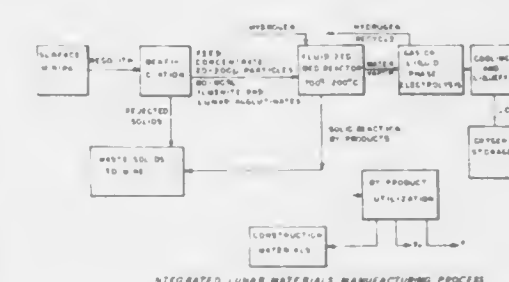
U.S. Cl. 204-129

53 Claims

1. An integrated lunar materials manufacturing process comprising mining a particulate lunar feed material containing ilmenite and lunar agglutinates, transporting said feed material to a processing area for beneficiation, separating particulate material in the size range of about 20-200 microns, separating silicates and other non-reducible minerals from said separated particulate material to produce an enriched feed containing about 80-90% ilmenite and lunar agglutinates, passing said enriched feed into a fluidized bed reactor, fluidizing said enriched feed in said fluidized bed reactor with a hydrogen-containing gas stream at a temperature of 700°-1,200° C. and pressure in excess of about 30 psia, to produce a gaseous effluent containing substantially an

equilibrium amount of water and by-product solids comprising at least partially reduced ilmenite and lunar agglutinates,

electrolyzing the product water to oxygen and hydrogen,



storing or using the electrolytic product oxygen, and recycling the electrolytic product hydrogen to the fluidized bed reactor at a pressure in excess of about 30 psia.

4,948,478

#### URANIUM ISOTOPE SEPARATION PROCESS FOLLOWING THE MOLECULAR LASER PROCESS

Alexander Obermayer, Köln-Forz, Fed. Rep. of Germany, assignor to Uranit GmbH, Jülich, Fed. Rep. of Germany

Filed May 18, 1989, Ser. No. 353,495

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817173

Int. Cl.<sup>5</sup> B01D 59/34

U.S. Cl. 204-157.22

10 Claims

1. A uranium isotope separation process, comprising: diluting gaseous uranium hexafluoride composed of an isotopic mixture of <sup>235</sup>UF<sub>6</sub> and <sup>238</sup>UF<sub>6</sub> with an inert gas, cooling said diluted isotopic mixture by adiabatic expansion, selectively exciting said cooled isotopic mixture by irradiation with laser light of at least one infrared wavelength, photodissociating said excited isotopic mixture by simultaneous or subsequent exposure to laser light of another infrared wavelength or an ultraviolet wavelength, to produce a gas phase dissociation product selected from the group consisting of UF<sub>5</sub>, an oligomer of UF<sub>5</sub>, and mixtures thereof, reacting said gas phase dissociation product with gaseous xenon hexafluoride to form a UXeF<sub>11</sub> complex compound, polymerizing said UXeF<sub>11</sub> to form a solid of poly(pentafluoroxenonium(+)-hexafluorouranate V), and separating said solid poly(pentafluoroxenonium(+)-hexafluorouranate V).

4,948,479

#### REMOVAL OF UNSATURATED CARBON COMPOUNDS FROM 1,1-DICHLORO-1-FLUOROETHANE

Wayne E. Brooks, Reidland, and William L. Baggett, Paducah, both of Ky., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Jun. 7, 1989, Ser. No. 362,730

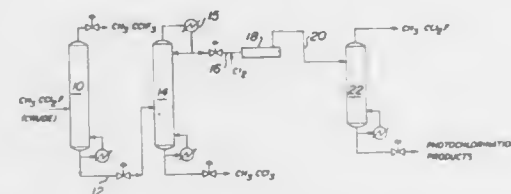
Int. Cl.<sup>5</sup> B01J 19/08

U.S. Cl. 204-158.21

13 Claims

1. A process for removing unsaturated carbon compounds from 1,1-dichloro-1-fluoroethane comprising: treating a liquid mixture comprising 1,1-dichloro-1-fluoroethane and at least one unsaturated carbon compound with chlorine; irradiating said chlorine-treated liquid mixture with ultraviolet light to selectively convert at least a portion of the unsaturated carbon compounds in the mixture to photo-

chlorination products thereof no or small consumption of 1,1-dichloro-1-fluoroethane; and



separating 1,1-dichloro-1-fluoroethane from said photo-chlorination products.

4,948,480

## KIT FOR ELECTROPHORESIS GEL MEDIUM

Kenneth G. Christy, Jr., Rochester; Hans W. Osterhoudt, Spencerport, and Ignazio S. Ponticello, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 2, 1988, Ser. No. 188,821

Int. Cl.<sup>3</sup> G01N 27/28, 27/26; B01D 57/02

U.S. Cl. 204—182.8

3 Claims

1. A method for preparing an electrophoresis gel medium while minimizing exposure to harmful chemicals which comprises forming a solution of the copolymer of a kit for preparing electrophoresis gel media which comprises, in combination, (1) a copolymer consisting of poly[acrylamide-co-N-(3-acetoacetaamidopropyl)methacrylamide having a weight ratio of acrylamide to the comonomer of 95:5 and (2) in a package separate from said copolymer, a crosslinking agent for reacting with the functional groups on the repeating units in the said copolymer derived from a monomer that contains a functional group that will enter into a crosslinking reaction by other than a free-radical initiated mechanism and an electrophoresis buffer in deionized water employing such proportions of said copolymer, buffer and water as to provide a gel of the desired said copolymer concentration and pH, providing means with which to form a shaped electrophoresis gel medium of the desired dimensions, adding the crosslinking agent from the kit to said solution of said copolymer and buffer in such concentration of crosslinking agent as to cause gelation to occur within a time period of from about 5 minutes to about 15 hours after said addition, and then promptly employing said gel shaping means to form the gel medium of desired dimensions from the gel thereby produced.

4,948,481

PROCESS AND DEVICE FOR THE ELECTROPHORETIC SEPARATION, PURIFICATION AND CONCENTRATION OF CHARGED OR POLARIZABLE MACROMOLECULES  
Stefan Müllner, Frankfurt am Main, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 25, 1989, Ser. No. 398,434

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829111

Int. Cl.<sup>3</sup> C07K 3/14

U.S. Cl. 204—182.8

13 Claims

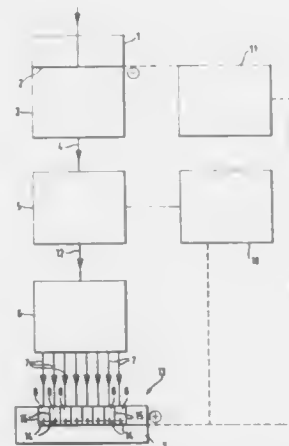
1. A method for electrophoretically separating, purifying and concentrating charged or polarized macromolecules, the method comprising the steps of:

- separating the macromolecules in a separation column, the separation column containing a support medium;
- migrating the separated macromolecules out of the support medium using electrophoretic current;
- feeding the separated macromolecules into a molecule detector;
- feeding the separated macromolecules from the molecule detector into a distributor; and
- collecting the separated macromolecules in a multi-electrode collector, each of the electrodes of said collector being

individually activatable by a signal from the molecule detector.

5. A device for electrophoretic separation, purification, and concentration of charged or polarized macromolecules from a mixture of macromolecules, the device comprising:

- a separation unit for containing a separation medium, said separation unit having an inlet and a counterelectrode disposed therein;
- a molecule detector;
- a distributor;
- a multi-electrode collector;



means for flow communicating said separation unit with said molecule detector;

means for flow communicating said molecular detector with said distributor;

means for flow communicating said distributor with said multi-electrode collector; and

means for transmitting a signal from said molecular detector to said multi-electrode collector, said signal for individually activating the electrodes of said multi-electrode collector.

4,948,482

## METHOD FOR FORMING SILICON NITRIDE FILM

Masato Kobayashi, and Yoichi Yamaguchi, both of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan

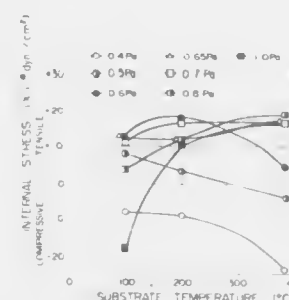
Filed Dec. 21, 1988, Ser. No. 287,017

Claims priority, application Japan, Dec. 29, 1987, 62-333733

Int. Cl.<sup>3</sup> C23C 14/34

U.S. Cl. 204—192.23

7 Claims



1. A method for forming a silicon nitride film which comprises depositing a silicon nitride film having a preselected amount of internal stress on a substrate by a sputtering method using, as a sputtering gas, an inert gas or a mixed gas of an inert gas and nitrogen gas, said method further comprising, during the deposition of said silicon nitride film, keeping the substrate

temperature at a given temperature range according to the pressure of the sputtering gas to control the internal stress of the film formed substantially to said preselected amount.

4,948,483

## ELECTROPLATING APPARATUS FOR PLATE-SHAPED WORKPIECES, PARTICULARLY PRINTED CIRCUIT BOARDS

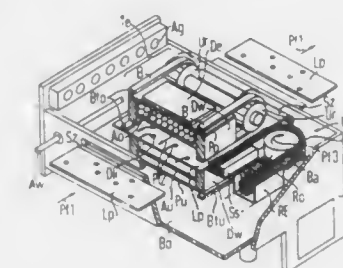
Daniel Hosten, Handzame, Belgium, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,725

Int. Cl.<sup>3</sup> C25D 17/00

U.S. Cl. 204—198

12 Claims



1. In an electroplating apparatus for plate-shaped workpieces, said apparatus having conveying means for conveying a workpiece through a container of an electrolytic solution in a horizontal path, each container having means for sealing a lateral edge of the workpiece from the electrolyte as the workpiece is conveyed through the container and contact means being arranged for engaging the exposed edge of the workpiece, the improvements comprising said contacting means being an endless circulating belt arrangement co-running with the workpiece, said belt arrangement having one run extending adjacent the edge of the workpiece and a return run, said contacting means including cleaning means for cleaning the circulating contact means arranged in the region of the return run.

4,948,484

## PROCESS FOR PRODUCING IMPROVED ELECTROLYTIC MANGANESE DIOXIDE

Terrell N. Andersen, Edmond, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed Jun. 23, 1988, Ser. No. 210,361

Int. Cl.<sup>3</sup> C25C 1/00

U.S. Cl. 204—105 M

19 Claims

1. A process for treating electrolytic manganese dioxide to enhance the alkaline discharge capacity thereof comprising: forming a mixture of electrolytic manganese dioxide, a carbon material and a strong base electrolyte; subjecting said mixture to electrochemical oxidation in the presence of additional strong base electrolyte while maintaining said mixture in an anodic condition; subjecting said oxidized mixture to an aqueous leach treatment to effect a removal of water soluble manganese salt byproducts formed during the electrochemical oxidation of said mixture; and recovering said oxidized and leached mixture substantially as produced.

4,948,485

## CASCADE ARC PLASMA TORCH AND A PROCESS FOR PLASMA POLYMERIZATION

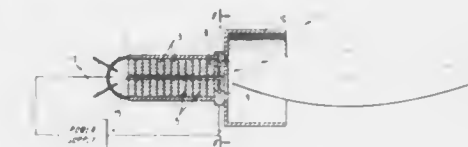
Hans I. Wallstén, Denens, Switzerland, and Hirotsugu K. Yasuda, Columbia, Mo., assignors to Plasmacarb Inc., Wilmington, Del.

Filed Nov. 23, 1988, Ser. No. 274,775

Int. Cl.<sup>3</sup> C23C 14/12, 14/28; H05H 1/34, 1/42

U.S. Cl. 204—164

21 Claims



1. A process for plasma polymerization at low pressure comprising the steps:

- (a) creating a plasma in a cascade arc generator to form a plasma torch which is directed into a low pressure zone;
- (b) injecting a monomeric gas into a central passage upstream of said plasma torch; and
- (c) directing the plasma torch resulting from step (b) onto a substrate to form a film thereon by plasma polymerization.

8. A cascade arc plasma torch apparatus for use in low temperature plasma polymerization coating, comprising means for vacuum generation and, in association therewith at least one plasma reactor including concentric electroconductive rings separated by insulator rings, said electroconductive rings and said insulator rings being arranged between electrode connectors and forming a central passage through said plasma reactor, a voltage supply source providing a voltage across said plasma reactor, and supply means for introducing an inert gas into said central passage, and further including conduit means for directing monomeric gas enabling plasma polymerization into a torch generated at the downstream end of said central passage.

4,948,486

## ELECTROPLATING APPARATUS FOR PLATE-SHAPED WORKPIECES, PARTICULARLY PRINTED CIRCUIT BOARDS

Daniel Hosten, Handzame, Belgium, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

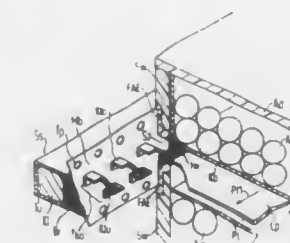
Filed Aug. 16, 1989, Ser. No. 394,536

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829763

Int. Cl.<sup>3</sup> C25D 17/00

U.S. Cl. 204—198

10 Claims



1. In an electroplating apparatus for plate-shaped workpieces, which are to be treated as they move in a horizontal path through an electrolytic cell, said apparatus having at least one endless drive arranged laterally from the throughput path, said endless drive carrying conveyor and contacting elements for grasping a lateral edge of the workpiece and to move the



workpiece in the throughput direction, the improvements comprising the conveying contact elements being secured to an endless circulating flexible metal band whose lateral surface facing toward the workpiece glides above and below the conveyor and contacting elements on guide and seal elements that extend in a direction of the throughput path.

#### 4,948,487 ELECTROLYTIC PROCESSING APPARATUS FOR METALLIC MEMBERS

Tsukasa Imazu; Mitsuo Kimura; Yoshiyuki Saito; Nobuyoshi Ishiwatari; Yoshio Miyano, and Mikio Kondo, all of Chiba, Japan, assignors to Kawasaki Steel Corp.

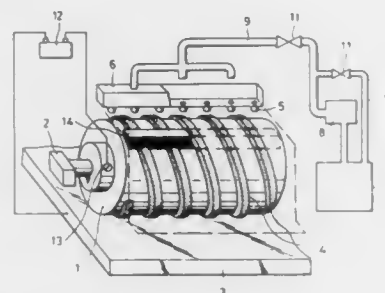
Filed Nov. 27, 1989, Ser. No. 441,886

Claims priority, application Japan, Nov. 29, 1988, 63-301788; Jan. 5, 1989, 64-795; May 24, 1989, 1-130464

Int. Cl.<sup>5</sup> C25O 17/00

U.S. Cl. 204-206

7 Claims



1. An apparatus for effecting an electrolytic process on a metallic member, comprising:

- a rotatable cylindrical electrode arranged adjacent to said member to be processed, with a gap between them;
- paste electrolyte supply means for supplying a paste electrolyte into the gap between said cylindrical electrode and said metallic member;
- a pad disposed on the outer peripheral surface of said cylindrical electrode, which pad is constructed and arranged for retaining said paste electrolyte supplied by said paste electrolyte supply means;
- electrical power supply means connected for causing an electric current to flow between said cylindrical electrode and said member across said gap in said paste electrolyte; and
- moving means for causing said metallic member and said cylindrical electrode to undergo relative movement therebetween.

#### 4,948,488 APPARATUS FOR THE ELECTROCHEMICAL MACHINING OF FASHIONED SURFACES

Valery D. Tsybal, ulitsa Pushkinskaya, 16, kv. 3; Vladimir G. Chernyshev, prospekt Krasnogo Znameni, 118, kv. 149; Mikhail G. Zhuravlev, ulitsa Irtyshskaya, 20, kv. 3; Oleg K. Morozov, ulitsa Borisenko, 6, kv. 66, all of Valdivostok; Georgy A. Tulyakov, ulitsa Sharikopodshipnikovskaya, 2, kv. 46, Moscow, and Alexandr V. Strutynsky, ulitsa Amurskaya, 22, kv. 3, Vladivostok, all of U.S.S.R.

Filed Jul. 14, 1989, Ser. No. 379,810

Int. Cl.<sup>5</sup> B23H 3/04, 7/12, 7/28

U.S. Cl. 204-212

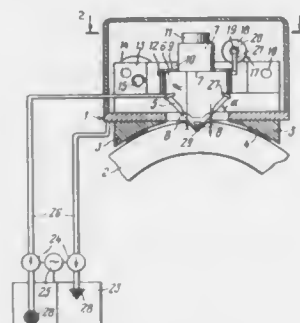
4 Claims

1. An apparatus for the electrochemical machining of fashioned surfaces, comprising:

- a bed held fast to said fashioned surface;
- a working unit coupled to said bed;
- a pair of electrodes of said working unit; each of said electrodes of said working unit being in the form of a disc; the axes of said electrodes extending at an angle with respect to each other; a part of each of said electrodes moved deep

into said fashioned surface; a working end face of each of said electrodes;

- a drive for rotating said electrodes of said working unit; said electrodes being mounted on said drive for rotating said electrodes on the side of said fashioned surface;
- a system for feeding said working unit to said fashioned surface;
- a carriage of said system for feeding said working unit to said fashioned surface mounted on said bed;
- a drive for horizontally moving said carriage along said bed connected to said carriage and mounted on said bed;



- a drive for vertically feeding said working unit in said system for feeding said working unit to said fashioned surface, said drive being mounted on said carriage and connected to said drive for rotating the electrodes; and two shafts of said drive for vertically feeding said working unit;
- said working unit being mounted on said two shafts of said drive for vertically feeding said working unit;
- a mechanism for imparting oscillatory motions to said working unit of said system for feeding said working unit to said fashioned surface, said mechanism being provided on said carriage.

#### 4,948,489 ELECTROLYTIC TREATMENT APPARATUS

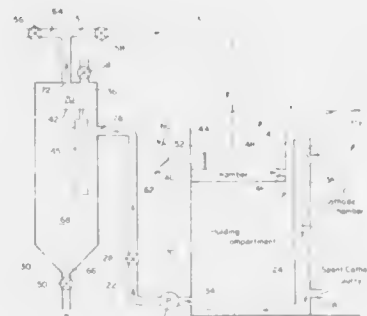
Bernard Greenberg, Brooklyn, N.Y., assignor to Environmental Recovery Systems, Inc., New York, N.Y.

Filed Apr. 19, 1989, Ser. No. 340,604

Int. Cl.<sup>5</sup> C25B 15/08, 9/00, 11/04, 15/02

U.S. Cl. 204-228

9 Claims



- 1. An electrolytic treatment unit comprising:
- an electrolytic cell having at least one cathode chamber and at least one anode chamber separated by an anion exchange membrane;
- means for applying electric current to said electrolytic cell;
- a holding compartment fluidly connected to said cathode chamber;
- a filter chamber fluidly connected to said holding compartment;

ment, said filter chamber having a filter membrane made of a porous tetrafluoroethylene polymeric material dividing said filter chamber into a precipitate collection zone and a clarified liquid zone;

- a clarified liquid collection chamber having an inlet fluidly connected to said clarified liquid zone of said filter chamber, an outlet for discharging clarified liquid and means proximate said outlet to ensure discharge of only clarified liquid during operation of said unit; and
- pump means for directing the flow of unfiltered liquid from said holding compartment to said filter chamber and through said filter membrane.

6. The electrolytic treatment unit recited in claim 1 further comprising means for measuring the pH of the clarified liquid in said collection chamber and for communicating the pH measurements thus obtained to a controller for controlling the amount of current applied to said electrolytic cell.

#### 4,948,490 TETRAALKYLAMMONIUM ION SOLID ELECTROLYTES

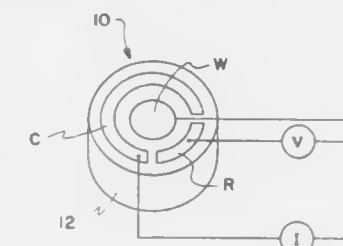
H. V. Venkatesetty, Burnsville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 161,269, Feb. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 21,457, Mar. 5, 1987, abandoned. This application Jul. 28, 1989, Ser. No. 388,307

Int. Cl.<sup>5</sup> G01N 27/30

U.S. Cl. 204-412

26 Claims



- 20. An electrochemical sensor comprising:
- a dielectric substrate;
- an electrode pattern including working, counter and reference electrodes on said substrate;
- an environmentally stable, solid, ionically conductive electrolyte system coated on said electrolyte pattern in composite film form and consisting essentially of an amount of plasticizer, an amount of symmetrical tetraalkylammonium electrolyte salt and an amount of organic polymeric complexing matrix material, said matrix material being one containing donor atoms capable of complexing with the cations of the electrolyte salt wherein said composite is predominately in an amorphous form; and
- circuit means configured to apply desired potential differences between the working electrode and the reference electrode and including means to measure cell output based on the reduction/oxidation of a species of interest.

#### 4,948,491 OXYGEN SENSOR

Nobuhide Kato, and Masanori Katsu, both of Aichi, Japan, assignors to NGK Insulators, Ltd., Japan

Filed Jul. 20, 1989, Ser. No. 382,580

Claims priority, application Japan, Jul. 30, 1988, 63-100595[U]

Int. Cl.<sup>5</sup> G01N 27/409

U.S. Cl. 204-424

7 Claims

- 1. An oxygen sensor comprising an oxygen sensor element for detecting oxygen concentration in an exhaust gas, at least one lead wire for transmitting off an oxygen concentration detecting signal from the oxygen sensor element and a metallic cover for protecting the oxygen sensor element, a portion of

the lead wire being extended inside the metallic cover, said sensor further comprising a resin grommet of a heat resistant resin being fitted in an upper open end portion of the metallic cover through which end the lead wire is taken out of the metallic cover with a portion of the resin grommet being



extended from the upper end of the metallic cover, a heat resistant non-metallic tube being fitted on the periphery of the extended portion of the resin grommet and the periphery of the upper end portion of the metallic cover and a metallic tube being fitted on the periphery of a portion of the non-metallic tube which is fitted on at least the metallic cover.

#### 4,948,492 ELECTRODE PROBE FOR USE IN AQUEOUS ENVIRONMENTS OF HIGH TEMPERATURE AND HIGH RADIATION

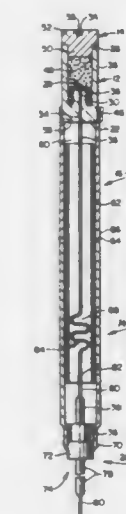
Leonard W. Niedrach, Schenectady, N.Y.; Maurice E. Indig, Fremont, Calif., and Laura L. H. King, Raleigh, N.C., assignors to General Electric Company, San Jose, Calif.

Filed May 1, 1989, Ser. No. 345,740

Int. Cl.<sup>5</sup> G01N 27/26

U.S. Cl. 204-435

19 Claims



- 1. A reference electrode probe for employment in monitoring electrochemical potentials, comprising:
- an alumina cell retainer having a base region with an externally disposed surface attachment region and sidewalls extending to an access opening therefrom for defining an internally disposed cavity, an integrally formed pedestal extending within said cavity from said base and having a continuous access channel extending through said base and said pedestal;
- a metal salt electrochemical reactant located within said cavity;
- a sealing retainer, the surface of which is a select metal to define with said metal salt the components constituting a

metal-metal salt electrode, located within said cavity and having an interior surface positioned over said pedestal and affixed thereto in intimate sealed adjacency;

a cap formed of alumina and positioned over said cell retainer access opening for retaining said electrode components within said cavity while permitting electrolytic communication with said cavity;

an annular sleeve formed of a first select metal exhibiting a coefficient of expansion compatible with said alumina cell retainer and having an acceptance portion for intimately sealed brazed connection with said cell retainer surface attachment region and having a first internal channel extending along the lengthwise extent thereof;

a first electrical conductor connected in electrical contact with said interior surface of said sealing retainer and insulatively extending therefrom through said first internal channel; and

positioning and signal transfer means for operatively supporting said sleeve means and conveying electrical signals from said first conductor.

4,948,493

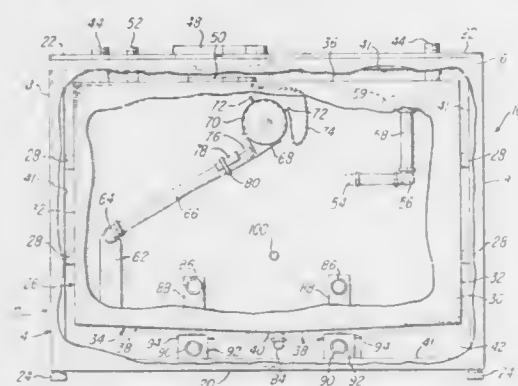
# METHOD AND APPARATUS FOR CLARIFYING USED LUBRICATING OIL

Lowell A. Wilson, 2349 Fairview St., Burlington, On, Canada L7R 2E3

Continuation of Ser. No. 203,712, Jun. 7, 1988, abandoned, which is a continuation of Ser. No. 13,997, Feb. 5, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 364,886 Int. Cl.<sup>5</sup> C10G 29/00

U.S. Cl. 208—179

7 Claims



1. An oil clarifier for use in a recovery system for used lubricating oil, comprising a tank having top, bottom, side and end walls forming an upper portion and a lower portion for receiving a predetermined volume of used lubricating oil, an enclosure having top, bottom side and end walls surrounding the corresponding said walls of said tank and spaced outwardly therefrom, means for supporting and spacing said tank within said enclosure to define a fluid chamber completely surrounding all of said walls of said tank, insulation means mounted on said enclosure, said insulation means spaced outwardly from said tank and extending completely around said fluid chamber to limit heat transfer from said fluid chamber through said enclosure, means for introducing used lubricating oil into said tank, first heater means for heating the oil within said tank, means including a pump and a conduit externally of said tank for recirculating the heated oil within said tank, means for introducing a coagulant into the oil for recirculation with the oil by said recirculating means, second heater means for heating a fluid within said chamber surrounding said tank to create a thermal blanket and oven-like condition completely around all of said walls of said tank including said top wall to maintain said tank and the oil within said tank at a constant temperature for an extended time period to avoid circulation of the heated oil within said tank during the time period for obtaining effective precipitation of coagulated impurities within the heated

oil, and means for removing clarified oil from said upper portion of said tank after coagulated impurities have precipitated from the oil in said lower portion of said tank during said time period.

5. A method of clarifying used lubricating oil, comprising the steps of supplying a predetermined volume of used lubricating oil into a tank having top, bottom, side and end walls forming an upper portion and a lower portion, completely surrounding the tank with an enclosure having top, bottom, side and end walls spaced outwardly from the corresponding walls of the tank to define a fluid chamber completely surrounding the tank, attaching insulation to the enclosure, extending the insulation completely around the fluid chamber spaced outwardly from the tank to limit heat transfer from the fluid chamber through the enclosure, heating the oil within the tank, recirculating the heated oil outwardly from the tank and then back into the tank, introducing a coagulant into the heated oil for recirculation with the oil, stopping the recirculation of the heated oil within the tank, heating a fluid within the chamber surrounding the tank to create a thermal blanket and oven-like condition completely around all of the walls of the tank including the top wall, using the heated fluid to maintain the tank and the oil within the tank at a constant temperature for an extended time period to avoid circulation of the heated oil within the tank during the time period for obtaining effective precipitation of coagulated impurities within the oil, and removing clarified oil from the upper portion of the tank after coagulated impurities have precipitated from the oil into the lower portion of the tank during the time period.

4,948,494

# REMOVAL OF HYDROGEN SULFIDE FROM PRODUCED FLUIDS

Charles A. Stout, Tustin, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jun. 28, 1989, Ser. No. 372,687

Int. Cl.<sup>5</sup> C10G 21/10

U.S. Cl. 208—293

71 Claims

1. A process for the removal of hydrogen sulfide from a water-in-oil emulsion containing hydrogen sulfide which comprises treating said water-in-oil emulsion with sulfur dioxide to convert the hydrogen sulfide present in said emulsion to elemental sulfur.

4,948,495

# HIGH LIQUID YIELD PROCESS FOR RETORTING VARIOUS ORGANIC MATERIALS INCLUDING OIL SHALE

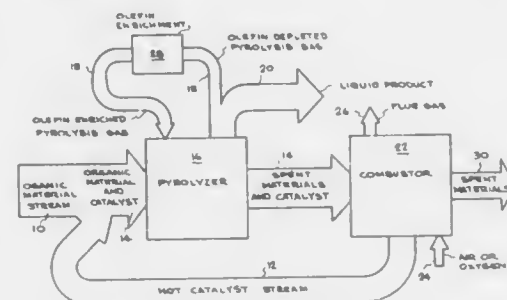
Thomas T. Coburn, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 26, 1988, Ser. No. 224,414

Int. Cl.<sup>5</sup> C10G 1/00, 1/08

U.S. Cl. 208—407

9 Claims



1. A continuous process for retorting a high molecular weight organic material selected from the group consisting of oil shale, tar sands, solvent refined coal, petroleum residue,

polyethylene, polystyrene, heavy oil, bitumen, and rubber wastes, the process comprising the steps of:

continuously mixing a feed stream, comprised of the organic material and a quantity of mineral matter, with a recycle stream, comprised of a hot acidic catalyst having a temperature in the approximate range from 600 to 800 degrees centigrade, the acidic catalyst being able to appreciably adsorb alkenes on active surface sites when at temperatures in the approximate range from 350 to 500 degrees centigrade, to thereby produce a mixed stream, comprised of the organic material, mineral matter, and not acidic catalyst;

continuously introducing the mixed stream, comprised of the organic material, mineral matter, and hot acidic catalyst and having a temperature in the approximate range from 425 to 525 degrees centigrade, into a pyrolyzer;

continuously sweeping a circulating stream, comprised of pyrolysis gas that is enriched in olefins, into the pyrolyzer and through the organic material and hot acidic catalyst of the mixed stream, whereby the olefins or, equivalently, the alkenes in the pyrolysis gas occupy the active surface sites of the acidic catalyst and polymerize slightly while trapping gas precursors to thereby eliminate or diminish gas formation, and whereby pyrolysis occurs and the mixed stream becomes comprised of spent organic material, mineral matter, and relatively cool acidic catalyst, the circulating stream becomes comprised of pyrolysis gas that is relatively depleted in olefins, and a maximized amount of a liquid product is produced;

continuously removing the liquid product from the pyrolyzer;

continuously withdrawing the mixed stream, comprised of spent organic material, mineral matter, and relatively cool acidic catalyst, from the pyrolyzer;

following the continuously withdrawing step, continuously combusting, in air or oxygen, the spent organic material and mineral matter of the mixed stream, whereby the relatively cool acidic catalyst is heated and once again becomes hot acidic catalyst;

continuously exhausting the circulating stream, comprised of pyrolysis gas that is relatively depleted in olefins, from the pyrolyzer;

following the continuously exhausting step, continuously enriching the circulating stream in olefin content, whereby the circulating stream once again becomes comprised of pyrolysis gas that is enriched in olefins;

following the continuously enriching step, continuously using the circulating stream comprised of pyrolysis gas that is enriched in olefins in carrying out the continuously sweeping step;

following the continuously combusting step, continuously separating the hot acidic catalyst from the mineral matter of the mixed stream, whereby the recycle stream, comprised of hot acidic catalyst, is produced; and

continuously employing the recycle stream, comprised of hot acidic catalyst, that results from the continuously separating step, in carrying out the continuously mixing step.

4,948,496

# GAS SENSOR

Ramesh Chand, Woodland Hills, Calif., assignor to G C Industries, Chatsworth, Calif.

Continuation of Ser. No. 891,233, Jul. 29, 1986, abandoned. This application May 4, 1989, Ser. No. 351,282

Int. Cl.<sup>5</sup> G01N 27/31

U.S. Cl. 204—408

11 Claims

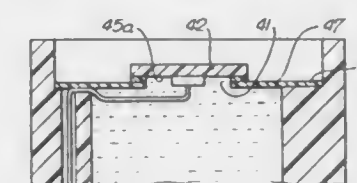
1. An electrochemical gas sensor which is relatively insensitive to variations in ambient conditions, comprising:

(a) a hollow sensor body which contains electrolyte and has an open sensing end;

(b) a flexible closure which extends across the open sensing end of the sensor body and which has at least an outer

annular section formed of an electrolyte impermeable flexible membrane;

(c) a sensing electrode in contact with the electrolyte which has an outer surface and smaller diametrical dimensions than the flexible closure;



(d) an electrolyte impermeable, gas permeable material covering the outer surface of the sensing electrode; and

(e) a support member secured to the sensing electrode forming therewith a relatively rigid sandwich structure centrally located on said closure and secured to the annular section thereof.

4,948,497

# ACOUSTICALLY FLUIDIZED BED OF FINE PARTICLES

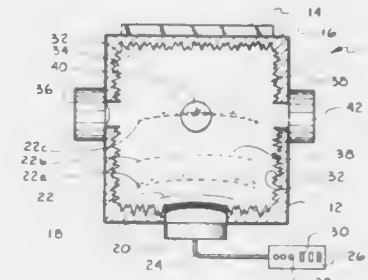
Tihoro Ohkawa, La Jolla, Calif., assignor to General Atomics, San Diego, Calif.

Filed May 18, 1988, Ser. No. 195,203

Int. Cl.<sup>5</sup> B07B 3/00

U.S. Cl. 209—1

16 Claims



1. An apparatus to acoustically fluidize a bed of fine particles which comprises:

a chamber for confining said particles in a substantially motionless gaseous medium, said chamber having a top and a bottom;

a sound source mounted on said bottom of said chamber for directing an acoustic wave into said chamber to suspend said particles on said wave therein;

means for adjusting the intensity of said wave to vary the distance of said suspended particles from said sound source in said chamber; and

an acoustic absorber effectively lining the interior of said chamber.

4,948,498

# SEPARATING DRUM

Oreste Cribiu, and Leo Cribiu, both of Gerezano, Italy, assignors to Eva Fin s.r.l., Milan, Italy

Filed Mar. 13, 1989, Ser. No. 322,170

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808215

Int. Cl.<sup>5</sup> B07B 1/18, 13/04

U.S. Cl. 209—664

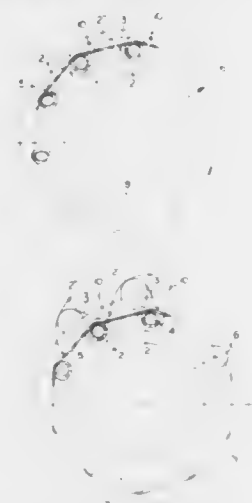
10 Claims

1. A rotatable separating drum having cylindrically shaped separating elements each having a longitudinal axis arranged parallel to an axis of rotation of the drum comprising

(a) at least one carrier element, pivotably affixed to the



separating drum, for firmly connecting adjacent cylindrically shaped separating elements in pairs, the at least one carrier element having an axis of pivot coaxial with the longitudinal axis of one of the pair of separating elements connected by the at least one carrier element, to form a rotatable separating element which is rotatable about the longitudinal axis thereof and a pivotable separating element which is pivotable about the axis of rotation of the rotatable separating element;



- (b) an adjustable separating slot formed between adjacent pairs of connected separating elements; and  
(c) an adjustment wheel affixed to at least one of the carrier element and the rotatable separating element, the adjustment wheel having an axis of rotation coaxial with the axis of rotation of the at least one carrier element; and  
(d) a drive means for rotatably driving the adjustment wheel to set the separation slot.

4,948,499

#### SIMPLIFIED METHOD AND APPARATUS FOR PURIFICATION

Anthony Peranio, Nyack, N.Y., assignor to Purewater Science International, Inc., Upper Nyack, N.Y.

Continuation of Ser. No. 80,751, Jul. 31, 1987, Pat. No. 4,828,692. This application Apr. 1, 1989, Ser. No. 337,668

Int. Cl.<sup>5</sup> B01D 24/28

U.S. Cl. 210—180

8 Claims



1. Apparatus for purifying a liquid comprising:  
a hollow unitary container defined by a bottom and an integral sidewall and having an open top for introducing a liquid into the container and a spout at the top open end of said container;  
a predetermined quantity of carbon being positioned in said container and being loosely arranged in the bottom portion of the container prior to heating the container and

being arranged to freely move into the upper region of the container and mix with the liquid placed in said container; a filter positioned in said spout to remove particulate matter from the liquid as the liquid containing such particulate matter passes through the spout and to prevent the carbon from passing through said filter;

said container being formed of a material capable of withstanding heat sufficient to raise the temperature of the liquid contents to about the boiling level whereby the contents are caused to interact with the carbon during heating and drive the carbon particles into the upper portion of the container to intimately interact with the heated water;

said container being provided with a lid removably covering said open top; and

said lid being perforated, said perforations being sufficient to permit venting of volatile matter from the container during heating.

4,948,500

#### MEMBRANE FILTER PLATE

Werner Klinkau, Berg am Starnbergersee, and Reinmund Stanik, Marktoberdorf, both of Fed. Rep. of Germany, assignors to Klinkau Besitzges. mbH, Fed. Rep. of Germany  
Division of Ser. No. 330,310, Mar. 29, 1989, Pat. No. 4,897,190, which is a division of Ser. No. 246,914, Sep. 16, 1988, Pat. No. 4,832,840, which is a continuation of Ser. No. 36,133, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 673,206, Nov. 19, 1984, abandoned, which is a continuation of Ser. No. 450,786, Dec. 17, 1982, abandoned. This application Oct. 10, 1989, Ser. No.

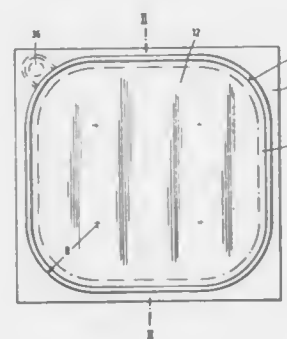
419,602

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1982, 3221249; Nov. 10, 1982, 3224917

Int. Cl.<sup>5</sup> B01D 25/12

U.S. Cl. 210—227

3 Claims



1. In a membrane filter plate for a filter press comprising a carrier plate, which includes a central recessed surface in an outer surface, both the outer surface and the central recessed surface being parallel to a central plane of the carrier plate, a membrane being secured to the plate and being spaced from the central recessed surface, and in which the carrier plate includes a passageway extending from the exterior of the carrier plate into the space between the membrane and the central recessed surface for supporting a flow of fluid to load the membrane away from the central recessed surface, and in which such loading normally causes the diaphragm to move with a wave motion, the improvements comprising means for causing the diaphragm to move away from the central recessed surface in the manner of a piston, including means defining fluid channels in fluid communication with the passageway and extending across the surface of the carrier plate for supporting a flow of fluid across the surface of the carrier plate.

4,948,501

#### MEMBRANE FILTER PLATE

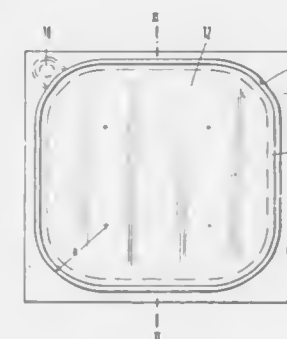
Werner Klinkau, Berg am Starnbergersee, and Reinmund Stanik, Marktoberdorf, both of Fed. Rep. of Germany, assignors to Klinkau Besitzges. mbH, Fed. Rep. of Germany  
Division of Ser. No. 330,310, Mar. 29, 1989, Pat. No. 4,897,190, which is a division of Ser. No. 246,914, Sep. 16, 1988, Pat. No. 4,832,840, and a continuation of Ser. No. 36,133, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 673,206, Nov. 19, 1984, abandoned, which is a continuation of Ser. No. 450,786, Dec. 17, 1982, abandoned. This application Oct. 10, 1989, Ser. No. 419,314

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1982, 3221249; Nov. 10, 1982, 3224917

Int. Cl.<sup>5</sup> B01D 13/00, 25/04, 25/14, 25/15

U.S. Cl. 210—228

1 Claim



1. In a membrane filter plate for a filter press comprising a carrier plate, which includes a central recessed surface in an outer surface, both the outer surface and the central recessed surface being parallel to a central plane of the carrier plate, a membrane carried on the outer surface of the carrier plate and a sealing frame including a periphery, said frame surrounding the carrier plate and the membrane and connecting the carrier plate and the membrane and sealing the space between the membrane and the central recessed surface against a fluid agent, the improvement comprising said frame comprising a sealing edge being spaced from the periphery of said frame and being sealed to the membrane, said sealing edge including a plurality of straight edge portions interconnected by a plurality of arcuate edge portions comprising means for providing a corner-less sealing edge sufficient to preclude fatigue of the membrane at these locations.

4,948,502

#### APPARATUS FOR FILTERING INDUSTRIAL LIQUIDS

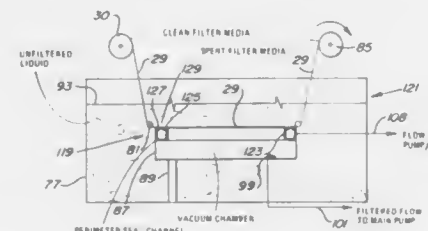
Raymond L. Anderson, Walled Lake, Mich., assignor to H. R. Black Company, Inc., Warren, Mich.

Division of Ser. No. 338,944, Apr. 17, 1989, This application Nov. 20, 1989, Ser. No. 438,794

Int. Cl.<sup>5</sup> B01D 33/056

U.S. Cl. 210—387

5 Claims



1. In a filter apparatus for industrial process liquids, a tank receiving and containing unfiltered liquids, a continuous con-

veyor screen guidably mounted within the tank and projecting therefrom, the improvement comprising:

- a continuous filter media overlying the tank guidably retained against said conveyor screen for horizontal movement within the tank and outwardly thereof;  
an open-top vacuum chamber supported within said tank underlying said filter media;  
a continuous perimeter seal channel overlying and surrounding said vacuum chamber and bearing against said filter media, said media spanning said sealed channel;  
an outlet upon said vacuum chamber connected to a conduit extending from said tank connected to a pump for delivering filtered liquids to a process area;  
the top of the channel having a continuous slot therein defining elongated continuous inner and outer seal surfaces engaging said filter media;  
the outer seal surfaces preventing flow of unfiltered liquid into the channel;  
the inner seal surfaces preventing flow from the channel into the vacuum chamber;  
said channel having a lateral outlet connected to a conduit which extends from the tank, and is connected to an auxiliary pump, thereby providing a negative pressure within the channel, so that any unfiltered liquid that breaches the outer seal is withdrawn from the sealed channel to prevent it from breaching the inner channel seal.

4,948,503

#### OIL FILTER COVER IN COMBINATION WITH AN OIL FILTER CARTRIDGE

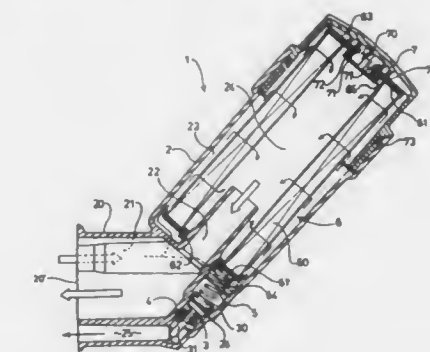
Dieter Baumann, Greven-Gimbte, and Norbert Prinz, Greven, both of Fed. Rep. of Germany, assignors to Ing. Walter Heugst GmbH & Co. KG, Muenster, Fed. Rep. of Germany  
Filed Nov. 1, 1988, Ser. No. 265,764

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1987, 8714656

Int. Cl.<sup>5</sup> B01D 27/08, 27/10

U.S. Cl. 210—232

2 Claims



1. An oil filter cover in combination with an oil filter cartridge comprising:

an oil filter cover and a filter cartridge which together include one or more releasable snap fasteners and which are fastened together solely by said one or more releasable snap fasteners, the cover having on its inside several spring tongues with catch projections arranged in a circle and projecting into the interior of the filter cartridge, the filter cartridge having a circular catch indentation for the catch projections to form snap fasteners.

4,948,504

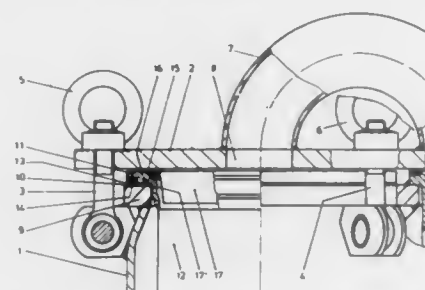
**FILTER BAG CARRIER WITH FILTER SEAL PROFILE**  
Frank M. Kierdorf, Cologne, and Rainer G. Behnke, Heppendorf, both of Fed. Rep. of Germany, assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Mar. 22, 1989, Ser. No. 327,278

Int. Cl.<sup>5</sup> B01D 29/10

U.S. Cl. 210—238

7 Claims



1. Filter apparatus for a fluid under pressure comprising in combination a container including a filter vessel as well as a cover for clamping against said filter vessel, a support basket inserted into said filter vessel, said support basket having an annular flange (11) adapted to be clamped between said cover and said filter vessel, said flange having an inwardly and upwardly open profile into which a profiled filter sealing element (18) of an annular filter bag carrier (17) is adaptively inserted therein, said profiled filter sealing element (18) comprising an upwardly and outwardly open groove (19) into which an inner O ring (20) may be inserted.

4,948,505

**QUICK-CHANGE FILTER CARTRIDGE AND HEAD THEREFOR**

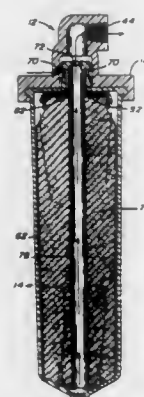
Raymond M. Petrucci, Middlebury; Bruce G. Taylor, Kensington; Edward C. Giordano, Manchester, all of Conn.; James M. Padilla, Covina Heights, and Carl Palmer, La Habra Heights, both of Calif., assignors to Cuno, Inc., Meriden, Conn.

Continuation of Ser. No. 173,689, Mar. 25, 1988, Pat. No. 4,877,521, which is a continuation of Ser. No. 44,895, Apr. 30, 1987, Pat. No. 4,735,716, which is a continuation-in-part of Ser. No. 822,536, Jan. 27, 1986, abandoned. This application Oct. 27, 1989, Ser. No. 428,285

Int. Cl.<sup>5</sup> B01D 27/08

U.S. Cl. 210—238

6 Claims



1. A replacement filter canister comprising:  
a flask shaped housing having a main body with a top surface and a cylindrical neck of substantially uniform diameter projecting from said top surface said substantially uniform

diameter defining a cylindrical surface, said neck having an internal surface;  
a tube disposed in said housing and extending into said neck, the cross-sectional area of said tube being smaller than the internal cross-sectional area of said internal surface of said neck to define a clearance therebetween, said clearance being sealed adjacent the upper distal end of said tube and the upper distal end of said neck;  
a first seal disposed circumferentially in and around said neck and proximate its upper distal end;  
a second seal disposed circumferentially in and around said neck below said first seal;  
at least one opening into the interior of said canister located between said first seal and said second seal, said opening extending radially inwardly from said cylindrical surface of said neck to said clearance; and  
means for filtering disposed in said main body of said housing below said top surface thereof, whereby fluid directed at said at least one opening will flow into said canister through said clearance between said neck and said tube, thence flow through said means for filtering and thence flow out of said canister through said tube.

4,948,506

**PHYSICOCHEMICALLY FUNCTIONAL ULTRATHIN FILMS BY INTERFACIAL POLYMERIZATION**

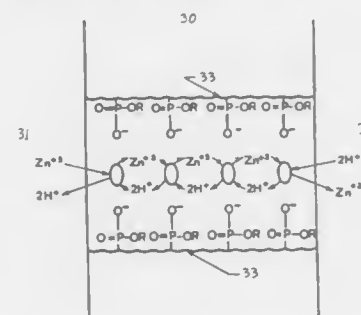
Harold K. Lonsdale; Walter C. Babcock; Dwayne T. Friensen; Kelly L. Smith; Bruce M. Johnson, all of Bend, and Carl C. Wamser, West Linn, all of Oreg., assignors to Bend Research, Inc., Bend, Oreg.

Continuation-in-part of Ser. No. 883,043, Jul. 7, 1986, Pat. No. 4,784,736. This application Nov. 14, 1988, Ser. No. 272,213

Int. Cl.<sup>5</sup> B01D 13/00

U.S. Cl. 210—490

36 Claims



19. A composite selective membrane comprising a microporous support and the thin film interfacial polymerization reaction product of  $M_FX_m$  and  $NY_n$  wherein  $M_F$  is a moiety having chemical species-specific reversibly-complexing complexing sites,  $N$  is a moiety not having any chemical species-specific complexing sites,  $X$  and  $Y$  are groups that are mutually reactive in a condensation reaction, and  $m$  and  $n$  are integers  $\geq 2$ .

4,948,507

**INTERFACIALLY SYNTHESIZED REVERSE OSMOSIS MEMBRANE CONTAINING AN AMINE SALT AND PROCESSES FOR PREPARING THE SAME**

John E. Tomaschke, San Diego, Calif., assignor to Hydranautics Corporation, San Diego, Calif.

Continuation-in-part of Ser. No. 250,190, Sep. 28, 1988, Pat. No. 4,872,984. This application Oct. 6, 1989, Ser. No. 418,076

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 61/08, 67/00

U.S. Cl. 210—500.38

58 Claims

1. A water permeable membrane prepared by interfacially polymerizing, on a microporous support, (1) an essentially monomeric polyamine reactant having at least two amine functional groups, and (2) an essentially monomeric amine-

reactive reactant comprising a polyfunctional acyl halide or mixture thereof, wherein the amine-reactive reactant has, on the average, at least about 2.2 acyl halide groups per reactant molecule in the presence of (3) a monomeric amine salt.

4,948,508

**SURFACE-HYDROPHILIC, HIGHLY SELECTIVE SEMIPERMEABLE MEMBRANE**

Tsutomu Nakagawa, Musashino, and Akon Higuchi, Edogawa, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 21, 1989, Ser. No. 341,217

Claims priority, application Japan, May 10, 1988, 63-111571

Int. Cl.<sup>5</sup> B01D 61/02, 61/14, 61/24

U.S. Cl. 210—500.33

8 Claims

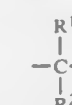


1. A surface-hydrophilic, highly selective semipermeable membrane comprising:

a semipermeable membrane of a hydrophobic polymer containing aromatic rings in the main chain thereof; and  
a hydrophilic segment having at least one end directly bonded to the aromatic ring,

said hydrophilic segment comprising moieties having properties of preventing adsorption of organic substances so as to avoid fouling of said membrane, including at least one methylene group or substituted methylene group which is positioned at least at said one end of the segment and at least one neutral hydroxyl group,

said methylene group or substituted methylene group being represented by the formula:



wherein each of  $R^1$  and  $R^2$  independently represents a hydrogen atom, a halogen atom, an alkyl group having 1 to 3 carbon atoms or a halogenated alkyl group having 1 to 3 carbon atoms,

and wherein the surface having said hydrophilic segment bonded thereto exhibits a contact angle against water of at least  $5^\circ$  smaller than the contact angle exhibited by the surface of a dense film made of said hydrophobic polymer which does not contain said hydrophilic segment bonded thereto.

4,948,509

**ANAEROBIC FERMENTATION PROCESS**

Charles R. Stack, Broken Arrow, Okla., assignor to Charles Stack & Associates, Inc., Tulsa, Okla.

Filed Aug. 24, 1988, Ser. No. 236,514

Int. Cl.<sup>5</sup> C02F 3/28

U.S. Cl. 210—603

12 Claims

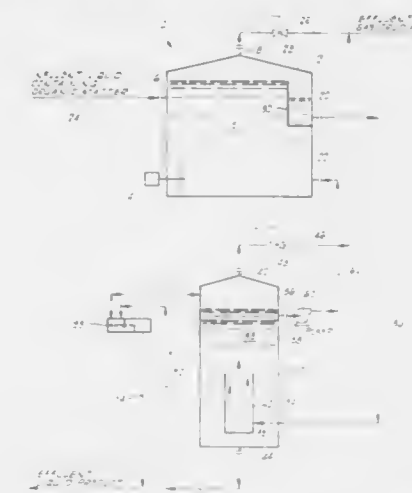
1. An improved anaerobic fermentation process for converting an influent liquid containing suspended organic matter to effluent gas and liquid products comprising the steps of:  
introducing said influent liquid into an anaerobic fermentation zone containing anaerobic microorganisms for con-

verting said suspended organic matter into fermentation products including a gas containing methane and bacterial cell mass particles;

maintaining said influent liquid in said fermentation zone at a temperature, at a first pressure and for a time sufficient to form said gas and to form a liquid containing dissolved gas and suspended bacterial cell mass particles;

withdrawing said liquid containing dissolved gas and suspended bacterial cell mass particles from said fermentation zone;

introducing said liquid into a flotation zone;



maintaining said liquid in said flotation zone at a temperature, at a second pressure and for a time whereby solution gas dissolved in said liquid is liberated therein forming bubbles which rise and cause said suspended bacterial cell mass particles to be floated to the surface of said liquid; withdrawing said bacterial cell mass particles from the surface of said liquid and from said flotation zone; recycling said withdrawn bacterial cell mass particles to said fermentation zone; and conducting the remaining liquid from said flotation zone to a point of further processing or use.

4,948,510

**BIOLOGICAL PHOSPHOROUS REMOVAL FROM WASTEWATER USING MULTIPLE RECOMBINABLE BASINS**

Michael D. Todd, and Raleigh L. Cox, both of Baton Rouge, La., assignors to United Industries, Inc., Baton Rouge, La.

Filed Oct. 12, 1989, Ser. No. 420,562

Int. Cl.<sup>5</sup> C02F 3/30

U.S. Cl. 210—605

16 Claims

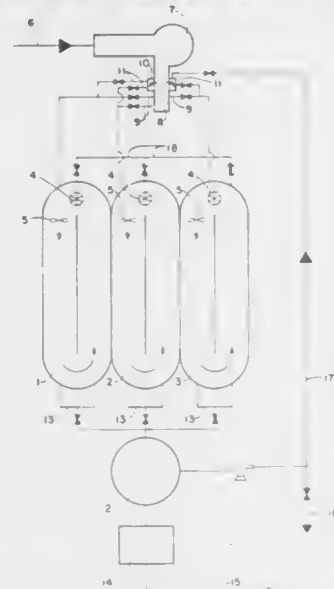
1. A process for the biological removal of phosphorous from an influent wastewater stream in a treatment facility having at least three basins containing mixed liquor with phosphorous storing microorganisms, the basins discharging to a clarifier for producing an effluent stream and activated sludge, comprising:

(a) a first step of directing said influent to a first basin at substantially anaerobic conditions, transferring mixed liquor in said first basin to one of said basins at aerobic conditions, discharging mixed liquor to said clarifier from one of said basins other than said first basin, and recycling said sludge from said clarifier to one of said basins other than said first basin;

(b) a second step of aerating said first basin, directing flow of said influent to a second basin at substantially anaerobic conditions, transferring mixed liquor from said second basin to one of said basins at aerobic condition, discharging mixed liquor to said clarifier from one of said basins other than said second basin, and recycling said sludge



from said clarifier to one of said basins other than said second basin; and  
(c) a third step of aerating said second basin, directing flow of said influent to a third basin at substantially anaerobic



conditions, transferring mixed liquor from said third basin to one of said basins at aerobic conditions, discharging mixed liquor to said clarifier from one of said basins other than said third basin, and recycling said sludge from said clarifier to one of said basins other than said third basin.

4,948,511

#### METHOD FOR EXTRACTING DISSOLVED ORGANIC POLLUTANTS FROM AQUEOUS STREAMS

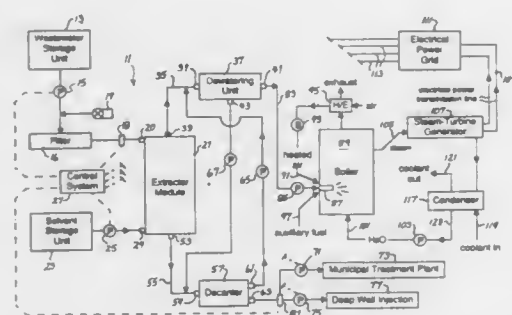
Gregory K. Swanson, San Diego, and Roger R. Argus, Solana Beach, both of Calif., assignors to Maxwell Laboratories, Inc., San Diego, Calif.

Filed Apr. 14, 1989, Ser. No. 339,020

Int. Cl.<sup>5</sup> B01D 11/04

U.S. Cl. 210—634

19 Claims



1. A method suitable for the extraction from a contaminated water stream of a wide variety of dissolved organic pollutants to render such stream suitable for reuse or for discharge to the environment or to another treatment method for removing different contaminants, which method comprises the steps of pretreating a first stream of contaminated water to remove suspended solids therefrom, contacting said pretreated first stream of contaminated water with a countercurrent second stream of substantially water-immiscible, non-polar mixed hydrocarbons of chain lengths between about C<sub>10</sub> and C<sub>20</sub> which second stream extracts particular dissolved organic pollutants of interest and removes same from said first stream to create a treated water stream which meets environmental stan-

dards for re-use or for discharge to a municipal treatment facility or to the environment and which contains less than 10 ppm total of dissolved organic pollutants; separating a treated water stream containing not more than 10 ppm of dissolved organic pollutants of concern and a contaminated mixed hydrocarbon stream from said countercurrent contacting step; transferring said contaminated mixed hydrocarbon stream to a power or heat-generating facility and burning said stream and its contaminants at a temperature of at least about 1000° F. and a residence time of at least about 1 second; and either directing said treated stream for re-use, or discharging said treated water stream to the environment or to a subsequent treatment facility.

4,948,512

#### MULTISTEP METHOD FOR SEPARATING DISSOLVED ORGANIC COMPOUNDS FROM A SOLUTION

Itzhak Gotlieb, 5 Balsam Ct., Roseland, N.J. 07068, and Aharon Zidon, 27 Hamaalot Street, Givataim, Israel

Division of Ser. No. 181,665, Apr. 14, 1988, Pat. No. 4,844,811.

This application Mar. 3, 1989, Ser. No. 318,611

Int. Cl.<sup>5</sup> B01D 21/00; C02F 1/40

U.S. Cl. 210—705

31 Claims

1. A process for separating at least one organic solute contaminant from an aqueous solution comprising: mixing said solution with a surfactant present in excess as compared with the amount of said at least one organic solute in order that said solute is adsorbed by said surfactant to form a surfactant/organic solute aggregate; and separating said aggregate from said solution in order to form a surfactant fraction and a clean water effluent water fraction substantially free of solute and surfactant by performing at least two of the following steps:  
a. reducing the solubility of the surfactant to form a separate surfactant phase and a water phase;  
b. filtering said solution; and  
c. foam fractionation of said solution, said at least two steps being performed in the orders a + b, b + a, b + c, c + b, a + c or c + a.

4,948,513

#### METHOD FOR CONTROLLING OVERSPRAY IN PAINT SPRAY BOOTHS

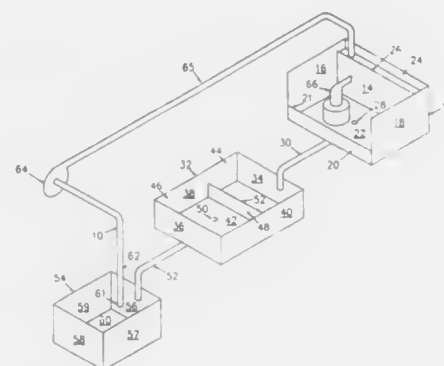
David B. Mitchell, Palatine, Ill., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed May 27, 1988, Ser. No. 199,984

Int. Cl.<sup>5</sup> C02F 1/56

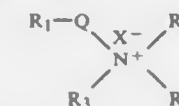
U.S. Cl. 210—705

35 Claims



1. A method of detackifying spray booth water containing particles from paint spray comprising the steps of:  
(a) adding to the spray booth water at least about 500 ppm of

modified tannin compounds formed by reacting a condensed tannin with both an amino compound and an aldehyde;  
(b) adding to the spray booth water at least about 300 ppm of polymers derived from hydrophilic-lipophilic quaternary ammonium repeat units of the formula:



wherein R<sub>1</sub>-Q is a lipophilic radical including R<sub>1</sub> which comprises an aliphatic hydrocarbon chain having a carbon chain length between about 7 and about 28 carbon atoms and Q, which is a linkage group selected from the group consisting of benzyl groups, ester groups, and amine groups that covalently links the lipophilic chain of R<sub>1</sub> to the quaternary nitrogen; wherein each R<sub>2</sub> is independently selected from alkyl, hydroxy alkyl, or aryl groups of from 1 to 7 carbon atoms; wherein R<sub>3</sub> is an ethylenically unsaturated hydrophilic group selected from acrylic ester groups of the formula CH<sub>2</sub>=CR<sub>4</sub>-CO-O-, where R<sub>4</sub> is hydrogen or methyl, acrylamide groups of the formula CH<sub>2</sub>=CR<sub>5</sub>-CO-NH-, where R<sub>5</sub> is hydrogen or methyl, vinyl pyrrolidone groups, and hydroxy ethyl methacrylate groups; and wherein X<sup>-</sup> is an anion;  
(c) providing a pH above about 6.5 in the spray booth water such that modified tannin added in step (a) forms a floc which is dispersed in the spray booth water for detackification, with the polymer added in step (b) stabilizing such floc and improving detackification and  
(d) separating the floc and paint particle from said spray booth water.

4,948,514

#### METHOD AND APPARATUS FOR SEPARATING IONS FROM LIQUIDS TO PRODUCE SEPARATE DILUTED AND CONCENTRATED EFFLUENTS

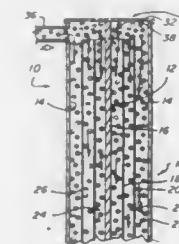
Douglas MacGregor, Salt Lake City, Utah, and Mark A. Smith, Boulder, Colo., assignors to Lion Capital, Ltd., Denver, Colo.

Filed Sep. 23, 1988, Ser. No. 248,781

Int. Cl.<sup>5</sup> C02F 1/46; B01D 35/06

U.S. Cl. 210—748

16 Claims



1. A method of separating charged particles from a liquid to form separate diluted and concentrated effluents of liquid comprising the steps of: passing such a liquid between a first tubular permanently polarized element and a second tubular permanently polarized element disposed within said first ele-

ment, exposing the liquid to spaced static fields on opposite sides of the liquid with one static field attracting negatively charged particles and the other static field attracting positively charged particles, so that the charged particles are concentrated in said static fields, and subsequently withdrawing liquid from which the charged particles have been removed in one stream and withdrawing liquid in which the charged particles have been concentrated in a second stream.

4,948,515

#### FILTER FOR LIQUID AND METHOD OF FILTERING LIQUID

Yoshiharu Okumura, and Katsutoshi Ando, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

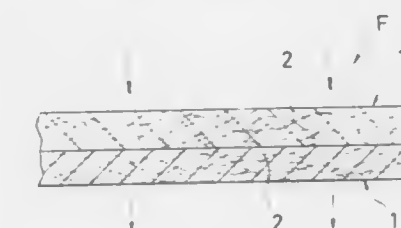
Filed Dec. 22, 1988, Ser. No. 288,657

Claims priority, application Japan, Dec. 24, 1987, 62-329281

Int. Cl.<sup>5</sup> B01D 17/06

U.S. Cl. 210—748

22 Claims



1. A method of filtering a liquid comprising the step of filtering a liquid having a dielectric constant of less than 10 through a porous layer of electret, wherein said porous layer comprises a fibrous sheet which has a surface charge density of at least 5 × 10<sup>-11</sup> coulombs/cm<sup>2</sup>, wherein on the upstream side of said porous layer of electret is laminated another porous layer having at least either a porosity or an average fiber diameter that is greater than that of said porous layer of electret.

4,948,516

#### METHOD OF DISPOSING OF WASTES CONTAINING HEAVY METAL COMPOUNDS

David O. Fisher, Chesterfield, Mo., and Kent P. Lannert, Freeburg, Ill., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 21, 1989, Ser. No. 396,420

Int. Cl.<sup>5</sup> C02F 11/14

U.S. Cl. 210—751

9 Claims

1. A method of disposing of aqueous sludge wastes containing heavy metal compounds and arsenic sulfide comprising (1) neutralizing the wastes to a pH of from about 7 to about 10 and dissolving the arsenic sulfide, (2) oxidizing the neutralized wastes, and (3) solidifying the oxidized wastes using mineral binding agents, wherein the combination of neutralizing and oxidizing is sufficient to reduce leaching of the arsenic from the solids produced with the mineral binding agents.

4,948,517

#### SYSTEM FOR PREVENTING OIL DROPLET SIZE REDUCTION

Grant A. Young, Tulsa, and William D. Wakley, Broken Arrow, both of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 21, 1989, Ser. No. 326,350

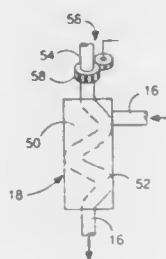
Int. Cl.<sup>5</sup> B01D 17/038

U.S. Cl. 210—767

6 Claims

5. A method of regulating the quantity of a fluid mixture passed into a separation unit in a manner to prevent the size reduction of droplets of a first fluid component of the fluid mixture, comprising:

- (a) passing a fluid mixture from a source of the fluid mixture through a progressive cavity motor;  
 (b) regulating the rotation of a rotor of the progressive cavity motor by operating a brake, mechanically connected to the rotor, to regulate the flow of the fluid mixture;



ture through the progressive cavity motor in a manner to prevent the size reduction of droplets of the first fluid component; and  
 (c) passing the fluid mixture from the progressive cavity motor into a separation unit.

4,948,518

# METHOD OF SEPARATING A SUSPENSION OF ACTIVATED SLUDGE AND SEWAGE WATER

Hüda Turgay, Berlin, Fed. Rep. of Germany, assignor to Borsig GmbH, Berlin, Fed. Rep. of Germany

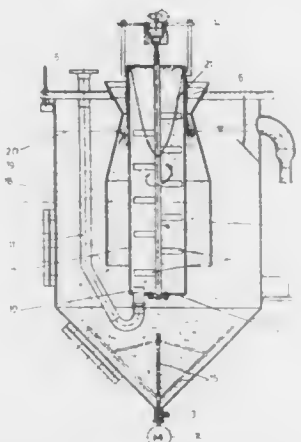
Filed Mar. 29, 1989, Ser. No. 330,598

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812715

Int. Cl.<sup>5</sup> B01D 21/06, 21/24

U.S. Cl. 210—802

4 Claims



1. A method for separating activated sludge from a suspension of activated sludge and sewage water comprising: introducing said suspension into a sedimentation tank, said tank comprising: intake means for entry of the suspension into the tank; said tank having a conical bottom and a top; outlet means at said conical bottom for exit of the activated sludge from the tank; discharge means at the top of said tank for discharging sewage water separated from the activated sludge; first pipe means at the center of said tank and having an open top and a closed bottom; base means for closing the bottom of said first pipe means; inlet means communicating with said intake means and said first pipe means at said base means; means for maintaining liquid in said tank at a level dependent on amount of liquid leaving the tank, said first pipe means extending above said level; second pipe means surrounding loosely said first pipe means and extending above and below said level of said liquid; and agitator means in said first pipe means; driving said agitator means at a speed for shaping the suspension at the top

of said first pipe means into a paraboloid of revolution extending to an edge at the top of said first pipe means, said suspension spilling over said edge; said agitator through said paraboloid producing a maximum border surface between said suspension and outer atmosphere for expelling gas bubbles present in said suspension to leave the suspension and enter the atmosphere, said agitator breaking up clumps of bacteria into smaller clumps for releasing the gas bubbles, said gas bubbles after release ascending along a phase interface between the suspension and outer atmosphere by the surface of said paraboloid, bacteria reuniting into clumps that are larger than the first-mentioned clumps and that are substantially free of gas bubbles after the suspension has left said first pipe means so that sedimentation of the activated sludge and separation from the water is accelerated for reducing the size of said sedimentation tank.

4,948,519

# METHOD OF REMOVING SEDIMENTATED SOLIDS FROM A CONTAINER AND AN APPARATUS THEREFOR

Horst Zeh, Karlsruhe, Fed. Rep. of Germany, assignor to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Filed Oct. 16, 1989, Ser. No. 422,115

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3835272

Int. Cl.<sup>5</sup> B01D 21/02

U.S. Cl. 210—803

6 Claims



1. A method of removing sedimentated solids from a container having an outlet opening and holding a liquid suspension of the solids, the method comprising the steps of:  
 inclining the container so as to cause the container to be inclined toward said outlet thereof and permit the liquid to flow to said outlet and from said container; and,  
 charging the residual liquid remaining in the container with pulsating compressed gas through a perforated pipe extending substantially parallel to the bottom of the container thereby causing the sedimentated solids to break up and be carried away with the residual liquid.

4,948,520

# SOFTENER COMPOSITION

Hisami Sasaki, Yokohama, Japan, assignor to Lion Corporation, Tokyo, Japan

Filed Sep. 1, 1987, Ser. No. 91,943

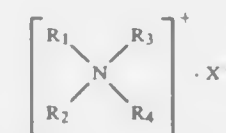
Claims priority, application Japan, Sep. 12, 1986, 61-215136

Int. Cl.<sup>5</sup> C07C 85/06

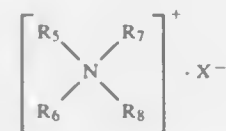
U.S. Cl. 252—8.8

18 Claims

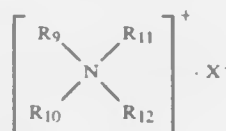
1. A softener composition comprising a mixture of the following three kinds of quaternary ammonium salts:  
 (A) a mono(long-chain) quaternary ammonium salt having the following formula (I):



(B) a di(long-chain) quaternary ammonium salt having the following formula (II):



and (C) a tri(long-chain) quaternary ammonium salt having the formula (III):



(in the formulas (I) to (III), R<sub>1</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>9</sub>, R<sub>10</sub> and R<sub>11</sub> representing an alkyl or an alkenyl group having 14 to 24 carbon atoms; R<sub>2</sub> representing methyl or ethyl group; R<sub>3</sub>, R<sub>4</sub>, R<sub>7</sub>, R<sub>8</sub> and R<sub>12</sub> representing methyl or ethyl group, or polyoxyethylene or polyoxypropylene group having an average degree of polymerization of 1 to 5; and X representing an anion), the weight ratio of the components (A):(B):(C) being within the range of from 2 to 30: 96 to 50: 2 to 20, and iodine value of the mixture being in the range of 35 to 100; and (D) a polyoxyethylene adducted nonionic surfactant.

4,948,521

# METALWORKING COMPOSITION

John F. Stewart, Jr., Opelika, and Michael L. Griffin, Valley, both of Ala., assignors to Cut-N-Clean Products, Inc., Opelika, Ala.

Filed Jul. 26, 1989, Ser. No. 385,065

Int. Cl.<sup>5</sup> C10M 173/00

U.S. Cl. 252—28

13 Claims

1. A metalworking composition in the form of a stable emulsion comprising a homogenous mixture of:  
 30–40 percent by weight of water,  
 30–40 percent by weight of a vegetable oil having a fatty acid content of less than 0.20% by weight,  
 1–5 percent by weight of a phosphatide selected from the group consisting of lecithin and cephalin,  
 0.5–3 percent by weight of a silica thickening agent, and  
 20–30 percent by weight of an emulsifying system comprising an anionic surfactant and a nonionic detergent, wherein said anionic surfactant is selected from the group consisting of a sulfate of a fatty acid, a sulfonate salt of an alkylbenzene and a sulfonate salt of an alkylphenoxy compound having about 4 to about 20 carbon atoms in the alkyl groups thereof, and wherein said nonionic detergent consists of an alkylbenzene sulfonate having about 4 to about 20 carbon atoms in the alkyl group thereof, a diethanolamide and an ethoxylated alcohol.

4,948,522

# DISPERSANT FOR MARINE DIESEL CYLINDER LUBRICANT

Adrian Dunn, Faringdon, and Richard D. Kerwood, Didcot, both of United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 22, 1989, Ser. No. 313,750

Claims priority, application United Kingdom, Feb. 23, 1988, 8804171

Int. Cl.<sup>5</sup> C10M 141/10

U.S. Cl. 252—32.7 E

33 Claims

1. A cylinder lubricant composition for marine diesel engines comprising a major amount of an oil of lubricating viscosity and  
 (a) at least C.1 wt % of a borated ashless dispersant;  
 (b) at least 10 wt % of one or more overbased metal compounds; and  
 (c) at least 0.005 wt % of a polybutene having a weight average molecular weight of greater than 100,000 wherein the boron content of the cylinder lubricant composition is from 0.001 wt %, and the TBN is at least 20.

4,948,523

# CHLORINE-FREE SILVER PROTECTIVE LUBRICANT COMPOSITION (I)

David A. Hutchison, Naperville, and Lionel D. Moore, Lisle, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Sep. 30, 1987, Ser. No. 103,186

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C10M 105/22, 105/58

U.S. Cl. 252—47

33 Claims

1. An internal combustion engine lubricating composition comprising a major proportion of an oil of lubricating viscosity and (1) a minor amount of a silver-protective additive composition comprising the reaction product of a C<sub>5</sub> to C<sub>60</sub> carboxylic acid and at least one amine selected from the group consisting of (i) guanidine, urea and thiourea compounds; (ii) C<sub>1</sub> to C<sub>20</sub> hydrocarbyl or hydroxy-substituted hydrocarbyl (a) monoamines, (b) alkylene diamines, and (c) polyalkylene polyamines; and (iii) N-alkyl glycine; (2) a minor amount, effective for dispersancy, of an ashless dispersant; and (3) a minor amount, effective for detergency, of at least one detergent selected from the group consisting of alkali and alkaline earth metal sulfonates, phenates and salicylates.

21. A method for protecting silver engine parts in an internal combustion engine which method comprises the step of contacting the internal portion of said engine with a lubricating composition comprising a major proportion of an oil of lubricating viscosity and a minor amount of a silver protective additive composition comprising the reaction product of a C<sub>5</sub> to C<sub>60</sub> carboxylic acid and at least one amine selected from the group consisting of (i) guanidine, urea or thiourea compounds; (ii) C<sub>1</sub> to C<sub>20</sub> hydrocarbyl or hydroxy-substituted hydrocarbyl (a) monoamines, (b) alkylene diamines, and (c) polyalkylene polyamines; and (iii) N-alkyl glycine.

4,948,524

# DISPERSANT ANTI-OXIDANT VI IMPROVER AND LUBRICATING OIL COMPOSITION CONTAINING SAME

Maria M. Kapuscinski, Carmel; Theodore E. Nalesnik, Wappinger Falls; Robert T. Biggs, Walden; Harry Chafetz, Glenham, and Christopher S. Lin, Poughkeepsie, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Aug. 18, 1989, Ser. No. 395,627

Int. Cl.<sup>5</sup> C10M 149/12; C08F 210/16

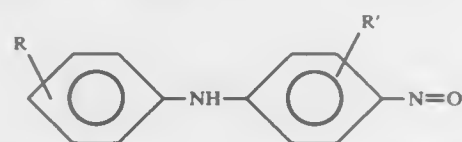
U.S. Cl. 252—51.5 R

21 Claims

1. An additive composition prepared by reacting a polymer prepared from ethylene and at least one C<sub>3</sub>-C<sub>10</sub> alpha-monoolefin and optionally a polyene selected from non-conjugated dienes and trienes comprising from about 15 to 80 mole percent



of ethylene from about 20 to 85 mole percent of said C<sub>3</sub>-C<sub>10</sub> alpha-monoolefin and from about 0 to 15 mole percent of said polyene and having an average molecular weight ranging from about 5,000 to 500,000 with a nitrosodiphenylamine compound represented by the formula:



in which R and R' represent hydrogen or an alkyl, alkenyl, or alkoxy radical having from 1 to 8 carbon atoms.

#### 4,948,525 LUBRICATING OIL COMPOSITIONS FOR REFRIGERATORS

Umekichi Sasaki, Kawasaki, and Hiroshi Hasegawa, Yokohama, both of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,443  
Claims priority, application Japan, Apr. 6, 1988, 63-82983; Apr. 22, 1988, 63-98378

Int. Cl.<sup>5</sup> C09K 5/04  
U.S. Cl. 252—52 A 7 Claims  
1. A lubricating oil composition for a refrigerator in which 1,1,1,2-tetrafluoroethane is used as the refrigerant, consisting essentially of the base oil a polyoxyalkylene glycol monoether represented by the general formula



wherein R<sub>1</sub> is an alkyl group having 1-18 carbon atoms, m is an integer of 5-70, R<sub>2</sub> is an alkylene group having 2-4 carbon atoms and a ratio "α" of 0-0.8 between (the number of —OR<sub>2</sub>— group wherein R<sub>2</sub> is ethylene group)/m in the molecule, the polyoxyalkylene glycol monoether having a pour point of up to -10° C. and a kinematic viscosity of 2-110 cSt at 100° C., a number average molecular weight of 500-1500 and a ratio (Mw/Mn) of 1.0-1.20 between the weight average molecular weight (Mw) and the number average molecular weight (Mn).

4,948,526  
AZEOTROPE-LIKE COMPOSITIONS OF PENTAFLUORODIMETHYL ETHER AND MONOCHLORODIFLUOROMETHANE  
Barbara R. Fellows, Kenmore; Earl A. E. Lund, West Seneca, and Ian R. Shankland, Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Sep. 26, 1989, Ser. No. 412,752  
Int. Cl.<sup>5</sup> C11D 7/30, 7/50

U.S. Cl. 252—69 12 Claims  
1. Azeotrope-like compositions consisting essentially of from about 5.0 to about 50.0 weight percent of pentafluorodimethyl ether and from about 95.0 weight percent to about 50.0 weight percent monochlorodifluoromethane which have a vapor pressure of about 73.8 psia at 32° F.

4,948,527  
METHOD OF MAKING EUROPIUM ACTIVATED YTTRIUM OXIDE PHOSPHOR  
Joseph E. Ritsko; Anthony F. Kasenga, both of Towanda, and Scott A. Renninger, Kreamer, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.  
Filed Oct. 10, 1989, Ser. No. 419,235  
Int. Cl.<sup>5</sup> C09K 11/78

U.S. Cl. 252—301.4 R 3 Claims  
1. The method of making europium activated yttrium oxide phosphor comprising the steps of dissolving europium oxide in nitric acid, adding ammonium hydroxide thereto to precipitate

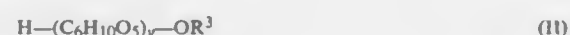
europium hydroxide, dissolving the europium hydroxide in citric acid monohydrate to form europium citrate solution, dispersing yttrium oxide powder in the europium citrate solution to form a slurry, spray drying the slurry, and firing the resultant spray dried powder in air to form the phosphor.

4,948,528  
FREE-FLOWING PEARLESCENT CONCENTRATE  
Horst Hoeffkes, and Anke Kaczich, both of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Division of Ser. No. 125,506, Nov. 25, 1987, Pat. No. 4,824,594.  
This application Jan. 27, 1989, Ser. No. 303,373  
Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640755

Int. Cl.<sup>5</sup> B01F 17/56  
U.S. Cl. 252—357 8 Claims  
1. A pearlescent concentrate in the form of a freeflowing dispersion at room temperature consisting essentially of from about 5 to about 15% by weight of one or more pearlescing ester corresponding to the formula

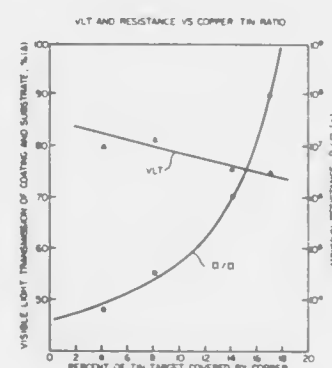


in which R<sup>1</sup> is a linear C<sub>16</sub>-C<sub>22</sub> fatty acyl group, R<sup>2</sup> is hydrogen or an R<sup>1</sup> group, n is 2 or 3, and x is a number from 1 to 4; and about 1 to about 6% by weight of one or more monoethanolamide of a C<sub>12</sub>-C<sub>22</sub> fatty acid; wherein the concentrate contains as an emulsifier from about 2 to about 8% by weight of one or more compound corresponding to general formula II below,



being an alyl (oligo)glucoside, in which y is the average degree of oligomerization and is equal to 1 to 5 and R<sup>3</sup> is a C<sub>6</sub>-C<sub>12</sub> alkyl group, and from about 70 to about 90% by weight of water, all weights being based on the weight of said concentrate.

4,948,529  
STABLE HIGH RESISTANCE TRANSPARENT COATING  
Ian T. Ritchie, Santa Monica, and Wilfred C. Kittler, Westlake Village, both of Calif., assignors to Andus Corporation, Canoga Park, Calif.  
Continuation of Ser. No. 46,808, May 4, 1987, abandoned, which is a division of Ser. No. 811,126, Dec. 18, 1985, Pat. No. 4,710,441. This application Jun. 28, 1988, Ser. No. 213,448  
Int. Cl.<sup>5</sup> H01B 1/06  
U.S. Cl. 252—501.1 16 Claims



1. A method of forming a partially transparent conductive coating, comprising the steps of:  
choosing an undoped wide band gap semiconducting oxide;

forming a film from elements constituting the undoped oxide and from a dopant so as to form a doped wide band gap semiconducting oxide, the doped oxide having an electrical resistance greater than the undoped oxide, the doped oxide being one whose electrical resistance first reaches an interim maximum and then reaches an interim minimum as an oxygen concentration thereof is varied and increased, the oxygen concentration of the doped oxide being within ±5% of an oxygen concentration yielding the interim minimum electrical resistance of the doped oxide.

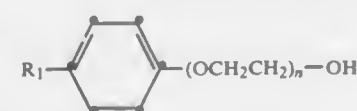
14. A high resistance partially transparent conductive coating, comprising:  
a wide band gap semiconducting oxide, an undoped composition thereof having a first electrical resistance, the oxide being doped so as to form a doped wide band gap semiconducting oxide whose electrical resistance is increased by an amount greater than an order of magnitude over the undoped composition, the doped oxide being one whose electrical resistance first reaches an interim maximum and then reaches an interim minimum as its oxygen concentration is increased, an oxygen concentration of the doped oxide being within ±5% of an oxygen concentration yielding the interim minimum electrical resistance.

4,948,530  
METHOD TO MAKE A REFLECTIVE COATING ON HIGH-PRESSURE DISCHARGE LAMPS  
Clemens Barthelme; Andreas Hohlfeld, and Lothar Vollmer, all of Berlin, Fed. Rep. of Germany, assignors to Patent-Treuhand-Gesellschaft für elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany  
Filed Aug. 29, 1989, Ser. No. 400,152  
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1988, 3832643  
Int. Cl.<sup>5</sup> C01B 33/00; C01G 25/00; C09D 1/00  
U.S. Cl. 252—520 5 Claims

1. A precursor paste suspension for forming a reflective coating at the end of a discharge vessel of a high-pressure discharge lamp by spraying the suspension onto the end of the discharge vessel and sintering said suspension consisting essentially of  
0.5-5% by weight silicic acid—aluminum oxide which contains 5 to 30% by weight aluminum oxide  
0.5% to 5% acetic acid,  
0.1% to 1% boric acid,  
24% to 55% of water, and zirconium oxide to make up 100%, all percentages by weight.

4,948,531  
LIQUID ONE-STEP HARD SURFACE CLEANING/PROTECTOR COMPOSITIONS  
Cynthia L. Fuggini, Florida, N.Y., and Allan L. Strelt, River Vale, N.J., assignors to Sterling Drug Incorporated, New York, N.Y.  
Filed Nov. 22, 1988, Ser. No. 275,246  
Int. Cl.<sup>5</sup> C11D 3/04, 7/00

U.S. Cl. 252—544 6 Claims  
1. A liquid cleaning composition for cleaning hard surfaces consisting essentially of:  
(A) (i) from 2.0 to 15.0 percent of from one to two nonionic surfactants selected from the group consisting of a polyethylene glycol alkylphenyl ether having the formula:



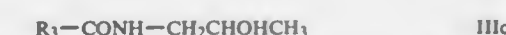
where R<sub>1</sub> is C<sub>8</sub>-C<sub>9</sub> straight or branched chain alkyl and n is an integer from 5 to 13, a polyethylene glycol long chain alkyl ether having the formula:



where R<sub>2</sub> is C<sub>9</sub>-C<sub>15</sub> straight chain or secondary alkyl and n has the meanings given above, a saturated or unsaturated fatty acid mono- or diethanolamide having the formulas IIIa or IIIb:



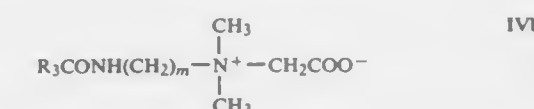
and a saturated or unsaturated fatty acid monoisopropylamide having the formula IIIc:



where R<sub>3</sub>, in all instances is a C<sub>9</sub>-C<sub>17</sub> alkane, alkene or alkadiene group, and (ii) an amphoteric surfactant having the formulas IVa or IVb:

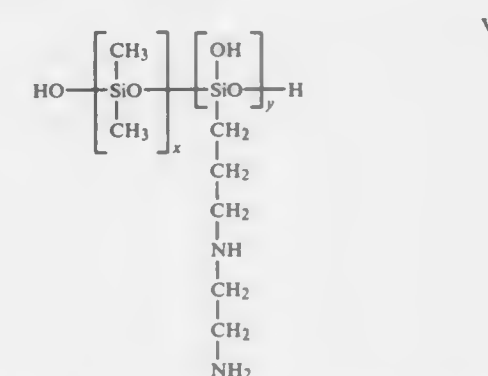


where R<sub>4</sub> is C<sub>6</sub>-C<sub>18</sub> alkyl or alkenyl,



where R<sub>5</sub> is C<sub>11</sub>-C<sub>17</sub> alkyl and m is one of the integers 2 and 3;

(B) from 0.07 to 3.0 percent of lecithin and from 0.50 to 10.0 percent of an aminofunctional polydimethylsiloxane copolymer having the formula:



(C) from 1.0 to 20.0 percent of from one to two glycols having one of the formulas VIa or VIb:



where R<sub>6</sub> is hydrogen or C<sub>1</sub>-C<sub>2</sub> lower-alkyl and p is one of the integers 1 to 2; and (D) the balance water.

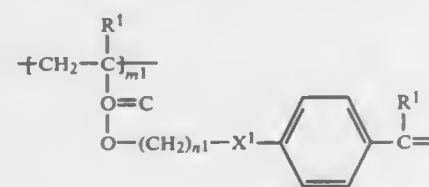
4,948,532

**SIDE CHAIN LIQUID CRYSTALLINE POLYMERS EXHIBITING NONLINEAR OPTICAL PROPERTIES**  
 Ronald N. DeMartino, Wayne; Hyun-Nam Yoon, New Providence, and James B. Stamato, Westfield, all of, assignors to Hoechst Celanese Corp., Somerville, N.J.  
 Division of Ser. No. 933,425, Nov. 21, 1986, Pat. No. 4,855,376.  
 This application Mar. 14, 1989, Ser. No. 323,000  
 Int. Cl.<sup>5</sup> F21V 9/00

U.S. Cl. 252-587

4 Claims

1. In a light switch or light modulator device with an organic nonlinear optical component the improvement which comprises a nonlinear optical component consisting of a transparent thin film medium comprising a thermotropic side chain liquid crystalline polymer characterized by a recurring monomeric unit corresponding to the formula:



where  $m^1$  is an integer of at least 5;  $n^1$  is an integer between about 2-20;  $R^1$  is hydrogen or a methyl group;  $X^1$  is  $-NR^1$ ,  $-O-$  or  $-S-$ ; and  $Z^1$  is  $-NO_2$ ,  $-CN$  or  $-CF_3$ .

4,948,533

**11A-HYDROXY STEROID DIESTER**

John M. Braugher, Edward D. Hall, both of Portage; Wendell Wierenga, and John M. McCall, both of Kalamazoo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.  
 Continuation of Ser. No. 912,677, Sep. 25, 1986, abandoned, which is a continuation of Ser. No. 701,601, Feb. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 594,096, Mar. 28, 1989, abandoned. This application Feb. 16, 1989, Ser. No. 312,337

Int. Cl.<sup>5</sup> A61K 31/56, 31/57; C07J 5/00

U.S. Cl. 552-576

2 Claims

1. 21-(3-Carboxy-1-oxopropoxy)-17 $\alpha$ -hydroxy-11 $\alpha$ -(3,3-dimethyl-1-oxobutoxy)pregna-1,4-diene-3,20-diene and pharmaceutically acceptable salts thereof.

4,948,534

**DERIVATIVES OF  $\beta$ -AMINO- $\gamma$ -TRIMETHYLAMMONIO-BUTYRATE AND THEIR PRODUCTION AND USE**

Susumu Shinagawa; Tsuneo Kanamaru, both of Osaka; Setsuo Harada, Kawanishi, and Mitsuko Asai, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan  
 Continuation of Ser. No. 830,986, Feb. 19, 1986, abandoned, which is a continuation of Ser. No. 613,416, May 24, 1984, abandoned, which is a continuation-in-part of Ser. No. 442,368, Nov. 17, 1982, Pat. No. 4,521,432. This application Oct. 16, 1989, Ser. No. 423,555

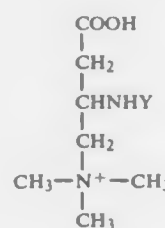
Claims priority, application PCT Int'l Appl., Nov. 26, 1981, PCT/JP81/00355; Jul. 28, 1982, PCT/JP82/00291; Oct. 15, 1982, PCT/JP82/00409; Japan, May 25, 1983, 58-93179; May 15, 1984, 59-96773

Int. Cl.<sup>5</sup> C09F 5/06

U.S. Cl. 260-399

21 Claims

1. Aminocarnitines having the structural formula:



wherein Y is selected from the group consisting of



wherein R is selected from the group consisting of aliphatic containing from 9+ to 19 carbon atoms, and wherein  $X^-$  is a nontoxic counterion; the non-toxic esters and salts thereof; or the zwitterionic form thereof wherein H is removed from the  $-\text{COOH}$  group and  $-\text{COO}^-$  serves as the counterion  $X^-$  or  $Z^-$ .

4,948,535

**PROCESS FOR THE SULFATION OF PARTIAL ESTERS OF ALIPHATIC POLYHYDRIC ALCOHOLS**

Herbert Stühler, Burgkirchen, and Klaus Dullinger, Neuötting, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
 Continuation of Ser. No. 119,859, Nov. 12, 1987, abandoned.  
 This application Jan. 23, 1990, Ser. No. 467,274

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1986, 3638742; Jul. 17, 1987, 3723702

Int. Cl.<sup>5</sup> C07C 303/00, 303/06

U.S. Cl. 260-400

10 Claims

1. A process for the sulfation of primary free OH-groups of partial esters obtained by esterifying polyhydric alcohols with aliphatic carboxylic acids containing 1 to 25 carbon atoms or with arylaliphatic acids containing 7 to 16 carbon atoms, comprising:

reacting said partial esters with  $\text{SO}_3$  in the presence of a solvent at a reaction temperature in the range of about 0 to 60° C., said solvent being liquid under the reaction conditions and comprising at least one nitrogen-containing compound, said nitrogen-containing compound having a boiling point of 40° to 200° C. at a pressure of 98 kPa and having at least one trivalent nitrogen atoms which is linked to three carbon atoms and, besides said trivalent nitrogen atoms, contains only carbon and hydrogen atoms or carbon, hydrogen, and ether oxygen atoms, said nitrogen-containing compound being present in such an amount that the entire partial ester of the aliphatic polyhydric alcohol goes into solutions at the reaction temperature.

4,948,536

**AUTOMATIC CHOKE FOR SMALL TWO-CYCLE INTERNAL COMBUSTION ENGINES**

William A. Scott, Mt. Zion; Mark A. Hutchinson, and Gary L. Baumbarger, both of Decatur, all of Ill., assignors to Tillotson, Ltd., Tralee, Ireland

Filed Jan. 31, 1989, Ser. No. 304,520

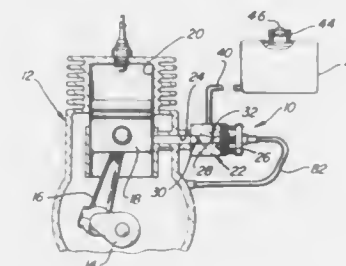
Int. Cl.<sup>5</sup> F02M 1/14

U.S. Cl. 261-64.4

3 Claims

1. An automatic choke for small internal combustion engines having a carburetor, a bore operatively associated with the carburetor and defining a longitudinal axis, the bore having one end in communication with a source of combustion air and another end of the bore in communication with a piston cylinder of the internal combustion engines, said choke comprising: a housing coupled with said carburetor along said longitudi-

nal axis, said housing positioned at the end of the bore in communication with the source of combustion air, means for spacing said housing from said carburetor, said means for spacing including a plurality of support member extending between said carburetor and said housing such that a gap is formed between said housing and said carburetor and between adjacent support members for enabling combustion air to enter said bore through the gap; pressure responsive means operatively coupled with said housing and associated with the internal combustion engines, said pressure responsive means including a diaphragm positioned in said housing in alignment with said longitudinal axis such that said diaphragm automatically moves in said housing in response to pressure changes in the internal combustion engine;



means for automatically controlling combustion air entering said bore, said controlling means including a plunger with a neck coupled with said diaphragm and a head adapted to cover the bore, said plunger head and a portion of said neck positioned outside of said housing, and a spring biasing said plunger against force of said diaphragm, said spring surrounding said neck and abutting said head and housing, said controlling means coupled with said pressure responsive means such that movement of said diaphragm moves said plunger axially so that said plunger head enables sufficient combustion air to enter said bore during start up and during continuous operation of the internal combustion engine such that at start up of the engine said plunger head opens and closes the end of the bore and during continuous operation of the engine the plunger head automatically opens said bore and enabling combustion air to enter the engine.

4,948,537

**METHOD OF PRODUCING A RESIN MOLD FOR REAR PROJECTION SCREEN**

Akio Ohkoshi; Takuji Inoue, both of Tokyo; Eiichi Ogino, and Tsutomu Nakazawa, both of Joetsu, all of Japan, assignors to Sony Corporation and Arisawa Mfg. Co., Ltd., both of Tokyo, Japan

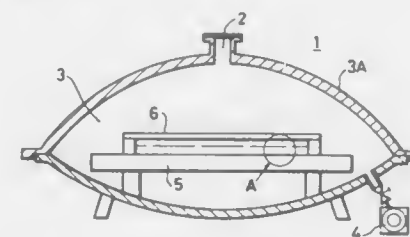
Filed Dec. 15, 1988, Ser. No. 284,698

Claims priority, application Japan, Dec. 28, 1987, 336414

Int. Cl.<sup>5</sup> B29C 33/40, 33/42; B29D 11/00

U.S. Cl. 264-2.5

10 Claims



1. A method of producing a resin mold comprising the steps of:

- (a) pouring a first resin into a metal mold having a reverse pattern;
- (b) curing said first resin at a first temperature thereby making an intermediate resin mold made of said first resin;
- (c) separating said intermediate resin mold from said metal mold;
- (d) pouring a second resin into said intermediate resin mold;
- (e) curing said second resin at a second temperature thereby making said resin mold made of said second resin;
- (f) separating said resin mold from said intermediate resin mold, in which said first and second temperatures are set at predetermined temperatures, respectively, so as to make the size of said resin mold substantially equal to that of said metal mold, and in which said first and second temperatures are set so as to make  $L'/L = 1$  in the following equation:

$$L' = \frac{L(1 + (T_1 - T)K_1)(1 - A)(1 + (T_2 - T)K_2)}{(1 - B)}$$

wherein  $L'$  represents the length (cm) of the resin mold at room temperature,  $L$  the length (cm) of the metal mold at room temperature,  $T$  the room temperature of 25°C.,  $T_1$  the curing temperature (°C.) of the intermediate resin mold,  $T_2$  the curing temperature (°C.) of the resin mold,  $K_1$  the linear expansion coefficient (cm/cm/°C.) of the metal mold,  $K_2$  the linear expansion coefficient (cm/cm/°C.) of the intermediate resin mold,  $A$  the molding shrinkage of the intermediate resin mold and  $B$  the molding shrinkage of the resin mold.

4,948,538

**METHOD OF MAKING TRANSLUCENT ALUMINA ARTICLES**

George C. Wei, Weston, and William H. Rhodes, Lexington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 11, 1988, Ser. No. 255,564

Int. Cl.<sup>5</sup> C04B 35/10

U.S. Cl. 264-6

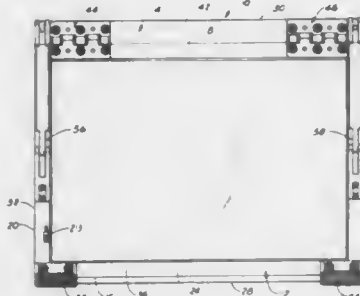
20 Claims

1. A method of making a translucent polycrystalline alumina article comprising the following steps:

- Step 1- mixing an alumina powder and a sintering aid in a liquid for a period sufficient to form a homogeneous slurry;
- Step 2- drying said homogeneous slurry from Step 1 to remove said liquid to form a dried powder;
- Step 3- shaping said dried powder to form a compacted green body;
- Step 4- heating said compacted green body from Step 3 at a temperature equal to or less than 500° C and for a period sufficient to form a compacted green body having a density of at least 30% of theoretical density;
- Step 5- heating said compacted green body having a density of at least 30% of theoretical density from Step 4 at a temperature from about 800° C to about 1300° C in an oxygen containing atmosphere for a period sufficient to impart green strength to said compacted green body to form a prefired compacted green body; and
- Step 6- sintering said prefired compacted green body from Step 5 at a temperature from about 1700° C to about 2000° C in a nitrogen/hydrogen atmosphere consisting essentially of nitrogen and hydrogen for a period sufficient to form a translucent polycrystalline alumina article, said hydrogen being equal to or greater than about one volume percent up to eighteen volume percent of said nitrogen/hydrogen atmosphere and having a dew point equal to or less than about minus 15° C.



**4,948,539**  
**PHOTOTOOL WITH A GLASS MEMBER CONNECTED TO A FRAME MEMBER WITH AN ADHESIVE**  
 Thomas L. Byers, 5840 Stewart Dr., Mustang, Okla. 73064  
 Filed Sep. 27, 1988, Ser. No. 250,325  
 Int. Cl.<sup>3</sup> B29C 39/10; B32B 7/12  
 U.S. Cl. 264—22 6 Claims



1. A method for making a phototool frame assembly wherein the frame assembly comprises a glass member having an edge and a frame member with an insert opening formed through the frame member defining an edge on the frame member with a curable adhesive from an adhesive source, the curable adhesive when cured connecting the glass member to the frame member for forming the frame assembly, the method comprising the steps of:

positioning the glass member in the insert opening of the frame member with the edge of the frame member being spaced a distance from the edge of the glass member, the space between the edge of the glass member and the edge of the frame member comprising a connecting space, the frame member surrounding the glass member when the glass member is inserted into the insert opening, wherein the glass member has an upper surface and a lower surface and a thickness extending generally between the upper and the lower surface, and wherein the frame member has an upper surface and a lower surface and a thickness extending generally between the upper and lower surfaces, and wherein the thickness of the glass member is substantially the same as the thickness of the frame member, and wherein no portions of the glass member overlap the frame member, and wherein no portions of the frame member overlap the glass member comprising:

positioning on the base assembly the glass member with respect to the frame member so that the lower surface of the glass member is substantially coplanar with the lower surface of the frame member; and

positioning on the base assembly the glass member and the frame member so that the upper surface of the glass member is substantially coplanar with the upper surface of the frame member;

filling the connecting space with an adhesive, comprising: closing a flexible lid over the base assembly with the glass member and the frame member being disposed between the flexible lid and the base assembly for enclosing substantially the glass member and the second member in a frame space with the connecting space also being enclosed within the frame space, the frame space being disposed generally between the flexible lid and the base assembly;

establishing a vacuum in the connecting space; and

establishing communication between the adhesive in the adhesive source and the connecting space for flowing the adhesive from the adhesive source into the connecting space so the adhesive substantially fills the connecting space; and

curing the adhesive in the connecting space for con-

necting the glass member to the frame member via the cured adhesive.

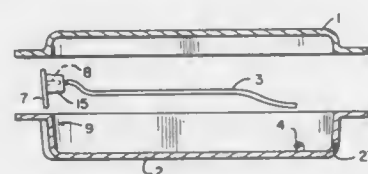
**4,948,540**  
**METHOD OF PREPARING COLLAGEN DRESSING SHEET MATERIAL**  
 Alok Nigam, Phoenixville, Pa., assignor to Semex Medical, Inc., Malvern, Pa.  
 Filed Aug. 1, 1988, Ser. No. 229,069  
 Int. Cl.<sup>3</sup> C08L 89/00; B29B 13/04  
 U.S. Cl. 264—28 8 Claims

1. A method of preparing a collagen dressing sheet, including the steps of:

- selecting an aqueous composition containing both soluble collagen and native collagen fibers;
- charging the composition of step (a) to a mold;
- lyophilizing said composition in said mold to yield a collagen mat having a thickness between 0.2-2 centimeters;
- compressing said collagen mat at a pressure of between 15,000-30,000 p.s.i. to a thickness of between 0.1-0.5 centimeters;

whereby the compressing of said mat imparts high absorptivity thereto.

**4,948,541**  
**METHOD OF FORMING AN ARM REST FOR A CHAIR HAVING A TUBULAR PASSAGEWAY FOR CONTAINING CONTROL MECHANISMS**  
 Stephen Beck, 29255 County Rd. W., Elkhart, Ind. 46517  
 Filed Oct. 27, 1988, Ser. No. 263,180  
 Int. Cl.<sup>3</sup> B29C 67/22  
 U.S. Cl. 264—46.7 13 Claims

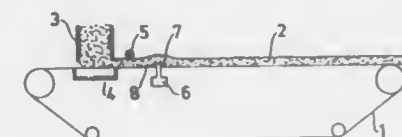


1. A process for molding a foam arm for a chair having a tubular passageway for the passage of control mechanisms through the arm, comprising the steps of:

- providing a mold having a cavity and with a nipple located on an inner surface of the mold cavity;
- attaching one end of a tube to said nipple;
- securing another end of the tube to an insert and positioning said insert into a recess located at an outer edge of said cavity;
- filling said cavity with a solidifiable material;
- closing said mold;
- allowing the material to solidify to create an arm rest with an inserted tube; and
- then opening said mold and removing the arm rest by first lifting said arm rest upwardly at said outer edge to a point where said insert is raised above a lip of said recess, then sliding said one end of said tube off said nipple and finally lifting said arm rest from the mold.

**4,948,542**  
**METHOD AND DEVICE FOR MANUFACTURING FIBRE BOARD**

Per A. Asberg, Stockholm, Sweden, assignor to Sands Defibrator Aktiebolag, Sweden  
 PCT No. PCT/SE87/00593, § 371 Date Apr. 5, 1989, § 102(e)  
 Date Apr. 5, 1989, PCT Pub. No. WO88/04224, PCT Pub. Date Jun. 16, 1988  
 PCT Filed Dec. 11, 1987, Ser. No. 339,619  
 Claims priority, application Sweden, Dec. 11, 1986, 8605330  
 Int. Cl.<sup>3</sup> G01G 11/02, 11/08  
 U.S. Cl. 264—40.4 11 Claims



8. A method of continuously weighing a web during formation thereof comprising the steps of providing fiber material, depositing and uniformly distributing said fiber material on a running forming wire, forming a web of said fiber material, lifting said web from an upper surface of said running forming wire, and weighing said web before said web returns to intimate contact with said running forming wire.

**4,948,543**  
**PROCESS FOR ELIMINATING SURFACE MELT FRACTURE DURING EXTRUSION OF THERMOPLASTIC POLYMERS**

Joseph Z. Pawlowski, Clarksburg, and Arakalgud V. Ramamurthy, East Windsor, both of N.J., assignors to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.  
 Filed Jun. 15, 1989, Ser. No. 366,684  
 Int. Cl.<sup>3</sup> B29C 33/60, 47/00, 49/00  
 U.S. Cl. 264—85 8 Claims

1. A process for substantially eliminating surface melt fracture during extrusion of a thermoplastic polymer under conditions of flow rate and melt temperature which would otherwise produce such melt fracture which comprises extruding said thermoplastic polymer through a die having a die land region defining opposing surfaces, said thermoplastic polymer having a surface in contact with said opposing surfaces wherein at least one of said opposing surfaces is coated with a composition comprising about 80% to about 95% nickel and about 5% to about 20% phosphorous, whereby melt fracture is substantially eliminated on the surface of the polymer adjacent to said nickel/phosphorous coated surface.

**4,948,544**  
**PROCESS FOR THE PRODUCTION OF THIN STRETCHED FILMS FROM POLYOLEFIN OF ULTRAHIGH MOLECULAR WEIGHT**

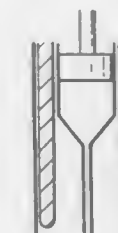
Lambert H. T. Van Unen, Heerlen; Pieter B. Pluyter, Sittard, and Willibrordus M. G. F. Pontenagel, Onderbanken, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands  
 Filed Jul. 25, 1988, Ser. No. 223,973  
 Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724434  
 Int. Cl.<sup>3</sup> B29C 55/14, 69/00  
 U.S. Cl. 264—204 16 Claims

1. A process for the production of thin stretched films from polyolefins of ultrahigh molecular weight by dissolving the polyolefin in a solvent, shaping the solution into a tape at a temperature above a solution temperature of the polyolefin, cooling the tape to a temperature below the solution temperature to achieve gelation and stretching the gelled tape, wherein the gelled tape is first subjected to a preliminary orientation in one direction under solvent removal, and then is stretched in a

direction essentially perpendicular to the direction of preliminary orientation, at elevated temperature, which is succeeded by a final stretching.

**4,948,545**  
**EXTRUSION PROCESS FOR PREPARING ORIENTATED POLYOLEFINS**

Zahir Bashir, Lower Clifton Hill; Andrew Keller, Westbury-on-Trym, and Jeffrey A. Odell, Knowle, all of England, assignors to Stamicarbon B.V., Netherlands  
 Continuation of Ser. No. 119,316, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 745,805, Jun. 17, 1985, abandoned, which is a division of Ser. No. 676,188, Nov. 29, 1984, abandoned. This application Oct. 6, 1989, Ser. No. 418,992  
 Claims priority, application United Kingdom, Dec. 10, 1983, 8333032  
 Int. Cl.<sup>3</sup> D01F 6/04  
 U.S. Cl. 264—210.8 11 Claims



1. In an extrusion process for preparing a polyolefin composition having an orientated microstructure which comprises substantially parallel chain extended cores of the component polymer(s) and associated lamellar overgrowths extending in planes normal to the cores and in which the lamellar overgrowths on adjacent cores intermesh, the improvement comprising:

- using as starting material a polyolefin comprising an olefin (co)polymer having a weight average molecular weight (Mw) above 30,000 and not greater than 1,000,000 and a high molecular weight tail extending to molecular weights greater than 1,000,000;
- performing the extrusion through a die under pressure and at a temperature above, but not more than 5° C. above, the self blocking temperature;
- cooling the extrudate at the die exit while maintaining the die temperature conditions set forth in (b) above; and
- continuously hauling off the extrudate at a haul-off stress of at least 10 MPa so as to avoid die swell.

**4,948,546**  
**PROCESS FOR MANUFACTURE OF POLYMETHYL METHACRYLATE SHEET WITH CONTROLLED COLOR**

Walter H. Delphin, Germantown; Clyde S. Hutchins, Arlington, both of Tenn., and Robert J. Buchacek, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
 Continuation of Ser. No. 210,258, Jun. 23, 1988, abandoned.  
 This application Dec. 2, 1988, Ser. No. 279,013  
 Int. Cl.<sup>3</sup> C08L 33/12  
 U.S. Cl. 264—216 7 Claims

1. In the process of manufacturing pigmented sheet comprised of methyl methacrylate (MMA) polymer by casting cooler syrup of polymer comprised of MMA dissolved in MMA monomer on a warmer substrate, wherein the syrup contains pigments which provide color, a pigment dispersant and additives selected from the group consisting of chain transfer agent, sheet release agent, thermal stabilizer, ultraviolet stabilizer, and

inhibitor, the improvement of controlling the color of the resulting sheet by using in the syrup 100 to 10,000 ppm by weight of the syrup of pigment dispersant having an A segment and a B segment bonded together to form a block copolymer, the A segment consisting essentially of polymerized methacrylic monomer units and the B segment consisting essentially of polymerized monomer units selected from the group consisting of acrylic and methacrylic groups,

the monomer units of said A segment, when homopolymerized, having a polarity which is higher than the polarity of the monomer units of said B segment when homopolymerized, said A segment being bonded to one or more polar groups selected from the group consisting of aromatic carboxylic acid, aliphatic carboxylic acids which have at least one functional group which increases the polarity of the reaction product of the A segment with the aliphatic carboxylic acid, ammonia and primary, secondary and tertiary aliphatic amines, primary aromatic amines, quaternary amine salts, epoxides and derivatives thereof which are subsequently hydrolyzed to diols, or reacted with orthophosphoric acid, phosphorus pentoxide, and anhydrous hydrohalogen acid, wherein said block copolymer is made by group transfer polymerization techniques at 0° C. or higher.

4,948,547

# METHOD FOR THE USE OF GAS ASSISTANCE IN THE MOLDING OF PLASTIC ARTICLES

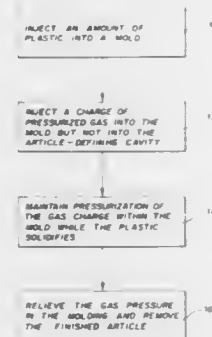
James W. Headry, Brooksville, Fla., assignor to Michael Ladney, Sterling Heights, Mich.

Filed Sep. 18, 1989, Ser. No. 408,921

Int. Cl.<sup>3</sup> B29C 45/00, 45/34, 45/38

U.S. Cl. 264—500

10 Claims



1. An improved method for the use of gas-assistance in the molding of a plastic article in an injection molding system including a mold having an injection aperture, the method comprising the steps of:

injecting an amount of molten plastic resin sufficient for the preparation of the plastic article through the injection aperture and along a resin flow path which extends from the injection aperture to an article-defining cavity in the mold;

injecting a charge of pressurized gas into the mold, said gas charge being of pressure and quantity sufficient to enter the resin flow path but not into the article-defining cavity; maintaining the gas charge under pressure within the mold while the plastic resin solidifies within the article-defining cavity; and

relieving the gas pressure within said resin flow path.

# METHOD OF FORMING REDUCING FORMATION OF IMPRESSIONS FROM THE FORMING TOOL

Friedrich Hanstein, Gross-Zimmern, and Karl-Heinz Fehring, Stockstadt/Rh., both of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Mar. 2, 1989, Ser. No. 317,843

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807040

Int. Cl.<sup>3</sup> B29C 51/42

U.S. Cl. 264—522

12 Claims

1. A method of forming a plastic article having a first surface and a second surface opposing said first surface, by means of a heated forming tool, comprising the steps of:

heating said plastic article to a thermoelastic state in a thermoelastic region of said plastic;

contacting said first surface of said plastic article with said forming tool and forming said plastic article, said tool having a thermal conductivity at least an order of magnitude higher than the thermal conductivity of said plastic article and having a temperature which is in the thermoelastic region of the plastic;

cooling said opposing surface of said formed plastic article below a softening temperature of the plastic until said opposing surface is shape-retentive; and then

disengaging said first surface from the forming tool while the temperature of said tool is in said thermoelastic region.

4,948,549

# PROCESS FOR PRODUCING SOOT FILTER ELEMENTS

Hans Erdmannsdörfer, Helmuth Fischer, both of Ludwigsburg; Helmut Röcker, Löhgau; Hartmut Wolff, Remseck, and Fritz Zundel, Besigheim, all of Fed. Rep. of Germany, assignors to Filterwerk Mann & Hummel GmbH, Ludwigsburg, Fed. Rep. of Germany

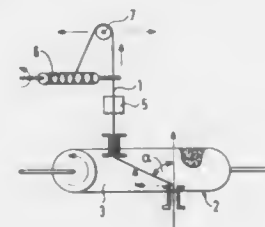
Filed Aug. 23, 1988, Ser. No. 235,440

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729659

Int. Cl.<sup>3</sup> D02J 3/02

U.S. Cl. 264—555

13 Claims



11. A process for producing a filter element comprising the steps of:

(a) roughening a yarn formed by twisting fine individual fibers into threads and then twisting the threads into a yarn counter to the twist of the fibers in the threads, said roughening being effected by pulling the yarn under tension over a moving roughening surface to break up fiber tufts at the yarn surface, the direction of movement of the roughening surface differing by an angle alpha from the direction in which the yarn is pulled in the area of contact between the yarn and the roughening surface, and said angle alpha being selected in relation to the twist of the yarn so that the threads of said yarn in contact with said roughening surface are oriented transversely to the direction of movement of said roughening surface; and

(b) cross-winding the roughened yarn into a filter element.

4,948,550

# STUD HOLE PLUG

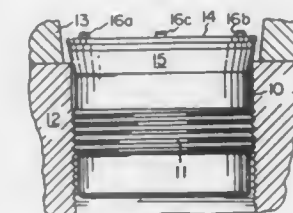
David P. Worthy, Portersville, Pa., assignor to Daden Products Corporation, Greensburg, Pa.

Filed Jan. 25, 1989, Ser. No. 301,666

Int. Cl.<sup>3</sup> G21C 13/06

U.S. Cl. 376—203

16 Claims



16. A system for sealing the internally threaded circular cylindrical stud holes in the flange of a nuclear reactor vessel during refueling comprising:

a plurality of plugs having

(a) a circular cylindrical body of dense wear resistant polymer having a cylindrical surface with external threads thereon sized for engaging the internal threads of the stud hole, said body also having two circular axial end faces having a diameter less than the diameter of the stud holes,

(b) a circular reaction plate axially spaced from and secured to one axial end face of the plug, said reaction plate having a diameter greater than the diameter of the stud holes, and

(c) an annular grommet of elastomer resistant to weak acid held between the reaction plate and one axial end face having an exterior conical surface tapering from the circular reaction plate to the abutting circular axial end face of the body,

(d) a plurality of fasteners extending through the reaction plate, the grommet and into the body,

(e) a raised portion extending from the axial end face of the body abutting the grommet being centered and integral with the body, said raised portion extending through the grommet toward the reaction plate,

(f) the reaction plate having an opening and the integral centered portion having a handle secured thereto for receiving a tool for applying torque to the plug for turning the external threads of the body into the internal threads of the stud hole thus drawing the grommet into the stud hole such that it deforms against the interior of the stud hole and the surface of the flange adjacent the stud hole, and

(g) a torquing tool having a portion sized to pass through the handle such that the torquing tool can be inserted into the handle and the tool then captures the plug so that it can be lifted by the tool.

4,948,551

# METHOD OF PROTECTING A PRESSURIZED WATER NUCLEAR REACTOR AGAINST FAILURES IN ITS EMERGENCY STOP MEANS

Olivier Onfroy, Bourg la Reine, France, assignor to Framatome, Courbevoie, France

Filed Aug. 24, 1988, Ser. No. 235,598

Claims priority, application France, Aug. 24, 1987, 87 11848

Int. Cl.<sup>3</sup> G21C 7/36

U.S. Cl. 376—216

4 Claims

1. Method of protecting a pressurized water nuclear reactor against failures of its emergency stop means, the reactor to be protected comprising

a core in which a nuclear reaction is taking place; control and/or stop rods adapted to penetrate into said core; emergency stops means for responding to an emergency stop

instruction by causing said rods to penetrate into said core in order to stop said reaction; and a primary cooling circuit for cooling said core by primary water driven under pressure by means of at least one primary pump;

said method including the steps of

(a) detecting an incident which initially leaves said primary cooling circuit of said reactor intact but which, after a delay, causes temperature and pressure in said primary cooling circuit to rise to undesirable levels; and

(b) generating said emergency stop instruction in the event of detection of said incident;

(c) monitoring execution of said emergency stop instruction and generating an emergency stop means failure signal if said instruction is not executed; and

(d) stopping said primary pump in response to said failure signal, in such manner that a rapid and limited rise in temperature of water in said core slows down said nuclear reaction soon enough to avoid said temperature from reaching an undesirable level after said delay has elapsed.

4,948,552

# ULTRASONIC WAVE SENSOR INTENDED TO COME INTO CONTACT WITH A WALL AT A HIGH TEMPERATURE AND APPLICATION OF THIS SENSOR

Christian Mollet, Paris, and Jacques Malmasson, Evry, both of France, assignors to Framatome, Courbevoie, France

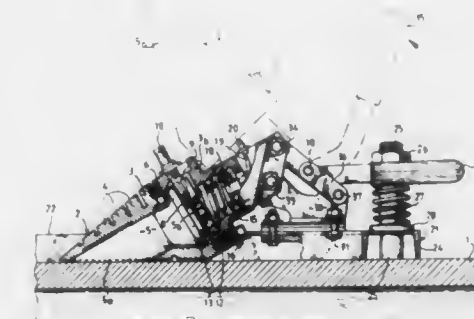
Continuation-in-part of Ser. No. 839,291, Mar. 13, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 119,275

Claims priority, application France, Mar. 15, 1985, 85 03871

Int. Cl.<sup>3</sup> G21C 17/02

U.S. Cl. 376—246

9 Claims



1. In an ultrasonic wave sensor coming into contact with a wall at a high temperature (1), incorporating, within a body (3) made of metallic material connected to a support (21) for positioning the sensor (2) on the wall (1), a piezoelectric ceramic pellet (8) connected on an electrical power supply and/or measuring leads (9), a wave guide a first end of which is placed in contact with said piezoelectric ceramic pellet and a second end (5a) of which is in contact with the wall (1) when the sensor (2) is in operating position, wherein the wave guide



(5) consists of a single part made of vitroceraamic material, i.e., a material of the glass-type entirely free of any crystal structure in the as-cast state, and developing a crystal structure after treatment, said wave guide being manufactured by casting, crystallization heat treatment, and machining incorporating finishing machining of said second end of said wave guide coming into contact with the wall to a mean roughness of 1 to 6  $\mu\text{m}$ , and preferably to a mean roughness of 3.2  $\mu\text{m}$ .

4,948,553

# METHOD OF MAKING A RACK FOR THE STORAGE OF SPENT NUCLEAR FUEL

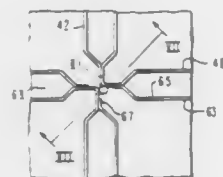
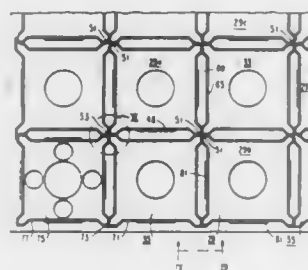
Octavio J. Machado, Pensacola; Jay T. Moore, Milton, both of Fla., and Barry F. Cooney, Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 127,615, Nov. 30, 1987, Pat. No. 4,857,263, which is a continuation of Ser. No. 470,905, Mar. 1, 1983, abandoned. This application Aug. 3, 1989, Ser. No. 353,270

Int. Cl.<sup>5</sup> G21C 19/40

U.S. Cl. 376—272

8 Claims



1. The method of making a rack for storing nuclear fuel including bending each of a plurality of sheets into a sheet structure of configuration of angular transverse cross section, positioning each sheet structure with its longitudinal edges abutting the longitudinal edges of another of said sheet structures, metallurgically joining the abutting edges of the pair of sheet structures whose edges are abutting to form a plurality of bodies of transverse rectangular cross section, mounting said bodies on a baseplate adjacent to each other with each longitudinal corner of each body face-to-face with a longitudinal corner of each adjacent body, metallurgically joining directly each corner of said each body to each facing corner of each adjacent body, and metallurgically joining each said body to said baseplate.

4,948,554

# NATURAL CIRCULATING PASSIVE COOLING SYSTEM FOR NUCLEAR REACTOR CONTAINMENT STRUCTURE

Perng-Fel Gou, and Gentry E. Wade, both of Saratoga, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jan. 6, 1989, Ser. No. 294,095

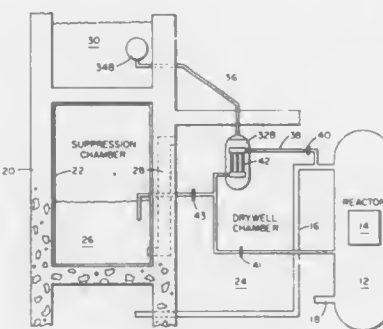
Int. Cl.<sup>5</sup> G21C 15/18

U.S. Cl. 376—283

7 Claims

7. A passive cooling, natural circulation system for the containment structure of a nuclear reactor plant which is isolated from containment material within the reactor containment and

provides overpressure protection within the containment housing, consisting essentially of the combination of a nuclear reactor assembly including a containment housing surrounding a pressure vessel having a heat producing core of fissionable fuel enclosed therein and at least one conduit in fluid communication with the interior of the pressure vessel extending out therefrom, a drywell chamber adjacent to said pressure vessel, a suppression pool chamber for retaining a cooling liquid and having a conduit providing fluid communication between said drywell chamber and suppression pool chamber, and a cooling system being closed to contaminating radioactive fission products from within the nuclear reactor containment housing and consisting of a heat transferring container holding a volatile liquid positioned within the drywell chamber and said heat



transferring container having a pipe passing therethrough and making a fluid circuit with the pressure vessel whereby excessive thermal energy from the pressure vessel is carried within the pipe through the heat transferring container, and a condensing container submerged in a liquid pool within a compartment which is connected in closed circuit fluid communication through at least one duct to the heat transferring container whereby the thermal energy from the pressure vessel is conveyed from the heat transferring container to the condensing container said cooling system consisting of the heat transferring container and the condensing container with their connecting fluid communicating duct being closed to isolate the cooling system from contaminated material within the containment housing.

4,948,555

# REMOVAL DEVICE FOR CONTROLLING THE FLOW RATE OF COOLANT FLUID IN A FAST-NEUTRON NUCLEAR REACTOR ASSEMBLY AND CORRESPONDING CONTROL PROCESS AND ASSEMBLY

Dominique Limouzin, Lyon; Michel Berte, Caluire, and Gérald Chiarelli, Jonage, all of France, assignors to Framatome, Courbevoie, France

Filed Oct. 14, 1988, Ser. No. 257,914

Claims priority, application France, Oct. 14, 1987, 87 14213

Int. Cl.<sup>5</sup> G21C 15/00, 19/04, 3/04

U.S. Cl. 376—352

7 Claims

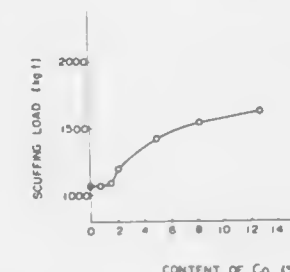
1. In a fast-neutron nuclear reactor comprising a core consisting of fuel assemblies each having a foot end part adapted to engage a stationary structure of the reactor supporting the core and distributing coolant fluid and a head end part located opposite said foot end part in axial direction and through which the coolant fluid leaves the assembly during operation, a device for adapting a rate of flow of said coolant fluid in an axial direction of a core assembly as a function of conditions of use of said assembly during operation of the reactor, the improvement wherein said device comprises

- (a) an assembly manipulator (9) of a type having controllable gripping means;
- (b) a central bore (2, 5) through the head end part of the assembly, said central bore being extended in the direction

of the foot end part by an axially directed passage channel (14) for the coolant fluid, said central bore comprising at least one housing (8) for hooking the gripping members of the assembly manipulator, and at least one hollow part in a wall of the central bore;

- (c) a cylindrical shaft (12) carrying diaphragm means adapted to be housed in the passage channel (14) for limiting the free passage of said channel and restricting the coolant fluid flow rate; and
- (d) a supporting body having an external surface corresponding substantially to an internal surface of the central bore, said supporting body being integrally attached to the cylindrical shaft and being located in an axial extension of

C, not more than 1.0% Si, not more than 1.0% Mn, 7.0 to 25.0% Cr, 2.0 to 13.0% Co, 0.05 to 3.0% V, 0.05 to 3.0% Nb,



and the balance Fe and incidental impurities, the total amount of said V and Nb being 0.05 to 3.0%.

4,948,557

# TARNISH RESISTANT GOLD COLORED ALLOY WITH ENHANCED GOLD COLOR

Daniel Davitz, 921 Harlem, Glenview, Ill. 60025

Continuation-in-part of Ser. No. 294,774, Jan. 9, 1989, Pat. No.

4,895,701. This application Feb. 1, 1989, Ser. No. 304,874

The portion of the term of this patent subsequent to Jan. 23,

2007, has been disclaimed.

Int. Cl.<sup>5</sup> C22C 30/02, 5/08

U.S. Cl. 420—503

9 Claims

1. A gold colored, highly tarnish and corrosion resistant alloy which consists essentially of, by weight, 17 to 22 percent indium, 24 to 27 percent palladium, 5 to 30 percent copper, 1 to 20 percent gold, and the balance consisting essentially of silver.

4,948,558

# METHOD AND APPARATUS FOR FORMING ALUMINUM-TRANSITION METAL ALLOYS HAVING HIGH STRENGTH AT ELEVATED TEMPERATURES

David J. Skinner, Flanders; Paul A. Chipko, Madison, and Kenji Okazaki, Baskingridge, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 631,261, Jul. 19, 1984, Pat. No. 4,743,317,

which is a continuation-in-part of Ser. No. 538,650, Oct. 3, 1983,

abandoned. This application Aug. 9, 1988, Ser. No. 184,654

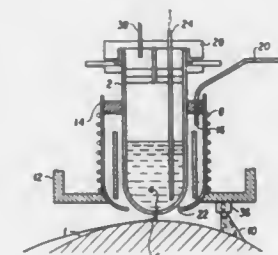
The portion of the term of this patent subsequent to May 10,

2005, has been disclaimed.

Int. Cl.<sup>5</sup> C22C 1/02

U.S. Cl. 420—540

5 Claims



4. A method for casting metal strip in an ambient atmosphere said metal strip being a rapidly solidified aluminum base alloy and said method comprising of steps of:

- moving a casting surface, which is adapted to quench and solidify thereon at a selected velocity molten metal having a composition essentially of the formula  $\text{Al}_{100}\text{Fe}_x\text{X}_y$ , wherein X is at least one element selected from the group consisting of Zn, Co, Ni, Cr, Mo, V, Zr, Ti, Y, Si and Ce,

4,948,556

# PISTON RING MATERIAL AND PISTON RING

Atushi Kumagai, Yonago, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 340,087

Claims priority, application Japan, Aug. 10, 1988, 63-199185

Int. Cl.<sup>5</sup> C22C 38/30

U.S. Cl. 420—36

10 Claims

1. A piston ring material consisting by weight of 0.6 to 1.5%

"a" ranges from about 7-15 wt %, "b" ranges from about 1.5-10 wt % and the balance is aluminum; depositing a stream of said molten metal onto a quenching region of said casting surface to solidify said molten metal at a quench rate of at least about  $10^6$  °C./sec providing a non-reactive gas atmosphere at said quenching region to minimize oxidation of said deposited metal; disrupting a moving gas boundary layer carried along by said moving casting surface to minimize disturbances of said molten metal stream that would inhibit the quenching of the molten metal on the casting surface.

4,948,559

## ALLOY FOR BUILDING UP VALVE

Shinji Oishi, Masahiro Nakagawa, Mototsugu Koyama, all of Toyota; Kanichi Tanaka, Yawata; Syozo Nagai, and Kensuke Hidaka, both of Kyoto, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Fukuda Metal Foil & Powder Co., Ltd., Kyoto, both of Japan

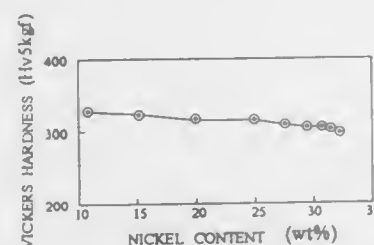
Filed Jul. 26, 1989, Ser. No. 385,075

Claims priority, application Japan, Jul. 30, 1988, 63-191888; Jul. 12, 1989, 1-179422

Int. Cl. C22C 30/00

U.S. Cl. 420-584

2 Claims



1. An alloy for building up a valve comprising; with respect to the total weight of said alloy taken as 100%, 30 to 40% by weight of chromium; 15 to 31% by weight of nickel; 7 to 20% by weight of molybdenum; 0.7 to 2.2% by weight of carbon; 1.5% or less by weight of silicon; and balance of iron and inevitable impurities, wherein the contents of manganese, aluminum and titanium contained in said inevitable impurities are 0.1% or less by weight, respectively.

4,948,560

## OXYGENATOR

Hiroshi Deguchi, Shizuoka, and Kiyotaka Nagayama, Unoke, both of Japan, assignors to Terumo Corporation, Tokyo, Japan

Continuation of Ser. No. 801,773, Nov. 26, 1985, abandoned.

This application May 12, 1989, Ser. No. 352,650

Claims priority, application Japan, Nov. 27, 1984, 59-250259

Int. Cl. A61M 1/03

U.S. Cl. 422-48

7 Claims

1. An oxygenator comprising:

- a housing;
- blood inlet means for allowing blood to enter said housing;
- blood outlet means for allowing blood to exit said housing;
- a bundled aggregate of a multiplicity of gas-exchange hollow fiber membranes mounted within said housing, said fiber membranes each having an opening at each end thereof;
- partition members supporting both ends of said bundled aggregate of hollow fiber membranes within said housing without closing the openings of said hollow fiber membranes;
- a gas inlet side header;
- gas inlet means for allowing gas to enter said hollow fiber membranes;
- a gas outlet side header;

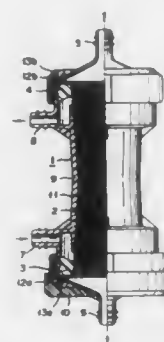
gas outlet means for allowing gas to exit said hollow fiber membranes;

said partition members being disposed between said inlet and outlet side headers, both said gas inlet means and said gas outlet means being in communication with the interiors of said hollow fiber membranes, said bundled aggregate of hollow fiber membranes being provided so as to separate a gas flow path within said housing through said hollow fiber membranes between said gas inlet means and said gas outlet means and a blood chamber defined between an inner wall of said housing, an outer wall of said hollow fiber membranes, and said partition members and in communication with said blood inlet means and said blood outlet means;

means for coupling said gas outlet side header to said housing; and

thermally insulating means in the shape of a cap and wrapped around a portion of an exterior surface of said for coupling and a substantial portion of an external wall surface forming said gas outlet side header formed by an insulating material provided so as to cover said gas outlet side header without preventing gas flow from said outlet, whereby the temperature of gas flowing toward and through said gas outlet means is maintained and condensation is minimized.

5. A process for eliminating carbon dioxide from blood and adding oxygen to the blood under external circulation which comprises the steps of:



providing a housing, blood inlet means for allowing blood to enter said housing, blood outlet means for allowing blood to exit said housing, a bundled aggregate of a multiplicity of gas-exchange hollow fiber membranes mounted within said housing, said fiber membranes each having an opening at each end thereof, partition members supporting both ends of said bundled aggregate of hollow fiber membranes within said housing without closing the openings of said hollow fiber membranes, a gas inlet side header, gas inlet means for allowing gas to enter said hollow fiber membranes, a gas outlet side header, gas outlet means for allowing gas to exit said hollow fiber membranes, said partition members being disposed between said inlet and outlet side headers, both said gas inlet means and said gas outlet means being in communication with the interiors of said hollow fiber membranes, said bundled aggregate of hollow fiber membranes being provided so as to separate a gas flow path within said housing through said hollow fiber membranes between said gas inlet means, and a blood chamber defined between an inner wall of said housing, an outer wall of said hollow fiber membranes, and said partition members and in communication with said blood inlet means and said blood outlet means, and means for coupling said gas outlet side header to said housing;

providing a thermally insulating means in the shape of a cap and wrapping the cap around a portion of an exterior surface of said means for coupling and a substantial portion of an external wall surface of said gas outlet side

header formed by an insulating material provided so as to cover said gas outlet side header without preventing gas flow from said gas outlet;

passing the blood into the blood inlet means of said housing;

passing the blood through the blood chamber within said housing;

feeding air containing oxygen into said gas inlet means and through gas flow path formed by the interior of said hollow fiber membranes;

contacting said blood with said air through said hollow fiber membranes to remove carbon dioxide in the blood and add oxygen to the blood; and

discharging the gas flowing through said hollow fiber membranes and through said gas outlet means under thermally insulating conditions by means of said thermally insulating means,

whereby the temperature of gas flowing toward and through said gas outlet means is maintained and condensation is minimized.

4,948,561

## MULTIPLE LEVEL FILTER DEVICE AND KIT CONTAINING SAME

Charles C. Hinckley, Pittsford; Thomas J. Cummins, Rochester, and Sheryl S. Sullivan, Hilton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

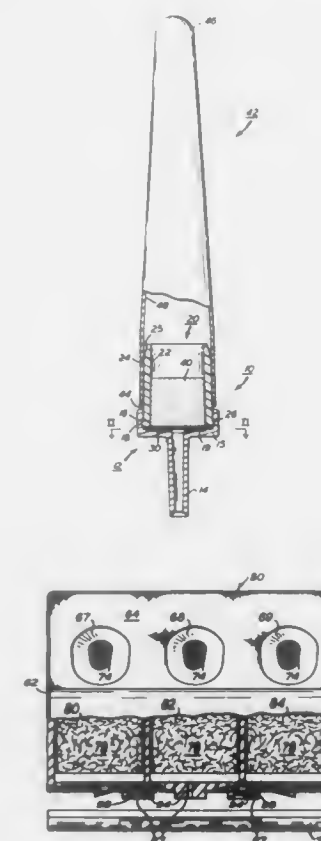
Filed Feb. 9, 1989, Ser. No. 308,842

Int. Cl. G01N 33/53; B01D 63/08

U.S. Cl. 422-61

5 Claims U.S. Cl. 422-73

17 Claims



1. In a kit for extracting and testing an antigen from body fluids, the kit including an extraction tube to which a body fluid and an extracting reagent are added to produce a solution of extracted antigen,

a filter tip for insertion into said tube after adding body fluids

and the extracting agent, said tip being constructed to mate with said tube;

a test device having plural test wells, filter means in each well for passing the solution through and for attaching the extracted antigen, said filter means having a predetermined average pore size, and an absorbent material underneath said filter means to draw liquid through said filter means and into said absorbent material, said test device being physically separate from said extraction tube;

and a container of labeled antibody for said antigen;

the improvement wherein said filter tip includes at least two filter media having two different predetermined pore sizes, one being a fine size and the other being a coarse size, said filter medium with said fine size being substantially the same pore size as said pore size of said test device filter means.

4,948,562

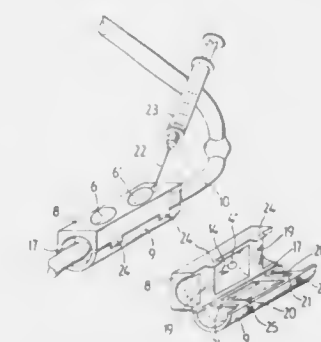
## DEVICE FOR DETERMINING A BLOOD GROUP

Yves M. Lacaille, 12, avenue Duvelleroy, Nogent sur Marne, France 94130, and Joelle Debar, 19, rue Vignon, Paris, France 75009

Continuation of Ser. No. 52,050, Jun. 22, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 310,012

Claims priority, application France, Sep. 4, 1985, 85 13140; Belgium, May 27, 1986, 6/48228

Int. Cl. G01N 33/16



1. A device for determining a blood group, including:

a first body member comprising a closed reaction chamber for containing a test serum,

a second body member,

reservoir means for containing a sample of blood to be tested,

means associated with said first and second body members for maintaining same and said reservoir means joined together while allowing displacement of the first body member relative to the second body member and to the reservoir means between an open position and a closed position of the device,

means for establishing a pressure difference between said chamber and said reservoir means, with the pressure in the latter being higher than the pressure in the chamber, and,

an element being formed with a hollow portion disposed between said reservoir means and said reaction chamber, means displaceable relative to said reservoir means as a result of the displacement of said first body member towards said closed position for piercing said reservoir means and establishing a path through said hollow element between said reservoir means and said reaction chamber for directly transferring a predetermined amount of blood from the reservoir means to the reaction chamber, due to said pressure difference, thereby allowing said amount of blood to form a reaction with said test serum in said chamber,



and wherein said first body member includes means for visually observing a result of said reaction.

4,948,563

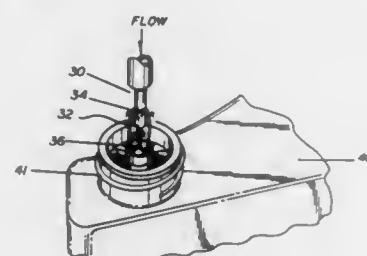
**WASTE CONTAINER INSERT FOR WASHING  
AUTOMATED IMMUNOASSAY APPARATUS PROBE**  
William J. Kanewake, III., Dallas, Tex., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 47,832, May 8, 1987, abandoned. This application May 9, 1989, Ser. No. 352,661

Int. Cl.<sup>5</sup> B01L 3/00; G01N 35/00

U.S. Cl. 422—99

18 Claims



1. An article for simultaneously cleansing the inner and outer surfaces of an automated centrally bored immunoassay probe after each sample use thereof comprising:

a unitary plug member adapted to be mounted in an inlet port of a waste container and having a continuous upstanding outer wall and a coaxially aligned upstanding inner wall, said inner wall defining an outer barrier of a first chamber having a bottom surface which is inclined downwardly toward its center, said inner wall also defining an inner barrier of a second annular chamber having an annular bottom surface and an outer barrier defined by said outer wall, said first and second chambers being concentrically aligned, and said annular bottom surface of said second chamber having at least one opening formed therein to provide drainage into a waste container upon which said plug member may be mounted, said outer wall projecting upwardly from said annular bottom surface to a first top edge, said inner wall projecting upwardly from said inclined bottom surface to a second top edge, said first chamber being adapted to have a used, centrally bored sample probe generally centered thereover with pressurized wash liquid being directed through said probe to cleanse the inner bore thereof and with said pressurized wash liquid then engaging said inclined bottom surface of said first chamber and being directed upwardly by said inclined bottom surface and the inner surface of said inner wall for cleansing engagement with the outer surface of said used probe, any overflow of wash liquid from said first chamber being over said second top edge into said second annular chamber for draining therefrom through said drainage opening into a waste container.

4,948,564

**MULTI-WELL FILTER STRIP AND COMPOSITE  
ASSEMBLIES**

David Root, Lexington, Mass., and George Lyman, Kennebunk, Me., assignors to Costar Corporation, Cambridge, Mass.  
Division of Ser. No. 187,083, Apr. 28, 1988, Pat. No. 4,895,706, which is a continuation-in-part of Ser. No. 923,906, Oct. 28, 1986, abandoned. This application Nov. 2, 1989, Ser. No. 430,812

Int. Cl.<sup>5</sup> B01L 3/00; G01N 1/18

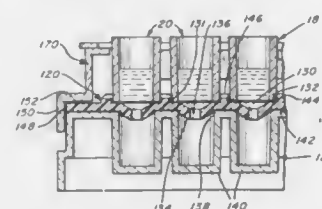
U.S. Cl. 422—101

9 Claims

1. A filter assembly comprising

a multi-well filter strip having a plurality of wells, each of the wells having side walls and open top and bottom ends, each of the wells further having a separate filter membrane

attached to a bottom surface of the side walls and closing the open bottom end of each well of the strip, an array of wells having open top and closed bottom ends and being spaced so that the array of closed bottom wells will align with the wells of the filter strip, and



a transfer plate having means for supporting each membrane adjacent the bottom ends of the respective wells in the filter strip and for engaging each of the wells in the array adjacent the open top end thereof for causing filtrate passing through the membranes on the wells in the filter strip to enter the corresponding separate wells in the array of wells aligned therewith.

4,948,565

**ANALYTICAL SYSTEM**

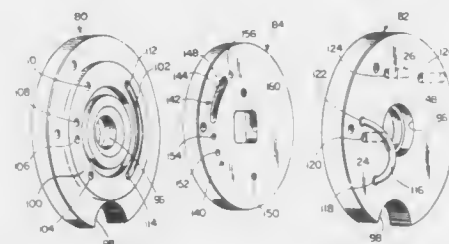
William G. Bemis, Westford, and John S. Uccello, Burlington, both of Mass., assignors to Fisher Scientific Company, Pittsburgh, Pa.

Filed Apr. 25, 1989, Ser. No. 343,014

Int. Cl.<sup>5</sup> G01N 1/20

U.S. Cl. 422—103

23 Claims



1. A metering valve assembly for use in an analytical system comprising

a fixed valve member and a movable valve member, said valve members having slidably engaged faces, one of said valve members including a first metering chamber in the form of a through passage having an axis perpendicular to the direction of relative valve member movement and a second metering chamber in the form of an elongated channel having a length at least three times its width and disposed along the direction of relative valve member movement,

said metering chambers being connected in series for serial receipt of sample liquid to be analyzed in a first valve position, and said first metering chamber being connected in series between a source of auxiliary fluid and a first analysis unit and said second metering chamber being concurrently connected in series between a source of auxiliary fluid and a second analysis unit in a second valve position.

4,948,566

**STERILIZING SYSTEM FOR STERILIZING  
CONTAINERS**

Lorenz Gabele, Sauldorf; Häusler, Walter Lohrer, both of Tuttlingen; Johannes Seibert, Wurlingen; Harald Stallforth, Tuttlingen; Wolfgang Taschner, Tuttlingen; Otmar Wawrik, Hanau, and Wilfried Wölfe, Bad Dürrenheim, all of Fed. Rep. of Germany, assignors to Aesculap-Werke AG, Tuttlingen, Fed. Rep. of Germany

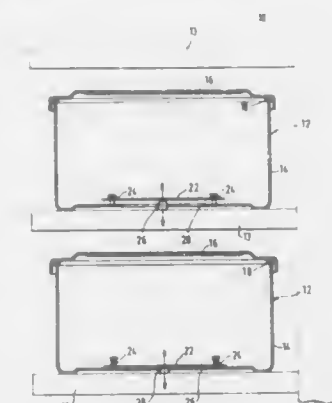
Filed Sep. 24, 1987, Ser. No. 100,490

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632675

Int. Cl.<sup>5</sup> B65D 51/16; A61L 2/06

U.S. Cl. 422—107

8 Claims



1. A system for sterilizing the interior and the contents of sterilizing containers for medical purposes in an autoclave chamber structure by means of a vaporous or gaseous sterilizing medium which enters the interior of the sterilizing container during sterilization through at least one opening which is sealingly closable by means of a closure element constituting part of the sterilizing container in order to maintain the sterile condition after completion of a sterilizing procedure, wherein:

an external actuating element constituting part of said autoclave chamber structure is provided, said actuating element being movable along a first direction into a first position relative to said sterilizing container in which said closure element is fixable in the open state for the duration of the sterilizing procedure, and said actuating element being movable after completion of the sterilizing procedure, with the autoclave chamber structure in the sealingly closed state, into a second position, this being controlled by at least one operating parameter of said autoclave chamber structure which is ascertained by an associated sensor constituting part of said autoclave chamber structure, said closure element being actuatable in said second position to sealingly close said opening.

4,948,567

**DEODORIZER FOR REFRIGERATORS OR THE LIKE**

Kousuke Atarashiya, Kameoka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 15, 1989, Ser. No. 310,669

Claims priority, application Japan, Feb. 22, 1988, 63-22209[U]; Feb. 24, 1988, 63-23528[U]

Int. Cl.<sup>5</sup> A61L 9/00, 9/16

U.S. Cl. 422—122

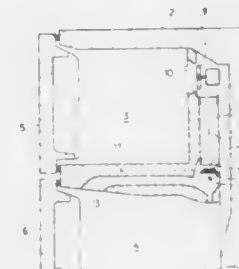
2 Claims

1. In a refrigerator, including a heat-insulated cabinet for storing foodstuffs, a refrigerating means for refrigerating air in the heat-insulated cabinet, a heating means disposed adjacent to the refrigerating means for applying heat to the refrigerating means for removal of frost adherent thereto, a means for providing intermittent energizing of said heating means for a predetermined period, and a means for circulating air along a circulation path, said circulation path including a duct, said

duct being in fluid communication with said heat-insulated cabinet, wherein the improvement comprises:

a deodorizer comprising:

(a) a deodorizing element disposed in said duct of said circulation path, said deodorizing element having an adsorbent for adsorbing odor components from said heat-insulated cabinet, and



(b) a catalyzing layer for oxidizing said odor components adsorbed by said adsorbent, said catalyzing layer covering the deodorizing element and being integral therewith,

wherein said deodorizer is intermittently heated by said heating means during said intermittent energizing of said heating means.

4,948,568

**METHOD AND APPARATUS FOR LIQUID FEED  
DISPERSION IN FLUID CATALYTIC CRACKING  
SYSTEMS**

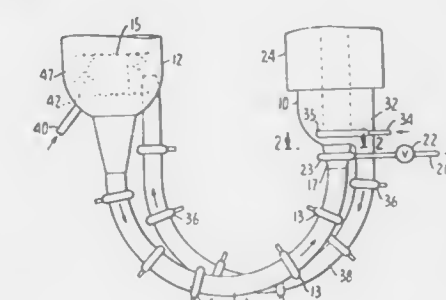
Donald O. Chessmore, Walnut Creek, and Frederick A. Petersen, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 813,152, Dec. 24, 1985, Pat. No. 4,793,913, which is a continuation of Ser. No. 640,110, Aug. 13, 1984, abandoned, Continuation-in-part of Ser. No. 464,121, Feb. 4, 1983, abandoned. This application Dec. 23, 1988, Ser. No. 289,323

Int. Cl.<sup>5</sup> C10G 11/00; F27B 15/08, 15/00

U.S. Cl. 422—140

6 Claims



means for recessing said nozzle unit within a wall of said reactor riser, said nozzle having a cylindrical swirl chamber positioned between a liquid hydrocarbon feed conduit and a discharge orifice from said chamber, said discharge orifice having a square edge to create a vena contracta of liquid flowing therethrough which is smaller in cross-sectional area than said orifice area, a plurality of stationary vane members between said feed line and said chamber for imparting centrifugal rotation to said liquid relative to the

flow axis through said chamber and said orifice, said discharge orifice being smaller in diameter and substantially shorter in length than said swirl chamber, both said orifice and said chamber being open for full flow throughout the full cylindrical volumes thereof, and means for positioning said at least one nozzle unit in said recessing means so that said orifice is out of said riser reactor but said vena contracta of the fluid flowing therethrough extends into said riser reactor.

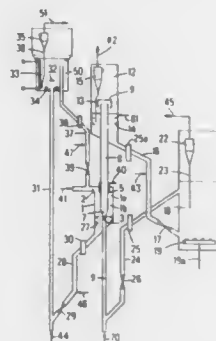
**4,948,569**  
**APPARATUS FOR CATALYTIC CRACKING OF A HYDROCARBON CHARGE SUBJECTED TO A PRETREATMENT WITH SOLID PARTICLES OF LOW ACTIVITY**

Gérard Martin, Reuil-Malmaison, and Alain Feugier, Orgeval, both of France, assignors to Institut Français du Pétrole, Reuil-Malmaison, France  
Division of Ser. No. 239,006, Aug. 29, 1988, Pat. No. 4,747,852, which is a continuation of Ser. No. 929,450, Nov. 12, 1986, abandoned. This application May 22, 1989, Ser. No. 354,584  
Claims priority, application France, Nov. 12, 1985, 85 16817; Jun. 2, 1986, 86 08008

Int. Cl.<sup>5</sup> B01D 45/12

U.S. Cl. 422—142

7 Claims



1. A catalytic cracking apparatus, comprising (see FIG. 1): at least one enclosure for the pretreatment of a hydrocarbon charge, providing cyclone means (1), inlet means (40,5) for a liquid or gaseous charge containing means for spraying said charge towards the inner periphery of the enclosure (the charge resultant flow being directed downwardly or upwardly towards the inlet of reactor (8), hereinafter defined), inlet means (3 and 7, see FIG. 2) for catalyst particles in said enclosure (1), inlet means (2) for solid particles, imparting to said particles a helical motion along the walls of said enclosure in the direction of flow resulting from the charge, means (27) for separating the solid particles, from the mixture of catalyst particles with the pretreated charge, means (28), connected to said enclosure (1), for conveying solid particles towards a tank for solid particles (50) and at least one means (31) for regenerating said solid particles and means (38, 39) for recycling regenerated solid particles towards the pretreatment enclosure (1), at least one means (7a) for feeding the mixture of pretreated charge with catalyst particles to reactor (8) which comprises a substantially vertical elongate tube, with co-current circulation of the pretreated charge and of the catalyst particles, either downwardly (dropper) or upwardly (riser), stripping means (14, 9) for separating the reaction effluent from the catalyst particles, provided at that end of the

reactor opposite to the end of introduction of the pretreated charge and of the catalyst particles, outlet means (42, 15) for the reaction effluent, connected to said stripping means, means (16) connected to said stripping means (14, 9), for conveying catalyst particles towards at least one regenerator (18) for said particles, and means (24, 25, 26) for recycling catalyst particles at least partly towards said pretreatment enclosure (1).

**4,948,570**  
**PROCESS FOR LOWERING RESIDUAL TANTALUM VALUES IN NIOBIUM**

James A. Sommers, Albany, Oreg., assignor to Teledyne Industries, Inc., Albany, Oreg.

Filed Jul. 11, 1989, Ser. No. 378,319

Int. Cl.<sup>5</sup> C01G 33/00

U.S. Cl. 423—65

8 Claims

1. The process for removing tantalum values from niobium values comprising admixing a NbCl<sub>5</sub>/TaCl<sub>5</sub> charge having a molar ratio from about 10/1 to about 10,000/1 with a 8N to 20N aqueous HCl solution at a total charge concentration of from about 50 to about 150 parts/100 parts by weight of said HCl solution to form a reaction system, and contacting at least the surface of said hydrolysis system with a gas for a period of time within which a precipitate settles out at an average rate of from about 0.1 to about 6.0% by weight of the initial solids charge per hour.

**4,948,571**  
**PROCESS FOR PURIFYING NITROGEN TRIFLUORIDE GAS**

Isao Harada; Hisashi Hokonohara, and Toshiaki Yamaguchi, all of Yamaguchi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

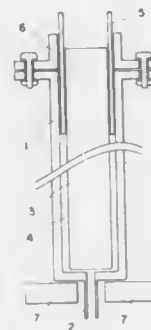
Filed Apr. 7, 1989, Ser. No. 334,529

Claims priority, application Japan, Apr. 11, 1988, 63-87209; Apr. 12, 1988, 63-90032

Int. Cl.<sup>5</sup> C01B 7/00, 21/06

U.S. Cl. 423—240

8 Claims



1. A process for purifying a nitrogen trifluoride gas, comprising the step of heating said nitrogen trifluoride gas containing at least dinitrogen difluoride as an impurity at a temperature of 150° to 600° C. in a metallic vessel, the whole inner wall of the metallic vessel having been previously lined with a compressed mold, a sintered mold or a fused mold of a solid fluoride which is at least one component selected from the group consisting of fluorides of metals in groups IA, IIA and IIIA of the periodic table, mixtures thereof and double salts thereof, the compressed mold, the sintered mold or the fused molding having a thickness of 1 to 5 mm.

**4,948,572**  
**PROCESS FOR THE RECOVERY OF SULFUR DIOXIDE FROM GAS FLOWS**

Olav Erga, Jakobsli, Norway, assignor to Sintef, Nth, Norway  
Continuation of Ser. No. 54,912, May 28, 1987, abandoned. This application Jan. 31, 1989, Ser. No. 305,105

Claims priority, application Norway, Sep. 16, 1985, 853622  
Int. Cl.<sup>5</sup> C01B 17/00

U.S. Cl. 423—242

15 Claims

1. Process for the purification of SO<sub>2</sub> containing gases by means of an aqueous absorption solution in an absorption unit and regeneration of this solution after absorption, which comprises absorbing from said gases SO<sub>2</sub> in an aqueous absorption solution which is added to the absorption unit with a pH of at least 5.5 and a content of at least 2.0 moles of disodium-hydrogen phosphate per liter, after absorption removing SO<sub>2</sub> from the absorption solution together with water by evaporating at least 70% of the water in the absorption solution, to form an evaporation residue which is diluted with water to form a regenerated absorption solution which may be added to the absorption unit, and recovering SO<sub>2</sub> from the evaporated water-SO<sub>2</sub> mixture.

diameter of less than two microns, then raising the temperature to a second temperature to drive the reaction to completion; and removing any remaining excess carbon from the resulting carbide product by oxidizing the carbon.

**4,948,574**  
**METHOD OF MANUFACTURING OF PITCH-BASE CARBON FIBER**

Hideharu Sasaki, Matsuyama, and Toru Sawaki, Iwakuni, both of Japan, assignors to Teijin Limited, Osaka, Japan  
Continuation of Ser. No. 88,741, Aug. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 943,822, Dec. 29, 1986, abandoned, which is a continuation of Ser. No. 751,191, Jul. 2, 1985, abandoned. This application May 8, 1989, Ser. No. 351,254

Claims priority, application Japan, Jul. 10, 1984, 59-141391  
Int. Cl.<sup>5</sup> D01F 9/12

U.S. Cl. 423—447.4

10 Claims

1. A method of manufacture of pitch-based carbon fiber by infusibilization of pitch fiber followed by carbonization, comprising doping the pitch fiber with at least 0.5 percent by weight of iodine, whereby the doping is effected by placing the pitch fiber into gaseous iodine, heating under an oxidizing atmosphere for infusibilization, whereby the fiber is infusibilized in about 10 minutes or less, and then heating under an inert atmosphere for carbonization, whereby it is carbonized or graphitized.

**4,948,575**  
**ALGINATE HYDROGEL FOAM WOUND DRESSING**  
Susan M. Cole, and James E. Garbe, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 24, 1989, Ser. No. 301,312

Int. Cl.<sup>5</sup> A61L 15/42, 25/00

U.S. Cl. 424—44

27 Claims

1. A method of making, in situ, a water-insoluble alginate hydrogel foam wound dressing comprising the steps of:

- (I) mixing together, to form a composite liquid mixture, a first liquid component comprising: (a) an aqueous suspension of particles of a water-insoluble di- or trivalent metal salt that will react with an acid to form a water-soluble metal salt, and which has a di- or trivalent metal ion capable of complexing with pendant carboxylate groups on water-soluble alginates to form water-insoluble alginate hydrogels, and (b) an effervescent compound which effervesces upon reaction with an acid; and a second liquid component comprising an aqueous solution of a biocompatible, water-soluble acid, wherein at least one of said components further comprise water-soluble alginate dissolved therein;
- (II) applying said composite liquid mixture directly to a wound site; and
- (III) allowing said composite liquid mixture to react.

**4,948,576**  
**DETERGENT COMPOSITIONS**  
Robert J. Verdichio, Succasunna, and Diane L. Spillatro, Piscataway, both of N.J., assignors to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.  
Filed Feb. 18, 1983, Ser. No. 468,120  
Int. Cl.<sup>5</sup> A61K 7/06, 7/08, 31/215

U.S. Cl. 424—59

13 Claims

1. A detergent composition consisting essentially of (a) at least one anionic or amphoteric surfactant wherein the anionic surfactant is selected from the group consisting of alkyl sulfates, alkyl ether sulfates, α-olefin sulfonates, alkyl sulfosuccinates, alkyl sarcosinates, alkyl monoglyceride sulfates, alkyl monoglyceride sulfonates, alkyl benzene sulfonates, acyl isethionates and acyl methyl taurides

**4,948,573**  
**PROCESS FOR PRODUCING SILICON CARBIDE AND METAL CARBIDES**

Sadashiv Nadkarni; Mukesh Jain, and Jean-Paul Huni, all of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

Continuation of Ser. No. 126,777, Nov. 30, 1987, abandoned.

This application May 16, 1989, Ser. No. 355,033

Claims priority, application Canada, Dec. 2, 1986, 524364; Jul. 2, 1987, 541167

Int. Cl.<sup>5</sup> C01B 31/36, 31/30, 31/34

U.S. Cl. 423—291

20 Claims

1. A process for producing substantially unagglomerated particles of a carbide of silicon or a carbide-forming metal capable of forming a gaseous sub-oxide selected from the group consisting of aluminum, boron, tantalum, titanium, zirconium, hafnium, yttrium, lanthanum, chromium, niobium, molybdenum, tungsten and vanadium from a corresponding oxide, said process comprising:

- forming a uniform dispersion consisting essentially of particles having an average size of less than two microns of said oxide in a polymer having the following characteristics: (a) a molecular weight of at least 10,000 and a long chain structure of at least 200 monomer units and (b) a carbon yield of at least 30% by weight.
- said dispersion being formed by dissolving the polymer in a solvent having a lower affinity for said oxide than the polymer, introducing the oxide particles into the resulting solution, agitating the solution to disperse the particles uniformly, and then removing the solvent from the solution such that said particles are substantially unagglomerated and separated from each other by said polymer;
- carbonizing the resulting dispersion in an inert atmosphere in order to convert the polymer to carbon;
- heating the carbonized product in an inert atmosphere in the presence of a catalyst for the formation of said sub-oxide at a first temperature, which results in the formation of carbide particles or whiskers having an average particle



and wherein the amphoteric surfactant is selected from the group consisting of betaines, sultaines, phosphobetaines, phosphitaines, n-alkylamino propionates, n-alkylimino dipropionates and imidazolines;

- (b) at least one water-soluble, nitrogen-containing polymer selected from the group consisting of nitrogen-containing free sulfonic acid polymers, adipic acid/dimethylaminohydroxypropyl diethylene-triamine copolymers, acrylamide copolymers, and quaternary ammonium polymers formed by the reaction product of dimethyl sulfate and a copolymer of vinyl pyrrolidone and dimethylaminoethylmethacrylate; and
- (c) at least one water-soluble non-particulate anti-dandruff agent selected from the group consisting of 1-hydroxy-2-pyridones and magnesium sulfate adducts of 2,2'-dithio-bis(pyridine-1-oxides).

4,948,577

**COMPOSITION FOR EXTERNAL APPLICATION**  
Kenichi Hara, Onojo, Japan, assignor to Sansho Seiyaku Co., Ltd., Onojo, Japan

Filed Dec. 7, 1987, Ser. No. 129,252

Claims priority, application Japan, Sep. 25, 1987, 62-241881  
Int. Cl.<sup>3</sup> A61K 7/021, 7/44, 7/135

U.S. Cl. 424—59

8 Claims

1. A composition for external application to skin to inhibit formation of erythema and pigmentation of the skin when exposed to ultraviolet light, comprising a kojic acid component selected from the group consisting of kojic acid and a kojic acid derivative, 0.01 to 5.0% by weight of the total composition of 4-(1,1-dimethylethyl)-4'-methoxydibenzoylmethane, and a carrier component.

4,948,578

**TRANSPARENT ANTIPERSPIRANT STICK COMPOSITIONS**

Allan R. Burger, Passaic, N.J.; Phillip E. Figdore, York, Pa.; Samuel Q. S. Lin, Paramus, and Michael Massaro, Bogota, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 50,607, May 15, 1987, abandoned. This application May 12, 1989, Ser. No. 355,097  
Int. Cl.<sup>3</sup> A61K 7/34, 7/38

U.S. Cl. 424—68

17 Claims

1. An antiperspirant composition in the form of a transparent stick which is an oil-in-water emulsion comprising:
- (i) from 5 to 25% of an antiperspirant effective aluminum salt;
  - (ii) from 10 to 40% of a nonionic surfactant which is a C<sub>11</sub>-C<sub>18</sub> fatty alcohol alkoxylated with from about 10 to about 20 moles ethylene oxide;
  - (iii) from 5 to 50% of a liquid oil immiscible with water; and
  - (iv) from 20 to 50% water, and wherein said composition is free of any wax matrix.

4,948,579

**QUATERNIZED POLYMER FOR USE AS A COSMETIC AGENT IN COSMETIC COMPOSITIONS FOR THE HAIR AND SKIN**

Bernard Jacquet, Antony, and Gerard Lang, Deuil-La-Barre, both of France, assignors to Societe Anonyme dite: l'Oreal, Paris, France

Division of Ser. No. 163,411, Jun. 26, 1980, Pat. No. 4,422,853, which is a continuation-in-part of Ser. No. 849,657, Nov. 8, 1977, Pat. No. 4,217,914, which is a continuation of Ser. No. 577,836, May 15, 1975, abandoned. This application Oct. 26, 1983, Ser. No. 545,770

Claims priority, application Luxembourg, May 16, 1974, 70096; Feb. 14, 1975, 71849

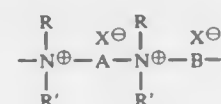
The portion of the term of this patent subsequent to Apr. 15, 1997, has been disclaimed.

Int. Cl.<sup>3</sup> A61K 7/09, 7/11, 7/06, 31/74

U.S. Cl. 424—72

2 Claims

1. A cosmetic composition comprising a reducing agent present in an amount effective to reduce a sufficient number of S—S bonds of the keratin of the hair and a quaternized polymer having recurring units of the formula

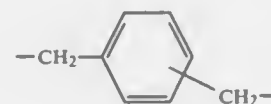


wherein

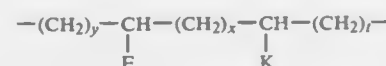
R is lower alkyl or —CH<sub>2</sub>—CH<sub>2</sub>OH;

R' is alkyl containing 1-20 carbon atoms, cyclohexyl chains or phenylalkyl wherein the alkyl moiety has 1-3 carbon atoms or R and R' together with the nitrogen atom to which they are attached form a ring wherein R and R' represent a polymethylene radical having 2-6 carbon atoms or R and R' together with the nitrogen atom to which they are attached form a ring wherein R and R' represent a polymethylene radical having 2-6 carbon atoms, said polymethylene radical also containing oxygen or sulfur as a heteroatom other than nitrogen;

A is a divalent group selected from the group consisting of (1) o-, m- or p-xylylidene of the formula

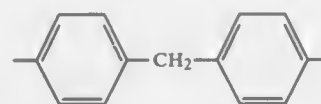


(2)



wherein x, y and t are whole numbers ranging from 0 to 11 such that the sum of x, y and t is greater than or equal to 0 and lower than 18, and E and K represent hydrogen or alkyl having less than 18 carbon atoms,

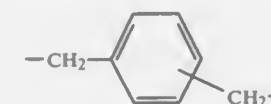
- (3) —(CH<sub>2</sub>)<sub>n</sub>—S—(CH<sub>2</sub>)<sub>n</sub>—,
- (4) —(CH<sub>2</sub>)<sub>n</sub>—O—(CH<sub>2</sub>)<sub>n</sub>—,
- (5) —(CH<sub>2</sub>)<sub>n</sub>—S—S—(CH<sub>2</sub>)<sub>n</sub>—,
- (6) —(CH<sub>2</sub>)<sub>n</sub>—SO—(CH<sub>2</sub>)<sub>n</sub>—,
- (7) —(CH<sub>2</sub>)<sub>n</sub>—SO<sub>2</sub>—(CH<sub>2</sub>)<sub>n</sub>— and
- (8)



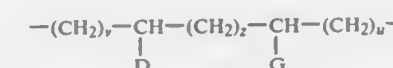
wherein n is equal to 2 or 3;

B represents a divalent group selected from the group consisting of

(1) o-, m- or p-xylylidene of the formula

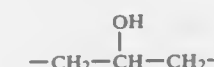


(2)



wherein D and G represent hydrogen or alkyl having less than 18 carbon atoms and v, z and u are whole numbers ranging from 0 to 11, with two of v, z and u simultaneously being capable of being 0, such that the sum of v, z and u is greater than or equal to 1 and lower than 18 and such that the sum of v, z and u is greater than 1 when the sum of x, y and t is equal to 0,

(3)



and

(4) —(CH<sub>2</sub>)<sub>n</sub>—O—(CH<sub>2</sub>)<sub>n</sub>— wherein n is 2 or 3;

X<sup>⊖</sup> is an anion derived from an organic or mineral acid, said quaternized polymer being present in an amount between 0.25 and 10 percent by weight of said composition.

4,948,580

**MUCO-BIOADHESIVE COMPOSITION**

Ivan Browning, Barnard Castle, England, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 8, 1988, Ser. No. 281,416

Int. Cl.<sup>3</sup> A61K 31/74, 9/06, 6/00; A61F 13/02

U.S. Cl. 424—78

9 Claims

1. An oral muco-bioadhesive composition comprising a mixture of (1) freeze dried combination comprising a lower alkyl vinyl ether/maleic anhydride copolymer or salt thereof and gelatin; and (2) an ointment therefor wherein the freeze dried product is present in an amount within the range of from about 25 to about 75% by weight of said composition and the ointment base is present in an amount within the range of from about 75 to about 25% by weight of the said composition.

4,948,581

**LONG ACTING DICLOFENAC SODIUM PREPARATION**  
Yoichi Sawayanagi, Shibuya, and Yoshiharu Otani, Yokohama, both of Japan, assignors to Dojin Iyaku-Kako Co., Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,333

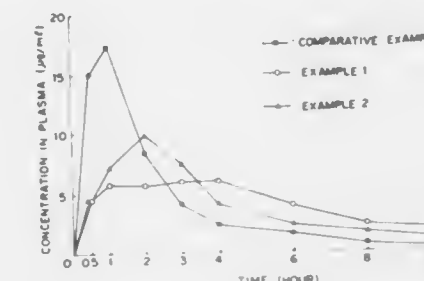
Int. Cl.<sup>3</sup> A61K 31/78; A61N 37/12

U.S. Cl. 424—81

9 Claims

1. A long acting diclofenac sodium preparation comprising a rapidly soluble component including an active ingredient consisting essentially of diclofenac sodium, and an enteric component including an active ingredient consisting essentially of diclofenac sodium and an enteric coating therefor, said enteric coating consisting essentially of in

admixture 100 parts by weight of a methacrylic acid-methyl methacrylate copolymer, 3 to 40 parts by weight



of a glycerin fatty acid ester, and 1 to 150 parts by weight of talc.

4,948,582

**TREATMENT OF CONDITIONS REQUIRING ENHANCED OXYGEN AVAILABILITY TO MAMMALIAN TISSUES**

John T. Suh, Maple Glen; Robert G. Pendleton, Hatfield; Charles E. Pendley, II, Abington; Kin T. Yu, Collegeville; Paul R. Menard, North Wales, and Alain B. Schreiber, Fort Washington, all of Pa., assignors to Rorer Pharmaceutical Corporation, Ft. Washington, Pa.

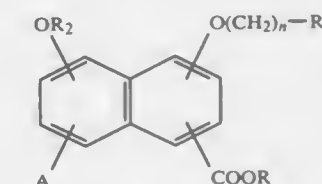
Division of Ser. No. 211,486, Jun. 23, 1988, Pat. No. 4,861,795. This application May 11, 1989, Ser. No. 333,520

Int. Cl.<sup>3</sup> A61K 31/21, 31/19, 31/195

U.S. Cl. 424—529

24 Claims

1. A method of maintaining oxygen-delivery capacity of transfusable blood cells comprising admixing said blood prior to transfusion with an effective amount of a compound of the formula

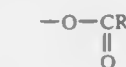


wherein

R is H, alkyl, aryl or aminoalkyl;

R<sub>1</sub> is H, alkyl, amino, NR<sub>3</sub>R<sub>4</sub> where R<sub>3</sub> and R<sub>4</sub> is H or alkyl;

R<sub>2</sub> is H, acyl, aminoacyl, alkyl, substituted alkyl wherein the substituents are aryl, cycloalkyl, CONHR, aryloxy or alkoxyalkyl.

A is H, halo, CF<sub>3</sub>, OH,

aminoalkyl, aryl, acyl, alkoxy, alkyloxy, or alkoxyalkyloxy; and

n is 0-6; wherein said alkyl group in alkyl, aminoalkyl, substituted alkyl, alkoxyalkyl, and alkoxyalkyloxy contains up to 8 carbon atoms and said cycloalkyl group contains 3 to 10 carbon atoms

or pharmaceutically acceptable salts thereof.

4,948,583

**COSMETIC COMPOSITION FOR THE TREATMENT OF HAIR, PARTICULARLY OILY HAIR, BASED ON AN EXTRACT OF YARROW (*ACHILLEA MILLEFOLIUM* L.)**  
Jean-Francois Grollier, Paris, and Georges Rosenbaum, Asnieres, both of France, assignors to Société Anonyme dite: l'Oreal, Paris, France

Filed Apr. 21, 1989, Ser. No. 342,672

Claims priority, application Luxembourg, Apr. 22, 1985, 85863

Int. Cl.<sup>5</sup> A61K 7/06, 7/40, 9/12, 35/78

U.S. Cl. 424—195.1

1 Claim

1. A process for the preparation of a non-allergenic dry extract of yarrow, comprising the steps of mixing flower tops of yarrow with water to produce an infusion, filtering said infusion to separate a solid residue from an aqueous extract, mixing said solid residue with methanol to produce a methanol solution, filtering said methanol solution and recovering a methanolic extract therefrom, mixing said aqueous extract and said methanolic extract to produce a water-methanol solution, oxidizing said water-methanol solution with sodium hypochlorite at room temperature and then after filtration recovering said dry extract of yarrow from the oxidized water-methanol solution by a technique selected from the group of techniques consisting of evaporation, atomization and freeze-drying.

4,948,584

**MODIFIED BEESWAX AND A PROCESS FOR THE MODIFICATION OF BEESWAX**

Hans M. Brand, Nieuwerkerk, Netherlands, assignor to Koster Keunen Holland B.V., Bladel, Netherlands

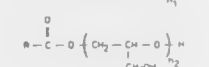
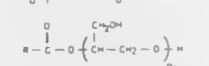
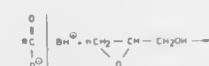
Filed Nov. 15, 1988, Ser. No. 271,737

Claims priority, application Netherlands, Dec. 2, 1987, 8702899

Int. Cl.<sup>5</sup> A61K 6/00

U.S. Cl. 424—401

10 Claims



1. Process for the modification of beeswax, wherein the beeswax is allowed to react with glycidol in the ratio of 2.4 mol of glycidol per mol of beeswax at a temperature of 80° to 150° C. in the presence of 0.000.5 to 3% by weight of a basic catalyst, the phases are allowed to separate and the wax is recovered from the wax-containing phase.

4,948,585

**WASHCLOTH CONTAINING CLEANSING AGENT**  
Allen P. Schlein, 107 Curtis Ter., Fairfield, Conn. 06432

Filed May 26, 1989, Ser. No. 358,176

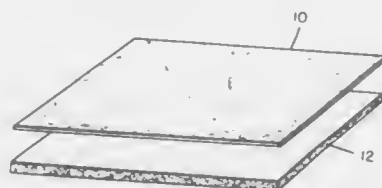
Int. Cl.<sup>5</sup> A61K 9/08

U.S. Cl. 424—404

5 Claims

1. A disposable washcloth for cleansing a person's skin comprising: a thin flexible sheet of non-woven paper containing a cured formulation comprising in selected proportions a water activated polyurethane gel, a sudsing detergent, and an

aqueous solution of an antiseptic antimicrobial skin cleansing agent, said skin cleansing agent being releasable at a controlled



rate, with modest sudsing, by dissolution of said polyurethane when the washcloth is wetted by a washing fluid.

4,948,586

**MICROENCAPSULATED INSECTICIDAL PATHOGENS**  
Howard A. Bohm, and Deborah R. Friend, both of Richmond, Va., assignors to Lim Technology Laboratories, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 115,879, Nov. 2, 1987, Pat. No. 4,844,896. This application Aug. 18, 1988, Ser. No. 233,522

Int. Cl.<sup>5</sup> A61K 39/02, 9/50

U.S. Cl. 424—406

13 Claims

1. Microencapsulated pathogen comprising:  
(i) an insecticidal pathogen;  
(ii) a polymeric encapsulating agent comprising polyacrylates, polyacrylic acids, cyclic acrylate polymer, polyacrylamides or mixtures thereof;  
(iii) a sunscreensing agent selected from the group consisting essentially of benzophenone, para aminobenzoic acid, benzil or mixtures thereof.

4,948,587

**ULTRASOUND ENHANCEMENT OF TRANSBUCCAL DRUG DELIVERY**

Joseph Kost, Omer, Israel, and Robert S. Langer, Somerville, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 883,111, Jul. 8, 1986, Pat. No. 4,767,402, and Ser. No. 936,000, Nov. 28, 1986, which is a division of Ser. No. 633,366, Jul. 23, 1984, Pat. No. 4,657,543.

This application Aug. 18, 1988, Ser. No. 233,590

Int. Cl.<sup>5</sup> A61F 13/00

U.S. Cl. 424—435

18 Claims

1. A method for enhancing and controlling transbuccal infusion of molecules comprising:  
(a) selecting the molecules to be infused through the buccal membranes;  
(b) applying said molecules to the buccal membrane;  
(c) applying ultrasound to said molecules at a frequency of between 20 kHz and 10 MHz and an intensity of between 0 and 4 W/cm<sup>2</sup>; and  
(d) varying the frequency and intensity over time to infuse said molecules through the transbuccal membranes at an optimal rate into the circulatory system without delay or damaging the buccal membranes, wherein the optimal rate is determined by measurements of a physiological fluid.

4,948,588

**PERCUTANEOUS ABSORPTION ACCELERATOR AND PREPARATION CONTAINING SAME**

Tetsuro Kamiya; Takeshi Inoue; Hidenori Yoroza; Yasuteru Eguchi, and Kaoru Tsujii, all of Tochigi, Japan, assignors to Kao Corporation, Tokyo, Japan

Division of Ser. No. 227,777, Aug. 3, 1988, Pat. No. 4,859,696, which is a continuation of Ser. No. 47,513, May 6, 1987,

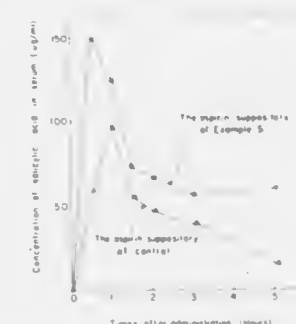
abandoned, which is a continuation of Ser. No. 726,320, Apr. 23, 1985, abandoned. This application Jun. 2, 1989, Ser. No. 361,489

Claims priority, application Japan, Apr. 23, 1984, 59-82464

Int. Cl.<sup>5</sup> A61K 9/02

U.S. Cl. 424—436

6 Claims



1. A percutaneous absorbent preparation for transdermal or transmucosal absorption of a pharmaceutically active substance, comprising:

an effective amount of pharmacopoeial aspirin, or insulin; and an absorption accelerator selected from the group consisting of 1-O-n-octyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-dodecyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-tetradecyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-hexadecyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecenyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-methyl-branched isostearyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-dodecyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-tetradecyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-hexadecyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecenyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-methyl-branched isostearyl-2-O-methyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-methyl-branched isostearyl-2-O-n-octyl-3-O-2',3'-dihydroxypropylglycerol; 1-O-n-octyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-n-dodecyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-n-tetradecyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-n-hexadecyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-n-octadecenyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-methyl-branched isostearyl-3-O-methyl-2-O-2',3'-dihydroxypropylglycerol; 1-O-methyl-branched isostearyl-3-O-n-butyl-2-O-2',3'-dihydroxypropylglycerol; and 1-O-methyl-branched isostearyl-3-O-n-octyl-2-O-2',3'-dihydroxypropylglycerol.

4,948,589

**GRANULAR COMPOSITION FOR RUMINANT**  
Hitoshi Iijima; Masayuki Kiuchi; Masahiro Nakao; Kunio Nishimura, all of Kawasaki, and Shigeaki Sato, Tokyo, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 5, 1989, Ser. No. 293,783

Int. Cl.<sup>5</sup> A23K 1/18; A61K 9/16

7 Claims

1. A granular composition for a ruminant comprising as a main component choline or its derivative selected from the group consisting of choline chloride, choline phosphate, choline bitartrate, choline gluconate, choline dihydrogen citrate, choline fumarate, choline carbonate, and choline pyrophosphate, said composition being prepared by

(i) granulating the choline or its derivative having an average particle size of 100 μm or less and a maximum particle size of 150 μm or less, an excipient having an average particle size of 10 μm or less and a maximum particle size of 20 μm or less, and a hydrophobic binder under a relative humidity of 10% or less by using an agitation granulator equipped with a stirring means and a chopping means, followed by cooling, separating and classifying the resultant granules to obtain spherical granules having a particle size of 0.5 to 2.5 mm, and  
(ii) forming a thin film on the surface of the granules at a temperature of at least 5° C. less than the melting point of the binder and 5° C. to 25° C. less than the melting point of the overcoating agent under a relative humidity of 30% or less in an agitation granulator by adding 20 to 40 parts by weight, based on 100 parts by weight of the granules, of a heated molten mixture of a hydrophobic overcoating agent and a solubility modifier in the form of a fine powder in a weight ratio of 1:0.2-1.

4,948,590

**AVIDIN OR STREPTAVIDIN CONJUGATED LIPOSOMES**

Edward Hawrot, New Haven, Conn.; Michael B. Rosenberg, San Diego, Calif., and Xandra O. Breakefield, Newton, Mass., assignors to Yale University, New Haven, Conn.

Filed Jun. 9, 1987, Ser. No. 60,140

Int. Cl.<sup>5</sup> A61K 37/22; C08H 1/00

U.S. Cl. 424—450

12 Claims

1. A liposome conjugated with a protein which binds biotin, said liposome comprising phospholipid amino groups, said protein which binds biotin further comprises carboxyl residues, said carboxyl residues being coupled to phospholipid amino groups of the liposome via a coupling reagent, wherein the protein which binds biotin is streptavidin and wherein the ratio of the concentration of the coupling reagent to the phospholipid concentration is up to 100 mg/ml of coupling reagent per 5 μmol/ml of phospholipid and whereby said liposome is not cross-linked to other liposomes.

4,948,591

**SOFT CAPSULAR PREPARATION OF SODIUM PICOSULFATE**

Tohru Yamada, Fuji, Japan, assignor to Tokai Capsule Co., Ltd., Shizuoka, Japan

Filed Apr. 28, 1989, Ser. No. 344,985

Claims priority, application Japan, May 10, 1988, 63-113311

Int. Cl.<sup>5</sup> A61K 9/48

U.S. Cl. 424—456

8 Claims

1. A soft capsular preparation comprising a polyethylene glycol solution of sodium picosulfate encapsulated with a capsular film.



4,948,592

**PULSED DRUG DELIVERY**

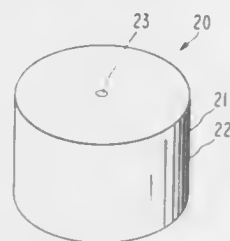
Atul D. Ayer, Mountain View; Felix Theeuwes, Los Altos, and Patrick S. L. Wong, Hayward, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 861,188, May 9, 1986, Pat. No. 4,842,867. This application Feb. 21, 1989, Ser. No. 313,211

Int. Cl.<sup>5</sup> A61K 9/24

U.S. Cl. 424—473

2 Claims



1. A dosage form for delivering a beneficial drug formulation to an environment of use, wherein the dosage form comprises:

- a wall comprising in at least a part a composition permeable to the passage of fluid and substantially impermeable to the passage of drug, which wall surrounds:
- (1) a first layer comprising a dosage amount of a beneficial drug;
- (2) a second layer comprising a hydrogel that expands in the presence of fluid;
- (3) means coated around the first and second layer for delaying the release of the drug from the dosage form;
- (b) at least one passageway in the wall for releasing the beneficial drug from the dosage form; and
- (c) a dosage amount of a beneficial drug in contact with the exterior surface of the wall of the dosage form, with the proviso that said drug is a different drug than the drug in the first layer.

4,948,593

**OSMOTIC DOSAGE FORM COMPRISING AN ESTROGEN AND A PROGESTOGEN**

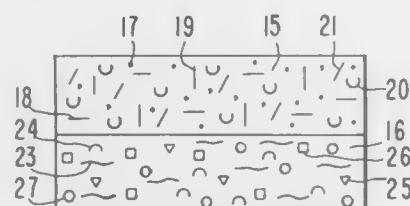
Jeri D. Wright, Dublin; Jerry D. Childers, Fremont; Brian L. Bareley, Sunnyvale; Patrick S. L. Wong, Palo Alto, and Linda E. Atkinson, Portola Valley, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed May 15, 1989, Ser. No. 351,365

Int. Cl.<sup>5</sup> A61K 9/22

U.S. Cl. 424—473

11 Claims



1. An osmotic device for delivering contraceptive steroids, the osmotic device comprising:

- a wall comprising at least in part a composition permeable to the passage of fluid, which wall surrounds;
- (b) a compartment;
- (c) at least one exit passageway that connects the exterior of the device with the compartment;
- (d) a first composition in the compartment, said composition comprising a contraceptively effective amount of an estro-

genic steroid and a contraceptively effective amount of a progestogenic steroid; and,

- (e) a second composition in the compartment, said second composition comprising an osmopolymer which composition, when the device is in operation in the presence of fluid that enters the device, increases in dimensions and displaces the first composition through the passageway from the device.

4,948,594

**COPPER COMPLEXES OF ALPHA-AMINO ACIDS THAT CONTAIN TERMINAL AMINO GROUPS, AND THEIR USE AS NUTRITIONAL SUPPLEMENTS**

Mahmoud M. Abdel-Monem, Moscow, Id., and Michael D. Anderson, Minnetonka, Minn., assignors to Zinpro Corporation, Edina, Minn.

Continuation-in-part of Ser. No. 293,225, Jan. 3, 1989, Pat. No. 4,900,561, which is a continuation-in-part of Ser. No. 285,593, Dec. 16, 1989, abandoned. This application Aug. 22, 1989, Ser. No. 396,685

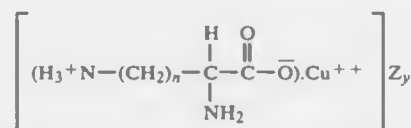
The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A23L 1/304

U.S. Cl. 426—2

5 Claims

1. In solid form, 1:1 copper complex salts of the formula:



wherein "n" is from 1 to 5, and "Z" is an inorganic anion and "Y" is the number required to electrostatically balance the set.

4,948,595

**SPEARMINT ENHANCED PEPPERMINT FLAVORED CHEWING GUM WITH IMPROVED STABILITY**

Mansukh M. Patel, Downers Grove, and Jayant C. Dave, Bloomington, both of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Jun. 30, 1989, Ser. No. 374,275

Int. Cl.<sup>5</sup> A23G 3/30

U.S. Cl. 426—3

18 Claims

1. A peppermint-flavored chewing gum comprising: gum base; sweetener; and peppermint flavor mixture comprising: a peppermint flavoring agent; and peppermint flavor enhancer present in an amount between about 0.1 and about 2 weight percent of the peppermint flavor mixture, wherein the peppermint flavor enhancer consists of a blend of spearmint flavor and methyl salicylate; and wherein the ratio of spearmint flavor to methyl salicylate is between about 10:1 to about 2:1.

4,948,596

**METHOD OF PURIFYING POLYDEXTROSE AND COMPOSITION CONTAINING SAME**

Frank J. Bunick, Budd Lake, and Shihuh J. Luo, Morris Plains, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

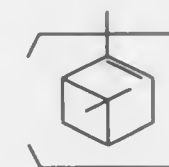
Continuation-in-part of Ser. No. 43,793, Apr. 29, 1987. This application Nov. 22, 1988, Ser. No. 276,500

Int. Cl.<sup>5</sup> A23L 1/015

U.S. Cl. 426—3

32 Claims

1. A liquid/liquid extraction process for purifying polydextrose having contaminants remaining from manufacturing thereby providing an organoleptically acceptable polydextrose ingredient comprising:



4,948,598

**PROCESS FOR THE PRODUCTION OF SPARKLING WINE**

Andreas Lembke, Eutiner-Sielbeck, Fed. Rep. of Germany; Emil Underberg, Dietlikon, and Hans J. Strobel, Basersdorf, both of Switzerland, assignors to Biodyn AG, Dietlikon, Switzerland

Filed Jan. 23, 1989, Ser. No. 299,580

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801442; Mar. 30, 1988, 3810753; Nov. 8, 1988, 3837846

Int. Cl.<sup>5</sup> C12G 1/06

U.S. Cl. 426—23

16 Claims

1. A process for producing sparkling wine comprising the steps of:

- (1) adding a first yeast portion and saccharose to sterilized wine,
  - (2) carrying out secondary fermentation, under a pressure-tight seal, wherein dissolved constituents from the first yeast portion are contained in the resulting crude sparkling wine,
  - (3) separating insoluble fractions from the resulting crude sparkling wine, and
  - (4) adding a composition comprising saccharose to the resulting crude sparkling wine so as to obtain the sparkling wine,
- wherein, prior to the end of the secondary fermentation, a second yeast portion is added to the resulting wine mixture of step (1), wherein the autolysis stability of the second yeast portion is reduced by damaging the cell walls thereof prior to the addition of the second yeast portion to the resulting wine mixture of step (1), and wherein the insoluble fractions of the first yeast portion which remain following autolysis of the first yeast portion are at least 70%, based on the total amount thereof, and the resulting loss in autolysis is adjusted by the second yeast portion.

4,948,599

**CONTINUOUS PRODUCTION PROCESS OF CHEESE CURDS AND PRODUCTION PROCESS OF CHEESE THEREFROM**

Kazuhiko Sagara; Kunio Ueda; Toshikazu Shimada, all of Yamanashi, and Toshiaki Ishii, Tokorozawa, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Sapporo, Japan

Filed Apr. 13, 1989, Ser. No. 337,554

Claims priority, application Japan, Apr. 13, 1988, 63-91118

Int. Cl.<sup>5</sup> A23C 19/05, 19/024

U.S. Cl. 426—40

4 Claims

1. A process for the continuous production of cheese curds from milk, which comprises cooling a concentrated milk, which has been obtained by ultrafiltration of pasteurized milk or pasteurized processed milk, to a temperature not higher than 15° C., adjusting the cooled concentrated milk to pH 4.8–5.8, adding a milk-coagulating enzyme and a lactic acid bacterium starter to the cooled concentrated milk without coagulation, and then adding a heated permeate which has been separated out by the ultrafiltration to the cooled concentrated milk mixture to raise the temperature of the resultant mixture to 25–85° C. to thereby coagulate the milk and to form cheese curds, the temperature of the heated permeate being sufficiently high so that the temperature of the resultant mixture is at 25–85° C.

vigorously agitating said mixture to form a homogenized emulsion of said polydextrose in said polar organic solvent, allowing said homogenized emulsion to equilibrate to form a substantially contaminant-containing liquid fraction and a substantially polydextrose-containing liquid fraction, separating said liquid fractions for use of said polydextrose-containing liquid fraction, and recovering said purified polydextrose ingredient from said polydextrose-containing liquid fraction.

4,948,597

**USES FOR AUGMENTING OR ENHANCING THE AROMA OR TASTE OF FOODSTUFFS AND CHEWING GUMS OF SCHIFF BASE REACTION PRODUCTS OF ALKYL ANTHRANILATES**

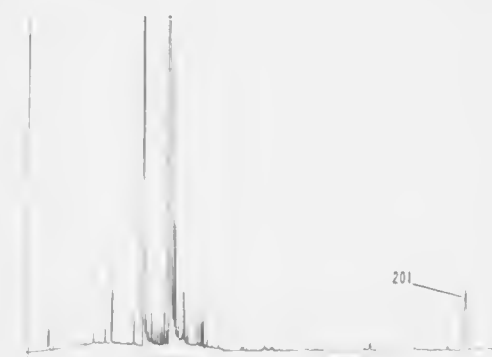
Braja D. Mookherjee, Holmdel; Robert W. Trenkle, Point Pleasant, both of N.J.; Nicholas Calderone, Laurel Hollow, N.Y., and Keith P. Sands, Marlboro, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 260,578, Oct. 21, 1988, Pat. No. 4,880,640, which is a continuation-in-part of Ser. No. 171,778, Mar. 22, 1988, Pat. No. 4,806,363. This application May 25, 1989, Ser. No. 356,504

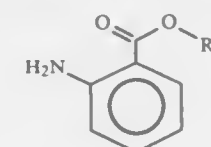
Int. Cl.<sup>5</sup> A23L 1/235

U.S. Cl. 426—3

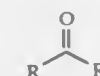
5 Claims



2. A process for augmenting or enhancing the aroma or taste of a foodstuff or chewing gum comprising the step of intimately admixing with said foodstuff or chewing gum from about 0.1 ppm up to about 100 ppm of a schiff base reaction product produced according to the process of reacting an alkyl anthranilate having the structure:



wherein R'' represents methyl or ethyl with a carbonyl-containing compound having the structure:



wherein R' represents hydrogen or methyl and R is the moiety:

4,948,600

**PROCESS FOR THE PURIFICATION OF A MATERIAL RICH IN COCOA DIETARY FIBER**

Albert Zumbé, Neuchâtel, and Thierry Schwitzgebel, La Landera, both of Switzerland, assignors to Jacobs Suchard AG, Zurich, Switzerland

Filed Feb. 6, 1989, Ser. No. 306,555

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804007

Int. Cl.<sup>5</sup> A23G 1/02

U.S. Cl. 426—45

19 Claims

1. Process for the purification and use of a cocoa powder containing cocoa dietary fibers comprising: treating the cocoa powder to remove starch, whereby first the starch is degraded enzymatically and then is extracted in the form of starch degradation products, thereby leaving a solid portion, washing the solid portion, effecting separation of the solid portion, drying the solid portion to form a product containing 35% to 75% cocoa dietary fibers, and incorporating the product in chocolate, candy or cocoa beverages.

4,948,601

**DEVICE FOR BREWING COFFEE**

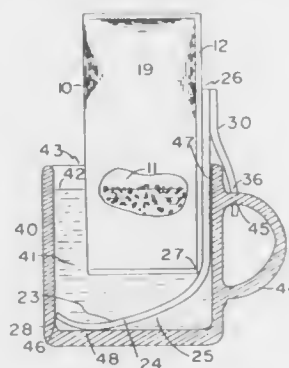
Gideon P. Serba, 105 Calverton Cir., Accokeek, Md. 20607

Filed Oct. 10, 1989, Ser. No. 419,472

Int. Cl.<sup>5</sup> B65B 29/04; A23F 5/26; B65D 33/14

U.S. Cl. 426—82

1 Claim



1. A disposable brewing device for brewing coffee in a cup comprising: an elongated filter bag enclosing a measured amount of ground coffee beans sealed therein and a thin, elongated flexible filter bag support element secured to said filter bag over a portion of both the length to the filter bag and the length of the support element leaving an upper portion of the bag relative to its vertical orientation in said cup and a lower portion of the support element unattached to each other; the filter bag being secured to said support element along a longitudinal edge of said filter bag so that the bag is oriented relatively transversely from said support element relative to the transverse direction of the bag when said device is placed in said cup, the attachment between said bag and said support element is such as to allow said bag to move freely from side to side relative to said support element; said support element comprising a tab element which extends away from the support element and the bag and which includes a cut out region sized and configured to engage a handle of said cup when said device is placed in said cup, said lower unattached portion of said support element having an inward bend in a direction away from the tab element; the length and configuration of the unattached lower portion of said support element being sufficient such that when said device is placed in said cup with said tab element extending outside the cup with its cut out region engaging a handle of said cup, said lower unattached portion of said support element is in contact with the inner surface of the

lower portion of said cup and is flexed so that it is concave upward to provide a spring action which pushes the attached portion of the support element against the inner wall of the cup, which, in combination with the cut out portion, anchors said filter bag in said cup; said bag is dimensioned such that in its anchored position in said cup, said unattached upper portion of said bag as well as a portion of said attached portion of said bag remains above the upper rim of said cup.

4,948,602

**FILLED COOKIE**

Donald G. Boehm, Mt. Kisco, N.Y., and Richard D. Fazzolare, Randolph, N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Oct. 21, 1988, Ser. No. 261,163

Int. Cl.<sup>5</sup> A21D 15/00

U.S. Cl. 426—94

18 Claims

1. A cookie comprising a baked dough-based shell containing therein at least two filters, said cookie having a weakened portion or at least one opening on its upper surface so that during a subsequent heating step at least one of said filters can flow from said weakened portion or opening and at least partially coat the outer surface of the cookie, at least one of said filters being an oil based filter and at least one of said filters being a water based filter.

4,948,603

**PROCESS FOR PREPARING STORAGE STABLE, READILY RECONSTITUTED FROZEN COMESTIBLES AND FROZEN COMESTIBLES PRODUCED THEREBY**

Donald B. Bernacchi, Robert J. Loewe, both of Chicago, and Donna L. Immel, Green Oaks, Ill., assignors to Griffith Laboratories U.S.A., Inc., Alsip, Ill.

Filed Aug. 16, 1988, Ser. No. 232,910

The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A23B 4/10

U.S. Cl. 426—95

69 Claims

1. A method for preparing storage stable, coated frozen comestibles which, when reconstituted by microwave cooking or by baking, have a texture and appearance organoleptically equivalent or superior to that of fat fried coated comestibles, comprising the steps of:

enrobing a comestible with a first coating comprising wheat flour and shortening blended with sufficient water to yield a batter or dough of a consistency suitable for enrobing the comestible, and treating the enrobed comestible with steam for up to about 90 seconds; frying the comestible to set up the first coating without undercooking or overcooking the first coating; applying to the comestible a second coating chosen from the group consisting of a chemically leavened batter and a combination of a batter and a supplemental breading capable of yielding a crisp, coating upon reconstitution and frying a second time; and freezing the twice coated, twice fried product.

4,948,604

**SHRINK PACKAGE OF IMPROVED PRODUCT TO CONTAINER FIT**

Richard O. Kuehne, Taylors; Karl R. Delly, Greenville, and Timothy L. Lawlis, Chesnee, all of S.C., assignors to W. R. Grace &amp; Co.-Conn., Duncan, S.C.

Filed Feb. 22, 1989, Ser. No. 313,940

Int. Cl.<sup>5</sup> B65B 53/02

U.S. Cl. 426—107

10 Claims

1. A shrink package having improved food product to container fit comprising:

a heat-shrinkable container including a heat-shrinkable flexible thermoplastic envelope substantially conformed to a contained food product and having been treated with

non-ionizing microwave radiation and then heat shrunk, said non-ionizing radiation being to an extent sufficient to cause substantially complete contact after the heat shrinking of the inner surface of the envelope and the product whereupon gap therebetween is less than about 0.32 cm.

4,948,605

**FROZEN FOOD COVER/CONTAINER ASSEMBLY FOR RECONSTITUTING THE FROZEN FOOD**

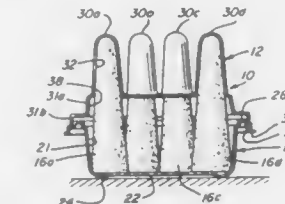
Ralph A. Lambert, Jr., Gettysburg, Pa., assignor to Hanover Brands, Incorporated, Hanover, Pa.

Filed Mar. 16, 1988, Ser. No. 169,042

Int. Cl.<sup>5</sup> B65D 81/34, 85/72

U.S. Cl. 426—107

8 Claims



1. A package for frozen liquid food adapted to undergo a reconstituting process including exposure to microwave energy, said package comprising:

(a) a mass of said frozen liquid solidified food having a top portion, a bottom portion and an intermediate peripheral surface, said frozen liquid food requiring thawing to a liquid state for consumption;

(b) a container adapted in normal use to be the bottom part of said package, said container having a first open mouth; and

(c) a cover disposed as the top part of said package, said cover having a second open mouth releasably engaging said first open mouth of said package and a pocket in said cover having an interior surface of a configuration corresponding to the shape of said top portion of said frozen liquid food, said bottom container and said top cover being assembled to form said package with said frozen liquid food contained therein and supported at said top portion of said frozen liquid food by said pocket and said bottom portion of said frozen liquid food resting on said bottom container, said frozen liquid food being supported between said bottom container and said top cover in an upright manner such that most of said peripheral surface of said frozen liquid food is free of contact with said package and said pocket extending down along the length of said frozen liquid food a distance sufficient to retain said liquid food upright and supported between said assembled bottom container and said top cover during at least a part of the thawing.

4,948,606

**STARCH-BASED PRODUCTS FOR MICROWAVE COOKING OR HEATING**

Victor T. Huang, Moundsview, Minn.; R. Carl Hoseney, Manhattan, Kans.; Ernst Graf, New Brighton, Minn.; Katy Ghiasi, St. Anthony, Minn.; Linda C. Miller, St. Louis Park, Minn.; Jean L. Weber, Minneapolis, Minn.; Karin C. Gaertner, Blaine, Minn.; Kristin L. Matson, Coon Rapids, Minn.; Antoinette M. Hunstiger, Edina, Minn.; Deborah E. Rogers, Manhattan, Kans., and Israel A. Saguy, Edina, Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Filed Jun. 29, 1988, Ser. No. 213,075

Int. Cl.<sup>5</sup> A21D 8/00

U.S. Cl. 426—243

34 Claims

1. A method for producing an edible starch-based bread-type

product having a desired degree of toughness, the method comprising the steps of:

forming a dough comprising water, flour and a texturizing agent selected from the group consisting of surfactants, hydrogen bon-breakers, fast acting oxidants, enzymes, and disulfide-reactants, the texturizing agent being included in an amount sufficient to provide a degree of toughening of the edible product when subjected to microwave irradiation which is distinguishably less than the degree of toughening generated from a dough which is formed without the texturizing agent;

preparing a product intermediate from said dough; and

exposing said product intermediate to microwave irradiation for a time sufficient to produce a desired edible product, said edible product having at least about 15 weight percent total water.

4,948,607

**METHOD FOR ELIMINATING FAT FROM A GROUND MEAT PRODUCT**

Geoffrey Margolis, 12229 Falkirk La., Los Angeles, Calif. 90049

Continuation-in-part of Ser. No. 224,449, Jul. 25, 1988,

abandoned. This application Sep. 12, 1989, Ser. No. 406,768

Int. Cl.<sup>5</sup> A23L 1/314, 1/317

U.S. Cl. 426—281

20 Claims

1. A method for eliminating fat from a formed, generally flat cooked ground meat product, while maintaining the structural integrity and texture of such product, comprising the steps of:

(a) bringing the product to a temperature at which a portion of the fat contained in the meat is liquified;

(b) compressing the product, while the fat remains liquified, by applying a rolling pressure which repeatedly traverses the product in a plane parallel to the product for a period and at a pressure level sufficient to exude at least 33 percent by weight of the fat from the product while maintaining the shape, structure and eating qualities; and

(c) removing the liquified fat as it is exuded from the patty.

4,948,608

**PROCESS FOR PREPARING OIL-IMPERVIOUS, WATER RETAINING SILICON OXIDE DERIVATIVE-CONTAINING FOOD PRODUCTS**

Richard J. Stypula, Colts Neck, and Lawrence Buckholz, Jr., Jackson, both of N.J., assignors to International Flavors &amp; Fragrances Inc., New York, N.Y.

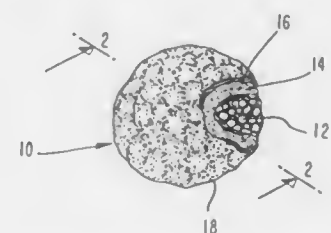
Division of Ser. No. 341,114, Apr. 14, 1989, which is a continuation-in-part of Ser. No. 302,272, Jan. 27, 1989, which is a continuation of Ser. No. 114,697, Oct. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 93,352, Sep. 3, 1987, abandoned. This application Oct. 20, 1989, Ser. No. 424,740

The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A23L 1/314, 1/315, 1/317

U.S. Cl. 426—302

12 Claims



1. A process for preparing a product consisting of the steps of:

1. providing a porous inner food structure consisting of a mixture of water, and macerated beef or macerated chicken meat and, optionally, one or more silicon oxide derivatives;

2. admixing a starch, methyl cellulose, xanthan gum and, op-



- tionally, one or more silicon oxide derivatives to provide a barrier mixture;
- providing a batter comprising flour and water;
  - coating and barrier mixture onto the porous inner food structure thereby forming a barrier-coated porous inner food structure;
  - baking the resulting barrier-coated porous inner food structure to form a baked product;
  - coating the batter onto the resulting baked product to form a battered baked product; and
  - baking the resulting battered, baked product whereby a food product is produced;
- wherein said food product includes one or more silicon oxide derivatives and whereby a food product is produced having the properties of:
- (x) retention of a substantial quantity of the water originally contained in the porous inner food structure on storage and/or on cooking; and
  - (y) substantial imperviousness to the absorption or adsorption of cooking oil into said porous inner food structure when said product is contacted with cooking oil on storage and/or on cooking.

4,948,609

**FRUIT AND VEGETABLE DRIED FOOD PRODUCT**  
Karim Nafisi-Movaghar, Walnut Creek, Calif., assignor to Nabisco Brands, Inc., E. Hanover, N.J.

Filed Feb. 12, 1988, Ser. No. 155,611

Int. Cl.<sup>5</sup> A23P 1/14; A23B 4/033

U.S. Cl. 426—321

33 Claims

1. A process for producing dried fruit and vegetable products which are not susceptible to browning and which retain their natural color and have a puffed consistency comprising reducing the fruit or vegetable to pieces of a desired size; contacting said fruit or vegetable pieces with an aqueous infusion solution containing (a) a reducing acid selected from the group consisting of erythorbic acid, ascorbic acid and sulfurous acid; (b) a proton donor substance which is an acid, (c) a disaccharide, and (d) a chelating agent for a period of time to infuse said solution into said fruits or vegetables and to remove at least some of the monosaccharide content therefrom and then drying said fruits or vegetables at a reduced pressure and an elevated temperature to a water content of less than about 10 percent by weight and to allow the other components of the infusion solution to remain within the dried fruits or vegetables, decreasing the temperature of said pieces to less than 40° C. and then releasing the pressure to produce a fruit or vegetable piece which retains its natural color and has a tender puffed consistency.

4,948,610

**PROCEDURE FOR THE PRODUCTION OF COOKED HAM**

Luigi Goglio, via Solari 10, Milan, Italy

Filed Mar. 2, 1989, Ser. No. 317,848

Claims priority, application Italy, Mar. 10, 1988, 19723 A/88

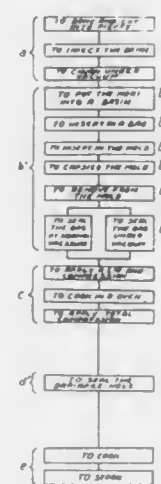
Int. Cl.<sup>5</sup> A23B 4/005; A23L 3/02

U.S. Cl. 426—392

2 Claims

1. A process for the production of high quality cooked ham comprising, after the injection of the brine in the meat and before cooling in the cooling cell and storage of the cooked ham, the steps of:
- a. churning the meat under vacuum;
  - b. placing the meat in a collecting basin;
  - c. insertion of a packaging bag provided, on one side, with a discharge hole to which a drainage valve is applied, with the open mouth of said bag directed downward;
  - d. insertion of a mold over the closed end of said bag, with the opening of said mold pointing downward;
  - e. overturning of the assembly formed by said basin, bag and mold by a rotation of 180°;
  - f. removal of said basin from said bag;

- g. sealing of the mouth of said bag;
- h. application of a pressing cover on said mold containing the meat, cooking in the oven, and finally compressing the meat to compensate for its reduction in volume due to cooking; and



- i. application of a steam jet at the zone around said drain hole to clean and sterilize said bag and ham, and closing by heat sealing of said drain hole in the wall of said packaging bag at the point of said drainage valve.

4,948,611

**METHOD FOR DIVIDING AND CUTTING DOUGH AND THE LIKE**

Donald L. Cummins, Mechanicsville, Va., assignor to Automated Machinery Systems, Inc., Richmond, Va.

Filed Jun. 19, 1989, Ser. No. 367,618

Int. Cl.<sup>5</sup> A21D 6/00

U.S. Cl. 426—503

10 Claims



1. A method for dividing a mass of material similar to dough into pieces of uniform weight comprising the steps of: continuously moving a stream of said material of uniform density under pressure from said mass through an extruder nozzle having an outlet rim in a common plane; cutting said extruded material into pieces having a volume of uniform weight by a cutter that moves across said outlet rim in a straight line; moving said freshly cut pieces rapidly away from said outlet rim to a conveyor to permit the next piece of material to be cut-off without interference from either the piece previously cut-off or the cutter; and moving the cutter away from and across said outlet rim to a dwell position where it slows its movement to permit the next piece to be extruded before being cut-off.

4,948,612

**CONTINUOUS PRODUCTION OF COOKIE-LIKE PRODUCT**

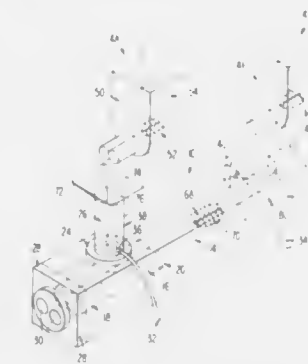
Lewis C. Keller, North Richland Hills, and Richard B. Reed, Lewisville, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Mar. 9, 1989, Ser. No. 321,272

Int. Cl.<sup>5</sup> A21D 8/00; A23P 1/00

U.S. Cl. 426—549

17 Claims



1. A method of forming a food product having cookie-like characteristics, which method comprises:
- (a) plasticizing a crystallizable sugar;
  - (b) blending the plasticized crystallizable sugar with shortening and flour to form an extrudable blend containing about 15% by weight moisture or less; and
  - (c) extruding said blend to form a food product having cookie-like characteristics.

4,948,613

**MANUFACTURING PROCESS FOR PROCESSED CHEESES WITH AN ORIGINAL TEXTURE AND PROCESSED CHEESE OBTAINED BY THIS PROCEDURE**

Jean-Yves Bernard, Lons Le Saulnier, and Jacques Daurelles, Voiteur, both of France, assignors to Fromageries Bel, Paris, France

Filed Feb. 16, 1988, Ser. No. 156,143

Claims priority, application France, Feb. 13, 1987, 87 01879

Int. Cl.<sup>5</sup> A23C 19/09

U.S. Cl. 426—564

7 Claims

1. Process for the manufacture of a processed cheese or a processed cheese specialty with a soft texture and possessing holes in the cheese which are at least 0.5 mm in diameter, comprising beating a processed cheese at a temperature between 70° C. and 95° C. and at a pressure of 2 to 5 × 10<sup>5</sup> Pa in the presence of an inert gas so as to cause the cheese to swell such that the ratio of the density of the whipped cheese to the unwhipped cheese is about 0.7 to about 0.8, then subjecting the whipped cheese so obtained to a partial reduction in volume while still at a temperature between 70° C. and 95° C. for a period of from 2 to 5 minutes and then cooling the product obtained at a temperature not more than about 20° C. thereby to freeze the product.

4,948,614

**FROZEN NON-DAIRY DESSERT**

David Feldpausch, 737-11 Woodside La. East, Sacramento, Calif. 95825

Filed Jan. 17, 1989, Ser. No. 297,036

Int. Cl.<sup>5</sup> A23G 9/02

U.S. Cl. 426—565

16 Claims

1. The process of making a frozen dessert which consists essentially of the steps of:
- a. peeling at least one ripe banana;
  - b. quick freezing the ripe banana(s);

- c. masticating the frozen banana(s) to form a pudding;
- d. aerating the masticated frozen banana(s) to entrain air and achieve a significant overrun.

4,948,615

**EXTRUDED GELLED PRODUCTS**

James P. Zallie, Hillsborough; James J. Kasica, Whitehouse Station, and James Eden, East Millstone, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Continuation-in-part of Ser. No. 167,059, Mar. 11, 1988, abandoned. This application Mar. 27, 1989, Ser. No. 329,219

Int. Cl.<sup>5</sup> A23L 1/0522

U.S. Cl. 426—578

20 Claims

1. A process for the manufacture of a gelled product in a cooker extruder comprising the steps of:

- (a) mixing about 10 to 18%, on dry solids basis, of a spray-dried, pregelatinized high amylose starch having an amylose content of at least about 40% amylose, about 70 to 90% of a sweetener, and water present in a total amount of 0 to about 20%, the percentages being by weight and totaling 100%; wherein the spray-dried, pregelatinized high amylose starch comprises (i) a uniformly gelatinized granular starch in the form of indented spheres, with at least a majority of the granules being whole and unbroken, the starch granules being in the form of loosely-bound agglomerates or individual granules, (ii) a fully dispersed, non-granular starch which is substantially non-crystalline and substantially non-retrograded, and (iii) mixtures thereof;
- (b) heating the mixture to about 93° C. (200° F.) to provide a flowable mixture;
- (c) introducing the hot mixture into a cooker extruder and heating at about 93°–149° C. (200°–300° F.) for a time sufficient to fully disperse the starch; and
- (d) extruding the mixture as a firm gel.

4,948,616

**SWEETENED CONDENSED MILK LIKE COMPOSITION AND A METHOD FOR PRODUCING IT**

Yoshio Iijima, Yokohama; Ryohel Yamabe, Tokorozawa; Masahiro Nakatsukasa, Urawa, and Hiroko Ogiwara, Gyoda, all of Japan, assignors to Lotte Company Limited, Tokyo, Japan

Filed May 2, 1989, Ser. No. 347,385

Int. Cl.<sup>5</sup> A23C 9/00

U.S. Cl. 426—587

7 Claims

1. A sweetened condensed milk composition comprising milk of reduced water content in solution with palatinose and palatinose syrup wherein said palatinose and palatinose syrup are present in a final solid weight ratio less than about 2:1.

4,948,617

**LOW CHOLESTEROL MAYONNAISE SUBSTITUTE AND PROCESS FOR ITS PREPARATION**

Clemence K. Dartey, Oakland; Thomas M. Trainor, Sparta, both of N.J., and Richard Evans, South Norwalk, Conn., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Nov. 23, 1988, Ser. No. 275,285

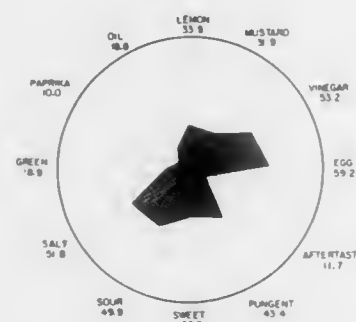
Int. Cl.<sup>5</sup> A23D 7/00

U.S. Cl. 426—602

31 Claims

1. A low cholesterol mayonnaise substitute consisting essentially of:
- a. water;
  - b. an edible oil, wherein said edible oil constitutes greater than 70% but less than 85% by weight of said low cholesterol mayonnaise substitute;
  - c. a food grade acidulant; and a texturization and emulsification system comprising:
- (i) an egg white material incapable of emulsifying said water and said edible oil by itself at oil levels of greater

than 70% but less than 85% by weight of said low cholesterol mayonnaise substitute;  
(ii) a non-proteinaceous food grade emulsifier with an HLB of 10-18; and



(iii) at least one edible gum, said texturization and emulsification system being present in an amount sufficient to hold said water, said edible oil, and said food grade acidulant in a substantially stable oil-in-water emulsion having the properties of real mayonnaise.

4,948,618

#### PROCESS FOR TEMPERING EDIBLE PLASTIC FAT PRODUCTS

Norio Hirokawa, Akashi; Satoshi Imai, Kobe, and Hisashi Morikawa, Kakogawa, all of Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 104,559, Sep. 30, 1987, abandoned, which is a continuation of Ser. No. 833,262, Feb. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 667,831, Nov. 2, 1984, abandoned. This application Sep. 6, 1989, Ser. No. 403,782

Claims priority, application Japan, Nov. 14, 1983, 58-214642  
Int. Cl.<sup>5</sup> A23D 7/02, 9/02

U.S. Cl. 426—603 10 Claims

1. A process for aging an edible plastic fat product, consisting essentially of crystallizing a starting fat product with cooling to obtain a crystallized fat product, and subjecting the crystallized fat product to a pressurizing treatment at a temperature of 10° to 45° C. and a pressure of 5 kg/cm<sup>2</sup>-G or more.

4,948,619

#### NATURAL ANTIOXIDANT SYSTEM FOR CEREALS

Richard L. Antrim, and James B. Taylor, both of Sparta, N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.  
Filed Apr. 25, 1989, Ser. No. 342,880

Int. Cl.<sup>5</sup> A23B 9/00

U.S. Cl. 426—610 27 Claims

1. Process for increasing the shelf life of baked shredded wheat, comprising:

- (a) treating the baked shredded wheat with a sufficient amount of a potable, anhydrous, oleophilic solvent to at least wet the regions below the surface of the baked shredded wheat, the solvent being liquid at room temperature and atmospheric pressure; and
- (b) evaporating the solvent from the shredded wheat, whereby the rate of the rancidification of the oil in the shredded wheat is significantly decreased.

4,948,620

#### PROCESS FOR THE MANUFACTURE OF REFORMED FISH PRODUCTS

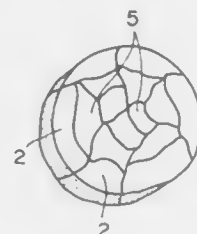
Noël Clairouin, Cordette; Alain Gueroult, Goincourt, both of France, and Remi Lemoyne, Vevey, Switzerland, assignors to Nestec S. A., Vevey, Switzerland  
Filed Aug. 29, 1989, Ser. No. 399,817

Claims priority, application European Pat. Off., Sep. 14, 1988, 88114994.2

Int. Cl.<sup>5</sup> A23L 1/325

U.S. Cl. 426—643

8 Claims



1. A process for the production of a reformed fish product which comprises:

- arranging and then compressing into an enclosing casing, which has an open end and a closed end and an inner and outer surface, a plurality of raw boneless fish fillets with skin and a plurality of raw boneless fish fillets without skin such that the fillets with skin encompass the fillets without skin and such that the skin of the fillets with skin faces the casing and covers substantially the entire inner surface of the casing;
- closing the open end of the casing; and then freezing the fillets in the casing.

4,948,621

#### COMPOSITION FOR TREATMENT MEAT

Barry Schwartz, Yardley, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed May 12, 1989, Ser. No. 350,861

Int. Cl.<sup>5</sup> A23B 4/02

U.S. Cl. 426—652

11 Claims

1. Composition suitable for preparing a clear, aqueous polyphosphate solution comprising, 8 to 15 parts by weight long-chain glassy phosphate having a degree of polymerization of about 20 to 30, an average mole ratio of (Na<sub>2</sub>O+H<sub>2</sub>O)/P<sub>2</sub>O<sub>5</sub> between about 1.067 and 1.1, and 92 and 85 parts by weight sodium tripolyphosphate, said composition forming a stable, clear solution when dissolved into an aqueous solution suitable for injecting into meat products.

4,948,622

#### METHOD FOR THE PREPARATION OF COATED SOLID MEDICAMENT FORM

Hiroyasu Kokubo; Hiroaki Muto, and Tohru Chiba, all of Niigata, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

PCT No. PCT/JP88/00483, § 371 Date Jun. 9, 1988, § 102(e) Date Jun. 9, 1988, PCT Pub. No. WO89/05635, PCT Pub. Date Jun. 29, 1989

PCT Filed May 23, 1988, Ser. No. 224,772

Claims priority, application Japan, Dec. 23, 1987, 62-326589  
Int. Cl.<sup>5</sup> A61K 9/00

U.S. Cl. 427—3

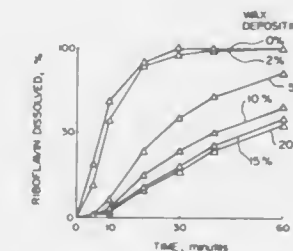
5 Claims

1. A method for the preparation of a coated solid medicament form which comprises the steps of:

- (a) coating a solid medicament form by using a coating liquid which is an aqueous dispersion of a powder of a cellulose

ether, which is insoluble in hot water but soluble in cold water, in hot water; and

- (c) chemically depositing an oxygen masking layer and patterning it with openings; and
- (d) selectively implanting oxygen ions with energies in a



(b) subjecting the coated solid medicament form obtained in the step (a) to a heat treatment in the presence of a wax.

4,948,623

#### METHOD OF CHEMICAL VAPOR DEPOSITION OF COPPER, SILVER, AND GOLD USING A CYCLOPENTADIENYL/METAL COMPLEX

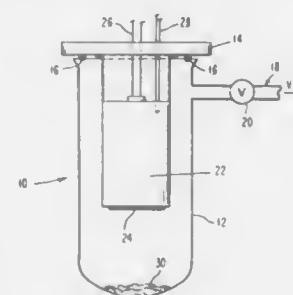
David B. Beach, Yorktown Hgts., and Joseph M. Jasinski, Pleasantville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 313,333, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 251,967, Sep. 27, 1988, abandoned, which is a continuation of Ser. No. 68,695, Jun. 30, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 415,452

Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—35

41 Claims



1. A method for depositing a group IB metal, said method including the step of decomposing onto a substrate a vapor of a precursor comprising a cyclopentadienyl ring, a 2 electron donor ligand selected from the group consisting of trivalent phosphines, amines, and arsines, and said group IB metal which is present in said precursor in a +1 oxidation state.

4,948,624

#### ETCH RESISTANT OXIDE MASK FORMED BY LOW TEMPERATURE AND LOW ENERGY OXYGEN IMPLANTATION

Lydia Rivaud, Rochester, and Gilbert Hawkins, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 191,525, May 9, 1988, abandoned. This application Apr. 12, 1989, Ser. No. 336,994

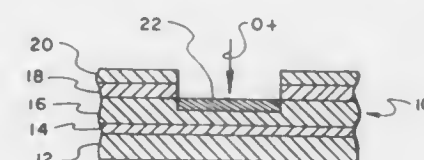
Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—38

1 Claim

1. A method of forming an etch resistant oxide mask in polysilicon comprising the steps of:

- (a) forming an oxide gate layer on a silicon substrate;
- (b) depositing a conductive etchable polysilicon layer on the oxide gate layer;



range between 0.1 and 35 keV through the opening into the polysilicon and at a temperature below 600° C. selected so that an oxide mask is formed on the surface of the polysilicon.

4,948,625

#### METHOD FOR FORMING SURFACE LAYER BY ELECTRIC DISCHARGE PROCESS

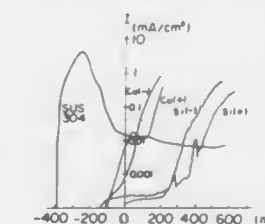
Masahiko Suzuki, 660-33, Yagotohizaka, Tempaku-ku Nagoya-shi, Aichi-ken; Nagao Saito, Tokyo; Naotake Mohri, 3837-3, Shimadakuroishi Tempaku-cho, Tempaku-ku Nagoya-shi, Aichi-ken; Hideaki Takahashi, and Tetsuo Shoji, both of Sendai, all of Japan, assignors to Masahiko Suzuki, Izumi; Mitsubishi Denki Kabushiki Kaisha, Tokyo and Naotake Mohri, Nagoya, all of Japan

Continuation of Ser. No. 233,822, Aug. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 887,939, Jul. 22, 1986, abandoned. This application Nov. 27, 1989, Ser. No. 441,220

Claims priority, application Japan, Jul. 22, 1985, 60-161566  
Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—37

11 Claims



1. A method for forming a surface layer on a base material, said method being characterized in that an electric discharge process is conducted in a process liquid not becoming part of the surface layer by the use of silicon, germanium, bismuth or zirconium as a positive electrode for said electric discharge process wherein a multitude of very fine electrical discharges takes place simultaneously on the entire surface of the electrode, electrode material having low heat conductivity being sputtered onto the surface of the base material and the base material being abruptly heated and cooled to thereby form on the surface of said base material a layer having an amorphous alloy structure or a very fine crystal structure.

4,948,626

#### METHOD FOR PRODUCING THIN-FILM MAGNETIC RECORDING MEDIUM

Tadashi Yasunaga; Koji Sasazawa, and Akio Yanai, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 2, 1989, Ser. No. 305,050

Claims priority, application Japan, Feb. 17, 1988, 63-32800  
Int. Cl.<sup>5</sup> H01F 10/02

U.S. Cl. 427—38

8 Claims

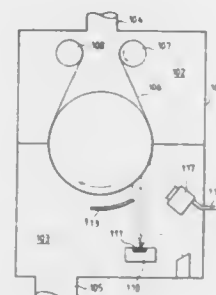
1. In a method for producing a thin-film magnetic recording medium in which a magnetic material vapor flow evaporated



from an evaporation source and a gas flow or an ion flow are applied to a nonmagnetic base in an evaporation chamber and those two flows react with each other to form a thin-film magnetic layer on said nonmagnetic base, the improvement wherein the expression

$$P_1/P_0 \leq 0.1$$

is satisfied, wherein  $P_0$  represents a degree of vacuum in said



evaporation chamber in a first condition where only said gas flow or said ion flow is applied to said nonmagnetic base after the pressure in said evaporation chamber has been reduced to a predetermined degree of vacuum and  $P_1$  represents a degree of vacuum in said evaporation chamber in a second condition where said magnetic material vapor flow is applied to said nonmagnetic base while said gas flow or said ion flow continues to be applied to said nonmagnetic base after said first condition has been established, and wherein a rate of forming said thin-film magnetic layer is 200 Å/sec or more on average.

4,948,627

## PROCESS FOR PRODUCING GLASS MOLD

Chiemi Hata, Akishima; Shinichiro Hirota, Hachioji, and Hiroyuki Sawada, Akishima, all of Japan, assignors to Hoya Corporation, Tokyo, Japan

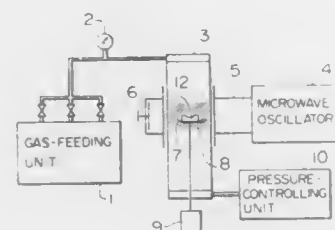
Filed May 18, 1989, Ser. No. 353,546

Claims priority, application Japan, May 31, 1988, 63-133930

Int. Cl.<sup>5</sup> B05D 3/06

U.S. Cl. 427—38

10 Claims



1. A process for producing a glass mold, which comprises forming, on a glass mold base having a shape corresponding to that of a glass article to be produced by press molding, a thin film consisting of diamond crystallites, graphite crystallites and amorphous carbon and having a maximum surface roughness of 200 Å or below, by a plasma CVD method or a thermal CVD method using a mixed gas comprising an organic gas and hydrogen gas, the concentration of the organic gas in the mixed gas being at least 3 mole %.

4,948,628

## METHOD FOR PLASMA TREATMENT OF SMALL DIAMETER TUBES

David B. Montgomery, and Joel L. Williams, both of Cary, N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

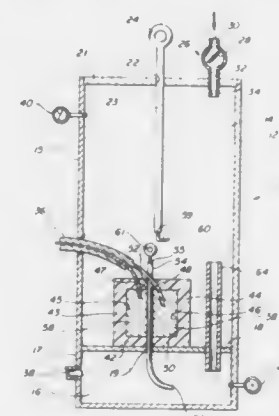
Division of Ser. No. 214,244, Jul. 1, 1988, Pat. No. 4,846,101.

This application Apr. 10, 1989, Ser. No. 335,476

Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 427—39

3 Claims



1. A method for treating a luminal wall of a tube with a plasma comprising:

- (a) positioning a tube in a plasma zone adjacent a plurality of electrodes, said electrodes being encased in a dielectric in a housing enclosing two chambers separated by a diaphragm and connected by a conduit;
- (b) evacuating a first of said chambers;
- (c) bleeding a gas into a second of said chambers, said gas contacting a luminal wall of said tube;
- (d) regulating a pressure differential between the proximal and distal ends of said tube with said conduit; and
- (e) delivering radiofrequency power to said electrodes, said power developing an electromagnetic field, said field ionizing said gas in contact with said luminal wall, said ionizing causing a plasma, said plasma treating said luminal wall.

4,948,629

## DEPOSITION OF DIAMOND FILMS

Nigel P. Hacker, Morgan Hill, and George W. Tyndall, III, Los Gatos, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 10, 1989, Ser. No. 309,521

Int. Cl.<sup>5</sup> B05D 3/06; B01J 3/06

U.S. Cl. 427—53.1

8 Claims

1. A process for depositing a diamond film on a substrate said process comprising the steps of:

- (a) confining in an enclosed space which includes a substrate at a temperature below 400° C., the vapor of a compound which is aliphatic carboxylic acid or an aromatic carboxylic anhydride; and
- (b) irradiating said vapor with a high powered, pulsed laser which strikes the substrate thereby depositing a diamond film on the substrate at the places struck by the laser radiation.

4,948,630

## THREE STEP PROCESS FOR TREATING PLASTICS WITH ALKALINE PERMANGANATE SOLUTIONS

Constantine I. Courduvelis, Orange, and Anthony E. DelGobbo, Watertown, both of Conn., assignors to Enthone, Inc., West Haven, Conn.

Division of Ser. No. 173,068, Mar. 25, 1988, Pat. No. 4,820,548,

which is a division of Ser. No. 860,100, May 6, 1986, abandoned,

which is a division of Ser. No. 614,912, May 29, 1984,

abandoned, which is a division of Ser. No. 791,804, Oct. 28,

1985, Pat. No. 4,629,436, which is a division of Ser. No. 618,281,

Jun. 7, 1984, Pat. No. 4,592,852. This application Mar. 14, 1989,

Ser. No. 313,587

Int. Cl.<sup>5</sup> C23C 3/02

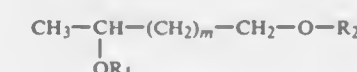
U.S. Cl. 427—98

45 Claims

1. A process for treating plastics to improve the adhesion of electroless metal plating comprising the steps of:

- (a) contacting the plastic with a solvent composition comprising:

- (i) a compound represented by the general formula



wherein  $\text{R}_1$  and  $\text{R}_2$  are independently selected from the group consisting of hydrogen atoms, aryl groups and alkyl groups of 1-4 carbon atoms and  $m$  is 0 to 2; and

- (ii) a compound represented by the general formula



wherein  $\text{R}_3$  and  $\text{R}_4$  are independently selected from the group consisting of aryl groups and alkyl groups of 1-4 carbon atoms and  $n$  is 2 to 5; the composition comprising, by weight, about 10 g/l to saturation compound (i) and about 10 g/l to saturation compound (ii);

- (b) thereafter etching the solvent treated plastic with an alkaline permanganate solution for an effective time at an elevated temperature to improve said adhesion, said solution including a secondary oxidant capable of oxidizing manganate ion to permanganate ion; and
- (c) controlling in said alkaline permanganate solution, at desired intervals, the ratio of permanganate ion concentration to the sum of the permanganate and manganate ion concentration at a level about 0.5 by adding, as needed, an effective amount of the secondary oxidant to the solution.

4,948,631

## PREPARATION OF PARTICULARLY BLuish PEARL LUSTER PIGMENTS

Werner Ostertag, Gruenstadt; Norbert Mrona, Dossenheim, and Ulrich Graessle, Boehr-Iggelheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 9, 1989, Ser. No. 321,109

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808070

Int. Cl.<sup>5</sup> B05D 7/00

U.S. Cl. 427—208

4 Claims

1. A process for preparing a particularly bluish pearl luster pigment by reduction of a titanium dioxide coated mica pigment with ammonia at elevated temperatures, which comprises using a mica pigment whose  $\text{TiO}_2$  coating has an optical layer thickness of from 50 to 100 nm or from 300 to 340 nm, performing the treatment with ammonia at from 750 to 850° C., and keeping the pigment in constant agitation during the reduction.

4,948,632

## ALKYLtinFLUORIDE COMPOSITION FOR DEPOSITION OF TIN OXIDE FILMS

J. Shannon Breininger, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 21, 1985, Ser. No. 736,605

Int. Cl.<sup>5</sup> C23C 16/00; C08L 95/00; C09D 3/24

U.S. Cl. 427—255

4 Claims

1. In a method of forming a metal-containing film on a surface of a substrate by contacting said surface with a dialkyltin difluoride coating reactant at a temperature sufficient to thermally decompose said coating reactant to form a metal-containing film on said surface, the improvement which comprises selecting a composition of said dialkyltin difluoride coating reactant on the basis of a decomposition temperature which is high relative to other compositions for use in said method.

3. A method for selecting a composition of dialkyltin difluoride coating reactant having optimum thermal properties for use in a method of forming a metal-containing coating on a surface of a substrate by contacting said surface with said reactant at a temperature sufficient to thermally decompose said reactant comprising the steps of:

- a. obtaining various batches of said dialkyltin difluoride coating reactant;
- b. thermally analyzing each of said batches of coating reactant to determine its decomposition temperature; and
- c. selecting at least one batch of said reactant which has a higher thermal decomposition temperature than nonselected batches.

4,948,633

## METHOD FOR PAINTING AN ARTICLE

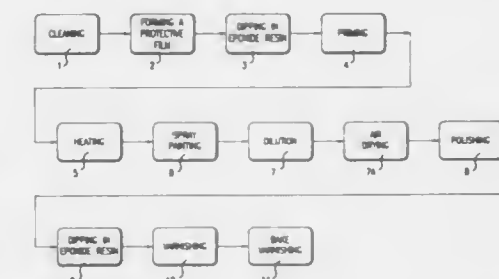
Mu-Lin Wu, No. 6, Lane 411, Gan-Chu Rd., Ho-Mei Chen, Chang-Hua Hsien, Taiwan

Filed Aug. 23, 1989, Ser. No. 397,286

Int. Cl.<sup>5</sup> B05D 3/00; 3/02, 5/00

U.S. Cl. 427—262

5 Claims



1. A method for painting a surface of an article comprising the steps of dipping said article in a mixture of varnish and silicone rubber so as to form a protective film on said surface thereof; and priming, painting and bake varnishing said protective film; wherein the improvement comprises, after priming said protective film, spray painting said article so as to form a plurality of paint flecks thereon; applying a solvent on said article to dilute said paint flecks to form a plurality of patterns; and air-drying said article.

4,948,634

**PROCESS FOR TROUBLEFREE COATING OF HYDROPHOBIC MATERIALS WITH POLYURETHANES**  
Walther Cohnen, Cologne; Alexander Riebel, Leverkusen, and Karl W. Schranz, Odenthal-Hahnenberg, all of Fed. Rep. of Germany, assignors to Miles Inc., Elkhart, Ind.

Filed May 23, 1989, Ser. No. 355,920  
Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818162

Int. Cl.<sup>5</sup> B05D 3/00

U.S. Cl. 427—302

2 Claims

1. Process for troublefree coating of hydrophobic supports with hydrophobic polyurethanes from organic solvents, characterized in that the support is pre-treated with an alcohol/acetone solution of polystyrene sulphonate before coating.

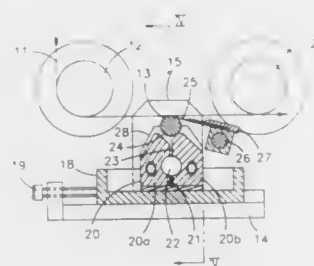
4,948,635

**GRAVURE COATING DEVICE AND METHOD**  
Takashi Iwasaki, Samukawa, Japan, assignor to Yasui Seiki Co., Ltd., Tokyo, Japan  
Continuation-in-part of Ser. No. 895,304, Aug. 11, 1986, Pat. No. 4,791,881. This application Dec. 16, 1988, Ser. No. 285,831  
Claims priority, application Japan, Sep. 6, 1985, 136404  
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B05C 1/08

U.S. Cl. 427—345

15 Claims



15. A method for applying coating material to a traveling continuous web to produce a smooth unrippled surface coating of relative maximum thickness on a web first side, comprising:

- advancing said web in extended generally linear disposition past a gravure roll having a diameter of from about 20 to about 50 millimeters and an engraved surface pattern;
- tangentially contacting said first side of said web with said gravure roll engraved surface pattern while said continuous web is generally linear and tangent to said gravure roll, with gravure roll-web contact providing sole contact with said web proximate said gravure roll;
- providing said coating material to said gravure roll while controlling amount of coating material on said gravure roll prior to transfer of coating material from said gravure roll to said traveling continuous web via gravure roll-web contact; and
- varying speed of rotation of said gravure roll to maintain relative velocity between said web and said gravure roll at about 2.0 by increasing speed of said gravure roll when said relative velocity is less than 2.0 and decreasing speed of said gravure roll when said relative velocity is greater than 2.0.

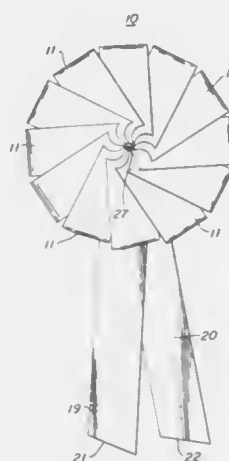
**DECORATIVE BOW AND METHOD OF MAKING THE SAME**

Jeffrey Lyons, Aldan, Pa., assignor to Delaware Ribbon Manufacturers, Inc., Philadelphia, Pa.

Filed Oct. 13, 1989, Ser. No. 421,185

Int. Cl.<sup>5</sup> D04D 7/10

2 Claims



1. A decorative bow having a tail which comprises at least one loop of ribbon of at least one layer having successive loops wrapped around it, said loops having cut outs at the center to form a bridge with the cut outs on each side thereof, said bridge is fastened to a card, and said last loop is not wrapped but cut at its end to form an integral tail having at least one leg.

4,948,637

**RUB RAIL END CAPS**

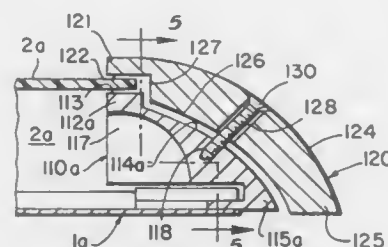
Gerald Kessler, 302 McClurg Rd., P.O. Box 389, Youngstown, Ohio 44512

Filed Aug. 4, 1989, Ser. No. 389,648

Int. Cl.<sup>5</sup> E04F 19/02; B60J 11/00

U.S. Cl. 428—31

8 Claims

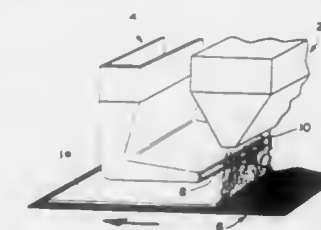


1. An end cap adapted to decoratively secure the terminal end of a laterally arcuate decorative trim strip to a surface-mounted channel strip, said trim strip being of the type having a first inner surface facing said channel strip and a second oppositely facing outer surface, said end cap comprising:

- a first body member having a generally quarter-spherical outer surface, said first body member being securely attachable to said channel strip and including an arcuate abutment surface for engagement with said trim strip first surface,
- a second body member having an inner surface configured for receiving the outer surface of said first body member in close spaced relationship therewith, said second body member having an arcuate squeezing surface adapted to

overlay the arcuate abutment surface of said first body member, for capturing and securing the terminal end of said decorative trim strip, said first and second body members each carrying cooperating means for diminishing the spacing between said inner surface of said second body member and the outer surface of said first body member, whereby as said spacing between the first and second body members is diminished, the terminal end of said trim strip is squeezed between said abutment surface and said squeezing surface, and is securely retained in a predesired position relative to the channel strip.

up to about 35%, by weight, based on the weight of the nonwoven material, of unblocked active particles, ranging



in size from about 50 to about 150 microns, adhered to the surface of said fibers and distributed throughout said web.

4,948,638

**PLASTIC FILM CONSTRUCTION**

Michael A. Francis, Mechanicsville, Va., assignor to Tredegar Industries, Inc., Richmond, Va.

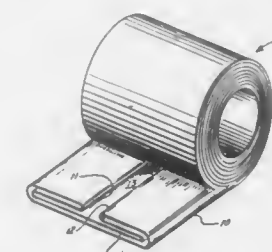
Continuation of Ser. No. 240,071, Sep. 2, 1988, which is a division of Ser. No. 946,938, Dec. 29, 1986, Pat. No. 4,795,415, which is a division of Ser. No. 735,655, May 20, 1985, Pat. No. 4,674,999, which is a continuation of Ser. No. 423,955, Sep. 27, 1982, abandoned. This application Aug. 24, 1989, Ser. No. 398,059

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 31/02

U.S. Cl. 428—35.2

3 Claims



1. A roll of greenhouse film comprised of large tubular plastic sheet having flattened longitudinal edges at least two plies in thickness, such edges being folded over about 180° toward an imaginary line drawn longitudinally along the upper median portion of such sheet such that there are at least four plies on each side of the imaginary line, the so-folded tubular plastic sheet being longitudinally rolled over the imaginary line into a cylindrically shaped object or roll.

4,948,639

**VACUUM CLEANER BAG**

Ronald W. Brooker, Atlanta, and Bernard Cohen, Duluth, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 241,682, Sep. 7, 1988, which is a division of Ser. No. 892,529, Jul. 31, 1986, Pat. No. 4,797,318. This application Nov. 13, 1989, Ser. No. 435,301

Int. Cl.<sup>5</sup> B65D 30/04; D04H 1/58

U.S. Cl. 428—35.2

17 Claims

1. A vacuum cleaner bag, formed from a substantially non-dusting nonwoven material, said material comprising:

- a web of meltblown fibers having a diameter of from less than about 1 micron to about 25 microns, said fibers comprising a blend of a polyolefin and from about 5% to about 30%, by weight, of an adhesive polymer selected from the group consisting of polybutylene and polyethylene acrylic acid; and

4,948,640

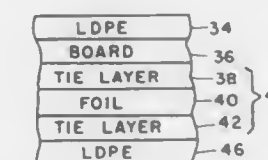
**COMPOSITE POLYETHYLENE BARRIER STRUCTURE**  
Charles E. Gibbons; Robert L. Lanham; Joe L. Kinsey, and Allan A. Whillock, all of Mobile, Ala., assignors to International Paper Company, Tuxedo Park, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,494

Int. Cl.<sup>5</sup> B65D 5/56; B32B 23/08

U.S. Cl. 428—34.9

8 Claims



1. A container for liquids containing essential oils and/or flavors, said container constructed from a laminate comprising:

- a paperboard substrate;
- a 0.18 mil outer layer of a heat-sealable low density polyethylene polymer coated on said outer surface of said paperboard substrate;
- an inner sandwich layer comprising a 4.5 lb. per 3000 square foot tie layer, a 0.000285 inch layer of aluminum foil and a 4.5 lb. per 3000 square foot tie layer applied on said inner surface of said paperboard substrate; and
- a product-contact layer of a 0.5 mil heat-sealable low density polyethylene polymer extruded on said inner surface of said inner sandwich layer of tie layer-foil-tie layer whereby said laminate has been heat-sealed on conventional equipment at temperatures ranging from 250° F.—500° F., creating a non-polar homogeneous heat-seal.

4,948,641

**MULTIPLE LAYER CONTAINER FOR STORAGE OF HIGH PURITY CHEMICALS**

David J. Shantz, Woodbury, Conn.; Thomas A. Armer, Westborough, Mass., and David V. Olson, Cromwell, Conn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 362,637, May 23, 1989, which is a continuation-in-part of Ser. No. 56,204, Jun. 1, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 448,454

Int. Cl.<sup>5</sup> B65D 23/00; B32B 27/08

U.S. Cl. 428—35.7

6 Claims

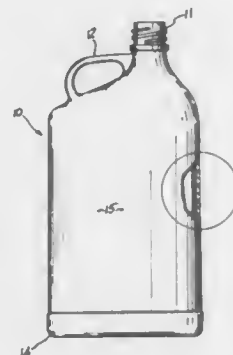
1. A hollow multiple-layered container providing an effective liquid and vapor barrier for the storage of high purity and highly reactive chemicals, said container having a top portion for filling and emptying and adapted to receive a closure means and a base portion upon which the container stands, said container comprising in combination:

- a first inner chemical resistant and non-contaminating layer fabricated of a fluoropolymer, said first layer being



impermeable to said high purity and highly reactive chemicals;

- (b) a second outer layer selected from the group consisting of polypropylene, polyethylene, polycarbonate, polyarylate, and polysulfone, said second layer being a structurally reinforcing layer for said bottle; and
- (c) a third layer being a tie-layer sandwiched between and



bonding said first layer and said second layer, said third layer being a polymer blend comprising polyethylene-vinyl acetate and a copolymer of styrene-ethylene-butadiene-styrene or styrene-butadiene-styrene, said blend containing a weight ratio of polyethylene-vinyl acetate to copolymer of between about 10:90 and about 90:10 based upon the total weight of EVA, SEBS, and SBS in the blend.

4,948,642

#### MULTIPLE LAYER CONTAINER FOR STORAGE OF HIGH PURITY CHEMICALS

David J. Shantz, Woodbury, Conn.; Thomas A. Armer, Westborough, Mass., and David V. Olson, Cromwell, Conn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 56,204, Jun. 1, 1987, abandoned. This application May 23, 1989, Ser. No. 362,637 Int. Cl.<sup>5</sup> B65D 23/00; B32B 27/08

U.S. Cl. 428—35.7

6 Claims



1. A hollow multiple-layered container providing an effective liquid and vapor barrier for the storage of high purity and highly reactive chemicals, said container having a top portion for filling and emptying and adapted to receive a closure means and a base portion upon which the container stands, said container comprising in combination:

- (a) a first inner chemical resistant and non-contaminating layer fabricated of a fluoropolymer, said first layer being impermeable to said high purity and highly reactive chemicals;
- (b) a second outer layer selected from the group consisting

of polypropylene, polyethylene, polycarbonate, polyarylate, and polysulfone, said second layer being a structurally reinforcing layer for said bottle; and

(c) a third layer being a tie-layer sandwiched between and bonding said first layer and said second layer, said third layer being a polymer blend comprising a fluoropolymer and a copolymer of styrene-ethylene-butadiene-styrene or styrene-butadiene-styrene, said blend containing a weight ratio of fluoropolymer to copolymer of between about 10:90 and about 90:10 based upon the total weight of fluoropolymer, SEBS, and SBS in the blend.

4,948,643

#### FLEXIBLE MEDICAL SOLUTION TUBING

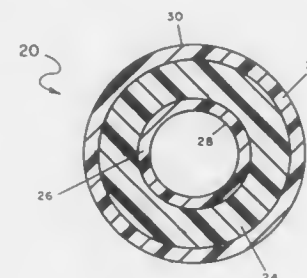
Walter B. Mueller, Inman, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation-in-part of Ser. No. 299,996, Jan. 23, 1989, abandoned. This application Apr. 21, 1989, Ser. No. 341,991

Int. Cl.<sup>5</sup> F16L 11/04

U.S. Cl. 428—36.6

5 Claims



1. A polymeric tubing useful for medical applications comprising:

- (a) an intermediate layer comprising a polymeric material selected from the group consisting of very low density polyethylene, ethylene vinyl acetate copolymer, ethylene methyl acrylate copolymer, modified ethylene methyl acrylate copolymer, polyvinyl chloride, a blend of ethylene vinyl acetate copolymer and modified ethylene methyl acrylate copolymer, a blend of very low density polyethylene and modified ethylene methyl acrylate copolymer, a blend of ethylene vinyl acetate copolymer and very low density polyethylene, and modified ethylene vinyl acetate copolymer;
- (b) an inner layer, bonded to an inner surface of the intermediate layer, and comprising a polymeric material selected from the group consisting of copolyester, polypropylene, ethylene propylene copolymer, polyurethane, polyvinyl chloride, and a blend of copolyester and ethylene vinyl acetate copolymer; and
- (c) an outer layer, bonded to an outer surface of the intermediate layer, and comprising a polymeric material selected from the group consisting of polypropylene, ethylene propylene copolymer, and modified ethylene propylene copolymer.

4,948,644

#### APPARATUS FOR MAKING A RESIN COMPOSITE PANEL

Jerry M. Wolf, Westerville, Ohio, assignor to Midwest Acoust-A-Fiber, Inc., Delaware, Ohio

Division of Ser. No. 267,281, Nov. 4, 1988, Pat. No. 4,877,476. This application Aug. 14, 1989, Ser. No. 393,419

Int. Cl.<sup>5</sup> B32B 27/00

U.S. Cl. 428—40

3 Claims

1. A molded resin-fiberglass article having at least one surface which is substantially non-porous, comprising:

a base layer of a resin impregnated fiberglass batt, said batt

including an upper surface, a lower surface and side surfaces, a zone adjacent the upper surface of the batt having a melted polymer incorporated therein and bonded to the



fibers of the fiberglass batt to form a non-porous upper surface;

an adhesive layer bonded to both the non-porous surface and to one of (1) a release sheet and (2) a substrate.

4,948,645

#### TAPE AUTOMATED BONDING AND METHOD OF MAKING THE SAME

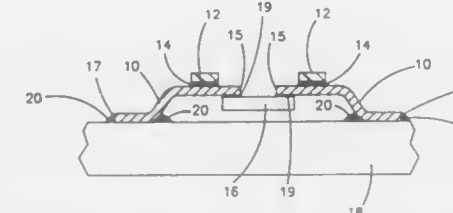
Steven T. Holzinger, Tempe, and Larry W. Barker, Chandler, both of Ariz., assignors to Rogers Corporation, Rogers, Conn.

Filed Aug. 1, 1989, Ser. No. 388,243

Int. Cl.<sup>5</sup> B32B 3/10

U.S. Cl. 428—40

21 Claims



1. Tape automated bonding (TAB) material comprising:
- a first strip of a flexible non-conductive material, said first strip having at least one feature window therein;
- a second strip of a flexible conductive material on said first strip;
- a layer of first adhesive between said first and second strips, and permanently bonding said first strip to said second strip;
- a support ring in said feature window, said support ring having opposed first and second surfaces, said first surface of said support ring being permanently bonded by said first adhesive to said first strip;
- a layer of second adhesive on said second surface of said support ring, said second adhesive releasably bonding said support ring to said second strip whereby said support ring is removable from said second strip.

4,948,646

#### MODIFIED SEAM FELT

Ellen Lasinsky, Dedham, Mass., and Dirk M. Baars, East Windsor, Conn., assignors to Albany International Corp., Albany, N.Y.

Filed Nov. 7, 1989, Ser. No. 432,799

Claims priority, application United Kingdom, Nov. 7, 1988, 8826008

Int. Cl.<sup>5</sup> B32B 5/02

U.S. Cl. 428—60

8 Claims

1. A press felt seam comprising a first felt end and a second felt end interconnected by hinge means wherein the soft cover layer on the first felt end is configured to provide a flap ele-

ment overlaying said hinge means, and the soft cover layer on the second end is configured to support said flap, characterized in that the surface of said flap contiguous said hinge means is provided with a resilient support material to impart to the seam area a compression recovered thickness substantially equal to or slightly greater than the rest of the felt.

4,948,647

#### GYPSUM BACKER BOARD

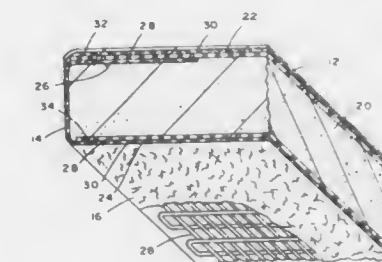
Edward A. Burkard, East Amherst, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Filed Feb. 13, 1989, Ser. No. 308,922

Int. Cl.<sup>5</sup> B32B 3/04, 5/14, 13/02, 33/00

U.S. Cl. 428—70

18 Claims



1. A gypsum board, for use in wet areas for application thereto of ceramic tile, said board comprising a set gypsum core, a front face with facing material thereon and a back face with facing material thereon, said facing material on at least said front face being a mineral fiber laminated composite facing, said composite facing including two plies, said two plies consisting of a woven mineral fiber scrim adhered to said gypsum core and a nonwoven mineral fiber mat disposed outward of said scrim, said outwardly disposed mat on said front face having a water based latex-provided film receptive to bonding with resin-enhanced mortars used to apply ceramic tile formed thereon.

4,948,648

#### FIRE RESISTANT LAMINAR CUSHIONING MATERIAL

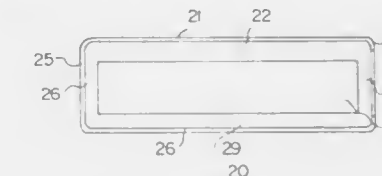
Billie B. Dadgar, and Thomas J. Walter, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Dec. 11, 1989, Ser. No. 448,611

Int. Cl.<sup>5</sup> B32B 3/26

U.S. Cl. 428—71

29 Claims



1. A composite fire resistant laminar cushioning material comprising (i) a foamed polyphosphazene outer lamella said lamella having a lamelliform, substantially unfoamed first outer layer and a substantially foamed second layer and (ii) a foamed polyurethane inner lamella.

10. The cushioning material in accordance with claim 1 wherein said foamed phosphazene outer lamella completely encloses said foamed polyurethane lamella.

4,948,649

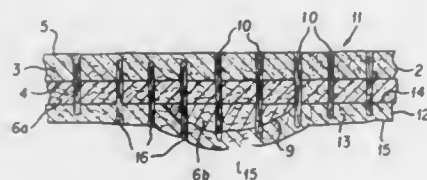
## INTEGRAL TEXTILE COMPOSITE FABRIC

John J. Hiers, Elkin, and Frank C. Burroughs, Winston-Salem, both of N.C., assignors to Lydall, Inc., Manchester, Conn.  
Filed Aug. 8, 1989, Ser. No. 390,746

Int. Cl.<sup>3</sup> B32B 3/14

U.S. Cl. 428—77

29 Claims



1. An integral textile composite fabric comprising:
  - A. a substrate portion having at least one organic textile fiber layer;
  - B. an insulating portion having:
    - (1) at least one inorganic fiber layer which is substantially co-extensive with the organic fiber layer, and
    - (2) at least one insulating layer of fibrous, foamed or particulate insulating material which is substantially less than co-extensive with the inorganic fiber layer; and
  - C. a plurality of first needled stitches composed of organic fibers from said organic fiber layer of said substrate portion needled in and disposed at least substantially through said insulating portion while the inorganic fibers of the inorganic fiber layer in the insulating portion are substantially undisturbed, and wherein the number of said stitches is sufficient that the insulating portion is substantially non-detachable from the substrate portion and the substrate portion is essentially free on its outer surface from inorganic fibers from the inorganic layer or insulating material from the insulating layer of the insulating portion.

4,948,650

## STAIN-RESISTANT TEXTILE SUBSTRATES

Patrick H. Fitzgerald, Pitman, N.J.; Nandakumar S. Rao; Yashavant V. Vinod, both of Hockessin, Del., and Jeffrey R. Alender, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 280,405, Dec. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 136,033, Dec. 21, 1987, abandoned. This application Oct. 26, 1989, Ser. No. 426,933

Int. Cl.<sup>3</sup> B32B 27/12, 33/00

U.S. Cl. 428—96

14 Claims

1. A polyamide textile substrate having deposited thereon an amount effective to impart stain-resistance to polyamide textile substrates a composition comprising between about 95 and 30 weight % of a hydrolyzed polymer of maleic anhydride and one or more ethylenically unsaturated aromatic monomers and between about 5 weight % and 70 weight % of a sulfonated phenol-formaldehyde condensation product which is useful as a dye-resist agent, a dye-fixing agent, a dye-reserving agent, or an agent which improves the wet-fastness of dyeings on polyamide fibers.

4,948,651

## BURN SHEET

Autry O. V. DeBusk, and Charles A. Lee, both of Knoxville, Tenn., assignors to DeRoyal Industries, Inc., Powell, Tenn.  
Filed Jun. 27, 1989, Ser. No. 372,870

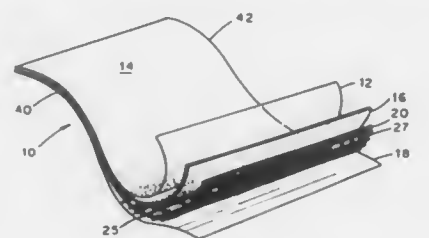
Int. Cl.<sup>3</sup> B32B 3/10

U.S. Cl. 422—110

11 Claims

1. A burn sheet characterized in that said sheet comprises a plurality of layers including a layer of liquid-absorbent material and a strength-imparting layer comprising a scrim formed

of a plurality of multifilamentary yarns, said scrim having a tensile strength of at least about 45 pli and an elongation in either its length or width dimension of not greater than about



30% thereby permitting said burn sheet to be grasped at the side edges thereof and serve as a transfer sheet for a patient disposed thereon.

4,948,652

## ELASTOMERIC COMPOSITE MEMBRANE

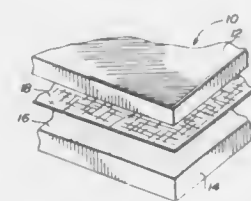
Denis M. Kelleher, 3981 S. Benton Way, Denver, Colo. 80235, and Robert B. Walters, 20456 Flint La., Morrison, Colo. 80465

Filed Oct. 6, 1989, Ser. No. 418,038

Int. Cl.<sup>3</sup> B32B 25/04

U.S. Cl. 422—110

14 Claims



11. In a construction installation incorporating an asphaltic component:
  - an elastomeric composite membrane;
    - the membrane comprising an upper exposed elastomeric sheet comprised of a compound resistant to weathering;
    - the membrane also comprising a lower elastomeric sheet comprised of a compound compatible with asphalt and with asphaltic adhesives;
    - each of the upper and lower sheets having a thickness in the range of 10 to 40 mils;
    - the upper and lower sheets being bonded together to form a laminate; and
    - the lower sheet of the laminate being in contact with the asphaltic component.

4,948,653

## HIGH-STRENGTH PANEL-TYPE ARTICLE WITH A TEXTURED SURFACE

Peter Dinter, Oestrich-Winkel, and Bernd Spross, Taunusstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 20, 1989, Ser. No. 382,891

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826318

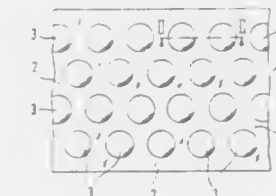
Int. Cl.<sup>3</sup> B32B 3/30, 3/26, 3/28

U.S. Cl. 428—172

14 Claims

1. A high-strength panel-type article which comprises a plurality of superposed thermoplastic films comprising at least one heat-sealing layer and a base layer, said films being firmly bonded to one another by local compression, wherein at least one surface of said article has a plurality of uncompressed individual elevations, in the areas of which said films are not

bonded to one another wherein the total uncompressed area of said surface does not exceed 70% of the total area of said



surface and wherein said article displays increased thickness in the areas of said elevations.

4,948,654

## SHEET MATERIAL USEFUL IN FORMING PROTECTIVE AND DECORATIVE COATINGS

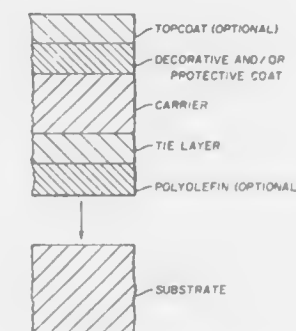
Richard V. Brooks, and Michael C. Carmody, Kingsport, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 27, 1989, Ser. No. 317,878

Int. Cl.<sup>3</sup> B32B 5/16, 27/08, 27/36

U.S. Cl. 428—201

11 Claims



1. A protective and/or decorative sheet material for covering substrates comprising
  - (a) a carrier layer comprising a polymer selected from polyesterethers, copolyesters and blends thereof,
  - (b) a tie layer bonded thereto, said tie layer being a low molecular weight polymer containing ethylene repeat units modified with about 0.1 to about 30 wt. percent of at least one unsaturated monomer which can be copolymerized with ethylene, said tie layer having a melt flow rate of about 0.25 to about 40 g/10 min, a tensile strength at break of at least 25 kg/cm<sup>2</sup>, an elongation at break of greater than 100% and a melting point of at least 65° C.,
  - (c) a layer of polyolefin bonded to the surface of said tie layer opposite said polymeric support, and
  - (d) a decorative and/or protective coating bonded to the surface said polymeric support opposite said tie layer.

4,948,655

## COMPOSITE PANEL AND METHOD OF MANUFACTURING WATERPROOF ROOFINGS

Marco Danese, Verona, Italy, assignor to Nord Bitumi S.a.s. di Marco Danese & C., Sona, Italy  
Filed Dec. 18, 1987, Ser. No. 135,125

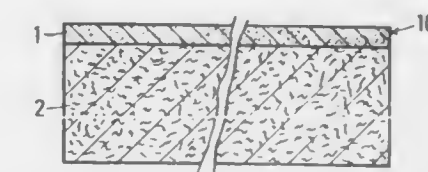
U.S. Cl. 428—213

2 Claims

1. A composite panel for forming waterproof roofing, comprising a layer of heat insulating material and a layer of waterproofing material, said layer of heat insulating material having a face and one other face, said layer of waterproofing material

being fixed to said one face of said layer of heat insulating material, wherein said layer of heat insulating material consists of foamed volcanic rock, glass fiber and cellulose and wherein said layer of waterproofing material consists of a filler and an atactic polypropylene-modified bitumen having a softening temperature of 150 degrees Celsius, a penetration of 25 dmm at 25 degrees Celsius, and a viscosity of 3500 CP at 180 degrees Celsius,

wherein said filler is a flame propagation retardant, said flame propagation retardant being selected from the group consisting of trihydrated alumina, sodium borate,



zinc borate, and chloroparaffin and being present in said waterproofing material in an amount ranging from 40 to 50%, said panel further comprising a removable protection layer, said removable protection layer being constituted by a material selected from the group consisting of talc, fine sand, polyethylene, polypropylene and silicon paper, said layer of heat insulating material having a thickness ranging from 20 to 40 mm, said layer of waterproofing material having a thickness ranging from 1 to 10 mm, said panel having a flexing resistance of at least 170N when a load is applied to said other face of said layer of heat insulating material.

4,948,656

## LAMINATE INCLUDING SEALING LIQUID BETWEEN FACING SURFACES OF LAMINATIONS

Jerry W. Schoen, Hamilton, Ohio, assignor to Armco Advanced Materials Corporation, Lyndora, Pa.

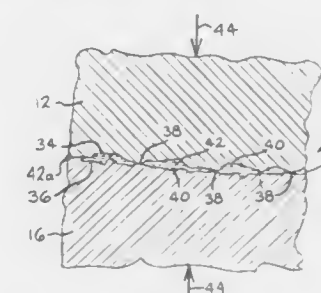
Division of Ser. No. 43,077, Apr. 27, 1987, Pat. No. 4,882,834.

This application Jul. 3, 1989, Ser. No. 375,237

Int. Cl.<sup>3</sup> H01F 27/24

U.S. Cl. 428—215

3 Claims



1. A metallic core comprising:
  - at least one laminate,
  - said laminate including at least two laminations having facing surfaces, said laminations having a thickness of less than about 0.5 mm,
  - said laminations being in point contact with each other over the entire area of said facing surfaces,
  - an oil between said facing surfaces wherein said oil has a viscosity at 24° C. of no more than about 80 cp,
  - said oil completely filling the voids between said contact points over the entire area of said facing surfaces,
  - said oil forming a seal to prevent reentry of air previously displaced from between said facing surfaces when said facing surfaces are brought into contact with one another,



whereby the core is formed without delamination of said laminations of said laminate.

4,948,657

## MULTI-LAYER SHRINK FILM

Tadatoshi Ogawa, and Teruaki Yoshida, both of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Feb. 25, 1988, Ser. No. 162,291

Claims priority, application Japan, Mar. 9, 1987, 62-53516  
Int. Cl.<sup>3</sup> B32B 27/00; C09J 7/02

U.S. Cl. 428—218 3 Claims

1. A multi-layer shrink film obtained by forming an assembly which comprises an interlayer comprising a flexible propylene resin having a Vicat softening point of 115° C. or less and/or a linear very low-density polyethylene having a density less than 0.91 g/cm<sup>3</sup> sandwiched between outermost layers comprising a propylene resin having a Vicat softening point higher than that of the flexible propylene resin of the interlayer, in the case the interlayer comprises propylene resin, and within the range of 85°–140° C. followed by stretching said assembly.

4,948,658

## STRIP OF MATERIAL AND ITS MANUFACTURING METHOD

Helmut Hülker, Niederzier, Fed. Rep. of Germany, assignor to Thomas Josef Heimbach GmbH & Co., Duren, Fed. Rep. of Germany

Filed May 13, 1988, Ser. No. 193,595

Claims priority, application European Pat. Off., May 14, 1987, 87106979.5

Int. Cl.<sup>3</sup> B32B 5/02, 5/06

U.S. Cl. 428—234



1. A strip of material for a papermaking machine, comprising:

- (a) a plurality of associated loop threads, each loop thread including a plurality of loops and the loops of said loop threads extending in a common direction;
- (b) a plurality of core threads, each core thread passing through the loops of an associated loop thread; and,
- (c) a plurality of binding threads extending orthogonal to and through associated loops of said loop threads, each binding thread comprising a magazine filling.

4,948,659

## PROCESS FOR PREPARATION OF WATER ABSORPTIVE COMPOSITE

Kiichi Itoh, and Takeshi Shibano, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo and Uni-Charm Corporation, Kawano, both of, Japan  
Filed Nov. 4, 1988, Ser. No. 267,277

Claims priority, application Japan, Nov. 6, 1987, 62-280339  
Int. Cl.<sup>3</sup> B32B 7/00; D04B 1/00

U.S. Cl. 428—254 19 Claims

1. A process for preparing a water absorptive composite, which comprises the combination of the steps of:

- (A) applying an aqueous solution containing (a) 20% by weight or more of a polymerizable monomer consisting as a main component acrylic acid, of which 20% or more of the carboxyl groups have been neutralized to its alkali metal salt or ammonium salt, (b) 0.001 to 10% by weight based on the polymerizable monomer (a) of a crosslinking agent, (c) 0.001 to 10% by weight based on the polymerizable monomer (a) of a polyoxyethylene acyl ester with HLB of 7 or more and (d) 0.01 to 10% by weight based on the polymerizable monomer (a) of an oxidative radical polymerization initiator to a prefabricated fibrous substrate and
- (B) polymerizing the polymerizable monomer applied to said fibrous substrate with addition of a reducing agent to form a composite of a polymer derived from said polymerizable monomer and said fibrous substrate.

7. A water absorptive composite produced by the process according to claim 1.

4,948,660

## HEAT AND SOUND INSULATING PANEL

Jean-Claude Rias, Villennes Sur Seine, and Roger Zinzius, Givry, both of France, assignors to Isover Saint-Gobain, Aubervilliers, France

Filed Feb. 1, 1989, Ser. No. 304,561

Claims priority, application France, Feb. 1, 1988, 88 01107  
Int. Cl.<sup>3</sup> B27N 9/00; B32B 5/26

U.S. Cl. 428—285

6 Claims



1. A heat and sound insulating panel, comprising:

- (1) an insulating layer having at least first and second major surfaces, and comprised of mineral fibers bonded together, by a synthetic resin,
- (2) a heat-sealing film of low steam permeability adhered to the first major surface of the said insulating layer,
- (3) a film of aluminum adhered to said heat-sealing film opposite said insulating layer, and of a thickness no greater than 9 microns, and
- (4) a layer comprised of a sheet of glass fibers adhered to said film of aluminum opposite said heat-sealing film.

4,948,661

## GLOSSY FINISH FIBER REINFORCED MOLDED PRODUCT AND PROCESSES OF CONSTRUCTION

Rayna W. Smith, Harrisburg, Pa., and Gerald W. Miller, Cincinnati, Ohio, assignors to C. H. Masland & Sons, Carlisle, Pa.

Continuation-in-part of Ser. No. 71,969, Jul. 10, 1987. This application Feb. 24, 1989, Ser. No. 314,896

Int. Cl.<sup>3</sup> B29C 51/02, 51/14; B32B 31/20, 33/00

U.S. Cl. 428—286

22 Claims

1. A process of preparing a fiber reinforced thermoplastic molded product having a glossy surface comprising the steps of:

- (a) blending discrete, single, reinforcing fibers, and thermoplastic fibers, to provide a uniformly blended non-needled, loose non-woven admixture devoid of liquid binder and distinctly different fiber layers or alternately distinctly different layers;
- (b) heating the admixture to at least the melting point of the thermoplastic fibers and applying pressure to the admixture to cause the thermoplastic fibers to melt, to eliminate air from the admixture and to press the admixture into a consolidated structure, thermoplastic material from melted thermoplastic fibers providing the matrix for reinforcing fibers in the molded product; and
- (c) minimizing breakage of the reinforcing fibers during the practice of step (b) by limiting the pressure, so as to produce a consolidated structure with minimal fiber breakage and a Notched Izod of at least one.

18. A consolidated, heat and pressure molded thermoplastic sheet of fibrous reinforced thermoplastic material having a flexural modulus above 200,000 psi, an ASTM standard D-523 gloss value above 20 at an angle of 20°, and a Notched Izod of at least three, prepared from a non-needled, non-woven web devoid of liquid binder and distinctly different fiber layers or alternately distinctly different layers, thermoplastic material from melted thermoplastic fibers providing the matrix for reinforcing fibers in the molded product.

4,948,662

## BORON NITRIDE COATED CERAMIC FIBERS AND COATING METHOD

Frederick H. Simpson, Seattle, and Juris Verzemnieks, Tacoma, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 711,898, Mar. 14, 1985, Pat. No. 4,605,588. This application Apr. 7, 1986, Ser. No. 848,539

Int. Cl.<sup>3</sup> D04H 1/58; B32B 9/00

U.S. Cl. 428—268

21 Claims

1. A method for coating a ceramic fiber that contains boron with boron nitride, comprising the step of diffusing boron in the fiber to the fiber surface and reacting the diffusing boron at the surface with a suitable source of nitrogen in a nitriding atmosphere, to form a surface coating the reaction occurring at a temperature of between about 2200° F.-2600° F., wherein all the boron in the boron nitride coating comes from boron originally in the fiber.

4,948,663

## ADHESIVE LABEL

Hans-Ulrich Hürter, and Dieter Frenkler, both of Schwelm, Fed. Rep. of Germany, assignors to Jackstadt GmbH, Wuppertal, Fed. Rep. of Germany

Filed Aug. 6, 1987, Ser. No. 84,592

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629770; Sep. 16, 1986, 3631397

Int. Cl.<sup>3</sup> B32B 5/16, 7/10, 27/08, 27/40

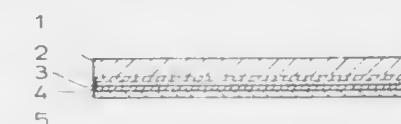
U.S. Cl. 428—331

7 Claims

1. An adhesive label comprising the following layers in order:

- a printing carrier;
- a primer consisting essentially of a solvent-free, isocyanate-

terminated polyurethane and a highly dispersed, pyrogenic, silicic acid filler;  
an adhesion layer consisting essentially of a polyacrylate dispersed in water; and



a cover layer; wherein dry application weight of said adhesion layer is from about 17 to about 23 g/m<sup>2</sup>.

4,948,664

## PAPER AND COATING COMPOSITION FOR USE IN GRAVURE PRINTING

Ronald E. Brociner, St. Austell, United Kingdom, assignor to English China Clays Lovering Pochin & Company Limited, Great Britain

Continuation of Ser. No. 427,424, Sep. 29, 1982, abandoned, which is a continuation-in-part of Ser. No. 188,089, Sep. 17, 1980, abandoned. This application Sep. 15, 1989, Ser. No. 408,470

Claims priority, application United Kingdom, Sep. 19, 1979, 7932458

Int. Cl.<sup>3</sup> B32B 19/04, 29/04; C09C 1/28, 1/42

U.S. Cl. 428—331

23 Claims

1. Paper provided with a coating composition comprising a pigment and an adhesive binder, the pigment consisting of a layer lattice silicate selected from the group consisting of kaolinitic clays, talc, and mixtures thereof, wherein the layer lattice silicate has a particle size range factor which is less than 3, wherein not more than 5% of the particles, by weight, have an equivalent spherical diameter which is less than 0.25 microns, and wherein at least 5% of the particles by weight, have an equivalent spherical diameter which is not less than 10 microns.

16. A paper coating composition comprising a pigment and an adhesive binder, the pigment consisting of a layer lattice silicate selected from the group consisting of kaolinitic clays, talc, and mixtures thereof, wherein the layer lattice silicate has a particle size range factor which is less than 3, wherein not more than 5% of the particles, by weight, have an equivalent spherical diameter which is less than 0.25 microns, and wherein at least 5% of the particles by weight, have an equivalent spherical diameter which is not less than 10 microns.

4,948,665

## MODIFIED THERMOPLASTIC AND A METHOD FOR THE MANUFACTURE OF THE THERMOPLASTIC

Klas A. Rosén, Helsingborg, Sweden, assignor to Tetra Pak Holdings & Finance S.A., Pully, Switzerland

Division of Ser. No. 191,118, May 6, 1988. This application May 22, 1989, Ser. No. 355,464

Claims priority, application Sweden, May 11, 1987, 8701924  
Int. Cl.<sup>3</sup> B65D 47/36; C08J 3/20; C08K 3/00; B29C 45/00

U.S. Cl. 428—332

12 Claims

1. A modified thermoplastic injection molded container lid comprising an injection molded thermoplastic lid having an opening arrangement of the tear-up type, the modified thermoplastic containing inert inorganic filler dispersed in the thermoplastic in an amount of 10–15% of the weight of the mixture.

4,948,666

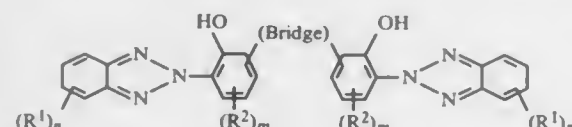
**STAIN RESISTANT POLYCARBONATE PANELS**  
Winfried G. Paul; Sivaram Krishnan, both of Pittsburgh, and Larry D. Sarver, Wexford, all of Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Apr. 22, 1988, Ser. No. 184,850  
Int. Cl.<sup>5</sup> B32B 27/36; C08G 63/62

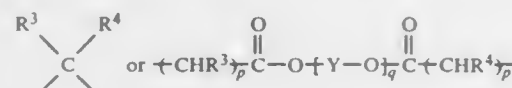
U.S. Cl. 428—334

4 Claims

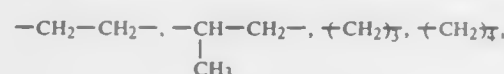
1. A polycarbonate panel comprising a polycarbonate sheet to which at least one of its surfaces there is bonded an adherent layer which includes a linear polycarbonate resin and about 1–15% of a bis-benzotriazole conforming to



wherein R<sup>1</sup> and R<sup>2</sup> independent of each other are a hydrogen or a halogen atom, a C<sub>1</sub>–C<sub>12</sub> alkoxy, C<sub>7</sub>–C<sub>18</sub> arylalkoxy or a C<sub>1</sub>–C<sub>10</sub> alkyl, cycloalkyl, arylalkyl or an aryl radical and R<sup>3</sup> and R<sup>4</sup> independent of each other are a hydrogen atom, a C<sub>1</sub>–C<sub>10</sub> alkyl, cycloalkyl, arylalkyl or an aryl radical, n is an integer of 0–4 and m is an integer of 1 to 3, —(Bridge)— is either



where p is 0–3, q is 1–10 Y denotes any of



and R<sup>3</sup> and R<sup>4</sup> independently denote a hydrogen atom a C<sub>1</sub>–C<sub>10</sub> alkyl, cycloalkyl, arylalkyl or an aryl radical characterized in that said adherent layer is about 5 to 100 microns in thickness and in that only one of its surfaces is bonded.

4,948,667

**MAGNETIC HEAD**

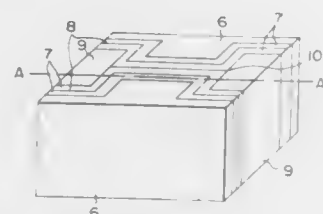
Hirosuke Mikami; Hideo Fujiwara, both of Ibaraki, and Takeshi Tottori, Toride, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Mar. 17, 1987, Ser. No. 26,620

Claims priority, application Japan, Mar. 19, 1986, 61-59433  
Int. Cl.<sup>5</sup> G11B 21/00

U.S. Cl. 428—336

19 Claims



1. A magnetic head for writing and reading information, having a sliding surface in contact with a recording medium, the core of said head being at least in part composed of a plurality of magnetic metal thin layers laminated and a non-magnetic intermediate layer of 0.05 to 0.3 μm in thickness disposed between the magnetic metal thin layers, a material for

said intermediate layer having a Vickers hardness of not less than 200 to less than 1,200.

4,948,668

**COMPATIBLE STYRENE-METHACRYLATE POLYMER BLENDS**

Werner Siol, Darmstadt-Eberstadt, and Ulrich Terbrack, Reinheim, both of Fed. Rep. of Germany, assignors to Roeham GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany Division of Ser. No. 233,754, Aug. 19, 1988, Pat. No. 4,892,909.

This application Oct. 23, 1989, Ser. No. 424,991

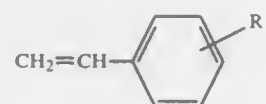
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730026

Int. Cl.<sup>5</sup> D01F 8/10; B32B 27/02, 27/30

U.S. Cl. 428—373

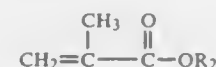
2 Claims

1. A shaped article consisting of a body formed from a polymerizable P1, which is formed from monomers of formula I:

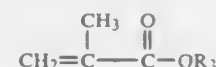


wherein R<sub>1</sub> is hydrogen or methyl, said body being at least partially covered with a layer of polymerizable P2, which is formed from

- (a) 5–40% by weight of cyclohexyl methacrylate,  
(b) 30–70% by weight of a methacrylic ester of formula II:



- wherein R<sub>2</sub> is methyl or ethyl,  
(c) 10–50% by weight of a methacrylic ester of formula III:



wherein R<sub>3</sub> is a hydrocarbon group having 4–18 carbon atoms, and

- (d) 0–10 parts by weight of a monomer M which is copolymerizable with monomers of (a)–(c), yet different from these monomers.

4,948,669

**FLAME RETARDANT ETHYLENE POLYMER BLENDS**  
Loic P. Rolland, Divonne les Bains, France, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 153,722, Feb. 8, 1988, abandoned. This application Jan. 25, 1989, Ser. No. 300,021  
Int. Cl.<sup>5</sup> B32B 15/00; C08K 3/10, 3/22

U.S. Cl. 428—379

5 Claims

1. A composition consisting essentially of 29 to 50 % by weight of composition of a linear low density polyethylene containing recurring units of an alkene-1 comonomer of 4–12 carbon atoms sufficient to provide a density less than 0.92; 3 to 15% of polypropylene material selected from the class consisting of

- (a) polypropylene homopolymer,  
(b) nonelastomeric copolymer of propylene and ethylene, and  
(c) melt-compounded blends or grafts of (a) or (b) with an elastomeric ethylene/propylene copolymer; 45–65% of alumina trihydrate; 0.5 to 1.5% of a coupling agent containing a hydrolyzable moiety containing titanium or

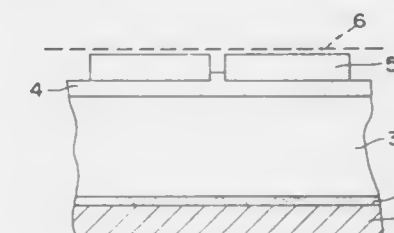
4,948,673

**PROTECTIVE PANEL, AND IN PARTICULAR A BALLISTIC SHIELD**

Walter G. Goeury, Pontenay Les Brils, France, assignor to Compagnie Europeenne d'Emballages Speciaux(S.A.), France  
Filed Apr. 12, 1988, Ser. No. 180,516  
Int. Cl.<sup>5</sup> B32S 27/00

U.S. Cl. 428—425.8

4 Claims



1. A multi-layer protective panel having on one surface thereof ceramic tiles wherein the layers of said panel are adhered together by a glue comprising an aliphatic polyether polyurethane having a Shore A hardness of 75 and a softening point at about 125° C. and wherein said glue initially forms a film between said layers having a thickness of from about 0.38 mm to 1.25 mm prior to adhering the layers of said panel together.

4,948,674

**METHOD OF APPLYING A METAL LAYER OF LARGE ADHESIVE STRENGTH ON ENAMELS**

Roland Herold; Eveline Dannenberg; Klaus Majentay, and Hermann-Josef Middeke, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin Bergkamen, Fed. Rep. of Germany

Filed Sep. 7, 1988, Ser. No. 241,594

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1987, 3731167

Int. Cl.<sup>5</sup> B32B 9/00

U.S. Cl. 428—469

26 Claims

1. A method of applying a metal layer of a large adhesive strength onto an enamel selected from the group consisting of glass-like and partially crystalline salts of polysilicic acid, comprising the steps of roughening a surface of the enamel; cleaning the surface with the aid of ultrasound; conditioning the surface with a wetting agent; activating the surface; and chemically metallizing the surface after said activating step.

4,948,675

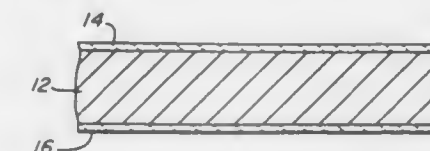
**SEPARATING-AGENT COATINGS ON SILICON STEEL**  
Nazmi Toker, Monroeville, and Leroy R. Price, Allison Park, both of Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.

Division of Ser. No. 209,593, Jun. 21, 1988, Pat. No. 4,871,402, which is a division of Ser. No. 947,002, Dec. 29, 1986, Pat. No. 4,781,769. This application May 19, 1989, Ser. No. 353,994

Int. Cl.<sup>5</sup> B32B 15/04, 15/18

U.S. Cl. 428—469

3 Claims



1. As an article, a silicon-steel strip provided with a separating-agent coating made in accordance with a method of preparing silicon-steel strip for texturizing annealing which com-

silicon and also containing an organophilic group; and an antioxidant in an amount that improves heat aging.

4,948,670

**VINYL CHLORIDE RESIN COMPOSITION FOR COATING ELECTRIC WIRES**

Selichi Morimoto; Kazuyuki Shiji, both of Nagoya, and Hisahiro Kusu, Kuwana, all of Japan, assignors to Mitsubishi Kasei Vinyl Company, Tokyo, Japan

Continuation of Ser. No. 183,745, Apr. 8, 1988, abandoned. This application Mar. 31, 1989, Ser. No. 332,434

Int. Cl.<sup>5</sup> B32B 15/00

U.S. Cl. 428—379

6 Claims

1. An electric wire coated with a vinyl chloride resin composition, the coating being thinner than 0.8 mm, said composition comprising 100 parts by weight of a vinyl chloride resin and from 10 to 200 parts of an alkyl biphenyltetracarboxylate, the coating having adequate

4,948,671

**MULTI-LAYERED LAMINATE**

Masafumi Hattori; Takayuki Inoue, and Masahide Ochiumi, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 715,024, Mar. 22, 1985, abandoned.

This application May 25, 1989, Ser. No. 356,609

Claims priority, application Japan, Apr. 5, 1984, 59-68228

Int. Cl.<sup>5</sup> B32B 9/04

U.S. Cl. 428—411.1

13 Claims

1. A multi-layered laminate comprising a polyolefin layer, a saponified ethylene/vinyl acetate copolymer layer, a transparent resin composition layer as an intermediate layer, wherein the transparent resin composition comprises,

from 65 to 99.9 parts by weight of a polyolefin component which is a polyolefin which is at least partially graft modified with a polyolefin modifier which is an unsaturated carboxylic acid or the anhydride thereof, the polyolefin component having the unsaturated carboxylic acid or anhydride content of from 0.002 to 5 wt. % and the polyolefin being a homopolymer or a copolymer of an α-olefin having from 2 to 12 carbon atoms;

from 35 to 0.1 parts by weight of a saponified ethylene/vinyl acetate copolymer having an ethylene content of from 25 to 75 mol % and a degree of saponification of at least 96%; and

from 0.5 to 200 parts by weight per 100 parts by weight of the saponified ethylene/vinyl acetate copolymer of a plasticizer for the saponified ethylene/vinyl acetate.

4,948,672

**POLYMERIC LAMINATE FOR SAFETY GLASS**

George E. Cartier, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 10, 1989, Ser. No. 335,249

Int. Cl.<sup>5</sup> B32B 27/00

U.S. Cl. 428—424.4

11 Claims

1. A polymeric laminate of plasticized polyvinyl butyral sheet containing about 17 to 25 weight % vinyl alcohol groups calculated as polyvinyl alcohol, said sheet being in face-adhering, inseparable bonding contact with a polyurethane layer as a result of chemical linkages formed at the interface between the sheet and layer by reaction between the vinyl alcohol groups and isocyanate groups associated with the polyurethane.



prises passing said strip at a line speed of 300 to 700 feet per minute through a slurry bath consisting principally of water, magnesium oxide, magnesium sulphate heptahydrate and a quantity of magnesium metal powder effective to prevent the development of coating defects on the surface of said steel during a subsequent coiling and texture-annealing treatment, said coating having an as-dried coating weight of 0.010 to 0.050 ounces per square foot, then drying said strip at the same line speed to obtain steel strip coated with separating agent containing 1 to 3 weight percent of water of hydration.

4,948,676

# CERMET MATERIAL, CERMET BODY AND METHOD OF MANUFACTURE

Dominique Darracq, Ville-la-Grand, France, and Jean-Jacques Duruz, Geneva, Switzerland, assignors to Moltech Invent S.A., Luxembourg

PCT No. PCT/EP87/00470, § 371 Date Feb. 15, 1989, § 102(e) Date Feb. 15, 1989, PCT Pub. No. WO88/01311, PCT Pub. Date Feb. 25, 1988

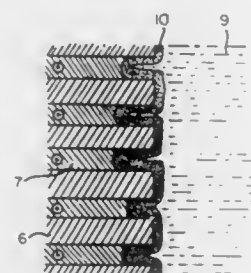
PCT Filed Aug. 19, 1987, Ser. No. 332,850

Claims priority, application Switzerland, Aug. 21, 1986, 86810372

Int. Cl.<sup>5</sup> B32B 7/00

U.S. Cl. 428—539.5

27 Claims



1. A ceramic/metal composite material of at least one ceramic phase and at least one metallic phase, comprising mixed oxides of cerium and at least one of aluminum, nickel, iron and copper in the form of a skeleton of interconnected ceramic oxide grains which skeleton is interwoven with a continuous metallic network of an alloy or intermetallic compound of cerium with at least one of aluminum, nickel, iron and copper.

4,948,677

# HIGH TRANSMITTANCE, LOW EMISSIVITY ARTICLE AND METHOD OF PREPARATION

F. Howard Gillery, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 683,458, Dec. 19, 1984, abandoned, and a continuation-in-part of Ser. No. 575,604, Jan. 31, 1984, Pat. No. 4,622,120. This application Mar. 17, 1986, Ser. No. 841,056

Int. Cl.<sup>5</sup> C23C 14/08; B32B 15/04, 17/06

U.S. Cl. 428—623

7 Claims

1. A high transmittance, low emissivity article comprising:  
a. a transparent nonmetallic substrate;  
b. a first transparent film comprising a metal oxide deposited on a surface of said substrate;  
c. a first transparent primer layer deposited on said first metal oxide film;  
d. a transparent reflective metallic film deposited on said primer layer;  
e. a second transparent primer layer deposited on said reflective metallic film; and  
f. a second transparent film comprising a metal oxide deposited on said second primer layer,  
wherein the primer films comprise copper.  
3. A method for making a multiple layer high transmittance, low emissivity coated product comprising the steps of:

- placing a transparent, nonmetallic substrate in a sputtering chamber;
- sputtering a cathode target comprising an alloy of zinc and tin in a reactive atmosphere comprising oxygen to deposit a transparent metal alloy oxide film on a surface of said substrate;
- sputtering a copper target to deposit a primer layer on said oxide film;
- sputtering a silver cathode target, in an inert atmosphere to deposit a transparent silver film on said primer layer;
- sputtering a copper target to deposit a second primer layer on said silver film; and
- sputtering a cathode target comprising an alloy of zinc and tin in a reactive atmosphere comprising oxygen to deposit a metal alloy oxide film on said second primer layer.

4,948,678

# ORGANIC COMPOSITE PLATED STEEL SHEET HIGHLY SUSCEPTIBLE TO CATIONIC ELECTRODEPOSITION

Yoshio Shindou, and Takashi Shimazu, both of Kimitsu, Japan, assignors to Nippon Steel Corporation, Japan

Filed Jan. 22, 1990, Ser. No. 468,296

Claims priority, application Japan, Jan. 23, 1989, 1-013342

Int. Cl.<sup>5</sup> B32B 15/08

U.S. Cl. 428—623

5 Claims

1. An organic composite plated steel sheet highly susceptible to cationic electrodeposition comprising a steel substrate plated with one selected from a group consisting of zinc, a zinc alloy, a zinc composite alloy, or aluminum, and a first layer of a less soluble chromate film having a water soluble content of 5% or less formed on said substrate in an amount of 10 to 150 mg as the total amount of chromium per square meter, and a second layer as a solid thin coating film of 0.2 to 2  $\mu$ m formed on said first layer, the second layer being formed with a coating composition containing 10 to 50% by weight of solids comprising:

- 30% by weight or more of a bisphenol A type epoxy resin having a number average molecular weight of 300 to 100,000 based on the total solids in said coating composition;
- a weight ratio of at least one curing agent selected from the group consisting of polyisocyanate compounds and block polyisocyanate compounds to said epoxy resin solid of 0.1 to 2.0;
- 5 to 50% by weight of fumed silica having an average particle size of 0.1 to 100 nm based on the total solids in said coating composition;
- at least one pigment selected from the group consisting of insoluble azo type, azo lake type, and phthalocyanine type organic pigments having an average size of 0.01 to 2  $\mu$ m in an amount of 0.1 to 15% by weight based on the total solids in said coating composition and in a weight ratio of said pigment to said fumed silica of 0.01 to 1.0; and
- 40% or more of a ketone type organic solvent in said coating composition.

4,948,679

# MICROSCREEN RADIATION SHIELD FOR THERMOELECTRIC GENERATOR

Thomas K. Hunt, Ann Arbor; Robert F. Novak, Farmington Hills, and James R. McBride, Ypsilanti, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jun. 1, 1989, Ser. No. 359,820

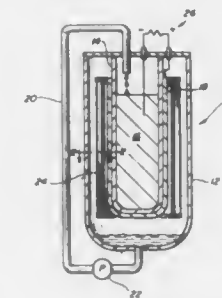
Int. Cl.<sup>5</sup> H01M 16/00, 6/36

U.S. Cl. 429—11

21 Claims

1. A radiation shield adapted to be interposed between a reaction zone and a means for condensing an alkali metal vapor in a thermoelectric generator for converting heat energy directly to electrical energy, said radiation shield comprising a

woven wire mesh screen, the spacing between the wires forming said mesh screen being such that said radiation shield re-



flects thermal radiation while permitting the passage of alkali metal vapor therethrough.

4,948,680

# SOLID COMPOSITIONS FOR FUEL CELL ELECTROLYTES

Marc J. Madou, Palo Alto; Takaaki Otagawa, Fremont, and Arden Sber, Foster City, all of Calif., assignors to SRI International, Menlo Park, Calif.

Continuation-in-part of Ser. No. 935,289, Nov. 26, 1989, Pat. No. 4,851,303. This application May 20, 1988, Ser. No. 196,498

Int. Cl.<sup>5</sup> H01M 8/10

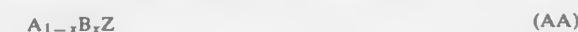
U.S. Cl. 429—13

32 Claims

Table I Fuel cell types

	Phosphoric Acid	Sulfuric Acid	Alkaline	High-Temperature Solid Oxide	Solid Polymer
Electrolyte	Con. $H_3PO_4$	$H_2SO_4$ , $H_2O$	$KOH$ solution	$ZrO_2$ , $Y_2O_3$ , or $ThO_2$ - $CaO$	Sulfonated fluorocarbon acidic ion-exchange membrane
Electrolyte support	Phosphoric Acid (SA)	$H_2O$	Absent	Electrolyte itself	Electrolyte itself
Electrode (catalyst)	Pt	$Ni$ , $NiO$	$Pt$ , $Pt$ , Au alloy	$H_2O$ - $ZrO_2$ , $LaNiO_3$ , $MnO_2$	Pt
Anode fuel	Hydrocarbon product	$H_2$ , $CO$	$H_2$ (high purity)	$H_2$ , $CO$	$H_2$
Cathode oxidant	Air	Air + $CO_2$	$O_2$ (high purity)	Air	$O_2$
Temperature ( $^{\circ}C$ )	160–190	800–700	82–104	900–1100	82
Pressure (atm)	<120 psia	<120 psia	50 psia	Atm	50 psia

1. The use of a solid  $O^{2-}$  (oxide ion) conducting material as an electrolyte for a fuel-cell, said material comprising: a monocrystal or polycrystal structure of the formula



wherein

A is independently selected from lanthanum, cerium, neodymium, scandium or mixtures thereof;  
B is independently selected from strontium, calcium, barium or magnesium, and  
x is between 0 and 0.9999,  
Z is selected from the group consisting of  $F_{3-x}$  and  $O_cF_d$  where F is fluorine, O is oxygen, x is between about 0 and 0.9999 and  $2c+d=3-x$ ,  
wherein c is between 0.0001 and 1.5 and d is between 0.001 and less than or equal to 3, wherein the solid material as an electrolyte is a thin layer having one side in contact with an electrode which is in contact with a gaseous fuel for a fuel cell and the other side of the thin solid material for the electrolyte is also in contact with an electrode which is in contact with gaseous oxygen, or air or mixtures thereof.

4,948,681

# TERMINAL ELECTRODE

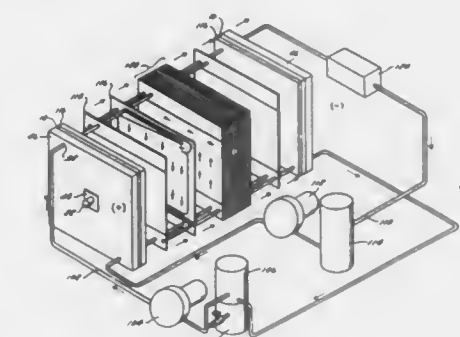
Jeffrey P. Zagrodnik, Hales Corners, and Gerald K. Bowen, Cedarburg, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Continuation of Ser. No. 189,363, May 2, 1988, abandoned. This application Jan. 30, 1989, Ser. No. 376,218

Int. Cl.<sup>5</sup> H01M 2/40, 4/86

U.S. Cl. 429—34

14 Claims



1. A bipolar flow battery, comprising:  
a series of half cells in electrical communication with one another, said cells being defined by a plurality of partitions comprising alternating electrodes and separators, each partition being secured to each adjacent partition about a common perimeter therewith, said series of half cells having a terminal electrode at an end thereof;  
an endblock, disposed at an end of said series of half cells, said endblock being secured to said terminal electrode;  
an electrolyte manifold in hydraulic communication with said half cells; and  
an electrolyte pump for urging electrolyte through said manifold and into said half cells;  
said terminal electrode comprising:  
a substantially flat metal screen having an electrically conductive stud attached to the external surface thereof, wherein said screen, including the region in which said stud is attached thereto, is encapsulated within a plastic envelope such that said screen is isolated from said electrolyte; and  
a nonconductive plastic frame disposed about the perimeter of said plastic envelope such that the perimeter of said screen is disposed within the perimeter of said frame.

4,948,682

# ELECTRODE MATERIAL FOR USE IN A STORAGE BATTERY

Pieter J. Sonneveld, Helmond, Netherlands, assignor to Stork Screens, B.V., Netherlands

Filed Feb. 24, 1989, Ser. No. 314,989

Claims priority, application Netherlands, Feb. 26, 1988, 8800500

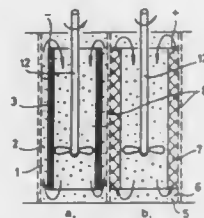
Int. Cl.<sup>5</sup> H07M 2/38

U.S. Cl. 429—67

4 Claims

1. Storage battery half-cell in which a suspension of particles of an electrolyte material is able to circulate, at least comprising a casing, an electrolyte material circulation means, an electrode (current collector) and electrode attachment means,

in which the electrode is formed from a material which is coated, at least at its surface which comes into contact with a



suspension to be used, with an electrically conducting ceramic material.

4,948,683

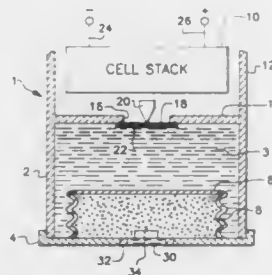
**RESERVE ACTIVATED ELECTROCHEMICAL CELL WITH A CELL CONDITION CHECKING APPARATUS**  
James R. Picozzi, Hatfield, and Norman A. Remer, Southampton, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 31, 1989, Ser. No. 386,652

Int. Cl.<sup>5</sup> H01M 6/36

U.S. Cl. 429—90

13 Claims



1. An electrochemical cell comprising pressurized electrochemical reservoir means for storing an electrochemical fluid including an expandible pressurized capsule and an internal volume external to said capsule for accommodating the electrochemical fluid and reservoir leak detectors means for detecting the presence of the electrochemical fluid within said capsule.

4,948,684

**ALKALINE ZINC BATTERY HAVING IMPROVED SHELF-LIFE, RECHARGEABILITY, CHARGE RETENTION AND CAPACITY RETENTION**  
Theresa M. Dantam, Rochester Hills, Mich., and Richard A. Jones, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 23, 1988, Ser. No. 235,127

Int. Cl.<sup>5</sup> H01M 10/26

U.S. Cl. 429—206

2 Claims

1. In an alkaline zinc galvanic rechargeable cell comprising a zinc electrode having a copper-containing conductor embedded in a zinc-rich active material, a counterelectrode spaced from said zinc electrode, and a concentrated, aqueous alkaline electrolyte permeating said active material and bridging the space between the electrodes, the improvement wherein said electrolyte includes sufficient benzotriazole to suppress dissolution of said copper from said conductor when said zinc electrode is substantially fully discharged and thereby extend the shelf-life and improve the rechargeability and charge retention of said cell following prolonged periods in such discharged state.

4,948,685

**SHEET-SHAPED ELECTRODE, METHOD OF PRODUCING THE SAME, AND SECONDARY BATTERY USING THE SHEET-SHAPED ELECTRODE**

Toshiyuki Ohsawa, Kawasaki; Toshiyuki Kabata, Yokohama; Okitoshi Kimura, Tokyo, and Sachiko Yoneyama, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

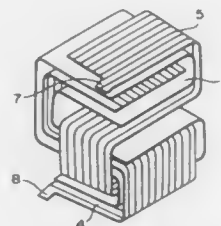
Filed Sep. 6, 1988, Ser. No. 240,727

Claims priority, application Japan, Sep. 3, 1987, 62-219056; Sep. 29, 1987, 62-242517; Oct. 2, 1987, 62-224030; Oct. 8, 1987, 62-252520; Nov. 10, 1987, 62-282134; Nov. 11, 1987, 62-283095; Jun. 22, 1988, 63-152227

Int. Cl.<sup>5</sup> H01M 4/66, 10/44

U.S. Cl. 429—213

14 Claims



7. A secondary battery comprising a positive electrode including an surfaced roughened aluminum collector having a terminal, a separator, and a negative electrode including a collector having a terminal, each being sheet-shaped, which positive electrode and negative electrode are folded alternately so as to cross each other through said separator, said terminals being provided at an end portion of said respective electrodes, and which positive electrode comprises an aniline based polymeric active material provided on both sides of said aluminum collector.

4,948,686

**PROCESS FOR FORMING TWO-COLOR IMAGES**  
Ronald J. Koch, Webster; Robert J. Gruber, Pittsford; Paul C. Julien, Webster; Donald J. Goodman, Rochester; Edward J. Gutman, Webster, and Deepak R. Maniar, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1989, Ser. No. 342,132

Int. Cl.<sup>5</sup> G03G 13/01, 13/09

U.S. Cl. 430—45

70 Claims

1. A process for forming two-colored images which comprises (1) charging an imaging member in an imaging apparatus; (2) creating on the member a latent image comprising areas of high, intermediate, and low potential; (3) developing the low areas of potential by conductive magnetic brush development with a developer comprising a colored first toner comprising a first resin present in an amount of from about 80 to about 98.8 percent by weight and selected from the group consisting of polyesters, styrene-butadiene polymers, styrene-acrylate polymers, styrene-methacrylate polymers, and mixtures thereof; a first pigment present in an amount of from about 1 to about 15 percent by weight and selected from the group consisting of copper phthalocyanine pigments, quinacridone pigments, azo pigments, rhodamine pigments, and mixtures thereof; a charge control agent present in an amount of from about 0.2 to about 5 percent by weight; colloidal silica surface external additives present in an amount of from about 0.1 to about 2 percent by weight; and external additives comprising metal salts or metal salts of fatty acids present in an amount of from about 0.1 to about 2 percent by weight; and a first carrier comprising a steel core with an average diameter of from about 25 to about 215 microns and a coating selected from the group consisting of methyl terpolymer, polymethyl methacrylate, and a blend of from about 35 to about 65 percent by weight of polymethylmethacrylate and from about 35 to about 65 percent by weight of chlorotrifluoroethylene-vinyl

4,948,688

**LAYERED ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISES BIS-AZO CHARGE GENERATOR COMPOUND**

Katsuji Kitatani, and Satoshi Hoshi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 3, 1989, Ser. No. 331,986

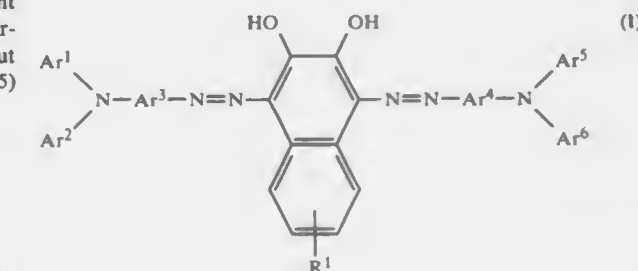
Claims priority, application Japan, Apr. 5, 1988, 63-83676

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—58

6 Claims

1. An electrophotographic photoreceptor comprising: (1) an electrophotographic photosensitive layer which comprises a charge carrier transporting compound and a charge carrier generating compound, or (2) an electrophotographic photosensitive layer which comprises a charge carrier transporting compound layer and a charge carrier generating compound layer, on an electrically conductive support, wherein said charge carrier generating compound is a bis-azo compound represented by formula (I):



wherein, Ar<sup>1</sup>, Ar<sup>2</sup>, Ar<sup>3</sup> and Ar<sup>4</sup> represent aryl groups. Ar<sup>3</sup> and Ar<sup>4</sup> represent arylene groups, and R<sup>1</sup> represents a hydrogen atom or an SO<sub>3</sub>Na group.

4,948,687

**MULTI-LAYERED SQUARYLIUM-BASED POSITIVE CHARGE ELECTROPHOTOGRAPHIC PHOTORECEPTOR**

Masanori Murase; Ichiro Takegawa; Makoto Takemoto, and Yasuo Sakaguchi, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,044

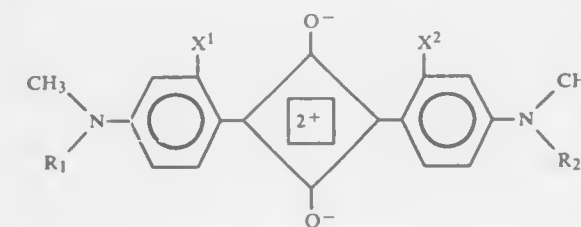
Claims priority, application Japan, Jan. 8, 1988, 63-001360

Int. Cl.<sup>5</sup> G03G 5/06

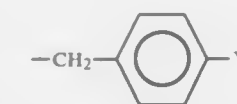
U.S. Cl. 430—58

11 Claims

1. An electrophotographic photoreceptor for use in positive charging electrophotographic machines comprising an electrically conductive substrate having thereon a charge transporting layer, a charge generating layer, and a low resistance surface protective layer, in that order, wherein a squarylium acid derivative having an asymmetrical structure represented by the formula (I):



wherein R<sub>1</sub> and R<sub>2</sub> may be the same or different and represent a —CH<sub>3</sub> group or a



group (wherein Y represents a halogen atom), X<sub>1</sub> and X<sub>2</sub> may be the same or different and represent a hydrogen atom, an —OH group or a halogen atom, and wherein at least one of said X<sub>1</sub> and X<sub>2</sub> is an —OH group; is dispersed in said charge generating layer.

4,948,689

**PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY HAVING AN AMINO CHARGE TRANSPORT COMPOUND**

Masami Kuroda; Youichi Nakamura, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Jun. 20, 1989, Ser. No. 368,543

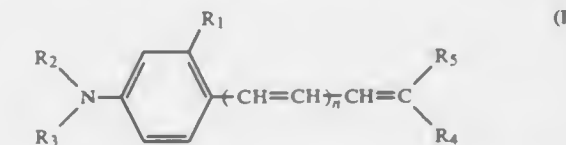
Claims priority, application Japan, Jun. 27, 1988, 63-159001

Int. Cl.<sup>5</sup> G03G 5/10

U.S. Cl. 430—59

12 Claims

1. A photoconductor for electrophotography comprising: a substrate; and a photosensitive layer formed on said substrate and including a charge generating substance together with at least one amino compound represented by the following general formula (I) as a charge transporting substance:



wherein, R<sub>1</sub> stands for one of a hydrogen atom, a halogen atom, an alkyl group, a hydroxy group and an alkoxy group, each of R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> stands for one of an alkyl group, an aryl group, a thienyl group, an aralkyl group and an alkenyl group, each of which groups may be or not may be substituted and further at least one of R<sub>2</sub> and R<sub>3</sub> stands for thenyl group and n stands for an integer of 0, 1 or 2.



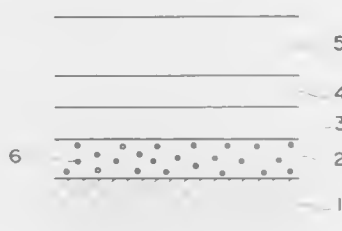
4,948,690

**ELECTROPHOTOGRAPHIC PHOTSENSITIVE MEMBER WITH FINE SPHERICAL RESIN POWDER**  
Masafumi Hisamura, Kawasaki; Naoto Fujimura, and Hisami Tanaka, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 352,630, May 15, 1989, abandoned, which is a continuation of Ser. No. 63,080, Jun. 17, 1987, abandoned. This application Jan. 11, 1990, Ser. No. 462,913  
Claims priority, application Japan, Jun. 19, 1986, 61-141329; Dec. 26, 1986, 61-310828

Int. Cl.<sup>5</sup> G03G 5/14

U.S. Cl. 430—60

21 Claims



1. An electrophotographic photosensitive member comprising an intermediate layer between a support and a photosensitive layer, wherein said intermediate layer contains spherical resin fine powder, said spherical resin fine powder:

- having a mean particle size of 0.6 to 6 microns;
- having a spherical degree of 0.5 or more in terms of ratio of the diameter of the minimum circumscribed circle to the diameter of the maximum inscribed circle when the diameter of the circumscribed circle is 1;
- being present in amounts from 0.5 to 30 weight percent based on the total weight of the intermediate layer.

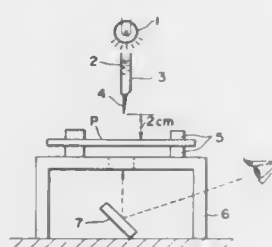
4,948,691

**IMAGE FIXING METHOD FOR USE IN WET-TYPE ELECTROPHOTOGRAPHIC COPYING MACHINE**  
Tsuneo Kurotori, Tokyo; Namabu Mochizuki, and Kenzo Ariyama, both of Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Mar. 13, 1989, Ser. No. 322,307  
Claims priority, application Japan, Apr. 2, 1988, 63-82625

Int. Cl.<sup>5</sup> G03G 13/20

U.S. Cl. 430—99

8 Claims



1. An image fixing method for use in a wet-type electrophotographic copying machine comprising the steps of:  
developing a latent electrostatic image formed on an electrophotographic photoconductor element to a visible toner image by use of a developer comprising a thermal cross-linking toner and a carrier liquid,  
transferring said visible toner image to a transfer sheet having an oil absorption coefficient  $\alpha$  of  $1.0 \times 10^{-2}$  cm/sec or more, which is determined by dividing the thickness of said transfer sheet by the time required for a drop of said carrier liquid placed on the front side of said transfer sheet to spread to a diameter of 1 cm on the back side of said

transfer sheet, to form a transferred image on said transfer sheet, and  
fixing said transferred image to said transfer sheet by bringing a heat application means into direct contact with said transferred image.

4,948,692

**COMBINATION TONER AND PRINTER UTILIZING SAME**

Koichi Higashimura; Yoshinori Miyazawa; Tsuneo Handa; Teruyuki Mizumoto; Hiroshi Ito; Atsushi Uchino; Masanobu Motoki; Masanao Kunugi; Tabei Ishiwatari, and Hidetsugu Shimura, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan  
Continuation of Ser. No. 33,135, Mar. 31, 1987, abandoned. This application May 3, 1988, Ser. No. 189,903

Claims priority, application Japan, Mar. 31, 1986, 61-073266; Apr. 30, 1986, 61-100167; Jul. 3, 1986, 61-156706; Nov. 27, 1986, 61-282277

Int. Cl.<sup>5</sup> G03G 9/087

U.S. Cl. 430—106.6

19 Claims

1. An image forming device adapted to print images using a xerography technique, said image forming device comprising at least a toner reservoir having toner dispersed therein, said toner including conductive portions and insulative portions, said conductive portions being adapted to accumulate a charge in the toner with a predetermined period of discharge and said insulative portion having adapted to lengthen the period of discharge of the accumulated charge, wherein said conductive portions include semiconductor material.

4,948,693

**POSITIVE WORKING COLOR PROOFING SYSTEM COMPRISING POLYVINYL ACETAL/POLYVINYL ALCOHOL/POLYVINYL ACETATE RESIN**

Richard L. Shadrach, Belle Mead; Stephan J. W. Platzer, Callon, and Gabor I. Koletar, Berkeley Heights, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Aug. 29, 1988, Ser. No. 237,864

Int. Cl.<sup>5</sup> G03C 7/20, 11/12, 5/18

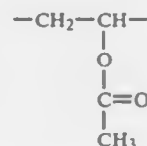
U.S. Cl. 430—143

29 Claims

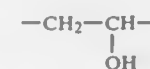
1. A method for forming a colored image which comprises:  
A. providing a photosensitive element which comprises, in order:  
(i) a substrate having a release surface; and  
(ii) a photosensitive layer on said release surface, which photosensitive layer comprises a light sensitive, positive working, naphthoquinone diazide compound; a resinous binder composition which composition contains at least 20% by weight of a resin having the general formula



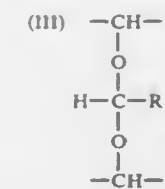
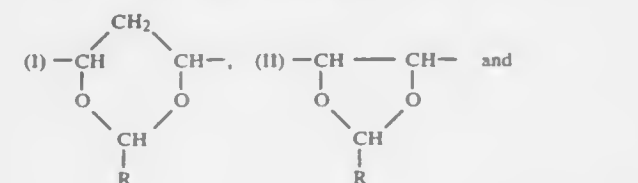
wherein a plurality of each of components A, B and C occur in ordered or random sequence in the resin and wherein A is present in said resin at about 5% to about 20% by weight and comprises groups of the formula



B is present in said resin at about 4% to about 30% by weight and comprises groups of the formula



and C is present in said resin at about 50% to about 91% by weight and comprises acetal groups consisting of groups of the formulae



where R is lower alkyl or hydrogen, and wherein said group I. is present in component C from about 75% to about 85%; group II. is present in component C from about 3% to about 5%; and group III. is present in component C from about 10% to about 22% wherein all acetals are based on the mol number of C units present; and at least one colorant; and

- an adhesive layer in direct contact with said photosensitive layer, which adhesive layer comprises a polyvinyl acetate containing polymer and which adhesive layer is nontacky at room temperature, thermally activated and can be transferred at temperatures between 60° C. and 90° C.; and
- either
  - laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and removing said substrate by the application of peeling forces; and imagewise exposing said photosensitive layer to actinic radiation; or
  - imagewise exposing said photosensitive layer to actinic radiation; and laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and removing said substrate by the application of peeling forces; or
  - laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and imagewise exposing said photosensitive layer to actinic radiation; and removing said substrate by the application of peeling forces; and
- removing the exposed areas of said photosensitive layer with a suitable liquid developer, which removing is conducted at a temperature at which said adhesive layer is substantially nontacky.

4,948,694

**RECORDING MEDIUM COMPRISING PHOTOPOLYMERS**

Norio Ohkuma, Machida; Masanori Takenouchi, Atsugi; Masashi Miyagawa, Kawasaki; Hiroshi Hayashi, Ohtsu; Tooru Minami, and Hiroharu Oobayashi, both of Kyoto, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 129,488, Dec. 7, 1987, abandoned. This application Sep. 11, 1989, Ser. No. 405,583

Claims priority, application Japan, Dec. 9, 1986, 61-292683

Int. Cl.<sup>5</sup> G03C 1/68, 1/72

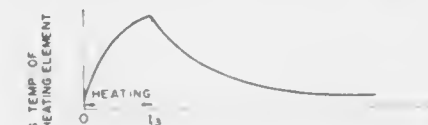
U.S. Cl. 430—138

11 Claims

1. A recording medium comprising a substrate and a transfer layer disposed thereon capable of irreversibly changing its

transfer characteristic when simultaneously provided with light energy and heat energy

wherein the transfer recording layer is solid at room temperature and comprises at least a colorant and a functional component sensitive to the provision of light energy and



heat energy; the functional component comprises at least a photo-initiator and a polymerizing component of a monomer, oligomer or prepolymer having an unsaturated double bond; and the photo-initiator comprises a coumarin derivative and camphorquinone.

4,948,695

**PHOTSENSITIVE HEAT-TRANSFER RECORDING SHEET AND PHOTSENSITIVE PRESSURE-SENSITIVE RECORDING SHEET**

Toshihiko Matsushita; Shigetoshi Hiraiishi, both of Tokyo, and Sadao Morishita, Ushiku, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Continuation of Ser. No. 253,326, Oct. 3, 1988, abandoned, which is a continuation of Ser. No. 895,810, Aug. 12, 1986, abandoned. This application May 25, 1989, Ser. No. 357,614  
Claims priority, application Japan, Aug. 14, 1985, 60-179596; Aug. 14, 1985, 60-179597

Int. Cl.<sup>5</sup> G03K 1/68, 1/72

U.S. Cl. 430—138

11 Claims

1. A photosensitive heat-transfer recording sheet capable of producing a print having a high storage stability and suitable for printing on to a plain paper which comprises (a) support and (b) a layer formed thereon and containing at least three kinds of microcapsules, the wall material of which consists of a heat-meltable substance, the microcapsules enclosing a photocurable resin solution in which a pigment or dye and a photopolymerization initiator are dissolved or dispersed, wherein the pigment or dye is yellow, magenta and cyan and each pigment or dye is enclosed in a different kind of microcapsules, and the photopolymerization initiator enclosed in the microcapsules enclosing a yellow pigment or dye has a  $\lambda_{max}$  of 340 nm and the photopolymerization initiator enclosed in the microcapsules enclosing a magenta pigment or dye has a  $\lambda_{max}$  of 300 nm and the photopolymerization initiator enclosed in the microcapsules enclosing a cyan pigment or dye has a  $\lambda_{max}$  of 250 nm.

4,948,696

**RADIATION IMAGE RECORDING AND REPRODUCING METHOD**

Takashi Nakamura, and Kenji Takahashi, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 42,608, Apr. 23, 1987, abandoned, which is a continuation of Ser. No. 898,827, Aug. 20, 1986, abandoned, which is a continuation of Ser. No. 778,738, Sep. 23, 1985, abandoned, which is a continuation of Ser. No. 664,084, Oct. 23, 1984, abandoned, which is a continuation of Ser. No. 451,226, Dec. 20, 1982, abandoned. This application Mar. 25, 1988, Ser. No. 178,840

Claims priority, application Japan, Dec. 24, 1981, 56-212269

Int. Cl.<sup>5</sup> G03C 5/16

U.S. Cl. 430—139

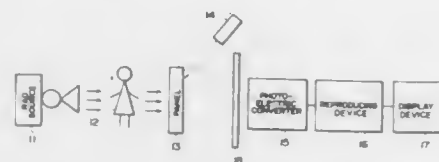
6 Claims

1. A radiation image recording and reproducing method comprising the steps of: exposing a stimutable phosphor containing a bivalent europium activated complex halide phosphor, said phosphor emitting light of higher luminance than

the luminance obtainable with a conventional  $\text{BaFX:Eu}^{2+}$  phosphor upon stimulation thereof, and being represented by the following general formula:



wherein X and X' each designate at least one of Cl, Br and I,



x is a number satisfying  $0 < x \leq 10^{-1}$ , and "a" is a number satisfying  $0 < a \leq 0.2$ , to a radiation passing through an object to have the radiation energy stored in said stimuable phosphor, stimulation said stimuable phosphor by an electromagnetic wave having a wavelength within the range of 450 nm to 1,100 nm, thereby causing said stimuable phosphor to emit said radiation energy in the form of light, and detecting the emitted light.

4,948,697

#### POSITIVE PHOTORESIST WITH A SOLVENT MIXTURE OF PROPYLENE GLYCOL ALKYL ETHER AND PROPYLENE GLYCOL ALKYL ETHER ACETATE

Dana Durham, Bloomsbury, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 97,252, Sep. 17, 1987, abandoned, which is a continuation of Ser. No. 791,880, Oct. 28, 1985, abandoned. This application Jul. 5, 1989, Ser. No. 376,147

Int. Cl.<sup>5</sup> G03C 1/60, 1/76

U.S. Cl. 430—165

13 Claims

1. A photosensitive positive working composition suitable for use as a photoresist, which comprises, at least one resin selected from the group consisting of novolaks and polyvinyl phenols, at least one o-quinone diazide photosensitizer and a sufficient amount of a solvent composition which solvent composition consists of a mixture of propylene glycol alkyl ether and propylene glycol alkyl ether acetate to form a homogenous solution wherein said resin is present in the composition in sufficient quantity amount to act as a binder for a photoresist, and wherein said diazide is present in sufficient quantity amount to act as an effective photosensitizer for a photoresist, and wherein said ether and said acetate are present in said composition in a ratio by weight of from about 1:20 to about 20:1.

7. A photosensitive element which comprises a substrate and the dried composition of the homogenous solution of claim 1 disposed on said substrate, wherein the dried composition contains residual solvent in an amount of from 1% to about 30% as based on the dried coating weight of the composition.

8. The element of claim 7 wherein said substrate comprises one or more components selected from the group consisting of silicon, aluminum, polymeric resins, silicon dioxide, doped silicon dioxide, silicon nitride, tantalum, copper, polysilicon, ceramics and aluminum/copper mixtures.

4,948,698

#### HEAT-PROCESSIBLE COLOR PHOTOGRAPHIC MATERIAL

Tawara Komamura, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Oct. 10, 1989, Ser. No. 418,660

Claims priority, application Japan, Oct. 13, 1988, 63-257998

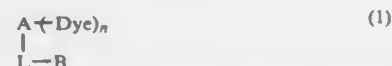
Int. Cl.<sup>5</sup> G03C 5/54, 1/40

U.S. Cl. 430—203

12 Claims

1. A heat-processible color photographic material having on a base support at least a light-sensitive silver halide, a reducing

agent, a binder and a dye-providing material represented by the following general formula (I):



where A is a coupler site capable of dye formation by entering into a coupling reaction with the oxidized product of the reducing agent; L is a divalent linkage group binding to A at the active point of the coupler site represented by A; B is a ballast group having a sufficient molecular size or shape to render the dye-providing material of the general formula (I) substantially immobile during thermal development; Dye is a dye site; n is 1, 2 or 3, part of the coupler site A optionally serving as part of the dye site Dye.

4,948,699

#### SILVER HALIDE PHOTOGRAPHIC LIGHT SENSITIVE MATERIAL AND LIGHT SENSITIVE LITHOGRAPHIC PRINTING PLATE MATERIAL

Hiroshi Nishinoiri; Toshiro Kondo, and Yoshikazu Takaya, all of Nagakakyō, Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan

Filed Aug. 1, 1988, Ser. No. 226,388

Claims priority, application Japan, Aug. 7, 1987, 62-197737; Aug. 7, 1987, 62-197738

Int. Cl.<sup>5</sup> G03C 5/54, 1/20, 1/28, 5/16

U.S. Cl. 430—204

10 Claims

7. A light sensitive lithographic printing plate material which comprises a support and, provided thereon, a silver halide emulsion layer containing a sensitizing dye having a spectral sensitivity maximum in a wavelength region longer than 700 nm and a physical development nuclei layer which is an outermost surface layer wherein such emulsion layer contains a water-soluble polymer which is a homopolymer of an olefinic unsaturated compound containing a carboxyl group, or a salt or an acid anhydride thereof, as a monomer unit or a copolymer of an olefinic unsaturated compound containing a carboxyl group, or a salt or an acid anhydride thereof, as a monomer unit with a vinyl monomer copolymerizable therewith, and the water-soluble polymer has a number-average molecular weight of 20,000 or less.

4,948,700

#### LIQUID LIGHT-SENSITIVE RESINOUS COMPOSITION

Minoru Maeda; Yuichi Wakata; Sadao Fujikura, and Masayuki Iwasaki, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 3, 1989, Ser. No. 389,144

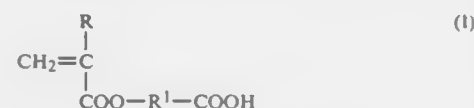
Claims priority, application Japan, Aug. 4, 1988, 63-194865

Int. Cl.<sup>5</sup> G03C 1/727

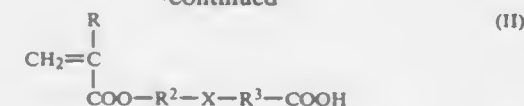
U.S. Cl. 430—280

12 Claims

1. A liquid heat-sensitive and light-sensitive resinous composition containing as main components (A) a photopolymerizable compound prepared by reacting a novolak type epoxy compound with, successively, an unsaturated monocarboxylic acid represented by at least one of formula (I) and (II) and a saturated or unsaturated polybasic acid anhydride, (B) a photopolymerizable compound having at least one ethylenic unsaturated double bond, (C) an epoxy compound having at least one epoxy group, (D) a photopolymerization initiator, (E) a thermosetting catalysts capable of making an epoxy group undergo a thermal reaction, and (F) an organic solvent:



-continued



wherein R represents —H or —CH<sub>3</sub>; R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each represents an unsubstituted or substituted alkylene group, an unsubstituted or substituted arylene group, or an unsubstituted or substituted aralkylene group, and X represents —COO—, —OCO— or —O—.

4,948,701

#### SILVER HALIDE WASH-OUT ELEMENTS

Robert P. Held, Englishtown, N.J., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Nov. 1, 1989, Ser. No. 430,137

Int. Cl.<sup>5</sup> G03C 1/04, 5/36

U.S. Cl. 430—264

16 Claims

1. In a silver halide wash-out element comprising a support that bears at least one gelatino-silver halide emulsion layer, the improvement wherein edge sharpness of the developed image is improved by including in the gelatino-silver halide emulsion layer an aqueous dispersion of a plasticized hydrophobic thermoplastic polymer.

4,948,702

#### PHOTOSENSITIVE RECORDING ELEMENT

Guenter Wallbillich, Neustadt; Peter Neumann, Wiesloch, and Guenter Hansen, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 273,636, Nov. 18, 1988, abandoned, which is a continuation of Ser. No. 16,849, Feb. 20, 1987, abandoned. This application Jun. 5, 1989, Ser. No. 363,420

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3606266

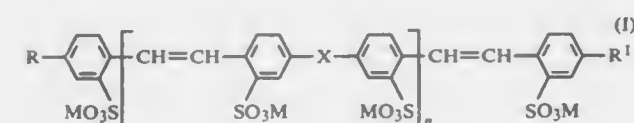
Int. Cl.<sup>5</sup> G03C 1/76

U.S. Cl. 430—271

13 Claims

1. An improved negative-working photosensitive recording element for the production of printing plates, said element comprising

- (a) a dimensionally stable base,
- (b) a photopolymerizable recording layer comprising a polymeric binder, a photopolymerizable ethylenically unsaturated compound and a photoinitiator, and
- (c) an intermediate layer between the base and the recording layer, said element containing a dye in the photopolymerizable recording layer or in the intermediate layer, the improvement comprising using as the dye, at least one migration-resistant sulfo-containing azo or azoxy dye in an amount effective to permit predetermined control of exposure, said sulfo-containing azo or azoxy dye being of the formula (I)



wherein

X is an azo or azoxy group;

M is hydrogen, an alkali metal cation, ammonium or an amine cation;

R and R<sup>1</sup> are identical or different and independently of one another are each —NO<sub>2</sub>, —NH<sub>2</sub>, —NHCOR<sup>2</sup>, —NH—SO<sub>2</sub>R<sup>3</sup> or —N=N—R<sup>4</sup>, in which R<sup>2</sup> is hydrogen, unsubstituted or substituted alkyl, unsubstituted or substituted cycloalkyl, unsubstituted or substituted phenyl, alkoxy, phenoxy, a 5-membered or 6-membered heteroaromatic

radical, —NH<sub>2</sub> or —COOH, R<sup>3</sup> is alkyl or phenyl and R<sup>4</sup> is a radical of a coupling component; and n is an integer from 1 to 6 or, where one or both of R or R<sup>1</sup> is —N=N—R<sup>4</sup>, n is an integer of from 0 to 6.

4,948,703

#### ULTRAVIOLET LIGHT CURABLE COMPOSITION AND USE THEREOF

Samuel J. Falcone, San Jose, Calif.; Richard M. Phelan, deceased, late of Tucson (by Lydia C. Phelan, legal representative), and David R. Smith, Tucson, both of Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 9, 1989, Ser. No. 363,756

Int. Cl.<sup>5</sup> G03C 85/00

U.S. Cl. 430—281

23 Claims



1. An ultraviolet light curable composition comprising:
  - A. About 35 to about 70% by weight of an ethoxylated bisphenol A or bisphenol F diacrylate or dimethacrylate;
  - B. A polyfunctional acrylate or methacrylate;
  - C. N-vinyl pyrrolidone wherein the total of B and C is 25–40% by weight and the ratio of B:A is about 1:2 to 2:1;
  - D. About 0.1 to about 5% by weight of a long chain acrylate or methacrylate being 10 to 22 carbon atoms; and
  - E. About 0.1 to about 5% by weight of a photoinitiator.

4,948,704

#### PROCESS OF FORMING IMAGED PHOTOHARDENED MATERIAL

Richard D. Bauer, Towanda, Pa.; Ursula A. Kraska, Pfungstadt, and Manfred A. J. Sondergeld, Mulheim/Main, both of Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 300,248, Jan. 23, 1989, Pat. No. 4,892,302 which is a continuation of Ser. No. 129,149, Dec. 7, 1987, abandoned, which is a continuation of Ser. No. 857,313, Apr. 30, 1986, abandoned.

Int. Cl.<sup>5</sup> G03C 5/00

U.S. Cl. 430—291

7 Claims

1. A process for reducing temperature dependency during toning which comprises
  - (a) laminating a photohardenable image-forming material on an image-receiving film wherein said image-forming material comprises a synthetic resin support layer and a photohardenable layer having a thickness from about 2 microns to about 1 mm consisting essentially of a mixture of:
    - (i) about 10 to about 80 weight % of at least one ethylenically unsaturated photopolymerizable compound based on the total weight of the dried film;
    - (ii) about 20 to about 90 weight % of binder based on the total weight of the dried film wherein a binder is selected from the group consisting of single polymers with  $T_g \leq 70^\circ \text{C}$ . and mixtures of polymers each with  $T_g \leq 80^\circ \text{C}$ ., the binder is at least one thermoplastic copolymer selected from the group consisting of esters of acrylic acid and esters of methacrylic acid, and the copolymer possesses at least 2 weight percent salt forming groups selected from the group consisting of carboxyl, sulfonic acid, sulfonamide and hydroxyl groups;
    - (iii) at least one crosslinking agent selected from the group consisting of compounds of multivalent metals of groups IIA—IVA, IIB—IVB and VIIB of the Periodic Chart, said agent being present in an effective amount to reduce temperature dependency during toning wherein fluctuations in achievable toned density due to temperature are less than fluctuations in achievable toned density in a tonable film comprising a synthetic resin sup-



- port layer and a photohardenable layer consisting essentially of (i), (ii) and (iv); and  
 (iv) about 0.01 to about 15 weight percent of a photoinitiator or photoinitiating system activatable by actinic radiation based on the total weight of the dried film;  
 (b) image-wise exposing to produce nontacky regions;  
 (c) removing the film support;  
 (d) applying toner to the tacky regions, whereby lamination, exposure, removal of the film support and toning are repeated several times.

4,948,705

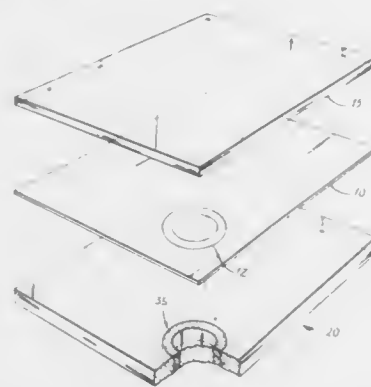
## PHOTOCHROMIC GLASS HIGHLIGHT MASK

Norman W. Throgmorton, 3328 Ringer Rd., St. Louis, Mo. 63125

Continuation-in-part of Ser. No. 15,279, Feb. 17, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 294,406  
 Int. Cl.<sup>5</sup> G03F 1/00; G03C 5/04

U.S. Cl. 430—292

8 Claims



1. The new use, namely as highlight mask for photoreproduction of transparencies having highlight areas, of photochromic sunglass lens material so constituted that radiation in the blue visible range, as well as in the ultraviolet range, will darken the glass, and red radiation will fade it to clear, comprising the steps of

providing such material with opposed parallel surfaces defining a thickness of between one and seven millimeters, securing a film transparency to one of said surfaces, and transmitting light consisting essentially of light in the blue visible range, along with substantially less or no red radiation, through the highlight area of such transparency into said photochromic glass,

whereby darkened microcrystals formed in reaction to such light will form a grainless highlight-mask extending throughout the thickness of the photochromic glass and already secured in registration with such transparency for subsequent photoprinting.

6. The process of making and using a highlight mask for enlarged photoprinting of color transparencies on photosensitive material, comprising the process of making such mask as defined in claim 5, together with the subsequent steps of presenting such mask with such a transparency secured thereon for printing at room temperature in a photo enlarging apparatus whose light source radiates a balance of all colors of the visible spectrum, and exposing such transparency and mask for transmission of light from such light source through the transparency and mask onto such photosensitive material, whereby the mask holds back a portion of light through the highlight areas of the transparency as the photoprinting is carried on, so as to improve the contrast in said highlight areas as printed, and the blue light of said color balance offsets the tendency of the red light thereof to fade the mask.

4,948,706

## PROCESS FOR PRODUCING TRANSPARENT SUBSTRATE HAVING THEREON TRANSPARENT CONDUCTIVE PATTERN ELEMENTS SEPARATED BY LIGHT-SHIELDING INSULATING FILM, AND PROCESS FOR PRODUCING SURFACE-COLORED MATERIAL

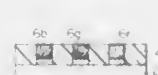
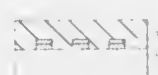
Osamu Sugihara, Nagasaka; Hiroshi Masuda, Yokohama; Shogo Tsukazaki, Tokorozawa; Tameyuki Suzuki, Zushi; Junichi Yasukawa, Chigasaki; Toshiaki Ohta, Narashino, and Toshio Mitsuhashi, Kamagaya, all of Japan, assignors to Hoya Corporation and Sblato Chemitron Co., Ltd., both of Tokyo, Japan  
 Filed Dec. 28, 1988, Ser. No. 291,151

Claims priority, application Japan, Dec. 30, 1987, 62-334002; Dec. 30, 1987, 62-334005

Int. Cl.<sup>5</sup> G03C 5/00; G07F 1/13

U.S. Cl. 430—311

15 Claims



1. A process for producing a transparent substrate having on one side transparent conductive pattern elements separated by a light-shielding insulating film, which process comprising carrying out the following steps in the following order:

- (I) a step of forming on one side of a transparent substrate transparent conductive pattern elements having thereon light-shielding inorganic film pattern elements,
- (II) a step of coating a pigment- and/or dye-containing curable resin on the same side of the transparent substrate,
- (III) a step of applying a light to the other side (the back side) of the transparent substrate to selectively cure the portion of the curable resin by using the light-shielding inorganic film pattern elements as a mask,
- (IV) a step of removing the uncured portion of the curable resin to form a light-shielding insulating film consisting of a colored cured resin, and
- (V) a step of peeling the light-shielding inorganic film pattern elements on the transparent conductive pattern elements.

3. A process according to claim 1, wherein the step (I) of

forming on one side of a transparent substrate transparent conductive pattern elements having thereon light-shielding inorganic film pattern elements is carried out by a method (B) comprising:

- a step (b<sub>1</sub>) of forming a transparent conductive film on a transparent substrate, forming on the transparent conductive film a light-shielding inorganic film which is resistant to an etching to be conducted later for the transparent conductive film, and forming a resist film on the light-shielding inorganic film, and
  - a step (b<sub>2</sub>) of subjecting the resist film formed in the step (b<sub>1</sub>) to selective light exposure and development to form a resist pattern, etching the light-shielding inorganic film using the resist pattern as a mask according to an appropriate etching means to form light-shielding inorganic film pattern elements, and etching the transparent conductive film using the light-shielding inorganic film pattern elements as a mask according to an appropriate etching means to form transparent conductive pattern elements.
4. A process according to claim 1, wherein the transparent conductive pattern elements consist of pixels and lead elements, said pixels forming triangular patterns or mosaic patterns and in the step (I) the light-shielding inorganic film pattern elements are formed substantially on only the pixels of the transparent conductive pattern elements.

4,948,708

## METHOD OF MANUFACTURING A DISPLAY DEVICE

Hendrik Veenliet; Antonius G. H. Verhulst, and Antonius H. M. Raaymakers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

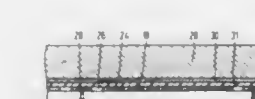
Division of Ser. No. 1,308, Jan. 8, 1987, Pat. No. 4,807,967. This application Sep. 22, 1988, Ser. No. 249,027

Claims priority, application Netherlands, Jan. 9, 1986, 8600027; Mar. 19, 1986, 8600697

Int. Cl.<sup>5</sup> G03C 5/00

U.S. Cl. 430—316

9 Claims



4,948,707

## CONDITIONING A NON-CONDUCTIVE SUBSTRATE FOR SUBSEQUENT SELECTIVE DEPOSITION OF A METAL THEREON

Robert W. Johnson, Endicott; William H. Lawrence, Greece; Gary K. Lemon; Roy H. Magnuson, both of Endicott; Voya R. Markovich, Endwell; Ralph E. Parsons, Endicott, and Carlos J. Sambucetti, Croton-On-Hudson, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,519

Int. Cl.<sup>5</sup> G03C 5/00

U.S. Cl. 430—11

20 Claims

1. Method for conditioning a non-conductive substrate for the subsequent selective deposition thereon of a metal from an electroless plating bath which comprises:
  - providing a non-conductive substrate having at least one of its major surfaces roughened;
  - contacting said at least one of its major surfaces with a homogeneous colloidal dispersion of palladium/tin particles having a particle size of about 10 angstroms to about 50 angstroms;
  - activating said palladium/tin particles by contacting with an alkali hydroxide solution of about 0.05 molar to about 1 molar;
  - laminating to said at least one major surface a photosensitive composition capable of providing a permanent protecting coating;
  - exposing said photosensitive composition to actinic light in a predetermined pattern; and
  - then developing said photosensitive composition to provide a predetermined pattern on said at least one major surface, whereby palladium particles, remaining beneath the photosensitive composition remaining as said permanent protective coating after the developing, are insulated and immobilized to thereby reduce current leakage between adjacent circuit lines from the subsequent selective deposition on the substrate of a metal from an electroless plating bath.

1. A method of manufacturing a passive display device comprising the steps of:

- (a) providing a first electrode structure on one side of a first substrate,
- (b) covering said electrode structure with a layer of dielectric material,
- (c) forming in succession on said layer of dielectric material a layer of a polymer, a layer of one of Al and Ag, a photoresist layer, and a mask having a plurality of apertures,
- (d) exposing and developing said photoresist layer through said mask,
- (e) etching said layer of one of Al and Ag to form a pattern of apertures corresponding to said plurality of apertures, said layer including a plurality of slit-shaped elements and bonding plates remaining between said plurality of apertures, and removing the developed photoresist layer and said mask having a plurality of apertures,
- (f) etching said polymer by a gas plasma through said pattern of apertures,
- (g) forming polymeric supports beneath said bonding plates from unetched portions of said layer of polymer,
- (h) etching away other parts of polymeric material of said layer of polymer, and
- (i) coating said layer of one of Al or Ag with a transparent second substrate, said transparent second substrate including a surface with a second electrode structure and a dielectric layer facing said first electrode structure.

wherein one or both of the substituents X and Y is a hydroxy group, and the other substituent X or Y, and the substituents R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub> are each hydrogen, alkyl, substituted alkyl, alkoxy, substituted alkoxy, aryl, substituted aryl, aryloxy, substituted aryloxy, dialkyl amino, alkyl thio, substituted alkyl thio, halogen, sulphonic acid or a metal salt thereof, or carboxylic acid or a metal salt thereof, ester or amide groups and wherein any two adjacent substituent groups may represent the atoms necessary to complete a heterocyclic or carbocyclic annulated ring which is optionally substituted.



4,948,715

## POLYMERIC POLYMETHINE DYES AND OPTICAL DATA STORAGE MEDIA CONTAINING SAME

Alan G. Hulme-Lowe, Andrew C. Jackson, both of Bishop's Stortford, England, and Vivien L. Bell, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 1, 1989, Ser. No. 305,418

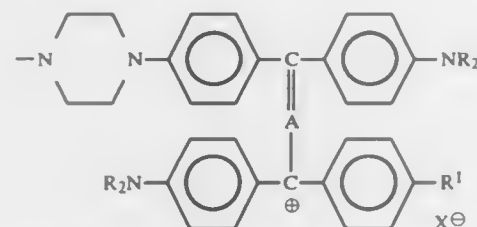
Claims priority, application United Kingdom, Feb. 15, 1988, 8803416

Int. Cl.<sup>5</sup> G03C 172

U.S. Cl. 430—495

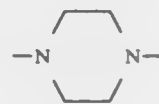
19 Claims

1. A polymeric dye having a plurality of units of the general formula:



wherein:

each R represents an alkyl group of 1 to 4 carbon atoms, A represents a conjugated chain of carbon atoms having an equal number of double and single bonds, R<sup>1</sup> is a member of the group consisting of —NR<sub>2</sub> and



and

X<sup>-</sup> represents an anion.

4,948,716

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Keiji Mihayashi, and Seiji Ichijima, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 7, 1988, Ser. No. 268,617

Claims priority, application Japan, Apr. 30, 1985, 60-93326

Int. Cl.<sup>5</sup> G03C 1/46

U.S. Cl. 430—505

15 Claims

1. A silver halide color photographic material including a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer on a support, wherein at least one of the photo-sensitive layers comprises two or more unit layers having different sensitivities, and among all of said unit layers, the unit layer highest in sensitivity contains at least one of

- a compound capable of producing, by the reaction of the compound with a developing agent oxidized product, a compound that can produce a development inhibitor or its precursor when oxidized, and
- a compound capable of producing, by the reaction of the compound with a developing agent oxidized product, a precursor of a compound that can produce a development inhibitor or its precursor when oxidized,

with the amount of said at least one of the compounds (a) and (b) being at most 1 mol% based on the amount of the silver halide in said unit layer highest in sensitivity.

## SOLID PARTICLE DYE DISPERSIONS FOR PHOTOGRAPHIC FILTER LAYERS

Donald R. Diehl, and Ronda E. Factor, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

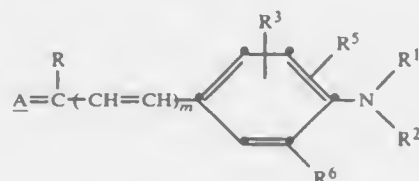
Continuation-in-part of Ser. No. 137,490, Dec. 23, 1987, Pat. No. 4,857,446, which is a continuation-in-part of Ser. No. 104,468, Oct. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 945,634, Dec. 23, 1986, abandoned. This application Jun. 30, 1989, Ser. No. 373,747

Int. Cl.<sup>5</sup> G03C 1/84

U.S. Cl. 430—510

9 Claims

1. A photographic element comprising a support, a radiation-sensitive silver halide layer and a hydrophilic filter layer comprising a hydrophilic binder and about 1 to 100 mg/m<sup>2</sup> of a dye having the formula:



wherein

A represents a substituted or unsubstituted nucleus selected from the group consisting of rhodanines, hydantoin, 2-thiohydantoin, 4-thiohydantoin, 2,4-oxazolidindiones, 2-thio-2,4-oxazolidindiones, isoxazolinones, barbiturics, 2-thiobarbiturics, and indandiones, said nucleus having a carboxyphenyl substituent or sulfonamidophenyl substituent,

R represents hydrogen, alkyl of 1 to 4 carbon atoms, or benzyl,

R<sup>1</sup> and R<sup>2</sup> each independently represents alkyl or aryl, or taken together with R<sup>3</sup>, R<sup>4</sup>, N, and the carbon atoms to which they are attached, represent the atoms needed to complete a julolidyl ring,

R<sup>3</sup> represents H, alkyl, or aryl,

R<sup>5</sup> and R<sup>6</sup> each independently represents H, or R<sup>5</sup> taken together with R<sup>1</sup>, or R<sup>6</sup> taken together with R<sup>2</sup>, may each represent the atoms necessary to complete a carbocyclic ring, and

m is 0 or 1, said dye being in the form of a dispersion of solid particles having a mean diameter of about 0.01 to 10 μm.

4,948,718

## PHOTOGRAPHIC SILVER HALIDE ELEMENTS CONTAINING SOLID PARTICLE DISPERSIONS OF DYES

Ronda E. Factor, and Donald R. Diehl, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 137,402, Dec. 23, 1987, abandoned.

This application Jun. 27, 1989, Ser. No. 372,142

Int. Cl.<sup>5</sup> G03C 1/34

U.S. Cl. 430—522

5 Claims

1. A photographic element comprising a support having thereon a radiation-sensitive silver halide emulsion layer and a layer, which is the same as or different from the silver halide layer, comprising a hydrophilic binder, and an amount effective as a photographic filter dye of a dispersion of solid particles, said dispersion consisting essentially of a compound having the formula:

4,948,720

## PHOTOGRAPHIC ELEMENT CONTAINING POLYPHOSPHAZENE ANTISTATIC COMPOSITION

Janglin Chen, Rochester; Wayne T. Ferrar, Fairport; James E. Kelly, Pittsford, and Akemi S. Marshall, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

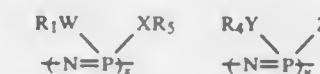
Continuation-in-part of Ser. No. 87,480, Aug. 20, 1987, abandoned. This application Jan. 6, 1989, Ser. No. 295,071

Int. Cl.<sup>5</sup> G03C 1/94

U.S. Cl. 430—527

11 Claims

1. A photographic element comprising an electrically insulative support having thereon a radiation-sensitive silver halide emulsion layer and an antistatic layer including a polyphosphazene comprising repeating units of the formula:



wherein

R<sub>1</sub> and R<sub>2</sub> are each independently substituted or unsubstituted alkyl or aryl, or together represent the atoms necessary to complete a substituted or unsubstituted 5- or 6-membered ring,

R<sub>3</sub> and R<sub>4</sub> each independently represents H, substituted or unsubstituted alkyl, substituted or unsubstituted aryl, CO<sub>2</sub>H, or NHSO<sub>2</sub>R<sub>6</sub>,

R<sub>5</sub> is H, substituted or unsubstituted alkyl, substituted or unsubstituted aryl, substituted or unsubstituted carboxylate, or substituted or unsubstituted acyl,

R<sub>6</sub> and R<sub>7</sub> are each independently substituted or unsubstituted alkyl or substituted or unsubstituted aryl,

R<sub>8</sub> is substituted or unsubstituted alkyl, or is part of a double bond between the ring carbon atoms to which R<sub>1</sub> and R<sub>2</sub> are attached, and

n is 1 or 2,

with the proviso that at least one of the aryl rings of the dye molecule has at least one substituent that is CO<sub>2</sub>H or NHSO<sub>2</sub>R<sub>6</sub>,

the particles of said dispersion having a mean diameter of about 0.01 to 10 μm.

4,948,719

## PHOTOGRAPHIC SUPPORT

Kazuyuki Koike; Tetsuro Fuchizawa, both of Shizuoka, and Keisuke Shiba, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 11, 1988, Ser. No. 179,925

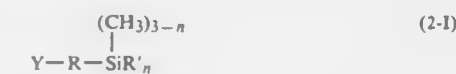
Claims priority, application Japan, Apr. 9, 1987, 62-87636; Apr. 9, 1987, 62-87637

Int. Cl.<sup>5</sup> G03C 1/94

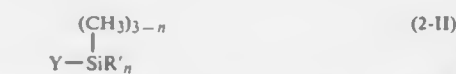
U.S. Cl. 430—524

4 Claims

1. A photographic element comprising a support having provided thereon at least one light-sensitive silver halide emulsion layer, wherein said support comprises a substrate having thereon a metal film layer having a secondary diffuse-reflective surface and an adhesive layer on said metal film layer, wherein said adhesive layer consists of a silane coupling agent represented by formula (2-I) or (2-II):



(2-I)



(2-II)

wherein Y represents an organic functional group, R represents an alkylene group having 1 to 5 carbon atoms, R' represents an alkoxy group having 1 to 4 carbon atoms, and n represents 2 or 3,

and has a thickness of 0.01 to 5 μm.

4,948,721

## PHOTOGRAPHIC RECORDING MATERIALS WITH ENHANCED LATENT IMAGE STABILITY

Roger Lok, Hilton, and Ronald E. Leone, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 26, 1989, Ser. No. 385,044

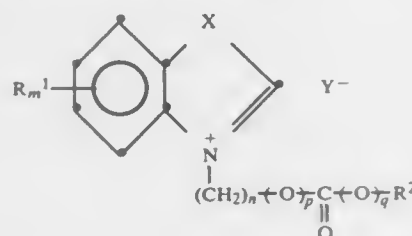
Int. Cl.<sup>5</sup> G03C 1/02

U.S. Cl. 430—551

16 Claims

1. A photographic recording material comprising a support and a silver halide emulsion which has associated therewith an

N-alkyl or N-alkenylbenzothiazolium or benzoselenazolium salt having the structural formula:



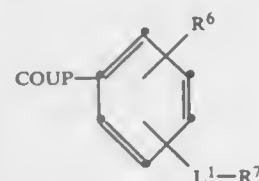
wherein:

- X is sulfur or selenium;  
 R<sup>1</sup> is hydrogen, halogen, lower alkyl or lower alkoxy;  
 R<sup>2</sup> is —CH<sub>2</sub>CH<sub>3</sub> or —CH=CH<sub>2</sub>;  
 Y is a counterbalancing ion;  
 m is 0 to 4;  
 n is 1 to 5; and  
 p and q are each 0 or 1, with the proviso that when p is 1, q is 0 and when q is 1, p is 0;

#### 4,948,722 PHOTOGRAPHIC MATERIAL AND PROCESS COMPRISING A PYRAZOLOAZOLE DYE-FORMING COUPLER

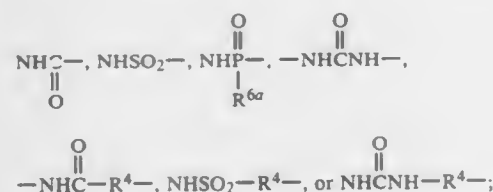
John W. Harder, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
 Filed Oct. 31, 1988, Ser. No. 265,155  
 Int. Cl.<sup>3</sup> G03C 7/38

U.S. Cl. 430—558 7 Claims  
 1. A photographic element comprising a support bearing a photographic silver halide emulsion and a dye-forming coupler wherein the dye-forming coupler is a pyrazoloazole coupler comprising (I) at least one polyether group (A) comprising at least two ether (—O—) groups and (II) having between the group (A) and the pyrazoloazole nucleus a linking group wherein the pyrazoloazole coupler is represented by the formula:



wherein

- COUP is a pyrazoloazole coupler nucleus;  
 R<sup>6</sup> is hydrogen or unsubstituted or substituted alkyl, aryl, alkoxy or aryloxy;  
 L<sup>1</sup> is



- R<sup>4</sup> is unsubstituted or substituted alkylene;  
 R<sup>6a</sup> is R<sup>6</sup> or O—R<sup>7</sup>; and  
 R<sup>7</sup> is a polyether group.

#### 4,948,723 METHOD OF DIAGNOSIS AND SEVERITY-ASSESSMENT OF PANCREATIC DISEASE John Hermon-Taylor, and Brian M. Austen, both of London, England, assignors to Bioscience International, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 3,738, Jan. 6, 1987. This application Jul. 28, 1987, Ser. No. 78,737  
 Int. Cl.<sup>3</sup> G01N 33/53, 33/543; C07K 7/06, 17/00  
 U.S. Cl. 435—7 10 Claims

1. A method of diagnosing pancreatic disease in a patient which comprises assaying a sample of the patient's body fluid for the presence or absence of peptides which are the activation peptides of pancreatic zymogens specifically cleaved by proteolysis during activation (PAP), the pancreatic zymogen being selected from the group consisting of trypsinogen, pro-phospholipase A<sub>2</sub>, procolipase, proelastase 1, proelastase 2, prekallekrein, procarboxypeptidases A, and procarboxypeptidases B, the activation peptide being selected from the group consisting of trypsinogen activation peptide (TAP), pro-phospholipase A<sub>2</sub> activation peptide (PLAP), procolipase activation peptide (CLAP), proelastase 1 activation peptide, proelastase 2 activation peptide (PEAP), prekallekrein activation peptide, procarboxypeptidases A activation peptide and procarboxypeptidases B activation peptide.

#### 4,948,724 COMPOSITION, KIT AND METHOD FOR ASSAYING HEPARIN AND A METHOD FOR MAKING THE COMPOSITION

E. Thye Yin, 2335 S. Hanley Rd., St. Louis, Mo. 63144  
 Continuation-in-part of Ser. No. 236,857, Aug. 26, 1988, Pat. No. 4,851,336, which is a continuation of Ser. No. 14,261, Feb. 11, 1987, abandoned, which is a continuation of Ser. No. 772,846, Sep. 5, 1985, abandoned. This application Mar. 14, 1989, Ser. No. 322,904

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C12Q 1/56; G01N 21/75, 33/86  
 U.S. Cl. 435—13 5 Claims

1. An assay composition consisting essentially of an admixture of  
 (1) calcium chloride,  
 (2) brain phospholipids, and  
 (3) a buffered plasma fraction that has been produced by treating mammalian blood to substantially remove clotting Factors II, VII, IX and X, while retaining incidental amounts of clotting Factor V and fibrinogen,  
 said admixture being characterized by the fact that  
 (a) it does not clot by itself for at least 24 hours at 37 degrees C., and  
 (b) it provides a linear heparin dilution curve using a standard heparin preparation.

#### 4,948,725 TYPE VI BACTERIAL FC RECEPTORS Michael D. P. Boyle, Gainesville, Fla., assignor to University of Florida Research Foundation, Inc., Gainesville, Fla.

Filed Dec. 10, 1987, Ser. No. 131,071  
 Int. Cl.<sup>3</sup> G01N 33/53, 33/532; C12Q 1/02; C12N 1/00  
 U.S. Cl. 435—7 2 Claims

1. A kit for use in identifying antibodies comprising:  
 (a) an immunoadsorbent comprising the antigen of interest;  
 (b) a diluent for a serum or plasma sample;  
 (c) a labeled type IV Fc receptor;  
 (d) a positive control; and  
 (e) a negative control.

#### 4,948,726 ENZYME IMMUNOASSAY BASED ON MEMBRANE SEPARATION OF ANTIGEN-ANTIBODY COMPLEXES Claude C. Longoria, 2927 Field Line Dr., Sugar Land, Tex. 77479

Continuation of Ser. No. 869,242, Jun. 2, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 311,222  
 Int. Cl.<sup>3</sup> G01N 33/53

U.S. Cl. 435—7 34 Claims

1. An enzyme immunoassay process for detection of antigen based on membrane separation of antigen-antibody complexes, comprising:

- mixing a fluid specimen containing the antigen with an enzyme-conjugated antibody specific for the antigen under test and forming an antigen antibody-conjugate having a distinctive net ionic charge differing from the ionic charge of each of the reactant antigen and antibody molecules;
- retaining the antigen-antibody-conjugate mixture for a period sufficient for reaction of the antigen and antibody;
- passing the reacted antigen-antibody-conjugate mixture through a filter membrane having a net electrostatic charge providing an affinity for retaining by adsorption thereto antigen-antibody-conjugate complexes having said distinctive net ionic charge while not having an electrostatic affinity for retaining free antibody-conjugate and permitting free antibody-conjugate to pass therethrough;
- applying a wash solution to said filter membrane to remove free antibody-conjugate remaining thereon thus leaving antigen-antibody-conjugate electrostatically adsorbed by said filter membrane; and
- applying an enzyme substrate-chromogen reagent solution to said filter membrane which reacts with filter-bound antigen-antibody-conjugate complex and develops a color indicative of the presence of said antigen-antibody-conjugate complex, said color being visible or fluorogenic.

#### 4,948,727 CHEMICAL SENSOR Anthony E. G. Cass, London, and Helena Bramwell, Chester, both of England, assignors to Medisense, Inc., Cambridge, Mass.

Filed Oct. 11, 1985, Ser. No. 786,974  
 Claims priority, application United Kingdom, Oct. 12, 1984, 8425777; Aug. 30, 1985, 8521627

Int. Cl.<sup>3</sup> C12Q 1/00; C12M 1/00; G01N 29/00  
 U.S. Cl. 435—18 10 Claims

1. A method of assay of a liquid sample of a bodily fluid to determine presence or content of N-acylated primary aromatic amine, comprising:

- contacting said sample with an enzyme capable of catalyzing the hydrolysis of N-acylated primary aromatic amine to form an enzyme/amine system comprising said enzyme and said N-acylated primary amine;
- contacting said enzyme/amine system with an electrode;
- poising said electrode at a potential responsive to direct non-mediated transfer of charge from the system to the electrode; and
- detecting or measuring the current flow as an indication of presence of amount of N-acylated primary aromatic amine in the system.

#### 4,948,728 MONOLITH REACTOR CONTAINING A PLURALITY OF FLOW PASSAGES AND METHOD FOR CARRYING OUT BIOLOGICAL REACTIONS

Gregory Stephanopoulos, Winchester, Mass.; Julia A. Kornfield, Menlo Park, and Gerald E. Voecks, La Cresenta, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 772,141, Sep. 3, 1985, abandoned. This application Mar. 10, 1988, Ser. No. 166,258  
 Int. Cl.<sup>3</sup> C12P 1/00; C12N 11/14; C12M 1/40, 1/04  
 U.S. Cl. 435—41 18 Claims

1. An apparatus for carrying out transfer and separation of fluid products from biological reactions comprising:

- a unitary structure formed of ceramic material having a plurality of flow passages therein including first and second sets of said flow passages and arranged so that individual passages of said first set of passages are adjacent to individual passages of said second set of passages being separated by walls formed of said ceramic material, said ceramic material being porous to provide selective mass transfer of oxygen and biological reaction products while containing liquid in said second set of passages;
- a first fluid means for providing fluid communication with said first set of flow passages and a first fluid outlet means for removing fluid from said flow passages;
- a second fluid communication means providing fluid communication with said second set of said flow passages and a second fluid outlet means for removing fluid from said flow passages; and
- means connected to said first fluid communication means for establishing flow of a fluid which will yield gaseous oxygen through said first set of flow passages and means connected to said second set of flow passages for establishing fluid flow through said second set of flow passages whereby a gaseous oxygen flow producing gradient through said porous ceramic material will be established between said first and second sets of passages.

#### 4,948,729 PRODUCTION OF SOLUBLE RECOMBINANT PROTEINS

Michael Piatak, Jr., Walnut Creek; Walter J. Laird, Pinole, and Julie A. Lane, Oakland, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 715,933, Mar. 25, 1985, abandoned. This application Mar. 17, 1988, Ser. No. 171,132  
 Int. Cl.<sup>3</sup> C12P 21/00; C12N 15/00, 1/20; C07H 21/04  
 U.S. Cl. 436—68 8 Claims

1. A system for production of a soluble, biologically active, heterologous protein in procaryotic hosts, which system comprises DNA having the coding sequence for a ricin A protein initiated by an ATG initiation codon, said initiated coding sequence operably linked to, and out of reading frame with, the terminated leader DNA sequence encoding bacterial alkaline phosphatase (phoA).

#### 4,948,730 MODULATION OF ANIMAL CELLULAR RESPONSES WITH COMPOSITIONS CONTAINING 8-SUBSTITUTED GUANINE DERIVATIVES

Michael G. Goodman, Carlsbad, and William O. Weigle, Del Mar, both of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

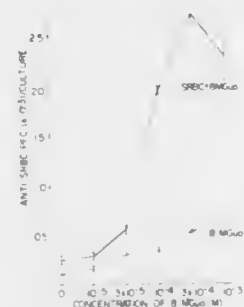
Division of Ser. No. 14,618, Feb. 13, 1987, Pat. No. 4,849,411, which is a continuation of Ser. No. 546,679, Nov. 1, 1983, Pat. No. 4,643,992, which is a continuation-in-part of Ser. No. 439,846, Nov. 9, 1982, Pat. No. 4,539,205. This application Jun. 6, 1989, Ser. No. 361,974

Int. Cl.<sup>3</sup> C12P 21/00; A61K 37/66; C07K 15/26  
 U.S. Cl. 435—70.5 7 Claims

1. The method of inducing interferon production comprising



contacting live animal cells with a composition including as an active ingredient an effective amount of 8-substituted guanine derivative bonded 9-1' to an aldose having 5 or 6 carbon atoms in the aldose chain, said guanine derivative being free of electrically charged functionality, and said 8-substituent having an



electron withdrawing effect greater than that of hydrogen and containing fewer than 15 atoms, together with a diluent amount of a physiologically tolerable carrier, said effective amount inducing interferon production in the presence or absence of interferon-inducing agents.

#### 4,948,731 MODIFIED TRANSCRIPTIONALLY ACTIVE SP6 PLASMID VECTOR

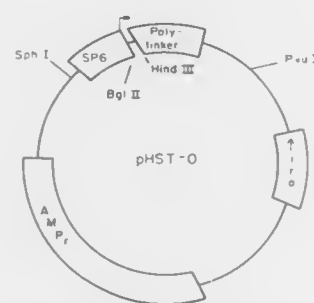
Lee Gehrke, Framingham, Mass.; Robert T. Fraley, St. Louis, and Stephen G. Rogers, Chesterfield, both of Mo., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 5, 1986, Ser. No. 893,482

Int. Cl.<sup>5</sup> C12N 1/00, 15/00, 1/22, 1/20; C12P 19/34, 12/06; C07H 15/12

U.S. Cl. 435—19

11 Claims



1. A transcriptionally active vector comprising a SP6 bacteriophage promoter sequence, and a unique site for a restriction endonuclease, said restriction site overlapping the downstream border of the promoter sequence 3', to and including the transcription initiation site G, wherein cleavage of said restriction site and insertion and transcription of a DNA sequence containing a 5', G downstream of the promoter sequence restores the transcriptional start site and results in a transcribed sequence not including nucleotide sequences derived from the vector.

#### 4,948,732 MICROBIOLOGICAL CHIRAL REDUCTION OF CARBONYL GROUPS

William Charney, Montclair, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 309,461, Feb. 10, 1989, Pat. No. 4,879,233. This application Sep. 26, 1989, Ser. No. 412,707

Int. Cl.<sup>5</sup> C12P 7/02, 7/22; C12R 1/66; C07P 41/00

U.S. Cl. 435—129

3 Claims

1. A process for chiral reduction of ketones to the corresponding hydroxy compound which comprises contacting said ketone with *Aspergillus niger* in a culture medium and recovering said hydroxy compound that is formed in the culture medium.

#### 4,948,733 ZOOGLOEA TRANSFORMATION USING EXOPOLY SACCHARIDE NON-CAPSULE PRODUCING STRAINS

Donald D. Easson, Jr., Cambridge; Oliver P. Peoples, Arlington, and Anthony J. Sinskey, Boston, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 891,136, Jul. 28, 1986, abandoned. This application Apr. 7, 1987, Ser. No. 35,604

Int. Cl.<sup>5</sup> C12N 15/64, 1/20, 1/21, 15/01; C12P 19/04

U.S. Cl. 435—172.3

12 Claims

1. A method for introducing foreign DNA into *Zoogloea* comprising: providing isolated nucleotide sequences, inserting said isolated sequences into a vector capable of replicating in *Zoogloea*; and introducing said vector containing said isolated sequences into an exopolysaccharide producing, non-capsule forming *Zoogloea ramigera* strain.

#### 4,948,734 NOVEL ISOLATES OF BACILLUS THURINGIENSIS HAVING ACTIVITY AGAINST NEMATODES

David L. Edwards, Del Mar; Jewel Payne, and George G. Soares, both of San Diego, all of Calif., assignors to Mycogen Corporation, San Diego, Calif.

Filed Aug. 12, 1987, Ser. No. 84,653

Int. Cl.<sup>5</sup> C12R 1/07; C12P 21/00; A01N 63/00

U.S. Cl. 435—252.5

20 Claims

1. A *Bacillus thuringiensis* isolate active against nematodes, said isolate selected from *B. thuringiensis* strain PS-17, *B. thuringiensis* strain PS-33F2, *B. thuringiensis* strain PS-52A1, *B. thuringiensis* strain PS-63B, and *B. thuringiensis* strain PS-69D1.

#### 4,948,735 SYSTEM FOR RELEASE OF PROTEINS FROM MICROBE CELLS

Salvador E. Luria, Lexington; Joan L. Suit, Cambridge, and Jennifer A. Jackson, Reading, all of Mass., assignors to Repligen Corporation, Cambridge, Mass.

Filed Feb. 6, 1987, Ser. No. 11,579

Int. Cl.<sup>5</sup> C12N 1/20, 1/06, 15/00; C12P 21/00

U.S. Cl. 435—252.8

7 Claims

1. *E. coli* mutant microbes, designated Class I, characterized as follows:

- fully resistant to the lysing action of the kil gene of pCo-IE1 or other such gene with kil-type activity;
- capable of releasing substantial amounts of any of several periplasmic *E. coli* or recombinant proteins into the culture medium when carrying an expressed kil gene or other gene with kil-type activity; and being further characterized as
- capable of releasing periplasmic proteins in amount of about 20 to about 50% throughout the growth cycle.

#### 4,948,736 CONTINUOUS MICROORGANISM CULTIVATING APPARATUS

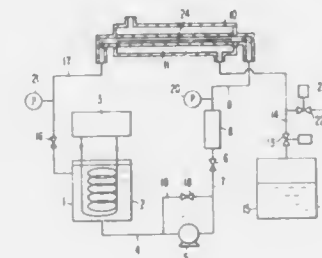
Takeshi Kobayashi, Nagoya; Masayuki Taniguchi, Niigata; Shunji Yasuda, Funabashi, and Shigehito Ikeda, Tongane, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 28,270, Mar. 20, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 373,595

Int. Cl.<sup>5</sup> C12M 1/12

U.S. Cl. 435—311

5 Claims



1. A continuous microorganism cultivating apparatus comprising:

- a stock solution tank containing a stock solution for microbial reaction;
- a filter casing;
- a pipe connecting the stock solution tank with the filter casing;
- a cylindrical filter through which the stock solution can pass in the longitudinal direction of the filter, the filter being placed within the filter casing in such a manner which provides cross-filtration so that the stock solution fed from the stock solution tank passes through the filter, thus separating the stock solution into a filtrate containing a metabolic product and a concentrated liquid containing microbes;
- means placed between the filter casing and the stock solution tank for recycling the concentrated liquid from the filter casing into the stock solution tank;
- a filtrate tank for storing the filtrate;
- a filtrate pipe for connecting the filter casing with the filtrate tank so as to feed the filtrate from the filter casing into the filtrate tank;
- a gas feed pipe joined to the filtrate pipe for feeding a gas through the filtration pipe into the filter casing and backwashing the filter within the filter casing;
- temperature control means for keeping the stock solution contained within the stock solution tank at a constant temperature, comprising a constant-temperature bath and means for feeding a constant-temperature water from the bath through coils in the stock solution in such a manner that the stock solution is maintained at a constant temperature by the constant-temperature water; and a valve and a flow meter for controlling pressure and flow rate of the solution;

wherein the filter, made of a high purity alumina, has a multi-layer structure in which the pore diameters gradually increase from an inner surface of the filter to an outer surface of the filter and the pores have an average pore diameter ranging between 0.2 microns and 1.5 microns, and wherein a liquid flow control means is inserted into the ceramic filter to enhance the cross flow effect.

#### 4,948,737 CARTRIDGE FOR PROPERLY RECEIVING TEST ELEMENTS

John A. Quenin, Rochester, and Mark J. Spath, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,716

Int. Cl.<sup>5</sup> G01N 35/00

U.S. Cl. 436—46

2 Claims

1. A method of properly orienting in a cartridge a stack of one or more test elements some of which can include locations for deposition of liquid that are asymmetrically located, the cartridge including wall means for confining the stack, and two generally opposite openings in opposite ones of said wall means, one of said openings being shaped to allow test elements to be inserted into and removed from the stack, the other being shaped to receive pusher means for pushing a test element out of the stack and cartridge; the method comprising the steps of:

- providing on said test elements in an asymmetric location a keyway or key;
- providing on one of said wall means other than the one having said one opening, a corresponding key or keyway, respectively, shaped and located to mate with the keyway or key of the test element, and
- loading the test elements into the cartridge through said one opening one at a time so that the keyway or key of the test element aligns and mates with the key or keyway of said cartridge, respectively.

#### 4,948,738 MONOCLONAL ANTIBODIES TO GAMMA-INTERFERON, HYBRIDOMAS PRODUCING SUCH ANTIBODIES, AND KIT FOR USING SUCH ANTIBODIES

Jacques Banchereau, Ecully; Odile Djossou, Lyon; John Wijdenes, Lyon; Hélène Cabrilat, Lyon, and Catherine Favre, Lyon, all of France, assignors to Laboratoires UNICET, Levallois-Perret, France

Continuation of Ser. No. 26,722, Mar. 4, 1987, abandoned. This application Jul. 14, 1989, Ser. No. 380,760

Claims priority, application France, Jul. 5, 1985, 8510346

Int. Cl.<sup>5</sup> G01N 33/577

U.S. Cl. 456—531

4 Claims

1. A method of determining the amount of gamma interferon having amino acids deleted at the C-terminus in a sample comprising the steps of:

- determining the total amount of gamma interferon in said sample comprising the steps of:
  - adding the sample to a first monoclonal antibody acting as a catcher, said catcher being capable of recognizing gamma interferons of any length;
  - incubating said first monoclonal antibody and said sample;
  - adding a second monoclonal antibody acting as a tracer, said tracer being capable of recognizing gamma interferons of any length to a moiety capable of generating a detectable response;
  - incubating; and
  - measuring said response to determine the total concentration of the gamma interferons of any length;
- determining the amount of full length gamma interferon in said sample comprising the steps of:
  - adding the sample to a first monoclonal antibody acting as a catcher, said catcher being capable of recognizing essentially full length gamma interferons;
  - incubating said first monoclonal antibody and said sample;
  - adding a second monoclonal antibody acting as a tracer, said tracer being capable of recognizing gamma interferons of any length and said tracer being conjugated to a moiety capable of generating a detectable response;

- (iv) incubating; and
- (v) measuring said response to determine the concentration of the full length gamma interferon, and
- (c) calculating the difference in amounts round in steps (a) and (b).

4,948,739

# COMPACT POLYMER/METAL COMPOSITE PARTICLES, AQUEOUS DISPERSIONS THEREOF, PREPARATION AND USE IN BIOLOGICAL APPLICATIONS

Dominique Charmot, Paris, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 4, 1988, Ser. No. 177,390

Claims priority, application France, Apr. 3, 1987, 87 04684  
Int. Cl.<sup>3</sup> B01J 13/02; C08K 3/08; G01N 33/546

U.S. Cl. 436—533

38 Claims

27. Polymer/metal composite particles, having a size of from 0.1 micron to 1 mm, said composite particles comprising 99.5 to 33% by weight of a matrix based on a copolymer derived from (a) 0.5 to 30% by weight of at least one monomer bearing nucleophilic sites which can be coordinated with a metal complex selected from the group consisting of metal-carbonyl, -organocarbonyl and -hydrocarbon complexes, (b) 30 to 99% by weight of at least one monoethylenic monomer which does not coordinate with said metal complex, and (c) 0.5 to 50% by weight of at least one crosslinkable polyethylenic monomer which does not coordinate with said metal complex and, encapsulated in said matrix, 0.5 to 67% by weight of crystallites of a metal of Group VIa, VIIa, or VIII of the Periodic Classification of the elements in the zero valence state derived from said metal complex, the nature of said copolymer being such that particles of said copolymer are capable of swelling by 0.1 to 50 times their volume, in the presence of an organic liquid which is a solvent for said metal complex, said swollen volume of said particles being such that said copolymer particles become accessible to the molecules of said metal complex while remaining insoluble in said organic liquid, said organic liquid having a boiling point above the temperature of decomposition of said metal complex, and wherein said composite particles are compact and sized, and wherein the size of said metal crystallites is from  $10^{-6}$  to  $10^{-4}$  mm.

36. The method of using the composite particles of claim 27, wherein said particles are employed as a solid phase in a biological application.

37. The method of claim 36, wherein said composite particles, as they are or in an aqueous dispersion, are employed as a solid phase in a diagnostic test.

4,948,740

# METHOD FOR THE INTEGRATED SERIES-INTERCONNECTION OF THICK-FILM SOLAR CELLS AND METHOD FOR THE MANUFACTURE OF TANDEM SOLAR CELLS

Rolf Plaettner, Riemerling, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 15, 1989, Ser. No. 323,867

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3810026

Int. Cl.<sup>3</sup> H01L 31/18

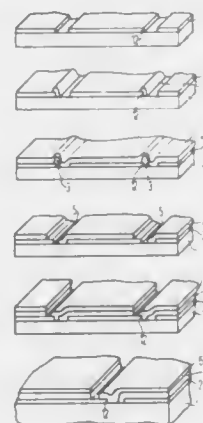
U.S. Cl. 437—4

10 Claims

1. A method for the integrated series-interconnection of a plurality of thick-film solar cells arranged on an insulating, transparent substrate, comprising the sequential steps of:

- (a) applying a stripe pattern onto a pattern of spaced apart base electrodes formed on a substrate, as a paste, through a silk-screening method, before deposition of a thick-film semiconductor layer thereon, the stripe pattern being applied such that it covers an edge of each base electrode lying in a direction toward a neighboring base electrode;

- (b) depositing the thick-film semiconductor layer surface-wide;
- (c) removing the stripe pattern through a lift-off technique, thereby selectively dividing the thick-film into a plurality of segments corresponding to each of the spaced apart base electrodes; and



- (d) applying a cover electrode surface-wide and structuring same such that a series interconnection is formed between the base electrode of each cell and the cover electrode of the neighboring cell.

2. The method of claim 1 wherein the thick-film semiconductor layer comprises polycrystalline silicon.

4,948,741

# POLYSILICON PHOTOCONDUCTOR FOR INTEGRATED CIRCUITS

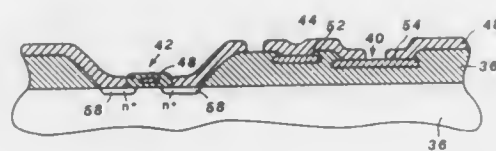
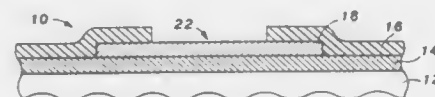
Robert B. Hammond, Los Alamos, N. Mex., and Douglas R. Bowman, Eatontown, N.J., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 147,130, Jan. 21, 1988, Pat. No. 4,821,091, which is a continuation of Ser. No. 888,311, Jul. 22, 1986, abandoned. This application Feb. 23, 1989, Ser. No. 315,449

Int. Cl.<sup>3</sup> H01L 31/18

U.S. Cl. 437—4

3 Claims



1. A process for producing at least one photoconductive element on a bulk silicon substrate comprising:

- a. forming a silicon dioxide layer on said bulk silicon substrate at each location selected for a photoconductive element;
- b. depositing at each of said selected locations a layer of polycrystalline silicon, which is insulatively separated from said bulk silicon by said silicon dioxide layer and which serves as a sensing element;
- c. annealing said deposits of polycrystalline silicon, said

4,948,743

# METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

Hidetoshi Ozaki, Kyoto, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

Filed Jun. 29, 1989, Ser. No. 373,102

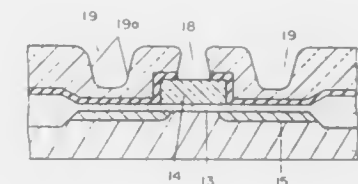
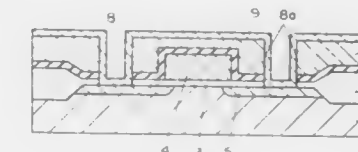
Claims priority, application Japan, Jun. 29, 1988, 63-161751; Jul. 14, 1988, 63-175975

Int. Cl.<sup>3</sup> H01L 21/31, 21/88

U.S. Cl. 437—40

5 Claims

- anneal being effective to increase output current of a photoconductive element and being carried out at a temperature in the range of from about 1000° to about 1200° C. for a time period of about one hour;
- d. providing electrically conductive means which contact each of said polycrystalline silicon deposits and which define an optical access gas above each of said polycrystalline silicon deposits;
- e. subjecting each of said polycrystalline silicon deposits to damage consisting of ion implantation which is effective to adjust response time of the photoconductive element, said response time being proportional to the damage caused to the polycrystalline silicon deposits by said ion implantation.



4,948,742

# METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

Tadashi Nishimura, and Yoichi Akasaka, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 238,251, Aug. 30, 1988, abandoned.

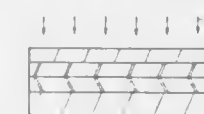
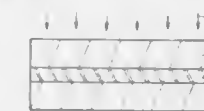
This application Nov. 20, 1989, Ser. No. 437,778

Claims priority, application Japan, Sep. 8, 1987, 62-225025; Sep. 8, 1987, 62-225027

Int. Cl.<sup>3</sup> H01L 21/265, 21/20

U.S. Cl. 437—24

15 Claims



1. A method of manufacturing a semiconductor device, comprising:

- (a) preparing a semiconductor substrate of a predetermined conductivity type;
- (b) implanting nitrogen ions into said semiconductor layer to form a first dielectric layer in a portion of predetermined depth in said semiconductor substrate, and then implanting oxygen ions into said semiconductor substrate to form a second dielectric layer which is adjacent to and is not overlapped with said first dielectric layer in the direction of depth, a portion of said semiconductor substrate on said first and second dielectric layers being defined as a residual semiconductor layer;
- (c) annealing said semiconductor substrate provided with said dielectric layer; and
- (d) forming an epitaxial semiconductor layer having a thickness greater than 2 μm on said residual semiconductor layer through epitaxial growth.

1. A method of manufacturing a semiconductor device comprising the following steps:

- depositing a first insulation film on a semiconductor substrate in which a semiconductor element is incorporated; providing said first insulation film with a heat treatment in order to form a smooth surface on said first insulation film; forming a resist having a predetermined pattern on said first insulation film;
- forming a contact hole in said first insulation film using said resist as a mask;
- removing said resist;
- depositing a second insulation film along the surface of the shape of said semiconductor substrate which has been provided by all of said previous steps;
- forming a slope on the peripheral edge and the side wall of said contact hole by a second heat treatment; and
- removing said second insulation film formed on the bottom of said contact hole.

4. A method of manufacturing a semiconductor device comprising the following steps:

- forming a MOS type semiconductor element which consists of a polycrystalline silicon gate layer on a gate oxidized film formed on a semiconductor substrate and a diffusion layer formed in the surface region of said semiconductor substrate adjacent to said polycrystalline silicon gate layer;
- depositing an insulation film on said polycrystalline gate layer and said semiconductor substrate;
- providing said insulation film with a first heat treatment so as to form a smooth surface on said insulation film;
- forming a resist having a predetermined pattern on said insulation film;
- forming a first contact hole which reaches said polycrystalline silicon gate layer in said insulation film within a region of said polycrystalline silicon gate layer by using said resist as a mask and forming a second contact hole in said insulation film within a region of said diffusion layer while leaving part of said insulation film on the bottom thereof;
- removing said resist;
- forming a slope on the peripheral edge and the side wall of said first and second contact holes by using a second heat treatment; and



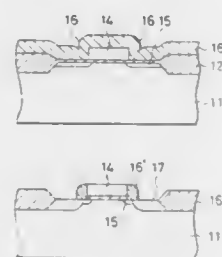
removing said insulation film remaining on the bottom of said second contact hole.

4,948,744

## PROCESS OF FABRICATING A MISFET

Akio Kita, Tokyo, Japan, assignor to OKI Electric Industry Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 245,339, Sep. 16, 1988, abandoned, which is a continuation of Ser. No. 62,427, Jun. 16, 1987, abandoned. This application Nov. 1, 1989, Ser. No. 430,972  
Claims priority, application Japan, Jun. 30, 1986, 61-151686  
Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—44



1. A process of fabricating a MISFET of the LDD structure comprising the steps of:

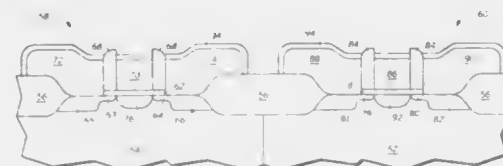
- providing a semiconductor substrate or a semiconductor thin film, said semiconductor substrate or thin film having a surface;
- forming a gate insulation film on the surface of said semiconductor substrate or semiconductor thin film;
- forming a gate electrode on the gate insulation film;
- forming lightly-doped regions in the semiconductor substrate or the semiconductor thin film by ion implantation using the gate electrode as a mask;
- depositing a CVD oxide film, having a thickness  $T_1$  which is less than 1.6 times the thickness  $T_{poly}$  of said gate electrode, over said gate insulation film and gate electrode, said CVD oxide film containing an impurity selected from the group consisting of phosphorus and boron, wherein the amount of said impurity is in the range 2 to 10 mol % for phosphorus when calculated in terms of the amount of  $P_2O_5$  and 3 to 10 mol % for boron when calculated in terms of the amount of  $B_2O_3$ , whereby said CVD oxide film has an overhang at each edge of said gate electrode and a covering angle greater than  $90^\circ$ , said covering angle being defined as the angle between a plane tangential to the edge of said CVD oxide film and the surface of said semiconductor substrate;
- performing anisotropic etching on said CVD oxide film with the projection over said gate electrode in a direction substantially parallel to the surface of said semiconductor substrate or thin film to form sidewalls having a surface along the edges of said gate electrode with a rising angle greater than  $80^\circ$ , said rising angle being defined as the angle between a plane tangential to the surface of said sidewall adjacent the surface of said semiconductor substrate and the surface of said semiconductor substrate; and
- forming heavily-doped source and drain regions in the semiconductor substrate or the semiconductor thin film by ion implantation using the gate electrode and the sidewalls as a mask.

4,948,745  
PROCESS FOR ELEVATED SOURCE/DRAIN FIELD EFFECT STRUCTURE

James R. Pfister, and Richard D. Sivan, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.  
Filed May 22, 1989, Ser. No. 353,933  
Int. Cl.<sup>5</sup> H01L 21/336

U.S. Cl. 437—41

9 Claims



1. A process for fabricating an insulated gate field effect transistor having elevated source and drain electrodes comprising the steps of:

- providing a silicon substrate of a first conductivity type;
- forming a field isolation dividing said substrate into active and field regions;
- forming a gate insulator overlying said active regions;
- depositing a first layer of polycrystalline silicon overlying said gate insulator;
- depositing a dielectric layer overlying said first layer of polycrystalline silicon;
- patterning said dielectric layer and said first layer of polycrystalline silicon to form a stacked structure having a patterned dielectric layer overlying a patterned layer of polycrystalline silicon in a gate electrode pattern;
- depositing a layer of spacer forming material overlying said stacked structure;
- anisotropically etching said layer of spacer forming material to form sidewall spacers at the sides of said stacked structure;
- exposing portions of said active regions adjacent said spacers;
- removing said patterned dielectric layer;
- selectively depositing a second layer of polycrystalline silicon on said patterned layer of polycrystalline silicon and on said exposed portions of said active regions; and doping said second layer of polycrystalline silicon with a first dopant.

4,948,746

## ISOLATED GATE MESFET AND METHOD OF MAKING AND TRIMMING

James D. Beasom, Melbourne Village, Fla., assignor to Harris Corporation, Melbourne, Fla.  
Filed Mar. 4, 1988, Ser. No. 164,342  
Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—44

10 Claims

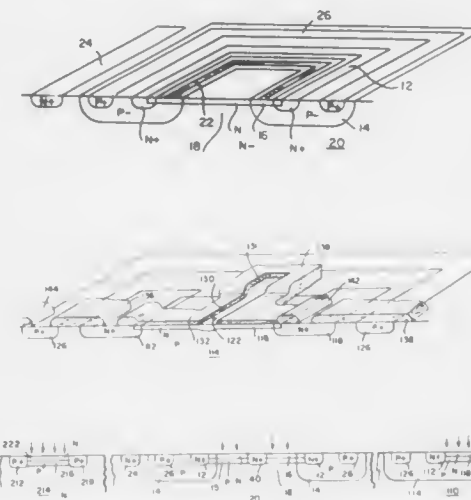
1. A method of making a metal Schottky junction field effect transistor comprising:

- selectively introducing impurities of a first conductivity type into a bottom gate region of a second conductivity type to form source and drain regions spaced in a surface of said bottom gate region;
- forming a first aperture, in a field insulative layer having a first thickness on said surface, to expose an area of said bottom gate region between said source and drain regions, said aperture having a length which is parallel to the direction of separation of said source and drain regions and a width orthogonal to said length;
- forming a thin insulative layer, having a thickness smaller than said first thickness, in said first aperture;
- forming a gate aperture in said field and thin insulative layers to expose a portion of said bottom gate and extending along said width of said first aperture;
- introducing impurities of said first conductivity type using

said field insulative layer as a mask to form a channel region having a width and length in said surface of said bottom gate region connecting said source and drain region; and  
applying a metal gate in said gate aperture in contact with said channel region and isolated from said bottom gate region and of a material which forms a Schottky barrier diode with said channel region to control the total width of said channel region.

5. A method of forming complementary junction field effect transistors comprising:

- introducing impurities of a second conductivity type into a first bottom gate region of a first conductivity type to form first source and drain regions separated by said first bottom gate;
- introducing impurities of said first conductivity type into a second bottom gate region of a second conductivity type



to form second source and drain regions separated by said second bottom gate;

introducing impurities of said second conductivity type in said first and second bottom gate regions to form therein respectively, a first channel region and an enhanced bottom gate region connecting respectively, said first source and drain regions and said second source and drain regions;

introducing impurities of said first conductivity type in said first channel region and said enhanced bottom gate region to form therein respectively, a first top gate region and a second channel region connecting respectively said first source and drain regions and said second source and drain regions; and

applying a metal gate on a portion of said second channel region of a material which forms a Schottky barrier diode second top gate with said second channel region.

4,948,747

## METHOD OF MAKING AN INTEGRATED CIRCUIT RESISTOR

James R. Pfister, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 18, 1989, Ser. No. 451,900

Int. Cl.<sup>5</sup> H01L 21/40, 21/90

U.S. Cl. 437—60

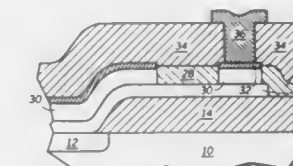
10 Claims

1. A process for fabricating a resistor in a semiconductor integrated circuit comprising the steps of:

- providing a semiconductor substrate;
- depositing a first thin layer of silicon overlying said substrate;

providing a predetermined level of conductivity determining dopant impurity in said first thin layer of silicon; patterning said first thin layer of silicon to form a first resistor area and a second interconnect area, said first and second areas being in contact;

depositing a layer of insulating material overlying said substrate and said first and second areas;



patterning said layer of insulating material to expose said second interconnect area;

depositing by selective deposition a second layer of silicon onto said exposed second interconnect area; and

providing a predetermined level of conductivity determining dopant impurity in said second layer of silicon.

4,948,748

## MANUFACTURE OF A SUBSTRATE STRUCTURE FOR A COMPOSITE SEMICONDUCTOR DEVICE USING WAFER BONDING AND EPITAXIAL REFILL

Kolchi Kitahara, Kawasaki; Yu Ohata, Tokyo, and Tsuyoshi Kuramoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 215,381, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 911,895, Sep. 26, 1986, abandoned.

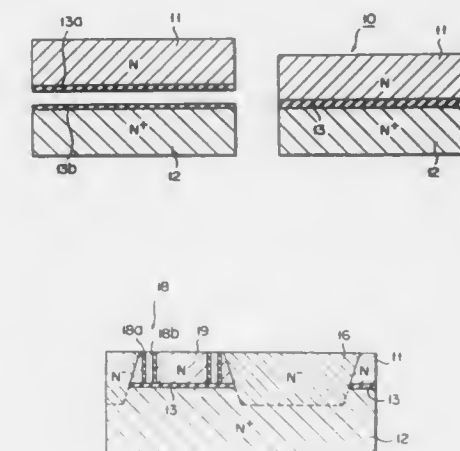
This application Aug. 21, 1989, Ser. No. 396,792

Claims priority, application Japan, Sep. 30, 1985, 60-214853

Int. Cl.<sup>5</sup> H01L 21/20, 21/306

U.S. Cl. 437—62

7 Claims



1. A method of making a substrate structure for a composite semiconductor device comprising the steps of:

- mirror-finishing a surface of each first and second semiconductor substrate;
- forming by thermal oxidation an insulating film on the mirror-finished surfaces of the first and second semiconductor substrates;
- bonding together the mirror finished surfaces of the first and second semiconductor substrates with the insulating

- film interposed between the bonded mirror-finished surfaces;
- (d) etching through a portion of the first semiconductor substrate and the insulating film to reach at least the second semiconductor substrate; and
- (e) forming an epitaxial layer on the second semiconductor substrate in the etched area.

4,948,749

# PROCESS FOR FORMING ELECTRODES FOR SEMICONDUCTOR DEVICES

Tadashi Nishioka; Yoji Mashiko; Hiroaki Morimoto, and Hiroshi Koyama, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

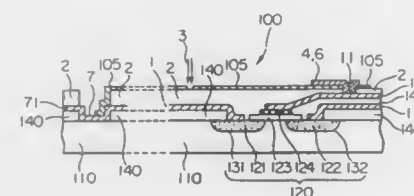
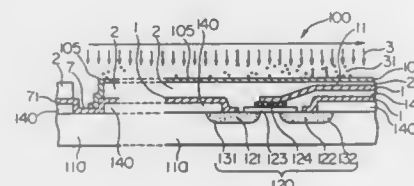
Division of Ser. No. 118,031, Nov. 9, 1987, Pat. No. 4,853,341.

This application Apr. 14, 1989, Ser. No. 338,236

Int. Cl.<sup>3</sup> H01L 21/268, 21/20

U.S. Cl. 437—89

64 Claims



1. A process for forming electrodes for semiconductor devices having a semiconductor substrate and an electrically conductive portion covered and protected by an electrically insulating coating, said process comprising:

of forming an electrically conductive layer on said electrically insulating coating, said electrically conductive layer extending from a given position on said electrically insulating coating having the same potential as that at the semiconductor substrate to a position overlying the electrically conductive portion at which said electrode is to be formed;

partially removing said electrically insulating coating and said electrically conductive layer to expose a part of said electrically conductive portion on said semiconductor substrate;

forming an electrode to be connected to an external circuit by exposing portions of the electrically insulating coating and the electrically conductive layer to an ion beam; and electrically connecting said electrode to the exposed portions of the electrically conductive portion and electrically disconnecting said electrode from said position which is at the same potential as that at said substrate by removing a portion of the extended electrically conductive layer.

4,948,750

# METHOD AND APPARATUS FOR PRODUCING SEMICONDUCTOR LAYERS COMPOSED OF AMORPHOUS SILICON-GERMANIUM ALLOYS THROUGH GLOW DISCHARGE TECHNIQUE, PARTICULARLY FOR SOLAR CELLS

Helmold Kausche, Munich, and Rolf Plaettner, Riemerling, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

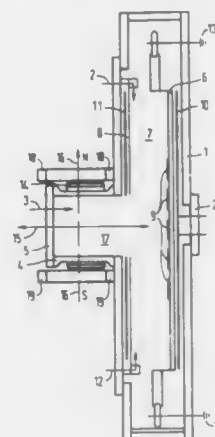
Filed Mar. 13, 1989, Ser. No. 322,117

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3810021

Int. Cl.<sup>3</sup> H01L 21/205, 31/20

U.S. Cl. 437—101

28 Claims



25. A method for producing semiconductor layers composed of amorphous silicon-germanium alloys  $a\text{-Si}_x\text{Ge}_{1-x}\text{:Y}$ , wherein Y is H, F; and  $0 < x < 1$ , by deposition from vapor phase, whereby gases containing hydrogenated or fluorinated silicon and germanium compounds are excited in a gas discharge plasma in a reactor and are deposited as solid, amorphous silicon-germanium layers on substrates, comprising the steps of:

locating the substrates in a reactor on a grounded substrate holder that functions as an electrode;

introducing hydrogen or other process gases for inductive plasma excitation into said reactor via an aperture formed in a central region of a metal cover plate of a silica glass cylinder that is attached to said reactor;

introducing at least one of a hydrogenated silicon-germanium compound as a reaction gas into the reactor at edge regions of the substrate holder plate;

producing plasma both by capacitive radio frequency coupling and inductive radio frequency coupling;

executing both plasma excitations in the same reaction, but, spatially separated; and

superimposing a dc magnetic field for resonance excitation on the inductively excited plasma perpendicular to a radio frequency magnetic field.

4,948,751

# MOLECULAR BEAM EPITAXY FOR SELECTIVE EPITAXIAL GROWTH OF III-V COMPOUND SEMICONDUCTOR

Akihiko Okamoto, and Keiichi Ohata, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed May 19, 1988, Ser. No. 196,009

Claims priority, application Japan, May 20, 1987, 62-124801

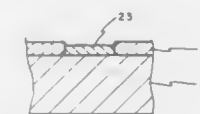
Int. Cl.<sup>3</sup> H01L 21/203, 21/20

U.S. Cl. 437—107

21 Claims

1. A method of selective epitaxial growth comprising:
- a first step of selectively forming an insulator film on a surface of semiconductor substrate; and

- a second step of performing selective epitaxial growth of a III-V compound semiconductor on the exposed area of said surface of said semiconductor substrate without growing said III-V compound semiconductor on said insulator film by evaporating the Group III element of said III-V compound semiconductor in the presence of a Group V element under a condition where a partial pres-



- sure of said Group III element just above said semiconductor substrate and said insulator film is greater than a first equilibrium vapor pressure of said Group III element contained in said III-V compound semiconductor existing on said semiconductor substrate and is smaller than a second equilibrium vapor pressure of said Group III element contained in said III-V compound semiconductor existing on said insulator film.

4,948,752

# METHOD OF MAKING SAGFETS ON BUFFER LAYERS

Arthur E. Geissberger; Robert A. Sadler; Gregory E. Menk, and Matthew L. Balzan, all of Roanoke, Va., assignors to ITT Corporation, New York, N.Y.

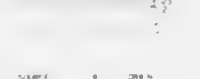
Division of Ser. No. 230,625, Aug. 10, 1988, Pat. No. 4,918,493.

This application Jan. 31, 1990, Ser. No. 472,993

Int. Cl.<sup>3</sup> H01L 21/36

U.S. Cl. 437—110

3 Claims



1. A method of manufacture for a GaAs based semiconductor product comprising:
- providing a semiconductor substrate having a first major surface generally aligned with the (1,0,0) plane of a GaAs surface layer of said substrate;
- providing a first epitaxial layer of GaAs on said first major surface;
- providing an AlAs/GaAs superlattice on said first epitaxial layer of GaAs;
- providing a second epitaxial layer of GaAs on said superlattice;
- providing a compositionally graded buffer layer of AlGaAs commencing with a first mole fraction of Al and ending with a second mole fraction of Al higher than said first mole fraction;
- providing a second layer of AlGaAs on said compositionally

- graded buffer layer of AlGaAs, said second layer of AlGaAs having a uniform mole fraction of Al substantially equal to said second mole fraction and including a top surface;
- providing a third epitaxial layer of GaAs on said second layer of AlGaAs.

4,948,753

# METHOD OF PRODUCING STRIPE-STRUCTURE SEMICONDUCTOR LASER

Akio Yoshikawa, Takatsuki, and Takashi Sugino, Kusatsu, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 715,392, Mar. 25, 1985, Pat. No. 4,719,633.

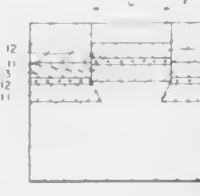
This application Oct. 29, 1987, Ser. No. 114,065

Claims priority, application Japan, Mar. 27, 1984, 59-58712; Jul. 5, 1984, 59-137932; Aug. 8, 1984, 59-166172

Int. Cl.<sup>3</sup> H01L 21/20, 21/203

U.S. Cl. 437—129

2 Claims



1. A method of producing a semiconductor laser, comprising the steps of:
- forming a stripe-shaped projection along a  $\langle 011 \rangle$  direction on a (100) surface of a semiconductor substrate by chemical etching;
- growing on said (100) surface of said semiconductor substrate and on said projection, multilayered thin films with a buried double heterostructure including an active layer, the top layer of which has the same conductivity as that of said semiconductor substrate, by using a metal organic chemical vapor phase epitaxial growth method or a molecular beam epitaxial growth method; and
- doping an impurity of the conductivity type opposite to that of said semiconductor substrate into the top layer of said multilayered thin films formed on said stripe-shaped projection.



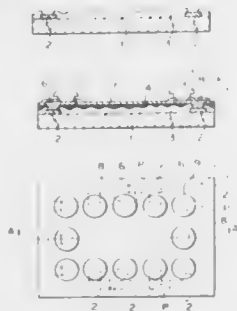
4,948,754

**METHOD FOR MAKING A SEMICONDUCTOR DEVICE**  
Kenji Kondo, Hoi; Hachiro Kunda, Chiryu, and Toshio Sonobe, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 31, 1988, Ser. No. 238,400  
Claims priority, application Japan, Sep. 2, 1987, 62-220031  
Int. Cl.<sup>5</sup> H01L 21/92

U.S. Cl. 437—183

19 Claims



1. A method of making a semiconductor device which comprises:

preparing a wire bonding type semiconductor device having at least one semiconductor element formed in a semiconductor substrate, a plurality of electrode pads electrically connected to said semiconductor element and a passivation film provided on the surface thereof, forming a leading layer over the surface of said electrode pads, and forming at least one bump electrode over the surface of said leading layer.

4,948,755

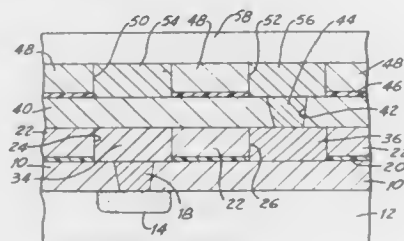
**METHOD OF MANUFACTURING SELF-ALIGNED CONFORMAL METALLIZATION OF SEMICONDUCTOR WAFER BY SELECTIVE METAL DEPOSITION**

Roy Mo, Flushing, N.Y., assignor to Standard Microsystems Corporation, Hauppauge, N.Y.

Continuation of Ser. No. 283,025, Dec. 9, 1988, abandoned, which is a continuation of Ser. No. 107,487, Oct. 8, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 378,490  
Int. Cl.<sup>5</sup> H01L 21/283

U.S. Cl. 437—195

13 Claims



1. A method for fabricating a semiconductor integrated circuit comprising the steps of providing a substrate, forming a first dielectric layer over an upper surface of said substrate, forming a contact hole in said first dielectric layer and extending to said upper surface of said substrate, selectively depositing a metal so as to fill said contact hole with said metal, forming a thin silicon layer overlying the remaining portion of said first dielectric layer and over said metal-filled contact hole, forming a second dielectric layer over said thin silicon layer, using said thin silicon layer as an etching stop, selectively removing portions of said second dielectric layer, thereby to form at least one trench in said second dielectric layer overlying said metal-filled contact hole, and thereafter depositing a metal to fill said trench to substantially the upper surface of said

second dielectric layer while at the same time consuming the portion of said thin silicon layer not protected by the remaining portion of said second dielectric layer, whereby said last-mentioned metal is in electrical contact with metal in said underlying contact hole and is substantially coplanar with the upper surface of said second dielectric layer.

4,948,756

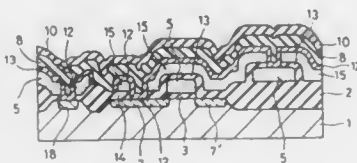
**METHOD OF MAKING INTERCONNECTS BETWEEN POLYSILICON LAYERS**

Seiji Ueda, Ohtsu City, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan

Continuation of Ser. No. 908,382, Sep. 17, 1986, abandoned, which is a division of Ser. No. 506,373, Jun. 21, 1983, abandoned. This application Oct. 28, 1988, Ser. No. 265,355  
Claims priority, application Japan, Jun. 25, 1982, 57-110176  
Int. Cl.<sup>5</sup> H01L 21/283

U.S. Cl. 437—195

6 Claims



1. A method for making a semiconductor device comprising the steps of:

forming a first insulation film on a semiconductor substrate; forming a first polycrystalline semiconductor layer on selected parts of said first insulation film so that said first insulation film is underlying said first polycrystalline semiconductor layer; forming a second insulation film on said first polycrystalline semiconductor layer so that said first polycrystalline semiconductor layer is underlying said second insulation film; forming a second polycrystalline semiconductor layer on a selected part of said second insulation film; forming at least two openings, a first opening penetrating said first insulation film, said first polycrystalline semiconductor layer and said second insulation film thereby exposing side walls of said first insulation film, said first polycrystalline semiconductor layer and said second insulation film and exposing a surface of said substrate and, a second opening penetrating said second insulation film and said second polycrystalline semiconductor layer thereby exposing side walls of said second insulation film and said second polycrystalline semiconductor layer and exposing a surface of said first polycrystalline semiconductor layer; introducing an impurity through said first opening into said substrate to form an impurity-diffused region in said substrate; and selectively forming at least two conductive films, a first conductive film being formed in said first opening, and only on said impurity-diffused region, and said side walls of said first insulation film and said first polycrystalline semiconductor layer to connect together said impurity-diffused region, said first polycrystalline semiconductor layer and said first conductive film in self-alignment and, a second conductive film being formed in said second opening and on said surface of said first polycrystalline semiconductor layer, said side walls of said second insulation film and said second polycrystalline semiconductor layer to connect together said first polycrystalline semiconductor layer, said second polycrystalline semiconductor layer, and said second conductive film in self-alignment.

4,948,757

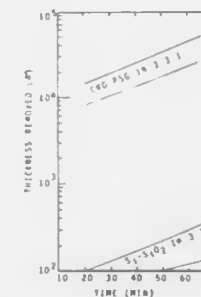
**METHOD FOR FABRICATING THREE-DIMENSIONAL MICROSTRUCTURES AND A HIGH-SENSITIVITY INTEGRATED VIBRATION SENSOR USING SUCH MICROSTRUCTURES**

Kailash C. Jain, Sterling Heights, Mich., and Jacob A. Abraham, Austin, Tex., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 37,581, Apr. 13, 1987, abandoned. This application Feb. 9, 1989, Ser. No. 307,930  
Int. Cl.<sup>5</sup> H01L 21/302, 21/311

U.S. Cl. 437—240

4 Claims



1. A method of etching undensified phosphosilicate glass comprising the step of contacting said phosphosilicate glass with an aqueous ammoniacal hydrogen peroxide solution containing from about 4 mole percent to about 8 mole percent ammonium hydroxide and from about 0.5 mole percent to about 4 mole percent hydrogen peroxide in aqueous solution, in an ammonium hydroxide, hydrogen peroxide and water ratio that is generally equivalent to about 1:1.25 to 1:1.4, respectively, of an aqueous ammonium hydroxide solution containing 28-30 percent  $\text{NH}_3$  by weight, of an aqueous hydrogen peroxide solution containing 30 percent  $\text{H}_2\text{O}_2$  by weight, and of water.

4,948,758

**FIBER-REINFORCED COMPOSITE COMPRISING MICA MATRIX OR INTERLAYER**

George H. Beall, Big Flats; Kenneth Chyung, Painted Post; Steven B. Dawes, Corning; Kishor P. Gadkaree, Big Flats, and Syed N. Hoda, Horseheads, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Division of Ser. No. 261,671, Oct. 24, 1988. This application Dec. 26, 1989, Ser. No. 456,803  
Int. Cl.<sup>5</sup> C03C 3/083

U.S. Cl. 501—3

6 Claims



1. A method for making a ceramic matrix composite article comprising the steps of combining an amorphous or crystalline inorganic fiber reinforcement material with a ceramic matrix material selected from the group consisting of ceramic, glass-ceramic and glass, and thereafter consolidating the combination of matrix material and fibers into a dense, fiber-reinforced composite material, characterized in that a coating consisting essentially of sheet silicate crystals or an oxide precursor thereof is applied to the surfaces of the

fiber reinforcement material prior to combining the fiber reinforcement material with the ceramic matrix material.

4,948,759

**GLASS CERAMIC DIELECTRIC COMPOSITIONS**

Kumaran M. Nair, East Amherst, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 885,829, Jul. 15, 1986, abandoned. This application Oct. 19, 1989, Ser. No. 423,649  
Int. Cl.<sup>5</sup> C03C 8/14, 8/16, 8/02, 3/066

U.S. Cl. 501—17

5 Claims

1. A printable thick film dielectric composition consisting essentially of an admixture of finely divided particles of (a) an amorphous aluminoborosilicate glass which upon firing at Thick Film Processing Conditions forms a single crystalline phase of  $\text{Ba}_2\text{Al}_2\text{Si}_2\text{O}_8$  in a matrix of remainder glass; (b) 1-15% wt., basis total solids, of a ceramic material selected from  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ , complex oxides of  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$ ,  $\text{Si}_3\text{N}_4$ ,  $\text{AlN}$ , complex nitrides  $\text{Si}_3\text{N}_4$  and  $\text{AlN}$  and mixtures thereof, the admixture being dispersed in (c) organic medium.

4,948,760

**WATER REPELLANT INORGANIC GLASS**

Takeshi Ohwaki, and Yasunori Taga, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Continuation of Ser. No. 114,017, Oct. 29, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 403,052

Claims priority, application Japan, Nov. 1, 1986, 61-259620; Nov. 27, 1986, 61-280684  
Int. Cl.<sup>5</sup> C03C 3/06, 15/00

U.S. Cl. 501—54

6 Claims

1. A transparent, inorganic glass comprising an inorganic oxide and having high water repellence which has been produced by irradiating ions having an energy of 50 to 100 keV upon a surface of said inorganic glass in the presence of a gas containing carbon so as to form a water repellent film containing carbon on the surface such that the contact angle of water on the surface of the glass is at least 70 degrees, said ions are those of at least one element selected from the group consisting of F, Cl, Br, Al, Ti, Y, In and Bi, He, Ne, Ar, Kr, Xe, Sc, Cu, Zn, Zr, Ag, Cd, Sn, Sb, Au, Hg, Tl, Pb, Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, and Ba, with the dose of said ions being  $5 \times 10^{14}$  to  $1 \times 10^{17}$  ion/cm<sup>2</sup>.

4,948,761

**PROCESS FOR MAKING A SILICON CARBIDE COMPOSITION**

George T. Hida, N. Tonawanda, N.Y., assignor to Benchmark Structural Ceramics Corporation, Aachen, N.Y.

Continuation-in-part of Ser. No. 279,428, Dec. 2, 1988, which is a continuation-in-part of Ser. No. 254,175, Oct. 6, 1988. This application Apr. 14, 1989, Ser. No. 339,199  
Int. Cl.<sup>5</sup> C04B 35/56

U.S. Cl. 501—89

8 Claims

1. A process for preparing a composite material comprised of silicon carbide, comprising the steps of sequentially:

- providing a composite material which is comprised of from about 25 to about 45 percent of alpha silicon carbide and from about 63 to about 71 percent of alumina, provided that least about 85 percent of such composite material is selected from the group consisting of alpha silicon carbide, alpha alumina, and mixtures thereof, wherein at least about 80 percent of such silicon carbide is comprised of silicon carbide whiskers;
- raising the temperature of said material to a temperature of from about 350 to about 500 degrees centigrade at a rate of from about 15 to about 30 degrees per minute while subjecting said material to a pressure of less than about 150 milliTor;
- maintaining said material at said temperature of from





4,948,770

# METHOD FOR CRYSTALLIZING MAGNESIUM CHLORIDE AND METHOD FOR USING IN A CATALYST COMPOSITION

Robert C. Job, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 67,040, Jun. 29, 1987, abandoned. This application Aug. 8, 1988, Ser. No. 229,203  
Int. Cl.<sup>5</sup> C08F 4/64

U.S. Cl. 502—107

17 Claims

1. A method for making crystalline magnesium halide particles having the formula  $Mg_nE_mX_p \cdot yROH$ , wherein E is iron, chromium, cobalt, aluminum or calcium, X is halogen, ROH is an alcohol, n is a number from 0.25 to 6, m is 0 or 1, p is a number from 2 n to (am+2n), where a is the valence of the metal E, and y is a positive number of up to 12, which method comprises contacting a magnesium compound of the formula  $Mg_nE_mX_p$ , wherein the various symbols are as defined herein, or precursor(s) thereof, with an alcohol of the formula ROH to form a solution thereof, heating the solution to remove any water present by azeotroping, and contacting the heated solution with an inert hydrocarbon liquid to precipitate crystalline particles.

5. A method for making supported particles which comprises melting crystalline magnesium halide particles prepared in accordance with the method claimed in claim 1 at a temperature of 80° C. to 200° C., and adding a porous support to the molten product to form supported magnesium halide particles.

10. A method for making a procatalyst component which comprises halogenating supported particles prepared in accordance with the method claimed in claim 5 using a first halide of tetravalent titanium and a first electron donor to form a halogenated product, contacting the halogenated product with a second halide of tetravalent titanium and a second electron donor to form a treated halogenated product, contacting the treated halogenated product with a third halide of tetravalent titanium and additional second electron donor at a temperature from 40° C. to 140° C., and washing the resulting treated product with an inert hydrocarbon liquid.

4,948,771

# ETHYLENE COPOLYMERIZATION CATALYST

Francis G. Stakem, Flemington, N.J., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Dec. 7, 1988, Ser. No. 280,981  
Int. Cl.<sup>5</sup> C08F 4/68

U.S. Cl. 502—112

11 Claims

1. A catalyst composition comprising:

- a complex comprised of  $V_2X_3(ED)_m$  and  $AlCl_2R_2$  wherein X = Cl, Br, or I, or mixtures thereof  
ED = an electron donor, which is an ether, a phosphine, a ketone, an isocyanide, or an ester, said electron donor having 2 to 20 carbon  
R = an alkyl having up to 14 carbon atoms  
m = an integer from 3 to 6,  
said complex impregnated into an inorganic oxide support;
- sufficient trialkylaluminum compound adsorbed on the inorganic oxide support to provide a molar ratio of adsorbed trialkylaluminum compound to vanadium of about 2.5:1 to about 10:1;
- a halocarbon promoter; and
- a hydrocarbyl aluminum cocatalyst.

4,948,772

# SUBSTANTIALLY FLAT SURFACED VINYL POLYMER EMULSION PARTICLES HAVING A CONCAVITY AND PROCESS FOR PREPARING THEM

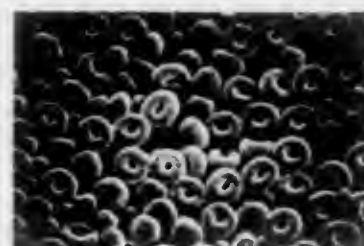
Futoshi Hoshino, Tokyo; Makoto Nakano, and Takeshi Yanagihara, both of Chigasaki, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Jun. 30, 1989, Ser. No. 373,427  
Claims priority, application Japan, Jul. 1, 1988, 63-162591; Sep. 5, 1988, 63-221844

Int. Cl.<sup>5</sup> B41M 5/18

U.S. Cl. 503—207

4 Claims



1. A thermal recording material comprising a substrate, a color developing layer containing a color former and a developer which becomes colored upon contact with the color former, and an undercoat between the substrate and the color developing layer which contains substantially flat surfaced vinyl polymer emulsion particles having a concavity in at least one of the flat surfaces of the particles.

4,948,773

# AMPHORA PARTICULATE CATALYST-SUPPORT AND A METHOD FOR THE PREPARATION OF AN AMPHORA-TYPE PARTICULATE CATALYST-SUPPORT

Toshio Ito, Sodegaura, Japan, assignor to Research Association for Petroleum Alternatives Development, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 310,232  
Int. Cl.<sup>5</sup> B01J 35/08, 37/10

U.S. Cl. 502—247

12 Claims

1. An amphora particulate catalyst-support having an average particle size of 30 to 200 μm and an attrition index of not larger than 10.

7. A hydrogenation catalyst comprising the amphora-type particulate catalyst-support as claimed in claim 1 and at least one catalyst component supported on the amphora particulate catalyst-support, the catalyst component being selected from the group consisting of vanadium, nickel, iron, molybdenum, tungsten, and cobalt.

4,948,774

# METAL-MADE CARRIER BODY FOR CARRYING THEREON EXHAUST GAS CLEANING CATALYST

Masayoshi Usui, and Haruo Serizawa, both of Shizuoka, Japan, assignors to Usui Kokusai Sangyo Kabushiki Kaisha, Japan

Filed Jul. 6, 1989, Ser. No. 376,069  
Claims priority, application Japan, Jul. 6, 1988, 63-166836  
Int. Cl.<sup>5</sup> B01J 32/00

U.S. Cl. 502—439

13 Claims

1. A metal-made carrier body for carrying thereon an exhaust gas cleaning catalyst, said carrier body being formed by superposing a sheet-like metal band made of a thin metal sheet and a corrugated band made from another thin metal sheet one over the other in a contiguous relation into a honeycomb core structure of a spiral or laminate form defining many network-patterned gas flow passages along the central axis thereof, and then fixing the honeycomb core structure within a tubular metal casing, characterized in that the honeycomb core body is

fixed on the tubular metal casing by a brazing material held in brazing-material-holding grooves formed in the inner wall of the tubular metal casing.

4,948,775

# HEAT-SENSITIVE RECORD MATERIAL

Takuji Tsuji, Sakai, and Tomohiro Yanagida, Hyogo, both of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,794  
Claims priority, application Japan, Aug. 24, 1987, 62-210802  
Int. Cl.<sup>5</sup> B41M 5/18

U.S. Cl. 503—207

4 Claims

1. A heat-sensitive record material comprising a protective layer on a recording layer wherein said recording layer is formed on a base sheet, said recording layer comprises a color forming material and a color developing material, and said color forming material is contacted with said color developing material upon heating said recording layer to produce color images, characterized in that said protective layer comprises a water-soluble polymer and a polyethylene wax having an average particle size of 3 to 10 μm, the polyethylene wax is present in an amount from 0.1 to 30 parts by weight per 100 parts by weight of a solid amount of said protective layer.

4,948,776

# INFRARED ABSORBING CHALCOGENOPYRRO-ARYLIDENE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Steven Evans, and Charles D. DeBoer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

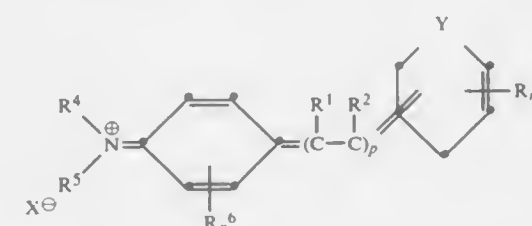
Filed Jun. 16, 1989, Ser. No. 366,969  
Int. Cl.<sup>5</sup> B41M 5/035, 5/26

U.S. Cl. 503—227

17 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

- imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and
- transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said infrared-absorbing material is a chalcogenopyrro-arylidene dye having the following formula:



wherein:

$R^1$  and  $R^2$  each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxy carbonyl, alkoxy carbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any of  $R^1$  and  $R^2$  may be joined together or with an adjacent aromatic ring to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;  
 $R^3$  and  $R^6$  each independently represents  $R^1$  or the atoms necessary to complete a 5- to 7-membered fused substituted or unsubstituted carbocyclic or heterocyclic ring;  
 $R^4$  and  $R^5$  each independently represents a substituted or unsubstituted alkyl or cycloalkyl group having from 1 to

about 6 carbon atoms or an aryl or hetaryl group having from about 5 to about 10 atoms;  
or  $R^4$  and  $R^5$  may be joined together or to the carbon atom of the adjacent aromatic ring at a position ortho to the position of attachment of the anilino nitrogen to form, along with the nitrogen to which they are attached, a 5- to 7-membered heterocyclic ring; Y is oxygen, sulfur, selenium or tellurium with the methine chain being joined ortho or para to Y;  
X is a monovalent anion;  
n and m are 4; and  
p is 1-3, with the proviso that when Y is oxygen, then p is 2 or 3.

4,948,777

# INFRARED ABSORBING BIS(CHALCOGENOPYRRO)POLYMETHINE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Steven Evans, and Charles D. DeBoer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

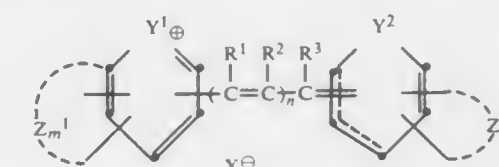
Filed Jun. 16, 1989, Ser. No. 366,970  
Int. Cl.<sup>5</sup> B41M 5/035, 5/26

U.S. Cl. 503—227

16 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

- imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and
- transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said infrared-absorbing material is a bis(chalcogenopyrro)polymethine dye which is located in said dye layer and has the following formula:



wherein:

$R^1$ ,  $R^2$  and  $R^3$  each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxy carbonyl, alkoxy carbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any two of said  $R^1$ ,  $R^2$  and  $R^3$  groups may be joined together to form a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; or  $R^1$  may be joined to  $Z^1$  to form a fused 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; or  $R^3$  may be joined to  $Z^2$  to form a fused 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;  
 $Y^1$  and  $Y^2$  each independently represents sulfur, oxygen, tellurium, or selenium, with the methine chain being joined ortho or para to each of  $Y^1$  and  $Y^2$ ;  
 $Z^1$  and  $Z^2$  each independently represents hydrogen; a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted aryl or hetaryl group having from about 5 to about 10 atoms; or the atoms necessary to complete a 5- to 7-membered carbocyclic or heterocyclic ring;  
each m independently is 1 to 4;  
n is 1 to 3; and  
X is a monovalent anion.

4,948,778

# INFRARED ABSORBING OXYINDOLIZINE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Charles D. DeBoer, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 20, 1989, Ser. No. 369,494

Int. Cl.<sup>5</sup> B41M 5/035, 5/26

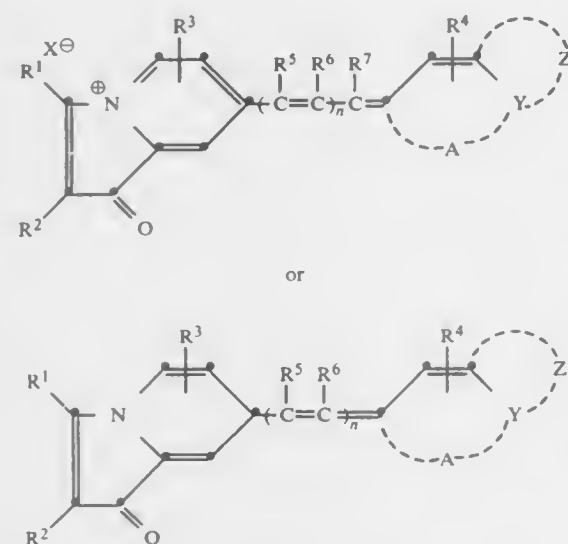
U.S. Cl. 503—227

17 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

(a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and

(b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said infrared-absorbing material is an oxyindolizine dye having the following formula:



wherein:

R<sup>1</sup> and R<sup>2</sup> each independently represents a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms or an aryl, cycloalkyl or heteraryl group having from about 5 to about 10 atoms;

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxy-carbonyl, alkoxy-carbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or heteraryl group;

or any two of said R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> groups may be combined with each other to form a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; Y represents oxygen, sulfur, selenium, tellurium, nitrogen or phosphorus;

A and Z each independently represents hydrogen or the atoms necessary to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring, with the proviso that Z may be a ring only when Y is nitrogen or phosphorus;

n is 0 to 2, with the proviso that n is 1 or 2 when Y is oxygen, sulfur, selenium or tellurium; and

X is a monovalent anion.

4,948,779

# SUPERCONDUCTIVE THIN LAYER

Wilhelmus C. Keur; Cornelis A. H. A. Mutsaers, and Henricus A. M. Van Hal, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

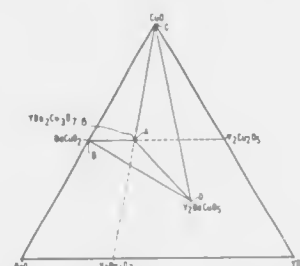
Filed Jul. 26, 1988, Ser. No. 224,109

Claims priority, application Netherlands, Jul. 28, 1987, 8701779

Int. Cl.<sup>5</sup> B32B 9/00

U.S. Cl. 505—1

2 Claims



1. A superconductive thin layer of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-γ</sub> wherein γ=0.1-0.5 supported by a substrate, at least the surface of said substrate in contact with said superconductive thin layer consisting of a compound having a composition falling on one of the tie lines connecting YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-γ</sub>(A), BaCuO<sub>2</sub>(B), CuO-(C) and Y<sub>2</sub>BaCuO<sub>5</sub>(D) in the Y<sub>2</sub>O<sub>3</sub>-BaO, Cu O phase diagram shown in the accompanying FIG. 1.

4,948,780

# ALCOHOLS AND ETHERS HAVING CYCLODODECYL AND CYCLODODECENYL GROUPS, PROCESS FOR THEIR PREPARATION AND SCENTS CONTAINING SAME

Walter Hafner, Eurasburg; Helmut Gebauer, Munich; Erich Markl, Munich, and Marlies Regiert, Munich, all of Fed. Rep. of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 6, 1988, Ser. No. 141,127

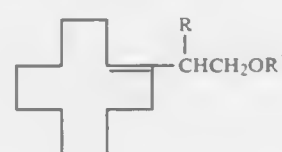
Claims priority, application Fed. Rep. of Germany, Feb. 6, 1987, 3703585

Int. Cl.<sup>5</sup> A61K 7/46

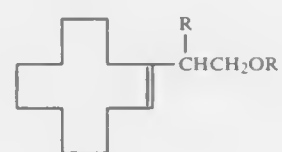
U.S. Cl. 512—8

2 Claims

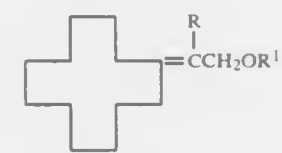
1. A compound of a formula selected from the group consisting of:



(I)



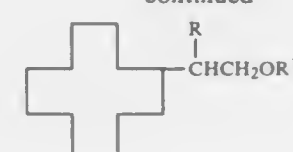
(II)



(III)

and

-continued

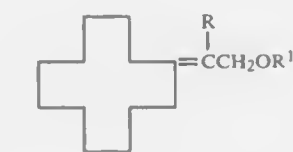


wherein:

R is a substituent selected from the group consisting of a methyl group and an ethyl group; and

R<sup>1</sup> is a substituent selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group.

2. A composition for use as a scent, comprising: a compound of a formula selected from the group consisting of:



and



wherein,

R is a substituent selected from the group consisting of a methyl group and an ethyl group; and

R<sup>1</sup> is a substituent selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group; and a carrier substance.

4,948,781

# NOVEL ODORANT AND/OR FLAVORING SUBSTANCES Roman Kaiser, Uster, and Dietmar Lamparsky, Wangen, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Filed Jan. 26, 1983, Ser. No. 461,080

Claims priority, application Switzerland, Jan. 27, 1982, 492/82

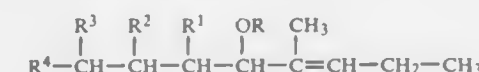
The portion of the term of this patent subsequent to Nov. 13, 2001, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 7/46; C07C 43/15

U.S. Cl. 512—25

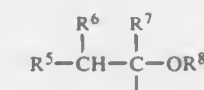
29 Claims

1. A compound of the formula



wherein:

(IV) R represents an alkyl group of one to four carbons, an alkenyl group of two to four carbons or a 1-alkoxy-alkyl group of the formula



R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> may be the same or different and represent hydrogen, methyl or ethyl;

R<sup>4</sup> represents hydrogen, an alkyl group of from one to five carbon atoms, or an alkenyl group of from two to four carbon atoms;

R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> may be the same or different and represent hydrogen, methyl or ethyl with the proviso that the sum R<sup>5</sup>+R<sup>6</sup>+R<sup>7</sup> does not exceed two carbon atoms; and

R<sup>8</sup> represents methyl or ethyl; with the proviso that at least two, but not more than three of the symbols R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> represent hydrogen.

4,948,782

# A METHOD OF PROMOTING THE GROWTH OF DOMESTIC ANIMALS WITH ERYTHROMYCIN DERIVATIVE CONTAINING COMPOSITION

Satoshi Omura, Tokyo, and Zen Itoh, Maebashi, both of Japan, assignors to Kitasato Kenkyusbo, Tokyo, Japan

Filed Feb. 18, 1988, Ser. No. 158,163

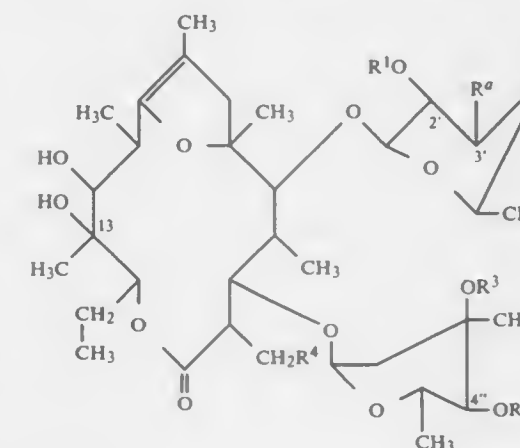
Claims priority, application Japan, Feb. 20, 1987, 62-35469

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—29

4 Claims

1. A method of improving the growth of domestic animals which consists of administering to said animals an effective growth promoting amount of a growth promoting composition containing a compound represented by the formula:



wherein:

R<sup>1</sup> is selected from the group consisting of:

a hydrogen atom; and

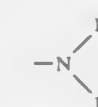
C<sub>1-5</sub> alkyl carboxylic radical;

R<sup>2</sup> is a hydrogen atom;

R<sup>3</sup> is a hydrogen atom;

R<sup>4</sup> is a hydrogen atom;

R<sup>a</sup> stands for the formula



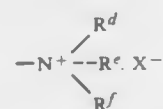
wherein R<sup>b</sup> is selected from the group consisting of:



a hydrogen atom,  
C<sub>1-6</sub> alkyl and  
C<sub>3-7</sub> cycloalkyl radical  
R<sup>c</sup> is selected from the group consisting of:

a hydrogen atom,  
C<sub>1-6</sub> alkyl,  
C<sub>3-7</sub> cycloalkyl,  
C<sub>2-6</sub> alkenyl and  
C<sub>2-6</sub> alkynyl radical  
each of which may be substituted with radicals selected from the group consisting of:  
hydroxy,  
carboxy,  
C<sub>1-4</sub> alkoxy-carbonyl,  
halogen and cyano,

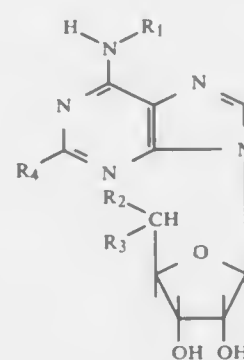
or together R<sup>b</sup> and R<sup>c</sup> form a C<sub>3-7</sub> cyclic alkylamino radical together with the adjacent nitrogen atom,  
with the proviso that R<sup>c</sup> stands for a atom, C<sub>2-6</sub> alkyl, C<sub>3-7</sub> cycloalkyl, C<sub>2-6</sub> alkenyl or C<sub>2-6</sub> alkynyl radical when R<sup>b</sup> is a methyl radical,  
or R<sup>a</sup> is represented by the formula:



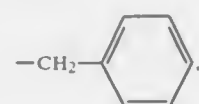
wherein each of R<sup>d</sup>, R<sup>e</sup>, and R<sup>f</sup>, which may be the same or different, are selected from the group consisting of:

C<sub>1-6</sub> alkyl,  
C<sub>3-7</sub> cycloalkyl,  
C<sub>2-6</sub> alkenyl and  
C<sub>2-6</sub> alkynyl radical  
each of which may be substituted with radicals selected from the group consisting of:  
hydroxy,  
carboxy,  
C<sub>1-4</sub> alkoxy-carboxyl,  
halogen and cyano,

or together R<sup>d</sup> and R<sup>e</sup> form a C<sub>3-7</sub> cyclic alkylamino radical together with the adjacent nitrogen atom, and  
X<sup>-</sup> stands for chlorine, bromine or iodine,  
in an acceptable solid or liquid carrier.



wherein R<sub>1</sub> is —H, —CH<sub>3</sub>, or



R<sub>2</sub> is —H, —OH, —Cl, —SCH<sub>3</sub>, OR —SCH<sub>2</sub>CH(CH<sub>3</sub>)<sub>2</sub>;  
R<sub>3</sub> is —H or —CH<sub>2</sub>CH<sub>2</sub>CH(NH<sub>2</sub>)COOH, and R<sub>4</sub> is —H or —Cl, and having antibacterial activity against *Streptococcus mutans* or *Bacteriodes gingivalis*, and  
(b) an orally acceptable carrier therefor.

#### 4,948,784 PLATINUM CONTAINING PULLULAN DERIVATIVES AND COMPOSITIONS CONTAINING THE SAME

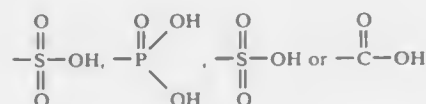
Fumio Mori; Masafumi Okada; Shuji Miki, all of Okayama; Iwao Ebashi, Kumamoto; Takashi Nishida; Kouichiro Kawai, both of Okayama; Tazuko Tashiro, and Shigeru Tsukagoshi, both of Tokyo, all of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan

PCT No. PCT/JP87/00322, § 371 Date Jan. 20, 1988, § 102(e) Date Jan. 20, 1988, PCT Pub. No. WO87/07142, PCT Pub. Date Dec. 3, 1987

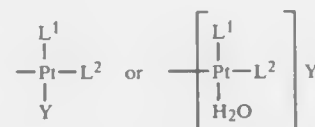
PCT Filed May 20, 1987, Ser. No. 163,961  
Claims priority, application Japan, May 21, 1986, 61-117969; Mar. 6, 1987, 62-52273

Int. Cl.<sup>5</sup> A61K 31/70; C07M 23/00  
U.S. Cl. 514—54 8 Claims

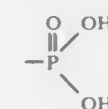
1. A pullulan derivative having a plurality of active sites resulting from the reaction of pullulan within a reactant having a reactive acid moiety selected from the group consisting of sulfuric acid, phosphoric acid, a sulfonic acid and a carboxylic acid, wherein (A) one hydrogen atom of the group of the formula:



occurring at some but not all of said active sites is substituted by a group of the formula



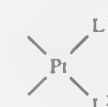
wherein L<sup>1</sup> and L<sup>2</sup> each independently is amine or a unidentate ligand amine or combinedly represent a bidentate ligand amine and Y is an anionic ligand, or (D) two hydrogen atoms of the group



or of two



groups bound to one and the same carbon atom or to two neighboring carbon atoms as occurring at said active sites are, each independently, partly substituted by a group of the formula



wherein L<sup>1</sup> and L<sup>2</sup> are as defined above, or both (A)+(B) hydrogen substitutions are present, or a pharmacologically acceptable salt thereof.

7. A pharmaceutical composition which comprises a therapeutically effective amount of at least one pullulan derivative or a pharmaceutically acceptable salt thereof as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

#### 4,948,785 PLANT POLYSACCHARIDE FRACTIONS INDUCING PROLACTIN IN MAMMALS

Tan Hung Nguyen, Le Porlair, France, assignor to Etablissements Guyomarc'h S. A., France

Filed Jul. 8, 1988, Ser. No. 216,806  
Claims priority, application France, Jul. 10, 1987, 87 09857  
Int. Cl.<sup>5</sup> A61K 31/715; C08B 37/00

U.S. Cl. 514—54 4 Claims

1. A polysaccharide product containing units corresponding to rhamnose, arabinose, xylose, mannose, galactose and glucose, containing a polysaccharide having a molecular mass between 10<sup>4</sup> and 10<sup>6</sup> and containing 1 to 8% of nitrogen and 0.8 to 2% of sulfur, said polysaccharide being of plant origin and being selected from the group consisting of euphorbine A of molecular mass lying between 3.10 × 10<sup>4</sup> and 5.10 × 10<sup>4</sup> daltons and containing 3.10% ± 0.3% of N and 1.09% ± 0.3% of S and euphorbine B, of molecular mass lying between 5.10 × 10<sup>4</sup> and 10<sup>5</sup> daltons and containing 2.5% ± 0.3% of N and 1.1% ± 0.3% of S said polysaccharide being capable of increasing the level of beta-casein in the mammary gland of mammals and providing humans and animals with an increased level of plasma prolactin when administered to said humans and animals in an effective amount, said product being substantially soluble in water and substantially insoluble in ethanol.

#### 4,948,786 COMPOSITION FOR TREATMENT OF ISCHEMIC DISORDER IN ORGANS

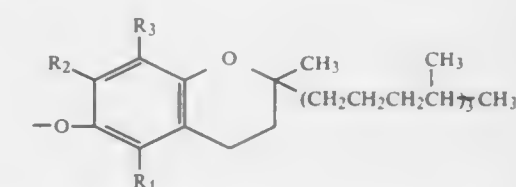
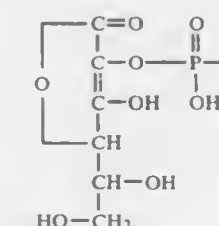
Norio Shimamoto, Hyogo, and Kazumi Ogata, Osaka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 10, 1989, Ser. No. 295,461  
Claims priority, application Japan, Jan. 11, 1988, 63-4480  
Int. Cl.<sup>5</sup> A61K 31/665

U.S. Cl. 514—100 6 Claims

1. A method for the prophylaxis or treatment of ischemic disorder in mammalian organs, which comprises administering

to a mammal an effective amount of a compound of the formula:



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently the methyl group or a hydrogen atom, or a salt thereof.

#### 4,948,787 INHIBITION OF MERCAPTAN ODOR IN ORGANOTHIOPHOSPHATE BIOCIDES

Chia-Chung Chen, Hercules; Richard H. Rider, El Cerrito, and Ray J. Lo, Alameda, all of Calif., assignors to Imperial Chemical Industries PLC, London, England  
Filed Jan. 4, 1989, Ser. No. 293,244  
Int. Cl.<sup>5</sup> A01N 57/00, 57/10, 57/18, 23/00

U.S. Cl. 514—141 35 Claims

1. A method for preparing a formulation of a biocidal thiophosphate composition substantially free of mercaptan from contaminants, said method comprising:

- contacting a first solution comprising an alkali or alkaline earth metal hydroxide in a first solvent with a second solution comprising said thiophosphate composition in a second solvent substantially immiscible with said first solvent, to convert substantially all mercaptan in said second solution to the corresponding alkali metal mercaptide in said first solution;
- recovering said second solution from said first solution; and
- combining said second solution with an inert diluent or carrier.

#### 4,948,788 COMPOSITION FOR INJECTION OF ACTIVE TYPE VITAMINS D<sub>3</sub>

Yuji Makino, and Yoshiki Suzuki, both of Hino, Japan, assignors to Teijin Limited, Osaka, Japan  
Filed Sep. 5, 1986, Ser. No. 904,125  
Claims priority, application Japan, Sep. 5, 1985, 60-194734  
Int. Cl.<sup>5</sup> A61K 31/59

U.S. Cl. 514—167 3 Claims

1. A composition for injection of active vitamin D<sub>3</sub> comprising:

- a lyophilized product of at least one active vitamin D<sub>3</sub> selected from the group consisting of 1α-hydroxycholecalciferol, 1α,25-dihydroxycholecalciferol, 1α,24-dihydroxycholecalciferol, 1α,25-dihydroxycholecalciferol-26, 23-lactone; and 100 to 1,000,000 parts by weight, based on 1 part by weight of said at least one active vitamin D<sub>3</sub>, of at least one pharmaceutically acceptable excipient selected from the group consisting of amino acids, monosaccharides, disaccharides, ascorbic acid and acid salts thereof, citric acid and salts thereof, and sodium hydrogen phosphates.

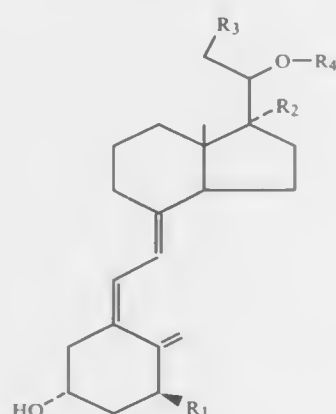
4,948,789

**SUPPRESSION OF PARATHYROID HORMONE SYNTHESIS AND SECRETION**  
Eduardo Slatopolsky, St. Louis, Mo., assignor to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 28, 1989, Ser. No. 329,606  
Int. Cl.<sup>5</sup> A61K 31/59

U.S. Cl. 514—167

11 Claims

1. A method for treating hyperparathyroidism comprising administering to a patient suffering from hyperparathyroidism an effective amount of a vitamin D<sub>3</sub> derivative of formula (I):



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, which may be the same or different, each represent a hydrogen atom or a hydroxyl group; R<sub>4</sub> is hydrogen or a C<sub>4-6</sub> alkyl group that is optionally substituted by a hydroxyl group.

4,948,790

**LONG-ACTING ANDROGENIC COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS THEREOF**  
Sydney Archer, Rensselaer Polytechnic Institute, Troy, N.Y. 12181; Gabriel Bialy, National Institute of Health, Bethesda, Md. 20892; Richard P. Blye, National Institute of Health, Bethesda, Md. 20892; Pierre Crabbe, deceased, late of Brussels; by Lucie Crabbe, executor, 14, Avenue Jules Cesar, 1150 Brussels, both of Belgium; Egon R. Diczfalussy, Reproductive Endocrinology Research Unit, Karolinska sjukhuset, 104 01 Stockholm 60, Sweden; Carl Djerassi, Department of Chemistry Stanford University, Palo Alto, Calif. 94305; Josef Fried, Department of Chemistry, University of Chicago, Chicago, Ill. 60637, and Hyun K. Kim, National Institute of Health, Bethesda, Md. 20892  
Filed Aug. 26, 1987, Ser. No. 89,391  
Int. Cl.<sup>5</sup> C07J 9/00; A61K 31/56

U.S. Cl. 514—178

15 Claims

1. A cis or trans testosterone 17β-ester of the formula



wherein R is cyclobutyl, cyclopentyl or cyclohexyl and R' is a straight chain or branched chain alkyl group of 4-6 carbons.

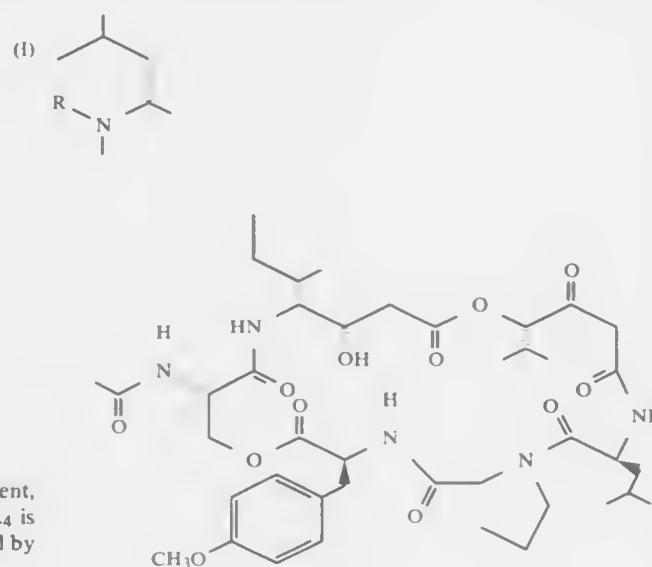
4,948,791

**NOVEL CYTOTOXIC CYCLIC DEPSIPEPTIDES FROM THE TUNICATE TRIDIDEMNUM SOLIDUM**  
Kenneth L. Rinehart, Jr.; Ryulchi Sakai, both of Urbana, Ill., and Justin G. Stroh, Stonington, Conn., assignors to The Board of Trustees of the University of Illinois, Urbana, Ill.  
Filed Apr. 10, 1989, Ser. No. 335,903  
Int. Cl.<sup>5</sup> A61K 31/395; C07D 521/00

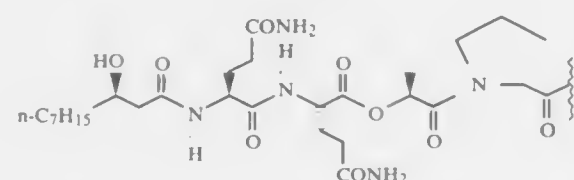
U.S. Cl. 514—183

6 Claims

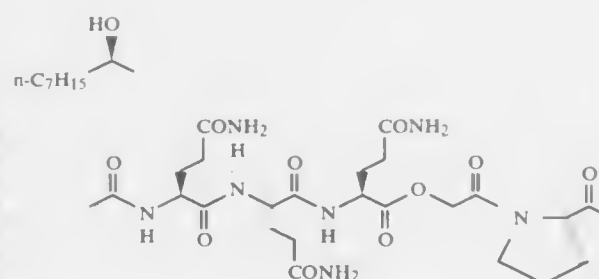
1. A didemnin of the formula



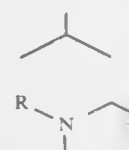
wherein R =



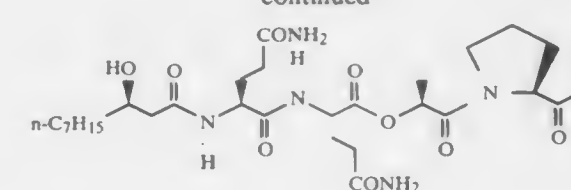
or



4. A process for treating animals and humans hosting a neoplastic disease which comprises administering to said host in need of treatment an effective neoplastic disease inhibiting amount of a didemnin compound of the formula



-continued



4,948,792

**METHODS FOR SUPPRESSING THE ENDOCRINE SYSTEM**

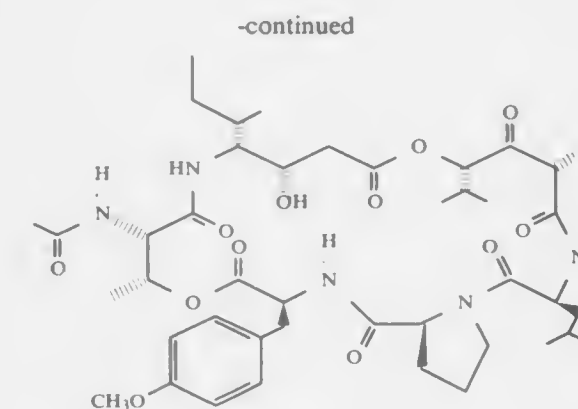
Attallah Kappas, and George S. Drummond, both of New York, N.Y., assignors to The Rockefeller University, New York, N.Y.

Continuation-in-part of Ser. No. 105,591, Nov. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 927,830, Nov. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 832,512, Feb. 21, 1986, abandoned, which is a continuation of Ser. No. 708,228, Mar. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 363,588, Mar. 30, 1982, abandoned. This application Feb. 14, 1989, Ser. No. 310,855  
Int. Cl.<sup>5</sup> A61K 31/40, 31/555

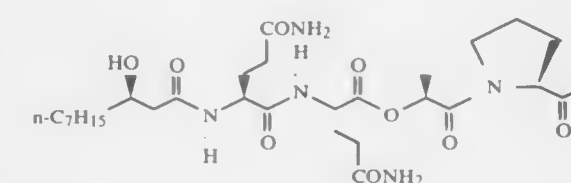
U.S. Cl. 514—185

3 Claims

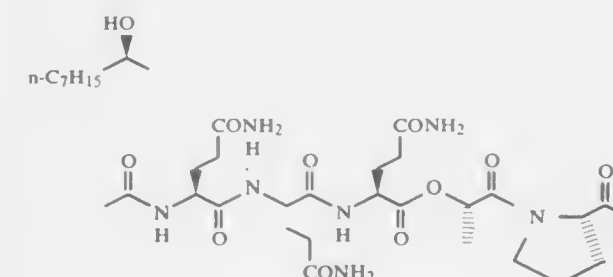
1. A method of controlling weight gain in animals in need of such control which comprises parenteral administration to said animal of from 5 to 50 μg/kg b.w. of cobalt protoporphyrin or cobalt mesoporphyrin.



wherein R =



or



4,948,793

**TREATMENT OF AUTOIMMUNE DISEASES WITH THE MORPHOLINOETHYL ESTER OF MYCOPHENOLIC ACID, AND DERIVATIVES THEREOF**

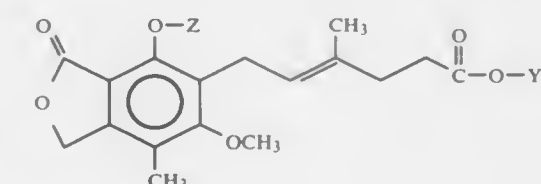
Anthony C. Allison; Elsie M. Eugui, both of Belmont; Peter H. Nelson, Los Altos; Chee-Liang L. Gu, Sunnyvale, and William A. Lee, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 233,200, Aug. 17, 1988, Pat. No. 4,868,153, and Ser. No. 272,161, Nov. 14, 1988, which is a division of Ser. No. 93,459, Sep. 4, 1987, Pat. No. 4,808,592, which is a division of Ser. No. 8,717, Jan. 30, 1987, Pat. No. 4,753,935, said Ser. No. 233,200, is a division of Ser. No. 146,883, Jan. 22, 1988, Pat. No. 4,786,637, which is a continuation-in-part of Ser. No. 8,717, Jan. 30, 1987, Pat. No. 4,753,935. This application Jan. 29, 1989, Ser. No. 373,413  
Int. Cl.<sup>5</sup> A61K 31/535

U.S. Cl. 514—233.5

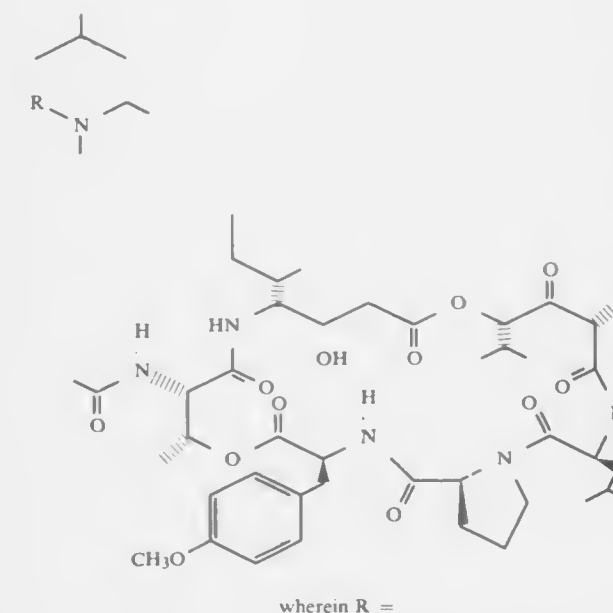
4 Claims

1. A method of treating autoimmune diseases, which comprises administering to a mammal in need thereof a therapeutically effective amount of a compound represented by the formula:



wherein:

Y is morpholinoethyl; and  
Z is hydrogen or —C(O)R,  
where R is lower alkyl or aryl;  
or a pharmaceutically acceptable salt thereof.



wherein R =

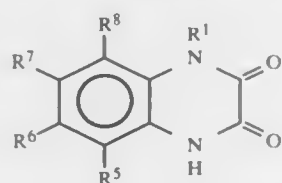


4,948,794

**CYCLOALKYL OR BENZYL-6-SUBSTITUTED-QUINOXALINEDIONES**  
Tage Honore, Kobenhavn; Poul Jacobsen, Rodovre; Flemming E. Nielsen, Virum, and Lars Naerum, Gentofte, all of Denmark, assignors to A/S Ferrosan, Soborg, Denmark

Filed Nov. 8, 1988, Ser. No. 268,939  
Claims priority, application Denmark, Nov. 10, 1987, 5862/87; Mar. 16, 1988, 1422/88

Int. Cl.<sup>5</sup> A61K 31/495; C07D 241/44  
U.S. Cl. 514—249 11 Claims  
1. A quinoxaline compound having the formula I



wherein

R<sup>1</sup> is C<sub>3-8</sub>-cycloalkyl or benzyl and wherein R<sup>6</sup> is halogen, CN, CF<sub>3</sub>, NO<sub>2</sub>, or OR', wherein R' is C<sub>1-4</sub>-alkyl and R<sup>5</sup>, R<sup>7</sup> and R<sup>8</sup> is hydrogen; or

R<sup>6</sup> and R<sup>7</sup> independently are NO<sub>2</sub>, halogen, CN, CF<sub>3</sub>, or OR', wherein R' is C<sub>1-4</sub>-alkyl, and R<sup>5</sup> and R<sup>8</sup> are each hydrogen.

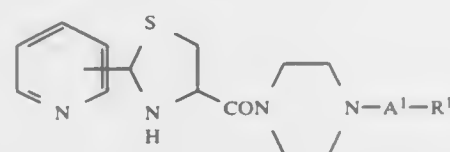
4,948,795

**PYRIDYLTHIAZOLIDINE CARBOXAMIDE DERIVATIVES AND THEIR INTERMEDIATES AND PRODUCTION OF BOTH**

Toshiyasu Mase, Chiba; Hiromu Hara, Saitama, and Toshimitsu Yamada, Ibaraki, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 337,064  
Claims priority, application Japan, Apr. 28, 1988, 63-108743  
Int. Cl.<sup>5</sup> A61K 31/495, 31/44; C07D 401/14

U.S. Cl. 514—252 10 Claims  
1. A pyridylthiazolidine carboxamide derivative represented by the Formula (I) or a pharmaceutically acceptable salt thereof:



wherein A' represents a single bond, a carbonyl group or a lower alkylene group which may contain a carbonyl group and R' represents a 5- or 6-membered heterocyclic group containing 1 to 3 oxygen, sulfur or nitrogen atoms of heteroatoms, which may be substituted with a lower alkyl group.

4,948,796

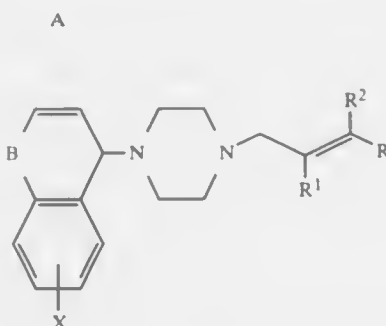
**PIPERAZINE DERIVATIVE OR ITS SALT, PROCESS FOR PRODUCING THE SAME AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME AS ACTIVE INGREDIENT**

Toru Hiraiwa; Kenji Takeda; Joji Nakano, all of Toyama; Mineichi Sudani, Shinminato; Kunikazu Furubata, Tokyo; Makoto Takata, Toyama; Hiroyo Kawafuchi, Nakanikawa, and Isao Watanabe, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1989, Ser. No. 316,174  
Claims priority, application Japan, Mar. 3, 1988, 63-48741; Feb. 3, 1989, 01-25555

Int. Cl.<sup>5</sup> A61K 31/495, 31/535; C07D 491/044, 487/00  
U.S. Cl. 514—254 25 Claims

1. A piperazine derivative represented by the following formula or a pharmaceutically acceptable salt thereof:



wherein A and the two carbon atoms to which A attaches form a pyridine ring or form a benzene ring substituted by a nitro group, X represents a hydrogen atom, a halogen atom, a lower alkyl group, a protected or unprotected hydroxyl group, a lower alkoxy group, a protected or unprotected amino group or a nitro group, B represents a group of the formula —CH<sub>2</sub>C—H<sub>2</sub>— or —CH=CH— or a group of the formula —CH<sub>2</sub>O— or —CH<sub>2</sub>S—, either of which can be in either orientation, R<sup>1</sup> represents a hydrogen atom, a halogen atom, a nitro group or a lower alkyl group, R<sup>2</sup> represents a hydrogen atom, a halogen atom or a lower alkyl group, R represents an aryl group or a 5- or 6-membered heterocyclic group selected from the group consisting of an unsubstituted or oxo group-substituted pyrrolidinyl or morpholinyl group, thienyl, furyl, pyrrolyl, thiazolyl, oxazolyl, thiadiazolyl, oxadiazolyl, imidazolyl, pyridyl, or a fused heterocyclic group selected from the group consisting of a benzothienyl, benzofuranyl, indolyl, benzimidazolyl, benzotriazolyl, benzothiazolyl, benzoxazolyl, benzothiadiazolyl, bezoxadiazolyl, quinolyl, phthalazyl, benzodioxanyl group, each of which may optionally be substituted by at least one substituent selected from the group consisting of a halogen atom, a protected or unprotected hydroxyl group, a nitro group, a protected or unprotected amino group, a di-(lower alkyl)amino group, a protected or unprotected carboxyl group, a cyano group, a lower alkenyl group, a lower carboxylic acyl group, an aryl group, a lower alkenyloxy group, an aryloxy group, a heterocyclic group selected from the above recited 5- or 6-membered heterocyclic group, or fused heterocyclic group a heterocyclic—O— group in which the heterocyclic group is selected from the above recited 5- or 6-membered heterocyclic group, or fused heterocyclic group a lower alkoxy group, a lower alkylthio group, a lower alkylsulfinyl group, a lower alkylsulfonyl group, a lower alkylsulfonylamino group, a lower alkylenedioxy group or a substituted or unsubstituted carbamoyl, sulfamoyl or lower alkyl group.

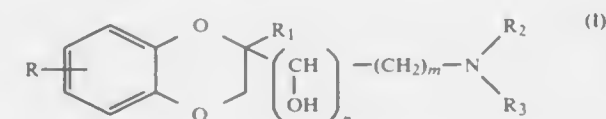
25. A method of treating a mammal having cerebro-vascular disease or post-cerebro-vascular disease by using an effective amount of a piperazine derivative or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 19 and 20 to 23.

4,948,797

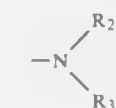
**2,2-DISUBSTITUED 2,3-DIHYDRO-1,4-BENZODIOXIN DERIVATIVES HAVING HYPOTENSIVE ACTIVITY**  
Elso Manghisi, and Aldo Salimbeni, both of Milan, Italy, assignors to Istituto Luso Farmaco d'Italia S.p.A., Milan, Italy

Filed Nov. 9, 1988, Ser. No. 269,773  
Int. Cl.<sup>5</sup> A61K 31/505; C07D 405/14

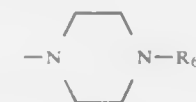
U.S. Cl. 514—254 4 Claims  
1. A compound of formula (I):



and to stereoisomers and optical isomers thereof, wherein R is hydrogen, at least one halogen atom, at least one methyl, trifluoromethyl, hydroxy, methoxy, nitro or amino group; R<sub>1</sub> is a C<sub>1-4</sub> straight or branched alkyl or phenyl unsubstituted or phenyl substituted by (a) at least one halogen atom, (b) methyl, (c) trifluoromethyl, (d) hydroxy, (e) methoxy, (f) nitro or (g) amino groups or R<sub>1</sub> is a C<sub>1-4</sub> straight or branched alkoxy which is unsubstituted or substituted by hydroxy group; n is 0 or 1; m is an integer 1 to 3; when n=1, m is always=1;



is a basic group of formula:



wherein R<sub>6</sub> is hydrogen, phenyl unsubstituted or substituted by (a) at least one halogen or by (b) methyl, (c) trifluoromethyl, (d) hydroxy, (e) methoxy, (f) nitro or (g) amino group, or R<sub>6</sub> is a 2-pyridyl, a benzyldryl group unsubstituted or substituted by (a) at least one halogen, (b) methyl, (c) methoxy or R<sub>6</sub> is 4-amino-6,7-dimethoxyquinazolin-2-yl group or acetyl, propionyl, benzoyl or 2-furoyl and a salt thereof with a pharmaceutically acceptable inorganic or organic acid.

4. Pharmaceutical compositions having antihypertensive activity, containing as the active ingredient a compound according to claim 1, in form of free bases or pharmaceutically acceptable salts.

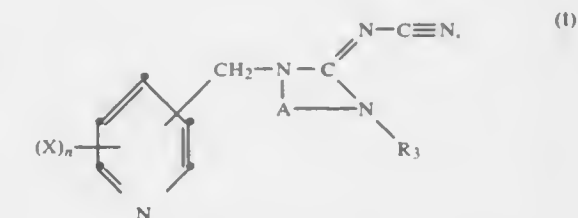
4,948,798

**SUBSTITUTED CYANOIMINOIMIDAZOLIDINES AND -TETRAHYDROPYRIMIDINES USEFUL AS PESTICIDES**  
Laurenz Gsell, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 226,357, Jul. 29, 1988, abandoned. This application Aug. 21, 1989, Ser. No. 396,588  
Claims priority, application Switzerland, Aug. 4, 1987, 2985/87; Jun. 6, 1988, 2141/88

Int. Cl.<sup>5</sup> C07D 401/06; A01N 43/50, 43/54  
U.S. Cl. 514—275 13 Claims

1. A compound of formula I



in which R<sub>3</sub> is hydrogen or C<sub>1-4</sub>alkyl; A is a —(CH<sub>2</sub>)<sub>2</sub>— or —(CH<sub>2</sub>)<sub>3</sub>— radical; X is halogen; and n is an integer 0, 1, 2 or 3; the salt of the compound of formula I.

12. A method of controlling insects and representatives of the order of Acarina which comprises bringing into contact or treating the pests, or various stages of development thereof or the locus thereof, with a pesticidally effective amount of a compound of formula I according to claim 1.

4,948,799

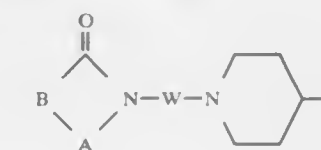
**IMIDE DERIVATIVES, AND THEIR USE IN PHARMACEUTICALS**

Fujio Antoku, Hyogo; Mayumi Yoshigi; Ikutaro Saji, both of Osaka; Atsuyuki Kojima, Hyogo, and Kikuo Ishizumi, Osaka, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan

Division of Ser. No. 100,824, Sep. 25, 1987, Pat. No. 4,812,461.  
This application Jan. 4, 1989, Ser. No. 293,440

Claims priority, application Japan, Sep. 26, 1986, 61-228795  
Int. Cl.<sup>5</sup> A61K 31/45; C07D 401/06, 417/14

U.S. Cl. 514—278 8 Claims  
1. A compound of the formula:

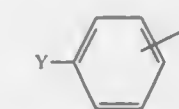


wherein

A is a carbonyl group;  
B is a group of the formula:



(in which R<sub>11</sub> and R<sub>12</sub> are each lower alkyl group, or they are combined together to form a lower alkylene group; W is trimethylene, propylene, tetramethylene, 2-methyltrimethylene or 2-methyltetramethylene, or a lower alkylene group, a lower alkynylene group or a lower alkylene group substituted with hydroxyl; and G is a benzoisothiazolyl group, a benzoisothiazolyl group substituted with a member selected from the group consisting of lower alkyl, lower alkoxy, halogen and halogenated lower alkyl or a group of the formula:



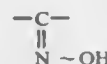
(in which Y is an oxygen atom, a carbonyl group, a methylene group, a group of the formula:



(in which m is an integer of 0, 1 or 2), a group of the formula:



(in which R<sub>13</sub> is a hydrogen atom, a lower alkyl group or a lower alkanoyl group) or a group of the formula:



and Z is a hydrogen atom, a halogen atom, a lower alkyl group or a lower alkoxy group, or its pharmaceutically acceptable salt.

4,948,800

# PHARMACEUTICAL METHOD USING FUSED IMIDAZOHETEROCYCLIC COMPOUNDS.

Bruce E. Tomeczuk, and Deborah S. Sutherland, both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

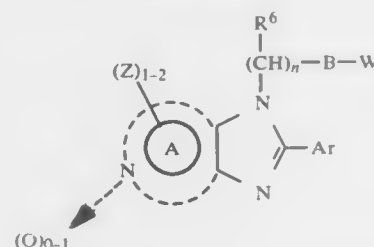
Division of Ser. No. 215,170, Jul. 5, 1988, Pat. No. 4,873,251, which is a division of Ser. No. 871,772, Jun. 9, 1986, Pat. No. 4,772,600. This application Jun. 30, 1989, Ser. No. 374,211

Int. Cl.<sup>5</sup> A61K 31/44

U.S. Cl. 514—303

3 Claims

1. A method for the treatment of a living animal body for muscle tension and spasticity and/or anxiety and/or convulsions which comprises administering a compound selected from the group having the formula:



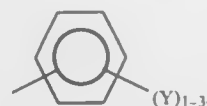
wherein;

A represents a heterocyclic ring having two of its carbon atoms held mutually with the imidazo moiety, selected from the group consisting of pyridine in any of its four positions wherein nitrogen is unshared by the imidazo moiety and substituted by one or two Z radicals on a carbon not shared by the imidazo moiety selected from the group consisting of hydrogen, halogen, loweralkyl, hydroxy, loweralkoxy, diloweralkylamino or nitro;

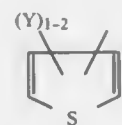
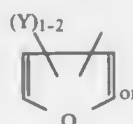
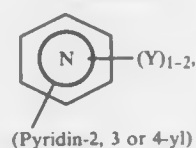
n is 1 to 3;

R<sup>6</sup> is hydrogen or loweralkyl;

Ar is selected from:



-continued



B is hydroxymethylene;

W is selected from:

hydrogen,

loweralkyl,

(Y)<sub>1-3</sub>-phenyl or

(Y)<sub>1-3</sub>-phenyl-loweralkyl;

wherein Y is hydrogen, halo, loweralkoxy, loweralkyl, trifluoromethyl, cyano, nitro or diloweralkylamino;

the optical isomers, the oxides represented by—O and the pharmaceutically acceptable acid addition salts.

4,948,801

# AMINOMETHYLOXOXAZOLIDINYL ARYLBENZENE DERIVATIVES USEFUL AS ANTIBACTERIAL AGENTS

Randall K. Carlson; Chung-Ho Park, and Walter A. Gregory, all of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

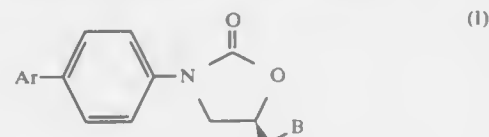
Filed Jul. 29, 1988, Ser. No. 225,809

Int. Cl.<sup>5</sup> A61K 31/44, 31/47; C07D 413/10

U.S. Cl. 514—307

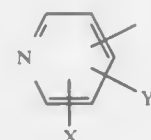
26 Claims

1. An aryl benzene oxazolidinone of the formula

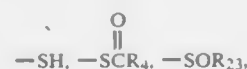


wherein, for the 1, and mixtures of the d and l stereoisomers of the compound

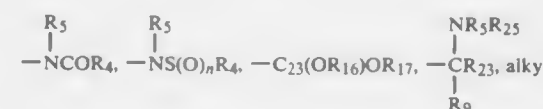
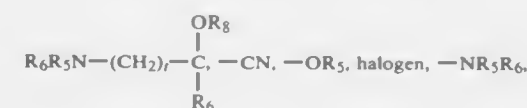
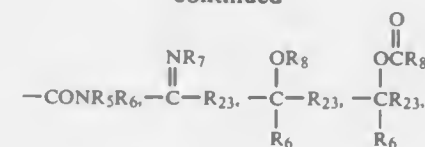
Ar is



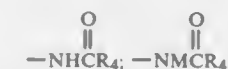
X independently is H, —NO<sub>2</sub>, —S(O)<sub>n</sub>R<sub>1</sub>, —S(O)<sub>2</sub>—N=S(O)<sub>p</sub>R<sub>2</sub>R<sub>3</sub>,



-continued



of 1 to 8 carbons optionally substituted with halogen, OH, =O other than at alpha position, S(O)<sub>n</sub>R<sub>24</sub>, or NR<sub>5</sub>R<sub>6</sub>, alkenyl of 2-5 carbons or cycloalkyl of 3-8 carbons; R<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, optionally substituted with halogen, OH, CN, NR<sub>5</sub>R<sub>6</sub> or CO<sub>2</sub>R<sub>8</sub>; C<sub>2</sub>-C<sub>4</sub> alkenyl; —NR<sub>9</sub>R<sub>10</sub>; —N<sub>3</sub>;



—NG<sub>2</sub>; —NR<sub>9</sub>G— —NGM<sup>+</sup>;

R<sub>2</sub> and R<sub>3</sub> are independently C<sub>1</sub>-C<sub>2</sub> alkyl;

R<sub>4</sub> is alkyl of 1-4 carbons, optionally substituted with halogen;

R<sub>5</sub> and R<sub>6</sub> are independently H, alkyl of 1-8 carbons, cycloalkyl of 3-8 carbons, —(CH<sub>2</sub>)<sub>u</sub>OR<sub>8</sub>, —(CH<sub>2</sub>)<sub>v</sub>R<sub>11</sub>R<sub>14</sub>, or

—O(CH<sub>2</sub>)<sub>t</sub>NR<sub>11</sub>R<sub>14</sub>;

R<sub>7</sub> is —NR<sub>5</sub>R<sub>6</sub>, —OR<sub>5</sub> or



R<sub>8</sub> is H or alkyl of 1-4 carbons;

R<sub>9</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>10</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>2</sub>-C<sub>4</sub> alkenyl, C<sub>3</sub>-C<sub>4</sub> cycloalkyl,

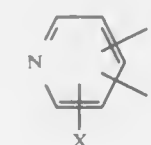
—OR<sub>8</sub> or NR<sub>11</sub>R<sub>14</sub>;

R<sub>11</sub> and R<sub>14</sub> are independently H or C<sub>1</sub>-C<sub>4</sub> alkyl;

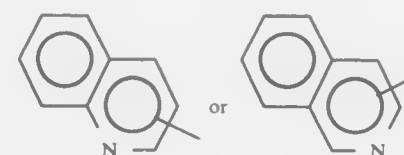
G is Cl, Br or I;

Y independently is H, F, Cl, Br, OR<sub>8</sub>, alkyl of 1-3 carbons, or

NO<sub>2</sub>; or



is:



M is a physiologically acceptable cation;

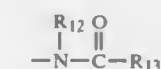
n is 0, 1 or 2;

p is 0 or 1;

r is 4 or 5;

t is 1, 2 or 3;

B is —NH<sub>2</sub>,



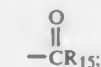
—N—S(O)<sub>u</sub>R<sub>14</sub>, or N<sub>3</sub>;

R<sub>12</sub> is H, C<sub>1</sub>-C<sub>10</sub> alkyl or C<sub>3</sub>-C<sub>8</sub> cycloalkyl;

R<sub>13</sub> is H; C<sub>1</sub>-C<sub>4</sub> alkyl optionally substituted with halogen,

C<sub>2</sub>-C<sub>4</sub> alkenyl; C<sub>3</sub>-C<sub>4</sub> cycloalkyl; phenyl; —CH<sub>2</sub>OR<sub>15</sub>;

—CH(OR<sub>16</sub>)OR<sub>17</sub>; —CH<sub>2</sub>S(O)<sub>v</sub>R<sub>14</sub>;



—OR<sub>18</sub>; —SR<sub>14</sub>; —CH<sub>2</sub>N<sub>3</sub>; an aminoalkyl group derived from an α-amino acid selected from the group consisting of glycine, L-alanine, L-cysteine, L-proline, and D-alanine;

—NR<sub>19</sub>R<sub>20</sub>; or —C(CH<sub>2</sub>)<sub>2</sub>R<sub>21</sub>R<sub>22</sub>;

R<sub>14</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, optionally substituted with halogen;

R<sub>15</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl, optionally substituted with halogen;

R<sub>16</sub> and R<sub>17</sub> are independently C<sub>1</sub>-C<sub>4</sub> alkyl or, taken together

are —(CH<sub>2</sub>)<sub>m</sub>—;

R<sub>18</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>7</sub>-C<sub>11</sub> aralkyl;

R<sub>19</sub> and R<sub>20</sub> are independently H or C<sub>1</sub>-C<sub>2</sub> alkyl;

R<sub>21</sub> and R<sub>22</sub> are independently H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, phenyl;

u is 1 or 2;

v is 0, 1 or 2;

m is 2 or 3;

s is 2, 3, 4 or 5;

R<sub>23</sub> is H, alkyl of 1-8 carbons optionally substituted with

halogen, cycloalkyl of 3-8 carbons, alkyl of 1-4 carbons

substituted with one or more of —S(O)<sub>n</sub>R<sub>24</sub>, —OR<sub>8</sub>,



or —NR<sub>5</sub>R<sub>6</sub>; or alkenyl of 2-5 carbons optionally substituted with CHO or CO<sub>2</sub>R<sub>8</sub>;

R<sub>24</sub> is alkyl of 1-4 carbons or cycloalkyl of 3-8 carbons; and

R<sub>25</sub> is R<sub>6</sub> or NR<sub>5</sub>R<sub>6</sub>;

or a pharmaceutically suitable salt thereof.

24. A method of treating a bacterial infection in a mammal

comprising: administering to the mammal an antibacterial

amount of a compound of claim 1.

4,948,802

# GUANIDINE CARBOXYLIC ACID ESTERS AND PHARMACEUTICAL PREPARATIONS CONTAINING THESE COMPOUNDS

Peter Mörsdorf, Langenzenn; Helmut Schickaneder, Eckental; Volker Pfahler, Nuremberg; Heidrun Engler, Cadolzburg; Armin Buschauer, and Walter Schunack, both of Berlin, all of Fed. Rep. of Germany, assignors to Heumann Pharma GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 180,135

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726381

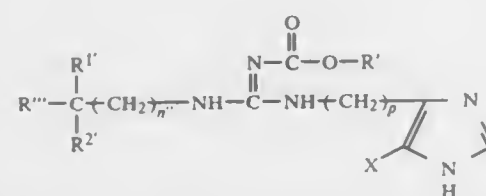
Int. Cl.<sup>5</sup> A61K 31/445; C07D 401/12

U.S. Cl. 514—341

15 Claims

1. A guanidine carboxylic acid ester corresponding to the formula





wherein one of  $R''$  and  $R^2$  is pyridine and the other is hydrogen, unsubstituted or substituted phenyl or unsubstituted or substituted naphthyl, wherein the substitutions are selected from halogen atom, a straight chained  $C_1$ - $C_3$  alkyl group, and a straight chained  $C_1$ - $C_3$  alkoxy group,  $R^1$  is hydrogen or methyl,  $R'$  is a straight chained or branched  $C_1$ - $C_6$  alkyl group unsubstituted or substituted with at least one halogen atom,  $C_1$ - $C_3$  alkoxy group, phenyl group or naphthyl group, or  $R'$  is a cycloalkyl group having up to 6 carbon atoms or an unsubstituted or substituted phenyl ring wherein the substituents in the phenyl ring are selected from halogen atom,  $C_1$ - $C_3$  alkyl and  $C_1$ - $C_3$  alkoxy, X is a hydrogen atom or methyl group, p is 2 or 3, and  $n''$  is 2, 3, 4 or 5.

4,948,803

# MEDICAMENTS FOR TREATMENT ON PREVENTION OF WITHDRAWAL SYNDROME

Michael B. Tyers, Welwyn, England, assignor to Glaxo Group Limited, London, England

PCT No. PCT/GB87/00826, § 371 Date Sep. 9, 1988, § 102(e) Date Sep. 9, 1988, PCT Pub. No. WO88/03801, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 20, 1987, Ser. No. 246,550

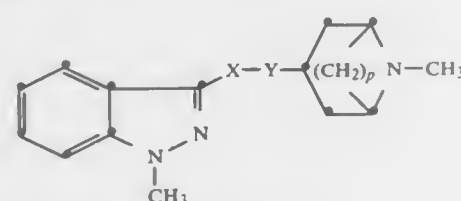
Claims priority, application United Kingdom, Nov. 21, 1986, 8627909; Nov. 21, 1986, 8627883; Nov. 21, 1986, 8627881; Dec. 17, 1986, 8630083; Mar. 25, 1987, 8707177

Int. Cl.<sup>5</sup> A61K 31/415

U.S. Cl. 514-397

8 Claims

1. A method of treatment for the relief or prevention of a withdrawal syndrome resulting from addiction to a drug and/or for the suppression of dependence on drugs, which comprises administering to a human or animal subject suffering from or liable to suffer from said withdrawal syndrome and/or dependent on a drug an effective amount of a compound of formula (IV):



wherein X is CO and Y is NH or O; and p is 2 or 3; or a pharmaceutically acceptable salt thereof.

## 4,948,804 DERIVATIVES OF 1-BENZOYL 2-OXO 5-ALKOXY PYRROLIDINE, THEIR PREPARATION, THEIR USE AS MEDICAMENTS AND THE COMPOSITIONS CONTAINING THEM

Giulio Galliani; Fernando Barzaghi, both of Monza; Carlo Zirotti, Arona, and Emilio Toja, Milan, all of Italy, assignors to Roussel Uclaf, Paris, France

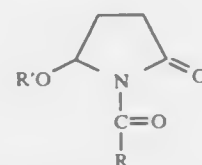
Filed Jun. 24, 1988, Ser. No. 211,287

Claims priority, application Italy, Jun. 26, 1987, 21079 A/87 Int. Cl.<sup>5</sup> A61K 31/40; C07D 207/12

U.S. Cl. 514-423

22 Claims

1. Compounds of formula (I):



in which  $R'$  represents linear, branched or cyclic alkyl containing up to 12 carbon atoms, alkenyl containing from 2 to 8 carbon atoms, alkanoyl-acyl containing from 1 to 6 carbon atoms or aralkyl containing from 7 to 15 carbon atoms and  $R$  represents aryl containing up to 14 carbon atoms, optionally substituted with a free, esterified or etherified hydroxy radical wherein said esterifying group is a carboxylic acid group containing up to 18 carbon atoms and said etherifying group is an alkyl group containing up to 18 carbon atoms, benzyloxy, alkyl up to 18 carbon atoms, cyclic alkyl up to 18 carbon atoms, unsaturated alkyl up to 18 carbon atoms, halogeno,  $CF_3$ ,  $SCF_3$ ,  $OCF_3$ ,  $NO_2$ ,  $CN$ , phenyl, alkanoyl, alkoxy carbonyl groups containing from 2 to 8 carbon atoms or alkyl sulphonyl groups containing up to 6 carbon atoms.

3. Compounds of formula (I) as defined in claim 1 or 2, in which  $R'$  represents a linear, branched or cyclic alkyl containing up to 12 carbon atoms.

20. A method for the treatment of patients suffering from memory failures, comprising administering to the patient an anti-memory failure therapeutically effective amount of a compound as defined in claim 3.

4,948,805

## SALT OF DICLOFENAC WITH A PYRROLIDINE COMPOUND AND PHARMACEUTICAL COMPOSITIONS WHICH CONTAIN IT

Antonio Ziggotti, Vezia, Switzerland, and Michele Di Schiena, Cislano, Italy, assignors to Altergon S. A. & Ricerfarma Srl., Italy

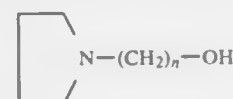
Filed Nov. 9, 1987, Ser. No. 117,823

Claims priority, application Italy, Nov. 13, 1986, 22320 A/86 Int. Cl.<sup>5</sup> A61K 31/40

U.S. Cl. 514-428

4 Claims

1. A water soluble salt, comprising: diclofenac (2-[(2,6-dichlorophenyl)-amino]-benzeneacetic acid); and a cyclic organic base having the formula



wherein n is 2.

4,948,806

## ANTIHYPERLIPIDEMIC AND ANTIATHEROSCLEROTIC COMPOUNDS AND COMPOSITIONS

Bharat K. Trivedi, Canton, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 176,080, Mar. 30, 1988, Pat. No. 4,868,210.

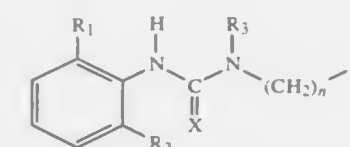
This application Jun. 9, 1989, Ser. No. 364,349

Int. Cl.<sup>5</sup> C07D 337/00, 335/04

U.S. Cl. 514-451

8 Claims

1. A compound having the formula



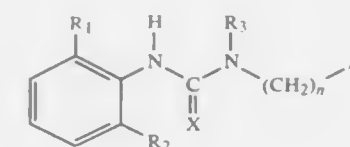
wherein  $R_1$  and  $R_2$  are independently selected from alkyl or alkoxy of from one to six carbon atoms;

$R_3$  is hydrogen, alkyl of from one to seven carbon atoms, or phenylmethyl;

X is oxygen or sulfur;

n is zero, one or two;

A is selected from



where

$n'$  is one or two;

Y is  $>O$ , or  $>S$ ;

$R_4$  is selected from

alkyl of from one to six carbon atoms,

hydroxy,

acetoxy,

alkoxy of from one to six carbon atoms,

phenoxy,

fluorine,

chlorine,

bromine,

nitro,

trifluoromethyl,

carboxyl,

-COO-alkyl in which the alkyl portion contains from one to four carbon atoms,

amino,

alkylamino of from one to six carbon atoms,

dialkylamino in which the alkyl groups contain from one to six carbon atoms,

-NH-acetyl; or

a pharmaceutically acceptable salt thereof.

8. A method of treating hypercholesterolemia or atherosclerosis comprising administering to a mammal in need of such treatment an ACAT-inhibitory effective amount of a compound as defined by claim 1.

4,948,807

## PHENYL CARBAMATES

Marta W. Rosin; Michael Chorev, and Ze'ev Tashma, all of Jerusalem, Israel, assignors to Proterra AG, Zug, Switzerland

Continuation of Ser. No. 185,451, Apr. 25, 1988, abandoned, which is a continuation of Ser. No. 835,466, Mar. 3, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,700

Claims priority, application Israel, Mar. 5, 1985, 74497

Int. Cl.<sup>5</sup> C07C 125/067; A61K 31/27

U.S. Cl. 514-484

4 Claims

1. N-cyclohexyl-3-[1-(dimethylamino)ethyl]phenyl carbamate and pharmacologically acceptable salts thereof.

4,948,808

## GUANIDINOBENZOIC ESTER DERIVATIVE

Shigeru Souda, Ushiku; Naoyuki Shimomura, Sakuramura; Norihiro Ueda, Sakuramura; Shuhei Miyazawa, Sakuramura; Takashi Yamanaka, Sakuramura; Kaname Miyamoto, Sakuramura; Ieharu Hishinuma, Moriyamachi; Junichi Nagakawa, Sakuramura; Naoko Nagaoka, Sakuramura; Hidetoshi Kawashima, Toride; Tsutomu Kawata, Tsuchiura; Junsaku Nagaoka, Sakuramura, and Tsuneo Wakabayashi, Mito, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan Division of Ser. No. 946,458, Dec. 24, 1986, Pat. No. 4,801,603.

This application Jul. 28, 1988, Ser. No. 225,278

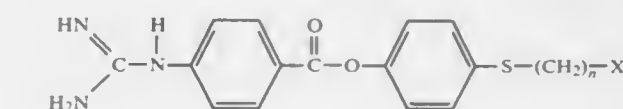
Claims priority, application Japan, Dec. 27, 1985, 60-293268

Int. Cl.<sup>5</sup> A61K 31/245; C07C 278/18

U.S. Cl. 514-535

8 Claims

1. A guanidinobenzoic ester compounds of the formula:



wherein X represents a group of the formula:

-OR

in which R is a hydrogen atom or a lower alkyl group and n represents an integer of 1 to 5, or a pharmacologically acceptable salt or thereof.

4,948,809

## SULPHONYLALKYLAMINES, PROCESSES FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Ernst-Christian Witte, Mannheim; Hans-Peter Wolff, Hirschberg-Grossachsen; Karlheinz Stegmeier, Heppenheim, and Johannes Pill, Leimen, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 913,717, Sep. 30, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 281,955

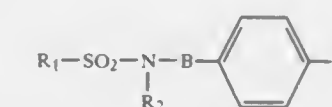
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535167

Int. Cl.<sup>5</sup> A61K 31/215; C07C 64/76

U.S. Cl. 514-538

17 Claims

1. A sulphonylphenylalkylamine compound of the formula:



(II)

wherein

$R_1$  is  $C_1$ - $C_6$  alkyl,  $C_3$ - $C_7$  cycloalkyl, or an aralkyl, aralkenyl or aryl, the aryl moiety, in each case, having 6-14 carbon atoms and being unsubstituted or substituted at least once by halogen,  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, hydroxyl, trifluoromethyl, cyano,

nitro, amino, C<sub>1</sub>-C<sub>6</sub> alkylamino, C<sub>2</sub>-C<sub>12</sub> dialkylamino, C<sub>1</sub>-C<sub>6</sub> acylamino, C<sub>1</sub>-C<sub>16</sub> acyl or azide;

R<sub>2</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> acyl, or an aralkyl or aralkenyl, the aryl moiety, in each case, having 6-14 carbon atoms and being substituted at least once by halogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, hydroxyl, trifluoromethyl, cyano, nitro, amino, C<sub>1</sub>-C<sub>6</sub> alkylamino, C<sub>2</sub>-C<sub>12</sub> dialkylamino, C<sub>1</sub>-C<sub>6</sub> acylamino, C<sub>1</sub>-C<sub>16</sub> acyl or azide;

B is an unbranched or branched C<sub>1</sub>-C<sub>4</sub> alkylene chain and A is —COR<sub>3</sub> OR —CHOHR<sub>3</sub> wherein R<sub>3</sub> is a C<sub>1</sub>-C<sub>5</sub> alkyl, with a terminal hydroxyl or carboxyl group [C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>1</sub>-C<sub>6</sub> formylalkyl, C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl, a C<sub>1</sub>-C<sub>6</sub> carboxyalkyl, a C<sub>1</sub>-C<sub>6</sub> acetylalkenyl or a —D—R<sub>3</sub> group, in which D is a —C— or —CH— group and R<sub>3</sub> is a hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> hydroxyalkyl or a C<sub>1</sub>-C<sub>5</sub> alkyl-carboxylic acid, or the pharmacologically acceptable salts thereof, the esters or amides thereof of those compounds which contain a hydroxyl and a carboxyl group.

15. A sulphonylphenylalkylamine compound of claim 1 consisting of benzenesulphonic acid-4-(1,4-dihydroxybutyl)-phenethylamide.

4,948,810

#### PHENOXYACETIC ACID DERIVATIVES, PHARMACEUTICAL COMPOSITIONS AND METHODS

Takeo Iwakuma, Ageo; Takayuki Kawaguchi, Tokyo; Toyoharu Yamashita, Kitamoto; Yasuhiko Sasaki, Urawa, and Tamotu Shimazaki, Sakado, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

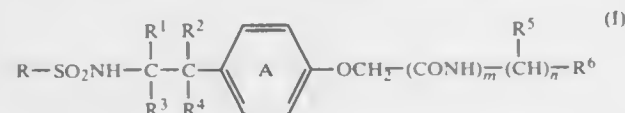
Filed Feb. 6, 1989, Ser. No. 306,867

Int. Cl.<sup>5</sup> A61K 31/215; C07C 323/07, 311/19

U.S. Cl. 514—539

9 Claims

1. A phenoxyacetic acid derivative of the formula:



wherein R is a phenyl group, a halogenophenyl group or a naphthyl group, each of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are a hydrogen atom, an alkyl group of one to four carbon atoms, a benzyl group or a phenyl group, R<sup>5</sup> is a hydrogen atom or an alkyl group of one to four carbon atoms, R<sup>6</sup> is a carboxyl group, an alkoxyacetyl group of two to five carbon atoms, a hydroxy group or a dialkylamino group of two to eight carbon atoms, Ring A is a phenylene group or a phenylene group having one to two substituents selected from the group consisting of halogen atoms and nitro groups, m is 0 or 1 and n is an integer of 0 to 5, provided that, when all of R<sup>1</sup> to R<sup>4</sup> are hydrogen atoms:

Ring A is a substituted phenylene group; and further provided that, when at least one of R<sup>1</sup> to R<sup>4</sup> is an alkyl group, m is 0 and R<sup>6</sup> is a carboxyl group or an alkoxyacetyl group;

R is a naphthyl group, or a pharmaceutically acceptable salt thereof.

4. A pharmaceutical composition possessing platelet aggregation-inhibiting activity which comprises a therapeutically effective amount of a compound claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

4,948,811

#### SALAD/COOKING OIL BALANCED FOR HEALTH BENEFITS

Jonathan Spinner, Cincinnati; Timothy B. Guffey, West Chester; Peter Y. T. Lin, Middletown, and Ronald J. Jandacek, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 148,420, Jan. 26, 1988, abandoned. This application Apr. 28, 1988, Ser. No. 187,184

Int. Cl.<sup>5</sup> A61K 31/20; A23D 5/00

U.S. Cl. 514—560

9 Claims

1. A cooking/salad oil composition consisting essentially of triglycerides, wherein the fatty acid composition of said triglycerides comprises by weight: from about 60% to about 92% oleic acid, from about 5% to about 25% linoleic acid, from 0% to about 15% α-linolenic acid, and less than about 3% saturated fatty acids and wherein at least about 20% of the triglycerides are triglycerides of mixed fatty acids.

4,948,812

#### 1-PHENOXY-3-AMINO-2-PROPANOLS USE THEREOF

Herbert Koppe; Franz Esser, both of Ingelheim am Rhein, Fed. Rep. of Germany; Walter Kobiing, and Mag. C. Lillie, both of Vienna, Austria, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Filed Nov. 25, 1987, Ser. No. 125,308

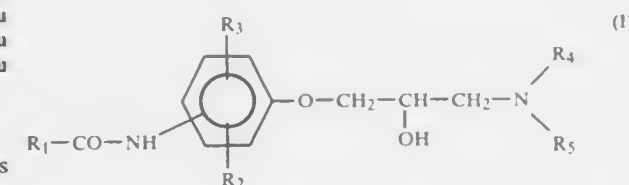
Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640829

Int. Cl.<sup>5</sup> A61K 31/165; C07C 103/133

U.S. Cl. 514—622

8 Claims

1. A compound of formula



wherein

R<sub>1</sub> represents a phenyl group which may optionally be substituted by one or more halogen atoms, lower alkyl, alkoxy, alkenyl, alkynyl, alkenyloxy, alkynyloxy, cycloalkyl, acyl, acyloxy, alkoxyacetyl, hydroxyalkyl or alkoxyalkyl groups or a sulphonyl group, or it may represent an aryloxyalkyl group which may optionally be substituted by one or more halogen atoms, lower alkyl, alkoxy, alkenyl, alkynyl, alkenyloxy, alkynyloxy, hydroxyalkyl, alkoxyalkyl, acyl, acyloxy or alkoxyacetyl groups.

R<sub>2</sub> represents a halogen atom, an alkyl or alkoxy group with 1 to 4 carbon atoms or a CN group.

R<sub>3</sub> represents a halogen atom or an alkyl group with 1 to 4 carbon atoms.

R<sub>4</sub> represents a straight-chained or branched alkyl group with 1 to 10 carbon atoms or a hydroxylalkyl group with 2 to 5 carbon atoms, and

R<sub>5</sub> represents a straight-chained or branched alkyl group with 1 to 10 carbon atoms or a hydroxylalkyl group with 2 to 5 carbon atoms or a phenylalkyl group or a phenoxyalkyl group, whilst the aromatic part may be substituted by alkyl or alkoxy groups or by chlorine or bromine atoms, or

a pharmaceutically acceptable acid addition salt thereof.

7. A pharmaceutical composition comprising a compound as claimed in claim 1 together with conventional excipients and/or carriers.

4,948,813

#### BENZYLKETONE PHOSPHOLIPASE A<sub>2</sub> INHIBITORS

Wendell W. Wilkerson, New Castle, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

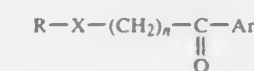
Continuation-in-part of Ser. No. 126,618, Nov. 30, 1987, abandoned. This application Jul. 28, 1989, Ser. No. 386,530

Int. Cl.<sup>5</sup> A61K 31/35

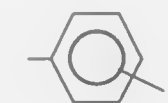
U.S. Cl. 514—648

26 Claims

1. A substituted benzylketone phospholipase A<sub>2</sub> inhibitor of the formula:



or a pharmaceutically acceptable salt thereof, wherein Ar is

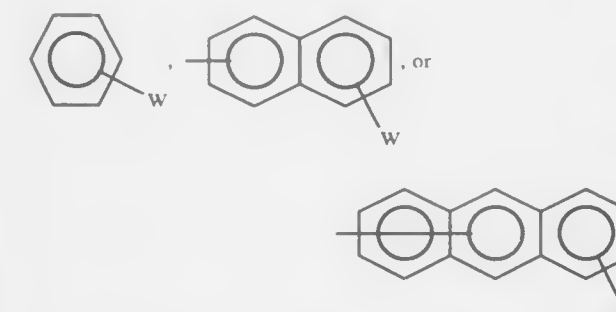


and Z is H, F, Cl, Br, OH, —OR<sup>1</sup>, —S(O)<sub>m</sub>R<sup>1</sup> and R<sup>1</sup> is methyl or ethyl, and m is 0, or 2;

n is 2 to 5;

X is NH, —NR<sup>2</sup>, and R<sup>2</sup> is methyl or ethyl;

R is C<sub>6</sub>-C<sub>25</sub> alkyl, aryl or substituted aryl of the formula:



where W is H, F, Cl, Br, hexafluoroisopropanol, phenyl, C<sub>1</sub>-C<sub>18</sub> alkyl, —OR<sup>3</sup>, —SR<sup>3</sup>, and R<sup>3</sup> is methyl or ethyl; or R is benzhydryl, or C<sub>7</sub>-C<sub>25</sub> alkaryl or substituted alkaryl where the substitution is on the aromatic moiety and is F, Cl, Br, OR<sup>3</sup>, S(O)<sub>r</sub>R<sup>3</sup>, or C<sub>1</sub>-C<sub>10</sub> alkyl, where R<sup>3</sup> is methyl or ethyl, and r is 0, 1, or 2;

provided that:

a. when X is —NCH<sub>3</sub> or —NC<sub>2</sub>H<sub>5</sub>, R must be hydroxyhexafluoroisopropylphenyl;

b. when X is O, n cannot be 2;

c. when X is —S(O)<sub>r</sub>, W cannot be methyl or ethyl;

d. when X is NH, R cannot be phenyl, benzyl, 1-methylbenzyl, phenylethyl, substituted phenylethyl, or pyridyl; and

e. when R is benzhydryl, Z must be F.

15. A method of treating inflammatory or allergic conditions mediated by phospholipase A<sub>2</sub> in a mammal, comprising administering to the mammal a therapeutically effective amount of a substituted benzylketone phospholipase A<sub>2</sub> inhibitor of claim 1.

4,948,814

#### ION EXCHANGER BASED ON CROSS-LINKED GLUCOMANNAN

Yoshiaki Motozato, Kumamoto; Takashi Tomoda, Ebina; Hiroshi Morita, Hatano; Masato Yamaguchi, Ebina, and Isao Joko, Ayase, all of Japan, assignors to Kurita Water Industries Ltd., Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,820

Claims priority, application Japan, Oct. 6, 1987, 62-250701

Int. Cl.<sup>5</sup> C08B 37/00

U.S. Cl. 521—30

9 Claims

1. An ion exchanger based on cross-linked konjakmannan, comprising beads of cross-linked konjakmannan having radicals of one or more ion-exchangeable groups introduced therein by a chemical treatment thereof.

4,948,815

#### PROCESS FOR CHARGING AT LEAST ONE COMPONENT WITH GAS IN THE PREPARATION OF CELLULAR PLASTICS

Kurt Krippel, Monheim, and Klaus Schulte, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

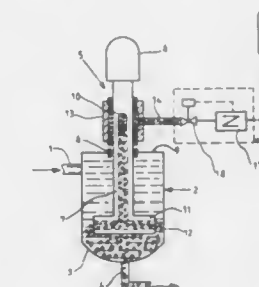
Filed Jan. 12, 1990, Ser. No. 463,760

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901462

Int. Cl.<sup>5</sup> C08J 9/00

U.S. Cl. 521—50

1 Claim



1. In a process for the preparation of cellular plastic from at least two free-flowing reaction components comprising charging at least one of said free-flowing components with gas, wherein the gas is metered into a hollow stirrer from the outside, is sucked through the stirrer and is dispersed into the component in a gassing chamber, mixing the component so charged with the other free flowing components, and allowing said cellular plastic to form, the improvement wherein the hollow stirrer is operated at a higher gas throughput capacity (standard liter per minute) than that corresponding to the amount of gas (standard liter per minute) available to it.



4,948,816

## SPHERICAL GRAINS OF POLYAMINO ACID AND PRODUCTION METHOD THEREOF

Chuichi Hirayama, No. 373-12, Shimonabe-machi, Kumamoto-shi, Kumamoto-ken; Yoshiaki Motozato, No. 1174-5, Hotakubohomachi, Kumamoto-shi, Kumamoto-ken, and Hirota Ibara, No. 854-2, Shimizu-machi, Takahira, Kumamoto-shi, Kumamoto-ken, all of Japan, assignors to Chuichi Hirayama; Yoshiaki Motozato; Hirota Ibara; Juridical Foundation the Chemo-Sero-Therapeutic Research Institute and Mitsui Toatsu Chemical, Inc., all of Japan Division of Ser. No. 117,925, Nov. 3, 1987, which is a continuation-in-part of Ser. No. 878,683, Jun. 26, 1986, abandoned. This application Jun. 20, 1989, Ser. No. 368,558 Claims priority, application Japan, Jun. 27, 1985, 60-141677 Int. Cl.<sup>5</sup> C08J 9/16

U.S. Cl. 521—56



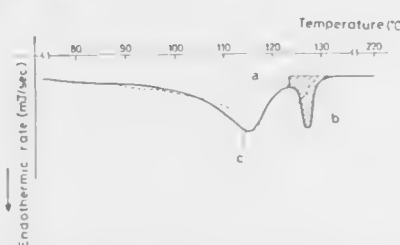
1. A filler for use in chromatography which comprises porous spherical grains of poly ( $\alpha$ -amino acid) having a porosity of 10 to 95%.

4,948,817

## PRE-FOAMED PARTICLES OF UNCROSSLINKED, LINEAR LOW-DENSITY POLYETHYLENE AND PRODUCTION METHOD THEREOF

Hideki Kuwabara, Hadano; Masahiro Hashiba, Isehara, and Masato Naito, Hiratsuka, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan Filed Jun. 8, 1988, Ser. No. 204,010 Claims priority, application Japan, Jun. 23, 1987, 62-156310 Int. Cl.<sup>5</sup> C08J 9/22

U.S. Cl. 521—58



1. A method for the production of pre-foamed particles of an uncrosslinked, linear low-density polyethylene, which comprises heating an uncrosslinked, linear low-density polyethylene to a temperature of the melting point of the resin or higher, quenching the heated resin in an atmosphere at a temperature of at least 40° C. lower than the crystallization temperature of the resin, wherein the crystallization temperature is a temperature corresponding to the top of a peak on a DSC curve obtained by heating about 2-5 mg of a sample of the resin to 200° C. at a rate of 10° C./min and then cooling the sample at a rate of 10° C./min, dispersing said heated and quenched uncrosslinked, linear low-density polyethylene resin and a volatile foaming agent in a dispersing medium in a closed vessel, heating the resultant dispersion without raising its temperature beyond a melting completion temperature  $T_m$  (° C.) of the resin particles (said melting completion temperature  $T_m$  having been determined from a peak on a DSC curve obtained by heating about 2-5 mg of a sample at a rate of 10° C./min),

holding the dispersion to a temperature of (the melting point of the resin - 20° C., inclusive) to (the melting point of the resin - 10° C., exclusive) (said melting point being a temperature corresponding to the top of the peak on the DSC curve obtained by heating about 2-5 mg of the sample at a rate of 10° C./min), and then opening the vessel at one end thereof so as to release the resin particles and the dispersing medium from the inside of the vessel into an atmosphere the pressure of which is lower than that in the vessel, thereby expanding the resin particles.

4,948,818

## METHOD OF MAKING POROUS HYDROPHILIC-LIPOPHILIC COPOLYMERIC POWDERS

Walter J. Carmody, and Anthony J. Buzzelli, both of Port Jervis, N.Y., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 15, 1989, Ser. No. 351,896  
Int. Cl.<sup>5</sup> C08F 36/02

U.S. Cl. 521—149

14 Claims

1. A precipitation polymerization process for producing a macroporous cross-linked copolymer powder capable of adsorbing hydrophilic and lipophilic fluids, comprising copolymerizing at least one monounsaturated monomer and at least one polyunsaturated monomer in the presence of an organic liquid which is a solvent for the monomers but not for the copolymer, initiating the copolymerization of the monomers by means of a free radical generating catalytic compound, precipitating a copolymer in the organic liquid in the form of a powder which includes unit particles, agglomerates, and aggregates, and forming a dry powder by removing the organic liquid from the precipitated copolymer powder, one monomer being a hydrophilic compound and the other monomer being a lipophilic compound.

4,948,819

## BENZOPHENONE QUATERNARY AMMONIUM LINKED (METH)ACRYLATES, PHOTOCURABLE AND PHOTOCURED PRODUCTS, AND METHOD OF COATING

Peter N. Green, and William A. Green, both of Liverpool, England, assignors to Ward Blenkinsop & Company Limited, Cheshire, United Kingdom

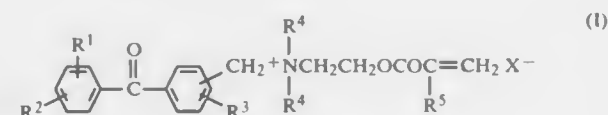
Filed Feb. 27, 1989, Ser. No. 315,599

Claims priority, application United Kingdom, Mar. 18, 1988, 8806527  
Int. Cl.<sup>5</sup> C07C 69/54; C08F 20/36, 22/36, 2/50

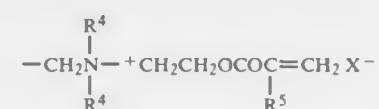
U.S. Cl. 522—31

9 Claims

1. A compound of general formula



in which  $X^-$  represents one equivalent of an anion;  $R^5$  represents a hydrogen atom or a methyl group; each  $R^4$  independently represents a methyl or ethyl group; and each of  $R^1$ ,  $R^2$  and  $R^3$  independently represents a hydrogen or halogen atom, an alkyl, alkoxy or alkylthio group having from 1 to 4 carbon atoms, an arylthio group, or a group of formula



in which  $R^4$ ,  $R^5$  and  $X^-$  have the meanings given above.

4,948,820

## THERMODEGRADABLE COMPOSITIONS BASED ON CRYSTALLINE HOMO- OR COPOLYMERS OF PROPYLENE AND PROCESS FOR CARRYING OUT THE SELECTIVE DEGRADATION OF SUCH HOMO- AND COPOLYMERS

Antonio Addeo, Nola; Annibale Vezzoli, Carugo; Stefano Saccardi, and Corrado Brichta, both of Milan, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

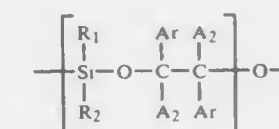
Filed Jan. 27, 1989, Ser. No. 302,191

Claims priority, application Italy, Jan. 28, 1988, 19233 A/88  
Int. Cl.<sup>5</sup> C08K 5/54; C08F 8/50

U.S. Cl. 523—124

17 Claims

1. Thermodegradable compositions based on crystalline homo- or copolymers of propylene comprising at least one primary and/or secondary antioxidant agent and at least one compound which is a derivative of benzopinacol having formula:

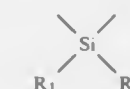


wherein Ar is an aryl radical and  $R_1$  and  $R_2$  have the meanings as defined hereinbefore;

when, on the contrary,  $n=0$ , X is =1

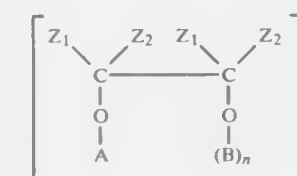
$Z_1$ ,  $Z_2$  are aryl radicals, which may be the same or different,

A=a group having formula



or the group having the formula:

(I)



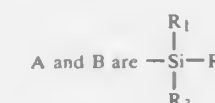
wherein n may be 1 or 0, and, when  $n=1$ , X may be =1 and in this case:

$Z_1$  and  $Z_2$  form with each other a



group

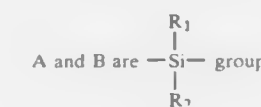
A and B are



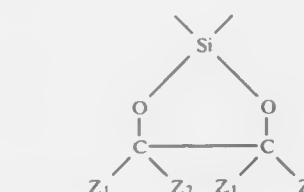
groups

wherein  $R_1$ ,  $R_2$ ,  $R_3$ , which may be the same or different, may be  $C_1$ - $C_4$  alkyl radicals or  $C_6$ - $C_{12}$  aryl radicals, or X may range from 3 to 20 and in this case:

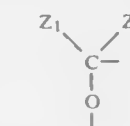
$Z_1$ ,  $Z_2$  are aryl radicals, which may be the same or different,



being part of an oligomer of the product having formula (I), consisting at least of 3 and up to 20 repeating units having the formula:



wherein every silicon link is bound to an oxygen atom of the group



and  $R_1$ ,  $R_2$  have the meanings as defined hereinbefore.

4,948,821

## THERMOSETTING COMPOSITION

Adrianus J. De Koning, Sittard, and Arnold J. Voskamp, Hoge Zwaluwe, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Aug. 18, 1988, Ser. No. 233,437

Claims priority, application Netherlands, Aug. 18, 1987, 8701932

Int. Cl.<sup>5</sup> C08L 67/06; C08K 7/02

U.S. Cl. 523—500

6 Claims

1. Composition comprising  
A: 30-65 parts by weight of unsaturated polyester with a molar mass per double bond of 142-500  
B: 25-55 parts by weight of ethylenically unsaturated monomer  
C: 3-35 parts by weight of slightly ethylenically unsaturated polyester as anti-shrinkage additive  
D: 0-750 parts by weight of filler, fibrous material and other additives, characterized in that as slightly ethylenically unsaturated polyester an unsaturated polyester is used which has a molar mass per double bond of 1200-20,000, an acid number of 5-50, and in which between 50 and 90% of the unsaturation consists of a terminal monoester of an  $\alpha$ ,  $\beta$ -unsaturated dicarboxylic acid.

4,948,822

## LAMINATING ADHESIVES

Carmin P. Iovine, Bridgewater, and James L. Walker, Whitehouse Sta., both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del. Filed Feb. 27, 1989, Ser. No. 315,985  
Int. Cl.<sup>3</sup> C08F 83/00

U.S. Cl. 523—201

6 Claims

1. A laminating adhesive in aqueous emulsion form comprising a core-shell polymer in aqueous emulsion form consisting essentially of a core copolymer of:

- (a) from 60 to 98% by weight of an acrylic or methacrylic acid alkyl or hydroxyalkyl ester monomer containing 1 to 12 carbon atoms in the alkyl portion or mixture of such esters,
- (b) from 0 to about 38% by weight of a vinyl ester of an alkanolic acid containing from 1-13 carbon atoms, and
- (c) from 2 to 12% by weight of a functional comonomer selected from glycidyl methacrylate, acrylic or methacrylic acid, and an amine-containing copolymerizable comonomer, and a shell copolymer of:

- (a) from 70 to 98% by weight of an acrylic or methacrylic acid alkyl ester monomer containing 1 to 12 carbon atoms in the alkyl portion or mixture of such esters,
- (b) from 0 to about 28% by weight of a vinyl ester of an alkanolic acid containing from 1-13 carbon atoms, and
- (c) from 2 to 12% by weight of a functional comonomer selected from glycidyl methacrylate, acrylic acid or methacrylic acid, and an amine-containing copolymerizable comonomer; wherein the core-shell polymer has a T<sub>g</sub> of -10° to -35° C., the weight ratio of core to shell monomers employed in preparing the polymer ranges from 2:1 to 5:1 and the functional comonomer employed in the core differs from and is latently reactive with the functional comonomer employed in the shell.

4,948,823

## NUCLEATING SYSTEMS

Morton L. Wallach, Leominster, Mass., assignor to Polysar Financial Services S.A., Fribourg, Switzerland  
Filed Dec. 1, 1988, Ser. No. 278,342  
Int. Cl.<sup>3</sup> C08K 5/15; C08L 67/02

U.S. Cl. 524—112

14 Claims

1. A composition consisting essentially of:

- (A) at least 0.2 weight percent of a nucleating system comprising at least 50 weight percent of succinic anhydride and up to 50 weight percent of one or more nucleating agents selected from the group consisting of:
  - (i) talc and sodium bicarbonate;
  - (ii) alkali metal salts of carboxylic acids;
  - (iii) ionomers; and;
  - (iv) crystallization promoters;
- (B) from 35 to 99 weight percent of a mixture comprising:
  - (i) at least 50 weight percent of one or more high molecular weight crystallizable polyesters; and
  - (ii) up to 50 weight percent of one or more alloy modifiers;
- (C) optionally up to 60 weight percent of one or more fillers selected from the group consisting of:
  - (i) fibers having of length up to  $\frac{1}{8}$  inch selected from the group consisting of glass, other inorganic fibers, carbon fiber and aramid fibers, provided that if glass fiber is present up to 50 weight percent of the glass fiber may be replaced by a low warpage mineral additive; and
  - (ii) particulate inorganic fillers.
- (D) optionally up to 35 weight percent of one or more rubbery impact modifiers;
- (E) from 0.5 to 5 weight percent of high density polyethylene;
- (F) optionally up to a total of about 20 weight percent of one or more additives selected from the group consisting of antioxidants, flame retardants, heat and light stabilizers, coupling agents and mold release agents; and
- (G) optionally a pigment.

4,948,824

## ADHESIVE COMPOSITIONS

Robert A. Auerbach, and George W. Watson, both of Erie, Pa., assignors to Lord Corporation, Erie, Pa.  
Continuation of Ser. No. 30,124, Mar. 26, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 333,738  
Int. Cl.<sup>3</sup> C08K 5/29

U.S. Cl. 524—197

4 Claims

1. A composition of matter, comprising:

- (a) an ethylene-propylene-diene terpolymer having a degree of unsaturation of at least four mole percent; and
- (b) an adduct of a dioxime and a polyisocyanate, said adduct being formed by the process of reacting a dioxime compound and an isocyanate compound in proportion to each other such that the ratio of oxime groups to isocyanate groups is greater than 2:1, whereby said composition of matter is essentially free of unreacted isocyanate functionality.

4,948,825

## CURABLE FILM FORMING COMPOSITIONS

Yukihiko Sasaki, Claremont, Calif., assignor to Avery International Corporation, Pasadena, Calif.  
Filed Jun. 3, 1987, Ser. No. 57,504  
Int. Cl.<sup>3</sup> C09J 7/02; C08K 5/01; C08L 53/00

U.S. Cl. 524—274

14 Claims

1. A pressure-sensitive adhesive comprising a free radical cured mixture of at least one unsaturated elastomeric polymer present in a total amount of from about 10 to about 60 parts by weight of the mixture and at least one organic additive which is substantially nonresponsive to the action of free radicals, said organic additive selected from the group consisting of aromatic organic additives which are at least 50% saturated and aliphatic organic hydrocarbon additives in which at least 65% of the unsaturated groups of the hydrocarbon as formed are saturated, the total of organic additive being present in an amount of from about 90 to about 40 parts by weight of the mixture and an effective amount up to about 10 parts by weight of the mixture of a polythiol cross linking agent, said cured pressure sensitive adhesive having a glass transition temperature at least 10° below use temperature and an elevated temperature shear higher than the elevated temperature shear prior to cure, said cured mixture when at a proportion of 40 parts by weight elastomeric polymer and 60 parts by weight organic additive and in the absence of the polythiol cross linking agent having relative incipient gel dosage at cure at an electron beam dosage of 200 KV of no more than about 1.65.

4,948,826

## TRANSPARENT FLAME-RETARDANT SILICONE RUBBER COMPOSITIONS

Kazuo Hirai, Ichihara, Japan, assignor to Toray Silicone Company Limited, Tokyo, Japan  
Filed Mar. 27, 1989, Ser. No. 329,060  
Claims priority, application Japan, Mar. 29, 1988, 63-75766  
Int. Cl.<sup>3</sup> C08K 5/10

U.S. Cl. 524—309

3 Claims

1. In a transparent flame-retardant silicone rubber composition comprising  
(A) 100 parts by weight of an organopolysiloxane having the average unit formula



where each R represents a substituted or unsubstituted monovalent hydrocarbon radical and the value of a is from 1.90 to 2.05;

- (B) from 1 to 200 parts by weight of platinum or a platinum compound per million parts of said organopolysiloxane;
- (C) from 0.1 to 10 parts by weight of an organoperoxide;
- (D) from 0 to 150 parts by weight of a microparticulate silica;

(E) from 0.05 to 2 parts by weight of an organotitanium compound; and

(F) a cerium compound in an amount sufficient to impart flame retardancy to said composition,  
the improvement comprising the presence as said cerium compound of from 0.05 to 5 parts by weight of the reaction product of a cerium compound with an alkali metal silanolate and the presence as said organotitanium compound of a compound selected from the group consisting of titanate esters and organotitanium chelates.

4,948,827

## METHYL-2-TERTIARY BUTYL-5-THIOPHENOL, ITS PREPARATION PROCESS AND ITS USE

Yani Christidis, Paris, France, assignor to Societe Francaise Hoechst, Puteaux, France  
Filed Oct. 25, 1989, Ser. No. 426,607  
Claims priority, application France, Nov. 8, 1988, 88 14572  
Int. Cl.<sup>3</sup> C07C 149/32; C08C 19/20; C08K 5/37

U.S. Cl. 524—392

4 Claims

- 1. Methyl-2 tertiary butyl-5 thiophenol.
- 2. In a method of stabilizing a vinyl chloride polymer with a stabilizer, the improvement wherein said stabilizer is 2-methyl 5-tertiary butyl thiophenol.
- 3. In a method of controlling molecular weight of a polymer with a chain transfer agent, the improvement wherein said chain transfer agent is 2-methyl 5-tertiary butyl thiophenol.
- 4. In a method of peptizing a rubber with a peptizer, the improvement wherein said peptizer is 2-methyl 5-tertiary butyl thiophenol.

4,948,828

## ASBESTOS FREE MATERIAL FOR GASSING CURRENT LIMITING FUSES

Stephen P. Johnson, Olean, N.Y., and Stephen P. Hassler, Muskego, Wis., assignors to Cooper Industries, Inc., Houston, Tex.  
Filed Jan. 31, 1989, Ser. No. 304,731  
Int. Cl.<sup>3</sup> C08K 3/34, 3/22

U.S. Cl. 524—437

9 Claims

1. An improved material for a spider of a gassing fuse, consisting essentially of the ingredients in substantially the following ranges of proportions:

50-80%	Al <sub>2</sub> O <sub>3</sub> ·3H <sub>2</sub> O;
8-22%	Wollastonite (CaSiO <sub>3</sub> ); and
10-25%	melamine formaldehyde resin.

4,948,829

## AQUEOUS COATING COMPOSITION AND COATING METHOD USING SAME

Masaru Mitsuji, Zama; Mistugu Endo, Ashigarakami; Youji Kawachi, Omihachiman, and Akira Asada, Nara, all of Japan, assignors to Kansai Paint Co., Ltd., Amagasaki and Sanyo Chemical Industries, Ltd., Kyoto, both of Japan  
Filed May 5, 1989, Ser. No. 347,645  
Claims priority, application Japan, May 13, 1988, 63-117769  
Int. Cl.<sup>3</sup> C09D 175/04, 4/02, 5/02

U.S. Cl. 524—457

8 Claims

- 1. An aqueous coating composition comprising:
  - (A) a hydroxy group-containing acrylic resin-type emulsion prepared by subjecting to emulsion polymerization at least one acrylic monomer selected from the group consisting of hydroxy group-containing (C<sub>2</sub>-C<sub>10</sub> alkyl) acrylates and hydroxy group-containing (C<sub>2</sub>-C<sub>10</sub> alkyl) methacrylates,
  - (B) a urethane resin-type emulsion and
  - (C) a crosslinking agent which is at least one member selected from the group consisting of a melamine resin and a phenol formaldehyde resin, the component (B) being a self-emulsifiable urethane emulsion prepared by subject-

ing a urethane prepolymer to reaction for chain extension by water and to emulsification after or during neutralization of the urethane prepolymer with a tertiary amine, the urethane prepolymer consisting essentially of (i) at least one of an aliphatic diisocyanate and an alicyclic diisocyanate, (ii) at least one of a polyether diol and a polyester diol both having a number-average molecular weight of about 500 to about 5000, (iii) a low-molecular weight polyhydroxyl compound and (iv) a dimethylolalkanoic acid in an NCO/OH ratio by equivalent of 1.1-1.9/1.

4,948,830

## BROAD TEMPERATURE CAPABILITY ELASTOMER

Jon W. Martin, Los Alamitos, and Leslye M. Fraser, Inglewood, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
Filed Oct. 7, 1988, Ser. No. 254,628  
Int. Cl.<sup>3</sup> C08L 27/20, 27/18, 27/16

U.S. Cl. 524—462

2 Claims

1. A fluoroelastomer composition having wide temperature application and excellent low temperature flexibility comprising a ternary mixture of:

- (a) a polymer comprising a material combination selected from the group consisting of tetrafluoroethylene and propylene, tetrafluoroethylene and vinylidene fluoride, tetrafluoroethylene and hexafluoropropene, vinylidene fluoride and hexafluoropropene, and tetrafluoroethylene and vinylidene fluoride and hexafluoropropene;
- (b) a random terpolymer of ethylene, propylene and a diene; and
- (c) an oligomer of chlorotrifluoroethylene; said polymer, random terpolymer and oligomer being in the approximate weight ratio of 85:15:10.

4,948,831

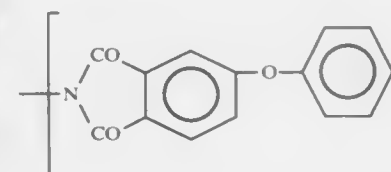
## PROCESS FOR PREPARING POLYETHERIMIDE/EPOXYIMIDE RESIN COMPOSITION

Shiro Nishi, Tokorozawa; Shigekuni Sasaki, Iruma, and Yoshinori Hasuda, Koganei, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan  
Division of Ser. No. 106,178, Oct. 7, 1987, Pat. No. 4,808,676.  
This application Dec. 7, 1988, Ser. No. 281,176  
Claims priority, application Japan, Oct. 11, 1986, 61-241765; Dec. 19, 1986, 61-303413  
Int. Cl.<sup>3</sup> C08L 63/00

U.S. Cl. 524—500

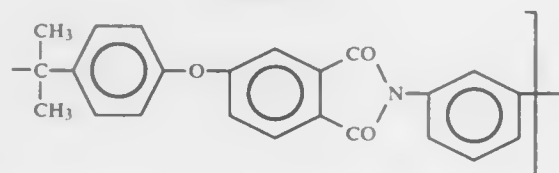
4 Claims

- 1. A process for the preparation of a polyetherimide/epoxyimide resin composition comprising:
  - (a) mixing a polyetherimide and an epoxyimide in a mixing ratio, by weight, of polyetherimide to epoxyimide of from 6:1 to 1:1 in a polar solvent to form a mixed resin composition, said polyetherimide being represented by the following formula of:

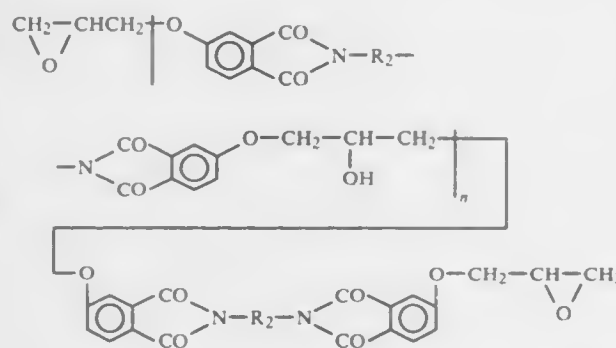




-continued



said epoxyimide being represented by the following general formula of:



wherein  $n$  is an integer of from 0 to 10; and  $R_2$  is a bifunctional organic radical residue selected from the group consisting of diphenylmethane, diphenyl ether, diphenyl sulfone, *m*-phenylene, *p*-phenylene and 1,6-hexamethylene;

- (b) molding said mixed resin composition prepared in the preceding mixing step, followed by removal of said polar solvent from the molded mixture; and  
(c) heating molded composition at a temperature of from 100° C. to 300° C. for 1 to 3 hours.

4,948,832

**REINFORCED THERMOPLASTIC MOLDING MATERIALS BASED ON POLYPHENYLENE ETHER**  
Bertram Ostermayer; Ehrenfried Baumgartner; Rainer Bueschl, all of Roedersheim-Gronau; Hermann Brandt, Schifferstadt; Klaus Boehlke, Hessheim; Erhard Seiler, Ludwigshafen, and Graham E. McKee, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 281,755

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741670

Int. Cl.<sup>5</sup> C08L 71/12, 43/04

U.S. Cl. 524—504 10 Claims  
1. A reinforced thermoplastic molding material containing, as essential components,

(A) from 40 to 94 parts by weight of a polymer component of

- (a<sub>1</sub>) from 10 to 90% by weight of polyphenylene ether and  
(a<sub>2</sub>) from 10 to 90% by weight, based in each case on A, of a styrene polymer toughened with an acrylate rubber or with an unhydrogenated or hydrogenated polymer of a conjugated diene, with the proviso that the acrylate rubber differs from component (B) in having a glass transition temperature below 0° C.

(B) from 1 to 20 parts by weight of a copolymer of  
(b<sub>1</sub>) from 70 to 99.9% by weight of a monomer from the group consisting of styrene,  $\alpha$ -methylstyrene and styrene alkylated in the nucleus or a mixture of these monomers,

(b<sub>2</sub>) from 0.1 to 30% by weight of one or more compounds from the group consisting of tert-butyl acrylate and tert-butyl methacrylate, and

(b<sub>3</sub>) from 0 to 10% by weight, based on the copolymer, of

a further ethylenically unsaturated monomer which is copolymerizable with b<sub>1</sub> and b<sub>2</sub>, and  
(C) from 5 to 50 parts by weight of an inorganic reinforcing agent, the number of parts by weight being based on 100 parts by weight of the sum of A, B and C.

4,948,833

**OLEFINIC RESIN COMPOSITION AND MOLDED ARTICLE**

Tatsuo Araki, Osaka, and Keisuke Okushiro, Kyoto, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

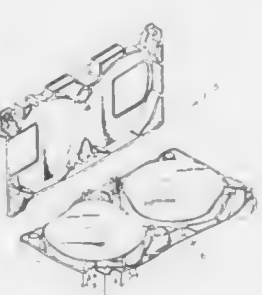
Filed May 17, 1989, Ser. No. 352,893

Claims priority, application Japan, May 18, 1988, 63-122669; Oct. 22, 1988, 63-266975

Int. Cl.<sup>5</sup> C08L 23/06, 67/00, 33/04

U.S. Cl. 524—508

10 Claims



1. A molding composition which comprises an olefinic resin, a synthetic ester resin having a hardness value greater than the hardness value of the olefinic resin and an inorganic material including particles of a planar crystalline structure within a range of 5 to 55% by volume to the volume of the composition and particles of a rod shaped structure in an amount of from 3 to 60% by volume to the volume of the composition. said olefinic resin component being present in an amount of not less than 30% by volume based on the compositions;

4,948,834

**VINYL CHLORIDE-OLEFIN COPOLYMERS HAVING GOOD COLOR STABILITY AND FLEXIBILITY FOR CONTAINER COATINGS**

John A. Baker, Allison Park; Rudolf Maska, Pittsburgh; James R. Bodwell, Pittsburgh; Surya K. Das, Pittsburgh; Jerome A. Seiner, Pittsburgh, all of Pa., and Terence J. Hart, Powell, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 27, 1989, Ser. No. 328,990

Int. Cl.<sup>5</sup> C08K 27/00

U.S. Cl. 524—567

15 Claims

1. An improved vinyl halide latex copolymer composition having color stability, containing a copolymer of free-radical addition polymerizable ethylenically unsaturated monomer in water, in the presence of a polymeric surfactant; the improvement comprising a copolymerizable alpha-olefin monomer selected from the group consisting of ethylene, propylene, isobutylene and butene-1, which is present in an amount of about 0.5 to 6 percent by weight based on the weight solids of the monomers of the latex copolymer to reduce or prevent discoloration of a film of the vinyl halide latex copolymer composition, upon baking at temperature of about 350° F. or higher.

4,948,835

**PROCESS FOR PRODUCING WATER-SOLUBLE POLYELECTROLYTE**

Farykhdzhon A. Artykov; Sadridin Zainutdinov, and Karim S. Akhmedov, all of Tashkent, U.S.S.R., assignors to Institut Khimii Akademii Nauk, Uzbekskoi, U.S.S.R.

Filed Jun. 1, 1988, Ser. No. 201,474

Int. Cl.<sup>5</sup> C08J 3/24; C08L 89/00

U.S. Cl. 524—704

1 Claim

1. A process for producing a water-soluble polyelectrolyte comprising reacting acrylic acid and/or methacrylic acid with ammonium carbonate at a temperature ranging from 15° to 20° C. and at a molar ratio of the acrylic acid and/or methacrylic acid to ammonium carbonate of 1-4:1 respectively; the resulting reaction mass is added with hydrogen peroxide in an amount of from 0.1 to 1.0% by weight of the acrylic acid and/or methacrylic acid and with a 5-14% aqueous solution of a joiner's glue based on animal-origin proteins in an amount of from 0.7 to 2.0% by weight of the acrylic acid and/or methacrylic acid used in the reaction as calculated on the dry solid content of the joiner's glue; polymerization of the reaction mass is effected first at a temperature of 15°-23° C. for 30 to 60 minutes and then at a spontaneous elevation of temperature as a result of the heat of the reaction to a temperature in the range of 110°-130° C.

4,948,836

**IMMOBILIZED ANTIBODIES**

Beka Solomon, Herzliya Pituach; Eran Hadas, Rishon LeZion, and Gideon Fleming, Rehovot, all of Israel, assignors to Roehm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,280

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1987, 3738721

Int. Cl.<sup>5</sup> C08H 1/00; C08L 89/00; A61K 35/14

U.S. Cl. 525—54.1

16 Claims

1. Antibodies which are immobilized and covalently bound to a matrix polymer through the carbohydrate region wherein; the binding of the antibodies is effected by condensing at least one aldehyde group, formed by periodate oxidation, with at least one epoxide function of an epoxy-group containing matrix polymer; said condensation being conducted in the presence of a bifunctional reagent of formula

4,948,837

**MIXTURES OF POLYCARBONATES WITH SILOXANE-CONTAINING GRAFT POLYMERS**

Dieter Wittmann, Krefeld; Christian Lindner, Cologne; Volker Damrath, Burscheid, all of Fed. Rep. of Germany; Hans-Jürgen Kress, Pittsburgh, Pa.; Horst Peters, Leverkusen, and Jochen Schoeps, Krefeld, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 3, 1988, Ser. No. 266,784

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738109

Int. Cl.<sup>5</sup> C08L 51/08

10 Claims

U.S. Cl. 525—63  
1. Thermoplastic polycarbonate molding compositions containing

- A. 52 to 94% by weight of one or more polycarbonates and  
B. 6 to 48% by weight of one or more particulate graft polymers wherein said graft polymer is prepared by grafting  
B.1 20 to 90 parts by weight of a polymer graft overlay of at least one  $\alpha,\beta$ -unsaturated, olefinic monomer onto  
B.2 80 to 10 parts by weight of a graft base having a core-shell structure, consisting of a core of  
(a) an organic, resin-like polymer of at least one olefinically unsaturated monomer having a glass temperature ( $T_g$ ) of  $> 30^\circ$  C. and a shell polymer (shell) of  
(b) crosslinked silicone rubber, the ratio by weight of the core (a) and the shell (b) being from 0.1:99.9 to 90:10, the graft polymer B) having an average particle diameter of from 0.05 to 10  $\mu$ m and the sum of the parts by weight of B.1 and B.2 always amounting to 100 parts by weight.

4,948,838

**THERMOPLASTIC MOLDING MATERIALS**

Hans Jadamus, Marl, and Martin Bartmann, Recklinghausen, both of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 945,767, Dec. 23, 1986, abandoned.

This application May 4, 1988, Ser. No. 191,784

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1986, 3600366

Int. Cl.<sup>5</sup> C08L 51/08, 71/04, 77/00

U.S. Cl. 525—66

13 Claims

1. A thermoplastic molding material comprising:  
(a) a polyphenylene ether,  
(b) a graft polymer, comprising a hydrocarbon as the principal chain and polyphenylene ether as the side chains said graft polymer being prepared by oxidative coupling in the presence of a copper-amine catalyst,  
(c) a functionalized polyethylene, and  
(d) a polyamide.

4,948,839

**COMPOSITION**

Christopher M. Hawkins, Evansville, and Robert R. Gallucci, Mt. Vernon, both of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 12, 1988, Ser. No. 243,372

Int. Cl.<sup>5</sup> C08G 81/02

U.S. Cl. 525—92

23 Claims

1. A composition comprising a modified amorphous polyester, selected from the group consisting of aromatic polycarbonate, aromatic copolyester carbonate and polyarylate said modification being in the additional presence in the backbone of the polyester unsaturated aliphatic diester repeating units, the said modified polyester being covalently bonded to a polyolefin.

4,948,840

**THERMOPLASTIC ELASTOMER OF PROPYLENE  
POLYMER MATERIAL AND CROSSLINKED  
ETHYLENE-PROPYLENE RUBBER**

Dominic A. Berta, New Castle County, Del., assignor to Himont Incorporated, Wilmington, Del.

Filed Nov. 14, 1989, Ser. No. 436,504

Int. Cl.<sup>3</sup> C08L 23/26, 23/16, 23/10

U.S. Cl. 525—193

20 Claims

1. A dynamically partially cured thermoplastic elastomer comprising, by weight, (a) 10 to 70 parts of a propylene polymer material selected from the group consisting of (i) crystalline polypropylene having an isotactic index of greater than 90% and (ii) an ethylene-propylene random copolymer having an ethylene content of up to about 5%, (b) 20 to 60 parts of an amorphous ethylene-propylene copolymer rubber, (c) 10 to 30 parts of a semi-crystalline, low density, essentially linear ethylene-propylene copolymer, xylene insoluble at room temperature, wherein the total amount of (a)+(b)+(c) is 100 parts, and (d) a curing system, based on 100 parts of (a)+(b)+(c), containing (i) 3 to 15 parts of 1,2-polybutadiene, (ii) 0.5 to 3 parts of a peroxide crosslinking agent having a half-life of 3.3 to 20 min. at 160° C. in EPDM.

4,948,841

**PROPYLENE POLYMER COMPOSITION**

Toshikazu Kasahara, and Hideo Funabashi, both of Ichihara, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 28, 1988, Ser. No. 263,803

Claims priority, application Japan, Nov. 11, 1987, 62-282994

Int. Cl.<sup>3</sup> C08L 23/10, 23/16; C08F 297/08

U.S. Cl. 525—240

16 Claims

1. A propylene polymer composition comprising: 65 to 95% by weight of a propylene homopolymer having (a) an intrinsic viscosity ( $[\eta]$ ) of 0.5 to 3.5 dl/g, (b) a xylene soluble content at ordinary temperature (Xs) of not more than 3% by weight, and a difference ( $\Delta[\eta]$ ) between an intrinsic viscosity ( $[\eta]$ ) of xylene insoluble portion at the ordinary temperature and an intrinsic viscosity ( $[\eta]$ ) of xylene soluble portion at the ordinary temperature of not more than 0.5 dl/g, (c) an isotactic pentad fraction (IP) falling within the range represented by the following equation:

$$IP \cong -0.624[\eta] + 97.5,$$

and (d) a crystallization temperature ( $T_c$ ) falling within the range represented by the following equation:

$$T_c \cong -2.33[\eta] + 116.0; \text{ and}$$

5 to 35% by weight of a propylene-ethylene random copolymer having (e) an intrinsic viscosity ( $[\eta]$ ) of less than 2.8 dl/g and (f) an ethylene content of 10 to 35% by weight.

4,948,842

**POLYESTERS HAVING IMPROVED IMPACT  
STRENGTH**

Errol J. Olivier, Baton Rouge, La., assignor to Copolymer Rubber and Chemical Corporation, Baton Rouge, La.

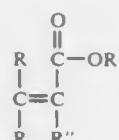
Continuation of Ser. No. 858,890, Apr. 25, 1986, abandoned, which is a continuation of Ser. No. 690,613, Jan. 11, 1985, abandoned. This application Oct. 26, 1988, Ser. No. 265,289

Int. Cl.<sup>3</sup> C08F 255/06, 255/02

U.S. Cl. 525—286

17 Claims

1. An additive for blending with polyester or polyamide resins as an impact strength improver comprising an unsaturated backbone rubber formed by interpolymerization of ethylene, at least one mono-olefin containing 3 to 16 carbon atoms and polyene in which the backbone rubber has been grafted in a solvent medium in the presence of a free radical initiator with an ester having the structure:



wherein R' is an organic group having an epoxide functionality, R'' is alkyl and R is selected from the group consisting of hydrogen, alkyl, aralkyl, cycloalkyl and aryl, said ester being present in an amount of 1 to 10 percent by weight of the rubber, said additive being substantially gel free.

4,948,843

**DYE POLYMER/SOL-GEL COMPOSITES**

Michael R. Roberts, Rochester, N.Y.; Bradley K. Coltrain, Fairport, and Sharon M. Melpolder, Hilton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,056

Int. Cl.<sup>3</sup> C08F 8/42, 20/70, 220/00

U.S. Cl. 525—328.2

6 Claims

1. A composite comprising a dye-containing polymer covalently bonded to a silicic acid heteropolycondensate, said dye-containing polymer having a backbone, and dye and  $\text{SiR}'_x(\text{OR})_a$  units bonded to said backbone through a linking group; said silicic acid heteropolycondensate being the reaction product produced by hydrolysis and condensation of a source of said heteropolycondensate, said source having the formula  $\text{R}_n\text{SiX}_b$ ;  $\text{R}_1$ ,  $\text{R}'$ , and  $\text{R}_2$  are alike or different, and are selected from alkyl groups having 1 to about 4 carbon atoms, X is a hydrolyzable group,  $(x+a)$  is a positive integer equal to one less than the valence of silicon, x being equal to 0 or 1, n is equal to zero, 1, or 2, and b is equal to the valence of silicon minus the value of n; said composite being characterized by covalent bonding between said polymer and said condensate, said bonding having been produced by participation of said  $\text{SiR}'_x(\text{OR})_a$  units in said hydrolysis and condensation reaction forming said heteropolycondensate; said composite being further characterized by producing optically clear films.

4,948,844

**PROCESS FOR PREPARATION OF PERFLUORINATED  
COPOLYMER**

Akihiko Nakahara, Yamaguchi; Yuji Iseki, and Kouichi Murata, both of Tokuyama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Filed Apr. 14, 1989, Ser. No. 338,209

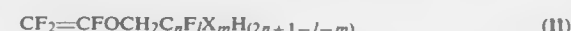
Claims priority, application Japan, Apr. 16, 1988, 63-92657

Int. Cl.<sup>3</sup> C08F 8/22

U.S. Cl. 525—356

8 Claims

1. A process for the preparation of a perfluorinated copolymer, which comprises copolymerizing (I) tetrafluoroethylene with (II) a monomer represented by the following general formula:



wherein X stands for —Cl or —Br, n is an integer of at least 0, l is an integer of from 0 to  $(2n+1)$ , m is 0 or 1, and the relation of  $l+m \leq 2n+1$  is established, at a predetermined monomer molar ratio (I)/(II) of from 99.5/0.5 to 50/50 in the state where both the monomers are dissolved in an organic solvent, to thereby form a copolymer comprising units of the monomers at a ratio substantially equal to said predetermined monomer ratio, and fluorinating said copolymer with molecular fluorine.

4,948,845

**NOVEL SURFACTANTS BASED ON POLY(ALKYLENE  
CARBONATE)**

Steven D. Gagnon, Detroit, and Edward M. Dexheimer, Grosse Ile, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Division of Ser. No. 184,585, Apr. 21, 1988, Pat. No. 4,866,143.

This application Apr. 17, 1989, Ser. No. 340,812

Int. Cl.<sup>3</sup> C08L 71/02

U.S. Cl. 525—409

12 Claims

1. A method for preparing a polyether polycarbonate block copolymer nonionic surface-active agent, comprising polymerizing, at a temperature effective to polymerize, a hydrophilic portion comprised of a polymer selected from the group consisting of a polyoxyalkylene polyether, a saccharide, a saccharide polyalkylate, a poly(alkylene carbonate) having a carbon dioxide content of from about 1 to 15 molar percent, and mixtures thereof, with a hydrophobic portion comprised of alkylene and carbonate units arranged in alternating or random order to form a poly(alkylene carbonate) having a total carbon dioxide content of from about 25 to 50 molar weight percent and a molecular weight of from about 300 to 10,000, at the site of each reactive hydrogen atom, said hydrophobic portion and said hydrophilic portion present in a weight ratio of from about 10:90 to 90:10.

4,948,846

**INVERSION POLYMERIZATION OF VINYLCHLORIDE  
IN A REACTOR COATED WITH AN AGENT  
COMPRISING A CLAY AND A WATER-SOLUBLE  
SUSPENDING AGENT**

Sam K. Lim, and Jae G. Kim, both of Sungnam, Rep. of Korea, assignors to Korea Steel Chemical Co., Ltd., Seoul, Rep. of Korea

Filed Jan. 3, 1989, Ser. No. 292,884

Int. Cl.<sup>3</sup> C08F 2/20

U.S. Cl. 526—62

13 Claims

1. In an improved process for the inversion polymerization of vinylchloride conducted in a reactor treated with a coating agent, the improved characterized by said coating agent comprising a complex colloidal magnesium aluminum silicate derived from smectite and a water-soluble suspending agent.

4,948,847

**PRODUCTION OF STYRENE RESINS BY CONTINUOUS  
BULK POLYMERIZATION**

Tsuyoshi Morita, and Kyotaro Shimazu, both of Chiba, Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

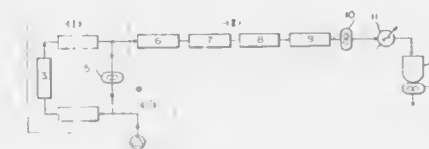
Filed Sep. 9, 1988, Ser. No. 242,164

Claims priority, application Japan, Sep. 11, 1987, 62-226522

Int. Cl.<sup>3</sup> C08F 2/02, 4/32

U.S. Cl. 526—64

10 Claims



1. A continuous bulk polymerization process for producing a styrene resin homopolymer or copolymer which comprises introducing a polymerization reaction mixture comprising (A) a styrene monomer and optionally, at least one other monomer copolymerizable therewith, (B) at least one organic solvent having a chain transfer constant of  $0.1 \times 10^{-5}$  to  $8 \times 10^{-5}$  at a weight ratio of (A)/(B) of from 98/2 to about 90/10, and (C) an organic peroxide having a half life of 10 hours at a temperature in the range of 75° to 130° C., into a circulating line (I) comprising at least one tubular reactor provided with a plurality of static

mixing elements to form an initial stage polymerization solution,

circulating said initial stage polymerization solution through said circulating line (I) to continuously associate and mix with said polymerization reaction mixture, withdrawing a portion of said initial stage polymerization solution of which at least 70% by weight of the organic peroxide (C) of the polymerization reaction mixture has been consumed from said circulating line (I) and continuously feeding said portion through a main-polymerization line (II) comprising a linear array of at least one tubular reactor provided with a plurality of static mixer elements and carrying out polymerization in said main-polymerization line.

4,948,848

**SOLUTION FEED, SLURRY POLYMERIZATION  
PROCESS FOR THE PRODUCTION OF COPOLYMERS  
OF MALEIC ANHYDRIDE AND AN ALKYL VINYL  
ETHER HAVING PREDETERMINED SPECIFIC  
VISCOSITIES**

Mohammed Tazi, Wayne, and Nikhil Kundel, Piscataway, both of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Apr. 7, 1989, Ser. No. 334,405

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.<sup>3</sup> C08F 2/06, 222/06, 216/18; A61K 6/083

U.S. Cl. 526—78

16 Claims

1. A solution feed, slurry polymerization process for making copolymer powders of maleic anhydride and a  $\text{C}_1\text{--C}_5$  alkyl vinyl ether having a predetermined high specific viscosity suitable for use in denture adhesives which comprises:

- (a) precharging a reactor with a substantial excess of a  $\text{C}_1\text{--C}_5$  alkyl vinyl ether,
  - (b) feeding a solution of maleic anhydride dissolved in a minimum amount of an organic solvent selected from ethyl acetate and acetone into the precharged reactor,
  - (c) copolymerizing said reactants at a temperature of about 45–85° C. in the presence of a free radical initiator, to form a pumpable slurry of the copolymer in the reaction medium, and
  - (d) recovering the copolymer product therefrom as a fine white powder having a specific viscosity of about 2.6 to about 3.5 measured as a 1% solution in 2-butanone at 25° C., and,
- when the solvent is ethyl acetate, the maleic anhydride to ethyl acetate weight ratio in the feed solution is about 1:1 to 1:4 and the maleic anhydride to alkyl vinyl ether ratio in the reaction mixture is about 1:3 to 1:10; and when the solvent is acetone, the maleic anhydride to acetone weight ratio is about 1:0.5 to 1:4 and the maleic anhydride to alkyl vinyl ether weight ratio is about 1:3 to 1:10.

4,948,849

**PROCESS FOR MAKING COPOLYMERS OF AROMATIC  
VINYL COMPOUNDS ADD CONJUGATED DIOLEFINS  
HAVING SUBSTANTIAL INCREASE IN AROMATIC  
VINYL COMPOUND DIFFERENTIAL CONTENT**

Robert J. Blythe, Birmingham; Robert Bond, Lichfield, both of England, and Gerardus E. La Heij, Amsterdam, Netherlands, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

Division of Ser. No. 524,019, Aug. 17, 1983, Pat. No. 4,845,154, which is a division of Ser. No. 239,514, Mar. 2, 1981, abandoned.

This application Jun. 9, 1988, Ser. No. 204,387

Claims priority, application United Kingdom, Mar. 7, 1980, 8007860; Mar. 7, 1980, 8007861; Nov. 29, 1980, 80038405; Nov. 29, 1980, 80038406; Feb. 20, 1981, 8105433

Int. Cl.<sup>3</sup> C08L 9/06, 53/02

U.S. Cl. 526—79

9 Claims

1. A process for the production of an elastomeric copolymer



of an aromatic vinyl compound and a conjugated diene, the copolymer having a differential content of the aromatic vinyl compound which changes from a first value to a second value within the first 10% portion of the copolymer chains (as determined by monomer conversion) said second value being at least 25 percentage points greater than said first value, in which process the aromatic vinyl compound and the conjugated diene are fed to a reaction zone containing a solvent for the reactants and an initiator of the copolymerization reaction, at feed rates such that at the beginning of the copolymerization reaction there is a substantial preponderance by weight of unreacted aromatic vinyl compound over any unreacted conjugated diene and said preponderance is changed, during the copolymerization reaction, to a substantial preponderance by weight of the conjugated diene over the aromatic vinyl compound.

4,948,850

# PREPARATION OF AMINE-MODIFIED ETHYLENE/CARBOXYLIC ACID COPOLYMERS, SUCH COPOLYMERS, AND USE THEREOF AS ADHESION PROMOTERS AND CABLE SHEATHING

Norbert Hasenbein, Dirmstein; Thomas Muehlenbernd, Heidelberg, and Gernot Koehler, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 400,529, Aug. 30, 1989. This application Jan. 5, 1990, Ser. No. 461,424

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3830007

Int. Cl.<sup>5</sup> C08F 8/32

U.S. Cl. 526—217

1 Claim

1. A high molecular weight ethylene copolymer having a melt flow index of less than 40 g/10 min and prepared by copolymerization of ethylene with an  $\alpha,\beta$ -ethylenically unsaturated acrylic acid, carboxylic anhydride or a derivative thereof in a polymerization system at a pressure of from 500 to 5,000 bar and a temperature of from 40° to 350° C. in the presence of a free-radical polymerization initiator, in the presence or absence of a molecular weight regulator and in the presence of a tertiary organic monoamine.

4,948,851

# AMORPHOUS COPOLYMERS OF PERFLUORO-2,2-DIMETHYL-1,3-DIOXOLE

Edward N. Squire, Spring Hill, Fla., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 148,579, Jan. 26, 1988, abandoned, which is a division of Ser. No. 904,095, Sep. 4, 1986, Pat. No. 4,754,009, which is a continuation-in-part of Ser. No. 723,649, Apr. 16, 1985, abandoned, which is a division of Ser. No. 591,486, Mar. 20, 1984, Pat. No. 4,530,569, which is a continuation-in-part of Ser. No. 294,789, Aug. 20, 1981, abandoned. This application Dec. 28, 1989, Ser. No. 458,012

Int. Cl.<sup>5</sup> C08F 16/24

U.S. Cl. 526—247

1 Claim

1. A self-supporting film of an amorphous dipolymer of 65–99 mole % of perfluoro-2,2-dimethyl-1,3-dioxole with a complementary amount of tetrafluoroethylene, the glass transition temperature of the dipolymer being at least 140° C.

4,948,852

# PEROXIDE-CURABLE FLUOROELASTOMERS AND CHLOROFLUOROELASTOMERS HAVING BROMINE AND IODINE CURESITES AND THE PREPARATION THEREOF

Albert L. Moore, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 26, 1989, Ser. No. 426,931

Int. Cl.<sup>5</sup> C08F 16/24

U.S. Cl. 526—247

22 Claims

1. A composition comprising a peroxide curable fluoroelastomer prepared by continuous emulsion polymerization in the

presence of iodinated compounds of the formula  $RI_n$ , where R is a radical of 1–8 carbon atoms and selected from the group consisting of fluorocarbons and chlorofluorocarbons, I is iodine, and n is 1 or 2, said iodine being bonded at a substantial number of terminal positions on the fluoroelastomer, the amount of iodinated compound being sufficient to provide at least 0.1 weight percent iodine in the fluoroelastomer, comprising:

- up to 3 weight percent, based on the total weight of components (a) and (b), of polymer repeat units selected from the group consisting of fluoroolefins and fluorovinyl ethers, said units containing bromine and being present in an amount present to provide 0.1–1.0 weight percent bromine in the fluoroelastomer; and
- complementally, at least 97 weight percent, based on the total weight of components (a) and (b), of:
  - polymer repeat units of vinylidene fluoride, and polymer repeat units of one or more fluoroolefins copolymerizable therewith, said fluoroolefins containing 2–8 carbon atoms and at least as many fluorine atoms as carbon atoms, optionally, polymer repeat units provided by or
  - 32–60 mole percent of polymer repeat units of tetrafluoroethylene, 20–40 mole percent of polymer repeat units of perfluoroalkyl perfluorovinyl ethers, and 10–40 mole percent of polymer repeat units of ethylene.

4,948,853

# BROMO-CONTAINING PERFLUOROPOLYMERS HAVING IODINE CURESITES

Anestis L. Logothetis, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 19, 1989, Ser. No. 354,192

Int. Cl.<sup>5</sup> C08F 16/24

U.S. Cl. 526—247

12 Claims

1. In a perfluoropolymer having randomly copolymerized units of tetrafluoroethylene, perfluoro (alkyl vinyl) ether and bromine-containing fluorinated cure site monomers, the improvement wherein the perfluoropolymer further comprises iodo moieties present in an amount of at least about 0.05 percent, by weight of the perfluoropolymer, the iodo moieties being derived from saturated iodo compounds.

4,948,854

# TRANSPARENT OPTICAL ARTICLE AND PROCESS FOR PREPARING SAME

Naoyuki Amaya; Keizo Anan, Both of 32-16, Higashiarai, Yatabemachi, Tsukuba-gun, Ibaraki-ken; Yoshishige Murata, 2-24-5, Sakuramura Umezono, Niihari-gun Ibaraki-ken; Takao Mogami; Yoshio Sano, both of c/o Seiko Epson Corporation, Suwa Kojo, 3-3-5, Owa, Suwa-shi, Nagano-ken; Harubiro Ikebe, 32-16, Higashiarai, Yatabemachi, Tsukuba-gun, Ibaraki-ken, and Rumiko Selta, 11954-3, Sakaecho, Yuki-shi, Ibaraki-ken, all of Japan

Continuation of Ser. No. 27,562, Mar. 18, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 418,813

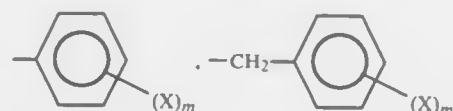
Claims priority, application Japan, Mar. 25, 1986, 61-64842; Aug. 12, 1986, 61-187862; Aug. 12, 1986, 61-187863

Int. Cl.<sup>5</sup> C08F 226/02, 222/26, 222/18

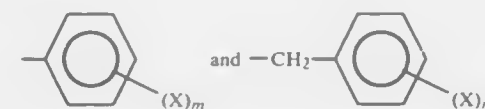
U.S. Cl. 526—261

5 Claims

1. A transparent optical article constituted of an optical resin obtained by polymerizing a feed monomer consisting essentially of a diameter of itaconic acid and a comonomer, ester groups forming said diester being the same or different groups, said ester group being selected from the group consisting of



and R, wherein X represents a halogen atom, m represents zero or an integer of 1 to 5 and R represents an alkyl group having 1 to 12 carbon atoms, an alkenyl group having 1 to 12 carbon atoms or a cycloalkyl group having 3 to 12 carbon atoms, at least one of said ester groups being selected from the group consisting of



wherein X and m represent the same as above, said comonomer being selected from the group consisting of styrene, p-methyl styrene, p-chlorostyrene, o-chlorostyrene, p-bromostyrene, o-bromostyrene, p-di-vinylbenzene, m-divinylbenzene, divinyl biphenyl, vinyl acetate, vinyl propionate, vinyl benzoate, methyl methacrylate, butyl methacrylate, methyl acrylate, ethyl acrylate, phenyl methacrylate, phenyl acetate, benzyl methacrylate, benzyl acrylate, bromophenyl methacrylate, methacrylonitrile, ethyleneglycol dimethacrylate, diethyleneglycol dimethacrylate, ethyleneglycol diacrylate, diethyleneglycol diacrylate, polyethyleneglycol diacrylate, di-propyleneglycol dimethacrylate, bisphenol. A dimethacrylate, 2,2-bis (4-methacryloyloxyethoxyphenyl) propane, 2,2-bis (4-arcyloyloxyethoxyphenyl) propane, allyl methacrylate, allyl acrylate, diallyl phthalate, diallyl tetrachlorophthalate, diallyl isophthalate, diallyl terephthalate, triallyl trimellitate, triallyl cyanurate, triallyl isocyanurate, diethyleneglycol bisallyl carbonate, diallyl tetrachlorophthalate, divinyl benzene, ethyleneglycol diacrylate, ethyleneglycol dimethacrylate, polyethyleneglycol diacrylate, polyethyleneglycol dimethacrylate, diallyl phthalate, diallyl isophthalate, ethyleneglycol bisallyl carbonate, triallyl trimellitate, triallyl isocyanurate, triallyl cyanurate and mixtures thereof.

4,948,855

# COMFORTABLE, OXYGEN PERMEABLE CONTACT LENSES AND THE MANUFACTURE THEREOF

Nick N. Novicky, Calgary, Canada, assignor to Progressive Chemical Research, Ltd., Canada

Division of Ser. No. 153,811, Feb. 8, 1988, Pat. No. 4,861,850, which is a continuation-in-part of Ser. No. 880,668, Jun. 30, 1986, Pat. No. 4,743,106. This application May 15, 1989, Ser. No. 351,798

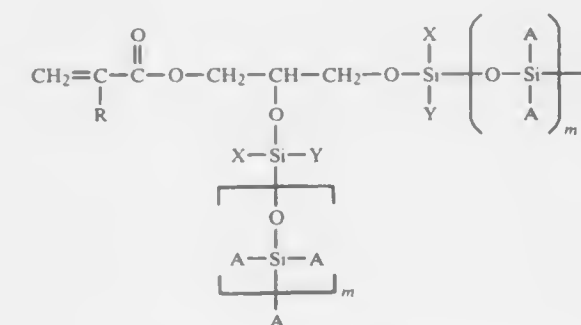
Int. Cl.<sup>5</sup> C08F 230/08

U.S. Cl. 526—279

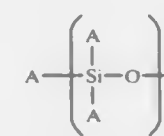
5 Claims

1. An ophthalmic device formed of a copolymer plastic material which comprises:

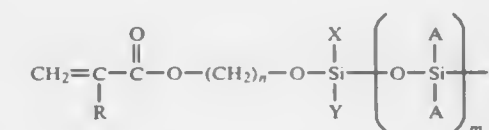
- at least one organosilicone monomer selected from the group consisting of
- (1) an organosiloxanylalkoxy ester monomer of acrylic or methacrylic acid having the following structural formula:



wherein X and Y are C<sub>1</sub> to C<sub>6</sub> alkyl, phenyl or groups of the following structure:

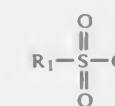


wherein A is C<sub>1</sub>–C<sub>6</sub> alkyl or phenyl, m being an integer from 1 to 5 and R is methyl or hydrogen; and,  
(2) an organosiloxanylalkoxy ester monomer of acrylic or methacrylic acid having the following structural formula:



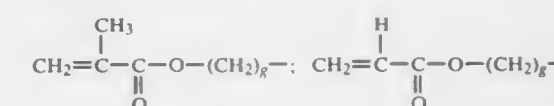
n being an integer from 1 to 3, wherein A, X, Y, R and m are as defined above;

which are copolymerized with an organosulfone monomer having the general structural formula:



wherein R<sub>1</sub> is selected from one of the following:

CH<sub>2</sub>=CH—; CH<sub>2</sub>=CH—C<sub>6</sub>H<sub>4</sub>—;



wherein Q is C<sub>1</sub> to C<sub>20</sub> alkyl, perfluoroalkyl, or phenyl and g is an integer from 1 to 5.

4,948,856

# HOMOGENEOUS ADDITION COPOLYMERS OF ETHYLENE AND CYCLOOLEFIN MONOMERS AND METHOD FOR PRODUCING SAME

Robert J. Minchak, Parma Heights, and James T. Ware, Doylestown, both of Ohio, assignors to B. F. Goodrich Company, Akron, Ohio

Filed May 22, 1987, Ser. No. 52,878

Int. Cl.<sup>5</sup> C08F 2/02, 4/622, 210/02

U.S. Cl. 526—281

18 Claims

1. A process for preparing homogeneous addition copolymers by copolymerization of a monomer having a norbornene group with ethylene within a vessel by contacting ethylene gas with a liquid reaction medium comprised of monomer having a norbornene group and an effective amount of a halogen containing addition polymerization catalyst/cocatalyst system which is soluble in said monomer having a norbornene group, wherein

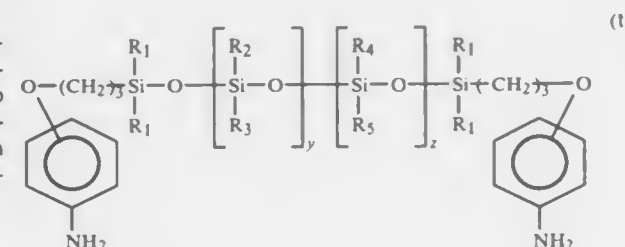
the reaction medium is maintained at a temperature in the range of about –50° C. to about 40° C.;

the molar ratio of monomer having a norbornene group to ethylene within the vessel is maintained above about 90:10;

the ethylene pressure in the reaction medium is maintained above 1 psig to about 10 psig; and

the concentration of monomer having a norbornene group

within the reaction medium is maintained above about 35% by volume, wherein the addition polymerization catalyst of the halogen-containing catalyst/cocatalyst system is a vanadium compound soluble in the monomer having a norbornene group and the cocatalyst of the halogen-containing catalyst/cocatalyst system is selected from an alkyl aluminum halide or an alkoxy alkyl aluminum soluble in the monomer having a norbornene group.



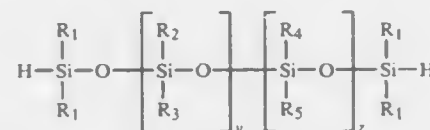
in which:

the oxygen of the phenoxyalkyl group is in the ortho, meta or para position relative to the carbon atom of the benzene ring bonded to nitrogen;

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub>, which may be identical or different, are each a straight or branched chain alkyl radical containing from 1 to 12 carbon atoms, or a substituted such radical bearing one or more chlorine, bromine or fluorine atom substituents or a —CN substituent; or a phenyl radical optionally substituted by one or more alkyl and/or alkoxy radicals containing from 1 to 4 carbon atoms or by one or more chlorine atoms; and

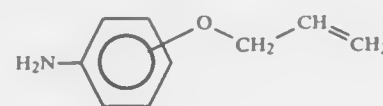
the symbols y and z represent integers or real numbers, which may be identical or different, the sum of which ranges from 0 to 100; said process being suitable for the preparation of the polysiloxylated diamine of the formula (1) with 100% selectivity by directly reading:

(a) an alpha, omega-bis(hydrogeno)diorganopolysiloxane of the formula:



in which R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>5</sub>, y and z are as defined above, with:

(b) an allyloxyaniline of the formula:



which the allyloxy radical is in the ortho, meta or para position relative to the carbon atom of the benzene ring bonded to nitrogen, in bulk in the absence of a solvent, at a temperature not exceeding 120° C., and in the presence of a catalytically effective amount of a platinum group metal catalyst.

4,948,859

**EXTRUDER POLYMERIZATION OF POLYURETHANES**  
Jimmie L. Echols, Maplewood; Walton J. Hammar, St. Paul, and Thomas A. Kotnour, Faribault, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 28, 1988, Ser. No. 263,713  
Int. Cl.<sup>5</sup> C08G 18/08, 18/67

**U.S. Cl. 528—28** 12 Claims  
1. A process for bulk polymerization of polyurethanes which comprises:

(A) providing the following raw materials:

- (1) at least one diisocyanate;
- (2) at least one oligomeric diol having a molecular weight of at least 400; and
- (3) at least one chain extending monomer having an acrylate or methacrylate moiety;

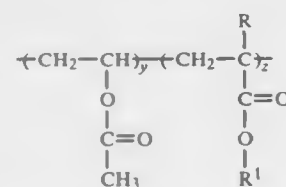
(B) continuously conveying the above raw materials to a

4,948,857

**COPOLYMERS OF VINYL ACETATE AND ACRYLATES**  
Finn L. Marten, Macungie; Amir Famili, Schnecksville, both of Pa., and Dillip K. Mohanty, Blacksburg, Va., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation of Ser. No. 3,966, Jan. 16, 1987, abandoned. This application Apr. 22, 1988, Ser. No. 184,728  
Int. Cl.<sup>5</sup> C08F 220/10

**U.S. Cl. 526—329.5** 15 Claims  
1. A substantially homogeneous random vinyl acetate copolymer comprising the following general structure:



wherein

R is hydrogen or methyl;

R<sup>1</sup> is a C<sub>10</sub>–C<sub>14</sub> hydrocarbyl group not containing an olefinic functionality;

y is 92 to 99.5 mole %; and

z is 0.5 to 8 mole %;

which copolymer has a degree of polymerization ranging from 100 to 2500 prepared by

- (a) continuously feeding vinyl acetate monomer and an acrylate monomer of the formula CH<sub>2</sub>=CR—CO<sub>2</sub>R<sup>1</sup> into a substantially non-aqueous solution polymerization reaction mixture in a reaction vessel,
- (b) polymerizing the vinyl acetate and acrylate monomer to yield a copolymer in the reaction mixture, and
- (c) continuously withdrawing from the reaction vessel reaction mixture containing the copolymer, with steps (a)–(c) being performed in such a manner as to attain a steady state condition in the reaction mixture.

4,948,858

**PREPARATION OF DIORGANOPOLYSILOXYLATED DIAMINES**

Pascal Barthelemy, Lyons, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Feb. 24, 1988, Ser. No. 159,906  
Claims priority, application France, Feb. 24, 1987, 87/02614  
Int. Cl.<sup>5</sup> C08G 77/08

**U.S. Cl. 528—15** 5 Claims  
1. A process for the preparation of a diorgano-polysiloxylated diamine having the general formula (I):

twin screw extruder and reacting them together to the desired degree of conversion in the extruder while conveying the reacting mass through the extruder under the following conditions:

- (1) molar ratio of isocyanate to hydroxy moieties 1.00±0.05;
- (2) ratio of chain extending monomer to other monomers sufficient to yield a polymer product having such chain extender incorporated therein to a level of from 0.1 to less than about 10 weight percent;
- (3) extruder barrel temperature sufficient to initiate and maintain reaction between the raw materials; and a residence time
- (4) extruder configured to have sufficient to obtain substantially complete reaction of the diisocyanate as measured by infrared spectrometry of the extrudate; and
- (C) cooling the resulting product polymer from the discharge of the extruder; to yield a polyurethane having the following properties:
  - (i) weight average molecular weight greater than 80,000; and
  - (ii) acrylate or methacrylate functionality in the polymer molecule resulting from the chain extending monomer and which functionality survived the extruder reaction conditions.

4,948,860

**MELT PROCESSABLE POLYURETHANEUREA COPOLYMERS AND METHOD FOR THEIR PREPARATION**

Donald D. Solomon, Spring Valley, Calif.; Anthony J. Walder, Dayton, Ohio, and Can B. Hu, Fountaint Valley, Calif., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed May 1, 1989, Ser. No. 345,800  
Int. Cl.<sup>5</sup> C08G 18/32

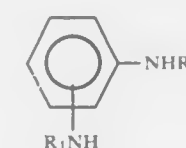
**U.S. Cl. 528—28** 20 Claims  
1. A method for producing a melt processable polyurethaneurea comprising combining with mixing a diisocyanate and a mixture of a polyetherglycol having a molecular weight of about 500 to 3,000, a diol chain extender and a diamine chain extender at a temperature sufficient to induce an exotherm to give a clear and uniform melt of polyurethaneurea and curing said polyurethaneurea.

4,948,861

**N,N'-DIALKYLPHENYLENEDIAMINES AS CURING AGENTS IN POLYURETHANE AND POLYUREA MANUFACTURE BY REACTION INJECTION MOLDING**  
William M. Baumann, Downers Grove; Ray V. Scott, Jr., Addison; David W. House, Arlington Heights, and Dusan J. Engel, Des Plaines, all of Ill., assignors to UOP, Des Plaines, Ill. Division of Ser. No. 130,838, Dec. 9, 1987, Pat. No. 4,806,616. This application Oct. 31, 1988, Ser. No. 265,098

Int. Cl.<sup>5</sup> C08G 18/32

**U.S. Cl. 528—68** 13 Claims  
1. A reaction injection molded elastomer made by reacting in a closed mold a first stream comprising one or more polyisocyanates with a second stream comprising from about 0.7 to about 1.3 equivalents of a blend of compounds having isocyanate reactive hydrogens said blend consisting essentially of a backbone polyamine (B<sub>1</sub>) or a backbone polyol (B<sub>2</sub>) and a first chain extender polyamine (D) which is at least one N,N'-disubstituted phenylenediamine of the structure,



where R<sub>1</sub> and R<sub>2</sub> are independently selected from the group

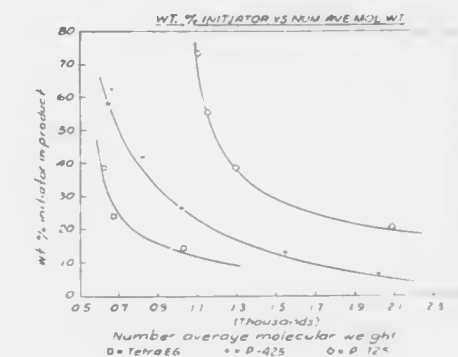
consisting of monovalent alkyl, alkenyl and aryl moieties where the alkyl and alkenyl moieties contain from 1 to about 20 carbon atoms, along with a second chain extender amine selected from the group consisting of 1-methyl-3,5-diethyl-2,4-diaminobenzene, 1-methyl-3,5-diethyl-2,6-diaminobenzene, toluene diamine, 1,3,5-triethyl-2,6-diaminobenzene, 3,3'-diaminodiphenylmethane where the second chain extender polyamine constitutes from about 80 to about 99% equivalents percent of the mixture of chain extender polyamines and the mixture of first and second chain extender polyamines constitutes from about 20 to about 80 equivalents percent of the blend.

4,948,862

**MODIFIED POLY(ALKYLENE CARBONATE) POLYAHLS**

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich. Division of Ser. No. 931,597, Nov. 17, 1986, Pat. No. 4,795,810, which is a continuation-in-part of Ser. No. 799,211, Nov. 18, 1985, Pat. No. 4,686,273, which is a continuation-in-part of Ser. No. 809,675, Dec. 16, 1985, Pat. No. 4,686,274. This application Sep. 2, 1988, Ser. No. 240,027  
Int. Cl.<sup>5</sup> C08G 18/32, 18/38

**U.S. Cl. 528—77** 16 Claims



1. A urethane/urea polymer comprising the reaction product of at least one organic polyisocyanate and at least one modified poly(alkylene carbonate) polyahl, which modified poly(alkylene carbonate) polyahl is a polymer comprising: (1) a backbone having (a) the residue of at least one polyahl initiator, (b) a plurality of poly(alkyleneoxy) moieties, and (c) a plurality of poly(alkylene carbonate) moieties (2) a plurality of active hydrogen end groups; and (3) the residue of at least one modifier which resides in the polymer in the backbone and/or as an end group; wherein the modifier is selected from the group consisting of alkylene, aralkylene and cycloalkylene polyahls and alkylene, aralkylene and cycloalkylene polyahls containing one or more oxygen, sulfur or nitrogen atoms, said modified poly(alkylene carbonate) polyahls having a number average molecular weight higher than the number average molecular weight of any known poly(alkylene carbonate) polyahl comprising the same monomeric components in the same proportions, said modified poly(alkylene carbonate) polyahls containing at least about 5 weight percent carbon dioxide and at least about 5 weight percent modifier.



4,948,863

**THERMOTROPIC POLYESTER IMIDE FROM N-(3-HYDROXY PHENYL) TRIMELLITIC ACID IMIDE**  
Hans-Rudolf Dicke; Joachim Genz; Volker Eckhardt, and Ludwig Bottenbruch, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 21, 1989, Ser. No. 341,621

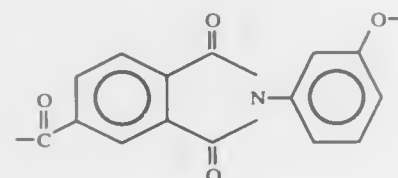
Claims priority, application Fed. Rep. of Germany, May 3, 1988, 3814974

Int. Cl.<sup>5</sup> C08G 73/10

U.S. Cl. 528—170

11 Claims

1. Thermotropic polyester imide having recurrent structural units corresponding to the following formulae:



and



and containing the condensed residues

(I) in a quantity of from 5 to 50 mol % and

(II) in a quantity of from 10 to 75 mol % based on the sum of the condensed residues (I) to (IV), the molar ratio of the condensed residues (III)/(IV) being from 0.95 to 1.05 with the condition that the total concentration of the condensed residues (I) and (II) is from 10 to 85 mol %, based on the sum of the condensed residues (I) to (IV) and m, n and o are 1 or 2.

4,948,864

**CATALYTIC METHOD FOR MANUFACTURING AROMATIC POLYESTER RESIN FROM AROMATIC DIOL, AROMATIC DIBROMIDE AND CARBON MONOXIDE**

Yoshio Imai, Tokyo; Masa-Aki Kakimoto, Yokohama, and Masaru Yoneyama, Tokyo, all of Japan, assignors to Tosoh Corporation, Sbinanyo, Japan

Filed Aug. 28, 1989, Ser. No. 400,143

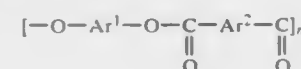
Claims priority, application Japan, Aug. 26, 1988, 63-210590

Int. Cl.<sup>5</sup> C08G 63/78

U.S. Cl. 528—219

19 Claims

1. A process for manufacturing an aromatic polyester resin having the formula:



wherein Ar<sup>1</sup> and Ar<sup>2</sup> are a bivalent aromatic radical and n is an integer between 10 and 100, comprising:

reacting an aromatic diol biphenol having the formula:



wherein Ar<sup>1</sup> is a bivalent aromatic radical, with a bivalent dibromide having the formula:



wherein Ar<sup>2</sup> is a bivalent aromatic radical, with carbon monoxide in the presence of a palladium catalyst and an organic base in an organic solvent.

(I)

4,948,865

**TERPOLYMER OF CARBON MONOXIDE, OLEFIN AND FUNCTIONALLY SUBSTITUTED OLEFIN**

Eit Drent, CM Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 98,652, Sep. 21, 1987, Pat. No. 4,841,020. This application Feb. 24, 1989, Ser. No. 314,740

Claims priority, application Netherlands, Nov. 27, 1986, 8603015

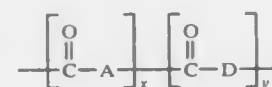
Int. Cl.<sup>5</sup> C08G 67/02

U.S. Cl. 528—271

10 Claims

1. A linear alternating polymer consisting essentially of repeating units

(II)



(IV)

wherein A is the moiety of an ethylenically unsaturated hydrocarbon of up to 15 carbon atoms polymerized through the ethylenic unsaturation, D is the moiety of a functionally substituted ethylenically unsaturated compound, wherein the functionally substituted ethylenically unsaturated compound has up to 20 carbon atoms and has the formula CH<sub>2</sub>=CH-(CH<sub>2</sub>)<sub>n</sub>-Z wherein n is an integer of up to 15 and Z is selected from hydroxyl, acyl, carboxyl, carboalkoxy, or halo polymerized through the ethylenic unsaturation, x and y are integers, and the ratio of x to y is 1:1 to about 80:1.

4,948,866

**PROCESS FOR PREPARING 2,3-BIS(HYDROXYMETHYL) BICYCLO [2,2,1] HEPTANE AND POLYESTER THEREWITH**

Kou-Chang Liu, Wayne, and Suzanne B. Nelsen, Mountain Lakes, both of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Sep. 5, 1989, Ser. No. 402,577

Int. Cl.<sup>5</sup> C08G 63/02

U.S. Cl. 528—272

1 Claim

1. A one-pot, two-step process for the preparation of 2,3-bis(hydroxymethyl) bicyclo heptane which comprises condensing cyclopentadiene and 2-butene-1,4-diol in ethanol as solvent, and hydrogenating the unsaturated diol intermediate thus formed over a hydrogenation catalyst in the same alcohol solvent wherein the yield of the desired compound is at least 75%, wherein the condensation step is carried out at a molar ratio of cyclopentadiene to 2-butene-1,4-diol of about 1:1 to 2:1, at a temperature of about 140° to 200° C., for about 5 to 20 hours, and at a solvent level of about 20 to 200% by weight of the reaction mixture, wherein the hydrogenation step is carried out at a temperature of about 50° to 200° C. for about 1 to 20 hours, and wherein the hydrogenation catalyst is present at a condensation of about 0.05 to 5% by weight of the unsaturated diol intermediate.

4,948,867

**INTERFACIAL METHOD OF PRODUCING PREPOLYMER OF AROMATIC POLYTHIAZOLE**  
Hideo Nishino, Mlyosbl; Tatsuya Hattori, Wako; Tsuneharu Kushida, and Masataka Kumata, both of Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1989, Ser. No. 361,370

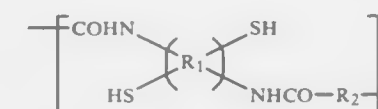
Claims priority, application Japan, Jun. 3, 1988, 63-136733

Int. Cl.<sup>5</sup> C08G 75/32

U.S. Cl. 528—337

2 Claims

1. A method of producing a prepolymer of aromatic polythiazole from an aromatic diaminodithiol compound or a salt thereof and a dicarboxylic acid derivative, said prepolymer having a repeating unit represented by the following general formula:



wherein R<sub>1</sub> is an aromatic group having at least one benzene nucleus, and R<sub>2</sub> is a residual group of said dicarboxylic acid derivative,

comprising the step of polymerizing said aromatic diaminodithiol compound or a salt thereof and said dicarboxylic acid derivative by an interfacial polymerization method.

4,948,868

**COPOLYAMIDE CONTAINING TERTIARY AMINE LINKAGE**

Tobru Taguchi, Iwakuni; Yurimasa Zenitani, Saiki; Akio Ikeda, Ohtake, and Toshiiji Nishimura, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo, Japan

Filed Jul. 13, 1988, Ser. No. 218,559

Claims priority, application Japan, Jul. 15, 1987, 62-177420

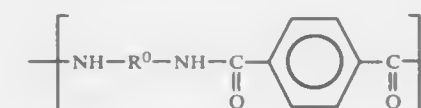
Int. Cl.<sup>5</sup> C08G 69/26

U.S. Cl. 528—339

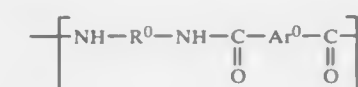
7 Claims

1. A polyamide comprising:

(a) from 60 to 99.9 mol % of terephthaloylalkylenediamine constituent units (a) of the general formula (I):

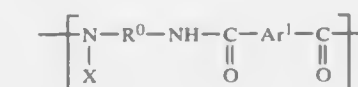


(b) from 0 to 39.9 mol % of diacyloylalkylenediamine constituent units (b) of the general formula (II):

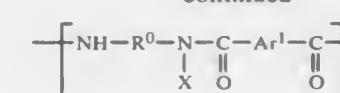


and

(c) from 0.1 to 5 mol % of trivalent diacyloylalkylenediamine constituent units (c) of the general formula (III) or (IV):



-continued



(IV)

wherein R<sup>0</sup> is an alkylene group having from 6 to 18 carbon atoms, Ar<sup>0</sup> is a divalent aromatic hydrocarbyl group having from 6 to 12 carbon atoms other than 1,4-phenylene, Ar<sup>1</sup> is a divalent aromatic hydrocarbon group selected from 1,4-phenylene or Ar<sup>0</sup>, X is a member selected from the group consisting of said constituent units (a), (b) and (c) attached to the tertiary nitrogen atom via a terminal carbonyl group, said constituent units (a), (b) and (c) being arranged at random to provide a branched linear structure, said polyamide being free from a gel-forming cross-linked structure and soluble in concentrated sulfuric acid and having:

(i) an intrinsic viscosity [η] of from 0.5 to 3 dl/g, as measured in concentrated sulfuric acid at a temperature of 30° C.,

(ii) a melting point of from 280° C. to 370° C. and a glass transition temperature of from 100° to 160° C., as measured by means of a differential scanning calorimeter at a heating rate of 10° C./min., and

(iii) a crystallinity of from 10 to 30%, as measured by X-ray diffractometry.

4,948,869

**MOLDED ARTICLE OF POLY (M-PHENYLENE ISOPHTHALAMIDE) AND PROCESS FOR PRODUCING THE SAME**

Hiroyuki Ogoe, Ayase, and Masami Kinoshita, Zushi, both of Japan, assignors to Oiles Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 808,741, Dec. 13, 1985, abandoned.

This application Feb. 22, 1988, Ser. No. 161,367

Int. Cl.<sup>5</sup> C08G 69/26; B29C 43/02

U.S. Cl. 528—348

8 Claims

1. A molded article of poly(m-phenylene isophthalamide) having a bending strength of not less than 13 kg/mm<sup>2</sup>, a density of 1.29 to 1.33 g/cm<sup>3</sup> and Rockwell hardness of not less than M 120.

5. A process for producing a molded article of poly(m-phenylene isophthalamide), comprising the steps of

drying a poly(m-phenylene isophthalamide) powder of a bulk density of 0.2 to 0.4 g/cm<sup>3</sup>, a specific surface area of 2 to 8 m<sup>2</sup>/g and a mean particle size of 37 to 500 μm to the moisture content of not more than 1% by weight,

filling the thus dried poly(m-phenylene isophthalamide) powder into a mold kept at a temperature of not more than 250° C.,

compressing the thus filled poly(m-phenylene isophthalamide) powder under a pressure of 70 to 500 kg/cm<sup>2</sup>,

molding the thus compressed poly(m-phenylene isophthalamide) powder at a temperature of 290° to 360° C. under a pressure of at least 70 kg/cm<sup>2</sup> for 1 to 5 min per 1 mm of the thickness of the molded article to be produced, and

cooling the thus molded article to a temperature of not more than 250° C., while keeping the pressure of the molding step.

4,948,870

POLYMERIZATION PROCESS

Johannes Van Doorn; Arris H. Kramer, and Johannes J. Maria Snel, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 12, 1989, Ser. No. 350,828

Claims priority, application Netherlands, May 27, 1988, 8801365

Int. Cl.<sup>5</sup> C08G 67/02

U.S. Cl. 528—392

8 Claims

1. In the process of producing linear alternating polymers of

- (a) suspending a reactive transition metal in a column above a reactor vessel containing alcohol and catalyst;
- (b) refluxing the alcohol so that it contacts the metal in the column; and
- (c) also withdrawing a portion of the alcohol and catalyst from the reactor and introducing it, as a liquid into the column above the position of at least a portion of the metal so that the alcohol and catalyst contacts the metal and thereby increases the yield of metal alkoxide as it flows back into the reactor vessel.



4,948,879

MONOAZO COMPOUNDS CONTAINING A  
FIBER-REACTIVE GROUP AND AN  
OXAZOLOPYRIDONE OR OXAZINOPYRIDONE  
COUPLING COMPONENT

Horst Tappe, Dietzenbach; Dieter Oehme, Flörsheim am Main,  
and Werner H. Russ, Hofheim am Taunus, all of Fed. Rep. of  
Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt  
am Main, Fed. Rep. of Germany

Filed Nov. 17, 1988, Ser. No. 272,781

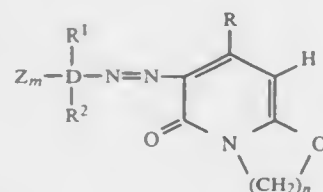
Claims priority, application Fed. Rep. of Germany, Nov. 20,  
1987, 3739349

Int. Cl.<sup>3</sup> C09B 62/028, 62/45; D06P 1/382, 1/384

U.S. Cl. 534—642

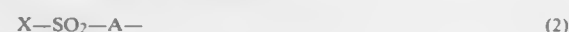
17 Claims

1. A monoazo compound conforming to the formula



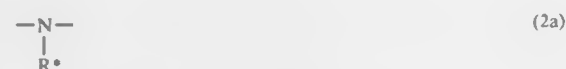
wherein:

D is a benzene or naphthalene ring or benzothiazol-2-yl,  
R<sup>1</sup> and R<sup>2</sup> are each, independently of the other, hydrogen,  
alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon  
atoms, halogen, carboxy or sulfo,  
Z is a group of the formula (2)



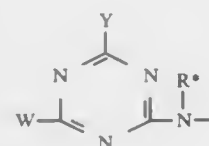
in which

X is vinyl, or is ethyl substituted in the  $\beta$ -position by a  
substituent eliminable under alkaline conditions to form a  
vinyl group, and  
A is a direct bond, methylene, ethylene or a group of the  
formula (2a)



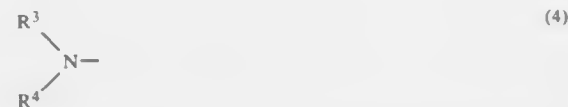
where

R<sup>\*</sup> is hydrogen or alkyl or 1 to 4 carbon atoms, or  
Z is  $\beta$ -bromoacryloylamino,  $\alpha,\beta$ -dibromopropionylamino,  
 $\beta$ -(phenylsulfonyl)propionylamino,  $\beta$ -(methylsulfonyl)-  
propionylamino,  $\beta$ -chloropropionylamino, 2,2,3,3-tetra-  
fluorocyclobutane-1-carbonylamino, N-( $\beta$ -sulfoethyl-  
sulfonyl)-N-methyl- or -N-ethyl-amino, or N-(vinylsul-  
fonyl)-N-methyl- or -N-ethyl-amino or a group of the  
formula (3)



where

R<sup>\*</sup> has the abovementioned meanings,  
Y is fluorine or chlorine and  
W is fluorine or chlorine or a N-nicotinamide or N-nicotinic  
acid group or an amino group of the formula (4)



where

R<sup>3</sup> is hydrogen, alkyl of 1 to 4 carbon atoms unsubstituted or  
substituted by 1 or 2 substituents selected from the group  
consisting of sulfo, carboxy, phosphato, sulfato, hydroxy,  
cyano, vinylsulfonyl,  $\beta$ -sulfoethylsulfonyl,  $\beta$ -chloroe-  
thylsulfonyl and phenyl or naphthyl each unsubstituted or  
substituted by 1, 2 or 3 substituents selected from the  
group consisting of sulfo, carboxy, methyl, ethyl, me-  
thoxy, ethoxy, chlorine, bromine and a group of the for-  
mula  $-\text{SO}_2-\text{X}$  where X has one of the abovementioned  
meanings, or

R<sup>3</sup> is a cycloaliphatic group, and

R<sup>4</sup> is hydrogen or alkyl of 1 to 4 carbon atoms unsubstituted  
or substituted by 1 or 2 substituents selected from the  
group consisting of sulfo, carboxy, phosphato, sulfato,  
hydroxy, cyano, vinylsulfonyl,  $\beta$ -sulfoethylsulfonyl,  
 $\beta$ -chloroethylsulfonyl and phenyl or naphthyl each un-  
substituted or substituted by 1, 2, or 3 substituents selected  
from the group consisting of sulfo, carboxy, methyl, ethyl,  
methoxy, ethoxy, chlorine, bromine, and a group of the  
formula  $-\text{SO}_2-\text{X}$  where X has one of the abovementioned  
meanings, or

R<sup>4</sup> is phenyl or naphthyl each unsubstituted or substituted by  
1, 2 or 3 substituents selected from the group consisting of  
sulfo, carboxy, chlorine, bromine, methyl, ethyl, methoxy,  
ethoxy and a group of the formula  $-\text{SO}_2-\text{X}$  where X has  
one of the abovementioned meanings, or

R<sup>3</sup> and R<sup>4</sup> together with the nitrogen atom form the piperi-  
dino, piperazino or morpholino group, or  
Z is a group of the formula (5)



where

R<sup>5</sup> is chlorine, fluorine or methylsulfonyl,  
R<sup>6</sup> is chlorine, fluorine or methyl and  
R<sup>7</sup> is chlorine or cyano

m is the number 1 or 2,

R is hydrogen or alkyl of 1 to 4 carbon atoms unsubstituted  
or substituted by halogen, hydroxy, cyano, sulfo, carboxy,  
sulfato or phosphato, or is phenyl unsubstituted or substi-  
tuted by 1 or 2 substituents selected from the group con-  
sisting of methyl, ethyl, methoxy, ethoxy, chlorine, sulfo  
and carboxy, or is carboxy, carbamoyl or carbalkoxy of 2  
to 5 carbon atoms,

n is the number 2 or 3.

4,948,880

ANTHRACYCLINE DERIVATIVES HAVING  
CYTOSTATIC ACTIVITY

Peter Hermentin, Marburg; Michael Paal, Hamburg; Hans P.  
Kraemer; Cenek Kolar, both of Marburg; Dieter Hoffmann,  
Lahntal; Manfred Gerken, Marburg; Hans G. Berscheid,  
Schwalbach am Taunus, and Dirk Böttger, Liederbach, all of  
Fed. Rep. of Germany, assignors to Behringwerke Aktien-  
gesellschaft, Marburg, Fed. Rep. of Germany

Filed Dec. 4, 1987, Ser. No. 129,006

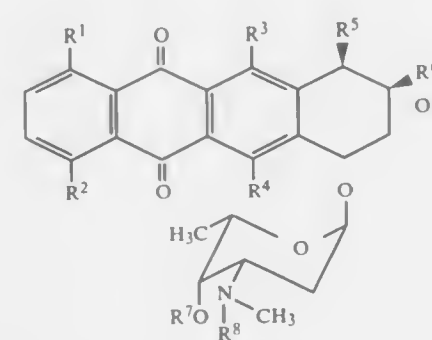
Claims priority, application Fed. Rep. of Germany, Dec. 8,  
1986, 3641833

Int. Cl.<sup>3</sup> C07H 15/252

U.S. Cl. 536—6.4

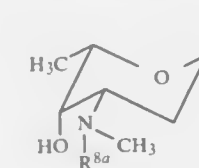
16 Claims

1. An anthracycline derivative having the formula I or a  
physiologically acceptable inorganic or organic acid salt  
thereof

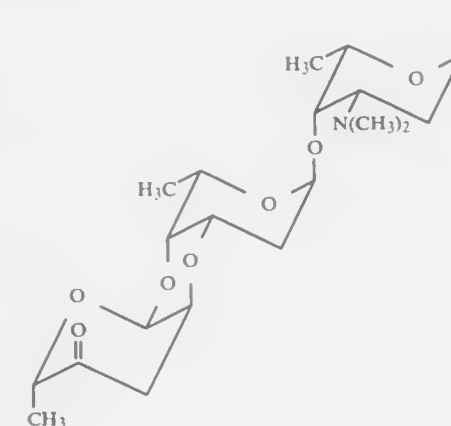


wherein

R<sup>1</sup> is hydrogen or a hydroxyl group,  
R<sup>2</sup> is hydrogen or a hydroxyl or a methoxy group,  
R<sup>3</sup> is hydrogen or a hydroxyl group,  
R<sup>4</sup> is hydrogen or a hydroxyl group,  
R<sup>5</sup> is hydrogen, a hydroxyl or a methoxycarbonyl group, or  
a substituent of the formula II,

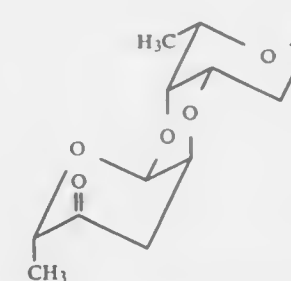


in which R<sup>8a</sup> has the meaning indicated for R<sup>8</sup>, or a substituent  
of the formula III,



R<sup>6</sup> is ethyl, hydroxymethylcarbonyl, hydroxymethylcarbo-  
nyl,

R<sup>7</sup> is hydrogen or a substituent of the formula IV,



R<sup>8</sup> is hydrogen or a cyanomethyl group or a substituent of  
the formula COR<sup>9</sup> or CH<sub>2</sub>R<sup>10</sup>, R<sup>9</sup> being hydrogen, CH<sub>3</sub>,  
CF<sub>3</sub> or CCl<sub>3</sub>, and R<sup>10</sup> being C<sub>1</sub>- to C<sub>8</sub>-alkyl, substituted  
alkyl, phenyl or substituted phenyl, excepting the com-  
pound of the formula I in which R<sup>1</sup>=H, R<sup>2</sup>=OH, R<sup>3</sup>=H,  
R<sup>4</sup>=OH, R<sup>5</sup>=COOCH<sub>3</sub>, R<sup>6</sup>=CH<sub>2</sub>CH<sub>3</sub> and R<sup>7</sup>=R<sup>8</sup>=H,  
excepting the compound of the formula I in which R<sup>1</sup>=H,  
R<sup>2</sup>=OCH<sub>3</sub>, R<sup>3</sup>=R<sup>4</sup>=OH, R<sup>5</sup>=H, R<sup>6</sup>=COCH<sub>3</sub> and  
R<sup>7</sup>=R<sup>8</sup>=H, excepting and, for the additional case where  
R<sup>8</sup> is a cyanomethyl group, those compounds in which R<sup>1</sup>  
is H, R<sup>2</sup> has the said meaning, R<sup>3</sup> is OH, R<sup>4</sup> is OH, R<sup>5</sup> is H,  
R<sup>6</sup> has the said meaning, and R<sup>7</sup> is H.

4,948,881

PROCESS FOR THE DEPOLYMERIZATION AND  
SULFATION OF POLYSACCHARIDES

Annamaria Naggi, Legnano, and Giangiacomo Torri, Bergamo,  
both of Italy, assignors to Sanofi, Paris, France

Continuation of Ser. No. 136,967, Dec. 23, 1987, abandoned,  
which is a continuation-in-part of Ser. No. 760,353, Jul. 29, 1985,  
abandoned, which is a continuation-in-part of Ser. No. 677,249,  
Dec. 3, 1984, abandoned, which is a continuation-in-part of Ser.  
No. 565,614, Dec. 27, 1983, abandoned. This application Jan. 27,  
1989, Ser. No. 302,147

Int. Cl.<sup>3</sup> A61K 31/725; C08B 37/10

U.S. Cl. 536—20

15 Claims

1. A process for the depolymerisation and sulfation of poly-  
saccharides, which comprises reacting the polysaccharides  
selected from the group consisting of heparansulfates, chito-  
san, chitin, cellulose, starch, guaran, the chondroitinsulfates,  
inulin, dermatansulfate, keratan, the mannans, scleroglucan,  
the galactomannans, the dextrans, the galactans, xanthan and,  
with a mixture consisting only of sulfuric acid and chlorosul-  
fonic acid.

4,948,882

SINGLE-STRANDED LABELLED OLIGONUCLEOTIDES,  
REACTIVE MONOMERS AND METHODS OF  
SYNTHESIS

Jerry L. Ruth, San Diego, Calif., assignor to Syngene, Inc., San  
Diego, Calif.

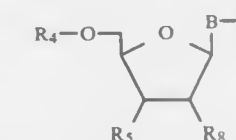
Continuation-in-part of Ser. No. 617,094, Feb. 22, 1984,  
abandoned, which is a continuation-in-part of Ser. No. 468,498,  
Feb. 22, 1983, abandoned. This application May 4, 1987, Ser.  
No. 46,133

Int. Cl.<sup>3</sup> C07H 19/073, 19/10, 19/173, 19/20

U.S. Cl. 536—27

4 Claims

1. A compound useful as an intermediate in the chemical  
synthesis of a single-stranded oligonucleotide comprising the  
structure:



wherein

B is a pyrimidine or purine base;

R is a linker arm attached to a compound selected from the group consisting of a blocking group, a detectable label and a solid surface;

and provided that

when  $R_4$  = blocking group then

$R_5$  = reactive phosphorus containing group

or

= H if the 5' —OH group of the 5' -

terminal nucleotide of a growing

oligonucleotide contains a reactive

phosphorous-containing group, and

when  $R_5$  = blocking group then

$R_4$  = reactive phosphorous-containing group

or

= H if the 3' —OH group of the 3' - terminal

nucleotide of a growing oligonucleotide

contains a reactive phosphorus-containing

group; and

$R_8$  = H.

4,948,883

#### PREPARATION OF HYDROGEN AND BISMUTH (PHOSPH/SULF) ATED SACCHARIDES

Steven R. Duff, DeSoto, Kans., assignor to Marion Laboratories, Inc., Kansas, Mo.

Continuation-in-part of Ser. No. 351,714, May 15, 1989, abandoned. This application Oct. 31, 1989, Ser. No. 430,059

Int. Cl.<sup>5</sup> C07H 11/00, 13/00, 1/00; C08B 37/00

U.S. Cl. 536—117

10 Claims

1. A process for preparing a hydrogen (phosph/sulf)ated saccharide comprising steps of, first, contacting a component of a metal salt of a (phosph/sulf)ated saccharide with a component of a water soluble organic acid having a pKa less than the pKa of the hydrogen (phosph/sulf)ated saccharide to be prepared, and second, maintaining contact of said components in mixture provided by said first step, under conditions such that the hydrogen (phosph/sulf)ated saccharide is prepared.

4,948,884

#### PROCESS FOR THE HALOGENATION OF COPPER PHTHALOCYANINE

Yoshiyuki Nonaka; Junichi Tsuchida; Masami Shirao; Toshiro Notoji, and Michihiko Hikosaka, all of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Filed May 16, 1989, Ser. No. 353,330

Int. Cl.<sup>5</sup> C07D 487/22; C09B 47/04

U.S. Cl. 540—138

4 Claims

1. A process for the halogenation of copper phthalocyanine in titanium tetrachloride in the presence of aluminum chloride, which comprises preliminarily stirring part or all of the aluminum chloride and the copper phthalocyanine in titanium tetrachloride at a temperature of not less than 50° C. and subsequently carrying out the halogenation reaction, provided that when only a part of the aluminum chloride is added for the preliminary stirring, the remaining portion of the aluminum chloride is added during the halogenation reaction, the amount of titanium tetrachloride being 4 to 20 times, by weight, as large as the amount of copper phthalocyanine, and wherein the amount of aluminum chloride for use in the preliminary stirring is 0.4 to 4 times, by mole, as large as the amount of copper phthalocyanine and the remaining portion of aluminum chloride is added during the halogenation reaction until the total amount of aluminum chloride for use in the preliminary stir-

ring and halogenation reaction is 3 to 8 times, by mole, as large as the amount of phthalocyanine.

4,948,885

#### SYNTHESIS OF AZETIDINONES

Donald Hou, Verona; Yee-Shing Wong, Clifton; Dinesh Gala, East Brunswick, and Martin Steinman, Livingston, all of N.J., assignors to Schering-Plough Corp., Kenilworth, N.J.

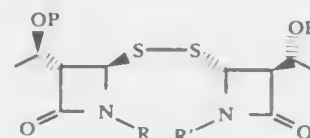
Division of Ser. No. 203,385, Jun. 7, 1988, Pat. No. 4,876,338, which is a division of Ser. No. 887,394, Jul. 21, 1986, Pat. No. 4,767,853. This application Jun. 23, 1989, Ser. No. 370,520

Int. Cl.<sup>5</sup> C07D 403/12, 205/09; C07F 7/18

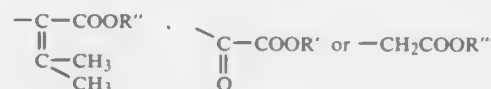
U.S. Cl. 540—358

3 Claims

1. A compound represented by the formula



wherein each P is hydrogen or a hydroxy protecting group and R and R' are each the same and are hydrogen,



wherein R'' is lower alkyl and R''' is a carboxy protecting group.

4,948,886

#### PROCESS FOR THE PREPARATION OF BENZOTHAZEPINONE DERIVATIVES

Franz-Josef Mais, Duesseldorf, and Helmut Fiege, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 4, 1989, Ser. No. 293,265

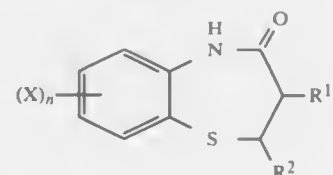
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800386

Int. Cl.<sup>5</sup> C07D 281/210

U.S. Cl. 540—491

20 Claims

1. A process for the preparation of benzothiazepinone derivatives of the formula



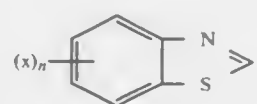
wherein

R<sup>1</sup> and R<sup>2</sup> independently of one another stand for hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl or (X)<sub>n</sub>-phenyl or together form C<sub>3</sub>-C<sub>5</sub>-alkylene,

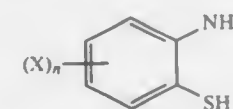
X stands for hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy and

n denotes 1 or 2,

by alkaline hydrolysis of benzothiazoles of the formula



to give o-amino-thiophenols of the formula



isolation thereof by acidification and reaction with acrylic acids of the formula



wherein

R<sup>1</sup>, R<sup>2</sup>, X and n have the meaning mentioned, characterized in that the acidification is carried out using a mineral acid, the mixture is then extracted using a water-insoluble solvent and the extract is reacted with the acrylic acid.

4,948,887

#### PYRAZOLE DERIVATIVE AND HERBICIDE CONTAINING IT

Masatoshi Baba, Wako; Takuya Kakuta; Norio Tanaka, both of Funabashi; Eiichi Oya, Narashino; Takashi Ikai, Tokyo; Tsutomu Nawamaki, Yono, and Shigeomi Watanabe, Omiya, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 122,366, Nov. 18, 1987, abandoned. This application Mar. 14, 1988, Ser. No. 168,139

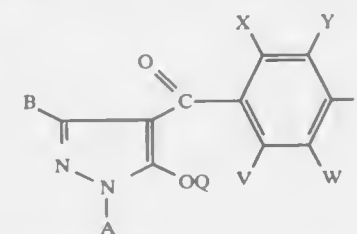
Claims priority, application Japan, Mar. 17, 1987, 62-61937; Jul. 17, 1987, 62-179797; Sep. 30, 1987, 62-247601; Jan. 13, 1988, 63-5449

Int. Cl.<sup>5</sup> C07D 231/20

U.S. Cl. 540—603

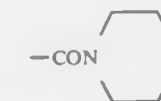
8 Claims

1. A pyrazole derivative having the formula:



(I)

group (wherein R<sub>5</sub> is an alkyl group having from 1 to 3 carbon atoms), a

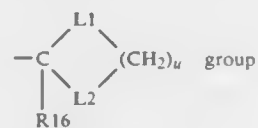


wherein A is an alkyl group having from 1 to 3 carbon atoms, an alkenyl group having from 2 to 4 carbon atoms or an alkynyl group having from 2 to 4 carbon atoms; B is a hydrogen atom, an alkyl group having from 1 to 3 carbon atoms, a haloalkenyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, an alkoxyalkyl group having from 2 to 4 carbon atoms, an alkoxyalkenyl group having from 2 to 4 carbon atoms or an alkoxyalkynyl group having from 2 to 4 carbon atoms; X is an alkyl group having from 1 to 6 carbon atoms, a haloalkenyl group having from 1 to 6 carbon atoms, a haloalkynyl group having from 1 to 6 carbon atoms, an alkoxyalkenyl group having from 2 to 6 carbon atoms, an alkoxyalkynyl group having from 2 to 6 carbon atoms, an aminocarbonyl group having from 2 to 6 carbon atoms, an aminocarbonyl group substituted independently by hydrogen or alkyl having from 1 to 6 carbon atoms, a haloalkoxy group having from 1 to 6 carbon atoms, an alkylthio group having from 1 to 6 carbon atoms or an alkylthioalkyl group having from 2 to 6 carbon atoms; Y is a —COOR<sup>1</sup> group (wherein R<sup>1</sup> is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkynyl group having from 3 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkenyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 3 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon

group, a —CONHSO<sub>2</sub>CH<sub>3</sub> group, a —CONHSO<sub>2</sub>CF<sub>3</sub> group, a —COO—L—N(R<sub>3</sub>) (R<sub>4</sub>) group (wherein L, R<sub>3</sub> and R<sub>4</sub> are as defined above), a —COO—L—CO—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —COO—L—CO—O—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —COO—L—CN group (wherein L is as defined above, a —COO—L—NO<sub>2</sub> group (wherein L is as defined above), a —COOSi(R<sub>5</sub>)<sub>3</sub> group (wherein R<sub>5</sub> is as defined above), a —COO—N=C(R<sub>6</sub>) (R<sub>7</sub>) group (wherein each of R<sub>6</sub> and R<sub>7</sub> which may be the same or different is an alkyl group having from 1 to 3 carbon atoms), a —COO—N=C—(CH<sub>2</sub>)<sub>n</sub> group (wherein [n] m is an integer of from 4 to 6), a —COO—L—O—SO<sub>2</sub>—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —COO—L—O—CO—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —COO—L—O—L—O—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —COO—L—Si(R<sub>5</sub>)<sub>3</sub> group (wherein L and R<sub>5</sub> are as defined above), a —C(O)S—R<sub>1</sub> group (wherein R<sub>1</sub> is as defined above), a —C(S)O—R<sub>1</sub> group (wherein R<sub>1</sub> is as defined above), a —C(S)S—R<sub>1</sub> group (wherein R<sub>1</sub> is as defined above), a —L—O—R<sub>1</sub> group (wherein L and R<sub>1</sub> are as defined above), a —L—O—L—O—R<sub>8</sub> group (wherein L is as defined above, and R<sub>8</sub> is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a —L—O—M group (wherein L and M are as defined above), a —L—O—L—M group (wherein L and M are as defined above), a —L—NR<sub>8</sub>R<sub>9</sub> group (wherein R<sub>8</sub> is as defined above, and R<sub>9</sub> is an alkyl group having from 1 to 6 carbon atoms), a



—L—O—CH<sub>2</sub>Ph group (wherein L is as defined above and Ph is phenyl), a —L—O—L—COOR<sub>9</sub> group (wherein L and R<sub>9</sub> are defined above), a —L—CN group (wherein L is as defined above), a —L—S(O)<sub>[n]</sub>—R<sub>1</sub> group (wherein L and R<sub>1</sub> is as defined above), and [n] is an integer of from 0 to 2), a —L—S—L—O—R<sub>9</sub> group (wherein L and R<sub>9</sub> are as defined above), a —L—O—COR<sub>9</sub> group (wherein L and R<sub>9</sub> are as defined above), a —L—O—S<sub>2</sub>R<sub>9</sub> group (wherein L and R<sub>9</sub> are as defined above), a —L—COOR<sub>8</sub> group (wherein L and R<sub>8</sub> are as defined above), a —CH=CHOR<sub>8</sub> group (wherein R<sub>8</sub> is as defined above) or a —L—O—L—CN group (wherein L is as defined above); Z is a halogen atom, a nitro group, an alkoxy group having from 1 to 3 carbon atoms, a trifluoromethyl group, a cyano group or a —S(O)<sub>[n]</sub>R<sub>10</sub> group (wherein R<sub>10</sub> is an alkyl group having from 1 to 3 carbon atoms or a haloalkyl group having from 1 to 3 carbon atoms, and [n] q is an integer of from 0 to 2); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, a haloalkoxy group having from 1 to 3 carbon atoms, a nitro group, a cyano group or a —S(O)<sub>[n]</sub>—R group (wherein [n] r is [as defined above] an integer of 0 to 2 and R is an alkyl group having from 1 to 4 carbon atoms); Q is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkenyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkynyl group having from 1 to 6 carbon atoms which may be substituted by halogen, a cyanomethyl group, a —C(O)—R<sub>11</sub> group (wherein R<sub>11</sub> is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of alkyl having from 1 to 6 carbon atoms, alkenyl having from 1 to 6 carbon atoms, alkynyl having from 1 to 6 carbon atoms, haloalkyl having from 1 to 6 carbon atoms, haloalkenyl having from 1 to 6 carbon atoms, haloalkynyl having from 1 to 6 carbon atoms, halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxyl group), a —S(O)<sub>2</sub>R<sub>11</sub> group (wherein R<sub>11</sub> is as defined above), a —P(O)(OR<sub>11</sub>)<sub>2</sub> group (wherein R<sub>11</sub> is as defined above), a —L—C(O)—R<sub>11</sub> group (wherein L and R<sub>11</sub> are as defined above), a —L—C(O)—N(R<sub>12</sub>)(R<sub>13</sub>) (wherein L is as defined above, each of R<sub>12</sub> and R<sub>13</sub> is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a —L—R<sub>14</sub> group (wherein L is as defined above, R<sub>14</sub> is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxy group), a —L—N(R<sub>12</sub>)(R<sub>13</sub>) group (wherein L, R<sub>12</sub> and R<sub>13</sub> are as defined above), a —L—OR<sub>15</sub> group (wherein R<sub>15</sub> is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms or an alkenyl group having from 1 to 6 carbon atoms), a —L—OC(O)R<sub>16</sub> group (wherein R<sub>16</sub> is an alkyl group having from 1 to 6 carbon atoms or an alkoxy group having from 1 to 6 carbon atoms), a —L—S(O)<sub>[n]</sub>R<sub>15</sub> group (wherein R<sub>15</sub> is as defined above, and [n] t is an integer of 0 or 2), a —L—SC(O)R<sub>12</sub> group (wherein R<sub>12</sub> is as defined above),



(wherein each of L<sub>1</sub> and L<sub>2</sub> is a methylene group, an oxygen atom or a sulfur atom, R<sub>16</sub> is a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms, and [n] u is an integer of 2 or 3), and a salt thereof

#### 4,948,888 PROCESS FOR THE PREPARATION OF STABILIZERS FOR ORGANIC POLYMERS

Alberto Greco, Milan, and Luciano Pallini, Fornovo Taro, both of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy  
Continuation of Ser. No. 791,410, Oct. 25, 1985, abandoned.

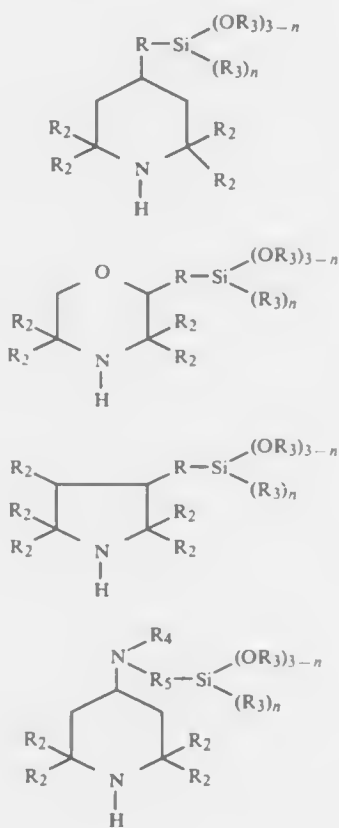
This application Jul. 27, 1987, Ser. No. 80,259

Claims priority, application Italy, Nov. 13, 1984, 23539 A/84  
Int. Cl.<sup>5</sup> C07F 7/02, 7/04

U.S. Cl. 544—69

9 Claims

1. A process for the preparation of stabilizer compounds comprising reacting a sterically hindered amine compound of the following formulae:



wherein R is selected from an aliphatic hydrocarbon and an oxyhydrocarbon group having 2 to 10 carbon atoms; R<sub>2</sub> is methyl; R<sub>3</sub> is selected from methyl and ethyl; R<sub>4</sub> is selected from a straight and branched chain alkyl group having from 1 to 10 carbon atoms; R<sub>5</sub> is selected from a straight and branched chain alkylene group having from 2 to 5 carbon atoms; and n is selected from 0, 1 and 2, with a monohydroxy aliphatic alcohol having at least 6 carbon atoms or a polyhydroxy aliphatic alcohol having at least 4 carbon atoms, wherein the ratio of the methoxy or ethoxy groups to the alcoholic hydroxy groups in within the range of 1/1 to 3/1, under transesterification conditions and in the presence of a transesterification catalyst whereby methanol or ethanol is formed as a by-product, continuously removing said by-product from the transesterification reaction and recovering said stabilizer compounds from said transesterification reaction.

#### 4,948,889 TRIAZINE COMPOUNDS DERIVED FROM 2,2,6,6-TETRAMETHYLPYPERIDINE

Giuseppe Cantatore, Bitonto; Franca Masina, Anzola Emilia, and Valerio Borzatta, Bologna, all of Italy, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 14, 1988, Ser. No. 167,808

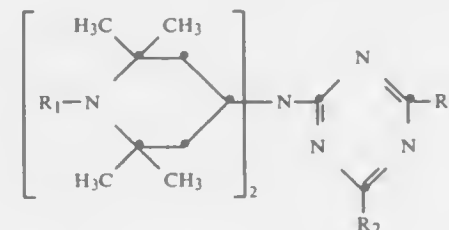
Claims priority, application Italy, Mar. 24, 1987, 19814 A/87

Int. Cl.<sup>5</sup> C07D 403/00, 403/14

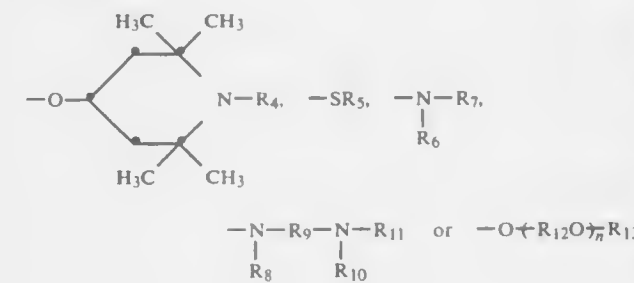
U.S. Cl. 544—198

20 Claims

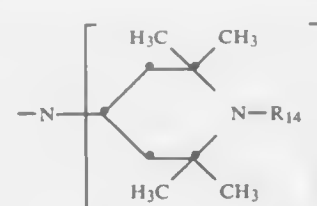
1. A compound of the formulae (I)



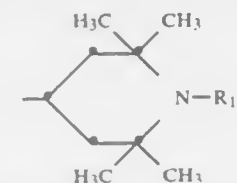
in which R<sub>1</sub> is hydrogen, O, —NO, —CH<sub>2</sub>CN, C<sub>1</sub>—C<sub>8</sub>alkyl, allyl, benzyl, OH-monosubstituted C<sub>2</sub>—C<sub>4</sub>alkyl or C<sub>1</sub>—C<sub>8</sub>alkenyl, C<sub>3</sub>—C<sub>8</sub>alkenyl or benzoyl, R<sub>2</sub> and R<sub>3</sub> are independently of one another



and R<sub>2</sub> is additionally a group of the formula (II)



R<sub>4</sub> have the for  
alkyl, C<sub>5</sub>—C<sub>12</sub>cycloalkyl unsubstituted or substituted by C<sub>1</sub>—C<sub>4</sub>alkyl, phenyl unsubstituted or substituted by C<sub>1</sub>—C<sub>4</sub>alkyl, C<sub>7</sub>—C<sub>12</sub>phenylalkyl unsubstituted or substituted at the phenyl ring by C<sub>1</sub>—C<sub>4</sub>alkyl or is C<sub>2</sub>—C<sub>4</sub>alkyl substituted in the 2, 3 or 4 position by OH, by C<sub>1</sub>—C<sub>12</sub>alkoxy or by di(C<sub>1</sub>—C<sub>4</sub>alkyl)amino, R<sub>6</sub> is hydrogen, C<sub>1</sub>—C<sub>18</sub>alkyl, C<sub>5</sub>—C<sub>12</sub>cycloalkyl unsubstituted or substituted by C<sub>1</sub>—C<sub>4</sub>alkyl, C<sub>7</sub>—C<sub>12</sub>phenylalkyl unsubstituted or substituted at the phenyl ring by C<sub>1</sub>—C<sub>4</sub>alkyl, C<sub>2</sub>—C<sub>4</sub>alkyl substituted in the 2, 3 or 4 position by —OH or by C<sub>1</sub>—C<sub>12</sub>alkoxy, tetrahydrofurfuryl or a group of the formula (III)



where R<sub>15</sub> has one of the meanings given for R<sub>1</sub>, R<sub>7</sub> is C<sub>7</sub>—C<sub>12</sub>

phenylalkyl unsubstituted or substituted at the phenyl ring by C<sub>1</sub>—C<sub>4</sub>alkyl or is tetrahydrofurfuryl or when R<sub>6</sub> is a group of the formula (III), R<sub>7</sub> is additionally C<sub>2</sub>—C<sub>4</sub>alkyl substituted in the 2, 3 or 4 position by —OH or by C<sub>1</sub>—C<sub>12</sub>alkoxy, or R<sub>6</sub> and R<sub>7</sub>, together with the nitrogen atom to which they are linked, form part of a 7-membered heterocyclic ring containing one or two nitrogen atoms, R<sub>8</sub> is hydrogen, C<sub>1</sub>—C<sub>18</sub>alkyl, C<sub>5</sub>—C<sub>12</sub>cycloalkyl unsubstituted or substituted by C<sub>1</sub>—C<sub>4</sub>alkyl, C<sub>7</sub>—C<sub>12</sub>phenylalkyl unsubstituted or substituted at the phenyl ring by C<sub>1</sub>—C<sub>4</sub>alkyl, C<sub>2</sub>—C<sub>4</sub>alkyl substituted in the 2, 3 or 4 position by —OH, by C<sub>1</sub>—C<sub>12</sub>alkoxy or by di(C<sub>1</sub>—C<sub>4</sub>alkyl)amino, tetrahydrofurfuryl or a group of the formula (III), R<sub>9</sub> is C<sub>2</sub>—C<sub>10</sub>alkylene, R<sub>10</sub> and R<sub>11</sub> are independently of one another C<sub>1</sub>—C<sub>18</sub>alkyl or R<sub>10</sub> and R<sub>11</sub>, together with the nitrogen to which they are linked, form part of a 5-membered to 7-membered heterocyclic ring, R<sub>12</sub> is C<sub>2</sub>—C<sub>4</sub>alkylene, R<sub>13</sub> is hydrogen, C<sub>1</sub>—C<sub>18</sub>alkyl, phenyl unsubstituted or substituted by C<sub>1</sub>—C<sub>12</sub>alkyl or a group of the formula (III) and n is an integer from 2 to 20.

#### 4,948,890 PROCESS FOR THE PREPARATION OF DAFNP

Heinrich Schneider, Ingelheim am Rhein, Fed. Rep. of Germany, assignor to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Division of Ser. No. 118,485, Nov. 6, 1987, Pat. No. 4,868,302.

This application Jul. 12, 1989, Ser. No. 378,893

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1986, 3638635

Int. Cl.<sup>5</sup> C07D 239/50

U.S. Cl. 544—320

8 Claims

1. A process for preparing, 2,4-diamino-5-formylamino-6-hydroxypyrimidine, which comprises:

(a) catalytically hydrogenating 2,4-diamino-6-hydroxy-5-nitrosopyrimidine (DAHNP) in an aqueous solution in the presence of a base, wherein about 0.8 to 1.5 mol of the base per mol of DAHNP is continuously metered into the aqueous solution comprising the DAHNP at a concentration of about 0.5 to 3 mol/l, throughout the entire hydrogenation reaction, to produce an alkaline solution of 2,4,5-triamino-6-hydroxypyrimidine (TAHP); and  
(b) reacting the alkaline solution of TAHP with formic acid, to produce 2,4-diamino-5-formylamino-6-hydroxypyrimidine.

#### 4,948,891 BENZAMIDE PROTEASE INHIBITORS

Rodney C. Schaur, Mystic, and Anton F. J. Fliri, Norwich, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 197,927, May 24, 1988, Pat. No. 4,874,864.

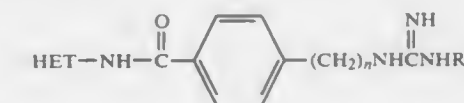
This application Aug. 9, 1989, Ser. No. 391,756

Int. Cl.<sup>5</sup> C07D 239/02, 241/02, 213/16, 261/06

U.S. Cl. 544—329

7 Claims

1. A compound of the formula



or a pharmaceutically acceptable salt thereof, wherein HET is pyrimid-2-yl, dimethylpyrimid-4-yl, thiazol-2-yl, 4-phenylthiazol-2-yl, 4-phenyl-5-carbomethoxythiazol-2-yl, 4-biphenylthiazol-2-yl, pyrazin-2-yl, 6-chloropyrazin-2-yl, 1,3,4-thiadiazol-2-yl, 3-phenyl-1,2,4-thiadiazol-5-yl, 5-trifluoromethyl-1,3,4-thiadiazol-2-yl, 5-methylisoxazol-3-yl, 5-chloropy-

rid-2-yl, 4,5-di-cyuoimidazol-2-yl, 5-chlorobenzoxazol-2-yl or indazol-5-yl-2-carbomethoxyindol-5-yl; n is an integer of 0 to 2; and R<sup>1</sup> is hydrogen or (C<sub>1</sub>-C<sub>3</sub>)alkyl.

4,948,892

# SULFONAMID COMPOUND USEFUL FOR TREATING CARDIOVASCULAR DISORDERS

Sohei Tanabe, Higashimurayama; Seiichi Sato, Tokyo; Yoshinori Kyotani, Higashiyamato; Tomio Ohta, Sayama, and Yasumi Uchida, Ichikawa, all of Japan, assignors to Kowa Comp., Ltd., Nagoya, Japan

Filed Feb. 15, 1989, Ser. No. 310,684

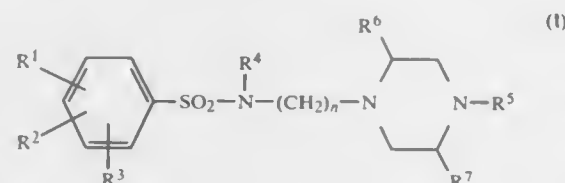
Claims priority, application Japan, Feb. 18, 1988, 63-33949

Int. Cl.<sup>5</sup> C07D 295/08, 295/10, 295/12

U.S. Cl. 544—396

8 Claims

1. A sulfonamide compound represented by the following formula



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are identical or different, and each represents a hydrogen atom, a halogen atom, a lower alkyl group or a lower alkoxy group; R<sup>4</sup> represents a hydrogen atom, a lower alkyl group or a lower alkyl group substituted by 1 to 3 phenyl or naphthyl groups the ring of which may be substituted by 1 to 3 substituents selected from the group consisting of lower alkyl groups, lower alkoxy groups and halogen atoms; R<sup>5</sup> represents a phenyl, naphthyl or pyridyl group the ring of which may be substituted by 1 to 3 substituents selected from the group consisting of a lower alkyl group, a lower alkoxy group and a halogen atom or a lower alkyl group substituted by 1 to 3 phenyl or naphthyl groups the ring of which may be substituted by 1 to 3 substituents selected from the group consisting of a lower alkyl group, a lower alkoxy group and a halogen atom; R<sup>6</sup> and R<sup>7</sup> are identical or different and each represents a hydrogen atom, a lower alkyl group or a lower alkoxy group; and n is an integer of 1 to 8, and an acid addition salt thereof.

4,948,893

# NOVEL BENZOFURAN DYES

Chin H. Chen, Fairport, N.Y., and John L. Fox, Baltimore, Md., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 191,948, May 9, 1988, Pat. No. 4,900,831.

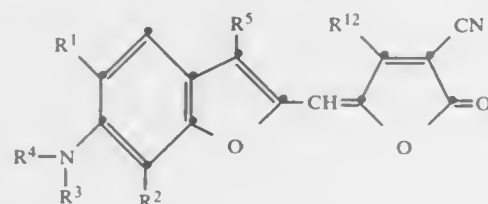
This application Aug. 17, 1989, Ser. No. 394,893

Int. Cl.<sup>5</sup> C07D 491/06

U.S. Cl. 546—66

5 Claims

1. A dye which satisfies the formula:



wherein

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> together complete a julolidene ring; R<sup>5</sup> is hydrogen, methyl, ethyl, propyl, or phenyl; and R<sup>12</sup> is phenyl.

4,948,894

# 8-FLUORO AND 7, 8, 10-TRIFLUORO-9-(SUBSTITUTED)-6-OXO-6H-BENZO-(C)QUINOLIZINE-5-CARBOXYLIC ACIDS

Daniel B. Moran, Suffern; Yang-I Lin, Tappan, and Carl B. Ziegler, Pearl River, all of N.Y., assignors to American Cyanamid Company, Wayne, N.J.

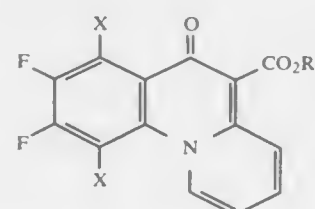
Division of Ser. No. 312,153, Feb. 21, 1989. This application Dec. 6, 1989, Ser. No. 446,747

Int. Cl.<sup>5</sup> C07D 455/04, 401/14; A61K 31/495

U.S. Cl. 546—95

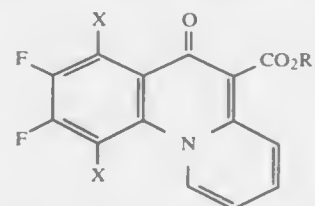
2 Claims

1. A compound of the formula:



wherein R<sub>1</sub> is hydrogen, alkyl(C<sub>1</sub>-C<sub>3</sub>), alkali metal, or alkaline earth metal and X is hydrogen or fluoro.

2. A process for producing compounds of the formula:



wherein R<sub>1</sub> is hydrogen, alkyl(C<sub>1</sub>-C<sub>3</sub>), alkali metal, or alkaline earth metal and X is hydrogen or fluoro, which comprises reacting ethyl 2-pyridyl acetate with lithium bis(trimethylsilyl)amide in tetrahydrofuran at -5° C. and adding the resultant mixture to either 2,4,5-trifluorobenzoyl chloride or tetrafluorobenzoyl chloride in tetrahydrofuran at -5° C.

4,948,895

# BENZOFURAN DYES

Chin H. Chen, Fairport, N.Y., and John L. Fox, Baltimore, Md., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 191,948, May 9, 1988, Pat. No. 4,900,831.

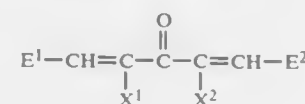
This application Oct. 13, 1989, Ser. No. 420,983

Int. Cl.<sup>5</sup> C07D 307/82

U.S. Cl. 546—196

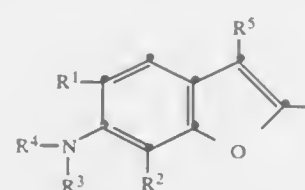
2 Claims

1. A dye which satisfies the formula:



where

E<sup>1</sup> and E<sup>2</sup> are independently selected to satisfy the formula:



R<sup>1</sup>, R<sup>2</sup>, and R<sup>5</sup> each independently represent hydrogen, alkyl, or aryl;  
R<sup>3</sup> and R<sup>4</sup> each independently represent alkyl; and  
X<sup>1</sup> and X<sup>2</sup> are independently hydrogen, alkyl, or aryl or together complete a 5 to 7 membered ring and satisfy the formula:



or



where

n is 2 to 4;

Y is —NR<sup>10</sup>— or —O—; and

R<sup>10</sup> is lower alkyl of from 1 to 3 carbon atoms or phenyl; alkyl, with the exception of said lower alkyl, in each occurrence containing from a to 8-carbon atoms and aryl in each occurrence being phenyl or naphthyl.

4,948,896

# PROCESS FOR PREPARING PYRIDINE-2,3-DICARBOXYLIC ACID COMPOUNDS

Keishiro Nagao, Amagasaki, Japan, assignor to Daiso Co., Ltd., Osaka, Japan

Filed Jul. 6, 1988, Ser. No. 215,761

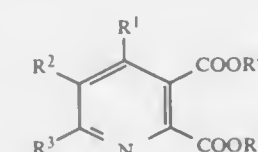
Claims priority, application Japan, Jul. 8, 1987, 62-171730

Int. Cl.<sup>5</sup> C07D 211/78, 213/08

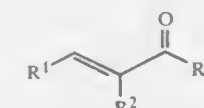
U.S. Cl. 546—250

6 Claims

1. A process for preparing pyridine-2,3-dicarboxylic acid compounds of the formula:



wherein R<sup>1</sup> and R<sup>3</sup> are the same or different and are each a hydrogen atom, a substituted or unsubstituted straight chain or branched chain alkyl having 1 to 4 carbon atoms, or a substituted or unsubstituted phenyl; R<sup>2</sup> is a hydrogen atom, a substituted or unsubstituted straight chain or branched chain alkyl having 1 to 4 carbon atoms, a substituted or unsubstituted phenyl, a straight chain or branched chain alkylthio having 1 to 4 carbon atoms, a straight chain or branched chain alkoxy having 1 to 4 carbon atoms, a substituted or unsubstituted phenylthio, a substituted or unsubstituted phenoxy, a halogen atom, a straight chain or branched chain alkoxy carbonyl having 1 to 4 carbon atoms in the alkoxy moiety, an aminocarbonyl which may optionally have a substituent, or cyano; or both of R<sup>1</sup> and R<sup>2</sup> or both R<sup>2</sup> and R<sup>3</sup> may be combined together to form a divalent alkylene selected from trimethylene, tetramethylene and pentamethylene; and R<sup>4</sup> and R<sup>5</sup> are the same or different and are each a straight chain or branched chain alkyl having 1 to 4 carbon atoms, which comprises reacting an enone of the formula (II):



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined above with an aminodiester of the formula (III): R<sup>4</sup>OOCCH=C(NH<sub>2</sub>)COOR<sup>5</sup> wherein R<sup>4</sup> and R<sup>5</sup> are as defined above.

4,948,897

# METHOD OF PREPARATION OF 2,6-BIS(PICRYLAMINO)-3,5-DINITROPYRIDINE

Robert S. Riggs, Grand Prairie, Tex., assignor to Jet Research Center, Inc., Arlington, Tex.

Division of Ser. No. 131,971, Dec. 11, 1987, Pat. No. 4,855,436.

This application Apr. 7, 1989, Ser. No. 335,158

Int. Cl.<sup>5</sup> C07D 213/74

6 Claims

U.S. Cl. 546—307

1. The method of preparing crystals of 2,6-bis(picrylamino)-3,5-dinitropyridine having improved high temperature explosive properties comprising:

dissolving one part by weight of 2,6-bis(picrylamino)-3,5-dinitropyridine in from about 2 to about 20 parts by weight of dimethylsulfoxide at a dissolution temperature of from about 70° C. to about 100° C. to form a primary solution;

combining at a temperature of from about 20° C. to about 100° C., the primary solution with a second solvent in which 2,6-bis(picrylamino)-3,5-dinitropyridine is substantially insoluble, but which combines with the primary solution to form a transparent binary solvent system in which 2,6-bis(picrylamino)-3,5-dinitropyridine is soluble, said second solvent being selected from the group of solvents consisting of methanol, ethanol, 2-propanol, acetone, benzaldehyde, ethyl acetate, propyl acetate, butyl acetate, tetrahydrofuran, thiophene, 2-propanone, 2-butanone, cyclohexanone, methylethyl ketone, acetonitrile and mixtures thereof which will combine with the primary solution to form a transparent binary solvent system, said secondary solvent being used in a volumetric ratio to said primary solvent of from about 10:1 to about 20:1;

adding to the binary solvent system, a third solvent which is miscible with the binary solvent system, and which upon such addition causes 2,6-bis(picrylamino)-3,5-dinitropyridine to be precipitated; then

recovering the precipitated 2,6-bis(picrylamino)-3,5-dinitropyridine from the solvent system from which it has been precipitated.

4,948,898

# PROCESS FOR THE MANUFACTURE OF 1-SULPHO-2-OXOAZETIDINE DERIVATIVES

André Furlenmeier, Basel; Werner Hofheinz, Bottmingen, both of Switzerland; Christian N. Hubschwerlen, Durmenach, France, and Hans P. Isenring, Sissach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

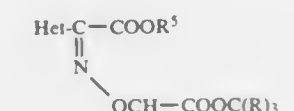
Continuation of Ser. No. 926,742, Nov. 3, 1986, abandoned, which is a continuation of Ser. No. 852,046, Apr. 14, 1986, Pat. No. 4,652,651, which is a division of Ser. No. 499,595, May 31, 1983, abandoned. This application Feb. 28, 1989, Ser. No. 317,081

Int. Cl.<sup>5</sup> C07D 213/73, 231/12, 233/46, 263/48

U.S. Cl. 546—311

5 Claims

1. A compound of the formula



in which Het is selected from the group consisting of pyrazolyl, amino-pyridyl, amino-imidazolyl and amino-oxazolyl groups, R is C<sub>1-3</sub>-alkyl, R<sup>5</sup> is allyl, and the group =NOCH<sub>2</sub>COOC(R)<sub>3</sub> is present at least partially in the syn-form.



4,948,899

## 1,4-DIHYDROPYRIDINE DERIVATIVES

Toshibisa Ogawa; Tomomi Ota; Shuichi Sato, all of Ageo; Takemi Sunaga, Tokyo; Yoshiaki Watanabe, Kodaira, and Katsuo Hatayama, Omiya, all of Japan, assignors to Taisho Pharmaceutical Co., Ltd., Japan

Filed Aug. 24, 1989, Ser. No. 397,850

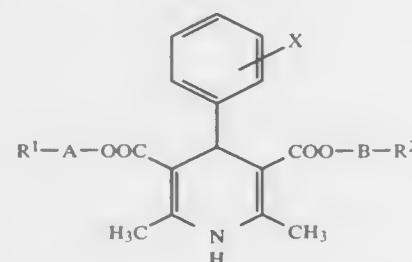
Claims priority, application Japan, Sep. 5, 1988, 63-221963

Int. Cl.<sup>5</sup> C07D 211/86

U.S. Cl. 546—321

6 Claims

1. A 1,4-dihydropyridine derivative represented by the formula



wherein R<sup>1</sup> is a hydrogen atom, an alkoxy group having 1 to 4 carbon atoms, a mercapto group, an alkylcarbonylthio group in which the alkyl group has 1 to 4 carbon atoms or a benzoylthio group, R<sup>2</sup> is a mercapto group, an alkylcarbonylthio group in which the alkyl group has 1 to 4 carbon atoms, a benzoylthio group or a 2-cyanoethylthio group, A and B are the same or different and are each an alkylene group having 1 to 4 carbon atoms, and X is a hydrogen atom, a halogen atom, a nitro group or a trifluoromethyl group.

4,948,900

## BENZOXAZOLE DERIVATIVES

Ikuo Iijima, Urawa; Masakatsu Ozeki, Wako; Kunihito Okumura, Urawa, and Masanori Inamasu, Misato, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan Division of Ser. No. 167,391, Mar. 14, 1988, Pat. No. 4,897,393. This application Nov. 13, 1989, Ser. No. 435,807

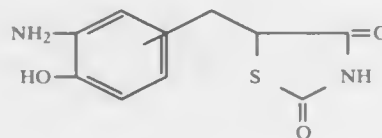
Claims priority, application Japan, Mar. 18, 1987, 62-65359; Mar. 20, 1987, 62-67073

Int. Cl.<sup>5</sup> C07D 277/34

U.S. Cl. 548—183

3 Claims

1. A compound of the formula:



wherein the group is a group of the formula: —CH<sub>2</sub>— or —CH=, or a salt thereof.

4,948,901

## BENZAMIDE PROTEASE INHIBITORS

Rodney C. Schnur, Mystic, and Anton F. J. Fliri, Norwich, both of Conn., assignors to Pfizer Inc., New York, N.Y. Division of Ser. No. 197,927, May 24, 1988, Pat. No. 4,874,864. This application Aug. 9, 1989, Ser. No. 391,764

Int. Cl.<sup>5</sup> C07D 235/04

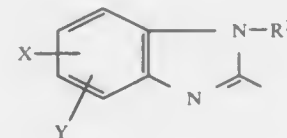
U.S. Cl. 548—329

7 Claims

1. A compound of the formula



or a pharmaceutically acceptable salt thereof, wherein HET is benzimidazol-2-yl of the formula



where X is hydrogen or methyl, Y is hydrogen, methyl, benzoyl, nitro, chloro, fluoro, bromo or methoxy and R<sup>2</sup> is hydrogen, (C<sub>1</sub>—C<sub>3</sub>)alkyl, phenethyl, phenacyl, N-(C<sub>1</sub>—C<sub>3</sub>)alkylcarbonylmethyl, N,N-di(C<sub>1</sub>—C<sub>3</sub>)alkylcarbonylmethyl, N-(C<sub>1</sub>—C<sub>3</sub>)alkylcarbonyl, (C<sub>1</sub>—C<sub>3</sub>)alkoxycarbonylmethyl or N-(p-chlorobenzyl)carbonylmethyl; n is an integer of 0 to 2; and R<sup>1</sup> is hydrogen or (C<sub>1</sub>—C<sub>3</sub>)alkyl.

4,948,902

## PROCESS FOR MAKING SUBSTITUTED PYRAZOLES

Bruce J. Gaede, University City, and Lisa L. Torrence, Hercules, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

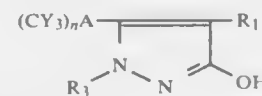
Filed Apr. 13, 1988, Ser. No. 175,462

Int. Cl.<sup>5</sup> C07D 231/46

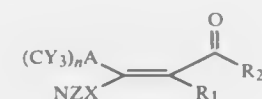
U.S. Cl. 548—376

8 Claims

1. A process for preparing a compound having the formula:



which comprises reacting



with R<sub>3</sub>NHNH<sub>2</sub>

wherein each Y is independently hydrido or halo; n is 0 or 1; A is CFY<sub>2</sub> when n is 0 and A is CFY when n is 1; Z is hydrido and X is hydrido, lower alkyl or phenyl, or Z and X together are cyclic alkyl, R<sub>1</sub> is hydrido or halo; R<sub>2</sub> is hydroxy, alkoxy, alkylthio or alkylamino; and R<sub>3</sub> is lower alkyl.

4,948,903

## PERFLUORODIAZIRIDINES AND PROCESS FOR PREPARING THEM

Walter Navarrini, Boffalora, Italy, and Darryl D. Desmarteau, Clemson, S.C., assignors to Ausimont S.r.l., Milan, Italy Filed Jun. 19, 1989, Ser. No. 369,046

Claims priority, application Italy, Jun. 22, 1988, 21063 A/88

Int. Cl.<sup>5</sup> C07D 229/02

U.S. Cl. 548—960

2 Claims

1. A perfluorodiaziridine having the formula:



wherein:

R<sub>1</sub> and R<sub>2</sub>, alike or different from each other, represent a perfluoroalkyl group of from 1 to 3 carbon atoms, and R<sub>3</sub> represents a fluorine atom, or a perfluoroalkyl group of from 1 to 2 carbon atoms.

wherein X equals a halide or a triflate, with an unsaturated carboxylic acid of the formula:



wherein "n" is selected from the numbers 1 and 2, in the presence of a palladium catalyst to provide a vinylic lactone.

4,948,904

## PROCESS FOR THE PREPARATION OF OXYDIPHTHALIC ANHYDRIDES

Jeffrey S. Stults, Grand Island, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

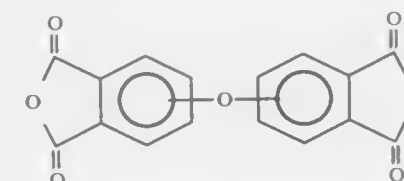
Filed Dec. 14, 1988, Ser. No. 284,221

Int. Cl.<sup>5</sup> C07D 307/89

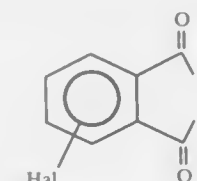
U.S. Cl. 549—241

24 Claims

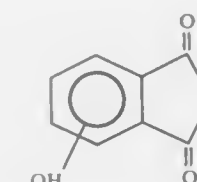
1. A process for the preparation of a diphtalic ether dianhydride of the formula



comprising reacting a halo-phthalic anhydride of the formula



where Hal is F or Br, with an hydroxyphthalic anhydride of the formula



and an alkali metal compound from the group consisting of K<sub>2</sub>CO<sub>3</sub>, KF, and CsF in the presence of a copper catalyst from the group consisting of elemental copper, cuprous oxide, cupric oxide, copper chromite, copper sulfate, copper (I) triflate, copper (II) triflate, stabilized copper (I) bromide, cupric tetrafluoroborate, cuprous benzoate and mixtures thereof.

4,948,905

## SYNTHESIS OF VINYL LACTONES

Richard C. Larock, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

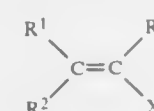
Filed Sep. 18, 1989, Ser. No. 408,894

Int. Cl.<sup>5</sup> C07D 307/26, 309/16

U.S. Cl. 549—326

14 Claims

1. A method of synthesis of vinylic lactones, comprising: reacting a vinylic compound of the formula:



4,948,906

## TRIMETHYLALUMINUM PROCESS

William R. Beard, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Feb. 16, 1990, Ser. No. 480,964

Int. Cl.<sup>5</sup> C07F 5/06

U.S. Cl. 556—187

13 Claims

1. A process for making trimethylaluminum, said process comprising reacting a methyl halide selected from methyl chloride, methyl bromide, methyl iodide and mixtures thereof with a tri-C<sub>2</sub>+ alkylaluminum or mixture thereof in the presence of a catalyst formed by the reaction of bismuth metal with an alkylaluminum compound and an alkyl halide.

4,948,907

## PROCESS FOR PREPARING LOW-MOLECULAR-WEIGHT ORGANO(POLY)SILOXANES

Gerald Fleischmann, Emmerting; Herbert Eck, Burghausen, and Petra Wenzeler, Bubeureuth, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 4, 1988, Ser. No. 228,078

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3726028

Int. Cl.<sup>5</sup> C07F 7/08, 7/10, 7/18

U.S. Cl. 556—462

7 Claims

1. A process for preparing linear low-molecular weight organo(poly)siloxanes, having one or two functional groups which are bonded to siloxane units wherein not more than one functional group is bonded to one siloxane unit, which comprises reacting an octaorganocyclotetrasiloxane with a lithium silanolate in a molar ratio of octaorganocyclotetrasiloxane to lithium silanolate of from 0.9:1 to 1.1:1 in an electron-donating, aprotic solvent at a temperature below 50° C., in the absence of water, and thereafter reacting the resultant lithium siloxanolate thus obtained with an organohalosilane.

4,948,908

## ORGANO PHOSPHORUS COMPOUNDS AND PESTICIDAL COMPOSITIONS

Moshe A. Frommer, Rehovot; Yoffi Segall, Ramat Hasharon, and Ezra Shirin, Tel Aviv, all of Israel, assignors to Ramot Purotech, Ltd., Tel Aviv, Israel

Filed Jul. 14, 1987, Ser. No. 73,447

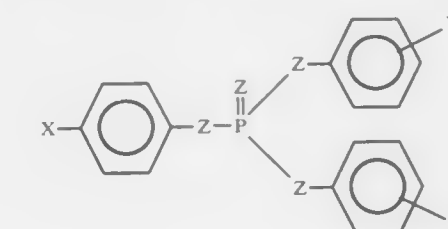
Claims priority, application Israel, Jul. 15, 1986, 79423

Int. Cl.<sup>5</sup> C07F 9/40

U.S. Cl. 558—193

7 Claims

1. An organo phosphorus compound of the formula



wherein X is hydrogen or —NO<sub>2</sub>; Y<sup>1</sup> and Y<sup>2</sup> are independently selected from m-N(CH<sub>3</sub>)<sub>2</sub>, m-N(CH<sub>3</sub>)<sub>3</sub> and C<sub>6</sub>H<sub>4</sub>—NH<sub>2</sub>, and Z is independently selected from oxygen and sulfur.

4,948,909

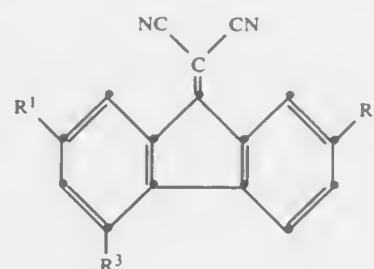
**PROCESS FOR THE PREPARATION OF IMINODIACETONITRILE AND IMINODIACETIC ACID**  
Karl E. Koenig, Ballwin; Gary A. Lanser, Pacific; Paul A. Morrison, Arnold, and Robert B. Weisenfeld, Manchester, all of Mo., assignors to Monsanto Company, St. Louis, Mo.  
Filed Aug. 14, 1989, Ser. No. 394,039  
Int. Cl.<sup>5</sup> C07C 253/30

U.S. Cl. 558—346

11 Claims

1. A process for producing iminodiacetonitrile which comprises:

- A. contacting ammonia, formaldehyde and hydrogen cyanide, or hexamethylenetetramine, formaldehyde and hydrogen cyanide, in a reaction medium to form iminodiacetonitrile; and  
B. without recycle thereafter adjusting the pH of the reaction medium to a pH between about 5.5 and about 10.0 and heating the reaction medium to an elevated temperature for a sufficient time to convert by-products in the reaction medium to iminodiacetonitrile.



wherein:

R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> are each independently hydrogen, nitro, alkyl, or —SO<sub>2</sub>R<sup>4</sup>, with the proviso that at least one of R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> is —SO<sub>2</sub>R<sup>4</sup>; each R<sup>4</sup> is independently alkyl, aryl, alkaryl, alkoxyaryl, or haloaryl; each alkyl or alkoxy moiety recited above has from 1 to 8 carbon atoms; and each aryl moiety recited above has from 6 to 10 aromatic ring carbon atoms.

4,948,912

**ALKYLATING AGENTS AND METHOD OF USE THEREOF**

Robert E. Lyle, Jr.; Donald J. Mangold, and Nollie F. Swynner-ton, all of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

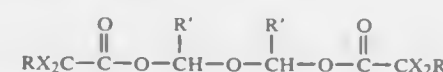
Filed Sep. 8, 1986, Ser. No. 904,884

Int. Cl.<sup>5</sup> C07C 69/63

U.S. Cl. 560—227

8 Claims

1. A non-toxic and non-mutagenic haloacetoxyalkyl ether having the formula:



wherein R is X, a C<sub>1</sub> to C<sub>4</sub> aryl substituted or unsubstituted alkyl group, R' is H or a C<sub>1</sub>-C<sub>3</sub> alkyl group, and X is chlorine or fluorine.

4,948,913

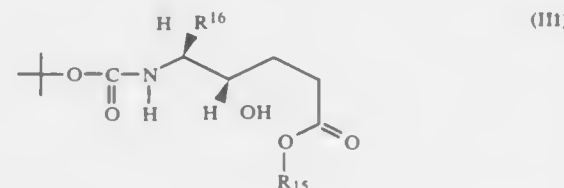
**RENIN INHIBITORS CONTAINING 5-AMINO-2,5-DISUBSTITUTED-4-HYDROXY-PENTANOIC ACID RESIDUES**

Edward F. Kleinman; Robert L. Rosati, and Jasjit S. Bindra, all of Groton, Conn., assignors to Pfizer Inc., New York, N.Y. Division of Ser. No. 858,324, Apr. 30, 1986, Pat. No. 4,729,985, which is a continuation-in-part of Ser. No. 764,168, Aug. 8, 1985, abandoned. This application Nov. 2, 1987, Ser. No. 336,697  
Int. Cl.<sup>5</sup> C07C 125/065

U.S. Cl. 560—115

3 Claims

1. A compound of the formula



wherein

R<sup>15</sup> is (C<sub>1</sub>-C<sub>3</sub>)alkyl; and  
R<sup>16</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>1</sub>-C<sub>6</sub>)alkenyl, phenyl, naphthyl, (C<sub>4</sub>-C<sub>7</sub>)cycloalkyl, (C<sub>4</sub>-C<sub>7</sub>)cycloalkenyl, C<sub>7</sub>-C<sub>9</sub>phenylalkyl, (C<sub>11</sub>-C<sub>13</sub>)naphthylalkyl, (C<sub>5</sub>-C<sub>10</sub>)cycloalkylalkyl, or one of said groups mono or disubstituted on the

4,948,911

**FLUORENONE DERIVATIVES**

Douglas E. Bugner; Teh-Ming Kung, and Louis J. Rossi, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1989, Ser. No. 452,536

Int. Cl.<sup>5</sup> C07C 261/00

U.S. Cl. 558—427

3 Claims

1. A chemical compound having the structure

4,948,916

**PROCESS FOR PRODUCING AMINOXYACETIC ACID SALTS**

Misao Uehama, and Youichirou Tanii, both of Chiba, Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan  
Filed Sep. 7, 1988, Ser. No. 241,422

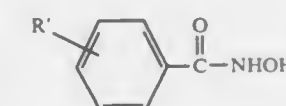
Claims priority, application Japan, Sep. 8, 1987, 62-222937

Int. Cl.<sup>5</sup> C07C 83/10

U.S. Cl. 560—515

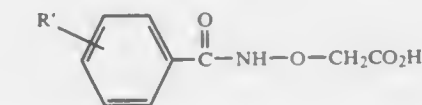
8 Claims

1. A process for producing an benzamidoxyacetic acid salt which comprises reacting benzhydroxamic acid of formula (II):



(II)

wherein R<sup>1</sup> is a hydrogen atom, an alkyl group, an alkoxy group or a halogen atom, with chloroacetic acid in the presence of a metal hydroxide or a metal carbonate to form benzamidoxyacetic acid of formula (IV):



(IV)

wherein R<sup>1</sup> is the same as in formula (II).

4,948,914

**PROCESS FOR PREPARING TRANS-2,2-DIMETHYL-3-(2,2-DIHALOVINYLCYCLOPROPANE CARBOXYLIC ACID ESTERS**

Koji Hagiya; Gohfu Suzukamo, both of Osaka; Masami Fukao, Shiga, all of Japan; Yoji Sakito, Montreal, Canada, and Hiroko Sakane, Osaka, Japan, assignors to Sumitomo Chemical Co., Limited, Osaka, Japan

Filed May 16, 1989, Ser. No. 352,288

Claims priority, application Japan, May 26, 1988, 63-128626;

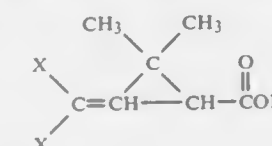
Aug. 9, 1988, 63-199157

Int. Cl.<sup>5</sup> C07C 69/743

U.S. Cl. 560—124

17 Claims

1. A process for preparing trans-2,2-dimethyl-3-(2,2-dihalovinyl)-cyclopropane carboxylic acid esters which comprises allowing either alkali metal alkoxides together with titanium alkoxides or silicon iodides to react with cis- or cis-/trans-mixed 2,2-dimethyl-3-(2,2-dihalovinyl)cyclopropane-cyclopropane carboxylic acid esters having the formula



wherein X stands for a halogen atom and R stands for an alkyl, cycloalkyl or aralkyl group having 1-10 carbon atoms.

4,948,915

**CATALYTIC PROCESS FOR PRODUCTION OF ALKOXYLATED ESTERS**

Brian T. Keen, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jul. 22, 1986, Ser. No. 887,916

Int. Cl.<sup>5</sup> C07C 69/708, 67/347, 67/31

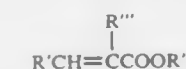
U.S. Cl. 560—187

21 Claims

1. In a process for the production hydrocarbyl hydrocarbyloxyalkanoates of the formula:



wherein n has a value of 1 or 2; R is (i) a linear or branched monovalent alkyl group having from 1 to 8 carbon atoms (ii) a divalent alkylene or divalent dialkylene ether or divalent polyalkylene polyether group wherein the alkylene group has 1 to 6 carbon atoms or (iii) a benzyl group; R' is (i) hydrogen or (ii) alkyl having from 1 to 3 carbon atoms; R'' is (i) a linear or branched alkyl group having from 1 to 8 carbon atoms or (ii) a phenyl group and R''' is hydrogen or methyl by the reaction of a monohydroxyl alcohol of the formula ROH or a dihydroxyl alcohol of the formula HO(RO)<sub>m</sub>H where m has a value of from 1 to about 10 with an alpha, beta-unsaturated ester of the formula



in contact with a strong basic anionic exchange resin catalyst in the hydroxide or alkoxide form, the improvement of enhancing the catalyst bed cycle life consisting of carrying out the reaction at a temperature of from about minus 5° C. to about 35° C., at a moisture content of from about 0.01 to about 0.5 weight percent and a mole ratio of alcohol to ester of from about 3:1 to about 100:1.

4,948,917

**PROCESS FOR THE PREPARATION OF BETA-CHLOROETHYLSULFONYLARYL ISOCYANATES**

Hans H. Steuernagel, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 14, 1990, Ser. No. 479,660

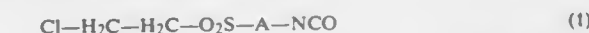
Claims priority, application Fed. Rep. of Germany, Feb. 16, 1989, 3904592

Int. Cl.<sup>5</sup> C07C 119/48

U.S. Cl. 560—347

6 Claims

1. A process for the preparation of a β-chloroethylsulfonylarylyl isocyanate of the formula (1)



(1)

in which A is an arylene radical, which can contain substituents from the series comprising alkyl(C<sub>1</sub>-C<sub>6</sub>), alkoxy(C<sub>1</sub>-C<sub>6</sub>), chlorine, bromine and nitro, or a naphthylene radical, which comprises allowing at least 2 moles of phosgene to act on 1 mole of a β-hydroxyethylsulfonyl-arylamine of the formula (2)



(2)

in which A has the abovementioned meaning, in the presence of a catalyst at temperatures of about 100° to about 200° C., if appropriate in an inert solvent.



4,948,918

PROCESS FOR THE PREPARATION OF  
 $\alpha$ -AMINOALKYLPHOSPHONIC ACIDS

Hans-Jerg Kleiner, Kronberg-Taunus, and Günter Bartels, Brunswick, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 36,489, Apr. 9, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,329

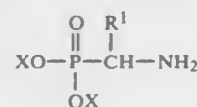
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1986, 3612192

Int. Cl.<sup>5</sup> C07F 9/38

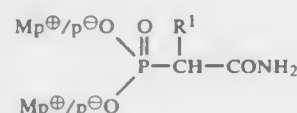
U.S. Cl. 562—16

18 Claims

1. A process for the production of  $\alpha$ -aminoalkylphosphonic acid or salts thereof of the formula A



wherein R<sup>1</sup> represents hydrogen, and X hydrogen or a metal cation, which comprises reacting a compound of the formula B



in which R<sup>1</sup> has the same meaning as in formula A and Mp<sup>⊕</sup> represents hydrogen or a p-valent metal cation, with a hypohalite of a p-valent metal cation, and isolating the metal salt produced or acidifying the reaction mixture obtained to produce the  $\alpha$ -aminoalkyl-phosphonic acid.

4,948,919

ARYLAMINONITROPHENYL HYDROXYETHYL  
SULFONES

Werner Brodt, Hattersheim am Taunus, and Theodor Papenfuhs, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 170,736, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 899,475, Aug. 22, 1986, abandoned.

This application Jan. 24, 1989, Ser. No. 304,596

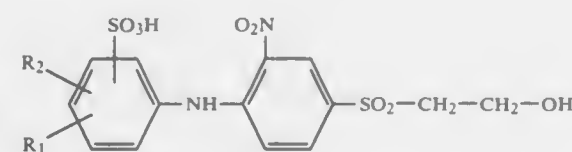
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1985, 3530338

Int. Cl.<sup>5</sup> C07D 143/55

U.S. Cl. 562—61

4 Claims

1. A [4-(2-hydroxy-ethylsulfonyl)-2-nitro-aniline]-benzenesulfonic acid of the formula



in which

R<sub>1</sub> represents amino,R<sub>2</sub> represents hydrogen, a C<sub>1</sub>-C<sub>4</sub>-alkyl, or a C<sub>1</sub>-C<sub>4</sub>-alkoxy group

4,948,920

PROCESS FOR THE PREPARATION OF  
PHENILPYRUVIC ACID FROM BENZYL CHLORIDE

Clark R. Landis, Boulder, Colo., and Hayat Khawaja, Belleville, Ill., assignors to The NutraSweet Company, Deerfield, Ill.

Filed Mar. 24, 1989, Ser. No. 328,410

Int. Cl.<sup>5</sup> C07C 51/04

U.S. Cl. 562—406

13 Claims

1. In a process for the production of phenylpyruvic acid which comprises the carbonylation of benzyl chloride with carbon monoxide in a liquid solvent, in the presence of a catalytic amount of a metal carbonyl catalyst and an inorganic base to produce a salt of phenylpyruvic acid, acidifying said salt and obtaining therefrom phenylpyruvic acid, the improvement wherein the liquid solvent is acetonitrile:water.

4,948,921

PROCESS FOR THE PRODUCTION AND RECOVERY OF  
TRIMELLITIC ACID

Michael R. Green, Geneva, and Wayne P. Schammel, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 29, 1989, Ser. No. 373,345

Int. Cl.<sup>5</sup> C07C 51/215

U.S. Cl. 562—413

17 Claims

1. A process for oxidizing pseudocumene to trimellitic acid which comprises catalytic oxidation of pseudocumene with air in the presence of acetic acid in an oxidation zone wherein liquidphase conditions are maintained and wherein the weight ratio of acetic acid to pseudocumene is in the range of about 0.5-4.0:1.0 and the catalyst comprises one or more heavy metal oxidation catalysts comprising zirconium, cobalt, and manganese to provide about 0.1 to about 0.4 weight percent total metals based on pseudocumene and a source of bromine and to provide a total about 0.10 to about 0.30 weight percent total bromine based on pseudocumene, wherein the total weight ratio of bromine ions to total metal ions is about 0.5 to about 2.0, the zirconium content is about 1 to about 5% and the manganese content is about 14 to about 60%, each metal by weight of the total metals and wherein the cobalt content is about 35 to about 80 weight percent, the temperature in the last 40% of the oxidation is upward from about 350° F. to about 420° F., the temperature in the preceding stage is between about 300° F. and about 350° F., cooling the oxidation reaction effluent to crystallize crude trimellitic acid, separating acid recovering crystallized crude trimellitic acid from the acetic acid solvent mother liquor, heating the crystallized crude trimellitic acid to convert it to its anhydride and distilling the anhydride to obtain trimellitic anhydride product, and wherein the resulting trimellitic anhydride product is hydrolyze with a solvent comprising water or a mixture thereof with one or more low molecular weight carboxylic acids wherein the log molecular weight carboxylic acid contains 1 to 4 carbon atoms to obtain pure trimellitic acid.

## ELECTRICAL

4,948,922

ELECTROMAGNETIC SHIELDING AND ABSORPTIVE  
MATERIALS

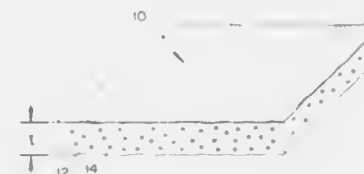
Vijay K. Varadan, and Vasundara V. Varadan, both of State College, Pa., assignors to The Pennsylvania State University, State College, Pa.

Continuation-in-part of Ser. No. 244,858, Sep. 15, 1988, abandoned. This application Sep. 30, 1988, Ser. No. 252,516

Int. Cl.<sup>5</sup> H05K 9/00

U.S. Cl. 174—35 GC

21 Claims



1. A composite material comprising:  
a base material having a first dielectric constant which is complex in the frequency range of 150 megahertz to 100 gigahertz, and being at least partially opaque to electromagnetic energy with frequencies in the range of 150 megahertz to 100 gigahertz; and  
a chiral material having handedness, having a second dielectric constant which is different from the first dielectric constant, and being dispersed throughout the base material.

4,948,923

BOTTOM COVER INSTALLATION STRUCTURE OF A  
SHIELD CASE

Nobuyuki Suzuki, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

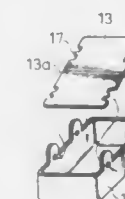
Filed Jun. 20, 1989, Ser. No. 368,627

Claims priority, application Japan, Jul. 8, 1988, 63-90575[U]

Int. Cl.<sup>5</sup> H05K 9/00

U.S. Cl. 174—35 R

2 Claims



1. A shield case and cover assembly comprising:  
a hollow shield case having an open side and plurality of legs affixed to the edge of said case defining said open side, each leg defining a hole therethrough;  
a cover plate whose perimeter configuration is substantially the same as the configuration of the edge of the case defining said open side;  
the cover plate defining a plurality of notch and protuberance pairs, the number of said pairs corresponding to the number of legs of the shield case and whose placement on said cover plate are such that when each leg is positioned in a notch, each protuberance is engaged with a hole, and said cover plate covers said open side of said shield case.

4,948,924

## STAND-OFF DEVICE FOR ENERGIZED CONDUCTOR

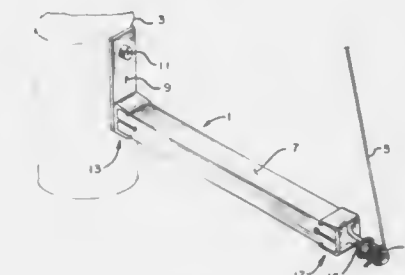
Marion R. Farmer, Germantown, Tenn., assignor to Alumafarm, Inc., Memphis, Tenn.

Filed Sep. 29, 1988, Ser. No. 251,124

Int. Cl.<sup>5</sup> H01B 17/14

U.S. Cl. 174—158 R

7 Claims



1. A stand-off device for supporting an energized conductor from an associated utility pole, comprising, an elongated self-supporting stand-off body, a utility pole connecting arm extending substantially transverse to said elongated body and fastened to one end of said elongated body, an energized conductor support arm being fastened to the opposite end of said elongated body, said utility pole connecting arm including integral fastener elements in interlocking engagement with said elongated body at said one end of said elongated body, said energized conductor support arm including integral fastener elements in interlocking engagement with said opposite end of said elongated body, said elongated self-supporting stand-off body being made of wood and said utility pole connecting arm including said integral fastener elements and said energized conductor support arm each including at least one enlarged head stud fastener in interlocking engagement with the interior of said elongated stand-off wood body and a pair of spaced fingers extending over outer wall surfaces of said elongated stand-off wood body and having internally directed fastener hooks at free ends thereof also in interlocking engagement with said elongated stand-off wood body, said energized conductor support arm being longitudinally aligned with and extending away from said opposite end of said elongated wood body, said elongated stand-off wood body having a polygonal cross-sectional configuration, and said pair of spaced fingers of said utility pole connecting arm and said energized conductor support arm being complementarily shaped relative to the polygonal shape of said elongated stand-off wood body, whereby upon attachment of said utility pole connecting arm at said one end of said elongated body to a utility pole, the energized conductor support arm at the opposite end of said elongated body contacts and supports an energized conductor in a stand-off position from the utility pole.

4,948,925

APPARATUS AND METHOD FOR ROTATIONALLY  
ORIENTING A FLUID CONDUCTING CONDUIT

Warren Winters; Michael B. Burton, both of Tulsa; Tommy M. Warren, Coweta, and J. Ford Brett, Tulsa, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 30, 1989, Ser. No. 443,762

Int. Cl.<sup>5</sup> E21B 7/06, 21/08, 21/10, 47/06

U.S. Cl. 175—48

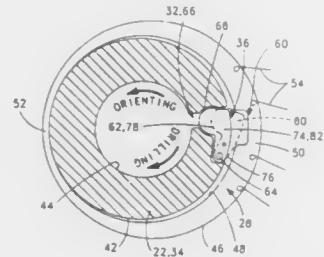
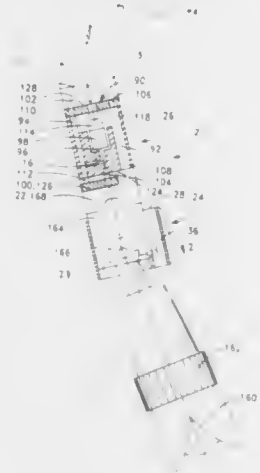
34 Claims

1. Apparatus for rotationally orienting a fluid conducting conduit, the conduit being rotatable about its longitudinal axis, comprising:

an insert, connectable inside the conduit so that the insert is rotatable with the conduit, for restricting fluid flow

through the conduit, the insert having an upstream side facing into the fluid flow and a downstream side facing the opposite direction;

- a flow passageway, extending through the insert, for passing fluid through the insert, the flow passageway having an upstream end and a downstream end;
- a pilot passageway, extending through the insert, for passing fluid through the insert, the pilot passageway having an upstream end and a downstream end;
- a piston bore, located in the insert, having an upstream end open to the flow passageway and a downstream end open to the pilot passageway;
- a piston, reciprocally mounted in the piston bore, for reciprocating between the upstream and downstream ends of the piston bore, the piston restricting flow through the flow passageway and creating a fluid pressure increase on the upstream side of the insert when the piston is in a restricted position in the piston bore; and



barrier means for blocking the pilot passageway in a selected rotational position of the pilot passageway and conduit in order to increase the fluid pressure at the downstream end of the piston bore and move the piston to the restricted position in the piston bore.

7. Apparatus for orienting a collar on a fluid conducting conduit, the collar and conduit being rotatable relative to one another about the longitudinal axis of the conduit, the apparatus comprising:

- an orifice through the wall of the conduit; and
- latch means for latching the collar to the conduit, allowing fluid communication through the orifice, and rotating the collar when the conduit is rotated in a first direction; and for unlatching the collar from the conduit, preventing fluid communication through the orifice, and allowing the conduit to rotate relative to the collar when the conduit is rotated in a second, opposite direction.

21. A method of rotationally orienting a collar on a conduit with respect to the longitudinal axis of the conduit, comprising: providing an orifice through the wall of the conduit; flowing

pressurized fluid through the conduit and orifice, and rotating the collar with the conduit when the conduit is rotated in a first direction about the longitudinal axis of the conduit; and

preventing fluid flow through the orifice and allowing the conduit to rotate relative to the collar when the conduit is rotated in a second, opposite direction about the longitudinal axis of the conduit.

4,948,926

## POSITION DETECTING APPARATUS

Azuma Murakami; Tsuguya Yamanami; Takahiko Funahashi, and Toshiaki Senda, all of Saitama, Japan, assignors to Kabushiki Kaisha Wakom, Saitama, Japan

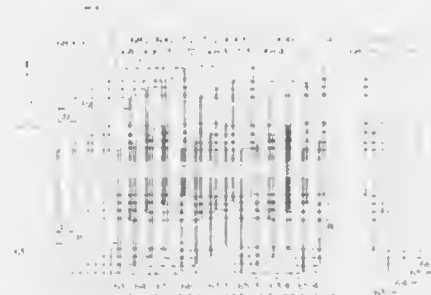
Filed Jan. 26, 1989, Ser. No. 302,532

Claims priority, application Japan, Jan. 29, 1988, 63-17250

Int. Cl.<sup>5</sup> G08C 21/00

U.S. Cl. 178—19

55 Claims



1. A position detecting apparatus comprising:
  - a position detection section having first and second overlapping coil groups provided on a substrate, each of said coil groups including a plurality of loop coils;
  - an implement having a tuning circuit including at least one coil and one capacitor, the tuning circuit having a predetermined resonant frequency;
  - selection means for successively selecting said loop coils of each of said first and second coil groups of said position detection section one by one;
  - signal generation means for applying an A.C. signal of said predetermined frequency to said loop coils;
  - signal detection means for detecting said A.C. signal of said predetermined frequency from said loop coils; and
  - controller means for identifying the position of said implement relative to said coil groups in response to said A.C. signal detected by said signal detection means from each of said loop coils of each of said first and second coil groups;
- each of said loop coils of each of said first and second coil groups including a plurality of substantially rectangular continuous coil sections;
- each of said rectangular coil sections of each of said loop coils of said first coil group including first and second parallel parts extending substantially perpendicularly to a position detection direction and spaced from each other by an interval of predetermined pitch P1, and a third part connecting corresponding ends of said first and second parts together; the first parts of adjacent pairs of said loop coils of said first coil group being displaced from each other by a predetermined interval d1 along the position detection direction;
- each of said rectangular coil sections of each of said loop coils of said second coil group including fourth and fifth parallel parts extending substantially perpendicularly to said position detection direction and spaced from each other by an interval of predetermined pitch P1, and a sixth part connecting corresponding ends of said fourth and fifth parts together;

the fourth parts of adjacent pairs of said loop coils of said second coil group being displaced from each other by a predetermined interval d2 along the position detection direction.

4,948,927

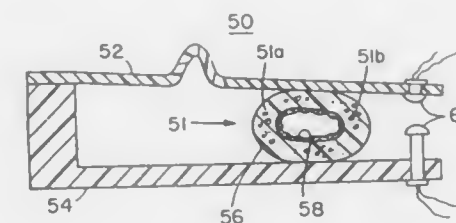
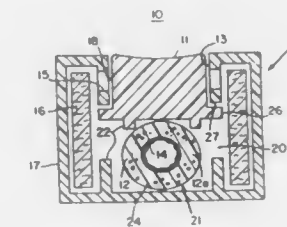
VISCO-ELASTIC DELAYED ACTUATOR AND SYSTEM  
Vic Pajak, Wayne, N.J., assignor to Piezo Electric Products, Inc., Metuchen, N.J.

Filed Oct. 3, 1988, Ser. No. 252,647

Int. Cl.<sup>5</sup> H01H 7/00

U.S. Cl. 200—33 R

29 Claims



1. A visco-elastic delayed actuator system comprising:
  - a visco-elastic delayed actuator including a restorable, collapsible structure having at least two confronting surfaces, resilient means having a first portion directly connected to one said surface and having a second portion directly connected to the other said surface, and visco-elastic delay means including visco-elastic adhesive on at least one of said confronting surfaces of said structure for providing a visco-elastic holding force when said other confronting surface comes in contact with said visco-elastic adhesive;
  - a support member for receiving said structure; and
  - operator means proximate one of said confronting surfaces of said structure in an initial position and adapted to force together the confronting surfaces of said structure, said operator means adapted to move into a secondary position, initiating a visco-elastic delay period, said resilient means urging apart said confronting surfaces to overcome said visco-elastic adhesive holding force and separate said confronting surfaces, generally restoring said structure, moving the operator means toward its initial position and ending the visco-elastic delay period.

4,948,928

## PUSH/PUSH RESET PROGRAMMER

John Willigman, Elk Grove Village, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 16, 1989, Ser. No. 394,446

Int. Cl.<sup>5</sup> H01H 43/10

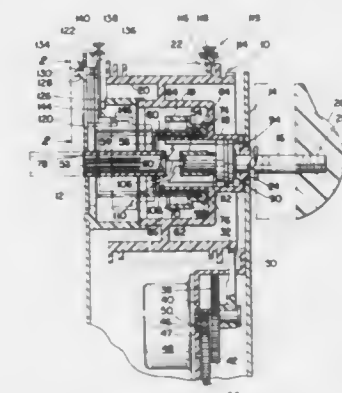
U.S. Cl. 200—38 R

12 Claims

1. A push-push reset electromechanical programmer assembly for an appliance comprising:
  - (a) base means including motorized advance means;
  - (b) a cam drum mounted for rotary movement on said base means and having at least one program cam track thereon,

said drum operatively connected for timed advancement by said advance means;

- (c) at least one program switch means adapted for controlling an appliance function including follower means operable to make and break a set of electrical contacts in response to advancement of said cam drum;
- (d) line switch means operative upon connection to a source of power to control current flow to said motorized advance means;
- (e) slider means disposed on said base means and movable between first and second positions for respectively actuating and deactuating said line switch means;
- (f) shaft means disposed on said base means concentrically



- with said cam drum and movable axially with respect thereto between first and second positions, said shaft means including switch cam means operable upon being moved to a first axial position with respect to said base means to move said slider means to said first position;
- (g) releasable means operable to retain said shaft means in said first axial position, said releasable means operable, upon subsequent user axial movement of said shaft means and user release thereof to move said switch cam means to a second axial position permitting said slider means to move to said second position; and
- (h) clutch means operable only when said shaft means is in said second position for transmitting rotary movement of said shaft means to said cam drum.

4,948,929

## IMPULSE SENSOR

Hiroshi Fukushima, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,858

Claims priority, application Japan, Sep. 14, 1988, 63-228566  
Int. Cl.<sup>5</sup> H01H 35/14

U.S. Cl. 200—61.45 M

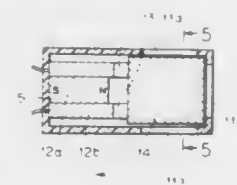
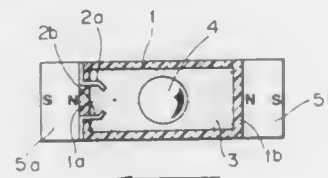
3 Claims

1. An impulse sensor for detecting an impulsive force when the impulsive force not less than a predetermined value is transmitted thereto, comprising:

- a weight having an electrically conductive property and slidably held in a case body by an inertia force;
- a pair of contacts spaced from each other and disposed in said case body at a position opposing said weight in a direction of movement of said weight;
- a magnetic fluid having a non-electrically conductive prop-



erty and interposed between said pair of contacts and said weight; and



a magnet for exerting a magnetic force to said magnetic fluid.

4,948,930

# LENGTH-ADJUSTING DEVICE ON A SWITCH

Jan Karlsson, Västra Frölunda, Sweden, assignor to AB Volvo, Sweden

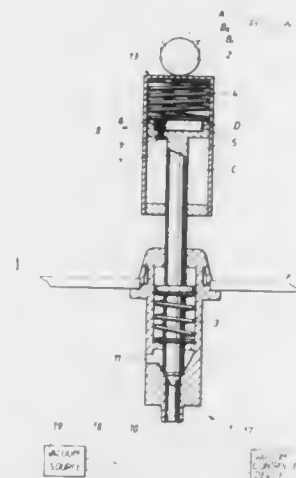
Filed Apr. 26, 1989, Ser. No. 344,101

Claims priority, application Sweden, Apr. 26, 1988, 8801578

Int. Cl.<sup>5</sup> H01H 35/38

U.S. Cl. 200—82 R

2 Claims



1. Length-adjusting device on a switch, intended to indicate the shift of an object from a normal position, said switch comprising a fixed part, intended to be assembled securely in a chassis, and a switch part which is movable relative to the latter and which can be changed between different positions for switching the switch depending on the position of the object, said device comprising a first part, designed to interact with the object in its positional shifting movements, and a second part, designed to interact with the movable switch part such that the said second part holds the movable switch part in one of its positions, wherein the length-adjusting device comprises at least one fluid chamber designed to change volume upon relative movement between the first and the second parts, wherein a valve is connected to the chamber and is designed to permit the passage of fluid to or from the chamber and to maintain a resistance to the passage of fluid in the opposite direction, whereby length-adjusting device adapts the position of the said second part relative to the position of the said first part to the distance between the normal position of the object and the switch.

## 4,948,931 COMBINED PRESSURE CUTOFF AND PRESSURE RELIEF VALVE

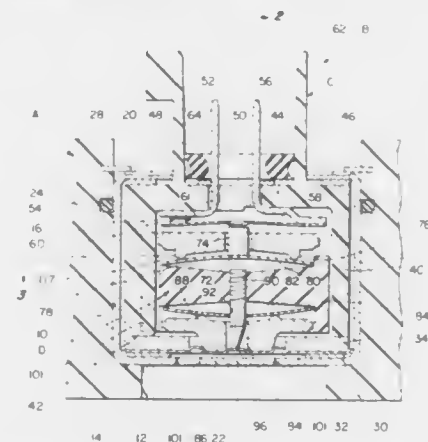
Ronald A. Nixon, Mansfield, and Charles Yagher, Jr., Lexington, both of Ohio, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Apr. 17, 1989, Ser. No. 340,141

Int. Cl.<sup>5</sup> H01H 35/34

U.S. Cl. 200—83 P

11 Claims



1. A pressure cutoff and relief valve comprising a housing, a normally closed switch in said housing movable between closed and open positions, a normally closed pressure relief vent in said housing, movable switch operating means in said housing for moving said switch between said closed and open positions, said switch operating means including a switch operating snap disc snapable between opposite bowed positions, movable vent operating means in said housing for opening said vent, said vent operating means including a vent operating snap disc snapable between opposite bowed positions, movable pressure responsive means for operating said switch operating means and said vent operating means, said pressure responsive means and said switch operating means being responsive to a first predetermined pressure acting on said pressure responsive means for snapping said switch operating snap disc in one direction for opening said switch and being responsive to a subsequent pressure less than said first predetermined pressure for snapping said switch operating snap disc in an opposite direction for closing said switch, and said pressure responsive means and said vent operating means being responsive to a second predetermined pressure greater than said first predetermined pressure acting on said pressure responsive means for snapping said vent operating snap disc from one of said opposite bowed positions thereof to the other for opening said vent.

4,948,932

## APERTURED MICROWAVE REACTIVE PACKAGE

Jane L. Clough, Neenah, Wis., assignor to James River Corporation, Richmond, Va.

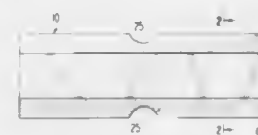
Continuation of Ser. No. 186,334, Apr. 26, 1988, abandoned.

This application May 5, 1989, Ser. No. 348,209

Int. Cl.<sup>5</sup> H05B 6/80

U.S. Cl. 219—10.55 E

12 Claims



1. A microwave food package assembly for achieving a desired balance of external surface and internal heating of food in a microwave oven, comprising

(a) a food item having a density and external dimensions which would normally result in the surface of said food item becoming excessively heated before the interior of

said food item is adequately and uniformly heated when subjected to unshielded microwave energy;

(b) a sleeve having bottom, top, and opposed side walls and open ends, said sleeve being shaped to be placed in surrounding heat conducting relationship with respect to the top, bottom and sides of said food item such that the ends of said food items are exposed to direct impingement by microwave energy when said food item is heated in a microwave oven, said sleeve being formed of microwave transparent material;

(c) a microwave interactive means for absorbing a portion of the microwave energy within the oven and converting the absorbed microwave energy into heat to raise the temperature of said microwave interactive means, said interactive means including a continuous layer of microwave interactive material which permits a limited portion of the microwave energy to be transmitted from outside the package assembly through said microwave interactive means into said food item, said microwave interactive material being coextensive with the entire inner surface of said sleeve and being positioned, because of the shape of said sleeve, adjacent the top, bottom and sides of said food item to cause the top, bottom and sides of said food item to be heated by said microwave interactive material, the degree of interactivity of said microwave interactive material being sufficiently great that the sum of the microwave energy reaching said food item by being transmitted through said microwave interactive material and through the open ends of said sleeve is inadequate to cause the interior of said food item to be adequately heated when the surface of said food item reaches the maximum level of desired surface heating; and

(d) microwave apportioning means for creating a desired division between the microwave absorptivity of said microwave interactive material and the microwave absorptivity of said food item, said microwave apportioning means including a portion of said microwave interactive layer surrounding at least a pair of localized non-interactive microwave permeable areas through which microwave energy may pass into the interior of said food item, said areas being surrounded by uninterrupted edges of said continuous microwave interactive material with all diametrically opposed sections of said edge being sufficiently separated to preclude microwave interactivity between said diametrically opposed sections, said microwave apportioning means including at least a pair of apertures formed in the portions of said microwave interactive material which are co-extensive with said opposed side walls.

4,948,933

## APPARATUS FOR CUTTING PRECISION NOTCHES IN WORK SURFACES

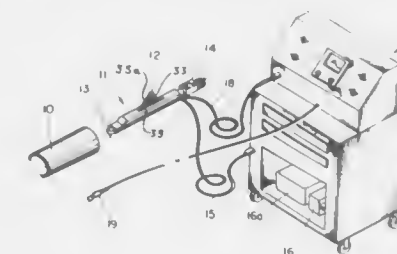
Carroll R. Thompson, Woodlands, Tex., assignor to Scan Systems, Inc., Houston, Tex.

Filed Feb. 27, 1989, Ser. No. 315,833

Int. Cl.<sup>5</sup> B23H 1/00, 7/26, 9/00

U.S. Cl. 219—69.2

19 Claims



1. Apparatus for producing a precision cut notch in a metal work surface having a defined axis, said apparatus comprising a portable cutting electrode tool having an electrode arc member and housing means for supporting said electrode arc member therein;

means for movably supporting said housing means on said electrode tool for controlled movement along an axis normal to said work surface, said electrode arc member being adapted for disposal proximate to the work surface in which a notch is to be made where the electrode arc member is elongated along an axis with a cutting edge and configuration to produce a notch with a defined side, end and bottom walls in said work surface, said means for supporting the electrode arc member including means for adjustably mounting said electrode arc member whereby said arc member can be oriented with its elongate axis substantially parallel to the work surface and in a selected angular relationship to said axis of the work surface throughout a predetermined range of angular relationships;

means for moving the electrode arc member toward and away from the work surface whereby the electrode arc member may be positioned for producing an electric arc discharge between said arc member and the work surface to be notched upon the application of an electrical voltage to said electrode arc member;

means for applying an electrical voltage to the electrode arc member for producing arc discharges of electrical current between the electrode arc member and the work surface for producing an electrical arc cutting effect on said work surface;

means for supplying an electrically non-conductive immersion fluid over the area to be notched during the cutting of said surface for cooling said electrode arc member and flushing residue material produced by said arc discharges from the notched area; and

means for moving said electrode arc member relative to said work surface while maintaining production of said arc discharges to produce desired dimensions of depth and the side and end walls of the notch in the work surface.

4,948,934

## PROCESSING METHOD FOR PLANETARY EROSION

Udo Behmer, Aachen, Fed. Rep. of Germany, assignor to H. C. Wilfried König, Aachen, Fed. Rep. of Germany

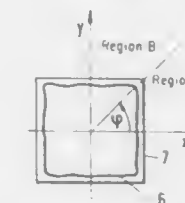
Filed Apr. 28, 1989, Ser. No. 345,087

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814675

Int. Cl.<sup>5</sup> B23H 7/28

U.S. Cl. 219—69.2

25 Claims



1. In a processing method for the planetary erosion of an existing depression, whereby for a finishing or dressing operation, a relatively cyclical lateral translational movement is carried out between a tool electrode and a workpiece, and whereby, using a final target value path, the actual movement is effected by regulating the width of an erosion gap via a deviation or travel radius, the improvement including the step of:

defining a preset target value path for each planetary revolution by determining the actual movement of at least one preceding planetary revolution and by using a target value/actual value difference that results in an optimum process progress, with each preset target value path being delimited by the final target value path, and effecting said regulation of the width of the erosion gap via the travel radius in a predominantly lateral direction.

4,948,935

# **APPARATUS FOR USE WITH A CARBON ARC TORCH TO RETAIN SHORT ELECTRODES**

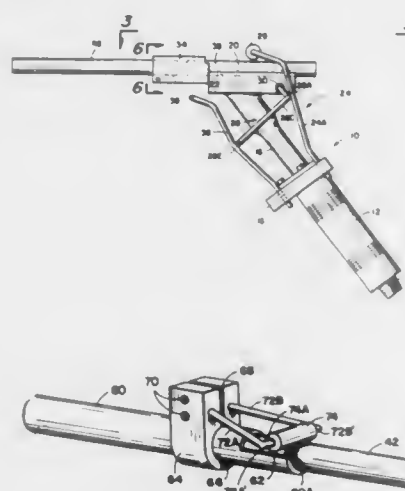
Paul B. Moss, 202 S. Lansing, Tulsa, Okla. 74102

Filed Apr. 6, 1989, Ser. No. 334,161

Int. Cl.<sup>5</sup> B23K 37/00

U.S. Cl. 219—70

4 Claims



1. An apparatus for use in a carbon arc torch to permit the torch to retain a short length cylindrical electrode, such as a carbon arc electrode, comprising:

- a holder having a first and second end and having an elongated open top trough in one end, the trough being configured to receive and retain a portion of the length of a cylindrical electrode thereon; and
- an elongated cylindrical member extending from said holder other end dimensioned as a cylindrical electrode and receivable in a torch constructed to receive a cylindrical electrode therein, whereby the apparatus can be utilized with a standard carbon arc torch without modification of the torch and can retain short length electrodes which are otherwise too short for use with a standard torch.

4,948,936

# **FLUX CORED ARC WELDING PROCESS**

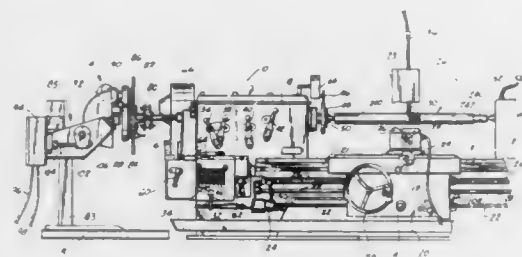
Milton E. Landry, New Orleans, La., assignor to Gulf Engineering Company, Inc., Jefferson, La.

Filed Sep. 28, 1988, Ser. No. 250,442

Int. Cl.<sup>5</sup> B23K 9/04

U.S. Cl. 219—76.14

44 Claims



18. A flux cored arc welding process for depositing a weld metal onto a revolving cylindrical workpiece having a longitudinal axis comprising the steps of:

- (a) providing a cylindrical workpiece with a circumferential surface, a longitudinal axis and containing an AISI No. 4100 series steel alloy or an AISI No. 4300 series steel

- alloy, and said cylindrical workpiece having at least one impeller means and comprising a damaged area;
- (b) removing the damaged area from the cylindrical workpiece to form an undercut having a depth greater than about 0.06 inch from the circumferential surface;
- (c) revolving the cylindrical workpiece at a circumferential rate of revolution of about 0.8 to 1.2 foot/min.;
- (d) moving, per each about 0.8 to 1.2 foot/min. circumferential rate of revolution of the cylindrical workpiece, a gas-shielded flux cored deposit zone along the longitudinal axis of the revolving cylindrical workpiece at a relative feed velocity of about 1/16 to 5/16 inch per each revolution of the revolving cylindrical workpiece, wherein said gas-shielded flux cored deposit zone is simultaneously depositing a weld metal in a spiral fashion into the undercut while moving simultaneously along the longitudinal axis of the cylindrical workpiece;
- (e) terminating the depositing of the weld metal into the undercut after the undercut has been filled with the weld metal;
- (f) surrounding the weld metal-filled undercut with an insulator means without having post weld heat treated the weld metal-filled undercut to insulate the weld metal-filled undercut from ambient atmosphere and to slowly cool the weld metal-filled undercut; and
- (g) revolving the cylindrical workpiece while the insulator means surrounds the weld metal-filled undercut.

4,948,937

# **APPARATUS AND METHOD FOR HEAT CLEANING SEMICONDUCTOR MATERIAL**

Richard E. Blank; James W. Harris, and Avraham Amith, all of Roanoke, Va., assignors to ITT Corporation, New York, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,353

Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.6

14 Claims



1. Apparatus for heating cleaning a photocathode comprising:
- a faceplate formed of an optical material;
  - a photoemissive wafer joined to said faceplate;
  - means for producing a uniform thermal distribution in the range of 500°–700° C. in an area of said photoemissive wafer for cleaning said wafer;
  - means for holding the faceplate such that said photoemissive wafer is positioned toward said producing means.

4,948,938

# **PROCESS FOR FASTENING A PIPE BY WELDING TO A THICK WALL MEMBER SUCH AS A PIPE-CARRYING SHELL OF A NUCLEAR REACTOR VESSEL**

Alain Vignes, Paris, France, assignor to Framatome, Courbevoie, France

Filed Oct. 17, 1988, Ser. No. 258,348

Claims priority, application France, Oct. 16, 1987, 87 14322

Int. Cl.<sup>5</sup> B23K 15/00

U.S. Cl. 219—121.14

5 Claims

1. Process for fastening a pipe (23) by welding to a thick wall member (20) comprising at least one passage opening (22) whose diameter is substantially equal to the internal diameter of the pipe (23), the pipe (23) being welded over its entire

4,948,940

# **DEVICE FOR TREATING A BODY WITH A BEAM OF RAYS**

Siegfried Ruckl, Kufstein, Austria, assignor to Schablonteknik Kufstein GmbH, Austria

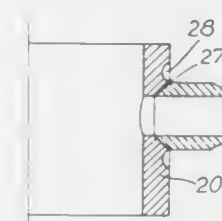
Filed Jun. 16, 1989, Ser. No. 367,247

Claims priority, application Netherlands, Jun. 17, 1988, 8801551

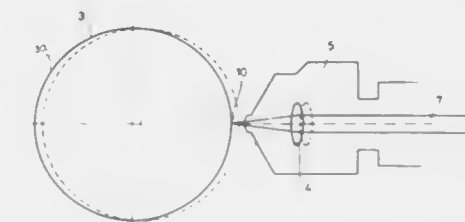
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.68

8 Claims



- thickness into the extension of the opening (22) on one of the sides or external side of the wall (20), comprising the steps of
- (a) producing on an end part of the pipe a connecting surface (24) of frusto-conical shape whose axis coincides with an axis of the pipe (23) having an apex semi-angle of between 30° and 60° and a section of transverse dimension decreasing towards the end of the pipe (23);
- (b) producing on the wall member (20), on only a part of its thickness, in the region of the opening (22) and coaxially with said opening, a connecting surface (25) of frusto-



- conical shape corresponding to the shape of the connecting surface (24) of the pipe (23) opening onto the external side of the wall (20) and widened in the direction of this side of the wall (20);
- (c) locating the connecting surfaces of the pipe (23) and of the wall (20) so that they coincide; and
- (d) welding the pipe (23) and the wall member (20) using an electron beam in a single pass and without filler metal along their connecting surfaces (24, 25), from an external side of the wall.

1. A device for programmed spot treatment of a body with a beam of rays, using a lens system, in which the point of impact of the beam describes a predetermined pattern on the surface of the body as a result of a movement which the body and the device carry out relative to each other, wherein the device has a source of rays, a lens system for directing rays from the source toward the surface of the body; and means for maintaining the constant predetermined distance between the lens system and the center of the point of impact of the beam of rays with the surface of the body as the body and the device move relatively.

4,948,939

# **LASER WELDING METHOD OF STEEL PLATE AND STEEL INGOT**

Beom G. Moon, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

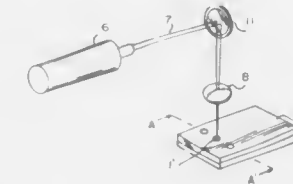
Filed Nov. 16, 1989, Ser. No. 438,101

Claims priority, application Rep. of Korea, Nov. 30, 1988, 15929/1988

Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.64

4 Claims



1. A laser welding method of steel plate and steel ingot which is characterized for the steel plates less than 1 mm thick, to make several through holes (1') whose diameter is less than 1 mm, to fix the first weldment (1) under the second weldment (2), and to irradiate laser beam (7) of Nd-YAG laser generator (6) through condensing lens (8) and holes (1') on the surface of the second weldment (2) to be welded.

4,948,941

# **METHOD OF LASER DRILLING A SUBSTRATE**

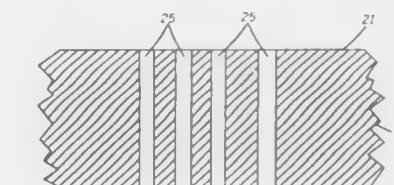
Leonard F. Altman, Coral Springs, and Thomas N. Johnson, Davie, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 27, 1989, Ser. No. 316,060

Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.71

5 Claims



1. A method for forming a hole or cavity in a substrate with a coherent energy beam, comprising the steps of:
- selecting a first member having a thickness less than the substrate and composed of the same material as the substrate;
  - placing the first member contiguous to the substrate; and
  - forming a hole or cavity in the substrate by penetrating said member and said substrate with the coherent energy beam.



4,948,942

**TUNGSTEN INERT GAS WELDING TORCH**

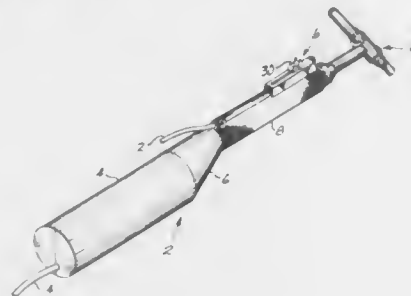
Paul J. Hübel, Auburn, Wash., assignor to C-K Systematics, Inc., Auburn, Wash.

Filed Jan. 29, 1990, Ser. No. 471,645

Int. Cl.<sup>5</sup> B23K 9/10

U.S. Cl. 219—132

4 Claims



1. A tungsten inert gas electric welding torch which comprises:

- an axially elongated body sized to be held in a users hand;
- a head portion attached to the body, the head portion containing a welding electrode and means to shield the electrode and a weld area with an inert gas;
- a linear potentiometer contained within the body, the potentiometer serving to control welding current;
- an on-off switch also contained within the body;
- an upstanding linearly moveable control arm operatively associated with the potentiometer and switch;
- a thumb button located adjacent the body and pivotally attached to the control arm, the thumb button serving to move the control arm so as to operate the switch and linear potentiometer and give a welder on-line control of welding current by linear movement of the thumb button, the switch being located so as to be actuated into the off position by the control arm at one travel extreme of the thumb button,
- an upstanding lug means associated with the torch body; and
- a latch means associated with the thumb button and positioned to engage the lug means at said one extreme position of thumb button travel so as to retain the button against accidental movement and maintain the switch in the off position until the button is rocked on its pivotal mounting to raise and disengage the latch means from the upstanding lug means and enable operation of the welding torch.

4,948,943

**FLAT CONSTRUCTION SELF-SUPPORTING FLOOR PLATE FOR HEATABLE RAISED FLOORS**

Günther Brückner, Abtswind, Fed. Rep. of Germany, assignor to MERO-Werke Dr. Ing. Max Mengeringhausen GmbH &amp; Co., Fed. Rep. of Germany

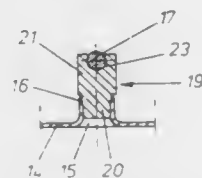
Filed Dec. 8, 1988, Ser. No. 281,227

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742559

Int. Cl.<sup>5</sup> H05B 3/36

U.S. Cl. 219—213

3 Claims



1. Flat construction self-supporting floor plate for heatable

raised floors, comprising a layer of a mineral, age-hardened material, for instance anhydrite, concrete or the like, with a metal wrapper, wherein an electric heating line is embedded in this layer of mineral material, which is connected with the wrapper, characterized in that the heating line (17) is fastened to holders (19) distributed over the bottom (14) of the shell making up a floor plate (10) with an outside wrapper comprised of a flat shell (11) which is open at the top which has a plurality of anchoring openings (15) distributed at least in the bottom (14) of the shell for the layer (12) of mineral material with neck-like inwardly turned edges (16), and the holders (19) comprise plug-like members (20) for fastening them in selected anchoring openings (15) in the floor (14) of the shell; each plug-like member (20) of the heating line-holder (19) having a head segment (21) with a contact edge (22), which rests on the inwardly turned edge (16) of the anchoring opening (15), the head segment (21) having a slot (23) at its top portion for the fitted reception of the electric heating line (17), each plug-like member (20) being configured to be slightly conical and to taper inwardly away from the head segment to engage the edge (16) of the adjacent anchoring opening (15) to retain the heating line-holder (19) therein.

4,948,944

**COMPACT HEATER ASSEMBLY FOR A HOT MELT APPLICATOR**

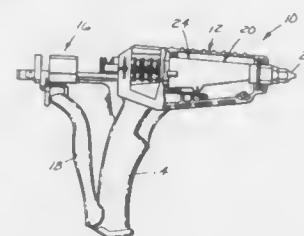
Craig D. Oster, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 19, 1988, Ser. No. 286,653

Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 219—227

8 Claims



1. A heater assembly for a hot melt adhesive applicator comprising:

- a heating block made of material having a relatively high thermal conductivity, said heating block having a melting chamber with an inlet and an outlet, said melting chamber having a generally truncated conical shape tapering toward said outlet along a central reference axis; and
  - a pair of elongated spaced apart, electric heating elements thermally coupled to said heating block and disposed along opposite sides of said melting chamber, said heating elements having respective longitudinal axes generally lying in a common plane that extends toward said outlet at an angle in the range of about 1 degree to about 16 degrees relative to said reference axis,
- wherein said heating elements each have a generally conical external configuration, wherein said heat block has a pair of spaced apart compartments for receiving said elements, each of said compartments having a generally conical shape complementary to said configuration of said heating elements, wherein said heating elements each have a rear end portion which extends along said plane, and wherein a reference line extending between said rear end portions and along said plane passes outside of said melting chamber.

4,948,945

**ELECTRIC IRONING DEVICE WITH POWER SUPPLY CONNECTOR ARRANGEMENT PERMITTING EITHER CORDED OR CORDLESS OPERATION**

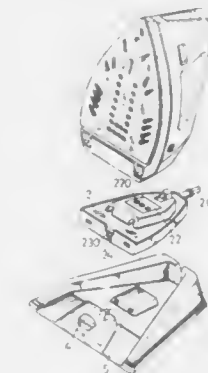
Tsann-Kuen Wu, No. 140-10, Che-Lu-Chien, Pan-An Tsun, Jen-Te Hsiang, Tainan Hsien, Taiwan

Filed Mar. 30, 1989, Ser. No. 331,260

Int. Cl.<sup>5</sup> D06F 79/02, 75/28; H05B 1/00

U.S. Cl. 219—247

5 Claims



1. An ironing device comprising:

- a power supply connector having a socket fixed therein and a power cord connected to said socket;
- an iron body having an electrical heating device mounted therein and prongs electrically connected with said heating device, said prongs being adapted to detachably plug into said socket of said connector for activating said heating device, said connector including first releasable latching means cooperating with said iron body and detachably interlocking said connector with said iron body;
- a seat adapted to be detachably interlocked with said connector, said connector including second releasable latching means adapted to cooperate with said seat for detachably interlocking said connector to said seat; whereby said ironing device can be used for ironing with said iron body only when said connector is interlocked with said seat, and ironing with said iron body and said connector when said iron body is interlocked with said connector by said first latching means; and
- a button device mounted to said seat and arranged to cooperate with said first and second latching means to selectively establish either the interlocked connection between said iron body and said connector or the interlocked connection between said seat and said connector.

4,948,946

**ELECTRIC SOLDERING IRON WITH DIRECTED AIR FLOW FOR FUME DISSIPATION**

Akio Fukunaga, 2055 Colby Ave., Los Angeles, Calif. 90025

Filed Sep. 22, 1987, Ser. No. 99,724

Int. Cl.<sup>5</sup> B23K 3/02; H05B 1/00

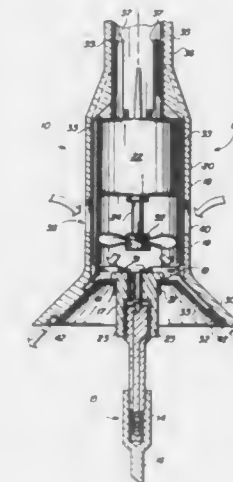
U.S. Cl. 219—230

15 Claims

1. An electrical soldering iron comprising:

- a handle having at least a portion which is hollow and an air inlet portion communicating with the hollow portion;
- a soldering portion extending longitudinally from the handle and having a soldering tip with a resistive heating element coupled thereto for heating the tip;
- air deflecting means extending from the handle and surrounding at least part of the soldering portion adjacent the handle, said deflecting means having an outlet for directing forced air in a thin air curtain surrounding and spaced from the tip to prevent fumes which may be formed in the vicinity of the tip from reaching the user of the iron, said

air deflecting means having an inlet communicating with the hollow portion of the handle; and means in said handle and cooperating with said handle air inlet to produce a pressurized flow of ambient air from said inlet portion through the hollow portion of the handle into said air deflecting means to exit along the air deflecting means and form the air curtain; wherein air deflecting means comprise a thin channel for directing said pressurized flow of ambient air to form said curtain; and



wherein said means in said handle comprise a motor and fan mounted within the hollow portion of the handle, the fan being positioned adjacent said inlet of the air deflecting means and mounted on a shaft of the motor to force air into the deflecting means, the handle including a housing defining the hollow portion of said handle and having at least one opening situated between the motor and the fan for admitting air to be driven by the fan.

4,948,947

**STEAM BOILER**

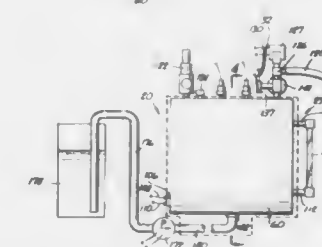
Shin-Duk Kang, Hacienda Heights, Calif., assignor to Pacific Steam Equipment, Inc., Los Angeles, Calif.

Filed Jul. 26, 1988, Ser. No. 224,169

Int. Cl.<sup>5</sup> H05B 3/02; F22B 1/28; B65D 6/02

U.S. Cl. 219—272

5 Claims



1. A metallic steam boiler for a steam boiler and steam iron

system electrically operatable from one 120 volt electric power receptacle wherein said portable steam boiler includes gauge outlets, water inlet, steam outlet and a water heater and there is a steam hose from said steam outlet to said steam iron and electrical control means are associated with said boiler and said steam iron to activate said boiler, pass water therinto, heat said water to steam and monitor steam pressure and the level of said water within said boiler, and to heat said steam iron through a thermostat, the improvement in said steam boiler including:

a first unitary generally U shaped member including a bridge portion forming a top of said boiler and a pair of spaced apart parallel leg members projecting therefrom having complementary parallel end edges and with said bridge forming a specific U shape, said leg members forming opposed end sections of said boiler and said bridge and leg members having a common width;

a second unitary generally U shaped member interfitted within said first generally U shaped member including an elongated bottom bridge portion and a pair of parallel spaced apart wall leg members forming the side walls of said boiler and projecting from said bottom bridge of a width complementary with the length of said elongated bridge portion of said first generally U shaped member and of a height generally corresponding to the length of said leg members of said first generally U shaped member and said bottom bridge and said wall leg members having cross sectional dimensions complementary with said specific shape of said first U shaped member to achieve said interfitting;

sealing means uniting said first and second U shaped members forming a water and steam tight chamber therein with communication between the atmosphere and said chamber through said outlets and said water inlet.

4,948,948

#### WATER HEATER WITH MULTIPLE HEATING ELEMENTS HAVING DIFFERENT POWER

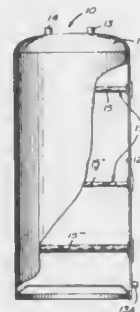
Claude Lesage, 215 Bord du Lac, Pointe-Claire, Quebec, Canada H9S 4K2

Filed May 23, 1989, Ser. No. 355,671

Int. Cl.<sup>5</sup> F24H 1/20; H05B 1/02

U.S. Cl. 219—329

6 Claims



1. A water heater comprising a tank having a water reservoir defined therein, connection means to feed water to said reservoir, a hot water outlet pipe connected to said reservoir, three electrical heating elements spaced apart in said reservoir, a first of said heating element being disposed in a top part of said reservoir to heat a first volume of water, a second heating element in a lower part of said reservoir for heating a larger volume of water, said second heating element having a power rating which is much smaller than said first heating element, a third heating element disposed in said reservoir intermediate said first and second heating elements for heating a third volume of water, said third heating element having a power rating intermediate the power rating of said first and second heating element, and the total power rating of said second and third

heating elements being less than the power rating of said first element, and automatic control timing circuit means controlling switching elements to supply electric power to said second and third heating elements during a predetermined time period outside peak demand load hours so that a reduced constant demand is achieved.

4,948,949

#### SWITCH MODULE ARRANGEMENT FOR USE WITH RESISTIVE-TYPE LOADS

Alfred Meisner, Nuremberg, and Walter Splitzl, Heroldsberg, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

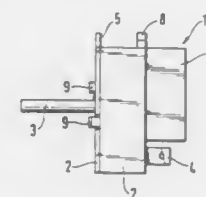
Continuation of Ser. No. 99,131, Jul. 21, 1987, abandoned. This application Apr. 27, 1989, Ser. No. 346,364

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1986, 3635324

Int. Cl.<sup>5</sup> H05B 1/02

U.S. Cl. 219—446

6 Claims



1. An arrangement for switching control modules which regulate the power output of resistive loads, such as cooking plates of electric ranges, said switch modules including actuating elements enclosed in a housing for activation and preselection of power stages for the resistive loads, with relays for supply of power and an electronic control circuit for regulating conductance of power to the resistive loads; comprising, in combination:

- a plurality of switch modules including actuating elements and relays, said switch modules having a box-like housing having a front and back face, said front face having at least one resilient tab, each said switch module including a printed circuit board with plug connectors for connection to a power supply and signal lines, such that said switch modules are connected through said plug connectors to the signal lines which connect to a remotely located microprocessor arranged in a range timer;
- a common electronic control circuit remote from said modules including said microprocessor for said plurality of switch modules; and
- a frame unit having spaced openings for fastening said plurality of said switch modules; wherein said at least one tab of each switch module connects by snap-action to said spaced openings of said frame unit to fasten said switch modules to said frame unit.

4,948,950

#### HEATING SYSTEM, CONTROL DEVICE THEREFOR AND METHODS OF MAKING THE SAME

Richard H. Rae, Richmond, Va., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 180,397, Apr. 12, 1988, Pat. No. 4,845,341. This application Apr. 25, 1989, Ser. No. 343,015

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

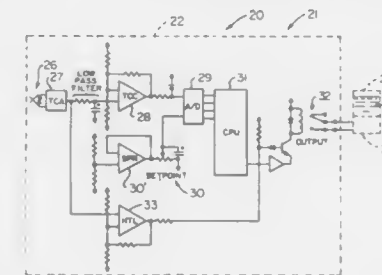
Int. Cl.<sup>5</sup> H05B 1/02

U.S. Cl. 219—497

8 Claims

1. In a method of operating a heating system comprising the steps of sensing with temperature sensing means the actual temperature of an output heating effect of a heat producing means, and selecting with setpoint means a final desired set-

point temperature that said heat producing means is to provide with said output heating effect thereof under the control of a control means that is operatively interconnected to all of the other said means and tends to cause said heat producing means to provide said desired setpoint temperature with said output heating effect thereof, the improvement comprising the step of turning off said heat producing means with said control means if the actual rate of change of the temperature of said output heating effect thereof is greater than a target rate of change thereof when said actual temperature of said output heating



effect at that time is below said desired setpoint temperature and to turn on said heat producing means if said actual rate of temperature change of said output heating effect thereof is less than said target rate of change when said actual temperature of said output heating effect thereof at that said time is below said desired setpoint temperature where said target rate of change is derived from the formula  $Stb = (Tsp - T) \cdot S$  where  $Stb$  is said target rate of change,  $Tsp$  is said desired setpoint temperature,  $T$  is said actual temperature of said output heating effect at that said time and  $S$  is a selected constant that comprises a sensitivity factor.

4,948,951

#### HEATER EMPLOYING FLEXIBLE CIRCUITRY

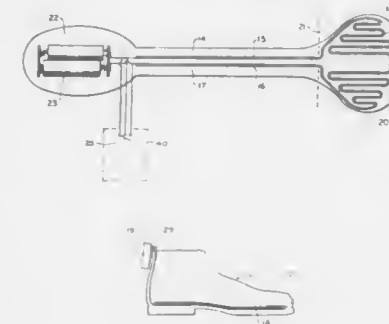
Alfiero Balzano, 11762 Western Ave., Unit O, Stanton, Calif. 90680

Filed Jan. 3, 1989, Ser. No. 292,833

Int. Cl.<sup>5</sup> H05B 3/34

U.S. Cl. 219—528

15 Claims



1. A flexible circuit heater adapted for use within an article of clothing or the like, comprising in combination:

- an elongated flat, flexible member of an electrically insulating material, and
- an electrically conductive strip having opposed ends and an interconnecting portion, said strip being wholly embedded within said electrically insulating material of said elongated member, said conductive strip traversing at least a major portion of the length of said elongated member with said ends being disposed side-by-side at one end region of said elongated member, the interconnecting portion of said conductive strip being

disposed in a continuously tortuous pattern of loops at the other end region of said elongated member, said other end region of said elongated member being foldable over the adjacent portion of said elongated member major length portion when in use as an article-inserted heater,

whereby when said elongated member is folded, the continuity of the electrical circuit extending between said one end region and said other end region is maintained during use.

4,948,952

#### ELECTRON TUBE FOR THE DETECTION, MEMORIZING AND SELECTION OF LIGHT IMAGES

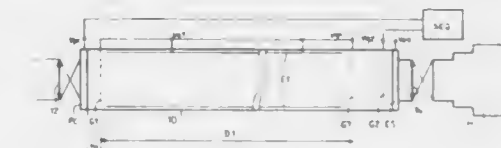
Lucien Guyot, Paris, France, assignor to Thomson-CSF, Puteaux, France

Filed Apr. 24, 1989, Ser. No. 342,281

Claims priority, application France, Apr. 27, 1988, 88 05591 Int. Cl.<sup>5</sup> H01J 40/00

U.S. Cl. 250—213 VT

11 Claims



1. A method to store a sequence of images arriving at a fast rate, to then select one of these images, with a view to analysis, and to eliminate the other images, said method comprising the steps of:

- focusing the light images at the input of an image converting electron tube;
- converting the light images into electronic images in the form of packets of electrons moving in the vacuum within the tube;
- giving these packets of electrons, by the application of a low-amplitude, accelerating electrical field, a known speed of motion which is very low as compared with the speed of light;
- making the packets of electrons undergo a to-and-fro trip in the tube;
- creating, in a section of the tube, by means of a selection electrode, an electrical field controlled by a selection logic signal, said field having either a first value for which the electrons are pushed back by the electrode towards the interior of the tube, or a second value for which the electrons can go through the electrode, the selection logic signal being produced in synchronism with the arrival of a packet of electrons to be selected in the vicinity of the selection electrode, the instant of arrival being related to the speed of motion of the packets of electrons, and the selection being made during the return trip of the selected packet;
- and finally, producing, at the output of the tube, an electronic image by means of packets of electrons selected by the logic signal, and eliminating the non-selected packets of electrons.

4,948,953

#### HOLDING PART FOR PTC COMPONENTS

Roland Starck, Bellheim, Fed. Rep. of Germany, assignor to Fritz Eichenauer GmbH & Co. KG, Kandel, Fed. Rep. of Germany

Filed Apr. 12, 1989, Ser. No. 337,083

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1989, 3902205

Int. Cl.<sup>5</sup> H01C 7/02

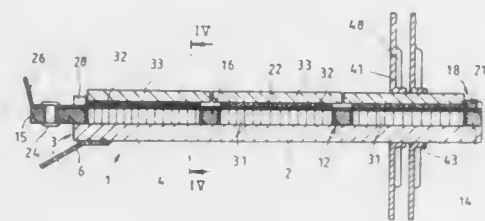
U.S. Cl. 219—504

9 Claims

1. Holding part for PTC components, the holding part comprising an insulating frame, at least one contact plate, means for firmly connecting the at least one contact plate to the insulat-



ing frame at a point of firm connection at one end of the insulating frame, and wherein an end of the insulating frame opposite the point of firm connection between the insulating frame



and the at least one contact plate includes clip means raised out of a plane of the at least contact plate for engaging the end of the insulating frame opposite the point of firm connection.

4,948,954

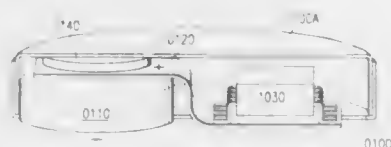
**INTERFACE FOR RECEIVING ELECTRONIC TOKENS**  
Donald R. Dias, Carrollton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed May 15, 1989, Ser. No. 352,596

Int. Cl.<sup>3</sup> G06K 7/06

U.S. Cl. 235-441

2 Claims



1. An interface for receiving two-terminal thin round electronic token data modules and establishing a data interface thereto, comprising:

- a physical positioning device, dimensioned to receive electronic tokens in an orientation which is well-defined but which does not conclusively determine which face of the token is facing in which of two directions;
- a grounded contact positioned to make contact to the edge of a token contacted by said physical positioning device;
- first and second data contacts, positioned in a slot to make contact to the opposite faces of a token contacted by said physical positioning device;
- first and second open-collector interface circuits, respectively connected to said first and second data contacts, said interface circuits each including a pull-up element;
- circuitry connected to detect when one of said data contacts is pulled to ground, and thereby to detect that a token has been contacted by said physical positioning device and that the other of said data contacts is in contact with the data line of the token.

4,948,955

**BARCODE LOCATION DETERMINATION**  
Shih-Jong J. Lee, Bellevue, and Robert C. Wang, Redmond, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 22, 1988, Ser. No. 289,662

Int. Cl.<sup>3</sup> G06K 7/10

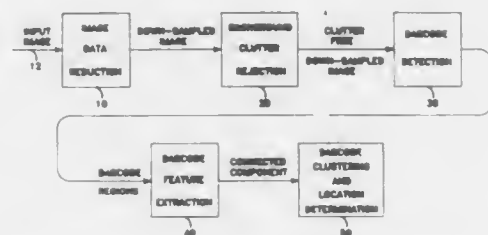
U.S. Cl. 235-462

27 Claims

1. A method of determining the location of a barcode block comprising the steps of:
  - reducing input image data into a down-sampled image;
  - removing background clutter from said down-sampled image thereby creating a clutter-free, down-sampled image;

detecting barcode regions from said clutter-free, down-sampled image;

extracting connected, collinear components, along with



their associated moment-based features, from said barcode regions; and  
grouping said connected, collinear components into barcode blocks.

4,948,956

**APPARATUS WITH AREA-MASKING FOR DETECTING DEFECTS ON BOTTLE SIDEWALLS**

Hiroyuki Fukuchi, Yokohama, Japan, assignor to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,288

Claims priority, application Japan, May 27, 1988, 63-128247

Int. Cl.<sup>3</sup> G01N 9/04; H04N 7/18

U.S. Cl. 250-223 B

28 Claims



1. An apparatus for detecting defects on bottle sidewalls comprising:
  - illumination means for illuminating the sidewall of a bottle;
  - photoelectrically converting means for photoelectrically converting an image of lights transmitted through the sidewall of the bottle illuminated by the illuminating means;
  - defect detecting means for inspecting the transmitted light image photoelectrically converted by the photoelectrically converting means for any defects to detect defects based on brightnesses of at least two points;
  - area-masking means for setting a masking area corresponding to a point to be noted in the transmitted light image, and outputting an area-masking signal indicating that the point to be noted is a defect point when the number of defect points in the masking area is more than a set value; and
  - judging means for judging the presence of a defect on the sidewall of the bottle, based on the area-masking signal from the area-masking means.

4,948,957

**METHOD FOR TRAINING INFRARED IMAGER USERS**  
Gerald A. Rusche, Fairfax City, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 31, 1989, Ser. No. 331,194

Int. Cl.<sup>3</sup> G01M 11/00; G03B 21/00; G09B 14/00

U.S. Cl. 250-330

4 Claims



1. A method for training a user of an infrared imager, including the steps of:
  - preparing an electronic representation of an infrared scene;
  - producing an infrared image from said representation;
  - projecting said infrared image onto a screen; and
  - converting, in said infrared imager, the infrared image on said screen into a visible image observable by said user.

4,948,958

**REMOTE SUBSURFACE WATER TEMPERATURE MEASURING APPARATUS WITH BRILLOUIN SCATTERING**

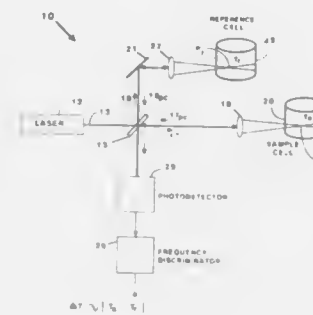
Harold E. Sweeney, Menlo Park, Calif., assignor to GTE Government Systems Corporation, Stamford, Conn.

Filed Aug. 1, 1989, Ser. No. 387,735

Int. Cl.<sup>3</sup> G01N 15/06; G01J 5/00; G01B 9/02

U.S. Cl. 250-574

9 Claims



1. Apparatus for remotely measuring the unknown temperature  $T_s$  of a sample of a transparent medium, comprising:
  - a transparent reference material having a known temperature  $T_r$ ;
  - a pulsed laser having an output beam, said output beam comprising a plurality of pulses each having an irradiance level such that:

$$\exp[GIL] \geq 10^{13}$$

where,

G is a gain parameter of said transparent medium;  
I is the intensity of said output beam pulse;  
L is the interaction length;

means for directing said output beam simultaneously into said medium and said material to produce stimulated Brillouin scattering (SBS) and to generate phase-conjugate beams emanating from said medium and said material, respectively;

a photodetector capable of optically heterodyning said phase-conjugate beams;  
means for simultaneously directing said phase-conjugate beams onto said photodetector and producing a difference frequency proportional to the difference in temperatures  $T_s$  and  $T_r$ ; and  
means for converting said difference frequency into a temperature value.

4,948,959

**OPTICAL COMPUTER INCLUDING PIPELINED CONVERSION OF NUMBERS TO RESIDUE REPRESENTATION**

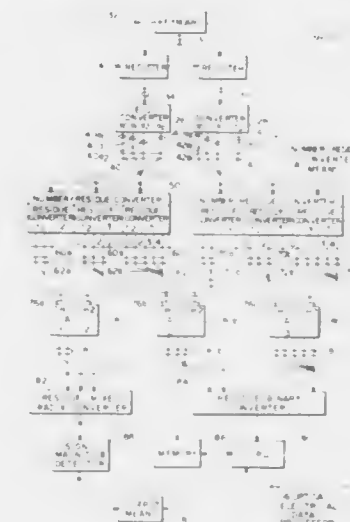
Theodore L. Houk, Seattle, and R. Aaron Falk, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jul. 15, 1988, Ser. No. 219,392

Int. Cl.<sup>3</sup> H01J 40/14

U.S. Cl. 250-578.1

51 Claims



1. An optical computing system comprising:
  - (a) input means for generating first light beams along selected ones of a first plurality of light transmitting paths, each of said first light beams representative of a digit of a number;
  - (b) converter means for converting said first light beams into second light beams selected among a second plurality of light transmitting paths, each of said second light beams representative of the residue of said number modulo a given modulus among a plurality of mutually prime moduli, said converter means generating, for each number, an ordered group of second light beams corresponding to an ordered group of residues modulo each of said mutually prime moduli, said converting being performed in a pipelined manner without storing said first light beams; and
  - (c) optical computing means coupled to receive said ordered group of second light beams from said converter means for performing residue arithmetic operations.

4,948,960

**DUAL MODE LIGHT EMITTING DIODE/DETECTOR DIODE FOR OPTICAL FIBER TRANSMISSION LINES**  
Garfield Simms, Dover, and Robert G. Hunsperger, Newark, both of Del., assignors to The University of Delaware, Newark, Del.

Filed Sep. 20, 1988, Ser. No. 247,042

Int. Cl.<sup>3</sup> G02B 27/42; G01C 3/12

U.S. Cl. 250-227.11

8 Claims

1. A unitary emitter-detector semiconductor diode device with the capability of direct optical coupling to optical trans-

- providing a plurality of optical fibers, each of said optical fibers having a first end and a second end;
- arranging said optical fibers so that the first ends thereof are in the form of a linear or two-dimensional array;
- providing a plurality of light beam splitters, each having an input port and a plurality of light beam splitters, each having an input port and a plurality of output ports and an optical fiber extending from each said output port, said optical fibers extending from said output ports being bundled into a plurality of groups;



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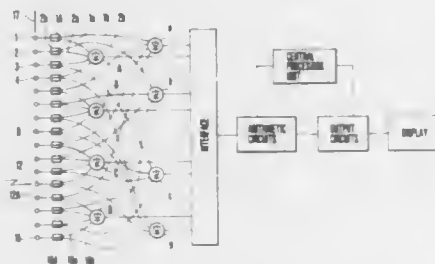
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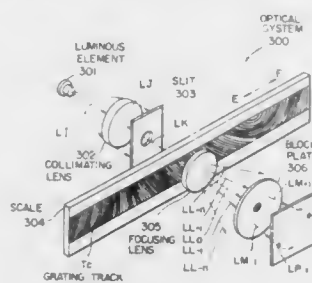
UMI

connecting each of said groups to a photosensor; connecting each said second end of said optical fibers to an input port of a respective light beam splitter,



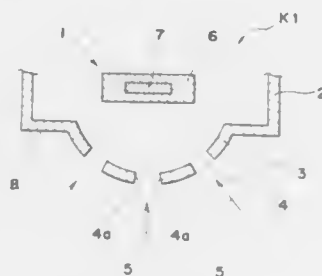
whereby, a light beam impinging upon said linear or two-dimensional array of first ends of said optical fibers is received by at least one of said first ends and detected by a said photosensor, so that a position of the light beam on said linear or two-dimensional array can be determined.

**4,948,968**  
**HIGH RESOLUTION OPTICAL ENCODER HAVING A LONG DETECTION STROKE**  
Kelji Matsui, Aichi, Japan, assignor to Spectra, Inc., Hanover, N.H.  
Division of Ser. No. 251,089, Sep. 29, 1988. This application Jul. 3, 1989, Ser. No. 374,918  
Claims priority, application Japan, Sep. 30, 1987, 62-246726; Sep. 30, 1987, 62-246727; Oct. 27, 1987, 62-271530  
Int. Cl.<sup>5</sup> H01T 3/14; G01D 5/34; G01B 11/14  
U.S. Cl. 250—237 G 15 Claims



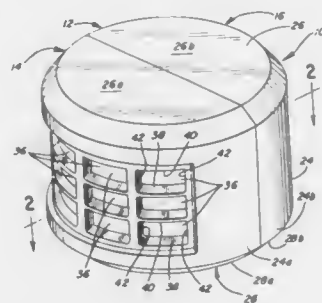
1. An optical encoder comprising: a light source unit which emits coherent parallel light, a scale which is provided with a grating track of uniform ratio and pitch but of different grating line directions of non-transmission sections against transmission sections and which diffracts said coherent parallel light emitted from said light source unit, and a light spot position detecting unit which receives positive and negative diffracted light beams of the same order out of light beams diffracted by said scale, and which detects light spot positions of said respective positive and negative diffracted light beams of the same order and converts said detected light spot positions into electrical signals corresponding thereto.

**4,948,969**  
**PHOTODETECTOR HAVING CONVEX WINDOW FOR SHIELDING ELECTROMAGNETIC WAVE AND ELECTROSTATIC INDUCTION NOISES**  
Shouji Yokota, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Feb. 3, 1989, Ser. No. 305,756  
Claims priority, application Japan, Mar. 29, 1988, 63-2256[U]  
Int. Cl.<sup>5</sup> H01J 5/02  
U.S. Cl. 250—239 11 Claims



1. A photodetector comprising:  
a reception portion and a shield casing for preventing electromagnetic wave and electrostatic induction noises from outside of the photodetector from entering said reception portion to thereby electromagnetically shield said reception portion;  
a light receiving window which is formed on said shield casing convexly in a direction away from said reception portion so as to confront said reception portion; and  
a plurality of holes which are so formed on a peripheral surface of said light receiving window as to direct light signals towards said reception portion.

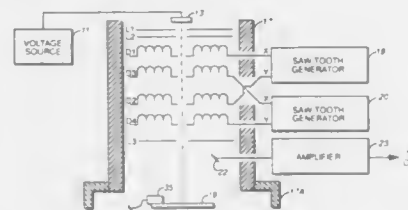
**4,948,970**  
**RADON MEASURING DEVICE**  
Eli A. Port, Evanston; John M. Bltner, Naperville; Irwin P. Lazarus, Skokie; Terry W. Liaboe, Highland Park, and Richard E. Toohey, Downers Grove, all of Ill., assignors to Radiation Safety Services, Inc., Morton Grove, Ill.  
Filed Jan. 23, 1989, Ser. No. 299,036  
Int. Cl.<sup>5</sup> G01T 1/169, 5/00  
U.S. Cl. 250—253 24 Claims



1. A radon measuring device comprising:  
a housing formed of at least two mating portions held together by fastening means, said housing including at least one vertically oriented wall and at least one aperture passing through said one wall to permit ambient atmosphere to enter said housing;  
filter means positioned in the interior of said housing and covering said aperture for filtering radon progeny and other particles from said ambient atmosphere as it enters said housing;

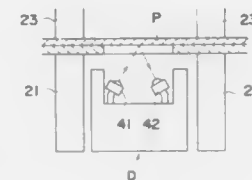
radon detector means within said housing for measuring the concentration of radon in the ambient atmosphere, said detector means being positioned in a plane substantially normal to the surface of said one wall; and  
mounting means within the interior of said housing for simultaneously positioning both said filter means and said radon detector means.

**4,948,971**  
**VIBRATION CANCELLATION SYSTEM FOR SCANNING ELECTRON MICROSCOPES**  
Wayne V. Vogen, Oakland, and Martin D. Mannion, Santa Cruz, both of Calif., assignors to Amray Inc.  
Filed Nov. 14, 1988, Ser. No. 270,369  
Int. Cl.<sup>5</sup> H01J 37/28  
U.S. Cl. 250—310 17 Claims



1. A system for adjusting the scanning pattern of an electron beam in a scanning electron microscope to decrease image sensitivity to vibrations, comprising:  
at least one velocity sensor means comprising a seismometer means having a resonant frequency less than about thirty hertz connected to the scanning electron microscope to sense vibrations in at least one direction;  
integrator means for integrating output signals from the velocity sensor means;  
beam steering means connected to receive the integrated signals from the velocity sensor means and operative, in response to the received signals, to adjust the normal scanning pattern of the electron beam of the microscope in a way that reduces the effects of the sensed vibrations on images provided by the scanning electron microscope.

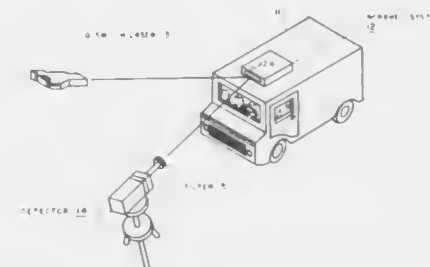
**4,948,972**  
**READ-OUT DEVICE FOR RADIATION IMAGE STORAGE PANEL**  
Hitoshi Shimizu, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Oct. 14, 1987, Ser. No. 108,003  
Claims priority, application Japan, Oct. 14, 1986, 61-243560  
Int. Cl.<sup>5</sup> G01N 23/04, 21/89  
U.S. Cl. 250—327.2 5 Claims



1. A read-out device for a radiation image storage panel containing a stimutable phosphor, wherein said device includes a housing containing a read-out means for photoelectrically reading out radiation image information recorded and stored in said stimutable phosphor-containing panel, a panel receiving means for receiving the panel and directing said panel into the housing to panel conveying means for conveying the panel to the read-out means within said housing, wherein said device

further includes a plurality of extraneous material detecting means located exteriorly of said housing for detecting the existence of undesirable extraneous material on said panel surface, each of said extraneous material detecting means comprising a light-emitting portion which irradiates said panel surface with infrared rays having a wavelength that will not adversely effect the radiation image on said stimutable phosphor and a light-receiving portion, which detects light reflectance from the surface of said panel, and wherein said read-out device further includes a panel-feeding means and said detecting means produces a signal for stopping the panel-feeding means from feeding said panel to said panel receiving means in the event comparison of the irradiating and reflected light detects the presence of extraneous material.

**4,948,973**  
**NONLINEAR OPTICAL INTERROGATION SYSTEM**  
Robert G. Comeyne, Stafford, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Oct. 2, 1985, Ser. No. 797,284  
Int. Cl.<sup>5</sup> G01J 1/00, 3/30  
U.S. Cl. 250—341 4 Claims



1. In a system for detecting the presence of polycrystalline nonlinear optical materials typically used as optical transmission elements in an infrared detection system in a military environment, the system for detecting comprising:  
means for irradiating said infrared detection system with a Q-switched laser beam in which said laser beam wavelengths are longer than visible spectrum wavelengths and in which nonlinear action of said optical transmission elements when irradiated with said Q-switched laser beam generates characteristic harmonic radiation in the visible spectrum; means for detecting said characteristic harmonic radiation reradiated from said infrared detection system; and  
means for identifying said polycrystalline nonlinear optical materials by including a bandpass filter means on the detecting means to pass only photons in a narrow band of visible wavelengths which identify the generated characteristic harmonic radiation of said optical materials normally used in said infrared detection systems and of the infrared radiation source of said detection systems.

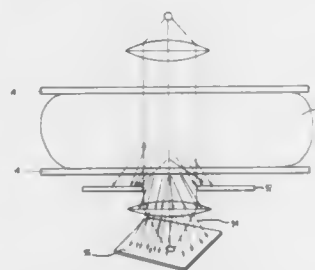
# 4,948,974

## HIGH RESOLUTION IMAGING APPARATUS AND METHOD FOR APPROXIMATING SCATTERING EFFECTS

Robert S. Nelson, 2922 Upshur St., San Diego, Calif. 92106, and D. Zach Reuven, 27572 Santa Charita, Saugus, Calif. 91350  
Continuation-in-part of Ser. No. 22,283, Mar. 5, 1987, Pat. No. 4,829,184, which is a continuation-in-part of Ser. No. 624,467, Jun. 25, 1984, Pat. No. 4,649,275. This application Jul. 20, 1988, Ser. No. 221,648

Int. Cl.<sup>5</sup> G01N 21/00  
U.S. Cl. 250—358.1

10 Claims

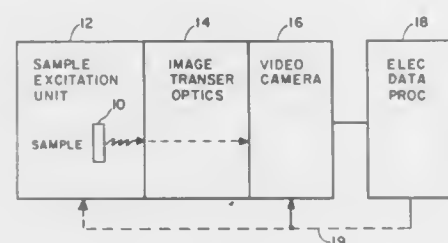


1. An apparatus for obtaining improved tissue images using non-ionizing radiation of narrow bandwidth comprising:  
a collimated source of non-ionizing radiation of relatively narrow bandwidth disposed such that radiation is incident on a sample of the tissue to be scanned,  
an optical detector disposed so as to detect radiation after transmission or reflection out of said tissue,  
a collimation device disposed between said tissue sample and said detector,  
and means for spatially separating a collimated component of said radiation from a scattered component of said radiation, said means being disposed between said collimation device and said detector.

**4,948,975**  
**QUANTITATIVE LUMINESCENCE IMAGING SYSTEM**  
David N. Erwin; Johnathan L. Kiel, both of San Antonio, Tex.; Charles R. Batishko, West Richland, and Kurt A. Stahl, Richland, both of Wash., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 8, 1988, Ser. No. 241,992  
Int. Cl.<sup>5</sup> G01N 21/76  
U.S. Cl. 250—361 C

5 Claims



1. A quantitative luminescence imaging system (QLIS) comprising a sample excitation unit which includes excitation means for exciting a sample by irradiation in an RF field to produce a luminescent reaction, video camera means, image transfer optic means arranged for coupling light from said sample to an input of the video camera means, the light being converted in the video camera means to electronic signals at an output thereof, and an electronic data processing system coupled to the output of the video camera means for processing the signals, the image transfer optic means being arranged so

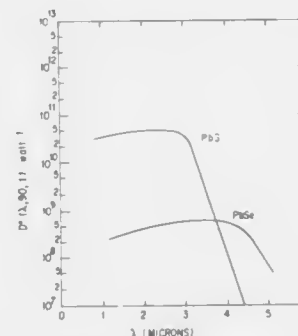
that the input of the video camera means is outside of the environment of said excitation means.

5. A quantitative luminescence imaging system (QLIS) comprising a sample excitation unit which includes excitation means for exciting a sample by microwave radiation as an activator to produce a luminescent reaction, video camera means, image transfer optic means arranged for coupling light from said sample to an input of the video camera means, the light being converted in the video camera means to electronic signals at an output thereof, and an electronic data processing system coupled to the output of the video camera means for processing the signals, the image transfer optic means being arranged so that the input of the video camera means is outside of the environment of said excitation means.

**4,948,976**  
**MULTI-WAVELENGTH BAND INFRARED DETECTOR**  
Shankar B. Baliga, Hauppauge; Adishwar L. Jain, Hicksville; John A. Little, Northport, and Martin R. Rost, Islip Terrace, all of N.Y., assignors to Servo Corporation of America, Hicksville, N.Y.

Filed Feb. 9, 1989, Ser. No. 308,409  
Int. Cl.<sup>5</sup> H01L 49/02; G01J 5/20  
U.S. Cl. 250—370.06

7 Claims



1. An infrared detector comprising a first thin film detector layer of PbSe responsive to infrared radiation in a first wavelength band, a second thin film detector layer of PbS overlying said first detector layer and responsive to infrared radiation in a second wavelength band and transparent to infrared radiation in said first wavelength band and contacts connected to each of said detector layers.

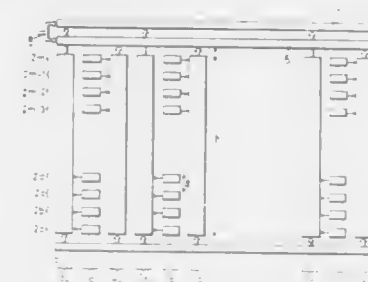
**4,948,977**  
**IMAGE PICKUP DEVICE**  
Hendrik Mulder, Delft, Netherlands, assignor to B.V. Optische Industrie "De Oude Delft", Delft, Netherlands  
Filed Oct. 13, 1987, Ser. No. 108,084  
Claims priority, application Netherlands, Oct. 17, 1986, 8602616

Int. Cl.<sup>5</sup> H01L 27/148, 31/115  
U.S. Cl. 250—370.09

8 Claims

1. Image pickup device comprising a matrix having horizontal rows and vertical columns of image pickup elements, at least two vertical shift registers associated with each column of image pickup elements, means for supplying clock signals to said matrix of image pickup elements and to shift registers for transferring image information in column direction in time-delay-and-integration mode, and at least one horizontal shift register near an end of said vertical shift registers for reading out and transferring image information, characterized by two vertical shift registers being associated with each column of image pickup elements and means for transferring the informa-

tion from said image pickup elements to a first vertical shift register associated with each column during a first period and

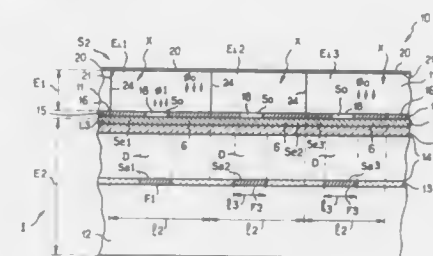


to a second vertical register associated with each column during a second period.

**4,948,978**  
**IMAGING DEVICE WITH MATRIX STRUCTURE**  
Lucien Guyot, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 2, 1989, Ser. No. 318,165  
Claims priority, application France, Mar. 11, 1988, 88 03227  
Int. Cl.<sup>5</sup> G01N 23/02; G01T 1/20  
U.S. Cl. 250—370.11

14 Claims



1. An image detector comprising a scintillator exposed to an incident radiation, a matrix of photosensitive dots, the matrix comprising orthogonal row conductors and column conductors, the matrix being divided into elementary surfaces, each having a photosensitive dot, the scintillator emitting a light radiation in response to the incident radiation, wherein an output screen is interposed between the scintillator and the elementary surfaces, the output screen being opaque and absorbing little of the light emitted by the scintillator, the output screen being perforated so that it comprises, facing each photosensitive dot, at least one aperture that lets through the light from the scintillator, and wherein the aperture has a far smaller area than that of an elementary surface, and wherein a second non-perforated screen is placed on an input face of the scintillator opposite to the elementary surfaces, the second screen being opaque and absorbing little of the light emitted by the scintillator.

**4,948,979**  
**VACUUM DEVICE FOR HANDLING WORKPIECES**  
Yasuo Munakata, and Mineo Gotou, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 21, 1988, Ser. No. 287,166  
Claims priority, application Japan, Dec. 21, 1987, 62-323334  
Int. Cl.<sup>5</sup> H01V 37/18

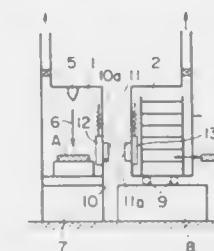
U.S. Cl. 250—492.2

10 Claims

1. A vacuum device for handling workpieces comprising: vacuum working chamber means for performing a predetermined process on a workpiece disposed in said working chamber means;  
vacuum prechamber means disposed adjacent to said work-

ing chamber means for relative movement to and away from the working chamber means for changing the workpiece in said working chamber means under vacuum condition;

a pair of coupling means provided respectively on side walls of said working chamber means and said prechamber means for opposing sealing connection to couple said



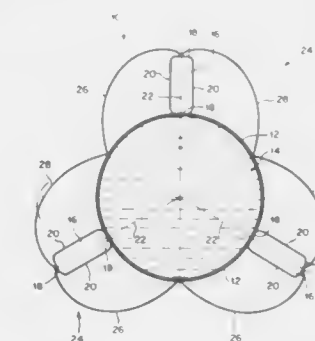
working chamber means and said prechamber means for their mutual communication in the state where said prechamber means is moved to said working chamber means; a first valve means positioned inside the coupling means of the working chamber means to open and close the same; and  
a second valve means positioned inside the coupling means of the prechamber means to open and close the same.

**4,948,980**  
**APPARATUS FOR IRRADIATING MEDIA WITH UV-LIGHT**

Horst Wedekamp, Herford, Fed. Rep. of Germany, assignor to Wedeco Gesellschaft für Entkeimungsanlagen m.b.H., Herford, Fed. Rep. of Germany  
Filed Jul. 20, 1989, Ser. No. 383,322  
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824647

Int. Cl.<sup>5</sup> A61L 2/00  
U.S. Cl. 250—504 R

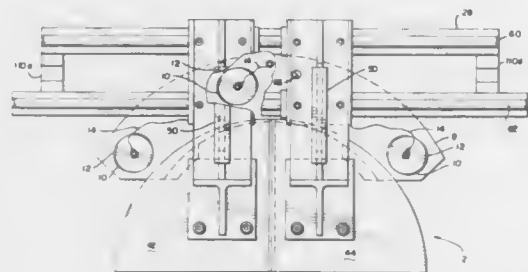
9 Claims



1. Apparatus for irradiating media with UV-light, comprising a tubular body formed of UV-permeable material, the medium to be irradiated passing through said tubular body, and at least two flat UV-radiators with reflectors arranged externally to said tubular body and having parallel axes, said UV-radiators having oblong, flat oval cross-sections with wide and narrow sides.

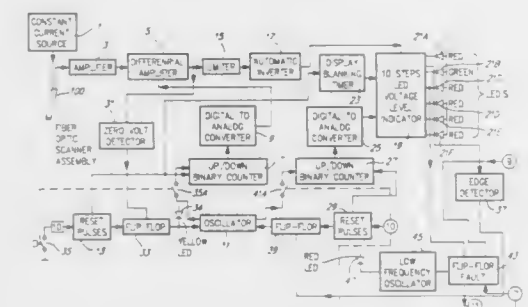


**4,948,981**  
**PRIMARY MANWAY SHIELDING AND EXHAUST COVERS FOR A STEAM GENERATOR**  
Wayne R. Wallace, N. Huntingdon; Allan K. Immel, Irwin Boro, Westmoreland County, and Warren E. Lester, II, Mt. Lebanon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Mar. 20, 1989, Ser. No. 325,747  
Int. Cl.<sup>5</sup> G21C 11/02  
U.S. Cl. 250-517.1 **37 Claims**



1. A radiation emission shielding cover in combination with a steam generator of a nuclear reactor for covering at least a portion of a manway of the steam generator for protecting an operator from radiation emission, said cover comprising:  
a plate;  
a mounting assembly including a mounting flange for securing said mounting assembly adjacent said manway of the steam generator and a mounting bracket;  
a slide means mounted on said mounting bracket adjacent said manway; and  
guide means mounted on said plate for receiving said slide means such that said plate can be moved from an open position adjacent said manway to a closed position over at least a portion of said manway.

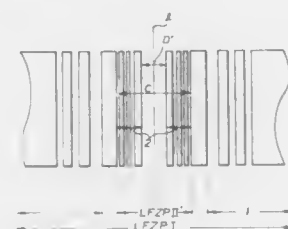
**4,948,982**  
**DEVICE FOR DETECTING A MISSING COPY BY DETECTING THE PRESENCE OR ABSENCE OF A COLOURED AREA ON A SURFACE**  
Daniel Roulin, St. Luc, Canada, assignor to Somerville Packaging, Montreal, Canada  
Filed Jul. 3, 1989, Ser. No. 375,349  
Int. Cl.<sup>5</sup> G01N 21/86  
U.S. Cl. 250-548 **17 Claims**



1. Apparatus for detecting the presence or absence of a coloured area at a predetermined position on a surface having a background of a colour different from said coloured area, or of a different shade of the same colour as the coloured area; said apparatus comprising:  
an optical scanner means, having an output means, for scanning said surface and providing an output signal level, at said output means of said scanner means, representative of the colours being scanned;

comparator means having a first input means, a second input means and an output means;  
said output means of said optical scanner means being connected to said first input means of said comparator means;  
background signal level generator means for generating a signal level representative of said background colour, said background signal level generator means having an output means;  
said output means of said background signal level generator means being connected to said second input means of said comparator means;  
whereby, to provide at the output means of said comparator means a differential signal level representative of the difference in levels between said output signal level and said background signal level;  
differential signal level generator means for generating a signal level corresponding to a preset differential level representative of the desired difference in levels between said output signal level and said background signal level, said preset signal level generator means having an input means and an output means;  
indicator means having a first input means and a second input means and output means;  
the output means of said comparator means being connected to said first input means of said indicator means, and the output means of said differential signal level generator means being connected to said second input means of said indicator means;  
whereby, when said differential signal level is substantially equal to said preset differential level, said indicator means will indicate the presence of said coloured area at said predetermined position; and  
when said differential signal level is different than said preset differential level, said indicator means will indicate the absence of said coloured area at said predetermined position.

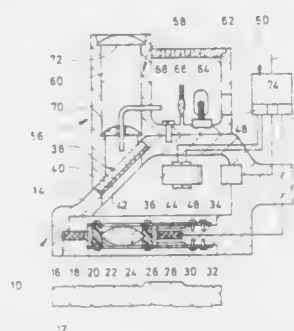
**4,948,983**  
**ALIGNMENT OF MASK AND SEMICONDUCTOR WAFER USING LINEAR FRESNEL ZONE PLATE**  
Shigeru Maruyama, Kawasaki; Shunsuke Fueki, Yokohama; Horonobu Kitajima, Yokohama, and Takashi Kiuchi, Tsukuba, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 349,177, May 9, 1989, abandoned. This application Jan. 25, 1990, Ser. No. 471,008  
Claims priority, application Japan, May 13, 1987, 63-114767  
Int. Cl.<sup>5</sup> G01N 21/86  
U.S. Cl. 250-548 **11 Claims**



1. A system for aligning a mask carrying a pattern to be transferred to a semiconductor wafer to be patterned, said mask being positioned above the semiconductor wafer, comprising:  
radiation source means for producing a radiation beam and for guiding the radiation beam thus produced so that the radiation beam irradiates the wafer through the mask located thereabove;  
focusing means provided on the mask for focusing the radiation beam incident thereto on a surface of the semiconductor wafer, said focusing means comprising first linear Fresnel zone part having a first focal length which in turn

comprises a central zone and a plurality of parallel and alternating opaque and transparent bands disposed symmetrically about a central axis passing through the central zone and a second linear Fresnel zone part having a second focal length substantially smaller than the first focal length, said second linear Fresnel zone part being provided in said first linear Fresnel zone part and comprising a plurality of parallel and alternating opaque and transparent bands disposed symmetrically with respect to a symmetrical axis;  
diffraction means provided on the surface of the semiconductor wafer in correspondence to the focusing means for diffracting the radiation beam focused thereon in a form of a diffracted beam traveling in a predetermined direction relative to the wafer;  
detection means held with a predetermined relationship with respect to the radiation source means and the mask for detecting the diffracted beam, said detection means further producing an output signal having a level proportional to the intensity of the diffracted beam;  
stage means for supporting the semiconductor wafer movably in a plane parallel to the surface of the wafer; and  
a controller for moving the stage means responsive to the output signal of the detection means.

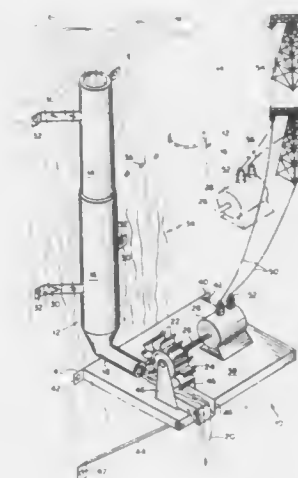
**4,948,984**  
**OPTICAL SCANNING HEAD WITH OBJECTIVE POSITION MEASURING AND MIRRORS**  
Ulrich O. Breitmeyer, Stuttgart, Fed. Rep. of Germany, assignor to Focus MeBtechnik GmbH & Co KG, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/EP88/00527, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO88/10405, PCT Pub. Date Dec. 29, 1988  
PCT Filed Jul. 14, 1988, Ser. No. 328,587  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, 3720079  
Int. Cl.<sup>5</sup> G01N 21/86; G01J 1/20; H01J 3/14  
U.S. Cl. 250-560 **9 Claims**



1. An optical surface scanning head which includes a measuring light source defining a light source axis, preferably a solid state laser, with an objective for focusing the measuring light source on a work-piece surface and having an objective axis which is inclined with respect to said light source axis and preferably intersects the latter at right angles, a deflecting mirror which is impermeable for the measuring light which is located at the intersection point of the objective axis and light source axis and has a light receiving front side and an opposing rear side, a measuring mirror which is semi-permeable for the measuring light and which is located between the measuring light source and the objective, preferably between the measuring light source and the deflecting mirror, a photoelectric transducer arrangement which is acted upon by the measuring light deflected by the measuring mirror returning from the work-piece surface and produces an output signal dependent on the incidence point of this measuring light, an adjusting device for axially moving the objective, a control circuit by

which the adjusting device is actuated depending on the output signal of the transducer arrangement so that the output signal of the transducer arrangement assumes a given value, and means for producing a measuring signal corresponding to the objective position characterized in that the deflecting mirror (38) is permeable for at least one light wave length not contained in the measuring light spectrum and also has optical quality on its rear side, and in that an observation optical system (70, 72) is located behind the deflecting mirror (38).

**4,948,985**  
**EXTERNAL PENSTOCK**  
Nelson P. Adams, 1 Center St., Municipal Bldg., Rm. 800, New York, N.Y. 10007  
Filed Dec. 2, 1988, Ser. No. 278,769  
Int. Cl.<sup>5</sup> F03B 13/08  
U.S. Cl. 290-54 **3 Claims**



1. An external penstock for providing electrical power from energy of a waterfall, comprising, a sleeve assembly mountable to a cliff face behind said waterfall, for collecting and directing a column of water descending said waterfall to blades of a water wheel mounted to platform securable to said cliff face behind said waterfall, and a generator secured to said platform, for converting rotary motion of said water wheel to said electrical power, wherein said sleeve assembly includes a first sleeve telescopically received in a second sleeve for adjusting height and said sleeve and said second sleeve are fixedly secured to a pair of sleeve assembly mounting brackets that are securable to said cliff face behind said waterfall by fasteners, and a nozzle is integrally attached to a bottom end of said second sleeve at right angles and said nozzle directs water flow from within, against said blades of said water wheel above said platform, and said platform is securable to said cliff face behind said waterfall by fasteners received in platform brackets and said cliff face.

4,948,986

# **ELECTRICAL FEEDING DEVICE OF A CENTRAL UNIT BY AT LEAST ONE CONTROL SIGNAL, THE SAID UNIT BEING CONNECTED WITH A RECEIVING LOCAL STATION**

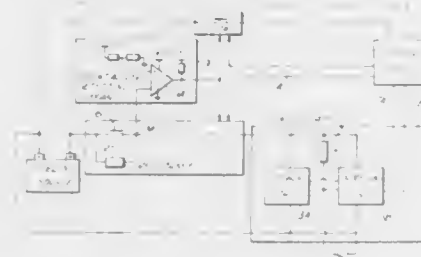
Jean-Michel Clique, La Celle Saint Cloud, France, assignor to Automobiles Peugeot and Automobiles Citroen, both of, France

Continuation of Ser. No. 27,162, Mar. 17, 1987, abandoned. This application Jan. 12, 1989, Ser. No. 296,812

Claims priority, application France, Mar. 24, 1986, 86 04192 Int. Cl.<sup>3</sup> G06F 15/50; H02J 1/00

U.S. Cl. 307—10.1

16 Claims



1. Electrical energy feeding device for feeding electrical energy to a system mounted on board a vehicle and comprising a central control unit and a plurality of local stations each connected to said central unit and controlled thereby and to each station being associated means for controlling a working device such as an accessory device of the vehicle such as a car glass riser, each local station being connected to said central unit by a data bus and being provided with an address to allow said central unit to communicate with said local station for putting the latter into condition to control the working device which is associated to said local station to accomplish a function, said central unit and each said local station being coupled to an electrical energy feeding source such as a battery of the vehicle, by a respective power bus, first switching means being mounted in each said power bus connecting a local station to said electric energy feeding source for closing and opening said power bus, and second switching means being mounted in said power bus interconnecting said central unit and said central unit and said electric energy feeding source for closing and opening this latter power bus, a voltage divider circuit being associated with each local station and mounted between positive and negative terminals of said feeding source, in series relationship with a switching element to be actioned for switching on said local station, each said divider circuit having a dividing terminal coupled to an electrical potential detecting device coupled to all local stations, the electrical potential of said dividing terminal being changeable between a first value when said corresponding switching element is not actioned and a second value when said corresponding switching element has been actioned to demand accomplishing of a function by said respective local station; said second value being detectable by said detecting device and causing said detecting device to produce a control signal for closing at least said first switching means mounted in the power bus interconnecting said power source to said respective local station, the switching element of which had been actioned for ensuring power feeding thereto, and said second switching means provided in the power bus interconnecting said power source to said central unit for ensuring power feeding thereto and for enabling it to communicate with said respective local station in order to put it in condition to accomplish its function by controlling its working device.

4,948,987

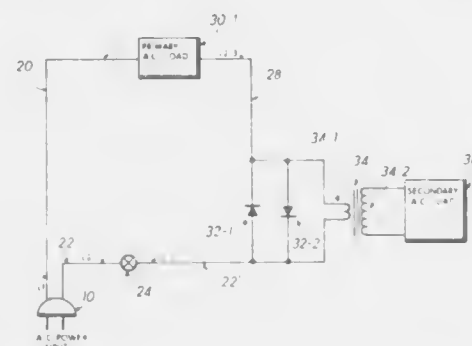
# **SECONDARY ELECTRIC POWER SOURCE PRODUCED BY CURRENT FLOW THROUGH A PRIMARY A.C. POWER CIRCUIT**

Harold J. Weber, 313 Washington St., Holliston, Mass. 01746 Filed Feb. 21, 1989, Ser. No. 312,820

Int. Cl.<sup>3</sup> H02J 3/00

U.S. Cl. 307—36

20 Claims



1. Power supply method for obtaining a secondary source of electrical power from current flowing through an alternating current primary power circuit, comprising the steps of: providing a primary power circuit including a source of a.c. power and a load; coupling a primary winding means of a transformer effectively in series with primary power circuit; exciting the primary winding means by current flow through the primary power circuit; developing a voltage drop across the primary winding means by said current flow therethrough; coupling bilateral semiconductor device means effectively in parallel with the primary winding means; predetermining a bilateral level of forward voltage drop permitted across said semiconductor device means; limiting the voltage drop developed across the primary winding means to that of the bilateral level of semiconductor device forward voltage drop; providing the transformer with a main secondary winding means which may serve to excite a secondary load means.

4,948,988

# **POWER SUPPLY CONTROL FOR LOW VOLTAGE I<sup>2</sup>L CIRCUITS**

Bernardus W. H. Kleiss, Arnhem; Arend J. E. Bretveld, and Franciscus J. M. Thus, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 12, 1988, Ser. No. 218,012

Claims priority, application United Kingdom, Jul. 29, 1987, 8717983

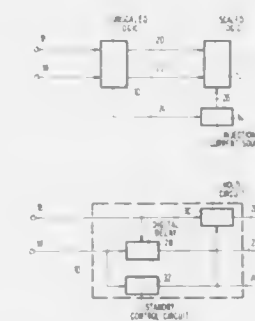
Int. Cl.<sup>3</sup> H03K 3/01, 19/091

U.S. Cl. 307—296.3

19 Claims

1. An integrated circuit comprising, in combination, a semiconductor logic circuit having an input terminal for receipt of data to be processed by the logic circuit, and a power supply circuit coupled to said semiconductor logic circuit to supply operating current thereto, said power supply circuit having means responsive to data present on the input terminal for

increasing the current supply to the logic circuit in a plurality of current increments and responsive to a termination of data



on the input terminal for reducing said current supply to the logic circuit in a plurality of current decrements.

4,948,989

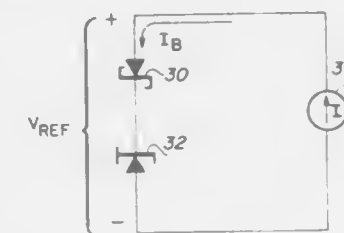
# **RADIATION-HARDENED TEMPERATURE-COMPENSATED VOLTAGE REFERENCE**

James P. Spratt, Rancho La Costa, Calif., assignor to Science Applications International Corporation, San Diego, Calif. Filed Jan. 31, 1989, Ser. No. 304,502

Int. Cl.<sup>3</sup> G05F 3/18

U.S. Cl. 307—296.6

26 Claims



1. A temperature compensated voltage reference device comprising: a series circuit comprising an avalanche diode connected in series with a Schottky diode; and means for passing an electrical current of a prescribed magnitude through said series circuit for operation of said avalanche diode in a reverse biased mode and operation of said Schottky diode in a forward biased mode, said diodes when so biased having opposite temperature coefficients of voltage.

4,948,990

# **BICMOS INVERTER CIRCUIT**

Yun-Seung Shin, Seoul, and Sung-Ki Min, Incheon, both of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Jan. 3, 1989, Ser. No. 292,883

Claims priority, application Rep. of Korea, Apr. 21, 1988, 88-4540

Int. Cl.<sup>3</sup> H03K 19/02, 19/017, 19/094

U.S. Cl. 307—446

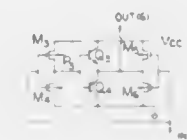
1 Claim

1. A BICMOS inverter circuit comprising: an input for receiving a high or low signal; a first P type MOS transistor having a gate connected to said input, a source adapted to be connected to the positive terminal of a voltage source, and a drain connected to a signal output node; a first N type MOS transistor having a gate connected to said

input, a source adapted to be connected to the negative terminal of said voltage source, and a drain connected to said signal output node;

a first bipolar transistor having an emitter, a base connected to said signal output node, and a collector connected to the source of said first P type MOS transistor;

a second bipolar transistor having a base connected to the base of said first bipolar transistor, an emitter connected to the emitter of said first bipolar transistor, and a collector connected to the source of said first N type MOS transistor;



4,948,991

# **LOAD CONTROLLED ECL TRANSIENT DRIVER**

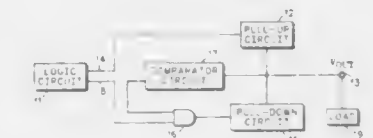
Douglas W. Schucker; David B. Weaver, both of Mesa; Pat Hickman, Chandler, and Walter C. Seelbach, Fountain Hills, all of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Nov. 3, 1988, Ser. No. 266,613

Int. Cl.<sup>3</sup> H03K 19/086, 3/33, 17/60, 3/01

U.S. Cl. 307—455

23 Claims



1. A circuit for driving a capacitive load, said circuit comprising:

an output terminal coupled to the load;

logic means for providing first and second signals;

pull-up means coupled to said output terminal for selectively supplying a voltage thereto in response to said first signal;

pull-down means coupled to said output terminal for selectively sinking a current therefrom in response to a third signal;

comparator means responsive to a charge on the capacitive load and coupled to said output terminal for selectively providing a fourth signal having a time integral relative to said charge on the load; and

gate means coupled to said pull-down means, said logic means and said comparator means for providing said third signal in response to said second and fourth signals.



4,948,992

# STATIC METHOD TO NEGATE OFFSET VOLTAGES IN CMOS OPERATIONAL AMPLIFIERS

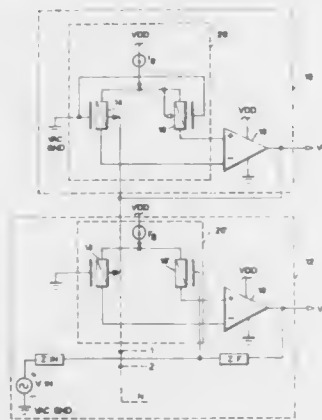
Eugene R. Bukowski, Jr., South Bend, Ind., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,113

Int. Cl.<sup>5</sup> G06G 7/12; H03K 5/00

U.S. Cl. 307—491

11 Claims



1. A circuit arrangement for adjusting offset voltages associated with operational amplifiers, said circuit arrangement comprising in combination:

- a first operational amplifier having an output;
- a first input stage coupled to said operational amplifier; said input stage having a pair of FET devices for providing a first offset voltage having a magnitude which is greater than the magnitude of a natural offset voltage of said operational amplifier; and
- a connecting means for coupling the output of said operational amplifier to a substrate electrode of one of said FET devices so that the algebraic sum of the first offset voltage, threshold voltage of said one of said FET devices and the natural offset voltage is essentially zero.

4,948,993

# DISTRIBUTED SENSING CONTROL CIRCUIT FOR A SENSE AMPLIFIER OF THE MEMORY DEVICE

Dae-Je Chin; Chang-Hyun Kim, both of Seoul, and Hong-Sun Hwang, Taegu, all of Rep. of Korea, assignors to Samsung Electronics Co. Ltd., Suwon, Rep. of Korea

Filed Dec. 27, 1988, Ser. No. 290,741

Claims priority, application Rep. of Korea, Jun. 7, 1988, 88-6797

Int. Cl.<sup>5</sup> H01R 19/00; H03F 3/45

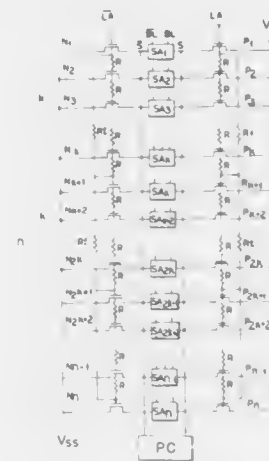
U.S. Cl. 307—530

6 Claims

1. A distributed sensing control circuit for a sense amplifier of a memory device comprising:

- (a) a plurality of first sensing control transistors for controlling a plurality of sense amplifiers each having a pair of sensing nodes, each of said first sensing control transistors being connected to one of the sensing nodes of a corresponding one of said sense amplifiers, said one sensing nodes of said amplifiers being connected in common to a recharge circuit;
- (b) a plurality of second sensing control transistors for controlling the plurality of sense amplifiers, each of said second sensing control transistors being connected to one of the other sensing nodes of a corresponding one of said sense amplifiers, said other sensing nodes being connected in common to said recharge circuit;
- (c) first and second power terminals for the application therebetween of a source of power, each of said first and second control transistors and said sense amplifiers being connected between said power terminals; and
- (d) a plurality of resistor means connected one by one to

each of gates of said sensing control transistors, said resistor means being connected in sequence through each of the gates of said first and second sensing control transistors, respectively, thereby arraying each of said first and second control transistors in respective first and second



sequences of transistors, whereby the turn-on time of each of the sensing control transistors in each sequence is delayed in sequential order after a sensing control signal is applied to the gate of the sensing control transistor first in line in each sequence because the applied sensing control signal is delayed by said resistor means.

4,948,994

# SEMICONDUCTOR CIRCUIT FOR DRIVING THE BASE OF A BIPOLAR TRANSISTOR

Takashi Akioka, Hitachi; Atsuo Watanabe, Hitachi, and Takahiro Nagano, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

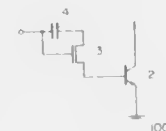
Filed Oct. 7, 1988, Ser. No. 254,568

Claims priority, application Japan, Oct. 9, 1987, 62-253700

Int. Cl.<sup>5</sup> H03K 17/60, 17/687, 3/01, 19/02

U.S. Cl. 307—570

22 Claims



1. A semiconductor circuit system comprising an NPN bipolar transistor, a capacitor and an nMOS FET, wherein the base of the NPN bipolar transistor is connected with the source of the nMOS FET, the gate of the nMOS FET is used as an input terminal, a capacitor is inserted between the input terminal and the drain of the nMOS FET, and the NPN bipolar transistor is driven by the signal applied to the input terminal, and wherein an ON-OFF operation of the NPN bipolar transistor for a current flowing through a collector-emitter path of the NPN bipolar transistor to a negative terminal of a power supply coupled to the NPN bipolar transistor is controlled by a voltage applied to the input terminal.

4,948,995

# DISENABLING CIRCUIT FOR POWER-ON EVENT

Yasunao Takahashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

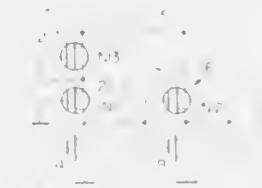
Filed Nov. 7, 1988, Ser. No. 267,817

Claims priority, application Japan, Nov. 6, 1987, 62-281453

Int. Cl.<sup>5</sup> H03K 5/153, 17/22, 17/284

U.S. Cl. 307—594

3 Claims



1. A disabling circuit operative to cause component circuits to shift into respective disabling states for a predetermined time period after a power-on event, comprising:

- (a) a level detecting circuit provided with a series combination of plural load transistors of one channel conductivity type and at least one shifting transistor of the opposite channel conductivity type coupled between a power supplying line and a source of constant voltage, an output node thereof being provided between said plural load transistors and said shifting transistor; and
- (b) a complementary inverter circuit coupled at an input node thereof to the output node of said level detecting circuit and having an output node where a disabling signal is produced, wherein said shifting transistor is responsive to the voltage level at the output node of said complementary inverter circuit, and wherein said shifting transistor has a gate electrode directly coupled to the output node of said complementary inverter circuit and one of said load transistors has a gate electrode coupled to said constant source of voltage and in which the other load transistors have respective gate electrodes couples to respective drain nodes thereof.

4,948,996

# DIRECT COOLED BORE CONNECTOR

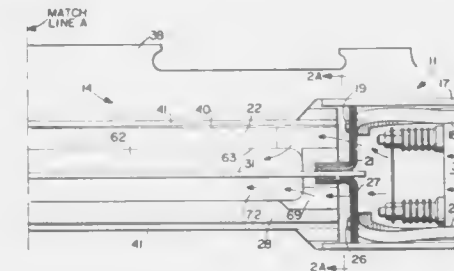
James B. Archibald, Schenectady; Paul C. Rasmussen, Rensselaer, and Kirk G. O'Brien, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 21, 1989, Ser. No. 312,266

Int. Cl.<sup>5</sup> H02K 9/00

U.S. Cl. 310—52

24 Claims



1. A cooling system for cooling core conductors in an electric power generator system of the type including an electric power generator and an exciter for providing direct current power to a generator field comprising:

- at least two elongated bore conductors electrically connecting said exciter to the field of the generator;

insulation separating said bore conductors and extending at least coextensively therewith;

a substantially cylindrical housing surrounding said bore conductors and said insulation;

means to provide cooling gas to the interior of one end of said housing;

wherein said bore conductors are each substantially in the shape of a half cylinder including a flat portion, such that in combination with said insulation they form a cylinder to thereby facilitate the insertion of said bore conductors and said insulation in said housing; wherein support members within an opposite end of said housing support one end of said insulation; and

wherein an insulating sleeve is positioned within said housing to separate and insulate said bore conductors from said housing;

said bore conductors each housing an axially extending slot through a surface adjacent to said insulation to form a cooling gas passage defined in part by said insulation;

at least one entrance opening in each of said bore conductors connecting the cooling gas in the interior of said one end of said housing to each cooling gas passage;

at least one exit opening in an opposite end of each of said bore conductors connecting each cooling gas passage to the outside of the respective bore conductor; and

means to direct said cooling gas out of said housing; whereby cooling gas can flow through each cooling gas passage within, and in direct contact with, the respective bore conductor.

4,948,997

# STARTER AND POWER GENERATOR AND ASSOCIATED MOTOR

Takashi Ohmitsu, Toyota, and Tsutomu Mitsui, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

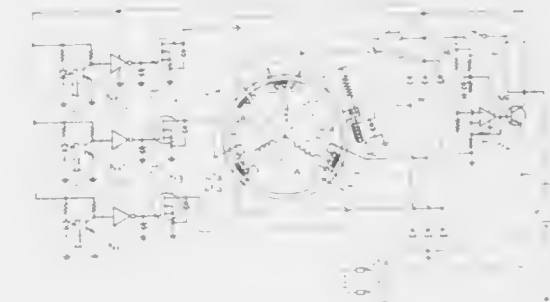
Filed Sep. 7, 1988, Ser. No. 241,197

Claims priority, application Japan, Sep. 10, 1987, 62-226955; Sep. 18, 1987, 62-234557

Int. Cl.<sup>5</sup> H02K 47/04; H02P 9/08

U.S. Cl. 310—113

16 Claims



1. A starter and power generator comprising:

a rotor including a plurality of magnetic poles, a rotor winding for exciting said magnetic poles, and a rotary shaft;

a plurality of slip rings installed on said rotary shaft of said rotor and being connected to said rotor winding;

a plurality of brushes, which are in contact with said slip rings, for supplying an exciting current to said rotor winding through said slip rings;

first supporting means for rotatably supporting said rotary shaft of the rotor;

engaging means for engaging said rotary shaft of the rotor with a rotary shaft of an engine;

a stator including three phase windings which are arranged to surround an outer peripheral surface of said rotor;

second support means for fixedly supporting the stator in a surrounding relationship with the rotor;

timing means for establishing a timing to energize each of the three phase windings of the stator for generating with said three phase windings a rotating magnetic field at the said outer peripheral surface of the rotor;  
 energizing means for energizing the three phase windings of the stator in accordance with the timing established by the timing means;  
 output matching means for receiving individual outputs from the three phase windings of the stator;  
 input means for supplying a command to start the engine; and  
 connection means for connecting the output matching means to the three phase windings of the stator to form an alternator and for substituting the energizing means for the output matching means for connection as a motor in response to a starting command.

4,948,998

## ELECTRIC MOTOR

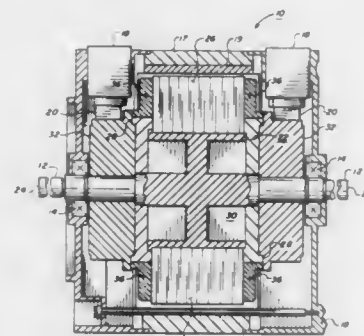
Richard A. Fink, Rougemont, and Robert C. Ellis, Jr., Durham, both of N.C., assignors to Honeywell Incorporated, Minneapolis, Minn.

Filed Jan. 10, 1989, Ser. No. 295,723

Int. Cl.<sup>3</sup> H02K 23/36, 13/00

U.S. Cl. 310—127

11 Claims



1. An electric motor comprising:
  - (a) a motor shaft having opposed ends;
  - (b) an armature having opposed faces mounted on said shaft intermediate said ends, wherein said armature includes four windings arranged in two sets of parallel pairs, said windings including a plurality of coils arranged in parallel pairs and each of said coils including a first end and a second end; and
  - (c) a commutator mounted on said shaft adjacent each of said faces, each of said pair of windings being connected to one of said commutators, each of said commutators including a plurality of commutator bars, a first end of one coil in a parallel pair and a second end of the other coil in said parallel pair terminating at the same commutator bar, wherein each of said commutators are arranged on said shaft with a circumferential width of each commutator bar on one of said commutators offset relative to a circumferential width of each commutator bar on the other of said commutator bars.

4,948,999

## SELF-STARTING TWO-POLE SINGLE-PHASE SYNCHRONOUS MOTOR

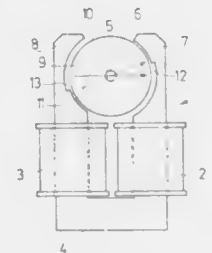
Leo Bertram, Stolberg, Fed. Rep. of Germany, and Romuald L. Bukoschek, Klagenfurt, Austria, assignors to U.S. Phillips Corporation, New York, N.Y.

Continuation of Ser. No. 593,173, Mar. 26, 1984, which is a continuation of Ser. No. 377,780, May 13, 1982, abandoned. This application Mar. 2, 1989, Ser. No. 318,507

Claims priority, application Austria, May 21, 1981, 2286/81 Int. Cl.<sup>3</sup> H02K 21/00

U.S. Cl. 310—162

3 Claims



1. A self-starting two-pole single-phase synchronous motor, comprising:
  - a stator having two stator-pole-forming limbs having stator pole faces, and an exciter coil, and
  - a permanent magnet rotor defining a rotor axis and disposed between said stator pole faces, said limbs being arranged such that said pole faces define air gaps between the rotor and the stator, said rotor being magnetized diametrically so as to define two only opposite magnetic poles on its circumference,
 characterized in that said rotor comprises a plastic-bonded anisotropic magnetic material forming the permanent magnet, magnetized such that the rotor poles are opposite each other and each extend over an angular range, about the rotor axis, less than 90°.

4,949,000

## D.C. MOTOR

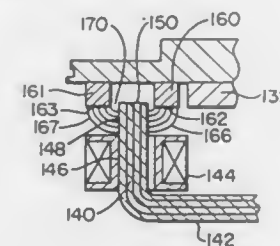
Christian C. Petersen, Fremont, Calif., assignor to Mueller and Smith, LPA, Columbus, Ohio

Filed Jul. 18, 1988, Ser. No. 220,235

Int. Cl.<sup>3</sup> H02K 1/00

U.S. Cl. 310—179

16 Claims



1. A d.c. motor comprising:
  - a stator core support structure having a given axis;
  - a plurality of magnetically permeable discrete core components supported upon said support structure along a locus of pole positions and extending in generally parallel relationship with said given axis to define a winding association region, a flux interaction region and an end surface;
  - field winding means positionable about select said core components in the vicinity of said winding association region for select excitation;
  - a rotor rotatable about said given axis and extending over said end surface of each said core component;
  - a predetermined number of permanent magnet components

located upon said rotor for movement therewith about said locus of pole positions and each configured having a flux coupling surface extending in perpendicular relationship with said given axis and said flux interaction regions for effecting flux coupling relationships substantially only with said core component flux interaction regions so as to minimize magnetic attraction with said core components along vectors parallel with said axis, said permanent magnet components being formed of magnetic material exhibiting high coercivity and which are magnetized to provide flux transfer substantially only from said flux coupling surface.

4,949,001

## PARTIAL DISCHARGE DETECTION METHOD AND APPARATUS

Steven R. Campbell, 43 Methuen Avenue, Toronto, Ontario, Canada M6S 1Z7

Filed Jul. 21, 1989, Ser. No. 383,026

Int. Cl.<sup>3</sup> H02K 3/487; G08B 21/00

U.S. Cl. 310—220

10 Claims



1. A detection device for detecting a partial discharge pulse in a high voltage conductor comprising:
  - a conductive plate having an insulated face;
  - an insulated signal conductor spanning a portion of the insulated face and electrically insulated from the conductive plate;
  - means for recording an electrical pulse; and
  - means for transmitting the electrical pulse from the signal conductor to the recording means
 whereby partial discharge activity along the high voltage conductor is directionally coupled to the signal conductor inducing a pulse which is transmitted to the recording means.

4,949,002

## ROTOR FOR PRINTED-WIRING MOTOR

Hiromitsu Ibe, Kosai; Yoshimichi Shirai, Toyooka, and Takaharu Ura, Kosai, all of Japan, assignors to Asmo Co., Ltd., Kosai, Japan

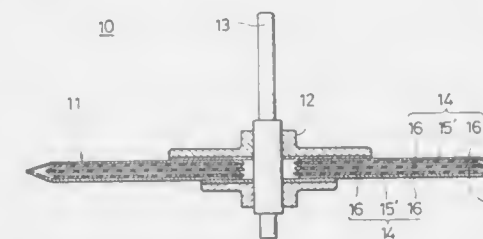
Filed Jun. 9, 1989, Ser. No. 363,923

Claims priority, application Japan, Jun. 11, 1988, 63-142784

Int. Cl.<sup>3</sup> H02K 3/47; H05K 3/38; B32B 3/06

U.S. Cl. 310—268

3 Claims



1. A rotor for printed-wiring motors, comprising:

a rotating shaft;  
 a hub firmly secured to said shaft; and  
 a flat, disc-like, non-iron armature mounted on said hub and composed of at least two sheet coil assemblies electrically connected together and bonded together under heat and pressure with a first thin insulating disc disposed therebetween, each of said sheet coil assemblies being composed of a pair of sheet coils electrically connected together and bonded together under heat and pressure with a second thin insulating disc disposed therebetween, each of said first and second insulating discs being formed of a web of aramid fibers and a pair of coating layers of insulating bonded adhesive on opposite sides of said aramid fiber web.

4,949,003

## OXYGEN PROTECTED ELECTRIC LAMP

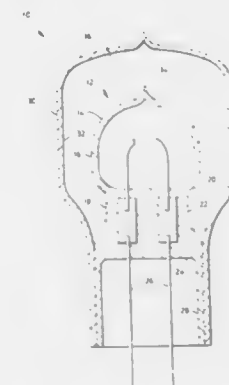
David A. Cox, and Stephen P. Senft, both of Lexington, Ky., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 21, 1988, Ser. No. 287,931

Int. Cl.<sup>3</sup> H01J 61/12, 61/34

U.S. Cl. 313—25

7 Claims



1. A double jacket arc lamp comprising:
  - (a) an electric lamp capsule having an inner light transmissive envelope with electrical leads extending from the inner envelope through a first seal,
  - (b) a second light transmissive envelope sealed to the inner envelope at a second seal to substantially surround the electric lamp capsule and form an enclosed intermediate volume between a portion of the exterior of the inner envelope and the interior of the outer envelope with the leads extending to the exterior of the outer envelope without passing through the intermediate volume, and
  - (c) fill gas in the intermediate volume including an oxygen component.



4,949,004

**GAS DISCHARGE LAMP HAVING TEMPERATURE CONTROLLED, LIQUID RESERVOIR FOR LIQUIFIED PORTION OF GAS**

Shunpei Yamazaki, Tokyo; Takashi Inujima; Kazuo Urata, both of Atsugi; Mamoru Tashiro, Tokyo; Yuji Tanamura, Machida; Shinji Imato, Atsugi; Kenji Itoh, Machida; Seiichi Odaka, Hisakata; Shigenori Hayashi, and Naoki Hirose, both of Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

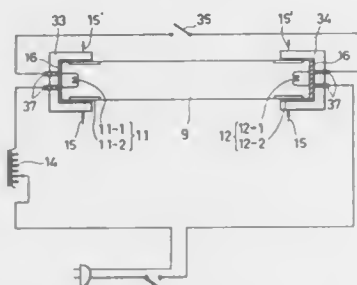
Continuation of Ser. No. 28,672, Mar. 20, 1987, abandoned. This application Feb. 8, 1989, Ser. No. 307,190

Claims priority, application Japan, Mar. 24, 1986, 61-65515; Sep. 24, 1986, 61-226449

Int. Cl.<sup>5</sup> H01J 61/28, 61/52

U.S. Cl. 313—35

2 Claims



## 1. An ultraviolet ray source comprising:

- a vacuum tube;
- an anode and a cathode provided in said vacuum tube to produce discharge between the anode and the cathode;
- a vaporous active substance contained in said vacuum tube and capable of being excited and emitting ultraviolet rays by virtue of the discharge; and
- a vapor pressure structure adjacent said vacuum tube comprising a reservoir retaining some liquified portion of said vaporous active substance and a cooling means for adjusting the temperature of the liquified portion of said vaporous active substance at which the vapor pressure of the liquified portion of said vaporous active substance is optimum for the emission, said liquified portion of said vaporous substance being vaporized substantially only in accordance with the temperature of the liquified portion and the pressure of the vaporous active substance.

4,949,005

**TANTALA-SILICA INTERFERENCE FILTERS AND LAMPS USING SAME**

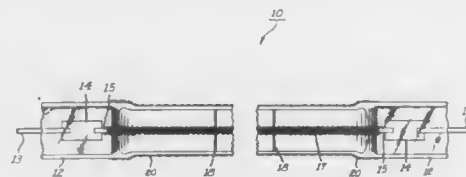
Thomas G. Parham, Gates Mills, Ohio; Seshu Desu, Blacksburg, Va., and Charles D. Tschetter, Mayfield Village, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,313

Int. Cl.<sup>5</sup> H01J 9/20; H01K 1/32

U.S. Cl. 313—112

38 Claims



1. An interference filter thin film optical coating produced by a low pressure chemical vapor deposition process and consisting essentially of alternating layers of tantalum and silica having a total of at least 12 layers and exhibiting (i) a randomized crack pattern when viewed at 50 times optical magnification

tion and (ii) diffuse reflection of no greater than about 5% at a wavelength of from about 1500–2000 nm.

4,949,006

**SPARK PLUG STRUCTURE**

Takafumi Oshima; Kazuhiko Kozuka, and Shigeyasu Yamada, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Inc., Nagoya, Japan

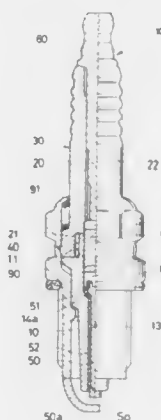
Filed Jun. 21, 1989, Ser. No. 369,114

Claims priority, application Japan, Jun. 21, 1988, 63-151153; Jul. 15, 1988, 63-174954; Jul. 18, 1988, 63-178661; Jan. 6, 1989, 64-1857; Jan. 9, 1989, 64-1300

Int. Cl.<sup>5</sup> H01T 13/20, 13/38

U.S. Cl. 313—144

7 Claims



## 1. A spark plug structure comprising:

- a cylindrical metallic shell having a ground electrode integrally;
- a joint type insulator having a center bore, and including a front half piece and a rear half piece, and the front and rear half pieces being joined at their respective end by means of a glass sealant, and concentrically encased into the metallic shell;
- a center electrode concentrically placed into the center bore of the insulator with a front end of the electrode somewhat extended outside that of the insulator to form a spark gap with the ground electrode;
- an elongated terminal placed into the rear half piece of the insulator with a rear end of the terminal somewhat extended outside that of the rear half piece;
- an electrically conductive glass provided to seal respective spaces appeared between the center electrode, the insulator and the terminal;
- the front half piece having an elongated projection, the length of which is more than 2.0 mm, and the rear half piece having a recess, the depth of which is more than 2.0 mm, the front and rear half pieces being jointed at the projection and the recess by means of an annular glass sealant which has thickness of less than 2.0 mm and length of more than 2.0 mm.

4,949,007

**LOW PRESSURE DISCHARGE LAMP WITH FLAT-PLATE TERMINAL**

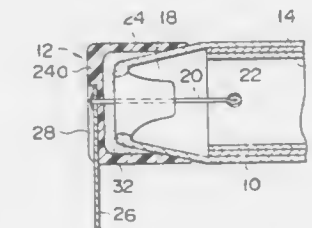
Masami Takagi, Yokohama; Shinichi Tsunekawa, Fujisawa, and Kenji Ohkubo, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 163,101, Mar. 2, 1988, abandoned. This application May 26, 1989, Ser. No. 358,534

Claims priority, application Japan, Mar. 5, 1987, 62-32508[U] Int. Cl.<sup>5</sup> H01J 61/36

U.S. Cl. 313—318

14 Claims



## 1. A low pressure gas discharge lamp comprising:

- a bulb having electrodes provided in the end portions of the bulb; and
- a pair of bases attached to the ends of the bulb, each of said bases having a substantially cylindrical base body with a bottom wall, in which one end portion of the bulb is inserted, and a flat-plate receiving terminal secured to the base body and electrically connected to the electrode, said terminal having a pair of mutually parallel flat faces and being secured to the base body in such a manner that these flat faces are located on planes which exist perpendicular to a longitudinal axis of the bulb and a part of at least one flat face is in contact with the bottom wall of the base body, and said terminal projecting from the base body in a direction perpendicular to the longitudinal axis of the bulb.

4,949,008

**COLOR CATHODE RAY TUBE ASSEMBLY WITH MAGNETIC SHIELD**

Kazuhiro Chihara, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

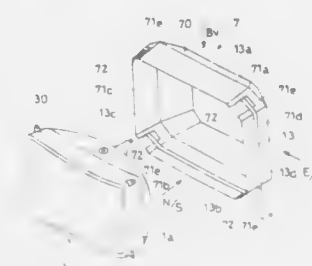
Filed Dec. 8, 1988, Ser. No. 281,381

Claims priority, application Japan, Dec. 11, 1987, 62-314440; Dec. 11, 1987, 62-314438

Int. Cl.<sup>5</sup> H01J 29/02; H04N 9/29

U.S. Cl. 313—402

30 Claims



## 1. A color cathode ray tube assembly which comprises:

- a highly evacuated envelope including a funnel section, a neck section continued to one end of the funnel section,
- a generally rectangular faceplate, said faceplate comprising a rectangular screen plate having an inner surface formed with a predetermined pattern of primary color elemental phosphor deposits to complete a phosphor deposited screen and a rectangular side wall structure, said side wall structure of the faceplate protruding from a peripheral

edge of the screen plate in a direction towards the funnel section and including a pair of opposite longer side walls and a pair of shorter side walls, said faceplate being connected to the funnel section with said longer and shorter side walls integrated with the other end of the funnel section;

a color selection mask disposed within the evacuated envelope in face-to-face relationship with the phosphor deposited screen; and

a generally tubular outer magnetic shield made of a magnetizable material and mounted on the evacuated envelope so as to encircle the side wall structure of the faceplate and also the funnel section, said outer magnetic shield comprising:

- a generally tubular wall structure having a pair of opposite longer side walls extending generally parallel to the corresponding longer side walls of the faceplate, a pair of opposite shorter side walls extending generally parallel to the corresponding shorter side walls of the faceplate, and a corner wall positioned between respective ends of each longer side wall and the adjacent shorter side wall and confronting an associated corner between each longer side wall of the faceplate and the associated shorter side wall of the faceplate with the angle of inclination of the corner wall relative to the adjacent longer side wall of the associated wall structure which lies in a horizontal plane is 45° or smaller; and
- said wall structure of the outer magnetic shield extending frontwardly a distance enough to cover the width of any one of the longer and shorter side walls of the faceplate.

4,949,009

**SHADOW MASK MOUNTING SYSTEM FOR A COLOR CATHODE RAY TUBE**

Toshikazu Iwamoto, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

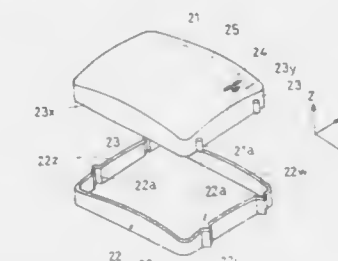
Filed Feb. 2, 1989, Ser. No. 305,405

Claims priority, application Japan, Feb. 3, 1988, 63-24289; Feb. 3, 1988, 63-24290

Int. Cl.<sup>5</sup> H01J 29/07

U.S. Cl. 313—407

24 Claims



1. A shadow mask mounting system for a color cathode ray tube, comprising an evacuated envelope having a longitudinal axis and including a generally rectangular faceplate sealed to one of opposite ends of the evacuated envelope and including a phosphor deposited screen plate lying generally perpendicular to the longitudinal axis, which mounting system comprises:

- a generally rectangular rigid support frame;
- a finely perforated shadow mask mounted across the support frame and having a skirt connected to the support frame;
- a plurality of positioning engagements formed in and spacedly distributed around one of the skirt of the perforated shadow mask and the support frame; and
- a corresponding number of mating engagements formed in the other of the skirt of the perforated shadow mask and the support frame so that, when the perforated shadow mask is mounted on the support frame, the positioning engagements can be engaged with the mating engagements to position the shadow mask relative to the support

frame in a plane perpendicular to the longitudinal axis of the evacuated envelope; wherein one of the positioning engagements and the mating engagements comprises generally elongated, generally semicircular cross-sectioned projections each having its longitudinal axis lying parallel to the longitudinal axis of the evacuated envelope and the other of the positioning engagements and the mating engagements comprises generally V-sectioned recesses, whereby when the perforated shadow mask is mounted relative to the support frame, the projections are received in the respective recesses while forming two line contacts therebetween.

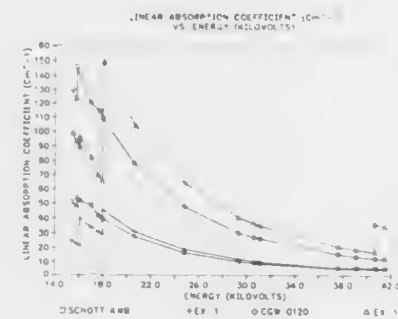
4,949,010

## X-RAY ATTENUATING CERAMIC MATERIALS

Ronald O. Petersen, Banks, Oreg., and James L. McAlpin, Somers Point, N.J., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 642,019, Aug. 20, 1984, Pat. No. 4,804,885, which is a continuation of Ser. No. 345,851, Feb. 4, 1982, abandoned. This application Jan. 11, 1988, Ser. No. 142,176

Int. Cl.<sup>5</sup> H01J 31/00; H04N 5/65; G21K 1/00  
U.S. Cl. 313—480 11 Claims



1. In a cathode ray tube comprising a polycrystalline ceramic funnel, a glass faceplate sealed to the funnel and an electron gun disposed within the sealed tube, the improvement wherein the funnel is a rigid, nonporous body of polycrystalline ceramic material formed by shaping a uniformly dispersed mixture of oxides to form a greenware body and heating the greenware body to a temperature which is sufficient to cause sintering of the mixture without total melting and loss of shape, the material having, by weight on the oxide basis, a total of at least 45 percent x-ray attenuating materials including, at least 20 percent CeO<sub>2</sub> and at least 20 percent of a material selected from the group consisting of BaO, SrO, ZrO<sub>2</sub>, Y<sub>2</sub>O<sub>3</sub>, Nb<sub>2</sub>O<sub>3</sub>, and mixtures thereof, the ceramic material having the property of absorbing X-ray wavelengths of X-rays which result from operation of the gun.

4,949,011

## KLYSTRON WITH REDUCED LENGTH

Joseph K. Mann, Grants Pass, Oreg., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Mar. 30, 1989, Ser. No. 330,656

Int. Cl.<sup>5</sup> H01J 25/02, 25/34

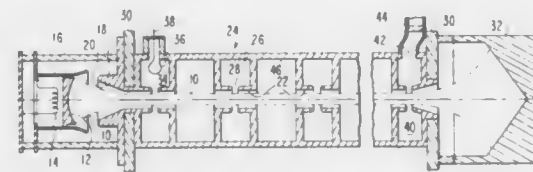
U.S. Cl. 315—5

1 Claim

1. A multi-cavity klystron amplifier tube with a conductive hollow drift tube with a passage for an electron beam of essentially uniform diameter in energy-exchanging relation with an interaction circuit comprising:

a series of resonant cavities surrounding said beam passage;

gaps in said drift tube within said cavities for coupling high-frequency electric cavity fields to said beam;



the diameter of said passage over a part of its length between two successive gaps being greater than said diameter at said gaps.

4,949,012

## AUTOMOTIVE VEHICLE DAYTIME RUNNING LIGHT CIRCUIT

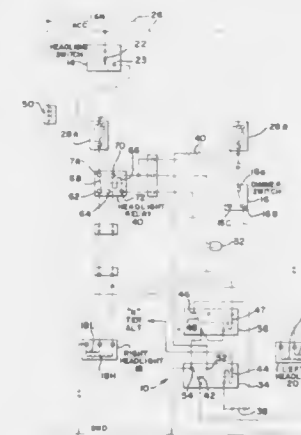
W. T. Irick, New Haven; James L. Roussey, Fort Wayne, and Merrill D. Miller, Huntington, all of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Continuation-in-part of Ser. No. 124,734, Jan. 21, 1988. This application Jul. 25, 1988, Ser. No. 223,817

Int. Cl.<sup>5</sup> B60Q 1/04

U.S. Cl. 315—82

11 Claims



1. In combination with an automotive vehicle headlight circuit which is powered from a source of electrical potential and comprises high and low beam headlights on both right and left sides of the vehicle, a headlight switch for turning the headlights on and off, and a dimmer switch that selects between the high and low beams of the headlights, and in which the low beams of the headlights are connected in separate branch circuits from the headlight switch, one of said branch circuits contains said dimmer switch, and the other of said branch circuits contains a switching means that is slaved to the dimmer switch, said dimmer switch and said switching means comprise respective switching devices each of which is operable to connect the low beam of the corresponding one of the right and left headlights across the source of electrical potential when the headlight switch is turned on and the dimmer switch is selecting the low beams, and to disconnect the low beam of the corresponding one of the right and left headlights from the source of electrical potential when either the headlight switch is turned off or the dimmer switch is selecting the high beams, said dimmer switch and said switching means further comprising means to connect the high beams of both the right and left headlights as a parallel load across the source of electrical potential when the headlight switch is turned on and the dimmer switch is selecting the high beams, and to disconnect the high beams of both headlights from the source of electrical potential when either the headlight switch is turned off or the dimmer switch is selecting the low beams, a

daytime running light circuit comprising means providing a signal indicative of vehicle running, and means responsive to said signal and to said headlight switch being off for causing the high beams of both the right and left headlights to be connected in series with each other and across the source of electrical potential whereby each headlight will illuminate at appreciably less than its rated intensity when the vehicle is running and the headlight switch is off, to thereby provide daytime running light illumination while full intensity illumination by the high beams can be obtained at anytime by turning the headlight switch on and operating the dimmer switch to select the high beams.

4,949,013

## HIGH-FREQUENCY OPERATING CIRCUIT FOR A FLUORESCENT LAMP

Anton Zuchtriegel, Taufkirchen, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft für elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany

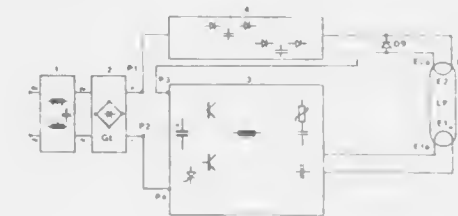
Filed Feb. 16, 1989, Ser. No. 311,525

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1988, 3805510

Int. Cl.<sup>5</sup> H05B 41/29

U.S. Cl. 315—106

7 Claims



1. High-frequency fluorescent lamp operating circuit in combination with a fluorescent lamp (LP) having a first lamp filament forming a first lamp electrode (E1) and a second lamp filament forming a second lamp electrode (E2),

said circuit having a power rectifier (2, GL) having output terminals (P1, P2); a push-pull transistor frequency generator (3) having two supply terminals (P3, P4),

two interconnected alternately conducting transistors (T1, T2) defining a common junction (M1), and an operating circuit for the transistors including a feedback and control circuit (RK1.1, RK1.2, RK1.3; DC);

a smoothing capacitor (C2) connected across the supply terminals (P3, P4) of the operating circuit for the transistors; and

a series resonance circuit having a series inductance (L1) defining two terminals and having a first terminal connected to the common junction (M1) of the transistors (T1, T2) and a second terminal (M4) connected to a series capacitor means (C6, C8) and through the first lamp filament of the first lamp electrode (E1),

and comprising, in accordance with the invention, means for deenergizing the lamp operating circuit upon failure of the second lamp filament of the second electrode or upon removal of the lamp, and for also enhancing preheating of the filaments of the lamp, including a connection circuit from one (P1) of said output terminals (P1, P2) of the power rectifier (2, GL) through the second lamp filament of the second lamp electrode (E2) to the second input terminal (P3) of the push-pull transistor frequency generator (3).

4,949,014  
DEVICE FOR REGULATING LUMINOUS FLUX OF BATTERY POWERED HEADLAMP

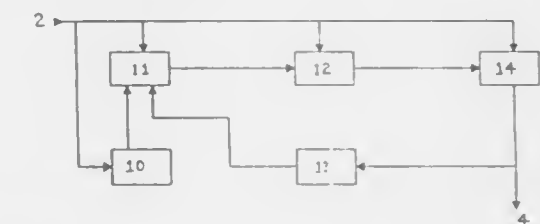
David S. Gasvoda, Missoula, Mont., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 1, 1989, Ser. No. 305,316

Int. Cl.<sup>5</sup> H05B 37/02

U.S. Cl. 315—158

6 Claims



1. An apparatus for maintaining a constant luminous flux output from a battery powered lamp in which the battery voltage decreases with time and which apparatus increase the life of the battery, the apparatus having a comparator means for comparing the voltage values of a reference device means and a feedback loop means, said voltage values being proportional to battery voltage and lamp power respectively, the comparator means output controlling the off-time/on-time pulse ratio of a pulse width modulator means and the off/on pulse outputs of said modulator means controlling a power switch means for turning power to the lamp from the battery off and on in a duty cycle which keeps power to the lamp nearly constant with time, the improvement comprising:

a feedback loop means comprising an optoisolator means and trimmer potentiometer.

4,949,015

## BRIDGE INVERTER BALLAST FOR FLUORESCENT LAMP

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

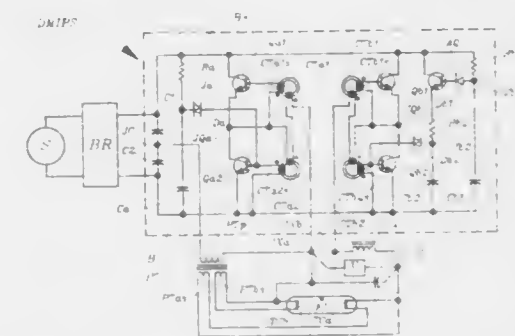
Filed May 30, 1986, Ser. No. 868,727

The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> H05B 37/00

U.S. Cl. 315—200 R

20 Claims





connected with the source of DC voltage, to provide a first AC voltage across a first set of AC output terminals; connect means operative to permit connection of the cathode power input terminals with the first set of AC output terminals; second inverter means connected in circuit with the DC terminals and operative after the provision of an initiating action to an initiating input means, whenever the DC terminals are connected with the source of DC voltage, to provide a second AC voltage at a second set of AC output terminals; connect and current-limiting means operative to permit connection of the main lamp power input terminals in circuit with both the first set and the second set of AC output terminals, thereby to permit the provision of a current-limited AC voltage to the main lamp power input terminals from both sets of AC output terminals, but only after the provision of the initiating action; power to the cathode power input terminals being provided irrespective of any power being provided to the main lamp power input terminals.

4,949,016

## CIRCUIT FOR SUPPLYING CONSTANT POWER TO A GAS DISCHARGE LAMP

Adrianus M. J. De Bijl, and Johannes M. Van Meurs, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

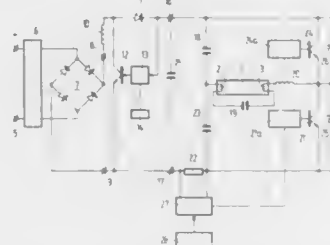
Filed Dec. 15, 1988, Ser. No. 285,181

Claims priority, application Netherlands, Jan. 6, 1988, 8800015

Int. Cl.<sup>5</sup> H05B 37/02, 39/04, 41/14

U.S. Cl. 315—208

15 Claims



1. An electric arrangement for igniting and supplying a gas discharge lamp from an alternating voltage source, said arrangement comprising: a rectifier bridge connected to said alternating voltage source and to a DC/DC converter provided with a rectifier element, a coil and a high-frequency switched semiconductor switching element coupled to a drive circuit, said DC/DC converter being connected to input terminals of a high-frequency DC/AC converter which includes the lamp and semiconductor switching elements, a capacitor coupled between said input terminals of the DC/AC converter, a sensor for measuring the converter current, said sensor being coupled between one of the input terminals and a semiconductor switching element of the DC/AC converter, wherein the lamp is connected in series with a frequency-dependent impedance and the drive circuit of the semiconductor switching element in the DC/DC converter is coupled to a control circuit and to the capacitor, the voltage across the capacitor being set to a certain value by adjusting at least one of the frequency and the period of conductance of the semiconductor switching element in the DC/DC converter, and means coupling the sensor to a second control circuit connected to drive circuits of the semiconductor switching elements of the DC/AC converter whereby the frequency and/or period of conductance of the switching elements of the DC/AC converter, and hence the power consumption of the lamp, can be controlled.

4,949,017

## STROBE TRIGGER PULSE GENERATOR

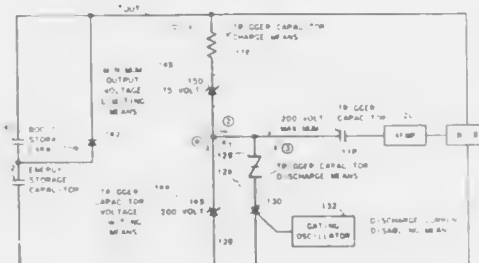
Scott T. Sikora, Mesa, Ariz., assignor to Tomar Electronics, Inc., Tempe, Ariz.

Continuation-in-part of Ser. No. 265,414, Oct. 31, 1988, which is a continuation-in-part of Ser. No. 238,039, Aug. 29, 1988, which is a continuation of Ser. No. 42,357, Apr. 24, 1987, Pat. No. 4,775,821, which is a continuation-in-part of Ser. No. 794,415, Nov. 4, 1984, Pat. No. 4,682,081. This application May 10, 1989, Ser. No. 350,783

Int. Cl.<sup>5</sup> H05B 41/14, 41/29, 41/34

U.S. Cl. 315—219

21 Claims



1. Apparatus for delivering current to an intermittently energized gaseous discharge tube comprising:
  - a. a power supply;
  - b. an energy storage capacitor coupled to the power supply;
  - c. a trigger pulse generator for intermittently generating trigger pulses to energize a trigger pulse transformer including
    - i. a trigger capacitor having first and second leads, the first lead being coupled to the trigger pulse transformer;
    - ii. trigger capacitor charge means having an input terminal coupled to the power supply and an output terminal coupled to the second lead of the trigger capacitor for establishing a current flow path between the power supply and the trigger capacitor to direct a charge current to the trigger capacitor;
    - iii. trigger capacitor discharge means coupled to the second lead of the trigger capacitor for periodically directing a discharge current from the trigger capacitor through the trigger pulse transformer to generate a high voltage trigger pulse; and
    - iv. discharge current disabling means coupled in series with the flow of discharge current from the trigger capacitor discharge means for selectively blocking or conducting the flow of discharge current from the trigger capacitor discharge means.

4,949,018

## HIGH PRESSURE SODIUM LAMP STARTER CONTROLLER

John V. Siglock, Sierra Madre, Calif., assignor to Unicorn Electric Products, Anaheim, Calif.

Continuation of Ser. No. 118,208, Nov. 6, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 372,190

Int. Cl.<sup>5</sup> H05B 37/00

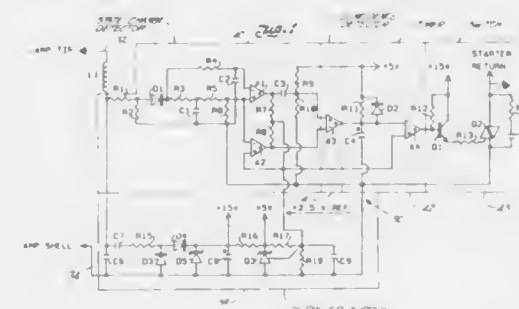
U.S. Cl. 315—225

29 Claims

1. A starter controller for a gas discharge lamp, in which the lamp has a pair of lamp input terminals connected across the output of a ballast, in which a lamp starter supplies starting signals to the lamp, and in which a starter controller is coupled to the lamp starter for controlling the starting signals to the lamp, the starter controller comprising:
  - a. state-change detector means having input terminals for connection across the input terminals of the lamp for detecting an electrical signal proportional to the state of the lamp voltage normally present across the lamp input terminals, wherein said lamp voltage undergoes a rapid rise when a lamp drop-out condition occurs either as a result

of a power line transient condition sufficient to cause a normally operating lamp to drop out, or as a result of a lamp aging condition, and the electrical signal detected across the input terminals of the state-change detector means measures the presence of said rapid rise in lamp voltage;

means responsive to the electrical signals present across the input terminals of the lamp for measuring and processing the detected electrical signals from the lamp, following a detection of said lamp drop-out condition by the state-change detector means, said electrical signal being proportional to the state of the lamp voltage wherein a first lamp voltage level is produced when the lamp drop-out



condition was caused by a power line transient condition and a second lamp voltage level is produced when the lamp drop-out condition was caused by a lamp aging condition;

means for generating a start signal to the lamp starter for enabling restarting of the lamp in response to the processed electrical signal producing a first indication that the lamp drop-out condition was caused by power line transient conditions; and

means for preventing restarting of the lamp in response to the processed electrical signal producing a second indication that the lamp drop-out condition was caused by the lamp aging condition.

4,949,019

## METHOD OF DRIVING THIN FILM EL PANEL FOR AGING

Kinichi Isaka, Yamatokoriyama; Hiroyuki Shimoyama, Nara; Toshihiro Ohba, Nara; Hiroshi Kishishita, Nara, and Hisashi Ueda, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

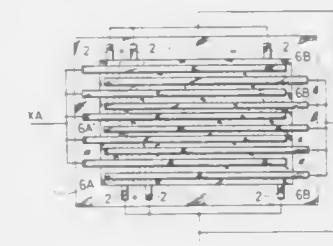
Filed Oct. 28, 1988, Ser. No. 264,085

Claims priority, application Japan, Oct. 30, 1987, 62-274983

Int. Cl.<sup>5</sup> H05B 33/10

U.S. Cl. 315—246

10 Claims



1. An aging drive method for a thin film EL panel which includes a group of transparent electrodes, a group of metal electrodes disposed thereover and extending in a direction intersecting the group of transparent electrodes, and an EL emitting layer interposed between the two groups of elec-

trodes to provide picture elements at the respective intersections, the method comprising the steps of:

performing a preparatory step of short-circuiting all the transparent electrodes by a first conductor, short circuiting every other metal electrode in an alternating manner by a second conductor and short-circuiting the remaining metal electrodes by a third conductor; and

performing four main steps periodically and repeatedly for a predetermined period of time to thereby cause all the picture elements to luminesce for aging, each of the four main steps including, in combination,

applying a first voltage, in a first step, across the first conductor and the second conductor and across the first conductor and the third conductor to charge all the picture elements, and

a second step of applying a second voltage, in a second step, across the second conductor and the third conductor, while maintaining the transparent electrodes in a floating state so as to cause luminescence of the picture elements of the metal electrodes short-circuited by the second conductor or the third conductor with the voltage resulting from the charge on the picture elements stored in the first step and with the second voltage, wherein the four main steps are different from one another in a combination of the first and second voltages of different polarities.

4,949,020

## LIGHTING CONTROL SYSTEM

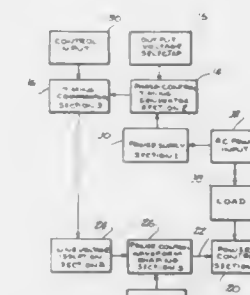
Rufus W. Warren, 9641 S. Brandt, Oak Lawn, Ill. 60653, and John E. Gorman, 3520 S. 54th Ave., Cicero, Ill. 60650

Filed Mar. 14, 1988, Ser. No. 167,397

Int. Cl.<sup>5</sup> H05B 37/02

U.S. Cl. 315—297

12 Claims



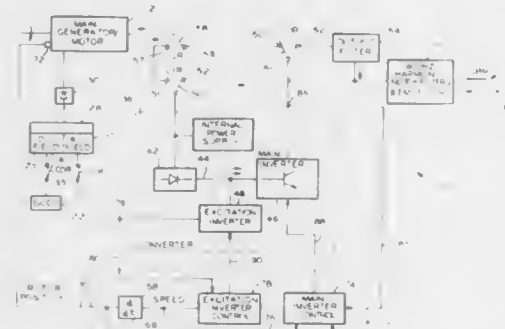
1. A lighting control circuit for controlling illumination and dimming of at least one light in a lighting circuit, said lighting control circuit comprising: power supply means for receiving an AC line voltage input and for converting said AC line voltage to selectable rectified AC and DC power supplies; timing generator circuit means coupled with said power supply means and responsive to a rectified AC power supply from said power supply means for generating and shaping an electrical timing signal; timing comparator circuit means responsive to said electrical timing signal and to a selectable control voltage for generating a variable duty cycle output signal; switching circuit means coupled with said lighting circuit for gating current therethrough and having a control input coupled in circuit with said timing comparator circuit means for gating said current in accordance with said variable duty cycle output, and current limiting comparator circuit means coupled with said switching circuit means and with said lighting circuit means for comparing the current gated by said switching circuit means with a selectable threshold value, and for controlling said switching circuit means to limit current flow in said lighting circuit in accordance with said comparison.

**4,949,021**  
**VARIABLE SPEED CONSTANT FREQUENCY START**  
**SYSTEM WITH SELECTABLE INPUT POWER**  
**LIMITING**

Gregory I. Rozman, Rockford, and Albert L. Markunas, Roscoe, both of Ill., assignors to Sunstrand Corporation, Rockford, Ill.  
 Filed Nov. 14, 1988, Ser. No. 270,625  
 Int. Cl.<sup>5</sup> H02P 3/18

U.S. Cl. 318—254

17 Claims

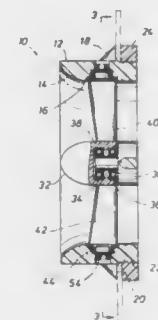


1. A start control system for a brushless machine having a rotor and a stator having a stator coil which is controllably energized from a source of DC power defining a positive and a negative DC voltage for imparting rotation to the rotor, comprising

means for sensing the rotational position of said rotor;  
 switching means coupled between the source of DC power and the stator coil for alternately applying the positive and negative voltage to the coil according to the rotational position of the rotor;  
 means for developing a stator current reference signal representing a desired stator current level;  
 means for generating an actual stator current signal representing actual current level through the stator coil; and  
 control means coupled to said developing means and said switching means for phase advancing the rotational position at which the positive and negative voltages are applied to the coil according to a difference between said desired and actual stator current level to provide constant current starting.

**4,949,022**  
**SOLID STATE DC FAN MOTOR**  
 Leonard H. Lipman, 1410 Magnolia, Humble, Tex. 77339  
 Filed Jan. 27, 1989, Ser. No. 303,320  
 Int. Cl.<sup>5</sup> H02K 9/04; F04B 35/04  
 U.S. Cl. 318—254

15 Claims



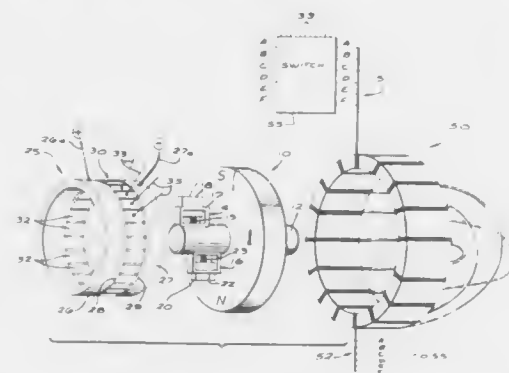
1. A direct current electric fan motor for use on small electrical equipment, comprising:

(a) a fan housing forming a circular fan rotor opening and a circular internal recess and having a bearing support lo-

cated centrally of said fan rotor opening and bearing means positioned by said bearing support;  
 (b) a plurality of electrical coils being supported by said housing in spaced relation about the periphery of said circular fan rotor opening;  
 (c) a fan having a central rotor being rotatably supported by said bearing means and having a plurality of fan blades radiating from said central rotor, said fan having a circular structural member extending from said fan blades and being interconnected with the tips of said fan blades;  
 (d) a plurality of permanent magnets being provided at the outer peripheral portion of said circular structural member and being positioned for close proximity with said electrical coils during rotation of said fan, said circular internal recess being traversed by said plurality of permanent magnets during rotation of said fan; and  
 (e) a solid state electrical circuit for sequentially energizing said coils and commutating said permanent magnets of said fan.

**4,949,023**  
**DIRECT CURRENT MACHINE WITH SWITCHABLE**  
**STATOR WINDINGS**  
 David J. Shlien, 6716 Leland Way, Hollywood, Calif. 90028  
 Filed Oct. 27, 1988, Ser. No. 263,235  
 Int. Cl.<sup>5</sup> H02K 23/48  
 U.S. Cl. 318—541

27 Claims



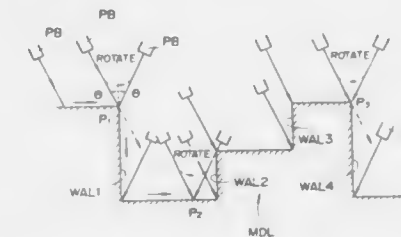
1. In a direct current machine, the combination comprising a permanent magnet rotor means having a rotor shaft; commutator means, said commutator means including at least first and second radially outwardly extending brush means connected for rotation with said rotor means, first and second stationary slip rings and a stationary group of commutator segments arranged in a cylindrical configuration, and wherein said brush means, said slip rings and said commutator segments are positioned, configured and arranged for enabling said first brush means to simultaneously contact a commutator segment and said first slip ring, and for enabling said second brush means to simultaneously contact a different commutator segment and said second slip ring; switch means; stator means including a plurality of poles, each pole including a plurality of windings with the ends of at least some of the windings being electrically connected to said switch means; and means interconnecting said commutator means and said switch means for enabling varying the interconnection of said windings whereby to alter the operating characteristics of said machine.

22. In a direct current machine, the combination comprising a permanent magnet rotor means having a rotor shaft; commutator means; switch means; stator means including a plurality of poles, each pole including a winding set of a plurality of windings, said windings being tapped at selected points, said selected points being electrically connected to said switch means; and means interconnecting said commutator means and said switch means for enabling varying the effective number of

turns of the pole whereby to alter the operating characteristics of said machine.

**4,949,024**  
**CONTACTLESS PROFILING METHOD**  
 Hitoshi Matsuura, Tokyo, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan  
 PCT No. PCT/JP88/01194, § 371 Date Aug. 1, 1989, § 102(e)  
 Date Aug. 1, 1989, PCT Pub. No. WO89/05212, PCT Pub. Date Jun. 15, 1989  
 PCT Filed Nov. 25, 1988, Ser. No. 392,921  
 Claims priority, application Japan, Dec. 10, 1987, 62-312913  
 Int. Cl.<sup>5</sup> G01B 11/00; G05B 19/00; B23Q 35/28  
 U.S. Cl. 318—567

18 Claims

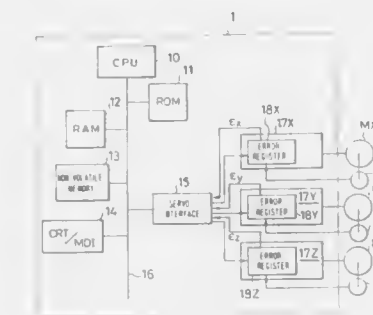


1. A contactless profiling method for tracing a model surface using an optical distance measuring probe capable of contactlessly measuring a distance L to the model surface, said method comprising the steps of:

(a) performing contactless profiling while tilting an optical axis of the optical distance measuring probe by an angle  $\theta$  in a first direction from a vertical axis;  
 (b) stopping movement of the optical distance measuring probe if measurement of the distance becomes impossible; and  
 (c) tilting the optical axis of the optical distance measuring probe from the vertical axis by the angle  $\theta$  in a second direction after said stopping in step (b); and  
 (d) resuming contactless profiling after said tilting in step (c).

**4,949,025**  
**NUMERICAL CONTROL METHOD FOR VARIABLY**  
**SETTING POSITIONING ACCURACY**  
 Takashi Iwagaya, Hachioji, and Tomomi Nakazato, Kawasaki, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan  
 PCT No. PCT/JP88/00179, § 371 Date Aug. 11, 1988, § 102(e)  
 Date Aug. 11, 1988, PCT Pub. No. WO88/06752, PCT Pub. Date Sep. 7, 1988  
 PCT Filed Feb. 19, 1988, Ser. No. 245,395  
 Claims priority, application Japan, Feb. 24, 1987, 62-39195  
 Int. Cl.<sup>5</sup> H02P 5/00  
 U.S. Cl. 318—569

5 Claims



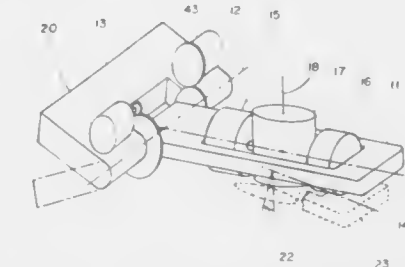
1. A numerical control method for variably setting positioning accuracy, comprising the steps of:

(a) presetting values of a parameter, each of the parameter

values representing positioning accuracy for an associated one combination of kinds of moving commands; and  
 (b) reading and executing consecutive blocks of a numerical control program;  
 said step (b) including the substeps of:  
 (b1) determining a combination of kinds of moving commands which are respectively stated in a plurality of the blocks including a block to be executed at present time;  
 (b2) selecting a corresponding one of the parameter values set in said step (a) in accordance with the result of the determination of said substep (b1), and starting execution of the block to be executed at the present time; and  
 (b3) starting execution of the next block of the numerical control program when it is determined, on the basis of the parameter value selected in said substep (b2), that positioning associated with the moving command for the block to be executed at the present time is completed.

**4,949,026**  
**ROBOT ARM SPACE STABILIZER**  
 John A. Mead, 506 Treetop Dr., Virginia Beach, Va. 23451  
 Filed Dec. 7, 1987, Ser. No. 129,589  
 Int. Cl.<sup>5</sup> B64C 17/06  
 U.S. Cl. 318—649

3 Claims



1. A system for maintaining the space attitude of a robot arm member supported by or hinged to a base undergoing random perturbations, comprising:

a torque motor mounted along said hinge where said arm is supported by said base;  
 a single-degree-of-freedom gyroscope whose first tilt or precession axis is housed perpendicular to its spin axle and, being formed between bearings carried within said arm, is oriented mutually perpendicular to said hinge;  
 first rotary differential transformer (RDT) mounted along said precession axis whose voltage output signifies amount and direction of angular inclination of said gyroscope wheel axle from its null position perpendicular to said hinge;  
 a velocity sensitive restrainer mounted along said precession axis to brake motion between said gyroscope and said arm and whose action, in combination with gyroscope wheel speed, determines said arm's attitude adjustment per unit angular inclination change of said wheel axle from its normal position of perpendicularity to said hinge;  
 second rotary differential transformer (RDT) mounted accessible to the operator whose output is connected in tandem with that of said first RDT and whose rotor is indexed to the position where the null of said second RDT coincides with that of said first RDT such that the output of the two RDTs' network is affected by rotation at either and provides input to an amplifier for said torque motor; whereby said arm is ordinarily maintained at a prescribed attitude by said torque motor responding to said first RDT's error signal, and whereby said arm attitude may be adjusted in response to a command rotation of said second RDT rotor, while capable of being exactly reinstated by derotation of said rotor back to said indexed position.



4,949,027

# ARRANGEMENT FOR AND METHOD OF OPERATING AN ELECTRIC STEP MOTOR

Reinhard Baur, Kippenheim, Fed. Rep. of Germany, assignor to Gerhard Berger GmbH & Co. KG Fabrik Elektrischer Geräte, Lahr, Fed. Rep. of Germany

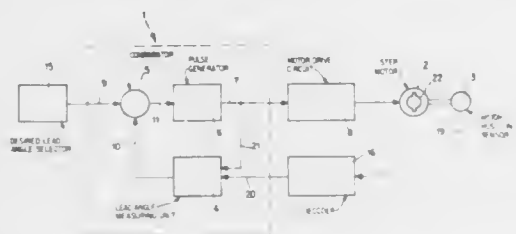
Filed Mar. 22, 1989, Ser. No. 327,066

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 3809657

Int. Cl.<sup>5</sup> H02P 8/00

U.S. Cl. 318—696

10 Claims



1. An arrangement for operating an electric step motor which includes a rotor, and a sensor for sensing the position of said rotor and having an output, said motor being driven by a driver having an input, and an output connected to said motor, and said arrangement comprising a lead angle measuring unit having a first input connectable to said output of said sensor, a second input and an output; a comparator having a first input connected to said output of said measuring unit, a second input and an output, said second input of said comparator being designed to receive data representing a desired lead angle; and a pulse generator having an input connected to said output of said comparator and an output connected to said second input of said measuring unit and connectable to said input of said driver, said comparator being operative to activate and deactivate said pulse generator, and said pulse generator being set to operate at a fixed frequency.

4,949,028

# MULTIPLE VOLTAGE BATTERY CHARGE BALANCING AND LOAD PROTECTING DEVICE

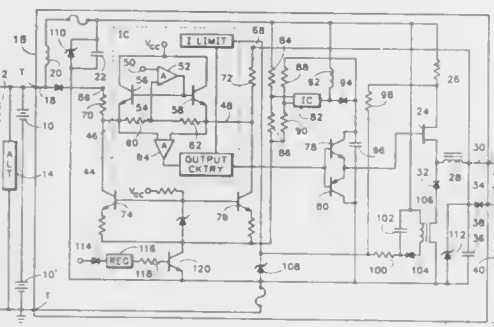
Lyle R. Brune, Beaverton, Oreg., assignor to Sure Power, Inc., Tualatin, Oreg.

Filed Oct. 18, 1988, Ser. No. 259,184

Int. Cl.<sup>5</sup> H02J 7/14

U.S. Cl. 320—6

9 Claims



1. For use in an electric supply system having a battery system providing an input voltage and a plurality of output voltages of different magnitudes for corresponding electric outputs and including means for charging the battery system, a device for maintaining a predetermined battery charge ratio, comprising:

- (a) an electric input,
- (b) a plurality of electric outputs,
- (c) means for developing an error current proportional to

the difference between a predetermined ratio of input to output voltage of a battery system and the actual ratio of input to output voltage of said battery system, and

(d) means responsive to said error current to change the current flow at said plurality of electric outputs to return the battery system input to output voltage ratio to said predetermined ratio.

4,949,029

# ADJUSTMENT CIRCUIT AND METHOD FOR SOLID-STATE ELECTRICITY METER

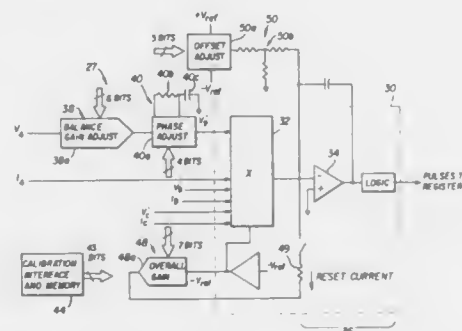
David M. Cooper, Duluth, and Ferokh Khandaghabadi, Norcross, both of Ga., assignors to Schulmberger Industries, Inc., Norcross, Ga.

Filed Jul. 15, 1988, Ser. No. 220,121

Int. Cl.<sup>5</sup> G01R 1/38, 35/00; G01C 25/00

U.S. Cl. 324—74

32 Claims



1. An improved power measurement calibration system for an electricity meter of the type comprising signal processing circuitry for determining line energy usage parameters by making power line current and voltage measurements, and, in response, obtaining an output signal related to said energy parameters, wherein errors tend to be contained in said output signal as a result of gain, phase and offset errors distributed within said signal processing circuitry, said improvement comprising:

- memory means for storing calibration data in accordance with a calibration for correcting one of said errors in said output signal;
- a plurality of interconnected resistors;
- a plurality of electrically controlled switches responsive to said calibration data stored in said memory means and interconnected with said plurality of resistors to form a variable voltage divider network having output voltage divider values which depend on the "on" and "off" states of said switches;
- means for obtaining a signal output from said voltage divider network which is representative of the calibration represented by said calibration data; and
- means for connecting said signal output from said variable voltage divider network to said signal processing circuitry for correcting one of said errors, thereby calibrating said circuitry.

4,949,030

# ISOLATED ANALOG VOLTAGE SENSE CIRCUIT

Man S. Tse, Kowloon, Hong Kong, assignor to Astec International Limited, Kowloon, Hong Kong

Filed Aug. 5, 1987, Ser. No. 81,840

Int. Cl.<sup>5</sup> G01R 19/18; H03K 5/00; H03F 3/38

U.S. Cl. 324—127

14 Claims

1. An improved analog sense circuit comprising:

(a) sensing means for passively sensing an input voltage;

(b) transformer means having first and second windings wherein each of said first and second windings have first and second terminals and further wherein said first and

second terminals of said first winding are coupled to said sensing means, said transformer means for coupling said sensed input voltage from said first winding to said second winding of said transformer means;

(c) clock signal input means for coupling a clock signal to said improved analog sense circuit;

(d) capacitor means coupled to the first terminal of said second winding of said transformer means; and

(e) switching means coupled between said capacitor means and said second terminal of said second winding of said

ment between said first opening and said product carrier module.

4,949,032

# PROBE FOR DUAL IN-LINE PACKAGES

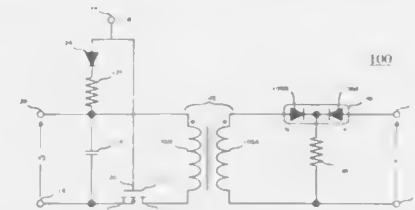
Robin P. Yergenson, and Donald D. Skarke, both of Colorado Springs, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 30, 1988, Ser. No. 252,212

Int. Cl.<sup>5</sup> G01R 1/06

U.S. Cl. 324—158 P

4 Claims



transformer means, said switching means responsive to said clock signal for causing said capacitor means to charge up to a voltage representative of said sensed input voltage upon the occurrence of said clock signal, including means for generating a conductive path between said capacitor and said second terminal of said second winding of said transformer upon the occurrence of said clock signal, said sensing means including diode means for preventing current flow in said primary winding of said transformer when said switching means is non-conductive.

4,949,031

# ENVIRONMENTAL STRESS SCREENING APPARATUS FOR ELECTRONIC PRODUCTS

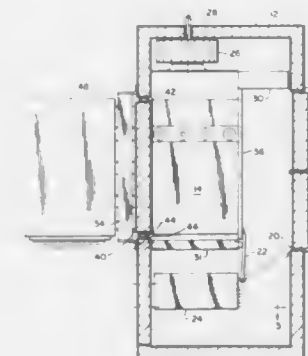
Norbert I. Szasz, Fremont, Calif., and Russell G. Shaw, Con-toocook, N.H., assignors to General Signal Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 29,213, Mar. 23, 1987. This application Apr. 5, 1988, Ser. No. 177,749

Int. Cl.<sup>5</sup> G01R 1/02, 1/04

U.S. Cl. 324—158 F

16 Claims



7. The apparatus for environmental stress screening electronic components which comprises:

- a substantially closed chamber having opposed walls defining respective first and second openings therein, said first and second openings being dimensioned for passage of said product carrier module and being substantially the same size and mutually aligned, and a product carrier module dimensioned and configured for insertion into either said first opening or said second opening and having an inflatable peripheral seal disposed for sealing engage-

- 1. A clip-on probe for a DIP, comprising: resilient compression means, having first and second ends, for urging the first and second ends apart along a path therebetween;
- a first body having a first axis, having a bore therethrough parallel to the first axis, and having entrance and exit orifices at opposite ends of the bore;
- first and second prongs, each having a length, the first and second prongs centered about the exit orifice and projecting by their lengths from the first body and spaced apart by an amount allowing them to interdigitate with pins on the DIP;
- a curved guide extending from the first body at a location proximate the exit orifice and having an entrance and an exit, the entrance of the curved guide aligned with a first plane that is parallel with the first axis and the exit of the curved guide aligned with a second plane that obtains by a non-twisted curving of the first plane;
- a finger grip projecting from the first body at a location thereon one-half revolution from the curved guide about the first axis;
- first retaining means, located along the first body between the entrance and exit orifices, for contacting the first end of the resilient compression means;
- a second body having a second axis and a passage there-through parallel with the second axis, having a slot therein parallel to the second axis, and having first and second orifices centered over the second axis at opposite ends of the passage;
- the first body slidably engaging in the passage and the slot slidably engaging the finger grip;
- second retaining means, located proximate the second orifice of the second body, for contacting the second end of the resilient compression means;
- a thumbpad attached to the second body at a location thereon one-half revolution around the second body from the slot;
- flexible strut means passing through the curved guide, having a distal end and attached at an opposite end to the second body at a location thereon one-half revolution around the second body from the slot, for extending the distal end as the second body slides along the first body in a first direction in response to an external force applied between the thumbpad and the finger grip, and for retracting the distal end as the second body slides along the first body in an opposite direction in response to the resilient compression means in the absence of the external force;

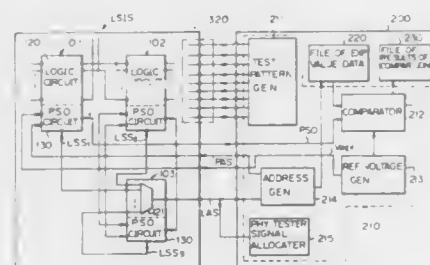
a plurality of gripping fingers extending from the distal end and spaced to interdigitate with pins of the DIP; and electrical contact means for passing through the bore, extending through the exit orifice by an amount less than the lengths of the first and second prongs, and for electrically contacting a pin on the DIP.

4,949,033

**LSI SYSTEM INCLUDING A PLURALITY OF LSI CIRCUIT CHIPS MOUNTED ON A BOARD**  
Takeshi Kono, and Tatsuro Yoshimura, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Filed May 19, 1989, Ser. No. 354,364  
Claims priority, application Japan, May 19, 1988, 63-123405  
Int. Cl.<sup>5</sup> G01R 31/28

U.S. Cl. 324—158 R

2 Claims



1. An LSI system comprising:  
a multi-layer printed circuit board; and  
a plurality of LSI circuit chips mounted on said multi-layer printed circuit board, each including a plurality of pins, a reference voltage terminal, a pin scan out terminal and a plurality of pin scan out circuits corresponding to said pins on a one-to-one basis, each of said plurality of pin scan out circuits comparing a pin voltage appearing at a corresponding pin with a reference voltage appearing at said reference voltage terminal and outputting a signal indicating the result of said comparing in response to a pin select signal, said signal output from each pin scan out circuit being transmitted to said pin scan out terminal in a selection state of the corresponding LSI circuit chip, said multi-layer printed circuit board including a reference voltage feeding layer formed therein in a form of a mesh or a sheet, at least one further layer overlying the reference voltage feeding layer and a plurality of through holes extending through each such further layer, and each reference voltage terminal of said plurality of LSI circuit chips being electrically connected via a corresponding through hole to said reference voltage feeding layer.

4,949,034

**METHOD FOR CONTACTLESS EVALUATION OF CHARACTERISTICS OF SEMICONDUCTOR WAFERS AND DEVICES**  
Makoto Imura, Noda, and Akira Usami, Aichi, both of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha and Japan Silicon Co., Ltd., both of Tokyo, Japan  
Filed Mar. 13, 1989, Ser. No. 322,390  
Claims priority, application Japan, Sep. 7, 1988, 63-224279  
Int. Cl.<sup>5</sup> G01R 31/26, 27/06

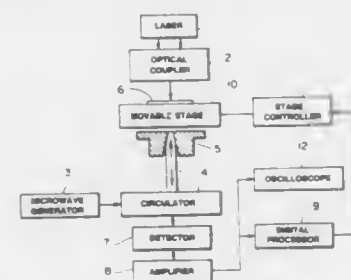
U.S. Cl. 324—158 R

28 Claims

1. A method for contactless evaluation of characteristics of semiconductor wafers and devices, the method comprising the steps of:

- continuously irradiating microwaves on a surface of a semiconductor specimen;
- continuously receiving reflected microwaves reflected from said surface;
- irradiating a laser beam pulse on the specimen, energy of the pulse being in excess of the band-gap energy of the

semiconductor material; said laser beam pulse having a wavelength below the near infrared range; and  
(d) changing the characteristic of the reflected microwaves to an electrical signal for obtaining the intensity of the reflected microwaves at a predetermined moment;



whereby said evaluation is made based on the obtained momentary intensity of the reflected microwaves, not on a time-history of the intensity of the reflected microwaves.

4,949,035

**CONNECTOR ALIGNMENT VERIFICATION AND MONITORING SYSTEM**

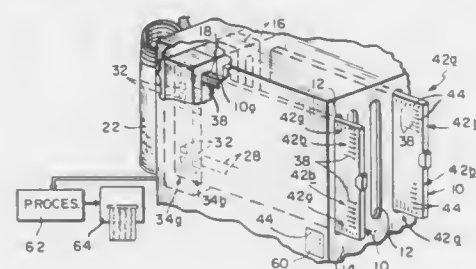
Ralph E. Palmer, II, Norwood, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 6, 1989, Ser. No. 294,202

Int. Cl.<sup>5</sup> G01R 31/02; G08B 21/00

U.S. Cl. 324—158 R

20 Claims



1. A connector alignment verification and monitoring system comprising  
a circuit module having a surface lying in a plane defined by a pair of orthogonal axes;  
a plurality of similar terminal pads on said surface, each said pad extending in the directions of said axes;  
a first alignment pad on said module surface, said first alignment pad comprising a set of electrically isolated conductive features which extends in the direction of at least one of said axes for a distance comparable to the extent of a terminal pad in that same direction;  
a corresponding set of electrical conductors on said module surface leading from said features;  
a connector including an array of electrical contacts for contacting said pads; and  
means for coupling the connector and module together so that a said connector contact is disposed opposite, and establishes electrical continuity with, at least one, but less than all of the features of said first alignment pad; and  
indicating means in circuit with said first alignment pad and its said connector contact for indicating which feature or features of that pad has established



4,949,039

**MAGNETIC FIELD SENSOR WITH FERROMAGNETIC THIN LAYERS HAVING MAGNETICALLY ANTIPARALLEL POLARIZED COMPONENTS**

Peter Grünberg, Jülich, Fed. Rep. of Germany, assignor to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany

Filed Jun. 14, 1989, Ser. No. 365,938

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820475

Int. Cl.<sup>5</sup> G01R 33/06; G11B 5/39; H01L 43/00

U.S. Cl. 324—252



1. A magnetic-field sensor, comprising:

a sensor element having a stack of at least three layers including:

a first ferromagnetic layer magnetized in a first direction, an intermediate layer of a nonferromagnetic material forming an interface with said first layer, and

a second ferromagnetic layer forming an interface with said intermediate layer and magnetically polarized with one magnetization-direction component in a direction opposite to said first direction so that said first and second layers are polarized with one component magnetically antiparallel to said first direction, said intermediate layer being composed of a material which causes a spin dependent electron scattering at the interfaces with the ferromagnetic layers, said intermediate layer having a thickness less than the mean free path length of conductivity electrons in said intermediate layer;

means for connecting an electric current source across the sensor element to pass an electrical current therethrough; and

means connected across the sensor element for measuring a potential difference thereacross representing an external magnetic field acting upon said stack.

4,949,040

**MAGNETIC RESONANCE SPECTROMETER**

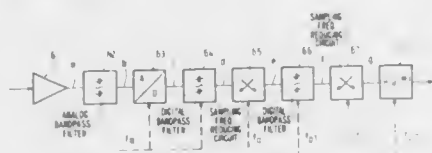
Roland Proksa, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 20, 1989, Ser. No. 325,630

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811066

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—307



1. A magnetic resonance spectrometer comprising: an analog-to-digital converter (63) in a signal path for receiving spin resonance signals; a digital filter (64, 66) in the signal path after the analog-to-digital converter; a sampling frequency reducing circuit (65, 67) in the signal path after the digital filter; and a Fourier transformation means (710) in the signal path after the

sampling frequency reducing circuit; wherein said sampling frequency reducing circuit has at its output a sampling frequency ( $f_{d1}$ ,  $f_{d2}$ ) which is reduced by an integer factor from the sampling frequency ( $f_a$ ,  $f_{d1}$ ) at its input and which equals the frequency of the signal ( $f_{s1}$ ,  $f_{s2}$ ) at the input to the sampling frequency reducing circuit divided by a first non-integer factor greater than 1.

4,949,041

**MAGNETIC RESONANCE IMAGING**

Yuval Zur, Herzlia, Israel, assignor to Elscint Ltd., Haifa, Israel

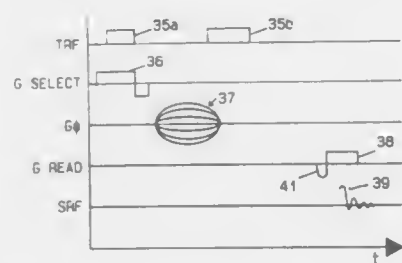
Filed Jan. 24, 1989, Ser. No. 300,980

Claims priority, application Israel, Jan. 29, 1988, 85259

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—309

18 Claims



1. A method of providing motion insensitive scanning in a magnetic resonance imaging system, said method comprising the steps of:

inserting a patient into a large static magnetic field to align spins in the patient with the large static magnetic field, subjecting the spins in the patient to radio frequency pulses to cause the spins to be tipped from alignment with the large static magnetic field,

detecting a signal from the tipped spins, said signal normally having a leading wing, a central section rising to an apex and falling to a trailing wing,

applying gradient pulses to localize the signal source to a selected portion of the patient,

said step of applying gradient pulses including the step of applying a view gradient pulse that begins its maximum amplitude after said leading wing section and before the apex of said signal,

Fourier transforming a digitized signal to obtain digitized data, and

using single side encoding techniques that comprise conjugating said digitized data to acquire full image data, said reconstructed image being insensitive to motion and thereby significantly reducing motion artifacts.

4,949,042

**MAGNETIC RESONANCE IMAGING SYSTEM**

Sigehide Kuhara, Yokohama, and Shoichi Kanayama, Kawaguchi, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 19, 1989, Ser. No. 298,947

Claims priority, application Japan, Jan. 22, 1988, 63-10823; Nov. 26, 1988, 63-299330

Int. Cl.<sup>5</sup> G01R 33/20

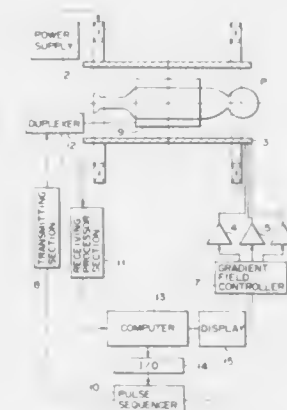
U.S. Cl. 324—311

18 Claims

1. A magnetic resonance imaging system for imaging magnetic resonance signals detected from within an object by applying a high frequency field and gradient field to the object in a homogeneous static field in accordance with a predetermined sequence, comprising:

data pick-up means which, with the use of a predetermined pulse sequence so time-adjusted that a nuclear magnetization phase difference between two predetermined types of

substances somewhat differing in their magnetic resonance frequencies due to a chemical shift is  $\pi/2$  or  $-\pi/2$  on a predetermined time, acquires all magnetic resonance data necessary for reconstruction of an image of a slice excited by said high frequency field into magnetic resonance within a time period in which the predetermined nuclear magnetization of the slice is relaxed due to the relaxation of a transverse magnetization, said predeter-



mined time being a data pick-up time at which a read-out gradient field integral function and phase encode gradient integral function are both zero in a predetermined pulse sequence; and

image processing means for obtaining a magnetic resonance image of at least one of said two substances separated into real and imaginary parts by subjecting magnetic resonance data acquired by said data pick-up means to a two-dimensional complex Fourier transformation.

4,949,043

**APPARATUS FOR RENDERING A STATIC MAGNETIC FIELD UNIFORM**

David F. Hillenbrand, Groveland, Mass., and Piotr M. Starewicz, North Plainfield, N.J., assignors to Resonance Research Inc., Billerica, Mass.

Continuation-in-part of Ser. No. 182,953, Apr. 18, 1988, Pat. No. 4,862,087. This application Jun. 9, 1989, Ser. No. 365,048

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—320

12 Claims

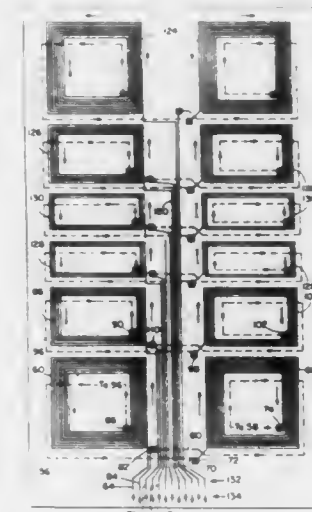
1. Nuclear magnetic resonance apparatus of for concurrent analysis of discrete samples which comprises:

nuclear magnetic resonance analysis apparatus adapted to analyze concomitantly a plurality of samples at rest, a sample container adapted to retain a plurality of discrete samples in a solvent, said samples being retained in radially discrete positions within a volume of a magnet within said apparatus having a substantially homogeneous static magnetic field,

an insulating cylinder positioned within the volume of said magnet and having mounted therein a plurality of electrically conductive radial and axial coils designed to control at least the first 6 orders of the spherical harmonic expansion of gradients of a static magnetic field generated by said magnet,

said radial coils being spirally wound and comprising a plurality of coils sets, each coil set extending about a substantial portion of the circumference of said volume,

each coil set being connected in series to an electrical current independent of that of all other coil sets,



and a plurality of signal detection channels, each arranged to couple with one of said samples, and each of said channels communicating with a radio frequency processing apparatus to obtain from said samples resonance spectra.

4,949,044

**APPARATUS FOR MAPPING A STATIC MAGNETIC FIELD**

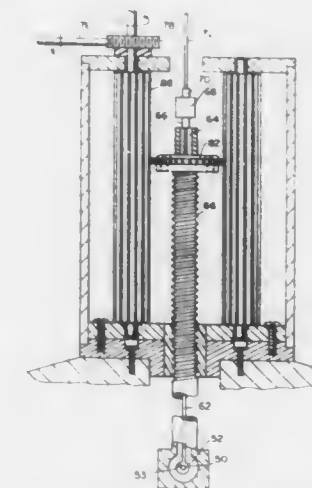
Piotr M. Starewicz, Plainfield, N.J., and David F. Hillenbrand, Groveland, Mass., assignors to Resonance Research, Inc., Billerica, Mass.

Filed Jun. 9, 1989, Ser. No. 364,310

Int. Cl.<sup>5</sup> G01R 33/20

U.S. Cl. 324—320

6 Claims



1. Apparatus for mapping a static magnetic field generated by a static magnet which comprises:

a liquid sample mounted on a magnetic field probe adapted to generate an alternating magnetic field and for measuring an induced signal from said sample, said signal being generated by said alternating magnetic field, means for generating said alternating magnetic field, means for moving said sample to discrete locations along a helical path within said static magnetic field, and means for recording said induced signal from said discrete locations.

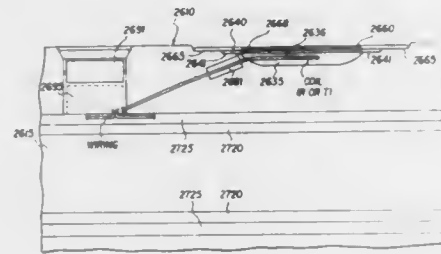
4,949,045

# WELL LOGGING APPARATUS HAVING A CYLINDRICAL HOUSING WITH ANTENNAS FORMED IN RECESSES AND COVERED WITH A WATERPROOF RUBBER LAYER

Brian Clark; Jacques Jundt; Martin Luling, all of Missouri City, and Michael O. Ross, Needville, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.  
Division of Ser. No. 115,503, Oct. 30, 1987, Pat. No. 4,899,112.  
This application Jun. 20, 1989, Ser. No. 369,584  
Int. Cl.<sup>5</sup> G01V 3/18

U.S. Cl. 324—338

19 Claims



1. A well logging device for investigating formations surrounding a borehole, comprising:
  - an elongated generally cylindrical housing moveable through the borehole;
  - a transmitting antenna and first and second receiving antennas carried by said housing, said receiving antennas being successively spaced longitudinally from said transmitting antenna;
  - first and second compartments in said housing, each of said compartments being adjacent a respective receiving antenna, and having at least one communicating passage through the housing to its respective receiving antenna, each of said compartments containing signal conditioning means that include impedance matching and preamplification means, each antenna being coupled to said signal conditioning means through said communicating passage;
  - means for applying electromagnetic energy to said transmitting antenna; and
  - means coupled to said signal conditioning means for receiving signals from said receiving antennas and for measuring said signals.

4,949,046

# BATTERY STATE OF CHARGE INDICATOR

George R. Seyfang, Lancashire, England, assignor to British Aerospace Public Limited Company, London, England  
Continuation of Ser. No. 932,144, Nov. 18, 1986, abandoned.  
This application Jun. 21, 1988, Ser. No. 210,166  
Claims priority, application United Kingdom, Nov. 19, 1985, 8528472

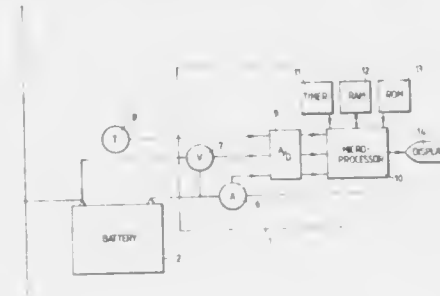
Int. Cl.<sup>5</sup> G01N 27/46

U.S. Cl. 324—427

12 Claims

1. A combination of a battery and a device for indicating a state of charge of said battery, comprising:
  - a Ni-Cad battery including input/output terminals;
  - a current sensor operatively connected to said input/output terminals and arranged to provide an output indicative of magnitude and direction of a current flow from said Ni-Cad battery;
  - a voltage sensor operatively connected to said input/output terminals and arranged to sense a potential difference subsisting across said input/output terminals;
  - timing means arranged to provide a time signal;
  - data storage means for storing an indication of a state of charge of said battery; and
  - computer means for determining said state of charge of said battery operatively connected to said current sensor, to

said voltage sensor, to said timing means, and to said data storage means, said computer including:  
means for computing from the output of the current sensor and the timing means a signal representative of a change in a state of charge of said battery over a period of time,  
means for supplying to said data storage means a signal representative of said change in said state of charge of said battery to update stored data on said state of charge of said battery to provide an indication of the current state of charge of said battery,  
means for monitoring an output signal of said voltage sensor and, when the monitored voltage reaches a pre-



determined maximum value to reset said data storage means to indicate that said battery is fully charged and, when said battery is fully charged and when said monitored voltage reaches a predetermined minimum value, to reset said data storage means to indicate that said battery is fully discharged, and  
means for comparing the state of charge indication immediately before it is reset at one of said predetermined maximum and minimum values with the state of charge indicated by the voltage sensor when the indication is reset when the battery is one of fully charged and fully discharged, respectively, and to use the results of this comparison to vary at least one parameter to tailor said at least one parameter to the connected battery.

4,949,047

# SEGMENTED RFQ ACCELERATOR

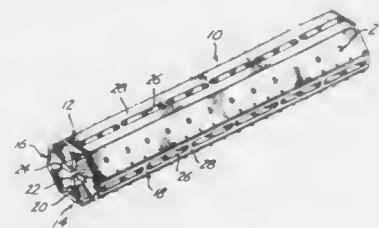
Thomas D. Hayward, Tacoma, Wash.; Robert H. Hamm, Pleasanton, Calif., and Marco Johnson, Seattle, Wash., assignors to The Boeing Company, Seattle, Wash. and AccSys Technology, Incorporated, Pleasanton, Calif.

Filed Sep. 24, 1987, Ser. No. 100,637

Int. Cl.<sup>5</sup> H05H 9/00

U.S. Cl. 328—233

4 Claims



1. A segmented RFQ accelerator comprising:
  - (a) a pair of elongated major segments with radio-frequency conducting surfaces, each of said major segments having:
    - (i) an elongated vane portion lying parallel to the longitudinal axis of the segment; and
    - (ii) a pair of elongated mounting arms projecting from said vane portion and lying parallel to the longitudinal axis

4,949,049

# BIASING NETWORK FOR INTEGRATED PAIRS OF AMPLIFIERS INTERNALLY COMMUTABLE FROM A SINGLE-ENDED TO A BALANCED CONFIGURATION AND VICEVERSA

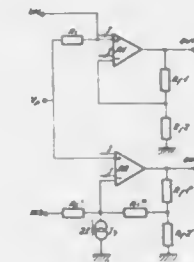
Edoardo Botti, Mortara, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Italy

Filed Apr. 25, 1989, Ser. No. 342,830

Claims priority, application Italy, Apr. 27, 1988, 83631 A/88  
Int. Cl.<sup>5</sup> H03F 3/68

U.S. Cl. 330—124 R

2 Claims



- of the segment, each of said mounting arms having a mounting surface;
- (b) a pair of elongated minor segments having radio-frequency conducting surfaces, each of said minor segments having:
  - (i) an elongated vane portion lying parallel to the longitudinal axis of the segment; and
  - (ii) an elongated mounting portion lying parallel to the longitudinal axis of the segment, said mounting portion being formed to have two mounting surfaces, each of said mounting surfaces of said elongated mounting portions being aligned with a respective one of the mounting surface on said elongated mounting arms on said first pair of elongated major segments such that when said first pair of elongated major segments and said second pair of elongated minor segments are joined together, said major segments and said minor segments are positioned in diametrically-opposed pairs along a common longitudinal axis, and said vane portions are oriented to face toward said common longitudinal axis;
- (c) four flexible seals, one positioned between each mounting surface of the elongated mounting portions and its respective aligned mounting surface of the elongated mounting arms, for maintaining radio-frequency contact between said mounting surfaces; and
- (d) fastening means for adjustably joining said major segments and said minor segments to one another.

1. An input bias network for an integrated pair of operational amplifiers, which may be switched between a single-ended and a bridge configuration to form a desired amplifier circuit, capable of preventing generation of an offset voltage, said network comprising:

means for connecting a constant voltage ( $V_p$ ) source through a first resistance ( $R_i$ ) to a noninverting input of a first operational amplifier of said pair, constituting a first input terminal (IN1) of the circuit, and directly to a noninverting input of a second amplifier of said pair, an inverting input of which is connected through a second resistance ( $R_i'$ ) to a second input terminal (IN2) of the circuit, said constant voltage ( $V_p$ ) source forcing the passage of a substantially identical bias current through inverting inputs and noninverting inputs of both said operational amplifiers; and

a single, constant current generator (13) for the input bias network for generating a current, the value of which is twice the value of said bias current, said generator being connected between the inverting input of the second operational amplifier and a ground node of the circuit for nullifying an input offset voltage.

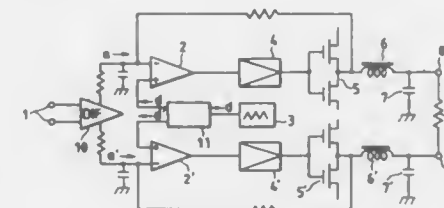
4,949,048

# PULSE WIDTH MODULATION AMPLIFIER CIRCUIT

Akio Tokumo; Masayuki Kato; Takeshi Sato, and Tatsuzo Hasegawa, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan  
Filed Nov. 8, 1989, Ser. No. 433,234  
Claims priority, application Japan, Dec. 28, 1988, 63-328811  
Int. Cl.<sup>5</sup> H03F 3/38

U.S. Cl. 330—10

5 Claims



1. A pulse width modulation circuit comprising:
  - generating means receiving an analog signal, for generating first and second analog signals having phases different from each other by 180 degrees;
  - phase shifting means for producing first and second high frequency carrier signals having phases different from each other by approximately 90 degrees; and
  - first and second pulse width modulation amplifier means for pulse width modulating said first and second high frequency carrier signals with said first and second analog signals, respectively, and amplifying resultant pulse width signals, respectively, output terminals of said first and second pulse width modulation amplifier means being connected to opposite ends of a load.

4,949,050

# RF POWER AMPLIFIER SYSTEM HAVING AMPLIFIER PROTECTION

Hilmer I. Swanson, Quincy, Ill., assignor to Harris Corporation, Melbourne, Fla.

Filed Sep. 12, 1989, Ser. No. 404,461

Int. Cl.<sup>5</sup> H02H 7/20; H03F 3/26

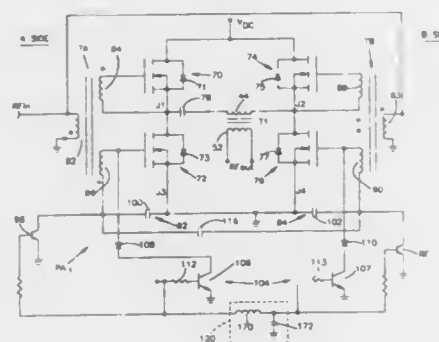
U.S. Cl. 330—298

15 Claims

1. An RF power amplifier system having amplifier protection, comprising:
  - an RF source for providing an RF signal;
  - a bridge circuit having an input circuit adapted for connection across a DC voltage source and an output circuit connected across a load, said bridge circuit including first and second transistor switching means for, when on, connecting said DC voltage source across said load for DC current flow therethrough in a first direction and third and fourth transistor switching means for, when on, connecting said DC voltage source across said load for DC current flow therethrough in a second direction;
  - switch drive control means responsive to said RF signal for normally driving said transistor switching means on and off at a frequency dependent upon said RF signal and in such a manner that current from said DC source alter-



nately flows in said first and second directions through said load;  
actuable amplifier control means for, until actuated, applying a reverse bias to said second and fourth transistor switching means to prevent them from conducting current; and  
turn on signal means for providing a turn on signal for actuating said amplifier control means to remove said reverse



bias from said second and fourth transistor switching means in such a manner that the reverse bias applied to said fourth transistor switching means is removed during a first half cycle of said RF signal when said fourth transistor switching means is off and that the reverse bias applied to said second transistor switching means is removed during a succeeding half cycle of said RF signal when said second transistor switching means is off.

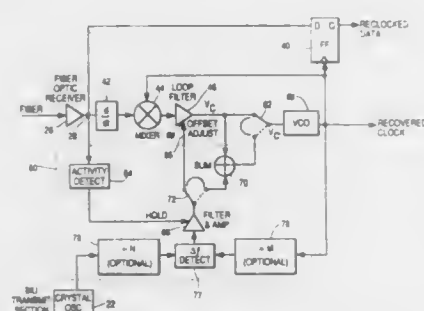
#### 4,949,051 PHASE LOCK CLOCK RECOVERY WITH AIDED FREQUENCY ACQUISITION

Jeffrey P. Viola, Brookhaven, Pa., assignor to General Electric Company, Camden, N.J.

Filed Sep. 1, 1989, Ser. No. 401,707  
Int. Cl.<sup>5</sup> H03L 7/00

U.S. Cl. 331-11

11 Claims



1. Apparatus adapted for determining the frequency of a clock signal from a received data signal which includes said clock signal, comprising in combination:

- first and second servo loops;
- said first servo loop comprising in combination:
- first means for comparing said data signal and a signal representing a frequency of an output recovered clock frequency for producing an output signal having a parameter corresponding to the difference between the frequency of said included clock signal and output recovered clock frequency signal; and
- a parameter controlled oscillator responsive to said first means output signal for producing said output recovered clock frequency signal;
- said second servo loop comprising in combination:

a signal source having a frequency which is nominally proportional to said frequency of said clock signal;  
second means responsive to said signal source and to said output recovered clock frequency signal for producing an output signal corresponding to the difference in frequency between those of the two signals input to it; and  
third means responsive to the absence or presence of said received data signal and to said second means output signal for producing an output signal having a parameter corresponding to said second means output signal in the absence of said received data signal and, in the presence of said received data signal, to a value that said third means had during the absence of said received data signal;  
said parameter controlled oscillator also being responsive to said third means output signal for thereby more quickly producing an output signal corresponding to the included clock frequency of said data signal than in the absence of said second servo loop.

#### 4,949,052 CLOCK SIGNAL GENERATOR HAVING BACK-UP OSCILLATOR SUBSTITUTION

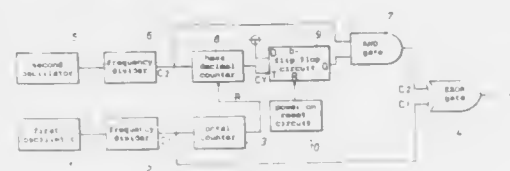
Kazumasa Chigira, Gumma, Japan, assignor to Mitsubishi Electric Manufacturing Co., Ltd., Gumma, Japan

Filed Mar. 15, 1989, Ser. No. 324,284

Claims priority, application Japan, Mar. 15, 1988, 63-61146  
Int. Cl.<sup>5</sup> H03K 3/00

U.S. Cl. 331-49

6 Claims



1. A clock signal generator, comprising:
  - a first oscillator for producing periodic pulses;
  - a second oscillator for producing periodic pulses;
  - detecting means for detecting the failure of said first oscillator to produce periodic pulses; and
  - control means for outputting the periodic pulses generated from said first oscillator when said detecting means does not detect the failure of said first oscillator to produce periodic pulses, and outputting the periodic pulses produced from said second oscillator when said detecting means detects the failure of said first oscillator to produce periodic pulses;
- wherein said detecting means comprises:
  - counting means for counting the periodic pulses produced from said second oscillator and producing a carry signal after counting n number of pulses, n being an integer greater than one; and
  - means for resetting said counting means before said counting means counts to n as long as said detecting means does not detect said failure of said first oscillator.

#### 4,949,053 OSCILLATOR HAVING FEEDBACK ISOLATED FROM ITS OUTPUT

Richard C. Havens, 613 Sabal Lake Dr., Apt. 211, Longwood, Fla. 32779

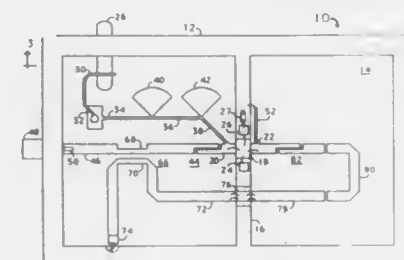
Filed Sep. 1, 1989, Ser. No. 401,917  
Int. Cl.<sup>5</sup> H03B 5/00

U.S. Cl. 331-96

9 Claims

1. A microwave oscillator including an active device for providing gain at the frequency of operation of the oscillator and a feedback path between the output of the device and the input of the device for providing a feedback signal to the latter of correct phase and magnitude for sustaining oscillations,

wherein the improvement comprises a coupling circuit comprised of a power splitter including an input port and two output ports for splitting the power supplied from the device to said input port between both an output of the oscillator which is coupled to one of said two output ports and the feedback



path which is coupled to the other of said two output ports while isolating said two output ports from each other to substantially inhibit any signals traveling from said output of the oscillator toward the device from being coupled into the feedback path.

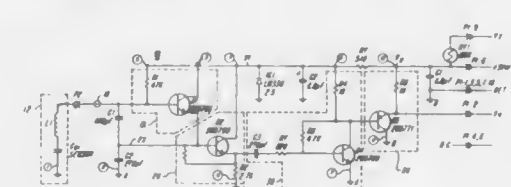
#### 4,949,054 TEMPERATURE STABLE OSCILLATOR

Dennis K. Briefér, Marlboro, Mass., assignor to Setra Systems, Inc., Acton, Mass.

Filed Aug. 24, 1988, Ser. No. 235,673

Int. Cl.<sup>5</sup> H03B 5/12; H03L 1/02  
U.S. Cl. 331-117 R

32 Claims



1. An oscillator comprising:
  - A. a first frequency control network coupled between a drive terminal and a first reference potential,
  - B. a pair of capacitors C1 and C2 coupled in series between said drive terminal and second reference potential,
  - C. a first emitter follower amplifier having a transistor with its base connected to said drive terminal, its collector coupled to a third reference potential, and its emitter coupled by way of a current limiter to a fourth reference potential, and having means for establishing a resistive current path between said base and a fifth reference potential,
  - D. means for establishing a feedback path between said emitter and the junction between capacitors C1 and C2, whereby current from said emitter is divided between said current limiter and said feedback path to establish an oscillatory potential at said drive terminal and at said emitter while maintaining said transistor substantially out of its saturation state.

#### 4,949,055 CRYSTAL OSCILLATOR COMPENSATION CIRCUIT

Franz Lettl, Luisenstrasse 3, D-7100 Heilbronn, Fed. Rep. of Germany

PCT No. PCT/DE87/00382, § 371 Date Feb. 10, 1989, § 102(e) Date Feb. 10, 1989, PCT Pub. No. WO88/01810, PCT Pub. Date Mar. 10, 1988

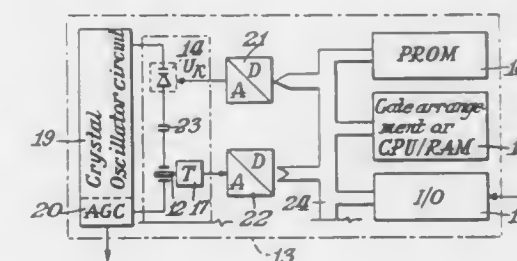
PCT Filed Aug. 28, 1987, Ser. No. 334,107

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1986, 3629588

Int. Cl.<sup>5</sup> H03B 5/32

U.S. Cl. 331-158

10 Claims



1. Crystal oscillator compensation circuit comprising
  - (a) an oscillator crystal which is excited into oscillation by a crystal oscillator circuit, and
  - (b) an adjustable capacitance for adjusting the frequency of the crystal, characterized by
  - (c) a port (15) for connecting a measuring instrument (27) for measuring characteristics of the crystal (12),
  - (d) a store (16; 16.1) for storing characteristic numbers of the crystal calculated from the measurement data
  - (e) a logic circuit (18), and
  - (f) an aging circuit (37), which emits an aging signal to the logic circuit (18) by means of a count (N) from a counter (40) and, for this purpose, contains an oscillator circuit (39) which exhibits at least one component (38) which is temperature-dependent in its characteristics and which is connected in such a manner that the elementary frequency of the oscillator counted by the counter (40) changes with the temperature in accordance with the law  $f = K_e \cdot e^{-k_f/T}$ , in which arrangement  $k_e$  and  $k_f$  are constants which are individually determined for each oscillator, and in which arrangement the logic circuit emits, in dependence on the respective aging signal, an aging compensation signal to the adjustable capacitance (14) which is changed between a first time (t1) and a second time (t2) in accordance with a known law and taking into consideration the stored characteristic numbers, by such an amount that the resultant influence for shifting the oscillator frequency (f) just cancels the influence for the opposite shift due to the aging between the two times.

#### 4,949,056 UNCONVENTIONAL ADAPTIVE OPTICS

Prasad R. Akkapeddi, Norwalk, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

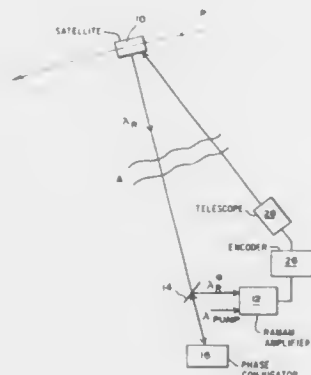
Filed Jul. 29, 1985, Ser. No. 759,729

Int. Cl.<sup>5</sup> H01S 3/00; H03F 7/00; H04B 9/00  
U.S. Cl. 330-4.3

13 Claims

1. The method of correcting an optical beam to be transmitted through an atmospheric path from a base location to a target for atmospheric and optical phase aberrations introduced by said path which comprises:
  - providing a Raman amplifier at said base location;
  - propagating an optical beam from said target to said base location at a Stokes shifted Raman wavelength which matches the vibrational state of the Raman amplifier medium;

phase-conjugating the optical beam from said target at said base location;  
amplifying the phase-conjugated optical beam in said Raman amplifier; and



redirecting the amplified phase-conjugated beam to said target through said atmospheric path.

4,949,057

# **DISTRIBUTED CONSTANT TYPE DELAY LINE DEVICE AND A MANUFACTURING METHOD THEREOF**

Taeko Ishizaka, Tokyo; Yoshihiko Kasai, and Hajime Okamura, both of Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

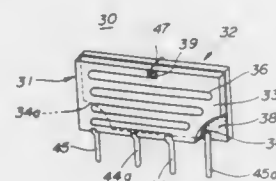
Filed Jul. 25, 1989, Ser. No. 384,729

Claims priority, application Japan, Jul. 28, 1988, 63-186928

Int. Cl.<sup>5</sup> H01P 9/00

U.S. Cl. 333—161

5 Claims



1. A distributed constant type delay line device, comprising:
  - a first base body having a first cutout portion at a first bottom corner thereof;
  - a first delay path pattern provided on a front side of the first base body;
  - a first ground conductor provided on a rear side of the first base body;
  - a second base body having a second cutout portion at a first bottom corner thereof corresponding to said first bottom corner of the first base body when viewed from a front direction of the second base body;
  - a second delay path pattern provided on a front side of the second base body;
  - a second ground conductor provided on a rear side of the second base body;
  - said second base body being combined with said first base body by contacting the second ground conductor to the first ground conductor such that said first cutout portion on the first base body exposes a part of the second ground conductor covering a second bottom corner of the second base body which is not provided with the second cutout portion and that said second cutout portion exposes a part of the first ground conductor covering a second bottom corner of the first base body which is not provided with

the first cutout portion when the first and second base bodies are assembled;

- a pair of input/output pins provided on said first and second base bodies for connection with respective first ends of the first and second delay path patterns;
- a pair of ground pins provided on the respective second bottom corners of said first and second base bodies for connection with exposed parts of the first and second ground conductors; and
- a jumper member provided so as to bridge the first and second base bodies for connecting a second end of the first delay path pattern to a corresponding end of the second delay path pattern.

4,949,058

# **ELECTROMAGNETIC RELAY**

Toyotaka Nishikawa, Tamaki, and Kazuhiko Inoue, Misono, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan

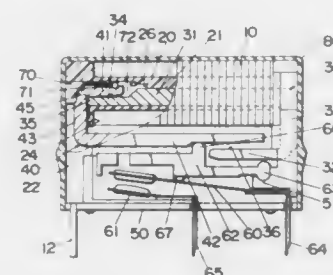
Filed Dec. 19, 1989, Ser. No. 452,503

Claims priority, application Japan, Dec. 23, 1988, 63-166932[U]; Oct. 2, 1989, 1-116095[U]

Int. Cl.<sup>5</sup> H01H 51/08

U.S. Cl. 335—128

8 Claims



1. An electromagnet relay comprising:
  - an elongated coil bobbin having an axially extending bore and carrying therearound an excitation coil;
  - a generally U-shaped yoke with opposed first and second yoke members, said yoke magnetically coupled to said excitation coil with said first yoke member extending into said axial bore and with said second yoke member extending outwardly of said excitation coil, said first yoke member terminating at a portion adjacent one longitudinal end of said axial bore to define thereat a first pole end with a pivot edge, and said second yoke member defining a second pole end at its end spaced from said coil;
  - a generally U-shaped armature having short and long legs connected by a web and defining a bearing edge at an inner corner formed between the short leg and the web, said long leg extending outwardly of said excitation coil to have its free end portion in an adjacent relation to said second pole end, said short leg extending into said axial bore in an overlying relation with said first pole end of said first yoke member with said bearing edge supported on said pivot edge such that said armature is pivotable about said pivot edge between a set position where said short and long legs are magnetically attracted respectively to said first and second pole ends upon energization of said excitation coil and a reset position where said short and long legs are kept respectively away from said first and second pole ends;
  - a movable contact operatively connected to said armature to be driven thereby to come into and out of contact with a complementary contact in response to said armature movement between the set and reset positions; and
  - a hinge spring held in said one end of the axial bore adjacent to and axially outwardly of said short leg of the armature so as to urge said bearing edge of against said pivot edge

for providing a fixed pivot axis about which said armature pivots between said set and reset positions.

4,949,059

# **FLANGE ENGAGEMENT OF CAPTIVE TUBE BY ENCLOSURE WALL IN ELECTROMAGNETIC CIRCUIT BREAKERS MOUNTED ON A BASE**

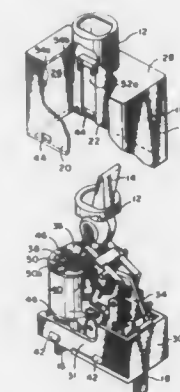
Konrad J. Richter, Sr., Lawrenceville, N.J., assignor to Heine-mann Electric Company, Lawrenceville, N.J.

Filed Feb. 22, 1989, Ser. No. 313,955

Int. Cl.<sup>5</sup> H01H 9/02

U.S. Cl. 335—202

4 Claims



1. An electromagnetic circuit breaker having a pair of breaker switch contacts electrically connected in series with a magnetic coil comprising an insulating base supporting a frame which, in turn, supports at least a linkage for opening and closing the switch contacts and having manual actuation means to open and close the switch contacts and a movable armature attractable to a pole piece for opening the switch contacts on overload, the pole piece terminating a non-magnetic tube containing and guiding a magnetic core, the non-magnetic tube being located within a bobbin supporting the magnetic coil and having a radially extending tube flange at the pole piece end, and an insulating housing enclosure for enclosing the structure supported on the base, the enclosure being connectable to the base so as to provide a unitary housing, the tube flange being engaged by shoulders on the respective opposed sidewalls of the interior of the enclosure as the enclosure is passed over the breaker structure so that just prior to connection with the base, pressure is applied to urge the tube flange against its supporting surface and clamp in place the flange and all structure between the flange and the frame.

4,949,060

# **FUSE-ISOLATOR - ACTUATOR**

Harvey W. Mikulecky, Oconomowoc, Wis., assignor to Cooper Power Systems, Inc., Houston, Tex.

Filed Jul. 11, 1989, Ser. No. 378,049

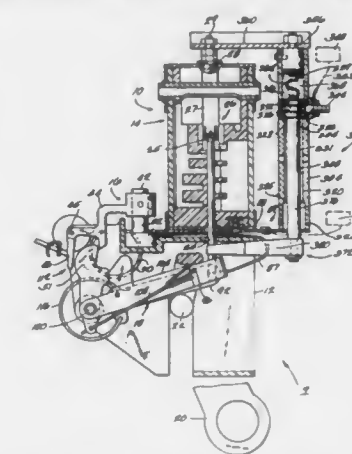
Int. Cl.<sup>5</sup> H01H 85/00, 71/20

U.S. Cl. 337—4

25 Claims

1. An apparatus comprising:
  - a power transformer primary circuit breaker device adapted to be electrically connected in a circuit and including a first contact, a second contact movable out of engagement with said first contact to open the circuit and movable into engagement with said first contact to close the circuit, and temperature out of engagement with said first contact in response to a fault condition in the circuit; and
  - a fuse device including a fusible link connected in electrical series with the breaker device, and adapted to melt upon an overcurrent condition in the circuit, and means separate from said trip means and for moving said second contact out of engagement with said first contact in response to fusing out of said fusible link, wherein melting of

said fusible link produces an arc, and wherein production of the arc causes said means separate from said trip means



to move said second contact out of engagement with said first contact.

4,949,061

# **ELECTROMECHANICAL RELAY**

Safa Kirma, Wedel/Holstein, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

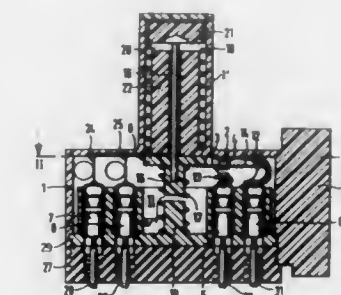
Filed Jul. 7, 1989, Ser. No. 376,613

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823186

Int. Cl.<sup>5</sup> H01H 61/06, 37/46

U.S. Cl. 337—140

7 Claims



1. An electromechanical relay, comprising housing means, electrical spring contact means in said housing means for actuating at least one operating circuit, a mechanical operating member in said housing means for operating said spring contact means for opening or closing a respective operating circuit, said operating member comprising a disk, a connecting rod, and a guide piston connected to said disk by said rod, said housing including a section in which said guide piston is guided, said relay including an actuator in said housing means for moving said operating member in response to a switching current applied to said actuator of said relay means, said actuator being made of a material having a shape memory characteristic for returning into a normal shape after a change in said normal shape, and reset means arranged for cooperation with said actuator, said reset means having an effective operating direction opposite to an operating direction of said actuator for assisting said actuator in returning to said normal shape.



**4,949,062**  
**FUSE HAVING A NON-ELECTRICALLY CONDUCTIVE END BELL**  
 Ronald E. Mollet, Ellsville, Md., assignor to Cooper Industries, Inc., Houston, Tex.  
 Filed Apr. 24, 1989, Ser. No. 344,718  
 Int. Cl.<sup>5</sup> H01H 85/143, 85/146  
 U.S. Cl. 337—248 2 Claims



1. A fuse comprising:  
 an insulating tube having a plurality of pin holes adjacent the ends thereof;  
 a first end bell assembly received in one end of said insulating tube comprising:  
 a first end bell of non-electrically conductive plastic material having a diameter adapted to be received within said insulating tube and having bores circumferentially spaced around the periphery thereof adapted for alignment with said pin holes around said tube;  
 an opening in said first end bell;  
 a first terminal having one end of said first terminal inserted in and passing through said opening and attached to said first end bell;  
 a second end bell assembly received in the other end of said insulating tube comprising:  
 a second end bell of non-electrically conductive plastic material having a diameter adapted to be received within said insulating tube and having bores circumferentially spaced around the periphery thereof adapted for alignment with said pin holes around said tube;  
 an opening in said second end bell;  
 a second terminal having one end of said second terminal inserted in and passing through said opening and attached to said second end bell;  
 a fuse element housed within said insulating tube electrically connecting said first and second terminals;  
 arc quenching material within said insulating tube surrounding said element; and  
 pins received within said aligned pin holes and bores for securing said end bells within said insulating tube whereby said pins are non-electrically engaged with said terminals and fuse element.

**4,949,063**  
**END CLOSURE SYSTEM FOR HIGH SPEED FUSE**  
 Fred Levko, Chesterfield, Mo., assignor to Cooper Industries, Inc., Houston, Tex.  
 Filed Apr. 24, 1989, Ser. No. 344,717  
 Int. Cl.<sup>5</sup> H01H 85/14, 85/16  
 U.S. Cl. 337—248 6 Claims

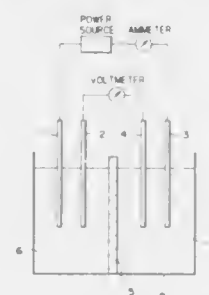
1. A fuse comprising:  
 a first end bell assembly comprising:  
 a first end bell;  
 an opening in said first end bell;  
 a first terminal having one end of said first terminal inserted in and passing through said opening;  
 said one end of said first terminal having a portion projecting through said opening and said projecting portion being staked to said first end bell to secure said first terminal to said first end bell;  
 a second end bell assembly comprising:  
 a second end bell;

an opening in said second end bell;  
 a second terminal having one end of said second terminal inserted in and passing through said opening;  
 said one end of said second terminal having a portion projecting through said opening and said projecting portion being staked to said second end bell to secure said second terminal to said second end bell;



a fuse element having ends electrically and mechanically connected to said projecting portions of said first and second terminals;  
 arc quenching material surrounding said element; and  
 a tube surrounding said arc quenching material.

**4,949,064**  
**NON-LINEAR RESISTOR HAVING A POLY (AMINO ACID) MEMBRANE**  
 Norihiko Minoura; Kei Urabe; Seichi Aiba; Kazuhiro Taguchi, and Yukihiko Fujiwara, all of Tsukuba, Japan, assignors to Japan as represented by Director General of Agency of Industrial Science and Technology, Tokyo, Japan  
 Filed Feb. 21, 1989, Ser. No. 313,079  
 Claims priority, application Japan, May 2, 1988, 63-109749  
 Int. Cl.<sup>5</sup> H01C 10/02  
 U.S. Cl. 338—80 11 Claims

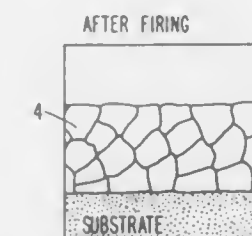


1. A non-linear resistor which comprises, as a functional element, a polymeric membrane formed of a poly(amino acid) having ionic groups as the pendants to the main chain of the molecule and insoluble in water as a whole.

**4,949,065**  
**RESISTOR COMPOSITION, RESISTOR PRODUCED THEREFROM, AND METHOD OF PRODUCING RESISTOR**  
 Hirotohi Watanabe, Osaka, and Toru Ishida, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Sep. 20, 1988, Ser. No. 247,064  
 Claims priority, application Japan, Sep. 21, 1987, 62-236521; Oct. 16, 1987, 62-262065  
 Int. Cl.<sup>5</sup> H01C 1/012  
 U.S. Cl. 338—308 31 Claims

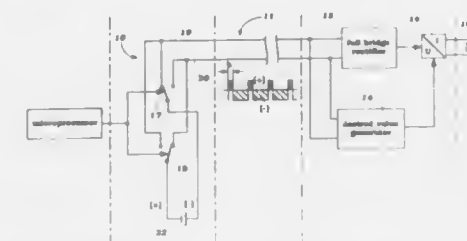
1. A resistor composition which comprises: at least one of silicon, silicon monoxide, and higher oxidation state precursor

of silicon monoxide; and a borosilicate glass containing at least one of zirconium oxide, vanadium pentoxide, chromium oxide,



tungsten trioxide, molybdenum trioxide, manganese oxide, titanium oxide, niobium pentoxide and tantalum pentoxide.

**4,949,066**  
**CIRCUIT ARRANGEMENT FOR TRANSMITTING A SUPPLY VOLTAGE AND A CONTROL SIGNAL**  
 Peter Reinhardt, Lohr, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr Postfach, Fed. Rep. of Germany  
 Filed May 9, 1988, Ser. No. 191,383  
 Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717260  
 Int. Cl.<sup>5</sup> H04M 11/04  
 U.S. Cl. 340—310 R 3 Claims



1. Circuit arrangement for transmitting a supply voltage and a control signal via a cable to a power stage for driving a solenoid valve, characterized by a changeover contact in said circuit for switching the polarity of the DC supply voltage alternately between two conductors of said cable to create pulses, the duration of said pulses being modulated in dependence upon the adjusting value of said control signal, and said power stage including a full-bridge rectifier for reestablishing the DC supply voltage from said pulses and a desired value generator for reestablishing the control signal in response to the duration of said pulses.

**4,949,067**  
**WARNING SYSTEM FOR RACETRACK**  
 Richard J. Martell, 4929 Orangeport Rd., Brewerton, N.Y. 13029  
 Continuation-in-part of Ser. No. 944,658, Dec. 22, 1986, abandoned. This application Mar. 17, 1989, Ser. No. 325,109  
 Int. Cl.<sup>5</sup> G08B 23/00  
 U.S. Cl. 340—323 R 9 Claims

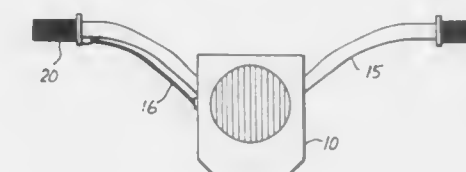
1. A race condition alerting system for use on a closed loop race course to signal racing conditions to all of a plurality of racing motor vehicles proceeding around said closed loop race course, in which a race official monitors race course conditions and signals one of a plurality of conditions including a yellow flag or caution condition or a green flag or safe race condition, to be observed by the operators of said racing motor vehicles with one of said conditions being in effect at any time during a race, comprising:  
 transmitter means transmitting a carrier which is modulated with a racing condition signal to indicate a selected one of

said conditions, including manually actuable means for permitting the race official to select between said conditions according to the observed race course condition, radiating means for radiating the carrier over a range that encompasses the entire race course, and a pulse-code-modulation encoder that encodes the modulated carrier for transmitting the selected one of the conditions; and a plurality of receiver units each including means for mounting in a respective one of each racing motor vehicles; antenna means to receive said carrier at all positions on said race course; a demodulator for demodulating said carrier; a decoder, corresponding to the encoder of said transmitter, to decode automatically said pulse-code-modulated carrier; indicating lights which comprise at least one yellow light and at least one green light; and means for switching on an associated one of said indicat-



ing lights in accordance with the decoded race course condition as represented by the decoded carrier and presenting a continuous positive visual indication to the respective operator at all times during the race; wherein the means for switching on an associated light includes a flag condition circuit coupled to an output of said decoder for switching over said green light and said yellow light only in response to the respective preset codes being applied to an input of said decoder, said flag condition circuit disregarding any codes except said preset codes; such that when said race official actuates said manually actuable means to any of said conditions, all of the racing motor vehicle operators are presented with the same continuously visible condition indication at substantially the same time, and the associated one of the lights will be lit and visible to the race vehicle operators at all times during the race.

**4,949,068**  
**MOTORCYCLE SOUND SIMULATOR FOR A CHILD'S TOY**  
 John Johnston, 3230 Colima Rd., Atascadero, Calif. 93422, and Dee Jordan, Bakersfield, Calif., assignors to John Johnston, Atascadero, Calif.  
 Filed Nov. 28, 1988, Ser. No. 277,016  
 Int. Cl.<sup>5</sup> G08B 3/00  
 U.S. Cl. 340—384 E 8 Claims



1. A device for simulating the sound of a motorcycle, comprising:  
 at least two oscillation means, each such means for creating an electrical oscillation, each oscillation being at least partially out of phase with the other oscillation;  
 a means for proportionately varying the frequencies of the electrical oscillations;

a means for mixing the electrical oscillations together;  
a means for converting the mixed electrical oscillations into audible sound waves;  
the at least two oscillation means comprise only two such means;  
each of the electrical oscillations is a positive going rectangular wave having pulse width;  
one said electrical oscillation has a wider pulse width than the other electrical oscillation; and  
the frequency range of one of the oscillation means is from approximately seventeen (17) Hertz to approximately one hundred thirty one (131) Hertz.

4,949,069

**DYNAMIC LIQUID LEVEL INDICATOR**

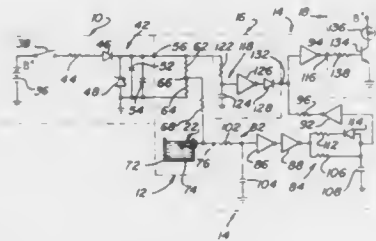
Carl R. Wilson, Texico, Ill., assignor to Sparten Corporation, Jackson, Mich.

Filed Nov. 9, 1988, Ser. No. 269,122

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—450.1

13 Claims



1. A liquid level indicator comprising:  
a sensing circuit responsive, when energized, to a liquid level for producing a first logic signal having one logic state when the liquid is above a predetermined level and another logic state when the liquid is below said predetermined level,  
an energizing circuit coupled with said sensing circuit and including a voltage source and a switch for energizing said sensing circuit,  
a logic circuit coupled with said sensing circuit and responsive to said first logic signal for producing a second logic signal in a first logic state in response to said first logic signal being in said one logic state and for producing said second logic signal in a second logic state in response to said first logic signal being in said another logic state,  
an indicator circuit coupled with said logic circuit and responsive to said second logic signal in said first logic state for signifying that said liquid is above said predetermined level and responsive to said second logic signal in said second logic state for signifying that said liquid is below said predetermined level,  
and inhibiting means responsive to energization of said sensing circuit and coupled with said logic circuit for holding said second logic signal in said first logic state for a predetermined time period after said sensing circuit is energized.

4,949,070

**LOCOMOTIVE LUBRICATION LEVEL MONITOR**

Donald C. Wetzal, Berea, Ohio

Filed Jan. 19, 1989, Ser. No. 298,680

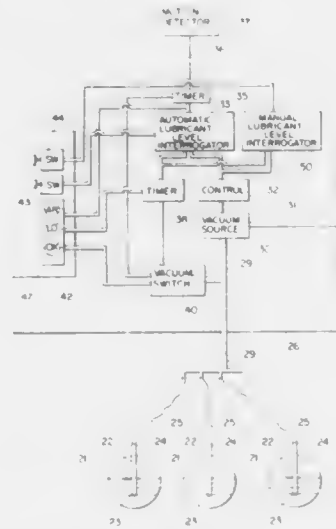
Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 340—450.3

12 Claims

1. A system for monitoring the lubricant level in the gear covers of locomotives, comprising:  
means for detecting when the locomotive is in motion and when the locomotive is at rest;  
a timer connected to the detecting means for determining if the locomotive has been at rest for a predetermined period of time;  
a probe tube for extending into the gear cover, the probe

tube having an open lower end, the lower end of the tube adapted to be positioned at a low lubricant level and to be covered with lubricant if the lubricant level is at or above the low lubricant level;  
a vacuum source connected to the probe tube for drawing a vacuum in the probe tube, the vacuum source being en-



abled by the timer to draw a vacuum only if the locomotive has been at rest for the predetermined period; and  
a vacuum sensor for determining if there is a partial vacuum in the probe tube, indicating that the probe tube is not vented and that the lubricant level is above the lower end of the tube.

4,949,071

**VEHICLE COMMUNICATION DEVICE**

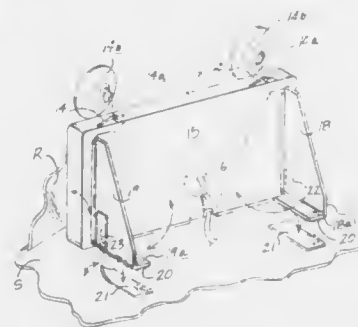
Thomas A. Hutchison, R.D. #2, Box 368, New Wilmington, Pa. 16142

Filed Jul. 18, 1989, Ser. No. 381,477

Int. Cl.<sup>5</sup> B60Q 1/50

U.S. Cl. 340—468

6 Claims



1. A vehicle communication device for use in combination with a self-propelled vehicle which includes a rear window, side windows, and forwardly oriented dash board within said vehicle, said apparatus comprising,  
a message display unit defined by a plurality of light emitting diodes arranged in a matrix, said light emitting diodes selectively illuminated to indicate a message, and  
said display unit including mounting means for selectively mounting said display unit adjacent said rear window, or secured to one of said windows of said vehicle, and  
a message control unit for selectively energizing said light emitting diodes, said message control unit being operatively interconnected to said light emitting diodes within

said display unit and being operative upon actuation of one of a plurality of switches to energize said light emitting diodes in any one of a plurality of preselected patterns, said preselected patterns forming messages for viewing exteriorly of said vehicle, and  
wherein said display unit is mounted in a first vertical position and operative to receive a signal generated by said control unit, and  
said display unit when mounted in a second horizontal position being automatically deactivated relative to said control unit, and  
said display unit including a longitudinally aligned rear face, and a first and second support bracket mounted to the rear face wherein each said first and second support bracket includes respective first and second planar flanges, each said first and second planar flange includes a respective first and second support flange integrally and orthogonally mounted to a lowermost edge of each planar flange, each planar flange including a respective first and second elongate hinge each orthogonally oriented relative to each respective said first and second support flange, and each said first and second elongate hinge mounted to the rear face of the display unit, the first and second elongate hinges arranged parallel to one another, and each said first and second planar flange extends below a lower edge of the rear face and each said first and second support flange includes a respective first and second hook and loop fastener patch mounted to a bottom surface of each said first and second support flange, and  
further including a hook and loop fastener strip securable to said support shelf and cooperative with the first and second hook and loop fastener patch of each said first and second support flange.

4,949,072

**DIVE PARAMETER INDICATING ASSEMBLY**

Ernest Comerford, 41 Moresby Street, Trinity Beach, Queensland 4871, and Michael Adamek, Magnetic Island, both of Australia, assignors to Ernest Comerford, Queensland, Australia

PCT No. PCT/AU88/00055, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/06549, PCT Pub. Date Sep. 7, 1988

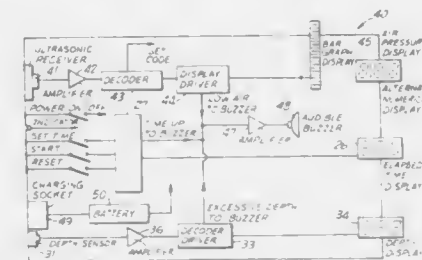
PCT Filed Mar. 3, 1988, Ser. No. 283,993

Claims priority, application Australia, Mar. 3, 1987, P10633

Int. Cl.<sup>5</sup> G08B 25/00; H04B 11/00

U.S. Cl. 340—525

22 Claims



1. An underwater transmitter/receiver assembly for use with a self-contained underwater breathing apparatus including a breathing gas tank and a diver's face mask, the assembly comprising:  
transmitting circuit means attachable to said tank and including sensor means for providing output signals indicative of variable actual dive parameters, a modulator for modulating said output signals, and a transmitting circuit for propagating a modulated carrier wave representative of a respective one of said output signals; and  
means for providing information on variable dive parameters to an individual diver wearing said face mask, said information providing means being formed as a single unit attachable to said face mask and including a receiver

circuit which is physically disconnected from said transmitting circuit means and receives therefrom said modulated carrier wave, a demodulator for demodulating said carrier wave, a display device for providing a visual display indicative of a respective variable dive parameter, and an imaging system providing an image of the display which is focussed in the line of sight of the diver wearing the face mask when said unit is attached thereto.

4,949,073

**GLASS BREAKAGE DETECTOR WITH SELF-ALIGNING HOUSING**

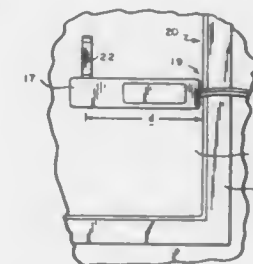
Robert C. Voosen, Newtown, Mass., assignor to International Electronics, Inc., Needham Heights, Mass.

Filed Jan. 10, 1989, Ser. No. 295,650

Int. Cl.<sup>5</sup> G08B 13/04

U.S. Cl. 340—550

9 Claims



1. A glass fracture detection system for use with a glass encased in a frame, said system comprising  
circuit means, including a sensor element for sensing a fracture of said glass, for providing an output signal when a glass fracture occurs;  
housing means containing said circuit means, the sensor element thereof being positioned within said housing means so that, when said housing means is mounted on the surface of said glass adjacent said frame, the sensor element is automatically positioned in communication with said glass surface at a specified distance from said frame, which distance is selected so as to reduce damping of said output signal by said frame and to reduce signals reflected from said frame to the sensor element.

4,949,074

**METHOD OF INTRUSION DETECTION**

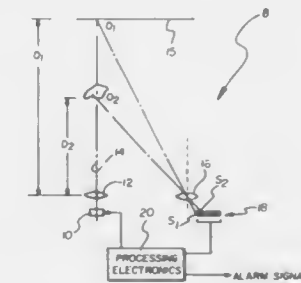
George C. D'Ambrosia, Penfield, and Christopher A. Ludden, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1988, Ser. No. 195,747

Int. Cl.<sup>5</sup> G08B 13/18

U.S. Cl. 340—552

10 Claims



1. The method of intrusion detection comprising the steps of projecting a beam of radiation toward a field of view from a



detection device whereby at least a portion of said beam is reflected by at least a portion of the field of view, receiving the reflected radiation of said beam reflected from said portion of the field of view, determining by triangulation the distance from said detection device at which said beam is reflected by said field of view, generating a signal indicative of the distance from said device at which said beam has been reflected by said field of view during a selected time period, storing a reference signal indicative of the distance of reflection of said beam from said field of view during a reference time period, comparing said signal from said selected time period with said reference signal, and generating an output signal if said signal is different from said reference signal.

4,949,075

# PORTABLE OPTICAL ALARM SYSTEM FOR AREA PROTECTION

László Kürti; Péter Hakkel; Gyula Tóth, and Gyoza Vasziljevics, all of Budapest, Hungary, assignors to Magyar Optikai Muek and Komplex Kulkereskedelmi Vallalat, both of, Hungary

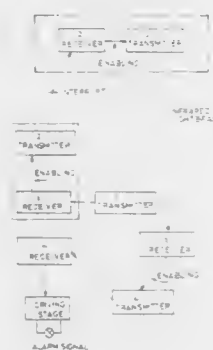
PCT No. PCT/HU87/00039, § 371 Date Jul. 13, 1988, § 102(e) Date Jul. 13, 1988, PCT Pub. No. WO88/02159, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 15, 1987, Ser. No. 199,039

Claims priority, application Hungary, Sep. 15, 1986, 3935/86 Int. Cl.<sup>5</sup> G01T 1/16

U.S. Cl. 340—555

14 Claims



1. Portable optical alarm system where more than one transmitter and associated receiver are used for area protection having at least one light-emitting pulse-mode transmitter having a transmitter circuit and at least one receiver, comprising a circuit and having an output, for sensing emitted light, as well as a driver stage connected to said output of one of said at least one receiver, wherein each transmitter and receiver are arranged in a separate casing containing said pulse-mode transmitter or receiver circuit with an associated battery as a power source and the output of said receiver is connected to an input of an additional transmitter in said system connected electrically thereto, while one of said at least one transmitters of said system is provided with a setting element activating an enabling input of the transmitter.

4,949,076

# APPARATUS FOR DETECTING AND LOCATING LEAKAGE IN UNDERWATER STRUCTURES

Laymond D. Wann, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Oct. 13, 1988, Ser. No. 258,298

Int. Cl.<sup>5</sup> G01V 1/38

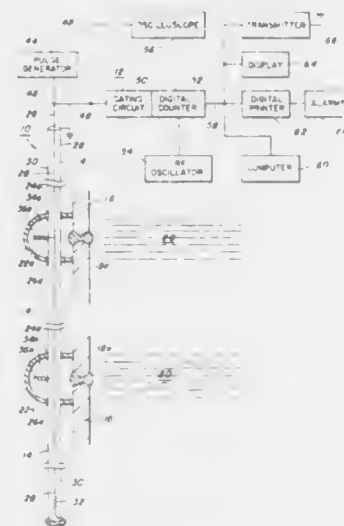
U.S. Cl. 340—605

10 Claims

1. A system for monitoring integrity of underwater structures, comprising:  
at least one enclosure member sealingly secured over at least one selected area of the underwater structure, each enclosure member maintaining a dry void;  
a coaxial cable having a central conductor and centric

shield, and having an input above water and extending down through said at least one enclosure member in water-tight passage, said cable terminating in characteristic resistance and water-tight enclosure;

a least one probe having a segment of insulative rod material and a pair of generally equi-spaced wires wound helically on said segment in one direction and reverse wound in overlap to terminate in an open end, and connected be-



tween the cable central conductor and shield and being disposed in each at least one dry void, said probe being wound to function as a parallel inductance and capacitance circuit that is resonant at a preselected frequency; means generating a pulse having said preselected frequency as the fundamental frequency applied as said input to the coaxial cable; and means detecting any reflected pulse on said coaxial cable.

4,949,077

# PORTABLE UNIT WITH SMOKE ALARM, CLOCK RADIO, COMPASS, RETRACTABLE TABLE, AND LAMP

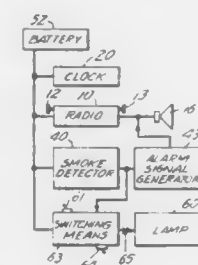
David G. Mbuthia, 188 Lower Sheep Pasture Rd., East Setauket, N.Y. 11733

Filed Oct. 2, 1989, Ser. No. 415,630

Int. Cl.<sup>5</sup> G08B 17/10

U.S. Cl. 340—628

10 Claims



1. A portable personal-security device self-contained within a housing, comprising a smoke-detector producing an electric-signal output in response to a predetermined threshold of ambient smoke, a radio including a loudspeaker, a digital-time clock, a compass, a high-intensity lamp, a retractable writing table disposed in a manner permitting said lamp to illuminate its surface, said electric-signal output being connected to sound an audible alarm via said loudspeaker and concurrently to operate said lamp, and means within said housing for remov-

able accommodating a battery to provide a source of power for said smoke detector, said clock, said radio, and said lamp.

ing analog signals from said photodetectors to digital signals suitable for input into a computer or the like.

4,949,078

# FAIL-SAFE OPERATION OF A VEHICLE AUTOMATIC TRANSMISSION RESPONSIVE TO FAILURE OF ENGINE WATER TEMPERATURE SENSOR

Yasunobu Ito; Kenji Suzuki, and Kazubiro Mikami, all of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan

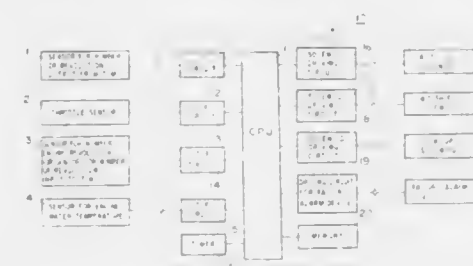
Filed Dec. 9, 1988, Ser. No. 282,275

Claims priority, application Japan, Dec. 28, 1987, 62-329511

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—635

7 Claims



1. A fail-safe control device for an electronically controlled automatic transmission having a lock-up clutch comprising:  
(a) means for detecting the number ( $N_E$ ) of engine revolutions or revolutions input to the transmission;  
(b) time counting means for measuring duration of engine operation after said number exceeds zero and generating a signal representative of counted time;  
(c) an engine water temperature sensor; and  
(d) means for receiving said signal and for determining that said engine water temperature sensor is in a failure state when the engine water temperature detected by said engine water temperature sensor, after said counted time exceeds a predetermined time, is lower than a temperature predetermined for said counted time.

4,949,079

# BRIGHTPEN/PAD GRAPHIC DEVICE FOR COMPUTER INPUTS AND THE LIKE

Hugh Loebner, 220 W. 98th St., #2B, New York, N.Y. 10025

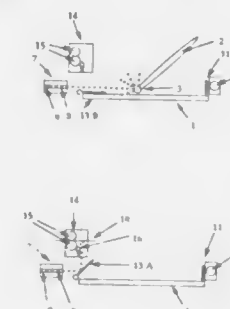
Continuation-in-part of Ser. No. 725,126, Apr. 19, 1985,

abandoned. This application May 7, 1987, Ser. No. 46,722

Int. Cl.<sup>5</sup> G09G 5/00

U.S. Cl. 340—706

4 Claims



1. An apparatus for digitizing graphic information on sheets of paper and the like comprising means of transporting said sheets of paper, photodetectors and collimators in the form of a detector array capable of imaging successive lines of graphic information on said sheet of paper and which photodetectors are also used to digitize the coordinate position of a light emitting stylus or light absorbing stylus by means for convert-

4,949,080

# COMPUTER KEYBOARD CONTROL ACCESSORY

Peter J. Mikan, 31 Greenfield Rd., Milford, Conn. 06460

Filed Dec. 12, 1988, Ser. No. 283,548

Int. Cl.<sup>5</sup> G09G 5/00

U.S. Cl. 340—711

18 Claims



1. A keyboard construction for computers and the like, comprising in combination:

(a) a keyboard console consisting of an enclosing housing which forms an enclosed space and which has spaced-apart walls consisting of a bottom wall, a front wall, a rear wall, left and right side walls, and a top wall with a through opening which is spanned by an array of keys,  
(b) an electrical control means adapted for electrical connection to said keyboard console, said control means having a manually engageable and operable control member,  
(c) an enclosure for the keyboard console housing, said enclosure having an entrance opening in which the keyboard console can be inserted, and having an upper wall containing an access opening through which the keys of the keyboard console can be accessed, said enclosure having abutment surfaces at said access opening, said abutment surfaces being adapted to engage and to butt against said keyboard console to thereby position the console in the enclosure, said upper wall of the enclosure surrounding said access opening and providing a rest on which a user can place his hand, said upper wall of the enclosure being disposed so as to be generally coplanar with the keys of the keyboard console and said control member of the control means being mounted in said upper wall of the enclosure to enable the control member to be conveniently actuated by said hand resting on said upper wall, and  
(d) clamping means carried by said enclosure, said clamping means being engageable with the keyboard console, thereby to clamp the keyboard console in position in the said enclosure against the said abutment surfaces of the enclosure.

4,949,081

# DATA DISPLAY DEVICE

Daniel R. Keller, St. Gallen, Switzerland, and Andreas D. Schelling, Heerlen, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 68,504, Jun. 30, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,148

Claims priority, application Netherlands, Jul. 7, 1986, 8601759

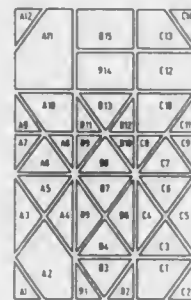
Int. Cl.<sup>5</sup> G09G 3/04

U.S. Cl. 340—765

15 Claims

1. A display device having at least one flat display screen, said display device comprising  
an array of a plurality of substantially rectangular or parallelogram-shaped display elements, said display elements being arranged in three columns, and said display elements being arranged in at least three rows,  
wherein each of said display elements includes at most 7

sub-segments, said sub-segments being of varying different geometric shapes and sizes to form different respective



display elements, and wherein said display elements include a combined total of 41 or 43 of said sub-segments.

4,949,082

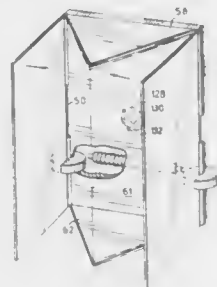
## HIGH SPEED DISPLAY DEVICE

Armand Yazdani, and Coeman L. S. Wong, both of Toronto, Canada, assignors to NEI Canada Limited, Rexdale, Canada  
Filed Jul. 6, 1988, Ser. No. 215,780

Int. Cl.<sup>5</sup> G09G 3/34

U.S. Cl. 340—783

21 Claims



1. Display or indicating element selectively displaying one of two contrasting colors in a viewing direction, a pair of rigid rotatable vanes which are substantially flat plates rotatable on parallel axes on a base, each rotatable between two limiting positions, less than 90° apart, said limiting positions being a first 'ON' position where said vanes extend in the viewing direction at spaced locations to define a display area therebetween, and a second 'OFF' position where said vanes slope inwardly to meet and obscure the display area to a viewer in the viewing direction,

permanent magnet means mounted for rotation on each of said vanes, stationary reversibly magnetizable, electromagnetic means located for use in cooperation with said permanent magnet means to drive said vanes to said 'ON' and said 'OFF' position responsive to one and the other magnetization of said electromagnetic means, whereby said electromagnetic means in cooperation with said permanent magnet means creates good magnetic torque to drive said vanes over the less than 90° angle and provides for rapid switching between 'ON' and 'OFF' positions.

4,949,083  
COMMUNICATION SYSTEM

Yuji Hirabayashi, Aichi; Yoshihisa Sato, Nagoya; Susumu Akiyama, Kariya; Katsonori Ito, Aichi; Takao Saito, Nagoya, and Tetsuo Tanigawa, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of Japan

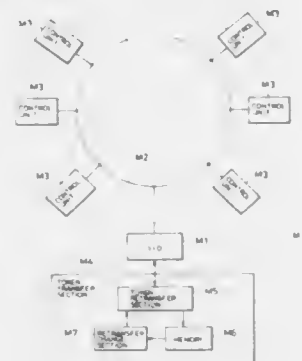
Filed May 18, 1988, Ser. No. 195,624

Claims priority, application Japan, May 21, 1987, 62-124151

Int. Cl.<sup>5</sup> H04J 3/00

U.S. Cl. 340—825.050

7 Claims



1. A communication system comprising:  
a plurality of separate data transmission control units for outputting data;  
a common signal line connecting said units;  
means for transferring a token from a first of said units to a second of said units in a first cycle, said token being a right to output said data to said common signal line;  
means for detecting when said second unit rejects said token in said first cycle;  
means for retransferring said token a maximum of a predetermined number of times in said first cycle if said token remains rejected from said first unit to said second unit;  
means for memorizing a rejection signal representing that said token is rejected by said second unit said maximum predetermined number of times in said first cycle; and  
means for decreasing said maximum predetermined number of times of said retransfer of said token from said first unit to said second unit when said rejection signal is memorized during a subsequent cycle token retransfer.

4,949,084

## PROGRAMMABLE INTEGRATED CROSSPOINT SWITCH

Rod Schwartz, Tempe, Ariz.; John T. Venaleck, Madison, and Kenneth W. Braund, Mentor, both of Ohio, assignors to Ohio Associated Enterprises, Inc., Painesville, Ohio  
Continuation of Ser. No. 132,907, Dec. 14, 1987, abandoned, which is a continuation of Ser. No. 792,482, Oct. 29, 1985, abandoned. This application Oct. 17, 1988, Ser. No. 259,496

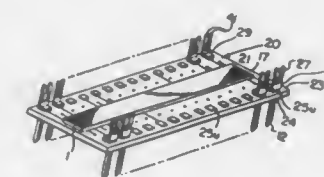
Int. Cl.<sup>5</sup> H04Q 1/18

U.S. Cl. 340—825.83

14 Claims

1. A programmable integrated crosspoint switch, comprising a matrix of first and second pluralities of electrically conductive paths, and selectively permanently and affirmatively programmable means for completing respective passive, bilateral electrically conductive circuit paths between electrically conductive paths of such first plurality of electrically conductive paths and electrically conductive paths of such second plurality of electrically conductive paths, and wherein said programmable means comprises a plurality of irreversible semiconductor switching elements each of said switching elements initially having a high impedance and, thus, effectively presenting an open circuit-like condition, and each being

programmable by applying an appropriate electrical input thereto to exceed a given threshold level, whereupon the element takes on a low impedance characteristic and effectively



tively becomes a closed circuit between a respective pair of conductive paths without the need for transistor driving, logic or other circuits for useful operation.

4,949,085

## PRIORITIZATION OF STORED MESSAGES IN A DIGITAL VOICE PAGING RECEIVER

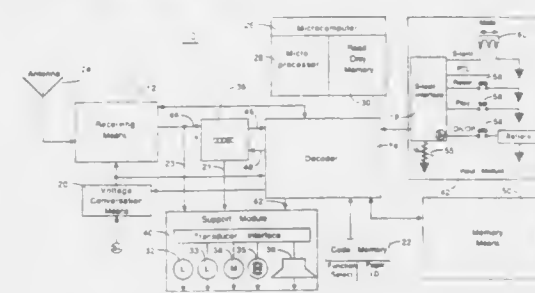
Kenneth D. Fisch, Delray Beach, and Walter L. Davis, Coral Springs, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 68,683, Jun. 30, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 334,734

Int. Cl.<sup>5</sup> G08B 5/22

U.S. Cl. 340—825.440

7 Claims



1. A method of storing in a fixed memory area of a paging receiver analog voice messages transmitted thereto from a remote source, said fixed memory area including a fixed number of storage slots with each slot capable of storing only one digitized voice message, said method comprising the steps of:  
(a) receiving and digitizing a transmitted analog voice message to recover a new digitized voice message replica thereof;  
(b) setting said paging receiver in one of a first mode to audibilize said transmitted analog voice message upon receipt or a second mode to not audibilize said transmitted analog voice message upon receipt;  
(c) initially assigning said new digitized voice message replica a priority status based on said mode setting corresponding thereto;  
(d) thereafter, storing said new digitized voice message replica and its assigned priority status in an empty storage slot of said fixed memory area, and if there are no empty storage slots of said fixed memory area, storing said new digitized voice message replica and its assigned priority status in a selected storage slot based on a predetermined priority relationship between the currently stored voice message of said selected storage slot and the other currently stored voice messages of said fixed memory area, thereby replacing said currently stored voice message of the selected storage slot with said new voice message.

4,949,086

BROADBAND SIGNAL SWITCHING EQUIPMENT  
Ruediger Hofmann, Gilching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

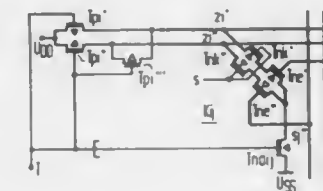
Filed May 17, 1989, Ser. No. 353,044

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819491

Int. Cl.<sup>5</sup> H04Q 1/00

U.S. Cl. 340—825.910

6 Claims



1. In a broadband switching apparatus of the type including a field effect transistor matrix comprising a plurality of matrix input lines and a plurality of matrix output lines defining a plurality of crosspoints, in which each matrix input line comprises a pair of complementary input signal conductors and each matrix output line comprises a pair of complementary output signal conductors, each of said output lines having its output conductors connected to two signal inputs of a respective output amplifier formed of a differential amplifier having a trigger behavior, in which each of said crosspoints comprises a pair of switching transistors each including a respective main electrode connected to a respective output conductor and a control electrode connected to receive a through-connect signal, a pair of series transistors each connected in series with a respective switching transistor and each including a control electrode connected to a respective input conductor and a main electrode facing away from the series circuit connected via a sampling transistor to one terminal of an operating voltage source to whose other terminal each said output signal conductor is connected via a respective pre-charging transistor, said pre-charging and sampling transistors oppositely charged at respective control electrodes with a switching matrix drive clock that subdivides a through-connect time interval into a pre-charging phase and a through-connect phase so that both signal conductors of the matrix output line are pre-charged in each pre-charging phase at least approximately to the potential existing at said other voltage source terminal given an inhibited sampling transistor, the improvement comprising:

a shunt transistor connected across the main electrodes of said pre-charging transistors, which electrodes are connected to the respective output conductors, the control electrode of said shunt transistor being connected to said control electrodes of said pre-charging transistors for receiving the drive clock.

4,949,087

## ENCODER DEVICE

Azuma Miyazawa, Mitaka, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jan. 31, 1989, Ser. No. 304,800

Claims priority, application Japan, Feb. 5, 1988, 63-026461

Int. Cl.<sup>5</sup> H03M 1/22

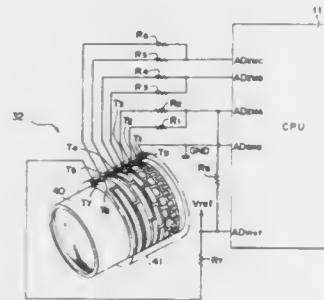
U.S. Cl. 341—16

34 Claims

1. An encoder device comprising:  
pattern conductor means and first and second contact pieces being movable relative to one another;  
said pattern conductor means including first pattern electrodes to which a first potential is applied and second pattern electrodes to which a second potential is applied, first and second arrays each having a selected number of



said first and second pattern electrodes, the arrangement of said first and second pattern electrodes in said first and second arrays being different;  
said first and second conductive contact pieces being in sliding contact with one of said first and second arrays;  
input means comprising a first resistor which has one end connected to said first conductive contact piece and the other end connected to an A/D conversion input terminal and a second resistor which has one end connected to said second conductive contact piece and the other end connected to the other end of said first resistor and which has a different resistance from that of said first resistor, for



inputting a voltage to said A/D conversion input terminal which voltage is variable in response to a change in sliding contact position of said first and second conductive contact pieces with reference to said pattern conductor, said first and second arrays being arranged to enable said input means to apply a voltage to said A/D conversion input terminal which is capable of assuming a plurality of voltage levels which are greater in number than the two potentials each respectively applied to one of said first and second arrays, the voltage level applied to the A/D conversion input terminal being determined by the position of said first and second conductive contact pieces relative to said first and second arrays.

4,949,088

**SYSTEM FOR IDENTIFYING DISTANCE AND RANGE BETWEEN A RADAR SOURCE AND A VEHICLE**  
Thomas M. Ryan, and Karen Ryan, both of 19925 SW. 62nd La., Dunnellon, Fla. 32630

Filed Aug. 21, 1989, Ser. No. 396,372  
Int. Cl.<sup>5</sup> G01S 7/36, 7/42

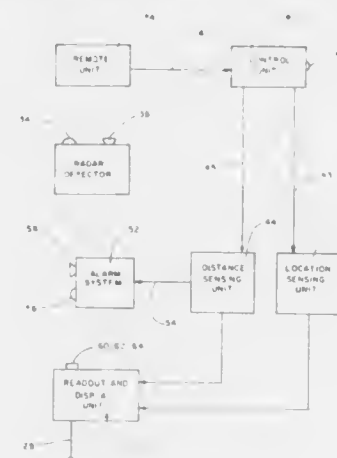
U.S. Cl. 342-20

3 Claims

1. A system for identifying location and range of a radar unit source comprising:

- (A) a radar detector unit;
- (B) a remote unit operatively coupled to said radar detector unit to be activated upon said radar detector unit detecting a radar signal from a source;
- (C) a control unit connected to said remote unit to be activated by said remote unit;
- (D) a distance sensing unit connected to said control unit to detect the distance between said radar detector and the source upon being activated by said control unit;
- (E) a location sensing unit connected to said control unit to detect the angular location of the source with respect to said radar detector upon being activated by said control unit;
- (F) a readout and display unit connected to said distance sensing unit and to said location sensing unit; and

(G) an alarm unit connected to said distance sensing unit to emit an alarm signal when said distance sensing unit de-



tests a radar signal source located within a prescribed distance from said distance sensing unit.

4,949,089

**PORTABLE TARGET LOCATOR SYSTEM**  
Robert A. Ruszkowski, Jr., Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Aug. 24, 1989, Ser. No. 398,188  
Int. Cl.<sup>5</sup> F41G 3/16

U.S. Cl. 342-52

20 Claims



1. A portable target locator system for determining the location coordinates of a selected target and coupling said coordinates to a remotely located control system, said portable target locator system comprising:

- location determination means for accurately and automatically determining the location coordinates of said portable target locator system;
- range finder means for determining the range from said portable target locator system to a selected target;
- azimuth sensor means for determining the azimuth from said portable target locator system to said selected target;
- processor means coupled to said location determination means, said range finder means and said azimuth sensor means for determining the location coordinates of said selected target; and
- communication means for coupling said location coordinates of said selected target to said remotely located control system.

4,949,090

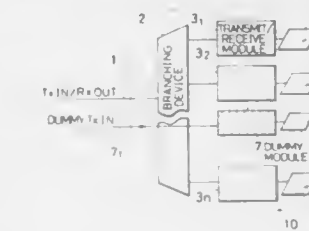
**TRANSMIT/RECEIVE MODULE TEST SYSTEM**  
Seizo Tamii; Norio Mutoh; Hiroshi Hasegawa; Hiroshi Okamura, and Noriyuki Tanii, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,492  
Claims priority, application Japan, Feb. 22, 1988, 63-41546

Int. Cl.<sup>5</sup> H01Q 21/22

U.S. Cl. 342-173

43 Claims



1. A transmit/receive module test system for a phased-array antenna having a plurality of antenna elements and a plurality of corresponding transmit/receive modules with phase shifters, comprising:

- dummy antenna element for transmitting signals to each of said multiple antenna elements simultaneously;
- dummy transmit/receive module, connected to said dummy antenna element, for amplifying said signals transmitted by said dummy antenna element prior to their transmission;

wherein each of said plurality of corresponding transmit/receive modules are simultaneously checked for normal receiving operation by said signals transmitted from said dummy antenna element, said dummy transmit/receive module being utilized exclusively for checking the remaining plurality of transmit/receive modules and not operating as such a transmit/receive module of the phased array antenna.

4,949,091

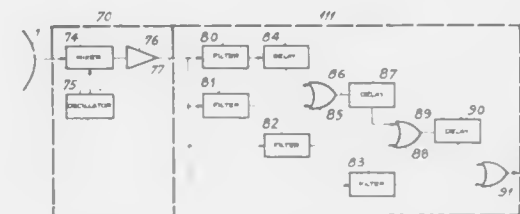
**SPECTRUM ANALYSIS ARRANGEMENT AND AUTOMATIC INTERCEPTION RECEIVING STATION COMPRISING SUCH AN ARRANGEMENT**  
Pierre Moulin, and Guy Delevacque, both of Paris, France, assignors to Thomson CSF, Paris, France

Filed Mar. 9, 1979, Ser. No. 23,528

Claims priority, application France, Mar. 14, 1978, 78 07278  
Int. Cl.<sup>5</sup> H03J 7/32; G01R 23/175

U.S. Cl. 342-192

5 Claims



1. A spectrum analysis arrangement comprising: and analysis receiver having an input and an output, an antenna coupled to said receiver input, and a filtering and coupling network having an input coupled to said receiver output, and an output forming the output of said arrangement; said receiver comprising a main frequency converter having an input coupled to said receiver input and an output, and a main intermediate frequency amplifier having an input coupled to said converter output and an output coupled to said receiver output; said converter including a saw-tooth wobbled local oscillator sweeping a frequency range equal to  $P_0$ , said amplifier having a bandwidth equal to  $b_0 < P_0$  and said network comprising  $n$

filter devices,  $n$  being greater than 1, each filter device having an input coupled to said network input and an output, each filter device comprising a band filter connected in series with an output detector, the  $n$  filter device outputs being coupled to said network output through coupling means comprising  $(n-1)$  delay devices, the bandwidth of said  $n$  band filters being roughly the same,  $b < b_0$ , and their band center frequencies distributed over said bandwidth  $b_0$  so that the arrangement output supplies, at a given time, the logic sum of the output signals delivered by each of the  $n$  filter devices, the delay in each of the  $(n-1)$  delay devices being such that each of said  $n$  output signals corresponds to the same frequency received by the receiver at  $n$  separate instants.

4,949,092

**MODULARIZED CONTOURED BEAM DIRECT RADIATING ANTENNA**

Timothy A. Crail, Los Angeles, and Sanford S. Shapiro, Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

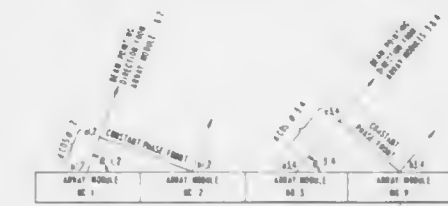
Continuation of Ser. No. 77,958, Jul. 27, 1987, abandoned, which is a continuation of Ser. No. 669,698, Nov. 8, 1984, abandoned.

This application Mar. 15, 1989, Ser. No. 323,175

Int. Cl.<sup>5</sup> H01Q 3/22

U.S. Cl. 342-354

18 Claims



1. A modular, phased array antenna system for providing predetermined contoured beam patterns, comprising:

- a plurality of array modules, each comprising at least one radiation element, a module port and first network means for communicating RF energy between said radiation elements and said module port;
- an array input/output port; and
- means for communicating RF energy between the respective module ports and said array port, said means including means for providing a dynamic, controllable, non-uniform intermodule power and phase excitation distribution to provide dynamic, controllable contoured beam patterns having irregular outlines.

4,949,093

**COMPACT ANTENNA RANGE WITH SWITCHABLE ELECTROMAGNETIC MIRROR**

Sutinder S. Dhanjal, Hamilton Township, Mercer County, N.J., assignor to General Electric Company, East Windsor, N.J.

Filed Feb. 12, 1988, Ser. No. 155,412

Int. Cl.<sup>5</sup> H01Q 19/10

U.S. Cl. 343-755

20 Claims

1. An arrangement producing a substantially planar electromagnetic wavefront, comprising:  
first and second mutually parallel spaced-apart plane electromagnetic reflecting means;  
means for introducing a pulse of electromagnetic energy, having a duration less than that required for a round trip between said first and second reflecting means, into the region between said spaced-apart first and second reflecting means; and

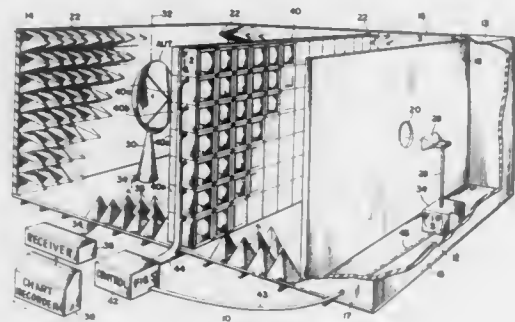
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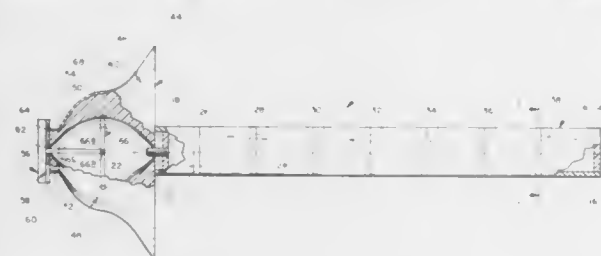
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controllable means for controllably rendering at least one of said first and second reflecting means transmissive rather



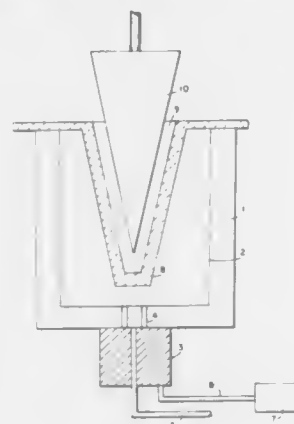
than reflective beginning at a predetermined time after introduction of each said pulse.

**4,949,094**  
**NEARFIELD/FARFIELD ANTENNA WITH PARASITIC ARRAY**  
Tex Yukl, Baker, Oreg., assignor to Spatial Dynamics, Ltd., Baker, Oreg.  
Filed Jan. 23, 1985, Ser. No. 694,084  
Int. Cl.<sup>5</sup> H01Q 19/00, 13/02  
U.S. Cl. 343-785 7 Claims



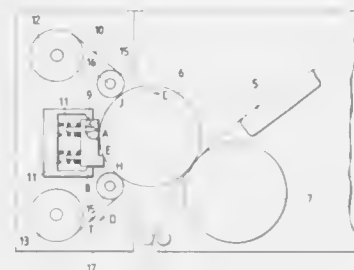
1. A parasitic array for use on a transmission/reception antenna having a known operating frequency with a wavelength  $\lambda$  in air, comprising:  
a hollow cylindrical dielectric tube of substantially circular uniform cross section,  
plural conductive film, ring-like parasitic elements disposed on the outer surface of said tube and extending circumferentially around said tube with said elements having a circumference of less than  $\lambda$ , wherein a first of said elements is spaced between  $0.219\lambda$  and  $0.243\lambda$  from one end of said tube and the successive elements are substantially uniformly spaced between  $0.0303\lambda$  and  $0.335\lambda$  apart along the length of said tube, and  
means for mounting one end of said tube on the antenna.

**4,949,095**  
**FUSED SILICA RADOME**  
Jeffrey T. Neil, Acton; Leslie J. Bowen, Concord, both of Mass., and Brett E. Michaud, Barrington, N.H., assignors to GTE Laboratories Incorporated, Waltham, Mass.  
Filed Nov. 29, 1988, Ser. No. 277,179  
Int. Cl.<sup>5</sup> H01Q 1/42  
U.S. Cl. 343-872 5 Claims



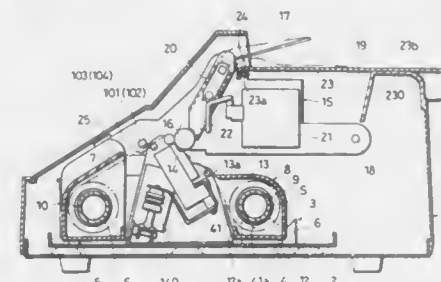
1. A silica radome comprising a fused silica radome having a density equal to or greater than 95 percent of theoretical density.

**4,949,096**  
**LASER PRINTER WITH THERMAL FIXING OF TONER**  
Toshitaka Ogawa; Yasuo Kikuchi; Tomio Sugaya; Isao Nakajima; Takashi Suzuki, and Shigenobu Katagiri, all of Ibaraki, Japan  
Filed Aug. 28, 1989, Ser. No. 399,110  
Claims priority, application Japan, Sep. 2, 1988, 63-22074;  
Int. Cl.<sup>5</sup> G01D 9/00; G03G 15/00; B05C 1/00  
U.S. Cl. 346-25 8 Claims



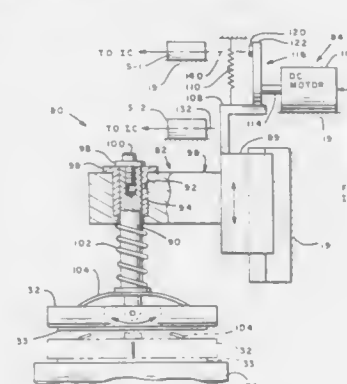
1. A laser printer with a thermal fixing unit, said thermal fixing unit comprising:  
a pair of heat and pressure rolls for pressing a sheet with a developed toner image therebetween to fix said toner image on said sheet;  
a web immersable with an oil;  
an oil coater for supplying said oil to said web and pressing said web against said heat roll at least one point to make said web contact with said heat roll so that said oil is applied from said oil coater onto the surface of said heat roll through said web to thereby prevent occurrence of offset of said toner image; and  
at least one pressing means provided separately from said oil coater for locally urging said web against said heat roll, said pressing means being located on at least one of before and behind said oil coater.

**4,949,097**  
**THERMAL PRINTER**  
Chiharu Imaseki, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Jun. 9, 1989, Ser. No. 363,990  
Claims priority, application Japan, Jun. 10, 1988, 63-143899  
Int. Cl.<sup>5</sup> G01D 15/10; B41J 3/20  
U.S. Cl. 346-76 PH 14 Claims



1. A thermal printer for printing on a recording paper both in a thermal transfer printing mode with an ink ribbon and in a thermosensible printing mode without an ink ribbon comprising:  
a thermal head;  
energy applying means for applying energy to said thermal head for printing;  
ink ribbon detecting means for detecting whether the ink ribbon is loaded in the printer or not;  
automatic printing mode selecting means for selecting the thermal transfer printing mode when the ink ribbon is loaded in the printer and for selecting the thermosensible printing mode when the ink ribbon is not loaded in the printer;  
ink ribbon transport means for transporting the ink ribbon; and  
driving prohibiting means for prohibiting driving of said ink ribbon transport means when the thermosensible printing mode is selected.

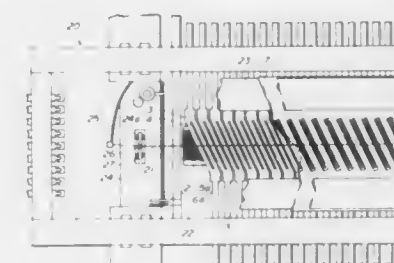
**4,949,098**  
**THERMAL PRINthead CONTROLLING MEANS**  
Julius Gluck, Norwalk, and Patrick Murphy, Stamford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.  
Filed Dec. 28, 1987, Ser. No. 138,424  
Int. Cl.<sup>5</sup> G01D 15/10  
U.S. Cl. 346-76 PH 12 Claims



1. In apparatus for thermally transferring ink from a ribbon, having backing and ink donor layers, to a letter, wherein the apparatus includes a frame, a thermal printhead, means for controlling the printhead, and a roller rotatably connected to the frame for rotation when in engagement with a letter fed between the roller and a ribbon, an improvement for urging a

ribbon and letter into engagement with one another, the improvement comprising:  
a. the printhead controlling means including means for disposing the printhead in a non-printing position permitting a ribbon to be located between the printhead and roller and in a printing position wherein the printhead is in engagement with the backing layer of ribbon;  
b. the printhead controlling means including means for resiliently supporting the printhead to urge the ink donor layer of a ribbon into contact with a letter when the printhead is disposed in the printing position; and  
c. the printhead controlling means including a shaft and means for permitting the printhead to tilt relative to the shaft.

**4,949,099**  
**FLUORESCENT PRINTER HEAD USING A SINGLE FILAMENTARY CATHODE**  
Yukihiko Shimizu; Toshimitsu Fuyuki, both of Mobara; Toru Teshigawara, Ebina; Kazuo Terao, Ebina, and Atsushi Kasao, Ebina, all of Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara and Fuji Xerox Company, Ltd., Tokyo, both of Japan  
Filed Oct. 7, 1988, Ser. No. 254,570  
Claims priority, application Japan, Oct. 7, 1987, 62-251546  
Int. Cl.<sup>5</sup> G01D 15/14  
U.S. Cl. 346-107 R 5 Claims



1. A fluorescent printer head comprising:  
a vacuum fluorescent display tube having an evacuated envelope formed of a substrate, side walls and a front cover;  
a lens system arranged on an outer surface of said front cover for passing luminescent light emitted from said fluorescent display tube therethrough to form an image on a record medium, said evacuated envelope including,  
a plurality of strip-like linear anode conductors arranged on said substrate, said anode conductors being arranged in parallel having intervals between each adjacent two anode conductors at the focal point of said lens systems spaced by a predetermined distance from said lens system, a phosphor layer deposited on each of said anode conductors functioning as a luminous area for emitting light,  
a plurality of control electrodes each having an aperture, said control electrodes being arranged above said strip-like linear anode conductors so as to have said aperture opposite to said phosphor layer obliquely crossing a row of said anode conductors to define luminous dots in cooperation with said anode conductors and being in parallel having gap between each adjacent two control electrodes, and  
a single filamentary cathode stretched above said control electrodes extending in the longitudinal direction of said anode conductors along the center of said luminous area, said filamentary cathode being positioned outside the depth of focus of said lens system as viewed from said anode conductors.



4,949,100

## APPARATUS FOR FORMING COMPOSITE LASER BEAM

Shinobu Hidaka, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

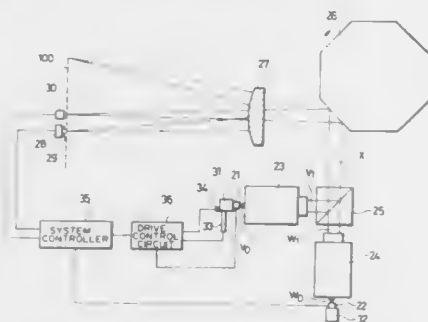
Filed Jan. 26, 1989, Ser. No. 302,831

Claims priority, application Japan, Jan. 28, 1988, 63-18670

Int. Cl.<sup>5</sup> G01D 15/14

U.S. Cl. 346-108

14 Claims



1. An apparatus for forming a composite laser beam for use in an image forming system which forms an image by scanning a recording medium with a composite laser beam, said apparatus comprising:

- a plurality of laser beam radiation means each radiating a laser beam, respectively;
- beam combining means for combining the plurality of laser beams radiated from said plurality of laser beam radiating means into a single composite beam;
- beam position detecting means for receiving the composite laser beam and for generating information which represents a relative position of the laser beams in the composite laser beam; and
- position adjusting means for adjusting the position of each of the laser radiating means in response to said information generated from said beam position detecting means.

4,949,101

## FLUORESCENT PRINTER HEAD

Yukihiko Shimizu, Mobara, Japan, assignor to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

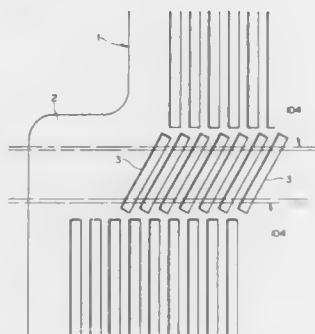
Filed Oct. 16, 1989, Ser. No. 422,048

Claims priority, application Japan, Oct. 21, 1988, 63-264123

Int. Cl.<sup>5</sup> G01D 9/42; G03G 15/00

U.S. Cl. 346-108

5 Claims



1. A fluorescent printer head comprising:
- a substrate;
  - a plurality of strip-like anode conductors arranged on said substrate so as to extend in the longitudinal direction of said substrate;
  - a phosphor layer deposited on each of said anode conductors

to form an anode in cooperation with said anode conductor;

- a second control electrode comprising a plurality of grid plates arranged in parallel above said anodes, each formed with a slit;
- a first control electrode comprising a single plate member formed with a plurality of slits and arranged above said second control electrode;
- filamentary cathodes extending above said first control electrode; and
- an envelope in which said anodes, control electrodes and filamentary cathodes are arranged and which is evacuated to a high vacuum;

said second control electrode being provided at each of its longitudinal ends with a dummy grid plate;

said first control electrode being provided at each of its longitudinal ends with a contiguous dummy grid section.

4,949,102

## BUBBLE JET PRINT HEAD ORIFICE CONSTRUCTION

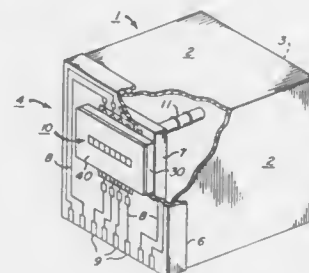
Hilarion Braun, Xenia, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,769

Int. Cl.<sup>5</sup> B41J 2/05, 2/14

U.S. Cl. 346-140 R

5 Claims



1. A bubble jet print head of the kind having a drop ejection chip including a plurality of resistive heater elements predeterminedly spaced in a linear array and electrode means for selectively addressing said heater elements, said print head further comprising:

- (a) a plurality of separator members extending up from said drop ejection chip surface at positions precisely between respective heater elements said separator members having substantially coplanar top surfaces at a predeterminedly capillary spacing from said chip surface; and
- (b) an orifice plate fixedly mounted above said drop ejection chip and having a liner slot, of desired orifice width and approximately linear array length, aligned over said heater elements and their intermediate separator members, said slot edges being coupled to separator members top surfaces to define a plurality of discrete orifices that are precisely located vis a vis respective heater elements.

4,949,103

## DIRECT ELECTROSTATIC PRINTING APPARATUS AND METHOD FOR MAKING LABELS

Fred W. Schmidlin, Pittsford, and William A. Sullivan, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 28, 1989, Ser. No. 393,122

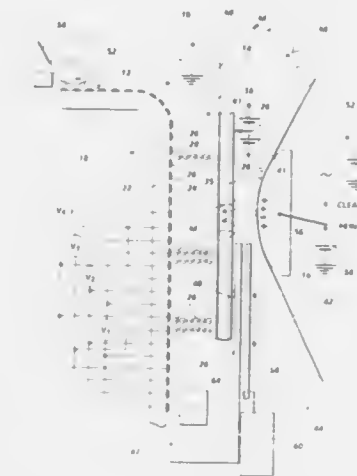
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346-150

5 Claims

1. Printing apparatus, said apparatus comprising:
- a supply of marking particles;

a transparent substrate having an adhesive coating on one side thereof; and



means for applying marking particles in wrong reading image configuration on said side of said transparent substrate having said adhesive coating thereon.

4,949,104

## JUSTIFICATION SYSTEM FOR USE IN A PRINTER EMPLOYING A CONTINUOUS FORM

Ikko Negoro, Sakado; Kiyoshi Negishi, Saitama, and Masahiro Kita, Tokyo, all of Japan, assignors to Asahi Kogyo Kogyo K.K., Tokyo, Japan

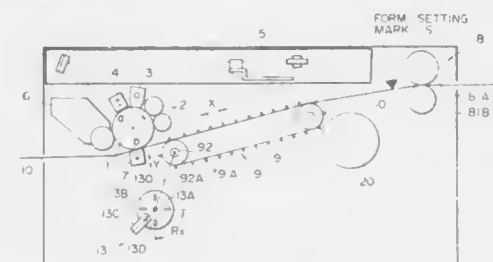
Filed Jul. 14, 1988, Ser. No. 218,866

Claims priority, application Japan, Jul. 15, 1987, 62-108722[U]

Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 346-153.1

13 Claims



1. A justification system for use in a printer employing a continuous form having a plurality of printing segments, comprising:

- a plurality of indicators provided on each of said printing segments, said indicators being arranged in a longitudinal direction thereof at predetermined intervals;
- means for detecting said indicators as said continuous form advances along a travel path; and
- means for controlling, in response to said detecting means, a timing signal for stopping the advancement of said continuous form along said travel path when a printing operation is finished, and for advancing said continuous form along said travel path when successive printing segments are to be executed, the beginning of each printing operation substantially starting at a beginning printing segment, irrespective of the displacement of said printing segment along the longitudinal direction of said continuous form, wherein said indicators comprise a plurality of sprocket holes provided along both edge portions of said continuous form at predetermined intervals in the longitudinal direction.

tion thereof, and said detecting means comprises a rotary member provided with at least two apertures, each aperture extending in a radial direction from the center of said rotary member at an interval that corresponds to said predetermined interval of said sprocket holes in said continuous form, whereby said detecting means detects the passing of said sprocket holes at a certain point of said travel path of said continuous form.

4,949,105

## PROCESS CONTROL PATCH GENERATOR

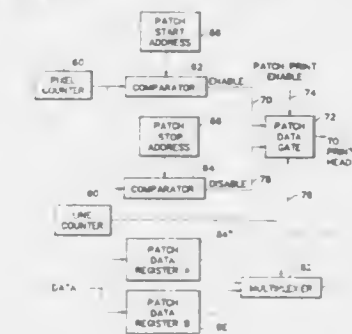
James R. Prowak, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 16, 1989, Ser. No. 394,443

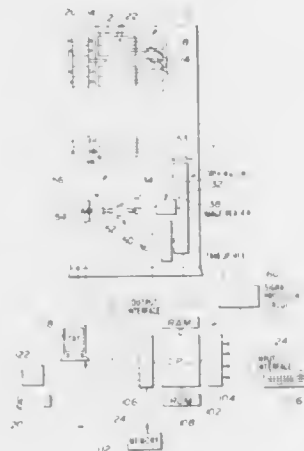
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346-154

19 Claims

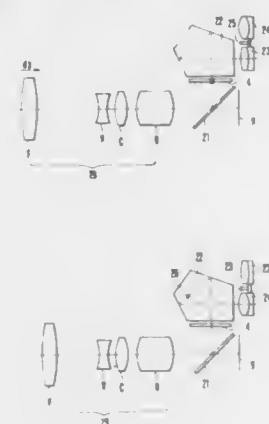


memory means for storing the location of the restored cartridge; and



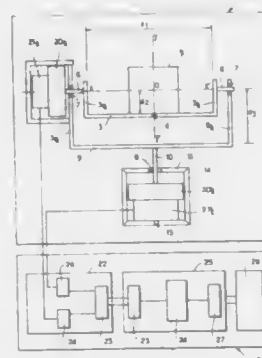
control means for controlling said carrier means, said scanner and said restoring means.

**4,949,107**  
**CAMERA HAVING TELESCOPIC CAPABILITY**  
Nozomu Kitagishi; Takeshi Koyama; Sadatoshi Takahashi, all of Tokyo, and Kouji Oizumi, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 15, 1989, Ser. No. 393,774  
Claims priority, application Japan, Aug. 31, 1988, 63-218177; Aug. 31, 1988, 63-218181; Dec. 6, 1988, 63-308663  
Int. Cl.<sup>5</sup> G03B 17/48  
U.S. Cl. 354—79



1. A camera having a first mode and a second mode, comprising:  
objective lens means;  
eyepiece lens means for observing an image concerning light of said objective lens means;  
focal length altering means for changing a focal length of said eyepiece lens means and distance from the image to said eyepiece lens means to shift from said first mode to said second mode.

**4,949,108**  
**IMAGE SHOOTING METHOD FOR RECORDING VISUAL SPHERES AND DEVICE FOR IMPLEMENTING SUCH METHOD**  
Jean-Michel Verret, 83 rue du Faubourg Saint-Antoine, 75011 Paris, France  
PCT No. PCT/FR87/00306, § 371 Date Mar. 31, 1988, § 102(e) Date Mar. 31, 1988, PCT Pub. No. WO88/01401, PCT Pub. Date Feb. 25, 1988  
PCT Filed Aug. 5, 1987, Ser. No. 180,981  
Claims priority, application France, Aug. 18, 1986, 86 11598  
Int. Cl.<sup>5</sup> G03B 29/00, 37/04  
U.S. Cl. 354—81

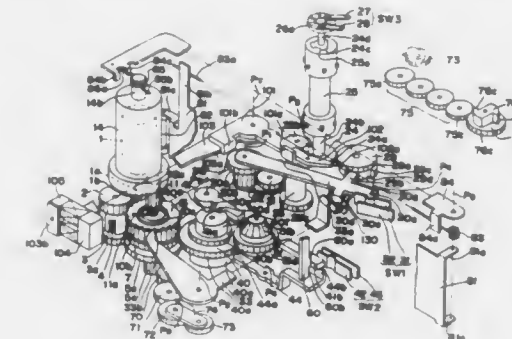


1. A method of taking views and enabling visual spheres to be recorded, comprising the steps of:  
(a) taking photographs of a plurality of views from a first point, said plurality of views surrounding said first point and being at a predetermined lateral and longitudinal relationship to each other;  
(b) recording images from said views; and  
(c) placing said images about a second point in the same lateral and longitudinal relationship to each other as when the view were taken, wherein said first and second points are focal points of respective areas surrounding said first and second points.

**4,949,109**  
**FILM WINDING SYSTEM OF CAMERA**  
Takahisa Shimada; Hideo Kajita; Sueyoshi Okumura; Reiji Seki; Toshibaiko Ishimura, and Sinji Katayori, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Apr. 5, 1989, Ser. No. 333,600  
Claims priority, application Japan, Apr. 6, 1988, 63-86161; Apr. 6, 1988, 63-86162; Apr. 7, 1988, 63-87650; Apr. 8, 1988, 63-87558; May 11, 1988, 63-115404; Jun. 21, 1988, 63-154333; Jun. 21, 1988, 63-154335; Jun. 21, 1988, 63-154336; Jun. 21, 1988, 63-154337; Aug. 17, 1988, 63-204282; Aug. 17, 1988, 63-204283  
Int. Cl.<sup>5</sup> G03B 1/12  
U.S. Cl. 354—173.1

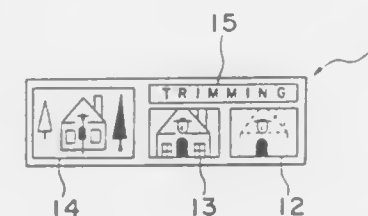
1. A film winding system of a camera, capable of automatically winding a film roll, comprising:  
an electrical motor;  
film winding means driven by said motor, for winding the film roll;  
cocking means driven by said motor, for cocking a predetermined mechanism;  
drive transmission means driven by said motor, for transmitting drive of said motor to one of said film winding means and said cocking means, selectively;  
counter means for counting a frame of the film roll which is wound by said film winding means;  
lock means for locking said film winding means every time

one frame of the film roll is wound up by said film winding means;  
dis-lock means for releasing a locked state of said film winding means by said lock means;  
order means for ordering initiation of initial loading of the camera; and  
control means for controlling said dis-lock means and said



motor in such a way that said dis-lock means operates at completion of a cocking operation of said cocking means at a normal film winding operation, while said dis-lock means operates when said order means operates, and an operation of said dis-lock means is terminated when the predetermined total number of the frames of the film roll is counted by said counter means, and said motor is continuously driven in operation of said dis-lock means.

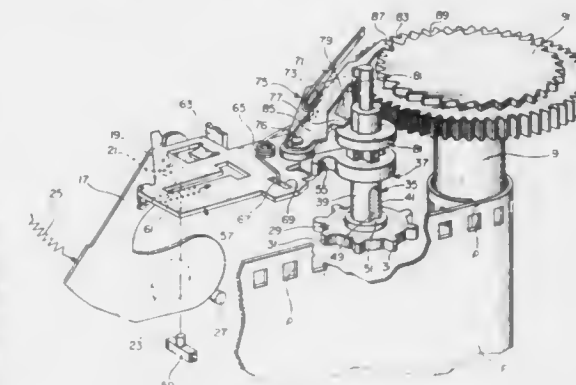
**4,949,110**  
**PHOTOGRAPHIC CAMERA**  
Nobuyuki Taniguchi, Nishinomiya; Takeo Hoda, Kawachinagano; Yoshiaki Hata, Nishinomiya; Manabu Inoue, Kobe; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Division of Ser. No. 199,201, May 26, 1988, which is a division of Ser. No. 937,509, Dec. 3, 1986, Pat. No. 4,708,047. This application Jun. 19, 1989, Ser. No. 367,723  
Claims priority, application Japan, Dec. 4, 1985, 60-271630; Dec. 4, 1985, 60-271631; Dec. 16, 1985, 60-281051  
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> G03B 3/00  
U.S. Cl. 354—195.1



1. A photographic camera having a real focal length photographing mode and a pseudo focal length photographing mode to thereby specify a scope for printing narrower than the scope in said real focal length photographing mode, said photographing camera comprising:  
first means for selecting one of said real focal length photographing mode and said pseudo focal length photographing mode; and  
second means, which operates when said pseudo focal length photographing mode is selected, for selecting one of a first photographing mode in which first photographic

effect will be obtained and a second photographing mode in which second photographic effect will be obtained, the second photographic effect being different from the first photographic effect for the identical scope for printing specified in said pseudo focal length photographing mode.

**4,949,111**  
**CAMERA HAVING FILM-DRIVEN MOTION TRANSMITTING MECHANISM**  
John H. Alligood, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Sep. 11, 1989, Ser. No. 405,257  
Int. Cl.<sup>5</sup> G03B 1/00  
U.S. Cl. 354—213



1. A photographic camera wherein a film metering sprocket undergoes respective cycles of rotation in each of two opposite directions when a filmstrip is advanced substantially a frame increment in corresponding directions over said metering sprocket, and an operating element is actuated to perform a camera function when said metering sprocket is rotated a cycle in one of the opposite directions but is not actuated for such purpose when the metering sprocket is rotated a cycle in the other direction, characterized in that:

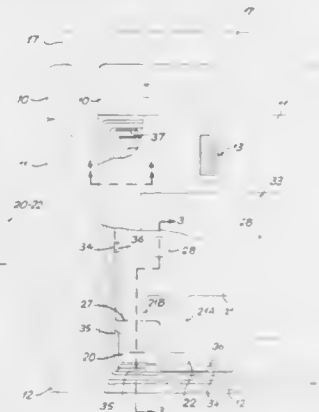
said operating element includes a split shaft comprising a pair of substantially parallel leg members which may be transversely flexed towards one another to at least partially occupy a space normally separating said leg members, and said metering sprocket includes a pair of ramp-like teeth normally disposed in the space between said leg members which remain in the space to engage the leg members when the metering sprocket is rotated a cycle in the one direction and which move out of the space to flex the leg members towards one another to avoid engaging them when the metering sprocket is rotated a cycle in the other direction.

**4,949,112**  
**SHEET FILM CASSETTE FOR PHOTOGRAPHIC CAMERAS**  
Karl Gfeller, Langwiesen, and Kurt Gloor, Thayngen, both of Switzerland, assignors to Sinar AG Schaffhausen, Switzerland  
Filed Aug. 30, 1989, Ser. No. 400,383  
Claims priority, application Switzerland, Sep. 30, 1988, 3638/88  
Int. Cl.<sup>5</sup> G03B 17/26  
U.S. Cl. 354—284

1. A sheet film cassette for receiving a light sensitive film for use in photographic cameras, the sheet film cassette comprising:  
a flat housing having an interior for receiving the inserted film, a front side having a picture defining gate, and a rear side;  
a rear wall located in said rear side, said rear wall movably connected to said housing between an open position to



allow insertion and removal of the film and a closed position;  
 supporting shoulders located along a periphery of the picture defining gate and projecting towards the rear side;  
 a pressure plate resiliently communicating with an inner side of said rear wall via a first resilient member;  
 guide grooves located in the housing interior near the front side of said housing;  
 a slide in sliding contact with said guide grooves, said slide slidable from a closed position which sealingly closes the picture defining gate and an open position which completely opens the gate;  
 a bridge-like leader element arranged between said pressure plate and the inner side of said rear wall, said leader element resiliently communicating with the inner side via a second resilient member;



a pair of support runners located on said leader element, received in said groove-like depressions, and extending over opposing peripheral edges of the pressure plate when said rear wall is partially closed, each support runner having a side facing the front side of said housing which has a dimension perpendicular to the front side which is greater than a dimension of the pressure plate perpendicular to the front side, whereby a space is defined to allow said pressure plate to move relative to said support runners towards the housing front when said rear wall is being closed; and  
 stop faces located on said support runners, said stop faces being sloped to contact outermost peripheral edges of the inserted film when said rear wall is partially closed, said stop faces thereby imparting a stress to a middle portion of the inserted film, whereby a middle portion of the inserted film is secured snugly against said pressure plate.

#### 4,949,113 TOP COVER MOUNTING CONSTRUCTION FOR CAMERAS

Junichi Tanii, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 12, 1989, Ser. No. 350,907

Claims priority, application Japan, May 13, 1988, 63-62253[U]

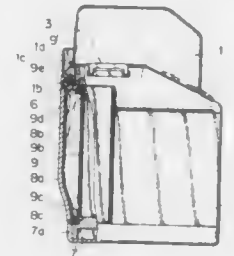
Int. Cl.<sup>5</sup> G03B 17/02

U.S. Cl. 354—288

7 Claims

1. A camera comprising:  
 a camera body having a rearward extension extending therefrom, said rearward extension including a first hole there-through;  
 a rear lid of said camera body including a rearward bulge which forms a contour generally continuous with said rearward extension when attached to said camera body;  
 a top cover of said camera body including a rearward bulge which forms a contour generally continuous with said rearward extension of the camera body and said rearward bulge of the rear lid when attached to said camera body,

said rearward bulge of the top cover having a bottom surface, said bottom surface facing said rearward extension of the camera body and having a second hole therein; and  
 a screw for fastening said bottom surface of said top cover rearward bulge to said rearward extension of the camera



body, said screw being screwed upwardly through said first hole of said rearward extension into said second hole of the bottom surface of said top cover rearward bulge; whereby said rear lid rearward bulge denies access to said screw when said rear lid is closed and allows access to said screw when said rear lid is opened or removed.

#### 4,949,114 DEVICE FOR INTRODUCING THE FREE END OF A PHOTOGRAPHIC FILM TO BE DEVELOPED, UNWOUND FROM A REEL, INTO A FILM DEVELOPING UNIT

Philippe Combet, Sassenage, and Serge Crasnianski, Meylan, both of France, assignors to Kis Photo Industrie/Serge Crasnianski, France

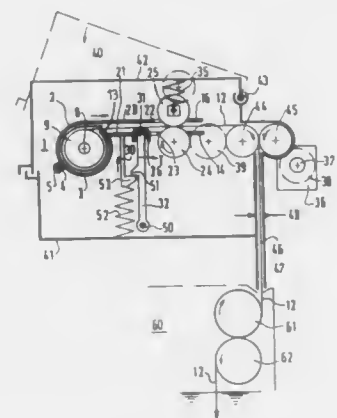
Filed Jun. 26, 1989, Ser. No. 371,637

Claims priority, application France, Jun. 30, 1988, 88 09111

Int. Cl.<sup>5</sup> G03D 3/13

U.S. Cl. 354—313

10 Claims



1. A device for introducing a free end of a photographic film into a film developing unit, after the film is unwound from a film reel having an unwind spindle, in which unit the film is to be developed, the film developing unit comprising  
 a generally cylindrical cradle-shaped support for supporting the reel so that the film can be withdrawn from it about an axis of the reel unwind spindle;  
 means for advancing the film including a first pair of motorized press rollers and a plurality of successive pairs of rollers disposed along a film path of the film developing unit; and  
 means for severing the other end of the film, which remains affixed to the unwind spindle of the reel, including a cutting member having a blade;

said film free-end introducing device comprising  
 a clamp formed of upper and lower wheel portions articulated about a pin parallel to the unwind spindle of the reel said clamp including said cradle-shaped support of the film developing unit shaped so as to receive said reel and including means to prevent rotation of the reel during unwinding of the film therefrom, and a rectilinear portion contiguous with said cylindrical cradle portion of the film developing unit and adapted to guide the film during unwinding from the reel, the rectilinear portion including:  
 a pair of parallel film guide channels for guiding the film,  
 a first window for passage therethrough of a blade of a cutting member when the unwinding of the film is complete, and  
 a second window for passage of said first pair of press rollers against said film for contacting and advancing the film.

4,949,115

#### AUTOMATIC FOCUSING PROJECTOR

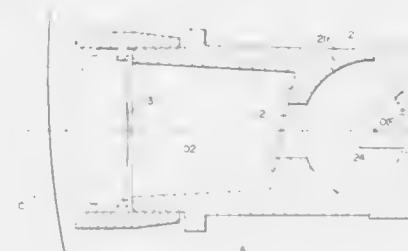
Yasuyuki Tejima; Akihiro Arai; Hideaki Yuda, all of Tokyo; Saburo Sugawara, Kawasaki, and Shigeo Toji, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan  
 Continuation of Ser. No. 120,650, Nov. 16, 1987, Pat. No. 4,905,034, which is a continuation-in-part of Ser. No. 29,924, Mar. 25, 1987, Pat. No. 4,771,308. This application Aug. 3, 1989, Ser. No. 389,299

Claims priority, application Japan, Nov. 17, 1986, 61-176497  
 The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G03B 3/00

U.S. Cl. 354—403

3 Claims



1. An automatic focusing projector having a light source, a contrast chart having a predetermined contrast pattern, a reflector which reflects rays of light from said light source towards said contrast chart, and a projecting lens which projects the light which is transmitted through said contrast chart onto an object, said light source being located in the vicinity of a focal point of said reflector, said contrast chart being positioned forwardly of said focal point, said projecting lens being located forwardly of said contrast chart, a color filter positioned forwardly of said projection lens, said contrast chart being inclined with respect to a plane passing through an optical axis of said projector at right angles, said apparatus comprising means for projecting said contrast chart pattern so that said pattern extends at least in a direction positioned along an optical axis of an imaging lens associated with said projector.

4,949,116

#### FOCUS DETECTION APPARATUS OF CAMERA

Toshihiko Karasaki, and Kazumi Sugitani, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 10, 1989, Ser. No. 391,923

Claims priority, application Japan, Aug. 11, 1988, 63-201559

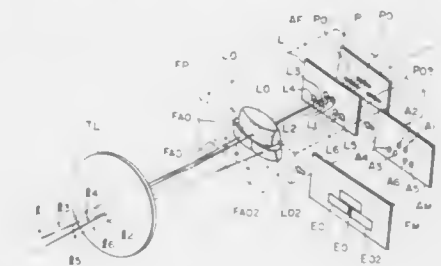
Int. Cl.<sup>5</sup> G03B 13/36

U.S. Cl. 354—408

13 Claims

1. A focus detection apparatus for a camera having a photo-taking lens, comprising:  
 a first focus condition detecting unit including means for

re-imaging a pair of images using a pair of light rays passed through said photo-taking lens and a condenser lens, means for receiving said pair of images, and means for detecting the focus condition of the photo-taking lens by calculating the correlation of said pair of images on the light receiving means, the first focus condition detecting unit defining a first focus detection area extended in a first direction on a photo-taking field; and  
 a second focus condition detecting unit including means for re-imaging a pair of images using a pair of light rays passed through said photo-taking lens and a condenser



lens, means for receiving said pair of images, and means for detecting the focus condition of the photo-taking lens by calculating the correlation of said pair of images on the light receiving means, the second focus condition detecting unit defining a second focus detection area extended in a second direction, which is parallel to the first direction, on the photo-taking field, and wherein the second focus detection area has an overlapping part, which overlaps the first focus detection area in a perpendicular direction to the second direction, and has a non-overlapping part, which does not overlap the first focus detection area in the perpendicular direction.

4,949,117  
CAMERA

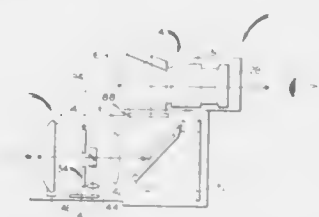
Roger S. Van Heyningen, Rochester; Cynthia S. Bell, Webster, and Paul L. Ruben, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,887

Int. Cl.<sup>5</sup> G03B 7/00

U.S. Cl. 354—412

10 Claims



1. A camera of the single lens reflex type, said camera comprising:  
 means for forming an image on photographic film, said forming means including optical means for producing an image of an object to be photographed;  
 means for producing an electronic image signal, said producing means including means for sensing scene parameters and for controlling said forming means in accordance with values of said parameters, said sensing and controlling means including means for focussing said optical means and for controlling the exposure of said film;  
 display means for receiving said image signal and for producing an image therefrom; and  
 a viewfinder for viewing said object and for viewing an

image on said display means, said viewfinder being optically coupled to said optical means by means of a reflecting surface.

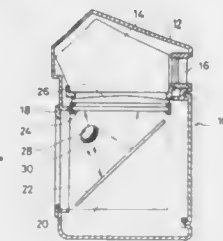
**4,949,118**  
**INDICATING APPARATUS WITHIN FINDER OF SINGLE-LENS REFLEX CAMERA**

Masato Yamamoto; Masahiro Nakajima, and Toshimasa Yamanaka, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,032  
Claims priority, application Japan, Dec. 28, 1987, 62-332905  
Int. Cl.<sup>5</sup> G03B 17/18

U.S. Cl. 354-475

16 Claims



1. An information indicating apparatus adapted for use in a single-lens reflex camera comprising a finder device in which rays of light, of an object to be photographed, are reflected by a mirror to form an image of said object on a focusing glass, said information indicating apparatus being located so as to project photographing information represented by a letter, or figure, or other symbol onto said focusing glass and to said finder device, an indication control circuit for controlling said photographing information to be indicated on said focusing glass, and an information indicating switch for turning said photographing information ON and OFF.

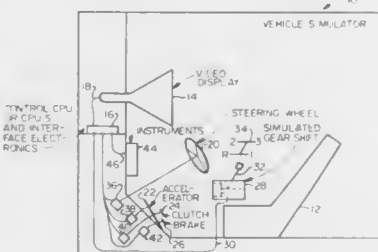
**4,949,119**  
**GEARSHIFT FOR A VEHICLE SIMULATOR USING COMPUTER CONTROLLED REALISTIC REAL WORLD FORCES**

Rick L. Moncrief, Santa Clara; Erik J. Durfey, Los Gatos, and Jacques D. Akin, San Carlos, all of Calif., assignors to Atari Games Corporation, Milpitas, Calif.

Filed Jan. 12, 1989, Ser. No. 296,552  
Int. Cl.<sup>5</sup> G09B 9/04

U.S. Cl. 364-578

21 Claims



18. An apparatus for simulating the look and feel of a real gearshift for a vehicle, comprising:  
a gearshift means having a gearshift lever and means to allow said gearshift lever to be pulled and pushed through a simulated gearshift pattern with a variable amount of resistance to movement thereof, including resistance means for receiving a control signal and for causing resistance to movement of said gearshift lever in accordance with said control signal; and  
control means for gathering data indicating the simulated conditions affecting said vehicle and for generating said

control signals to cause said resistance means to cause resistance similar to that which would be felt through the gearshift lever of an actual transmission under similar conditions.

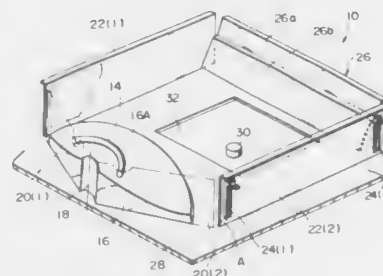
**4,949,120**  
**ILLUMINATING DEVICE**

Yuji Yasuda, Tokyo, and Tetsuya Fujio, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,467  
Claims priority, application Japan, Apr. 21, 1988, 63-99151; Apr. 21, 1988, 63-99152; Jul. 11, 1988, 63-172468  
Int. Cl.<sup>5</sup> G03B 27/54

U.S. Cl. 355-67

9 Claims



1. A device for illuminating a square flat area, comprising:  
a light source;  
main reflector means located outside of one end of said area and having a reflecting surface for reflecting light issuing from said light source; and  
auxiliary reflector means located at an outer edge of said area and having a reflecting surface for directing light reflected by said reflecting surface of said main reflector means toward said area,  
said reflecting surface of said main reflector means being shaped to reflect the light from said light source toward said area in a luminous flux density which is proportional to a distance as measured from said light source, said main reflector means comprising a sectorial mirror having a side reflecting surface at each of two radial edges of said mirror, said side reflecting surfaces constituting said reflecting surface.

**4,949,121**  
**PHOTOGRAPHIC PAPER MAGAZINE**  
Yoshio Ozawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 11, 1988, Ser. No. 256,358  
Claims priority, application Japan, Oct. 9, 1987, 62-154815[U]

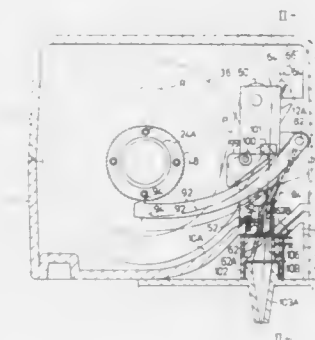
Int. Cl.<sup>5</sup> G03B 27/54

U.S. Cl. 355-72

20 Claims

1. A photographic paper magazine for supplying a photographic printing apparatus with photographic paper, comprising:  
a magazine body accommodating a roll of photographic paper and having an outlet aperture through which the photographic paper may be taken out, said magazine being closed and opened;  
photographic paper supporting means axially supported on said magazine body;  
detection means for facing a photographic paper drawing-out section defined between the roll of photographic paper and said outlet aperture, said detection means being moved depending upon whether or not any portion of the photographic paper exists in said photographic paper drawing out section;  
checking means disposed between said detection means and

said photographic paper supporting means, and, checking photographic paper winding-up rotations of said photographic paper supporting means when no photographic paper exists in said photographic paper drawing-out section; and



release means for releasing said checking means from the checking state when said magazine is opened, whereby the roll of photographic paper can be replaced when the magazine body is opened, and said checking means is allowed to operate when said magazine body is closed.

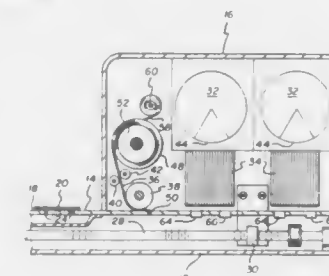
**4,949,122**  
**CONTACT PRINTER FOR EXPOSING SENSITIZED GRAPHIC ART FILM AND PAPER**

Robert S. Jones, and John J. Maurer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 17, 1989, Ser. No. 438,565  
Int. Cl.<sup>5</sup> G03B 27/10, 27/20

U.S. Cl. 355-84

12 Claims



1. A contact printer comprising means for supporting a film and an original in superposed relationship, means for providing a source of light for exposing said film through said original, means for moving said light over the surface of said superposed film and original, means for applying a transparent cover sheet over said superposed film and original as said light is moved, and means carried by said light moving means between said light and said cover sheet for collimating said light.

**4,949,123**  
**TONER SUPPLY DEVICE FOR A DEVELOPING APPARATUS**

Masayuki Takashima, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

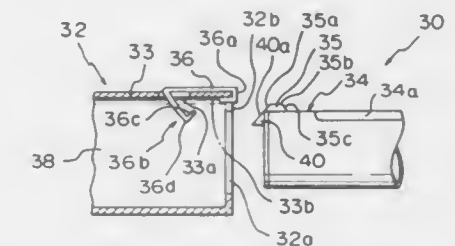
Filed Mar. 1, 1989, Ser. No. 317,564  
Claims priority, application Japan, Mar. 1, 1988, 63-25915[U]  
Int. Cl.<sup>5</sup> G03G 15/08

U.S. Cl. 355-260

8 Claims

1. A toner supply device for a developing apparatus on which a toner tank having a circular opening at one end for inserting a cylindrical toner cartridge is mounted, comprising:  
stop means provided on said toner tank adjacently to said

circular opening and protruding into a toner cartridge insertion path defined in said toner tank to interfere with said toner cartridge being inserted, said stop means resiliently retracting from said toner cartridge insertion path when urged outward in a radial direction of said toner tank from inside of said toner tank; and



urging means provided on said toner cartridge adjacently to one end of said toner cartridge and having an inclined surface for, when said toner cartridge is inserted into said toner tank, engaging with said stop to urge said stop outward from the inside of said toner tank.

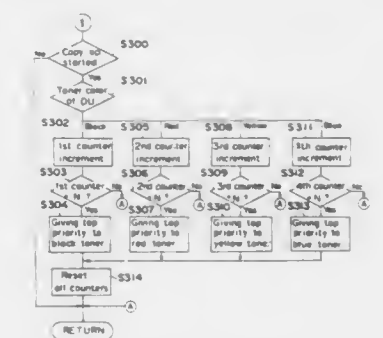
**4,949,124**  
**IMAGE FORMING APPARATUS HAVING PLURAL DEVELOPING UNITS AND AN ARRANGEMENT FOR SELECTING THE DEVELOPING UNIT HAVING THE HIGHEST USE COUNT**

Keiji Kusumoto; Masazumi Ito; Yoshiaki Takano, and Takashi Noda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 7, 1988, Ser. No. 203,158  
Claims priority, application Japan, Jun. 8, 1987, 62-142932  
Int. Cl.<sup>5</sup> G03G 15/00, 15/01

U.S. Cl. 355-203

20 Claims



1. An image forming apparatus having plural developing units which performs image forming operation with use of either one of the developing units further including:  
means for counting respective number of times in use with respect to each of the plural developing units; and  
means for selecting the developing unit having the largest number of times in use when a power source for the image forming apparatus is turned on.



**4,949,125**  
**METHOD AND APPARATUS FOR COLOR ELECTROPHOTOGRAPHY**

Hajime Yamamoto, Osaka; Kazunori Kitagaki, Utsunomiya, and Masahiko Nakamura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Oct. 21, 1988, Ser. No. 261,072

Claims priority, application Japan, Oct. 27, 1987, 62-270664; Dec. 25, 1987, 62-330818

Int. Cl.<sup>5</sup> G03G 15/01, 15/08  
U.S. Cl. 355—219

23 Claims



1. A method of color electrophotography comprising the steps of:

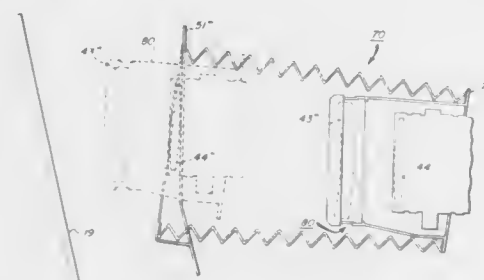
- performing a charging process, an exposure process, and a development process to form a toner image on a photosensitive member for each of a plurality of different colors, wherein the toner images for the respective colors form a composite color image;
- transferring the composite color image to a sheet; and
- varying a potential of toner on the photosensitive member before the development process for a final color is performed.

**4,949,126**  
**OPTICAL REPRODUCTION APPARATUS AND IMPROVED BELLOWS THEREFOR**

Calvin A. Frelier, Penfield, and David V. Kinney, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Mar. 30, 1989, Ser. No. 330,662

Int. Cl.<sup>5</sup> G03G 15/00  
U.S. Cl. 355—243

6 Claims



1. Reproduction apparatus comprising:  
means for supporting a radiation sensitive member for exposure;  
optical means including one or more optical elements for forming an image on said radiation sensitive member;  
means for supporting an optical element of said optical means in each of at least two extreme positions, in both of which positions the optical element is positioned in an optical path for forming an image upon the member;  
bellows means coupled to said optical element;  
said bellows means including an outer pleated bellows movable from collapsed to extended positions and an inner

light excluding means supported for movement within the outer bellows means;

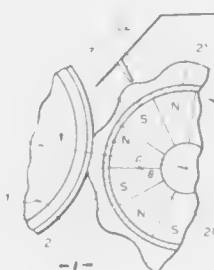
the pleated bellows being supported at one end by a stationary frame-like member and at a second end by a movable frame-like member, an optical element being movable within the outer bellows during collapsing of this outer bellows and, with the outer bellows collapsed, the optical element being located at one extreme position to one side of said stationary support and, with the outer bellows extended, the optical element being located to the other side of the stationary support.

**4,949,127**  
**MAGNETIC BRUSH DEVELOPMENT PROCESS**  
Tomiya Matsuda, Yokosuka, and Teruaki Higashiguchi, Tokyo, both of Japan, assignors to Mita Industrial Co., Ltd., Japan

Filed Nov. 28, 1989, Ser. No. 442,295  
Claims priority, application Japan, Nov. 28, 1988, 63-298383  
Int. Cl.<sup>5</sup> G03G 15/09

U.S. Cl. 355—251

11 Claims



1. A magnetic brush development process in the electrophotography, which comprises supplying a twocomponent type developer comprising an electroscopic toner and a magnetic carrier onto a magnet sleeve to form a magnetic brush and bringing the magnetic brush into sliding contact with the surface of a photosensitive material drum on which an electrostatic latent image is formed, to effect development, wherein the development is carried out under such conditions that the peripheral speed ratio K of the magnet sleeve to the photosensitive material drum satisfies the following requirement:

$$\frac{0.75d}{\mu^{1/2} \cdot x} \leq K \leq \frac{1.25d}{\mu^{1/2} \cdot x}$$

wherein d represents the average particle size (μm) of the magnetic carrier of the developer, x represents the saturation magnetization (emu/g) of the magnetic carrier of the developer, and μ represents the dynamic friction coefficient of the magnetic brush,

**4,949,128**  
**IMAGE FORMING APPARATUS WITH INTERLEAVED OUTPUT SHEETS**

Michael H. Parsons, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 2, 1989, Ser. No. 430,408  
Int. Cl.<sup>5</sup> G03G 15/14, 15/01, 21/00

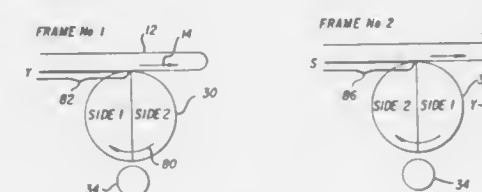
U.S. Cl. 355—271

20 Claims

1. A method of producing a plurality of regular output sheets containing composite color image information which are interleaved with special sheets on electrostatographic apparatus, said apparatus having an intermediate transfer member sized sufficiently to simultaneously contain separate color images for at least two separate sheets and said apparatus also having means for producing regular developed and special

frames for transfer to the intermediate transfer member, said method including the steps of:

- intermixing separate color images for different regular output sheets on the intermediate transfer member at the same time;
- providing special frames which are aligned for transfer to the intermediate transfer member at predetermined times;



- feeding the interleaved special sheets synchronously with the special frames; and  
transferring the composite images to the regular output sheets after all of the separate color images have been transferred to the intermediate transfer member.

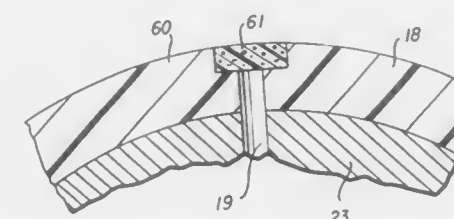
**4,949,129**  
**APPARATUS FOR TRANSFERRING TONER IMAGES TO A RECEIVING SHEET**

William Y. Fowlkes, Brockport; Bruce J. Rubin; Victor C. Solomon, both of Rochester, and William B. Vreeland, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 3, 1989, Ser. No. 375,105  
Int. Cl.<sup>5</sup> G03G 15/16

U.S. Cl. 355—274

18 Claims



1. Apparatus for transferring a toner image from an image bearing member to a receiving sheet, which apparatus includes:

- a transfer drum having a conductive surface and having vacuum holes to said surface,
- means for applying a vacuum to said vacuum holes to hold a receiving sheet on the surface of the drum,
- means for creating an electric field urging a toner image toward said drum, and
- means positioned in said vacuum holes, said means being sufficiently conductive to improve the continuity of said electrical field and sufficiently porous to permit maintenance of a vacuum on the receiving sheet.

**4,949,130**  
**HEAT-FIXING APPARATUS**  
Mitsubishi Torino, Fukaya, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 225,993  
Claims priority, application Japan, Jul. 30, 1987, 62-190988; Apr. 21, 1988, 63-53976

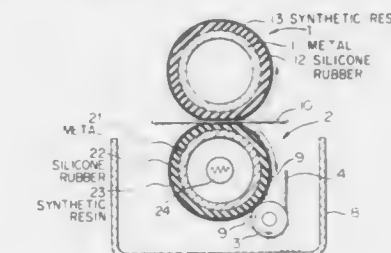
Int. Cl.<sup>5</sup> G03G 15/20

U.S. Cl. 355—282

4 Claims

1. A heat-fixing apparatus comprising a heating roll to be brought into contact with a toner image-bearing sheet member,

said heating roll being constituted by a cylindrical core coated with an elastic layer; a pressure roll, said pressure roll being in pressed contact with said heating roll to provide a flat nip portion of a certain width therebetween; a cleaning roll, said cleaning roll being rotatably in pressed contact with said heating roll; and a scraper in slidable contact with the outer surface of said cleaning roll, said scraper being supported by a support plate and a holding plate and being movable longitudinally with respect to said support plate and said holding plate to



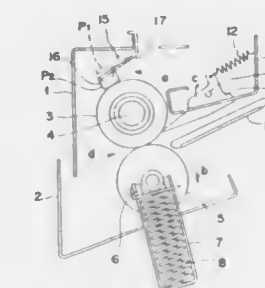
prevent the deformation of said scraper due to its thermal expansion, wherein said scraper is mounted between said support plate and said holding plate by one or more mounting members extending through respective apertures in said scraper; and wherein said holding plate is spaced from said support plate a distance greater than the thickness of said scraper and said scraper mounting apertures are elongated in the longitudinal direction, for permitting longitudinal movement of said scraper.

**4,949,131**  
**FIXING APPARATUS**  
Masazumi Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 22, 1988, Ser. No. 210,017  
Claims priority, application Japan, Jun. 24, 1987, 62-156782  
Int. Cl.<sup>5</sup> G03G 15/20, 21/00

U.S. Cl. 355—282

6 Claims



1. A fixing apparatus comprising:  
a heat roller having a heater;  
a pressure roller contacting said heat roller under pressure;  
drive means for rotating said heat roller;  
a temperature detecting element for detecting a temperature of said heat roller;  
a holder holding said temperature detecting element to maintain said element out of contact with said heat roller when said heat roller is at a specified temperature or less and to maintain said element in a contact with said heat roller when said heat roller is above the specified temperature;  
detecting means for detecting that said temperature detecting element contacts said heat roller; and  
control means for starting rotation of said heat roller in response to a signal from said detecting means.

4,949,132

## LOW PRESSURE HEAT FIXING DEVICE

Ikurou Chimoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

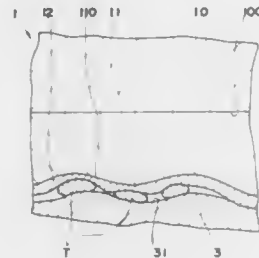
Filed Sep. 8, 1988, Ser. No. 241,571

Claims priority, application Japan, Sep. 10, 1987, 62-226934

Int. Cl.<sup>3</sup> G03G 15/20

U.S. Cl. 355—290

7 Claims



1. A low pressure heat fixing device comprising:
  - a heat fixing roller having a metal roller body, an elastic intermediate layer on the surface of said metal roller body, and a thin resin film formed over the surface of said intermediate layer, said elastic intermediate layer having a thickness of 0.1 mm-1 mm and said thin resin film having a releasing property and a thickness of 10  $\mu$ m-100  $\mu$ m and being thinner than said intermediate layer;
  - a pressure roller in contact with said heat fixing roller and having a metal roller body, and an elastic layer on the surface of said last mentioned metal roller body, and
  - a pressing means for pressing said heat fixing roller and said pressure roller together along a nip line at a total pressure of less than 20 kg to thereby thermally fix an image to a paper passed between said rollers.

4,949,133

## APPARATUS FOR CLEANING AND MOVING A PHOTORECEPTOR

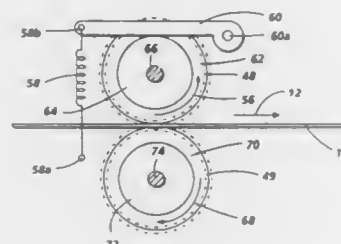
Benzion Landa, Rehovot, Israel, assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 16, 1988, Ser. No. 271,830

Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355—296

6 Claims



1. An electrophotographic printing machine of the type in which a photoconductive belt has extraneous liquid developer material thereon, wherein the improvement includes:
  - a first roller for cleaning a substantial portion of the extraneous liquid material from the photoconductive belt;
  - a second roller rotatively coupled to said first roller with the photoconductive belt being interposed between said first roller and said second roller.
- means for pressing said first roller and said second roller into contact with the photoconductive belt; and
- means for moving either the photoconductive belt or said second roller with movement of one frictionally moving the other so that said first roller and the belt move with the extraneous liquid material being removed from the

belt with the tangential velocity of said first roller being substantially equal to the velocity of the photoconductive belt.

4,949,134

## IMAGE FORMING APPARATUS HAVING INTERMEDIATE TRAY

Hiroshi Iwaki, Ichinomiya, Yoshiharu Mita, Himeji; Akihiko Suto, Gifu; Shinichi Kikkawa, Ogaki; Yasushi Handa, and Sadaki Kadera, both of Gifu, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

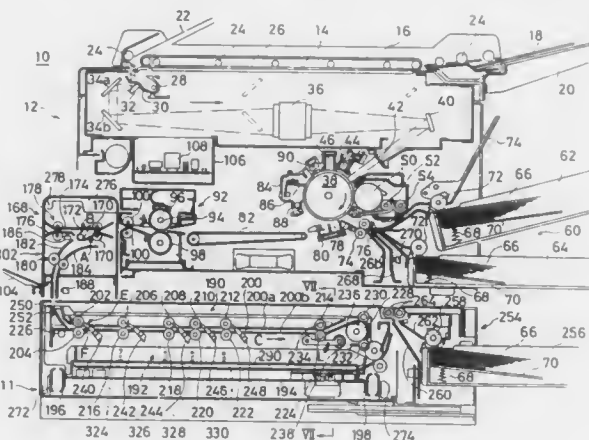
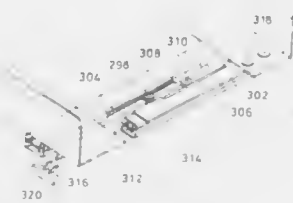
Filed Mar. 6, 1989, Ser. No. 319,636

Claims priority, application Japan, Mar. 3, 1988, 63-28427; Mar. 9, 1988, 63-55272; Mar. 10, 1988, 63-56939; Mar. 10, 1988, 63-32073[U]; Mar. 14, 1988, 63-60802; Mar. 15, 1988, 63-33922[U]; Mar. 19, 1988, 63-66151; Apr. 6, 1988, 63-84435

Int. Cl.<sup>3</sup> G03G 15/00

U.S. Cl. 355—317

26 Claims



1. An imaging forming apparatus, comprising:
  - image forming means;
  - first paper supplying means for supplying a copying paper to said image forming means;
  - an intermediate tray for temporarily storing a copied paper on which an image has been formed by said image forming means;
  - second paper supplying means for supplying again the copied paper from said intermediate tray to said image forming means;
  - two movable guide members provided in association with said intermediate tray for aligning both side ends of the copied paper stored in the intermediate tray;
  - moving means for moving each of said movable guide members in a direction of a width of said copied paper; and
  - center position changing means for changing a center position between said two movable guide members in a width direction of said copied paper.

4,949,135

## VISUAL BASED PROCESS CONTROL APPARATUS WHICH IS BASED ON A NEAR UNIFORM HUMAN VISUAL RESPONSE SPACE

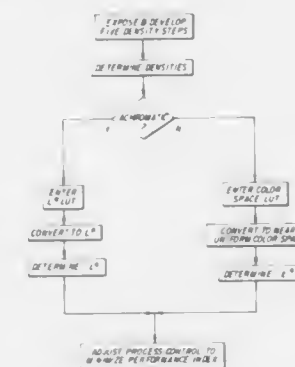
Yee S. Ng, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 17, 1989, Ser. No. 394,902

Int. Cl.<sup>3</sup> G03G 15/01

U.S. Cl. 355—327

21 Claims



8. In a color image reproduction device, apparatus for automatically adjusting process control parameters for a plurality of color separations to achieve reproductions in terms of human visual response; said apparatus comprising:

means for producing reproductions;  
 means for making a plurality of density measurements across a range of densities for each color separation;  
 means for converting the density measurements to a near uniform color space;  
 means for calculating a set of error signals for the converted density measurements in accordance with human visual sensitivities of said near uniform color space;  
 means responsive to said set of error signals for calculating a set of process control parameter adjustment signals to minimize a performance index which is a function of said error signals; and  
 means responsive to said set of parameter adjustment signals for adjusting process control parameters to influence reproduction.

4,949,136

## SUBMICRON LIGHTLY DOPED FIELD EFFECT TRANSISTORS

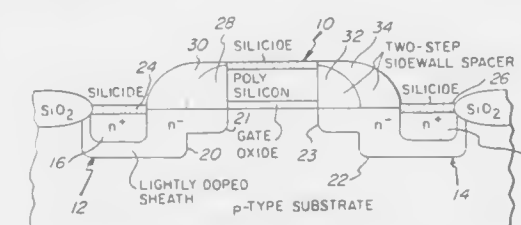
Faqir C. Jain, Storrs, Conn., assignor to University of Connecticut, Storrs, Conn.

Filed Jun. 9, 1988, Ser. No. 204,578

Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—23.3

6 Claims



1. A silicon lightly doped field effect transistor having:
  - (a) a central gate portion;
  - (b) a source portion to one side of said gate portion and having a heavily doped contact section spaced from said gate portion, a sidewall spacer portion about said gate portion and between said gate portion and contact section,

and a lightly doped sheath about the sides and bottom of said heavily doped contact section, said sheath extending to a first depth about the sides of and below said contact section and having an extension of lesser depth extending from below said spacer portion to said gate portion, thereby providing a stepped configuration in cross section; and

- (c) a drain portion to the opposite side of said gate portion and having a heavily doped contact section spaced from said gate portion, a sidewall spacer portion about said gate portion and between said gate portion and contact section, and a lightly doped sheath about the sides and bottom of said heavily doped contact section, said sheath extending to a first depth about the sides of and below said contact section and having an extension of lesser depth extending from below said spacer portion to said gate portion, thereby providing a stepped configuration in cross section, said sheaths having an impurity doping concentration  $10^2$ - $10^4$  lower than the impurity doping concentration in the heavily doped contact sections.

4,949,137

## SEMICONDUCTOR DEVICE

Hitoshi Matsuzaki, Mito; Kiyoshi Takeda, Hitachi; Toshikatsu Shirasawa, Hitachiota, and Hideki Miyazaki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

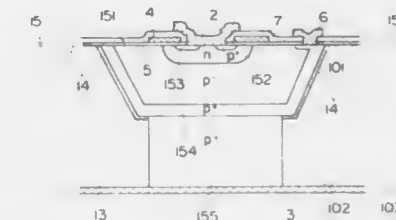
Filed May 31, 1989, Ser. No. 358,880

Claims priority, application Japan, Jun. 1, 1988, 63-132741

Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—23.4

7 Claims



1. A semiconductor device comprising:
  - a semiconductor substrate including, between its first and second principal surface,
  - a first semiconductor layer of a first conduction type extending from the first principal surface toward the second principal surface,
  - a second semiconductor layer of the first conduction type having substantially the same impurity concentration as said first semiconductor layer, said second semiconductor layer extending from the second principal surface toward the first principal surface so as to be adjacent to said first semiconductor layer to form a first boundary,
  - a third semiconductor layer of the first conduction type having a lower impurity concentration than said first semiconductor layer, said third semiconductor layer being adjacent to said first principal surface and extending into said first semiconductor layer, and
  - a fourth semiconductor layer of a second conduction type having a higher impurity concentration than said third semiconductor layer, said fourth semiconductor layer being adjacent to said first principal surface and extending into said third semiconductor layer;
- a first main electrode kept in ohmic contact with said fourth semiconductor layer on said first principal surface;
- a second main electrode kept in ohmic contact with said second semiconductor layer on said second principal surface; and
- a current detection electrode kept in ohmic contact with said first semiconductor layer on said first principal surface, wherein a potential drop in a main current flowing through said second semiconductor layer is detected using said



current detection electrode so that the main current flowing between said both principal electrodes can be detected

4,949,138

**SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE**  
Akitoshi Nishimura, Ibaraki, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.

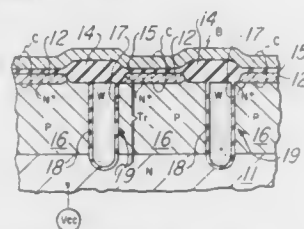
Continuation of Ser. No. 113,794, Oct. 27, 1987, abandoned.

This application May 11, 1989, Ser. No. 351,265

Int. Cl.<sup>3</sup> H01L 29/78, 27/02, 29/06

U.S. Cl. 357—23.6

8 Claims



1. A semiconductor integrated circuit device comprising:  
a semiconductor body having a top surface, said semiconductor body having a plurality of vertically elongated grooves provided therein opening onto the top surface thereof;

said semiconductor body including a lower semiconductor portion of one conductivity type and an upper semiconductor portion of the other conductivity type;  
said plurality of vertically elongated grooves extending into said lower semiconductor portion of one conductivity type;

a plurality of regions of said one conductivity type provided in said upper semiconductor portion of the other conductivity type and opening onto the top surface of said semiconductor body, said plurality of regions being arranged in groups defining respective rows of said regions of said one conductivity type;

an insulation lining disposed in each of said grooves and covering the groove-defining surfaces of said semiconductor body;

a conductive material filling each of said grooves and being insulated from said semiconductor body by said insulation lining in said grooves;

an insulation layer disposed on said top surface of said semiconductor body and including spaced apart insulation portions of increased thickness, the remaining portions of said insulation layer being relatively thin in relation to said insulation portions of increased thickness;

each of said insulation portions of increased thickness extending above the upper surface and below the lower surface of said relatively thin remaining portions of said insulation layer, each of said insulation portions of increased thickness further being interposed between adjacent regions of said one conductivity type provided in said upper semiconductor portion of the other conductivity type to electrically isolate adjacent ones of said regions of said one conductivity type from each other and overlying said conductive material filling each of said grooves;

said relatively thin remaining portions of said insulation layer overlying said plurality of regions of said one conductivity type provided in said upper semiconductor portion of the other conductivity type and respectively extending between adjacent insulation portions of increased thickness;

a plurality of strips of conductive material overlying said insulation layer in registration with respective rows of said regions of said one conductivity type;

said semiconductor body, said conductive material filling each of said grooves in said semiconductor body, said insulation layer and said plurality of strips of conductive material cooperating to define a plurality of memory cells each comprising a transfer gate transistor and a capacitor; the transistor of each memory cell being vertically arranged

along the conductive material filling a respective groove and including one of said regions of said one conductivity type as a source region, the upper semiconductor portion of said other conductivity type as a channel region, and the lower semiconductor portion of said one conductivity type as a drain region, with said conductive material filling said groove being a transfer gate;

the capacitor of each memory cell including said one region of said one conductivity type forming the source region of said transistor as a first electrode, a respective one of said plurality of strips of conductive material in registration with the row containing said one region of said one conductivity type as a second electrode, and a respective relatively thin portion of said insulation layer as the dielectric layer between said first and second electrodes; and said conductive material filling each of said grooves in said semiconductor body serving as respective word lines and said plurality of strips of conductive material serving as bit lines for the plurality of memory cells.

4,949,139

**TRANSISTOR CONSTRUCTION FOR LOW NOISE OUTPUT DRIVER**

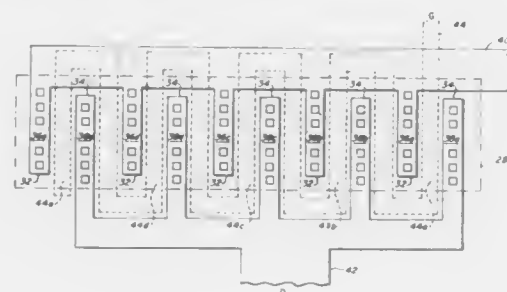
George J. Korsh, Redwood City, and Edward Hul, Sunnyvale, both of Calif., assignors to Atmel Corporation, San Jose, Calif.

Filed Sep. 9, 1988, Ser. No. 242,708

Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—23.14

3 Claims



1. A transistor construction with a switching delay comprising:

(a) a semiconductor substrate  
(b) a first plurality of spaced apart diffusion zones in said semiconductor substrate electrically connected together in parallel to form a comb-like source electrode,

(c) a second plurality of spaced apart diffusion zones in said semiconductor substrate electrically connected together in parallel to form a comb-like drain electrode, said comb-like source and drain electrodes facing each other with said first and second pluralities of spaced apart diffusion zones being interlaced and sequentially alternating with one another,

(d) a gate electrode passing between said first and second diffusion zones in an elongated pattern, said gate electrode having a length which, together with a gate resistance R and a local transistor capacitance C, is sufficient to form an RC delay element with an RC delay of at least 2 nanoseconds.

(e) a gate turn-on driver circuit connected to a first end of said gate electrode,

(f) a high Z/L low RC transistor having a source and drain connected to respective comb-like source and drain electrodes, and having a control gate connected to a second end of said gate electrode distal to said first end, said control gate of said high Z/L low RC transistor being connected to said gate turn-on driver circuit only through said RC delay element formed by said gate electrode, and

(g) gate turn-off driver circuits, at least one of said turn-off circuits connected to said gate electrode, said control gate of said high Z/L low RC transistor being directly connected to one said gate turn-off driver circuits.

4,949,140

**EEPROM CELL WITH INTEGRAL SELECT TRANSISTOR**

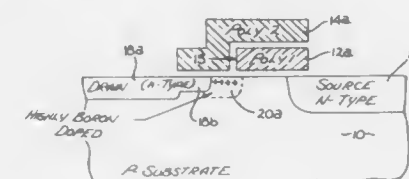
Simon M. Tam, San Mateo, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 9,998, Feb. 2, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 338,382

Int. Cl.<sup>3</sup> H01L 27/115

U.S. Cl. 357—23.5

3 Claims



1. An electrically programmable and electrically erasable memory cell formed in a silicon body comprising:

a source region formed in said body;  
a drain region formed in said body, said drain region having a first flat bottomed portion and a second flat bottomed portion, said first portion extending deeper into said body as compared to said second portion, both of said first and second portions being spaced apart from said source region, said second portion being nearer to said source region than said first portion, thereby defining a channel region therebetween;

a first polysilicon member completely surrounded with insulation and extending from over said source region above said channel to a point spaced apart from said drain region so as to define a third region in said body between an edge of said first gate member and said drain region; said third region being more heavily doped than said channel region with a dopant opposite to the dopant forming said source and drain regions;

a second polysilicon gate member defined in alignment with and formed over said first gate member and extending from said first gate member over said channel region to overlapping at least said shallow region of said drain region, said second gate member being insulated from said first gate member and said body;

said source region extending deeper into said body than said deep section of said drain region;

said third region and said second polysilicon gate member integrally forming a select device within said memory cell for halting the flow of current across said channel region after said first polysilicon gate member has been erased, said select device halting current flow unless a reference potential which exceeds the voltage threshold of said third region is applied to said second polysilicon gate member.

4,949,141

**VERTICAL GATE THIN FILM TRANSISTORS IN LIQUID CRYSTAL ARRAY**

Heinz H. Busta, Park Ridge, Ill., assignor to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 152,349, Feb. 4, 1988, Pat. No. 4,859,623.

This application Jun. 19, 1989, Ser. No. 367,889

Int. Cl.<sup>3</sup> H01L 29/78

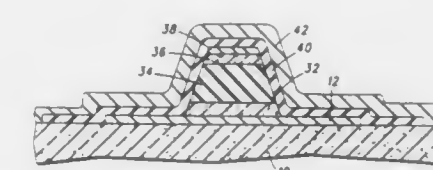
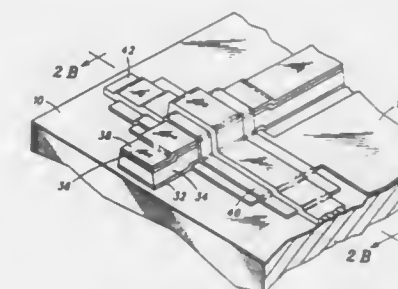
U.S. Cl. 357—23.7

27 Claims

27. A visual display device including pixels and switching

field effect transistors for charging said pixels, the device comprising:

an insulating substrate;  
conductive pixel elements formed on one surface of said substrate in an array of rows and columns;



a transistor drain formed directly on each one of said pixel elements; and

a grid of addressing lines formed between rows and columns of pixel elements, the portions of said grid lines over each said drain providing the source and gate of the corresponding transistor.

4,949,142

**INTEGRATED N-CHANNEL POWER MOS BRIDGE CIRCUIT**

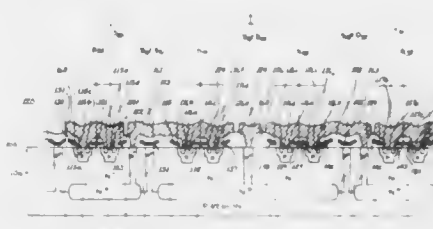
Claudio Contiero, Via Giovanni XXIII, 5, 20090 Buccinasco (MI), and Paola Galbiati, Via Ramazzotti, 24, 20052 Monza (MI), both of Italy

Filed Sep. 6, 1985, Ser. No. 773,316

Claims priority, application Italy, Dec. 18, 1984, 24126 A/84 Int. Cl.<sup>3</sup> H01L 29/78

U.S. Cl. 357—23.4

1 Claim



1. An integrated power MOS bridge circuit comprising, in combination:

a semiconductor substrate;  
first, second and third junction isolated regions of a first conductivity type located in said substrate;  
junction isolation means in said substrate for laterally separating and electrically isolating said first, second, and third junction isolated regions;

first, second and third buried drain layer regions of said first conductivity type in respective ones of said junction isolated regions;

a first MOS transistor in said first junction isolated region

and a second MOS transistor in said second junction isolated region;  
third and fourth MOS transistors in said third junction isolated region over said third buried layer region, said third and fourth MOS transistors each including a channel region of a second conductivity type spaced from said junction isolation means; and  
a sinker region of said first conductivity type in said third junction isolation region, said sinker region extending to said third buried drain layer region between said third and said fourth MOS transistors.

4,949,143

# SEMICONDUCTOR DEVICES AND METHOD OF MANUFACTURING THE SAME

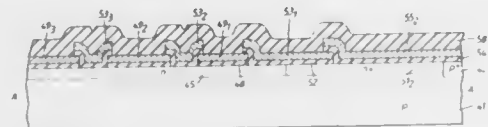
Mamoru Iesaka; Shinji Uya, and Nozomu Harada, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 904,296, Sep. 8, 1986, abandoned. This application Jan. 11, 1989, Ser. No. 296,324

Claims priority, application Japan, Sep. 12, 1985, 60-202114 Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—24

13 Claims



13. A semiconductor device, comprising:

a semiconductor substrate;

a plurality of charge accumulation regions which accumulate electric charges obtained by a photoelectric conversion, and are formed at the surface of said semiconductor substrate;

a plurality of first CCD regions which transfer said electric charges of said charge accumulation regions, each said first CCD region including a channel region and an end transfer electrode for controlling a potential of a corresponding portion of said channel region;

a second CCD region to which said first CCD regions are connected, said second CCD region including transfer electrodes corresponding to channel portions to which said first CCD regions are connected, and said transfer electrodes in said second CCD region and said end transfer electrode being adjacent each other in a direction of elongation of said first CCD region;

wherein, said channel region of each said first CCD region has a different channel impurity concentration area corresponding to a latter part of the end transfer electrode directly adjacent said second CCD region as compared to a remainder of said channel region corresponding to said end transfer electrode to make the potential well of said different channel impurity concentration area deeper.

4,949,144

# SEMICONDUCTOR PHOTO-DETECTOR HAVING A TWO-STEPPED IMPURITY PROFILE

Fumihiko Kuroda, Yokohama; Tetsuo Sadamasa, Chigasaki; Nobuo Suzuki, Tokyo, and Masaru Nakamura, Kawaguchi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 903,426, Sep. 4, 1986, abandoned. This application Sep. 1, 1988, Ser. No. 240,345

Claims priority, application Japan, Sep. 24, 1985, 60-208808; Sep. 24, 1985, 60-210419; Dec. 4, 1985, 60-271568

Int. Cl.<sup>5</sup> H01L 29/205, 31/06

U.S. Cl. 357—30

5 Claims

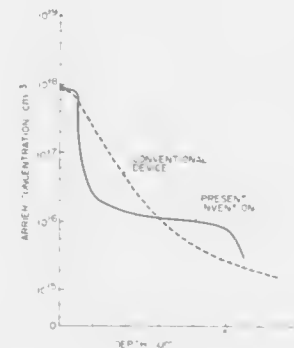
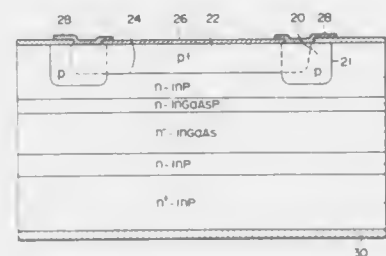
1. A semiconductor photodetector comprising:  
a semiconductor substrate;

a light absorption layer of a first conductivity type formed on the semiconductor or substrate;

a multiplication layer of said first conductivity type, formed on the light absorption layer, for multiplying a photocurrent;

a semiconductor region of a second conductivity type formed on the multiplication layer and constituting an abrupt pn junction with said multiplication layer; and

a guard ring area of a second conductivity type formed around a periphery of the semiconductor region such that a carrier concentration profile of said guard ring area has



a large gradient portion at a location adjacent to a device surface and a small gradient portion below the large gradient portion, said small gradient portion having substantially constant carrier concentration and at least reaching to a pn junction between said guard ring area and an adjacent layer;

wherein the carrier concentration gradient of said large gradient portion is above 3 decade/μm, and the carrier concentration gradient of said small gradient portion is below 0.2 decade/μm, and the unit decade/μm is defined as the exponent to the base 10 of the carrier concentration in atom/cm<sup>3</sup> per μm of depth in said guard ring area.

4,949,145

# HOMO-JUNCTION BIPOLAR TRANSISTOR HAVING HIGH BASE CONCENTRATION AND SUITABLE FOR LOW TEMPERATURE OPERATION

Kazuo Yano, Koganei; Masaaki Aoki, Mlnato; Toshiaki Masuhara, Nishitama, and Katsuhiko Shimohigashi, Musashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,228

Claims priority, application Japan, Oct. 7, 1987, 62-251491;

Jun. 10, 1988, 63-141702; Aug. 12, 1988, 63-199834

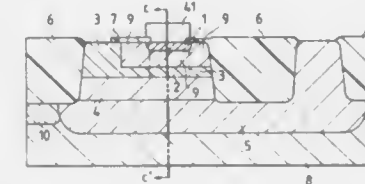
Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—34

7 Claims

1. A semiconductor apparatus comprising:  
(1) a semiconductor substrate; and

(2) means for cooling said semiconductor substrate down to an operation temperature substantially below 200° K.; wherein said semiconductor substrate contains on the surface thereof at least one bipolar transistor; wherein said bipolar transistor includes a collector region of a first conductivity type, an intrinsic base region of a second conductivity type connected to said collector region and an emitter region of the first conductivity type connected to said intrinsic base region; wherein the maximum value of the impurity concentration



of the second conductivity type of said intrinsic base region is set to be at least  $1 \times 10^{18}/\text{cm}^3$ ;

wherein the impurity concentration of the first conductivity type in a first region at at least part of said emitter region is set to a value lower than the maximum value of the impurity concentration of the second conductivity type; and

wherein said intrinsic base region and said first region in said emitter region are made of substantially the same material except for the first and second conductivity type impurities.

4,949,146

# STRUCTURED SEMICONDUCTOR BODY

Hans J. Herzog, Neu-Ulm; Klaus Wörner, Leingarten, and Erich Kasper, Pfaffenhofen, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt am Main and Telefunken electronic GmbH, Heilbronn, both of, Fed. Rep. of Germany

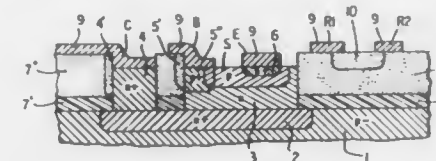
Filed Dec. 12, 1986, Ser. No. 941,225

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545238

Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—34

18 Claims



1. In a semiconductor device including a structured semiconductor body comprising at least a plurality of differently doped monocrystalline silicon semiconductor regions which are formed on a planar major surface of a silicon substrate and which are delimited by at least one insulating barrier region which prevents undesirable electrical current flow between said monocrystalline silicon semiconductor regions, the improvements wherein: said insulating barrier region comprises a layer of silicon oxide containing openings formed on said major surface of said silicon substrate, and a layer of poorly conducting polycrystalline silicon grown on the outer surface of said silicon oxide layer; said monocrystalline semiconductor regions are disposed on said major surface within said openings provided in said layer of silicon oxide; said monocrystalline regions and said polycrystalline layer have the same thickness and were grown by a differential silicon molecular beam epitaxy process; and at least one resistor is provided within said polycrystalline silicon layer of said insulating barrier region,

said resistor comprising a highly doped region of said polycrystalline silicon layer disposed at the outer surface of said polycrystalline layer, and surrounded by said poorly conducting polycrystalline silicon of said polycrystalline layer at said outer surface of said poorly conducting polycrystalline layer.

4,949,147

# SENSITIVE THYRISTOR WITH INTEGRATED GATE-CATHODE DECOUPLING

Pierre Bacuvier, Luynes, France, assignor to Thomson-CSF, Paris, France

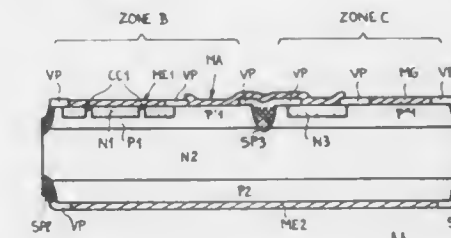
Continuation-in-part of Ser. No. 892,913, Aug. 4, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 253,927

Claims priority, application France, Aug. 6, 1985, 85 12036

Int. Cl.<sup>5</sup> H01L 29/74

U.S. Cl. 357—38

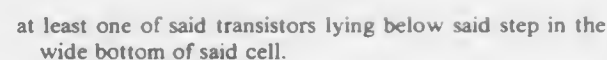
9 Claims



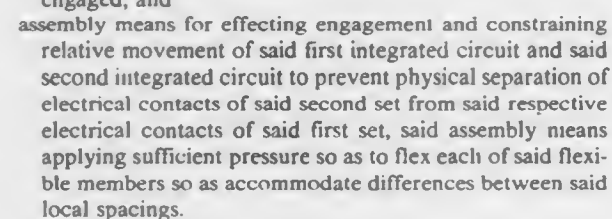
1. A thyristor which is sensitive to triggering by a gate current and which is insensitive to triggering by a voltage gradient  $dV/dt$ , comprising a semiconductor substrate having a rear face covered with an anode metallization and a front face with a cathode metallization and a gate metallization, the thyristor having under the metallization of the front face a semiconductor layer of P type occupying the whole of the surface of the substrate, and a cathode region of N type being locally formed in the P type layer, wherein the P type layer is divided into two zones separated by a furrow filled with a passivation substance, a first zone containing on the one hand the whole of the cathode region and on the other hand a first P layer portion flush with the surface of the substrate and adjacent the furrow, and a second zone containing on the one hand an auxiliary region of N type formed in the P type layer and on the other hand a second P type layer portion flush with the surface, the gate metallization covering at least partially the second P layer portion in a corner of the second zone away from the auxiliary region of N type, the cathode metallization covering the cathode region without covering the first P layer portion, and an auxiliary metallization being provided, separate from the other metallizations, this metallization covering on the other hand at least partially the first P type layer portion and on the other hand at least partially the N type auxiliary region, said second zone occupying a substantially lesser surface of said front face than said first zone, said auxiliary region of N type formed in said second zone forming an N emitter of an auxiliary thyristor of which the second P type layer portion in the second zone serves as a gate, wherein triggering of said gate of said auxiliary thyristor results in conduction of said auxiliary thyristor and triggering of a main thyristor including the cathode region of N type formed in said first zone by means of the auxiliary metallization connecting the first P type layer portion of the first zone to the N emitter of the auxiliary thyristor of the second zone, said first P type layer portion serving as a gate of said main thyristor, said thyristor further comprising a capacity provided between the gate of said auxiliary thyristor and the gate of said main thyristor, said auxiliary metallization serving as an electrode of said capacity, said capacity comprising a dielectric layer deposited over said auxiliary metallization and said gate metallization extending over said dielectric layer.



## 8 Claims



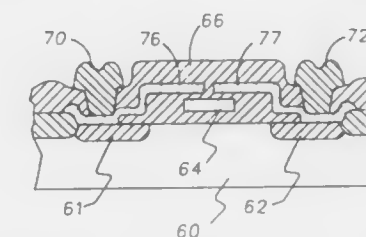
## 2 Claims



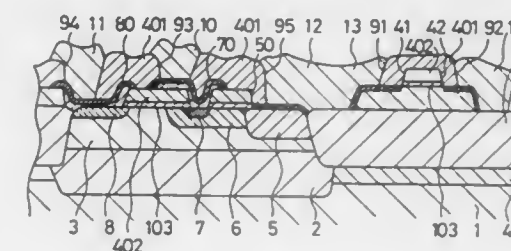
### 13 Claims

at least one of said sidewalls being shaped to include a step

### 36 Claims



## 15 Claims



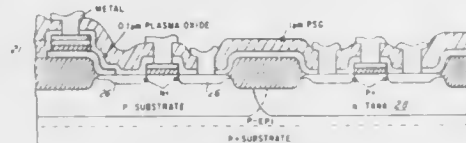
## 12 Claims

1. An integrated semiconductor device comprising:  
a substrate having a stack area and a transistor area;

### 6 Claims

1. A semiconductor integrated circuit comprising:
  - (a) a substrate of a first conductivity type;
  - (b) first and second regions of a second conductivity type forming first and second P-N junctions with said substrate;
  - (c) a gate electrode having a portion separated from said first region and partially overlapping with said second region through an insulating layer;
  - (d) light interrupting means, made from a polycrystalline layer, connected to said first region, for preventing light

- an insulating layer formed on said substrate over said stack area;  
 a first conductive layer formed on said insulating layer;  
 a first silicon dioxide layer formed on said first conductive layer;  
 a silicon nitride layer formed on said first silicon dioxide layer;



- a second silicon dioxide layer, said second silicon dioxide layer being formed by thermal oxidation of said silicon nitride layer, of the exposed portions of said first conductive layer and of the exposed portions of said substrate; and  
 a second conductive layer formed on said second silicon dioxide layer, said second conductive layer formed over said stack area and said transistor area.

4,949,155

## TAPE CARRIER FOR SEMICONDUCTOR CHIPS

Naoyuki Tajima, Nara; Takaaki Tsuda, Tenri, and Yasunori Chikawa, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

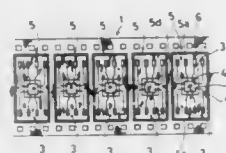
Filed Jul. 14, 1988, Ser. No. 219,218

Claims priority, application Japan, Jul. 14, 1987, 62-107993[U]

Int. Cl.<sup>3</sup> H01L 23/48

U.S. Cl. 357—68

10 Claims



1. A tape carrier for semiconductor chips, comprising:  
 an insulating tape;  
 a plurality of first conductor patterns longitudinally formed on the insulating tape and spaced from each other, each of the first conductor patterns having a first lead connected with a substrate electrode of a semiconductor chip and second leads connected with the other electrodes of the chip;  
 a second stripe shaped conductor pattern disposed near each of the first conductor patterns on the insulating tape; and  
 a third conductor pattern formed on the insulating tape and having conductors electrically connecting the first lead with the second conductor pattern;  
 said second conductor pattern being connected with the substrate electrode through the third conductor pattern, thereby lowering the electrostatic potential of the tape carrier, each of these second leads being separate from any other lead and conductor pattern, thereby enabling individual testing of semiconductor chips mounted on the tape carrier.

4,949,156  
 SEMICONDUCTOR STRING CONNECTION STRUCTURE

Adam Mii, 3Fl., No. 1, Fu Hsing N. Rd., Taipei, Taiwan  
 Filed Feb. 10, 1988, Ser. No. 154,588

Int. Cl.<sup>3</sup> H01L 23/48

U.S. Cl. 357—68

5 Claims



1. A semiconductor string connection structure comprising:  
 a plurality of encasements, each of which encloses a semiconductor chip, and a plurality of conducting leads projecting parallel from one end thereof;  
 a transverse plate integral with said plurality of conducting leads and disposed at an end opposite to the encasements;  
 a plurality of longitudinal pieces, each longitudinal piece disposed between two pairs of said conducting leads and integral with the transverse plate;  
 a plurality of stop pieces, integrally formed with the conducting leads and disposed at a midpoint of the conducting leads;  
 a plurality of binding pieces integrally formed with the disposed between each encasement;  
 a plurality of transverse thin pieces, integral with the conducting leads and/or the longitudinal pieces and disposed between the conducting leads and longitudinal pieces; and  
 a plurality of positioning holes uniformly disposed along a length of the transverse piece.

4,949,157

## LARGE SCALE INTEGRATED CIRCUIT

Eiichi Minami, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

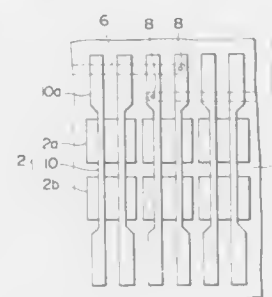
Filed Oct. 4, 1988, Ser. No. 253,186

Claims priority, application Japan, Oct. 6, 1987, 62-251963

Int. Cl.<sup>3</sup> H01L 23/48

U.S. Cl. 357—68

6 Claims



1. A large scale integrated circuit constructed in a gate array type, having basic cells, comprising:  
 a semiconductor substrate having a main surface region;  
 logic cells, each of which is constructed by combining a plurality of said basic cells including at least a gate electrode wiring and being disposed on the main surface region of said semiconductor substrate;  
 a marginal region on the main surface region of said semi-

conductor substrate which does not include said logic cells;  
 wherein said gate electrode wiring includes extended portions which extend to said marginal region;  
 at least one wiring which includes wiring portions being disposed in said marginal region and in a layer which is different from the layer to which said extended portions of said gate electrode wiring belong;  
 said extended portions of said gate electrode wiring intersecting, in said marginal region, with more than one of said wiring portions corresponding to said at least one wiring and which portions which extend in a different direction from that of said gate electrode wiring; and  
 through holes, through which said extended portions of said gate electrode wiring are connected with said wiring portions of the layer which is different therefrom.

4,949,158

## SEMICONDUCTOR DEVICE

Tetsuya Ueda, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

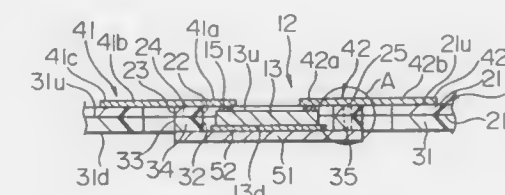
Filed Jul. 12, 1988, Ser. No. 217,975

Claims priority, application Japan, Jul. 24, 1987, 62-185947

Int. Cl.<sup>3</sup> H01L 23/48, 29/44, 29/52, 29/60

U.S. Cl. 357—68

7 Claims



1. A semiconductor device comprising:  
 an electrically insulating film having an opening and first and second surfaces;  
 a semiconductor chip positioned in said opening, said semiconductor chip having first and second surfaces respectively generally parallel to said first and second surfaces of said electrically insulating film and first and second electrodes disposed on said first and second surfaces of said semiconductor chip, respectively;  
 at least one first lead mounted on said first surface of said electrically insulating film, said first lead being electrically connected to said first electrode;  
 at least one second lead mounted on said first surface of said electrically insulating film;  
 an electrically conductive member mounted on said second surface of said electrically insulating film mechanically and electrically connected to said second electrode at the second side of the insulating film; and  
 connection means passing through said electrically insulating film electrically connecting said second lead with said electrically conductive member whereby electrical access to said first and second electrodes is provided at said first surface of said electrically insulating film.

4,949,159

## CARRIER FOR FILM-MOUNTED INTEGRATED CIRCUIT

Chester H. Petry, Jr., Tigard, Oreg., and Jon C. Houghton, Auburn, Wash., assignors to Byers Photo Equipment Company, Portland, Oreg.

Filed Aug. 3, 1988, Ser. No. 228,365

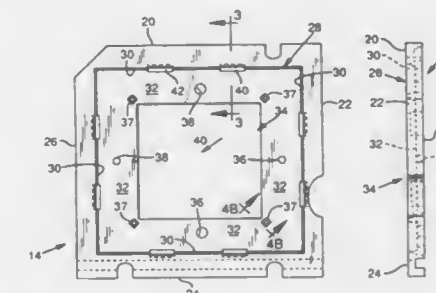
Int. Cl.<sup>3</sup> H01L 23/48, 29/46, 29/54

U.S. Cl. 357—70

36 Claims

1. A carrier for film-mounted integrated circuits, comprising:  
 a body member defining a first rectilinear frame having a cavity with a bottom wall and a rectangular interior pe-

riphery defined by sidewalls for receiving a rectangular segment of a flexible film strip and a central opening in the bottom wall sized to expose a central portion of a lower side of the segment;  
 a retainer member defining a second rectilinear frame having a rectangular exterior periphery defined by outer edge faces shaped and sized to fit conformably within the rectangular sidewalls of the cavity; and



complementary interengagement means spaced along the sidewalls of the interior periphery of the cavity in the first frame and the edge faces of the exterior periphery of the second frame for laterally interlocking the retainer member within the body member in nested relationship with a margin of said rectangular segment sandwiched immovably between said members.

4,949,160

## SEMICONDUCTOR DEVICE

Jun-ichi Ohno, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 16, 1988, Ser. No. 285,021

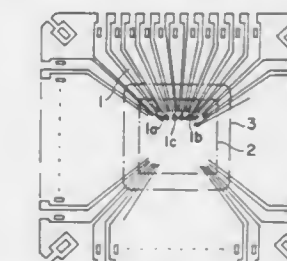
Claims priority, application Japan, Dec. 17, 1987, 62-319773

Int. Cl.<sup>3</sup> H01L 23/48, 23/50

U.S. Cl. 357—70

4 Claims

## BACKGROUND ART



1. A semiconductor device comprising:  
 a semiconductor pellet,  
 insulating sheet means for mounting said semiconductor pellet thereon; and  
 a plurality of inner leads for supporting said sheet means and for electrically connecting to said semiconductor pellet, said inner leads being substantially radially arranged around a pellet mounting area of said sheet means, the tip portions of at least every other inner lead being provided with a portion which is broader than the tip portions of remaining inner leads;  
 said broad portion being positioned closer to the central portion of said sheet means than the tip portions of the remaining inner leads, the broad portions having means for strengthening an adhesive force acting between said insulating sheet means and said broad portions of the inner leads.



4,949,161

## INTERDIGITIZED LEADFRAME STRIP

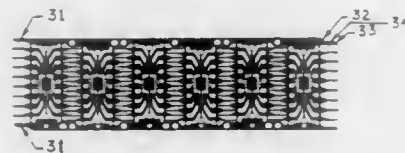
Timothy J. Allen, and Alan G. Wood, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Dec. 23, 1988, Ser. No. 290,261

Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357—70

4 Claims



1. An improved leadframe strip of the type having a pair of rails and a plurality of leadframes, each of which is attached on opposite sides to one of said rails by a framework of expendable support members such as dams and tie bars that are removable during a trim and form operation, and said leadframes being positioned such that, except at the ends of the strip where the pins of end leadframes are exposed, the pins of one leadframe are interdigitized with those of an adjacent leadframe, wherein the improvement consists of each rail having a stub at each end thereof which is coextensive with the exposed pins of the leadframe at that end of the strip, and which is essentially half the width of the same rail in corresponding sections of the strip.

4,949,162

## SEMICONDUCTOR INTEGRATED CIRCUIT WITH DUMMY PEDESTALS

Yoichi Tamaki, Kokubunji; Kiyoji Ikeda, Hachioji; Toru Nakamura, Tanashi; Akihisa Uchida, Tachikawa; Toru Koizumi, Tachikawa; Hiromichi Enami, Tachikawa; Satoru Isomura; Shinji Nakajima, both of Hamura; Katsumi Ogiue, Hinode, and Kaoru Ohgaya, Ohme, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

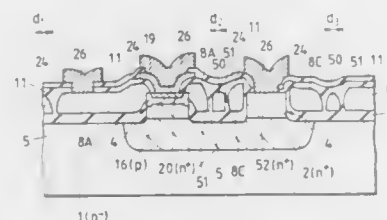
Filed Jun. 3, 1988, Ser. No. 201,928

Claims priority, application Japan, Jun. 5, 1987, 62-139907; Mar. 4, 1988, 63-50642; Mar. 4, 1988, 63-50643; Mar. 4, 1988, 63-50644; Apr. 20, 1988, 63-98816

Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357—71

21 Claims



1. A semiconductor integrated circuit device comprising:
  - (a) a semiconductor substrate having a main surface;
  - (b) first generally parallel wiring channel regions extending in one direction over said main surface, said first wiring channel regions being arranged at a predetermined interval;
  - (c) second generally parallel wiring channel regions extending in a vertical direction to said one direction over said main surface, said second wiring channel regions being arranged so that said first and second wiring channel regions form a wiring channel grid;
  - (d) lower layer wirings formed along said wiring channel grid on said main surface, said lower layer wirings being comprised of a first conductive layer;
  - (e) dummy pedestals comprised of the same conductive layer

as that of said lower wirings, said dummy pedestals being formed on said main surface;

(f) an inter-layer insulator film formed over said main surface so as to cover said lower layer wirings and said dummy pedestals; and

(g) upper layer wirings formed along said first generally parallel wiring channel regions over said inter-layer insulator film, said upper layer wirings being comprised of a second conductive layer,

wherein said dummy pedestals are provided respectively in intersecting areas of said first and second wiring channel regions in which none of said lower layer wirings is placed, and wherein said dummy pedestals are provided at least under areas in which said upper layer wirings are extended.

4,949,163

## SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE PARTICULARLY FOR HIGH SPEED LOGIC OPERATIONS

Toshio Sudo, Kawasaki, and Chiaki Takubo, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

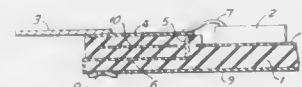
Filed Apr. 13, 1988, Ser. No. 181,084

Claims priority, application Japan, Apr. 15, 1987, 62-92291

Int. Cl.<sup>5</sup> H01L 23/48, 23/02, 39/02

U.S. Cl. 357—80

11 Claims



1. A semiconductor integrated circuit device, comprising:
  - an insulator substrate;
  - a semiconductor integrated circuit chip having an input terminal and mounted on the substrate;
  - a first wiring pattern element provided on the substrate;
  - an outer lead connected to a first end of the first wiring pattern element;
  - connecting means for connecting a second end of the first wiring pattern element to the input terminal of the chip;
  - an electrical conducting bridge provided in the substrate and extending perpendicularly to the first wiring pattern element and being connected at one end thereof to the first wiring pattern element;
  - a second wiring pattern element having at least a portion and extending parallel to the first wiring pattern element, the second wiring pattern element having a first and second end and being connected at the first end thereof to another end of the bridge; and
  - an impedance matching element provided on the substrate and being connected to the second end of the second wiring pattern element.

4,949,164

## SEMICONDUCTOR COOLING APPARATUS AND COOLING METHOD THEREOF

Shigeo Ohashi, Chiyoda; Heikichi Kuwabara, Minori; Takatsugu Nakajima, Chiyoda; Wataru Nakayama, Kashiwa; Motohiro Sato, Minori, and Kenichi Kasai, Ushiku, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,704

Claims priority, application Japan, Jul. 10, 1987, 62-172403

Int. Cl.<sup>5</sup> H01L 23/02, 25/04, 23/16

U.S. Cl. 357—82

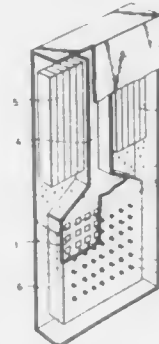
22 Claims

1. A semiconductor cooling apparatus comprising:
  - a container having enclosed a refrigerant liquid therein;
  - a substrate having mounted a plurality of semiconductor

elements thereon and dipped in said refrigerant liquid of said container;

a condenser disposed at an upper portion of said container and condensing a generated refrigerant steam;

a partition wall for separating a flow path of ascending refrigerant steam generated by cooling said semiconductor elements and a flow path of descending refrigerant liquid condensed by said condenser; and



a plurality of guide flow paths, provided on said partition wall for sending said condensed refrigerant liquid from said flow path of descending refrigerant liquid to a semiconductor element side of said partition wall;

wherein said guide flow paths are corresponding positioned relative to said semiconductor elements to respectively supply condensed refrigerant liquid from said flow path of descending refrigerant liquid to each of said semiconductor elements.

4,949,165

## METHOD AND APPARATUS FOR TESTING AND CHECKING THE CRITERIA OF A KEY SIGNAL DECODER FROM A CHROMAKEY MIXER

Uwe Riemann, Braunschweig, and Gerd Brand, Ditterse, both of Fed. Rep. of Germany, assignors to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

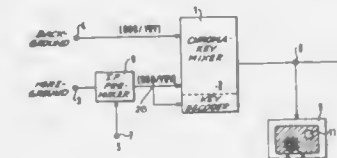
Filed Feb. 11, 1988, Ser. No. 154,913

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 3704289

Int. Cl.<sup>5</sup> H04N 9/68, 9/74, 17/02

U.S. Cl. 358—10

8 Claims



1. Method of testing the signal switching color criteria of a key signal decoder of a chromakey video signal mixer, comprising the steps of:

generating a color scan signal covering a continuous range of color hue wider than an expected signal switching color range for said key signal decoder, said color scan signal being generated in a form capable of producing a localized test pattern in a display on a television monitor screen;

furnishing to a background signal input of a chromakey video signal mixer a background picture signal and furnishing to a foreground signal input of said chromakey video signal mixer a premix of a foreground picture

signal, having a broad color range excluding a small color range of a predetermined key color except for a portion containing a key signal within said small color range for keying said chromakey video mixer and a localized test pattern producing signal containing said color scan signal; furnishing to a key signal input of said chromakey decoder said premix of said foreground picture signal and said test pattern producing signal, and

displaying the output of said chromakey mixer on a television monitor screen for observing what part of said localized test pattern is occupied by said background picture signal as a result of operation of said decoder.

4,949,166

## APPARATUS FOR COMBINING AND SEPARATING CONSTITUENT COMPONENTS OF A VIDEO SIGNAL

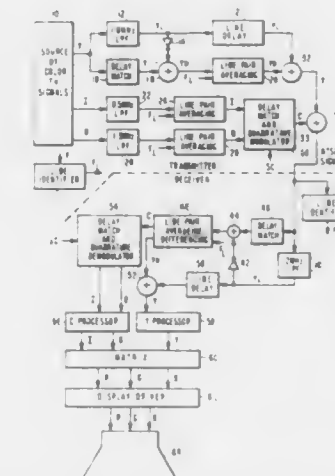
Michael A. Isnardi, Plainsboro, N.J., assignor to General Electric Company, Princeton, N.J.

Filed Oct. 3, 1988, Ser. No. 253,273

Int. Cl.<sup>5</sup> H04N 11/14

U.S. Cl. 358—12

30 Claims



1. A system for encoding video signal luminance and chrominance information, comprising:

means for providing processed luminance information, exclusive of chrominance information, with groups of mutually exclusive correlated image information pixels of identical value within each group, said pixels within each group being separated by an odd number of image scanning lines within an image frame;

means for providing processed chrominance information, exclusive of luminance information, with groups of mutually exclusive correlated image information pixels of identical value within each group, said pixels within each group being separated by an odd number of image scanning lines within an image frame, said chrominance information exhibiting opposite phase from one image scanning line to the next; and

means for combining said processed luminance and chrominance information with an invertible algorithm to produce a combined encoded video signal.

**4,949,167**  
**WIDESCREEN TELEVISION SIGNAL PROCESSING SYSTEM WITH CENTER AND SIDE PANEL IMAGE RESOLUTION UNIFORMITY**

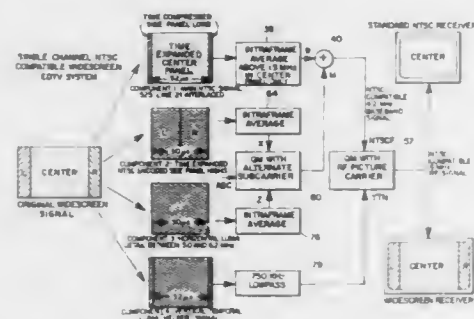
Michael A. Isardi, Plainsboro, and Terrence R. Smith, Westmont, both of N.J., assignors to General Electric Company, Princeton, N.J.

Continuation of Ser. No. 215,124, Jun. 29, 1988, abandoned.  
 This application Jun. 14, 1989, Ser. No. 368,141

Int. Cl.<sup>5</sup> H04N 11/14

U.S. Cl. 358—12

20 Claims



1. In a system for processing a television-type signal representative of a widescreen image having side portion image information and dominant nonside portion image information, and an image aspect ratio greater than that of a standard television image, apparatus comprising:

means responsive to said representative signal for developing a first component containing side portion image information time compressed into an overscan region of said first component, and containing dominant nonside portion image information; and

first means for intraframe processing said dominant nonside portion image information exclusive of said time compressed information.

**4,949,168**  
**DECODING EQUALIZER**

Yuichi Ninomiya, Kawasaki, and Yuichi Iwade, Komae, both of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan  
 Filed Sep. 19, 1988, Ser. No. 246,195

Claims priority, application Japan, Sep. 25, 1987, 62-238891;  
 Dec. 19, 1987, 62-320077

Int. Cl.<sup>5</sup> H04N 7/12

U.S. Cl. 358—21 V

15 Claims

1. A decoding equalizer for a transmission system which samples a high definition television signal at a specified sampling frequency, transmits a sampled value and a test signal for detecting transmission characteristics of a transmission path, decodes the sampled value with a decoder, and equalizes the transmission characteristics of the transmission path using the test signal, the decoding equalizer comprising:

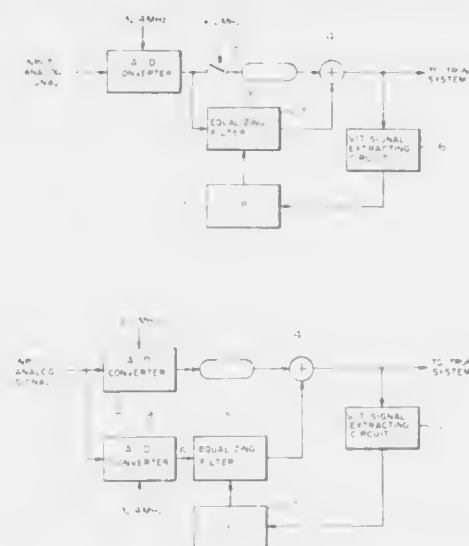
first sampling means which samples the sampled value at a sampling frequency twice the specified sampling frequency said first sampling means providing an output signal;

second sampling means which samples the sampled value at the specified sampling frequency, said second sampling means providing an output signal;

filter means which filters the output signal of the first sampling means and produces a correction value for correcting a transmission distortion of the high definition television signal;

adding means which adds a delayed version of the output signal of the second sampling means to an output signal of the filter means, said adding means providing an output signal;

extracting means which extracts the test signal from the output signal of the adding means; and  
 arithmetic means which receives data pertinent to the test signal extracted by the extracting means, calculates an error of the data with respect to predetermined reference



data, determines the correction value produced by the filter means based on the calculated error, and repeats the operations of data reception, error calculation and correction value determination until the error becomes smaller than a predetermined value.

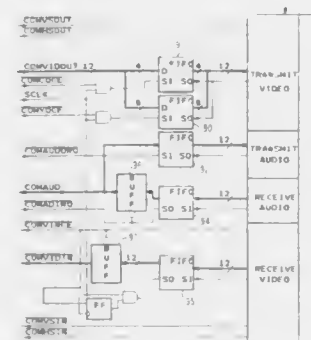
**4,949,169**  
**AUDIO-VIDEO DATA INTERFACE FOR A HIGH SPEED COMMUNICATION LINK IN A VIDEO-GRAPHICS DISPLAY WINDOW ENVIRONMENT**

Leon Lumelsky, Stamford, Conn.; Sung M. Chol, White Plains, and Alan W. Peevers, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
 Filed Oct. 27, 1989, Ser. No. 428,251

Int. Cl.<sup>5</sup> H04N 7/10

U.S. Cl. 358—86

9 Claims



1. In an audio/video communications system for interconnecting a plurality of video display devices each operable under the control of a host CPU, over a limited bandwidth communication channel, an interface architecture comprising means for connecting the individual video display devices to associated communication adapters which are in turn connected to said communication channel, said system being selectively operable in a "receive" and a "transmit" mode, and wherein each video display device includes;

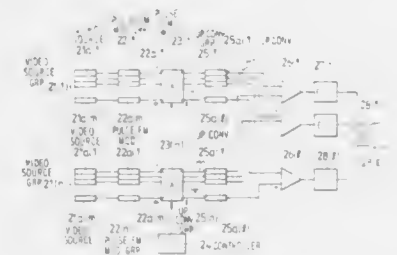
a local system clock source for producing a series of clock pulses at the video sampling rate (SCLK),  
 a digital TV signal source for producing a serial digital TV pixel data stream (COMVIDOUT) for selective transmission over said communication channel,  
 a frame buffer for storing video data to be displayed on an attached monitor,  
 a memory means located in series with the input to said frame buffer for temporarily storing all data to be subsequently stored in the frame buffer,  
 a scaling control means for determining which scan lines and pixels generated by said digital TV signal source are to be skipped as a result of a predetermined scaling procedure, and for generating signals (COMYOCE and COMCOCE) which specify which chrominance and luminance data fields in a particular TV scan line and which scan lines are to be transmitted,  
 vertical and horizontal sync generator means for supplying vertical and horizontal sync signals to control both the storage of video data in the frame buffer and also the transmission of data over said communication channel, (COMVSOUT, COMHSOUT),  
 means for storing incoming video data (COMVIDIN) from the communication adapter in said series memory means, means in said vertical and horizontal sync signal generating means for synchronizing the storage of incoming data from said channel in the frame buffer in accordance with input vertical and horizontal sync signals (COMHSIN, COMVSIN) received from the communication adapter, and  
 further means in said scaling control means for storing data into said series memory means when the system is in 'receive mode' under control of a communication input clock enable (COMVINCE) signal from the communication adapter which causes the chrominance and luminance pixels on the channel to be gated into and stored in said series memory.

**4,949,170**  
**VIDEO INFORMATION TRANSMISSION SERVICE SYSTEM AND HEAD END DEVICE THEREFOR**  
 Masatoshi Yanagidaira, and Tsutomu Kanai, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 9, 1989, Ser. No. 321,139  
 Claims priority, application Japan, Sep. 22, 1988, 63-236555  
 Int. Cl.<sup>5</sup> H04N 7/10, 7/173

U.S. Cl. 358—86

6 Claims



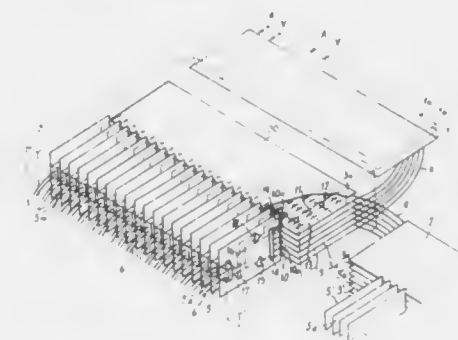
1. A video information transmission service system comprising:  
 a plurality of video source groups, each comprising a plurality of video sources for outputting video signals;  
 a plurality of video selecting means, corresponding to respective ones of said plurality of video source groups, for receiving and outputting said video signals from said video sources, each of said plurality of video selecting means including input terminals for receiving and inputting said video signals from said respective video sources and output terminals for outputting the received video signals, so that desired ones of the video signals inputted

through said input terminals are outputted through said output terminals;  
 a plurality of frequency converting means, corresponding to respective ones of said plurality of video selecting means and each operating at a different respective particular frequency, for frequency converting the outputted video signals, each of said plurality of frequency converting means outputting respective converted video signals which have said different respective particular frequency;  
 a plurality of mixing means for receiving respective ones of the converted video signals from said plurality of frequency converting means and FM-multiplexing the converted video signals to produce FM-multiplexed video signals;  
 a plurality of electro-optical converting means respectively corresponding to said plurality of mixing means, each of said plurality of electro-optical converting means converting the FM-multiplexed video signals into optical signals;  
 video transmitting system having a plurality of channels for transmitting the optical signals to optical fibers of an optical fiber cable;  
 communication means for enabling communication with said video transmitting system and a transmission system;  
 control means for making a selection frequency of a tuner coincident with a frequency of a channel indicated by said video transmitting system; and  
 a terminal device for demodulating an output of said tuner to obtain picture and voice outputs.

**4,949,171**  
**COMMUTATION GRID**  
 Gérard Grandmougin, Strasbourg, France, assignor to Visicable+, Paris, France  
 Filed Nov. 23, 1988, Ser. No. 275,387  
 Claims priority, application France, Nov. 24, 1987, 8716272  
 Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—93

17 Claims



1. A commutation grid for the selective distribution of N input signals to any of M outputs, wherein one of said M outputs will be commuted to one of said N input signals based on a telecontrol signal, where N and M are integers greater than 0, comprising:

a fixed support structure for an assembly of input cards (1), each said input card receiving a plurality of input signals, the number of which correspond to a predetermined sub-multiple of the total number of input signals N;  
 at least one sub-assembly of commutation cards (3), each of which is connected to an associated input card (1);  
 at least one sub-assembly of output cards (5) connected to a sub-assembly of commutation cards (3) and each output card delivering to a user any of the N input signals received by each commutation card from the associated input card;  
 said commutation cards (3) including an assembly of input cells (E) mounted in parallel, the number of which is equal



to the number of a sub-multiple defining the number of signals to be transmitted and received by an input card (1), and an assembly of output cells (S), their number being equal to the number of output cards (5), each input cell and output cell being joined by a commutation cell (C), wherein said commutation cell allows a selective signal from an input cell to be sent to an output cell under the effect of a command order given by a user, which command order flows through the output card (5) associated with the user to a treatment card (20) which is common to the assembly of commutation cards (3) wherein said treatment card controls a conversion stage (R) of the received command order; and

said support structure including at least one rack (2) containing a sub-assembly of parallel commutation cards (3) and a sub-assembly of parallel output cards (5) disposed perpendicular to the commutation cards, wherein a contact point (10) of an edge of each commutation card and an associated edge of an associated output card provides a connection between an output cell (S) of the commutation card (3) and a selection circuit on the associated output card (5).

4,949,172

### DUAL-MODE TDI/RASTER-SCAN TELEVISION CAMERA SYSTEM

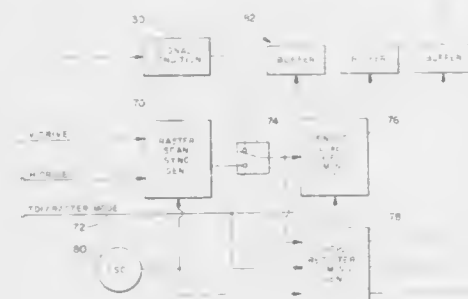
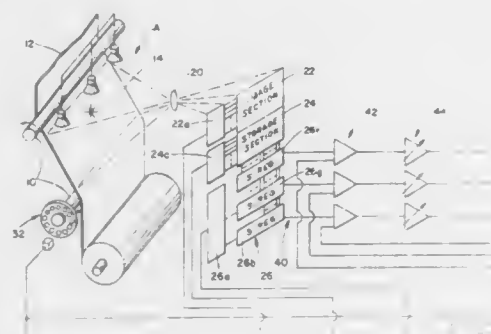
Robert P. Hunt, Palo Alto, and David L. Gilblom, Los Altos, both of Calif., assignors to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 249,385, Sep. 26, 1988, and a continuation-in-part of Ser. No. 186,446, Apr. 26, 1988. This application Jan. 6, 1989, Ser. No. 293,960

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—101

21 Claims



1. A dual mode CCD camera comprising:

- a CCD image section having an array of light sensitive elements for accumulating pixel values indicative of an accumulative amount of light received;
- a storage section having an array of pixel storage elements, the storage section being electrically connected with the

image section such that the pixel values are transferred from the image section to the storage section;

a serializing means for serializing the pixel values from the storage section into an output video signal;

a sensor line shift timing generating means for generating clocking signals for controlling the shifting of lines of pixel values through the image section and the storage section;

an output register timing generating means for generating output register timing signals for clocking the pixel values from the serializing means;

a reference oscillator operatively connected with the output register timing generating means for controlling the output register timing signals in accordance therewith;

a raster-scan sync generating means for producing master timing signals for a raster-scan mode;

a timing signal conditioning means for conditioning an externally generated timing signal for compatibility with the sensor line shift timing generating means; and,

a switching means for selectively switching one of the signal conditioning means and the raster scan sync generating means into electrical communication with at least the sensor line shift timing generating means for providing master timing signals thereto such that the sensor line shift clock signals are coordinated with a selected one of the external timing signals and the raster-scan master timing signals.

4,949,173

### SECURITY SURVEILLANCE SYSTEM WITH INTERMITTENT MAGNETIC RECORDING/REPRODUCING DEVICE

Yasuo Mitsubishi, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

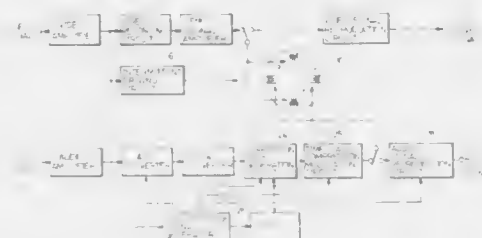
Continuation of Ser. No. 909,304, Sep. 19, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 266,297

Claims priority, application Japan, Sep. 20, 1985, 60-209417

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—108

5 Claims



1. A magnetic recording/reproducing device for use with a security surveillance system for recording an inputted video signal together with a continuous audio signal on a periodically operated magnetic tape, comprising:

- driving means for periodically running the magnetic tape,
- AD converting means for continuously converting an inputted audio signal into a digital signal which is suitable to be recorded on said magnetic tape,
- compression means for compressing the digital signal outputted from said AD converting means on a time base in response to the periodic running of said magnetic tape, and
- recording means including a rotating drum having on the outer surface a video head and an audio head, for recording said inputted video signal and the compressed audio signal which is compressed by said digital compression means in adjacent tracks inclined to the running direction of said magnetic tape, said recording means further comprising means for deep-recording said audio signal by said audio head on said magnetic tape and for surface-record-

ing a portion of said video signal corresponding to said deep-recorded audio signal by said video head thereon whereby said corresponding video signal is recorded in a track positioned over a track of said deep-recorded audio signal track.

4,949,174

### ZOOM LENS THERMAL IMAGER INCORPORATING A NON-PIXELLATED DETECTOR

Michael C. Wiltshire, High Wycombe, England, assignor to The General Electric Company, p.l.c., London, England

PCT No. PCT/GB88/00436, § 371 Date Feb. 1, 1989, § 102(e) Date Feb. 1, 1989, PCT Pub. No. WO88/10044, PCT Pub. Date Dec. 15, 1988

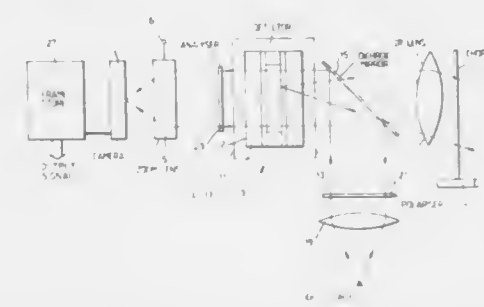
PCT Filed Jun. 3, 1988, Ser. No. 314,574

Claims priority, application United Kingdom, Jun. 3, 1987, 8713023

Int. Cl.<sup>5</sup> H04N 5/30

U.S. Cl. 358—113

14 Claims



1. A thermal imaging device, comprising a non-pixelated detector (3) including a component (12) the optical properties of which vary with temperature; means (1) for forming a focused image of a thermal scene on said non-pixelated detector; a visible-light source (17) arranged to illuminate the non-pixelated detector such that visible light from the source is modulated by the image formed on the non-pixelated detector; a further detector (7) effective to detect said modulated visible light to give an output representative of the image of the thermal scene; and a visible light zoom lens (5) interposed in the optical path between the non-pixelated detector and the further detector such that variation of the focal length of the lens varies the field of view of the thermal imaging device.

4,949,175

### DIGITAL DATA TRANSMISSION SYSTEM

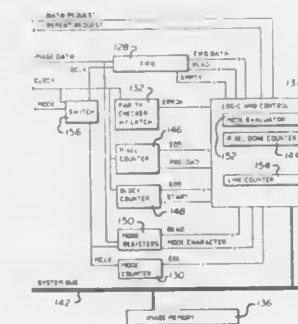
Anthony G. Wind, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 19, 1989, Ser. No. 381,904

Int. Cl.<sup>5</sup> H04N 1/00

U.S. Cl. 358—141

4 Claims



1. An improved digital data transmission system for trans-

mitting and receiving digital images, of the type having a means for transmitting a line of characters including a start of message character, a line type character, a plurality of data characters, and an end of line character; buffer means for receiving the line of characters and delivering the characters to an image memory; an image memory for receiving lines of characters from the buffer means; logic and control means including means for evaluating the parity of each character and generating a reorder line signal if parity is violated, means for counting characters to determine the current number of characters in a line received that have been transferred to the image memory and generating a reorder signal if the count is incorrect, a mode counter for signaling the receipt of an end of line character, and mode evaluator means for (1) checking the correctness of the start of message character, (2) checking to see if the line is an image size packet, and if so, determining the size of the image, and (3) responsive to the signal from the block counter to begin transferring the message from the buffer means to the image memory, and (4) responsive to the end of line character from the mode counter means to order the next line if the end of line character is an end of line message and to verify that a full image is received if the end of line character represents an end of image, wherein the improvement comprises:

- a. block counter means for counting characters in an incoming message simultaneously with loading the characters into the buffer means and producing an end of block indication when a predetermined number of characters have been received;
  - b. pixel counter means for counting data characters per line and producing a signal representing the character count;
  - c. mode register means for storing the end of line character external to the buffer means; and
  - d. said logic and control means being responsive to the end of block indication from the block counter means to begin transferring data from the buffer means to the image memory, and responsive to the signal from the mode counter that an end of line character has been received for retrieving the end of line character from the mode register, and if the end of line character represents an end of line, retrieving the character count from the pixel counter means, and if the number of characters left in the buffer means is less than a predetermined number, requesting another line of data;
- whereby, data received is processed into the image memory during the receipt of further data, and the next line of data is requested during the processing of the previous line.

4,949,176

### METHOD AND APPARATUS FOR DPCM VIDEO SIGNAL COMPRESSION AND TRANSMISSION

David F. Levy, Hampshire, England, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,186

Claims priority, application United Kingdom, Mar. 30, 1987, 8707556

Int. Cl.<sup>5</sup> H04N 7/12

U.S. Cl. 358—135

8 Claims

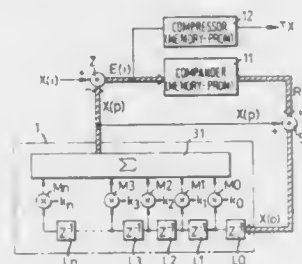
1. A differential pulse code modulation apparatus comprising: error signal generating means having an input video signal comprising successive words representing video samples, for producing an error signal of which successive words each represent a difference between a word of the input video signal and a predicted value thereof;

means for compressing and expanding the error signal to produce a received video signal;

adding means for adding successive words of the received video signal to successive words of a predicted value signal representing said predicted values to produce a received error signal; and

a predictor in the form of a ladder network having multipliers supplied with respective weighting coefficients connected in the rungs of the ladder network, means for

applying the received error signal to the nodes of a first side of the ladder network so that the received error signal is applied simultaneously to each of said multipliers, adders arranged at nodes of a second side of the ladder network, and delay elements arranged between nodes of said second side of the ladder network, whereby said



predictor is responsive to the received error signal to produce the predicted value signal; the transfer function of said means for compressing and expanding the error signal established in dependence on a predetermined number of quantization levels used to quantize a picture element of a video signal for each of a plurality of input frequencies of said video signal.

4,949,177

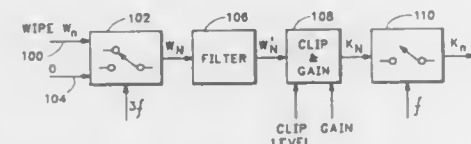
**METHOD AND APPARATUS FOR CARRYING OUT A NON-LINEAR OPERATION ON A DIGITAL SIGNAL**  
Richard S. Bannister, Grass Valley, and Richard A. Jackson, Nevada City, both of Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Sep. 19, 1988, Ser. No. 245,603

Int. Cl.<sup>5</sup> H04N 5/275

U.S. Cl. 358—138

9 Claims



1. A method of carrying out a non-linear operation on a digital input signal having a sampling frequency  $f$ , comprising: interpolating the digital input signal by a factor  $N$ , where  $N$  is a positive integer, whereby a first digital signal having a sampling frequency  $Nf$  is generated, carrying out a non-linear operation on the first digital signal having the sampling frequency  $Nf$  and providing a second digital signal having the sampling frequency  $Nf$ , and decimating the second digital signal by the factor  $N$  and thereby providing a digital output signal having the sampling frequency  $f$ .

4,949,178

**COINCIDENCE CIRCUIT IN A LINE SYNCHRONIZING CIRCUIT ARRANGEMENT**

Paulus J. M. Hovens, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 6, 1987, Ser. No. 35,107

Claims priority, application Netherlands, Apr. 15, 1986, 8600945

Int. Cl.<sup>5</sup> H04N 5/04

U.S. Cl. 358—149

12 Claims

1. In a line synchronizing circuit arrangement for a picture display device, a coincidence circuit for establishing a coincidence state between an incoming line synchronizing signal which originates from a synchronizing signal separator and a locally generated line signal which originates from a line oscil-

lator, said coincidence circuit comprising: a coincidence detector having a coincidence state in response to at least partly simultaneous occurrence of said signals, information storage means coupled to an output of the coincidence detector, wherein the coincidence detector, when enabled, is made operative by the incoming line synchronizing signal for modifying in one sense a quantity of information which is stored in



the information storage means in the absence of the coincidence state of the detector the operation of said coincidence detector being inhibited by the locally generated line signal in the coincidence state of the coincidence detector whereby the quantity of stored information in the information storage means is modified in the opposite sense and means for enabling the coincidence detector during the occurrence of a field blanking signal.

4,949,179

**PICTURE DISPLAY DEVICE ALLOWING SEPARATE SELECTION AND DISCERNING OF MAIN AND SUB PROGRAMS USED FOR MAIN-SCREEN/SUB-SCREEN LAYOUT**

Toshio Hosono, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

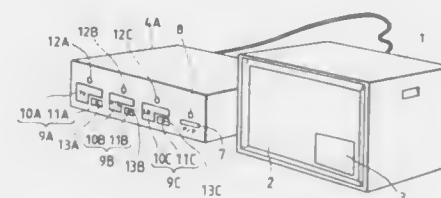
Filed May 12, 1989, Ser. No. 350,877

Claims priority, application Japan, Oct. 6, 1988, 63-250794

Int. Cl.<sup>5</sup> H04N 5/272, 5/268, 9/74

U.S. Cl. 358—183

11 Claims



1. A picture-in-picture display device for allowing separate selection of a main-program and a sub-program for display on display means in a main-screen/sub-screen layout format, respectively, said device comprising:

main-program means, including a plurality of manual main-screen function changeover switch means for manual selection by a user, each of said main-screen function changeover switch means allowing selection of a program input from a different one of a plurality of program reproducing means, and for outputting a selected program as a main-program for display in a main-screen portion of said display means; and

sub-program means, including a plurality of manual sub-screen function changeover switch means which are different from said plurality of manual main-screen function changeover switch means, for manual selection by a user, each of said sub-screen function changeover switch means allowing selection of a program input from a different one of a plurality of program reproducing means and for

outputting a selected program as a sub-program for display in a sub-screen portion of said display means.

4,949,180

**VIDEO IMAGE PROCESSING SYSTEMS**  
Barry D. R. Miles, Newbury, Great Britain, assignor to Quantel Limited, Newbury, England

Continuation of Ser. No. 926,451, Nov. 3, 1986, abandoned. This

application Oct. 3, 1988, Ser. No. 253,395

Int. Cl.<sup>5</sup> H04N 1/23

U.S. Cl. 358—183

21 Claims



1. A video processing system comprising:  
(a) at least two sources of video signals representing different pictures;  
(b) a source of brush shape signals representing brush shape;  
(c) a video graphic means including a stylus device for producing pressure signals relating to pressure applied to said stylus;  
(d) a source of video graphic signals for points on a picture designated by said stylus device;  
(e) a source of stencil signals;  
(f) framestore means having a writing input and a reading output;  
(g) a processing circuit having respective first and second video inputs for first and second video signals  $L_1$  and  $L_2$  and a control input for a control signal  $K$  and arranged to produce output signals representing  $K L_1 + (1 - K) L_2$ ;  
(h) selector means for conditioning the system to operate selectively in any one of a plurality of different modes including:

(1) a first mode in which said source of video graphic signals is connected to the first video input of said processing circuit to provide said first video signal  $L_1$ , said output of said framestore means is connected to the second video input of said processing circuit to provide said second video signal  $L_2$ , the output of said processing circuit is written into said framestore means, and a control signal  $K$  derived from said pressure signals and said brush shape signals is applied to said control input of said processing circuit, and

(2) a second mode in which said two sources of video signals are connected to said two video inputs of said processing circuit to provide said first and second video signals  $L_1$  and  $L_2$  respectively, said control input of said processing circuit is connected to said source of stencil signals to provide said control signal  $K$ , and the output of said processing circuit is written into said framestore means.

4,949,181

**CLOSED CIRCUIT TELEVISION APPARATUS FOR REMOTELY CONTROLLING TELEVISION CAMERAS**  
David Elberbaum, Tokyo, Japan, assignor to Elbex Video, Ltd., Tokyo, Japan

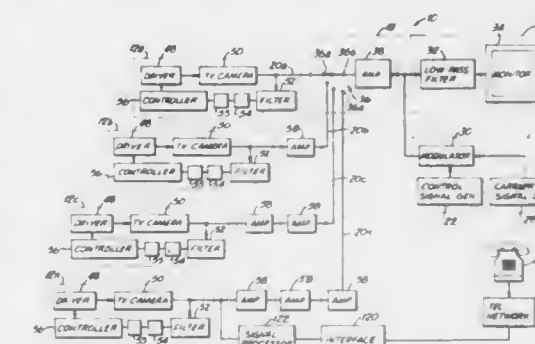
Filed Nov. 14, 1988, Ser. No. 271,199

Claims priority, application Japan, Nov. 16, 1987, 62-287548

Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—210

6 Claims



1. A closed circuit television apparatus comprising: at least one imaging means including a remote-controllable television camera for generating video signals; monitoring means for receiving said video signals to display images corresponding to the received video signals; and controlling means for generating composite control signals to control said television camera; said composite control signals having a higher frequency than that of said video signals, said imaging means further including receiving means for receiving said composite control signals, for extracting said composite control signals by utilizing the difference in frequency between the received composite control signals and said video signals, and for operating said television camera based on the extracted composite control signals, said controlling means including a circuit for generating a control signal having a frequency corresponding to a kind of control, a circuit for generating a carrier signal having a frequency higher than the frequency of said video signal, and a modulating circuit for modulating said carrier signal by said control signal and for transmitting the modulated carrier signal, said receiving means including a filter for receiving the modulated carrier signal transmitted from said controlling means and for extracting the modulated carrier signal, a demodulator for demodulating said control signal from the extracted carrier signal, a decoder for decoding the demodulated control signal, a driver for driving said television camera, and a controller for controlling said driver based on the output signal of said decoder.

4,949,182

CCD SENSOR

Ronald W. J. Mumford, Hitchin, United Kingdom, assignor to Rank Cintel Limited, United Kingdom

Filed Feb. 18, 1988, Ser. No. 156,998

Claims priority, application United Kingdom, Mar. 10, 1987, 8705614

Int. Cl.<sup>5</sup> H04W 5/335

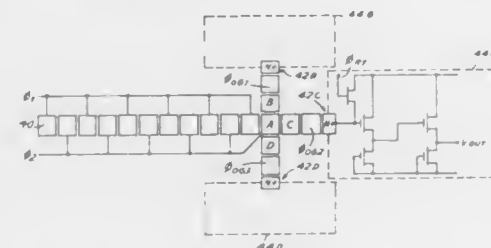
U.S. Cl. 358—213.26

1 Claim

1. A CCD sensor comprising: a plurality of photosites; at least one transport register into which at least some of said sensor photosites discharge in use;  $n$  detectors,  $n$  being an integer greater than 1, coupled to an output of said transport register so that successive charge packets serially discharged from said register are passed



sequentially to respective ones of said plurality of detectors such that each detector receives one out of n said charge packets; and



means for combining output signals of said n detectors to provide a resultant serial output signal in the order in which said charge packets are delivered to said detectors.

4,949,183

### IMAGE SENSOR HAVING MULTIPLE HORIZONTAL SHIFT REGISTERS

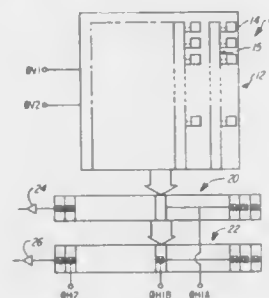
Eric G. Stevens, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 29, 1989, Ser. No. 442,749

Int. Cl.<sup>5</sup> H04N 3/14, 5/335

U.S. Cl. 358—213.23

15 Claims



#### 1. An image sensor comprising:

an imaging region which includes a substrate of semiconductor material, said region including means in said material for accumulating charge carriers and for transferring said charge carriers from said region; at least two shift registers arranged in a side-by-side relationship adjacent said region, said shift registers being adapted to receive charge carriers from said region; means for controlling the transfer of charge carriers from one shift register to the other shift register, said controlling means comprising a barrier implant formed in said semiconductor material between said shift registers; means for effecting the transfer of charge carriers from said one shift register to the other shift register; and means for clocking said shift registers to transfer said charge packets from said registers to an output circuit.

4,949,184

### COLOR IMAGE RECORDER WITH CORRECTION OF GRADATION ERRORS IN LIGHT SHIELDING MASK IMAGES AND VISIBLY DEVELOPED IMAGES

Makoto Suzuki, Kani, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 9, 1989, Ser. No. 391,298

Claims priority, application Japan, Aug. 9, 1988, 63-199277

Int. Cl.<sup>5</sup> B41J 2/465; G01D 15/14; H04N 1/29

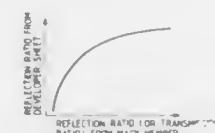
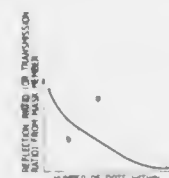
U.S. Cl. 358—300

5 Claims

1. An image recording apparatus for recording an image of an original document on a developer sheet while using a photo-

sensitive recording medium, the image being expressed with gradations, the apparatus comprising:

means for producing an intermediate mask member carrying thereon a light shielding image corresponding to the image of the original document wherein the light shielding image yields a first gradation error with respect to the image of the original document;



means for exposing the photosensitive recording medium to light through the intermediate mask member to form a latent image corresponding to the light shielding image; means for developing the latent image formed on the photosensitive recording medium to provide a visible image wherein the visible image yields a second gradation error with respect to the light shielding image; and means for correcting the first gradation error and the second gradation error.

4,949,185

### COLOR IMAGE RECORDER USING COLOR MASKS WITH IDENTIFYING MARKS

Hitoshi Nakai, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

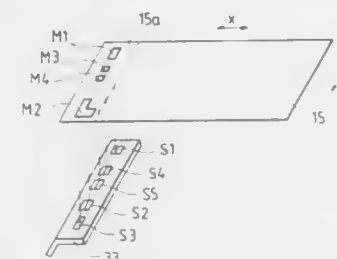
Filed Aug. 28, 1989, Ser. No. 398,978

Claims priority, application Japan, Sep. 1, 1988, 63-219548

Int. Cl.<sup>5</sup> B41J 2/465; G01D 15/14; H04N 1/29

U.S. Cl. 358—300

5 Claims



1. A color image recording apparatus for exposing a photosensitive recording medium to light through a succession of mask members prepared based on colored image information to form a latent image on the photosensitive recording medium, and developing the latent image into a colored visible image, the color image recording apparatus comprising: each of the mask members being formed with identifying marks indicative of the color of the mask member; mask member identifying means for detecting the identifying marks, the identifying means generating an output signal indicative of the color of the mask member; exposure means providing an exposure zone for exposing the photosensitive recording medium to color-separated light

from the mask member, the exposure means being positioned downstream of the mask member identifying means;

means for changing the color-separated lights in the exposure means in response to the output signal from the mask member identifying means; and

a mask member transfer means positioned upstream of the exposure means for transferring the mask member to the exposure zone.

4,949,186

### VEHICLE MOUNTED SURVEILLANCE SYSTEM

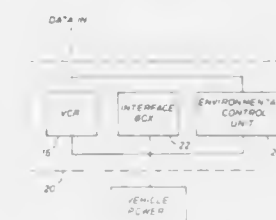
Roger D. Peterson, Rte. 1 Box 316, Sweeny, Tex. 77480

Continuation of Ser. No. 14,793, Feb. 13, 1987, Pat. No. 4,789,904. This application Dec. 5, 1988, Ser. No. 279,932

Int. Cl.<sup>5</sup> H04N 5/782

U.S. Cl. 358—335

20 Claims



1. A method of providing a record of events utilizing a vehicle mounted surveillance system, comprising the steps of: (a) mounting and positioning a camera supported by a vehicle for viewing a selected scene outside of the vehicle; (b) positioning a video recorder within the vehicle operatively connected to said camera; (c) mounting control means within the vehicle wherein said control means is operatively connected to said camera and said video recorder for operation thereof by a person riding in the vehicle; (d) securing said video recorder within a vault mounted within the vehicle; and (e) operating said camera, said video recorder and said control means from the power supply system of the vehicle.

4,949,187

### VIDEO COMMUNICATIONS SYSTEM HAVING A REMOTELY CONTROLLED CENTRAL SOURCE OF VIDEO AND AUDIO DATA

Jason M. Cohen, 20 Skookwams Ct., West Islip, N.Y. 11795

Filed Dec. 16, 1988, Ser. No. 285,214

Int. Cl.<sup>5</sup> H04M 11/00; H04N 7/10

U.S. Cl. 358—335

19 Claims

1. A video communications system comprising:

(a) a remotely-controlled central source of video and audio data contained in mass storage and distributed therefrom, said remotely-controlled central source includes a plurality of hard disk drives each containing densely packed video and audio data, disk controllers connected to said disk drives wherein said disk controllers control the read/write cycles of said hard disk drives, a streaming tape archive for mass storage of such video and audio data not requiring the random access provided by said hard

disk drives, said streaming tape archive being an accessory and not necessarily an integral part of said remotely-controlled central source, a tape driver connected to said streaming tape archive wherein said tape driver controls the read/write cycles of said streaming tape archive, said tape driver being an accessory and not necessarily an integral part of said remotely-controlled central source, a distribution system CPU connected to said disk controllers and said tape driver such that said distribution system CPU serves to direct video data bi-directionally, an accounting system hard disk containing an operating system and system commands as well as information relating to customer accounts, an accounting and control systems CPU that bi-directionally transmits and receives data from said accounting system CPU and acts as master over said distribution system CPU so that remote access to permitted subsets of data is limited and billing and data usage statistics are further provided, a plurality of modems to process the data from said distribution system CPU into a serial bit stream for transmission through a serial communications link to a plurality of modems disposed in said respective terminal unit, a plurality of input/output controllers each of which is disposed at said remotely controlled central source and is connected between said distribution system CPU and its respective said modem, a multiplexer whose inputs are the serial bit-stream outputs of said modems and whose output is connected to a transmission medium; and

(b) a terminal unit having a microprocessor disposed at the home of the user so that an actual microprocessor based home terminal is provided, said terminal unit being coupled to said central source via a data link, such that video and audio data may be downloaded from said central source, stored locally within said terminal unit, and displayed at any time, said downloading coming from said central source when requested by said terminal unit and not vice versa, said terminal unit includes a communications board containing a modem for processing the incoming serial bit-stream data from a communications link into the appropriate format for storage and processing, a central processor unit, a disk storage system, a disk controller connected between said central processing unit and said disk storage system so that said central processing unit may read from or write to said disk storage system, a video controller board connected to said central processing unit whereby said video controller board processes video and audio data into a composite format for eventual video display and provides necessary decoding, a video board that takes said composite format and outputs a video signal for display on an accessory television or monitor, an alphanumeric display connected to said central processing unit such that said display provides an operator with information about the operation of said video communications system, a numeric key pad and function pad connected to said central processing unit such that said pads allow an operator to input operational instructions to said video communications system, a system controller to act as master over the central processing unit, and a filtered power supply to power said video communications system.

4,949,188

### IMAGE PROCESSING APPARATUS

Yuichi Sato, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1989, Ser. No. 296,593

Claims priority, application Japan, Jan. 19, 1988, 63-010133

Int. Cl.<sup>5</sup> H04N 1/40

U.S. Cl. 358—448

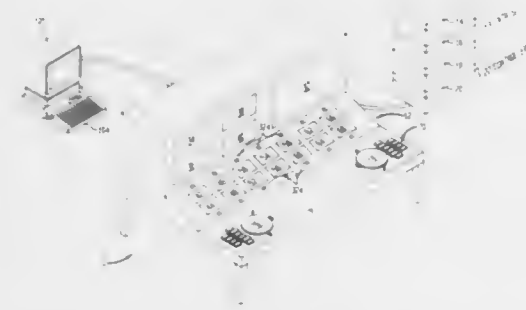
9 Claims

1. An image processing apparatus comprising: output means for outputting image data representing an original image; means for generating a page description language including

means responsive to said operator control means for selectively displaying segment frames on said pictorial display means, said operator control means having an operator controlled manual rotation means for varying the segment frames displayed on said display means, said rotation means having a plurality of operating positions, said displaying means being responsive to each successive



position of said rotation means for displaying a next successive frame, the direction of said next frame with respect to the present displayed frame corresponding to the direction of rotation of said rotation means,



whereby, through back and forth rotation of said rotation means, action scrolling of a predetermined number of said segment frames can be achieved such that an operator may better determine the boundary of said selected segment.

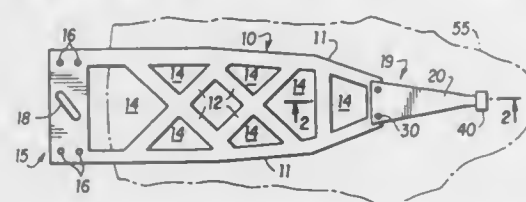
#### 4,949,194 CERAMIC SUPPORT ARM FOR MOVABLY POSITIONING TRANSDUCERS

John A. MacPherson, San Diego, Calif., and Ernest V. Johnson, Phillipston, Mass., assignors to Quest Technology Corporation, San Diego, Calif.

Filed Feb. 26, 1988, Ser. No. 160,883  
Int. Cl.<sup>5</sup> G11B 5/48

U.S. Cl. 360—104

16 Claims



1. A dimensionally accurate support arm for movably positioning and supporting a transducer assembly in a cantilevered fashion, the support arm having a positioning-actuator connection end for connection to a positioning actuator and a transducer-assembly connection end generally opposed to the positioning-actuator connection end for connection to at least one transducer assembly, the support arm being essentially composed of a ceramic material having a specific stiffness in excess of  $5 \times 10^6$  m and a coefficient of thermal expansion of less than about  $7 \times 10^{-6}$  m/m/°C., the transducer assembly connection end of the support arm being shaped to define transducer-assembly-connection means integral of the support arm for mating with transducer-assembly-fastener means to connect the at least one transducer assembly to the support arm, the positioning actuator connection end of the support arm being shaped to define positioning-actuator-connection means integral of the support arm for mating with positioning-actuator-fastener means to connect the support arm to the positioning actuator.

#### 4,949,195 VIDEO SIGNAL MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS WITH AUTOMATIC MODE DISCRIMINATION

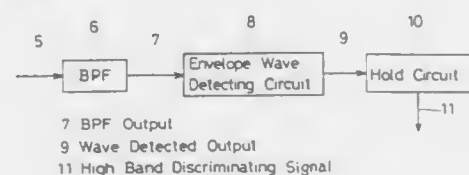
Naohisa Fujiwara, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
PCT No. PCT/JP87/00827, § 371 Date Jun. 28, 1988, § 102(e)  
Date Jun. 28, 1988, PCT Pub. No. WO88/03348, PCT Pub. Date May 5, 1988

PCT Filed Oct. 27, 1987, Ser. No. 233,654

Claims priority, application Japan, Oct. 28, 1986, 61-257362  
Int. Cl.<sup>5</sup> H04N 5/78

U.S. Cl. 360—33.1

8 Claims



1. In a video signal magnetic recording/reproducing apparatus, a mode discriminating circuit which automatically discriminates the original recording of a reproduced luminance signal FM wave in a standard mode or high band mode comprising:

- a bandpass filter, coupled to said reproduced luminance signal FM wave and of a selected bandpass, passing as a bandpass filter output frequencies in the vicinity of a sync signal tip portion of the reproduced luminance signal FM wave for said standard mode;
- an envelope wave detecting circuit, coupled to said bandpass filter, providing a wave detected output in accordance with said bandpass filter output; and
- a hold circuit, coupled to said envelope wave detecting circuit, holding said wave detected output for a predetermined period of time to provide a discrimination signal of a high level indicative of said standard mode and of a low level indicative of said high band mode.

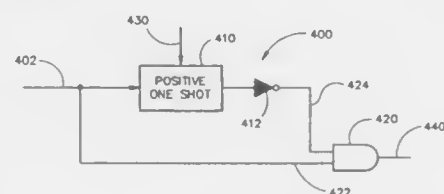
#### 4,949,196 METHOD AND APPARATUS FOR ASYMMETRICAL RLL CODING

Neil R. Davie, Tucson, Ariz.; Martin A. Hassner, Palo Alto, Calif.; Thomas D. Howell, Los Gatos, Calif.; Razmik Karabed, and Paul H. Siegel, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 874,041, Jun. 13, 1986, abandoned. This application Mar. 30, 1988, Ser. No. 175,171  
Int. Cl.<sup>5</sup> G11B 5/09; H03K 13/24

U.S. Cl. 360—40

41 Claims



1. A method of asymmetrically encoding an input string of binary data bits into an output string of binary coding characters, said input string having the form of a sequence of 1's and 0's, said output string having the form of a sequence of code characters drawn from a binary character alphabet including first and second code characters, said method comprising the steps of:

recursively encoding said input string according to a run-

length-limited code having a code constraint  $M/N(d_1, K_1)$ ; ( $d_2, K_2$ ), where  $M$  is the number of data bits encoded during a recursion and  $N$  is the number of code characters produced by encoding  $M$  data bits,  $d_1$  and  $d_2$  are minimum numbers of said first code characters occurring between adjacent second code characters in said output string, and  $k_1$  and  $k_2$  are maximum numbers of said first code characters occurring between adjacent second code characters in said output string; and alternating between the constraints ( $d_1, k_1$ ) and ( $d_2, k_2$ ) in response to the occurrence of said second code characters in said output string.

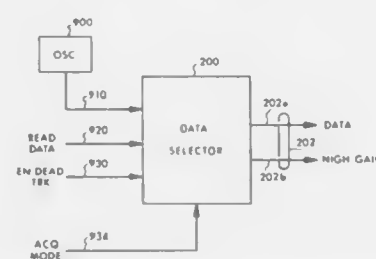
#### 4,949,197 DEAD TRACK ACQUISITION FOR PHASE-LOCKED LOOP CONTROL

Brian G. Cleveland, Boulder, Colo., assignor to Aspen Peripherals Corp., Longmont, Colo.

Filed Sep. 8, 1988, Ser. No. 242,031  
Int. Cl.<sup>5</sup> G11B 5/05

U.S. Cl. 360—51

8 Claims



1. In a data storage subsystem having high density storage media, said high density storage media having a data block (330) with at least one data track, means (100) for issuing a DEAD TRACK signal when one of said at least one data tracks is defective, means (340) in said data block on said defective track for providing a plurality of resynchronization data frames (RESYNC), and a phase-locked loop control for locking onto the frequency of the data read from said storage media, said phase-locked loop control comprising:

- means (800) for generating a fixed frequency of digital pulses, said fixed frequency corresponding to the frequency of data stored on said defective track,
- means (200) receptive (a) of said data from said storage media, (b) of said digital pulses from said generating means, and (c) of said DEAD TRACK signal from said issuing means for selectively outputting (1) said data in the absence of said DEAD TRACK signal between successive resynchronization frames and (2) said digital pulses in the presence of said DEAD TRACK signal, and
- means (210, 220, 225, 230) connected to the output of said outputting means for phase-locking onto said digital pulses for said defective track so as to maintain lock between said successive resynchronization frames and onto said data when said at least one data track is not defective.

#### 4,949,198 THERMOMAGNETIC RECORDING HEAD AND MODE OF EMBODIMENT

Ernst Huijter, Orsay; Jean C. Leheureau, Genevieve Des Bois, and Jean P. Castera, Orsay, all of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 914,005, Oct. 1, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 257,133

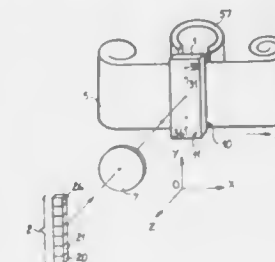
Claims priority, application France, Oct. 4, 1985, 85 14766  
Int. Cl.<sup>5</sup> G11B 5/02

U.S. Cl. 360—59

18 Claims

1. Thermomagnetic recording head adapted for use with a data-recording magnetic medium, comprising a layer of homo-

geneously magnetized ferromagnetic material at a determined Curie point, the thickness of which is delimited by a first main surface and a second main surface, said layer adapted to being set with its first main surface in the vicinity of the magnetic recording medium; and a heating source set beside the second main surface of the said layer, used to raise the temperature of at least one zone throughout the thickness of the layer starting



from the said second main surface up to the first main surface until attainment of the Curie point of the ferromagnetic material that constitutes the layer, wherein said heating source comprises a light source emitting a light beam which impinges on a light valve located between the light source and the first surface of said layer, said light valve having plural sections for selectively passing light from said light source to respective zones of the layer to heat said zones of the layer.

#### 4,949,199 MAGNETIC RECORDING/REPRODUCTION APPARATUS

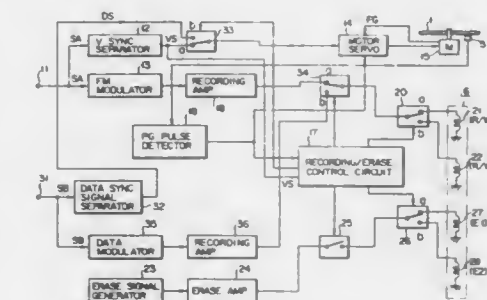
Yutaka Yunoki, Kunitachi, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 167,257, Mar. 11, 1988, abandoned, which is a division of Ser. No. 796,573, Oct. 28, 1985, Pat. No. 4,742,404. This application Nov. 9, 1989, Ser. No. 434,513  
Claims priority, application Japan, Mar. 13, 1984, 59-47865; Mar. 13, 1984, 59-47866; Mar. 13, 1984, 59-47867; Mar. 13, 1984, 59-47868; Mar. 13, 1984, 59-47869; Mar. 13, 1984, 59-47870

Int. Cl.<sup>5</sup> G11B 5/03

U.S. Cl. 360—66

9 Claims



1. An image information recording apparatus using a magnetic disk as a recording medium, the magnetic disk having a plurality of recording tracks and a rotating position detection index at a position on the outer periphery of a hub in a central portion thereof, comprising:

- means for rotating a magnetic disk;
- detection pulse generating means for generating a pulse train representative of a rotating state of a magnetic disk, a pulse being generated by said detection pulse generating means at every rotation of the rotating position detection index on the magnetic disk;
- timing pulse generating means for generating timing pulses

which are in-phase with said pulse train generated by said detection pulse generating means;

a composite magnetic head having integrated erase and read/write gaps separated from each other for respectively erasing and recording image information with respect to said magnetic disk;

image information receiving means for receiving image information to be recorded on a magnetic disk;

first instruction receiving means for issuing a first instruction signal for starting an information recording operation in response to a first instructing operation of an operator;

second instruction receiving means for issuing a second instruction signal for selecting a successive image recording mode in response to a second instructing operation of the operator;

erasing signal generating means for generating an erasing signal for erasing a recorded information on said magnetic disk; and

sequential change-over timing determining means for determining a sequential change-over timing for selectively supplying the image information received by said image information receiving means or the erasing signal generated by said erasing signal generating means to said composite magnetic head, in synchronism with successive timing pulses generated by said timing pulse generating means, said sequential change-over timing determining means enabling repeating an erasing and recording operation cycle in a single recording track on a magnetic disk whenever both said first and second instruction signals of said first and second instruction receiving means are applied to said sequential change-over timing determining means.

4,949,200

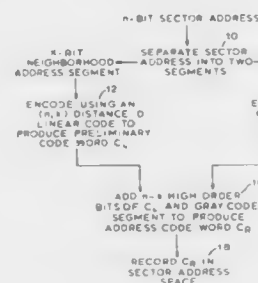
**METHOD AND APPARATUS FOR ENCODING AND MAPPING MAGNETIC DISK SECTOR ADDRESSES**  
Lih-Jyh Weng, Lexington, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Mar. 31, 1988, Ser. No. 176,093

Int. Cl. 5 G11B 5/012

U.S. Cl. 360—72.2

34 Claims



1. A method for locating data sectors on a magnetic disk during sector seeking operations comprising the steps of:

- A. encoding the addresses of the sectors to produce address code words by:
1. separating the sector address containing n bits into two segments, a segment containing the k lower order bits and a segment containing the n-k higher order bits;
  2. using a distance D linear (n,k) code over Galois Field GF(2) to encode said k-bit segment into an n-bit code word containing n-k redundancy symbols and the k address bits such that any two encoded addresses differ by at least  $D/2$  bits;
  3. representing said n-k redundancy symbol segment in Gray code;
  4. adding said Gray coded segment to the n-k higher order bits of said n-bit code word to produce an n-bit address code word;

- B. recording said address code words in the sectors during the formatting of the disk;
- C. reading said address code word from the sector rotating under the head;
- D. encoding the specified address of the sector to be located in the same manner of step A to produce a specified address code word;
- E. comparing said sector address code word read from a disk sector with said specified address code word;
- F. (1) if the comparison results in a number of bits which differ between said address code word and said specified address code word that is less than a predetermined number, identifying the sector as a correct sector; or (2) if the comparison results in a number of bits which differ that is greater than said predetermined number, not identifying the sector as the correct sector.

4,949,201

**DISK DRIVE HEAD POSITION CONTROLLER WITH STATIC BIAS COMPENSATION AND PLURAL VELOCITY DETECTORS**

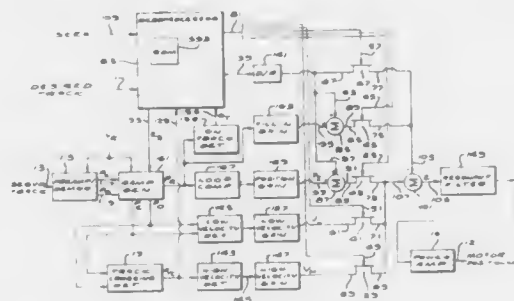
Majeed Abed, Moorpark, Calif., assignor to Micropolis Corporation, Chatsworth, Calif.

Filed Apr. 1, 1988, Ser. No. 176,432

Int. Cl. 5 G11B 5/596, 5/56

U.S. Cl. 360—78.07

22 Claims



1. A hard disk drive positioning system for quickly positioning a data transfer head over a desired track on a rotating magnetic disk on command comprising:

- a. feedback circuitry, including a velocity loop, for connection to a device which controls the position of the data transfer head, to a signal indicative of the desired track, and to at least one signal indicative of a physical parameter relating to the position of the data transfer head;
- b. high velocity means connected to said velocity loop for detecting high head velocities by measuring the frequency at which the head crosses tracks on the rotating disk; and
- c. low velocity means connected to said velocity loop for detecting low head velocities by measuring the slope of a ramp signal whose magnitude is proportional to the position of the head with respect to a particular track.

4,949,202

**DISK TRACK FOR LOCATING ZERO TRACK AND GENERATING TIMING FOR INDEX SIGNAL**

Timothy Kim, San Jose, Calif., assignor to Kalok Corporation, Sunnyvale, Calif.

Filed Apr. 4, 1988, Ser. No. 176,903

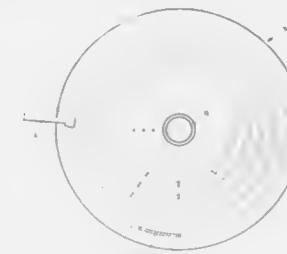
Int. Cl. 5 G11B 5/55

U.S. Cl. 360—78.14

8 Claims

1. A data storage device comprising a magnetic disk including a plurality of tracks, at least one of said tracks having only a first portion and a second portion: wherein said first portion contains data unique to said track so that when a read/write head is positioned over said first portion, said read/write head receives a signal unique to said track; and

said second portion contains data so that when a read/write head is positioned over said second portion, said read/write



write head receives a second signal, said second signal being an index signal.

4,949,203

**TAPE RECORDER HAVING AN IMPROVED CASSETTE MOUNTING DEVICE**

Noritaka Kunimaru; Katsuhiko Shiba; Norio Kudo; Gen Inoshita, and Shogo Sato, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

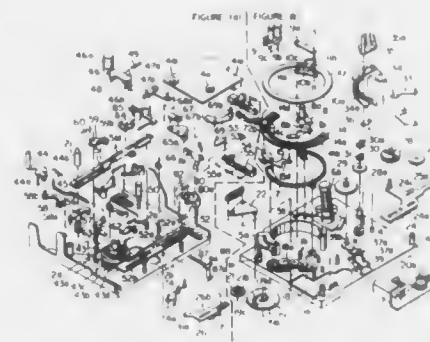
Filed Mar. 10, 1988, Ser. No. 166,595

Claims priority, application Japan, Mar. 11, 1987, 62-35351; Mar. 11, 1987, 62-35357; Mar. 11, 1987, 62-35359; Mar. 13, 1987, 62-35978

Int. Cl. 5 G11B 15/665, 15/675, 5/027

U.S. Cl. 360—85

4 Claims



1. A tape recorder comprising:

- a stationary chassis and a movable chassis relatively movable between a tape loading state where a tape is loaded in said recorder and a tape unloading state where the tape is unloaded from said recorder;
- a rotary drum having a magnetic head, a capstan and a tape loading mechanism for loading said tape in said recorder, said rotary drum being provided on said stationary chassis;
- a pair of reel stands provided on said movable chassis; one of said pair for supplying said tape and another of said pair for winding said tape; and
- a mode switching mechanism for switching said recorder from said tape loading state to said tape unloading state, said rotary drum, said capstan and a tape loading motor being provided on said stationary chassis, and said mode switching mechanism being provided on said movable chassis, wherein said tape loading mechanism includes first and second guide members adapted to be movable along an outer periphery of said rotary drum, said guide members having tape draw-out pins for drawing out said tape from said tape cassette and a third guide member adapted to draw-out said tape in cooperation with said first and second guide members, said third guide member having a first tape draw-out pin which changes height of

said tape draw-out position to a height the same as that of said tape cassette position; and said third guide member also having a second tape draw-out pin for directing said tape subjected to positional change by said first pin to a direction parallel with the tape cassette.

4,949,204

**TAPE RECORDER FOR PLAYING ENDLESS MAGNETIC TAPE**

Kobun Yoshida, Sayama, and Toshiro Mori, Musashino, both of Japan, assignors to TEAC Corporation, Tokyo, Japan

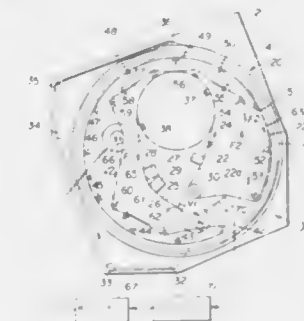
Filed Jul. 26, 1988, Ser. No. 224,660

Claims priority, application Japan, Jul. 27, 1987, 62-187256; Aug. 27, 1987, 62-211316

Int. Cl. 5 G11B 15/18, 15/61

U.S. Cl. 360—93

10 Claims



1. A tape recorder for recording and/or reproducing an information signal on and/or from an endless magnetic tape which has a shape of an endless loop, said tape recorder comprising:

- a stationary reel having an upper flange and a lower flange, said stationary reel having a circular shape;
- a plurality of rollers provided between the upper and lower flanges of said stationary reel;
- an endless belt guided by said rollers and forming an approximate C-shape along an inner periphery of said stationary reel, a large portion of the endless magnetic tape being wound around an outer portion of said endless belt and accommodated within said stationary reel in a form of a tape roll, said endless magnetic tape forming a predetermined tape path with a remaining portion thereof;
- recording and/or reproducing means located on an inside of said stationary reel and making contact with the endless magnetic tape in the predetermined tape path for recording and/or reproducing the information signal on and/or from the endless magnetic tape;
- tape transport means for transporting the endless magnetic tape in at least a forward direction;
- belt transport means for transporting said endless belt so as to transport the endless magnetic tape in a direction identical to a direction in which the endless magnetic tape is transported by said tape transport means, said belt transport means operating independently of said tape transport means;
- means for detecting a tension of the endless magnetic tape in the predetermined tape path adjacent to an innermost turn of the tape roll; and
- means for controlling said belt transport means depending on the detected tension so as to maintain an approximately constant tension;
- said endless magnetic tape being drawn out from the innermost turn of the tape roll and taken up on an outermost turn of the tape roll when the endless magnetic tape is transported in the forward direction.



**4,949,205**  
**RECORDING OR REPRODUCING APPARATUS**  
**INCLUDING A DISC CARTRIDGE LOADING AND**  
**CLAMPING MECHANISM**

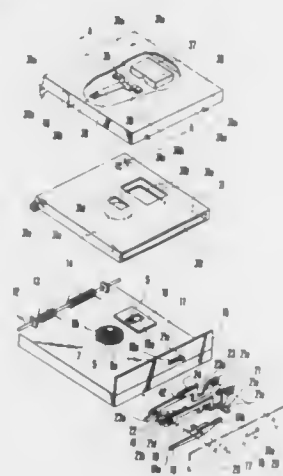
Nobuo Tezuka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 27,110, Mar. 13, 1987, abandoned, which is a continuation of Ser. No. 603,137, Apr. 23, 1984, abandoned. This application Jan. 26, 1989, Ser. No. 303,042  
 Claims priority, application Japan, Apr. 25, 1983, 58-72429; Oct. 27, 1983, 58-201517; Mar. 9, 1984, 59-45196

Int. Cl.<sup>5</sup> G11B 5/012, 17/02

U.S. Cl. 360—99.05

16 Claims



1. An apparatus arranged to handle a disc having an engaging portion including an engaging magnetic member, said apparatus comprising:

(A) receiving means having an opening for receiving said disc;

(B) rotating means for rotating the disc received at said receiving means, said rotating means having an engageable portion engageable with said engaging portion of said disc, said engageable portion having a magnet magnetically attractive to said engaging magnetic member;

(C) recording and/or reproducing head means for recording signals on and/or reproducing signals from said disc in the state where said disc is held in engagement with said rotating means;

(D) cover means movable between a first position and a third position and through a second position between said first and third positions, said cover means operating at said first position to uncover said opening of said receiving means and at said second position to cover said opening of said receiving means;

(E) pressing means operatively associated with said cover means for pressing a portion of said disc received at said receiving means to engage said engaging portion of the disc with said engageable portion of said rotating means until the engaging magnetic member and the magnet of the engageable portion are magnetically attracted to each other when the cover means is moved to said third position, said pressing means being disabled when the cover means is positioned at said second position, said pressing means including a plate spring with one end thereof being fixed to the cover means so as to press the portion of said disc, said plate spring being so arranged that its pressing portion for pressing said portion of said disc is positioned in opposed and separated relation to said portion of the disc when said cover means is positioned at said first position and its support point fixed to said cover means is at a position other than the position where said head means is arranged; and

(F) arresting means for arresting said cover means at said

second position when the cover means is returned to the second position from said third position.

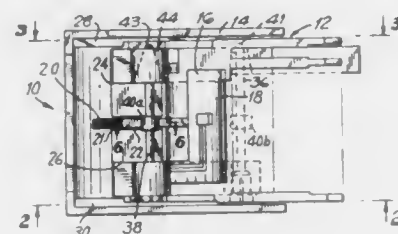
**4,949,206**  
**CRASH STOP FOR ROTARY DISK DRIVE ACTUATOR**  
 Wayne Phillips, Arvada; David Normen, Boulder, and Richard Rupp, Berthoud, all of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed Jul. 29, 1988, Ser. No. 226,280

Int. Cl.<sup>5</sup> G11B 5/55

U.S. Cl. 360—106

19 Claims



1. In a rotary disk drive system, apparatus for supporting a read/write head at a selected one of a plurality of substantially circular, concentric data tracks, said apparatus comprising:

head actuator means having at least one read/write head mounted thereon;

an actuator housing;

means for coupling a coil to said head actuator means;

at least one permanent magnet fixedly mounted with respect to said head actuator means;

upper and lower magnetic plates supporting said at least one permanent magnet and each having at least two cavities which are substantially aligned with, but displaced off-axis from, the cavities of the other plate;

an inner diameter and an outer diameter crash stop being insertably retained within the corresponding cavities of the magnetic plates to preload the crash stops to provide a stopping force immediately upon impact with the head actuator means, each said crash stop having a central generally cylindrical section of elastomeric material; and engaging means operatively connected to said coupling means and engageable with said central cylindrical sections to reduce the rebound shock of said head actuator means after it strikes either of said inner and outer diameter crash stops.

**4,949,207**  
**PLANAR STRUCTURE THIN FILM MAGNETIC HEAD**  
 Jean-Pierre Lazzari, Corenc, France, assignor to Commissariat a l'Energie Atomique, Paris, France

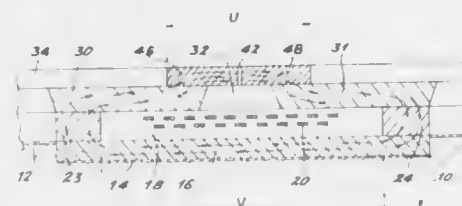
Continuation of Ser. No. 304,232, Jan. 31, 1989, abandoned, which is a division of Ser. No. 94,292, Sep. 8, 1987, Pat. No. 4,837,924. This application Jul. 21, 1989, Ser. No. 384,112

Claims priority, application France, Sep. 17, 1986, 86 13010

Int. Cl.<sup>5</sup> G11B 5/235

U.S. Cl. 360—119

2 Claims



2. A planar structure thin film magnetic head, which comprises:

(i) a first layer having; an insulating substrate having a top surface and a first magnetic film buried in the substrate from the top surface thereof such that an exposed surface of the magnetic film is level with the top surface of the substrate;

(ii) a second layer overlying said first layer having; a second insulating film in overlying contact with the exposed surface of said first magnetic film and leaving said first magnetic film exposed at each end of the second insulating film, said second insulating film having an electrical coil located therein and two magnetic contact pads in overlying contact with the exposed surface of the first magnetic film at the ends of the second insulating film and in contact with second insulating film;

(iii) a third layer overlying said second layer and having; a central insulating island and two second magnetic film portions in overlying contact with and completely covering said second insulating film and said contact pads such that said central insulating island is in contact with the second insulating film at a central portion thereof thereby leaving the surface of the second insulating film on either side of the insulating island uncovered and each of said second magnetic film portions in overlying contact with a respective one of the uncovered surfaces of the second insulating film and a contact pad contiguous to that uncovered portion of the second insulating film; and

(iv) a fourth layer overlying said third layer and having; a third magnetic film, subdivided and separated into two parts by an amagnetic spacer, in overlying contact with said insulating island, said two parts each overlying and contacting a respective one of said second magnetic film portions, and a hard protective insulating film in contact with the subdivided third magnetic film and covering all portions of the third layer not covered by said subdivided third magnetic film and said amagnetic spacer.

**4,949,208**  
**MULTIHEAD MAGNETIC HEAD ASSEMBLY HAVING A**  
**SINGLE PIECE FACEPLATE OF MAGNETIC FERRITE**  
 Richard K. Milo, El Toro, and John D. Ricards, Del Mar, both of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

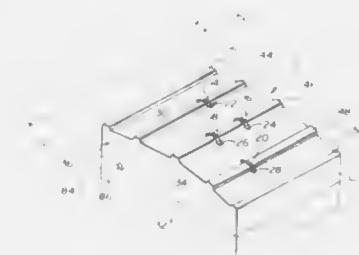
Continuation of Ser. No. 181,130, Apr. 13, 1988, abandoned.

This application Oct. 4, 1989, Ser. No. 417,977

Int. Cl.<sup>5</sup> G11B 5/187

U.S. Cl. 360—122

9 Claims



1. A multihead magnetic head assembly comprising:

a single piece faceplate of magnetic ferrite wherein said faceplate (1) has a face which interfaces with magnetic media and (2) has a plurality of slots opening on said face and extending into said faceplate;

a plurality of magnetic heads of magnetic ferrite wherein each head has a tip with a head gap; and

means for bonding said magnetic heads within the slots of said magnetic ferrite faceplate by means of non-magnetic bonding material, wherein head gap tips of said magnetic heads are located at said media interfacing face of said faceplate wherein said media is only contacted by said face of said magnetic ferrite faceplate and by said magnetic head tips, and wherein said magnetic heads are sub-

stantially surrounded by the magnetic ferrite faceplate so that said magnetic ferrite faceplate shields individual magnetic heads from external magnetic fields such as produced by other magnetic heads in the head assembly.

**4,949,209**  
**THIN-FILM MAGNETIC HEAD HAVING SPECIAL**  
**INPUT/OUTPUT TERMINAL BACKING CONNECTION**  
**AND METHOD OF FABRICATING THE SAME**

Tadashi Imanaka, Odawara; Tetsuo Kobayashi, Ashigarakami; Harunobu Saito, Odawara; Osamu Hirai, Odawara, and Kanji Kawakami, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

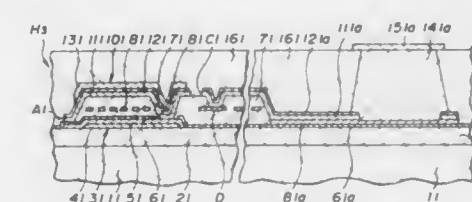
Filed Aug. 12, 1988, Ser. No. 231,505

Claims priority, application Japan, Aug. 26, 1987, 62-210198

Int. Cl.<sup>5</sup> G11B 5/147, 5/17

U.S. Cl. 360—126

26 Claims



1. A thin-film magnetic head comprising:

an electromagnetic conversion section; and

a wiring section;

said electromagnetic conversion section comprising

a coil and

an upper magnetic layer comprising,

an upper first magnetic film,

inorganic insulating layer, and

upper second magnetic film,

said upper first magnetic film being connected to a center of said coil at the electromagnetic conversion section;

said wiring section comprising,

a first wiring for a first input/output terminal, connected to an outer circumference of said coil and made of a same material as said coil; and

a first wiring for a second input/output terminal, cut off at the center of said coil, and made of a same material as said coil,

wherein said upper first magnetic film being a laminate on said first wiring for said first input/output terminal, thus constituting a second wiring for said first input/output terminal; and

wherein said upper first magnetic film being a laminate on said first wiring for said second input/output terminal, thus constituting a second wiring for said second input/output terminal as well.

**4,949,210**  
**TAPE CASSETTE**  
 Takateru Satoh, Saku; Noboru Uemura, Odawara; Haruo Shiba, Komoro; Kimio Tanaka, and Kenkichi Akaoka, both of Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed May 31, 1989, Ser. No. 359,219

Claims priority, application Japan, Jun. 1, 1988, 63-71732[U]

Int. Cl.<sup>5</sup> G11B 23/02

U.S. Cl. 360—132

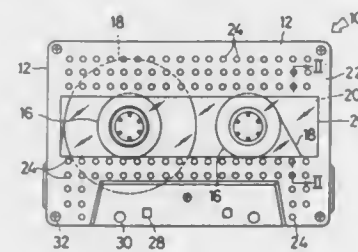
10 Claims

1. A tape cassette comprising:

a casing comprising an upper casing member and a lower casing member joined together; and

a pair of reel hubs which are rotatably arranged in said casing and on which a tape is wound in a manner to extend therebetween;

each of said upper casing member and lower casing member being made of a primary resin layer and a secondary resin layer integrally formed by two-layer molding; said secondary resin layer being formed with a plurality of penetrations in a dotted manner;



said primary resin layer being joined to said secondary resin layer in such a manner that at least a part thereof is fitted in said penetrations, resulting in being integral with said secondary resin layer.

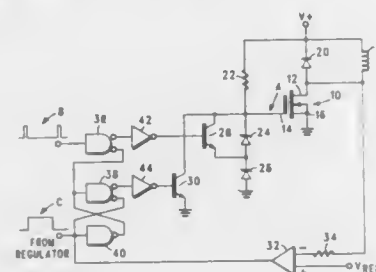
4,949,211

**PROTECTIVE, BI-LEVEL DRIVE FOR FET'S**  
Arthur J. Edwards, Hoffman Estates, Ill., assignor to Motorola Inc., Schaumburg, Ill.

Filed May 5, 1989, Ser. No. 437,702  
Int. Cl.<sup>5</sup> H02H 7/122

U.S. Cl. 361-18

3 Claims



1. In an electronic circuit that uses an FET to supply current to a load, and wherein the FET has a drain electrode, a gate electrode and a source electrode, a method for protectively driving the FET, comprising:

- generating, and applying to the gate electrode, a signal that has a first, relatively low, test level followed by a second, relatively higher operating level, the magnitude and the duration of the test level being selected to produce a non-destructive drain current in the FET irrespective of the impedance of the load, and the operating level being selected to produce a larger drain current whose level is appropriate for driving the load;
- measuring the FET's drain-to-source potential at least while the test potential is being applied to the gate electrode;
- turning the FET off when the measured value of the drain-to-source potential is high enough to indicate an abnormal load condition; and
- allowing the FET turn on in response to the control signal's operating level when the value of the measured drain-to-source potential is indicative of a normal load condition.

#### 4,949,212 CIRCUIT CONFIGURATION FOR PROTECTING AN INTEGRATED CIRCUIT

Michael Lenz, Zorneding; Frank-Lotthar Schwertlein, Munich, and Wolfgang Horschler, Haar, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

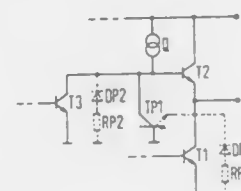
Filed Feb. 15, 1989, Ser. No. 311,176

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1988, 3804726

Int. Cl.<sup>5</sup> H02H 9/04

U.S. Cl. 361-56

8 Claims



1. Circuit configuration for protecting an integrated circuit from damage by a voltage present at an output exceeding the supply voltage range of the integrated circuit, comprising a given number of parasitic circuit structures of the integrated circuit, including parasitic lateral protective npn-transistor structures, wherein a collector-emitter path of said parasitic lateral protective npn-transistor structures is connected in parallel with a given npn-transistor structure of the integrated circuit, said parasitic lateral protective npn-transistor structures being activated by the voltage at the output exceeding the supply voltage range.

4,949,213

#### DRIVE CIRCUIT FOR USE WITH VOLTAGE-DRIVE SEMICONDUCTOR DEVICE

Kiyoaki Sasagawa; Hiroshi Miki; Tadashi Miyasaka, and Hideki Ninomiya, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Nov. 15, 1989, Ser. No. 436,643

Claims priority, application Japan, Nov. 16, 1988, 63-289231; Dec. 22, 1988, 63-324359; Mar. 20, 1989, 64-68821; Apr. 20, 1989, 64-100569; Jul. 12, 1989, 64-179497; Jul. 14, 1989, 64-181771; Aug. 8, 1989, 222642

Int. Cl.<sup>5</sup> H02H 3/20

U.S. Cl. 361-91

8 Claims

5. A drive circuit for use with a voltage-driven semiconductor device, comprising:  
a drive section having as constituent elements at least a signal insulating photocoupler and a pair of complementary output transistors;  
detection means that monitors a voltage at an input main terminal of said voltage-driven semiconductor device in the presence of a drive signal and which produces a detection signal if said voltage exceeds a predetermined level; and

a variable voltage source that gradually lowers the voltage with time while said detection means is operating; wherein said drive circuit further includes a transistor which conducts when said detection means senses that the voltage at the input main terminal of said voltage-driven semiconductor device has exceeded a predetermined level in the presence of a drive signal and a collector terminal of which is connected to a collector terminal of said signal insulating photocoupler via a diode the forward direction of which is toward said transistor.

4,949,214

#### TRIP DELAY OVERRIDE FOR ELECTRICAL CIRCUIT BREAKERS

George A. Spencer, 1909 Fresno Rd., Plano, Tex. 75074

Filed Aug. 28, 1989, Ser. No. 399,151

Int. Cl.<sup>5</sup> H02H 3/08

U.S. Cl. 361-95

22 Claims



12. In a circuit breaker of the type having a movable contact arm for making and breaking an electrical circuit in a power distribution circuit having a first power conductor and a second power conductor, the improvement comprising a protector circuit for overriding the trip delay and tripping the movable contact arm to interrupt current flow through a selected one of said power conductors in response to current flow through said selected power conductor which exceeds a predetermined level, said protector circuit including a solenoid movably coupled to said contact arm for tripping said contact arm in response to an actuating control signal, a detector for detecting the magnitude of current flow through said selected power conductor, and means coupled to said detector for generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level.

4,949,215

**DRIVER FOR HIGH SPEED SOLENOID ACTUATOR**  
George H. Studtmann; Stanley B. Quinn, Jr., both of Mt. Prospect, and Todd L. King, Buffalo Grove, all of Ill., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Aug. 26, 1988, Ser. No. 237,289

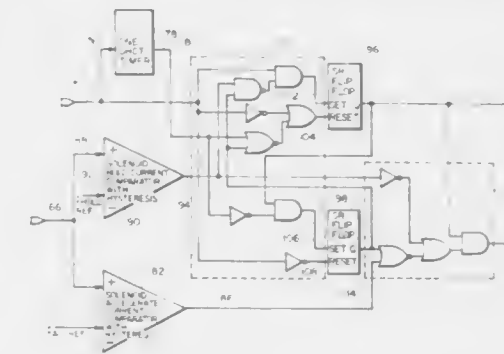
Int. Cl.<sup>5</sup> H01H 47/00

U.S. Cl. 361-154

50 Claims

1. For a solenoid operated valve actuator control system, a method of proportioning unidirectional actuator solenoid current in response to an actuator control signal, comprising the steps of:  
sensing a control signal for actuation of an actuator having a solenoid operator;  
supplying current to said solenoid in response to said control signal;  
sensing the level of current applied to said solenoid;  
periodically interrupting said supplied current to said solenoid to provide a sensed solenoid current for a prescribed solenoid acceleration period to move said actuator to an actuated position from a released position;

reducing said solenoid current at a prescribed rate after said solenoid drive period has expired;  
periodically interrupting said supplied current to said solenoid to provide a prescribed current holding level less than said prescribed current acceleration level in response



to said sensed solenoid current for a holding period sensed from said control signal, to hold said actuator in said actuated position for said holding period; and  
reducing said solenoid current at said prescribed rate after the expiration of said holding period to return said actuator to said released position.

4,949,216

#### APPARATUS FOR DISCOURAGING ANIMALS FROM A SELECTED AREA

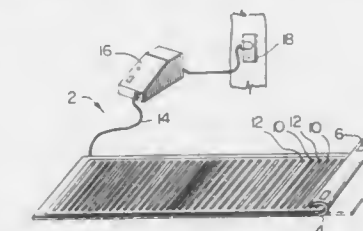
Klaus Dinkastein, Sidney, Canada, assignor to Contech Electronics Inc., Sidney, Canada

Filed Jun. 17, 1988, Ser. No. 208,451

Int. Cl.<sup>5</sup> H05F 3/02

U.S. Cl. 361-232

5 Claims



1. A device for discouraging small domestic or wild animals from frequenting areas where they may become a nuisance, comprising:

- a mat made of non-conductive material to be spread over said area;
  - a continuous and substantially flat upper surface;
  - a plurality of conductive strips closely spaced in comparison to the length of said surface and spaced on said upper surface of the mat so that adjacent conductive surfaces are electrically insulated from each other and are, alternately, live and grounded; and
  - electric control means associated with the conductive surfaces to provide a series of electrical pulses to the conductive surfaces, said pulses being spaced by about one second and having durations of substantially less than one second;
- the electric control means and conductive surfaces being arranged so that, when an animal comes into contact with the mat, a portion of its body completes a circuit between adjacent live and ground conductive surfaces on the mat and the animal is thereby provided with an unpleasant electrical sensation.



**4,949,217**  
**MULTILAYER CAPACITOR SUITABLE FOR**  
**SUBSTRATE INTEGRATION AND MULTIMEGAHERTZ**  
**FILTERING**

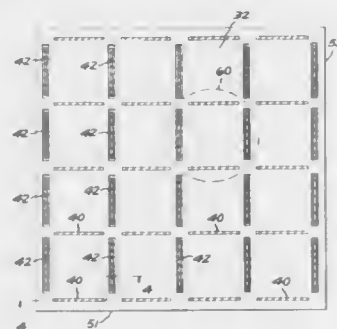
Khai D. T. Ngo, Gainesville, Fla., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,517

Int. Cl.<sup>5</sup> H01G 4/38, 7/00

U.S. Cl. 361—328

21 Claims



1. A multilayer capacitor comprising:  
 a stack of sheet electrodes and dielectric layers arranged alternately such that each respective sheet surface of each of said dielectric layers is in contact with a sheet electrode, respectively; and  
 first and second groups of spaced-apart conductive vias extending through aligned holes in said dielectric layers and said sheet electrodes;  
 said first group of conductive vias being in electrical contact with alternate ones of said sheet electrodes in said stack and being insulated from the remaining ones of said sheet electrodes, and said second group of conductive vias being in electrical contact with said remaining ones of said sheet electrodes and being insulated from said alternate ones of said sheet electrodes, each of said vias having, in the plane of said electrodes, a cross-sectional form in the shape of an elongated rib having a greater length than width, said vias of said first group arranged in a first plurality of rows of multiple vias in spaced-apart, aligned relationship and said vias of said second group arranged in a second plurality of rows of multiple vias in spaced-apart, aligned relationship; said first plurality of rows extending transversely with respect to said second plurality of rows.

**4,949,218**  
**CABINET WITH BUILT-IN COOLING SYSTEM**

Joseph H. Blanchard, Richardson, Tex.; Earl C. Barb, Muncie, Ind., and Yasushi Kojima, Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan and Fujitsu America, Inc., San Jose, Calif.

Filed Feb. 1, 1989, Ser. No. 304,480

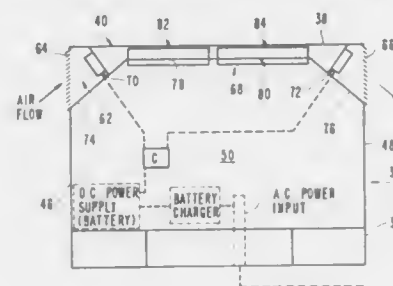
Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—384

21 Claims

21. A cabinet housing electronic equipment comprising:  
 a base portion supporting the cabinet and being connectable to a pad;  
 opposite longitudinal sidewalls and opposite lateral end walls upstanding from the base portion and forming an interior chamber mounting electronic equipment capable of producing heat when operating;  
 a top covering the opposite sidewalls and end walls;  
 a pair of air vents disposed respectively in an upper portion of the opposite end walls;  
 an air duct disposed between the air vents in upper portion of the cabinet above the interior chamber;  
 heat exchange means, disposed partially in the air duct and partially in the interior chamber, for conducting heat generated by the electronic equipment to the air duct; and  
 means for moving ambient air through the air duct, thereby removing heat generated by the electronic equipment; wherein the air duct includes a pair of diagonal plates, each

having a proximal end and distal end, and each being respectively mounted at the proximal ends thereof to the opposite end walls of the cabinet below the air vents, the distal ends extending upwardly towards the top of the



cabinet, a longitudinal divider plate substantially connected to and extending between the distal ends of the diagonal plates, the diagonal plates and the longitudinal divider plate forming a bottom wall of the air duct, a pair of opposite sidewalls extending downwardly from the top of the cabinet longitudinally between the opposite end walls of the cabinet to the bottom wall of the air duct, and a top wall formed by the top of the cabinet.

**4,949,219**  
**MODULE SEALING STRUCTURE**

Kiyokazu Moriizumi, Kawasaki; Kyolchiro Kawano, Yokohama, and Kiyotaka Seyama, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

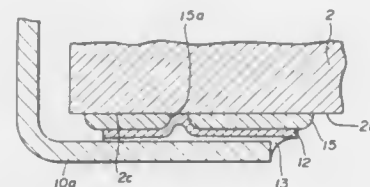
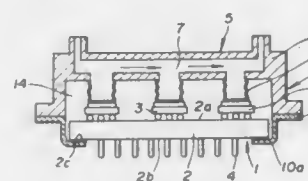
Filed May 24, 1989, Ser. No. 356,245

Claims priority, application Japan, May 24, 1988, 63-125023

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—386

10 Claims



1. A sealed module comprising:  
 a cold plate having a passage through which a cooling medium flows;  
 bellows structure attached to said cold plate and having a first end which communicates with the passage in said cold plate, said cold plate and said bellows structure forming a thermal conduction type cooling system;  
 a plated printed circuit having a substrate and an integrated circuit element provided on a first surface of the substrate, said integrated circuit element being in contact with a second end of said bellows structure;  
 a metal fitting secured on said cold plate and having a flange disposed beneath a second surface of the substrate to present a junction between the second surface of the substrate and the flange of said metal fitting;  
 a polyimide layer formed on the second surface of the substrate;  
 a conductor layer formed on the polyimide layer, said polyimide layer and said conductor layer being in the periph-

eral portion of the second surface of said substrate; and solder means fixing the flange of said metal fitting to said conductor layer.

**4,949,220**

**HYBRID IC WITH HEAT SINK**

Tadafumi Tashiro, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Feb. 23, 1989, Ser. No. 314,503

Claims priority, application Japan, Feb. 24, 1988, 63-23962

Int. Cl.<sup>5</sup> H65K 7/20

U.S. Cl. 361—386

8 Claims



1. A hybrid IC comprising:  
 a conductive substrate;  
 a heat sink separated from said conductive substrate;  
 an insulating sheet arranged on said conductive substrate, electric components, wiring conductors, and connecting electrodes being arranged on a surface of said insulating sheet;  
 a plurality of terminal each terminal being connected to a respective electrode on said insulating sheet;  
 at least one power-consuming component disposed on said heat sink to be connected to said wiring conductors on said insulating sheet through connecting means; and  
 a resin sealing said insulating sheet and a portion of said heat sink on which said at least one power-consuming component is disposed.

**4,949,221**

**ENCASED ELECTRONIC COMPONENT**

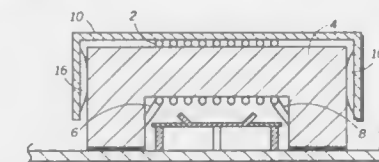
Thomas J. Rollins, Boca Raton; Charles W. Mooney, Lake Worth, and James I. Jaffee, West Palm Beach, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 3, 1989, Ser. No. 306,009

Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361—400

15 Claims



1. An encased electronic component, comprising:  
 a casing holding said component  
 so as to protect said component and to expose electrodes thereof for soldering; and  
 air exhaust means on said casing for allowing air internal of said casing to exhaust upon heating during soldering so as to oppose the ingress of foreign material into said casing.

**4,949,222**

**ELECTRICAL APPARATUS COMBINATION**

Peter Bender, Wädenswil, and Maruizio Bellé, Richterswil, both of Switzerland, assignors to Feller AG, Horgen, Switzerland

Filed Aug. 22, 1989, Ser. No. 396,930

Claims priority, application Switzerland, Aug. 29, 1988, 3197/88

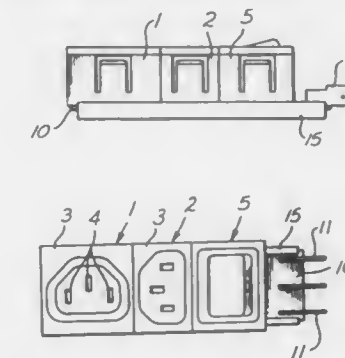
Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361—400

4 Claims

1. Electrical apparatus for connecting an external power supply cable to other electrical apparatus comprising in combi-

nation a plurality of electrical components which are interconnected electrically into an integrated energy transmitter modular unit comprising at least plug and socket electrical power cable connection components, each component including one base consisting of an insulating material and contact members arranged therein for carrying electrical power between a power supply cable connected thereto and said other electrical apparatus, which plug and socket are located adjacent to each other and are plugged onto a printed circuit board panel hav-



ing parallel side edges by means of said contact members and are interconnected electrically to conductors mounted onto the reverse side of said printed circuit board panel from the components by interconnecting soldered junctions to form the modular unit, and a protective cover panel mounted in a snapped fashion over the side edges of the circuit board panel to produce a protective function to said contact members and conductors, structural reinforcement of the apparatus, and an outer surface for labelling.

**4,949,223**

**ELECTRONIC COMPONENT ENCAPSULATED IN A PACKAGE AND ELECTRONIC APPARATUS USING THEREOF**

Masayoshi Achiwa, Ohtsu, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

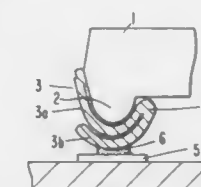
Filed Jun. 30, 1989, Ser. No. 373,201

Claims priority, application Japan, Jan. 30, 1988, 63-160642

Int. Cl.<sup>5</sup> H01R 9/00

U.S. Cl. 361—408

8 Claims



1. An electronic component comprising:  
 an electric element or circuit;  
 a package in which said electric element or circuit is encapsulated, said package having sides and a lower surface extending between said sides, and said package defining protrusions extending longitudinally along said lower surface adjacent the sides of the package, said protrusions each having a generally semi-circular cross section; and  
 a plurality of conductive and flexible external leads electrically connected to said electric element or circuit encapsulated in said package and projecting from the sides of said package;  
 each of said leads including a first curved portion substantially covering a cross sectional portion of the protrusion adjacent thereto and conformed to the contour thereof, a second curved portion superposed with and conformed to the contour of said first curved portion, and a linking portion extending between and coupling ends of said first and said second curved portions, said first curved portion

being bendable away from said second curved portion about said linking portion in each said lead.

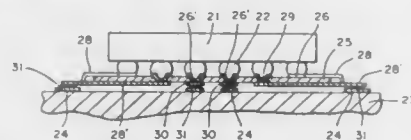
#### 4,949,224 STRUCTURE FOR MOUNTING A SEMICONDUCTOR DEVICE

Keiji Yamamura, Sakurai, and Hirokazu Yoshida, Osaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan Continuation of Ser. No. 131,262, Dec. 9, 1987, abandoned, which is a continuation of Ser. No. 905,850, Sep. 10, 1986, abandoned. This application Aug. 16, 1988, Ser. No. 233,843 Claims priority, application Japan, Sep. 20, 1985, 60-209086; Sep. 20, 1985, 60-209086

Int. Cl.<sup>5</sup> H05K 1/14

U.S. Cl. 361—412

18 Claims



1. A structure mounting a flip chip to a circuit board, said flip chip having on a surface thereof a plurality of bump electrodes including peripheral bumps and central bumps, said peripheral bumps being in peripheral regions of said surface and including at least those of said bump electrodes abutting peripheries of said surface, said central bumps being in non-peripheral regions of said surface and surrounded by said peripheral bumps, said circuit board having thereon peripheral and central terminal electrodes, said central terminal electrodes being opposite said non-peripheral regions and being connected to said central bumps, said structure comprising:

- a tape carrier film between said flip chip and said circuit board, said tape carrier film having a first surface opposite said flip chip, a second surface opposite said circuit board and a plurality of throughholes therethrough,
- bump-connecting pads which are provided on said first surface of said tape carrier film and connected individually to said bump electrodes,
- board-connecting pads which are provided on said second surface of said tape carrier film and connected individually to those of bump-connecting pads individually connected to one of said central bumps through one of said throughholes and to one of said central terminal electrodes,
- leads of first kind in part on said first surface of said tape carrier film, each serving to electrically connect one of said peripheral terminal electrodes with one of said bump-connecting pads connected individually to one of said peripheral bumps, and
- leads of second kind in part on said second surface of said tape carrier film, each serving to electrically connect one of said peripheral terminal electrodes with one of said peripheral bumps through one of said throughholes and through one of said bump-connecting pads.

#### 4,949,225 CIRCUIT BOARD FOR MOUNTING ELECTRONIC COMPONENTS

Katsumi Sagisaka, and Sadahisa Furuhashi, both of Oogaki City, Japan, assignors to Ibiden Co., Ltd., Japan Filed Aug. 29, 1988, Ser. No. 237,385

Claims priority, application Japan, Nov. 10, 1987, 62-284849 Int. Cl.<sup>5</sup> H05K 1/04

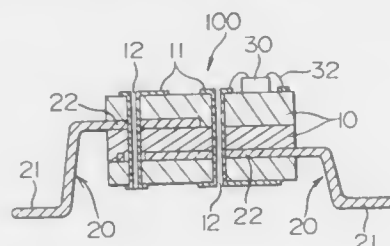
U.S. Cl. 361—414

2 Claims

1. A circuit board for mounting at least one electronic component, the circuit board comprising:
- a substrate including at least one inner base member and an outer base member on which the at least one electronic component is mounted said base member having through holes;
  - a plurality of metal members which are electrically independent of one another and which protrude from the sub-

strate, each metal member including a lead and an internal connection portion unitarily formed with the lead and having a larger area than the lead and first and second surfaces, the substrate contacting both surfaces of the internal connection portion; and

conductor circuits between said base members extending



through the internal connection portions and through the through holes onto the outer base member to electrically connect the metal members to the at least one electronic component.

#### 4,949,226 PROJECTOR-TYPE LIGHTING DEVICE OF EXPANDED OUTLINE APPEARANCE FOR USE AS A VEHICULAR HEADLAMP OR THE LIKE

Hiroyuki Makita; Takahisa Shinoda; Yasuaki Nakamura, and Osamu Endoh, all of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan

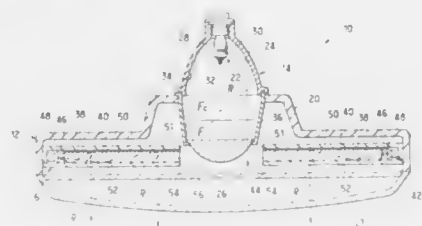
Filed Jun. 23, 1989, Ser. No. 369,995

Claims priority, application Japan, Jun. 24, 1988, 63-83475[U]; Jan. 17, 1989, 1-5969; Jan. 19, 1989, 1-10495

Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 362—61

15 Claims



1. A projector-type lighting device of expanded outline appearance suitable for use as a headlamp or the like on a motor vehicle or the like, comprising:

- (a) a lamp housing of desired shape and size;
- (b) projector-type light source means mounted to the lamp housing approximately in a central position thereon and at least partly received therein, the projector-type light source means comprising:
  - (1) a light source;
  - (2) a reflector for reflecting and converging the light emitted by the light source;
  - (3) a projection lens disposed opposite the light source and having a focus at a point intermediate the projection lens and the light source for projecting a beam of light through the lamp housing; and
  - (4) the projector-type light source means being so small in comparison with the lamp housing that an annular space is left around the light source means within the lamp housing; and
- (c) outline expansion means for enlarging the apparent size of the light source, said expansion means being disposed in the annular space between the projector-type light source means and the lamp housing, the outline expansion means being self-illuminating so as to glow when the projector-type light source means is glowing.

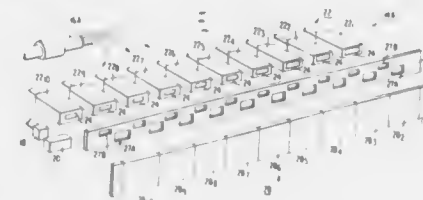
#### 4,949,227 UPPER AND LOWER BEAM OPTICAL SWITCH FOR LINE-OF-LIGHT HEADLAMPS USING OPAQUE MASKS

William W. Finch, University Heights; John M. Davenport, Lyndhurst, and Richard L. Hansler, Pepper Pike, all of Ohio, assignors to General Electric Company, Schenectady, N.Y. Filed Oct. 31, 1989, Ser. No. 429,746

Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 362—61

10 Claims



1. A vehicle forward lighting system for selectively projecting a plurality of beam patterns, comprising in combination;
- a high intensity light source;
  - a plurality of optical light conductors, one end of each said conductor optically coupled to said light source and another end of each said conductor terminating in a connector having an aperture forming a light emitting area;
  - a plurality of lens elements, each lens element being positioned in front of a corresponding aperture for projecting an image of said aperture, the projection of a plurality of said images forming a beam pattern; and
  - an opaque mask having at least first and second openings therein for each said aperture, said mask being movable between at least first and second positions to move either said first or said second opening into registry with a corresponding aperture, said forward lighting system projecting a first beam pattern when said mask is in said first position and projecting a second beam pattern when said mask is in said second position.

#### 4,949,228 BICYCLE SIGNALLING DEVICE

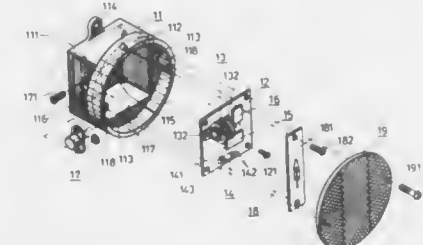
Wu Fu Lin, No. 92, Tung Hsing Rd. Tali, Taichung Hsian, and Ropin Wang, 5F, No. 1, Lane 85, FuHshin Nr. Rd., Taipei, both of Taiwan

Filed May 31, 1988, Ser. No. 200,411

Int. Cl.<sup>5</sup> B52J 6/00

U.S. Cl. 362—72

20 Claims



18. A signalling device for a bicycle, comprising:
- means mountable on a bicycle, for reflecting incident light;
  - a lamp mounted near said reflecting means;
  - means electrically connected to said lamp, for controlling illumination of said lamp in dependence upon intensity of ambient light; and
  - switching means disposable beneath a seat of a bicycle to be electrically operable by bodily mass of a cyclist engaging the seat, and electrically connected in a circuit including said lamp and said illumination controlling means, for

enabling electrical conduction between said lamp and a source of electrical energy.

#### 4,949,229 LIGHT-BULB HOLDING DEVICE FOR HOUSEHOLD APPLIANCES

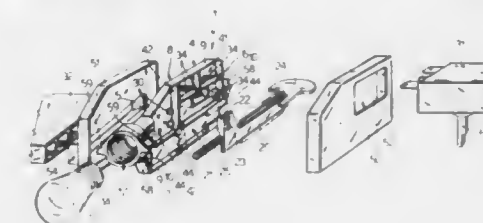
Alberto Bassi, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy

Filed Jun. 2, 1989, Ser. No. 360,572

Claims priority, application Italy, Jun. 3, 1988, 53198/88[U] Int. Cl.<sup>5</sup> F21V 33/00

U.S. Cl. 362—92

13 Claims



1. A light-bulb holding device for household appliances, such as, for example, refrigerators and freezers, characterized in that it comprises in combination:

- a substantially planar board-shaped structure having first and second opposite ends and first and second substantially planar surfaces disposed upon opposite lateral sides thereof;
- a support and power supply sleeve for a light bulb fixedly mounted upon said board structure at one of said ends of said board structure and adapted for accommodating a stem of said light bulb;
- switch means movably mounted upon said board structure in a first direction under the influence of a closure of said household appliance so as to be maintained in a normally OPEN position when said closure is disposed in a CLOSED state whereby electrical power is not provided to said light bulb;
- a counteracting spring mounted upon said board structure and engaged with said movable switch means for maintaining said switch means in a CLOSED position when said closure is disposed in an OPEN state so as to provide electrical power to said light bulb;
- means mounted upon one of said first and second planar surfaces of said board structure for supporting a thermostat; and
- means mounted upon a second one of said first and second planar surfaces of said board structure for supporting a multiple electrical power connector for providing electrical power to said thermostat and said light bulb.

#### 4,949,230 LIGHT ATTACHMENT FOR A REMOTE CONTROL UNIT

Curtis R. Burmeister, 65 Independence Rd., Feeding Hills, Mass. 01030

Filed Jul. 19, 1989, Ser. No. 381,845

Int. Cl.<sup>5</sup> F21V 33/00

U.S. Cl. 362—109

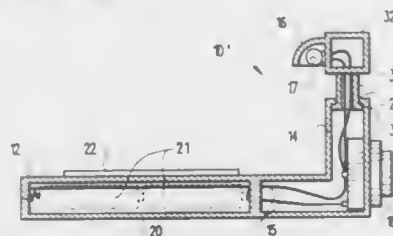
6 Claims

1. A light attachment for illuminating control keys on a remote control unit of the type utilized for controlling stereos, televisions and video cassette recorders, said light attachment comprising:

- a generally L-shaped body member having first and second generally perpendicular hollow leg portions;
- fastening means on an upper face of said first leg portion for securing said body member to a lower surface of a remote control unit;



an extensible and rotatable post extending upwardly through a circular aperture in a top wall of said second leg portion; said post dimensioned for frictional engagement within said aperture for maintaining a selected adjusted position; a radially outwardly extending retaining flange formed on an end of said post within said second leg portion; said retaining flange formed from a resilient material and dimensioned for abutment with interior wall surfaces of said second leg portion; a lamp mounted on said post for illuminating keys of a remote control unit;



a reflecting hood on said post, surrounding said lamp; said first leg portion dimensioned to extend across a width of a remote control unit and said second leg portion dimensioned to orient said lamp above a key pad of a remote control unit; battery means in said body member for powering said lamp; and switch means on an outwardly directed exterior side wall of said second leg portion for selectively illuminating said lamp.

4,949,231

## VARIABLE LIGHT BEAM FLASHLIGHT

Fu H. Wang, No. 7, Alley 14, Lane 64, Ching Ping Rd., Chung Ho City, Taipei Hsien, Taiwan

Filed Aug. 28, 1989, Ser. No. 399,717

Int. Cl.<sup>5</sup> F21L 7/00

U.S. Cl. 362—206

9 Claims



1. A flashlight comprising a cylindrical tube enclosed at a rear end by a tail cap, a first portion being formed at a front end of said cylindrical tube; a pair of guide holes being formed in said first portion; a control ferrule with an inner helical groove being freely rotatably disposed on said first portion of said cylindrical tube; and a face cap with a lens and a reflector being provided with said face cap engaged at a front end of said first portion; at least one battery being disposed within said tube; a spring member being located between said tail cap and an adjacent battery; a socket with two conductors respectively connected to two prongs of a light bulb being slidably disposed within said first portion of said tube; two ends of a guide means extending through said guide holes of said first portion and being engaged with said inner helical groove of said control ferrule; said guide means coupling said socket to said control ferrule; said guide means being guided to move along said guide holes of said first portion by a relative motion between said guide means and said control ferrule, and said socket being guided by said guide means to move longitudinally within said first portion.

# 4,949,232 WALL WASHER EXHIBIT LIGHT WITH HEAT DISSIPATION REFLECTOR

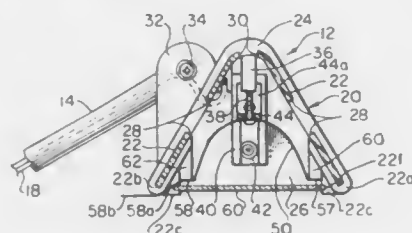
Bernard Safyan, 6667 Maryland Dr., Los Angeles, Calif. 90048

Filed Dec. 11, 1989, Ser. No. 448,516

Int. Cl.<sup>5</sup> F21L 29/00

U.S. Cl. 362—218

7 Claims



1. In a lighting device for illuminating exhibit, display and work surfaces with a substantially uniform wash of light consisting of an elongated molded plastic housing having a front opening, a high intensity electric lamp tube positioned centrally within the housing, and an elongated concave metallic light reflector within the housing extending over the length thereof and positioned between the electric lamp and the rear of the housing to reflect light from the lamp outwardly through the front opening of the housing, said reflector having edge portions along its length impinging upon the edges of the housing along its length at its front opening thereof for supporting the reflector therein, the improvement comprising: the provision of an extension of the edge portion of said reflector along at least one side thereof to provide a strip of the reflector metal external to the plastic housing of the lighting device whereby during use of the lighting device heat generated by the lamp within the housing and absorbed by the reflector is conducted thereby to the extension strip of reflector metal and radiated therefrom to maintain the plastic housing of the lighting device at a temperature well below its melting point.

4,949,233

## POWER SUPPLY CIRCUIT IN MICROWAVE OVENS

Eckart Braunisch, Kimstad, and Jan Önnegren, Norrköping, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

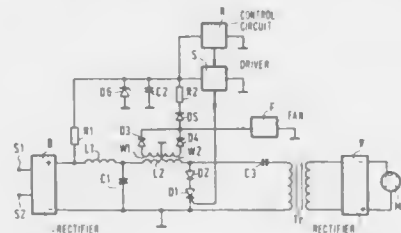
Filed Jun. 27, 1989, Ser. No. 372,573

Claims priority, application Sweden, Jul. 6, 1988, 8802529

Int. Cl.<sup>5</sup> H02M 3/335; H05B 6/66

U.S. Cl. 363—28

10 Claims



1. A power supply circuit for a high-frequency energy source in a microwave oven comprising: a rectifier, coupled to terminals of an AC supply voltage, for producing a rectified supply voltage and a switched-mode-power-supply (SMPS) unit driven by the rectified supply voltage; the SMPS unit comprising, a coil included in a resonant circuit, a controllable switch, a driving stage fed by a DC voltage and producing drive current pulses for switching the controllable switch between its open and its closed condition, a control circuit connected to the driving stage for controlling the frequency of the drive current pulses, the resonant circuit further including

capacitances and reactive impedances appearing at the primary side of a transformer having a secondary side connected to means for supplying a drive voltage to the high-frequency source, an auxiliary winding coupled to the coil of the resonant circuit, a rectifier connected to the auxiliary winding for producing a rectified auxiliary voltage, a capacitor connected across a DC feed input of the driving stage, and means for applying the rectified auxiliary voltage and the rectified supply voltage to the DC feed input of the driving stage, said capacitor being dimensioned so as to serve both as a storage capacitor for the rectified supply voltage to deliver the DC voltage to the driving stage when starting the operation of the resonant circuit and as a smoothing capacitor for the rectified auxiliary voltage when the resonant circuit is in normal operation.

4,949,234

## HIGH EFFICIENCY POWER FACTOR CORRECTION CIRCUIT

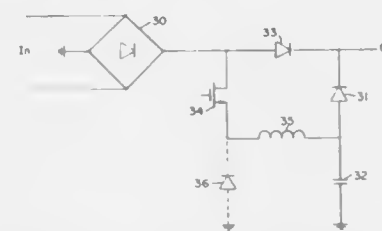
Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Apr. 17, 1989, Ser. No. 338,328

Int. Cl.<sup>5</sup> H02M 3/335

U.S. Cl. 363—48

10 Claims



1. Switching apparatus having input and output, comprising: a rectifying means coupled to the input for providing a first and second rectified signals, wherein the second rectified signal is applied to the output; a capacitive means for storing a DC voltage; a charging means for selectively applying the first rectified signal to the capacitive means; and a diode means for applying the DC voltage to the output.

4,949,235

## MAGNETIC AMPLIFIER SHUTDOWN CIRCUIT

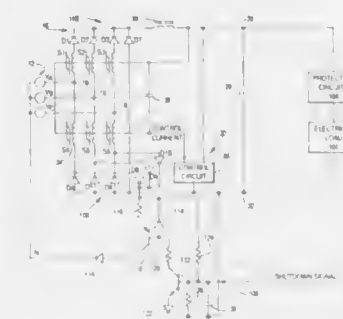
Robert A. Barnet, Howell, N.J., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 21, 1989, Ser. No. 439,683

Int. Cl.<sup>5</sup> H02M 7/06

U.S. Cl. 363—92

28 Claims



1. A power supply for producing a regulated output DC voltage from an AC input voltage comprising: an AC voltage source having at least one phase; a fullwave rectifier coupled to the at least one phase of the AC voltage source for producing a rectified output voltage, the fullwave rectifier having a number of pairs of

diodes equal to a number of phases of the AC voltage source which are respectively connected to each of the phases with a first diode of each pair of diodes of a phase passing current having a first polarity to a first output and a second diode of each pair of diodes of a phase passing current of a second polarity to a second output; a number of pairs of magnetic amplifiers equal to a number of phases of the AC voltage source, each magnetic amplifier having a control input for varying an impedance between an input and an output in response to variation of a control signal with the first magnetic amplifier of each pair of magnetic amplifiers of a phase being coupled to the first diode of the phase and the second magnetic amplifier of each phase being coupled to the second diode of the phase, current flowing through the magnetic amplifiers in a first direction during rectification by the rectifier; a control, responsive to the output voltage, for producing the control signal with the control signal varying in response to the output voltage to cancel any variation in the output voltage from the regulated voltage; means, responsive to an electrical load drawing current from the power supply, for detecting a fault condition for producing a shutdown signal; and means, coupled to one of the magnetic amplifiers of each of the phases, responsive to the shutdown signal, for conducting current to the AC voltage source in response to the shutdown signal to cause current flow from the AC source through the magnetic amplifiers coupled to the means for conducting in a second direction opposite to the current flow through the magnetic amplifiers in the first direction.

4,949,236

## SMART CONTROLLER

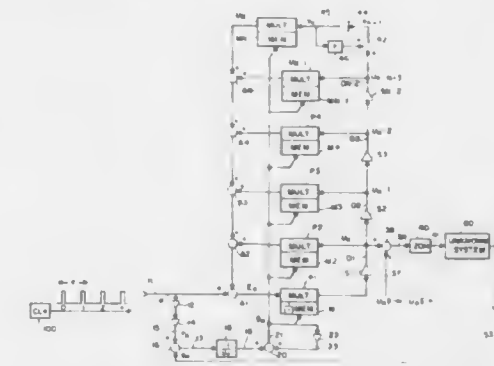
Hsi-Han Yeh, Fairborn; Siva S. Bandi, Dayton, and Paul J. Lynch, both of Dayton, all of Ohio, assignors to United States as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 8, 1988, Ser. No. 229,590

Int. Cl.<sup>5</sup> G05B 13/00, 17/00

U.S. Cl. 364—148

5 Claims



1. A controller for controlling a system whose transfer function is partially known, vaguely known, or even unknown to the control designer, and may even vary with time, a continuous-time system output signal  $c(t)$  on a system output being a function of said transfer, function and a continuous control input signal  $u(t)$  on a system input line; wherein said controller comprises digital apparatus operating on signals in the form of digital words having a predetermined number of binary digits, including a source of clock pulses recurring at intervals equal to a sampling period  $T$ , a number  $(n)$  being the number of clock intervals from an initial time zero, sampling means coupled to said system output line for converting said continuous-time system output signal  $c(t)$  to digital system output signals

$c_n$  comprising digital words occurring at time  $nT$  on a feedback line, a command line on which command signals are supplied as digital words, a controller input line, a reference input line, the command line being coupled to the controller input line and to the reference input line with delay means which provides that signals at the command line appear at the reference input line with a delay of two clock intervals  $T$  relative to the time of appearance at the controller input line, a controller output line, the input of the controller at the controller output line being a control sequence of control signal  $u_n$  which is converted to the continuous signal  $u(t)$  at said system input line, starter means for applying a digital starter signal at said controller output line, said starter signal having a nonzero value only for a given number of clock intervals beginning with the initial time;

the signals from the command line at the reference input line being reference signals  $r_n$  occurring at times  $nT$ , error detection means having inputs from the reference input line and the feedback line and output to an error line for subtracting the digital system output signals  $c_n$  from the reference signals  $r_n$  to provide error signals  $e_n$  at the error line;

said controller having a first configuration including identifier means and control means, operative during an identification and control stage;

wherein the identifier means comprises means coupled between the error line and an identification terminal to compute a unit-impulse response sequence of the said system and output it as a sequence of identification signals  $g_n$  at the identification terminal;

wherein the control means comprises  $N$  memory locations  $Mn$  ( $n=1$  to  $N$ ) which at the initial time have words of value zero stored therein, the memory locations being coupled to the identification terminal to store the sequence of identification signals  $g_n$ , with each element  $g_n$  of the sequence output at the corresponding sampling instant and stored subsequently in the corresponding memory location  $Mn$ , except for the first memory location where the inverse of  $g_1$  is stored (if  $g_1$  is zero, then the first nonzero element of the sequence), means including shift-register means and arithmetic means coupled between the controller input line and the controller output line with connections to the memory locations, for generating a sequence of next-step control signals  $u_{n+1}$  which will cause the system output to follow the reference input closely, each control signal  $u_{n+1}$  being generated during the time  $nT$  that the corresponding identification signal  $g_n$  ( $g_2$  to  $g_N$ ) is being stored in the corresponding memory location  $Mn$ ;

said controller further having a second configuration comprising update means coupled to said control means and to said error line, said identifier means being excluded from the second configuration, the controller being switched from the first configuration to the second configuration in response to the  $N$ th memory location  $MN$  having the work  $g_N$  stored therein, so that the second configuration is operative for clock intervals greater than  $NT$ , wherein the update means comprises means for causing the controller to adjust the contents in each memory location after each sampling instant in such a way that each term in the convolution sum of the control sequence and the unit-impulse response sequence is increased in proportion to the error signal, which increases the next-step output if the error signal is positive and decreases the next-step output if the error signal is negative, and thus reduces the magnitude of the error signal.

#### 4,949,237 DIGITAL INTEGRATING MODULE FOR SAMPLING CONTROL DEVICES

Peter Brich, Herzogenaurach; Franz Kolb, Offenburg, and Siegfried Oblasser, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

PCT No. PCT/EP88/00154, § 371 Date Oct. 12, 1988, § 102(e) Date Oct. 12, 1988, PCT Pub. No. WO88/07230, PCT Pub. Date Sep. 22, 1988

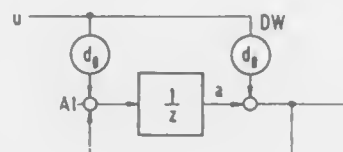
PCT Filed Mar. 2, 1988, Ser. No. 272,774

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1987, 3707498

Int. Cl.<sup>5</sup> G05B 13/04, 21/02

U.S. Cl. 364—178

3 Claims



1. An integrating module for a sampling control device which can be fed back and in which the relation between the input and the output signals at every sampling instant is determined by a recursive integrating algorithm which is formed by the approximation of the area under a continuous function by means of the trapezoidal rule, comprising:

an internal rectangle rule integrating module, in which the relationship between the input and the output signal at every sampling instant is determined by a recursive integrating algorithm which is formed by the approximation of the area under a continuous function by means of the rectangle rule;

wherein

a first amplifier which weights the input signal of the integrating module with the first factor  $d_0 = T_A/2 \times T_I$ , where  $T_A$  = sampling time and  $T_I$  = integration time constant and makes it available as the input signal for the internal rectangle rule integrating module and as a pass-through value; a first adder which forms as the output signal of the integrating module the sum of the pass-through value and twice the output signal of the internal rectangle rule integrating module;

a separate feedback output at which twice the output signal of the internal rectangle rule integrating module is delivered; and

means for correcting the deviation of the signal at the feedback output from the output signal if feedback from the feedback output to the input of the integrating module is present.

#### 4,949,238 APPARATUS FOR DETECTING MEMORY PROTECTION VIOLATION

Shigeo Kamiya, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 11, 1988, Ser. No. 155,085

Claims priority, application Japan, Feb. 18, 1987, 62-33518

Int. Cl.<sup>5</sup> G06F 12/14

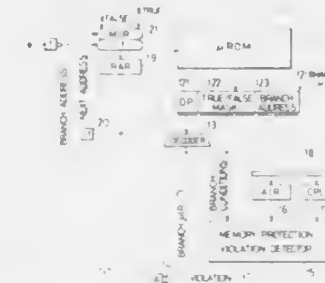
U.S. Cl. 364—200

1 Claim

1. An apparatus for detecting a memory protection violation in a data processor for executing microinstructions under control of microprograms, which comprises:

(a) attribute information register means for storing a plurality of memory protection information of a descriptor of a program whenever any one of an instruction segment, a stack segment or a non-stack segment is changed, said memory protection information including data of descrip-

- tion validity, descriptor privilege level, descriptor type, code/data discrimination and write-enable;
- (b) current privilege level register means for storing a current privilege level of a program now being executed;
- (c) comparator means for comparing a descriptor privilege level of said memory protection information stored in said attribute information register means with said current privilege level stored in said current privilege level register means;
- (d) microinstruction register means for storing a memory protection branch microinstruction including branch condition information and a branch address;
- (e) means for simultaneously discriminating whether said



plurality of memory protection information stored in said attribute information register means are correct or not on the basis of the comparison result of said comparator means and said branch condition information stored in said microinstruction register means and for generating a memory protection violation detection signal when not correct;

(f) means for selecting a succeeding microinstruction execution in response to the absence of said memory protection violation detection signal and a microinstruction branch operation in accordance with said branch address stored in said microinstruction register means in response to the presence of said memory protection violation detection signal.

#### 4,949,239 SYSTEM FOR IMPLEMENTING MULTIPLE LOCK INDICATORS ON SYNCHRONOUS PENDED BUS IN MULTIPROCESSOR COMPUTER SYSTEM

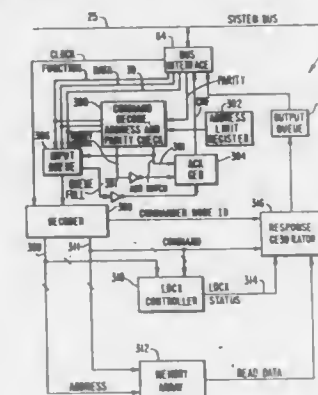
Richard B. Gillett, Jr., Westford, and Douglas D. Williams, Pepperell, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed May 1, 1987, Ser. No. 44,466

Int. Cl.<sup>5</sup> G06F 13/14, 13/364, 13/42, 15/16

U.S. Cl. 364—200

8 Claims



1. An apparatus for executing exclusive read-modify-write operations generated in a multiple node computer system

including a plurality of commander nodes and a synchronous pended bus, said operations having a set of distinct transactions on said synchronous pended bus including an interlock read transaction to retrieve information stored at a specified location and restrict access to said stored information by subsequent interlock read transactions, and an unlock write transaction to store information in said specified location and restore access to said stored information, said interlock read transaction including a command transfer comprising an interlock read command arbitration to reserve bus cycles on said synchronous pended bus, an interlock read command message transmitted by one of said commander nodes over said synchronous pended bus during said bus cycles reserved by said interlock read command arbitration, and a command confirmation transmitted over said synchronous pended bus to said one commander node during bus cycles reserved by said interlock read command arbitration; said interlock read transaction further including a response transfer, said response transfer comprising a response arbitration to reserve bus cycles on said synchronous pended bus, a lock response message transmitted to said one commander node over said synchronous pended bus during said bus cycles reserved by said response arbitration, and a response confirmation transmitted over said synchronous pended bus from said one commander node during bus cycles reserved by said response arbitration; said unlock write transaction including a command transfer comprising an unlock write command arbitration to reserve bus cycles on said synchronous pended bus, an unlock write command message transmitted from said one commander node during bus cycles reserved by said unlock write command arbitration, and a command confirmation transmitted over said synchronous pended bus during bus cycles reserved by said unlock write command arbitration; said apparatus comprising:

means for receiving said interlock read command message and said unlock write command message from said commander node;

storage means, including said specified location, for storing information;

lock means, coupled to said storage means and capable of assuming one of an unlocked condition and a locked condition, for permitting access to said storage means when in an unlocked condition and for denying access to said storage means when in a locked condition;

acknowledge means for acknowledging receipt of said interlock read command message by transmitting to said one commander node, at a predetermined time subsequent to transmission of said interlock read command message, a command confirmation indicating successful receipt of said interlock read command message;

command means responsive to said interlock read command message for generating a lock status indication indicating the condition of said lock means and for switching said lock means from an unlocked condition to a locked condition, and responsive to an unlock write command message for storing modified information in said specified location and for switching said lock means from the locked condition to the unlocked condition; and

status response means for transmitting to said one commander node, at an unspecified time subsequent to transmission of said interlock read command message, a lock response message including said lock status indication.



4,949,240

# DATA STORAGE SYSTEM HAVING CIRCUITRY FOR DIVIDING RECEIVED DATA INTO SEQUENTIAL WORDS EACH STORED IN STORAGE REGION IDENTIFIED BY CHAIN DATA

Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

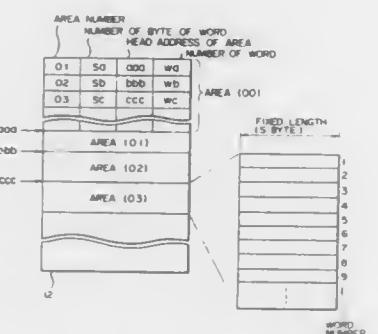
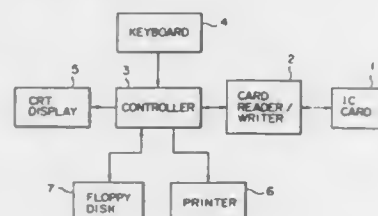
Filed Mar. 7, 1988, Ser. No. 164,961

Claims priority, application Japan, Mar. 13, 1987, 62-56742; Mar. 13, 1987, 62-58105; Mar. 13, 1987, 62-58106

Int. Cl.<sup>5</sup> G06F 12/04, 13/14, 13/37, 15/415

U.S. Cl. 364-200

20 Claims



1. A data storing system having a control function for storing data together with chain data items, said data storing system comprising:

receiving means for receiving storage data to be stored, the storage data having a certain data length;

data storing means for storing the storage data received by said receiving means, said data storing means including a plurality of storage regions each for storing data having a first predetermined data length shorter than said certain data length; and

control means, connected to said receiving means and said data storing means, for directing the storage data received by said receiving means into said data storing means, said control means including:

(a) data-dividing means, connected to said data receiving means, for dividing the storage data received by said receiving means into a plurality of sequential words including a first word and a last word, each word having a second predetermined data length which is shorter than said first predetermined data length, and each word, except said last word, being followed in sequence by a next word;

(b) chain data generating means, connected to said data-dividing means, for generating chain data items corresponding to said plurality of words in a one-to-one relationship, each respective chain data item identifying a unique storage region of said plurality of storage regions of said data storing means in which said next word of said plurality of words is stored, said chain data items having a specific value if said chain data items correspond to said first word or said last word; and

(c) storing control means, connected to said data-dividing means, said chain data generating means, and said data storing means, for directing said plurality of words

divided by said data-dividing means together with said chain data items generated by said chain data generating means, into said plurality of storage regions of said data storing means.

4,949,241

# MICROCOMPUTER SYSTEM INCLUDING A MASTER PROCESSOR AND A SLAVE PROCESSOR SYNCHRONIZED BY THREE CONTROL LINES

Junichi Iwasaki, and Shingo Kojima, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

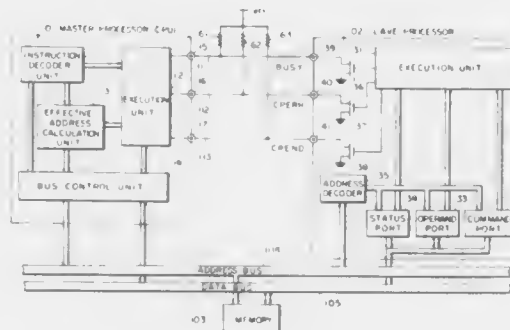
Filed Oct. 21, 1988, Ser. No. 260,699

Claims priority, application Japan, Oct. 22, 1987, 62-267796

Int. Cl.<sup>5</sup> G06F 15/16

U.S. Cl. 364-200

6 Claims



1. A processing system, comprising:

a master processor;

a coprocessor; and

a bus interconnecting said master processor and said coprocessor;

said coprocessor including,

first means for producing a first signal which takes an active level when said coprocessor requests that said master processor be brought into a wait condition, said first signal taking an inactive level when said coprocessor allows said master processor to perform a subsequent operation,

second means for producing a second signal which takes an active level at least when said first signal is changed from an active level to an inactive level in a state of occurrence of an arithmetic exception in said coprocessor, said second signal taking an inactive level at least when said first signal is changed from an active level to an inactive level in a state of no occurrence of said arithmetic exception in said coprocessor, and

third means for producing a third signal which takes an active level when said coprocessor is free of execution of an instruction and of said arithmetic exception, said third signal taking an inactive level when said coprocessor starts to execute an instruction and maintaining an inactive level until said coprocessor completes execution of said instruction, said third signal further maintaining an inactive level when said arithmetic exception occurs in said coprocessor,

said master processor including,

a first terminal supplied with said first signal,

a second terminal supplied with said second signal,

a third terminal supplied with said third signal,

fourth means for transferring an instruction to be executed by said coprocessor to said coprocessor via said bus,

fifth means for detecting whether or not an instruction to be executed by said coprocessor is an instruction for which said coprocessor is required to return execution resultant data to said master processor,

4,949,243

# DATA PROCESSING SYSTEM INTENDED FOR THE EXECUTION OF PROGRAMS IN THE FORM OF SEARCH TREES, SO-CALLED OR PARALLEL EXECUTION

Khayri A. Mohamed Ali, Stockholm, and Lennart E. Fahlén, Bromma, both of Sweden, assignors to Stiftelsen Institutet För Mikrovägteknik Vid Tekniska Hög Skolan I Stockholm, Kista, Sweden

PCT No. PCT/SE87/00090, § 371 Date Nov. 2, 1987, § 102(e) Date Nov. 2, 1987, PCT Pub. No. WO87/05418, PCT Pub. Date Sep. 11, 1987

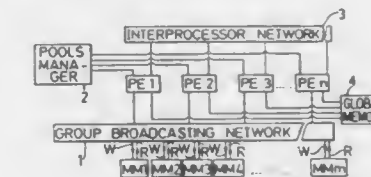
PCT Filed Feb. 24, 1987, Ser. No. 124,116

Claims priority, application Sweden, Mar. 5, 1986, 8601018

Int. Cl.<sup>5</sup> G06F 15/16, 13/00

U.S. Cl. 364-200

9 Claims



4,949,242

# MICROCOMPUTER CAPABLE OF ACCESSING CONTINUOUS ADDRESSES FOR A SHORT TIME Kazuhiro Takeuchi, and Shigetatsu Katori, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

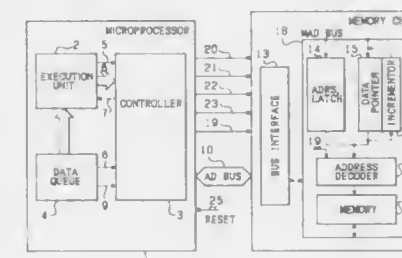
Filed Nov. 4, 1988, Ser. No. 268,330

Claims priority, application Japan, Nov. 4, 1987, 62-278823

Int. Cl.<sup>5</sup> G06F 12/00

U.S. Cl. 364-200

10 Claims



1. A microcomputer comprising memory means for storing various processing data, control means for designating an address of said memory means for be accessed for data transfer, so as to control a data transfer to and from the memory means, first and second indication means for holding the address output from the control means, updating means coupled to the second indication means to update the address stored in the second indication means, and data transfer means for accessing a predetermined address of the memory means indicated by the first or second indication means for data transfer, the control means operating to cause the first indication means to supply the address to the memory means in case of individually designating an address for each item of data to be transferred, so that an address is given through the first indication means from the control means for each data transfer of one unitary data, and to cause the second indication means to supply the address to the memory means in case of continuously designating an address for each item of data to be transferred, so that an address is given to the second indication means only for data transfer of a first unitary data to be transferred and then the second indication means is automatically updated by the updating means for each of second and succeeding data transfers.

4,949,244

# STORAGE SYSTEM

Kanji Kubo, Akio Yamamoto, and Katsumi Takeda, all of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 27, 1988, Ser. No. 148,859

Claims priority, application Japan, Feb. 18, 1987, 62-35357

Int. Cl.<sup>5</sup> G06F 12/08

U.S. Cl. 364-200

17 Claims

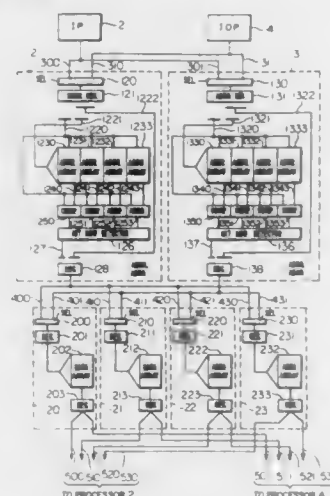
1. A storage system having a main storage and a buffer storage accessible by a plurality of requesters, said buffer storage comprising:

address storage means divided into plural address area banks each having plural first blocks for holding addresses, the addresses being allocated to the different address area banks sequentially in a cyclic fashion in the order of the address number and the addresses allocated to each of the address area banks being allocated to said first blocks in its address area bank;

access request transfer means capable of simultaneously receiving access request from a plurality of said requesters

and capable of simultaneously transferring the access request to different address area banks respectively designated by said access requests;

data storage means for holding a part of data of said main storage which is respectively associated with the addresses in said address storage means as a copy of said main storage, said data storage means being divided in to plural data area banks each having plural second blocks for holding data which is respectively designated by the addresses, the part of data being allocated to the different data area banks sequentially in a cyclic fashion in the order of the address number and the data allocated to each of the data area banks being allocated to said second blocks in its data area bank; and



address transfer means capable of simultaneously receiving addresses from said plurality of address area banks and capable of simultaneously transferring the received address to the different data area banks respectively designated by the addresses;

wherein each of said address area banks includes judge means for judging whether an address designated by an access request transferred from said access request transfer means is held in its address area bank or not, and means for supplying the address which is judged as being held in its address area bank by said judge means to said address transfer means; and

each of said data area banks accesses one of said second blocks designated by an address transferred from said address transfer means.

4,949,245

#### INTERMEDIATE MEMORY SYSTEM FOR CONNECTING MICROCOMPUTERS TO A ROTATING DISK MEMORY

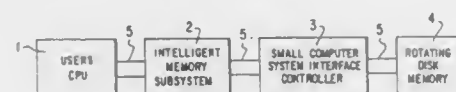
Peter D. Martin, Coral Springs; Larry Groshart, Fort Lauderdale; Guy Rabbat, Boca Raton, and Sandra Wolner, Pompano Beach, all of Fla., assignors to Modular Computer Systems, Inc., Fort Lauderdale, Fla.

Filed Oct. 21, 1988, Ser. No. 260,714

Int. Cl.<sup>5</sup> G06F 12/00

U.S. Cl. 364—200

6 Claims



1. A computer system including at least one central processor unit, a rotating disk memory device in which data is stored

on a disk in sectors, and an intermediate memory system for controlling data transfer between said at least one central processor unit and said rotating disk memory device, all connected to a common bus; and wherein said intermediate memory system comprises:

means, coupled to said bus, for separating data and commands of original data packets received by said intermediate memory system;

means, coupled to said means for separating, for creating composite data packets, wherein each composite packet consists of a new command and of all data blocks of a number of original data packets received by the intermediate memory system and wherein said new command contains a size indication of each data block; and

means, coupled to said means for creating for sending the created said composite data packets via said bus to said rotating disk memory device.

4,949,246

#### ADAPTER FOR TRANSMISSION OF DATA WORDS OF DIFFERENT LENGTHS

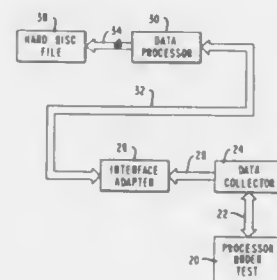
Robert R. O'Dell, Cambridge, and Michael A. Reiss, Lore City, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 23, 1988, Ser. No. 210,671

Int. Cl.<sup>5</sup> G06F 13/00, 11/22

U.S. Cl. 364—200

11 Claims



1. In a data processing system comprising a first remote processor constructed to process data words of a first length and a second remote processor constructed to process data words of a second length, an interface means for interfacing said first and second remote processors comprising:

RAM means for storing words of a third length;

a DMA controller coupled to said first remote processor and said RAM means for controlling the transfer of a data word of said first length between the first remote processor and the DMA controller, for combining the words of said first length into words of said third length and for transferring a data word of said third length over a first bus means to the RAM means for storage therein when enabled, said DMA controller outputting a first control signal to the RAM means, when enabled, requesting access to the RAM means to transfer a data word of said third length to the RAM means;

transfer means coupled to said second remote processor over a second bus means and to said RAM means over a third bus means for combining the words of said third length stored in the RAM means into words of said second length and enabling the RAM means to output a data word of said second length to said second remote processor when enabled, said transfer means outputting, when enabled, a second control signal to said RAM means enabling the memory means to transfer a data word of said second length to said second remote processor, said first, second and third lengths are not equal;

a second control processor coupled to said second remote processor, said DMA controller and said transfer means for outputting an enabling signal to said first control pro-

cessor and said transfer means enabling said DMA controller and said transfer means to transfer a data word of said third length from said DMA controller to said RAM means and to transfer a word of said second length from said RAM means to said second remote processor, said second control processor outputting a third control signal to said memory means enabling the RAM means to store a data word of said third length in said RAM means;

first storage means connected to said second remote processor over said second bus means and to said second control processor over said third bus means for storing transferred data requesting that a data word be transferred to said second remote processor from said first remote processor, said storage means generating an interrupt signal to said second control processor in response to the storing of the transferred data enabling said second control processor to read the transferred data whereby the second control processor will enable said DMA controller and said transfer means to transfer data words from said first remote processor to said second remote processor; and

logic circuit means connected to said RAM means and said DMA controller and second control processor and said transfer means for receiving said first, second and third control signals for selecting one of said DMA controller and second control processor and said transfer means for access to the RAM means to perform a read or write operation on the RAM means in accordance with said third control signal whereby a data word is transferred from said first remote processor to said second remote processor through said RAM means under the control of said second control processor.

4,949,247

#### SYSTEM FOR TRANSFERRING MULTIPLE VECTOR DATA ELEMENTS TO AND FROM VECTOR MEMORY IN A SINGLE OPERATION

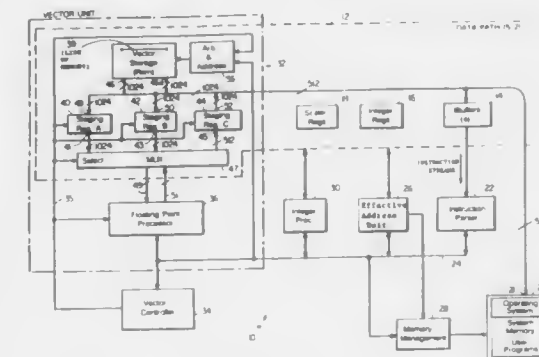
R. Ashley Stephenson, Tewksbury, and Kevin B. Normoyle, Ashland, both of Mass., assignors to Stellar Computer, Inc., Newton, Mass.

Filed Feb. 23, 1988, Ser. No. 159,362

Int. Cl.<sup>5</sup> G06F 13/00, 15/347

U.S. Cl. 364—200

9 Claims



1. Apparatus for performing vector operations on the data elements of vector comprising

a vector processor for performing operations on said elements,

a vector memory for storing said data elements for use by said processor, said vector memory having a port for reading and writing, and

at least one staging register interposed between said vector memory port and said processor, said port and said register each being sufficiently wide to span more than one said data element, whereby on average fewer than one read or write operation per data element is required to access said vector memory via said port to transfer multiple data

elements between said vector memory and said staging register.

4,949,248

#### SYSTEM FOR SHARED REMOTE ACCESS OF MULTIPLE APPLICATION PROGRAMS EXECUTING IN ONE OR MORE COMPUTERS

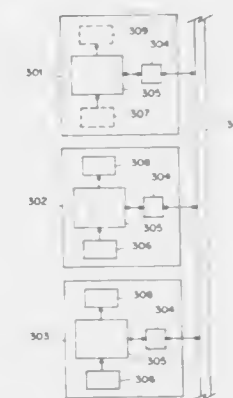
Marshall A. Caro, 43 Little Neck Rd., Southampton, N.Y. 11968-4311

Filed Jul. 15, 1988, Ser. No. 220,024

Int. Cl.<sup>5</sup> G06F 13/00, 13/14, 13/38, 13/42

U.S. Cl. 364—200

15 Claims



1. A system for remote shared access or control or one or more application programs executing in one or more server computers on a local-area network by one or more client computers on the local-area network, each of the server computers having at least a first memory containing video data representing a screen presentation, a second memory having at least one application program, a selective operating system program and a respective local-area network driver program, a processor for executing the programs in the second memory, and a respective interface to the local-area network, and each of the client computers having at least a first memory containing video data representing a screen presentation, a display for presenting the video data in its first memory, a second memory containing a respective operating system program and a respective network driver program, a processor for executing the programs in the second memory, a keyboard, and a respective interface to the local-area network, the system comprising:

means operatively coupled to the first memory in each server computer and being responsive to a change in the video data in the first memory of the server computer for providing on the local-area network one or more video-grams representing the change in such video data;

means in each client computer responsive to one of a plurality of first predetermined sequences of keystrokes entered from the keyboard of the client computer for providing on the local-area network a control request message requesting control of an application program of a particular one of the server computers;

means in each server computer responsive to a control request message on the local-area network requesting control of an application program of the server computer for confirming whether or not the client computer providing the control request message is permitted to control such application program and providing on the local-area network a control request reply message respectively granting or denying the client computer providing the control request message control of such application program of the server computer;

means in each client computer responsive to a control request reply message on the local-area network granting the client computer control of an application program of a particular one of the server computers, to which the



client computer has provided a control request message, for providing a video recovery request message on the local-area network requesting one or more videograms representing all the video data in the first memory of the particular one of the server computers, and thereafter receiving and processing each videogram on the local-area network providing by the particular one of the server computers by changing the video data in the first memory of the client computer in accordance with the videogram; means in each client computer responsive to a control request reply message on the local-area network granting the client computer control of an application program of a particular one of the server computers, to which the client computer has provided a control request message, for subsequently responding to one or more keystrokes from the keyboard of the client computer and providing on the local-area network one or more keystrokegrams representing the one or more keystrokes; means in each server computer responsive to a video recovery request message on the local-area network from a client computer, to which the server computer has granted control of an application program thereof, for providing on the local-area network one or more videograms representing all the video data in the first memory of the server computer; and means in each server computer responsive to one or more keystrokegrams on the local-area network from a client computer, to which the server computer has granted control of an application program thereof, for deriving one or more keystrokes represented by such keystrokegrams and passing the derived keystrokes for processing by such application program of the server computer.

**4,949,249**  
**CLOCK SKEW AVOIDANCE TECHNIQUE FOR PIPELINE PROCESSORS**  
Brian Lefsky, West Newton; Joseph L. Ardin, Jr., Needham, and Michael Schwartz, Milford, all of Mass., assignors to Prime Computer, Inc., Natick, Mass.  
Continuation of Ser. No. 36,909, Apr. 10, 1987, abandoned. This application Aug. 3, 1989, Ser. No. 390,471  
Int. Cl.<sup>5</sup> G06F 13/00  
U.S. Cl. 364—200 2 Claims



1. A pipelined processor comprising M sequential stages of combinational logic for performing M steps of pipelined processing, where M is greater than one, a clock signal associated with each stage, each of said M stages having combinational logic including an output terminal, M registers, each of said M registers associated with one of said M stages and having an input terminal coupled to receive an output signal from said output terminal of said combinational logic of the immediately preceding stage, a clock input terminal coupled to receive said clock signal associated with said stage, and an output terminal, M latches, each latch associated with one of said M stages and having an output terminal coupled to an input terminal of said combinational logic associated with said stage, an input terminal coupled to the output terminal of said register associated with said stage, and an enable input terminal coupled to receive said clock signal associated with said stage, said clock signal having first and second states, said M registers activated to pass data when said associated clock signal is in said first state and to hold data when said associated clock signal is in said second state and said M latches activated to pass data when said clock

signal is in said associated second state and to hold data when said associated clock signal is in said first state.

**4,949,250**  
**METHOD AND APPARATUS FOR EXECUTING INSTRUCTIONS FOR A VECTOR PROCESSING SYSTEM**  
Dileep P. Bhandarkar, Shrewsbury; Robert Supnik, Carlisle; Trygve Fossum, Northboro, and Dwight Manley, Holliston, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.  
Filed Mar. 18, 1988, Ser. No. 170,395  
Int. Cl.<sup>5</sup> G06F 15/347  
U.S. Cl. 364—200 13 Claims

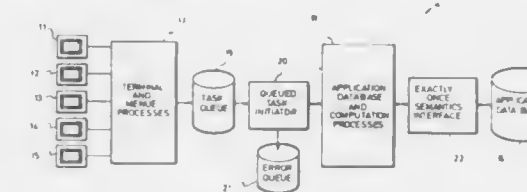


1. A data processing system for executing vector instructions and scalar instructions each including an operation code portion specifying an operation to be executed and an operand pointer portion specifying operands used in the execution of the operation, said data processing system comprising: a memory for storing said operands and said instructions; instruction fetching means for retrieving said instructions from said memory; instruction parsing means for separating the operation code portions and the operand pointer portions of said vector and scalar instructions; operand fetching means for retrieving from said memory the operands specified by said operand pointer portions of said vector and scalar instructions; vector processing means for executing said vector instructions, said vector processing means including means for storing vector data into said memory; means for retrieving vector data from said memory; vector storage means for storing vector data used in the execution of said vector instructions; vector extracting means for decoding one of said operands of each of said vector instructions to identify vector pointers to said vector data for each of said vector instructions, and means for fetching from said vector storage means vector data identified by said vector pointers; and vector instruction routing means, coupled to said instruction parsing means, for routing said operation code portions and said operands of said vector instructions to said vector processing means.

**4,949,251**  
**EXACTLY-ONCE SEMANTICS IN A TP QUEUING SYSTEM**  
Robert W. Griffin, Mason, and James P. Emmond, Amherst, both of N.H., assignors to Digital Equipment Corporation, Maynard, Mass.  
Filed Jul. 18, 1988, Ser. No. 220,502  
Int. Cl.<sup>5</sup> G06F 15/40  
U.S. Cl. 364—200 9 Claims

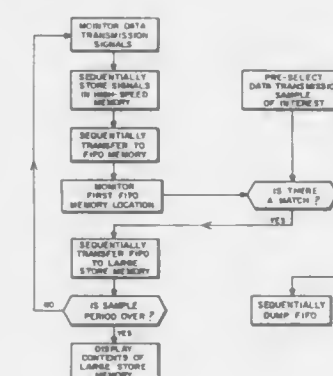
1. A method of operating a data processing system of the kind having a data base, a task queue, and an application processor for performing data base updates requested by selected

tasks queued in said task queue, said tasks being removed from said task queue after the respective data base updates requested by the tasks are performed, a partial failure of said system occurring after the performance of a data base update being capable of preventing the normal removal of a respective task from said task queue, said method preventing said respective task from thereafter causing the performance of a duplicate update of said data base, said method comprising the steps of assigning a respective task identifier to each task in the task queue, and before performing a data base update requested by a selected task; reading the data base to obtain a task identifier previously



stored during updating of the data base before failure occurs; comparing the previously stored task identifier to the respective task identifier assigned to the respective task to determine whether both of the task identifiers identify the same task; and inhibiting the data base update requested by the selected task, when the step of comparing determines that both of the task identifiers identify the same task, and otherwise writing the respective task identifier of the selected task into the data base when the data base is updated as requested by the selected task.

**4,949,252**  
**COMPUTER CHANNEL ANALYZER WITH MONITORING AND SELECTIVE DISPLAY OF PREDETERMINING EVENTS AND RELATED DATA**  
Trygve A. Hange, Wayzata, Minn., assignor to Technology 80, Inc., Golden Valley, Minn.  
Division of Ser. No. 788,394, Oct. 17, 1985, Pat. No. 4,773,003.  
This application Jun. 10, 1988, Ser. No. 205,362  
Int. Cl.<sup>5</sup> G06F 7/02, 3/05, 11/28, 11/32  
U.S. Cl. 364—200 3 Claims

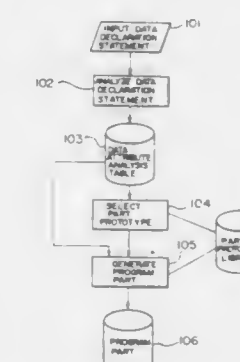


1. A method of monitoring a plurality of digital communications lines having simultaneous and sequential signal transitions representative of data transmissions in random time sequence by circuits in a computer channel analyzer, for recognizing a predetermined data transmission sample and presenting the predetermined data transmission sample and a preselected number of data transmissions in the time sequence immediately

preceding the predetermined sample on a visual display screen for viewing by an operator, comprising the steps of:

- preselecting a particular data transmission sample of interest;
- monitoring the signals transmitted over a plurality of digital communications lines, which signals are representative of data transmissions in random time sequence;
- storing the signals in sequential memory locations of a high speed memory, wherein the sequential memory locations correspond to the time sequence of the signals;
- transferring the contents of the high speed memory sequential memory locations sequentially into a first memory location in a first-in, first-out memory and then sequentially through a plurality of further memory locations, to a last location in said first-in, first-out memory;
- monitoring said first memory location and comparing the contents with said preselected data transmission sample of interest to determine if the contents of said first memory location include the predetermined data transmission sample of interest;
- when it is determined that the contents of said first memory location include the predetermined data transmission sample of interest in step (e), activating a large store memory and sequentially transferring the contents of said last location in first-in, first-out memory to said large store memory; and
- displaying for operator viewing a portion of the contents of said large store memory bounded about said particular data transmission sample of interest by a preselected number of sequential data transmissions which occurred both before and after said particular data transmission sample of interest.

**4,949,253**  
**METHOD AND APPARATUS FOR AUTOMATICALLY GENERATING PROGRAM**  
Eiki Chigira, and Takehiro Yokoyama, both of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Seibu Software Co., Ltd., Osaka, both of Japan  
Filed Jan. 20, 1988, Ser. No. 145,989  
Claims priority, application Japan, Jan. 23, 1987, 62-13780  
Int. Cl.<sup>5</sup> G06F 12/00 20 Claims



1. An automatic program generation apparatus for automatically generating a program for processing data comprising: input means for inputting input information elements representing at least a type of data to be processed by a program to be generated and a type of processing to be performed by said program to be generated; memory means for storing a plurality of prototype parts of a program each having at least a declaration of data part and a procedure of data processing part, wherein each declaration of data and procedure of data processing parts are described by modifiable information elements which are

modifiable by an associated element of said input information elements;  
 analyzing means for analyzing said input information elements;  
 selection means for selecting a prototype part of a program stored in said memory means in accordance with a result of the analyzing operation performed by the analyzing mean on said input information elements; and  
 generation means for substituting said input information elements for modifiable information elements of said selected prototype part of a program to thereby develop said selected prototype part of a program into a part of said program to be generated.

4,949,254

# METHOD TO MANAGE CONCURRENT EXECUTION OF A DISTRIBUTED APPLICATION PROGRAM BY A HOST COMPUTER AND A LARGE PLURALITY OF INTELLIGENT WORK STATIONS ON AN SNA NETWORK

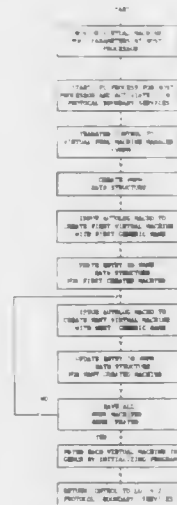
David U. Shorter, Lewisville, Tex., assignor to IBM Corp., Armonk, N.Y.

Filed Sep. 29, 1988, Ser. No. 250,598

Int. Cl.<sup>3</sup> G06F 12/08, 13/42

U.S. Cl. 364—200

14 Claims



1. A method for executing a distributed application program in an SNA type data processing network that supports program to program communication in accordance with SNA Logical Unit 6.2 protocols and in which said application program comprises a first part that is run on one terminal and a second part that is run on a host processor of said network in response to a request to initiate LU 6.2 conversations between said terminal and said host processor involving said program, said method comprising the following combination of sequential steps:

- (A) establishing a virtual machine pool manager which functions,
  - (1) to create at least two virtual machines at said host processor that are brought to a run ready state prior to receiving said request,
  - (2) to prime each said virtual machine by initializing said second part of said application program after said virtual machine has been created and prior to receiving said request, and
  - (3) to dynamically assign a primed virtual machine to process said request received from a first said terminal involving said application program so that said request is immediately accepted and a conversation is initiated between said assigned virtual machine and said first terminal, and
  - (4) to return said assigned virtual machine to said pool

when said conversation has ended to permit a new assignment, and  
 (B) providing a pool manager data structure for use by said pool manager to manage said virtual machines in said pool, whereby said requests for LU 6.2 conversations that are received at said host processor and involve said distributed application program can be assigned to said primed virtual machines and serviced immediately.

4,949,255

# MESSAGE INTERFACE AND METHOD FOR RECURSIVE CALLING BETWEEN INTERPRETIVE AND COMPILED COMPUTER PROCESSES

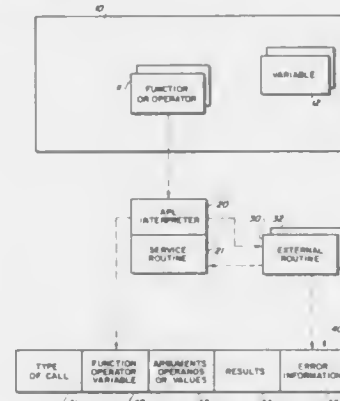
John A. Gerth, Danbury, Conn., and Michael T. Wheatley, San Jose, Calif., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Sep. 7, 1988, Ser. No. 241,415

Int. Cl.<sup>3</sup> G06F 9/44

U.S. Cl. 364—200

3 Claims



1. In a machine-effected method, in a multiprocessing environment having an interpretive processor which includes a service routine and a plurality of internal named objects, of accessing individual internal ones of said named objects by a non-interpretive external routine,

including the machine-executed steps of:

- establishing a message passing interface between said external routine and said processor which includes a pointer to an entry point of said service routine for enabling passing control in the environment from the external routine directly to said service routine;
- invoking said external routine from said processor and while the external routine is executing by said invocation enabling recursive calling of the external routine by itself via said message passing interface;
- invoking said service routine from said external routine, and while the service routine is invoked, indicating in the message passing interface a type of interpretive service is to be performed, identification of a processing routine in the processor to be executed and pointers to or other identification of argument data as an input to the identified processing routine, or identification of individual data items to be accessed within the processor by the external routine;
- synchronously passing control of the environment from the external routine to the processor at the entry point of the service routine for enabling execution of the identified processing routine by said service routine; and
- when returning control of the environment from the service routine to the external routine, indicating in the established message passing interface pointers to results produced for enabling access to such results by said external routine.

4,949,256

# COUPON VALIDATION NETWORK WITH STORAGE OF CUSTOMER COUPON DATA FOR CREDIT ON FUTURE PURCHASES

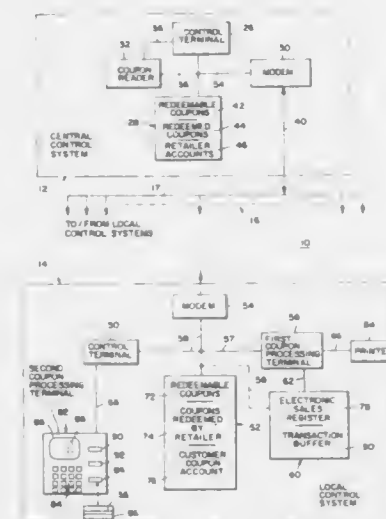
David R. Humble, 2696 Emerald Way N., Deerfield Beach, Fla. 33441

Filed May 6, 1988, Ser. No. 190,764

Int. Cl.<sup>3</sup> G06F 15/21

U.S. Cl. 364—401

6 Claims



1. A coupon validation network, comprising:

at least one central control system, having means for maintaining at least two master files, the master files including a first file for all redeemable encoded coupons issued by all coupon issuers participating in the network and a second file for all coupons redeemed by each merchant participating in the network;

a plurality of control systems, each adapted for operation by one of the merchants and having means for maintaining at least three local information files, the local information files including a first file of all the redeemable encoded coupons, a second file for all coupons redeemed by the merchant and a third file customer coupon accounts, said customer coupon accounts storing data respecting all validated redeemable coupons presented in advance for credit by individual customers, including both coupons presented in conjunction with products presented for purchase by the customer, and also coupons presented at an earlier time to be used in conjunction with potential later purchases of corresponding products to be made by the customer, said third file forming an index of coupons applicable to said individual customer;

at least one first coupon processing terminal adapted for use in conjunction with an electronic sales register and the like and having means for effecting adjustment of a total purchase price to reflect all valid redeemed coupons and means for updating the second local database file, the at least one first coupon processing terminal including:  
 means for reading coupon account cards to be carried by customers, each card having encoded means uniquely identifying a coupon customer account;  
 means for reading encoded coupons presented for redemption;  
 means for validating the read coupons by comparison of each of the coupons with the local information file of redeemable coupons and with each product purchased during a transaction for TM which the coupons have been presented;  
 means for comparing each of the coupons in any one of the customer coupon accounts with each product purchased

during a transaction for cashing-in coupons presented in advance;  
 means for automatically accumulating credit values for validated coupons; and  
 means for preventing subsequent revalidation of validated coupons;  
 at least one second coupon processing terminal adapted for independent use by customers apart from specific purchases and sale transactions, and having means for identifying all valid coupons presented in advance for later redemption credit, and means for updating the third local information file; and  
 means for transferring data between the at least one central control system and the plurality of local control systems; and  
 means for updating the third local information file to delete cashed-in coupons and to add coupons which are presented, read and validated, but which do not correspond to any of the products purchased during the transaction;  
 said control systems and said first and second coupon processing terminals further including means for allowing merchants to read, validate and redeem coupons automatically, to accumulate data facilitating accurate calculation of full potential credit values, to enable the coupon issuers to conveniently reimburse the merchants for the value of valid coupons redeemed upon purchase of corresponding products and to provide customers a means for permanently claiming credit for their coupons without carrying them, the coupons being discardable after redemption for one of purchase and credit.

4,949,257

# AUTOMATED MERCHANDISING SYSTEM FOR COMPUTER SOFTWARE

Zvi Orbach, 143A Derech HaYam, Haifa, Israel

Continuation of Ser. No. 184,923, Apr. 22, 1988, abandoned.

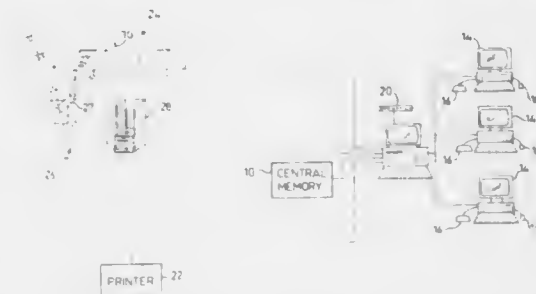
This application Nov. 7, 1989, Ser. No. 433,395

Claims priority, application Israel, Apr. 28, 1987, 82370

Int. Cl.<sup>3</sup> G06F 3/08

U.S. Cl. 364—401

18 Claims



1. An automated merchandising system for computer software comprising:  
 a memory for storing software for distribution to customers;  
 a point of sale terminal including customer interface means for receiving a software select customer choice input; and  
 means for writing software selected by a customer from the memory onto a software carrier; and  
 means for associating an identification code with software provided to a customer, said identification code comprising at least one of the following identification parameters: purchaser identification, point of sale identification and date of purchase,  
 wherein said means for associating comprises means for embedding said identification code on the software carrier.



4,949,258

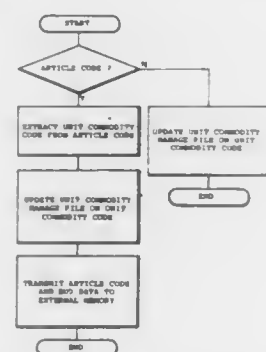
**TRANSACTION PROCESSOR WHICH DERIVES A COMMODITY CODE FROM AN ARTICLE CODE AND STORES SALES OF DATA OF BOTH**  
Seiji Miyamoto, Kusatsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed May 12, 1988, Ser. No. 194,037

Claims priority, application Japan, May 22, 1987, 62-126389  
Int. Cl.<sup>3</sup> G06F 7/24, 15/21; G07G 1/12

U.S. Cl. 364—405

3 Claims



1. A transaction processing system comprising:
  - (a) first storing means for storing sales data for each unit commodity code;
  - (b) second storing means for storing sales data for each article code;
  - (c) input means for inputting buy data including at least one of a unit commodity code and an article code which includes a unit commodity code as a part thereof;
  - (d) means for determining whether inputted buy data is an article code or a unit commodity code;
  - (e) registration control means for updating a sale data corresponding to a unit commodity code stored in said first storing means on the basis of the inputted buy data when the entered code is determined to be the unit commodity code, and for extracting unit commodity code from an inputted article code and updating a sale data corresponding to a unit commodity code stored in said first storing means when the entered code is determined to be the article code; and
  - (f) update control means for transmitting buy data which includes an article code to said second storing means and updating a sales data of said second storing means corresponding to the article code.

4,949,259

**DELAY COEFFICIENT GENERATOR FOR ACCUMULATORS**

Thomas J. Hunt, Derry, N.H.; David Lipschutz, Lexington, Mass., and Bernard J. Savord, Ithaca, N.Y., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 114,815, Oct. 29, 1987, abandoned.

This application Apr. 11, 1989, Ser. No. 336,536

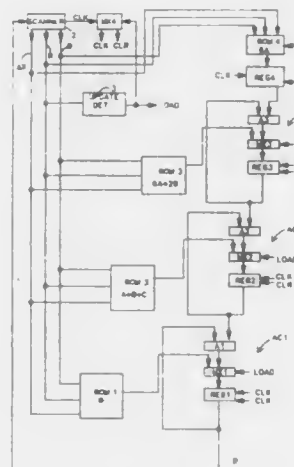
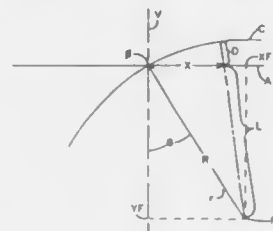
Int. Cl.<sup>3</sup> G01N 29/00

U.S. Cl. 364—413.25

11 Claims

1. Apparatus for providing signals D indicative of the delays for a group of transducer elements of an array that are required to focus them at a focal point comprising:
  - a plurality of accumulators connected in series;
  - means for clocking said accumulators;
  - means for continuously loading the first accumulator in the series with a given combination of the coefficients of the terms of a polynomial series representing the difference between the radius of a focal point and its distance from transducer elements as a function of their distance from the center of the array; and
  - means for initially preloading the said accumulators, with

respectively different combinations of the coefficients of the terms of said polynomial series, the preloading of the last accumulator in the series being the value of D for a



given transducer element in the group whereby the output of the last accumulator in the series at each clock pulse represents the value of D for the adjacent transducer element.

4,949,260

**METHOD FOR INPUTTING CHINESE INFORMATION THROUGH HIEROGLYPHIC APPROACH AND KEYBOARD ARRANGEMENT THEREFOR**

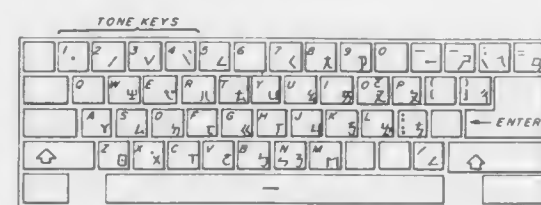
Su-Hsia Hsu, No. 19, Wen Wu 2nd Street, Chien King District, Kao Hsiung, Taiwan

Filed Jan. 3, 1989, Ser. No. 292,995

Int. Cl.<sup>3</sup> B41J 5/00; G06F 15/38

U.S. Cl. 364—419

3 Claims



1. A method for inputting information in Chinese through the hieroglyphic approach, comprising the steps of:
  - (1) establishing a combination in which the Chinese characters are arranged to be correlated with the English letters and symbols on a keyboard in form, pronunciation and meaning;
  - (2) establishing inputting rules according to said combination which includes:
    - (i) characters are obtainable with no more than four codes and once the four codes are inputted, the character

4,949,262

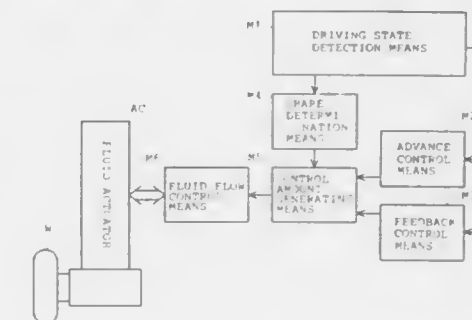
**ELECTRONIC CONTROLLED FLUID SUSPENSION SYSTEM WITH AN ADVANCE CONTROL AND A FEEDBACK CONTROL OF A VEHICLE ATTITUDE**  
Shuichi Buma; Toshio Aburaya, both of Toyota; Takashi Yonekawa, Mishima; Osamu Takeda, Susono; Shingo Urababa, Toyota, and Shunichi Doi, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho and Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 2, 1988, Ser. No. 239,982

Claims priority, application Japan, Sep. 3, 1987, 62-135015; Sep. 3, 1987, 62-135014; Sep. 4, 1987, 62-135884; Jul. 28, 1988, 63-188873; Aug. 4, 1988, 63-103453; Aug. 4, 1988, 63-103454  
Int. Cl.<sup>3</sup> B60G 21/00

U.S. Cl. 364—424.05

8 Claims



1. An electronic controlled fluid suspension system for a vehicle comprising:
  - a plurality of fluid actuators, one corresponding to each wheel of the vehicle;
  - a driving state detection means for detecting driving parameters of the vehicle;
  - an advance control means responsive to the detected driving parameters for anticipating a change in an attitude of the vehicle caused by a change in direction or velocity of the vehicle and for generating an advance control amount to alleviate the anticipated change in the attitude of the vehicle;
  - a feedback control means responsive to the detected driving parameters for measuring the change in attitude of the vehicle and generating a feedback control amount in order to alleviate the measured change in the attitude of the vehicle;
  - a share determination means responsive to the detected driving parameters for determining shares of the advance control amount and the feedback control amount;
  - a control amount generating means for generating a final control amount from the advance control amount and the feedback control amount according to the determined shares; and
  - a fluid flow control means responsive to the final control amount for controlling fluid flow from and into the fluid actuators.

4,949,263

**LOAD HANDLING VEHICLE MONITORING SYSTEM**  
Zeljko T. Jurca, Etobicoke, Canada, assignor to Alert-o-Brake Systems Inc., Mississauga, Canada

Continuation-in-part of Ser. No. 55,859, Jun. 1, 1987, Pat. No. 4,757,712. This application Jul. 18, 1988, Ser. No. 220,598

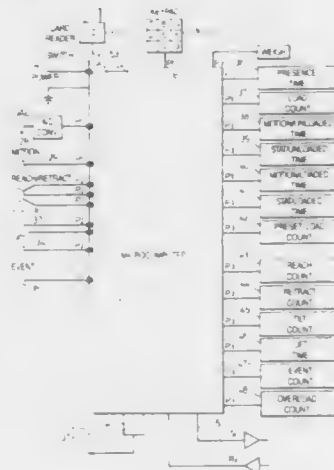
Int. Cl.<sup>3</sup> G04F 10/00

U.S. Cl. 364—424.07

13 Claims

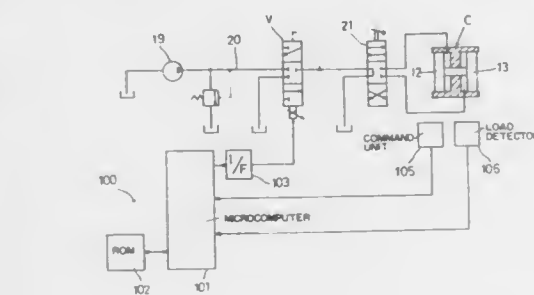
1. An electric monitoring system for use in association with a load handling vehicle to record the pattern of vehicle usage, comprising:
  - first transducer means for detecting the presence of a load applied to the vehicle;
  - second transducer means for detecting motion of the vehicle,

supply circuit means including an on-off switch operable to activate the monitoring system, said supply circuit means including a first timer responsive to operation of the on-off switch for timing the activation of the monitoring system; timer means including a plurality of further timers each assigned to record the duration of a selected mode of vehicle usage; and



selective gating means interconnecting said further timers with said supply circuit means, the selective gating means being operable by the first and second transducer means for selectively activating the timers in accordance with the respective conditions of the transducer means, thereby to record the durations of said selected modes of vehicle usage.

**4,949,264**  
TRANSMISSION HAVING ELECTROMAGNETIC PROPORTIONAL REDUCTION VALVE  
Yoshiyuki Katayama, and Takeshi Ura, both of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan  
Filed Sep. 22, 1988, Ser. No. 247,568  
Int. Cl.<sup>5</sup> B06K 41/28; F16D 43/28  
U.S. Cl. 364-424.1 5 Claims



1. A hydraulic control apparatus for a transmission comprising:  
a hydraulic change speed clutch including force neutralizing springs (18B),  
a hydraulic pressure source,  
an oil line for connecting said change speed clutch to said hydraulic pressure source,  
an electromagnetic proportional reduction valve-mounted on said oil line for varying oil pressure output to said change speed clutch in response to a control current (I) applied to said reduction valve,

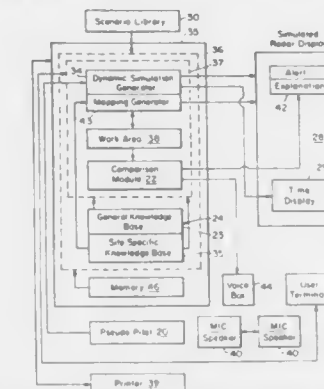
control means for producing said control current and applying the same to said reduction valve, and  
command means for transmitting a command signal to said control means to engage said change speed clutch,  
wherein said control means produces said control current (I) including a first component current (I1) which continues at a first current level (i1) for a first predetermined period (T1), a second component current (I2) following said first component current which continues at a second current level (i2) which is lower than said first current level for a second predetermined period (T2) which is sufficient to produce a pressure slightly greater than the force of the springs, and a third component current (I3) following said second component current which starts at a third current level (i3) not exceeding said second current level and continuing at a current level which rises with progress of time.

**4,949,265**  
STEERING CONTROL SYSTEM FOR 4WD VEHICLE HAVING DRIVE TORQUE DISTRIBUTION CONTROL  
Takaaki Eguchi, Isehara, and Yuzo Sakita, Machida, both of Japan, assignors to Nissan Motor Co., Ltd., Japan  
Filed Feb. 14, 1989, Ser. No. 309,887  
Claims priority, application Japan, Feb. 18, 1988, 63-33892  
Int. Cl.<sup>5</sup> B62D 6/00  
U.S. Cl. 364-424.05 10 Claims



1. A control system for a vehicle having primary and secondary driving wheel pairs, comprising:  
a sensor group for sensing conditions of said vehicle to determine a steering input and a difference between primary and secondary wheel speeds,  
a drive force distribution control actuator for controlling a drive force distribution between said primary driving wheel pair and said secondary driving wheel pair of said vehicle, in response to a drive force distribution control signal,  
an auxiliary steering actuator for controlling a controlled wheel steer angle of a controlled wheel pair which is one of said primary wheel pair and said secondary wheel pair, in response to an auxiliary steering control signal, and  
a controller for producing said drive force distribution control signal in accordance with said primary and secondary wheel speed difference, determining a derivative control steering quantity in accordance with a derivative of said steering input, and producing said auxiliary steering control signal in accordance with said derivative control steering quantity, said controller comprising adjusting means for varying said derivative control steering quantity in accordance with said primary and secondary wheel speed difference.

**4,949,267**  
SITE-SELECTABLE AIR TRAFFIC CONTROL SYSTEM  
Arthur Gerstenfeld, Newton; Michael N. Gualtieri, Boxford, and Thomas D. Moody, North Reading, all of Mass., assignors to UFA, Inc., Newton, Mass.  
Continuation-in-part of Ser. No. 176,639, Apr. 1, 1988, which is a continuation-in-part of Ser. No. 931,867, Nov. 18, 1986, Pat. No. 4,827,418. This application Aug. 17, 1988, Ser. No. 233,037  
Int. Cl.<sup>5</sup> G06F 15/48  
U.S. Cl. 364-439 26 Claims

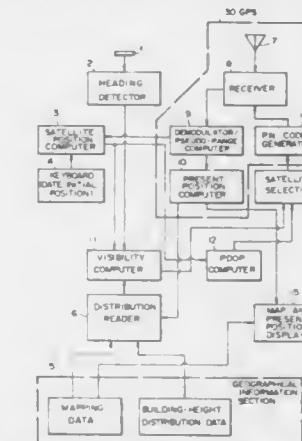


1. A site-selectable traffic control training system for interacting with a user, comprising:  
means for generating a representation of at least one moving vehicle having an initial position and heading for producing a dynamic simulation of a traffic scenario at one of a plurality of selectable sites;  
means for entering a controller command from the user for altering the traffic scenario simulation;  
a general knowledge base for storing common rules and procedures applicable to traffic scenario simulations for said plurality of selectable sites;  
a site-specific knowledge base for storing particular rules and procedures applicable to one or more traffic scenario simulations for each of said plurality of selectable sites; and  
a comparison module for comparing the rules and procedures of said general knowledge base and said site-specific knowledge base to at least one of the present state of the simulation of the traffic scenario and the controller command and for issuing an alert upon the immediate or foreseeable failure of the user to observe any rule or procedure in said knowledge bases.

**4,949,268**  
LAND VEHICLE NAVIGATION SYSTEM  
Kunitoshi Nishikawa, Nagoya; Mitoshi Fujimoto, Aichi, and Yoshikazu Asano, Owariasahi, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan  
Filed Sep. 22, 1988, Ser. No. 247,537  
Claims priority, application Japan, Sep. 22, 1987, 62-236092  
Int. Cl.<sup>5</sup> G01S 5/02, 3/02; G06F 15/50  
U.S. Cl. 364-449 19 Claims

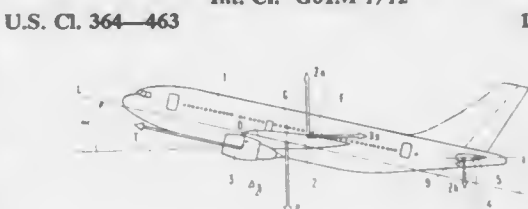
1. A land vehicle navigation system comprising:  
a global positioning system (GPS) for receiving and demodulating signals from a plurality of satellites to fixedly determine the present travelling position of a vehicle;  
a satellite position computing means for determining the position of each of said satellites, based on almanac data supplied from said global positioning system;  
a heading detector for continuously detecting the heading of said vehicle;  
a geographical information means for storing a map indicated on an area in which the vehicle is to run and data representative of the distribution of the building height at said area;  
a visibility computing means for determining the visibility for signals from each of the satellites, based on signals indicative of the position of each satellite from said satel-

lite position computing means, data representative of the heading of the vehicle from said heading detector and data indicative of the distribution of the building height from said geographical information means;  
a satellite selecting means for selecting a combination of satellites providing the maximum visibility at said area, based on signals indicative of the visibility from said visibility computing means; and  
a map and present position displaying means for displaying data representative of the map from said geographical information means and the present position of the vehicle,



whereby a combination of satellites providing the maximum visibility for signals to be received by said global positioning system can be selected depending on the distribution of the building height in the area in which the vehicle is running.

**4,949,269**  
PROCESS AND SYSTEM FOR DETERMINING THE LONGITUDINAL POSITION OF THE CENTER OF GRAVITY OF AN AIRCRAFT PROVIDED WITH AN ADJUSTABLE HORIZONTAL STABILIZER  
Dominique Buisson, Villemur, and Joseph Irvoas, Cugnaux, both of France, assignors to Societe Nationale Industrielle et Aerospatiale, Paris, France  
PCT No. PCT/FR88/00003, § 371 Date Aug. 12, 1988, § 102(e) Date Aug. 12, 1988, PCT Pub. No. WO88/05163, PCT Pub. Date Jul. 14, 1988  
PCT Filed Jan. 4, 1988, Ser. No. 251,709  
Claims priority, application France, Jan. 8, 1987, 87 00117  
Int. Cl.<sup>5</sup> G01M 1/12 13 Claims



1. A system for determining the longitudinal position  $X_G$  of the center of gravity  $G$  of an aircraft in flight, said aircraft being provided with an adjustable horizontal stabilizer which is deflectable and to which is articulated an elevator, said aircraft having a determined focus  $F$  with a longitudinal position  $X_F$ , speed of engine, Mach number and coefficient of lift, said system comprising:  
means for transferring fuel from one tank of the aircraft to another;  
angular position sensing means associated with said adjustable horizontal stabilizer for measuring the deflection thereof and delivering said deflection information;  
first means for delivering information representative of the speed of the engine of the aircraft;



second means for delivering information representative of the Mach number;  
 third means for delivering information representative of the coefficient of lift of the aircraft;  
 first memory means in which is stored a first function of the speed of the engine of the aircraft and the Mach number, said first function being representative of the value of the deflection of said adjustable horizontal stabilizer, in the case where the center of gravity G lies at the focus F of said aircraft, said first memory means receiving the information delivered by said first and second information delivering means and delivering at the output of the first memory means the corresponding values of said first function;  
 second memory means in which is stored a second function of the coefficient of lift of said aircraft and said Mach number, said second function being representative of the deviation of deflection of said horizontal stabilizer for a deviation of 1 percent from the position of the center of gravity, that is the deviation of deflection for which  $X_G X_F = 1$  percent, said second memory means receiving the information delivered by said second and third information delivering means and delivering at the output of the second memory means the corresponding values of said second function; and  
 computing means based on the position  $X_F$  of the focus F of the aircraft in addition to the information delivered by said first and second memory means as well as that delivered by said angular position sensing means, and, at a point of flight for which the aircraft is in equilibrium with its elevator in aerodynamic extension of said adjustable horizontal stabilizer, said computing means generating a center of gravity signal representing the longitudinal position  $X_G$  of the aircraft center of gravity G, said signal being delivered to said transfer means in order to control the longitudinal position of the center of gravity of the aircraft, acting on the distribution of fuel among said fuel tanks.

4,949,270

# METHOD OF CREATING NC PROGRAM FOR POCKET MACHINING

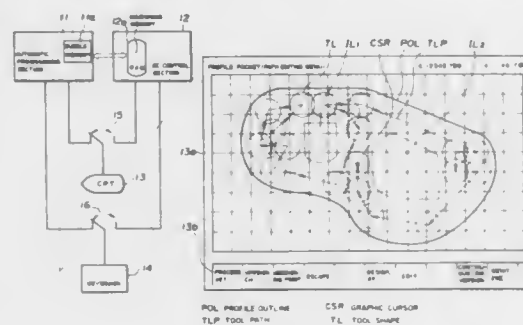
Atsushi Shima; Tetsuya Shimizu, and Naoki Fujita, all of Tokyo, Japan, assignors to Fanuc Ltd, Minamitsuru, Japan  
 PCT No. PCT/JP87/00775, § 371 Date Jun. 15, 1988, § 102(e) Date Jun. 15, 1988, PCT Pub. No. WO88/03073, PCT Pub. Date May 5, 1988

PCT Filed Oct. 15, 1987, Ser. No. 219,159

Claims priority, application Japan, Oct. 21, 1986, 61-250360  
 Int. Cl. G05B 19/405

U.S. Cl. 364—474.26

4 Claims



1. A method of creating a numerical control program for pocket machining of a workpiece in which the interior of a profile outline is machined by a series of cuts along at least one of straight lines and circular arcs, comprising the steps of:
  - (a) displaying the profile outline and a graphic cursor on a display screen;
  - (b) displaying a grid on the display screen, overlaying the

- profile outline, the grid formed of squares having sides with a length corresponding to a tool diameter;
- (c) inputting points, by successively positioning the graphic cursor and inputting the coordinates of the graphic cursor at a starting point and end point of one of the straight lines and circular arcs;
- (d) displaying a tool shape, having the tool diameter, at the starting and end points;
- (e) displaying a tool path by successively connecting the starting and end points using the one of the straight lines and circular arcs; and
- (f) creating a numerical control program for moving a tool, having the tool diameter, along the tool path to perform pocket machining.

4,949,271

# CURVED SURFACE CREATION METHOD

Masaki Seki; Koji Samukawa, and Osamu Haseoka, all of Tokyo, Japan; assignors to Fanuc Ltd, Minamitsuru, Japan  
 PCT No. PCT/JP88/00159, § 371 Date Oct. 18, 1988, § 102(e) Date Oct. 18, 1988, PCT Pub. No. WO88/06312, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 17, 1988, Ser. No. 265,797

Claims priority, application Japan, Feb. 20, 1987, 62-37278  
 Int. Cl. G06F 15/46

U.S. Cl. 364—474.29

15 Claims



1. A curved surface creation method comprising the steps of:
  - (a) obtaining first and second space curves each represented as a sequence of points;
  - (b) creating a first curved surface by connecting first corresponding dividing points obtained by dividing the first and second space curves into N segments, where N is an integer, at predetermined pitches a and a', respectively;
  - (c) dividing the first and second space curves into M segments, where M is an integer, at predetermined pitches b and b', respectively, forming second corresponding dividing points;
  - (d) creating a second curved surface by connecting the second corresponding dividing points of the first and second space curves that have been divided into M segments in step (c); and
  - (e) machining one of the first and second curved surfaces.

4,949,272

# FLEXIBLE BILLING RATE FOR MAIL COMMUNICATION SYSTEMS

Robert A. Vanourek, New Canaan, and Joseph W. Wall, Monroe, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 16, 1988, Ser. No. 285,904

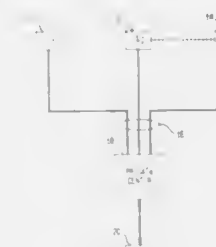
Int. Cl. H04M 11/08; G07B 17/00

U.S. Cl. 364—464.02

13 Claims

12. In a communication system for setting billing plans for a user facility from a central facility in accordance with a rate controlled information distribution arrangement, the method comprising the steps of:
  - electronically transmitting over a data link a past history to said central facility from said user facility;
  - electronically transmitting over a data link a future usage projection to said central facility from said user facility;

receiving at said user facility a projected billing program based on said usage data;  
 displaying said projected billing program to a user station operator for acceptance;



responding at said central facility to rejection of said billing program by recalculation and retransmission thereof; and responding at said central facility to acceptance thereof by entering same into said central data station for future billing.

4,949,273

# VITAL PROCESSING SYSTEM INCLUDING A VITAL POWER CONTROLLER WITH FORGIVENESS FEATURE

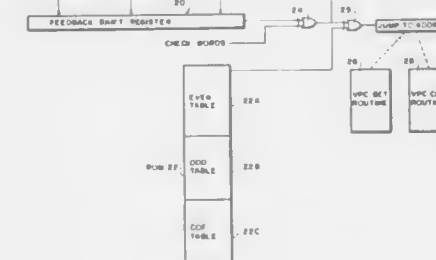
David B. Rutherford, and John W. Parker, both of Rochester, N.Y., assignors to General Signal Corporation, N.Y.

Filed Nov. 4, 1988, Ser. No. 267,070

Int. Cl. G06F 11/08, 15/20

U.S. Cl. 364—480

12 Claims



1. A vital power controller for verifying the proper operation of a vital processing system and for providing vital power to the system outputs only when the system is functioning correctly comprising:
  - (1) a microprocessor adapted to receive odd and even checkword sets, and including means for converting the checkword sets so as to produce a vital drive signal at an output of said microprocessor;
  - (2) a passive detector for receiving said vital drive signal at its input and providing a low power DC voltage at its output;
  - (3) a DC-to-DC converter for receiving said low power DC voltage at its input and providing vital power at its output;
  - (4) said means for converting said checkword sets including a feedback shift register, a read-only memory having odd and even tables stored therein, whereby a valid checkword set enables the vital power controller to generate said vital power for a time limited by the number of entries in said tables; and
  - (5) means for discriminating between noise events occurring at a relatively low rate compared with the rate encountered with hardware failures, said means for discriminating including a plurality of forgiveness buffers connected to said feedback shift register, each of said buffers being operative to initialize said feedback shift register for generating said vital drive signal for a period equivalent to that for a valid checkword set.

4,949,274

# TEST METERS

Milton B. Hollander; William E. McKinley, both of Stamford; James P. Crimmins, and Ian K. Storer, both of Westport, all of Conn., assignors to Omega Engineering, Inc., Stamford, Conn.

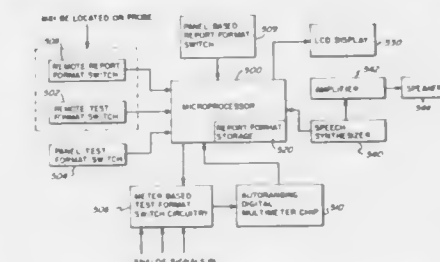
PCT No. PCT/US88/01648, § 371 Date Oct. 31, 1988, § 102(e) Date Oct. 31, 1988

Continuation-in-part of Ser. No. 53,385, May 22, 1987, abandoned. This PCT application May 18, 1988, Ser. No. 312,880

Int. Cl. G01R 19/00

U.S. Cl. 364—483

24 Claims



1. A test meter capable of testing and displaying a plurality of parameters and of reporting the results in a plurality of formats, comprising:
  - first selector switch means responsive to an electrical signal on an electrical conductor, for changing the report format of the test meter through a plurality of report formats in a predetermined sequence;
  - second selector switch means responsive to an electrical signal on an electrical conductor for changing the test parameter formats of the test meter through a plurality of parameter formats in a predetermined sequence;
  - an independently locatable and movable probe having an extended multi-conductor lead detachably connected to the test meter;
  - one of the conductors in the multi-conductor lead being coupled to said first selector switch means and another one of the conductors in said multi-conductor lead being coupled to the second selector switch means;
  - said probe having a first control switch coupled to send an electrical signal on said one conductor in said lead so as to operate said first selector switch means to change to the report format of said test meter;
  - and, said probe having a second control switch coupled to send an electrical signal on said other conductor in said lead so as to operate said second selector switch means to change the test parameter format of said test meter.

4,949,275

# SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE MADE BY A STANDARD-CELL SYSTEM AND METHOD FOR MANUFACTURE OF SAME

Terumoto Nonaka, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jul. 8, 1985, Ser. No. 752,934

Claims priority, application Japan, Jul. 13, 1984, 59-145537  
 Int. Cl. G06F 15/60

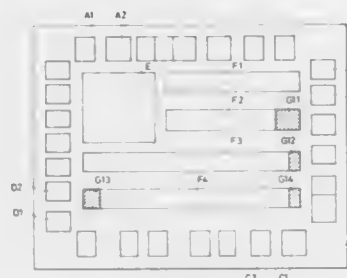
U.S. Cl. 364—490

20 Claims

1. A semiconductor integrated circuit device comprising:
  - a semiconductor chip with a plurality of standard cells formed thereon, wherein the standard cells comprise an initial circuit, and wherein each of said standard cells is selected from among plural types of standard cells which are pre-registered in a standard cell library retained by a computer, the placement pattern of said standard cells on said semiconductor chip being designed automatically by a computer system in accordance with an initial circuit design which includes the standard cells as constituent

elements thereof and which includes the initial design of the electrical interconnection pattern of the standard cells; and

at least one basic cell comprised of the circuit elements for at



least one general-purpose logical gate formed on said semiconductor chip in addition to the standard cells, wherein at least one of the basic cells is electrically connected to said initial circuit to form a modified circuit design different from the initial design.

4,949,276

#### METHOD AND APPARATUS FOR PREVENTING SURGE IN A DYNAMIC COMPRESSOR

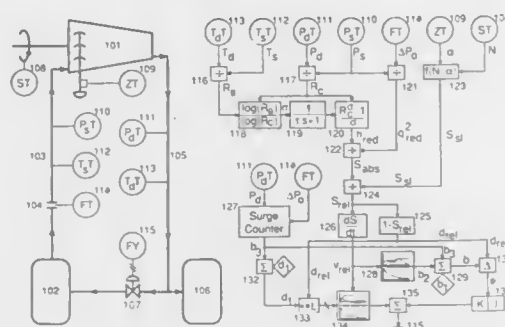
Naum Staroselsky, Des Moines; Saul Mirsky, West Des Moines, and Paul A. Reinke, Des Moines, all of Iowa, assignors to Compressor Controls Corp., Des Moines, Iowa

Filed Oct. 26, 1988, Ser. No. 263,172

Int. Cl.<sup>5</sup> F04D 27/02; G04B 13/02

U.S. Cl. 364—509

4 Claims



1. A method of anti-surge protection for a dynamic compressor having a corresponding compressor performance map and inlet and discharge networks, an anti-surge valve connecting said discharge and inlet networks and an anti-surge control system operating said anti-surge control valve to maintain the relative distance between the compressor operating point and the surge limit below which said compressor would surge, said relative distance being a difference between the relative operating slope of the compressor and the relative slope of the surge limit, both of said relative slopes being ratios of the actual slopes to the slope of the surge limit line, both actual slopes being tangents of the angles between the operating point and the horizontal axis of the compressor performance map and the surge limit and the horizontal axis of the compressor performance map, said method comprising:

continuously calculating said relative distance between the compressor operating point and the surge limit as a function of one or more measured process variables and adjusting the position of said anti-surge valve by a closed loop response of the control system to prevent said relative distance between the compressor operating point and the surge limit from decreasing below a minimum margin of safety, said margin of safety including both constant and variable parts; and

maintaining said variable part at zero under steady-state conditions, increasing said variable part when said operating point approaches said surge limit at an increasing rate, and slowly decreasing said variable part toward zero when the rate of approaching surge decreases.

4,949,277

#### DIFFERENTIAL BUDDING: METHOD AND APPARATUS FOR PATH PLANNING WITH MOVING OBSTACLES AND GOALS

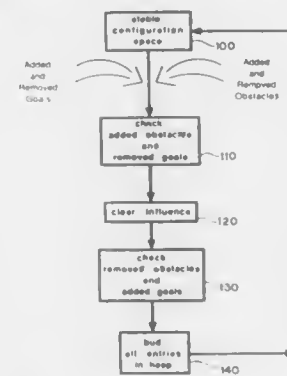
Karen I. Trovato, Putnam Valley, and Leendert Dorst, Yorktown Heights, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Mar. 9, 1988, Ser. No. 166,599

Int. Cl.<sup>5</sup> G06F 15/46, 15/18

U.S. Cl. 364—513

40 Claims



1. A method for planning a path for an object to follow in a task space in which there has been a change in conditions comprising the steps of:

- a. starting from an initialized configuration space;
- b. identifying a perimeter of a region in the configuration space which is effected by the change in conditions; and
- c. propagating cost waves from the perimeter using a space variant metric to create updated direction errors values corresponding to the change in conditions,

wherein the method is part of a method for controlling the motion of the object, comprising the further steps of:

- a. using the updated direction arrows values to find a least cost path a start point to a goal point in the task space;
- b. providing at least one point on the path; and
- c. controlling the object to travel to the at least one point.

4,949,278

#### EXPERT SYSTEM ARCHITECTURE

Kenneth E. Davies, Hants, United Kingdom; Walter C. Geddes, Rockville, Md.; Mark J. Kline, Arlington, Va.; Alexander T. Maluta, Redondo Beach, Calif.; Bruce E. Naylor, San Jose, both of Calif.; Harrison Scofield, Morgan Hill, Calif., and Jeffrey N. Stevens, Gaithersburg, Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1988, Ser. No. 291,796

Int. Cl.<sup>5</sup> G06F 15/18

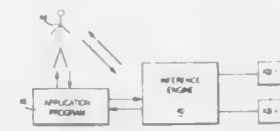
U.S. Cl. 364—513

6 Claims

1. A computer system for performing expert consultations comprising:

- means for storing data, said data including application programs and knowledge information;
- means for processing said application programs;
- means for performing expert consultations based upon said knowledge information in response to requests from said means for processing said application programs;
- means, associated with said expert consultation means, for managing a plurality of concurrent expert consultations; and
- means for controlling the flow of data between said expert

consultation means and said means for processing said application programs,



whereby an expert system can be accessed by an application program running in said computer system.

4,949,279

#### IMAGE PROCESSING DEVICE

Masaki Takakura, Tenri; Yoji Noguchi, Ikoma; Yasukuni Yamane, and Noriohiko Kako, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 714,757, Mar. 22, 1985, Pat. No. 4,695,966.

This application Jun. 12, 1987, Ser. No. 61,296

Claims priority, application Japan, Mar. 22, 1984, 59-55665; Mar. 22, 1984, 59-55666; Mar. 22, 1984, 59-55668; Apr. 18, 1984, 59-78910; Jun. 4, 1984, 59-116308; Dec. 24, 1984, 59-280825; Mar. 18, 1985, 60-55477

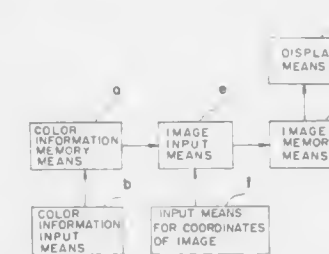
Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 364—518

7 Claims

U.S. Cl. 364—518

10 Claims



3. An image processing device, comprising:

- information storing means for storing information equivalent to at least two picture-face portions, the information storing means including: (i) a color information storing means for storing color information equivalent to the at least two picture-face portions, and (ii) a color information inputting means for inputting color patterns of the picture-face portions in advance into the color information storing means;
- image storing means for storing information of images equivalent to the at least two picture-face portions;
- display means for displaying images stored in the image storing means;
- image inputting means for inputting parameters of images to be drawn, said image inputting means for inputting parameters including an image coordinate inputting means for inputting the coordinates of images to be drawn; and
- image inputting means for writing the information in the

inputted parameters within a given shape in accordance with the inputted parameters within the image storing means, and wherein each of the image inputting means for writing information provides images different in shape from each other,

wherein the image storing means comprises: (i) a first image storing means for storing a one picture-face portion of images; and (ii) a second image storing means for storing another picture-face portion of images, and wherein the image inputting means being for inputting the images to the first image storing, and wherein the display means being for displaying contents stored in the second image storing means, and wherein the image processing device, further comprising: (a) an image quality selecting means for selecting points to be changed in the image quality on the images, and element patterns for defining image touches; (b) an image processing means which reads out color information stored in the image storing means corresponding to points on the images selected, and transfers it into an address within a range of the element patterns in accordance with the points in the second image storing means.

4,949,280

#### PARALLEL PROCESSOR-BASED RASTER GRAPHICS SYSTEM ARCHITECTURE

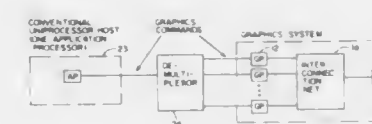
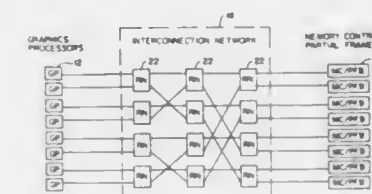
Richard J. Littlefield, Seattle, Wash., assignor to Battelle Memorial Institute, Richland, Wash.

Filed May 10, 1988, Ser. No. 192,218

Int. Cl.<sup>5</sup> G06F 15/16

U.S. Cl. 364—518

10 Claims



1. Apparatus for generating raster graphics images from a graphics command stream, comprising:

- a plurality of graphics processing means each adapted to receive any part of the graphics command stream for processing the command stream part into pixel data;
- frame buffer means for mapping the pixel data to pixel locations; and
- a unidirectional interconnection network having multiple levels of linked nodes to provide a data path from each graphics processing means to any part of the frame buffer means, each node at one level including means for queuing at the node pixel data intended for a part of the frame buffer until a link is available from the node to a node at another level.



Figure 1 is a block diagram of the computer system architecture. At the top, a 'TERMINAL PANEL' block contains a 'MULTIPLEXER' and an 'ALARM OUTPUT'. The 'MULTIPLEXER' has inputs labeled AD, AD2, AD3, ..., ADn. It is connected to a central 'MICROPROCESSOR' block. The 'MICROPROCESSOR' is connected to 'RAM' and 'ROM' blocks via a 16-bit bus (labeled 27 and 10). It is also connected to four 'I/O DEVICE' blocks via 8-bit buses (labeled 20, 28, 36, 38, 42, and 44). The 'ALARM OUTPUT' is connected to the 'MICROPROCESSOR' via an 8-bit bus (labeled 44). The diagram is labeled with 27, 10, 20, 28, 36, 38, 42, and 44.

1. A multichannel point recorder comprising multiplex scanning means for sequentially scanning a plurality of input measured variables; memory means for storing values applied thereof and for supply stored values as memory output signals, recording chart means including a recording chart and drive means arranged to effect a longitudinal displacement of the chart with respect to time; a recording head displaceable transversely across the chart for recording on the chart; discriminator means arranged between said multiplex scanning means and said memory means for evaluating for each measured variable at each scanning cycle of said scanning means whether the difference between the last value of said measured variable stored in said memory means and the presently scanned value is equal to or greater than a given constant representing a distance between two printing points on the recording chart by said recording head and, if not, whether the summed displacement of the recording chart is equal to or greater than said constant with a subsequent storage in said memory means of the value of measured variable and the recording chart displacement meeting at least one of said evaluations and recording head control means under control of the stored data in said memory means to record by said recording head the values of said measured variables stored in said memory means.

4,949,286

## DRESS DESIGN FORMING APPARATUS

Akio Ohba, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Division of Ser. No. 888,846, Jul. 22, 1986, Pat. No. 4,791,581.

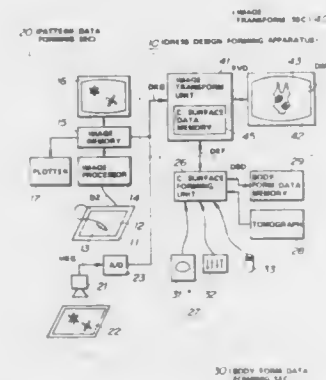
This application Nov. 9, 1988, Ser. No. 268,760

Claims priority, application Japan, Jul. 27, 1985, 60-166312; Oct. 24, 1985, 60-238166; Nov. 27, 1985, 60-266575

Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 364-521

6 Claims



1. A computer graphics apparatus for interactively forming dress designs, which comprises:

- (a) pattern data forming means for forming plane pattern electronic data representative of a cloth pattern on a two-dimensional plane;
- (b) body form data forming means for selectively forming body form electronic data representative of a three-dimensional shape of a dress when tailored, the body form data forming means including a deformation calculation means for deforming the three-dimensional shape according to a given body form;
- (c) image transforming means for mapping the cloth pattern represented by the plane pattern data on a two-dimensional plane onto a curved surface represented by the body form data and producing a corresponding video signal; and
- (d) electronic display means for displaying a dress design on the basis of the video signal generated from the image transforming means and for displaying the changes in the dress design as a function of changes in one or both of the pattern data and the body form data.

4,949,287

## DOCUMENT PROCESSING SYSTEM

Koji Yamaguchi; Mika Fukui, both of Yokohama, and Isamu Iwai, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 16, 1989, Ser. No. 367,436

Claims priority, application Japan, Jun. 16, 1988, 63-149170

Int. Cl.<sup>5</sup> G06F 15/00

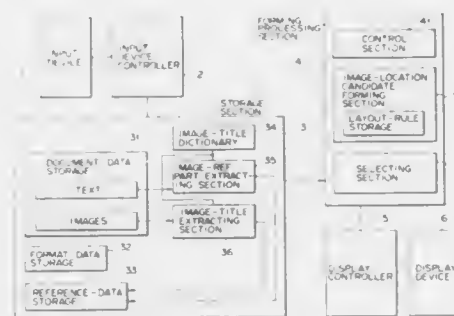
U.S. Cl. 364-523

27 Claims

1. A document processing system for appropriately laying out text data and an image data which is referred to in the text data, thereby to prepare a document formed of the text and images laid out at appropriate locations in the text, said system comprising:

- format-data storage means for storing format data including region-attribute data representing at least an image-layout inhibited region in which to lay out no image data;
- reference-data storage means for storing reference data representing the relationship between any image-referring part of the text data and an image data which is referred to in that image-referring part; and
- data-layout section for laying out the text data and also laying out the image data outside said image-layout inhibited region, in accordance with the region-attribute data stored in said format-data storage means and the reference data stored in said reference-data storage means, thereby to prepare document data.

ited region, in accordance with the region-attribute data stored in said format-data storage means and the reference



data stored in said reference-data storage means, thereby to prepare document data.

4,949,288

## TESTING SYSTEM FOR SAFETY RELIEF VALVES

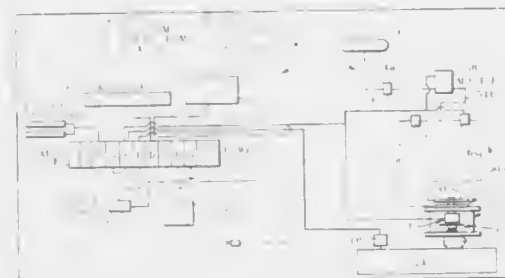
Philip J. Bookout, Marietta, Ga., assignor to Movats Incorporated, Kennesaw, Ga.

Filed Sep. 2, 1988, Ser. No. 239,773

Int. Cl.<sup>5</sup> G01L 27/00

U.S. Cl. 364-558

30 Claims



12. Apparatus for testing a safety relief valve whose function is to relieve pressure in a pipe or like chamber, which relief valve includes, at least, an outlet port from which medium under pressure escapes from the chamber, a seat defining the open end of the outlet port, a valve closure element removably resting on the seat for blocking escape of medium from the outlet port, biasing means for exerting a biasing force on the closure element to hold the closure element on the seat, and lift assist mechanism associated with the closure element by which the closure element can be lifted off the seat, said apparatus comprising:

- pulling device removably connected to the lift assist mechanism;
- driving force means for applying a driving force to said pulling device to exert a pulling force on the closure element through the lift assist mechanism;
- force transducer means for measuring said pulling force;
- data acquisition means for acquiring pulling force data from said force transducer means over time; and
- processing means for processing said acquired pulling force versus time data and for detecting, through processing of the pulling force versus time data, that a set point has been achieved where the pulling force approximates the difference between the biasing force and the force on the closure element due to internal pressure in the chamber.

4,949,289

## INTERPOLATION APPARATUS

W. F. Noel Stephens, Badminton, and Mark E. Pleydell, Wotton-under-Edge, both of United Kingdom, assignors to Renishaw plc, Gloucestershire, United Kingdom

PCT No. PCT/GB87/00433, § 371 Date Feb. 9, 1988, § 102(e) Date Feb. 9, 1988, PCT Pub. No. WO87/07943, PCT Pub. Date Dec. 30, 1987

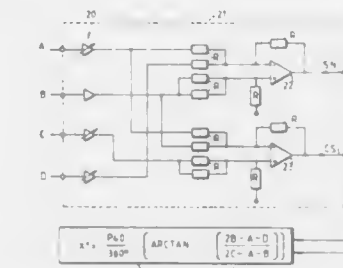
PCT Filed Jun. 22, 1987, Ser. No. 159,549

Claims priority, application United Kingdom, Jun. 21, 1986, 8615196; Dec. 30, 1986, 8631035

Int. Cl.<sup>5</sup> G06F 15/46, 15/353

U.S. Cl. 364-577

26 Claims



1. Scale reading apparatus for reading a position measuring scale provided with periodic graduations, the apparatus comprising:

- reading means for scanning the scale, having four spaced transducers for interacting with the periodic graduations and producing therefrom four respective scanning signals, each of said scanning signals having a predetermined nominal phase and a predetermined nominal phase separation relative to the other of said scanning signals;
- converting means for converting said four scanning signals into first and second derived signals, said converting means comprising first combining means for combining a first grouping of said scanning signals to produce the first derived signal, and second combining means for combining a second grouping of said scanning signals, different from the first grouping, to produce the second derived signal, the nominal phases of the scanning signals which make up the first grouping having a vector sum which is at substantially ninety degrees to the vector sum of the nominal phases of the scanning signals making up the second grouping, whereby the derived signals have a phase difference between them of substantially ninety degrees, at least one of said groupings consisting of at least three of said scanning signals, the accuracy of said ninety degree phase difference between the derived functions being increased as compared with the accuracy with which the actual phase separations between said scanning signals conform to said predetermined nominal phase separations; and
- means coupled to said converting means for receiving said first and second derived signals, said means producing an output signal representing position along said scale.

4,949,290

## METHOD AND APPARATUS FOR DEFINING TEST SEQUENCES FOR A SIGNAL MEASUREMENT SYSTEM

William T. Pike, and Robert T. Loder, Jr., both of Santa Rosa, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 5, 1988, Ser. No. 178,036

Int. Cl.<sup>5</sup> G06F 15/20; G01R 23/16

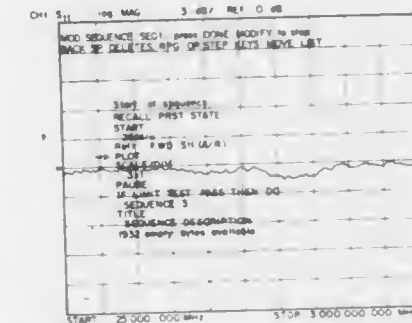
U.S. Cl. 364-580

14 Claims

1. A method for enabling a user to define a test sequence during setup of a signal measurement system, comprising the steps of:

- providing a user of the signal measurement system with softkey menus for selecting a desired series of test steps,

including measurement selection for a device to be tested, for combination into a test sequence for execution as a single measurement process; measuring data using the selected test sequence;



displaying the measured data; and displaying the steps in the selected test sequence, as the steps of the test sequence are entered, as an overlay on displayed data measured using the selected test sequence.

4,949,291

## APPARATUS AND METHOD FOR CONVERTING FLOATING POINT DATA FORMATS IN A MICROPROCESSOR

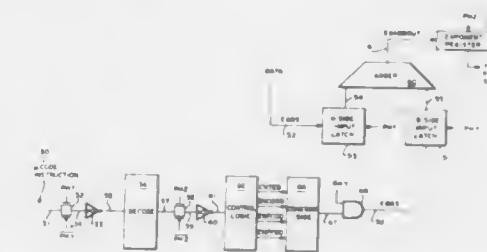
Avtar Saini, San Jose, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Dec. 22, 1988, Ser. No. 288,433

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364-715.03

13 Claims



1. In a computer system which includes a two-phase clocking means, a data format conversion apparatus for converting floating point data formats comprising:

- decoding means for decoding an instruction in response to a first phase of a first clock pulse to begin the conversion of a floating point number having a first kind of format and for providing signal when said instruction is received;
- constant generating means for providing a certain constant prior to the end of a second phase of said first clock pulse in response to said first signal;
- latching means or latching said floating point number in aid first kind of format and said certain constant; and
- adder means for adding said certain constant to said floating point number of said first kind of format to produce a result which is said floating point number in a second kind of format.



4,949,292

## VECTOR PROCESSOR FOR PROCESSING RECURRENT EQUATIONS AT A HIGH SPEED

Akihiko Hoshino, Tokyo; Shoji Nakatani; Koji Karoda, both of Kawasaki, and Tetsu Kawai, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

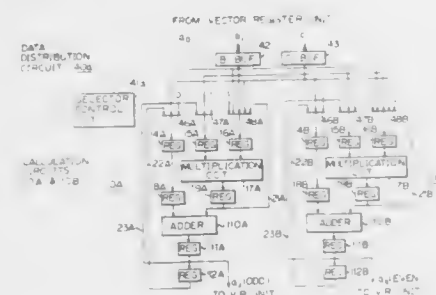
PCT No. PCT/JP88/00464, § 371 Date Jan. 11, 1989, § 102(e) Date Jan. 11, 1989, PCT Pub. No. WO88/09016, PCT Pub. Date Nov. 17, 1988

PCT Filed May 14, 1988, Ser. No. 298,748

Int. Cl.<sup>5</sup> G06F 15/06, 15/32

U.S. Cl. 364—736

17 Claims



1. A vector processor for processing a modified recurrent equation having a formula expressed, when first order developed, as  $a_i = a_{i-2} \times b_{i-1} \times b_i + b_i \times c_{i-1} + c_i$ , comprising: vector instruction control means for controlling vector instructions; main storage means for storing data; vector storage access means for accessing input vector data and calculated data to said main storage means; vector calculation means for calculating vector data under control of said vector instruction means, said vector calculation means includes at least one odd term calculation means for calculating odd terms of the modified recurrent equation according to the formulas

$$a_1 = a_0 \times b_1 + c_1$$

$$a_j = a_{j-2} \times b_{j-1} \times b_j + b_j \times c_{j-1} + c_j$$

where  $j$  is an odd integer, each odd term calculation means including a first adding circuit, a first multiplication circuit, at least one odd term data storage circuit for holding a calculated odd term, and at least one odd term feedback line for feeding back the calculated odd term to at least one of said multiplication circuit and said first adding circuit through said odd term data storage circuit; and at least one even term calculation circuit means for calculating even terms of the modified recurrent equation according to the formula

$$a_k = a_{k-2} \times b_{k-1} \times b_k + b_k \times c_{k-1} + c_k$$

where  $k$  is an even integer, each even term calculation means including a second adding circuit, a second multiplication circuit, at least one even term data storage circuit for holding a calculated even term, and at least one even term feedback line for feeding back the calculated even term to at least one of said second multiplication circuit and said second adding circuit through said even term data storage circuit; and data distribution means, operatively connected to and cooperative with said vector calculation means to process the modified recurrent equation, said data distribution means including

- a first data setter for outputting zero;
- a second data setter for outputting one;
- a plurality of selectors for selecting input operands for calculating the recurrent equation, constant  $d_{i-1}$  and 1 from

said first and second data setters, and the calculated odd and even terms; and a selector control unit for controlling said plurality of selectors in a predetermined manner defined by the modified recurrent equation, to supply selected data to said odd and even term calculation means.

4,949,293

## METHOD AND APPARATUS FOR COMPUTING RESIDUE WITH RESPECT TO ARBITRARY MODULUS

Sbinichi Kawamura, and Kyoko Takabayashi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

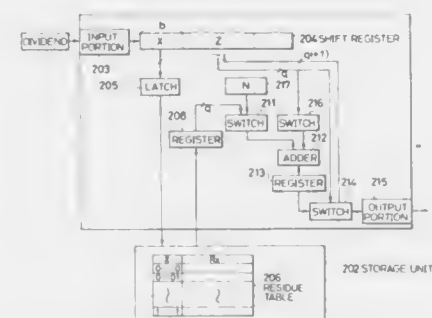
Filed Sep. 23, 1988, Ser. No. 248,041

Claims priority, application Japan, Sep. 25, 1987, 62-238856

Int. Cl.<sup>5</sup> G06F 7/72

U.S. Cl. 364—746

2 Claims



1. An apparatus for computing a residue  $R$  of an  $m$ -digit number  $M$  with respect to a  $q$ -digit modulus  $N$ , where both  $M$  and  $N$  are represented using an integer "a" as a radix, comprising:

- shift register means for temporarily holding said number  $M$ ;
- memory means for storing at most  $a^b$  different residues with respect to said modulus  $N$ , where  $b$  is a predetermined number;
- latch means for partitioning said number  $M$  in a shift register means into a  $b$ -digit block  $X$  obtained by separating  $b$  most significant digits of said number  $M$ , and a remaining portion  $Z$  of  $(m-b)$  digits;
- means for finding a residue  $R_x$  corresponding to said block  $X$  with respect to said modulus  $N$  by looking up in said memory means;
- means for aligning a least significant digit of said residue  $R_x$  with a  $q$ -th most significant digit of said remaining portion  $Z$ ;
- adder means for obtaining a number  $R_q$  by adding said residue  $R_x$  and said remaining portion  $Z$  as aligned by said aligning means;
- means for determining whether said number  $R_q$  has more than  $q+b$  digits;
- means for taking said number  $R_q$  as a residue  $R$  of said number  $M$  when said number  $R_q$  has not more than  $q+b$  digits; and
- means for replacing said number  $M$  in said shift register means by said number  $R_q$  when said number  $R_q$  has more than  $q+b$  digits.

4,949,294

## COMPUTATION CIRCUIT USING RESIDUAL ARITHMETIC

Claude Wambergue, Sceaux, France, assignor to Thomson-CSF, Paris, France

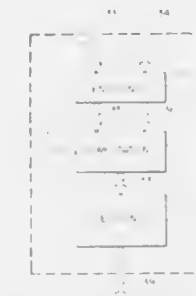
Filed Oct. 28, 1988, Ser. No. 264,244

Claims priority, application France, Oct. 30, 1987, 87 15057

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364—746

7 Claims



1. A computation device comprising: a numeral encoding module converting numbers from positional notation into residual notation on a ring so that a complex multiplication corresponds to an index addition; a computation module connected to the output of the numeral encoding module performing complex computations in residual notation using residual computed modulo the numbers  $m_i$  of the form  $m_i = 4k + 3$ , where  $k$  is a whole number, said module including means used to associate, with each complex number, an index, such that a multiplication of two complex numbers corresponds biuniquely to an addition of said complex number indices; and, a decoding module connected to the output of the computing module, converting numbers from residual notation into positional notation.

4,949,295

## TRANSFORMATION OF DIVISOR AND DIVIDEND IN DIGITAL DIVISION

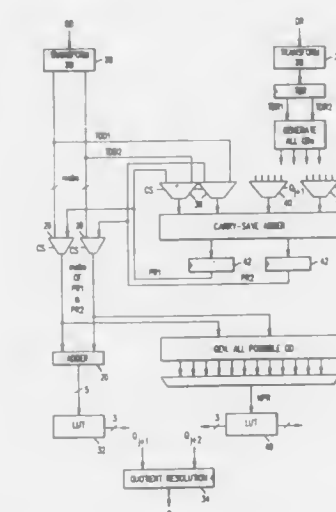
Charles C. Stearns, Palo Alto, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.

Filed Jul. 18, 1988, Ser. No. 220,768

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364—748

12 Claims



1. A method to reduce the complexity of quotient selection logic in a floating-point divider, said divider dividing a divisor

into a dividend, said divisor and said dividend having a mantissa part after normalization of said divisor and dividend in conformance with a standard for floating-point division applicable to said divisor and dividend, said normalization of said divisor placing said mantissa part of said divisor within a first range bounded by a maximum allowable value and a minimum allowable value, said method comprising the steps of:

inspecting said mantissa part of said divisor to determine if said mantissa part of said divisor is within a second range, said second range being bounded at a high end to said maximum allowable value of said mantissa part of said divisor and bounded at a low end to a value greater than said minimum allowable value of said mantissa part of said divisor;

transforming said mantissa part of said divisor, prior to dividing and after said normalization of said divisor, up to a value which is within said second range if said mantissa part of said divisor, after normalization, is not already in said second range.

4,949,296

## METHOD AND APPARATUS FOR COMPUTING SQUARE ROOTS OF BINARY NUMBERS

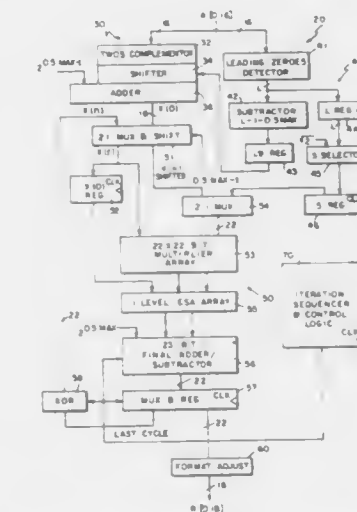
Christopher W. Malinowski, Melbourne Beach, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed May 18, 1988, Ser. No. 195,265

Int. Cl.<sup>5</sup> G06F 7/552

U.S. Cl. 364—752

9 Claims



1. A binary number square root calculator comprising: input means for receiving a  $N$ -bit operand  $A$ ; seed means connected to said input means for determining a seed value  $X(0)$  of  $n$  bits from said operand  $A$  as follows:

$$X(0) = (2^{\max} - A) \cdot 2^{-0.5 \max - 1};$$

said seed means including: a complementer means for complementing said operand  $A$ ; shifter means for shifting said complemented operand  $-A$  by  $-0.5 \max - 1$ ; and adder means for adding  $2^{0.5 \max - 1}$  to a shifted complemented operand  $-A$ ; iteration means connected to said seed means for performing a plurality of iterations of the following:

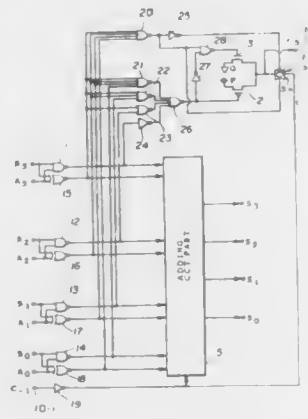
$$X(n+1) = X(0) + X(n) \cdot X(n) \cdot 2^{-0.5 \max - 1}$$

where  $\max$  is the weight of the most significant bit of the smallest perfect binary square higher than the most significant bit of operand  $A$ ; and root means connected to said iteration means for determining

ing a last iteration and calculating a square root of the operand A from the results of the last iteration X(last) of the iteration means as follows:

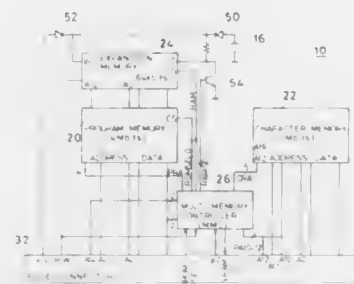
$$R = 2^{0.5 \max} - X(\text{last}).$$

**4,949,297**  
**ADDER HAVING MEANS FOR REDUCING PROPAGATION TIME OF CARRY BIT**  
 Shigeki Matsuoka, Suita, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
 Filed Aug. 25, 1988, Ser. No. 236,541  
 Claims priority, application Japan, Sep. 8, 1987, 62-224839  
 Int. Cl.<sup>3</sup> G06F 7/50  
 U.S. Cl. 364—787 14 Claims



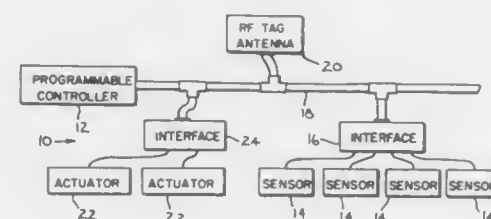
I. An adder comprising:  
 first input terminals for receiving bits of a first binary value;  
 second input terminals for receiving bits of a second binary value which is to be added to the first binary value;  
 a carry bit input terminal for receiving a carry bit signal;  
 a carry bit output terminal for outputting a carry bit signal;  
 a first switching circuit coupled between said carry bit input terminal and said carry bit output terminal;  
 a second switching circuit coupled between said carry bit output terminal and a first power source voltage;  
 a third switching circuit coupled between said carry bit output terminal and a second power source voltage;  
 wherein each of said second and third switching circuits comprises only a single transistor;  
 an adding circuit part for adding the bits of the first binary value received through said first input terminals and the bits of the second binary value received through said second input terminals;  
 a logic circuit for controlling ON/OFF states of said first through third switching circuits responsive to the bits of the first and second binary values received through said first and second input terminals,  
 said logic circuit supplying a control signal to each of said first through third switching circuits so that said first switching circuit is turned ON and said second and third switching circuits are turned OFF when all of the bits of the first binary value differ from the corresponding bits of the second binary value, said second switching circuit is turned ON and said first and third switching circuits are turned OFF when one bit of the first binary value coincides with a corresponding bit of the second binary value and corresponding bits on a higher significant side of the one bit differ from the first and second binary values, and otherwise said third switching circuit is turned ON and said second switching circuits are turned OFF.

**4,949,298**  
**MEMORY CARTRIDGE HAVING A MULTI-MEMORY CONTROLLER WITH MEMORY BANK SWITCHING CAPABILITIES AND DATA PROCESSING APPARATUS**  
 Yoshiaki Nakanishi, and Katsuya Nakagawa, both of Kyoto, Japan, assignors to Nintendo Company Limited, Kyoto, Japan  
 Filed Nov. 12, 1987, Ser. No. 119,551  
 Claims priority, application Japan, Nov. 19, 1986, 61-277543  
 Int. Cl.<sup>3</sup> G06F 12/00  
 U.S. Cl. 364—900 29 Claims



1. A memory cartridge which is removably connectable to a data processing unit that includes a microprocessor and a picture processing unit coupled to said microprocessor, said memory cartridge being loaded in said data processing unit when in use, said memory cartridge comprising:  
 a printed circuit board which is connected to said data processing unit when loaded therein,  
 at least one memory which is installed on said printed circuit board and whose memory area is divided into a plurality of banks, said at least one memory being coupled to said microprocessor and said picture processing unit when said memory cartridge is loaded in said data processing unit, and  
 memory controlling means which is installed on said printed circuit board, for receiving data representing bank switching conditions from said microprocessor, and for sending bank specifying address data for specifying a bank to said at least one memory, said memory controlling means including a plurality of registers into which said data from said microprocessor are loaded and address generating means for generating said bank specifying address data based on data from at least one of said plurality of registers.

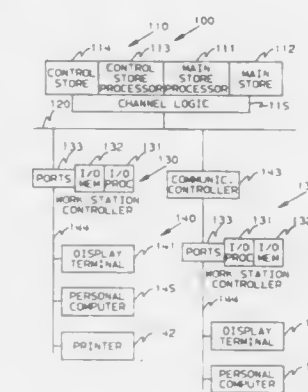
**4,949,299**  
**INDUSTRIAL CONTROL COMMUNICATION NETWORK AND METHOD**  
 Dennis C. Pickett, Waukesha, Wis., assignor to Allen-Bradley Company, Inc., Milwaukee, Wis.  
 Filed Dec. 4, 1987, Ser. No. 128,822  
 Int. Cl.<sup>3</sup> G06F 15/46  
 U.S. Cl. 364—900 11 Claims



1. In a communications network in which a computer gathers data from different sensor devices over a cable, the im-

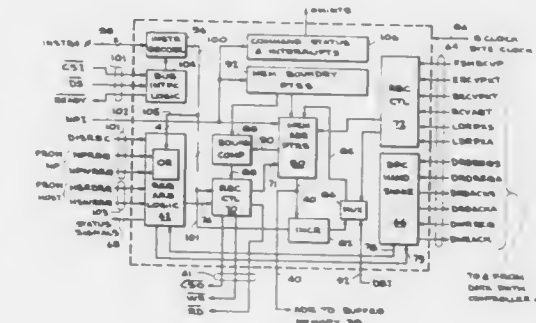
provement comprising an interface circuit coupling a sensor device to the cable, said interface circuit including:  
 means for receiving a message packet from said computer, said packet containing a plurality of operation commands for the sensor;  
 means for storing the plurality sensor operation commands received by said means for receiving;  
 means for sequentially sending data from each stored sensor operation command to the sensor device;  
 means for storing data from the sensor device in response to each sensor operation command; and  
 means for transmitting the response data to the computer.

**4,949,300**  
**SHARING WORD-PROCESSING FUNCTIONS AMONG MULTIPLE PROCESSORS**  
 Patrick J. Christenson; Craig W. Martens; David G. Wenz, and David N. Youngers, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.  
 Filed Jan. 7, 1988, Ser. No. 142,587  
 Int. Cl.<sup>3</sup> G06F 15/16, 15/21  
 U.S. Cl. 364—900 8 Claims



1. A method of performing an interactive task upon a data entity by means of a first central data processor and a second auxiliary data processor, said auxiliary processor being adapted for display to and input from an operator, said method comprising the steps of:  
 (a) storing said entire data entity in said central processor;  
 (b) transferring a portion of said data entity to said second processor;  
 (c) displaying at least some of said data-entity portion on said display under the control of code located in said auxiliary processor;  
 (d) receiving in said auxiliary processor a command input by said operator to perform a predetermined function upon said entity;  
 (e) if said function belongs to a first predefined category, performing said predetermined function in said central processor, by means of code located entirely in said central processor, upon said data entity located in said central processor;  
 (f) if said function belongs to a second predefined category, determining in said auxiliary processor whether said function involves only data in said data-entity portion located in said auxiliary processor;  
 (1) if so, performing said predetermined function entirely in said auxiliary processor, by means of program code located in said auxiliary processor, upon data located in said auxiliary processor;  
 (2) if not, performing the same predetermined function in said central processor, by means of program code located in said central processor, upon data in the same data entity located in said central processor.

**4,949,301**  
**IMPROVED POINTER FIFO CONTROLLER FOR CONVERTING A STANDARD RAM INTO A SIMULATED DUAL FIFO BY CONTROLLING THE RAM'S ADDRESS INPUTS**  
 Sunil P. Joshi, Campbell, and Venkatraman Iyer, Berkeley, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
 Filed Mar. 6, 1986, Ser. No. 836,936  
 Int. Cl.<sup>3</sup> G06F 12/00, 12/06, 12/08, 12/10  
 U.S. Cl. 364—900 40 Claims



1. An apparatus for controlling the address inputs of a memory, comprising:  
 first means for storing a plurality of address pointers;  
 second means coupled to said first means for selecting one of said address pointers and for outputting said selected address pointer to said memory;  
 third means coupled to said second means and to said first means for incrementing the selected address pointer and loading it back into said first means to replace the selected address pointer;  
 wherein said first means stores a write address pointer and read address pointer for receiving packets to be stored in said memory and a read address pointer and a write address pointer for transmit packets to be retrieved from said memory for transmission, said receive packets and transmit packets being received from and/or sent to said accessing devices;  
 further comprising an initialization bus coupled to said first means, and fourth means coupled to said initialization bus and said first means for receiving and storing starting address pointers on said initialization bus and said initialization bus for allowing independent setting of any of said address pointers to a selected address, and said fourth means also for causing said starting address pointers to be stored in said first means at predetermined times, wherein said first means includes a plurality of registers for storing said address pointers including a first register for storing a write pointer for receive packets and having an output coupled to said second means and a second register for storing a shadow write pointer for receive packets where said first and second registers have inputs and outputs, and further comprising first and second multiplexers having outputs coupled respectively to said inputs of said first and second registers, each said multiplexer having a plurality of inputs wherein one input of said first multiplexer is coupled to said third means for receiving the incremented value of said write pointer for receive packets when said second means selects the write pointer for receive packets for output to said memory and wherein the output of said second register is coupled to an input of each of said first and second multiplexers and wherein the output of said first register is coupled to an input of each of said first and second multiplexers.



4,949,302

## MESSAGE FILE FORMATION FOR COMPUTER PROGRAMS

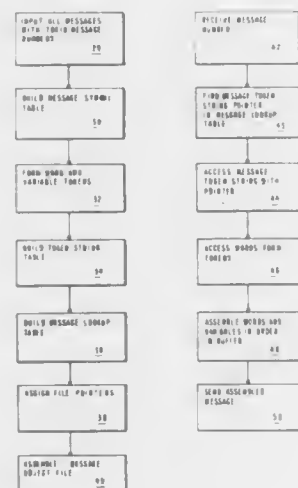
Hugh H. Arnold, and Thomas E. Hintz, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 17, 1986, Ser. No. 931,109

Int. Cl.<sup>3</sup> G06F 12/00, 3/00

U.S. Cl. 364—900

7 Claims



1. In a computer program containing a plurality of messages, each including a plurality of text words, a method for forming a data file of the messages comprising the steps of:

forming a first file portion as a message word table having unique entries corresponding to one or more of the message words, said entries ordered in said table in accordance with their frequency of occurrence in the plurality of messages;

forming a second file portion as a message token string table containing a token string for each message, each token string including a plurality of tokens each representing a word in the message, said tokens ordered in the string by the location of their corresponding words in the corresponding message, each token having a value representing the location of its corresponding word in the message word table, said tokens including at least one token to indicate the location of a variable in the message, said variable having a value being defined when the message is retrieved and wherein said variable includes a ring variable type indicating one of a plurality of values, said values stored as words in the message word table and indicated in said token string as a plurality of corresponding tokens following a token representing the ring variable, a specific value of a selected variable being provided when the message is retrieved; and

forming a third file portion as a message lookup table containing a unique identifier for each message and a corresponding pointer, said pointer indicating an address of the token string for the corresponding message.

4,949,303

## INFORMATION RETRIEVAL CONTROL SYSTEM WITH INPUT AND OUTPUT BUFFERS

Masayuki Hoshino, Odawara, and Haruo Hayami, Yokohama, both of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph and Telephone Corporation, both of Tokyo, Japan

Continuation of Ser. No. 845,350, Mar. 28, 1986. This

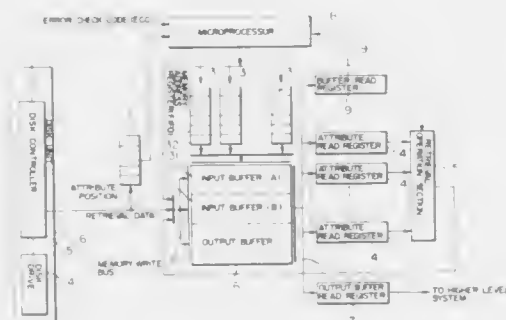
application Jan. 25, 1989, Ser. No. 302,074

Claims priority, application Japan, Mar. 29, 1985, 60-63605

Int. Cl.<sup>3</sup> G06F 3/06

U.S. Cl. 364—900

11 Claims



1. An information retrieval system for retrieving and processing attribute data items included in a plurality of tuples which form a plurality of records recorded on tracks of a rotating recording medium, each of said attribute data items having an attribute data portion and a length information portion which indicates the length of said attribute data portion, comprising:

(a) input/output buffer means including a first RAM for storing the attribute data items of at least one tuple read from the rotating recording medium and a second RAM for storing data obtained by processing data residing in an address space which is continuous in said first and second RAMs;

(b) means for supplying attribute data items read out from said rotating recording medium to said input/output buffer means for storing therein;

(c) means including a plurality of address registers coupled to said input/output buffer means for specifying addresses based on position and length information for reading of selected attribute data items stored in said input/output buffer means, each of said plurality of address registers including a sequence of queue buffers serially connected to sequentially provide said addresses to said input/output buffer means;

(d) retrieval operation means connected to said input/output buffer means for effecting an operation processing on attribute data items read out of said input/output buffer means, and for storing data resulting from the operation processing in said second RAM of said input/output buffer means; and

(e) control means for obtaining position and length information of each attribute data item contained in said data read from the rotating recording medium in parallel with storing the attribute data items of said at least one tuple into said input/output buffer means from said rotating recording medium, and for sequentially supplying the addresses of selected attribute data items based on said position and length information to said address registers.

4,949,304

## BLOCH LINE MEMORY DEVICE

Yoji Maruyama, Iruma; Tadashi Ikeda, Tsukui, and Ryo Suzuki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

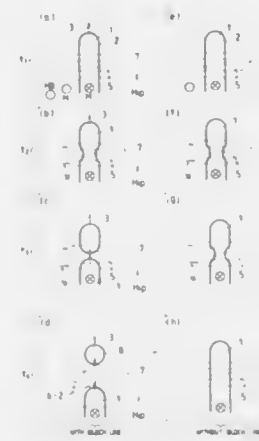
Filed Sep. 8, 1988, Ser. No. 241,731

Claims priority, application Japan, Sep. 16, 1987, 62-22950

Int. Cl.<sup>3</sup> G11C 19/08

U.S. Cl. 365—87

7 Claims



3. In a Bloch line memory device which employs as a storage information unit a Bloch line pair formed within a magnetic wall surrounding a stripe magnetic domain which is present in a ferromagnetic film having an axis of easy magnetization which is perpendicular to the plane of the film,

the improvement which is characterized in that, after said stripe magnetic domain has been shrunk in such a manner that no Bloch line is generated therein, said stripe magnetic domain is chopped off to form a magnetic bubble.

4,949,305

## ERASABLE READ-ONLY SEMICONDUCTOR MEMORY DEVICE

Tsuyoshi Toyama; Kenji Kohda; Nobuaki Andoh; Kenji Noguchi, and Shinichi Kobayashi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

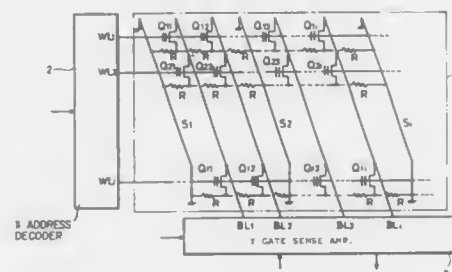
Filed Oct. 6, 1988, Ser. No. 254,232

Claims priority, application Japan, Oct. 21, 1987, 62-267184

Int. Cl.<sup>3</sup> G11C 7/00

U.S. Cl. 365—185

33 Claims



9. A semiconductor memory device, comprising:

a plurality of memory transistors arranged in a matrix of rows and columns, each said memory transistor having a drain electrode, a source electrode and a first control electrode for controlling conduction between said drain and source electrodes based on a threshold voltage representing stored information;

a plurality of bit lines for applying a bit line voltage to the drain electrodes of said plurality of memory transistors; ground lines continuously maintained at a predetermined constant voltage; and

interconnection means for interconnecting each one of said source electrodes of said plurality of memory transistors and said ground lines, said interconnection means including means for establishing substantially the same value of connection resistance between each one of said source electrodes and said ground lines.

4,949,306

## SENSE CIRCUIT AND SEMICONDUCTOR MEMORY HAVING A CURRENT-VOLTAGE CONVERTER CIRCUIT

Yoshinobu Nakagome, Albany, Calif.; Masakazu Aoki, Tokorozawa, Japan; Masashi Horiguchi, Kokubunji, Japan; Kiyoo Itoh, Higashikurume, Japan, and Shinichi Ikenaga, Koganei, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

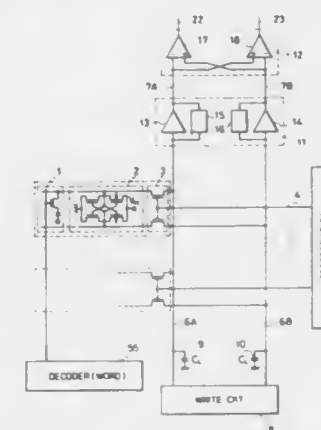
Filed Jun. 1, 1988, Ser. No. 201,015

Claims priority, application Japan, Jun. 19, 1987, 62-151113

Int. Cl.<sup>3</sup> G11C 7/02

U.S. Cl. 365—189.01

13 Claims



1. A semiconductor memory comprising:

a memory cell array comprising a plurality of memory cells each of which include at least one insulated gate field effect transistor;

a plurality of data lines to which the memory cells are connected;

decoder selecting a memory cell out of a plurality of memory cells and connecting it to the data line associated with the memory cell selected;

a sense amplifier connected to the data line to amplify a voltage according to the data on a data line connected to the selected memory cell;

a common line capable of connection to selected one of the plurality of data lines via a column switch selecting ones of the data lines in accordance with a column address; and a differential amplifier, connected to the common line, said differential amplifier including means for stabilizing the voltage of the common line and an amplifying mechanism.

4,949,307

## CIRCUIT FOR SENSING THE STATE OF MATRIX CELLS IN MOS EPROM MEMORIES INCLUDING AN OFFSET CURRENT GENERATOR

Giovanni Campardo, Bergamo, Italy, assignor to SGS-THOMSON Microelectronics srl, Milan, Italy

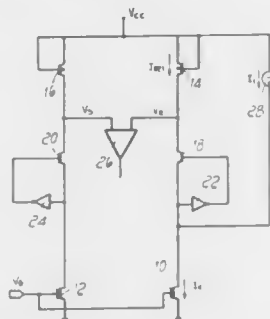
Filed Jan. 18, 1989, Ser. No. 298,487

Claims priority, application Italy, Jan. 29, 1988, 19254 A/88

Int. Cl.<sup>5</sup> G11C 13/00

U.S. Cl. 365—201

3 Claims



1. A circuit for sensing the virgin or written state of a matrix cell in MOS EPROM memories comprising:

- at least one matrix cell;
- a plurality of load means;
- a virgin reference cell, said matrix cell and said virgin reference cell having their respective sources connected to ground, having their respective drains connected to a voltage supply through respective ones of said plurality of load means, and their respective gates mutually interconnected with one another and controlled by a selection voltage;
- a differential amplifier having a first input and a second input respectively connected to said respective ones of said load means, said differential amplifier sensing the respective currents flowing across said virgin reference cell and said matrix cell; and
- a current generator means interconnecting the drain of said virgin reference cell and the supply voltage, for generating continuously a current which is constant when the voltage output by said voltage supply varies.

4,949,308

## STATIC RANDOM ACCESS MEMORY HAVING A FLASH CLEAR FUNCTION

Shigeo Araki; Hitoshi Taniguchi; Hiroyuki Suzuki, and Takaaki Komatsu, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

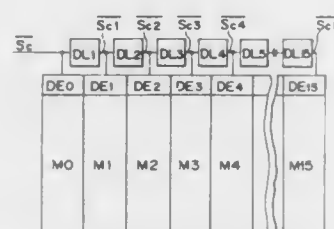
Filed Nov. 15, 1988, Ser. No. 271,619

Claims priority, application Japan, Nov. 17, 1987, 62-290408

Int. Cl.<sup>5</sup> G11C 7/00

U.S. Cl. 365—218

3 Claims



1. A static random access memory having a flash clear func-

tion which is activated by a flash clear command signal on a control line, comprising:

- a memory cell array which is divided into a plurality of memory cell groups;
- a plurality of decoders, each of which is associated with a different one of said memory cell groups and each of which drives its associated memory cell group when it receives a flash clear command signal; and
- means for controlling the decoders to operate sequentially for flash-clearing, by sequentially supplying the flash clear command signal to each of the decoders.

4,949,309

## EEPROM UTILIZING SINGLE TRANSISTOR PER CELL CAPABLE OF BOTH BYTE ERASE AND FLASH ERASE

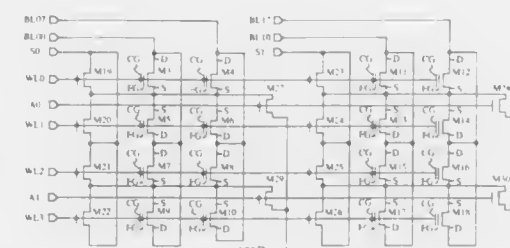
Kamesawara K. Rao, San Jose, Calif., assignor to Catalyst Semiconductor, Inc., Santa Clara, Calif.

Filed May 11, 1988, Ser. No. 192,580

Int. Cl.<sup>5</sup> G11C 11/40

U.S. Cl. 365—218

4 Claims



- Circuit comprising:
  - a first region of semiconductor material;
  - an array of floating gates organized into rows and columns, each of said floating gates being formed above but insulated from said first region of semiconductor material, each row of floating gates being organized into groups of floating gates within said row;
  - a plurality of control gate leads, each control gate lead being associated with one of said rows of floating gates, wherein each control gate lead extends over but is insulated from the floating gates within the associated row of floating gates;
  - a plurality of common source/drain regions formed within said first region of semiconductor material such that each common source/drain region is bordered on a first side by a first group of said floating gates from one of said rows while a second side is bordered by another group of said floating gates from another of said rows;
  - a plurality of source/drain regions formed within said first region of semiconductor material adjacent at least one of said floating gates such that each floating gate separates an associated one of said source/drain regions within said plurality from one of said common source/drain regions;
  - means for applying an erase voltage to said common source/drain regions in a first mode and a second mode such that in said first mode, all of said common source/drain regions simultaneously receive said erase voltage so that all of said floating gates are simultaneously erased, and in said second mode, fewer than all of said common source/drain regions receive said erase voltage so that fewer than all of said floating gates are erased.

4,949,310

## MALTESE CROSS PROCESSOR: A HIGH SPEED COMPOUND ACOUSTIC IMAGING SYSTEM

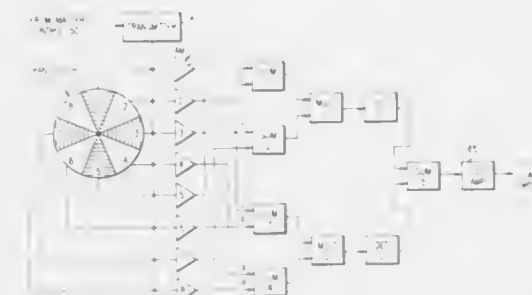
Stephen W. Smith, Rockville, Md., and Olaf T. Von Ramm, Hillsborough, N.C., assignors to Duke University, Durham, N.C.

Filed Nov. 21, 1988, Ser. No. 273,601

Int. Cl.<sup>5</sup> G03B 42/06

U.S. Cl. 367—7

12 Claims



- An electronic signal processing device for forming a compound image of a pulse-echo ultrasound imaging system wherein said ultrasound imaging system includes a two-dimensional array transducer and wherein said transducer comprises a plurality of cross-shaped apertures with each cross-shaped aperture having two orthogonal arms and with said transducer having a plurality of rectangular or pie-shaped segments, said processor further including a means for detecting the output of each of said cross-shaped apertures and a compound images means which receives the output of said means for detecting and which outputs a combined signal which forms said compound image, wherein said output of each of said cross-shaped apertures is provided by forming the product of the output signal from the orthogonal arms of said cross-shaped apertures.

4,949,311

## SINGLE LASER DIRECT READ AFTER WRITE SYSTEM (DRAW)

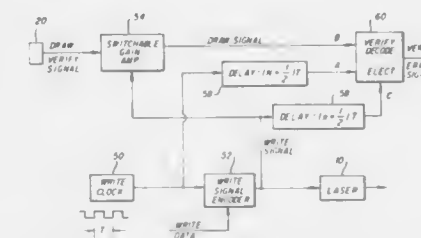
James A. Barnard, Conesus, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 22, 1988, Ser. No. 274,578

Int. Cl.<sup>5</sup> G11B 7/00

U.S. Cl. 369—54

12 Claims



- A single laser direct read after write system comprising:
  - a laser source for providing a first laser beam;
  - means for generating two parallel laser beams from said first laser beam;
  - means for focusing said two parallel laser beams spaced apart onto the recording track of a rotatable optical disk;
  - write means for switching the energy level of said first laser beam between a write level and a read level to cause the first of said parallel laser beams to write on said recording track;
  - detector means responsive to the reflections from the second

4,949,312

## ULTRASONIC DIAGNOSTIC APPARATUS AND PULSE COMPRESSION APPARATUS FOR USE THEREIN

Hiroshi Iwasawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1989, Ser. No. 339,113

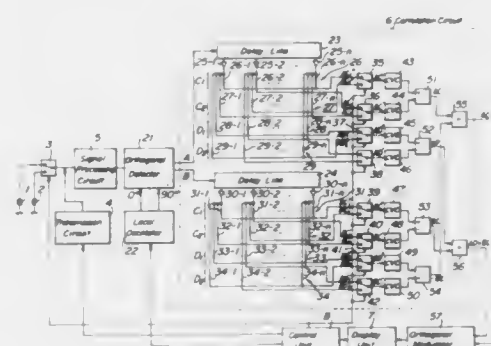
Claims priority, application Japan, Apr. 20, 1988, 63-95439;

Apr. 28, 1988, 63-104346; Jul. 19, 1988, 63-178128; Jan. 19, 1989, 1-8581

Int. Cl.<sup>5</sup> G03B 42/06

U.S. Cl. 367—7

15 Claims



- An ultrasonic diagnostic apparatus comprising:
  - an ultrasonic wave transmitting and receiving means, including a plurality of ultrasonic vibrating elements having different frequency characteristics, for transmitting an ultrasonic wave generated from a selected ultrasonic vibrating element and receiving an ultrasonic echo reflected from a body under inspection to produce an echo signal;
  - chirp signal generating means for generating a plurality of chirp signals each corresponding to respective ultrasonic vibrating elements and supplying one of the chirp signals corresponding to said selected ultrasonic vibrating element to said ultrasonic wave transmitting and receiving means to emit an ultrasonic chirp wave;
  - means for providing a plurality of reference signals each corresponding to respective ones of said ultrasonic vibrating elements;
  - pulse compressing means for compressing the echo signal by deriving a correlation between the echo signal and a reference wave signal which is selected from said plurality of reference wave signals, said selected reference wave signal corresponding to said selected ultrasonic vibrating element; and
  - display means for displaying an ultrasonic image of the body in accordance with a compressed echo signal supplied from said pulse compressing means.



4,949,313

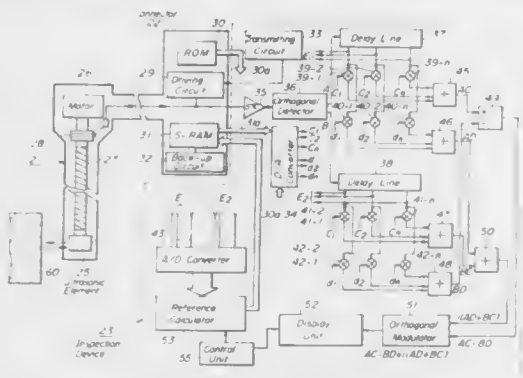
**ULTRASONIC DIAGNOSTIC APPARATUS AND PULSE COMPRESSION APPARATUS FOR USE THEREIN**  
Hiroshi Iwasawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1989, Ser. No. 339,112  
Claims priority, application Japan, Apr. 20, 1988, 63-95438;  
Jan. 18, 1989, 1-17721

Int. Cl. 5 G03B 42/06

U.S. Cl. 367-7

22 Claims



1. An ultrasonic diagnostic apparatus comprising transmitting means for transmitting toward a body under inspection an ultrasonic chirp wave whose frequency is varied in accordance with time; receiving means for receiving an ultrasonic wave reflected from the body under inspection to generate an echo signal; a reference wave forming means for forming a reference wave in accordance with an echo signal generated by said receiving means; a correlation means for deriving a correlation between said reference wave formed by said reference wave forming means and the echo signal from the body under inspection to generate a pulse-compressed echo signal; and a display means for displaying an ultrasonic image of the body under inspection in accordance with said pulse-compressed echo signal generated from said correlation means.

4,949,314

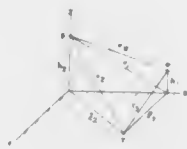
**METHOD AND MEANS FOR INCREASING ECHO-RANGING-SEARCH RATE**  
Francis J. Murphree, Sunnyside, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1966, Ser. No. 573,168

Int. Cl. 5 G01S 15/00

U.S. Cl. 367-88

11 Claims



1. An echo-ranging-search system comprising in combination: means, adapted for being moved along a predetermined navigation course, for broadcasting a predetermined energy along substantially that portion of said navigation

course already traversed and within an arcular volume bounded thereby and at a given angle; means connected to the input of the aforesaid broadcasting means for the timely energization thereof in such manner as to cause it to broadcast said predetermined energy; first receiving transducer means spatially disposed substantially a predetermined distance from said energy broadcasting means, within said arcular volume, and in such position as to follow a course substantially paralleling the predetermined navigation course already traversed by said energy broadcasting means; a second receiving transducer means contiguously disposed with said first transducer means and also disposed in such manner as to be responsive to incoming signals, including target echoes, which arrive thereat from substantially within a planar volume, the plane of which passes through said second receiving transducer means and is perpendicular to said already traversed navigation course; readout means; means connected between the output of said second transducer means and an input of said readout means for supplying the aforesaid incoming signals thereto; and means connected between the output of said first transducer means and an input of said readout means for timely initiating the readout of the incoming signals received by said second transducer means.

4,949,315

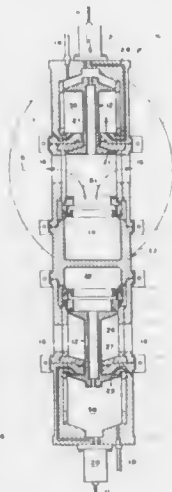
**EXTERNAL BUBBLE-SUPPRESSION METHOD AND APPARATUS**

Adrien P. Pasquet, 8925 - Houston, Tex. 77063  
Division of Ser. No. 118,430, Nov. 6, 1987, Pat. No. 4,875,545, which is a continuation-in-part of Ser. No. 703,342, Feb. 20, 1985, abandoned. This application Aug. 3, 1989, Ser. No. 389,361

Int. Cl. 5 H04R 23/00

U.S. Cl. 367-144

8 Claims



1. A marine acoustic source for generating impulsive acoustic signals in a body of water, comprising: a signal chamber containing a first change of a highly compressed gas; a normally-closed first fast-acting valve means normally maintaining said signal chamber closed and having discharge port means into the water; a second chamber containing a second change of a highly compressed gas; a normally-closed second fast-acting valve means normally maintaining said second chamber closed and having outlet means into the water; and control means for explosively opening said first valve means so as to release said first charge and thereby generate at a

first point within said body of water an impulsive acoustic signal and a first bubble, and for subsequently opening said second valve means to thereby release said second charge from said second chamber through said outlet means and into said water while said first bubble is substantially at its maximum volume such that the first bubble interacts but does not coalesce with the second bubble.

4,949,316

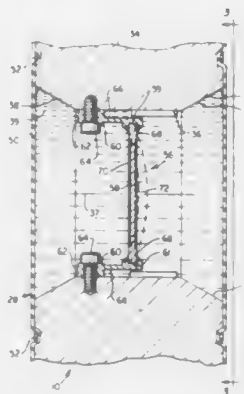
**ACOUSTIC LOGGING TOOL TRANSDUCERS**  
Keith W. Katahara, Allen, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 12, 1989, Ser. No. 405,918

Int. Cl. 5 G01V 1/40; H01L 41/08

U.S. Cl. 367-157

16 Claims



1. An acoustic wave signal-receiving transducer for a logging tool, particularly adapted for sensing an asymmetric pressure wave imposed on said logging tool when said logging tool is disposed in a wellbore, said logging tool including a body member forming a cavity, said transducer being disposed in said cavity and characterized by: a plate member disposed in said cavity for deflection in at least one direction; support means for supporting said plate member in said cavity at spaced apart points on said plate member; a fluid in said cavity for coupling said pressure wave to said plate member; and a piezoresistor disposed on said plate member and responsive to deflection of said plate member to produce an electrical signal proportional to the amount of deflection of said plate member.

4,949,317

**COMPLIANT UNDERWATER ACOUSTIC BAFFLE**  
Jim B. McQuitty, Adelphi; Arnat W. Martin, Spencerville, and David K. Studenick, Beltsville, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1967, Ser. No. 619,075

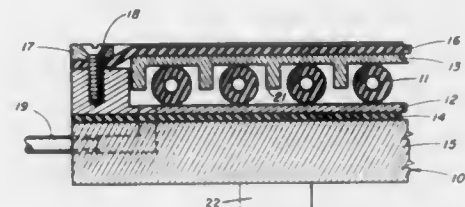
Int. Cl. 5 H04R 1/00

U.S. Cl. 367-176

9 Claims

1. An underwater acoustic baffle for mounting contiguous to an underwater acoustic transducer, comprising: a backing plate of a first acoustical impedance having a first surface to which the transducer is contiguously mounted and a second surface opposite the transducer; a fabricated acoustical insulation material of a second acoustical impedance substantially lower than said first acoustical impedance, said material including a first resilient sheet layer having a first surface bonded to said second surface of said backing plate and having a second surface, a second flat resilient sheet layer thinner than said backing plate having a

first surface bonded to said second surface of said first flat resilient sheet layer and having a second surface, a plurality of elongate, resilient, deformable compliant means interstitially disposed in parallel to one another and adjacent said second surface of said first metallic plate, a second metallic plate thinner than said backing plate dis-



- posed parallel to said first metallic plate and having a first surface adjacent said compliant means and having a second surface, means for constraining said compliant means from lateral displacement, a second flat resilient sheet layer bonded to said second surface of said second metallic plate.

4,949,318

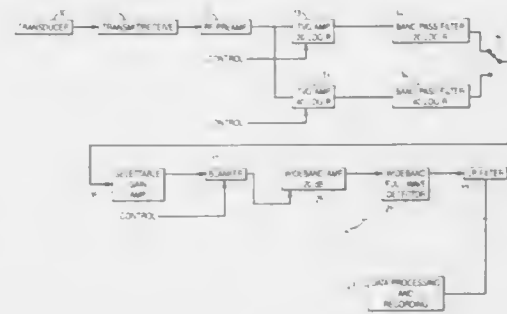
**HYDROACOUSTIC SONAR EQUIPMENT**  
Paul H. Patrick, 6345 Bell School Line, Milton, Ontario, Canada L9T 2Y1; Gerald A. Hunt, 70 Ontario Street, Georgetown, Ontario, Canada L7G 3L1, and Blair E. Sim, 23 English Street, Brampton, Ontario, Canada L6X 1L5

Filed Jan. 1, 1989, Ser. No. 360,200

Int. Cl. 5 G01S 15/00

U.S. Cl. 367-135

2 Claims



1. In a hydroacoustic sonar system comprising transmitter-receiver means for beaming a pulse modulated radio frequency acoustic signal towards a target and receiving an echo signal reflected from the target, and means for deriving from the received echo signal a time varied gain corrected electrical signal to be demodulated and recorded, an improved means for demodulating said electrical signal comprising an input amplifier having a bandwidth of at least 500 kHz, a full wave detector means having a bandwidth of at least 500 kHz, the detector being coupled to the output of the amplifier, and an active low pass filter coupled to the output of the detector, the low pass filter having a cut off frequency of at least 50 kHz.

4,949,319

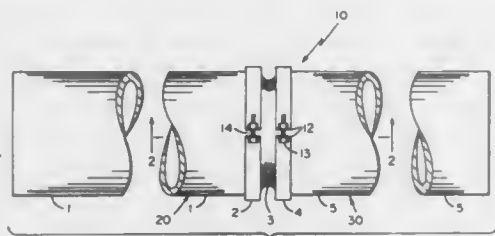
## SONAR TRANSDUCER JOINT SEAL

Richard W. Boeglin, N. Kingstown, and Arthur B. Joyal, Bristol, both of R.I., assignors to Raytheon Company, Lexington, Mass.

Filed Dec. 20, 1988, Ser. No. 286,688  
Int. Cl.<sup>5</sup> G01V 1/38

U.S. Cl. 367—154

13 Claims



1. A joint seal comprising:  
a pair of transducers, each having a shell having an interior;  
said shells each having a continuous periphery and an end having an opening to said interior;  
said shell ends being spaced from each other to form a gap between said ends;  
a flexible material joined by attachment to said shell ends forming a watertight barrier to said shell interior; and  
said material having a looped portion substantially extending into the gap between said shell ends causing a rolling seal motion which provides low resistance to motion between the shells.

4,949,320

## ACOUSTIC SIGNAL APPARATUS

Georg Karrenberg, Hauptstr. 26, D-8037 Olching, Fed. Rep. of Germany

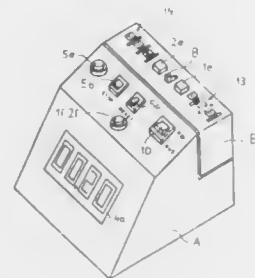
Continuation of Ser. No. 163,756, Jan. 19, 1988, abandoned. This application Aug. 17, 1989, Ser. No. 395,294

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1985, 3521911

Int. Cl.<sup>5</sup> G04F 8/00, 7/06

U.S. Cl. 368—109

3 Claims



1. An athletic timer device comprising:  
first, second and third sound generation means, each for generating a respective acoustic signal in response to first, second and third respective control signals;  
a first counter means for counting a first interval, for manually selecting the duration of said first interval, and for outputting said first control signal to said first sound generation means when said first interval has been counted;  
a second counter means connected to receive said first control signal for counting a second interval upon occurrence of said first control signal, for manually selecting the duration of said second interval, and for outputting said second control signal to said second sound generation means when said first interval has been counted; and  
a third counter means responsive to occurrence of said

second control signal for counting a third interval, for manually selecting the duration of said third interval, and for supplying said third control signal to said third sound generation means when said third interval has been counted.

4,949,321

## ULTRASOUND ECHO PROFILE SENSOR USED AS TACTILE SENSOR

Valentin Magori, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

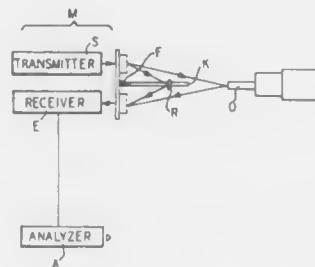
Filed Sep. 30, 1987, Ser. No. 102,725

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633268

Int. Cl.<sup>5</sup> G01S 15/08

U.S. Cl. 367—99

8 Claims



1. An ultrasound echo profile sensor for use as a tactile sensor, having an ultrasound measuring head containing a transmitter and a receiver and further having an entrained reference reflector by means of which momentary speed of sound of ambient air can be determined, whereby the respective distance of the tactile sensor from a sensor subject is to be correctly measured independently of the variable speed of sound of the ambient air because a reference echo caused by the reference reflector can be discriminated from situation echoes due to its known, approximate position, said reference reflector, whose distance from the ultrasound receiver is constant in a reference case in which there is no contact between the measuring head and the sensor subject, is arranged such that the distance between the ultrasound receiver and the reference reflector changes in a predetermined fashion relative to tactile contact between a sensor head and the sensor subject.

4,949,322

## RANDOM-PLAY CONTROL SYSTEM IN DISK PLAYER

Toshiyuki Kimura, Yoshio Aoyagi, and Fumio Endo, all of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

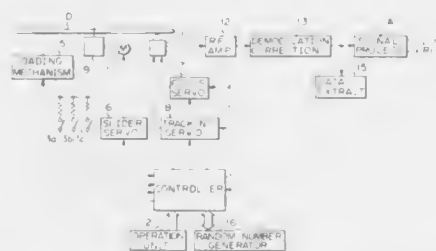
Filed Jun. 15, 1988, Ser. No. 206,816

Claims priority, application Japan, Aug. 22, 1987, 62-208773

Int. Cl.<sup>5</sup> G11B 17/22, 27/30

U.S. Cl. 369—32

3 Claims



1. A random-play control system in a disk player for playing

4,949,324

## DISC-TYPE RECORDING MEDIUM TRANSFER MECHANISM

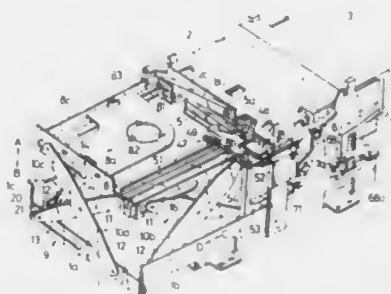
Tadao Arata, Inagi, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan

Filed Nov. 16, 1989, Ser. No. 437,262

Claims priority, application Japan, Apr. 4, 1989, 1-39896[U]  
Int. Cl.<sup>5</sup> G11B 17/26, 17/22

U.S. Cl. 369—36

12 Claims



1. A disc-type recording medium transfer mechanism comprising:  
(a) a magazine storage for releasably holding therein a magazine which has a plurality of disc trays releasably held therein and stacked one above another in a first direction for supporting thereon disc-type recording mediums, respectively;  
(b) a tray transfer means movable in said first direction and also in a second direction perpendicular to said first direction to reciprocate between a tray insertion/withdrawal position close to said magazine storage and a playback standby position remote from said tray magazine storage for transferring a selected one of the trays between a storage position within said magazine and said playback standby position;  
(c) a tray storage position memory member movable in said first direction and releasably engageable with said tray transfer means to move in said second direction together with said tray transfer means only when said tray transfer means is disposed in said tray insertion/withdrawal position, upon departure of said tray transfer means from said tray insertion/withdrawal position, said memory member being released from said tray transfer means and left over in a position of its previous engagement with said tray transfer mechanism assigned before said tray transfer means departs from said tray insertion/withdrawal position;  
(d) a drive means for moving said tray transfer means selectively in said first and second directions; and  
(e) a contact-type switch for controlling activation and de-activation of said drive means depending on the position of said memory member in said first direction.

4,949,325

## METHOD AND ASSOCIATED APPARATUS AND MEDIUM FOR OPTICAL RECORDING AND REPRODUCING INFORMATION

Toshiaki Tsuyoshi, Hachioji; Masatoshi Ohtake, Ome; Wasao Takasugi, Higashiyamato; Seiji Yonezawa, Hachioji; Takashi Takeuchi, Fujisawa, and Tadashi Saitoh, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,597

Claims priority, application Japan, Mar. 18, 1987, 62-61023  
Int. Cl.<sup>5</sup> G11B 7/00, 27/10

U.S. Cl. 369—49

13 Claims

1. A method of recording and reproducing an information signal on a recording layer of a recording medium based on a first clock signal produced in response to a readout signal of

a disk containing sub-code signals which identify a plurality of programs, said random-play control system comprising:

- a sub-code extractor for extracting said sub-code signals upon turn-on of a power source for the disk player;
- a random number generator for generating random number data by starting from an initial number obtained from one of the extracted sub-code signals independently of said random number generator; and
- determining means for determining one or more programs to be played in accordance with one or more random numbers of said random number data.

4,949,323

## DISK REPRODUCTION APPARATUS AND METHOD FOR HIGH SPEED ACCESSING OF DESIRED INFORMATION DATA BY CHECKING ADDRESS DATA

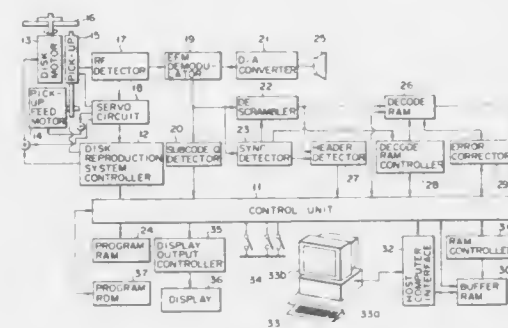
Takuji Yoshida, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 4, 1988, Ser. No. 228,213

Claims priority, application Japan, Aug. 7, 1987, 62-197517  
Int. Cl.<sup>5</sup> G11B 7/00

U.S. Cl. 369—32

15 Claims



1. An apparatus for controlling reproduction of information data recorded on a disk, the disk having a plurality of data blocks recorded thereon, each of said data blocks including a predetermined number of information data and address data which corresponds to each of said data blocks, said disk reproduction apparatus comprising:  
inputting means for inputting target address data, the target address data representing the address of the data block containing the desired information data;  
pick-up means for reading the information data and address data from the disk;  
memory means for storing the address data read by said pick-up means;  
first calculating means for calculating the difference between the address data stored in said memory means and the address data currently read by said pick-up means;  
second calculating means for calculating the difference between the address data currently read by said pick-up means and the target address data;  
control means for accepting the address data currently read by said pick-up means as being correct when either of the differences calculated by said first and second calculating means is within a preset value; and  
update means for updating the address data stored in said memory means with the address data currently read by said pick-up means.



1. An apparatus for pre-forming a relief pattern of substantially parallel recording tracks on an optical record-carrier comprising a substrate and a recording layer thereon in which information can be optically recorded by scanning with a beam of radiation producing a scanning spot on such layer, said tracks having a predetermined track period ( $P_T$ ); each track having servo-track portions alternating with sector addresses in the track direction, each sector address of a track having optically detectable pit areas separated by land areas so as to signify address information for a sector of the track; the servo-track portions and sector addresses producing different phase depths of reflected radiation when a track is scanned by a read beam of radiation; said apparatus comprising:

means for producing a beam of radiation for scanning said recording layer in accordance with said track patterns; modulating means for switching the intensity of said radiation beam in accordance with the servo-track portions and sector addresses to be formed in each track; an objective lens system for focussing the so-modulated radiation beam into a radiation spot on said recording layer to form thereon said servo-track portions and sector addresses of each of said tracks; and optical means arranged between said modulating means and said objective lens system for asymmetrically altering the radiation beam which enters the objective lens system so that it does not entirely fill the pupil thereof in a direction transverse to the track being scanned by such beam, thereby causing the shape of said radiation spot to be elongated in said transverse direction to an extent such that the servo-track portions and sector address pit areas formed thereby in each track have a maximum width in said transverse direction which exceeds approximately  $\frac{1}{2}P$ , and is less than approximately  $\frac{3}{4}P$ , whereby when said tracks are scanned by a radiation beam producing reflected radiation therefrom, the radiation from each sector address is adapted for integral detection so as to produce an address signal and the radiation from each servo-track portion is adapted for differential detection so as to produce a tracking signal signifying positioning errors of said beam with respect to such servo-track portion.

4,949,331

#### APPARATUS AND RECORD CARRIER FOR OPTICAL DISC MEMORY WITH CORRECTION PATTERN AND MASTER DISC CUTTING APPARATUS

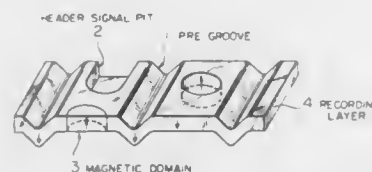
Takeshi Maeda, Kokubunji; Yoshito Tsunoda, Mitaka; Kazuo Shigematsu, Saitama, and Toshimitsu Kaku, Sagami, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jun. 17, 1986, Ser. No. 875,442

Claims priority, application Japan, Jun. 19, 1985, 60-131850; Dec. 6, 1985, 60-273227

Int. Cl. G11B 3/78

U.S. Cl. 369—275.3

13 Claims



1. A record carrier having a track offset correction pattern comprising a disc-shaped substrate, a recording layer formed on said substrate, first and second regions alternately arranged along the rotational direction of the record carrier, guide grooves disposed in at least said second region and extending in the rotational direction of the record carrier while being spaced apart in the radial direction of the record carrier, a land extending in the rotational direction of the record carrier between adjacent guide grooves, said adjacent guide grooves serving as an optical guide for a light spot which follows on a center line between said adjacent guide grooves, said first region including said correction pattern for correcting track offset, and said correction pattern having at least first elements which are different in optical characteristic from said guide grooves and are provided in said first region while extending on center lines of said guide grooves so that said first elements of said adjacent guide grooves do not overlap each other when viewed in the radial direction of the record carrier, wherein said correction pattern further includes at least one second element which is different in optical characteristic from said guide grooves and is provided on said land in said first region on the center line between said adjacent guide grooves so that said at least one second element overlaps at least a respective

one of said first elements of said adjacent guide grooves when viewed in the radial direction of the record carrier.

4,949,332

#### OPTICAL RECORD CARRIER HAVING CONTRAST ENHANCING INFORMATION AND SERVO-TRACKS

Aartje W. Veenis, and Winslow M. Minnagh, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

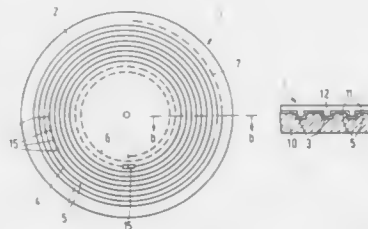
Filed May 9, 1988, Ser. No. 191,505

Claims priority, application Netherlands, Feb. 3, 1988, 8800255

Int. Cl. G11B 7/00

U.S. Cl. 369—275.3

4 Claims



1. An optical record carrier for optically readable information, said record carrier comprising a substrate having an information surface including a structure of servo-tracks which are also used for recording information and which alternate in a transversal direction relative to track orientation, having intermediate strips located in an information plane, while the servo-tracks are located in a second plane, the structure of servo-tracks having a predetermined transversal track period and being provided with an inscribable recording layer for writing optically detectable information areas in the servo-tracks, said record carrier further comprising one of the following combinations to increase the contrast between the servo-tracks provided with information areas and the intermediate tracks:

- a first recording layer responsive to writing by increasing its reflectivity relative to that of unwritten portions of the first recording layer and a first servo-track width which exceeds half of the transversal track period,
- a second recording layer responsive to writing by decreasing its reflectivity relative to that of unwritten portions of the second recording layer and a second servo-track width which less than half of the transversal track period, and means for appropriately identifying presence of the first or the second servo-track width.

4,949,333

#### ENHANCED UNIVERSAL ASYNCHRONOUS RECEIVER-TRANSMITTER

Dale E. Gulick; Terry G. Lawell, both of Austin, Tex., and Charles Crowe, Germantown, Tenn., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 35,684, Apr. 2, 1987, abandoned. This application Nov. 27, 1989, Ser. No. 443,088

Int. Cl. H04J 15/00; H04L 5/14

U.S. Cl. 370—32

17 Claims

1. A universal asynchronous receiver-transmitter device configured for connection to full-duplex means for low-speed serial receipt and transmission of data signals, the device having an internal bus and being selectively operable in a synchronous mode, the device comprising:

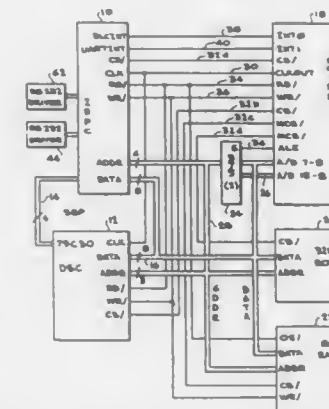
- a means for generating an asynchronous clock signal;
- a receive clock multiplexer means for receiving a synchronous receive clock signal and said asynchronous clock signal and for generating a receive clock signal in response to a receive synchronous/asynchronous mode selection;
- a serial-to-parallel receive shift register means for receiving

serial incoming data signals and said receive clock signal and generating parallel incoming data signals representative of said serial incoming data signals;

a first-in, first-out receive register means for successively receiving said parallel incoming data signals and storing a plurality of said parallel incoming data signals, said first-in, first-out receive register means successively introducing parallel received signals to said internal bus, each successive said parallel received signal respectively being representative of the earliest received parallel incoming data signal extant in said first-in, first-out receive register means;

said first-in, first-out receive register means being programmable to define an incoming threshold number of said parallel incoming data signals which comprises said plurality of parallel incoming data signals;

a transmit clock multiplexer means for receiving said synchronous receive clock signal and said asynchronous clock signal and for generating a transmit clock signal in



response to a transmit synchronous/asynchronous mode selection;

a first-in, first-out transmit register means for successively receiving parallel outgoing data signals from said internal bus and storing a plurality of said parallel outgoing data signals, said first-in, first-out transmit register means successively presenting parallel transmit signals at a FIFO transmit register output, each successive parallel transmit signal respectively being representative of the earliest received parallel outgoing data signal extant in said first-in, first-out transmit register means;

said first-in, first-out transmit register means being programmable to define an outgoing threshold number of said parallel outgoing data signals which comprises said plurality of said parallel outgoing data signals;

a parallel-to-serial transmit shift register means for receiving said transmit clock signal and said parallel transmit signals, said transmit shift register means generating serial outgoing data signals representative of said parallel transmit signals.

4,949,334

#### PROTECTED INFORMATION TRANSFER SYSTEM

Keith L. Bernhardt, Raleigh, N.C., assignor to Alcatel NA, Inc., Hickory, N.C.

Filed Apr. 21, 1989, Ser. No. 341,551

Int. Cl. H04J 3/08

U.S. Cl. 370—55

11 Claims

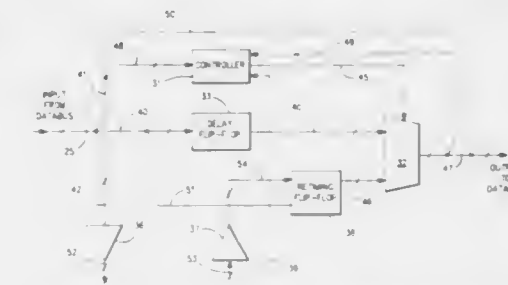
1. An information transfer system, adapted for use with add/drop modules for reading data from a data bus and/or adding data to a data bus, said system including at least one add/drop interface connected in series with the data bus and constructed for connection to an add/drop module, said interface comprising:

a data input for connection to the data bus;

a data output for connection to the data bus;

means for connecting to an add/drop module, said means including a module output connected to the data input for providing data from the data bus to the add/drop module, a module input for receiving data from the add/drop module, and signal means for receiving a module present signal from the add/drop module;

multiplexing means having a first input connected to the data input for receiving data from the data bus and a second input connected to the module input for receiving data from the add/drop module, said multiplexing means being



responsive to an output control signal for selecting the data on one of said first and second inputs, and for transmitting said selected data to the data output for transmission on the data bus; and

control means connected to the means for connecting to an add/drop module for receiving the module present signal therefrom and for providing said output control signal to said multiplexing means in response to said module present signal, whereby said multiplexing means transmits the data received from the add/drop module when a module is present, and transmits the data received from the data bus when an add/drop module is not present.

4,949,335

#### A TDM QUASI-DUPLEX SYSTEM

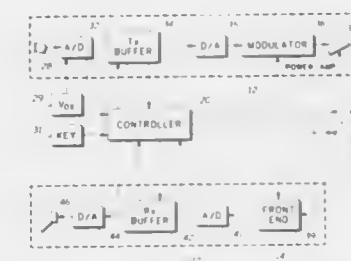
Morris A. Moore, West Palm Beach, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 23, 1989, Ser. No. 300,673

Int. Cl. H04J 3/16; H04B 1/54

U.S. Cl. 370—29

12 Claims



1. A method for communicating a voice signal between at least two stations via a time division multiplexed communication channel arranged into voice segments and data segments, comprising the steps of:

- at a first station:
  - (a) transmitting a voice signal during at least one of said voice segments allocated to said first station for transmitting voice;
  - (b) receiving a command code during at least one of said data segments allocated to a second station for transmitting data; and
  - (c) exchanging segment allocation so as to receive voice



signals during at least one of said voice segments allocated for transmitting voice by said second station in response to said command code; and

at said second station:

- receiving said voice signal during at least one of said voice segments allocated to said first station for transmitting voice;
- transmitting said command code during at least one of said data segments allocated to said second station for transmitting data; and
- exchanging segment allocation for transmitting a voice signal during at least one of said voice segments allocated for transmitting voice by said second station in response to said command code.

4,949,336

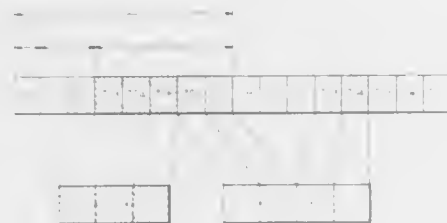
## MULTI-SLOT ACCESS SYSTEM

Takui Hamada, Hitachi, Masahiro Takahashi, Katsuhiko Yoneda, both of Hitachi, and Masakazu Okada, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 13, 1988, Ser. No. 218,130

Claims priority, application Japan, Jul. 15, 1987, 61-174672  
Int. Cl.<sup>5</sup> H04J 3/00

U.S. Cl. 370—85.2

2 Claims



1. A multi-slot access method for transmitting information on an annular transmitting apparatus having a ring-like transmission path realized by interconnecting serially a plurality of transmission stations in an annular form, at least one of said transmissions stations generating repetitively a transmitting signal referred to as a transmission frame which includes a plurality of transmission units referred to as time slots, said frame being circulated along said transmission path, wherein transmission of information among transmission stations is performed in such a manner in which each of said transmission stations having a request to send information divides said information into a plurality of information units and inserts each of said information units in a time slot, said information units being received by the transmission station destined to receive said information, said multi-slot access method comprising the steps of:

- providing with each of said time slots an area which includes an indicator for indicating whether the associated time slot is "free" or "busy"; and
- determining in a transmission station having a request to send information that sending of said information is enabled when it is detected that one time slot located at a particular position within said frame is "free" or when it is detected that the time slot succeeding immediately to a "busy" slot is "free", to thereby set successively those usable time slots which succeed to said detected "free" time slot to the "busy" state and insert said information units in said usable time slots; or
- permitting, when there is a free slot detected after a specified slot in a transmission frame before said request to send information, information having a continuous format occupying successive time slots of a next transmission frame to be inserted in said free time slots; and
- permitting, when there is a busy slot detected before said request to said information immediately after said busy

slot, information having a continuous format occupying successive time slot to be inserted in said free time slots.

4,949,337

## TOKEN PASSING COMMUNICATION NETWORK INCLUDING A NODE WHICH MAINTAINS AND TRANSMITS A LIST SPECIFYING THE ORDER IN WHICH THE TOKEN IS PASSED

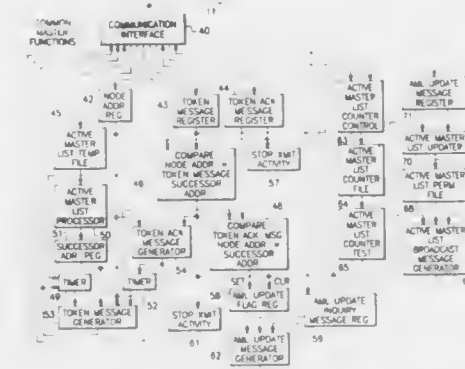
John R. Aggers, Apple Valley, and Roger R. Roth, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 30, 1989, Ser. No. 303,427

Int. Cl.<sup>5</sup> H04J 3/02, 3/16

U.S. Cl. 370—85.4

9 Claims



1. In a communications network comprising a plurality of master nodes all connected to a single data bus comprising a pair of electrical conductors and each node including a node address register whose contents are a node address preassigned to the node, each of the nodes of the type having an active mode during which the node may provide on the data bus a plurality of different messages comprising electrical signals for communicating with the other nodes, and each of said nodes including a successor address register dedicated to storing a network address different from the content of the node address register, said active mode of a node being initiated responsive to receiving on the data bus signals encoding a token message having a preselected unique identifying format and including a successor address equal to the contents of the node address register of the node, and each said node further transmitting a token message including a successor address comprising the address stored in the successor address register of the node and terminating the active mode responsive to the receipt on the data bus of a token acknowledge signal having a preselected unique identifying format, and wherein a first of the master nodes includes an address memory in which may be stored an active master list including the contents of the node address registers of active master nodes in the network and further, specifying a successor address for each of the node addresses included in the active master list, the improvement comprising

- in the first of the master nodes, an active master list broadcast means for providing signals on the data bus encoding therein an active master list message having a preselected unique identifying format and including at least a part of the active master list stored in the address memory; and
- in each of the master nodes, means for receiving the active master list message on the data bus from the first of the master nodes, means responsive to the active master list message identifying format for extracting therefrom the successor address specified in the active master list for the network address of the master node involved, and means for storing the network address so extracted in the successor address register of the master node involved.

4,949,338

## ARBITRATION IN MULTIPROCESSOR COMMUNICATION NODE

Nandakishore A. Albal, Sunrise, and Pradeep K. Goyal, Ft. Lauderdale, both of Fla., assignors to Rascal Data Communications Inc., Sunrise, Fla.

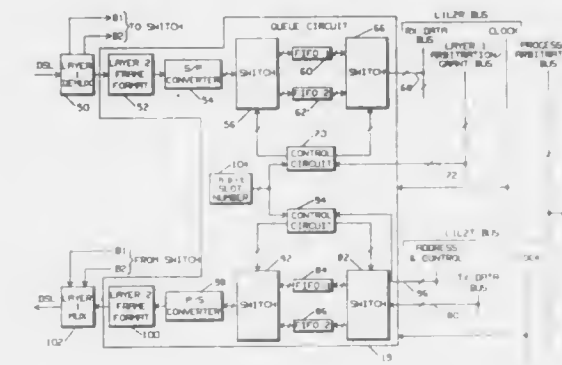
Division of Ser. No. 35,130, Apr. 6, 1987, Pat. No. 4,821,265.

This application Nov. 14, 1988, Ser. No. 271,210

Int. Cl.<sup>5</sup> H04J 3/02

U.S. Cl. 370—85.6

10 Claims



1. A method of arbitrating among a plurality of processors sharing a common bus to determine which one of said processors obtains access to said bus, comprising the steps of: assigning an arbitrary unique processor number N to each of said processors; assigning a constant  $\beta$  to each of said processors, said constant being indicative of the relative computing power of each of said processors; determining how many previous unsuccessful attempts F each of said processors has made to access said common bus, where F is an integer; computing a priority number PN for each of said processors as follows:

$$PN = \text{CON}(\beta F, N);$$

and granting access to said common bus to said processor having the largest value of PN.

4,949,339

## MULTIPLEXER APPARATUS ADAPTABLE FOR TWO KINDS OF TRANSMISSION RATES

Naohiro Shimada, Tokyo; Toehyuki Nishina, and Hiroyuki Sugawara, both of Miyagi, all of Japan, assignors to NEC Corporation, Tokyo, Japan

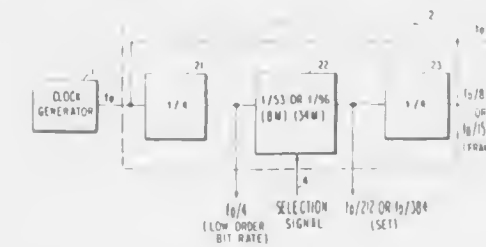
Filed Sep. 6, 1988, Ser. No. 240,334

Claims priority, application Japan, Sep. 3, 1987, 62-219170; Sep. 3, 1987, 62-219171; May 31, 1988, 63-131663; May 31, 1988, 63-131664

Int. Cl.<sup>5</sup> H04J 3/02; H04Q 11/04

U.S. Cl. 370—112

14 Claims



1. A multiplexer apparatus adaptable for operation at two or

more different transmission rates, and for multiplexing at least two lower speed bit streams, each of said lower speed bit streams at a selected one of a plurality of predetermined bit rates, into a single higher speed bits stream at a selected one of a plurality of predetermined bit rates, comprising:

- reference clock means for supplying a reference clock for the operation of the multiplexer apparatus;
- pulse generating means responsive to the reference clock for generating a set of timing pulses, pulse rates of the set of timing pulses being changed in response to a selection signal designating bit rates of the lower speed bit streams and the higher speed bit stream;
- buffer memory means responsive to selected timing pulses of the set of timing pulses for temporarily storing said lower speed bit streams; and
- multiplexer means responsive to the set of timing pulses for multiplexing said lower speed bit streams read out of said buffer memory means into said higher speed bit stream.

4,949,340

## REDUNDANT REPEATER

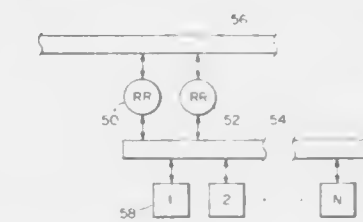
Mark L. Smith, Salem, Mass.; Joseph J. Nicosia, Hudson, N.H.; Daniel A. Boudreau, Westford, Mass., and Leo A. Goyette, Salem, N.H., assignors to Xyplex, Inc., Boxboro, Mass.

Filed Jul. 21, 1988, Ser. No. 222,148

Int. Cl.<sup>5</sup> G06F 11/20

U.S. Cl. 371—8.2

30 Claims



1. An apparatus for repeating information between a plurality of transmission mediums, said apparatus comprising: a repeater connected between two of said transmission mediums for repeating information received on one transmission medium to its other transmission medium; and a second repeater connected between two of said transmission mediums for repeating information received on one transmission medium to its other transmission medium, wherein at least one of said repeaters detects whether information is being independently repeated between its respective transmission mediums and does not repeat any information if information is being so repeated, said one repeater repeating information if information is not being so repeated.

4,949,341

## BUILT-IN SELF TEST METHOD FOR APPLICATION SPECIFIC INTEGRATED CIRCUIT LIBRARIES

David E. Lopez, and Tomas Colunga, both of Tempe, Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Oct. 28, 1988, Ser. No. 263,855

Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371—25.1

21 Claims

1. A circuit for testing a plurality of logic states of each of a plurality of cells, said circuit comprising: first means for generating a plurality of binary signals; second means responsive to said plurality of binary signals for converting said binary signals into Gray code signals, said binary and Gray code signals being sequentially applied to the plurality of cells of producing a plurality of input stimuli thereat to generate the plurality of logic states within the plurality of cells; and



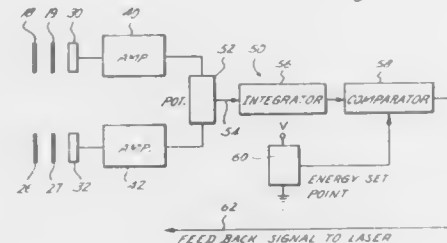
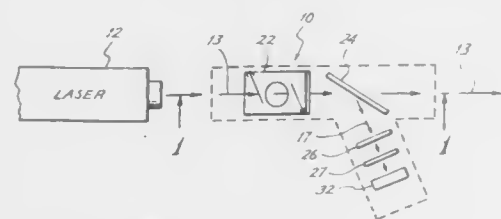
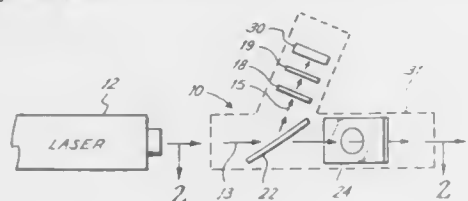


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comparing the total energy with a predetermined energy set point, and



controlling the energy output of the laser beam in response to the comparison of the total energy with the set point.

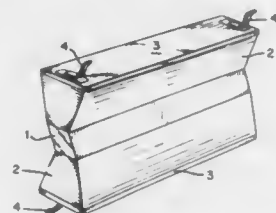
#### 4,949,346 CONDUCTIVELY COOLED, DIODE-PUMPED SOLID-STATE SLAB LASER

Jerry W. Kuper, Martinsville, and William R. Rapoport, Bridgewater, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Aug. 14, 1989, Ser. No. 393,185  
Int. Cl.<sup>5</sup> H01S 3/04

U.S. Cl. 372-36

10 Claims



1. A conductively cooled, optically diode-pumped slab laser apparatus comprising, in combination:

- (a) an elongated slab of active laser host having two opposite ends, two opposed sides, and a pair of parallel, optically plane faces extending along its length for receiving radiation for optical pumping of the host, and for acting as total internal reflective surfaces for creating internal optical paths;
- (b) first and second transparent, thermally conductive solid heat sink means, each having an optically plane face which is dimensioned to match and is bonded to a parallel optically plane face of said laser host by means of a bonding agent having a refractive index which is smaller than the refractive index of the laser host, said heat sink means having a substantially flat surface opposite the one cavity optically plane face for mounting semiconductor diode pumping means; and
- (c) semiconductor diode pumping means mounted on said heat sink means for exciting the laser host.

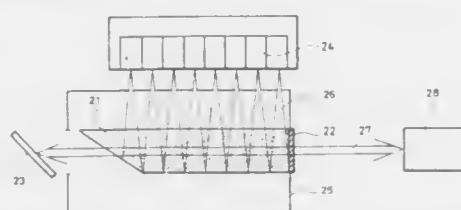
#### 4,949,347 DIAMOND LASER, METHOD FOR PRODUCING THE SAME, AND METHOD FOR ACTIVATING SUCH A LASER

Shuichi Satoh, Kazuo Tsuji, and Takeru Nakashima, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 3, 1989, Ser. No. 306,813  
Claims priority, application Japan, Feb. 5, 1988, 63-26372  
Int. Cl.<sup>5</sup> H01S 3/16

U.S. Cl. 372-41

7 Claims



1. A laser emitting synthetic diamond, comprising H<sub>2</sub> centers with a maximum optical density in the direction of a pumping light within the range of 0.01 to 4 and a lasing ability in the range of 1000 to 1400 nm in response to an external pumping light having a wavelength within the range of 650 to 950 nm.

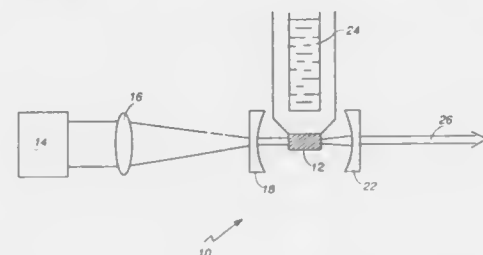
#### 4,949,348 BLUE-GREEN UPCONVERSION LASER

Dinh C. Nguyen, and George E. Faulkner, both of Los Alamos, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Aug. 25, 1989, Ser. No. 398,585  
Int. Cl.<sup>5</sup> H01S 3/16

U.S. Cl. 372-41

6 Claims



1. A blue-green laser comprising:

- a laser rod having a host crystal doped with Tm<sup>3+</sup>;
- a first pumping laser to excite said Tm<sup>3+</sup> from a ground state to a first excited in the <sup>3</sup>H<sub>4</sub> manifold; and
- a second pumping laser effective to excite said Tm<sup>3+</sup> from said first state to a second excited state in the <sup>1</sup>D<sub>2</sub> manifold for transition to a relatively low state in the <sup>3</sup>H<sub>6</sub> manifold at a wavelength in said blue-green range.

#### 4,949,349 DOUBLE-HETEROSTRUCTURE SEMICONDUCTOR WITH MESA STRIPE WAVEGUIDE

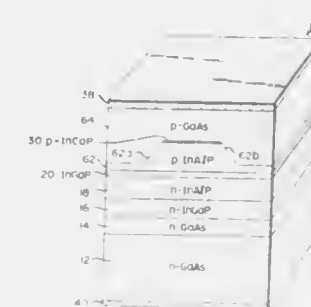
Yasuo Ohba, Yokohama, Japan; Niyoko Watanabe, Halifax, Canada; Hideto Sugawara; Masayuki Ishikawa, both of Tokyo, Japan; Yukio Watanabe, Yokohama, and Motoyuki Yamamoto, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 83,189, Aug. 10, 1987, Pat. No. 4,809,287. This application Dec. 5, 1988, Ser. No. 279,816  
Claims priority, application Japan, Aug. 8, 1986, 61-186505; Sep. 26, 1986, 61-225842

Int. Cl.<sup>5</sup> H01S 3/19

U.S. Cl. 372-45

17 Claims



1. A semiconductor laser for emitting a laser light, comprising:

- a semiconductive substrate of a first conductivity type made of a III-V compound semiconductor material;
- a first semiconductor cladding layer of the first conductivity type disposed above said substrate;
- an active layer made of a semiconductor film and provided on said cladding layer, said active layer serving as a light emission layer;
- a first terminal electrode connected to said first cladding layer;
- a second semiconductive cladding layer of a second conductivity type provided on said active layer to constitute a double hetero-structure, said second cladding layer being made of a specific III-V compound semiconductor material comprising at least indium, aluminum and phosphorus; conductive layer means for serving as a second terminal electrode of said laser;
- a contact layer provided between said second cladding layer and said conductive layer means, having a band gap which has a value between those of said second cladding layer and of said conductive layer means, said contact layer being formed on a part of said second cladding layer so as to define a current flowing region in said second cladding layer, said current flowing region serving as a part of a light waveguide channel of said laser; and
- said conductive layer means being made of a specific III-V compound semiconductor material comprising at least arsenide.

#### 4,949,350 SURFACE EMITTING SEMICONDUCTOR LASER

Jack L. Jewell, Bridgewater, and Axel Scherer, Matawan, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Jun. 17, 1989, Ser. No. 380,996  
Int. Cl.<sup>5</sup> H01S 3/19

U.S. Cl. 372-45

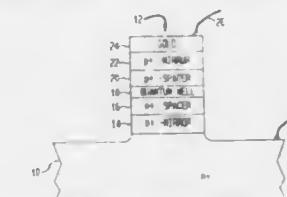
13 Claims

1. A vertical-cavity, surface emitting laser, comprising:  
a crystalline substrate;  
a lower multiple layer interference mirror epitaxially formed on said substrate, said layers being arranged in a vertical direction;  
an active region comprising at least one quantum well layer

epitaxially formed on said lower mirror and lasing a predetermined wavelength  $\lambda$ ;  
an upper multiple layer interference mirror epitaxially formed on said active region;

a lower and an upper spacer region interposed between said active region and respective ones of said mirrors and epitaxial therewith to provide a vertical optical cavity between opposing faces of said mirrors separated by an optical distance L of a predetermined relationship to said wavelength  $\lambda$ ; and

wherein at least said active region, said upper spacer region and said upper mirror are formed into a vertical wave-



guiding region having a substantially constant cross-section area A and an effective dielectric constant n below said upper mirror;

said laser further comprising:

- a medium laterally substantially surrounding said waveguiding region and having a dielectric constant less than said effective dielectric constant n; and
- two electrical contact regions, one of said electrical contact regions being electrically connected to said waveguiding region above said active region, electrical power applied to said contact regions causing said laser to lase at said wavelength  $\lambda$  with a loss per pass of S; wherein a waveguiding confinement factor

$$W = \frac{4 \cdot L \cdot \lambda}{n \cdot S \cdot A}$$

has a value approximately equal to or greater than 17.

#### 4,949,351 SURFACE-EMITTING SEMICONDUCTOR LASER AND MANUFACTURING METHOD OF SAME

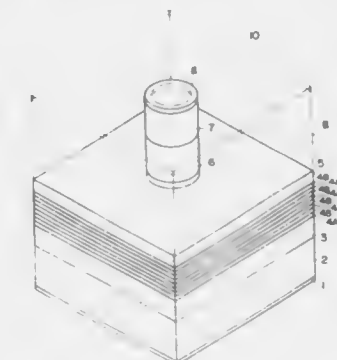
Koichi Imanaka, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 12, 1989, Ser. No. 337,095

Claims priority, application Japan, Apr. 15, 1988, 63-91632  
Int. Cl.<sup>5</sup> H01S 3/19; H01L 27/12, 33/00

U.S. Cl. 372-45

3 Claims



1. A surface-emitting semiconductor laser comprising:  
a first electrode;

an n-type semiconductor substrate disposed on said first electrode;  
 a lower reflection mirror including a semiconductor multi-layer supported on said substrate;  
 an upper reflection mirror formed of TiPtAu, said upper reflection mirror comprising a second electrode;  
 a double heterojunction disposed between said lower reflection mirror and said upper reflection mirror, said double heterojunction comprising a first clad layer adjacent said upper reflection mirror, a second clad layer adjacent said lower reflection mirror and an active layer disposed between said first clad layer and said second clad layer; and  
 an insulating material disposed around a periphery of said double heterojunction so as to surround said double heterojunction, whereby said laser emits light in an upward direction away from a side of said first clad layer directed away from said first electrode.

4,949,352

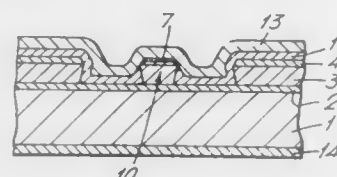
## LASER MANUFACTURE

Richard G. S. Plumb, Ipswich, England, assignor to ITT Corporation, New York, N.Y.  
 Division of Ser. No. 861,015, May 8, 1986, Pat. No. 4,830,986.  
 This application Jan. 17, 1989, Ser. No. 296,946  
 Claims priority, application United Kingdom, May 15, 1985, 8512321

Int. Cl.<sup>3</sup> H01S 3/19

U.S. Cl. 372-46

7 Claims

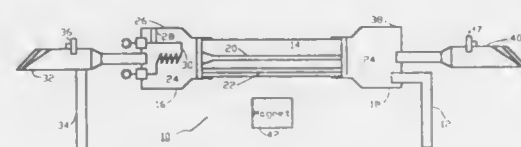


1. A laser wafer having a multilayer structure, for use in a ridge waveguide laser, comprising in order:  
 a substrate layer;  
 an active layer provided on the substrate layer;  
 a passive layer provided on the active layer having a pair of channels etched therein down to the active layer on each side of a central ridge layer, each channel being defined by a pair of opposing sidewalls extending upwardly from the active layer, and the central ridge layer having a given width at an upper surface thereof and being defined by an adjoining sidewall of each of the channels which is undercut from the width of the upper surface to a narrower width at the active layer;  
 a cap layer provided on the passive layer on each side of the pair of channels and on the central ridge layer but not in the channels etched in the passive layer;  
 an insulating layer provided on the cap layer on each side of the pair of channels, in the channels on the active layers, and along the sidewalls of each channel including the sidewalls adjoining the central ridge layer, wherein the insulating layer terminates on the adjoining sidewalls of the central ridge layer exactly at the undercut upper surface of the central ridge layer due to the undercutting of the adjoining sidewalls thereof, and does not extend onto the upper surface of the central ridge layer; and  
 a metallization layer provided on the insulating layer.

4,949,353  
 LASER PROCESSING  
 Holger Jaenisch, Rosemead, Calif., assignor to Talandic Research Corporation, Azusa, Calif.  
 Filed Jan. 4, 1989, Ser. No. 293,264  
 Int. Cl.<sup>3</sup> H01S 3/22

U.S. Cl. 372-59

33 Claims



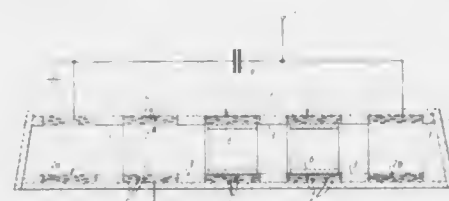
1. A method for processing ion gas lasers of the type having a discharge tube including a cathode and a discharge bore to reduce contamination of the discharge tube, comprising the steps of removing lasing gas from the discharge tube:  
 flowing a processing gas through the discharge tube to release contaminants from the cathode and the structure of the discharge bore to remove the contaminants from the laser.

4,949,354  
 LASER APPARATUS HAVING A DISCHARGE TRIGGERING DEVICE INSIDE A LASER TUBE  
 Arthur Maitland, St. Andrews, Scotland, assignor to English Electric Valve Company Limited, Chelmsford, United Kingdom  
 Filed Apr. 2, 1987, Ser. No. 33,145  
 Claims priority, application United Kingdom, Apr. 9, 1986, 8608610

Int. Cl.<sup>3</sup> H01S 3/03

U.S. Cl. 372-61

32 Claims



1. Laser apparatus, comprising: a gas filled tube having a longitudinal axis; an anode in said tube; a cathode in said tube; material in said tube to form at least part of a laser amplifying medium; storage means located outside said tube for storing charge, said storage means applying a potential difference between said anode and cathode; and trigger means within said tube for acting as a switch to cause said storage means to discharge through said tube, power dissipated in the discharge being applied to said material, said trigger means including a control electrode inside said tube, said anode, cathode, and control electrode being spaced along said longitudinal axis with said control electrode being disposed between said anode and said cathode, wherein said discharge is formed by applying a trigger potential to said control electrode, and wherein said tube defines a volume within which, during operation, laser action occurs.

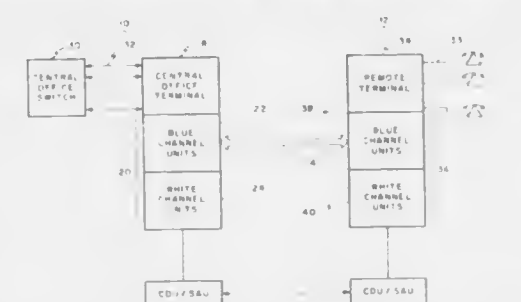
4,949,355  
 TEST ACCESS SYSTEM FOR A DIGITAL LOOP CARRIER SYSTEM  
 Harry J. Dyke, Oak Forest, and Donald E. Koch, Aurora, both of Ill., assignors to Rockwell International Corporation, El Segundo, Calif.  
 Filed Jan. 23, 1989, Ser. No. 300,451  
 Int. Cl.<sup>3</sup> H04L 12/26

U.S. Cl. 375-10

15 Claims

10. A test access system in a digital loop carrier communication system having at least first and second terminals connected by a digital transmission line, each of said first and second terminals having a plurality of analog ports for analog signals each of said first and second terminals having and at least one digital port connected to said digital transmission line for digital signals, each of said first and second terminals having a plurality of channel units having first ports and a second port, said first ports connected to said analog ports, respectively, and at least one digital interface unit having a first port connected to said second port of said channel units and a second port connected to said digital port, comprising:

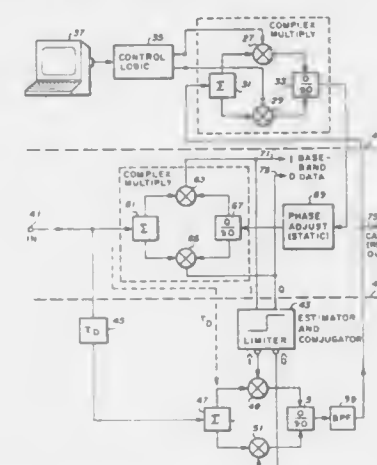
ected by a digital transmission line, each of said first and second terminals having a plurality of analog ports for analog signals each of said first and second terminals having and at least one digital port connected to said digital transmission line for digital signals, each of said first and second terminals having a plurality of channel units having first ports and a second port, said first ports connected to said analog ports, respectively, and at least one digital interface unit having a first port connected to said second port of said channel units and a second port connected to said digital port, comprising:



means for establishing at least a signal test path connected via a first bus to each of said analog ports and said first ports of said channel units and connected via a second bus to said first port of said digital interface unit;  
 means for monitoring connected via said first bus to each of said analog ports and said first ports of said channel units and connected via said second bus to said first port of said digital interface unit; and  
 said means for monitoring also having means for insertion of test signals on said signal test path.

4,949,356  
 PCM RECEIVER WITH LOCK STATE CONTROL  
 Christopher D. Long, Redondo Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.  
 Filed Jun. 30, 1988, Ser. No. 213,393  
 Int. Cl.<sup>3</sup> H03D 3/02; H04L 27/22  
 U.S. Cl. 375-86

24 Claims



1. In a communications receiver for receiving at a receiver input and demodulating a phase modulated RF carrier to obtain information contained in said modulation, said modulation characterized by phase changes occurring at a predetermined rate,  $T_r$ , between a predetermined number of phase states,  $N$ , said number being an integer between 2 and  $N$ , with each of said phase states representing a permissible lock state, said receiver including:

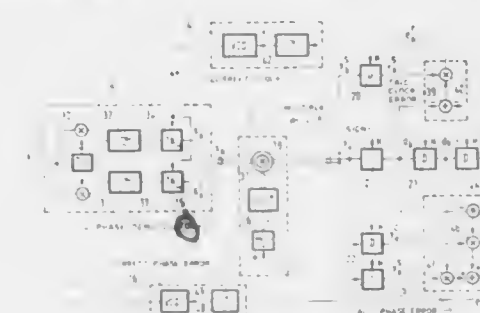
demodulator means for deriving information signals from said modulation, said demodulator means including:  
 demodulator input for receiving a modulated RF carrier;  
 means for deriving from said received modulated RF carrier

an unmodulated RF carrier at the frequency of the received carrier;  
 means for synchronizing and maintaining the synchronism the phase of said derived unmodulated carrier to one phase of said received modulated RF carrier to establish a reference phase, including circuit means for permitting said received RF carrier and said derived carrier to lock into a phase synchronism lock state in any one of  $N$  states in a self determining random manner to represent a permissible reference phase relationship and including automatic adjusting means; said phase synchronism being interrupted upon interruption of said received modulated carrier to said demodulator input; and  
 means for detecting and outputting changes in state of said received RF carrier from said reference phase and any one of said  $N$  states to another one of said  $N$  states occurring at a rate of  $T_r$  [or less]; the improvement comprising:

selectively operable phase changing means for selectively incrementally changing the relative phase between the received RF carrier and said reference phase by an increment of  $(n-1) \cdot 360/N$  degrees, where  $n$  represents the number of any of the possible phase states of the modulation of said received carrier to change the lock state between said carrier and said derived carrier,  $n$  being any number between 1 and  $N$ , said number  $N$  representing the number of possible lock states for the given modulation type applied to the receiver;  
 said phase changing means being capable of change said carrier phase within an interval equal to or less than said predetermined rate of change of said phase shift in said modulation,  $T_r$ , whereby the lock state is selectively changed without disconnection of said received RF carrier.

4,949,357  
 SYNCHRONIZING CIRCUIT FOR OFFSET QUATERNARY PHASE SHIFT KEYING  
 Philippe Sehier, Levallois Perret, France, assignor to Alcatel N.V., Amsterdam, Netherlands  
 Filed Mar. 14, 1989, Ser. No. 323,411  
 Claims priority, application France, Mar. 15, 1988, 88 03334  
 Int. Cl.<sup>3</sup> H03D 3/24

7 Claims



6. A synchronizing circuit for offset quaternary phase shift keying, comprising:

a four-phase demodulator for providing a demodulated signal sample  $x_k$  sampled at bit time  $k$  and having a real component  $x_k^c$  and an imaginary component  $x_k^s$ ;  
 a processing module responsive to the real and imaginary components of the output of the four-phase demodulator for multiplying each signal sample  $x_k$  by  $(-j)^k$  to form  $x_k(-j)^k$  and for deriving therefrom a corresponding useful sample  $y_k^c$  on a real path and a corresponding synchronization sample  $y_k^s$  on an imaginary path;  
 a phase error calculating circuit responsive to the output of the processing module for deriving a phase loop error correction signal; and  
 a phase correcting circuit responsive to the phase loop error correction signal for changing the phase of the useful sample.



4,949,358

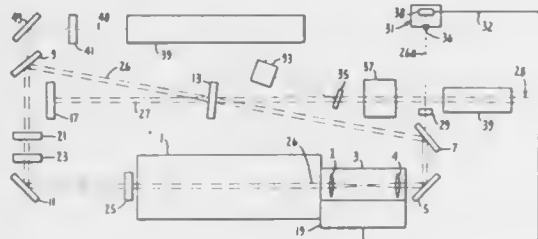
**RING LASER WITH IMPROVED BEAM QUALITY**  
Joseph W. Kantorski, Southbridge; Klaus Hachfeld, Sturbridge, both of Mass., and James L. Hobart, Los Altos Hills, Calif., assignors to Coherent, Inc., Palo Alto, Calif.

Filed Apr. 25, 1988, Ser. No. 185,864

Int. Cl.<sup>5</sup> H01S 3/083

U.S. Cl. 372-94

13 Claims



## 1. A ring laser, including:

- a solid-state laser rod positioned along a ring-shaped path;
- a substantially totally reflective first mirror;
- a set of mirrors oriented to cause laser light emerging from the rod to propagate as a beam around the ring-shaped path, said set of mirrors including a partially reflective second mirror having front surface and a back surface, wherein the second mirror is oriented so that laser light incident at the front surface of the second mirror after propagating in a first direction around the ring-shaped path will reflect from the second mirror into an output beam direction away from the ring-shaped path, and wherein the first mirror and the second mirror are oriented so that a first portion of laser light incident at the back surface of the second mirror after propagating in a second direction around the ring-shaped path will propagate through the second mirror and will continue to propagate in the second direction around the ring-shaped path, and so that a second portion of laser light incident at the back surface of the second mirror after propagating in the second direction around the path will reflect from the second mirror toward the first mirror and will then reflect from the first mirror back toward the back surface of the second mirror, and will then propagate through the second mirror into the output beam direction; and
- a 90° crystal quartz polarization rotator positioned along the ring-shaped path, for rotating the polarization of the laser light propagating along the ring-shaped path by an angle substantially equal to 90 degrees, in order to compensate for thermal birefringence of the rod.

4,949,359

**METHOD FOR THE ELECTRONIC TRANSMISSION OF DATA AND INSTALLATION FOR CARRYING OUT THIS METHOD**

Jean-Pierre Voillat, Delemont, Switzerland, assignor to Willemin Electronis S.A., Switzerland

Filed Sep. 6, 1988, Ser. No. 241,034

Claims priority, application Switzerland, Sep. 9, 1987, 3490/87

Int. Cl.<sup>5</sup> H04L 7/00, 25/38

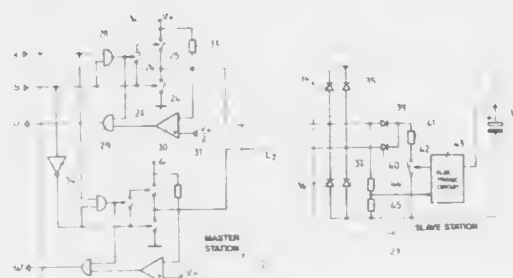
U.S. Cl. 375-106

10 Claims

1. A method of electronic bidirectional transmission of data between a master station and a plurality of slave stations, including the feeding in of power to the slave stations by the master station along the same data transmission lines, comprising:

providing a bus for connecting the master station to the slave stations, said bus including at least two conductors in operable communication with the slave stations, the bidirectional transmission of data being provided by interrupting momentarily a portion of the total time of transmission of the data carrying signal of a bit produced by the master

station on one of the two conductors of the bus to provide the capability of altering the data carrying signal received by said slave stations, the presence or the absence of such alterations constituting information which the slave stations transmit to the master station, the bits of the data carrying signals transmitted by the master station having a shape such that they present at least one dead zone or irrelevant time portion where they have no effect on the



data carrying signal of the bit, where during said dead zone the momentary interruption of the transmission of the data carrying signal on one of the two conductors of the bus is effected without this interruption having any influence on the reception by the slave stations of the signals from the master station, thereby permitting the slave stations to transmit data back towards the master station at substantially the same time as they receive data from the master station.

4,949,360

**SYNCHRONIZING CIRCUIT**

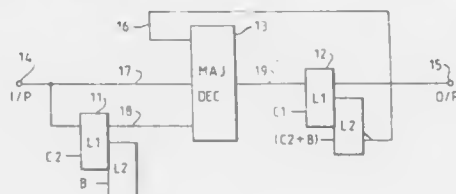
Gareth R. Martin, Romsey, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 8, 1989, Ser. No. 390,796

Int. Cl.<sup>5</sup> H04L 7/06

U.S. Cl. 375-106

5 Claims



1. A synchronizing circuit for synchronizing an asynchronous serial two level input signal to a first clock signal to produce a synchronized serial two level output signal, the circuit comprising:
  - a majority decoder to a first input of which the asynchronous input signal is applied;
  - a second clock signal having the same frequency as said first clock signal and phase shifted so as to not overlap said first clock signal;
  - a first clocked latching means for latching the asynchronous input signal when enabled by said second clock signal, the output of said first clocked latching means being applied to a second input of said majority decoder;
  - a second clocked latching means for latching the output of the majority decoder when enabled by said first clock to produce said synchronized output signal;
  - a feedback path for feeding back an inverted version of said synchronized output signal to a third input of said majority decoder; and means for delaying said inverted syn-

chronized output signal by an interval less than the period of said first and second clock signals.

4,949,361

**DIGITAL DATA TRANSFER SYNCHRONIZATION CIRCUIT AND METHOD**

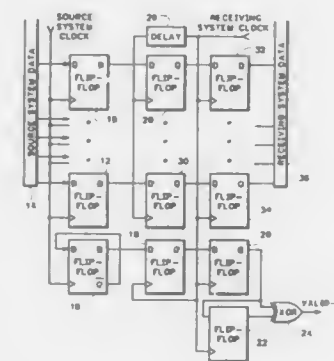
Ronald M. Jackson, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 26, 1989, Ser. No. 371,147

Int. Cl.<sup>5</sup> H04L 7/02

U.S. Cl. 375-118

16 Claims



1. A circuit for synchronizing digital data transfer between a source system having source system data synchronized to a source system clock signal and a receiving system having receiving system data synchronized to a receiving system clock signal, the circuit comprising:

- a first data storage element, clocked by the source system clock signal and coupled to receive source system data;
- a second data storage element, coupled to receive the source system clock signal in such a manner that the output toggles on the occurrence of the source system clock signal;
- a third data storage element, clocked by the receiving system clock signal and coupled to detect the output of the second data storage element;
- means for delaying a signal, having the receiving system clock signal as input and a delayed receiving system clock signal as output;
- a fourth data storage element, clocked by the delayed receiving system clock signal and coupled to receive the output of the first data storage element, for producing an output synchronized to the delayed receiving system clock signal; and
- means for generating a data valid signal, clocked by the receiving system clock signal and coupled to receive the output of the third data storage element, so that a data valid signal output is generated during every receiving system clock signal cycle that follows a receiving system clock signal cycle in which the state of the output of the third data storage element has changed.

4,949,362

**SYSTEM FOR DETECTING AND LIMITING ELECTRICAL GROUND FAULTS WITHIN ELECTRICAL DEVICES**

Donald C. Gaubatz, Cupertino, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Mar. 9, 1989, Ser. No. 321,232

Int. Cl.<sup>5</sup> G21C 17/00

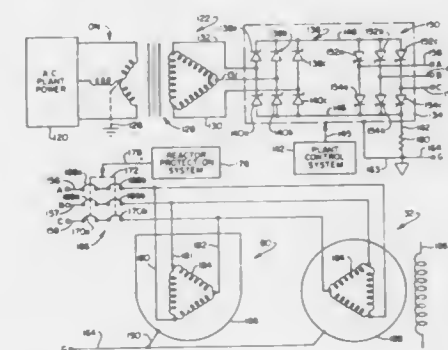
U.S. Cl. 376-259

17 Claims

15. In a nuclear power plant of a variety wherein a reactor is provided including a reactor vessel retaining a liquid metal coolant, a reactor core and an electromagnetic pump having a plurality of inductive windings insulatively retained within the electrically conductive wall of an enclosure, means defining a facility electrical ground, an a.c. plant power supply and a

plant control system; the method for controlling electrical ground fault current between a said inductive winding and said walls comprising the steps of:

- providing an electrically isolated power source by inductive coupling with said plant power supply;
- rectifying said power source to provide an isolated d.c. power source;
- providing an inverter powered from said isolated d.c. power



source under the control of said plant control system for selectively energizing said inductive windings; providing a fault control conductor electrically connected with said pump enclosure wall and extending as an electrical return for ground fault current to said inverter; and providing an electrical resistance between said conductor and said isolated inverter having an impedance selected to limit said fault current below a predetermined value limiting arc damage at any said electrical ground fault location.

4,949,363

**BOTTOM SUPPORTED LIQUID METAL NUCLEAR REACTOR**

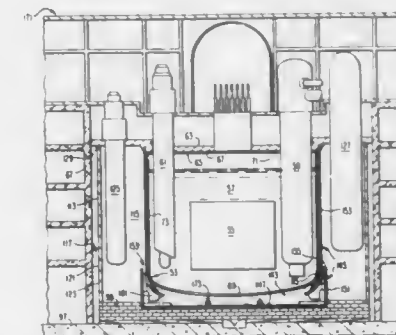
Robert B. Tapper, Greensburg; James D. Mangus, Hempfield Township, Westmoreland County; John E. Sharbaugh, Bullskin Township, Fayette County; Gedney B. Brown, Wilkins Township, Allegheny County; Julie M. Livingston, North Huntingdon, and Asfandiar K. Dhalla, Latrobe, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 95,989, Sep. 10, 1987, Pat. No. 4,859,402. This application Mar. 20, 1989, Ser. No. 325,758

Int. Cl.<sup>5</sup> G21C 19/00

U.S. Cl. 376-260

5 Claims



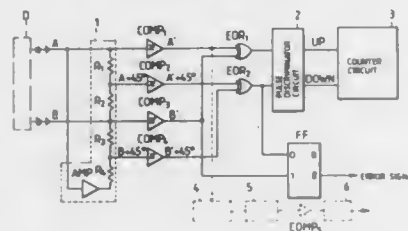
1. The method of preheating the closed bottom of a sodium tank of a liquid metal nuclear reactor for charging of liquid sodium to the confines thereof, comprising:
  - providing a supply of solid lead-bismuth alloy adjacent to the closed bottom of said sodium tank outside the confines of said sodium tank;

heating said solid lead-bismuth alloy to melt the same and form a heated pool of liquid lead-bismuth alloy while contacting said heated pool with the closed bottom of said sodium tank to heat the same; and adding sodium to the confines of said sodium tank having a heated bottom resulting from said contact with the heated pool of liquid lead-bismuth alloy.

4,949,364

**COUNT ERROR DETECTING DEVICE FOR COUNT TYPE MEASURING INSTRUMENTS**  
Hiroshi Yukawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,377  
Claims priority, application Japan, Oct. 12, 1987, 62-256516  
Int. Cl.<sup>5</sup> G01R 23/02; H03K 21/40  
U.S. Cl. 377-28 4 Claims



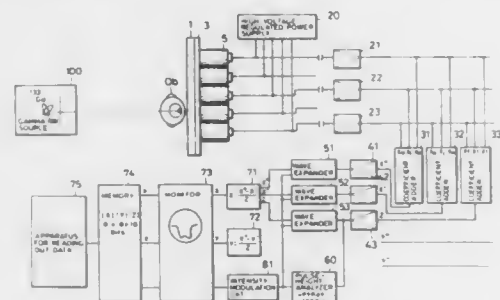
1. A count error detecting device for count type measuring instruments, comprising:  
phase-shift means for producing two N phase interpolation signals from two first signals shifted in phase by 90° with respect to each other and outputted from a detector;  
means for generating a signal representing an Exclusive-Or function of said two interpolation signals;  
count means for making count on the basis of said two first signals and said two N phase interpolation signals; and  
error signal generating means for generating an error signal on the basis of said Exclusive-Or signal and one of said two first signals.

4,949,365

**APPARATUS FOR MEASURING DENSITY OR THE LIKE OF AN OBJECT HAVING A SMALL TRANSMISSION FACTOR**

Kiyoshi Kolke, Hiroshi Uchida, Keisuke Masuda, Tatsuro Hayashi, all of Shizuoka, and Rikushi Morita, Kyoto, all of Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan

Continuation of Ser. No. 928,404, Nov. 10, 1986, abandoned.  
This application Feb. 16, 1989, Ser. No. 312,343  
Claims priority, application Japan, Nov. 8, 1985, 60-250315  
Int. Cl.<sup>5</sup> G01B 15/02  
U.S. Cl. 378-54 10 Claims



1. An apparatus for measuring a physical property such as the density or the thickness of an object such as a portion of a

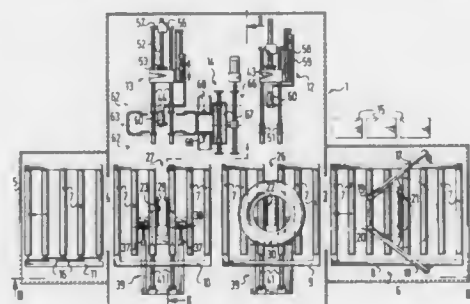
human body, having a small transmission factor, and located at a selected measuring position, comprising:

- a gamma ray source, located at a fixed point, for emitting gamma rays comprising gamma ray photons having two distinct energy levels, constrained within a predetermined solid angle measured from the fixed point, toward the selected measuring position;
- a collimator disposed in the path of gamma rays that have been transmitted through the object, said collimator extending for a distance corresponding to the predetermined solid angle at a predetermined axial distance from said gamma ray source and including a plurality of capillaries extending therethrough, said capillaries being radially directed from said gamma ray source at the fixed point, for collimating the gamma rays transmitted through the object within said predetermined solid angle so that said collimator removes scattered gamma rays;
- a scintillator disposed closely adjacent to said collimator and having a first surface with receiving locations for receiving the gamma rays collimated by said collimator and a second surface with emitting locations for emitting light at emitting locations corresponding to the receiving locations receiving the collimated gamma rays;
- a plurality of photomultipliers disposed in an arrangement close to each other and to said second surface of said scintillator for receiving the emitted light from said emitting locations and for generating electrical signals corresponding to light intensity of the light received by said plurality of photomultipliers;
- calculating means for generating an object density spectrum for the object at the selected measuring position from said electrical signals; and
- said calculating means including means for determining for each photomultiplier generated electrical signal a corresponding one of said two distinct gamma ray photon energy levels, the result of that determination being used by said calculating means in generating the object density spectrum.

4,949,366

**DEVICE FOR, AND A METHOD OF, X-RAY EXAMINATION OF MOTOR VEHICLE TIRES**  
Wilhelm Collmann, Lübeck, Fed. Rep. of Germany, assignor to Collmann GmbH & Co. Spezialmaschinenbau KG, Lübeck, Fed. Rep. of Germany

Filed Dec. 13, 1989, Ser. No. 450,043  
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843408  
Int. Cl.<sup>5</sup> G01N 23/02  
U.S. Cl. 378-61 11 Claims



11. A method of X-ray examination of motor vehicle tires, comprising the steps of:  
conveying such a tire into an initial position;  
bringing said tire from said initial position into an examination position;  
rotating said tire, penetrating the tire from within and outwardly thereof by means of X-rays, during one revolution

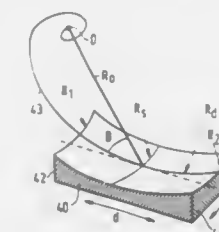
of the tire and observing regions of the tire, so penetrated by means of external X-ray receiving means producing output electrical signals;  
applying said output signals to a monitoring means producing an optical representation and evaluation of the penetrated regions of the tire;  
removing the tire from said examination position; and conveying away the tire;  
said method comprising the further steps of:  
conveying a first tire to be examined into a first initial horizontal position on a conveying line;  
bringing said first tire from the first initial horizontal position into a vertical position, inserting it into a first X-ray examination unit laterally adjacent to the conveying line and aligning said first tire in a vertical examination position and simultaneously examining by means of said X-ray receiving means, a second tire disposed in a vertical examination position in a second X-ray examination unit laterally adjacent to said conveying line;  
moving said receiving means from said second examination unit to said first examination unit;  
examining by means of said X-ray receiving means said first tire in said first X-ray examining unit and simultaneously removing said second tire from said second X-ray examination unit and returning it to a horizontal position on said conveying line and conveying away said second tire;  
conveying a further tire to be examined, horizontally into an initial position; bringing said further tire, to a vertical position and inserting it into the second X-ray examination unit and aligning it in a vertical position therein; and bringing said first tire from the first X-ray examination unit into a horizontal position on said conveying line and conveying said first tire away, whilst conveying yet a further tire to be examined into an initial position and moving said X-ray receiving means from the first X-ray examination unit to the second X-ray examination unit.

4,949,367

**X-RAY SPECTROMETER HAVING A DOUBLY CURVED CRYSTAL**

Albert Huizing, Cornelis P. G. M. Zegers, Teunis J. A. Heijmans, all of Eindhoven, and Maurits W. Van Tol, Almelo, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 29, 1989, Ser. No. 330,242  
Claims priority, application Netherlands, Apr. 20, 1988, 881019  
Int. Cl.<sup>5</sup> G21K 1/06  
U.S. Cl. 378-84 11 Claims

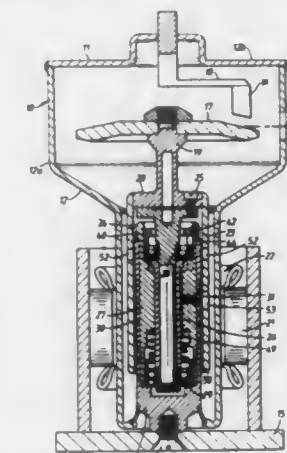


1. In an X-ray analysis apparatus comprising an X-ray source, a monochromator crystal curved in a dispersing direction in one of an elliptical shape and a first logarithmic spiral of curvature, an object holder; and an X-ray detector, the improvement comprising said monochromator being curved in a sagittal direction transverse to said dispersing direction, the curvature in said sagittal direction being circular with a varying radius of curvature measured in said dispersing direction.

4,949,368

**BEARING ASSEMBLY AND ROTATING ANODE X-RAY TUBE DEVICE EMPLOYING BEARING ASSEMBLY**  
Masahiro Kubo, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 8, 1989, Ser. No. 348,540  
Claims priority, application Japan, Jul. 15, 1988, 63-176712  
Int. Cl.<sup>5</sup> H01J 35/10  
U.S. Cl. 378-132 23 Claims

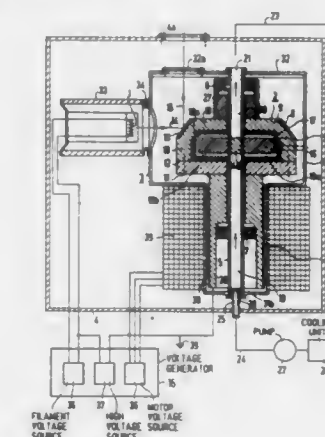


1. A bearing assembly comprising:  
a first member having a cylindrical configuration;  
a second member partially disposed in said first member and concentric therewith;  
at least one ball bearing interposed between said first and said second member for supporting a relative rotating motion therebetween, said ball bearing having an inner race and an outer race, one of said inner and said outer race being open at an axial end thereof; and  
a through-hole serving as a ball introduction passageway when assembling said ball bearing, said through-hole leading from a position near the open end of the one race to a radially outer surface of at least said first or said second member.

4,949,369

**X-RAY TUBE**  
Herbert Bittl, Nuremberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 279,922  
Claims priority, application Fed. Rep. of Germany, Feb. 15, 1988, 8801941[U]  
Int. Cl.<sup>5</sup> H01J 35/10  
U.S. Cl. 378-130 13 Claims



1. An x-ray tube comprising:  
an evacuated housing;



a stationary shaft in said housing;  
a stationary cathode and a rotating anode disposed in said housing for generating x-rays, and thereby also generating heat in said anode, said rotating anode having a hollow interior with an interior wall;  
bearing means disposed on opposite sides of said anode for rotatably seating said anode on said shaft;  
means for rotating said anode;  
a heat-absorption member attached to said shaft and disposed in said hollow interior of said anode spaced from said interior wall; and  
means for charging said heat-absorption member with a coolant for eliminating heat from said heat-absorption member transferred thereto by said rotating anode.

4,949,370

**DENTAL X-RAY IRRADIATION INDICATING DEVICE**  
Hiroyuki Tanaka, Yokohama, Japan, assignor to Nix Company Limited, Tokyo, Japan

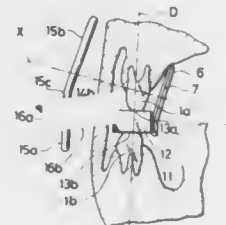
Filed Aug. 10, 1988, Ser. No. 230,513

Claims priority, application Japan, Sep. 16, 1987, 62-140137[U]; Sep. 30, 1987, 62-148207[U]; Jan. 14, 1988, 63-2561[U]; Jan. 25, 1988, 63-7130[U]; Mar. 4, 1988, 63-28125[U]; Mar. 29, 1988, 63-40441[U]; Apr. 1, 1988, 63-42917[U]

Int. Cl.<sup>5</sup> A61B 6/14

U.S. Cl. 378-170

32 Claims



1. A dental X-ray irradiation indicating device for holding an intra-oral X-ray film package in an oral cavity of a patient and for indicating a direction in which an X-ray is to be irradiated from outside the oral cavity, comprising a supporting member having a film fixing portion to which an intra-oral X-ray film package is to be fixed and a bitten portion means for being bitten by a tooth, an arm means which extends outwardly of an oral cavity from said supporting member when said bitten portion means of said supporting member is bitten by a tooth, an indexing means for defining an inclined plane and indicating a direction perpendicular to the inclined plane in which an X-ray is to be irradiated, said indexing means including a first indexing element defining a first plane, a second indexing element defining the inclined plane which is inclined by a predetermined angle with respect to the first plane, and a connecting element for interconnecting said first and second indexing elements, and a mounting structure for removably mounting said indexing means on said arm means.

4,949,371

**FLEXIBLE INTEROPERATIVE X-RAY CASSETTE**

Patrick J. Young, 505 Rosewood Dr., Benton, Ark. 72015, and Sherry C. Faulkner, 153 San Fernando, Galveston, Tex. 77550

Filed Oct. 27, 1988, Ser. No. 263,185

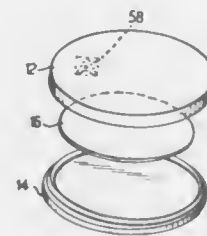
Int. Cl.<sup>5</sup> G03B 42/04

U.S. Cl. 378-184

20 Claims

1. An x-ray film cassette for use in making x-ray negatives of internal organs in a human body consisting of:  
a top piece formed of a soft, flexible material;  
a bottom piece formed of a similar material;  
a seal means formed between said top piece and bottom

piece for removably securing said top piece to said bottom piece; and wherein said molded material comprises



means for permitting said cassette to be folded and inserted through an incision in said human body.

4,949,372

**REMOTE ACTUATED COMMAND CIRCUIT FOR SEIZING TELEPHONE LINES**

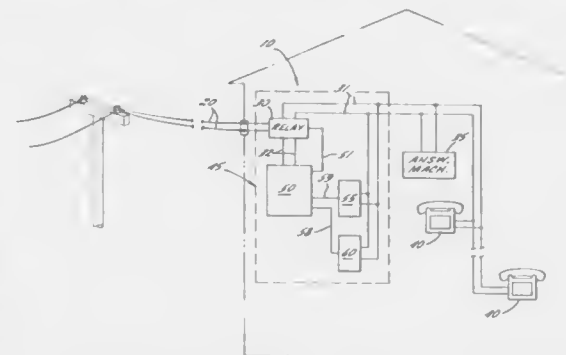
David C. Steele, Granite Falls, N.C., assignor to Moose Products, Inc., Hickory, N.C.

Filed Nov. 9, 1988, Ser. No. 269,636

Int. Cl.<sup>5</sup> H04M 11/04

U.S. Cl. 379-46

25 Claims



1. A method for establishing telephone communications between a central security monitoring facility at a remote location and a local security system terminal without interference from a telephone answering machine connected to an incoming telephone line of a local telephone system, said method comprising: normally maintaining the incoming telephone line of the local telephone system connected to the telephone answering machine; placing a telephone call from the central security monitoring facility to the incoming telephone line of the local telephone system to generate a ringing signal; establishing an off-hook condition on the local telephone system by the telephone answering machine; transmitting from the central security monitoring facility to the incoming telephone line of the local telephone system a predetermined signal which is not produced by a normal DTMF telephone keypad and thus not normally available to a telephone user; monitoring the incoming telephone line for said predetermined signal, and in response to receipt of said predetermined signal, overriding and bypassing the telephone answering machine by disconnecting the telephone answering machine from the incoming telephone line and connecting said local security system terminal to the incoming telephone line to thereby establish telephone communications from the central security monitoring facility to the local security system terminal without interference presented by the connection of the telephone answering machine to the incoming telephone line.

4,949,373

**HOST LOAD BALANCING**

William T. Baker, Jr., Palo Alto; Charles M. Buffum, San Jose; Charles H. Jollissaint, Sunnyvale, and Gregg W. Kerlin, Los Gatos, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

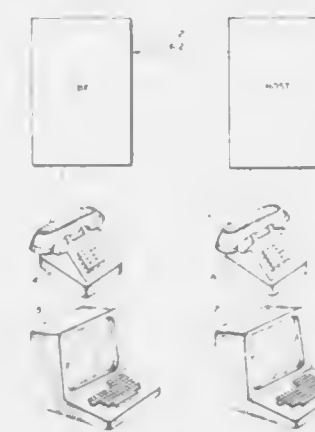
Filed Jan. 6, 1989, Ser. No. 294,316

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> H04M 11/06

U.S. Cl. 379-96

26 Claims



1. Method of coordinating the transfer of a phone call and information associated with the phone call in a system having a plurality of phones managed by a digital switch, a plurality of display terminals, a host processor, and memory means for storing programs and data structures, the digital switch including memory means for storing programs and a data structure for uniquely identifying each phone by an extension, control means for attaching said plurality of phones and communication means for communicating with the host processor, the host processor having memory means for storing a communication manager, data structures and applications programs and communication means for communicating with the digital switch and the plurality of display terminals, said method comprising the steps of:

- sending the host processor a communication in anticipation of a call transfer, said communication containing a group extension;
- receiving said communication by the communication manager of the host processor;
- determining a minimally loaded phone extension associated with the group extension;
- determining an associated application program and an associated display terminal to link with said minimally loaded phone extension; and
- invoking said associated application program to communicate with said associated display terminal to display information associated with said call transfer.

4,949,374

**SPEECH RECOGNITION SYSTEM WITH AN ACCURATE RECOGNITION FUNCTION**

Takaaki Ishii, Sagami-hara, and Toru Kuge, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 933,213, Nov. 21, 1986, Pat. No. 4,873,714. This application Aug. 28, 1989, Ser. No. 398,939

Claims priority, application Japan, Nov. 26, 1985, 60-181654; Nov. 26, 1985, 60-265502; Dec. 20, 1985, 60-287434

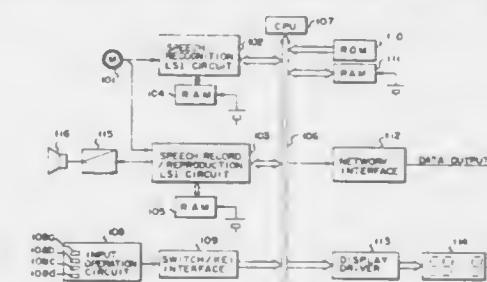
Int. Cl.<sup>5</sup> H04M 1/26, 1/56

U.S. Cl. 379-88

8 Claims

1. A telephone apparatus with a speech recognition function comprising:

microphone means for producing speech input signals of various users, to be registered or recognized;  
speech registration/recognition processing means, responsive to a speech input signal from the microphone means, wherein said speech registration/recognition processing means is manually selectable so as to subject the speech input signal to either a registration or a recognition processing, in which upon the registration processing, the speech input signal is stored as recognition data and upon recognition processing, the speech input signal is compared to the recognition data which has been stored;  
speech record/reproduction processing means, responsive to a speech input signal from the microphone means to subject this speech input signal to a record/reproduction processing, in which, upon the record processing, this speech input signal is recorded as a record signal and, upon the reproduction processing, the record signal is delivered as a reproduction signal in a given user voice, which has been pre-registered, in advance;  
speaker means to which the reproduction signal is supplied;



mode designation means for delivering registration or a recognition mode designation signal;  
control means, in accordance with the registration or the recognition mode designation signal, for setting the speech registration/recognition processing means to the registration or the recognition processing mode and for setting the speech record/reproduction processing means to the record or the reproduction processing mode corresponding to the registration or the recognition processing mode in which the speech registration/recognition processing means is placed;  
telephone dial number input means for inputting a telephone dial number corresponding to the produced speech input signals in the registration processing; and  
call origination means responsive to a speech input signal inputted in the recognition processing for originating a call on the basis of a telephone dial number corresponding to a speech input signal registered in the registration processing, in the event that the speech input signal inputted in the recognition processing is identical with the registered speech input signal.

4,949,375

**AUTOMATIC POSITIVE TELEPHONE DISCONNECT SYSTEM**

Joseph D. G. Houle, 79 Hobart Crescent, Nepean, Ontario, Canada K2H 5S3

Filed Apr. 13, 1989, Ser. No. 337,414

Claims priority, application Canada, Nov. 3, 1988, 582133

Int. Cl.<sup>5</sup> H04M 1/00

U.S. Cl. 379-199

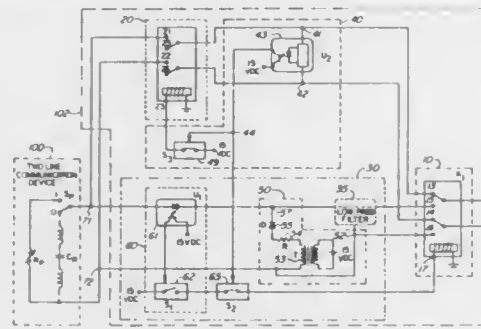
13 Claims

1. An automatic positive disconnect circuit for controlling the connection of a communication device having two signal conducting lines and also having sensing means for indicating the condition of said communication device, said disconnect circuit comprising:

a first relay means operable to electronically connect said two lines to said communication device;

a second relay means operable to electronically connect said two lines to said communication device in response to an AC ring-signal carried by said two lines;

a first control means operable selectively to disable and enable said first relay means dependent upon the mode of said communication device indicated by said sensing means, said first control means comprising a current detector for detecting any current that flows in response to said condition of said sensing means, an isolation transformer means for controlling the current flow in said first control means, a first switch means responsive to said



current detector for enabling said first relay means, a second switch means for disabling said first relay means in response to an AC ring-signal received by first and second lines, and a diode connected in series with said isolation transformer means operable to prevent an equivalent capacitance charge in said communication device from discharging through said first control means;

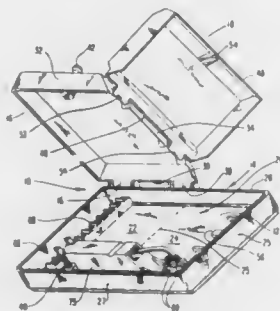
said disconnect circuit further comprising a second control means including an optically isolated ring detector for detecting an AC ring-signal, said second control means being operable to disable said second relay means in response to an AC ring-signal carried by said two lines.

4,949,376

**TELEPHONE NETWORK INTERFACE APPARATUS**  
 Anthony L. Nieves, Bradley Beach, and Thomas J. Collins, Wall, both of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.  
 Filed Jan. 15, 1989, Ser. No. 366,498  
 Int. Cl. H04M 9/00

U.S. Cl. 379-399

9 Claims



1. Telephone network interface apparatus, comprising:  
 a base and a wall circumscribing said base and extending outwardly therefrom said base and wall cooperatively providing an open compartment having a telephone company compartment portion and a subscriber compartment portion;

said telephone company compartment portion for having a plurality of pairs of telephone company terminals mounted therein for connection to a plurality of incoming telephone company lines and said subscriber compartment

portion for having a plurality of subscriber terminals mounted therein for connection to a plurality of subscriber premises lines;

a telephone company cover mounted pivotally to a portion of said wall and for being closed and fastened over said telephone company compartment portion;

first fastening means for fastening said telephone company cover closed over said telephone company compartment portion;

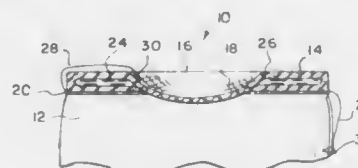
a subscriber cover mounted pivotally to said telephone company cover and for being closed and fastened over said subscriber compartment portion; and

second fastening means for fastening said subscriber cover closed over said subscriber compartment portion.

4,949,377

**TELEPHONE STERILIZER**  
 Dorothy O. Nishina, 78-6401 Mamalahoa Hwy., Honolulu, HI, 96725, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007  
 Filed Dec. 29, 1988, Ser. No. 291,578  
 Int. Cl. H04R 1/12; H04M 1/17  
 U.S. Cl. 379-452

4 Claims



1. A telephone sterilizing device adapted for mounting on a transmitter or receiver of a telephone handset, said device comprising:

(a) a sterilizing substance carrying pad having a central aperture therethrough and a peripheral shape corresponding generally to said transmitter or receiver;

(b) a layer of gauze material attached to and substantially covering said central aperture to allow sound to travel therethrough while protecting said transmitter or receiver;

(c) a layer of adhesive material applied to one side of said pad;

(d) a protective cover having a peripheral shape corresponding to said pad and being removably affixed to said adhesive layer whereby removal of said protective cover will allow said adhesive material to be applied to the telephone handset portion bringing said pad with said gauze material into engagement with said transmitter or receiver;

(e) said pad being fabricated out of sponge rubber material and

(f) said sterilizing substance being contained in a disinfectant liquid cell having a canal, said cell carried within said sponge rubber pad with said canal extending towards said gauze material so that when a person using the telephone handset presses said sponge rubber pad against their face said sterilizing substance will be squeezed out into said pad and said gauze material.

4,949,378

**TOY HELMET FOR SCRAMBLED COMMUNICATIONS**  
 Richard J. Mammone, 112 Nathan Dr., North Brunswick, N.J. 08902  
 Continuation of Ser. No. 93,226, Sep. 4, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 483,982  
 Int. Cl. H04K 1/02

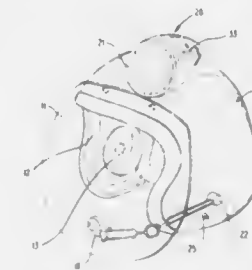
U.S. Cl. 380-9

10 Claims

1. Apparatus for recoverably scrambling a speech signal, comprising:  
 filter means having a predetermined cutoff frequency,

means for applying said speech signal to said filter means to produce an output,

sample and hold means (35, 36) for sampling said output of said filter means at a sampling rate substantially equal to said cutoff frequency to produce sampled components,



means (38) for subtracting from said sampled components a predetermined amplitude fraction of said original signal to produce an intermediate signal,

means (53, 25-2) for adding to said intermediate signal an energy component at said sampling rate, and

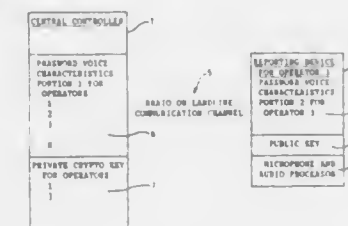
means (21) for transmitting to a receiving point said intermediate signal and said energy component.

4,949,379

**PROCESS FOR ENCRYPTED INFORMATION TRANSMISSION**  
 Steve Cordell, 3317 Cardiff Ave., Los Angeles, Calif. 90034  
 Filed May 5, 1989, Ser. No. 348,294  
 Int. Cl. H04L 9/30

U.S. Cl. 380-9

11 Claims



1. A method for encrypted information transmission, especially on the battlefield, between a normally mobile or handheld reporting device and a central controller, whereby the information encryption as well as the transmission is dependent on the voice characteristics of a spoken password, comprising the steps of:

analyzing the voice characteristics of a known operator of said reporting device speaking a password in a relaxed manner;

storing the results of said analyzing step in onboard memories of both said central controller and said reporting device;

speaking the password into the reporting device by the known operator;

performing a first voice analysis of said password spoken by said operator using said reporting device;

comparing said voice analysis results to the voice characteristics of said operator stored in said reporting device;

opening a transmission channel between said reporting device and said central controller if said comparison indicates a correspondence between the voice characteristics of said stored and said later operator spoken password;

transmitting said voice analysis to said central controller and performing a second voice analysis at said central controller by comparing said analyzed voice results to said stored voice analysis results; and

opening an information transmission channel between said

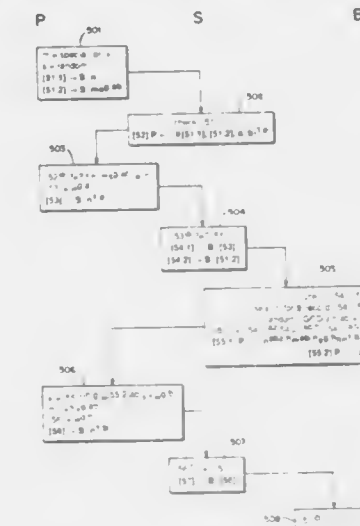
central controller and said reporting device if the results of said voice analysis comparison indicates agreement between said stored analysis and said later analysis by said central controller.

4,949,380

**RETURNED-VALUE BLIND SIGNATURE SYSTEMS**  
 David Chaum, 14652 Sutton St., Sherman Oaks, Calif. 91403  
 Filed Oct. 20, 1988, Ser. No. 260,053  
 Int. Cl. H04L 9/30

U.S. Cl. 380-30

14 Claims



1. In a method for transferring value between parties that is based on public-key-digital blind signatures, the improvement comprising the steps of:

diminishing the value of a first blind signature by a first party from an original value to a diminished value;

communicating said diminished value of said first blind signature in a first message to at least a second party by said first party;

communicating a blinded second message to said second party by said first party;

checking the validity of said signature contained in said first message received by at least said second party;

forming by said second party of a second digital signature on said blinded second message received, and the type of second signature formed responsive to the type of signature checked on said first message, and where the relationship between the type of signature checked on said first message and the type of said second signature formed being such that a higher-valued signature checked corresponds to a lower-valued second signature formed; and

communicating by said second party said formed second signature to said first party.

4,949,381

**ELECTRONIC INDICIA IN BIT-MAPPED FORM**  
 Jose Pastor, Westport, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.  
 Filed Sep. 19, 1988, Ser. No. 245,479  
 The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.  
 Int. Cl. H04L 9/00

U.S. Cl. 380-51

19 Claims

8. An apparatus for applying indicia, said indicia verifying the status of items upon which said indicia are applied, comprising:



means for applying an array of pixels, said pixels having values selected from a predetermined set of values;



means for selecting said values for said pixels in accordance with a mapping of an encrypted message onto said array.

4,949,382

# SPEECH-CONTROLLED PHONETIC TYPEWRITER OR DISPLAY DEVICE HAVING CIRCUITRY FOR ANALYZING FAST AND SLOW SPEECH

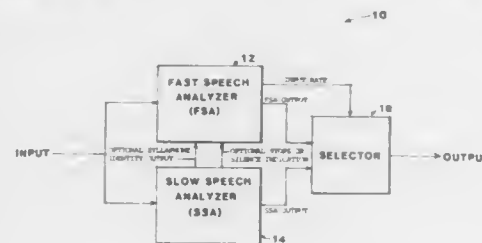
D. Thurston Griggs, Baltimore, Md., assignor to Griggs Talkwriter Corporation, Baltimore, Md.

Filed Oct. 5, 1988, Ser. No. 254,000

Int. Cl.<sup>5</sup> G10L 7/08

U.S. Cl. 381—44

30 Claims



1. A device for producing an output corresponding to a visual representation of a speech input, comprising: analyzing means for analyzing the speech input as a relatively fast speech input to obtain a fast speech output and for analyzing the speech input as a relatively slow speech input to obtain a slow speech output; timer means for timing the speech input to determine whether the speech input is a relatively fast speech input or a relatively slow speech input; and selecting means for selecting the fast speech output as the output corresponding to the visual representation of the speech input when the timer means determines that the speech input is a relatively fast speech input and for selecting the slow speech output as the output corresponding to the visual representation of the speech input when the timer means determines that the speech input is a relatively slow speech input; wherein the speech input is analyzed as a relatively slow speech input based on identification of phonemes in the speech input, and wherein the speech input is analyzed as a relatively fast speech input based on processing of word features and word shapes derived from the speech input.

4,949,383

# FREQUENCY DOMAIN SPEECH CODING

Soo N. Koh, Telok Blangah Hts, Singapore, and Costas Xydeas, Loughborough, United Kingdom, assignors to British Telecommunications public limited company, Great Britain

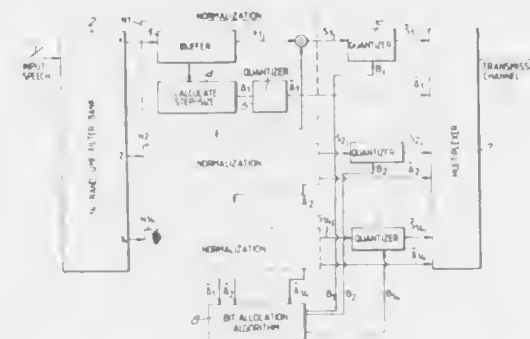
Continuation of Ser. No. 768,786, Aug. 23, 1985, abandoned. This application Aug. 21, 1988, Ser. No. 396,771

Claims priority, application United Kingdom, Aug. 24, 1984, 8421498

U.S. Cl. 381—31

Int. Cl.<sup>5</sup> G10L 5/00

14 Claims



1. A sub-band coder for speech signals comprising: filter means for dividing the frequency spectrum of speech signals input thereto into a plurality of sub-bands and generating for each sub-band a respective series of samples corresponding to that sub-band; encoding means for digitally encoding each series, and bit allocation means for varying the number of bits used for encoding each respective series in dependence on the relative energy content of the sub-bands; characterized in said bit allocation means being operative to vary the number of bits used for encoding in accordance with a fixed predetermined set of n numbers, said bit allocation means including means for measuring the energy content of each sub-band, and for ranking the sub-bands in the order of their energy content, said bit allocation means further including means for allocating to the sub-band having the largest energy content the number of bits indicated by the largest number of the set and for allocating to each successively lower energy sub-band the highest remaining number from the set.

4,949,384

# DRIVING APPARATUS

Masao Noro, and Daisuke Suzuki, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

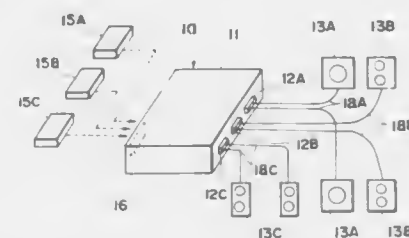
Filed Sep. 28, 1989, Ser. No. 414,188

Claims priority, application Japan, Sep. 30, 1988, 63-127434[U]

U.S. Cl. 381—96

Int. Cl.<sup>5</sup> H04R 3/00

10 Claims



1. A driving apparatus which comprises:

- a power amplifier for supplying a drive power to an electro-acoustic transducer;
- a feedback circuit for detecting a magnitude of a signal flowing across said transducer and transmitting a detected result to the input side of said amplifier, said feedback circuit having a determining means which is separated into a main body portion connected to said amplifier and a control information storage body, which is arranged to be detachably connected to said main body portion, for storing control information for setting transmission characteristics of said feedback circuit, wherein said amplifier drives said transducer in accordance with the detected result of the feedback circuit;
- a plurality of transducer connection terminals on the amplifier for connection to a plurality of transducers, respectively;
- an amplifier output selection means for selectively supplying an amplifier output to said transducer connection terminals;
- a transducer selection information means housed in said control information storage body; and
- a transducer selection control means for, when said control information storage body is mounted, determining the transducer selection information, and driving said amplifier output selection means on the basis of the determination result to control so as to supply the amplifier output to a predetermined transducer.

4,949,385

# APPARATUS AND METHOD FOR MAKING PRECIPITATION AUDIBLE

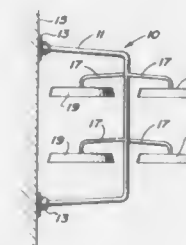
Robert Murphy, 124 Schoolhouse Rd., R.D. #2, Harveys Lake, Pa. 18618

Filed Mar. 28, 1988, Ser. No. 173,809

Int. Cl.<sup>5</sup> G10D 5/00

U.S. Cl. 381—118

20 Claims



1. An apparatus for providing a sound when directly impacted by atmospheric precipitation comprising:
  - (a) a support means,
  - (b) at least one laterally extended chime means having an upper surface area adapted to be exposed to interrupt the fall of multiple particles of atmospheric precipitation designed and constructed for resonant vibration within an audible range when impacted upon said upper surface by said atmospheric precipitation.

4,949,386

# SPEAKER SYSTEM

Amel L. Hill, 3290 Progress Dr., Ste. 160, Orlando, Fla. 32826

Filed May 23, 1988, Ser. No. 197,324

Int. Cl.<sup>5</sup> H04R 1/02, 1/28; H05K 5/06

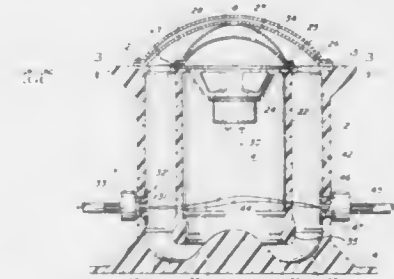
U.S. Cl. 381—188

12 Claims

1. A waterproof audio speaker comprising:
  - a speaker housing having side walls and a pair of ends, one end being closed and the other end being open;
  - a hollow inner housing having walls and a pair of open ends and being mounted to said speaker housing with its walls in spaced relationship to the walls of said speaker housing,

and forming a passageway between the walls of said inner housing and the walls of said speaker housing;

a loudspeaker mounted in said hollow inner housing facing one open end thereof, said speaker housing being a substantially cylindrical housing, and said hollow inner housing being a substantially cylindrical housing, and said speaker housing having an annular grooved bottom formed with a protruding knob in the center of said groove and said inner housing having one end protruding into said annular groove to form an annular arcuate passageway between said inner housing and the passageway between said inner



housing and speaker housing; whereby the backwave of said speaker is ported through said inner housing and through the passageway between the walls of said inner housing and the walls of said speaker housing to the open end of said speaker enclosure;

a supporting cover extending over the open end of said speaker housing; and

a filter membrane cover extending over the open end of said speaker housing under said supporting cover for blocking the ingress of fluids and materials into the speaker housing.

4,949,387

# ELECTRO-ACOUSTIC TRANSDUCER UNIT

Tomas Andert, Bocholt, and Stefan Pieper, Haltern, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

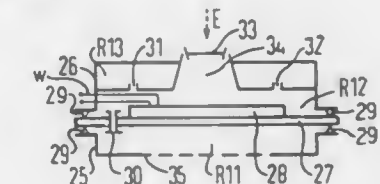
Filed Jun. 8, 1989, Ser. No. 363,519

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825973

Int. Cl.<sup>5</sup> H04R 17/00

U.S. Cl. 381—190

7 Claims



UMI



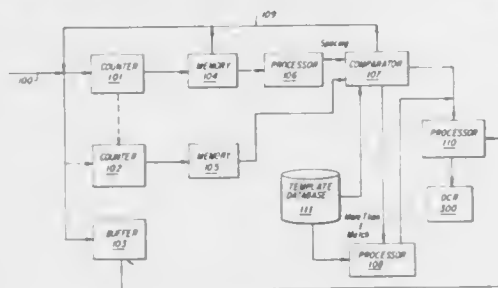
means for providing an output image frame data set for each acquired image frame which includes data representative of only the pixel element data determined to be non-redundant to the pixel element data of the next preceding image frame.

**4,949,392**  
**DOCUMENT RECOGNITION AND AUTOMATIC INDEXING FOR OPTICAL CHARACTER RECOGNITION**  
Lori L. Barski, North Chili, and Roger S. Gaborski, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 20, 1988, Ser. No. 196,513  
Int. Cl.<sup>5</sup> G06K 9/20

U.S. Cl. 382-61

24 Claims



1. A lick document character recognition system for use with an optical character recognition system, said document character recognition system comprising:

means for storing in memory plural reference templates specifying spacings between and the lengths of pre-printed lines in corresponding plural pre-printed forms; means for receiving incoming video data comprising successive video lines thereof representing the image of a document of unknown form;

means for generating a sample template from said incoming video data, said sample template specifying spacing between and lengths of pre-printed lines in said image of said document;

means for determining which one of said plural reference templates most closely resembles said sample template;

buffer means for storing the video data representing said one document until said determining means identifies said one reference template; and

output processor means, responsive whenever said determining means identifies said one template, comprising (a) means for fetching the video data from said buffer means, (b) means for masking therefrom data representing pre-printed lines therein corresponding to the pre-printed line spacings and lengths in said one reference template, and (c) means for transmitting the data thus masked to said optical character recognition system.

**4,949,393**  
**MOTOR ROTATION SPEED CONTROLLING APPARATUS**

Koji Ohmori, Takasuki; Yutaka Nozaki, Muko; Hirofumi Endo, Nagaokakyo, and Hidetoshi Matsumoto, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jan. 19, 1988, Ser. No. 144,985

Claims priority, application Japan, Jan. 20, 1987, 62-11543  
Int. Cl.<sup>5</sup> H02P 5/00

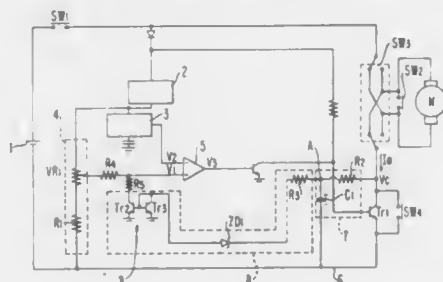
U.S. Cl. 388-815

9 Claims

1. A motor rotation speed controlling apparatus comprising: means for generating a saw-tooth voltage; setting means for setting a constant voltage; comparison means for comparing the saw-tooth voltage with the constant voltage and for outputting a signal

which has a duty cycle corresponding to the result of the comparison;

driving means for providing a driving current to drive a motor in response to the signal from said comparison means, wherein said driving means comprises a transistor having a collector voltage; and



circuit means for changing the level of said constant voltage set by said setting means in response to a feedback signal of said motor, wherein said circuit means comprises means for detecting said collector voltage and means for converting said collector voltage into a current.

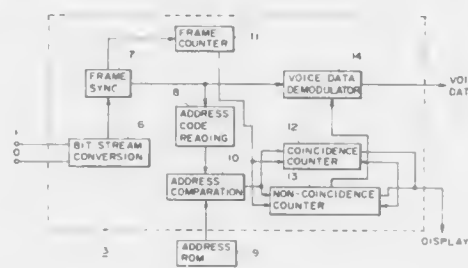
**4,949,394**  
**ADDRESSABLE PCM MUSIC BROADCAST RECEIVER**  
Kenichi Shiraishi, Yokohama; Hirokazu Kobayashi, Urawa, and Yukihiko Miyamoto, Tama, all of Japan, assignors to Kabushiki Kaisha Kenwood, Tokyo, Japan

Filed Feb. 17, 1989, Ser. No. 311,977

Claims priority, application Japan, Feb. 29, 1988, 63-47214  
Int. Cl.<sup>5</sup> H04B 17/00; H04H 1/00

U.S. Cl. 455-2

4 Claims



1. A receiver for reproducing a music program from an addressable PCM music broadcast signal which includes music data in every frame and contract code data for each of a predetermined number of frames, the receiver comprising:

demodulating means for demodulating the music data and the addressable music broadcast signal to reproduce the music program;

read-out means for reading out the contract code data; comparing means for comparing the read-out contract code data with a code assigned to the receiver for each of the predetermined number of frames;

counting means in response to the comparing means for counting coincidence events in which the read-out contract code data coincides with the code assigned to the receiver and non-coincidence events in which the read-out contract code data does not coincide with the code assigned to the receiver, and generating a demonstration service mode indication signal until either of the counts of the coincidence events or non-coincidence events reaches a predetermined count, said counting means further generating a contract program service mode indication signal when the count of the coincidence events reaches the

predetermined count first and generating a muting signal to said demodulating means to inhibit the music program reproduction when the count of the non-coincidence events reaches the predetermined count first.

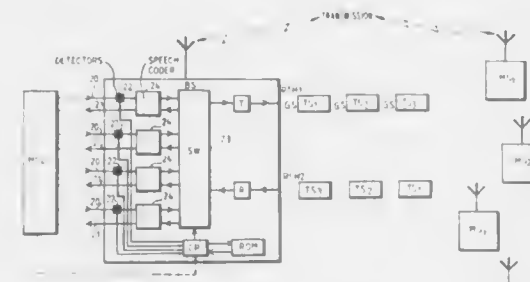
**4,949,395**  
**METHOD AND ARRANGEMENT FOR DYNAMICALLY ALLOCATING TIME SLOTS TO CONNECTIONS IN A DIGITAL MOBILE RADIO SYSTEM**

Nils R. C. Rydbeck, Lund, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Jul. 7, 1989, Ser. No. 376,575

U.S. Cl. 455-33

10 Claims



1. A method of dynamically allocating time slots in frames on radio channels to connections in a cellular mobile radio system comprising base stations, mobile stations and radio channels, the method comprising the steps of:

dividing a first and a second radio channel into time slots grouped in frames of equal length;

determining a plurality of multiframe time slot allocation schemes for the first and second radio channels;

monitoring the number of established connections at a serving base station and comparing with the available number of time slots;

monitoring the amount of information to be transmitted on established connections from the serving base station;

selecting one of the time slot allocation schemes for the first and second radio channels in dependence upon the monitored number of established connections in relation to the available number of time slots and the monitored amount of information;

transmitting from the serving base station in guard spaces of the first channel information on the multiframe time slot allocation scheme selected for the first and second radio channels;

transmitting from the serving base station information on more connections than the time slots in a frame to served mobile stations on the first radio channel, the time slots being allotted to the connections in accordance with the multiframe allocation scheme selected;

receiving in served mobile stations radio signals transmitted by the serving base station in the guard space of the first radio channel; and

transmitting from the served mobile stations radio signals on the second radio channel, whereby the speech information is transmitted from the mobile stations in accordance with the multiframe time slot allocation scheme determined by the information in the guard spaces of the first radio channel.

**4,949,396**  
**DIVIDER METHOD AND APPARATUS WITH MEANS FOR AVOIDING DIVIDE BY ZERO ERRORS**  
Kah-Seng Chung, Bull Creek, Australia, assignor to U.S. Philips Corp., New York, N.Y.

Filed Oct. 21, 1988, Ser. No. 261,208

Claims priority, application United Kingdom, Nov. 4, 1987, 8725870

Int. Cl.<sup>5</sup> H04B 1/26

U.S. Cl. 455-216

22 Claims



1. A divider circuit arrangement in which a first signal is to be divided by a second signal and in which an extra signal is used to produce a dividend signal and a divisor signal comprising:

divider means for dividing the dividend signal by the divisor signal to produce a divider output signal and having a first input for the dividend signal, a second input for the divisor signal and an output;

summing means for adding the second signal to the extra signal to produce the divisor signal and having a first input for receiving the second signal, a second input for receiving the extra signal and an output connected to apply the divisor signal to the second input of the divider means;

multiplying means for multiplying the divider output signal by the extra signal to produce a product signal and having a first input connected to the output of the divider means, a second input for receiving the extra signal and an output for the product signal; and

signal combining means having a first input for receiving the first signal, a second input connected to receive the product signal from the multiplying means, and an output for providing a desired combination of the first signal and said product signal which combination forms the dividend and is applied to the first input of the divider means.

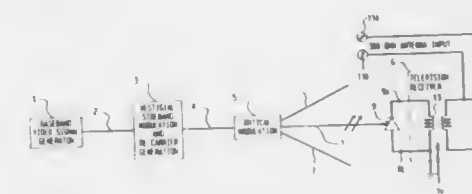
**4,949,397**  
**DETECTOR FOR OPTICALLY TRANSMITTED TELEVISION SIGNALS**  
Lanny S. Smoot, Morristown, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Aug. 25, 1988, Ser. No. 236,188

Int. Cl.<sup>5</sup> H04B 10/06

U.S. Cl. 455-619

6 Claims



1. An interface unit for a television receiver consisting essentially of

a single photo-sensitive semiconductor device to which no power is applied for detecting an optical carrier signal modulated with a radio frequency signal, said single photo-sensitive semiconductor device being directly connected to a set of antenna terminals of said television

receiver for transmitting said radio frequency signal directly to said television receiver.

4,949,398

## GAAS MESFET BALANCED RESISTIVE MIXER

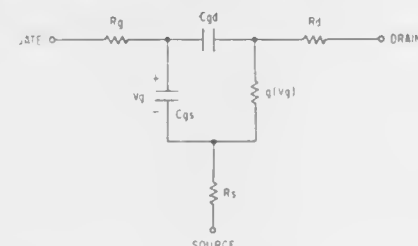
Stephen A. Maas, Long Beach, Calif., assignor to The Aerospace Corporation, El Segundo, Calif.

Filed Jun. 9, 1988, Ser. No. 204,334

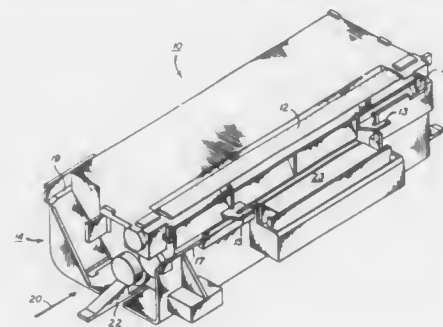
Int. Cl.<sup>3</sup> H04B 1/26

U.S. Cl. 455-326

1 Claim



wall means for defining a chamber containing a supply of a development mixture of toner and carrier particles; and



means for drawing said development station firmly into contact with the toner monitor when said development station is received in the apparatus.

4,949,400

## HAND HELD GLUCOSE COLORIMETER DEVICE

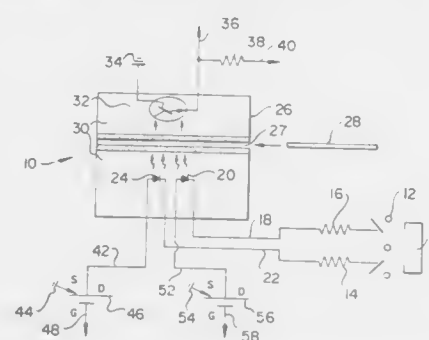
Harry H. Leveen, 321 Confederate Cir., Charleston, S.C. 29407; William F. Kahler, 519 Main Rd., Johns Island, S.C. 29455, and Stephen D. Kahler, 1023 Wappoo Rd., Suite 41-B, Charleston, S.C. 29407

Filed Mar. 31, 1988, Ser. No. 176,331

Int. Cl.<sup>3</sup> G01J 3/50; G01N 21/77

U.S. Cl. 356-420

8 Claims



1. A process of operating a glucose monitoring system comprising the steps of

- selectively energizing one of a plurality of different color light emitting diodes to emit light against a test specimen strip with a glucose concentration falling within a range of differing glucose concentrations causing differing absorption spectra;
- receiving conductive emissions from a selected diode through said test specimen strip with photo transistor means and converting the emissions with said photo transistor means into an electronic signal;
- transmitting said electronic signal to a computer;
- providing said computer with a characteristic data base comprising a plurality of records corresponding to each of a number of readout components, each of said records comprising a plurality of characteristic identifiers describing corresponding specimens and including at least characteristics in the categories of milliliters per deciliter, four digit number readout, acceptability indicator; and
- displaying said characteristics.

4,949,399

## DEVELOPMENT STATION ENGAGEABLE WITH TONER MONITOR

Ralph E. Williams, Rochester, and Ronald C. Holzhauser, Holley, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 9, 1989, Ser. No. 349,476

Int. Cl.<sup>3</sup> G03G 15/06

U.S. Cl. 355-260

6 Claims

1. A replaceable development station usable for developing electrostatic images in apparatus having a toner monitor and means for slidably receiving said development station; said development station comprising:

## DESIGN PATENTS

GRANTED AUG. 14, 1990

## ERRATA

For CLASS	See PATENT NO.
D09-378	309,858
D11-096	309,973
D23-209	309,974

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## DESIGNS

AUGUST 14, 1990

309,820

### PANTY FOR PANTY HOSE

Roy D. Bryant, 2240 Hume Rd., Lexington, Ky. 40516

Filed May 18, 1988, Ser. No. 195,498

Term of patent 14 years

U.S. Cl. D2—10



309,822

### GOLF SHOE

Thierry Barret, Pringy-Gare, France, assignor to Salomon S.A.,

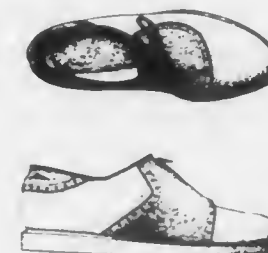
Annecy Cedex, France

Filed Aug. 7, 1987, Ser. No. 82,715

Claims priority, application France, Jul. 10, 1987, 866984

Term of patent 14 years

U.S. Cl. D2—313



309,821

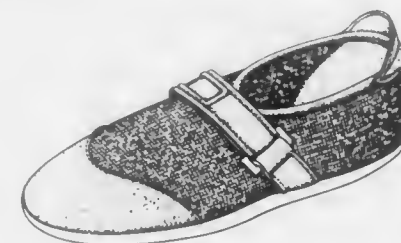
### SHOE FOR MARINE ACTIVITIES

Harry Miller, Boston, Mass., assignor to Omega Corporation,  
East Boston, Mass.

Filed May 11, 1988, Ser. No. 193,486

Term of patent 14 years

U.S. Cl. D2—265



309,823

### SHOE UPPER

Bruce J. Kilgore, Lake Oswego, and Tinker L. Hatfield,  
Portland, both of Oreg., assignors to Nike, Inc. and Nike  
International Ltd., Beaverton, Oreg.

Filed Dec. 5, 1988, Ser. No. 280,273

Term of patent 14 years

U.S. Cl. D2—314



309,824

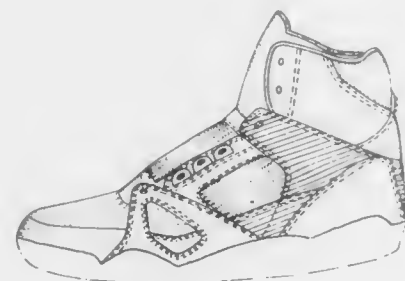
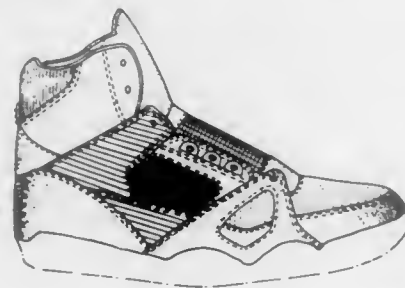
## ATHLETIC SHOE UPPER

Michael A. Aveni, Lake Oswego, and Tinker L. Hatfield, Portland, both of Oreg., assignors to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.

Filed Jun. 30, 1989, Ser. No. 373,780

Term of patent 14 years

U.S. Cl. D2—314



309,827

## WATER BOTTLE PACK

Gary D. Wells, 3882 Claremont St., Irvine, Calif. 92714

Filed Jan. 6, 1986, Ser. No. 816,264

Term of patent 14 years

U.S. Cl. D3—30.1



309,829

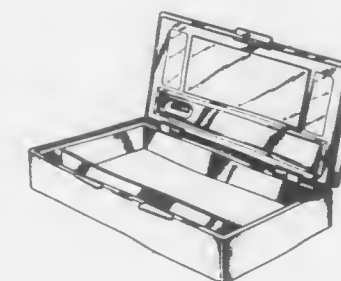
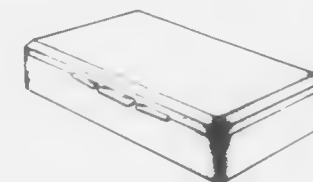
## FLIP TOP LIGHTED VANITY MIRROR FOR AN AUTOMOBILE DASH

Pierre Charet, and Duke Kraai, both of Miami, Fla., assignors to Rally Accessories, Inc., Miami, Fla.

Filed Dec. 5, 1986, Ser. No. 938,751

Term of patent 14 years

U.S. Cl. D3—40



309,831

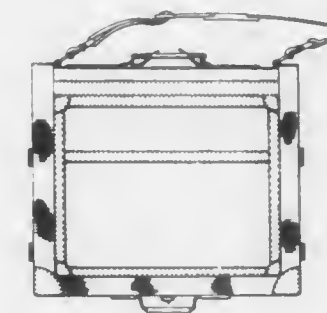
## WARDROBE BAG

Richard B. Gibbs, 11548 Thurston Cir., Los Angeles, Calif. 90049

Filed Nov. 4, 1986, Ser. No. 926,994

Term of patent 14 years

U.S. Cl. D3—71



309,825

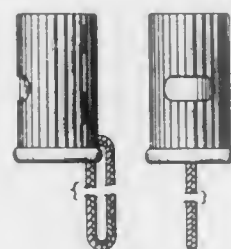
## UMBRELLA HANDLE

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio

Filed Nov. 14, 1988, Ser. No. 270,117

Term of patent 14 years

U.S. Cl. D3—12



309,828

## EYEGLASS CASE

Cary Cook, 1947 N. Mariposa, Los Angeles, Calif. 90027

Filed Jun. 30, 1988, Ser. No. 214,152

Term of patent 14 years

U.S. Cl. D3—34



309,826

## UMBRELLA HANDLE

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio

Filed Dec. 19, 1988, Ser. No. 286,536

Term of patent 14 years

U.S. Cl. D3—12

309,830

## KEY CHAIN

Arthur M. Kraus, Weston, Canada, assignor to A.M.K. Investments Ltd., Ontario, Canada

Filed Oct. 18, 1988, Ser. No. 259,106

Term of patent 14 years

U.S. Cl. D3—61



309,832

## CARRYING CASE FOR A HYDRAULIC HAND JACK

Michael Hung, 9-16, Nan Kan Hsia, Nan Kan, Lu Chu Hsiang, Tao Yuan County, Taiwan

Filed Nov. 3, 1986, Ser. No. 926,184

Term of patent 14 years

U.S. Cl. D3—73



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309,833

## EXTENSION MIRROR

John F. Wahl, Sterling, Ill., assignor to Wahl Clipper Corporation, Sterling, Ill.

Filed Aug. 3, 1987, Ser. No. 80,592

Term of patent 14 years

U.S. Cl. D6—300



309,836

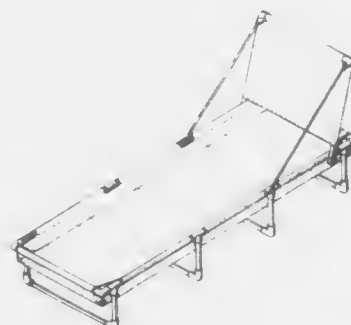
## COMBINATION LOUNGE CHAIR AND WATER RECEPTACLE UNIT

Janis E. Meredith, 350 Covington, and Joyce K. Girrens, 11824 Kent, both of Wichita, Kans. 67209

Filed Nov. 21, 1986, Ser. No. 933,679

Term of patent 14 years

U.S. Cl. D6—361



309,834

## FOLDABLE DRESS HANGER

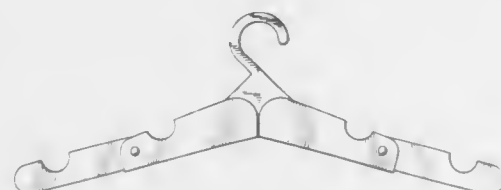
David Passini, Tolentino, Italy, assignor to Nazareno Gabrielli Diffusion S.p.A., Tolentino, Italy

Continuation-in-part of Ser. No. 38,801, Apr. 15, 1987, abandoned. This application Jul. 20, 1987, Ser. No. 75,473

Claims priority, application Italy, Oct. 15, 1986, 36157/86[U]

Term of patent 14 years

U.S. Cl. D6—318



309,837

## CHAIR

Andras Dozsa-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland

Filed Mar. 30, 1987, Ser. No. 32,091

Claims priority, application Switzerland, Dec. 30, 1986, DM/008001

The portion of the term of this patent subsequent to Jul. 30, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—366



309,835

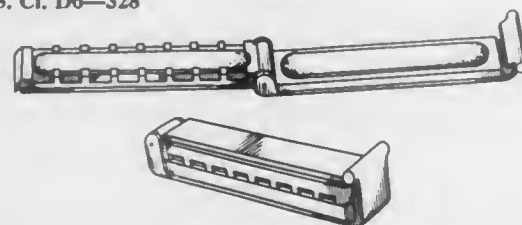
## HANGER RETAINER

James R. Stone, Jr., 1675 Cedar Bluff Way, Marietta, Ga. 30062, and Denise P. Neill, 5002 Meadow La., NE., Marietta, Ga. 30068

Filed Jun. 22, 1987, Ser. No. 64,923

Term of patent 14 years

U.S. Cl. D6—328



309,838

## ETAGERE

Uri Glatstein, Louisville, Ky., assignor to Rosalco, Inc., Louisville, Ky.

Filed Mar. 29, 1989, Ser. No. 328,833

Term of patent 14 years

U.S. Cl. D6—465



309,841

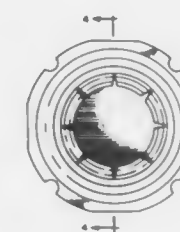
## COASTER

Patrick Fox, 5252-P Olive Hwy., Oroville, Calif. 95966

Filed Feb. 18, 1986, Ser. No. 834,053

Term of patent 14 years

U.S. Cl. D7—624



309,839

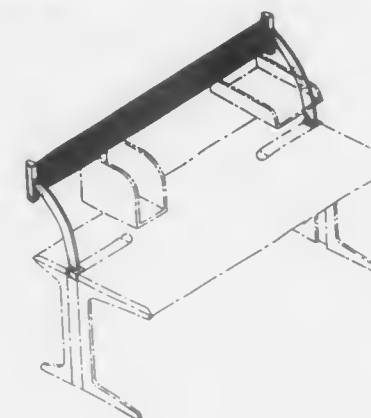
## ACCESSORY SUPPORT ATTACHMENT FOR A WORKTABLE

Thomas J. Newhouse, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Jun. 2, 1987, Ser. No. 57,828

Term of patent 14 years

U.S. Cl. D6—491



309,842

## COFFEE MACHINE

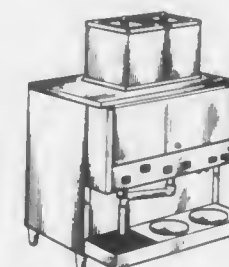
Josef Frech, Gerstetten, Fed. Rep. of Germany, assignor to Württembergische Metallwarenfabrik AG., Geislingen/Steige, Fed. Rep. of Germany

Filed Jan. 7, 1987, Ser. No. 1,107

The portion of the term of this patent subsequent to Nov. 8, 2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D7—308



309,840

## DISPOSABLE TOOTHBRUSH HOLDER

Terry L. Estvold, 46 Mt. Vernon Cir., Dunwoody, Ga. 30338

Filed May 21, 1987, Ser. No. 52,744

Term of patent 14 years

U.S. Cl. D6—534



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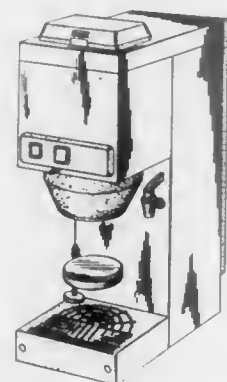
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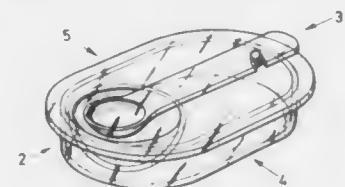
1990

UMI

309,843  
BEVERAGE DISPENSER  
Adrianus F. Reichmann, Utrecht, Netherlands, assignor to  
Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderij-  
en-Theehandel N.V., Joure, Netherlands  
Filed Aug. 28, 1986, Ser. No. 846,975  
Term of patent 14 years  
U.S. Cl. D7—309



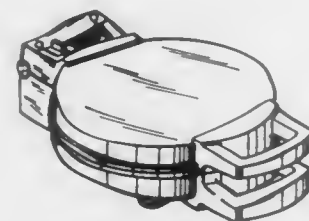
309,845  
EGG CUP WITH A SPOON  
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini  
S.p.A., Recanati, Italy  
Filed Oct. 16, 1987, Ser. No. 109,423  
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]  
Term of patent 14 years  
U.S. Cl. D7—503



309,846  
SERVING TRAY OR SIMILAR ARTICLE  
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini  
S.p.A., Recanati, Italy  
Filed Oct. 16, 1987, Ser. No. 109,422  
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]  
Term of patent 14 years  
U.S. Cl. D7—587



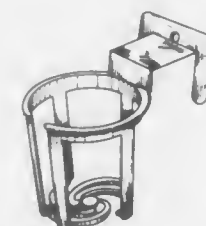
309,844  
WAFFLE IRON  
Günter Storsberg, Solingen, Fed. Rep. of Germany, assignor to  
Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of  
Germany  
Filed Jul. 30, 1987, Ser. No. 79,812  
Term of patent 14 years  
U.S. Cl. D7—352



309,847  
BEVERAGE CAN HOLDER  
Robert S. Scheurer, P.O. Box 539, Wichita Falls, Tex. 76307  
Filed Nov. 15, 1988, Ser. No. 271,772  
Term of patent 14 years  
U.S. Cl. D7—606



309,848  
MUG HOLDER  
Robert Sokolski, and John Downey, both of Warren, Pa., assign-  
ors to Whirley Industries, Inc., Warren, Pa.  
Filed Feb. 19, 1988, Ser. No. 158,207  
Term of patent 14 years  
U.S. Cl. D7—620



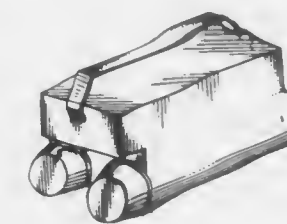
309,850  
HANDLE FOR FLATWARE  
Christopher J. Callinan, Centerport, N.Y., assignor to Regent  
Sheffield, Ltd., Farmingdale, N.Y.  
Filed Dec. 29, 1987, Ser. No. 139,049  
Term of patent 14 years  
U.S. Cl. D7—649



309,849  
HANDLE FOR FLATWARE  
Christopher J. Callinan, Centerport, N.Y., assignor to Regent  
Sheffield, Ltd., Farmingdale, N.Y.  
Filed Dec. 29, 1987, Ser. No. 139,047  
Term of patent 14 years  
U.S. Cl. D7—649



309,851  
COMBINED LUNCH BOX AND VACUUM BOTTLE  
Arnold F. Moore, P.O. Box 157, Salisbury Center, N.Y. 13454  
Filed Nov. 29, 1988, Ser. No. 278,305  
Term of patent 14 years  
U.S. Cl. D7—626





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OFFICIAL GAZETTE

AUGUST 14, 1990

309,852

## HANDLE FOR FLATWARE

Christopher J. Callinan, Centerport, N.Y., assignor to Regent Sheffield, Ltd., Farmingdale, N.Y.

Filed Jan. 29, 1988, Ser. No. 149,882

Term of patent 14 years

U.S. Cl. D7—649



309,854

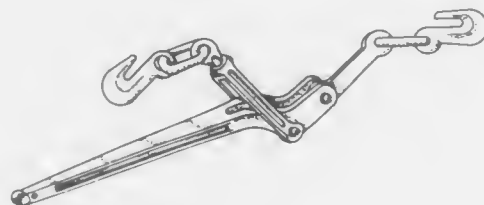
## LOAD BINDER

Lonnie M. Smith, St. Louis, Mo., assignor to Durbin-Durco, Inc., St. Louis, Mo.

Filed Jun. 26, 1986, Ser. No. 879,179

Term of patent 14 years

U.S. Cl. D8—51



309,853

## DISPENSING APPARATUS FOR COMESTIBLES OR SIMILAR ARTICLE

Paul P. Kolada, Bexley, and Rainer B. Teufel, Columbus, both of Ohio, assignors to Proctor-Silex, Inc., Glen Allen, Va.

Filed Sep. 6, 1988, Ser. No. 241,544

Term of patent 14 years

U.S. Cl. D7—672



309,855

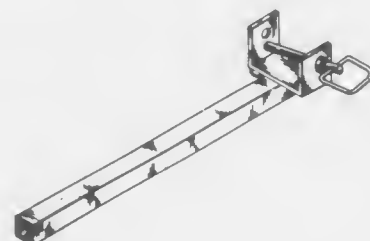
## LAWN MOWER BLADE HOLDING TOOL

Leonard D. Davidson, 301 East St., Farmersville, Ill. 62533

Filed Nov. 30, 1989, Ser. No. 444,101

Term of patent 14 years

U.S. Cl. D8—71



AUGUST 14, 1990

U.S. PATENT AND TRADEMARK OFFICE

1317

309,856

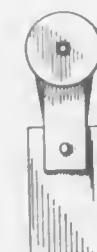
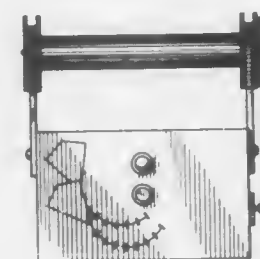
## HANDHELD ELECTRONIC KITE CONTROL

Michel L. Martine, 470 Memorial Dr. #341, Chicopee, Mass. 01020

Filed Feb. 8, 1988, Ser. No. 154,992

Term of patent 14 years

U.S. Cl. D8—358



309,858

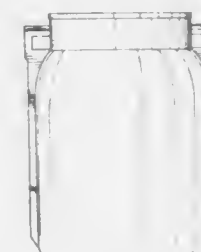
## SPRAYER CANISTER

Richard W. Meyersburg, Tenaflly, N.J., assignor to VMC Industries, Inc., Philadelphia, Pa.

Filed Apr. 28, 1987, Ser. No. 43,588

Term of patent 14 years

U.S. Cl. D9—378



309,859

## CORD-HOLDING CLIP

Virgil R. Lyngaard, R.R. 5, Site 3, Comp. 87, Kamloops, British Columbia V2C 6C2, Canada

Filed Nov. 25, 1988, Ser. No. 276,510

Term of patent 14 years

U.S. Cl. D8—395



309,857

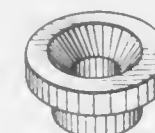
## ANCHOR BUTTON FOR A PICTURE HANGING WIRE, OR SIMILAR ARTICLE

Ronald B. Fenton, 722 Wisteria Ave., Mount Lebanon, Pa. 15228

Filed Aug. 4, 1986, Ser. No. 892,398

Term of patent 14 years

U.S. Cl. D8—373



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COMBINED DISPENSER CONTAINER AND CAP  
Antonio Fossati, via Erba, 100, 20037-Paderno Dugnano (Mi-  
lano), Italy

Filed Nov. 12, 1987, Ser. No. 119,985  
Claims priority, application Italy, May 13, 1987, 21595/87[U]  
Term of patent 14 years

U.S. Cl. D9—300



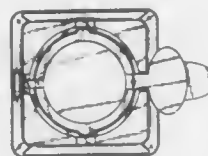
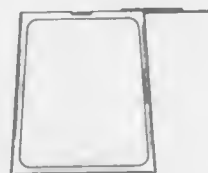
309,862

COMBINED SPOON AND CONTAINER

Manfred Rose, Schillerstrasse 20, 1000 Berlin 12, Fed. Rep. of  
Germany

Filed Apr. 18, 1988, Ser. No. 182,581  
Term of patent 14 years

U.S. Cl. D9—432



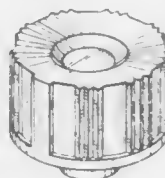
309,863

PLUG FOR VIALS

James A. Baxter, 73a Friern Barnet Lane, London N20 0XT,  
England

Filed Sep. 9, 1987, Ser. No. 94,928  
Claims priority, application United Kingdom, Mar. 28, 1987, 1  
041 101

Term of patent 14 years  
U.S. Cl. D9—439

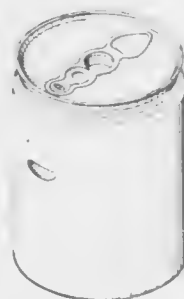


309,861

KEG HOLDER FOR BEER DISPLAY

Kenneth D. Farrar, 118 Blanco, San Marcos, Tex. 78666  
Filed Feb. 27, 1986, Ser. No. 838,033

Term of patent 14 years  
U.S. Cl. D9—416

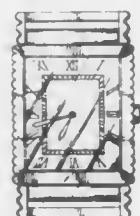


309,864

WRISTWATCH

Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114  
Filed Mar. 26, 1987, Ser. No. 30,918

Term of patent 14 years  
U.S. Cl. D10—39



309,865

WRISTWATCH

Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114  
Filed Mar. 26, 1987, Ser. No. 30,917

Term of patent 14 years  
U.S. Cl. D10—39



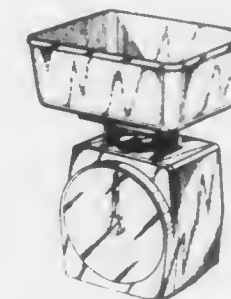
309,868

KITCHEN SCALE

Rido Busse, Elchingen, Fed. Rep. of Germany, assignor to Soeh-  
nle-Waagen GmbH & Co., Murrhardt, Fed. Rep. of Germany

Filed Apr. 3, 1987, Ser. No. 34,317  
Claims priority, application German Democratic Rep., Feb.  
19, 1987, 008217

Term of patent 14 years  
U.S. Cl. D10—91

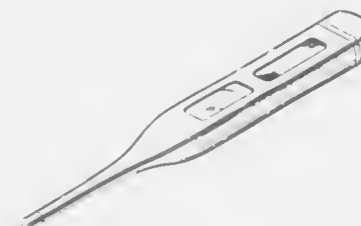


309,866

ELECTRONIC CLINICAL THERMOMETER

Masao Fukuda, and Kenichi Kida, both of Tokyo, Japan, assign-  
ors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 11, 1987, Ser. No. 95,546  
Term of patent 14 years  
U.S. Cl. D10—57

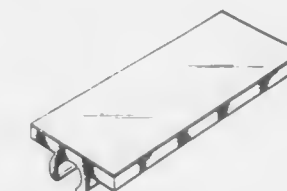


309,869

RETRO-REFLECTIVE ELEMENT FOR BICYCLE WHEEL  
SPOKES OR SIMILAR ARTICLES

Derek G. Dunmore, 40 Richview Road, #1803, Islington, On-  
tario, Canada M9A 5C1

Filed May 15, 1987, Ser. No. 50,347  
Claims priority, application Canada, Nov. 19, 1986, 19-11-86-3  
Term of patent 14 years  
U.S. Cl. D10—111

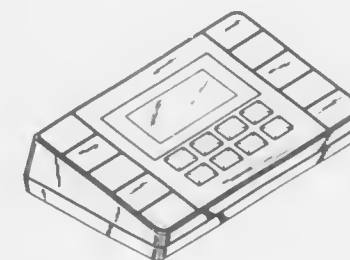


309,867

PH METER

Ronald C. Johnson, Fullerton, Calif., assignor to Beckman In-  
struments, Inc., Fullerton, Calif.

Filed Sep. 16, 1987, Ser. No. 97,466  
Term of patent 14 years  
U.S. Cl. D10—81

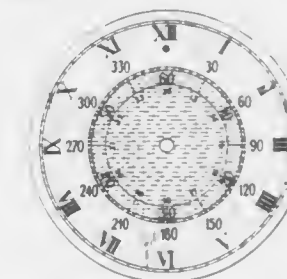


309,870

WRIST WATCH DIAL

Gedalia Grinberg, New York, N.Y., assignor to North American  
Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,813  
Term of patent 14 years  
U.S. Cl. D10—126





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309,871

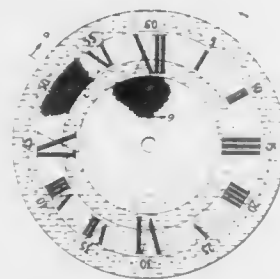
## WRIST WATCH DIAL

Gedaliao Grinberg, New York, N.Y., and Hugo Berger, Le Locle, Switzerland, assignors to North American Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,819

Term of patent 14 years

U.S. Cl. D10—126



309,874

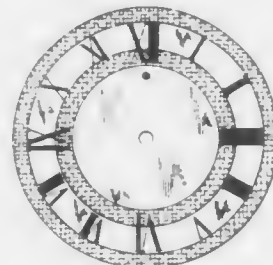
## WRIST WATCH DIAL

Gedaliao Grinberg, New York, N.Y., assignor to North American Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,824

Term of patent 14 years

U.S. Cl. D10—126



309,875

## CHRISTMAS ORNAMENT

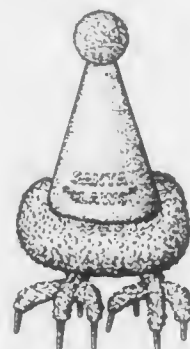
Brigitte Talevski, 115 Lankin Boulevard, Toronto, Ontario, Canada M4J 4X2

Filed Jun. 8, 1987, Ser. No. 59,399

Claims priority, application Canada, Dec. 19, 1986, 19-12-86-10

Term of patent 14 years

U.S. Cl. D11—125



309,872

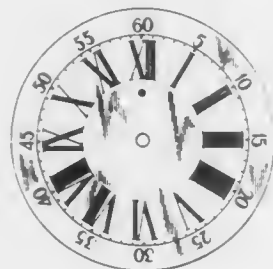
## WRIST WATCH DIAL

Gedaliao Grinberg, New York, N.Y., and Hugo Berger, Le Locle, Switzerland, assignors to North American Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,820

Term of patent 14 years

U.S. Cl. D10—126



309,873

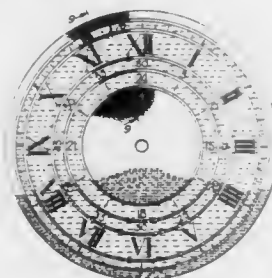
## WRIST WATCH DIAL

Gedaliao Grinberg, New York, N.Y., and Hugo Berger, Le Locle, Switzerland, assignors to North American Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,821

Term of patent 14 years

U.S. Cl. D10—126



309,876

## NOVELTY MAILER

Curtis L. Mesnard, 4118 59th St. West, Bradenton, Fla. 33529

Filed Feb. 27, 1987, Ser. No. 19,956

Term of patent 14 years

U.S. Cl. D11—157



309,877

## FIGURINE

Jack N. Dannheiser, 1206 Western Hills, Evansville, Ind. 47712

Filed Oct. 30, 1986, Ser. No. 925,137

Term of patent 14 years

U.S. Cl. D11—157



309,880

## LINK ELEMENT

Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari, S.p.A., Rome, Italy

Filed Apr. 30, 1987, Ser. No. 44,120

Claims priority, application Italy, Oct. 31, 1986, 36215/86[U]

Term of patent 14 years

U.S. Cl. D11—93



309,878

## PLANT CONTAINER

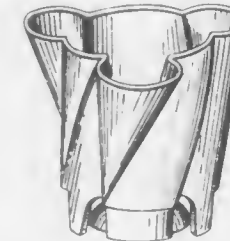
Stanley I. Mason, Jr., 61 River Rd., Weston, Conn. 06883

Division of Ser. No. 11,159, Feb. 5, 1987. This application Sep.

5, 1989, Ser. No. 402,424

Term of patent 14 years

U.S. Cl. D11—143



309,881

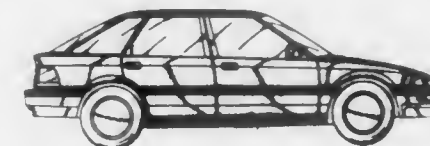
## AUTOMOBILE

Yutaka Ikeda, Rolling Hills Estates, Calif.; Kenji Abe, Saitama, Japan; Masanori Imaki, and Yusuke Saitoh, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,715

Term of patent 14 years

U.S. Cl. D12—91



309,879

## EARRING

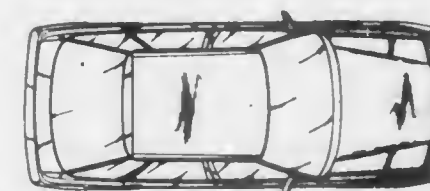
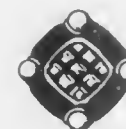
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy

Filed Jul. 13, 1988, Ser. No. 218,034

Claims priority, application Int'l Pat. Institute, Jan. 14, 1988, DM/010065

Term of patent 14 years

U.S. Cl. D11—71



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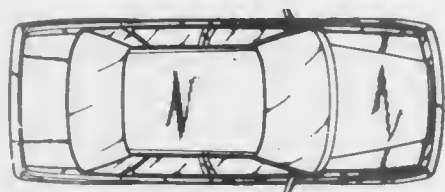
UMI

309,882

## AUTOMOBILE

Masonori Imaki, Tokyo; Kenji Abe, Saitama; Yusuke Saitoh, Tokyo, and Hideyuki Ikeda, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed May 13, 1988, Ser. No. 193,984  
Term of patent 14 years

U.S. Cl. D12—92



309,884

## VEHICLE TIRE

Shusuke Kitagawa, Osaka, Japan, assignor to The Ohtsu Tire & Rubber Co., Ltd., Izumi-Ohtsu, Japan  
Filed Aug. 11, 1987, Ser. No. 83,997  
Claims priority, application Japan, Mar. 13, 1987, 62-9679  
Term of patent 14 years

U.S. Cl. D12—146

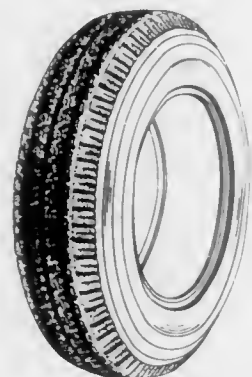


309,883

## VEHICLE TIRE

Rex B. Barnett, S. Coldfield, England, assignor to SP Tyres UK Limited, Birmingham, England  
Filed Feb. 5, 1988, Ser. No. 152,589  
Claims priority, application United Kingdom, Aug. 5, 1987, 1043993  
Term of patent 14 years

U.S. Cl. D12—143

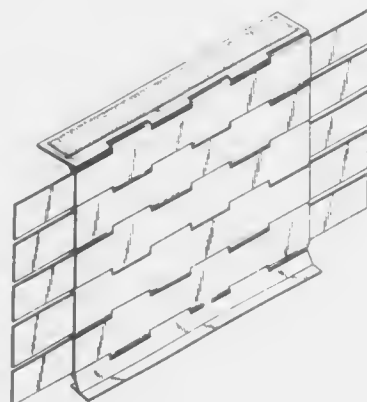


309,885

## WINDSHIELD SUN SHADE

Juan Gurruchaga, Calle 2 Num. 155-B, Saint Just, Trujillo Alto, P.R. 00750  
Filed Mar. 25, 1988, Ser. No. 174,612  
Term of patent 14 years

U.S. Cl. D12—191

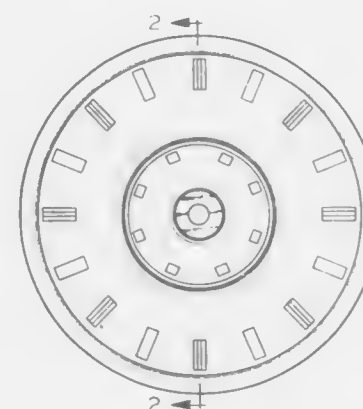


309,886

## STROLLER WHEEL

Harry J. Giambone, Kettering, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.  
Filed Oct. 13, 1988, Ser. No. 257,234  
Term of patent 14 years

U.S. Cl. D12—211

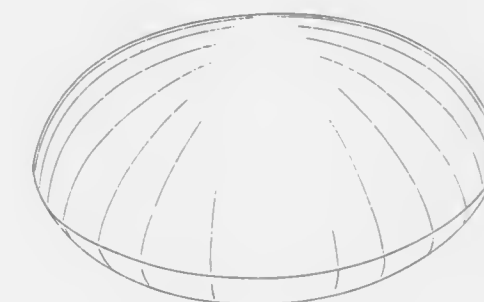
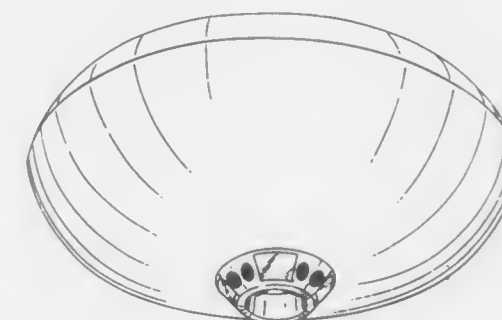
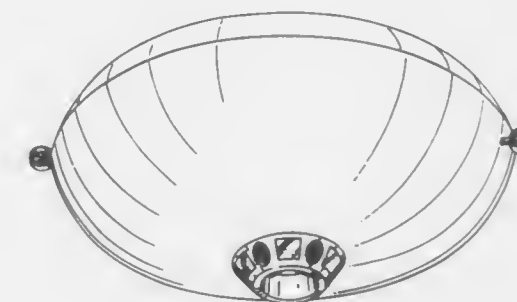


309,887

## AIR VEHICLE

George Ninkovich, Richmond, Canada, assignor to Hystar Aerospace Development Corporation, Vancouver, Canada  
Filed Jan. 20, 1987, Ser. No. 5,521  
Claims priority, application Japan, Oct. 29, 1986, 62-101955  
Term of patent 14 years

U.S. Cl. D12—325





309,888  
TRANSFORMER WITH LIGHT SOCKET CONNECTOR  
INPUT AND TELEPHONE-STYLE CONNECTOR  
OUTPUT

Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
Taiwan

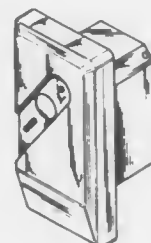
Filed Jul. 11, 1988, Ser. No. 216,982  
Term of patent 14 years  
U.S. Cl. D13—110



309,891  
REMOTELY CONTROLLED WALL-MOUNTED SWITCH

Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
Taiwan

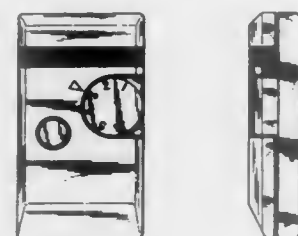
Filed Jul. 11, 1988, Ser. No. 216,980  
Term of patent 14 years  
U.S. Cl. D13—158



309,889  
MULTI-CHANNEL TRANSMITTER

Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
Taiwan

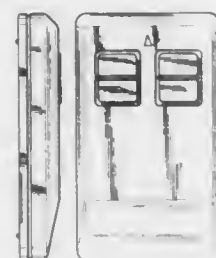
Filed Jul. 11, 1988, Ser. No. 216,978  
Term of patent 14 years  
U.S. Cl. D13—168



309,890  
INDOOR/OUTDOOR TRANSMITTER

Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
Taiwan

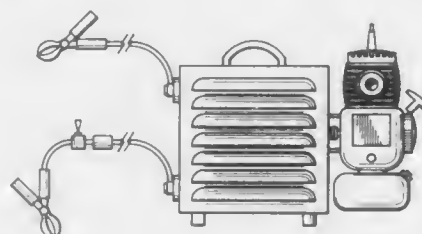
Filed Jul. 11, 1988, Ser. No. 216,983  
Term of patent 14 years  
U.S. Cl. D13—168



309,892  
PORTABLE GENERATOR FOR CHARGING  
AUTOMOBILE BATTERIES

David B. Troup, 868 Mohawk Dr., Livermore, Calif. 94550

Filed Jun. 22, 1988, Ser. No. 209,800  
Term of patent 14 years  
U.S. Cl. D13—107



309,893  
COVER FOR AN ELECTRICAL WIRE CONNECTOR  
HOUSING

Takayoshi Endo, and Masayuki Yamamoto, all of Gotenba,  
Japan, assignors to Yazaki Corporation, Tokyo, Japan

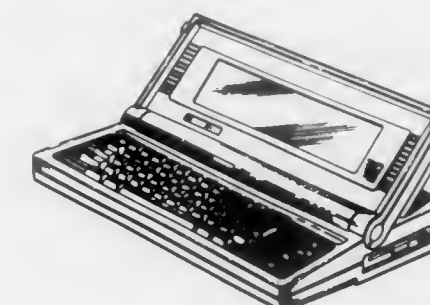
Filed Jul. 30, 1987, Ser. No. 79,603  
Claims priority, application Japan, Jan. 30, 1987, 62-003092  
Term of patent 14 years  
U.S. Cl. D13—156



309,895  
PORTABLE WORD PROCESSOR

Mark J. Lampe, Syracuse, N.Y., assignor to Smith Corona  
Corporation

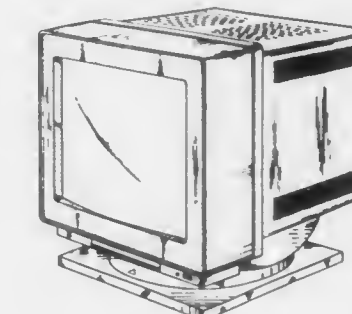
Filed Jan. 6, 1989, Ser. No. 294,543  
Term of patent 14 years  
U.S. Cl. D14—106



309,896  
DISPLAY MONITOR

David L. Schaum, Woodstock, N.Y., assignor to International  
Business Machines Corporation, Armonk, N.Y.

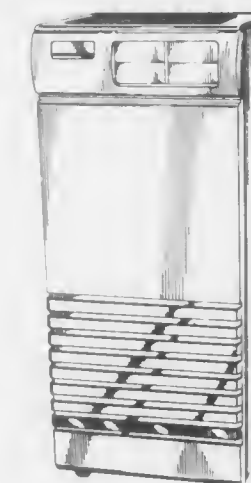
Filed Oct. 21, 1986, Ser. No. 922,446  
Term of patent 14 years  
U.S. Cl. D14—113



309,894  
COMPUTER PROCESSING SYSTEM

Edward J. Cesarczyk, Watertown; Richard R. Dillon, Wellesley,  
and Helmut H. Henneberg, Canton, all of Mass., assignors to  
Bull HN Information Systems Inc., Billerica, Mass.

Filed Dec. 7, 1987, Ser. No. 130,338  
Term of patent 14 years  
U.S. Cl. D14—100



309,897  
ANTI-THEFT ANCHOR

Robert Perry, 5755 SW. Willow La., Lake Oswego, Oreg. 97034

Filed Sep. 25, 1987, Ser. No. 101,153  
Term of patent 14 years  
U.S. Cl. D14—114



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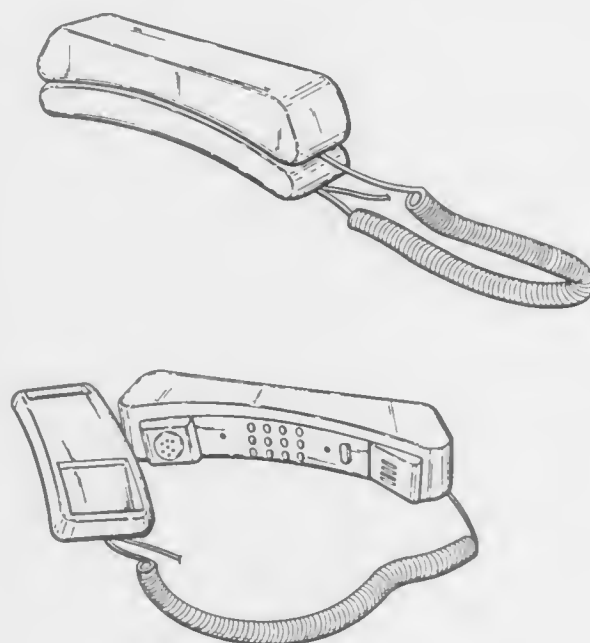
UMI

309,898

## TELEPHONE SET

Juan M. Azpeitia Ortiz de Arri, San Sebastian Guipuzcoa, Spain, assignor to Solac Telecom, S.A., Vitoria, Spain  
Division of Ser. No. 378,395, Jul. 11, 1989. This application Sep. 14, 1989, Ser. No. 407,779  
Term of patent 14 years

U.S. Cl. D14-148



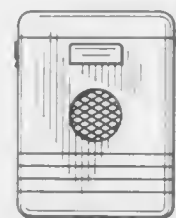
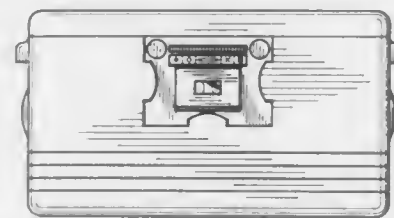
309,900

## COMBINED RADIO, TAPE PLAYER AND ICE CHEST

Edward T. Hilsley, 6536 Old Zion Hill Rd., Richmond, Va. 23234  
Filed May 18, 1988, Ser. No. 195,189

Term of patent 14 years

U.S. Cl. D14-168



309,901

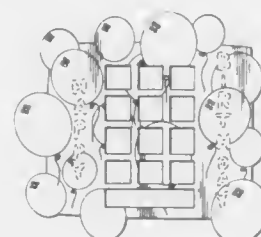
## TELEPHONE FACEPLATE

Jeannine J. Caesar, Royal Oak, Mich., assignor to Kapow, Inc., Royal Oak, Mich.

Filed Jan. 3, 1989, Ser. No. 292,878

Term of patent 14 years

U.S. Cl. D14-244



309,902

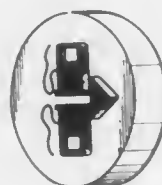
## FUEL DIRECTION INDICATOR DISK

Howard Schneider, 1426 Deerfield Dr., Allentown, Pa. 18104

Filed Jun. 29, 1988, Ser. No. 213,985

Term of patent 14 years

U.S. Cl. D15-9.1



309,899

## COMBINED TAPE RECORDER AND RADIO RECEIVER

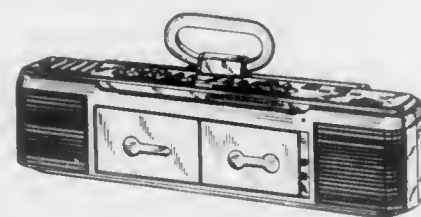
Ryo Kashiwagi, Kunitachi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,788

Claims priority, application Japan, Jan. 28, 1988, 63-3201

Term of patent 14 years

U.S. Cl. D14-163



309,903

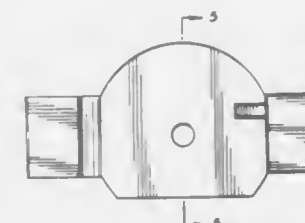
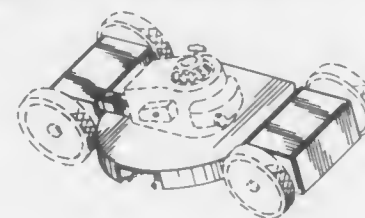
## HOUSING FOR LAWN TRIMMERS OR THE LIKE

Dallas W. Jones, New Hartford; Lauren J. Young, Poland, and Richard P. Nadeau, Frankfort, all of N.Y., assignors to Trim-A-Lawn Corporation, Utica, N.Y.

Filed Feb. 5, 1988, Ser. No. 152,583

Term of patent 14 years

U.S. Cl. D15-17



309,904

## DISTRIBUTOR FOR A CONCRETE SCREED

Donald R. Morrison, 9827 Mt. Holly Rd., Rte. 6, Box 634, Charlotte, N.C. 28208

Filed Jul. 19, 1988, Ser. No. 221,193

Term of patent 14 years

U.S. Cl. D15-28



309,905

## COVERED ICE CUBE TRAY

Michel Weissman, 22 Louisburg Sq., Lakewood, N.J. 08701

Filed Oct. 8, 1987, Ser. No. 106,441

Term of patent 14 years

U.S. Cl. D15-90



309,906

## DRILL POSITIONING FIXTURE

Peter V. N. Heller, 213 Esplanade, San Clemente, Calif. 92672

Filed Jul. 8, 1988, Ser. No. 216,454

Term of patent 14 years

U.S. Cl. D15-140



309,907

## MINI CAMCORDER SUPPORT

Arnold Herb, 7607 Hamilton Ave., Cincinnati, Ohio 45231

Filed Jul. 30, 1987, Ser. No. 79,751

Term of patent 14 years

U.S. Cl. D16-242



309,908

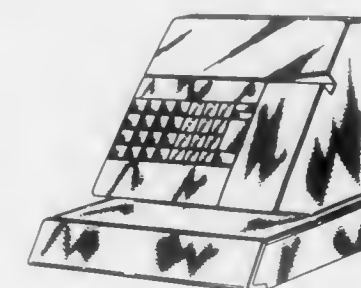
## ELECTRONIC CASH REGISTER OR SIMILAR ARTICLE

Bruce A. Quinn, Beavercreek, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed May 2, 1988, Ser. No. 189,505

Term of patent 14 years

U.S. Cl. D18-4



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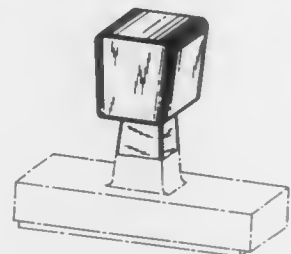
**HANDLE PORTION OF A HAND STAMP**

Walter Just, Wels, Austria, assignor to Trodat-Werke Franz Just &amp; Söhne, Wels, Austria

Filed May 1, 1986, Ser. No. 858,511

Term of patent 14 years

U.S. Cl. D18—18



309,912

**SORTER FOR COPYING MACHINE**

Tomohiko Hirata, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,781

Claims priority, application Japan, Mar. 1, 1988, 63-8325

Term of patent 14 years

U.S. Cl. D18—42



309,910

**ELECTRONIC CALCULATOR**

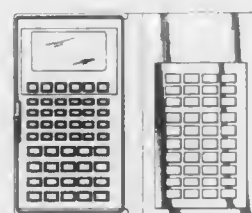
Hiroshi Sakaguchi, and Toshiya Takahashi, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Apr. 6, 1987, Ser. No. 35,138

Claims priority, application Japan, Oct. 7, 1986, 61-39833

Term of patent 14 years

U.S. Cl. D18—7



309,911

**PROCESS UNIT FOR COPYING MACHINE**

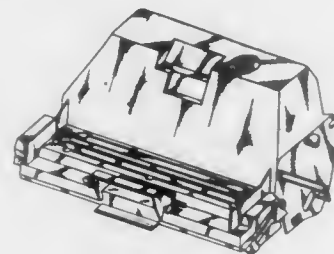
Shigeo Koyama, Ibaragi, and Eiji Etoh, Osaka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Mar. 8, 1989, Ser. No. 320,722

Claims priority, application Japan, Nov. 11, 1988, 63-44378

Term of patent 14 years

U.S. Cl. D18—40



309,913

**MARKING INSTRUMENT**

Koichi Shintani, Kashiwa, Japan, assignor to Coleem Pencil Co., Japan, Tokyo, Japan

Filed Jul. 15, 1987, Ser. No. 73,965

Term of patent 14 years

U.S. Cl. D19—43



309,914

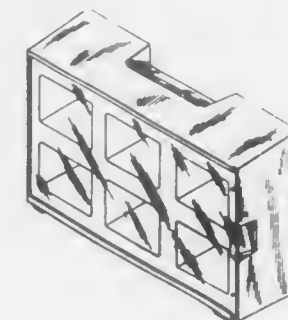
**SORTING AND INSPECTING TEST BOX**

Kris Kagelmann-Holtz; Gene Mihleisen, both of Milwaukee, Wis., and Tracy M. Gibbons, Chicago, Ill., assignors to Manpower Inc., Milwaukee, Wis.

Filed Feb. 3, 1987, Ser. No. 10,574

Term of patent 14 years

U.S. Cl. D19—59



309,916

**PUNCH**

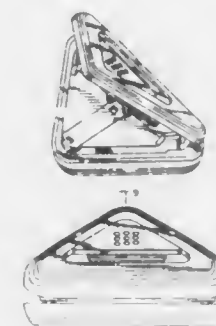
Kazuyoshi Higashi, Yao, Japan, assignor to Sakuraseiki Co., Ltd., Osaka, Japan

Filed Mar. 5, 1987, Ser. No. 22,359

Claims priority, application Japan, Sep. 6, 1986, 61-136854

Term of patent 14 years

U.S. Cl. D19—72



309,915

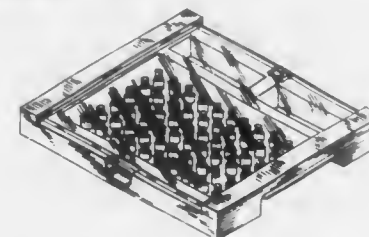
**CASE FOR COORDINATED RAPID MOVEMENT TESTING**

Kris Kagelmann-Holtz; Gene Mihleisen, both of Milwaukee, Wis., and Tracy M. Gibbons, Chicago, Ill., assignors to Manpower Inc., Milwaukee, Wis.

Filed Feb. 3, 1987, Ser. No. 10,576

Term of patent 14 years

U.S. Cl. D19—59



309,917

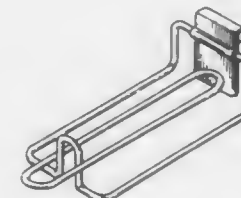
**WALL-MOUNTABLE CARD FILE**

Jean Beirise, and John Coons, both of Cincinnati, Ohio, assignors to Herman Miller, Inc., Zeeland, Mich.

Filed Apr. 22, 1987, Ser. No. 41,584

Term of patent 14 years

U.S. Cl. D19—76



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UMI

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OFFICIAL GAZETTE

AUGUST 14, 1990

309,918

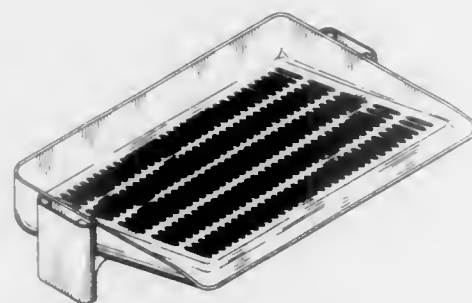
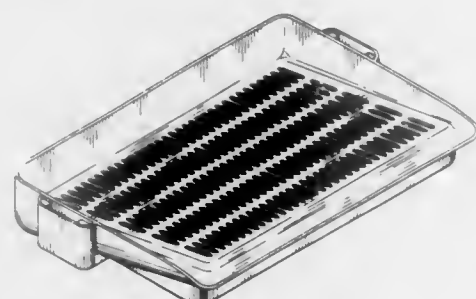
## DESK TRAY UNIT

Mel Evenson, San Pedro, Calif., assignor to Fidon Industries, Inc., Inglewood, Calif.

Filed Apr. 14, 1986, Ser. No. 851,697

Term of patent 14 years

U.S. Cl. D19—92



309,920

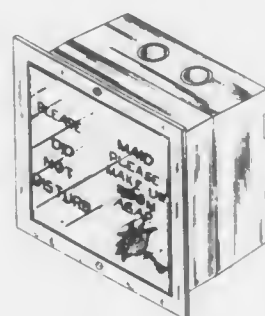
## ILLUMINATED SIGN

Constantin Malinovsky, Miami, Fla., assignor to Architectural Creative Lighting, Inc., Miami, Fla.

Filed Apr. 23, 1987, Ser. No. 41,592

Term of patent 14 years

U.S. Cl. D20—42



309,921

## TWO SIDED SIGN

Daniel W. Leo, Sr., New York, N.Y., assignor to Ledan, Inc., New York, N.Y.

Filed Aug. 24, 1988, Ser. No. 235,634

Term of patent 14 years

U.S. Cl. D20—42



309,919

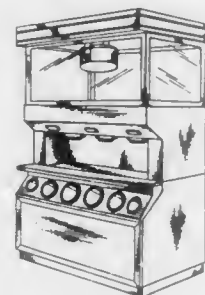
## POPCORN VENDING MACHINE

Frank D. Byrley, 12112 Madeleine Cir., Dallas, Tex. 75230

Filed Nov. 2, 1987, Ser. No. 115,185

Term of patent 14 years

U.S. Cl. D20—1



AUGUST 14, 1990

U.S. PATENT AND TRADEMARK OFFICE

1331

309,922

## MINI-BOWLING GAME

Dennix E. Jorgensen, 2303 Howard Avenue, Windsor, Ontario, Canada N8X 3V4

Filed Oct. 3, 1986, Ser. No. 916,086

Claims priority, application Canada, Apr. 24, 1986, 2404868

Term of patent 14 years

U.S. Cl. D21—11



309,925

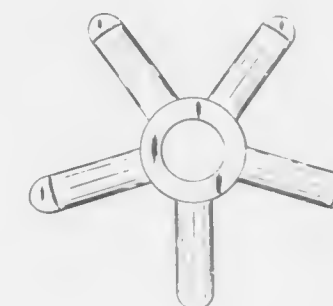
## BOOMERANG

J. Turner Hunt, Kirkwood, Mo., assignor to Turner Toys Corporation, Kansas City, Mo.

Filed Aug. 5, 1988, Ser. No. 229,097

Term of patent 14 years

U.S. Cl. D21—85



309,923

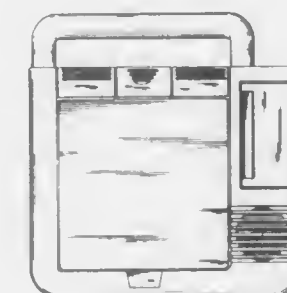
## ELECTRONIC EDUCATIONAL GAME HOUSING

David Cheung, Shatin Pass Est., Hong Kong, assignor to Video Technology Industries, Inc., Wheeling, Ill.

Filed Oct. 14, 1987, Ser. No. 108,043

Term of patent 14 years

U.S. Cl. D21—13



309,926

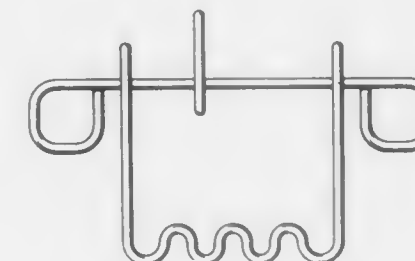
## PUZZLE

George A. Petrucelli, 569 Crocus Rd., Venice, Fla. 34293, and Calvin D. Grade, 228 Mayberry St., North Point, Fla. 34287

Filed Oct. 7, 1988, Ser. No. 254,786

Term of patent 14 years

U.S. Cl. D21—106



309,924

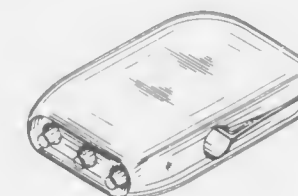
## HOLDER FOR DART PARTS

Joseph A. LeFebvre, Jr., P.O. Box 779, Windham, Me. 04062

Filed Sep. 19, 1988, Ser. No. 249,071

Term of patent 14 years

U.S. Cl. D21—54



309,927

## TOY BUILDING ELEMENT

Jan Ryaa, Billund, and Edel S. Andersen, Randbol, both of Denmark, assignors to Interlego A.G., Baar, Switzerland

Filed Dec. 4, 1985, Ser. No. 805,191

Term of patent 14 years

U.S. Cl. D21—108





309,928

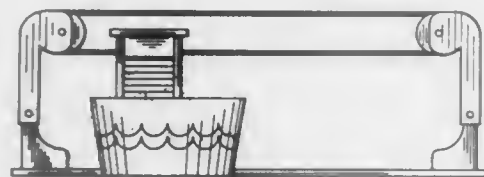
## DOLL CLOTHES LINE

Keith Thomas, P.O. Box 131, King's Point, NF., Canada A0J 1H0

Filed Jan. 25, 1988, Ser. No. 147,677

Term of patent 14 years

U.S. Cl. D21-109



309,929

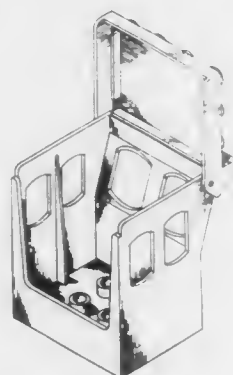
## WHEEL HOUSE FOR A TOY SHIP

Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Baar, Switzerland

Filed Nov. 29, 1988, Ser. No. 277,909

Term of patent 14 years

U.S. Cl. D21-141

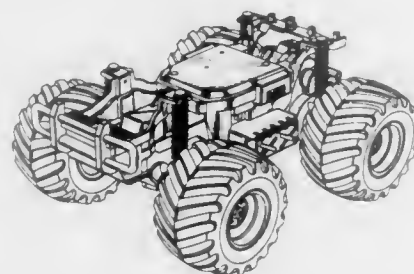
309,930  
TOY CAR

Kohji Asaeda, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan

Filed May 4, 1989, Ser. No. 347,090

Term of patent 14 years

U.S. Cl. D21-141



309,931

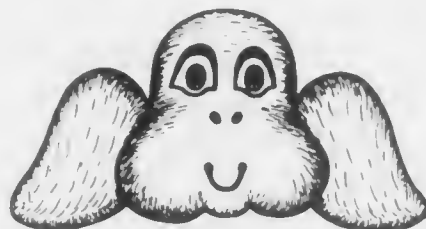
## STUFFED TOY FIGURE

David F. Cosgrove, Box 320, Wainscott, N.Y. 11975

Filed Feb. 17, 1987, Ser. No. 15,606

Term of patent 14 years

U.S. Cl. D21-161



309,932

## STAND FOR A DOLL OR SIMILAR ARTICLE

Hector Rivera, Jr., Chicago; Philip P. Kaiser, and Philip P. Kaiser, Jr., both of Northbrook, Ill., assignors to Kaiser Manufacturing Co., Chicago, Ill.

Filed Jun. 30, 1986, Ser. No. 880,330

Term of patent 14 years

U.S. Cl. D21-189



309,933

## EXERCISE ROD OR SIMILAR ARTICLE

Gordon L. Brown, Jr., Bristol, Tenn., assignor to Morrison Molded Fiber Glass Company, Bristol, Va.

Filed Mar. 8, 1989, Ser. No. 322,823

Term of patent 14 years

U.S. Cl. D21-198



309,934

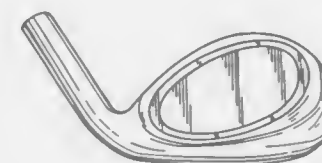
## GOLF CLUB HEAD

Kingso C. Lin, 1632 Tower Ct., Newark, Ohio 43055

Filed Dec. 22, 1986, Ser. No. 945,326

Term of patent 14 years

U.S. Cl. D21-220



309,935

## SANDBOX, WADING POOL OR SIMILAR ARTICLE

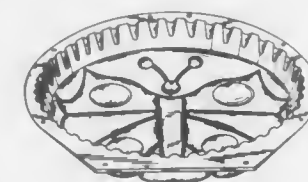
Petrus J. Van Oers, Bazuinlaan 72, Etten-Leur, Netherlands

Filed Mar. 18, 1987, Ser. No. 27,667

Claims priority, application Int'l Pat. Institute, Sep. 25, 1986, DM/007 525

Term of patent 14 years

U.S. Cl. D21-252



309,936

## FISHING REEL

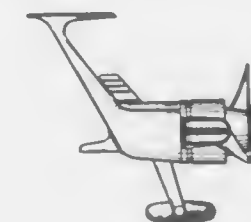
Etsuo Hiraishi, and Teruhisa Namata, both of Tokyo, Japan, assignors to Ryobi Ltd., Hiroshima, Japan

Filed Jan. 7, 1988, Ser. No. 141,659

Claims priority, application Japan, Jul. 21, 1987, 62-29653

Term of patent 14 years

U.S. Cl. D22-141



309,937

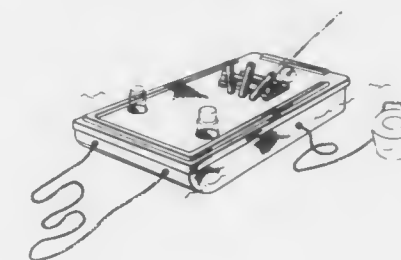
## FISHING TACKLE FLOAT

John A. Baxter, 1420 18th St. West, Bradenton, Fla. 33505

Filed Oct. 1, 1987, Ser. No. 103,371

Term of patent 14 years

U.S. Cl. D22-134



309,938

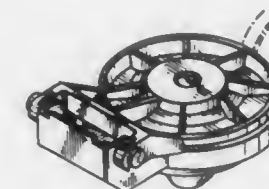
## FLUSH VALVE FOR TOILETS

Adolf Schoepe, and Oscar R. Dufau, both of Fullerton, Calif., assignors to Fluidmaster, Inc., Anaheim, Calif.

Filed Oct. 8, 1986, Ser. No. 916,998

Term of patent 14 years

U.S. Cl. D23-236



VOL

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309,939

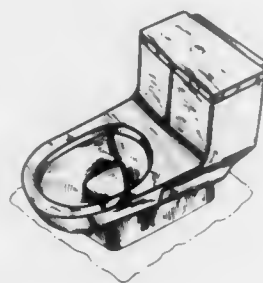
## WATER CLOSET

Roger J. Yvetot, Conflans Ste Honorine, France, assignor to  
Compagnie Internationale des Produits Sanitaires, Paris,  
France

Filed Apr. 11, 1989, Ser. No. 337,221

Term of patent 14 years

U.S. Cl. D23—301



309,941

PORTABLE AIR-CONDITIONER FOR  
THROUGH-HATCH MARINE APPLICATIONS

Edmund H. Machen; Edgar B. Montague; Tracy L. Teague;  
James W. Bolter, and James R. Machen, all of Charlotte,  
N.C., assignors to Marine Products, Inc., Richmond, Va.

Filed Sep. 20, 1988, Ser. No. 246,654

Term of patent 14 years

U.S. Cl. D23—333



309,942

## AIR CONDITIONER

Kenji Shimano, Tokyo, and Yoshinori Katagami, Yokohama,  
both of Japan, assignors to Kabushiki Kaisha Toshiba,  
Kanagawa, Japan

Filed Nov. 30, 1988, Ser. No. 278,262

Claims priority, application Japan, Aug. 19, 1988, 63-32735

Term of patent 14 years

U.S. Cl. D23—351



309,940

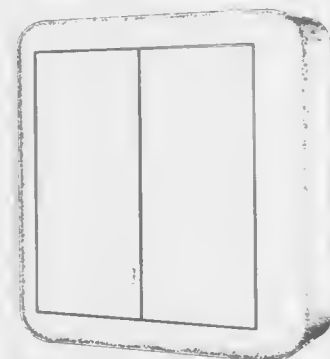
## COVER FOR A TRANSPORT CARGO HEATER UNIT

Daniel T. Neimy, Minneapolis; Roderick A. Haberman, Coon  
Rapids; Peter B. Allard, Minnetonka, all of Minn., and Clar-  
ence F. Graser, Venice, Fla., assignors to Thermo King Corpo-  
ration, Minneapolis, Minn.

Filed Apr. 27, 1988, Ser. No. 186,870

Term of patent 14 years

U.S. Cl. D23—324



309,943

## AIR FRESHENER DISPENSER

David A. Jones, Dayton, and William J. O'Neil, Jr., Cincinnati,  
both of Ohio, assignors to The Drackett Company, Cincinnati,  
Ohio

Filed Aug. 12, 1988, Ser. No. 231,417

Term of patent 14 years

U.S. Cl. D23—369



309,944

## ELECTRIC FAN

Bernard Chin, Ashland, Mass., assignor to Holmes Products  
Corp., Holliston, Mass.

Filed Jul. 5, 1988, Ser. No. 215,880

Term of patent 14 years

U.S. Cl. D23—382



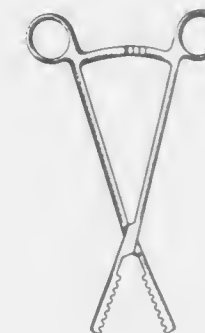
309,947

## SOFT TISSUE RELEASE INSTRUMENT

Randall J. Torre, 842 S. Clover, San Jose, Calif. 95128  
Filed Apr. 19, 1989, Ser. No. 340,577

Term of patent 14 years

U.S. Cl. D24—27



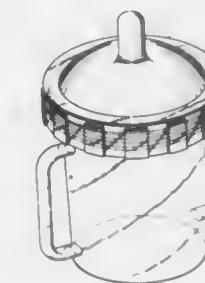
309,948

## NURSING BOTTLE

Debra D. Chambers, Rte. 3, Box 85B, Warren, Ark. 71671  
Filed Nov. 23, 1988, Ser. No. 276,437

Term of patent 14 years

U.S. Cl. D24—47



309,945

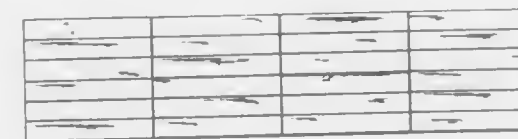
CHILD PROTECTIVE BUMPER FOR FIREPLACE  
HEARTH AND THE LIKE

Dennis K. Hicks, 3680 Oil Creek Dr., Indianapolis, Ind. 46268

Filed Dec. 8, 1988, Ser. No. 281,478

Term of patent 14 years

U.S. Cl. D23—403



309,949

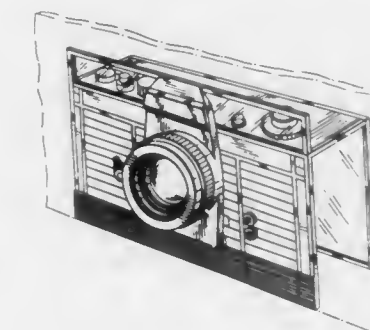
## STOREFRONT

A. Edward Moore, 215 Grandpre, L'Arcadie, Quebec, Canada  
J0J 1H0

Filed Apr. 21, 1988, Ser. No. 184,166

Term of patent 14 years

U.S. Cl. D25—59



309,946

## METATARSAL HEAD RETRACTOR

Randall J. Torre, 842 S. Clover, San Jose, Calif. 95128

Filed Mar. 31, 1989, Ser. No. 332,092

Term of patent 14 years

U.S. Cl. D24—27





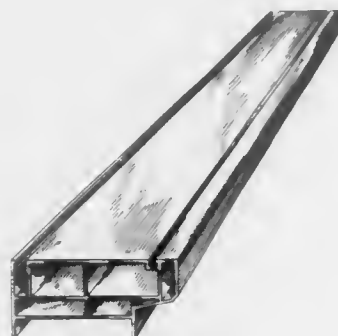
309,950

## WINDOW COMPONENT EXTRUSION

Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.

Filed Sep. 19, 1988, Ser. No. 246,320  
Term of patent 14 years

U.S. Cl. D25—122



309,952

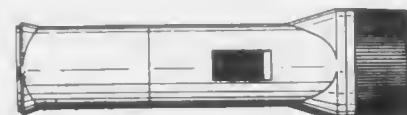
## COMBINED TORCH AND WARNING LIGHT

Kwok W. J. Lee, Kwai Chung, Hong Kong, assignor to Lomak Industrial Company Limited, Hong Kong  
Filed May 25, 1988, Ser. No. 198,820

Claims priority, application United Kingdom, Nov. 27, 1987, 1046696

Term of patent 14 years

U.S. Cl. D26—49



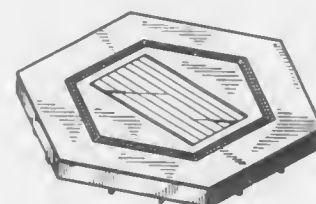
309,953

## SOLAR POWERED LIGHT

Tseng L. Chien, Suite 8-6, No. 9, San-Min Rd., Taipei, Taiwan  
Filed Dec. 7, 1988, Ser. No. 280,992

Term of patent 14 years

U.S. Cl. D26—67



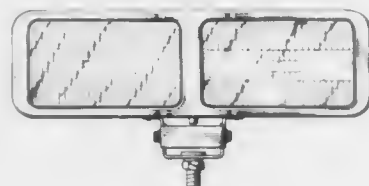
309,951

## TWIN BEAM FOG/DRIVING AUTOMOBILE HEADLIGHT

Pierre Charet, and Duke Kraai, both of Miami, Fla., assignors to Rally Accessories, Inc., Miami, Fla.

Filed Feb. 3, 1988, Ser. No. 151,795  
Term of patent 14 years

U.S. Cl. D26—35



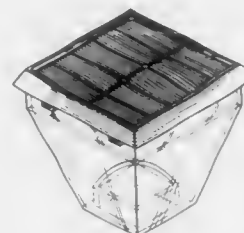
309,954

## SOLAR POWERED OUTDOOR LIGHT

Tseng L. Chien, Suite 8-6, No. 9, San-Min Rd., Taipei, Taiwan  
Filed Dec. 7, 1988, Ser. No. 281,005

Term of patent 14 years

U.S. Cl. D26—67



309,955

## WALL LAMP

Ernesto Gismondi, Milan, Italy, assignor to Artemide S.p.A., Milan, Italy

Filed Dec. 5, 1988, Ser. No. 280,620

Claims priority, application Italy, Jun. 10, 1988, 21407/88[U]

Term of patent 14 years

U.S. Cl. D26—87



309,956

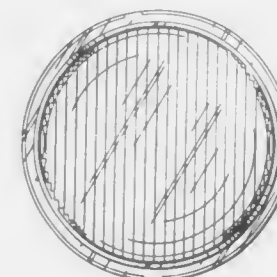
## FRONT LENS FOR HIGH INTENSITY STROBE FLASH LAMP

Thomas R. Sikora, Mesa, and Robert Nagel, Chandler, both of Ariz., assignors to Tomar Electronics, Inc., Tempe, Ariz.

Filed Sep. 20, 1988, Ser. No. 246,814

Term of patent 14 years

U.S. Cl. D26—123



309,957

## CIGARETTE LIGHTER

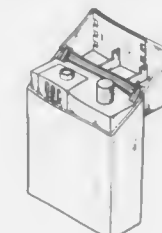
Tomio Nitta, Kanagawa, Japan, assignor to Tokai Corporation, Kanagawa, Japan

Filed Dec. 8, 1987, Ser. No. 130,343

Claims priority, application Japan, Jun. 8, 1987, 62-23159

Term of patent 14 years

U.S. Cl. D27—148



309,958

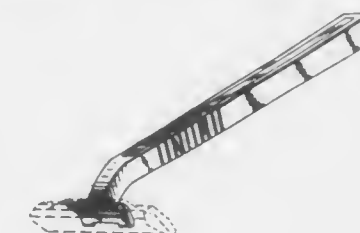
## SAFETY RAZOR HANDLE

Clemens A. Iten, Fishersville, Va.; John N. McGarvey, Drexel Hill, Pa., and Alvin R. Tilley, Redbank, N.J., assignors to American Safety Razor Company, Verona, Va.

Filed Aug. 3, 1988, Ser. No. 227,746

Term of patent 14 years

U.S. Cl. D28—48



309,959

## DENTAL FLOSS DISPENSER

Robert A. Endelson, 330 E. 79th St., New York, N.Y. 10021, and Eric Blank, 81 New Bridge Rd., Sudbury, Mass. 01776

Filed Jun. 7, 1988, Ser. No. 203,751

Term of patent 14 years

U.S. Cl. D28—64



309,960

## LOW FLOW NASAL CANNULA

Gregory R. Applebaugh, 12550 Creek Crest Dr., Reno, Nev. 89511

Filed Jul. 17, 1987, Ser. No. 75,028

Term of patent 14 years

U.S. Cl. D29—7



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309,961

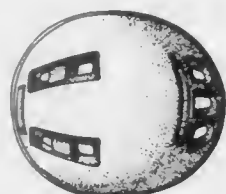
**BICYCLIST'S HELMET**

Michael L. Bobrick, Malibu, Calif., assignor to Western States  
Import Company, Inc., Camarillo, Calif.

Filed Jul. 17, 1987, Ser. No. 74,517

Term of patent 14 years

U.S. Cl. D29—12



309,963

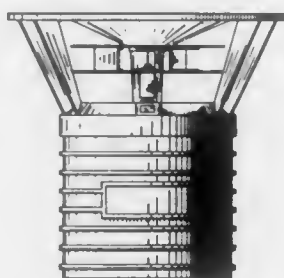
**DISTRIBUTOR HOUSING AND COVER FOR A WILDLIFE FEEDER MOTOR**

Earl E. Cureton, 358 Fenwick Dr., San Antonio, Tex. 78239

Filed Jan. 14, 1987, Ser. No. 3,221

Term of patent 14 years

U.S. Cl. D30—122



309,964

**CAT PLAY TOY AND EXERCISER**

Loraine Viner, and Stephen G. Viner, both of 1066 S. Ogden Dr.,  
Los Angeles, Calif. 90019

Filed Feb. 21, 1989, Ser. No. 312,573

Term of patent 14 years

U.S. Cl. D30—160



309,962

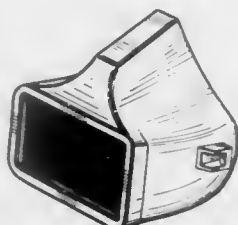
**FACE MASK FOR COLD PROTECTION**

Olavi Ebeling, Helsinki, Finland, assignor to SUOMEN  
JONAS OY, Helsinki, Finland

Filed Dec. 10, 1987, Ser. No. 130,982

Term of patent 14 years

U.S. Cl. D29—17



309,965

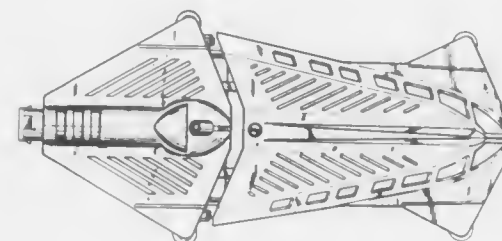
**CLEANING UNIT FOR COLLECTING DEBRIS IN A SWIMMING POOL**

David A. Brooks, Roodepoort, South Africa, assignor to Spooner  
Est, Vaduz, Liechtenstein

Filed Nov. 7, 1986, Ser. No. 928,118

Term of patent 14 years

U.S. Cl. D32—25



309,968

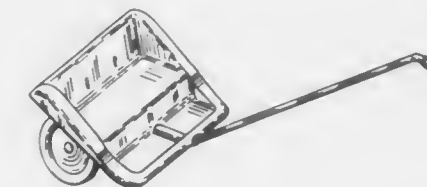
**TOY CART**

Robert L. Parshall, 3200 Kibby Rd., Jackson, Mich. 49203

Filed Jan. 6, 1989, Ser. No. 294,046

Term of patent 14 years

U.S. Cl. D34—24



309,969

**BODY OF ELECTRIC CHAIN HOIST**

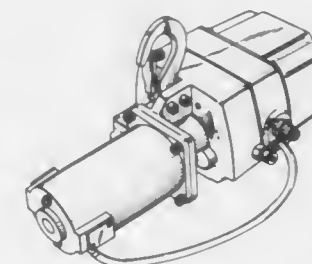
Tetsuya Tamura, Tokyo, Japan, assignor to Kito Corp.,  
Nakakoma, Japan

Filed Feb. 13, 1987, Ser. No. 14,521

Claims priority, application Japan, Sep. 10, 1986, 61-35468

Term of patent 14 years

U.S. Cl. D34—33



309,966

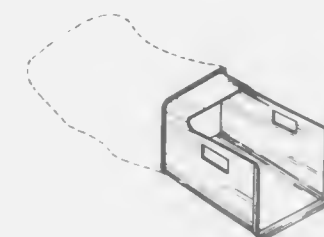
**TRASH BAG FUNNEL**

Harold B. Bishop, 1737 Sylvan Dr., Montgomery, Ala. 36106

Filed Feb. 1, 1988, Ser. No. 150,701

Term of patent 14 years

U.S. Cl. D34—5



309,967

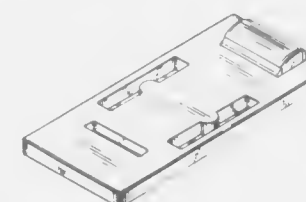
**MECHANIC'S CREEPER**

William Fagan, 10 Garfield Pl., Lindenhurst, N.Y. 11757

Filed Feb. 16, 1988, Ser. No. 156,192

Term of patent 14 years

U.S. Cl. D34—23



309,970

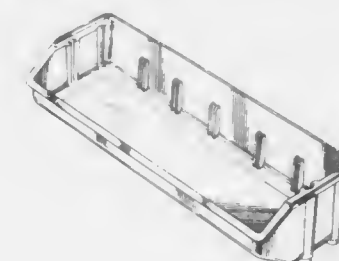
**ELONGATED PARTS BIN**

Donald Embree, Copley, and David L. Hamann, Cincinnati, both  
of Ohio, assignors to Rubbermaid Incorporated, Wooster,  
Ohio

Filed Aug. 10, 1988, Ser. No. 230,507

Term of patent 14 years

U.S. Cl. D34—40





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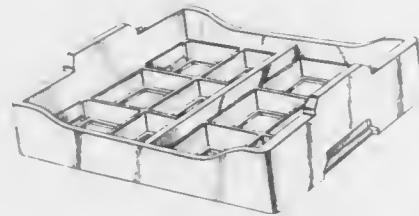
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14

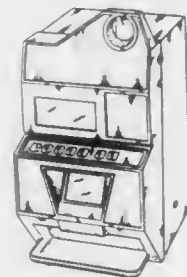
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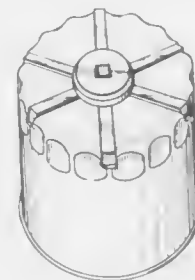
- 309,971**  
SUPPORT TRAY FOR PRODUCE AND THE LIKE  
Paul Quong, 1914 Orangewood Ave., Suite 102, Orange, Calif. 92668  
Filed Sep. 11, 1987, Ser. No. 95,877  
Term of patent 14 years  
U.S. Cl. D34—46
- 309,973**  
CROSS  
Joseph Mallon, 904 Oak Lane, Philadelphia, Pa. 19126  
Filed Mar. 28, 1989, Ser. No. 329,510  
Term of patent 14 years  
U.S. Cl. D11—96



- 309,972**  
SAVINGS BOX OR SIMILAR ARTICLE  
Kazumi Chiba, 367-1, Hoemokumotomachi Naka-ku, Yokohama-shi, Japan  
Continuation of Ser. No. 1,154, Jan. 7, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 205,586  
Claims priority, application Japan, Oct. 28, 1986, 61-42700  
Term of patent 14 years  
U.S. Cl. D99—37



- 309,974**  
COMBINED ENGINE OIL FILTER AND REMOVAL  
WRENCH THEREFOR  
Issa Y. Tannous, 307 20th St., Oakland, Calif. 94612  
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## LIST OF PATENTEES

TO WHOM

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- Riisko, Joseph E.; Kasenga, Anthony F.; and Renninger, Scott A., 4,948,527, Cl. 252-301.40R.
- GTE Valenite Corporation: See—  
Reiterman, Lee, 4,948,305, Cl. 408-224.000.
- GTx Corporation: See—  
Bhaskaran, Parvathy, 4,949,388, Cl. 382-10.000.
- Gu, Chee-Liang L.: See—  
Allison, Anthony C.; Eugui, Elsie M.; Nelson, Peter H.; Gu, Chee-Liang L.; and Lee, William A., 4,948,793, Cl. 514-233.500.
- Gualtieri, Michael N.: See—  
Gerstenfeld, Arthur; Gualtieri, Michael N.; and Moody, Thomas D., 4,949,267, Cl. 364-439.000.
- Guardian Industries Corp.: See—  
Chenoweth, Vaughn C.; Gieselmann, Doyle; and Wainwright, Vernon L., 4,948,409, Cl. 65-15.000.
- Gueroult, Alain: See—  
Clairouin, Noel; Gueroult, Alain; and Lemoyne, Remi, 4,948,620, Cl. 426-643.000.
- Guetle, Norbert J., Jr., to Pease Industries, Inc. Exterior door construction, 4,947,585, Cl. 49-478.000.
- Guffey, Timothy B.: See—  
Spinner, Jonathan; Guffey, Timothy B.; Lin, Peter Y. T.; and Jandacek, Ronald J., 4,948,811, Cl. 514-560.000.
- Guggenheim, Elie. Sterile cart cover, 4,948,154, Cl. 280-79.300.
- Guillemin, Jean, to Valeo. Distribution box for a heating and/or air conditioning apparatus, especially for an automotive vehicle, 4,947,735, Cl. 98-2.060.
- Gulczynski, Zdzislaw. High efficiency power factor correction circuit, 4,949,234, Cl. 363-48.000.
- Gulf Engineering Company, Inc.: See—  
Landry, Milton E., 4,948,936, Cl. 219-76.140.
- Gulick, Dale E.; Lawell, Terry G.; and Crowe, Charles, to Advanced Micro Devices, Inc. Enhanced universal asynchronous receiver-transmitter, 4,949,333, Cl. 370-32.000.
- Gunkel, Ronald W.; Cargnel, Robert A.; Morran, James R.; and Patrick, Edward P., to Aluminum Company of America. Method and apparatus for reforming a container, 4,947,667, Cl. 72-56.000.
- Gussman, Robert L., to Reliability Incorporated. Automated burn-in system, 4,947,545, Cl. 29-705.000.
- Gutman, Edward J.: See—  
Koch, Ronald J.; Gruber, Robert J.; Julien, Paul C.; Goodman, Donald J.; Gutman, Edward J.; and Maniar, Deepak R., 4,948,686, Cl. 430-45.000.
- Gutschmit, Alan, to Alandale Industries, Inc. Textile Yarn Creel, 4,948,067, Cl. 242-131.000.
- Guyot, Lucien, to Thomson-CSF. Electron tube for the detection, memorizing and selection of light images, 4,948,952, Cl. 250-213.0VT.
- Guyot, Lucien, to Thomson-CSF. Imaging device with matrix structure, 4,948,978, Cl. 250-370.110.
- Guyot, Lucien: See—  
Arques, Marc; and Guyot, Lucien, 4,948,966, Cl. 250-208.100.
- H. Berthold AG: See—  
Hillenbrand, Franz; Schroer, Klaus; Rebs, Frank; Dlabka, Michael, and Sprenger, Dietmar, 4,949,281, Cl. 364-518.000.
- H. L. & H. Timber Products: See—  
Schroeder, Hartwig F. T., 4,947,906, Cl. 144-208.00J.
- H. R. Black Company, Inc.: See—  
Anderson, Raymond L., 4,948,502, Cl. 210-387.000.
- Haaheim, Gary R.; Theisen, Paul M.; and Ketter, Karl N., to Fitness Master, Inc. Exercise machine, 4,948,121, Cl. 272-97.000.
- Haas, Martin, to Summit Orthodontic Services, Inc. Orthodontic accessories and method of applying the same, 4,948,367, Cl. 433-9.000.
- Haber, Terry M.; Foster, Clark B.; and Smedley, William H., to Habley Medical Technology Corporation. Energy-dissipating, safety blood collection tube holder, 4,947,863, Cl. 128-764.000.
- Habley Medical Technology Corporation: See—  
Haber, Terry M.; Foster, Clark B.; and Smedley, William H., 4,947,863, Cl. 128-764.000.
- Hachfeld, Klaus: See—  
Kantorski, Joseph W.; Hachfeld, Klaus; and Hobart, James L., 4,949,358, Cl. 372-94.000.
- Hacker, Nigel P.; and Tyndall, George W., III, to International Business Machines Corporation. Deposition of diamond films, 4,948,629, Cl. 427-53.100.
- Hadas, Eran: See—  
Solomon, Bekai; Hadas, Eran; and Fleming, Gideon, 4,948,836, Cl. 525-54.100.

Hafner, Walter; Gebauer, Helmut; Markl, Erich; and Regiert, Marlies, to Consortium fur Elektrochemische Industrie GmbH. Alcohols and ethers having cyclododecyl and cyclododecyl groups, process for their preparation and scents containing same. 4,948,780, Cl. 512-8.000.

Haftmann, Johannes; and Schmeikal, Rudolf, to TA Triumph-Adler Aktiengesellschaft. Typewriter, printer or the like and ribbon cassette therefor. 4,948,276, Cl. 400-208.000.

Hager, Elmer J.: See—  
Tench, Rex D.; and Hager, Elmer J., 4,948,042, Cl. 239-113.000.

Hagiya, Koji; Suzukamo, Gohfu; Fukao, Masami; Sakito, Yoji; and Sakane, Hiroko, to Sumitomo Chemical Co., Limited. Process for preparing trans-2,2-dimethyl-3-(2,2-dihalovinyl)cyclopropane carboxylic acid esters. 4,948,914, Cl. 560-124.000.

Hainaut, Jean-Pierre: See—  
Veaux, Jacques; Derrien, Michel; and Hainaut, Jean-Pierre, 4,948,069, Cl. 244-50.000.

Haisma, Jan; and Miedema, Andries R., to U.S. Philips Corporation. Method of bonding two bodies. 4,948,029, Cl. 228-112.000.

Haken, Roger A., to Texas Instruments, Incorporated. Thin dielectrics over polysilicon. 4,949,154, Cl. 357-54.000.

Hakkel, Peter: See—  
Kurti, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasziljevics, Gyozo, 4,949,075, Cl. 340-555.000.

Halker, Helmut, to Thomas Josef Heimbach GmbH & Co. Strip of material and its manufacturing method. 4,948,658, Cl. 428-234.000.

Hall, Edward D.: See—  
Braughtler, John M.; Hall, Edward D.; Wierenga, Wendell; and McCall, John M., 4,948,533, Cl. 552-576.000.

Hall, Howard F., to United States of America, Energy. System for training and evaluation of security personnel in use of firearms. 4,948,371, Cl. 434-21.000.

Hall, Martin P. Training fin device for swimming. 4,948,385, Cl. 441-64.000.

Halliburton Logging Services, Inc.: See—  
Minear, John W.; and Gold, Randy, 4,947,683, Cl. 73-155.000.

Halsell, Hampton L., II; Galloway, William W.; and Shults, David H., to Mead Corporation, The. Moisture resistant container. 4,948,033, Cl. 229-23.000.

Hamada, Motonobu: See—  
Koike, Seiji; Hirosaki, Yukihiro; Hamada, Motonobu; and Ohata, Takahiko, 4,948,282, Cl. 400-616.200.

Hamada, Takuji; Takahashi, Masahiro; Yoneda, Katsuhiko; and Okada, Masakazu, to Hitachi, Ltd. Multi-slot access system. 4,949,336, Cl. 370-85.200.

Hamamatsu Photonics Kabushiki Kaisha: See—  
Koike, Kiyoshi; Uchida, Hiroshi; Hayashi, Tatsuro; and Morita, Rikushi, 4,949,365, Cl. 378-54.000.

Hamane, Tokuhito: See—  
Kawazoe, Hiroshi; and Hamane, Tokuhito, 4,947,543, Cl. 29-605.000.

Hamblen, David P., to Eastman Kodak Company. Step-index light guide and gradient index microlens device for I.F.D. imaging. 4,948,214, Cl. 350-413.000.

Hamblin, Ronald F., to Skf (U K) Limited. Preventing movement of an article along a shaft or bore. 4,948,320, Cl. 411-511.000.

Hametner, Albert L.; and Trammell, Larry L., to Boeing Company, The. Method and apparatus for bending an elongate workpiece. 4,947,666, Cl. 72-37.000.

Hamilton, James T. Bearing temperature regulation and lubrication system. 4,948,269, Cl. 384-467.000.

Hamilton, Lyle H. Noninvasive diagnosis of gastritis and duodenitis. 4,947,861, Cl. 128-719.000.

Hamilton, Peter W.: See—  
Thornock, Del M.; Goldberg, James R.; Kock, Ronald W.; Paul, Robert A.; Hamilton, Peter W.; and Willhite, William, Jr., 4,948,002, Cl. 215-221.000.

Hamm, Robert H.: See—  
Hayward, Thomas D.; Hamm, Robert H.; and Johnson, Marco, 4,949,047, Cl. 328-233.000.

Hammar, Walton J.: See—  
Echols, Jimmie L.; Hammar, Walton J.; and Kotnour, Thomas A., 4,948,859, Cl. 528-28.000.

Hammersley, Michael E.: See—  
Bezinque, David J.; McCormack, Mark R.; and Hammersley, Michael E., 4,949,036, Cl. 324-212.000.

Hammond, Robert B.; and Bowman, Douglas R., to United States of America, Energy. Polysilicon photoconductor for integrated circuits. 4,948,741, Cl. 437-4.000.

Hams Corporation: See—  
Miyachi, Nobuji; and Miyake, Keniti, 4,947,771, Cl. 112-141.000.

Hanagan, Mary A.; and Wexler, Barry A., to Du Pont de Nemours, E. I., and Company. Herbicidal pyridine sulfonamides. 4,948,419, Cl. 71-93.000.

Hanaoka, Osamu: See—  
Seki, Masaki; Samukawa, Koji; and Hanaoka, Osamu, 4,949,271, Cl. 364-474.290.

Hanaoka, Yukihiro: See—  
Tezuka, Chikao; Hanaoka, Yukihiro; and Nakayama, Hiroyuki, 4,948,273, Cl. 400-185.000.

Handa, Tsuneo: See—  
Higashimura, Koichi; Miyazawa, Yoshinori; Handa, Tsuneo; Mizumoto, Teruyuki; Ito, Hiroshi; Uchino, Atsushi; Motoki, Masanobu; Kunugi, Masanao; Ishiwatari, Taisei; and Shimura, Hidetsugu, 4,948,692, Cl. 430-106.600.

Handa, Yasushi: See—  
Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Kadera, Sadaki, 4,949,134, Cl. 355-317.000.

Hano, Sunao; Fukushima, Naoto; Fukunaga, Yukio; Akatsu, Yohsuke; Satoh, Masaharu; and Fujimura, Itaru, to Nissan Motor Company, Limited. Actively controlled suspension system with compensation of delay in phase in control system. 4,948,164, Cl. 280-707.000.

Hanover Brands, Incorporated: See—  
Lambert, Ralph A., Jr., 4,948,605, Cl. 426-107.000.

Hansen, Guenter: See—  
Wallbillich, Guenter; Neumann, Peter; and Hansen, Guenter, 4,948,702, Cl. 430-271.000.

Hansen, Kenneth N.: See—  
Dorner, Wolfgang C.; and Hansen, Kenneth N., 4,947,981, Cl. 198-360.000.

Hansler, Richard L.: See—  
Finch, William W.; Davenport, John M.; and Hansler, Richard L., 4,949,227, Cl. 362-61.000.

Hanstein, Friedrich; and Fehring, Karl-Heinz, to Rohm GmbH Chemische Fabrik. Method of forming reducing formation of impressions from the forming tool. 4,948,548, Cl. 264-522.000.

Hara, Hiromu: See—  
Mase, Toshiyasu; Hara, Hiromu; and Yamada, Toshimitsu, 4,948,795, Cl. 514-252.000.

Hara, Katsutoshi: See—  
Morita, Yoshiyasu; Seguchi, Manabu; Okamura, Kazuo; Hikami, Fuminori; Ishihara, Koichiro; and Hara, Katsutoshi, 4,947,924, Cl. 164-97.000.

Hara, Kenichi, to Sansho Seiyaku Co., Ltd. Composition for external application. 4,948,577, Cl. 424-59.000.

Harada, Chikao: See—  
Yokoe, Hifumi; and Harada, Chikao, 4,947,855, Cl. 128-672.000.

Harada, Isao; Hokonohara, Hisashi; and Yamaguchi, Toshiaki, to Mitsui Toatsu Chemicals, Inc. Process for purifying nitrogen trifluoride gas. 4,948,571, Cl. 423-240.000.

Harada, Nozomu: See—  
Iesaka, Mamoru; Uya, Shinji; and Harada, Nozomu, 4,949,143, Cl. 357-24.000.

Harada, Riichiro: See—  
Satoh, Ikumi; Nakano, Jun; Harada, Riichiro; Koba, Tatsuhiko; Fujita, Yuichi; and Shima, Kazumi, 4,948,091, Cl. 251-65.000.

Harada, Setsuo: See—  
Shinagawa, Susumu; Kanamaru, Tsuneo; Harada, Setsuo; and Asai, Mitsuko, 4,948,534, Cl. 260-399.000.

Harada, Shoichi: See—  
Kito, Shozo; Harada, Shoichi; Imai, Hajime; and Muramatsu, Tadao, 4,947,967, Cl. 192-4.00A.

Harbor Branch Oceanographic Institute, Inc.: See—  
Caimi, Frank M., 4,948,258, Cl. 356-376.000.

Harder, John W., to Eastman Kodak Company. Photographic material and process comprising a pyrazoloazole dye-forming coupler. 4,948,722, Cl. 430-558.000.

Harper-Wyman Company: See—  
Cacciatore, Joseph J., 4,948,044, Cl. 236-46.00R.

Harris Corporation: See—  
Beasom, James D., 4,948,746, Cl. 437-44.000.

Malinowski, Christopher W., 4,949,296, Cl. 364-752.000.

Swanson, Hilmer I., 4,949,050, Cl. 330-298.000.

Harris, Howard J. Unitary article holder/display. 4,947,996, Cl. 211-50.000.

Harris, James W.: See—  
Blank, Richard E.; Harris, James W.; and Amuth, Avraham, 4,948,937, Cl. 219-121.600.

Harris, Robert F., to Dow Chemical Company, The. Modified poly(alkylene carbonate) polyahls. 4,948,862, Cl. 528-77.000.

Harrison, Deborah: See—  
Harrison, Richard; Harrison, Deborah; and Zuhoski, Peter B., Jr., 4,947,579, Cl. 47-1.010.

Harrison, Richard; Harrison, Deborah; and Zuhoski, Peter B., Jr., to Weirton Steel Corporation. Computer operated automatic seedling plant transplanting machine. 4,947,579, Cl. 47-1.010.

Hart, Paul R., to Betz Laboratories, Inc. Brine monitor. 4,947,885, Cl. 137-5.000.

Hart, Terence J.: See—  
Baker, John A.; Maska, Rudolf; Bodwell, James R.; Das, Surya K.; Seiner, Jerome A.; and Hart, Terence J., 4,948,834, Cl. 524-567.000.

Hartinger, Benedikt: See—  
Rattner, Manfred; and Hartinger, Benedikt, 4,947,830, Cl. 128-24.00A.

Hartke, David H.: See—  
Flaig, John D.; Baltz, Gene F.; Billingsley, Henry C.; Hartke, David H.; Holcomb, James A.; DuBois, Chester G.; and Taipale, Dale L., 4,947,807, Cl. 123-52.0MV.

Hartley, Craig J.: See—  
Rabinovitz, Raphael S.; Hartley, Craig J.; and Noon, George P., 4,947,854, Cl. 128-662.040.

Harwell, Robert W.; and Simon, William M., to Microluminescence, Inc. Thermoelectric refrigeration apparatus. 4,947,648, Cl. 62-3.200.

Hasegawa, Hiroshi: See—  
Sasaki, Umekichi; and Hasegawa, Hiroshi, 4,948,525, Cl. 252-52.00A.

Tamii, Seizo; Mutoh, Norio; Hasegawa, Hiroshi; Okamura, Hiroshi; and Tani, Noriyuki, 4,949,090, Cl. 342-173.000.

Hasegawa, Shin-ya; Yamagishi, Fumio; Ikeda, Hiroyuki; and Iwata, Shigetake, to Fujitsu Limited. Beam scanner. 4,948,213, Cl. 350-3.710.

Hasegawa, Tatsuzo: See—  
Tokumo, Akio; Kato, Masayuki; Sato, Takeshi; and Hasegawa, Tatsuzo, 4,949,048, Cl. 330-10.000.

Hasenbein, Norbert; Muehlenbernd, Thomas; and Koehler, Gernot, to BASF Aktiengesellschaft. Preparation of amine-modified ethylene/carboxylic acid copolymers, such copolymers, and use thereof as adhesion promoters and cable sheathing. 4,948,850, Cl. 526-217.000.

Haser Company Limited, The: See—  
Wells, Alan A., 4,948,360, Cl. 431-1.000.

Hashiba, Masahiro: See—  
Kuwabara, Hideki; Hashiba, Masahiro; and Naito, Masato, 4,948,817, Cl. 521-58.000.

Hashimoto Forming Industry Co., Ltd.: See—  
Baba, Yuko; and Ichikawa, Tatsuo, 4,948,196, Cl. 296-188.000.

Haslam, Stephen D. Snow shovel. 4,948,188, Cl. 294-54.500.

Hassler, Stephen P.: See—  
Johnson, Stephen P.; and Hassler, Stephen P., 4,948,828, Cl. 524-437.000.

Hassner, Martin A.: See—  
Davie, Neil R.; Hassner, Martin A.; Howell, Thomas D.; Karabed, Razmik; and Siegel, Paul H., 4,949,196, Cl. 360-40.000.

Hasuda, Yoshinori: See—  
Nishi, Shiro; Sasaki, Shigekuni; and Hasuda, Yoshinori, 4,948,831, Cl. 524-500.000.

Hata, Chiemi; Hirota, Shinichiro; and Sawada, Hiroyuki, to Hoya Corporation. Process for producing glass mold. 4,948,627, Cl. 427-38.000.

Hata, Yoshiaki: See—  
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,949,110, Cl. 354-195.100.

Hatayama, Katsuo: See—  
Ogawa, Toshihisa; Ota, Tomomi; Sato, Shuichi; Sunaga, Takemi; Watanabe, Yoshiaki; and Hatayama, Katsuo, 4,948,899, Cl. 546-321.000.

Hatta, Susumu, to Tachi-S Company, Ltd. Height adjusting device for automotive seat. 4,948,081, Cl. 248-396.000.

Hattori, Masafumi; Inoue, Takayuki; and Ochiuimi, Masahide, to Mitsubishi Petrochemical Co., Ltd. Multi-layered laminate. 4,948,671, Cl. 428-411.100.

Hattori, Tatsuya: See—  
Nishino, Hideo; Hattori, Tatsuya; Kushida, Tsuneharu; and Kumata, Masataka, 4,948,867, Cl. 528-337.000.

Haufe, Wolfgang; and Rothkegel, Bernard, deceased (by Rothkegel, Rita G.; Bianca Rothkegel and Matthias Rothkegel, heirs.), to Siemens Aktiengesellschaft. Low voltage switching apparatus sinter contact material. 4,948,424, Cl. 75-234.000.

Hauge, Trygve A., to Technology 80, Inc. Computer channel analyzer with monitoring and selective display of predetermining events and related data. 4,949,252, Cl. 364-200.000.

Haught, Deborah A.: See—  
Talmay, Inna G.; and Haught, Deborah A., 4,948,766, Cl. 501-128.000.

Hausler: See—  
Gabele, Lorenz; Hausler, Lohrer, Walter; Seibert, Johannes; Stallforth, Harald; Taschner, Wolfgang; Wawrik, Otmar; and Wolfe, Wilfried, 4,948,566, Cl. 422-107.000.

Haven, Matthew B.; and Musil, Joseph E., to Cedarapids, Inc. Paving machine having transversely and longitudinally adjustable grade sensors. 4,948,292, Cl. 404-84.000.

Havens, Richard C. Oscillator having feedback isolated from its output. 4,949,053, Cl. 331-96.000.

Hawkins, Christopher M.; and Gallucci, Robert R., to General Electric Company, Composition. 4,948,839, Cl. 525-92.000.

Hawkins, Gilbert: See—  
Rivaud, Lydia; and Hawkins, Gilbert, 4,948,624, Cl. 427-38.000.

Hawrot, Edward; Rosenberg, Michael B.; and Breakefield, Xandra O., to Yale University. Avidin or streptavidin conjugated liposomes. 4,948,590, Cl. 424-450.000.

Hayami, Haruo: See—  
Hoshino, Masayuki; and Hayami, Haruo, 4,949,303, Cl. 364-900.000.

Hayashi, Hiroshi: See—  
Ohkuma, Norio; Takenouchi, Masanori; Miyagawa, Masashi; Hayashi, Hiroshi; Minami, Tooru; and Oobayashi, Hiroharu, 4,948,694, Cl. 430-138.000.

Hayashi, Shigenori: See—  
Yamazaki, Shunpei; Inujima, Takashi; Urata, Kazuo; Tashiro, Mamoru; Tanamura, Yuji; Imato, Shinji; Itoh, Kenji; Odaka, Seiichi; Hayashi, Shigenori; and Hirose, Naoki, 4,949,004, Cl. 313-35.000.

Hayashi, Tatsuro: See—  
Koike, Kiyoshi; Uchida, Hiroshi; Hayashi, Tatsuro; and Morita, Rikushi, 4,949,365, Cl. 378-54.000.

Hayashida, Akira; Takamizawa, Minoru; and Takeda, Yoshihumi, to Shin-Etsu Chemical Co., Ltd. Preparation of hollow ceramic fibers. 4,948,763, Cl. 501-95.000.

Hayden, James T. Football helmet with breakaway face mask. 4,947,490, Cl. 2-424.000.

Hayden, Rudolf, to Allgemeine Baugesellschaft-A. Porr Aktiengesellschaft. Process for restoring channels threatening to collapse, in particular profiled channels. 4,948,298, Cl. 405-154.000.

Haynes, David E.: See—  
Corke, Michael; Haynes, David E.; Stowe, David W.; Shaw, Stillman, III; and Vigeant, Joseph E., 4,948,222, Cl. 350-96.200.

Hayward, Thomas D.; Hamm, Robert H.; and Johnson, Marco, to Boeing Company, The; and AccSys Technology, Incorporated. Segmented RFQ accelerator. 4,949,047, Cl. 328-233.000.

Hazeltine Corporation: See—  
De Clerck, Charles E., 4,948,031, Cl. 228-194.000.

Heep, Dieter; Vogel, Paul; and Reichert, Gerhard, to Waeschle Maschinenfabrik GmbH. Rotary feeder. 4,948,017, Cl. 222-368.000.

Hees, Ronald D. Method and apparatus for making a corrugated fiber-board honeycomb structure. 4,948,445, Cl. 156-196.000.

Heeszel, Robert. Bingo game box. 4,948,139, Cl. 273-148.00A.

Hegg, Jeffrey W., to Honeywell Inc. Roll and pinch palm pivot hand controller. 4,947,701, Cl. 74-471.0XY.

Heidelberger Druckmaschinen AG: See—  
Hiltwein, Hans-Peter; and Becker, Willi, 4,947,748, Cl. 101-409.000.

Heidelberger Druckmaschinen Aktiengesellschaft: See—  
Jeschke, Willi; and Löffler, Gerhard, 4,947,746, Cl. 101-211.000.

Heijmans, Teunis J. A.: See—  
Huizing, Albert; Zegers, Cornelis P. G. M.; Heijmans, Teunis J. A.; and Van Tol, Maurits W., 4,949,367, Cl. 378-84.000.

Heinemann Electric Company: See—  
Richter, Konrad J., Sr., 4,949,059, Cl. 335-202.000.

Heintz, Richard P., to Deaccelerator Corporation, The. Vehicle speed control device. 4,947,950, Cl. 180-176.000.

Heki, Tatsuo: See—  
Inoue, Noriyuki; Heki, Tatsuo; Kobayashi, Hidetoshi; Deguchi, Naoyasu; and Hirano, Shigeo, 4,948,712, Cl. 430-409.000.

Held, Robert P., to Du Pont de Nemours, E. I., and Company. Silver halide wash-out elements. 4,948,701, Cl. 430-264.000.

Helm, Arthur E.; and Keane, Stuart J., to Elton Fabrications Limited. Machines for gaming, amusement, education and the like. 4,948,133, Cl. 273-85.00G.

Helmstetter, Christopher M., to American Telephone and Telegraph Company. Method and apparatus for stopping and clamping substrates. 4,947,980, Cl. 198-345.300.

Helseth, James R., to Twist-Ease, Inc. Twist-tie dispenser apparatus and method. 4,948,202, Cl. 312-35.000.

Helsper, Steve M. Adjustable scaffold support. 4,947,962, Cl. 182-182.000.

Hen, John, to Mobil Oil Corporation. Method of increasing retention of scale inhibitor in subterranean formations. 4,947,934, Cl. 166-279.000.

Hendry, James W., to Ladney, Michael. Method for the use of gas assistance in the molding of plastic articles. 4,948,547, Cl. 264-500.000.

Henkel Kommanditgesellschaft auf Aktien: See—  
Hoeftkes, Horst; and Kaczeh, Anke, 4,948,528, Cl. 252-357.000.

Henline, John W., to Clark Equipment Company. Hydrostatic transmissions system for an articulated vehicle. 4,947,956, Cl. 180-235.000.

Hennig, Michael R., to Matchbox Toys (USA) Ltd. Coupling system for modular article. 4,947,527, Cl. 24-575.000.

Hepburn, George R.; and Paley, Dror, to Dynasplint Systems, Inc. Adjustable splint assembly. 4,947,835, Cl. 128-84.00R.

Herchenback, Paul; and Muller, Norbert, to Jean Walterscheid GmbH. Bearing ball for a three-point connecting device. 4,948,287, Cl. 403-13.000.

Hermann, Klaus-Dieter. Label tape. 4,947,567, Cl. 40-299.000.

Hermann, Klaus-Dieter. Hand-held labeling device with pivotally mounted front plate. 4,947,747, Cl. 101-288.000.

Hermant, Eric, to Societe Europeenne de Propulsion. Diverging portion of discontinuous curvature for a rocket engine nozzle. 4,947,644, Cl. 60-257.000.

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Martin, Gerard; and Feugier, Alain, 4,948,569, Cl. 422-142.000.  
Rojey, Alexandre, 4,948,394, Cl. 55-48.000.  
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Sudnitsnikov, Vadim B.; and Zelentsov, Andrei A., 4,947,941, Cl. 173-134.000.  
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Artykov, Farykhdzhon A.; Zaimutdinov, Sadridin; and Akhmedov, Karim S., 4,948,835, Cl. 524-704.000.  
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Sarvazyan, Armen P.; Ponomarev, Viktor; Vucelic, Dusan; Popovic, Goran; and Veksler, Akiva, 4,947,851, Cl. 128-660.020.  
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Rush, William F., 4,948,392, Cl. 55-34.000.  
Intel Corporation: *See—*  
Saini, Avtar, 4,949,291, Cl. 364-715.030.  
Tam, Simon M., 4,949,140, Cl. 357-23.500.  
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Arnold, Hugh H.; and Hintz, Thomas E., 4,949,302, Cl. 364-900.000.  
Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,949,373, Cl. 379-96.000.  
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Christenson, Patrick J.; Martens, Craig W.; Wenz, David G.; and Youngers, David N., 4,949,300, Cl. 364-900.000.  
Davie, Neil R.; Hassner, Martin A.; Howell, Thomas D.; Karabed, Razmik; and Siegel, Paul H., 4,949,196, Cl. 360-40.000.  
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Gerth, John A.; and Wheatley, Michael T., 4,949,255, Cl. 364-200.000.  
Hacker, Nigel P.; and Tyndall, George W., III, 4,948,629, Cl. 427-53.100.  
Johnson, Robert W.; Lawrence, William H.; Lemon, Gary K.; Magnuson, Roy H.; Markovich, Voya R.; Parsons, Ralph E.; and Sambucetti, Carlos J., 4,948,707, Cl. 430-11.000.  
Lumelsky, Leon; Choi, Sung M.; and Peevers, Alan W., 4,949,169, Cl. 358-86.000.  
Martin, Gareth R., 4,949,360, Cl. 375-106.000.  
Shorter, David U., 4,949,254, Cl. 364-200.000.  
Werner, Arend, 4,948,281, Cl. 400-472.000.  
International Electronics, Inc.: *See—*  
Voosen, Robert C., 4,949,073, Cl. 340-550.000.  
International Flavors & Fragrances Inc.: *See—*  
Mookherjee, Braja D.; Trenkle, Robert W.; Calderone, Nicholas; and Sands, Keith P., 4,948,597, Cl. 426-3.000.  
Stypula, Richard J.; and Buckholz, Lawrence, Jr., 4,948,608, Cl. 426-302.000.  
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Kilmartin, John D., III, 4,948,204, Cl. 312-140.000.  
International Paint public limited Company: *See—*  
Milne, Alexander, 4,947,785, Cl. 114-357.000.  
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Seiichi; Hayashi, Shigenori; and Hirose, Naoki, 4,949,004, Cl. 313-35.000.  
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Husmann, Josef, 4,947,964, Cl. 187-52.0LC.  
Perzl, Leopold; Zortea, August; and Anderegg, Kurt, 4,947,762, Cl. 105-329.100.  
Invivo Research Inc.: *See—*  
Lehman, Thomas F., 4,948,248, Cl. 356-40.000.  
Iovine, Carmine P.; and Walker, James L., to National Starch and Chemical Investment Holding Corporation. Laminating adhesives. 4,948,822, Cl. 523-201.000.  
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Larock, Richard C., 4,948,905, Cl. 549-326.000.  
Irick, W. T.; Roussey, James L.; and Miller, Merrill D., to Navistar International Transportation Corp. Automotive vehicle daytime running light circuit. 4,949,012, Cl. 315-82.000.  
Iritani, Hirofumi, to Kubota, Ltd. Propeller shaft transmission structure for a tractor. 4,947,709, Cl. 74-640.000.  
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Buisson, Dominique; and Irvoas, Joseph, 4,949,269, Cl. 364-463.000.  
Isaka, Kinichi; Shimoyama, Hiroyuki; Ohba, Toshihiro; Kishishita, Hiroshi; and Ueda, Hisashi, to Sharp Kabushiki Kaisha. Method of driving thin film EL panel for aging. 4,949,019, Cl. 315-246.000.  
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Fujita, Kozo; and Ise, Kiyotaka, 4,947,954, Cl. 180-197.000.  
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Furlenmeier, Andre; Hofheinz, Werner; Hubschwerlen, Christian N.; and Isenring, Hans P., 4,948,898, Cl. 546-311.000.  
Ishida, Akira, to Research Development Corporation of Japan. Light wave interference length-measuring apparatus. 4,948,254, Cl. 356-358.000.  
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Konishi, Satoshi; Tatsuo, Masahiko; and Komatsu, Toshiyuki, 4,947,946, Cl. 177-105.000.  
Ishida, Toru: *See—*  
Watanabe, Hirotoshi; and Ishida, Toru, 4,949,065, Cl. 338-308.000.  
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Kawai, Yasuo; and Ishihara, Kazuoki, 4,948,783, Cl. 514-46.000.  
Ishihara, Koichiro: *See—*  
Morita, Yoshiyasu; Seguchi, Manabu; Okamura, Kazuo; Hikami, Fuminori; Ishihara, Koichiro; and Hara, Katsutoshi, 4,947,924, Cl. 164-97.000.  
Ishii, Takaaki; and Kuge, Toru, to Kabushiki Kaisha Toshiba. Speech recognition system with an accurate recognition function. 4,949,374, Cl. 379-88.000.  
Ishii, Toshiaki: *See—*  
Sagara, Kazuhiko; Ueda, Kunio; Shimada, Toshikazu; and Ishii, Toshiaki, 4,948,599, Cl. 426-40.000.  
Ishikawa, Akira, to Kabushiki Kaisha Toshiba. Cover locking apparatus for a record medium player. 4,948,182, Cl. 292-30.000.  
Ishikawa, Kouichi; Mihira, Hiroshi; Kimura, Noriyuki; and Yamaguchi, Masao, to Stec Inc. Method of measuring flow rate and flow meter for use in said method as well as apparatus for controlling flow rate of liquid using said flow meter. 4,947,889, Cl. 137-486.000.  
Ishikawa, Masao: *See—*  
Kobayashi, Kazuhiro; Koboshi, Shigeharu; Kuse, Satoru; and Ishikawa, Masao, 4,948,713, Cl. 430-434.000.  
Ishikawa, Masayuki: *See—*  
Ohba, Yasuo; Watanabe, Niyoko; Sugawara, Hideto; Ishikawa, Masayuki; Watanabe, Yukio; and Yamamoto, Motoyuki, 4,949,349, Cl. 372-45.000.  
Ishikawa, Takatoshi; and Kishimoto, Shinzo, to Fuji Photo Film Co., Ltd. Method of processing silver halide color photographic light-sensitive materials. 4,948,710, Cl. 430-372.000.  
Ishikawa, Yasuhiro; Kaidoo, Hiroyuki; Takei, Sadakazu; and Takahashi, Shuji, to Yokohama Rubber Co., Ltd., The Pneumatic radial tire having belt reinforcements. 4,947,916, Cl. 152-536.000.  
Ishimura, Toshihiko: *See—*  
Shimada, Takahisa; Kajita, Hideo; Okumura, Sueyoshi; Seki, Reiji; Ishimura, Toshihiko; and Katayori, Sinji, 4,949,109, Cl. 354-173.100.  
Ishiwatari, Nobuyoshi: *See—*  
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Higashimura, Koichi; Miyazawa, Yoshinori; Handa, Tsuneo; Mizumoto, Teruyuki; Ito, Hiroshi; Uchino, Atsushi; Motoki, Masanobu; Kunugi, Masanao; Ishiwatari, Taihei; and Shimura, Hidetsugu, 4,948,692, Cl. 430-106.600.  
Ishizaka, Taeko; Kasai, Yoshihiko; and Okamura, Hajime, to Fujitsu Limited. Distributed constant type delay line device and a manufacturing method thereof. 4,949,057, Cl. 333-161.000.  
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Antoku, Fujio; Yoshigi, Mayumi; Saji, Ikutaro; Kojima, Atsuyuki; and Ishizumi, Kuku, 4,948,799, Cl. 514-278.000.  
Isnardi, Michael A., to General Electric Company. Apparatus for combining and separating constituent components of a video signal. 4,949,166, Cl. 358-12.000.  
Isnardi, Michael A.; and Smith, Terrence R., to General Electric Company. Widescreen television signal processing system with center and side panel image resolution uniformity. 4,949,167, Cl. 358-12.000.

Isoda, Shigeru: *See—*  
Maekawa, Yoshio; Yagyu, Osamu; Mizuno, Hironori; Okumura, Minoru; Isoda, Shigeru; and Yagi, Kaoru, 4,948,413, Cl. 71-65.000.  
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Tamaki, Yoichi; Ikeda, Kiyoji; Nakamura, Toru; Uchida, Akihisa; Koizumi, Toru; Enami, Hiromichi; Isomura, Satoru; Nakajima, Shinji; Ogiue, Katsumi; and Ohgaya, Kaoru, 4,949,162, Cl. 357-71.000.  
Isover Saint-Gobain: *See—*  
Rias, Jean-Claude; and Zinzius, Roger, 4,948,660, Cl. 428-285.000.  
Istituto Luso Farmaco d'Italia S.p.A.: *See—*  
Manghisi, Elso; and Salimbeni, Aldo, 4,948,797, Cl. 514-254.000.  
Isuzu Motors Limited: *See—*  
Kawamura, Hideo, 4,947,808, Cl. 123-145.00A.  
Italclimax S.r.l.: *See—*  
Alvisi, Cesare, 4,947,656, Cl. 62-235.100.  
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Ito, Hiroshi: *See—*  
Higashimura, Koichi; Miyazawa, Yoshinori; Handa, Tsuneo; Mizumoto, Teruyuki; Ito, Hiroshi; Uchino, Atsushi; Motoki, Masanobu; Kunugi, Masanao; Ishiwatari, Taihei; and Shimura, Hidetsugu, 4,948,692, Cl. 430-106.600.  
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Hirabayashi, Yuji; Sato, Yoshihisa; Akiyama, Susumu; Ito, Katsonori; Saito, Takao; and Tanigawa, Tetsuo, 4,949,083, Cl. 340-825.050.  
Ito, Ken; and Ito, Hideo, to Nissan Motor Company, Limited. Steering control system for wheeled vehicle. 4,949,261, Cl. 364-424.050.  
Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Fixing apparatus. 4,949,131, Cl. 355-282.000.  
Ito, Masazumi: *See—*  
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Ito, Sadao: *See—*  
Terada, Takami; Suzuki, Saburo; Ito, Sadao; and Yamazaki, Masayuki, 4,948,189, Cl. 296-65.100.  
Ito, Toshio, to Research Association for Petroleum Alternatives Development. Amphora particulate catalyst-support and a method for the preparation of an amphora-type particulate catalyst-support. 4,948,773, Cl. 502-247.000.  
Ito, Yasunobu; Suzuki, Kenji; and Mikami, Kazuhiro, to Aisin AW Kabushiki Kaisha. Fail-safe operation of a vehicle automatic transmission responsive to failure of engine water temperature sensor. 4,949,078, Cl. 340-635.000.  
Itoh, Hiroshi: *See—*  
Umeyama, Mitsuhiro; Itoh, Hiroshi; Nimura, Hiroski; and Yamamoto, Kenichi, 4,947,706, Cl. 74-574.000.  
Itoh, Kenji: *See—*  
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Itoh, Kensuke: *See—*  
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Itoh, Kiichi; and Shibano, Takeshi, to Mitsubishi Petrochemical Company Limited; and Uni-Charm Corporation. Process for preparation of water absorbent composite. 4,948,659, Cl. 428-254.000.  
Itoh, Kiyoo: *See—*  
Nakagome, Yoshinobu; Aoki, Masakazu; Horiguchi, Masashi; Itoh, Kiyoo; and Ikenaga, Shinichi, 4,949,306, Cl. 365-189.010.  
Itoh, Zen: *See—*  
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ITT Corporation: *See—*  
Blank, Richard E.; Harris, James W.; and Amith, Avraham, 4,948,937, Cl. 219-121.600.  
Geissberger, Arthur E.; Sadler, Robert A.; Menk, Gregory E.; and Balzan, Matthew L., 4,948,752, Cl. 437-110.000.  
Plumb, Richard G. S., 4,949,352, Cl. 372-46.000.  
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Ivarsson, Per A., to Aktiebolaget Electrolux. Nozzle for removing paint. 4,947,515, Cl. 15-401.000.  
Iverson, R. David; Chin, Roland T.; McPhearson, Matthew; and Stover, Dan, to Applied Vision Systems, Inc. Interconnect verification using serial neighborhood processors. 4,949,390, Cl. 382-49.000.  
Iwadate, Yuichi: *See—*  
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Iwagaya, Takashi; and Nakazato, Tomomi, to Fanuc Ltd. Numerical control method for variably setting positioning accuracy. 4,949,025, Cl. 318-569.000.  
Iwahashi, Hiroshi: *See—*  
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Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Kodera, Sadaki, to Sanyo Electric Co., Ltd.

Image forming apparatus having intermediate tray. 4,949,134, Cl. 355-317.000.  
Iwakiri, Norio; Bingo, Hideyuki; and Tugui, Hideji, to Ormon Tateisi Electronics Co. Method of manufacturing fluid pressure sensor. 4,947,544, Cl. 29-622.000.  
Iwakuma, Takeo; Kawaguchi, Takayuki; Yamashita, Toyoharu; Sasaki, Yasuhiko; and Shimazaki, Tamoto, to Tanabe Seiyaku Co., Ltd. Phenoxyacetic acid derivatives, pharmaceutical compositions and methods. 4,948,810, Cl. 514-539.000.  
Iwamoto, Toshikazu, to Mitsubishi Denki Kabushiki Kaisha. Shadow mask mounting system for a color cathode ray tube. 4,949,009, Cl. 313-407.000.  
Iwantscheff, Georg: *See—*  
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Iwasaki, Junichi; and Kojima, Shingo, to NEC Corporation. Microcomputer system including a master processor and a slave processor synchronized by three control lines. 4,949,241, Cl. 364-200.000.  
Iwasaki, Masayuki: *See—*  
Maeda, Minoru; Wakata, Yuichi; Fujikura, Sadao; and Iwasaki, Masayuki, 4,948,700, Cl. 430-280.000.  
Iwasaki, Takashi, to Yasui Seiki Co., Ltd. Gravure coating device and method. 4,948,635, Cl. 427-345.000.  
Iwasawa, Hiroshi, to Olympus Optical Co., Ltd. Ultrasonic diagnostic apparatus and pulse compression apparatus for use therein. 4,949,312, Cl. 367-7.000.  
Iwasawa, Hiroshi, to Olympus Optical Co., Ltd. Ultrasonic diagnostic apparatus and pulse compression apparatus for use therein. 4,949,313, Cl. 367-7.000.  
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Izumi, Jun; Tanabe, Seiichi; and Ohshima, Kazuaki, to Mitsubishi Jukogyo Kabushiki Kaisha. Gas mixture separator utilizing pressure modulation. 4,948,401, Cl. 55-180.000.  
J. I. Case Company: *See—*  
Orsborn, Jesse H.; and Covington, Michael J., 4,947,628, Cl. 56-13.500.  
Jaakkola, Jyrki, to Valmet Paper Machinery Inc. Method for heating a cylinder or roll with an electrically conductive ceramic outer layer. 4,948,466, Cl. 162-207.000.  
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Jack, Stephen W. Bicycle drink holder. 4,948,080, Cl. 248-311.200.  
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Saffer, Jeffrey D.; and Profenno, Louis A., 4,947,487, Cl. 2-167.000.  
Jackson, Richard A.: *See—*  
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Jackson, Ronald M., to Tektronix, Inc. Digital data transfer synchronization circuit and method. 4,949,361, Cl. 375-118.000.  
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Jacquet, Bernard; and Lang, Gerard, to Societe Anonyme dite: l'Oreal. Quaternized polymer for use as a cosmetic agent in cosmetic compositions for the hair and skin. 4,948,579, Cl. 424-72.000.  
Jadamus, Hans; and Bartmann, Martin, to Huls Aktiengesellschaft. Thermoplastic molding materials. 4,948,838, Cl. 525-66.000.  
Jaenisch, Holger, to Talandic Research Corporation. Laser processing. 4,949,353, Cl. 372-59.000.  
Jaffee, James I.: *See—*  
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Jain, Faquir C., to University of Connecticut. Submicron lightly doped field effect transistors. 4,949,136, Cl. 357-23.300.

Jain, Kailash C.; and Abraham, Jacob A., to General Motors Corporation. Method for fabricating three-dimensional microstructures and a high-sensitivity integrated vibration sensor using such microstructures. 4,948,757, Cl. 437-240.000.

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James River Corporation: See—  
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Janome Sewing Machine Co. Ltd.: See—  
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Janssen, Pieter; Bock, Guenter; and Scheuer, Helmut, to Schuco International GmbH & Co. T-connection between two profiles, particularly cross-bar profile and post profile of a facade. 4,948,290, Cl. 403-255.000.

Janzen, Peter; and Metcalfe, Raymond, to Atomic Energy of Canada Limited. Rotary end face seal assembly. 4,948,151, Cl. 277-27.000.

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Minoura, Norihiko; Urabe, Kei; Aiba, Seiichi; Taguchi, Kazuhiro; and Fujiwara, Yukihiko, 4,949,064, Cl. 338-80.000.

Japan Electronic Control Systems Company, Limited: See—  
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Japan Silicon Co., Ltd.: See—  
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Jasinski, Joseph M.: See—  
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Jean Blanc, Ferdinand H. Thread guide ring for a needle bar. 4,947,773, Cl. 112-302.000.

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Jensen, Jack D.: See—  
St. Pierre, Frank H.; and Jensen, Jack D., 4,948,311, Cl. 410-107.000.

Jensen, Robert K. Energy storage and generation hydro well apparatus. 4,947,647, Cl. 60-659.000.

Jeschke, Willi; and Löffler, Gerhard, to Heidelberger Druckmaschinen Aktiengesellschaft. Print control strip. 4,947,746, Cl. 101-211.000.

Jesensky, Alexander: See—  
Kurz, Robert S.; Jesensky, Alexander; Johnson, Raymond W.; Hetenyi, Tamas; Grigg, Geoffrey C.; Dangel, Stephen C.; Clifford, John W.; and Butler, Richard A., Jr., 4,948,060, Cl. 242-58.100.

Jet Research Center, Inc.: See—  
Riggs, Robert S., 4,948,897, Cl. 546-307.000.

Jewell, Jack L.; and Scherer, Axel, to Bell Communications Research, Inc. Surface emitting semiconductor laser. 4,949,350, Cl. 372-45.000.

Jitsukata, Hiroshi: See—  
Hirata, Koji; Fukuda, Kyohei; Yoshikawa, Hiroki; Mori, Shigeru; Muranaka, Masayuki; Yoshizaki, Isao; Inaoka, Shigeru; and Jitsukata, Hiroshi, 4,948,237, Cl. 350-432.000.

Job, Robert C., to Shell Oil Company. Method for crystallizing magnesium chloride and method for using in a catalyst composition. 4,948,770, Cl. 502-107.000.

Jochum, Peter, to Hilti Aktiengesellschaft. Fastening element with guide member. 4,948,312, Cl. 411-5.000.

Joerg, Andreas; and Mondini, Giancarlo, to Rieter Machine Works Ltd. Combing machine. 4,947,521, Cl. 19-235.000.

Johannsen, Donald O.: See—  
Smemo, Alfred S.; and Johannsen, Donald O., 4,947,974, Cl. 192-85.00A.

Johansson, Hans: See—  
Gillbrand, Per; Johansson, Hans; and Nytomt, Jan, 4,947,810, Cl. 123-179.00G.

John C. Marrelli: See—  
Rutledge, Gary L., 4,948,268, Cl. 383-72.000.

John D. Brush & Co., Inc.: See—  
Legge, Richard C.; and Arp, George F., 4,948,357, Cl. 425-522.000.

John D. Hollingsworth on Wheels, Inc.: See—  
Hollingsworth, John D.; and Rookstool, Gary H., 4,947,520, Cl. 19-105.000.

John H. Imbt: See—  
Weaver, Robert C., 4,948,193, Cl. 296-100.000.

John O. Butler Company: See—  
Tarrson, Emanuel B.; and Maric, Dane, 4,947,880, Cl. 132-329.000.

Johnson, Bruce M.: See—  
Lonsdale, Harold K.; Babcock, Walter C.; Friensen, Dwayne T.; Smith, Kelly L.; Johnson, Bruce M.; and Wamser, Carl C., 4,948,506, Cl. 210-490.000.

Johnson, Dave: See—  
Sumrell, K. Drew; Blair, Don R.; and Johnson, Dave, 4,948,076, Cl. 248-125.000.

Johnson, Ernest V.: See—  
MacPherson, John A.; and Johnson, Ernest V., 4,949,194, Cl. 360-104.000.

Johnson & Johnson Consumer Products, Inc.: See—  
Verdicchio, Robert J.; and Spilatro, Diane L., 4,948,576, Cl. 424-59.000.

Johnson, Marco: See—  
Hayward, Thomas D.; Hamm, Robert H.; and Johnson, Marco, 4,949,047, Cl. 328-233.000.

Johnson, Raymond W.: See—  
Kurz, Robert S.; Jesensky, Alexander; Johnson, Raymond W.; Hetenyi, Tamas; Grigg, Geoffrey C.; Dangel, Stephen C.; Clifford, John W.; and Butler, Richard A., Jr., 4,948,060, Cl. 242-58.100.

Johnson, Robert W.; Lawrence, William H.; Lemon, Gary K.; Magnuson, Roy H.; Markovich, Voya R.; Parsons, Ralph E.; and Sambucetti, Carlos J., to International Business Machines Corporation. Conditioning a non-conductive substrate for subsequent selective deposition of a metal thereon. 4,948,707, Cl. 430-11.000.

Johnson, Stephen P.; and Hassler, Stephen P., to Cooper Industries, Inc. Asbestos free material for gassing current limiting fuses. 4,948,828, Cl. 524-437.000.

Johnson, Thomas N.: See—  
Altman, Leonard F.; and Johnson, Thomas N., 4,948,941, Cl. 219-121.710.

Johnston, Barry. Multicylinder self-starting uniflow engine. 4,947,731, Cl. 91-229.000.

Johnston, John; and Jordan, Dee, to Johnston, John. Motorcycle sound simulator for a child's toy. 4,949,068, Cl. 340-384.00E.

Johnston, Mark, to Yetter Manufacturing Company. Coulter and fertilizer applicator linkage arrangement. 4,947,770, Cl. 111-121.000.

Joko, Isao: See—  
Motozato, Yoshiaki; Tomoda, Takashi; Morita, Hiroshi; Yamaguchi, Masato; and Joko, Isao, 4,948,814, Cl. 521-30.000.

Jolissaint, Charles H.: See—  
Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,949,373, Cl. 379-96.000.

Jones, Billy R. Rotatable, multi-focus eye glasses. 4,948,244, Cl. 351-57.000.

Jones, Daniel A.: See—  
Suttle, James P.; and Jones, Daniel A., 4,948,134, Cl. 273-85.00CP.

Jones, Leland L.; deceased; and Scherer, Dovie D., administrator. Crossbow arrow stabilizer. 4,947,822, Cl. 124-41.100.

Jones, Lloyd G.; and Shu, Winston R., to Mobil Oil Corporation. Temperature activated polymer for profile control. 4,947,933, Cl. 166-263.000.

Jones, Richard A.: See—  
Dantam, Theresa M.; and Jones, Richard A., 4,948,684, Cl. 429-206.000.

Jones, Robert S.; and Maurer, John J., to Eastman Kodak Company. Contact printer for exposing sensitized graphic art film and paper. 4,949,122, Cl. 355-84.000.

Jordan, Dee: See—  
Johnston, John; and Jordan, Dee, 4,949,068, Cl. 340-384.00E.

Josephson, Stanley M.: See—  
Thomson, Eric A.; and Josephson, Stanley M., 4,948,174, Cl. 283-58.000.

Joshi, Sunil P.; and Iyer, Venkatraman, to Advanced Micro Devices, Inc. Improved pointer FIFO controller for converting a standard RAM into a simulated dual FIFO by controlling the RAM's address inputs. 4,949,301, Cl. 364-900.000.

Jost, Walter. Distilling apparatus. 4,947,983, Cl. 202-163.000.

Joy Technologies, Inc.: See—  
Cowles, Dennis, 4,947,535, Cl. 29-428.000.

Joyal, Arthur B.: See—  
Boeglin, Richard W.; and Joyal, Arthur B., 4,949,319, Cl. 367-154.000.

Juergens, Wilfried, to Siemens Aktiengesellschaft. Thin-film solar cell arrangement. 4,948,436, Cl. 136-249.000.

Julien, Paul C.: See—  
Koch, Ronald J.; Gruber, Robert J.; Julien, Paul C.; Goodman, Donald J.; Gutman, Edward J.; and Maniar, Deepak R., 4,948,686, Cl. 430-45.000.

Jundt, Jacques: See—  
Clark, Brian; Jundt, Jacques; Luling, Martin; and Ross, Michael O., 4,949,045, Cl. 324-338.000.

Jung, Johann: See—  
Keil, Michael; Jahn, Dieter; Kolassa, Dieter; Schirmer, Ulrich; Becker, Rainer; Jung, Johann; and Rademacher, Wilhelm, 4,948,415, Cl. 71-90.000.

Jungkind, Roland, to Marker Deutschland GmbH. Safety ski binding. 4,948,159, Cl. 280-632.000.

Jurca, Zeljko T., to Alert-o-Brake Systems Inc. Load handling vehicle monitoring system. 4,949,263, Cl. 364-424.070.

Juridical Foundation the Chemo-Sero-Therapeutic Research Institute: See—  
Hirayama, Chuichi; Motozato, Yoshiaki; and Ihara, Hirotaka, 4,948,816, Cl. 521-56.000.

Kaba, Kazuyuki; Takahashi, Ken; and Kida, Masashi, to Yokohama Rubber Co., Ltd., The. Pneumatic radial tire profile. 4,947,913, Cl. 152-454.000.

Kabata, Toshiyuki: See—  
Ohsawa, Toshiyuki; Kabata, Toshiyuki; Kimura, Okitoshi; and Yoneyama, Sachiko, 4,948,685, Cl. 429-213.000.

Kabushiki Kaisha Daikin Seisakusho: See—  
Takeuchi, Hiroshi, 4,947,973, Cl. 192-70.120.

Tojima, Hiromi, 4,947,975, Cl. 192-98.000.

Kabushiki Kaisha Fuji Iryoku: See—  
Yamasaki, Yoshiaki, 4,947,833, Cl. 128-52.000.

Kabushiki Kaisha Japan Health: See—  
Yamasaki, Yoshiaki, 4,947,833, Cl. 128-52.000.

Kahushiki Kaisha Kenwood: See—  
Shiraishi, Kenichi; Kobayashi, Hirokazu; and Miyamoto, Yukihiko, 4,949,394, Cl. 455-2.000.

Kabushiki Kaisha Kosmek: See—  
Yonezawa, Keitaro, 4,948,105, Cl. 269-32.000.

Kabushiki Kaisha Little Rock: See—  
Koizumi, Yoshinobu, 4,948,349, Cl. 417-383.000.

Kabushiki Kaisha Machida Seisakusho: See—  
Komachi, Yuichi, 4,947,540, Cl. 29-600.000.

Kabushiki Kaisha Morita Seisakusho: See—  
Ogino, Sekiya; and Nishimura, Mikinori, 4,947,926, Cl. 164-519.000.

Kabushiki Kaisha Sigel: See—  
Nakanishi, Motoyasu, 4,948,131, Cl. 273-73.00R.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: See—  
Kito, Shozo; Harada, Shoichi; Imai, Hajime; and Muramatsu, Tadao, 4,947,967, Cl. 192-4.00A.

Kabushiki Kaisha Toshiba: See—  
Atarashiya, Kousuke, 4,948,567, Cl. 422-122.000.

Fujiwara, Takayoshi; and Sone, Yoshinori, 4,948,347, Cl. 417-356.000.

Iesaka, Mamoru; Uya, Shinji; and Harada, Nozomu, 4,949,143, Cl. 357-24.000.

Iijima, Yasuo, 4,949,240, Cl. 364-200.000.

Ishii, Takaaki; and Kuge, Toru, 4,949,374, Cl. 379-88.000.

Ishikawa, Akira, 4,948,182, Cl. 292-30.000.

Kamiya, Shigeo, 4,949,238, Cl. 364-200.000.

Kasahara, Akihito; Yamada, Akira; Wada, Katsutoshi; and Yamasaki, Hideo, 4,948,230, Cl. 350-255.000.

Kawamura, Shinichi; and Takabayashi, Kyoko, 4,949,293, Cl. 364-746.000.

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Kubo, Masahiro, 4,949,368, Cl. 378-132.000.

Kuhara, Sieghide; and Kanayama, Shoichi, 4,949,042, Cl. 324-311.000.

Kuroda, Fumihiko; Sadamasa, Tetsuo; Suzuki, Nobuo; and Nakamura, Masaru, 4,949,144, Cl. 357-30.000.

Munakata, Yasuo; and Gotou, Mineo, 4,948,979, Cl. 250-492.200.

Nomura, Takehiko; and Suzuki, Ryoichi, 4,948,330, Cl. 414-749.000.

Ohba, Yasuo; Watanabe, Niyoko; Sugawara, Hideto; Ishikawa, Masayuki; Watanabe, Yukio; and Yamamoto, Motoyuki, 4,949,349, Cl. 372-45.000.

Ohno, Jun-ichi, 4,949,160, Cl. 357-70.000.

Sudo, Toshio; and Takubo, Chiaki, 4,949,163, Cl. 357-80.000.

Takagi, Masami; Tsunekawa, Shinichi; and Ohkubo, Kenji, 4,949,007, Cl. 313-318.000.

Yamaguchi, Koji; Fukui, Mika; and Iwai, Isamu, 4,949,287, Cl. 364-523.000.

Yoshida, Takuji, 4,949,323, Cl. 369-32.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: See—  
Buma, Shuichi; Aburaya, Toshio; Yonekawa, Takashi; Takeda, Osamu; Urababa, Shingo; and Doi, Shunichi, 4,949,262, Cl. 364-424.050.

Nishikawa, Kunitoshi; Fujimoto, Mitoshi; and Asano, Yoshikazu, 4,949,268, Cl. 364-449.000.

Ohwaki, Takeshi; and Taga, Yasunori, 4,948,760, Cl. 501-54.000.

Kabushiki Kaisha Wakom: See—  
Murakami, Azuma; Yamanami, Tsuguya; Funahashi, Takahiko; and Senda, Toshiaki, 4,948,926, Cl. 178-19.000.

Kabushiki Kaisha Yaskawa Denki Seisakusho: See—  
Sato, Ikumi; Nakano, Jun; Harada, Riichiro; Koba, Tatsuhiko; Fujita, Yuichi; and Shima, Kazumi, 4,948,091, Cl. 251-65.000.

Kabushiki Kaisha Advance Kaihatsu kenkyujo: See—  
Kawai, Yasuo; and Ishihara, Kazuoki, 4,948,783, Cl. 514-46.000.

Kaczich, Anke: See—  
Hoeftkes, Horst; and Kaczich, Anke, 4,948,528, Cl. 252-357.000.

Kadee Metal Products, Co.: See—  
Edwards, Clarence K.; and Edwards, Lawrence D., 4,948,073, Cl. 246-415.00A.

Kadomaru, Kazuo: See—  
Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, 4,947,917, Cl. 152-536.000.

Kaepa, Inc.: See—  
Fuerst, Rory W.; and Granville, James E., 4,947,560, Cl. 36-88.000.

Kahler, Stephen D.: See—  
Leveen, Harry H.; Kahler, William F.; and Kahler, Stephen D., 4,949,400, Cl. 356-420.000.

Kahler, William F.: See—  
Leveen, Harry H.; Kahler, William F.; and Kahler, Stephen D., 4,949,400, Cl. 356-420.000.

Kai, Yukio: See—  
Watanabe, Tadahiko; Doutsu, Tsuyoshi; Yagishita, Osamu; Yamamoto, Hideo; and Kai, Yukio, 4,948,425, Cl. 75-238.000.

Kaidoo, Hiroyuki: See—  
Ishikawa, Yasuhiro; Kaidoo, Hiroyuki; Takei, Sadakazu; and Takahashi, Shuji, 4,947,916, Cl. 152-536.000.

Kaiser, Roman; and Lamparsky, Dietmar, to Givaudan Corporation. Novel odorant and/or flavoring substances. 4,948,781, Cl. 512-25.000.

Kajita, Hideo: See—  
Shimada, Takahisa; Kajita, Hideo; Okumura, Sueyoshi; Seki, Reiji; Ishimura, Toshihiko; and Katayori, Sinji, 4,949,109, Cl. 354-173.100.

Kajiwara, Yasuya, to Mitsubishi Denki Kabushiki Kaisha. Slow speed cruising control apparatus. 4,947,952, Cl. 180-178.000.

Kakimoto, Masa-Aki: See—  
Imai, Yoshio; Kakimoto, Masa-Aki; and Yoneyama, Masaru, 4,948,864, Cl. 528-219.000.

Kakizaki, Shinobu: See—  
Kikushima, Shigeru; Yamaoka, Fumiyuki; Kakizaki, Shinobu; and Emura, Junichi, 4,948,163, Cl. 280-707.000.

Kako, Noritoshi: See—  
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,949,279, Cl. 364-518.000.

Kaku, Toshimitsu: See—  
Maeda, Takeshi; Tsunoda, Yoshito; Shigematsu, Kazuo; and Kaku, Toshimitsu, 4,949,331, Cl. 369-275.300.

Kakuta, Takuya: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; and Watanabe, Shigeomi, 4,948,887, Cl. 540-603.000.

Kaldenbaugh, Nicholas, to Foot-Joy, Inc. Product display storage package. 4,948,267, Cl. 383-63.000.

Kalmhach, John F. Auxiliary air conditioning apparatus and method for air conditioned vehicles. 4,947,657, Cl. 62-236.000.

Kalok Corporation: See—  
Kim, Timothy, 4,949,202, Cl. 360-78.140.

Kaminaka, Nobuyuki: See—  
Satomi, Mitsuo; and Kaminaka, Nobuyuki, 4,947,542, Cl. 29-603.000.

Kaminer, Isaac: See—  
Dodds, Kevin J.; and Kaminer, Isaac, 4,947,698, Cl. 74-25.000.

Kaminski, Kevin F. Decorative surface coating. 4,947,792, Cl. 119-5.000.

Kamio, Keiji: See—  
Imazumi, Katsumi; Kamio, Keiji; and Nishiyama, Kazuhiko, 4,948,283, Cl. 400-647.100.

Kamiya, Shigeo, to Kabushiki Kaisha Toshiba. Apparatus for detecting memory protection violation. 4,949,238, Cl. 364-200.000.

Kamiya, Tetsuro; Inoue, Takeshi; Yorozu, Hidenori; Eguchi, Yasuteru; and Tsujii, Kaoru, to Kao Corporation. Percutaneous absorption accelerator and preparation containing same. 4,948,588, Cl. 424-436.000.

Kamohara, Tatsuyoshi; Sugino, Tadashi; Suematsu, Toshio; and Nishimura, Satomu, to Toyota Jidosha Kabushiki Kaisha. Internal combustion engine with device for warning of malfunction in an air-fuel ratio control system. 4,947,818, Cl. 123-479.000.

Kamperman, David R.; and Friesen, Dwayne T., to Bend Research, Inc. Hybrid chromium recovery process. 4,948,476, Cl. 204-89.000.

Kanai, Tsutomu: See—  
Yanagidaira, Masatoshi; and Kanai, Tsutomu, 4,949,170, Cl. 358-86.000.

Kanamaru, Tsuneo: See—  
Shinagawa, Susumu; Kanamaru, Tsuneo; Harada, Setsuo; and Asai, Mitsuko, 4,948,534, Cl. 260-399.000.

Kanayama, Shoichi: See—  
Kuhara, Sieghide; and Kanayama, Shoichi, 4,949,042, Cl. 324-311.000.

Kanegafuchi Chemical Industry Co., Ltd.: See—  
Hirokawa, Norio; Imai, Satoshi; and Morikawa, Hisashi, 4,948,618, Cl. 426-603.000.

Kaneko, Hiroaki, to NEC Corporation. Error detecting circuit for a decoder. 4,949,343, Cl. 371-57.100.

Kaneko, Takanobu, to Nissan Motor Company, Limited. Vehicular height regulation system with variable sensitivity depending upon vehicle driving condition. 4,948,166, Cl. 280-707.000.

Kanewske, William J., III, to Abbott Laboratories. Waste container insert for washing automated immunoassay apparatus probe. 4,948,563, Cl. 422-99.000.

Kang, Shin-Duk, to Pacific Steam Equipment, Inc. Steam boiler. 4,948,947, Cl. 219-272.000.

Kanotscher, Alexander. Mixing device for use in dentistry. 4,948,368, Cl. 433-77.000.

Kansai Paint Co., Ltd.: See—  
Mitsui, Masaru; Endo, Mistugu; Kawachi, Youji; and Asada, Akira, 4,948,829, Cl. 524-457.000.

Kantorski, Joseph W.; Hachfeld, Klaus; and Hobart, James L., to Coherent, Inc. Ring laser with improved beam quality. 4,949,358, Cl. 372-94.000.

Kanyicska, Bela: See—  
Sepodi, Janos; Teplan, Istvan; Schon, Istvan; Ercegyi, Judit; Vadasz, Zsolt; nee Kuprina, Olga N.; Szirtes, Tamas; Selmezi, Andras; and Kanyicska, Bela, 4,948,873, Cl. 530-328.000.

Kanzaki Paper Manufacturing Co., Ltd.: See—  
Tsuiji, Takuji; and Yanagida, Tomohiro, 4,948,775, Cl. 503-207.000.

Kao Corporation: See—  
Kamiya, Tetsuro; Inoue, Takeshi; Yorozu, Hidenori; Eguchi, Yasuteru; and Tsujii, Kaoru, 4,948,588, Cl. 424-436.000.

Kapps, Attallah; and Drummond, George S., to Rockefeller University. The. Methods for suppressing the endocrine system. 4,948,792, Cl. 514-185.000.

Kapuscinski, Maria M.; Nalesnik, Theodore E.; Biggs, Robert T.; Chafetz, Harry; and Liu, Christopher S., to Texaco Inc. Dispersant anti-oxidant VI improver and lubricating oil composition containing same. 4,948,524, Cl. 252-51.50R.



- Karabed, Razmik: See—  
Davie, Neil R.; Hassner, Martin A.; Howell, Thomas D.; Karabed, Razmik; and Siegel, Paul H., 4,949,196, Cl. 360-40.000.
- Karasaki, Toshihiko; and Sugitani, Kazumi, to Minolta Camera Kabushiki Kaisha. Focus detection apparatus of camera, 4,949,116, Cl. 354-408.000.
- Karlsson, Jan, to AB Volvo. Length-adjusting device on a switch, 4,948,930, Cl. 200-82.00R.
- Karr, Robert J.: See—  
Romano, Harry A., 4,948,045, Cl. 236-51.000.
- Karrenberg, Georg. Acoustic signal apparatus, 4,949,320, Cl. 368-109.000.
- Kartheus, Holger; Pietsch, Hanns; Hogrefe, Andreas; Bargsten, Harald; Voss, Berndt; and Arnason, Vignir, to Beiersdorf AG. Device for treating human extremities, 4,947,834, Cl. 128-64.000.
- Kasahara, Akihiro; Yamada, Akira; Wada, Katsutoshi; and Yamasaki, Hideo, to Kabushiki Kaisha Toshiba. Objective lens driving apparatus, 4,948,230, Cl. 350-255.000.
- Kasahara, Toshikazu; and Funabashi, Hideo, to Idemitsu Petrochemical Co., Ltd. Propylene polymer composition, 4,948,841, Cl. 525-240.000.
- Kasai, Kenichi: See—  
Ohashi, Shigeo; Kuwabara, Heikichi; Nakajima, Tadakatsu; Nakayama, Wataru; Sato, Motohiro; and Kasai, Kenichi, 4,949,164, Cl. 357-82.000.
- Kasai, Yoshihiko: See—  
Ishizaka, Taeko; Kasai, Yoshihiko; and Okamura, Hajime, 4,949,057, Cl. 333-161.000.
- Kasao, Atsushi: See—  
Shimizu, Yukihiko; Fuyuki, Toshimitsu; Teshigawara, Toru; Terao, Kazuo; and Kasao, Atsushi, 4,949,099, Cl. 346-107.00R.
- Kase, Masao; Koizumi, Toshiaki; Otaki, Masatsugu; Yamashita, Masakazu; Tanaka, Kenji; and Matsuura, Ryo, to Pioneer Electronic Corporation. Disk player for playing both sides of a disk or multiple disks without ejection thereof and a disk player with a disk being played that overlaps disks stored in a storage receptor, 4,949,328, Cl. 369-75.200.
- Kasenga, Anthony F.: See—  
Ritsko, Joseph E.; Kasenga, Anthony F.; and Renninger, Scott A., 4,948,527, Cl. 252-301.40R.
- Kasica, James J.: See—  
Zallie, James P.; Kasica, James J.; and Eden, James, 4,948,615, Cl. 426-578.000.
- Kasparaitis, Albinas J.: See—  
Gapshis, Vladas-Algis A.; Dzidolikas, Kyastutis P.; Kumetaitis, Juozas-Stasis; and Kasparaitis, Albinas J., 4,947,557, Cl. 33-503.000.
- Kasper, Erich: See—  
Herzog, Hans J.; Worner, Klaus; and Kasper, Erich, 4,949,146, Cl. 357-34.000.
- Kasper, Thomas A.; Lucas, William G.; and Singas, Gus A., to Royce Medical Company. Combined check valve and fluid pressure relief valve, 4,948,092, Cl. 251-82.000.
- Katagiri, Shigenobu: See—  
Ogawa, Toshitaka; Kikuchi, Yasuo; Sugaya, Tomio; Nakajima, Isao; Suzuki, Takashi; and Katagiri, Shigenobu, 4,949,096, Cl. 346-25.000.
- Katahara, Keith W., to Atlantic Richfield Company. Acoustic logging tool transducers, 4,949,316, Cl. 367-157.000.
- Katayama, Yoshiyuki; and Ura, Takeshi, to Kubota, Ltd. Transmission having electromagnetic proportional reduction valve, 4,949,264, Cl. 364-424.100.
- Katayori, Sinji: See—  
Shimada, Takahisa; Kajita, Hideo; Okumura, Sueyoshi; Seki, Reiji; Ishimura, Toshihiko; and Katayori, Sinji, 4,949,109, Cl. 354-173.100.
- Kato, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Industrial robot, 4,947,702, Cl. 74-479.000.
- Kato, Masayuki: See—  
Tokumo, Akio; Kato, Masayuki; Sato, Takeshi; and Hasegawa, Tatsuzo, 4,949,048, Cl. 330-10.000.
- Kato, Nobuhide; and Katsu, Masanori, to NGK Insulators, Ltd. Oxygen sensor, 4,948,491, Cl. 204-424.000.
- Kato, Takahisa: See—  
Kawajiri, Ryoichi; Uematsu, Hiroshi; and Kato, Takahisa, 4,948,015, Cl. 222-107.000.
- Kato, Yutaka; and Kijima, Yoshio, to Sumitomo Metal Mining Company Limited. Sintering metal powder and a process for making a sintered metal product, 4,948,426, Cl. 419-23.000.
- Katoh, Namio: See—  
Kitagawa, Toshiyuki; and Katoh, Namio, 4,947,846, Cl. 128-640.000.
- Katori, Shigetatsu: See—  
Takeuchi, Kazuhiro; and Katori, Shigetatsu, 4,949,242, Cl. 364-200.000.
- Katsu, Masanori: See—  
Kato, Nobuhide; and Katsu, Masanori, 4,948,491, Cl. 204-424.000.
- Katamata, Yasuo, to KM Cloth Cutting Machine Co., Ltd. Cloth cutting apparatus, 4,947,554, Cl. 30-275.400.
- Kaufman, Benjamin J.: See—  
Sung, Rodney L.; Kaufman, Benjamin J.; and Thomas, Karol J., 4,948,386, Cl. 44-57.000.
- Kaufman, Harrison: See—  
Kaufman, Lauren; and Kaufman, Harrison, 4,947,984, Cl. 206-44.120.
- Kaufman, Lauren; and Kaufman, Harrison. Packaging cases incorporating elevating mechanism for displaying contents, 4,947,984, Cl. 206-44.120.
- Kaufman, Stanley L.; Dorman, Frank D.; Bjorkquist, Daniel C.; and Finn, Miles R., to TSI Incorporated. Laser optical measuring device and method for stabilizing fringe pattern spacing, 4,948,257, Cl. 356-354.000.
- Kausche, Helmold; and Plaettner, Rolf, to Siemens Aktiengesellschaft. Method and apparatus for producing semiconductor layers composed of amorphous silicon-germanium alloys through glow discharge technique, particularly for solar cells, 4,948,750, Cl. 437-101.000.
- Kawachi, Youji: See—  
Mitsuji, Masaru; Endo, Mistugu; Kawachi, Youji; and Asada, Akira, 4,948,829, Cl. 524-457.000.
- Kawafuchi, Hiroyo: See—  
Hiraiwa, Toru; Takeda, Kenji; Nakano, Joji; Sudani, Mineichi; Furuhata, Kunikazu; Takata, Makoto; Kawafuchi, Hiroyo; and Watanabe, Isao, 4,948,796, Cl. 514-254.000.
- Kawaguchi, Takayuki: See—  
Iwakuma, Takeo; Kawaguchi, Takayuki; Yamashita, Toyoharu; Sasaki, Yasuhiko; and Shimazaki, Tamotu, 4,948,810, Cl. 514-539.000.
- Kawai, Kouichiro: See—  
Mori, Fumio; Okada, Masafumi; Miki, Shuji; Ebashi, Iwao; Nishida, Takashi; Kawai, Kouichiro; Tashiro, Tazuko; and Tsukagoshi, Shigeru, 4,948,784, Cl. 514-54.000.
- Kawai, Tetsu: See—  
Hoshino, Akihiko; Nakatani, Shoji; Kuroda, Koji; and Kawai, Tetsu, 4,949,292, Cl. 364-736.000.
- Kawai, Yasuo; and Ishihara, Kazuoki, to Kabushiki Kaisha Advance Kaihatsu kenkyujo. Anticariogenic or antiperidontitic method, 4,948,783, Cl. 514-46.000.
- Kawajiri, Ryoichi; Uematsu, Hiroshi; and Kato, Takahisa, to Dai Nippon Insatsu Kabushiki Kaisha. Carton equipped with liquid pouring-out device, 4,948,015, Cl. 222-107.000.
- Kawakami, Kanji: See—  
Imanaka, Tadashi; Kobayashi, Tetsuo; Saito, Harunobu; Hirai, Osamu; and Kawakami, Kanji, 4,949,209, Cl. 360-126.000.
- Kawamura, Hideo, to Isuzu Motors Limited. Igniting device for engine, 4,947,808, Cl. 123-145.00A.
- Kawamura, Shinichi; and Takabayashi, Kyoko, to Kabushiki Kaisha Toshiba. Method and apparatus for computing residue with respect to arbitrary modulus, 4,949,293, Cl. 364-746.000.
- Kawano, Kyoichiro: See—  
Morizumi, Kiyokazu; Kawano, Kyoichiro; and Seyama, Kiyotaka, 4,949,219, Cl. 361-386.000.
- Kawasaki Steel Corp.: See—  
Imazu, Tsukasa; Kimura, Mitsuo; Saito, Yoshiyuki; Ishiwatari, Nobuyoshi; Miyano, Yoshio; and Kondo, Mikio, 4,948,487, Cl. 204-206.000.
- Kawasaki, Yoshinobu: See—  
Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, 4,948,329, Cl. 414-735.000.
- Kawashima, Hidetoshi: See—  
Souda, Shigeru; Shimomura, Naoyuki; Ueda, Norihito; Miyazawa, Shuhei; Yamanaka, Takashi; Miyamoto, Kaname; Hishinuma, Icharu; Nagakawa, Junichi; Nagaoka, Naoko; Kawashima, Hidetoshi; Kawata, Tsutomu; Nagaoka, Junsaku; and Wakabayashi, Tsuneo, 4,948,808, Cl. 514-535.000.
- Kawashima, Susumu; and Uchiyama, Yasuji, to Yamaha Corporation. Tone signal generation device having a tone sampling function, 4,947,723, Cl. 84-603.000.
- Kawata, Osamu: See—  
Yamada, Takeshi; Osato, Yasukuni; Suzuki, Masao; Watanabe, Okosu; and Kawata, Osamu, 4,948,412, Cl. 65-4.210.
- Kawata, Tsutomu: See—  
Souda, Shigeru; Shimomura, Naoyuki; Ueda, Norihito; Miyazawa, Shuhei; Yamanaka, Takashi; Miyamoto, Kaname; Hishinuma, Icharu; Nagakawa, Junichi; Nagaoka, Naoko; Kawashima, Hidetoshi; Kawata, Tsutomu; Nagaoka, Junsaku; and Wakabayashi, Tsuneo, 4,948,808, Cl. 514-535.000.
- Kawazoe, Hiroshi; and Hamane, Tokuhito, to Matsushita Electric Industrial Co., Ltd. Method of winding wire on inner surface of cylindrical member, 4,947,543, Cl. 29-605.000.
- Keane, Stuart J.: See—  
Helm, Arthur E.; and Keane, Stuart J., 4,948,133, Cl. 273-85.00G.
- Keck, Donald B.; Lyons, Donald R.; and Nolan, Daniel A., to Corning Incorporated. Optic coupler, 4,948,217, Cl. 350-96.150.
- Keen, Brian T., to Union Carbide Chemicals and Plastics Company Inc. Catalytic process for production of alkoxylated esters, 4,948,915, Cl. 560-187.000.
- Keenan, Kathleen C. Ready access hang-up storage and retrieval device for articles of wear, 4,947,987, Cl. 206-292.000.
- Keens, Andrew P., to Thorn Emi plc. Optical image rotators, 4,948,228, Cl. 350-397.000.
- Keeton, William F. Surgical clothing and labeling means therefor, 4,947,867, Cl. 128-846.000.
- Keil, Michael; Jahn, Dieter; Kolassa, Dieter; Schirmer, Ulrich; Becker, Rainer; Jung, Johann; and Rademacher, Wilhelm, to BASF Aktiengesellschaft. Agents for regulating plant growth, 4,948,415, Cl. 71-90.000.
- Kelbin Co., Ltd.: See—  
Koiwa, Yoshinobu, 4,948,349, Cl. 417-383.000.
- Kelleher, Denis M.; and Walters, Robert B. Elastomeric composite membrane, 4,948,652, Cl. 422-110.000.

- Keller, Andrew: See—  
Bashir, Zahir; Keller, Andrew; and Odell, Jeffrey A., 4,948,545, Cl. 264-210.800.
- Keller, Daniel R.; and Schelling, Andreas D., to U.S. Philips Corporation. Data display device, 4,949,081, Cl. 340-765.000.
- Keller, Lewis C.; and Reed, Richard B., to Frito-Lay, Inc. Continuous production of cookie-like product, 4,948,612, Cl. 426-549.000.
- Kelley, James O., to Sligh Furniture Co. Desk with concealed wire storage, 4,948,205, Cl. 312-196.000.
- Kelly, James E.: See—  
Chen, Janglin; Ferrar, Wayne T.; Kelly, James E.; and Marshall, Akemi S., 4,948,720, Cl. 430-527.000.
- Kelly, Kevin A., to Danninger Medical Technology, Inc. Body composition analyzer, 4,947,862, Cl. 128-734.000.
- Kelm, Walter H.: See—  
Newland, Paul W.; Kornilov, Anthony; and Kelm, Walter H., 4,948,309, Cl. 409-234.000.
- Kennedy, David L.; True, Donald C.; and Welsh, David M., to Imperial Chemical Industries, PLC. Multi-directional initiator for explosives, 4,947,751, Cl. 102-305.000.
- Keptel, Inc.: See—  
Nieves, Anthony L.; and Collins, Thomas J., 4,949,376, Cl. 379-399.000.
- Kerlin, Gregg W.: See—  
Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,949,373, Cl. 379-96.000.
- Kern, John M.; Freyburger, Donald E.; Schneider, Karl F.; and Spokas, Roman B., to Borg-Warner Automotive, Inc. Continuously variable transmission system and long travel torsion damper therefor, 4,947,700, Cl. 74-445.000.
- Kernforschungsanlage Julich GmbH: See—  
Grunberg, Peter, 4,949,039, Cl. 324-252.000.
- Kerr-McGee Chemical Corporation: See—  
Andersen, Terrell N., 4,948,484, Cl. 204-105.00M.
- Kerwood, Richard D.: See—  
Dunn, Adrian; and Kerwood, Richard D., 4,948,522, Cl. 252-32.70E.
- Kessler, Gerald. Rub rail end caps, 4,948,637, Cl. 428-31.000.
- Ketter, Karl N.: See—  
Haasheim, Gary R.; Theisen, Paul M.; and Ketter, Karl N., 4,948,121, Cl. 272-97.000.
- Keur, Wilhelmus C.; Mutsaers, Cornelis A. H. A.; and Van Hal, Henricus A. M., to U.S. Philips Corporation. Superconductive thin layer, 4,948,779, Cl. 505-1.000.
- Keyser, Larry R.: See—  
Rich, Frank C.; and Keyser, Larry R., 4,947,630, Cl. 56-249.000.
- Khaimin, Jury F.: See—  
Vainshtein, Grigory Y.; Kozlon, Anatoly V.; Marakin, Vladimir I.; and Khaimin, Jury F., 4,947,813, Cl. 123-352.000.
- Khalid, Syed J.: See—  
Pollak, Robert R.; Khalid, Syed J.; and Marcos, Juan A., 4,947,643, Cl. 60-236.000.
- Khandaghabadi, Ferrok: See—  
Cooper, David M.; and Khandaghabadi, Ferrok, 4,949,029, Cl. 324-74.000.
- Khowaja, Hayat: See—  
Landis, Clark R.; and Khowaja, Hayat, 4,948,920, Cl. 562-406.000.
- Kida, Masashi: See—  
Kaba, Kazuyuki; Takahashi, Ken; and Kida, Masashi, 4,947,913, Cl. 152-454.000.
- Kiel, Johnathan L.: See—  
Erwin, David N.; Kiel, Johnathan L.; Batishko, Charles R.; and Stahl, Kurt A., 4,948,975, Cl. 250-361.00C.
- Kierdorf, Frank M.; and Behnke, Rainer G., to GAF Chemicals Corporation. Filter bag carrier with filter seal profile, 4,948,504, Cl. 210-238.000.
- Kiesel, Kenneth C., to Lex Computer and Management Corporation. Video composition method employing action scrolling, 4,949,193, Cl. 360-14.100.
- Kight, Jerry D. Closure for roof vent, 4,947,596, Cl. 52-202.000.
- Kijima, Yoshio: See—  
Kato, Yutaka; and Kijima, Yoshio, 4,948,426, Cl. 419-23.000.
- Kikkawa, Shinichi: See—  
Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Kadera, Sadaki, 4,949,134, Cl. 355-317.000.
- Kikuchi, Yasuo: See—  
Ogawa, Toshitaka; Kikuchi, Yasuo; Sugaya, Tomio; Nakajima, Isao; Suzuki, Takashi; and Katagiri, Shigenobu, 4,949,096, Cl. 346-25.000.
- Kikushima, Shigeru; Yamaoka, Fumiyuki; Kakizaki, Shinobu; and Emura, Junichi, to Atsugi Motor Parts Company, Limited. Damping characteristics variable hydraulic shock absorber for automotive suspension system with vehicular attitude suppressing capability, 4,948,163, Cl. 280-707.000.
- Kilmartin, John D., III, to International Packaging Corporation. Display cabinet construction, 4,948,204, Cl. 312-140.000.
- Kilthau, Gerhard; Spies, Karl H.; Vogt, Rolf; Freilander, Peter; and Seethaler, Toni, to Carl Freudenberg, Firma. Shaft seal, 4,948,152, Cl. 277-80.000.
- Kim, Chang-Hyun: See—  
Chin, Dae-Je; Kim, Chang-Hyun; and Hwang, Hong-Sun, 4,948,993, Cl. 307-530.000.
- Kim, Hyun K.: See—  
Archer, Sydney; Bialy, Gabriel; Blye, Richard P.; Crabbe, Pierre; deceased; Crabbe, Lucie, executor; Diczfalusy, Egon R.; Djerasi, Carl; Fried, Josef; and Kim, Hyun K., 4,948,790, Cl. 514-178.000.
- Kim, Jae G.: See—  
Lim, Sam K., and Kim, Jae G., 4,948,846, Cl. 526-62.000.
- Kim, Timothy, to Kalok Corporation. Disk track for locating zero track and generating timing for index signal, 4,949,202, Cl. 360-78.140.
- Kimberly-Clark Corporation: See—  
Brooker, Ronald W.; and Cohen, Bernard, 4,948,639, Cl. 428-35.200.
- Kimura, Hidetoshi: See—  
Takahashi, Masakatsu; Buseki, Hiroo; and Kimura, Hidetoshi, 4,948,153, Cl. 277-235.00E.
- Kimura, Makoto: See—  
Ejiri, Susumu; Kimura, Makoto; Tabuchi, Yasuhiko; and Yokoyama, Nobuyoshi, 4,947,824, Cl. 126-391.000.
- Kimura, Mitsuo: See—  
Imazu, Tsukasa; Kimura, Mitsuo; Saito, Yoshiyuki; Ishiwatari, Nobuyoshi; Miyano, Yoshio; and Kondo, Mikio, 4,948,487, Cl. 204-206.000.
- Kimura, Noriyuki: See—  
Ishikawa, Kouichi; Mihra, Hiroshi; Kimura, Noriyuki; and Yamaguchi, Masao, 4,947,889, Cl. 137-486.000.
- Kimura, Okitoshi: See—  
Ohsawa, Toshiyuki; Kabata, Toshiyuki; Kimura, Okitoshi; and Yoneyama, Sachiko, 4,948,685, Cl. 429-213.000.
- Kimura, Toshiyuki; Aoyagi, Yoshio; and Endo, Fumio, to Pioneer Electronic Corporation. Random-play control system in disk player, 4,949,322, Cl. 369-32.000.
- King Instrument Corporation: See—  
Woodley, George M., 4,948,455, Cl. 156-497.000.
- King, Laura L. H.: See—  
Niedrach, Leonard W.; Indig, Maurice E.; and King, Laura L. H., 4,948,492, Cl. 204-435.000.
- King, Todd L.: See—  
Studtmann, George H.; Quinn, Stanley B., Jr.; and King, Todd L., 4,949,215, Cl. 361-154.000.
- Kinney, David V.: See—  
Frelter, Calvin A.; and Kinney, David V., 4,949,126, Cl. 355-243.000.
- Kinoshita, Masami: See—  
Ogoe, Hiroyuki; and Kinoshita, Masami, 4,948,869, Cl. 528-348.000.
- Kinsey, Joe L.: See—  
Gibbons, Charles E.; Lanham, Robert L.; Kinsey, Joe L.; and Whillock, Allan A., 4,948,640, Cl. 428-34.900.
- Kinsley, Homan B., Jr., to James River Corporation. Magnetic barrier paper, 4,948,463, Cl. 162-138.000.
- Kiphart, James A.: See—  
Douds, Willard O.; and Kiphart, James A., 4,947,595, Cl. 52-177.000.
- Kirin Beer Kabushiki Kaisha: See—  
Fukuchi, Hiroyuki, 4,948,956, Cl. 250-223.00B.
- Kirma, Safa, to Messerschmitt-Boelkow-Blohm GmbH. Electromechanical relay, 4,949,061, Cl. 337-140.000.
- Kirman, Richard G.; and Spencer, Sally A., to W & T Avery Limited. Vibrating force sensor, 4,947,694, Cl. 73-862.590.
- Kis Photo Industrie/Serge Crasnianski: See—  
Combet, Philippe; and Crasnianski, Serge, 4,949,114, Cl. 354-313.000.
- Kishimoto, Shinzo: See—  
Ishikawa, Takatoshi; and Kishimoto, Shinzo, 4,948,710, Cl. 430-372.000.
- Kishishita, Hiroshi: See—  
Isaka, Kinichi; Shimoyama, Hiroyuki; Ohba, Toshihiro; Kishishita, Hiroshi; and Ueda, Hisashi, 4,949,019, Cl. 315-246.000.
- Kita, Akio, to OKI Electric Industry Co., Ltd. Process of fabricating a MISFET, 4,948,744, Cl. 437-44.000.
- Kita, Masahiro: See—  
Negoro, Ikuo; Negishi, Kiyoshi; and Kita, Masahiro, 4,949,104, Cl. 346-153.100.
- Kitagaki, Kazunori: See—  
Yamamoto, Hajime; Kitagaki, Kazunori; and Nakamura, Masahiko, 4,949,125, Cl. 355-219.000.
- Kitagawa, Toshiyuki; and Katoh, Namio, to TDK Corporation. Waterproof electrode device for a living body, 4,947,846, Cl. 128-640.000.
- Kitagishi, Nozomu; Koyama, Takeshi; Takahashi, Sadatoshi; and Oizumi, Kouji, to Canon Kabushiki Kaisha. Camera having telescopic capability, 4,949,107, Cl. 354-79.000.
- Kitahara, Koichi; Ohata, Yu; and Kuramoto, Tsuyoshi, to Kabushiki Kaisha Toshiba. Manufacture of a substrate structure for a composite semiconductor device using wafer bonding and epitaxial refill, 4,948,748, Cl. 437-62.000.
- Kitajima, Horonobu: See—  
Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Horonobu; and Kiuchi, Takashi, 4,948,983, Cl. 250-548.000.
- Kitamura, Yoichi: See—  
Someya, Sinzo; Koura, Seigo; Ito, Mikio; Kitamura, Yoichi; Watanabe, Hiroyuki; and Tsuzuki, Kenji, 4,948,421, Cl. 71-94.000.
- Kitasato Kenkyusho: See—  
Omura, Satoshi; and Itoh, Zen, 4,948,782, Cl. 514-29.000.
- Kitatani, Katsuji; and Hoshi, Satoshi, to Fuji Photo Film Co., Ltd. Layered electrophotographic photoreceptor comprises bis-azo charge generator compound, 4,948,688, Cl. 430-58.000.
- Kito, Shozo; Harada, Shoichi; Imai, Hajime; and Muramatsu, Tadao, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho; and Toyota Jidosha Kabushiki Kaisha. Locking apparatus for shift lever in automatic transmission, 4,947,967, Cl. 192-4.00A.

Kittler, Wilfred C.: See—  
 Ritchie, Ian T.; and Kittler, Wilfred C., 4,948,529, Cl. 252-501.100.  
 Kitzmann, Ernst. Self-loading pistol. 4,947,571, Cl. 42-15.000.  
 Kiuchi, Masayuki: See—  
 Iijima, Hitoshi; Kiuchi, Masayuki; Nakao, Masahiro; Nishimura, Kunio; and Sato, Shigeaki, 4,948,589, Cl. 424-438.000.  
 Kiuchi, Takashi: See—  
 Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Horonobu; and Kiuchi, Takashi, 4,948,983, Cl. 250-548.000.  
 Klein, Kenneth J.; Song, Wei J.; and Thompson, Michael, to Hewlett-Packard Company. Gas chromatograph having cyro blast coolings. 4,948,389, Cl. 55-20.000.  
 Kleiner, Hans-Jerg; and Bartels, Gunter, to Hoechst Aktiengesellschaft. Process for the preparation of  $\alpha$ -aminoalkylphosphonic acids. 4,948,918, Cl. 562-16.000.  
 Kleinman, Edward F.; Rosati, Robert L.; and Bindra, Jasjit S., to Pfizer Inc. Renin inhibitors containing 5-amino-2,5-disubstituted-4-hydroxy-pentanoic acid residues. 4,948,913, Cl. 560-115.000.  
 Kleiss, Bernardus W. H.; Bretveld, Arend J. E.; and Thus, Franciscus J. M., to U.S. Philips Corporation. Power supply control for low voltage I<sup>2</sup>L circuits. 4,948,988, Cl. 307-296.300.  
 Klemets, Ronny, to KWH Mirka Ltd. Package of abrasive materials. 4,947,990, Cl. 206-409.000.  
 Kline, John F.: See—  
 Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,947,749, Cl. 101-459.000.  
 Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,947,750, Cl. 101-459.000.  
 Kline, Mark J.: See—  
 Davies, Kenneth E.; Geddes, Walter C.; Kline, Mark J.; Maluta, Alexander T.; Naylor, Bruce E.; Scofield, Harrison; and Stevens, Jeffrey N., 4,949,278, Cl. 364-513.000.  
 Klinkau Besitzges. mbH: See—  
 Klinkau, Werner; and Stanik, Reinmund, 4,948,500, Cl. 210-227.000.  
 Klinkau, Werner; and Stanik, Reinmund, 4,948,501, Cl. 210-228.000.  
 Klinkau, Werner; and Stanik, Reinmund, to Klinkau Besitzges. mbH. Membrane filter plate. 4,948,500, Cl. 210-227.000.  
 Klinkau, Werner; and Stanik, Reinmund, to Klinkau Besitzges mbH. Membrane filter plate. 4,948,501, Cl. 210-228.000.  
 KM Cloth Cutting Machine Co., Ltd.: See—  
 Katumata, Yasuo, 4,947,554, Cl. 30-275.400.  
 Knabel, Walter; Mayer, Josef; Wentker, Stephan; and Notar, Walter, to Autoliv-Kolb, GmbH & Co. Acceleration sensor for safety systems and/or seat belt systems in motor vehicles. 4,948,171, Cl. 280-806.000.  
 Knodel, Rolf; Schimpff, Frithjof; Bergenthal, Wolfgang; and Zander, Thomas, to Wayss & Freytag Aktiengesellschaft. Concrete mold with arrangement for mounting tubular components. 4,948,089, Cl. 249-86.000.  
 Knoll, Frederick L., to Boeing Company. The Hot/cold press forming apparatus for thermoformable materials. 4,948,355, Cl. 425-517.000.  
 Knudsen, Christian W.: See—  
 Gibson, Michael A.; and Knudsen, Christian W., 4,948,477, Cl. 204-129.000.  
 Koba, Tatsuhiko: See—  
 Satoh, Ikumi; Nakano, Jun; Harada, Riichiroh; Koba, Tatsuhiko; Fujita, Yuichi; and Shima, Kazumi, 4,948,091, Cl. 251-65.000.  
 Kobayashi Gimlet Mfg. Co., Ltd.: See—  
 Kobayashi, Tsunemi, 4,948,304, Cl. 408-16.000.  
 Kobayashi, Hidetoshi: See—  
 Inoue, Noriyuki; Heki, Tatsuo; Kobayashi, Hidetoshi; Deguchi, Naoyasu; and Hirano, Shigeo, 4,948,712, Cl. 430-409.000.  
 Kobayashi, Hirokazu: See—  
 Shiraiishi, Kenichi; Kobayashi, Hirokazu; and Miyamoto, Yukihiko, 4,949,394, Cl. 455-2.000.  
 Kobayashi, Kazuhiro; Koboshi, Shigeharu; Kuse, Satoru; and Ishikawa, Masao, to Konishiroku Photo Industry Co., Ltd. Processing solution for a light-sensitive silver halide color photographic material. 4,948,713, Cl. 430-434.000.  
 Kobayashi, Masato; and Yamaguchi, Yoichi, to Hoya Corporation. Method for forming silicon nitride film. 4,948,482, Cl. 204-192.230.  
 Kobayashi, Shinichi: See—  
 Toyama, Tsuyoshi; Kohda, Kenji; Andoh, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, 4,949,305, Cl. 365-185.000.  
 Kobayashi, Takeshi; Taniguchi, Masayuki; Yasuda, Shunji; and Ikeda, Shigehito, to Toshiba Ceramics Co., Ltd. Continuous microorganism cultivating apparatus. 4,948,736, Cl. 435-311.000.  
 Kobayashi, Tetsuo: See—  
 Imanaka, Tadashi; Kobayashi, Tetsuo; Saito, Harunobu; Hirai, Osamu; and Kawakami, Kanji, 4,949,209, Cl. 360-126.000.  
 Kobayashi, Toyohiro; Otsuka, Nobuo; Thompson, Peter; and Stratton, Larry J., to Mitsubishi Denki Kabushiki Kaisha. Air conditioning system. 4,948,040, Cl. 236-49.300.  
 Kobayashi, Toyohiro; and Mukohara, Shouji, to Mitsubishi Denki Kabushiki Kaisha. Optoelectronic device for an optical communication system. 4,948,218, Cl. 350-96.160.  
 Kobayashi, Tsunemi, to Kobayashi Gimlet Mfg. Co., Ltd. Adjustable tool guide and driver for a bit. 4,948,304, Cl. 408-16.000.  
 Kobinger, Walter: See—  
 Koppe, Herbert; Esser, Franz; Kobinger, Walter; and Lillie, Mag. C., 4,948,812, Cl. 514-622.000.

Koboshi, Shigeharu: See—  
 Kobayashi, Kazuhiro; Koboshi, Shigeharu; Kuse, Satoru; and Ishikawa, Masao, 4,948,713, Cl. 430-434.000.  
 Koch, Donald E.: See—  
 Dyke, Harry J.; and Koch, Donald E., 4,949,355, Cl. 375-10.000.  
 Koch, Ronald J.; Gruber, Robert J.; Julien, Paul C.; Goodman, Donald J.; Gutman, Edward J.; and Maniar, Deepak R., to Xerox Corporation. Process for forming two-color images. 4,948,686, Cl. 430-45.000.  
 Koch, Werner, to Bruckner Apparatebau GmbH. Method and apparatus for continuous wet-in-wet processing. 4,947,501, Cl. 8-151.000.  
 Kock, Ronald W.: See—  
 Thornock, Del M.; Goldberg, James R.; Kock, Ronald W.; Paul, Robert A.; Hamilton, Peter W.; and Willhite, William, Jr., 4,948,002, Cl. 215-221.000.  
 Koder, Sadaki: See—  
 Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Koder, Sadaki, 4,949,134, Cl. 355-317.000.  
 Koehler, Gernot: See—  
 Hasenbein, Norbert; Muehlenbernd, Thomas; and Koehler, Gernot, 4,948,850, Cl. 526-217.000.  
 Koenig, Karl E.; Lanser, Gary A.; Morrison, Paul A.; and Weisenfeld, Robert B., to Monsanto Company. Process for the preparation of iminodiacetonitrile and iminodiacetic acid. 4,948,909, Cl. 558-346.000.  
 Koenneker, Reinhard, to Dr. Ing. h.c.f. Porsche Aktiengesellschaft. Arrangement for decoupling the torsional vibrations in a gear transmission. 4,947,707, Cl. 74-574.000.  
 Koerner, Robert. Method and apparatus for building a brick wall. 4,947,610, Cl. 52-585.000.  
 Koga, Keisuke: See—  
 Nomura, Noboru, and Koga, Keisuke, 4,948,238, Cl. 350-469.000.  
 Koga, Masataka: See—  
 Oishi, Konosuke; Koizumi, Hideaki; and Koga, Masataka, 4,948,250, Cl. 356-307.000.  
 Koh, Soo H.: See—  
 Koh, Soo L.; Koh, Soo K.; and Koh, Soo H., 4,948,709, Cl. 430-364.000.  
 Koh, Soo K.: See—  
 Koh, Soo L.; Koh, Soo K.; and Koh, Soo H., 4,948,709, Cl. 430-364.000.  
 Koh, Soo L.; Koh, Soo K.; and Koh, Soo H., to Color Processing System SDN BHD. Production of business cards and the like. 4,948,709, Cl. 430-364.000.  
 Koh, Soo N.; and Xydeas, Costas, to British Telecommunications public limited company. Frequency domain speech coding. 4,949,383, Cl. 381-31.000.  
 Kohda, Kenji: See—  
 Toyama, Tsuyoshi; Kohda, Kenji; Andoh, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, 4,949,305, Cl. 365-185.000.  
 Koike, Kazuyuki; Fuchizawa, Tetsuro; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Photographic support. 4,948,719, Cl. 430-524.000.  
 Koike, Kiyoshi; Uchida, Hiroshi; Hayashi, Tatsuro; and Morita, Rikushi, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for measuring density or the like of an object having a small transmission factor. 4,949,365, Cl. 378-54.000.  
 Koike, Masahiko: See—  
 Hirano, Katsuhiko; Koike, Masahiko; and Toda, Hiroyuki, 4,947,724, Cl. 84-631.000.  
 Koike, Seiji; Hiroaki, Yukihiko; Hamada, Motonobu; and Ohata, Takahiko, to Tokyo Electric Co., Ltd. Drive device for a thermal transfer printer. 4,948,282, Cl. 400-616.200.  
 Koito Seisakusyo Co., Ltd.: See—  
 Makita, Hiroyuki; Shinoda, Takahisa; Nakamura, Yasuaki; and Endoh, Osamu, 4,949,226, Cl. 362-61.000.  
 Koiwa, Yoshinobu, to Koiwa, Yoshinobu; Kabushiki Kaisha Little Rock; Kelbin Co., Ltd.; and Fujimori, Shuichi. Pump and valve apparatus. 4,948,349, Cl. 417-383.000.  
 Koizumi, Hideaki: See—  
 Oishi, Konosuke; Koizumi, Hideaki; and Koga, Masataka, 4,948,250, Cl. 356-307.000.  
 Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,947,837, Cl. 128-653.0AF.  
 Koizumi, Toru: See—  
 Tamaki, Yoichi; Ikeda, Kiyoji; Nakamura, Toru; Uchida, Akihisa; Koizumi, Toru; Enami, Hiromichi; Isomura, Satoru; Nakajima, Shinji; Ogiue, Katsumi; and Ohgaya, Kaoru, 4,949,162, Cl. 357-71.000.  
 Koizumi, Toshiaki: See—  
 Kase, Masao; Koizumi, Toshiaki; Otaki, Masatsugu; Yamashita, Masakazu; Tanaka, Kenji; and Matsuura, Ryo, 4,949,328, Cl. 369-75.200.  
 Kojima, Atsuyuki: See—  
 Antoku, Fujio; Yoshigi, Mayumi; Saji, Ikutaro; Kojima, Atsuyuki; and Ishizumi, Kuku, 4,948,799, Cl. 514-278.000.  
 Kojima, Shingo: See—  
 Iwasaki, Junichi; and Kojima, Shingo, 4,949,241, Cl. 364-200.000.  
 Kojima, Tetsuro; Fujita, Yoshihiro; Yamanouchi, Junichi; and Yasuda, Tomokazu, to Fuji Photo Film Co., Ltd. Method for processing silver halide photographic light-sensitive materials. 4,948,711, Cl. 430-393.000.  
 Kojima, Yasushi: See—  
 Blanchard, Joseph H.; Barb, Earl C.; and Kojima, Yasushi, 4,949,218, Cl. 361-384.000.  
 Kokubo, Hiroyasu; Muto, Hiroaki; and Chiba, Tohru, to Shin-Etsu Chemical Co., Ltd. Method for the preparation of coated solid medicament form. 4,948,622, Cl. 427-3.000.

Kolar, Cenek: See—  
 Hermentin, Peter; Paal, Michael; Kraemer, Hans P.; Kolar, Cenek; Hoffmann, Dieter; Gerken, Manfred; Berscheid, Hans G.; and Bottger, Dirk, 4,948,880, Cl. 536-6.400.  
 Kolassa, Dieter: See—  
 Keil, Michael; Jahn, Dieter; Kolassa, Dieter; Schirmer, Ulrich; Becker, Rainer; Jung, Johann; and Rademacher, Wilhelm, 4,948,415, Cl. 71-90.000.  
 Kolb, Franz: See—  
 Brich, Peter; Kolb, Franz; and Oblasser, Siegfried, 4,949,237, Cl. 364-178.000.  
 Kolbus GmbH & Co. KG: See—  
 Singer, Helmut, 4,948,110, Cl. 270-58.000.  
 Koletar, Gabor I.: See—  
 Shadrach, Richard L.; Platzer, Stephan J. W.; and Koletar, Gabor I., 4,948,693, Cl. 430-143.000.  
 Komachi, Yuichi, to Kabushiki Kaisha Machida Seisakusho. Method of producing waveguide. 4,947,540, Cl. 29-600.000.  
 Komamura, Tawara, to Konica Corporation. Heat-processible color photographic material. 4,948,698, Cl. 430-203.000.  
 Komatsu, Takaaki: See—  
 Araki, Shigeo; Taniguchi, Hitoshi; Suzuki, Hiroyuki; and Komatsu, Takaaki, 4,949,308, Cl. 365-218.000.  
 Komatsu, Toshiyuki: See—  
 Konishi, Satoshi; Tatsuo, Masahiko; and Komatsu, Toshiyuki, 4,947,946, Cl. 177-105.000.  
 Kominami, Seiya: See—  
 Takahashi, Toshihisa; Uchinami, Masanobu; Nishiyama, yoji; Kominami, Seiya; and Nishida, Shinichi, 4,947,819, Cl. 123-489.000.  
 Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifer, Gyula; Bohus, Peter; Tromfos, Katalin; Meszaros, nee Szekrenyesi, Agnes; and Kuronya, Istvan, to Budapesti Vegyimuvek; and MTA Kozponti Mediai Kutato Intezet. Herbicidal aryloxy phenoxy acyl malonates. 4,948,420, Cl. 71-94.000.  
 Komoda, Tsutomu: See—  
 Mitsui, Yasuhiro; Shimura, Satoshi; and Komoda, Tsutomu, 4,948,962, Cl. 250-288.000.  
 Komori Printing Machinery, Co.: See—  
 Watanabe, Hideo, 4,949,284, Cl. 364-520.000.  
 Komplex Kulkereskedelmi Vallalat: See—  
 Kurti, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasziljevics, Gyozo, 4,949,075, Cl. 340-555.000.  
 Kondo, Kenji; Kunda, Hachiro; and Sonobe, Toshio, to Nippondenso Co., Ltd. Method for making a semiconductor device. 4,948,754, Cl. 437-183.000.  
 Kondo, Michio, to Brother Kogyo Kabushiki Kaisha. Optical heterodyne measuring apparatus. 4,948,251, Cl. 356-349.000.  
 Kondo, Mikio: See—  
 Imazu, Tsukasa; Kimura, Mitsuo; Saito, Yoshiyuki; Ishiwatari, Nobuyoshi; Miyano, Yoshio; and Kondo, Mikio, 4,948,487, Cl. 204-206.000.  
 Kondo, Osamu: See—  
 Taniguchi, Katuhiko; Nakajima, Akiharu; and Kondo, Osamu, 4,947,533, Cl. 29-894.000.  
 Kondo, Toshiro: See—  
 Nishinoiri, Hiroshi; Kondo, Toshiro; and Takaya, Yoshikazu, 4,948,699, Cl. 430-204.000.  
 Konica Corporation: See—  
 Komamura, Tawara, 4,948,698, Cl. 430-203.000.  
 Konig, H. C. Wilfried: See—  
 Behmer, Udo, 4,948,934, Cl. 219-69.200.  
 Koning, Wiebe. Chimney cap unit for extinguishing a starting chimney fire. 4,947,736, Cl. 98-86.000.  
 Konishi, Satoshi; Tatsuo, Masahiko; and Komatsu, Toshiyuki, to Shida Scales Mfg. Co. Ltd. Hopper gate opening and closing device for an automatic weighing apparatus. 4,947,946, Cl. 177-105.000.  
 Konishiroku Photo Industry Co., Ltd.: See—  
 Kobayashi, Kazuhiro; Koboshi, Shigeharu; Kuse, Satoru; and Ishikawa, Masao, 4,948,713, Cl. 430-434.000.  
 Kono, Takeshi; and Yoshimura, Tatsuro, to Fujitsu Limited. LSI system including a plurality of LSI circuit chips mounted on a board. 4,949,033, Cl. 324-158.00R.  
 Kopczynski, John F. All-terrain vehicle. 4,948,167, Cl. 280-721.000.  
 Koppe, Herbert; Esser, Franz; Kobinger, Walter; and Lillie, Mag. C., to Boehringer Ingelheim KG. 1-phenoxy-3-amino-2-propanols use thereof. 4,948,812, Cl. 514-622.000.  
 Koppel, Jakob, to Gesellschaft Zur-Forderung der Industrieorientierten Forschung An den Schweizerischen. Apparatus for detecting positional changes in relation to a vertical reference direction in buildings or in building subsoil. 4,947,692, Cl. 73-786.000.  
 Korea Steel Chemical Co., Ltd.: See—  
 Lim, Sam K.; and Kim, Jae G., 4,948,846, Cl. 526-62.000.  
 Kornfield, Julia A.: See—  
 Stephanopoulos, Gregory; Kornfield, Julia A.; and Voeks, Gerald E., 4,948,728, Cl. 435-41.000.  
 Kornilov, Anthony: See—  
 Newland, Paul W.; Kornilov, Anthony; and Kelm, Walter H., 4,948,309, Cl. 409-234.000.  
 Kornmann, Michel, to Battelle Memorial Institute. Apparatus and process for forming an optical fibre covered by a metallic sleeve. 4,948,406, Cl. 65-3.110.  
 Korsh, George J.; and Hui, Edward, to Atmel Corporation. Transistor construction for low noise output driver. 4,949,139, Cl. 357-23.140.

Korsten, Gunter: See—  
 Grah, Klaus; Korsten, Gunter; and Schaaf, Werner, 4,947,787, Cl. 118-64.000.  
 Kost, Joseph; and Langer, Robert S., to Massachusetts Institute of Technology. Ultrasound enhancement of transbuccal drug delivery. 4,948,587, Cl. 424-435.000.  
 Koster Keunen Holland B.V.: See—  
 Brand, Hans M., 4,948,584, Cl. 424-401.000.  
 Kotnour, Thomas A.: See—  
 Echols, Jimmie L.; Hammar, Walton J.; and Kotnour, Thomas A., 4,948,859, Cl. 528-28.000.  
 Kouno, Tadao: See—  
 Noma, Hiroyuki; Kouno, Tadao, and Kadamaru, Kazuo, 4,947,917, Cl. 152-536.000.  
 Koura, Seigo: See—  
 Someya, Rinzou; Koura, Seigo; Ito, Mikio; Kitamura, Yoichi; Watanabe, Hiroyuki; and Tsuzuki, Kenji, 4,948,421, Cl. 71-94.000.  
 Kowa Comp., Ltd.: See—  
 Tanabe, Sohei; Sato, Seichi; Kyotani, Yoshinori; Ohta, Tomio; and Uchida, Yasumi, 4,948,892, Cl. 544-396.000.  
 Koy, Ilrman: See—  
 Reuffurth, Rainer; and Koy, Hermann, 4,948,399, Cl. 55-148.000.  
 Koyama, Hiroshi: See—  
 Nishioka, Tadashi; Mashiko, Yoji; Morimoto, Hiroaki; and Koyama, Hiroshi, 4,948,749, Cl. 437-89.000.  
 Koyama, Mototsugu: See—  
 Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 4,948,559, Cl. 420-584.000.  
 Koyama, Takeshi: See—  
 Kitagishi, Nozomu; Koyama, Takeshi; Takahashi, Sadatoshi; and Oizumi, Kouji, 4,949,107, Cl. 354-79.000.  
 Koyo Seiko Co., Ltd.: See—  
 Nunotani, Masao; and Matsumoto, Masaaki, 4,948,271, Cl. 384-473.000.  
 Kozlon, Anatoly V.: See—  
 Vainshtein, Grigory Y.; Kozlon, Anatoly V.; Marakin, Vladimir I.; and Khaimin, Jury F., 4,947,813, Cl. 123-352.000.  
 Kozuka, Kazuhiko: See—  
 Oshima, Takafumi; Kozuka, Kazuhiko; and Yamada, Shigeyasu, 4,949,006, Cl. 313-144.000.  
 Kraemer, Hans P.: See—  
 Hermentin, Peter; Paal, Michael; Kraemer, Hans P.; Kolar, Cenek; Hoffmann, Dieter; Gerken, Manfred; Berscheid, Hans G.; and Bottger, Dirk, 4,948,880, Cl. 536-6.400.  
 Kraft, Inc.: See—  
 Munoz, Daniel R., 4,948,003, Cl. 215-237.000.  
 Kramer, Arris H.: See—  
 Van Doorn, Johannes; Kramer, Arris H.; and Maria Snel, Johannes J., 4,948,870, Cl. 528-392.000.  
 Kraska, Robert E.: See—  
 Lessar, Joseph F.; Rosenberg, Duane L.; Kraska, Robert E.; Speckien, James M.; and Upton, James E., 4,947,866, Cl. 128-784.000.  
 Kraska, Ursula A.: See—  
 Bauer, Richard D.; Kraska, Ursula A.; and Sondergeld, Manfred A. J., 4,948,704, Cl. 430-291.000.  
 Krasznai, Charles Z.: See—  
 Gerke, Burton E., Jr.; Bitzel, Michael E.; Kubicko, Robert; and Krasznai, Charles Z., 4,947,514, Cl. 15-339.000.  
 Krause, Guenther, to Krause-Werk GmbH & Co. KG. Connecting element. 4,947,960, Cl. 182-26.000.  
 Krause-Werk GmbH & Co. KG: See—  
 Krause, Guenther, 4,947,960, Cl. 182-26.000.  
 Kreft, David R.: See—  
 Opie, Eric, deceased; Silverstein, Fred E.; and Kreft, David R., 4,947,827, Cl. 128-4.000.  
 Kress, Hans-Jurgen: See—  
 Wittmann, Dieter; Lindner, Christian; Damrath, Volker; Kress, Hans-Jurgen; Peters, Horst; and Schoeps, Jochen, 4,948,837, Cl. 525-63.000.  
 Kretschman, Gerald L.; and Gartley, William H., to Whirlpool Corporation. Lid retainer mechanism for automatic washer. 4,947,516, Cl. 16-289.000.  
 Krinsky, Leonard C.; and Van Rietschoten, Henk, to Worldwide Converting Machinery. Flying splice unwinder. 4,948,061, Cl. 242-58.300.  
 Krippel, Kurt; and Schulte, Klaus, to Bayer Aktiengesellschaft. Process for charging at least one component with gas in the preparation of cellular plastics. 4,948,815, Cl. 521-50.000.  
 Krishnan, Sivaram: See—  
 Paul, Winfried G.; Krishnan, Sivaram; and Sarver, Larry D., 4,948,666, Cl. 428-334.000.  
 Kroll, Arthur S.: See—  
 Hill, Lawrence A.; Kroll, Arthur S.; and Williams, Ralph E., 4,947,788, Cl. 118-653.000.  
 Kroll, Mark W.: See—  
 Brewer, James E.; and Kroll, Mark W., 4,947,859, Cl. 128-715.000.  
 Kronvall, Goran; and Bjorck, Lars, to Pharmacia AB. Purified protein G from streptococcal bacteria. 4,948,874, Cl. 530-350.000.  
 Kross, Manfred: See—  
 Theobald, Thomas; Kross, Manfred; and Plumer, Hans J., 4,947,594, Cl. 52-126.400.  
 Krueger, Deborah; and Snyder, Damon. Portable, self-supporting, baby carrier apparatus. 4,948,120, Cl. 272-85.000.  
 Krumbe, Wolfgang; Laubach, Benno; and Franz, Gerhard, to Bayer Aktiengesellschaft. Process for the preparation of finely divided



- carbides and nitrides from ceramic precursor-compounds. 4,948,762, Cl. 501-92.000.
- Kubicko, Robert: *See—*  
Gerke, Burton E., Jr.; Bitzel, Michael E.; Kubicko, Robert; and Krasznai, Charles Z., 4,947,514, Cl. 15-339.000.
- Kubo, Kanji; Yamamoto, Akio; and Takeda, Katsumi, to Hitachi, Ltd. Storage system. 4,949,244, Cl. 364-200.000.
- Kubo, Masahiro, to Kabushiki Kaisha Toshiba. Bearing assembly and rotating anode X-ray tube device employing bearing assembly. 4,949,368, Cl. 378-132.000.
- Kubota, Ltd.: *See—*  
Iritani, Hirofumi, 4,947,709, Cl. 74-640.000.
- Katayama, Yoshiyuki; and Ura, Takeshi, 4,949,264, Cl. 364-424.100.
- Kuchta, Richard, to Gerber Garment Technology, Inc. High performance chain for automated transport system. 4,947,758, Cl. 104-172.500.
- Kuder, James E.: *See—*  
Furman, Steven R.; and Kuder, James E., 4,949,329, Cl. 369-116.000.
- Kudo, Norio: *See—*  
Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, 4,949,203, Cl. 360-85.000.
- Kudo, Yoshinobu: *See—*  
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,949,110, Cl. 354-195.100.
- Kuehn, Melvin C. Bi-fold hay rake system. 4,947,631, Cl. 56-377.000.
- Kuehne, Richard O.; Deily, Karl R.; and Lawlis, Timothy L., to W. R. Grace & Co.-Conn. Shrink package of improved product to container fit. 4,948,604, Cl. 426-107.000.
- Kuge, Toru: *See—*  
Ishii, Takaaki; and Kuge, Toru, 4,949,374, Cl. 379-88.000.
- Kuhara, Sigehide; and Kanayama, Shoichi, to Kabushiki Kaisha Toshiba. Magnetic resonance imaging system. 4,949,042, Cl. 324-311.000.
- Kuhn, Matthias W. J.; Schoeman, Douglas A.; and Le Roux, Stephanus J., to Technical Systems Engineering CC. Ribbon re-inking device. 4,948,275, Cl. 400-200.000.
- Kuhn, s.a.: *See—*  
Ermacora, Rino; and Neuerburg, Horst, 4,947,629, Cl. 56-134.000.
- Kukes, Simon G., to Phillips Petroleum Company. Catalyst composition for oligomerization of olefins. 4,948,768, Cl. 502-63.000.
- Kulikowski, Ernest F.; Mack, Brian A.; and Fournier, Paul J. E., to Aeroquip Corporation. Quick connect fitting for smooth wall conduit. 4,948,179, Cl. 285-316.000.
- Kumagai, Atushi, to Hitachi Metals, Ltd. Piston ring material and piston ring. 4,948,556, Cl. 420-36.000.
- Kumar, Prabhat. Method, means and device for separation of particulate matter from a carrier medium. 4,948,397, Cl. 55-96.000.
- Kumata, Masataka: *See—*  
Nishino, Hideo; Hattori, Tatsuya; Kushida, Tsuneharu; and Kumata, Masataka, 4,948,867, Cl. 528-337.000.
- Kumetaitis, Juozas-Stasis: *See—*  
Gapshis, Vladas-Algis A.; Dzidolikas, Kyastutis P.; Kumetaitis, Juozas-Stasis; and Kasparaitis, Albinas J., 4,947,557, Cl. 33-503.000.
- Kunda, Hachiro: *See—*  
Kondo, Kenji; Kunda, Hachiro; and Sonobe, Toshio, 4,948,754, Cl. 437-183.000.
- Kundel, Nikhil: *See—*  
Tazi, Mohammed; and Kundel, Nikhil, 4,948,848, Cl. 526-78.000.
- Kung, Teh-Ming: *See—*  
Bugner, Douglas E.; Kung, Teh-Ming; and Rossi, Louis J., 4,948,911, Cl. 558-427.000.
- Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, to Pioneer Electronic Corporation. Tape recorder having an improved cassette mounting device. 4,949,203, Cl. 360-85.000.
- Kunstmann, Uwe, to Carl Schenck AG. Process and apparatus for production of uniformly discharged particle flow. 4,948,322, Cl. 414-300.000.
- Kunugi, Masanao: *See—*  
Higashimura, Koichi; Miyazawa, Yoshinori; Handa, Tsuneo; Mizumoto, Teruyuki; Ito, Hiroshi; Uchino, Atsushi; Motoki, Masanobu; Kunugi, Masanao; Ishiwatari, Tahci; and Shimura, Hidetsugu, 4,948,692, Cl. 430-106.600.
- Kuo, Po-Pang. Ventilable curtain wall linked by ventilating couplers. 4,947,593, Cl. 52-105.000.
- Kuper, Jerry W.; and Rapoport, William R., to Allied-Signal Inc. Conductively cooled, diode-pumped solid-state slab laser. 4,949,346, Cl. 372-36.000.
- Kuramoto, Tsuyoshi: *See—*  
Kitahara, Koichi; Ohata, Yu; and Kuramoto, Tsuyoshi, 4,948,748, Cl. 437-62.000.
- Kuraray Company, Ltd.: *See—*  
Mori, Fumio; Okada, Masafumi; Miki, Shuji; Ebashi, Iwao; Nishida, Takashi; Kawai, Kouichiro; Tashiro, Tazuko; and Tsukagoshi, Shigeru, 4,948,784, Cl. 514-54.000.
- Kurita Water Industries Ltd.: *See—*  
Motozato, Yoshiaki; Tomoda, Takashi; Morita, Hiroshi; Yamaguchi, Masato; and Joko, Isao, 4,948,814, Cl. 521-30.000.
- Kuroda, Fumihiko; Sadamasa, Tetsuo; Suzuki, Nobuo; and Nakamura, Masaru, to Kabushiki Kaisha Toshiba. Semiconductor photo-detector having a two-stepped impurity profile. 4,949,144, Cl. 357-30.000.
- Kuroda, Koji: *See—*  
Hoshino, Akihiko; Nakatani, Shoji; Kuroda, Koji; and Kawai, Tetsu, 4,949,292, Cl. 364-736.000.
- Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, to Fuji Electric Co., Ltd. Photoconductor for electrophotography having an amino charge transport compound. 4,948,689, Cl. 430-59.000.
- Kuroki, Katsuro: *See—*  
Nakashima, Shozaburo; Kuroki, Katsuro; and Ueno, Kiyoshi, 4,948,433, Cl. 148-111.000.
- Kuroki, Yuzuru: *See—*  
Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; Kuroki, Yuzuru; and Azumai, Yasushi, 4,949,326, Cl. 369-54.000.
- Kuronya, Istvan: *See—*  
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Tromfos, Katalin; Meszaros nee Szekrenyesi, Agnes; and Kuronya, Istvan, 4,948,420, Cl. 71-94.000.
- Kurosaki, Mutsuo, to Nifco, Inc. Screw fastener. 4,948,314, Cl. 411-182.000.
- Kurosawa, Katsuhiro: *See—*  
Shimbo, Masatoshi; and Kurosawa, Katsuhiro, 4,949,342, Cl. 371-40.100.
- Kurotori, Tsuneo; Mochizuki, Namabu; and Ariyama, Kenzo, to Ricoh Company, Ltd. Image fixing method for use in wet-type electrophotographic copying machine. 4,948,691, Cl. 430-99.000.
- Kurti, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasziljevic, Gyoza, to Magyar Optikai Muvek; and Komplex Kulkereskedelmi Vallalat. Portable optical alarm system for area protection. 4,949,075, Cl. 340-555.000.
- Kurz, Robert S.; Jesensky, Alexander; Johnson, Raymond W.; Hetenyi, Tamas; Grigg, Geoffrey C.; Dangel, Stephen C.; Clifford, John W.; and Butler, Richard A., Jr., to Butler Automatic, Inc. Automatic web roll handling system for splicing. 4,948,060, Cl. 242-58.100.
- Kuse, Satoru: *See—*  
Kobayashi, Kazuhiro; Koboshi, Shigeharu; Kuse, Satoru; and Ishikawa, Masao, 4,948,713, Cl. 430-434.000.
- Kusel, Peter G.; and Rose, Joachim, to Kusel, Peter G. Laying railway track. 4,947,756, Cl. 104-2.000.
- Kushi, Naoto, to Toyota Jidosha Kabushiki Kaisha. Combustion control system for internal combustion engine adaptable to on and off of exhaust gas recirculation. 4,947,820, Cl. 123-571.000.
- Kushibe, Yukio; and Sato, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Die clamping apparatus. 4,948,358, Cl. 425-574.000.
- Kushida, Tsuneharu: *See—*  
Nishino, Hideo; Hattori, Tatsuya; Kushida, Tsuneharu; and Kumata, Masataka, 4,948,867, Cl. 528-337.000.
- Kusu, Hisahiro: *See—*  
Morimoto, Seiichi; Shiji, Kazuyuki; and Kusu, Hisahiro, 4,948,670, Cl. 428-379.000.
- Kusumoto, Keiji; Ito, Masazumi; Takano, Yoshiaki; and Noda, Takashi, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having plural developing units and an arrangement for selecting the developing unit having the highest use count. 4,949,124, Cl. 355-203.000.
- Kuwabara, Heikichi: *See—*  
Ohashi, Shigeo; Kuwabara, Heikichi; Nakajima, Tadakatsu; Nakayama, Wataru; Sato, Motohiro; and Kasai, Kenichi, 4,949,164, Cl. 357-82.000.
- Kuwabara, Hideki; Hashiba, Masahiro; and Naito, Masato, to Japan Styrene Paper Corporation. Pre-foamed particles of uncrosslinked, linear low-density polyethylene and production method thereof. 4,948,817, Cl. 521-58.000.
- Kuze, Yoshikazu. Wax-pellet thermostat. 4,948,043, Cl. 236-34.500.
- Kuzunuki, Soshiro; Morita, Yuzo; Yoneda, Kenji; Ueshima, Takaaki; Tobita, Toshimitsu; and Fujino, Atsuya, to Hitachi, Ltd. Group-control method and apparatus for an elevator system with plural cages. 4,947,965, Cl. 187-127.000.
- KWH Mirka Ltd.: *See—*  
Klemets, Ronny, 4,947,990, Cl. 206-409.000.
- Kyotani, Yoshinori: *See—*  
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- Laiterman, Lee H.: *See—*  
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- Lakhan, Hareesh C.: *See—*  
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- Lambert, Ralph A., Jr., to Hanover Brands, Incorporated. Frozen food cover/container assembly for reconstituting the frozen food. 4,948,605, Cl. 426-107.000.
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- Lancaster, Robert: *See—*  
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- Landa, Benzion, to Xerox Corporation. Apparatus for cleaning and moving a photoreceptor. 4,949,133, Cl. 355-296.000.
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- Landry, Milton E., to Gulf Engineering Company, Inc. Flux cored arc welding process. 4,948,936, Cl. 219-76.140.
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- Lang, Gary D.: *See—*  
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- Lanser, Gary A.: *See—*  
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- Larock, Richard C., to Iowa State University Research Foundation, Inc. Synthesis of vinyl lactones. 4,948,905, Cl. 549-326.000.
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- Larson, Marlow W., to Browning. Arrow rest for archery bows. 4,947,823, Cl. 124-41.100.
- La See, Jack C. Vision panel assembly. 4,947,606, Cl. 52-455.000.
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- Laubach, Benno: *See—*  
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- Lawlor, Parick J.: *See—*  
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- Lea, Bruce K. Axially frangible automatic torque limiting clutch. 4,947,972, Cl. 192-56.000.
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- Lee, Shih-Jong J.; and Wang, Robert C., to Boeing Company, The. Barcode location determination. 4,948,955, Cl. 235-462.000.
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- Leitl, Franz. Crystal oscillator compensation circuit. 4,949,055, Cl. 331-158.000.
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- Leone, Ronald E.: *See—*  
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- Lepperhoff, Gerhard; and Lutkemeyer, Georg, to FEV Motorentechnik GmbH & Co. KG. Filter system for the removal of engine emission particulates. 4,948,403, Cl. 55-282.000.
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Lisee, Peter: Apparatus for breaking glass sheets scored on one side, 4,948,025, Cl. 225-104.000.

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Long, William E.; McCombe, Kenneth M.; Palmer, Marion R.; and Webb, Terence C., to Ilford Limited: Processing of photographic silver halide materials, 4,948,714, Cl. 430-435.000.

Longoria, Claude C.: Enzyme immunoassay based on membrane separation of antigen-antibody complexes, 4,948,726, Cl. 435-7.000.

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Luling, Martin: See—  
Clark, Brian; Jundt, Jacques; Luling, Martin; and Ross, Michael O., 4,949,045, Cl. 324-338.000.

Lumelsky, Leon; Choi, Sung M.; and Peevers, Alan W., to International Business Machines Corporation: Audio-video data interface for a high speed communication link in a video-graphics display window environment, 4,949,169, Cl. 358-86.000.

Lund, Earl A. E.: See—  
Fellows, Barbara R.; Lund, Earl A. E.; and Shankland, Ian R., 4,948,526, Cl. 252-69.000.

Luo, Shihui J.: See—  
Bunick, Frank J.; and Luo, Shihui J., 4,948,596, Cl. 426-3.000.

Luria, Salvador E.; Suit, Joan L.; and Jackson, Jennifer A., to Repligen Corporation: System for release of proteins from microbe cells, 4,948,735, Cl. 435-252.800.

Lutgen, Michael: See—  
Neesser, Timothy; Preston, Duane; and Lutgen, Michael, 4,947,651, Cl. 62-50.400.

Lutkemeyer, Georg: See—  
Lepperhoff, Gerhard; and Lutkemeyer, Georg, 4,948,403, Cl. 55-282.000.

Lutz, James C.: See—  
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Lydall, Inc.: See—  
Hiers, John J.; and Burroughs, Frank C., 4,948,649, Cl. 428-77.000.

Lyle, Robert E., Jr.; Mangold, Donald J.; and Swynnerton, Nollie F., to Southwest Research Institute: Alkylating agents and method of use thereof, 4,948,912, Cl. 560-227.000.

Lyman, George: See—  
Root, David; and Lyman, George, 4,948,564, Cl. 422-101.000.

Lyman, Richard R., to TRE Corporation: Inflatable external fuel tank, 4,948,070, Cl. 244-135.00R.

Lynch, James P.: Collapsible canopy with auto erect roof support structure, 4,947,884, Cl. 135-97.000.

Lynch, Paul J.: See—  
Yeh, Hsi-Han; Banda, Siva S.; and Lynch, Paul J., 4,949,236, Cl. 364-148.000.

Lyons, Donald R.: See—  
Keck, Donald B.; Lyons, Donald R.; and Nolan, Daniel A., 4,948,217, Cl. 350-96.150.

Lyons, Jeffrey, to Delaware Ribbon Manufacturers, Inc.: Decorative bow and method of making the same, 4,948,636, Cl. 428-5.000.

M & W Gear Company: See—  
McCanse, James E., 4,948,162, Cl. 280-699.000.

M. Yasui & Co., Ltd.: See—  
Yasui, Shozui, 4,948,359, Cl. 425-576.000.

Maas, Stephen A., to Aerospace Corporation, The: GaAs MESFET balanced resistive mixer, 4,949,398, Cl. 455-326.000.

MacGregor, Douglas; and Smith, Mark A., to Lion Capital, Ltd.: Method and apparatus for separating ions from liquids to produce separate diluted and concentrated effluents, 4,948,514, Cl. 210-748.000.

Machado, Octavio J.; Moore, Jay T.; and Cooney, Barry F., to Westinghouse Electric Corp.: Method of making a rack for the storage of spent nuclear fuel, 4,948,553, Cl. 376-272.000.

Machen, Inc.: See—  
Speer, Stephen R.; Norton, Jan G.; and Wilson, James D., 4,947,806, Cl. 123-41.860.

Machiele, Delwyn E.: See—  
Brazas, John C., Jr.; and Machiele, Delwyn E., 4,948,216, Cl. 350-96.110.

Mack, Brian A.: See—  
Kulikowski, Ernest F.; Mack, Brian A.; and Fournier, Paul J. E., 4,948,179, Cl. 285-316.000.

MacPherson, John A.; and Johnson, Ernest V., to Quest Technology Corporation: Ceramic support arm for movably positioning transducers, 4,949,194, Cl. 360-104.000.

Madou, Marc J.; Otagawa, Takaaki; and Sher, Arden, to SRI International: Solid compositions for fuel cell electrolytes, 4,948,680, Cl. 429-13.000.

Maeda, Minoru; Wakata, Yuichi; Fujikura, Sadao; and Iwasaki, Masayuki, to Fuji Photo Film Co., Ltd.: Liquid light-sensitive resinous composition, 4,948,700, Cl. 430-280.000.

Maeda, Takeshi; Tsunoda, Yoshito; Shigematsu, Kazuo; and Kaku, Toshimitsu, to Hitachi, Ltd.: Apparatus and record carrier for optical disc memory with correction pattern and master disc cutting apparatus, 4,949,331, Cl. 369-275.300.

Maeda, Tomoo: See—  
Yoshizawa, Akinori; Maeda, Tomoo; and Yamato, Masayuki, 4,948,422, Cl. 75-348.000.

Maekawa, Yoshio; Yagyu, Osamu; Mizuno, Hironori; Okumura, Minoru; Isoda, Shigeru; and Yagi, Kaoru, to Taki Chemical Co., Ltd.: Physiologically active agent for agriculture use, 4,948,413, Cl. 71-65.000.

Mag-Tek, Inc.: See—  
McGeary, Thomas C., 4,949,192, Cl. 360-2.000.

Magid, Hillel; Eibeck, Richard E.; Van Der Puy, Michael, and Li, Chien C., to Allied-Signal Inc.: Method of cleaning using hydrochlorofluorocarbons, 4,947,881, Cl. 134-40.000.

Magly, Earl D., to Continental Can Company, Inc.: Interrupted threads on a plastic bottle finish, 4,948,001, Cl. 215-31.000.

Magnuson, Roy H.: See—  
Johnson, Robert W.; Lawrence, William H.; Lemon, Gary K.; Magnuson, Roy H.; Markovich, Voya R.; Parsons, Ralph E.; and Sambucetti, Carlos J., 4,948,707, Cl. 430-11.000.

Magori, Valentin, to Siemens Aktiengesellschaft: Ultrasound echo profile sensor used as tactile sensor, 4,949,321, Cl. 367-99.000.

Magyar Optikai Muvek: See—  
Kurti, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasziljevics, Gyozo, 4,949,075, Cl. 340-555.000.

Mahar, Katie: See—  
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Mahar, Paul J.; and Mahar, Katie: Sterile film dispenser for applanating tonometer, 4,948,062, Cl. 242-67.30R.

Mahle GmbH: See—  
Steppat, Eduard; and Letsch, Thomas, 4,947,805, Cl. 123-41.350.

Maier, Martin, to Greenland GmbH & Co. KG: Conditioner for agricultural harvesting machines, 4,947,626, Cl. 56-364.000.

Mais, Franz-Josef; and Fiege, Helmut, to Bayer Aktiengesellschaft: Process for the preparation of benzothiazepinone derivatives, 4,948,886, Cl. 540-491.000.

Maitland, Arthur, to English Electric Valve Company Limited: Laser apparatus having a discharge triggering device inside a laser tube, 4,949,354, Cl. 372-61.000.

Majentny, Klaus: See—  
Herold, Roland; Dannenberg, Eveline; Majentny, Klaus; and Middeke, Hermann-Josef, 4,948,674, Cl. 428-469.000.

Makarenko, Vladimir S.: Ski binding, 4,948,158, Cl. 280-615.000.

Makino, Yuji; and Suzuki, Yoshiki, to Teijin Limited: Composition for injection of active type vitamins D<sub>3</sub>, 4,948,788, Cl. 514-167.000.

Makita, Hiroyuki; Shinoda, Takahisa; Nakamura, Yasuaki; and Endoh, Osamu, to Koito Seisakusyo Co., Ltd.: Projector-type lighting device of expanded outline appearance for use as a vehicular headlamp or the like, 4,949,226, Cl. 362-61.000.

Malco Products, Inc.: See—  
Rancour, James K.; and Smith, Lester N., 4,947,901, Cl. 140-93.200.

Malinowski, Christopher W., to Harris Corporation: Method and apparatus for computing square roots of binary numbers, 4,949,296, Cl. 364-752.000.

Malmasson, Jacques: See—  
Mollot, Christian; and Malmasson, Jacques, 4,948,552, Cl. 376-246.000.

Maluta, Alexander T.: See—  
Davies, Kenneth E.; Geddes, Walter C.; Kline, Mark J.; Maluta, Alexander T.; Naylor, Bruce E.; Scofield, Harrison; and Stevens, Jeffrey N., 4,949,278, Cl. 364-513.000.

Malys, Henri: See—  
Brown, Douglas B.; and Malys, Henri, 4,947,743, Cl. 100-45.000.

Mammone, Richard J.: Toy helmet for scrambled communications, 4,949,378, Cl. 380-9.000.

MAN Gutehoffnungshutte AG: See—  
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MAN Nutzfahrzeuge GmbH: See—  
Thudi, Hubert, 4,948,157, Cl. 280-494.000.

Man Roland Druckmaschinen AG: See—  
Petersen, Godber, 4,948,109, Cl. 270-1.100.

Manghisi, Elso; and Salimbeni, Aldo, to Istituto Luso Farmaco d'Italia S.p.A.: 2,2-disubstituted 2,3-dihydro-1,4-benzodioxin derivatives having hypotensive activity, 4,948,797, Cl. 514-254.000.



Mangold, Donald J.: See—  
Lyle, Robert E., Jr.; Mangold, Donald J.; and Swynnerton, Nollie F., 4,948,912, Cl. 560-227.000.

Mangus, James D.: See—  
Tupper, Robert B.; Mangus, James D.; Sharbaugh, John E.; Brown, Gedney B.; Livingston, Julie M.; and Dhalla, Asfandiar K., 4,949,363, Cl. 376-260.000.

Manhardt, Paul D.: See—  
Nitzberg, Leonard R.; and Manhardt, Paul D., 4,947,905, Cl. 141-206.000.

Maniar, Deepak R.: See—  
Koch, Ronald J.; Gruber, Robert J.; Julien, Paul C.; Goodman, Donald J.; Gutman, Edward J.; and Maniar, Deepak R., 4,948,686, Cl. 430-45.000.

Manley, Dwight: See—  
Bhandarkar, Dileep P.; Supnik, Robert; Fossum, Trygve; and Manley, Dwight, 4,949,250, Cl. 364-200.000.

Mann, Joseph K., to Varian Associates, Inc. Klystron with reduced length, 4,949,011, Cl. 315-5.000.

Mannesmann Rexroth GmbH: See—  
Reinhardt, Peter, 4,949,066, Cl. 340-310.00R.

Mannino, Robert S., to Sercomp Corporation. Ribbon feed mechanism, 4,948,274, Cl. 400-196.100.

Mannion, Martin D.: See—  
Vogen, Wayne V.; and Mannion, Martin D., 4,948,971, Cl. 250-310.000.

Manns, Roy, to Polyfiltronics, Inc. Method of making a multiwell test plate, 4,948,442, Cl. 156-73.100.

Marakin, Vladimir I.: See—  
Vainshtein, Grigory Y.; Kozlon, Anatoly V.; Marakin, Vladimir I.; and Khaimin, Yuri F., 4,947,813, Cl. 123-352.000.

Marathon Oil Company: See—  
Ellwood, David E., 4,947,936, Cl. 166-379.000.

Sydansk, Robert D., 4,947,935, Cl. 166-295.000.

Webb, Robert A., 4,947,675, Cl. 73-3.000.

Marchand, Bernard. Apparatus for lifting patients, 4,947,497, Cl. 5-86.000.

Marchosky, Jose A.; Moran, Christopher J.; and Fearnot, Neal E., to Medical Engineering and Development Institute, Inc. Method and apparatus for treating tissue with first and second modalities, 4,947,842, Cl. 128-401.000.

Marconnet, Guy, to Ermont C. M. Device for preparing bituminous coated products, consisting of a drum, 4,948,261, Cl. 366-25.000.

Marcos, Juan A.: See—  
Pollak, Robert R.; Khalid, Syed J.; and Marcos, Juan A., 4,947,643, Cl. 60-236.000.

Margolis, Geoffrey. Method for eliminating fat from a ground meat product, 4,948,607, Cl. 426-281.000.

Maria Snel, Johannes J.: See—  
Van Doorn, Johannes; Kramer, Arris H.; and Maria Snel, Johannes J., 4,948,870, Cl. 528-392.000.

Maric, Dane: See—  
Tarrson, Emanuel B.; and Maric, Dane, 4,947,880, Cl. 132-329.000.

Marinero, Carl. Method and device for electrical fitting stabilization, 4,948,317, Cl. 411-535.000.

Marion Laboratories, Inc.: See—  
Duff, Steven R., 4,948,883, Cl. 536-117.000.

Marker Deutschland GmbH: See—  
Jungkind, Roland, 4,948,159, Cl. 280-632.000.

Markl, Erich: See—  
Hafner, Walter; Gebauer, Helmut; Markl, Erich; and Regiert, Marlies, 4,948,780, Cl. 512-8.000.

Markovich, Vova R.: See—  
Johnson, Robert W.; Lawrence, William H.; Lemon, Gary K.; Magnuson, Roy H.; Markovich, Vova R.; Parsons, Ralph E.; and Sambucetti, Carlos J., 4,948,707, Cl. 430-11.000.

Markunas, Albert L.: See—  
Rozman, Gregory I.; and Markunas, Albert L., 4,949,021, Cl. 318-254.000.

Marlin K. Gingrich: See—  
Weaver, Robert C., 4,948,193, Cl. 296-100.000.

Marpoe, Gary R., Jr.; and Pentz, Edward LeRoy, to AMP Incorporated. Miniature insulation displacement electrical contact, 4,948,382, Cl. 439-406.000.

Marshall, Akemi S.: See—  
Chen, Janglin; Ferrar, Wayne T.; Kelly, James E.; and Marshall, Akemi S., 4,948,720, Cl. 430-527.000.

Martell, Richard J. Warning system for racetrack, 4,949,067, Cl. 340-323.00R.

Marten, Finn L.; Famili, Amir; and Mohanty, Dillip K., to Air Products and Chemicals, Inc. Copolymers of vinyl acetate and acrylates, 4,948,857, Cl. 526-329.500.

Martens, Craig W.: See—  
Christenson, Patrick J.; Martens, Craig W.; Wenz, David G.; and Youngers, David N., 4,949,300, Cl. 364-900.000.

Martin, Anthony N.; and Bartle, Robert G., to United Technologies Corporation. Aircraft engine propulsor blade pitch sensing, 4,948,337, Cl. 416-3.000.

Martin, Arnat W.: See—  
McQuitty, Jim B.; Martin, Arnat W.; and Studenick, David K., 4,949,317, Cl. 367-176.000.

Martin, Gareth R., to International Business Machines Corporation. Synchronizing circuit, 4,949,360, Cl. 375-106.000.

Martin, Gerard; and Feugier, Alain, to Institut Francais du Petrole. Apparatus for catalytic cracking of a hydrocarbon charge subjected

to a pretreatment with solid particles of low activity, 4,948,569, Cl. 422-142.000.

Martin, J. Harold: See—  
Romano, Harry A., 4,948,045, Cl. 236-51.000.

Martin, Jon W.; and Fraser, Leslye M., to United States of America, Air Force. Broad temperature capability elastomer, 4,948,830, Cl. 524-462.000.

Martin, M. Warren; and Weber, Lawrence H., to R & B Machine Tool Company. Transfer apparatus, 4,947,979, Cl. 198-343.100.

Martin, Michael C.; and Reich, Erwin A., to Texaco Inc. Synthesis gas barrier and refractory support, 4,948,387, Cl. 48-62.00R.

Martin, Peter D.; Groshart, Larry; Rabbat, Guy; and Wolner, Sandra, to Modular Computer Systems, Inc. Intermediate memory system for connecting microcomputers to a rotating disk memory, 4,949,245, Cl. 364-200.000.

Martin, Stephen J.: See—  
Frye, Gregory C.; Martin, Stephen J.; and Ricco, Antonio J., 4,947,677, Cl. 73-38.000.

Martini, Stefan; Reistle, Wolfgang; and Sommer, Thomas, to Hydromatik GmbH. Drive system comprising a variable speed driving motor, an adjustable hydrostatic transmission and a gear-changing means, 4,947,687, Cl. 74-733.100.

Martus, Charles R.: See—  
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Maruyama, Hideo: See—  
Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,948,452, Cl. 156-382.000.

Maruyama, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Beam shaping optical system, 4,948,233, Cl. 350-421.000.

Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Horonobu; and Kiuchi, Takashi, to Fujitsu Limited. Alignment of mask and semiconductor wafer using linear fresnel zone plate, 4,948,983, Cl. 250-548.000.

Maruyama, Youji; Ikeda, Tadashi; and Suzuki, Ryo, to Hitachi, Ltd. Bloch line memory device, 4,949,304, Cl. 365-87.000.

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Breslow, Jeffrey D., 4,948,145, Cl. 273-256.000.

Snyder, Carol D.; and Breslow, Jeffrey D., 4,948,146, Cl. 273-273.000.

Mase, Hiroshi: See—  
Ushida, Yoshihisa; Hirai, Nobuki; and Mase, Hiroshi, 4,948,767, Cl. 501-134.000.

Mase, Toshiyasu; Hara, Hiromu; and Yamada, Toshimitsu, to Yamanouchi Pharmaceutical Co., Ltd. Pyridylthiazolidine carboxamide derivatives and their intermediates and production of both, 4,948,795, Cl. 514-252.000.

Mashiko, Yoji: See—  
Nishioka, Tadashi; Mashiko, Yoji; Morimoto, Hiroaki; and Koyama, Hiroshi, 4,948,749, Cl. 437-89.000.

Masina, Franca: See—  
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Maska, Rudolf: See—  
Baker, John A.; Maska, Rudolf; Bodwell, James R.; Das, Suryya K.; Seiner, Jerome A.; and Hart, Terence J., 4,948,834, Cl. 524-567.000.

Massachusetts Institute of Technology: See—  
Easson, Donald D., Jr.; Peoples, Oliver P., and Sinskey, Anthony J., 4,948,733, Cl. 435-172.300.

Gehrke, Lee; Fraley, Robert T.; and Rogers, Stephen G., 4,948,731, Cl. 435-91.000.

Kost, Joseph; and Langer, Robert S., 4,948,587, Cl. 424-435.000.

Yannas, Ioannis V.; Lee, Elaine; and Ferdman, Ariel, 4,947,840, Cl. 128-156.000.

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Masuda, Hiroshi: See—  
Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsuura, Toshio, 4,948,706, Cl. 430-311.000.

Masuhara, Toshiaki: See—  
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Matchbox Toys (USA) Ltd.: See—  
Hennig, Michael R., 4,947,527, Cl. 24-575.000.

Matson, Kristin L.: See—  
Huang, Victor T.; Hoseney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah E.; and Saguy, Israel A., 4,948,606, Cl. 426-243.000.

Matsuda, Tomiyasu; and Higashiguchi, Teruaki, to Mita Industrial Co., Ltd. Magnetic brush development process, 4,949,127, Cl. 355-251.000.

Matsui, Keiji, to Spectra, Inc. High resolution optical encoder having a long detection stroke, 4,948,968, Cl. 250-237.00G.

Matsumoto, Hidetoshi: See—  
Ohmori, Koji; Nozaki, Yutaka; Endo, Hirofumi; and Matsumoto, Hidetoshi, 4,949,393, Cl. 388-815.000.

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Matsumoto, Masaaki: See—  
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Matsumoto, Michio: See—  
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Matsumoto, Osamu: See—  
Sumida, Mamoru; Fukata, Hironobu; Yoshida, Takeji; and Matsumoto, Osamu, 4,947,890, Cl. 137-546.000.

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Matsushita Electric Industrial Co., Ltd.: See—  
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Nomura, Noboru; and Koga, Keisuke, 4,948,238, Cl. 350-469.000.

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Shimbo, Masatoshi; and Kurosawa, Katsuhiko, 4,949,342, Cl. 371-40.100.

Takagi, Yui; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; Kuroki, Yuzuru; and Azumani, Yasushi, 4,949,326, Cl. 369-54.000.

Watanabe, Hirotoshi; and Ishida, Toru, 4,949,065, Cl. 338-308.000.

Yamamoto, Hajime; Kitagaki, Kazunori; and Nakamura, Masahiko, 4,949,125, Cl. 355-219.000.

Yoshikawa, Akio; and Sugino, Takashi, 4,948,753, Cl. 437-129.000.

Matsushita Electric Works, Ltd.: See—  
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Ozaki, Hideto, 4,948,743, Cl. 437-40.000.

Ueda, Seiji, 4,948,756, Cl. 437-195.000.

Matsushita, Toshihiko; Hiraishi, Shigetoshi; and Morishita, Sadao, to Mitsubishi Paper Mills, Ltd. Photosensitive heat-transfer recording sheet and photosensitive pressure-sensitive recording sheet, 4,948,695, Cl. 430-138.000.

Matsuura, Hitoshi, to Fanuc Ltd. Contactless profiling method, 4,949,024, Cl. 318-567.000.

Matsuura, Ryo: See—  
Kase, Masao; Koizumi, Toshiaki; Otaki, Masatsugu; Yamashita, Masakazu; Tanaka, Kenji; and Matsuura, Ryo, 4,949,328, Cl. 369-75.200.

Matsuzaki, Hitoshi; Takeda, Kiyoshi; Shirasawa, Toshikatsu; and Miyazaki, Hideki, to Hitachi, Ltd. Semiconductor device, 4,949,137, Cl. 357-23.400.

Matt, Lukas, to Etablissement Supervis. Method of manufacturing a camshaft, 4,947,547, Cl. 29-888.100.

Mattingly, Bruce W.; and Coates, Roger J., to Soltech, Inc. Water heater package construction and method, 4,947,619, Cl. 53-399.000.

Maurer, John J.: See—  
Jones, Robert S.; and Maurer, John J., 4,949,122, Cl. 355-84.000.

Maus, Wolfgang; and Cyron, Theodor, to EMITEC Gesellschaft fur Emissionstechnologie mbH. Metal catalyst carrier body having a shortened jacket tube and a method of producing the same, 4,948,353, Cl. 422-180.000.

Maxwell Laboratories, Inc.: See—  
Swanson, Gregory K.; and Argus, Roger R., 4,948,511, Cl. 210-634.000.

May, Proctor; and Hughes, Jack, to Wesco Promotions, Inc. Display unit, 4,947,570, Cl. 40-553.000.

Mayer, Josef: See—  
Knabel, Walter; Mayer, Josef; Wentker, Stephan; and Notar, Walter, 4,948,171, Cl. 280-806.000.

Mayer, Robert J. Electronic scorekeeper for dice game, 4,948,125, Cl. 273-1.0ES.

Mayle, Robert L. One-piece self-covering termination bar, 4,947,614, Cl. 52-717.100.

Maynard, Raymond L.; and Neitzke, Donald D. Overheated-axle indicator device, 4,947,786, Cl. 116-218.000.

Mayo, Kay L. Infant sun shade apparatus, 4,947,883, Cl. 135-90.000.

Mazda Motor Corporation: See—  
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Mbuthia, David G. Portable unit with smoke alarm, clock radio, compass, retractable table, and lamp, 4,949,077, Cl. 340-628.000.

McAlpin, James L.: See—  
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McBride, James R.: See—  
Hunt, Thomas K.; Novak, Robert F.; and McBride, James R., 4,948,679, Cl. 429-11.000.

McCall, John M.: See—  
Braugher, John M.; Hall, Edward D.; Wierenga, Wendell; and McCall, John M., 4,948,533, Cl. 552-576.000.

McCann, Gordon D.: See—  
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McCanse, James E., to M & W Gear Company. Tail wheel spring arm assembly, 4,948,162, Cl. 280-699.000.

McCarthy, Timothy J.: See—  
Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner, Bruce E., 4,949,391, Cl. 382-56.000.

McCauley, John P. Thermostatic garden hose protection device, 4,948,041, Cl. 236-93.00A.

McCombe, Kenneth M.: See—  
Long, William E.; McCombe, Kenneth M.; Palmer, Marion R.; and Webb, Terence C., 4,948,714, Cl. 430-435.000.

McCormack, John J.: See—  
Desmond, John P.; Flynn, Thomas P.; Gaffney, Thomas D.; Campbell, James P.; Lawlor, Patrick J.; McCormack, John J.; and Molyneux, Keith W., 4,948,242, Cl. 350-637.000.

McCormack, Mark R.: See—  
Bezinque, David J.; McCormack, Mark R.; and Hammersley, Michael E., 4,949,036, Cl. 324-212.000.

McCrary, Charles H. Heat bonnet for heat pump, 4,947,930, Cl. 165-47.000.

McDermott, Hugh J., to University of Melbourne, The. Receiver/stimulator for hearing prosthesis, 4,947,844, Cl. 128-421.000.

McDonnell Douglas Corporation: See—  
Sullivan, Harold M., 4,948,108, Cl. 269-903.000.

VanHorn, James R., 4,948,068, Cl. 244-17.190.

McDougal, John A. Separation of variables in an ion gap controlled engine, 4,947,680, Cl. 73-116.000.

McGeary, Thomas C., to Mag-Tek, Inc. Magnetic card transducing system, 4,949,192, Cl. 360-2.000.

McGee, Robert L.; Nowak, David J.; McCann, Gordon D.; and Saunders, Frank L., to Dow Chemical Company, The. Apparatus for determining resin gel time, 4,947,679, Cl. 73-64.100.

McGuire, Robert L., to Glen O'Brien Movable Partition Co., Inc. Wall panel trim system and method, 4,947,601, Cl. 52-239.000.

McKee, Graham E.: See—  
Ostermayer, Bertram; Baumgartner, Ehrenfried; Bueschl, Rainer; Brandt, Hermann; Boehle, Klaus; Seiler, Erhard; and McKee, Graham E., 4,948,832, Cl. 524-504.000.

McKinley, William E.: See—  
Hollander, Milton B.; McKinley, William E.; Crimmins, James P.; and Storer, Ian K., 4,949,274, Cl. 364-483.000.

McMurry, David R., to Renishaw plc. Machine tool, 4,947,538, Cl. 29-568.000.

McNaney, Thomas F., Jr., and Effinger, Rudolph, to Penn Fishing and Tackle Mfg. Co. Swivel base mount for downrigger, 4,948,083, Cl. 248-514.000.

McPhearson, Matthew: See—  
Iverson, R. David; Chin, Roland T.; McPhearson, Matthew; and Stover, Dan, 4,949,390, Cl. 382-49.000.

McQuitty, Jim B.; Martin, Arnat W.; and Studenick, David K., to United States of America, Navy. Compliant underwater acoustic baffle, 4,949,317, Cl. 367-176.000.

Mead Corporation, The: See—  
Halsell, Hampton L., II; Galloway, William W.; and Shults, David H., 4,948,033, Cl. 229-23.00R.

Mead, John A. Robot arm space stabilizer, 4,949,026, Cl. 318-649.000.

Measures Corporation: See—  
Balakrishnan, Ramesh, 4,947,684, Cl. 73-159.000.

Medgvesy, Stephen, to Sulzer Brothers Limited. Locking arrangement for a machine part on a shaft, 4,948,288, Cl. 403-24.000.

Medical Engineering and Development Institute, Inc.: See—  
Marchosky, Jose A.; Moran, Christopher J.; and Fearnot, Neal E., 4,947,842, Cl. 128-401.000.

Medisense, Inc.: See—  
Cass, Anthony E. G.; and Bramwell, Helena, 4,948,727, Cl. 435-18.000.

Medtronic, Inc.: See—  
Lassar, Joseph F.; Rosenberg, Duane L.; Kraska, Robert E.; Speckien, James M.; and Upton, James E., 4,947,866, Cl. 128-784.000.

Meer, Hans-Peter; and Wieland, Ueli, to Asea Brown Boveri Ltd. Axial-flow turbine with a radial/axial first stage, 4,948,333, Cl. 415-93.000.

Meisner, Alfred; and Spitzel, Walter, to Diehl GmbH & Co. Switch module arrangement for use with resistive-type loads, 4,948,949, Cl. 219-446.000.

Mekada, Naoyuki: See—  
Seino, Minoru; and Mekada, Naoyuki, 4,948,219, Cl. 350-96.200.

Melpolder, Sharon M.: See—  
Roberts, Michael R.; Coltrain, Bradley K.; and Melpolder, Sharon M., 4,948,843, Cl. 525-328.200.

Menard, Edward J.: See—  
Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner, Bruce E., 4,949,391, Cl. 382-56.000.

Menard, Paul R.: See—  
Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 4,948,582, Cl. 424-529.000.

Menk, Gregory E.: See—  
Geissberger, Arthur E.; Sadler, Robert A.; Menk, Gregory E.; and Balzan, Matthew L., 4,948,752, Cl. 437-110.000.

Mercier, Francois, to Innotag Inc. Control device for underground drainage and irrigation network, 4,948,294, Cl. 405-37.000.

MERO-Werke Dr. Ing. Max Mengerhausen GmbH & Co.: See—  
Bruckner, Gunther, 4,948,943, Cl. 219-213.000.

Mesnel, Francois: See—  
Mesnel, Gerard; and Mesnel, Francois, 4,947,586, Cl. 49-488.000.

Mesnel, Gerard; and Mesnel, Francois, to Mesnel S.A. Window seal and guide for flush mounted windows, 4,947,586, Cl. 49-488.000.

Mesnel S.A.: See—  
Mesnel, Gerard; and Mesnel, Francois, 4,947,586, Cl. 49-488.000.

Messerschmitt-Boelkow-Blohm GmbH: See—  
Kirma, Safa, 4,949,061, Cl. 337-140.000.

Messier-Hispano-Bugatti: See—  
 Vaux, Jacques; Derrien, Michel; and Hainaut, Jean-Pierre, 4,948,069, Cl. 244-50.000.  
 Meszaros nee Szekrenyesi, Agnes: See—  
 Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonka, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Tromfos, Katalin; Meszaros nee Szekrenyesi, Agnes; and Kuro-  
 nya, Istvan, 4,948,420, Cl. 71-94.000.  
 Metallgesellschaft Aktiengesellschaft: See—  
 Reuffurth, Rainer; and Koy, Hermann, 4,948,399, Cl. 55-148.000.  
 Metalmark Corporation: See—  
 Douds, Willard O.; and Kiphart, James A., 4,947,595, Cl. 52-177.000.  
 Metcalfe, Raymond: See—  
 Janzen, Peter; and Metcalfe, Raymond, 4,948,151, Cl. 277-27.000.  
 Meteor AG: See—  
 Arnold, Ernst, 4,948,454, Cl. 156-443.000.  
 Metzler, Horst, to Schwabische Huttenwerke GmbH, Process for the heat-after treatment of a pig iron port, 4,948,437, Cl. 148-138.000.  
 Meyer, Seymour; and Russo, Harvey J. Hair replacement method, 4,947,877, Cl. 132-201.000.  
 Miceli, Joseph J. Chimney and fireplace construction, 4,947,826, Cl. 126-529.000.  
 Michaud, Brett E.: See—  
 Neil, Jeffrey T.; Bowen, Leslie J.; and Michaud, Brett E., 4,949,095, Cl. 343-872.000.  
 Microelectronics and Computer Technology Corporation: See—  
 Luijtes, Nicolaas G., 4,949,345, Cl. 372-27.000.  
 Microluminetics, Inc.: See—  
 Harwell, Robert W.; and Simon, William M., 4,947,648, Cl. 62-3.200.  
 Micron Technology, Inc.: See—  
 Allen, Timothy J.; and Wood, Alan G., 4,949,161, Cl. 357-70.000.  
 Micro-itis Corporation: See—  
 Abed, Majeed, 4,949,201, Cl. 360-78.070.  
 Middeck, Hermann-Josef: See—  
 Herold, Roland; Dannenberg, Eveline; Majentny, Klaus; and Mid-  
 deck, Hermann-Josef, 4,948,674, Cl. 428-469.000.  
 Midwest Acoust-A-Fiber, Inc.: See—  
 Wolf, Jerry M., 4,948,644, Cl. 428-40.000.  
 Midwest Marko, Inc.: See—  
 Fogelman, Sam, 4,947,526, Cl. 24-336.000.  
 Miedema, Andries R.: See—  
 Haisma, Jan; and Miedema, Andries R., 4,948,029, Cl. 228-112.000.  
 Mihara, Sinichi, to Olympus Optical Co., Ltd. Zoom lens system, 4,948,234, Cl. 350-423.000.  
 Mihayashi, Keiji; and Ichijima, Seiji, to Fuji Photo Film Co., Ltd. Silver halide color photographic material, 4,948,716, Cl. 430-505.000.  
 Mihira, Hiroshi: See—  
 Ishikawa, Kouichi; Mihira, Hiroshi; Kimura, Noriyuki; and Yamaguchi, Masao, 4,947,889, Cl. 137-486.000.  
 Mii, Adam. Semiconductor string connection structure, 4,949,156, Cl. 357-68.000.  
 Mikami, Hirotsuke; Fujiwara, Hideo; and Tottori, Takeshi, to Hitachi Maxell, Ltd. Magnetic head, 4,948,667, Cl. 428-336.000.  
 Mikami, Kazuhiro: See—  
 Ito, Yasunobu; Suzuki, Kenji; and Mikami, Kazuhiro, 4,949,078, Cl. 340-635.000.  
 Mikan, Peter J. Computer keyboard control accessory, 4,949,080, Cl. 340-711.000.  
 Miki, Hiroshi: See—  
 Sasagawa, Kiyoaki; Miki, Hiroshi; Miyasaka, Tadashi; and Nino-  
 miya, Hideki, 4,949,213, Cl. 361-91.000.  
 Miki, Shuji: See—  
 Mori, Fumio; Okada, Masafumi; Miki, Shuji; Ebashi, Iwao; Ni-  
 shida, Takashi; Kawai, Kouichiro; Tashiro, Tazuko; and Tsukagoshi, Shigeru, 4,948,784, Cl. 514-54.000.  
 Mikulecky, Harvey W., to Cooper Power Systems, Inc. Fuse-isolator -  
 actuator, 4,949,060, Cl. 337-4.000.  
 Miles, Barry D. R., to Quantel Limited. Video image processing sys-  
 tems, 4,949,180, Cl. 358-183.000.  
 Miles Inc.: See—  
 Cohnen, Walther; Riebel, Alexander; and Schranz, Karl W., 4,948,634, Cl. 427-302.000.  
 Miles Laboratories, Inc.: See—  
 Mitra, Gautam; and Mozen, Milton M., 4,948,877, Cl. 530-387.000.  
 Miljkovic, Momcilo, to Pennsylvania Research Corporation. Copper electroplating solutions and methods, 4,948,474, Cl. 204-52.100.  
 Milks, Lawrence R.: See—  
 Lightle, Paul S.; and Milks, Lawrence R., 4,947,942, Cl. 173-163.000.  
 Miller, Alan L.; Schultz, Susan W.; and Umlauf, William P., to Borg-  
 Warner Automotive, Inc. Dual clutch control system, 4,947,970, Cl. 192-0.076.  
 Miller, Ellsworth S.; Slavin, Michael; and Ling, Ching C., to Lectron Products, Inc. Variable force solenoid pressure regulator for elec-  
 tronic transmission controller, 4,947,893, Cl. 137-625.650.  
 Miller, Ellsworth S.: See—  
 Slavin, Michael; Detweiler, Charles A.; Miller, Ellsworth S.; and Martus, Charles R., 4,947,968, Cl. 192-4.00A.  
 Miller, Gerald W.: See—  
 Smith, Rayna W.; and Miller, Gerald W., 4,948,661, Cl. 428-286.000.  
 Miller, John: See—  
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Miller, Laurence L., to TRW Inc. Pressure responsive and electrically controllable flow control apparatus, 4,947,951, Cl. 180-143.000.  
 Miller, Linda C.: See—  
 Huang, Victor T.; Hosney, R. Carl; Graf, Ernst; Ghiasi, Katy; Miller, Linda C.; Weber, Jean L.; Gaertner, Karin C.; Matson, Kristin L.; Hunstiger, Antoinette M.; Rogers, Deborah E.; and Saguy, Israel A., 4,948,606, Cl. 426-243.000.  
 Miller, Matthew T.: See—  
 Bowling, Joseph M.; and Miller, Matthew T., 4,947,546, Cl. 29-861.000.  
 Miller, Merrill D.: See—  
 Irick, W. T.; Roussey, James L.; and Miller, Merrill D., 4,949,012, Cl. 315-82.000.  
 Miller, Michael K.; and Stockton, Warren D. Large capacity ammuni-  
 tion magazine, 4,947,572, Cl. 42-49.010.  
 Miller, Roy W., to Pullman Leasing Company. Hatch cover assembly, 4,948,185, Cl. 292-256.500.  
 Miliken Research Corporation: See—  
 Dischler, Louis, 4,947,528, Cl. 26-2.00R.  
 Mills, Gregory B., to Behr Process Corporation. Pneumatic drywall texture bazooka, 4,948,054, Cl. 239-325.000.  
 Milne, Alexander, to International Paint public limited Company. Improvements in or relating to boat hulls, 4,947,785, Cl. 114-357.000.  
 Milo, Richard K.; and Ricards, John D., to Eastman Kodak Company. Multihead magnetic head assembly having a single piece faceplate of magnetic ferrite, 4,949,208, Cl. 360-122.000.  
 Minnagh, Winslow M.: See—  
 Veenis, Aartje W.; and Minnagh, Winslow M., 4,949,332, Cl. 369-275.300.  
 Min, Sung-Ki: See—  
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 Minami, Eiichi, to Hitachi, Ltd. Large scale integrated circuit, 4,949,157, Cl. 357-68.000.  
 Minami, Tooru: See—  
 Ohkuma, Norio; Takenouchi, Masanori; Miyagawa, Masashi; Hayashi, Hiroshi; Minami, Tooru; and Oobayashi, Hiroharu, 4,948,694, Cl. 430-138.000.  
 Minard, Paul G.; Hurman, Robert C.; and Weiland, William A., to Westinghouse Electric Corp. Oil flushing adapter, 4,948,270, Cl. 384-399.000.  
 Minaudo, Diego, to Bridgestone/Firestone, Inc. Extrusion head for producing sheet material reinforced internally with close-packed cords, 4,948,354, Cl. 425-114.000.  
 Minchak, Robert J.; and Ware, James T., to B. F. Goodrich Company. Homogeneous addition copolymers of ethylene and cycloolefin monomers and method for producing same, 4,948,856, Cl. 526-281.000.  
 Minear, John W.; and Gold, Randy, to Halliburton Logging Services, Inc. Pulsed ultrasonic doppler borehole fluid measuring apparatus, 4,947,683, Cl. 73-155.000.  
 MiniScribe Corporation: See—  
 Phillips, Wayne; Normen, David; and Rupp, Richard, 4,949,206, Cl. 360-106.000.  
 Minnesota Mining and Manufacturing Company: See—  
 Cole, Susan M.; and Garbe, James E., 4,948,575, Cl. 424-44.000.  
 Echols, Jimmie L.; Hammar, Walton J.; and Kotnour, Thomas A., 4,948,859, Cl. 528-28.000.  
 Hulme-Lowe, Alan G.; Jackson, Andrew C.; and Bell, Vivien L., 4,948,715, Cl. 430-495.000.  
 Oster, Craig D., 4,948,944, Cl. 219-227.000.  
 Tarbutton, Kent S.; Robins, Janis; and Tangen, John C., 4,948,449, Cl. 156-307.300.  
 Minnesota Valley Engineering, Inc.: See—  
 Neeser, Timothy; Preston, Duane; and Lutgen, Michael, 4,947,651, Cl. 62-50.400.  
 Minolta Camera Kabushiki Kaisha: See—  
 Chimoto, Ikuro, 4,949,132, Cl. 355-290.000.  
 Hidaka, Shinobu, 4,949,100, Cl. 346-108.000.  
 Imaseki, Chiharu, 4,949,097, Cl. 346-76.0PH.  
 Ito, Masazumi, 4,949,131, Cl. 355-282.000.  
 Karasaki, Toshihiko; and Sugitani, Kazumi, 4,949,116, Cl. 354-408.000.  
 Kusumoto, Keiji; Ito, Masazumi; Takano, Yoshiaki; and Noda, Takashi, 4,949,124, Cl. 355-203.000.  
 Shimada, Takahisa; Kajita, Hideo; Okumura, Sueyoshi; Seki, Reiji; Ishimura, Toshihiko; and Katayori, Sinji, 4,949,109, Cl. 354-173.100.  
 Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,949,110, Cl. 354-195.100.  
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 Minoura, Norihiko; Urabe, Kei; Aiba, Seiichi; Taguchi, Kazuhiro; and Fujiwara, Yukihiko, to Japan as represented by Director General of Agency of Industrial Science and Technology. Non-linear resistor having a poly (amino acid) membrane, 4,949,064, Cl. 338-80.000.  
 Miraglia, Louis. Support apparatus for water exercise and therapy, 4,948,118, Cl. 272-71.000.  
 Mirsky, Saul: See—  
 Staroselsky, Naum; Mirsky, Saul; and Reinke, Paul A., 4,949,276, Cl. 364-509.000.  
 Mita Industrial Co., Ltd.: See—  
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 Mita, Yoshiharu: See—  
 Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Kadera, Sadaki, 4,949,134, Cl. 355-317.000.

Mitchell, David B., to W. R. Grace & Co.-Conn. Method for control-  
 ling overspray in paint spray booths, 4,948,513, Cl. 210-705.000.  
 Mitra, Gautam; and Mozen, Milton M., to Miles Laboratories, Inc. Preparation of retrovirus-free immunoglobulins, 4,948,877, Cl. 530-387.000.  
 Mitsubishi Denki Kabushiki Kaisha: See—  
 Chihara, Kazuhiro, 4,949,008, Cl. 313-402.000.  
 Fujiwara, Naohisa, 4,949,195, Cl. 360-33.100.  
 Hirao, Tadashi; Sakae, Kiyoshi; Yakushiji, Hisao; and Ohsaki, Saburo, 4,949,153, Cl. 357-51.000.  
 Iwamoto, Toshikazu, 4,949,009, Cl. 313-407.000.  
 Kajiwara, Yasuya, 4,947,952, Cl. 180-178.000.  
 Kato, Hisao, 4,947,702, Cl. 74-479.000.  
 Kobayashi, Toyohiro; Otsuka, Nobuo; Thompson, Peter; and Stratton, Larry J., 4,948,040, Cl. 236-49.300.  
 Kobayashi, Toyohiro; and Mukohara, Shouji, 4,948,218, Cl. 350-96.160.  
 Mitsushashi, Yasuo, 4,949,173, Cl. 358-108.000.  
 Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,947,949, Cl. 180-79.100.  
 Nishimura, Tadashi; and Akasaka, Yoichi, 4,948,742, Cl. 437-24.000.  
 Nishioka, Tadashi; Mashiko, Yoji; Morimoto, Hiroaki; and Koyama, Hiroshi, 4,948,749, Cl. 437-89.000.  
 Sumida, Mamoru; Fukata, Hironobu; Yoshida, Takeji; and Matsu-  
 moto, Osamu, 4,947,890, Cl. 137-546.000.  
 Suzuki, Masahiko; Saito, Nagao; Mohri, Naotake; Takahashi, Hideo; and Shoji, Tetsuo, 4,948,625, Cl. 427-37.000.  
 Takahashi, Toshihisa; Uchinami, Masanobu; Nishiyama, yoji; Kominami, Seiya; and Nishida, Shinichi, 4,947,819, Cl. 123-489.000.  
 Tamii, Seizo; Mutoh, Norio; Hasegawa, Hiroshi; Okamura, Hiro-  
 shi; and Tani, Noriyuki, 4,949,090, Cl. 342-173.000.  
 Toyama, Tsuyoshi; Kohda, Kenji; Andoh, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, 4,949,305, Cl. 365-185.000.  
 Ueda, Tetsuya, 4,949,158, Cl. 357-68.000.  
 Mitsubishi Electric Manufacturing Co., Ltd.: See—  
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 Mitsubishi Jidosha Kogyo Kabushiki Kaisha: See—  
 Fujita, Kenjiro; Ozaki, Tetsuo; and Hiramatsu, Takeo, 4,947,734, Cl. 91-471.000.  
 Mitsubishi Jukogyo Kabushiki Kaisha: See—  
 Izumi, Jun; Tanabe, Seiichi; and Ohshima, Kazuaki, 4,948,401, Cl. 55-180.000.  
 Kushibe, Yuki; and Sato, Hiroshi, 4,948,358, Cl. 425-574.000.  
 Sato, Manabu; Nomi, Kazutoshi; Morita, Yasuo; and Shoji, Yukikazu, 4,948,112, Cl. 270-60.000.  
 Mitsubishi Kasei Vinyl Company: See—  
 Morimoto, Seiichi; Shiji, Kazuyuki; and Kusu, Hisahiro, 4,948,670, Cl. 428-379.000.  
 Mitsubishi Kinzoku Kabushiki Kaisha: See—  
 Imura, Makoto; and Usami, Akira, 4,949,034, Cl. 324-158.00R.  
 Mitsubishi Paper Mills, Ltd.: See—  
 Matsushita, Toshihiko; Hiraiishi, Shigetoshi; and Morishita, Sadao, 4,948,695, Cl. 430-138.000.  
 Nishimori, Hiroshi; Kondo, Toshiro; and Takaya, Yoshikazu, 4,948,699, Cl. 430-204.000.  
 Mitsubishi Petrochemical Co., Ltd.: See—  
 Hattori, Masafumi; Inoue, Takayuki; and Ochiumi, Masahide, 4,948,671, Cl. 428-411.100.  
 Itoh, Kiichi; and Shibano, Takeshi, 4,948,659, Cl. 428-254.000.  
 Mitsuhashi, Toshio: See—  
 Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsuhashi, Toshio, 4,948,706, Cl. 430-311.000.  
 Mitsuhashi, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Security surveillance system with intermittent magnetic recording/reproduc-  
 ing device, 4,949,173, Cl. 358-108.000.  
 Mitsui Engineering & Shipbuilding Co., Ltd.: See—  
 Takahashi, Yasuo, 4,947,782, Cl. 114-312.000.  
 Mitsui Kinzoku Kogyo Kabushiki Kaisha: See—  
 Yamada, Shinjiro, 4,948,183, Cl. 292-199.000.  
 Mitsui Petrochemical Industries Ltd.: See—  
 Taguchi, Tohru; Zenitani, Yurimasa; Ikeda, Akio; and Nishimura, Toshiji, 4,948,868, Cl. 528-339.000.  
 Ushida, Yoshihisa; Hirai, Nobuki; and Mase, Hiroshi, 4,948,767, Cl. 501-134.000.  
 Mitsui Toatsu Chemicals, Inc.: See—  
 Harada, Isao; Hokenohara, Hisashi; and Yamaguchi, Toshiaki, 4,948,571, Cl. 423-240.000.  
 Hoshino, Futoshi; Nakano, Makoto; and Yanagihara, Takeshi, 4,948,772, Cl. 503-207.000.  
 Mitsui Toatsu Chemical, Inc.: See—  
 Hirayama, Chuichi; Motozato, Yoshiaki; and Ihara, Hiroaki, 4,948,816, Cl. 521-56.000.  
 Mitsui, Tsutomu: See—  
 Ohmitsu, Takashi; and Mitsui, Tsutomu, 4,948,997, Cl. 310-113.000.  
 Mitsui, Yasuhiro; Shimura, Satoshi; and Komoda, Tsutomu, to Hitachi, Ltd. Plasma ion source mass spectrometer, 4,948,962, Cl. 250-288.000.  
 Mitsui, Masaru; Endo, Mitsugu; Kawachi, Youji; and Asada, Akira, to Kansai Paint Co., Ltd.; and Sanyo Chemical Industries, Ltd. Aqueous coating composition and coating method using same, 4,948,829, Cl. 524-457.000.  
 Mittelhauser, Bernhard. Internal mirror for motor vehicles, 4,948,085, Cl. 248-549.000.

Miwa, Hiroshi: See—  
 Fuse, Genzo; Miwa, Hiroshi; and Kawasaki, Yoshinobu, 4,948,329, Cl. 414-735.000.  
 Miwa, Kenji: See—  
 Ikoma, Keiichi; Nakai, Shizuo; Obata, Tomokazu; and Miwa, Kenji, 4,948,279, Cl. 400-323.000.  
 Miyachi, Nobuji; and Miyake, Keniti, to Hams Corporation. Sewing machine, 4,947,771, Cl. 112-141.000.  
 Miyagawa, Masashi: See—  
 Ohkuma, Norio; Takenouchi, Masanori; Miyagawa, Masashi; Hayashi, Hiroshi; Minami, Tooru; and Oobayashi, Hiroharu, 4,948,694, Cl. 430-138.000.  
 Miyake, Katsumi: See—  
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 Miyake, Keniti: See—  
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 Miyaki, Yukio, to Sharp Kabushiki Kaisha. Device for automatically supplying screws, 4,947,982, Cl. 198-391.000.  
 Miyamoto, Kaname: See—  
 Souda, Shigeru; Shimomura, Naoyuki; Ueda, Norihiro; Miyazawa, Shuhei; Yamanaka, Takashi; Miyamoto, Kaname; Hishinuma, Icharu; Nagakawa, Junichi; Nagaoka, Naoko; Kawashima, Hidetoshi; Kawata, Tsutomu; Nagaoka, Junsaku; and Wakabayashi, Tsuneo, 4,948,808, Cl. 514-535.000.  
 Miyamoto, Masao: See—  
 Inui, Yoshio; Osaka, Masayoshi; Tanaka, Mitsuo; and Miyamoto, Masao, 4,947,583, Cl. 49-193.000.  
 Miyamoto, Seiji, to Omron Tateisi Electronics Co. Transaction proces-  
 sor which derives a commodity code from an article code and stores sales of data of both, 4,949,258, Cl. 364-405.000.  
 Miyamoto, Yukihiko: See—  
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 Miyano, Yoshio: See—  
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 Miyasaka, Tadashi: See—  
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Polysar Financial Services S.A.: See—

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Pommier, Yves: See—

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Porter, William H. Brick wall covering. 4,947,600, Cl. 52-235.000.

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Progressive Chemical Research, Ltd.: See—

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Brooks, Johnny L.; Roberts, Donald L.; and Simmons, Jerry S., 4,947,875, Cl. 131-330.000.

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Scheuer, Helmut: See—  
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Scheuing, Christopher J.: See—  
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Schiffmacher, William M.; and Griffin, B. Franklin, Jr., to Aspen Ribbons, Inc. Replaceable ribbon guide for dot matrix printers. 4,948,278, Cl. 400-248.000.

Schildkraut, Jay S.: See—  
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Schilling, Jan: See—  
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Schimpff, Frithjof: See—  
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Schirmer, Ulrich: See—  
Keil, Michael; Jahn, Dieter; Kolassa, Dieter; Schirmer, Ulrich; Becker, Rainer; Jung, Johann; and Rademacher, Wilhelm, 4,948,415, Cl. 71-90.000.

Schleif, Ludwig. Ball point pen with two cartridges. 4,948,285, Cl. 401-195.000.

Schlein, Allen P. Washcloth containing cleansing agent. 4,948,585, Cl. 424-404.000.

Schlumberger Technology Corporation: See—  
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Schmeykal, Rudolf: See—  
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Kern, John M.; Freyburger, Donald E.; Schneider, Karl F.; and Spokas, Romas B., 4,947,700, Cl. 74-445.000.

Schneider (U.S.A.), Inc. A Pfizer Company: See—  
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Schneider, Werner; and Baur, Walter, to Rovema Verpackungsmaschinen GmbH. Bag sealing device. 4,947,618, Cl. 53-373.000.

Schnur, Rodney C.; and Fliri, Anton F. J., to Pfizer Inc. Benzamide protease inhibitors. 4,948,891, Cl. 544-329.000.

Schnur, Rodney C.; and Fliri, Anton F. J., to Pfizer Inc. Benzamide protease inhibitors. 4,948,901, Cl. 548-329.000.

Schoeman, Douglas A.: See—  
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Schon, Istvan: See—  
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Schook, Michael N. Quick release dumbbell and barbell exercise equipment. 4,948,123, Cl. 272-123.000.

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Schoolman Scientific Corporation: See—  
Schoolman, Arnold, 4,947,868, Cl. 128-847.000.

Schott Fiber Optics: See—  
Carpenter, George J.; Siegmund, Walter P.; and Smith, John M., 4,947,828, Cl. 128-6.000.

Schranz, Karl W.: See—  
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Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 4,948,582, Cl. 424-529.000.

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Schubert, Wolfgang, to Grass AG. Guide or runner systems for accommodating translational movement. 4,948,208, Cl. 312-344.100.

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Schuco International GmbH & Co.: See—  
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Schulmberger Industries, Inc.: See—  
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Schulte, Klaus: See—  
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Miller, Alan L.; Schultz, Susan W.; and Umlauf, William P., 4,947,970, Cl. 192-0.076.

Schunack, Walter: See—  
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Schurter, Rolf, and Diel, Peter J., to Ciba-Geigy Corporation. 3-fluoropyridyl-2-oxo-phenoxy derivatives having herbicidal activity. 4,948,414, Cl. 71-86.000.

Schutz, Richard A., and Paris, Patrick, to Societe Lyonnaise des Eaux. Process for production of a bundle of hollow semi-permeable fibers. 4,948,444, Cl. 156-168.000.

Schutz, Udo. Pallet container having inner container surrounded by an outer housing of lattice bars. 4,947,988, Cl. 206-386.000.

Schwabsche Huttenwerke GmbH: See—  
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Schwarzfeller, Holger: See—  
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Science Applications International Corporation: See—  
Spratt, James P., 4,948,989, Cl. 307-296.600.

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Scott, Ray V., Jr.: See—  
Baumann, William M.; Scott, Ray V., Jr.; House, David W.; and Engel, Dusan J., 4,948,861, Cl. 528-66.000.

Scott, William A.; Hutchinson, Mark A.; and Baumbarger, Gary L., to Tillotson, Ltd. Automatic choke for small two-cycle internal combustion engines. 4,948,536, Cl. 261-64.400.

Scozzafava, Michael: See—  
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Sea Fathoms Industries, Inc.: See—  
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Sea Rose II: See—  
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Seagate Technology, Inc.: See—  
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Searer, Floyd A.; and Searer, Ralph, 4,947,937, Cl. 160-133.000.

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Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, The: See—  
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Segal, Jerome: See—  
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Segall, Yoffi: See—  
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Sercomp Corporation: See—  
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Shantz, David J.; Armer, Thomas A., and Olson, David V., to Olin Corporation. Multiple layer container for storage of high purity chemicals. 4,948,642, Cl. 428-35.700.

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Madou, Marc J.; Otagawa, Takaaki; and Sher, Arden, 4,948,680, Cl. 429-13.000.

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Wirges, Winfried, 4,948,104, Cl. 267-64.110.

Stack, Charles R., to Charles Stack & Associates, Inc. Anaerobic fermentation process, 4,948,509, Cl. 210-603.000.

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Erwin, David N.; Kiel, Johnathan L.; Batishko, Charles R.; and Stahl, Kurt A., 4,948,975, Cl. 250-361.00C.

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Stahlecker, Fritz, 4,947,633, Cl. 57-86.000.  
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Brown, Douglas B.; and Malys, Henri, 4,947,743, Cl. 100-45.000.  
Stakem, Francis G., to Union Carbide Chemicals and Plastics Company Inc. Ethylene copolymerization catalyst, 4,948,771, Cl. 502-112.000.  
Stallforth, Harald: See—  
Gabele, Lorenz; Hausler, Lohrer, Walter; Seibert, Johannes; Stallforth, Harald; Taschner, Wolfgang; Wawrik, Otmar; and Wofle, Wilfried, 4,948,566, Cl. 422-107.000.  
Stamatoff, James B.: See—  
DeMartino, Ronald N.; Yoon, Hyun-Nam; and Stamatoff, James B., 4,948,532, Cl. 252-587.000.  
Stamcarbon B.V.: See—  
Bashir, Zahir; Keller, Andrew; and Odell, Jeffrey A., 4,948,545, Cl. 264-210.800.  
De Koning, Adrianus J.; and Voskamp, Arnold J., 4,948,821, Cl. 523-500.000.  
Van Unen, Lambert H. T.; Pluyter, Pieter B.; and Pontenagel, Willibrordus M. G. F., 4,948,544, Cl. 264-204.000.  
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Starck, Roland, to Fritz Eichenauer GmbH & Co. KG Holding part for PTC components, 4,948,953, Cl. 219-504.000.  
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Hillenbrand, David F.; and Starewicz, Piotr M., 4,949,043, Cl. 324-320.000.  
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Stearns, Charles C., to LSI Logic Corporation. Transformation of divisor and dividend in digital division, 4,949,295, Cl. 364-748.000.  
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Stec Inc.: See—  
Ishikawa, Kouichi; Mihira, Hiroshi; Kimura, Noriyuki; and Yamaguchi, Masao, 4,947,889, Cl. 137-486.000.  
Steele, David C., to Moose Products, Inc. Remote actuated command circuit for seizing telephone lines, 4,949,372, Cl. 379-46.000.  
Steger, Johann, to Birfield Trasmissioni S.p.A. Grinding tool, 4,947,588, Cl. 51-206.00R.  
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Witte, Ernst-Christian; Wolff, Hans-Peter; Stegmeier, Karlheinz; and Pill, Johannes, 4,948,809, Cl. 514-538.000.  
Stein, Henry G., to USG Interiors, Inc. Suspended ceiling construction and compression strut therefor, 4,947,607, Cl. 52-484.000.  
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Stephanopoulos, Gregory; Kornfield, Julia A.; and Voecks, Gerald E., to California Institute of Technology. Monolith reactor containing a plurality of flow passages and method for carrying out biological reactions, 4,948,728, Cl. 435-41.000.  
Stephens, W. F. Noel; and Pleydell, Mark E., to Renishaw plc. Interpolation apparatus, 4,949,289, Cl. 364-577.000.  
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Steppat, Eduard; and Letsch, Thomas, to Mahle GmbH. Coolable plunger piston for internal combustion engines, 4,947,805, Cl. 123-41.350.  
Sterling Drug Incorporated: See—  
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Steuernagel, Hans H., to Hoechst Aktiengesellschaft. Process for the preparation of beta-chloroethylsulfonfylaryl isocyanates, 4,948,917, Cl. 560-347.000.  
Stevens, Eric G., to Eastman Kodak Company. Image sensor having multiple horizontal shift registers, 4,949,183, Cl. 358-213.230.  
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Stevens, Larry L. Stair rail for toddlers, 4,948,100, Cl. 256-65.000.  
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Stewart, Peter J. Apparatus for carbon pulp reactivation, 4,947,929, Cl. 165-66.000.  
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Mohamed Ali, Khayri A.; and Fahlen, Lennart E., 4,949,243, Cl. 364-200.000.

Stobart, John. Tensioning stretched-canvas frame and method for use, 4,947,922, Cl. 160-374.100.  
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Miller, Michael K.; and Stockton, Warren D., 4,947,572, Cl. 42-49.010.  
Stoltzfus, Ivan L.: See—  
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Hollander, Milton B.; McKinley, William E.; Crimmins, James P.; and Storer, Ian K., 4,949,274, Cl. 364-483.000.  
Stork Screens, B.V.: See—  
Sonneveld, Pieter J., 4,948,682, Cl. 429-67.000.  
Stotland, Duane. Tennis instructional aid and method, 4,948,372, Cl. 434-247.000.  
Stout, Charles A., to Union Oil Company of California. Removal of hydrogen sulfide from produced fluids, 4,948,494, Cl. 208-293.000.  
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Corke, Michael; Haynes, David E.; Stowe, David W.; Shaw, Stillman, III; and Vigeant, Joseph E., 4,948,222, Cl. 350-96.200.  
Stowe, Keith A., to General Motors Corporation. Plastic housing thrust bearing with complete sealing, 4,948,272, Cl. 384-607.000.  
Strain, Kevin L.; and Huizenga, Jack A., to Commonwealth Edison. Limit switch calibration system, 4,947,674, Cl. 73-1.00D.  
Strang, Harry: See—  
Lindig, Markus; Dickore, Karlfried; Findeisen, Kurt; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,948,417, Cl. 71-92.000.  
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Strawser, Michael G.; and Sands, William M. Popcorn popper, 4,947,740, Cl. 99-323.600.  
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Strickland, Paul D.; and Doran, Paul C. Patch binder and method for road surface repair, 4,948,431, Cl. 106-273.100.  
Strobel, Hans J.: See—  
Lembke, Andreas; Underberg, Emil; and Strobel, Hans J., 4,948,598, Cl. 426-23.000.  
Stroh, Justin G.: See—  
Rinehart, Kenneth L., Jr.; Sakai, Ryuichi; and Stroh, Justin G., 4,948,791, Cl. 514-183.000.  
Stroud, Brian T., to CAE Machinery Ltd. Process and apparatus for optimizing volume of boards cut from a log, 4,947,909, Cl. 144-357.000.  
Strudel Werner; and Hostenkamp, Oliver, to Lindauer Dornier Gesellschaft mbH. Expander for tubular fabric, 4,947,529, Cl. 26-84.000.  
Strunk, Dennis L.: See—  
Banyai, Bruce E.; LaSota, Denis E.; and Strunk, Dennis L., 4,948,430, Cl. 75-321.000.  
Strutynsky, Alexandre V.: See—  
Tsymbal, Valery D.; Chernyshev, Vladimir G.; Zhuravlev, Mikhail G.; Morozov, Oleg K.; Tulyakov, Georgy A.; and Strutynsky, Alexandre V., 4,948,488, Cl. 204-212.000.  
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Lightle, Paul S.; and Milks, Lawrence R., 4,947,942, Cl. 173-163.000.  
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McQuitty, Jim B.; Martin, Arnat W.; and Studenick, David K., 4,949,317, Cl. 367-176.000.  
Studtmann, George H.; Quinn, Stanley B., Jr.; and King, Todd L., to Borg-Warner Automotive, Inc. Driver for high speed solenoid actuator, 4,949,215, Cl. 361-154.000.  
Stuhler, Herbert; and Dullinger, Klaus, to Hoechst Aktiengesellschaft. Process for the sulfation of partial esters of aliphatic polyhydric alcohols, 4,948,535, Cl. 260-400.000.  
Stults, Jeffrey S., to Occidental Chemical Corporation. Process for the preparation of oxydiphthalic anhydrides, 4,948,904, Cl. 549-241.000.  
Sturwald, Wilhelm, to SKF Textilmaschinen-Komponenten GmbH. Ring spinning or ring twisting machine, 4,947,634, Cl. 57-93.000.  
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Stypula, Richard J.; and Buckholz, Lawrence, Jr., to International Flavors & Fragrances Inc. Process for preparing oil-impervious, water retaining silicon oxide derivative-containing food products, 4,948,608, Cl. 426-302.000.  
Subbotin, Anatoly N.: See—  
Lipukhin, Jury V.; Damlov, Leonid I.; Subbotin, Anatoly N.; Garber, Eduard A.; and Abramenko, Viktor I., 4,947,587, Cl. 51-17.000.  
Sudani, Mineichi: See—  
Hiraiwa, Toru; Takeda, Kenji; Nakano, Joji; Sudani, Mineichi; Furuhashi, Kunikazu; Takata, Makoto; Kawafuchi, Hiroyo; and Watanabe, Isao, 4,948,796, Cl. 514-254.000.  
Sudnishnikov, Vadim B.; and Zelenstov, Andrei A., to Institut Gornogo Dela Sibirskogo Otdelenija Akademii Nauk SSSR. Single-stroke pneumatic apparatus, 4,947,941, Cl. 173-134.000.  
Sudo, Toshio; and Takubo, Chiaki, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit device particularly for high speed logic operations, 4,949,163, Cl. 357-80.000.

Suematsu, Toshio: See—  
Kamohara, Tatsuyoshi; Sugino, Tadashi; Suematsu, Toshio; and Nishimura, Satomu, 4,947,818, Cl. 123-479.000.  
Sugawara, Hideto: See—  
Ohba, Yasuo; Watanabe, Niyoko; Sugawara, Hideto; Ishikawa, Masayuki; Watanabe, Yukio; and Yamamoto, Motoyuki, 4,949,349, Cl. 372-45.000.  
Sugawara, Hiroyuki: See—  
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Sugawara, Saburo: See—  
Tejima, Yasuyuki; Arai, Akihiro; Yuda, Hideaki; Sugawara, Saburo; and Toji, Shigeo, 4,949,115, Cl. 354-403.000.  
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Sugaya, Tomio: See—  
Ogawa, Toshitaka; Kikuchi, Yasuo; Sugaya, Tomio; Nakajima, Isao; Suzuki, Takashi; and Katagiri, Shigenobu, 4,949,096, Cl. 346-25.000.  
Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsuura, Toshio, to Hoya Corporation; and Shinto Chemitron Co., Ltd. Process for producing transparent substrate having thereon transparent conductive pattern elements separated by light-shielding insulating film, and process for producing surface-colored material, 4,948,706, Cl. 430-311.000.  
Sugino, Tadashi: See—  
Kamohara, Tatsuyoshi; Sugino, Tadashi; Suematsu, Toshio; and Nishimura, Satomu, 4,947,818, Cl. 123-479.000.  
Sugino, Takashi: See—  
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Sugitani, Kazumi: See—  
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Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., to Rorer Pharmaceutical Corporation. Treatment of conditions requiring enhanced oxygen availability to mammalian tissues, 4,948,582, Cl. 424-529.000.  
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Violo, Robert D.; Calevo, Robert; and Suillerot, Didier, M., 4,948,220, Cl. 350-96.200.  
Suit, Joan L.: See—  
Luria, Salvador E.; Suit, Joan L.; and Jackson, Jennifer A., 4,948,735, Cl. 435-252.800.  
Sullivan, Harold M., to McDonnell Douglas Corporation. Circuit board support device, 4,948,108, Cl. 269-903.000.  
Sullivan, Sheryl S.: See—  
Hinckley, Charles C.; Cummins, Thomas J.; and Sullivan, Sheryl S., 4,948,561, Cl. 422-61.000.  
Sullivan, William A.: See—  
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Sulzer Brothers Limited: See—  
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Sumida, Mamoru; Fukata, Hironobu; Yoshida, Takeji; and Matsumoto, Osamu, to Mitsubishi Denki Kabushiki Kaisha. Flow control valve with dirt protection, 4,947,890, Cl. 137-546.000.  
Sumitomo Chemical Co., Limited: See—  
Hagiya, Koji; Suzukamo, Gohfu; Fukao, Masami; Sakito, Yoji; and Sakane, Hiroko, 4,948,914, Cl. 560-124.000.  
Ogawa, Tadatoshi; and Yoshida, Teruaki, 4,948,657, Cl. 428-218.000.  
Sumitomo Electric Industries, Ltd.: See—  
Nagamine, Akira; Okamoto, Kenichi; and Nakata, Hidekazu, 4,947,638, Cl. 57-212.000.  
Sato, Shuichi; Tsuji, Kazuo; and Nakashima, Takeru, 4,949,347, Cl. 372-41.000.  
Sumitomo Metal Industries, Ltd.: See—  
Morita, Yoshiyasu; Seguchi, Manabu; Okamura, Kazuo; Hikami, Fuminori; Ishihara, Koichi; and Hara, Katsutoshi, 4,947,924, Cl. 164-97.000.  
Sumitomo Metal Mining Company Limited: See—  
Kato, Yutaka; and Kijima, Yoshio, 4,948,426, Cl. 419-23.000.  
Sumitomo Pharmaceuticals Company, Limited: See—  
Antoku, Fujio; Yoshigi, Mayumi; Saji, Ikutaro; Kojima, Atsuyuki; and Ishizumi, Kuku, 4,948,799, Cl. 514-278.000.  
Sumitomo Rubber Industries, Ltd.: See—  
Noma, Hiroyuki; Oda, Kazuo, and Otani, Takao, 4,947,914, Cl. 152-531.000.  
Noma, Hiroyuki; Kouno, Tadao; and Kadomaru, Kazuo, 4,947,917, Cl. 152-536.000.  
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Summit Orthodontic Services, Inc.: See—  
Haas, Martin, 4,948,367, Cl. 433-9.000.  
Summons, Wayne L.; and Burch, Lester G., to Sashco, Inc. Laminated materials container, 4,948,016, Cl. 222-158.000.  
Sumner, Steven P.: See—  
Feitkeno, Michael A.; Sumner, Steven P.; and LaRocca, Joseph, 4,948,423, Cl. 75-10.140.  
Sumrell, K. Drew; Blair, Don R.; and Johnson, Dave. Speaker support stand, 4,948,076, Cl. 248-125.000.

Sunaga, Takemi: See—  
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Sunds Defibrator Aktiebolag: See—  
Asberg, Per A., 4,948,542, Cl. 264-40.400.  
Sundstrand Corporation: See—  
Barnet, Robert A., 4,949,235, Cl. 363-92.000.  
Cygnor, John E., 4,948,344, Cl. 417-279.000.  
Mosure, Duane, 4,948,336, Cl. 415-172.100.  
Rodgers, Colin, 4,947,641, Cl. 60-39.142.  
Sung, Rodney L.; Kaufman, Benjamin J.; and Thomas, Karol J., to Texaco Inc. Middle distillate containing storage stability additive, 4,948,386, Cl. 44-57.000.  
Sunstrand Corporation: See—  
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Tanaka, Shoji; Tsujimoto, Masafumi; Wada, Yayoi; Tsuruoka, Nobuo; and Nakazato, Hiroshi, 4,948,875, Cl. 530-350.000.  
Supnik, Robert: See—  
Bhandarkar, Dileep P.; Supnik, Robert; Fossum, Tryggve; and Manley, Dwight, 4,949,250, Cl. 364-200.000.  
Sure Power, Inc.: See—  
Brune, Lyle R., 4,949,028, Cl. 320-6.000.  
Sutherland, Deborah S.: See—  
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Suto, Akihiko: See—  
Iwaki, Hiroshi; Mita, Yoshiharu; Suto, Akihiko; Kikkawa, Shinichi; Handa, Yasushi; and Kodera, Sadaki, 4,949,134, Cl. 355-317.000.  
Suttle, James P.; and Jones, Daniel A., to Caribean Stud Enterprises, Inc. Electronic poker game, 4,948,134, Cl. 273-85.00P.  
Suttner GmbH & Co. KG: See—  
Olbrisch, Walter; and Suttner, Wolfgang, 4,948,350, Cl. 417-474.000.  
Suttner, Wolfgang: See—  
Olbrisch, Walter; and Suttner, Wolfgang, 4,948,350, Cl. 417-474.000.  
Suzukamo, Gohfu: See—  
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Suzuki, Chiaki; and Shimizu, Shigehisa, to Fuji Photo Film Co., Ltd. Method of winding film on a spool and loading the spool with the film into a magazine, 4,947,536, Cl. 29-430.000.  
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Suzuki, Hiroyuki: See—  
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Suzuki Jidosha Kogyo Kabushiki Kaisha: See—  
Taniguchi, Katuhiko; Nakajima, Akiharu; and Kondo, Osamu, 4,947,533, Cl. 29-894.000.  
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Ito, Yasunobu; Suzuki, Kenji; and Mikami, Kazuhiro, 4,949,078, Cl. 340-635.000.  
Suzuki, Makoto, to Brother Kogyo Kabushiki Kaisha. Color image recorder with correction of gradation errors in light shielding mask images and visibly developed images, 4,949,184, Cl. 358-300.000.  
Suzuki, Masahiko; Saito, Nagao; Mohri, Naotake; Takahashi, Hideaki; and Shoji, Tetsuo, to Suzuki, Masahiko; Mitsubishi Denki Kabushiki Kaisha; and Mohri, Naotake. Method for forming surface layer by electric discharge process, 4,948,625, Cl. 427-37.000.  
Suzuki, Masao: See—  
Yamada, Takeshi; Osalo, Yasukuni; Suzuki, Masao; Watanabe, Okosu; and Kawata, Osamu, 4,948,412, Cl. 65-4.210.  
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Suzuki, Tameyuki: See—  
Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsuura, Toshio, 4,948,706, Cl. 430-311.000.  
Suzuki, Yoshiki: See—  
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Swanson, Gregory K.; and Argus, Roger R., to Maxwell Laboratories, Inc. Method for extracting dissolved organic pollutants from aqueous streams, 4,948,511, Cl. 210-634.000.



Swanson, Hilmer I., to Harris Corporation. RF power amplifier system having amplifier protection. 4,949,050, Cl. 330-298.000.

Sweeney, Donald W.: See—  
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Sweeney, Harold E., to GTE Government Systems Corporation. Remote subsurface water temperature measuring apparatus with Brillouin scattering. 4,948,958, Cl. 250-574.000.

SWF Auto-Electric GmbH: See—  
Bauer, Kurt; Prohaska, Hans; and Schmid, Eckhardt, 4,947,508, Cl. 15-250.350.

Swynnerton, Nollie F.: See—  
Lyle, Robert E., Jr.; Mangold, Donald J.; and Swynnerton, Nollie F., 4,948,912, Cl. 560-227.000.

Sydansk, Robert D., to Marathon Oil Company. Kill fluid for oil field operations. 4,947,935, Cl. 166-295.000.

Sylvester, Michael S. Sealant with uniform spacer particles. 4,947,604, Cl. 52-398.000.

Syngene, Inc.: See—  
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Syntex (U.S.A.) Inc.: See—  
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Szasz, Norbert I.; and Shaw, Russell G., to General Signal Corporation. Environmental stress screening apparatus for electronic products. 4,949,031, Cl. 324-158.00F.

Szirtes, Tamas: See—  
Seprodi, Janos; Teplan, Istvan; Schon, Istvan; Erchegey, Judit; Vadasz, Zsolt; nee Kuprina, Olga N.; Szirtes, Tamas; Selmezei, Andras; and Kanyicska, Bela, 4,948,873, Cl. 530-328.000.

Szuzy, Nicholas C.; and Caserta, Anthony, to Grumman Aerospace Corporation. Discrete strain sensor. 4,947,693, Cl. 73-800.000.

TA Triumph-Adler Aktiengesellschaft: See—  
Haftmann, Johannes; and Schmeikal, Rudolf, 4,948,276, Cl. 400-208.000.

Taber, Donald J. Gold position training device. 4,948,142, Cl. 273-183.00B.

Tabuchi, Yasuhiko: See—  
Ejiri, Susumu; Kimura, Makoto; Tabuchi, Yasuhiko; and Yokoyama, Nobuyoshi, 4,947,824, Cl. 126-391.000.

Tachi-S Company, Ltd.: See—  
Hatta, Susumu, 4,948,081, Cl. 248-396.000.

Taga, Yasunori: See—  
Ohwaki, Takeshi; and Taga, Yasunori, 4,948,760, Cl. 501-54.000.

Tagg, Richard L.: See—  
Parkinson, Brian; Bishop, Angus J.; and Tagg, Richard L., 4,947,491, Cl. 4-321.000.

Taguchi, Kazuhiro: See—  
Minoura, Norihiko; Urabe, Kei; Aiba, Seichi; Taguchi, Kazuhiro; and Fujiwara, Yukihiko, 4,949,064, Cl. 338-80.000.

Taguchi, Tohru; Zenitani, Yurimasa; Ikeda, Akio; and Nishimura, Toshiji, to Mitsui Petrochemical Industries Ltd. Copolyamide containing tertiary amine linkage. 4,948,868, Cl. 528-339.000.

Taipale, Dale L.: See—  
Flaig, John D.; Baltz, Gene F.; Billingsley, Henry C.; Hartke, David H.; Holcomb, James A.; DuBois, Chester G.; and Taipale, Dale L., 4,947,807, Cl. 123-52.0MV.

Taisei Corporation: See—  
Naito, Masamitsu; and Matsumoto, Michio, 4,948,967, Cl. 250-227.280.

Taisho Pharmaceutical Co., Ltd.: See—  
Ogawa, Toshihisa; Ota, Tomomi; Sato, Shuichi; Sunaga, Takemi; Watanabe, Yoshiaki; and Hatayama, Katsuo, 4,948,899, Cl. 546-321.000.

Tajima, Naoyuki; Tsuda, Takaaki; and Chikawa, Yasunori, to Sharp Kabushiki Kaisha. Tape carrier for semiconductor chips. 4,949,155, Cl. 357-68.000.

Takabayashi, Kyoko: See—  
Kawamura, Shinichi; and Takabayashi, Kyoko, 4,949,293, Cl. 364-746.000.

Takabayashi, Youjiro, to Yamaha Corporation. Electronic musical instrument and string deviation sensor arrangement therefor. 4,947,726, Cl. 84-743.000.

Takagi, Masami; Tsunekawa, Shinichi; and Ohkubo, Kenji, to Kabushiki Kaisha Toshiba. Low pressure discharge lamp with flat-plate terminal. 4,949,007, Cl. 313-318.000.

Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; Kuroki, Yuzuru; and Azumata, Yasushi, to Matsushita Electric Industrial Co., Ltd. Optical information recording and reproducing system using optical disks having an error correction function. 4,949,326, Cl. 369-54.000.

Takahashi, Hideaki: See—  
Suzuki, Masahiko; Saito, Nagao; Mohri, Naotake; Takahashi, Hideaki; and Shoji, Tetsuo, 4,948,625, Cl. 427-37.000.

Takahashi, Ken: See—  
Kaba, Kazuyuki; Takahashi, Ken; and Kida, Masashi, 4,947,913, Cl. 152-454.000.

Takahashi, Kenji: See—  
Nakamura, Takashi; and Takahashi, Kenji, 4,948,696, Cl. 430-139.000.

Takahashi, Kenro; Inoue, Naohiko; and Tsukamoto, Masahiro, to Nissan Motor Company, limited. Proportioning valve assembly for an actively controlled suspension system. 4,948,165, Cl. 280-707.000.

Takahashi, Masahiro: See—  
Hamada, Takuji; Takahashi, Masahiro; Yoneda, Katsuhiko; and Okada, Masakazu, 4,949,336, Cl. 370-85.200.

Takahashi, Masakatsu; Buseki, Hiroo; and Kimura, Hidetoshi, to Nippon Reinz Co., Ltd. Metal gasket. 4,948,153, Cl. 277-235.00B.

Takahashi, Sadatoshi: See—  
Kitagishi, Nozomu; Koyama, Takeshi; Takahashi, Sadatoshi; and Oizumi, Kouji, 4,949,107, Cl. 354-79.000.

Takahashi, Shuji: See—  
Ishikawa, Yasuhiro; Kaidoo, Hiroyuki; Takei, Sadakazu; and Takahashi, Shuji, 4,947,916, Cl. 152-536.000.

Takahashi, Susumu; and Ohtomo, Fumio, to Tokyo Kogaku Kikai Kabushiki Kaisha. Non-contact type tonometer. 4,947,849, Cl. 128-648.000.

Takahashi, Toshihisa; Uchinami, Masanobu; Nishiyama, yoji; Kominami, Seiya; and Nishida, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Air-fuel ratio controller of internal combustion engine. 4,947,819, Cl. 123-489.000.

Takahashi, Yasunao, to NEC Corporation. Disabling circuit for power-on event. 4,948,995, Cl. 307-594.000.

Takahashi, Yasuo, to Mitsui Engineering & Shipbuilding Co., Ltd. Remotely operated vehicle. 4,947,782, Cl. 114-312.000.

Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, to Sharp Kabushiki Kaisha. Image processing device. 4,949,279, Cl. 364-518.000.

Takamizawa, Minoru: See—  
Hayashida, Akira; Takamizawa, Minoru; and Takeda, Yoshihumi, 4,948,763, Cl. 501-95.000.

Takano, Yoshiaki: See—  
Kusumoto, Keiji; Ito, Masazumi; Takano, Yoshiaki; and Noda, Takashi, 4,949,124, Cl. 355-203.000.

Takashima, Masayuki, to Ricoh Company, Ltd. Toner supply device for a developing apparatus. 4,949,123, Cl. 355-260.000.

Takasugi, Wasao: See—  
Tsuyoshi, Toshiaki; Ohtake, Masatoshi; Takasugi, Wasao; Yonezawa, Seiji; Takeuchi, Takashi; and Saitoh, Tadashi, 4,949,325, Cl. 369-49.000.

Takata, Makoto: See—  
Hiraiwa, Toru; Takeda, Kenji; Nakano, Joji; Sudani, Mineichi; Furuhashi, Kunikazu; Takata, Makoto; Kawafuchi, Hiroyo; and Watanabe, Isao, 4,948,796, Cl. 514-254.000.

Takaya, Yoshikazu: See—  
Nishinoiri, Hiroshi; Kondo, Toshiro; and Takaya, Yoshikazu, 4,948,699, Cl. 430-204.000.

Takeda Chemical Industries, Ltd.: See—  
Shimamoto, Norio; and Ogata, Kazumi, 4,948,786, Cl. 514-100.000.

Shinagawa, Susumu; Kanamaru, Tsuneo; Harada, Setsuo; and Asai, Mitsuko, 4,948,534, Cl. 260-399.000.

Takeda, Katsumi: See—  
Kubo, Kanji; Yamamoto, Akio; and Takeda, Katsumi, 4,949,244, Cl. 364-200.000.

Takeda, Kenji: See—  
Hiraiwa, Toru; Takeda, Kenji; Nakano, Joji; Sudani, Mineichi; Furuhashi, Kunikazu; Takata, Makoto; Kawafuchi, Hiroyo; and Watanabe, Isao, 4,948,796, Cl. 514-254.000.

Takeda, Osamu: See—  
Buma, Shuichi; Aburaya, Toshio; Yonekawa, Takashi; Takeda, Osamu; Urababa, Shingo; and Doi, Shunichi, 4,949,262, Cl. 364-424.050.

Takeda, Yoshihumi: See—  
Hayashida, Akira; Takamizawa, Minoru; and Takeda, Yoshihumi, 4,948,763, Cl. 501-95.000.

Takegawa, Ichiro: See—  
Murae, Masanori; Takegawa, Ichiro; Takemoto, Makoto; and Sakaguchi, Yasuo, 4,948,687, Cl. 430-58.000.

Takei, Sadakazu: See—  
Ishikawa, Yasuhiro; Kaidoo, Hiroyuki; Takei, Sadakazu; and Takahashi, Shuji, 4,947,916, Cl. 152-536.000.

Takemoto, Makoto: See—  
Murae, Masanori; Takegawa, Ichiro; Takemoto, Makoto; and Sakaguchi, Yasuo, 4,948,687, Cl. 430-58.000.

Takenouchi, Masanori: See—  
Ohkuma, Norio; Takenouchi, Masanori; Miyagawa, Masashi; Hayashi, Hiroshi; Minami, Tooru; and Oohayashi, Hiroharu, 4,948,694, Cl. 430-138.000.

Takeuchi, Hiroshi, to Kabushiki Kaisha Daikin Seisakusho. Cooling device for pull type clutch. 4,947,973, Cl. 192-70.120.

Takeuchi, Kazuhiro; and Katori, Shigetatsu, to NEC Corporation. Microcomputer capable of accessing continuous addresses for a short time. 4,949,242, Cl. 364-200.000.

Takeuchi, Takashi: See—  
Tsuyoshi, Toshiaki; Ohtake, Masatoshi; Takasugi, Wasao; Yonezawa, Seiji; Takeuchi, Takashi; and Saitoh, Tadashi, 4,949,325, Cl. 369-49.000.

Takeya, Fuminori: See—  
Sandaiji, Hideto; Takeya, Fuminori; and Terada, Nohuhiro, 4,948,460, Cl. 156-630.000.

Takeyasu, Hatsuichi, to Asahi Kogaku Kogyo K.K. Apparatus for operatively connecting cam ring and associated member actuated thereby. 4,948,227, Cl. 350-255.000.

Taki Chemical Co., Ltd.: See—  
Maekawa, Yoshio; Yagyu, Osamu; Mizuno, Hironori; Okumura, Minoru; Isoda, Shigeru; and Yagi, Kaoru, 4,948,413, Cl. 71-65.000.

Takikawa, Kazunori: See—  
Usui, Masayoshi; and Takikawa, Kazunori, 4,948,180, Cl. 285-319.000.

Takubo, Chiaki: See—  
Sudo, Toshio; and Takubo, Chiaki, 4,949,163, Cl. 357-80.000.

Talancie Research Corporation: See—  
Jaenisch, Holger, 4,949,353, Cl. 372-59.000.

Talleres de Escoriaza, S.A.: See—  
Imedio, Juan A., 4,947,662, Cl. 70-395.000.

Talmy, Inna G.; and Haught, Deborah A., to United States of America, Navy Rigid multilevel whisker felt and method of preparation. 4,948,766, Cl. 501-128.000.

Tam, Simon M., to Intel Corporation. EEPROM cell with integral select transistor. 4,949,140, Cl. 357-23.500.

Tamaki, Yoichi; Ikeda, Kiyoji; Nakamura, Toru; Uchida, Akihisa; Koizumi, Toru; Enami, Hiromichi; Isomura, Satoru; Nakajima, Shinji; Ogue, Katsumi; and Ohgaya, Kaoru, to Hitachi, Ltd. Semiconductor integrated circuit with dummy pedestals. 4,949,162, Cl. 357-71.000.

Tamii, Seizo; Mutoh, Norio; Hasegawa, Hiroshi; Okamura, Hiroshi; and Tani, Noriyuki, to Mitsubishi Denki Kabushiki Kaisha. Transmit/receive module test system. 4,949,090, Cl. 342-173.000.

Tanabe, Seiichi: See—  
Izumi, Jun; Tanabe, Seiichi; and Ohshima, Kazuaki, 4,948,401, Cl. 55-180.000.

Tanabe Seiyaku Co., Ltd.: See—  
Iijima, Ikuo; Ozeki, Masakatsu; Okumura, Kunihito; and Inamasu, Masanori, 4,948,900, Cl. 548-183.000.

Iwakuma, Takeo; Kawaguchi, Takayuki; Yamashita, Toyoharu; Sasaki, Yasuhiko; and Shimazaki, Tamotu, 4,948,810, Cl. 514-539.000.

Tanabe, Sohei; Sato, Seiichi; Kyotani, Yoshinori; Ohta, Tomio; and Uchida, Yasumi, to Kowa Comp., Ltd. Sulfonamide compound useful for treating cardiovascular disorders. 4,948,892, Cl. 544-396.000.

Tanaka, Hiroshi, to Fuji Jukogyo Kabushiki Kaisha. Control system for a clutch for a motor vehicle. 4,947,971, Cl. 192-0.033.

Tanaka, Hiroyuki, to Nix Company Limited. Dental X-ray irradiation indicating device. 4,949,370, Cl. 378-170.000.

Tanaka, Hisami: See—  
Hisamura, Masafumi; Fujimura, Naoto; and Tanaka, Hisami, 4,948,690, Cl. 430-60.000.

Tanaka, Kanichi: See—  
Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 4,948,559, Cl. 420-584.000.

Tanaka, Kenji: See—  
Kase, Masao; Koizumi, Toshiaki; Otaki, Masatsugu; Yamashita, Masakazu; Tanaka, Kenji; and Matsuura, Ryo, 4,949,328, Cl. 369-75.200.

Tanaka, Kimio: See—  
Satoh, Takateru; Uemura, Noboru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,949,210, Cl. 360-132.000.

Tanaka, Mitsuo: See—  
Inui, Yoshio; Osaka, Masayoshi; Tanaka, Mitsuo; and Miyamoto, Masao, 4,947,583, Cl. 49-193.000.

Tanaka, Norio: See—  
Baba, Masatoshi; Kakuta, Takuya; Tanaka, Norio; Oya, Eiichi; Ikai, Takashi; Nawamaki, Tsutomu; and Watanabe, Shigeomi, 4,948,887, Cl. 540-603.000.

Tanaka, Shoji; Tsujimoto, Masafumi; Wada, Yayoi; Tsuruoka, Nobuo; and Nakazato, Hiroshi, to Suntory Limited. Novel polypeptide having an anti-tumor activity and a method of preparation thereof. 4,948,875, Cl. 530-350.000.

Tanamura, Yuji: See—  
Yamazaki, Shunpei; Inujima, Takashi; Urata, Kazuo; Tashiro, Mamoru; Tanamura, Yuji; Imato, Shinji; Itoh, Kenji; Odaka, Seiichi; Hayashi, Shigenori; and Hirose, Naoki, 4,949,004, Cl. 313-35.000.

Tanashin Denki Co., Ltd.: See—  
Arata, Tadao, 4,949,324, Cl. 369-36.000.

Tangen, John C.: See—  
Tarbuton, Kent S.; Robins, Janis; and Tangen, John C., 4,948,449, Cl. 156-307.300.

Tani, Youichirou: See—  
Uohama, Misao; and Tani, Youichirou, 4,948,916, Cl. 560-515.000.

Tanigawa, Tetsuo: See—  
Hirabayashi, Yuji; Sato, Yoshihisa; Akiyama, Susumu; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, 4,949,083, Cl. 340-825.050.

Taniguchi, Hitoshi: See—  
Araki, Shigeo; Taniguchi, Hitoshi; Suzuki, Hiroyuki; and Komatsu, Takaaki, 4,949,308, Cl. 365-218.000.

Taniguchi, Katuhiko; Nakajima, Akiharu; and Kondo, Osamu, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Manufacturing method of disk for belt-driven continuously-variable-speed drive. 4,947,533, Cl. 29-894.000.

Taniguchi, Masayuki: See—  
Kobayashi, Takeshi; Taniguchi, Masayuki; Yasuda, Shunji; and Ikeda, Shigehito, 4,948,736, Cl. 435-311.000.

Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 4,949,110, Cl. 354-195.100.

Tanii, Junichi, to Minolta Camera Kabushiki Kaisha. Top cover mounting construction for cameras. 4,949,113, Cl. 354-288.000.

Tanii, Noriyuki: See—  
Tamii, Seizo; Mutoh, Norio; Hasegawa, Hiroshi; Okamura, Hiroshi; and Tanii, Noriyuki, 4,949,090, Cl. 342-173.000.

Tanimoto, Shigemi: See—  
Otsuka, Ryotatsu; Tanimoto, Shigemi; and Toyoda, Kazuo, 4,948,102, Cl. 266-205.000.

Tanner, Thomas. Toxic fluid and vapor handling apparatus. 4,947,888, Cl. 137-312.000.

Tansley, Robert W.; and Bentley, Andrew C., to General Foods, Ltd. Nozzles. 4,948,018, Cl. 222-541.000.

Tapley, William. Spring loaded fish hook assembly. 4,947,574, Cl. 43-36.000.

Tappe, Horst; Oehme, Dieter; and Russ, Werner H., to Hoechst Aktiengesellschaft. Monoazo compounds containing a fiber-reactive group and an oxazolopyridone or oxazinopyridone coupling component. 4,948,879, Cl. 534-642.000.

Tarbuton, Kent S.; Robins, Janis; and Tangen, John C., to Minnesota Mining and Manufacturing Company. Epoxy resin composition. 4,948,449, Cl. 156-307.300.

Tarling, Stephen R., to Avdel Systems Limited. Discharge apparatus for broken-off fastener parts. 4,948,302, Cl. 406-17.000.

Tarlton, James K., Sr., to Dana Corporation. Center load clutch brake. 4,947,969, Cl. 192-13.00R.

Tarrson, Emanuel B.; and Maric, Dane, to John O. Butler Company. Dental flossing device. 4,947,880, Cl. 132-329.000.

Taschner, Wolfgang: See—  
Gabele, Lorenz; Hausler; Lohrer, Walter; Seibert, Johannes; Stallforth, Harald; Taschner, Wolfgang; Wawrik, Otmar; and Wofle, Wilfried, 4,948,566, Cl. 422-107.000.

Tashiro, Mamoru: See—  
Yamazaki, Shunpei; Inujima, Takashi; Urata, Kazuo; Tashiro, Mamoru; Tanamura, Yuji; Imato, Shinji; Itoh, Kenji; Odaka, Seiichi; Hayashi, Shigenori; and Hirose, Naoki, 4,949,004, Cl. 313-35.000.

Tashiro, Tadafumi, to NEC Corporation. Hybrid IC with heat sink. 4,949,220, Cl. 361-386.000.

Tashiro, Tazuko: See—  
Mori, Fumio; Okada, Masafumi; Miki, Shuji; Ebashi, Iwao; Nishida, Takashi; Kawai, Kouichiro; Tashiro, Tazuko; and Tsukagoshi, Shigeru, 4,948,784, Cl. 514-54.000.

Tashma, Zeev: See—  
Rosin, Maria W.; Chorev, Michael; and Tashma, Zeev, 4,948,807, Cl. 514-484.000.

Tatsuoka, Masahiko: See—  
Konishi, Satoshi; Tatsuoka, Masahiko; and Komatsu, Toshiyuki, 4,947,946, Cl. 177-105.000.

Taub, Steven I.: See—  
Thomades, Lazarus; and Taub, Steven I., 4,948,398, Cl. 55-97.000.

Taylor, Bruce G.: See—  
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 4,948,505, Cl. 210-238.000.

Taylor, J. Eric: See—  
Blatton, Russell W.; Taylor, J. Eric; and Stearns, Thornton, 4,947,650, Cl. 62-50.100.

Taylor, James B.: See—  
Antrim, Richard L.; and Taylor, James B., 4,948,619, Cl. 426-610.000.

Taylor, John W. R.; Palmer, John M.; and Butkovsky, Emanuel. Bracing system. 4,947,612, Cl. 52-693.000.

Tazi, Mohammed; and Kundel, Nikhil, to GAF Chemicals Corporation. Solution feed, slurry polymerization process for the production of copolymers of maleic anhydride and an alkyl vinyl ether having predetermined specific viscosities. 4,948,848, Cl. 526-78.000.

TDK Corporation: See—  
Kitagawa, Toshiyuki; and Katoh, Namio, 4,947,846, Cl. 128-640.000.

Satoh, Takateru; Uemura, Noboru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,949,210, Cl. 360-132.000.

TEAC Corporation: See—  
Yoshida, Kobun; and Mori, Toshiro, 4,949,204, Cl. 360-93.000.

Technical Systems Engineering CC: See—  
Kuhn, Matthias W. J.; Schoeman, Douglas A.; and Le Roux, Stephanus J., 4,948,275, Cl. 400-200.000.

Technology 80, Inc.: See—  
Hauge, Trygve A., 4,949,252, Cl. 364-200.000.

Tecnoma: See—  
Ballu, Patrick J. M., 4,947,986, Cl. 206-221.000.

Tedco, Inc.: See—  
Setteducati, Mark, 4,948,241, Cl. 350-618.000.

Teh Yor Industrial Co., Ltd.: See—  
Chun-cheng, Huang, 4,947,921, Cl. 160-176.100.

Teijin Limited: See—  
Makino, Yuji; and Suzuki, Yoshiko, 4,948,788, Cl. 514-167.000.

Sasaki, Hideharu; and Sawaki, Toru, 4,948,574, Cl. 423-447.400.

Teijin Seike Co., Ltd.: See—  
Hidenobu, Ako, 4,947,732, Cl. 91-363.00R.

Tejima, Yasuyuki; Arai, Akihiro; Yuda, Hideaki; Sugawara, Saburo; and Toji, Shigeo, to Asahi Kogaku Kogyo K.K. Automatic focusing projector. 4,949,115, Cl. 354-403.000.

Tektronix, Inc.: See—  
Jackson, Ronald M., 4,949,361, Cl. 375-118.000.

Petersen, Ronald O.; and McAlpin, James L., 4,949,010, Cl. 313-480.000.

Tel Sagami Limited: See—  
Nishi, Hironobu, 4,947,784, Cl. 414-404.000.

Tele Engineering, Inc.: See—  
Uhl, Robert J., 4,947,759, Cl. 104-299.000.

Teledyne Industries, Inc.: See—  
Sommers, James A., 4,948,570, Cl. 423-65.000.

Telefonaktiebolaget L M Ericsson: See—  
Rydbeck, Nils R. C., 4,949,395, Cl. 455-33.000.

Telefunken electronic GmbH: See—  
Herzog, Hans J.; Worner, Klaus; and Kasper, Erich, 4,949,146, Cl. 357-34.000.

Tench, Rex D.; and Hager, Elmer J. Compressed air spray gun adapted for use with more than one canister. 4,948,042, Cl. 239-113.000.

Tengqvist, Lennart; to Lacani AB. Method of manufacturing moisture resistant corrugated fiberboard. 4,948,448, Cl. 156-292.000.

Teplan, Istvan: See—  
Seprodi, Janos; Teplan, Istvan; Schon, Istvan; Erchevgy, Judit; Vadasz, Zsolt; nec Kuprina, Olga N.; Szirtes, Tamas; Selmezci, Andras; and Kanyicska, Bela, 4,948,873, Cl. 530-328.000.

Terada, Nobuhiro: See—  
Sandaiji, Hideto; Takeya, Fuminori; and Terada, Nobuhiro, 4,948,460, Cl. 156-630.000.

Terada, Takami; Suzuki, Saburo; Ito, Sadao; and Yamazaki, Masayuki, to Aisin Seiki Kabushiki Kaisha. Seat slide assembly. 4,948,189, Cl. 296-65.100.

Terao, Kazuo: See—  
Shimizu, Yukihiko; Fuyuki, Toshimitsu; Teshigawara, Toru; Terao, Kazuo; and Kasao, Atsushi, 4,949,099, Cl. 346-107.00R.

Terbrack, Ulrich: See—  
Siol, Werner; and Terbrack, Ulrich, 4,948,668, Cl. 428-373.000.

Terry, Elizabeth J., executrix: See—  
Opie, Eric, deceased; Silverstein, Fred E.; and Kreft, David R., 4,947,827, Cl. 128-4.000.

Terumo Corporation: See—  
Deguchi, Hiromi; and Nagayama, Kiyotaka, 4,948,560, Cl. 422-48.000.

Teshigawara, Toru: See—  
Shimizu, Yukihiko; Fuyuki, Toshimitsu; Teshigawara, Toru; Terao, Kazuo; and Kasao, Atsushi, 4,949,099, Cl. 346-107.00R.

Tetra Pak Holdings & Finance S.A.: See—  
Rosen, Klas A., 4,948,665, Cl. 428-332.000.

Texaco Inc.: See—  
Kapusinski, Maria M.; Nalesnik, Theodore E.; Biggs, Robert T.; Chafetz, Harry; and Liu, Christopher S., 4,948,524, Cl. 252-51.50R.

Martin, Michael C.; and Reich, Erwin A., 4,948,387, Cl. 48-62.00R.

Sung, Rodney L.; Kaufman, Benjamin J.; and Thomas, Karol J., 4,948,386, Cl. 44-57.000.

Texas Instruments Incorporated: See—  
Gohlke, Mark A., 4,948,964, Cl. 250-350.000.

Haken, Roger A., 4,949,154, Cl. 357-54.000.

Nishimura, Akitoshi, 4,949,138, Cl. 357-23.600.

Textron, Inc.: See—  
Nottelmann, Donald A.; Wallace, Norman G.; and Stager, Joseph E., 4,948,318, Cl. 411-377.000.

Tezuka, Chikao; Hanaoka, Yukihiko; and Nakayama, Hiroyuki, to Seiko Epson Corporation. Drive mechanism for a miniature printer. 4,948,273, Cl. 400-185.000.

Tezuka, Nobuo, to Canon Kabushiki Kaisha. Recording or reproducing apparatus including a disc cartridge loading and clamping mechanism. 4,949,205, Cl. 360-99.050.

Theeuwes, Felix: See—  
Ayer, Atul D.; Theeuwes, Felix; and Wong, Patrick S. L., 4,948,592, Cl. 424-473.000.

Theisen, Paul M.: See—  
Haaheim, Gary R.; Theisen, Paul M.; and Ketter, Karl N., 4,948,121, Cl. 272-97.000.

Theobald, Thomas; Kross, Manfred; and Plumer, Hans J., to ITW-Ateco GmbH. Device for adjusting and fixedly securing window frames and door cases or the like in wall openings. 4,947,594, Cl. 52-126.400.

Therm-O-Disc, Incorporated: See—  
Nixon, Ronald A.; and Yagher, Charles, Jr., 4,948,931, Cl. 200-83.00P.

Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Method and machine arrangement for working in a track switch section. 4,947,757, Cl. 104-7.200.

Thomaides, Lazarus; and Taub, Steven I., to Ceco Filters, Inc. Multi-candle fiber mist eliminator. 4,948,398, Cl. 55-97.000.

Thomas & Betts Corporation: See—  
Hoshino, Haruo, 4,948,378, Cl. 439-271.000.

Thomas, John E.; and Lakhani, Hareesh C., to Ecolab Inc. Method and apparatus for dispersing powdered pesticide. 4,948,013, Cl. 222-1.000.

Thomas Josef Heimbach GmbH & Co.: See—  
Halker, Helmut, 4,948,658, Cl. 428-234.000.

Thomas, Karol J.: See—  
Sung, Rodney L.; Kaufman, Benjamin J.; and Thomas, Karol J., 4,948,386, Cl. 44-57.000.

Thompson, Carroll R., to Scan Systems, Inc. Apparatus for cutting precision notches in work surfaces. 4,948,933, Cl. 219-69.200.

Thompson, Darwin, Jr.: See—  
Forsse, Earl K.; Larsen, Larry K.; Davies, John M.; and Thompson, Darwin, Jr., 4,949,327, Cl. 369-58.000.

Thompson, Jeffery L. Lime kilns. 4,948,364, Cl. 432-98.000.

Thompson, John R., to Eastman Kodak Company. Collation of buffered multi-page documents. 4,949,190, Cl. 358-426.000.

Thompson, Max W., to Phillips Petroleum Company. Nitrogen rejection unit. 4,948,405, Cl. 62-24.000.

Thompson, Michael: See—  
Klein, Kenneth J.; Song, Wei J.; and Thompson, Michael, 4,948,389, Cl. 55-20.000.

Thompson, Peter: See—  
Kobayashi, Toyohiro; Otsuka, Nobuo; Thompson, Peter; and Stratton, Larry J., 4,948,040, Cl. 236-49.300.

Thomsen, Elmer R. Method and apparatus for incorporating backing boards in the printed paper stack of a printing press. 4,948,111, Cl. 270-59.000.

Thomson-CSF: See—  
Arques, Marc; and Guyot, Lucien, 4,948,966, Cl. 250-208.100.

Bacuvier, Pierre, 4,949,147, Cl. 357-38.000.

Guyot, Lucien, 4,948,952, Cl. 250-213.0VT.

Guyot, Lucien, 4,948,978, Cl. 250-370.110.

Huijer, Ernst; Leheureau, Jean C.; and Castera, Jean P., 4,949,198, Cl. 360-59.000.

Moulin, Pierre; and Delevacque, Guy, 4,949,091, Cl. 342-192.000.

Wambergue, Claude, 4,949,294, Cl. 364-746.000.

Thomson, Eric A.; and Josephson, Stanley M., to Remittance Technology Corporation. Financial data processing system. 4,948,174, Cl. 283-58.000.

Thorn EMI plc: See—  
Keens, Andrew P., 4,948,228, Cl. 350-397.000.

Thornock, Del M.; Goldberg, James R.; Kock, Ronald W.; Paul, Robert A.; Hamilton, Peter W.; and Willhite, William, Jr., to Procter & Gamble Company. The Package exhibiting improved child resistance without significantly impeding access by adults. 4,948,002, Cl. 215-221.000.

Thrommorton, Norman W. Photochromic glass highlight mask. 4,948,705, Cl. 430-292.000.

Thudt, Hubert, to MAN Nutzfahrzeuge GmbH. Connection means between adjacent articulated segments of an omnibus. 4,948,157, Cl. 280-494.000.

Thus, Franciscus J. M.: See—  
Kleiss, Bernardus W. H.; Bretveld, Arend J. E.; and Thus, Franciscus J. M., 4,948,988, Cl. 307-296.300.

Tillotson, Ltd.: See—  
Scott, William A.; Hutchinson, Mark A.; and Baumbarger, Gary L., 4,948,536, Cl. 261-64.400.

Timlin, Patrick M. Automated tire mounting and inflation system. 4,947,919, Cl. 157-1.240.

Tiphook Plc.: See—  
Ord, Robert M., 4,948,310, Cl. 410-1.000.

Tishman Research Corporation: See—  
Donaldson, Barry G.; and Newman, Joseph H., 4,947,608, Cl. 52-509.000.

Tobita, Toshimitsu: See—  
Kuzunuki, Soshiro; Morita, Yuzo; Yoneda, Kenzi; Ueshima, Takaaki; Tobita, Toshimitsu; and Fujino, Atsuya, 4,947,965, Cl. 187-127.000.

Toda, Hiroyuki: See—  
Hirano, Katsuhiko; Koike, Masahiko; and Toda, Hiroyuki, 4,947,724, Cl. 84-631.000.

Todd, Michael D.; and Cox, Raleigh L., to United Industries, Inc. Biological phosphorus removal from wastewater using multiple recombinable basins. 4,948,510, Cl. 210-605.000.

Tohoku Mikuni Kogyo Kabushiki Kaisha: See—  
Sugawara, Toshimitsu; Iinuma, Takeshi; and Suzuki, Tadashi, 4,948,093, Cl. 251-129.150.

Toja, Emilio: See—  
Galliani, Giulio; Barzaghi, Fernando; Zirotti, Carlo; and Toja, Emilio, 4,948,804, Cl. 514-423.000.

Toji, Shigeo: See—  
Tejima, Yasuyuki; Arai, Akihiro; Yuda, Hideaki; Sugawara, Saburo; and Toji, Shigeo, 4,949,115, Cl. 354-403.000.

Tojima, Hiromi, to Kabushiki Kaisha Daikin Seisakusho. Release bearing mechanism of a clutch. 4,947,975, Cl. 192-98.000.

Tokai Capsule Co., Ltd.: See—  
Yamada, Tohru, 4,948,591, Cl. 424-456.000.

Toker, Nazmi; and Price, Leroy R., to Allegheny Ludlum Corporation. Separating-agent coatings on silicon steel. 4,948,675, Cl. 428-469.000.

Tokumo, Akio; Kato, Masayuki; Sato, Takeshi; and Hasegawa, Tatsuzo, to Pioneer Electronic Corporation. Pulse width modulation amplifier circuit. 4,949,048, Cl. 330-10.000.

Tokuyama Soda Kabushiki Kaisha: See—  
Nakahara, Akihiko; Iseki, Yuji; and Murata, Kouichi, 4,948,844, Cl. 525-356.000.

Tokyo Electric Co., Ltd.: See—  
Koike, Seiji; Hirosaki, Yukihiko; Hamada, Motonobu; and Ohata, Takahiko, 4,948,282, Cl. 400-616.200.

Tokyo Gas Co., Ltd.: See—  
Moringa, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,948,452, Cl. 156-382.000.

Tokyo Kogaku Kikai Kabushiki Kaisha: See—  
Takahashi, Susumu; and Ohtomo, Fumio, 4,947,849, Cl. 128-648.000.

Tokyo Shibaura Denki Kabushiki Kaisha: See—  
Asano, Masamichi; and Iwahashi, Hiroshi, 4,949,152, Cl. 357-51.000.

Tolkachev, Anatoly P.: See—  
Fisinin, Vladimir I.; Filonenko, Vladimir I.; Shol, Viktor G.; Balakhonov, Anatoly M.; Tolkachev, Anatoly P.; and Vorobiev, Sergei A., 4,947,802, Cl. 119-160.000.

Tomar Electronics, Inc.: See—  
Sikora, Scott T., 4,949,017, Cl. 315-219.000.

Tomaschke, John E., to Hydranautics Corporation. Interfacially synthesized reverse osmosis membrane containing an amine salt and processes for preparing the same. 4,948,507, Cl. 210-500.380.

Tomczuk, Bruce E.; and Sutherland, Deborah S., to A. H. Robins Company, Incorporated. Pharmaceutical method using fused imidazoheterocyclic compounds. 4,948,800, Cl. 514-303.000.

Tome, Floyd, Jr. Rotary mixing and straining apparatus. 4,948,262, Cl. 366-129.000.

Tominaga, Teruyuki: See—  
Ushikubo, Hisao; and Tominaga, Teruyuki, 4,947,911, Cl. 152-209.00R.

Tomisawa, Naoki: See—  
Nakanawa, Shinpei; and Tomisawa, Naoki, 4,947,816, Cl. 123-422.000.

Tomoda, Takashi: See—  
Motozato, Yoshiaki; Tomoda, Takashi; Morita, Hiroshi; Yamaguchi, Masato; and Joko, Isao, 4,948,814, Cl. 521-30.000.

Tompkins, Laramie W. Electrical clamp. 4,948,383, Cl. 439-759.000.

Tonomura, Hiroshi, to Nissan Motor Co., Ltd. Suspension system for a dirigible wheel of motor vehicle. 4,948,161, Cl. 280-675.000.

Toohy, Richard E.: See—  
Port, Eli A.; Bitner, John M.; Lazarus, Irwin P.; Liaboe, Terry W.; and Toohy, Richard E., 4,918,970, Cl. 250-253.000.

Toray Industries, Inc.: See—  
Okumura, Yoshiharu; and Ando, Katsutoshi, 4,948,515, Cl. 210-748.000.

Toray Silicone Company Limited: See—  
Hirai, Kazuo, 4,948,826, Cl. 524-309.000.

Torino, Mitsuhiko, to Hitachi Metals, Ltd. Heat-fixing apparatus. 4,949,130, Cl. 355-282.000.

Tornqvist, Borje G. S.: See—  
Rendahl, Karl I. F.; and Tornqvist, Borje G. S., 4,947,774, Cl. 112-444.000.

Torrence, Lisa L.: See—  
Gaede, Bruce J.; and Torrence, Lisa L., 4,948,902, Cl. 548-376.000.

Torri, Giangiacomo: See—  
Naggi, Annamaria; and Torri, Giangiacomo, 4,948,881, Cl. 536-20.000.

Torrington Company, The: See—  
Alff, Denis, 4,948,277, Cl. 384-448.000.

Toshiba Ceramics Co., Ltd.: See—  
Kobayashi, Takeshi; Taniguchi, Masayuki; Yasuda, Shunji; and Ikeda, Shigehito, 4,948,736, Cl. 435-311.000.

Tosoh Corporation: See—  
Imai, Yoshio; Kakimoto, Masa-Aki; and Yoneyama, Masaru, 4,948,864, Cl. 528-219.000.

Someya, Sinzo; Koura, Seigo; Ito, Mikio; Kitamura, Yoichi; Watanabe, Hiroyuki; and Tsuzuki, Kenji, 4,948,421, Cl. 71-94.000.

Toter, Inc.: See—  
Niederer, Kurt W., 4,948,324, Cl. 414-415.000.

Toth, Gyula: See—  
Kurii, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasiljevics, Gyozo, 4,949,075, Cl. 340-555.000.

Toto Ltd.: See—  
Hisaeda, Masanobu; Saitou, Satoru; and Ogata, Masahiro, 4,948,087, Cl. 249-113.000.

Tottori, Takeshi: See—  
Mikami, Hirosuke; Fujiwara, Hideo; and Tottori, Takeshi, 4,948,667, Cl. 428-336.000.

Toyama Chemical Co., Ltd.: See—  
Hiraiwa, Toru; Takeda, Kenji; Nakano, Joji; Sudani, Mineichi; Furuhata, Kunikazu; Takata, Makoto; Kawafuchi, Hiroyo; and Watanabe, Isao, 4,948,796, Cl. 514-254.000.

Toyama, Tsuyoshi; Kohda, Kenji; Andoh, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Erasable read-only semiconductor memory device. 4,949,305, Cl. 365-185.000.

Toy Engineering Corporation: See—  
Sato, Ikumi; Nakano, Jun; Harada, Riichiro; Koba, Tatsuhiko; Fujita, Yuichi; and Shima, Kazumi, 4,948,091, Cl. 251-65.000.

Toyo Ink Manufacturing Co., Ltd.: See—  
Nonaka, Yoshiyuki; Tsuchida, Junichi; Shirao, Masami; Notoji, Toshiro; and Hikosaka, Michichika, 4,948,884, Cl. 540-138.000.

Toyoda, Atsushi; and Sawada, Shuichi, to Yamaha Corporation. Method for producing a thin film head. 4,947,541, Cl. 29-603.000.

Toyoda, Kazuo: See—  
Otsuka, Ryotatsu; Tanimoto, Shigemori; and Toyoda, Kazuo, 4,948,102, Cl. 266-205.000.

Toyota Jidosha Kabushiki Kaisha: See—  
Buma, Shuichi; Aburaya, Toshio; Yonekawa, Takashi; Takeda, Osamu; Urababa, Shingo; and Doi, Shunichi, 4,949,262, Cl. 364-424.050.

Fujita, Kozo; and Ise, Kiyotaka, 4,947,954, Cl. 180-197.000.

Hirabayashi, Yuji; Sato, Yoshihisa; Akiyama, Susumu; Ito, Katsunori; Saito, Takao; and Tanigawa, Tetsuo, 4,949,083, Cl. 340-825.050.

Kamohara, Tatsuyoshi; Sugino, Tadashi; Suematsu, Toshio; and Nishimura, Satomu, 4,947,818, Cl. 123-479.000.

Kito, Shozo; Harada, Shouichi; Imai, Hajime; and Muramatsu, Tadao, 4,947,967, Cl. 192-4.00A.

Kushi, Naoto, 4,947,820, Cl. 123-571.000.

Naiki, Hiroshi; 4,947,507, Cl. 15-250.160.

Oishi, Shinji; Nakagawa, Masahiro; Koyama, Mototsugu; Tanaka, Kanichi; Nagai, Syozo; and Hidaka, Kensuke, 4,948,559, Cl. 420-584.000.

Shigematsu, Takashi, 4,948,246, Cl. 356-5.000.

Umeyama, Mitsuhiko; Itoh, Hiroshi; Nimura, Hiroshi; and Yamamoto, Kenichi, 4,947,706, Cl. 74-574.000.

Trailer Train Company: See—  
Dawson, Richard W.; and Sellberg, Ronald P., 4,947,760, Cl. 105-03.000.

Trainor, Thomas M.: See—  
Dartey, Clemence K.; Trainor, Thomas M.; and Evans, Richard, 4,948,617, Cl. 426-602.000.

Trammell, Larry L.: See—  
Hametner, Albert L.; and Trammell, Larry L., 4,947,666, Cl. 72-37.000.

TRE Corporation: See—  
Lyman, Richard K., 4,948,070, Cl. 244-135.00R.

Tredegar Industries, Inc.: See—  
Francis, Michael A., 4,948,638, Cl. 428-35.200.

Trenkle, Robert W.: See—  
Mookherjee, Braja D.; Trenkle, Robert W.; Calderone, Nicholas; and Sands, Keith P., 4,948,597, Cl. 426-3.000.

Tri-Tronics Inc.: See—  
Farkas, Gregory J., 4,947,795, Cl. 119-29.000.

Tripartite, Ltd.: See—  
Christine, William C.; and Herschman, George J., 4,947,621, Cl. 53-451.000.

Tripp, Ernst: See—  
Muhlhausen, Peter; and Tripp, Ernst, 4,947,728, Cl. 89-46.000.

Tripp, Gordon R. Fluid storing and supply means. 4,948,023, Cl. 224-148.000.

Trivedi, Bharat K., to Warner-Lambert Company. Antihyperlipidemic and antiatherosclerotic compounds and compositions. 4,948,806, Cl. 514-451.000.

Tromfos, Katalin: See—  
Komives, Tamas; Dutka, Ferenc; Barta, Istvan; Jablonkai, Istvan; Hulesch, Agnes; Bihari, Ferenc; Eifert, Gyula; Bohus, Peter; Tromfos, Katalin; Meszaros nee Szekrenyesi, Agnes; and Kuro-nya, Istvan, 4,948,420, Cl. 71-94.000.

Trovato, Karen I.; and Dorst, Leendert, to North American Philips Corporation. Differential budding: method and apparatus for path planning with moving obstacles and goals. 4,949,277, Cl. 364-513.000.

True, Donald C.: See—  
Kennedy, David L.; True, Donald C.; and Welsh, David M., 4,947,751, Cl. 102-305.000.

Truman's Inc., Ohio Corporation: See—  
Zwicker, Fred, 4,947,589, Cl. 51-410.000.

TRW Inc.: See—  
Long, Christopher D., 4,949,356, Cl. 375-86.000.

Miller, Laurence L., 4,947,951, Cl. 180-143.000.

TRW Repa GmbH: See—  
Adomeit, Heinz-Dieter; and Brenner, Roland, 4,948,168, Cl. 280-732.000.

Weller, Hermann, 4,948,199, Cl. 297-472.000.

Tschetter, Charles D.: See—  
Parham, Thomas G.; Desu, Seshu; and Tschetter, Charles D., 4,949,005, Cl. 313-112.000.

Tse, Man S., to Astec International Limited. Isolated analog voltage sense circuit. 4,949,030, Cl. 324-127.000.

TSI Incorporated: See—  
Kaufman, Stanley L.; Dorman, Frank D.; Bjorkquist, Daniel C.; and Finn, Miles R., 4,948,257, Cl. 356-354.000.

Tsuchida, Junichi: See—  
Nonaka, Yoshiyuki; Tsuchida, Junichi; Shirao, Masami; Notoji, Toshiro; and Hikosaka, Michichika, 4,948,884, Cl. 540-138.000.

Tsuda, Takaaki: See—  
Tajima, Naoyuki; Tsuda, Takaaki; and Chikawa, Yasunori, 4,949,155, Cl. 357-68.000.

Tsuji, Kazuo: See—  
Sato, Shuichi; Tsuji, Kazuo; and Nakashima, Takeru, 4,949,347, Cl. 372-41.000.

Tsuji, Takuji; and Yanagida, Tomohiro, to Kanzaki Paper Manufacturing Co., Ltd. Heat-sensitive record material. 4,948,775, Cl. 503-207.000.

Tsuji, Kaoru: See—  
Kamiya, Tetsuro; Inoue, Takeshi; Yoroze, Hidenori; Eguchi, Yasuteru; and Tsujii, Kaoru, 4,948,588, Cl. 424-436.000.

Tsujimoto, Masafumi: See—  
Tanaka, Shoji; Tsujimoto, Masafumi; Wada, Yayoi; Tsuruoka, Nobuo; and Nakazato, Hiroshi, 4,948,875, Cl. 530-350.000.

Tsukagoshi, Shigeru: See—  
Mori, Fumio; Okada, Masafumi; Miki, Shuji; Ebashi, Iwao; Nishida, Takashi; Kawai, Kouichiro; Tashiro, Tazuko; and Tsukagoshi, Shigeru, 4,948,784, Cl. 514-54.000.

Tsukahara, Kazuta: See—  
Matsumoto, Kenjiro; and Tsukahara, Kazuta, 4,948,066, Cl. 242-107.40A.

Tsukamoto, Masahiro: See—  
Takahashi, Kenro; Inoue, Naohiko; and Tsukamoto, Masahiro, 4,948,165, Cl. 280-707.000.

Tsukazaki, Shogo: See—  
Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsu-hara, Toshio, 4,948,706, Cl. 430-311.000.

Tsunekawa, Shinichi: See—  
Takagi, Masami; Tsunekawa, Shinichi; and Ohkubo, Kenji, 4,949,007, Cl. 313-318.000.

Tsunoda, Yoshito: See—  
Maeda, Takeshi; Tsunoda, Yoshito; Shigematsu, Kazuo; and Kaku, Toshimitsu, 4,949,331, Cl. 369-275.300.

Tsuruoka, Nobuo: See—  
Tanaka, Shoji; Tsujimoto, Masafumi; Wada, Yayoi; Tsuruoka, Nobuo; and Nakazato, Hiroshi, 4,948,875, Cl. 530-350.000.

Tsuyoshi, Toshiaki; Ohtake, Masatoshi; Takasugi, Wasao; Yonezawa, Seiji; Takeuchi, Takashi; and Saitoh, Tadashi, to Hitachi, Ltd.



Method and associated apparatus and medium for optical recording and reproducing information. 4,949,325, Cl. 369-49.000.

Tsuzuki, Kenji: See—  
Someya, Sinzo; Koura, Seigo; Ito, Mikio; Kitamura, Yoichi; Watanabe, Hiroyuki; and Tsuzuki, Kenji, 4,948,421, Cl. 71-94.000.

Tsymbal, Valery D.; Chernyshev, Vladimir G.; Zhuravlev, Mikhail G.; Morozov, Oleg K.; Tulyakov, Georgy A.; and Strutynsky, Alexandr V.: Apparatus for the electrochemical machining of fashioned surfaces. 4,948,488, Cl. 204-212.000.

Tucker, Edward L.: Scaler holder. 4,947,532, Cl. 29-81.140.

Tuckey, Charles H.: to Walbro Corporation. Fuel pump mount for reduction of vibration transmission. 4,948,346, Cl. 417-312.000.

Tugui, Hideji: See—  
Iwakiri, Norio; Bingo, Hideyuki; and Tugui, Hideji, 4,947,544, Cl. 29-622.000.

Tukuda, Kiyoshi: See—  
Matsuzaki, Hitoshi; Tukuda, Kiyoshi; Shirasawa, Toshikatsu; and Miyazaki, Hideki, 4,949,137, Cl. 357-23.400.

Tulyakov, Georgy A.: See—  
Tsymbal, Valery D.; Chernyshev, Vladimir G.; Zhuravlev, Mikhail G.; Morozov, Oleg K.; Tulyakov, Georgy A.; and Strutynsky, Alexandr V., 4,948,488, Cl. 204-212.000.

Tupper, Robert B.; Mangus, James D.; Sharbaugh, John E.; Brown, Gedney B.; Livingston, Julie M.; and Dhalla, Asfandiar K.: to Westinghouse Electric Corp. Bottom supported liquid metal nuclear reactor. 4,949,363, Cl. 376-260.000.

Turgay, Hudai, to Borsig GmbH. Method of separating a suspension of activated sludge and sewage water. 4,948,518, Cl. 210-802.000.

Twist-Ease, Inc.: See—  
Helseth, James R., 4,948,202, Cl. 312-35.000.

Tyers, Michael B., to Glaxo Group Limited. Medicaments for treatment on prevention of withdrawal syndrome. 4,948,803, Cl. 514-397.000.

Tyler, Mike W.: See—  
Wilding, Edwin L.; and Tyler, Mike W., 4,948,321, Cl. 414-288.000.

Tyler, Thomas W., to Adele Knits. Fabric severing device for circular knitting machine. 4,947,659, Cl. 66-147.000.

Tyndall, George W., III: See—  
Hacker, Nigel P.; and Tyndall, George W., III, 4,948,629, Cl. 427-53.100.

UAS Support, Inc.: See—  
Snyder, Stephen J., 4,947,958, Cl. 181-296.000.

Uccello, John S.: See—  
Bemis, William G.; and Uccello, John S., 4,948,565, Cl. 422-103.000.

Uchida, Akihisa: See—  
Tamaki, Yoichi; Ikeda, Kiyoji; Nakamura, Toru; Uchida, Akihisa; Koizumi, Toru; Enami, Hiromichi; Isomura, Satoru; Nakajima, Shinji; Ogiue, Katsumi; and Ohgaya, Kaoru, 4,949,162, Cl. 357-71.000.

Uchida, Hiroshi: See—  
Koike, Kiyoshi; Uchida, Hiroshi; Hayashi, Tatsuro; and Morita, Rikushi, 4,949,365, Cl. 378-54.000.

Uchida, Yasumi: See—  
Tanabe, Sohei; Sato, Seiichi; Kyotani, Yoshinori; Ohta, Tomio; and Uchida, Yasumi, 4,948,892, Cl. 544-396.000.

Uchinami, Masanobu: See—  
Takahashi, Toshihisa; Uchinami, Masanobu; Nishiyama, yoji; Kominami, Seiya; and Nishida, Shinichi, 4,947,819, Cl. 123-489.000.

Uchino, Atsushi: See—  
Higashimura, Koichi; Miyazawa, Yoshinori; Handa, Tsuneo; Mizumoto, Teruyuki; Ito, Hiroshi; Uchino, Atsushi; Motoki, Masanobu; Kunugi, Masanao; Ishiwatari, Tahei; and Shimura, Hidetsugu, 4,948,692, Cl. 430-106.600.

Uchiyama, Yasuji: See—  
Kawashima, Susumu; and Uchiyama, Yasuji, 4,947,723, Cl. 84-603.000.

Ueda, Hiroshi: See—  
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,949,110, Cl. 354-195.100.

Ueda, Kunio: See—  
Sagara, Kazuhiko; Ueda, Kunio; Shimada, Toshikazu; and Ishii, Toshiaki, 4,948,599, Cl. 426-40.000.

Ueda, Norihiro: See—  
Souda, Shigeru; Shimomura, Naoyuki; Ueda, Norihiro; Miyazawa, Shuhei; Yamanaka, Takashi; Miyamoto, Kaname; Hishinuma, Ieharu; Nagakawa, Junichi; Nagaoka, Naoko; Kawashima, Hidetoshi; Kawata, Tsutomu; Nagaoka, Junsaaku; and Wakabayashi, Tsuneo, 4,948,808, Cl. 514-535.000.

Ueda, Seiji, to Matsushita Electronics Corporation. Method of making interconnects between polysilicon layers. 4,948,756, Cl. 437-195.000.

Ueda, Tetsuya, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 4,949,158, Cl. 357-68.000.

Uede, Hisashi: See—  
Isaka, Kinichi; Shimoyama, Hiroyuki; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, 4,949,019, Cl. 315-246.000.

Uematsu, Hiroshi: See—  
Kawajiri, Ryoichi; Uematsu, Hiroshi; and Kato, Takahisa, 4,948,015, Cl. 222-107.000.

Uemura, Noboru: See—  
Sato, Takateru; Uemura, Noboru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenichi, 4,949,210, Cl. 360-132.000.

Ueno, Kiyoshi: See—  
Nakashima, Shozaburo; Kuroki, Katsuro; and Ueno, Kiyoshi, 4,948,433, Cl. 148-111.000.

Ueshima, Takaaki: See—  
Kusunuki, Soshiro; Morita, Yuzo; Yoneda, Kenzi; Ueshima, Takaaki; Tobita, Toshimitsu; and Fujino, Atsuya, 4,947,965, Cl. 187-127.000.

UFA, Inc.: See—  
Gerstenfeld, Arthur; Gualtieri, Michael N.; and Moody, Thomas D., 4,949,267, Cl. 364-439.000.

Ugai, Yasuhiro: See—  
Aoki, Shigeo; Ugai, Yasuhiro; Miyake, Katsumi; and Okamoto, Kotaro, 4,948,231, Cl. 350-334.000.

Uhl, Robert J., to Tele Engineering, Inc. Proximity control system. 4,947,759, Cl. 104-299.000.

Umeyama, Mitsuhiro; Itoh, Hiroshi; Nimura, Hiroski; and Yamamoto, Kenichi, to Toyota Jidosha Kabushiki Kaisha. Flywheel with a torsional damper. 4,947,706, Cl. 74-574.000.

Umlauf, William P.: See—  
Miller, Alan L.; Schultz, Susan W.; and Umlauf, William P., 4,947,970, Cl. 192-0.076.

Underberg, Emil: See—  
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Rinehart, Kenneth L., Jr.; Sakai, Ryuichi; and Stroh, Justin G., 4,948,791, Cl. 514-183.000.

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Baumann, William M.; Scott, Ray V., Jr.; House, David W.; and Engel, Dusan J., 4,948,861, Cl. 528-68.000.

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Minoura, Norihiko; Urabe, Kei; Aiba, Seichi; Taguchi, Kazuhiro; and Fujiwara, Yukihiko, 4,949,064, Cl. 338-80.000.

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Usui, Masayoshi; and Serizawa, Haruo, 4,948,774, Cl. 502-439.000.

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Day, Robert H.; and Hewison, George D., 4,948,319, Cl. 411-377.000.

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Blatton, Russell W.; Taylor, J. Eric; and Stearns, Thornton, 4,947,650, Cl. 62-50.100.

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Seprodi, Janos; Teplan, Istvan; Schon, Istvan; Ercegyi, Judit; Vadasz, Zsolt; nee Kuprina, Olga N.; Szirtes, Tamas; Selmerci, Andras; and Kanyicska, Bela, 4,948,873, Cl. 530-328.000.

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Vanderboegh, Ronald A.: See—  
Amstutz, Douglas D.; and Vanderboegh, Ronald A., 4,948,203, Cl. 312-140.000.

Vanderkooi, Jane; and Wilson, David, to University of Pennsylvania, Trustees of the. Method and apparatus for imaging an internal body portion of a host animal. 4,947,850, Cl. 128-654.000.

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Keur, Wilhelmus C.; Mutsaers, Cornelis A. H. A.; and Van Hal, Henricus A. M., 4,948,779, Cl. 505-1.000.

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VanHorn, James R., to McDonnell Douglas Corporation. Circulation control slots in helicopter yaw control system. 4,948,068, Cl. 244-17.190.

van Laarhoven, Josephus M. F. G.; de Bruin, Leendert; and van Arendonk, Anton P. M., to U.S. Philips Corporation. Method of enabling electrical connection to a substructure forming part of an electronic device. 4,948,459, Cl. 156-643.000.

Van Meurs, Johannes M.: See—  
De Bijl, Adrianus M. J.; and Van Meurs, Johannes M., 4,949,016, Cl. 315-208.000.

Vanourek, Robert A.; and Wall, Joseph W., to Pitney Bowes Inc. Flexible billing rate for mail communication systems. 4,949,272, Cl. 364-464.020.

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van Steenberg, Arie, to United States of America, Energy. Fast pulsed excitation wiggler or undulator. 4,949,344, Cl. 372-2.000.

Van Tol, Maurits W.: See—  
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Van Unen, Lambert H. T.; Pluyter, Pieter B.; and Pontenagel, Wilibrordus M. G. F., to Stamicarbon B.V. Process for the production of thin stretched films from polyolefin of ultrahigh molecular weight. 4,948,544, Cl. 264-204.000.

Varadan, Vasundara V.: See—  
Varadan, Vijay K.; and Varadan, Vasundara V., 4,948,922, Cl. 174-35.00G.

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Kurti, Laszlo; Hakkel, Peter; Toth, Gyula; and Vasiziljevics, Gyoze, 4,949,075, Cl. 340-555.000.

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Veksler, Akiva: See—  
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Venkatasesetty, H. V., to Honeywell Inc. Tetraalkylammonium ion solid electrolytes. 4,948,490, Cl. 204-412.000.

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Veenliet, Hendrik; Verhulst, Antonius G. H.; and Raaymakers, Antonius H. M., 4,948,708, Cl. 430-316.000.

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Verret, Jean-Michel. Image shooting method for recording visual spheres and device for implementing such method. 4,949,108, Cl. 354-81.000.

Verzemnieks, Juris: See—  
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Veser, Franz. Winding template for coils drawable into the stator of an electrical machine. 4,947,900, Cl. 140-92.100.

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Villanyi, Tibor J.; and Crofts, John D., to Cummins Engine Company, Inc. Retractable throttle stop. 4,947,814, Cl. 123-396.000.

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Viola, Jeffrey P., to General Electric Company. Phase lock clock recovery with aided frequency acquisition. 4,949,051, Cl. 331-11.000.

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Viscible-4: See—  
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Visser, Anthony, to Visser 's-Gravendeel Holding B.V. Apparatus and method for planting out plants. 4,947,582, Cl. 47-101.000.

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Vitacco, Richard L. Plastic vehicular radiator-condenser with metal cooling inserts. 4,947,931, Cl. 165-148.000.

Vital Kogyo Kabushiki Kaisha: See—  
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Voecks, Gerald E.: See—  
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Vogel, Paul: See—  
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Vogen, Wayne V.; and Mannion, Martin D., to Amray Inc. Vibration cancellation system for scanning electron microscopes. 4,948,971, Cl. 250-310.000.

Vogt, Rolf: See—  
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Voillat, Jean-Pierre, to Willemijn Electronis S.A. Method for the electronic transmission of data and installation for carrying out this method. 4,949,359, Cl. 375-106.000.

Vollmer, Lothar: See—  
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Vollowitz, Robert S., to Avery International Corporation. Variable size envelope with single closure flap. 4,948,028, Cl. 229-80.000.

von der Eltz, Hans-Ulrich; and Christ, Wilhelm, to Hoechst Aktiengesellschaft. Apparatus for continuous treatment, preferably dyeing, of textile material in rope form. 4,947,660, Cl. 68-62.000.

Von Ramm, Olaf T.: See—  
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Voosen, Robert C., to International Electronics, Inc. Glass breakage detector with self-aligning housing. 4,949,073, Cl. 340-550.000.

Vorobiev, Sergei A.: See—  
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Voskamp, Arnold J.: See—  
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W. R. Grace & Co.-Conn.: See—  
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Wada, Katsutoshi: See—  
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Wade, Gentry E.: See—  
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Waeschle Maschinenfabrik GmbH: See—  
Heep, Dieter; Vogel, Paul; and Reichert, Gerhard, 4,948,017, Cl. 222-368.000.

Wagstaff Engineering, Inc.: See—  
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Koch, Ronald J.; Gruber, Robert J.; Julien, Paul C.; Goodman, Donald J.; Gutman, Edward J.; and Maniar, Deepak R., 4,948,686, Cl. 430-45.000.
- Landa, Benzion, 4,949,133, Cl. 355-296.000.
- Schmidlin, Fred W.; and Sullivan, William A., 4,949,103, Cl. 346-150.000.
- Xerxes Corporation: See—  
Berg, Robin; and Burwell, John, 4,948,007, Cl. 220-5.00A.
- Xydeas, Costas: See—  
Koh, Soo N.; and Xydeas, Costas, 4,949,383, Cl. 381-31.000.
- Xyplex, Inc.: See—  
Smith, Mark L.; Nicotia, Joseph J.; Boudreau, Daniel A.; and Goyette, Leo A., 4,949,340, Cl. 371-8.200.
- Yagawara, Shinji; and Ohta, Wasaburo, to Ricoh Company, Ltd. Flow velocity sensor, 4,947,688, Cl. 73-204.260.
- Yagher, Charles, Jr.: See—  
Nixon, Ronald A.; and Yagher, Charles, Jr., 4,948,931, Cl. 200-83.00P.
- Yagi, Isaburo: See—  
Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,948,452, Cl. 156-382.000.
- Yagi, Kaoru: See—  
Maekawa, Yoshio; Yagyu, Osamu; Mizuno, Hironori; Okumura, Minoru; Isoda, Shigeru; and Yagi, Kaoru, 4,948,413, Cl. 71-65.000.
- Yagishita, Osamu: See—  
Watanabe, Tadahiko; Doutsu, Tsuyoshi; Yagishita, Osamu; Yamamoto, Hideki; and Kai, Yukio, 4,948,425, Cl. 75-238.000.
- Yagyu, Osamu: See—  
Maekawa, Yoshio; Yagyu, Osamu; Mizuno, Hironori; Okumura, Minoru; Isoda, Shigeru; and Yagi, Kaoru, 4,948,413, Cl. 71-65.000.
- Yakushiji, Hisao: See—  
Hirao, Tadashi; Sakae, Kiyoshi; Yakushiji, Hisao; and Ohsaki, Saburo, 4,949,153, Cl. 357-51.000.
- Yale University: See—  
Hawrot, Edward; Rosenberg, Michael B.; and Breakefield, Xandra O., 4,948,590, Cl. 424-450.000.
- Yamabe, Ryohei: See—  
Iijima, Yoshio; Yamabe, Ryohei; Nakatsukasa, Masahiro; and Ogiwara, Hiroko, 4,948,616, Cl. 426-587.000.
- Yamada, Akio: See—  
Saito, Yukio; and Yamada, Akio, 4,948,381, Cl. 439-405.000.
- Yamada, Akira: See—  
Kasahara, Akihiro; Yamada, Akira; Wada, Katsutoshi; and Yamasaki, Hideo, 4,948,230, Cl. 350-255.000.
- Yamada, Kenichi, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission, 4,948,370, Cl. 474-28.000.
- Yamada, Shigeyasu: See—  
Oshima, Takafumi; Kozuka, Kazuhiko; and Yamada, Shigeyasu, 4,949,006, Cl. 313-144.000.
- Yamada, Shinjiro, to Mitsui Kinzoku Kogyo Kabushiki Kaisha Door locking device for vehicles, 4,948,183, Cl. 292-199.000.
- Yamada, Takeshi; Osato, Yasukuni; Suzuki, Masao; Watanabe, Okosui; and Kawata, Osamu, to Fujikura Ltd.; and Nippon Telegraph and Telephone Corporation. Method of fusion splicing single-mode optical fibers using an arc discharge, 4,948,412, Cl. 65-4.210.
- Yamada, Tohru, to Tokai Capsule Co., Ltd. Soft capsular preparation of sodium picosulfate, 4,948,591, Cl. 424-456.000.
- Yamada, Toshimitsu: See—  
Mase, Toshiyasu; Hara, Hiromu; and Yamada, Toshimitsu, 4,948,795, Cl. 514-252.000.
- Yamada, Yasuharu; Furukawa, Nobuyuki; and Furukawa, Masaya, to Nippon Steel Chemical Co., Ltd. Separation membranes and process for preparing the same, 4,948,400, Cl. 55-158.000.
- Yamagishi, Fumio: See—  
Hasegawa, Shin-ya; Yamagishi, Fumio; Ikeda, Hiroyuki; and Iwata, Shigetake, 4,948,213, Cl. 350-3.710.
- Yamagishi, Yasuo; Narusawa, Toshiaki; Sawatari, Norio; and Ebisu, Katsuji, to Fujitsu Limited. Process for preparing ink for ink jet printer, 4,948,427, Cl. 106-20.000.
- Yamaguchi, Koji; Fukui, Mika; and Iwai, Isamu, to Kabushiki Kaisha Toshiba. Document processing system, 4,949,287, Cl. 364-523.000.
- Yamaguchi, Masao: See—  
Ishikawa, Kouichi; Mihara, Hiroshi; Kimura, Noriyuki; and Yamaguchi, Masao, 4,947,889, Cl. 137-486.000.
- Yamaguchi, Masato: See—  
Motozato, Yoshiaki; Tomoda, Takashi; Morita, Hiroshi; Yamaguchi, Masato; and Joko, Isao, 4,948,814, Cl. 521-30.000.
- Yamaguchi, Toshiaki: See—  
Harada, Isao; Hokenohara, Hisashi; and Yamaguchi, Toshiaki, 4,948,571, Cl. 423-240.000.
- Yamaguchi, Yoichi: See—  
Kobayashi, Masato; and Yamaguchi, Yoichi, 4,948,482, Cl. 204-192.230.
- Yamaha Corporation: See—  
Hirano, Katsuhiko; Koike, Masahiko; and Toda, Hiroyuki, 4,947,724, Cl. 84-631.000.
- Kawashima, Susumu; and Uchiyama, Yasuji, 4,947,723, Cl. 84-603.000.
- Nonaka, Terumoto, 4,949,275, Cl. 364-490.000.
- Noro, Masao; and Suzuki, Daisuke, 4,949,384, Cl. 381-96.000.
- Takabayashi, Youjiro, 4,947,726, Cl. 84-743.000.
- Toyoda, Atsushi; and Sawada, Shuichi, 4,947,541, Cl. 29-603.000.
- Yamahata, Takashi; and Ohtsu, Tadatoshi, to General Company Limited. Heat-sensitive transferring medium of delayed sending type, 4,948,446, Cl. 156-234.000.
- Yamamoto, Akifumi: See—  
Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,948,452, Cl. 156-382.000.
- Yamamoto, Akio: See—  
Kubo, Kanji; Yamamoto, Akio; and Takeda, Katsumi, 4,949,244, Cl. 364-200.000.
- Yamamoto, Hajime; Kitagaki, Kazunori; and Nakamura, Masahiko, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for color electrophotography, 4,949,125, Cl. 355-219.000.
- Yamamoto, Hideki: See—  
Watanabe, Tadahiko; Doutsu, Tsuyoshi; Yagishita, Osamu; Yamamoto, Hideki; and Kai, Yukio, 4,948,425, Cl. 75-238.000.
- Yamamoto, Kenichi: See—  
Umeyama, Mitsuhiro; Itoh, Hiroshi; Nimura, Hiroshi; and Yamamoto, Kenichi, 4,947,706, Cl. 74-574.000.
- Yamamoto, Masato; Nakajima, Masahiro; and Yamanaka, Toshimasa, to Asahi Kogyo Kogyo K.K. Indicating apparatus within finder of single-lens reflex camera, 4,949,118, Cl. 354-475.000.
- Yamamoto, Motoyuki: See—  
Ohba, Yasuo; Watanabe, Niyoiko; Sugawara, Hideto; Ishikawa, Masayuki; Watanabe, Yukio; and Yamamoto, Motoyuki, 4,949,349, Cl. 372-45.000.
- Yamamura, Keiji; and Yoshida, Hirokazu, to Sharp Kabushiki Kaisha. Structure for mounting a semiconductor device, 4,949,224, Cl. 361-412.000.
- Yamanaka, Takashi: See—  
Souda, Shigeru; Shimomura, Naoyuki; Ueda, Norihiro; Miyazawa, Shuhei; Yamanaka, Takashi; Miyamoto, Kaname; Hishinuma, Ieharu; Nagakawa, Junichi; Nagaoka, Naoko; Kawashima, Hidetoshi; Kawata, Tsutomu; Nagaoka, Junsaku; and Wakabayashi, Tsuneo, 4,948,808, Cl. 514-535.000.
- Yamanaka, Toshimasa: See—  
Yamamoto, Masato; Nakajima, Masahiro; and Yamanaka, Toshimasa, 4,949,118, Cl. 354-475.000.
- Yamanami, Tsuguya: See—  
Murakami, Azuma; Yamanami, Tsuguya; Funahashi, Takahiko; and Senda, Toshiaki, 4,948,926, Cl. 178-19.000.
- Yamane, Yasukuni: See—  
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,949,279, Cl. 364-518.000.
- Yamanouchi, Junichi: See—  
Kojima, Tetsuro; Fujita, Yoshihiro; Yamanouchi, Junichi; and Yasuda, Tomokazu, 4,948,711, Cl. 430-393.000.
- Yamanouchi Pharmaceutical Co., Ltd.: See—  
Mase, Toshiyasu; Hara, Hiromu; and Yamada, Toshimitsu, 4,948,795, Cl. 514-252.000.
- Yamaoka, Fumiyuki: See—  
Kikushima, Shigeru; Yamaoka, Fumiyuki; Kakizaki, Shinobu; and Emura, Junichi, 4,948,163, Cl. 280-707.000.
- Yamasaki, Hideo: See—  
Kasahara, Akihiro; Yamada, Akira; Wada, Katsutoshi; and Yamasaki, Hideo, 4,948,230, Cl. 350-255.000.
- Yamasaki, Yoshiyuki, to Kabushiki Kaisha Fuji Iryoku; and Kabushiki Kaisha Japan Health. Bed-type roller massaging machine, 4,947,833, Cl. 128-52.000.

Yamashita, Masakazu: See—  
Kase, Masao; Koizumi, Toshiaki; Otaki, Masatsugu; Yamashita, Masakazu; Tanaka, Kenji; and Matsuura, Ryo, 4,949,328, Cl. 369-75.200.

Yamashita, Sachihiko; Nakamura, Hideo; and Enomoto, Masayuki, to Honda Giken Kogyo Kabushiki Kaisha. Device for retaining an attachment member. 4,948,027, Cl. 228-44.300.

Yamashita, Toyoharu: See—  
Iwakuma, Takeo; Kawaguchi, Takayuki; Yamashita, Toyoharu; Sasaki, Yasuhiko; and Shimazaki, Tamotu, 4,948,810, Cl. 514-539.000.

Yamato, Masayuki: See—  
Yoshizawa, Akinori; Maeda, Tomoo; and Yamato, Masayuki, 4,948,422, Cl. 75-348.000.

Yamauchi, Kazuki; Sagisaka, Atsushi; and Mochinaga, Nobuyuki, to Casio Computer Co., Ltd. Manually sweepable printing apparatus. 4,949,283, Cl. 364-519.000.

Yamazaki, Masayuki: See—  
Terada, Takami; Suzuki, Saburo; Ito, Sadao; and Yamazaki, Masayuki, 4,948,189, Cl. 296-65.100.

Yamazaki, Shunpei; Inujima, Takashi; Urata, Kazuo; Tashiro, Mamoru; Tanamura, Yuji; Imoto, Shinji; Itoh, Kenji; Odaka, Seichi; Hayashi, Shigenori; and Hirose, Naoki, to Semiconductor Energy Laboratory Co., Ltd. Gas discharge lamp having temperature controlled, liquid reservoir for liquified portion of gas. 4,949,004, Cl. 313-35.000.

Yanagida, Tomohiro: See—  
Tsuiji, Takuji; and Yanagida, Tomohiro, 4,948,775, Cl. 503-207.000.

Yanagidaira, Masatoshi; and Kanai, Tsutomu, to Pioneer Electronic Corporation. Video information transmission service system and head end device therefor. 4,949,170, Cl. 358-86.000.

Yanagihara, Takeshi: See—  
Hoshino, Futoshi; Nakano, Makoto; and Yanagihara, Takeshi, 4,948,772, Cl. 503-207.000.

Yanai, Akio: See—  
Yasunaga, Tadashi; Sasazawa, Koji; and Yanai, Akio, 4,948,626, Cl. 427-38.000.

Yankatis, Michael J.: See—  
Alcock, Richard A.; Alcock, Scott A.; and Yankatis, Michael J., 4,947,665, Cl. 72-17.000.

Yannas, Ioannis V.; Lee, Elaine; and Ferdman, Ariel, to Massachusetts Institute of Technology. Biodegradable templates for the regeneration of tissues. 4,947,840, Cl. 128-156.000.

Yano, Kazuo; Aoki, Masaaki; Masuhara, Toshiaki; and Shimohigashi, Katsuhiko, to Hitachi, Ltd. Homo-junction bipolar transistor having high base concentration and suitable for low temperature operation. 4,949,145, Cl. 357-34.000.

Yasuda, Hirotosugu K.: See—  
Wallsten, Hans I.; and Yasuda, Hirotosugu K., 4,948,485, Cl. 204-164.000.

Yasuda, Shunji: See—  
Kobayashi, Takeshi; Taniguchi, Masayuki; Yasuda, Shunji; and Ikeda, Shigehito, 4,948,736, Cl. 435-311.000.

Yasuda, Tomokazu: See—  
Kojima, Tetsuro; Fujita, Yoshihiro; Yamanouchi, Junichi; and Yasuda, Tomokazu, 4,948,711, Cl. 430-393.000.

Yasuda, Yuji; and Fujioka, Tetsuya, to Ricoh Company, Ltd. Illuminating device. 4,949,120, Cl. 355-67.000.

Yasui Seiki Co., Ltd.: See—  
Iwasaki, Takashi, 4,948,635, Cl. 427-345.000.

Yasui, Shozui, to M. Yasui & Co., Ltd. Mold holding and positioning means for use with wax injector. 4,948,359, Cl. 425-576.000.

Yasukawa, Junichi: See—  
Sugihara, Osamu; Masuda, Hiroshi; Tsukazaki, Shogo; Suzuki, Tameyuki; Yasukawa, Junichi; Ohta, Toshiaki; and Mitsuahara, Toshio, 4,948,706, Cl. 430-311.000.

Yasukawa, Takeshi: See—  
Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,947,949, Cl. 180-79.100.

Yasunaga, Tadashi; Sasazawa, Koji; and Yanai, Akio, to Fuji Photo Film Co., Ltd. Method for producing thin-film magnetic recording medium. 4,948,626, Cl. 427-38.000.

Yates, Steve K.; and Darland, Tracy M., to Ingersoll-Rand Company. Method and apparatus for maintaining a load raising linkage in a raised position. 4,947,705, Cl. 74-529.000.

Yates, Thomas E., to Eastman Kodak Company. Athermalized optical head. 4,948,221, Cl. 350-96.200.

Yazdani, Armand; and Wong, Coeman L. S., to NEI Canada Limited. High speed display device. 4,949,082, Cl. 340-783.000.

Yeager, Elmer R. Security device for dead bolt door lock. 4,947,663, Cl. 70-416.000.

Yeh, Hsi-Han; Banda, Siva S.; and Lynch, Paul J., to United States of America, Air Force. Smart controller. 4,949,236, Cl. 364-148.000.

Yergenson, Robin P.; and Skarke, Donald D., to Hewlett-Packard Company. Probe for dual in-line packages. 4,949,032, Cl. 324-158.00P.

Yerkovich, Nick A. Bait holder. 4,947,575, Cl. 43-44.400.

Yetter Manufacturing Company: See—  
Johnston, Mark, 4,947,770, Cl. 111-121.000.

Yin, E. Thye. Composition, kit and method for assaying heparin and a method for making the composition. 4,948,724, Cl. 435-13.000.

Yoder, Ronald L., to Universal Consolidated Methods, Inc. Adjustable downrigger mounting device. 4,947,777, Cl. 114-221.00R.

Yokoe, Hifumi; and Harada, Chikao, to Colin Electronics Co., Ltd. Blood pressure measuring apparatus. 4,947,855, Cl. 128-672.000.

Yokohama Rubber Co., Ltd.: See—  
Ishikawa, Yasuhiro; Kaidoo, Hiroyuki; Takei, Sadakazu; and Takahashi, Shuji, 4,947,916, Cl. 152-536.000.

Kaba, Kazuyuki; Takahashi, Ken; and Kida, Masashi, 4,947,913, Cl. 152-454.000.

Yokota, Shouji, to Sharp Kabushiki Kaisha. Photodetector having convex window for shielding electromagnetic wave and electrostatic induction noises. 4,948,969, Cl. 250-239.000.

Yokoyama, Nobuyoshi: See—  
Ejiri, Susumu; Kimura, Makoto; Tabuchi, Yasuhiko; and Yokoyama, Nobuyoshi, 4,947,824, Cl. 126-391.000.

Yokoyama, Takehiro: See—  
Chigira, Eiki; and Yokoyama, Takehiro, 4,949,253, Cl. 364-200.000.

Yokoyama, Tetsuo: See—  
Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,947,837, Cl. 128-653.0AF.

Yoneda, Katsuhiko: See—  
Hamada, Takuji; Takahashi, Masahiro; Yoneda, Katsuhiko; and Okada, Masakazu, 4,949,336, Cl. 370-85.200.

Yoneda, Kenzi: See—  
Kuzunuki, Soshiro; Morita, Yuzo; Yoneda, Kenzi; Ueshima, Takaaki; Iobita, Toshimitsu; and Fujino, Atsuya, 4,947,965, Cl. 187-127.000.

Yonekawa, Takashi: See—  
Buma, Shuichi; Aburaya, Toshio; Yonekawa, Takashi; Takeda, Osamu; Urababa, Shingo; and Doi, Shunichi, 4,949,262, Cl. 364-424.050.

Yoneyama, Masaru: See—  
Imai, Yoshio; Kakimoto, Masa-Aki; and Yoneyama, Masaru, 4,948,864, Cl. 528-219.000.

Yoneyama, Sachiko: See—  
Ohsawa, Toshiyuki; Kabata, Toshiyuki; Kimura, Okitoshi; and Yoneyama, Sachiko, 4,948,685, Cl. 429-213.000.

Yonezawa, Keitaro, to Kabushiki Kaisha Kosmek. Hydraulic clamp. 4,948,105, Cl. 269-32.000.

Yonezawa, Seiji: See—  
Tsuyoshi, Toshiaki; Ohtake, Masatoshi; Takasugi, Wasao; Yonezawa, Seiji; Takeuchi, Takashi; and Saitoh, Tadashi, 4,949,325, Cl. 369-49.000.

Yoon, Hyun-Nam: See—  
DeMartino, Ronald N.; Yoon, Hyun-Nam; and Stamatoff, James B., 4,948,532, Cl. 252-587.000.

Yorozu, Hidenori: See—  
Kamiya, Tetsuro; Inoue, Takeshi; Yoroze, Hidenori; Eguchi, Yasuteru; and Tsujii, Kaoru, 4,948,588, Cl. 424-436.000.

Yoshida, Hirokazu: See—  
Yamamura, Keiji; and Yoshida, Hirokazu, 4,949,224, Cl. 361-412.000.

Yoshida, Kobun; and Mori, Toshiro, to TEAC Corporation. Tape recorder for playing endless magnetic tape. 4,949,204, Cl. 360-93.000.

Yoshida, Takeji: See—  
Sumida, Mamoru; Fukata, Hironobu; Yoshida, Takeji; and Matsumoto, Osamu, 4,947,890, Cl. 137-546.000.

Yoshida, Takuji, to Kabushiki Kaisha Toshiba. Disk reproduction apparatus and method for high speed accessing of desired information data by checking address data. 4,949,323, Cl. 369-32.000.

Yoshida, Teruaki: See—  
Ogawa, Tadatoshi; and Yoshida, Teruaki, 4,948,657, Cl. 428-218.000.

Yoshida, Tomoji, to Clarion Co., Ltd. Detachable type carborne electronic apparatus. 4,947,661, Cl. 70-57.000.

Yoshigi, Mayumi: See—  
Antoku, Fujio; Yoshigi, Mayumi; Saji, Ikutaro; Kojima, Atsuyuki; and Ishizumi, Kuku, 4,948,799, Cl. 514-278.000.

Yoshikawa, Akio; and Sugino, Takashi, to Matsushita Electric Industrial Co., Ltd. Method of producing stripe-structure semiconductor laser. 4,948,753, Cl. 437-129.000.

Yoshikawa, Hiroki: See—  
Hirata, Koji; Fukuda, Kyohei; Yoshikawa, Hiroki; Mori, Shigeru; Muranaka, Masayuki; Yoshizaki, Isao; Inaoka, Shigeru; and Jitsukata, Hiroshi, 4,948,237, Cl. 350-432.000.

Yoshimura, Tatsuro: See—  
Kono, Takeshi; and Yoshimura, Tatsuro, 4,949,033, Cl. 324-158.00R.

Yoshizaki, Isao: See—  
Hirata, Koji; Fukuda, Kyohei; Yoshikawa, Hiroki; Mori, Shigeru; Muranaka, Masayuki; Yoshizaki, Isao; Inaoka, Shigeru; and Jitsukata, Hiroshi, 4,948,237, Cl. 350-432.000.

Yoshizawa, Akinori; Maeda, Tomoo; and Yamato, Masayuki, to Yoshizawa, Akinori; and Nippon Kokan Kabushiki Kaisha. Method of manufacturing superfine magnetic metal powder. 4,948,422, Cl. 75-348.000.

Young, David A.: See—  
Crossman, Philip; Hybarger, Kenneth C.; Zeeuw, Bryan H.; and Young, David A., 4,948,198, Cl. 297-304.000.

Young, Grant A.; and Wakley, William D., to Amoco Corporation. System for preventing oil droplet size reduction. 4,948,517, Cl. 210-767.000.

Young, Harold W., Jr.; and Curnutt, Gerald L. Oxydehydrogenation of saturated aliphatic nitriles over a carbon catalyst. 4,948,910, Cl. 558-383.000.

Young, Jonathan, to Paccar Inc. System and method for facilitating correct gear meshing and clutch engagement in vehicles. 4,947,681, Cl. 73-118.100.

Young, Patrick J.; and Faulkner, Sherry C. Flexible interoperative X-ray cassette. 4,949,371, Cl. 378-184.000.

Young, Robert: See—  
Duran, John A.; Young, Robert; and Chang, Peter, 4,948,316, Cl. 411-353.000.

Youngers, David N.: See—  
Christenson, Patrick J.; Martens, Craig W.; Wenz, David G.; and Youngers, David N., 4,949,300, Cl. 364-900.000.

Yu, Kin T.: See—  
Suh, John T.; Pendleton, Robert G.; Pendley, Charles E., II; Yu, Kin T.; Menard, Paul R.; and Schreiber, Alain B., 4,948,582, Cl. 424-529.000.

Yuda, Hideaki: See—  
Tejima, Yasuyuki; Arai, Akihiro; Yuda, Hideaki; Sugawara, Saburo; and Toji, Shigeo, 4,949,115, Cl. 354-403.000.

Yuen, Haison. Folding ladder. 4,947,959, Cl. 182-22.000.

Yuen, Walter W., to Zond Systems, Inc. High-temperature, gas-burning furnace. 4,948,365, Cl. 432-103.000.

Yukawa, Hiroshi, to Olympus Optical Co., Ltd. Count error detecting device for count type measuring instruments. 4,949,364, Cl. 377-28.000.

Yukl, Tex, to Spatial Dynamics, Ltd. Dielectric-constant change monitoring. 4,947,848, Cl. 128-653.00R.

Yukl, Tex, to Spatial Dynamics, Ltd. Nearfield/farfield antenna with parasitic array. 4,949,094, Cl. 343-785.000.

Yunoki, Yutaka, to Olympus Optical Co., Ltd. Magnetic recording/reproduction apparatus. 4,949,199, Cl. 360-66.000.

Zagrodnik, Jeffrey P.; and Bowen, Gerald K., to Globe-Union Inc. Terminal electrode. 4,948,681, Cl. 429-34.000.

Zahnradfabrik Frieorichshafen AG: See—  
Huff, Martin, 4,947,966, Cl. 188-170.000.

Zainutdinov, Sadridin: See—  
Artyukov, Farykhdzhon A.; Zainutdinov, Sadridin; and Akhmedov, Karim S., 4,948,835, Cl. 524-704.000.

Zallie, James P.; Kascia, James J.; and Eden, James, to National Starch and Chemical Investment Holding Corporation. Extruded gelled products. 4,948,615, Cl. 426-578.000.

Zander, Thomas: See—  
Knodel, Rolf; Schimpff, Frithjof; Bergenthal, Wolfgang; and Zander, Thomas, 4,948,089, Cl. 249-86.000.

Zankovich, Thomas J., to Wesanco, Inc. Nut platform for framing channels. 4,948,313, Cl. 411-85.000.

Zaun GmbH: See—  
Brand, Werner; Rohr, Gerhard; Werner, Heinz; and Schwarzfeller, Holger, 4,948,099, Cl. 256-47.000.

Zdanowicz, Lawrence E.: See—  
Bland, Gerald F.; Mondek, Martin J.; and Zdanowicz, Lawrence E., 4,948,384, Cl. 440-78.000.

Zeeuw, Bryan H.: See—  
Crossman, Philip; Hybarger, Kenneth C.; Zeeuw, Bryan H.; and Young, David A., 4,948,198, Cl. 297-304.000.

Zegers, Cornelis P. G. M.: See—  
Huizing, Albert; Zegers, Cornelis P. G. M.; Heijmans, Teunis J. A.; and Van Tol, Maurits W., 4,949,367, Cl. 378-84.000.

Zeh, Horst, to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH. Method of removing sedimentated solids from a container and an apparatus therefor. 4,948,519, Cl. 210-803.000.

Zelentsov, Andrei A.: See—  
Sudnishnikov, Vadim B.; and Zelentsov, Andrei A., 4,947,941, Cl. 173-134.000.

Zellweger Uster Ltd.: See—  
Felix, Ernst; and Wampfler, Hans, 4,948,260, Cl. 356-429.000.

Zelmin, Arnold E., to Aktiebolaget Electrolux. Cable reel. 4,948,065, Cl. 242-107.600.

Zembrodt, Anthony R., to Drackett Company. Air freshener with microporous membrane. 4,948,047, Cl. 239-34.000.

Zenitani, Yurimasa: See—  
Taguchi, Tohru; Zenitani, Yurimasa; Ikeda, Akio; and Nishimura, Toshiji, 4,948,868, Cl. 528-339.000.

Zenz, Frederick A., to HRI, Inc. Fluidized bed reactor using capped dual-sided contact units and methods for use. 4,947,803, Cl. 122-4.00D.

Zero International Inc.: See—  
Wexler, Elias, 4,947,584, Cl. 49-307.000.

Zero-Max Industries Inc.: See—  
Dodds, Kevin J.; and Kaminer, Isaac, 4,947,698, Cl. 74-25.000.

Zhuravlev, Mikhail G.: See—  
Tsymbal, Valery D.; Chernyshev, Vladimir G.; Zhuravlev, Mikhail G.; Morozov, Oleg K.; Tulyakov, Georgy A.; and Sirutynsky, Alexandr V., 4,948,488, Cl. 204-212.000.

Zidon, Aharon: See—  
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Ziggliotti, Antonio; and Di Schiena, Michele, to Altergon S. A. & Ricerfarma Srl. Salt of diclofenac with a pyrrolidine compound and pharmaceutical compositions which contain it. 4,948,805, Cl. 514-428.000.

Zike, Donald R. Bag-forming and filling apparatus and process. 4,947,625, Cl. 53-459.000.

Zimmerman, Larry; and Miller, John. Pneumatic ball drop checker device and method. 4,947,676, Cl. 73-37.500.

Zimmermann, Reinhard: See—  
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Zipperle, Michael. Sun visor for motor vehicles. 4,948,240, Cl. 350-606.000.

Zirotti, Carlo: See—  
Galliani, Giulio; Barzaghi, Fernando; Zirotti, Carlo; and Toja, Emilio, 4,948,804, Cl. 514-423.000.

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Zschocher, Hartmut: See—  
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Zuchtriegel, Anton, to Patent Treuhand Gesellschaft für elektrische Glühlampen m.b.H. High-frequency operating circuit for a fluorescent lamp. 4,949,013, Cl. 315-106.000.

Zuhoski, Peter B., Jr.: See—  
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Zupancic, Viktor. Worm reduction gear assembly. 4,947,699, Cl. 74-425.000.

Zur, Yuval, to Elscint Ltd. Magnetic resonance imaging. 4,949,041, Cl. 324-309.000.

Zwicker, Fred, to Truman's Inc., Ohio Corporation. Sandblasting valving device. 4,947,589, Cl. 51-410.000.

Zyer, Benjamin: See—  
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## LIST OF REISSUE PATENTEEES

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NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Baker, Stephen R.; Jamieson, William B.; and Todd, Alec, to Eli Lilly and Company. Oxiranes. Re. 33,300, Cl. 548-252.000.
- Bayer Aktiengesellschaft: See—  
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; and Schmidt, Robert R., Re. 33,298, Cl. 71-92.000.
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- Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 1-(2-oxyaminosulphonyl-phenylsulphonyl)-3-heteroaryl-ureas. Re. 33,298, Cl. 71-92.000.
- Eli Lilly and Company: See—  
Baker, Stephen R.; Jamieson, William B.; and Todd, Alec, Re. 33,300, Cl. 548-252.000.
- Fest, Christa: See—  
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- Ford Motor Company: See—  
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- Fujii, Tatsuo; and Takeda, Shigetomo, to TDK Corporation. Casing for magnetic tape cassette. Re. 33,294, Cl. 206-387.000.
- Gould Inc.: See—  
Stowe, David W.; and Kopera, Paul M., Re. 33,296, Cl. 350-320.000.
- Jamieson, William B.: See—  
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- Kirsten, Rolf: See—  
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- Kluth, Joachim: See—  
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; and Schmidt, Robert R., Re. 33,298, Cl. 71-92.000.
- Kopera, Paul M.: See—  
Stowe, David W.; and Kopera, Paul M., Re. 33,296, Cl. 350-320.000.
- Minnesota Mining and Manufacturing Company: See—  
Sweeny, Norman P.; Charbonneau, Jack W.; and Wienke, Orville F., Re. 33,299, Cl. 428-201.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Oshikiri, Keichi; and Nakamura, Tooru, Re. 33,301, Cl. 307-527.000.
- Muller, Klaus-Helmut: See—  
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- Nakamura, Tooru: See—  
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- Oshikiri, Keichi; and Nakamura, Tooru, to Mitsubishi Denki Kabushiki Kaisha. Synchronism detector circuit. Re. 33,301, Cl. 307-527.000.
- Pfister, Theodor: See—  
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- Priesnitz, Uwe: See—  
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- Ramus, Kevin J.; and Youngs, John D., to Ford Motor Company. Method for making an electrically heatable windshield. Re. 33,297, Cl. 65-42.000.
- Riebel, Hans-Jochem: See—  
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- Roy, Wolfgang: See—  
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- Santel, Hans-Joachim: See—  
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- Schmidt, Robert R.: See—  
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- Stowe, David W.; and Kopera, Paul M., to Gould Inc. Method of making a polarization-insensitive, evanescent-wave, fused coupler with minimal environmental sensitivity. Re. 33,296, Cl. 350-320.000.
- Sweeny, Norman P.; Charbonneau, Jack W.; and Wienke, Orville F., to Minnesota Mining and Manufacturing Company. Fragrance-releasing pull apart sheet. Re. 33,299, Cl. 428-201.000.
- Takeda, Shigetomo: See—  
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- TDK Corporation: See—  
Fujii, Tatsuo; and Takeda, Shigetomo, Re. 33,294, Cl. 206-387.000.
- Todd, Alec: See—  
Baker, Stephen R.; Jamieson, William B.; and Todd, Alec, Re. 33,300, Cl. 548-252.000.
- Trimble Design, Inc.: See—  
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- Trimble, James L., to Trimble Design, Inc. Bicycle frame. Re. 33,295, Cl. 280-281.100.
- Wienke, Orville F.: See—  
Sweeny, Norman P.; Charbonneau, Jack W.; and Wienke, Orville F., Re. 33,299, Cl. 428-201.000.
- Youngs, John D.: See—  
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## LIST OF REEXAMINATION PATENTEEES

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- Fetter, Richard W.; Gadsby, Peter D.; and Kabachinski, Jeffery L., to Marquette Electronics Inc. Microwave hyperthermia probe. B1 4,841,988, 8-14-90, Cl. 128-804.000.
- Gadsby, Peter D.: See—  
Fetter, Richard W.; Gadsby, Peter D.; and Kabachinski, Jeffery L., B1 4,841,988, Cl. 128-804.000.
- Kabachinski, Jeffery L.: See—  
Fetter, Richard W.; Gadsby, Peter D.; and Kabachinski, Jeffery L., B1 4,841,988, Cl. 128-804.000.
- Marquette Electronics Inc.: See—  
Fetter, Richard W.; Gadsby, Peter D.; and Kabachinski, Jeffery L., B1 4,841,988, Cl. 128-804.000.

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- A.M.K. Investments Ltd.: See—  
Kraus, Arthur M., 309,830, Cl. D3-61.000.
- Abe, Kenji: See—  
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- Allard, Peter B.: See—  
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- American Safety Razor Company: See—  
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- Andersen, Edel S.: See—  
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- Applebaugh, Gregory R. Low flow nasal cannula. 309,960, 8-14-90, Cl. D29-7.000.
- Architectural Creative Lighting, Inc.: See—  
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- Artemide S.p.A.: See—  
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- Asada, Kohji, to Kabushiki Kaisha Tamiya Mokei. Toy car. 309,930, 8-14-90, Cl. D21-141.000.
- Aveni, Michael A.; and Hatfield, Tinker L., to Nike, Inc.; and Nike International Ltd. Athletic shoe upper. 309,824, 8-14-90, Cl. D2-314.000.
- Azpetia Ortiz de Arri, Juan M., to Solac Telecom, S.A. Telephone set. 309,898, 8-14-90, Cl. D14-148.000.
- Barnett, Rex B., to SP Tyres UK Limited. Vehicle tire. 309,883, 8-14-90, Cl. D12-143.000.
- Barret, Thierry, to Salomon S.A. Golf shoe. 309,822, 8-14-90, Cl. D2-313.000.
- Baxter, James A. Plug for vials. 309,863, 8-14-90, Cl. D9-439.000.
- Baxter, John A. Fishing tackle float. 309,937, 8-14-90, Cl. D22-134.000.
- Beckman Instruments, Inc.: See—  
Johnson, Ronald C., 309,867, Cl. D10-81.000.
- Beirise, Jean; and Coons, John, to Herman Miller, Inc. Wall-mountable card file. 309,917, 8-14-90, Cl. D19-76.000.
- Berger, Hugo: See—  
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- Grinberg, Gedalia; and Berger, Hugo, 309,872, Cl. D10-126.000.
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- Bobrick, Michael L., to Western States Import Company, Inc. Bicyclist's helmet. 309,961, 8-14-90, Cl. D29-12.000.
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- Brooks, David A., to Spooner Est. Cleaning unit for collecting debris in a swimming pool. 309,965, 8-14-90, Cl. D32-25.000.
- Brown, Gordon L., Jr., to Morrison Molded Fiber Glass Company. Exercise rod or similar article. 309,933, 8-14-90, Cl. D21-198.000.
- Bryant, Roy D. Panty for panty hose. 309,820, 8-14-90, Cl. D2-10.000.
- Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Earring. 309,879, 8-14-90, Cl. D11-71.000.
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- Byrley, Frank D. Popcorn vending machine. 309,919, 8-14-90, Cl. D20-1.000.
- Caesar, Jeannine J., to Kapow, Inc. Telephone faceplate. 309,901, 8-14-90, Cl. D14-244.000.
- Cain, Ann S., to 'totes', incorporated. Umbrella handle. 309,825, 8-14-90, Cl. D3-12.000.
- Cain, Ann S., to 'totes', incorporated. Umbrella handle. 309,826, 8-14-90, Cl. D3-12.000.
- Callinan, Christopher J., to Regent Sheffield, Ltd. Handle for flatware. 309,849, 8-14-90, Cl. D7-649.000.
- Callinan, Christopher J., to Regent Sheffield, Ltd. Handle for flatware. 309,850, 8-14-90, Cl. D7-649.000.
- Callinan, Christopher J., to Regent Sheffield, Ltd. Handle for flatware. 309,852, 8-14-90, Cl. D7-649.000.
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- Cesarczyk, Edward J.; Dillon, Richard R.; and Henneberg, Helmut H., to Bull HN Information Systems Inc. Computer processing system. 309,894, 8-14-90, Cl. D14-100.000.
- Chambers, Debra D. Nursing bottle. 309,948, 8-14-90, Cl. D24-47.000.
- Cheng, Willis, to Woods Far East, Inc. Transformer with light socket connector input and telephone-style connector output. 309,888, 8-14-90, Cl. D13-110.000.
- Cheng, Willis, to Woods Far East, Inc. Multi-channel transmitter. 309,889, 8-14-90, Cl. D13-168.000.
- Cheng, Willis, to Woods Far East, Inc. Indoor/outdoor transmitter. 309,890, 8-14-90, Cl. D13-168.000.
- Cheng, Willis, to Woods Far East, Inc. Remotely controlled wall-mounted switch. 309,891, 8-14-90, Cl. D13-158.000.
- Cheung, David, to Video Technology Industries, Inc. Electronic educational game housing. 309,923, 8-14-90, Cl. D21-13.000.
- Chiba, Kazumi. Savings box or similar article. 309,972, 8-14-90, Cl. D99-37.000.
- Chien, Tseng L. Solar powered light. 309,953, 8-14-90, Cl. D26-67.000.
- Chien, Tseng L. Solar powered outdoor light. 309,954, 8-14-90, Cl. D26-67.000.
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- Cook, Cary. Eyeglass case. 309,828, 8-14-90, Cl. D3-34.000.
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- Cureton, Earl E. Distributor housing and cover for a wildlife feeder motor. 309,963, 8-14-90, Cl. D30-122.000.
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- Dunmore, Derek G. Retro-reflective element for bicycle wheel spokes or similar articles. 309,869, 8-14-90, Cl. D10-111.000.
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- Ebeling, Olavi, to Suomen Jonas Oy. Face mask for cold protection. 309,962, 8-14-90, Cl. D29-17.000.
- Eldon Industries, Inc.: See—  
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- Endelson, Robert A.; and Blank, Eric. Dental floss dispenser. 309,959, 8-14-90, Cl. D28-64.000.
- Endo, Takayoshi; and Yamamoto, Masayuki, to Yazaki Corporation. Cover for an electrical wire connector housing. 309,893, 8-14-90, Cl. D13-156.000.
- Estvold, Terry L. Disposable toothbrush holder. 309,840, 8-14-90, Cl. D6-534.000.
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- Fagan, William. Mechanic's creeper. 309,967, 8-14-90, Cl. D34-23.000.
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- Fukuda, Masao; and Kida, Kenichi, to Terumo Kabushiki Kaisha. Electronic clinical thermometer. 309,866, 8-14-90, Cl. D10-57.000.
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 Grinberg, Gedalia; and Berger, Hugo, to North American Watch Corporation. Wrist watch dial. 309,872, 8-14-90, Cl. D10-126.000.  
 Grinberg, Gedalia; and Berger, Hugo, to North American Watch Corporation. Wrist watch dial. 309,873, 8-14-90, Cl. D10-126.000.  
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 Neimy, Daniel T.; Haberman, Roderick A.; Allard, Peter B.; and Graser, Clarence F., 309,940, Cl. D23-324.000.  
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Hartman, Robert: See—

Vanderlaan, Dan H.; and Hartman, Robert, 7,298, Cl. 89.000.

Herrick, Robert D., to Cottage Gardens Nursery. *Nephrolepis exaltata* named Napa Cottage. 7,299, 8-14-90, Cl. 89.000.

Ison, William G. Farrer. 7,294, 8-14-90, Cl. 47.000.

Ison, William G. African Queen. 7,295, 8-14-90, Cl. 47.000.

Ison, William G. Fry seedless. 7,296, 8-14-90, Cl. 47.000.

Vanderlaan, Dan H.; and Hartman, Robert, to Hartman Plant Laboratories, Inc. *Dieffenbachia* plant named Tiki. 7,298, 8-14-90, Cl. 89.000.

## CLASSIFICATION OF PATENTS

ISSUED AUGUST 14, 1990

NOTE—First number, class; second number, subclass; third number, patent number

CLASS 2		275.4	4,947,554		373	4,947,618		86	4,948,414		743	4,947,726		357	4,947,785		
164	4,947,486	CLASS 33			399	4,947,619		90	4,948,415		CLASS 87		CLASS 116				
167	4,947,487	199 R	4,947,555		425	4,947,620		91	4,948,416		12	4,947,727		218	4,947,786		
181	4,947,488	370	4,947,556		442	4,947,605		92	Re:33,298		CLASS 89		CLASS 118				
304	4,947,489	503	4,947,557		451	4,947,621			4,948,417		14.3		4,947,729		64	4,947,787	
424	4,947,490	797	4,947,558		459	4,947,625			4,948,418		46	4,947,728		653	4,947,788		
CLASS 4		CLASS 34			487	4,947,622		93	4,948,419		146	4,947,730		715	4,947,790		
321	4,947,491	70	4,947,559		493	4,947,623		94	4,948,420		CLASS 91		CLASS 119				
420	4,947,492	CLASS 36			540	4,947,624			4,948,421		229	4,947,731			CLASS 119		
476	4,947,493	88	4,947,560		557	4,947,627		CLASS 72			363 R	4,947,732		3	4,947,791		
492	4,947,494	CLASS 37			20	4,948,389		17	4,947,665		466	4,947,733		5	4,947,792		
496	4,947,495	197	4,947,562		21	4,948,390		56	4,947,667		471	4,947,734		14.17	4,947,793		
CLASS 5		231	4,947,563		26	4,948,391		75	4,947,668		CLASS 98		CLASS 119				
61	4,947,496	CLASS 38			34	4,948,392		77	4,947,669		2.06	4,947,735		17	4,947,794		
86	4,947,497	102.91	4,947,561		40	4,948,393		130	4,947,670		86	4,947,736		29	4,947,795		
113	4,947,498	CLASS 40			48	4,948,394		181	4,947,671		CLASS 99		51.5		4,947,796		
432	4,947,499	110	4,947,564		67	4,948,395		453.16	4,947,672		CLASS 99		52.2		4,947,797		
453	4,947,500	152	4,947,565		92	4,948,396		456	4,947,673		277.1	4,947,737		53	4,947,798		
CLASS 8		158.1	4,947,566		96	4,948,397		CLASS 73			293	4,947,738		83	4,947,799		
151	4,947,501	299	4,947,567		97	4,948,398		1 D	4,947,674		323.2	4,947,739		98	4,947,800		
CLASS 10		316	4,947,568		148	4,948,399		3	4,947,675		323.6	4,947,740		120	4,947,801		
10 R	4,947,502	337	4,947,569		158	4,948,400		37.5	4,947,676		345	4,947,741		160	4,947,802		
CLASS 15		553	4,947,570		180	4,948,401		38	4,947,677		483	4,947,742		CLASS 122			
CLASS 42		CLASS 56			233	4,948,402		54	4,947,678		CLASS 100		4 D		4,947,803		
49.1	4,947,503	13.5	4,947,628		282	4,948,403		64.1	4,947,679		45	4,947,743		CLASS 123			
119 A	4,947,504	13.6	4,947,629		CLASS 57			116	4,947,680		CLASS 101		CLASS 123				
246	4,947,505	249	4,947,630		74	4,947,632		118.1	4,947,681		129	4,947,744		41.35	4,947,805		
247	4,947,506	364	4,947,626		86	4,947,633		154	4,947,682		142	4,947,745		41.86	4,947,806		
250.16	4,947,507	377	4,947,631		93	4,947,634		155	4,947,683		211	4,947,746		52 MV	4,947,807		
250.35	4,947,508	36	4,947,574		202	4,947,635		159	4,947,684		288	4,947,747		145 A	4,947,808		
301	4,947,509	44.4	4,947,575		212	4,947,638			4,947,685		409	4,947,748		169 PA	4,947,809		
310	4,947,510	57.1	4,947,577		218	4,947,639		204.26	4,947,686		459	4,947,749		179 BG	4,947,810		
312.1	4,947,511	131	4,947,578		311	4,947,637		304 C	4,947,688		459	4,947,750		188 P	4,947,811		
329	4,947,512	535	4,947,576		CLASS 60			654	4,947,690			4,947,750		193 C	4,947,812		
330	4,947,513	57	4,948,386		CLASS 62			753	4,947,691		CLASS 102		352		4,947,813		
339	4,947,514	1.01	4,947,579		CLASS 62			786	4,947,692		305	4,947,751		396	4,947,814		
401	4,947,515	1.5	4,947,580		CLASS 62			800	4,947,693		430	4,947,752		399	4,947,815		
CLASS 16		1.7	4,947,581		CLASS 62			862.59	4,947,694		487	4,947,753		422	4,947,816		
289	4,947,516	101	4,947,582		CLASS 62			863.01	4,947,695		489	4,947,754		425	4,947,817		
CLASS 17		62 R	4,948,387		CLASS 62			864.34	4,947,696		506	4,947,755		479	4,947,818		
1 R	4,947,517	CLASS 48			CLASS 62			865.9	4,947,697		CLASS 104		489		4,947,819		
11.2	4,947,518	CLASS 49			CLASS 62			CLASS 74			2	4,947,756		571	4,947,820		
48	4,947,519	193	4,947,583		CLASS 62			25	4,947,698		7.2	4,947,757		606	4,947,821		
CLASS 19		307	4,947,584		CLASS 62			425	4,947,699		172.5	4,947,758		CLASS 124			
104	4,947,522	478	4,947,585		CLASS 62			445	4,947,700		299	4,947,759		41.1	4,947,822		
105	4,947,520	193	4,947,583		CLASS 62			471 XY	4,947,701		CLASS 105		CLASS 126				
235	4,947,521	307	4,947,584		CLASS 62			479	4,947,702		4.4	4,947,761		391	4,947,823		
CLASS 24		478	4,947,586		CLASS 62			501.5 R	4,947,703		03	4,947,760		439	4,947,824		
30.5 R	4,947,523	488	4,947,586		CLASS 62			502.4	4,947,704		329.1	4,947,762		529	4,947,825		
67.9	4,947,524	CLASS 51			CLASS 62			529	4,947,705		CLASS 106		CLASS 128				
304	4,947,525	17	4,947,587		CLASS 62			574	4,947,706		20	4,948,427		24 A	4,947,826		
336	4,947,526	206 R	4,947,588		CLASS 62				4,947,707		8	4,948,428		4	4,947,827		
575	4,947,527	283 R	4,947,589		CLASS 62				4,947,708		273.1	4,948,431		6	4,947,828		
CLASS 26		287	4,947,590		CLASS 62				4,947,709		628	4,948,428		11	4,947,829		
CLASS 26		308	4,948,388		CLASS 62				4,947,687		659	4,948,429		CLASS 128			
2 R	4,947,528	320	4,947,591		CLASS 62			CLASS 75			CLASS 108		24 A		4,947,830		
84	4,947,529	410	4,947,589		CLASS 62			10.14	4,948,423		8	4,947,763		25 R	4,947,831		
CLASS 29		436	4,947,592		CLASS 62			234	4,948,424		CLASS 109		33		4,947,832		
81.14	4,947,532	105	4,947,593		CLASS 62			238	4,948,425		3	4,947,764		52	4,947,833		
402.14	4,947,530	126.4	4,947,594		CLASS 62			321	4,948,430		6	4,947,765		64	4,947,834		
426.4	4,947,534	177	4,947,595		CLASS 62			348	4,948,422		3	4,947,766		80 R	4,947,835		
428	4,947,535	202	4,947,596		CLASS 62			CLASS 76			56	4,947,766		84 R	4,947,836		
430	4,947,536	208	4,947,597		CLASS 62			119	4,947,710		CLASS 110		90		4,947,839		
446	4,947,531	226	4,947,599		CLASS 62				CLASS 81			212	4,947,767		156	4,947,840	
527.1	4,947,537	235	4,947,600		CLASS 62			3.37	4,947,711		259	4,947,769		207.14	4,947,841		
568	4,947,538	239	4,947,601		CLASS 62			53.2	4,947,712		CLASS 111		401		4,947,842		
598	4,947,539	309.4	4,947,602		CLASS 62			121.1	4,947,713		CLASS 111		419 R		4,947,836		
600	4,947,540	385	4,947,603		CLASS 62			475	4,947,714		121	4,947,770		421	4,947,837		
603	4,947,541	398	4,947,604		CLASS 62			CLASS 82			CLASS 112		637		4,947,844		
	4,947,542	455	4,947,606		CLASS 62			1.11	4,947,715		CLASS 112		640		4,947,845		
605	4,947,543	484	4,947,607		CLASS 62				CLASS 83			141	4,947,771			4,947,846	
622	4,947,544	509	4,947,608		CLASS 62			98	4,947,716		262.1	4,947,772		648	4,947,847		
705	4,947,545	545	4,947,609		CLASS 62			138	4,947,717		302	4,947,773		653 AF	4,947,848		
861	4,947,546	585	4,947,610		CLASS 62				CLASS 84			444	4,947,774		53 R	4,947,849	
888.1	4,947,547	590	4,947,611		CLASS 62			CLASS 84			39.1	4,947,775		654	4,947,850		
890.039	4,947,548	693	4,947,612		CLASS 62			146	4,947,718		102	4,947,776		660.02	4,947,851		
894	4,947,533	704	4,947,613		CLASS 62			843	4,947,719		221 R	4,947,777		662.03	4,947,852		
CLASS 30		717.1	4,947,614		CLASS 62			95.2	4,947,722		248	4,947,778		662.06	4,947,853		
90.8	4,947,549	745	4,947,615		CLASS 62			603	4,947,723		250	4,947,779		672	4,947,854		
123.4	4,947,550	749	4,947,616		CLASS 62			631	4,947,724		283	4,947,780		673	4,947,855		
161	4,947,551	CLASS 53			CLASS 62			723	4,947,725		312	4,947,781		696	4,947,856		
767	4,947,552	234	4,947,617		CLASS 62			CLASS 84			CLASS 114		715		4,947,857		
	4,947,553	65	4,948,413		CLASS 62			CLASS 84			CLASS 114		719		4,947,858		

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## CLASSIFICATION OF PATENTS

	4,947,861	611	4,948,456	56 R	4,947,972	CLASS 215	65	4,948,100					
734	4,947,862	629	4,948,457	70.12	4,947,973	12.2	4,948,000	18 A	4,948,058	CLASS 260			
764	4,947,863	630	4,948,460	85 A A	4,947,974	31	4,948,001	18 R	4,948,057	399	4,948,534		
772	4,947,864	643	4,948,458	98	4,947,975	221	4,948,002	58 I	4,948,060	400	4,948,535		
784	4,947,865		4,948,459		4,947,976	237	4,948,003	58.3	4,948,061				
804	B1 4,947,866		4,948,461	103 B	4,947,977			67.3 R	4,948,062		CLASS 261		
846	4,947,867				CLASS 198	CLASS 219	71.1	4,948,063	64.4	4,948,536			
847	4,947,868				341	4,947,978	10.55 E	4,948,932	106	4,948,064	CLASS 264		
874	4,947,869	1.22	4,947,918	343.1	4,947,979	69.2	4,948,933	107.4 A	4,948,066	2.5	4,948,537		
875	4,947,870	1.24	4,947,919	345.3	4,947,980		4,948,934	107.6	4,948,065	6	4,948,538		
898	4,947,871			360	4,947,981	70	4,948,935	131	4,948,067	22	4,948,539		
				391	4,947,982	76.14	4,948,936	156	4,948,059	28	4,948,540		
					CLASS 200	121.14	4,948,938			40.4	4,948,542		
28.3	4,947,872	84.1	4,947,920		33 R	4,948,927	121.64	4,948,939	17.19	4,948,068	46.7	4,948,541	
329	4,947,873	133	4,947,937		38 R	4,948,928	121.68	4,948,940	23 D	4,948,072	85	4,948,543	
	4,947,874	176.1	4,947,921		61.45 M	4,948,929	121.71	4,948,941	50	4,948,069	204	4,948,544	
330	4,947,875	374.1	4,947,922		82 R	4,948,930	132	4,948,942	135 R	4,948,070	210.8	4,948,545	
			CLASS 162		83 P	4,948,931	227	4,948,943	149	4,948,071	206	4,948,546	
			137	4,948,463		CLASS 202	230	4,948,946		522	4,948,548		
73	4,947,876	158.1	4,948,464		93	4,948,468	247	4,948,945	415 A	4,948,073	555	4,948,549	
201	4,947,877	199	4,948,465		163	4,947,983	272	4,948,947		CLASS 248	CLASS 266		
203	4,947,878	207	4,948,466		CLASS 203	329	4,948,948	446	4,948,949	27.1	4,948,074	55	4,948,101
218	4,947,879	358	4,948,467		51	4,948,469	497	4,948,950	97	4,948,075	205	4,948,102	
329	4,947,880				CLASS 134	4,948,470	504	4,948,953	125	4,948,076		CLASS 267	
					CLASS 135	4,948,471	528	4,948,951	129	4,948,077	34	4,948,103	
40	4,947,881	5	4,947,923		55	4,948,472			176	4,948,078	64.11	4,948,104	
		97	4,947,924		CLASS 204	CLASS 220	309.1	4,948,079	311.2	4,948,080		CLASS 269	
		459	4,947,925		52.1	4,948,474	1	4,948,004	311.2	4,948,081	32	4,948,105	
84	4,947,882	517	4,947,927		55.5	4,948,475	1.5	4,948,005	396	4,948,082	87.2	4,948,106	
90	4,947,883	519	4,947,928		89	4,948,476	5 A	4,948,007	460	4,948,083	903	4,948,108	
97	4,947,884				105 M	4,948,484	85 S	4,948,010	523	4,948,084		CLASS 270	
			CLASS 165		129	4,948,477	212	4,948,008	549	4,948,085			
		22	4,947,928		153.2	4,948,473	229	4,948,009	676	4,948,086	1.1	4,948,109	
249	4,948,436	47	4,947,930		157.22	4,948,478		CLASS 221		CLASS 249	58	4,948,110	
		66	4,947,929		158.21	4,948,479		1	4,948,011	86	4,948,089	59	4,948,111
		148	4,947,931		164	4,948,485		195	4,948,012	113	4,948,087	60	4,948,112
5	4,947,885				182.8	4,948,480				196	4,948,088		CLASS 271
72	4,947,886				192.23	4,948,482		CLASS 222		CLASS 250	8.1	4,948,113	
82	4,947,887	246	4,947,932		198	4,948,483		1	4,948,013	207	4,948,965	202	4,948,114
312	4,947,888	263	4,947,933			4,948,486		83	4,948,014	207	4,948,966	273	4,948,115
486	4,947,889	279	4,947,934			4,948,487		107	4,948,015	208 I	4,948,967		CLASS 272
543	4,947,890	295	4,947,935			4,948,488		158	4,948,016	213 VT	4,948,968		
599.2	4,947,891	379	4,947,936			4,948,489		368	4,948,017	223 B	4,948,969	3	4,948,116
624.11	4,947,892					4,948,490		541	4,948,018	227.11	4,948,966	28	4,948,118
625.65	4,947,893					4,948,491		94	4,948,019	227.28	4,948,967	71	4,948,117
625.66	4,947,894	22	4,947,938			4,948,492				237 G	4,948,968	78	4,948,118
807	4,947,895									239	4,948,969	85	4,948,119
			CLASS 173					CLASS 224		252.1	4,948,961	87	4,948,120
		12	4,947,939			CLASS 206		31	4,948,020	253	4,948,970	95	4,948,121
		49	4,947,940			4,947,984		42.13	4,948,021	288	4,948,962	119	4,948,122
		134	4,947,941			4,947,985		42.42	4,948,022	310	4,948,971	123	4,948,123
		163	4,947,942			4,947,986		148	4,948,023	327.2	4,948,972	132	4,948,124
		CLASS 174				4,947,987		310	4,948,024	330	4,948,957		CLASS 273
		35 GC	4,948,922			386				338.1	4,948,963		
		35 R	4,948,923			387	Re 33.294			341	4,948,973	1	4,948,125
		158 R	4,948,924			409	4,947,989			350	4,948,964	1	4,948,126
						427	4,947,990			351 C	4,948,975	1.5 R	4,948,127
			CLASS 175			427	4,947,991			351 C	4,948,975	11 R	4,948,128
		18	4,947,943			506	4,947,992			370.06	4,948,976	29 B	4,948,129
		48	4,948,925			551	4,947,993			370.09	4,948,977	33	4,948,130
		73	4,947,944			606	4,947,994			370.11	4,948,978	73 R	4,948,131
		409	4,947,945							370.12	4,948,979	80.1	4,948,132
			CLASS 177							370.13	4,948,980	85 CP	4,948,133
		105	4,947,946							370.14	4,948,981	85 G	4,948,134
		153	4,947,947							370.15	4,948,982	90	4,948,135
			CLASS 178							370.16	4,948,983	109	4,948,136
		19	4,948,926							370.17	4,948,984	138 A	4,948,137
			CLASS 180							370.18	4,948,985	148	4,948,138
		6.7	4,947,948							370.19	4,948,986	169	4,948,139
		79.1	4,947,949							370.20	4,948,987	186 FA	4,948,140
		143	4,947,951							370.21	4,948,988	173 B	4,948,141
		176	4,947,950							370.22	4,948,989	187 A	4,948,142
		138	4,947,952							370.23	4,948,990	232	4,948,143
			4,947,953							370.24	4,948,991	249	4,948,144
		197	4,947,954							370.25	4,948,992	256	4,948,145
		216	4,947,955							370.26	4,948,993	273	4,948,146
		235	4,947,956							370.27	4,948,994	402	4,948,147
			CLASS 181							370.28	4,948,995	408	4,948,148
		258	4,947,957							370.29	4,948,996	411	4,948,149
		296	4,947,958							370.30	4,948,997	413	4,948,150
			CLASS 182							370.31	4,948,998		4,948,151
			4,947,959							370.32	4,948,999		4,948,152
		22	4,947,960							370.33	4,949,000		4,948,153
		26	4,947,961							370.34	4,949,001		
		92	4,947,962							370.35	4,949,002		
		182								370.36	4,949,003		
			CLASS 184							370.37	4,949,004		
		6	4,947,963							370.38	4,949,005		
			CLASS 187							370.39	4,949,006		
		52 LC	4,947,964							370.40	4,949,007		
		127	4,947,965							370.41	4,949,008		
			CLASS 188							370.42	4,949,009		
		170	4,947,966							370.43	4,949,010		
			CLASS 192							370.44	4,949,011		
			4,947,971										



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399 4,948,270	41 4,948,340	CLASS 427	527	4,948,720	134	4,948,767	217	4,948,850	
448 4,948,277	104 4,948,341	3 4,948,622	551	4,948,721	CLASS 502	247	4,948,851		
467 4,948,269	222 S 4,948,343	35 4,948,623	558	4,948,722	63 4,948,768		4,948,852		
473 4,948,271	279 4,948,342	37 4,948,625	CLASS 431		68 4,948,769	261	4,948,854		
607 4,948,272	4,948,344	38 4,948,624	1 4,948,360	107 4,948,770	107 4,948,770	279	4,948,855		
CLASS 388	295 4,948,345	4,948,626	125 4,948,361	112 4,948,771	112 4,948,771	281	4,948,856		
815 4,949,393	312 4,948,346	4,948,627	CLASS 432	247 4,948,773	247 4,948,773	329 S	4,948,857		
CLASS 400	356 4,948,347	39 4,948,628	439 4,948,774		439 4,948,774		CLASS 528		
185 4,948,273	365 4,948,348	53.1 4,948,629	14 4,948,362	CLASS 503		15	4,948,858		
196.1 4,948,274	383 4,948,349	98 4,948,630	77 4,948,363	207 4,948,772	207 4,948,772	28	4,948,859		
200 4,948,275	474 4,948,350	208 4,948,631	98 4,948,364	227 4,948,775	227 4,948,775	68	4,948,860		
208 4,948,276	565 4,948,351	255 4,948,632	103 4,948,365	4,948,776	4,948,776	77	4,948,861		
248 4,948,278	CLASS 418	262 4,948,633	CLASS 433	4,948,777	4,948,777	77	4,948,862		
248 4,948,278	109 4,948,352	302 4,948,634	9 4,948,366	4,948,778	4,948,778	170	4,948,863		
323 4,948,279	CLASS 419	345 4,948,635	77 4,948,368	CLASS 505		219	4,948,864		
472 4,948,280	23 4,948,426	CLASS 428	CLASS 434	1 4,948,779	1 4,948,779	271	4,948,865		
616.2 4,948,282	CLASS 420	5 4,948,636	21 4,948,371	CLASS 512		337	4,948,867		
647.1 4,948,283	36 4,948,556	31 4,948,637	247 4,948,372	8 4,948,780	8 4,948,780	339	4,948,868		
CLASS 401	503 4,948,557	34.9 4,948,638	270 4,948,373	25 4,948,781	25 4,948,781	392	4,948,869		
195 4,948,284	540 4,948,558	35.7 4,948,639	CLASS 435	CLASS 514		481	4,948,871		
4,948,285	584 4,948,559	36.6 4,948,642	7 4,948,723	29 4,948,782	29 4,948,782	499	4,948,872		
CLASS 402	CLASS 422	40 4,948,643	4,948,725	46 4,948,783	46 4,948,783		CLASS 530		
34 4,948,286	48 4,948,560	4,948,644	4,948,726	54 4,948,784	54 4,948,784	328	4,948,873		
CLASS 403	61 4,948,561	4,948,645	13 4,948,724	4,948,785	4,948,785	350	4,948,874		
13 4,948,287	73 4,948,562	4,948,646	18 4,948,727	100 4,948,786	100 4,948,786	357	4,948,875		
24 4,948,288	99 4,948,563	4,948,647	41 4,948,728	141 4,948,787	141 4,948,787	387	4,948,876		
246 4,948,289	101 4,948,564	4,948,648	70.5 4,948,731	167 4,948,788	167 4,948,788		4,948,877		
255 4,948,290	103 4,948,565	4,948,649	91 4,948,732	178 4,948,789	178 4,948,789		CLASS 534		
301 4,948,291	107 4,948,566	4,948,650	129 4,948,733	183 4,948,790	183 4,948,790	15	4,948,878		
CLASS 404	110 4,948,651	4,948,651	172.3 4,948,734	185 4,948,791	185 4,948,791	642	4,948,879		
84 4,948,292	122 4,948,567	201 4,948,652	252.5 4,948,735	233.5 4,948,792	233.5 4,948,792		CLASS 536		
CLASS 405	140 4,948,568	213 4,948,655	311 4,948,736	249 4,948,793	249 4,948,793	6.4	4,948,880		
36 4,948,293	142 4,948,569	218 4,948,656	CLASS 436	252 4,948,794	252 4,948,794	20	4,948,881		
37 4,948,294	180 4,948,570	234 4,948,657	46 4,948,737	254 4,948,795	254 4,948,795	27	4,948,882		
44 4,948,295	CLASS 423	254 4,948,658	68 4,948,739	275 4,948,796	275 4,948,796	117	4,948,883		
55 4,948,296	65 4,948,570	285 4,948,659	533 4,948,739	278 4,948,797	278 4,948,797		CLASS 540		
128 4,948,297	240 4,948,571	4,948,660	CLASS 437	303 4,948,798	303 4,948,798	138	4,948,884		
154 4,948,298	242 4,948,572	4,948,661	4 4,948,740	307 4,948,800	307 4,948,800	158	4,948,885		
179 4,948,299	291 4,948,573	4,948,662	24 4,948,741	341 4,948,801	341 4,948,801	491	4,948,886		
220 4,948,300	447.4 4,948,574	4,948,663	40 4,948,742	397 4,948,802	397 4,948,802	603	4,948,887		
244 4,948,301	CLASS 424	4,948,664	41 4,948,743	423 4,948,803	423 4,948,803		CLASS 544		
CLASS 406	44 4,948,575	332 4,948,665	44 4,948,744	428 4,948,804	428 4,948,804	69	4,948,888		
17 4,948,302	59 4,948,576	334 4,948,666	60 4,948,745	451 4,948,805	451 4,948,805	198	4,948,889		
186 4,948,303	4,948,577	373 4,948,667	62 4,948,746	484 4,948,806	484 4,948,806	320	4,948,890		
CLASS 408	68 4,948,578	379 4,948,668	62 4,948,747	535 4,948,807	535 4,948,807	329	4,948,891		
16 4,948,304	72 4,948,579	411.1 4,948,670	60 4,948,748	538 4,948,808	538 4,948,808	396	4,948,892		
97 4,948,305	78 4,948,580	424.4 4,948,671	82 4,948,749	539 4,948,809	539 4,948,809		CLASS 546		
224 4,948,306	81 4,948,581	425.8 4,948,672	101 4,948,750	560 4,948,810	560 4,948,810	66	4,948,893		
227 4,948,307	81 4,948,582	469 4,948,673	107 4,948,751	622 4,948,811	622 4,948,811	95	4,948,894		
CLASS 409	401 4,948,583	4,948,674	110 4,948,752	648 4,948,812	648 4,948,812	196	4,948,895		
136 4,948,308	404 4,948,584	4,948,675	129 4,948,753	CLASS 521	CLASS 521	250	4,948,896		
234 4,948,309	435 4,948,585	539.5 4,948,676	183 4,948,754	30 4,948,813	30 4,948,813	307	4,948,897		
CLASS 410	436 4,948,586	623 4,948,677	195 4,948,755	50 4,948,814	50 4,948,814	311	4,948,898		
1 4,948,310	438 4,948,587	4,948,678	240 4,948,756	56 4,948,815	56 4,948,815	321	4,948,899		
107 4,948,311	450 4,948,588	CLASS 429	CLASS 439	58 4,948,816	58 4,948,816		CLASS 548		
CLASS 411	456 4,948,589	11 4,948,679	67 4,948,374	149 4,948,817	149 4,948,817		4,948,900		
5 4,948,312	473 4,948,590	13 4,948,680	72 4,948,375	CLASS 522	CLASS 522	183	4,948,901		
85 4,948,313	473 4,948,591	34 4,948,681	188 4,948,376	CLASS 523	CLASS 523	252	4,948,902		
182 4,948,314	473 4,948,592	67 4,948,682	200 4,948,377	CLASS 524	CLASS 524	329	4,948,903		
349 4,948,315	473 4,948,593	72 4,948,683	271 4,948,378	124 4,948,819	124 4,948,819	376	4,948,904		
353 4,948,316	473 4,948,594	188 4,948,684	329 4,948,379	201 4,948,820	201 4,948,820	960	4,948,905		
377 4,948,317	473 4,948,595	200 4,948,685	347 4,948,380	500 4,948,821	500 4,948,821		CLASS 549		
511 4,948,318	473 4,948,596	271 4,948,381	405 4,948,381	CLASS 525	CLASS 525	241	4,948,906		
535 4,948,319	473 4,948,597	406 4,948,382	759 4,948,383	112 4,948,823	112 4,948,823	326	4,948,907		
515 4,948,320	473 4,948,598	CLASS 440	CLASS 441	197 4,948,824	197 4,948,824		CLASS 552		
288 4,948,321	473 4,948,599	78 4,948,384	64 4,948,385	274 4,948,825	274 4,948,825	576	4,948,908		
300 4,948,322	473 4,948,600	CLASS 442	CLASS 443	309 4,948,826	309 4,948,826		CLASS 556		
404 4,947,784	473 4,948,601	CLASS 444	CLASS 445	392 4,948,827	392 4,948,827	187	4,948,909		
408 4,948,323	473 4,948,602	CLASS 446	CLASS 447	437 4,948,828	437 4,948,828	462	4,948,910		
415 4,948,324	473 4,948,603	CLASS 448	CLASS 449	457 4,948,829	457 4,948,829		CLASS 558		
527 4,948,325	473 4,948,604	CLASS 450	CLASS 451	462 4,948,830	462 4,948,830	193	4,948,911		
541 4,948,326	473 4,948,605	CLASS 452	CLASS 453	500 4,948,831	500 4,948,831	347	4,948,912		
563 4,948,327	473 4,948,606	CLASS 454	CLASS 455	504 4,948,832	504 4,948,832	315	4,948,913		
723 4,948,328	473 4,948,607	CLASS 456	CLASS 457	508 4,948,833	508 4,948,833	493	4,948,914		
735 4,948,329	473 4,948,608	CLASS 458	CLASS 459	567 4,948,834	567 4,948,834	383	4,948,915		
749 4,948,330	473 4,948,609	CLASS 460	CLASS 461	704 4,948,835	704 4,948,835	427	4,948,916		
CLASS 415	473 4,948,610	CLASS 462	CLASS 463	CLASS 525	CLASS 525		CLASS 560		
20 4,948,331	473 4,948,611	CLASS 464	CLASS 465	54.1 4,948,836	54.1 4,948,836	115	4,948,913		
27 4,948,332	473 4,948,612	CLASS 466	CLASS 467	63 4,948,837	63 4,948,837	124	4,948,914		
93 4,948,333	473 4,948,613	CLASS 468	CLASS 469	66 4,948,838	66 4,948,838	187	4,948,915		
167.1 4,948,334	473 4,948,614	CLASS 470	CLASS 471	92 4,948,839	92 4,948,839	227	4,948,916		
169.2 4,948,335	473 4,948,615	CLASS 472	CLASS 473	193 4,948,840	193 4,948,840	347	4,948,917		
172.1 4,948,336	473 4,948,616	CLASS 474	CLASS 475	240 4,948,841	240 4,948,841	515	4,948,918		
CLASS 416	473 4,948,617	CLASS 476	CLASS 477	286 4,948,842	286 4,948,842		CLASS 562		
3 4,948,337	473 4,948,618	CLASS 478	CLASS 479	328.2 4,948,843	328.2 4,948,843	16	4,948,919		
92 4,948,338	473 4,948,619	CLASS 480	CLASS 481	356 4,948,844	356 4,948,844	61	4,948,920		
145 4,948,339	473 4,948,620	CLASS 482	CLASS 483	409 4,948,845	409 4,948,845	406	4,948,921		
		CLASS 484	CLASS 485	CLASS 526	CLASS 526	413	4,948,922		
		CLASS 486	CLASS 487	62 4,948,846	62 4,948,846		CLASS 6.4		
		CLASS 488	CLASS 489	64 4,948,847	64 4,948,847	200	4,949,251		
		CLASS 490	CLASS 491	78 4,948,848	78 4,948,848				

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D2—	10	309,820	606	309,847		309,872	114	309,897	13	309,923	47	309,948					
	265	309,821	620	309,848		309,873	148	309,898	54	309,924	59	309,949					
	313	309,822	624	309,849		309,874	163	309,899	85	309,925	122	309,950					
	314	309,823	626	309,851	D11—	71	309,879	168	309,900	106	309,926	35	309,951				
		309,824	649	309,849		93	309,880	244	309,901	108	309,927	49	309,952				
D3—	12	309,825		309,850		96	309,873	D15—	9	309,902	109	309,928	67	309,953			
		309,826		309,852		125	309,875		17	309,903	141	309,929		309,954			
	30,1	309,827	672	309,853		143	309,878		28	309,904		309,930	87	309,955			
	34	309,828	D8—	51	309,854	157	309,876		90	309,905	161	309,931	123	309,956			
	40	309,829		71	309,855		309,877		140	309,906	189	309,932		309,957			
	61	309,830		358	309,856	D12—	91	309,881	D16—	242	309,907	198	309,933	D27—	148	309,958	
	71	309,831		373	309,857		92	309,882	D18—	4	309,908	220	309,934	D28—	48	309,959	
	73	309,832		395	309,859		143	309,883		7	309,910	252	309,935		64	309,960	
D6—	300	309,833	D9—	300	309,860		146	309,884		18	309,909	D22—	134	309,937	D29—	7	309,961
	318	309,834		378	309,858		191	309,885		40	309,911		141	309,936		12	309,962
	328	309,835		416	309,861		211	309,886		42	309,912	D23—	209	309,974	D30—	122	309,963
	361	309,836		412	309,862		325	309,887	D19—	43	309,913		236	309,938		160	309,964
	366	309,837		439	309,863	D13—	107	309,892		59	309,914		301	309,939	D32—	25	309,965
	465	309,838	D10—	39	309,864		110	309,888		72	309,915		324	309,940	D34—	5	309,966
	491	309,839		57	309,865		156	309,893		79	309,916		333	309,941		23	309,967
	534	309,840		81	309,866		158	309,891		76	309,917		351	309,942		24	309,968
D7—	308	309,842		81	309,867		168	309,889		92	309,918		369	309,943		33	309,969
	309	309,843		91	309,868			309,890	D20—	1	309,919		382	309,944		40	309,970
	352	309,844		111	309,869	D14—	100	309,894		42	309,920		403	309,945		36	309,971
	503	309,845		126	309,870		106	309,895			309,921	D24—	27	309,946		47	309,972
	587	309,846			309,871		113	309,896	D21—	11	309,922			309,947	D99—	37	309,973

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01	4,947,523	4,947,984	4,948,629	4,949,379	4,948,416	4,949,088
	4,947,791	4,948,680	4,949,391	4,948,418	4,949,217	4,948,418
	4,947,972	4,948,002	4,949,398	4,948,419	4,949,221	4,948,419
	4,948,364	4,948,014	4,947,647	4,948,430	4,949,245	4,948,430
	4,948,521	4,948,028	4,947,686	4,948,764	4,949,256	4,948,764
	4,948,640	4,948,052	4,947,843	4,948,801	4,949,296	4,948,801
04	4,947,513	4,948,054	4,947,884	4,948,813	4,949,314	4,948,813
	4,947,776	4,948,080	4,947,935	4,948,840	4,949,335	4,948,840
	4,947,795	4,948,084	4,947,996	4,948,852	4,949,338	4,948,852
	4,948,068	4,948,836	4,948,016	4,948,853	4,949,386	4,948,853
	4,948,210	4,948,092	4,948,156	4,948,960	4,947,596	4,948,960
	4,948,645	4,948,106	4,948,278	4,948,877	4,947,829	4,948,877
	4,948,991	4,948,108	4,948,431	4,948,882	4,947,867	4,948,882
	4,949,017	4,948,117	4,948,468	4,948,946	4,947,519	4,948,946
	4,949,053	4,948,125	4,948,652	4,948,947	4,947,580	4,948,947
	4,949,084	4,948,128	4,948,920	4,948,951	4,947,643	4,948,920
	4,949,196	4,948,139	4,949,032	4,948,958	4,947,669	4,949,032
	4,949,341	4,948,148	4,949,197	4,948,961	4,947,685	4,948,961
	4,949,388	4,948,174	4,949,206	4,948,971	4,947,701	4,948,971
05	4,947,720	4,948,191	4,947,514	4,948,974	4,947,715	4,948,974
	4,947,739	4,948,195	4,947,639	4,948,989	4,947,730	4,948,989
	4,948,033	4,948,197	4,947,655	4,949,000	4,947,766	4,949,000
	4,949,371	4,948,212	4,947,758	4,949,018	4,947,767	4,949,018
06	4,947,492	4,948,245	4,947,832	4,949,023	4,947,780	4,949,023
	4,947,494	4,948,252	4,948,064	4,949,031	4,947,780	4,949,031
	4,947,499	4,948,274	4,948,173	4,949,036	4,947,826	4,949,036
	4,947,560	4,948,293	4,948,215	4,949,068	4,948,215	4,949,068
	4,947,562	4,948,311	4,948,253	4,949,092	4,948,253	4,949,092
	4,947,572	4,948,313	4,948,337	4,949,119	4,947,963	4,949,119
	4,947,591	4,948,316	4,948,410	4,949,139	4,947,991	4,949,139
	4,947,616	4,948,328	4,948,453	4,949,140	4,948,011	4,949,140
	4,947,637	4,948,340	4,948,505	4,949,148	4,947,506	4,949,148
	4,947,641	4,948,365	4,948,585	4,949,149	4,948,045	4,949,149
	4,947,648	4,948,366	4,948,590	4,949,150	4,947,731	4,949,150
	4,947,652	4,948,385	4,948,630	4,949,172	4,947,665	4,949,172
	4,947,681	4,948,432	4,948,641	4,949,177	4,947,835	4,949,177
	4,947,684	4,948,458	4,948,642	4,949,192	4,947,866	4,949,192
	4,947,690	4,948,462	4,948,891	4,949,194	4,947,901	4,949,194
	4,947,711	4,948,473	4,948,901	4,949,201	4,947,760	4,949,201
	4,947,754	4,948,494	4,948,913	4,949,202	4,947,765	4,949,202
	4,947,775	4,948,495	4,949,056	4,949,208	4,947,770	4,949,208
	4,947,781	4,948,496	4,949,080	4,949,232	4,947,799	4,949,232
	4,947,801	4,948,497	4,949,098	4,949,290	4,947,807	4,949,290
	4,947,825	4,948,507	4,949,136	4,949,291	4,947,870	4,949,291
	4,947,841	4,948,511	4,949,169	4,949,295	4,947,880	4,949,295
	4,947,845	4,948,529	4,949,255	4,949,301	4,947,887	4,949,301
	4,947,852	4,948,554	4,949,272	4,949,306	4,947,923	4,949,306
	4,947,853	4,948,568	4,949,274	4,949,309	4,947,962	4,949,309
	4,947,856	4,948,592	4,949,381	4,949,327	4,947,970	4,949,327
	4,947,863	4,948,593	4,947,518	4,949,353	4,947,987	4,949,353
	4,947,865	4,948,607	4,947,605	4,949,356	4,947,999	4,949,356
	4,947,892	4,948,609	4,947,897	4,949,362	4,948,941	4,949,362
	4,947,958	4,948,614	4,949,373	4,949,373	4,948,941	4,949,373

	4,948,003	4,948,049	4,949,337	4,947,717	4,947,659	4,947,943
	4,948,012	4,948,060	4,949,390	4,947,718	4,947,874	4,948,039
	4,948,030	4,948,136	4,947,539	4,947,719	4,947,875	4,948,083
	4,948,044	4,948,143	4,947,601	4,947,722	4,947,947	4,948,123
	4,948,077	4,948,222	4,947,653	4,947,737	4,948,042	4,948,193
	4,948,103	4,948,229	4,947,729	4,947,755	4,948,067	4,948,297
	4,948,145	4,948,267	4,947,842	4,947,761	4,948,076	4,948,317
	4,948,162	4,948,331	4,947,868	4,947,788	4,948,120	4,948,325
	4,948,206	4,948,442	4,947,903	4,947,803	4,948,318	4,948,356
	4,948,269	4,948,455	4,947,940	4,947,876	4,948,324	4,948,379
	4,948,336	4,948,538	4,948,395	4,947,877	4,948,382	4,948,398
	4,948,344	4,948,564	4,948,516	4,947,879	4,948,628	4,948,407
	4,948,384	4,948,565	4,948,705	4,947,881	4,948,649	4,948,474
	4,948,392	4,948,646	4,948,724	4,947,957	4,948,998	4,948,527
	4,948,464	4,948,672	4,948,789	4,948,031	4,949,334	4,948,540
	4,948,513	4,948,728	4,948,902	4,948,035	4,949,372	4,948,550
	4,948,523	4,948,731	4,948,909	4,948,036	4,947,956	4,948,582
	4,948,536	4,948,733	4,949,063	4,948,056	4,947,490	4,948,605
	4,948,557	4,948,735	4,948,469	4,948,059	4,947,493	4,948,621
	4,948,595	4,948,823	4,948,471	4,948,063	4,947,512	4,948,632
	4,948,603	4,948,965	4,949,014	4,948,113	4,947,535	4,948,636
	4,948,768	4,948,987	4,947,786	4,948,146	4,947,585	4,948,661
	4,948,791	4,949,035	4,947,576	4,948,167	4,947,589	4,948,666
	4,948,861	4,949,043	4,947,961	4,948,177	4,947,592	4,948,675
	4,948,921	4,949,054	4,948,134	4,948,214	4,947,604	4,948,677
	4,948,928	4,949,073	4,948,138	4,948,216	4,947,607	4,948,683
	4,948,970	4,949,095	4,947,672	4,948,217	4,947,614	4,948,704
	4,949,015	4,949,193	4,947,749	4,948,221	4,947,624	4,948,824
	4,949,020	4,949,200	4,947,750	4,948,225	4,947,636	4,948,834
	4,949,021	4,949,230	4,948,074	4,948,239	4,947,704	4,948,857
	4,949,050	4,949,234	4,948,280	4,948,241	4,947,712	4,948,922
	4,949,069	4,949,239	4,948,429	4,948,264	4,947,862	4,948,981
	4,949,141	4,949,247	4,948,251	4,948,266	4,947,927	4,949,051
	4,949,211	4,949,259	4,948,259	4,948,308	4,948,053	4,949,071
	4,949,215	4,949,250	4,947,527	4,948,327	4,948,062	4,949,363
	4,949,355	4,949,267	4,947,559	4,948,357	4,948,082	4,949,385
	4,947,502	4,949,340	4,947,563	4,948,386	4,948,094	4,948,204
	4,947,551	4,949,358	4,947,603	4,948,435	4,948,100	4,949,319
	4,947,595	4,947,516	4,947,759	4,948,461	4,948,107	4,947,520
	4,947,741	4,947,600	4,947,804	4,948,480	4,948,122	4,947,528
	4,947,777	4,947,679	4,947,888	4,948,489	4,948,188	4,947,896
	4,947,811	4,947,680	4,947,934	4,948,492	4,948,209	4,947,930
	4,947,814	4,947,689	4,947,955	4,948,499	4,948,262	4,948,186
	4,947,883	4,947,796	4,947,980	4,948,524	4,948,272	4,948,604
	4,947,886	4,947,893	4,947,993	4,948,526	4,948,339	4,948,643
	4,947,937	4,947,942	4,948,038	4,948,531	4,948,351	4,949,400
	4,947,951	4,947,950	4,948,061	4,948,561	4,948,367	Re. 33,297
	4,947,969	4,947,968	4,948,115	4,948,602	4,948,408	4,947,597
	4,948,005	4,947,979	4,948,135	4,948,623	4,948,443	4,947,640
	4,948,185	4,947,989	4,948,137	4,948,624	4,948,637	4,947,753
	4,948,207	4,948,024	4,948,369	4,948,647	4,948,644	4,947,794
	4,948,300	4,948,095	4,948,512	4,948,686	4,948,656	4,947,797
	4,948,456	4,948,150	4,948,532	4,948,707	4,948,811	4,947,905
	4,948,541	4,948,160	4,948,543	4,948,717	4,948,856	4,948,546
	4,948,839	4,948,175	4,948,558	4,948,718	4,948,931	4,948,651
	4,948,892	4,948,176	4,948,576	4,948,720	4,949,005	4,948,654
	4,949,012	4,948,177	4,948,578	4,948,721	4,949,070	4,948,924
	4,949,389	4,948,198	4,948,596	4,948,722	4,949,102	4,947,545
	4,947,674	4,948,203	4,948,597	4,948,737	4,949,227	4,947,609
	4,947,974	4,948,205	4,948,608	4,948,755	4,949,236	4,947,657
	4,948,292	4,948,305	4,948,615	4,948,758	4,949,246	4,947,683
	4,948,305	4,948,309	4,948,617	4,948,759	4,947,740	4,947,854
	4,948,346	4,948,346	4,948,619	4,948,761	4,947,800	4,947,885
	4,947,530	4,948,409	4,948,650	4,948,776	4,947,836	4,947,910
	4,947,564	4,948,423	4,948,693	4,948,777	4,947,839	4,947,919
	4,947,977	4,948,445	4,948,697	4,948,778	4,947,857	4,947,933
	4,948,247	4,948,451	4,948,701	4,948,790	4,948,010	4,947,936
	4,948,510	4,948,455	4,948,732	4,948,792	4,948,190	4,947,988
	4,948,648	4,948,533	4,948,771	4,948,818	4,948,248	4,948,151
	4,948,883	4,948,679	4,948,822	4,948,828	4,948,470	4,948,191
	4,947,619	4,948,686	4,948,848	4,948,843	4,948,472	4,948,244
	4,947,710	4,948,687	4,948,866	4,948,878	4,948,484	4,948,263
	4,947,907	4,948,757	4,948,885	4,948,893	4,948,509	4,948,299
	4,947,978	4,948,806	4,948,927	4,948,894	4,948,517	4,948,381
	4,948,047	4,948,845	4,949,044	4,948,895	4,948,539	4,948,381
	4,948,321	4,948,866	4,949,059	4,948,904	4,948,925	4,948,400
	4,948,479	4,948,861	4,949,093	4,948,911	4,948,935	4,948,400
	4,949,003	Re. 33,299	4,949,166	4,948,976	4,949,076	4,948,421
	4,947,534	4,947,534	4,949,167	4,948,985	4,947,721	4,948,441
	4,947,822	4,947,822	4,949,235	4,948,996	4,947,848	4,948,477
	4,948,247	4,947,556	4,949,329	4,949,067	4,947,858	4,948,566
	4,948,510	4,947,565	4,949,346	4,949,074	4,948,073	4,948,611
	4,948,648	4,947,573	4,949,350	4,949,077	4,948,111	4,948,721
	4,948,842	4,947,578	4,949,376	4,949,079	4,948,119	4,948,741
	4,947,619	4,947,581	4,949,378	4,949,103	4,948,169	4,948,741
	4,947,710	4,947,631	4,949,397	4,949,105	4,948,181	4,948,776
	4,947,907	4,947,651	4,947,645	4,949,111	4,948,476	4,948,776
	4,947,978	4,947,698	4,947,677	4,949,117	4,948,506	4,948,891
	4,948,047	4,947,731	4,947,859	4,949,122	4,948,570	4,948,911
	4,948,321	4,947,783	4,947,866	4,949,126	4,949,010	4,948,933
	4,948,479	4,947,835	4,947,866	4,949,128	4,949,011	4,948,951
	4,949,003	4,947,908	4,947,866	4,949,129	4,949,028	4,948,961
	4,948,140	4,948,140	4,947,901	4,949,135	4,949,094	4,948,976
	4,948,601	4,948,601	4,948,032	4,949,175	4,949,159	4,949,021
	4,948,766	4,948,766	4,948,121	4,949,183	4,949,361	4,949,041
	4,949,062	4,949,062	4,948,124	4,949,187	4,947,544	4,949,081
	4,949,310	4,948,127	4,948,127	4,949,190	4,947,555	4,949,115
	4,949,317	4,948,202	4,947,577	4,949,248	4,947,621	4,949,145
	4,949,382	4,948,257	4,947,579	4,949,273	4,947,649	4,949,211
	Re. 33,295	4,948,449	4,947,584	4,949,277	4,947,667	4,949,211
	Re. 33,296	4,948,490	4,947,608	4,949,311	4,947,705	4,949,257
	4,947,622	4,948,575	4,947,630	4,949,344	4,947,713	4,949,303
	4,947,650	4,948,606	4,947,646	4,949,392	4,947,801	4,949,311
	4,947,792	4,948,859	4,947,682	4,949,399	4,947,891	4,949,311
	4,947,828	4,948,894	4,947,693	4,949,407	4,947,932	4,949,333
	4,947,840	4,949,252	4,947,700	4,949,411	4,947,938	4,949,341
	4,947,922	4,949,300	4,947,716	4,949,411	4,947,938	4,949,341
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49	4,947,575	4,948,230	4,948,973	4,947,998	4,949,280	4,948,004
	4,947,823	4,948,447	4,949,026	4,948,116	4,948,915	4,948,007
	4,948,022	4,948,463	52 : 4,948,315	4,948,118	4,947,504	4,948,013
	4,948,070	4,948,586	53 : 4,947,532	4,948,303	4,947,553	4,948,034
	4,948,155	4,948,611	4,947,625	4,948,355	4,947,606	4,948,096
	4,948,514	4,948,638	4,947,658	4,948,439	4,947,691	4,948,681
51	4,947,510	4,948,752	4,947,666	4,948,662	4,947,861	4,948,932
	4,947,568	4,948,800	4,947,769	4,948,942	4,947,869	4,949,060
	4,947,569	4,948,937	4,947,806	4,948,955	4,947,931	4,949,299
	4,947,994	4,948,950	4,947,827	4,948,959	4,947,981	4,841,988
	4,948,021	4,948,957	4,947,925	4,949,047		

## DESIGN PATENTS

01	309,966	309,964	20	309,836	34	309,858	41	309,823
04	309,956	309,971		309,950		309,905		309,824
05	309,948	309,974	21	309,820	36	309,849	37	309,904
06	309,827	309,878		309,838		309,850	42	309,848
	309,828	309,829	23	309,924	39	309,851		309,902
	309,831	309,876	25	309,821		309,852		309,973
	309,841	309,920		309,856		309,870	43	309,885
	309,857	309,926		309,894		309,871	47	309,933
	309,867	309,937		309,944		309,872	48	309,847
	309,881	309,951	26	309,839		309,873		309,861
	309,892	309,835		309,901		309,874		309,919
	309,906	309,840		309,968		309,895		309,963
	309,918	309,833	27	309,940		309,896	51	309,900
	309,938	309,855	29	309,854		309,903		309,958
	309,946	309,932		309,925		309,921	55	309,914
	309,947	309,877		309,960		309,931		309,915
	309,961	309,945	32			309,970		

## PLANT PATENTS

06	7,297	7,299	12	7,298	13	7,294	7,295	7,296
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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

## U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00

USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharges for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks.

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on August 18, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,686,710 through 4,688,268  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on August 16, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,398,305 through 4,399,566  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

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beyond 4 years; the fee is due by three years and six months after the original grant	4,333,451	06/215,832	6/08/82
	4,333,521	06/250,493	6/08/82
	4,333,522	06/241,896	6/08/82
"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant	4,333,599	06/217,351	6/08/82
	4,333,713	06/260,583	6/08/82
	4,333,735	06/244,205	6/08/82
	4,333,740	06/219,746	6/08/82
	4,333,760	06/269,510	6/08/82
	4,333,794	06/251,698	6/08/82
"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:	4,333,808	06/234,084	6/08/82
	4,333,873	06/257,454	6/08/82
	4,333,878	06/236,039	6/08/82
	4,333,880	06/228,177	6/08/82
By a small entity (§ 1.9(f))	4,333,882	06/234,842	6/08/82
By other than a small entity	4,333,883	06/280,638	6/08/82
	4,333,889	06/252,842	6/08/82
"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:	4,333,910	06/225,969	6/08/82
	4,333,923	06/247,673	6/08/82
	4,333,930	06/237,277	6/08/82
	4,333,931	06/221,181	6/08/82
	4,333,948	06/243,443	6/08/82
By a small entity (§ 1.9(f))	4,333,961	06/259,270	6/08/82
By other than a small entity	4,333,993	06/282,311	6/08/82
	4,333,994	06/248,216	6/08/82
The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:	4,334,014	06/244,993	6/08/82
	4,334,017	06/243,860	6/08/82
	4,334,025	06/230,293	6/08/82
	4,334,029	06/222,929	6/08/82
"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982	4,334,034	06/231,836	6/08/82
	4,334,070	06/230,765	6/08/82
	4,334,077	06/229,223	6/08/82
	4,334,099	06/217,943	6/08/82
	4,334,116	06/258,151	6/08/82
	4,334,119	06/229,941	6/08/82
	4,334,321	06/226,447	6/08/82
"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:	4,593,423	06/436,290	6/10/86
	4,593,441	06/729,045	6/10/86
	4,593,443	06/784,690	6/10/86
	4,593,449	06/617,034	6/10/86
	4,593,450	06/670,092	6/10/86
By a small entity (§ 1.9(f))	4,593,461	06/676,727	6/10/86
By other than a small entity	4,593,464	06/665,473	6/10/86
	4,593,468	06/666,114	6/10/86
	4,593,470	06/640,443	6/10/86
"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable	4,593,482	06/635,939	6/10/86
	4,593,500	06/519,041	6/10/86
	4,593,504	06/701,722	6/10/86
	4,593,511	06/615,789	6/10/86
	4,593,519	06/534,909	6/10/86
	4,593,522	06/500,441	6/10/86
	4,593,525	06/756,932	6/10/86
	4,593,545	06/546,386	6/10/86
	4,593,550	06/755,499	6/10/86
	4,593,552	06/744,048	6/10/86
	4,593,576	06/581,940	6/10/86
	4,593,589	06/473,624	6/10/86
	4,593,597	06/706,840	6/10/86
According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.	4,593,598	06/648,296	6/10/86
	4,593,605	06/742,241	6/10/86
	4,593,606	06/681,340	6/10/86
	4,593,607	06/706,883	6/10/86
	4,593,616	06/657,522	6/10/86
	4,593,622	06/652,010	6/10/86
	4,593,624	06/700,181	6/10/86
	4,593,626	06/623,883	6/10/86
	4,593,628	06/696,113	6/10/86
	4,593,631	06/311,750	6/10/86
	4,593,634	06/659,706	6/10/86
	4,593,640	06/645,272	6/10/86
	4,593,643	06/606,101	6/10/86
	4,593,645	06/729,806	6/10/86
	4,593,654	06/656,093	6/10/86
	4,593,671	06/704,581	6/10/86
	4,593,675	06/536,545	6/10/86

Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JUNE 10, 1990  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,333,182	06/299,781	6/08/82
4,333,216	06/246,757	6/08/82
4,333,227	06/224,705	6/08/82
4,333,236	06/245,037	6/08/82
4,333,258	06/246,557	6/08/82
4,333,323	06/216,119	6/08/82
4,333,377	06/240,183	6/08/82
4,333,399	06/243,237	6/08/82
4,333,406	06/271,630	6/08/82

Patent Number	Serial Number	Issue Date	4,594,048	06/656,436	6/10/86
4,593,678	06/289,402	6/10/86	4,594,062	06/559,814	6/10/86
4,593,679	06/697,807	6/10/86	4,594,069	06/658,527	6/10/86
4,593,681	06/692,429	6/10/86	4,594,071	06/699,831	6/10/86
4,593,683	06/676,072	6/10/86	4,594,078	06/638,459	6/10/86
4,593,687	06/546,943	6/10/86	4,594,081	06/577,126	6/10/86
4,593,689	06/723,368	6/10/86	4,594,084	06/754,913	6/10/86
4,593,692	06/617,232	6/10/86	4,594,090	06/786,996	6/10/86
4,593,702	06/434,903	6/10/86	4,594,093	06/674,634	6/10/86
4,593,706	06/289,481	6/10/86	4,594,094	06/482,371	6/10/86
4,593,709	06/614,871	6/10/86	4,594,095	06/640,156	6/10/86
4,593,721	06/662,711	6/10/86	4,594,099	06/540,691	6/10/86
4,593,731	06/641,024	6/10/86	4,594,105	06/693,621	6/10/86
4,593,732	06/616,219	6/10/86	4,594,107	06/733,399	6/10/86
4,593,743	06/732,460	6/10/86	4,594,111	06/657,604	6/10/86
4,593,745	06/658,652	6/10/86	4,594,126	06/630,211	6/10/86
4,593,753	06/669,894	6/10/86	4,594,128	06/590,469	6/10/86
4,593,754	06/767,254	6/10/86	4,594,129	06/700,581	6/10/86
4,593,762	06/549,216	6/10/86	4,594,166	06/715,926	6/10/86
4,593,763	06/642,148	6/10/86	4,594,183	06/584,481	6/10/86
4,593,764	06/669,281	6/10/86	4,594,186	06/487,026	6/10/86
4,593,766	06/671,937	6/10/86	4,594,193	06/654,831	6/10/86
4,593,769	06/641,377	6/10/86	4,594,195	06/684,630	6/10/86
4,593,790	06/724,258	6/10/86	4,594,205	06/679,427	6/10/86
4,593,795	06/490,522	6/10/86	4,594,206	06/596,851	6/10/86
4,593,812	06/634,623	6/10/86	4,594,209	06/592,095	6/10/86
4,593,813	06/721,051	6/10/86	4,594,210	06/571,718	6/10/86
4,593,824	06/681,654	6/10/86	4,594,211	06/668,035	6/10/86
4,593,825	06/742,415	6/10/86	4,594,212	06/511,514	6/10/86
4,593,838	06/641,290	6/10/86	4,594,228	06/790,784	6/10/86
4,593,840	06/612,379	6/10/86	4,594,233	06/688,819	6/10/86
4,593,842	06/671,950	6/10/86	4,594,235	06/746,374	6/10/86
4,593,843	06/410,936	6/10/86	4,594,236	06/526,411	6/10/86
4,593,845	06/571,545	6/10/86	4,594,237	06/600,873	6/10/86
4,593,846	06/559,105	6/10/86	4,594,250	06/652,428	6/10/86
4,593,848	06/695,524	6/10/86	4,594,254	06/768,701	6/10/86
4,593,854	06/603,598	6/10/86	4,594,266	06/629,866	6/10/86
4,593,874	06/654,969	6/10/86	4,594,277	06/692,874	6/10/86
4,593,878	06/319,994	6/10/86	4,594,283	06/713,899	6/10/86
4,593,882	06/458,521	6/10/86	4,594,292	06/658,917	6/10/86
4,593,884	06/694,642	6/10/86	4,594,302	06/739,012	6/10/86
4,593,885	06/626,009	6/10/86	4,594,303	06/769,779	6/10/86
4,593,887	06/744,531	6/10/86	4,594,305	06/743,817	6/10/86
4,593,899	06/651,539	6/10/86	4,594,309	06/666,864	6/10/86
4,593,902	06/639,453	6/10/86	4,594,313	06/710,891	6/10/86
4,593,903	06/522,803	6/10/86	4,594,316	06/660,838	6/10/86
4,593,904	06/591,209	6/10/86	4,594,336	06/601,745	6/10/86
4,593,905	06/574,368	6/10/86	4,594,344	06/755,044	6/10/86
4,593,906	06/477,840	6/10/86	4,594,346	06/693,050	6/10/86
4,593,907	06/394,869	6/10/86	4,594,350	06/635,389	6/10/86
4,593,910	06/709,130	6/10/86	4,594,360	06/674,493	6/10/86
4,593,911	06/735,259	6/10/86	4,594,367	06/718,441	6/10/86
4,593,912	06/707,800	6/10/86	4,594,383	06/685,216	6/10/86
4,593,915	06/675,653	6/10/86	4,594,409	06/646,317	6/10/86
4,593,917	06/719,068	6/10/86	4,594,411	06/617,155	6/10/86
4,593,918	06/629,710	6/10/86	4,594,415	06/685,999	6/10/86
4,593,925	06/655,067	6/10/86	4,594,421	06/696,589	6/10/86
4,593,934	06/668,330	6/10/86	4,594,429	06/619,158	6/10/86
4,593,947	06/645,679	6/10/86	4,594,437	06/703,694	6/10/86
4,593,971	06/503,197	6/10/86	4,594,464	06/742,273	6/10/86
4,593,978	06/590,644	6/10/86	4,594,481	06/746,528	6/10/86
4,593,982	06/665,433	6/10/86	4,594,487	06/679,535	6/10/86
4,593,988	06/462,114	6/10/86	4,594,489	06/693,119	6/10/86
4,594,010	06/603,232	6/10/86	4,594,500	06/464,423	6/10/86
4,594,015	06/618,682	6/10/86	4,594,508	06/675,391	6/10/86
4,594,016	06/579,526	6/10/86	4,594,514	06/462,338	6/10/86
4,594,017	06/745,532	6/10/86	4,594,515	06/619,718	6/10/86
4,594,020	06/607,279	6/10/86	4,594,532	06/621,273	6/10/86
4,594,021	06/603,130	6/10/86	4,594,541	06/649,319	6/10/86
4,594,025	06/623,985	6/10/86	4,594,546	06/588,488	6/10/86
4,594,027	06/488,896	6/10/86	4,594,568	06/748,427	6/10/86
4,594,028	06/431,678	6/10/86	4,594,575	06/635,979	6/10/86
4,594,046	06/708,697	6/10/86	4,594,580	06/680,628	6/10/86
			4,594,585	06/573,946	6/10/86

Patent Number	Serial Number	Issue Date	4,594,651	06/571,757	6/10/86
4,594,600	06/659,771	6/10/86	4,594,652	06/545,549	6/10/86
4,594,605	06/489,303	6/10/86	4,594,673	06/509,125	6/10/86
4,594,641	06/730,278	6/10/86	4,594,685	06/507,413	6/10/86
4,594,643	06/650,659	6/10/86	4,594,701	06/547,039	6/10/86
4,594,644	06/663,353	6/10/86	4,594,722	06/735,572	6/10/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF  
MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,523,009	06/636,076	6/11/85	7/31/84	7/19/90
4,525,235	06/640,735	6/25/85	8/14/84	7/13/90
4,530,947	06/603,396	7/23/85	4/24/84	7/19/90
4,535,623	06/608,995	8/20/88	5/10/84	7/13/90
4,536,756	06/558,048	8/20/85	12/05/83	7/19/90
4,579,487	06/651,474	4/01/86	9/17/84	7/19/90
4,453,600	06/404,402	6/12/84	8/02/82	7/19/90
4,477,935	06/338,040	10/23/84	1/08/82	7/19/90
4,497,156	06/421,242	2/05/85	9/22/82	7/19/90
4,511,874	06/480,766	4/16/85	3/31/83	7/19/90
4,522,368	06/562,821	6/11/85	12/19/83	7/13/90
4,522,386	06/503,494	6/11/85	6/10/83	7/19/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,531,738**, Re. S. N. 07/550,220, Filed July 9, 1990, Cl. 273, RACQUETBALL RACQUET WITH INCREASED HITTING AREA, Raymond L. Mortvedt, et al., Owner of Record: *Ektelon, San Diego, Calif.*, Attorney or Agent: Edwin W. Oldham, Ex. Gp.: 334

**4,553,136**, Re. S. N. 07/534,002, Filed June 5, 1990, Cl. 340, AMORPHOUS ANTIPILFERAGE MARKER, Philip M. Anderson, et al., Owner of Record: *Allied Corp., New York, N. Y.*, Attorney or Agent: Gus T. Hampilos, Ex. Gp.: 265

**4,616,652**, Re. S. N. 07/550,801, Filed July 9, 1990, Cl. 128, DILATION CATHETER POSITIONING APPARATUS, John Simpton, Owner of Record: *Advanced Cardiovascular Systems, Inc., Mountain View, Calif.*, Attorney or Agent: Edward J. Lynch, Ex. Gp.: 333

**4,648,215**, Re. S. N. 07/540,301, Filed June 18, 1990, Cl. 51, METHOD AND APPARATUS FOR FORMING A HIGH VELOCITY LIQUID ABRASIVE JET, Mohamed A. Hashish, et al., Owner of Record: *Flow International Corp., Kent, Wash.*, Attorney or Agent: Robert B. Hughes, Ex. Gp.: 323

**4,667,535**, Re. S. N. 07/358,871, Filed May 26, 1990, Cl. 74/715, DIFFERNETIALS, David John Knight, Owner of Record: *Knight-Mechadyne Ltd., Woking, England*, Attorney or Agent: William H. Needle, Ex. Gp.: 352

**4,752,008**, Re. S. N. 07/541,717, Filed June 21, 1990, Cl. 206/579, UTILITY BAG, Michael J. Pratt, Owner of Record: *Ogio International Inc., Salt Lake City, Utah*, Attorney or Agent: Todd E. Zehger, Ex. Gp.: 244

**4,755,799**, Re. S. N. 07/547,840, Filed July 3, 1990, Cl. 340/543, MICROCOMPUTER CONTROLLED COMBINATION LOCK SECURITY SYSTEM, James Romano, Owner of Record: *Inventor*, Attorney or Agent: Charles S. McGuire, Ex. Gp.: 268

**4,769,519**, Re. S. N. 07/548,866, Filed July 5, 1990, Cl. 219/10.41, FERROMAGNETIC ELEMENT WITH TEMPERATURE REGULATION, William D. Hall, Owner of Record: *Metcal, Inc., Menlo Park, Calif.*, Attorney or Agent: Inventor, Ex. Gp.: 214

**4,770,803**, Re. S. N. 07/547,910, Filed July 3, 1990, Cl. 252/75, AQUEOUS COMPOSITIONS CONTAINING CARBOXYLIC SALTS, John W. Forsberg, Owner of Record: *The Lubrizo Corp., Wickliffe, Ohio*, Attorney or Agent: Neil A. Duchez, Ex. Gp.: 115

**4,801,832**, Re. S. N. 07/533,251, Filed June 4, 1990, Cl. 310/216, STATOR AND ROTOR LAMINATION CONSTRUCTION FOR A DYNAMO-ELECTRIC MACHINE, Thomas Neumann, Owner of Record: *General Electric Co., Fort Wayne, Ind.*, Attorney or Agent: Samson Helfgott, Ex. Gp.: 212

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,708,966**, Reexam. No. 90/002,074, Requested July 2, 1990, Cl. 514/689, NOVEL ANTI-INFLAMMATORY AGENTS, PHARMECEUTICAL COMPOSITIONS AND METHODS FOR REDUCING INFLAMMATION, Maurice E. Loomans, et al., Owner of Record: *The Procter & Gamble Co., Cincinnati, Ohio*, Attorney or Agent: Milton B. Graff, Ex. Gp.: 125, Requester: Owner

**4,842,138**, Reexam. No. 90/002,075, Requested July 2, 1990, Cl. 206/370, RIGID DISPOSABLE CONTAINER FOR HOLDING AND DISPENSING OF USED MEDICAL SHARPS AND OTHER MEDICAL-SURGICAL MATERIALS, Dan Sandel, et al., Owner of Record: *Devon Industries, Inc., Chatsworth, Calif.*, Attorney or Agent: Poms, Smith, Lande & Rose, Los Angeles, Calif., Ex. Gp.: 244, Requester: Owner



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**4,847,303**, Reexam. No. 90/002,078, Requested July 2, 1990, Cl. 514/689, TERT-BUTYLPHENYL COMPOUNDS USEFUL AS ANTI-INFLAMMATORY AGENTS, Maurice E. Loomans, et al., Owner of Record; *The Proctor & Gamble Corp., Cincinnati, Ohio*, Attorney or Agent; Milton B. Graff, IV, Ex. Gp.: 125, Requester: Owner

**4,899,562**, Reexam. No. 90/002,076, Requested July 2, 1990, Cl. 070/277, ELECTRONIC DOOR LOCK, Klaus W. Gartner, Owner of Record; *Inventor*, Attorney or Agent; Poms, Smith, Lane & Rose, Los Angeles, Calif., Ex. Gp.: 358, Requester: Owner

**4,900,441**, Reexam. No. 90/002,077, Requested July 2, 1990, Cl. 210/321, SMALL FILTER AND METHOD OF ITS MANUFACTURE, Andreas Graus, et al., Owner of Record; *Satoris GmbH, Gottingen, Fed. Rep. of Germany*, Attorney or Agent; Eric P. Schellin, Ex. Gp.: 136, Requester: Filtertek, Inc., Hebron, Ill.

**4,901,519**, Reexam. No. 90/002,079, Requested July 2, 1990, Cl. 422/292, MEDICAL INSTRUMENT STERILIZATION CONTAINER, Robert L. Nichols, Owner of Record; *Inventor, Jacksonville, Tex.*, Attorney or Agent; Jerry W. Mills, Baker & Botts, Dallas Tex., Ex. Gp.: 181, Requester: Robert E. Clemency, Michael, Best & Friedrich, Milwaukee, Wis.

**4,908,469**, Reexam. No. 90/002,080, Requested June 26, 1990, Cl. 562/431, 2-HYDROXY-PROPANOIC ACID ACYCLIC ALKY ESTERS FOR BENZOTHAZEPHINES, Daniel E. Martin, Owner of Record; *Marion Labs, Inc., Kansas City, Mo.*, Attorney or Agent; Christopher J. Rudy, Washington, D.C., Ex. Gp.: 126, Requester: Martin P. Hoffman, Hoffman, Wasson, Fallow & Gittler, Arlington, Va.

**Federal Register Notice  
U. S. DEPARTMENT OF COMMERCE  
Advisory Commission on Patent Law Reform**

Agency: Patent and Trademark Office  
Action: Notice of Establishment

In accordance with the provisions of the Federal Advisory Committee Act, 5 U.S.C. App. 2, and the General Services Administration (GSA) rule on Federal Advisory Committee Management, 41 CFR Part 101-6, and after consultation with GSA, the Secretary of Commerce has determined that the establishment of the Advisory Commission on Patent Law Reform is in the public interest in connection with the performance of duties imposed on the Department by law.

The Commission will advise the Secretary through the Assistant Secretary and Commissioner of Patents and Trademarks on what, if any, changes are needed in the U. S. patent system.

The Commission will consist of no more than fifteen members to be appointed by the Secretary to assure a balanced representation among executives from corporations which rely heavily on patents, members of the patent bar, academia, and the general public.

The Commission will function solely as an advisory body, and in compliance with provisions of the Federal Advisory Committee Act. The charter will be filed under the Act, fifteen days from the date of publication of this notice.

Interested persons are invited to submit comments regarding the establishment of this Commission to Edward R. Kazenske, Assistant to the Commissioner and Director of Interdisciplinary Programs, Office of the Assistant Secretary and Commissioner

of Patents and Trademarks, Department of Commerce, Washington, D. C. 20231; telephone (703) 557-3071.

July 27, 1990

HARRY F. MANBECK  
Assistant Secretary and Commissioner  
of Patents and Trademarks

**Erratum**

"All reference to Patent No. 4,937,420 to C. Deckard of Austin, Tex. for 'METHOD AND APPARATUS FOR PRODUCING PARTS BY SELECTIVE SINTERING' appearing in the Official Gazette of June 26, 1990 should be deleted since no patent was granted."

**Service by Publication**

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Michael L. Cooper, dba Itza Great Pizza, Harrison, Ark., Reg. No. 1,347,023, for the mark "ITZA GREAT PIZZA", Canc. No. 18,540.

JEAN BROWN  
Administrator of the  
Trademark Trial and  
Appeal Board  
For JEFERY M. SAMUELS  
Assistant Commissioner for  
Trademarks

**Service by Publication**

A petition to cancel the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

The Creasey Company of Delaware, Louisville, Ky., Reg. No. 1,120,159 for the mark "GATEWAY ECONOMIZER MONEY", Canc. No. 18,636.

Rubber Kneekers, Danville, Calif., Reg. No. 1,585,387, for the mark "THE ORIGINAL KNECKERS FOR SAFE SPEX" and design, Canc. No. 18,732.

JEAN BROWN  
Administrator, Trademark  
Trial and Appeal Board  
For JEFERY M. SAMUELS  
Assistant Commissioner  
for Trademarks

**PATENT NOTICES**

**Certificates of Correction For Week of August 21, 1990**

Re. 33,060	4,827,286	4,849,306	4,862,719
4,383,984	4,827,421	4,850,028	4,862,726
4,560,795	4,828,166	4,850,255	4,862,736
4,610,335	4,828,202	4,850,549	4,862,792
4,677,768	4,829,179	4,851,399	4,863,211
4,688,183	4,829,293	4,851,696	4,864,040
4,694,054	4,830,776	4,851,902	4,864,170
4,699,717	4,830,839	4,852,011	4,864,285
4,743,719	4,831,108	4,852,062	4,864,993
4,751,689	4,831,339	4,852,200	4,865,082
4,755,815	4,832,022	4,852,239	4,865,301
4,761,403	4,832,659	4,852,336	4,865,357
4,762,283	4,833,226	4,853,132	4,865,941
4,764,123	4,833,484	4,853,163	4,866,080
4,768,705	4,834,734	4,853,772	4,866,090
4,770,073	4,836,832	4,853,774	4,866,224
4,778,106	4,838,093	4,854,118	4,866,265
4,787,194	4,838,467	4,855,119	4,866,281
4,788,252	4,839,396	4,855,156	4,866,855
4,791,821	4,839,401	4,855,270	4,866,919
4,795,665	4,839,602	4,855,291	4,867,085
4,795,791	4,840,995	4,855,481	4,867,212
4,797,327	4,841,217	4,855,848	4,867,262
4,798,694	4,842,416	4,856,099	4,867,468
4,801,107	4,842,626	4,856,606	4,867,504
4,805,048	4,843,169	4,857,366	4,867,511
4,805,309	4,844,717	4,857,563	4,868,258
4,808,803	4,844,746	4,857,807	4,868,425
4,809,099	4,845,085	4,859,062	4,869,121
4,813,005	4,845,405	4,859,226	4,869,850
4,813,167	4,846,421	4,859,468	4,870,123
4,814,688	4,846,853	4,859,531	4,870,233
4,817,816	4,847,021	4,859,620	4,870,296
4,818,635	4,847,433	4,859,862	4,870,476
4,819,665	4,847,481	4,859,983	4,871,122
4,820,798	4,847,562	4,860,261	4,871,195
4,822,369	4,847,578	4,860,676	4,875,087
4,822,385	4,847,601	4,860,717	4,875,974
4,822,390	4,848,066	4,861,400	4,876,397
4,824,026	4,848,278	4,861,780	4,889,902
4,825,450	4,848,521	4,861,840	4,910,770
4,825,582	4,848,999	4,862,480	4,919,156

**Errata**

In the Notice of Certificates of Correction appearing at 1116 O.G. 49, of July 24, 1990, Patent No. 4,965,181 should be 4,865,181.

In the Notice of Certificates of Correction appearing at 1116 O.G. 49, of July 24, 1990, Patent No. 4,965,176 should be 4,865,176.

In the Notice of Certificates of Correction appearing at 1116 O.G. 49, of July 24, 1990, Patent No. 4,965,111 should be 4,865,111.

In the Notice of Certificates of Correction appearing at 1116 O.G. 49, of July 24, 1990, Patent No. 4,864,546 should be 4,864,456.

## SPECIAL BOXES FOR MAIL

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Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application prior to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

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These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification*, *Index to the U.S. Patent Classification*, *Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Sunnyvale Patent Clearinghouse .....	(408) 730-7290
Colorado	Denver Public Library .....	(303) 640-8874
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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 14, 1990

PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP—130	
BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	4-20-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87

ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
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ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-22-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP—260	
STEWART LEVY, Acting Director	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	1-5-87

MECHANICAL EXAMINING GROUPS

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MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	5-5-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

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## REEXAMINATIONS

AUGUST 21, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,079,028 (1338th)  
POLYURETHANE THICKENERS IN LATEX  
COMPOSITIONS

William D. Emmons, Huntingdon Valley, and Travis E. Stevens, Ambler, both of Pa., assignors to Rohm & Haas Co., Philadelphia, Pa.

Reexamination Request Nos. 90/001,846, Sep. 19, 1989 and 90/001,995, Apr. 10, 1990.

Reexamination Certificate for Patent No. 4,079,028, issued Mar. 14, 1978, Ser. No. 686,751, May 17, 1976.

Continuation-in-part of Ser. No. 619,549, Oct. 3, 1975, abandoned.

Int. Cl.<sup>4</sup> C08L 33/08

U.S. Cl. 524—804

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-4 and 7-24 is confirmed.

Claims 5 and 6 are determined to be patentable as amended.

New claims 25, 26 and 27 are added and determined to be patentable.

1. A latex composition containing an emulsion polymer and from about 0.1 to about 10% by weight based on emulsion polymer solids of a thickener selected from polymers of Groups A, B and C as follows:

Group A: A—B<sub>p</sub>—E<sub>q</sub>—B—E)<sub>n</sub>Br—E<sub>r</sub>—A

where

each of p, q, r, and t independently is zero or 1; at least one of q and r is 1, t is zero when r is zero, and n is at least 1; provided that,

when q is 1, then

a. each of p, r and t is zero; or

b. p is zero and each of r and t is 1; or

c. t is zero and each of r and p is 1; and when q is zero, then r is 1 and each of p and t is zero;

Group B: [H—E—OCH<sub>2</sub>]<sub>2</sub>L[Q<sub>v</sub>—D<sub>u</sub>—E—A)<sub>w</sub>R]<sub>z</sub>

where

L is X, Y or —O—, Q is —CH<sub>2</sub>C≡, D is —CH<sub>2</sub>O—, m is 2-4, s is zero to 2, the sum of m and s is 2-4, w is 1-3, and each of u, v and z independently is zero or 1;

and

where X is a hydrocarbon radical containing at least 1 carbon atom; and Y is a trivalent radical selected from —O—CONH(CH<sub>2</sub>)<sub>6</sub>N[CONH(CH<sub>2</sub>)<sub>6</sub>NHCO—O]<sub>2</sub>, CH<sub>3</sub>C[CH<sub>2</sub>O—OCNHC<sub>7</sub>H<sub>6</sub>NHCO]<sub>3</sub> and CH<sub>3</sub>CH<sub>2</sub>C[CH<sub>2</sub>O—OCNHC<sub>7</sub>H<sub>6</sub>NHCO]<sub>3</sub>;

provided that,

a. when L is X, then u and w are each 1, v and z are each zero, m is at least 2, and the sum of m and s is 4;

b. when L is Y, then u, v and s are each zero, m is 3, w is 2-3, and z is zero or 1; and

c. when L is —O—, then v and u are each 1, w is 1-3, m is 2 and each of s and z is zero;

and

where, in each of the polymers of Groups A and B:

A and R are hydrophobic organic radicals;

B is a divalent hydrophobic group of the structure



where G is the residue of an organic di- or triisocyanate, said residue having no remaining unreacted isocyanate groups; and E is a divalent, hydrophilic, nonionic polyether group;

Group C:

A composition prepared by reacting (a) a polyfunctional reactant selected from an organic polyol having at least three hydroxyl groups, an organic polyisocyanate having at least three isocyanate groups, and mixtures thereof; (b) a difunctional reactant selected from an organic diol, an organic diisocyanate, and mixtures thereof, said diol being present in the reaction mixture when said polyisocyanate is present and said diisocyanate being present when said polyol is present; (c) a monofunctional hydroxyl or amino compound is an amount sufficient to cap any unreacted isocyanate remaining from the reaction of reactants (a) and (b) and to prevent gelation of the reaction mixture; and optionally (d) an organic monoisocyanate to cap hydroxyl groups remaining from the reaction of reactants (a) and (b); wherein at least one of said polyol and diol contains at least one water soluble polyether segment of at least 1500 molecular weight, and wherein the sum of the carbon atoms in said isocyanate-containing reactants, said hydroxyl compound and said amino compound is at least 20 and the average molecular weight of the components of the composition is about 10,000-2000,000.

B2 4,189,834 (1339th)  
DENTAL REINFORCING PINS

Andrew J. Smith, London, England, assignor to Fairfax Dental Ltd, Dublin, Ireland

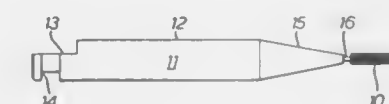
Reexamination Request No. 90/001,299, Aug. 3, 1987.

Reexamination Certificate for Patent No. 4,189,834, issued Feb. 26, 1980, Ser. No. 804,831, Jun. 8, 1977.

Reexamination Certificate B1 4,189,834, issued Oct. 9, 1984.

Int. Cl.<sup>3</sup> A61C 5/04

U.S. Cl. 433—225



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

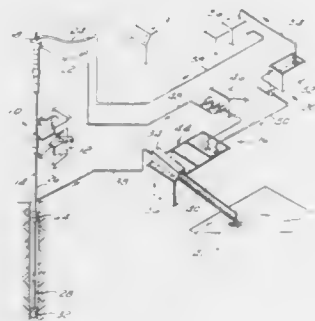
The patentability of claims 1-5 is confirmed.

1. A dental anchoring device comprising a threaded portion for self-threading insertion in a bore formed in a tooth dentine, a connecting portion forming an integral unit with said threaded portion and having an elongated shank adapted for direct positive attachment in a powered dental hand-piece, and a weakened portion intermediate the threaded portion and one end of the connecting portion for permitting shearing and separation of the connecting portion from the threaded portion; the free end of the connecting portion having a flat portion and a part annular groove, whereby the connecting portion can be latched in a latching-type dental hand-piece to securely retain the dental anchoring device in the hand-piece



without dropping therefrom and when said threaded portion is fully inserted in a bore said weakened portion shears to separate said connecting portion from said threaded portion.

**B1 4,624,327 (1340th)**  
**METHOD FOR COMBINED JET AND MECHANICAL DRILLING**  
 James R. Reichman, Issaquah, Wash., assignor to Flowdril Corporation, Kent, Wash.  
 Reexamination Request No. 90/001,728, Mar. 13, 1989.  
 Reexamination Certificate for Patent No. 4,624,327, issued Nov. 25, 1986, Ser. No. 661,368, Oct. 16, 1984.  
 Filed Mar. 13, 1989, Ser. No. 661,368  
 Int. Cl.<sup>5</sup> E21B 7/18  
 U.S. Cl. 175—67



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 2 and 3 are cancelled.

Claims 1, 8, 10, 12, and 18 are determined to be patentable as amended.

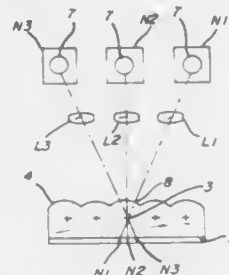
Claims 4-7, 9, 11, 13-17 and 19-23, dependent on an amended claim, are determined to be patentable.

1. A method for improving the rate of drilling a hole in an earthen formation, comprising:

- (a) conducting a first fluid down said hole to said drill;
- (b) conducting a second fluid down said hole to said drill;
- (c) jetting said second fluid through openings in said drill and against said formation to assist said drill in drilling, said second fluid being substantially clarified to prevent the clogging of said openings;

- (d) mixing said first and second fluids substantially at the bottom of said hole;
- (e) conducting the mixture of fluids back up the hole to the surface;
- (f) cleaning the mixture of fluids to remove solids therefrom;
- [(f)] (g) segregating a portion of [said] the fluid mixture with the solids removed to provide said second fluid, the [remainder] remaining portion of said mixture serving as said first fluid;
- (h) further cleaning said segregated portion by removing small particles therefrom to substantially clarify said second fluid to prevent clogging of the openings in said drill;
- [(g)] (i) re-conducting said substantially clarified second fluid down said hole; and
- [(h)] (j) re-conducting said first fluid down said hole.

**B1 4,800,407 (1341st)**  
**TOTAL FOCUS-3-D CAMERA AND 3-D IMAGE STRUCTURE**  
 Allen K. W. Lo, Dunwoody, Ga.  
 Reexamination Request No. 90/001,767.  
 Reexamination Certificate for Patent No. 4,800,407, issued Jun. 8, 1990, Ser. No. 150,977, Feb. 1, 1988.  
 U.S. Cl. 354—114



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is cancelled.

Claims 2 and 5 are determined to be patentable as amended.

Claims 3 and 4, dependent on an amended claim, are determined to be patentable.

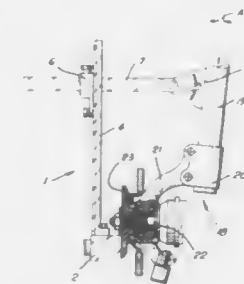
[1. An image array formed on the photosensitive surface of lenticular print film, said image array consisting of two stereoscopic image pairs within a group of three image bands in each lenticule.]

## REISSUES

AUGUST 21, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 33,302**  
**MACPHERSON STRUT ALIGNMENT GAUGE AND STRAIGHTENING APPARATUS**  
 James H. Mason, 786 Pittwater Rd., Brookvale, New South Wales 2100, Australia  
 Original No. 4,640,015, dated Feb. 3, 1987, Ser. No. 684,103, Dec. 20, 1984. Application for reissue Jan. 24, 1989, Ser. No. 301,079  
 Claims priority, application Australia, Dec. 20, 1983, PG2918  
 Int. Cl.<sup>5</sup> G01B 3/38  
 U.S. Cl. 33—608

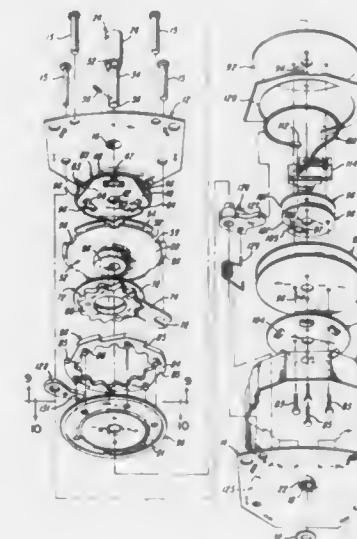


12. Vehicle gauging apparatus comprising:  
 an elongate bar;  
 a pair of attachment means slidably mounted on said bar, each said attachment means having an attachment portion spaced from said bar and including engagement means for engaging an associated datum point on a vehicle; and  
 a pair of extension pieces slidably mounted on said bar outwardly of said attachment means, each said extension piece including a reference bar adapted to contact a gauge apparatus for measuring the angular displacement of a wheel of the vehicle with respect to said elongate bar.

**Re. 33,303**  
**TIRE LIFT/CARRIER**  
 Stephan A. Denman, Centerville, and Garthwood R. Taylor, Dayton, both of Ohio, assignors to Deuer Manufacturing Inc., Dayton, Ohio  
 Original No. 4,625,947, dated Dec. 2, 1986, Ser. No. 627,029, Jul. 2, 1984. Continuation-in-part of Ser. No. 554,278, Nov. 22, 1983, Pat. No. 4,544,136, which is a continuation of Ser. No. 277,088, Jun. 25, 1981, abandoned. Application for reissue Sep. 17, 1987, Ser. No. 99,165  
 The portion of the term of this patent subsequent to Oct. 12, 2002, has been disclaimed.  
 Int. Cl.<sup>5</sup> B66D 1/14, 1/34, 1/36, 1/58  
 U.S. Cl. 254—323

**5 Claims**  
 14. Tire lift/carrier apparatus comprising a drive shaft, a housing supporting said drive shaft for rotation, a clutch plate within said housing and mounted on said drive shaft for rotation therewith, a set of annular sheet metal plates forming a spool mounted on said drive shaft for relative rotation within said housing and defining a narrow annular track, said clutch plate being normally in driving relation to said spool through interposed means surrounding said shaft, an elongated flexible cable having opposite end portions, means mounted on one end portion of said cable for supporting a tire, means connecting the opposite end portion of said cable to said spool, said annular track of said spool having a width slightly greater than the diameter of said cable to confine said cable for wrapping radially outwardly in a spiral overlapping manner within said track, said interposed means including a drive plate supported

for rotation relative to said shaft and adjacent said clutch plate, [said drive plate including circumferentially spaced projections disposed around said clutch plate, spring elements mounted on said clutch plate and having portions projecting outwardly into engagement with said projections on said drive plate, said spring elements being deformable inwardly by said projections] spring bias means interconnecting said clutch plate and said drive plate and being deformable in response to relative rotation between said clutch plate and said drive plate and

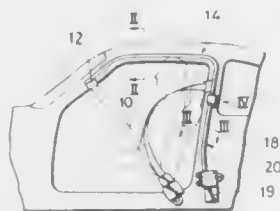


providing for driving said drive plate by said clutch plate with a predetermined limiting torque, said interposed means further including an eccentric cam member rotatable with said drive plate, an annular drive gear mounted on said cam member and supported for orbital movement in response to rotation of said cam member, a ring gear surrounding said drive gear, and means for rigidly securing said ring gear to said spool to effect rotation of said spool in response to rotation of said shaft and said clutch plate through said interposed means.

**Re. 33,304**  
**AUTOMATIC SEAT BELT SYSTEM**  
 Yoshihiro Yokote, Yokohama, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan  
 Original No. 4,659,107, dated Apr. 21, 1987, Ser. No. 662,903, Oct. 22, 1984. Application for reissue Apr. 21, 1989, Ser. No. 341,745  
 Claims priority, application Japan, Nov. 1, 1983, 58-168388[U]  
 Int. Cl.<sup>5</sup> B60R 21/02, 22/06  
 U.S. Cl. 280—804

**10 Claims**  
 8. An automatic seat belt system including a guide rail arranged along a predetermined path within the room of an automobile, a runner provided movably on the guide rail, and a drive member for causing the runner to move in such a way that a webbing fastened to the runner is displaceable between an occupant restraining position and an occupant non-restraining position, the system further comprising:  
 a plurality of brackets provided in contact with the other wall of the guide rail;  
 means for securing the brackets on the body of the automobile; and

means for positioning the brackets at desired locations relative to the length of the guide rail, said positioning means comprising



cut-off portions formed on the guide rail and defining indentations in which the brackets are partly received.

**Re. 33,305  
FIXTURE FOR SECURING AN ELECTRICAL CONNECTOR**

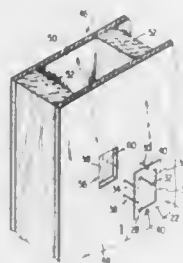
C. Kenneth Thayer, 11141 Georgia Ave., Silver Spring, Md. 20902

Original No. 4,576,431, dated Mar. 18, 1986, Ser. No. 729,402, May 1, 1985. Application for reissue Feb. 2, 1987, Ser. No. 10,080

Int. Cl.<sup>5</sup> G04D 7/00; H01R 13/74

U.S. Cl. 439—560

25 Claims



1. A fixture for mounting an electrical connector element in an opening in a panel, the connector element having a plurality of openings to accommodate mounting screws, comprising:

a sheet metal element having  
a substantially flat portion with an opening therein, said opening having first and second spaced-apart ends and first and second spaced-apart sides that are substantially parallel, said first and second sides being longer than said first and second ends, said substantially flat portion having a hole adjacent said first end of said opening and substantially equally distant from said first and second sides, said substantially flat portion additionally having a hole adjacent said second end of said opening and substantially equally distant from said first and second sides.

a plurality of first elongated legs joining said substantially flat portion at respective first bent regions that are disposed along said first side of said opening at first predetermined distances from said first end, each first leg being longer than half the distance between said first and second sides, and

a plurality of second elongated legs joining said substantially flat portion at respective second bent regions that are disposed along said second side of said opening at second predetermined distances from said first end, said second predetermined distances being different from said first predetermined distances to stagger said second legs with respect to said first legs so that said legs alternate from a first leg to a second leg, for all of said legs, from one of said ends to the other of said ends, each second leg being longer than half the distance between said first and second sides; and

screw securing means disposed on said substantially flat portion at said holes for securing the mounting screws.

14. A fixture for mounting an electrical connector plate over an aperture in a panel having front and rear surfaces, the connector plate having a plurality of openings to accommodate mounting screws, comprising:

a unitary sheet metal element having

a substantially flat portion with a substantially rectangular opening therein, said opening having first and second spaced-apart sides that are substantially parallel and third and fourth spaced-apart sides that are substantially parallel, said substantially flat portion having a front surface which faces away from said panel and a rear surface which faces said front surface of said panel, said substantially flat portion additionally having a pair of spaced-apart holes which lie along a line substantially parallel to two of said sides and substantially bisecting said substantially rectangular opening,

at least one first elongated leg to pass through said aperture in said panel and engage said rear surface thereof, said at least one first leg extending from said first side of said opening, and

at least one second elongated leg to pass through said aperture in said panel and engage said rear surface thereof, said at least one second leg extending from said second side of said opening; and

screw securing means disposed on said substantially flat portion at said holes for receiving the mounting screws to attach the electrical connector plate adjacent the front surface of the substantially flat portion.

**Re. 33,306  
SECONDARY BATTERY OR CELL WITH IMPROVED RECHARGEABILITY**

Hiroshi Hayashi, Otu, and Masahiro Satoh, Kyoto, both of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

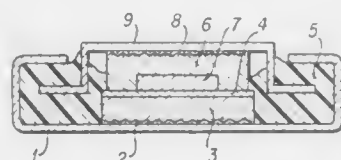
Original No. 4,615,959, dated Oct. 7, 1986, Ser. No. 709,397, Mar. 7, 1985. Application for reissue Oct. 7, 1988, Ser. No. 254,966

Claims priority, application Japan, May 7, 1984, 59-91455

Int. Cl.<sup>5</sup> H01M 6/14, 4/58

U.S. Cl. 429—194

18 Claims



14. A secondary battery or cell with improved rechargeability, which comprises:

(A) a cathode active material comprising a chalcogen compound of a transition metal,

(B) an electrolyte comprising an organic solvent having dissolved therein a lithium salt, and

(C) an anode active material comprising lithium metal in electrical contact with an electrically conductive substantially amorphous carbonaceous material having a conductivity of at least  $10^{-5}$  mho/cm,

said carbonaceous material being a pyrolysis residue formed by heating at least one organic material selected from the group consisting of synthetic high polymers, natural high polymers, pitches and coals, in an inert atmosphere to a temperature ranging from about 300° C. to 1500° C.,

wherein said anode material is formed in situ within the secondary battery or cell, by self discharge of lithium metal into said carbonaceous material.

**Re. 33,307  
CYCLIC HYDROXY COMPOUNDS**

Stephen C. Taylor, Darlington, and Michael D. Turnbull, Earley, both of England, assignors to Imperial Chemical Industries PLC, London, England

Original No. 4,740,638, dated Apr. 26, 1988, Ser. No. 59,813, Jun. 9, 1987. Application for reissue Dec. 30, 1988, Ser. No. 292,348

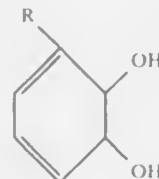
Claims priority, application United Kingdom, Jun. 19, 1986, 8614925

Int. Cl.<sup>5</sup> C07C 35/14, 43/196, 43/253

U.S. Cl. 568—832

10 Claims

1. Compounds having the general formula:



wherein R is selected from the group consisting of a —C trihalide, [an —O alkyl] and an —O phenyl group.

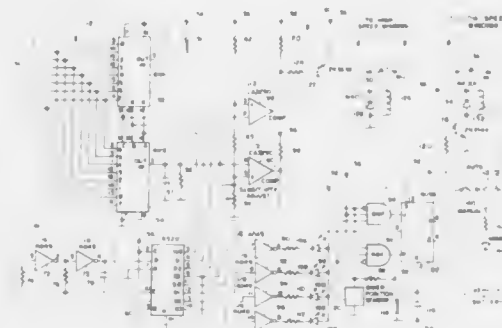
**Re. 33,308  
AUTOMATIC WINDOW WIPER CONTROL**

Donald L. Miller, San Diego, and Marl J. Bell, Valley Center, both of Calif., assignors to Mist-Defy'r, Inc., La Jolla, Calif. Original No. 4,705,998, dated Nov. 10, 1987, Ser. No. 12,617, Feb. 9, 1987. Application for reissue Mar. 29, 1988, Ser. No. 175,041

Int. Cl.<sup>5</sup> B60S 1/08

U.S. Cl. 318—444

32 Claims



1. An automatic wiper motor control system for operating a window wiper motor which operates at least one wiper blade to and fro across window for removing moisture from [the] an area which it sweeps, said motor having a park circuit means for returning said wiper blade to a home location when said wiper motor [motor] operation is terminated at other than the wiper blade home location comprising:

a voltage source;

a moisture sensor, said moisture sensor comprising a plurality of spaced apart exposed conductive strips positioned within [an] the area of the sweep of said at least one wiper blade;

a voltage storage means;

a scanning circuit for sequentially connecting adjacent pairs of said conductive strips, one of said pair to said voltage source and the other of said pair to said voltage storage means;

a wiper motor operating circuit for activating said wiper motor;

a voltage sensing means connected between said voltage storage means and said wiper motor operating circuit, said voltage sensing means activates said wiper motor operat-

ing circuit when the voltage level of said voltage storage means exceeds a preselected voltage level; and

a wiper position sensor means positioned along the sweep of said wiper blade and influenced by the blade passing thereacross for [activating the operation of said voltage sensing means] controlling termination of the operation of said wiper motor, whereby a determination is made by said [automotive] automatic wiper motor control system to operate said wiper motor or terminate said operation in dependence upon the amount of moisture on the window.

15. An automatic wiper control system for operating a window wiper motor which moves at least one wiper blade to and fro across the window for removing moisture from an area which it sweeps, said system comprising, in combination:

(a) a voltage source;

(b) current detection means, having an input and an output, for producing a wiper activation signal at said output, said wiper motor being operated in response to said wiper activation signal;

(c) a moisture sensor comprising at least three spaced apart, exposed conductive strips;

(d) first means for connecting one of said conductive strips to said voltage source; and

(e) second means for connecting one other of said conductive strips to said current detection means;

wherein said first and second means sequentially scan adjacent pairs of said conductive strips, one of said pair to said voltage source and the other of said pair to said current detection means, respectively; and

wherein said current detection means includes means for accumulating a parameter substantially representative of the current received by each of said other conductive strips during at least one scan of said conductive strips by said first and second means;

whereby a determination is made by said wiper motor control system to operate said wiper motor or to terminate its operation, in dependence upon the amount of moisture on the window.

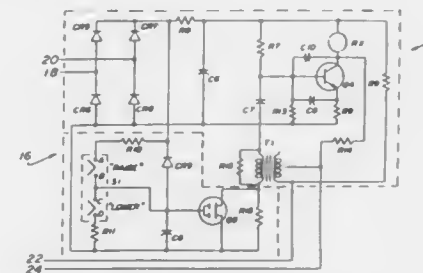
**Re. 33,309  
TELEPHONE HANDSET AMPLIFIER CIRCUIT**  
Wesley F. Walker, Jr., Ringgold, Ga., and David Hanon, Chattanooga, Tenn., assignors to Walker Equipment Corporation, Ringgold, Ga.

Original No. 4,466,120, dated Aug. 14, 1984, Ser. No. 533,884, Sep. 20, 1983. Continuation of Ser. No. 273,714, Jun. 15, 1981, abandoned. Application for reissue Mar. 27, 1989, Ser. No. 329,120

Int. Cl.<sup>5</sup> H04M 1/60

U.S. Cl. 379—395

14 Claims



9. Telephone signal amplifier, comprising:

a telephone handset having a receiver cup and transmitter cup separated by a handle portion,

an operator accessible switch mounted on the handset handle portion, said switch being operable in [a] at least two states,

means disposed within the handset and coupled to said operator accessible switch for amplifying an audio signal generated by a telephone network based on the duration of



operation of said switch to either of said states, said means for amplifying said [sudio] audio signal comprising an amplifier and FET means ac coupled to the input side of said amplifier for reducing the level of said telephone network audio signal over a range of levels based on the

duration of operation of said switch to one of said states, and ,  
a receiver disposed within the receiver cup for transducing the amplified audio signal to sound.

## PLANT PATENTS

GRANTED AUGUST 21, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,300

### STANDARD CARNATION NAMED LONTILTO

Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Laboratoire de Physiologie Vegetale, La Londe-les-Maures, France

Filed Oct. 11, 1988, Ser. No. 255,443  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—71

1 Claim

1. The new and distinct carnation cultivar substantially as herein shown and described, particularly distinguished by the Empire Rose coloring of its medium sized and well formed flowers borne singly on strong, upright stems on a plant having a vigorous and rather rigid growth habit and moderately abundant foliage.

7,301

### SPRAY CARNATION NAMED LONCHEZU

Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Laboratoire de Physiologie Vegetale, La Londe-les-Maures, France

Filed Oct. 11, 1988, Ser. No. 266,130  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. The new and distinctive spray carnation plant substantially as herein shown and described, characterized by the clean, bright yellow color of its blooms, its profuse production of blooms, its relatively long flower stems, its good production of foliage and its vigorous, upright growth habit.

7,302

### LILY PLANT NAMED ITALIA

Petrus M. M. Hoff, Hem, Netherlands, assignor to Hoffgaarde B.V., Netherlands

Filed May 11, 1989, Ser. No. 350,251  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct cultivar of lily plant named Italia, as illustrated and described.

7,303

### AGAPANTHUS ELAINE PLANT

Archie A. Amate, 15662 Sunflower La., Huntington Beach, Calif. 92647

Filed Feb. 21, 1989, Ser. No. 313,703  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct variety of Agapanthus plant substantially as shown and described characterized by its ability to reach a height of 13 dm when in flower, which includes slender glaucous scape that reach to a maximum height of 11.1 dm, and having a hardy upright growth habit along with prominent dark blue-violet flowers which are slightly zygomorphic from the cylindrical base and with each flower being composed of six segments arranged in two whorls of three defined by a narrower outer pair, the flowers ranging from 4.0-4.2 cm long, and 2.2-2.5 cm across at the apex when fully expanded with the leaves being formed having veins closely spaced about 2 mm apart near the center of the leaves which are thick-textured but pliable and reach a maximum length of 60 cm long and range from 5.6-6.3 cm wide.

7,304

### PITTOSPORUM TOBIRA 'HINES HARDY'

William C. Barr, Rosenberg, Tex., assignor to Weyerhaeuser Company

Filed Dec. 19, 1988, Ser. No. 286,570  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—54

1 Claim

1. A new and distinct plant cultivar of *Pittosporum tobira* characterized by compact appearance and lustrous dark green foliage and having winter hardiness at least adequate for USDA Zone 8 (10°-20° F.).

7,305

### NECTARINE TREE "APRIL GLO"

Chris F. Zaiger, 537 Rosemore Ave.; Gary N. Zaiger, 1907 Elm Ave.; Leith M. Gardner, 1207 Grimes Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351

Filed Aug. 2, 1989, Ser. No. 388,891  
Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—40

1 Claim

1. A new and distinct variety of nectarine tree substantially as illustrated and described, characterized by its low chilling requirement of approximately 200 hours, its large size, vigorous, upright growth and being a regular and productive bearer of medium size, early maturing, yellow flesh, semi freestone fruit with good flavor and eating quality; the fruit is further characterized by having good shipping quality and maturing approximately 10-14 days before the low chilling nectarine variety May Glo, U.S. Pat. No. P.P. 5,245.

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PATENTS  
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ERRATA

For CLASS	See PATENT NO.
004-228 .....	4,949,403
089-180 .....	4,949,618
242-862 .....	4,949,909
242-581 .....	4,949,910
242-671 .....	4,949,911
242-683 .....	4,949,912
242-118 .....	4,949,913
242-195 .....	4,949,914
272-134 .....	4,949,951
272-070 .....	4,949,993
280-655 .....	4,950,003
297-452 .....	4,950,004
292-006 .....	4,950,018
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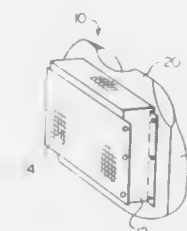
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## PATENTS

GRANTED AUGUST 21, 1990

## GENERAL AND MECHANICAL

**4,949,401**  
**COLLAPSIBLE MULTICOMPARTMENTED PACK FOR**  
**THE BACK OF A GARMENT**  
 Cheston B. Kimsey, Jr., P.O. Box 197, Clarksville, Ga. 30523  
 Filed Jun. 19, 1989, Ser. No. 367,621  
 Int. Cl.<sup>5</sup> A41D 1/02, 1/04  
 U.S. Cl. 2—102 32 Claims

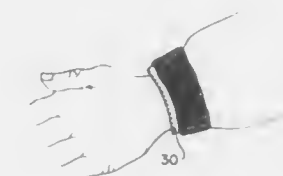


1. A utility vest with multiple storage compartments on a back thereof comprising:
  - (a) two front panels having means to join said two front panels in a front of the vest;
  - (b) a back panel affixed to the sides of said two front panels to form a vest-like garment;
  - (c) a first collapsible compartment affixed to and substantially covering said back panel with an opening at its top, said first compartment comprising:
    - a first generally rectangular panel having a side-to-side width larger than the corresponding side-to-side width of said back panel, the sides of said first panel being affixed to the sides of said back panel to form the sides and back of the first compartment;
    - a second panel affixed to said vest back panel and to said first panel to form the bottom of said first compartment;
    - a third panel affixed to said back panel and having first closing means for selective attachment to said first panel to thereby form a top for said first compartment whereby the opening at the top of said first compartment may be closed; and
  - (d) a second flat compartment carried on an outside of said first compartment having generally the same width and height as said first compartment, said second compartment comprising a fourth generally rectangular panel affixed on both sides and the bottom to the outside of said first panel to form said second compartment with an opening at the top thereof,
- said first and fourth panels having second closing means for selectively retaining said first compartment in a collapsed position by removably joining said first and fourth panels at the sides thereof,
- said third panel and said fourth panel having third closing means for selectively retaining said third panel in an overlying position with respect to said first and second compartments.

**4,949,402**  
**MINI-SHIRT**  
 Charles F. McCool, Two Rivers La., Chesapeake City, Md. 21915, and Sandra M. Pagel, 4356-D Belair Ct., Andrews AFB, Md. 20335  
 Filed Mar. 8, 1989, Ser. No. 320,595  
 Int. Cl.<sup>5</sup> A41B 7/06  
 U.S. Cl. 2—124 4 Claims

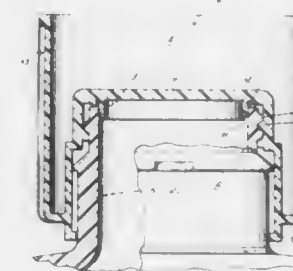
1. A clothing ensemble, comprising:
  - a sweater, said sweater formed of a material and having a pair of sleeves each including an inner surface;
  - a pair of cuffs with each cuff including attachment means for releasably attaching said cuffs directly to the material

forming said sweater, said attachment means including a plurality of elongated elements having a first end in attachment with said cuff and a second hook-shaped end



releasably connectable directly with the material forming said sweater, and said elongated elements being positioned between the inner surface of said sweater and said cuffs when said cuffs are in attachment with said sweater.

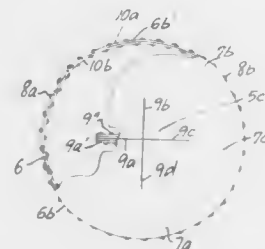
**4,949,403**  
**AUTOMATIC DISPENSER FOR FLUSH TANKS**  
 Lewis C. LoMaglio, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio  
 Filed Oct. 19, 1988, Ser. No. 259,990  
 Int. Cl.<sup>5</sup> E03D 9/03  
 U.S. Cl. 4—228 6 Claims



1. A liquid dispenser for flush tanks comprising the combination of:
  - an inverted container having a neck with external screw threads and a rim;
  - a cap adapted for movement on the neck and having internal screw threads cooperable and engageable with the external threads of the neck, said cap having a cover for covering said neck when said cap is fully threaded thereon;
  - raised and lowered stop means positioned on said cap and neck for restricting axial movement of the cap between raised and lowered position on the neck when the screw threads of the neck and cap are disengaged;
  - sealing means on the cap upstanding from said cover and cooperable with said neck for sealingly closing the neck when the cap is threaded fully thereon;
  - said sealing means on said cap comprises a resilient annular sealing fin which fits snugly in the open end of the container neck when said cap is fully threaded on said neck to sealingly close said neck but which is spaced from said neck when said cap is in said raised position, and an annular ring-like bead on the cap adjacent said fin which abuts said rim of said neck when said cap is fully threaded on said neck to further sealingly close said neck;
  - said stop means holding said sealing means away from said neck when the cap is not threaded fully onto said neck,

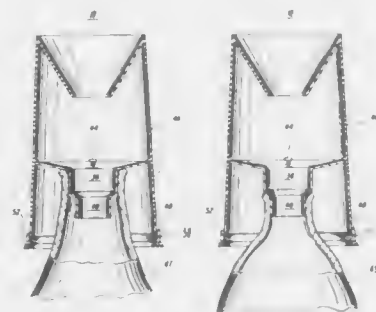
and for enabling discharge of liquid from the container into the cap when the cap is lowered from said raised position; and  
 flotation means on the cap for automatically shifting the cap from its lowered to its raised position in response to a rising level of said liquid in a flush tank, said flotation means comprising a generally cylindrical outer wall surrounding said cap, said outer wall having an upper end sealed to said cap to form a buoyant chamber which is closed upwardly but which opens downwardly at a lower end thereof, said cap shifting by gravity to its lowered position as the liquid level falls in the tank.

**4,949,404**  
**HARDHAT LINER**  
 Joseph Fekete, Sr., Virginia Garment Co., Inc., P.O. Box 2020,  
 Richmond, Va. 23216  
 Filed Nov. 30, 1989, Ser. No. 443,600  
 Int. Cl.<sup>5</sup> A42B 1/06  
 U.S. Cl. 2—410 9 Claims



1. A hardhat liner for wearing beneath a hardhat and for retaining warmth of the sinus and ears and neck back and sides while concurrently being fashioned to avoid blocking of good-view visibility and being fashioned to avoid blocking of hearing of warning sounds, comprising at least two separate single first and second liner fabrics each of corresponding tubular construction having a closed upper portion cut and sewn to have a dome shaped to conform to a crown of a person's head when worn, and having an open lower portion cut and shaped to include a forward upwardly-extending substantially semicircular cut-out space circumscribed by a substantially semicircular upwardly-extending forward edge and to include a rearward portion, the rearward portion having opposite-side lateral portions and an intermediate back portion that are contiguous and congruent portions that have a continuing common substantially horizontal bottom peripheral edge, said semicircular forward edge and said horizontal bottom peripheral edge of the first and second woven liner fabrics having aligned and matched with one-another their corresponding said dome and said open lower portion for matching shapes and being stitched-together with stitching thread along their corresponding and matched said semicircular forward edges and matched said horizontal bottom peripheral edges, such that when worn said sewn-together semicircular forward edges are normally laterally positioned behind a wearer's eyes in front of a wearer's ears and upwardly along a wearer's browline whereby warmth of the sinus is retained, and such that when worn, said sewn-together horizontal bottom peripheral edges extend rearwardly substantially horizontally below a wearer's ears and around a back portion of a wearer's neck whereby warmth is retained for ears and neck of the wearer and such that when worn said sewn-together horizontal bottom peripheral edges extend rearwardly substantially horizontally below a wearer's ears and around a back portion of a wearer's neck whereby a wearer's side-view is not blocked and whereby the fabric does not exclude warning sounds from ears of the wearer.

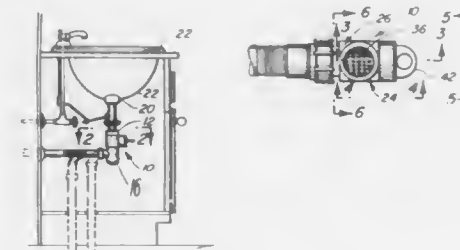
**4,949,405**  
**CUSPIDOR CONVERTOR**  
 William J. Johnson, 1445 Sedalia Dr., Flower Mound, Tex. 75028  
 Filed Dec. 22, 1988, Ser. No. 288,766  
 Int. Cl.<sup>5</sup> A61J 19/00 14 Claims  
 U.S. Cl. 4—258



1. Apparatus for selectively adapting a container having an upper portion defined by inner and outer surfaces surrounding an inlet opening for use as a cuspidor, said apparatus comprising:  
 a housing having top and bottom openings and a passageway communicating therebetween;  
 means disposed within said housing for directing material introduced therein through said top opening into said passageway toward said bottom opening and into said inlet opening and for substantially preventing said material from escaping back through said top opening; and  
 means located with respect to said bottom opening and adapted to be selectively engaged with one of said inner and outer surfaces of said upper portion whereby said container can be retained in a substantially fixed position with respect to said housing by selectively engaging either said inner or outer surface with said means, such that said container will receive at least some of the material directed into said passageway toward said bottom opening and into said container.

12. Apparatus for adapting a beverage can for use as a cuspidor, said can having opposed top and bottom surfaces, a cylindrical wall connecting the top and bottom surfaces, an inlet opening in a portion of the top surface and a rim member surrounding a top edge of the can, said apparatus comprising:  
 a housing having top and bottom openings and a passageway communicating therebetween;  
 means disposed within said housing for directing material introduced therein through said top opening into said passageway toward said bottom opening and into said inlet opening and for substantially preventing said material from escaping back through said top opening;  
 means located adjacent to said bottom opening for selectively engaging said rim member, said means including a shoulder member disposed in said housing for engaging a top part of said rim member to limit upward movement of said can within said housing and a plurality of nubs projecting inwardly from an inner wall of said housing for engaging a bottom part of said rim member to retain said can at least partially within said housing, so that at least some of the material directed into said passageway will enter said can through said inlet opening, said nubs being spaced apart vertically from said shoulder member sufficient to receive said rim member therebetween to provide a snug-fit engagement.

**4,949,406**  
**SINK TRAP FILTER ASSEMBLY**  
 Giuseppe Canelli, Via Degli Aranci #21, Sorrento 80067, Napoli, Italy  
 Filed Nov. 16, 1989, Ser. No. 437,405  
 Int. Cl.<sup>5</sup> E03C 1/26 12 Claims  
 U.S. Cl. 4—288

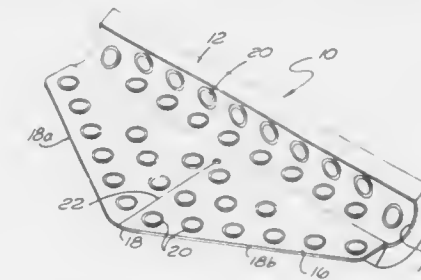


1. A sink trap filter assembly for use along the drain line of a sink, bathtub or like facility, said assembly comprising:  
 (a) a substantially vertical pipe section having an open end and a closed end oppositely disposed relative to one another,  
 (b) said open end connected to a drain pipe section of the sink and said closed end located below said open end and defining a chamber for a liquid reservoir,  
 (c) a filter housing including a base connected to said vertical pipe section intermediate said open and closed ends, said base having a hollow interior structure to facilitate liquid flow therethrough,  
 (d) a filter element having an open mesh construction to allow liquid flow therethrough and cooperatively structured with said filter housing to be removably mounted on the interior of said base in interruptive relation to liquid flow between said open end and said closed end,  
 (e) said filter housing including a conduit connected at one end to said base and extending therefrom toward said closed end on the interior of said vertical pipe section in flow-through alignment with said open end,  
 (f) an opposite end of said conduit being open and disposed in spaced relation to the closed end of said vertical pipe section and within said chamber defining said liquid reservoir, said conduit defining a path of liquid flow from said base to said closed end, and  
 (g) an outlet disposed below said base, between and in spaced relation to both said closed end and said conduit and in transverse relation to said vertical pipe section.

**4,949,407**  
**SHAMPOO BASIN NECK REST**  
 Cy A. Singer, 1500 Malcolm Ave., Los Angeles, Calif. 90024, and Anthony L. Davis, #4 Privateer St., Marina Del Rey, Calif. 90292  
 Filed Apr. 6, 1989, Ser. No. 334,703  
 Int. Cl.<sup>5</sup> A45D 44/10 2 Claims  
 U.S. Cl. 4—523

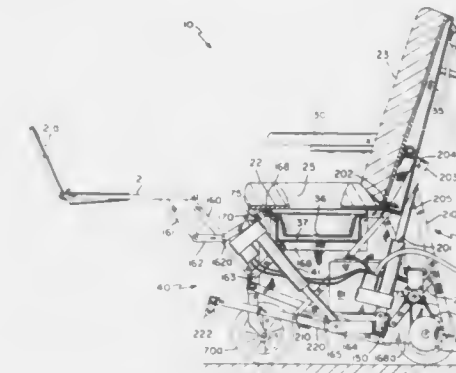
1. A neck rest for use with a shampoo basin comprising:  
 a cushion portion having a generally semi-cylindrical shape of generally uniform thickness and having inner and outer generally semi-cylindrical surfaces, said cushion portion having a core of resilient material coated with a layer of waterproof material;  
 a flap portion bonded to said inner generally semicylindrical surface of said cushion portion and extending generally tangentially therefrom, said flap portion having a surface including a plurality of suction cups formed integrally

thereon for releasably securing said neck rest to the shampoo basin, wherein said flap portion is divided into at least



two panels by a slit extending lengthwise through said flap portion from a position proximate to said cushion portion.

**4,949,408**  
**ALL PURPOSE WHEELCHAIR**  
 Theodore A. Trkla, 205 Ninth St. So., St. Paul, Minn. 55075  
 Filed Sep. 29, 1989, Ser. No. 414,753  
 Int. Cl.<sup>5</sup> A61G 7/06 18 Claims  
 U.S. Cl. 5—86



1. An all purpose wheelchair to permit a user to be self sufficient and to permit a user to move from a chair type support to a horizontal bed type support with the horizontal bed type support being vertically positionable comprising:  
 a frame;  
 a backrest for supporting the back of a person, said backrest pivotably connected to said frame;  
 a first set of extendable legs connected to said backrest;  
 a seat cushion located on said frame for supporting the posterior region of a person;  
 a legrest for supporting the legs of a person;  
 a backrest pivoting mechanism connected to said backrest;  
 a second set of extendable legs connected to said backrest and said frame;  
 a first power mechanism for pivoting said backrest from a horizontal to a vertical position or from a vertical to a horizontal position; and  
 a source of power for activating said first power mechanism so that when the wheelchair is in the chair type support position the powering of said first mechanism causes said backrest to pivot from the vertical to the horizontal position and to extend said first set of legs and said second set of legs to form engagement with a support surface to permit the vertical raising of a user on said seat cushion and said backrest to thereby permit a user of the wheelchair to be positioned at the same level of a bed so the wheelchair user can be transferred from the wheelchair to the bed without anyone having to lift the wheelchair user.



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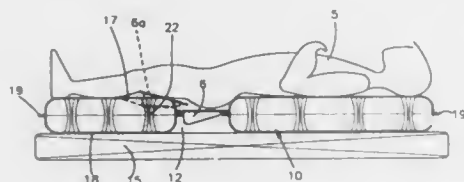
4,949,409

**PNEUMATIC LIFT TO AID BEDPAN USE**

Sandra Stefano, 25600 Columbus Rd., Bedford Hts., Ohio 44146  
Continuation-in-part of Ser. No. 244,287, Sep. 15, 1988,  
abandoned. This application Jul. 28, 1989, Ser. No. 387,217  
Int. Cl.<sup>5</sup> A01G 9/00

U.S. Cl. 5—90

16 Claims



1. A pneumatic lifting device and underlayment adapted to be placed under a supine-positioned human and for use with a fracture type bedpan of common commercial use, said fracture pan having a tapered cross section in side view and a tapered cross section in plan view and an overhanging rim around the periphery thereof, wherein said lifting device comprises an upper sheet and a lower sheet, said two sheets are attached at the edges thereof to form a bladder capable of holding air therein, wherein said lifting device has a through passage through the thickness thereof in register with the rectal area of said supine-positioned human and wherein said lifting device is adapted to be inflated by external means or deflated as desired, and, when inflated at relatively low pressures as in an air mattress, thereby lifting said human above an underlying substantially horizontal surface, and when said lifting device is inflated, said through passage in said lifting device forms a wedge-shaped cavity for receiving said fracture pan in register with the rectal region of said human, wherein the shape of said through passage in plan view matches the tapered shape of said fracture pan in plan view, and wherein said cavity has around the periphery thereof a projecting ledge-like ridge adapted to engage said rim of said fracture pan and thereby to support said fracture pan in a use position in said cavity, and wherein, owing to said low inflation pressure, which allows the depressing of the top surface of said lifting device, said fracture pan may be inserted into and removed from said cavity without moving the legs or hips of said supine-positioned human.

4,949,410

**GUARD RAIL FOR PATIENT TRANSPORT APPARATUS HOSPITAL BEDS AND THE LIKE**

Raymond A. Failor, Seville; Eugene Hayton, Medina, and Mark Reuter, Chippewa, all of Ohio, assignors to Hausted, Inc., Medina, Ohio

Division of Ser. No. 166,675, Mar. 11, 1988, Pat. No. 4,858,260.  
This application Apr. 18, 1989, Ser. No. 339,674

Int. Cl.<sup>5</sup> A47C 21/08

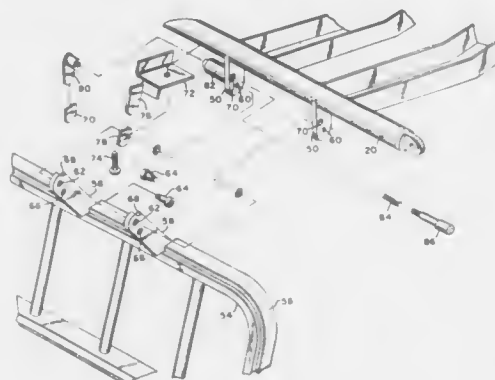
U.S. Cl. 5—430

17 Claims

1. A patient support apparatus comprising:  
a frame assembly defining a patient support plane;  
a pair of plate-like pivot arms pivotably mounted to said frame assembly, said pivot arms being pivotable about an axis, each of said pivot arms including at least one substantially flat side;  
a guard rail assembly secured to said pivot arms, said guard rail defining a second plane; said second plane being substantially perpendicular to said patient support plane when said guard rail is in a fully raised position, said axis running substantially parallel to said patient support plane and said second plane; and said pivot arms extending from said guard rail at an oblique angle with respect to said second plane, whereby said guard rail is positioned a distance from said frame assembly when in a raised posi-

tion and beneath said frame assembly when in a lowered position;

said frame assembly including a horizontally extending frame member, a pair of plate-like projections extending downwardly from and fixedly secured directly to said frame member, each of said plate-like projections including at least one substantially flat side, said substantially flat



sides of said plate-like projections adjoining, respectively, said substantially flat sides of said pivot arms;  
means for pivotably mounting said pair of pivot arms to said pair of projections;  
means for locking said guard rail in said fully raised position; and  
means for locking said guard rail in said lowered position.

4,949,411

**PILLOW WITH CONVERGING EDGE CHAMBERS**

Günter Tesch, Avenue Jean-Marie-Musy 15, CH-1700 Fribourg, Switzerland

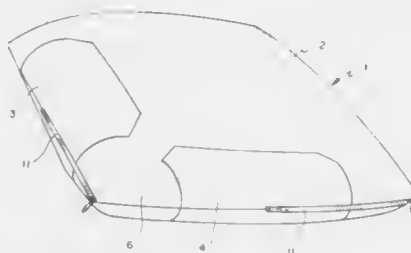
Filed Nov. 17, 1988, Ser. No. 272,413

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739449; Jan. 12, 1988, 3800639

Int. Cl.<sup>5</sup> A47C 16/00

U.S. Cl. 5—434

20 Claims



1. A pillow with a cover, the inside of which is divided into several adjacent individual chambers, as viewed over the area of the pillow, said chambers being filled with filler material, wherein the pillow comprises at least one principal chamber and at least two lateral edges of the pillow converging toward a common corner with each edge containing an individual tubular-like chamber that extends substantially the entire length of the edge and that border the principal chamber, wherein at least one of the chambers is filled with spherical fiber aggregates and wherein all of the chambers are accessible by means of an openable closure.

4,949,412

**CLOSED LOOP FEEDBACK AIR SUPPLY FOR AIR SUPPORT BEDS**

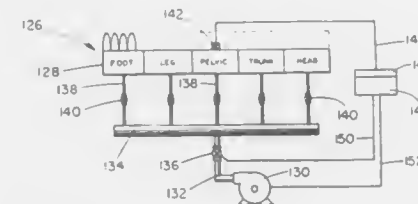
Barry L. Goode, Humble, Tex., assignor to Air Plus, Inc., Houston, Tex.

Continuation of Ser. No. 927,498, Nov. 5, 1986, Pat. No. 4,797,902. This application Oct. 13, 1989, Ser. No. 297,626

Int. Cl.<sup>5</sup> A61G 7/04

U.S. Cl. 5—453

10 Claims



1. In a low air loss air support convalescent bed having a plurality of low air loss air sacs that are maintained within a desired pressure range and are arranged for supporting various body sections of a patient, the improvement comprising:

- (a) air supply means for supplying compressed air at a pressure in excess of said desired pressure range of any of said air sacs;
- (b) air distributing means for distributing compressed air from said air supply means to said plurality of air sacs;
- (c) pressure control means having a plurality of manually set pressure control valves for conducting air at preset pressure ranges to individual air sacs, each of said manually set pressure control valves having a fixed orifice of selected diameter;
- (d) pressure monitoring means directly and continuously monitoring the air pressure of only a selected one of said plurality of air sacs and providing pressure indicative signals; and
- (e) feedback means receiving said pressure indicative signals and providing pressure signals to said pressure control means, said pressure control means adjusting a master servo valve to maintain the proper pressure range throughout the bed, whereby a selected pressure between the air sacs and the patient is established.

2. A low air loss air support convalescent bed as recited in claim 1 wherein:

- (a) said pressure monitoring means provides pressure responsive feedback signals for said selected one of said plurality of air sacs for pressure adjustment thereof in the event the air sac pressure of said selected one of said plurality of air sacs is outside the preset pressure range thereof; and
- (b) said feedback means comprises control electronics receiving said feedback signals and providing adjustment signals to said master servo valve, said control electronics being programmable with physical body parameters of the patient and providing signals to said master servo valve for establishment of the preset pressure ranges thereof.

4,949,413

**LOW AIR LOSS BED**

Vernon L. Goodwin, Charlotte, N.C., assignor to SSI Medical Services, Inc., Charleston, S.C.

Continuation-in-part of Ser. No. 814,610, Dec. 30, 1985, Pat. No. 4,745,647, and a continuation-in-part of Ser. No. 912,774, Sep. 26, 1986, Pat. No. 4,768,249. This application Aug. 3, 1987, Ser. No. 81,702

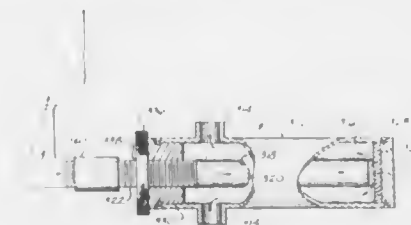
Int. Cl.<sup>5</sup> A61G 7/057

U.S. Cl. 5—453

6 Claims

1. An improved patient support structure, comprising:  
(a) a frame;

- (b) a plurality of elongated inflatable sacs atop said frame;
- (c) gas supply means in communication with each of said sacs for supplying gas to same; and
- (d) control means associated with said gas supply means and said sacs, for controlling supply of gas to each of said sacs according to a predetermined pressure profile across said plurality of sacs and according to a plurality of



predetermined combinations of said sacs, each said combination of sacs defining a separate support zone, and said control means comprising at least one gas flow muffler in communication with said gas supply means; wherein said gas flow muffler defines a gas flow tube having a gas flow restriction space adjacent one end thereof, said gas flow restriction space being variable to vary the gas flow through said muffler.

4,949,414

**MODULAR LOW AIR LOSS PATIENT SUPPORT SYSTEM AND METHODS FOR AUTOMATIC PATIENT TURNING AND PRESSURE POINT RELIEF**

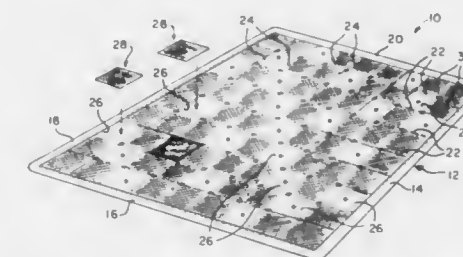
James M. C. Thomas, Mt. Pleasant; James R. Stolpmann, Charleston; William T. Sutton, Charleston, and James J. Romano, Charleston, all of S.C., assignors to SSI Medical Services, Inc., Charleston, S.C.

Continuation-in-part of Ser. No. 321,255, Mar. 9, 1989, abandoned. This application May 22, 1989, Ser. No. 355,755

Int. Cl.<sup>5</sup> A61G 7/057

U.S. Cl. 5—453

21 Claims



1. An apparatus for supporting a patient, the apparatus comprising:

- (a) a rigid support member;
- (b) a plurality of elongated inflatable sacs, each said sack being disposed to extend transversely across said support member;
- (c) at least one of said elongated inflatable sacs having:
  - (i) a pair of end chambers, each end chamber disposed at an opposite end of said sack and being separately pressurizable;
  - (ii) a pair of intermediate chambers disposed between said end chambers, each said intermediate chamber having a right pentahedron shape with the diagonal surface facing toward the center of said elongated inflatable sack, and
  - (iii) a first restrictive flow passage connecting one of said end chambers to said adjacent intermediate chamber, and a second restrictive flow passage connecting said

second of said pair of end chambers to said second of said pair of intermediate chambers.

4,949,415

# FABRIC GREETING CARDS AND MEMORY QUILT CONSTRUCTED THEREFROM

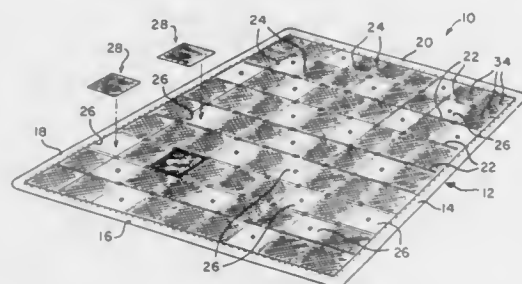
Betty J. Selga, 4859 Briercreech Ave., Lakewood, Calif. 90713

Filed Dec. 18, 1989, Ser. No. 451,883

Int. Cl.<sup>5</sup> A47G 9/02

U.S. Cl. 5—502

13 Claims



1. A quilt comprising a fabric framework forming a peripheral border and a plurality of intersecting strips that form a grid defining a plurality of openings therewithin, and a plurality of fabric patches each containing a separate greeting message thereon and each suitable for mailing as a greeting card and for subsequent securement to said grid to cover a selected one of said openings.

4,949,416

# ADHESIVE APPLICATOR DEVICE

Frank C. Price, Leicester, England, assignor to DVSG Patent Verwaltungs GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 27, 1989, Ser. No. 329,198

Claims priority, application United Kingdom, Apr. 22, 1988, 8809498

Int. Cl.<sup>5</sup> B05C 5/04, 5/02

U.S. Cl. 12—10.5

12 Claims



1. An adhesive applicator device for use in a machine for lasting toe and forepart regions of shoes, said device providing a generally U-shaped surface to which adhesive is supplied and into contact with which the toe and forepart regions of a shoe bottom can be pressed for the application of adhesive thereto, said device comprising:

a pair of base elements pivotably connected to each other in a position corresponding to the toe region of a shoe and forming the base of the "U", said elements forming the mechanism whereby adhesive can be applied as aforesaid

to the toe region of a shoe bottom that is pressed thereagainst;

two leg elements, one pivotably connected to each of the base elements in a position corresponding to the toe region of a shoe, said leg elements forming the legs of the "U", said elements forming the mechanism whereby adhesive can be applied as aforesaid to the forepart regions of the shoe bottom that is pressed thereagainst; and means for adjusting the configuration of said surface according to the style of shoe to which adhesive is to be applied by adjusting the distance between the pivotal connections between the leg elements and the base elements said means for adjusting being positioned adjacent said base elements whereby to vary the configuration of the toe end of the device and also to vary the distance between the remote ends of the leg elements according to the shape of the shoe bottom.

4,949,417

# ABRASIVE PAD, WHICH CAN BE SUBSTITUTE FOR A STEEL WOOL PAD, AND/OR SCOURING PAD AND PROCESS FOR PRODUCING SAME

Jean-Luc Wertz, Beauvais, and Jacques Baudouin, Onsen-Bray, both of France, assignors to Spontex Incorporated, New Rochelle, N.Y.

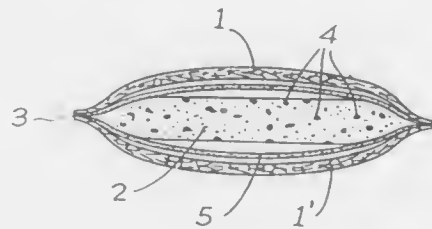
Continuation-in-part of Ser. No. 159,707, Feb. 24, 1988, Pat. No. 4,856,134. This application Nov. 21, 1988, Ser. No. 273,822

Claims priority, application France, Jan. 27, 1988, 88 00947

Int. Cl.<sup>5</sup> A47L 17/08

U.S. Cl. 15—104.93

18 Claims



1. A pad which can be abrasive, scouring or both comprising a foam core, two outer nonwoven webs sandwiching the foam core therebetween and two intermediate layers comprising one of the group consisting of a heat fusible or heat softening material between said foam core and said outer layers, said nonwoven webs comprising a mixture of polyamide and polyester fibers, said polyamide fibers having physical properties similar to those of said polyurethane foam, and a thermal weld bonding said foam core to said outer layers around the periphery of the core.

4,949,418

# CHIMNEY CLEANING APPARATUS

Frank Girard; Raymond Russell, and George Hostland, all of Gibsons, Canada, assignors to Wiz Innovations, Inc., Gibsons, Canada

Filed Feb. 9, 1989, Ser. No. 310,206

Claims priority, application Canada, Feb. 12, 1988, 558825

Int. Cl.<sup>5</sup> F23J 3/02

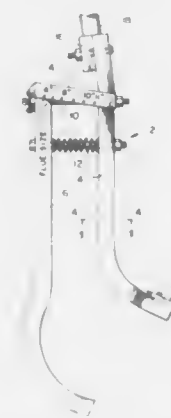
U.S. Cl. 15—242

10 Claims

1. A device for cleaning the interior of a chimney comprising:

- (a) scraping means for contacting and scraping a side of the chimney;
- (b) contacting means for contacting a side of the chimney opposite to the scraping means;
- (c) means for enabling the distance between the scraping means and the contacting means to be adjusted;
- (d) force applying means comprising a coil spring and an

associated rod extending between the scraping means and the contacting means, for causing a force to be applied between the scraping means and the contacting means; and



(e) means for enabling the scraping means and the contacting means to be secured to a handle.

4,949,419

# POOL CLEANER COMPONENT

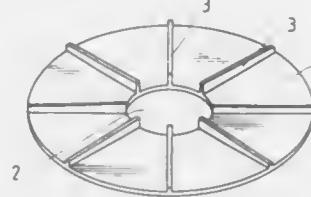
Dieter H. F. Kallenbach, Chartwell, South Africa, assignor to BPH Patent Holding AG, Switzerland

Filed Mar. 2, 1989, Ser. No. 317,963

Int. Cl.<sup>5</sup> E04H 3/20

U.S. Cl. 15—246

8 Claims



1. A plastics material flexible disc shaped to engage around the inlet of a swimming pool cleaner which in use is caused to move by an interruption of flow induced through the cleaner in which the disc has guides on the upper surface thereof which extend radially from a central opening through the disc outwardly at least halfway to the periphery of the disc.

4,949,420

# WINDSHIELD WIPER FOR SWEEPING A NON-CIRCULAR AREA, IN PARTICULAR FOR A WINDSHIELD OF AN AUTOMOTIVE VEHICLE

Jean-Pierre Eustache, Antony, France, assignor to Valeo Systemes d'Essuyage, Montigny-le Bretonneux, France

Filed Mar. 6, 1990, Ser. No. 489,230

Claims priority, application France, Mar. 9, 1989, 89 03096

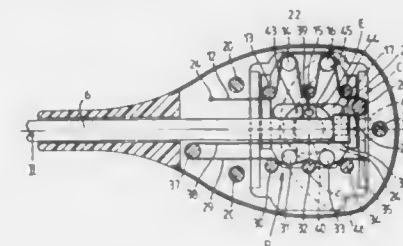
Int. Cl.<sup>5</sup> B60S 1/20

U.S. Cl. 15—250.13

10 Claims

1. A windshield wiper for sweeping in a non-circular pattern, comprising: a crank member defining an axis of rotation and means for coupling the crank member to a motor spindle such that the crank member can be driven in relation to a body, in an alternating rotational movement about said axis, by means of the said motor spindle; at least one windshield wiper arm mounted in the crank member for sliding movement therein in a radial direction with respect to said axis; and control means in the crank member for the sliding movements of the arm, the said control means comprising at least one flexible band for

controlling the said sliding movement in one direction, and return means in the crank member for ensuring the said sliding movement in the opposite direction, wherein the wiper further comprises within the crank member: at least one axis mounting a first rotatable pulley thereon; at least one second axis mounting a second rotatable pulley thereon, said first and second axes being spaced apart in a direction substantially parallel to the arm; means mounting said at least one axis in a fixed position in the crank member; driving means in the crank member and coupling means coupling the driving means with said second



4,949,421

# CONNECTOR FOR A WIPER SYSTEM

Marcello Scorsiroli, Turin, Italy, assignor to Champion Spark Plug Italiana SpA, Italy

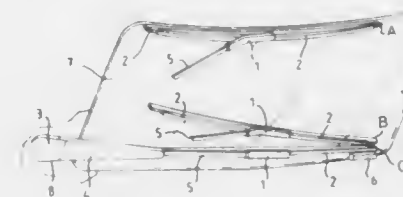
Filed Dec. 22, 1988, Ser. No. 289,602

Claims priority, application Italy, Jan. 29, 1988, 67060 A/88

Int. Cl.<sup>5</sup> B60S 1/42

U.S. Cl. 15—250.32

33 Claims





(1a, 11a, 21a), second portion (1b, 11b, 21b) and resilient intermediate portion (1c, 11c, 21c) define a plane substantially parallel to the surface to be wiped, and wherein the wiper blade (2) is rotatable about an axis through the resilient intermediate portion (1c, 11c, 21c) of the connector, said axis extending substantially perpendicular to the surface to be wiped (7).

4,949,422

# CONNECTING MEMBER FOR A WIPER BLADE AND A WIPER ARM

Kurt Bauer, Ingersheim, and Eckhardt Schmid, Bietigheim-Bissingen, both of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

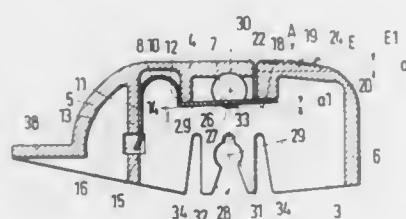
Continuation of Ser. No. 100,508, Sep. 24, 1987, abandoned. This application Nov. 29, 1988, Ser. No. 277,495

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632733

Int. Cl.<sup>5</sup> B60S 1/40

U.S. Cl. 15—250.32

8 Claims



1. A connecting member for a wiper blade and a wiper arm comprising, in combination:

- a housing having side walls connected by a back wall;
- an opening in said housing providing a bearing bore extending therethrough and bounded by each of said walls;
- a pivot pin inserted in said bore and extending away from said housing for receiving a wiper arm thereon and said pin having a recessed portion intermediate the ends thereof;
- a locking spring mounted in said housing and extending across a portion of said bore and being received said recessed portion of said pivot pin in said bore;
- a deflectable member mounted on said back wall for movement toward and away from said spring for engaging and moving a portion of said spring and being arranged for moving said spring out of said recessed portion to permit removal of said pivot pin from said housing; and,
- a second opening provided on said housing for releasably receiving a wiper blade member therein.

4,949,423

# DRYER FOR AUTOMATIC CAR WASH EQUIPMENT

Sherman L. Larson, Palmyra, and Daniel J. Del Prato, Marlton, both of N.J., assignors to Sherman Industries, Inc., Palmyra, N.J.

Continuation-in-part of Ser. No. 59,862, Jun. 8, 1987, Pat. No. 4,809,392. This application Dec. 5, 1988, Ser. No. 280,125

Int. Cl.<sup>5</sup> B60S 3/04

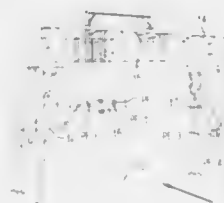
U.S. Cl. 15—316 R

28 Claims

- 1. Automatic car wash equipment comprising:
- a forced-air dryer including a blower for producing high-velocity air and a nozzle for directing said high-velocity air toward vehicles being washed;
- support means for mounting said forced-air dryer above a path followed by said vehicles to direct said high-velocity air from said nozzle to top opaque portions and top transparent portions of said vehicles;
- drive means for moving said nozzle toward and away from said vehicles;
- first sensor means mounted on said nozzle for detecting the

proximity of said nozzle to said top opaque portions of said vehicles and for developing first control signals representative of the proximity of said nozzle to said top opaque portions of said vehicles;

second sensor means mounted on said nozzle for detecting the proximity of said nozzle to said top transparent portions of said vehicles and for developing second control



4,949,424

# CARPET CLEANING SYSTEM

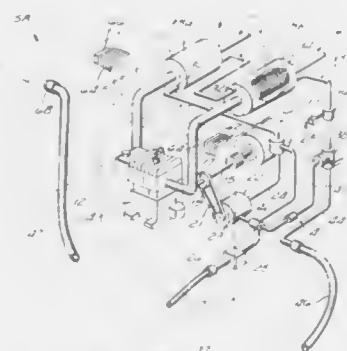
William Shero, 30961 Steeplechase, San Juan Capistrano, Calif. 92675

Continuation of Ser. No. 301,189, Jan. 23, 1989, abandoned, which is a continuation of Ser. No. 231,700, Aug. 11, 1988, abandoned, which is a continuation of Ser. No. 165,846, Mar. 9, 1988, abandoned, which is a continuation of Ser. No. 857,067, Apr. 29, 1986, abandoned. This application Jun. 14, 1989, Ser. No. 365,961

Int. Cl.<sup>5</sup> A47L 11/34

U.S. Cl. 15—321

12 Claims



- 1. A carpet cleaning apparatus comprising:
- a heat exchanger having an inlet port and an outlet port;
- a heat source for providing heat to said heat exchanger;
- an inlet conduit fluidly connected to the inlet port of said heat exchanger;
- a liquid supply means for passing liquid into said inlet conduit;
- an outlet conduit fluidly connected to the outlet port of said heat exchanger;

a pump having an inlet and an outlet, said pump being positioned and operatively connected to said apparatus so as to pump liquid in a first direction through said inlet conduit, through said heat exchanger and through said outlet conduit;

an applicator wand having an inlet port fluidly connected to said outlet conduit and an exhaust port for expelling liquid onto a carpet;

a trigger means alternately positionable in at least first and second positions, such that,

(a) when in said first position, said trigger means will operate to halt the flow of liquid through said applicator wand and the resultant expulsion of liquid through said exhaust port and

(b) when in said second position said trigger means will allow the flow of liquid through said applicator wand and the resultant expulsion of liquid through said exhaust port;

a bypass conduit fluidly connecting said at least one outlet conduit to said at least one inlet conduit;

a bypass valve positioned in said outlet conduit, said bypass valve being sized and configured such that,

(a) when said trigger means is in said first position, the bypass valve will allow passage of liquid from said one outlet conduit into said bypass conduit, thereby permitting said pump to continue circulation of liquid through said heat exchanger although the flow of liquid through the applicator wand and out of the exhaust port is halted; and

(b) when said trigger is in said second position, the bypass valve will divert a fraction of the liquid flowing through said one outlet conduit into said bypass conduit, thereby causing said fraction of liquid to be recirculated through said heat exchanger as outflow of liquid through the applicator wand and out of the exhaust port continues.

4,949,425

# SPRING LOADED BLOCK AND TACKLE WINDOW SASH BALANCE ASSEMBLY

Earl L. Dodson, Elliston, Va., and Frederick P. Strobl, Jr., Cary, Ill., assignors to American Balance Corporation, Roanoke, Va.

Continuation of Ser. No. 922,998, Oct. 24, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 259,419

Int. Cl.<sup>5</sup> E05F 1/16

U.S. Cl. 16—198

17 Claims



- 1. A unitary, spring loaded, block and tackle balance assembly adapted for providing vertical support for a window sash running in an elongated, generally upright sash run having a guide channel comprising flange means defining a longitudinal slot extending along a plow region of the sash run, said assembly comprising:

an elongated, generally U-shaped housing having a pair of generally parallel, laterally spaced side walls and an outer wall interconnecting the side walls, said outer wall and said side walls together defining an elongated chamber having an open side located across from said outer wall; block and tackle spring balance means in said chamber and

adapted for being operably connected to said sash in supporting relationship thereto;

first securing means discrete from said housing and including first slide means configured for slidably interengaging said guide channel;

means for mounting said first securing means in said chamber in a generally fixed longitudinally position with said first slide means adjacent said open side of the chamber; second securing means discrete from the housing and fixed in said chamber in longitudinal spaced relationship to said first securing means, said second securing means including second slide means disposed adjacent said open side of the chamber and configured for slidably interengaging said guide channel; and

support means for holding said assembly in a fixed longitudinal position relative to said guide channel during running of the window sash in the sash run,

whereby said assembly may be slidably received in said sash run during attachment in the latter and thereby mounted in the said fixed position relative to the guide channel for supporting a window sash with said block and tackle spring balance means covered by said housing.

4,949,426

# HINGE MECHANISM WITH TORSION BAR

Susumu Komaki, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

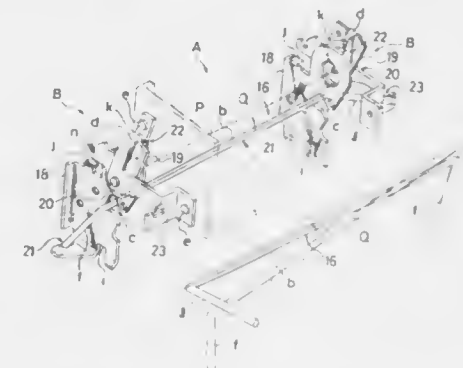
Filed Nov. 17, 1988, Ser. No. 272,250

Claims priority, application Japan, Nov. 30, 1987, 62-303583; Aug. 10, 1988, 63-106456[U]

Int. Cl.<sup>5</sup> E05F 1/08

U.S. Cl. 16—308

7 Claims



- 1. A frame opening and closing mechanism, comprising:
- an upper split portion of a frame and a lower split portion of a frame;

a torsion bar for biasing said upper split portion in an opening direction, said torsion bar comprising a shaft portion and a biasing reaction force portion extending from each end of said shaft portion;

a frame connection member fixedly mounted on one of said upper split portion and said lower split portion, said frame connection member comprising means for pivotably mounting the other of said upper split portion and said lower split portion thereto for pivotal movement about an axis line and an inversely tapered concave portion for receiving said shaft portion of said torsion bar therein;

a first engagement member on said frame connection member for engaging a said biasing reaction force portion extending from one end of said torsion bar;

a second engagement member on the other of said upper split portion and said lower split portion for engaging said biasing reaction force portion extending from the other end of said torsion bar;

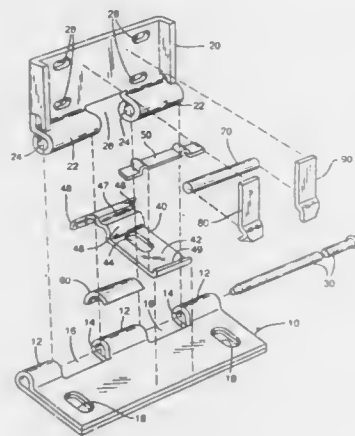
means, at least a portion of which is disposed on the other of said upper split portion and said lower split portion, for regulating the amount which said upper split portion can be opened relative to said lower split portion by setting a predetermined angular opening limit, and for regulating the extent to which said frame connection member can pivot relative to the other of said upper split portion and said lower split portion by setting a pivoting range, said pivoting range being greater than said predetermined angular limit.

4,949,427

**HINGE WITH INTEGRAL DETENT AND STOP**  
Russell D. Keller, 149 N. Lotus Beach Dr., Portland, Oreg. 97217

Filed Jan. 6, 1989, Ser. No. 293,953  
Int. Cl.<sup>5</sup> E05D 11/10, 11/06  
U.S. Cl. 16—335

18 Claims



1. A hinge assembly comprising:  
a first hinge member and a second hinge member joined to rotate about an axis from a fully closed position to a fully open position;  
spring means attached to said first hinge member for resiliently biasing the hinge assembly, said spring means being a leaf spring having a first substantially flat surface portion and a second arcuate surface portion, the arcuate surface portion having a depression across the surface thereof and an end portion wider than the remainder of the spring;  
a roller restrained against the second hinge member and cooperating with the spring means to provide a detent means for halting rotation of the first hinge member with respect to the second hinge member at an intermediate position between the fully closed position and the fully open position; and  
the spring means cooperating with the second hinge member to stop rotation of the second hinge member with respect to the first hinge member at the fully open position.

4,949,428

**CLOSING CLIP FOR SAUSAGE CASINGS AND THE LIKE**  
Dieter Simon, Reinbek, Fed. Rep. of Germany, assignor to Technopack Ewald Hagedorn KG (GmbH & Co), Hamburg, Fed. Rep. of Germany

Filed Apr. 7, 1989, Ser. No. 335,059  
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1988, 3811978

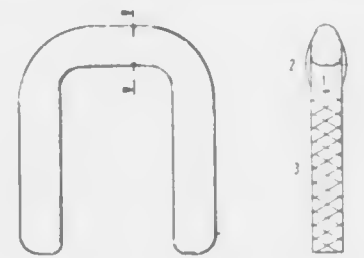
Int. Cl.<sup>5</sup> A22C 21/00

U.S. Cl. 17—1 R

15 Claims

1. In a clip for closing the gathered end of sausage casings and the like, formed from a metal strip which is to be bent around and bear upon the casing end, the bearing surface of the clip containing a friction-increasing impression, the improve-

ment wherein a plurality of impressions substantially cover the entire bearing surface and the length of the edges formed by



the impressions per unit length of the metal strip amounts to at least approximately three length units.

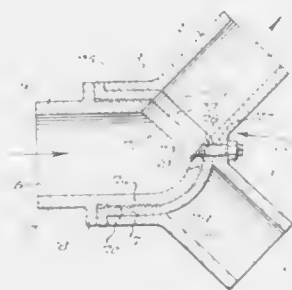
4,949,429

**STUFFING HORN ASSEMBLY**  
Thomas R. Stanley, Kansas City, Mo., assignor to Teepak, Inc., Westchester, Ill.

Filed Sep. 13, 1989, Ser. No. 406,922  
Int. Cl.<sup>5</sup> A22C 11/02

U.S. Cl. 17—41

32 Claims



1. A turret horn assembly comprising a hollow main member, said hollow main member having an exterior end surface terminating in a convex configuration which contains at least one outlet void therein; a horn turret, having a concave exterior surface for generally engaging the convex exterior end surface of the main member and having at least one inlet void therein; means for mounting said horn turret concave surface to the convex surface of the main member; and, means for aligning said at least one outlet void with said at least one inlet void, said horn turret comprising horn means alignable with said at least one inlet void.

4,949,430

**METHOD AND APPARATUS FOR COATING A FOOD PRODUCT CASING**

Thomas G. Stanek, Smyrna, Ga., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

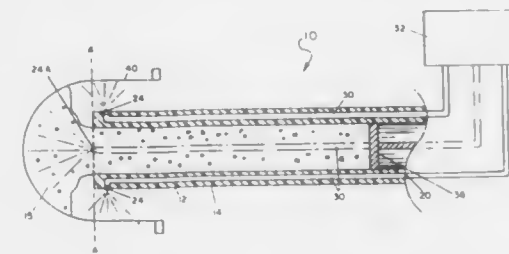
Filed Sep. 19, 1989, Ser. No. 409,485  
Int. Cl.<sup>5</sup> A22C 11/02

U.S. Cl. 17—41

5 Claims

1. In a stuffing horn suitable for use with a flexible, thermoplastic container, the stuffing horn comprising a cylindrical sleeve having
  - (i) an outer diameter substantially corresponding to the inside diameter of the container,
  - (ii) an inner diameter slightly greater than the outside diameter of the stuffing horn, and
  - (iii) two parallel, lateral faces defining the lateral thickness of the sleeve, the improvement comprising:
    - (a) at least one channel within the sleeve, said channel having a first end and a second end, the first end termi-

inating in an orifice at one of the lateral faces of the sleeve; and



(b) an atomizer located at an outer extremity of the sleeve, in communication with the second end of the channel, and intermediate the lateral faces of the sleeve.

4,949,431

**APPARATUS FOR COMPRESSING AND AUTOMATICALLY INTRODUCING A TEXTILE FIBER SLIVER**

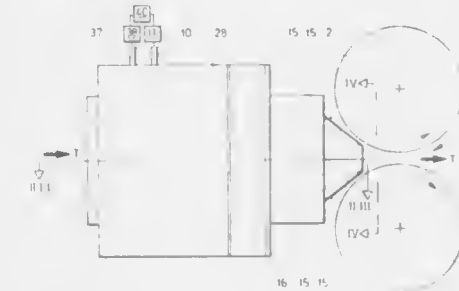
Hermann Gasser, Frauenfeld, Switzerland, assignor to Hollingsworth GmbH, Neubulach, Fed. Rep. of Germany

Filed Mar. 8, 1989, Ser. No. 320,339  
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1988, 3807582

Int. Cl.<sup>5</sup> D01G 25/00

U.S. Cl. 19—150

13 Claims



1. An apparatus for compressing and automatically introducing a textile fiber sliver into a roller feed nip comprising:  
a feed passage;  
a flow generator for generating a gas flow in said feed passage;  
an insertion nozzle extending from said feed passage and including a nozzle passage aligned with said feed passage and tapered in the flow direction to an outlet portion and to a lateral opening in the outlet portion for permitting said gas flow to escape from said nozzle passage; and  
a control for closing said lateral opening, said control keeping said lateral opening open during introduction of said fiber sliver and closing said opening during subsequent feed.

4,949,432

**EYEGLASS HOLDER**

Ronald C. Wisniewski, 2605 Bauernschmidt Dr., Baltimore, Md. 21221

Filed Mar. 13, 1989, Ser. No. 322,678

Int. Cl.<sup>5</sup> A44B 21/00

U.S. Cl. 24—3 C

6 Claims

1. A holder for a pair of eyeglasses with temple bars comprising a body formed of resilient material, shaped and folded to form two adjoining transverse substantially U-shaped flat hinged-type clips, said resilient material having three leg sections, with said first hinged-type clip being formed of two of said three leg sections folded longitudinally to form a substantially U-shape flat hinged-type clip having a bight at one end

and a mouth at the opposite end, and a second hinged-type clip being formed of a third leg section folded laterally across the reverse face of one of two leg sections and having a bight at one end and a mouth at the opposite end, one of said clips comprising a relatively parallel planar outer leg extending from a central relatively parallel planar common central leg in a U-shaped direction abreast and concentric to one face of said common leg with said outer leg as measured longitudinally being shorter in length to said common leg and transversely



arcuate at the mouth to facilitate inserting and securely and removably attaching of a garment or similar object; with said other clip being arranged transversely to said first clip comprising a relatively parallel planar outer leg extending in a transverse and opposite U-shape direction from the adjacent side of said common leg abreast and concentric to the reverse face of common leg and being arranged longitudinally arcuate near the mouth end to facilitate inserting and securely and removably attaching an eyeglass temple bar thereto.

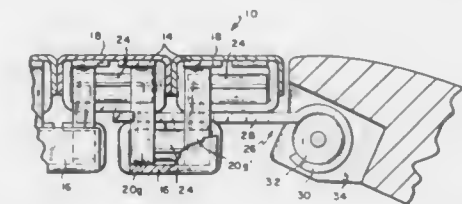
4,949,433

**END CONNECTOR FOR EXPANSIBLE WATCH BAND**  
Stephen F. Bert, North Scituate, R.I., assignor to Textron Inc., Providence, R.I.

Filed Feb. 2, 1989, Ser. No. 306,068  
The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A44C 5/18

U.S. Cl. 24—265 WS

4 Claims



1. For use in combination with an elongated longitudinally expandable watch band of the type having a row of top links overlying a row of bottom links, each bottom link being connected to two adjacent top links by first and second pairs of generally U-shaped staples, said pairs of staples being separated from each other by a first distance measured in the direction of the band width and being arranged respectively along opposite sides of the band, said staples having legs protruding into the links connected thereby, with springs housed in the links and acting on said legs to yieldably contract the band longitudinally and to yieldably urge the legs of each staple pair apart to occupy a maximum second distance measured in the direction of the length of said band and defined by the spacing between the side walls of the links receiving said legs, a connector for connecting the band to a watch case, said connector comprising:

a generally planar shank having an inner end received in an end of the band between the rows of top and bottom links, an outer end protruding beyond the end of the band, and first and second sides extending between said inner and

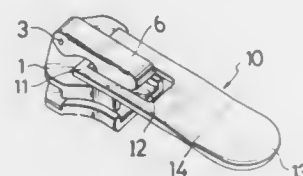


outer ends, said first and second sides being respectively located laterally inwardly of said first and second pairs of staples;  
means at the outer end of said shank for connecting said shank to a watch case;  
first and second ears respectively protruding laterally beyond said first and second sides at the inner end of said shank, said first and second ears being respectively located in the direction of the band length inwardly of the innermost staples of said first and second pairs, the width of said shank measured at said ears being greater than said first distance and the difference between the width of said shank measured between said first and second sides and said first distance being less than the distance that each of said ears protrudes beyond its respective side; and  
a notch in said first side edge, said notch being located between said inner and outer ends and being defined by inner and outer edges extending laterally from said first side towards said second side, and by a bottom edge extending from said inner edge to said outer edge, the distance measured between said inner and outer edges in the direction of the length of said band being less than said second distance.

yond the planes formed by the spine and said leg portions, and in which the length of at least one of the bent end portions is more than  $\frac{1}{2}$  the distance from the end of the side leg portion to

the opposite end of the top spine portion wherein said spine and said leg portions having the same length and being of sufficient length so that said spine will act as a torque spring with respect to said leg portions.

**4,949,434**  
**SLIDE FASTENER SLIDER**  
Hiroo Minami, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan  
Filed May 11, 1988, Ser. No. 192,605  
Claims priority, application Japan, May 22, 1987, 62-76900[U]  
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> A44B 19/26  
U.S. Cl. 24—429 2 Claims

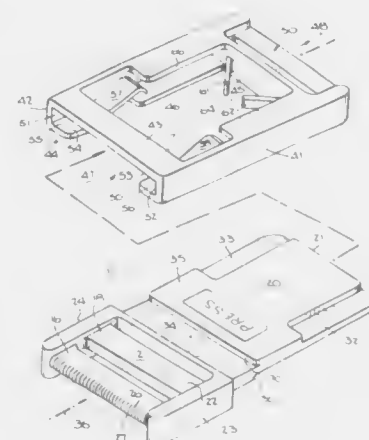


1. A slide fastener comprising:  
(a) a slider body having a pull-tab supporting portion; and  
(b) a one-piece solid non-hollow pull-tab made of elastic synthetic rubber and pivotally connected at its one end to said pull-tab supporting portion;  
said elastic pull-tab having two opposite ends and a portion disposed centrally between said two opposite ends of said pull-tab, said portion being thinned relative to said ends.

**4,949,435**  
**PAPER CLIP**  
Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291  
Filed Oct. 14, 1988, Ser. No. 257,849  
Int. Cl.<sup>5</sup> B42F 1/02  
U.S. Cl. 24—67.9 1 Claim

1. A paper clip comprising a single piece of bent wire having a straight top spine portion, two side leg portions bent substantially perpendicular to the top spine portion and two bent end portions bent substantially at a 45 degree angle to the side leg portions, said end portions overlapping one another and not extending to the other side leg, said end portions having a length less than the diameter of the rectangular plane formed by said spine and said leg portions, one of said leg portions and one of said bent end portions forming a first plane and the other of said leg portions and the other of said bent end portions forming a second plane, said end portions not extending be-

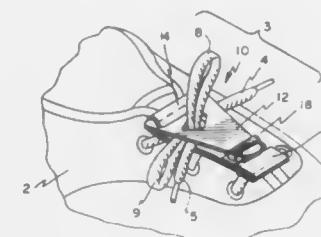
**4,949,436**  
**PRESS RELEASE FASTENER**  
Joseph A. Anscher, 7 Marlin La., Port Washington, N.Y. 11743  
Filed Aug. 11, 1988, Ser. No. 231,149  
Int. Cl.<sup>5</sup> A44B 11/25  
U.S. Cl. 24—671 22 Claims



1. A low-profile two piece plastic fastener comprising:  
a receptacle and a clasp;  
said clasp comprising a base having a substantially rigid tongue protruding therefrom, and a release tab on an upper surface of said rigid tongue, said release tab having a first shoulder comprising a first stop means;  
said receptacle comprising a body that defines a cavity adapted to receive said rigid tongue, an aperture in an upper panel of said receptacle, said aperture having a second shoulder comprising a second stop means disposed for cooperative engagement with said first stop means;  
means for urging said release tab into said aperture such that said first and second stop means abut one another and said receptacle and clasp are engaged;  
said means for urging comprising at least one first protruding member within the cavity of the receptacle constructed and arranged to flex against the rigid tongue so as to urge the release tab into the aperture and at least one second protruding member within the cavity of the receptacle constructed and arranged to flex so as to urge the first shoulder against the second shoulder; and

means for releasing the engagement so that the receptacle and clasp are separated.

**4,949,437**  
**SHOELACE KNOT RETAINING APPARATUS**  
Travis B. Anderson, 4503 Heron St., Gulfport, Miss. 39501  
Filed Jul. 11, 1989, Ser. No. 378,009  
Int. Cl.<sup>5</sup> F16G 11/00  
U.S. Cl. 24—712.2 12 Claims



1. A device for retaining a knot of a shoelace, said device comprising:  
(a) a band with proximate and distal ends, said band comprising an elastic material whereby said band may be stretched from a relaxed length to a stretched length,  
(b) a rigid tab member comprising a proximate end portion connected to said proximate end of said elastic band, a distal end portion, and a lace slot cut entirely there-through said rigid tab member; and  
(c) a clip affixed to said distal end of said elastic band, said band and clip forming together an opening for receiving said distal end portion in an attached state, wherein a force is applied by said elastic band attempting to retract said elastic band from said stretched length to said relaxed length to urge said proximate end portion of said rigid tab member further into said opening and to maintain said distal end portion of said rigid tab member securely within said clip, and wherein the knot is maintained in said lace slot and the shoelace clamped between said elastic band and said rigid tab member.

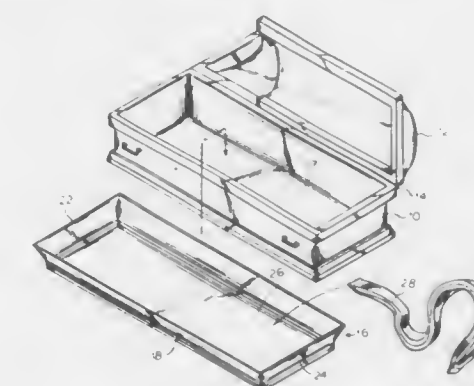
**4,949,438**  
**TENTER CLIP WITH REPLACEABLE BUSHINGS**  
Hans H. Richter, Warwick, R.I., assignor to Marshall and Williams Company, Providence, R.I.  
Continuation-in-part of Ser. No. 88,492, Aug. 12, 1987, abandoned, which is a continuation of Ser. No. 803,773, Nov. 29, 1985, abandoned, which is a continuation of Ser. No. 467,770, Feb. 18, 1983, abandoned. This application Jul. 15, 1988, Ser. No. 221,014  
Int. Cl.<sup>5</sup> D06C 3/02  
U.S. Cl. 26—79 1 Claim

1. A tenter clip carried by a chain upon a tenter rail comprising:  
a substantially U-shaped housing including an upper member extending inwardly over a lower plate;  
a jaw pivotally carried by said upper member having a depending portion for gripping a web against said lower plate;  
a pin carried transversely of said upper member upon which said jaw is pivotally carried;  
said pin extending transversely through said jaw and said upper member;  
central axial transverse bushings fixedly pressed into portions of said jaw pivotally carried concentrically of said bushing by said pin and fixedly pressed into portions of said upper member receiving said pin centrally and transversely thereof for pivotal movement whereby wear is received by said bushings and said pin avoiding wear upon

said jaw and said upper member, said bushings and said pin being easily replaceable once worn; and

an outwardly extending controller carried by said depending portion of said jaw.

**4,949,439**  
**DRIP PAN FOR CASKETS**  
Joseph R. Semon, Eynon, Pa., assignor to Casket Shells, Inc., Eynon, Pa.  
Continuation of Ser. No. 914,241, Oct. 2, 1986, abandoned. This application Jun. 22, 1989, Ser. No. 370,117  
Int. Cl.<sup>5</sup> A63G 17/00 3 Claims



1. A casket sealing system which comprises a casket for receiving a deceased and having a base section and substantially perpendicular sides and ends extending upwardly therefrom, support means for supporting the deceased above the base, a pan of resinous material inserted beneath the support means for trapping and collecting body liquids of decomposition, said pan being integrally molded in one piece, said pan having a bottom resting in the base section, and sides and ends extending upwardly therefrom in proximity of the sides and ends respectively of the casket and extending beyond the support means a sufficient distance to collect fluids of decomposition, the bottom of the pan being slightly smaller in lateral dimension than the casket base section to fit readily neatly in the casket, the upper edges of the side and ends of the pan being substantially contiguous to the sides and ends, respectively of the casket, said sides and ends of the pan are flared outwardly from the bottom and into firm sealing engagement with the sides and ends respectively of the casket to cooperate in preventing body liquids finding their way down to the base section of the casket.

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4,949,440

## METHOD AND APPARATUS FOR TWISTING YARN, AND PRODUCT

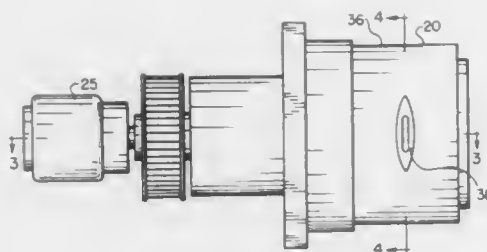
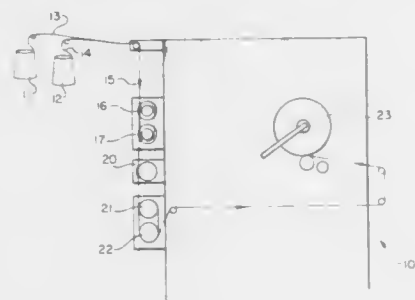
Kurt W. Niederer, Charlotte; Edward L. Hand, Belmont, both of N.C., and Edwin R. Grose, Clover, S.C., assignors to Belmont Textile Machinery Co., Inc., Belmont, N.C.

Continuation-in-part of Ser. No. 311,138, Feb. 15, 1989, Pat. No. 4,899,426, which is a continuation-in-part of Ser. No. 226,297, Jul. 29, 1988, Pat. No. 4,934,134. This application Sep. 28, 1989, Ser. No. 413,779

Int. Cl. D02G 1/16, 3/24; D02J 1/06

U.S. Cl. 28—271

28 Claims



1. An apparatus for processing yarn, comprising:
  - (a) a yarn supply package means for supplying a plied yarn comprised of first and second plied yarn strands wherein at least one of said yarn strands comprises either spun yarn strand or a twisted yarn strand;
  - (b) first and second feed rolls and a take-up roll for delivering said plied yarn from the supply package means onto a take-up package; and
  - (c) an air-jet positioned between said first and second feed rolls for inserting short, spaced-apart entangled segments into the plied yarn as the plied yarn moves past said air-jet at a predetermined speed; said air-jet comprising:
    - (i) an enclosure having a yarn entrance and a yarn exit;
    - (ii) nozzle means for directing a stream of pressurized air into said enclosure and against said plied yarn while said plied yarn is moving through said enclosure;
    - (iii) means for moving said nozzle means through said enclosure at substantially the same surface speed as the yarn is moving through said enclosure whereby said stream of pressurized air impacts a short, discrete segment of yarn while said segment of yarn is within said enclosure.

4,949,441

## POLYLAMINAR APPARATUS FOR FLUID TREATMENT OF YARN

Fredrick A. Ethridge, P.O. Drawer 2547, Carmel Station, Charlotte, N.C. 28247-2547

Filed Oct. 13, 1989, Ser. No. 420,913

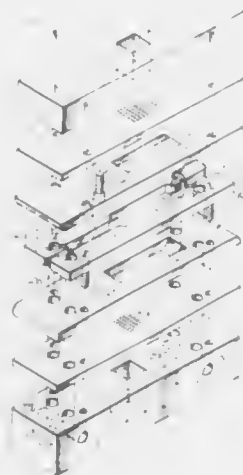
Int. Cl. D02G 1/00, 1/16, 1/12, 1/20

U.S. Cl. 28—271

23 Claims

1. Apparatus for fluid treatment of advancing strand material such as yarn, tow, or film, comprising a body member, a

cover plate, and a stack of laminae held in assembled relationship between opposing surfaces of said body member and said cover plate, said laminae cooperating to define an elongate processing duct for the advancing strand material, said process-



ing duct having a strand inlet and a strand outlet and a duct cross section which changes both in breadth and in height between said inlet and outlet, and said apparatus including at least one fluid entry port for supplying treatment fluid to said processing duct.

4,949,442

## DEVICE FOR REMOVING YARN RESIDUE FROM TEXTILE TUBES

Jose R. Trias, Fontcuberta 34 -Urbanización, "La Coromina", Manlleu (Barcelona), Spain

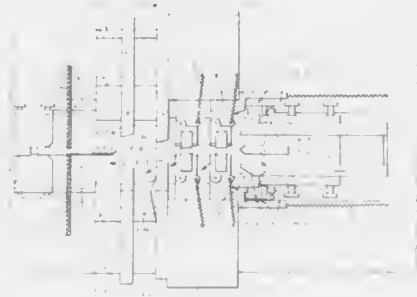
Division of Ser. No. 195,242, May 11, 1988, which is a continuation-in-part of Ser. No. 756,964, Jul. 18, 1985, Pat. No. 4,783,887. This application Mar. 28, 1989, Ser. No. 330,107

Claims priority, application Spain, Jan. 22, 1985, 529741

Int. Cl. B65H 73/00

U.S. Cl. 28—297

6 Claims



1. A device for removing yarn residue from textile tubes, each of said textile tubes having a wider end and a narrower end comprising:

a plurality of jaws between which each of said textile tubes is positionable so said jaws close on said yarn residue; means for opening said jaws including a plurality of rollers and biased wedges, said wedges abutting on said rollers and said jaws, a plurality of stringers arranged to engage and push apart said rollers and thereby push apart said wedges and said jaws, and pawl means for guiding said stringers into engagement with said rollers for moving apart said jaws;

means for closing said jaws into the yarn residue so as to minimize a pressure exerted by said jaws on the textile tubes, said closing means including biasing means which bias said jaws to close towards each other; and guide means for guiding said textile tubes including tips between which the textile tube is holdable longitudinally and a guide member formed so as to center the textile tubes relative to said jaws, one of said tips being arranged to receive the yarn residue retained by said jaws and the other of said tips being formed on said guide member, said one tip having a displaceable spring-loaded sleeve so that the yarn residue is collected with the help of said sleeve and means for displacing said sleeve so as to expel the yarn residue collected thereby, each of said tips having a tapered end suitable for engaging different diameters of said textile tubes, said guide member being moveable in opposite directions between said jaws so that said opening means opens said jaws in response to said guide member being moved in one of said opposite directions and said closing means closes said jaws in response to said guide member being moved in the other of said opposite directions so that said jaws close into and retain the yarn residue as said guide member moves.

4,949,443

## NUMERICALLY CONTROLLED LATHE

Tatsuhiko Saruwatari, 203, 1-30, 1-chome Shitoku, Kokurakita-ku, Kitakyushu-shi, Fukuoka; Atsushi Otani, 1086-33, Komaki, Nagareyama-shi, Chiba; Akira Kosho, 2504-53, Yamazaki, Noda-shi, Chiba, and Satoru Togawa, 39-1, 4-chome Asakusa, Taito-ku, Tokyo, all of Japan

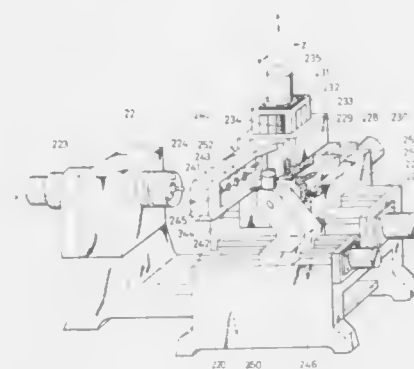
Filed Jun. 26, 1989, Ser. No. 371,900

Claims priority, application Japan, Jun. 29, 1988, 63-161460; May 10, 1989, 1-115073; May 24, 1989, 1-130492

Int. Cl. B23B 3/22, 7/04, 29/24

U.S. Cl. 29—27 C

6 Claims



1. A numerically controlled lathe including a frame constituting the main body of the lathe, a main spindle driven to rotate, a main spindle chuck provided on said main spindle to hold and rotate a workpiece, a multiple-tool head having a plurality of tools, and a tool turret head, wherein the improvement comprises:

a. said multiple-tool head having three servomotors to move it along three axes defining directions of movement which are perpendicular to each other;

b. a multiple-tool head body of said multiple-tool head having an annular and rectangular frame structure;

c. said multiple-tool head body having a space defined and enclosed by said annular and rectangular frame structure so as to extend through a part thereof for machining said workpiece within said space with said tools;

d. said plurality of tools including at least two rows of rotary and non-rotary tools for machining said workpiece disposed on said multiple-tool head body and having tool

axes extending in a direction parallel with one of said directions of movement; and

e. a tool driving motor disposed on said multiple-tool head body to drive said rotary tools.

4,949,444

## MACHINE TOOL MACHINING METHOD

Hiroshi Kojima; Keikichi Sakata, both of Aichi; Seigo Watanabe, Gifu; Yukio Mitsukuchi, Aichi; Shuichi Hashimoto, Gifu; Choji Kato, Aichi; Mikiro Teshigawara, Aichi; Ryoichi Furuhashi, Aichi; Shoji Momoi, Gifu; Toshihiko Inoue, Aichi; Kazuki Uemura, Aichi, and Katsushi Oshima, Aichi, all of Japan, assignors to Yamazaki Mazak Corporation, Aichi, Japan

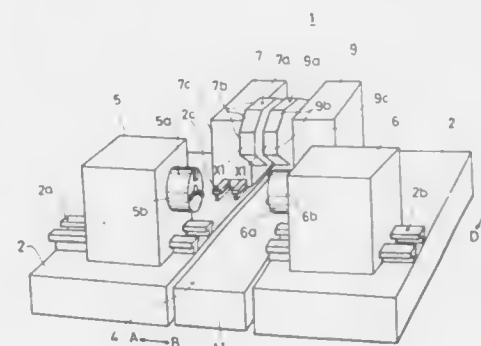
Filed Apr. 18, 1988, Ser. No. 182,452

Claims priority, application Japan, Apr. 17, 1987, 62-58205[U]; Apr. 28, 1987, 62-105439; Apr. 28, 1987, 62-105441; Apr. 28, 1987, 62-105442; Apr. 28, 1987, 62-105443; Apr. 28, 1987, 62-105444; May 29, 1987, 62-134150; May 29, 1987, 62-134151; Jun. 23, 1987, 62-156054; Jun. 23, 1987, 62-156055; Jul. 24, 1987, 62-185006; Sep. 25, 1987, 62-241521; Oct. 13, 1987, 62-258012; Dec. 24, 1987, 62-327652; Dec. 24, 1987, 62-327654

Int. Cl. B23B 7/04

U.S. Cl. 29—27 R

2 Claims



1. A machining method for a complex machine tool having a frame, first and second spindle stocks provided on said frame so as to face each other, first and second workpiece spindles rotatably supported by respective said spindle stocks, and workpiece holding means on each said workpiece spindle, said method comprising:

providing said first and second spindle stocks on said frame such that at least one of said spindle stocks is drivable and movable relative to the other only in the direction of a central axis of said workpiece spindles;

providing first and second tool rests on said frame on one side of said central axis such that each said tool rest corresponds to a respective workpiece spindle, and such that each said tool rest is free to be driven and moved in at least a direction perpendicular to said direction of said central axis of said first and second workpiece spindles;

providing tool holding means on each of said first and second tool rests free to be driven and rotated on an axis parallel to said direction of said central axis of said first and second workpieces;

providing a plurality of tools on each of said tool holding means, whereby said tools are free to be selectively positioned facing their respective corresponding workpiece spindle;

holding a workpiece with a said workpiece holding means;

performing a first machining on said workpiece with one of said plurality of tools on one of said tool holding means;

executing a first step after said first machining, said first step comprising relatively moving said second spindle stock a predetermined distance toward said first spindle stock and



holding said workpiece between said first and second workpiece spindles;  
 executing a second step after said first step, said second step comprising rotating said first and second workpiece spindles at the same speed and cutting off and detaching a portion of said workpiece held by said second workpiece spindle from the remainder of said workpiece;  
 executing a third step, said third step comprising moving said second spindle stock together with said portion of said workpiece relative to and a predetermined distance away from said first spindle stock;  
 executing a fourth step, said fourth step comprising performing said first machining on said workpiece held by said first workpiece spindle;  
 executing a fifth step, said fifth step comprising performing a second machining on said portion held by said second workpiece spindle; and  
 feeding said workpiece a predetermined length during at least one of said first through said fourth steps.

4,949,445

## FITTED SLEEVE ON A ROLLER CORE

Anthony M. Van Der Meulen, Helmond, and Albert J. Bosch, Rijkevoort, both of Netherlands, assignors to Stork Screens B.V., Netherlands

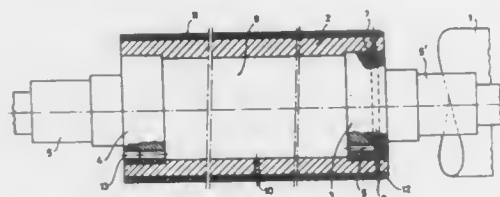
Filed Mar. 21, 1989, Ser. No. 326,628

Claims priority, application Netherlands, Mar. 28, 1988, 8800781

Int. Cl.<sup>5</sup> B60B 9/00

U.S. Cl. 29—117

6 Claims



1. A roller assembly comprising a roller core having a diameter which may be changed and a cylindrical sleeve which is to be disposed around the roller core, the roller core having at least one end with one or more outflow apertures for pressurized medium for changing the diameter of the roller core and the sleeve relative to each other upon feeding of the pressurized medium through the outflow apertures when the cylindrical sleeve is being pushed onto the roller core, and in which the roller core is covered on its surface with a layer of material which is compressible by the pressurized medium fed in through the outflow apertures.

4,949,446

## RIVET REMOVER

Daniel Kuwica, Unit 5 - 3009 Murray St., Port Moody, Canada (V3H 1Y3)

Filed Jul. 25, 1989, Ser. No. 385,025

Int. Cl.<sup>5</sup> B25B 1/24

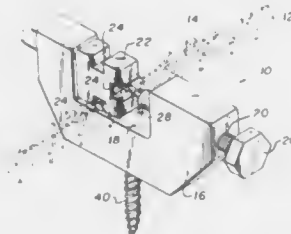
U.S. Cl. 29—243.53

16 Claims

1. Apparatus to remove a rivet from a chain saw chain comprising:

- a body;
- a recess in the body;
- an at least partially threaded opening at one end of the body extending to the recess;
- an anvil to be located in the recess;
- a plurality of slots in the anvil, each slot of predetermined width to contact a saw chain of predetermined pitch;

a bolt to be received in the at least partially threaded opening;



a punch member to be received in the opening to abut the bolt to extend into the recess whereby tightening of the bolt extends the punch into the recess.

4,949,447

## APPARATUS TO REPLACE SETS OF ROLLS AND RELATIVE EQUIPMENT IN ROLLING STANDS HAVING ROLLS SUPPORTED AS CANTILEVERS

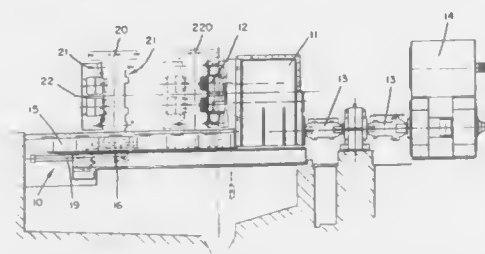
Fausto Drigani, Zugliano (UD), Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Oct. 13, 1988, Ser. No. 257,281

Claims priority, application Italy, Jun. 30, 1988, 83430 A/88 Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—252

21 Claims



1. Apparatus for replacing sets of rolls and relative equipment on a rolling stand having rolls supported on cantilevered shafts, comprising:

- a support device;
- at least one positioner assembly adapted to cooperate with the rolling stand;
- means for movably mounting said at least one positioner assembly on said support device;
- support means for supporting the rolls and relative equipment of the rolling stand comprising at least two support units; and
- support unit mounting means for removably mounting said support means on said at least one positioner assembly; wherein said positioner assembly is movable in reciprocal relation with the rolling stand between a first position wherein the rolls of one of said at least two support units are aligned with the cantilevered shafts of the rolling stand and a second position wherein the positioner assembly is disengaged from the rolling stand.

4,949,448

## WHEEL MOUNTING TOOL

Allan M. Hebnes, Hooper, Colo., assignor to David, Steven, Marjorie Mitchell, Brighton, Colo.

Filed Oct. 16, 1989, Ser. No. 421,821

Int. Cl.<sup>5</sup> B25B 27/14

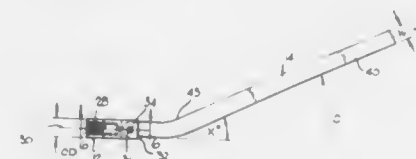
U.S. Cl. 29—273

2 Claims

1. A tool for mounting a wheel having a plurality of mounting holes to a hub having a matching plurality of externally threaded mounting studs said tool comprising:

a generally flat handle having an elongated handle portion, a generally curved middle portion, and a socket mounting portion with the handle portion angularly offset from the socket mounting portion and with said handle having a width and a length less than a diameter of a mounting hole of the wheel; and

a generally cylindrical shaped socket portion formed with a through slot sized to receive the socket mounting portion of said handle with a roll pin placed through matching holes in said socket and said handle such that said handle is pivotally attached at said socket to said socket mounting



portion of said handle and with said socket having an internal thread that matches the external thread of the mounting studs of the hub and having an outside diameter less than but approximately equal to a diameter of a mounting hole of the wheel; whereby said socket may be threaded to an externally threaded stud of the hub, said handle placed through a mounting hole of the wheel, said handle pivoted upward to lift the wheel and the wheel slid along said handle, and along the curved middle portion of said handle and forced onto the hub by the curved middle portion with the mounting holes of the wheel in alignment with the mounting studs of the hub.

4,949,449

## QUICK RELEASE ROTARY PUNCH

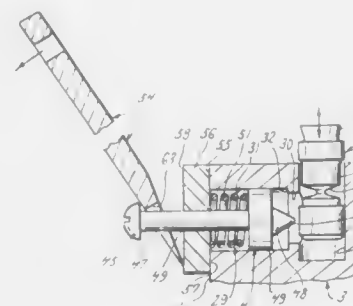
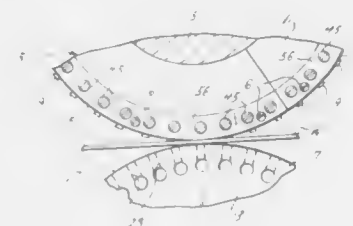
John S. Wilson, St. Louis, Mo., assignor to Wilson Manufacturing Company, St. Louis, Mo.

Filed Feb. 23, 1989, Ser. No. 315,335

Int. Cl.<sup>5</sup> B26F 1/10

U.S. Cl. 29—402.08

17 Claims



16. A method of releasably locking a punch element in a rotary punch wheel, the wheel having an end face lying in a radial plane of the wheel and an outer generally cylindrical rim surface extending generally axially of the wheel, a plurality of radial bores in the wheel extending generally radially inwardly

from said rim surface at intervals spaced circumferentially of the wheel, a corresponding plurality of axial bores in said wheel extending generally axially inwardly from said end face of the wheel and intersecting said radial bores generally at right angles thereto, and retainer pins slidably received in said axial bores, each retainer pin being biased by spring means toward an extended position in which it projects into a respective radial bore, said method comprising,

engaging a prying tool with a retainer pin,  
 prying the retainer pin with said prying tool for moving the retainer pin from said extended position to a retracted position in which the retainer pin is removed from said radial bore,  
 inserting the punch element in the radial bore,  
 relaxing the prying force applied by the prying tool on the retainer pin whereby the retainer pin moves back to said extended position projecting into the radial bore and engages the punch element in its groove for locking the punch element in fixed radial position in its radial bore, and  
 disengaging the prying tool from the retainer pin.

4,949,450

## INSULATED BLIND RIVET MOUNTING AND METHOD OF MAKING

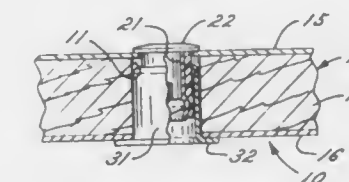
Harry J. Scharres, 41 Poplar Place, LaGrange, Ill. 60525

Filed Jan. 14, 1988, Ser. No. 144,323

Int. Cl.<sup>5</sup> B21D 39/20; F16B 13/06

U.S. Cl. 29—523

23 Claims



1. A method of making an insulated connection in an aperture of a wall comprising the steps of positioning at least partially into the aperture a metallic blind rivet having a metallic tubular rivet member and an actuating rod that is disposed in the tubular rivet member and adapted for axial withdrawal movement therefrom, positioning a non-metallic insulating sheath over the tubular rivet member, and withdrawing the actuating rod from said blind rivet to expand a portion of said tubular rivet member and insulating sheath into tight interfitting relation with each other in said aperture with said sheath insulating said tubular rivet member from said wall, said expanded rivet portion being located intermediate the ends of said rivet and entirely within said wall aperture and being effected in response to withdrawal of said rod without deformation of any portion of said rivet extending outside of said wall aperture.

4,949,451

## DEVICE FOR PLUGGING CONTACTS INTO A CONNECTOR BOX

Guy Pech, Labastide St-Pierre, France, assignor to LABINAL, societe anonyme, France

Filed Oct. 28, 1988, Ser. No. 263,886

Claims priority, application France, Oct. 28, 1987, 87 14935 Int. Cl.<sup>5</sup> H01R 43/00

U.S. Cl. 29—564.1

21 Claims

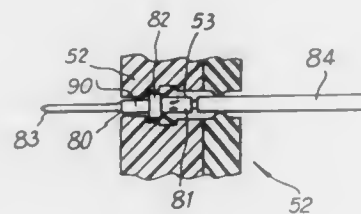
1. A device for inserting contacts, each contact having a front end and a rear end and being provided with a flexible conductor or cable extending out of the rear end, in a desired one of a plurality of cavities of a connector box, which device comprises:

a connector box support;

a support moving means for producing a relative movement between the connector box support and a path along which the contact is moved to said connector box so as to present the desired cavity of the connector box in said path; and

an insertion means for inserting the contact along the path into the connector box, said insertion means comprising:

(a) an insertion head which is openable for receiving a contact and closable around the contact, a forward end of the head adjacent to the front end of the contact and oriented toward the connector box being beveled for the purpose of gradually spreading apart during the movement of the head toward the connector box any cables and



contacts which may have already been mounted to the connector box,

(b) a head closing means for opening and closing said insertion head,

(c) a head moving means for moving said insertion head between a withdrawn position for receiving the contact and an advanced position close to the cavity located in the path, and

(d) a final insertion means for shifting the contact along and end portion of said path after said head closing means opens between a position of the contact corresponding to said advanced position of the insertion head and a position corresponding to the end of the insertion of the contact in the cavity.

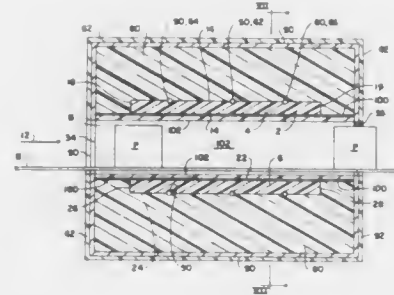
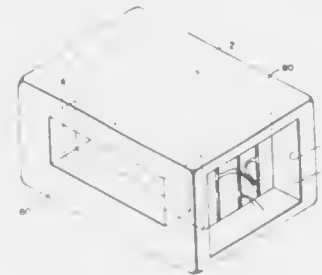
**4,949,452**  
**METHOD FOR MAKING SEARCH COIL ASSEMBLY FOR METAL DETECTORS**  
 James M. Moran, Leominster, Mass., assignor to Barkley & Dexter Laboratories, Inc., Fitchburg, Mass.  
 Division of Ser. No. 357,781, May 30, 1989, Pat. No. 4,903,395, which is a continuation-in-part of Ser. No. 56,241, Jun. 1, 1987, Pat. No. 4,833,773. This application Nov. 6, 1989, Ser. No. 431,880

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> H01F 7/06

U.S. Cl. 29—602.1 2 Claims

1. A method for making search coil assemblies for metal detectors, comprising providing a frame of non-metallic material, said frame defining an aperture therethrough of a selected size for inspection of a selected product of a given size, winding coils of electrically conductive strands about said frame, shielding internal surfaces of said frame, applying a first plastic coating in liquid form to external surfaces of said frame and said coils to imbed said coils in said first plastic coating and to form a cavity in one end of the assembly, allowing said first plastic coating to cure, covering said cavity with a cover plate, applying metal in fluid form to the surface of the first plastic coating other than the internal plastic surfaces of said cavity,

permitting the metal to harden, to thereby encase the first plastic coating in a metal layer, and applying a second plastic

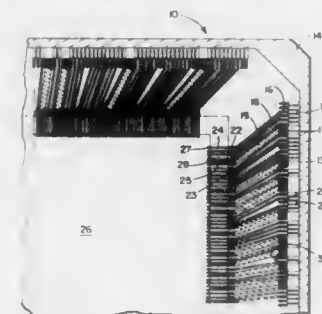


coating in liquid form to the surface of said metal layer to encase said metal layer in said second plastic coating.

**4,949,453**  
**METHOD OF MAKING A CHIP CARRIER WITH TERMINATING RESISTIVE ELEMENTS**  
 Eugene F. Neumann; Melvin C. August, both of Chippewa Falls; James N. Kruchowski, Eau Claire; Stephen Nelson, and Richard R. Steitz, both of Chippewa Falls, all of Wis., assignors to Cray Research, Inc., Minneapolis, Minn.  
 Filed Jun. 15, 1989, Ser. No. 366,604  
 Int. Cl.<sup>5</sup> H01C 17/06

U.S. Cl. 29—620

7 Claims



1. A method of fabricating an integrated circuit chip carrier, comprising the steps of:

(a) providing a first substrate having a location defined for receiving the integrated circuit;

(b) metallizing a portion of said first substrate such that a voltage bus is created;

(c) defining at least one conductive signal path on said first substrate; and

(d) depositing at least one resistive element on said first

substrate such that said resistive element is connected between said conductive signal path and said voltage bus.

**4,949,454**  
**METHOD FOR MAKING AN ELECTRICAL CONNECTION TO A FLAT ELECTRICAL CONDUCTOR**  
 Friedrich Schauer, Heroldsberg, and Manfred Wolff, Schwarzenbrunn, both of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany  
 Filed Nov. 8, 1989, Ser. No. 433,156  
 Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3840014

U.S. Cl. 29—860

Int. Cl.<sup>5</sup> H01R 43/02

8 Claims



1. Method of making an electrical through connection between a first insulated conduction line comprising a first electrical conductor having a flat cross-section, to a second insulated electrical conduction line comprising a second electrical conductor means, comprising the steps of:

removing an end portion of a first insulation layer from said first conduction line to expose an end portion of said first electrical conductor;

removing an end portion of a second insulation layer from said second conduction line to expose an end portion of said second electrical conductor means; and

attaching a first elongated connecting device between said first and second conduction lines, said first connecting device being comprised of a deformable conductive metal and including a plurality of transverse claws at one end, an attachment member at the other end, and a base member in between, said attaching of said connecting device, comprising the steps of:

placing said connecting device longitudinally adjacent said first conduction line so that said plurality of transverse claws are opposite a portion of said first insulation layer, and said exposed end portion of said first electrical conductor is opposite said base member;

deforming said plurality of transverse claws into said first insulation layer to provide a fixed longitudinal retention between said first conduction line and said first connecting device, said step of deforming including the application of a force sufficient to cause claw penetration into only said first insulation layer and not into said flat electrical conductor;

bonding said exposed end portion of said first flat electrical conductor to said base member for achieving an electrical connection thereto;

affixing said attachment member of said connecting device to said exposed end portion of said second electrical conductor means for achieving an electrical connection thereto.

**4,949,455**  
**I/O PIN AND METHOD FOR MAKING SAME**  
 Keiichi Nakamura; Tsutomu Oshima, both of Tokyo; Noriharu Kurokawa, Surashi, and Toshihiko Kitai, Isehara, all of Japan, assignors to AMP Incorporated, Harrisburg, Pa.  
 Filed Feb. 1, 1989, Ser. No. 305,312  
 Claims priority, application Japan, Feb. 27, 1988, 63-45427  
 Int. Cl.<sup>5</sup> H01R 9/06, 43/20; H05K 1/00

U.S. Cl. 29—843

10 Claims

1. A method of making electrical pins comprising the steps of:

forming a matrix of a metal plate member and metal rods

secured in longitudinally spaced grooves in a surface of the metal plate member;

securing a plurality of said matrix together along with a planar metal plate member on the uppermost matrix thereby forming a stacked structure;

cutting the stacked structure at a specified length and perpendicular to the direction of the metal rods thereby providing a workpiece of metal plate member sections and pins;

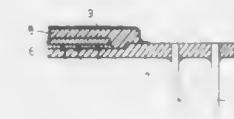
placing photoresist layers on upper and lower surfaces of said workpiece;

applying light through a mask onto the photoresist layers causing areas of the photoresist layers over the end surfaces of the pins and between the pins to be fixed while the areas of the photoresist layers surrounding the fixed areas over the end surfaces of the pins is unfixed;

removing the unfixed areas of the photoresist layers thereby exposing the areas of the metal plate member sections thereunder;

etching the exposed areas of the metal plate member sections thereby forming recesses and exposing peripheral surfaces at the ends of the pins;

plating the recesses and peripheral end surfaces of the pins with a metal layer;



removing the fixed areas of the photoresist layers from the workpiece;

applying a photoresist layer onto the upper and lower surfaces of the workpiece leaving the end surfaces of the pins and the plated metal layers exposed;

plating a solder layer onto the exposed end surfaces of the pins and plated metal layers thereby forming head members;

removing the photoresist layer from the workpiece surfaces; and

etching the metal plate member sections until a thin section thereof remains thereby forming a carrier member with a group of electrical pins.

4. An electrical pin, comprising:

an elongate member having plated metal members secured to peripheral surfaces of the ends of the elongate member with the end surfaces of the elongate member being substantially coplanar with the respective end surfaces of the plated metal members; and

head member of conductive metal including solder secured onto the end surfaces of said elongate member and said plated metal members, and an inner layer of a precious metal covered by the solder.

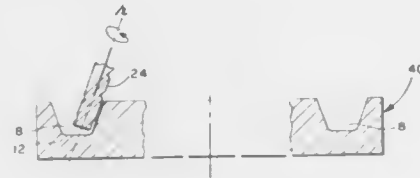


**4,949,456**  
**METHOD OF MAKING RING GEAR AND RING GEAR THEREFROM**

Joseph A. Kovach, Aurora, and Dale B. McCartney, Painesville, both of Ohio, assignors to Eaton Corporation, Cleveland, Ohio  
Continuation of Ser. No. 294,072, Jan. 6, 1989, abandoned. This application Nov. 8, 1989, Ser. No. 453,377

Int. Cl.<sup>5</sup> B23P 17/00  
U.S. Cl. 29—893.35

19 Claims



1. An improved method for machining a forged or ring-cut metallic ring gear tooth having a pair of spaced-apart sidewalls respectively extending from opposite edges of a bottom surface extending therebetween and defining a curved tool path extending therealong having a median radius of curvature "R" in a plane substantially parallel to the bottom surface, said method including the step of machining said tooth by a rotary tool rotating about a central rotational axis "r" that projectionally intersects the bottom surface whilst following the curved tool path therealong.

**4,949,457**  
**SOFT RESILIENT RAZOR HANDLE**  
Charles J. Burout, III, Oxford, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 3, 1988, Ser. No. 227,930  
Int. Cl.<sup>5</sup> B26B 21/14

U.S. Cl. 30—85

8 Claims



1. A composite razor handle comprising in combination:  
(a) a rigid inner core of thermoplastic material, said core having at least one elongate indentation extending substantially along its length;  
(b) a moldable compressible resilient covering layer, said layer having durometer values between 55 Shore A and 50 Shore D hardness.

**4,949,458**  
**KNIFE**  
Roger I. Davis, Didsbury, and David B. Scott, Halfway, both of Great Britain, assignors to The Shirley Institute, Manchester, England

Continuation of Ser. No. 70,418, Jul. 7, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 290,845  
Claims priority, application United Kingdom, Jul. 8, 1986, 8616636

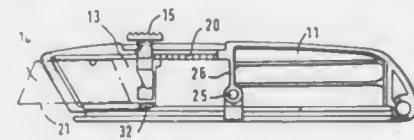
Int. Cl.<sup>5</sup> B26B 3/06

U.S. Cl. 30—162

7 Claims

1. A hand knife comprising a handle having a blade with a cutting edge extendable from the handle, a guard movable between a normally retracted position in the handle and an extended position covering the cutting edge of the blade when extended from the handle, acceleration detection means in the handle and comprising a movable mass for detecting violent

movement of the knife, biasing means for moving the guard from said retracted position to said extended position, the



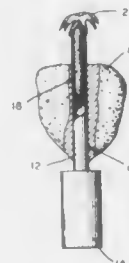
acceleration detection means connected to the biasing means to actuate said movement of the guard to said extended position.

**4,949,459**  
**STRAWBERRY STEM REMOVAL DEVICE**  
Bradley T. Noble, 110 S. Helberta Ave., Redondo Beach, Calif. 90277

Filed Jun. 26, 1989, Ser. No. 371,821  
Int. Cl.<sup>5</sup> A47J 23/00

U.S. Cl. 30—113.1

10 Claims



1. A strawberry stem removal device particularly configured for removing the stem and core from strawberries, said strawberry stem removal device comprising in combination:  
a. one or more long, tubular members that are individually inserted through the centers of strawberries; and  
b. a handle member attached to one end of the tubular member that is used to grasp the device during use; and  
c. a knob and cam assembly used to vary the diameter of the tubular member.

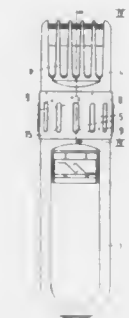
**4,949,460**  
**HAIR TRIMMER**  
Olivier Sterk, Drachten, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jan. 13, 1989, Ser. No. 301,918  
Claims priority, application Netherlands, Jan. 21, 1988, 8800132

Int. Cl.<sup>5</sup> B26B 19/00, 21/14, 19/16, 19/02

U.S. Cl. 30—201

5 Claims



1. A hair trimmer, comprising a housing provided with a

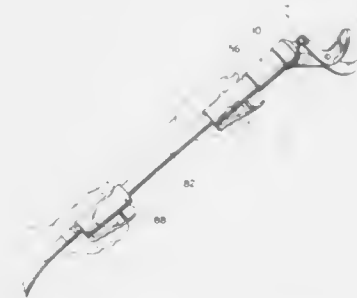
stationary cutter and a cutter which can be driven relative to the stationary cutter, the housing being provided with a comb attachment which is adjustable relative to the housing, a spiral-groove coupling between the housing and the comb attachment, said coupling comprising a rotatable annular adjusting element wherein the position of said comb attachment relative to the cutters may be changed by rotating said coupling comprising said adjusting element.

**4,949,461**  
**DUAL CONTROL HANDLE FOR PNEUMATIC TREE TRIMMER**

Jacobus C. van der Merwe, and Lucas C. van der Merwe, both of 801 Beechwood Dr., Kingsport, Tenn. 37663  
Filed Mar. 1, 1989, Ser. No. 317,587

Int. Cl.<sup>5</sup> B26B 13/00, 17/00, 15/00; D02J 1/18  
U.S. Cl. 30—245

5 Claims



1. A trimmer device comprising:  
cutting means to be used for a trimming operation;  
means through which pressurized fluid is supplied to said trimmer device;  
first and second selectively openable and closable valves connected with one another and disposed between said cutting means and the means through which pressurized fluid is supplied, the trimmer device including passage means provided therein which connects said means through which pressurized fluid is supplied, said first selectively openable and closable valve, said second selectively openable and closable valve, and said cutting means;  
means by which an operator can manually open and close said first and second selectively openable and closable valves independently;  
each of said first and second selectively openable and closable valves being biased into a closed position prior to said trimming operation, and pressurized fluid passing from said means through which pressurized fluid is supplied to said cutting means to perform said trimming operation only when both of said first and second selectively openable and closable valves are manually opened by the operator.

**4,949,462**  
**DRYWALL CUTTING GUIDE**  
Michael P. Spencer, 415 W. Jefferson St., Marshfield, Wis. 54449

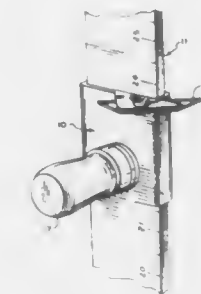
Filed Nov. 2, 1988, Ser. No. 265,931  
Int. Cl.<sup>5</sup> B26B 29/00

U.S. Cl. 30—293

13 Claims

1. A drywall cutting device including a channel-shaped sleeve for slidably mounted disposition on a stem of a T-square at predetermined selectable positions, a clamping device mounted on the channel-shaped sleeve for retaining the sleeve in a predetermined selected fixed position on the stem of a T-square, a knife holder being joined with the sleeve, and a knife adjustably secured with the knife holder at right angles to

the stem for cutting a line perpendicular to the stem of the T-square when the clamping device and the T-square are drawn together across a surface to be cut, said clamping device including a threaded screw extended through said channel-



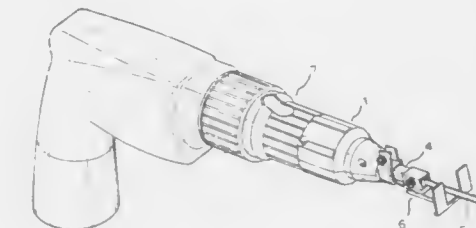
shaped sleeve in threaded assembly therewith, and a screw end extended into a channel-shaped area defined by the channel-shaped sleeve, the end being adapted for retaining engagement with the T-square.

**4,949,463**  
**SAWING DEVICE ATTACHABLE TO REGULAR ELECTRIC DRILL**  
Yi-Chang Chen, No. 637, Sec. 1, Hsien Tung Rd., Changhua, Taiwan

Filed Nov. 28, 1988, Ser. No. 276,527  
Int. Cl.<sup>5</sup> B26B 7/00

U.S. Cl. 30—500

1 Claim



1. A sawing device for attachment to an electric drill comprising:  
(a) a main body including symmetrically configured upper and lower cover plates having reduced front and rear end portions, the cover plates collectively defining an inner chamber having a round recess therein, a rear cylindrical-shaped hole and a front rectangular-shaped channel;  
(b) a spiral gear set disposed in the inner chamber and including a longitudinal spiral gear provided with a bearing disposed in the round recess, an eccentric strut and a sleeve disposed on the strut, and a transverse spiral gear provided with a coupled bearing assembly disposed within the rear cylindrical-shaped hole and a revolving shaft;  
(c) a hollow tube disposed in the front rectangular-shaped channel and means for securing the tube within the channel;  
(d) a link rod disposed through the hollow tube and extending outwardly of the main body, the link rod including means for securing a saw blade thereto at one end and guide means engageable with the strut and sleeve at another end;  
(e) a locating device secured to the hollow tube and including a fixed bracket and a movable support, the movable support being provided with an opening through which the

saw blade extends and is confined within the periphery of the opening; and  
 (f) a drill sleeve having a reduced hollow front end for attachment to the rear end of the main body, and a rear end provided with an outer thread, a hollow ring-shaped cover plate for threaded attachment to the outer thread of the drill sleeve, a lashing ring disposable within the cover plate and engageable with the drill sleeve for securing the drill sleeve to an electric drill, and a hole formed in the drill sleeve for permitting access to the revolving shaft for securing same to the electric drill.

4,949,464

## BATTERY OPERATED COPING SAW

Brandon J. Adomatis, 15715 Hazel Dell Rd., Noblesville, Ind. 46060

Filed Dec. 27, 1988, Ser. No. 290,296

Int. Cl.<sup>5</sup> B27B 19/02

U.S. Cl. 30—509

11 Claims



1. A battery operated coping saw comprising:  
 a main frame;  
 a coping saw blade removably and reciprocally mounted to said main frame and including a proximal end and a distal end, said coping saw blade including a thin main body incapable of supporting itself during sawing without said distal end supported;  
 battery powered motor means mounted to said main frame and having a reciprocating output connected to said proximal end of said saw blade;  
 support means mounted to said main frame and extending outward therefrom being attached to and supporting said distal end of said saw blade; and wherein,  
 said support means includes a generally U-shaped frame with a first leg with a first end thereon and a second leg with a second end thereon, said U-shaped frame further includes a lateral portion extending between said first leg and said second leg with said lateral portion spaced apart from said coping saw blade and said second end attached to and supporting said distal end of said saw blade; and further comprising,  
 spring means mounted to said second end of said second leg and receiving said distal end of said saw blade being operable to move said saw blade in a direction opposite to forced movement of said saw blade by said motor means; and wherein,  
 said spring means includes a first mount reciprocally mounted to said second end of said second leg with said distal end of said saw blade removably connected to said first mount, said spring means further includes a spring connected between said first mount and said second end and operable to pull said saw blade in a direction away from said motor means but yieldable to allow said motor means to pull said first mount and said saw blade toward said motor means.

4,949,465

## COUNTERWEIGHT FOR COORDINATE MEASURING MACHINE

Vitaly I. Pesikov, Providence, R.I., assignor to Brown & Sharpe Manufacturing Company, North Kingstown, R.I.

Continuation of Ser. No. 925,323, Oct. 31, 1986, Pat. No.

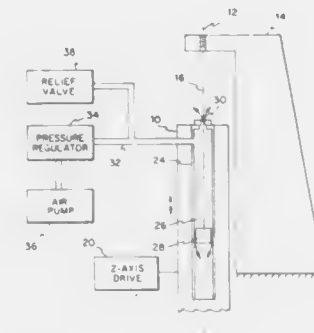
4,835,871. This application Jun. 1, 1989, Ser. No. 360,009

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G01B 5/20

U.S. Cl. 33—1 M

22 Claims



1. Apparatus for counterbalancing a vertically movable element of a machine comprising:  
 a cylinder defining an elongated cylindrical space attached to the movable element with its axis parallel to the direction of movement of said movable element and having a small axial opening at its upper end;  
 a piston located in said cylindrical space for axial movement therein;  
 a machine element fixed in the vertical direction and having a portion aligned with the axis of said cylinder;  
 an elongated connection member attached between said piston and said fixed machine element and passing through said opening in said cylinder, said connection member being substantially nonelastic in a longitudinal direction and being substantially free to bend and flex in a direction transverse of the axis of said cylinder for permitting misalignment of said movable element with respect to said fixed machine element in a horizontal plane without binding of said connection member at said opening and without causing substantial friction between said connection member and said opening;  
 means for supplying air under pressure to the portion of said cylindrical space between said piston and said opening in said cylinder sufficient to counterbalance the weight of said movable element.

4,949,466

## DRAWING DEVICE HAVING INDEXABLE STYLUS TURRET

Robert T. Auer, East Stroudsburg, Pa.; Richard J. Mayer, Parsippany, N.Y., and Jore M. Chung, Jackson, N.J., assignors to Buddy L Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 193,879, May 13, 1988, Pat. No. 4,856,197. This application Apr. 26, 1989, Ser. No. 343,897

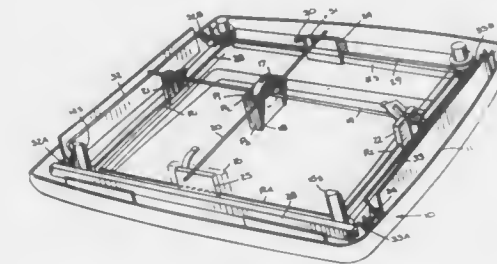
Int. Cl.<sup>5</sup> B43L 13/00

U.S. Cl. 33—18.1

9 Claims

1. A drawing device for producing line drawings or sketches, said device comprising:  
 (a) a box-like case provided at its top with a transparent screen, said case being partly filled with a slightly adhesive powder that adheres to the undersurface of the screen to render it opaque;  
 (b) transverse and longitudinal rods disposed within the case,

whereby the rods intersect at a point depending on the relative positions of the rods in the case;  
 (c) control means including first and second knobs operatively coupled to said rods whereby when the first knob is turned, the transverse rod is shifted toward either end of the case, and when the second knob is turned the longitudinal rod is shifted toward either side of the case;  
 (d) an indexable stylus turret and carrier assembly supported at the intersection of the rods, said turret which is received within the carrier being slidably supported on one



rod and the carrier being slidably supported on the other rod whereby said assembly is caused to assume a position that depends on the point of intersection, said turret having a plurality of styluses at spaced positions on its rim, each stylus having a distinctive line drawing characteristic; and  
 (e) indexing means including an actuator bar operatively coupled through said rods to said assembly to index said turret to present to the undersurface of said screen a selected one of said styluses.

4,949,467

## INCLINOMETER INCLUDING AN APPARATUS FOR MAINTAINING A SCIENTIFIC AND MEASURING INSTRUMENT OR THE LIKE IN A LEVEL PLANE

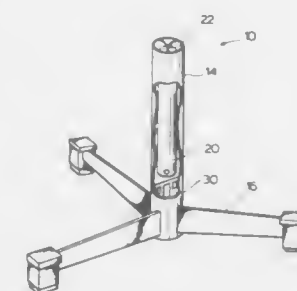
Robert Oman, 284 Maplehurst Ave., Toronto, Ontario, Canada M2N 3C4, and David Oman, 330 Winnifred Drive, Keswick, Ontario, Canada L3P 3B5

Filed Oct. 3, 1988, Ser. No. 252,758

Int. Cl.<sup>5</sup> G01C 9/06, 9/12

U.S. Cl. 33—366

2 Claims



1. An inclinometer comprising a support housing and a plumb member freely suspended within said support housing, said support housing comprising an elongated hollow tube, said plumb member comprising an elongated body suspended within said elongated hollow tube, said elongated body being supported in a manner to prevent rotation thereof, said plumb member having an exterior surface provided with first sensing means and said support housing having an interior surface provided with second sensing means,  
 said first and second sensing means comprising individual sensors opposing one another on said exterior surface of

said plumb member and said interior surface of said supporting housing, said first and second sensing means cooperating to determine all different degrees of variation of said support housing from an exact upright position.

4,949,468

## ROLL MEASURING DEVICE

Paul Kohler, Heldenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heldenheim, Fed. Rep. of Germany

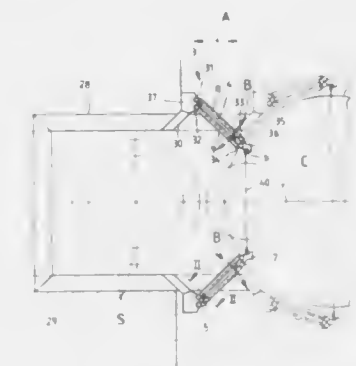
Filed Feb. 15, 1989, Ser. No. 311,213

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806640

Int. Cl.<sup>5</sup> G01B 5/08, 7/12

U.S. Cl. 33—555.1

17 Claims



1. In a measuring apparatus for measuring the diameter of a rotationally symmetric body having a peripheral surface, said measuring apparatus having at least one straight-line arm having a free end and supporting on said free end measuring means, including a stylus for scanning said peripheral surface, for measuring the diameter of said body, said arm including at least two rails disposed parallel to each other and joined together to form part of a jointed parallelogram serving to set the stylus on and lift the stylus from said peripheral surface, the improvement comprising means for locking the rails of the arm against movement relative to each other, said locking means including at least one pressure hose actuated by a pressure medium.

4,949,469

## TEMPERATURE-COMPENSATED QUANTITATIVE DIMENSIONAL MEASUREMENT DEVICE WITH RAPID TEMPERATURE SENSING AND COMPENSATION

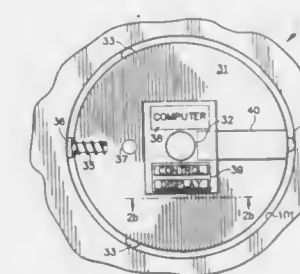
William R. Wachtler, Solana Beach, Calif., assignor to Albion Devices, Inc., San Diego, Calif.

Filed Jul. 1, 1988, Ser. No. 214,636

Int. Cl.<sup>5</sup> G01B 7/12

U.S. Cl. 33—702

52 Claims



1. A workpiece-temperature-compensated dimensional measuring device comprising:



gauge means  
for, at a first time, measuring a dimension of a reference standard as a first dimension, and  
for, at a second time, measuring a dimension of an arbitrarily-sized workpiece as a second dimension;  
first thermal sensing means  
held at the first time by the gauge means in thermal communication with a reference standard for measuring a temperature of the reference standard as a first temperature, and  
held at the second time by the gauge means in thermal communication with the workpiece for measuring a temperature of the workpiece as a second temperature; and  
computational means

for receiving at the first time the first dimension from the gauge means and the first temperature from the first thermal sensing means and for producing, in consideration of a predetermined dimensional sensitivity of the reference standard to temperature variations about a first predetermined reference temperature that is not equal to the first temperature, that temperature-normalized dimension that the reference standard would measure to and by the selfsame gauge means upon such times as the reference standard was to be at the first predetermined reference temperature, therein to calibrate the gauge means, and  
for receiving at the second time the second dimension from the calibrated gauge means and the second temperature from the first thermal sensing means and for producing, in consideration of a predetermined dimensional sensitivity of the workpiece to temperature variations about the first predetermined reference temperature, that temperature-normalized dimension that the workpiece would measure to and by the selfsame gauge means upon such times as the workpiece was to be at the first predetermined reference temperature.

46. A temperature-compensated method of calibrating a gauge to a reference dimensional standard, the standard being dimensionally sensitive to deviations from a reference temperature, when the standard is not at the reference temperature, the method comprising:

first dimensionally measuring a first dimension of the reference dimensional standard with a gauge; while  
first thermally measuring a first temperature of the reference dimensional standard with a temperature measurement device that is attached to the gauge and that comes into thermal contact with the reference dimensional standard in order to measure the temperature thereof during the act of first dimensionally measuring; and  
calibrating the gauge in consideration of (i) the measured first dimension and (ii) the measured first temperature of the reference dimensional standard, both of which first dimension and first temperature were measured by the gauge itself, and (iii) a predetermined thermal coefficient of expansion of the reference dimensional standard.

4,949,470

## GROOVE DEPTH LOCATION GAGE

Douglas J. Heckler; Richard S. Hille, Jr., and Tony L. Reynolds, all of Van Wert, Ohio, assignors to Aeroquip Corporation, Jackson, Mich.

Filed Dec. 19, 1989, Ser. No. 452,351

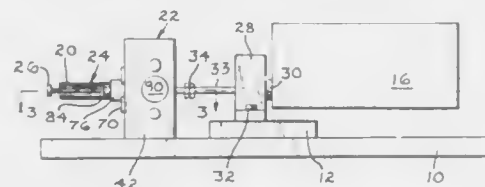
Int. Cl.<sup>5</sup> G01B 5/13

U.S. Cl. 33—836

6 Claims

1. A groove depth location gage for determining the relative axial distance between a groove and a shoulder defined in a bore having an axis comprising, in combination, a base, a gage mounted upon said base having a linearly displaceable feeler movable in an axial direction, shoulder sensing means defined on said feeler, a bore insert support mounted upon said base, a bore insert having an axis mounted upon said support, said feeler coaxially extending through said insert, and a groove

indicator defined on said insert adapted to be received within the bore groove thereby permitting the axial spacing between



the groove and bore shoulder to be indicated by said gage upon said feeler shoulder sensing means engaging the bore shoulder.

4,949,471

## MECHANICAL DRYING PROCESS APPLICABLE TO PAPERMAKING

Daniel Garcia Pastor, and Francisco Garcia Pastor, both of Burriana, 19, 46005 Valencia, Spain

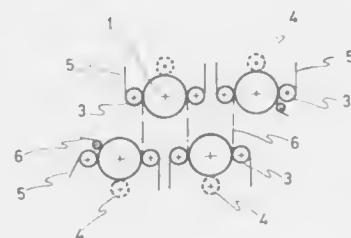
Filed Apr. 27, 1989, Ser. No. 343,677

Claims priority, application Spain, Aug. 17, 1988, 8802555

Int. Cl.<sup>5</sup> F26B 3/00

U.S. Cl. 34—23

6 Claims



1. An improved mechanical drying process applicable to papermaking, which is used in drying installations made up of a heated large diameter cylinder, over whose surface moves a sheet of paper guided by guide rollers, said guide rollers also guiding the movement of a guide belt over the cylinder surface such that paper is pressed between the belt and the cylinder surface, the improvement comprising:

applying pressure against the belt, paper and cylinder surface with a pressing roller, said pressing roller being independent from any guiding movement of the paper and belt, whereby combining the pressure and heat accelerates and increases the extent of the drying.

4,949,472

## DRYER FOR LACQUER COATED PHOTOGRAPHS

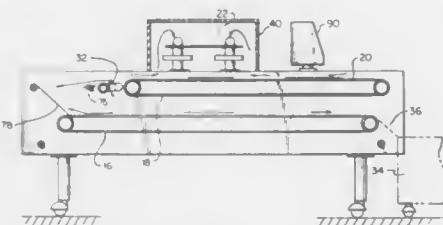
Joseph A. Arnone, 258 Briggs St., Syracuse, N.Y. 13208

Filed Jun. 26, 1989, Ser. No. 371,606

Int. Cl.<sup>5</sup> F26B 19/00

U.S. Cl. 34—48

11 Claims



1. An environmentally acceptable apparatus for drying photographic materials comprising:  
a frame member;

first conveyor means mounted in said frame member;

second conveyor means mounted in said frame member adjacent said first conveyor means;  
heater means mounted adjacent but spaced from said first conveyor means;  
air exhaust means disposed about said heater means for removing heated air, solvents and the like emitted from the material being dried;  
transfer means for transferring the photographic material from said first conveyor means to said second conveyor means without turning said material over; and  
control means operatively connected to said heater means for limiting the heat applied so as to prevent scorching of the photographic material.

4,949,473

## FREEZE DRYING APPARATUS WITH ADDITIONAL CONDENSATION SURFACE AND REFRIGERATION SOURCE

Heinrich Steinkamp, Cologne, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Köln, Fed. Rep. of Germany

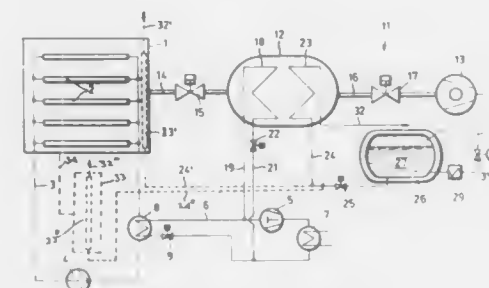
Filed Jul. 29, 1988, Ser. No. 226,536

Claims priority, application European Pat. Off., Jul. 29, 1987, 87110955

Int. Cl.<sup>5</sup> F26B 13/30

U.S. Cl. 34—92

6 Claims



5. A freeze drying apparatus, comprising:

a vacuum chamber;  
an evacuation system comprised of a condenser and a vacuum pump connected by a conduit including a second valve, wherein the condenser is connected to the vacuum chamber by a conduit including a third valve;  
a reservoir container containing a coolant which is a liquid having a low boiling point; and  
an additional condensation surface which is disposed in a chamber which is interconnected by a conduit to the vacuum chamber, and which is connected to the reservoir container by a conduit including a first valve.

4,949,474

## METHOD AND APPARATUS FOR DRYING PARTICULATE MATERIAL

Eero Berg, Oulu, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland

Continuation-in-part of Ser. No. 207,865, Jun. 17, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 432,866

Claims priority, application Finland, Jun. 17, 1987, 872695

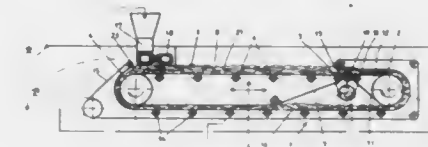
Int. Cl.<sup>5</sup> F26B 25/00

U.S. Cl. 34—102

12 Claims

10. Apparatus for drying particulate material comprising:  
means defining a conveyor for endlessly conveying a bed of material to be dried along a closed path and disposed substantially in a vertical plane with upper and lower conveying sections spaced one from the other;  
means defining guides at longitudinally opposite ends to define the conveyor, and, in part, said upper and lower conveying sections;  
means for continuously supplying material to be dried onto

said conveyor such that a plurality of successive layers of material are provided in the bed thereof on the conveyor;  
means for continuously discharging dried material from said conveyor; and  
means providing a drying gas between said upper and lower conveyor sections for passage thereof first outwardly through said conveyor and then through the layers of material in the bed;  
said supply means and said discharge means being arranged such that the material on the conveyor in each layer



thereof advances a distance at least in excess of that necessary to make a complete circuit of said closed path and has a succeeding overlying layer of material thereon before being discharged from said conveyor whereby the layers of dried material are discharged from the conveyor in the order in which they are supplied to the conveyor;  
said supplying means and said discharging means being arranged to supply and discharge material to and from said endless conveyor, respectively, at substantially the same rate.

4,949,475

## TEMPERATURE COMPENSATED VENTILATING ROLL

Arnold J. Roerig; Gregory L. Wedel, both of Beloit, and Dale A. Brown, Milton, all of Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Dec. 20, 1989, Ser. No. 453,516

Int. Cl.<sup>5</sup> F26B 13/16

U.S. Cl. 34—115

16 Claims



1. A roll for ventilating air in a pocket, such as the space intermediate the dryer rolls, fabric and paper web in a paper-making machine, comprising, in combination:

a stationary center shaft having an interior space, front and rear ends with journals at either end;  
wall means in the center shaft forming a portion of the inner space into a plurality of longitudinally extending chambers, there being at least two vacuum chambers and at least two pressure chambers;  
vacuum conduit means within at least one of the journals for establishing fluid communication between a source of sub-atmospheric pressure air and a vacuum chamber;  
pressure conduit means within at least one of the journals for

establishing fluid communication between a source of super-atmospheric pressure air and a pressure chamber; a roll shell having perforations in its cylindrical surface, which perforations extend along an effective face length of its surface for permitting ventilating air to pass there-through;

bearings at either end of the roll for rotatably supporting the roll shell about the center shaft;

first connection means linking at least two of the plurality of pressure chambers in fluid communication with one another;

second connection means linking at least two of the plurality of vacuum chambers in fluid communication with one another;

the wall means and first and second connection means arranged to alternate the vacuum and pressure chambers circumferentially about the center shaft;

seal means disposed between the center shaft and roll shell, and slidably engaging the inner surface of the roll shell, said seal means maintaining fluid separation between the vacuum and pressure chambers between the center shaft and roll shell;

distribution means within at least one vacuum chamber for receiving air from the pocket, and within at least one pressure chamber for distributing air into the pocket.

#### 4,949,476 RUNNING SHOE

Wolf Anderie, Herzogenaurach, Fed. Rep. of Germany, assignor to Adidas Sportschuhfabriken, ADI Dassler Stiftung & Co. Kg., Herzogenaurach, Fed. Rep. of Germany

PCT No. PCT/DE88/00164, § 371 Date Dec. 21, 1988, § 102(e) Date Dec. 21, 1988, PCT Pub. No. WO88/08263, PCT Pub. Date Nov. 3, 1988

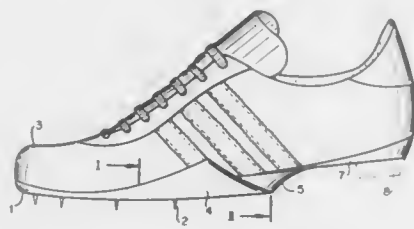
PCT Filed Mar. 17, 1988, Ser. No. 301,885

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 8705947[U]; Jul. 1, 1987, 8709091[U]

Int. Cl.<sup>5</sup> A43B 5/06

U.S. Cl. 36—129

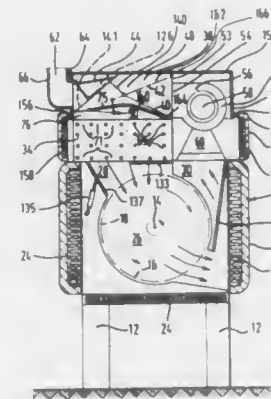
6 Claims



1. A track shoe comprising:  
an upper; and  
a sole attached to said upper, said sole having an outer side edge, an inner side edge and a shank region and including a front sole portion of hard plastics material, said front sole portion having a ground engaging side, a rearward edge and a plurality of gripping element holding means distributed on said ground engaging side in a predetermined pattern which provides a rearmost gripping element holding means, said sole further including  
a wedge-shaped support member of an elastically compressible material arranged behind said rearmost gripping element holding means and increasing in thickness in a rearward direction, said wedge-shaped support member having an underside approximately in one plane with said ground engaging side of the front sole portion and including a first part associated with said outer side edge of said sole, and at least said first part of said wedge-shaped support member extending into said shank region of said sole, whereby said underside of said wedge-shaped support member forms a continuation of said ground engaging side of said front sole portion.

4,949,477  
CONTROL SYSTEM WITH VALVE FLAPS FOR A DRIER  
Friedrich Geiger, Hellbronn, Fed. Rep. of Germany, assignor to Passat Maschinenbau GmbH, Fed. Rep. of Germany  
Filed Jun. 1, 1989, Ser. No. 360,084  
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819514

Int. Cl.<sup>5</sup> F26B 11/02  
U.S. Cl. 34—133  
19 Claims



1. A drier (10) with a control system with valve flaps (40, 42, 44) for controlling the quantities of supply, waste and circulating air transported by a blower (36) for the drying process in a drier drum (16), characterized in that  
the control system comprises a cohesive valve space (38) which is subdivided by a partition (48) into a first and a second parallel valve space, at least the first partial valve space comprising valve chamber (50) which is substantially closed in respect of the environment and which has at least one blow-in aperture (54) connected to the outlet (56) of the blower (36), which is connected by its induction side (58) to the drum interior and which has at least one waste air orifice (62) which connects the first partial valve space (38) to the outside environment,  
the second partial valve space comprises at least one inlet aperture (80) which connects the interior of the drum to the outside environment,  
at least for opening and closing the inlet aperture (80) and blow-in aperture (54), at least one first and one second valve flap (40, 42) are provided and can be moved by at least one triggerable drive into at least one open position and one closed position,  
in one of its open positions, the first valve flap (40) opens up at least the flow path from the blow-in aperture (54) to the drum interior or, in its closed position, to the waste air orifice (62), while the second valve flap (42), in one of its open positions, opens up the flow path from the outside environment through the inlet aperture (80) to the drum interior, or alternatively and when in its closed position closes this path again and  
a heat exchanger (34) is disposed at least between the inlet aperture (80) and the drum interior.

4,949,478  
ARRANGEMENT FOR A PROCESS PLANT ARRANGED  
FOR THE HEAT TREATMENT OF STRIP-SHAPED  
PRODUCTS

Jürgen Socha, Uddevalla, Sweden, assignor to Impact Systems Inc., San Jose, Calif.

PCT No. PCT/SE87/00050, § 371 Date Aug. 1, 1988, § 102(e) Date Aug. 1, 1988, PCT Pub. No. WO87/04739, PCT Pub. Date Aug. 13, 1987

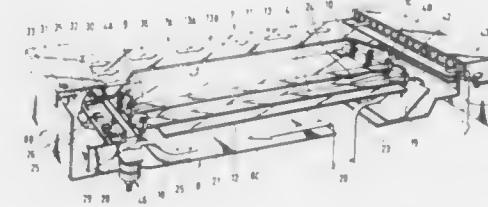
PCT Filed Feb. 4, 1987, Ser. No. 228,916

Claims priority, application Sweden, Feb. 6, 1986, 8600529

Int. Cl.<sup>5</sup> F26B 13/00

U.S. Cl. 34—155

27 Claims



1. An arrangement for a process plant arranged for the heat treatment of strip-shaped products, which plant contains a number of lamps operating with infra-red radiation and means for supplying a flow of heat treatment medium to the strip-shaped product via a heat treatment ramp which directs said heat treatment medium to flow essentially parallel to the strip-shaped product and cause the strip-shaped product to be moved in a direction towards said ramp, against the effect of the accumulated static pressure of said medium, characterized in that a number of row-shaped heat treatment modules are connectable together to form said ramp provided with an inlet duct for receiving said medium and an outlet duct for exhausting spent medium, the said ramp being arranged along only one side of the strip-shaped product and provides along one of its sides an exhaust passageway having outlet holes for leading away said spent medium to the outlet duct, means for directing said medium over said lamps and past exit holes in components secured to one side of the modules in such a way that the medium being directed parallel to said strip-shaped product is made to flow essentially in a parallel fashion between said strip-shaped product and a surface of a strip covering layer with the result of stabilizing the strip at an optimal distance from the modules, wherein the lamps are held at their respective ends by lamp holders in a reflector frame equipped with reference and functioning with a clamping effect, and wherein the reflector frame is so arranged at one of its ends as to support a component provided with air exit holes.

4,949,479  
SKI BOOT HAVING VARIABLE VOLUME INNER SHELL  
Marco T. Ottieri, 15 West 53rd St., Apt. 15C, New York, N.Y. 10019

Filed Nov. 22, 1988, Ser. No. 274,919

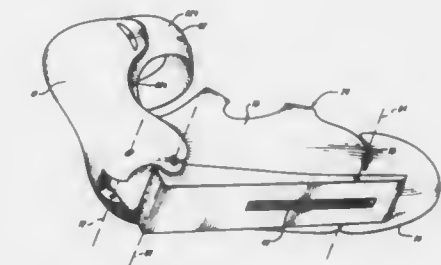
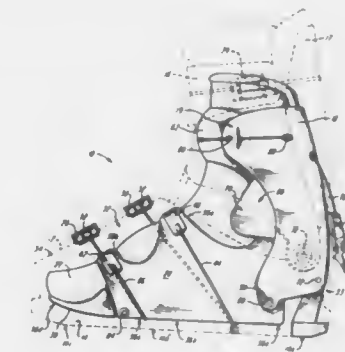
Int. Cl.<sup>5</sup> A43B 5/04, 3/26, 23/00

U.S. Cl. 36—117

11 Claims

1. In a ski boot having a substantially rigid outer shell, a heel spoiler hingedly connected to the outer shell to facilitate pivotal movement of the spoiler between open and closed positions, means for engaging and supporting a wearer's lower leg, and selectively operable closure means for fastening the boot to a wearer's foot, the improvement comprising  
inner shell means seated within and secured to the outer shell for selectively providing support to a wearer's foot, said inner shell means having  
a sole portion with heel, arch, metatarsal and phalanx regions, and  
foot restraint means extending between opposite sides of the

sole portion for supportively engaging the instep and metatarsal regions of a wearer's foot,



said sole portion further having a centrally disposed slot extending along said sole portion, and having means for selectively increasing and alternatively decreasing the width of said sole portion.

4,949,480  
SKI BOOT  
Milan Hercog, Graz, and Axel Kubelka, Obdach, both of Austria, assignors to Kastinger Skiboot GmbH of Seewalchen, Austria

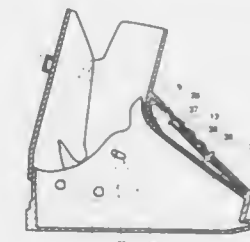
Filed Jan. 27, 1989, Ser. No. 303,521

Claims priority, application Austria, Jan. 28, 1988, A175/88

Int. Cl.<sup>5</sup> A43B 5/04

U.S. Cl. 36—119

38 Claims



1. A ski boot comprising:  
a shell upon a sole, preferably adapted to the shape of a foot, comprising a back heel portion, a shell tip, and a front portion rearwardly extending from said shell tip to approximately an instep region, said front portion having a longitudinal slot to divide part of said front portion into two shell flaps;  
a rear flap pivotably mounted to said heel portion for forward and backward movement;



a cuff pivotably mounted to the shell for forward and backward movement;  
means for closing said cuff in separable connection with said rear flap, said cuff and rear flap when closed defining at least part of a tubular shaft;  
an outer wall above and at the sides of said front portion of the shell to form at least one chamber substantially sealed toward the outer surface of said outer wall and defined by the front portion at the bottom, the length of said outer wall being changeable depending on the pivotal movement of said cuff; and  
means for adjusting said two shell flaps in a transverse direction.

4,949,481

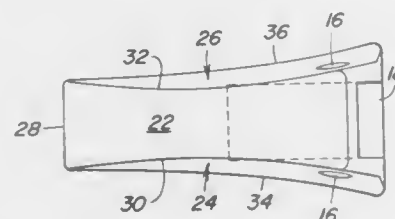
## DIGGING TOOTH ASSEMBLY

Ronald W. Fellner, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 4, 1989, Ser. No. 389,655  
Int. Cl.<sup>5</sup> E02F 5/00

U.S. Cl. 37—141 T

1 Claim



1. A digging tooth for a digging bucket, comprising
  - a top concave surface;
  - a bottom convex surface intersecting the top surface to form a forward cutting edge;
  - two moldboard sidewalls extending between the concave top surface and the convex bottom surface, the top surface and the two sidewalls defining two concave top-side edges, the bottom surface and the two sidewalls defining two concave bottom-side edges; and
  - a rear portion extending between the concave top surface, the convex bottom surface and the two sidewalls, the rear portion being provided with mounting means for mounting said digging tooth on a digging bucket, wherein the bottom surface proceeding from the forward cutting edge to the rear portion first converges then diverges, and the top surface proceeding from the forward cutting edge to the rear portion continuously diverges.

4,949,482

## QUADRILATERAL POP-UP PRODUCT

Frederick F. Price, Chicago, Ill., assignor to The Wessel Company, Elk Grove Village, Ill.

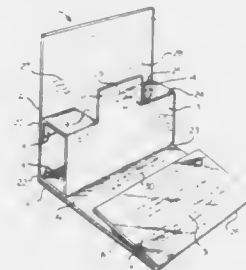
Filed Jun. 26, 1989, Ser. No. 371,628  
Int. Cl.<sup>5</sup> G09F 1/00

U.S. Cl. 40—124.1

3 Claims

1. A pop-up product comprising:
  - first and second sheets of material;
  - a first sheet folded along four crease lines to form five panels;
  - said first sheet comprising a first panel connected by a first crease line to a second panel connected by a second crease line to a third panel connected by a third crease line to a fourth panel connected by a fourth crease line to a fifth panel;
  - said fifth panel of said first sheet being attached to said first panel along a mutual area of attachment on each of said panels;
  - a quadrilateral defined by the edges of said second, third, and fourth panels and the edge of said first panel from said

first crease line to and including the area where the fifth panel is mutually attached to the first panel;  
a tongue formed by cutting out a section of the fourth panel; said tongue being attached to said first sheet at a junction between the third and fourth panels;



there being no crease line at said junction so that said tongue remains coplanar with the third panel;  
said second sheet being adhered to the first sheet along the second panel of said first sheet.

4,949,483

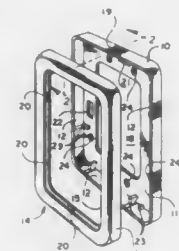
## ADJUSTABLE THICKNESS DISPLAY FRAME

William R. Dobson, 1673 Remington Rd., Atlanta, Ga. 30341, and Robert L. Browning, Atlanta, Ga., assignors to William R. Dobson, Atlanta, Ga.

Filed Nov. 14, 1988, Ser. No. 270,838  
Int. Cl.<sup>5</sup> A47G 1/06; G09F 1/12

U.S. Cl. 40—155

12 Claims



1. A display frame for framing an article so as to display one surface of the article, comprising:
  - a first frame member for receiving the article;
  - a second frame member for holding the article within the first frame member;
  - one of the frame members having an opening therein for exposing the one surface of the article;
  - one of the frame members having a peripheral wall and selectively adjustable means for laterally defining the position of the article within the frame member at a plurality of spaced distances apart from the peripheral wall, so as to centrally position articles of several different lateral dimensions relative to the opening;
  - the positioning means comprising a plurality of members associated with and extending radially inwardly from the peripheral wall;
  - a first one of said plurality of members having a first radial spacing from the peripheral wall and a second one of said plurality of members having a second radial spacing from the peripheral wall, so that the first and second members support the article in selectively different spaced relations to the peripheral wall; and
  - at least one of the first and second members including means for aiding selective removal of said one member from the peripheral wall so as to selectively accommodate an arti-

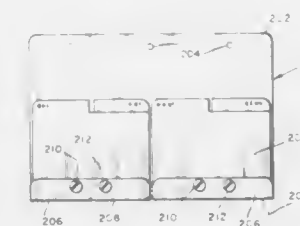
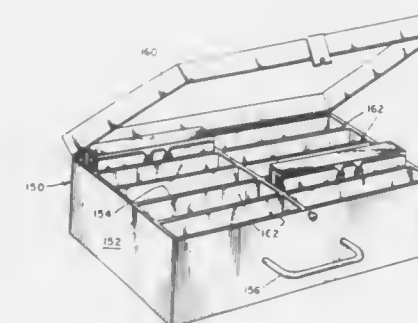
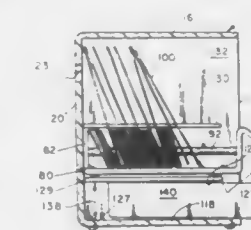
cle of greater dimension than the spacing provided by the one member.

4,949,484

## CARD HOLDING, CARRYING AND RETAINING SYSTEM AND SPECIALIZED HOUSING AND CARRYING MEMBER THEREFOR

Julie Finger, 725 - 1/4 N. Alfred St., Los Angeles, Calif. 90069  
Continuation of Ser. No. 109,770, Oct. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 29,735, Mar. 24, 1987, abandoned. This application Oct. 20, 1989, Ser. No. 424,593  
Int. Cl.<sup>5</sup> B42F 21/00; B65D 27/00  
U.S. Cl. 40—359

6 Claims



1. A card holding, carrying, retaining, and housing system comprising:

- a. a card holding means further comprising,
  - (i) a rectangularly shaped strip of material having a first edge and a second edge oppositely disposed to each other,
  - (ii) said strip of material having two sections, with a first section terminating in said first edge and a second section terminating in said second edge,
  - (iii) a self adhesive section located on one face of said first section, located adjacent said first edge, and protected by a removable section covering means when said card holding means is not in use to hold a card,
  - (iv) a first retaining means located in said second section, the first retaining means forming a slot having a wide portion located within the second section of said rectangularly shaped strip of material and a narrow portion extending from the wide portion and opening out of said second edge of said rectangularly shaped strip of material,
  - (v) a second retaining means located in said second section, the second retaining means forming a slot having a wide portion located within the second section of said rectangularly shaped strip of material and a narrow portion extend-

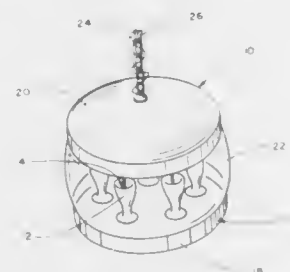
ing from the wide portion and opening out of said second edge of said rectangularly shaped strip of material, the second retaining means being spaced apart from and generally parallel to said first retaining means;

- b. a generally rectangular card carrying means further comprising,
  - (i) a front ledge,
  - (ii) a bottom attached to the front ledge along one edge,
  - (iii) a rear portion attached to the bottom along the opposite edge of the bottom,
  - (iv) a flexible cover attached to the opposite edge of the rear portion, which flexible cover can be opened to permit insertion of the card holding means,
  - (v) a pair of spaced apart generally parallel tracks whose longitudinal centerlines are spaced apart by approximately the same distance as the longitudinal centerlines of said first retaining means and said second retaining means of said card holding means, the tracks being supported by and between the front ledge and the rear portion of the generally rectangular card carrying case, and the tracks being accessible to insertion and removal of said first retaining means and said second retaining means;
- d. said first retaining means configured to be removably retained by one of said spaced apart generally parallel tracks of said card carrying means and said second retaining means configured to be simultaneously removably retained by the second of said spaced apart generally parallel tracks of said card carrying means, and further configured so that the first and second retaining means can be reattached on their respective tracks;
- e. a card retaining means further comprising,
  - (i) a rear wall and a front wall generally parallel to each other and each being generally perpendicular to a floor to thereby create a well between the rear wall and the front wall,
  - (ii) said front wall further including a handle member attached thereto,
  - (iii) a pair of spaced apart generally parallel tracks extending from said front wall to said rear wall within said well, the longitudinal centerlines of the tracks being spaced apart by approximately the same distance as the longitudinal centerlines of said first retaining means and said second retaining means of said card holding means;
- f. said first retaining means configured to be removably retained by one of said spaced apart generally parallel tracks of said card retaining means and said second retaining means configured to be simultaneously removably retained by the second of said spaced apart generally parallel tracks of said card retaining means;
- g. a housing means for movably retaining said card retaining means and associated card holding means therein, the housing means further comprising,
  - (i) an open faced chamber bounded by a pair of generally parallel and oppositely disposed side walls constituting a first side wall and a second side wall, a pair of generally parallel and oppositely disposed walls forming a top wall and a bottom wall, and a rear wall,
  - (ii) a first lower track attached to and running adjacent said first side wall and located within said chamber and a first upper track attached to and running adjacent said first side wall and located within said chamber and set at a distance above the first lower track,
  - (iii) a second lower track parallel to said first lower track and attached to and running adjacent said second side wall and located within said chamber and a second upper track parallel to said first upper track and attached to and running adjacent said second side wall and located within said chamber and set at a distance above the second lower track; and
- h. said card retaining means inserted into said chamber of said housing means through its open face such that said floor of the card retaining means slides on said first lower track and said second lower track and the upper portion of said rear wall of said card retaining means rests just below said first

upper track and said second upper track, and wherein said card retaining means and associated card holding means and cards are slidably received within said chamber;

i. whereby a card can be attached to said card holding means by removing said removable section covering means and bonding the card to the self adhesive section such that the card extends past said first edge of said strip but does not extend to the location of said first retaining means and said second retaining means, and the card holding section can be movably and removably inserted on said pair of tracks located in said generally rectangular card carrying means at any desired location in front of or behind any other multiplicity of card holding means and cards retained thereon already in place on the pair of tracks through said first retaining means and said second retaining means of said strip of material located on a respective one of the pair of tracks and can be carried in the card carrying means until the card holding means and associated card are brought to the card retaining means at which time the card holding means and associated card are removed from the card carrying means and thereafter movably and removably inserted on said pair of tracks located in said card retaining means at any desired location in front of or behind any other multiplicity of card holding means and cards retained thereon already in place on the pair of tracks through said first retaining means and said second retaining means of said card holding means, and said card retaining means is slidably balanced between the lower pair of tracks and the upper pair of tracks of said housing means in a manner whereby the cards are entirely within the chamber of said housing means.

**4,949,485**  
**CONTINUOUSLY FLOWING DISPLAY DEVICE HAVING A PLURALITY OF VISUAL EFFECTS**  
Samuel G. Garrett, 2141 Bluebell Ave., Greeley, Colo. 80631  
Filed Dec. 2, 1988, Ser. No. 279,066  
Int. Cl.<sup>5</sup> G09F 19/00  
U.S. Cl. 40—406 15 Claims



1. A display device for producing an illusion of a continuously flowing fluid comprising:  
a decorative receptacle;  
a fluid pump having an inlet and an outlet;  
a return fluid line having an inlet located in said decorative receptacle and an outlet connected to said fluid pump inlet and fluidically connecting said receptacle to said fluid pump inlet;  
a base support fixedly attached to said return fluid line adjacent to said return fluid line inlet, said base support being fixedly mounted to said decorative receptacle to suspend said decorative receptacle from said return fluid line and having a plurality of fluid passages defined therethrough through which fluid from said decorative receptacle passes as such fluid flows toward said return fluid line inlet;  
two supports fixed to said return fluid line at positions that are spaced apart from each other and from said base support, said two supports being fixed to said decorative receptacle to connect said decorative receptacle to said return fluid line via said two supports, each of said two

supports including a plurality of fluid passages defined therethrough;  
a fluid manifold means on said return fluid line, said fluid manifold means including  
a base and a cylindrical wall extending from said base, said base having a fluid passage defined there-through centrally thereof;  
a spider support mounted on said base adjacent to said base fluid passage and connected to said fluid return line and connecting said base to said return fluid line adjacent to said base fluid passage so that said base and said cylindrical wall surround said return fluid line, and  
a feed fluid opening defined through said cylindrical wall;  
a feed fluid line fluidically connected to said cylindrical wall feed fluid opening and to said pump outlet to direct fluid from said pump outlet to said fluid manifold means; and  
fluid directed to said fluid manifold means from said pump flowing along the outside of said return fluid line from said base centrally located fluid passage, and from said decorative receptacle back to said pump via said return fluid line.

**4,949,486**  
**DISPLAY UNIT COMPRISING SIMULATED FLYING OBJECT DRIVEN BY AUTOMATICALLY REVERSIBLE ELECTRIC MOTOR**  
Martin P. Belokin, and Paul Belokin, Jr., both of Denton, Tex., assignors to Martin Paul, Inc., Denton, Tex.  
Filed Feb. 3, 1989, Ser. No. 306,829  
Int. Cl.<sup>5</sup> A63H 13/20  
U.S. Cl. 40—414 26 Claims

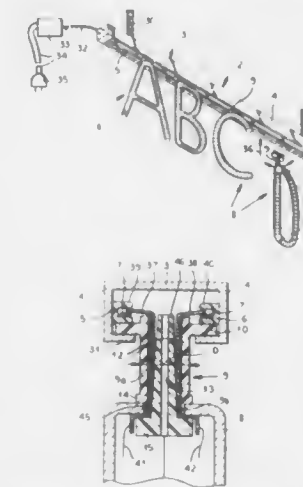


1. A display unit comprising:  
a support;  
a flying object;  
and means mounted on said support and connected to said flying object, said means being operable to effect reversible orbital movement of said flying object relative to said support; said means comprising:  
an electric motor comprising a stator and a rotor;  
and an elongated, small-diameter, flexible, resilient member secured between said rotor and said flying object;  
said motor being operable in response to a predetermined mechanical load imposed on said rotor resulting from a variation in the movement of said flying object to effect a reversal in the direction of rotation of said rotor and said flying object.

**4,949,487**  
**ILLUMINATED DISPLAY**  
Fadil Kibarer, Pont de l'Isere, Tain L'Hermitage, Drôme, France  
Filed Nov. 3, 1988, Ser. No. 266,726  
Int. Cl.<sup>5</sup> G09F 13/28  
U.S. Cl. 40—551 6 Claims

1. An illuminated display comprising:  
a U-section rail formed along internal walls thereof with respective electrical conductors;  
a plurality of different standard illuminable symbol elements each comprising electrically energizable lamp means; and

a respective connector terminal of each of said elements electrically connected to the respective lamp means, receivable in said rail and having a cross section corresponding to an interior section thereof for mechanically supporting selected ones of said elements on said rail and effecting electrical connection with said conductors whereby said conductors can energize the respective lamp means, each of said symbol elements comprising a tube of a light transmitting material and each of said lamp means comprises a multiplicity of small electric lamp ampules spaced along the tube, said tube reproducing the shape of a symbol to be displayed, each of said tubes being formed



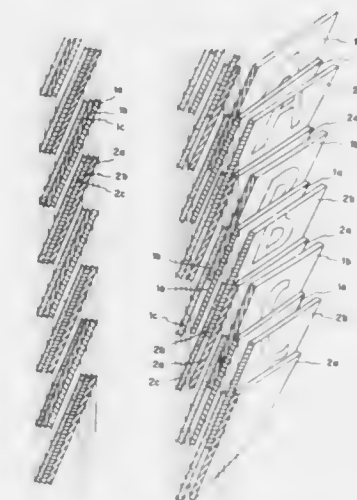
from a pair of half-shells of synthetic resin material, said half-shells being formed with mating pins and holes enabling assembly of said half-shells to form said tube, one of said half-shells being provided with blocks spaced therealong and provided with grooves for receiving electrical conductors connected to said lamp ampules, said half-shells being ultrasonically welded together, said half-shells being formed with recesses at one end of said tube adapted to form a square opening, each of said terminals having a cylindrical shank extended by a square part fitting in said opening, said shank being formed with a pair of wings adapted to engage in said rail and support the respective symbol element thereon.

**4,949,488**  
**CASSETTE AND AN APPURTENANT APPARATUS HAVING A SCREEN FOR CYCLICAL DISPLAYING OF A PLURALITY OF PICTURES**  
Jon Holk, 23 Vennemidevej, DK-2100 Copenhagen 0, Denmark  
Continuation of Ser. No. 904,766, Sep. 5, 1986, abandoned, which is a continuation of Ser. No. 530,582, Aug. 24, 1983, abandoned. This application Aug. 8, 1988, Ser. No. 231,587  
Claims priority, application Denmark, Jan. 15, 1982, 168/82  
Int. Cl.<sup>5</sup> G09F 7/00

U.S. Cl. 40—488 4 Claims  
1. A display apparatus for displaying a plurality of pictures, comprising:  
a front stack of at least three superimposed front sheets, each front sheet having opposite marginal portions, a plurality of vertically spaced horizontal cut lines extending between the marginal portions, and an upwardly enlarged opening at opposite ends of each cut line, said cut lines and openings dividing each front sheet into a plurality of vertically spaced front strips, the front strips being superimposed in the front stack of sheets in a first position of the display apparatus;  
a rear stack of at least three superimposed rear sheets, each rear sheet having opposite marginal portions, a plurality of vertically spaced horizontally cut lines extending between the marginal portions, and a downwardly enlarged

opening at opposite ends of each cut line, said cut lines and openings dividing each rear sheet into a plurality of vertically spaced rear strips, the rear strips being superimposed in the rear stack of sheets in the first position of the display apparatus;

said superimposed front strips being interleaved with said superimposed rear strips in the first position of the display apparatus so that lower horizontal portions of said front strips are covered by upper horizontal portions of said rear strips for displaying an upper horizontal portion of the front strips in an uppermost sheet of said front stack, and the upper horizontal portions of the rear strips in an uppermost sheet of said rear stack, in said first position of the display apparatus; and



each front sheet carrying at least segments of a different picture and each rear sheet carrying at least segments of a different picture, with segments of the same picture being carried by one sheet from each of said front and rear stacks, a sheet from each of said front and rear stacks which carry at least segments of the same picture and which are below said uppermost front and rear sheets, being moved upwardly to establish a second position of the display apparatus which displays the same picture, the front and rear sheets being moved upwardly by an amount so that upper horizontal portions of the strips of the moved front sheet cover the upper horizontal portions of the rear strips of the uppermost rear sheet and upper horizontal portions of the rear strips of the moved rear sheet cover the upper horizontal portions of the front strips of the uppermost front sheet.

**4,949,489**  
**EDGE-LIT MULTIPLE IMAGE DISPLAY DEVICE**  
Elliot A. Rudell, 6556 Sattes Dr., Rancho Palos Verdes, Calif. 90274, and Roger J. Gardner, 29641 S. Western Ave., Rancho Palos Verdes, Calif. 90732  
Continuation of Ser. No. 138,669, Dec. 28, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 378,087  
Int. Cl.<sup>5</sup> G09F 13/18

U.S. Cl. 40—546 20 Claims  
1. A children's and drawing toy for the sequential display of two or more temporary and removable images which comprises:  
a. a light source;  
b. at least two thin plates having opposite planar surfaces of an internally light-reflecting material secured together by attachment means, said plates being positioned in a superimposed, stacked array with at least one edge of each juxtapositioned to a respective edge of the other and



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adjacent to and coextensive with said light source, said attachment means permitting said plates to be moved out of said stacked array, exposing and providing access to the planar surface of each plate whereby images of light transmitting coatings may be applied and removed therefrom;

c. at least two images, each formed as a removable light transmitting coating having a sufficient density to cause



the loss of the internal light refraction of said plate and temporarily adhered onto one of the planar surfaces of a respective one of said plates; and

d. means to selectively and sequentially illuminate each of said juxtapositioned edges of said plates to thereby illuminate and selectively display said images sequentially, thereby providing a children's drawing toy for the creation and display of animated images.

**4,949,490**  
**REINFORCED PANEL DEVICE**  
Melvin M. Miller, Bloomington, Ind., assignor to Channel-Kor Systems, Inc., Bloomington, Ind.  
Filed Sep. 17, 1986, Ser. No. 908,229  
Int. Cl.<sup>5</sup> G09F 7/00  
U.S. Cl. 40—605 14 Claims



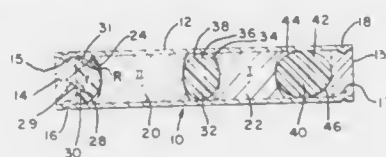
1. A reinforced panel device comprising a base having a plurality of panel sections which are pivotally connected to each other in a planar relationship, which are stabilized by a rectangular header which is detachably attached to the upper edge of the said base wherein said header is angularly disposed to the plane of said base and bridges at least one pivot joint of the base in order to prevent the pivoted movement of the panels of said base.

**4,949,491**  
**DIFFERENTIAL RECOIL DIFFUSER**  
William F. Broske, P.O. Box 621, Oriental, N.C. 28571  
Filed Apr. 25, 1989, Ser. No. 342,851  
Int. Cl.<sup>5</sup> F41C 27/22

U.S. Cl. 42—1.06 10 Claims

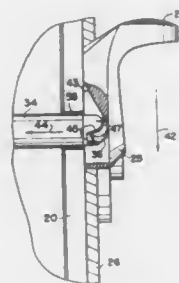
7. A spring system for accommodating axial impact forces including a pair of spaced apart weights, each said weight adapted to be displaced by impact force, said weights each having a concave end surface, a plastic element disposed between said weights having a convex surface adapted to fit within the profile of one of said weights surrounded by said convex surface, the shapes of the said concave and convex

surfaces being dimensioned to allow a space therebetween greater at the periphery than at the center axis of said element



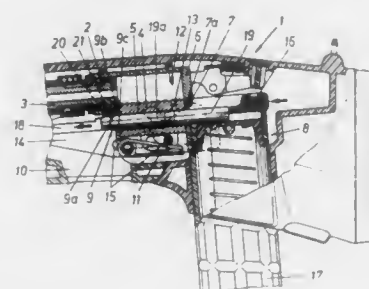
to provide a differential force displacement characteristic to said system upon impact displacement of said weights.

**4,949,492**  
**QUICK RELEASE MAGAZINE CATCH**  
Norman E. Clifton, Jr., Jacksonville, Fla., assignor to Prezine, Inc., Jacksonville, Fla.  
Filed Sep. 29, 1989, Ser. No. 414,284  
Int. Cl.<sup>5</sup> F41C 23/12  
U.S. Cl. 42—7 10 Claims



1. In an automatic pistol having a hollow hand grip portion to receive a magazine an improved quick release magazine catch mechanism comprising a pivotable thumb operated lever, a lever support plate, pivot pin means connecting said lever to said plate, a spring biased magazine catch slidably engaged with said hand grip portion and having a roller means engageable with an inclined plane on said lever to cause said catch to slide laterally when said lever is pivoted downwardly.

**4,949,493**  
**FIREARM**  
Ulrich Zedrosser, Steyr, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria  
Filed Sep. 7, 1989, Ser. No. 404,080  
Claims priority, application Austria, Sep. 23, 1988, 2351/88  
Int. Cl.<sup>5</sup> F41A 3/10  
U.S. Cl. 42—15 4 Claims



1. In a firearm comprising a receiver,

a barrel, which is fixed to said receiver and extends forwardly from said receiver in a longitudinal direction,

a firing block, which is fixed to said receiver and comprises a firing portion and a loading portion, which are offset from each other transversely to said longitudinal direction,

a hollow magazine holder, which is provided on said receiver at one end of said firing block,

a downwardly open ejection shaft, which is provided in said receiver at the other end of said firing block,

said firing block being formed in its loading portion with a loading opening, which communicates with the interior of said magazine holder,

said firing block being formed in its loading portion with an ejection opening, which is aligned with said loading opening in said longitudinal direction and communicates with said ejection shaft,

said firearm also comprising a chamber member, which has an inside surface portion that defines in said chamber member a chamber on the side that is remote from said firing portion, said chamber member being mounted in said firing block to be reciprocable between a firing position in said firing portion and a loading position in said loading portion, wherein said chamber is arranged to be freely accessible and to communicate through said loading opening with the interior of said magazine holder and through said ejection opening with said ejection shaft when said chamber member is in said loading position,

drive means are provided, which are operable to impart to said chamber member a movement from said loading position to said firing position,

said firearm also comprising a slider, which carries a feeder, which protrudes in said longitudinal direction toward said firing block and is aligned with said loading opening in said longitudinal direction, wherein said slider is mounted in said receiver to be reciprocable in said longitudinal direction to move said feeder past said magazine holder between a first end position, in which said feeder is disposed on that side of said magazine holder which is opposite to said firing block, and a second end position, in which said feeder extends into said loading opening,

the improvement residing in that

said firing block is provided in said loading portion with an edge portion which defines said ejection opening on the side thereof which is remote from said firing portion and has an inner edge and is provided with an ejecting nose that is spaced from said inner edge in said longitudinal direction and protrudes toward said firing portion and is arranged to terminate on the level of said inside surface portion when said chamber member is in said loading position,

said edge portion is formed between said nose and said inner edge with a deflecting surface, which is convexly curved from said inner edge to said nose, and

control means are provided for initiating said movement of said chamber member by said drive means from said loading position to said firing position in response to a movement of said slider in said longitudinal direction toward said second end position before said slider has arrived in said second end position.

**4,949,494**  
**REPEATING RUBBER BAND PISTOL**  
Donald B. Mims, 5665 Banks Rd., Fort Worth, Tex. 76140  
Filed Nov. 14, 1989, Ser. No. 436,440  
Int. Cl.<sup>5</sup> F41C 3/08

U.S. Cl. 42—54 3 Claims

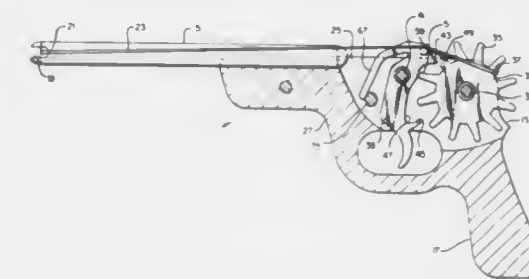
1. A repeating rubber band pistol, comprising:

a pistol frame having a barrel region attached to a handle region, the barrel region having a forward barrel notch for engaging one end of a rubber band, the handle region having an upwardly facing recess defined between opposing sidewalls;

a rotary magazine mounted on an axle extending transverse

to the opposing sidewalls of the upwardly facing recess, the rotary magazine having a central rotational axis and having a plurality of radially extending elongated arms disposed circumferentially about the central rotational axis on the magazine for engaging the opposite ends of a plurality of rubber bands which are stretched between the forward, band engaging region and selected ones of the radially extending arms in readiness for shooting;

a trigger element pivotally mounted in the frame recess for movement between a ready position and a firing position, the trigger element including first and second spaced cam regions formed on an interior surface of the trigger element, the spaced cam regions forming an arcuate gap on the interior surface of the trigger element, the gap being of a predetermined width, whereby only the first of the cam



regions is received between selected ones of the radially extending arms to prevent rotation of the magazine within the frame recess in the ready position and only the second of the cam regions is received between selected ones of the radially extending arms in the firing position;

a flexible leg having a proximate end integrally formed with the trigger element and having a distal end contactable with the frame interior for normally urging the trigger element toward the ready position; and

wherein the trigger element includes an exposed region which extends upwardly above the handle recess, the exposed region of the trigger element including a cross piece for supporting a portion of the length of a rubber band stretched between the barrel notch and the selected radially extending arm on the rotary magazine.

**4,949,495**  
**AUTOMATIC DEVICE FOR THE INTRODUCTION OF CARTRIDGES IN ARM MAGAZINES**  
Marco Mari, Via IV Novembre, 31, Paderno Ponchielli, Italy  
PCT No. PCT/IT86/00087, § 371 Date Mar. 28, 1988, § 102(e) Date Mar. 28, 1988, PCT Pub. No. WO88/01042, PCT Pub. Date Feb. 11, 1988  
PCT Filed Nov. 27, 1986, Ser. No. 193,653  
Claims priority, application Italy, Aug. 6, 1986, 48363 A/86  
Int. Cl.<sup>5</sup> F41A 9/83

U.S. Cl. 42—87 8 Claims

1. An automatic device for introducing cartridges into bifilar and monofilar magazines of automatic arms, comprising:

a plate having a cartridge-guide ledge;

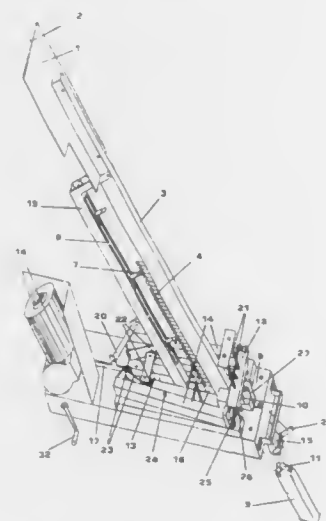
a vertical track having guides for guiding the cartridges down said track;

a vertical rod for facilitating sliding of the cartridges along said track;

an arm magazine, positioned near the bottom of said track, having a cavity for receiving the cartridges;

an interface and housing for holding said magazine;

a movable pin for downwardly pushing cartridges already contained in said magazine;  
a press for biasing said movable pin;



a piston for inserting the cartridges, in succession, into said magazine; and  
arms for lifting said press and said pin.

#### 4,949,496 GUN BRUSH

Gerard A. Stephan, 11 Oak Pl., Seldon, N.Y. 11784  
Filed Oct. 5, 1989, Ser. No. 417,481  
Int. Cl.<sup>5</sup> F41A 29/02

U.S. Cl. 42—90



1. In combination a brush and a clip receptacle of a gun, the clip receptacle having a cross-sectional shape, comprising:  
(a) a handle portion; and  
(b) a brush portion attached to said handle portion and having a cross sectional shape that matches the cross sectional shape of the clip receptacle of the gun so that said brush portion can easily enter the clip receptacle of the gun and readily clean the clip receptacle, said cross sectional shape of said brush portion having a rounded front and a flat back.

4,949,497

#### ICE FISHING DEVICE

James R. Lindell, 27125 Beverly Dr., Excelsior, Minn. 55331  
Continuation of Ser. No. 860,843, May 8, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 149,969

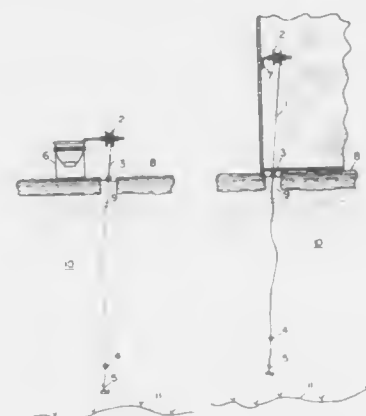
Int. Cl.<sup>5</sup> A01K 97/12

U.S. Cl. 43—17

5 Claims

1. An ice fishing device suitable for mounting on the vertical wall of an ice fishing house, said device comprising a wall bracket, a support rod and a rotatable spool, said spool having an opening defined therein, said support rod being L-shaped having an elongated portion and an integral short portion, said short portion being in parallel with said vertical wall, said short

portion being removeably mounted in said wall bracket, said elongated portion being received in the opening defined in said spool,  
said support rod including a cylindrical portion and said spool having an opening defined in the center thereof



approximating the diameter of said cylindrical portion, and  
a pair of elastic O-rings snugly disposed on said cylindrical portion whereby the location of said spool may be adjusted by movement of the location of said O-rings on said cylindrical portion.

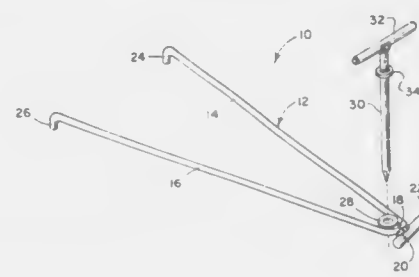
4,949,498

#### FISHING ROD HOLDER SUPPORT DEVICE

Alfred E. Cecchetti, 1623 Leishman Ave., Arnold, Pa. 15468  
Filed Mar. 27, 1989, Ser. No. 328,897  
Int. Cl.<sup>5</sup> A01K 97/10

U.S. Cl. 43—21.2

17 Claims



13. The system of a fishing rod holder and support apparatus therefore, said system comprising:  
a rod-like fishing rod holder having first and second end portions, said first end portion including means for receiving and holding a fishing rod above a relatively penetrable ground surface when said second end portion is inserted thereinto;  
base means for supporting said fishing rod holder on a relatively impenetrable frozen support surface, said base means comprising a plurality of spaced apart legs and means for joining said legs;  
means for affixing said base means to said support surface; a member having a bore therethrough for removably receiving said second end portion of said fishing rod holder; and means for attaching said member to said base means, whereby said rod-like fishing rod holder, normally possessing utility only when said second end portion thereof is inserted into said relatively penetrable ground surface, is adaptable for use on said relatively impenetrable frozen

support surface when said second end portion thereof is received in said member and said means for affixing affixes said base means to said support surface.

4,949,499

#### ANIMAL TRAP

Chester A. Lindros, Jr., 335 Woodruff Ave., Avenel, N.J. 07001  
Filed May 30, 1989, Ser. No. 359,639  
Int. Cl.<sup>5</sup> A01M 23/02

U.S. Cl. 43—61

6 Claims



1. An animal trap, comprising:  
(a) an outer housing having a closed end and an open end;  
(b) an inner housing having a closed end and an open end mounted within and movable relative to said outer housing to define a trapping area within said inner and outer housings;  
(c) at least one trap opening in said inner housing for an animal to enter said trapping area;  
(d) means for moving said inner housing into said outer housing to close off said trap opening to trap an animal in said trapping area; and  
(e) bait means for holding said trap opening in an open position so that when an animal in said trapping area eats said bait means, said moving means moves said inner housing into said outer housing to close off said trap opening to trap an animal in said trapping area.

4,949,500

#### INSECT OR VERMIN TRAP

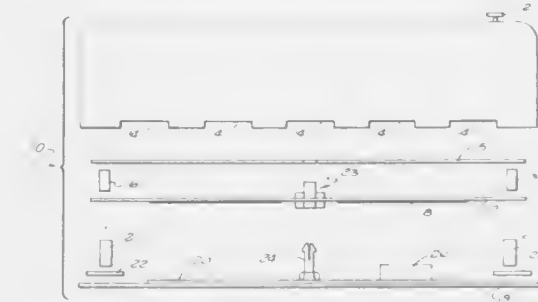
Gregory Jefferys, Queensland, Australia, assignor to Lawrence V. M. Stone, Chelmer and Robert C. J. Van Mourik, St. Lucia, both of, Australia  
PCT No. PCT/AU87/00046, § 371 Date Oct. 14, 1987, § 102(e)  
Date Oct. 14, 1987, PCT Pub. No. WO87/04901, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 19, 1987, Ser. No. 137,537

Claims priority, application Australia, Feb. 20, 1986, PH4707  
Int. Cl.<sup>5</sup> A01M 19/00

U.S. Cl. 43—98

14 Claims



1. A trap for exterminating insects such as cockroaches comprising: a main housing having a body portion and a removable cover; high voltage generating of sufficient magnitude for exterminating insects entering the trap; two electrodes

within the main housing coupled to said high voltage generating means; said electrodes being mounted on electronically non-conducting supports and arranged spaced from each other in separate planes and extending substantially along and across the housing in which they are located and covering an area providing numerous locations at which insects may be exterminated when the electrodes are supplied with the high voltage from said high voltage generating means; the support for one electrode forms said cover; at least one entry into the housing in which the electrodes are located to allow insects to enter between the electrodes at any time; and control means connected for providing controlled alternation between an off period for which the electrodes are not supplied with the high voltage and an on period for which the electrodes are supplied with the high voltage during which insects which bridge or substantially bridge the space between the electrodes are exterminated.

4,949,501

#### FLYING INSECT TRAP

Edward F. Larkin, 1169 Outlet Rd., Hallowell, Me. 04347  
Filed Oct. 3, 1989, Ser. No. 416,616  
Int. Cl.<sup>5</sup> A01M 1/00

U.S. Cl. 43—113

3 Claims



1. An insect trap of the type which employs light to attract flying insects comprising  
a light and tray-holding housing generally oblong in shape defined by bottom, upstanding side walls and a base member,  
said housing being open at the top and having its side walls provided with a pair of internal longitudinally extending mutually facing grooves,  
a mounting member hinged to said base member permitting said housing to swing approximately 180° from an open position wherein said housing is located substantially in the plane of said base member to another position wherein said members are folded against each other,  
an insect attracting light mounted within said housing, and  
a tray carrying insect trapping material on its surface removably carried in said grooves,  
whereby when said trap is mounted on a wall or the like the light and tray-holding housing may be swung between a light exposing position and light hiding position spaced from the wall surface, said tray being readily removable and replaceable for cleaning purposes.



4,949,502

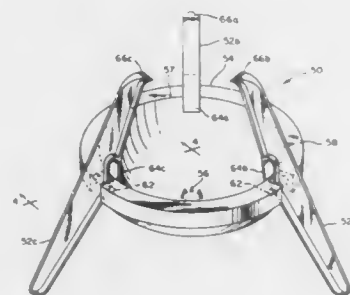
## CHRISTMAS TREE HOLDER

William E. Anderson, 4210 174th SE., Bothell, Wash. 98012  
Continuation-in-part of Ser. No. 216,958, Jul. 11, 1988, Pat. No. 4,894,949, which is a continuation-in-part of Ser. No. 470,389, Feb. 28, 1983, Pat. No. 4,796,382. This application Jul. 14, 1989, Ser. No. 379,812

Int. Cl.<sup>5</sup> A47G 7/02

U.S. Cl. 47—40.5

2 Claims



1. A tree holder comprising  
a. a container having a bottom and a rim, said rim having at least three openings therein, said rim also having an outer lip, said outer lip having a portion extending outwardly and a portion extending downwardly, said outer lip having at least three sets of slots therein;  
b. at least three legs, each leg having a top portion for contacting and supporting a tree, each leg having a bottom portion contacting the ground, each leg having pin means adapted to be received by one of said three sets of slots in said outer lip so as to allow rotation of said legs about a longitudinal axis running through said pin means whereby the weight of a tree placed within the top portions of said legs into said container and contacting the bottom of said container depresses said container to the ground and causes the top portions of said legs to contact and support the tree, and each leg having a protruding portion thereon;  
c. at least three leaf springs, each leaf spring having a top and a bottom, the bottom of said leaf springs being disposed in each of said openings in said rim, and the top of said leaf springs contacting the protruding portion of each leg for maintaining said container in a position above ground level prior to insertion of a tree therein.

4,949,503

## POROUS PRODUCT FOR CULTIVATION PLANTS AND A METHOD FOR MANUFACTURING SAME

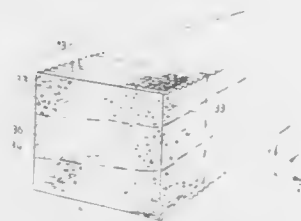
Christiaan Blok, Roermond, Netherlands, assignor to Rockwool Lapinus B.V., Melick-Herkenbosch, Netherlands  
Continuation of Ser. No. 145,480, Jan. 19, 1988, abandoned. This application Nov. 16, 1989, Ser. No. 438,934

Claims priority, application Netherlands, Jan. 27, 1987, 8700199

Int. Cl.<sup>5</sup> A01G 31/02

U.S. Cl. 47—64

12 Claims



1. Porous product for cultivating plants, comprising a matrix

of mineral fibres which can be moistened with water, characterized by material present in said porous product having a greater water retaining capacity than said mineral fibres which form said matrix and which can be moistened with water, said material being distributed throughout said matrix within the interstices among said mineral fibres which form said matrix.

4,949,504

## GUIDING DEVICE FOR SLIDING DOORS WHICH ARE RECIPROCALLY COPLANAR AT THE CLOSED POSITION THEREOF

Guido Bortoluzzi, Belluno, Italy, assignor to Molteni & C. S.p.A., Milan, Italy

Filed May 3, 1989, Ser. No. 346,935

Claims priority, application Italy, May 3, 1988, 45721 A/88  
Int. Cl.<sup>5</sup> E05D 15/20

U.S. Cl. 49—130

16 Claims



1. Guide structure in a piece of furniture comprising:  
a group of sliding doors including first and second doors alternately disposed as taken in a lateral direction and coplanar when in respective closed position thereof, each of said first and second doors having upper and lower ends;  
a first and a second group of guide members extending longitudinally in said lateral direction and disposed at a front portion of the piece of furniture at lower and upper parts of the piece of furniture,  
said first group of guide members supporting said first and second doors at the lower ends thereof, and said second group of guide members supporting said first and second doors at the upper ends thereof;  
respective rigid connecting elements connecting to each said first door, and sliding elements respectively supported on said rigid connecting elements and in sliding engagement with said first group of guide members,  
each said first door being slidably guided in said lateral direction by said first group of guide members via said rigid connecting elements and said sliding elements;  
respective articulate parallelogram linkages connected to each said second door, and sliding elements supported on said parallelogram linkages at joints thereof and in sliding engagement with said second group of guide members,  
each said second door being both slidably guided in said lateral direction by said second group of guide members and being forwardly shiftable, from the closed position thereof by an amount sufficient to allow a said first door adjacent thereto to be slid therebehind in the piece of furniture, via said articulate parallelogram linkages and the sliding elements supported thereon;  
longitudinal guide elements connected to the upper and lower ends of each of one of said first and second doors, each of said longitudinal guide elements terminating at inclined portions which are inclined in a horizontal plane with respect to said lateral direction; and  
sliding elements connected to the upper and lower ends of each of the other of said first and second doors adjacent said each of one of said first and second doors, and cooperating with said longitudinal guide elements by abutting said inclined portions when the doors connected thereto are slide laterally to forwardly shift each said second door forwardly from the closed position thereof;  
a third group of guide members adjacent and extending parallel to said first and said second groups of guide members, each of the guide members of said third group having a rectilinear portion and an arcuate portion projecting

4,949,506

## WINDOW CONSTRUCTION

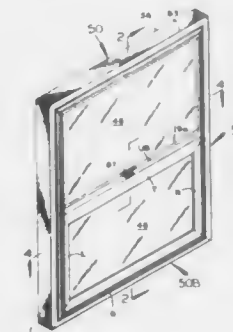
Robert C. Durham, Jr., Ft. Lauderdale, Fla., assignor to Chelsea Industries, Inc., Boston, Mass.

Filed Nov. 24, 1989, Ser. No. 440,866

Int. Cl.<sup>5</sup> E06B 3/00

U.S. Cl. 49—449

29 Claims



1. A window assembly comprising:  
a rectangular framework having four interconnected framework members, all having in common an identical extruded first cross-section;  
a sliding window having a window pane, four interconnected peripheral members respectively extending along the edges of said window pane, three of said peripheral members having in common an identical extruded second cross-section and the fourth peripheral member having said second cross-section plus an additional wall segment on the outside, and means for holding said pane against said peripheral members;  
said sliding window being slidably received in said framework with a pair of opposite peripheral members of said identical second cross section slidably interfitting lengthwise with a pair of opposite framework members to guide said sliding window for slidable movement in said framework;  
an additional peripheral member of the same cross-section as said fourth peripheral member extending perpendicularly between said pair of opposite framework members at a location spaced substantially from the remaining two framework members of said framework, said additional peripheral member forming part of said framework;  
a fixed window pane extending between and bounded by said pair of opposite framework members, said additional peripheral member and one of said remaining two framework members, and means for holding said fixed window pane against said opposite framework members, said additional peripheral member and said one of said remaining two framework members;  
said sliding window having a closed position in said framework in which its peripheral member along the opposite edge of the window pane from said fourth peripheral member extends contiguous to the other of said remaining two framework members and said fourth peripheral member extends contiguous to said additional peripheral member forming part of said framework, said sliding window being slidable along said framework from said closed position toward said one of said remaining two framework members;  
and lock means for locking said sliding window in said closed position.

4,949,505

## DOOR COORDINATOR

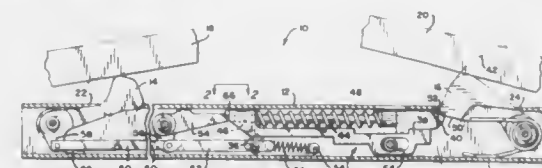
Richard B. Cohrs, Indianapolis, Ind., assignor to Von Duprin, Inc., Indianapolis, Ind.

Filed May 26, 1989, Ser. No. 357,228

Int. Cl.<sup>5</sup> E05C 7/05

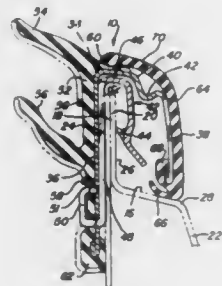
U.S. Cl. 49—367

8 Claims



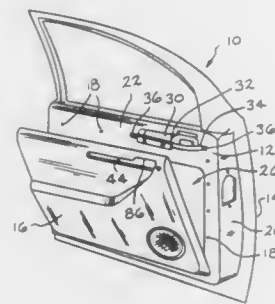
1. A door coordinator, comprising:  
a housing;  
a pair of limbs mounted to said housing, in spaced-apart locations, for movement thereof, relative to said housing, between passive and operative dispositions thereof, in which one of said limbs, when in said operative disposition thereof, holds a door open, and the other of said limbs, when in said operative disposition, is set for impingement by another door to cause said other limb to activate said door coordinator; and  
a carriage mounted to said housing for movement thereof, relative to said housing, between first and second positions; wherein  
said carriage has means engageable with one of said limbs of said pair, while said carriage is in its first position, for inhibiting movement of said one limb from its operative disposition to its passive disposition; and including means, mounted by attachment to said housing, for movement thereof, relative to said housing, between primary and secondary attitudes thereof, for (a) blocking said carriage and preventing its movement from said first position thereof to its second position, when said blocking means is in its primary attitude, and (b) unblocking said carriage, for carriage movement to its second position, when said blocking means is in its secondary attitude; means commonly joining said blocking means and the other limb of said pair for moving said blocking means from its primary attitude to its secondary attitude, coincident with movement of said other limb from its operative disposition to its passive disposition; said blocking means comprises an arm pivotable on said housing; said carriage comprises a frame slidable on said housing; and an end of said arm engages an end of said frame when said blocking means is in its primary attitude.

**4,949,507**  
**ONE-PIECE EXPANDABLE WEATHERSTRIP**  
 Robert A. Vaughan, Dearborn, Mich., assignor to The Standard Products Company, Cleveland, Ohio  
 Filed Jan. 18, 1990, Ser. No. 466,998  
 Int. Cl.<sup>5</sup> E06B 7/16  
 U.S. Cl. 49—482 16 Claims



1. A weatherstrip adapted to engage an end flange of a vehicle for sealing between a glass window and a vehicle surface, said flange having an inner surface and an outer surface, said weatherstrip being expandable in its width to accommodate adaptability to various contours and dimensions of said vehicle surface, said weatherstrip comprising:  
 an elongated core substrate including an inner flange portion for placement adjacent said end flange, an outer flange portion and an intermediate portion connecting said outer flange portion with said inner flange portion;  
 a means for securing said elongated core substrate to said end flange; and  
 a sealing lip member integral with said outer flange portion allowing sealing engagement between said outer flange and a window panel, said intermediate portion including a bend formed therein, said bend providing for adjustment of the width of said weatherstrip to accommodate varying final applications in a vehicle.

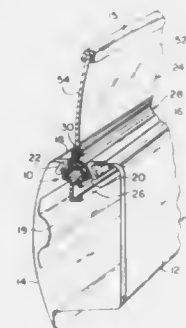
**4,949,508**  
**DOOR ASSEMBLY WITH PULL AND HANDLE CONCEALED BY DOOR TRIM PANEL**  
 Robert D. Elton, Ann Arbor, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.  
 Filed Feb. 1, 1990, Ser. No. 473,415  
 Int. Cl.<sup>5</sup> B60J 5/04  
 U.S. Cl. 49—502 12 Claims



1. A vehicle door assembly comprising:  
 an inner door frame structure;  
 means forming a door pull to which a vehicle occupant applies a force to move said door assembly from an open position to a closed position, said door pull means transferring the door closing force directly to said frame structure an interior door trim panel secured to said frame structure and covering said door pull means, said panel having an opening adjacent to said door pull means through which

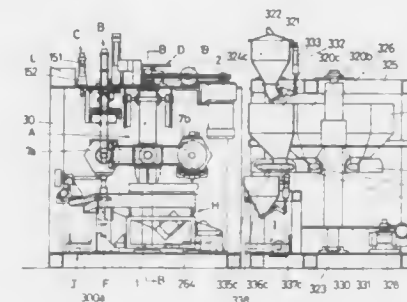
said occupant can reach to apply said force to said door pull means.

**4,949,509**  
**AUTOMOTIVE WINDOW MOUNTING ASSEMBLY**  
 Peter N. Gold, 465 N. Wood Ave., Rockville Centre, N.Y. 11570  
 Filed Jun. 12, 1989, Ser. No. 365,251  
 The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.  
 Int. Cl.<sup>5</sup> B60J 5/04  
 U.S. Cl. 49—502 7 Claims



1. A window panel mounting assembly for operatively coupling a window panel having a bottom edge to a mechanism for raising and lowering the window panel within a vehicle door of the type having a peripheral frame extending upwardly and inwardly toward the interior of the vehicle from a window sill line thereon to define a window opening, the peripheral frame adapted to support the top and side peripheral edges of the window panel when the window panel is in a fully raised position, said assembly comprising:  
 a sash element capable of being operatively coupled to the mechanism for raising and lowering the window;  
 an upwardly extending window panel engagement element fixedly attached to said sash element and extending upwardly therefrom, said window panel engagement element having a cam surface thereon having a predetermined width and including a pair of inwardly extending shoulders thereon;  
 a window panel receiving element having a first end thereof fixedly attached to an inner and outer side of the window panel along the bottom edge thereof, said receiving element having a resilient second end connected to said first end by a flexible connecting portion extending downwardly from the bottom edge of said window panel and said second end defining a receiving portion having leg portions spaced a predetermined distance apart to resiliently deflect outwardly upon engaging said cam surface of said upwardly extending window panel engagement element, said flexible connecting portion permitting inward deflection of said window panel toward the vehicle interior as the window panel is moved to the fully raised position;  
 cam means formed on said second ends of said opposed sides of said window panel receiving element for resiliently capturing said shoulder on said upwardly extending window panel engagement element.

**4,949,510**  
**FULL-AUTOMATIC MULTI-FUNCTION BARREL FINISHING MACHINE**  
 Hisamine Kobayashi, and Katsuhiro Izuhara, both of Nagoya, Japan, assignors to Tipton Manufacturing Corporation, Nagoya, Japan  
 Filed Dec. 2, 1988, Ser. No. 279,103  
 Claims priority, application Japan, Dec. 28, 1987, 62-332150  
 Int. Cl.<sup>5</sup> B24B 31/037  
 U.S. Cl. 51—165.72 4 Claims



1. A full automatic multi-function workpiece finishing machine that enables different types of operations to be performed singly or in combination of selected operations that best meet the requirements for a particular type of workpiece to be finished, said machine comprising:  
 a machine frame;  
 a main spindle across said machine frame;  
 a turret means rotatably supported on said main spindle;  
 a plurality of barrel containers each having a lid and mounted on said turret means and each having a shaft on which the corresponding barrel container is rotatably supported, each of said shafts being mounted substantially perpendicular to said main spindle;  
 first driving means for rotating said turret means and connected to said main spindle, said first driving means including means for controlling the speed of rotation of said turret means at any number of revolutions per minute according to a desired finishing mode;  
 second driving means for rotating said plurality of barrel containers and connected to the respective ones of said plurality of barrel containers, said second driving means including means for controlling the speed of rotation of said barrel containers so as to be the same as or different from the number of revolutions per minute of said main spindle;  
 means for handling a lid of a barrel positioned adjacent said turret means and including lid handling drive means for driving said lid handling means;  
 a lid cleaning unit adjacent said lid handling means and including cleaning unit drive means for driving said lid cleaning unit;  
 a finishing compound supply and compound/water draining unit adjacent said turret means and including unit drive means for driving said unit for supplying a finishing compound to said barrel containers and draining compound and water from said barrel containers;  
 separator means below said barrel containers for receiving a mixture of abrasive media and workpieces and separator drive means for driving said separator means for separating finished workpieces from abrasive media;  
 means for supplying batches of workpieces to be finished to said barrel containers and including drive means therefor;  
 abrasive media tanks;  
 abrasive media supply means including drive means and for selectively receiving controlled amounts of different types of abrasive media from said abrasive media tanks and delivering abrasive media to said barrel containers;  
 a transfer means for transferring abrasive media separated in

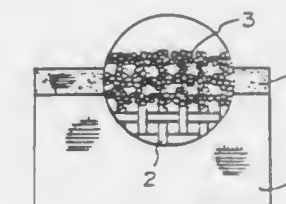
said mass separator means to said abrasive media tanks and including transfer drive means;  
 a computer controlled sequence controller connected to the respective controlling means of said first and second driving means and to the respective lid cleaning unit drive means for operating said first and second driving means and said lid cleaning unit drive means separately or in respective combinations of the different types of operations thereof with a particular type of abrasive media, each single operation or combination meeting the particular requirements of a particular workpiece to be finished and each single operation or combination of the different types of operations being identified by a unique code number and previously defined and stored in the computer; and  
 means for associating said unique code numbers with respective batches of workpieces to be finished and for identifying said unique code numbers and means for supplying said code numbers to the computer for causing said sequence controller to perform the particular operation or sequence of operations for that code number.

**4,949,511**  
**SUPER ABRASIVE GRINDING TOOL ELEMENT AND GRINDING TOOL**

Yukio Endo, Yokohama; Kazuyuki Mitani, Tokyo; Tadashi Matsuoka, Kodaira; Masayoshi Ueki, Abiko, and Norio Otake, Tokyo, all of Japan, assignors to Toshiba Tungaloy Co., Ltd.; Koya-Sha Co., Ltd. and Science and Creative Co., Ltd., Japan  
 PCT No. PCT/JP87/00084, § 371 Date Oct. 9, 1987, § 102(e) Date Oct. 9, 1987, PCT Pub. No. WO87/04652, PCT Pub. Date Aug. 13, 1987  
 Continuation of Ser. No. 124,840, Oct. 9, 1987, abandoned. This PCT application Feb. 10, 1987, Ser. No. 334,803  
 Int. Cl.<sup>5</sup> B24B 1/00

U.S. Cl. 51—295

3 Claims

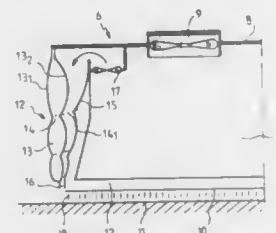


1. A super abrasive grinding tool comprising a plurality of integrally laminated grinding elements, each of said grinding elements comprising:  
 a mesh base, said mesh base being formed of threads composed of organic or synthetic organic fibers, said threads being spaced 0.4–1.5 mm apart from each other to form openings in said mesh base, said mesh base having a mesh density of 10–30 mesh; and  
 a super-abrasive grain fixing portion, said super-abrasive grain fixing portion including super-abrasive grains such as diamond or cubic boron nitride, said super-abrasive grain fixing portion further including a resin adhesive, said super-abrasive grain fixing portion being bonded together and fixed to at least a part of said mesh base such that said threads are wrapped with said super-abrasive grains, wherein the area of said openings blocked by said super-abrasive grain fixing portion is less than 75%, and wherein said openings permit cuttings and air to pass therethrough.



**4,949,512**  
**CAGE FOR RECONDITIONING BUILDING FACADES**  
Gabrielle Thomann, 123bis, boulevard Exelmans, 75016 Paris, France

Filed Nov. 1, 1988, Ser. No. 265,743  
Claims priority, application France, Nov. 3, 1987, 87 15213  
Int. Cl.<sup>5</sup> B24C 9/00  
U.S. Cl. 51—426 9 Claims

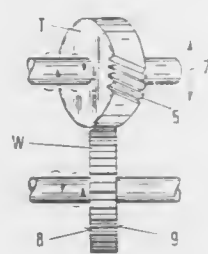


4. A cage for the reconditioning of building facades comprising a floor within said cage upon which persons may stand, a bottom wall below said floor, an upper wall above said floor, and side walls interconnecting said bottom wall and said upper wall to form a partially enclosed region in which persons standing on said floor may be located, said walls defining an open front of said cage that is intended to be disposed closely adjacent to a facade to be reconditioned, each of said walls including an air flow slot that is oriented toward said facade, and an air blower communicating with said slots for producing an air jet that emerges from said slots toward said facade in a direction substantially perpendicular to said facade to form an air curtain adjacent the open front of said cage in surrounding relation to the front end of said partially enclosed region.

**4,949,513**  
**METHOD FOR THE PRECISION MACHINING OF PARTICULARLY HARDENED GEARS AND A TOOL SUITED THEREFOR**

Udo Schapp, Wessling, and Josef Lohrer, Munich, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany  
Filed Sep. 22, 1988, Ser. No. 247,875  
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734653

Int. Cl.<sup>5</sup> B24B 19/00, 27/00  
U.S. Cl. 51—287 2 Claims

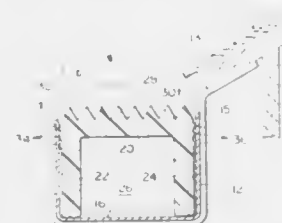


1. A method for working tooth flanks of a hardened workpiece gear using a gear-shaped tool (T) having an abrasive surface on its tooth flanks, wherein the surface is free of geometrically defined cutting edges, moving said workpiece gear and said tool relative to each other in rolling contact and in mesh at a crossed-axes angle, wherein between said workpiece gear and said tool there is carried out a relative feed movement in a plane parallel to the axes of said workpiece gear and said tool at an angle ( $\epsilon$ ) with respect to the workpiece gear axis, said feed movement being carried out at an angle  $\epsilon > 0^\circ$  (diagonal feed), and wherein said tool is verified as having a width  $b_T$  which satisfies the following relationship:

$$b_T \geq b_w \left[ 2 \cdot \cos \phi - \frac{\sin \epsilon}{\sin (\epsilon + \phi)} \right]$$

with  $b_w$  representing the width of said workpiece gear which is to be machined, with  $\phi$  identifying the crossed-axes angle between said tool axis and said workpiece gear axis and  $\epsilon$  identifying the angle between the workpiece axis and the feed direction of said tool relative to said workpiece gear.

**4,949,514**  
**RAIN GUTTER LINER**  
Kip D. Weller, 121 Skunk Misery Rd., Higganum, Conn. 06441  
Filed Dec. 1, 1989, Ser. No. 444,290  
Int. Cl.<sup>5</sup> E04D 13/00  
U.S. Cl. 52—12 20 Claims

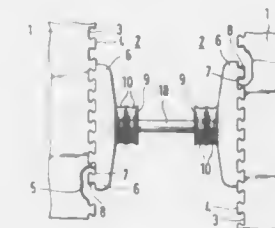


1. A liner adapted for installation in a rain gutter having an open upper inlet comprising:  
an elongated integral body of porous solid material dimensioned for positioning within a rain gutter, said body comprising an upper barrier surface and a pair of opposing side portions, and defining a generally longitudinally extending, liquid passageway disposed below said barrier surface;  
a plurality of undulations traversing said barrier surface; and  
sealing means comprising a longitudinally extending structure projecting from said side portions for sealing said body with said gutter,  
so that when a run off stream comprising liquid and solid debris components impinges said upper barrier surface from a generally upward location, the liquid component traverses through the body for flow through said passageway and the barrier surface functions as a barrier to passage of the debris components.

**4,949,515**  
**FASTENING ELEMENT FOR THE CLADDING CONCRETE METHOD OF CONSTRUCTION**  
Edmond D. Krecke, P.O. Box 33, 6315 Beaufort, Luxembourg  
PCT No. PCT/EP87/00021, § 371 Date Sep. 21, 1987, § 102(e)  
Date Sep. 21, 1987, PCT Pub. No. WO87/04478, PCT Pub. Date Jul. 30, 1987  
PCT Filed Jan. 17, 1987, Ser. No. 116,075  
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1986, 3601878  
The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> E04B 1/02 13 Claims

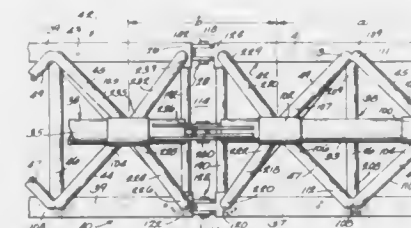
1. A fastening element for use in forming concrete wall structure within sheathing components wherein said sheathing components and the fastening elements comprise mutually interlocking members for fixedly joining the fastening elements to said components, said fastening element being formed of concrete and comprising a plate-like member having on one side thereof a surface configuration adapted to form an interlocking contact with a corresponding facing surface configura-

tion on a sheathing component, said fastening element having a shank on a second side thereof,



fastening means fixed to said shank and adapted to interconnect one sheathing component to a second sheathing component for fixing said components relative to each other to receive concrete between said components.

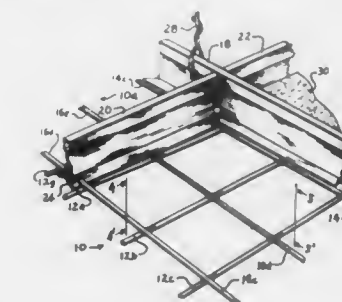
**4,949,516**  
**CRANE TRUSS CONNECTING JOINT**  
Herbert D. Long, Jr., West Allis, Wis., assignor to Harnischfeger Corporation, Brookfield, Wis.  
Filed Dec. 9, 1988, Ser. No. 281,770  
Int. Cl.<sup>5</sup> E04H 12/18  
U.S. Cl. 52—645 11 Claims



1. A splice joint for connecting together the ends of two beams each having a length and an I-shaped cross-section including first and second spaced apart flanges and a web integral with and positioned between the flanges, comprising:  
a female ear projecting from the end of one of the beams and including a female pair of spaced apart plates each affixed to the first and second flanges of the one of the beams, the female plates being positioned parallel to each other and parallel to the web of the one beam;  
a male ear projecting from an end of the other of the beams and having a width transverse to the direction of its projection, the ear including a male pair of spaced apart plates each affixed to the first and second flanges of the other of the beams, the male plates being positioned parallel to each other and parallel to the web of the other beam, the male ear also including a portion of each of the first and second flanges of the other of the beams spanning the space between and affixed to the male plates;  
the spacing of the male plates, including the portions of first and second flanges, being such that the male ear is narrower in its width direction than the spacing distance between the female plates and is positionable between the female plates; and  
connecting means engageable with the female and male ears for connecting the two beams together.

**4,949,517**  
**WIRE GRID SUBCEILING PANEL**  
Jacob H. Blitzler, 400 S. Saltair, Los Angeles, Calif. 90049, and Richard M. O'Toole, 4495 Huntley Ave., Culver City, Calif. 90230

Filed Dec. 27, 1989, Ser. No. 457,845  
Int. Cl.<sup>5</sup> E04C 2/00; E04B 9/00; E08B 1/00  
U.S. Cl. 52—644 8 Claims



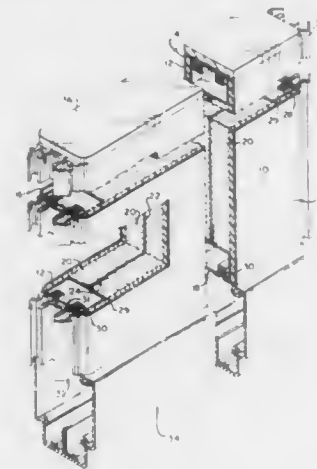
8. A wire grid rectangular panel for use in multiples as panel members of a suspended subceiling of the type in which panel members are supported by a framework of inverted T-bar rails defining an array of like rectangular cell openings, the panel comprising:  
a first array of adjacent parallel elongated cylindrical rods disposed in a first horizontal layer;  
a second array of adjacent elongated cylindrical rods, non-parallel to the rods in the first array, disposed in a second layer immediately beneath said first layer, and attached thereto; and  
a pair of elongated cylindrical end rods in the second layer, parallel to said rods in the first layer, disposed transversely and attached, one across each end of said second array; the rods in the first array being dimensioned in length to extend beyond two opposed edges of said second array and thus provide support for said panel on upper surfaces of flanges of the T-bar rail such that said end rods and an outermost pair of rods in said second array are caused to define a rod perimeter fitted within said cell openings, immediately adjacent to support rail flanges at all four edges thereof.

**4,949,518**  
**SPACE-DIVIDING WALL PANEL**  
Russell A. Nagel, Ada, and Paul R. Walker, Hudsonville, both of Mich., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 6, 1986, Ser. No. 872,053  
Int. Cl.<sup>5</sup> E04H 5/00 11 Claims

1. A space-dividing wall panel for use in open office space-dividing wall panel systems, said wall panel comprising:  
a rectangular outer frame defining the top, bottom and side edges of said panel;  
a foamed in-place gypsum foam filler filling the space sur-

rounded by said outer frame and constituting a panel core having planar lateral surfaces; and



a decorative fabric cover covering said planar surfaces of said core and secured to said frame.

4,949,519

# FASTENER ARRANGEMENT FOR SECURING AN EDGE CAP TO AN UPSTANDING WALL PANEL

Robert E. Jeffers, Ada, Mich., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1989, Ser. No. 313,559

Int. Cl.<sup>5</sup> E04B 2/74

U.S. Cl. 52—239

11 Claims



1. In a space dividing wall panel system which includes a first upstanding wall panel having first and second flat major opposed sides bounded by outer edges, the improvement comprising:

an elongated non-metallic edge cap having a channel-shaped cross-sectional configuration including a bight and first and second spaced, depending leg portions having inner surfaces oriented perpendicular to the bight, and a predetermined dimension between said inner surfaces, and fastener means for securing said edge cap to a predetermined outer edge of the first wall panel, said predetermined outer edge including a pair of spaced longitudinally extending grooves, said fastener means including a plurality of metallic spring clips, and means for attaching said spring clips to the predetermined outer edge of the first wall panel, each of said spring clips including a flat base portion having

first and second sides which are disposed adjacent to the first and second major opposed sides, respectively, of the first wall panel, and first and second ends,

said first and second ends of the base portion of each spring clip including a pair of depending orienting tabs which enter the pair of spaced longitudinally extending grooves in said predetermined outer edge,

said first and second sides terminating in first and second upstanding, inwardly converging leg portions, respectively, which terminate in outwardly extending flanges which angle downwardly from a plane disposed parallel to the flat base portion,

said flanges defining a plurality of spaced teeth, with an outer dimension of each spring clip measured between the teeth defined by the flanges being greater than the predetermined dimension between the depending leg portions of the edge cap,

whereby the upstanding leg portions of each spring clip are flexed inwardly by the depending leg portions of the edge cap, with the teeth biting into the inner surfaces of the depending leg portions of the edge cap, to resist dis-assembly of the edge cap from the predetermined outer edge of the first wall panel.

4,949,520

# MODULAR COMPONENTIAL SYSTEM FOR ASSEMBLING VARIOUS BUILDING INTERIOR FACADE STRUCTURES

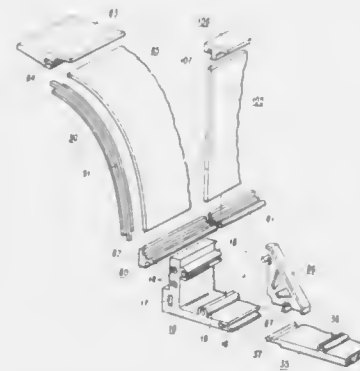
Richard W. Bear, 510 Merrybrook Ct., Clemmons, N.C. 27012

Filed May 9, 1989, Ser. No. 351,457

Int. Cl.<sup>5</sup> E04D 1/36; E04C 1/39

U.S. Cl. 52—288

14 Claims



1. A modular componential system for assembling various building interior facade structures, the system comprising:

- at least one elongated base member of generally "L-shaped" configuration in cross-section and extruded in its longitudinal direction from plastic material, the legs of the "L" having a pair of first and second outer faces and a corresponding pair of first and second inner faces, the outer faces of the legs abutting each other at a right angle;
- at least one elongated vertical panel of generally rectangular shape having outer and inner faces and extruding in its longitudinal direction from plastic material;
- first cooperating means at the exterior face of one of the legs of the base member and adjacent one of the longitudinal edges of the vertical panel for snappingly engaging the vertical panel with the base member in order to join one to the other, the first cooperating means being respectively integrally extruded with the base member and the vertical panel and extending the lengths thereof;
- at least one elongated panel brace member molded from plastic material and having opposite longitudinal edges; and
- second cooperating means disposed on the interior face of the vertical panel and on one longitudinal edge of the

panel brace member for snappingly engaging the panel brace member with the inner face of the vertical panel such that the panel brace member extends transversely of and is joined to the vertical panel, said second means on the vertical panel extending the length thereof, being integrally extruded therewith and comprising a plurality of means uniformly spaced apart transversely of the vertical panel, said second means on the panel brace member extending transversely thereof, being molded integrally therewith and comprising a plurality of uniformly spaced apart means effective to engage as aforesaid said second means on the vertical panel.

4,949,521

# FRAME AND MUNTIN ASSEMBLY

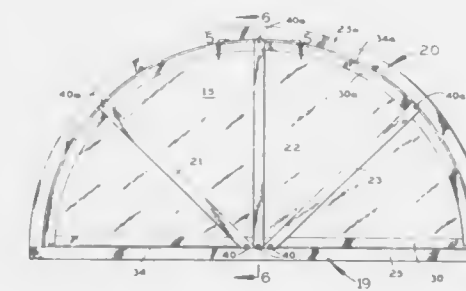
Harry M. Riegelman, and Steven P. Davis, both of c/o Dade Metals Corp. 200 NW. 22nd St., Miami, Fla. 33127-4811

Filed Apr. 3, 1989, Ser. No. 333,550

Int. Cl.<sup>5</sup> E06B 3/70

U.S. Cl. 52—456

22 Claims



1. A panel assembly for use on a building structure comprising:

- a relatively thin panel having opposite first and second major faces;
- a frame extending around said panel along its periphery and including substantially rigid frame members, each having an exposed surface located outside the periphery of said panel and offset from said first major face of said panel on the side of said first major face away from said second major face of said panel, and each of said frame members having a narrow blind groove which is open along said frame member next to said exposed surface and is elongated along the periphery of the panel, said groove being located outside the periphery of the panel and extending into the respective frame member transverse to said first major face of said panel;
- a plurality of separate, disconnected muntins extending across said first major face of said panel and fasteners received in said grooves and attaching said muntins directly to said frame members.

4,949,522

# ROOFING TILE

Shigeru Harada, Aichi, Japan, assignor to Kabushiki Kaisha Cosmic, Aichi, Japan

Filed Nov. 1, 1988, Ser. No. 265,486

Int. Cl.<sup>5</sup> E04D 1/30, 1/24

U.S. Cl. 52—533

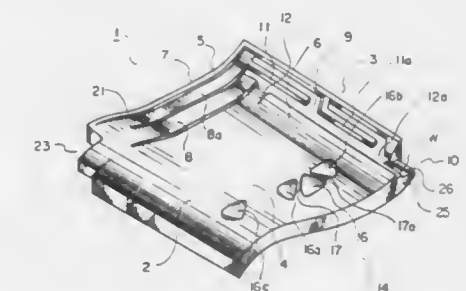
5 Claims

- A roofing tile, comprising:
  - a platelike but sinuous body including a continuously smoothly rounded, upwardly concave and downwardly convex valley part, and a continuously smoothly rounded, upwardly convex and downwardly concave ridge part, said valley part and said ridge part being respectively located on a valley side and a ridge side of said sinuous body, said sinuous body terminating in a ridge side edge on said ridge side thereof and in a valley side edge on said valley side thereof, said valley part and said ridge part

adjoining one another substantially centrally between said valley side edge and said ridge side edge of said sinuous body;

a support part projecting downwardly from a bottom surface of said valley part and terminating at a downwardly facing bonding surface adapted for engagement against and adhesive bonding directly to a roof, said support part being located near a first end of said sinuous body between said ridge side edge and said valley side edge;

a sidewardly extending wall upstanding from a top surface of said sinuous body at said first end thereof, and a sidewardly extending groove formed in said bottom surface of said valley part adjacent a second end of said sinuous body opposite said first end, said groove being adapted to receive said sidewardly extending wall of another said roofing tile for adhesive bonding of said wall therein; and said sinuous body including means for defining a downwardly facing engagement surface spaced slightly inwardly from both said ridge side edge and said first end, and means for defining an upwardly facing engagement



surface spaced slightly inwardly from said valley side edge and adjoining said second end, said means for defining said engagement surfaces including notches formed in said sinuous body where said first end meet said ridge side edge and where said second end meets said valley side edge, said upwardly facing engagement surface being adapted for engagement with and adhesive bonding to said downwardly facing engagement surface of another said roofing tile, and said sinuous body including a plurality of projections formed on said top surface of said valley part near said second end, said projections each having a first wall which faces and inclines downwardly toward said second end, an adjacent pair of said projections having respective second walls which face each other and define a substantially funnel-shaped gap therebetween which gradually widens as it extends generally in a direction from said first end to said second end of said sinuous body.

4,949,523

# NON-PENETRATING ELASTOMERIC MEMBRANE ANCHORING SYSTEM

Gary M. Kassem, Margaret and McKee Sts., McKee Rocks, Pa. 15136

Continuation-in-part of Ser. No. 172,762, Mar. 28, 1988, Pat. No. 4,858,412. This application Jun. 15, 1989, Ser. No. 366,500

The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E04D 5/14

U.S. Cl. 52—713

15 Claims

1. An anchoring system for fastening an elastomeric membrane to the upper surface of a roof without puncturing the membrane, comprising:

- a rigid anchoring plate having a top planar surface having outside edges and a pair of spaced-apart raised sidewalls



4,949,524

## FLANGE FINISHER WITH WEATHERSTRIP

Richard D. Martin, and Roger D. Smith, both of Stratford, Canada, assignors to The Standard Products Company, Cleveland, Ohio

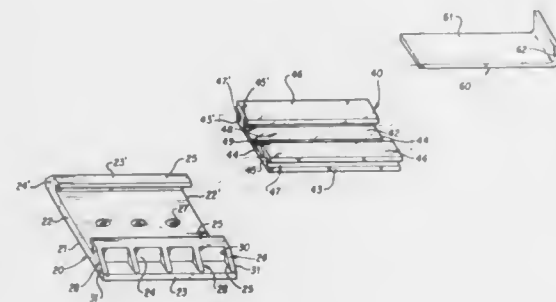
Continuation of Ser. No. 98,006, Sep. 16, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 304,872  
Int. Cl.<sup>5</sup> E04C 2/38

U.S. Cl. 52—716

5 Claims

having a top outside edge on said top planar surface over which an elastomeric membrane may be laid, said sidewalls each having a retaining lip extending inwardly from said sidewalls over, and substantially parallel to, said top planar surface for aiding in the retention of a spacing insert, and at least one aperture disposed within said top planar surface for facilitating the securing of said anchoring plate to said upper surface of a roof;

(b) a hinged spacing insert having a planar top and bottom surface with outer edges arranged to be inserted within said anchoring plate; a pair of spaced-apart, raised flanges having interior and exterior faces disposed parallel to each other and positioned on said top surface near, but not at, the outer edges of the top surface of said spacing insert, said flanges on said top surface thereby dividing said top surface into three regions that consist of an interior region between said flanges, and two exterior regions outside of each of said flanges; said flanges each having a retaining lip extending over and substantially parallel to said top surface, both inwardly and outwardly from said flanges, the inwardly extending portions of said lips, along with said interior faces of said flanges and said interior region of said top surface of said spacing insert, thereby defining a substantially rectangular-shaped cavity into which an insert wedge may be slid to aid in securely interlocking



1. A flange finisher having a pair of side walls joined by a web to form a U-shaped channel, a plurality of relatively short ribs extending into said channel from one of said pair of side walls, sealing means having a hook configuration extending from one of said side walls such that said sealing means extends above said U-shaped channel and said hook end is adapted to contact and seal a member received in said U-shaped channel, a second sealing means in said U-shaped channel, said second sealing means comprised of a sponge rubber member having a pair of lateral ends spanning said web such that said lateral ends are joined at the junction of said side wall and web so that a cavity is formed between said member and said web, said sponge rubber member adapted to seal with said flange and a relatively long foot with a plurality of ridges thereon extending into said channel from the other of said pair of side walls.

4,949,525

## ROTATABLE, FLEXIBLE FLAGPOLE ARRANGEMENT

John H. Weaver, 207 Hawkins Dr., Brainerd, Minn. 56401

Filed Mar. 21, 1989, Ser. No. 326,280

Int. Cl.<sup>5</sup> E04C 3/30

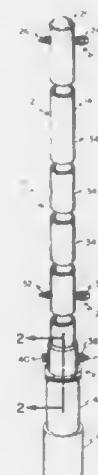
U.S. Cl. 52—720

12 Claims

said anchoring system; the outwardly extending portions of said lips, along with said exterior faces of said flanges and said exterior regions of said top surface of said spacing insert thereby defining a pair of C-shaped notches for snappingly engaging the retaining lips of said anchoring plate after said elastomeric membrane has been laid over said anchoring plate; and, hinging means disposed within said top and bottom planar surfaces of said spacing insert parallel to, and equidistant from, said flanges, said hinging means thereby forming a line of flexure along which said insert is thereby divided into two mirror-symmetrical halves;

(c) an insert wedge having a planar top and bottom surface and a raised lip disposed along one edge of said wedge perpendicular to said top and bottom surfaces for grasping and thereby facilitating the insertion of said wedge within said substantially rectangular-shaped cavity within said hinged spacing insert; and,

(d) fastening means for securely attaching said anchoring plate to said upper surface of a roof, including an elongated threaded member, said elongated threaded member partially disposed through and affixed to one of said apertures normal to said anchor plate, said elongated threaded member consisting of a shank having a head and oppositely disposed leading end, screw threads disposed only on said leading end and adjacent said head.



1. A rotatable flagpole arrangement of the type which is adapted to be supported in a vertically extending pipe shaped socket which has an upper surface, comprising:

an elongate pole;  
means on said pole which is adapted for retaining a flag or like banner;

means on said pole for defining a stop surface, said stop surface extending radially with respect to said pole and facing in a direction away from said retaining means;

a first bearing washer having a maximum radial dimension and a maximum axial dimension, said maximum radial dimension being greater than said maximum axial dimension, a central opening for receiving said pole, a top surface which contacts said stop surface, and a bottom surface; and

a second bearing washer having a maximum radial dimension and a maximum axial dimension, said maximum radial dimension being greater than said maximum axial dimension, a central opening for receiving said pole, a top surface which contacts said bottom surface of said first bearing washer and a bottom surface which is adapted to be supported by the upper surface of the pipe shaped socket, whereby an inexpensive rotatable flagpole arrangement is provided which is responsive to the direction of a wind.

4,949,526

## LID DISPENSER FOR AN AUTOMATED DRINKMAKER SYSTEM

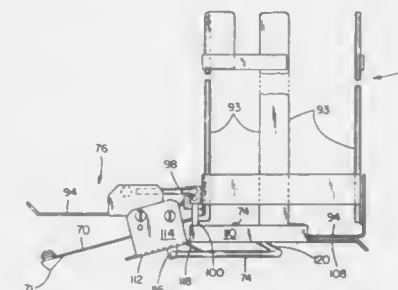
Salvatore J. Brogna, Southbury; George E. Riehm, New Fairfield, both of Conn., and Burt Shulman, Poughkeepsie, N.Y., assignors to PepsiCo Inc., Purchase, N.Y.

Filed May 18, 1989, Ser. No. 353,881

Int. Cl.<sup>5</sup> B67B 3/22; B65B 7/28; G07F 11/12

U.S. Cl. 53—306

11 Claims



1. A lid dispensing and application arrangement for separating lids from a stack of lids and applying the separated lids onto cups, comprising:

a. a lid dispenser supporting a stack of lids to be dispensed;  
b. a lid shuttle positioned near the bottom of the lid dispenser and supported for substantially linear translating and reciprocating movement between retracted and extended positions relative to the lid dispenser, said lid shuttle supporting a lid engaging member designed to engage a first bottommost lid of the stack of lids and to retain the first bottommost lid in a first intermediate position in the lid shuttle while the lid shuttle is moved in translation to said extended position, the lid shuttle then being moved in translation to said retracted position during which the first lid is moved in translation within the lid shuttle to a second loaded position therein beneath a lid applicator supported by the lid shuttle, the lid shuttle then being moved to said extended position during which the first lid remains in the second loaded position while the lid engaging member simultaneously engages a second bottommost lid of the lid stack and retains the second lid in said first intermediate position in the lid shuttle, the lid shuttle then being moved in translation to said retracted position during which said lid applicator presses and applies the first lid onto a cup beneath said second loaded position and the second lid is moved in translation within the lid shuttle to said second loaded position, and wherein the cycle is

repeated for subsequent lids during linear translating and reciprocating movements of the lid shuttle.

4,949,527

## METHOD OF FORMING A RECLOSABLE TRAY

Hugo Boeckmann, Arlington Heights, Ill., and Steven Ausnit, New York, N.Y., assignors to Zip-Pak Incorporated, Northbrook, Ill.

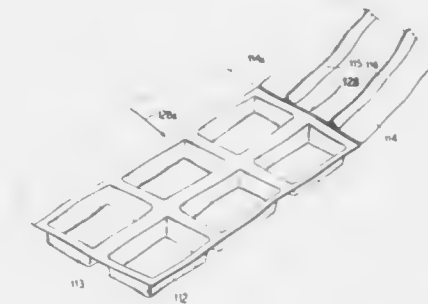
Division of Ser. No. 213,161, Jan. 29, 1988, Pat. No. 4,896,775.

This application Sep. 29, 1989, Ser. No. 414,773

Int. Cl.<sup>5</sup> B65B 61/18; B43M 7/00; B65D 33/16; B31B 1/84

U.S. Cl. 53—412

17 Claims



1. A method of closing a tray having a recess for contents with a continuous edge rim comprising the steps:

laying a flexible plastic cover over the tray contents and sealing the cover to said edge rim;  
laying an elongate fastener over the cover, said elongate fastener having facing interlocking rib and groove profiles on pull flanges with attachment webs at the base; and  
sealing said attachment webs to the outer surface of the cover so that the flanges and profiles may be separated for access to the tray contents through an opening in the cover.

4,949,528

## METHOD AND MEANS FOR RECLAMATION AND RECYCLING

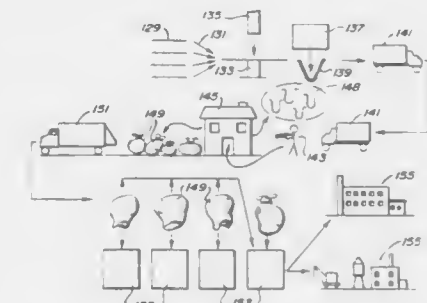
Robert A. Palik, R.D. 5-Apple St., Bethlehem, Pa. 18015

Filed Jan. 23, 1989, Ser. No. 299,138

Int. Cl.<sup>5</sup> B65B 27/08

U.S. Cl. 53—429

23 Claims



1. A method for separating solid post-consumer waste materials into source-separated recyclable materials comprising:

(a) providing a plurality of multiple indicia coded flat expandable flexible container means, each expandable flexible container being coded for receipt therein of a predetermined category of waste-materials,  
(b) periodically physically associating at least one of said flexible container means with each of at least a substantial number of newsprint media to be delivered to building units within targeted areas in a political subdivision,

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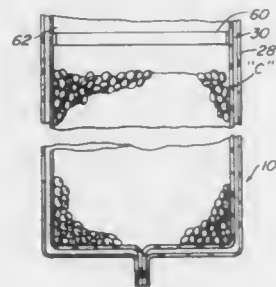
UMI

(c) delivering said physically associated container means to said building units with said newsprint media,  
(d) collecting said flexible containers after they have had placed within them source separated recyclable materials appropriate to the indicia provided on the containers, and  
(e) delivering similarly indicia coded groups of said containers to appropriate recycling facilities in accordance with the indicia of said containers for processing.

**4,949,529**  
**VACUUM PACKAGE WITH SMOOTH SURFACE AND METHOD OF MAKING SAME**  
John S. Davis, New Hope, Pa., assignor to Paramount Packaging Corporation, Chalfont, Pa.  
Filed Sep. 7, 1988, Ser. No. 241,916  
Int. Cl.<sup>5</sup> B65D 30/08

U.S. Cl. 53—434

10 Claims



1. A method of making from a web of material flexible packages of the kind having closed wall portions, an open mouth portion and a hand peelable seal, and characterized by a smooth outer surface, comprising the steps of providing a first running web of flexible material; printing on said material a repetitive pattern; laminating the printed web to a second running web to form a first packaging layer; providing as a second packaging layer a running web of gas-impermeable material; laminating said first layer to said second layer at spaced locations thereon so as to form a composite laminate in which said first and said second layers have spaces therebetween to facilitate the flow therebetween of atmospheric gases; printing on one face of the second packaging layer in a direction across the width of the webs and in registry with each repetition of the pattern on the printed web a seal strip of heat fusible plastic polymeric material adapted to form the hand-peelable seal; and gathering and storing the finished web on a take-up roll; and removing and selectively severing the web to form individual bags having hand peelable seals.

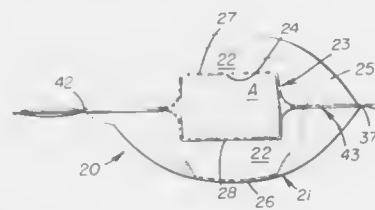
**4,949,530**  
**METHOD FOR FORMING BAG-IN-BAG PACKAGING SYSTEM**  
Daniel A. Pharo, 1901 Avenue of the Stars, Suite 450, Los Angeles, Calif. 90067  
Division of Ser. No. 089,228, Aug. 25, 1987, Pat. No. 4,872,558.  
This application Aug. 11, 1989, Ser. No. 392,443  
Int. Cl.<sup>5</sup> B65B 23/00

U.S. Cl. 53—449

6 Claims

1. A method for packaging an article comprising the steps of securing opposite peripheral edges of an inner bag and an outer bag together to suspend said inner bag within divided chamber portions defined within said outer bag on opposite upper and lower sides of said inner bag to further define an open side, disposed transversely relative to said opposite peripheral edges, on each of said first and second bags,  
forming a filling stem to define an inlet passage between peripheral and overlying edge portions of said outer bag that communicates with said chamber portions,

placing an article through the open side of said of inner bag and within a pocket defined within said inner bag, sealing the open sides of said inner and outer bags, at least substantially filling said chamber portions simulta-

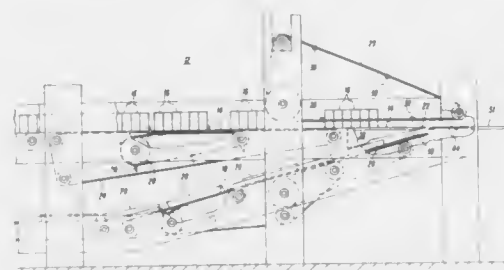


neously with a filler medium through said filling stem and inlet passage to substantially encapsulate and support said inner bag and said article at a preselected fixed position within said chamber portions, and sealing chamber portions.

**4,949,531**  
**SYSTEM FOR PACKING CONTAINERS INTO TRAYS**  
Keith A. Langenbeck, 4005 University Blvd., Dallas, Tex. 75205; Andrew P. Devine, and Joseph M. Howsden, both of Oklahoma City, Okla., assignors to Keith A. Langenbeck, Dallas, Tex.  
Filed Apr. 26, 1988, Ser. No. 186,157  
Int. Cl.<sup>5</sup> B65B 5/10, 35/44

U.S. Cl. 53—534

9 Claims



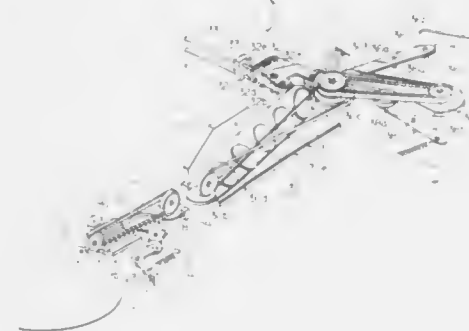
1. A system for packing containers into a corresponding tray, comprising:  
first conveyor means for transporting said containers along a first track;  
second conveyor means for transporting said tray along a second track, at least a portion of said second track being inclined with respect to said first track so that said second track converges toward said first track;  
guide means positioned between the first track and the inclined portion of the second track;  
means for urging said tray into contact with said guide means as said tray is transported along the inclined portion of the second track and for cooperating with the guide means to position said tray so that a leading end of said tray clears the downstream end of the first track, said guide means having first, second and third inclined surfaces in facing relationship with said urging means, said first inclined surface extending in said downstream direction from a first position to a second position, said second inclined surface extending upwardly and downstream at a predetermined obtuse angle relative to said first inclined surface from said second position to a third position, said second inclined surface being inclined with respect to a major surface of said first track, said third inclined surface extending upwardly and downstream from said third position to the downstream end of first track at substantially said predetermined obtuse angle relative to the second inclined surface, said first and said third inclined

surfaces being substantially parallel, the distance between the second position and the downstream end of said first track being less than the distance between the leading and trailing ends of the tray, so that the leading end of the tray clears the downstream end of the first track before the trailing end of the tray passes the second position, the width of said tray along an axis transverse with respect to the direction of movement of the tray along the second track being greater than the respective widths of the third inclined surface of the guide means and the first track, as measured along an axis transverse with respect to the direction of movement of the containers along the first track, such that when the leading end of the tray clears the downstream end of the first track, the leading end of the tray will move abruptly upward; and  
support means positioned downstream of said first track for journally supporting at least a portion of said tray as said tray is transported past the downstream end of the first track.

**4,949,532**  
**COIN PACKAGING DEVICE**  
Sachio Fujimagari, Tokyo; Seiji Mizusaki, and Noboru Nishizawa, both of Ueda, all of Japan, assignors to Musashi Engineering Kabushiki Kaisha, Tokyo and Ueda Japan Radio Co., Ltd., Ueda, both, Japan  
Filed Nov. 9, 1988, Ser. No. 269,476  
Claims priority, application Japan, Nov. 13, 1987, 62-285277  
Int. Cl.<sup>5</sup> B65B 11/04

U.S. Cl. 53—542

4 Claims

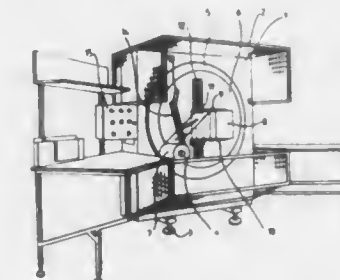


1. A coin packaging device for transferring and collecting coins despatched from a turntable, counting, transporting and packaging said coins in groups each containing a predetermined number of said coins, said device comprising in combination coin profile sorting means for sorting a designated coin from coins transported thereto from a turntable, counting means for counting the number of said sorted coins passed by said profile sorting means, a coin passage having a warped surface, a transport belt mounted adjacent said coin passage cooperating with said warped surface for transporting said sorted coins from said profile sorting means along said warped surface for erecting said sorted coins from a prone to an upstanding position, a coin collecting section having a coin collector/stacker for accommodating said coins in an intimately contacted aligned upstanding position to form a bar of said coins, means for transporting said coins between said warped surface and said collector/stacker, transfer means for moving said coin collector/stacker to a predetermined location and transferring said coin bar of intimately contacted aligned upstanding coins from said collector/stacker to a packaging station, and packaging means at said packaging station including a plurality of horizontally disposed rolls and a pair of end engaging pawls for respectively rolling a wrapper around said coin bar and folding over the ends of said wrapper.

**4,949,533**  
**PACKAGING MACHINE AND PROCESS**  
Frederick D. C. Bate, Nelson, United Kingdom, assignor to Elmwood Packing Machinery Limited, Colen, United Kingdom  
Filed Feb. 3, 1988, Ser. No. 151,775  
Claims priority, application United Kingdom, Feb. 4, 1987, 8702486  
Int. Cl.<sup>5</sup> B65B 11/02

U.S. Cl. 53—556

8 Claims



1. An apparatus for band wrapping an article comprising: a rotatable support for a supply of wrapping material; an adjustable support for the article to be wrapped thereby permitting a variety of differently sized articles to be band wrapped by a single apparatus, the adjustable support having two or more support members movable relative to each other, wherein the surfaces of the support members have been treated with a friction reducing agent; means enabling the wrapping material to be wrapped round both the article and the support members, the support members being adapted to be removed from between the wrapping material and the article; means for maintaining the wrapping material under tension during its travel from the supply to the article; and means for reciprocating the rotatable support an amount in the range from about twenty to about forty percent of the width of the article being wrapped in a substantially horizontal direction parallel to the axis of rotation of said rotatable support, such that the wrapping material, during its travel from the supply to the article, undergoes reciprocatory motion in a direction perpendicular to its direction of travel and the distance of travel of the wrapping material is limited to a distance substantially less than the width of the article being wrapped.

**4,949,534**  
**SWIVELING LAWN MOWER**  
Billy Evans, Rte. 5, Box 124, Belton, S.C. 29627  
Filed Oct. 17, 1989, Ser. No. 422,700  
Int. Cl.<sup>5</sup> E21B 34/00

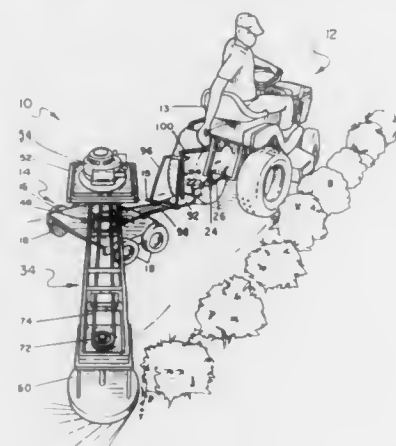
U.S. Cl. 56—6

19 Claims

1. A lawn mower arranged for connection to a tractor having a seat for an operator comprising:  
a trailer frame pivotally and detachably mountable to the tractor, said trailer frame having one or more wheels arranged thereon for supporting said frame above the ground;  
a cutter boom frame pivotally carried by said trailer frame; means for cutting vegetation, said cutting means being mounted at one end of said boom frame;  
means for supplying power for imparting cutting action to said cutting means, said power means being mounted at the opposite end of said boom frame and connected to said cutting means;  
means for pivoting said boom frame relative to said trailer frame over a range of from 0 to 280 degrees;  
means for activating said pivoting means to selectively pivot said boom frame in a horizontal plane for moving said



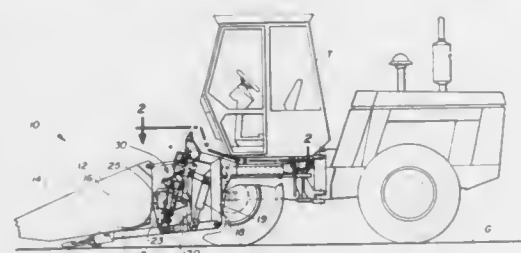
cutting means to selected cutting positions, said activating means being connected to said pivoting means and carried by said trailer frame so as to be conveniently operable by the operator, and



wherein said activating means includes a hand operable crank carried by said trailer frame for operation near the seat of the tractor.

**4,949,535**  
**CONDITIONING ROLL BIASING MECHANISM**  
Joseph C. Hurlburt, Lancaster, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 10, 1989, Ser. No. 377,876  
Int. Cl.<sup>5</sup> A01D 43/10, 82/00  
U.S. Cl. 56—16.4 19 Claims



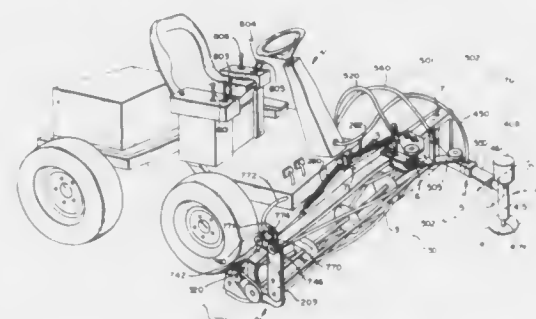
1. In a conditioning mechanism for use on a crop harvesting machine having a frame; crop gathering crop means disposed forwardly of said conditioning mechanism to gather crop material from a field and convey the crop material rearwardly to the conditioning mechanism, said conditioning mechanism having a rotatable transverse lower roll, a rotatable transverse upper roll positioned above said lower roll and being mounted for movement toward and away from said lower roll, said upper roll having first and second transversely spaced ends, and a biasing mechanism operably connected to the ends of said upper roll to urge said upper roll toward said lower roll; and drive means operably connected to said upper and lower rolls to power the rotation of said upper and lower rolls to condition crop material passing therebetween, an improved biasing mechanism comprising:

a torsion bar having first and second transversely spaced ends corresponding to and operably interconnected with the opposing ends of said upper roll such that any movement of either said upper roll end away from said lower roll effects a twisting of both the corresponding torsion bar end and the opposing torsion bar end to increase the biasing force exerted thereby simultaneously on both said

upper roll ends, the movement of one of said upper roll ends away from said lower roll urging a movement of the other said upper roll end in an opposing direction toward said lower roll, said torsion bar exerting a biasing force on said upper roll and having one of said torsion bar ends connected to a mounting mechanism connected to said frame to control the twisting movement of said one torsion bar end.

**4,949,536**  
**LAWN AND GARDEN TRIMMER APPARATUS**  
George Neufeld, 1978 - 134A Street, Surrey, B.C., Canada (V4A 6B6)

Filed Jul. 6, 1989, Ser. No. 375,993  
Int. Cl.<sup>5</sup> A01D 34/84  
U.S. Cl. 56—13.7 7 Claims



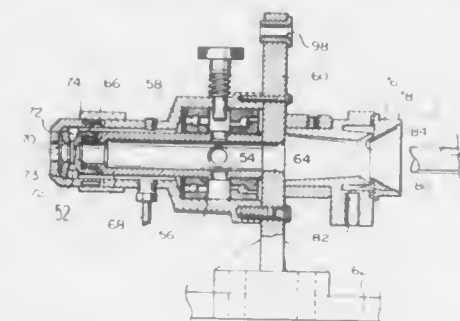
1. Lawn and garden trimmer apparatus, comprising:  
(a) supporting framework, and means for mounting said framework to a lawn mower body;  
(b) a guide rail supported longitudinally between opposed sides of said framework;  
(c) a carrier bracket movably mounted on said rail for longitudinal movement and positioning along the length of said rail;  
(d) a support arm having an inner and an outer end, said inner end being pivotally mounted to said bracket for rotation about a support arm access extending transfers to said rail;  
(e) a trimmer assembly mounted to said outer end of said arm; and  
(f) said support arm and said trimmer assembly being supported solely by said bracket and are free hanging therefrom.

**4,949,537**  
**MANUFACTURE OF OPTICAL CABLE**  
Michael G. Rawlyk, and Neale E. Felske, both of Saskatoon, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Nov. 13, 1989, Ser. No. 435,117  
Int. Cl.<sup>5</sup> G02B 6/10; H01P 11/00  
U.S. Cl. 57—7 8 Claims

1. A method of locating a flexible tube and water blocking material along a groove in a core member during manufacture of an optical cable comprising:  
passing the core member along a passline and through a water blocking material application station;  
at the water blocking material application station, laying a viscous displaceable water blocking material progressively along the groove and into contact with a base surface of the groove so as to only fill a base region of the groove;  
laying the flexible tube progressively along and into the groove and towards the base of the groove so as to contact the water blocking material; and  
then continuing the movement of the flexible tube into the water blocking material while displacing the water blocking material between the tube and sides of the groove so as

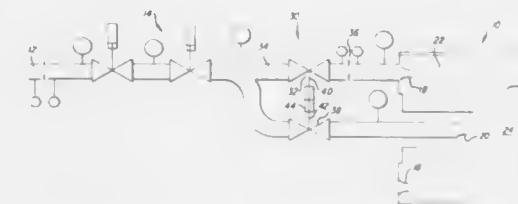
to fill a space in the base region of the groove with the water blocking material, the space in the base region



defined below nips provided between the surface of the tube and sides of the groove.

**4,949,538**  
**COMBUSTOR GAS FEED WITH COORDINATED PROPORTIONING**  
Robert J. Iasillo, Guilderland, and Stephen Fedor, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 28, 1988, Ser. No. 276,594  
Int. Cl.<sup>5</sup> F23R 3/34  
U.S. Cl. 60—39.465 5 Claims



1. A gas fuel splitter for a combustor for a gas turbine engine, said combustor including at least one primary nozzle and at least one secondary nozzle, comprising:  
a set of stop, speed-ratio and control valves for feeding a controlled flow of said gas fuel;  
a coordinated valve splitter assembly for receiving said controlled flow;  
said coordinated valve splitter assembly including a primary split valve adapted to feed a portion of said controlled flow to said at least one primary nozzle;  
said coordinated valve splitter assembly further including a secondary split valve in parallel with said primary split valve, and adapted to feed a remainder of said flow of said gas fuel to said at least one secondary nozzle;  
said primary split valve and said secondary split valve including first and second different valve trims; and  
means for coordinating actuation of said primary split valve and said secondary split valve.

**4,949,539**  
**MUFFLER WITH A PURIFYING SYSTEM FOR CAR OR MOTORCYCLE**  
Chi-chu Hsu, 4f No. 144, Chu Lin Rd., Yung Ho; Chin-ching Yu, 3f, Lane 4, Tunhua N. Rd.; Suyueh Chao, 2-1, Lane 162, Szu Wei Rd., and Miguel Huang, 183, Nei-hu Rd. Sect. 2, all of Taipei City, Taiwan

Filed Mar. 14, 1989, Ser. No. 323,419  
Int. Cl.<sup>5</sup> E01N 3/04  
U.S. Cl. 60—275 7 Claims

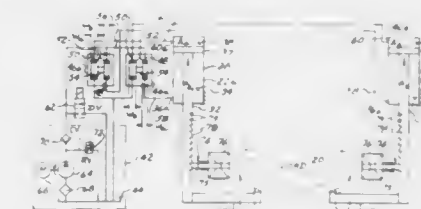
1. A muffler with a purifying system comprising:  
a muffler having a case equally and vertically separated into two communicating compartments respectively having an

inlet end for leading in exhaust gases and an outlet end; and  
a purifying system having two sets of strainers with intervals formed therein, respectively located within and across mid portions of the compartments, water spray means with a plurality of spray nozzles indicated substantially downwards, located in upper portions of the compart-



ments and extending over the strainers, a pump for transferring water to the water spray means, a water pipe line with one end connected to the pump and the other end communicated with a lower portion of an inner space of the case, and an electrolysis apparatus having layers of brass nets extended in the intervals of the strainers and connected to a positive electrode thereof.

**4,949,540**  
**HYDRAULIC ACTUATOR SYSTEM HAVING NON-CAVITATING FLOW EQUALIZER**  
Thomas Wich, Upland, Calif., assignor to Bishamon Industries Corporation, Ontario, Calif.  
Filed Nov. 21, 1988, Ser. No. 273,974  
Int. Cl.<sup>5</sup> B66F 3/46, 3/30  
U.S. Cl. 60—387 18 Claims



1. A hydraulic actuator system comprising:  
(a) a plurality of hydraulic actuators, each actuator comprising:  
(i) a housing;  
(ii) a movable piston in the housing, the piston forming first and second chambers with the housing and having a first effective area associated with the first chamber and a second effective area associated with the second chamber;  
(iii) a first port in the housing in fluid communication with the first chamber for producing movement of the element in a first direction in response to flow of fluid into the housing; and  
(iv) a second port in the housing in fluid communication with the second chamber for producing movement of the element in a second direction in response to flow of fluid therethrough into the housing;  
(b) flow divider means having a plurality of first and second fluid paths, the number of first and second fluid paths corresponding to the number of actuators, each fluid path

of the flow divider means being through a positive displacement pump element, each pump element comprising a rotating member that moves with an angular velocity that is proportional to the volume rate of fluid displacement of the respective fluid path, the rotating member for each first fluid path being shaft-connected to the rotating member of the corresponding second fluid path whereby a volume displacement of fluid in each first fluid path is directly proportional to the displacement of fluid in the corresponding second fluid path, in relation to the respective chamber effective areas to which each divider fluid path is connected;

- (c) means for fluid connecting the first fluid path of each divider means in series with the first port of a corresponding actuator;
  - (d) means for fluid connecting the second fluid path of each divider means in series with the second port of a different one of the actuators for correlating the movement of each of the actuators with the movement of the other actuators;
  - (e) a hydraulic reservoir;
  - (f) manifold means for parallel fluid-connecting the first fluid paths of the divider means;
  - (g) pump means for selectively pressure feeding hydraulic fluid from the reservoir to the manifold means for advancing the actuators;
  - (h) means for fluid-connecting the second fluid paths of the divider means to the reservoir;
  - (i) dump means for selectively permitting the fluid to flow from the manifold means to the reservoir for retracting the actuators;
  - (j) a plurality of vertically movable carriage means, each carriage means being operatively coupled to a corresponding actuator for lifting a load, the load being lifted during movement of the actuator elements in the first direction; and
  - (k) safety latch means for preventing movement of the carriage means in a direction lowering the load, comprising for each carriage means a latch mechanism operatively coupled thereto
- whereby a volume of fluid from the first port of each of the actuators is operatively cross-connected through the flow divider means to the second port of another of the actuators.

4,949,541

**APPARATUS FOR THE FEED AND THE SPEED AND TORQUE CONTROL OF A HYDRAULIC MOTOR WITH VARIABLE DISPLACEMENT AT CONSTANT PRESSURE**  
Ivano de Vietro, San Lazzaro Di Savena, Italy, assignor to Riva Calzoni S.P.A., Milan, Italy

Filed Feb. 26, 1988, Ser. No. 160,688  
Int. Cl.<sup>5</sup> F16H 61/42, 61/46

U.S. Cl. 60—413

3 Claims

1. An apparatus for controlling the speed and torque of a hydraulic motor having variable swept volume comprising: hydraulic feed means dimensioned to supplying a hydraulic fluid under constant pressure and at a flow rate sufficient to satisfy all hydraulic requirements of said motor; a speed control circuit including: means for generating an electrical reference signal, sensing means responsive to a speed of the motor for detecting an actual value of the speed of the motor in response to a change of a load on said motor and generating an electrical signal representing said actual value, comparator means for comparing said reference signal and said actual value, and an electrically controlled flow regulating valve receiving a comparison signal from said comparator means and connected in series between said hydraulic feed means and said motor, said flow regulating valve varying flow of the hydraulic fluid between said hydraulic feed means and said motor for maintaining a predetermined rotational speed of the motor regardless of said change of the load,

said flow regulating valve being formed with an outlet port connected to a feed inlet of said motor; and a hydraulic constant-pressure control circuit operatively connected with said outlet port of said valve, said constant-pressure control circuit including: means for varying a swept volume of the motor in response to the change of a pressure of said fluid at said outlet port

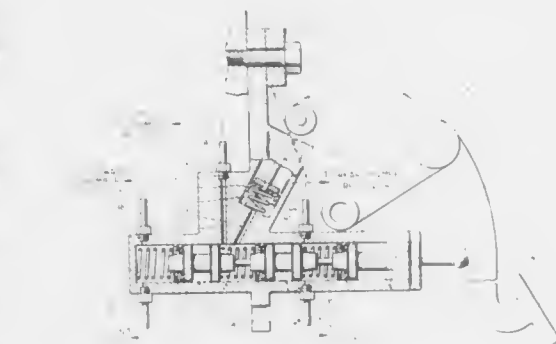


4,949,542  
**TRIPLEX PISTON SYSTEM FOR HYDRAULIC BRAKES**  
Lloyd L. Pruett, 1210 Whitney Dr., Columbia, Tenn. 38401

Filed Nov. 13, 1989, Ser. No. 434,223  
Int. Cl.<sup>5</sup> B60T 7/02

U.S. Cl. 60—594

4 Claims



1. Hydraulic brake apparatus comprising in cyclical cooperative juxtaposition a brake pedal connected to a master cylinder by a push rod, said master cylinder being divided into a rear chamber, a middle chamber and a forward chamber, each having a piston member therein, an auxiliary booster cylinder having a piston member therein, an hydraulic fluid line leading from said master cylinder to said auxiliary booster cylinder, and a brake lever movable in two directions from a fixed pivot, said brake lever being connected to a piston rod of said auxiliary booster cylinder on one side of said fixed pivot and being

in abutment connection with a piston rod of said rear chamber of said master cylinder on the other side of said fixed pivot.

4,949,543

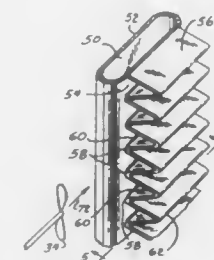
**TUBE AND FIN ASSEMBLY FOR HEAT EXCHANGERS IN POWER PLANTS**

Andrew J. Cottone, Racine, Wis., and Zalman P. Saperstein, Lake Bluff, Ill., assignors to Modine Manufacturing Company, Racine, Wis.

Filed Sep. 12, 1989, Ser. No. 406,064  
Int. Cl.<sup>5</sup> F28F 13/18

U.S. Cl. 60—692

6 Claims



1. A fin and tube assembly for use in a heat exchanger and consisting essentially of: a steel tube provided with an external coating of aluminum; and at least one aluminum fin having aluminum braze cladding in contact with and brazed to said tube; said assembly being characterized by the absence of any appreciable exposed layer of ferrous-aluminum intermetallic compound or intermediate phase on the exterior of said tube in the area of said fin.

4,949,544

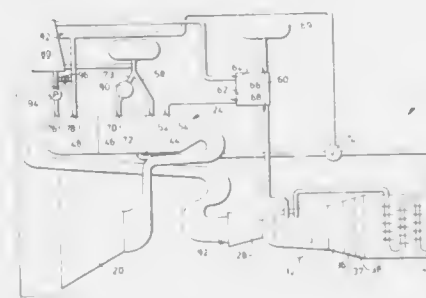
**SERIES INTERCOOLER**

William R. Hines, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Dec. 6, 1988, Ser. No. 280,403  
Int. Cl.<sup>5</sup> F02K 11/00

U.S. Cl. 60—728

29 Claims



1. A turbine engine comprising: a first compressor for producing a downstream flow; an intercooler positioned downstream of said first compressor, said intercooler having a first fuel heating system having a heated fuel outlet, a second intercooler stage having a feedwater input port and a feedwater output port, said feedwater input port being coupled to a means for supplying water; a second compressor positioned downstream of said intercooler; a combustor region positioned downstream of said second

compressor, said combustor region being coupled to said fuel outlet; a turbine positioned downstream of said combustor region; and a turbine exhaust heat exchanger downstream of said turbine, said heat exchanger being coupled to said feedwater output port.

4,949,545

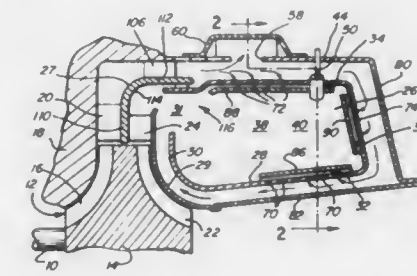
**TURBINE WHEEL AND NOZZLE COOLING**

Jack R. Shekleton, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 12, 1988, Ser. No. 283,078  
Int. Cl.<sup>5</sup> F23R 3/08, 3/14

U.S. Cl. 60—756

7 Claims



1. A gas turbine comprising: a rotor including compressor blades and turbine blades; an inlet adjacent one side of said compressor blades; a diffuser adjacent the other side of said compressor blades; a nozzle including front and rear shrouds and adjacent said turbine blades for directing hot gases at said turbine blades to cause rotation of said rotor; an annular combustor having radially inner and outer walls connected by a generally radially extending wall about said rotor and having an outlet connected to said nozzle and a primary combustion annulus defined by said walls remote from said outlet, a plurality of fuel injectors to said primary combustion annulus and being substantially equally angularly spaced therearound and configured to inject fuel into said primary combustion annulus in a nominally tangential direction; and means on said radially outer wall and at said outlet for establishing a cooling air stream on said front shroud; said front shroud including a radial section having its outer extremity joined to an axial section by a relatively small radius, said establishing means being located at the junction of said radius and said axial section.

4,949,546

**COMPACT HEAT EXCHANGER FOR A CRYOGENIC REFRIGERATOR**

Lawrence A. Klusmier, Chelmsford; Allen J. Bartlett, Milford, and Dale A. Dopson, Dorchester, all of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

Filed Nov. 14, 1988, Ser. No. 270,660  
Int. Cl.<sup>5</sup> F25B 39/02

U.S. Cl. 62—6

20 Claims

20. A cryogenic refrigeration system comprising: (a) a compressor for compressing refrigerant gas mixed with oil; (b) a separator for separating gas and oil; (c) a heat exchanger for cooling the oil, the heat exchanger comprising: (1) three parallel rows of tubes, the middle row being staggered with respect to the other two rows, which are coupled to form a serpentine laminar flow path; (2) fins of high thermal conductivity material in thermal communication with the tubes realized as a stack of



U.S. Cl. 62—1964. 11 Claims

1. A cooling system for beverages delivered through a line run to a dispensing station remote from a beverage storage area comprising:

a refrigeration unit controllable without thermostat comprising a fluid refrigerant circuit having a compressor, a condenser, and an evaporator coil;

a coolant unit comprising a coolant circuit having a coolant tank, a pump, a chiller coil in intimate contact with the evaporator coil of the refrigeration unit, and a coolant line and coolant return line in the line run; and

means for maintaining a substantially constant vapor pressure of the refrigerant in the evaporator coil so that the



coolant in the chiller coil is chilled to a substantially constant temperature.

4,949,553

## AIR-CONDITIONER FOR AUTOMOBILES

Nobuhiko Suzuki, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 18, 1989, Ser. No. 452,274

Claims priority, application Japan, Jan. 12, 1989, 1-5631  
Int. Cl.<sup>5</sup> F25B 27/02

U.S. Cl. 62—238.7

6 Claims



1. An air-conditioner for an automobile, comprising:

- (a) an exhaust gas heat exchanger for exchanging heat between exhaust gas leaving an internal combustion engine of the automobile and an engine cooling water;
- (b) a heat pump including at least a compressor, an accumulator, a four-way valve, a first heat exchanger and a second heat exchanger that are connected in fluid circuit with each other and jointly constitute a cooling cycle which is reversible depending on the setting of said four-way valve; and
- (c) a cooling water circulating circuit for circulating the engine cooling water and including
  - (i) a main circulating circuit for circulation of the engine cooling water,
  - (ii) a bypass passage bypassing a part of said main circulating circuit for guiding a part of the engine cooling water to flow from the main circulating circuit to said bypass passage and then returning the part of the engine cooling water to said main circulating circuit, said bypass passage having a portion disposed in contact with a refrigerant passage in said first heat exchanger, and
  - (iii) shut-off means for selectively opening and closing said bypass passage.

4,949,554  
SINGLE PANE, CURVED GLASS LID, FROZEN FOOD  
MERCHANDISER

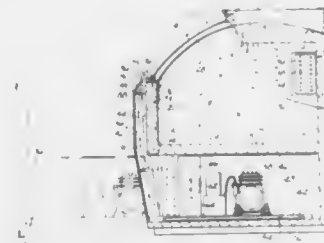
Michael A. Branz, and Ralph A. Fuhrmann, Jr., both of Spartanburg, S.C., assignors to Specialty Equipment Companies, Inc., Berkeley, Ill.

Filed Sep. 8, 1989, Ser. No. 404,780

Int. Cl.<sup>5</sup> A47F 3/04

U.S. Cl. 62—248

20 Claims



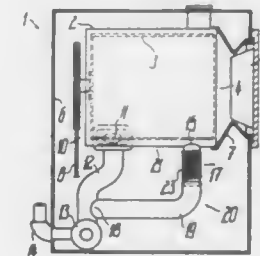
18. A frozen food merchandiser, comprising:

- (a) a compartment for holding items to be frozen, said compartment defining a rear wall, a top wall, a pair of end walls, a front wall, a lower bottom wall, an upper bottom wall disposed closer to said top wall than said lower bottom wall, at least one interior side wall connecting one end of said lower bottom wall to one end of said upper bottom wall, and at least one compartment access opening, each said opening being defined at least in part by a free edge of said front wall and a free edge of said top wall;
- (b) a housing defining a top panel, a rear panel, two opposed side panels, and a front opening;
- (c) a mounting board disposed to slide through said front opening of said housing;
- (d) a cabinet for enclosing said housing and said compartment therewithin;
- (e) a compressor mounted on said mounting board;
- (f) a condenser mounted on said mounting board and disposed closer to said front opening of said housing than said compressor;
- (g) a fan disposed so as to move air across said condenser and said compressor and through said front opening of said housing;
- (h) at least one, single pane, curved glass lid;
- (i) at least two curved tracks for slidably receiving the side edges of each said lid, said tracks being disposed across said compartment opening and between said compartment top wall and said cabinet;
- (j) an elongated channel disposed in front of said compartment front wall and between said front wall and said cabinet, said channel extending substantially the full length of the extent of the curved glass lids along the front of the merchandiser and communicating with said housing via said front opening of said housing, said channel having an exit slot defined by a front edge member having a free edge disposed above said free edge of said compartment front wall and at a vertical height of less than 26 inches above the floor on which the merchandiser rests, said front edge member extending along substantially the full length of the extent of the curved glass lids along the front of the merchandiser and being configured and disposed to direct air exiting said slot to attach to the exterior surface of each curved glass lid when each said lid encloses each said compartment opening;
- (k) a shelf extending from said rear wall of said compartment and disposed closer to said top wall than said bottom wall;
- (l) an evaporator disposed above said shelf and extending across substantially the full length of said compartment and mounted against said rear wall;

(m) at least one conduit for carrying refrigerant between said evaporator and said compressor and having a first length thereof disposed against said rear wall of said compartment, a second length disposed against said one of said end walls, a third length disposed against said front wall, a fourth length disposed against said one interior side wall, a fifth length disposed against said upper bottom wall, and a sixth length disposed against said other of said end walls; and

(n) heat insulation disposed between said cabinet and each of said compartment and housing, between said at least one interior side wall and at least one of said side panels, between said top panel and said upper bottom wall, and between said compartment and said channel.

duct, said drain pump having a top side, and wherein said pump inlet is provided on the top side of said drain pump,



a drain duct portion of said circuit duct leading to said top side.

4,949,555

## REFRIGERATOR

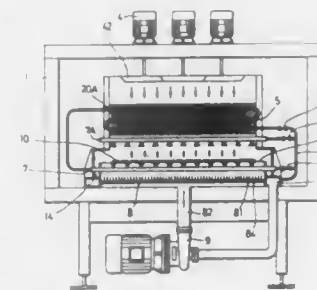
Ching-I Chao, 87, San-Duo 2nd Rd., Kaohsiung, Taiwan

Filed May 2, 1989, Ser. No. 346,437

Int. Cl.<sup>5</sup> E25D 17/02

U.S. Cl. 62—374

4 Claims



1. A device for cooling objects comprising:

- a housing having a first end and a second end;
- a conveyor for carrying objects to be cooled from said first end to said second end;
- a spray means to spray a salt solution from a salt solution source onto said conveyor;
- a cooling unit disposed in said housing operating with a cooling medium in a closed passage, to cool the salt solution in an open passage collecting the salt solution after it has been sprayed and providing it to said source.

4,949,556

## HEATING MEANS FOR WASHING SOLUTIONS IN CLEANING MACHINES

Hermann Knauss, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,163

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518565

Int. Cl.<sup>5</sup> D06F 1/08

U.S. Cl. 68—16

18 Claims

14. A heating means for heating washing liquids in a washing machine, said heating means comprising:

- a wet chamber for receiving articles to be washed, said wet chamber having a liquid outlet, a liquid inlet and a lowest region;
- a circuit duct connecting said liquid outlet to said liquid inlet, a liquid circuit conduit being defined by said circuit duct, the liquid inlet, the wet chamber and the liquid outlet;
- a heating duct operable to heat the washing liquid when circulating in said liquid circuit conduit; and
- a drain pump having a pump inlet connected to said circuit

4,949,557

## RELATING TO LAUNDRY MACHINES

Wayne L. Price, Auckland, New Zealand, assignor to Fisher & Paykel Limited, Auckland, New Zealand

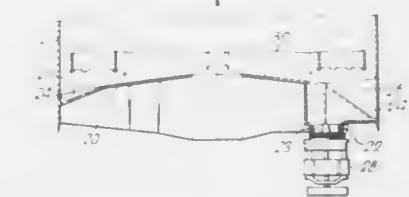
Filed Sep. 12, 1989, Ser. No. 406,238

Claims priority, application New Zealand, Sep. 13, 1988, 226165

Int. Cl.<sup>5</sup> D06F 23/04, 39/08

U.S. Cl. 68—23.4

10 Claims



1. A laundry machine comprising a cabinet, a washing container within said cabinet, said washing container having a base and an outer wall; a rotatable assembly comprising a spin tub within said container, said spin tub having a base and an outer wall, an agitator within said spin tub; a motor driving said agitator and said spin tub when required; washing liquid admission means; and draining means having an inlet at or below a draining level in said base of said washing container, said base having over at least an annular part thereof a helical path starting from a point adjacent said inlet to said draining means but beyond said inlet in the direction of rotation of said rotatable means, said path increasing the depth of said washing container substantially to said draining level of said inlet, the construction and arrangement being such that in use on said rotating means rotating for the purpose of spinning clothes placed in said spin tub, the formation of suds on water passing down said helical path to said draining means inlet is obviated or minimized as the water passes to said draining means.

4,949,558

## SEALING HEADS FOR AN ENCLOSURE FOR CONTINUOUS STEAM TREATMENT OF TEXTILE YARNS

Robert Enderlin, Morschwiller-Le-Bas, France, assignor to Passap Knitting Machines, Inc., Salt Lake City, Utah

Filed Mar. 27, 1989, Ser. No. 328,612

Claims priority, application France, Mar. 25, 1988, 88 04147

Int. Cl.<sup>5</sup> D06B 23/18

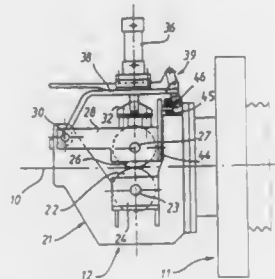
U.S. Cl. 68—5 E

16 Claims

1. Enclosure having a controlled atmosphere under a predetermined pressure for the continuous treatment of textile yarns deposited on a continuous conveyor belt outside of said enclosure.



sure and transported by said conveyor belt through said enclosure, said enclosure being at least partially sealed and comprising an inlet and an outlet which are traversed by said conveyor belt, said inlet and outlet each having a sealing head with rollers, in which each of said sealing heads of said inlet and the outlet comprises at least one fixed roller and one movable roller, wherein at least one of said fixed and movable rollers has a peripheral mounting of compressible material, said fixed and movable rollers being positioned transversely and across from one another below and above said conveyor belt, respectively, each of said sealing heads further comprising a means for movably supporting a respective one of said movable rollers, each of said means for movably supporting including means for biasing a respective one of said movable rollers in the direction of a respective one of said fixed rollers so as to tighten between said respective fixed and movable rollers said



conveyor belt and yarns that are carried, said means for movably supporting a respective one of said movable rollers comprising two separately movable support members, positioned near the respective ends of said movable roller, each support member carrying one end of an axis of said movable roller, wherein said biasing means comprising two hydraulic jacks connected to an axis of a respective movable roller, wherein said two hydraulic jacks are connected to a hydraulic pressure source by means of control and adjustments means, and wherein said two hydraulic jacks communicate hydraulically between them with a common pressure limiting valve so as to apply respective tightening forces which are always substantially equal at each end of said movable roller, and wherein at least one adjustable stop member is positioned in a manner so as to limit the biasing effect of said biasing means regardless of the biasing force.

4,949,559

## ARTICLE LOCK

James A. Glines, Indianapolis, Ind., assignor to Meyer Plastics, Inc., Indianapolis, Ind.

Division of Ser. No. 199,027, May 26, 1988, Pat. No. 4,881,386.

This application Sep. 11, 1989, Ser. No. 405,880

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

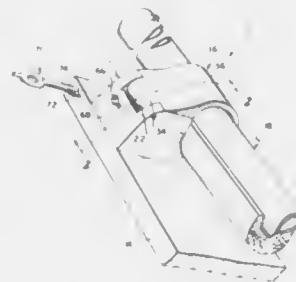
Int. Cl.<sup>5</sup> E05B 73/00

U.S. Cl. 70—19

21 Claims

1. An article lock comprising means for receiving an article, means for releasably retaining the article in the receiving means, the retaining means being movable relative to the receiving means, and a single blocking means for blocking movement of the retaining means relative to the receiving means to fix the retaining means in a predetermined locking position locking the article in the receiving means, the blocking means being movable by an actuating means between a projected position engaging the retaining means and a retracted position away from the retaining means, the receiving means being formed to include means for introducing a key means to the blocking means so that the key means is movable to act on the blocking means independent of the

actuating means to move the blocking means to its retracted position, thereby permitting movement of the



retaining means relative to the receiving means to release the article.

4,949,560

## SHACKLE PROTECTIVE PADLOCK MOUNT

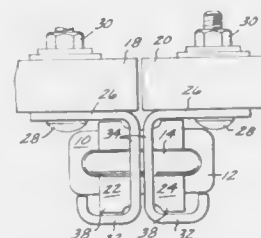
John P. Anderson, Norco, Calif., assignor to The Hartwell Corporation, Placentia, Calif.

Filed Dec. 20, 1989, Ser. No. 454,736

Int. Cl.<sup>5</sup> F05B 67/38

U.S. Cl. 70—54

21 Claims



1. A shackle protective padlock mount comprising: a pair of complementary shackle receivers which include, respectively, central sections having shackle openings for receiving a padlock shackle having oppositely located shackle legs, the shackle receivers also including, respectively, rear sections for fixedly mounting the shackle receivers to adjacent structures to place the central sections in close proximity whereby a padlock shackle received in the shackle openings locks the adjacent structure together, the shackle receivers further including, respectively, front sections for protectively overlying the front of a padlock shackle received in the shackle openings, the central sections including oppositely and laterally outwardly directed shackle leg engaging means for engaging the shackle legs of a padlock shackle received in the shackle openings to constrain the central sections against movement out of their close proximity.

4,949,561

## STEERING WHEEL LOCK BAR

Joseph E. Solow, and Stanley E. Solow, both of Plainview, N.Y., assignors to Wolo Manufacturing Corporation, Deer Park, N.Y.

Filed Apr. 7, 1989, Ser. No. 335,217

Int. Cl.<sup>5</sup> B60R 25/02

U.S. Cl. 70—209

9 Claims

1. A device for securing a vehicle steering wheel comprising: a lock housing having an axial bore therethrough; a pair of legs rigidly extending from the housing at an acute angle relative to said axis and to one another; engagement means of each leg, spaced from said housing,

and comprising a U-shaped hook having an opening facing away from said housing for engaging one side of the steering wheel at spaced locations; a rod extending axially from said bore in the direction opposite to said legs, said rod being axially moveable in said bore and having a distal end;



second U-shaped engagement means on said rod having an opening facing said distal end for engaging the opposite side of the steering wheel, said second engagement means being spaced a distance from said distal end; and lock means disposed in said housing for locking said rod at selected axial locations.

4,949,562

## LOCKING DEVICE

Irwin C. Thorncraft, Winston Hills; Owen B. Holmes, and Harry Wolters, both of Orange, all of Australia, assignors to Forrest PTY Limited, New South Wales, Australia

PCT No. PCT/AU88/00150, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989, PCT Pub. No. WO88/09421, PCT Pub. Date Dec. 1, 1988

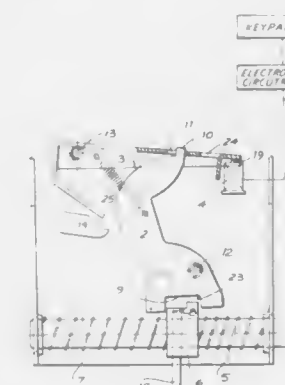
PCT Filed May 18, 1988, Ser. No. 302,744

Claims priority, application Australia, May 18, 1987, P12015

Int. Cl.<sup>5</sup> E05B 47/00

U.S. Cl. 70—277

9 Claims



1. A locking device comprising: a bolt provided with a handle mounting block and a handle for movement of said bolt; and a lever, adapted to selectively engage said handle mounting block upon activation of an activation means; wherein, in a neutral mode said lever allows free movement of said bolt and prevents said bolt from assuming a locking posi-

tion, in a locking mode and upon movement of said handle, said handle mounting block may be engaged by said lever, and, in a locked mode said handle mounting block engaged by said lever substantially prevents any movement of said bolt.

4,949,563

## LOCK FOR DOORS, WINDOWS OR THE LIKE

Prevot Gerard, Willerwald; Jumercier Laurent, Phalsbourg, and Simoncelli Philippe, Hoff, all of France, assignors to Ferco International Usine de Ferrures de Batiment S.A.R.L., Sarrebourg, France

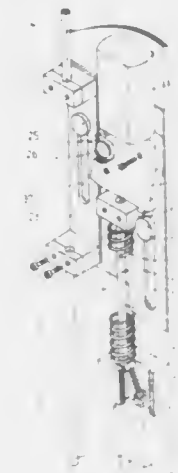
Filed Jun. 21, 1989, Ser. No. 369,604

Claims priority, application France, Jul. 1, 1988, 88 09123

Int. Cl.<sup>5</sup> E05B 47/00

U.S. Cl. 70—279

17 Claims



1. A lock for doors, windows, or the like, said lock comprising:

- (a) a case;
- (b) a control mechanism housed within said case, said control mechanism including at least one control rod for actuating at least one locking member, a motor for moving said at least one control rod, a movable bracket being mounted for vertical movement in said case, said motor being mounted on said movable bracket;
- (c) connection means between said at least one control rod and said motor, said connection means forming a substantially rigid connection when said motor is not actuated and a movable connection when said motor is actuated; and
- (d) drive means for moving said bracket and thereby said at least one control rod when said connection means is a substantially rigid connection.

4,949,564

## PADLOCK WITH A HARD SHELL CASING FOR RECEIVING A CYLINDER LOCK UNIT

Israel Barzilai, Netanya, Israel, assignor to Nabob Ltd., Israel

Filed Nov. 13, 1989, Ser. No. 436,068

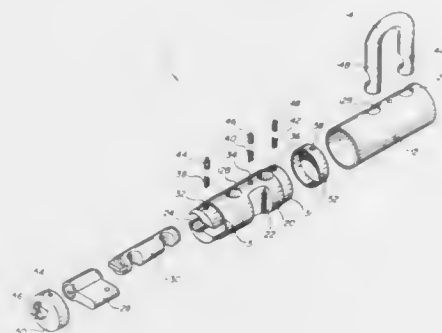
Int. Cl.<sup>5</sup> E05B 63/00

U.S. Cl. 70—417

8 Claims

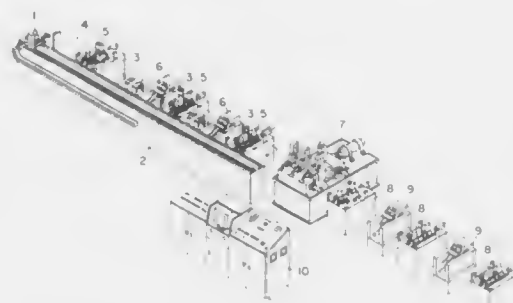
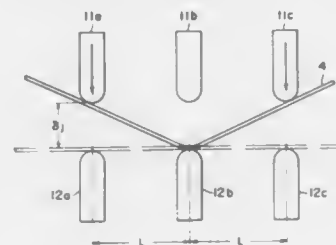
1. A padlock comprising: an elongated lock casing, the casing having bores extending in from its periphery, a U-shaped shackle adapted to be inserted into the bores in the casing, a key-operated, cylinder-type locking device installed at one end of the lock casing for locking the shackles in the casing bores; the casing comprising: an inner solid member made of a material which is substan-

tially unprotected against drilling or the like burglary attempts; the inner member having opposite end portions; an outer tubular shell fitted over the inner member and made of a material protected against drilling or the like burglary attempts; the outer shell also having opposite end portions; a respective cup shaded end cover being fitted over each end portion of the inner member, the end cover being at least partly covered by a corresponding end portion of the shell;



recesses formed at the inner member end portions, and the end covers being received in the respective recesses, each inner member end portion being provided with releasable fastening means for holding its respective end cover; each cover has a circumferential rim portion with an opening formed in it, each cover fastening means comprise a spring-urged detent adapted to project, in its fastening position, into the opening formed in the circumferential rim portion of the respective end cover, so that the detent becomes protectively covered by the shell.

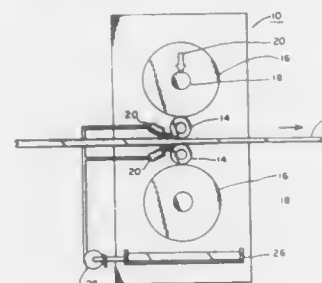
(c) straightening the distortion at said first point of said elongated metal chamber in accordance with the amounts



of the distortions to be straightened at said remaining points.

**4,949,566**  
**ROLLING MILL LUBRICATION**  
Robert Eichelbaum, 2509 Scarsborough Dr., Richmond, Va. 23235

Filed Sep. 11, 1989, Ser. No. 405,655  
Int. Cl.<sup>5</sup> B21D 27/10, 45/02  
U.S. Cl. 72—42 8 Claims



**4,949,565**  
**DISTORTION STRAIGHTENING METHOD**  
Nobukazu Kadera, Kodaira, and Takeo Kakuti, Chofu, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 30, 1989, Ser. No. 330,618  
Claims priority, application Japan, Mar. 31, 1988, 63-78516  
Int. Cl.<sup>5</sup> B21D 37/00 4 Claims

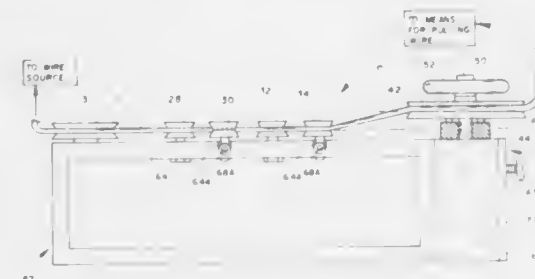
U.S. Cl. 72—10

1. A method of straightening an elongated metal member comprising the steps of:

- preliminarily setting a plurality of points at which distortion of said elongated metal member from a substantially linearly straight shape are to be straighten;
- calculating an amount of distortion to be straightened at a first one of said plural points in consideration of the amounts of distortions to be straightened at the remaining points so as to give said elongated metal member said substantially linearly straight shape; and

1. A method of rolling metal in a mill having superimposed work rolls and backup rolls, and having mechanical means controlling operation of said rolls during rolling, comprising applying to the metal passing into the nip of a pair of said work rolls a non-aqueous liquid rolling lubricant consisting of about 0.5 to 25 percent by volume of polyalkylene glycol, the balance being principally petroleum solvent, providing lubricant to said mechanical means substantially entirely consisting of about 5 to 100 percent polyalkylene glycol and about 10 to 95 percent petroleum solvent, collecting the used rolling lubricant in a sump located beneath said rolls, also collecting in said sump at least part of any leakage of said lubricant of said mechanical means during operation of the rolls, admixing the collected roll lubricant with the collected leaked lubricant, and using the admixture as at least part of the rolling lubricant during subsequent rolling in the mill, whereby compatibility of the constituents of the rolling lubricant and of the leaked mechanical lubricant is improved for purposes of continued use of the recycled rolling lubricant.

**4,949,567**  
**APPARATUS AND METHOD FOR CONTROL OF WIRE CAST AND HELIX**  
Edward W. Corbin, 10854 York Rd., Cockeysville, Md. 21030  
Filed Nov. 4, 1988, Ser. No. 267,316  
Int. Cl.<sup>5</sup> B21F 1/02  
U.S. Cl. 72—164 30 Claims



1. An apparatus for controlling the helix characteristic of wire drawn from a wire source by means for pulling the wire, said apparatus comprising:

- means, located between the wire source and the means for pulling the wire, for guiding the pulled wire along a path to alternately bend the wire in a first plane,
- means, located between said guide means and the means for pulling the wire, for selectively exerting forces on the pulled wire, said forces being exerted on the pulled wire in a direction outside the first plane causing the wire to run on an angle, said force exerting means guiding the wire in a second plane which is parallel to said first plane.

**4,949,568**  
**DEVICE TO REPLACE ROLLS AND APPARATUS ON ROLLING STANDS HAVING ROLLS SUPPORTED AT ONE END**

Alfredo Poloni, Via Redipuglia, 155, 34077 Ronchi Dei Legionari (GO), Italy  
Continuation of Ser. No. 89,170, Aug. 25, 1987, abandoned, which is a division of Ser. No. 903,871, Sep. 2, 1986, Pat. No. 4,726,108, which is a continuation of Ser. No. 668,019, Nov. 5, 1984, abandoned. This application Oct. 26, 1988, Ser. No. 262,981

Claims priority, application Italy, Nov. 11, 1983, 83497 A/83  
Int. Cl.<sup>5</sup> B21B 31/08 6 Claims

U.S. Cl. 72—239



1. A method for replacing rolls on a rolling stand, the rolling stand comprising a rolling stand base with roll-bearing shafts having horizontal or vertical axes, cantilevered rolls, a guide assembly, and support means, the method comprising the steps of:

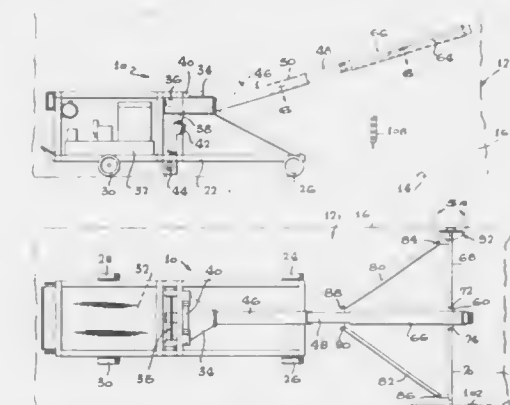
- placing a frame means on said support means, said frame means having means for clamping said rolls and means for engaging said support means,
- actuating said means for clamping and said means for engag-

ing so that the rolls are clamped and the support means is engaged, actuating said means for clamping and said means for engaging so that the rolls are clamped and the support means is engaged, removing said support means, frame means, rolls and guide assembly from said rolling stand base; removing said rolls from said frame means; placing replacement rolls on said frame means at a location which is remote from said rolling stand base; replacing said support means, said frame means, said replacement rolls, and said guide assembly on said rolling stand base; releasing said clamp means and said engaging means; and removing said frame means from said base.

**4,949,569**  
**CONTAINER REPAIR APPARATUS**  
Almon A. Young, 156 Riverside Dr., Pittsburg, Calif. 94565, and William T. Martin, 21483 Wawleu Rd., Apple Valley, Calif. 92307

Filed May 22, 1989, Ser. No. 354,705  
Int. Cl.<sup>5</sup> B21D 39/20 8 Claims

U.S. Cl. 72—392



1. An apparatus for repairing one of the first and second spaced metal walls of a container, comprising: a frame sized so that it may enter between the first and second spaced metal walls; a boom on said frame so that said boom may enter between the first and second walls; metal forming die holding means on said boom for holding a forming die for engagement against the first wall of the container so that the first wall can be hammered opposite the forming die to shape the first wall in accordance with the configuration of the forming die; backing plate holding means on said boom for holding a backing plate for engagement with the second wall opposite the engagement of the forming die with the first wall; and means on said boom for spreading said forming die holding means away from said backing plate holding means so that the forming die can be urged against the first wall while the backing plate is urged against the second wall to hold the forming die in place, said means for spreading comprising left and right arms, each arm having one end pivotally mounted on said boom and the other end of each arm being mounted to one of said backing plate holding means or forming die holding means, said arms being pivoted with respect to said boom to separate said holding means.



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4,949,570

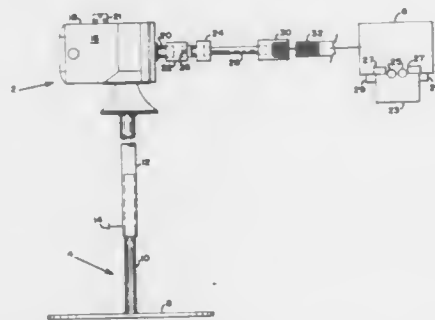
**METHOD AND APPARATUS FOR CALIBRATING AGRICULTURAL GRANULAR MATERIAL APPLICATORS**

David Harmon, Machesney Park, and Winston H. Hines, Davis Junction, both of Ill., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 22, 1988, Ser. No. 288,473  
Int. Cl.<sup>5</sup> G01F 25/00

U.S. Cl. 73—3

20 Claims



1. An apparatus for calibrating the delivery rate of granular material to be applied to a field by a granular dispenser of the type driven by an agricultural vehicle, said apparatus comprising:

- a motor having a motor shaft,
- means for coupling said motor shaft to said granular dispenser for causing the delivery of said granular material from said granular dispenser,
- collector means operatively mounted to said granular dispenser to collect said granular material delivered from said granular dispenser, and
- means for driving said motor at a predetermined speed for a preselected period of time to simulate a predetermined distance traveled by said agricultural vehicle at a predetermined planting speed.

4,949,571

**ACCELERATION DETECTOR**

Satoshi Komurasaki, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

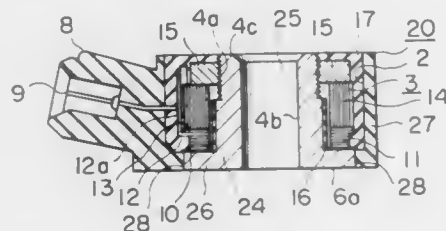
Filed Aug. 4, 1989, Ser. No. 389,469

Claims priority, application Japan, Aug. 5, 1988, 63-103203[U]

Int. Cl.<sup>5</sup> G01H 11/08

U.S. Cl. 73—35

3 Claims



1. An acceleration detector comprising:

- a housing defining a cavity therein and including an electrically conductive metallic bushing and an electrically insulating resinous outer case;
- an acceleration transducer assembly disposed on said bushing in said cavity; and
- a resilient filler material applied around said acceleration transducer assembly for resiliently sealing said acceleration transducer assembly from the exterior, said resilient

filler material being sufficiently resilient to allow the movement of said inertial weight relative to said housing when an acceleration is applied to said inertial weight; said metallic bushing and said resinous outer case being integrally attached together by insert-molding to provide an integral structure.

4,949,572

**METHOD AND APPARATUS FOR DETERMINING PHYSICAL PROPERTIES OF LIQUIDS**

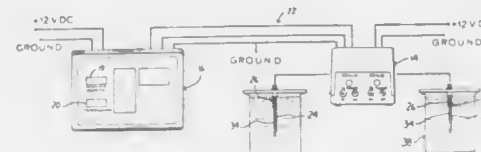
Don J. Wilen, West Hempstead, and Frank Cooper, South Huntington, both of N.Y., assignors to Computer Instruments Corporation, Hempstead, N.Y.

Filed Nov. 30, 1988, Ser. No. 278,223

Int. Cl.<sup>5</sup> G01N 9/28

U.S. Cl. 73—53

8 Claims



1. An apparatus for determining a physical property of a liquid, comprising:

- a dip tube;
- a pressure sensor for detecting pressure within said dip tube and producing output signals corresponding to the detected pressure;
- means for flowing a selected volume of gas into said dip tube;
- means for stopping the flow through said means for flowing once a volume of gas substantially equal to said selected volume has been released from said dip tube; and
- means for selecting output signals from said pressure sensor once the means for stopping has stopped the flow of gas into said dip tube.

4,949,573

**VELOCITY TRANSDUCER FOR VEHICLE SUSPENSION SYSTEM**

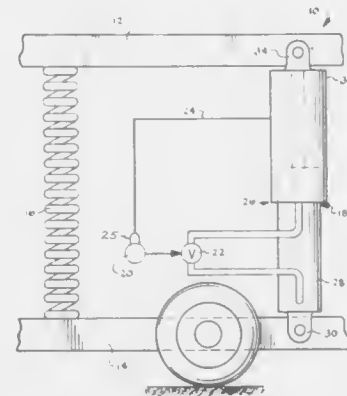
Paul T. Wolfe, Erie, Pa., and Mark R. Jolly, Raleigh, N.C., assignors to Lord Corporation, Erie, Pa.

Filed Nov. 13, 1989, Ser. No. 435,709

Int. Cl.<sup>5</sup> G01M 19/00

U.S. Cl. 73—118.1

26 Claims



1. A passive velocity transducer for detecting relative velocity between two relatively movable vehicle components interconnected by a fluid-type damper having a central axis, said damper including a cover member connected to one of said

vehicle components and a cylinder member connected to the other of said vehicle components, and said damper members undergoing telescoping movement relative to each other during relative movement between said vehicle components, said transducer comprising:

- a coil of electrically conductive material carried by said cover member and encircling said axis;
- a magnet carried by said cover member.

4,949,574

**TESTING DEVICE FOR VEHICLE TIRES**

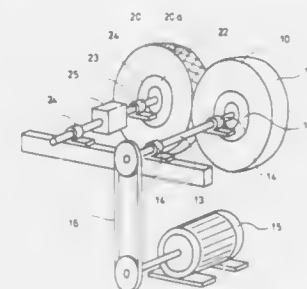
Unto Lindén, Hämeenlinna, and Erkki Suvanto, Porvoo, both of Finland, assignors to Neste Oy, Finland

Filed Jul. 14, 1989, Ser. No. 380,895

Int. Cl.<sup>5</sup> G01M 17/02

U.S. Cl. 73—146

22 Claims



1. Device for testing a vehicle tire including anti-skid means of the tire, wherein

- the tire to be tested is pressed against an outer surface of another tire while rotating the tires in opposite directions, said another tire is a pneumatic tire, and comprising means for disposing the tire to be tested and means for disposing said another tire to be pressed against one another such that a contact surface between the tires is substantially straight and that respective axes of rotation of said tire to be tested and said another tire are substantially parallel.

4,949,575

**FORMATION VOLUMETRIC EVALUATION WHILE DRILLING**

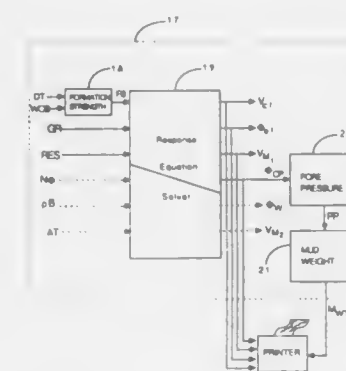
John C. Rasmus, Richmond, Tex., assignor to Anadrill, Inc., Sugar Land, Tex.

Division of Ser. No. 187,761, Apr. 29, 1988, Pat. No. 4,833,914. This application Feb. 27, 1989, Ser. No. 316,256

Int. Cl.<sup>5</sup> E21B 49/00

U.S. Cl. 73—152

13 Claims



1. A method for investigating properties of subsurface for-

mations traversed by a borehole, the method comprising the steps of:

- a. deriving a drilling signal indicative of the resistance of the formation to being drilled by a drill bit;
- b. deriving a plurality of additional signals indicative of formation properties; and
- b. in response to said drilling signal and to said additional signals, deriving a volumetric analysis of the subsurface formation.

4,949,576

**SELF-ADJUSTING LID WRENCH**

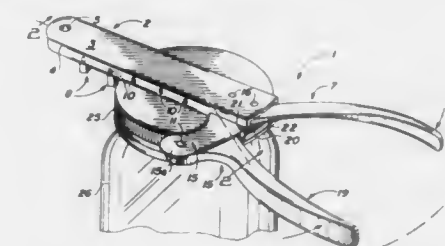
Fred D. Floyd, 1403 Fairview Ave., Monroe, La. 71201

Filed Jul. 5, 1989, Ser. No. 375,678

Int. Cl.<sup>5</sup> B67B 7/00

U.S. Cl. 81—3.44

21 Claims



1. A self-adjusting lid wrench for removing a lid from a container, comprising a lug support, a plurality of lugs arranged in linearly spaced relationship on said lug support and lug teeth provided on said lugs, a fixed handle carried by said lug support in fixed relationship, jaw means pivotally carried by said lug support in spaced relationship with respect to said lug means and a jaw handle carried by said jaw means in fixed relationship, whereby said lugs and said jaw means engage the lid and the lid is loosened on the container responsive to insertion of said lid wrench over the lid between one of said lugs and said jaw means, squeezing said jaw handle toward said fixed handle and twisting said lid wrench in the counterclockwise direction.

4,949,577

**METERING ASSEMBLY FOR TANK TRUCK/TRAILER**

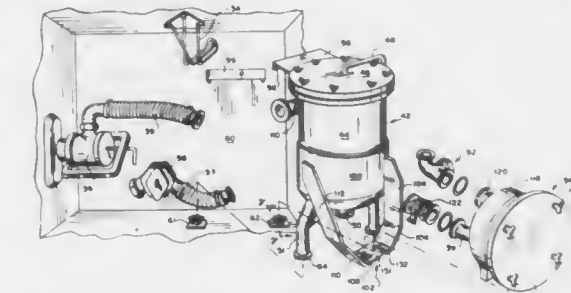
James J. Schnitzler, Barrington, Ill., assignor to Accurate Metering Systems, Inc., Schaumburg, Ill.

Filed Aug. 29, 1988, Ser. No. 237,057

Int. Cl.<sup>5</sup> G01F 15/08

U.S. Cl. 73—200

9 Claims



1. According to the present invention there is provided a metering assembly for a tank truck/trailer comprising: an air eliminator vessel; means for mounting the air eliminator vessel in a compartment of the tank truck/trailer; a pump mounted in the compartment; a fluid connection between the pump and the air eliminator vessel; a hose connected to the pump and adapted to be inserted in an outside receptacle containing liquid to be pumped into or out of the tank truck/trailer; a flow meter fluidly coupled to the air eliminator vessel; an outlet from the flow meter coupled to the tank of the tank truck/-

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trailer; and means for straining liquid pumped from or to the receptacle prior to the delivery of the liquid into or from the tank of the tank truck/trailer, said means for straining liquid including a strainer assembly coupled between the outlet of said air eliminator vessel and the inlet to said flow meter, the strainer assembly comprising a tubular elbow having a short tube portion and long tube portion, a side tube extending laterally outwardly from said long tube portion adjacent the corner connection with said short tube portion, and a strainer member in the form of an elongate strainer plate received in said side tube and positioned to block the flow of any large particles flowing through said tubular elbow, said strainer plate having a rib which extends outwardly from and longitudinally along one side of said strainer plate.

4,949,578

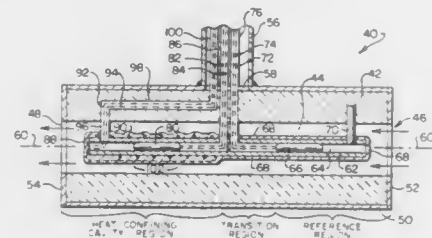
**FLOW METERING OF HIGH TEMPERATURE GASES**  
Joseph W. C. Harpster, 11450 Overbrook La., Galena, Ohio 43021

Filed Oct. 11, 1988, Ser. No. 255,842

Int. Cl.<sup>5</sup> G01F 1/68, 5/00

U.S. Cl. 73—202.5

20 Claims



1. Apparatus for measuring the flow of gas of temperature above 600° F. comprising:

a housing formed of material which is structurally stable, thermally insulating, and having a gas flow passageway therethrough along an axis thereof extending from an entrance opening to an exit opening, having a surface representing a heat confining cavity region of predetermined cross-sectional dimension and length extending inwardly from said exit opening, said passageway having a reference region extending inwardly from said entrance opening and spaced from said heat confining cavity region a distance substantially effecting a thermal isolation therefrom, said housing being positionable to locate said entrance opening to confront said gas flow to provide for passage of a local component of said gas through said passageway;

first temperature sensor means mounted within said heat confining cavity region and including thermally stable first leads extending therefrom for providing signals corresponding with the temperature thereof;

heater means mounted within said heat confining cavity region adjacent said first temperature sensor means for elevating the temperature thereof above said gas temperature and having thermally stable power input leads extending from said housing, said heater means being positioned within said cavity region and said cavity region having a cross-sectional dimension effecting a transfer, by radiation, of heat derived from said heater means and transferred to the surface of said passageway, into said heat confining cavity region, and to said first temperature sensor means and effective to substantially reduce radiant heat loss, conductive heat loss and convective loss of heat generated thereby other than by the passage thereof of said gas; and

second temperature sensor means mounted within said reference region and including thermally stable second leads extending from said housing for providing reference signals corresponding with said gas passing thereover.

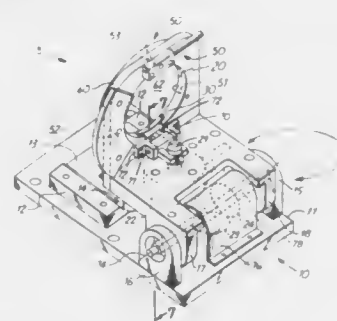
4,949,579  
**APPARATUS FOR GRIPPING HIGH DENSITY DISK PACKS FOR PRECISION BALANCING**  
Sham S. Nayar, Eagan, Minn., assignor to Magnetic Peripherals Inc., Minnetonka, Minn.

Filed Jan. 17, 1989, Ser. No. 297,213

Int. Cl.<sup>5</sup> G01M 1/02

U.S. Cl. 73—468

5 Claims



1. Apparatus for holding an assembly during balancing, the assembly having a precision balancing ring, by the application of pressure inward upon the outside circumference of said ring, wherein said apparatus comprises:

a pivotally mounted holding plate member, pivotable between vertical and horizontal positions;

a large plate member perpendicularly mounted on said holding plate member, said large plate member having a circular aperture for receiving an assembly to be balanced and a cavity extending outwardly from said aperture in the plane of said aperture;

three arched surface members arranged around said circular aperture at roughly 120 degrees from each nearest surface member, the inner circumference of said three surface members being nearly exactly matable to the outside circumference of the balancing ring of an assembly to be balanced, and wherein one of said surface members is moveable toward and away from said ring, the other two surface members being fixedly mounted on said large plate member;

means for pushing said movable surface member toward the center of said aperture with sufficient force to grip the balancing ring between said three surface members;

vibration sensor means fixedly mounted relative to said holding plate and located such that it is in contact with said large plate when said holding plate is in said horizontal position and said large plate is in a vertical position; whereby said assembly may be lowered into said aperture and gripped by said three surface members said holding plate member is in a vertical position and said large plate is in a horizontal position, and thereafter said assembly may be pivoted into a horizontal position for balancing with said large plate in contact with said vibration sensor means, the aperture providing easy access to said assembly for the purpose of adding balancing weights.

4,949,580

**AUDIO ANALYSIS SYSTEM**

John F. Graham, 1191 Calle Arroyo, Thousand Oaks, Calif. 91360, and Donald N. McLaughlin, 22757 Plummer, Chatsworth, Calif. 91311

Filed May 31, 1989, Ser. No. 359,222

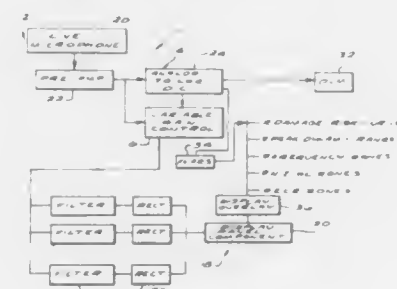
Int. Cl.<sup>5</sup> G01H 17/00

U.S. Cl. 73—646

40 Claims

1. An audio analysis system comprising:  
means for detecting audible sound and converting said sound into a first electrical signal;  
means responsive to said first electrical signal for developing

a second electrical signal as a function of an average DC level of said first signal;  
means responsive to said first electrical signal and said second electrical signal for shifting said average DC level of



said first signal by an amount equal to the inverse of said second signal to develop a level shifted signal; and  
means responsive to said level shifted signal for visually displaying a variance of said level shifted signal in a plurality of discrete frequency bands from said second signal.

4,949,581

**EXTENDED MEASUREMENT CAPABILITY TRANSMITTER HAVING SHARED OVERPRESSURE PROTECTION MEANS**

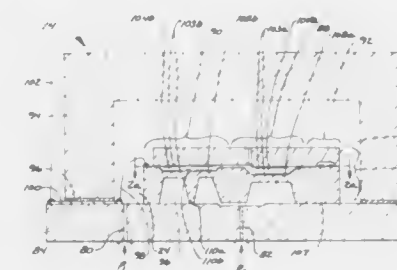
Stanley E. Rud, Jr., Eden Prairie, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Filed Jun. 15, 1994, Ser. No. 365,922

Int. Cl.<sup>5</sup> G01L 7/08, 9/12, 19/04

U.S. Cl. 73—706

14 Claims



1. A transmitter for sensing a difference between two applied pressures, comprising:

a differential pressure sensor having a pair of pressure inlets; overpressure protection means for isolatingly coupling the pair of applied pressures to a corresponding pair of separated volumes of substantially incompressible isolator fluid and correspondingly to the pair of pressure inlets, the overpressure protection means limiting further increase in isolator fluid pressure when the applied differential pressure exceeds a preselected limit and;

at least one additional differential pressure sensor each having a pair of pressure inlets, each inlet open to one of the two volumes of isolator fluid so that the overpressure protection means is shared by such pressure sensor, such pressure sensor extending the measurement capability of the transmitter.

4,949,582

**LIQUID SAMPLER**

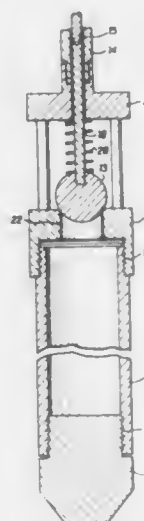
Arthur R. Vollweiler, 105 Harrison, American Falls, Id. 83421

Filed Mar. 6, 1989, Ser. No. 319,541

Int. Cl.<sup>5</sup> G01N 1/12

U.S. Cl. 73—804.63

12 Claims



1. An apparatus for taking samples of liquid and semi-liquid substances comprising, in combination:

a cylindrical hollow tube with screw threads at either end for selectively attaching end caps or attaching other tubes sequentially;

a first cap attached to one end of said hollow tube by means of screw threads which interfacingly engage with said threads of said hollow tube;

a second cap attached to said other end of said hollow tube by means of screw threads which interfacingly engage with said threads of said hollow tube, said second cap having an opening therein sealed, when in the closed position, by a ball valve;

an actuating means attached to said ball valve for releasing said ball valve from said opening in said second cap.

4,949,583

**METHOD OF MASS FLOW MEASUREMENT BY THE CORIOLIS PRINCIPLE AND MASS FLOW METER OPERATING BY THE CORIOLIS PRINCIPLE**

Michael Lang, Weil-Haltingen, Fed. Rep. of Germany, and Jaime Donoso, Reinach, Switzerland, assignors to Flowtec AG, Reinach, Switzerland

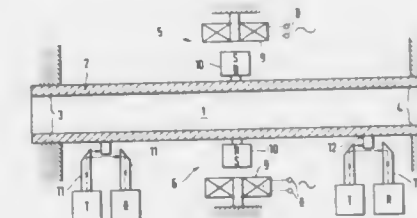
Filed Nov. 17, 1988, Ser. No. 273,360

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739383; Mar. 14, 1988, 3808461

Int. Cl.<sup>5</sup> G01F 1/84

U.S. Cl. 73—861.37

21 Claims



1. A method for mass flow measurement according to the Coriolis principle by means of an elastically deformable measuring tube through which a fluid flows, said method compris-



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ing the steps of effecting a periodic deformation of a cross-section of the measuring tube with an exciter in such a manner that portions of the measuring tube wall which lie diametrically opposite each other are radially deflected through substantially equal distances in the same direction or in opposite directions transversely of the flow direction of the fluid, detecting the tube wall deflections at locations on the measuring tube axially displaced from the exciter, and measuring the phase difference between the detected tube wall deflections which phase difference is indicative of the mass flow of the fluid.

**4,949,584**  
**APPARATUS FOR MEASURING DEPTH OF A FLUID CHAMBER**

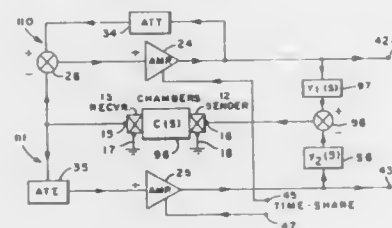
Robert W. Lade, Milwaukee; Herman P. Schutten, Bayside, and Joseph C. Zuercher, Whitefish Bay, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed May 8, 1989, Ser. No. 350,658

Int. Cl.<sup>5</sup> G01B 17/00

U.S. Cl. 73-865.8

8 Claims



1. Fluid power apparatus comprising:  
a cylinder (2') having an end surface (14');  
a piston (4') adapted for axial movement in said cylinder and defining a main fluid chamber (10') bounded by the piston and said end surface;  
a reference chamber (117);  
means (121) for fluid communication between said main chamber and said reference chamber;  
transducer means (12, 13) which is vibratable located in at least one of said main and reference chambers coupling vibrations of said transducer means with fluid in said main chamber and said reference chamber;  
amplifier means (24, 25) having positive feedback and connected with said transducer means for interacting with the fluid in said main and reference chambers to provide respective main and reference oscillation signals (at 42, 43), the frequency of each signal being a function of a dimension of the respective chamber;  
information-processing means (44) receiving said main and reference oscillation signals for providing an output signal (at 82) that depends upon the frequencies of both of said oscillation signals and indicative of the location of the piston in the cylinder.

**4,949,585**  
**TELESCOPIC SCREW JACK FOR THE ADJUSTMENT OF AN ELEMENT SUCH AS A VEHICLE SEAT**

Jean L. Dauvigne, Fosses; Claude Cheavance, Savigny-sur-Orge, and Bruno Laurent, Paris, all of France, assignors to Rockwell-CIM, France

Filed Nov. 14, 1988, Ser. No. 270,972

Claims priority, application France, Nov. 20, 1987, 87 16122

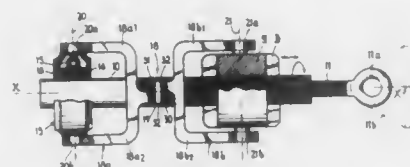
Int. Cl.<sup>5</sup> F16H 25/20

U.S. Cl. 74-89.15

10 Claims

1. Telescopic screw jack for adjusting a translatable housing, said jack comprising a primary tubular screw having an outer screw thread and an inner screw thread of opposite thread hands, a secondary screw cooperative with the inner screw thread and having an end for articulation to a fixed member, a nut fixed in rotation and connected to move in translation along a slide with said translatable housing to be adjusted and

cooperative with the outer screw thread, a motor, a speed reducer connecting the motor to the primary screw for driving the primary screw in rotation, and means for preventing a rotation of the speed reducer relative to the nut, said means



comprising an articulated compass structure comprising two branches articulated to each other, one of the branches being also articulated to the speed reducer while the other branch is articulated to a part of the jack which is fixed in rotation.

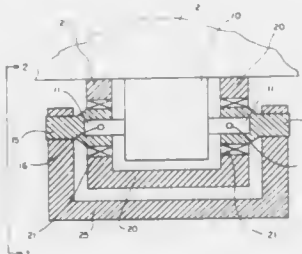
**4,949,586**  
**ACTUATOR SWING ARM MECHANISM**  
Minoru Akagawa, Fremont, Calif., assignor to Intelmatic Corp., Fremont, Calif.

Filed Nov. 7, 1988, Ser. No. 268,377

Int. Cl.<sup>5</sup> B25J 17/00

U.S. Cl. 74-96

2 Claims



1. An actuator swing arm mechanism comprising  
a rotary actuator affixed to a base, said rotary actuator having a rotatable drive shaft,  
extension shafts firmly affixed coaxially to said drive shaft so as to rotate with said drive shaft, each of said extension shafts being provided with a cylindrical tubular section engaging said drive shaft therein,  
a swing arm firmly attached to said extension shafts so as to move unstructurally with said extension shafts, and  
supporting means affixed to said base for rotatably supporting said extension shafts such that a load on said swing arm is supported substantially entirely by said supporting means and only slightly by said drive shaft of said rotary actuator.

**4,949,587**  
**REVERSE GEAR MECHANISM FOR VEHICLE GEAR TRANSMISSION**

Yosio Oka, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1985, Ser. No. 781,565

Claims priority, application Japan, Oct. 1, 1984, 59-148625

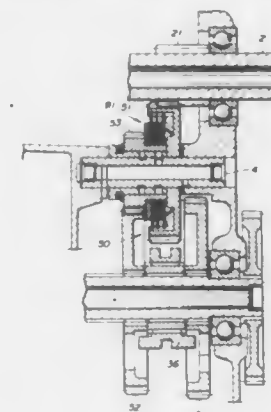
Int. Cl.<sup>5</sup> F16H 3/08, 3/14

U.S. Cl. 74-333

5 Claims

1. A reverse gear mechanism in a vehicle gear transmission having a first shaft, a second shaft, and gear train means associated with said first and second shafts for transmitting the torque from one of the first and second shafts to the other, said reverse gear mechanism comprising:  
a reverse drive gear supported on said first shaft;  
a reverse driven gear supported on said second shaft; and  
idle gear means interposed in meshing relation between said

reverse drive and driven gears and including a third shaft, a first idle gear supported on said third shaft and meshing with said reverse drive gear, a second idle gear supported



bearing and the driving disc on the side of the ball bearing radially opposite the first contact point; and  
a recess adjacent the outer race providing clearance that permits contact between the outer race and the first contact point on the driving disc.

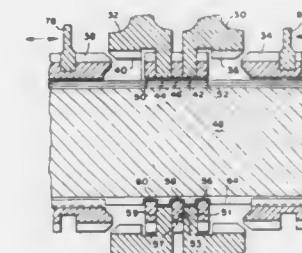
**4,949,589**  
**TRANSMISSION MAINSHAFT GEAR RETAINER**  
Joseph E. Reynolds, Climax, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 27, 1989, Ser. No. 329,134

Int. Cl.<sup>5</sup> F16H 3/08

U.S. Cl. 74-363

7 Claims



on said third gear and meshing with said reverse driven gear, and a clutch unit interposed between said first and second idle gears for limiting the torque transmitted between the first and second idle gears to a prescribed value.

**4,949,588**  
**CONTROLLABLE FRICTION GEAR**  
Eugen Svab, Cologne, Fed. Rep. of Germany, assignor to Ford Motor Company, Dearborn, Mich.

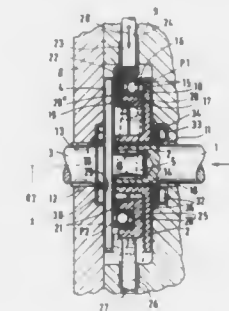
Filed Jun. 23, 1989, Ser. No. 370,655

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824399

Int. Cl.<sup>5</sup> F16H 15/42; F04C 15/04

U.S. Cl. 74-199

7 Claims



1. A friction gear for changing the drive ratio between an input and an output, comprising:  
driving and driven shafts;  
driving and driven discs, each disc connected to the corresponding shaft, the shafts and discs being rotatably mounted coaxially, the discs having faces spaced apart axially;  
a ball bearing radially displaceable between the discs, disposed obliquely between the discs, having an inner race, an outer race contacting the driving disc at a first contact point and contacting the driven disc at a second contact point; and  
displacement means including:  
an inner flange defining a canted surface in which the inner race is supported obliquely with respect to the faces of the driving and driven discs;  
an outer flange located radially outward from the inner race; and  
a web extending radially between the inner flange and outer flange, passing through a space located between the ball

1. In a transmission of the type having a mainshaft, at least two floating mainshaft gears encircling said mainshaft in axial spaced-apart relationship to each other, a plurality of countershafts having countershaft gears supporting and mainshaft gears and driving said mainshaft gears at different rotative speeds, thrust means disposed between the mainshaft gears and operative to transmit axial thrust therefrom to the mainshaft, and clutch means selectively operative to clutch said mainshaft gears to said mainshaft one at a time, wherein the improvement is characterized by said thrust means provided by:

- each of said mainshaft gears having a flange extending toward the mainshaft and having thrust surfaces of opposite sides thereof facing in a direction along the mainshaft;  
a first thrust washer encircling the mainshaft intermediate the respective mainshaft gear flanges;  
a second thrust washer encircling the mainshaft adjacent the flange thrust surface of one of said mainshaft gears facing away from the other of said mainshaft gears;  
a third thrust washer encircling the mainshaft adjacent the flange thrust surface of the other of said mainshaft gears facing away from said one mainshaft gear;  
means for securing said first, second and third thrust washers to the mainshaft for concurrent rotation therewith and to enable axial thrust to be transmitted from the first thrust washer to the mainshaft; and  
said first, second and third thrust washers axially spaced from each other a distance predetermined to enable the respective mainshaft gears to rotate relative thereto when neither is clutched to the mainshaft and to enable one of said mainshaft gears to rotate relative to said first, second and third thrust washers when the other said mainshaft gear is clutched to the mainshaft; and to enable the flange thrust surface facing towards said first thrust washer of the particular mainshaft gear being clutched to the mainshaft to engage therewith and transmit axial thrust to the mainshaft through the means securing the first thrust washer thereto.

4,949,590

**HYDRAULIC CYLINDER ASSEMBLY**

David C. Barker, Utica, and Keith V. Leigh-Monstevens, Troy, both of Mich., assignors to Automotive Products plc, Warwickshire, England

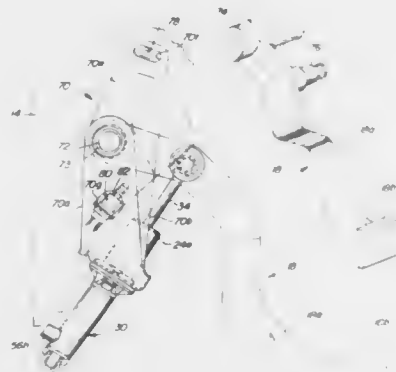
Division of Ser. No. 156,820, Feb. 17, 1988, Pat. No. 4,924,673.

This application Nov. 7, 1988, Ser. No. 268,207

Int. Cl.<sup>5</sup> G05G 1/14

U.S. Cl. 74—512

10 Claims



1. A vehicle control assembly comprising:

- (A) a bracket;
- (B) a hydraulic cylinder assembly including a cylinder mounted on said bracket and a piston rod projecting out of said cylinder;
- (C) a pedal assembly including a pedal arm pivotally connected to the free end of said piston rod; and
- (D) pivot mounting means on said bracket including means for mounting said bracket for pivotal movement about a pivot axis and means mounting said pedal arm at a location thereon spaced from its pivotal connection to the free end of said piston rod for pivotal movement on said bracket about an axis coincident with said bracket pivot axis.

4,949,591

**LEVER CONTROL**

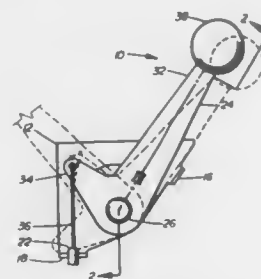
David R. Roelle, Conroe, Tex., assignor to Capro, Inc., Willis, Tex.

Continuation-in-part of Ser. No. 182,245, Apr. 15, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,526

Int. Cl.<sup>5</sup> G05G 5/06

U.S. Cl. 74—531

13 Claims



1. An engine throttle control comprising
- a metal bracket having a first mounting opening,
  - a metal throttle lever including a second mounting opening and means for connecting to a throttle cable,
  - a plastic detent pad having a third mounting opening with an annular ridge surrounding the third opening and an arcuate ridge spaced radially outward from said annular ridge, means extending through said first, second and third mounting openings in said bracket, said lever and said pad to

secure said lever and said pad to said bracket with said pad positioned between said lever and said bracket, and means biasing said lever toward said pad, said lever having a detent projecting toward said pad to engage said arcuate ridge, said arcuate ridge having a first recess to receive said lever detent to define a preselected position of said lever.

4,949,592

**PEDAL-OPERATED PARKING BRAKE**

Takeo Yamazaki, Anjo; Takuya Inaba, Hekinan, and Kiyooki Suesaka, Kariya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

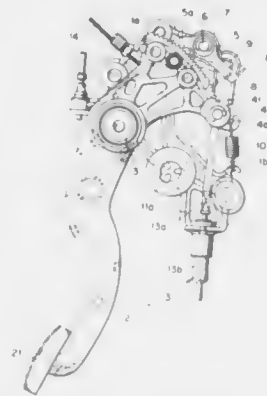
Filed May 26, 1988, Ser. No. 199,198

Claims priority, application Japan, May 29, 1987, 62-80881[U]; May 29, 1987, 62-80883[U]; Jul. 25, 1987, 62-114291[U]; Jul. 25, 1987, 62-114292[U]

Int. Cl.<sup>5</sup> G05G 1/14

U.S. Cl. 74—512

4 Claims



1. A pedal-operated parking brake for use in an automotive vehicle comprising:

- a bracket secured to a vehicle body;
- a brake pedal lever pivotally mounted on said bracket;
- a sector fixed to said brake pedal lever through positioning means for positioning said sector on said brake pedal lever, and fastening means for fastening said sector to said brake pedal lever, said sector having an arcuate end portion with teeth formed thereon, said positioning means having at least one protrusion formed on one of said sector and said brake pedal lever, and at least one bore for receiving said protrusion formed on the other of said sector and said brake pedal lever, and wherein said fastening means comprises a connecting pin for penetrating said sector and said brake pedal lever and connecting therebetween;
- a pawl having at least a tooth at one end thereof, said pawl being pivotally mounted on said bracket and biased toward said sector so that said tooth of said pawl engages with said teeth of said sector; and
- a release lever pivotally mounted on said bracket and associated with said pawl for disengaging said pawl from said sector.

4,949,593

**AXIALLY RECIPROCATABLE CONTROL ROD**

Terenzio Vignoli, Bologna, and Daniele Fantelli, Baricella, both of Italy, assignors to SASIB S.p.A., Bologna, Italy

Filed Apr. 17, 1987, Ser. No. 39,215

Claims priority, application Italy, Jun. 6, 1986, 15186/86[U]

Int. Cl.<sup>5</sup> G05G 1/00; F16P 1/00

U.S. Cl. 74—566

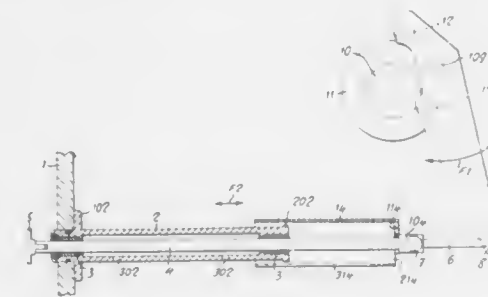
4 Claims

1. An apparatus for processing articles comprising:
- a housing having an interior, an exterior and at least one wall;
  - a support tube disposed in said housing with one end connected to said wall of said housing, said support tube

including an external collar located on the other end of said support tube, a lower portion provided with at least one hole for oil drainage, and at least one self-lubricating bushing disposed therein;

an axially movable horizontally disposed control rod extending through said wall and said support tube such that said control rod has an outward portion extending externally from said housing, a middle portion located within said support tube and an inward portion extending inwardly into said housing beyond said support tube, said middle portion of said control rod being supported by said at least one bushing;

mechanical means for driving said control rod wherein the respective lengths of said outward and inward portions change as said control rod is driven axially by said mechanical means, said mechanical means being located within said housing and connected to said control rod at the end of said control rod located within said housing; and



an axially movable oil guard sleeve means for preventing oil from splashing onto said inward portion of said control rod, said oil guard sleeve means being disposed within said housing and having a portion extending coaxially around a portion of said support tube so that said oil guard sleeve means overlaps and is spaced from said support tube during the entire axial movement of said control rod, said oil guard sleeve means including:

- a lower portion provided with means for allowing oil removal from said oil guard sleeve means,
- an end plate having a lower portion provided with at least one aperture, said end plate being connected to the end of said control rod disposed in said chamber so that said oil guard sleeve means moves with said control rod, whereby oil used to lubricate said mechanical means is prevented by said oil guard sleeve means from soiling articles being processed.

4,949,594

**INTERAXLE DIFFERENTIAL FOR FULL TIME ALL WHEEL DRIVE SYSTEM**

Ashwani K. Galhotra, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Mar. 31, 1989, Ser. No. 331,202

Int. Cl.<sup>5</sup> F16H 35/04

U.S. Cl. 74—650

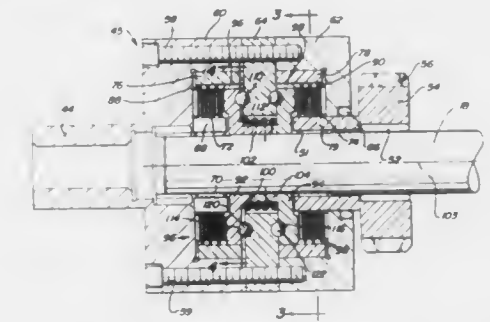
3 Claims

1. A driveline for a full-time four wheel drive motor vehicle, comprising:

- front axleshafts and rear axleshafts;
- a first driveshaft;
- a front driveshaft;
- a rear driveshaft coaxial with the first driveshaft;
- front interwheel differential means for differentially driveably connecting the front axleshafts to the front driveshaft;
- rear interwheel differential means for differentially driveably connecting the rear axleshafts to the rear driveshaft;
- a transfer case rotatably supporting the front and rear driveshafts and the first driveshaft, including means for driveably connecting the first driveshaft and front driveshaft;

an interaxle differential mechanism located in said transfer case, including:

- an input shaft coaxial with the first driveshaft and rear driveshaft;
- first clutch means for driveably engaging and disengaging the first driveshaft and the input shaft;
- second clutch means for driveably engaging and disengaging the rear driveshaft and the input shaft;
- means for continually urging engagement of the first and second clutch means;
- actuator means for varying, in accordance with the magnitude of rotational displacement of the first driveshaft relative to the rear driveshaft, the magnitude of torque transmitted by the first clutch means and second clutch means;
- a first pressure plate located between the actuator means and the first clutch means driveably connected to the first driveshaft;



a second pressure plate located between the actuator means and the second clutch means, driveably connected to the rear driveshaft;

means for driveably connecting mutually the first and second pressure plates when a predetermined magnitude of angular displacement of the first pressure plate relative to the second pressure plate is exceeded;

and wherein the actuator means includes:

- a central disc located between the first and second pressure plates, driveably connected to the input shaft, defining with the first pressure plate a first set of recesses and cam surfaces distributed about said common axis, and defining with the second pressure plate a second set of recesses and cam surfaces distributed about said common axis; and
- first and second sets of driving balls located in the first and second sets of recesses, respectively, forced by contact with the cam surfaces against the corresponding pressure plates as the magnitude of rotational displacement of the first driveshaft relative to the rear driveshaft changes from a reference.

4,949,595

**LINE PRESSURE CONTROL ARRANGEMENT FOR AN AUTOMATIC TRANSMISSION**

Shigeki Shimanaka, Hadashino, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 31, 1989, Ser. No. 387,286

Claims priority, application Japan, Aug. 1, 1988, 63-190536

Int. Cl.<sup>5</sup> B60K 41/18

U.S. Cl. 74—866

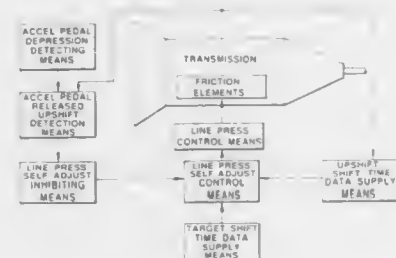
4 Claims

1. In a power train including an engine and transmission operatively connected with said engine, said transmission including means for selectively applying line pressure to friction element of the transmission in order to select predetermined gear ratios, the arrangement comprising:

- line pressure self-adjust means for adjusting the level of line pressure in accordance with the difference between the time required for an upshift and a target time of said shift,
- means for detecting a power off upshift which occurs when



the transmission undergoes an upshift with the engine operating under no load; and



means for inhibiting the self-adjust function when a power off upshift takes place.

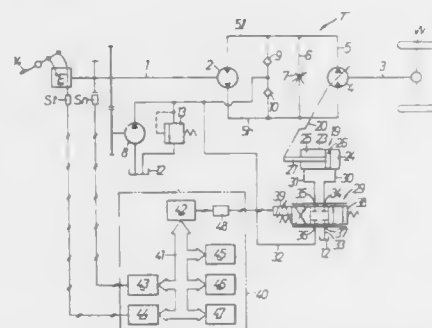
4,949,596

**METHOD OF CONTROLLING CONTINUOUSLY VARIABLE AUTOMOTIVE TRANSMISSION**  
Takashi Iino, and Kazuya Maki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 15, 1987, Ser. No. 73,737

Claims priority, application Japan, Jul. 15, 1986, 61-166325  
Int. Cl.<sup>5</sup> B60K 17/356

U.S. Cl. 74-866

13 Claims



1. A method of controlling a continuously variable transmission having a variable transmission ratio in an automobile having an engine by controlling the transmission ratio thereof based on the difference between a target rotational speed of the engine which is preset according to an indication of the driver's intention of acceleration or deceleration and a detected rotational speed of the engine, said method comprising the step of:

reducing a variable gain of the time rate of change of the transmission ratio as the detected rotational speed of the engine increases.

4,949,597

**HYDRAULIC SYSTEM FOR CONTROLLING SHIFT IN AUTOMATIC TRANSMISSION**  
Akihiro Ueki, Zama, and Kazuhiko Sugano, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Oct. 31, 1988, Ser. No. 264,715

Claims priority, application Japan, Oct. 30, 1987, 62-273220  
Int. Cl.<sup>5</sup> B60K 41/10

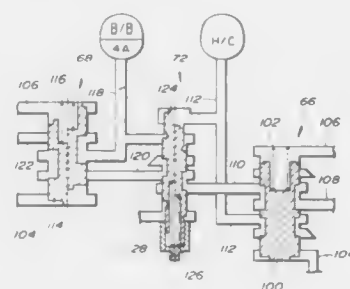
U.S. Cl. 74-869

9 Claims

1. In an automatic transmission:  
a first frictional device;  
a second frictional device having a predetermined chamber;  
a first shift valve means having a first hydraulic line and a second hydraulic line, said second hydraulic line being connected to said first frictional device, for supplying hydraulic fluid to one of said first hydraulic line or said

second hydraulic line and discharging hydraulic fluid from the other of said first hydraulic line and said second hydraulic line;

second shift valve means having a third hydraulic line connected to said predetermined chamber of said second frictional device and a fourth hydraulic line, for connecting said third hydraulic line to said fourth hydraulic line; sequence valve means connected to said first hydraulic line



and said fourth hydraulic line for normally discharging hydraulic fluid from said fourth hydraulic line and blocking said first hydraulic line, said sequence valve means including spool means responsive to hydraulic pressure in said second hydraulic line and hydraulic pressure in said third hydraulic line for connecting said fourth hydraulic line to said first hydraulic line to allow a supply of hydraulic fluid from said first hydraulic line to said fourth hydraulic line.

4,949,598

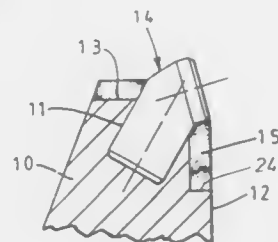
**MANUFACTURE OF ROTARY DRILL BITS**  
Nigel D. Griffin, Whitminster, England, assignor to Reed Tool Company Limited, Gloucestershire, England  
Filed Oct. 31, 1988, Ser. No. 265,238

Claims priority, application United Kingdom, Nov. 3, 1987, 8725671

Int. Cl.<sup>5</sup> B22F 7/08

U.S. Cl. 76-108.2

23 Claims



1. A method of manufacturing a rotary drill bit which includes the steps of forming a main bit body part from a machinable metal, machining in the outer surface of the main bit body part a plurality of sockets, inserting in each of said sockets an element which substantially fills at least the mouth of the socket and projects beyond the outer surface of the main bit body part, applying to the surface of the main body part, at least in an area surrounding each said socket, a compound comprising powdered matrix-forming material mixed with a binder to form a paste, enclosing the matrix-forming compound by packing particulate mould-forming material around at least the areas of the main bit body part to which said compound is applied, and infiltrating said matrix-forming compound with a metal alloy in a furnace to form a hard matrix.

4,949,599

TIPPED TOOLS

Benno Iseli, Schotz, Switzerland, assignor to Iseli & Co. AG, Schotz, Switzerland

Filed Mar. 23, 1989, Ser. No. 328,104

Claims priority, application United Kingdom, Mar. 25, 1988, 88017125

Int. Cl.<sup>5</sup> B23D 63/00

U.S. Cl. 76-112

10 Claims



1. A method of producing cutting edges of tools involving teeth having tips of a material harder than that of the remainder of the tool comprising the steps of:

forming a rod of Stellite having at least one longitudinally extending planar surface,  
mounting the Stellite in a predetermined direction with respect to the tool such that the planar surface provides the front face of a tip of a tooth, and  
cutting the rod of Stellite in a plane transverse to the planar surface to form a top surface of the tip.

4,949,600

**COMBINATION POP-TOP CAN AND BOTTLE OPENER HAVING ENGAGING LIP**

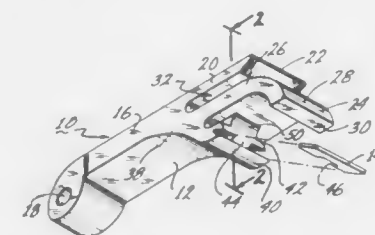
Bruce E. Tricinella, 17629 San Cristobal, Fountain Valley, Calif. 92708

Continuation-in-part of Ser. No. 199,311, May 26, 1988, Pat. No. 4,864,898. This application Aug. 11, 1989, Ser. No. 393,566

Int. Cl.<sup>5</sup> B67B 7/44

U.S. Cl. 81-3.09

17 Claims



1. In combination with a pop-top can and bottle opener of the type having a lever body formed as a unitary elongated body with an elongated planar portion of the lever body formed as a lifting element for fitting underneath a pop-top can lift tab on a pop-top can, the lifting element including a wedge surface for fitting between a pop-top can lift tab and the top surface of a pop-top can; a fulcrum element formed as a further portion of the elongated lever body, the fulcrum element for engaging either the top of a bottle cap or one surface of the pop-top lift tab, the fulcrum element including a straight section and an arcuate section with the straight section of the fulcrum element located in parallel planar association with the lifting element and joining the arcuate section to the remainder of the lever body, and the arcuate section of the fulcrum element curving away from the lifting element, a pop-top lift tab sheaving channel formed as an opening between the lifting element and the fulcrum element on the lever body, an improvement comprising:  
a generally planar bottle cap gripping member independent of but fixedly joining to said lever body, said gripping member having first and second side edges joined by a back edge and a lifting edge;

said gripping member formed of a material essentially impervious to deformation by an edge of a bottle cap;  
said lifting edge of said gripping member including a bottle cap engagement means for engaging with the under side of the edge of a bottle cap.

4,949,601

**APPARATUS FOR ASSEMBLING THREADED MEMBERS**

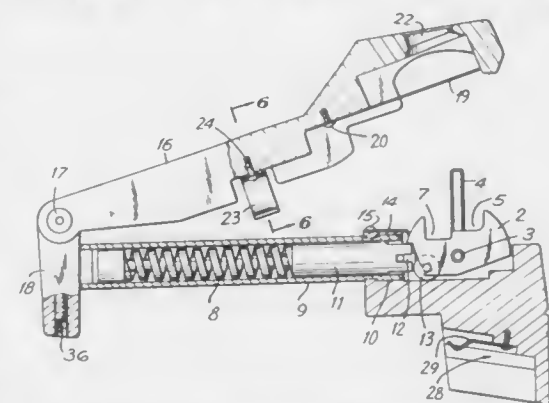
Alan Broadwin, Brooklyn, N.Y., and Joseph N. Logan, Trumbull, Conn., assignors to Valleylab, Inc., Boulder, Colo.

Filed Oct. 13, 1989, Ser. No. 421,209

Int. Cl.<sup>5</sup> B25B 9/02

U.S. Cl. 81-52

11 Claims



1. An apparatus for assembling and disassembling a device comprising at least a first and a second threadably engageable member, which apparatus comprises:

- wrenching means and
- an integral securing means and torque limiter assembly; said assembly comprising, in combination, securing means operatively associated with a pinion block pivotally mounted on a solid base, said pinion block having a surface which bears against biasing means connected to force means which provides a predetermined amount of torquing when said first member is held in said securing means and said second member is turned relative thereto by said wrenching means, whereby the amount of torquing is limited by the pivotal movement of said pinion block.

4,949,602  
WRENCH

Robert A. Letts, Fleet; David G. Allen, Chiddingfold, and Terence C. Bullen, Guildford, all of England, assignors to MHH Engineering Co., Ltd., Guildford, England

Filed Dec. 29, 1988, Ser. No. 291,720

Claims priority, application United Kingdom, Dec. 30, 1987, 8730296; Jun. 18, 1988, 8814542

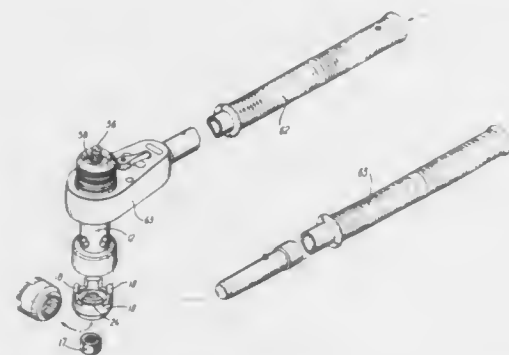
Int. Cl.<sup>5</sup> B25B 23/14

U.S. Cl. 81-467

11 Claims

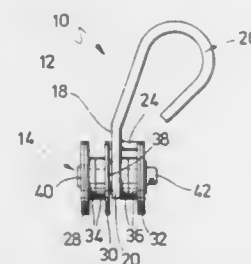
1. A wrench for use with a nut and bolt combination in which the bolt has an axial bore in its stem and a pin member located within the bore; the wrench comprising a first engagement member for rotational engagement with one of the nut and the bolt head, a second engagement member for rotational

engagement with said pin member, a common drive member for simultaneous rotation of the first and second engagement



members, and detection means for detecting a change in resistance to the rotation of the second engagement member.

**4,949,604**  
**CARPET ATTACHING DEVICE**  
Daniel R. Squires, 7300 Murkins, Kansas City, Mo. 64133  
Filed Apr. 5, 1989, Ser. No. 333,445  
Int. Cl.<sup>5</sup> A47G 27/04; B25B 27/02  
U.S. Cl. 81—488 **7 Claims**



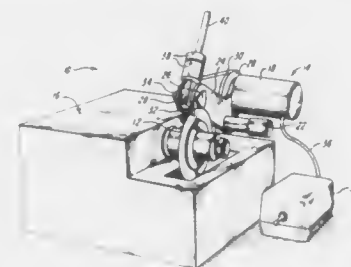
1. A carpet attaching device for attaching carpeting presenting an upper face to tack stripping having a plurality of upstanding tacks substantially aligned therealong, said device comprising:

- a frame;
- roller means presenting a peripheral surface for engaging the carpet upper surface, said roller means including two parallel wheels spaced apart from one another for straddling tacks as said device axially rolls along the tack stripping; and
- means rotatably coupling said roller means and said frame with at least a portion of said peripheral surface extending therefrom,
- said frame presenting graspable means for grasping by a user of said device for placing said peripheral surface portion into depressing engagement with the carpet upper face, and for rollably moving said device axially along the tack stripping with the carpet therebetween in order to secure the carpet to the tack stripping.

**4,949,605**  
**CUTTING APPARATUS WITH WORKPIECE ROTATION CONTROL**  
Joseph D. Geller, 52 Prospect St., Topsfield, Mass. 01983, and Robert E. LeBlanc, P.O. Box 613, Peabody, Mass. 01960  
Filed Nov. 29, 1988, Ser. No. 277,190  
Int. Cl.<sup>5</sup> B23B 5/14 **5 Claims**

1. In apparatus for cutting a workpiece, the apparatus including a blade having a cutting surface rotatable in a first

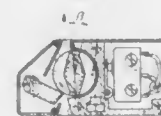
rotation direction for cutting at least a first surface of the workpiece, the improvement comprising  
workpiece holding means for holding the workpiece, said workpiece holding means being rotatable about an axis of rotation in either of (i) the first rotation direction, so that the first surface of the workpiece moves in a direction substantially opposite that of the cutting surface or (ii) a second rotation direction opposite said first rotation direction, so that the first surface of the workpiece moves in a direction substantially the same as that of the cutting surface,  
pivoting arm means pivotably supporting said workpiece holding means, for pivoting, due to gravity, so that the workpiece is urged into resilient contact with the cutting surface, at least in part due to gravity, wherein radial



irregularities of the surface of the workpiece that are sequentially encountered by the blade due to rotation of the workpiece are resiliently tracked by the pivoting arm means during rotation of the workpiece, so that at least a portion of the cutting surface is in contact with the surface of the workpiece at all times during rotation of the workpiece, regardless of radial irregularities of the workpiece that are sequentially encountered by the blade due to rotation of the workpiece, and  
variable rotation control means, mechanically coupled to said workpiece holding means, for selectively and variably controlling rotation of said workpiece holding means so that movement of the surface of the workpiece selectively differs in any of velocity or direction from the movement of the cutting surface of the blade.

**4,949,606**  
**APPARATUS FOR SEVERING DATA-BEARING TAPES WHICH ARE DISPENSED BY A MACHINE**  
Horst Pfeiffer, Aldingen, Fed. Rep. of Germany, assignor to Hengstler GmbH, Aldingen, Fed. Rep. of Germany  
Filed Nov. 22, 1988, Ser. No. 275,528  
Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 8716108[U]

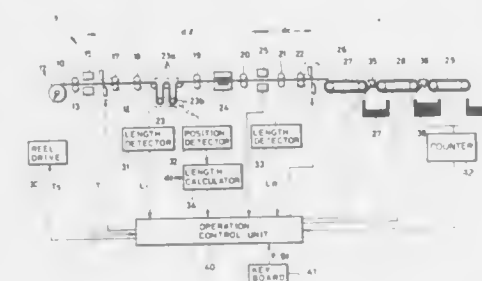
Int. Cl.<sup>5</sup> B26D 1/62, 5/06  
U.S. Cl. 83—69 **14 Claims**



1. In an apparatus for severing data-bearing tapes, comprising,  
a helical rotary cutter,  
a stationary cutter for cooperating with said rotary cutter to sever said tape,

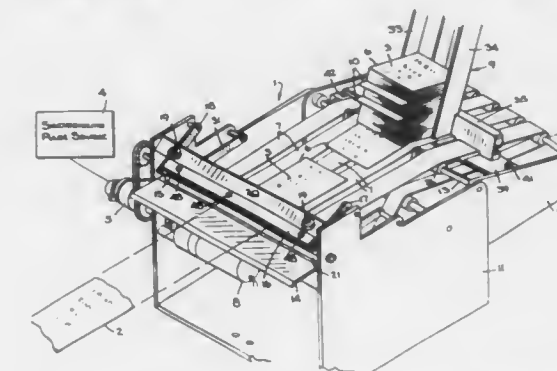
spring means for urging said stationary cutter against said rotary cutter, and  
an electric motor for rotating said rotary cutter, the improvement residing in that  
an angle-section carrier having first and second legs is provided, said first leg is provided with a concave recess extending longitudinally along said carrier,  
means for mounting said rotary cutter in said recess, said electric motor being mounted on said second leg, a first covering hood is mounted on said carrier and covers said rotary and stationary cutters,  
a second covering hood is mounted on said carrier and covers said electric motor, and  
said means for mounting said rotary cutter includes a pair of spaced end walls, each of said end walls is provided with at least one pin for retaining said first covering hood.

**4,949,607**  
**CONTROL SYSTEM FOR WEB MATERIAL CUTTING LINE**  
Fumio Yuito, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Apr. 10, 1989, Ser. No. 335,680  
Claims priority, application Japan, Apr. 8, 1988, 63-86692  
Int. Cl.<sup>5</sup> B26D 5/40 **7 Claims**  
U.S. Cl. 83—76.7



1. A control system for a web cutting line in which a web of indeterminate length is cut into sheets, comprising:  
cutting means for cutting a web advanced along a web cutting line to sheets of predetermined length;  
end cutting shear means disposed near an entrance to said web cutting line for severing that part of said web that extends along said web cutting line from the part of said web that has not yet entered the cutting line;  
first defect sensor means disposed near said end cutting shear means for detecting surface defects in said web;  
second defect sensing means disposed near said cutting means for detecting defective parts of said web that include a surface defect detected by said first defect sensing means;  
control means for estimating the number of acceptable sheets obtainable from said part of said web extending along said cutting line based on the distribution of surface defects detected by said first defect sensing means;  
a counter for cumulatively counting acceptable sheets cut off from said web; and  
said control means also causing said end cutting shear means to cut off said part of said web extending along said cutting line when the sum of said estimated number and said counted number of acceptable sheets reaches a predetermined total.

**4,949,608**  
**COMBINED WEB-CUTTING AND SHEET STACKING APPARATUS**  
Donald J. Ward, Sayre, and Gerald R. Bradley, Athens, both of Pa., assignors to Paxar Corporation, Pearl River, N.Y.  
Filed Nov. 17, 1988, Ser. No. 273,470  
Int. Cl.<sup>5</sup> B26D 7/32; B65H 29/40, 35/08  
U.S. Cl. 83—96 **10 Claims**

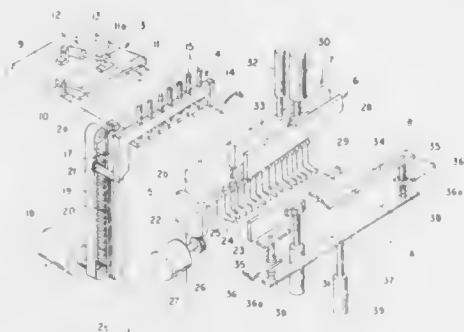


1. Apparatus for cutting a web into separate sheets and stacking such sheets as the web is fed into said apparatus, said apparatus comprising:  
a fixed frame;  
a plurality of rollers rotatably mounted on said frame with the axes of said rollers substantially parallel to each other and spaced from each other in a predetermined direction, a first one of said rollers being mounted at one end of said frame and a second one of said rollers being mounted at the other end of said frame;  
a pivotable frame pivotally mounted on said fixed frame for pivotal movement around the axis of said second roller;  
a third roller rotatably mounted on said pivotable frame with its axis spaced from the axis of said second roller in said predetermined direction;  
at least three relatively long and narrow, laterally spaced belts disposed in side-by-side relation and mounted on said plurality of rollers and said third roller with their lengths substantially parallel and extending in said predetermined direction for transporting individual sheets from said first roller to said second roller;  
motor means connected to said first one of said rollers by a continuous drive for continuously moving the upper surfaces of said belts in said predetermined direction;  
a rotatable knife rotatably mounted on said fixed frame with its axis of rotation substantially parallel to the axis of said first roller and mounted in spaced relation to said first roller in the direction opposite to said predetermined direction for engaging and cutting a web as its is fed to said belts;  
a non-rotatable knife mounted on said fixed frame in opposition to said rotatable knife for receiving web therebetween;  
clutch means connected to said rotatable knife and said motor means for periodically interconnecting said rotatable knife and said motor means and cutting the web at predetermined portions thereof into sheets of predetermined length as the web is fed to said knife means, said belts being disposed to receive the sheets as the web is cut;  
stop means adjustably mounted on said pivotable frame intermediate said second roller and said third roller for engaging the sheets at their leading edges as the latter pass said second roller, said stop means being adjustable in position in directions parallel to said predetermined direction;  
a pair of uprights adjustably mounted on said stop means for receiving the sheets with their major surfaces substantially horizontal and holding them in a vertical stack, said up-



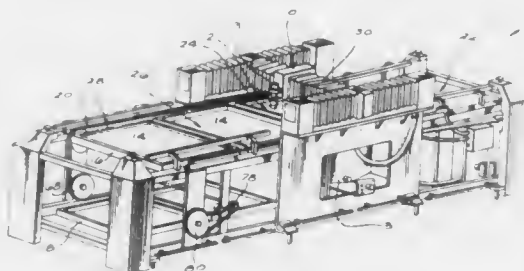
rights being adjustable toward and away from each other for receiving sheets of different widths; stripping fingers below said uprights for removing sheets from said belts and respectively disposed between pairs of said belts; and adjusting means connected to said fixed frame and to said pivotable frame for changing the angular relationship of said pivotable frame to said fixed frame and thereby changing the angle of said uprights to the vertical.

**4,949,609**  
**CUTTING APPRATUS FOR TOWEL CLOTH**  
Kenichi Sohtome, Tochigi, and Munetaka Nagasaki, Osaka, both of Japan, assignors to SSMC Inc., Edison, N.J.  
Filed Jun. 5, 1989, Ser. No. 361,533  
Claims priority, application Japan, Jul. 11, 1988, 63-171022  
Int. Cl.<sup>5</sup> B26D 7/00  
U.S. Cl. 83—175



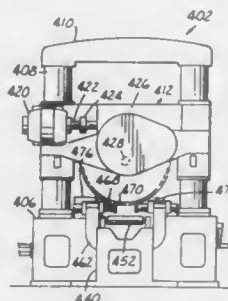
1. A cutting apparatus for severing the individual margin portions composed of warp yarns from a towel cloth having an end and plurality of said margin portions longitudinally disposed and spaced apart, said apparatus comprising:  
a towel automatic sewing machine body;  
first and second working tables disposed at the body in opposed positions, the tables having a space therebetween;  
a clamping unit mounted on the first table for detachably clamping the end of the towel;  
a towel drawing unit mounted on the first table for drawing a length of towel from the cloth;  
a towel alignment unit for receiving the drawn length, mounted on the second table and rotatably secured to the body, the alignment unit including a segment gear secured to the end thereof, comb teeth supporting shaft secured to the gear and extending transversely across the towel cloth length, the shaft supporting a plurality of comb teeth disposed side by side in spaced position along the shaft and each comb tooth having an operative portion, a base and an operative portion defining an L shape, a pinion gear engaging the segment gear and rotatable in one direction to cause the comb teeth to engage the warp yarn of the margin portion of the drawn length and in an opposite direction to disengage the comb teeth from the yarn, and a motor for rotating the pinion gear in either direction; and  
a cutting device cooperating with the alignment unit for cutting the margin portion out of the drawn length.

**4,949,610**  
**BOARD-SUPPORTING ASSEMBLY FOR FLUID JET CUTTING SYSTEM**  
Edward P. Jones, 4115 - 209th Ct., NE., Redmond, Wash. 98052; G. Duncan Murdock, 14505 SE. 254th Ave., Kent, Wash. 98042, and Geoffrey J. Dean, 9633 - 26th Ave., NW., Seattle, Wash. 98117  
Filed Apr. 15, 1985, Ser. No. 723,428  
Int. Cl.<sup>5</sup> B26F 3/00  
U.S. Cl. 83—177



1. A fluid jet cutting system of the type employing a high velocity fluid jet as the cutting medium to cut a masterboard, said cutting system comprising:  
nozzle means for producing a high velocity fluid jet and directing said jet towards a masterboard of material to be cut;  
catcher means for capturing and dissipating the jet emerging from the masterboard; and  
a platen assembly for supporting the masterboard and including a layer of resiliently compressible material for supporting the masterboard material on its top surface, and a lattice-like network of relatively uncuttable structural bonded to the bottom surface of the layer of resiliently compressible material to form a non-migrating support surface from the cut pieces of masterboard.

**4,949,611**  
**HYDRAULIC AND ELECTRICAL CIRCUITS FOR A HEAVY-DUTY SAW**  
Michael J. Fillion, Dearborn, Mich., assignor to Steel Industries, Inc., Detroit, Mich.  
Continuation of Ser. No. 274,413, Nov. 21, 1988, abandoned.  
This application Dec. 20, 1989, Ser. No. 455,819  
Int. Cl.<sup>5</sup> B26D 5/20, 5/42  
U.S. Cl. 83—221



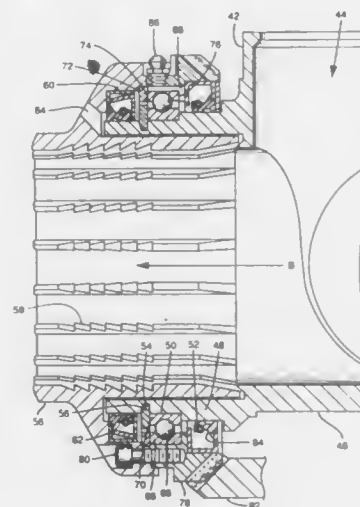
1. In a heavy-duty saw assembly having a base, a pair of spaced columns thereon, a saw feed carriage guidably mounted upon the columns upon vertical axes and supporting a power-driven saw rotatable upon a horizontal axis a hydraulic lift feed cylinder assembly within each column and connected to said saw feed carriage, an elongated roller train extending at right angles to said base and connected thereto, including a plurality

24 Claims

37 Claims

of spaced transverse rollers, a continuous sprocket chain connected to the rollers for selective rotation in unison for intermittently feeding an elongated workpiece onto said base transversely of and under the saw, spaced normally open rear and front hydraulic vises adjustably mounted upon said base rearwardly and forwardly of the saw respectively adapted to selectively grip the work, and a pair of spaced manually rotatable lead screws journaled upon the base adapted for connection to said vises respectively, the improvement of hydraulic circuit means therefor comprising:  
first and second hydraulic circuits;  
first and second power-operated hydraulic pumps for feeding hydraulic fluid into said circuits respectively;  
a four-way, three-position, spring centered, solenoid-activated saw feed carriage first valve in said first circuit having an outlet connected to the lift feed cylinder assemblies for selectively raising and lowering the saw feed carriage;  
a reversible hydraulic motor having an output drive connected to said sprocket chain;  
a four-way, three-position, spring centered, solenoid-activated second valve in said first hydraulic circuit having an output connected to said hydraulic motor;  
a two-position, four-way, spring offset, solenoid-operated third valve in said second hydraulic circuit having an outlet connected to said rear vise;  
said saw feed carriage being initially retracted, activation of said second four-way valve and hydraulic motor first actuating said rollers;  
activation of said third valve closing said rear vise upon the work; and  
successive actuating of said first valve actuating said cylinder assemblies for feeding the saw to and through said work.

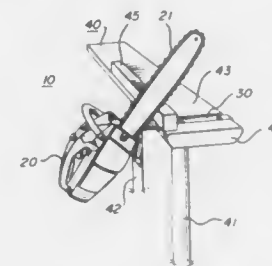
**4,949,612**  
**APPARATUS FOR SLICING VEGETABLES**  
John C. Julian, 1914 Hood St., Richmond, Wash. 99352  
Filed Aug. 15, 1989, Ser. No. 394,216  
Int. Cl.<sup>5</sup> B26D 3/28  
U.S. Cl. 83—403



1. An apparatus for slicing vegetables comprising:  
an impeller hub to receive a product to be sliced;  
a plurality of tubular extensions projecting outwardly from said impeller hub, each of said tubular extensions having a first step and a second step about the periphery thereof;  
a means to rotate the impeller hub in a first plane;  
a plurality of impeller tubes, one of said plurality of impeller tubes located inside each of said plurality of tubular extensions, to displace the product to be sliced outwardly;  
a means to rotate the impeller tubes within the impeller hub

in a second plane, said second plane being perpendicular to the first plane;  
a plurality of impeller bevel gears associated with said means to rotate said impeller tubes, one of said plurality of bevel gears located outside of each of said plurality of tubular extensions, and attached to the impeller tube within each of said tubular extensions;  
a plurality of bearings, each of said bearings having a first surface and a second surface, one of said plurality of said bearings positioned between each of said tubular extensions of said impeller hub on said first step of said tubular extension and said impeller bevel gear to locate said impeller bevel gear about said tubular extension of said impeller hub and to locate said impeller tube within said tubular extension of said impeller hub;  
a first seal positioned on the second step of each of said tubular extensions between said tubular extension and said bevel gear to seal the first surface of said bearing;  
a second seal positioned on the first step of each of said tubular extensions between said tubular extension and said impeller tube to seal the second surface of said bearing; and  
a means to hold stationary knives radially about the displacement means to slice the product.

**4,949,613**  
**CUTTING OF MATERIALS**  
Arnold R. Bone, 25 Bradford St., Needham, Mass. 02192  
Filed Sep. 29, 1982, Ser. No. 427,486  
Int. Cl.<sup>5</sup> B26D 5/08  
U.S. Cl. 83—574



1. Apparatus for facilitating the operation of a cutting instrumentality, which comprises:  
a member having a first section for attachment solely to the surface of a mount that receives a work piece to be acted upon by said cutting instrumentality;  
said member having a second section, integral with the first section, extending outwardly and downwardly with respect to the surface of said mount when said member is attached to said mount;  
said second section including a spindle extending outwardly from only one side of said member for acting as the sole pivotal support for said cutting instrumentality; and  
said second section further including, beyond said spindle at a free end of said second section, a retainer that is upwardly pivotable when said cutting instrumentality is pivoted on said spindle, to prevent accidental dislodgment of said cutting instrumentality from said spindle.

**4,949,614**  
**PUNCH AND DIE SET**  
Gordon L. Hoppestad, Downers Grove, Ill., assignor to Precision Brand Products, Inc., Downers Grove, Ill.  
Filed Jun. 20, 1989, Ser. No. 368,835  
Int. Cl.<sup>5</sup> B26D 1/00; B21D 53/20  
U.S. Cl. 83—681

1. In combinations with a manually operated punch and die

7 Claims

4 Claims

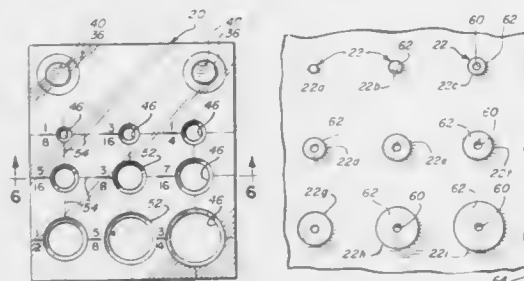
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set including a die having a series of openings therethrough graduated according to diameter, and a series of punches having cutting faces complementary to and received in said die openings for manually severing discs from sheet material and leaving corresponding graduated openings in the sheet material, means adapted for use in making washers or the like from the sheet material which comprises:

a series of pilots having heads graduated in diameter to correspond to the diameters of a like number of said graduated sheet material openings, each of said pilots having a shank joined to its head, and



means providing a shank-receiving bore in the cutting face of each of a plurality of said punches, each of said bores removably receiving each of said shanks therein, whereby any of said pilots selectively may be removably mounted on any of the latter cutting faces of greater diameter than the head of the pilot for manual insertion of the head into a sheet material opening of corresponding diameter to orient the opening with respect to the cutting face, for severing from the sheet material an annular washer encompassing the opening.

4,949,615

## INDEXABLE INSERT CUTTERS

James W. Jordan, Coventry, England, assignor to Sandvik Hard Materials, Ltd., Coventry, England

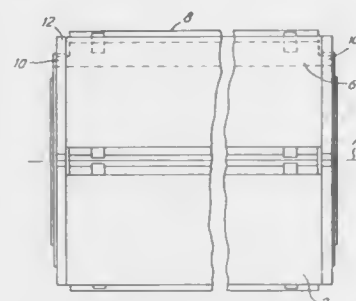
Filed May 4, 1988, Ser. No. 190,089

Claims priority, application United Kingdom, May 21, 1987, 8712080; Jul. 24, 1987, 8717591

Int. Cl.<sup>5</sup> B26D 1/62

U.S. Cl. 83—674

14 Claims



1. A cutter comprising a body having an axis of rotation, a periphery of said body extending in the direction of said axis, at least one elongate cutter insert having at least one cutting edge at said periphery of the body and extending axially of the body, and clamping means displaceably mounted on the body, said clamping means comprising, for said at least one cutter insert, a plurality of axially spaced clamping elements, each said clamping element comprising a pair of spaced clamping faces directed obliquely inwards of the cutter body at opposite inclinations to said periphery, said insert having a polygonal cross-section comprising outwardly inclined faces on opposite sides of an operative cutting edge of the insert for a engagement by said spaced clamping faces, said clamping elements

having freedom of movement towards and away from the rotary axis of the body for applying a generally radially inward force clamping said cutter insert releasably upon the body.

4,949,616

## STEPLESS TRANSMISSION SCROLL SAWING MACHINE WITH SAW BLADE FASTENING AND MICRO-INCH ADJUSTING MEANS AND THE RELATED POSITIONING DEVICE

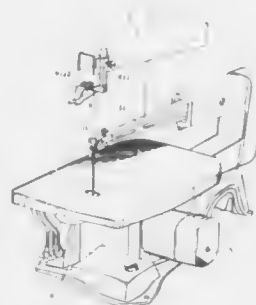
Andy Chang, No. 38, Juan Liao Road, Fong Yuan, Taichung, Taiwan

Filed May 22, 1989, Ser. No. 355,430

Int. Cl.<sup>5</sup> B27B 19/06

U.S. Cl. 83—748

3 Claims



1. A stepless transmission scroll sawing machine for sawing a material with a saw blade and saw blade fastening and micro-inch adjusting means and a positioning device which comprises a base with a flat working table mounted thereon, said flat working table being adjustable to turn leftwardly or rightwardly, an upper revolving carriage and a lower revolving carriage being connected together at one end thereof to define a determined degree of contained angle, the other ends thereof being movably connected with an upper arm and a lower arm, each of said upper and lower arms having saw blade fastening and micro-inch adjusting means, a variable-speed motor mounted on said base and set at one side thereof, one end of said motor being connected to a power supply through a control circuit, said motor having a revolving shaft connected with a first eccentric plate and a second eccentric plate, said first eccentric plate being connected to a bearing point located in the middle of said lower arm, said second eccentric plate being of the same mass as said first eccentric plate and being set opposite to said first eccentric plate to neutralize the shocking force resulting from the sawing process, said upper and lower arms having an upper and a lower saw blade holder, an arm shield covering said upper saw blade holder, positioning means for the saw blade and for said material connected to said arm shield, wherein said positioning means comprise a retaining plate mounted on one side of said arm shield, said arm shield is a reduced channel bar, said retaining plate and said arm shield define an orifice, said positioning means comprising an adjusting rod having one end inserted into said orifice whereby the height of said positioning means is adjustable according to the extent said adjusting rod is inserted into said orifice, the other end of said adjusting rod connected to an adjusting clamp means by means of screw means, said adjusting clamp means comprising a lower pressure plate and a bent upper pressure plate, said lower pressure plate retaining the material to be processed during sawing, said upper pressure plate having a front notch, whereby the swinging range of said saw blade held between said upper and lower arms is confined, said upper pressure plate also having a back notch for engagement with screw means to movably connect said upper pressure plate to said adjusting clamp means, said lower pressure plate having a forked front end turning upwardly to define a front notch for passing therethrough said saw blade and having a rear notch at

4,949,618

## MISSILE PROTECTION SYSTEM

John P. Tarlano, Fairfax County, Va., assignor to The United States of America, Washington, D.C.

Filed Dec. 19, 1989, Ser. No. 456,829

Int. Cl.<sup>5</sup> F41F 3/04

U.S. Cl. 89—1.809

3 Claims



1. An underwater launched missile protection system, comprising:

- (a) a missile having a nozzle system in the aft end of the missile; and
- (b) a meltable cover for protecting the nozzle system from energy of turbulent water, the turbulent water being created during underwater launch of the missile, said meltable cover being fixedly attached to the missile.

4,949,619

## SOUND PICKUP DEVICE FOR ACOUSTIC STRINGED INSTRUMENTS

Wolf-Ulrich Freiherr von Maltzan, Königsweg 3100, D-1000 Berlin 39, Fed. Rep. of Germany

PCT No. PCT/DE88/00055, § 371 Date Oct. 5, 1988, § 102(e) Date Oct. 5, 1988, PCT Pub. No. WO88/05952, PCT Pub. Date Aug. 11, 1988

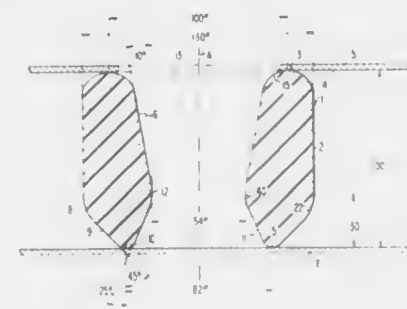
PCT Filed Feb. 8, 1988, Ser. No. 275,040

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1987, 8702014; Sep. 1, 1987, 8711963

Int. Cl.<sup>5</sup> G10H 3/18

U.S. Cl. 84—723

17 Claims



1. A sound pickup device for acoustic stringed instruments, comprising:

- an elastic foam body, said body having an outer peripheral wall and top and bottom ends, each of said top and bottom ends having at least one projection extending therefrom, whereby said body will be retained within a soundbox of an acoustic stringed instrument by abutment of said projections against interior walls of the soundbox;
- microphone means connected to said body; and
- means for connecting said microphone means to external equipment, said means for connecting being connected to said body.

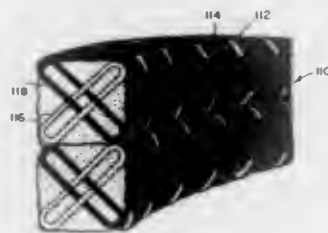
1. An apparatus for applying and dispensing a masking paper wound in a roll form and comprising a relatively thin synthetic-resin film folded in a plurality of parallel pleats and a relatively thick tape disposed along a longitudinal margin of said film and having a pressure-sensitive adhesive layer formed on the opposite sides thereof, said apparatus comprising:

- a housing accommodating said masking paper in a roll form, a group of rolls for taking said masking paper out of said housing,
- a cutter blade for cutting said masking paper, means for reciprocating said cutter blade in a first direction from a starting position across said masking paper and in a second direction across said masking paper back to said starting position, and
- means for retracting said cutter blade from said masking paper during said movement in said first direction, comprising:
  - a blade carrier supporting said cutter blade for movement in a direction toward and away from said masking paper;
  - a spring means for biasing said cutter blade away from said masking paper; and
  - cam means carried by said blade carrier, wherein said cam means comprises a cam member having:

- (a) a first cam surface engagable with said cutter blade for holding said cutter blade in an advanced position, in opposition to said spring means, for cutting said masking paper,
- (b) a second cam surface engagable with said cutter blade for permitting said cutter blade to retract due to the biasing of said spring means, wherein said cutter blade is movable between said first cam surface and said second cam surface,
- (c) a first abutting surface which abuts said housing when said cutter blade is moved back to said starting position by said reciprocating means, whereby said cam member is stopped allowing said cutter blade to move from said first cam surface to said second cam surface for permitting said cutter blade to be retracted for subsequent movement in said first direction.

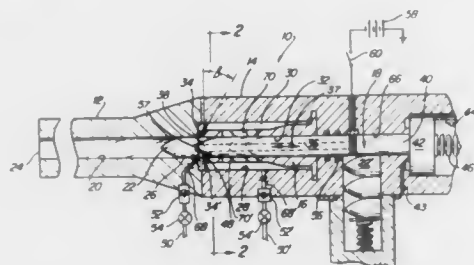


**4,949,620**  
**EDGE-REINFORCED PACKING FOR USE IN STEAM SERVICE**  
Charles F. Swan, Brooklin, Me., and George B. Champlin, Stoneham, Mass., assignors to New England Braiding Company, Inc., Manchester, N.H.  
Filed Dec. 21, 1988, Ser. No. 287,916  
Int. Cl.<sup>5</sup> D04C 1/06; F16J 15/22, 15/26; F16K 41/02  
U.S. Cl. 87—8 5 Claims



1. A braided packing having axial warp yarns and carrier yarns braided about said axial warp yarn comprising: said carrier yarns braided into a packing having a generally rectilinear cross section, the resulting packing having edges, the carrier yarns forming at least two diagonally opposed edges having a metal reinforcing wire embedded therein, with the carrier yarns not involved in forming said edges being devoid of reinforcing wire, whereby reinforcing wire usage is minimized.

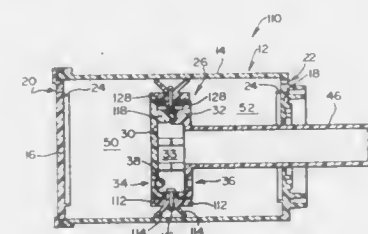
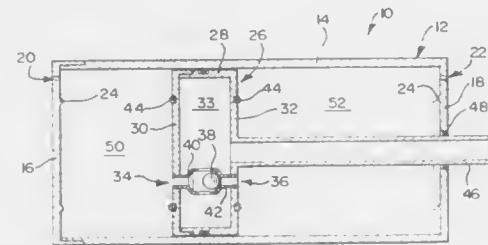
**4,949,621**  
**LIQUID PROPELLANT GUN**  
Michael L. Stephens, 19163 Beaconsfield, Detroit, Mich. 48224  
Filed Jul. 19, 1989, Ser. No. 382,779  
Int. Cl.<sup>5</sup> F41F 1/04  
U.S. Cl. 89—7 23 Claims



18. A method of controlling combustion in a liquid propellant gun chamber comprising the following steps: providing a gun having; a barrel with an axial bore thereby forming a muzzle end and a throat end, a receiver attached to the barrel and having a chamber axially aligned with the bore throat; a guide tube coaxially extending through the chamber and having one or more orifices extending therethrough, and a pin telescopically fitting within guide tube shiftable relative to the guide tube axial passageway; loading a projectile to be fired into the barrel throat through the guide tube using the pin thereby defining a prechamber which is bounded by the guide tube axial passageway, the projectile and the pin, and a main chamber connected thereto by the one or more orifices bounded by the chamber cavity and the guide tube outer periphery; elastically biasing the pin to a firing position wherein the bolt at least partially obstructs the one or more orifices extending through the guide tube; introducing a liquid propellant into the chamber at least partially filling the prechamber and main chamber; igniting the liquid propellant within the prechamber causing

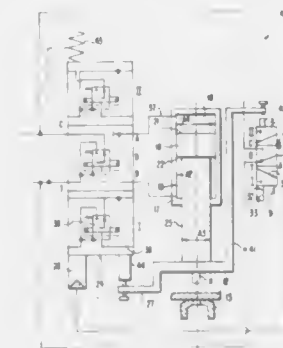
the prechamber pressure to rapidly rise forcing hot combustion products into the main chamber through the one or more orifices and causing the pin to begin to retract; burning the liquid propellant within the main chamber causing a combustion pressure to propel the projectile of the bore at uniform and predictable speed and further causing the bolt to retract; and automatically loading a new projectile into the barrel throat as the pin returns to the firing position ready for another firing cycle.

**4,949,622**  
**FLUID OPERABLE ENGINE**  
David A. Brooks, 144 Belladonna Avenue, Roodekrans, Roodepoort, Transvaal Province, South Africa  
Filed Dec. 5, 1988, Ser. No. 280,232  
Claims priority, application South Africa, Dec. 3, 1987, 87/9089  
Int. Cl.<sup>5</sup> F01L 15/12  
U.S. Cl. 91—224 20 Claims



1. A fluid operable engine, which includes a positionally fixed cylinder defining member which has walls to define a cylinder that is closed at opposed first and second ends; a piston that is within the positionally fixed cylinder and is slidable therein, the piston having opposed first and second ends; a first set of orifices comprising a first opening defined in the first end of the piston and second opening defined in the second end of the piston; a second set of orifices comprising a first aperture defined in a wall of the cylinder defining member at its first end and a second aperture defined in a wall of the cylinder defining member at its second end; a cyclically operable closure means for alternately closing the orifices of a selected one of the sets of orifices; a communication means for establishing fluid communication through the piston between the exterior of the cylinder and the first and second openings; and a force and movement transferring means for transferring forces exerted on the piston and movement of the piston to the exterior of the cylinder.

**4,949,623**  
**HYDRAULIC DRIVE MECHANISM**  
Eckehart Schulze, Weissach-Flacht, Fed. Rep. of Germany, assignor to Hartmann & Lammle GmbH & Co. KG, Rutesheim, Fed. Rep. of Germany  
Filed Mar. 3, 1989, Ser. No. 318,323  
Int. Cl.<sup>5</sup> F01L 25/02  
U.S. Cl. 91—286 5 Claims



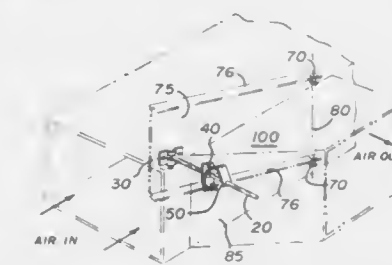
1. Hydraulic drive mechanism for a machine element carrying a treatment tool executing a rapid feed operation directed toward a workpiece to be treated, and under-load feed operation directed in the same direction during a treatment of the workpiece, subsequently thereto optionally again a rapid retraction operation up into an end and, respectively, an initial position for further treatment, the hydraulic drive mechanism includes power drive means including a double-acting drive hydrocylinder means having a piston means adapted to execute movement strokes, a pressure pilot-controlled main control valve means for controlling a movement of the piston means, and a solenoid valve means for pilot controlling the main control valve means, the piston means includes a large piston area and the smaller annular counter piston area, wherein, in the rapid feed operation, the piston means is pressurized on the larger piston area and on the smaller counter piston area, in the under-load feed operation only the larger piston area is pressurized while the smaller piston area is relieved, and in the rapid retraction operation only the smaller piston area is pressurized while the larger piston area is pressure-relieved, characterized in that the piston means divides the hydrocylinder into a large operating chamber and a small operating chamber, a pressure switching valve means is provided which is responsive to a pressure at least in the large operating chamber of the drive hydrocylinder, said pressure switching valve means switching to the under-load feed operation when the pressure in the large operating chamber exceeds a threshold value higher than one-quarter of an operating pressure of a pressure supply source but lower than one-half the operating pressure thereof, and, when the pressure in the large operating chamber again falls below the threshold value, switches back to the rapid feed operation wherein both operating chambers are pressurized, said solenoid valve means providing pressure pilot control for the main control valve means includes two control windings effective in opposite directions wherein, by excitation of one of the control windings, the solenoid valve means is controlled into a position provided for the feed operations and thereby the feed operation is initiated, a switching means is provided which, in one of a position-controlled and time-controlled fashion, excites the second control winding acting in the opposite direction after the first control winding has been excited, and in that a return signalling stop means is provided for bringing about, in a point of reversal of a movement of the piston means of the hydrocylinder means on a side of the workpiece, a mechanical switchover of the solenoid valve means into a position required for the retraction operation.

**4,949,624**  
**AIR CONDITIONING SYSTEM FOR USE WITH AUTOMOTIVE VEHICLE**  
Junichiro Hara, and Hideo Takahashi, both of Yokohama City, Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan  
Filed Nov. 17, 1989, Ser. No. 437,944  
Claims priority, application Japan, Dec. 15, 1988, 63-317351  
Int. Cl.<sup>5</sup> B60H 1/00  
U.S. Cl. 98—2.01 13 Claims



1. An air conditioning system for use with an automotive vehicle including a duct through which tempered air is directed into a compartment for passengers, the system comprising: a control device associated with the duct for operating in a first mode discharging the tempered air in the form of concentrated currents toward the respective passengers, in a second mode discharging the tempered air in the form of diffused currents toward the respective passengers, and in a third mode changing the first and second modes alternatively to continue the first mode for a first period of time and the second mode for a second period of time; means sensitive to a temperature in the passenger compartment for producing a first sensor signal indicative of a sensed value of compartment temperature; means sensitive to an insolation intensity for producing a second sensor signal indicative of a sensed value of insolation intensity; and a control unit responsive to the first and second sensor signals for operating the control device in one of the first, second and third modes, the control unit including means for increasing a ratio of the first time period to the second time period with increasing insolation intensity during the third mode.

**4,949,625**  
**AIR VOLUME DAMPER KIT AND ASSEMBLY**  
Louis F. Miklos, Howard Industries, Inc., Box 500, East Chicago, Ind. 46312  
Filed May 22, 1989, Ser. No. 355,166  
Int. Cl.<sup>5</sup> F24F 13/10  
U.S. Cl. 98—41.1 10 Claims



1. A kit for forming an air volume damper in an air duct

having sidewalls using a damper blade sized to fit and move inside the air duct or takeoff branch, comprising:

- a damper control rod having a control end and an attachment end;
- a blade bracket for receiving and holding the attachment end of said control rod such that the rod may pivot therefrom;
- means for attaching said blade bracket to the blade;
- damper blade hinge means for hingedly attaching the blade inside the duct or takeoff branch;
- manually releasable rod captivating means;
- bracket means for mounting said manually releasable rod captivating means;
- means for securing said captivating means and said mounting means to the wall of the duct or takeoff branch;
- wherein said releasable rod captivating means includes a spring detent for captivating the rod, which spring detent is manually releasable; and
- wherein said spring detent comprises leaf spring means having two flat leaf sections which are manually movable relative to one another and each of which define an aperture for receiving the rod therethrough, which rod may easily slide through said apertures when the leaf spring means is manually flexed but is captivated thereby when not manually flexed.

4,949,626

## PROTECTIVE SYSTEM

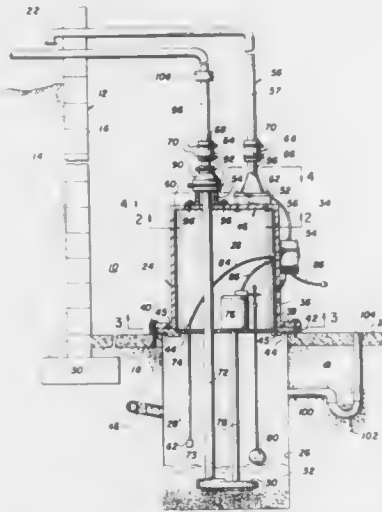
Douglas W. Townsend, and Duane O. Terry, both of Glen Burnie, Md., assignors to Radon Appliances, Inc., Glen Burnie, Md.

Continuation of Ser. No. 13,950, Feb. 12, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 334,764

Int. Cl.<sup>3</sup> F24F 7/06, 11/00

U.S. Cl. 98—42.02

15 Claims



1. A protective system for preventing deleterious gases from entering a building structure from a surrounding ground environment, comprising:

- (a) enclosure means mounted over a sump pit enclosing a sump pump and forming a substantially air tight enclosure, said enclosure means including (1) a first member fixedly secured to a concrete floor slab and mounted at least partially around a periphery of said sump pit, and, (2) a second member releasably secured to said first member for providing a temporary opening when said second member is removed from said first member, through which said sump pump may be removed from said sump pit without removal of said first member from said concrete floor slab;
- (b) at least one conduit fitting defining a stub pipe fixedly secured to an outer surface of said second member and in

- axial alignment with an opening formed through a wall of said second member defining a stub through passage;
- (c) means for removal of air from within said air tight enclosure and discharge external to said building structure;
- (d) means for discharging liquid from said air tight enclosure to an external environment of said building structure, said means for discharging liquid including a liquid discharge pipe extending from said sump pit at least through said stub pipe through passage in a co-axial manner; and,
- (e) means for securing said stub pipe to said liquid discharge pipe in a substantially air tight manner.

4,949,627

## COFFEE MAKER FOR USE IN AIRCRAFT

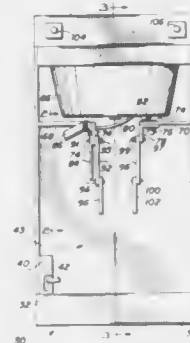
Robert A. Nordskog, 18135 Karen Dr., Tarzana, Calif. 91356

Filed Mar. 9, 1989, Ser. No. 321,423

Int. Cl.<sup>3</sup> A47J 31/00

U.S. Cl. 99—281

22 Claims



1. A device for brewing coffee or the like in an aircraft, comprising:

- a housing;
- a container for holding fluid, said container being received by said housing in a position for receiving brewed coffee or the like;
- a brew tray for holding coffee or the like, said brew tray being received in said housing in a position above said container when said container is in a position for receiving brewed coffee or the like, said brew tray having at least one perforation at the bottom thereof through which brewed coffee or the like may drain from said brew tray into said container;
- a brew nozzle mounted in said housing above said brew tray when said brew tray is received in said housing, said brew nozzle for spraying hot water received by said brew nozzle into said brew tray onto coffee or the like;
- means for heating water, said heating means having an inlet end and an outlet end, said inlet end of said heating means being for connection to a supply of water under pressure from a source external to said device; and
- an electrically operated solenoid valve located between said outlet end of said heating means and said brew nozzle, hot water being supplied to said brew nozzle from said heating means when said electrically operated solenoid valve is in an open position.

4,949,628

EXTRUDER AND CONTINUOUS MIXER  
ARRANGEMENT FOR PRODUCING AN AT LEAST  
PARTIALLY BAKED PRODUCT HAVING A  
COOKIE-LIKE CRUMB STRUCTURE, THE EXTRUDER  
INCLUDING A MICROWAVE APPLICATOR

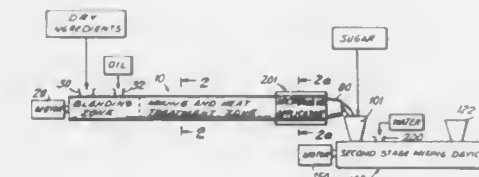
Bernhard H. van Lengerich, Ringwood, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 362,374, Jun. 7, 1989, abandoned. This application Nov. 22, 1989, Ser. No. 441,230

Int. Cl.<sup>3</sup> A21C 3/04; A47J 27/12; A23P 1/00

U.S. Cl. 99—353

18 Claims



1. An apparatus for producing a product having a cookie-like crumb structure, which comprises an extruder including a housing having a screw channel formed along the longitudinal axis of the housing; at least one screw-type element rotatably received within the screw channel to convey and mix ingredients; a feed port means arranged in the housing adjacent the upstream end thereof to input ingredients into the screw channel for conveyance and mixing by the screw-type element;
- means for inputting at least certain ingredients of a cookie-like dough formulation, including oil and flour, with less than a preselected total water content, by weight, of the ingredients;
- the means for inputting being coupled to the feed port means;
- a vigorous mixing zone formed by the screw channel and screw-type element downstream from the feed port means to vigorously mix and convey the ingredients input into the feed port means;
- a temperature control means operating to elevate the temperature of the screw channel for heat treatment of the ingredients input into the feed port means in a heat treatment zone of the housing extending downstream from the feed port means;
- a microwave applicator arranged downstream from the heat treatment zone and vigorous mixing zone of the extruder for further heat treatment of the ingredients input into the feed port means of the extruder;
- a second stage mixing apparatus including an inlet port coupled to the downstream end of the extruder housing to receive, mix and convey the heat treated ingredients conveyed through the extruder;
- an added water inlet port arranged in the second stage mixing apparatus;
- a source of water coupled to the added water inlet port to add a preselected amount of water through the added water inlet port to increase the water content and modify the consistency of the heat treated ingredients from the extruder input into the inlet port of the second stage mixing apparatus;
- a mixing zone formed by the second stage mixing apparatus and operating to mix the added water throughout the heat treated ingredients under pressure and temperature conditions to avoid substantial oil separation from the heat treated ingredients and added water; and
- an output means at the downstream most end of the second stage mixing apparatus.

4,949,629

COOKING A FOOD PRODUCT IN A PROCESS VAPOR  
AT PROGRESSIVELY VARYING RATES

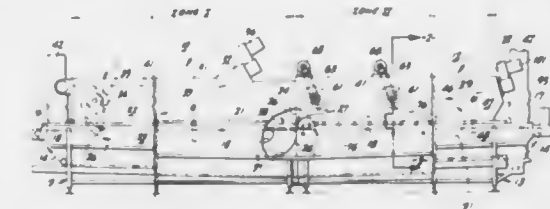
Steven G. Leary, San Mateo; Clark K. Benson, Millbrae; Andrew A. Caridis, Foster City, and Daniel E. Brown, San Bruno, all of Calif., assignors to Heat and Control, Inc., San Francisco, Calif.

Filed Oct. 13, 1987, Ser. No. 107,774

Int. Cl.<sup>3</sup> A47J 37/04

U.S. Cl. 99—386

11 Claims



1. An oven for cooking food products comprising an elongated housing having an inlet for food products to be cooked in the oven and an outlet for emitting cooked food products from the oven, conveyor means of generally permeable construction serving to convey food products through such inlet and outlet,

- said housing being divided internally by a generally horizontal baffle into an upper heating chamber and a lower cooking chamber, said housing being further divided internally by a generally vertical baffle into a first and second cooking zone,
- means in said first cooking zone serving to provide a steam laden process vapor for treating food products and including means for circulating said process vapor between said heating and cooking chambers along a path substantially parallel to the direction of conveyor movement,
- means in said second cooking zone serving to provide a steam laden process vapor circulating between said heat and cooking chambers (in a path which in said heating chamber is generally parallel to the direction of conveyor movement),
- means communicating with the heating chamber in said second cooking zone serving to divert (divide) the circulating process vapor and to direct its flow so as to emit the process vapor generally horizontally into (in) the cooking chamber from a location alongside the conveyor means (is circulated) in a path substantially lateral(ly) to the direction of conveyor movement and lateral to the product carrying surface of the conveyor means,
- control means serving to permit control of the temperature and moisture content of the process vapor circulating in the second zone independently of the temperature and moisture content of the process vapor circulating in the first zone.

4,949,630

APPARATUS FOR FORMING A FOLD-OVER SOFT  
CENTER-FILLED CONFECTION

Leslie F. Knebl, Morristown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 4, 1988, Ser. No. 253,793

Int. Cl.<sup>3</sup> A23P 1/00; A23G 3/00

U.S. Cl. 99—450.7

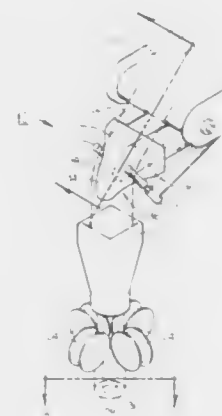
21 Claims

1. An apparatus for forming a confectionary rope with a soft center from an exterior layer of candy having a continuous rectangular shape, comprising:

- a forming nose having an upper surface and a lower surface, said upper surface configured to cause said continuous rectangularly-shaped exterior layer to take on a cylindrical configuration to form a continuous outer layer of



confectionary mass flowing in a substantially hollow cylindrical shape; and extruding means arranged in spaced relationship with the

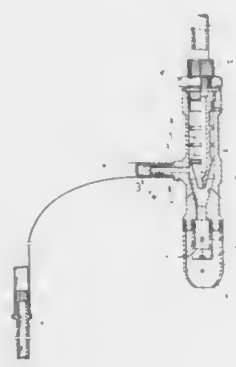


lower surface of the forming nose for extruding a soft confectionary mass into the center of the cylindrically-shaped outer layer of confectionary mass formed by the forming nose.

4,949,631

# DEVICE FOR WHIPPING MILK DESIGNED TO BE CONNECTED TO THE CONVENTIONAL STEAM NOZZLE OF AN EXPRESSO COFFEE MACHINE FOR THE PREPARATION OF ITALIAN CAPPUCCINO COFFEE

Florindo Fregnan, Dosson, Italy, assignor to Fregnan Florindo—Costruzioni Macchine de Caffè Elektra, Dosson, Italy  
Filed Oct. 2, 1989, Ser. No. 416,157  
Claims priority, application Italy, Oct. 20, 1988, 3629 A/88  
Int. Cl.<sup>5</sup> A01J 1/04; A23C 9/00  
U.S. Cl. 99—452



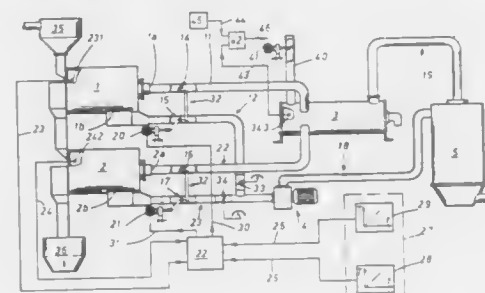
1. A device, for taking up milk from a container by creating a vacuum in the container and supplying it already whipped directly to a cup, connected to a steam nozzle of an espresso coffee machine for the preparation of Italian cappuccino coffee, the device comprising a tubular body having an inner conical seat and a laterally extending tubing connector, an injector having an outer conical surface cooperating with the seat to define therewith an angular space, an air inlet communicating with the annular space, with atmosphere, and with the tubing connecting, a tube provided with a suction member having a calibrated duct which can be inserted in the milk container being connected to the tubing connector, characterized in that the conical seat is provided in the vicinity of one

end of the tubular body, in that the injector has a rod-shaped portion provided with splash-guard members extending up to the opposite end of the tubular body for leak-tight connection with the steam nozzle and with the tubular body, and in that the air inlet is provided upstream of the splash-guard members with respect to the direction of delivery of the steam through the injector, the device further comprising an inner nozzle with multiple flow-breaking holes and externally thereto an outer nozzle with a flow guide jacket both located at the end of the tubular body downstream of and coaxial with the conical seat and forming a space therebetween for conveying and discharging the milk in a whipped state through the space into the cup.

4,949,632

# CIRCUIT FOR MONITORING AND CONTROLLING THE FLOW OF HOT AIR IN EQUIPMENT FOR ROASTING COFFEE, NUTS AND SIMILAR EDIBLE COMMODITIES

Pier Cesare Camerini Porzi, Casalecchio di Reno, Italy, assignor to Officine Vittoria S.p.A., Bologna, Italy  
Filed Nov. 29, 1988, Ser. No. 277,189  
Claims priority, application Italy, Dec. 4, 1987, 3720 A/87  
Int. Cl.<sup>5</sup> A47J 31/42, 42/52; F26B 3/08, 9/08  
U.S. Cl. 99—468



1. A circuit for monitoring and controlling the flow of hot air in equipment for roasting coffee, nuts and similar edible commodities, comprising:  
first drum and a second drum, each provided with an inlet and an outlet for the passage of hot air;  
a hot air generator, in communication with both drums by way of respective ducts connected to the inlets and outlets;  
a fan unit by which the hot air is circulated through the ducts;  
monitoring means located internally of the first drum and the second drum;  
a plurality of single dampers located one in each duct adjacent the drum inlets and outlets, operated in pairs and caused to move between a fully open limit position and a fully closed position;  
a first controller, consisting in a processor and a comparator, one input of which is in receipt of a set of signals reflecting the effective temperature and color or the roasting commodity as sensed by the monitoring means, and another input, in receipt of a set of reference signals reflecting prescribed temperature and color characteristics as entered at a first source processor;  
drive means associated with each pair of dampers, which are interlocked to a respective output signal emitted by the first controller as a function of the comparison made between the monitored signal and the reference signal relative to the respective drum, and designed to invest the relative pair of dampers with an opening and closing movement that consists in a plurality of positions covered in a predetermined sequence of two successive stages: a first continuous stage serving to produce an initial thermal transition, and a second stage occurring as a succession of

discrete steps, which completes the overall transition and produces a variation in temperature internally of the drum such as will ensure that the relative temperature set point is reached successfully, and at the prescribed moment in time.

4,949,633

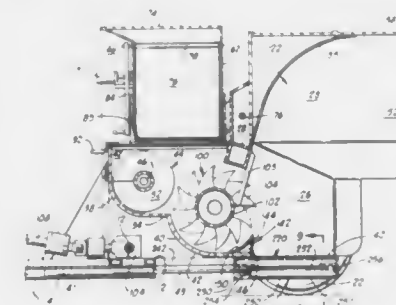
# ANIMAL FEED BAGGING APPARATUS

William C. Johnson, Omaha, Nebr., and Mervin E. Aurand, Adrian, Mo., assignors to Rand Farm Systems Inc., Adrian, Mich.

Filed Jan. 30, 1989, Ser. No. 304,418  
Int. Cl.<sup>5</sup> A01F 25/16; B65G 3/04

U.S. Cl. 100—65

6 Claims



6. A silage bagging machine comprising:  
a chassis having a forward end and a rear end;  
an elongated silage-receiving trough mounted on the forward end of said chassis;  
a silage distributing, elongated helical auger in the trough, said elongated helical auger extending laterally across said chassis and having a pair of oppositely turned, reverse flighted blades along its length, and with the blades thereof meeting substantially in the center of its length and distributing silage laterally in opposite directions toward the opposite ends of the auger from the center thereof;  
an elongated, generally cylindrical rotary drum mounted rearwardly on the chassis from the auger for receiving silage from the auger;  
a plurality of teeth projecting radially outwardly from said rotary drum, said teeth being arrayed in a sine wave pattern on said drum from a location adjacent one end thereof, to a location adjacent the other end thereof;  
a silage compression and shaping chamber positioned on said chassis rearwardly from said rotary drum, said compression and forming chamber having:  
a retractable floor, retractable in a horizontal reciprocating motion from a first extended, bottom closure position forwardly therefrom on said chassis to a second retracted, clean out position;  
a pair of opposed, horizontally spaced, upwardly extending vertically converging side walls; and  
a top wall;  
said compression and forming chamber having a trapezoidal-shaped cross-sectional configuration in a substantially vertical plane extending therethrough;  
a silage discharge section positioned rearwardly on said chassis from said compression and forming chamber;  
an upwardly and rearwardly inclined material lifting step positioned centrally on said chassis at the entrance of said compression and forming chamber;  
a flexible silage-receiving bag positioned in part in folds around said compression and forming chamber and positioned in part rearwardly from said chassis and from said silage discharge section for receiving silage from said discharge section, said bag including a closed end positioned rearwardly from said chassis and from said silage discharge section;

ground-engaging wheels on said chassis rollably supporting said chassis on the ground;  
means on said chassis facilitating the control of movement of said chassis away from the closed end of said bag as said bag is filled with silage;  
feed conveyor means mounted at the forward end of said chassis and including a portion extending up over the central portion of said elongated silage-receiving trough and said elongated helical auger, said feed conveyor means including:  
an elongated, upwardly inclined housing;  
an elongated, upwardly inclined silage conveyor mounted in said housing and having an upper discharge end above the central portion of said elongated helical auger; and  
a generally vertically extending, adjustably movable deflector plate positioned to guide and deflect silage discharged from the upper discharge end of said silage conveyor as it falls downwardly to said auger, said deflector plate being pivotally mounted in said conveyor housing for pivotation of said deflector plate about a horizontal axis, whereby said deflector plate can be selectively inclined relative to a vertical plane and thereby guide gravitating silage from the upper discharge end of said conveyor to a location along, and on, said elongated auger, such that the auger can uniformly distribute silage laterally toward the right and toward the left at the opposite ends of the auger and thereby keep said rotor uniformly covered with said silage.

4,949,634

# PRESS APPARATUS

Ian W. Riddick, Bury, England, assignor to Beloit Corporation, Beloit, Wis.

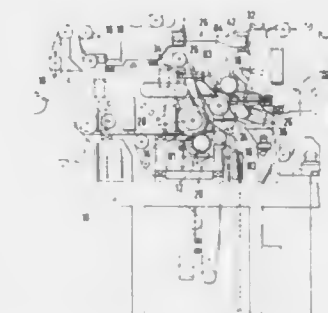
Filed Jun. 6, 1989, Ser. No. 362,184

Claims priority, application United Kingdom, Jun. 23, 1988, 8815009

Int. Cl.<sup>5</sup> B30B 9/24

U.S. Cl. 100—118

16 Claims



1. A press apparatus for removing water from a formed web, said apparatus comprising:  
a first press member;  
backing roll means cooperating with said first press member for defining therebetween a first press nip such that when the web extends through said first press nip, a first portion of water is removed from the web;  
a second press member disposed downstream relative to said first press nip, said second press member cooperating with said roll means for defining therebetween a second press nip such that when the web extends through said second press nip, a second portion of water is removed from the web;  
a third press member disposed downstream relative to said second press nip, said third press member cooperating with said second press member for defining therebetween a third press nip such that when the web extends through

said third press nip, a third portion of water is removed from the web;  
a wet end support means for supporting said first press member and said backing roll means;  
dry end frame means disposed downstream relative to said wet end support means for supporting said third press member;  
intermediate anchoring means disposed between said support means and said frame means for supporting said second press member; and  
pivoted link means removably extending between said support means, said frame means and said intermediate anchoring means such that in an operative mode of the press apparatus, said support means, frame means and anchoring means are rigidly connected together for stabilizing the press apparatus and so that in an inoperative mode of the press apparatus, said link means are released from and pivoted relative to the press apparatus for facilitating the removal of said press members and backing roll means from the press apparatus.

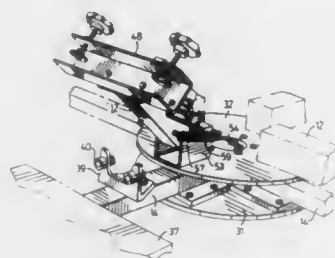
4,949,635

**TEXTILE PRINTING APPARATUS**

Benito Padula, Richmond Hill, Canada, assignor to Benmar Manufacturing Incorporated, Concord, Canada  
Filed Aug. 17, 1989, Ser. No. 394,946  
Int. Cl.<sup>5</sup> B41F 15/10

U.S. Cl. 101—115

12 Claims



1. A textile printing apparatus, comprising:  
an axle and a hub about the axle, the hub and axle being rotatable with respect to one another;  
ground support means for the axle and hub;  
means associated with the hub and axle for attaching a plurality of upper and lower arms extending radially from the hub and axle, an upper arm being capable of rotating into alignment above a lower arm and a lower arm being capable of rotating into alignment beneath an upper arm, said means comprising a first flange attached to the axle and a second flange attached to the hub with first and second circular supports being attached respectively to the first and second flanges, the circular supports providing structures to which the upper and lower arms are attached;  
a platform attached to each lower arm for receiving a textile workpiece;  
pivot means for each upper arm enabling each upper arm to pivot between a raised and a lowered position, said pivot means comprising a bracket attached to the circular support for the upper arms, each upper arm being a rectangular section tubular member having flat bottom, top and side surfaces and front and rear rectangular edges, each upper arm being attached pivotally to the bracket by a pin so that the upper arm may be moved between a raised and a lowered position, and wherein the pin hinges the upper arm to the bracket near the rear top edge of the upper arm; clamping means being adjustably attached to each upper arm for releasably engaging a stencil to be positioned on top of a workpiece so that a pattern might be printed thereon;

spring bias means for urging each upper arm toward the raised position;  
guide means attached to each lower arm for receiving the upper arm when it is lowered, the guide means providing rough alignment of a stencil on top of a workpiece;  
a fine adjustment bar attached to and extending transversely from each clamping means, the bar being releasably and adjustably secured along an upper arm; and  
adjustment means for exact alignment of a stencil held by a clamping means on top of a textile workpiece, the adjustment means comprising a first threaded means for adjustment of the clamp means in the longitudinal direction of the upper arm, the first threaded means extending from the clamping means along and to one side of the upper arm to a strut extending transversely from the upper arm; and a second threaded means for adjustment of the clamp means in the transverse direction of the upper arm, the second threaded means extending from the fine adjustment bar transversely to a strut attached to the upper arm.

4,949,636

**SCREEN PRINTING MACHINE**

Itaru Tachibana, Tokyo, Japan, assignor to New Long Seimitsu Kogyo Co., Ltd., Tokyo, Japan

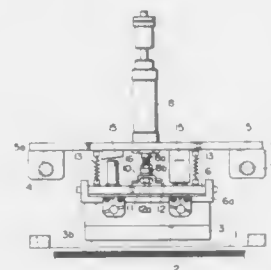
Filed Aug. 23, 1988, Ser. No. 235,302

Claims priority, application Japan, Sep. 17, 1987, 62-140871[U]

Int. Cl.<sup>5</sup> B05C 17/06

U.S. Cl. 101—123

2 Claims



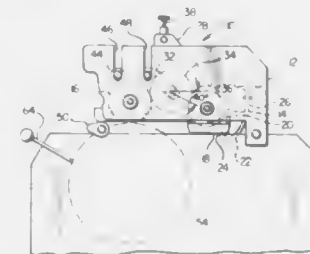
1. A screen printing machine for printing a surface of an article with a pattern defined on a screen disposed on the surface, said machine comprising:  
a movable plate supported in the machine for reciprocal movement in a horizontal direction;  
a lifting plate supported by said movable plate so as to move in the horizontal direction therewith and so as to be raisable and lowerable relative thereto;  
a printing member for spreading ink over the surface of an article to be printed, said printing member comprising at least one of a skid and a scraper mounted to said movable plate so as to move therewith;  
mounting means mounting said lifting plate to said movable plate in a manner which allows said lifting plate to pivot relative to said movable plate and to move horizontally, relative to said movable plate, in a direction extending transversely to said horizontal direction; and  
lifting plate drive means operatively connected to said lifting plate for raising and lowering said lifting plate relative to said movable plate, and wherein said mounting means comprises a supporting pin extending from said lifting plate, said bracket having a groove extending therein that is elongate in a direction extending transversely to said horizontal direction, and said pin extending into said bracket within said groove.

4,949,637

**SELF-METERING DAMPENING SYSTEM FOR A LITHOGRAPHIC PRESS**

James J. Keller, 7405 Inwood Rd., Dallas, Tex. 75209  
Continuation-in-part of Ser. No. 131,111, Dec. 10, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,264  
Int. Cl.<sup>5</sup> B41F 7/26, 7/40  
U.S. Cl. 101—148

23 Claims



1. An apparatus for continuously supplying a dampening fluid to the plate of a lithographic press comprising:  
a frame;  
a dampening fluid reservoir;  
a pan roller rotatably mounted in said frame, said pan roller disposed in contact with dampening fluid in said dampening fluid reservoir;  
a transfer roller tangentially contacting and parallel to said pan roller;  
a water form roller rotatably mounted in said frame, said water form roller positioned to tangentially contact the plate of said lithographic press and said water form roller mounted in parallel relation to said pan roller;  
a hanger support element pivotally mounted on said frame, said transfer roller being rotatably mounted in said hanger support element, and said hanger support element being pivotable between a first position and a second position, whereby in said first position said transfer roller tangentially contacts said water form roller and said transfer roller tangentially contacts and is frictionally driven by said pan roller, and whereby in said second position said transfer roller is spaced from said water form roller;  
a means for adjusting the pressure between said pan roller and said transfer roller, said means for adjusting mounted on said hanger support element; and  
a means for driving said pan roller and said water form roller at the surface speed of the plate of said lithographic press.

4,949,638

**PRINTER USING A DRUM**

Tetsuo Watanabe, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 9, 1989, Ser. No. 349,083

Claims priority, application Japan, May 9, 1988, 63-60702; Mar. 6, 1989, 1-53173

Int. Cl.<sup>5</sup> B41F 1/30

U.S. Cl. 101—409

4 Claims

1. A printer for printing out information on a paper sheet which is wound around a drum of said printer, comprising:  
paper feeding and discharging means for feeding and discharging the paper sheet;  
clamping means provided on an outer periphery of the drum for selectively clamping and unclamping a leading edge of the paper sheet on the drum;  
a single motor selectively rotatable in a forward and a reverse direction;  
first and second gearing means for transmitting rotation of said single motor to said paper feeding and discharging means and said clamping means, respectively; and  
first and second clutch means respectively associated with said first gearing means and said second gearing means for causing, when said single motor is rotated in any of the

forward and reverse directions, either one of said first gearing means and second gearing means to transmit the rotation of said motor, wherein said single motor feeds

and discharges said paper sheet and selectively clamps and unclamps the leading edge of said paper sheet on the drum.

4,949,639

**TEMPERATURE-COMPENSATED, ACCELERATION-ACTIVATED IGNITER**

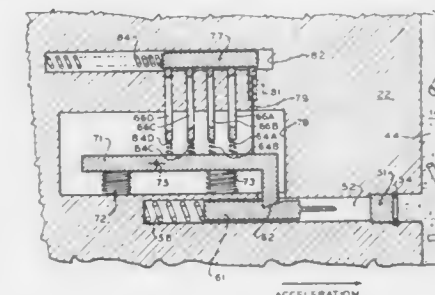
Bruce P. Burns, Churchville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 3, 1989, Ser. No. 379,303

Int. Cl.<sup>5</sup> F42C 15/24

U.S. Cl. 102—249

28 Claims



1. An igniter for energetic material comprising:  
a sear having first and second spaced positions;  
an ignition means for initiating combustion of the energetic material in response to an actuating force;  
firing means for selectively applying the actuating force to the ignition means in response to the sear, and including means controlled by said sear when in the first position for preventing application of said actuating force and for causing application of said actuating force when said sear changes from said first position to said second position; and  
control means, including means responsive to the temperature and the acceleration of the igniter, coupled to said sear for causing said sear to move from said first position to said second position as a function of the temperature and acceleration of said igniter.



4,949,640

## PROPELLANT CHARGE CONTAINER

Karlheinz Reinelt, Hermannsburg, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

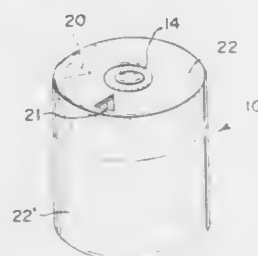
Filed Mar. 11, 1985, Ser. No. 710,144

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 8407198[U]

Int. Cl.<sup>5</sup> F42B 9/24

U.S. Cl. 102—282

5 Claims



1. A propellant charge container for holding loose propellant charge powder, wherein

said container consists of two combustible parts which have substantially cylindrical shapes and said two parts are rotatably telescopically mounted relative to each other, each part of said container has a cylindrically shaped wall surface, said cylindrically shaped wall surfaces of a first part of two parts overlaps the cylindrically shaped wall surfaces of the second part of said two parts over a predetermined region in each part, wherein each part has at least one wall to form at least a pair of abutting and overlapping surfaces of said container and mutually engaging corrugations in said pair of abutting wall surfaces, each one of said overlapping wall surfaces having at least one opening said openings overlapping upon rotation of one of said parts with respect to the other of said parts.

4,949,641

## METHOD OF SAFELY DETOXYFYING MUSTARD GASES

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 5, 1990, Ser. No. 488,545

Int. Cl.<sup>5</sup> C06D 7/00

U.S. Cl. 102—293

4 Claims

1. A method of safely detoxifying mustard gases and chemical agents by completing a first reaction with an incandescent pyrophoric metallic powder compounded in a selected, specific formulation to form reaction products and by completing a second reaction including a deflagration reaction to generate extremely high temperatures to bring about thermal deflagration of any unreacted toxic agent and the intermediate products produced by said first reaction with the incandescent pyrophoric metallic powder, said method comprising:

- providing a chamber capable of being evacuated, said chamber having a predetermined size for receiving and containing munition having a casing for containing mustard gases or toxic chemical agents within said munition casing;
- placing said munition within said chamber;
- placing a formulation containing an incandescent pyrophoric metallic powder within said chamber, said formulation selected from the formulations A and B set forth hereinbelow as follows:

Formulation A	
Ingredient	Parts by Weight
Hydroxyl-terminated polybutadiene prepolymer	10
Isophorone diisocyanate (isocyanate -	

-continued

Formulation A	
Ingredient	Parts by Weight
to hydroxyl ratio = 0.95)	
Pyrophoric metallic powder	35
Ammonium perchlorate (200-Micrometers)	52
Ferric oxide	3

Formulation B	
Ingredient	Parts by Weight
Antimony sulfide	15.0%
Pyrophoric metallic powder	39.0%
Pentaerythritol tetranitrate	5.0%
Tetracene	4.0%
Lead styphnate	37.0%
Gum Arabic (105 milliliters of 1% solution per 3.05 Kg of formulation)	0.2%

- placing an igniter charge in said chamber and in contact with said formulation for igniting said formulation containing said pyrophoric metallic powder;
- evacuating said chamber;
- remotely drilling said munition casing to allow said mustard gases or said toxic chemical agents to escape into said evacuated chamber; and,
- igniting said igniter charge thereby initiating the combustion of said formulation containing said pyrophoric metallic powder to accomplish a first and second reaction process, said first reaction process detoxifying said mustard gases or said toxic chemical agents by forming reaction products of said mustard gases or said toxic chemical agents and said pyrophoric metallic powder, and said second reaction process generating higher temperature reactions which enhance the neutralization of the toxicity of said mustard gases and said toxic chemical agents by thermal pyrolysis or deflagration of any unreacted toxic chemical agent and of the intermediate products produced by said reaction with said pyrophoric metallic powder.

4,949,642

## FUNNEL OR BOWL SHAPED INSERT FOR HOLLOW CHARGES AND METHOD AND MOULD FOR ITS PRODUCTION

Jürgen Wisotzki, Weserstrasse 7a, 6074 Rödermark, Fed. Rep. of Germany

Filed Jun. 29, 1984, Ser. No. 640,144

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1983, 3323991

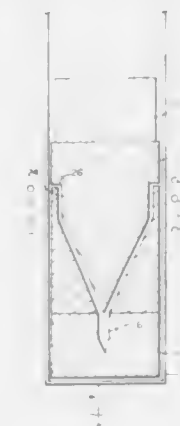
Int. Cl.<sup>5</sup> F42B 1/02

U.S. Cl. 102—307

14 Claims

1. A funnel- or bowl-shaped insert for hollow charges, wherein the improvement comprises an insert constituting of a

hollow body formed by crystal growth of a copper monocrystal drawn from a melt in a mould starting from a nucleus



crystal, the inner and outer surfaces of the insert being directly formed by corresponding shaping surfaces of the mould.

4,949,643

## ANTI-TILT BUOY MOORING SYSTEM

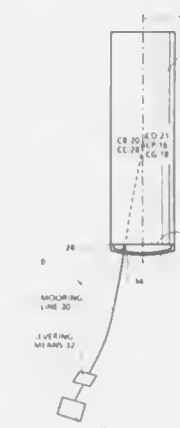
Charles F. Bowersett, Burtonsville, and Eugene H. Beach, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 11, 1974, Ser. No. 488,249

Int. Cl.<sup>5</sup> F42B 22/00

U.S. Cl. 102—413

7 Claims



- Means for attaching a buoy having a center of buoyancy to a mooring line comprising: means for directing the force generated by said mooring line through the center of buoyancy of said buoy, said means comprising an arcuate bail rigidly attached to the bottom of said buoy with the center of curvature of said bail being essentially coincident with the center of buoyancy of said buoy, and movably mounted connecting means on said bail for connecting said bail to said mooring line.

4,949,644

## NON-TOXIC SHOT AND SHOT SHELL CONTAINING SAME

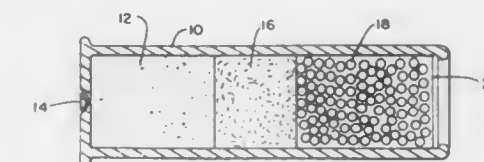
John E. Brown, 8 Northwood Drive, St. Catharines, Ontario, Canada (L2M 4J6)

Filed Jun. 23, 1989, Ser. No. 370,763

Int. Cl.<sup>5</sup> F42G 5/24

U.S. Cl. 102—498

19 Claims



1. A projectile comprising a substantially spherical, non-toxic wildlife shot pellet for a shotgun shell, said pellet being all-metal and primarily made up of bismuth, said pellet being of a size within a range selected from the group consisting of BBB to "dust" shot size, and OOO to T size.

4,949,645

## HIGH DENSITY MATERIALS AND PRODUCTS

Andrew C. Hayward, Stonnall, and Melvyn E. Slater, Cannock, both of England, assignors to Royal Ordnance Speciality Metals Ltd., London, England

Division of Ser. No. 45,714, May 6, 1987, Pat. No. 4,789,981, which is a continuation of Ser. No. 930,988, Nov. 14, 1986, abandoned, which is a continuation of Ser. No. 714,953, Mar. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 667,894, Nov. 2, 1984, abandoned, which is a

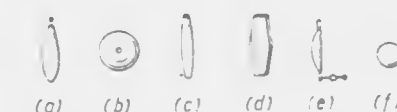
continuation-in-part of Ser. No. 536,241, Sep. 27, 1983, abandoned. This application May 12, 1988, Ser. No. 192,905

Claims priority, application United Kingdom, Sep. 27, 1982, 8227505; Jul. 12, 1983, 8318830; European Pat. Off., Sep. 22, 1983, 83.305632.8; Japan, Sep. 26, 1983, 58-176530; United Kingdom, Nov. 4, 1983, 8329526; Mar. 22, 1984, 8407471

Int. Cl.<sup>5</sup> F42B 7/04

U.S. Cl. 102—517

15 Claims



1. A shotgun pellet or shotgun shot for use in a shotgun cartridge, said shotgun pellet or shotgun shot being formed from a tungsten-rich material that comprises tungsten and a settable plastics material.

4,949,646

## CONTAINER CARRYING RAILROAD CAR WITH IMPROVED SUPPORT SYSTEM

Richard E. Jamroz, 3419 170th St., Lansing, Ill. 60438, and Shaun Richmond, 9151 Sunrise La., Orland Park, Ill. 60462

Continuation of Ser. No. 180,316, Apr. 11, 1988, Pat. No. 4,909,157, which is a continuation-in-part of Ser. No. 890,284, Jul. 29, 1986, Pat. No. 4,771,706. This application Sep. 7, 1989, Ser. No. 405,145

The portion of the term of this patent subsequent to Mar. 20, 2007, has been disclaimed.

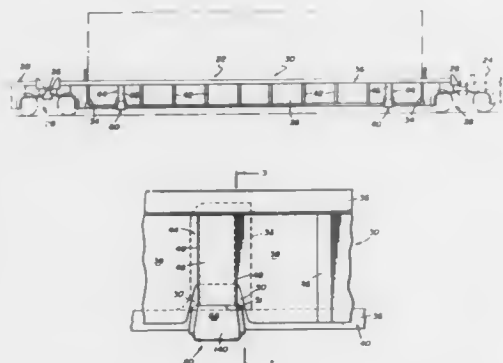
Int. Cl.<sup>5</sup> B61D 3/20, 17/00; B60P 1/64

U.S. Cl. 105—406.1

33 Claims

1. A railroad car for carrying containers comprising: a car body supported by rail truck means adapted for movement over a railroad; the car body having opposing side walls and an end wall near each end connected to the side walls with said side

walls and end walls defining a well in which a container can be received;  
means for supporting the bottom of a container, when in the well, comprising a plurality of spaced metal reinforcing elements joined to each side wall and spaced inwardly from the well end walls;  
each reinforcing element being substantially L-shaped and having a substantially vertical leg joined at the bottom of a side wall and the reinforcing element having an arm extending laterally substantially horizontally inwardly toward the center of the car to aid in supporting a container in the well;

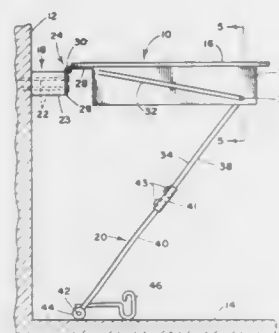


the reinforcing element vertical leg having inner and outer substantially vertical spaced apart flanges longitudinal to an adjoining car body side wall and at least two spaced apart substantially vertical webs lateral to and joined to the flanges thereby defining a vertical pocket open at the top and extending downwardly for less than the length of the leg;  
the reinforcing element lateral horizontal arm having top and bottom substantially horizontal spaced apart flanges and at least two spaced apart substantially vertical webs joined to the flanges thereby defining a horizontal pocket open at the end of the arm and extending horizontally inwardly from the arm end for less than the length of the arm.

**4,949,647**  
**COLLAPSIBLE PLATFORM ASSEMBLY**  
Alvin S. Grant, 1836 Wright St., Pittsburgh, Pa. 15221  
Filed Mar. 27, 1989, Ser. No. 328,898  
Int. Cl.<sup>3</sup> A47B 5/00

U.S. Cl. 108—48

5 Claims



1. A collapsible platform assembly allowing a user to position a platform in either a horizontal, upright position providing a horizontal surface upon which to place an object or, alternatively, in a vertical, storage position adjacent to a vertical

cal support extending upwardly from a floor, said collapsible platform assembly including:

a planar platform member having an upper surface and a lower surface;

a support assembly having pivotal support means the vertical support at a desired vertical height above the floor; and

foot-actuated rotation means for rotating the planar platform member; said foot-actuated rotation means including a rod member having a foot pedal mounted thereto, and extending therefrom, a foot pedal mounting block, wherein a first end of said rod member is slidably engaged with said lower surface, a second end of said rod member is pivotally coupled to said foot pedal mounting block, and said foot pedal mounting block is affixed to the floor,

whereby, upon application of a force by a user's foot to said foot pedal, said planar platform is rotated by virtue of engagement with said rod member from the horizontal, upright position to the vertical, storage position, or, alternatively, from the vertical, storage position to the horizontal, upright position.

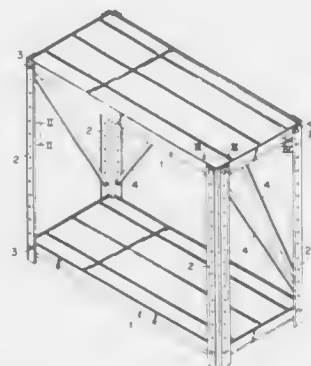
**4,949,648**

**SHEET METAL SHELVING ASSEMBLY**

Daniel R. Miller, Cincinnati, Ohio, assignor to Samsung Electronics Co., Ltd., Kwonsun-gu, Rep. of Korea  
Continuation of Ser. No. 9,070, Jan. 27, 1987, Pat. No. 4,742,782, which is a continuation of Ser. No. 631,399, Jul. 16, 1984, abandoned. This application May 9, 1988, Ser. No. 191,960  
The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.  
Int. Cl.<sup>3</sup> A47B 3/00

U.S. Cl. 108—111

17 Claims



1. Shelving, comprising:

a plurality of bent sheet metal columns to be vertically arranged in spaced parallel relationship, and each having at least one sheet metal side wall having at least one horizontal aperture;

at least one bent sheet metal shelf having a main planar support portion to be horizontally arranged within said columns, and an integrally formed generally vertically extending skirt portion having a horizontal aperture therethrough to be aligned with the horizontal aperture in an adjacent one column side wall for receiving a threaded bolt therethrough so that a nut threaded on the bolt will supportingly clamp said shelf on said one column;

said skirt portion including an upper portion integral in one piece with the sheet metal of said planar support portion, a depending outer wall portion, an inwardly bent sheet metal lower return portion forming an upwardly facing nut locking surface spaced from said aperture in said skirt portion a distance substantially equal to the minimum nut width as measured perpendicular to the nut axis, and said aperture in said skirt portion being spaced from the adjacent

cent lowermost surface of said planar support portion, a distance substantially greater than said first mentioned distance, so that a nut may be easily initially threaded onto a bolt passing through aligned apertures in said skirt portion and column side wall will not thereafter turn when tightening and will hold against turning only due to positive interference with said locking surface.

**4,949,649**

**FOLDING STAGES**

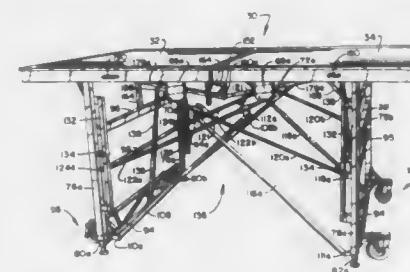
Mark A. Terres, Bloomington; Paul Thompson, Burnsville, and Richard C. Bue, Chaska, all of Minn., assignors to Sico Incorporated, Minneapolis, Minn.

Filed Apr. 28, 1989, Ser. No. 345,122

Int. Cl.<sup>3</sup> A47B 3/02

U.S. Cl. 108—116

10 Claims



2. An elevationally adjustable stage, comprising:

(a) a pair of planar stage surface members;

(b) hinge means connecting adjacent edges of the pair of stage surface members for movement between an operative position in which the stage surface members are coplanar to define a common stage surface, and a folded position in which the undersides of the stage surface members face each other;

(c) main support legs for each of the stage surface members, and means pivotally connecting the support legs to the respective stage surface member at a position remote from the hinge means;

(d) a plurality of cross connect links and means pivotally connecting the links to the support legs and to the underside of the opposite stage surface member;

(e) elevationally adjustable lower support legs telescopically positioned within the main support legs;

(f) brace means connected to the lower support legs and to the cross connect links for stabilizing the support legs with respect to the opposite stage surface member;

(g) means for adjusting the point of connection of the brace means to the lower support legs in accordance with different elevationally adjusted positions of the lower support legs;

(h) lifting means connected to the stage surface members and said main support legs providing lift during elevational adjusting and folding of the stage surface members;

(i) locking means for locking the position of the lower support legs relative to the main support legs, whereby upon releasing the locking means, the elevation of the stage surface members may be raised or lowered; and

(j) remote locking release means for releasing and actuating the locking means at a location remote from the locking means.

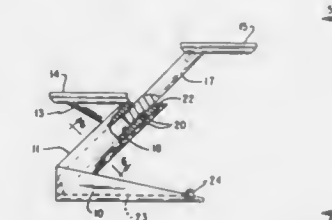
**4,949,650**

**TABLE HAVING A PART OF WHICH IS ADJUSTABLE UPWARDLY**

David D. Allard, R.R. 1, Box 2795, Rapid City, S. Dak. 57702  
Filed Jul. 31, 1989, Ser. No. 388,065  
Int. Cl.<sup>3</sup> A47B 11/00

U.S. Cl. 108—146

5 Claims



1. A table comprising a top and leg means at each end of said top adapted to support said top, said leg means being a stationary part and at least a portion of said top being a moveable part, post members fastened to each end of said moveable part, said post members being slidably engaged in grooves formed in said leg means, means on said leg means adapted to provide a surface adjacent said grooves, means engaged between said post members and said leg means to allow upward movement and prevent downward movement of said post members relative to said leg means, said means engaged between said post members and said leg means including at least one lever on said post member, one end of each said lever being releasably engageable with the surface on said means on said leg means, and release means engaged with each of said levers adapted operate said lever to release the engagement.

**4,949,651**

**LOCKING MEANS FOR A GATE IN AN AUTOMATIC TELLER MACHINE**

Bruno Frank, Ehningen, and Ulrich Hengstler, Schoenaich, both of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

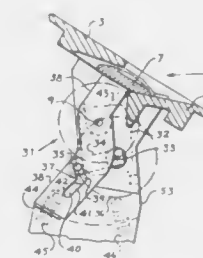
Filed Oct. 28, 1988, Ser. No. 264,334

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1987, 3737882

Int. Cl.<sup>3</sup> E05G 01/06

U.S. Cl. 109—24.1

7 Claims



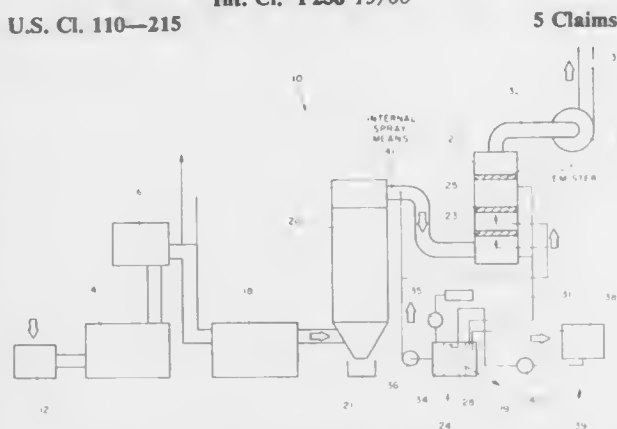
1. Locking means for a dispensing or deposit gate in an automatic teller machine comprising;

an opening defined by an upper panel, a lower recessed panel and two side elements connecting said panels; and a pivotally mounted locking flap which, when in a closed position is positioned partially behind said upper wall panel and in front of said lower recessed panel and when in an open position is rotated to a position behind said upper panel, said locking flap provided with substantially cylindrically shaped upper and lower edges and a face therebetween which includes a substantially planar recess which, when said locking flap is pivoted to said open



position, causes an increasing gap to occur between said face and an inner surface of said upper panel.

**4,949,652**  
**WASTE DISPOSAL SYSTEM**  
Henry H. Hadley, Old Country Rd., Lincoln, Mass. 01773  
Filed Jun. 26, 1989, Ser. No. 371,340  
Int. Cl.<sup>5</sup> F23J 15/00  
U.S. Cl. 110—215

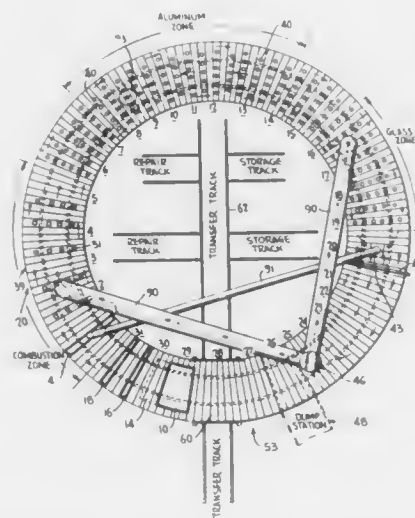


1. A waste disposal system for controlled burning and safe disposal of contaminated materials comprising a means of holding the contaminated materials having a feed means associated therewith, the feed means transporting the contaminated materials to an incinerator chamber, the incinerator chamber providing a combustion of the contaminated materials, the incinerator chamber in communication with a bag filter which is connected to a packed column scrubber, the packed column scrubber including a first packed bed and a second packed bed and means of maintaining the bag filter at a temperature above the dew point of HCl the first packed bed in communication with the second packed bed, the packed column scrubber having a sump tank connected thereto, an exhaust stack in communication with the packed column scrubber for exhausting the smoke from the packed column scrubber to an external environment, the smoke substantially free of hazardous contaminants.

**4,949,653**  
**PROCESS AND APPARATUS FOR INCINERATION**  
James P. Rast, 9510 Herring Hill Rd., Millington, Tenn. 38053  
Filed Dec. 6, 1989, Ser. No. 446,880  
Int. Cl.<sup>5</sup> F23D 14/00; F23G 5/00  
U.S. Cl. 110—235

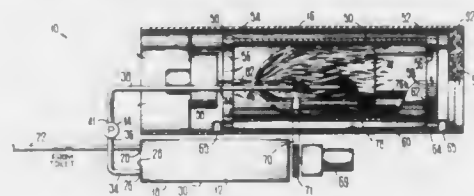
1. An incinerator and recyclable material recovery facility for the processing of a refuse mass comprising:  
(a) an incineration means comprising a refuse loading area, a combustion area for the incineration of combustible materials in the refuse mass; a recyclable recovery area for the melting and selective collection of metallic and glass components of the refuse mass; and a residue disposition means for the removal of non-combustible ash and materials having a melting point higher than the temperatures reached in the incineration means;  
(b) means to transport the refuse mass in the incinerator said transport means comprising a movable refuse mass support surface having means to allow the removal of melted components of the refuse mass;  
(c) means to convey the said transport means in the incinerator;  
(d) means to provide additional heat to the incinerator in

excess of the heat generated during combustion of the combustible portion of the refuse mass; and



(e) means to convey the gaseous and particulate combustion products from the said combustion zone to the said recyclable recovery area of the incinerator.

**4,949,654**  
**INCINERATOR FOR COMBUSTING SEWAGE**  
Wilson L. Porter, 220 John Phillips Rd., Cedartown, Ga. 30125  
Filed Apr. 7, 1989, Ser. No. 335,036  
Int. Cl.<sup>5</sup> A47D 36/00, 36/24  
U.S. Cl. 110—216

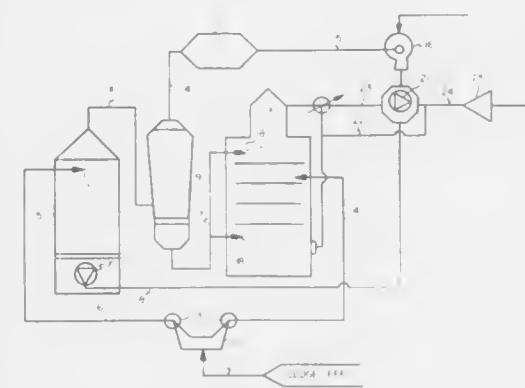


1. An incinerator for combusting waste materials, comprising:  
a combustion chamber;  
a source of flames located at an upstream end of the combustion chamber;  
means for rotating the combustion chamber;  
means for delivering waste to the interior of the combustion chamber, whereby the waste is introduced to the flames for incineration; and  
a cone coaxial with the combustion chamber having a small end adjacent the source of flames so as to direct the flames against the kiln wall.

**4,949,655**  
**PROCESS FOR THE UTILIZATION OF POWDERED SOLID WASTE**  
Fred C. Greer, 2020 Creekway, Lansdale, Pa. 19446, and Allan S. Paul, 238 6th Avenue, Collegeville, Pa. 19426  
Filed Feb. 17, 1989, Ser. No. 311,836  
Int. Cl.<sup>5</sup> F23G 7/04  
U.S. Cl. 110—346

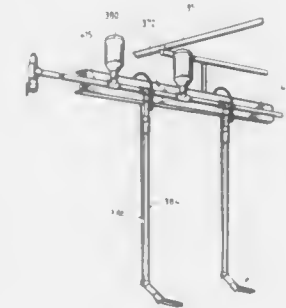
1. A process for the thermal oxidation of aqueous waste materials as a replacement for auxiliary fuel comprising:  
(i) dewatering the waste;  
(ii) transporting the waste to a sludge feed hopper;

(iii) drying a portion of the waste from the hopper wherein the amount of the waste dried is sufficient to support autogenous combustion in a multiple hearth furnace having a plurality of hearths;



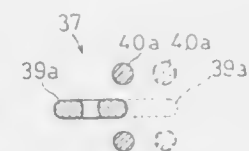
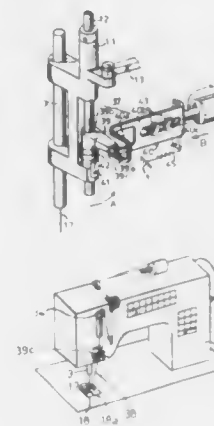
(iv) pneumatically transporting the dried waste to multiple locations within the multiple hearth furnace; and  
(v) oxidizing the waste particles wherein the waste is fired in suspension.

**4,949,656**  
**DISTRIBUTION MANIFOLD FOR MOBILE SPAN-AND-TOWER IRRIGATION SYSTEMS**  
William M. Lyle, Ralls; James P. Bordovsky, Plainview, both of Tex., and Mark A. Butler, Hastings, Nebr., assignors to The Texas A&M University System, College Station, Tex.  
Division of Ser. No. 150,776, Feb. 1, 1988. This application Nov. 15, 1989, Ser. No. 437,375  
Int. Cl.<sup>5</sup> A01C 7/18  
U.S. Cl. 111—174



1. A seed distribution manifold supported on a pipe span-and-tower irrigation system, comprising:  
a first horizontal disposed conduit manifold extending along and suspended from the span on the irrigation system;  
a second horizontally disposed conduit mounted on the span above the first conduit and adapted to convey a supply of seed in carrier water;  
a vertically disposed manifold recharge pipe connected at its lower end to the first conduit medial the conduit ends and connected at its upper end to the second conduit;  
a first valve in the manifold recharge pipe to regulate flow therethrough;  
at least one outlet pipe in fluid communication with and depending from the first conduit towards the ground;  
at least one accumulator in fluid communication with and extending upwardly from the first conduit; and  
a second valve disposed in each outlet pipe to control flow of seed and water through the outlet pipe.

**4,949,657**  
**SEWING MACHINE WITH A DEVICE FOR AMENDING THREAD TIGHTENING BY NEEDLE POSITIONS**  
Susumu Hanyu, Noboru Kasuga, Kazumasa Hara, and Mikio Kolke, all of Tokyo, Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan  
Filed Nov. 2, 1988, Ser. No. 266,385  
Claims priority, application Japan, Nov. 6, 1987, 62-279084  
Int. Cl.<sup>5</sup> D05B 3/02, 47/04, 49/00  
U.S. Cl. 112—121.13



1. A sewing machine comprising a needle bar having a lower end; a needle for carrying an upper thread and attached to said lower end of said needle bar; a vertical shaft; a needle bar support swingable around said vertical shaft to swing said needle laterally with respect to a fabric feeding direction, an upper drive shaft operatively connected with said needle bar and rotatable to vertically reciprocate said needle bar on said needle bar support; a loop taker for carrying a lower thread and operatively connected with said upper drive shaft for rotation in synchronism with said needle, said loop taker and said needle cooperating to interlock the upper thread and the lower thread to form a stitch each time said needle is displaced downward; a thread take-up lever operatively connected to said upper drive shaft for vertical reciprocation in synchronism with said needle to feed the upper thread to said needle upon downward movement of said take-up lever and to tighten the stitch upon upward movement of said take-up lever; thread deflecting means arranged between said thread take-up lever and said needle for deflecting the upper thread laterally of the fabric feeding direction in response to swinging movement of said needle bar effected in response to selection of zigzag stitch pattern data stored in a memory of said sewing machine; thread blocking means arranged on one side of said thread deflecting means and movable relative to said thread deflecting means between inoperative and operative positions; and actuating means for moving said thread blocking means to the operative position of said blocking means in response to selection of the zigzag stitch pattern data, said thread blocking means in the operative position thereof blocking the upper thread as the upper thread is being deflected in one direction by said thread deflecting means for providing a predetermined degree of tension of the upper thread to thereby tighten the stitch on one side of the zigzag stitch in addition to tightening the stitch by said thread take-up lever.

4,949,658

## TAPE FEEDING DEVICE IN A TAPE WINDING STITCHING MACHINE

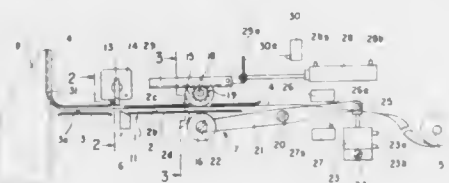
Hideyuki Kobayashi, Tochigi, Japan, assignor to SSMC Inc., Edison, N.J.

Filed May 8, 1989, Ser. No. 348,432

Claims priority, application Japan, Jun. 14, 1988, 63-78556[U]  
Int. Cl.<sup>5</sup> D05B 35/06

U.S. Cl. 112—137

4 Claims



1. A tape feeding device in a tape winding stitching machine comprising:

- a binder arrangement for bending a belt shape tape so that the bent portion thereof extends longitudinally, the arrangement including a first binder for guiding a base of the tape and a second binder for bending the tape in a predetermined shape while guiding a tip end of the tape, the first binder having a flat tubular shape and a guide passage having first and second opposite ends and a middle portion extending therebetween, the middle section being gradually deformed as it extends from the first end to the second end, the first end having a substantially rectangular cross section, the second end having a V-shaped bent portion at one edge side and a U-shaped bent portion curved in a direction opposite to that of the V-shaped bent portion on other and opposite edge side, the second binder having a first end, an opposite second end and a passage extending between the first and second ends, the first end of the second binder being adjacent the second end of the first binder, and having a shape opposite to that of the second end of the first binder, the second end of the second binder having a V-shape;
- cutting means disposed between the first and the second binders for cutting the tape; and a tape feeding mechanism for feeding the tape from the first binder to the second binder after the tape was cut by the cutting means.

4,949,659

## CONTAINER/BULK CARGO INTERCHANGEABLE SYSTEM

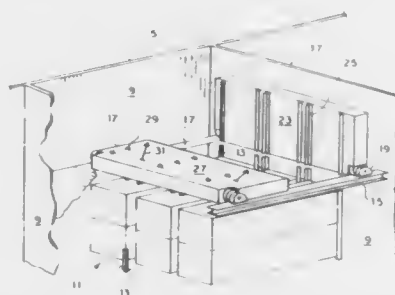
Michael M. Shen, 5214 Mornington Ct., Fairfax, Va. 22032

Filed Nov. 7, 1989, Ser. No. 432,990

Int. Cl.<sup>5</sup> B63B 25/00

U.S. Cl. 114—78

2 Claims



1. In a cargo ship's cargo hold, a container/bulk cargo interchangeable system affording such ship the versatility and option of entirely storing and carrying International Standard Organizational (ISO) standard containers, or of storing and

carrying a combination of ISO containers and bulk cargo or break bulk, or of entirely storing and carrying bulk cargo or break bulk; said system comprising hold side walls, horizontal support structure, a plurality of flat platforms, hinges, winching cables and cell guides; said hold side walls fixedly carrying said support structure, said support structure and flat platforms fixedly carrying said hinges, said platforms carrying said winching cables, said winching cables being operable in one direction to raise said platforms to vertical upright positions to permit the storage and carrying of said ISO standard containers, and in an opposite direction to lower, by force of gravity, and dispose said platforms in horizontal rest upon said support structure to store and carry bulk cargo or break bulk, and a requisite number of said platforms being raised to their vertical upright positions and the remainder of said platforms being lowered to their horizontal positions to thereby store and carry said ISO containers and to store and carry said bulk cargo or break bulk, respectively, said flat platforms having bottom surfaces, both said bottom surfaces of said flat platforms and said hold side walls fixedly carrying thereon said cell guides, said hold side walls fixedly carrying said cell guides in vertical disposition, said cell guides on said bottom surfaces of said flat platforms and on said hold side walls receiving therebetween said ISO containers, and said cell guides on said bottom surfaces of said flat platforms in their vertical upright positions of said flat platforms being in common alignment with said cell guides on said hold side walls.

4,949,660

## SAIL WINDER CONTROL SYSTEMS

Jean-Michel Despries, 10 Ter, Rue Croix Marigny, 50550 St-Vaast La Hougue, and Jean-Marie Padelon, Résidence Pasteur, 50100 Cherbourg, both of France

Filed Nov. 23, 1988, Ser. No. 275,523

Claims priority, application France, Nov. 26, 1987, 87 16407  
Int. Cl.<sup>5</sup> B63H 9/10

U.S. Cl. 114—106

7 Claims



1. A sail winder comprising a tube that is rotatable about its longitudinal axis with said tube being mounted adjacent a mast and being connected to a sail around which tube the sail is adapted to wind; a control system for controlling rotation of said tube; and said mast having a foot portion, with said control system being at least partially positioned underneath the foot portion of said mast and at least partially extending past the foot portion.

4,949,661

## MECHANICAL RUDDER STOPPERS

R. H. Phillips, Kings Beach, and Ching Yiu, San Leandro, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Nov. 25, 1985, Ser. No. 801,655

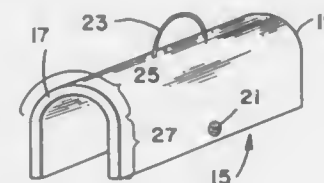
Int. Cl.<sup>5</sup> B63H 25/22

U.S. Cl. 114—170

10 Claims

9. A method for arresting the movement of a hydraulically

operated rudder on an ocean going ship comprising the steps of:



inserting two or more half-collars between load-bearing surfaces of a slidable member in a hydraulic rudder; and engaging a quick hold-on device on said half-collar.

4,949,662

## STEERING DEVICE FOR SMALL SIZED JET PROPULSION BOAT

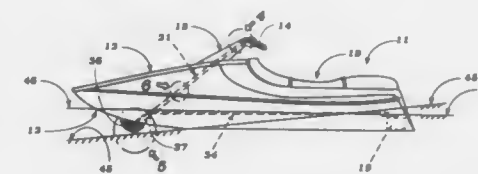
Noboru Kobayashi, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Nov. 2, 1988, Ser. No. 266,111

Int. Cl.<sup>5</sup> B63H 25/06

U.S. Cl. 114—162

8 Claims



1. In a watercraft having a hull, propulsion means carried by said hull for propelling said hull through a body of water, steering means supported contiguous to the stern of said hull for steering said hull, the configuration of said hull being such that a forward portion thereof is submerged when traveling at low speeds and is out of the water when said hull is being propelled at high speeds by said propulsion means, the improvement comprising auxiliary steering means carried by said hull forward portion and being ineffective to effect a steering effect when said watercraft is traveling at high speeds and to create a steering effect when said watercraft is travelling at low speeds.

4,949,663

## ELECTRO-MAGNETIC COUPLING FOR TOW BOAT AND BARGE

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, Harahan, La.

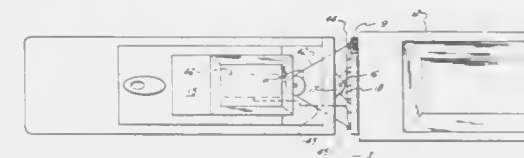
Continuation of Ser. No. 142,517, Nov. 1, 1988, Pat. No.

4,848,259. This application Jul. 11, 1989, Ser. No. 378,414

Int. Cl.<sup>5</sup> B63B 21/62

U.S. Cl. 114—246

10 Claims



1. An electro-magnetic coupling apparatus for a tug boat and barge tow comprising:

- (a) a bumper frame carried by the tug boat and including a forwardly facing portion positioned to engage the barge;
- (b) a plurality of bearing surfaces spaced along the bumper

frame forwardly facing portion, each defining a separate load transfer surface between the tug boat and the barge;

- (c) magnetic coupling means carried at each load transfer surface for developing a magnetic field which can form a tensile connection between the barge and tug at the bearing surface;
- (d) power means for energizing the magnetic field; and
- (e) articulating means spaced laterally along the bumper frame forwardly facing portion for allowing movement between each bearing surface and the barge so that the bearing surfaces can separately and closely conform to the barge when the magnetic field is energized.

4,949,664

## WARNING TAPE FOR UNDERGROUND LINES

Steven J. Wallace, Waterloo, Wis., assignor to Thor Enterprises, Inc., Sun Prairie, Wis.

Filed Jan. 3, 1989, Ser. No. 292,774

Int. Cl.<sup>5</sup> G01D 21/00

U.S. Cl. 116—209

18 Claims

1. An indicating means for use in a backfilled trench above an elongated line comprising an elongated tape having a first plurality of plastic fibers disposed substantially parallel to the axis of elongation of the tape and a second plurality of fibers disposed substantially parallel to each other, the second plurality of fibers being disposed normal to the first plurality of fibers and being cross-woven with the first plurality of fibers into a scrim, the number of fibers per unit length of the first plurality being no greater than 25 to 90 per cent of the number of fibers of the second plurality, a plastic coating disposed on at least one surface of the scrim, said coating closing voids between the fibers and rendering the tape water impervious, and a sign disposed on the tape adapted to contain information relating to the line.

4,949,665

## INSTALLATION FOR COATING AND DRYING BOTH SIDES OF PRINTED CIRCUIT BOARDS

Erich Weber, Effnerstr. 89, D-800 Muenchen 80, Fed. Rep. of Germany

Division of Ser. No. 128,830, Nov. 23, 1987, Pat. No. 4,871,584.

This application May 22, 1989, Ser. No. 354,957

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1986, 3602350

Int. Cl.<sup>5</sup> B05C 3/10

U.S. Cl. 118—66

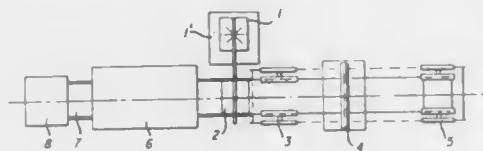
5 Claims

1. Apparatus for coating both sides of a printed circuit board with a liquid coating material, said apparatus comprising:

- a conveyor;
- means for feeding a circuit board to the conveyor;
- a movable board holder configured to grip said circuit board only at outer edges of said board;



a coating device for coating said board one side at a time located in a path of said conveyor;



means for rotating said board located at an end of said conveyor; and  
means for drying both sides of said board simultaneously.

4,949,666

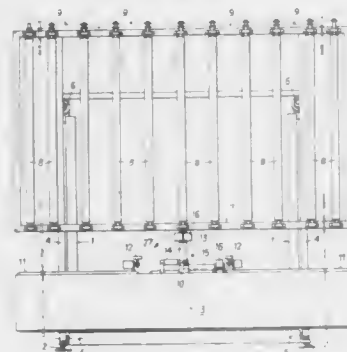
# APPARATUS FOR THE HANDLING OF SPACER FRAMES

Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

Filed Dec. 12, 1988, Ser. No. 283,558  
Claims priority, application Austria, Mar. 14, 1988, 691/88  
Int. Cl.<sup>5</sup> B05C 9/04, 13/02

U.S. Cl. 118—110

10 Claims



1. Apparatus for coating spacer frames for insulating glass, said spacer frames having corners and being bent from one piece, said apparatus comprising means for conveying said spacer frames along a conveying path, nozzles arranged on opposite sides of said path for the application of a coating compound to lateral faces of the spacer frames, a lateral support for the spacer frames above said conveying means, a turning device for rotating the spacer frames about an axis extending transversely to a plane of the spacer frames, and means for changing the position of said nozzles relative to said axis.

4,949,667

# ROLL COATING APPARATUS FOR FORMING A FILM OF A HIGH VISCOSITY COATING LIQUID ON A SURFACE

Toshio Yoshida; Kenichi Nakamura; Yoshihisa Matsuda; Eiichi Hayashi; Kazuo Kinose, and Megumu Fukui, all of Shiga, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Apr. 14, 1989, Ser. No. 339,017  
Claims priority, application Japan, Apr. 20, 1988, 63-98730; Jun. 7, 1988, 63-75650[U]; Jul. 14, 1988, 63-93142[U]  
Int. Cl.<sup>5</sup> B05C 1/05

U.S. Cl. 118—60

48 Claims

1. A roll coating apparatus for applying a coating liquid having a high viscosity at a normal temperature to a surface of a substrate fed thereto, comprising:  
means for feeding said substrate to said roll coating apparatus;  
a coating roll extending along a width of said substrate in a

direction intersecting with a direction of feeding of said substrate, so as to be in contact with said substrate under pressure, said coating roll being rotatable, and doctor means extending parallel with an axis of said coating roll, so as to be in contact with said coating roll, defining a space for storing said coating liquid between said coating roll and said doctor means, and allowing said coating



liquid to adhere to a surface of said coating roll according to rotation thereof,  
said coating roll and said doctor means having their respective axial lines inclined with a prescribed angle with respect to a horizontal plane, and  
coating liquid supply means for supplying said coating liquid to said space for storing said coating liquid at a position higher than the upper side of the substrate.

4,949,668

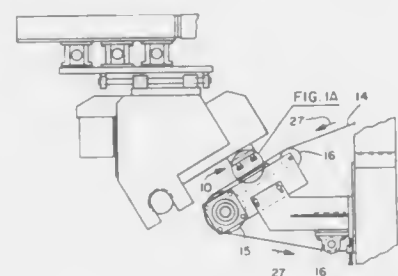
# APPARATUS FOR SPRAYED ADHESIVE DIAPER CONSTRUCTION

Timothy R. Heindel, Neenah, Wis.; Michael J. Garvey, Cordova, Tenn.; Daniel W. Dick, Paris, Tex.; Richard F. Keller, Hortonville, Wis.; Mary P. Jordan, Neenah, Wis., and Alan F. Schleinz, Appleton, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jun. 16, 1988, Ser. No. 207,682  
Int. Cl.<sup>5</sup> B05B 13/02

U.S. Cl. 118—314

29 Claims



15. An apparatus for depositing a pattern of material onto a substrate, comprising:  
a first nozzle for supplying a first stream of a selected viscous material;  
a second nozzle for supplying at least a second stream of a selected viscous material, said second nozzle located in a position which is offset from said first nozzle along a substrate movement direction of said apparatus and staggered from said first nozzle along a cross-direction of said apparatus;  
gas directing means for forming a plurality of gas streams, which have selected velocities and are arranged to entrain said first and second material streams to impart a swirling motion to each of the material streams as it moves toward said substrate;  
transport means for moving said substrate past said nozzles along said substrate movement direction; and  
regulating means for controlling said material streams and said gas streams to direct each of said material streams in

a selected path toward said substrate and deposit said material thereon to form adjacent semi-cycloidal patterns of said material on said substrate.

4,949,669

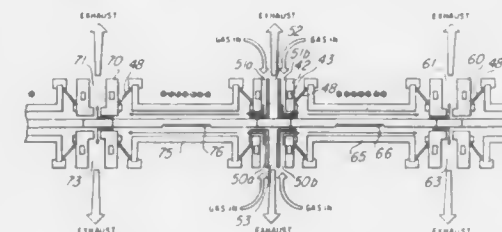
# GAS FLOW SYSTEMS IN CCVD REACTORS

Kaoru Ishii, and Thomas F. Wilkinson, both of Garland, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 20, 1988, Ser. No. 287,174

Int. Cl.<sup>5</sup> C23C 16/00

7 Claims



1. Process gas inlet and exhaust port structures for use with continuous chemical vapor deposition reactors having junctions between reaction chambers, where a junction on one end of a reaction chamber is a gas input junction and a junction on the other end of the reaction chamber is an exhaust junction, comprising:

- a gas plenum within the gas input junction having a single input orifice;
- a plurality of orifices for distributing gas into the reaction chamber, said plurality of orifices being located on a side of the plenum opposite said single input orifice and positioned to receive equal amounts of gas from said input orifice;
- an exhaust port in an exhaust junction located at the end of the reaction chamber opposite said input junction, said exhaust port being centrally located in respect to the reaction chamber end adjacent said exhaust junction; and
- a shutter partially closing each of said plurality of orifices for distributing gas into the reaction chamber.

4,949,670

# METHOD AND APPARATUS FOR LOW PRESSURE PLASMA

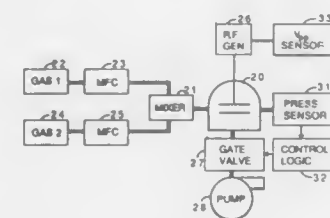
Ole Krogh, San Francisco, Calif., assignor to Tegal Corporation, Petaluma, Calif.

Filed Nov. 4, 1988, Ser. No. 267,193

Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 118—723

3 Claims



1. In apparatus for treating a semiconductor wafer with a glow discharge in a chamber including means for supplying one or more gases to said chamber, means for exhausting gases from said chamber, means for supplying RF power to said chamber, and means for magnetically confining said glow discharge, the improvement comprising:  
means coupled to said means for supplying RF power to said chamber for monitoring the peak to peak voltage within

said chamber and producing a control signal in response thereto; and  
means for maintaining the pressure within said chamber at or near a pressure corresponding to a minimum peak to peak voltage in response to said control signal.

4,949,671

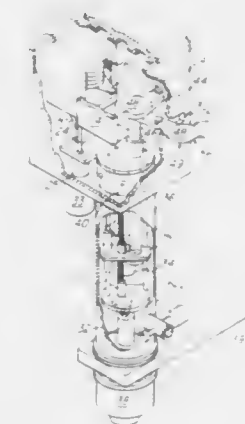
# PROCESSING APPARATUS AND METHOD

Cecil J. Davis, Greenville; Robert T. Matthews; Rudy L. York, both of Plano; Joseph D. Luttmer, Richardson; Dwain R. Jakubik, Palmer, and James B. Hunter, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 74,112, Jul. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 73,678, Jul. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 790,707, Oct. 24, 1985, Pat. No. 4,685,999. This application Dec. 21, 1985, Ser. No. 292,624  
Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 118—725

9 Claims



1. An apparatus for uniformly depositing a thin film on a workpiece; comprising:  
a process chamber having a top portion;  
support means for supporting the workpiece adjacent to the top portion of the process chamber;  
a cylindrical baffle within the process chamber;  
a first gas distribution ring for releasing a first process gas the first gas distribution ring being within the volume of, and, concentric with the cylindrical baffle and below the top portion of the process chamber;  
a second gas distribution ring for releasing a second process gas the second gas distribution ring being with the volume and concentric with the cylindrical baffle, and concentric with the first gas distributor ring and below the first gas distributor ring.

4,949,672

# BORON-BASED ODOR CONTROL ANIMAL LITTER

Steven D. Ratcliff, Antioch; Randy L. Wood, San Ramon; Donald K. Swatling, El Cerrito, and Peter C. Arbogast, Pleasanton, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Jun. 17, 1988, Ser. No. 208,956

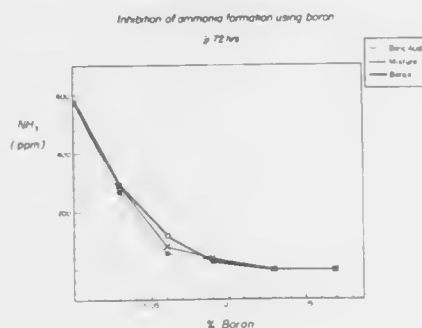
Int. Cl.<sup>5</sup> A01K 1/015

U.S. Cl. 119—1

20 Claims

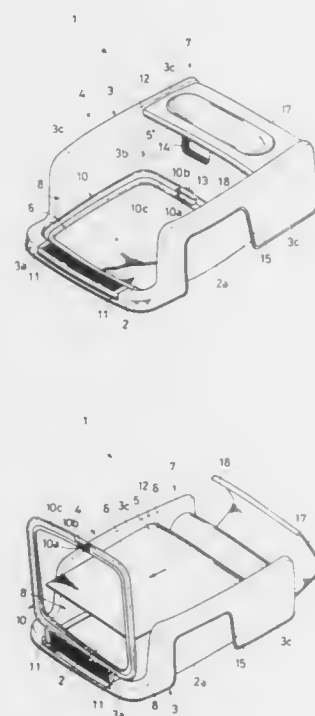
1. An odor control animal litter comprising: particles of an absorbent clay substrate, said particles being contacted with a liquid carrier containing an odor-controlling-effective amount of a boron-containing material having an equivalent boron

level of a least 0.06%, said material comprising boric acid present in an amount of from 0.06% to about 50% by weight



and said liquid carrier comprising an alkali metal hydroxide in solution.

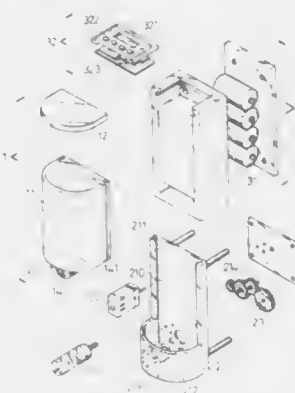
**4,949,673**  
**DOMESTIC PETS CHAMBERPOT**  
Yoshikazu Yamamoto, 3-1-1, Eganosho, Habikino-shi, Osaka, Japan  
Filed Oct. 12, 1989, Ser. No. 420,766  
Claims priority, application Japan, Nov. 12, 1988, 63-147976[U]  
Int. Cl.<sup>5</sup> A01K 29/00  
U.S. Cl. 119—1 2 Claims



1. A chamberpot for domestic pets employing a water-absorptive sheet as placed on a soil bed surrounded by peripheral walls, said chamberpot comprising;  
a sheet containing section continuous with one of the peripheral walls for storing said sheet in a manner to allow the sheet to be drawn therefrom,  
said one of the peripheral walls defining a sheet draw-out position for guiding the sheet from said sheet containing section to said soil bed, and  
clamp means having a frame shape corresponding to said soil

bed and defining a sheet pressing portion on a bottom peripheral face thereof for pressing the sheet on peripheries of said soil bed.

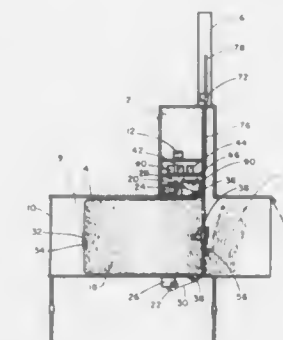
**4,949,674**  
**AUTOMATIC FISHFOOD DISPENSER**  
Richard Young, 5 Fl., No. 7, Lane 389, Lien Cheng Rd., Chung Ho City, Taipei Hsien, Taiwan  
Filed Dec. 15, 1989, Ser. No. 451,424  
Int. Cl.<sup>5</sup> A01K 61/02  
U.S. Cl. 119—51.04 1 Claim



1. An automatic fishfood dispenser comprises  
a food container, integrally formed with a channel on a base thereof for communicating an outflow of fishfood there-through, including a removable cover;  
a dispensing mechanism provided with a seat on which said food container is disposed, said seat integrally formed with a straight back provided with slotted grooves on each side thereof by means of which said food container is slidably connectable with said dispensing mechanism, said seat being provided on a lower portion thereof with an egress for allowing an outflow of fishfood to a fish tank, an outflow of fishfood from said food container through said channel communicated to said egress via a chute, a spindle threaded with a plurality of grooves positioned in said channel for regulating an outflow of fishfood to said chute, such that, when rotating, said spindle distributes a quantity of fishfood to said chute by means of said grooves, but, when stationary, said spindle blocks an outflow of fishfood through said channel to said chute, said spindle being rotated by a battery powered motor, also disposed in said seat, operating in conjunction with a set of gears which are disposed on an exterior surface of said seat; and,  
a battery pack housing a plurality of batteries for operating said battery powered motor, further comprising a timer by means of which a user communicated a set quantity of fishfood to be dispensed by said automatic fishfood dispenser through a rotation of said spindle and a set time interval at which said battery operated motor activates said spindle.

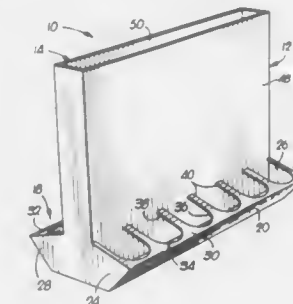
**4,949,675**  
**AUTOMATIC ANIMAL FEEDER**  
Jack C. Parks, 4001 Visby La., Las Vegas, Nev. 89119  
Filed Dec. 13, 1988, Ser. No. 284,064  
Int. Cl.<sup>5</sup> A01K 5/02  
U.S. Cl. 119—51.11 12 Claims  
1. An automatic animal feeding apparatus comprising a housing,  
a chamber within the housing adapted to receive a hay bale, cutting means mounted at an end portion of the chamber for

severing a portion of the hay bale, said cutting means being movable along a plane transverse to the bale between a first position on one side of the bale to a second position adjacent another side of the bale,  
advancement means for moving the bale within the chamber toward the cutting means,



actuating means for sequentially activating the advancement means and the cutting means, drive means for operably moving the cutting means transverse to the chamber, and a power source for providing electrical power to the advancement means and the cutting means.

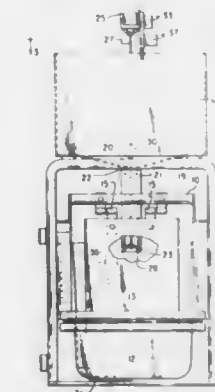
**4,949,676**  
**LIVESTOCK FEEDER APPARATUS**  
Danny Burns, Rt. 3, Maryville, Mo. 64468  
Filed Oct. 12, 1988, Ser. No. 256,743  
Int. Cl.<sup>5</sup> A01K 5/01  
U.S. Cl. 119—52.1 2 Claims



1. A livestock feeding apparatus comprising:  
a hopper for storing a supply of feed, said hopper having upper and lower ends, and including an opening adjacent the lower end; and a feed trough mounted adjacent the lower end of the hopper and being in communication with the hopper through the opening so that feed in the hopper can pass into the feed trough from the hopper, the feed trough including:  
a bottom wall,  
a front wall extending upwardly from the bottom wall and having a top edge, and  
a top face having a lower edge connected to the top edge of the front wall and an upper edge connected to the hopper, the top face having at least one feeding hole therethrough which is substantially U-shaped having a curved portion and a straight portion, the curved portion of the feeding hole being remote from the hopper, the diameter of the curved portion being substantially equal to the distance along the front wall between the bottom wall and the top edge of the front wall, and being approximately 2 inches smaller than the width of the top face between the top edge of the front wall and the hopper and approximately

1 inch smaller than the height of the upper edge of the top face above the bottom wall.

**4,949,677**  
**AUTOMATIC MECHANISM FOR ANIMAL FEEDER**  
Randy R. Kock, R.R. 1, Box 276, Inwood, Iowa 51240  
Filed Jan. 10, 1989, Ser. No. 295,342  
Int. Cl.<sup>5</sup> A01K 5/00  
U.S. Cl. 119—56.1 5 Claims



1. A feeding system comprising container means, a bin mounted above said container means, metering means including feed carrying means adapted to convey feed by gravity from said bin to said container means, and control means for said metering means including a heat source beneath said container means and sensor means above said heat source whereby a reduction of insulation of said source by removal of feed from said container means will activate said control means to drop a metered amount of feed.

**4,949,678**  
**DISPOSABLE PET FEEDING DISH**  
Albert J. Demko, 520 S. Collier Blvd., Marco Island, Fla. 33937  
Filed Nov. 13, 1989, Ser. No. 434,366  
Int. Cl.<sup>5</sup> A01K 5/01  
U.S. Cl. 119—61 2 Claims



1. A disposable one-piece pet feeding dish which when in use is releasably attached to a surface comprising  
a central bowl surrounded by an outwardly sloping skirt having a planar ring-shaped lower edge,  
the bottom of the central bowl substantially flat and lying in the same plane as the ring-shaped lower edge of the dish's skirt,  
a patch having its upper and lower sides covered with a releasable adhesive affixed by the adhesive on its upper side to the flat outside surface of the bottom of the bowl, and  
a sheet of release paper covering the lower adhesive covered surface of the patch.



**4,949,679**  
**APPARATUS FOR SECURING AN INDIVIDUAL'S HANDS ADJACENT HIS WAIST**  
 Joseph A. Wolfer, 4903 W. Carol Ave., Glendale, Ariz. 85302  
 Filed Nov. 14, 1988, Ser. No. 270,083  
 Int. Cl.<sup>5</sup> A61F 5/37

U.S. Cl. 119—96

4 Claims

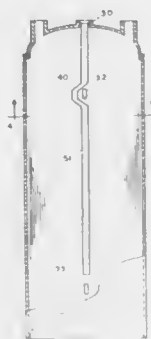


1. For use with an individual, apparatus for maintaining the wrist and hands of the individual adjacent the individual's waist comprising,
  - (a) a pair of handcuffs worn on the wrists of the individual;
  - (b) elongated means interconnecting said handcuffs to maintain said cuffs in close proximity to one another;
  - (c) elongate restraining strap means extending around the waist of the individual and including
    - (i) first and second ends,
    - (ii) fastening means for releasably attaching said first and second ends,
    - (iii) an elongate pliable strap having a first end connected to said fastening means, a second end slidably engaging said fastening means to tighten and loosen said strap about the individual's waist, and a center point intermediate said ends,
    - (iv) a loop formed at a selected point along the length of said pliable strap, said selected point being intermediate said center point and one of the pair comprising said first end and said second end; said strap extending from said fastening means through said loop and around said elongate means interconnecting said handcuffs and back to said fastening means.

**4,949,680**  
**WATER HEATER HAVING FILLING DIP TUBE**  
 Hemant D. Kale, 5145 North Kenton, Chicago, Ill. 60630  
 Filed Jan. 23, 1989, Ser. No. 299,136  
 Int. Cl.<sup>5</sup> F22B 5/00

U.S. Cl. 122—17

12 Claims



1. In a heater having a pressurized vertical storage tank defined by a cylindrical side wall having a diameter between 12 and 26 inches, a bottom wall and a curved top wall and having a non-compartmentalized internal storage area, means for heating water within the tank, a cold water inlet and a hot

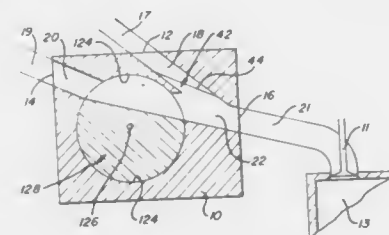
water outlet generally adjacent the top thereof, the improvement comprising an inlet dip tube entirely within the storage area of the tank for delivering water from the inlet to the tank interior, said dip tube extending downwardly to a position in the bottom portion of said tank and being disposed not more than 3 1/2 inches from the vertical central axis of said tank, said dip tube incorporating a bend to allow room for a heating element extending into the area of said vertical axis.

**4,949,681**  
**METHOD FOR POSTCHARGING AN IC ENGINE OF THE PISTON TYPE AND AN APPARATUS FOR PERFORMING THE METHOD**  
 Oskar Schatz, Waldpromenade 16, D-8035 Gauting, and Thomas Steidele, Munich, both of Fed. Rep. of Germany, assignors to Oskar Schatz, Fed. Rep. of Germany  
 Continuation of Ser. No. 267,087, Nov. 4, 1988, Pat. No. 4,890,582. This application Nov. 30, 1989, Ser. No. 444,558  
 Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737826

Int. Cl.<sup>5</sup> F02B 17/00

U.S. Cl. 123—26

20 Claims

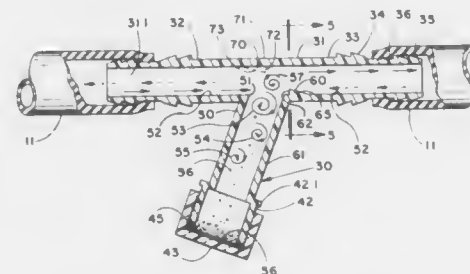


1. A method of postcharging a piston internal combustion engine, said engine including one or more combustion chambers, each combustion chamber including an inlet and a controller for controlling air entering the combustion chambers through the inlets, the controller coupled with an induction and a pressurized air source; said method comprising:
  - drawing air into said combustion chamber simultaneously from said induction air source and said pressurized air source such that an exchange of momentum between induction and pressure currents is propagating towards said combustion chamber.

**4,949,682**  
**PARTICULATE AND DIRT COLLECTING INDICATOR, DEFLECTOR AND COLLECTOR FOR AN AUTO COOLANT SYSTEM**  
 Michael E. Klein, 5715 Jamison Ave. NE., St. Michael, Minn. 55376  
 Filed Jun. 30, 1989, Ser. No. 374,361  
 Int. Cl.<sup>5</sup> F01P 5/14

U.S. Cl. 123—41.15

20 Claims

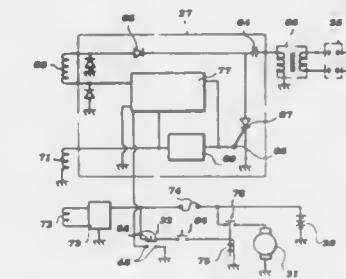


1. A deflector for removing particulate matter from the coolant system of an internal combustion engine and being

connectable in a hose of the coolant system, the deflector comprising:

- an upper conduit section with inlet and outlet ends, the ends being connectable into the hose of the coolant system, the upper conduit section having an inner wall defining a flow passage,
- a lower conduit section with a lower end and depending from the upper conduit section,
- removable collector means connected to the lower end of the lower conduit section for collecting and removing particulate collected in the lower conduit section,
- a corner portion formed by the upper and lower conduit sections whereby the corner portion creates eddy like fluid flow to slow down the rate of fluid and particulate flow so that particulates settle into and are collected by the lower conduit section for removal, and
- the upper conduit section including a raised portion extending from the inner wall and partially into the flow passage to contribute to the eddy like fluid flow, the raised portion being disposed wholly between the outlet end and the corner portion.

ing the firing of the spark plug when the magneto is generating power and a starter for starting the engine, the improvement

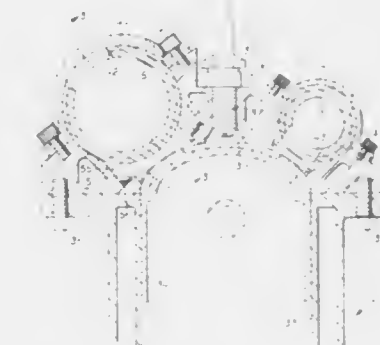


comprising means for precluding operation of said starter when said kill circuit is energized.

**4,949,685**  
**INTERNAL COMBUSTION ENGINE WITH ROTARY VALVES**  
 George J. Doland, and Kevin D. Anton, both of 17400 El Camino Real, Houston, Tex. 77058  
 Filed Oct. 25, 1989, Ser. No. 426,975  
 Int. Cl.<sup>5</sup> F01L 7/10

U.S. Cl. 123—190 A

29 Claims

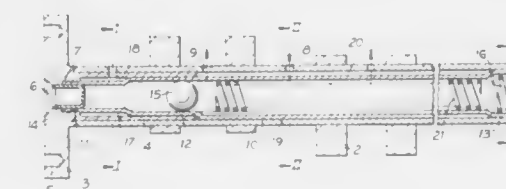


**4,949,683**  
**TUBULAR CAMSHAFT WITH LUBRICANT PASSAGES**  
 Helmut Swars, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Emitec Gesellschaft für Emissionstechnologie mbH, Lohmar, Fed. Rep. of Germany  
 Filed Feb. 2, 1989, Ser. No. 306,034  
 Claims priority, application Fed. Rep. of Germany, Feb. 7, 1988, 3803685

Int. Cl.<sup>5</sup> F01M 9/10

U.S. Cl. 123—90.34

12 Claims



3. A camshaft comprising a hollow tubular shaft and an inner member received within the tubular shaft so that a lubricant guiding space is defined between the tubular shaft and the inner member and is connectable via radial bores in the tubular shaft to bearing regions on the outside of the tubular shaft and to at least one lubricant supply, wherein portions of the inner member are in supporting contact with the tubular shaft, the inner member being in the form of a tube and at least some of said portions being established by expansions of the cross-section of the inner member.

**4,949,684**  
**STARTING SYSTEM FOR INTERNAL COMBUSTION ENGINE**  
 Yoshihiro Gohara, Hamamatsu, Japan, assignor to Sanshin Kogyo Kaisha, Hamamatsu, Japan  
 Filed Feb. 21, 1989, Ser. No. 313,542  
 Claims priority, application Japan, Feb. 25, 1988, 63-42885  
 Int. Cl.<sup>5</sup> F02N 11/10

U.S. Cl. 123—179 BG

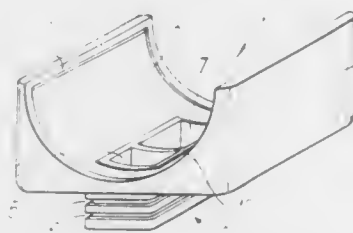
9 Claims

1. In a control system for a spark ignited magneto fired internal combustion engine having a kill circuit for interrupt-

1. An internal combustion engine of the type having an engine block with at least one cylinder formed therein and a removable cylinder head therefor, at least one piston member positioned for reciprocal movement in said cylinder, said cylinder having intake and exhaust ports, intake means for communicating fuel or air, or a fuel/air mixture to said cylinder, and exhaust passage means for exhausting combustion products from said cylinder, having an improvement which comprises,
  - a first rotary valve assembly comprising a first hollow tube having a closed end and an open end and an intake valve port in the wall thereof,
  - means securing and sealing said first hollow tube for rotation on said cylinder head,
  - said first hollow tube being positioned with said open end operatively connected and sealed to said intake means, and having said intake port positioned to register with and open said cylinder intake port on rotation to a selected position and to close said cylinder intake port on rotation away from said selected position,
  - a second rotary valve assembly comprising a second hollow tube having a closed end and an open end and an exhaust valve port in the wall thereof,
  - means securing and sealing said second hollow tube for rotation on said cylinder head,
  - said second hollow tube being positioned with said open end operatively connected and sealed to said combustion

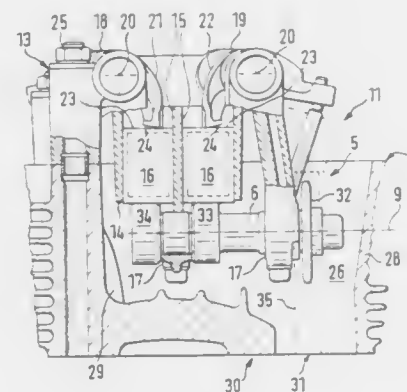
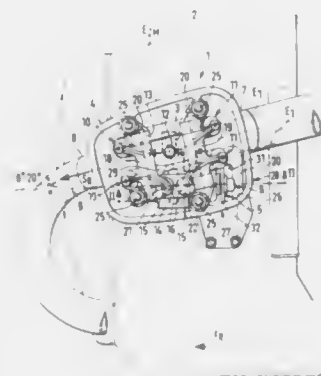
products exhaust means, and having said exhaust port positioned to register with and open said cylinder exhaust port on rotation to a selected position and to close said cylinder exhaust port on rotation away from said selected position, and timing means operatively connected to said closed ends of said first and said second hollow tubes operable to rotate said tubes to open and close said cylinder intake and exhaust valves at selected intervals.

**4,949,686**  
**SEALING ELEMENT FOR A ROTARY TIMING SYSTEM OF INTERNAL-COMBUSTION ENGINES**  
Giancarlo Brusutti, Via Terraglio, 73, 31021 Mogliano Veneto, Italy  
Filed Oct. 23, 1989, Ser. No. 425,258  
Claims priority, application Italy, Oct. 26, 1988, 41698 A/88  
Int. Cl.<sup>5</sup> F01L 7/00  
U.S. Cl. 123—190 E 7 Claims



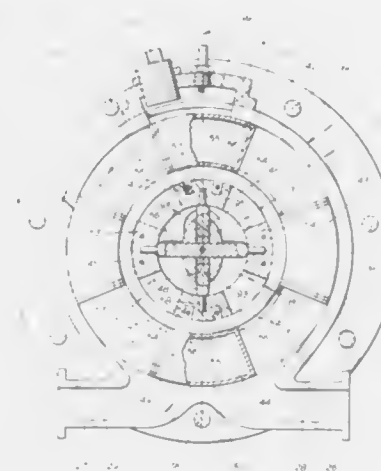
1. Sealing element for a rotary timing system of internal-combustion engines comprising a case associated with at least one combustion chamber of a cylinder of an engine, said case being furthermore connected to induction and exhaust manifolds, said case comprising a rotary distribution cylinder, said distribution cylinder having internal chambers and ports, said ports being adapted to selectively connect said internal chambers to said manifolds and to said at least one combustion chamber, a said sealing element being arranged at said case between said distribution cylinder and said combustion chamber, and a said sealing element being arranged between said distribution cylinder and said manifolds to connect said ports respectively to said combustion chamber and to said manifolds, wherein said sealing element comprises a head and a body, said head having a face shaped according to said distribution cylinder, said distribution cylinder being adapted to rotate and slide on said element face, said body of said element being arranged in a seat provided in said case at said combustion chamber and at said manifolds, said head and said body having at least two parallel ports, a first port of said parallel ports being adapted to connect said combustion chamber with said induction manifold through at least one of said internal chambers, a second port of said parallel ports being adapted to connect said combustion chamber to said exhaust manifold through at least one of said internal chambers.

**4,949,687**  
**FOUR VALVE CYLINDER HEAD FOR A FOUR CYCLE ENGINE**  
Georg Emmersberger, Munchen, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Munich, Fed. Rep. of Germany  
PCT No. PCT/EP88/01151, § 371 Date Aug. 16, 1989, § 102(e) Date Aug. 16, 1989, PCT Pub. No. WO89/05910, PCT Pub. Date Jun. 29, 1989  
PCT Filed Dec. 14, 1988, Ser. No. 399,478  
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743501  
Int. Cl.<sup>5</sup> F01P 1/02; F02F 1/28; F02B 75/24, 61/02  
U.S. Cl. 123—193 H 20 Claims



1. A motorcycle internal-combustion engine having a cross-flow air-cooled single cylinder head, comprising:  
a crankshaft with an axis pointing in a driving direction of the motorcycle;  
a camshaft in the cross-flow cylinder head, having its rotation axis arranged essentially in parallel to the crankshaft; the camshaft controls overhead inlet and outlet valves for engine charge cycle ducts by rocker arms;  
the cross-flow cylinder head has a scavenging direction at an acute angle ( $\alpha$ ) with the axis of rotation of the camshaft; the inlet and outlet valves are arranged in planes, each of said planes including a respective inlet and outlet valve, said planes being essentially in parallel with respect to the scavenging direction; and  
wherein the camshaft is in driving connection with the rocker arms by tappets arranged in the cross-flow cylinder head.

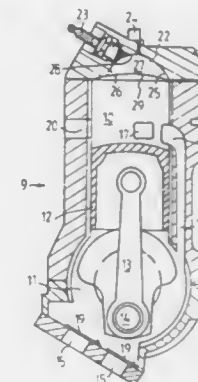
**4,949,688**  
**ROTARY INTERNAL COMBUSTION ENGINE**  
Jack H. Bayless, 14335 Chadbourne, Houston, Tex. 77079  
Filed Jan. 27, 1989, Ser. No. 302,580  
Int. Cl.<sup>5</sup> F02B 53/00  
U.S. Cl. 123—245 10 Claims



1. An internal combustion rotary engine comprising:  
(a) a housing;  
(b) a casing mounted in the housing and defining, at least in part, (i) an annular circular piston chamber, (ii) a continuous chamber slot formed in the casing and extending the full interior circumference thereof, and (iii) a combustion chamber;  
(c) a shaft mounted in the housing for rotation about its axis and positioned radially inwardly of the annular piston chamber, the shaft having two intersecting passages extending radially therethrough and at right angles;  
(d) four pistons movably mounted in the piston chamber for rotation about an axis of rotation which intersects the shaft axis and defines therewith an angle between about 30° and 80°;  
(e) a first connecting rod extending through one passage and interconnecting two pistons 180° apart within the piston chamber;  
(f) a second connecting rod passing through the second passage and interconnecting the other two pistons 180° apart within the piston chamber, and being pivotable with respect to said first connecting rod within the passages; and  
(g) ignition means mounted in the combustion chamber whereby ignition drives a piston within the piston chamber which in turn causes the shaft to rotate.

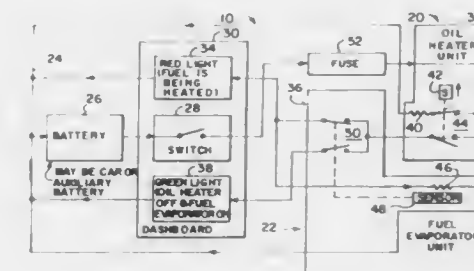
**4,949,689**  
**TIMING OF FUEL INJECTED ENGINES**  
Christopher K. Schlunke, Kingsley, Australia, assignor to Orbital Engine Company Proprietary Limited, Balcatta, Australia  
Continuation of Ser. No. 44,369, Mar. 11, 1987, abandoned. This application Mar. 9, 1988, Ser. No. 169,118  
Claims priority, application Australia, Jul. 19, 1985, PH01561  
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> F02D 41/34; F02M 67/02  
U.S. Cl. 123—295 8 Claims  
1. A method of operating a spark ignited two stroke cycle engine to control hydrocarbon emissions in the exhaust gas, the engine having a cylinder head with a cavity therein forming part of a combustion chamber, the cavity being in direct communication with the remainder of the combustion chamber over the full extent of the cavity in a plane normal to the

cylinder axis, the engine having inlet and exhaust ports opened and closed by a reciprocating piston, said method comprising: injecting a metered quantity of fuel directly into the combustion chamber; and controlling the timing of ignition and injection of said fuel so that at some conditions of low engine load the ignition is



effected between 50° and 65° of crank angle rotation before top dead center of the engine cycle, and injection of the fuel is commenced prior to ignition and at least 80% of the fuel is injected after exhaust port closure, to thereby contribute to establishment of a stratified fuel distribution in the gas charge in the combustion chamber.

**4,949,690**  
**ELECTRIC AUTOMATIC OIL HEATING AND FUEL EVAPORATING SYSTEM**  
Gilberto V. Mauren, Santiago Rivas 1612, Apt 101 Buceo, Sud America, Montivideo, Uruguay, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007  
Filed Apr. 20, 1989, Ser. No. 340,699  
Int. Cl.<sup>5</sup> F02N 17/04; F02M 31/12  
U.S. Cl. 123—142.5 E 4 Claims



1. An oil heating and fuel evaporating system for an internal combustion engine of a motor having an oil pan and a fuel duct downstream of a carburetor, said system comprising:  
(a) means for heating oil in the oil pan to a predetermined temperature;  
(b) means for heating an air-fuel mixture in the fuel duct to a predetermined temperature after the oil is heated so that the engine can be started during cold weather conditions; wherein said oil heating means includes:  
(c) an electrical circuit;  
(d) a battery carried in said circuit to supply electricity throughout said circuit;  
(e) a switch carried in said circuit and disposed on dashboard of the motor vehicle to turn said circuit on and off;  
(f) an oil heater unit carried in said circuit to heat the oil to the predetermined temperature and then activate said air-fuel mixture heating means;  
(g) a red light carried in said circuit and disposed on the



dashboard to be turned on by said oil heater unit when the oil is heated to the predetermined temperature.

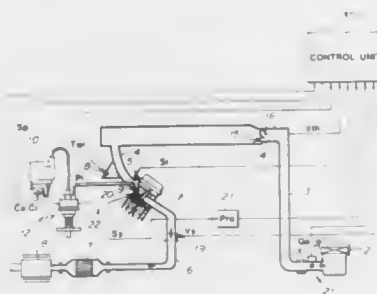
**4,949,691**  
**SYSTEM AND METHOD FOR CONTROLLING**  
**IGNITION TIMING FOR INTERNAL COMBUSTION**  
**ENGINE**

Toshiro Abe, Tokyo, and Atsunori Hashimoto, Kanagawa, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 8, 1989, Ser. No. 404,282  
Claims priority, application Japan, Sep. 12, 1988, 63-229621  
Int. Cl.<sup>5</sup> F02P 5/15

U.S. Cl. 123—419

20 Claims



1. A system for controlling ignition timing for a vehicular internal combustion engine, comprising:
  - (a) first means for detecting engine operating conditions;
  - (b) second means for setting a basic ignition timing on the basis of the engine operating conditions;
  - (c) third means for determining whether the engine is transferred into a transient operating state on the basis of the engine operating conditions and for deriving an engine rotational angle (MBT) with respect to a top dead center of at least one cylinder at which pressure in a combustion chamber thereof has reached its maximum;
  - (d) fourth means for determining whether the basic ignition timing exceeds the engine rotational angle (MBT) in an advance angle direction when the engine is transferred into the transient operating state;
  - (e) fifth means for deriving whether the engine rotational speed is increased or decreased when the basic ignition timing exceeds the engine rotational angle (MBT), for correcting the basic ignition timing in the advance angle direction when the engine rotational speed is increased, and for correcting the basic ignition timing in a retardation angle direction when the engine rotational speed is decreased; and
  - (f) sixth means for igniting air-fuel mixture supplied into each cylinder of the engine at a timing determined by the fifth means.

**4,949,692**  
**AUTOMATIC CONTROL OF A CARBURETOR FUEL**  
**SYSTEM**

John Devine, Tralee, Ireland, assignor to 501 Tillotson Limited, Tralee, Ireland

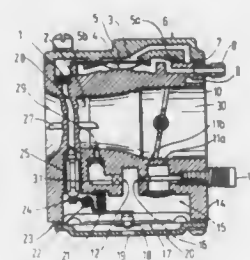
Filed Oct. 21, 1988, Ser. No. 260,594  
Claims priority, application Ireland, Oct. 23, 1987, 2864/87  
Int. Cl.<sup>5</sup> F02M 7/18

U.S. Cl. 123—440

6 Claims

3. A diaphragm type carburetor comprising a main body portion defining a venturi having an air intake side and an engine outlet side, a throttle shutter mounted within the venturi between the air intake side and the engine outlet side, a metering chamber for supplying fuel into the venturi via a main discharge port, the main discharge port opening into the venturi on the air intake side of the throttle shutter, wherein there is provided means for monitoring an engine parameter, and

electrically controlled valve means for adjusting the fuel flow through the main discharge port into the venturi, the monitoring means comprising a first circuit means for monitoring the

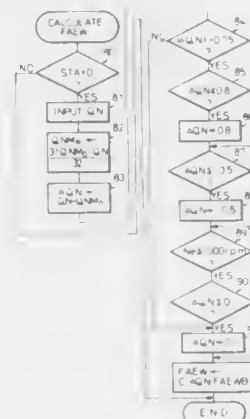


**4,949,693**  
**FUEL INJECTION CONTROL DEVICE OF AN ENGINE**  
Yukihiko Sonoda, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 7, 1988, Ser. No. 268,030  
Claims priority, application Japan, Dec. 8, 1987, 62-310600  
Int. Cl.<sup>5</sup> F02D 41/06, 41/10, 41/12

U.S. Cl. 123—491

15 Claims



1. A fuel injection control device of an engine having an engine cylinder and a fuel injector, said device comprising:
  - engine speed detecting means for detecting an engine speed;
  - air amount detecting means for detecting an amount of air fed into the engine cylinder;
  - air amount calculating means for calculating said amount of air per one revolution of the engine on the basis of a result of a detection by said engine speed detecting means and said air amount detecting means;
  - fuel amount calculating means for calculating an amount of fuel injected by the fuel injector on the basis of a result of a calculation by said air amount calculating means;
  - changing rate calculating means for calculating a changing rate of said amount of air per one revolution of the engine on the basis of the result of the calculation by said air amount calculating means;
  - correction means for correcting said amount of fuel injected by the fuel injector in response to a change of said changing rate to increase said amount of fuel when said changing rate is positive and to decrease said amount of fuel when said changing rate is negative;
  - enrichment means for increasing said amount of fuel during

a predetermined enrichment period after the engine is started; and  
prohibition means for prohibiting a decreasing operation of said amount of fuel, which operation is effected by said correction means, even when said changing rate is negative during a predetermined prohibition period after the engine is started, wherein said predetermined prohibition period is equal to said predetermined enrichment period.

**4,949,694**  
**FUEL SUPPLY CONTROL SYSTEM FOR INTERNAL**  
**COMBUSTION ENGINE**

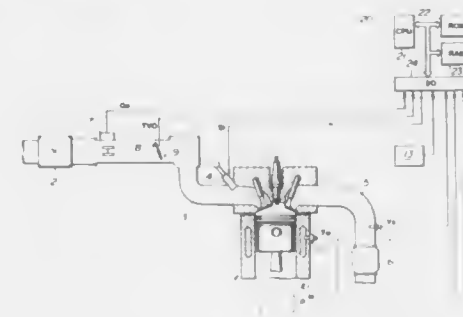
Hatsuo Nagaishi, Zushi City; Hiromichi Miwa, and Toyoaki Nakagawa, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 26, 1989, Ser. No. 343,204  
Claims priority, application Japan, Apr. 26, 1988, 63-105091; Apr. 26, 1988, 63-105092; May 17, 1988, 63-121254; May 17, 1988, 63-121255; May 18, 1988, 63-122523; May 19, 1988, 63-123688

Int. Cl.<sup>5</sup> F02D 41/18, 41/26

U.S. Cl. 123—494

10 Claims



1. In a method of operating an internal combustion engine sensing the amount of air flowing in an induction conduit using an air-flow meter;
  - throttling of said induction conduit using a throttle valve, said throttle valve being disposed in said air induction conduit at a location downstream of said air-flow meter;
  - sensing the position of said throttle valve using a throttle valve position sensor, said throttle valve position sensor being operatively connected with said throttle valve and arranged to output a signal indicative of the opening degree thereof;
  - injecting fuel into said induction conduit using a fuel injector, said fuel injector being disposed in said air induction conduit at a location proximate the downstream end thereof;
  - sensing the rotational speed of said engine using a rotational speed sensor, said rotational speed sensor being operatively connected with said engine and arranged to output a signal indicative of the rotational speed thereof;
  - deriving a basic injection pulse width (Tp) based on the output of said air-flow meter and said engine speed sensor (Qa/N);
  - deriving an air induction amount (Qho) based on the output of said throttle valve position sensor and said rotational speed sensor (TVO/N);
  - smoothing the result of the basic injection pulse width derivation using a smoothing factor which varies with the output of said engine speed and said derived air induction amount;
  - deriving a correction pulse width based on the change in a first intermediate value (TTHSTP) which varies with said rotational speed sensor output and said derived air induction amount; and
  - adding the correction pulse width to said basic pulse width to derive a corrected pulse width (AvTp); and

limiting the maximum value of said corrected pulse width to a maximum value (Tpmax).

**4,949,695**  
**DEVICE FOR DETECTING MALFUNCTION OF FUEL**  
**EVAPORATIVE PURGE SYSTEM**

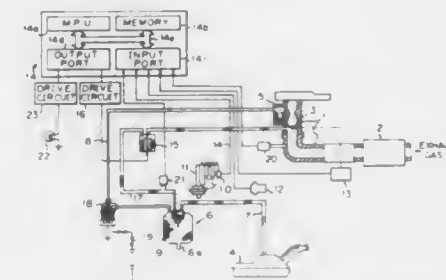
Kouji Uranishi, and Kouichi Osawa, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 21, 1989, Ser. No. 384,241  
Claims priority, application Japan, Aug. 10, 1988, 63-104869[U]

Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123—520

13 Claims



1. A device for detecting a malfunction of a fuel evaporative purge system provided with a canister for absorbing fuel vapor evaporated from stored fuel, a purge passage connecting said canister to an intake pipe of an engine, a valve arranged in said purge passage, and means for opening said valve when said engine is operating under a predetermined driving condition, to thereby supply fuel vapor held in said canister to the intake pipe, said device comprising:
  - means for detecting a flow of fuel vapor in said purge passage at the predetermined driving condition;
  - means for comparing the detected flow of fuel vapor with a predetermined flow of said fuel vapor when said system is operating normally; and
  - means for determining whether a malfunction has occurred in said system, said determining means cooperating with said comparing means to detect a malfunction of said system.

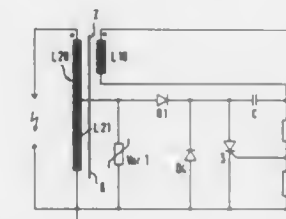
**4,949,696**  
**CAPACITOR IGNITION SYSTEMS**  
Michael Muller, and Werner Erhardt, both of Cadolzburg, Fed. Rep. of Germany, assignors to Prufrex-Electro-Apparatebau, Cadolzburg, Fed. Rep. of Germany

Filed Apr. 7, 1989, Ser. No. 334,933  
Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817187

Int. Cl.<sup>5</sup> F02P 1/00

U.S. Cl. 123—601

9 Claims



1. A capacitor ignition system for internal combustion engines, including an ignition coil having a core of magnetic material positionable adjacent a path of a rotating magnet and having winding means on said core to provide a primary wind-

## 12 Claims

a base member;

oppositely disposed first and second upright members, each of said upright members being pivotally attached to said base member at opposite ends of said base member and being an integrally formed unit of tubular stock bent intermediate its ends to provide a generally U-shaped configuration defining bifurcated leg portions joined by and depending from an intermediate bight portion;

a barbeque grill cooking unit pivotally attached at the lower side of one end thereof to said first upright member at a point intermediate the ends thereof;

said first and second upright members, said base member and said top member each being respectively preassembled in pivotally attached relationship and arranged for pivotal movement from a collapsed position in which said cooking unit is folded against said first upright member to an upright operating position;

first fastening means for securing said second upright member to said top member to complete assembly of the respective member after unfolding said members from said collapsed position;

second fastening members for securing the upper side of said pivotally attached end to the bight portion of said first upright member.



4,949,702

## SELF-HEATING CONTAINER

Ryoichi Suzuki, Yokohama; Mitsuo Maiya, Tokyo; Motoo Kuwahara, Kamaishi; Kunio Yamauchi, Hikone; Choji Kawabata, Tatebayashi; Akira Takeuchi, Fukaya, and Koki Ando, Tokyo, all of Japan, assignors to Nissin Shokuhin Kabushiki Kaisha, Osaka, Japan

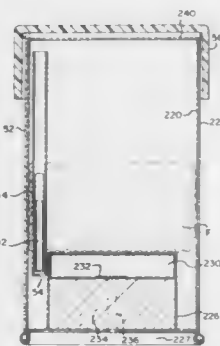
Filed Aug. 11, 1989, Ser. No. 392,422

Claims priority, application Japan, Aug. 12, 1988, 63-200041; Aug. 12, 1988, 63-200042; Jun. 28, 1989, 1-74838[U]

Int. Cl.<sup>5</sup> F24J 1/00

U.S. Cl. 126—263

14 Claims



1. A self-heating container comprising: an inner casing fixed to and inside said container, a heater contained in said casing and including a pyrogen and a firing agent in contact with said pyrogen, said pyrogen comprising a mixture of at least one kind of metal oxide powder and at least one kind of powder of elementary substance or an alloy of metal and semimetal, said firing agent being easier to fire than said pyrogen, and comprising a mixture of at least one kind of metal oxide powder and at least one kind of powder of elementary substance or alloy of metal and semimetal, a heat insulator contained in said casing under said pyrogen and insulating said heater from said container, said insulator having a bore formed therethrough and extending between said firing agent and the outside of said container, and an igniter adapted to generate sparks by friction heat, at least a separate component of said igniter being normally supported by said container away from said heater and being adapted to be inserted into said bore.

4,949,703

## LIQUID HEATING APPARATUS OF THE PULSE COMBUSTION TYPE

Susuma Ejiri, and Makoto Kimura, both of Nagoya, Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Sep. 1, 1989, Ser. No. 401,914

Claims priority, application Japan, Sep. 2, 1988, 63-116333[U]

Int. Cl.<sup>5</sup> F24H 1/00

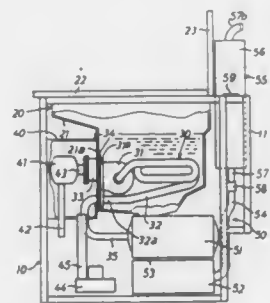
U.S. Cl. 126—360 R

3 Claims

1. A liquid heating apparatus of the pulse combustion type comprising a liquid vessel assembled within a support frame to store an amount of liquid such as cooking oil or other fluid medium to be heated, a pulse combustion burner mounted to said vessel and having a combustion chamber secured at its inlet end to a side wall of said vessel and immersed in the liquid in said vessel, a tailpipe connected at one end thereof to an exhaust port of said combustion chamber in such a manner that the great part of said tailpipe is immersed in the liquid in said vessel and being extended outwardly from said vessel, and an exhaust muffler assembly connected to an exhaust end of said tailpipe to permit combustion products exhausted there-through from said tailpipe,

wherein said exhaust muffler assembly includes a first muffler in the form of a decoupler connected at its inlet to the

exhaust end of said tailpipe for stabilizing pulse combustion in said combustion chamber, a second muffler connected in series at its inlet to said first muffler for reducing medium and high frequency noises applied thereto, and a third muffler in the form of a resonance type muffler connected in series at its inlet to said second muffler for



reducing low frequency noises caused by pulse combustion in said combustion chamber, and wherein said third muffler is detachably mounted in place at one side of said support frame for replacement with another resonance type muffler and connected to said second muffler in a disengageable manner.

4,949,704

## SOLAR COLLECTOR FOR THE GENERATION OF HIGH TEMPERATURE

Antonio Pfluger, Bonn, Fed. Rep. of Germany, assignor to Forschung e.V. Fraunhofer-Gesellschaft zur Förderung der angewandten, Munich, Fed. Rep. of Germany

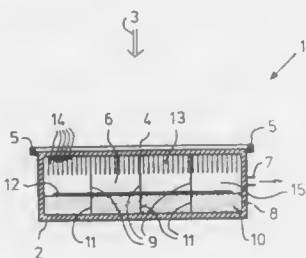
Filed Jul. 21, 1989, Ser. No. 383,204

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824759

Int. Cl.<sup>5</sup> F24J 3/02

U.S. Cl. 126—441

13 Claims



1. Solar collector for the generation of high temperatures, said solar collector including a housing, said housing defining a cavity, a glass plate forming a sealing closure for said cavity, a selective absorber disposed in said cavity, said cavity being at least partially evacuated so that it is at lower than atmospheric pressure, a transparent thermal insulation member sealingly secured to the glass plate inside said cavity, said thermal insulation member having a radiation length of less than 5 cm., a gap separating said thermal insulating member and said selective absorber, at least one of the inside walls of said housing having a microporous thermal insulating material disposed thereon, the pores of said microporous material being smaller than the mean free length of travel of air molecules at normal operating pressures in said cavity, and a heat exchange fluid in said cavity.

4,949,705

## FIREPLACE STARTING APPARATUS

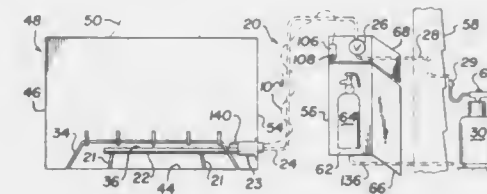
T. Randolph Smith, 4316 Grassmere Ln., Dallas, Tex. 75205

Filed Oct. 14, 1988, Ser. No. 258,258

Int. Cl.<sup>5</sup> F24C 3/00

U.S. Cl. 126—512

40 Claims



1. A fireplace starting apparatus, comprising: a control valve for controlling the flow of flammable gas to a fireplace burner, said control valve being located externally of a firebox of a fireplace with the inlet of said control valve being adapted for connection to a source of flammable gas; a conduit connectable at one end to a fireplace burner within the firebox and connectable at the other end to the control valve; a remotely operable ignition device including an igniter mountable within the firebox, an actuator adjacent the control valve and means for operably connecting the actuator to the igniter; and a container adapted for permanent mounting to the structure of a building adjacent the fireplace, said container containing the control valve and the actuator.

4,949,706

## SIDE-VIEWING ENDOSCOPE

Hans J. Thon, Lindenweg 26, D-5305 Alfter-Oedekoven, Fed. Rep. of Germany

PCT No. PCT/DE87/00287, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/00020, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 25, 1987, Ser. No. 159,965

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 3621509

Int. Cl.<sup>5</sup> A61B 1/00

U.S. Cl. 128—4

15 Claims



1. A side viewing endoscope comprising a hollow shaft having a distal end and a lateral wall with an outlet opening adjacent the distal end; an instrumentation channel being disposed in said shaft and having a distal end with a curved section terminating adjacent said outlet opening, said channel having a diameter and a radius of curvature for the curved section matched to each other to guide a complementary instrument out of said outlet opening at an angle to the axis of the shaft in a range of 60°-90°; and a deflection element being mounted adjacent said curved section for transverse movement to the axis of said shaft from a position withdrawn from the outlet opening to a position increasing the curved path of the instrument.

said curved portion by an amount in the range of 60°-90° so that an instrument being guided out of said outlet opening can be deflected up to an additional 90° by said element.

4,949,707

## RETRACTOR APPARATUS

Bruce A. LeVahn, New Brighton, and Robert E. Olson, Roseville, both of Minn., assignors to Minnesota Scientific, Inc., Minneapolis, Minn.

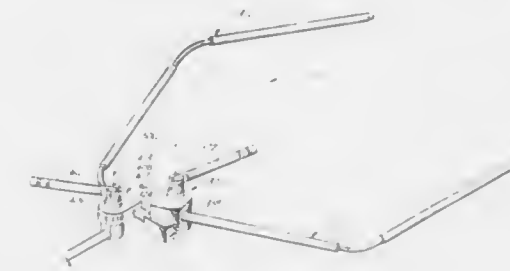
Continuation-in-part of Ser. No. 869,347, Jun. 2, 1986, Pat. No. 4,718,151, which is a division of Ser. No. 669,362, Nov. 8, 1984, Pat. No. 4,617,916. This application Jan. 11, 1988, Ser. No. 143,499

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> A61B 17/02

U.S. Cl. 128—20

14 Claims



a first support rod with a first end portion; a second support rod with a second end portion; an extension rod with a third end portion; a first clamping means for connecting the third end portion of the extension rod to the first end portion of the first support rod, the first clamping means having both a base means portion and a first clamping section and a first force means wherein the base means portion has a first pivot bore extending therethrough with the third end portion of the extension rod attached to the base means portion wherein the base means portion has a frusto-conical section extending outwardly, the first clamping section having a first unitary body with a second pivot bore extending therethrough and a first clamping bore extending therethrough proximate one end of the first body and a slot running through the first body from the first clamping bore to an opposite end of the first body, separating the first body into first and second resilient leg portions such that when the first force means is applied to the first and second leg portions the diameter of the first clamping bore is reduced, thereby frictionally clamping the first end portion of the first support rod, the first clamping section having a frusto-conical recess such that the base means portion and the first clamping section are joined together in a frictional engagement by inserting the frusto-conical section of the base means portion into the frusto-conical recess of the first clamping section; a second means for connecting the first end portion at a second position of the first support rod to the second end portion of the second support rod, the second clamping means having both a second clamping section and a third clamping section and a second force means wherein the second clamping section has a second unitary body with a third pivot bore extending therethrough and a second clamping bore extending therethrough proximate one end of the second body and a slot running through the second body from the second clamping bore to an opposite end of the second body, separating the second body into third and fourth resilient leg portions such that when said sec-

ond force means is applied to the leg third and fourth portions the diameter of the second clamping bore is reduced thereby frictionally clamping the first end portion of the first support rod, the second clamping section having a frusto-conical section extending outwardly; the third clamping section having a third unitary body with a fourth pivot bore extending therethrough and a third clamping bore extending therethrough proximate one end of the third body and a slot running through the third body from the third clamping bore to an opposite end of the third body, separating the third body into fifth and sixth resilient leg portions such that when said second force means is applied to the fifth and sixth leg portions the diameter of the third clamping bore is reduced, thereby frictionally clamping the second end portion of the second support rod, the third clamping section having a frusto-conical recess such that the second clamping section and the third clamping section are joined together in a frictional engagement by inserting the frusto-conical section of the second clamping section into the frusto-conical recess of the third clamping section.

4,949,708

## HYPOTHERMIA APPARATUS

Naohiko Takayama, Kyoto, Japan, assignor to Shimadzu Corporation, Japan

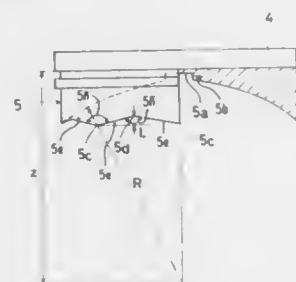
Continuation of Ser. No. 265,607, Nov. 1, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 492,324

Claims priority, application Japan, Nov. 6, 1987, 62-281491; Jan. 25, 1988, 63-14148

Int. Cl.<sup>5</sup> A61H 1/00

U.S. Cl. 128—24 A

3 Claims



1. In a hyperthermia apparatus having an ultrasonic vibrator for producing an ultrasonic wave and a rotatable acoustic lens for directing said ultrasonic wave through degassed water and focusing it in a patient's body to thereby heat a portion of said body, the improvement wherein said acoustic lens comprises: a circular lens body, one side of said body being concave and comprising a plurality of contiguous equal surface segments symmetrically arranged about the center of the lens body, each of said surface segments being bounded at one side by a hill edge line and at the other side by a valley edge line, each said hill edge line and each said valley edge line being at the apex of an angle formed by said intersecting contiguous surface segments, said hill edge lines and said valley edge lines extending azimuthally relative to the center of said circular lens body, such that the thickness of said lens body at a given position along any of said hill edge lines is thicker than the thickness of said lens body at a corresponding position along any of said valley lines by a factor  $\lambda/(1-VW/VA)$  where  $\lambda$  is the wave length of said ultrasonic wave, VW is the velocity of sound in water, and VA is the velocity of sound in said lens body; the angle formed between any two of said intersecting contiguous surface segments being greater than 90 degrees.

4,949,709

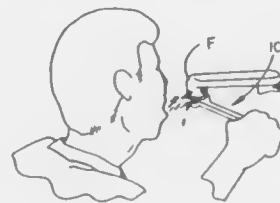
## COMBINATION TOOTHBRUSH AND WATER DEFLECTOR APPARATUS

Momcilo Bojovich, Fregattv 1611, Lidings, Sweden (18137)  
Filed Jul. 18, 1989, Ser. No. 381,475

Int. Cl.<sup>5</sup> A61H 9/00

U.S. Cl. 128—66

2 Claims



1. A combination water deflector and toothbrush apparatus for use with a water faucet defined by a discharge nozzle of a predetermined diameter, said apparatus comprising, an elongate handle defined by an upper surface coextensive with and overlying a bottom surface, and a matrix of toothbrush bristles extending outwardly of the bottom surface adjacent a first end of the handle, and a water deflector means for directing water from the faucet through a discharge outlet formed in the water deflector means wherein the water deflector means is integrally secured to a second end of the handle, and wherein the water deflector means is defined by a cylindrical housing integrally secured to the second end of the handle along a diameter of the cylindrical housing, and the discharge outlet is arranged orthogonally through a discontinuous wall of the cylindrical housing orthogonally relative to the elongate handle, and wherein the discontinuous wall is annular and defines an opening between twenty and forty degrees of arc through the wall, and wherein an angular rim is disposed and integrally secured below an upper terminal edge of the annular wall and integrally secured to the annular wall interiorly thereof, and the angular rim is of a planar configuration and defines an annular rim discontinuity and arranged between twenty and forty degrees of arc aligned with the discontinuity of the annular wall, and wherein the annular rim includes a central aperture there-through, and the annular rim overlies a chamber defined between the annular rim and an underlying concave floor, and the aperture is of a diameter less than that of the predetermined diameter, and the annular wall is of a diameter greater than the predetermined diameter.

4,949,710

## METHOD OF ARTIFACT REJECTION FOR NONINVASIVE BLOOD-PRESSURE MEASUREMENT BY PREDICTION AND ADJUSTMENT OF BLOOD-PRESSURE DATA

Thomas J. Dorsett, Hillsboro, and Charles L. Davis, Portland, both of Oreg., assignors to Protocol Systems, Inc., Oreg.

Filed Oct. 6, 1988, Ser. No. 254,204

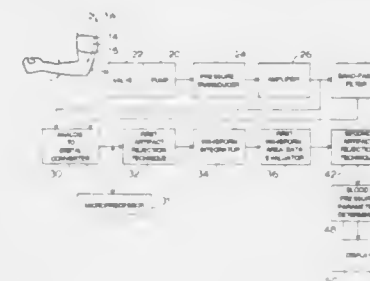
Int. Cl.<sup>5</sup> A61B 5/0225

U.S. Cl. 128—680

19 Claims

1. An artifact rejection method for noninvasive blood-pressure measurement employed to predict data acquired relative to blood-pressure-induced pressure waveforms, said method comprising, in a means for producing a baseline counterpressure adjacent a blood vessel in a living subject, progressively reducing such counterpressure in counterpressure steps from a predetermining beginning, occluding baseline counterpressure above systolic pressure to a predetermined ending baseline counterpressure; during said reducing, and for a predetermined number of

such counterpressure steps, and at each such step, monitoring a plurality of the waveforms of blood-pressure-induced changes in the pressure of such means; on the basis of said monitoring, developing and storing waveform-specific data; at each of such counterpressure steps, choosing a predetermined number of stored, waveform-specific data values as indicative of blood pressure and computing one waveform-specific value from such chosen values; thereafter, from such computed values, fitting a curve on a



step-by-step basis and, from such curve, predicting an expected-to-be-stored waveform-specific data value for a next baseline counterpressure step, and applying experimentally determined bounds to such expected-to-be-stored waveform-specific data value; modifying said monitoring at such next baseline counterpressure step so that a single, first waveform-specific data value is developed and stored; and checking whether such single, first value is within such bounds from said predicting as a way of determining the acceptability of the value.

4,949,711

## DYNAMIC MP JOINT EXTENSION SPLINT

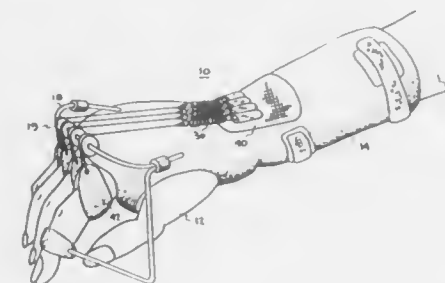
James E. Gyovai, Albany, Oreg.; Michael A. Jennings, San Jose, and Mark E. Biehl, Campbell, both of Calif., assignors to North Coast Medical, Inc., San Jose, Calif.

Filed Mar. 8, 1989, Ser. No. 321,630

Int. Cl.<sup>5</sup> A61F 5/04, 5/10

U.S. Cl. 128—87 A

6 Claims



1. An improved low-profile dynamic splint for a hand, comprising: a splint base of moldable material for embracing a wrist and forearm, said splint base including an attachment area near a patient's wrist for adjustable attachment of a rigging to said splint base; an outrigger means fixed to said splint base for guiding a rigging connected to a finger loop means attached to one end of said rigging for engaging a finger; said rigging comprising: a line guided by said outrigger means and attached at one end to said finger loop means; coil spring means for applying a range of tension forces to

said rigging, one end of said coil spring means attached to the other end of said line; and loop-and-hook means for releasably fastening a second end of said spring means to various points of said attachment area of said splint base near a patient's wrist to adjust the tension force provided by said coil spring means, wherein said releasable fastening means includes a detachable fastener element which is attached to said rigging and also includes a fastener pad which is fixed to said splint base for engaging said detachable fastener element, wherein said detachable fastener element includes a strip of fastening material which is releasably positionable at various points on said fastener pad to stretch said coil spring means to various lengths to provide corresponding tension forces to said rigging.

4,949,712

## BODY SHAKING DEVICE

Masakatsu Torii, 40-9, Kamiya 2-chome, Kita-ku, Tokyo, Japan

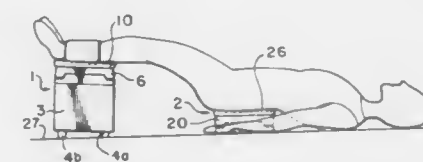
Filed Apr. 28, 1989, Ser. No. 345,011

Claims priority, application Japan, May 19, 1988, 63-65190[U]; Feb. 21, 1989, 1-18452[U]

Int. Cl.<sup>5</sup> A61H 1/02

U.S. Cl. 128—25 R

6 Claims



1. A body shaking device comprising a leg rest casing; a first track mounted to extend from side to side across said leg rest casing; a leg rest that is arranged to be movable along said first track on which the terminal parts of both legs of a reclining user are rested; driving means for reciprocating said leg rest along said first track, moving said user's legs from side to side; and a separate hip rest assembly that includes a base whereon are arranged a second track that extends thereacross, and a hip rest that is arranged to be movable along said track.

4,949,713

## TENSILE ARC AND BRIDGE BODY SUPPORT

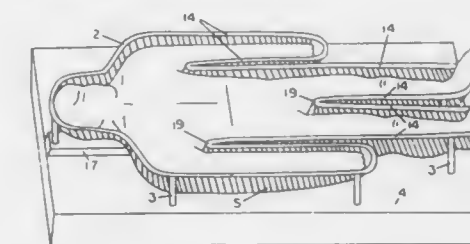
Walter Mykietuch, 21012 Royal Ann Rd., Bothell, Wash. 98021

Continuation-in-part of Ser. No. 642,107, Aug. 20, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 916,898

Int. Cl.<sup>5</sup> A61F 5/01

U.S. Cl. 128—78

5 Claims



1. An individually fitted apparatus for supporting a body, whereby pressure is redistributed from underneath body portions and onto the substantial side area of the lengthwise and widthwise sides of said body portions, providing maximum support contact area and optimal reduction and uniformity in support pressure, the said apparatus comprising in combination: a frame member made of rigid tubular material that is supported and elevated by rigid vertical members, and



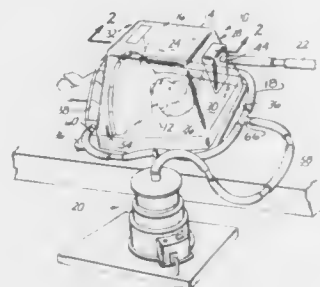
adapted to be located above and adjacent to but not in contact with said body portions, with the said frame member adapted to extend the length and width of said body portions;

a fabric, anatomically and coextensively tailored to deeply and tightly fit a three-dimensional profile of the width and length of said body portions, and adapted to extend the length and width of said body portions, a top end of the said fabric that is tailored to oppose the vertical side of said body portions is attached to the said frame, the said fabric supported from said frame is adapted to extend down a side of said body portions, curve down the said side of the body portions, pass under body portions, curve and extend up the other side of said body portions, and is attached to the said frame, similarly as the said first side, the said fabric supporting the said body portions in a deep tight three-dimensional contour,

the said frame and said fabric together are dimensioned to support and suspend the said body portions, using said vertical members,

a rigid bridge member is attached to said fabric to support only the concave or planar body surface areas, the said bridge member having a contoured, undulated surface to conform to said concave or planar body surface areas, the surface of the said bridge and said fabric that is in contact with the said planar or concave body portions is padded, by placing a body portion in the said apparatus, the said fabric tenses and the said fabric adapted to contact the sides of the said body portions moves inwardly against the said sides of said body portions with a force or a pressure directly proportional to the weight of the said body portions being supported, this dynamic action redistributes the support pressure from underneath the body portions and onto the sides of the body portions, thus substantially reducing the effect of gravity.

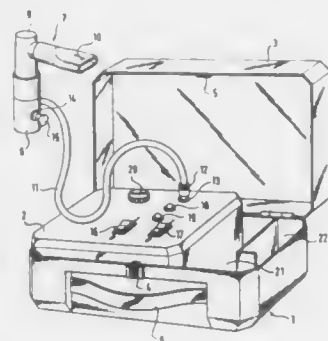
**4,949,714**  
**SCAVENGING MEDICAL HOOD**  
Robert L. Orr, San Clemente, Calif., assignor to Viratek Inc., Costa Mesa, Calif.  
Filed Jul. 26, 1989, Ser. No. 385,892  
Int. Cl.<sup>5</sup> A61M 16/00  
U.S. Cl. 128—200.24 23 Claims



1. A scavenging medical hood comprising:  
patient enclosure means for enclosing at least the head area of a patient, said patient enclosure means having a hollow interior, said patient enclosure means sized and shaped to contain within said hollow interior at least said head of said patient and a volume of gas suitable for providing respiratory gas to said patient;  
gas inlet port means connecting to said enclosure means for supplying a respiratory gas and an aerosolized medicinal agent contained therein to said interior of said enclosure means;  
gas outlet means connected to said enclosure means for exhausting gas and residual aerosolized medicinal agent from said interior of said enclosure means;  
vacuum port means for aspiration, said vacuum port means located external of said enclosure means in operative

association with said gas outlet means for aspirating gas, residual aerosolized medicinal agent and ambient air from the vicinity of said gas outlet means; and  
vacuum means for supplying aspirate vacuum to said vacuum port means.

**4,949,715**  
**TRANSPORTABLE INHALATION DEVICE**  
Stephan Brugger, Etztalstrasse 21, 8137 Berg, Fed. Rep. of Germany  
Filed Aug. 12, 1988, Ser. No. 231,812  
Claims priority, application European Pat. Off., Aug. 12, 1987, 87111686.9  
Int. Cl.<sup>5</sup> A61M 16/00  
U.S. Cl. 128—204.21 14 Claims

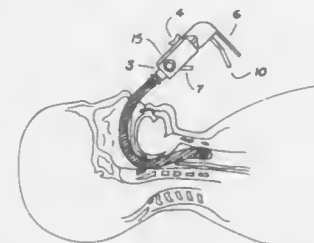


1. Transportable inhalation device for treatment of affected respiratory passages, comprising:  
a compressed-air generator,  
an electric motor, which drives the compressed-air generator;  
a power supply for the motor with at least one accumulator;  
an aerosol mister for supplying gasses to the affected respiratory passages;  
a flexible compressed-air hose having an inlet and an outlet, the inlet being connected to the compressed-air generator and the outlet being connected to the aerosol mister;  
a hand-actuated valve, which is mounted on the aerosol mister and which blocks the supply of compressed air when actuated;  
a controller for controlling the electric motor; and  
a pressure sensor in said housing which monitors the pressure in the compressed-air hose between the compressed-air generator and the valve and transmits an indication of the monitored pressure to the controller for controlling the motor in response to the pressure indication;  
where said controller comprises a two-point regulator so that when the pressure in the compressed-air hose drops below a lower limiting value, the electric motor of the compressed-air generator is switched on and when the pressure reaches an upper limiting value, the compressor is switched off.

**4,949,716**  
**NASAL INTUBATION ADJUNCT**  
David Chenoweth, Lakewood, Colo., assignor to Medical Devices, Inc., Lakewood, Colo.  
Continuation of Ser. No. 265,213, Oct. 31, 1988, abandoned.  
This application Nov. 28, 1989, Ser. No. 442,998  
Int. Cl.<sup>5</sup> A61M 16/00  
U.S. Cl. 128—207.14 13 Claims

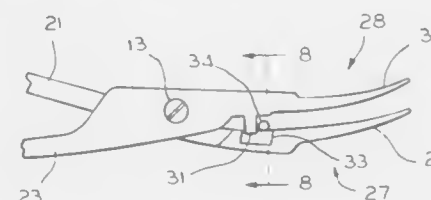
1. An instrument for allowing an operator to insert a nasally placed airway tube into a patient, said instrument comprising: a body having a first opening extending therethrough and a

second opening extending into said body to connect to said first opening;  
tube attachment means for attaching the airway tube to said body and for allowing the airway tube to cooperate with said first opening in said body;  
manipulator means for flexing the airway tube, said manipulator means being insertable into said body and the airway tube through said first opening; and  
means attached to said second opening for detecting breathing sounds,



means for attaching said manipulator to said body, said means for attaching the manipulator including a slide mounted to said manipulator;  
a slide track located on said body parallel to said first opening; and  
means for attaching said slide to said slide track; whereby said manipulator may be adjusted to a plurality of positions to accommodate a plurality of airway tube lengths.

**4,949,717**  
**SURGICAL INSTRUMENT WITH SUTURE CUTTER**  
Edward L. Shaw, 5615 N. Palacio Way, Phoenix, Ariz. 85014  
Filed Mar. 17, 1988, Ser. No. 169,418  
Int. Cl.<sup>5</sup> A61B 17/06  
U.S. Cl. 606—147 9 Claims



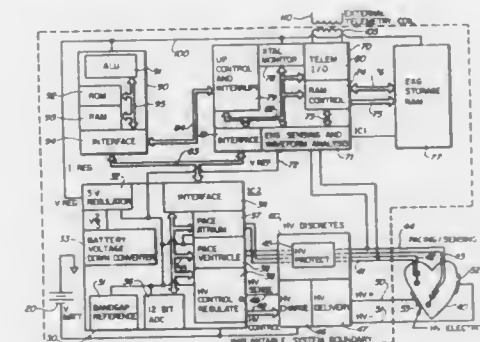
1. In a hand-manipulable cross-action surgical instrument, said instrument of the type having opposed first and second members, each said member having a pivot portion, a jaw extending in a first direction from said pivot portion, and a handle portion extending in a second direction opposite that of said first direction, said first and second members pivotably joined at said pivot portion, said handle portions adapted to scissor said jaws together from an open position to progressively overlap portions of said jaws from said pivot portion toward a closed position to clamping receive either a first severable object or a second, non-severable object therebetween, the improvement comprising:  
first means formed on said jaws to stop said first or second object from reaching the point at which said first and second jaws are overlapped; and  
second means formed on said jaws to selectively sever said first object, said severing means being positioned proximate to and in front of said stop means.

**4,949,718**  
**INTRAUTERINE CAUTERIZING APPARATUS**  
Robert S. Neuwirth, Englewood, N.J., and Lee R. Bolduc, Raleigh, N.C., assignors to Gynelab Products, Raleigh, N.C.  
Filed Sep. 9, 1988, Ser. No. 242,730  
Int. Cl.<sup>5</sup> A61F 7/12  
U.S. Cl. 128—401 20 Claims



1. An apparatus for effecting necrosis of an uterine endometrium comprising:  
a catheter having a proximal end and a distal end;  
a distensible bladder means attached to said proximal end for insertion into and distending the uterus;  
inflating means connected to said distal end for introducing an inflation medium into said bladder;  
heating means for heating said inflation medium to a temperature sufficient to effect tissue necrosis positioned internal to said bladder; and  
control means connected to said distal end for regulating the inflating and heating of said bladder.

**4,949,719**  
**METHOD FOR CARDIAC DEFIBRILLATION**  
Benjamin Pless, Menlo Park, and Phillip L. Ball, San Jose, both of Calif., assignors to Ventritex, Inc., Sunnyvale, Calif.  
Filed Apr. 26, 1989, Ser. No. 344,011  
Int. Cl.<sup>5</sup> A61N 1/39  
U.S. Cl. 128—419 D 14 Claims



1. A system for cardiac defibrillation which comprises: an implanted defibrillator having means for sensing R-waves;  
energy storage means;  
charging means for charging the energy storage means;  
discharging means for discharging the energy storage means and delivering a shock to the heart;  
means for measuring R-R intervals from said sensed R-waves;  
means for commencing charging of said storage means if an arrhythmia is detected;

means for determining whether the arrhythmia is still in progress;  
 means for discontinuing the charging if the arrhythmia is not still in progress;  
 means for detecting another R-R interval if said storage means is charged a predetermined amount; and  
 said discharging means delivering said shock to the heart if said another R-R interval is shorter than a selected amount.

4,949,720

# APPARATUS FOR MEASURING THE LEAD CURRENT IN A PACEMAKER

David L. Thompson, Fridley, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Sep. 20, 1988, Ser. No. 246,600  
 Int. Cl.<sup>5</sup> A61N 1/37

U.S. Cl. 128—419 P

4 Claims



1. In a pacemaker having output circuit means for generation of stimulation pulses, timing means for triggering said output circuit means to provide said stimulation pulses, and terminal means coupled to said output circuit means for providing said stimulation pulses to said heart, the improvement wherein:

said output circuit means comprises an output capacitor and switching means for providing current flow between said output capacitor and said terminal means in response to said timing means, said switching means comprising a plurality of parallel connected metal oxide semiconductor output transistors; and

wherein said pacemaker further comprises measuring means coupled to at least one of said output transistors for monitoring the drain to source current of said at least one of said output transistors, when current flows between said output capacitor and said terminal means.

4,949,721

# TRANSCUTANEOUS ELECTRIC NERVE STIMULATOR

Mamoru Toriu, Sayama; Ikuro Onishi, Tokyo; Youichiro Tani, Warabi; Nobuo Ogiwara, Machida; Hiroshi Tanikoshi, Tokyo, and Mitsuru Kitamura, Yokohama, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto and Ito Co., Ltd., Tokyo, both of Japan

Filed Aug. 4, 1989, Ser. No. 389,582

Claims priority, application Japan, Aug. 11, 1988, 63-200596; Aug. 11, 1988, 63-106500[U]

Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—421

8 Claims



1. A transcutaneous electric nerve stimulator comprising:

pulse generate means for generating an output pulse of which a frequency varies with a lapse of time; and  
 pulse width control means for increasing a pulse width of the output pulse when the frequency becomes smaller and for reducing the pulse width when the frequency becomes greater.

4,949,722

# METHOD FOR DETERMINING BLOOD PLATELET ADHESIVENESS

Roy Bean, P.O. Box 23, Diamond Creek 3089, Victoria, and Avni Sali, 61 Mary St., Hawthorn 3122, Victoria, both of Australia

Filed Sep. 18, 1989, Ser. No. 408,717  
 Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—637

20 Claims



1. A process for measuring a platelet adhesiveness characteristic of human blood platelets, the process comprising the steps of:

using a hypodermic needle connected to a tube which is loaded with a plurality of glass spheres, a first end of the tube being connected to the needle and a second end being exposed to normal ambient pressure, to make a venipuncture with the needle in a human subject whose blood platelet characteristic is being measured, the venipuncture causing flow of blood from the human subject through the glass sphere loaded tube;  
 collecting through the glass sphere loaded tube a predetermined volume of blood sample in a container;  
 measuring the time during which the predetermined volume of blood sample is collected through the glass sphere loaded tube;  
 measuring the platelet count per unit of volume in the blood sample collected through the glass sphere loaded tube;  
 collecting a control blood sample from the same human subject without passing the control sample through a glass sphere loaded tube, and  
 measuring the platelet count per unit of volume in the control blood sample, and  
 calculating from the measured time and the measured platelet counts at least one parameter characteristic of the adhesiveness of the blood platelets of the human subject.

4,949,723

# MEDICAL PRESSURE MULTIPLEXING SYSTEM

W. Dean Wallace, and Jon Neese, both of Salt Lake City, Utah, assignors to Utah Medical Products, Inc., Midvale, Utah

Filed Oct. 15, 1987, Ser. No. 108,926

Int. Cl.<sup>5</sup> A61B 5/02

U.S. Cl. 128—672

17 Claims



1. A pressure multiplexing system for selectively communicating a pulmonary artery pressure communicated by a first catheter lumen and a central venous pressure communicated by a second catheter lumen to a single pressure transducer and an infusion device, said pressure multiplexing system comprising:

a valve body comprising a cylindrical bore therein;  
 first and second lumen port means for providing simultaneous fluid communication between said first and second catheter lumens, respectively, and said cylindrical bore;  
 transducer port means for providing fluid communication between said cylindrical bore and said transducer;  
 infusion port means for providing fluid communication between said cylindrical bore and said infusion device;  
 a rotor disposed within said cylindrical bore and rotatable about a central axis between a first monitoring position wherein one of said pulmonary artery and central venous pressures is detected by said pressure transducer and a second monitoring position wherein the other of said pulmonary artery and central venous pressures is detected by said pressure transducer;

first passageway means associated with said rotor for interconnecting one of said first and second lumen port means with said infusion port means when said rotor is in the first monitoring position;

second passageway means associated with said rotor for simultaneously interconnecting the other of said first and second lumen port means with said transducer port means when said rotor is in the first monitoring position; and  
 third passageway means associated with said rotor for interconnecting said one of said first and second lumen port means with the transducer port when said rotor is in said second monitoring position, while the other of said first and second lumen port means is closed off.

4,949,724

# METHOD AND APPARATUS FOR CONTINUOUS MEASUREMENT OF CARDIAC OUTPUT

Cornelis K. Mahutte, 1371 Gwen, and Pieter Halter, 11111 Yarmouth, both of Santa Ana, Calif. 92705

Filed Dec. 23, 1988, Ser. No. 289,969

Int. Cl.<sup>5</sup> A61B 5/028

U.S. Cl. 128—713

33 Claims

1. A method of continuous monitoring of the cardiac output of a patient comprising the steps of:

determining a value of a cardiac output constant for the patient by measuring at least one parameter of the patient and calculating the cardiac output constant as a function of the measured parameter, wherein the cardiac output constant is calculated without employing any assumed

ratio between oxygen intake and carbon dioxide production by the patient;  
 continuously monitoring carbon dioxide production and mixed venous oxygen saturation of the patient to obtain current values thereof; and



monitoring cardiac output of the patient over time by calculating a value of cardiac output as a function of the current values of carbon dioxide production and mixed venous oxygen saturation and the previously calculated value of the cardiac output constant.

4,949,725

# APPARATUS AND METHOD FOR DISPLAYING ELECTRICAL ACTIVITY GENERATED WITHIN A LIVING BODY

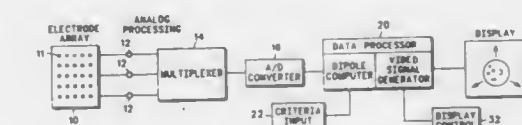
Gil Raviv, Deerfield; Ivan Pal, Highland Park; Dean Koester, Grayslake; David Kripal, Gurnee, all of Ill., and James N. Towle, Kirkland, Wash., assignors to Bio-Logic Systems Corporation, Mundelein, Ill.

Filed Jul. 1, 1988, Ser. No. 214,753

Int. Cl.<sup>5</sup> A61B 5/04

U.S. Cl. 128—731

49 Claims

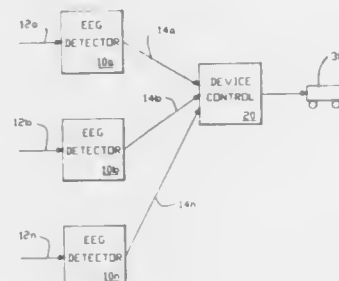


1. An apparatus for displaying electrical activity generated within a living body comprising:

a plurality of sensors for sensing a characteristic of said electrical activity at spaced locations on the surface of said body;  
 means for computing first dipole data representing one or more of the location, direction and magnitude parameters of at least one dipole disposed within said body corresponding to said sensed electrical activity characteristic;  
 means for receiving and storing second dipole data representing assumed values for one or more of the location, direction and magnitude parameters of said at least one dipole;  
 video display means for generating and presenting from said first dipole data or from said first and second dipole data a video display showing the location, direction and magnitude of said at least one dipole within a three dimensional representation of said body; and  
 said video display means being adapted to generate further video displays to present different perspective views of said at least one dipole and said three dimensional representation of said body.

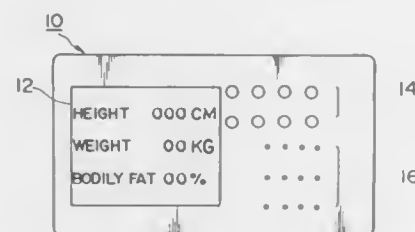


**4,949,726**  
**BRAINWAVE-RESPONSIVE APPARATUS**  
Rex Hartzell; E. Dale Walters, both of Topeka, Kans., and Julian Gresser, Sausalito, Calif., assignors to Discovery Engineering International, Sausalito, Calif.  
Filed Mar. 29, 1988, Ser. No. 174,784  
Int. Cl.<sup>5</sup> A61B 5/04  
U.S. Cl. 128—731 31 Claims



1. Brainwave responsive apparatus for use with a subject, comprising:  
an output device; and  
means for controlling said output device to perform a first function in response to the presence or absence in said subject of a brainwave pattern frequency component which is borderline between the alpha and theta ranges of the brainwave spectrum.

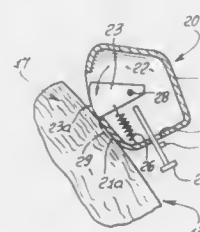
**4,949,727**  
**PORTABLE PHYSICAL CHECKER**  
Iwao Yamazaki, and Katsumi Sakamoto, both of Tokyo, Japan, assignors to Ya-man Ltd., Tokyo, Japan  
Continuation of Ser. No. 181,325, Apr. 13, 1988, abandoned.  
This application Mar. 28, 1989, Ser. No. 331,051  
Claims priority, application Japan, May 27, 1987, 62-78756[U]  
Int. Cl.<sup>5</sup> A61B 5/05  
U.S. Cl. 128—734 1 Claim



1. A card type physical checker comprising:  
a case; said case having a thickness substantially thinner than its height and width;  
a rear face of said case;  
a pair of electrodes provided as said rear face for measuring inner body impedance;  
a front face of said case provided opposite said pair of electrodes, said front face having a display part; key pad means for inputting basic physiological data; and a group of function changing keys for selecting one of a plurality of desired operation modes, said selected operation mode adapted to accept data of measured body impedance from said pair of electrodes;  
a central processing means positioned within said case for processing signals inputted from said electrodes and data inputted from said key pad in accordance with said one

selected operation mode for determining body fat corresponding to said inner body impedance; and  
a memory unit positioned within said case for storing data based on said signals inputted from said pair of electrodes and said data inputted from said key pad in said selected operation mode.

**4,949,728**  
**METHOD FOR PERFORMING IN VITRO DIAGNOSTIC TEST ON HORSES UTILIZING A BLOOD SAMPLE**  
Derek Brook, 20515 Covina Hills Rd., Covina, Calif. 91724  
Filed Nov. 30, 1988, Ser. No. 277,983  
Int. Cl.<sup>5</sup> A61B 5/00  
U.S. Cl. 128—760 7 Claims

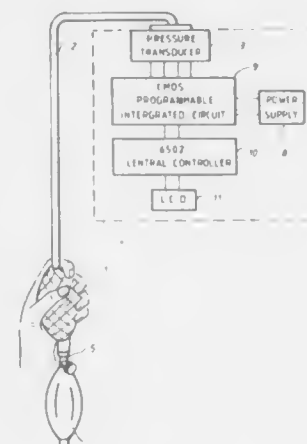


1. A method for easily and safely obtaining a blood sample from a horse or other hoofed animal comprising the steps of:  
(a) making a small incision in the coronary plexus region of one of the legs of the horse or animal;  
(b) allowing a small amount of blood to flow from the incision; and  
(c) collecting a portion of the resulting blood sample,  
(d) said incision being made to a depth of about one millimeter, and along about five millimeters, while employing an incision-making device of the type having a case and a spring-activated blade, and the method including placing said device on said coronary plexus, while the horse is standing on the leg forming said coronary plexus, and then activating said device so that the blade swiftly moves relative to the case, to form the incision,  
(e) there being horse hair on said coronary plexus region, the hair extending lengthwise generally downwardly, said making of the incision being effected in the general direction of hair lengthwise extent.

**4,949,729**  
**GRIP RATE MEASUREMENT**  
Andre L. Haski, Dover Heights, Australia, assignor to Benjamin Dextronics Pty. Limited, Dover Heights, Australia  
Filed Mar. 9, 1987, Ser. No. 23,171  
Claims priority, application Australia, Mar. 12, 1986, PH4980  
Int. Cl.<sup>5</sup> A61B 5/103  
U.S. Cl. 128—774 8 Claims

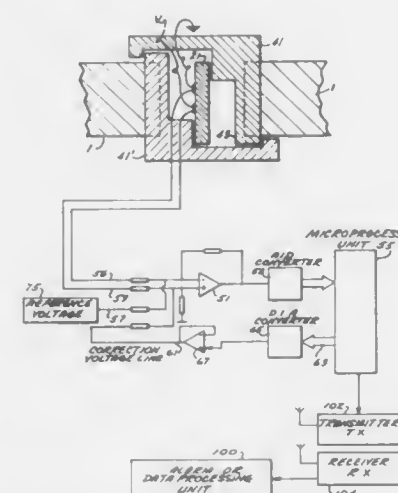
1. An apparatus for measuring the rate at which movement of a joint compresses a compressible object, comprising a fluid filled compressible object, such as an inflatable bladder, a pressure transducer in fluid connection with said object, circuit means connected to the pressure transducer and output display means connected to circuit means, said circuit means including means for determining the rate of change with time of the loga-

rithm of the pressure of the fluid in said object between predetermined lower and upper pressure levels between which said



rate of change is substantially linear, said output display means connected to said circuit means to display said rate of change.

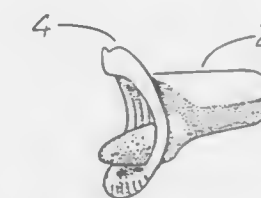
**4,949,730**  
**MONITORING DEVICE INTENDED ESPECIALLY FOR PARTURITION AND ITS APPLICATION**  
Andree Cobben; Francis Jaspas, both of 8 rue de Liernu, B-5854 Meux, and Christian Mouthuy, Bte. 19, Avenue de Martin-Pecqueur, B-1170 Bruxelles, all of Belgium  
Continuation-in-part of Ser. No. 230,255, Aug. 9, 1988, abandoned, which is a division of Ser. No. 56,994, May 11, 1987, abandoned. This application May 12, 1989, Ser. No. 351,106  
Claims priority, application Luxembourg, Nov. 9, 1985, 86072; PCT Int'l Appl., Mar. 9, 1986, PCT/BE86/00027  
Int. Cl.<sup>5</sup> A61B 5/10  
U.S. Cl. 128—775 5 Claims



1. Parturition monitoring device comprising:  
a monitoring belt which comprises two sensing elements acting in the longitudinal direction of deformation of said belt which enables abdominal muscular activity to be detected, said sensing elements being connected to an electronic circuit for evaluation, treatment and/or recording of data supplied by said sensing elements, said evaluation treatment and/or recording enabling an alarm or safety system to be triggered, said two sensing elements being mounted on said belt so that only one of the sensing elements is exposed to disturbance produced by parameters to be monitored, whereas the other element is exposed

to all other common stimulations, said two sensing elements being connected so that all signals common to said two sensing elements cancel themselves out;  
wherein said electronic circuit comprises:  
a microprocessor and storage means;  
a differential amplifier for receiving input signals;  
a first sensing element signal line mounted in parallel to and being connected to a reference voltage upstream of a first input to the differential amplifier;  
a second sensing element signal line being connected to a base line correction voltage upstream of a second input to the differential amplifier;  
analog to digital conversion means connected between the differential amplifier and the microprocessor;  
digital to analog conversion means connected to the microprocessor; and  
at least one amplifier means connected between the digital to analog conversion means and the base line correction voltage, the base line correction voltage being supplied by the microprocessor after analog/digital conversion and analysis.

**4,949,731**  
**ORAL PROPHYLACTICS**  
Glen R. Harding, 656 Rosemont, La Jolla, Calif. 92037  
Filed Aug. 27, 1987, Ser. No. 89,780  
Int. Cl.<sup>5</sup> A61F 6/00  
U.S. Cl. 128—842 9 Claims

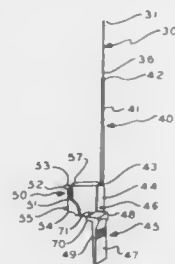


1. An oral prophylactic for use in the mouth and adapted for the lips of a wearer comprising:  
an elastic unitary, liquid impermeable body having a thin-walled tubular portion received into the mouth over the tongue of the wearer, the tubular portion being closed at a first end located in the mouth of the wearer, and having an open end remote from said first end, said open end entirely surrounded by a continuous peripheral lips portion, wherein said lips portion is substantially elliptical and adapted to cover without extending significantly beyond the wearer's lips; and wherein said lips portion is flexible and resilient.

**4,949,732**  
**APPARATUS FOR INSERTION AND FIXATION OF AN INTRA UTERINE CONTRACEPTIVE DEVICE TO THE UTERINE FUNDUS**  
Herbert Spoon, Bridgewater; Vincent Vaillancourt, Livingston, both of N.J., and Robert Caspari, W. Nyack, N.Y., assignors to Gyno Pharma Inc., Somerville, N.J.  
Filed Aug. 24, 1989, Ser. No. 397,861  
Int. Cl.<sup>5</sup> A61F 6/00  
U.S. Cl. 128—839 9 Claims

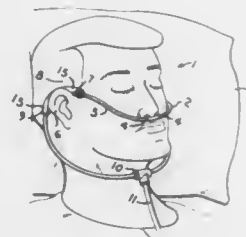
1. A one hand apparatus for inserting and fixing an intra uterine contraceptive device (IUD) having an attaching means for fixation to the fundus; said apparatus comprising:  
a penetration member having a holding means for a digit of a user at the proximal end thereof and a needle at the distal end thereof, said needle adapted to engage said attaching means of said IUD whereby penetration of said needle by a predetermined distance into the fundus causes fixation of said IUD to the fundus;  
an insertion tube for insertion into the uterine cavity and for

slidably receiving said penetration member with said IUD within said insertion tube;  
a lock/release member for positively locking said insertion tube to said penetration member with said penetration member in said insertion tube to prevent slidable movement of said penetration member during insertion of said insertion tube into the uterine cavity by movement of one hand of the user on said holding means, and for thereafter releasing, with the same hand of the user, said penetration member from said insertion tube to permit slidable movement of said needle forward from within said insertion tube by said predetermined distance of penetration into the fundus by the slidable movement of said needle forward from within said insertion tube;



said lock/release member including a clamping means at one end for positively locking said insertion tube to said lock/release member;  
said lock/release member also including a locking means at the other end for positively locking said penetration member to said lock/release member; and  
said lock/release member further including an extension member extending toward and over the holding means whereby the movement of said extension by a digit of the user will release the lock/release member from both said insertion tube and said penetration member for slidable movement of said penetration member within said insertion tube.

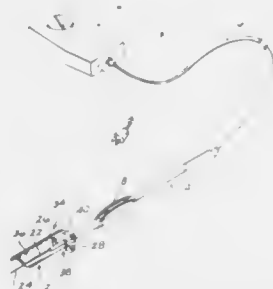
**4,949,733**  
**NASAL OXYGEN CANNULA PAD**  
Robert D. Sampson, 3610 Chestnut, Kansas City, Mo. 64110  
Filed Jul. 21, 1988, Ser. No. 222,631  
Int. Cl.<sup>5</sup> A61M 16/00  
U.S. Cl. 128—864 9 Claims



1. In combination with a tube cannula, a pad for cushioning tubing contact area with skin surface and thereby reducing the likelihood of irritation comprising:  
(a) a flexible pad of generally continuous cross-section and  
(b) multiple slits intersecting generally centrally of said cross-section and forming an opening extending along and within said pad, said pad receiving said tube cannula into said opening;  
(c) one of said slits extending from the central portion of said pad to an exterior surface thereof;  
(d) said pad being located with respect to said tube cannula

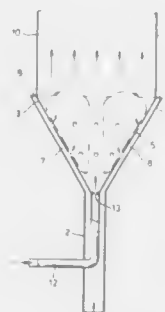
for preventing contact between said tube cannula and exposed skin of a person wearing said tube cannula.

**4,949,734**  
**SHIELD FOR ELECTROSURGICAL DEVICE**  
Gerald Bernstein, 6653 N.E. Windermere Rd., Seattle, Wash. 98115  
Filed Aug. 25, 1988, Ser. No. 236,501  
Int. Cl.<sup>5</sup> A61G 17/00  
U.S. Cl. 128—897 22 Claims



1. A spray shield for an electrosurgical unit having an electrode extending from a holder comprising:  
transparent barrier means, positioned between the electrode and the operator of the electrosurgical unit during use when the electrode contacts a work area on a patient for capturing a portion of the matter emanating from the work surface, said barrier means transversely subtending an angle of at least 45° about the electrode; and  
mounting means integral with said barrier means for mounting said spray shield on said electrosurgical unit to hold said spray shield in said position between the electrode and the operator during use of the electrosurgical unit.

**4,949,735**  
**TREATMENT OF PARTICULATE MATERIALS**  
Roland Clift, Godalming; Robert Legros, Guildford, and Clive A. Millington, Godalming, all of England, assignors to British-American Tobacco Company Limited, London, England  
Filed Jan. 17, 1986, Ser. No. 820,527  
Claims priority, application United Kingdom, Jan. 25, 1985, 8501959  
Int. Cl.<sup>5</sup> A24B 3/18, 3/12  
U.S. Cl. 131—291 16 Claims

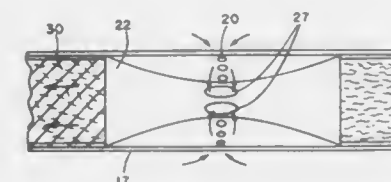


1. A method of disentangling entangled fibrous particulate material, which comprises: introducing the entangled material into apparatus wherein the particulate material is disentangled and maintained in a mobilized state in a mobilization zone bounded by wall means upwardly divergent from the vertical, whereby the horizontal cross-sectional area of said zone increases in an upward direction thereof, gaseous disentangling

and mobilizing medium being supplied at a multiplicity of sites of said wall means to said zone whereby there obtains in said zone a circulatory pattern comprising downward flow at said wall and upward flow from a lower region of said zone.

9. Apparatus for disentangling entangled fibrous particulate materials, which comprises: wall means bounding a mobilization zone, said wall means being wholly upwardly divergent from the vertical whereby the horizontal cross-sectional area of said zone increases in an upward direction thereof, and mobilization nozzle means operable to supply gaseous disentangling and mobilizing medium to said zone at a multiplicity of sites of said wall means, whereby in operation of said apparatus to mobilize and disentangle fibrous particulate material there obtains in said zone a circulatory pattern comprising downward flow at said wall means and upward flow from a lower region of said zone.

**4,949,736**  
**VARIABLE VENTILATION MOUTHPIECE FOR A SMOKING ARTICLE**  
Donald L. Roberts, and David W. Boldridge, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.  
Filed Mar. 16, 1988, Ser. No. 168,730  
Int. Cl.<sup>5</sup> A24D 3/04  
U.S. Cl. 131—336 7 Claims

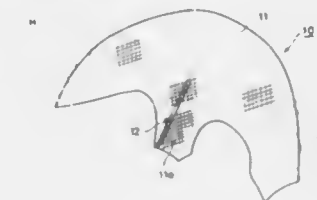


1. A smoking article comprising in combination a smokable material, air ventilation means for providing air to the smoking article and valve means operatively associated with the air ventilation means and movable from a first position to a second position to increase the concentration of air in the puff flow stream according to the depth of each puff and then return substantially to the first position; said air ventilation means comprising a mouthpiece including a tube having perforations therein, and said valve means comprising a flexible tubular membrane attached at either end to the inner wall of said tube and having a sidewall with slits therein which are substantially closed in said first position and open in said second position to allow the entry of air into the puff flow stream via said perforations and open slits.

**4,949,737**  
**WIG HAVING SHAPE RETAINING ELEMENT**  
Yukimichi Nakamura, and Ryuji Teratoko, both of Shinjuku, Japan, assignors to Aderans Co., Ltd., Tokyo, Japan  
PCT No. PCT/JP88/01121, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO89/04122, PCT Pub. Date May 18, 1989  
PCT Filed Nov. 4, 1988, Ser. No. 378,223  
Claims priority, application Japan, Nov. 4, 1987, 62-278940  
Int. Cl.<sup>5</sup> A41G 5/00 11 Claims

1. A wig comprising a curved wig base, hair implanted to a convex outer surface of said wig base, and at least one shape retaining element arranged in position on at least one of a concave inner surface and the convex outer surface of said wig base, characterized in that  
the at least one shape retaining element is made of a shape

memory alloy having a transformation temperature which is higher than a temperature at a location between a sur-



face of a user's head and said wig base during a period for which the wig is worn on the head.

**4,949,738**  
**SMALL PARTS CATCHER FOR HIGH PRESSURE FLUID CLEANING APPARATUS**  
William F. Hubbard, Gambrils, Md., assignor to David W. Wootton, Lutherville, Md.  
Filed Aug. 1, 1989, Ser. No. 387,795  
Int. Cl.<sup>5</sup> B08B 3/02  
U.S. Cl. 134—104.3 6 Claims

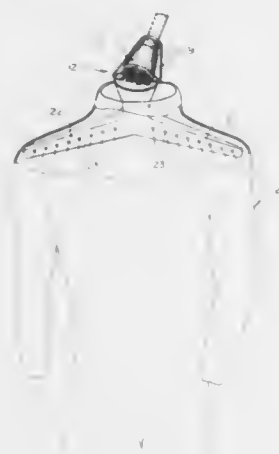


1. An attachment to a source of high pressure cleaning fluid for confining items which may be dislodged by a fluid stream of said high pressure cleaning fluid during a cleaning process comprising:  
a housing having an upper end, an elongated central body and a lower end;  
said upper end including a nozzle means integrally connected thereto, said nozzle means having means for attachment to said source of high pressure cleaning fluid on one end thereof and a fluid outlet on the other end thereof for directing fluid in a direction along the longitudinal axis of said housing;  
said central body section having a permanent opening formed adjacent said fluid outlet of said nozzle, said opening being sized to permit access to said fluid stream of said high pressure fluid from the outside of the housing during the cleaning process while preventing the escape of and maintaining said fluid stream and any dislodged items within said housing during the cleaning process;  
said lower end including a fluid passage opening, and a screen member covering said fluid passage opening and structured to catch and confine any items dislodged by said fluid stream preventing them from passing out of said housing while simultaneously permitting the passage of said fluid stream through said screen and out of said housing.



**4,949,739**  
**WETSUIT WASHING HANGER DEVICE**  
 Francis D. Ryan, 1770 Broadway—Apt. #101, San Francisco, Calif. 94109  
 Filed Mar. 13, 1989, Ser. No. 306,169  
 Int. Cl.<sup>5</sup> B08S 3/02  
 U.S. Cl. 134—166 R

8 Claims



5. As an article of manufacture, a wetsuit washing hanger device for suspending a wetsuit under a shower head for the purpose of discharging water into the wetsuit to wash or rinse the interior thereof, comprising:

- a hollow body including a funnel portion having an open mouth end for receiving water from said shower head and a smaller diameter apex end for delivering water from said funnel portion;
- a pair of lateral oppositely extending hollow arms forming a part of said hollow body and integral with said funnel portion at said apex end thereof and closed at their ends remote from said funnel portion, the interior of said hollow arms communicating with the interior of said funnel portion so that water discharged into said funnel portion is directed into said lateral oppositely extending arms;
- a bale mounted on said funnel portion and selectively manipulable to detachably suspend the hanger device from an associated shower head; and
- apertures in said lateral oppositely extending hollow arms through which water directed into said hollow body may be discharged for the purpose of washing or rinsing the interior of a wetsuit suspended on said hanger device.

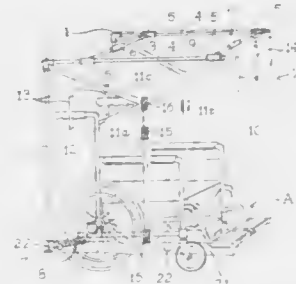
**4,949,740**  
**WHEELCHAIR RAINWARE**  
 Barry J. Friday, 909 E. Upsal St., Philadelphia, Pa. 19150  
 Filed Jun. 1, 1989, Ser. No. 360,115  
 Int. Cl.<sup>5</sup> A61G 5/10

U.S. Cl. 135—90

11 Claims

1. An inclement weather protective hood device for use with a wheelchair constructed of a collapsible support frame for attachment to the undercarriage of the wheelchair and a removable transparent plastic covering supported by said frame for protecting the wheelchair and occupant against inclement weather conditions, said collapsible support frame comprising a rectangular shaped portion of four tubular members joined at two front corners thereof by hinge joint connectors and at two rear corners by hinge joint connectors where the rectangular shaped portion is supported over the wheelchair at a sufficient distance above the wheelchair to accommodate a seated occupant, said collapsible support frame further comprising a plurality of tubular supports comprising a symmetrical construction with a pair of parallel vertical tubular members attached to

undercarriage attachment mechanism in the base of the wheelchair seat, and said vertical tubular members interconnecting with a pair of parallel horizontal tubular members at a height above the wheelchair occupant's head and which extend forward the length of the wheelchair and a pair of parallel transverse tubular members which transverse the rear and front of the structure, said transverse tubular members attaching to the horizontal tubular members recessed in from the rear and front at a distance of not less than about 1 inch, and a plurality of tubular members where the vertical tubular members connect with the horizontal tubular members at the uppermost rear point, and on the transverse tubular members midway between the members and at the interconnection between the horizontal tubular members and the transverse tubular members, and said removable transparent plastic covering comprising top, front, side, and rear panels and wherein the side panels are comprised

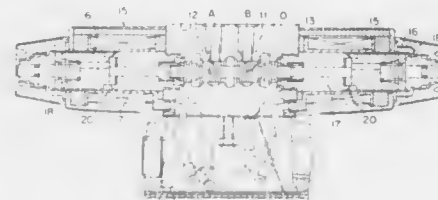


of forward, rear and triangular portions, which covering is attached to the tubular support members by passageways at the corners, with the front panel and forward portions of the side panels provided with means to secure in a rolled up position, wherein the top panel is comprised of a transparent or translucent flexible material with 3 or more equidistant rod pockets traversing the length of the structure, said rod pockets housing lightweight rods for support and to reduce the reservoir capacity of the top panel and further the two triangular portions of the side panels are attached at the edges of the top panel and extend downwardly over the top of the other side panel portions and have means to attach to the other portions of the side panels by a quick release mechanism at the apex of the triangular portion allowing for easy accessibility and venting, wherein the tubular support and covering device can be easily removed, folded and stored in a container which is provided for storage and transport.

**4,949,741**  
**POWER TRANSMISSION**  
 Harry J. Nowicki, and Charles E. Oliveto, both of Searcy, Ark., assignors to Vickers, Incorporated, Troy, Mich.  
 Filed Jan. 10, 1989, Ser. No. 295,485  
 Int. Cl.<sup>5</sup> F15B 13/044

U.S. Cl. 137—1

1 Claim



1. A method of controlling spool shift speed in a solenoid operated hydraulic directional valve which includes a body, a spool slidably mounted in a bore in the body and operable to control hydraulic fluid flow, a force controlled solenoid adapted to be electrically energized by a constant current

supply and a spring yieldingly urging the valve spool to a predetermined position, which method comprises applying a constant force by energizing the solenoid with constant current to the spool valve which opposes the variable force of the spring thereby decelerating the shifting action of the spool.

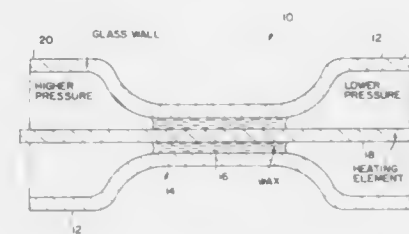
**4,949,742**  
**TEMPERATURE OPERATED GAS VALVE**  
 Joseph F. Rando, Los Altos Hills, and Ilya M. Fishman, Fremont, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Apr. 26, 1989, Ser. No. 344,325

Int. Cl.<sup>5</sup> F16K 13/10

U.S. Cl. 137—13

31 Claims



1. A method for operating a valve between two gas volumes, a first volume at an initially higher pressure and a second volume at an initially lower pressure, comprising, providing a conduit between the first volume and the second volume, the conduit including a horizontal portion, providing a restriction in the horizontal portion of the conduit for which a liquid would have a preference due to surface tension at the restriction, with a meltable solid material closing the restriction, when gas is to be moved from the first volume to the second volume, heating the meltable solid material until at least part of the material becomes liquified, allowing gas to pass from the first volume to the second volume, until the pressure differential between the two volumes becomes small, at which time the melted material returns essentially to its preferred initial position by surface tension, when valve closure is required, discontinuing heating and allowing the melted material to re-solidify essentially in its initial position thereby to seal the restriction and close the valve.

**4,949,743**  
**FLUIDIZATION OF HEAVY SLURRIES**  
 Henry T. Broom, Richmond, Tex., assignor to NALCO Chemical Company, Naperville, Ill.

Filed Dec. 14, 1987, Ser. No. 132,836

Int. Cl.<sup>5</sup> F17D 1/17, 1/18; B01J 13/00

U.S. Cl. 137—13

6 Claims

1. A process for fluidizing oily heavy slurries chosen from slurries of catalyst fines in hydrocarbon, coke slurries in hydrocarbon, and asphalt residues in hydrocarbon which comprises:

- (1) Heating, with mixing, the oily heavy slurries to at least 140° F., thereby forming a heated heavy slurry;
- (2) Adding to said heated heavy slurry with mixing, an effective fluidizing amount of a fluidizing agent which comprises the ingredients:

Ingredient	Wt. Percent
(a) water	15-85
(b) an ethoxylated nonyl phenol/formaldehyde resin having a molecular wt. between about 1000-25,000	40-5
(c) Surfactants having an HLB between about 2.0-25.0, said surfactants chosen from the group consisting of alkanolamide condensates,	40-5

-continued

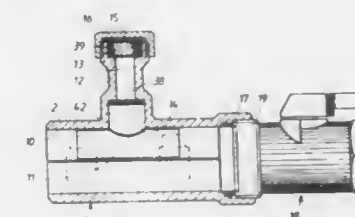
Ingredient	Wt. Percent
alkoxylated fatty alcohol phosphates and mixtures thereof; and	
(d) liquid organic solvents chosen from the group consisting of naphthas, aromatic naphthas, heavy aromatic naphthas, alkylated aromatics, light aromatic petroleum distillates, turpentine, dipentene rich turpentine, and mixtures thereof; thereby forming a heated treated heavy slurry, and then mixing effectively until the heated treated heavy slurry becomes fluidized and pumpable.	75-5

**4,949,744**  
**METHOD AND DEVICE FOR MOUNTING A BODY IN A CONDUIT CONTAINING FLUID**  
 Kai Heed, and Anne WikegÅrd-Heed, both of Brobyvägen 16, S-614 00 Söderköping, Sweden  
 PCT No. PCT/SE87/00576, § 371 Date May 24, 1989, § 102(c) Date May 24, 1989, PCT Pub. No. WO88/04386, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 3, 1987, Ser. No. 360,896  
 Claims priority, application Sweden, Dec. 4, 1986, 8605208  
 Int. Cl.<sup>5</sup> F16K 43/00; F16L 55/12

U.S. Cl. 137—15

9 Claims



1. A method for mounting an expandable blocking body (21) in a conduit (4) containing fluid, comprising the steps of releasably mounting an installation unit (1) having a channel (13) with a first sealing means (39) mounted therein onto the conduit (4) at a place where mounting of said body is desired, establishing during said mounting a sealing by a second sealing means (11) between said conduit and said installation unit against the environment around an area where a hole (47) in the surface of the conduit will be made, inserting a hole making device (27) through said first sealing means and into said channel of said installation unit having a diameter such that it is in sealing contact with said first sealing means (39) in order to keep said channel sealed against the environment when said device is situated in said channel, providing a third sealing means in said unit between said first and second sealing means in the form of a resilient reclosable valve means (40,41), moving said hole making device so that it pushes said reclosable valve means (40) open in a direction towards said conduit and making said hole (47) in said conduit in said area while still maintaining sealing against the environment, thereby establishing communication between said hole and said channel, moving said device out of said hole and said reclosable valve means whereby said reclosable valve means (40) closes before said device passes said first sealing means by means of the resiliency thereof and/or the pressure of the fluid in said conduit so that leakage is avoided, inserting a valve (32) for connection to a pressure medium through said first sealing means and having a body with a diameter substantially equal to the diameter of said hole making device and an expandable body (21) at an end thereof into said channel and pushing said reclosable valve means open again and inserting said expandable body through said hole, so that said expandable body is placed in said conduit at the place where the conduit is to be blocked, while still

maintaining sealing against the environment by said first and second sealing means, expanding said expandable body to a cross-sectional area and shape adapted to the inner cross-sectional area of the conduit by operating said valve, whereby the conduit is blocked, after completing any necessary work on the conduit, reducing the dimension of said expandable body to such a shape that it can be taken out through said hole, and removing said valve (32) and expandable body (21) from said hole and through said reclosable valve means (40,41) so that the latter can again close before said valve (32) passes said first sealing means (39), whereby sealing is still maintained against the environment and leakage is still avoided.

4,949,745

## CLEAN AIR CONNECTOR

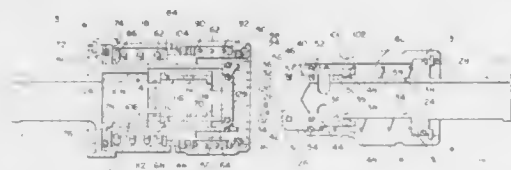
John J. McKeon, Hamden, Conn., assignor to Air-Lock, Incorporated, Milford, Conn.

Filed Dec. 27, 1988, Ser. No. 290,691

Int. Cl.<sup>5</sup> F16L 37/28

U.S. Cl. 137—15

21 Claims



1. A method for coupling the end of a first conduit to the end of a second conduit comprising the steps of:
  - (a) providing the end of the first conduit with a first coupler;
  - (b) providing the end of the second conduit with a second coupler, said first and second couplers being engageable with one another to produce a fluid path between the two conduits, said fluid path defining an outer envelope;
  - (c) engaging the first and second couplers to form the fluid path; and
  - (d) isolating from the fluid path all surfaces of the couplers which (i) are exposed to the environment when the couplers are out of engagement with each other, and (ii) are within the outer envelope of the fluid path when the couplers are engaged.

4,949,746

## FLUID CONTROL VALVES

Francis X. Kay, Buckingham, Englaod, assignor to F.X.K. Patents Limited, Addington, England

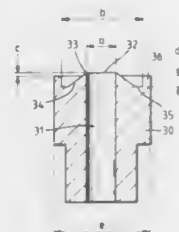
Filed Jun. 23, 1989, Ser. No. 370,730

Claims priority, application United Kingdom, Jun. 23, 1988, 8814925

Int. Cl.<sup>5</sup> G05D 16/00

U.S. Cl. 137—82

9 Claims



1. A fluid control valve comprising a discharge port and an obturator movable towards and away from such port to open and close the port, said discharge port having an orifice which is bounded by a sharp edge on which the obturator seats to close the port and an annular wall spaced radially outwardly from and surrounding the boundary of the orifice and which is

sufficiently narrow at its end facing the obturator as to minimize surface friction resulting from fluid flow therepast.

4,949,747

## SELF-FLUSHING FLUID APPARATUS PARTICULARLY USEFUL IN PULSATOR DEVICES

Peretz Rosenberg, Belt Shaareem, Israel

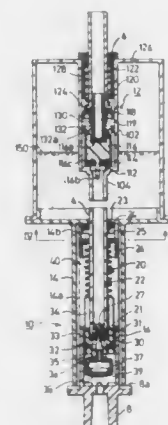
Filed Sep. 25, 1989, Ser. No. 411,986

Claims priority, application Israel, Oct. 12, 1988, 88014

Int. Cl.<sup>5</sup> F16K 51/00

U.S. Cl. 137—107

18 Claims



1. A self-flushing fluid apparatus, comprising:
  - a housing having an inlet port for receiving fluid under pressure, and an outlet port for discharging the fluid therefrom under pressure;
  - an inlet fitting connected to said inlet port for feeding pressurized fluid therethrough into said housing;
  - and a restricted inlet orifice between said inlet port and said inlet fitting, and including two relatively movable flow-control members restricting the flow of the fluid from said inlet fitting into said housing; said restricted inlet orifice comprising a first assembly including one of said flow-control members, a second assembly including the other of said flow-control members, and a spring between the two assemblies and effective:
    - (a) in the presence of pressurized fluid at the inlet fitting, to permit one assembly to be displaced in one direction with respect to the other assembly, to move the two flow-control members to an operative position with respect to each other to restrict the flow of the fluid from the inlet fitting into the housing; and
    - (b) in the absence of pressurized fluid at the inlet fitting, to displace one assembly with respect to the other assembly in the opposite direction to move the two flow-control members to an inoperative position spaced away from each other, and thereby to produce a self-flushing of the restricted inlet orifice by the pressurized fluid in the housing.

4,949,748

## BACKFLASH INTERRUPTER

SriKrishna Chatrathi, and Robert L. DeGood, both of Blue Springs, Mo., assignors to Fike Corporation, Blue Spring, Mo.

Filed Mar. 2, 1989, Ser. No. 317,768

Int. Cl.<sup>5</sup> F16K 17/00

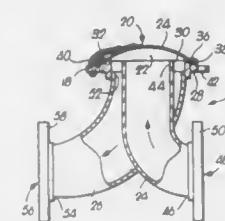
U.S. Cl. 137—115

10 Claims

1. An interrupter device for in-line placement in a run of pipe, duct, or the like conducting fluids or fluidized particles for preventing a pressure wave and any subsequent flame front traveling therealong from passing beyond said device into an adjacent portion of said run and equipment and areas con-

nected thereto, said run presenting respective first and second spaced-apart, portions thereof, said device comprising:

- a chamber structure defining an enclosed fluid transfer chamber and including pressure responsive vent means for opening said chamber for exterior venting upon the occurrence of a predetermined level of pressure therein;
- a first fluid-conducting member presenting a first fluid port and coupled with said chamber structure in order to fluidically couple said chamber with said first port;
- a second fluid-conducting member presenting a second fluid port and coupled with said chamber structure in order to fluidically couple said chamber with said second port, said members and chamber structure defining a fluid flow path between said ports by way of said chamber,



- said members being coupled with said chamber structure in a non-aligned relationship relative to one another in order to prevent direct in-line fluid flow between said members by way of said chamber; and
- respective first and second connecting means for fluidically connecting said first port with the first run portion and said second port with the second run portion respectively in order to place said apparatus in an in-line relationship with the run of pipe, duct, or the like, said vent means including a dome-shaped vent cap defining at least a portion of said fluid flow path between said ports by way of said chamber.

4,949,749

## SAFETY VALVES AND CONTROL APPARATUS FOR UNDERGROUND STORAGE FACILITIES

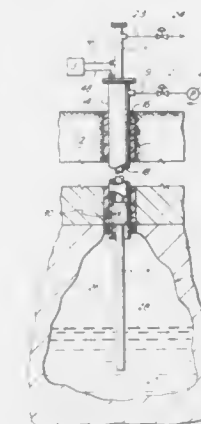
Joe R. Fowler, Spring, and Robert J. Pirkle, Jr., Missouri City, both of Tex., assignors to Safety Services, Inc., Houston, Tex.

Filed Feb. 27, 1989, Ser. No. 315,814

Int. Cl.<sup>5</sup> B65G 5/00

U.S. Cl. 137—236.1

12 Claims



1. In a remote storage facility for fluids, including a reservoir which is generally inaccessible and capable of containing fluids, and access facilities for injection and discharge of fluids to and from the reservoir from an accessible control location, including a first access conduit in communication with the reservoir and a second access conduit capable of fitting within the first access conduit and being inserted into the reservoir

from the accessible control location by feeding the second access conduit into and along the first access conduit; the improvement of control apparatus for interrupting fluid flow in the access facilities at or near the inaccessible reservoir comprising first closure means mounted on the second access conduit at the accessible control location and capable of fitting within the first access conduit so as to be fed with the second conduit into and along the first conduit to a remote location at or near the reservoir yet still within the first conduit, said first closure means being capable of being selectively actuated to permit or interrupt fluid flow in the annulus between the first and second conduits; second closure means mounted to the second access conduit at the accessible control location and capable of fitting within the first access conduit so as to be fed with the second conduit into and along the first conduit to a remote location near, at or within the reservoir, said second closure means being capable of being selectively actuated to permit or interrupt fluid flow within the second access conduit; and actuating means located at the accessible control location and capable of selectively actuating said first or second closure means, or both, to permit or interrupt fluid flow in the corresponding first or second access conduit, as desired.

4,949,750

## SURGE RELIEVER RELIEF VALVE

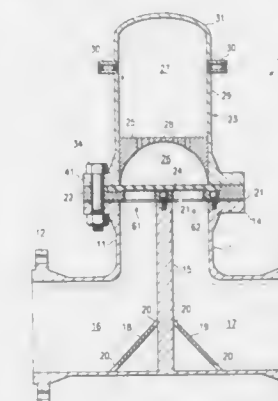
Donald W. Goodwin, Richardson, Tex., and Kenneth S. Adamson, Penn Valley, Calif., assignors to Peerless Manufacturing Company, Dallas, Tex.

Filed Oct. 28, 1988, Ser. No. 264,220

Int. Cl.<sup>5</sup> F16K 17/18, 47/02

U.S. Cl. 137—510

8 Claims



1. An improved surge relief valve, comprising:
  - a grid having a periphery, a central portion and a pier which bisects the central portion, the pier separating two laterally adjacent matrices of through passages, the matrices defining an intake matrix and an output matrix;
  - a liquid flow intake section having an effluent end bounded by the intake matrix of the grid;
  - a liquid flow output section having an effluent end bounded by the output matrix of the grid;
  - the affluent and effluent ends forming an opening bisected by a barrier;
  - the grid interposed between the bisected opening and a membrane;
  - the membrane in sealing contact with the periphery of the grid and covering an opening to a flow chamber having an arched retainer;
  - the retainer having one or more vents formed therein, the vents leading into a pressure chamber; and
  - the membrane being an extensible elastomeric element having a rest position in sealing contact with the central portion of the grid and adapted to deform, under the influence of an increasing intake fluid pressure to an ex-



tended position in which the membrane is in full contact with the retainer, the grid being flat.

4,949,751

# COMPRESSION RELEASE RETARDER WITH VALVE MOTION MODIFIER

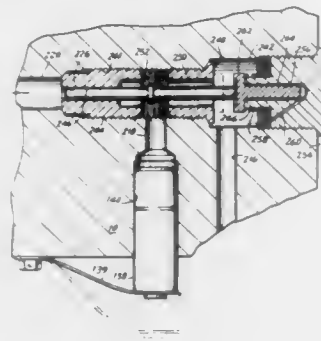
Zdenek S. Meistrick, Bloomfield, and Raymond N. Quenneville, Suffield, both of Conn., assignors to Jacobs Brake Technology Corporation, Wilmington, Del.

Division of Ser. No. 308,837, Feb. 9, 1989, Pat. No. 4,898,206, which is a division of Ser. No. 120,825, Nov. 16, 1987, Pat. No. 4,838,516, and a continuation-in-part of Ser. No. 872,494, Jun. 10, 1986, now Re. 33,052. This application Oct. 6, 1989, Ser. No. 418,133

Int. Cl.<sup>5</sup> F16K 15/06

U.S. Cl. 137—522

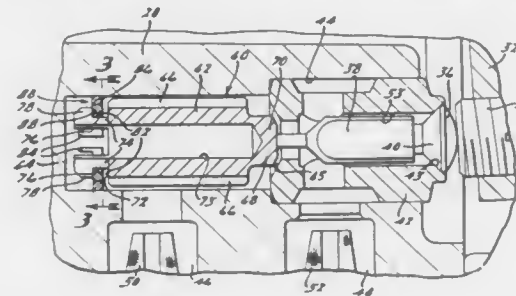
3 Claims



between positions which cause the element port to be either connected to said supply port or a vent port; a valve seat means forming at least one valve seat in said passageway and having a central passage communicating therethrough;

electromagnetic means for producing a magnetic field when electrically energized;

a plunger operatively connected to said electromagnetic means having a longitudinal axis aligned with said central



passageway to move said valve and act in conjunction with said valve and said valve seat means to effect the element connection to either said supply or vent port; a damper slideably disposed within said passageway; and said damper including means for expanding and contracting in response to the temperature of the fluid to allow gradual flow of fluid within said passageway to slow the velocity of said valve and reduce impact noise between said valve and at least one of said valve seat means and said housing.

4,949,753

# FLUID MIXTURE AND FLOW CONTROL VALVE

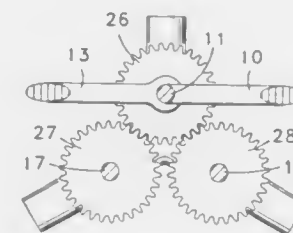
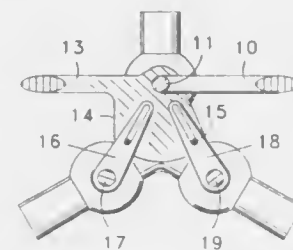
John V. Stewart, 1308 Henry Balch Dr., Orlando, Fla. 32810

Filed Jun. 12, 1989, Ser. No. 364,645

Int. Cl.<sup>5</sup> F16K 11/085, 11/087, 11/22

U.S. Cl. 137—607

10 Claims



4,949,752

# THERMALLY COMPENSATED NOISE CONTROL DEVICE FOR A SOLENOID-ACTUATED VALVE

Thomas D. Nogle, Troy, and Roy S. Nassar, Canton, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed May 12, 1989, Ser. No. 351,352

Int. Cl.<sup>5</sup> F15B 13/44

U.S. Cl. 137—596.17

20 Claims

1. A valve assembly for controlling fluid flow between a fluid supply source and fluid actuating device in a vehicle transmission, said assembly comprising:

a housing having a supply port for connection with the fluid supply source, an element port for connection with the fluid actuating device, and a passageway communicating with said supply port and said element port;

a valve disposed within said passageway and moveable

1. A device for fluid mixture and flow control, comprising: first and second flow control valves, each having a rotor and an outlet channel,

said outlet channels joined into a merged outlet channel, a third flow control valve mounted in said merged outlet channel,

means for linking said rotors to operate in substantially opposite phase from each other,

a first control arm connected to said linking means, and a second control arm connected to said third valve,

said control arms pivot about a substantially common axis, a dial face with diametrically opposed arcuate segments of marks, said arcuate segments essentially concentric with said pivot axis, and said dial face mounted adjacent said arms.

4,949,754

# PRESSURE CONTROL VALVE FOR RAILWAY VEHICLES

Hideo Tamamori, Kita, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

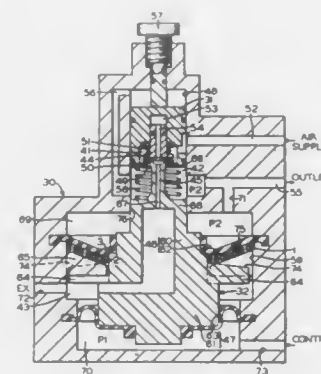
Filed Dec. 1, 1988, Ser. No. 278,388

Claims priority, application Japan, Dec. 15, 1987, 62-190597

Int. Cl.<sup>5</sup> G05D 16/00

U.S. Cl. 137—627.5

10 Claims



1. A railway car pressure control valve comprising, an adjustable middle body member having an air supply chamber, an air supply valve and a valve seat, the air supply chamber is connected to a source of compressed air, an output chamber is connectable to an output passage, an exhaust chamber is opened to the atmosphere, the valve seat located in an air supply passage connects the air supply chamber to the output chamber, the air supply valve is biased by a spring toward the valve seat, an exhaust valve rod having a valve tip which faces the air supply valve and fits loosely in the air supply passage and having an exhaust passage which has one end open at the valve tip and which has the other end open to the exhaust chamber, a control piston having a center portion attached to an inner periphery of a control piston diaphragm, the control piston diaphragm having an outer periphery fixed to the inside wall of a valve main body for defining a control chamber, a source of control air pressure connected to the control chamber to provide a pressure force to move the exhaust valve rod in the direction of the air supply valve, a balance piston having a center portion attached to an inner periphery of a balance piston diaphragm, the balance piston diaphragm having an outer periphery fixed to the inside wall of the main valve body for defining a balance chamber which receives the air pressure from the output chamber providing a balancing force to resist the pressure force in the control chamber, a first and second plurality of radially extending interleaved fins connected to the main valve body and one of the center portions, respectively, and a protective member interposed between one of the balance and control piston diaphragms and the radially extending interleaved fins to reduce the deformation resistance of the one diaphragm.

4,949,755

# FLUIDIC VOLUMETRIC FLUID FLOW METER

John F. Thurston, and Alan L. Golembewski, both of Mesa, assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

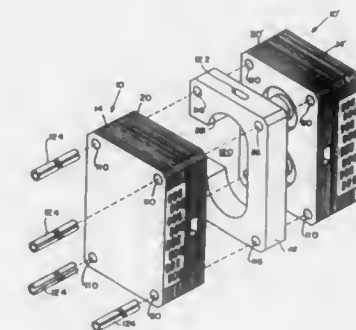
Division of Ser. No. 933,648, Nov. 21, 1986. This application

Jan. 3, 1990, Ser. No. 460,499

Int. Cl.<sup>5</sup> F15C 5/00

U.S. Cl. 137—833

2 Claims



1. Fluidic lamina for stacking an interbonding with plural substantially identical lamina to define a fluidic bypass member of exteriorly prismatic shape, and having a plurality of bypass passages provided by each lamina in cooperation with next adjacent lamina, each bypass passage substantially replicating a selected discharge coefficient, said lamina comprising:

a first and a dissimilar second spaced apart end portions, each end portion defining substantially identical cooperable alignment features for stacking of said lamina in aligned relation with substantially identical lamina, each in sequentially opposite end orientation;

a pair of spaced apart removable waste side edge portions connecting said end portions;

said lamina defining a plurality of equally spaced apart similar bypass passage openings of certain width and extending from within one of said pair of removable side edge portions to within the other of said removable side edge portions, said bypass passage openings separating a plurality of similar equally spaced apart boundary portions connecting said removable side edge portions and each of determined width exceeding said certain width by twice an interbonding dimension;

said plurality of bypass passage openings being offset as a group from a centered position on said lamina toward one of said pair of end portions and away from the other of said end portions by a dimension equal to one-half the total of said certain width plus said interbonding dimension to result in said end portions being dissimilar in width; whereby stacking of plural lamina each in sequentially opposite end orientation results in bypass passage openings of each lamina being bounded by boundary portions of next adjacent stacked lamina, and the wider of said end portions of a lamina bounding the bypass passage opening next adjacent to the narrower of said end portions of adjacent lamina, and said removable waste side edge portions are removed after interbonding of said stacked lamina to open inlet and outlet ends of said bypass passages.

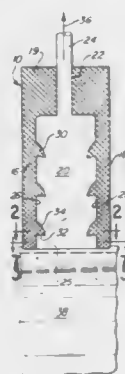
4,949,756

## ONE-WAY VALVE

Lev Melinyshyn, Mt. Prospect, and Edward M. Goldberg, Glen-coe, both of Ill., assignors to Uresil Corporation, Skokie, Ill.  
Filed Aug. 31, 1988, Ser. No. 237,849  
Int. Cl.<sup>5</sup> F16K 15/14

U.S. Cl. 137—846

11 Claims



1. A one-way valve comprising:  
two flat resilient members in face-to-face relationship with each other, said resilient members being bonded along two generally parallel tracks defining a passageway therebetween, said tracks having a tortuous profile along their inner edges;  
a wetting agent wetting said opposing faces of said resilient members; and  
an inlet port at one end of said passageway and an outlet port at the opposite end of the passageway.

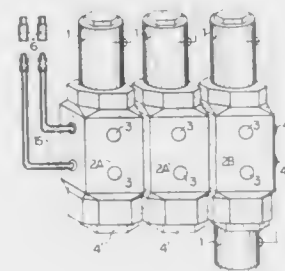
4,949,757

## HYDRAULIC CONTROL SYSTEM

Steve Lashta, Post Office Box 263, Yorkton, Saskatchewan, Canada (S3N 2V7)  
Continuation of Ser. No. 173,242, Mar. 24, 1988, abandoned.  
This application Nov. 28, 1988, Ser. No. 442,409  
Int. Cl.<sup>5</sup> G16K 31/02

U.S. Cl. 137—884

8 Claims



1. A kit for converting to a plural outlet system a single outlet hydraulic system having a single hydraulic system outlet including two hydraulic system outlet ports, means for supplying hydraulic fluid under pressure to the hydraulic system outlet and means including a manually operable lever for varying the hydraulic fluid supply to the hydraulic system outlet, said kit comprising:  
a plurality of two-way, two-position valves, each having a valve inlet comprising two valve inlet ports, a valve outlet comprising two valve outlet ports, valving means operatively connected between the inlet and outlet and having valve opening and valve closed conditions, respectively opening and closing communication between the outlet and the inlet, and actuator means operatively associated with the valving means for selectively actuating the valving means into the valve open and valve closed conditions

each actuator means being independent of each other actuator means;  
valve inlet coupling means coupling the valve inlets in parallel for fluid communication therebetween;  
means for connecting the coupled valve inlets to the hydraulic system outlets;  
a control handle including a hand grip and a plurality of manually operable control means spaced therealong for engagement by respective fingers of an operator's hand;  
means for mounting the control handle on the manually operable lever of the hydraulic system; and  
control circuit means connecting each valve actuator means to a respective manually operable control means for selective operation of the actuator means in response to operation of the control.

4,949,758

## THIN-WALLED SMALL-BORE STEEL TUBE WITH CASE

HARDENED INTERNAL SURFACE  
William H. Bear, Edmonton, Canada, assignor to Quinn's Oil-field Supply Ltd., Red Deer, Canada

Filed Jul. 17, 1985, Ser. No. 756,042

Int. Cl.<sup>5</sup> F16L 9/00; C22C 35/00

U.S. Cl. 138—177

5 Claims



1. A long straight thin-walled small-bore steel tube 8–32 feet long, having an internal diameter of  $1\frac{1}{4}$ – $3\frac{1}{4}$  inches and a wall  $\frac{1}{8}$ – $\frac{1}{4}$  inch thick of substantially constant chemical composition, said tube wall having an internal surface case which has a substantially uniform fully transformed martensitic microstructure, which is in a state of residual compressive stress, which extends across said tube wall's entire internal surface area, and which has a substantially uniform total depth of less than about 1 mm, an effective case depth of HRC 50 of at least about 0.5 mm and a surface hardness of at least HRC 58, the remaining outer base portion of said tube wall being substantially unhardened, with a sharp demarcation between the hardened case portion and the non-hardened base portion.

4,949,759

## SEERSUCKER LOOM WITH TENSION REGULATION OF PUCKERING WARP

Yujiro Takegawa, Kahoku; Kenjiro Ohno, Kanazawa; Fumio Matsuda, Kanazawa, and Zenji Tamura, Kanazawa, all of Japan, assignors to Tsudakowa Corp., Ishikawa, Japan  
Filed Jul. 26, 1989, Ser. No. 385,417

Claims priority, application Japan, Jul. 27, 1988, 63-187590  
Int. Cl.<sup>5</sup> D03D 39/22, 49/10

U.S. Cl. 139—25

6 Claims

1. A seersucker loom for weaving a seersucker by simultaneously letting off ground warp yarns at a let-off rate and puckering warp yarns at a let-off rate higher than that of the ground warp yarns, and interlacing the ground warp yarns and the puckering warp yarns with a weft yarn, said seersucker loom comprising: a main shaft; a tension regulating means disposed in the path of the puckering warp yarns for applying a predetermined tension to the puckering warp yarns; a driving means for moving said tension regulating means in a direction to slacken the puckering warp yarns, said driving means moving said tension regulating means in a direction to slacken the puckering warp yarns at least during a slackening period from a shed closing operation to a beating-up operation in every one full turn of said main shaft;

wherein said tension regulating means comprises a pair of

swing levers, and a tension regulating roller rotatably supported on one end of each of the pair of swing levers; and wherein said driving means comprises a cam mecha-



nism including a synchronizing means for moving said tension regulating roller in a direction to slacken the puckering warp yarns once every one full turn of said main shaft in synchronism with the rotation of said main shaft.

4,949,760

## OFFSET HOOK, BALANCED CENTER SHED DOBBY APPARATUS

Arthur J. Wilson, Menlo Park, and Fredrick J. Ahrens, Oakland, both of Calif., assignors to Jeffrey Wilson and Cyrena N. Wilson, both of Menlo Park, Calif.

Filed Oct. 3, 1988, Ser. No. 252,736

Int. Cl.<sup>5</sup> D03C 1/06

U.S. Cl. 139—66 R

14 Claims



1. A dobby apparatus for use with hand looms for automatically controlling the lifting sequence of a plurality of shafts comprising:  
a dobby operating drive mechanism connected to a dobby operating arm for pivoting said dobby operating arm downwardly from a neutral position and returning it to said neutral position during each dobby operating cycle;  
a plurality of dobby hook pairs mounted in a transfer position when said dobby operating arm is in said neutral position, each of said plurality of dobby hook pairs being connected to a different one of said plurality of shafts;  
a plurality of dobby hook positioner assemblies contacting said dobby hook pairs to laterally transfer both of said dobby hooks in each of said pairs between a first capture position in which a first dobby hook in each of said dobby hook pairs is engageable in said dobby operating arm and a second capture position in which a second dobby hook

in each of said dobby hook pairs is engageable in said dobby operating arm; and  
a dobby program drive assembly in operative engagement with said dobby hook positioner assemblies to control lateral displacement of said dobby hook positioner assemblies in accordance with a predetermined weaving program;  
the dobby hooks of said plurality of dobby hook pairs each having two generally parallel sections connected by a terminal end and a hook portion extending from one of the parallel sections, offset toward the other of the parallel sections and aligned directly beneath the parallel sections, each of the dobby hooks being connected to one of said plurality of shafts from the terminal end, each of said dobby hook pairs being connected to one of said plurality of shafts with flexible cord, a biasing means being connected to the flexible cord to pull on the flexible cord in a direction opposite to a direction of pull by the weight of the one of said plurality of shafts on the flexible cord, thus to balance the weight of the one of said plurality of shafts.

4,949,761

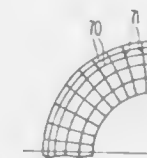
## SPHEROIDALLY CONTOURED FABRIC

Gilles A. Fleury, Garden Grove; Robert L. LaVallee, Perris, both of Calif., and Thomas S. Ohnstad, Marysville, Wash., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 77,672, Jul. 23, 1987. This application Dec. 7, 1988, Ser. No. 280,801  
Int. Cl.<sup>5</sup> D03D 3/00

U.S. Cl. 139—384 R

3 Claims



1. A curved contoured continuous length fabric having warp yarns extending longitudinally along the length of said fabric and weft yarns extending longitudinally across the width of said fabric, said warp yarns being positioned closer together, as they approach the outer curved surface of the fabric, and said weft yarns being substantially equally spaced lengthwise relative to each other.

4,949,762

## WEFT GRIPPER FOR SHUTTLELESS LOOM

Francisco Speich, Gipf-Oberfrick, Switzerland, and Erich Buehler, Rheinfelden/Baden, Fed. Rep. of Germany, assignors to Textilma AG

Filed Oct. 3, 1988, Ser. No. 252,734

Claims priority, application Switzerland, Oct. 2, 1987, 3,849/87

Int. Cl.<sup>5</sup> D03D 47/20

U.S. Cl. 139—445

11 Claims

1. A gripper loom comprising:  
a gripper mounted for movement to insert a filling thread into a shed formed by warp threads;  
a clip mounted to said gripper for holding a filling thread to said gripper while said gripper inserts the filling thread into the shed;  
opening means operatively connected to said clip for moving said clip to release the filling thread from said gripper; and

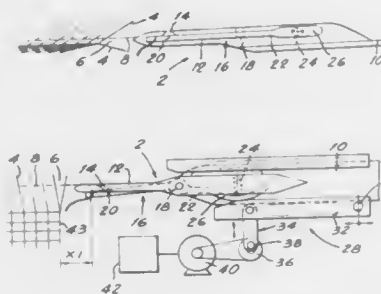


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adjustment means operatively connected to said opening means for adjusting during loom operation a spacing



between said gripper and the warp threads at which said opening means moves said clip to release the filling thread.

**4,949,763**  
**DEVICE FOR DAMPING WEFT YARN OSCILLATIONS AND VIBRATIONS IN WEFT FEEDERS FOR AIR LOOMS**

Bruno Maina, Vercelli, Italy, assignor to ROJ Electrotex S.p.A., Biella, Italy

Filed Mar. 23, 1987, Ser. No. 28,338

Int. Cl.<sup>5</sup> D03D 47/36

U.S. Cl. 139—452

3 Claims



1. In a loom having a weft feeder for feeding yarn to the loom, a cutter for cutting off fed lengths of yarn, the weft feeder having an outlet and a fixed yarn guide at said outlet; the improvement comprising a second fixed yarn guide in alignment with the first yarn guide and spaced downstream thereof with respect to the direction of travel of yarn from the yarn guide outlet, an intermediate yarn guide movable from a first position in which it does not engage the weft yarn on its path between the two fixed guides and a position in which it engages said yarn and deflects the yarn, thereby forcing the yarn to follow a winding path between said two fixed guides, and an actuator that moves said intermediate yarn guide from said first position to said second position and back to said first position just at the time of actuation of said cutter, thereby to damp weft yarn oscillations and vibrations resulting from operation of said cutter.

**4,949,764**  
**METHOD FOR FILLING CONTAINERS WITH CARBONATED LIQUID UNDER COUNTERPRESSURE AS DISPENSED HAVING DIFFERENT FILLING CHARACTERISTICS BY ADJUSTING PRESSURE DIFFERENTIAL WITHOUT CHANGING FLOW CONTROL MECHANISM**

Ludwig Clüsserath, Bad Kreuznach, Fed. Rep. of Germany, assignor to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

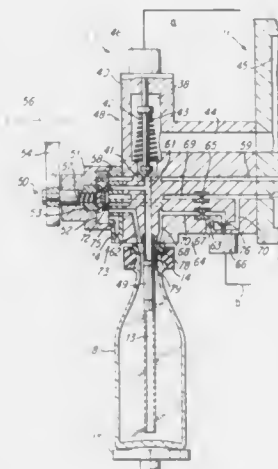
Filed May 20, 1988, Ser. No. 196,731

Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717256

Int. Cl.<sup>5</sup> B65B 3/18; B67C 3/06

U.S. Cl. 141—6

6 Claims



1. A method of filling a carbonated liquid, particularly beverages, into a container under counterpressure, said method comprising the steps of:

preliminarily pressurizing said container with pressurizing gas;

then introducing, via a filling element, said liquid, which is under a filling pressure, into said container when the latter is in a sealing position with respect to said filling element; during said introducing of liquid into said container, at least for a given period of time, withdrawing from said container, the gas or gas mixture, formed by return gas, that is displaced by said introduced liquid involving a pressure differential between filling pressure of the liquid and the gas or gas mixture in the container under counterpressure, and thereupon conveying said gas or gas mixture into a chamber via a connecting means that is provided with a flow control mechanism, said flow control mechanism including a space having a pressure relationship of gas or gas mixture therein beyond which upon pressure increase at an output from the space of said flow control mechanism the volume flow of return gas displaced from the container by the liquid and passing through the flow control mechanism has an interdependent interrelationship of the pressure with respect to the gas or gas mixture and the liquid;

regulating in said chamber a pressure that is adjustable within a range that is between said filling pressure and the pressure of said flow control mechanism; interrupting said connecting means upon termination of introduction of liquid into said container; and thereupon reducing the pressure in said container to atmospheric pressure.

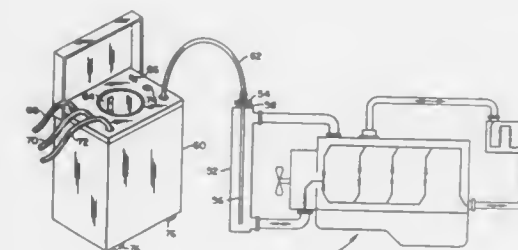
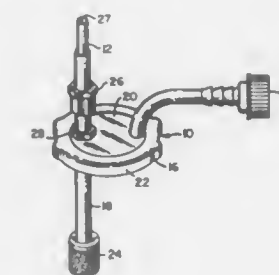
**4,949,765**  
**CLEANING APPARATUS AND METHOD**  
Richard F. Creeron, Valley Stream, N.Y., assignor to First Brands Corporation, Danbury, Conn.

Filed May 31, 1988, Ser. No. 200,347

Int. Cl.<sup>5</sup> B65B 3/12

U.S. Cl. 141—7

18 Claims



1. A process for flushing/filling an automotive cooling system using a flushing apparatus having pumping means, liquid switching means and a modified radiator cap unit having an elongated hollow tubular member for flushing/filling an automotive cooling system having an automobile radiator having a neck opening, said automotive cooling system containing a first liquid to be replaced with a second liquid wherein the process comprises affixing said modified radiator cap unit to said neck opening thereby forming an elongated open fluid passageway through the modified radiator cap unit and extending into the automobile radiator through the neck opening for accessing said first liquid, one end of the elongated hollow tubular member adapted to engage in a fluid tight relationship said pumping means in communication with said liquid switching means for removing a major amount of said first liquid from said automotive cooling system through said elongated hollow tubular member and for introducing said second liquid through said elongated hollow tubular member, said process comprising:

- (a) removing said first liquid from said automobile radiator through said elongated hollow tubular member using said pumping means through said switching means;
- (b) introducing said second liquid to said pumping means and to said elongated hollow tubular member through said liquid switching means to said pumping means; and
- (c) introducing said second liquid to said automobile radiator through said elongated hollow tubular member using said pumping means and said liquid switching means.

**4,949,766**  
**POWDER FILLING MACHINE**  
Trevor Coatsworth, Barnard Castle, England, assignor to Glaxo Group Limited, London, England

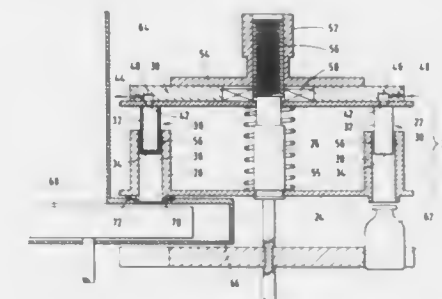
Filed Oct. 6, 1988, Ser. No. 254,397

Claims priority, application United Kingdom, Oct. 7, 1987, 8723559

U.S. Cl. 141—67

Int. Cl.<sup>5</sup> B65B 43/50

13 Claims



1. A machine for introducing a quantity of powder into a plurality of containers, comprising a powder transporting member having a plurality of downwardly open chambers, a container transporting member located below the powder transporting member, means for continuously rotating the powder transporting member and the container transporting member in unison about a common and substantially vertical axis, a reservoir for powder with which the said chambers communicate during part of the rotation of the powder transporting member, means for applying vacuum to the chambers to cause powder to be drawn therein, and means for discharging the powder from each chamber into a container carried by the container transporting member.

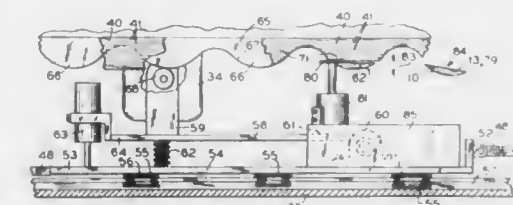
**4,949,767**  
**APPARATUS AND METHOD FOR MANUFACTURE OF WOOD PATCH**  
David L. Murphy, Prineville, Oreg., assignor to Arthur H. Fitzgerald, Prineville, Oreg., a part interest

Filed Sep. 25, 1989, Ser. No. 412,020

Int. Cl.<sup>5</sup> B27L 5/02

U.S. Cl. 144—369

10 Claims



1. A method for the manufacture of wood patches, comprising the following steps:

- a. clamping a piece of wood stock within a clamp mechanism;
- b. engaging a rotating double router bit, having a straight cutting edge and an angled cutting edge, against the clamped piece of wood stock;
- c. moving the rotating double router bit and clamped piece of wood longitudinally with respect to each other; while also
- d. moving the double router bit and clamped piece of wood stock transversely with respect to each other;
- e. forming by said relative longitudinal and transverse movement between the double router bit and clamped piece of wood, a protrusion on said piece of wood stock having a first flat face created by the straight cutting edge and an

angled arcuate face created by the angled cutting edge, which first flat face and angled face intersect at an angle formed between the straight cutting edge and the angled cutting edge as measured in a plane normal to said first flat face;

f. cutting, by longitudinal movement between the wood stock and a cutting blade which is oriented perpendicular to the first flat face cut by the straight cutting edge of the double router bit, said protrusion from the wood stock; said cutting forming a second flat face perpendicular to the first flat face, which second flat face also intersects the angled arcuate face, thereby producing a completed wood patch.

**4,949,768**  
**LOG SURFACE HEWING PROCESS AND ASSOCIATE SURFACE HEWING MACHINE**

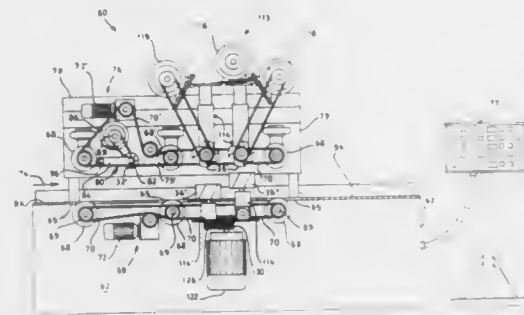
Randy K. Giles, Jefferson County, and Wolfgang Krausslich, Cooke County, both of Tenn., assignors to Hearthstone Builders, Inc., Dandridge, Tenn.

Continuation-in-part of Ser. No. 247,717, Sep. 22, 1988, Pat. No. 4,871,003. This application Oct. 23, 1989, Ser. No. 425,808

Int. Cl.<sup>5</sup> B27L 5/02; B27C 9/00

U.S. Cl. 144—3 R

17 Claims



1. A log surface hewing machine for configuring the surfaces of a construction log used in the construction of log structures to produce a log having a hand-hewn appearance, said log having an elongated body defining a substantially rectangular cross-section, and including first and second end portions and a longitudinal axis extending therebetween, said body defining upper and lower surfaces and oppositely disposed front and rear surfaces, and further defining longitudinally extending upper and lower forward edge portions and longitudinally extending upper and lower rearward edge portions, said hewing machine comprising:

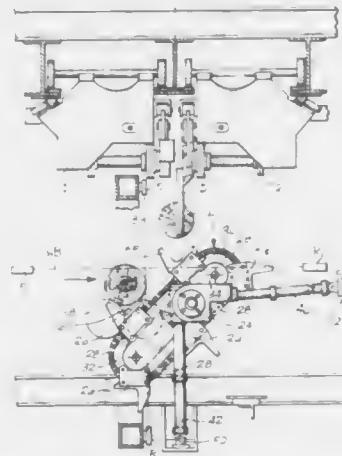
a support structure;

a first cutting means supported by said support structure for chamfering at least two said edge portions of said body simultaneously to produce irregularly beveled corners, said first cutting means including a pair of chamfering bits mounted on a common spindle and first motor means for selectively rotating said spindle, said first cutting means also including means for varying the depth of cut of said chamfering bits; and

a second cutting means supported by said support structure for cutting a plurality of indentations in at least one of said surfaces of said body, said second cutting means including at least two cutter assemblies each having a rotatable blade and second motor means for rotating said blades of said cutter assemblies said second cutting means further including means for selectively moving said blades into cutting contact with said body.

**4,949,769**  
**LOG DELIVERY MECHANISM**  
Robert E. Cameron, P.O. Box 251, Warrenton, Oreg. 97146  
Filed Sep. 15, 1989, Ser. No. 407,668  
Int. Cl.<sup>5</sup> B27B 15/04, 31/00  
U.S. Cl. 144—245 A

16 Claims



1. A log delivery and positioning mechanism, comprising: an endless conveyor having an endless conveyor path including an ascending upper run, a plurality of spaced-apart log-engaging lugs which travel the endless conveyor path, and a power drive for stepping the lugs in position about the endless conveyor path, with each step positioning a new log-engaging lug in an uppermost position on the conveyor, wherein in use logs are delivered in succession onto the upper run, each immediately forwardly of a log-engaging lug, and the log-engaging lugs engage the logs and move them forwardly and upwardly as the log engaging-lugs move;

measurement means for measuring at least a diameter of each log as it travels along the upper run of the conveyor, prior to such log reaching said uppermost position on the conveyor, and producing a measurement signal; and positioning means responsive to the measurement signal for moving the conveyor horizontally and/or vertically as necessary after the measured log reaches said uppermost position on the conveyor, to move such log into a desirable pick-up position for that particular log.

**4,949,770**  
**BREAKER BELT STRUCTURE IN PNEUMATIC TIRES FOR VEHICLE WHEELS**

Ornella Polvara, and Alessandro Volpi, both of Milan, Italy, assignors to Pirelli Coordinamento Pneumatici S.p.A., Italy  
Filed Nov. 18, 1988, Ser. No. 273,418

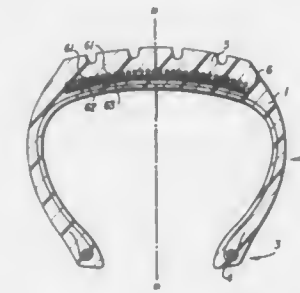
Claims priority, application Italy, Dec. 17, 1987, 23056 A/87  
Int. Cl.<sup>5</sup> B60C 9/18

U.S. Cl. 152—531

10 Claims

1. A pneumatic tire for vehicle wheels which comprises a radial carcass, a tread band provided with a raised pattern on its surface for coming into contact with the ground and situated on the carcass radial outer surface, sidewalls and the beads for anchorage of the tire on a wheel rim, and a breaker belt structure sandwiched between the tread band and the carcass, the tire being characterized in that said breaker belt structure comprises at least one strip of rubberized fabric with longitudinal reinforcing cords lying at an angle of substantially 0° with respect to the mid-circumferential plane of said tire, and at

least two layers of elastomeric material filled with aramide pulp oriented in each layer so as to lie at an angle with respect



to said mid-circumferential plane, the cords in one layer lying in an opposite sense with respect to the angle of the other layer.

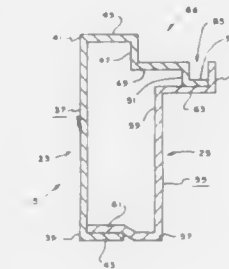
**4,949,771**  
**STEEL SECURITY DOOR FRAME**  
Fred A. Grisham, 4130 Bartlett Country Rd., Bartlett, Tenn. 38134, and C. Lynwood Grisham, 9016 Anderton Springs Dr., Memphis, Tenn. 38133

Continuation of Ser. No. 21,416, Mar. 4, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 365,223

Int. Cl.<sup>5</sup> A47H 1/00

U.S. Cl. 160—90

3 Claims



1. A steel security door frame for use with a fixed glass panel, a fixed screen panel, and a movable glass panel; said steel security door frame comprising:

- (a) an elongated steel horizontal top frame member;
- (b) an elongated steel horizontal bottom frame member;
- (c) an elongated steel vertical first side frame member; and
- (d) an elongated steel vertical second side frame member;

each of said frame members comprising a composition frame member having separate front and rear sections, said front section and rear section being manufactured separately and being attached to one another in a manner to form a guideway for slidably receiving said movable glass panel and for allowing said movable glass panel to be moved between open and closed positions; each of said front sections being bent from sheet steel to form a first panel having a first end and a second end, a second panel attached to said first end of said first panel at a right angle thereto and extending rearwardly thereof, a third panel attached to said second end of said first panel at a right angle thereto and extending rearwardly thereof and substantially parallel with said second panel, a fourth panel attached to said third panel at the end thereof opposite said first panel and extending at a right angle to said third panel in a direction toward said second panel, a fifth panel attached to said fourth panel at the end thereof opposite said third panel and extending at a right angle to said fourth panel in a direction rearwardly of said first panel, a sixth panel attached to said fifth panel at the end thereof opposite said fourth panel and extending at a right angle to said fifth panel in a direction toward said second panel,

and a seventh panel attached to said sixth panel at the end thereof opposite said fifth panel and extending at a right angle to said sixth panel in a direction rearwardly of said first panel; each of said rear sections being bent from sheet steel to form a first panel having a first end and a second end, a second panel attached to said first end of said first panel at a right angle thereto and extending forwardly thereof, a third panel attached to said second end of said first panel at a right angle thereto and extending rearwardly thereof and substantially parallel with said second panel, and a fourth panel attached to said third panel at the end thereof opposite said first panel and extending at a right angle to said third panel in a direction opposite said second panel; said second and seventh panels of said front section abutting and being fastened to said second and third panels, respectively, of said rear section, thereby forming said composition frame member.

**4,949,772**  
**ROLL-UP DOORS**

Jan Ballyns, Pickering, John C. Martin, and Paul H. Martin, both of Toronto, all of Canada, assignors to Diesel Equipment Limited, Toronto, Canada

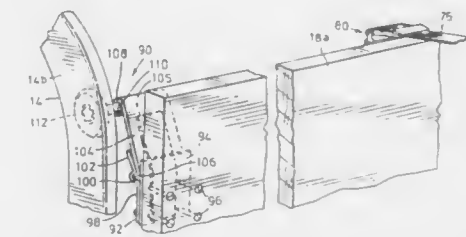
Division of Ser. No. 92,571, Sep. 2, 1987, Pat. No. 4,860,813.

This application Jul. 11, 1989, Ser. No. 378,158

Int. Cl.<sup>5</sup> E06B 3/92

U.S. Cl. 160—201

1 Claim



1. In an articulated roller mounted door of the type having a plurality of door panels hingedly connected to one another in an edge-to-edge relationship and in which a guide track is provided for guiding door mounting rollers as the door is moved from its open position to its closed position, the guide track having a first straight length extending in a first plane for locating the door in its open position and a second straight length extending in a second plane for locating the door in its closed position and a curved portion connecting the first length to the second length the door mounting rollers travelling around the curved section of the guide track during movement of the door between its open and closed positions, and in which the door has a trailing panel which is the last panel to be located in the second plane as the door is closed, and wherein the mounting rollers of the trailing panel which are located on the curved portion of the guide track and are rearwardly off-set to locate the trailing panel in the closed door plane, the improvement wherein:

the mounting rollers of the trailing panel are mounted on a bracket which is pivotally mounted on the trailing panel so as to pivot between a first position in which the mounting rollers are located closely adjacent the trailing panel and a second position in which the mounting rollers are spaced a substantial distance rearwardly of the trailing panel and biasing spring means mounted on the trailing panel and attached directly to the bracket so as to urge the mounting rollers of the trailing panel toward said first position such that when the door is in the open position the mounting rollers will be located in their first position and the trailing door panel will extend closely adjacent the first straight length of the guide track so as to minimize the clearance spaced required between the door and an adjacent wall when the door is in the open position.



4,949,773

PRODUCTION METHOD OF A MOLD FOR  
CONTINUOUS CASTING

Hirotohi Nomura, and Tokumi Ikeda, both of Osaka, Japan,  
assignors to Techno Research Kabushiki, Osaka, Japan  
Filed Aug. 11, 1989, Ser. No. 393,405  
Claims priority, application Japan, Sep. 9, 1988, 63-227240  
Int. Cl.<sup>5</sup> B22D 19/04

U.S. Cl. 164—91

2 Claims



1. A method of producing a mold for continuous casting comprising the steps of:  
providing cooling water paths in a surface of a mold water cooling mechanism;  
filling the cooling water paths with wax to form an uniform surface;  
depositing a copper or copper alloy stratum on said wax by electrolytic plating to unite said mold with said water cooling mechanism; and  
removing the wax from the water cooling path.

4,949,774

EXPENDABLE CAP DEVICE TO MINIMIZE DROSS  
INCLUSIONS IN THE VACUUM CASTING PROCESS

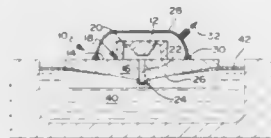
John R. Keough; William R. Keough, both of Birmingham, and  
Bela V. Kovacs, Bloomfield Hills, all of Mich., assignors to  
Atmosphere Group, Livonia, Mich.

Filed Mar. 27, 1989, Ser. No. 329,392

Int. Cl.<sup>5</sup> B22D 18/06

U.S. Cl. 164—256

28 Claims



1. A mold for casting workpieces, comprising:  
a closed mold assembly having a mold cavity therein, said mold assembly having an ingate extending from the mold cavity through the mold assembly, said ingate having a lower end extending below the bottom of the mold assembly with an opening for immersion in the bath of molten metal and an upper end terminating in the mold cavity, said lower end of the ingate having an outer wall of the ingate surrounding the portion of the ingate extending below the bottom, and said outer wall of the ingate having an upwardly and outwardly tapering shape; and  
an expendable cap of a size and shape sufficient to fit around the outer wall of the lower end of the ingate, said expendable cap being formed into a conical shape having a pointed tip, thereby providing an upwardly and out-

wardly tapering surface to urge the top layer of the molten metal in the bath away from the ingate opening during the immersion process to minimize impurity inclusion in the mold, said expendable cap being made from a non-contaminating, sacrificial material intended to melt a desired time after immersion in said melt without being detrimental to the quality of the workpiece being molded.

4,949,775

## DIE CASTING ARRANGEMENTS

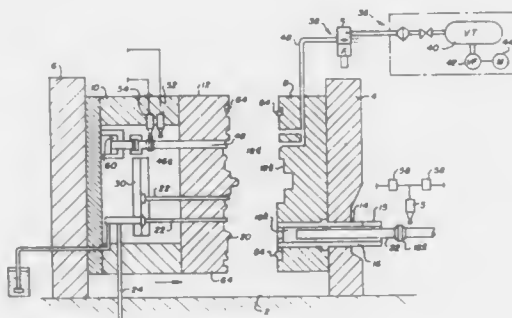
Fumitaka Takehisa, Anjo; Mitsuyoshi Yokoi, Takahama, and  
Fumio Kondoh, Nagoya, all of Japan, assignors to Nippon-  
denso Co., Ltd., Kariya, Japan  
Continuation of Ser. No. 310,002, Feb. 8, 1989, abandoned,  
which is a continuation of Ser. No. 178,316, Apr. 6, 1988,  
abandoned, which is a division of Ser. No. 947,207, Dec. 29,  
1986, Pat. No. 4,762,163. This application Sep. 7, 1989, Ser. No.  
404,070

Claims priority, application Japan, Dec. 27, 1985, 60-298396  
The portion of the term of this patent subsequent to Aug. 9, 2005,  
has been disclaimed.

Int. Cl.<sup>5</sup> B22D 17/10; B22C 3/00

U.S. Cl. 164—267

9 Claims



1. A die-casting apparatus comprising:  
a stationary mold;  
a movable mold contactable with said stationary mold to define therewith a mold cavity and a sprue, a high-temperature portion of said sprue being defined on a surface of one of said stationary mold and said movable mold, said high temperature portion of said sprue including at least a sprue core;  
an injection sleeve opening at one end to said mold cavity for introducing molten metal into said mold cavity;  
an injection plunger slidably disposed within said injection sleeve for injecting said molten metal into said mold cavity; and  
a nozzle for spraying a lubricant over said high-temperature portion of said sprue, said nozzle having a spraying path directed towards said surface defining said high-temperature portion of said sprue so that lubricant is sprayed onto said surface.

4,949,776

MOLTEN METAL POURING NOZZLE FOR  
CONTINUOUS CASTING MACHINE HAVING  
ENDLESS-TRAVELLING TYPE MOLD

Hideto Takasugi; Akichika Ozeki; Masami Komatsu; Masayuki  
Nakada, and Hisahiko Fukase, all of Tokyo, Japan, assignors  
to NKK Corporation and Ishikawajima-Harima Jukogyo  
Kabushiki Kaisha, both of Tokyo, Japan

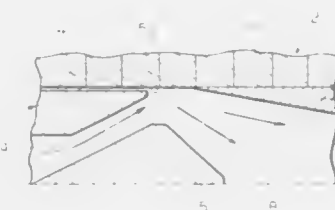
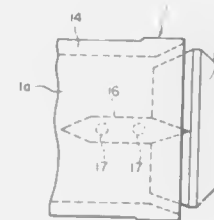
Filed Jun. 6, 1989, Ser. No. 362,023

Claims priority, application Japan, Jun. 21, 1988, 63-153014

Int. Cl.<sup>5</sup> B22D 11/06, 11/10

U.S. Cl. 164—437

5 Claims



1. A continuous casting machine comprising:  
an endless-travelling type mold including two pairs of opposing wall members endlessly travelling in the same direction and at the same speed;  
a pouring nozzle having one end which is connected to a tundish for receiving molten metal, and another end which is inserted into said mold;  
said pouring nozzle being made of a refractory material and comprising a nozzle body and a flow regulator;  
said nozzle body having a bore, through which molten metal flows, along an axial line thereof, in a downstream direction a sectional area of a downstream end portion of said bore of said nozzle body becoming gradually larger toward a downstream end thereof;  
said flow regulator being arranged at the center of the downstream end portion of said bore of said nozzle body, and said flow regulator forming, in cooperation with said bore, a path for molten metal, by which molten metal flowing through said bore impinges against an inner surface of said mold, near the downstream end of said nozzle body;  
the improvement wherein:  
said flow regulator (15, 18) has an upstream portion formed into a wedge shape, and at least part of said upstream portion of said flow regulator (15, 18) is arranged in said bore (1a, 3a) of said nozzle body (14, 20);  
the distance between the inner surface of said bore (1a, 3a) of said nozzle body (14, 20) and said upstream portion of said flow regulator (15, 18) is constant throughout the entire length of said path; and  
said flow regulator (15, 18) is secured in said bore (1a, 3a) of said nozzle body (14, 20) by means of a support (16, 19) made of a refractory material, said support being arranged in said bore (1a, 3a) of said nozzle body (14, 20).

4,949,777

PROCESS OF AND APPARATUS FOR CONTINUOUS  
CASTING WITH DETECTION OF POSSIBILITY OF  
BREAK OUT

Seiji Itoyama; Kichio Tada; Tsukasa Telashima; Shuji Tanaka;  
Hiromitsu Yamanaka; Takao Yunde; Hiroaki Iguchi, and  
Nagayasu Bessho, all of Chiba, Japan, assignors to Kawasaki  
Steel Corp.

Filed Sep. 29, 1988, Ser. No. 251,410

Claims priority, application Japan, Oct. 2, 1987, 62-248149;

Nov. 30, 1987, 62-299885

Int. Cl.<sup>5</sup> B22D 11/18, 11/20

U.S. Cl. 164—453

18 Claims



5. A process of continuous casting comprising the steps of:  
casting molten metal to one end of a continuous casting mold at a given controlled casting speed;  
drawing solidifying cast block from the other end of said continuous casting mold at a given drawing speed;  
measuring the temperature of a wall of said continuous casting mold at a plurality of temperature measuring points oriented in circumferential alignment with a given interval;  
deriving the rates of temperature change at respective temperature measuring points;  
deriving an average rate of temperature change based on the rates of temperature change of respective temperature measuring points;  
deriving a difference between the rate of temperature change at each temperature measuring point and said average rate of temperature change;  
comparing the derived difference with a predetermined threshold for detecting abnormal temperature change of each temperature measuring point;  
observing sequential distribution and propagation of abnormal temperature measuring points for detecting possibility of break out when predetermined pattern of sequential distribution and propagation of the abnormal temperature measuring points is detected; and  
controlling at least one of casting speed and drawing speed for preventing the cast block from causing break out.
13. A continuous casting apparatus for casting molten metal to one end of a continuous casting mold at a given controlled casting speed, and drawing solidifying cast block from the other end of said continuous casting mold at a given drawing speed, comprising:  
a plurality of temperature measuring devices, arranged in circumferential alignment on the wall of said casting mold, for measuring temperatures of the wall of said continuous casting mold at a plurality of temperature measuring points oriented in circumferential alignment with a given interval between them, each of said temperature measuring devices producing a temperature indicative signal indicate of the measured temperature at an associated temperature measuring point;  
first means for receiving said temperature indicative signals from said temperature measuring devices and deriving

rates of temperature change at said respective temperature measuring points to produce rate of temperature change data;

second means for receiving said rate of temperature change data from said first means and for deriving an average rate of temperature change based on the rates of temperature change of said respective temperature measuring points, said second means producing average rate of temperature change data;

third means for comparing said rate of temperature change data of respective temperature measuring points with said average rate of temperature change for deriving a difference between the rate of temperature change data at each temperature measuring point and said average rate of temperature change;

fourth means for comparing the derived difference with a predetermined threshold for detecting abnormal temperature changes of each temperature measuring point;

fifth means for observing sequential distribution and propagation of abnormal temperature measuring points for detecting possibility of break out when a predetermined pattern of sequential distribution and propagation of the abnormal temperature measuring points is detected; and

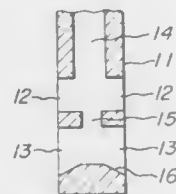
sixth means for controlling at least one of casting speed and drawing speed for preventing the cast block from causing break out.

4,949,778

**IMMERSION NOZZLE FOR CONTINUOUS CASTING**  
Kenji Saito; Tsutomu Nozaki, both of Chiba; Yukio Oguchi, Aki; Kenichi Sorimachi, Kurashiki; Hakaru Nakato, Chiba; Haruji Okuda, Kurashiki; Koji Hosotani, Chiba; Katsuo Kinoshita, Tokyo, and Kenji Murata, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe City, Japan  
Filed Dec. 13, 1988, Ser. No. 283,789  
Claims priority, application Japan, Dec. 16, 1987, 62-316144; Dec. 28, 1987, 62-329744; Dec. 28, 1987, 197265  
Int. Cl.<sup>5</sup> B22D 11/00

U.S. Cl. 164—468

6 Claims



1. An immersion nozzle having a molten steel passage for continuous casting, characterized in that at least one portion of reduced sectional area of passage for molten metal is formed in said immersion nozzle near to the bottom of the nozzle and plural discharge ports symmetrically arranged with respect to a longitudinal axis of the nozzle are arranged above and below said one portion in the longitudinal direction of the nozzle, wherein a total sectional area of said discharge ports is not less than twice the sectional area of said molten steel passage.

4,949,779

**REGULATING HEATER DISCHARGE AIR TEMPERATURE FOR FRONT AND REAR PASSENGERS IN A VEHICLE**

Andrew A. Kenny, Roselle; Thomas F. Glennon, Darien; Rudolph J. Franz, Schaumburg, and Dennis DeVera, Carol Stream, all of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 1, 1990, Ser. No. 473,141  
Int. Cl.<sup>5</sup> F25B 29/00; B60H 1/02

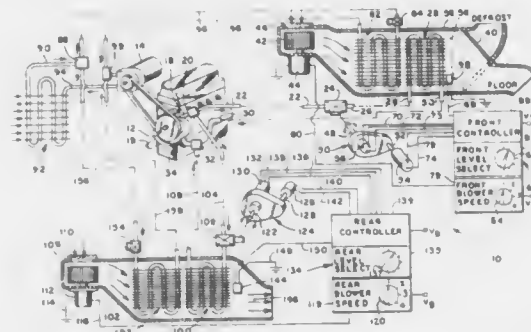
U.S. Cl. 165—2

18 Claims

17. A method of controlling the temperature of air dis-

charged into a vehicle passenger compartment comprising the steps of:

- providing a heat exchanger and flowing heated fluid therethrough;
- blowing a stream of air over said heat exchanger and directing the discharge therefrom into the vehicle passenger compartment;
- sensing the temperature of the air discharge from the heat exchanger into the passenger compartment and providing an electrical temperature signal indicative of the sensed temperature;



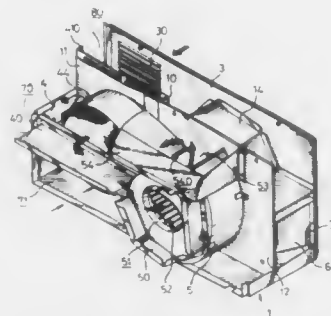
- providing a valve having a movable member for controlling the flow of heated fluid through said heat exchanger and providing an electrical indication of the position of said valve member;
- providing an electrical reference signal indicative of a user desired relative change in said discharge air temperature; and
- summing only said electrical reference signal, said temperature signal and said electrical indication of said valve position and moving said valve member until said sum is zero for regulating the temperature of said discharge air from said heat exchanger.

4,949,780

**AIR CIRCULATING APPARATUS**  
Jui-Chin Chen, Taichung, Taiwan, assignor to Rexon Industrial Corp. Ltd., Taichung Hsien, Taiwan  
Filed Jan. 12, 1990, Ser. No. 464,153  
Int. Cl.<sup>5</sup> F28D 17/00

U.S. Cl. 165—7

4 Claims



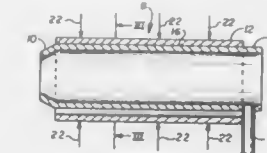
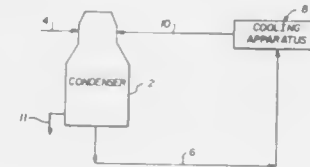
1. An air circulating apparatus comprising a housing being separated into a front room and a rear room; said front room being separated into an upper compartment and a lower compartment, said rear room being separated into an upper chamber and a lower chamber; a front cap with a first inlet opening and a first outlet opening being disposed on a front end of said housing, a rear cap with a second inlet opening and a second outlet opening being disposed on a rear end of said housing; a heat exchanging wheel being rotatably disposed in one side of

said housing between said front room and said rear room, an upper portion of said heat exchanging wheel communicating said upper compartment with said upper chamber, a lower portion of said heat exchanging wheel communicating said lower compartment with said lower chamber; an induced draft fan being disposed in a first casing which is provided in an other side of said housing and located substantially in said upper compartment; an exhaust fan being disposed in a second casing which is provided substantially in said lower chamber; a guide plate being disposed in said front room above said upper compartment in order to communicate a third outlet opening of said first casing with said first outlet opening of said front cap; a fourth outlet opening of said second casing being communicated with said second outlet opening of said rear cap; a first motor being coupled to an axle of said heat exchanging wheel for operating said heat exchanging wheel; a second motor being coupled to said induced draft fan and to said exhaust fan; air in front of said front cap being drawn through said first inlet opening of said front cap and said lower portion of said heat exchanging wheel by said induced draft fan, and flowing out from said second outlet opening of said rear cap; and air behind said rear cap being drawn through said second inlet opening of said rear cap and said upper portion of said heat exchanging wheel by said induced draft fan and flowing out from said first outlet of said front cap.

4,949,781

**COOLING APPARATUS**  
Jan S. Porowski, Pittsburgh, Pa., assignor to SMC O'Donnell Inc., Pittsburgh, Pa.  
Filed Mar. 20, 1989, Ser. No. 326,010  
Int. Cl.<sup>5</sup> F28D 7/10; F28F 11/00  
U.S. Cl. 165—11.1

3 Claims



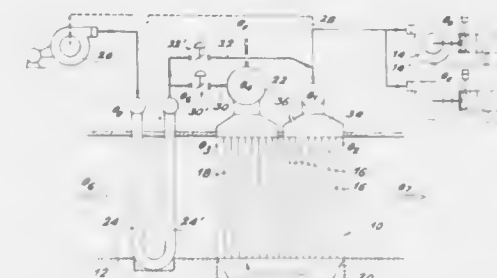
1. A cooling apparatus comprising a first elongated metal tube having a constant diameter, a second elongated metal tube having a constant diameter longitudinally disposed within said first elongated metal tube and having a substantial portion of its outer surface out of contact with the inner surface of said first elongated metal tube, the maximum distance between a point on the inner surface of said first elongated metal tube and the closest adjacent point on the outer surface of said second elongated metal tube being in the range of about 0.01 to about 2.0 percent of the inner diameter of said first elongated metal tube, said second longitudinal inner metal tube adapted to provide passage therethrough of a hot fluid, and means for cooling the outer surface of said first elongated metal tube comprising apparatus for spraying a cooling fluid onto the outer surface of said first elongated metal tube, whereby at ambient temperatures the tubes can be easily separated for inspection and at operating temperatures the tubes are substantially in contact with each other.

4,949,782

**AIR HEATER FOR CORROSIVE ATMOSPHERES**  
Yves Brand, Maurepas, France, assignor to Stein Heurtey, Evry Cedex, France  
Filed Mar. 24, 1989, Ser. No. 328,291  
Claims priority, application France, Apr. 5, 1988, 88 04445  
Int. Cl.<sup>5</sup> F28F 19/00

U.S. Cl. 165—34

7 Claims



1. An air heater resisting corrosion, using combustion products from thermal equipment, said combustion products being corrosive fumes containing polluting and corrosive agents such as sulfur oxidized components and sodium and vanadium salts, said air heater including at least one heater tubular nest through which flows the air to be heated, which is placed in the path of travel of the corrosive fumes prior to their discharge to the atmosphere, said corrosive fumes flowing counter-current to the air to be heated and flowing through the tubes, said air heater further comprising a protective tubular nest placed upstream of said heater tubular nest, this protective nest being fed with a constant flow of cold air circulating in the same direction as the fumes, this cold air flow and the exchange surface of said protective nest being chosen in such manner that the temperature of the first tubes of the heater tubular nest is at all times below the sodium and vanadium corrosion critical temperature, and means are provided wherein the constant air flow exiting from said protective nest is thereafter redistributed at the inlet or at the outlet of the heater tubular nest, as a function of the operating conditions, so that the temperature of the skin of the tubes of the heater tubular nest is always slightly above the acid dew point temperature of the fumes.

4,949,783

**SUBSTRATE TRANSPORT AND COOLING APPARATUS AND METHOD FOR SAME**

Emmanuel N. Lakios, Port Jefferson Station, and Michael F. McGraw, East Setauket, both of N.Y., assignors to Veeco Instruments, Inc., Melville, N.Y.

Filed May 18, 1988, Ser. No. 195,707  
Int. Cl.<sup>5</sup> F28F 13/02; C23C 14/50

U.S. Cl. 165—80.1

6 Claims

1. A method for cooling a wafer-like article in a vacuum chamber, comprising the steps of:  
pressing the article to a cooling seat  
flowing gas under pressure into and through a region between the article and the seat to facilitate heat transfer from the article by forced convection; wherein the gas pressure in said region is high enough to facilitate heat

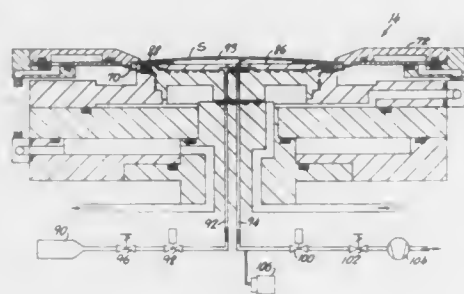


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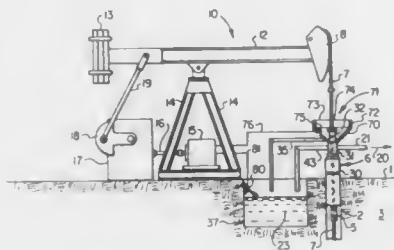
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transfer from the article to the seat by free convection; and



cooling the article by solid-to-solid conduction between the article and the cooling clamp, wherein the cooling clamp is cooled by circulating cooling fluid.

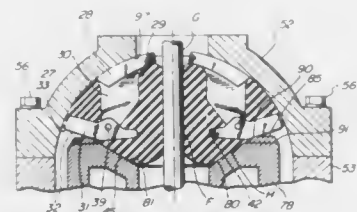
**4,949,784**  
**WELLHEAD LEAK CONTAINMENT**  
Vlanton R. Evans, Crane, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.  
Filed Dec. 15, 1989, Ser. No. 450,987  
Int. Cl.<sup>5</sup> E21B 33/08  
U.S. Cl. 166—81 14 Claims



1. In apparatus for producing fluid from a wellbore in the earth wherein said wellbore is capped at the surface of the earth with a wellhead, said wellhead being adapted for use with a reciprocating downhole rod pump which is carried by a sucker-rod string that extends from said downhole pump through said wellhead and connects with a reciprocating pumping unit on the earth's surface, said pumping unit being operated by a power plant means, the improvement comprising a catch basin carried by said wellhead in the vicinity where said sucker-rod string exits from said wellhead, said basin being located so that liquid leaking from said wellhead flows down said wellhead into said catch basin, a sump means spaced from said wellhead and adapted to hold liquid of the type produced from said wellbore, at least a portion of the interior of said sump means being available for visual inspection from the earth's surface, first conduit means in open communication between a lower portion of said catch basin and said sump means for draining liquid from said catch basin into said sump means, and second conduit means carrying first valve means and being in communication between said wellhead and said sump means, said second conduit means being in communication with that portion of said wellhead through which flows liquid being produced from said wellbore so that upon opening said first valve means at least a portion of said liquid in said wellhead flows from said wellhead through said second conduit means and into said sump means.

**4,949,785**  
**FORCE-LIMITING/WEAR COMPENSATING ANNULAR SEALING ELEMENT FOR BLOWOUT PREVENTERS**  
Joseph O. Beard, 1025 N. Lincoln Ave., Fullerton, Calif. 92631; Stanley W. Granger, 23800 Gold Nugget, Diamond Bar, Calif. 91765, and Frode Sveen, 12697 Orgren Ave., Chino, Calif. 91710

Filed May 2, 1989, Ser. No. 346,415  
Int. Cl.<sup>5</sup> E21B 33/06  
U.S. Cl. 166—84 13 Claims



1. An improved annular sealing member for oil well blowout preventers of the type having a housing including an entrance bore, a coaxially aligned exit bore, and a generally circular symmetric curved hollow interior cavity coaxial with and communicating with said entrance and exit bores, said housing being adapted to receive drill string components coaxially through said entrance and exit bores said housing being adapted to contain a generally lenticular-shaped sealing member having a generally flat lower surface, a convex upper surface, and a hollow central bore, said housing having an actuator piston coaxial with the center line of said housing and movable axially therewithin, said piston having a hollow central coaxial bore and said piston having in its upper face an upper annular area beveled downwards and inwards towards the longitudinal center line of said piston, said upper annular area of said piston being of the proper shape to slidably engage said lower surface of said sealing member, thereby moving said sealing member longitudinally and radially within said curved hollow interior cavity into sealing circumferential contact with the circumferential surface of said drill string components, or the inner facing radial surfaces of said sealing member; said improved sealing member comprising a generally circularly symmetric lenticular-shaped body having a generally annular-shaped base, a convexly curved upper wall surface, and a cylindrical bore of substantial diameter extending coaxially through the entire body, said body comprising a matrix of resilient material holding a plurality of imbedded metal segments spaced at regular circumferential angles around the bore at equal radial distances therefrom, each of said segments comprising:

- a. an upper section with a tooth-like upper plate section having a convexly curved upper, outer surface coextensive with the convexly curved upper, outer wall surface of said lenticular body, said upper plate section having a supporting web extending perpendicularly downwards from the lower surface of said upper plate, centered on the vertical mid-plane of said upper plate, and
- b. a generally wedge-shaped base plate, said base plate having in plan view the shape of a truncated sector of a circle similar in shape to said upper plate, with a generally

straight front, truncated, transverse surface and a generally curved rear transverse face, said base plate having a convexly curved lower surface, and said base plate including pivot means for pivotably supporting the lower end of said web of said upper section, thereby permitting pivotable motion in a vertical plane of said upper section relative to said base plate, said pivot means comprising a horizontally disposed pivot pin attached to said base plate so as to be positioned above the upper surface of said base plate, perpendicular to the longitudinal medial plane of said base plate, said pivot pin passing through the lower end of said web of said upper section of said segment, and said pivot pin being located nearer to the front transverse wall surface of said base plate than to the rear transverse wall surface, thus partitioning said base plate into a relatively short, front toe section and a relatively longer rear heel section.

**4,949,786**  
**EMERGENCY CASING HANGER**  
Lawrence A. Eckert, Houston, Tex.; Graeme Johnston, Aberdeen, Scotland, and Peter M. Kent, Scotland, United Kingdom, assignors to Vecto Gray Inc., Houston, Tex.  
Filed Apr. 7, 1989, Ser. No. 335,996  
Int. Cl.<sup>5</sup> E21B 23/00, 33/04  
U.S. Cl. 166—208 6 Claims

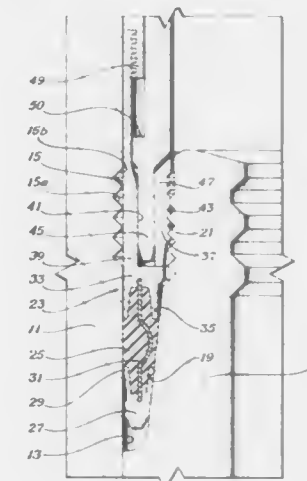


1. An apparatus for supporting a string of casing within a conduit which has a landing shoulder, comprising in combination:

- a slip body having an exterior shoulder for landing on the landing shoulder, the slip body having at least one inner frusto-conical bowl which is adapted to encircle the casing and which has a longitudinal axis;
- slip means carried on the bowl for gripping the casing, the slip means including a plurality of slips, each of the slips having an inner face containing grooves, each of the slips having an upper end located in a plane perpendicular to the axis of the body, each of the slips being movable from an upper retracted position in which the inner face is spaced from the casing to a lower engaged position in which the slip grips the casing;
- the body having a tubular upper portion extending upward from the bowl, the upper portion having interior threads; an energizing ring threaded to the interior threads of the upper portion of the slip body and having a lower end which is in a plane perpendicular to the axis of the body and which engages the upper end of each of the slips;
- means for moving the energizing ring downward relative to the slip body by rotating the energizing ring relative to the slip body to move the slips to the engaged position;
- means for preventing the slips from moving downward on the slip bowl under the force of gravity and other than by movement of the energizing ring, to assure that each of

the slips moves in unison with the other slips as it moves downward, to center the casing in the conduit; and packoff means located above the energizing ring for sealing the casing to the conduit.

**4,949,787**  
**CASING HANGER SEAL LOCKING MECHANISM**  
Norman Brammer, Scotland, United Kingdom, and Philippe C. Nobileau, Ladefense, France, assignors to Vetco Gray Inc., Houston, Tex.  
Filed Apr. 7, 1989, Ser. No. 336,012  
Int. Cl.<sup>5</sup> E21B 23/00, 33/04  
U.S. Cl. 166—208 7 Claims



1. In a well having a wellhead housing with a bore there-through for supporting a casing hanger, the casing hanger having an exterior wall surface spaced inward from an interior wall surface in the bore, an improved means for sealing the wall surfaces between the casing hanger and the wellhead housing, comprising in combination:

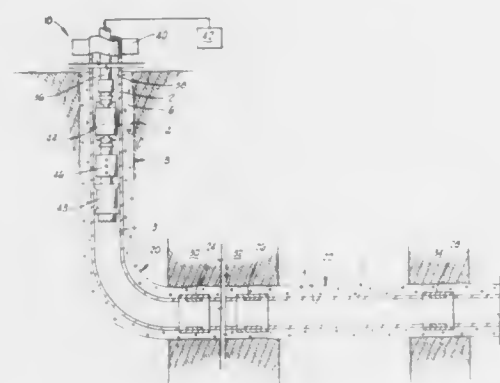
- a plurality of serrations formed on one of the wall surfaces, each of the serrations having an inclined downward facing flank;
- a seal member, having a seal section which is compressed between the wall surfaces below the serrations;
- a locking section on the seal member located directly above the seal section, the locking section having inner and outer cylindrical walls radially separated from each other;
- a plurality of serrations formed on one of the cylindrical walls of the locking section, each of the serrations on the locking section having an inclined upward facing flank; and
- means including an energizing ring for downward movement between the walls of the locking section to urge the walls of the locking section apart, causing at least some of the upward facing flanks to engage at least some of the downward facing flanks to lock the seal member in place.

**4,949,788**  
**WELL COMPLETIONS USING CASING VALVES**  
David D. Szarka; Bob L. Sullaway; John T. Brandell, and Steven L. Schwegman, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.  
Filed Nov. 8, 1989, Ser. No. 435,303  
Int. Cl.<sup>5</sup> E21B 33/13, 34/14  
U.S. Cl. 166—285 29 Claims

1. A method of completing a well, comprising:

- (a) cementing a casing string in place in a borehole, said casing string including a casing valve, said casing valve including an outer housing with a plurality of housing

- ports defined through a wall thereof and a sliding sleeve received in said housing, said sleeve initially being in a closed position covering said housing ports, said housing ports initially being blocked by disintegratable plugs;
- running a jetting tool assembly into said casing string on a tubing string;
  - sliding said sliding sleeve with said jetting tool assembly to an open position wherein said each of said housing ports is uncovered; and
  - hydraulically jetting said disintegratable plugs from said housing ports to communicate a subsurface formation adjacent said casing valve with an interior of said casing string.
25. A method of completing a well having a substantially non-vertical well portion, comprising:
- cementing a casing string in place in said well, said casing



- string including a plurality of casing valves located in said non-vertical well portion;
- drilling out residual cement from said casing string;
  - one at a time, for each of said casing valves:
    - hydraulically jetting said casing valve while it is in a closed position to remove any further residual cement therefrom;
    - opening the casing valve to communicate a subsurface formation adjacent thereto with an interior of said casing string; and
    - reclosing said casing valve;
  - backwashing said casing string by reverse circulating down a well annulus between a tubing string and said casing string and back up through said tubing string;
  - reopening at least one of said casing valves; and
  - producing well fluid through said one reopened casing valve up through a production tubing string.

4,949,789

#### PRESSURE RELIEF SYSTEM FOR DOWN HOLE CHEMICAL CUTTERS

Louis D. Lafitte, Houma, La., assignor to Leon A. Robichaux, Houma, La., a part interest

Continuation-in-part of Ser. No. 92,087, Sep. 1, 1987, Pat. No. 4,819,728. This application Apr. 10, 1989, Ser. No. 335,684

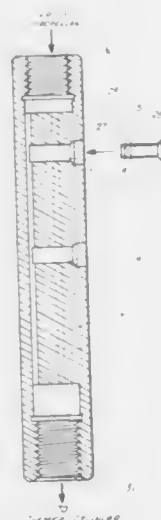
Int. Cl.<sup>5</sup> E21B 29/02

U.S. Cl. 166—298

5 Claims

5. A method for cutting an object within an earth bore in a desired application area, said method comprising the following steps:
- implementing a downhole chemical cutter comprising:
    - suspension means for suspending the apparatus within the earth bore;
    - gas generation means for generating gas under pressure when ignited;
    - firing means associated with said generation means for ignition of said gas generation means for generating the gas under pressure;
    - a chamber, and movable anchor means in said chamber

- associated with and activated by pressure produced by said gas generation means for maintaining the apparatus in a substantially axial position in relation to the earth bore during the cutting operation;
- chemical releasing means for releasing a chemical cutting agent contained within the apparatus to the earth bore; and
  - discharge means for discharging a chemical cutting agent utilizing said gas generation means via said releasing means to the desired application area;
- providing means of pressure relief in the form of a pressure relief port in the side of a pressure relief subassembly located intermediate said gas generation means and said suspension



means, sized and situated to avoid any significant interference with the normal operation of said chemical cutter but being effective in automatically releasing the high internal pressure which otherwise would exist and could cause the tool to become stuck down in the hole without the pressure relief port and further including chemical discharge means, said discharge means including an elongated body having a cylindrical interior located intermediate said gas generation means and said discharge means, a piston having a diameter slightly less than the interior of said elongated body, said piston configured to slidably engage said cylindrical interior of said elongated body, pressure communication means to communicate said pressure associated with said gas gener-

- ation means with said piston, fluid containment means for containing said chemical cutting agent, said method further including the following steps:
- lowering the chemical cutter into the hole to the designated area to be cut;
  - firing said gas generation means;
  - allowing the increased pressure associated with said gas generation means to move said anchor means into anchoring position;
  - allowing the increased pressure to communicate with said piston of said discharge means, forcing said piston to slidably engage the interior of said elongated body, forcing any cutting agent within said elongated body to be forced out of said body; and
  - allowing said pressure to communicate with said pressure relief subassembly, allowing said pressure to vent from said pressure relief port in controlled manner and to continue to vent until all of the increased pressure associated with the gas generation means is vented.

4,949,790

#### COMPOSITIONS AND METHOD FOR CONTROLLING PRECIPITATION WHEN ACIDIZING SOUR WELLS

Walter R. Dill, and Michael L. Walker, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 177,743, Apr. 5, 1988, Pat. No. 4,888,121.

This application Mar. 7, 1989, Ser. No. 320,655

Int. Cl.<sup>5</sup> E21B 37/00, 43/27

U.S. Cl. 166—307

7 Claims

1. A method of treating a sour well penetrating a subterranean formation comprising:

introducing into said well a treating fluid comprising an acid solution having a pH below 1.9, an iron sequestering agent comprising at least one compound selected from the group consisting of aminopolycarboxylic acids, hydroxycarboxylic acids, cyclic polyethers and derivatives of said acids and ethers, present in an amount of from about 0.25 to about 5 percent by weight of the acid solution, and a sulfide modifier comprising at least one compound selected from the group consisting of an aldehyde, acetal, hemiacetal and any other compound capable of forming aldehydes in the acid solution, present in an amount of from about 0.25 to about 5 percent of the acid solution; and

treating said subterranean formation with said treating fluid whereby said fluid spends to a pH above about 1.9 while substantially preventing precipitation of ferrous hydroxide, ferrous sulfide and free sulfur within said formation from said spent acid solution.

4,949,791

#### METHOD AND APPARATUS FOR SECURING AND RELEASING CONTINUOUS TUBING IN A SUBTERRANEAN WELL

Mark E. Hopmann, Broken Arrow; Douglas J. Murray, and Scott C. Strattan, both of Tulsa, all of Okla., assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Feb. 9, 1989, Ser. No. 308,887

Int. Cl.<sup>5</sup> E21B 19/16, 19/22

U.S. Cl. 166—378

23 Claims

1. Apparatus for securing onto one end of a continuous length of remedial tubing introduceable into a subterranean well and concentrically insertable through production tubing previously positioned within said well, said remedial tubing having a pre-determined tensile strength, said apparatus comprising:

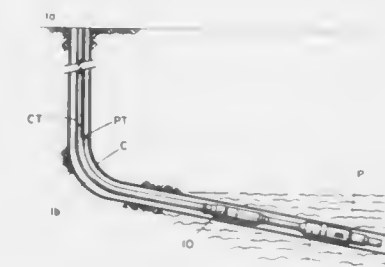
- inner and outer cylindrical housing members having an opening therethrough for receipt of said one end of said remedial tubing therebetween;
- a first element of one of said housings having a first tapered surface therein, said first tapered surface decreas-

- ing in internal diameter from a first end away from said opening to a second end toward said opening; and
- gripping means housed within said surface and having a second tapered surface in companion contoured relationship with said first tapered surface for engagement actuation relative to said remedial tubing and movable along said first tapered surface whereby tensile load applied through the remedial tubing and the decrease of the diameter of said first and second tapered surface will urge said gripping means into further radially axial engagement with said remedial tubing, said housings and said gripping means having a tensile strength in excess of the tensile strength of the remedial tubing.

8. A method of completing a wellbore having a deviated configuration including an entry portion communicating with a curved portion extending downwardly in the well from said entry portion and a generally linear end portion traversable with a production formation, comprising the steps of:

- affixing onto one end of a continuous length of remedial tubing introduceable into said wellbore and concentrically insertable through said production tubing previously positioned within said well through an entry portion communicating with said curved portion extending downwardly in the well, a securement apparatus comprising:

- inner and outer cylindrical housing members having an



opening therethrough for receipt of said one end of said remedial tubing therebetween;

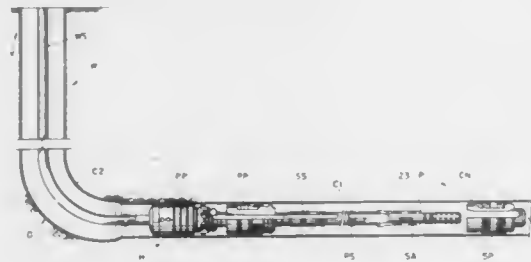
- a first element of one of said housings having a first tapered surface therein, said first tapered surface decreasing in internal diameter from a first end away from said opening to a second end toward said opening; and
  - gripping means housed within said surface and having a second tapered surface in companion contoured relationship with said first tapered surface for engagement with said remedial tubing and movable along said first tapered surface whereby tensile load applied through the remedial tubing and the decrease of the diameter of said first and second tapered surface will urge said gripping means into further radially axial engagement with said remedial tubing, said housings and said gripping means having a tensile strength in excess of the tensile strength of the remedial tubing;
- causing a tensile load to be applied through the remedial tubing to urge said gripping means into gripping engagement with said one end of the continuous length of remedial tubing; and
  - running the aforementioned continuous length of remedial tubing with said securement apparatus affixed thereon into the wellbore and manipulating the conduit to facilitate passage of the conduit through the curved portion of the wellbore.



**4,949,792**  
**PACKER ASSEMBLY AND MEANS FOR ACTIVATING SAME ONLY IN SMALLER DIAMETER WELL CONDUIT**  
 Richard P. Rubbo, and Alfred R. Curington, both of The Woodlands, Tex., assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Apr. 28, 1989, Ser. No. 345,206  
 Int. Cl. E21B 23/06, 33/128  
 U.S. Cl. 166—382

28 Claims



1. A packer assembly for use in a subterranean well and settable in said well only by longitudinal manipulation of a tubular workstring, comprising:

- (1) an outer housing;
- (2) a seal assembly and anchoring means carried by said housing in initial retracted position and movable to expanded position for engagement along the inner wall of a tubular conduit disposed within said well;
- (3) a longitudinally extending control mandrel telescopically movable within said housing, at least one of said housing and said control mandrel operably extending from said workstring;
- (4) orienting and setting pins carried on one of said housing and said control mandrel;
- (5) orienting slot means having a first length and running slot means having a second length shorter than said first length, each of the slot means being defined on the other of said housing and said control mandrel for receipt of said orienting and setting pins, respectively; and
- (6) means for manipulating said housing relative to said mandrel to a first position to orient said pins and said slot means whereby said orienting pins are within said running slot means and said setting pins are within said orienting slot means to place said seal assembly and said anchoring means in retracted position, and to a second position whereby said orienting and setting pins are within said orienting slot means to place said seal assembly and said anchoring means in expanded position.

**4,949,793**  
**METHOD AND APPARATUS FOR COMPLETION OF A WELL**

Richard P. Rubbo, The Woodlands; F. T. Tilton, Spring; A. A. Mullins, Humble; Daniel S. Bangert, Kingwood; Forrest Howard, Houston, all of Tex.; Scott Carpenter, New Orleans, La., and Alfred R. Curington, The Woodlands, Tex., assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Apr. 28, 1989, Ser. No. 345,347  
 Int. Cl. E21B 23/00, 33/124, 43/11  
 U.S. Cl. 166—382

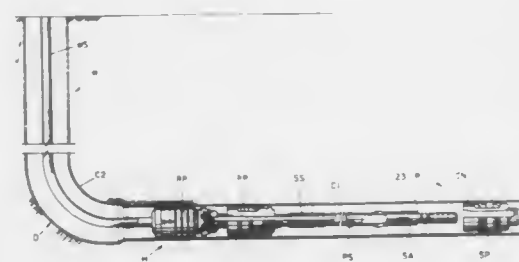
7 Claims

1. An apparatus for completion of a horizontal section of a subterranean well, comprising:

- (1) a first packer assembly settable in said well only by longitudinal manipulation of a tubular work string, said first packer assembly comprising:
  - (a) an outer housing;
  - (b) a seal assembly and anchoring means carried by said housing in initial retracted position and movable to expanded position for engagement along the inner wall of a tubular conduit disposed within said well;
  - (c) a longitudinally extending control mandrel telescopically

cally movable within said housing, at least one of said housing and said control mandrel operably extending from said work string;

- (d) orienting and setting pins carried on one of said housing and said control mandrel;
  - (e) orienting slot means having a first length and running slot means having a second length shorter than said first length, each of the slot means being defined on the other of said housing and said control mandrel for receipt of said orienting and setting pins, respectively; and
  - (f) means for manipulating said housing relative to said mandrel to a first position to orient said pins and said slot means whereby said orienting pins are within said running slot means and said setting pins are within said orienting slot means to place said seal assembly and said anchoring means in retracted position, and to a second position whereby said orienting and setting pins are within said orienting slot means to place said seal assembly and said anchoring means in expanded position;
- (2) a second packer assembly settable by application of hydraulic pressure through said work string, said second packer comprising:
- (a) a tubular housing;
  - (b) a seal assembly disposed around said housing and carried in said well in initially retracted position and activatable into expanded position within said well to sealing securement relative to the inner wall of said tubular conduit;
  - (c) anchoring means for securing said second packer in position within said tubular conduit and activatable to



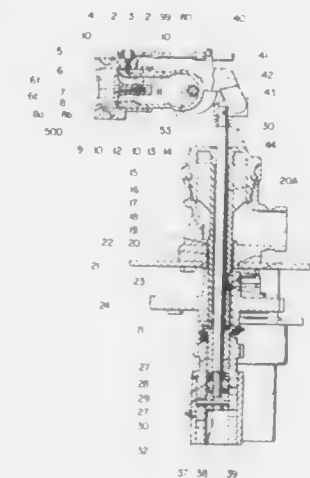
securing condition to resist movement of said second packer relative to said tubular conduit in at least one direction;

- (d) first and second cylindrical members of said tubular housing movable in a first direction to actuate one of said seal assembly and said anchoring means into engagement with said tubular conduit; and
- (e) primary and secondary piston means carried within said cylindrical members and tandemly arranged for movement in a second direction to activate the other of said seal assembly and said anchoring means and responsive to pressure introduced through said work string for said actuation, each of said piston means being selectively secured against longitudinal movement relative to said housing and selectively secured against longitudinal movement relative to each other, said primary piston being released relative to said housing upon application of hydraulic pressure across one of said piston means prior to release of said secondary piston relative to said housing whereby upon release of said piston means relative to said housing, said piston means and said cylinder members are movable to actuate said seal assembly to expanded position and said anchoring means to securing condition;
- (3) a perforating gun cariable into said well on and in communication with said work string;
- (4) means for telescopically retracting said perforating gun, comprising:
  - (a) a cylindrical housing cariable into said well on said work string;

- (b) a first chamber within said housing and containing a body of fluid;
  - (c) telescoping piston means selectively releasably locked relative to said housing;
  - (d) a second chamber in selective fluid flow communication with said first chamber;
  - (e) means securing the perforating gun relative to said piston means within said well;
  - (f) means for communicating well pressure to said piston means upon firing of said perforating gun; and
  - (g) means for selectively transferring said body of fluid from said first chamber to said second chamber, whereby during such transferring, said gun is telescopically retracted relative to said housing; and
- (5) a locator mandrel cariable in said well on said workstring at the lowermost end of said apparatus, said mandrel having an exterior sealing surface thereon for selective sealing engagement with a seal receptacle assembly positioned in said well below a production zone, whereby subsequent to firing of said perforating gun and retraction of said gun by said means for telescopically retracting said gun, said workstring may be longitudinally manipulated to sealingly position said locator mandrel relative to said seal receptacle assembly.

**4,949,794**  
**REMOTELY CONTROLLED FIREFIGHTING APPARATUS AND CONTROL MEANS**  
 Kevin J. Petit; Eugene E. Dettra, both of Wooster; Richard L. Beery, Shreve, and Jeffrey T. Orin, Canton, all of Ohio, assignors to Premier Industrial Corporation, Cleveland, Ohio  
 Filed May 31, 1988, Ser. No. 200,572  
 Int. Cl. A62C 37/00, 37/08; B05B 15/08  
 U.S. Cl. 169—52

2 Claims



2. A remotely controlled firefighting apparatus which includes a fluid discharge device comprising nozzle means disposed for horizontal and vertical positioning and movement and for variation of discharge stream flow for said fluid, and control apparatus for converting control input into controlling output which directs movement of said fluid discharge device about at least two, perpendicularly disposed axes, wherein:

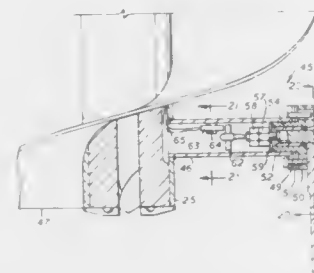
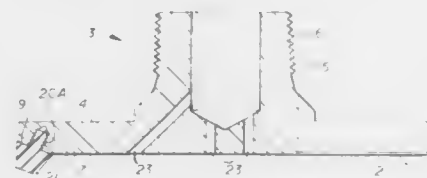
- A. said control apparatus is comprised of the control means of claim 1;
- B. said controlled firefighting apparatus is further comprised of:
  - a. vertically disposed, vertical movement drive transfer means, one end being connected to and driven by said second electrically controlled drive motor means through unitary cam groove and spur gear means, which convert said drive motor rotation into substantially linear movement of said transfer means, the opposite end of which is disposed to contact said nozzle

means, whereby said movement of said vertical movement drive transfer means varies the vertical positioning and movement of said nozzle means;

- b. longitudinally axially extending guide bearing means in which said vertical movement drive transfer means is journaled, said bearing means comprising a substantially annular cylindrical sleeve formed from a flat strip, the opposing longitudinal surfaces of said strip having an angular edge, whereby said bearing allows for expansion and contraction through movement of said opposing longitudinal surfaces;
  - c. spring washer means, disposed about the upper and lower ends of said vertical movement drive transfer means, whereby yieldable stop capability is provided, through interaction with said second controlled apparatus position determining means, said yieldable stops providing current buildup through said position determining means for said control apparatus to sense and react to, thereby avoiding mechanical damage; and
  - d. elastomeric stop means, disposed to provide a stop to horizontal movement of said nozzle means, whereby yieldable stop capability is provided, through interaction with said first controlled apparatus position determining means, said yieldable stop providing current build up through said position determining means for said control apparatus to sense and react to, thereby avoiding mechanical damage; and
- C. said nozzle means is further comprised of:
- a. an outer retainer ring, fixedly attached to nozzle sleeve means, said ring having a substantially cylindrical bore therethrough, said bore having a longitudinal axis, an inner face disposed perpendicularly to the axis of said bore, a concave outerface, and an inner part and an outer portion disposed closest to said outerface, wherein said outer portion of said bore communicating with said outer face is substantially frustoconical in shape, said frustoconical outer portion of said bore further comprising a first and a second portion therein, the first portion of said frustoconical outer portion is disposed closest to said outer face and forms a shallower or smaller angle taken with respect to the axis of said bore than the second portion of said frustoconical outer portion, wherein said second portion of said frustoconical outer portion is disposed axially away from said outer face;
  - b. a substantially cylindrical nozzle body, having an outwardly directed portion with a substantially cylindrical bore disposed in said body through said outwardly directed portion, and having an outer face, said bore having a longitudinal axis, an inner portion and an outer portion, said nozzle sleeve means being disposed radially outwardly from the outermost surface of said nozzle body and in sliding, telescopic engagement therewith, whereby said sleeve means may be displaced axially with respect to said nozzle body and bore; a support web disposed in said substantially cylindrical bore proximate to said outer face of said bore; and a baffle fixed to said support web, and disposed within said bore, said baffle being generally T-shaped in cross-section and consisting of a cylindrical, inwardly projecting portion, which has an inner most and an outermost end, which flares outwardly at its said outermost end into a coaxially aligned disc portion, said disc portion and the outer portion of said bore being disposed to form an annular throat passage, through which fluid flows in exiting said nozzle body, wherein the inner surface of said bore is configured so as to shape the fluid flow stream as it passes therethrough prior to its passage through said annular throat passage; and
  - c. rotatable turbine means, coaxially disposed to rotate about the longitudinal axis of said substantially cylindrical bore in said nozzle body, mounted upon said nozzle sleeve means and positioned inwardly from said outer

retainer ring, said turbine means having a bore there-through and a plurality of teeth projecting radially inward towards the axis of said bore, whereby impingement of said fluid flow stream passing through said annular throat upon said teeth causes rotation of said turbine means and the break-up of said flow into a fog or mist flow by said teeth, the combination of said outer retainer ring and said configured bore inner surface providing a substantially elliptical fluid flow pattern in fluid leaving said fluid discharge device, the widest portion of said elliptical pattern being substantially disposed in a horizontal plane.

**4,949,795**  
**ROTARY RAPID EXCAVATION SYSTEM**  
 William C. McDonald; Gerard T. Pittard, and John H. Cohen,  
 all of Houston, Tex., assignors to Gas Research Institute,  
 Chicago, Ill.  
 Filed Jul. 11, 1988, Ser. No. 218,946  
 Int. Cl.<sup>5</sup> E21B 10/46  
 U.S. Cl. 175—40 25 Claims



1 Apparatus for boring holes in the earth comprising: a shaft, means for rotating said shaft, and earth boring means supported on said shaft and having a plurality of cutting members mounted thereon, all of said cutting members of said earth boring means being made of soft flexible polymeric material said soft flexible polymeric material being sufficiently strong to cut the earth without breaking and sufficiently flexible and non-abrasive to prevent damage to buried pipe or cable or other buried article substantially different from the native soil upon contact of said boring means therewith.

21. Apparatus for boring holes in the earth comprising: a shaft, an elongated spiral auger flight with a leading edge cutting surface rigidly secured to said shaft for conveying material from the bore hole during operation, said flight extending laterally outwardly from and longitudinally along said shaft, and indicator means movably mounted forward of and below the leading edge cutting surface of said flight and operatively connected to warning means for warning the operator prior to the cutting surface contacting buried pipe or cable or other buried article substantially different from the native soil upon contact of said indicator means therewith.

**4,949,796**  
**DRILLING HEAD SEAL ASSEMBLY**  
 John R. Williams, Box 6155, Fort Smith, Ark. 72906  
 Filed Mar. 7, 1989, Ser. No. 320,288  
 Int. Cl.<sup>5</sup> E21B 33/068  
 U.S. Cl. 175—209 5 Claims

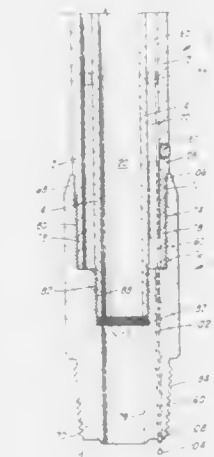
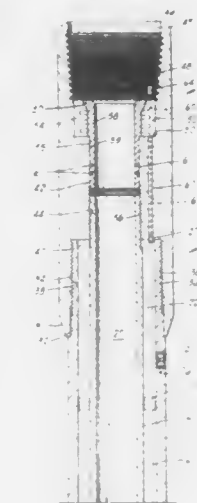


5. An improved drilling head assembly for a well bore, comprising: stationary housing having an upper and a lower end, an axial bore extending through the housing from the upper end to the lower end and configured to receive there-through a rotating driving member, the housing having an inner sealing surface; an assembly carrier removably coupled to a first stripper means, via a stripper fastener means, the combination disposable within the axial bore for facing a fluid passage seal between the driving member extended through the axial bore and the inner sealing surface of the housing; a bearing means removably coupled to a second stripper means, the combination removably disposed within the assembly carrier, said bearing means and second stripper means rotatable with said driving member and adapted for forming a fluid passage seal between said driving member and the assembly carrier; first clamping means for removable securing the stationary housing to the assembly carrier and a second clamping means for securing the assembly carrier to the bearing means, where said stripper fastening means allow the disassembly and reassembly of said bearing assembly and said second stripper means while said first stripper means remains situated in sealing contact with said stationary housing.

**4,949,797**  
**DRILL PIPE**  
 John R. Isom, 7251 Poppy Way, Golden, Colo. 80403  
 Filed Aug. 24, 1989, Ser. No. 397,846  
 Int. Cl.<sup>5</sup> E21B 17/02, 17/18, 17/22  
 U.S. Cl. 175—317 16 Claims

1. An improved drill pipe assembly wherein each drill pipe comprises: an outer pipe; an inner pipe disposed within said outer pipe to define a normally sealed annular space, said inner pipe having a predetermined inner diameter; a box end joint having first and second ends with the second end rigidly secured to each of said outer and inner pipes and the first end having internal box end threads for drill pipe interconnection;

a pin end joint having first and second ends with the second end rigidly secured to each of said outer and inner pipes and the first end having pin end external threads for drill pipe interconnection;

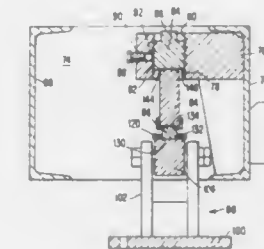


a short cylindrical pipe means for sealed insertion within one of said box end and pin end joints to provide communication between the inner pipes of a box end and pin end when joined; and means providing access selectively to said normally sealed annular space.

**4,949,798**  
**PORTABLE DESK TRUCK SCALE**  
 Thomas F. Strasser, and Herbert L. Stott, both of Meridian, Miss., assignors to Fairbanks, Inc., Kansas City, Mo.  
 Continuation of Ser. No. 271,992, Nov. 15, 1988, Pat. No. 4,874,050. This application Aug. 14, 1989, Ser. No. 393,246  
 Int. Cl.<sup>5</sup> G01G 19/02, 3/14; G01L 1/22  
 U.S. Cl. 177—134 26 Claims

1. A scale comprising a scale deck, load cell means mounted beneath said scale deck, said load cell means including spaced support means and a load cell beam extending between said spaced support means and being mounted thereby beneath said scale deck, said load cell beam having a flat upper surface, a bottom surface spaced beneath said upper surface, and an opening formed in said load cell beam and extending inwardly thereof substantially perpendicular to the flat upper surface

from an open end at said flat upper surface to a closed end between said upper and bottom surfaces, and load transmitting means extending between said scale deck and said load cell means, said load transmitting means including a load button having a flat button bottom surface in contact with the flat upper surface of said load cell beam, said load button having a button opening formed therein which extends inwardly from an open end at the flat button bottom surface to a closed end within said button, a curved surface at an end thereof opposite



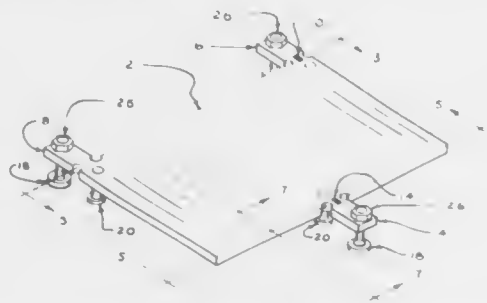
to said flat button bottom surface, and pin means mounted in the opening in said load cell beam and extending outwardly therefrom into the button opening to retain said load button on said load cell beam, said load transmitting means further including an elongate rocker load pin having a flat pin end surface at a first end thereof engaging and supported by the curved surface of said load button and pint collar means disposed about the juncture between said flat pin end surface and said curved surface of said load button to retain said load pin on said load button and to permit said load pin to have limited rocking movement on the curved surface of said load button.

**4,949,799**  
**ELECTRONIC WEIGHING STRUCTURE**  
 T. August Wernimont, P.O. Box 116, 2801 Cathmar Ave., Burlington, Iowa 52601  
 Continuation-in-part of Ser. No. 825,456, Feb. 3, 1986, abandoned. This application Jul. 5, 1989, Ser. No. 376,900  
 Int. Cl.<sup>5</sup> G01G 3/14; G01L 1/22  
 U.S. Cl. 177—211 6 Claims

1. A method of constructing an electrical load sensing device comprising the steps of: (a) attaching two (2) strain gages to two (2) independent load carrying members and, (b) attaching two (2) additional strain gages to opposite sides of a third independent load carrying member and, (c) orientating the strain gage sensing elements on the load carrying members so that two (2) strain gages detect tension and two (2) strain gages detect compression when loaded and, (d) attaching the load carrying members to a suitable weighing platform and,



(e) electronically interconnecting the strain gages in a bridge circuit where the output of the bridge circuit is further



connected to a meter suitable to read the object weight in engineering units.

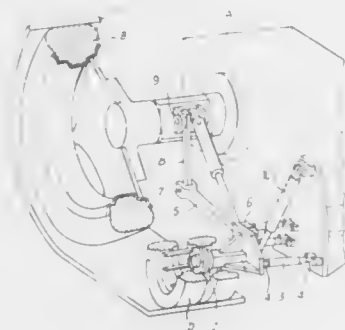
**4,949,800**  
**TENSIONING DEVICE FOR THE FLEXIBLE OR ARTICULATED ELEMENT OF A TRANSMISSION OR TRAVELLING SYSTEM**

Patrick Virly, Le Poinçonnet, France, assignor to Colmant Cuvelier, France

Filed Aug. 5, 1988, Ser. No. 229,049  
Claims priority, application France, Aug. 7, 1987, 87 11318  
Int. Cl.<sup>5</sup> B62D 55/30

U.S. Cl. 180—9.21

8 Claims



1. A tensioning device for a flexible or articulated element of a transmission or travelling system equipping each side of a machine provided with a rear wheel axle, which comprises:

- (a) at least one tensioning wheel engaging said element,
- (b) a support rigid with the hub of the tensioning wheel,
- (c) connecting means between said support and a fixed member carried by the chassis of the machine at the level of said rear wheel axle thereof, said connecting means allowing said support to move in a plane parallel to the longitudinal axis of the machine to vary tensioning of the element,

(d) an articulated suspension system connecting said support and said chassis, in line with the hub of the tensioning wheel, allowing the tensioning wheel to move in a vertical plane, said articulated suspension system comprising links transversely disposed in relation to the longitudinal axis of the machine, each of said links being pivotally connected at one end to the chassis of the machine so as to be able to pivot in all directions and at the other end to the support by a joint allowing pivoting in all directions, and

(e) resilient stress means transversely disposed between said support and the chassis of the machine, in line with the hub of the tensioning wheel, for urging said tensioning wheel towards the ground.

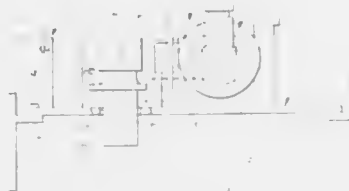
**4,949,801**  
**PARTS-MOUNTING ARRANGEMENT OF INDUSTRIAL VEHICLE**

Ryuji Tsutsui, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 7, 1989, Ser. No. 307,105  
Claims priority, application Japan, Feb. 9, 1988, 63-16188  
Int. Cl.<sup>5</sup> B62D 25/20; B60K 1/00

U.S. Cl. 180—90.6

8 Claims



1. In an electrically powered motor vehicle having a traction motor, a traction motor room for housing therein said motor, and two side frames extending longitudinally along both sides of said traction motor room, an arrangement comprising:
  - a first group of parts including a brake pedal, a brake booster and a vacuum pump for energizing said brake booster;
  - a second group of parts including an accelerator pedal and an accelerator control unit;
  - a supporting plate having said first and second groups of parts assembled thereon, said supporting plate supported by and secured to said side frames and extending across an upper open portion of said traction motor room; and
  - means defining in said supporting plate an aperture through which a part of said vacuum pump is projected into said traction motor room.

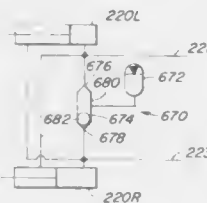
**4,949,802**  
**HYDRAULIC STEERING SYSTEMS DAMPENING DEVICES**

Douglas M. Gage, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Division of Ser. No. 262,399, Oct. 25, 1988, Pat. No. 4,915,186.  
This application Dec. 12, 1989, Ser. No. 449,665  
Int. Cl.<sup>5</sup> B62D 5/08

U.S. Cl. 180—132

1 Claim



1. A self-propelled work vehicle, the vehicle having a supporting structure to which is mounted ground engaging means for propelling the vehicle, the supporting structure is also provided with a prime mover which is operatively coupled through a suitable transmission to the ground engaging means for propelling the vehicle, the vehicle comprising:

- a hydraulic steering system having a source of hydraulic pressure which is directed to a steering valve, the steering valve is also provided with two steering hydraulic motors for positively turning the vehicle; and
- a mechanical hydraulic pressure dampening device hydraulically positioned between two steering cylinders, the pres-

sure dampening device comprising a hydraulic pressure accumulator and a shuttle check valve having two inlets and an outlet, the outlet is hydraulically coupled to the pressure accumulator and the inlets are each adapted to be coupled to one of the two steering hydraulic motors respectively.

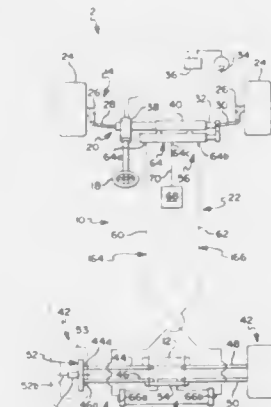
**4,949,803**  
**FOUR WHEEL STEERING SYSTEM**

David A. Janson, Plymouth; Jerome V. Glinski, Jr., East Detroit, and David M. Preston, Madison Heights, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jun. 12, 1989, Ser. No. 364,419  
Int. Cl.<sup>5</sup> B62D 5/06; F01B 3/00

U.S. Cl. 180—140

21 Claims



- a closed hydraulic system including first and second closed fluid flow branches comprising a fluid displacement assembly operative to reverse fluid flow in both branches in response to reversing of the steering movement of the front wheel steering assembly;
- a hydraulic actuator assembly operative to effect steering movement of the rear wheel steering assembly in response to said fluid flow; characterized by:

hydraulic actuator assembly including a housing having a cylindrical bore sealed at its ends, a piston slidably and sealingly disposed in the bore and defining in cooperation with the housing first and second volumes, first and second port means respectively communicating with the first and second volumes, the first and second port means respectively communicating with the first and second branches for moving the piston axially to-and-fro from a neutral position; characterized by:

first cam means reacting between the housing and piston for effecting to-and-fro rotation of the piston in the bore about a neutral position of the cam means in response to to-and-fro axial movement of the piston about the neutral position of the piston and;

second cam means reacting between the piston and the driven means for effecting to-and-fro axial movement of the driven means in response to the rotation of the piston.

**4,949,804**  
**PROTECTIVE CONTROL SYSTEM FOR POWER DOOR LATCH**

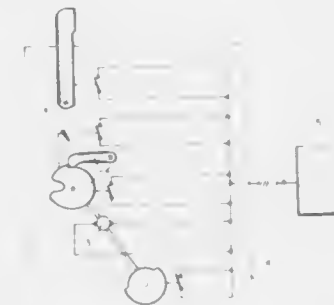
Peter Bartel, Hattingen, Fed. Rep. of Germany, assignor to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,595  
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1988, 3801650

U.S. Cl. 180—281

Int. Cl.<sup>5</sup> B60R 21/00

10 Claims



1. In combination with a vehicular power door latch having a mechanism operated by a motor in turn driven by a drive apparatus for opening and closing vehicle door, a safety system comprising:

- a vehicle speed sensor generating an output when vehicle speed exceeds a predetermined limit;
- a counter startable when the motor is actuated; and
- control means connected between the speed sensor and the counter and to the apparatus for shutting down the apparatus and thereby deenergizing the motor when the vehicle-speed output exceeds the limit and when the counter has counted since the motor started beyond a predetermined limit.

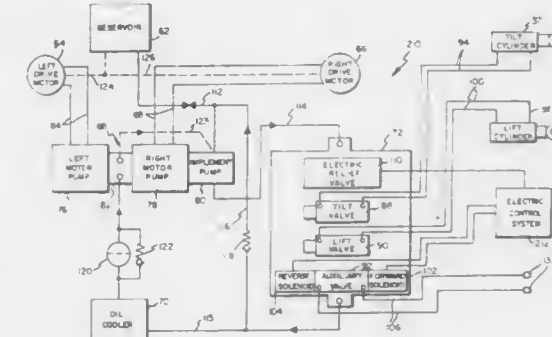
**4,949,805**  
**ELECTRICALLY CONTROLLED AUXILIARY HYDRAULIC SYSTEM FOR A SKID STEER LOADER**

Joseph M. Mather, Lisbon; Scott B. Jacobson, Kindred, and Thomas Q. Haeder, Lisbon, all of N. Dak., assignors to Clark Equipment Company, South Bend, Ind.

Continuation of Ser. No. 224,643, Jul. 27, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 418,805  
Int. Cl.<sup>5</sup> B60K 26/00

U.S. Cl. 180—333

26 Claims



1. A skid steer loader adapted for use in conjunction with an attachment having a hydraulic motor, including:

- an operator compartment;
- an engine;
- ground engaging drive wheels;

a lift arm assembly;  
hydraulic pump means driven by the engine for providing hydraulic fluid under pressure;  
an attachment mount for removably mounting an attachment having an auxiliary hydraulic motor to the lift arm assembly of the loader;  
auxiliary fluid fitting means for coupling hydraulic fluid to a hydraulic motor of an attachment;  
a drive control lever having a hand grip and mounted within the operator compartment;  
an electrically actuated auxiliary control valve coupling the auxiliary fluid fitting means to the hydraulic pump means, for controlling flow of hydraulic fluid to the auxiliary fluid fitting means in response to electric control signals; and  
an operator actuated auxiliary forward latch switch system at least partially mounted to the hand grip of the control lever and coupled to the auxiliary control valve, for controlling electric auxiliary control signals to initiate continuous fluid flow in a first direction to the auxiliary fluid fitting means in response to a first operator actuation, and to discontinue the continuous fluid flow in response to a second operator actuation.

4,949,806

## HEADSET FOR UNDERWATER USE

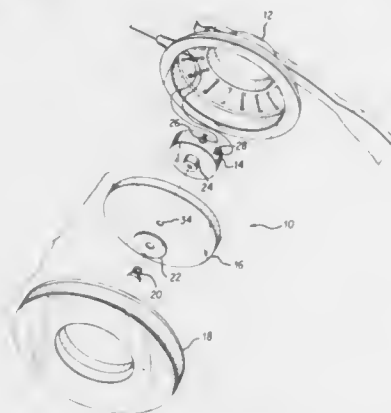
Alan Hofer, Wantagh, N.Y., assignor to Stanton Magnetics, Inc., Plainview, N.Y.

Filed Dec. 20, 1988, Ser. No. 287,490

Int. Cl.<sup>5</sup> H04R 25/00

U.S. Cl. 181—129

6 Claims



1. An underwater headset speaker comprising:  
a housing having an unsealed interior portion and an open bottom end,  
a rigid membrane positioned within said housing separating said housing into an upper chamber and a lower chamber, said membrane having a periphery secured to said housing interior portion; and  
an inertial transducer packaged within a water tight casing positioned in said upper chamber and secured to said membrane whereby said membrane vibrates in response to excitation of said transducer.

4,949,807

## ENGINE EXHAUST MUFFLER APPARATUS

Makizo Hirata; Shinichi Tamba, both of Kakogawa, and Akio Miguchi, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 9, 1988, Ser. No. 165,721

Claims priority, application Japan, Mar. 11, 1987, 62-35555

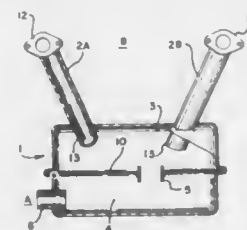
Int. Cl.<sup>5</sup> F01N 1/08

U.S. Cl. 181—240

6 Claims

1. An engine exhaust muffling apparatus comprising a muffler, two exhaust pipes attached to said muffler and adapted to

be attached to an engine body, said muffler comprising an outer housing, an inner partition positioned within said housing and shaped to form an enclosed interior space, a first expansion chamber formed between said housing and said partition, said exhaust pipes being separately attached to said housing adjacent opposite ends of said housing and extending into said first expansion chamber, means forming second and third expansion



chambers within said enclosed interior space formed by partition adjacent said ends, respectively, means connecting said first and second and expansion chambers together, means connecting said second and third expansion chambers together, and outlet means connected to said third expansion chamber and extending through said second expansion chamber.

4,949,808  
AERIAL APPARATUS AND STABILIZING MEANS THEREFOR

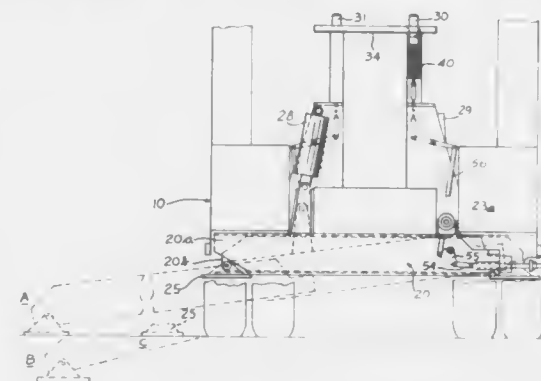
Edward V. Gernett, Huntington Beach, Calif., assignor to Figgie International, Inc., Willoughby, Ohio

Continuation-in-part of Ser. No. 307,898, Feb. 7, 1989, Pat. No. 4,941,546. This application Aug. 22, 1989, Ser. No. 396,858

Int. Cl.<sup>5</sup> E06C 5/38

U.S. Cl. 182—17

10 Claims



1. In an apparatus comprising extendible structure having a free end and supported at the other end by a base structure which rotatably supports the extendible structure for rotation in a circumferential path to swing the extendible structure outwardly of the sides of the apparatus, said extendible structure being pivotally mounted on base structure for vertical swinging movement about the pivot to raise and lower the outer end thereof, said extendible structure being rotatable to swing said extendible means to a desired circumferential position extending outwardly of the sides of the apparatus and said extendible means having a lowered rest position from which it is raised and swung to one side or the other of said apparatus, outrigger means extendible outwardly of said apparatus for stabilizing the extendible structure when rotated to extend outwardly of a side of said apparatus comprising an outrigger for stabilizing the extendible structure in a predetermined circumferential sector, said outrigger comprising first and second relatively movable telescoping sections, said second section being extendible and retractable relative to said first section between a minimum length storage position and a

maximum length extended position for stabilizing the extendible structure, stop rotation means comprising a first element rotatable with said extendible structure and a stop rotation element disposed in the path of said first element for disabling rotation of said extendible means into said sector, means for moving said second section to extend and retract said outrigger, and rotation enabling and disabling means responsive to the extension of said second section as it approaches its fully extended position and moves through a final part of its extension movement for disabling said stop rotation means and enabling the rotation of said extendible structure into said predetermined circumferential sector, and to the initial part of the movement away from said fully extended position for enabling said stop rotation means to disable rotation into said sector.

4,949,809

## EXTENDABLE POLE LOCKING MECHANISM FOR LADDER STABILIZER

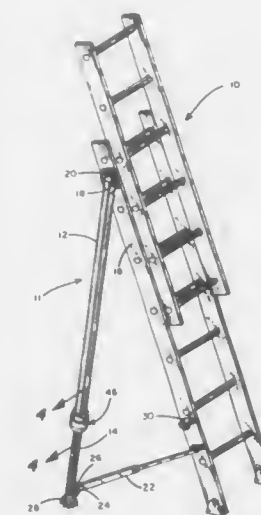
Avraham Y. Levi, St. Paul, and Craig D. Quarberg, Brooklyn Park, both of Minn., assignors to A. C. Innovations, Inc., Bloomington, Minn.

Filed Dec. 7, 1989, Ser. No. 447,194

Int. Cl.<sup>5</sup> E06C 5/36, 1/22

U.S. Cl. 182—172

5 Claims



1. A releasable locking mechanism for inhibiting longitudinal sliding motion between two concentrically disposed tubular pole members comprising:

- (a) an outer tubular pole member having a generally circular cross-section except for an integrally formed channel of rectangular cross-section extending radially therefrom along the length of said outer tubular pole member;
- (b) an inner tubular pole member having a generally circular cross-section and an outer diameter slightly less than the internal diameter of said outer tubular pole member with a toothed rack of rectangular cross-section extending radially therefrom along the length of said inner tubular pole member, said inner tubular pole member being fitted in telescoping relation within said outer tubular pole member with said toothed rack fitted within said channel for sliding relation therein; and
- (c) a locking ring rotatably coupled to said outer tubular member, said locking ring including a plurality of parallel, arcuate teeth for selectively meshing with the teeth on said toothed rack and a rectangular notch circumferentially adjacent said arcuate teeth, which when aligned with said toothed rack allows longitudinal sliding of said inner tubular pole member relative to said outer tubular pole member.

4,949,810  
ATTACHMENT TO STABILIZE AND EXPAND THE USE OF HOLLOW RUNG LADDERS

Wayne F. Dwinnell, 530 Old Petersen Road, Campbell River, British Columbia, Canada (V9W 3M9)

Filed Oct. 3, 1988, Ser. No. 251,771

Int. Cl.<sup>5</sup> E06C 7/48, 7/16

U.S. Cl. 182—214

1 Claim



1. A bracket attachment for a ladder having a plurality of spaced hollow rungs, said bracket attachment having a flat metal bar bended at an acute angle, a pair of metal tubes, each one of said metal tubes being attached at one end to each end of said flat metal bar, the other end of said metal tubes extending a distance from an edge of said flat metal bar, the opposite distance between each metal tube being greater than the distance between a pair of adjacent hollow rungs whereby upon compression of each end of said flat metal bar toward each other, the metal tubes could be inserted into the hollow rungs of the ladder with a spring action providing a positive locking of said bracket within the ladder rungs and without the use of any other fastening means.

4,949,811  
LADDER BRACE

William Bailey, Daisy Hill, Australia, assignor to Bailey Aluminium Products Pty., Ltd., Queensland, Australia

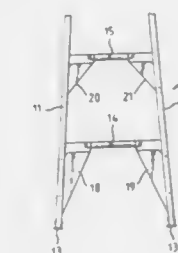
Filed Sep. 27, 1989, Ser. No. 413,448

Claims priority, application Australia, Sep. 29, 1988, PJ0679

Int. Cl.<sup>5</sup> E06C 7/10, 7/50

U.S. Cl. 182—220

13 Claims



1. A brace for a ladder having a step and a pair of spaced channel shaped stiles, said brace having a body portion substantially channel shaped at least along one peripheral face and having peripheral edges along the body portion and in use said brace is receivable within the stile such that the peripheral edges of the channel shaped body portion are in abutment with the stile and the step.



4,949,812

## DESCENT SYSTEM

Ronald W. Arthur, and Huwald, Edmund, both of Victoria, Australia, assignors to Ullapara Holdings Pty. Ltd., New South Wales, Australia

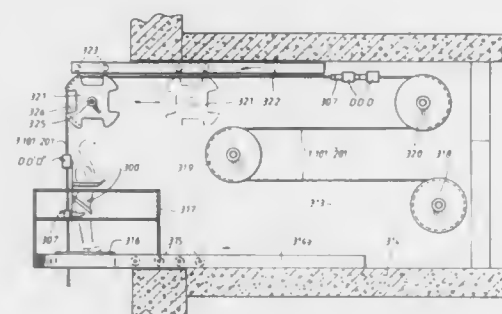
PCT No. PCT/AU88/00218, § 371 Date Apr. 5, 1989, § 102(e) Date Apr. 5, 1989, PCT Pub. No. WO89/00063, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 28, 1988, Ser. No. 348,640

Claims priority, application Australia, Jun. 29, 1987, PI2773 Int. Cl.<sup>5</sup> A62B 1/14; B66D 5/16

U.S. Cl. 182—234

10 Claims



1. A lowering device adapted, in use, to engage a cable or rope of a twisted configuration, and comprising an inner rotatable means surrounding and engaging said cable or rope to follow the twist therein and thereby rotate about the cable or rope as it descends down said cable or rope, said rotatable means being supported by, and rotatable within, an outer housing having means to support a load therefrom, and means for controlling the speed of rotation of said rotatable means and therefore the rate of descent of said lowering device down said cable or rope.

4,949,813

## LUBRICATION/COOLANT DELIVERY SYSTEM

Paul R. Kidder, and Ronnie J. Kidder, both of 307-A Leonie St., Lafayette, La. 70506

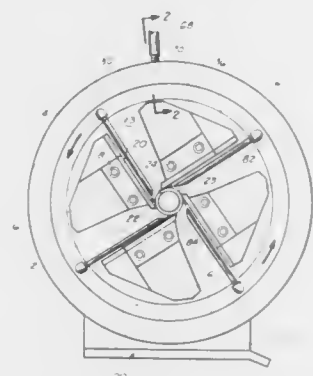
Continuation of Ser. No. 311,528, Feb. 15, 1989, abandoned.

This application Dec. 21, 1989, Ser. No. 455,811

Int. Cl.<sup>5</sup> B23G 1/00; B23B 51/06; B27C 9/00

U.S. Cl. 184—6.14

7 Claims



1. A system for delivering a fluid to a stationary work piece, which is being machined by a plurality of rotating blade members making contact with the outer surface of the work piece, the system comprising:

- (a) a first annular member removably mounted on the outer annular wall of the die head, and rotating therewith;
- (b) means positioned between the annular member and a wall of the die head in order to provide frictional engagement

between the annular member and the die head for achieving rotation of the member as the die head is rotated;

(c) an annular channel formed in the body of the member mounted on the die head;

(d) a plurality of nozzle members, extending from the base of the rotatable member, and downward to the point of contact between teeth of each of the blade members, and the work piece being machined, each of the nozzles in fluid communication with the annular channel, and providing fluid flow between the annular channel and the end of each of the nozzle members; and

(e) means for supplying the annular channel with a continuous flow of the fluid, so that as the blade members are rotated, the nozzle members are rotated therewith, and provide continuous flow of fluid to the work piece at that point between the rotating blades making contact with the work piece, in order to lubricate or cool the work piece.

4,949,814

## DRIVING MECHANISM, AND VEHICLE THEREWITH

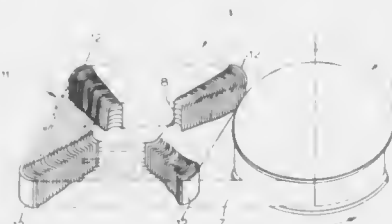
Anatoly Borovsky, Brooklyn, N.Y., assignor to Nachum D. Donner, Brooklyn, N.Y.

Filed Nov. 14, 1989, Ser. No. 436,220

Int. Cl.<sup>5</sup> F03G 1/04, 1/08; B60K 8/00

U.S. Cl. 185—11

18 Claims



1. A driving mechanism, comprising an elongated stretchable band-like

a rotatable support arranged so that when one end of said stretchable element is fixed and said rotatable support is rotated in one direction, said stretchable element is wound on said support with stretching, and then when said rotatable support is released said stretchable element compresses and rotates said rotatable support in an opposite direction so that said rotatable support provides a driving force in said opposite direction, said stretchable element being composed of a plurality of stretchable members which are spaced from one another in a direction which is transverse to direction of elongation of said stretchable element; and

guiding means for guiding said stretchable element during its winding on said rotatable support and unwinding from the latter, said guiding means including a plurality of portions each guiding a respective one of said stretchable members, said guiding means including a one piece integral guide provided with a plurality of partitions subdividing said guide into said guiding portions.

4,949,815

## SHEAVE ARRAY OF A SELF PROPELLED ELEVATOR USING A LINEAR MOTOR ON THE COUNTERWEIGHT

Marcel Pavoz, Nanteere, France, assignor to Otis Elevator Company, Farmington, Conn.

Filed Jun. 8, 1989, Ser. No. 363,001

Int. Cl.<sup>5</sup> B66B 11/04

U.S. Cl. 187—20

9 Claims

1. An elevator assembly mounted in a hoistway, said assembly including a car with side walls and a door; a counterweight; ropes interconnecting the car and counterweight; and a linear motor mounted on one of the car and counterweight

for providing motive power for the assembly; first and second sheave sets mounted in an upper end of the hoistway, and the first and second sheave sets consist of all of the sheaves mounted in the upper end of the hoistway each one of said sheave sets being mounted on each respective side of the car whereby none of the sheaves directly overlie the roof of the car, said sheave sets engaging said ropes to guide the latter in the hoistway during movement of the car and counterweight in the hoistway; means attached to said car for securing said ropes to said car at points outboard of said side walls of said

fixed rail at substantially said forwardly directed divergent angle.

4,949,817

## EMERGENCY BRAKING ARRANGEMENT FOR TRUCKS

Charles W. Knies, Rte. 3, Box 441, Huntingburg, Ind. 47542

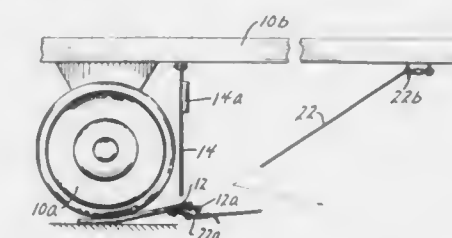
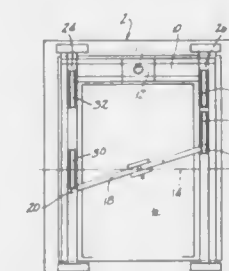
Continuation of Ser. No. 117,550, Nov. 6, 1987, abandoned. This

application Jan. 27, 1989, Ser. No. 302,559

Int. Cl.<sup>5</sup> B60T 1/14

U.S. Cl. 188—4 R

3 Claims



car, said means for securing defining a first rope securement location outboard of one of said car side walls and located on the car door side of an imaginary vertical plane containing the center of gravity of the car and perpendicular to said car side walls, and said means for securing defining a second rope securement location outboard of the other of said car side walls and located on the side of said imaginary plane away from the car door whereby the ropes travel from the car in the hoistway along fore and aft paths spaced apart from said imaginary plane.

4,949,816

## UPRIGHT FOR LIFT TRUCK

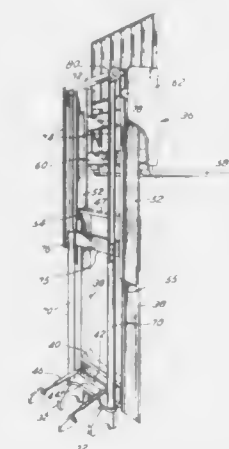
Warner K. Brown, Lexington, Ky., and Maynard L. Adams, Bellevue, Mich., assignors to Clark Equipment Company, South Bend, Ind.

Filed Nov. 3, 1988, Ser. No. 266,534

Int. Cl.<sup>5</sup> B66B 9/20

U.S. Cl. 187—9 E

20 Claims



1. In an upright assembly for lift trucks and the like, a fixed upright section mounted from the lift truck having fixed rails located at opposite sides thereof, at least one of said rails being mounted at a forwardly directed divergent angle in relation to the longitudinal axis of the lift truck, and a telescopic upright section supported from the fixed upright section for elevation thereon having movable rails located at opposite sides thereof, at least one of said movable rails being supported from said one

1. An emergency braking arrangement for a vehicle having a wheel mounted framework comprising a fixed flat plate extending downwardly from said framework in a generally vertical plane at a location forwardly of a wheel in the direction of movement of such, a flexible and selectively wheel engaging brake pad generally vertically disposed adjacent and forwardly of said fixed flat plate, and selective means freely and independently mounting and freely and directly dropping said flexible and selectively wheel engaging brake pad from a normal vertical hanging non-operative position in front of said fixed flat plate to an operative position beneath said wheel in a speed reducing relationship, where said mounting and dropping means includes a retainer member mounted on said flexible and selectively wheel engaging brake pad, and a control cable having a laterally disposed horizontally movable pin on one end thereof selectively supporting said retainer member and said flexible and selectively wheel engaging brake pad at said normal vertical hanging non-operative position and causing the dropping of said wheel engaging brake pad to said operational position upon slidable movement thereof, and where said fixed flat plate includes means defined by edge portions thereof confining unwanted lateral movement of edge portions of said flexible and selectively wheel engaging brake pad.

4,949,818

## BRAKE BAND FOR BRINGING THE SAW CHAIN OF A MOTOR-DRIVEN CHAIN SAW TO STANDSTILL

Reinhard Siede, Remshalden, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

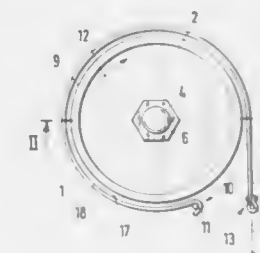
Filed Jan. 26, 1989, Ser. No. 301,602

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802488

Int. Cl.<sup>5</sup> F16D 69/02

U.S. Cl. 188—251 M

11 Claims



1. A brake band for a motor-driven chain saw, the chain saw

## 28 Claims





4,949,824

**HIGH PRODUCTION, TORQUE LIMITING, ONE-WAY CLUTCH**

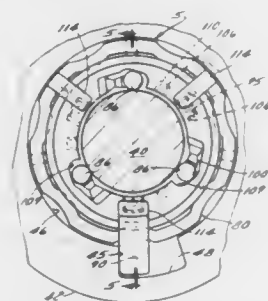
James A. V. Buckley, Whitefish Bay; George H. Hinkens, and James J. Dimsey, both of Milwaukee, all of Wis., assignors to Hayes Industrial Brake, Inc., Mequon, Wis.

Filed Jul. 8, 1988, Ser. No. 216,795

Int. Cl.<sup>5</sup> F16D 7/06, 13/75, 55/14, 65/56

U.S. Cl. 192—45

10 Claims



1. A torque limiting one-way clutch assembly for transferring rotary motion from a rotor having a central bore to a shaft extending through said bore, said clutch comprising:
- a bearing housing positioned in said central bore, said housing having an outer cylindrical surface, an axial bore and a number of grooves around said axial bore;
  - each groove including a ramp inclined toward one end of said groove;
  - a roller in each of said grooves;
  - a spring assembly mounted on one end of said housing, said spring assembly including means extending into said grooves for biasing said rollers toward said one end; and
  - a torque ring mounted on said outside surface of said housing and having an internal diameter smaller than said bearing housing to provide a friction fit between said torque ring and the outside of said bearing housing whereby said bearing housing will slip in said ring when a predetermined torque is applied to said ring.

4,949,825

**FLUID COUPLING DEVICE HAVING IMPROVED TEMPERATURE RESPONSIVENESS**

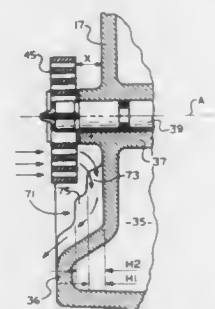
Gerard M. Light, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 5, 1990, Ser. No. 361,478

Int. Cl.<sup>5</sup> F16D 35/02

U.S. Cl. 192—58 B

12 Claims



9. A relatively high-torque fluid coupling device of the type including a first rotatable coupling assembly comprising a housing member and a cover member cooperating to define a fluid chamber therebetween; valve means associated with said first coupling assembly and disposed to separate the fluid chamber into a fluid operating chamber and a fluid reservoir chamber; a second rotatable coupling member disposed in said

fluid operating chamber and being rotatable relative to said first coupling assembly; a surface of said second coupling member and an adjacent surface of said first rotatable coupling assembly cooperating to define a viscous shear space therebetween, one of said housing member and said cover member including a plurality of cooling fins, generally adjacent said viscous shear space; said valve means further comprising a movable valve actuating member supported by said cover member and a valve element attached to said valve actuating member, said valve actuating member extending outwardly through said cover member; a temperature responsive bimetal element operatively connected to said cover member and to said valve actuating member, said bimetal element defining an outer peripheral and having a rear surface spaced from a forward surface of said cover member by an axial distance; said cover member including a generally annular portion disposed generally concentric relative to an axis of rotation of said device, said annular portion being configured to define a major portion of said fluid reservoir chamber; characterized by:

- (a) said annular portion includes a plurality of blower fin members oriented generally radially, each of said blower fin members extending radially inwardly from said annular portion to a location disposed adjacent said bimetal element periphery; and
- (b) each of said blower fin members having an axial height, at its radially inwardmost extent, which comprises a major portion of said axial distance from the forward surface of said cover member to said rear surface of said element.

4,949,826

**SPRING CLUTCH**

Masao Ohkanda, Sagami, Japan, assignor to Kioritz Corporation, Tokyo, Japan

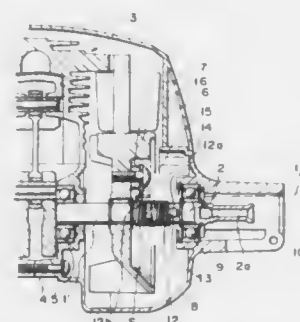
Filed Aug. 8, 1989, Ser. No. 391,107

Claims priority, application Japan, Aug. 12, 1988, 63-202430

Int. Cl.<sup>5</sup> F16D 13/08, 43/18

U.S. Cl. 192—81 C

4 Claims



1. A clutch comprising a rotatable input shaft and output shaft coaxially aligned and having adjacent end axially spaced from each other by a small clearance, a coil spring disposed over the adjacent ends of said input and output shafts, a first end of said coil being secured to said output shaft, and a second end of said coil being freely disposed over said input shaft, a rotor mounted on said input shaft for conjoint rotation therewith, a rockable pawl mounted on said rotor and having an arm resiliently biased into a first position out of contact with the second end of said coil and movable into a second position engaging the second end of said coil in response to centrifugal force created by rotation of said input shaft stop means mounted on said rotor to limit the movement of said pawl upon said input shaft attaining said predetermined speed, said pawl when in engagement with the second end of said coil causing said coil to wind and tighten about said input shaft to thereby couple said input and output shafts.

4,949,827

**CONCENTRICALLY MOUNTED HYDRAULIC CLUTCH ACTUATOR**

Keith V. Leigh-Monstevens, Troy, and David L. Wroblewski, Fraser, both of Mich., assignors to Automotive Products plc, Warwickshire, England

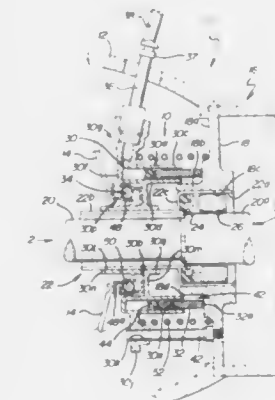
Continuation-in-part of Ser. No. 153,512, Feb. 18, 1988, which is a continuation of Ser. No. 921,762, Oct. 22, 1986, abandoned.

This application Jun. 15, 1988, Ser. No. 206,657

Int. Cl.<sup>5</sup> F16D 23/14, 25/08

U.S. Cl. 192—85 CA

12 Claims



2. A hydraulic apparatus for use with a clutch having a clutch housing and a clutch release element, a transmission including a transmission housing positioned rearwardly of the clutch and having a front face, and a transmission input shaft drivingly interconnecting the clutch and the transmission, said apparatus comprising:

- (A) a quill shaft fixedly positioned relative to the front face of the transmission housing and extending forwardly from the front face in concentrically surrounding but radially spaced relation to the transmission input shaft;
- (B) a clutch actuator housing adapted to be positioned within the clutch housing in concentric relation to the transmission input shaft and including an annular bearing carrier section having an axially extending annular hub portion slidably mounted on said quill shaft so as to mount said housing for axial sliding movement along said quill shaft, an annular main body section defining a rearwardly opening annular piston bore spaced radially outwardly from said bearing carrier section hub portion, and means defining a forwardly opening annular bearing bore between said bearing carrier hub portion and said piston bore;
- (C) a release bearing mounted on said bearing carrier section in said bearing bore;
- (D) an annular piston fitted at its forward end in said piston bore and bearing at its rearward end against the transmission housing front face; and
- (E) means for delivering hydraulic pressure fluid to said piston bore so as to move said actuator housing axially forward relative to the transmission input shaft with the axial movement guided by the sliding engagement of said bearing carrier section hub portion on said quill shaft whereby to move the clutch release element to a clutch disengaged position through the intermediary of said release bearing.

4,949,828

**APPARATUS AND METHOD FOR SENSING CLUTCH SLIPPAGE**

Robert A. Olsen, Janesville, Wis., assignor to Dana Corporation, Toledo, Ohio

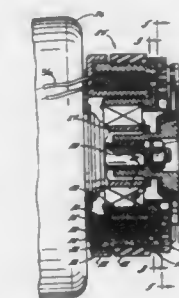
Filed Oct. 21, 1988, Ser. No. 260,913

The portion of the term of this patent subsequent to Jan. 7, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F16D 27/02

U.S. Cl. 192—84 R

23 Claims



1. A soft start electromagnetic clutch including first means for engaging driving and driven members of said clutch in response to the flow of a direct electrical current to said clutch, second means for initiating slippage between said driving and driven members after the engagement which dissipates in time, and third means for monitoring the current flow and for detecting the presence of an alternating current component in said direct electrical current whereby slippage in said clutch is indicated.

4,949,829

**CLUTCH COVER ASSEMBLY WITH ANNULAR CONED DISC SPRING**

Hiromi Tojima; Hiroshi Minakami; Yasuyuki Hashimoto; Mamoru Okubo; Ikuo Murata, and Hiroshi Takeuchi, all of Neyagawa, Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Neyagawa, Japan

PCT No. PCT/JP88/00773, § 371 Date Apr. 6, 1989, § 102(e) Date Apr. 6, 1989, PCT Pub. No. WO89/01096, PCT Pub. Date Feb. 9, 1989

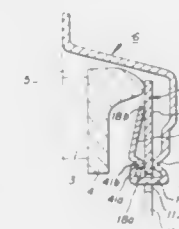
PCT Filed Aug. 2, 1988, Ser. No. 360,914

Claims priority, application Japan, Aug. 3, 1987, 62-119886[U]; Apr. 1, 1988, 63-45150[U]; Apr. 18, 1988, 63-51732[U]

Int. Cl.<sup>5</sup> F16D 13/44, 19/00

U.S. Cl. 192—89 B

7 Claims



1. A clutch cover assembly, in which an outer peripheral edge of a diaphragm spring is pressed on a pressure plate; an inner peripheral edge of said diaphragm spring is connected to a release bearing mechanism; a disc-like annular coned disc spring is non-rotatably disposed at an axial one-side of the diaphragm spring; the coned disc spring is secured to a clutch cover in such a manner that circumferential plural places of the coned disc spring are provided so as not to leave any play relative to projecting portions of the clutch cover at least in an

axial and a circumferential direction of said clutch cover; the coned disc spring is so installed that an outer peripheral edge and an inner peripheral edge thereof contacts with the diaphragm spring to urge the diaphragm spring in a direction to disengage a clutch at a time when the clutch is engaged; and a radial intermediate portion of the diaphragm spring is supported by the clutch cover through a fulcrum mechanism.

4,949,830

**CONTROL APPARATUS FOR A MOTOR, CLUTCH AND GEAR DRIVE ARRANGEMENT**

Axel Kemner, Isernhagen, and Andreas Oberlander, Hannover, both of Fed. Rep. of Germany, assignors to WABCO Westinghouse Steuerungstechnik GmbH & Co., Hanover, Fed. Rep. of Germany

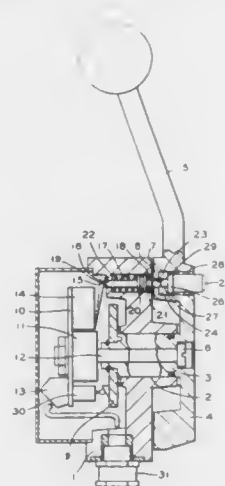
Filed May 30, 1989, Ser. No. 358,726

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832501

Int. Cl.<sup>5</sup> B60K 41/28, 23/00

U.S. Cl. 192—0.092

44 Claims



1. A control apparatus for controlling an arrangement which includes each of a motor, a clutch and a gear drive positioned on a preselected piece of equipment, said control apparatus comprising:

- (a) a housing member for mounting said control apparatus in an operating position on such preselected piece of equipment to control said each of said motor, said clutch and said gear drive, said housing member includes an aperture formed through a wall portion thereof;
- (b) a control lever assembly movably connected to said housing member adjacent a first side of said housing member to enable movement of said control lever from a neutral position of said control apparatus into at least one different position which represents at least one operating position of said control apparatus, said control lever assembly includes:
  - (i) a body portion,
  - (ii) a handle portion connected to said body portion,
  - (iii) a first shaft member connected to said body portion and extending through said aperture formed through said wall portion of said housing member to enable a movable connection of said control lever assembly to said housing member, and
  - (iv) a cavity formed in and adjacent one end of said body portion intermediate said handle portion and said first shaft member;
- (c) a second shaft member connected to said first shaft member;
- (d) a plate-like member connected to said second shaft member;
- (e) a switching assembly connected to said plate-like member, said switching assembly enables said control appara-

tus to accommodate both a switching function and a control function in response to movement of said control lever assembly, said switching assembly is rigidly mounted in relationship to said control lever assembly;

- (f) a guide arrangement positioned adjacent one end of said housing member in axial alignment with said cavity formed in said body portion of said control lever assembly;
- (g) an activating means having a first portion rigidly mounted in said guide arrangement in relationship to said control lever assembly and a second portion disposed in said cavity in said body portion of said control lever assembly for activating said switching assembly, said activating means, in a neutral position of said control lever assembly, is capable of being moved from a first position into a second position in which said activating means will act upon said switching means, said cavity formed in said body portion of said control lever assembly and said second portion of said activating means disposed in said cavity formed in said body portion of said control lever assembly are each sized in a manner such that with said second portion of said activating means disposed in said cavity said second portion of said activating means can by-pass said first portion of said activating means;
- (h) a locking mechanism engageable with said activating means to lock said activating means when said activating means is in said second position and when said control lever assembly is in a position other than a neutral position; and
- (i) a force means for providing a return force which, in said neutral position of said control lever assembly, is capable of activating said second portion of said activating means in a direction of said cavity formed in said body portion of said control lever assembly.

4,949,831

**DAMPING MECHANISM OF CLUTCH DISC**

Syogo Ohga, Osaka, and Toshiyuki Imai, Higashiosaka, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Neyagawa, Japan

Continuation-in-part of Ser. No. 150,423, Jan. 25, 1988, abandoned, and Ser. No. 183,039, Mar. 4, 1988, abandoned. This application Mar. 29, 1989, Ser. No. 330,019

Claims priority, application Japan, May 26, 1986, 61-120798; May 26, 1986, 61-79332; Sep. 29, 1986, 61-149053; Oct. 9, 1986, 61-155103; PCT Int'l Appl., May 20, 1987, PCT/JP87/00323; Sep. 10, 1987, PCT/JP87/00672

Int. Cl.<sup>5</sup> F16D 13/60

U.S. Cl. 192—107 C

11 Claims



1. A clutch disc for use between a flywheel and a pressure plate, said clutch disc having a clutch plate, a cushioning plate connected to said clutch plate and friction facings connected to the opposite sides of said cushioning plate, said cushioning plate having a first part flush with said clutch plate at the

flywheel side of said clutch disc and a second part protruding away from said first part toward a pressure plate side of said clutch disc, said friction facing at the flywheel side of said cushioning plate being fastened to the flywheel side of said first part and said friction facings at the pressure plate side of said cushioning plate being fastened to the pressure plate side of said second part of said cushioning plate and a damping member positioned between said cushioning plate and said clutch plate for damping vibrations of said clutch disc in an axial direction of said cushioning plate.

4,949,832

**CURVED ESCALATOR WITH VERTICAL PLANAR STEP RISERS AND CONSTANT HORIZONTAL VELOCITY**

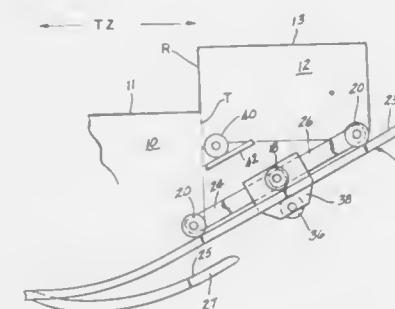
Frank M. Sansevero, West Hartford, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Filed Oct. 16, 1989, Ser. No. 422,265

Int. Cl.<sup>5</sup> B66B 21/02

U.S. Cl. 198—328

7 Claims



1. An escalator comprising a plurality of serially disposed steps; each of said steps having a vertical planar cleated riser part, a cleated trailing edge part and a step axle; the cleats in each riser part of each step meshing with the cleats in the trailing edge part of an adjacent step; and means for moving said steps along a passenger transporting path of travel which includes a pair of landing zones, a constant slope incline zone and a pair of transition zones respectively interconnecting each landing zone with said incline zone, said means for moving being operable to move each of said steps vertically in each transition zone in a manner which does not impart horizontal acceleration to said steps while maintaining the intermeshing cleat relationship of each successive pair of steps, and said means for moving comprising lateral inner and outer step chains connected to lateral inner and outer ends of said step axles, and means for kinking said inner and outer step chains in said landing zones and straightening said inner and outer step chains in said constant slope incline zone.

4,949,833

**APPARATUS FOR SUCCESSIVE SUPPLY OF PARTS**

Shunji Sakamoto, and Tuiyosi Watanabe, both of Higashibiroshima, Japan, assignors to Mazda Motor Corporation, Kanagawa, Japan

Filed Aug. 16, 1988, Ser. No. 233,216

Claims priority, application Japan, Aug. 18, 1987, 62-204337

Int. Cl.<sup>5</sup> B65G 11/00

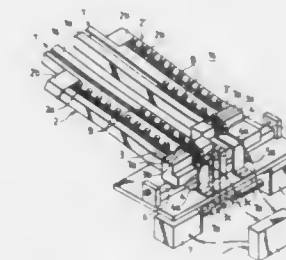
U.S. Cl. 198—358

7 Claims

1. An apparatus for successively supplying parts comprising: a main parts feeding means having a parts shooting portion and operative to feed parts successively from one end of said parts shooting portion, an auxiliary parts feeding means having a parts storing portion and operative to supply parts stored in said parts storing portion from one end of said parts storing portion in a selected situation, checking means for checking a parts feeding condition of said main parts feeding means, movable means provided thereon with a parts receiving

portion and disposed to engage with said one end of said parts shooting portion and said one end of said parts storing portion,

driving means for moving said movable means to control a position of said parts receiving portion, operation control means operative to cause said driving means to keep said movable means at a first position for receiving one of the parts fed from said one end of said parts shooting portion successively by said parts receiving portion and preventing said parts storing portion from



supplying the parts stored therein by a portion of said movable means when said checking means detects that said main parts feeding means operates properly and to cause said driving means to move said movable means from said first position to a second position for causing said parts storing portion to supply one of the parts stored therein to said parts receiving portion when said checking means detects that said main parts feeding means fails to feed the parts from said one end of said parts shooting portion.

4,949,834

**APPARATUS FOR RIGHTING SHAPED PARTS IN ARRAY**

Hugo Schiodel, Obersaulheimer Strasse 64 6501, Saulheim, Fed. Rep. of Germany

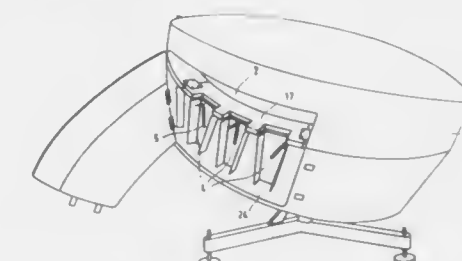
Filed Feb. 9, 1989, Ser. No. 308,737

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1989, 3803852

Int. Cl.<sup>5</sup> B65G 47/24

U.S. Cl. 198—392

3 Claims

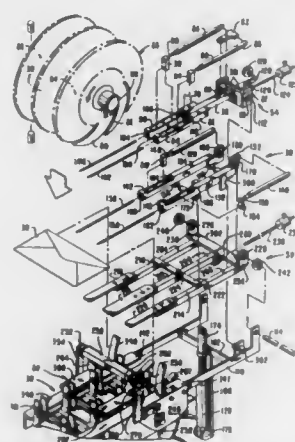


1. An apparatus for orienting randomly oriented oblong bottles and like-shaped objects into upright orientation with a filling end pointing upwardly and followed by delivering the bottles one by one to a horizontal transfer device, and including a housing (3) adapted to receive randomly oriented bottles and having an inclined shaft (11) concentrically and rotatably arranged in the housing; a turntable means (2,16) concentrically fixed to said shaft, said housing enclosing said turntable and having a funnel-shaped lower region; a plurality of spaced openings (6) at the periphery of said turntable means, each opening adapted to receive one of said bottles; a plurality of individual fall shafts (4) aligned with and vertically spaced from said openings, said fall shafts being attached to said turn-



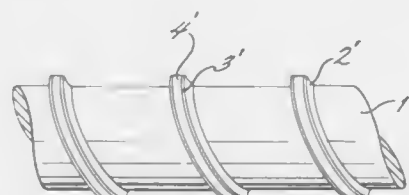
table means and converging downwardly to a funnel shape to conform with said funnel-shaped lower region of the housing; a fixed floor (9) arranged between said openings and said fall shafts to prevent the bottles from falling through said openings and into the fall shafts, said fixed floor further having a gap in the vicinity of the uppermost point of the revolution path of the turntable to permit the bottles to fall into said fall shafts; the improvement comprising a baffle plate pivotally attached to each fall shaft, said baffle plate comprising a swingable lever (5) and control means (13,14,15) for positioning the lever, depending upon the position of the bottle, to contact the bottle adjacent the filling end, the lever acting as a fulcrum to permit the end opposite the filling end to fall first through said shaft.

**4,949,835**  
**ENVELOPE HANDLING SYSTEM**  
John A. Beeman, Dayton, Ohio; James L. Leep, Martin; Wayne S. Marvin, Kalamazoo, both of Mich.; Floyd R. Solt, Garland, Tex., and Troy F. Smith, Kalamazoo, Mich., assignors to The Mead Corporation, Dayton, Ohio  
Division of Ser. No. 4,365, Jan. 16, 1987, Pat. No. 4,930,977.  
This application Feb. 23, 1989, Ser. No. 316,266  
Int. Cl.<sup>5</sup> B65G 43/00  
U.S. Cl. 198—464.4



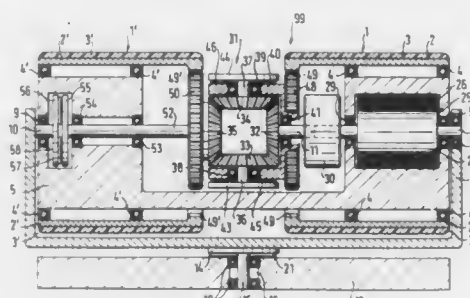
1. For use with an endless bucket conveyor for transporting stacks of sheet-like articles, a misfeed detector for detecting improperly stacked ones of said articles wherein said stack projects upwardly past a predetermined height, said misfeed detector comprising:  
an axle mounted above and transversely of said conveyor, whereby said conveyor transports said stacks thereunder; means depending downwardly from said axle toward said conveyor and terminating above said stack conveyed thereon;  
detent means for holding said downwardly depending means in a substantially vertical position and releasing said downwardly depending means to pivot about said axle in response to contact with a stack of said improperly stacked articles transported by said conveyor; and means, responsive to said pivoting movement of said downwardly depending means, for generating a signal indicating passage of one of said improperly stacked stacks under said axle.

**4,949,836**  
**SCREW WITH WEAR RESISTANT SURFACE**  
Hubert Schostek, Haar, Fed. Rep. of Germany, assignor to Krauss-Maffel A.G., Fed. Rep. of Germany  
Filed Jun. 3, 1988, Ser. No. 202,006  
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718779  
Int. Cl.<sup>5</sup> B65G 33/26  
U.S. Cl. 198—676



1. A machine part subject to wear during use comprising: a steel base material configured as a plastic processing screw exhibiting screw lands, and a wear-resistant alloy coated on and welded to crests of said screw lands by plasma powder deposition welding, said alloy comprising by weight: 40-70% molybdenum and manganese, 0-10% chromium, 0.5-5% boron, 0-1% zirconium, 0-1% titanium, and the remainder being nickel, cobalt or mixtures of nickel and cobalt.

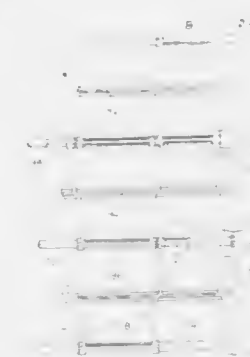
**4,949,837**  
**DRIVE ROLLER UNIT**  
Thomas Huber, Iffeldorf, Fed. Rep. of Germany, assignor to Bavaria Cargo Technologie GmbH, Munich, Fed. Rep. of Germany  
Filed Jul. 11, 1989, Ser. No. 377,971  
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828232; Feb. 21, 1989, 89102955  
Int. Cl.<sup>5</sup> B65G 13/02  
U.S. Cl. 198—782



1. A drive roller unit (99) for driving an article on a conveyor track, comprising:  
first and second drive rollers (1, 1') arranged with their axes of rotation substantially transversely with respect to the direction of drive of the article (100) to be driven and in juxtaposed relationship in their axial direction, the drive rollers (1, 1') having a drive position in which they are in engagement with the underside of the article (100) to driven;  
an electric motor means (25);  
a transmission means (30, 31, 48, 49 49', 50) including a differential transmission (31) having an input (32) drivingly connected to the electric motor means (25), a first output (40) drivingly connected to one drive roller (1) and a second output (35) drivingly connected to the other drive roller (1');  
a brake means (45, 46) operatively associated with at least one differential pinion (33, 34) of the differential transmis-

sion (31) for braking said pinion (33, 34) with respect to a casing (40) of the differential transmission (31) with a defined braking moment which is of such a magnitude that the drive rollers (1, 1') rotate in the same direction as long as the article (100) to be driven thereby can move substantially unimpededly beyond the drive roller unit (99), and a holding means (7) which carries the drive rollers (1, 1') and the differential transmission (31) and which is mounted rotatably about a vertical axis with respect to a base structure of the conveyor track with which the drive roller unit (99) is adapted to be used.

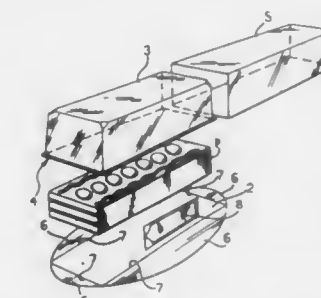
**4,949,838**  
**APPARATUS AND METHODS TO ALLOW NON-DESTRUCTIVE REMOVAL OF PIVOT RODS IN MODULAR PLASTIC CONVEYOR BELTS**  
James M. Lapeyre, and James O. Gundlach, both of New Orleans, La., assignors to The Laitram Corporation, Harahan, La.  
Continuation-in-part of Ser. No. 270,101, Nov. 14, 1988. This application Jan. 26, 1989, Ser. No. 302,541  
Int. Cl.<sup>5</sup> B65G 17/06  
U.S. Cl. 198—853



1. An integrally molded conveyor belt edge module suitable for being pivotally connected end-to-end with two similar modules by pivot rods to construct a side portion of a conveyor belt which can move along a predetermined path, said edge module comprising:  
first and second pluralities of link ends;  
said link ends of said first plurality defining pivotal apertures arranged along a first pivot axis and said link ends of said second pluralities defining pivotal apertures aligned along a second pivot axis, each plurality of link ends suitable for being intermeshed such that said first and second pivot axis are aligned and pivotally connected by pivot rods with link ends of a similar module to form at least one of the side portions of a conveyor belt;  
an integrally molded connecting structure for joining said first and second pluralities of link ends, and for maintaining the relative positions of said link ends with each other; an edge portion integrally molded to at least one of the sides of said module, said edge portion including a resilient stop member having an operating position and an assembly position, said operating position obstructing the axial movement of a pivot rod into or removal from said pivotal apertures defined in one of said first and second plurality of link ends, said edge portion further including a support structure molded proximate to the outermost link end of the other one of said first and second pluralities of link ends, said resilient stop member receiving interacting support from said support structure of a pivotally connected module and said resilient member capable of flexing between said operating position and said assembly position such that a pivot rod may be inserted into or

removed from said connecting position by moving said stop member to said assembly position.

**4,949,839**  
**PACKAGE FOR FOOD PRODUCTS, PARTICULARLY CONFECTIONERY PRODUCTS SUCH AS SLICES OF CAKE AND THE LIKE**  
Pietro Ferrero, Brussels, Belgium, assignor to Ferrero S.p.A., Alba, Italy  
Filed Mar. 29, 1989, Ser. No. 330,215  
Claims priority, application Italy, May 31, 1988, 53190/88[U]  
Int. Cl.<sup>5</sup> B65D 25/00  
U.S. Cl. 206—45.32



1. A package for food products, comprising:  
a flat base having four sides constituting a support formation for a food product,  
a transparent cover which is generally trough-shaped and can be fitted to cover the product with its open edge resting on the flat base, and  
a flexible transparent wrapper which can envelop the flat base and the transparent cover,  
wherein the flat base has an appendage extending from each of the four sides of the base, wherein the appendages can project beyond the open edge of the cover and are selectively orientable between a packaging position in which the appendages are folded against the transparent cover, and a consumption position in which, the wrapper having been removed, the appendages extend outwardly from the flat base, and wherein said package includes an auxiliary container for a decorative product, the auxiliary container having a generally flattened shape and being insertable between the transparent cover and one of the said appendages of the flat base which is folded against the transparent cover in the packaging position.

**4,949,840**  
**SPECIMEN COLLECTION KIT FOR MAILING**  
J. Theodore Brown, 12214 Parkton Ct., Ft. Washington, Md. 20744  
Filed Dec. 11, 1989, Ser. No. 448,231  
Int. Cl.<sup>5</sup> B65D 81/04, 81/14

**U.S. Cl. 206—204**  
13 Claims  
1. An improved method for packaging a collected specimen of animal body fluid for mailing via regular mail service system, said improvement comprising the steps of:  
a. partially filling a specimen collection container having a predetermined volume capacity, with an animal body fluid in an amount equal to at least three quarters of said container's volume capacity;  
b. sealing said partially filled container with a plug-like cap for retaining said body fluid therein;  
c. snugly fitting said sealed container into a block of cushion-like material to reduce the shock of a jar or impact to said container;  
d. securing said snugly fitted sealed container and block of cushion material by a flexible retainer means;  
e. enclosing said block of cushion material with said sealed

container therein, in a pouch of absorptive material and sealing said pouch;

f. enclosing said pouch containing said block and container in a mailing envelope having a complete air-bubble material inner-lining, and sealing said envelope, to thereby complete a light weight package which is safe and acceptable for transport and delivery by regular mail service system.

9. An improved animal body fluid specimen collection kit for mailing via regular mail service system, said improvement comprising:

a. a specimen collection container having a predetermined volume capacity, and a plug-like cap connected at an end and opening of said container, to thereby retain a fluid therein when said cap is placed in said opening;



- b. a block of cushion material for snugly receiving said entire volume capacity of said container, to thereby reduce the shock of a jar or impact to said container;
- c. means for securing said container within said block of cushion material;
- d. a pouch of absorptive lightweight material for receiving said container and block, to thereby provide means for absorbing fluid from said container in the event of spillage; and
- e. a mailing envelope having a complete air-bubble inner-lining of material, to further reduce the shock of a jar or impact to said container during the transport and delivery via regular mailing.

4,949,841

**CIGARETTE PACK, ESPECIALLY HINGE-LID PACK**  
Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 318,395

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806819

Int. Cl.<sup>5</sup> B65D 85/10; A24F 15/16

U.S. Cl. 206—254

5 Claims

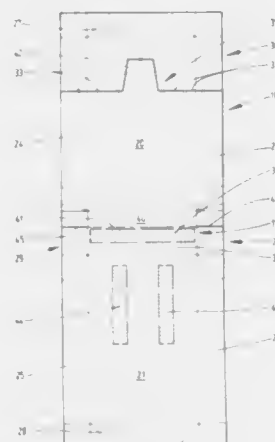
1. A hinge-lid cigarette pack, with an outer pack part and a hinge-lid, for receiving a cigarette group wrapped in an inner blank, the inner blank being folded around the cigarette group for the formation of a front wall, rear wall and continuous bottom wall and of side walls and end walls from folding tabs partially overlapping one another, characterized in that:

one part of the inner blank (18) is anchored in the outer pack part (12), in such a way that another part of the inner blank (18) can be lifted to lift up cigarettes (34); the inner blank (18) has a liftable front wall (20) which remains after a flap (30) in the front wall has been pulled off and which, together with adjoining side tabs (24) and a lifting part (40) forming a portion of the bottom wall (19) and facing the front wall, is liftable to lift up a cigarette row (34);

said one part of the inner blank (18) is a non-liftable blank

part of the bottom wall (19) and is anchored by adhesive bonding in the outer pack part (12);

said non-liftable blank part of the bottom wall (19) is an anchoring part (37) which faces the rear wall (21) of the pack, and which is anchored to a pack bottom (38) of the outer pack part (12) by adhesive bonding; and



the lifting part (40) of the bottom wall (19) is delimited from the anchoring part (37) of the bottom wall (19) by a hinge line (41) extending in the longitudinal direction of the bottom wall (19).

4,949,842

**WETSUIT CARRIER**

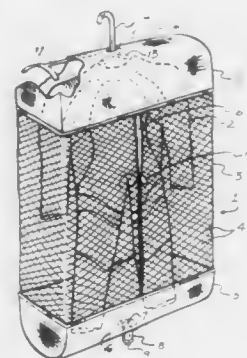
Charles Mokiao, II, 4892 Dixie St., San Diego, Calif. 92109

Filed Nov. 6, 1989, Ser. No. 431,991

Int. Cl.<sup>5</sup> B65D 85/18

U.S. Cl. 206—286

9 Claims



1. In combination with a diver's garment such as a wetsuit, bathing suit or the like, a drying and storage bag which comprise:

a sealable enclosure made of at least one type of pliable laminar material, and shaped and dimensioned to contain said garment in a generally unfolded position;

said enclosure comprising a mid-section surrounding said garment and made of a first pliable material having a plurality of apertures scattered therethrough;

a bottom section made of a second pliable material which is waterproof, said bottom section being shaped and dimensioned to form a drip-pan under the garment;

a top section capping said mid-section and forming a roof above said garment; and

means connected to said top section, for hanging said enclosure.

4,949,843

**ONE-PIECE MULTI-POCKETED STORAGE DEVICE**

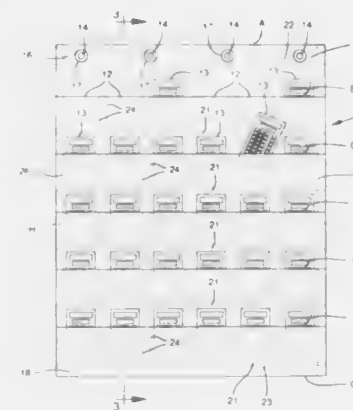
William T. Stokes, 1125 Robin Way, Sunnyvale, Calif. 94087

Filed Aug. 31, 1989, Ser. No. 401,185

Int. Cl.<sup>5</sup> B65D 30/04, 30/22, 30/08

U.S. Cl. 206—305

24 Claims



1. A multi-pocket carrying device for storing and dispensing a series of items in pockets and for hanging vertically in generally planar form to enable storage and retrieval of the items, comprising,

a single, integral sheet of flexible fabric material, the material capable of being folded and of being stitched,

a series of folds in the single sheet of material, along spaced parallel horizontal fold lines, defining three-ply overlapped areas of material alternating with single-ply areas of material, and with a fold line exposed at a front surface of the device at the top of each of said three-ply areas, there being a series of the horizontally extending three-ply areas spaced vertically along the height of the device, and a series of vertical lines of stitching, parallel and spaced apart in each three-ply area so as to define and separate a plurality of pockets along each said three-ply area, the pockets being formed between the center ply and the back ply of material, and the pockets being spaced apart and non-overlapping vertically.

4,949,844

**GOLF BAG HAVING PIVOTABLE SUPPORT**  
Fu-Hsiung Yang, No. 158-1, 3rd Floor, Chao-Chou St., Taipei, Taiwan

Filed Mar. 17, 1989, Ser. No. 325,171

Int. Cl.<sup>5</sup> A63B 55/00, 55/06

U.S. Cl. 206—315.7

5 Claims



1. A golf bag device comprising:  
a bag means for storing therein at least a club, and having a closed bottom end portion formed with a base plate, an

open top end portion, and a collar attached to said open top end portion;

a base means secured to said bag means; and

a support means pivotally mounted to said base means for securely standing said bag means in a first stored position and in a second use position, wherein said base means is for pivotally supporting said support means onto said bag means, said support means including connector means and leg means, said connector means having a top end operably connected to said base means and a bottom end operably connected to said leg means,

wherein said base means includes an upper seat, an intermediate seat and a lower seat, each seat having a substantially U-shaped groove,

wherein said support means further includes a handle means having an engaging end, and a free end retained in one of said upper and lower substantially U-shaped grooves,

wherein said leg means has at least two leg support members, each leg support member having an upper end pivotally mounted to said lower seat,

wherein said connector means has at least two connecting rods, each connecting rod having a bottom end pivotally connected to one of said leg support members and a top end,

wherein said connector means further has at least two connectors, each connector having a first end rotatably connected to said top end of one of said connecting rods, and a second end positioned above or below said first end when said first end is rotated around said top end of said one of said connecting rods; and

a pin rotatably mounted in said intermediate seat and pinning together said engaging end of said handle means and said second ends of said connectors.

4,949,845

**FOLDING CARTON WITH RECLOSABLE TUCK AND DISPOSABLE HANG PANEL**

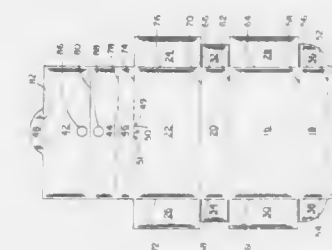
Rodney D. Dixon, Burlington, N.C., assignor to Mebane Packaging Corporation, Mebane, N.C.

Filed Nov. 14, 1989, Ser. No. 436,355

Int. Cl.<sup>5</sup> B65D 5/54

U.S. Cl. 206—626

5 Claims



1. A folding carton having a front wall, a bottom wall, a rear wall, and a cover hingedly secured to said front wall comprising:

(a) said cover having a closure flap hingedly attached to the rear edge thereof, said closure flap having an inner and outer surface;

(b) a fifth wall extending upwardly from the top edge of said rear wall and comprising a plurality of rectangular panels including:

(i) a first, relatively narrow panel attached to the upper edge of said rear wall along a second tearline;

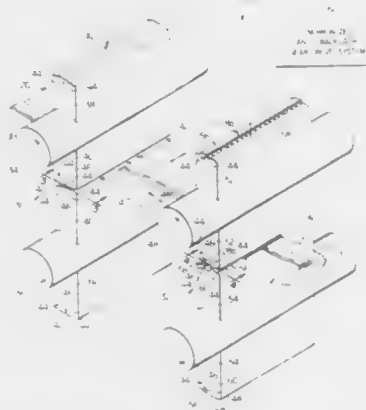
(ii) a second panel of intermediate width attached to the upper edge of said first panel along a first tear-line;

(iii) a third panel of a width substantially equaling the



- combined widths of the first and second panels and connected to the upper edge of said second panel by a fold-line;
- (iv) a pull-tab attached to the upper edge of said third panel by a fold-line;
- (c) said inner surface of said closure flap being relatively permanently secured to said first panel substantially across the length and width thereof, said closure flap being positioned behind the lower portion of said third panel which has been folded down along said fold-line;
- (d) the lower portion of said third panel being relatively releasably secured to the adjacent outer surface of said closure flap by spot glue areas;
- (e) said pull-tab being folded forwardly and lying loosely along said top wall;
- (f) whereby to open said carton,
- (i) said pull-tab is pulled upwardly freeing said third panel from said closure flap;
- (ii) said second and third panel and glue-tab are torn away as a unit from said first panel, and
- (iii) said first panel which is secured to the inner surface of said closure tuck is severed from the top edge of the rear wall along said second tearline and folded downwardly to form said closure tuck.

**4,949,846**  
**PACKAGE END SEALING AND CUTTING METHOD AND APPARATUS**  
 Lawrence D. Lakey, 4628 O'Connor Ct., Irving, Tex. 75062  
 Filed Jul. 31, 1989, Ser. No. 387,235  
 Int. Cl.<sup>5</sup> B65B 7/06, 9/06, 51/16  
 U.S. Cl. 206—484 20 Claims

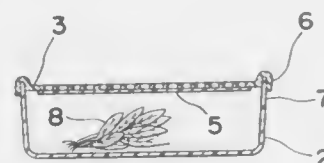


15. A method of forming a series of packages, each having tightly sealed, essentially leak-free opposite ends, from a wrapping material tube being longitudinally moved in a first direction and having a series of longitudinal sections thereon mutually spaced apart in said first direction, said method comprising the steps of:

forming on each successive longitudinal tube section an initially heat sealed area having a predetermined configuration and defining abutting sealed ends of two adjacent package portions of the tube; and

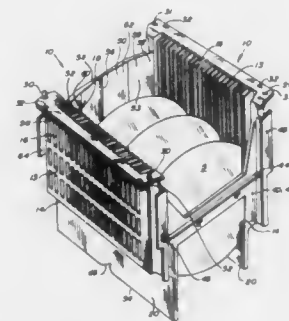
subsequently forming on each initially heat sealed area a secondary heat sealed area, the secondary heat seal area being essentially identical in configuration to and congruent with a major portion of the initially heat sealed area, while cutting through the abutting, sealed package ends defined by the initially heat sealed area whereby the opposite ends of the resulting individual packages area doubly heat sealed along essentially the entire initially heat sealed areas thereon.

**4,949,847**  
**STORAGE RECEPTACLE**  
 Kohji Nagata, Yao, Japan, assignor to Matsushita Refrigeration Company, Osaka, Japan  
 Continuation of Ser. No. 35,281, Apr. 7, 1987, abandoned. This application Feb. 2, 1989, Ser. No. 306,204  
 Claims priority, application Japan, Apr. 7, 1986, 61-79748; Jul. 29, 1986, 61-178068  
 Int. Cl.<sup>5</sup> B65D 81/24, 65/40  
 U.S. Cl. 206—484.1 3 Claims



1. A vegetable storage receptacle particularly effective for leafy vegetables for use in a refrigerator, which comprises: a receptacle body of synthetic resinous material opened on its upper side;
- a covering member of synthetic resinous material for covering the opening portion of said receptacle body;
- a permeable film member formed on said covering member so as to cover a plurality of openings defined therein, said permeable film member being composed of a base cloth of a fibrous layer, a synthetic resinous thin film formed on said base cloth and having a permeability to gases between its molecules spaced at intervals of 10 to 10<sup>3</sup> Å and a protective fibrous layer covered on said thin film, said thin film having a thickness of several microns to several tens of microns, said permeable film member having an area of approximately 0.1 m<sup>2</sup> for each 50 liters of the vegetable storage receptacle, and
- wherein the moisture permeability of said permeable film from the inside of said receptacle towards the outside is 1500 to 3500 g/m<sup>2</sup>·24 hr by virtue of said thickness of said thin film.

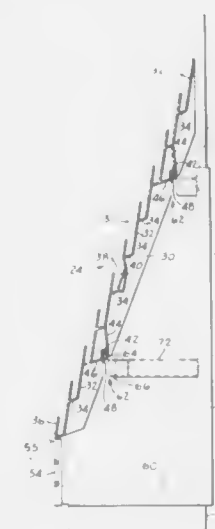
**4,949,848**  
**WAFER CARRIER**  
 Robert D. Kos, Victoria, Minn., assignor to Fluoroware, Inc., Chaska, Minn.  
 Filed Apr. 29, 1988, Ser. No. 188,312  
 Int. Cl.<sup>5</sup> A47G 19/08  
 U.S. Cl. 211—41 15 Claims



1. A moldable plastic, distortion and warp resistant wafer carrier having an open top for insertion and removal of wafers, an open bottom, a pair of opposed upright end walls, and a pair of opposed upright side walls with inner, opposed ribs for spacing axially aligned wafers in the carrier, one said upright end wall being H-shaped with a horizontal indexing bar ex-

tending thereacross intermediate the height of the carrier, the other upright end wall comprised of a center panel and two side panels each oriented at an oblique angle relative to the center panel, the center panel having a planar outer surface with an upright center line and two planar inner surfaces being oriented obliquely to each other at the center line so that the center panel is thinner adjacent the center line than at outer edge portions of the center panel thereby adding rigidity to the wafer carrier while minimizing warp stress in the wafer carrier and preventing the other upright end wall from distorting or bowing inwardly when the wafer carrier is subjected to high temperatures or caustic chemicals.

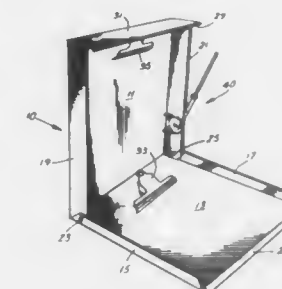
**4,949,849**  
**ADJUSTABLE GREETING CARD DISPLAY ASSEMBLY**  
 Stephen N. Hardy, Copley, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio  
 Filed Feb. 9, 1989, Ser. No. 308,660  
 Int. Cl.<sup>5</sup> A47F 7/00  
 U.S. Cl. 211—55 7 Claims



1. An adjustable display assembly comprising:
- a supporting structure including at least two transversely extending support rails having an inverted U-shaped portion, and
- a plurality of pocket forming members adjustably positioned on and supported by said supporting structure in side by side relationship, said pocket forming members comprising:
- (1) at least one laterally movable pocket forming member located between the lateral edges of said supporting structure, said laterally movable pocket forming member comprising a generally vertical wall and a pocket forming structure extending laterally on both sides of said vertical wall, said pocket forming structure comprising a plurality of generally upright parallel back members and a plurality of bottom members arranged in step relationship and forming a plurality of half pockets in step relationship on either side of said vertical wall, the sides of said half pockets which are remote from said vertical wall being open, and an upstanding front member extending upwardly from the front edge of the respective of each bottom member generally parallel to said back members but of lesser height; and
- (2) right hand and left hand end pocket forming members disposed along the right and left sides, respectively, of said supporting structure, said right hand and said left hand end pocket forming members being of similar construction but oppositely oriented, each of said right hand and left hand end pocket forming members comprising a generally vertical wall along one edge thereof, and a pocket forming

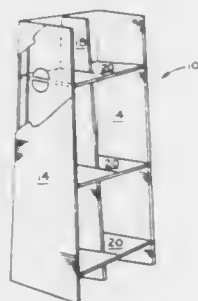
structure forming a plurality of half pockets in generally step relationship, the last mentioned pocket forming structure comprising a plurality of generally upright substantially parallel back members and a plurality of bottom members extending laterally in one direction only from the last mentioned vertical wall, the sides of the last mentioned half pockets which are remote from said last mentioned vertical wall being open, and said last mentioned pocket forming structure also comprising an upstanding front member extending upwardly from the front edge of the respective of each last mentioned bottom member generally parallel to the last mentioned back members but of lesser height, said last mentioned back members and said last mentioned bottom members and the last mentioned front members extending inwardly from said last mentioned vertical wall toward said at least one laterally movable pocket forming member, wherein each of said end pocket forming members and said at least one laterally movable pocket forming member includes at least two socket means forming inverted U-shaped sockets which receivingly engage said inverted U-shaped portion on said support rails to support said plurality of pocket forming members at intermediate locations thereon and together with another of said pocket forming members, form a plurality of pockets having the pocket size thereof adjustable by means of said laterally movable pocket forming member.

**4,949,850**  
**SELF-STORING WRITING INSTRUMENT HOLDER FOR CABINETS**  
 James E. Weathers, Fruitport, Mich., assignor to Grabman Associates, Grand Haven, Mich.  
 Filed May 3, 1989, Ser. No. 346,923  
 Int. Cl.<sup>5</sup> A47F 7/00  
 U.S. Cl. 211—69.7 13 Claims



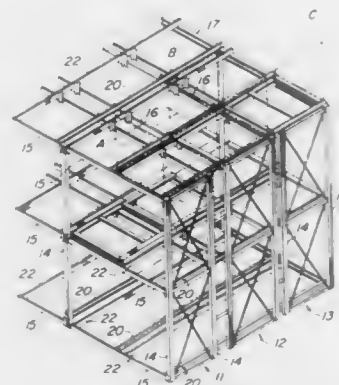
1. A cabinet having a self-storing writing instrument holder comprising:
- a cabinet for mounting in a generally vertical plane and having a back, vertical sidewalls extending from each side of the said back, a top extending from said back and joining said sidewalls and a front pivotally secured to each of said vertical sidewalls and able to swing upwardly to contact said top to close said cabinet;
- a base for attachment to one of said vertical sidewalls of said cabinet and having upper and lower stops;
- a pedestal mounted for rotation about a pivot point on said base and having rotation-limiting stops which contact the stops on said base;
- a fastener for joining said base and said pedestal while enabling said pedestal to rotate relative to said base;
- a writing instrument holder on said pedestal and adapted to move with said pedestal under the pull of gravity from a first to a second position when the writing instrument holder is released by the opening of said cabinet.

**4,949,851**  
**COLLAPSIBLE DISPLAY**  
Douglas E. Shaffer, Concord, N.C., assignor to Chesapeake Display & Packaging Company, Winston-Salem, N.C.  
Filed May 27, 1988, Ser. No. 199,740  
Int. Cl.<sup>5</sup> A47F 5/00  
U.S. Cl. 211-149



1. A collapsible one size display comprising: a foldable back wall and connected side walls; side wall-to-side wall foldable shelves separate and distinct from said back wall moveably affixed to said side wall; a divider moveably secured to said shelves, said divider being separate and distinct from and moveable relative to said back wall and said side walls, and said divider dividing each of said foldable shelves into separate and unconnected compartments; and means associated with said back wall and said shelves for releasably securing said shelves to said back wall to form a free standing display, said back wall being foldable as said divider and said shelves are moved upwardly with respect thereto so that said divider, said shelves, said side walls, and said foldable back wall form a flat collapsed display.

**4,949,852**  
**STORAGE RACK SYSTEMS**  
Donald R. Allen, Frenchtown, N.J., assignor to Frazier Industrial Company, Long Valley, N.J.  
Filed Sep. 13, 1989, Ser. No. 406,723  
Int. Cl.<sup>5</sup> A47F 5/00  
U.S. Cl. 211-151



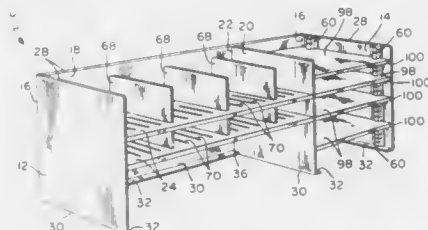
1. In a storage rack system for storing pallet loads to a depth of three pallets deep having a framework providing a plurality of storage bays each of which is defined by a plurality of vertical uprights and horizontal shelf beams, each of said storage bays comprising a pair of track means extending from front to back along the depth of said storage bay and being spaced apart across the width of said storage bay, a double cart assembly movable along said track between a forward position and a back position and including a large cart including a frame providing support for a pallet

8 Claims

15 Claims

load, a track member mounted on each side of said large cart frame, a plurality of wheel assemblies on each side of said large cart frame, and means for supporting each of said large cart wheel assemblies to be guided by and make good rolling contact with said track means as said large cart moves along the depth of the storage bay, and a small cart carried by and mounted for movement on said large cart between front and rear positions, and including a frame providing support for a loaded pallet, a plurality of wheel assemblies on each side of said small cart frame, and means for supporting each of said small cart wheel assemblies on said large cart track members as said small cart moves along the depth of the storage bay between its front and rear positions, said large cart being of a length to span the depth of two pallet loads, and said small cart being approximately one half the length of said large cart and to span the depth of one pallet load, said forward position of said double cart assembly being located at the entry end of the storage bay, said back position of said double cart assembly being located to span two and three pallets deep from the entry end of the storage bay, said front position of said small cart overlying the forward half of said large cart, and said rear position of said small cart overlying the back half of said large cart, said pair of track means being mounted on said storage bay framework so as to be inclined toward the entry end of said storage bay and said track members being constructed and arranged so that said double cart assembly and said small cart are supported so that they tend to roll along said track means and said track members toward the entry end of said storage bay.

**4,949,853**  
**CONVERTIBLE DESKTOP ORGANIZER**  
Harold S. Klein, Wayzata; Marcus S. Lehman, Lake City, and Mark A. Feucht, Champlin, all of Minn., assignors to Liberty Diversified Industries, New Hope, Minn.  
Continuation-in-part of Ser. No. 72,800, Jul. 13, 1987. This application Jun. 3, 1988, Ser. No. 201,843  
The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A47F 5/00  
U.S. Cl. 211-186

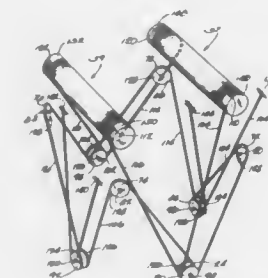


1. In a desktop organizer of the type having at least one generally vertical side wall panel and one generally vertical back wall panel connected to an extending generally perpendicular from said side wall panel, said side wall panel and said back wall panel each having a surface facing an interior region of said desktop organizer, the improvement comprising: at least one corner tray, said corner tray having a generally planar tray portion, said tray portion further having a pair of side edges and a width measured between said side edges, said tray portion further having a back edge, a portion of said corner tray adjacent to one of said side edges being angled upwardly relative to said planar tray portion; and at least two mounting brackets, one of said mounting brackets being connected to and oriented generally vertically on the surface of the side wall panel facing the interior region of the desktop organizer and one of said mounting brackets being

21 Claims

connected to and oriented generally vertically on the surface of the back wall panel facing the interior region of the desktop organizer, said mounting brackets each defining a plurality of notches extending through said mounting bracket and oriented in a generally horizontal direction, said notches in the mounting bracket connected to the side wall panel being sized so as to slidably receive a segment of the side edges of the corner tray therein, said notches in the mounting bracket connected to the back wall panel being sized so as to slidably receive a segment of the back edge of the tray portion therein, said notches further being positioned such that the notches in the mounting bracket connected to the side wall panel are at substantially the same vertical height as the notches in the mounting bracket connected to the back wall panel, whereby the upwardly angled side edge may be oriented generally horizontally and inserted into one of the notches of the mounting bracket attached to the side wall panel such that the opposing side edge of the tray portion is raised a distance vertically relative to the notch in which the upwardly angled side edge is received, the side edge of the tray portion opposing the upwardly angled side edge then being pressed downwardly to flex the corner tray and to pivot the rear edge of the tray portion into alignment with one of the notches of the mounting bracket connected to the back wall panel such that the tray portion may be slidably moved rearwardly until the segment of the rear edge of the tray portion is received within one of the notches of the mounting bracket connected to the back wall panel to securely engage and support the corner tray.

**4,949,854**  
**ANTI-SWAY CRANE REEVEING APPARATUS**  
Villem Folt, Greenfield, Wis., assignor to Harnischfeger Corporation, Brookfield, Wis.  
Filed Dec. 9, 1988, Ser. No. 281,719  
Int. Cl.<sup>5</sup> B66C 13/06  
U.S. Cl. 212-147



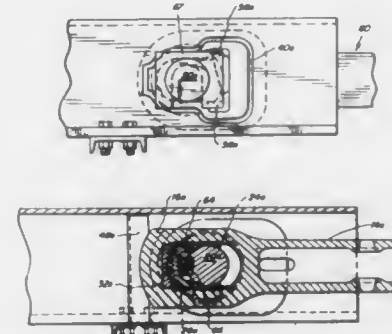
1. A reeving apparatus for a crane having an overhead frame, winding drum means mounted on the frame, and a lifting beam positioned below the frame and subject to swaying forces and movement transverse to the vertical, comprising: a plurality of spaced-apart rotatable lower sheaves affixed to the lifting beam, each of said sheaves having first and second grooves; and rope means affixed to the drum means and overhead frame and wrapped around the sheaves for supporting the lifting beam and load carrying means, the rope means including a plurality of first and second rope means both extending to and wrapped in the same direction around one of the plurality of sheaves respectively in the first and second grooves, each first and second rope means wrapped around one of the sheaves extending to the one sheave from opposite directions relative to the vertical and transverse to the axis of the one sheave for generating friction forces with each one of the sheaves which dissipates the energy of the swaying forces on the lifting beam.

**4,949,855**  
**ANTI-SWAY CRANE REEVEING APPARATUS**  
Villem Folt, Greenfield, Wis., assignor to Harnischfeger Corporation, Brookfield, Wis.  
Filed Dec. 9, 1988, Ser. No. 281,608  
Int. Cl.<sup>5</sup> B66C 13/06  
U.S. Cl. 212-147



5. A reeving apparatus for a crane having an overhead frame, winding drum means mounted on the frame, a lifting beam positioned below the frame and subject to swaying forces transverse to the vertical, and load carrying means suspended from the lifting beam, comprising: a plurality of sheaves comprising a plurality of pairs of spaced-apart rotatable sheaves, the sheaves of each pair being in axial alignment with each other; rope means affixed to the drum means and overhead frame for supporting and raising and lowering the lifting beam and load carrying means, the rope means comprising a plurality of pairs of first and second ropes, the first and second ropes of each rope pair respectively wrapping around a different one of the sheaves of the same pair of sheaves and having a position diverging from each other in directions transverse to the axis of said same pair of sheaves.

**4,949,856**  
**SLACKLESS DRAWBAR**  
James E. Solomon, Lithopolis, Ohio, assignor to Buckeye Steel Castings Co., Columbus, Ohio  
Filed Nov. 27, 1987, Ser. No. 126,183  
Int. Cl.<sup>5</sup> B61G 7/10  
U.S. Cl. 213-62 R



14. In the drawbar assembly for interconnecting a pair of railcars, said assembly comprising: a drawbar having an enlarged end positioned in a socket formed in a railcar sill having outer side walls; a drawbar pin retained in said sill and passing through an aperture in said enlarged drawbar end to retain said drawbar in the socket; pin bearing block means carried in said drawbar and abutting said pin; and slack adjusting wedge

10 Claims

16 Claims



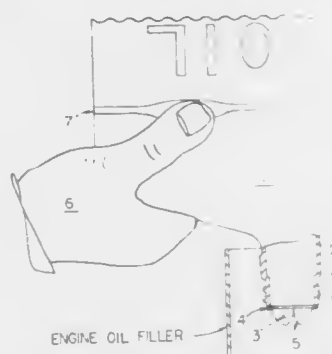
VOL  
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AG  
21  
1990  
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means urging said pin against said bearing block means, the improvement comprising, in combination, said pin bearing block means defining a slot facing said drawbar pin, said drawbar pin carrying a projection which slideably fits into said slot to permit rotation of said drawbar in a first direction, said bearing block means having means permitting rotation of said drawbar in a direction perpendicular to said first direction.

**4,949,857**  
**MANUAL PRESSURE BREAKING SEAL AND**  
**BREAKING PATTERN**

Carl D. Russell, Box 334, Sailisaw, Okla. 74955  
Filed Dec. 5, 1988, Ser. No. 279,843  
Int. Cl.<sup>5</sup> B65D 47/10, 47/36  
U.S. Cl. 215—253

2 Claims



1. A viscous motor oil bottle of flexible structure and breakable seal combination for use with the engine oil filler of a vehicle, comprising in combination:

- said oil bottle having a hollow spigot with a mouth with a rim of a size to fit within said filler to avoid oil spillage when transferring oil from the bottle to the engine;
- a disk closure member seal of non-absorbent material, relative to oil, fitting over the mouth of the oil bottle;
- a peripheral coating of adhesive on the closure member for contacting the rim of the bottle causing the member to seal the bottle;
- a predetermined breaking pattern in the closure member to permit rupturing of the member when manual pressure is applied to the bottle while having its spigot in said filler; and

said pattern being deployed across the closure member in at least two directions to insure that the closure member when fractured will act as a two-way valve by admitting air to the bottle while allowing oil to exit the bottle.

**4,949,858**  
**SAMPLE BOTTLE AND CAP THEREFOR**  
Michael Sheridan, Old Bridge, N.J., assignor to Ethylene Corp., Murray Hill, N.J.

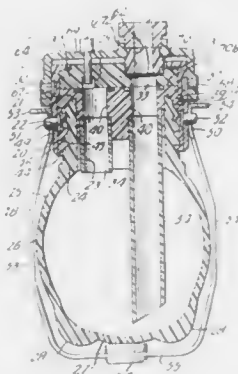
Filed Jun. 19, 1989, Ser. No. 367,781  
Int. Cl.<sup>5</sup> B65D 45/04

U.S. Cl. 215—330

7 Claims

1. Improved sample bottle structure for use in withdrawing samples from a sample valve structure comprising: a bottle element having an end wall and a bottle closure element; threaded means selectively interconnecting said bottle element to said bottle closure element, and pivotally mounted U-shaped strap means carried by said bottle closure element and selectively engaging said end wall of said bottle element in one

pivotal position thereof to prevent the unthreading of said bottle element from said bottle closure element, and means



selectively engaging said bottle closure element for preventing movement of said strap means from said one pivotal position.

**4,949,859**  
**CLOSURE ASSEMBLY AND METHOD OF MAKING**  
**SAME USING EPOXIDIZED NATURAL OIL IN A LOW**  
**FUSING, FOAM PLASTISOL**

John W. Bayer, Toledo, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio  
Continuation-in-part of Ser. No. 21,936, Mar. 5, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 204,847  
Int. Cl.<sup>5</sup> B65D 53/06

U.S. Cl. 215—341

12 Claims

1. A closure assembly comprising a closure cap with a top and a depending skirt for engagement with a neck portion of a container, the closure having an inside and outside periphery, a foam thermoplastic plastisol composition liner around the edge of the periphery of the cap top on the inside between the cap and the container, the foam plastisol composition having a shelf life of at least about 4 months and comprising particles consisting essentially of a copolymer consisting essentially of at least about 80 weight percent vinyl chloride and another copolymerizable vinyl monomer and a blowing agent, the particles being fused in about 90 to 120 seconds at a temperature of about 280° to 300° F. and the composition being thermoplastic and being blown to form the foam liner, the composition being plasticized with an epoxidized natural oil in an amount of about 30 to 130 parts by weight per 100 parts by weight of copolymer.

**4,949,860**  
**CONTAINER STORAGE APPARATUS**  
Scott B. Sundin, 45 South Rd., Holden, Mass. 01520  
Filed Jun. 1, 1989, Ser. No. 359,980  
Int. Cl.<sup>5</sup> B65D 6/08, 6/18

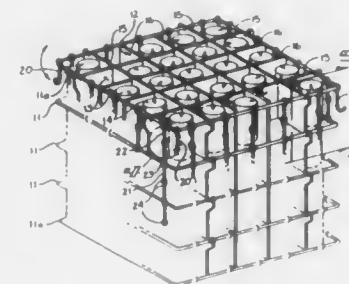
U.S. Cl. 220—489

5 Claims

1. A container storage apparatus for storage of elongate containers therein comprising, at least three frame loops of equal dimensional configuration, each including parallel sides, and wherein three frame loops define at least one intermediate frame loop with an overlying frame loop and an underlying frame loop, each of said frame loops aligned relative to one another when said apparatus is in an extended configuration, and a plurality of compartment container inserts, each positioned between adjacent frame loops, and pivoted link means pivotally mounted to each of said frame loops and to each other to secure said frame loops together, and said pivoted link means includes a plurality of main links pivotally mounted to said intermediate frame loop, each of said main links includes a central pivot opening medially

of said main link and pivotally mounted about said intermediate loop with spaced terminal pivot openings formed at terminal ends of said main link, and said terminal pivot openings pivotally mounted to adjacent pivot openings of adjacent main links,

and including external links pivotally mounted to each of said overlying and underlying frame loops and aligned with said main links and wherein each of said external links is of a length equal to half a length defined by each of the main links, and wherein each of the external links is formed with a single pivot opening pivotally formed to a respective overlying and underlying frame loop with a



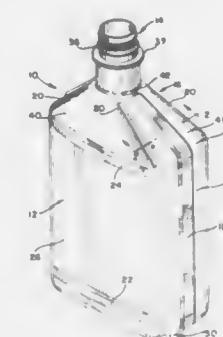
single terminal pivot opening pivotally secured to a terminal pivot opening of an aligned adjacent main link, and each of said container inserts includes plural pairs of interior and exterior panels orthogonally secured to further exterior and interior panels, and wherein each of said exterior panels is of a length greater than that defined by an associated frame loop, and wherein each of said interior panels is of a length substantially equal to that defined within an associated frame loop, and each of said exterior panels includes a notched leg, wherein each of the notches receive an associated frame loop therewithin.

**4,949,861**  
**RECTANGULAR PLASTIC CONTAINER WITH PANEL**  
**SUPPORT**  
Donald D. Cochran, Bartlett, Ill., assignor to American National Can Company, Chicago, Ill.

Filed Nov. 14, 1988, Ser. No. 271,055  
Int. Cl.<sup>5</sup> B65D 1/42

U.S. Cl. 220—72

14 Claims



1. A container comprising: a generally rectangular container body including opposed side walls and opposed end walls, defining a continuous container side wall having a generally rectangular horizontal cross section; a bottom wall enclosing one end of said container body; an open end in the form of an extended cylindrical spout and

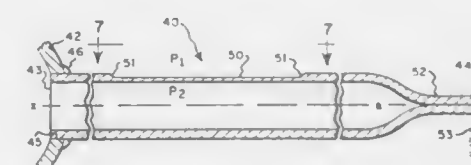
closure means on an upper portion of said spout for cooperably receiving a closure member; a tapered neck portion between said container body and said extended cylindrical spout; said tapered neck portion including an inwardly disposed container shoulder at the end of said continuous container side wall, four generally flat neck panels integral with said container shoulder and an annular arcuate segment between said neck panels and said cylindrical spout defining a spout base; said neck panels intersect at corners and said corners converge toward said cylindrical spout terminating integrally in said spout base; at least one first support member integral with and extending continuously along each said opposed end wall from said enclosed end over said shoulder and further along said tapered neck portion terminating proximate to said spout; and, at least one second support member integral with each neck panel, said second support members extending from said side wall continuously over said container shoulder and further along said tapered neck portion terminating proximate to said spout.

**4,949,862**  
**PRESSURE RELIEF DEVICE, AND METHOD**  
Joseph K. Barbarits, Cheektowaga, and Leonard T. Kujawa, West Seneca, both of N.Y., assignors to Carleton Technologies, Inc., East Aurora, N.Y.  
PCT No. PCT/US89/02100, § 371 Date Nov. 8, 1989, § 102(e)  
Date Nov. 8, 1989, PCT Pub. No. WO89/09902, PCT Pub. Date Oct. 19, 1989

PCT Filed May 16, 1989, Ser. No. 438,505  
Int. Cl.<sup>5</sup> B65D 90/34

U.S. Cl. 220—89.1

18 Claims



1. A pressure relief device, comprising: an elongated tube having an inner surface and having an outer surface; a first fluid pressure acting on said tube outer surface; a second fluid pressure acting on said tube inner surface; said second pressure being greater than said first pressure so that a pressure differential will normally exist between said inner and outer surfaces; said tube having a weakened portion of reduced wall thickness, said portion being so dimensioned and configured that the maximum hoop stress in said tube will occur along a line in the outer surface of said weakened portion; whereby, should said pressure differential exceed the burst pressure of said tube, said tube will rupture predictably along said line.

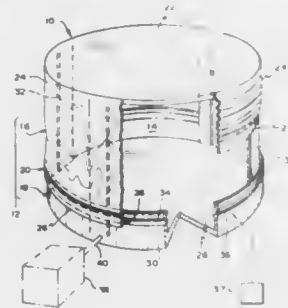
**4,949,863**  
**ISOLATOR FOR WORK IN AN ASEPTIC ENVIRONMENT**

Jean-Pierre Cazalis, Sigoules, and Bernard S. Martin, Montrouge, both of France, assignors to ISO Concept, Boulogne, France

Filed May 6, 1988, Ser. No. 191,174  
Int. Cl.<sup>5</sup> B25J 21/00

U.S. Cl. 220—9.1

7 Claims

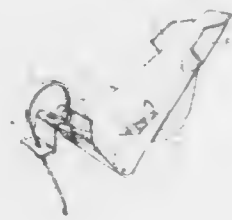


1. A sealed isolator for handling aseptic process and/or toxic or dangerous products comprising a wall (12) having a rigid lower part (18), an upper edge of which lower part is defined by a rigid belt (30), an upper part (16) including a top and a flexible side wall (24), fixed in a sealed manner to a peripheral edge of the top, a lower edge of which upper part is formed to be connected in a disconnectable manner over the rigid belt (30), wherein the rigid belt (30) has a convex shape, and the flexible side wall (24) comprises a single piece which is defined on its lower edge by a deformable belt (26) capable of encircling the rigid belt (30) and sealing the parts, and wherein the deformable belt (26) is unstretchable, and the rigid belt (30) has an inflatable seal (36) formed to sealingly contact the deformable belt (26) over an entire periphery of the deformable belt, and wherein the inflatable seal is positioned in a recess in the rigid belt.

**4,949,864**  
**PAINT BRUSH HOLDER**  
Earl I. La Kier, 9 Brisbane Dr., Charleston, S.C. 29407  
Filed Aug. 30, 1989, Ser. No. 400,589  
Int. Cl.<sup>5</sup> B65D 55/00

U.S. Cl. 220—90

8 Claims



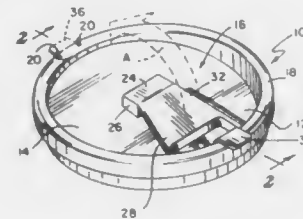
1. A brush holder, comprising:  
a. a clip which is attached to a rim of an opening of a container;  
b. a plate which rests on said rim of said container; and  
c. a connecting means, one end of which is attached in a fixed manner to said plate, and which connects said clip and said plate, wherein the effective length of said connecting means may be increased or decreased so as to lower or raise said plate within said container.

**4,949,865**  
**CONTAINER LID WITH INTEGRAL STOPPER**  
Donald R. Turner, Shelbyville, Ind., assignor to Williams Industries, Inc., Shelbyville, Ind.

Filed Jan. 2, 1990, Ser. No. 459,527  
Int. Cl.<sup>5</sup> B65D 41/32

U.S. Cl. 220—90.4

8 Claims

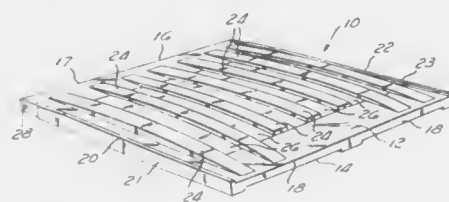


1. A lid for a container for holding a liquid, the container having an upwardly facing, generally planar opening bounded by an edge, the lid comprising:  
a. a circular rim portion including means for sealingly engaging the container opening, the rim portion defining a first plane;  
a. cover portion within the rim portion to cover the container opening, the cover portion having an outer and inner surface, the outer surface defining a second plane situated below and at an angle to the first plane, a first part of the outer surface being closer to a container bottom position than a second part of the outer surface;  
an opening formed in the first part of the cover portion and extending between the outer surface and the inner surface, whereby liquid which is exposed to the outer surface flows by gravity toward the first part of the outer surface and flows through the opening into the container;  
a support centrally situated in the planar cover portion between the first part and the second part of the upper surface, the support having an upper margin situated at least as high as the first plane;  
a closure member formed unitarily with the cover and configured to seal the cover opening; and  
hinge means for permitting the closure member to be pivoted between a position where the closure member is engaged in the cover opening and a position where the closure member is displaced from the cover opening.

**4,949,866**  
**REFUSE CONTAINER COVER**  
Glen D. Sanders, 1372 Sierra Alta, Tustin, Calif. 92680  
Filed Feb. 7, 1989, Ser. No. 307,615  
Int. Cl.<sup>5</sup> B65D 43/16

U.S. Cl. 220—334

11 Claims



1. A refuse container cover comprising:  
an upper member comprising a generally rectangular platform like body having an upper surface and a lower surface, a front edge, a rear edge and two lateral side edges extending between said front and rear edges;  
a lower member comprising a generally rectangular platform like body having an upper surface a lower surface, a

front edge, a rear edge and two lateral side edges extending between said front and rear edges;  
said upper and lower members being joined in coplanar juxtaposition such that the lower surface of the upper member is generally opposite the upper surface of the lower member, such joining of the upper and lower members resulting in the formation of a generally unitary refuse container cover structure;  
means for connecting said cover to a refuse container such that said cover will be movable (a) between an "open position" whereby access to the interior of said refuse container is permitted and (b) a "closed" position whereby access to the interior of said refuse container is substantially precluded;  
a plurality of first elongate ribs formed on said upper member, said first elongate ribs being in generally parallel relation to one another and oriented in a first direction; and  
a plurality of second elongate ribs formed on said lower member, said second elongate ribs being in generally parallel relation to one another and oriented in a second direction generally perpendicular to said first direction.

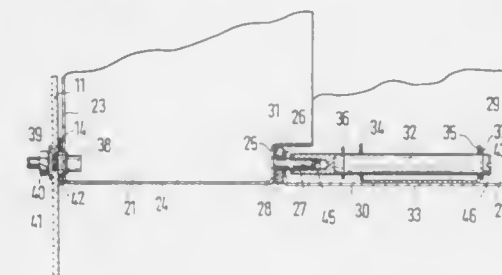
**4,949,867**  
**AIR CONDITIONING DEVICE FOR A CONTROL PANEL**  
Manfred Immel, Mittenaar, Fed. Rep. of Germany, assignor to Rittal-Werk Rudolf Loh GmbH & Co. KG, Herborn, Fed. Rep. of Germany

Filed Nov. 17, 1988, Ser. No. 272,671  
Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738941

U.S. Cl. 220—467

Int. Cl.<sup>5</sup> B65D 6/34

27 Claims



1. An air conditioning device for a control panel having a lower housing part and an attachable cover for installation on a mounting wall (11), the air conditioning device comprising:  
said lower housing part (21) having a base (23), a plurality of connecting elements for securing said lower housing part (21) to the mounting wall (11);  
said lower housing part (21) having a housing open side, said cover (22) having a cover open side oriented towards said housing open side, a housing side wall (24) of said lower housing part (21) having an inwardly directed peripheral housing edge (25) on said housing open side, a cover side wall (30) of said cover (22) having an inwardly directed peripheral cover edge (31) on said cover open side;  
said peripheral housing edge (25) of said lower housing part (21) oriented towards said cover (22) and a plurality of threaded bolts (27) secured to said peripheral housing edge (25), said cover edge (31) of said cover (22) having corresponding openings each mateable with each said threaded bolt (27);  
a peripheral sealing strip (28) mounted between said cover edge (31) of said cover (22) and said peripheral housing edge (25) of said lower housing part (21) during the installation of the air conditioning device (20); and  
said cover (22) connectable with said lower housing part (21), a plurality of mounting bolts (32) each having a threaded reception mount (45), each said threaded bolt (27) secured to said cover (22) and mateable with each

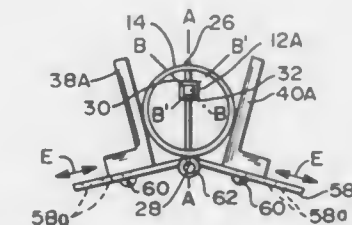
said threaded reception amount (45), and each said threaded reception mount (45) being axially adjustable.

**4,949,868**  
**UNIVERSAL PACKAGING SYSTEM FOR ELECTRICAL COMPONENTS AND THE LIKE**

Thorwald F. Olson, Wheaton, Ill., assignor to Molex Incorporated, Lisle, Ill.  
Division of Ser. No. 123,004, Nov. 19, 1987, Pat. No. 4,815,594, which is a continuation-in-part of Ser. No. 44,386, Apr. 30, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 315,362  
Int. Cl.<sup>5</sup> B65D 83/00

U.S. Cl. 221—64

13 Claims



1. In apparatus for dispensing a plurality of electrical components in selected orientations from a package containing the same, said package being of a type including an elongated tubular wall of flexible material with at least a portion of said wall frictionally engaging said components for holding the same therein;  
the improvement comprising:  
means for supporting said package with said elongated wall in alignment along a common line extending toward an adjacent work station and for applying external force transversely of said common line to an end portion of said flexible tubular wall for changing the cross-sectional shape thereof to move away from stopping engagement with said components therein said support and external force means including at least one pair of pivotally interconnected pressure elements for engaging opposite wall portions of said package;  
means for relatively moving said components and said tubular wall while said external force is applied for moving said components out of said package from said end portion of said tubular wall toward said adjacent work station while said components are retained in said selected orientation.

**4,949,869**  
**DISTRIBUTOR FOR A MONOSEED SOWING MACHINE**  
Michel Ribouleau, Paris, France, assignor to Ateliers Ribouleau, Largeasse, France  
Filed Apr. 24, 1989, Ser. No. 342,028  
Claims priority, application France, Apr. 22, 1988, 88 05398  
Int. Cl.<sup>5</sup> A01C 7/04

U.S. Cl. 221—211

11 Claims

1. A distributor for a monoseed sowing machine comprising a generally cylindrical case, a horizontal shaft supported on said case, a distributor disk rotatively mounted on said shaft and provided with circumferentially spaced-apart orifices, said disk separating in said case a seed container from a suction device so that the orifices are subjected to a depression which retains the seeds taken from the container during at least a part of their angular travel about said shaft, means for eliminating double seeds and, in a lower part of the case, a seed discharge opening, said suction device comprising, inside the case, a depression passageway which has substantially the shape of a crescent and ends which are extended toward each other along



the periphery of the case by two narrow branches, said passageway comprising at a beginning of one of the branches a



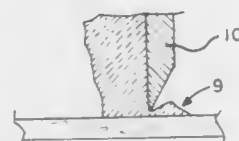
cavity and a closure element inserted in said cavity and capable of isolating said one branch from the source of depression.

**4,949,870**  
**REINFORCED POURING ASSEMBLY AND ITS METHOD OF CONSTRUCTION**  
Michel Cazes, Vittel, France, assignor to Societe Generale Des Eaux Minerales De Vittel, Vittel, France  
PCT No. PCT/FR87/00241, § 371 Date Mar. 2, 1988, § 102(e) Date Mar. 2, 1988, PCT Pub. No. WO88/00162, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 23, 1987, Ser. No. 180,866  
Claims priority, application France, Jul. 2, 1986, 86 09702  
Int. Cl. B65D 17/00

U.S. Cl. 222—81

13 Claims



1. In a device for perforating a pack made of flexible synthetic material and having a closing-off and pouring assembly including a cylindrical shank and a plug for interacting with the shank and including means for cutting and perforating the pack in order to access a liquid contained in the pack, the improvement which comprises:

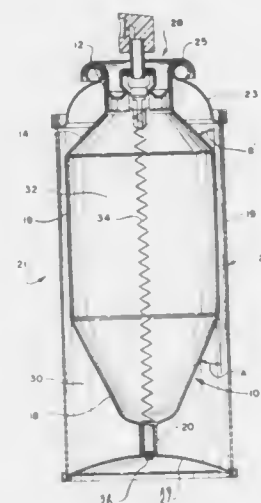
a reinforcement attached to and extending from base portions of the shank, partially inwardly toward center portions of the shank, wherein the reinforcement overlies the pack in a region where the pack is to be perforated.

**4,949,871**  
**BARRIER PACK PRODUCT DISPENSING CANS**  
Lloyd Flanner, Hudson, Ohio, assignor to Aerosol Systems, Inc., Macedonia, Ohio  
Filed Feb. 9, 1989, Ser. No. 308,899  
Int. Cl. B65D 35/24, 83/14

U.S. Cl. 222—95  
1. A unitary collapsible product bag for storing product in a barrier pack product-dispensing can comprising:

an upper section;  
a middle section; and  
a lower section,  
said middle section having an open-ended cylindrical shape, while said upper and lower sections are frustum-shaped, the upper section being open-ended, and the lower section having an open larger end and a closed smaller end, the larger ends of said upper and lower sections adjoining respective ends of said middle section, wherein connection means are provided at the smaller end of said upper section for attaching said bag to the top of said can, inte-

rior thereof, while bag support means are attached to the smaller, closed end of said lower section for supporting said bag on the bottom of said can, and

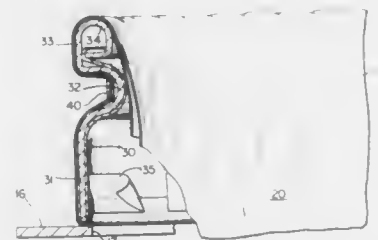


said bag support means comprising a tubular projection extending downward from the smaller end of said lower section, for positioning around a plug located in the can's bottom wall.

**4,949,872**  
**STACKABLE FLUENT MATERIAL CONTAINER**  
Harry D. Heaps, Jr., Villanova, Pa., assignor to Connelly Containers, Inc., Bala-Cynwyd, Pa.  
Continuation-in-part of Ser. No. 332,375, Mar. 31, 1989, Pat. No. 4,919,306, which is a continuation of Ser. No. 149,920, Jan. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 994,502, Dec. 17, 1986, Pat. No. 4,771,917. This application Apr. 7, 1989, Ser. No. 334,880  
Int. Cl. B65D 37/00

U.S. Cl. 222—105

16 Claims



1. A container for holding large weights of fluent material and capable of being stacked comprising:  
a wall comprising outer and inner layers of corrugated paperboard, the inner layer having a substantially horizontal upper edges, said outer layer having a substantial height above said upper edge of said inner layer,  
a plate on said upper edge of said inner layer, said plate having a transverse opening therethrough,  
a bag holder on said plate outwardly of said opening, and extending above said plate a substantial distance,  
a bag of fluid impervious material in said container having the mouth thereof extending through said opening and attached to said bag holder, said bag holder and said bag extending above said plate not higher than said outer layer,  
a cap on said wall, engaging said upper edge of said outer layer and overlying said bag holder,  
means positioned between and engaging said cap and said

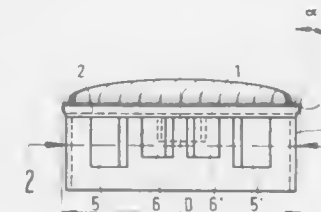
plate for transmitting a load on said cap of a filled second said container stacked thereon to said upper edge of said inner layer through said plate without significant deformation thereof,  
said plate comprising means for transmitting said load without significant deformation thereof.

**4,949,873**  
**SEMI-CIRCULAR PLUNGERS FOR A PLURAL COMPONENT DISPENSER**  
August Maeder, Hurdnerwaidli Strasse 42, 8808 Pfäfersikon/Sz, Switzerland  
Filed Apr. 28, 1989, Ser. No. 344,581  
Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814633

Int. Cl. B67D 5/42

U.S. Cl. 222—135

7 Claims



1. A container for fluid substances, the container comprising a cylindrical housing divided into two separate chambers by means of a partition wall formed as an integral part of the housing along a longitudinal axis thereof, and each one of the chambers having an outlet at a forward end thereof, and a semi-circular shaped plunger having a pair of sides, slidably disposed in each manner, comprising:

- (a) a camber portion on one side of the plunger in contact with the fluid substance within the chamber;
- (b) a plurality of inside and outside ribs, having free ends extending perpendicularly from the other side of the plunger for contacting a pressure plate, the outside ribs having a different height from the inside ribs and the inside ribs positioned between the outside ribs;
- (c) a side wall extending rearwardly from the camber portion; and
- (d) a lip seal formed as an integral part of the plunger along an outside edge of the camber portion, the lip seal having an outside surface set at a predetermined angle to and extending beyond the side wall.

**4,949,874**  
**DEVICE FOR DISPENSING AT LEAST TWO FLOWABLE SUBSTANCES**

Juergen Fiedler, Nettetal, and Albert Stoeffler, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Continuation of Ser. No. 07/279,372, Dec. 2, 1988, abandoned.  
This application Jan. 3, 1990, Ser. No. 462,892

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741086

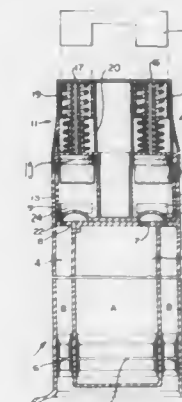
Int. Cl. B67D 5/60

U.S. Cl. 222—135

5 Claims

1. A device for dispensing at least two flowable substances, comprises:  
a container;  
at least two individually operable dosing units in an upper portion of said container;  
at least two separate compartments, one enclosing the other, in a lower portion of said container for receiving at least two flowable substances, respectively, for unpressurized

containment therein, said compartments each including an opening into one of said dosing units, respectively;  
said dosing units each being associated with an individual one of said compartments, respectively, each one of said dosing units including independent means for selectively withdrawing and dispensing a predetermined amount of associated flowable substance from their associated compartment;  
said dosing units each including:  
a cylinder;  
a spring-biased plunger guided within said cylinder;  
valving means within said cylinder including a valve flap located in the bottom of said cylinder, and immediately below said plunger, for sealing off an opening into an associated one of said compartments upon a downstroke



of said plunger, for opening upon an upstroke of said plunger for allowing flowable substance to flow from said associated compartment into said cylinder, and permitting the dispensing of said flowable substance out of said cylinder to a user;

the outermost one of said compartments including an opening at an inner circumferential edge proximate a wall common with the innermost compartment, with the opening being immediately below the associated valve flap of the associated said cylinder; and

the innermost one of said compartments including an opening at an outer circumferential edge proximate a wall common with said outermost compartment, with the opening being immediately below the associated valve flap of the associated said cylinder.

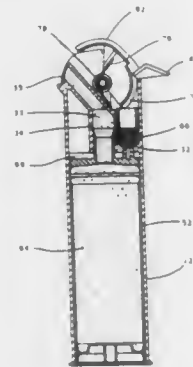
**4,949,875**  
**DISPENSER WITH INTEGRATED COVER FOR PASTE-LIKE MATERIAL**  
Youti Kuo, 88 Foxbourne Rd., Penfield, N.Y. 14526  
Continuation-in-part of Ser. No. 94,938, Sep. 10, 1988, Pat. No. 4,787,765. This application Nov. 28, 1988, Ser. No. 276,934  
Int. Cl. B67D 5/42

U.S. Cl. 222—156

6 Claims

1. A dispenser for paste-like material comprising:  
a. a housing;  
b. a reservoir situated within the housing for storing paste-like material;  
c. a stationary channel immovably fixed within the housing, said stationary channel having a first opening and a second opening;  
d. a well comprising a recess fixed within the housing and outside of and laterally offset from the stationary channel;  
e. pumping means comprising a piston having  
i. a piston head slidably mounted in the housing between the stationary channel and the reservoir;  
ii. a piston stem attached to the piston head and slidably mounted within the stationary channel;

- iii. an orifice which extends longitudinally through the piston head and piston stem; and
- iv. drive rod means having a lower end attached to the piston head and an upper end slidably mounted in the well;
- f. a cover rotatably attached to an end of the housing;
- g. a cap attached to the cover for sealing and unsealing the second channel opening as the cover is rotated; and



- h. a plunger attached to the cover for supplying a pumping force which sequentially activates the pumping means after rotational movement of the cover causes the cap to unseal the second channel opening, said plunger being spaced apart from the upper end of the drive rod means when the second channel opening is being sealed and said plunger being in contact with the upper end of the drive rod means when the second channel opening is being unsealed.

4,949,876

#### DISTRIBUTOR FOR A PASTY MATERIAL COMPRISING AN AXIAL PUSHBUTTON MEMBER WITH LATERAL DISTRIBUTION AND AN ELEMENT FOR MASKING ITS OUTLET ORIFICE

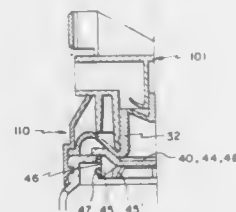
Bernard Schneider, Sainte Menehould, France, assignor to Cebal, Clichy, France

Filed Feb. 17, 1989, Ser. No. 311,771

Claims priority, application France, Feb. 19, 1988, 88 02507  
Int. Cl.<sup>5</sup> B67D 5/40

U.S. Cl. 222—209

11 Claims



1. A distributor for pasty material comprising a pushbutton member (101; 201) provided with a distribution conduit (105; 205) with a lateral outlet, the pushbutton member (101; 201) being longitudinally slidable with respect to a fixed part (110) of said distributor and acting on a spring-action return means (22; 32) and on the means (22, 230 and 202; 32, 34 and 35) for passing the flow of pasty material, said distributor comprising an outlet orifice (116), a masking element (113) with a surface (114) and an end surface (117) for masking the outlet orifice (116) of said distribution conduit (105; 205) in the released position of the pushbutton member (101; 201), said masking element (113) being carried by an external tubular part (110) of the distributor and leaving said orifice (116) open when said pushbutton member (101; 201) is depressed, characterised in

that said pushbutton member (101; 201) is slidable with respect to said external tubular part (110) of the distributor, said end surface (117) surrounding said outlet orifice (116) of said conduit (105; 205) and the surface (114) of the masking element (113) which is disposed facing said end surface (117) when the pushbutton member (101; 201) is released both being parallel to the direction of sliding movement (X) of the pushbutton member, the masking element (113) then cutting the end of the strand of pasty material and scraping said outlet orifice (117) and said end surface (116) of the distribution conduit (105; 205) when the pushbutton member (101; 201) is released; and said means (22, 230 and 202; 32, 34 and 35, 39 and 40) for passing the flow of the pasty material comprise a deformable tubular cup (22, 32) sealingly fixed to the body of the distributor and to the pushbutton member (101, 201), said cup (22, 32) delimiting a compression chamber (29, 38) and forming both the spring-action element and the compression means on which the pushbutton member (101, 201) acts by virtue of the depression movement thereof, and returning the pushbutton member to the released position.

4,949,877

#### FLUID DISPENSER VALVE

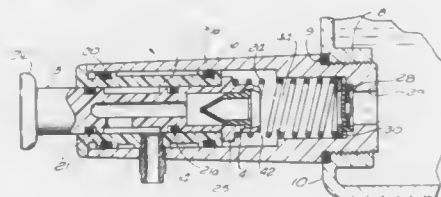
Emmanuel A. Hanna, Lakeview Terrace, and Henry J. Loewenthal, Santa Monica, both of Calif., assignors to Bobrick Washroom Equipment, Inc., North Hollywood, Calif.

Filed May 11, 1989, Ser. No. 350,650

Int. Cl.<sup>5</sup> B65D 88/54

U.S. Cl. 222—341

10 Claims



1. In a push-in flush dispenser having a fluid storage container and a plunger carried in said container, with said plunger being manually pushable inward for dispensing fluid from said container, the improvement comprising in combination:

a valve cylinder including means for mounting said cylinder in said container, said cylinder having an inner opening and an outer sleeve mounted in said container and an inner sleeve slidably inserted into said outer sleeve, with said plunger sliding in said inner sleeve, and an outlet nozzle joining said inner and outer sleeves and forming the outlet portion of said flow path,

with said plunger having a fluid flow passage therein providing a flow path from the interior of said cylinder to the exterior of said plunger within said inner sleeve and through said outlet nozzle to the exterior of said dispenser and having an outer end for engagement by an operator; first and second one-way valves, with said first one-way valve disposed for control of fluid flow into said interior of said cylinder through said inner opening and with said second one-way valve disposed for control of fluid flow from said interior into said plunger passage, said first one-way valve comprising a disc assembly of a relatively rigid washer with a central opening, and a relatively flexible resilient seal having an annular rim enclosing said washer and a central flapper joined to said rim and overlying said washer central opening;

spring means engaging said cylinder and plunger for urging said plunger outward away from said cylinder inner opening; and

interengaging stop means in said cylinder and plunger for limiting outward movement of said plunger and with engagement of said plunger with said cylinder limiting inward movement of said plunger;

said plunger and said inner sleeve having spaced first and second interengaging seal means for axial sliding of said plunger in said inner sleeve, with said seal means positioned to provide sealing between said plunger and inner sleeve around said flow path on said exterior of said plunger for the entire movement of said plunger between the outward and inward limited positions; with an inward force on said plunger moving said plunger inward compressing said spring means and forcing fluid from said interior of said cylinder out said plunger passage through said second one-way valve, and with said spring means moving said plunger outward drawing fluid from said container into said interior of said cylinder through said inner opening and first one-way valve.

4,949,878

#### REUSABLE CONTAINER SYSTEM

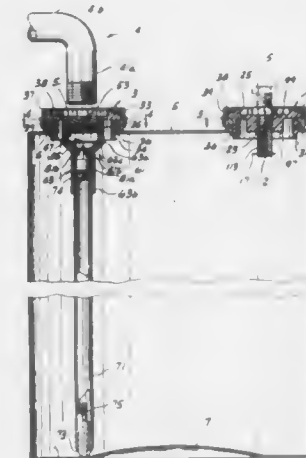
Stephen V. Jacobi, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 27, 1988, Ser. No. 289,898

Int. Cl.<sup>5</sup> B67D 5/40

U.S. Cl. 222—382

39 Claims



1. A reusable container system comprising a container for holding a bulk quantity of liquid or other fluent material, said container being adapted to be filled with said material at a first location and transported to a second location for unloading off material from the container,

pump means for pumping said material out of the container at said second location,

said container having top, bottom and side walls, a port in the top wall of the container through which material in the container may be unloaded by said pump means, a closure for closing said port, said closure having a tamper-evident connection with said container for indicating removal of the closure from the container, and a passage through the closure,

suction tube means attached to said closure and extending down into the container, said suction tube means having an upper end communicating with said passage through the closure and a lower end adjacent the bottom wall of the container communicating with the interior of the container for suction of liquid from the container up through said suction tube means and then out of the container via said passage,

a one-way check valve in said suction tube means permitting flow of liquid out of the container through said suction tube means but preventing flow of liquid into the container through said suction tube means, and connector means for releasably connecting said pump means and said container with said pump means in fluid-flow communication with said passage through the closure

whereby, after arrival of said container at said second location, said pump means is adapted to be releasably connected to the container for removal of liquid from the container and disconnected from the container after the container is emptied for transport of the container to another location for refilling,

said suction tube means comprising a tubular fitting attached to said closure, and a suction tube connected to said tubular fitting and extending downwardly to a point adjacent the bottom of the container, said suction tube and fitting being movable relative to one another to accommodate, for example, deformation of the top and bottom walls of the container, and spring means urging said suction tube downwardly relative to said fitting toward the bottom wall of the container.

4,949,879

#### DISPENSING MEANS FOR PIECES OF PRODUCT

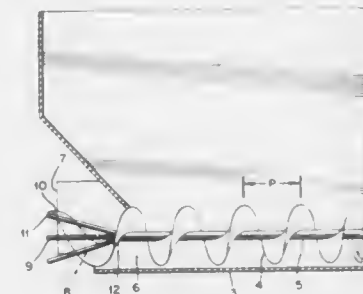
Rene G. Mariotti, St. Cloud, France, assignor to Ore-Ida Vended Products, Inc., Boise, Id.

Filed Aug. 4, 1987, Ser. No. 81,507

Claims priority, application France, Aug. 4, 1986, 86 11258  
Int. Cl.<sup>5</sup> G01F 22/00

U.S. Cl. 222—413

2 Claims



1. A means for dispensing a product in the form of pieces or chips, comprising: a hopper into which the pieces or chips of product are loaded, having a hopper discharge orifice; feed screw which is housed in the hopper to receive said product, said screw extending outwardly from the hopper through the hopper discharge orifice and having divergent legs located adjacent the hopper discharge orifice and extending in the feed direction of said product;

wherein the legs are of identical length; and wherein the length of each leg is greater than the normal pitch of the screw, and the pitch separating the final screw thread nearest the outwardly extending end of the screw and the thread most adjacent to the final screw thread is equal to the length of each leg.

4,949,880

#### HOMOGENIZER/PROPORTIONER DISPENSER FOR BOTTLES

Lawrence T. Bradley, 2723 Harrington Mews, Regina, Saskatchewan, Canada (S4T 7S8)

Filed Jun. 9, 1988, Ser. No. 204,261

Claims priority, application Canada, Jun. 8, 1987, 539152  
Int. Cl.<sup>5</sup> G01F 11/26

U.S. Cl. 222—454

8 Claims

1. A dispenser for bottles which include a neck and which may contain two or more unhomogenized immiscible ingredients of different specific gravities comprising a vertically situated web spanning said neck and dividing same into a first chamber and a mutually adjacent, substantially equal volume second chamber, the upper end of said web terminating just below the upper open end of the neck, said first chamber constituting an open ended channel communicating with the



UMI

d 18. In a process wherein a stream of molten metal flows  
ll downwardly, toward a molten metal bath, through a vertically  
disposed nozzle having a bottom part, and then through tubu-

lar shroud vertically aligned with said nozzle below the nozzle, said shroud having an annular upper portion surrounding the nozzle's bottom part and a lower end extending below the top surface of said molten metal bath, there being an annular clearance between the shroud's upper portion and the surrounded bottom part of the nozzle, and wherein said stream of molten metal descending through said shroud reduces the pressure within said shroud to a level below the pressure in the atmosphere outside said shroud, a method for preventing air in the atmosphere outside said nozzle and said shroud from being aspirated into the interior of said shroud through said clearance, said method comprising the steps of:

- introducing an inert gas into said clearance;
- providing a ring of said inert gas around said nozzle adjacent said clearance and in communication with said inert gas in the clearance;
- maintaining the pressure of said inert gas in said ring above the pressure of the atmosphere outside said shroud;
- preventing the escape of said inert gas from said clearance and said ring into the outside atmosphere around said nozzle, and preventing the entry into said clearance of air from said outside atmosphere when there are eddy currents in the inert gas within said clearance.

4,949,886

#### HORIZONTAL OR VERTICAL ROTARY VALVE FOR A METALLURGICAL VESSEL

Ernst Lührs, Bad Schwalbach; Ulrich Hintzen, Taunusstein-Watzbahn, and Raimund Brückner, Engenhahn, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 227,880, Aug. 3, 1988, Pat. No. 4,913,324. This application Sep. 19, 1988, Ser. No. 248,550

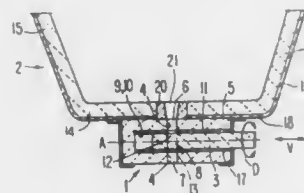
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1987, 3731600

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> B22D 41/14

U.S. Cl. 222-599

32 Claims



1. A rotary valve for controlling the discharge of molten metal in a substantially downward direction from a metallurgical vessel, said valve comprising:

- a refractory rotor to be rotatable about an axis to be aligned substantially horizontally, said rotor having a cylindrical outer peripheral surface arranged symmetrically about said axis, and said rotor having therethrough a flow channel having inlet and outlet ports, at least one of said inlet port and said outlet port opening onto said outer surface;
- a refractory stator having therein a recess defined by a cylindrical inner surface complementary to said outer surface of said rotor, said stator having therethrough a discharge channel, said stator being mountable on the exterior of the bottom of a metallurgical vessel; and
- said rotor being mounted to at least partially fit within said recess in said stator with said outer and inner surfaces of said rotor and stator, respectively, being complementarily positioned symmetrically about said axis, such that said rotor is rotatable about said axis relative to said stator and is movable in opposite directions axially relative to said stator, whereby rotation of said rotor about said axis relative to said stator and axial movement of said rotor within said recess relative to said stator selectively bring said

flow channel of said rotor into and out of alignment with said discharge channel of said stator.

4,949,887

#### INSULATED MULTI-USE SEAT CUSHION WITH CLOSABLE HAND AND FOOT OPENINGS

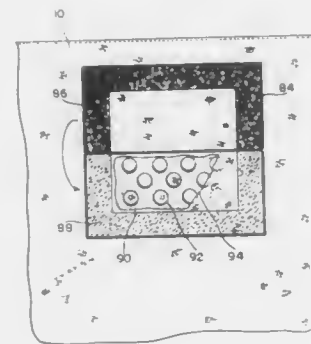
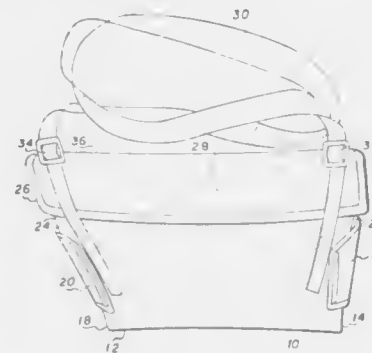
William A. Holmes, 209 Highland Ave., Piedmont, Calif. 94611-3709

Continuation-in-part of Ser. No. 867,453, May 28, 1986, abandoned. This application Dec. 15, 1987, Ser. No. 132,982

Int. Cl.<sup>5</sup> A61G 1/00

U.S. Cl. 224-151

20 Claims



1. An insulating seat cushion which can also provide an insulating container or insulate a human user's hands or feet, comprising, in combination:

front and back panels, each of which has top, bottom and two side edges, each panel having inner and outer opposing major surfaces, said panels being positioned in an overlying, face-to-face relationship such that their inner surfaces face each other, each of said panels being made of insulating material,

said panels being permanently joined directly together at their bottom edges and their respective corresponding side edges, including the top of each side edge and along the length of said corresponding side edges, except for a pair of side openings, such that when nothing is positioned between said front and back panels, (a) said inner surfaces of said front and back panels will be in contact with each other, (b) said inner surfaces will lie parallel to each other, and (c) said entire panels, including said outer surfaces thereof, will be parallel to each other, whereby said device with said opposing and parallel outer surfaces can be usable as a cushion,

said front and back panels being large enough so that said device can contain the hands or feet of a user, or cover the seat area of such user,

each of said side openings being spaced from the top of its side edge and being shorter than its respective side edge,

but wide enough to accommodate the passage of a hand therethrough so that said hand can be positioned between said inner surfaces of said panels,

a pair of closure flaps for repeatably closing and opening said respective side openings, each of said closure flaps having one end which is attached to the exterior of one side of said cushion and being arranged so that a user's hand can be inserted into said side opening and remain in said cushion without contacting a closure flap, each of said closure flaps having a height which is less than the height of its respective side edge, the exterior of the other side of said cushion and an opposite end of each closure flap containing means for temporarily attaching said opposite end of each closure flap to the exterior of said other side of said cushion,

said cushion having a relatively large top opening which extends substantially across the entire width of the top portion of said cushion from side edge to side edge, and means for repeatably closing the opening said relatively large top opening,

whereby said cushion can alternatively be used as a hand warmer by inserting one's hands through said side openings with said top opening closed, a foot warmer by inserting one's feet through said top opening with said side openings closed, as a seat cushion by closing both said top and said side openings, and as an insulated container by placing hot or cold objects therein.

4,949,888

#### HUNTER'S SUSPENDERS

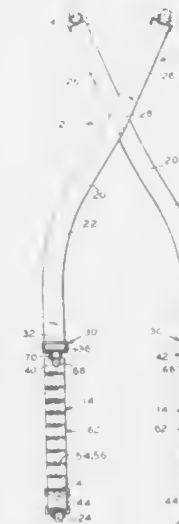
Everett L. May, Cheshire, Oreg., assignor to May Manufacturing, Ltd., Lebanon, Oreg.

Filed Dec. 7, 1989, Ser. No. 447,431

Int. Cl.<sup>5</sup> F42B 39/02

U.S. Cl. 224-203

4 Claims



1. Suspenders, which comprise:

- a. a shoulder and back section, formed of:
  - (1) two lengths of longitudinally elasticized webbing, each having a first end and a second end;
  - (2) means for connecting the first ends of said webbing lengths to a pant garment at a back location thereof;
  - (3) said two webbing lengths being joined to each other intermediate said first and second ends; and
  - (4) detachable connecting means attached at said second ends;
- b. two front sections, each formed to include:
  - (1) a first length of longitudinally elasticized webbing, having an upper end and a lower end;
  - (2) detachable connecting means, at the upper end of said front section, which are engagable with said detachable

connecting means located at the second end of a webbing length of said shoulder and back section;

(3) means for connecting the lower end of the webbing length of the front section to a front location of said pant garment; and

(4) a second length of longitudinally elasticized webbing which is oriented adjacent and parallel to said first webbing length, whereat the second length is attached to said first webbing length by a plurality of equally spaced transverse attachments, wherein each pair of said adjacent transverse attachments, in combination with the first webbing length and second webbing length included therebetween, form a transverse tube of expandable diameter, into which a single unit of ammunition may be inserted for carrying.

4,949,889

#### BRACKET FOR MOUNTING AUXILIARY COMPRESSED AIR TANK TO A MAIN TANK

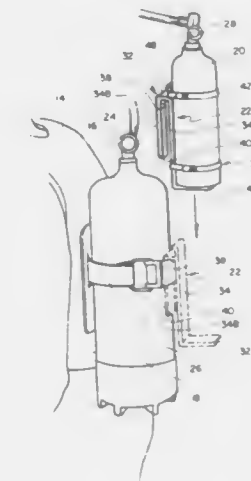
Ronald H. Carson, 3919 S. Holden Rd., Greensboro, N.C. 27406

Filed Jun. 13, 1989, Ser. No. 365,750

Int. Cl.<sup>5</sup> A45F 5/00

U.S. Cl. 224-270

5 Claims



1. In combination with an underwater or like breathing apparatus of the type having a harness to be worn by a user, a main compressed air tank, and a strap for securing said main tank to said harness, an auxiliary compressed air tank and an apparatus for releasably mounting said auxiliary compressed air tank to said breathing apparatus in tandem with said main tank for normal wearing of said auxiliary tank as a part of said breathing apparatus and selective removal of said auxiliary tank for use without removal of the breathing apparatus by the user, said mounting apparatus comprising:

- a bracket having a pair of mounting legs connected in relatively closely spaced facing relation to one another and defining therebetween a strap receiving area with respective adjacent ends of said legs unconnected to one another defining a strap insertion slot into said strap receiving area; and
- means for clamping one said mounting leg rigidly to the auxiliary tank with the other said mounting leg spaced outwardly therefrom, wherein the other said leg is selectively insertable into and removable from a disposition between the main tank and the securing strap of the harness in which the strap is inserted through said strap insertion slot into said strap receiving area of said bracket when the strap is in a loosened condition and in which the other said leg is rigidly held between the strap and the main tank



when the strap is tightened to effect rigid mounting of the auxiliary tank to the main tank.

4,949,890

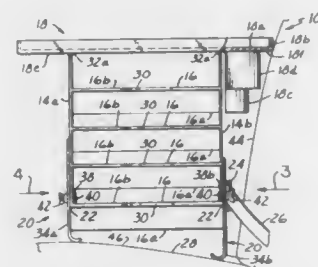
**FILING, ORGANIZING AND DESK DEVICE FOR USE IN MOTOR VEHICLES**

Victor K. Schultz, 21310 Willow Wisp, St. Clair Shores, Mich. 48082

Filed Jun. 28, 1989, Ser. No. 373,141  
Int. Cl.<sup>5</sup> B60R 7/00

U.S. Cl. 224—275

22 Claims



1. A filing and organizing device for use in connection with a passenger seat of a motor vehicle, said passenger seat having a seat portion and a back portion, said motor vehicle further having a seat belt for use by an occupant of said passenger seat, said seat belt having a lap portion, said filing and organizing device comprising:

- a pair of sidewalls, each sidewall of said pair of sidewalls being mutually spaced apart, each said sidewall having an upper end and a lower end, each said lower end terminating in a foot for resting upon said portion of said passenger seat, each said foot providing a contact point with said passenger seat;
- a plurality of shelves connected between each sidewall of said pair of sidewalls, each shelf of said plurality of shelves having a front end, a rear end and two side ends, each shelf of said plurality of shelves being connected to said pair of sidewalls at its respective said two side ends, each said shelf being accessible from its respective said front end;
- a top connected with said upper end of each said sidewall, said top having a desk surface;
- restraining means connected with one sidewall of said pair of sidewalls for selectively engaging said lap portion of said seat belt of said passenger seat so that said filing and organizing device may be secured to said passenger seat; and
- an overhang integrally connected with said top at a location adjacent one of said sidewalls, said overhang being dimensioned to contact said back portion of said passenger seat when said filing and organizing device is secured to said passenger seat by said restraining means, said overhang thereby serving to provide another contact point with said passenger seat which is in addition to that provided by each said foot.

4,949,891

**APPARATUS FOR FEEDING A LABEL-PRINTING TAPE**  
Kyonichi Yamashita, Yokohama, Japan, assignor to Koyou Jidouki Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 577,917, Feb. 7, 1984, abandoned. This application Oct. 7, 1985, Ser. No. 786,138

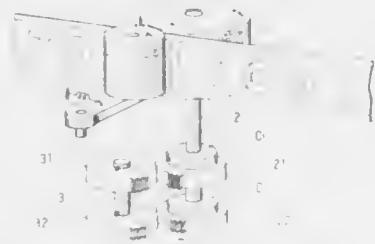
Claims priority, application Japan, Jul. 13, 1983, 58-126212  
Int. Cl.<sup>5</sup> B65H 20/02, 23/188

U.S. Cl. 226—30

9 Claims

1. An apparatus for feeding a tape having label patterns printed thereon comprising; a feed drum attached to a main shaft; a pressure drum held in contact with said feed drum to feed the tape therebetween; a drive shaft extending parallel to said main shaft; a pair of clutches having fixed portions fixed to

said main shaft; a first gear associated with a first of said clutches and made unitary with said main shaft when said first clutch is engaged; a second gear associated with a second of said clutches and made unitary with said main shaft when said



second clutch is engaged; gear means mounted on said drive shaft for continuously driving both said first and second gears at respectively different speed ratios; and control means for selecting the engagement of either said first clutch or said second clutch.

4,949,892

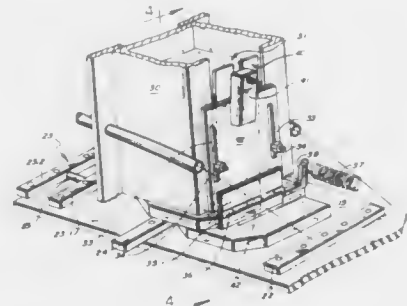
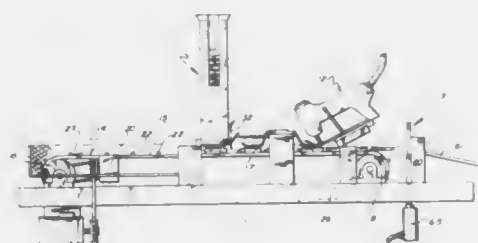
**METHOD AND APPARATUS FOR MAKING FLEXIBLE SECTIONS OF FENCE**

John C. Neely, 152 Muriel Blvd., West St. Paul, Minn. 55118, and John M. Czech, Jr., 529 Peterson La., Chippewa Falls, Wis. 54729

Filed Oct. 13, 1989, Ser. No. 421,533  
Int. Cl.<sup>5</sup> B27F 7/00

U.S. Cl. 227—44

14 Claims



1. A machine for automatically making elongate flexible sections of fence from a multiplicity of precut pickets and a flexible stringer along a horizontal work table, comprising:

- a. an elongate endless moving belt for moving the pickets along the work table in a spaced relationship, said belt further having a start point defining the end of a fence section;
- b. a hopper disposed vertically overlying the moving belt

receiving and storing the multiplicity of pickets, and individually dispensing the pickets along the moving belt; the hopper further having a movable separator door and a settable mounted separator each attached forwardly onto the hopper bottom for separating the bottom two pickets from the stack and dropping said bottom-most picket onto said moving belt without interference of the second bottom picket thereabove;

c. means for drawing a continuous elongate stringer and positioning the stringer along the surface of the pickets along the moving belt;

d. means for positioning and affixing a fastener attaching the stringer at a defined location on each of said pickets; and

e. a cutter assembly for cutting the stringer at predetermined lengths responsive to the position of the moving belt.

4,949,893

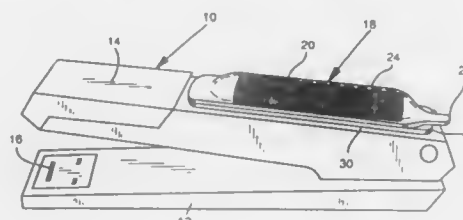
**EMERGENCY STAPLE PACK**

Carolann M. Heckathorn, 14422 N.W. Hunters Dr., Beaverton, Oreg. 97006

Filed Aug. 18, 1989, Ser. No. 395,657  
Int. Cl.<sup>5</sup> B25C 5/02; B65D 85/24

U.S. Cl. 227—120

2 Claims



1. In combination, a stapler having a base portion, a pivoted hand operated pusher arm on said base portion with top and side surface portions, an emergency staple pack comprising a bottom wall having upper and lower surfaces and end portions and being arranged to support a single strip of staples on said upper surface thereof for use as an emergency supply, enclosure means on said bottom wall enclosing a single strip of staples, a non-setting adhesive on the lower surface of said bottom wall arranged to temporarily attach said staple pack to one of said surface portions of the stapler, said bottom wall being dimensioned selectively relative to the surface portions of the pusher arm such that when attached to one said surface portions it is confined within the dimensions of said one of said surface portions.

4,949,894

**METHOD AND APPARATUS FOR FORMING ULTRA-SMALL OPTICAL FIBER CABLE ASSEMBLIES**

Joseph Winter, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Jun. 7, 1984, Ser. No. 618,271  
Int. Cl.<sup>5</sup> H04B 9/00

U.S. Cl. 228—148

22 Claims

1. An apparatus for fabricating an optical fiber cable for use in communication applications, said apparatus comprising: means for forming an assembly having at least one optical fiber encapsulated in a metallic tube having an ultra-small diameter, said assembly forming means comprising means for forming said tube from a strip of metal or metal alloy in a desired condition; said tube being characterized by a longitudinally extending seam;

means for sealing said seam to provide a hermetic tubular structure; and means for applying a tensile force to said metal or metal alloy strip to pull said metal or metal alloy strip through



said tube forming means, said tensile force applying means being positioned between said tube forming means and said sealing means so as to apply said tensile force to said metal or metal alloy before deration of the condition of said metal or metal alloy.

4,949,895

**PROCESS OF FIXING INTERNALLY TITANIUM-LINED DOUBLE-WALLED TUBING STRUCTURE TO TITANIUM TUBE SHEET**

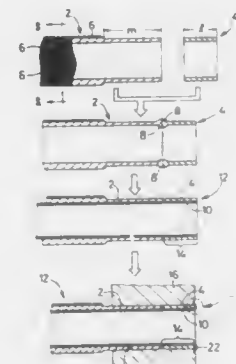
Yoshihiko Sugiyama, Tadashi Nozotani, Keizo Namba, and Hiromiti Sano, all of Nagoya, Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Filed Jan. 25, 1985, Ser. No. 695,048

Claims priority, application Japan, Jan. 31, 1984, 59-16855  
Int. Cl.<sup>5</sup> B23K 31/02; F16L 9/14

U.S. Cl. 228—175

21 Claims



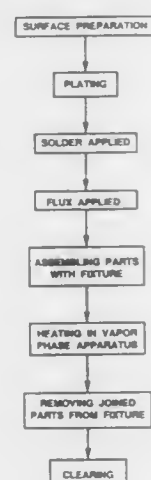
1. A process for fixing an internally titanium-lined double-walled tubing structure to a titanium tube sheet of a condenser wherein the tubing structure is exposed at its end faces to a corrosive cooling fluid, said double-walled tubing structure comprising an aluminum outer tube made of aluminum or an aluminum alloy, and a titanium inner lining tube made of titanium or a titanium alloy, and fixed to said aluminum outer tube in pressed contact with an inner surface of the outer tube, the tubing structure being fixed to said titanium tube sheet such that an outer surface of said aluminum outer tube is exposed to a condensable working fluid while an inner surface of said titanium inner lining tube is exposed to said corrosive cooling fluid, said process comprising the steps of:

pressure-welding an end face of a titanium collar of a predetermined length made of titanium or a titanium alloy to an end face of said aluminum outer tube, and thereby forming an integral titanium end portion consisting of said titanium collar at one end of said outer tube;

inserting said titanium inner lining tube in the outer tube including said titanium end portion, and fixing the titanium inner lining tube to said outer tube in pressed contact with the inner surface of the outer tube including said

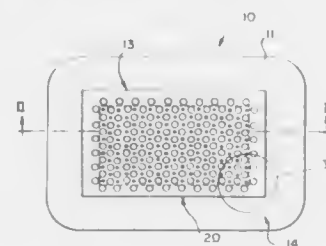
titanium end portion, to form said internally titanium-lined double-walled tubing structure; and inserting an end section of said double-walled tubing structure including said titanium end portion, in a mounting hole formed in said titanium tube sheet, and welding said titanium end portion of the outer tube and a corresponding end portion of the titanium inner lining tube to said titanium tube sheet.

**4,949,896**  
**TECHNIQUE OF ASSEMBLING STRUCTURES USING VAPOR PHASE SOLDERING**  
Noel C. Peterson, Severna Park, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
Filed Oct. 19, 1984, Ser. No. 663,015  
Int. Cl.<sup>5</sup> B23K 1/20  
U.S. Cl. 228—205



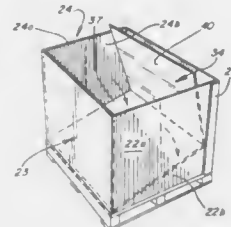
1. A process for joining aluminum parts having a plurality of joints to form a lightweight structure, said process comprising the steps of:  
cleaning said parts to remove foreign matter from the surfaces of said parts;  
masking selectively areas of said surface to prevent the deposition of solderable metals thereupon;  
depositing a first layer of metal selectively upon said surfaces to prevent oxidation;  
depositing a second layer of metal selectively upon said first layer of metal, said second layer being solderable;  
placing selectively an eutectic alloy solder on said second layer where joints are to be formed;  
coating said solder and said joints with flux;  
fixturing said parts to form said structure, a fixture for fixturing being made of a metal having a lower coefficient of expansion than aluminum, said eutectic alloy solder being held in said joints by said fixture before heating, upon heating, said fixture holding said joints together;  
heating said structure being fixtured in a vapor phase apparatus to cause said solder to flow in said joints simultaneously, said heating being at about 215° C;  
cooling said structure, said structure becoming loosely held by said fixture after cooling;  
removing said structure from said fixturing;  
removing masking; and  
cleaning said structure of residue matter.

**4,949,897**  
**PRODUCT TRAY**  
David M. Pawlak, Richmond, and Darryn R. Adams, Vancouver, both of Canada, assignors to KNX Holdings International Ltd., British Columbia, Canada  
Filed May 3, 1989, Ser. No. 346,742  
Int. Cl.<sup>5</sup> B65D 1/34  
U.S. Cl. 229—2.5 R



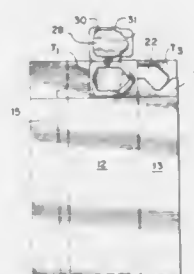
1. A product tray comprising a first layer having a central area and a sidewall area, a second layer located beneath and positioned a distance from said first layer in said central area and having a raised portion substantially conterminous with said central area, a first series of protuberances extending from said raised portion toward said first layer, a plurality of holes extending through said first layer in said central area, and having a reservoir area around said central area.

**4,949,898**  
**PALLETIZED CONTAINER**  
Terrill L. Nederveld, Ada, Mich., assignor to Packaging Corporation of America, Evanston, Ill.  
Filed Jan. 13, 1989, Ser. No. 297,421  
Int. Cl.<sup>5</sup> B65D 5/32  
U.S. Cl. 229—117.02



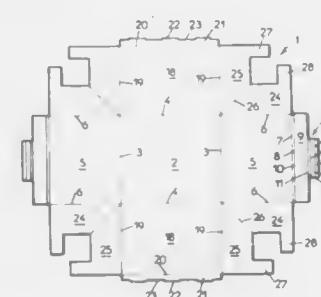
1. A palletized container comprising a collapsible receptacle section supported and subtended by an upper surface of a pallet section; said receptacle section including a plurality of foldably interconnected pairs of outer wall panels adapted to extend upright from the pallet section upper surface when said receptacle section is in a set up mode, a first pair of outer wall panels being disposed in opposed relation, each panel of said first pair being provided with a pair a complemental panel segments foldably interconnected and adapted to assume a substantially planar relation when said receptacle section is in the set up mode, and to assume a folded substantially face to face relation intermediate a second pair of outer wall panels when said receptacle section is in a collapsed mode and overlying said pallet section upper surface, one panel of the second pair being provided with a flap foldably connected to a bottom-forming edge thereof and fixedly secured to the upper surface of the pallet section adjacent a perimeter thereof, and adjustable means, when in one position of adjustment, coacting with said receptacle wall panels to effect retention thereof in said set up mode; said receptacle section, when in the collapsed mode, having the outer wall panels thereof disposed in substantially overlying stacked relation with respect to the pallet section upper surface and substantially disposed within the perimeter of the pallet section upper surface.

**4,949,899**  
**COLLAPSIBLE, FOLDABLE DISPENSING CARTON**  
James L. Stone, Grand Rapids, Mich., assignor to Packaging Corporation of America, Evanston, Ill.  
Filed Apr. 21, 1989, Ser. No. 341,560  
Int. Cl.<sup>5</sup> B65D 5/66  
U.S. Cl. 229—125.09



1. A collapsible foldable dispensing carton comprising a pair of opposed first wall panels; a pair of opposed second wall panels, the wall panels of said pairs being interposed and foldably interconnected to one another; a pair of top closure first flaps foldably connected to upper edges of said first wall panels; a pair of top closure second flaps foldably connected to upper edges of said second wall panels, said first and second flaps being in overlapping close relation when said carton is in a set up mode whereby one first flap is an outermost flap and is provided with a dispensing opening and one of the other flaps is provided with means whereby the dispensing opening is in communication with the interior of the carton, when the latter is in the set up mode and the flaps are in the close relation; and a fitment of thin material mounted on an exposed surface of the outermost flap and in registry with the dispensing opening, said fitment including a base section affixed to a predetermined portion of the exposed surface circumjacent the dispensing opening, said base section being provided with an aperture in registry with the dispensing opening, and a cover section mounted for hinged adjustment relative to said base section between fully open and close modes, said cover section, when in a fully open mode, being disposed substantially outside the periphery of the outermost top closure flap to which said base section is affixed.

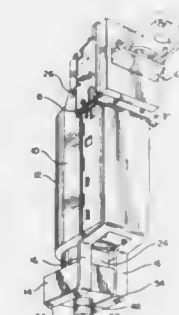
**4,949,900**  
**CARDBOARD CONTAINER FOR COMPACTING**  
Patrick J. N. Ballu, Reims, France, assignor to Caruelle, France  
Filed May 12, 1989, Ser. No. 351,029  
Claims priority, application France, May 16, 1988, 88 06518  
Int. Cl.<sup>5</sup> B65D 5/24  
U.S. Cl. 229—125.26



1. A cardboard container in which materials can be compacted and retained, said container comprising a body and a cover, said body being formed from a first flat blank which has fold lines so as to define a generally rectangular central panel,

two opposite front panels, two opposite lateral panels, four corner panels, and respective first projections extending away from said front panels in a direction opposite said central panel, each corner panel including an indentation that provides a tab and a diagonal fold line, said central panel, when said first blank is folded along said fold lines, providing a bottom wall of said body, said front panels providing opposite front walls of said body, said lateral panels providing opposite side walls of said body, said tabs of respective corner panels adjacent each front wall extending towards one another outwardly of the adjacent front wall, and each first projection extending from a front wall being folded over tabs located outwardly of said front wall to provide a handle, and said cover being formed from a second flat blank which has fold lines so as to define a generally rectangular central section, two opposite front sections, and respective second projections extending from said front sections in a direction opposite said central section, said cover being insertable between the front and side walls of said body to retain material in said body, said second projections being extendable over said handles and between said handles and the adjacent front wall.

**4,949,901**  
**SELF-LOCKING BILL ACCUMULATOR**  
Robert R. Harris, Schaumburg, Ill., assignor to Jerome Remien Corporation, Skokie, Ill.  
Filed May 11, 1989, Ser. No. 350,306  
Int. Cl.<sup>5</sup> G07B 15/00  
U.S. Cl. 232—15

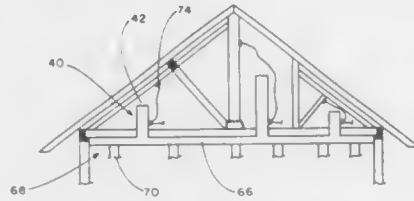


1. A bill accumulator system for receiving and storing bills, comprising:  
an outer housing having an open face for receiving bills from a bill validator;  
an inner housing having an open face for receiving and storing bills inside the inner housing, rotatably mounted inside the outer housing;  
first actuating means mounted to at least one of the inner and outer housings for rotating the inner housing relative to the outer housing, comprising an inner locking means for selectively locking the inner housing into an open position for receiving bills in which the open face of the inner housing corresponds to the open face of the outer housing, and a closed position for blocking the passage of bills in which the open face of the inner housing points away from the open face of the outer housing;  
second actuating means engageable to the first actuating means for driving the first actuating means, comprising a first key means engageable to the inner locking means and a second locking means for selectively locking the second actuating means to the first actuating means as the inner housing is rotated to its open position, and for releasing the first actuating means from the second actuating means as the inner housing is rotated to its closed position; and



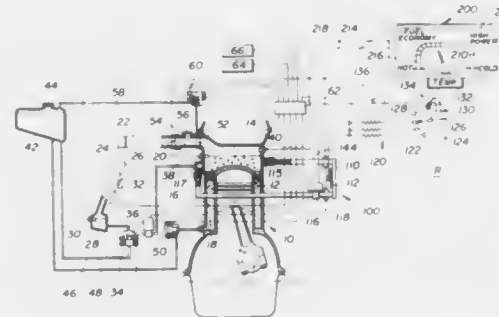
means for mounting the bill accumulator system onto a bill validator.

**4,949,902**  
**BUILDING HEATING SYSTEM**  
 Charles W. Mills, 21011 Oak Ridge Rd., Sheridan, Ind. 46069  
 Filed Jan. 2, 1990, Ser. No. 459,516  
 Int. Cl.<sup>5</sup> F24F 7/00  
 U.S. Cl. 236—49.3 5 Claims



1. A building heating system which comprises:
  - (A) a warm air inlet system located in an attic area of a building and including
    - (1) a plurality of inlet ducts positioned at spaced apart locations in the attic area and extending through a floor of the attic,
    - (2) a fan unit mounted in each inlet duct to draw air from the attic area into each inlet duct when said fan is operated,
    - (3) an air flow control valve mounted in each duct to control the amount of air flowing into the duct;
  - (B) a manifold mounted adjacent to the attic floor and fluidically connected to each inlet duct to receive warm air therefrom;
  - (C) a warm air outlet system which includes a plurality of warm air outlet ducts positioned at spaced apart locations throughout the building and each fluidically connected to said manifold to receive warm air therefrom; and
  - (D) a control system which includes
    - (1) an inlet duct control unit mounted on each inlet duct and including
      - (a) a fan unit control circuit means,
      - (b) an air flow control valve control circuit means,
      - (c) a temperature sensing thermocouple located in the attic and generating a temperature dependent signal, and
      - (d) a temperature signal relaying circuit which receives said temperature dependent signal, and
    - (2) a main control circuit means which includes
      - (a) a circuit means which receives the temperature dependent signal from each thermocouple via said inlet duct control unit temperature signal relaying circuits on each inlet duct, and
      - (b) a comparator circuit means which continuously receives all temperature dependant signals and continuously compares each temperature dependant signal to a reference and to other temperature dependant signals and continuously selects a maximum temperature signal that exceeds said reference and also exceeds all other temperatures sensed by the rest of said thermocouples and which signals all of said inlet duct control units to activate one fan and one flow control valve associated with the temperature sensing thermocouple sensing said maximum temperature and shuts off all other fans and flow control valves so that only the fan and valve of that inlet duct associated with the highest temperature in the attic are operated and all other fans and flow control valves are shut off.

**4,949,903**  
**PASSENGER ROOM HEATING SYSTEM FOR USE WITH BOILING LIQUID ENGINE COOLING SYSTEM**  
 Yoshimasa Hayashi, Kamakura, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
 Filed Feb. 26, 1985, Ser. No. 705,923  
 Claims priority, application Japan, Mar. 2, 1984, 59-40053  
 Int. Cl.<sup>5</sup> G05D 31/20  
 U.S. Cl. 237—2 A 12 Claims

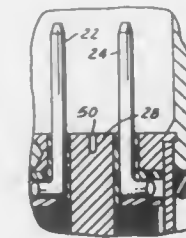


1. In a motor vehicle powered by a combustion engine cooled by a boiling liquid cooling system which includes a coolant jacket defined in the engine proper and containing therein a liquid coolant to a certain level to cover highly heated portions of the engine, a condenser for condensing the gaseous coolant introduced therinto from said coolant jacket and recirculating means for recirculating the coolant thus liquefied in the condenser back into the coolant jacket, a passenger room heating system comprising:
  - a heat exchanger exposed to the passenger room of the vehicle, said heat exchanger including a heater core through which a liquid flows for achieving heat exchange between the liquid and air surrounding said heater core;
  - a first conduit means extending from said coolant jacket to a coolant inlet of said heat exchanger;
  - a second conduit means extending from a coolant outlet of said heat exchanger to said coolant jacket; and
  - pumping means for enforcedly circulating the coolant through said first conduit means, said heat exchanger, said second conduit means and said coolant jacket in this order,
 wherein said first conduit means is exposed at its open end to the coolant jacket at a position below the certain level of the liquid coolant in the vicinity of said highly heated portions, so that upon operation, the liquid coolant positioned near said highly heated portions is forcedly introduced into the heat exchanger through said first conduit means.

**4,949,904**  
**CALIBRATION OF FUEL INJECTORS VIA PERMEABILITY ADJUSTMENT**  
 George T. Bata, Grafton, and David P. Wiczorek, Newport News, both of Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.  
 Filed Aug. 7, 1989, Ser. No. 390,563  
 Int. Cl.<sup>5</sup> F02M 51/00, 65/00  
 U.S. Cl. 239—5 8 Claims

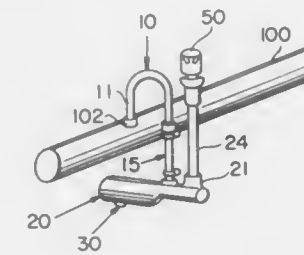
1. The method of calibrating a fuel injector for desired dynamic fuel flow, said fuel injector being of the type comprising a body, a fuel path through said body leading from a pressurized fuel inlet to a fuel outlet, a solenoid coil and an associated magnetic circuit that are associated with said fuel path and arranged to be operated to create dynamic flow through said fuel path, said method comprising:
  - operating the fuel injector under certain controlled conditions to create dynamic fuel flow through said fuel path;

measuring the fuel flow through the injector while so operating the injector; and



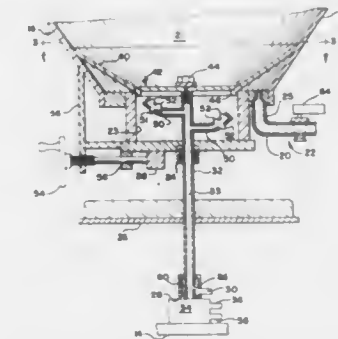
while the fuel injector is so operating, creating a blind hole in said magnetic circuit to cause the injector to produce a desired dynamic fuel flow.

**4,949,905**  
**SPRINKLER HEAD MOUNTING SYSTEM**  
 Gregory A. Jones, 40498 Hwy. 59, Yuma, Colo. 80759, and Dale D. Anderson, Yuma, Colo., assignors to Gregory A. Jones, Yuma, Colo.  
 Filed Aug. 26, 1988, Ser. No. 237,524  
 Int. Cl.<sup>5</sup> B05B 15/06; E02B 13/00  
 U.S. Cl. 239—279 9 Claims



1. A sprinkler head mounting system for connecting a sprinkler head to a horizontal water supply pipe in an irrigation system, said mounting system comprising:
  - (a) a U-shaped tubular member having first and second ends, wherein said first end is adapted to be operably secured to said supply pipe in a manner such that water flows into said first end of said tubular member;
  - (b) a flexible tubular member having first and second ends, wherein said first end is coupled to said second end of said U-shaped tubular member and receives water flowing through said U-shaped member;
  - (c) a tubular riser member having upper and lower ends, wherein said sprinkler head is adapted to be operably secured to said upper end;
  - (d) conduit means having an inlet portion operably connected to said second end of said flexible tubular member and an outlet portion operably connected to said lower end of said riser;
  - (e) a counter-weight carried by said conduit means and extending horizontally outwardly therefrom, said counter-weight being adapted to balance the weight of said riser and said sprinkler head in a manner such that said riser is maintained in a generally vertical plane; wherein said counter-weight comprises a body member having a cavity therein which communicates with said conduit means, wherein said cavity is adapted to become filled with water when said irrigation system is operating.

**4,949,906**  
**CONVERTIBLE DISPENSING SYSTEM**  
 Oliver Godwin, U.S. Road 41-27, P.O. Box 1136, High Springs, Fla. 42643  
 Filed Mar. 22, 1989, Ser. No. 327,294  
 Int. Cl.<sup>5</sup> A01C 23/00  
 U.S. Cl. 239—663 9 Claims



1. A convertible dispensing system for selectively dispensing solid and liquid phase materials, comprising:
  - a tank structure including downwardly extending sidewalls and defining a single materials chamber;
  - first dispensing means positioned generally at the lower extent of said tank structure, said first dispensing means being adapted to dispense, by gravity, particulate solids from within said tank structure, said first dispensing means comprising adjustable gate means for controlling flow of said particulate solids from within said tank structure through a first opening;
  - second dispensing means positioned generally at the lower extent of said tank structure, said second dispensing means being adapted to dispense, by gravity, a liquid material from within said tank structure, said second dispensing means comprising valve means for controlling flow of said liquid material from within said tank structure through a second opening discrete from said first opening; and,
  - means for selectively converting said system for dispersing materials of different phase, said converting means being positioned within the materials chamber and configured for selectively by-passing one of said first and said second dispensing means, while maintaining the other of said dispensing means in communication with the materials chamber of said tank structure, including means for by-passing said flow controlling valve means while said adjustable gate means is maintained in communication with said single materials chamber of said tank structure, and means for by-passing said adjustable gate means while maintaining said flow controlling valve means in communication with said single materials chamber.

**4,949,907**  
**BALL-TUBE MILL**  
 Vasily S. Bogdanov; Nikolai S. Bogdanov; Nikolai D. Vorobiev, all of Belgorod, and Alexandr D. Netesin, Stary Oskol, all of U.S.S.R., assignors to Belgorosky Tekhnologicheskyy Institut, Stroitelnykh Material OV Imeni, I.A. Grishmanova, Belgorod, U.S.S.R.  
 Continuation of Ser. No. 184,284, Apr. 21, 1988, abandoned.  
 This application Sep. 6, 1989, Ser. No. 403,597  
 Int. Cl.<sup>5</sup> B02C 17/06 4 Claims

1. A ball-tube mill comprising:
  - a lined drum having a longitudinal axis;
  - a coarse grinding chamber inside said lined drum;
  - a fine grinding chamber inside said lined drum;

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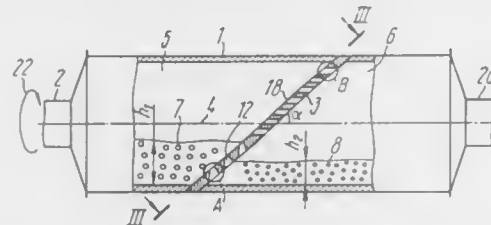
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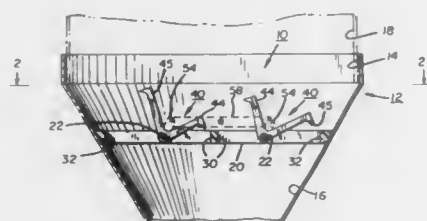
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coarse and fine grinding bodies respectively occupying said coarse and fine grinding chambers; an elliptical wall having an outer contour and a minor axis extending transversely to said longitudinal axis, said wall dividing said lined drum into said coarse and fine grinding chambers and being inclined at an angle in relation to said longitudinal axis and defining first and second contacting



areas respectively contacting said coarse and fine grinding bodies during rotation of said drum; and through holes having longer and shorter sides for the passage of material, said holes being provided only in said first contacting area of said inclined wall and having a length substantially greater than their width, the longer sides of each hole extending substantially in parallel to the outer contour of said inclined wall.

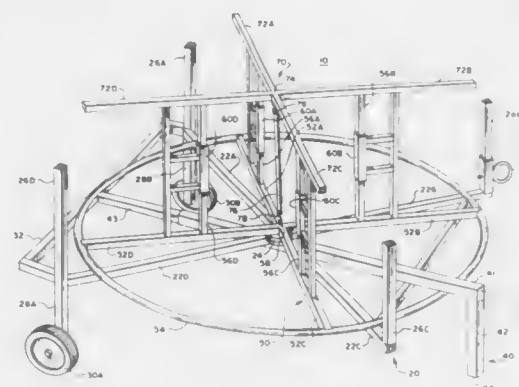
**4,949,908**  
**ROCKER-TYPE LUMP BREAKER**  
Helmut Habicht, 15 Royal Park Ter., Hillsdale, N.J. 07642  
Filed Oct. 23, 1989, Ser. No. 425,558  
Int. Cl.<sup>5</sup> B02C 1/02  
U.S. Cl. 241—84.3 11 Claims



1. A rocker-type lump breaking apparatus for breaking oversized or lumped granular materials into acceptable sizes, said granular material carried in a hopper, said lump breaking apparatus including:  
(a) at least one first aperture provided in and through a wall of a hopper;  
(b) a substantially flat deck member contoured to closely fit at a selected position interior of the hopper;  
(c) a plurality of elongated apertures, selectively positioned in and through each major surface of said deck member, said plurality of apertures arrayed in at least one row, each major axis of said elongated apertures arrayed in substantially parallel spaced alignment;  
(d) at least one elongated shaft member, said shaft member rotatively carried in and through said deck member, said shaft member passing through each elongated aperture at a selected point, an axis of said shaft arrayed transverse to the major axis of each elongated aperture;  
(e) a drive end of said shaft member, said drive end extending exterior of said hopper, said shaft member passing through said first aperture in the wall of the hopper;  
(f) a plurality of rocker arm members, said rocker arm members having a first shaped arm portion, a second shaped arm portion, and a hub portion, said first shaped arm portion and second shaped arm portion radially extending from said hub portion at selected positions, said hub portion having a drive means for engaging said shaft member,

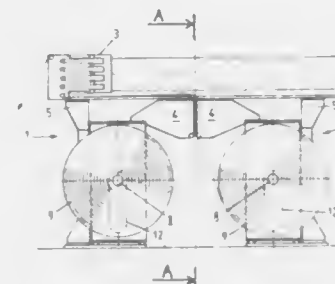
one of said rocker arms carried interior of each of said elongated apertures in the deck member;  
(g) said first shaped arm portion and second shaped arm portion having means for breaking lumped or oversized granular materials; and  
(h) a reciprocating drive means adapted to attach to said drive end of the shaft, said reciprocating drive means causing said first shaped arm portion and said second shaped arm portion to alternately co-act with said deck member for breaking said oversized or lumped materials into acceptable sizes, said acceptable sized material passing through said elongated apertures in the deck member into a lower portion of said hopper.

**4,949,909**  
**PIPE COIL DISPENSING RACK**  
Steven D. Hatfield, 5242 Pawnee, Lincoln, Nebr. 68506  
Filed Oct. 3, 1989, Ser. No. 416,427  
Int. Cl.<sup>5</sup> B65H 49/28, 16/00  
U.S. Cl. 242—86.2 20 Claims



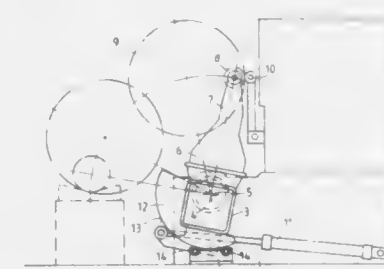
1. A pipe coil dispensing rack comprising:  
a frame formed having a plurality of substantially horizontal spoke frame members; at least one vertically disposed upright extending above at least one of the plurality of horizontal spoke members, two vertically disposed legs extending below the horizontal spoke members with wheels disposed near the lower end of the vertically disposed legs;  
a tongue secured to the frame with a tongue end downwardly disposed at one end of the tongue, the wheels and tongue end forming a supporting surface when the rack is positioned horizontally;  
a turntable supported for rotational movement about a turntable bearing; the turntable having radially extending turntable arms extending from the turntable bearing with an annular ring disposed at the ends of the turntable arms; with turntable uprights extending in spaced relation from the turntable arms;  
a pipe reel hold down assembly removably secured to the turntable uprights in spaced relation from the turntable arms; and  
a pipe guide ring secured above the spoke members upon one of the vertically disposed uprights.

**4,949,910**  
**UNWINDING MACHINE**  
Claude Kleitz, Strasbourg; Gérard Maetz, Eckbolsheim; Bernard Muller, Drusenheim; Jean-Claude Thlen, Herrlisheim, and Marcel Loesch, Eckbolsheim; all of France, assignors to Monomatic S.A., Strasbourg-Koenigsboffen, France  
Filed Jul. 19, 1988, Ser. No. 221,468  
Claims priority, application France, Jul. 29, 1987, 87 10863  
Int. Cl.<sup>5</sup> B65H 19/18  
U.S. Cl. 242—58.1 15 Claims



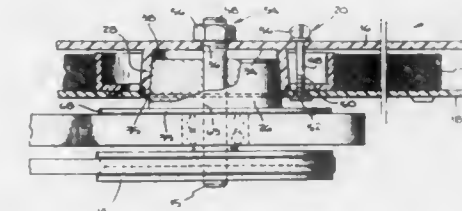
1. Unwinding machine comprising two reelstand towers (1) covered by an overhead bridge (2) supporting a web accumulator (3), wherein each reelstand tower (1) comprises a fixed frame (5) connected to the bridge (2) and a movable frame (6) movable on the fixed frame (5) perpendicularly to the bridge length (2), and two splicing cases (4) adapted to splice webs at zero speed each being rigidly secured to one of the movable frames (6) for movement therewith and rolling along rails fastened under the bridge (2).

**4,949,911**  
**WINDING CROSSBEAM**  
Eberhard Kampf, Wiehl, Fed. Rep. of Germany, assignor to Kampf GmbH & Co. Maschinenfabrik, Fed. Rep. of Germany  
Filed Feb. 18, 1986, Ser. No. 831,136  
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506867  
Int. Cl.<sup>5</sup> B65H 18/04  
U.S. Cl. 242—67.1 R 6 Claims



1. The winding crossbeam assembly having a plurality of winding stations comprising:  
a pair of spaced apart side shields;  
an elongated non-circular winding crossbeam pivotally connected between said side shields;  
a circular arc segment for peripheral engagement of at least a portion of said winding crossbeam, said circular arc segment providing a circular support surface for said winding crossbeam;  
a support pedestal; and  
a plurality of support rollers rotatably carried by said support pedestal for supporting said circular arc segment.

**4,949,912**  
**FILM TRANSFER AND EDIT ADAPTOR**  
Scott Bose, 4348 Danbury La., Racine, Wis. 53403, and Steven Klindworth, 1451 Bayview Dr., Hermosa Beach, Calif. 90254  
Filed Mar. 25, 1988, Ser. No. 173,320  
Int. Cl.<sup>5</sup> B65H 16/04  
U.S. Cl. 242—68.3 13 Claims



1. A dual-element film transfer and edit adaptor for facilitating the moving, reviewing and editing on spindle type systems of a film set p for platter system projection equipment, said film adaptor comprising:  
a support plate for said film;  
an apron drum with a stem having sidewalls and a central bore, said central bore being slidably engageable with said spindle system;  
a cover plate for protecting said film, said cover plate having an annular engaging surface mounted upon said cover plate, said annular engaging surface being capable of forming a friction fit with said sidewalls of said stem;  
at least one fastening means for removably securing said cover plate to said support plate, said fastening means being positioned concentrically inward from said film;  
a locking means for lockingly engaging said stem with said spindle system;  
whereby said stem can be placed onto said spindle system and said cover plate, after being fastened to said support plate above said film to form a moveable reel, can be placed on said stem and said film edited using said spindle system.

**4,949,913**  
**YARN CARRIER WITH ANTI-NESTING RIB**  
Israel Fernandez, Gastonia, N.C., assignor to Conitex, Inc., Gastonia, N.C.  
Filed May 15, 1989, Ser. No. 351,729  
Int. Cl.<sup>5</sup> B65H 75/10  
U.S. Cl. 242—118.3 6 Claims



1. In a frusto-conical paper yarn carrier of the type characterized by having a relatively small diameter end, a relatively large diameter end, an outer wall and a smooth, uninterrupted inner wall parallel to the outer wall whereby a plurality of like



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yarn carriers can be nested together for storage and shipment, the improvement comprising a narrow annular rib having a width of approximately 3 millimeters and a height of approximately 1 millimeter projecting from the inner wall of the carrier in spaced-apart relation from the relatively large diameter end thereof but nearer the larger diameter end than the smaller diameter end thereof for contacting the outer wall of a like yarn carrier into which the yarn carrier is nested for reducing surface contact between adjacent yarn carriers and thereby permitting easier separation from nesting relationship.

4,949,914

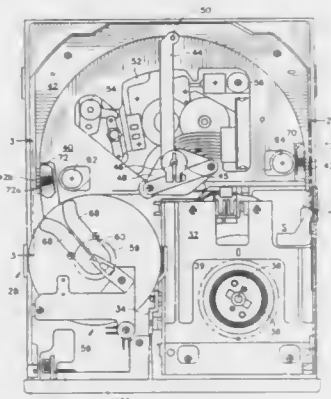
**TAPE TRANSPORT WITH RIGID ARM THREADER MECHANISM FOR LEADER BLOCK TAPE CARTRIDGE**  
William M. Barton, Jr., Encinitas, Calif., assignor to Cipher Data Products, Inc., San Diego, Calif.

Filed Jul. 3, 1989, Ser. No. 375,400

The portion of the term of this patent subsequent to Aug. 1, 1998, has been disclaimed.  
Int. Cl.<sup>5</sup> G11B 15/66

U.S. Cl. 242—195

11 Claims



1. A transport for a leader block tape cartridge, comprising: a generally rectangular frame; means for receiving and supporting the cartridge within the frame; a supply reel motor mounted to the frame; first drive means connected to the supply reel motor and engageable with a supply reel inside the cartridge for rotating the same; a take-up motor mounted to the frame; a take-up hub; second drive means connected to the take-up motor for rotating the take-up hub; a magnetic tape transducer assembly mounted to the frame between the take-up hub and the cartridge when the cartridge is inserted in the frame; and tape threading means for extracting a leader block from the cartridge, pulling the leader block past the transducer assembly, and inserting the leader block into the take-up hub so that a length of tape attached to the leader block will be threaded along a tape path during a threading operation, and for extracting the leader block from the take-up hub, pulling the leader block past the transducer assembly and inserting the leader block into the cartridge during a rewinding operation, including a rigid non-articulating threader arm having inner and outer ends, a threader pin directly connected in a fixed manner to the outer end of the threader arm for engaging the leader block, and means connected to the inner end of the threader arm for rotating the threader arm to move the pin along an arc radially outside of the tape path.

4,949,915

**IMPELLER FOR COMMINUTER**

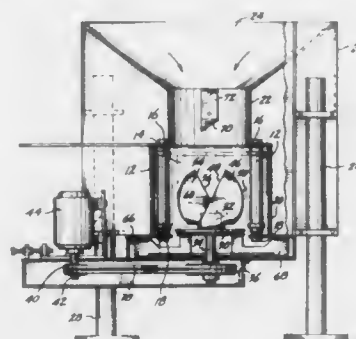
John H. Hughes, Montesano, Wash., assignor to ComCorp, Inc., Montesano, Wash.

Filed Jan. 18, 1989, Ser. No. 298,439

Int. Cl.<sup>5</sup> B02C 4/02

U.S. Cl. 241—245

10 Claims



1. In a comminuter having a plurality of comminuting rolls vertically mounted for free rotation on a frame, said rolls being arranged in substantially circular fashion to define a cylindrical comminuting chamber and an impeller plate mounted for rotation in a horizontal plane in a lowermost end of the comminuting chamber, an improved impeller comprising: motor means mounted on said frame and coupling means for drivingly connecting said motor means to said impeller plate to rotatably drive said impeller plate in a first direction; and, a first impeller blade affixed at a first end thereof to the impeller plate, said first impeller blade extending in a direction tangential to said first direction and upwardly at an acute angle from said plate, a second end of said first impeller blade terminating closely adjacent the comminuting rolls, said first impeller blade having a straight edge extending from said first end to said second end thereof and a curvilinear edge extending from said first end to said second end thereof in close proximity to said comminuting rolls.

4,949,916

**DEVICE FOR DISINTEGRATING MATERIAL, SUCH AS WASTE**

Franz Wroblewski, Granitvägen 8, S-826 00 Söderhamn, Sweden  
PCT No. PCT/SE87/00585, § 371 Date Jun. 7, 1989, § 102(e)

Date Jun. 7, 1989, PCT Pub. No. WO88/04200, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 9, 1987, Ser. No. 368,359

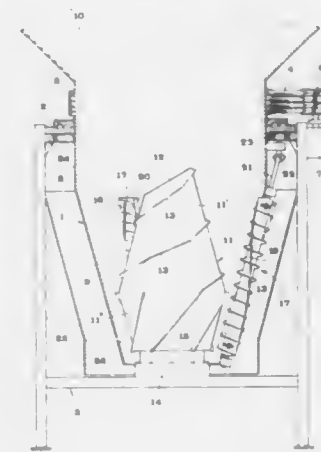
Claims priority, application Sweden, Dec. 10, 1986, 8605288  
Int. Cl.<sup>5</sup> B02C 19/22

U.S. Cl. 241—257 R

9 Claims

1. In a device for disintegrating material, such as waste, comprising a rotatable drum having an inlet opening and at least one outlet opening, a stand for supporting said drum, a counterbody disposed inside said drum, a gap located between said counterbody and the inside of said drum, and at least one helically arranged member being provided on the inside of said drum and adapted to convey, during rotation of said drum the material received in said drum in a downward direction towards said gap, the improvement wherein said counterbody has an upper portion and a lower portion, at least said upper

portion of said counterbody tapering towards said inlet opening and being of a polygonal cross-section, and wherein said



upper portion of said counterbody has at least one inclined counterblade arranged thereon.

4,949,917

**GYRO STABILIZED OPTICS WITH FIXED DETECTOR**

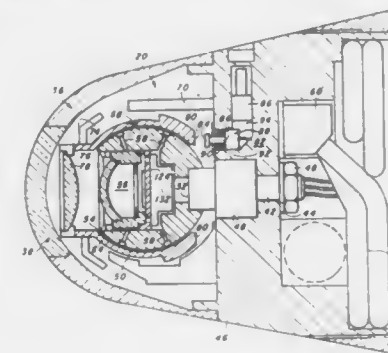
Wilbur W. Cottle, Jr., and Lilburn R. Smith, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 6, 1972, Ser. No. 295,746

Int. Cl.<sup>5</sup> F42G 7/00; F42B 15/02

U.S. Cl. 244—3.16

17 Claims



1. An automatic guidance system for guiding an object to a target comprising:

- a housing;
- a dome mounted in said housing for admitting light;
- a gyroscope having a stator operatively attached to the housing, a rotor supported by the stator and gyro torquers and pickoffs in operative association with the rotor;
- a lens attached at the centerline of the rotor for rotation with the gyro rotor in the path of target indicating light for focusing the light at the gyro center of rotation;
- a detector assembly rigidly fixed to the gyro stator, said detector assembly including a detector centered at the center of rotation of the rotor in the path of focused light whereby a light spot is produced on the detector for producing electrical signals indicative of the position of the focused light spot on the detector; and
- electronic guidance means responsive to the detector's electrical signals to produce pitch and yaw signals for the gyro torquers to precess the rotor to align the lens and the target, and to produce pitch and yaw control signals for an electrical drive means for aligning the housing and target.

4,949,918

**MOMENT CONTROL OF ROCKETS**

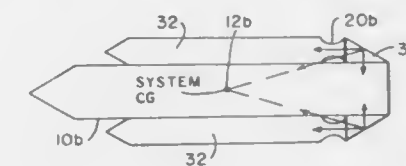
Jerrold H. Arizman, 4211 Huntingdon Rd., Huntsville, Ala. 35802

Filed Aug. 2, 1989, Ser. No. 401,195

Int. Cl.<sup>5</sup> F41G 7/00

U.S. Cl. 244—3.22

5 Claims



1. A rocket comprising a center body section with a system center of gravity at an axis of the center body, a rocket motor mounted at the periphery of said center body and having an axis that is parallel to the axis of said center body, said rocket motor having an exhaust nozzle that exhausts axially along the axis of said rocket motor, and means mounted in a permanently fixed and stationary position beyond an exit end of the exhaust nozzle and forming a reaction surface so that a resultant force from thrust of the rocket motor is produced which resultant force is continuously directed through the system center of gravity of said center body.

4,949,919

**FOIL**

Krzysztof Wajnkonis, 63 Jeddo Road, London, England (W12 9EE)

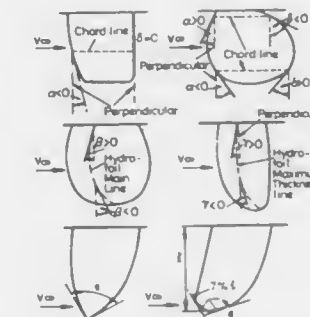
Continuation of Ser. No. 61,280, Jun. 1, 1987, abandoned. This application Aug. 17, 1989, Ser. No. 395,151

Claims priority, application United Kingdom, Sep. 9, 1985, 8522270

Int. Cl.<sup>5</sup> B64C 3/10; B63B 1/24, 3/38, 41/00

U.S. Cl. 244—35 R

15 Claims

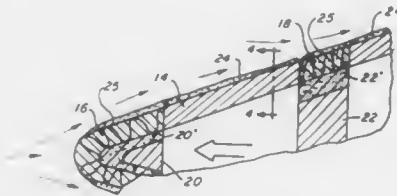


1. A hydrofoil for use submerged in a liquid medium, where relative motion between every point of the hydrofoil and the liquid medium produces a flow across the hydrofoil and defines a direction of undisturbed flow in every point of said hydrofoil, said hydrofoil extending from a base to a tip and having a leading edge and a trailing edge, wherein said flow is in a direction from said leading edge to said trailing edge, and said hydrofoil having a pressure side and a suction side, wherein said flow around both said sides generates a pressure difference between said sides and produces a lift force perpendicular to the direction of said undisturbed flow and directed from said pressure side to said suction side;

said hydrofoil having a main line extending from said base to said tip, wherein said main line is the geometrical locus of centres of effort of sections of said hydrofoil by sectioning

surfaces and said main line lies on a surface created by all mean lines of said sections and locations of maximum thickness of said sections define a maximum thickness line, wherein each of said sectioning surfaces passes through one endpoint on said leading edge and through one endpoint on said trailing edge, and said sectioning surfaces belong to a class of surfaces which includes planes used when said hydrofoil is engaged in a progressive motion and which includes rotational surfaces meant as surfaces of revolution described by said hydrofoil, said rotational surfaces being used whenever said hydrofoil is engaged in a rotational motion, said sectioning surfaces being shaped such that said sections are lead between said endpoints approximately in line with streamlines of said flow; said hydrofoil defining a chord surface formed by chords of said sections, wherein each chord joins said endpoints along said sectioning surface to define a chord length; said hydrofoil having an angle  $\alpha$ , said hydrofoil having at least one of an angle  $\beta$  and an angle  $\gamma$ , and said hydrofoil having an angle  $\delta$ , said angles  $\alpha$ ,  $\beta$ ,  $\gamma$  and  $\delta$  being respectively angles of sweep of said leading edge, said main line, said maximum thickness line and said trailing edge, where each of said angles of sweep is measured in relation to a direction perpendicular to the direction of said undisturbed flow and tangent to said chord surface of said hydrofoil at that point of said chord surface which is nearest to that point of one of said edges and said lines in which a corresponding one of said angles of sweep is measured, each of said angles of sweep being determined in at least one point of the corresponding one of said lines and said edges, wherein each of said angles of sweep has a positive value for those locations where the corresponding one of said lines and said edges is swept forward; said hydrofoil, whenever said hydrofoil belongs to one of groups which include round ended hydrofoils and sharp ended hydrofoils which groups both characterize by said hydrofoil having a single point on said hydrofoil tip being furthestmost from said hydrofoil base, for said hydrofoil belonging to one of groups which include round ended hydrofoils and sharp ended hydrofoils being defined an angle  $\epsilon$  which is the absolute value of a difference between said angle  $\alpha$  and said angle  $\delta$ , which whenever said hydrofoil is sharp ended are for the purpose of determining said angle  $\gamma$  measured at said hydrofoil tip, and whenever said hydrofoil is round ended said angle  $\epsilon$  is measured between the tangents to said leading edge and to said trailing edge at points which are 7% of the length of said hydrofoil distant from that point of said hydrofoil tip, which is furthestmost from said hydrofoil base; this invention comprising said hydrofoil being orientable to the direction of said undisturbed flow such that; in at least one point along said leading edge said angle  $\alpha$  is positive and greater than or equal to  $10^\circ$ ; and in at least one point along said hydrofoil, at least one of said angle  $\beta$  and said angle  $\gamma$  is positive and greater than or equal to  $14^\circ$ ; and the chord length at the hydrofoil tip is not greater than 40% of a maximum chord length of said hydrofoil; and whenever said hydrofoil belongs to one of groups which include round ended hydrofoils and sharp ended hydrofoils, said angle  $\epsilon$  is smaller than the difference of  $90^\circ$  minus an angle  $\alpha$ , said angle  $\alpha$  having the value of angle  $\alpha$  at the hydrofoil tip measured at that point of said leading edge which is used to determine said angle  $\epsilon$ .

**4,949,920**  
**ABLATIVE COOLING OF AERODYNAMICALLY HEATED RADOMES**  
Leon H. Schindel, Rockville, and Richard T. Driftmyer, Bowie, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Dec. 14, 1989, Ser. No. 450,754  
Int. Cl. B64C 1/38  
U.S. Cl. 244—117 A 20 Claims

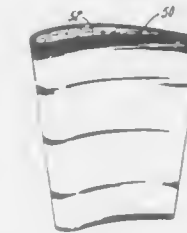
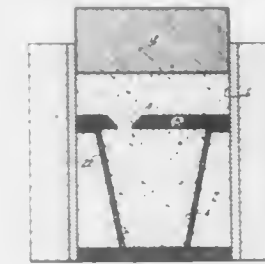


7. In combination with a missile adapted to travel through a fluent medium at velocities during which aerodynamic heating thereof occurs, said missile including a nose cone shell made of a solid material having a geometry altering temperature, cooling means for preventing geometric alteration of the nose cone shell by said aerodynamic heating thereof in response to said travel of the missile, including a body of coolant having a melting temperature lower than the geometry altering temperature of the shell to accommodate melting of the coolant in response to said aerodynamic heating of the shell, porous means formed in the shell for inflow of the melted coolant into a protective boundary layer established externally on the shell during said travel of the missile, said coolant having a difference between heats of vaporization and fusion resulting in withdrawal of heat from the coolant at a predetermined rate during travel of the missile, and means storing the body of coolant in operative relation to the porous means for automatically regulating said inflow of the coolant into the boundary layer by formation of a solidified coating of the coolant adhering to the porous means in response to said withdrawal of heat from the coolant at the predetermined rate, the porous means including a tip section and an annular band section of the shell spaced downstream of the tip section.

**4,949,921**  
**METHOD OF MOLDING FIBER REINFORCED GLASS MATRIX COMPOSITE ARTICLES**  
David C. Jarmon, Kensington, and Eric Minford, Windsor, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.  
Continuation of Ser. No. 90,713, Aug. 28, 1987, abandoned. This application Aug. 17, 1989, Ser. No. 395,169  
Int. Cl. B64C 3/24  
U.S. Cl. 244—123 3 Claims

1. A process for fabricating a fiber reinforced glass matrix composite article, comprising: laying up at least one ply of glass impregnated continuous fiber tape against an inner surface of a die, wherein said continuous fibers are oriented against the die surface in a first direction and define a mold cavity, and subsequently introducing a fluid mixture of discontinuous fibers and molten glass into the mold cavity to substantially fill the mold cavity wherein said mixture is introduced into the cavity in a direction aligned with said first direction, and applying pressure to the fluid mixture to compress the fluid mixture and to compress and consolidate the continuous

fiber tape to form a fiber reinforced glass matrix composite article having a discontinuous fiber reinforced glass



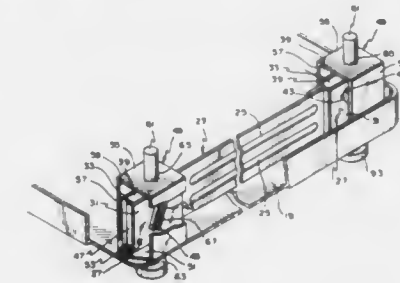
matrix composite inner core and continuous fiber reinforced glass matrix composite outer layer.

**4,949,922**  
**SATELLITE CONTROL SYSTEM**  
Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Dec. 9, 1988, Ser. No. 282,015  
Int. Cl. B64G 1/36  
U.S. Cl. 244—168 25 Claims



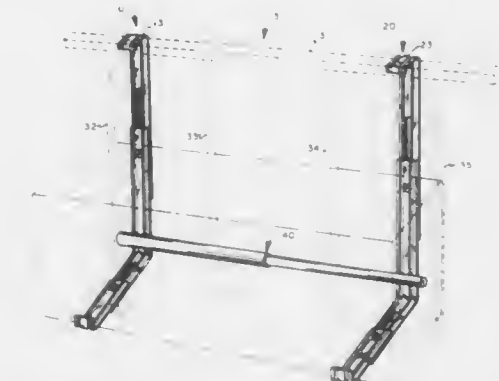
1. For use with a satellite of the type including first and second solar collection panels rotatable about a common axis to a position normally tracking the sun, said panels extending in generally opposite directions away from the body of said satellite, a method for compensating for the effects of undesired torque applied to said satellite, comprising the steps of: (A) determining the magnitude and direction of undesired torque applied to said satellite; and (B) applying a compensating torque to said satellite to compensate for the effects of said undesired torque on said satellite by essentially simultaneously rotating said first and second panels in a first common direction about said common axis from said normal sun tracking position to respectively first and second compensating positions angularly offset from said normal sun tracking position.

**4,949,923**  
**SELF-LEVELING ASSEMBLY FOR AN APPLIANCE**  
Thomas E. Daily, Herrin, Ill., assignor to Maytag Corporation, Newton, Iowa  
Filed Jul. 18, 1989, Ser. No. 381,186  
Int. Cl. F16M 11/24  
U.S. Cl. 248—188.3 14 Claims



1. An assembly for self-leveling an appliance on a support surface comprising: (a) a pair of bracket housings for attachment to the base portion of an appliance, each bracket housing including aperture means therethrough and a first cavity; (b) a stabilizer bar including two channel portions, each channel portion being receivable in the first cavity of a bracket housing and including elongate slot means and a second cavity; and (c) an elongate leg slidably disposed through the aperture means of each bracket housing and the second cavity of a corresponding channel portion, and including frictional engagement means disposable through the elongate slot means of the corresponding channel portion for securing the channel portions and the legs to the bracket housings and permitting free floating movement of the stabilizer bar with respect to the legs.

**4,949,924**  
**SUPPORT FIXTURE FOR MOUNTING ON RAILINGS AND THE LIKE**  
Burr T. Carmody, 955 S. Wellington Ct., Park Ridge, Ill. 54457-9040  
Filed Jun. 8, 1987, Ser. No. 59,340  
Int. Cl. A47B 96/00  
U.S. Cl. 248—215 12 Claims

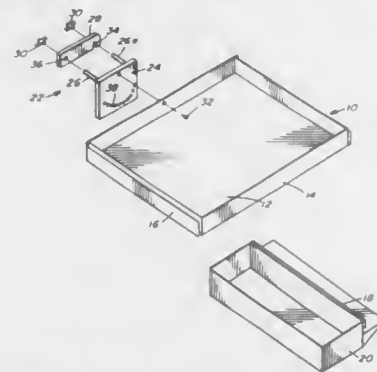


1. A support fixture for mounting onto railings or the like, said fixture comprising: a plurality of brackets, each adapted to be mounted on a different side of at least one member supporting the railing on which said fixture is mounted, each of said brackets including,



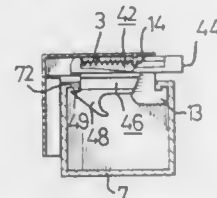
a horizontal section adapted to support a horizontally disposed object;  
 a vertical section joined to said horizontal section, including a forward projecting horizontal portion adapted to be brought into position from the rear, then to be placed over said railing; and  
 stabilizer means connecting said brackets, adapted to be placed in front of at least one of said railing support members.

**4,949,925**  
**LADDER CADDY**  
 Dennis E. Gorecki, 5825 Melanite, Houston, Tex. 77053  
 Filed Jul. 13, 1989, Ser. No. 379,612  
 Int. Cl.<sup>5</sup> E06C 7/14  
 U.S. Cl. 248—238



1. An adjustable utility shelf for attachment to a side rail of a ladder, comprising:  
 a tray having an upper support surface;  
 clamp means rotatably connected to said tray for permitting said tray to pivot about said clamp means, said clamp means including means for releasably attaching said clamp means to the said rail of the ladder; and  
 angular locating means disposed on and interconnecting said tray and said clamp means for positively retaining said tray in a selected angular position with respect to said clamp means, wherein said tray is a main tray and further including an auxiliary tray, said main tray including slide guide means disposed thereon for receiving correlatively shaped, interengageable slide guide means disposed on said auxiliary tray for removably attaching said auxiliary tray to said main tray, and wherein said main tray and said auxiliary tray each includes a raised side wall and said slide guide means on said main tray and said auxiliary tray each include an elongate U-shaped channel disposed along the raised side wall of the respective tray, one of said channels opening upwardly and the other of said channels opening downwardly.

**4,949,926**  
**CLAMPING ASSEMBLY FOR A VENETIAN BLIND**  
 Tai-Ping Liu, No. 118-1, Kuang Hsing Li, Tou Fen Chen, Miao Li Hsien, Taiwan  
 Filed Jun. 1, 1989, Ser. No. 359,545  
 Int. Cl.<sup>5</sup> A47H 1/00  
 U.S. Cl. 248—251

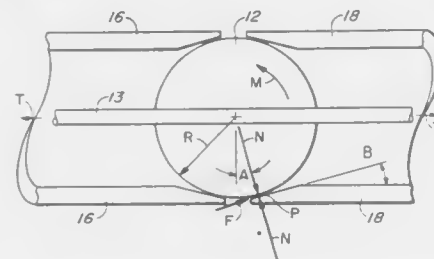


1. A clamping assembly for a headrail of a venetian blind, said headrail being substantially U-shaped with a first flange and a second flange formed on an upper end thereof, said clamping assembly comprising: a bracket being substantially

L-shaped and composed of a horizontal plate and a vertical plate, said horizontal plate having a pair of stops extended downward from a lower surface thereof, a pair of side plates being formed on both sides of said horizontal plate and extending downward, a first holder being provided on a front end of each said side plate; a flange being formed on a lower end of each said side plate and extending inwards of said bracket; a hole being formed in each said side plate;

a slidable block having a pair of recesses longitudinally formed on both ends thereof, a channel being formed below each recess and being parallel to said recess, said inward flanges of said bracket being slidably received in said channels, a second holder being formed on a rear and lower end of each said channel, a tapered surface being formed on a lower end of each said second holder;  
 a spring member being insertable through each said hole and being disposed within each said recess so that each said spring member being biased between a rear end of each said recess and a respective stop, a handle being formed on a front end of said slidable block; and  
 said first holders of said bracket being engageable with said first flange of said slidable block, said spring member biasing said second holders of said slidable block to move rearward relative to said bracket in order to engage with said second flange of said headrail; said tapered surfaces of said slidable block facilitating an engagement of said second holders with said second flange of said headrail; and said slidable block being pulled forward relative to said bracket so that said clamping assembly can be readily removed from said headrail.

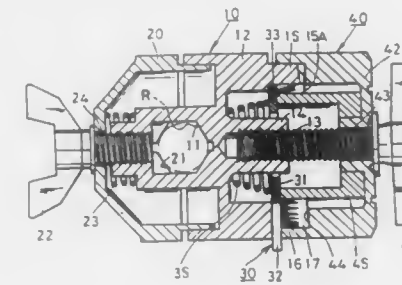
**4,949,927**  
**ARTICULABLE COLUMN**  
 John E. Madocks, and Thomas M. Young, both of Oakland, Calif., assignors to John Madocks, Oakland, Calif.  
 Filed Oct. 17, 1989, Ser. No. 422,595  
 Int. Cl.<sup>5</sup> E04G 3/00  
 U.S. Cl. 248—276



2. An articable column having an elongated central axis, comprising:  
 (a) a series of ball and socket members arranged along said central axis to form articable ball and socket joints frictionally engaged over the length of the column, said ball member having a center common to the frictional surface thereof and an aperture therethrough coincident with said column axis; and  
 (b) means generatively associated with said ball and socket members retaining said ball and socket members in frictional engagement;  
 (c) said socket members comprising a cradle having surfaces contiguously receiving said ball members at a contact angle defined by a plane perpendicular to the column axis and including said ball center and a line including the contact point of said socket member on said ball member and including said center;  
 (d) said contact angle of a first ball and socket joint comprising a first predetermined value;  
 (e) said contact angle of a second ball and socket joint comprising a second predetermined value larger than or

smaller than said contact angle of said first ball and socket joint;  
 (f) whereby the first and second predetermined values of contact angles for the first and second ball and socket joints provide incrementally varying frictional forces in said series of ball and socket joints over the length of the column.

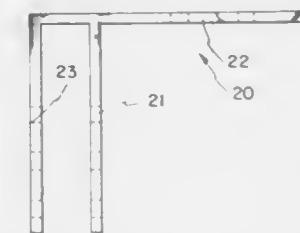
**4,949,928**  
**ROTATABLE HOLDER WITH POSITION MEMORY**  
 Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan  
 Filed Oct. 17, 1989, Ser. No. 422,999  
 Claims priority, application Japan, Oct. 20, 1988, 63-137026[U]  
 Int. Cl.<sup>5</sup> B61L 11/04  
 U.S. Cl. 248—286



1. A position memorizing mechanism for establishing and memorizing the angular orientation of a rotatable part with respect to a fixed part of a holder for an article, the mechanism comprising:  
 a relatively fixed part, having a front side; a stop defined on the front side of the fixed part;  
 a relatively rotatable part having a rear side; means supporting the rear side of the rotatable part at the front side of the fixed part and enabling relative rotation of the rotatable part with respect to the fixed part;  
 a first engagement surface on the rear side of the rotatable part, a cooperating second engagement surface on the front side of the fixed part, and the first and second engagement surfaces being engageable for locking the rotatable part against rotation with respect to the fixed part when the fixed and rotatable parts are secured together;  
 securing means between the fixed and the rotatable parts for drawing them together for moving the first and second engagement surfaces into engagement and also for enabling the fixed and rotatable parts to move slightly apart for disengaging the first and second engagement surfaces;  
 a rearwardly projecting protrusion on the rotatable part, the protrusion including third engagement surface thereon, the third engagement surface having a first smaller diameter section spaced further away from the rear side of the rotatable part, the protrusion having a second greater diameter section spaced further toward the rear side of the rotatable part;  
 memory means supported at the rotatable part including a fourth engagement surface on the periphery of the memory means engageable with the third engagement surface of the protrusion, the fourth engagement surface having a diameter such that it engages the third engagement surface when the memory means is at the first small diameter section of the third engagement surface and such that it disengages from the third engagement surface when the memory means is at the second greater diameter section of the protrusion with the third and fourth engagement surfaces in engagement while the securing means is adjusted to move the first and second engagement surfaces apart from engaging one another, the memory means is rotatable with respect to the fixed part while the memory

means fourth engagement surface is in engagement with the rotatable part third engagement surface such that the memory means rotates together with the rotary part; the securing means being further releasable to also release the engagement between the third and fourth engagement surfaces;  
 stop engagement means on the memory means for engaging the stop on the fixed part when the memory means is rotated to an orientation at which the stop engaging means engages the stop, and the memory means being rotatable with respect to the fixed part for the stop engagement means to be off the stop.

**4,949,929**  
**ADJUSTABLE L-SHAPED MOUNTING BRACKET**  
 Marcia E. Kesselman, and Robert S. Feingold, both of 300 E. 59th St., Apt. 1204, New York, N.Y. 10022  
 Filed Mar. 27, 1989, Ser. No. 329,025  
 Int. Cl.<sup>5</sup> A47F 5/00  
 U.S. Cl. 248—300

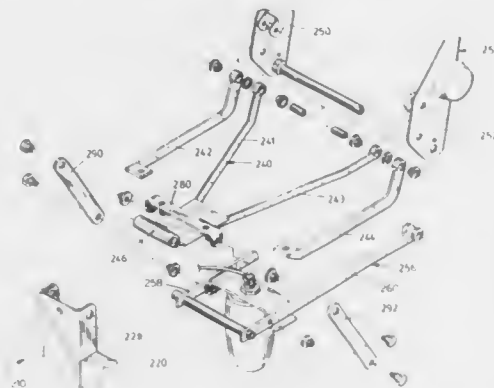


1. An F-shaped support bracket formed as a one-piece unitary member comprising:  
 (a) first and second plate portions, each being rectangular in shape and having at least one elongated hole therethrough, said first and second portions being parallel to each other and adapted to be fastened to a panel held between said first and second plate portions;  
 (b) a third plate portion rectangular in shape having juncture lines with said first and second plate portions, said third plate portion having at least one elongated hole therethrough, being perpendicular to said first and second plate portions and being adapted to support a second panel;  
 (c) wherein the direction of elongation of the holes in the first and second portions are perpendicular to said juncture lines, the direction of elongation of the hole in the third plate portion is parallel to said juncture line, and said elongated holes are adapted to have fastening means extending therethrough permitting the bracket to move relative to said fastening means for adjustment of the bracket relative to the panels prior to the fastening means being fully tightened.

**4,949,930**  
**FLOATING KNEE PIVOT SUSPENSION**  
 Harold J. Van Duser, Reedsburg, Wis., assignor to Seats, Inc., Reedsburg, Wis.  
 Continuation of Ser. No. 245,659, Sep. 16, 1988, abandoned, which is a division of Ser. No. 67,102, Jun. 26, 1987, Pat. No. 4,828,216. This application May 1, 1989, Ser. No. 348,163  
 Int. Cl.<sup>5</sup> F16M 13/00

U.S. Cl. 248—421  
 1. A seat subject to vibration in which the seat has a seat front portion and a seat rear portion comprising:  
 a base;  
 a seat cushion;  
 a seat bracket;  
 arm bracket;  
 a first link member;

a second link member; and  
a third link member;  
the seat bracket mounted on the seat cushion;  
the first link member pivotally mounted directly to the base  
forming a first pivot and pivotally mounted directly to the  
arm bracket forming a second pivot proximate the seat  
rear portion and away from the first pivot;  
the second link member pivotally mounted directly to the  
seat bracket forming a third pivot proximate the seat front



portion and away from the second pivot and pivotally  
mounted directly to the third link member forming a  
fourth pivot away from the third pivot;  
the third link member pivotally mounted directly to the base  
forming a fifth pivot away from the fourth pivot and  
pivotally mounted directly to the arm brackets forming a  
sixth pivot away from the fifth pivot;  
whereby, under vibration, the seat rear portion pivots about  
the base and the seat front portion both pivots and moves  
vertically relative to the base.

4,949,931

#### APPARATUS FOR MOUNTING AND MODIFYING THE ARRANGEMENT OF SEATS IN A VEHICLE

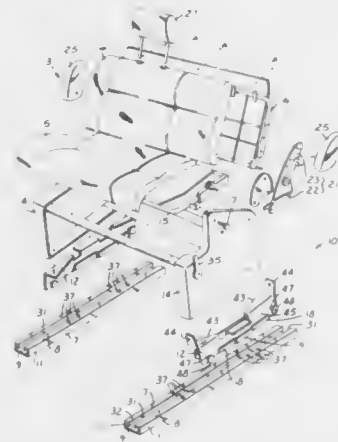
Mikio Fujiwara, Hideki Irie, and Minoru Komohara, all of  
Ayase, Japan, assignors to Ikeda Bussan Company, Ltd.,  
Kanagawa, Japan

Filed Jul. 24, 1989, Ser. No. 384,400

Claims priority, application Japan, Sep. 17, 1988, 63-233098  
Int. Cl.<sup>5</sup> F16M 13/00

U.S. Cl. 248-429

18 Claims



1. A locking slide apparatus for mounting one side of a  
longitudinally slidable seat having a seat cushion frame tiltable  
about a lateral axis and a seat back frame both mounted on a  
seat support and respectively supporting a seat cushion and a

seat back and for facilitating the rearrangement of seats in a  
vehicle having mounted respectively in tandem therein a non-  
removable seat, a removable seat and the slidable seat, the  
slidable seat being lockably positionable at a plurality of seat  
positions, the locking slide apparatus comprising:

- a elongated stationary rail securable to a vehicle floor and  
extending rearwardly from a location behind the nonre-  
movable seat, beneath the removable seat, and to a loca-  
tion beneath the slidable seat, said stationary rail having an  
upper horizontal side and a lower horizontal side con-  
nected by at least one vertical side, said upper horizontal  
side having at least one lock hole extending vertically  
therethrough at each of the seat positions;
- a slide mechanism supported by and longitudinally slidable  
along said stationary rail, said slide mechanism being  
adapted to support the slidable seat thereon;
- a lock mechanism having a vertical member supported by  
and vertically slidable along said slide mechanism, a hori-  
zontal lower flange connected to said vertical member,  
and at least one lock pawl connected to and extending  
vertically upward from said lower flange to be inserted  
upwardly into a vertical lock hole in said upper horizontal  
side of said stationary rail to prevent said slide mechanism  
from sliding along said stationary rail;
- biasing means for resiliently biasing said lock pawl into a  
vertical lock hole in said upper horizontal side of said  
stationary rail; and
- operating means for operating said lock mechanism to with-  
draw said lock pawl from the lock hole.

4,949,932

#### SEAT SLIDE DEVICE

Masanori Terai, Ayase, Japan, assignor to Ikeda Bussan Co.,  
Ltd., Ayase, Japan

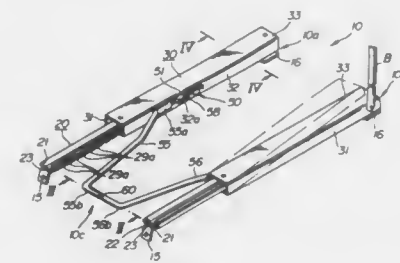
Filed Mar. 8, 1989, Ser. No. 320,715

Claims priority, application Japan, Jul. 28, 1988, 63-  
100557[U]

Int. Cl.<sup>5</sup> B60N 1/08

U.S. Cl. 240-430

9 Claims



1. A seat slide device comprising:

- two slider units which are substantially the same in construc-  
tion and arranged in parallel with each other, each slider  
unit including a lower rail adapted to be fixed to a floor  
member and an upper rail longitudinally slidably disposed  
on said lower rail and a seat mounted thereon;
- two lock mechanisms respectively mounted to said two  
slider units for locking the upper rails relative to said  
lower rails, each lock mechanism including a plurality of  
notches formed in the lower rail, a locking lever pivotally  
supported by the upper rail, and a pawl carried by the  
locking lever and latchingly engageable with said notches;  
and
- a lock releaser incorporated with both of said two lock  
mechanisms for cancelling the locked condition of said  
lock mechanisms when manipulated, comprising:  
two identical bars including first portions connected to each  
other around a common axis, and second portions secured  
to said locking levers respectively, and

means for allowing a relative rotation between said first  
portions around said common axis.

4,949,933

#### DOCUMENT HOLDER FOR COMPUTER KEYBOARD

Earlyn Stone, P.O. Box 18, 33900 Sanwood Rd., Nuevo, Calif.  
92367

Filed Apr. 24, 1989, Ser. No. 342,339

Int. Cl.<sup>5</sup> B41J 11/02

U.S. Cl. 248-442.2

8 Claims



1. A document holder to support documents above a com-  
puter keyboard having a triangular cross section with a thick  
rear edge, narrow front edge and inclined top surface, which  
comprises:

- a. an adjustable base formed from a pair of elongated angles  
having vertical and horizontal sides, with their vertical  
sides joined together to form an elongated channel which  
is received over the rear edge of said computer keyboard  
and which has a length to extend along the length of said  
computer keyboard, said angles being secured by assem-  
bly means comprising fasteners extending through aper-  
tures in said vertical sides with at least one of each pair of  
aligned apertures being elongated to provide adjustability  
in the width of said channel to accommodate variations in  
sizes of computer keyboards, and slots along the hori-  
zontal sides of each of said angles and received in each slot a  
stiff but yielding sheet extending outwardly from said slot  
and supporting a cushion band coextensive the length of  
each sheet to apply compressive attachment forces to the  
bottom and inclined top surface of said computer key-  
board;
- b. an angle bracket with one of its legs rotationally mounted  
on the backs of the joined vertical sides of said angles;
- c. an elongated arm having a length substantially the same as  
said length of said elongated channel with one end thereof  
mounted to the other leg of said angle bracket;
- d. a spring clip pivotally mounted to the opposite end of said  
elongated arm, with said angle bracket and spring clip  
being pivotal about axes normal to the joined vertical sides  
of said angles, whereby said elongated arm can be pivoted  
upwardly from the rear of said elongated channel to sup-  
port a document above said computer keyboard.

4,949,934

#### COMPUTER STAND

Horst M. Krenz, Bridgman, Mich., and Fred E. Wahlemeier,  
San Antonio, Tex., assignors to Zenith Data Systems Corpora-  
tion, Mt. Prospect, Ill.

Filed Apr. 5, 1989, Ser. No. 333,373

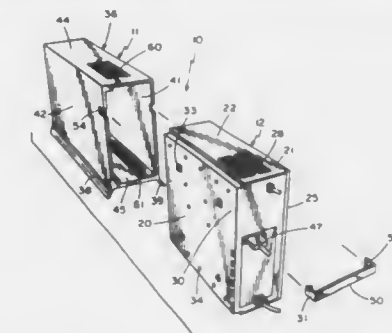
Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 248-676

12 Claims

1. A computer assembly adapted to be used in either a hori-  
zontal or vertical orientation, comprising: an inner generally  
rectangular housing including an unfinished base plate support-  
ing a plurality of computer components and a cover enclosing  
the components on the base plate and including spaced parallel

sides, a plurality of feet projecting transversely to the base  
plate for supporting the computer inner housing in a horizontal  
position on a horizontal surface, and an outer housing for  
supporting the inner housing in a vertical position without any  
vertical mount bracket on the inner housing including a stand  
portion adapted to engage a supporting surface and having a  
horizontal support surface for receiving one of the inner hous-  
ing cover sides, a vertical wall for substantially completely  
covering the unfinished inner housing base plate and a top  
wall, said vertical and top walls being positioned closely adja-



cent and engageable with the inner housing base plate feed and  
other inner housing side to minimize envelope size and con-  
structed to vertically support the inner housing without any  
additional brackets on the inner housing, a plurality of vents in  
the outer housing top wall, said outer housing having a suffi-  
ciently large rear opening to permit the forward insertion of  
the inner housing therethrough, and a bezel on the forward end  
of the vertical wall having a sufficient lateral extension to  
prevent the base plate and its feet from being viewed from the  
front of the outer housing, whereby the base plate is not visible  
in either horizontal or vertical positions.

4,949,935

#### APPARATUS FOR POSITIONING AND SUPPORTING AN INNER MOLD PANEL OF A FORM

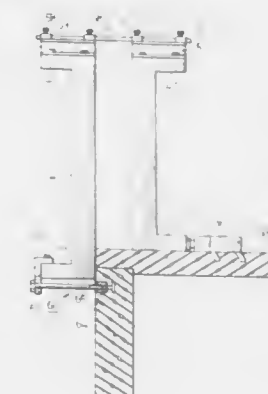
Yuan-Ho Lee, No. 851, Chung-San Rd., Nan-Pao Tsun, Kuei-  
Jen Hsian, Tainan Hsien, Taiwan

Filed Jun. 22, 1989, Ser. No. 369,869

Int. Cl.<sup>5</sup> E04G 17/14

U.S. Cl. 249-210

6 Claims



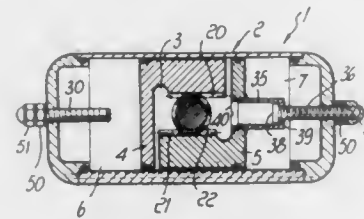
1. An apparatus for positioning and supporting the bottom of  
inner mold panels which rest on a floor of a construction site  
where concrete wall building forms are being erected compris-  
ing:

- a plurality of supporting members provided on the floor  
wherein each of said supporting members is substantially  
in the form of a body having a plurality of holding pins



which may be embedded into the floor and an operational surface which faces the inner mold panel, said plurality of holding pins being inclined with respect to a planar bottom of the body; and  
a plurality of jack means, each said jack means being disposed between an associated supporting member serving as a rest for said jack means and the bottom of an adjacent mold panel and pressing against the bottom of said inner mold panel.

**4,949,936**  
**ACTUATOR FOR ACTUATING VALVES**  
Aurelio Messina, Via Prealpi, 8, 20032 Cormanò (Milano), Italy  
Filed May 12, 1989, Ser. No. 351,388  
Claims priority, application Italy, May 24, 1988, 20716 A/88  
Int. Cl.<sup>3</sup> F16K 31/163; F15B 15/24  
U.S. Cl. 251—58 2 Claims

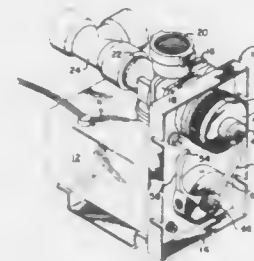


1. An improved actuator for actuating valve elements comprising a body including a cavity, said body having a pair of end caps for closing opposite ends thereof, said body having disposed therein two piston that can move in opposite directions, said pistons being provided with tooth portions meshing with a pignon rigid with a shaft including a seat in which are removably engaged fitting means for coupling said shaft to a spindle of a valve element performing opening and closing strokes, end of stroke limit means contact engaged by said pistons to adjust said opening and closing strokes of said valve element, said two pistons defining in said cavity a first and second opposite chambers communicating with pressurized air delivery ducts for driving said pistons, said end of stroke limit means being supported on head portions of said first and second opposite chambers, said end of stroke limit means including a first threaded stem rotatably supported by said head portion of said first chamber and suitable to contact engage with said first piston, and a cap bush associated with said second piston, said cap bush being associated with a second threaded stem which is rotatably supported and received within said cap bush, said second threaded stem having an enlarged stop head portion which abuts an annular narrowed portion formed at the end of said cap bush, said stop head portion will operate to stop displacement of the second piston in the direction opposite to the direction in which said first threaded stem operates as a stop member for said first piston, said stop head portion will move within said cap bush and away from said narrowed portion permitting said cap bush to abut the interior of one of said end caps when the second piston moves in the other direction in which said first threaded stem operates as the stop member for said first piston, both for opening and closing displacement of said valve.

**4,949,937**  
**REMOTE THROTTLING VALVE**  
John E. Waldrum, 349 Fairview Ave., Ambler, Pa. 19002  
Filed Jan. 9, 1990, Ser. No. 462,227  
Int. Cl.<sup>3</sup> F16K 31/04, 31/52

U.S. Cl. 251—129.11 19 Claims  
1. In a valve of the type having a body defining a hollow interior, an inlet opening communicating with the body interior, an outlet opening communicating with the body interior, a valve seat within the body intermediate the inlet and outlet openings, a movable valve operator within the body in align-

ment with the valve seat and a worm shaft means connected to the valve operator to move the valve operator towards and away from the valve seat, a portion of the worm gear means extending exteriorly of the body, the improvement comprising a ratchet gear having an outer diameter, the ratchet gear being connected to the said portion of the worm shaft means to rotate the worm shaft means when the ratchet gear is rotated, the worm shift means and the ratchet gear being adapted to be moved longitudinally of valve body upon rotation;  
the ratchet gear comprising a plurality of circularly spaced, ratchet teeth extending radially outwardly from the outer periphery, the ratchet gear having a width defined by a front surface and a rear surface, the length of the ratchet teeth being less than the width of the ratchet gear, the ratchet teeth defining a forward annular clearance space about the ratchet gear between the ratchet teeth and the ratchet gear front surface and a rearward annular clearance space about the ratchet gear between the ratchet teeth and the said ratchet gear rear surface;

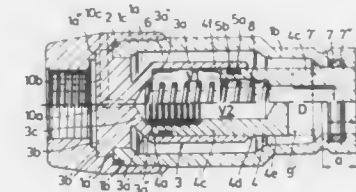


a pawl selectively engageable with the ratchet teeth of the ratchet gear, the pawl comprising a pair of spaced first and second pawl fingers;  
a motor means including an eccentric drive operatively connected to the pawl, the motor means being reversible and being alternately operable in a first, clockwise direction and in a second, counter-clockwise direction, the eccentric drive urging the first pawl finger into successive contacts with ratchet teeth to rotate the ratchet gear in a clockwise direction when the motor means is rotated in a first direction, the eccentric drive urging the second pawl finger into successive contacts with ratchet teeth to rotate the ratchet gear in a counter-clockwise direction when the motor means is rotated in the second, opposite direction;  
whereby the valve operator will be advanced toward the seat when the motor means is rotated in the first direction and the valve operator will be withdrawn away from the seat when the motor means is rotated in the second direction.

**4,949,938**  
**CONNECTION ARRANGEMENT**  
Kjell R. Ekman, Abernain 43, 6340 Baar, Switzerland  
Continuation of Ser. No. 141,023, Jan. 5, 1988, abandoned. This application May 1, 1989, Ser. No. 351,293  
Claims priority, application Sweden, Jan. 13, 1987, 8700093  
Int. Cl.<sup>3</sup> F16L 29/02

U.S. Cl. 251—149.6 11 Claims  
1. A fluid connecting arrangement for coupling components forming a passageway for passing fluid therethrough, comprising:  
a supporting device including a tubular center part, and at least one wing-shaped support element for centering said supporting device inside the fluid passageway formed in a coupling component;

a valve member longitudinally displaceable in said tubular center part of said supporting device between an open and a closed position of said valve member;  
said valve member having a substantially uniform, solid outer wall with a substantially continuous wall surface and a substantially uniform outer diameter along its length; said valve member having a rear portion extending outside said tubular center part;  
a first sealing means positioned between a front portion of said valve member and said tubular center part of said supporting member;  
a first, internal, variable space sealingly defined inside said tubular center part and said longitudinally displaceable valve member;  
a second space formed in the passageway for passing the fluid in the coupling, said second space extending between

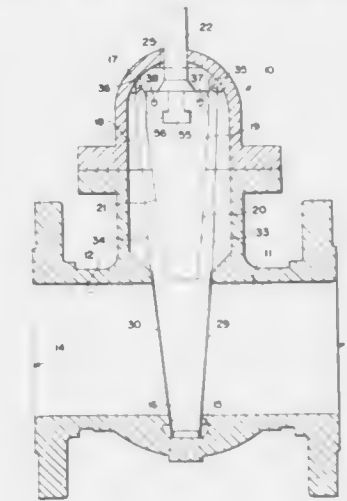


an inner wall of said coupling component, the outer wall of said extending portion of said valve member and the outer wall of said tubular center part; and  
a second, elongated sealing means provided between the inner wall surface of said coupling component and the end part of the outer wall of said rear extending portion of said valve member, said second sealing means including a seal positioned in the inner wall of said coupling component; said second, elongated sealing means forming a sealing distance in a closed position of said valve member; wherein said valve member being longitudinally displaceable into said first, internal, variable space, at a distance corresponding to said sealing distance, substantially without causing compression of the fluid in said second space during an initial lifting movement, before activation of the passage of the fluid past said second sealing means.

**4,949,939**  
**GATE VALVES WITH SEAT PROTECTORS**  
Edward M. Almada, 7537 Linden St., Hammond, Ind. 46324  
Filed Mar. 8, 1989, Ser. No. 320,615  
Int. Cl.<sup>3</sup> F16K 3/30, 3/12  
U.S. Cl. 251—328 29 Claims

1. A valve comprising:  
an inlet;  
an outlet;  
wall means for defining a flow path between said inlet and said outlet;  
a gate selectively movable between a first gate position and a second gate position, said inlet communicating with said outlet when said gate is in said first gate position;  
at least one valve seat, said gate contacting said valve seat when in said second gate position, thereby preventing flow between said inlet and said outlet;  
at least one valve seat protector selectively movable between a first seat protector position and a second seat protector position, said valve seat protector covering said valve seat when in said first seat protector position, said valve seat protector being retracted away from said valve seat when in said second seat protector position; and  
seat protector moving means for causing said seat protector to move from said first seat protector position to said second seat protector position when said gate is moved from said first gate position to said second gate position and for causing said valve seat protector to move from said second seat protector position to said first seat protector position when said gate is moved from said second gate position to said first gate position.

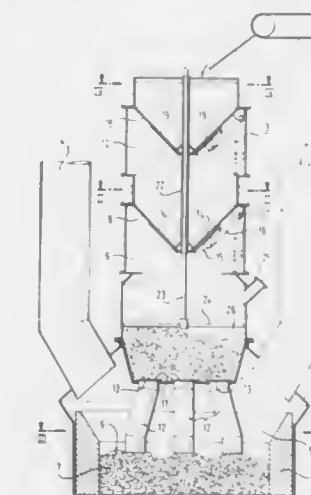
tor position when said gate is moved from said second gate position to said first gate position, said seat protector



moving means comprising a strap attached at one end to said seat protector, the strap passing around a pulley and being attached at its other end to said gate.

**4,949,940**  
**CHARGING ARRANGEMENT FOR SHAFT FURNACES, IN PARTICULAR BLAST FURNACES**  
Ralph Weber, Rio de Janeiro, Brazil, assignor to Kortec AG, Switzerland  
Filed Oct. 12, 1989, Ser. No. 420,289  
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1988, 3834969  
Int. Cl.<sup>3</sup> C21B 7/18 8 Claims

U.S. Cl. 266—100



1. A charging arrangement for shaft furnaces, in particular for blast furnaces, comprising a distributor chamber which can be arranged above a shaft furnace for which the charging arrangement is to be provided, the distributor chamber including a plurality of discharge openings which are distributed over a bottom surface of the distributor chamber and to which are mounted distributor pipes which terminate in an upper region of the shaft furnace at a level lower than an upper gas outlet of the shaft furnace and which feed charging

material to the furnace, distributed over a cross-section thereof, and further comprising a lock chamber which is arranged above the distributor chamber and which includes a closable bottom opening for passing charging material from the lock chamber into the distributor chamber and to which charging material can be fed from above, wherein the improvement comprises that a bottom of the lock chamber is in the form of a separating wall of a container defining the distributor chamber and the lock chamber, the separating wall including at least two individually closable bottom openings outside a center thereof and distributed over a periphery thereof.

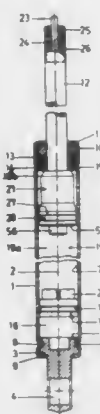
4,949,941

## LONGITUDINALLY CONTROLLABLE ADJUSTMENT DEVICE

Hans J. Bauer, and Hans P. Bauer, both of Altdorf, Fed. Rep. of Germany, assignors to Fritz Bauer + Sohne oHG, Altdorf, Fed. Rep. of Germany

Filed Jul. 13, 1989, Ser. No. 379,299  
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825077

Int. Cl.<sup>5</sup> A47B 9/10; A47C 3/30; F16F 9/44  
U.S. Cl. 267—64.12 17 Claims



1. A longitudinally controllable adjustment device, comprising:
  - a cylindrical housing closed at one end and filled with a pressure medium;
  - a piston rod sealingly extending from the other end of the housing and slidable therein;
  - a piston disposed in the housing and sealingly guided against an inner wall thereof, the piston being fixedly connected with the piston rod and slidable together with the piston rod and which divides the inner chamber of the housing into two partial chambers, the piston having a receptacle for receiving without play the cylindrical piston rod;
  - a valve passing through the piston and being substantially arranged in a valve housing formed by a bore in the piston rod, for connecting or separating the two partial chambers, comprising a valve body passing through the piston and being actuable by means of a trigger pin slidably guided in the piston rod, which valve body has one sealing face which abuts against a seal and which, by the trigger pin, can be slidably brought into a position bridging the seal;
  - wherein the piston rod with the valve is stressed against said seal in the piston, which seal is located between and sealingly abuts on an annular bottom of the receptacle, the valve and the sealing face of the valve body.

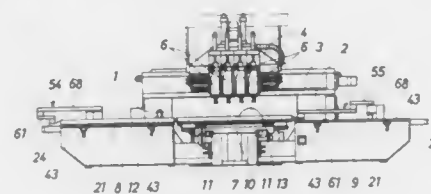
4,949,942  
TABLE EXCHANGING DEVICE FOR WOOD WORKING MACHINE

Isao Shoda, 116-4, Okaba-cho, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Nov. 13, 1989, Ser. No. 435,133  
Int. Cl.<sup>5</sup> B23B 7/04

U.S. Cl. 269—21

1 Claim



1. A table exchanging device for a wood working machine, comprising a pair of left and right slide tables each having an air chamber formed therein and each having a large number of air sucking holes formed in an upper wall thereof in a communicating relationship to said air chamber, a hollow bracket provided on an end face of each of said slide tables and communicating with said air chamber in the slide table, a hollow tubular shaft provided on a side face of each of a pair of left and right beds of said wood working machine and connected to a blower or a vacuum pump, a first hollow arm supported at a base end portion thereof for horizontal pivotal motion on each of the hollow brackets, the inside of each of the hollow brackets being communicated with the inside of the corresponding first hollow arm at the location at which the first hollow arm is supported for pivotal motion on the hollow bracket, a second hollow arm supported at a base end portion thereof for horizontal pivotal motion on each of the hollow tubular shafts, the inside of each of the hollow tubular shafts being communicated with the inside of the corresponding second hollow arm at the location at which the second hollow arm is supported for pivotal motion on the hollow tubular shaft, and a shaft for connecting a free end portion of each of the first hollow arms to a free end portion of the corresponding second hollow arm, the inside of each of the first hollow arms being communicated with the inside of the corresponding second hollow arm at the location at which the first and second hollow arms are connected to each other.

4,949,943

## MULTIPLE AIR CYLINDER CLAMP FOR VISE

Leon M. Bernstein, Minneapolis, Minn., assignor to Kurt Manufacturing Company, Inc., Minneapolis, Minn.

Filed Jul. 10, 1989, Ser. No. 377,710  
Int. Cl.<sup>5</sup> B23Q 3/08

U.S. Cl. 269—32

4 Claims



1. A multi-stage modular actuator assembly for attachment to a rotatable vise screw for operating a machine vise that has a main body, a fixed jaw at one end of the body and a movable jaw slidably mounted on the frame, the vise screw having a screw section for driving the movable jaw upon rotation of the vise screw and having a shaft portion linearly slidable relative to the body for moving the movable jaw relative to the fixed jaw, said vise body having a support at the end adjacent the fixed jaw for mounting the modular actuator assembly thereon

for carrying and causing tension loads in said vise screw to clamp the movable jaw toward the fixed jaw, said modular actuator assembly comprising:

- a base cylinder housing having an attachment member adapted to be mounted onto the body and restrained from movement relative to the body for reacting tension loads in the vise screw, said base cylinder housing including a cylinder base wall extending generally radially from a longitudinal axis of the vise screw shaft, and an annular wall defining an interior cylinder chamber, said cylinder base wall having an axial opening therein for receiving the vise screw shaft, and a base piston mounted in the chamber of said base cylinder housing, said base piston having a piston wall generally parallel to the cylinder base wall and sealingly mounted in the chamber, said vise screw shaft extending through the base piston and said base piston having a seated position against the base cylinder housing;

- at least one secondary piston-cylinder assembly comprising a secondary cylinder housing having a secondary cylinder base wall extending radially from the axis of shaft on which the modular assembly is mounted, said secondary cylinder housing abutting the base cylinder housing for reacting tension loads in said vise screw and having a secondary chamber defined therein and enclosed by an annular wall, a secondary piston slidably mounted in the secondary chamber said secondary piston having a secondary piston wall extending generally radially from a shaft on which it is mounted and parallel to the secondary cylinder base wall, said secondary piston having a secondary piston hub surrounding the vise screw shaft and slidably mounted through an opening in the secondary cylinder wall, said secondary piston hub being of length so that when the base cylinder housing and the secondary cylinder housing are clamped together the secondary piston hub will engage the base piston for carrying compressive loads therebetween;

- an outer end wall mounted to enclose the chamber of the secondary cylinder housing, the vise screw shaft extending outwardly through the outer wall;

- a nut mounted on the vise screw shaft on a portion of the vise screw shaft extending outwardly from the outer wall, said nut bearing against an outermost secondary piston wall under tension loads in the vise screw and being slidable relative to the outer wall and, said vise screw shaft being rotatable relative the cylinder housings and the outer end wall; and

- means to provide fluid pressure in parallel to the chambers of the cylinder housings simultaneously, and on the same sides of the respective piston in such chambers to apply tension force to the vise screw shaft which is additive for the forces generated by the base and secondary cylinders and pistons.

4,949,944

## MODEL AIRPLANE JIG

James Groff, Sr., 292 New Brooklyn Rd., Sicklerville, N.J. 08081

Filed May 25, 1989, Ser. No. 356,499  
Int. Cl.<sup>5</sup> B23Q 1/04

U.S. Cl. 269—45

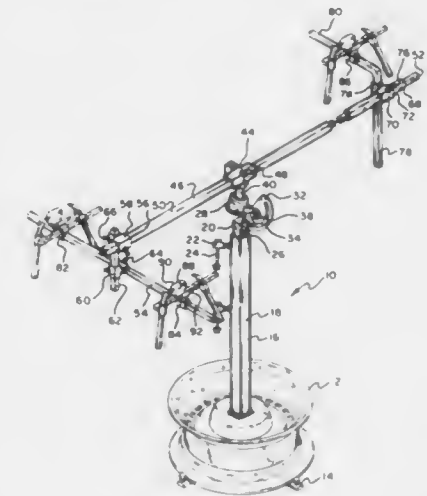
16 Claims

1. A model airplane jig comprising:
  - a weighted base;
  - a vertical post extending upwardly from said base;
  - an elongated main beam;
  - means connecting said main beam intermediate the ends thereof to the top of said vertical post;
  - said connecting means permitting said beam to be movable between a first position wherein it is located substantially above said vertical post and a second position wherein it is inverted and located at a position horizontally spaced from said vertical post;
  - a rear support means adjustably connected to one end of said

main beam, said rear support means including means for clamping the rear wheel of a model airplane;

a secondary cross beam adjustably connected to the other end of said main beam and being substantially perpendicular thereto;

left and right forward support means adjustably connected



to either end of said second cross beam, each of said forward support means including means for clamping a different one of the two front wheels of a model airplane, each of said support means including a saddle member for supporting the underside of the wheel and a pair of adjustable clamping elements adapted to hold the top of the wheel.

4,949,945

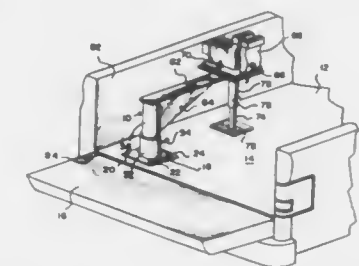
## VISE SWIVEL MOUNT

Durwood J. Whiteley, Rd 1, Box 290, Forksville, Pa. 18616  
Filed Feb. 9, 1989, Ser. No. 308,267

Int. Cl.<sup>5</sup> B23Q 1/04

U.S. Cl. 269—71

10 Claims



1. In combination a vise swivel mount, mounting a vise on a movable truck of the type having a bed and a sidewall comprising:
  - a base secured to the movable truck bed, the base comprising an upwardly open swivel socket;
  - a vise support rotatively secured within the swivel socket, the vise support comprising a swivel column within the swivel socket and a vise support arm affixed to the swivel column, the vise support arm and the swivel column being adapted to rotate as a unit relative to the swivel socket, the vise support arm being rotatable from a first position immediately adjacent to the truck sidewall to a second position that is rotatively spaced from the truck sidewall, the vise support arm carrying a vise support pad; and
  - a support column affixed to the vise support arm beneath the



vise support pad in spaced relationship to the vise support, the vise support column extending from the vise support pad to the movable truck bed, the vise support column being rotatable about the vise support when the vise support arm is moved between the said first and second positions;

whereby a vise secured to the vise support pad can be rotated relative to the movable truck bed between any one of a number of circularly adjusted position and wherein the vise can be easily transported from job site to job site by utilizing the truck.

4,949,946

## QUICK-ACTING CLAMPING DEVICE

Beat Buchter, Hallau, Switzerland, assignor to Buchter Formenbau AG, Switzerland

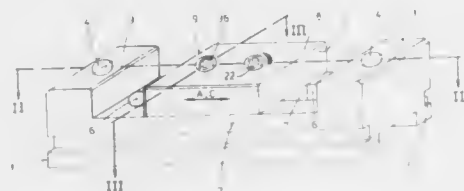
Filed Jul. 31, 1989, Ser. No. 387,522

Claims priority, application Switzerland, Aug. 11, 1988, 3036/88

Int. Cl.<sup>5</sup> B25B 1/08

U.S. Cl. 269—203

3 Claims



1. A quick-acting clamping device for clamping workpieces, comprising a base part having an elongated yoke plate and a fixed jaw at each end of said yoke plate, said yoke plate having a guide slot therethrough and having a lower abutment surface, said guide slot being longitudinally arranged between said fixed jaws; and a clamping block on said base part, said clamping block having a clamping head and a slide part which is longitudinally movable relative to said base part, whereby said clamping block is longitudinally displaceable and lockable at any selected point between said fixed jaws, said slide part including a guide plate which is longitudinally movable in said guide slot, said guide plate having a top on which there is integrally formed a first part of a connecting link guide and having a bottom which is connected to a slide plate, said first part having a base shoulder which cooperates with said slide plate to maintain said guide plate in said guide slot, said slide plate having a mounting portion and a clamping portion, said mounting portion and said clamping portion being longitudinally arranged and divided by transversely running weakening grooves, said mounting portion attaching firmly to said bottom of said guide plate and said clamping portion being elastically clampable against said first part and said abutment surface, whereby said clamping block is alternatively clampable against said yoke plate and longitudinally displaceable relative thereto, and said clamping head including a second part of said connecting link guide, wherein said second part slideably engages with said first part such that said clamping head is longitudinally displaceable on said slide part, and a rotatably mounted eccentric part, wherein said clamping head is moveable in a clamping direction on said slide part.

4,949,947

## EYEGLASS SUPPORT

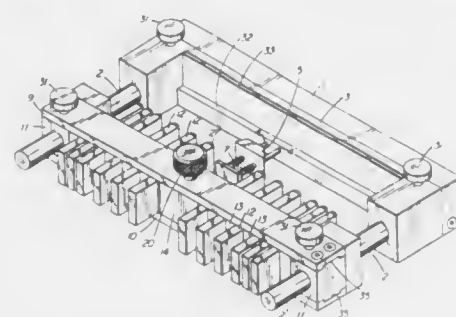
Marc Y. Savoie, 166 Maple Street, Moncton, New Brunswick, Canada E1C-6A4, and Charles R. Smith, 10 Madison Avenue, Moncton, New Brunswick, Canada E1E 1R6

Filed Oct. 30, 1987, Ser. No. 114,937

Int. Cl.<sup>5</sup> B25B 1/24

U.S. Cl. 269—266

5 Claims



1. A variable contour vice adapted to retaining a pair of eyeglasses comprised of:
  - (a) a frame with an opening within which to receive a pair of eyeglasses, said frame including a stationary wall and a jaw carrier;
  - (b) a backing surface along an inner portion of said stationary wall of said frame against which on upper side of an eyeglass frame which is to be retained may be placed;
  - (c) first and second banks of parallel mounted slidable jaw elements mounted on said jaw carrier said frame, such, slideable jaw elements being capable of advancing towards said backing surface;
  - (d) first and second abutment means respectively mounted to said carrier at the outermost ends of said first and second banks of slideable jaw elements; and
  - (e) clamping means mounted between said banks of jaw elements at, innermost end of each bank of slideable jaw elements said clamping means including a wedge member and a pair of thrust elements wherein said wedge member, when advanced, is adapted to apply a clamping force through said pair of thrust elements so as to simultaneously compress said first and second banks of jaw elements against their respective abutment means and thereby immobilize said and,
  - (f) resilient means mounted on said stationary wall for centrally locating a portion of said eyeglasses against said stationary wall.

4,949,948

## ADDRESSING SYSTEM FOR PRODUCTS LOCATED IN OR ON A PLURALITY OF STORAGE HOLDERS PARTICULARLY FOLDED PRINTED PRODUCTS

Godber Petersen, Augsburg, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,340

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805877

Int. Cl.<sup>5</sup> B65H 39/02

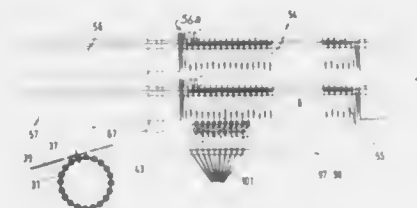
U.S. Cl. 270—54

17 Claims

1. Addressing system for addressing of products located on a plurality of storage means, particularly for addressing of printed products, wherein said printed products are located in or on the respective storage means (55) in predetermined product locations of the storage means, said system comprising a plurality of address carriers (6); a plurality of address fields on each of said carriers, the

fields, respectively, containing the addresses of recipients of the products and located at predetermined field locations on the respective address carriers;

a control means (103) having a memory for mutually associating a selected predetermined address carrier (6) and at least one address field thereon with the products at selected predetermined locations of the storage means (55);



severing means (68, 66) severing selected address fields from the selected address carrier (6); and address holder and application means (64, 65) controlled by the control means (103) separately holding the severed address fields associated with the products (59) and applying the so selected and held address fields (2) to the associated products.

4,949,949

## HYBRID SEQUENCED DADF DUPLEXING SYSTEM

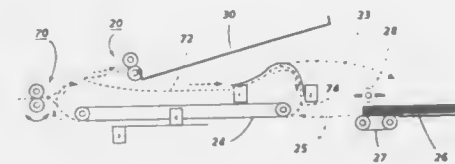
Maurice F. Holmes, Rochester; George J. Roller, Penfield, and Steven R. Moore, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 22, 1988, Ser. No. 274,516

Int. Cl.<sup>5</sup> B65H 5/22

U.S. Cl. 271—3

4 Claims



1. In a postcollation method of copying both the first and second sides of a plural sheet set of duplex document sheets on a copier for making duplex copies in order from the duplex document sheets, wherein said plural duplex documents to be copied are stacked and automatically fed from this stack to the copying station of the copier by a document feeder, wherein said document feeder is also capable of automatically inverting and presenting the opposite sides of the duplex document sheets to be so copied after the first sides have been copied, the improvement comprising:

making two separate buffer sets at a time on the first sides of plural copy sheets of plural copies of the first sides of two different duplex document sheets sequentially fed by said document feeder, and temporarily retaining and maintaining these two separate buffer sets in a duplexing buffer tray in the copier;

sequentially inverting and returning duplex document sheets which have been copied on one side via a duplex document return loop path returning those documents back to said copying station without returning to said stack, said duplex document return loop path having a path length greater than the dimensions of one document sheet, for copying the second sides of those documents by feeding them to the copying station again interleaved between the feeding of other documents from said stack to said copying station for copying their first sides, so that at least one said duplex document sheet which has been copied on one side is moving in said duplex return loop path while another document sheet fed from said stack is being copied on its first side;

and copying onto the second sides of said buffer sets the other sides of documents so fed back to said copying station through said duplex document return loop and outputting these completed copies to be sorted by being separately placed in the bins of a multiple bin sorter at the output of the copier;

and repeating these steps until all the document sheets in the document set have been copied.

4,949,950

## ELECTROSTATIC SHEET TRANSPORT

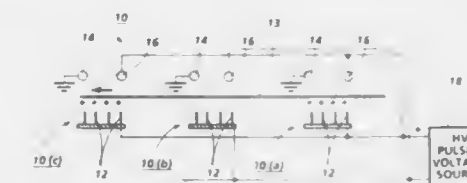
Joseph F. Stephany, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 14, 1989, Ser. No. 310,103

Int. Cl.<sup>5</sup> B65H 29/00

U.S. Cl. 271—193

5 Claims



1. An electrostatic sheet transport system for transporting a sheet in a downstream direction along a generally planar sheet path; comprising plural arrays of corona generating electrodes extending along at least one side of the plane of the sheet path, and opposing electrodes spaced on the opposite side of the plane of the sheet path, said opposing electrodes and said arrays of corona generating electrodes being offset relative to one another in said downstream sheet path direction, said corona generating electrodes arrays being pulsed with a pulsed high voltage, for pulsatingly applying corona charges to the sheet, to generate with said corona generating electrodes and said offset opposing electrodes electrical field patterns with electrostatic force components acting on said charged sheet in said downstream sheet path direction to move it along said generally planar sheet path.

4,949,951

## BODY BUILDING EXERCISE DEVICE

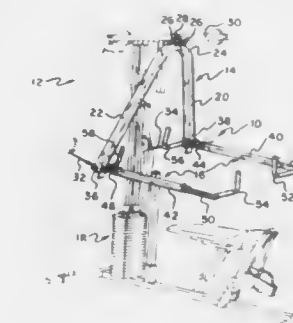
James A. Deola, Ladow Ave., Apt. 23A Cumberland Green Apts., Millville, N.J. 08332

Filed Oct. 2, 1989, Ser. No. 415,032

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272—134

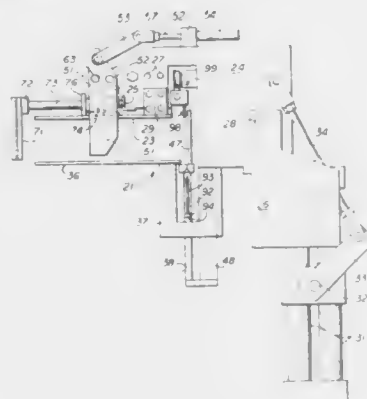
9 Claims



1. A body building exercise device comprising:
  - (a) a frame,
  - (b) a first member supported on the frame comprising a

median position and two connection points on opposite sides of the median position,  
(c) pivot means to connect the median position of the first member to the frame and to allow the member to pivot at the median position to allow the connection points of the first member to move on two lines equally spaced apart from the median position,  
(d) force means connected to the first member to provide a resisting force against movement of the connection points of the first bar along the two lines,  
(e) second and third members each having a first position and a second position,  
(f) universal connecting means to separately connect the first positions of the second and third members to the connection points of the first member and to allow pivotal movement of the second and third members in all directions with respect to the connection points, and  
(g) gripping means proximate the second positions of the second and third members to allow gripping of appendages of the person's body to the second and third members, wherein movement of the gripping means is on a plane equidistant around the median position.

**4,949,952**  
**SHEET JUSTIFIER FOR AUTOMATIC BOOKBINDING MACHINE**  
Peter Hotkowski, Checter, and Frank A. Todaro, Clinton, both of Conn., assignors to VeloBind, Inc., Fremont, Calif.  
Filed Mar. 20, 1989, Ser. No. 326,090  
Int. Cl.<sup>5</sup> B65H 31/34  
U.S. Cl. 271—221



1. For use in a bookbinding machine to bind books using a stack of sheets each formed with first holes spaced apart and spaced from adjacent a spine edge of said sheets, a male strip having studs projecting therefrom at the same intervals as said first holes and a female strip having second holes spaced at the same intervals as said first holes, a justifying apparatus comprising:  
a justifying assembly frame,  
a base plate  
a first jaw projecting at right angles to said base plate,  
a second jaw spaced below, parallel to and aligned with said first jaw,  
tilting means for tilting said frame between a first position with said jaws substantially horizontal and a second position with said jaws substantially vertical,  
a first side guide mounted on a first side of one of said jaws, a second side guide mounted on a second side of said one jaw opposite said first side guide,  
pivot means on one said jaw for pivoting at least said first side guide from a first position between said jaws to a second position remote from the space between said jaws, reciprocating means for rapidly reciprocating one of said side guides toward and away from the other said side

guide for jogging sheets on said second jaw against said other guide.

**4,949,953**  
**DEVICE FOR STACKING SHEETS**  
Ernst Claassen, Goch; Jakob Bodewijn, Düsseldorf; Henning Koss, Wuppertal, and Rolf Kollan, Herten-Westerh., all of Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany  
Filed Nov. 18, 1988, Ser. No. 273,306  
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 3739194  
Int. Cl.<sup>5</sup> B65H 31/32, 29/34  
U.S. Cl. 271—218

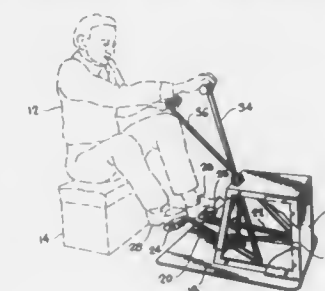


1. In a device for stacking sheets, such as paper, that arrive overlapped, having a layoff platform with a mechanism for raising and lowering, a separating mechanism positioned behind the stack, which can be raised and lowered, and which can be introduced into the vicinity of the top of the stack between the uppermost sheet and an incoming stream of overlapping sheets, two compression jaws positioned at different heights at the rear of the stack, which can be raised and lowered, and which can be inserted into gaps created by the separating mechanism, and an auxiliary stacking platform positioned at the rear of the stack, which can be raised and lowered, and which can be introduced into the vicinity of the layoff platform immediately below the lower compression jaw, the improvement which comprises a carrier for the two compression jaws and the auxiliary stacking platform, a vertical drive mechanism for the carrier, and means for synchronizing the downward motion of the carrier with the downward motion of the layoff platform.

**4,949,954**  
**JOINTED BICYCLE-SIMULATION DEVICE FOR ISOMETRIC EXERCISE**  
William R. Hix, 2224 Davis Way, Modesto, Calif. 95351  
Filed May 4, 1989, Ser. No. 347,746  
The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> A63B 21/00  
U.S. Cl. 272—73

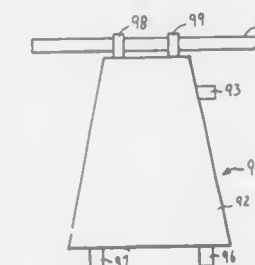
14. A bicycle-simulation device comprising,  
a housing having a base for placement on a floor,  
first and second adjacent linear bars, each having a lower end slidably received within said housing and having an upper end terminating in a foot pedal,  
third and fourth linear bars, each having a lower portion received within said housing, the lower ends of said first and third bars being pivotally attached at a first axis, the lower ends of said second and fourth bars being pivotally attached at a second axis, said third and fourth bars each having an upper end terminating in a hand-gripping means,  
a pulley mounted to said frame, said pulley having a pulley axis extending generally vertical in direction, and

a belt frictionally trained about said pulley, said belt having opposed ends fixed to said first and second axes, thereby



causing opposed back-and-forth swinging motion of said first and second bars and of said third and fourth bars upon movement of any one of said bars.

**4,949,955**  
**EXERCISE WEIGHT DEVICE FOR VARYING FORCE DURING EXERCISE MOTION**  
Robert Keen, 54 Central Ave., Demarest, N.J. 07627  
Continuation of Ser. No. 221,338, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 931,836, Nov. 18, 1986, abandoned. This application Oct. 6, 1989, Ser. No. 418,085  
Int. Cl.<sup>5</sup> A63B 21/06  
U.S. Cl. 272—117

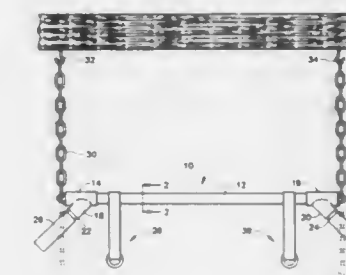


1. A weight lifting device which provides predetermined varying weight resistance during exercise motion comprising:  
a weight means, said weight means including a flexible member of an increasing cross-sectional area having a first end and a second end and being capable of being flexed at a plurality of points along a substantial portion of its length, wherein said weight means provides an increase in the amount of weight as said weight means is incrementally lifted off of a surface, and said member of increasing cross-sectional area provides an increase in the rate of increase of said weight;  
an attachment means; and  
a handle means, said handle means having a first end and a second end and being secured to said weight means by said attachment means.

**4,949,956**  
**PULL-UP BAR EXERCISE DEVICE**  
David H. Pobran, 1771 Tattenham Rd., Leucadia, Calif. 92024  
Filed Aug. 24, 1989, Ser. No. 398,378  
Int. Cl.<sup>5</sup> A63B 1/00, 23/12  
U.S. Cl. 272—62

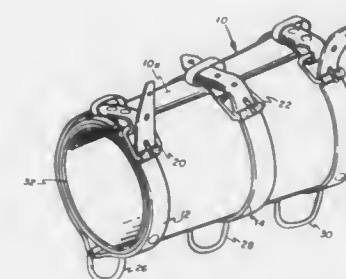
1. A pull-up exercise apparatus comprising in combination:  
an elongated transverse bar having a straight section terminating at opposite ends, and grip means including at least two pairs of hand grips of different orientation, one of said pair of grips including a pair of spaced apart grips rigidly attached to and extending outward from said bar interme-

diating the ends thereof at a forty-five degree angle to the axis thereof; and



means at said opposite ends for adjustably supporting said bar at multiple selected height positions from an overhead structure.

**4,949,957**  
**ISOLATION LEVERAGE WEIGHT TRAINING CUFF**  
Alfred L. Cucchiara, P.O. Box 696, Los Alamos, N. Mex. 87544  
Filed Dec. 12, 1988, Ser. No. 283,545  
Int. Cl.<sup>5</sup> A63B 21/065  
U.S. Cl. 272—119



1. An isolation leverage weight training cuff comprising a tapered flexible tube adapted to fit snugly about a limb, said tapered flexible tube being split longitudinally, said tapered flexible tube having on the exterior surface thereof a plurality of first fastening means for fastening said cuff to a weight training device, said plurality of first fastening means being spaced apart and secured longitudinally along said tube, said plurality of first fastening means being sized to receive a releasable attachment of a weight training device and being sufficiently secured to said tube for bearing the load of the weight training device, whereby a weight training device can be selectively attached to said cuff at a plurality of positions along said limb, and said tapered tube further including a plurality of second fastening means for fastening said tube about a limb, said second fastening means being adjustable in position so as to accommodate limbs of various sizes and shapes.

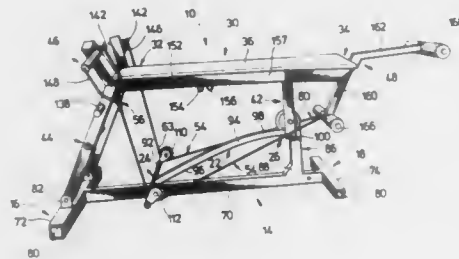
**4,949,958**  
**WEIGHT LIFTING MACHINE**  
Michael L. Richey, 1305 Wigwam, Kokomo, Ind. 46902  
Filed Jan. 23, 1989, Ser. No. 300,032  
Int. Cl.<sup>5</sup> A63B 21/00  
U.S. Cl. 272—120

1. A weightlifting exercising device of the type wherein at



least a portion of the weight lifted includes the user's own weight, comprising

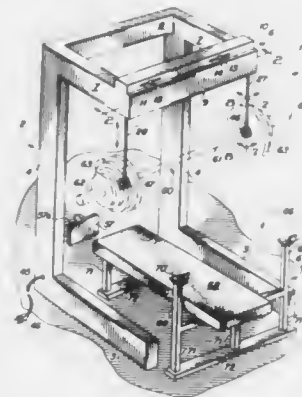
- (a) a frame means having a first end and a second end,
- (b) a platform means having a first end and a second end, the second end of the platform means being pivotally mounted adjacent to the second end of the frame means to permit the first end of the platform means to move in a generally vertical arc during the operation of the device.
- (c) a bench means having a first end disposed adjacent to the first end of the frame means, a second end disposed adjacent to the second end of the frame means and the second end of the platform means, and an upper surface, the first end of the bench means being pivotally mounted to the



frame means adjacent to the first end of the bench means to permit the second end to move in a generally vertical arc during the operation of the device,

- (d) a carriage means disposed below the bench means for supporting the second end of the bench means on the platform means,
- (e) a first exercise bar means, and
- (f) a first flexible means having a first end, a second end, and a middle portion, the first end being coupled to the first exercise bar means, the second end including a coupling means for coupling the second end to a member on the device disposed at a level generally below the upper surface of the bench means, and the middle portion passing around the platform means.

sheave means in spaced relationship for attachment to the barbell, whereby said cables are raised and lowered in concert



responsive to operation of said yoke and said reversible drive means.

4,949,960

#### BUTTERFLY CHAIR STRETCHING APPARATUS

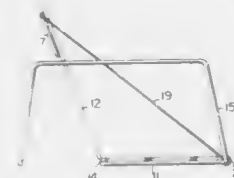
Sven Harlan, Norwalk, Conn., assignor to Ballet Design, Inc., Norwalk, Conn.

Filed Apr. 14, 1989, Ser. No. 338,186

Int. Cl. A63B 103/00

U.S. Cl. 272-138

4 Claims



4,949,959

#### BARBELL ASSIST DEVICE

William E. Stevens, 368 Deer Trace St., Apt. 402, Pineville, La. 71360

Filed Oct. 10, 1989, Ser. No. 419,509

Int. Cl. A63B 21/078

U.S. Cl. 272-123

15 Claims

1. A barbell assist device for raising and lowering a barbell, comprising a support frame, a horizontal ball screw journaled for rotation in said support frame reversible drive means connected to said ball screw in driving relationship for selectively rotating said ball screw in both the clockwise and counter-clockwise direction; a ball nut threadably carried by said ball screw and a yoke attached to said ball nut; pull block means carried by said yoke; sheave means rotatably carried by said support frame on each side of said yoke; and a pair of cables having one end attached to said pull block means, said cables extending around said sheave means, respectively, and the opposite ends of said cables extending downwardly from said

1. A muscle and joint stretching apparatus for stretching human leg and hip muscles and increasing rotation of the leg in the hip joint of a user when in a reclining position, said apparatus comprising:

- (a) two body support platforms connected end-to-end at an angle arranged such that a user may sit upright on a first support body platform and rest the back of the body on a second platform or lie on the top sides of both platforms;
- (b) a frame connected to one end of the first body support platform;
- (c) a crossbar connected to the second body support platform; and
- (d) a pair flexible straps, each strap connected to said crossbar at one end and said frame at the other end, whereby upon expansion of the angle between the body support platforms by the reclining of the user against the force of the flexible strap, the user's leg muscles and hip joint are

stretched, and the user's leg is rotated outwardly in the hip joint.

individual arcuate sections of less than 360 and means for securing the individual arcuate sections together in end-to-end

4,949,961

#### GOLF BALL SETTER

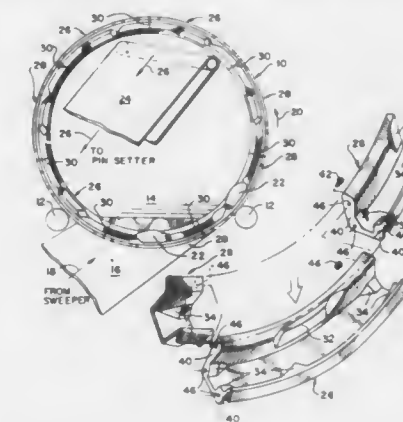
Salvatore Milano, 69 Tapley Ave., Revere, Mass. 02151

Filed Nov. 27, 1989, Ser. No. 441,619

Int. Cl. A63B 71/00

U.S. Cl. 273-32.5

7 Claims



1. A golf ball and tee setter and retriever apparatus comprising, and elongated handle having first and second ends, a pair of jaw members, each said jaw member having a straight portion at one end thereof and an arcuate portion at the other end thereof, support means connected to said first end of said handle, pivot means connecting said jaw members to said support means intermediate the end of said straight portion such that said straight portions cross each other and said arcuate portions face each other to form a ball grasping pocket therebetween, wheel means attached to said straight portions remote from said pivot means and said arcuate portions, means normally biasing said wheel means towards each other and said arcuate towards each other and said arcuate portions towards each other to form said ball grasping pocket, connector ends, said connector means extending from beyond said handle first end to said handle second end and being longitudinally movable along said handle, wedge means attached to said connector means first end, control means attached to said handle second end, said connector means second end being attached to said control means, said wedge means being positioned between said wheel means such that upon actuation of said control means by a user said wedge means will move towards said handle means and said wheel means along with said arcuate portions will be forced apart for releasing or grasping a golf ball, cradle means attached to said support means for cradling a golf ball from above when said ball is placed between said arcuate portions, means on said arcuate portions for grasping a golf tee below a golf ball held by said jaw members such that when the tee is pushed into the ground and said jaw members are forced apart by said wedge means the ball will be placed upon the tee, gauge means attached to said support means for centering a golf ball between said jaw members and beneath said handle means, and for placing a golf ball on a tee a desired height above a ground surface.

relation so that the secured arcuate sections combine to form a full 360 composite circular wheel.

4,949,964

#### EXTENDABLE CUE STICK

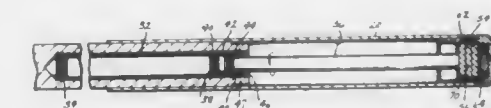
James D. Jolly, Rte. 2, Box 84, Glen Dean, Ky. 40141

Filed Apr. 14, 1989, Ser. No. 338,185

Int. Cl. A63D 15/08

U.S. Cl. 273-68

4 Claims



1. An extendable cue stick, comprising: a first shaft having an end with a reduced outside diameter and containing an internal bore; an elongated external hollow sleeve member adapted for co-extensive alignment with said reduced outside diameter shaft end and extending beyond the end of said reduced outside diameter shaft end; and an extension assembly inserted into said shaft bore wherein said extension assembly further comprises: a tube having an internally threaded first end and an internally smooth second end; a second shaft having a threaded locking end comprising a first threaded portion, an annular sleeve portion adjacent thereto and a second threaded portion, wherein said first threaded portion is adapted to threadably engage said tube threaded end; an internally threaded sleeve member having a retaining shoulder positioned on said tube and adapted to threadably engage said second threaded portion of said locking end, and said internally threaded sleeve member being retained within said tube second end; and a cylindrical cap member means fastened to said second shaft and inserted into said external hollow sleeve member for causing said second shaft to be rotated and moved within said tube.

4,949,962

#### PINWHEEL STRUCTURE FOR BOWLING PIN SETTERS

Anthony J. Gretzky, Muskegon, Mich., assignor to Brunswick Bowling and Billiards Corporation, Skokie, Ill.

Filed Dec. 7, 1988, Ser. No. 280,957

Int. Cl. A63D 5/08

U.S. Cl. 273-43 E

26 Claims

1. A pinwheel structure for transporting bowling pins from a lane upwardly to an appropriate in-feed station of a pin setter, comprising a modular circular wheel frame having a plurality of pin-receiving pockets, the frame comprising a plurality of

4,949,965

## POOL STICK SHAFT CONSTRUCTION

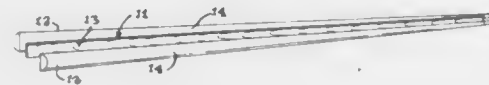
Marion J. Ross, Jr., 2629 E. Serendipity Cir., Colorado Springs, Colo. 80917, and David M. Kikel, 3650 N. Academy Blvd., #8, both of Colorado Springs, Colo.

Filed Mar. 28, 1989, Ser. No. 329,613

Int. Cl.<sup>5</sup> A64D 13/00

U.S. Cl. 273—68

3 Claims



1. A cue stick construction comprising:  
a shaft unit with a tapered end which includes a pair of mirror image generally enlarged laminate segments with an outer periphery fabricated from wood having a first selected color; and, a relatively narrow intermediate insert segment sandwiched between said laminate segments wherein said insert segment has upper and lower surfaces and is fabricated from wood having a second selected color which contrasts with said first selected color; and,  
a ferrule tip unit including a generally hollow cylindrical ferrule member dimensioned to receive the tapered end of said shaft unit; wherein, the ferrule member is provided with a pair of elongated diametrically opposed narrow recesses that are dimensioned to receive relatively thin inserts wherein said inserts are aligned with said intermediate insert segment of said shaft unit.

4,949,966

## MULTIPLE PURPOSE BATON

Wolfgang Bopp, 10, Blumenweg, Rüsselsheim-Bausenheim, D-6090, Fed. Rep. of Germany

Filed Mar. 28, 1988, Ser. No. 174,042

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 8704536[U]; Nov. 2, 1987, 8714575[U]

Int. Cl.<sup>5</sup> F41B 15/02

U.S. Cl. 273—84 ES

13 Claims



1. A multiple purpose baton comprising:  
an elongate baton body having an inside end and an outside end; and  
an elongate handle mounted adjacent said inside end and projecting longitudinally at a right angle to said elongate baton body, said handle including (a) a handle knob provided at a distal end of said handle distant from said baton body and protruding laterally from a remainder of said

handle, said handle knob including a distally opening recess, and (b) a metal impact head received in said recess such that said impact head is laterally, completely surrounded by said handle knob, except for a convexly curved outer surface of said impact head located longitudinally beyond said surrounding handle knob.

4,949,967

## TENNIS GAME BOARD

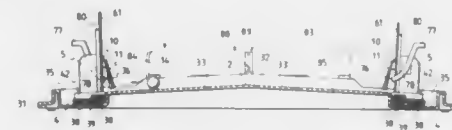
Masatoshi Todokoro, 2-33, Koganehara 2-chome, Matsudo-shi, Chiba-ken, Japan

Filed Jun. 15, 1989, Ser. No. 366,470

Int. Cl.<sup>5</sup> A63F 7/06, 7/20

U.S. Cl. 273—85 D

8 Claims



1. A tennis game board comprising:  
(a) a base board having a board surface formed on its upper surface on which a ball is rolled;  
(b) a racket-supporting body mounted at each end of the board surface in such a way that the racket-supporting bodies can be moved along the ends of the board surface;  
(c) a main shaft mounted inside the racket-supporting body;  
(d) a racket drive shaft mounted inside the racket-supporting body, the racket drive shaft supporting the racket that is used to strike the ball rolling toward it on the board surface;  
(e) a cam plate mounted on the main shaft, the cam plate having an action curve that transmits the ball hitting motion to the racket;  
(f) a windup spring supported on the main shaft to transmit the rotating force to the cam plate;  
(g) a winding mechanism hooked up to the windup spring;  
(h) a link coupled to the racket drive shaft, the link having a cam follower that engages the action curve in the cam plate; wherein each of the racket-supporting bodies includes a ball delivery member having a ball gutter portion and a ball leading portion, the ball leading portion being adapted to feed the ball from the ball gutter portion so that the ball will fall rolling onto the board surface at a position close to each racket-supporting body and roll toward the other racket-supporting body at the other end of the board surface;  
(i) said ball delivery member consisting of a ball gutter portion disposed above and on the side of the racket-supporting body, with a ball leading portion having a U-shaped cross-section, the ball leading portion extending along a downward slope from the ball gutter portion and projecting slightly from the front of the racket supporting body, the slope becoming gentler as the slope goes downward;  
(j) a mounting plate provided to the side of the ball leading portion of the ball delivery member, the mounting plate being capable of being removably attached to the side of the racket-supporting body.

4,949,968

## RACKET FOR BALL GAMES, IN PARTICULAR TENNIS, AS WELL AS STRINGING DEVICE THEREFOR

Hans-Werner Korte-Jungermann, KleinKollenburg Strasse 58, D-4156 Willich 2(DE), Fed. Rep. of Germany

PCT No. PCT/DE87/00418, § 371 Date May 17, 1988, § 102(e)

Date May 17, 1988, PCT Pub. No. WO88/01889, PCT Pub.

Date Mar. 24, 1988

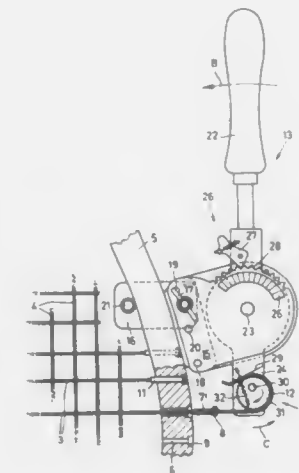
PCT Filed Sep. 16, 1987, Ser. No. 195,077

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1986, 8624290

Int. Cl.<sup>5</sup> A63B 51/14

U.S. Cl. 273—73 A

10 Claims



1. In combination, an individual string for fitting in a racket used for ball games, in particular tennis, said string having first and second rivet sleeves mounted adjacent opposite ends, a racket having a frame with inside and outer surfaces and aligned holes formed on opposite sides of said frame for receiving said string passed therethrough by means of a stringing device, and a stringing device including tensioning means for exerting tensile stress on said individual string and including a contact portion adapted to be mounted on said outer surface of said racket frame, a holding portion for engaging said inside surface of said racket frame, said holding portion including means movable relative to said contact portion for adjustment to accommodate frames of different thicknesses, prestressing means for said string on said contact portion including an actuating lever having clamping means for holding tension on said string, measuring means for indicating the level of prestressing achieved, and means for compressing said second rivet sleeve tightly on said string while said string is maintained in a prestressed condition;  
the improvement wherein:  
said first rivet sleeve is fixedly mounted at one end of said individual string; and  
said second rivet sleeve is dimensioned for loosely pushing into said string after said string has been inserted through an aligned hole on said opposite side of said frame, said second rivet sleeve being compressed to hold a fixed position on said string while tensioned by said stringing device.

4,949,969

## PUZZLE

Harvey P. Johnson, 11374 Brydan Dr., Apt. 258, Taylor, Mich. 48180

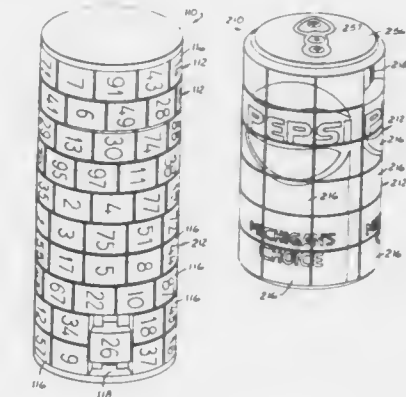
Continuation-in-part of Ser. No. 235,517, Sep. 24, 1988,

abandoned. This application Jan. 10, 1989, Ser. No. 295,305

Int. Cl.<sup>5</sup> A63F 9/08

U.S. Cl. 273—153 S

10 Claims



1. A self-contained puzzle comprising:  
a plurality of slide elements, each slide element having a dove tail tenon projecting radially inwardly to an axis and each slide element including a curved face having indicia thereon and projecting radially outwardly from said axis, all of the faces of the slide elements generally forming together a mosaic cylinder about said axis, the cylinder characterized by the absence of at least one element, leaving a slot in one position on the cylinder into which slot one of the plurality of slide elements is slidable to leave a slot in another position on the cylinder;  
a multiplicity of rotatable base wheels aligned end to end concentrically about said axis, including at least one end rotatable base wheel disposed at each end of the aligned multiplicity of rotatable base wheels, each at least one end rotatable base wheel having at least one female fitting that opens toward the end of the aligned multiplicity of rotatable base wheels at which said at least one end rotatable base wheel is disposed, each base wheel including a cylindrical hub collar of a determinate length, the hub collar having a hub inner surface which faces radially inwardly and in which a plurality of detent grooves are disposed parallel to and spaced concentrically about said axis and having an outer surface from which a plurality of planar spokes radiate and each base wheel including an outer collar to which said planar spokes radiate, the outer collar being disposed concentrically about the hub collar and the outer collar having a surface which faces radially outwardly and in which a plurality of mortise grooves are disposed parallel to and concentrically about said axis, the dove tail tenon of each slide element being insertable into, retainable by, and slidable along a mortise groove of an outer collar and being slidable from a mortise groove of one outer collar to the mortise groove of another when the mortise groove of said one outer collar and the mortise groove of said another are aligned;  
an axle having two ends, the axle extending between said two ends along said axis through the cylindrical hub collars of the multiplicity of rotatable base wheels so that the base wheels are rotatable about the axle, the axle having detent means comprising a multiplicity of sockets in the axle, the sockets spaced discretely from one another by said determinate length and aligned in a line that is parallel to said axis, each socket receiving therein a cammable detent and a means biasing the detent radially outwardly into a detent groove in the inner surface of a hub collar when the base wheel is rotated so as to bring said detent



groove into alignment with said detent means, the detent being cammable out of said detent groove, and the axle having a retention means on each end thereof, the retention means comprising a lip disposed generally at a respective end of the aligned multiplicity of rotatable base wheels; and

end caps, each end cap having at least one male insert alignable with a respective female fitting of an end rotatable base wheel and fittable thereto, each end cap including a cylindrical hub rib having a hub rib inner surface which faces radially inwardly and in which a concentric retention groove is disposed into which the retention means of the axle is snap fittable and having an outer surface from which a plurality of spoke ribs radiate, and each end cap including an outer rim to which said rib spokes radiate, whereby, the puzzle is a self contained unit which may be manipulated by rotating the base wheels so as to change angular alignments of the slide elements on one base wheel with respect to the slide elements on another and by sliding a slide element into the slot at one position so as to change axial alignments of the slide elements with respect to one another so that the indicia may be on the faces of the slide elements may be positioned to represent a solution for the puzzle.

4,949,970

## GOLF PRACTICE PUTTING DEVICE

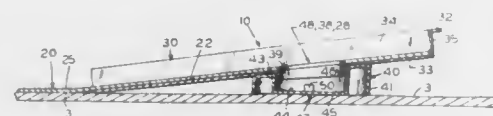
John E. Culley, 2260 Autumn Way, Meridian, Id. 83642

Filed Feb. 23, 1990, Ser. No. 483,731

Int. Cl.<sup>5</sup> A63B 67/02

U.S. Cl. 273—176 H

10 Claims



1. A golf practice putting device comprising:
  - a tray having a bottom member; a pair of opposing sidewalls; and an end wall, said bottom member provided with a ball receiving aperture;
  - a rotatable disc having a top face of fixed angular inclination for supporting said tray at a selected angle of inclination, said disc provided with a ball receiving cup having a top opening in registry with said ball receiving aperture of said tray; and
  - a flexible mat placeable upon a support surface for said device and upon the bottom member of said tray to provide a putting surface; said mat provided with an aperture in registry with said aperture of said tray for conducting a golf ball therethrough into the cup of said disc.

4,949,971

## GOLF TRAINING AID

C. J. Thornton, 4452 S. Rogers La., Claremore, Okla. 74017

Filed Aug. 14, 1989, Ser. No. 393,648

Int. Cl.<sup>5</sup> A63B 69/36

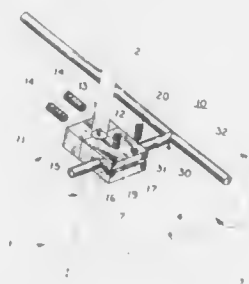
U.S. Cl. 273—186 A

3 Claims

1. An improved golf training aid including:
  - a first block section;
  - a second block section;
  - said first and second block sections removably affixed together;
  - a first passageway disposed through said block sections and adapted for passage of a golf club shaft, said first passageway being formed by said block sections and axially divided when said block sections are disengaged;
  - an elongated pointer bar rotatably attached to said second block section, said elongated pointer bar being rotatable about an axis normal to said pointer bar, said elongated pointer bar being rotatably attached to said second block section by a smooth surfaced elongated pointer shaft

normally affixed to said elongated pointer bar and disposed through a smooth surfaced second passageway in said second block section which is non-intersecting with said first passageway, said elongated pointer shaft being axially displaceable and rotatable within said second passageway;

said second passageway being disposed normally in relation to said first passageway;



said second passageway having a continuous lengthwise opening to the surface of said second block section in the form of a planar slit; and

threaded fastener means disposed normally through said planar slit to adjust said second passageway clearance around said elongated pointer shaft.

4,949,972

## TARGET SCORING AND DISPLAY SYSTEM

Max W. Goodwin, P.O. Box 233, Mesa, Colo. 81643, and Thomas T. Melsheimer, Longmont, Colo., assignors to Max W. Goodwin, Mesa, Colo.

Continuation-in-part of Ser. No. 824,626, Jan. 31, 1986, Pat. No. 4,763,903. This application Aug. 10, 1988, Ser. No. 239,221

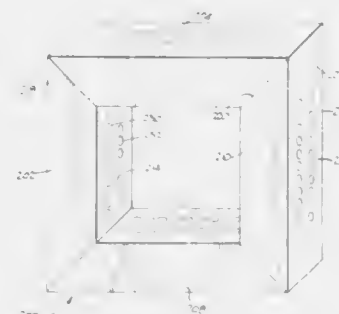
The portion of the term of this patent subsequent to Aug. 16,

2005, has been disclaimed.

Int. Cl.<sup>5</sup> F41J 5/02; G01P 3/68

U.S. Cl. 273—371

33 Claims



1. A system for automatically determining the location of a relatively small size projectile fired from a gun and travelling at relatively high velocity relative to a target area and for scoring the proximity of the projectile to the center of the target, the system comprising:
  - a rigid quadrilateral frame means having spaced parallel vertical side portions and spaced parallel upper and lower horizontal side portions for defining a polygonal open target area therebetween;
  - at least two transverse rows of a plurality of separate closely spaced light emitting means mounted on said frame means with a first row extending along a first one of said vertical

side portions and a second row extending along a first one of said horizontal side portions along the periphery of the target area for providing a multiplicity of separate individual generally parallel light beams of non-visible limited wave length of substantially circular cross-section extending across the target area projected directly through the atmosphere without passage through any intervening separate device extending across the path of the light beam and substantially covering the entire target area and being arranged in an X-Y transverse coordinate axis pattern;

target sheet mounting means mounted on said frame means for supporting and locating a target sheet with target indicia on said frame means with the target indicia located in predetermined relationship with said X-Y coordinate pattern of light beams;

at least two transverse rows of a plurality of separate closely spaced light detector means equal in number to the number of said light emitting means and being mounted on said frame means with one row extending along a second one of said vertical side portions and a second row extending along a second one of said horizontal side portions along the periphery of the target area opposite the light emitting means for normally directly receiving a generally cylindrical column of uninterrupted light directly through the atmosphere without passage through any intervening separate device extending across the path of the light beam from an associated one of the light emitting means in the absence of the presence of a projectile in the target area and for enabling each light detector means to generate a normal standard separate signal indicative of uninterrupted receipt of light from the associated light emitter means and to generate a separate interrupt signal upon passage of a projectile through the associated light beam in the target area;

said parallel light beams having a diameter of less than one-half the diameter of the projectile and said light emitting means and said light detector means in each row being mounted in closely spaced laterally adjacent relationship so that at least two of said parallel light beams are interrupted and at least two of said light detector means generate a separate interrupt signal during passage of a projectile through the target area;

means for receiving said interrupt signal from each of said light detector means and determining the location of each light beam interrupted by the passage of the projectile through the target area and for generating coordinate signals representative of the X coordinate and the Y coordinate of each interrupted light beam; and

means for receiving and correlating the coordinate signals with prior established coordinate reference information to establish the precise location of the passage of the projectile through the target area and to generate control signals representative of such locations.

4,949,973

## PRACTICE DEVICE FOR BALL HITTER OR KICKER

Bob C. Williamson, P.O. Box 24946, Lexington, Ky. 40524

Filed Dec. 11, 1989, Ser. No. 448,641

Int. Cl.<sup>5</sup> A63B 69/36, 69/34, 69/00

U.S. Cl. 273—185 D

8 Claims

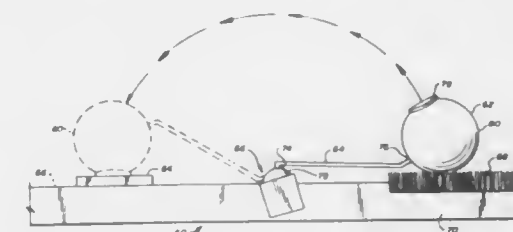
1. A practice device for a ball hitting or kicking player, comprising:
  - a base which extends horizontally and is adapted to be supported on a ground plane, said base having a medial line which extends upfield and downfield in relation to a desired direction;
  - means providing an upwardly-presented rotary joint on said base on a vertical axis disposed at an intermediate location along said medial line;
  - a rod mounted to said rotary joint by one end of said rod, said rotary joint providing for rotation of said rod about

said vertical axis and also about a horizontal axis generally intersecting said vertical axis;

a practice ball means mounted to said rod distally of said one end thereof, whereby a portion of said rod extends between said practice ball means and said rotary joint;

a pattern of corresponding rays marked on said base downfield of said vertical axis to the left and to the right of said medial line and having an origin at said vertical axis;

a transversally extensive band of one member of a set of



4,949,974

## GOLF TRAINING APPARATUS

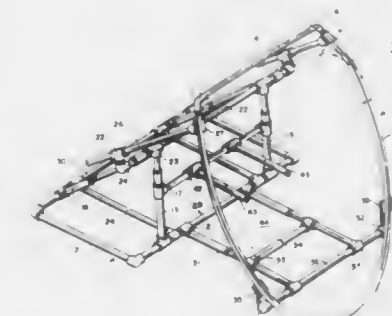
Miro D. Bellagamba, 13140 Lake Mary Jane Rd., Orlando, Fla. 32832

Filed Dec. 8, 1989, Ser. No. 448,078

Int. Cl.<sup>5</sup> A63B 69/36

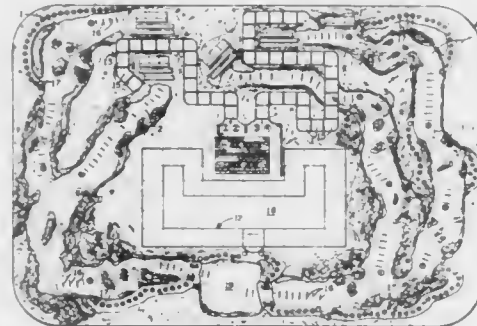
U.S. Cl. 273—186 R

18 Claims



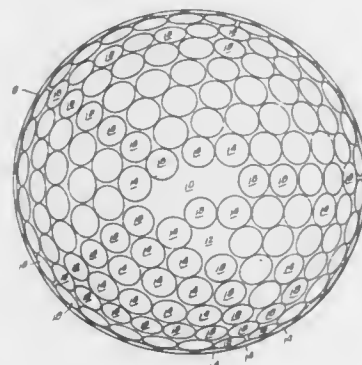
1. A golf training apparatus comprising:
  - a frame having a base for sitting on the ground;
  - a golf club swing guide attached to said frame, said golf club swing guide for guiding a person's swing;
  - guide adjustment means for adjusting the position of said golf club swing guide, said guide adjustment means having a height and angle adjustment for said golf club swing guide; and
  - said golf club swing guide having an arcuate polymer pipe segment having a replaceable connecting segment connecting the ends of said arcuate pipe segment to thereby vary the swing guide from a complete circle and customize the swing guide for the practice swing of a golfer.

4,949,975  
**WHITEWATER BOARD GAME**  
William J. Carrier, 4603 Bray Rd., Tampa, Fla. 33614  
Filed Oct. 17, 1988, Ser. No. 258,263  
Int. Cl.<sup>5</sup> A63F 3/00  
U.S. Cl. 273—251



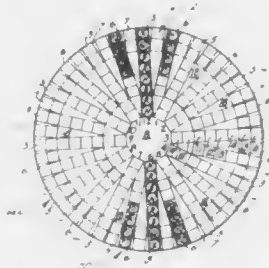
1. A whitewater board game, comprising a game board for two or more players, with indicia thereon of a plurality of pathways, each having successive segments to be traversed by the players and including a waterway having in it rapids to be run, a time pathway of preparations for, and a land pathway of travel to, such waterway;  
player tokens, equipment tokens, money tokens, and traverse time tokens; and  
route cards indicating the outcome of a particular running of such rapids, and having on the face thereof, identification of a route for a particular one of such rapids, and on the back thereof a plurality of outcomes, some of which are mishaps, according to water level and type of boat.

4,949,976  
**MULTIPLE DIMPLE GOLF BALL**  
William Gobush, No. Dartmouth, Mass., assignor to Acushnet Company, New Bedford, Mass.  
Division of Ser. No. 43,218, Apr. 27, 1987, Pat. No. 4,804,189, which is a continuation-in-part of Ser. No. 18,840, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 544,780, Oct. 24, 1983, abandoned. This application Oct. 13, 1988, Ser. No. 257,283  
Int. Cl.<sup>5</sup> A63B 37/14  
U.S. Cl. 273—232



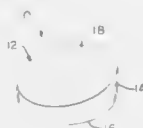
7. A golf ball having 324 dimples, said 324 dimples consisting essentially of two sets of dimples, a first set of dimples wherein each dimple has an identical small dimple diameter and a second set of dimples wherein each dimple has an identical large dimple diameter, said small dimple diameter being smaller than said large dimple diameter and said small dimple diameter having a nominal diameter of 0.157 inches.

4,949,977  
**GAME WITH TABLE TOP AND WALL SUPPORTED GAME BOARDS**  
Michael J. Smith, 426 Northwood Rd., North Bend, Oreg. 97459  
Filed Feb. 10, 1989, Ser. No. 308,632  
Int. Cl.<sup>5</sup> A63F 9/02  
U.S. Cl. 273—261



1. A game comprising,  
first and second game boards for table top and wall placement respectively, means on the game boards to denote radially disposed lanes of different lengths and circular lanes, said game boards having corresponding areas of like size and shape and position thereon, said lanes each comprised of spaces,  
sets of game pieces for individual movement one each by each player about said first game board,  
sets of player aimed means for identifying by contact one of said areas on said second game board, and  
said one of said areas identified by the player aimed means indicating the corresponding area on said first game board to which the last mentioned player may move one of said game pieces said second game board including grid-like pairs of wire members to denote said radially disposed lanes.

4,949,978  
**MAGNIFYING DEVICE**  
David Berner, 27 Conway Dr., Middletown, Pa. 17057  
Filed Nov. 25, 1988, Ser. No. 275,954  
Int. Cl.<sup>5</sup> A63F 3/06; G02B 27/02, 3/00  
U.S. Cl. 273—288



1. A device for use on flat surface having indicia and adapted to provide a user with an enlargement of the indicia,

said device comprising a preform made from a transparent material and having a flat lower surface adapted to receive the flat surface, a convex upper surface and sides therebetween which are tapered outwardly from said lower surface to said upper surface so that the periphery of said upper surface is greater than the periphery of said lower surface for providing a viewing surface area larger than said lower surface, the length of said sides are not uniform so that the plane of said upper surface is at an angle relative to said lower surface for providing an image, at an oblique angle to the user, of an indicia over which the preform lays.

4,949,979  
**GAME TARGET AND PLAYING METHOD**  
Kim E. Wheatcroft, P.O. Box 20122, Wichita, Kans. 67208  
Filed Mar. 1, 1989, Ser. No. 317,752  
Int. Cl.<sup>5</sup> F41J 5/00; A63B 69/36  
U.S. Cl. 273—389

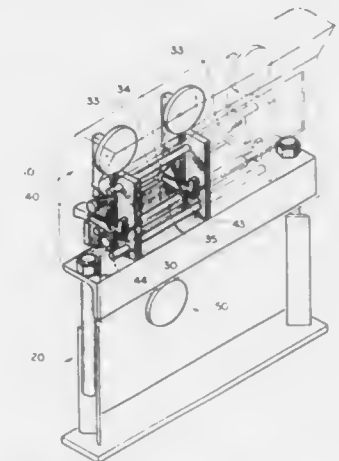


1. An apparatus for playing a game wherein a circular disk is thrown comprising a frame having an opening; a conical shaped net converging from said frame into a back net portion and secured to said frame for receiving a circular disk; a target pivotally secured to said frame such that when a circular disk comes into contact with said target after being thrown, the target pivots towards the net to allow the circular disk to land in the net; a pair of front legs secured to said frame for supporting said frame in a substantially vertical, elevated plane on a support surface; and a rear leg secured to said frame and extending rearward from said frame towards the back net portion for supporting the frame in a substantially vertical, elevated plane on said support surface along with the pair of front legs, said back net portion being secured to said rear leg; and when said frame is in a substantially vertical elevated plane, the opening of the frame defines a plane that is generally vertical with respect to the support surface.

4,949,980  
**RESETTABLE TARGET ARRAY**  
James C. Hoy, Box 218AB, R.D. 4, Reading, Pa. 19606  
Filed Dec. 12, 1989, Ser. No. 449,558  
Int. Cl.<sup>5</sup> F41J 7/04  
U.S. Cl. 273—391

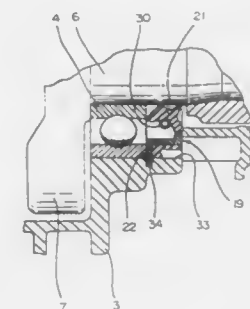
1. An improved target array comprising:  
(a) a frame for holding a multiplicity of upright first target assemblies;  
(b) a target assembly having a first target attached to a first pivoting target arm in cooperative contact with a target torsion spring means responsive to the arm pivot, the spring coming under load when the target and arm are knocked down;  
(c) latch means to latch the arm in the knocked down position and restrain the load on the torsion spring;  
(d) a reset target assembly having  
(1) a second target attached to a second pivoting arm for resetting, depending from the frame,

(2) a clearing bar guidingly mounted on the frame, which is lifted by the reset arm's pivoting action to unlatch the



first pivoting target arm thereby permitting the first target to be reset upright.

4,949,981  
**OIL SEAL**  
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan  
Continuation of Ser. No. 77,210, Jul. 24, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 333,361  
Claims priority, application Japan, Aug. 13, 1986, 61-124438[U]  
Int. Cl.<sup>5</sup> F16J 15/32  
U.S. Cl. 277—37



1. A composite oil seal for a bearing assembly to seal a clearance between two elements which rotate relative to one another, said seal comprising:  
two substantially L-shaped annular members connected to one another to form a seal, each of said members comprising a radially extending portion having a first end forming a radially outward edge, and an axially extending portion extending from a second end of the radially extending portions of the respective members, a first of said members forming a support member and being disposed radially inwardly with respect to a second of said members, said second member being made of an elastic material, the radially outward edge of said second member having a circumference which is slightly smaller than a circumference of the radially outward edge of said first member, whereby when the radially outward edge of said first member is held without substantially any displacement in the axial or radial direction in a circumferential groove formed in an inner circumferential surface of a stationary structure, the radially outward edge of said second mem-



ber is brought into intimate contact with the stationary structure so as to prevent flow of fluid through the oil seal; an annular elastic sealing member extending, in a radially inward direction and in an axial direction opposite to the extending direction of said axially extending portion of said first member, from a free end of said axially extending portion of said first member to form a sealing portion to sealingly engage with an outer circumferential surface of a rotatable member.

4,949,982

## COMPRESSOR VALVE ASSEMBLY

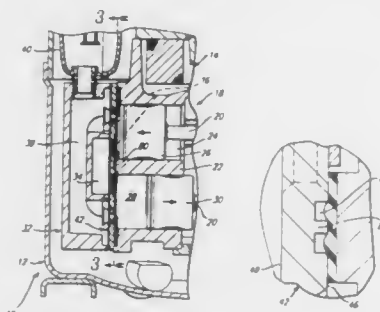
Michael A. DiFlora, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Division of Ser. No. 20,480, Jun. 13, 1988, Pat. No. 4,854,839. This application May 25, 1989, Ser. No. 357,904

Int. Cl.<sup>5</sup> E21B 33/00; F16J 15/00

U.S. Cl. 277-189

7 Claims



1. A high pressure seal arrangement for preventing fluid leakage between adjacent compression chambers of a compressor having a body defining said chambers, a valve plate affixed thereto and closing said chambers, said body and valve plate having mating faces, and a gasket disposed between the mating faces of said body and plate, said arrangement characterized by one of said mating faces comprising a groove with portions of said gasket being extruded into said groove to form a mechanical interlock resisting lateral movement.

4,949,983

## MULTI PLANE ARTICULATING ROD SEAL

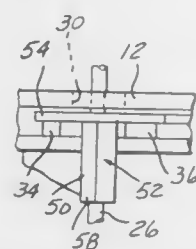
Robert J. Miller, Warren, Mich., assignor to Colt Industries Inc., New York, N.Y.

Filed Oct. 3, 1989, Ser. No. 416,756

Int. Cl.<sup>5</sup> F16J 15/56

U.S. Cl. 277-199

4 Claims



1. A seal for sealing an elongate rod having an enlargement at one end to a housing wall lying in a general plane substantially normal to the longitudinal axis of the rod, said wall having an opening through which said rod projects, said opening freely accommodating both reciprocation of said rod relative to said housing along the rod axis and lateral movement of said rod relative to said housing in directions normal to its axis; said seal comprising a flat plate having one side surface

adapted to slidably engage said housing wall in overlying relationship to said opening, said plate having a rod receiving bore therethrough adapted to accommodate the passage of said enlargement therethrough, an elongate leg portion projecting perpendicularly from the other side surface of said plate at one side of said rod receiving bore and having elongate concave groove extending from said bore the entire length of said leg portion, an elongate closure member having a elongate concave groove extending its entire length, cooperating snap fit coupling means on said leg portion and closure member for fixedly assembling said leg portion and closure member to each other with one end of said closure member engaged within said other side surface of said plate and the concave grooves in said leg portion and said closure member defining a rod receiving passage extending from said rod receiving bore in said plate to the remote end of said leg portion, said passage slidably receiving said rod.

4,949,984

## REAR-WHEEL STEERING APPARATUS FOR VEHICLE

Hiroki Uemura, Katsuhiko Tokumaru, and Ayumu Doi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

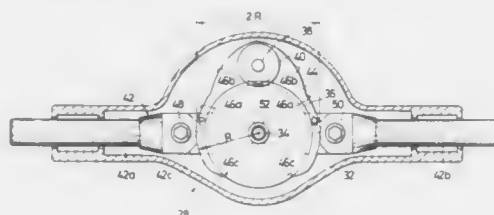
Filed Jul. 21, 1989, Ser. No. 383,091

Claims priority, application Japan, Jul. 25, 1988, 63-183583; Mar. 1, 1989, 1-49121

Int. Cl.<sup>5</sup> B72D 7/00

U.S. Cl. 280-91

21 Claims



1. In a rear-wheel steering apparatus for a vehicle, comprising:

a pair of tie rods, respectively connected to a pair of rear wheels, for turning the corresponding rear wheels in a right-and-left direction of the vehicle; and rear-wheel steering means, connected to said tie rods, for displacing the corresponding tie rods in the right-and-left direction of the vehicle,

the improvement in which said rear-wheel steering means includes:

a casing;

an output shaft both ends of which are respectively connected to said pair of tie rods and supported on said casing to be displaceable in the right-and-left direction of the vehicle;

a cam member which is supported to be rotatable about an axis extending to be perpendicular to an axial direction of said output shaft and on an outer peripheral surface of which a cam profile is formed;

a pair of roller members which are provided to said output shaft, disposed at two sides of said cam member to sandwich said cam member therebetween, and in rolling contact with opposing portions of the outer peripheral surface of said cam member; and

an input shaft for rotating said cam member.

4,949,985

## LOW RIDE SADDLE MOUNT

Nicholas J. Lichter, Kenosha, Wis., assignor to Jupiter Transportation Company, Kenosha, Wis.

Filed Jun. 22, 1989, Ser. No. 369,950

Int. Cl.<sup>5</sup> B60P 3/075

U.S. Cl. 280-402

3 Claims



1. A low ride saddle mount for use in the transportation of trucks, comprising a pair of laterally spaced supports, a generally horizontal shaft extending between said supports, aligned journals on said supports supporting the ends of said shaft for axial rotation, a platform on said shaft between said ends thereof, a saddle, means mounting said saddle on said platform for rotation about a transverse axis extending at right angles to the longitudinal axis of said generally horizontal shaft, and attachment means on said saddle adapted to releasably clamp on the front axle of a truck to be towed, said supports being adapted to be mounted on a towing truck in an upright position in which said shaft is above said supports, said supports also being adapted to be mounted on a towing truck in inverted position in which said shaft is below said supports for a lower ride, the construction and arrangement being such that said saddle and attachment means can rotate about said transverse axis free of interference with said supports and journals in the upright position of said supports and also in the inverted position thereof, said attachment means being disposed above said supports and journals in both said positions of said supports so that said saddle and attachment means with the front axle of a truck to be towed clamped to said attachment means can rotate about said transverse axis without interference in both said positions of said supports.

4,949,986

## BODY AND UNDERCARRIAGE FOR INTERCONNECTABLE BAGGAGE CARTS

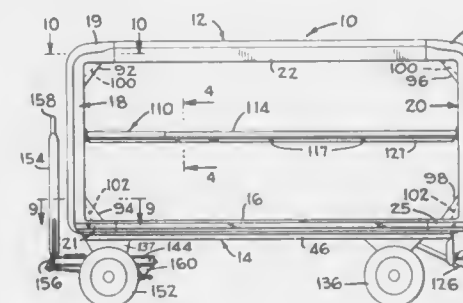
Pierre R. Gohier, Midvale, Utah, assignor to United Tractor Company, Cleveland, Ohio

Continuation of Ser. No. 911,582, Sep. 24, 1986, abandoned. This application Aug. 19, 1988, Ser. No. 235,705

Int. Cl.<sup>5</sup> B62D 13/00, 53/00

U.S. Cl. 280-410

2 Claims



1. A baggage cart intended to be selectively coupled to other carts to form a train of carts, the baggage cart comprising:

a. a body including:

a plastic floor having outer edges,

a plastic roof,

a pair of plastic end walls capable of mating and interlocking with said floor and roof, and

fastening means for securing said ends walls to said floor and roof; and

b. an undercarriage supporting said body, said undercarriage including:

stringer means extending substantially the length of said body and capable of attachment thereto, said stringer means including a pair of metal members positioned parallel to each other, each of said metal members having a substantially U-shaped cross section with an inner flange extending toward and an outer flange extending away from the other of said metal members, said outer flanges terminating in a downward extending lip positioned under one of said outer edges of said floor,

a tower assembly secured to said stringer means, a steerable front axle assembly disposed beneath said tower assembly,

a bearing member interconnecting said tower assembly and said front axle assembly such that said front axle assembly is rotatable relative to said tower assembly, a tow bar pivotally secured to said front axle assembly, a rear axle assembly attached to said stringer means, and a hitch attached to said stringer means and capable of releasably securing one of the other carts.

4,949,987

## ASYMMETRICAL FOUR-BAR TRAILER HITCH

Norman W. Gallatin, P.O. Box 120, Garrison, Iowa 52229

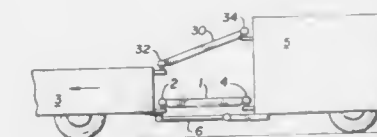
PCT No. PCT/US86/01431, § 371 Date Mar. 27, 1987, § 102(e) Date Mar. 27, 1987, PCT Pub. No. WO88/00149, PCT Pub. Date Jan. 14, 1988

Continuation-in-part of Ser. No. 428,537, Sep. 30, 1982, Pat. No. 4,598,926. This PCT application Jul. 9, 1986, Ser. No. 178,991 The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> B62D 53/00

U.S. Cl. 280-459

21 Claims



1. A four-bar hitch for pulling a trailer vehicle behind a tow vehicle, said tow vehicle having a rear end and a longitudinal axis, said trailer having a longitudinal axis and a forward end which is connected by said hitch to the rear end of the tow vehicle,

said four-bar hitch having a main arm and a steering arm, said main arm having a first pivot means connecting a forward portion thereof to the rear end of the tow vehicle and a second pivot means connecting a rear portion thereof to the forward end of the trailer, said steering arm being spaced laterally from said main arm and having a

third pivot means connecting a forward portion of the steering arm to the rear end of the tow vehicle, said steering arm having a fourth pivot means connecting a rear portion thereof to the forward end of the trailer, said main arm being substantially parallel to the longitudinal axes of the tow vehicle and the trailer when the longitudinal axis of the trailer is parallel to the longitudinal axis of the tow vehicle,

said arms and said vehicle comprising a quadrilateral linkage, four corners of which are defined in plan view by said first, second, third and fourth pivot means, said quadrilateral linkage being asymmetrical with respect to the longitudinal axis of the tow vehicle when the longitudinal axis of the trailer is parallel to the longitudinal axis of the tow vehicle,

said first and third pivot means being spaced apart a distance which is less than the distance between the second and fourth pivot means,

said first and second pivot means being spaced apart a distance which is from about 0.7 to 1.5 times the distance between the third and fourth pivot means.

4,949,988

## CROSS-COUNTRY SKI BOOT AND BINDING

Didier Rousset, Lescheraines; Marc Provence, Annecy Le Vieux, and Josiane Dunand, Cran Gevrier, all of France, assignors to Salomon S.A., Annecy Cedex, France

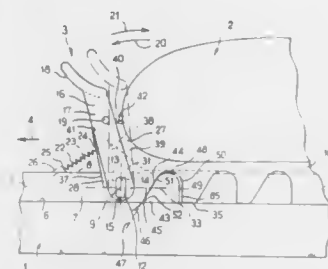
Filed Jan. 11, 1988, Ser. No. 141,846

Claims priority, application France, Jan. 12, 1987, 87 00214

Int. Cl.<sup>5</sup> A63C 9/10

U.S. Cl. 280—615

35 Claims



1. A cross-country ski-binding member for releasably attaching the toe of a boot member to a ski having a longitudinal axis comprising:

- cam means on said members cooperable, during downward movement of the boot member relative to the binding member in a direction perpendicular to said axis, for effecting forward displacement of said boot member along said axis relative to the binding member until the sole of said boot member seats on said ski;
- a stirrup, mounting means for movably mounting said stirrup on said binding, said bias means for resiliently biasing said stirrup towards a neutral position;
- mutual engagement means on said stirrup and on said boot member, said engagement means being constructed and arranged so as to be engageable during cooperation of said cam means for effecting resilient displacement of said stirrup from its neutral position during initial forward displacement of said boot member, for effecting resilient displacement of said stirrup towards its neutral position during final displacement of said boot member, and for retaining said boot member to said ski after the boot member seats on the ski;
- a connector pin on one of said members positioned transversely to said longitudinal axis when said stirrup retains said boot member to said ski, said pin defining a transverse axis;
- a receiver on the other said members for pivotably receiving said connector pin and effecting a pivotal connection between the members while said boot members is retained to said ski; and
- said connector pin and said receiver being constructed and arranged so that said boot member is pivotal on said binding member about said transverse axis of said pin.

tion between the members while said boot members is retained to said ski; and

- said connector pin and said receiver being constructed and arranged so that said boot member is pivotal on said binding member about said transverse axis of said pin.

4,949,989

## AUTOMOTIVE SUSPENSION SYSTEM WITH VARIABLE SUSPENSION CHARACTERISTICS AND VARIABLE DAMPING FORCE SHOCK ABSORBER THEREFOR

Shinobu Kakizaki; Fumiyuki Yamaoka; Shigeru Kikushima, and Junichi Emura, all of Kanagawa, Japan, assignors to Atsugi Motor Parts Co., Ltd., Kanagawa, Japan

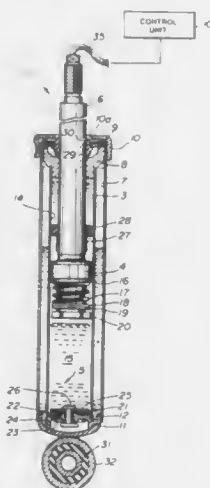
Filed Apr. 18, 1989, Ser. No. 340,062

Claims priority, application Japan, Apr. 19, 1988, 63-53301[U]; Apr. 19, 1988, 63-53302[U]; Apr. 28, 1988, 63-58799[U]; Nov. 4, 1988, 63-279092

Int. Cl.<sup>5</sup> F16F 9/50; B60G 17/00

U.S. Cl. 280—707

60 Claims



1. An automotive suspension system comprising:

- a shock absorber disposed between a vehicle body and a suspension member rotatably supporting a road wheel, said shock absorber including a cylinder tube connected to one of said vehicle body and said suspension member and defining an internal space, a piston disposed within said internal space for dividing said internal space into first and second chambers and connected to the other of said vehicle body and said suspension member for relative movement with respect to said cylinder tube, said first and second chambers being filled with a working fluid;
- a fluid communication means for establishing fluid communication between said first and second chambers with a limited fluid flow rate for generating a damping force against relative motion between said piston and said cylinder tube;
- a valve means associated with said fluid communication means for controlling flow restriction of said fluid communication means, said valve means being variable of flow restriction characteristics for varying damping characteristics of said shock absorber;
- a sensor means for monitoring fluid pressure in said first chamber for producing a piston stroke indicative signal indicative of magnitude of piston stroke;
- an actuating means, associated with said valve means and responsive to a control signal, for controlling said valve means for adjusting flow restriction characteristics according said said control signal; and
- a controlling means, receiving said piston stroke indicative signal, for deriving a piston motion representative data on the basis of said piston stroke indicative signal, comparing said piston motion representative data with a predetermined deadband criteria which are set with respect to a neutral value and defining a predetermined deadband, and detecting said piston motion representative data out of said deadband and reaching a peak value for producing said control signal for harder damping characteristics and detecting said piston motion representative data varying across said neutral value for producing said control signal for softer damping characteristics.

the basis of said piston stroke indicative signal, comparing said piston motion representative data with a predetermined deadband criteria which are set with respect to a neutral value and defining a predetermined deadband, and detecting said piston motion representative data out of said deadband and reaching a peak value for producing said control signal for harder damping characteristics and detecting said piston motion representative data varying across said neutral value for producing said control signal for softer damping characteristics.

4,949,990

## STEERING COLUMN FIXING STRUCTURE FOR A VEHICLE

Shinichi Hirahara; Hiroyuki Kawanishi, and Naoto Shibui, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

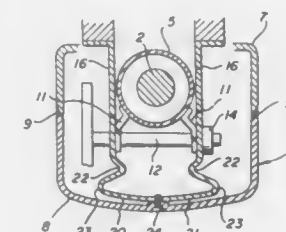
Filed Oct. 21, 1988, Ser. No. 260,850

Claims priority, application Japan, Dec. 18, 1987, 62-321018

Int. Cl.<sup>5</sup> B60R 21/05; B62D 1/19

U.S. Cl. 280—750

4 Claims



1. A steering column fixing structure for a vehicle comprising: column brackets fixing a steering column to the body of the vehicle and incorporating a tilt adjusting unit for adjusting the tilt of the steering column, a column cover covering the steering column and being yieldable to external force exerted thereon from behind the same, said column cover having two sections each having a pair of abutting scarfs, and energy absorbing means provided behind the column brackets and within the cover for absorbing external force exerted on the steering column from behind the same, said energy absorbing means comprising an integrally formed bulge joining rearward ends of the column brackets and having corners which define easily yieldable portions, wherein said bulge has a slightly curved broad surface extending in parallel with an inside surface of said column cover and further wherein said broad surface has a width substantially wider than a width of said column brackets.

4,949,991

ROLLOVER PROTECTION SYSTEM FOR VEHICLES  
Dieter Ludwig, Weidhelm, Fed. Rep. of Germany, assignor to Deere & Company, Moline, Ill.

Filed Jul. 26, 1989, Ser. No. 385,757

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826392

Int. Cl.<sup>5</sup> B60R 21/13

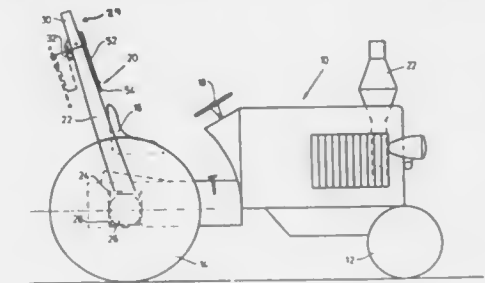
U.S. Cl. 280—756

11 Claims

1. A rollover protection system for a vehicle having an operator station, comprising:

- a pair of posts mounted to and directed generally upwards from the vehicle;
- upper frame means pivotally mounted to the upper ends of said posts and pivotably between and raised and lowered positions; and
- a lever mounted to said upper frame means, said lever being positioned to allow an operator in said operator station to manually move said upper frame means back and forth between said raised and lowered position.

c. a lever mounted to said upper frame means, said lever being positioned to allow an operator in said operator station to manually move said upper frame means back and forth between said raised and lowered position.



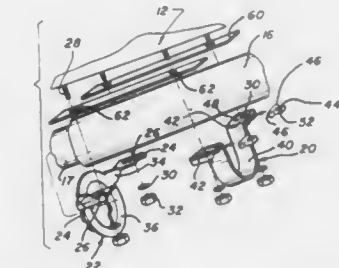
4,949,992  
COLLAPSIBLE STEERING COLUMN  
William M. Abramczyk, Rochester Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 1, 1989, Ser. No. 402,165

Int. Cl.<sup>5</sup> B62D 1/18

U.S. Cl. 280—777

9 Claims



1. A collapsible steering column assembly for a vehicle adapted to be connected to a steering column support member secured to a vehicle dashboard assembly, said steering column assembly being collapsible relative to said support member and comprising:

- a break-away coupling member fixed to one end portion of said steering column assembly and being adapted to connect said steering column assembly to said steering column support member;
- an energy absorbing means integral with and located at the remaining portion of said steering column assembly and adapted to be affixed to the vehicle dashboard assembly;
- an axially oriented slide means adapted to be secured between said steering column support member and the remainder of said steering column assembly, said slide means including a flat plane substantially rigid slide surface;
- said break-away coupling member including a slide portion means in sliding engagement with said slide surface for allowing that upon the vehicle occupant's impact with a steering wheel at said one end portion of said steering column assembly during a collision the steering column assembly will slide axially in the direction of the dashboard assembly relative to the steering column support member.



4,949,993

**EXERCISE APPARATUS HAVING HIGH DURABILITY MECHANISM FOR USER ENERGY TRANSMISSION**

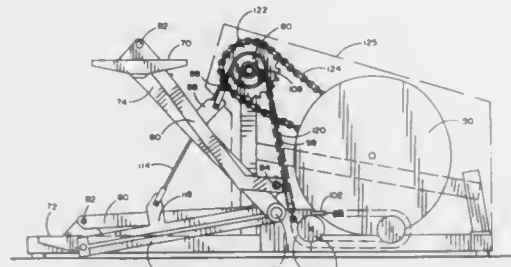
Duane P. Stark, and Michael T. Sweeney, both of Laguna Beach, Calif., assignors to Laguna Tectrix, Inc., Irvine, Calif.

Filed Jul. 31, 1989, Ser. No. 387,936

Int. Cl.<sup>5</sup> A63B 23/00

U.S. Cl. 272-70

10 Claims



1. In an exercise apparatus which simulates stair climbing, which has a rotating resistance mechanism, and means for causing rotation of said mechanism as a user steps alternately on a left foot pedal, moving it from an upper to a lower position, and a right foot pedal, moving it from an upper to a lower position, a force transmitting structure between the pedals and the resistance mechanism, comprising:

- a driving shaft rotatable in one direction only;
- a member which rotates with the driving shaft to cause rotation of the resistance mechanism;
- a first pulley wheel mounted on the driving shaft and arranged to apply torque to the driving shaft when the first pulley wheel rotates in one direction, and to free wheel on the driving shaft when the first pulley wheel rotates in the opposite direction;
- a first cable connected at one end to the left foot pedal and at the other end to the first pulley wheel, said first cable applying torque at the first pulley wheel to rotate the driving shaft when the left foot pedal is moved from its upper position to its lower position by the user's weight;
- a first pedal-returning means for automatically returning the left pedal from its lower to its upper position when the user's weight is removed from that pedal;
- a second cable connected at one end to the first pedal-returning means and at the other end to the first pulley wheel, said second cable applying torque to rotate that pulley wheel but not the driving shaft;
- a second pulley wheel mounted on the driving shaft and arranged to apply torque to the driving shaft when the second pulley wheel rotates in one direction, and to free wheel on the driving shaft when the second pulley wheel rotates in the opposite direction;
- a third cable connected at one end to the right foot pedal and at the other end to the second pulley wheel, said third cable applying torque at the second pulley wheel to rotate the driving shaft when the right foot pedal is moved from its upper position to its lower position by the user's weight;
- a second pedal-returning means for automatically returning the right pedal from its lower to its upper position when the user's weight is removed from that pedal; and
- a fourth cable connected at one end to the second pedal-returning means and at the other end to the second pulley wheel, said fourth cable applying torque to rotate that pulley wheel but not the driving shaft.

4,949,994

**HEIGHT ADJUSTABLE SHOULDER BELT GUIDE LOOP**

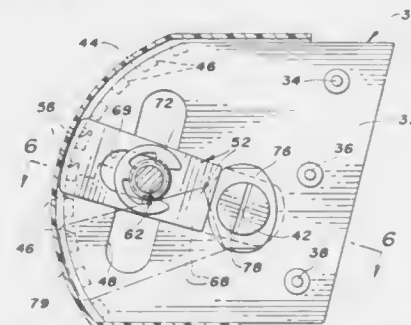
Kenneth M. Zawisa, Farmington Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 4, 1989, Ser. No. 389,459

Int. Cl.<sup>5</sup> B60R 22/04

U.S. Cl. 280-802

4 Claims



1. A guide loop for vertically adjusting a vehicle shoulder belt comprising:

- a mounting bracket mounted on the vehicle and having a pivot, a plurality of teeth displayed in an arcuate path about the pivot and projecting from the bracket in a direction parallel with the axis of the pivot, and a vertically extending guide slot interposed between the pivot and the teeth;
- an arm mounted on the pivot for pivotal movement and having teeth thereon engageable with the teeth of the mounting bracket to lock the arm against pivotal movement and having a guide slot therein extending radially from the pivot;
- a guide loop having the belt slidable therethrough; and
- guide means connected to the guide loop and slidably guided within the vertical guide slot of the mounting bracket and the radial slot of the arm so that pivotal movement of the arm about the pivot as permitted by disengagement of the teeth between the mounting bracket and the arm moves the guide loop vertically along slot of the mounting bracket to adjust the height of the shoulder belt.

4,949,995

**SAFETY BELT ARRANGEMENT**

Lars Y. Haland, Falsterbo; Mats A. Karlin, Vargarda; Leif Ennerdahl, Allingsas, and Enar T. Skanberg, Billdal, all of Sweden, assignors to General Engineering (Netherlands) B.V., Utrecht, Netherlands

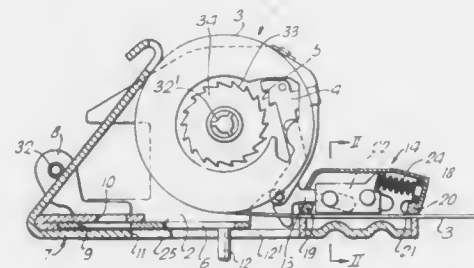
Filed Apr. 4, 1989, Ser. No. 333,827

Claims priority, application United Kingdom, Apr. 5, 1988, 8807929

Int. Cl.<sup>5</sup> B60R 21/10

U.S. Cl. 280-805

12 Claims



1. A safety belt arrangement for use in a vehicle, said arrangement comprising a safety belt, a retractor reel for the safety belt, said retractor reel incorporating a spindle, means to wind the belt on to the spindle, means to lock the spindle on

which the belt is wound in response to predetermined conditions, means to mount the retractor reel on the vehicle so that the reel can move relative to the vehicle if a large force is applied to the reel by the belt in excess of a predetermined force, a clamp movable to clamp the safety belt leaving the reel, means to operate said clamp in response to movement of said reel as a consequence of said large force, and means mounting said clamp in position, said clamp mounting means incorporating a force limiter, such that if a force is applied to the clamp greater than a second predetermined force, the clamp will move relative to the vehicle.

4,949,996

**SKI EQUIPMENT INCLUDING A MIRROR PANEL ATTACHMENT**

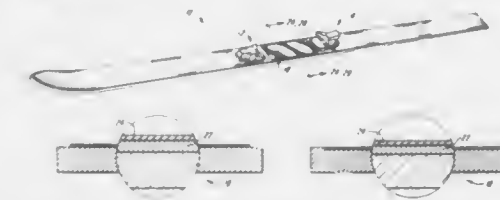
Mark H. McNally, 155 Northwood Apartments, Sunderland, Mass. 01375

Filed Feb. 28, 1989, Ser. No. 316,815

Int. Cl.<sup>5</sup> A63C 5/06, 11/00

U.S. Cl. 280-816

5 Claims



5. A mirror panel for placement on a snow ski having a ski binding area on an upper surface thereof comprising a highly reflective mirror surface applied to a coating of abrasive and wear resistant material, said coating being optically transparent wherein said mirror surface is located within said binding area.

4,949,997

**BINDING SYSTEM FOR FLAT MATERIAL OF VARYING THICKNESS**

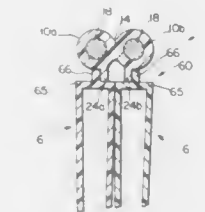
Michel Champagne, Laval, Canada, assignor to Les Profiles d'Extrusion Plastival, Inc., Canada

Filed Jul. 19, 1989, Ser. No. 382,741

Int. Cl.<sup>5</sup> B42D 17/00

U.S. Cl. 281-45

15 Claims



9. A binding system for sheets of material of varying thickness, comprising:

- a plurality of side-by-side elongated sheet-holding members, each of said members comprising gripping means for gripping a sheet of material and a plurality of coaxial, spaced-apart cylindrical first hinge members arranged in a single row extending outwardly from said gripping means, said gripping means having a maximum width and each of said first hinge members having a longitudinal axis and an outer diameter;
- a plurality of link means for interlocking said plurality of sheet-holding members together in side-by-side relation, each of said link means comprising first and second parallel, connected second hinge members aligned on two parallel spaced apart longitudinal axes, and said second hinge members each having an outer diameter, said first and second hinge member outer diameters being the same, said first hinge members being spaced apart by a distance

which is substantially equal to the length of said second hinge members, and said longitudinal axes of said second hinge members separated by a distance substantially equal to said maximum width of said gripping means; and a plurality of fastening means for interlocking said first and second hinge members in coaxial registration.

4,949,998

**HOLDER FOR TRANSFER MEDIUM FOR CHECKS**

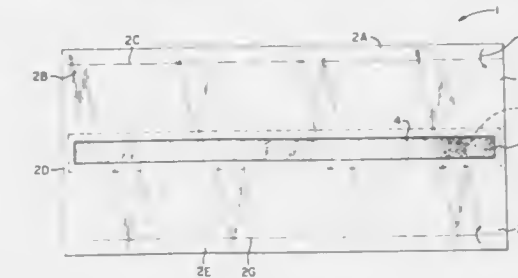
C. Joseph McFann, Ridgefield, Conn., and Gerald A. Callahan, Framingham, Mass., assignors to Transkrit Corporation, Brewster, N.Y.

Filed Sep. 16, 1988, Ser. No. 246,094

Int. Cl.<sup>5</sup> B41L 3/12, 3/00

U.S. Cl. 282-29 B

10 Claims



1. A holder for use in transferring information being recorded on a preselected area of a check to a record, the check having predetermined height and width dimensions with the width dimension being substantially greater than the height dimension, the holder comprising:

- a support member having substantially the same width dimension as said predetermined width dimension and a greater height dimension than the portion of said predetermined height dimension from the top edge of the check to the bottom edge of said preselected area;
- a transfer medium supported on said support member, said transfer medium being of extent sufficient to encompass said preselected area when aligned with said preselected area;
- and alignment means comprising a flange disposed on the upper portion of the width portion of said support member such that when said support member is placed adjacent the check with said flange of said alignment means engaging the top edge of the check said transfer medium becomes aligned with said preselected area of the check.

4,949,999

**BOOK INDEXING SYSTEM**

Cui Ke-hui, 1630 N. W. 2nd Avenue, Gainesville, Fla. 32603

Filed May 23, 1988, Ser. No. 197,167

Int. Cl.<sup>5</sup> B42F 21/00, 21/04, 21/08, 21/02

U.S. Cl. 283-38

12 Claims

1. An indexing system for books having contents arranged alphabetically or numerically, comprising symbols and colored marks imprinted on the edges of the pages opposite the binding such that said symbols and marks are visually identifiable when said book is closed; the system including:

- (a) primary symbols of a size to extend laterally substantially from the first page to the last page of contents relating to that symbol;
- (b) secondary symbols, positioned vertically below each appropriate primary symbol, of a size to extend laterally substantially from the first page to the last page of contents relating to said primary symbol and said secondary symbol;
- (c) tertiary symbols, positioned vertically below each appropriate secondary symbol, of a size to extend laterally substantially from the first page to the last page of con-

tents relating to said primary symbol, said secondary symbol, and said tertiary symbol; and  
(d) vertical marks positioned vertically below each appropriate said symbol, whether it be primary, secondary, or tertiary, of a size to extend laterally substantially from the



first page to the last page of contents relating to the combination of all symbols vertically above said mark, and including said mark; said marks being colored any one of a selected plurality of colors defined to represent the entire spectrum of logical subdivisions of the symbol to which it pertains.

4,950,000

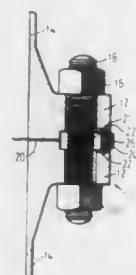
## FLANGED PIPELINE CONNECTIONS

Arthur W. Richardson, Cumbria, United Kingdom, assignor to Furmanite International Ltd., Kendal, England  
Filed Nov. 17, 1988, Ser. No. 271,817  
Claims priority, application United Kingdom, Nov. 17, 1987, 8726885

Int. Cl.<sup>3</sup> F16L 55/18

U.S. Cl. 285—15

3 Claims



1. In a flanged pipe coupling comprising a pair of pipes for transporting process fluid, said pipes having flanged ends coupled together face to face with a gasket therebetween, the improvement comprising the combination of:

- (i) an annular space defined by annular aligned grooves formed in each of the facing flanged ends,
- (ii) a unitary annular ring of reduced height and width dimension relative to the respective height and width dimension of the aligned annular grooves to be thereby loosely retained in the said space, the said ring being of such thickness as not to interfere with sealing by the said gasket, whereby, in the event that a leak occurs from between the flanges, the process fluid may escape past the ring and vent to the atmosphere, and
- (iii) port means for receiving injected sealing compound into the said space.

4,950,001

## GRADUATED FRICTION ANCHOR

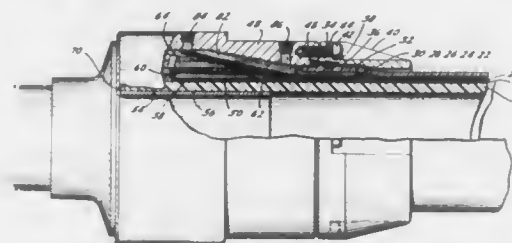
Kerry D. Briggs, South Berwick, Me., assignor to Simplex Wire & Cable, Portsmouth, N.H.

Filed Dec. 11, 1987, Ser. No. 131,768

Int. Cl.<sup>3</sup> F16L 39/02

U.S. Cl. 285—149

11 Claims



1. In a pipe coupling having a free end for releasable connection to another coupling, the combination which comprises: an elongated flexible pipe core adapted to be positioned within said coupling; a layer of aramid fibers exteriorly disposed about and extending along said pipe core; an anchor ring surrounding portions of said aramid fibers and the pipe core and having an inner surface, an outer surface, a curved end portion proximate said free end and a curved end portion away from said free end, said curved end portions connecting said surfaces, said aramid fibers extending along said inner surface, said curved end portion proximate said free end and said outer surface; a wedge ring wedged against an inwardly facing portion of said flexible pipe core, said flexible pipe core expanding radially outwardly against said aramid fibers in response to wedging force from said wedge ring; said inner surface of said anchor ring being inclined relative to the outer surface of said wedge ring such that the distance between said inner surface and said wedge ring decreases toward said free end, whereby graduated compression forces acting between said anchor ring and said wedge ring through said radially expanded flexible core are imposed upon said aramid fibers located intermediate said flexible core and said wedge ring.

4,950,002

## SCREW SEAL

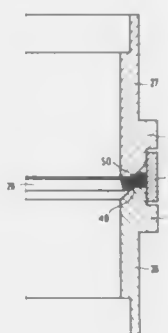
Gerd Hormansdorfer, Kastanieneck 6a, 3167 Burgdorf, Fed. Rep. of Germany

Filed Jun. 6, 1988, Ser. No. 202,389

Int. Cl.<sup>3</sup> F16J 15/08; F16L 17/08

U.S. Cl. 285—328

2 Claims



1. Sealing connection between two coaxial cylindrical members having cooperating sealing surfaces comprising

a first sealing surface having an outer vertical cylindrical wall, an inner frusto-conical wall, and a horizontal surface joining said cylindrical wall and merging with said frusto-conical wall to provide a first sealing rim, a second sealing surface opposed to said first sealing surface, said second sealing surface having in cross section a V-shaped second sealing rim, the diameter of said V-shaped second sealing rim being smaller than the diameter of said first sealing rim, the outer face of said second sealing surface joining an axially-extending cylindrical surface having a diameter slightly less than the diameter of said outer vertical cylindrical wall, and an annular gasket of ductile material, flat in the undeformed state, having a substantially rectangular cross section disposed on said horizontal surface between said first and second sealing rims, the difference in diameters between said first and second sealing rims being less than the thickness of said gasket whereby upon axially forcing the two coaxial cylindrical members together the gasket is tilted toward the axis of said members and said sealing rims bite into the surface of said gasket.

4,950,003

## LUGGAGE CART

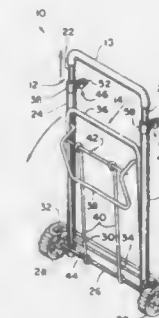
Gilbert J. Holtz, 182 Tibbetts Rd., Yonkers, N.Y. 10705

Filed Jun. 30, 1989, Ser. No. 373,563

Int. Cl.<sup>3</sup> B62B 1/12

U.S. Cl. 280—655

1 Claim



1. Improvements for a luggage cart of the type having a size-adjustable handle comprised of a telescoped together cooperating pair of a first lower hollow tubular handle member with an upper opening therein in which is slidably disposed a second upper tubular handle member wherein the extent of the extension of said second handle member beyond said first handle member upper opening establishes the size of said handle of said luggage cart, said second upper tubular member having first and second flared ends, said first lower hollow tubular handle member having a first and second ends having a crimped portions therein, said crimps retaining said flared ends of said second tubular member within said first lower hollow tubular member, a hollow cap disposed in covering relation over said first handle member upper opening having a central opening in aligned relation to said upper opening and a cylindrical wall in encircling relation about the upper end of said first handle member and extending in covering relation over said crimps therein, said central opening of said cap being slightly undersized with respect to the upper opening of said first lower handle member, to thereby provide an optimum sliding clearance for the size-adjusting sliding movement of said second upper handle member, a laterally extending hub embodied in said cap wall oriented transverse to the sliding direction of said second handle member, said hub having a threaded opening therethrough opening at its inner end into said hollow interior of said first handle member so as to provide access to said second handle member slidably disposed

therein, and a threaded member adjustably threadably disposed in said hub threaded opening for engaging said second handle member incident to holding said second handle member in a selected sliding position of movement, whereby said size of said laterally extending hub is selected to provide a correspondingly sized said threaded opening in said hub to provide an optimum number of threadably interengaged teeth of said threaded hub opening and said threaded member to obviate inadvertent disengagement of said threaded member from said second handle member during use of said luggage cart.

4,950,004

## BICYCLE CHAIR

William N. Sunshine, 5631 Reamer, Houston, Tex. 77096

Filed Apr. 3, 1989, Ser. No. 332,544

Int. Cl.<sup>3</sup> A47C 7/02

U.S. Cl. 297—452

10 Claims



1. A bicycle chair for mounting on a bicycle frame, comprising:
  - (a) a substantially U-shaped chair bracket formed by a horizontal base member terminating in substantially parallel upstanding leg members at each end thereof;
  - (b) a chair pad frame fixedly mounted to said chair bracket and retained thereon in a forwardly inclined position, said chair pad frame supporting a transversely extending chair pad for supporting a rider thereon;
  - (c) shim means positioned at the juncture of said chair pad frame and said chair bracket for forming a rigid connection therebetween; and
  - (d) clamp means for mounting the bicycle chair on the mounting post of the bicycle.

4,950,005

## LOCK DEADBOLT PROTECTOR

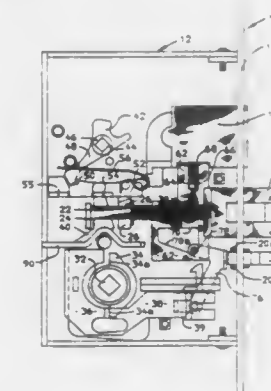
Charles A. Cudd, Duluth, Ga., assignor to Yale Security Inc., Monroe, N.C.

Continuation of Ser. No. 254,257, Oct. 6, 1988, abandoned. This application Sep. 25, 1989, Ser. No. 412,644

Int. Cl.<sup>3</sup> E05B 63/20

U.S. Cl. 292—150

4 Claims

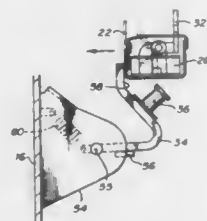


1. A mortise lock for a door comprising:



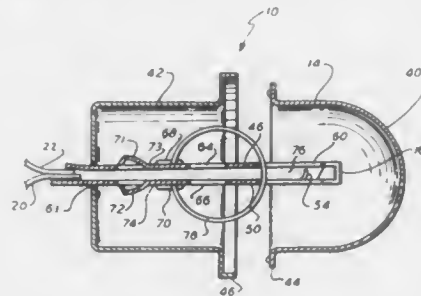
- a. a box-like housing having an apertured end plate adapted to be mounted in the end surface of a door,  
 b. an outwardly biased latchbolt protruding through the end plate,  
 c. an operator for said latchbolt,  
 d. a deadbolt mounted in the housing for reciprocation through the end plate,  
 e. a manual operator for projecting and retracting the deadbolt,  
 f. deadbolt blocking means comprising:  
 (1) an outwardly biased guardbolt normally extending through the end plate,  
 (2) the deadbolt being formed with a recess in its side more proximate the guardbolt,  
 (3) a deadlock interlock slide mounted for vertical reciprocation in the housing and adapted to take a first position in which its upper end extends into the recess to prevent manual projection of the deadbolt and a second position farther away from the deadbolt to permit manual projection of the deadbolt, the slide being biased toward the first position,  
 (4) cam means associated with the slide and guardbolt for driving the slide toward the second position as the guardbolt is moved in, whereby when the guardbolt is moved inward as by engagement with a door strike or by manual manipulation it moves the slide from first to second position and the deadbolt may then be manually projected.

**4,950,006**  
**LATCH ASSEMBLY FOR A PIVOTAL CLOSURE MEMBER AND IMPROVED LATCH STRIKER MEANS THEREFOR**  
 Bernard J. Lambke, Lake Villa, Ill., assignor to Komatsu Dresser Company, Libertyville, Ill.  
 Filed Feb. 10, 1989, Ser. No. 309,604  
 Int. Cl.<sup>5</sup> E05C 3/26  
 U.S. Cl. 292—216



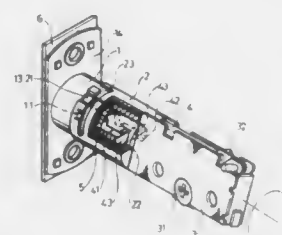
1. A latch assembly for releaseably retaining a pivotal closure member, such as a window or the like, in positions covering and uncovering an opening extending through a bulkhead, comprising in combination:  
 a jaw-type latch mounted in the closure member;  
 latch releasing means mounted in the closure member and accessible from one side thereof for releasing the latch;  
 a striker member mounted on said bulkhead for latchably engaging said latch when said closure member is in the covered position; and  
 striker means mounted on said bulkhead remote from said opening for latchably engaging said latch when said closure member is in the uncovered position, said striker means including a second striker member pivotal into latching engagement with said latch when engaged by said latch during movement of said closure member to the uncovering position.

**4,950,007**  
**BALL SEAL**  
 Allan W. Swift, Denville, N.J., assignor to E. J. Brooks Company, Newark, N.J.  
 Filed Jun. 22, 1988, Ser. No. 210,702  
 Int. Cl.<sup>5</sup> F05B 39/00  
 U.S. Cl. 292—324



1. A ball seal comprising:  
 an elongated flexible strap having first and second ends;  
 a housing having an entrance opening therein;  
 a strap lock disposed in said housing;  
 said strap lock including a locking means for engaging said first end of said strap upon insertion of said first end in said entrance opening and for preventing removal of said first end from said entrance opening;  
 said strap lock having a frangible means for causing said strap lock to fracture upon the application of a predetermined force on said first end;  
 said strap lock includes a pair of spaced, superimposed leaves joined to each other at one end by said frangible means; and  
 said locking means includes at least one resilient tab extending from one of said leaves and said first end of said strap includes a hole for engaging said tab.

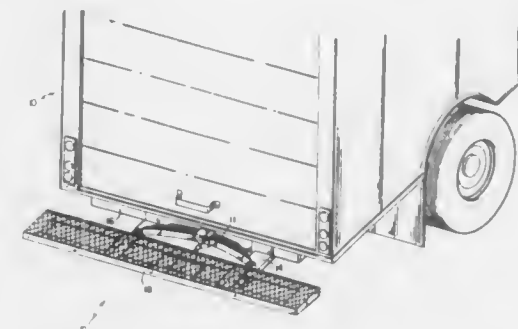
**4,950,008**  
**AUXILIARY LOCK WITH AN EXTENSIBLE DEVICE**  
 Yau C. Fang, Chiayi, Taiwan, assignor to Posse Lock Manufacturing Co., Ltd., Chiayi, Taiwan  
 Filed Oct. 27, 1989, Ser. No. 428,051  
 Int. Cl.<sup>5</sup> E05B 9/06  
 U.S. Cl. 292—337



1. An auxiliary lock with an extensible portion, comprising:  
 a cylinder provided with two positioning holes and a longitudinal slot, and having its outer circumferential surface surrounded by an extensible shell;  
 said extensible shell being provided with an inner projection which can selectively extend into one of the two positioning holes in the cylinder and move lengthwise along the slot in the cylinder by turning the extensible shell and causing relative axial movement between the shell and the cylinder;  
 a combining plate assembled with a rear section of the extensible shell and provided with a connecting plate connected with a moving plate;

said moving plate also being connected with a dead bolt and being provided with a front round tube section which is received in the dead bolt, said front round tube section having a U-shaped slot and a reversed U-shaped slot for receiving respective portions of a pin;  
 said dead bolt being movably contained inside the cylinder and having a hollow interior which receives the front round tube section of the moving plate, with said pin extending crosswise through a rear end of the dead bolt and said U-shaped slot and said reversed U-shaped slot in the front round tube section of the moving plate; and  
 said pin connecting the dead bolt and the moving plate, and being capable of movement from one end of both the U-shaped slot and the reversed U-shaped slot to the other ends of both of the slots when the projection in the extensible shell moves from one of the two positioning holes to the other in adjusting the lock from a short length to a long length or reversely.

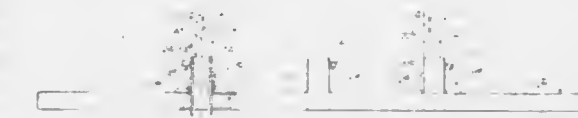
**4,950,009**  
**SAFETY STEP BUMPER ASSEMBLY**  
 Robert W. Vetter, Patchogue, N.Y.  
 Filed Aug. 30, 1989, Ser. No. 400,366  
 Int. Cl.<sup>5</sup> B60R 19/48  
 U.S. Cl. 293—117



1. A safety step bumper assembly for a vehicle comprising:  
 a frame having a base member constructed for fixed attachment of said frame to the chassis of a vehicle,  
 an elongated step bumper member mounted upon said frame in a predetermined axial position and a predetermined rotational position,  
 a pin member joining said step bumper member and said frame in pivotable relationship, said step bumper member adapted for pivoting movement, relative to said frame, from said predetermined rotational position and for return thereto,  
 said safety step bumper assembly defining a slot, and  
 said pin member engaged in said slot and movable therein between a first pin position with said step bumper member spaced from said chassis and in said predetermined axial position, and a second pin position with said step bumper member relatively closer to said chassis,  
 means for biasing said step bumper member toward said predetermined axial and rotational position, and  
 a stop member adapted to limit movement of said step bumper member for return of said bumper member toward its said predetermined axial and rotational positions under influence of said means for biasing,  
 whereby said safety step bumper assembly is adapted for pivoting and sliding movement of said step bumper member, relative to the fixed frame on the chassis, from said predetermined axial and rotational positions, in a manner to adjust to otherwise destructive forces applied to said step bumper member by engagement upon a dock or other obstruction.

**4,950,010**  
**VEHICLE FRAME-MOUNTABLE ACCESSORY RECEIVER APPARATUS AND METHOD FOR MANUFACTURE**  
 Gerald L. Denny, 3132 SE. 28th St., Portland, Oreg. 97202  
 Filed Jun. 19, 1989, Ser. No. 367,626  
 Int. Cl.<sup>5</sup> B60R 19/48

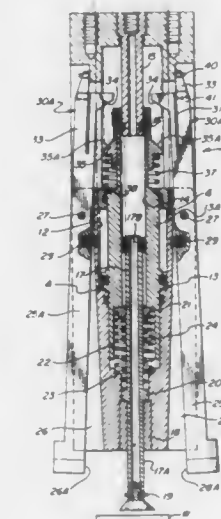
U.S. Cl. 293—117



3. For detachably mounting an accessory having a pair of laterally spaced elongate mounting projections, a vehicle frame-mountable bumper/receiver apparatus comprising:  
 at least two elongate receivers having longitudinal axes; each of said receivers being rigidly joined with a bumper having a first generally planar expanse and a predefined thickness, said receivers extending inwardly from said first expanse in a generally horizontal plane with said longitudinal axes of said receivers being substantially parallel with one another, each of said receivers forming a channel extending from said first expanse of said bumper to an opposite terminal edge of said receiver, each of said channels having a lengthwise dimension substantially greater than said predefined thickness of said bumper, each of said channels being configured to receive therein an elongate mounting projection of an accessory; and  
 mounting means for mounting said bumper to the frame of a vehicle.

**4,950,011**  
**TOOL FOR PRECISELY POSITIONING A WORKPIECE**  
 Nicky Borcea, 95 Steep Hill Rd., Weston, Conn. 06883, and Alexander D. Ionescu, 190 Sport Hill Rd., Easton, Conn. 06612  
 Filed Oct. 24, 1988, Ser. No. 261,499  
 Int. Cl.<sup>5</sup> H05K 3/32

U.S. Cl. 294—2



1. A tool for precisely positioning a workpiece relative to a component part comprising

a pick-up means for picking up a part and translating the workpiece for placement on a component part, locating means on said pick-up means for locating a workpiece relative to the end of the pick-up means, means for actuating said locating means to an operative position for predetermined positioning a workpiece on the end of the pick-up means relative to a first and second axis thereof, and for positively maintaining said locating means on said workpiece in the operative position thereof, and means for adjusting said locating means relative to said pick-up means to effect a predetermined precise location of a workpiece on said pick-up means along said first and second axis thereof,

said locating means comprising  
a first and second pair of locator fingers pivotably mounted on said pick-up means for movement between an inoperative and operative position,  
said first pair of fingers being oppositely disposed and having one end thereof disposed to opposite sides of said pick-up means for locating a workpiece along said first axis in the operative position thereof,  
and said second pair of fingers being angularly disposed relative to said first pair of fingers and having one end thereof disposed to opposite sides of said pick-up means for locating a workpiece along said second axis in the operative position thereof,  
said fingers each being pivotably mounted intermediate the ends thereof,  
and said adjusting means being connected to the other end of the respective fingers for individually adjusting the limits of movement of said respective pairs of fingers between an operative and inoperative position thereof,  
wherein each of said locator fingers having its said other end bifurcated by a longitudinally extending slit to define a flexible leaf portion and a relatively rigid portion, and said adjusting means including an adjustable stop for varying the distance between said one end of said corresponding finger and said nozzle in the inoperative position thereof.

4,950,012

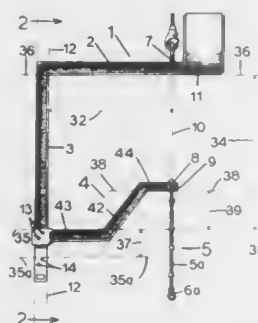
# UNIVERSAL ACCESSORIES REMOVER FOR LOCOMOTIVES

Harmon L. Jones, 7737 Kittrell La., Ooltewah, Tenn. 37363  
Filed Jun. 19, 1989, Ser. No. 367,794

Int. Cl.<sup>5</sup> B66C 1/22

U.S. Cl. 294—67.2

4 Claims



1. A device for replacing diverse engine accessories of a locomotive precluding the need, during the process of replacing any said accessory, to make mechanical or physical adjustments of the frame or arms of said device, or to make a forced adjustment, relative to the frame or arms of said device, of the accessory being replaced comprising: a hoisting frame having a horizontally extending upper arm rigidly attached to a vertically extending outer arm, said outer arm having at its lower portion means of attachment for a lower arm; and a lower arm having a configuration that renders it capable of reaching diverse engine accessories located in interior a locomotive.

tive car bodies, such configuration being composed of an outer portion, an elevated inner portion, and a connecting portion that rigidly attaches said outer portion to the elevated inner portion, said outer portion having at its outer end means of attachment to the outer arm of the hoisting frame, and the elevated inner portion having at its inner end means of attachment to a hoisting sling; and a hoisting sling having several means of attachment to said elevated inner portion of the lower arm, said several means of attachment being positioned at several points along the length of the hoisting sling, said sling having at its lower end means of attachment to the accessory being hoisted.

4,950,013

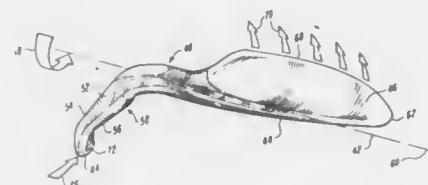
# GARDENING TROWEL

E. Hubbard Yonkers, 13 Cooney St., Somerville, Mass. 02143  
Filed Oct. 28, 1988, Ser. No. 263,685

Int. Cl.<sup>5</sup> A01B 1/02

U.S. Cl. 294—49

5 Claims



3. A trowel for tilling earth, comprising:  
an asymmetric blade rotatable about an axis defined by a spine, with the blade including a spoon-like portion solely to one side of the axis and extending parallel to said spine; and,  
an offset handle attached to said blade at one side thereof and angled to said axis in a downward direction said axis.

4,950,014

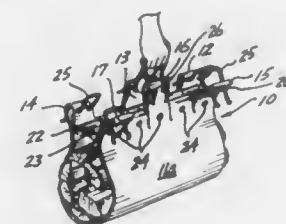
# FIREWOOD CARRIER

Gregory M. Smith, 12521 212th SE., Snohomish, Wash. 98290  
Filed Apr. 18, 1989, Ser. No. 339,580

Int. Cl.<sup>5</sup> B65D 63/18, 71/02

U.S. Cl. 294—152

5 Claims



5. In a carrier including an elongated central web and first and second rigid braces secured along the opposite end portions of such web, the improvement comprising a first set of handles extending outwardly of the first brace and a second set of handles extending outwardly of the second brace, each of said sets of handles including a plurality of overfolded web portions defining inner and outer web members and a continuous flexible cord extending outwardly of such overfolded web portions to define a continuous handle loop, the overfolded web portions of said first set of handles being aligned, respectively, with said overfolded web portions of said second set.

4,950,015

# SYRINGE CAP CLAMP TOOL

Umid R. Nejib, Trucksville; James J. Lennox, Berwick; George M. Sarnecky, White Haven, and Larry C. Sickler, Falls, all of Pa., assignors to Design Specialties Laboratories, Inc., Kingston, Pa.

Filed Jan. 23, 1989, Ser. No. 300,124

Int. Cl.<sup>5</sup> A61M 5/32; B25B 13/52; B25J 15/00

U.S. Cl. 294—19.1

8 Claims



1. A tool which can be held and manipulated with one hand comprising base means, rod means having an inner end connected to said base means and an outer end extending longitudinally therefrom, sleeve means mounted on said rod means for longitudinal sliding movement between an inner locked position and an outer release position, article clamp means connected to the outer end of said rod means, said clamp means being open when said sleeve means is in said locked position and being closed on an article when said sleeve means is in said release position, spring means mounted within said base means for biasing said sleeve means from said locked position to said release position, locking means connected to said base means for locking said sleeve means in said locked position, finger grip means mounted on said sleeve means at a location closely adjacent said base means, whereby when using the tool said base means rests within the palm of the hand, said finger grip means is engageable by the fingers of the same hand to move said sleeve means from said release position to said locked position, and said locking means is quickly releasable to free said sleeve means to said release position.

4,950,016

# INTEGRATED PNEUMATIC VALVE/SENSOR ASSEMBLY FOR VACUUM SUPPLY APPARATUS

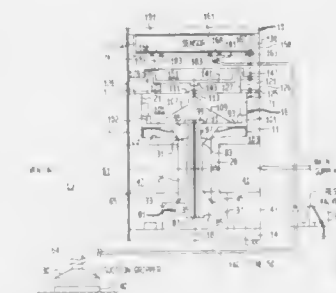
Viraraghavan S. Kumar, Palm Bay, Fla., assignor to Teknocrast, Inc., Palm Bay, Fla.

Filed Apr. 24, 1989, Ser. No. 342,340

Int. Cl.<sup>5</sup> B66C 1/02; F04F 5/48

U.S. Cl. 294—64.2

16 Claims



1. A fluid-flow control valve assembly for controlling the operation of a pneumatic vacuum gripping system having a suction gripper device that is arranged for suction engagement with an object and is coupled by way of a fluid flow link to a venturi for controlling the vacuum of said suction gripper device comprising:

a housing having first, second and third chambers, a first fluid communication port coupled to a first portion of said first chamber, a second fluid communication port coupled to a second portion of said first chamber, and a third fluid communication port coupled between a third portion of said first chamber and a first portion of said second chamber, said housing further containing a first movable valve element disposed within said first chamber between the

first and second portions thereof and having a fluid passageway for providing a fluid communication path there-through between said first fluid communication port and said third portion of said first chamber, and being movable between first and second positions within said first chamber, such that, at its first position, said first movable valve element provides a fluid communication path between said first and second portions of said first chamber and thereby provides fluid communication between said first and second fluid communication ports, and at its second position, said first movable valve element interrupts the fluid communication path between said first and second portions of said first chamber and thereby prevents fluid communication between said first and second fluid communication ports, a second movable valve element supported within said second chamber for controllably restricting fluid flow through said third communication port, a first fluid communication passageway formed in said housing between said second chamber and a first location within said third chamber, and a second fluid communication passageway formed in said housing between said first portion of said first chamber and a second location within said third chamber;

fluid-flow sensor means, provided in said third chamber, having a fluid pressure supply port coupled to said second fluid communication passageway at said second location within said third chamber, a fluid pressure output port coupled to said first fluid communication passageway at said first location within said third chamber, and a fluid pressure sensor port, said fluid-flow sensor means providing, at said fluid pressure output port, a controlled pressure in response to a pressure stimulus at said fluid pressure sensor port, said controlled pressure being coupled through said first fluid pressure passageway to said second chamber to control the operation of said second valve element and thereby fluid communication through said third communication port; whereby

in response to a first pressure stimulus applied to said fluid pressure sensor port, a controlled pressure is coupled through said first fluid pressure passageway to said third chamber to cause said second valve element to restrict fluid communication through said third communication port and thereby cause said first movable valve element to be translated to said first position, so that a fluid flow communication path may be established between said first and second communication ports and, in response to a second pressure stimulus applied to said fluid pressure sensor port, said controlled pressure is reduced, so as to cause said second valve element to allow fluid communication through said third communication port and thereby cause said first movable valve element to be translated to said second position, and interrupt a fluid flow communication path between said first and second communication ports.

4,950,017

# KIT WHICH PROVIDES A REMOVABLE TOP ASSEMBLY FOR ALL-TERRAIN VEHICLES AND THE LIKE, AND THE ASSEMBLED TOP THEREOF

Don S. Norton, Clinton, Miss., assignor to Brell Mar Products, Inc., Jackson, Miss.

Filed Mar. 2, 1989, Ser. No. 317,982

Int. Cl.<sup>5</sup> B60J 1/04

U.S. Cl. 296—77.1

29 Claims

1. A kit which provides a removable top assembly for a vehicle comprising the following components:

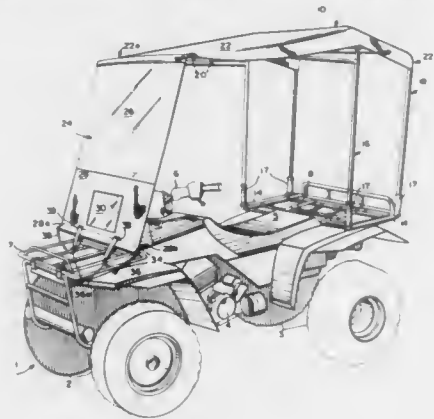
a pair of lateral upright support members adapted to being rigidly coupled to a rearward portion of the vehicle, each said lateral upright support member having forward and rearward upright support posts;  
a first support bow including a first generally U-shaped support rod, and a pair of first elongate support rods each having an upper end adapted to being removably con-



ected to a respective end of said first U-shaped support rod and a lower end adapted to being removably connected to a respective one of said forward upright support posts;

each of said first elongate support rods of said first support bow including a nib which projects outwardly therefrom;

a second support bow including a second generally U-shaped support rod, and a pair of second elongate support rods each having an upper end adapted to being removably connected to a respective end of said second U-shaped support rod and a lower end adapted to being



removably connected to a respective one of said rearward upright support posts;

a third support bow including a third generally U-shaped support rod, and a pair of third elongate support rods each having a front end adapted to being removably connected to a respective end of said third U-shaped support rod and rear end adapted to being removably connected to a respective one of said nibs of said first elongate support rods; and

a fabric cover component having a forward edge attached to said third U-shaped support rod, and a rearward edge attached to said second U-shaped support rod.

#### 4,950,018 LATCH FOR COMBINATION VENT AND ESCAPE HATCH

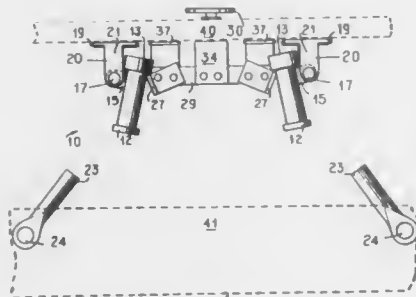
Austin K. Jeffords, and Cris G. Cornelius, both of Rte. 2 Box 2150, Nashville, Ga. 31639

Filed Dec. 26, 1989, Ser. No. 456,954

Int. Cl.<sup>5</sup> E05C 17/30

U.S. Cl. 292—6

6 Claims



1. A latch adapted for operative association with a frame and a hatch door that is hinged to the frame so that the door can be opened outwardly, comprising:

(a) at least one support pedestal secured to the inside surface of the hatch door;

(b) at least one hollow cylinder open at one end and closed at the other end and pivotally connected to the pedestal;

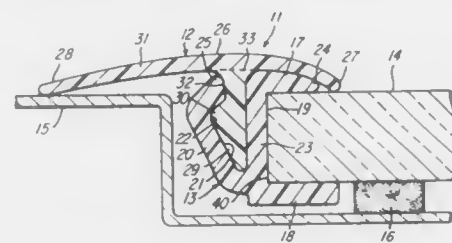
(c) a first compression spring disposed within the cylinder;

(d) a rod that is slideably engageable with the cylinder, the rod being pivotally connected to the frame;

(e) means, including at least one stop connected to the hatch door, for limiting the rotation of the cylinder about its pivotal connection with the pedestal, the cylinder rotating about said pivotal connection as the hatch door is being opened initially, the first compression spring being compressed by the rod both when the hatch door is closed and when the cylinder abuts the stop, the spring forcing the cylinder against the stop and holding the hatch door in the partly opened position so that an opening formed between the hatch door and the frame can be used for a vent; and

(g) means for moving the stop out of the path of the cylinder to allow the hatch door to be fully opened.

4,950,019  
MOLDING CONSTRUCTION  
Michael G. Gross, Tipp City, Ohio, assignor to Creative Extruded Products, Inc., Tipp City, Ohio  
Filed Oct. 26, 1989, Ser. No. 426,966  
Int. Cl.<sup>5</sup> B60R 13/06  
U.S. Cl. 296—93 12 Claims



1. In a motor vehicle body having a body panel flange and an adjacent window, a molding construction concealing the space between said body panel flange and an edge of said window; the improvement wherein said construction comprises separate inner and outer members which are free of permanent attachment to each other, said inner member retaining said window edge, and said outer member mounted on said inner member but capable of repeated removal therefrom and reattachment thereto, said inner and outer members each having mutually interengaging means for mounting said outer member on said inner member, said outer member also comprising an elongated outer body, said interengaging means of said outer member being formed as part of said outer member but being harder than said outer body of said outer member and having approximately the same hardness as said inner member, said outer body having one end contacting said body panel flange and the other end contacting said window edge, said outer body having the same hardness throughout.

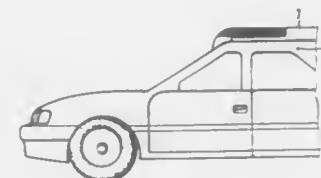
4,950,020  
CONVERTIBLE CANOPY APPARATUS FOR  
AUTOMOBILES  
Fu-Ping Chen, No. 32, Lane 412, Hsin 1 Street, Hsin Hua Chen Tainan Hsien, Taiwan  
Filed Jul. 7, 1989, Ser. No. 376,749  
Int. Cl.<sup>5</sup> B60J 7/00  
U.S. Cl. 296—95.1 4 Claims

1. A canopy apparatus for releasable coupling to a roof portion of an automobile, comprising:  
support means disposed on said roof portion of said automobile for releasably coupling said canopy apparatus thereto, said support means including a pair of support members being transversely disposed in space relationship on said roof portion;  
first shade means coupled to one of said pair of support

members for displacement from a retracted position to an extended position in a first direction;

second shade means coupled to the other of said pair of support members for displacement from a retracted position to an extended direction in a second direction, said second direction being opposite said first direction; and,

hood means displaceably coupled to each of said pair of support members for concealing in said retracted position said first shade means and second shade means, said hood means including means for elevating said hood means from a first position to a second position coupled to both said pair of support members to expose said first and second shade means, wherein said first and second shade means each includes (1) a plurality of shade members slidingly coupled each to the other in overlying relation-

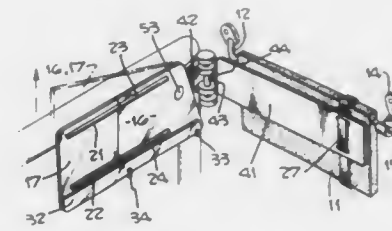
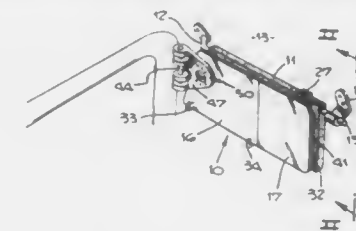


ship, said coupling between any two of said plurality of shade members being defined by a rivet fixedly coupled to a lower one of said two shade members and slidingly coupled to said overlying other of said two shade members through a longitudinally extended slotted through opening, (2) a rail member slidingly coupled to a respective one of said support members, said rail member having a distal end fixedly coupled to an endmost one of said plurality of shade members, and (3) reversible displacement means coupled to a respective one of said support members and drivingly coupled to said rail member for longitudinally displacing said rail member in (1) a first direction to telescopically extend said plurality of shade members, and (2) an opposite second direction to retract said plurality of shade members.

4,950,021  
ADJUSTABLE SUN VISOR ATTACHMENT  
Craig G. Vandagriff, 24637 Gardenstone La., West Hills, Calif. 91307  
Filed Feb. 12, 1990, Ser. No. 478,546  
Int. Cl.<sup>5</sup> B60J 3/02  
U.S. Cl. 296—97.6 9 Claims

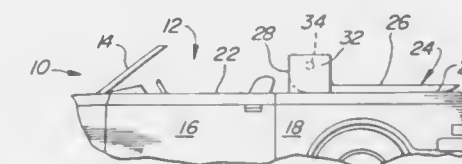
1. A sun visor adapted to be attachable to the pre-existing sun visor of a vehicle comprising:  
a main elongated panel section having clamping means for removably clamping said panel section to a pre-existing sun visor;  
a flange pivotally mounted to said panel section adjacent said clamping means;  
a first panel fixedly secured to said flange;  
a second panel secured to said first panel, said first and second panels forming a generally rectangular elongated planar panel section generally of length related to the overall length of said main panel section, said second panel being slidably mounted to said first panel and mov-

able from a first position adjacent to said first panel to a second position remote from said first panel; and



said elongated planar panel section being pivotally attached to said flange and movable with respect thereto in a plane parallel to said flange about said flange.

4,950,022  
CONVERTIBLE HARD-TOP PASSENGER VEHICLE  
Clark C. Pattee, 1460 1/2 W. Third St., Davenport, Iowa 52808  
Filed Aug. 30, 1989, Ser. No. 400,902  
Int. Cl.<sup>5</sup> B60J 7/16, 7/14  
U.S. Cl. 296—107 2 Claims



1. A hard-top convertible passenger vehicle having a fore-and-aft body having a fore-and-aft belt line and including a passenger compartment delineated at its front by a windshield, at opposite sides by longitudinal right and left side walls and at its rear by a rearwardly extending deck having a closed lid at about the belt line of the body and a bipositionable hard top, characterized in that transversely aligned right and left rigid post elements are fixedly carried respectively by the right and left side walls closely adjacent to a forward portion of the deck and rise therefrom to upper end portions disposed at a level appreciably above that of the side walls, belt line and deck lid and the hard top is an L-shaped structure including a roof and right and left leg members fixed to the roof and extending respectively closely alongside the post elements and pivoted to the upper end portions of said elements on a transverse axis for swinging of the top between an up mode in which the roof extends forwardly from the post elements and overlies the passenger compartment to an inverted storage mode in which the roof uncovers the compartment and extends rearwardly of the post elements and overlies the deck lid.

4,950,023

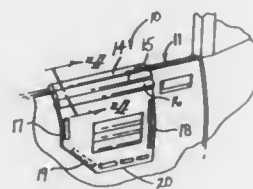
## AUTOMOTIVE ARM REST

Edward Waller, 9440 Fontainebleau Blvd. #303, Miami, Fla. 33172, and Ramon Mendez, 7053 SW. 22 St., Miami, Fla. 33155

Filed Feb. 13, 1989, Ser. No. 309,487

Int. Cl.<sup>5</sup> B60J 9/00

U.S. Cl. 296—153



1. An automotive arm rest device for selective securement to a window channel of an automotive door for overlying an outer surface of said door wherein said device comprises, a flexible pad including an upper terminal edge, a right terminal edge, a left terminal edge, and a lower terminal edge; and a plurality of finger members integrally secured to and extending outwardly of said upper terminal edge, and chamber means positioned adjacent said upper terminal edge in an exterior surface of said flexible pad and extending between said right and left terminal edges for resiliently accommodating an individual's arm thereon, and stabilizing means positioned along a lower terminal edge of said flexible pad for maintaining said flexible pad in an extended orientation when secured to said automotive door, and

at least one pocket means secured to said exterior surface for accepting and displaying a message, and wherein said chamber means comprises a plurality of elongate pneumatic chambers, each chamber formed with an inflation valve for inflating each chamber to a selective predetermined pressure, and wherein said pocket means includes a plurality of transparent elongate pockets formed with an opening at an end thereof for receiving said message within said pocket, and wherein said finger members each include an elongate flexible generally "L" shaped finger for securement within the window channel of said door, and wherein said stabilizing means comprises a series of elongate generally cylindrical pockets extending along said lower terminal edge and said right and left terminal edges each formed with an opening including a cylindrical weighted member of complementary exterior configuration to an interior configuration defined by each pocket wherein each weighted member is selectively receivable within each pocket for maintaining said flexible pad in an extended orientation, and wherein a plurality of flexible magnetic strips are secured to a lowermost peripheral edge of said flexible pad and secured on an interior surface of said pad for magnetically attracting said flexible pad to said automotive door, and further including a forward transition edge formed between said right terminal edge and said lower terminal edge and formed at 45 degree angles relative to said right terminal edge and lower terminal edge to define a relief to accommodate automotive doors of tapered configuration, and wherein said transparent pockets are generally parallel to and positioned between said pneumatic chambers and said stabilizing means.

4,950,024

## VEHICLE COWL STRUCTURE HAVING ALTERNATING INTERIOR AND EXTERIOR REINFORCEMENTS

Tadayoshi Watari, and Masahiro Osumi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

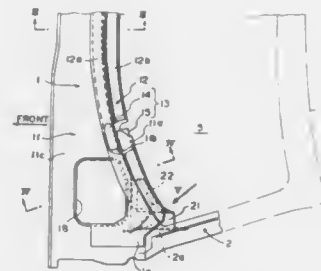
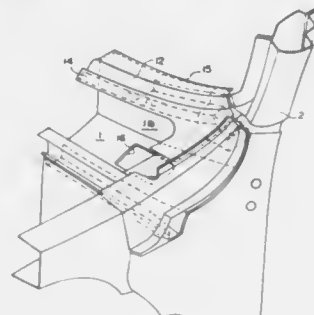
Filed Oct. 20, 1989, Ser. No. 424,830

Claims priority, application Japan, Oct. 21, 1988, 63-266931

Int. Cl.<sup>5</sup> B60K 37/00

U.S. Cl. 296—192

4 Claims



1. A front structure for a vehicle comprising a cowl box which extends in the transverse direction of a vehicle body in front of a passenger room between left and right hinge pillars and is defined by a windshield support member on which a windshield of the vehicle is supported and a dashboard upper member which is joined to a lower surface of the windshield support member and has a vertical wall portion facing the passenger room, the cowl box having an open cross-section, and a reinforcement being provided along a joining line of the dashboard upper member to the windshield support member, characterized in that said reinforcement comprises an end portion which extends along an end region of the joining line of the dashboard upper member to the windshield support member and a main portion which extends along the joining line of the dashboard upper member to the windshield support member inboard of said end portion, the end portion being on the passenger room side of said joining line over the entire length said end portion thereof and being fixed to one of said hinge pillars, and the main portion being on a side of said joining line remote from the passenger room at least at a portion opposed to an intermediate portion of the cowl box.

4,950,025

## AUTOMOBILE REAR BODY STRUCTURE

Noboru Yoshii, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 27, 1989, Ser. No. 328,985

Claims priority, application Japan, Mar. 25, 1988, 63-72357

Int. Cl.<sup>5</sup> B62D 27/02

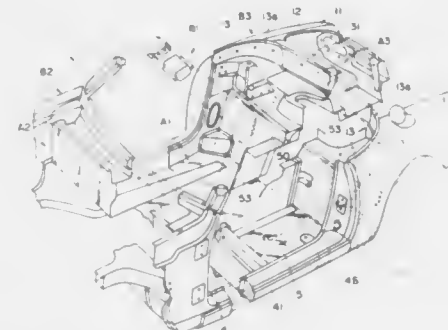
U.S. Cl. 296—195

16 Claims

1. A rear body structure of an automobile body consisting of rear side walls each of which consists of a rear fender member,

an inner panel member and a rear wheel house said rear body structure comprising:

side sill means extending along opposite sides of the automobile body in a lengthwise direction of the automobile body;



rear deck means extending in a widthwise direction of the automobile body above the rear wheels houses, and reinforcement means rigidly connected between an outer portion of said wheel house and said inner panel member and interconnecting said side sill and said rear deck means.

4,950,026

## PASSENGER VEHICLE BODY FRAME

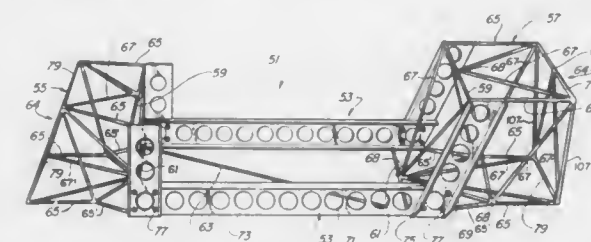
J. Bruce Emmons, 31695 Auburn, Birmingham, Mich. 48009

Filed Oct. 6, 1988, Ser. No. 253,702

Int. Cl.<sup>5</sup> B60R 27/00

U.S. Cl. 296—203

10 Claims



1. A passenger vehicle body frame comprising a pair of generally parallel opposed upright beam members defining a passenger compartment therebetween; front and rear truss assemblies at opposite ends of said beam members spanning and rigidly interconnecting the beam members in a rigid unit construction, the truss assemblies being the primary frame lateral reinforcement between the beam members; said truss assemblies each being three dimensional having a top, a bottom, opposed sides, a front and a back; and each of said top, bottom, sides, front and back including a generally planar truss, having a plurality of interconnected struts defining a series of adjacent rigidly interconnected triangles.

4,950,027

## BRAKE PRESSURE REGULATOR

Hans-Dieter Reinartz, Frankfurt Am Main, and Helmut Steffes, Hattersheim, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,128

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737727

Int. Cl.<sup>5</sup> B60Z 8/02

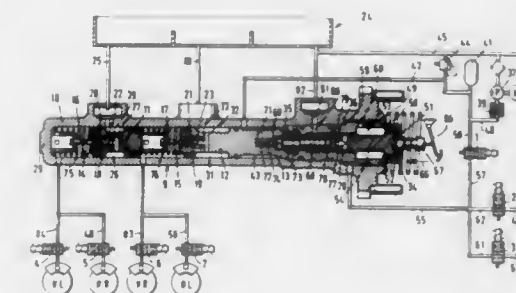
U.S. Cl. 303—114

4 Claims

1. In a brake pressure regulator for the hydraulic brake system of an automotive vehicle having a brake pedal and hydraulically actuated wheel brakes at each wheel of said

vehicle, said system including wheel speed sensor means for sensing and generating signals representative of the respective speeds of rotation of individual wheel brakes in response to signals generated by said wheel sensor means, a master cylinder piston operable within a master cylinder chamber, in a master cylinder housing to apply braking pressure to said wheel brakes, and brake pedal actuated booster means for controlling said master cylinder piston, said booster means including a pressure supply source having a high supply conduit and a low pressure return conduit;

the improvement wherein said booster means comprises first means in said housing defining a booster chamber receiving one end of said master cylinder piston, said master cylinder piston being movable in a direction applying braking pressure to said wheel brakes in response to an increase in pressure in said booster chamber, second means in said housing defining a modulating chamber hydraulically isolated within said housing from said booster chamber, an actuating piston defining a movable wall of said modulating chamber and directly coupled to said brake pedal to move in one direction in response to a brake applying force exerted by said pedal and to move in the opposite direction when the force applied to said



piston by pressure in said modulating chamber exceeds the force applied to said actuating piston by said pedal, first valve controlled passage means opening through said master cylinder piston into said booster chamber and including a normally closed first valve operable when opened to connect said booster chamber to said supply conduit, second valve controlled passage means opening through said actuating piston into said booster chamber and including a normally open second valve normally connecting said booster chamber to said return conduit and operable when closed to isolate said booster chamber from said return conduit, said actuating piston being movable relative to said master cylinder piston, actuating means responsive to movement of said actuating piston relative to master cylinder piston to actuate said first and said second valves to connect said booster chamber to said supply conduit in response to movement of said actuating piston in said one direction and to connect said booster chamber to said return conduit in response to movement of said actuating piston in said opposite direction, and third and fourth valve means operable by said control means for selectively connecting said modulating chamber to said supply conduit or to said return conduit in response to signals generated by said wheel sensor means.

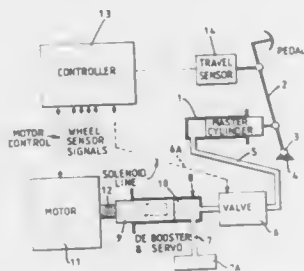


**4,950,028**  
**HYDRAULIC BRAKING SYSTEM**  
Anthony W. Harrison, Birmingham, Great Britain, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Nov. 17, 1988, Ser. No. 272,439  
Claims priority, application United Kingdom, Nov. 20, 1987, 8727296

Int. Cl.<sup>5</sup> B60T 8/58, 8/46  
U.S. Cl. 303—115

14 Claims



1. A braking system comprising:  
a a hydraulic circuit including a primary hydraulic pressure source having an actuation parameter, brake actuator means, first fluid connection means between said primary hydraulic pressure source and said brake actuator means, fluid displacer means, and further fluid connection means between said fluid displacer means and said brake actuator means and between said fluid displacer means and said primary hydraulic pressure source;  
electric motor means drivingly connected to said fluid displacer means for operating said fluid displacer means;  
said fluid displacer means comprising a pressure chamber connected to said brake actuator means by said further fluid connection means, and a piston reciprocative in said pressure chamber by said electric motor means to vary the volume of said pressure chamber to modify the braking pressure in said brake actuator means;  
a screw coupling mechanism operatively connecting said piston to said electric motor means so that rotation of said electric motor means produces linear movement of said piston;  
sensor means for producing an output signal proportional to said actuation parameter of said primary hydraulic pressure source; and  
electronic control means operatively connected to said sensor means and said electric motor means and operable to produce a control signal for actuating said electric motor means in response to said output signal from said sensor means for effecting fluid displacement by said fluid displacer means so that fluid displacement from said fluid displacer and said primary hydraulic pressure source varies the volume of said hydraulic circuit in a controlled proportion to said actuation parameter of said primary hydraulic pressure source.

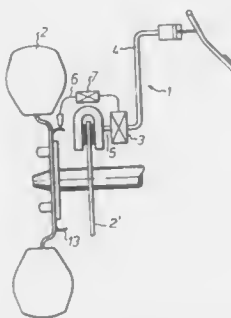
**4,950,029**  
**BRAKE CONTROL SYSTEM FOR PREVENTING WHEEL BLOCKING AND/OR SPINNING**  
Tor Albertsson, Norrgården 49, Vallentuna, S-186 00, and Thomas Björshammar, Norrbackagatan 8, Stockholm, S-113 41, both of Sweden

PCT No. PCT/SE87/00521, § 371 Date Sep. 7, 1988, § 102(e) Date Sep. 7, 1988, PCT Pub. No. WO88/03489, PCT Pub. Date May 19, 1988

PCT Filed Nov. 6, 1987, Ser. No. 216,625  
Claims priority, application Sweden, Nov. 7, 1986, 8604791  
Int. Cl.<sup>5</sup> B60T 8/42

U.S. Cl. 303—117

5 Claims



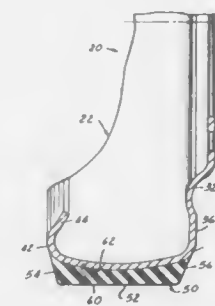
1. An anti-blocking anti-spinning hydraulic brake system for vehicles, comprising:  
a plurality of wheel brakes,  
hydraulic brake line means connected to said wheel brakes, means connected to said brake line means for applying hydraulic fluid pressure to said wheel brakes, and  
for each said wheel brake, means for preventing blocking and spinning of an associated wheel, including means for detecting blocking and spinning conditions of said wheel, a control valve, and means for operating said control valve in accordance with the detected condition of said wheel,  
said valve having a housing, said housing containing a cylinder, a controlled passageway with primary and secondary sides in communication with each other through said cylinder and connected respectively to said pressure applying means and said wheel brake by way of said brake line means, spool means supported in said cylinder at a neutral position between opposite first and second end volumes of said cylinder and selectively displaceable toward said first end volume to a first position in which said spool means blocks communication between said primary and secondary sides of said controlled passageway and toward said second end volume to a second position in which said spool means blocks communication between said primary and secondary sides of said controlled passageway, first connecting passageway means providing fluid communication between said primary side of said controlled passageway and said first end volume, and second connecting passageway means providing fluid communication between said secondary side of said controlled passageway and said second end volume, whereby when said spool means is displaced from said neutral position to said first position, fluid from said secondary side of said controlled passageway may flow into said second end volume to relieve hydraulic pressure at said wheel brake, and when said spool means is displaced from said neutral position to said second position, fluid may flow from said second end volume into said secondary side of said passageway to apply fluid pressure to said wheel brake,  
said operating means displacing said spool means from said neutral position to said first position in response to the detection of a blocking condition of said wheel, and dis-

placing said spool means from said neutral position to said second position in response to the detection of a spinning condition of said wheel.

**4,950,030**  
**WHEEL FOR A TRACK LAYING VEHICLE**  
Leslie M. Kindel, Holt, and Iqbal S. Rai, Akron, both of Mich., assignors to Motor Wheel Corporation, Ohio  
Continuation of Ser. No. 869,388, May 30, 1986, abandoned.  
This application Sep. 14, 1989, Ser. No. 407,274  
Int. Cl.<sup>5</sup> B62D 55/00

U.S. Cl. 305—24

18 Claims



1. A support wheel for a vehicle comprising a disc part and a rim part, said rim part having a rim portion of toroidal geometry, said rim portion toroidal geometry being defined by a radially outermost surface of said rim portion having a uniform radius of curvature taken in radial cross section in a plane including the axis of rotation of said wheel and being symmetrical about a radially outermost apex of said toroidal rim portion, said rim portion being joined to and extending generally axially from the radially outermost portion of said disc part and having at least one free end portion spaced axially of said wheel remote from said radially outermost disc portion, and a non-pneumatic elastomeric tire tread having a curved inner surface complementarily matching and being bonded to said outermost surface of the rim portion and centered on and also being symmetrical about the apex of said toroidal rim portion, said tire tread having a smooth, circumferentially continuous cylindrical outer face adapted for engagement with a hard, flat supporting surface for the vehicle.

**4,950,031**  
**AUTOMOBILE REAR UNDERBODY STRUCTURE**  
Sumiaki Mizunaga; Katsuaki Matsui; Hiroaki Kodama; Makoto Tokuda, and Morikazu Sakamoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jun. 29, 1988, Ser. No. 213,227  
Claims priority, application Japan, Jul. 4, 1987, 62-103051[U]; Oct. 16, 1987, 62-261038; Oct. 29, 1987, 62-165735[U]

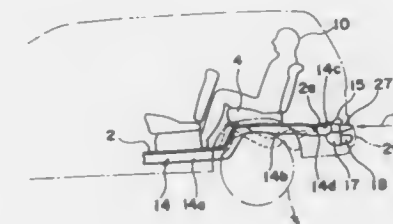
Int. Cl.<sup>5</sup> B60R 27/00

U.S. Cl. 296—189

30 Claims

30. An automobile rear underbody structure, comprising:  
a pair of side frames, said side frames being spaced apart from each other and extending in a direction lengthwise of an automobile body structure, each of said side frames having at least one side wall and having front and rear frame portions with said rear frame portions lying in a level offset upwardly relative to said front frame portions, each of said rear frame portions having a depressed region at a predetermined position thereof to permit said rear frame portions to bend downwardly when an external impact greater than a predetermined value is applied thereto;

a guide bead defined in each of said side walls substantially at the mid-point of said depressed region; and

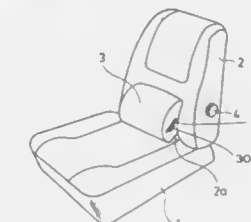


a cross member having opposite ends thereof rigidly connected to respective rear ends of said side frames.

**4,950,032**  
**SEAT HAVING VERTICALLY MOVABLE LUMBER SUPPORT**  
Yuuetsu Nagasaka, Fujisawa, Japan, assignor to Shiroki Corporation, Fujisawa, Japan  
Filed Jul. 25, 1989, Ser. No. 384,371  
Claims priority, application Japan, Mar. 31, 1989, 1-38045[U]  
Int. Cl.<sup>5</sup> A47C 7/40

U.S. Cl. 297—284

10 Claims



1. A seat, comprising:  
a seat cushion;  
a seat back connected to said seat cushion, wherein a space is formed within a lower portion of said seat back;  
a rod rotatably interposed between opposed side frames of said seat back;  
a hip support disposed within said space provided within said seat back;  
an operation handle provided upon either one of said side frames and adapted to rotate said rod by means of a brake mechanism interposed between said operation handle and said rod;  
a pinion, operatively connected to said rod, to which the rotation of said operation handle is transmitted by means of said brake mechanism;  
said hip support including a support plate secured upon an intermediate portion of said rod and disposed inside of said hip support;

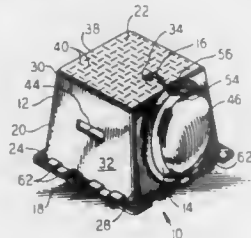
a support board mounted upon said support plate so as to be vertically movable therealong between a plurality of selective positions; and  
retaining means defined between said support board and said support plate for retaining said support board at a selected one of said selective positions.

**4,950,033**  
**PORTABLE STOOL WITH WEIGHT DISTRIBUTION FLANGE**

Dennis L. Anderson, 1821 E. Maryland, Phoenix, Ariz. 85016  
Filed Feb. 13, 1989, Ser. No. 309,879  
Int. Cl.<sup>5</sup> A47C 16/02

U.S. Cl. 297-461

17 Claims



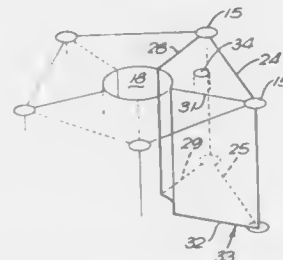
1. A stool for placement of a soft surface to support an average-sized adult person in standing and sitting positions, said stool comprising:
  - a. an upright wall surrounding an interior section and extending from a seat side thereof to a base side thereof, said base side opposing said seat side;
  - b. a seat surface immovably attached to said seat side of said upright wall and forming a boundary for said interior section, said seat surface being dimensioned to comfortably accommodate the buttocks of said person when said person is in a sitting position;
  - c. a weight-distribution flange rigidly attached at said base side of said upright wall and extending outward from said upright wall, said weight-distribution flange extending continuously along said base side and having a bottom surface for contacting said soft surface so that when said bottom surface is placed in contact with said soft surface and said person is supported by said stool, the weight of said person is transmitted through said upright wall and substantially evenly distributed through said flange for application to said soft surface without becoming embedded therein;
  - d. a cushion movably coupled to one of said upright wall, seat surface, and weight distribution flange so that said cushion selectively resides in at least a first position overlying said seat surface and a second position not overlying said seat surface; and
  - e. a tether having first and second ends, said tether first end being attached to one of said upright wall, seat surface, and weight distribution flange, and said tether second end being attached to said cushion to permit movement of said cushion between said first and second positions.

**4,950,034**  
**SHAFT EXCAVATION METHOD**  
Neil Reid, Buckinghamshire, England, assignor to Trigon Geoducts Limited, London, England  
Filed Oct. 16, 1989, Ser. No. 421,462  
Claims priority, application United Kingdom, Oct. 14, 1988, 8824111

Int. Cl.<sup>5</sup> B28D 1/08; E21C 41/12  
U.S. Cl. 299-15

1. A method for excavating a bore through rock which comprises: drilling an inner borehole, drilling a series of outer boreholes surrounding said inner borehole; cutting the rock material between first and second adjacent outer boreholes to form an outer cut; cutting the rock material between said inner

borehole and each of said first and second outer boreholes to form two radial cuts; said outer cut and two radial cuts thereby defining a first rock segment; cutting a cross cut through the first rock segment to join said outer and radial cuts, thereby freeing the first rock segment; removing the first rock segment;

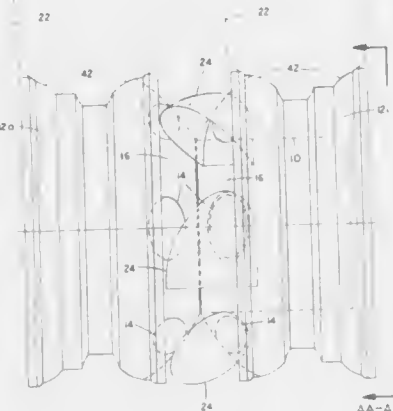


forming further similar outer cuts, radial cuts and cross cuts to free further rock segments; removing the further rock segments; and repeating the cutting and removal procedures progressively along said bore until the required extent has been attained.

**4,950,035**  
**ROTATING AIR INCLUDING SCOOPS**  
Richard Villarreal, 1720 Gotham St., and John R. Stewart, III, 1716 Gotham St., both of Chula Vista, Calif. 92013  
Filed Feb. 23, 1989, Ser. No. 315,274  
Int. Cl.<sup>5</sup> F16D 65/78

U.S. Cl. 301-6 CS

3 Claims



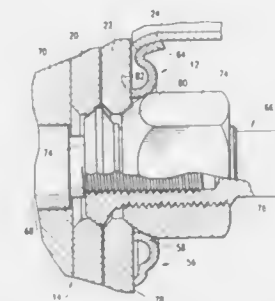
1. An assembly including an innermost wheel and an outermost wheel, said wheels having dished wheel disks extending from the wheel rims to the attaching location at a wheel hub structure and said wheel disks having air holes located at spaced intervals adjacent to said rims, said assembly including tires on said rims and a brake structure, said assembly including air cooling means comprising:
  - (a) said wheels being paired with their disks abutting each other and an air inducing scoop having an air input end being attached to and extending over said associated air holes on the outboard side only of said wheel disk of said innermost wheel in said assembly,
  - (b) said air inducing scoops extend from said air holes to substantially occupy the area between said adjacent wheels to collect air upon forward rotation of said wheels and direct that air as a heat dissipating burst over said brake structure at the inboard side of said innermost wheel,
  - (c) said air inducing scoops forming cups over each of said

associated air holes only on the outboard side of said wheel disk of said innermost wheel as to a direction perpendicular to the axis of rotation whereby air will be impelled generally towards the center of said axis of rotation where said brake structure is located thereby directing a heat dissipating burst over said braking structure situated at the inboard side of said innermost wheel.

**4,950,036**  
**WHEEL COVER FOR A VEHICLE**  
Tony Patti, 1001 Carden St., San Leandro, Calif. 94577  
Filed Jun. 12, 1989, Ser. No. 364,128  
Int. Cl.<sup>5</sup> B60B 7/06

U.S. Cl. 301-37 S

9 Claims

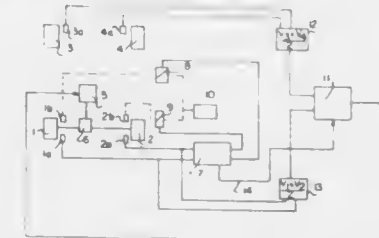


1. A wheel cover for a vehicle wheel possessing a wheel outer face and having a plurality of lug bolts and associated lug nuts, comprising:
  - a. a mounting member including a first surface and a second surface, said mounting member further including a multiplicity of openings therethrough a first group of said openings passing over and fitting around one group of the lug bolts and associated lug nuts, a second group of said openings passing over and fitting around only the lug bolts of another group of lug bolts and associated lug nuts; said first surface of said mounting member lying adjacent the vehicle wheel outer face,
  - b. a multiplicity of resilient projections at least partially surrounding said second group of openings, said multiplicity of projections formed integrally with said mounting member, each of said multiplicity of projections associated with one of said second group of openings including a first portion extending towards the vehicle wheel outer face, a second portion also extending toward the vehicle wheel outer face, said second portion positioned outwardly from said associated opening of said second group of openings, and each of said multiplicity of projections further including an intermediate portion connecting said first and second portions, said first portion of said resilient projection being capable of bearing on a lug nut without interference with the seating of the lug nut on the vehicle wheel, said resilient projection being capable of acting resiliently upon said lug nut bearing on said first portion of said resilient projection.

**4,950,037**  
**DRIVE SLIP REGULATING SYSTEM**  
Werner Kopper, Brighton, Mich.; Rudiger Frank, Lutelforst, Fed. Rep. of Germany; Herbert Schramm, Stuttgart, Fed. Rep. of Germany; Dieter Werner, Pleidelsheim, Fed. Rep. of Germany, and Habert Moller, Stuttgart, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/EP86/00626, § 371 Date Sep. 8, 1987, § 102(e) Date Sep. 8, 1987, PCT Pub. No. WO87/02948, PCT Pub. Date May 21, 1987  
Continuation of Ser. No. 284,570, Dec. 15, 1988, abandoned, which is a continuation of Ser. No. 82,406, Sep. 8, 1987, abandoned. This PCT application Oct. 30, 1986, Ser. No. 455,803

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540708  
Int. Cl.<sup>5</sup> B60T 8/00, 8/60; B60K 28/16  
U.S. Cl. 303-110

14 Claims



1. A drive slip regulating system of a vehicle including driven and non-driven wheels, which includes means for measuring the wheel speeds of the driven wheels, means for generating drive slip regulating signals from a comparison of the driven wheel speeds, control valves (8, 9) controlled by means of the drive slip regulating signals for controlling the actual brake pressure at the individual driven wheels so as to reduce the drive slip, said means for generating drive slip regulating signals including means for comparing the wheel speeds of the driven wheels and ascertaining deviations between the speeds, means for continuously at brief intervals determining a set-point brake pressure  $P_{set}$  from the ascertained deviations, and means using said set-point brake pressure and a brake pressure build-up function  $P_{auf}$  to produce the drive slip regulating signals, said drive slip regulating signals being variable time length trigger signals for controlling the control valves which control the build-up time of the actual brake pressure so that the actual brake pressure continuously at brief intervals attains the most recently determined set-point brake pressure and thus drive slip is reduced.

**4,950,038**  
**SLIP-CONTROLLED HYDRAULIC BRAKE SYSTEM**  
Norbert Ocvirk, Offenbach, and Lutz Weise, Mainz, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany  
Filed Apr. 12, 1989, Ser. No. 337,038  
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3814045

Int. Cl.<sup>5</sup> B60T 8/62

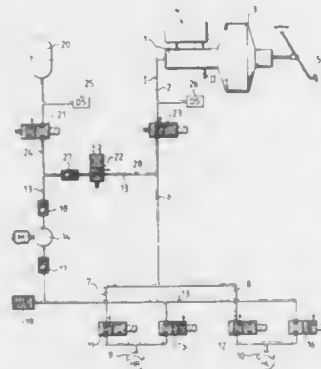
U.S. Cl. 303-110

7 Claims

1. A slip-controlled hydraulic brake system for a vehicle comprising a master cylinder (1), a working chamber of said cylinder being connected to a supply reservoir (4) when the brake is not applied, comprising a hydraulic accumulator (20), the master brake cylinder (1) and the hydraulic accumulator (20) being in communication by a valve assembly (21, 22, 23) with a brake line (6) which leads to a wheel brake (9, 10) of a driven wheel, and further comprising an inlet valve (11, 12) contained in the brake line (6), a shunt line (13) leading to the inlet valve (11, 12) into which a pump (14) is inserted that delivers fluid by way of an outlet valve (15, 16) out of the



wheel brake cylinders (9, 10), wherein the valve assembly (21, 22, 23) includes a switch position (valve 22) in which the shunt line on the pressure side of the pump is closed and the hydraulic accumulator is connected to the pump outlet for a charging operation, and wherein the inlet valve (11, 12) and the outlet



valve (15, 16) are switchable simultaneously into an opened position, and wherein a connection between said master cylinder (1) and the wheel brake remains open when the hydraulic accumulator (20) is connected to the pump outlet during said charging operation so that a braking operation immediately can be performed during said charging operation.

4,950,039

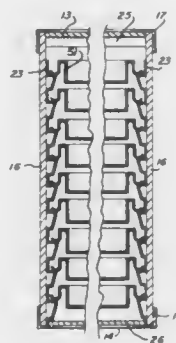
#### MULTIPLE-SHELF STORAGE CONTAINER FOR THIN FLEXIBLE STACKABLE ARTICLES

Robert W. Helling, 11214 Quivas Way, Westminster, Colo. 80234, and Daniel J. Helling, 8288 Pecos St., Denver, Colo. 80221

Filed Sep. 5, 1989, Ser. No. 402,624

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 312—20



1. A multiple-shelf storage container for a plurality of thin, flexible stackable article and the like comprising:  
a pair of oppositely disposed upright, shelf-supporting side panels spaced a selected distance apart, each said side panel being in the form of a relatively thin, substantially rigid, molded, one-piece plastic body, said side panels having a plurality of vertically spaced, opposed, sets of inwardly protruding shelf support portions with each said set being disposed at substantially the same elevation, and  
a plurality of shelves supported at selected elevations between said side panels by said shelf support portions, each said shelf being in the form of a relatively thin, substantially rigid, molded, one-piece plastic body, each said shelf having oppositely disposed edge portions supported on an associated set of said shelf support portions for slidable movement thereon between extended and retracted posi-

tions, each said shelf having a recessed portion of a selected shape substantially conforming with the shape of a stack of thin flexible articles to be supported thereon whereby a number of said articles can be stored and selectively retrieved from selected of said shelves,  
each said shelf including a generally flat, main body portion providing a top surface, said recessed portion being within said main body portion said recessed portion having a side section extending down from said main body portion and a bottom section extending inwardly from the lower end of said side wall section, there being a pair of guide rail surface portions along opposite outer side edges of said main body portion, said guide rail surface portions of each shelf being slidable on an associated set of said shelf support portions, said guide rail surface portions being provided by a vertical segment depending from the outer edge of said main body portion, a horizontal rail segment extending out from the bottom end of said vertical segment, and an upturned curved end segment extending up from the outer end of said horizontal rail segment.

4,950,040

#### MEASURING RANGE SELECTION SWITCH

Wolfgang Schulze, and Heinrich M. Pekar, both of Nürnberg, Fed. Rep. of Germany, assignors to ASEA Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,354

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813532

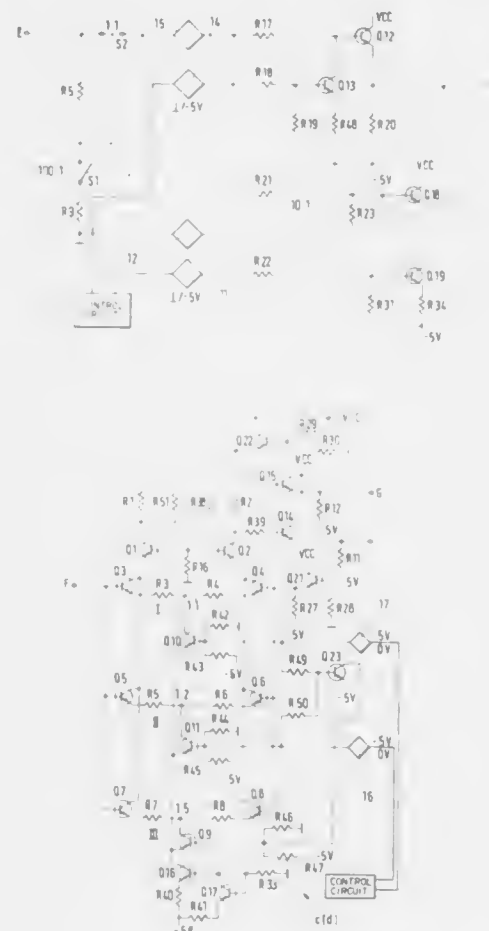
Int. Cl.<sup>5</sup> H03G 3/00

U.S. Cl. 330—254

11 Claims

1. Measuring range selection switch for a measuring device to selectively divide a measuring voltage into smaller values under control of an external control circuit, comprising a first circuit part of the measuring range selection switch for dividing the measuring voltage into decimal steps, a second circuit part of the measuring range selection switch having an input connected to an output of said first circuit part for dividing the measuring voltage a second time into still smaller steps, said second circuit part including three symmetrically constructed differential amplifier stages each having two transistors, each transistor having only one emitter, current feedback resistors each being connected to a respective one of said emitters, said current feedback resistors respectively connected to said differential amplifier stages to provide said differential amplifier stages with respective preset voltage ratios of steps smaller than decadic steps between input and output voltage, a blocking transistor for each differential amplifier, each blocking transistor connected to said respective feedback resistor, a constant current source connected in common to all of said differential amplifier stages, the control circuit connected to said blocking transistors for selectively causing one of said blocking transistors to remain in conduction and to switch on only said respective differential amplifier stage supplied through said one blocking transistor with current, so that one attenuation step combined with one amplification ratio is se-

lected for the measurement, a common output and a common input connected to all of said differential amplifier stages, ment coating with each other to provide a common back focal distance for said lens system at at least three discrete wavelengths.



wherein said measuring range selection switch has an output stage including a pair of emitter followers.

4,950,041

#### LENS SYSTEMS COMPRISING PLASTIC AND LIQUID LENS ELEMENTS

Paul N. Robb, Sunnyvale, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Jul. 13, 1989, Ser. No. 379,386

Int. Cl.<sup>5</sup> G02B 1/06

U.S. Cl. 350—418

10 Claims

4,950,042

#### INTEGRATED OPTICAL GIVEN'S ROTATION DEVICE

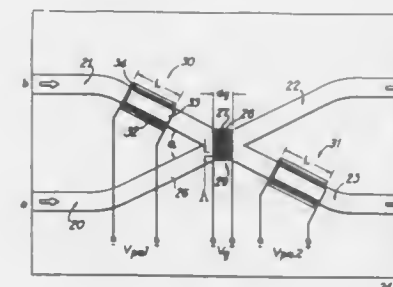
Thomas K. Gaylor; Erik I. Verriest, both of Atlanta, Ga., and Mir M. Mirsalehi, Huntsville, Ala., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 049,722, May 12, 1987, abandoned. This application Aug. 16, 1988, Ser. No. 232,905

Int. Cl.<sup>5</sup> G02B 6/12; G02F 1/21

U.S. Cl. 350—96.14

16 Claims



1. An elementary Givens rotation matrix device comprising a monolithic integrated optical circuit including crossed waveguides, interdigitated-electrode voltage-induced cosinusoidal grating associated with the crossed waveguides at their crossing point such that light from a first of the crossed waveguides is incident at a first Bragg angle and light from a second of the crossed waveguides is incident at another first Bragg angle, the interdigitated-electrode voltage-induced cosinusoidal grating transmitting and diffracting coherent light energy traveling simultaneously through the respective waveguides, a means for applying a constant voltage to the interdigitated-electrode voltage-induced cosinusoidal grating, and electro-optic phase shifter means lying upstream and downstream of the interdigitated-electrode voltage-induced cosinusoidal grating with respect to one of the waveguides for effecting the respective phase shifts therein by applying voltages to said phase shifter means which are equal but of opposite sign.

4,950,043

#### DISTORTION-FREE FIBER OPTIC SENSORS EMBEDDED IN TITANIUM

Jeff D. Russum, Maryland Heights, Mo., assignor to McDonnell-Douglas Corporation, St. Louis, Mo.

Filed Nov. 18, 1988, Ser. No. 272,906

Int. Cl.<sup>5</sup> G02B 6/00

U.S. Cl. 350—96.1

3 Claims

1. A highly sensitive intermetallic-fiber optic composite, capable of distortion-free optical monitoring of the environmental and structural effects on the skin of an aircraft, said composite comprising:

- optical fiber material embedded in a titanium matrix, and
- a titanium aluminide barrier layer between the optical fiber and the titanium matrix.

1. A lens system comprising two plastic lens elements and a liquid lens element disposed coaxially along an optic axis, said two plastic lens elements being substantially identical to each other, said two plastic lens elements and said liquid lens ele-

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**4,950,044**  
**OPTICAL SEMICONDUCTOR DEVICE FOR**  
**DEMULTIPLEXING WAVELENGTH MULTIPLEXED**  
**LIGHTS**Kiko Makita, Tokyo, Japan, assignor to NEC Corporation,  
Tokyo, Japan

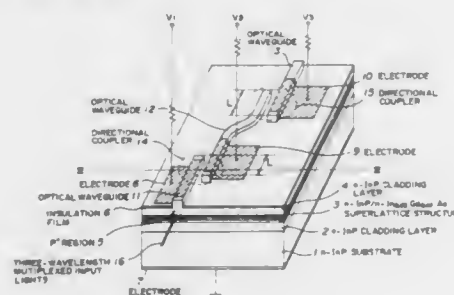
Filed Sep. 19, 1988, Ser. No. 246,060

Claims priority, application Japan, Sep. 17, 1987, 62-234324

Int. Cl.<sup>5</sup> H04J 14/02

U.S. Cl. 350-96.14

4 Claims



1. An optical semiconductor device for demultiplexing wavelength multiplexed lights comprising:  
a plurality of waveguides each including first to third semiconductor layers;  
said first semiconductor layer being grown on a substrate, said second semiconductor layer being grown on said first semiconductor layer and being of a larger refractive index and a lower absorption edge energy than said first semiconductor layer and including a superlattice structure which functions as an optical absorption and waveguide layer, and said third semiconductor layer being grown on said second semiconductor layer and being of a lower refractive index and a larger absorption edge energy than said second semiconductor layer;  
a plurality of directional couplers each coupling two neighboring waveguides optically among said plurality of waveguides; and  
a plurality of electrodes for applying different voltages to said plurality of waveguides, wherein absorption edge energies are different in said plurality of waveguides in accordance with said different voltages applied across said plurality of waveguides by said plurality of electrodes.

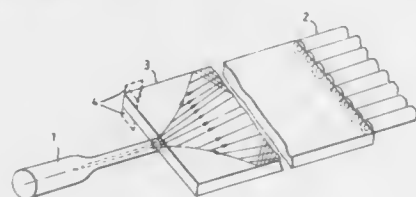
**4,950,045**  
**SINGLE MODE COUPLERS**  
Terry Brichen, Great Sampford; Alan Fielding, Sawbridge-  
worth, and Stephen Day, Harlow, all of Great Britain, assign-  
ors to STC PLC, London, England

Filed Jul. 10, 1989, Ser. No. 377,468

Claims priority, application United Kingdom, Jul. 15, 1988,  
8816896Int. Cl.<sup>5</sup> G02B 6/28

U.S. Cl. 350-96.16

10 Claims



1. A 1×N single mode optical waveguide coupler having a single input which comprises a single mode optical waveguide optically coupled to one end of an elongate generally slab-like

waveguide, the single input being disposed centrally of the one end of the slab-like waveguide, and a set of N single mode output optical waveguides optically coupled to the other end of the slab-like waveguide, wherein the slab-like waveguide is rectangular in cross-section and the dimensions of the slab-like waveguide are such that interference effects therein for light launched into the single input produce a set of output spots in a linear array at said other end, each member of the set of output waveguides being positioned such as to be aligned with a respective member of the set of spots.

**4,950,046**  
**FIBER OPTIC COUPLER**  
Richard P. Hughes, Kanata; Vincent C. Y. So, and Paul J. Vella,  
both of Ottawa, all of Canada, assignors to Northern Telecom  
Limited, Montreal, Canada

Continuation of Ser. No. 171,351, Mar. 21, 1988, abandoned,

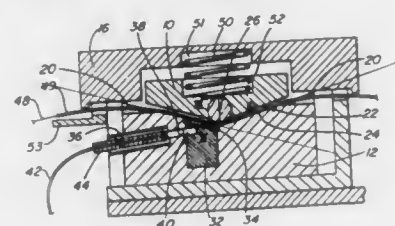
which is a continuation of Ser. No. 757,696, Feb. 22, 1985,

abandoned. This application Nov. 28, 1989, Ser. No. 442,878

Int. Cl.<sup>5</sup> G02B 6/32

U.S. Cl. 350-96.18

15 Claims



1. A fiber optic coupler comprising:  
a cylindrical rod;  
means for mounting a fiber having a core, a cladding and a resilient coating to extend along a path around a part of the circumference of the rod;  
a rigid transparent body having a substantially flat surface located on a side of the path remote from the rod;  
means for pressing the fiber between the rod and the substantially flat surface and into intimate contact with the rod and with a localized contact region of the substantially flat surface; and  
a lens positioned to direct light into the fiber core and to receive light from the fiber core, said light passing through the localized contact region of the substantially flat surface of the transparent body.

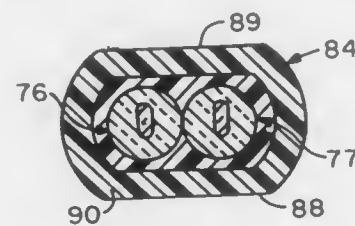
**4,950,047**  
**METHOD OF COATING OPTICAL FIBERS**  
George E. Berkey, Pine City, and Robert M. Hawk, Bath, both  
of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Jun. 5, 1989, Ser. No. 361,385

Int. Cl.<sup>5</sup> G02B 6/44

U.S. Cl. 350-96.23

13 Claims



1. A flexible fiber optic cable comprising  
a plurality of polarization retaining single-mode optical fibers, each of said fibers having a core and cladding, the

refractive index profile of each of said cores in a cross-section perpendicular to the fiber axis being such that said core exhibits a minimum refractive index along a minor axis in said cross-section and a maximum refractive index along a major axis in said cross-section, said major and minor axes being perpendicular to one another, said minor axes of said fiber cores lying in a given plane, and a protective coating on said fibers, said coating having opposed surfaces that are substantially flat, said plane being substantially parallel to said surfaces.

**4,950,048**  
**OPTICAL CONNECTOR FERRULE**  
Toshiaki Kakii; Yasuo Asano; Shuzo Suzuki; Koji Kashihara;  
Kazuhito Saito, and Takeo Komiya, all of Kanagawa, Japan,  
assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 11, 1987, Ser. No. 60,615

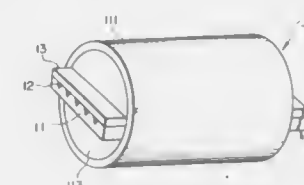
Claims priority, application Japan, Jun. 13, 1986, 61-138671;

Apr. 1, 1987, 62-81767

Int. Cl.<sup>5</sup> G02B 6/36, 7/26

U.S. Cl. 350-96.20

18 Claims



1. An optical connector ferrule for use in an optical coupling of optical fibers, comprising:  
an insertion member having a guide capillary for positioning said optical fibers, said guide capillary comprising a flat plate and a guide substrate having optical fiber guide grooves in one surface thereof, said flat plate being bounded to said guide substrate so as to form optical fiber guide holes into which said optical fibers are inserted;  
a reinforcing pipe for surrounding said guide capillary;  
a resin material provided in the area between said guide capillary and said reinforcing pipe for insert-molding said guide capillary within said reinforcing pipe; and  
a flange member having a non-circular cross section, said flange member being provided at one end of said insertion member so that said optical angle fiber guide holes are positioned at a predetermined angle with respect to said flange member.

**4,950,049**  
**STABLE PACKAGE OF ELONGATED OPTICAL FIBER**  
**STRAND MATERIAL**Ralph J. Darsey, Lawrenceville; John W. Shea, Chamblee, and  
Carl R. Taylor, Lawrenceville, all of Ga., assignors to AT&T  
Bell Laboratories, Murray Hill, N.J.

Filed Feb. 28, 1989, Ser. No. 316,615

Int. Cl.<sup>5</sup> G02B 6/10; B05D 5/06; B32B 31/00

U.S. Cl. 350-96.30

5 Claims

1. An adherent elongated strand material, which comprises:  
a length of elongated strand material which is capable of being disposed in a configuration such that a portion of an outer surface thereof becomes juxtaposed to an adjacent surface to which said portion of said outer surface of said elongated strand material is to become adhered; and  
a layer of an adhesive material which encloses said outer surface of said elongated strand material and which along

at least said portion of said outer surface is adapted upon suitable treatment of bond molecularly across an interface

with another portion of an adhesive material which has been applied to said adjacent surface.

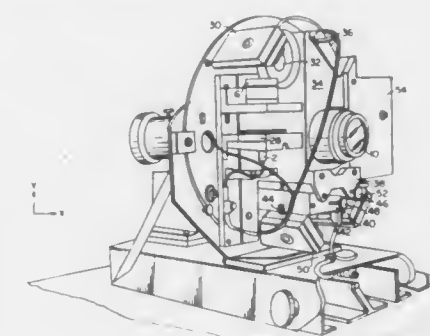
**4,950,050**  
**OPTICAL TARGET RECOGNITION SYSTEM**  
Benjamin J. Pernick, Hampton Bays, and Suey Jue, deceased,  
late of Hicksville, both of N.Y. (by Catharine Jue, executrix),  
assignors to Grumman Aerospace Corporation, Bethpage,  
N.Y.

Filed Jun. 19, 1987, Ser. No. 63,958

Int. Cl.<sup>5</sup> G02B 5/32

U.S. Cl. 350-162.13

8 Claims





and its corresponding encoded beam to indicate the presence of the of interest target; and wherein the mounting means and the first and second enclosures are either directly or indirectly coupled to each other to effect a compact structure for the apparatus.

4,950,051

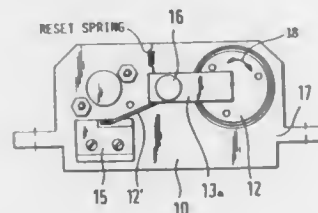
# **ELECTROMAGNETIC BEAM SWITCH ESPECIALLY FOR LASER RESONATORS**

Udo Barton, and Gerhard Ruf, both of Munich, Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany  
Filed Aug. 28, 1989, Ser. No. 399,267

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829166

Int. Cl.<sup>5</sup> G05D 25/02; G02B 26/00  
U.S. Cl. 350—269

3 Claims



1. An electromagnetic beam switch, especially for interrupting a laser beam path, comprising two rotary electromagnets arranged for rotation on a mounting bracket, a filter glass plate connected to each of said rotary magnets for tilting both filter glass plates into said laser beam path, two electrical switches arranged to be operated by a respective one of said filter glass plates, each switch having a normally closed contact and a normally open contact, a magnet energizing electric circuit means in which said normally closed contacts connect said electromagnets initially in parallel with each other for energization at full power and in which a closing of said normally open contacts by said filter glass plates connects said magnets in series with each other for continuing energization at half power, said circuit means further comprising an R-C-network means connected to said electromagnets for preventing a permanent or prolonged holding of said electromagnets.

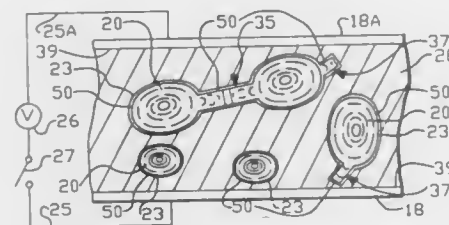
4,950,052

# **ENCAPSULATED LIQUID CRYSTAL APPARATUS WITH A POLYMER ADDITIVE**

James L. Ferguson, San Mateo, and Ning S. Fan, Cupertino, both of Calif., assignors to Taliq Corporation, Sunnyvale, Calif.

Filed Aug. 29, 1988, Ser. No. 237,974  
Int. Cl.<sup>5</sup> G02F 1/13; B01J 13/00; B32B 5/16; C09K 19/00  
U.S. Cl. 350—334

51 Claims



29. An apparatus comprising a latex containment medium, liquid crystal material contained in plural volumes in said medium wherein passageways extend between at least some of said volumes and from at least some of said volumes to a sur-

face of said medium and wherein said liquid crystal material includes operationally nematic liquid crystal having positive dielectric anisotropy, and a water soluble polymer forming a wall in plural volumes in said medium and along said passageways.

4,950,053

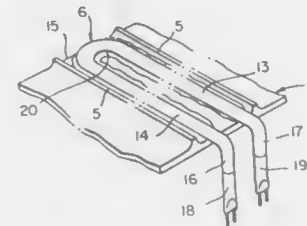
# **MULTIBEND FLUORESCENT LIGHT SOURCE FOR LIQUID CRYSTAL DISPLAYS WITH OUT OF PLANE LAMP ELECTRODES**

Elias S. Haim, Windham, N.H., and Francis L. Leard, Sndbury, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 5, 1987, Ser. No. 339  
Int. Cl.<sup>5</sup> G02F 1/13; F21V 7/04

U.S. Cl. 350—345

6 Claims



1. A liquid crystal display assembly comprising, in combination:

- a housing having a rectangular frontal opening for receiving a liquid crystal display panel;
- a mounting board secured in said housing rearwardly of said frontal opening; and
- a source of back illumination including a plurality of fluorescent lamps affixed to said mounting board in side-by-side relation, each said lamp including a medial portion having an intermediate bend such as to provide a plane of back illumination parallel to said liquid crystal display panel and electrode-containing terminal end portions bent rearwardly out of said back illumination plane.

4,950,054

# **LENS POSITION CONTROL DEVICE**

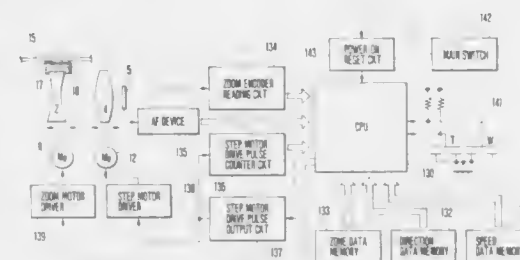
Hiroyuki Wada; Naoya Kaneda; Masahide Hirasawa, and Hirofumi Suda, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 31, 1989, Ser. No. 359,388

Claims priority, application Japan, Jun. 1, 1988, 63-135903  
Int. Cl.<sup>5</sup> G02B 15/00

U.S. Cl. 350—429

10 Claims



1. A lens position control device comprising:

- a first lens group movable along an optical axis for performing a function of varying an image magnification;
- a second lens group movable along the optical axis for performing a function of compensating at the time of variation of the image magnification and a function of focusing;

4,950,056

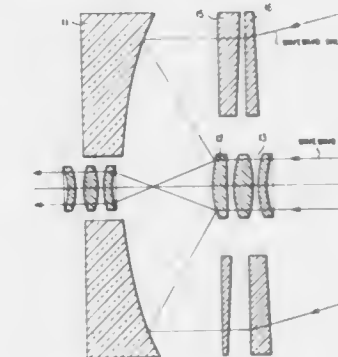
# **OPTICAL SYSTEM**

Brian F. Smith, Rayleigh, United Kingdom, assignor to GEC-Marconi Limited, Middlesex, United Kingdom  
Filed Jan. 19, 1989, Ser. No. 299,115

Int. Cl.<sup>5</sup> G02B 17/08

U.S. Cl. 350—505

7 Claims



4,950,055

# **RETROFOCUS TYPE WIDE ANGLE LENS**

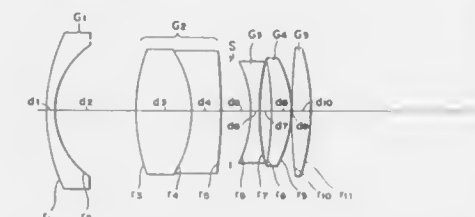
Wataru Tatsumo, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,259

Claims priority, application Japan, Aug. 12, 1988, 63-201077  
Int. Cl.<sup>5</sup> G02B 13/04

U.S. Cl. 350—462

8 Claims



1. A five group, six element, retrofocus type wide angle lens comprising a first lens group consisting of a meniscus-shaped negative lens whose convex surface is directed toward an object side, a second lens group consisting of a biconvex lens and a negative lens cemented therewith, a third lens group consisting of a biconcave lens, a fourth lens group consisting of a meniscus-shaped positive lens whose convex surface is directed toward an image side and a fifth lens group consisting of a biconvex lens all of which are arranged in the order named from said object side and satisfy the following conditions:

- 1.3 < f<sub>2</sub>/f<sub>2p</sub> < 2 (1)
- 0.18 < n<sub>3</sub> - n<sub>4</sub> < 0.3 (2)
- 0.35 < d<sub>2</sub>/f<sub>1</sub> < -0.15 (3)
- 0.2 < (d<sub>3</sub> + d<sub>4</sub>)/f < 0.5 (4)
- 0.14 < d<sub>5</sub>/f < 0.2 (5)
- 0.3 < r<sub>3</sub>/r<sub>5</sub> < 0.1 (6)

where

- f: the focal length of the whole system;  
f<sub>1</sub>: the focal length of the first lens group;  
f<sub>2</sub>: the focal length of the second lens group;  
f<sub>2p</sub>: the focal length of the positive lens in the second lens group;  
n<sub>3</sub>: the refractive index of the positive lens in the second lens group;  
n<sub>4</sub>: the refractive index of the negative lens in the second lens group;  
d<sub>2</sub>: the distance between the first and second lens groups;  
d<sub>3</sub>: the thickness of the positive lens in the second lens group;  
d<sub>4</sub>: the thickness of the negative lens in the second lens group;  
d<sub>5</sub>: the distance between the second and third lens groups;  
r<sub>3</sub>: the radius of curvature of the surface nearest to said object side of said second lens group; and  
r<sub>5</sub>: the radius of curvature of the surface nearest to said image side of the second lens group.

1. An optical system comprising optical apparatus defining transmission paths for respective first and second optical beams of radiation, each optical beam of radiation having a field of view, and means including at least one prism for variably steering the field of view for said first beam of radiation relative to the field of view for the second beam of radiation.

4,950,057

# **PROGRESSIVE MULTI-FOCAL OPHTHALMIC LENS**

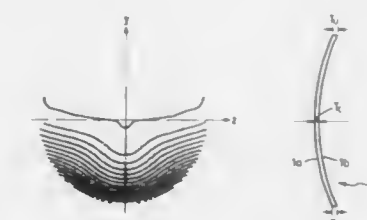
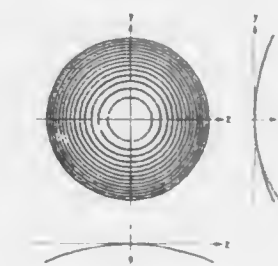
Moriyasu Shirayanagi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 369,796, Jan. 22, 1989, abandoned, which is a continuation of Ser. No. 276,164, Nov. 23, 1988, abandoned. This application Dec. 20, 1989, Ser. No. 456,209

Claims priority, application Japan, Nov. 30, 1987, 62-302495  
Int. Cl.<sup>5</sup> G02C 7/06; G02B 3/08, 3/10

U.S. Cl. 351—169

7 Claims



1. In a progressive multi-focal ophthalmic lens having a front refracting surface and a rear refracting surface one of which is a progressive surface whose refractive power changes continuously with the other being a non-progressive surface,

the improvement wherein said progressive surface is formed as a Fresnel lens surface composed of microscopic steps so that the macroscopic shape of said progressive surface generally conforms to that of said non-progressive surface.

4,950,058

# ACTIVE MATRIX COLOR DISPLAY SCREEN WITHOUT CROSSING OF ADDRESS LINE CONDUCTORS AND COMMAND COLUMN CONDUCTORS

Bernard Diem, Echirolles, and Thierry Leroux, Fontaine, both of France, assignors to Commissariat A L'Energie Atomique, Paris, France

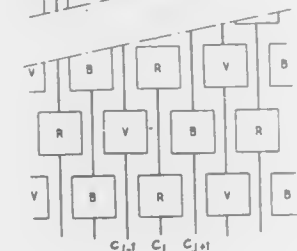
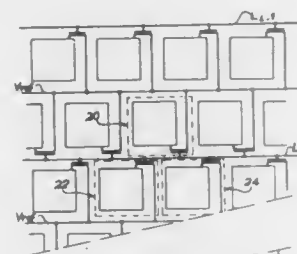
Filed Jan. 5, 1989, Ser. No. 293,638

Claims priority, application France, Jan. 11, 1988, 88 00200

Int. Cl.<sup>5</sup> G02F 1/13; G09G 3/36

U.S. Cl. 350—333

1 Claim



1. Active matrix color display screen without crossing of address line conductors (Li, Li-1) and signal column conductors (Cj-1; Cj; Cj+2), comprising:
  - a first surface and a second transparent surface;
  - a liquid crystal interposed between the first and second surfaces;
  - a plurality of color image points, each color image point being formed of three elemental image points (20, 22, 24) of the color red, green and blue disposed in a triangle in the plane of the display screen;
  - each elemental image point (20, 22, 24) comprising a liquid crystal cell being formed of a first electrode on the first surface, a second electrode (R, G, B) on the second surface, the liquid crystal contained between the first and second electrodes, and a thin film transistor being located on the first surface, said transistor being connected at its base to an address line conductor (Li, Li-1), at its collector to a reference potential conductor (Vref), and at its emitter to the first electrode of the liquid crystal cell;
  - the first electrodes of the first surface being arranged in a plurality of lines of first electrodes;
  - the second electrodes (R, G, B) of the second surface being arranged in a plurality of columns of second electrodes, each column of second electrodes corresponding to a color successively red, green, blue, and the second electrodes (R, G, B) of a column being connected between themselves by a signal column conductor (Cj-1; Cj; Cj+1);
  - each address line conductor (Li, Li-1) being common to two adjacent lines of first electrodes, each reference potential conductor (Vref) being common to two adjacent lines of first electrodes, whereby at one side of a given line of first electrodes and paralleling that given line there is an address line conductor (Li, Li-1) and on the other side of

that given line of first electrodes and paralleling that given line there is a reference potential conductor (Vref).

4,950,059

# COMBINATION LAMP AND INTEGRATING SPHERE FOR EFFICIENTLY COUPLING RADIANT ENERGY FROM A GAS DISCHARGE TO A LIGHTGUIDE

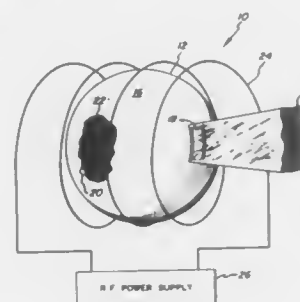
Victor D. Roberts, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 11, 1988, Ser. No. 256,019

Int. Cl.<sup>5</sup> G02F 1/133; H01J 11/00, 61/30; F21V 7/04

U.S. Cl. 350—345

30 Claims



1. An illuminated liquid crystal display system, comprising:
  - a flat panel liquid crystal display;
  - an electrodeless discharge lamp positioned to illuminate one side of said display, said lamp comprising a light integrating, closed container having an interior surface and an exterior surface, at least one of said surfaces being coated with a light-reflective material, said container enclosing a gaseous fill and having a light-transmissive window formed therein for permitting light to exit from said container;
  - RF excitation means coupled to said integrating container for electrically producing a field to establish a discharge current in said fill; and
  - an elongated, tapered lightguide means for emitting light from said container, said lightguide means having a narrow end and a wide end, the narrow end of said lightguide means being in registry with said window to intercept light exiting from said container, the wide end of said lightguide means being positioned adjacent to said liquid crystal display, whereby the light exiting from said container is guided from said container by said lightguide means and is emitted from the wide end thereof to illuminate said liquid crystal display.

4,950,060

# LENS DRIVING CAM MECHANISM

Ken Nagasaka, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 5, 1989, Ser. No. 348,253

Claims priority, application Japan, May 7, 1988, 63-110672; May 7, 1988, 63-60473[U]

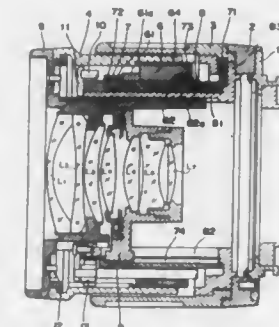
Int. Cl.<sup>5</sup> G02B 15/00, 7/04

U.S. Cl. 350—429

9 Claims

2. A lens-driving cam mechanism adapted to a zoom lens system for driving at least a movable lens unit of the zoom lens system in a zooming operation comprising:
  - a stationary cylinder adapted to be fixed to a camera body;
  - a rotaty cylinder held rotatably about said stationary cylinder and having at least one pair of cam followers disposed in a forward and rearward position, respectively, on the circumference thereof in the direction of an optical axis of the lens unit and uncoincident with each other in the circumferential direction thereof; and
  - a cam ring held rectilinearly movable only along the optical axis relative to said rotaty cylinder and having at least one

cam portion whose cam faces are disposed forwardly and rearwardly along the optical axis and uncoincident with each other in the circumferential direction thereof so that said cam faces are sandwiched between the pair of said cam followers formed on said rotaty cylinder and are brought in contact therewith,



whereby said cam ring is moved rectilinearly by the rotation of said rotaty cylinder along optical axis according to the sliding contact of the pair of said cam followers and said cam faces.

4,950,061

# DRIVE DEVICE FOR A VARIFOCAL LENS SYSTEM

Ikuya Tsurukawa, Yokohama; Kunihisa Yamaguchi, and Kosaku Sawabe, both of Ichikawa, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

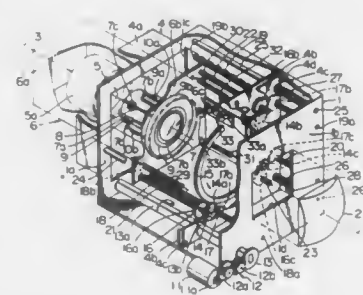
Filed Dec. 21, 1988, Ser. No. 287,851

Claims priority, application Japan, Dec. 23, 1987, 62-326069; Dec. 23, 1987, 62-326070; Dec. 24, 1987, 62-325247; Dec. 26, 1987, 62-328433; Dec. 30, 1987, 62-199789

Int. Cl.<sup>5</sup> G02B 15/00

U.S. Cl. 350—429

24 Claims



1. A device for driving a varifocal lens system, comprising:
  - a fixed frame fixed to a stationary member of an optical device,
  - a lens barrel frame movably supported inside said fixed frame along a predetermined optical axis,
  - a first group of lenses for focusing arranged on said optical axis,
  - a first group frame fixedly supporting said first group of lenses for focusing, said first group frame being movably supported within said lens barrel frame along said optical axis,
  - a second group of lenses arranged on said optical axis for zooming,
  - a second group frame supporting said second group of lenses therein in a fixed manner and supported with said first group frame inside said first group frame movably in parallel with said optical axis,
  - at least three driver screw members disposed within said

fixed frame in parallel with said optical axis and having the same screw pitch with one another,

- at least three driver gear members held in mesh with said driver screw members, respectively, and
- a drive means for driving said at least three driver gear members to thereby move said lens barrel frame and said first group frame by a predetermined amount respectively.

4,950,062

# PROJECTION LENS

Yuichi Kimura, Higashiosaka; Yoshiharu Yamamoto, Toyonaka, and Masayuki Takahashi, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

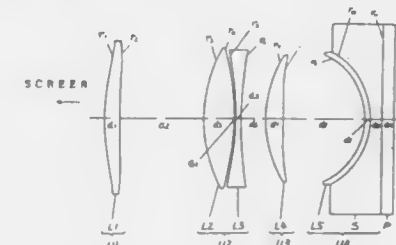
Filed Dec. 30, 1987, Ser. No. 139,452

Claims priority, application Japan, Mar. 31, 1987, 62-77716

Int. Cl.<sup>5</sup> G02B 13/18

U.S. Cl. 350—432

8 Claims



1. A projection lens for projecting on a screen an enlargement of an image appearing on a cathode ray tube, comprising from the screen end:
  - a first lens unit of positive optical power having a strongly convex surface facing the screen end;
  - a second lens unit comprising a biconvex lens element of positive optical power and a lens element of negative optical power having a concave surface facing the screen end;
  - a third lens unit of positive optical power at an optical axis having a convex surface facing the screen end;
  - and a fourth lens unit of negative optical power having a concave surface facing the screen end;said projection lens satisfying the following conditions:
  - (1)  $f_2 P V_2 P / f_2 N V_2 N < -0.69$
  - (2)  $0.10 < d_{23} / f < 0.15$where,
  - f: focal length of the overall lens system
  - $f_2 P$ : focal length of the lens element of positive optical power in the second lens unit
  - $f_2 N$ : focal length of the lens element of negative optical power in the second lens unit
  - $V_2 P$ : Abbe's number of the lens element of positive optical power in the second lens unit
  - $V_2 N$ : Abbe's number of the lens element of negative optical power in the second lens unit
  - $d_{23}$ : distance between the second lens unit and the third lens unit.

4,950,063

# AUTOMATIC COMPENSATION OF OPTICAL PATH FOR GIMBALED PHASED ARRAY TELESCOPE

Richard H. Pohle, Kula, HI., and David M. Stubbs, Mtn. View, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 28, 1989, Ser. No. 317,161

Int. Cl.<sup>5</sup> G02B 7/00, 23/00

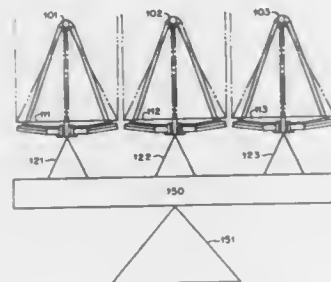
U.S. Cl. 350—571

2 Claims

2. A phased array telescope system which outputs a steerable beam, said phased array telescope system comprising:
  - an array housing;

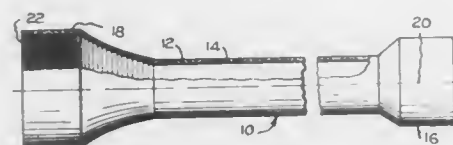


a means for tilting said array housing about two axes of rotation to mechanically steer said phased array telescope system over large angles;  
a plurality of transmitting optical elements, each being mounted on said array housing and transmitting an output signal; and



a means for tilting each of said plurality of transmitting optical elements about two axes of rotation to mechanically steer the output signal of the plurality of transmitting optical elements over medium angles, said medium angles being less than 20 degrees.

**4,950,064**  
**CARBON FIBER RIFLESCOPE HOUSING**  
Alfred A. Akin, Jr., Guina, Calif., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.  
Filed Dec. 28, 1988, Ser. No. 290,969  
Int. Cl.<sup>5</sup> G02B 7/02, 23/16; B23B 7/14  
U.S. Cl. 350-574



1. In a rifle scope housing having a plurality of optical lenses disposed along an optical axis, the improvement comprising a tubular housing constructed of a plurality of angularly overlapping carbon fibers impregnated with an activating agent, said carbon fiber tubular housing having a coefficient of thermal expansion which is nearly zero over the entire range of temperatures to which a rifle scope would be normally exposed whereby the optical characteristics of the rifle scope remain unaffected by changes in climatic conditions.

**4,950,065**  
**SHOWER MIRROR**  
Lawrence W. Wyman, 4225 Forest Beach Dr., NW., Gig Harbor, Wash. 98335  
Filed Dec. 19, 1988, Ser. No. 287,475  
Int. Cl.<sup>5</sup> G02B 7/18, 5/08  
U.S. Cl. 350-631

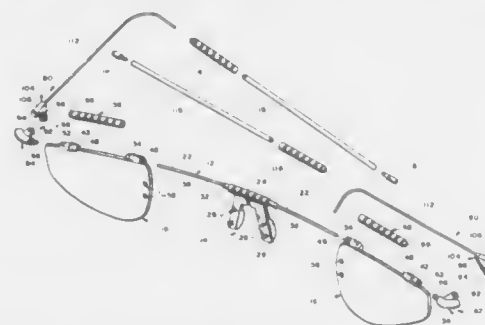
1. A portable mirror comprising:  
a mirror element;  
hanger means for removably securing the mirror element to a wall, said hanger means including means for removably securing said hanger means to said mirror element, said

hanger means including a base element having a plurality of suction cups extending therefrom and a loop for secur-



ing said hanger means to a hook or the like mounted on the wall.

**4,950,066**  
**EYEGLASSES HAVING DEMOUNTABLE FUNCTIONAL AND DECORATIVE ELEMENTS**  
James Hartman, 904 Elmwood Trail, Cedar Park, Tex. 78613  
Filed Nov. 7, 1988, Ser. No. 268,938  
Int. Cl.<sup>5</sup> G02C 1/04, 11/02, 5/02  
U.S. Cl. 351-106

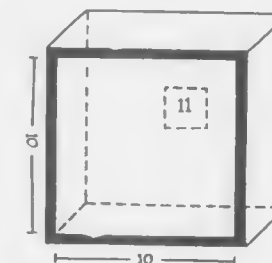


1. In a pair of eyeglasses, the combination of:  
a bridge member having wire line lens mounting elements extending laterally therefrom; and  
a pair of lenses mounted on said elements, each lens having mounting means thereupon rotatable and slidable on said elements to permit said lenses to be readily removed from operative relation with said elements.

**4,950,067**  
**HOLOGRAM WHICH HELPS REDUCE EYE STRAIN**  
Celeste V. Bonham, 835 Fernwood Pacific Dr., Topanga, Calif. 90290  
Filed Jul. 5, 1989, Ser. No. 375,834  
Int. Cl.<sup>5</sup> A61B 3/00; G03H 1/02

U.S. Cl. 351-203  
2 Claims  
1. A method of stimulating the eye muscles with a hologram including two or more depth-of-field opticals with one image appearing to be very close to the viewer and one image substantially at an infinite distance from the viewer, comprising the steps of:  
displaying the hologram;  
illuminating the hologram;  
having a viewer strongly focus on one of the images of the hologram appearing to be at one distance from the viewer;  
shifting the relative position of the viewer's head and the

hologram to present to the viewer another image of the hologram appearing to be at a different distance from the



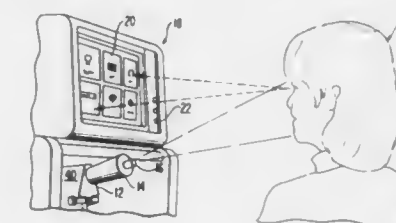
viewer and having the viewer strongly focus on this different image, thereby exercising the viewer's eye muscles.

**4,950,068**  
**OPHTHALMIC DISEASE DETECTION APPARATUS**  
Susumu Mizuta, Hino, Japan, assignor to Kowa Company Ltd., Japan  
Filed Jul. 7, 1988, Ser. No. 216,394  
Claims priority, application Japan, Jul. 14, 1987, 62-173990  
Int. Cl.<sup>5</sup> A61B 3/14, 3/10  
U.S. Cl. 351-208



1. An apparatus for detecting ophthalmic diseases in a patient's eye, in which a laser beam is projected at a selected spot in the patient's eye and light scattered therefrom is received on a photoelectric converter for conversion into an electrical signal, comprising:  
a laser source for producing a laser beam;  
a laser beam projector for projecting the laser beam;  
means for focusing the laser beam at a selected spot in the patient's eye; and  
means provided in the laser beam projector for monitoring light scattered from the cornea surface of the patient's eye on which the laser beam is projected, and a virtual image which is formed by the cornea surface from light scattered at the exit window of the laser beam;  
wherein the monitoring means is provided with a monitor screen and disposed with its optical axis the same as that of the laser beam projector so that the monitoring means receives an image of the light scattered from the cornea surface at a predetermined position on the monitor screen irrespective of the alignment of the apparatus relative to the patient's eye, while receiving the virtual image at a position on the monitor screen depending on its alignment relative thereto.

**4,950,069**  
**EYE MOVEMENT DETECTOR WITH IMPROVED CALIBRATION AND SPEED**  
Thomas E. Hutchinson, Ivy, Va., assignor to University of Virginia, Charlottesville, Va.  
Filed Nov. 4, 1988, Ser. No. 267,266  
Int. Cl.<sup>5</sup> A61B 3/14  
U.S. Cl. 351-210



1. An eye movement detector comprising:  
a display having multiple individual areas representing different choices that can be made by an operator when viewed by an operator for a predetermined interval of time;  
a camera with a lens located near said display and directed in a manner to obtain an image of an operator's eye when the display is being viewed;  
an illuminator directing an infrared source of illumination towards the position of an operator's eye so that the reflected illumination causes the operator's pupil to be brighter than the surrounding part of the eye due to the bright eye effect and also causes a glint reflection from the cornea of the eye;  
a computer including means for analyzing said image of an illuminated operator's eye to determine the center of the pupil and location of the glint and utilizing said information in determining the eye-gaze point and correlating said eye-gaze point with whether or not the operator is gazing at an individual area of the display;  
said computer further including means for using said image of the operator's eye in a digitized matrix of pixels that is used to make a determination of the pupil intensity threshold represented by the intensity of the pixels between the intensity of the pixels in the pupil and the pixel intensity represented by the part of the eye and face surrounding the pupil and also determining the glint intensity threshold;  
means included in said computer for determining said eye-gaze point by utilizing said pupil threshold in first scanning the pixels in said matrix by a rough scan of the pixels both horizontally and vertically by periodically skipping a predetermined number of the pixels both horizontally and vertically during the scan with said number of skipped pixels in the horizontal direction and the vertical direction being less than the diameter of said pupil and with said rough scan being utilized to determine a first chord of predetermined length passing through the pupil image.

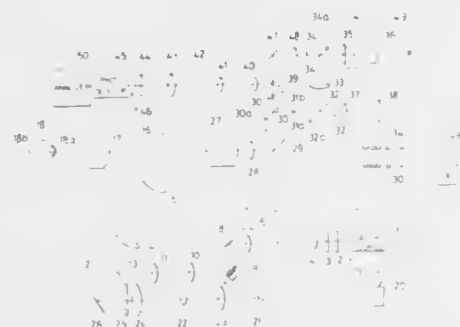
**4,950,070**  
**OPHTHALMOLOGICAL DIAGNOSIS METHOD AND APPARATUS**  
Yoshihisa Aizu, Machida; Kouji Ogino, and Toshiaki Sagita, both of Hino, all of Japan, assignors to Kowa Company Ltd., Japan  
Filed Apr. 3, 1989, Ser. No. 333,021  
Claims priority, application Japan, Apr. 8, 1988, 63-85145; Apr. 8, 1988, 63-85146; Apr. 8, 1988, 63-85147; Apr. 8, 1988, 63-85148  
Int. Cl.<sup>5</sup> A61B 3/10, 3/14  
U.S. Cl. 351-221

1. An ophthalmological diagnosis method in which the eye fundus is illuminated with a laser beam of a predetermined

diameter to produce a laser speckle pattern formed at an observation plane by light scattered and reflected from tissue in the eye fundus, and motion of the laser speckle pattern is detected as fluctuation in the light intensity of speckles to produce a speckle signal which is evaluated to measure the blood state in the eye fundus tissue, comprising the steps of:

illuminating a blood vessel to be measured with the laser beam of a predetermined beam spot whose diameter is substantially equal to or smaller than that of the blood vessel;

converging light scattered and reflected by blood cells flow-



ing through the blood vessel illuminated by the laser beam to form its spot image in equal or magnified size at an image plane which is conjugate with the eye fundus;

detecting boiling motion of the speckles at the image plane appearing within the spot image through a detection aperture disposed at the conjugate image plane and formed thereon with a multiple detection aperture pattern comprised of a plurality of small apertures; and

evaluating a speckle signal produced depending upon the fluctuation in a total amount of light passing through the multiple detection aperture pattern to measure velocity of the blood flowing through the blood vessel concerned.

**4,950,071**  
**FILM REGISTRATION APPARATUS AND SHUTTER FOR A CAMERA AND METHOD**  
 Stanislav Maron, 7801 N. 54th St., Paradise Valley, Ariz. 85253  
 Filed Oct. 20, 1988, Ser. No. 260,450  
 Int. Cl.<sup>5</sup> G03B 1/48

U.S. Cl. 352—225

6 Claims

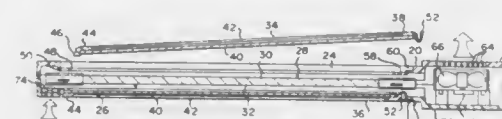
1. A film registration apparatus for repetitively registering a segment of a film strip with a mask or the like, said registration apparatus comprising in combination:

- a plate assembly for supporting the film strip;
- a pressure plate for positioning the film strip, mask and the like adjacent the plate assembly;
- means for biasing said pressure plate against said plate assembly and for raising said pressure plate away from said plate assembly;
- a pair of registration pins for aligning the film strip, mask and the like in one axis, said registration pins extending from said plate assembly to penetrably engage sprocket holes disposed along one edge of the film strip, each of said registration pins having one dimension equal with a first dimension of the sprocket holes and another dimension less than a second dimension of the sprocket holes;

- a further registration pin for aligning the film strip, mask and the like in another axis, said registration pin extending from said plate assembly to penetrably engage sprocket holes disposed along the edge of the film strip, said further registration pin having the one dimension equal with the second dimension of the sprocket holes and another dimension less than the first dimension of the sprocket holes; and
- means for raising an edge of the film strip upon raising of said pressure plate to permit withdrawal of the film strip from engagement with said pair of registration pins and said further registration pin.

**4,950,072**  
**PRESENTATION DEVICE FOR OVERHEAD PROJECTOR**  
 Masami Honda, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Apr. 25, 1989, Ser. No. 342,782  
 Claims priority, application Japan, Apr. 28, 1988, 63-57837[U]  
 Int. Cl.<sup>5</sup> G03B 21/54  
 U.S. Cl. 353—122

10 Claims



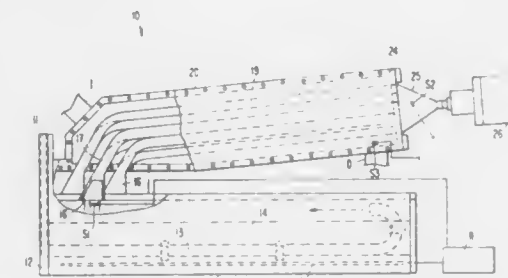
1. A presentation device used in a combination with an overhead projector, comprising:
- a frame-shaped casing for defining first and second openings opposing each other;
  - a transmissive-type liquid crystal panel fixed in said casing, said liquid crystal panel having first and second surfaces respectively opposing said first and second openings;
  - a first protective cover spaced apart from said first surface of said liquid crystal panel by a predetermined gap, and positioned to close said first opening of said casing, said first protective cover having a transparent area through which said first surface of said liquid crystal panel can be externally observed;
  - a second protective cover spaced apart from said second surface of said liquid crystal panel by a predetermined gap, and positioned to close said second opening of said casing, said second protective cover having a transparent area through which said second surface of said liquid crystal panel can be externally observed;
  - first engaging means for selectively engaging and disengaging said first protective cover with said casing, said first engaging means including a locking pawl extending from an outer edge of said first protective cover, an insertion recess formed in an inner edge of said first opening of said casing for receiving said locking pawl, an elastically deformable locking piece formed on an outer edge of said first protective cover, said locking piece being spaced apart from said locking pawl, and a fitting recess formed on an inner edge region of said first opening of said casing for receiving and retaining said locking piece upon elastic deformation of said locking piece;
  - second engaging means for detachably engaging said second protective cover with said casing, said second engaging means including a locking pawl extending from an outer edge of said second protective cover, an insertion recess formed in an inner edge of said second opening of said casing for receiving said locking pawl, an elastically deformable locking piece formed on an outer edge of said second protective cover, said locking piece being spaced

apart from said locking pawl, and a fitting recess formed on an inner edge region of said second opening of said casing for receiving and retaining said locking piece upon elastic deformation of said locking piece; and

cooling means for cooling said liquid crystal panel by feeding outer air into said casing, causing the outer air to flow along said first and second surfaces of said liquid crystal panel, and thereafter for exhausting the air from said casing.

**4,950,073**  
**SUBMICRON PARTICLE COUNTING ENLARGING THE PARTICLES IN A CONDENSATION BASED GROWTH PROCESS**  
 Holger T. Sommer, Greenbelt, Md., assignor to Pacific Scientific Company, Newport Beach, Calif.  
 Filed Feb. 10, 1989, Ser. No. 308,556  
 Int. Cl.<sup>5</sup> G01N 1/00  
 U.S. Cl. 356—37

6 Claims

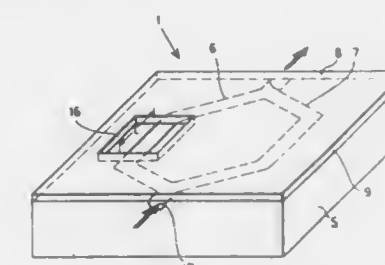


1. Apparatus for detecting particles having at least a predetermined submicron size in a sample of gas containing such particles comprising:
- means for detecting particles of a size substantially greater than said predetermined submicron size;
  - means for increasing the size of the particles having at least the predetermined submicron size in a sample of gas to said substantially greater size, said size increasing means comprising a bath of liquid and means defining a space over said bath, said bath and said space comprising means to saturate said gas sample with vapor from said liquid in said space;
  - means for condensing the vapor in the saturated sample around the particles in said sample having at least the predetermined submicron size to increase the size of said particles to said substantially greater size, wherein said space over said bath, said condensing means and said detecting means define a continuous flowpath for conveying a flow of said sample from said space to said detecting means;
  - means upstream of said space over said bath, with respect to the flow of said sample, for heating said sample, said heating means comprising a plurality of conduits connected in parallel extending through said bath of liquid, said conduits having outlet ends above the bath of liquid; and
  - means for dividing a stream of a sample entering said plurality of conduits into a plurality of streams corresponding in number to the number of said conduits, wherein said dividing means comprises a plurality of channels connected with said conduits, and means for maintaining equal pressure in at least some of the plurality of said channels, said equal pressure maintaining means comprising at least one recombining channel connecting to one another two of the channels connecting with said conduits.

**4,950,074**  
**METHOD OF DETERMINING THE REFRACTIVE INDEX OF A SUBSTANCE AND APPARATUS THEREOF**  
 Norbert Fabricius, Schöna; Helmut Oerte, Dortmund; Helga Götz, Bingen-Buedesh; Ludwig Roß, Armsheim; Hans-Jürgen Guttman, Wiesbaden; Jürgen Kluge, Dossenheim; Jörg Baumgart, Waghäusel, and Charitos Efstathiou, Rüsselsheim, all of Fed. Rep. of Germany, assignors to IOT Entwicklungsgesellschaft für Integrierte Optik-Technologie mbH, Waghäusel-Kirrlach, Fed. Rep. of Germany  
 Filed May 2, 1989, Ser. No. 346,523  
 Claims priority, application Fed. Rep. of Germany, May 2, 1988, 3814844

Int. Cl.<sup>5</sup> G01N 21/41, 21/45  
 U.S. Cl. 356—133

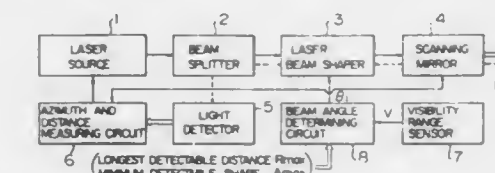
13 Claims



1. A method of determining the index of refraction (n) of a substance, the method comprising the steps of:
- conducting monochromatic light to an optical single-mode wave guide integrated into a substrate; the wave guide defining two paths for conducting respective components of light therealong; one of said paths having a measurement segment of predetermined length (L) and an effective refractive index along said segment;
  - bringing the substance to be measured into optical contact with the wave guide along said measurement segment thereby changing the effective refractive index of the wave guide along said segment to produce a phase displacement of the light travelling along the path of said measurement segment; and,
  - determining the refractive index (n) from the phase difference between the components of light travelling along said two light paths.

**4,950,075**  
**METHOD OF DETECTING AN OBJECT BY USE OF LASER LIGHT AND LASER RADAR**  
 Yuuji Ichinose, Hitachi, and Fuminobu Takahashi, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed May 2, 1989, Ser. No. 346,228  
 Claims priority, application Japan, May 2, 1988, 63-109764  
 Int. Cl.<sup>5</sup> G01B 11/26; G01N 21/00  
 U.S. Cl. 356—141

17 Claims



1. A method of detecting a target by scanning a laser beam in a predetermined region, comprising the steps of:
- determining a rate of attenuation of laser light propagating in the atmosphere;
  - calculating a laser beam scan angle utilizing said determined rate of attenuation;
  - controlling said laser beam in accordance with said calcu-



lated laser beam angle so as to scan said predetermined region; and  
detecting said target in said predetermined region in response to said scan of said predetermined region.

4,950,076

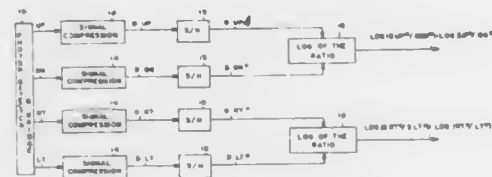
**ALTERNATE APPROACH FOR OBTAINING DYNAMIC RANGE IN MONOPULSE GUIDANCE SYSTEMS**  
Bobby R. Jarrett, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 14, 1976, Ser. No. 723,262

Int. Cl.<sup>5</sup> B01B 11/26; G01C 1/00

U.S. Cl. 356—152

10 Claims



1. A circuit for logarithmic processing of guidance signals with improved dynamic range comprising:
  - a four quadrant photon detector wherein the photon energy input is converted to electrical energy;
  - a bridge connected to said detector for combining adjacent quadrant signals to provide spatially resolved output channels;
  - a plurality of transimpedance amplifiers, each amplifier having a feedback impedance with one transimpedance amplifier connected to each spatially resolved bridge output channel, each transimpedance amplifier converting said photon detector current output to a voltage signal;
  - a plurality of sample/hold circuits, one connected to each transimpedance amplifier voltage signal output wherein the amplitude of the voltage signal output pulse is held; and
  - a pair of log of the ratio circuits, each log of the ratio circuit being connected to a pair of opposed spatially resolved sample/hold circuits, said log circuits determining the relative angle information for guidance.

4,950,077

**PHOTOELECTRIC MEASURING APPARATUS FOR USE IN AUTOMATIC ANALYZER**

Sugio Manabe, Kodaira, Japan, assignor to Olympus Optical Co., Ltd., Japan

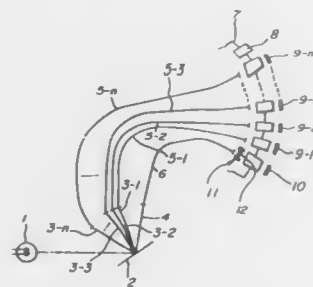
Filed Apr. 27, 1989, Ser. No. 343,681

Claims priority, application Japan, Apr. 28, 1988, 63-56737

Int. Cl.<sup>5</sup> G01J 3/42, 3/18

U.S. Cl. 356—328

6 Claims



1. A photoelectric measuring apparatus for use in an automatic analyzer utilizing a plurality of light beams having different wavelengths, comprising:

a light source for emitting a polychromatic light beam;  
a grating for receiving said polychromatic light beam and generating a plurality of light beams having predetermined different wavelengths as higher order light beams, and a polychromatic light beam as a zero order light beam;  
a plurality of light guides for guiding said plurality of light beams having predetermined different wavelengths to a plurality of cuvettes which contain test liquids to be analyzed and which are arranged along a reaction line;  
a plurality of light receiving elements for receiving light beams transmitted through said plurality of cuvettes;  
optical filter means for deriving a light beam having a desired wavelength from said polychromatic light beam of the zero order light beam emanating from the grating;  
a light guide for guiding the polychromatic light beam of the zero order light beam via the optical filter means to a cuvette; and  
a light receiving element for receiving a light beam transmitted through said cuvette.

4,950,078

**HIGH ACCURACY DIFFERENTIAL PLANE MIRROR INTERFEROMETER**

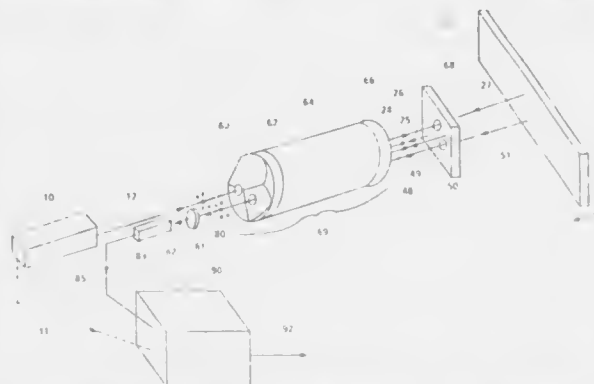
Gary E. Sommargren, Santa Cruz, Calif., assignor to Zygo Corporation, Middlefield, Conn.

Filed Dec. 8, 1988, Ser. No. 282,018

Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—349

35 Claims



1. A differential plane mirror interferometer system capable of measuring changes in length or changes in optical length between two plane mirror surfaces in said system, said system comprising a source of an input beam with two linear orthogonally polarized components; means including a birefringent optical element, optically aligned with said input beam for converting said input beam into two, separated, parallel orthogonally polarized beams; a stationary reference plane mirror comprising one of said two plane mirror surfaces; a movable plane mirror comprising the other of said two plane mirror surfaces; means, including a corner-cube retroreflector, for causing each of said separated, parallel, orthogonally polarized beams to be reflected twice by one of said two plane mirrors, respectively, for producing two separated, parallel, orthogonally polarized output beams; means optically aligned with said two output beams for converting said two, separated, parallel orthogonally polarized output beams into a single output beam having two orthogonal polarization components having a phase difference there between, with said phase difference between said two orthogonal polarization components of said single output beam being directly proportional to the optical path length between said two plane mirrors; means optically aligned with said single output beam for mixing said orthogonal polarization components of said single output beam; means associated with said single output beam for providing an electric measurement signal therefrom; and means for extracting said phase difference between said orthogonal components of said single output beam from said electrical measurement signal.

nal, said extracted phase difference being proportional to said optical path length between said two plane mirrors; whereby said changes in length or optical length between said two plane mirror surfaces may be measured with significantly reduced cyclic non-linearity errors.

4,950,079

**COMBINED SCALE AND INTERFEROMETER**

David R. McMurtry, Wotton-Under-Edge, and Raymond J. Chaney, Berkeley, both of United Kingdom, assignors to Renishaw plc, Gloucestershire, England

PCT No. PCT/GB88/00166, § 371 Date Oct. 25, 1988, § 102(e)

Date Oct. 25, 1988, PCT Pub. No. WO88/06712, PCT Pub.

Date Sep. 7, 1988

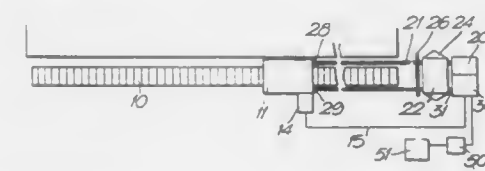
PCT Filed Mar. 7, 1988, Ser. No. 265,137

Claims priority, application United Kingdom, Mar. 6, 1987, 8705302

Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—358

9 Claims



1. Measuring apparatus for measuring relative movements between two objects comprising:
  - a scale attached to one of the objects and having spaced marks thereon the relative positions of which are accurately known,
  - a scale reader attached to the other one of the objects and which includes a detector system for detecting the presence of scale marks as they attain a known position relative to the scale reader during said relative movement of the objects, and for providing an output signal indicative of the presence of a mark,
  - recording means for providing information as to the position of the detected mark,
  - an interferometer arranged to measure the relative movement between the scale and scale reader along the scale and to provide an output indicative of the amount of said movement,
  - means for passing the output signal from the scale reader to the interferometer, and simultaneously with the receipt thereof by the interferometer causing the output of the interferometer to be updated, and
  - means for interrogating the output of the interferometer alone or in conjunction with the recording means to determine the relative movement between the two objects.

4,950,080

**METALLIC STRIP DESIGNED FOR THE MANUFACTURE OF SOLID ELECTROLYTE CAPACITORS, MANUFACTURING METHOD THEREOF, AND CAPACITORS OBTAINED THEREBY**

Georges Boullay, Dijon, and Gilles Bernard, Seurre, both of France, assignors to Compagnie Europeenne de Composants Electroniques LCC, Courbevoie, France

Filed Feb. 28, 1989, Ser. No. 316,788

Claims priority, application France, Mar. 1, 1988, 88 02531

Int. Cl.<sup>5</sup> H01G 9/00

U.S. Cl. 361—525

8 Claims

1. A metallic strip designed for the manufacture of solid electrolyte capacitors, the strip being etched and oxidized,



said strip also supports layers of insulating material designed for the electrical protection of the electrolyte.

4,950,081

**MULTI-SPINDLE KNEADING MIXER**

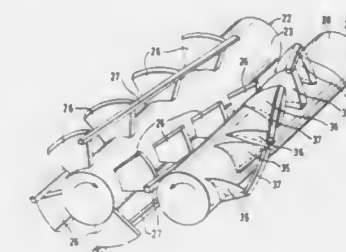
Heinz List, deceased, late of Pratteln, Switzerland (by Jorg List, executor), assignor to List AG, Pratteln, Switzerland  
Filed Feb. 15, 1989, Ser. No. 311,691

Claims priority, application Switzerland, Feb. 16, 1988, 00551/88

Int. Cl.<sup>5</sup> B01F 7/08

U.S. Cl. 366—85

8 Claims



8. A multi-spindle kneading mixer for performing mechanical, chemical and/or thermal processes which comprises: at least two axis-parallel rotating shafts; disk elements on one of said shafts and an approximately axially aligned kneading bar on said disk elements; kneading elements on the second of said shafts, wherein the kneading elements on the second shaft and the kneading bars mesh, said kneading elements including a radial part; a scraping edge of the radial part of said kneading elements operative to scrape the disk elements; an inclined diverting surface of said kneading elements adjoining the scraping edge; and a kneading gap formed by the diverting surface and the disk elements; wherein the diverting surface is operative to divert the scraped-off product axially into said kneading gap, said radial parts including a first and second radial part with each radial part including a respective first and second axial kneading bar, wherein the first radial part and first kneading bar sweep over some of the space between the disk elements and wherein the second radial part and second kneading bar sweep over the remaining space between the disk elements.

4,950,082

**MIXING APPARATUS**

John T. Carlson, 811 Ashland Ave., St. Paul, Minn. 55104

Division of Ser. No. 173,249, Mar. 24, 1988. This application

Jul. 13, 1989, Ser. No. 379,369

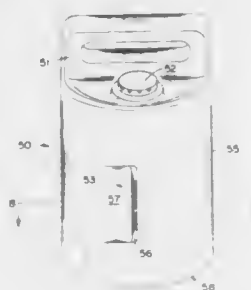
Int. Cl.<sup>5</sup> B01F 9/12

U.S. Cl. 366—130

4 Claims

1. A mixing apparatus for mixing liquids, comprising a container for liquids having a top surface, side surfaces and a bottom surface, said top surface having a handle thereon for carrying the container, said side surfaces having at least two spaced inwardly projecting perimeter baffles thereon,

said perimeter baffles each are comprised of a front side and a back side wherein said perimeter baffle front side abruptly projects inwardly from said side surface and said perimeter baffle back side gradually tapers from said perimeter baffle front side to said side surface; said bottom surface having at least two spaced upwardly extending inner baffles thereon, and



said inner baffles each having an inner baffle front side and an inner baffle back side, wherein said inner baffle front side abruptly projects upwardly from said bottom surface and said inner baffle back side gradually tapers from said inner baffle front side to said bottom surface.

4,950,083

# PACKAGING FOR A LIQUID COMPOSITION WHICH IS READY FOR USE, PRODUCED FROM A CONCENTRATED LIQUID COMPOSITION, AND METHOD FOR ITS IMPLEMENTATION

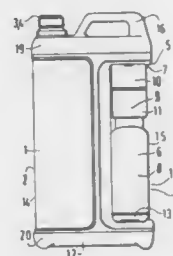
Tristan Bavaveas, Paris, France, assignor to Eparco, Paris, France

Filed Aug. 2, 1989, Ser. No. 387,752

Claims priority, application France, Aug. 3, 1988, 88 10503  
Int. Cl.<sup>5</sup> B01F 13/00; B65D 1/02, 69/00, 81/32

U.S. Cl. 366—348

10 Claims



10. A method for mixing and preparing a liquid composition comprising the steps of providing a packaging including a bottle having first wall means for providing an overall rigidity and self-supporting quantity, said wall means defining a first hollow body of a known volume having a first opening and an outer recess along one side of the bottle, a bottle cap removably closing said first opening, a container being of a size smaller than said bottle and having second wall means for providing an overall rigidity and self-supporting quantity, said second wall means defining a second hollow body filled with a concentrated liquid composition, said second hollow body having a second opening with an integral measuring device being closed by a removable cap, said container being disposed in said recess and said recess having rigid means for holding the container in said recess against one side of said bottle; removing the container from said recess; removing the bottle cap from said first opening and removing the removable cap from said second opening; utilizing the measuring device of said container to measure a suitable volume of the concentrated liquid composition; pouring the measured suitable vol-

ume through the first opening of said bottle; adding the support product into said bottle; applying said bottle cap to said first opening; and then shaking said bottle to mix and to finish the preparation of said liquid composition.

4,950,084

## CAPACITIVE SENSOR

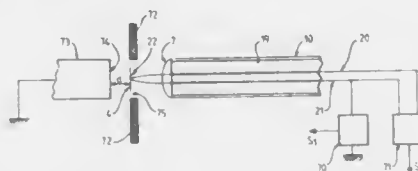
Gilles Bailleul, Montesson; Carlos Rodrigues, Le Chesnay, and Samin Albijar, Puteaux, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 16, 1989, Ser. No. 324,471

Claims priority, application France, Mar. 25, 1988, 88 03939  
Int. Cl.<sup>5</sup> G01K 13/08, 7/00

U.S. Cl. 374—144

7 Claims



1. A capacitive sensor for the measurement of at least one characteristic of a turbo-machine under dynamic conditions, said turbo-machine having a casing and rotating blades adjacent said casing, said sensor comprising a conductive surface fixed to said casing approximate said rotating blades to form a first plate of a capacitor, said capacitor's second plate comprising each one of the ends of said rotating blades when passing in proximity to said conductive surface, said sensor also comprising an electrical interconnection means to connect said conductive surface to a first electrical detection means for measuring the variations of the capacitance of said capacitor, wherein said electrical interconnection means also constitutes a means to connect said conductive surface to a second electrical detection means for measuring the temperature of said casing in the region of said conductive surface, said electrical interconnection means including conductors of a thermocouple and means for coupling said thermocouple in electrical and thermal contact with said conductive surface, said means for coupling said thermocouple comprising at least one metallic electrode having a plane front face which cooperates with said conductive surface, said thermocouple being in electrical and thermal contact with this electrode, said thermocouple being surrounded by a shielding comprising a cylindrical metallic sheath, said sheath having an aperture whereby said thermocouple can electrically and thermally contact said electrode.

4,950,085

## MULTI-POSITIONAL THERMOMETER

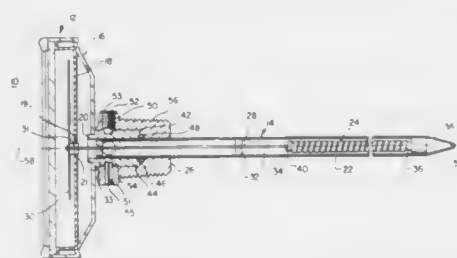
Agoston Horvath, Plano, Tex., assignor to Rochester Gauges, Inc., Dallas, Tex.

Filed Feb. 6, 1989, Ser. No. 306,571

Int. Cl.<sup>5</sup> G01K 5/62

U.S. Cl. 374—207

10 Claims



1. A temperature sensing device having a gauge assembly

including a dial, and a stem assembly including an indicator, a stem, and a temperature sensitive helical bimetallic strip connected at one end to said stem comprising:

means to connect the indicator to the bimetallic strip at the free end of the bimetallic strip; and  
a means to connect the gauge assembly to the stem assembly including a set screw and a means for limiting motion between the gauge assembly and the stem assembly to rotation relative each other in a single plane wherein the gauge assembly may be rotated relative to the stem assembly allowing calibration of the dial to the indicator to reflect the appropriate temperature reading on the dial of the gauge assembly and secured in place by the set screw, wherein a temperature change causes the bimetallic strip to expand or contract, resulting in rotation of the free end of the helical strip thus rotating the indicator.

4,950,086

## STRUCTURE HAVING RADIOACTIVE PLANT COMPONENTS

Hermann Operschal, Lauf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

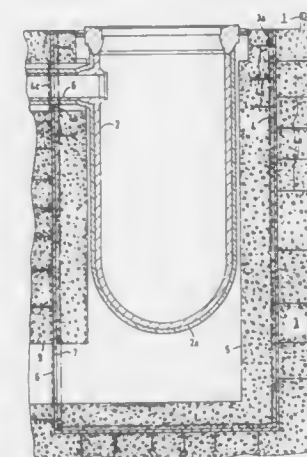
Continuation of Ser. No. 106,566, Oct. 8, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,296

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1986, 3634881

Int. Cl.<sup>5</sup> G21C 11/02

U.S. Cl. 376—293

6 Claims



1. Assembly, comprising a structure, a shielding apparatus inside said structure, a radioactive plant component having a given height and being surrounded by said shielding apparatus prior to dismantling said radioactive plant component, said radioactive plant component and said shielding apparatus having sides and a bottom, said shielding apparatus including relatively highly radioactive parts and relatively weakly radioactive or non-radioactive parts, and a water-tight vessel having sides and a bottom embedded in said structure, having an interior and an outside and surrounding said radioactive plant component and said relatively highly radioactive parts exclusively at the sides and at the bottom with said relatively highly radioactive parts disposed in the interior and said relatively weakly radioactive or non-radioactive parts disposed at the outside, said water-tight vessel having substantially said given height and being sufficiently large to hold water serving as shielding means and to hold crushed contaminated pieces of all of said radioactive plant component and said relatively highly radioactive parts during subsequent dismantling of said plant component and said relatively highly radioactive parts.

4,950,087

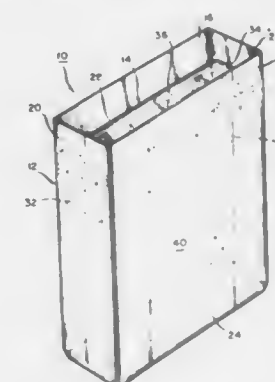
## SNACK BAG

Robert J. Carey, P.O. Box 251, Monroe, N.Y. 10950  
Filed Jan. 24, 1990, Ser. No. 469,362

Int. Cl.<sup>5</sup> B65D 33/24, 43/04

U.S. Cl. 383—43

1 Claim



1. Bag for containing snacks, comprising:  
an outer bag including opposed sides, opposed ends, a bottom and an open top;  
an inner bag including opposed sides, opposed ends, a bottom and an open top;  
said inner bag being inverted and residing in said outer bag at a predetermined distance between the top and bottom of said outer bag, with said ends of said inner bag being opposed to and at least portions thereof secured to said opposed ends of said outer bag, with said opposed sides of said inner bag being opposite said opposed sides of said outer bag and being in substantial engagement therewith but not secured thereto to provide a substantially air tight seal therebetween, and with said bottom of said inner bag being opposite said bottom of said outer bag, said bottoms, said opposed sides and ends of said inner bag and portions of said opposed ends and sides of said outer bag providing in combination a chamber for receiving said snacks; and access to snacks contained in said chamber being provided by physically separating said opposed sides of said outer and inner bags.

4,950,088

## SLIDE HAVING AN UPPER PROFILE ELEMENT AND A LOWER PROFILE ELEMENT DESIGNED FOR MAKING A FLOATING LATCH THEREBETWEEN

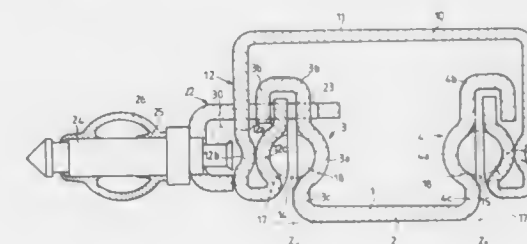
Yves Pipon, and Georges Droulon, both of Fiers, France, assignors to A & M Cousin Etablissements Cousin Freres, Orne, France

Filed Nov. 7, 1989, Ser. No. 432,640

Claims priority, application France, Nov. 10, 1988, 88 14697  
Int. Cl.<sup>5</sup> F16C 29/10

U.S. Cl. 384—47

7 Claims



1. A slide having an upper profile element and a lower profile element designed for making a floating latch slide so as



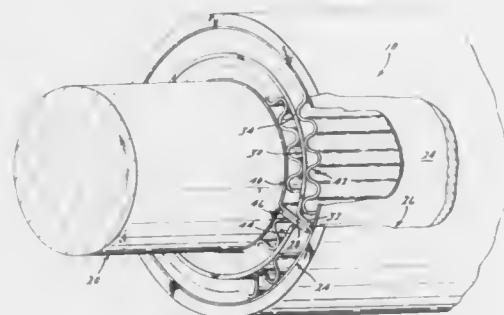
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to provide a reliable latching between the fixed lower profile element (1) and the mobile upper profile element (10), wherein the lower profile element (1) is substantially of a U-shaped section and includes wings (3, 4) having each a median zone with a semi-cylindrical channel (3a, 4a) prolonged by a bent-over portion (3b, 4b) provided for covering V-bent vertical ends of side branches (12, 13) of the upper profile element (10) whereby contours are defined on each side of the slide for containing each a set of balls (14, 15) separated by a rod (16), then a wing (3b') of the lower profile element (1) is cut out in order to form a row (6) of teeth (7) having each a trapezoidal shape prolonged by a rectangular shape in order to cooperate with an L-section latch-comb (22) formed with rectangular openings (23), said latch-comb being freely mounted on a pin (24) which pin (24) is displaceable by a control of the slide, then a spring (30) applies to said latch-comb a pressure permitting a passage of teeth (23) of the latch-comb through openings (20) formed in the upper profile element (10) so as to cause a penetration of said latch-comb into said openings (23) between the row (6) of teeth (7) of the lower profile element (1) for latching the upper profile element (10) on the lower profile element (1).

**4,950,089**  
**COMPLIANT FOIL BEARING**  
Allen M. Jones, Novi, Mich., assignor to Williams International Corporation, Walled Lake, Mich.  
Filed May 12, 1988, Ser. No. 192,935  
Int. Cl.<sup>5</sup> F16C 32/06  
U.S. Cl. 384—103 2 Claims

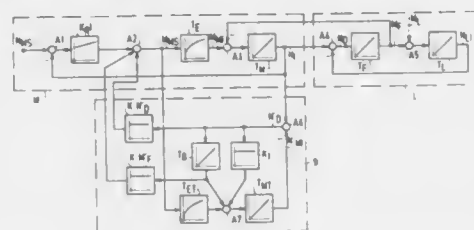


1. A compliant foil bearing adapted to be supported in a bearing housing for journaling of a shaft, said bearing comprising:  
a one-piece bearing foil having a first relatively thin bearing foil end portion disposed about said shaft in juxtaposed relation thereto,  
said bearing foil having a second relatively thin bearing foil opposite end portion extending circumferentially of said shaft in radially outwardly spaced relation from said first bearing foil portion and in juxtaposed relation to said bearing housing,  
a relatively thick segregating foil extending circumferentially of said shaft between said first and second bearing foil portions and radially spaced therefrom, respectively, and  
a pair of spacer foils disposed between said segregating foil and said first and second bearing portions, respectively.

**4,950,090**  
**METHOD FOR THE DETECTION AND REGULATION OF A SPRING MOMENT AND A DIFFERENCE SPEED IN ROTATIONALLY DRIVEN TWO-MASS SYSTEMS**  
Wolfgang Papiernik, Erlangen, and Hans-Peter Troendle, Forchheim/Kersbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

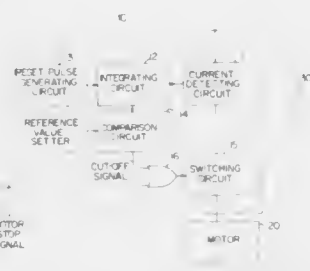
Filed Oct. 20, 1988, Ser. No. 260,378  
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736214

Int. Cl.<sup>5</sup> H02P 5/00  
U.S. Cl. 388—815 3 Claims



1. A method for detecting and regulating a spring moment and a difference speed in a rotationally driven system having a motor and a load in a drive unit which acts as an elastically coupled two-mass system, the method comprising the steps of:  
simulating in a control unit a spring moment and a difference speed between a first mass and a second mass of said drive unit, with said first mass representing the inert mass of said motor and said second mass representing the inert mass of said load, wherein said simulating steps includes the steps of determining the simulated difference speed from a difference of a simulated motor speed and an actual motor speed, and integrating said simulated difference speed to form said simulated spring moment; and  
supplying said simulated spring moment and said simulated difference speed as correction values to a system regulator that regulates the rotationally driven system.

**4,950,091**  
**ROD ANTENNA CONTROL SYSTEM FOR AUTOMOBILES**  
Takujji Harada, Kanagawa, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 4, 1989, Ser. No. 293,363  
Int. Cl.<sup>5</sup> H02P 5/06  
U.S. Cl. 388—815 5 Claims



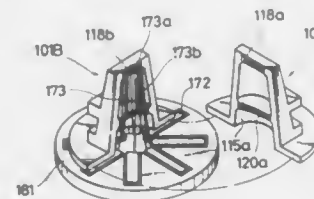
1. A rod antenna control system for an automobile wherein an electric motor is used to push up an antenna rope to extend a telescopic rod antenna, said antenna control system comprising:  
a means for sensing electric current supplied to said electric motor;  
a means for determining when the sensed electric current is greater than a predetermined current value; and  
a means for intermittently supplying current to said electric

motor when said sensed current is determined to be greater than said predetermined current value;  
whereby said current is continuously supplied to said electric motor when said current is below said predetermined value and said current is intermittently supplied to said motor when said current is above said predetermined value.

**4,950,092**  
**WIRE DOT PRINT HEAD WITH A PAIR OF GUIDE NOSE HALVES**  
Hiroshi Kikuchi; Youichi Umezawa; Hirokazu Andou; Minoru Teshima; Noboru Ohishi, and Mitsuru Kishimoto, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,713  
Claims priority, application Japan, Nov. 10, 1987, 62-170723[U]; Mar. 23, 1988, 63-37200[U]

Int. Cl.<sup>5</sup> B41J 3/12  
U.S. Cl. 400—124 14 Claims



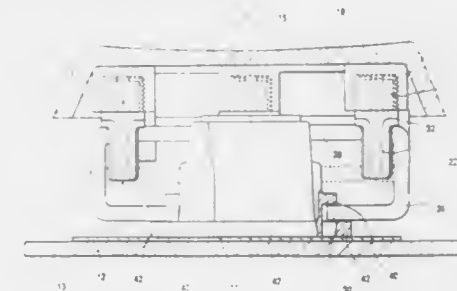
1. A dot print head comprising:  
a guide nose comprising first and second guide nose half members;  
said first guide nose half member including means, comprising a first sidewall, for defining a first recess, and means, comprising a first tip guide part formed integrally with said first sidewall, for substantially closing a first end of said first recess, said first tip guide part having an abutting surface with grooves formed therein;  
said second guide nose half member including means, comprising a second sidewall, for defining a second recess, and means, comprising a second tip guide part formed integrally with said second sidewall, for substantially closing a first end of said second recess, said second tip guide part having an abutting surface with grooves formed therein;  
and  
said first and second guide nose half members being detachably connectable along a dividing plane to form said guide nose, such that said first and second recesses together form a substantially sealed cavity, said abutting surface of said first tip guide part abuts with said abutting surface of said second tip guide part, and said grooves in said abutting surface of said first tip guide part align with said grooves in said abutting surface of said second tip guide part to form guide holes adapted to receive and slidably support print wires therethrough.

**4,950,093**  
**SUPPORT MECHANISM FOR MULTIPLE-KEY UNITS**  
Wolfgang Ertl, Freiburg, Fed. Rep. of Germany, assignor to Cherry Mikroschalter GmbH, Auerbach, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 380,373  
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1988, 3824980

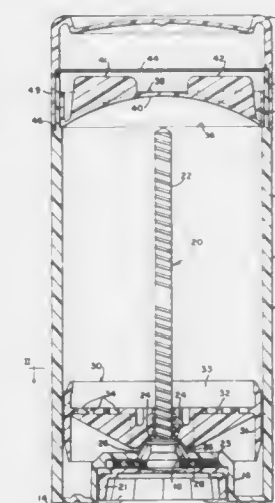
Int. Cl.<sup>5</sup> B41J 5/16  
U.S. Cl. 400—496 11 Claims  
1. A multiple-key unit comprising a top portion, a base portion and a support mechanism;

said top portion including means for attaching said top portion to said base portion and said support mechanism;  
said support mechanism comprising a body portion and a substantially U-shaped wire;  
said body portion including means for attaching said body portion to said top portion; bearing means for pivotably holding said substantially U-shaped wire; and means for maintaining said substantially U-shaped wire at an oblique position during assembly; and



said substantially U-shaped wire including two free ends and a cross-part connected to said free ends, said free ends being inwardly bent and parallel to said cross-part; and  
said base portion including a guide fixture forming a channel for receiving said free ends of said substantially U-shaped wire, and a guide shoulder spaced from said guide fixture by a distance substantially greater than the diameter of said wire, whereby said free ends of said substantially U-shaped wire are substantially horizontally displaceable in said guide fixture during actuation of the multiple-key unit.

**4,950,094**  
**COSMETIC DISPENSER AND METHOD**  
Charles H. Yorks, Natick, Mass., assignor to The Gillette Company, Boston, Mass.  
Filed Jul. 26, 1989, Ser. No. 385,671  
Int. Cl.<sup>5</sup> A45D 40/06  
U.S. Cl. 401—75 18 Claims



9. A container for dispensing a cosmetic product such as a deodorant in stick form comprising:  
a one piece body member formed of elongated tubular side-walls open at the top end having a bottom wall section;  
dial means in the form of a disc having a threaded shaft extending from one surface thereof, said shaft being dis-

posed within said body member and extending through an opening formed in said bottom wall section;  
a platform disposed within said body member having outer edges thereof substantially conforming to said tubular sidewalls, said platform having an opening formed at the center thereof for receiving said threaded shaft in threaded engagement therewith, and a unitary washer disposed between said one surface of said disc and the exterior surface of the said bottom wall; and  
a cap member inserted entirely within said tubular sidewalls of said body member, said opening formed in said bottom wall section being dimensioned to receive said shaft therein and said washer forming the entire seal between said one disc shaft and said opening found in said bottom wall section.

4,950,095

## DENTAL HYGIENE DEVICE

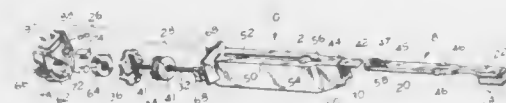
Pierre E. Picard, 121, 9th Ave., Sherbrooke, Québec, Canada (J1G 2P9)

Filed Sep. 19, 1989, Ser. No. 409,330

Int. Cl.<sup>3</sup> A46B 11/00; B43K 29/00

U.S. Cl. 401-191

2 Claims



1. A dental hygiene device for dispensing toothpaste and for housing a toothbrush having a handle, a head projecting at one end of the handle and at least two rows of bristles extending laterally from said head, said dental hygiene device comprising:

- a hollow elongated receptacle having a displaceable cover at one end and a removable end cap at the other end;
- a first tubular compartment in said receptacle for receiving toothpaste;
- a second tubular compartment in said receptacle adjacent said first compartment for housing said toothbrush, said second compartment having a protruding section recessed in front of said first compartment for receiving said head and said bristles, said toothbrush being adapted to slide between a first position whereby said bristles are fully retracted inside said protruding section of said second compartment and a second position whereby said bristles are exposed outside of said second compartment, said second compartment further having an external wall provided with an elongated aperture, an upwardly slanted spring leg extending from the handle of said toothbrush, said spring leg having a protuberant button at its upper end and adapted to extend through said elongated aperture for sliding said toothbrush between said first position and said second position, said elongated aperture being narrower than the width of said protuberant button and having a broadening larger than the width of said button, whereby said protuberant button is adapted to be pushed downwards through said broadening so that said upwardly slanted spring leg clears said external wall allowing said toothbrush to be ejected from said second compartment, said handle of said toothbrush having two lateral resilient legs, said second tubular compartment having an opening providing with an outer edge for allowing the toothbrush to slide out of the second compartment, said second compartment having two internal longitudinal abutting strips, said strips being secured at one end to said second compartment and laterally flexible at the other end, whereby when said toothbrush is in said first position,

said resilient legs releasably abut against said other end of said abutting strips for preventing an unwanted sliding movement of said toothbrush towards said second position and whereby said resilient legs releasably abut against said outer edge of said second compartment when said toothbrush is in said second position preventing an unwanted retraction of said toothbrush.

4,950,096

## BINDING AND FILING UNIT

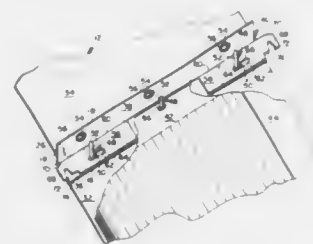
Herbert J. Gilder, Pittsfield, Mass., assignor to Sheaffer Eaton Inc., Pittsfield, Mass.

Filed Dec. 12, 1988, Ser. No. 282,590

Int. Cl.<sup>3</sup> B42F 3/00

U.S. Cl. 402-4

21 Claims



1. In a unit for binding and filing a sheaf of sheets, the combination of

- (A) a binder having a spine comprised of a central fold and a pair of binding strips separable from one another to receive a marginal edge of said sheaf therebetween,
- (B) at least two clamping members extending through perforations in said marginal edge and operatively engaging said binding strips to clamp said marginal edge within said spine,
- (C) a pair of unitary generally flat suspension elements slidably disposed within said spine proximate the distal ends thereof, each of said suspension elements comprising
  - (1) first support means slidably engaging said central fold,
  - (2) second support means slidably engaging one of said clamping members,
  - (3) stop means for limiting movement of said suspension element between retracted and extended positions relative to the proximate distal end of said spine, and
  - (4) a head portion
    - (a) disposed substantially within said spine upon movement of said suspension element to its retracted position and
    - (b) projecting beyond the proximate end of said spine upon movement of said suspension element to its extended position,
- (D) said binder being suspendable between a pair of spaced support rails upon movement of both said suspension elements to their extended positions to project said head portions beyond opposite distal ends of said spine for engagement with said spaced rails.

4,950,097

## FILE FOLDER AND METHOD OF MANUFACTURE

Murray B. Blumberg, Woodmead Springs Sandton, South Africa, assignor to Technokantoor Ltd., Brussels, Belgium

Filed Jul. 6, 1988, Ser. No. 215,604

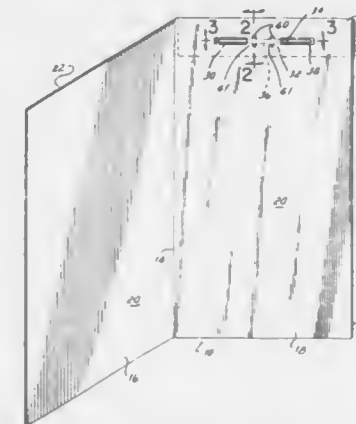
Int. Cl.<sup>3</sup> B42F 13/06, 13/08

U.S. Cl. 402-8

7 Claims

1. In combination, a folder and a fastener for securing loose papers to the folder,

said folder having a pair of opposed faces and a pair of opposed side edges, said folder having a third edge, said folder having a pair of spaced, colinearly aligned, elongated slots, said slots terminating prior to said side edges and being separated by a medial portion of said folder, said slots being located adjacent to and spaced from said third edge, said pair of slots having near ends and remote ends, said fastener consisting of an elongated strip of sheet material, said fastener having a central body portion and a pair of opposed, elongated prongs extending from opposite ends of the central body portion, said fastener terminating at the ends of said prongs, said central body portion of said fastener overlying said



medial portion of said folder on one face of said folder, said central body portion of said fastener being secured to said medial portion of said folder, and said prongs of said fastener overlying said spaced, elongated slots of said folder,

a cover strip, said cover strip being located over said one face of said folder and over said fastener, whereby said central body portion of said fastener is located between said cover strip and said folder, said cover strip being adhesively secured to said folder,

whereby said prongs may be bent upwardly on the opposite face for securement or removal of loose papers relative thereto and bent downwardly to retain papers mounted thereon.

4,950,098

## SLAT FENCE RETAINER

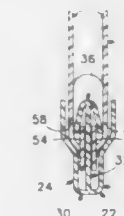
Joshua B. Abbott; Patrick E. Kohls, both of Salem; Joseph W. Schoenholt, Portland, all of Oreg., and Fred O. Walden, Tacoma, Wash., assignors to VIP Company, Clackamas, Oreg.

Filed Jun. 16, 1989, Ser. No. 367,004

Int. Cl.<sup>3</sup> B21F 27/00

U.S. Cl. 403-34

20 Claims



1. A slat fence retainer for retaining slats in a chain-link fence comprising:

- an elongate, horizontal slat retaining element predimensioned to be interwoven between horizontally consecutive links in the fence, having a pair of spaced apart side walls, a base joining the bottom margins of said side walls, and an open top, said element further including integrally formed

vertical-slat retention means having a projection extending upwardly from said base, said projection having a substantially vertically extending stalk connected at one end thereof to said base and a slot-means engaging head at the other end thereof; and

plural vertical slat elements predimensioned to be interwoven between vertically consecutive links in the fence and to have an end of each slat received between said side walls of said horizontal slat retaining element, said vertical slat element further including slot means located adjacent an end thereof for engagement with said retention means to hold said vertical slat element in the fence.

4,950,099

## RELEASABLE CLAMPING-TYPE COMPRESSIVE JOINT

Ulrich Roellin, Zürich, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

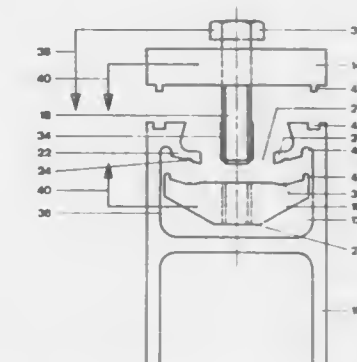
Filed Dec. 11, 1989, Ser. No. 448,336

Claims priority, application Switzerland, Dec. 20, 1988, 4690/88

Int. Cl.<sup>3</sup> F16B 27/00

U.S. Cl. 403-348

10 Claims



1. Releasable clamping-type compressive joint which comprises a continuous section having, at least one groove that is undercut on both sides thereof and flanges forming said undercut, wherein said groove runs in the longitudinal direction of said section and forms a longitudinal opening, a component engagable with said continuous section, a securing bolt, at least one clamping plate that can be introduced into the groove and turned by means of the securing bolt, said clamping plate engaging with the flanges on the continuous section on tightening the securing bolt and the continuous section being partly deformed by the clamping plate, said flanges tapering in cross-section toward the longitudinal opening of the groove and each include at least one weakening notch extending in the longitudinal direction of said section and having clamping cam tips on the flanges beyond said notches which are plastically deformed by a region of the clamping plate after tightening the securing bolt, and which plates are essentially in the shape of a parallelepiped and are configured to be rotated 30°-60° in the groove such that four mechanical steps providing configurational locking are created per clamping plate and clamping cam tip bent an equal distance from the longitudinal opening in the groove.

4,950,100

## MOVABLE SUPPORT ARM

Jon C. Horgas, Westland, Mich., assignor to Tru-Bore Engineering, Westland, Mich.

Filed May 5, 1989, Ser. No. 347,729

Int. Cl.<sup>3</sup> E04G 3/00; A47F 5/10

U.S. Cl. 403-405.1

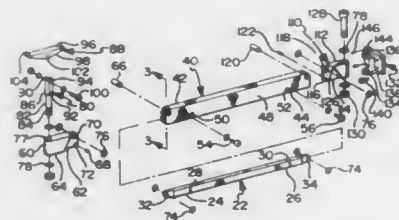
10 Claims

1. An articulated arm for supportably attaching a movable



first body to a second body which is substantially stationary with respect to the first body, the arm comprising:

- (a) a connector bar having a first end and a second end, the bar being formed from a rigid material;
- (b) a substantially hollow sheath defining a passage therein, the connector bar disposed in the passage of the sheath, the sheath having a first end and a second end;
- (c) a first intermediate member comprising:
  - (1) a reduced diameter portion dimensioned to fit in the passage at the first end of the sheath, and
  - (2) an enlarged diameter portion integral with the reduced diameter portion and dimensioned so as to be too large to fit within the passage of the sheath, the enlarged diameter portion slanting outwardly away from the vertical along an edge thereof to define a stop for limiting pivotal movement of the sheath with respect thereto;
- (d) means for attaching the first intermediate member to a movable first body;
- (e) a second intermediate member comprising:



- (1) a reduced diameter portion dimensioned to fit in the passage of the sheath at the second end thereof, and
- (2) an enlarged diameter portion integral with the reduced diameter portion and dimensioned so as to be too large to fit within the passage of the sheath, the enlarged diameter portion slanting outwardly away from the vertical along an edge thereof to define a stop for limiting pivotal movement of the sheath with respect thereto;
- (f) first pivot means for pivotally attaching the first intermediate member to the first end of the sheath;
- (g) second pivot means for pivotally attaching the first intermediate member to the first end of the connector bar;
- (h) third pivot means for pivotally attaching the second intermediate member to the second end of the sheath;
- (i) fourth pivot means for pivotally attaching the second intermediate member to the second end of the connector bar; and
- (j) means for attaching the second intermediate member to a second body which is substantially stationary with respect to the first body.

4,950,101

#### SHAFT COUPLING CONSTRUCTION FOR A VIBRATORY SCREED

Thomas G. Artzberger, Menomonee Falls, Wis., assignor to M-B-W Inc., Slinger, Wis.

Filed Mar. 10, 1989, Ser. No. 321,762

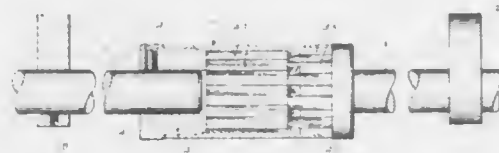
Int. Cl. E01C 19/38

U.S. Cl. 404—114

15 Claims

1. In a vibratory screed construction, a pair of shafts disposed in end-to-end relation, eccentric means associated with each shaft for imparting eccentric motion to each shaft to thereby vibrate the screed, a flexible tubular open ended coupling means for connecting adjacent ends of said shaft and transmitting rotation therebetween, and locating means interconnecting said shafts and said coupling means for aligning the

eccentric means of one shaft with the eccentric means of the other shaft, said locating means being constructed and arranged



such that each shaft can be connected to said coupling means in only one circumferential position.

4,950,102

#### WHEEL COMPACTION UNIT

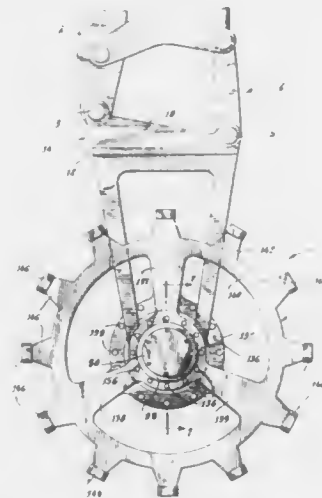
James H. Zeitz, 27930 Kalmia Ave., Moreno Valley, Calif. 92360

Filed Jan. 27, 1988, Ser. No. 149,145

Int. Cl. E01C 19/26

U.S. Cl. 404—121

11 Claims



1. In a wheel compaction unit of the type generally comprising a plurality of compacting wheels mounted to an axle and frame, the compacting wheels including spaced-apart, radially outwardly protruding compacting feet each having a compacting sole surface, the improvement comprising a wear collar removably mounted closely surrounding each compacting foot, the wear collar defining an opening therethrough sized and shaped to fit over and surround the compacting foot, leaving the compacting sole of the compacting foot exposed while protecting the portions of the compacting foot adjacent the compacting sole surface, whereby the wear collar sustains substantially all of the abrasion, impact, damage and wear inherent in the compaction operation and is replaceable.

4,950,103

#### CORRUGATED DRAINAGE TUBE

Donald R. Justice, P.O. Box 458, Matlacha, Fla. 33909

Filed Jul. 17, 1989, Ser. No. 380,482

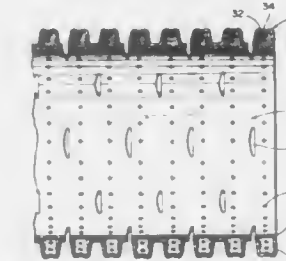
Int. Cl. F16L 31/00

U.S. Cl. 405—43

6 Claims

1. A drainage tube comprising:  
a corrugated exterior wall having a plurality of alternating annular peaks and annular valleys,  
a smooth surfaced interior wall joined to said exterior wall

for passage of water therethrough by slots defined by said interior wall and said exterior wall, and said exterior wall being joined to said interior wall at an interior surface of said annular valleys,  
an outermost surface of said annular peaks including a groove separating said annular peaks into spaced raised portions located on opposite sides of a base of said groove



for supporting a sock drain across said raised portions and thereby spacing the sock drain from aid base of said groove,  
said groove including a plurality of spaced openings located in said base of said groove,  
said interior wall including a plurality of openings for passage of water therethrough from said openings of said groove.

4,950,104

#### ARTIFICIAL SUBSTRATES FOR MARINE BIOMASS ENHANCEMENT AND WAVE ENERGY ABSORPTION

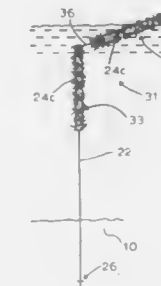
Rodolphe Stelchenberger, 301 1/2 North Bay Front, Balboa Island, Calif. 92662

Continuation-in-part of Ser. No. 35,449, Apr. 7, 1987, Pat. No. 4,872,782. This application Aug. 10, 1989, Ser. No. 392,055

Int. Cl. E02B 3/00; A01K 61/00

U.S. Cl. 405—24

9 Claims



1. An artificial substrate comprising:  
a first buoyant tube having a first end and a second end, the first end being connected by a flexible line to a bottom mooring, the first buoyant tube and the flexible line having lengths such that the first buoyant tube floats in a vertical orientation in a positioned permanently below lowest water level;  
a second buoyant tube having a first end and a second end, the first end being connected by a flexible connector to the second end of said first buoyant tube, the flexible connector and the second buoyant tube having lengths such that the second buoyant tube floats (a) in a substantially vertical orientation with its second end at or just below water surface at high water level and (b) in an inclined orientation at low water level; and  
sessile organisms attached to the first and second buoyant tubes.

4,950,105

#### INSPECTABLE VAULT SYSTEM FOR THE DISPOSAL OF RADIOACTIVE WASTE HAVING A LIQUID COLLECTION SYSTEM

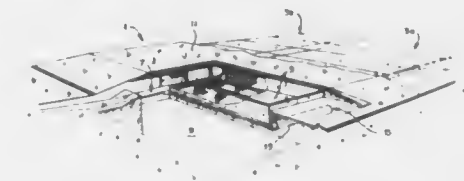
Daniel C. Meese, William H. Hamilton, Jr., both of Murrysville; Wayne J. Severson, Pittsburgh; James B. Wright, and Thomas G. Weiss, Jr., both of Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 30, 1989, Ser. No. 330,672

Int. Cl. B65G 5/00

U.S. Cl. 405—128

30 Claims



1. An inspectable vault cell for the disposal of hazardous waste having a liquid collection and monitoring system, characterized by:

- a. a liquid impermeable floor slab having a drainage channel along one of its edges and being sloped so that liquid on said floor slab flow toward said drainage channel;
- b. a wall assembly disposed around the periphery of the floor slab, and
- c. a monitoring and inspection aisleway defined between the wall assembly and hazardous waste deposited on said floor slab for providing both an unobstructed view and convenient access to said drainage channel.

said drainage channel of said floor slab being subsumed within said monitoring aisleway so that the location of the origination of a flow of liquid toward said drainage channel may be observed from said aisleway and easily accessed from said aisleway.

4,950,106

#### METHOD AND APPARATUS FOR INSTALLATION OF AN UNDERGROUND SEAL BENEATH A GARBAGE DUMP

Hans Richter, Ortlerstrasse 77, D-8900 Augsburg, Fed. Rep. of Germany

PCT No. PCT/EP88/00721, § 371 Date Apr. 27, 1989, § 102(e) Date Apr. 27, 1989, PCT Pub. No. WO89/02009, PCT Pub. Date Mar. 9, 1989

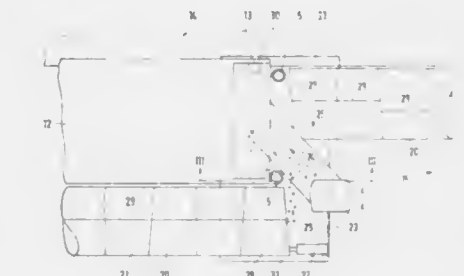
PCT Filed Aug. 12, 1988, Ser. No. 347,779

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728569

Int. Cl. B09B 1/00

U.S. Cl. 405—128

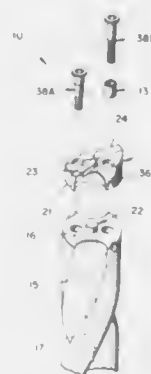
19 Claims



1. A method for installing an underground seal beneath a garbage dump in a strip-like manner, comprising progressively working the earth in strips under the garbage dump at the front end of a driving shield, transporting the earth to the rear end of the driving shield, compressing the earth at said rear end,

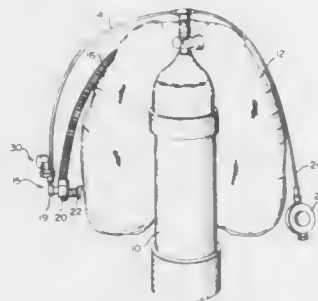
inserting a strip-like layer of a waterproof material under the protection of a cover of the driving shield, constructing and subsequently dismantling a supply tunnel pipe comprised of individual tunnel pipe sections under the protection of said cover while the driving shield is moved forward, and using the dismantled tunnel pipe sections of the one tunnel pipe to erect an additional tunnel pipe which is laterally displaced in direction toward the next strip-like layer opposite said one tunnel pipe behind the driving shield.

having a tap received in said recess for properly aligning said drill tip relative to said drill body, said tap including resilient



means enabling said tap to yield axially relative to said drill body when entering and cooperating with said recess.

**4,950,107**  
**AUDIBLE ALARM DEVICE FOR DIVERS**  
David A. Hancock, 5647-40th West, Seattle, Wash. 98199, and Barry A. Kornett, Town House Moto-Azabu 401, 5-24 Moto-Azabu 1-chome, Minato-ku, Tokyo 106, Japan  
Filed Oct. 12, 1988, Ser. No. 256,606  
Int. Cl.<sup>5</sup> B63C 11/02  
U.S. Cl. 405—186 6 Claims

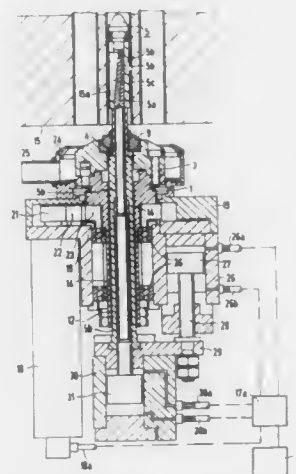


1. An apparatus for use with diving equipment to produce an audible alarm, comprising:  
means, including air control means and an air hose, receiving air under pressure from a scuba diving tank for inflation of a diver's buoyancy vest;  
means responsive to air under pressure to produce an alarm, said alarm means being adapted to be carried with said inflation means during diving operations, without interfering therewith; and  
means selectively operable by a diver for diverting a portion of the pressurized air in said inflation means to said alarm means to produce an audible alarm.

**4,950,108**  
**DRILL COMPRISING DRILL BODY AND REPLACEABLE DRILL TIP**  
Aage V. Roos, Skärplinge, Sweden, assignor to Sandvik AB, Sandviken, Sweden  
Filed Jun. 22, 1989, Ser. No. 369,709  
Claims priority, application Sweden, Jun. 23, 1988, 8802382  
Int. Cl.<sup>5</sup> B23B 51/02  
U.S. Cl. 408—59 15 Claims

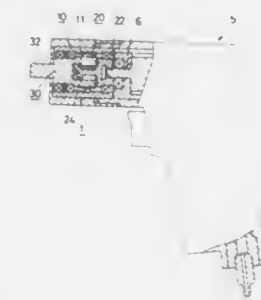
1. A rotary drill comprising a drill body defining a front-to-rear rotary axis and having a front end surface and a plurality of chip flutes, a drill tip having a plurality of cutting elements and a rear end surface, and fasteners for securing said drill tip to said drill body, one of said front and rear end surfaces having a recess, and the other of said front and rear end surfaces

1. Milling and countersinking fixture for machining cylindrical openings, comprising:  
(a) a spindle head having a central opening formed therein, a tool holder disposed on said spindle head having an end surface and having a central cylindrical opening formed therein defining an inner surface;  
(b) a clamping mandrel supported in said central opening formed in said spindle head and guided through said central opening formed in said tool holder;  
(c) said tool holder having at least one recess formed therein having a given cross-sectional shape and being open only toward said end surface and toward said inner surface, said recess being defined by one substantially rectangular bottom surface and four lateral surfaces of said tool holder, and said central cylindrical opening formed in said tool holder passing through at least two of said lateral surfaces; and  
(d) at least one cutting body having a cross-sectional shape



adapted to said given cross-sectional shape for insertion in said at least one recess.

**4,950,110**  
**ROTATING TOOL AND TRACTION DRIVE UNIT THEREFOR**  
Keiji Suzuki, Osaka, Japan, assignor to Koya Seiko Co., Ltd., Osaka, Japan  
Filed Jan. 26, 1989, Ser. No. 301,585  
Claims priority, application Japan, Jan. 26, 1988, 63-8239[U]; Dec. 29, 1988, 63-169446; Dec. 29, 1988, 63-169447; Dec. 29, 1988, 63-169448  
Int. Cl.<sup>5</sup> B23B 47/04; F16H 13/08  
U.S. Cl. 408—126 6 Claims

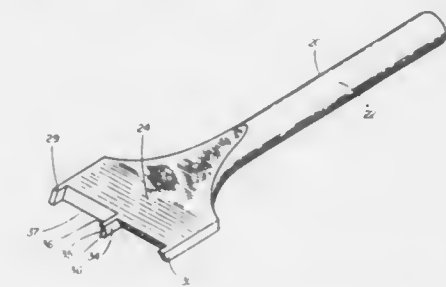


4. A rotating tool comprising:  
drive means;  
work means; and  
a traction drive unit intercoupled between said drive means and work means, said traction drive unit comprising:  
a unit case having a through-hole;  
a drive shaft inserted into said through-hole and supported via a rolling bearing at an outer end of said unit case;  
a plurality of planet rollers positioned between said unit case and said drive shaft;  
a follower shaft inserted into said through-hole and supported via a rolling bearing at the other outer end of said unit case;  
means for supporting said plurality of planet rollers at the side of said follower shaft; and  
means for frictionally rotating said plurality of planet rollers, said means for frictionally rotating including only a hardened inner through-hole surface of said unit case.

**4,950,111**  
**DRILL BIT WITH SPURS AND HAVING RECTANGULAR CENTER SPUR WITH CONCAVE TIP**  
Robert E. Thomas, 1100 Driftwood Dr., Lincoln, Nebr. 68510  
Continuation-in-part of Ser. No. 289,970, Dec. 23, 1988, abandoned. This application Jan. 5, 1990, Ser. No. 462,973  
Int. Cl.<sup>5</sup> B23B 51/04  
U.S. Cl. 408—212 1 Claim

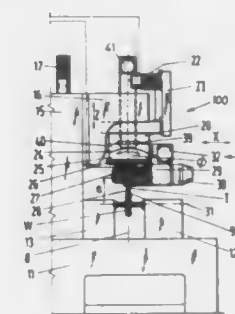
1. A drill bit for wood or other relatively soft material, comprising:  
a generally cylindrical shaft;  
a flattened blade portion at one end of said shaft, said blade portion including  
broad, flat, and essentially parallel side faces;  
side edges, each of said side edges having a leading edge with the side edge negatively beveled with respect to said leading edge along the length of said side edge;  
an end edge, said end edge including  
two side spurs, each of said side spurs being rectangular in cross section and located on lateral extremities of said end edge, said side spurs comprising narrow extensions of said side edges and having a length equal to about one half to several times the thickness of said blade portion, each of said side spurs having an end face with a leading terminal edge, said end face

negatively beveled with respect to said leading terminal edge;  
a center spur centered on said end edge, said center spur being rectangular in cross section and having parallel sides and a concave tip, said center spur having a length of about one half to several times the thickness of said blade portion; and



end surfaces extending radially between said center spur and said side spurs, each of said end surfaces having a leading cutting edge, said end surfaces being negatively beveled with respect to said leading cutting edges.

**4,950,112**  
**MACHINE FOR THE PRECISION WORKING OF THE TOOTH FLANKS OF TOOTHED WORKPIECES**  
Manfred Huber, Munich, Fed. Rep. of Germany, assignor to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany  
Filed Jul. 7, 1989, Ser. No. 376,856  
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 8812273[U]  
Int. Cl.<sup>5</sup> B23F 19/06  
U.S. Cl. 409—32 10 Claims



1. In a machine for the precision working of the tooth flanks of a toothed workpiece with a gearlike tool, which tool is in a two-flank engagement with said workpiece, which machine has a machine bed on which is provided a vertically movable feed carriage, said feed carriage having a feed slide and a cross like means mounted thereon for supporting said tool for movement in two orthogonally related directions and orthogonally relative to a direction of movement of said feed carriage, said feed carriage also having a rockable like member mounted thereon, said machine further comprising:  
(a) means for totally and axially stationarily supporting said workpiece on said machine bed,  
(b) a tool head adapted to hold said tool for movement about a tool axis, said tool head being mounted on said rockable slide member and being arranged rotationally adjustably about an adjusting axis extending perpendicularly with respect to said tool axis and with respect to a workpiece



axis, said rockable slide member being pivotal guided about a horizontal axis in an arched guide, and  
(c) support means arranged between said rockable slide member and said feed carriage for supporting said feed slide for movement parallel with respect to said work-piece axis,

the improvement wherein:

- (d) said cross slide means includes a cross slide arranged directly under said feed slide, said cross slide having on its underside said arched guide for said guiding of said rockable slide member, said support means including further support means provided between said feed slide and said cross slide for facilitating said cross slide being movable in a direction offset at 90° with respect to the direction of movement of said feed slide, and  
(e) control means are provided for controlling the movements of said feed slide, said cross side and said feed carriage all of said movements being controlled independently from one another.

4,950,113

MACHINE TOOL

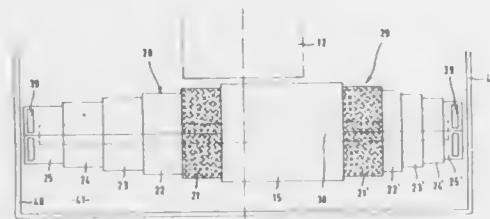
Hans-Henning Winkler, Tuttlingen, and Eugen Rüttschle, Mülheim, both of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH & Co. KG, Tuttlingen, Fed. Rep. of Germany  
Filed Oct. 11, 1988, Ser. No. 255,889

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 3734716

Int. Cl.<sup>5</sup> B23Q 11/08

U.S. Cl. 409—134

5 Claims



1. A machine tool, comprising:

- a base member;
- a pair of first, elongate guide elements fixedly attached to said base member, and defining an axis;
- a carriage having second guide elements running on said first, elongate guide elements;
- drive means for displacing said carriage along said first, elongate guide means;
- telescopic cover means arranged above said first, elongate guide means, said cover means having a first cover element attached to said base member, a second cover element attached to said carriage, and a number of intermediate cover members arranged therebetween, said second and said intermediate cover elements being axially displaceable with respect to each other and with respect to said first cover element;
- a chip container arranged on said base member and surrounding said first elongate guide elements and said telescopic cover means;
- an opening arranged in said first cover element and giving access to said chip container, arranged thereunder, said opening extending substantially perpendicular to said axis and spanning substantially spanning said first cover element.

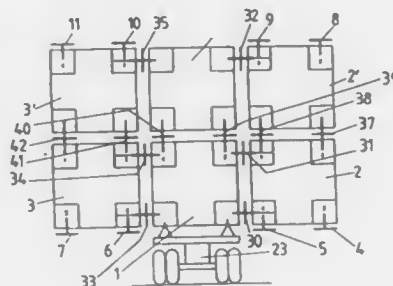
4,950,114  
METHOD FOR COMBINING AT LEAST TWO  
CONTAINER UNITS COMPRISING ISO CONTAINERS  
TO FORM A TRANSPORTATION UNIT, AS WELL AS  
THE TRANSPORTATION UNIT FORMED  
Dieter Borchardt, Rissener Dorfstr. 45, 2000 Hamburg 56, Fed.  
Rep. of Germany

Filed Dec. 30, 1987, Ser. No. 139,665

Int. Cl.<sup>5</sup> B60P 7/13

U.S. Cl. 410—82

77 Claims



1. A transportation unit formed from a plurality of container units (1, 1'; 2, 2'; 3, 3') comprising ISO containers (e.g. 1, 1', 2, 2', 3, 3') whose side faces are juxtaposed by the detachable coupling of end fittings by means of coupling elements (e.g. 31, 32, 51) extending into anchoring openings, comprising an uneven number of container units (1, 1'; 2, 2'; 3, 3'), which are interconnected by means of coupling elements (31, 32, 51) comprising transverse elements, anchoring openings in an upper surface of a central container unit (1, 1') being left free so as to permit the engagement of locking heads of lifting equipment (e.g. 22), whilst upper anchoring areas provided in the plane of upper surfaces of container units positioned laterally of the central container unit are blocked against the penetration of locking heads of lifting equipment and are at least partially closed and supporting elements are inserted in lower anchoring openings provided in the plane of lower surfaces of the container units positioned laterally of the central container unit.

4,950,115

BLIND FASTENER WITH EXPANDABLE SLEEVE  
FORMING A BLIND BULBED HEAD WITH LARGE  
BEARING AREA AND A PIN HAVING A CONTROLLED  
PROTRUSION LENGTH

Shahriar M. Sadri, El Torro, Calif., assignor to Huck Manufacturing Company, Irvine, Calif.

Filed Oct. 2, 1989, Ser. No. 415,744

Int. Cl.<sup>5</sup> F16B 13/04

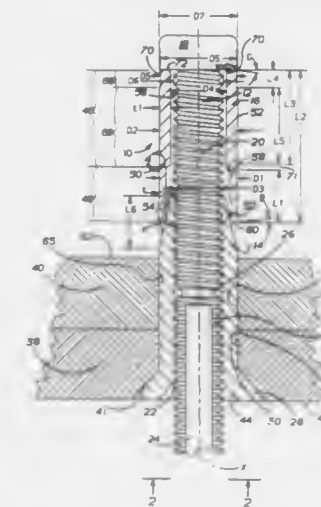
U.S. Cl. 411—38

26 Claims

1. A blind fastener for securing a plurality of workpieces at a desired clamp load with the workpieces having aligned openings therein and having an accessible surface and a blind side surface with the blind side surface defined by a workpiece of crushable material, said fastener comprising:

- a pin member having an elongated pin shank terminating at one end in an enlarged pin head;
- a main sleeve member having an elongated sleeve shank terminated at one end in an enlarged head adapted to engage the accessible surface on one of the workpieces, said sleeve shank terminating at its opposite end in a tapered nose portion, said sleeve shank adapted to be located in the aligned bores in the workpieces, said main sleeve member having a first central through bore adapted to receive said pin shank,
- a stop surface located generally at the blind side surface of the workpiece of crushable material,
- an expandable sleeve member having a second central

through bore and adapted to be located on said pin shank adjacent said pin head,  
said expandable sleeve member having a primary sleeve section adapted to be located adjacent said pin head and a secondary sleeve section adapted to be located adjacent said nose portion of said main sleeve member,  
said fastener adapted to be set by a relative axial force applied between said pin member and said main and expandable sleeves,  
said secondary sleeve section adapted to move axially over said nose portion and engage said stop surface and to fold at a first preselected magnitude of said relative axial force and to be generally flattened to define an enlarged flattened blind head bearing against the blind side surface over substantially the full area of said flattened blind head,



said fastener adapted to be finally set at a second preselected magnitude of said relative axial force greater than said first preselected magnitude,  
said primary sleeve section beginning at the leading end portion thereof adjacent said secondary sleeve section having a hardness and hence strength substantially greater than that of said secondary sleeve section whereby said leading end portion of said primary sleeve section will be substantially continuously radially expanded beyond said sleeve shank as said primary sleeve section moves past said nose portion and further whereby buckling of said primary sleeve section is substantially precluded in response to said relative axial force.

4,950,116

MANIPULATOR CONTROLLING APPARATUS  
Shinichiro Nishida, Funabashi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 18, 1989, Ser. No. 395,721

Claims priority, application Japan, Aug. 18, 1988, 63-203738; Apr. 28, 1989, 1-107562

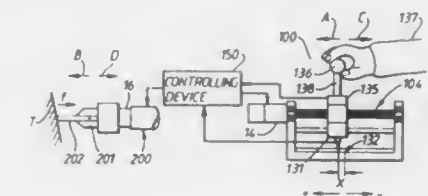
Int. Cl.<sup>5</sup> B25J 3/04

U.S. Cl. 414—5

14 Claims

1. Apparatus for controlling a manipulator, which has an end portion, in response to an external force, comprising:  
control means for generating an operating force/torque corresponding to the external force;  
first detecting means for detecting the operating force/torque generated by the control means;  
second detecting means for detecting a deflecting amount corresponding to the movement of the control means from a reference position;  
third detecting means for detecting an end force applied on the end portion of the manipulator;  
producing means connected to the second and third detecting means for generating reaction signals corresponding to

a function of both the deflecting amount and the end force; and  
driving means for generating driving signals corresponding



to the difference value between values of output signals from the first detecting means and the producing means, and applying force/torque corresponding to the driving signals on the control means.

4,950,117

THREE DIMENSIONAL HOUSING APPARATUS AND  
CONTROL METHOD THEREOF

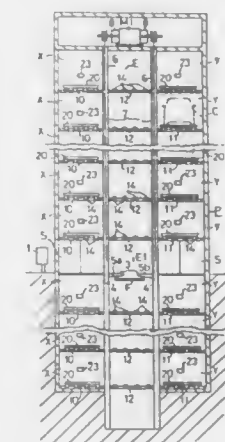
Junichi Go, 2510-11, Nagara, Gifu-shi, Gifu-ken, Japan

Filed May 29, 1987, Ser. No. 56,598

Int. Cl.<sup>5</sup> E04H 6/06

U.S. Cl. 414—254

15 Claims



1. A three dimensional housing apparatus comprising:  
a lift space,  
a liftable fork unit movable up and down in the lift space, multi-storied housing spaces abutting the lift space provided on at least one side out of the left side, right side, front side, and rear side of the lift space, and  
a plurality of traversable housing forks each mounted movably outward and homeward between a corresponding housing space and the lift space,  
wherein each traversable housing fork and the liftable fork unit are intersectable with each other to transfer an object to be housed therebetween,  
characterized in that;  
the liftable fork unit is composed of a pair of liftable forks which are not connected in the lift space, wherein said pair of liftable forks is moved by a moving means,  
each traversable housing fork is composed of a fork piece fixing member and a plurality of fork pieces fixed to the fork piece fixing member which are capable of coming into mesh with the liftable forks,  
each traversable housing fork is capable of moving outward and homeward between a corresponding housing space and the lift space without interference with the liftable fork unit, and

each traversable housing fork is supported by supporting means which are driven by driving means attached to traverse roller frames, whereby each traversable housing fork is transported on said supporting means without a mechanical linkage to said driving means, and said liftable forks are capable of moving continuously and passing above or below a said traversable fork in the said lift space.

4,950,118

# SYSTEM FOR LOADING AND UNLOADING TRAILERS USING AUTOMATIC GUIDED VEHICLES

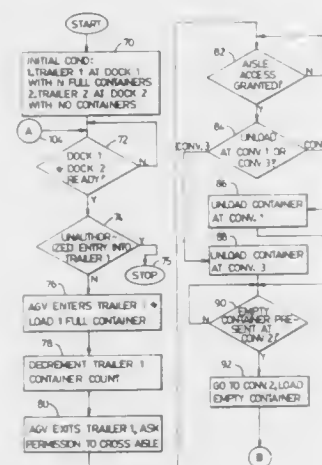
William R. Mueller, Mentor; John E. Wible, Painesville, and Richard A. Nestoff, Cuyahoga, all of Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Mar. 22, 1989, Ser. No. 327,196

Int. Cl.<sup>3</sup> B65G 67/02

U.S. Cl. 414—274

20 Claims



1. A system for loading and unloading a mobile structure with at least one automatic guided vehicle (AGV), said system comprising:

- means for detecting said mobile structure being in position and arranged and oriented for loading and unloading, and for delivering a signal in response to said mobile structure being in position and arranged and oriented for loading and unloading;
- means for navigating said AGV inside said mobile structure;
- means for monitoring traffic and delivering a signal in response to unauthorized traffic being present; and
- means for receiving said traffic monitoring signal and halting said AGV in response to receiving said traffic monitoring signal.

4,950,119

# STORAGE AND RETRIEVAL SYSTEM

Keith W. Nord, Stillwater, and Mark S. Nord, Scandia, both of Minn., assignors to Nordway, Inc., Stillwater, Minn.

Filed Mar. 13, 1989, Ser. No. 322,516

Int. Cl.<sup>3</sup> B65G 65/00

U.S. Cl. 414—277

14 Claims

1. A system for storing and retrieving goods within a structure having an entrance area and an exit area, comprising:

- (a) a vehicle for transporting the goods between said areas, said vehicle having a plurality of wheels driven by drive means;
- (b) electrical control means operatively interconnected to said vehicle drive means;
- (c) a track, said track including a track rail configuration upon which said vehicle wheels are supported, said track interconnecting a plurality of areas within said structure;
- (d) storage means for storing the goods, said storage means

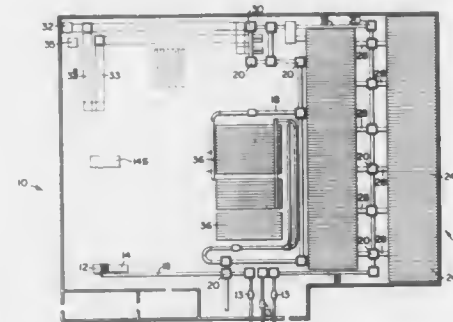
having a plurality of lanes, each lane including a storage rail configuration corresponding to said track rail configuration; and

- (e) vehicle transfer means positioned proximate said storage means, wherein said vehicle transfer means includes means for moving a stationary vehicle in a lateral direction so as to position said vehicle proximate a particular lane, said vehicle transfer means having a transfer means rail configuration corresponding to said track rail configuration.

10. A vehicle for transporting goods comprising:

- (a) a framework having flanges at a bottom end thereof for supporting the goods, said framework forming a holding area sized and configured to accommodate the goods;
- (b) a plurality of wheels supporting said framework;
- (c) drive means interconnected to said wheels for rotation thereof in forward and reverse directions;
- (d) electrical control means operatively interconnected to said drive means; and
- (e) lift means for moving said framework in a vertical direction with respect to said wheels wherein said lift means includes a rotatable cam including a cam follower, said lift means having a framework member supported by said cam follower, wherein vertical movement of said cam follower causes vertical movement of said framework, said lift means having a lift motor operatively interconnected to said rotatable cam.

11. An apparatus for transferring a vehicle from a first vehicle support structure to a second vehicle support structure, said apparatus comprising:



- (a) a stationary framework;
- (b) a vehicle carriage supported by said framework, said vehicle carriage supporting said vehicle, said vehicle carriage having a carriage rail configuration corresponding to a rail configuration on said first and second vehicle support structures;
- (c) shaft alignment means for aligning said vehicle carriage rail configuration with respect to said rail configuration of one of said vehicle support structures, said alignment means comprising a shaft mounted upon said vehicle carriage and a corresponding aperture mounted upon said vehicle support structure;
- (d) sensing means for sensing the engagement of said shaft and corresponding aperture; and
- (e) drive means interconnected to said sensing means for moving said vehicle from said vehicle carriage to one of said vehicle support structures.

14. A method for transporting, storing and retrieving goods within a warehouse having a storage area, comprising the steps of:

- (a) loading the goods within a vehicle, said vehicle being supported by a transport track;
- (b) moving said vehicle along said transport track;
- (c) aligning said transport track with a storage area track;
- (d) sensing the alignment of said transport track with said storage area track;

- (c) transferring said vehicle from said transport track to said storage area track;
- (f) depositing the goods within said storage area; and
- (g) moving said vehicle away from said storage area.

4,950,120

# APPARATUS AND METHOD FOR FEEDING CARD EDGE CONNECTORS AND CONNECTOR MAGAZINES

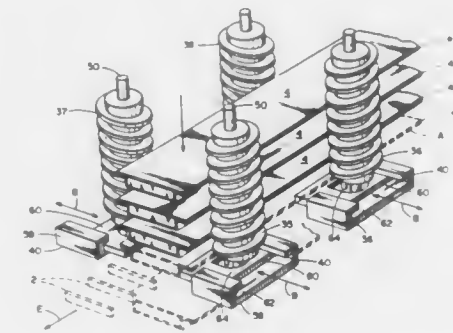
Donald E. Barnes, Wilton, Conn., assignor to Burndy Corporation, Norwalk, Conn.

Filed Feb. 27, 1989, Ser. No. 316,212

Int. Cl.<sup>3</sup> B65H 3/28

U.S. Cl. 414—331

26 Claims



26. An apparatus for feeding objects comprising: a frame;

- two worm gears axially rotatably connected to said frame, said worm gears each having a flight section and forming a central feeding path between said worm gears for holding and moving objects through said path;

two platform plates movably connected to said frame for reciprocating linear movement, each one of said plates being located under one of said worm gear flight sections and being operably moveable, at least partially, into and out of said central feeding path, each plate comprising a key receiving portion;

- means for axially rotating said two worm gears; and
- means for operably moving said two plates in response to predetermined axial rotation of said two worm gears including a moving key member connected to each one of said worm gears, said key members being cooperatable with said plate key receiving portions to move said plates into said central feeding path upon a first predetermined axial rotation of said worm gears, and to move said plates out of said central feeding path upon a second predetermined axial rotation of said worm gears.

4,950,121

# UNIVERSAL METHOD AND APPARATUS FOR ATTACHING AN AIRCRAFT TUG TO AN AIRPLANE

Ronald A. Meyer, Dexter, and Neil D. Gerl, Ann Arbor, both of Mich., assignors to Aeromover Systems Inc., Dexter, Mich.

Filed Jan. 25, 1989, Ser. No. 301,331

Int. Cl.<sup>3</sup> B60P 3/06

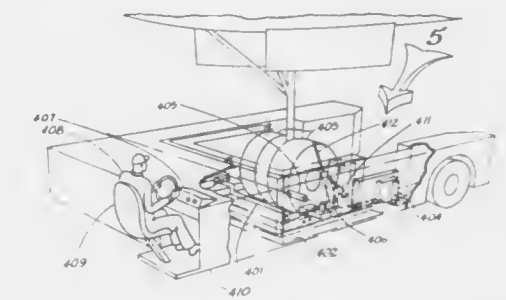
U.S. Cl. 414—428

12 Claims

1. In an aircraft tug, means for attaching said tug to a nosewheel of an airplane, the aircraft tug comprising, in combination:

- lifting means for raising the nosewheel of the airplane;
- universal nosewheel capturing means for receiving the nosewheel of the airplane along a longitudinal direction thereof, said universal nosewheel capturing means being provided with a transverse crossbar arranged transverse to said longitudinal direction of said lifting means, said transverse crossbar being displaceable along said longitudinal direction, and a pivotable capture arm, said universal

nosewheel capturing means being connected to said lifting means; and, universal nosewheel clamping means for securing the nosewheel of the aircraft to said capturing means, said univer-



sal nosewheel clamping means being provided with positioner means for pivoting said universal nosewheel clamping means toward the nosewheel of the aircraft, and extender means for linearly extending said universal nosewheel clamping means.

4,950,122

# IMPROVEMENT IN MONOCOQUE CONTAINERS

Stig-Ragnar J. Landsdorff, Lot 2 Shallow Bay Road, Coomaba Bay via Pacific Palms, Pacific Palms, N.S.W. 2428, Australia

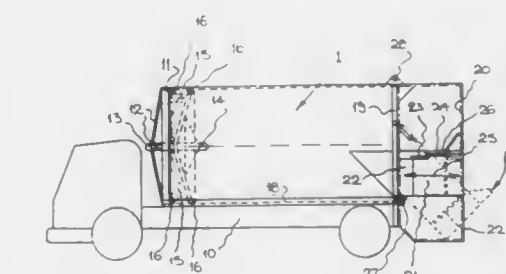
PCT No. PCT/AU87/00110, § 371 Date Oct. 12, 1988, § 102(e) Date Oct. 12, 1988, PCT Pub. No. WO87/06560, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 22, 1987, Ser. No. 279,703

Claims priority, application Australia, Apr. 24, 1986, PH5610 Int. Cl.<sup>3</sup> B60P 1/00

U.S. Cl. 414—512

15 Claims



1. A monocoque structural container in geodesic composite construction comprising

- a peripheral wall having first and second ends, a first end member and a second end member located at and enclosing said first and second ends, respectively, of said peripheral wall;

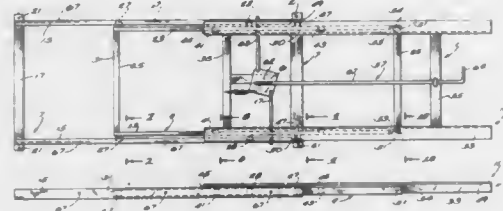
said peripheral wall comprising an inner wall and an outer wall substantially concentrically disposed with respect to each other and separated by a plurality of circumferentially-spaced, longitudinally-directed stringer members disposed in an annular space defined between said inner and outer walls, said inner and outer walls being spirally-wound tubes formed from strip metal, adjacent edges of the strip metal overlapping so as to form resilient rolled helical seams disposed so as to project inwardly into said annular space, the direction of the helical seam of the inner wall running oppositely to the direction of the helical seam of the outer wall, and said annular space being filled with a plastics material;

characterized in that the combination of the opposed, rolled helical seams, the plastics material and said stringer members serve to provide a geodesic structure forming a grid



of polygons to thereby distribute any impact and pressure loads throughout the container.

**4,950,123**  
**RETRACTABLE BED FOR TRUCK**  
Peter B. Brockhaus, Owen, Wis., assignor to Donald Volhard, Marathon City, Wis., a part interest  
Filed Oct. 19, 1987, Ser. No. 109,763  
Int. Cl.<sup>3</sup> B60P 1/00  
U.S. Cl. 414—522 7 Claims



1. A track and roller system for horizontally moving a load longitudinally over a surface between front and back positions comprising:

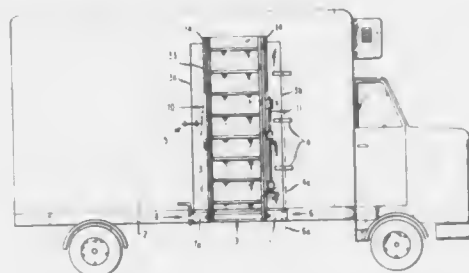
- a. a top frame comprising:
  - i. a deck to support the load;
  - ii. first and second elongated laterally spaced beams having front and back ends for supporting the deck;
  - iii. a first roller mounted to the back end of each beam; and
  - iv. a second roller mounted to each beam at approximately the midpoint thereof;

- b. a secondary frame comprising:
  - i. first and second elongated beams having lengths approximately equal to the respective top frame beams and having front and back ends and underlying at least a portion of the respective top frame beams, the secondary frame beams being adapted to receive the first and second rollers mounted to the respective top frame beams for permitting the top frame to reciprocate longitudinally along the secondary frame between the front and back positions;
  - ii. a first roller mounted to the back end of each beam;
  - iii. a second roller mounted to each beam at approximately the midpoint thereof; and
  - iv. a third roller mounted to the front end of each beam and protruding thereabove to support the respective top frame beam; and

- c. a fixed frame comprising:
  - i. first and second elongated beams having lengths approximately equal to the lengths of the respective secondary frame beams and having front and back ends, the fixed frame beams being fixedly mounted to the surface and underlying at least a portion of the respective top frame beams, the fixed frame beams being adapted to receive the first and second rollers of the secondary frame to thereby permit longitudinal reciprocation of the secondary frame along the fixed frame between the front and back positions; and
  - ii. a roller mounted to the front end of each beam and protruding above the beam to support the overlying top frame beam,

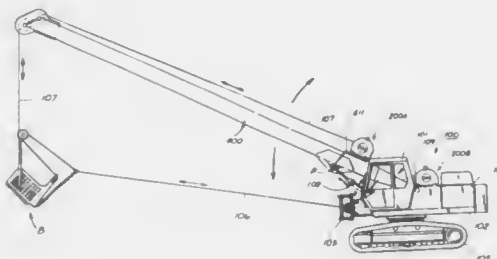
so that the top and secondary frames can be extended from the fixed frame to an extended length approximately double the length of the fixed frame.

**4,950,124**  
**TRUCK AND/OR TRAILER WITH A CLOSED BOX BODY**  
Hermann Burghart, Lauingen, and Alois Kübbeck, Dillingen, both of Fed. Rep. of Germany, assignors to Alois Kübbeck GmbH, Dillingen-Fristigen, Fed. Rep. of Germany  
Filed Jul. 10, 1989, Ser. No. 377,885  
Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823639  
Int. Cl.<sup>3</sup> B60R 3/00; B60P 3/20  
U.S. Cl. 414—537 17 Claims



1. A vehicle of a closed box body attached to a vehicle frame comprising
- hinges attached to the box body;
  - a door attached to the box body via said hinges and pivotable around hinges with vertical pivot axes;
  - a pivot hinge attached to the box body;
  - a pivot arm attached to the pivot hinge extending horizontally over two sides below the door on the vehicle and disposed such that a rotation axis of the pivot arm is aligned with the pivot axes of the door hinge, and where the pivot arm is connectable at its free end by a bolting device to the vehicle;
  - a ramp disposed at the pivot arm, where said ramp is pivoted around a pivot hinge device and mountable and demountable to the door by way of a bolting device on the door, and where the ramp is narrower than the door.

**4,950,125**  
**"TRUE FREE FALL" HYDRAULIC WINCH SYSTEM FOR CONVERTING A "BACKHOE" TO A "CRANE"**  
Richard L. Gravenhorst, River Ridge, La., assignor to Reco Crane Company, Inc., New Orleans, La.  
Filed Dec. 19, 1986, Ser. No. 944,421  
Int. Cl.<sup>3</sup> B66C 23/36  
U.S. Cl. 414—569 8 Claims



1. A conversion system, including a hydraulically powered winching system and a crane-type boom, for converting a backhoe vehicle operated by a backhoe operator to crane-like operations, which backhoe includes a front end to which a standard backhoe type boom having a forward end and a distal end is pivotally connected and at least one boom hoist hydraulic cylinder, whose lower end is connected to the lower front of the backhoe and whose upper end is connected to said standard backhoe type boom, which winching system controls

a hoisting cable on the converted backhoe for suspending a crane-type work implement on the cable, such a work implement being for example, a dragline bucket, lift hook, clamshell, or pile driver, comprising:

- a hoist winch drum on which the hoist cable is wound;
- a hoist winch drum base upon which said drum is mounted, the mounting of said drum on said base allowing said drum to rotate with respect to said base;
- a crane-type boom associated with said base, with said base and said boom having a fixed, constant, longitudinal separation distance during winch operation, said boom having a boom foot with foot pivot connection means for pivotally connecting said boom foot to the front end of the backhoe where the standard backhoe type boom is connected, and intermediate, hoist hydraulic cylinder connection means for connecting said boom to the upper end(s) of the backhoe hoist hydraulic cylinder(s), over which boom the cable is suspended for supporting a crane-type work implement at said distal end of said boom;

hydraulic motor means connected to said drum for directly driving and rotating said drum in two alternative directions of rotation to wind up and play out the cable, depending upon the direction of rotation under the control of said backhoe operator, said motor having a neutral disposition in which no significant drag is placed on said drum when said drum is rotated, allowing said drum to be free wheeling with respect to said motor; said drum, said motor and the directly driving structure connecting said motor to said drum forming a winch system; and

supplemental braking system means associated with the cable for retarding the movement of the cable, when desired, independent of said hydraulic motor means and under the control of the operator, when said drum is free wheeling with respect to said hydraulic motor; said supplemental braking system means comprises a mechanical braking system which acts on said winch system and includes

- a disc element having peripheral edge portions fixedly mounted on said shaft for common rotation with said drum and said shaft, and
- at least one caliper brake element having hydraulic actuation means, said caliper brake element fixedly mounted with respect to said winch base, through which caliper brake element said peripheral edge portions of said disc element passes, the hydraulic actuation of said caliper brake element onto said disc element braking said drum under the control of the operator; and
- a shaft on which said drum is fixedly mounted for rotation, said motor being directly connected to said shaft for rotating said drum; and wherein said supplemental braking system means further includes:

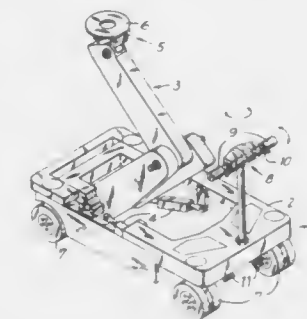
- a disc element fixedly mounted on said shaft for common rotation with said drum and said shaft;
- a second, supplemental winch system for a second cable, likewise including

- a winch drum on which the second cable is wound;
- a winch drum base upon which said drum for the second cable is mounted, the mounting of said drum on said base allowing said drum to rotate with respect to said base;

hydraulic motor means connected to said drum for said second cable for directly driving and rotating in two alternative directions of rotation said drum to wind up and play out said second cable, depending upon the direction of rotation, said motor having a neutral disposition in which no significant drag is placed on said drum when said drum is rotated, allowing said drum to be free wheeling with respect to said motor; said drum, said motor and the directly driving structure connecting said motor to said drum forming operative elements of said second winch system; the axes of rotation of said hoist drum and said supplemental drum being substantially spaced from one another in a longitudinal direction; and

supplemental braking system means associated with said second cable for retarding movement of said second cable, when desired, independent of said hydraulic motor means and under the control of the operator, when said drum is free wheeling with respect to said hydraulic motor.

**4,950,126**  
**MOVIE EQUIPMENT DOLLY**  
Michael J. Fabiano, Carmel, N.Y.; Wes Gilbert, New Tripoli, Pa.; Jeffrey S. Janover, Middletown, N.J., and Robert Ward, Brooklyn, N.Y., assignors to Kestrel International, Ltd., Carmel, N.Y.  
Filed Apr. 5, 1988, Ser. No. 177,588  
Int. Cl.<sup>3</sup> B66F 11/00  
U.S. Cl. 414—590 7 Claims



1. A movie equipment dolly comprising:

- (a) a chassis;
- (b) a lifting arm connected to said chassis;
- (c) means for lifting said lifting arm upon actuation thereof, connected to said lifting arm;
- (d) at least one steerable wheel connected to said chassis for moving said dolly;
- (e) a transmission connected to said wheel for orienting said wheel into selectable steering modes upon actuation thereof; and
- (f) a control handle having:
  - (1) a rotatable steering shaft connected to said wheel for steering said wheel,
  - (2) at least one moveable grip portion connected to said steering shaft and said transmission for rotating said shaft and for actuating said transmission, and
  - (3) lever means connected to said steering shaft and said means for lifting, for actuating said means for lifting.

**4,950,127**  
**ROTARY DIPPER STICK**  
Paul P. Weyer, 48811-284th Ave., S. E., Enumclaw, Wash. 98022  
Filed Apr. 13, 1989, Ser. No. 337,749  
Int. Cl.<sup>3</sup> E02F 3/75  
U.S. Cl. 414—694 48 Claims

1. A fluid-powered, rotary dipper stick assembly, usable with a vehicle having a boom arm and a selectively operable dipper stick actuator associated therewith for pivotal movement of the dipper stick assembly through a boom plane containing the boom arm, the dipper stick assembly being usable with a work implement such as a bucket having a selectively operable work implement actuator associated therewith for pivotal movement of the work implement through a dipper stick plane containing the dipper stick assembly, the dipper stick assembly comprising:

- a boom attachment head having a first attachment portion

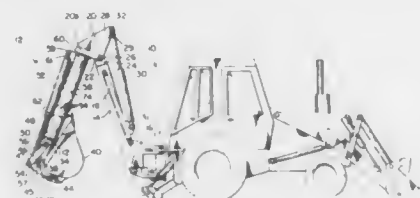
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attachable to the vehicle boom arm, and a second attachment portion attachable to the dipper stick actuator to provide pivotal movement of said boom attachment head through the boom plane upon actuation of the dipper stick actuator, said first attachment portion and said second attachment portion being selectively detachable from the boom arm and the dipper stick actuator;

- a work implement attachment head having a third attachment portion attachable to the work implement to provide pivotal movement of the work implement through the dipper stick plane upon actuation of the work implement actuator, said third attachment portion being selectively detachable from the work implement;
- an elongated, generally cylindrical outer body having a longitudinal axis and generally extending at least partially between said boom attachment head and said work implement attachment head, with a first outer body end toward said boom attachment head and a second outer body end toward said work implement attachment head;
- a shaft extending longitudinally within said outer body in general coaxial arrangement with said outer body; said shaft being rigidly attached to said boom attachment head, and said outer body being rigidly attached to said work implement attachment head and having a fourth attachment portion spaced away from said work implement attachment head and attachable to the work implement actuator to apply a counterforce upon actuation of the work implement actuator to rotate the work implement in the dipper stick plane, said outer body and said shaft being selectively rotatable relative to each other about said body longitudinal axis;



an elongated, generally cylindrical inner body disposed within said outer body with an outward wall portion thereof positioned immediately adjacent to an inward wall portion of said outer body, said inner body having first and second inner body ends and extending longitudinally within said outer body in generally coaxial arrangement therewith from said first inner body end positioned toward said first outer body end to said second inner body end positioned toward a midportion of said outer body between said first and second outer body ends, said inner body being rigidly attached to said shaft toward said first inner body end, said outer body being selectively rotatable relative to said inner body and said shaft about said body longitudinal axis, at least said outward wall portion of said inner body toward said first inner body end being in engagement with said inward wall portion of said outer body and at least said outward wall portion of said inner body toward said second inner body end being in engagement with said inward wall portion of said outer body, said first and second inner body ends being spaced apart by a sufficient distance to provide increased stability against forces generated during use of the dipper stick assembly tending to move said outer body out of coaxial alignment with said shaft; and

linear-to-rotary transmission means disposed within said outer body and operable for producing rotational movement of said shaft relative to said outer body, said transmission means including a piston for the selective application of fluid pressure to one or an other side thereof to produce linear movement of said piston within said outer body selectively toward said first and second outer body ends, and means for translating linear movement of said piston toward one of said first or second outer body ends

into clockwise relative rotational movement between said shaft and said outer body and translating linear movement of said piston toward the other of said first or second outer body ends into counterclockwise relative rotational movement between said shaft and said outer body to selectively rotate said work implement attachment head and hence the work implement about said body longitudinal axis independent of said boom attachment head and hence the boom arm, whereby the dipper stick assembly is capable of handling significantly increased loads without interfering with the operation of said linear-to-rotary transmission means such as can occur on misalignment.

4,950,128

# **AUTOMATIC LOADING UNIT FOR SHEET UNITS ONTO MACHINES EQUIPPED WITH A CONVEYOR**

Sergio Sala, Trezzo Sull'adda, Italy, assignor to Telmecc S.p.A., Trezzano Rosa, Italy

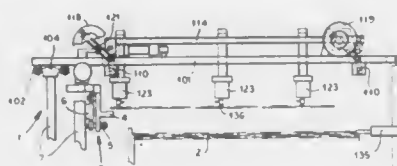
Filed Nov. 7, 1988, Ser. No. 267,959

Claims priority, application Italy, Nov. 9, 1987, 22568 A/87; Oct. 25, 1988, 22413 A/88

Int. Cl.<sup>3</sup> B65H 5/00

U.S. Cl. 414—796.9

13 Claims



1. A unit for the automatic loading of sheet units comprising: a conveyor having a direction of advance; a plurality of rails defining a track parallel to the direction of advance of the conveyor; a base frame movable on said rails; a second frame bearing one or more members for picking up said sheet units, carried by the base frame; drive means for movement of said frames comprising means for moving said base frame parallel to said direction of advance, means for horizontal movement of said second frame in a direction perpendicular to the direction of movement of the base frame and means for vertical movement of said members, said means for horizontal and vertical movement together effecting displacement of said members between a pickup position overlying an area in which sheet units are accumulated and a setting-down position overlying the conveyor, in which extreme positions the sheet unit picked up lies substantially horizontal, with an intermediate position in which the sheet unit picked up lies at an inclined angle;

controllable means for translational coupling between the conveyor and the first frame, said base frame constituting a first flat frame, lying horizontally, which can be moved on respective rails parallel to the direction of advance of said conveyor, said first frame being equipped with a central opening within which are located two cross-members can rotate about axes parallel to the direction of advance of the conveyor, the cross-member closest to the conveyor being connected by means of an articulated joint, having its axis offset from the axis of rotation of the cross-member itself, to one end of a second frame bearing one or more members for picking up a sheet unit, the opposite end of the second frame resting slidably on the other cross-member in a position offset from the axis of rotation thereof, together with actuators which rotate independently of the cross-members through a predetermined angle for moving the pickup members linked by articulations to the cross-members vertically and horizontally between a pickup position above an area in which

sheet units are accumulated and a setting-down position overlying the conveyor.

4,950,129

# **VARIABLE INLET GUIDE VANES FOR AN AXIAL FLOW COMPRESSOR**

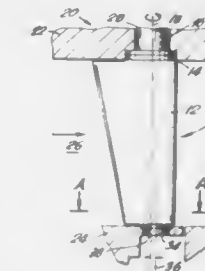
Manubhai M. Patel, Clifton Park, and Robert F. Hoeft, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 21, 1989, Ser. No. 312,264

Int. Cl.<sup>3</sup> F01D 19/00

U.S. Cl. 415—160

15 Claims



1. In an axial flow compressor having a frame defining an annular path for axial flow of a fluid and a plurality of radially extending, circumferentially-spaced vanes, each of said vanes being rotatably mounted at its radially outer end, said compressor having means for rotating and positioning said vanes in unison about their respective axes of rotation between a first and a second position, each of said vanes having radially inner ends subject to deflection and vibration due to aerodynamic forces of said fluid, the improvement comprising:

a frame portion disposed radially inward of each of said vanes arranged to limit movement of the radially inner end thereof, and

a projection on the end of each of said vanes forming clearances with said frame portion, such that deflection of the vane inner ends under aerodynamic forces of the fluid on said vane is restrained by said projection contacting the frame portion, said projection being eccentrically offset with respect to the vane axis of rotation by a preselected amount and in a preselected direction to cause said projection to provide restraining force on the vane inner ends when the vane is rotated from the first position to the second position.

4,950,130

# **PELTON TURBINE**

Josef Erlach, Ravensburg-Oberzell, Fed. Rep. of Germany, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sep. 11, 1989, Ser. No. 405,736

Claims priority, application Switzerland, Oct. 6, 1988, 3714/88

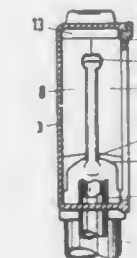
Int. Cl.<sup>3</sup> F03B 7/00

U.S. Cl. 415—202

20 Claims

1. A Pelton turbine comprising a casing having a fluid outlet; a transversely disposed partition in said casing separating a spray fluid and outlet region from a ventilation region therein; a rotatable drive shaft extending through said casing; a wheel disc mounted on said shaft within said casing and passing through said partition; a plurality of peripherally mounted buckets on said disc; and

at least one high-pressure nozzle in said spray fluid and outlet region below said partition for expelling a fluid jet



tangentially of said disc sequentially onto said buckets for rotating said disc and said shaft.

4,950,131

# **HIGH-EFFICIENCY TURBINE, IN PARTICULAR FOR EXPLOITING WIND POWER IN AUXILIARY POWER SOURCES FOR AERONAUTICAL APPLICATIONS**

Antonio Callerio, and Vincenzo Callerio, both of Milan, Italy, assignors to F.I.M.A.C. Fabbrica Italiana Macchine Aria Compressa S.p.A., Senago, Italy

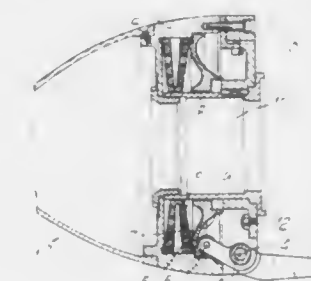
Filed Jun. 7, 1989, Ser. No. 362,740

Claims priority, application Italy, Jun. 15, 1988, 20974 A/88

Int. Cl.<sup>3</sup> F01D 25/16; F03D 11/00

U.S. Cl. 416—87

12 Claims



1. A high-efficiency turbine comprising a central body, at least two vanes, centrifugal mass means, and elastic contrasting means, said at least two vanes protruding externally from and being pivotally associated with said central body thereby allowing for different positioning of said at least two vanes relative to said central body, a rotation axis being defined by said central body, said central body and said at least two vanes rotating about said rotation axis at a rotation speed, said centrifugal mass means and said elastic contrasting means being associated with said at least two vanes and rotating along with said central body around said rotation axis, said centrifugal mass means and said elastic contrasting means simultaneously supplying opposite moments to said at least two vanes thereby positioning said at least two vanes relative to said central body so as to keep constant said rotation speed, said turbine further comprising an adjustment element, said adjustment element being constituted by at least one cam element defining on one side thereof a cam profile, said centrifugal mass means comprising a follower for each one of said at least two vanes, said at least one cam element being interposed between said elastic contrasting means and said centrifugal mass means such that said cam profile communicates motion to said follower of said centrifugal mass means, said elastic contrasting means being associated with said at least one cam element opposite to said cam profile.



4,950,132

**SWASHPLATE AND SLIDING SHOE ASSEMBLY FOR AN AIR CONDITIONING COMPRESSOR**

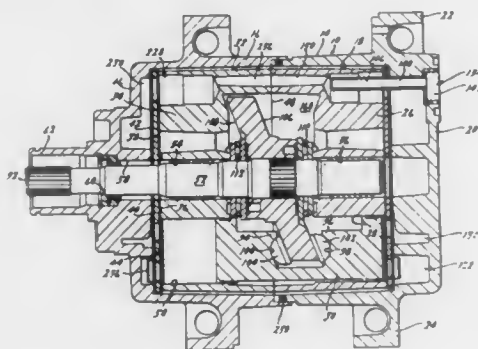
Chester J. Brian, Jr., Birmingham, and Karen M. Menapace-Burmeister, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 11, 1988, Ser. No. 155,173

Int. Cl.<sup>3</sup> F04B 1/16, 1/18

U.S. Cl. 417-269

3 Claims



1. In an air conditioning compressor;  
a swashplate assembly comprising a die cast aluminum alloy swashplate with bearing surfaces disposed in a plane angularly oriented with respect to the swashplate axis, a swashplate hub, a hub opening formed centrally in the hub and thrust bearing surfaces on each axial side of said hub;  
a driveshaft, a knurled portion on said driveshaft, said driveshaft being received in said hub opening with a force fit, the degree of dimension interference that establishes said force fit being reduced due to the presence of said knurled portion, whereby a driving connection between said swashplate and said driveshaft is established with minimal stress on said swashplate;  
said swashplate assembly including multiple, generally semi-spherical, unitary shoes, said shoes being formed of sintered powdered metal, each shoe having a bearing surface engageable with said bearing surfaces on said swashplate;  
a cylinder body, cylinders disposed axially in said cylinder body surrounding the axis of said driveshaft;  
double acting pistons in said cylinder, a partial spherical recess in said cylinders on either side of said swashplate;  
said shoes being received in said piston recesses, the powdered metal shoes being formed of a bearing alloy of iron with iron being the major ingredient.

4,950,133

**AIR BLOWER ASSEMBLY**

Ronald J. Sargent, Escondido, Calif., assignor to Alopex Industries, Inc., San Marcos, Calif.

Filed Nov. 15, 1988, Ser. No. 271,998

Int. Cl.<sup>3</sup> F04B 39/00

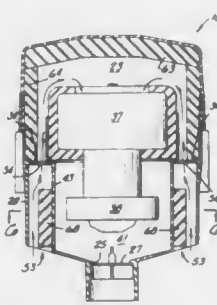
U.S. Cl. 417-312

18 Claims

1. An air blower assembly, comprising:  
a blower-and-motor unit having an enlarged upper end constituting a blower with an air intake on its upper side and an air outlet on its lower side;  
a cup-shaped base having an open upper side, a sidewall and a lower end wall opposite said open side formed with a centrally located air outlet port, said unit being disposed in said base with said blower adjacent the open side of the base;  
means in said base forming a supporting structure for said unit and including a platform extending across the base and having a central opening through which said unit hangs into the interior of said base, a nest composed of acoustical foam resting on said platform and surrounding said blower, said nest having a bottom wall formed with

an opening that is aligned with the opening in said platform and an open top that overlies the air intake of said blower, and means clamping said unit and said nest against said platform;

an inverted cup-shaped cover fitted tightly over said open side of said base and including an end wall spaced above said blower, and a sidewall spaced outwardly from said blower and telescoping with the sidewall of said base to enclose the blower-and-motor unit and define an enclosed air chamber above said blower;



layers of acoustical foam covering the end wall and sidewall of said cover above said platform, and leaving an air chamber between said blower and the layers of acoustical foam;

means in said base defining at least one air inlet port in said end wall of said base and at least one elongated air passage from said air inlet port to said chamber, for admitting air into said blower;

and an acoustical foam barrier in said air passage defining a tortuous path between said chamber and said air inlet port and blocking any straight-line path in said air passage.

4,950,134

**PRECISION LIQUID DISPENSER**

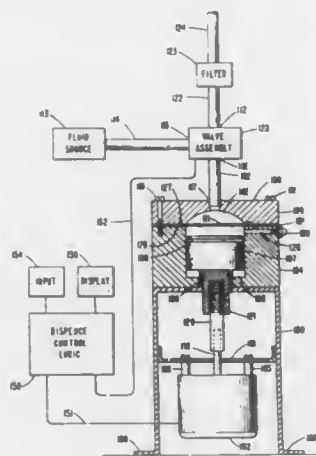
David C. Bailey, and Carl A. Martin, both of San Jose, Calif., assignors to Cybor Corporation, San Jose, Calif.

Filed Dec. 27, 1988, Ser. No. 290,258

Int. Cl.<sup>3</sup> F04B 9/08

U.S. Cl. 417-383

5 Claims



1. In a system for dispensing liquids used in the manufacture of components which require a layer of liquid to be placed thereon, a precision liquid dispenser for dispensing precise amounts of a pumped liquid at controlled rates comprising:

a positive displacement liquid pump having a flexible diaphragm, a pump chamber and a driving chamber on opposite sides of said diaphragm;

4,950,136

**PERISTALTIC PUMP**

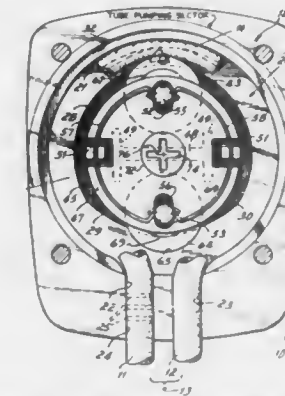
Richard E. Haas, Fairfax, and Thomas R. Fegette, Batavia, both of Ohio, assignors to Hydro Systems Company, Cincinnati, Ohio

Filed Aug. 14, 1989, Ser. No. 393,899

Int. Cl.<sup>3</sup> F04B 43/12

U.S. Cl. 417-477

18 Claims



- an inlet channel and an outlet channel, each being capable of fluid communication with said pump chamber;  
valve means for selectively putting said inlet channel in fluid communication between a source of liquid to be dispensed and said pump chamber, and for selectively putting said outlet channel in fluid connection between said pump chamber and a dispensing port;  
a hydraulic driving system for selectively deforming said diaphragm;  
means for controlling said valve means in coordination with said means for controlling said hydraulic system;  
means for controlling said hydraulic system;  
said hydraulic system including a piston adjacent to said driving chamber for maintaining a driving liquid in fluid communication with said diaphragm;  
said means for controlling said hydraulic system including a reversible stepping motor, motion converting means for changing rotative output motion of said motor into axial motion of said piston to provide bi-directional linear motion of said piston;  
said motion converting means comprising a threaded coupling between said motor and said piston;  
and a source of electrical signals for controlling said motor.

4,950,135

**PIEZOELECTRIC POWERED SCROLL COMPRESSOR**

Kenji Tojo, Shigeru Machida, both of Ibaraki, and Kenji Mori, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

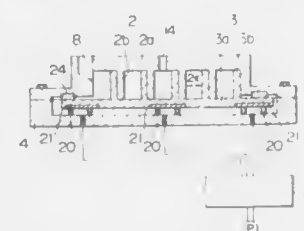
Filed Nov. 7, 1988, Ser. No. 268,197

Claims priority, application Japan, Nov. 12, 1987, 62-286085; Aug. 22, 1988, 63-207522

Int. Cl.<sup>3</sup> H01L 41/09; F04C 18/04

U.S. Cl. 417-410

21 Claims



1. A scroll-type fluid machine, having a frame, a stationary scroll member attached to said frame and an orbiting scroll member, each scroll member having an end plate and a spiral wrap projecting axially from one side of said end plate, said stationary scroll member and said orbiting scroll member being assembled with said wraps of both scroll members meshing with each other, said orbiting scroll member orbiting around an axis of said stationary scroll member without rotating on its own axis so that volumes of closed chambers defined by the end plates and wraps of both scroll members progressively vary to transport a fluid, said scroll-type fluid machine further comprising:

a plurality of actuators which contact with said orbiting scroll member and expand or contract in response to voltages supplied to said actuators, contact points between actuators and said orbiting scroll member being moved by expansion and contraction of said actuators so that said orbiting scroll member orbit.

4,950,137

**RADIAL PISTON MACHINE HAVING PIVOTED CONTROL MEANS ENGAGING CAM RING**

Horst Fischer, Lohr, Günter Fischer, Gemünden, and Rainer Knöll, Burgsinn, all of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

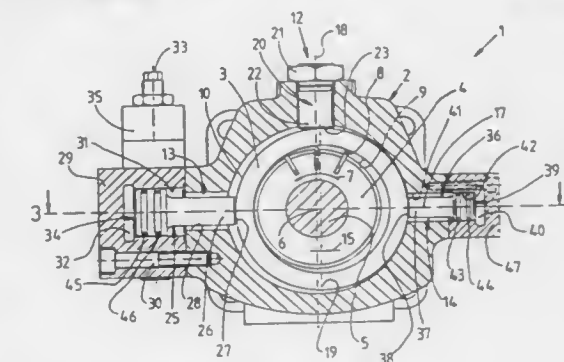
Filed Jul. 21, 1988, Ser. No. 222,703

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725353

Int. Cl.<sup>3</sup> F01C 21/16

U.S. Cl. 418-26

16 Claims



1. A radial piston machine comprising:  
a housing,

a cam ring locating in said housing and adjustable in horizontal and vertical direction,  
 a rotor rotatably mounted in said housing and located within said cam ring,  
 pressure chambers formed between said rotor and said cam ring,  
 means for supplying pressure medium and for removing pressure medium,  
 a height adjustment means mounted in said housing and adapted to adjust the height of the cam ring so as to change the beginning of the compression of the machine, said height adjustment means having abutment means for engagement with the cam ring,  
 a control means in engagement with said cam ring by means of abutment means,  
 an adjustment means pivotally mounted in said housing and located substantially diametrically with respect to the control means, wherein said adjustment means is in engagement with said cam ring by means of abutment means,  
 wherein a connecting line of said control means and said adjustment means extends substantially perpendicular to the line of action, along which the height adjustment means transfer a force on to said cam ring,  
 wherein the abutment means of the height adjustment means are stationary for a predetermined adjusted level and comprise in the area of engagement with the cam ring a planar abutment surface such that the cam ring can freely rotate thereon,  
 wherein the abutment means of the control means comprise in the area of the engagement with the cam ring a planar abutment surface such that the cam ring can freely roll thereon,  
 wherein the abutment means of the control means are pivotally mounted in the housing such that for a change of the eccentricity of the cam ring the cam ring rolls on the abutment means of the height adjustment means and pivots the abutment means of the control means during said rolling movement,  
 and wherein said abutment means of the adjustment means comprises in the area of engagement with the cam ring a planar abutment surface such that for a change of eccentricity of the cam ring the cam ring rolls on the abutment means of the adjustment means and pivots it during said movement.

4,950,138

# SPIRAL DISPLACEMENT MACHINE WITH FLEXIBLE ECCENTRIC GUIDE ARRANGEMENT

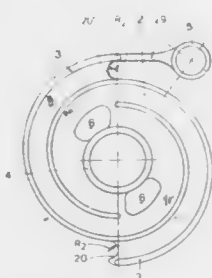
Fritz Spinnler, Mellingen, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Dec. 12, 1988, Ser. No. 282,737  
 Claims priority, application Switzerland, Dec. 21, 1987, 4982/87

Int. Cl. F04C 18/04

U.S. Cl. 418—55.3

3 Claims



1. A displacement machine for compressible media including a fixed housing formed of two housing halves, each housing half having two of at least four delivery spaces offset by about 180° with respect to one another, said at least two delivery

spaces each extending in a spiral shape from a corresponding inlet to an outlet, and each delivery space having a corresponding displacement body engaged with said delivery space, each displacement body formed as a spiral-shaped strip and perpendicularly fixed on a disk-shaped rotor, said rotor drivable eccentrically with respect to the housing and being guided by a second eccentric guiding arrangement disposed at an interval from a first eccentric drive arrangement, said first eccentric drive arrangement and said second eccentric guiding arrangement being disposed in the housing, said rotor having a means for flexibly compensating any length differences between said delivery space and said displacement body, said means for flexibly compensating including a guide eye of the second eccentric guiding arrangement wherein said guide eye is connected to the disk-shaped rotor by a stem, said stem being formed as a tangential extension at an inlet-side end of one of the spiral-shaped strips wherein said stem is rigid in a tangential direction and elastic in a radial direction.

4,950,139

# PROCESS OF CATALYTICALLY REDUCING NO

Wolfgang Fennemann, Karben; Werner Weisweiler, Remchingen-Singen; Burkhard Retzlaff, and Bernd Hochstein, both of Karlsruhe, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 17, 1989, Ser. No. 297,830

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801785

Int. Cl. B01J 8/00; C01B 21/00

U.S. Cl. 423—239

4 Claims

1. A process for catalytically reducing NO which is contained in a gas comprising:  
 mixing the NO-containing with  $\text{NH}_3$  to form a mixture; and reacting the mixture at a temperature of from 290° C. to 450° C. under normal pressure in the presence of a catalyst which has a support consisting of  $\text{SiO}_2$  and contains 5 to 15% by weight manganese sulfate and iron sulfate applied to the support, the iron sulfate being at least one of  $\text{FeSO}_4$  and  $\text{Fe}_2(\text{SO}_4)_3$ , the mole ratio of manganese sulfate to iron sulfate, the latter calculated as  $\text{FeSO}_4$ , being between 1:10 and 10:1.

4,950,140

# COOKIES CONTAINING PSYLLIUM

Phillip F. Pflaumer, Hamilton; Edward D. Smith, III, Cincinnati, both of Ohio, and Wilbur G. Hudson, Jr., Hebron, Ky., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 14, 1987, Ser. No. 96,685

Int. Cl. A21D 13/00, 8/00, 13/08; A23L 1/29

U.S. Cl. 424—439

21 Claims

1. A method for making a psyllium-containing cookie dough comprising the steps of:  
 (a) combining from about 3% to about 15%, by weight of the dough, of a liquid component selected from the group consisting of water, fresh egg, and mixtures thereof, with from about 0.6% to about 35%, by weight of the dough, of a dry ingredient component selected from the group consisting of sugar, flour, non-pre-gelatinized starch, egg solids, protein solids, and mixtures thereof;  
 (b) combining from about 10% to about 35% by weight of the dough, of a fluid shortening component with the mixtures of (a); and  
 (c) combining the mixture of (b) with from about 5% to about 30%, by weight of the dough, of a psyllium component, and other conventional cookie components to form said dough.

4,950,141

# STANDING WELL POST TYPE CENTER MECHANISM IN TIRE PRESS

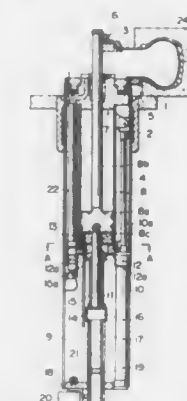
Yoshimata Maikuma, Kobe, and Katsumi Ichikawa, Akashi, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 29, 1989, Ser. No. 414,363

Claims priority, application Japan, Oct. 17, 1988, 63-262525  
 Int. Cl. B29C 35/00

U.S. Cl. 425—33

1 Claim



1. A standing well post type center mechanism in a tire press which comprises a bladder well disposed vertically liftably in the center of the tire press, the bladder well comprising a bead ring at the upper end thereof, an upper clamp ring assembly for holding the upper end of a bladder, the upper clamp ring assembly disposed concentrically with the bladder well and being vertically liftable independently of the bladder well, and a lower clamp ring assembly concentric with the upper clamp ring assembly and vertically liftable independently of the bladder well and the upper clamp ring assembly.

wherein an air cylinder for lifting the upper clamp ring assembly is disposed liftably in the bladder well, the upper clamp ring assembly is fitted to the upper end of a piston rod in the air cylinder, the lower clamp ring assembly is fitted to the upper end of the air cylinder, and the lower end of the air cylinder is constrained engageably and disengageably through a stopper.

4,950,142

# GREEN TIRE INSERTING APPARATUS IN A TIRE VULCANIZING MACHINE

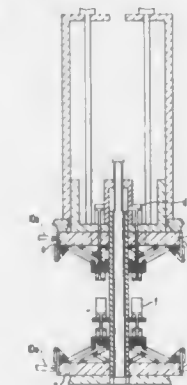
Hideaki Katayama, and Toshifumi Murakami, both of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 9, 1989, Ser. No. 295,196

Claims priority, application Japan, Jan. 27, 1988, 63-14564  
 Int. Cl. B29D 30/06

U.S. Cl. 425—38

11 Claims



1. An apparatus for inserting green tires in a vulcanizing machine, comprising:  
 an inner cylinder having a longitudinal axis;

first and second chuck means connected to said inner cylinder, said first and second chuck means being spaced from each other along said axis, each said chuck means including a plurality of expanding segments radially spaced about said axis and mounted for sliding movement radially of said axis between a contracted position and an expanded position spaced radially further from said axis than said contracted position, each said chuck means further including a plurality of push-in segments, each push-in segment being mounted on a radially outer face of an associated one of said expanding segments for sliding movement substantially parallel to said axis between a retracted position and an extended position, said push-in segments of each one of said chuck means moving away from the other one of said chuck means when moving from said retracted to said extended position, each said chuck means further including means for moving each of said expanding segments between said contracted and said expanded position and means for moving each of said push-in segments between said retracted and said extended position;

whereby a green tire may be held by said apparatus with each bead contacted by said outer radial faces of said expanding segments of an associated one of said chuck means, said expanding segments may be moved to said expanded position to thereby expand the diameters of the beads to at least near the diameter of mold bead rings which are in close proximity thereto, and said push-in segments may be moved to said extended positions to move the beads from said expanding segments to an associated one of the mold bead rings.

4,950,143

# INJECTION MOLD MANIFOLD ARRANGEMENT

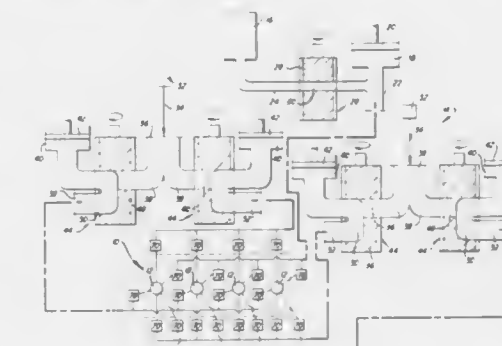
Suppayan M. Krishnakumar, Nashua; Wayne N. Collette; Steven L. Schmidt, both of Merrimack, and Thomas E. Nahlil, Amherst, all of N.H., assignors to Continental PET Technologies, Inc., Norwalk, Conn.

Filed Jan. 3, 1989, Ser. No. 292,956

Int. Cl. B29C 45/02

U.S. Cl. 425—130

7 Claims



1. Apparatus for use in combination with a plural cavity injection mold for multiple layer preforms of a selected size, there being a known cavity spacing in a multiple cavity injection system for a preform of said selected size when said preform is formed of a single material, said apparatus comprising a resin supply apparatus of a size for maintaining cavity spacing in said plural material injection mold essentially the same as that which exists in said multiple cavity injection system for a single material preform of said selected size, said resin supply apparatus includes first and second supply units, and at least one of said resin supply units including a single supply valve device coupled to all of said cavities for simultaneously supplying a quantity of resin to all of said cavities from a single resin source.



4,950,144

**NOZZLE TOUCH APPARATUS IN AN INJECTION MOLDING MACHINE**

Kikuo Watanabe, Minamitsuru, and Masaki Muranaka, Shibuya, both of Japan, assignors to Fanuc LTD, Minamitsuru, Japan

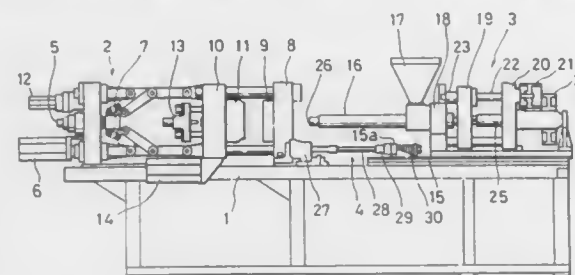
PCT No. PCT/JP88/00768, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO89/00913, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 30, 1988, Ser. No. 315,685

Claims priority, application Japan, Aug. 1, 1987, 62-191517 Int. Cl.<sup>5</sup> B29C 45/07

U.S. Cl. 425—135

8 Claims



1. A nozzle touch apparatus for use in an injection molding machine having an injection unit disposed for reciprocal movement, comprising:

a movable spring seat member disposed for reciprocal movement from a first moved position to a second moved position;

means for setting and detecting the first moved position and the second moved position of said movable spring seat member;

drive means for causing said movable spring seat member to be reciprocated, said drive means being operable to cause said movable spring seat member to be at the first moved position, when a mold lockup released state is established, and a second moved position, when a mold lockup state is established;

a stationary spring seat member arranged to be movable in unison with said injection unit and arranged opposite said movable spring seat member; and

a spring interposed between said stationary spring seat member and said movable spring seat member, a compressed state of said spring being dependent upon the position of said movable spring seat member, said compressed state generating a nozzle touch force, whereby the nozzle touch force generated by said spring in the mold lockup released state in which said movable spring seat member is at the first moved position is less than that in the mold lockup state in which said movable spring seat member is at the second moved position.

4,950,145

**APPARATUS FOR MOLDING CHOCOLATE**

Tom Zanetos, and Paul E. Reeder, both of Columbus, Ohio, assignors to Anthony-Thomas Candy Company, Columbus, Ohio

Filed Jun. 15, 1989, Ser. No. 366,670 Int. Cl.<sup>5</sup> B29C 45/76, 45/80

U.S. Cl. 425—140

3 Claims

1. Apparatus for filling solid chocolate shape molds, and comprising:

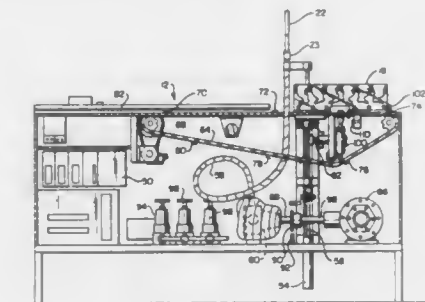
(a) a plurality of molds, each mold having a distinct number of cavities, cavity volumes, a fill opening height, and cavity fill opening spacings, process codes keyed to each of said plurality of molds, and having base support flanges for maintaining said plurality of molds in generally upright positions;

(b) conveyor means for receiving and advancing said plurality of molds, in upright positions, predetermined distances

corresponding to said plurality of molds distinct number of cavities and cavity fill opening spacing;

(c) pump means for metering tempered chocolate in different predetermined quantities corresponding to said plurality of molds distinct cavity volumes;

(d) fill tube means for receiving metered chocolate from said pump means and having different outlet opening predetermined heights corresponding to each of said plurality of molds distinct cavity fill opening heights;



(e) programmable controller means responsive to said plurality of molds process codes to control said conveyor means, said pump means, and said fill tube means to said plurality of molds distinct number of cavities, cavity volumes, cavity fill opening heights, and cavity fill opening spacings; and

(f) sensor means detecting said plurality of molds process codes and serially transmitting said process codes to said programmable controller means,

said process codes being incorporated in said base support flanges in binary form.

4,950,146

**MOTOR CONTROL DEVICE FOR ELECTRIC INJECTION MOLDING MACHINE**

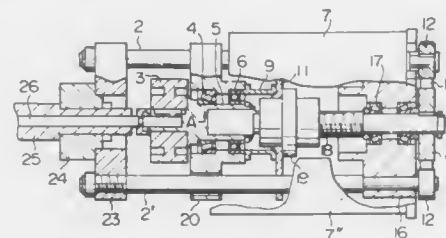
Taira Adachi, Sakura, Japan, assignor to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 377,976

Claims priority, application Japan, Jul. 13, 1988, 63-172570 Int. Cl.<sup>5</sup> B29C 45/77

U.S. Cl. 425—149

2 Claims



1. A motor control device for an electric injection molding machine comprising:

rotating means for rotating a resin feeding screw including a rotary shaft associated with one end of a screw received in a heating cylinder, a holding member rotatably holding said rotary shaft and slidable in an axial direction of said direction of said rotary shaft, and a first motor for driving said screw through said rotary shaft;

screw advancing/retracting means including a second motor for producing a force for advancing said screw in an injection direction and retracting said screw, a screw shaft and a nut for converting output torque of said second motor into linear movement, and a sliding member to which said nut is fixed; and

a load detecting member provided between said screw rotating means and said screw advancing/retracting means, said load detecting member being fixed at one end to said holding member and at a second end to said sliding member.

4,950,147

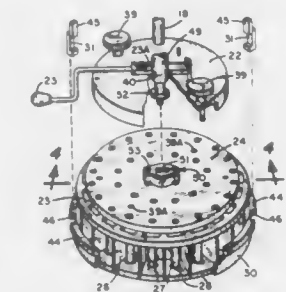
**DIVIDING AND ROUNDING MACHINE**

Mark L. Willard, Plymouth; David E. Beatty, Wrenshall, both of Minn., and Jeffery A. Nyquist, Superior, Wis., assignors to Dutchess Bakers' Machinery Company, Inc., Superior, Wis. Continuation-in-part of Ser. No. 217,657, Jul. 12, 1988, Pat. No. 4,898,528. This application May 1, 1989, Ser. No. 346,565 The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A21C 3/10, 5/08

U.S. Cl. 425—185

21 Claims



1. An improvement in a dividing and rounding machine of the type having a dividing and rounding assembly connected to a drive rack which is vertically guidable through an upper yoke positioned above a crank plate which may be horizontally oscillated, wherein the improvement comprises

(a) a drive rack mechanism comprising a first link pivotally attached to said upper yoke and a pivot bracket and operating lever pivotally attached to said drive rack, and torsion spring means for connecting said first link to said pivot bracket to urge said drive rack to an upwardly position, said drive rack having a downwardly extending keyed end portion; and

(b) a dividing and rounding assembly having an upper receptacle for receiving said drive rack keyed end portion, including means for releasably connecting to said drive rack.

4,950,148

**APPARATUS FOR MANUFACTURING SILICONE GEL SHEET**

Motoyasu Nakanishi, Fujishi, Japan, assignor to Kabushiki Kaisha Cubic Engineering, Shizuokaken, Japan

Filed Jul. 13, 1987, Ser. No. 73,067

Claims priority, application Japan, Jan. 31, 1987, 62-21254 Int. Cl.<sup>5</sup> B29G 3/02; A01J 21/00; B29B 7/00

U.S. Cl. 425—224

2 Claims

1. An apparatus for manufacturing a silicone gel sheet, comprising:

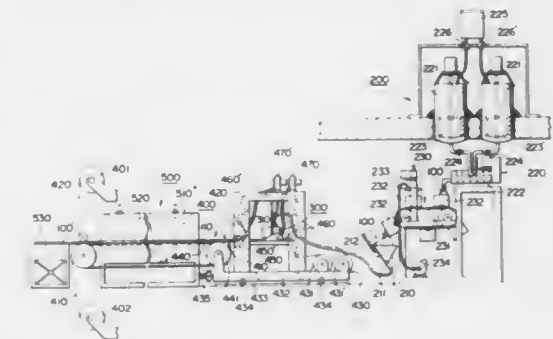
a transfer means having an upper receiving surface; means for moving said transfer means so as to move said upper surface in a direction at a predetermined speed; supplying means for supplying a thin heat resistant film to said upper receiving surface so as to leave an upper surface of said film exposed;

applying means for applying a parting agent to said upper surface of said film;

a nozzle spaced along said transfer means from said applying means in the direction of movement of said transfer means, said nozzle having a long narrow discharging port orthogonally intersecting the direction of forward movement of said receiving means for supplying silicone gel material as

a sheet-formed strip onto said film on said transfer means through said discharging port;

a material supplying means for supplying silicone gel material to said nozzle, said material supplying means having a hopper connected to said nozzle and a pressurized feeding means connected to said hopper, a bubble removing means connected to said hopper for removing bubbles from the silicone gel material being supplied to said hopper, a feeder connected to said bubbles removing means for kneading and feeding silicone gel material under pressure to said bubble removing means, two kneading tanks connected to said feeder and each having



mixing means therein, the first tank being for supplying the first of two liquids for preparing a two-liquid kneaded type of silicone gel material and the second tank for supplying the second of the two liquids, and at least one further tank connected to said two kneading tanks for supplying fine hollow particles to said two kneading tanks;

a heating section spaced along said transfer means from said nozzle for heating the sheet-formed strip on said transfer means for gelling it; and means on the end of said heating section toward which said transfer means is moving for peeling said film from the under side of the gelled sheet-formed strip.

4,950,149

**MOLDING APPARATUS FOR FIBER-FILLED RESIN**  
Douglas K. Schehr, Columbia, Md.; William J. Hampshire, Peninsula, Ohio, and Marvin T. Conger, Liberty, Miss., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 11, 1988, Ser. No. 166,947 Int. Cl.<sup>5</sup> B29B 11/12; B29C 43/08

U.S. Cl. 425—345

6 Claims

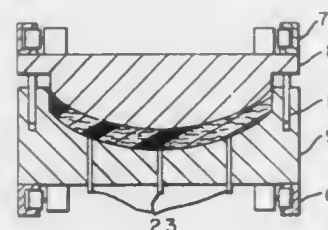
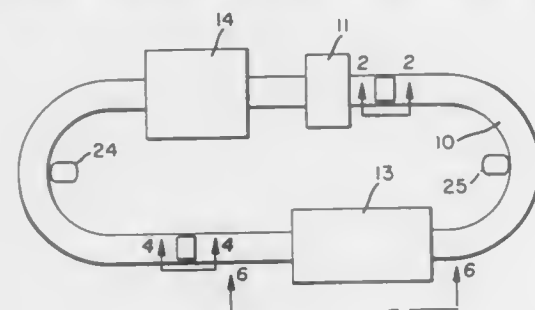
1. An apparatus for molding a charge of oriented chopped filament loaded resin into a molded article comprising moving at least one mold composed of a male part and a female part each part moving on separate vertically separated tracks through an endless passage past a series of stations, including a loading station, having means to deposit an oriented charge of chopped filament loaded resin in said female part;

a mold closing station;

a curing station and an unloading station having means to eject the article from the female part, said parts moving at least in an indexed contact during passage through said cure station, but being moved to essentially a fully spaced apart relationship when the female part enters said unloading station until it leaves said loading station;

movement of said parts relative to each other being controlled by spacing and alignment between said tracks respectively for each part, said tracks being inclined at sufficient angle to bring said parts into index and under sufficient contact to exert enough pressure on a charge of chopped filament loaded resin between said parts to com-

press the charge into a unitary article at least by time said mold moves from the cure station and having a reverse angle of inclination from the cure station to move said



parts to the fully spaced apart relationship by time the female part enters said unloading station and maintain said fully spaced apart relationship until the female part leaves the loading station.

4,950,150

## BRIQUETTING MACHINE

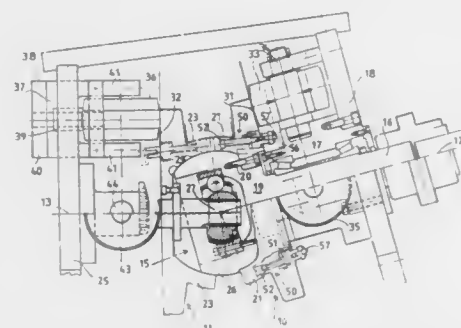
Barry A. Linger, Dorset; Peter G. Williams, Norfolk, both of England, and Reinhard Vitols, Tollerton, United Kingdom, assignors to Barrico Limited, Peterborough, England  
Filed Dec. 1, 1988, Ser. No. 278,803

Claims priority, application United Kingdom, Dec. 1, 1987, 8728094

Int. Cl.<sup>3</sup> B29C 43/08

U.S. Cl. 425—348 R

9 Claims



1. A briquetting machine for forming briquettes which comprises a pair of rotatable briquetting wheels each wheel having towards its outer periphery die means defining a continuous circular row of briquetting pockets, the wheels being arranged to come together to define a nip between the wheels at which material is compacted in the pockets, the wheels being movable relative to one another, at least in the region of the nip, in a direction generally transverse to the plane of rotation of the pockets to vary the volume of the pockets in this region, the die means including alternating male and female dies on each of the wheels and having outer edges, the male and female dies each being arranged to receive material to be compacted, the male dies on one of the wheels mating with the female dies on

the other one of the wheels to define the pockets, and the outer edges of the male and female dies cooperating with one another to shear and separate any material joining successive briquettes, the mating male and female dies overlapping one another at their edges an extent of overlap depending on the extent of said relative movement between the wheels in order to vary the volume of said pockets.

4,950,151

## ROLLING DIE FOR PRODUCING HIGH MODULUS PRODUCTS

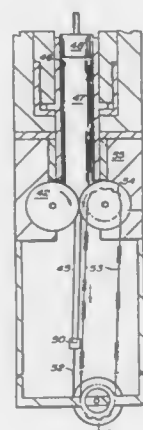
Anagnostis E. Zachariades, 65 Glengarry Way, Hillsborough, Calif. 94010

Division of Ser. No. 6,008, Jan. 22, 1987, Pat. No. 4,820,466, which is a continuation-in-part of Ser. No. 877,896, Jun. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 697,211, Jan. 31, 1985, abandoned, which is a continuation-in-part of Ser. No. 578,171, Feb. 8, 1984, abandoned. This application Jan. 19, 1989, Ser. No. 299,727

Int. Cl.<sup>3</sup> B29C 47/24, 47/32

U.S. Cl. 425—379.1

15 Claims



1. An extrusion rolling die having a perimeter for producing high-modulus products having a crystalline melting point comprising:

a pair of rotatable rollers having an input side and an output side and die-providing exterior shapes confining an entire perimeter of material extruded therethrough at a rate of extrusion and reducing the material overall cross-sectional area,

means for keeping said rollers at a temperature near but below the crystalline melting point of the material to be processed,

force-applying means for applying extrusion pressure to said rollers, and

control means for controlling the rate of rotation of the rollers so that the rate of extrusion of the material is substantially the same as the rate of rotation of the rolling die surface, the

die having an extrudate therefrom and a supporting frame with a distal end and wherein said control means comprises:

a chain-engaging pulley wheel rotatably mounted on said distal end of said frame,

one of said rollers having a chain-engaging wheel rigidly mounted thereon,

a gear train means for keeping said pair of rollers at identical rotational speeds,

a chain looped around said two wheels, and cable means attached at one end to said pulley wheel for attachment of the cable means other end to the extrudate from said die.

4,950,152

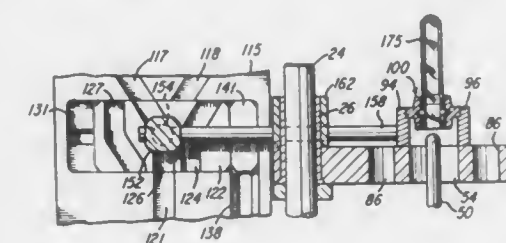
## APPARATUS FOR PRODUCING PREFORMS AND BLOW MOLDED ARTICLES

Charles J. Bran, Jr., Xenia, and Anthony F. Newport, Dayton, both of Ohio, assignors to Electra Form, Inc., Vandalia, Ohio  
Filed Dec. 5, 1988, Ser. No. 279,662

Int. Cl.<sup>3</sup> B29C 49/06

U.S. Cl. 425—533

21 Claims



1. A mold assembly for efficiently producing hollow articles, comprising a stationary platen and a generally parallel movable platen, a stripper platen disposed between said stationary and movable platens, means defining a plurality of injection cavities and supported by said stationary platen, a corresponding plurality of injection cores supported by said movable platen for movement between retracted positions and extended positions within said injection cavities, means defining at least one blow cavity for each of said injection cavities and supported by said stationary platen adjacent said injection cavity, a blow core unit for each of said blow cavities and having an axis, means mounted on said movable platen and supporting each said blow core unit for axial movement between an extended position and a retracted position relative to said movable platen, a transfer mold unit for each of said injection cavities and forming an extension of said injection cavity, means mounted on said stripper platen and supporting said transfer mold units for lateral movement relative to said stripper platen and said injection cores and said blow core units and between corresponding alignment with said injection cavities and with said blow cavities, and means for moving said transfer mold units laterally relative to said injection cores and said blow core units for transferring the articles molded in said injection cavities to the corresponding said blow cavities without lateral transfer of said injection cores and said blow core units.

4,950,153

## BLOW MOLDING APPARATUS

Dennis L. Dundas, Dover, and Eugene L. Moore, York, both of Pa., assignors to Graham Engineering Corporation, York, Pa.  
Filed Jul. 19, 1989, Ser. No. 382,560

Int. Cl.<sup>3</sup> B29C 49/60, 49/62

U.S. Cl. 425—536

3 Claims



1. An apparatus for sealing blow molded plastic bottles at subatmospheric pressure including:

a. a mold having a pair of mold halves each including a body recess, a blow dome recess and a shallow seal neck recess,

the seal neck recess being located between and connecting the body recess and the blow dome recess, said recesses being formed in opposing faces of the mold halves across from each other respectively so that when the mold halves are closed the recesses define hollow and joined blow dome, seal neck and body cavities with the seal neck cavity being located between the body and the blow dome cavities, the cavities forming a single interior volume when the mold is closed;

b. a blow needle bore in one mold half, the bore opening into a said blow dome recess;

c. a hollow blow needle in the bore, the needle having a tip, and needle drive means for moving the needle along the bore between an extended position in which the tip of the needle is located within the blow dome cavity when the mold is closed and a retracted position in which the tip of the needle is located in the bore a first distance away from the wall of the adjacent blow dome recess;

d. a blow air exhaust passage partially in said one mold half, the passage having a first end joining the blow needle bore a distance from the wall of the adjacent blow dome recess less than said first distance and a second end;

e. a venturi having a low pressure port and a passage, said second end of the blow air exhaust passage being connected to the low pressure port; the pressure drop at the low pressure port being sufficient to reduce the pressure in a plastic body blown in the interior volume of the closed mold below atmospheric pressure without restricting free exhaust flow of blow air out of the plastic body through the needle bore and the blow air exhaust passage;

f. a first source of pressurized air connected to the main passage of the venturi whereby pressurized air flowing through the main passage reduces the pressure in the interior volume defined by the closed mold halves;

g. a second source of pressurized air connected to the end of the blow needle away from the tip of the needle, and a valve connecting the second source of pressurized air to the needle;

h. a sealing blade bore in one of the mold halves, one end of said blade bore opening into the seal neck recess in said mold half; and

i. a sealing blade in said blade bore, said blade having a sealing end, and sealing blade drive means for moving the blade along said blade bore between an extended position in which the sealing end of the blade is located adjacent the surface of the seal neck recess in the other mold half to form a seal in the plastic in the seal neck to close the plastic body in the body cavity at a negative pressure, and a retracted position within said blade bore.

4,950,154

## COMBINATION INJECTION MOLD AND SPRUE BUSHING

Clifford A. Moberg, W328 N4065 Allendale Dr., Nasbotoh, Wis. 53058

Filed Jul. 3, 1989, Ser. No. 374,927

Int. Cl.<sup>3</sup> B29C 45/73

U.S. Cl. 425—552

3 Claims

1. Injection molding apparatus comprising in combination: (a) an elongated injection mold barrel having a nozzle extension and a nozzle tip respectively successively axially mounted on said barrel;

(b) a mold structure including a stationary platen fixedly coupled at right angles to one end each of a pair of spaced parallel elongated tie bars and a moveable platen slideably coupled to said tie bars for axial reciprocal movement thereon toward and away from said stationary platen;

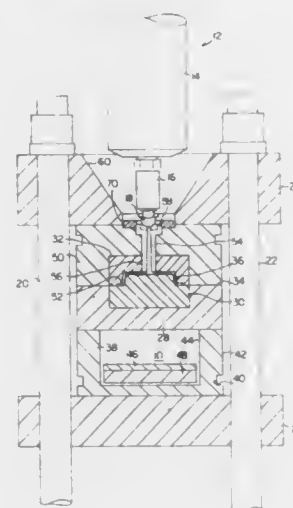
(c) a centrally disposed injector aperture in said stationary platen disposed to receive in insertive relationship said elongated injection mold barrel and to be in generally axial alignment therewith;

(d) said mold structure further including a mold base having a centrally disposed mold core and a cavity plate having a



centrally disposed cavity mold, said mold base disposed on a side of said moveable platen facing toward the stationary platen and said cavity plate disposed on a side of said stationary platen facing toward said moveable platen, a surface of said mold core facing the stationary platen and a surface of the cavity mold facing the moveable platen combining to complementarily define a cavity having a configuration of a product to be molded when said moveable platen is moved axially on said tie bars to cause said mold base to be in abutting relationship to said cavity plate;

(e) a passageway through said stationary platen, cavity plate and cavity mold in coaxial alignment with said elongated injection mold barrel, nozzle extension, and nozzle tip;



(f) a beryllium-free copper alloy sprue bushing configured to fit within said passageway from said stationary platen to said cavity, said sprue bushing having a passageway coaxial with and along a longitudinal centerline axis of the sprue, stationary platen, cavity plate and cavity mold;

(g) a stainless steel insert located intermediate the nozzle tip and said sprue bushing to prohibit heat exchange from said nozzle tip to the cavity mold and configured to enhance heat dispersion from the cavity mold to atmosphere via said sprue bushing

whereby molten material from the mold barrel is passed through the sprue bushing into said cavity to form a product, whereby said sprue bushing dissipates heat from the cavity mold to atmosphere.

4,950,155

# REPLACEABLE LONGITUDINAL SEAL FOR A ROTARY COMBUSTOR

Anthony R. Brienza, Orange, Calif.; Casmier L. Liszewski, Smithton, Pa.; Richard R. Harloff, Monroeville, Pa., and William F. Garland, Manchester, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 16, 1989, Ser. No. 437,969

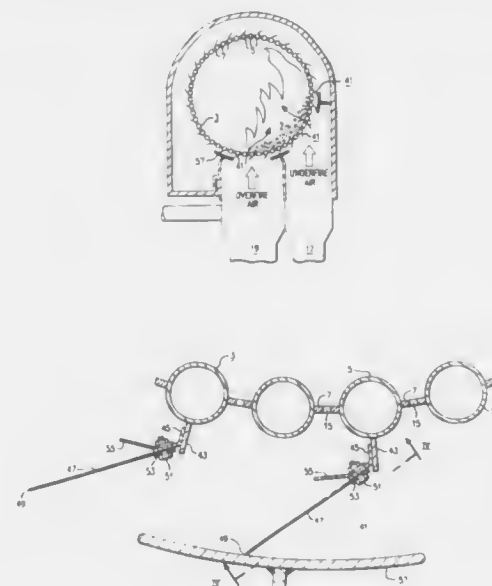
Int. Cl.<sup>3</sup> F27B 7/24

U.S. Cl. 432—115

8 Claims

1. A longitudinal seal for a rotary combustor formed from a circular array of pipes with a web between adjacent pipes, the web being perforated to supply combustion air to the combustor, said seal comprising a plate affixed to at least some of the pipes so as to extend radially outward therefrom, an angle bracket affixed to each of said plates in such a way as to compensate for out of roundness of said rotary combustor, a thin strip replaceably fastened to each of said angle brackets so that a distal margin thereof extends from said bracket and away from said rotary combustor and a plurality of shoes disposed longitudinally adjacent said rotary combustor, the distal margin of said thin strips being disposed to scribe a circle proximate

said shoes to form a seal therebetween as the rotary combustor rotates, the width of the shoes being sufficient that the margin of the adjacent strip becomes proximate the shoe prior to the margin of the thin strip which was proximate the shoe moving away therefrom a radiation shield fastened to a



radially inner side of the angle brackets to protect the thin strips from radiant energy emitted from the burning waste which pass through perforations in the adjacent webs, wherein a plurality of thin strip segments are disposed longitudinally along each of said angle brackets.

4,950,156

# INERT GAS CURTAIN FOR A THERMAL PROCESSING FURNACE

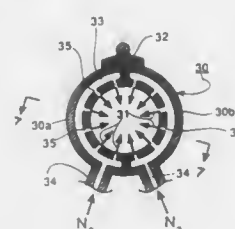
Ara Philipposian, Stoneham, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 28, 1989, Ser. No. 372,669

Int. Cl.<sup>3</sup> F27D 7/00; F27B 17/00

U.S. Cl. 432—253

17 Claims



1. A thermal processing furnace comprising:

- (a) a tube furnace having an elongated cylindrical chamber open at one end for receiving articles to be processed;
- (b) means for introducing reactant or inert gasses into the other end of said cylindrical chamber; and
- (c) means for providing an inert gas barrier surrounding said one end of said cylindrical chamber, said means including a removable annular manifold having at least two sections and having a plurality of openings in each of said sections spaced circumferentially around an inner face of said sections of said manifold to direct inert gas radially inwardly of said cylindrical chamber to prevent ambient gas from entering said cylindrical chamber.

4,950,157

# DEBONDING INSTRUMENT FOR ORTHODONTIC BRACKETS

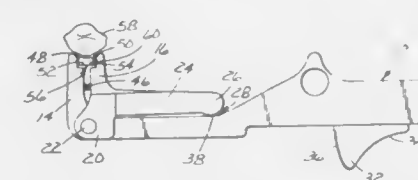
James D. Cleary, Glendora, Calif., assignor to Unitek Corporation, Monrovia, Calif.

Filed Nov. 14, 1988, Ser. No. 270,522

Int. Cl.<sup>3</sup> A61C 3/00

U.S. Cl. 433—4

10 Claims



1. An instrument for removing orthodontic brackets from teeth comprising:

- an elongated frame including a handle portion;
- a first jaw connected to said frame and having a tip with a generally flat edge for gripping a side of an orthodontic bracket;
- a second jaw having a tip with a generally flat edge opposed to said edge of said first jaw for gripping an opposite side of the bracket;
- means coupling said second jaw to said frame for movement of said second jaw either toward or away from said first jaw;
- means yieldably biasing said second jaw toward said first jaw; and
- a manually operable actuator movably connected to said frame, said actuator being operable to shift said second jaw toward first jaw during movement of said actuator in a direction generally along the length of said frame.

4,950,158

# BUMPER FOR ORTHODONTIC BRACKETS

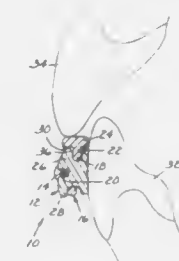
Conrad A. Barngrover, San Dimas; James D. Cleary, Glendora, and Thomas M. Olsen, Alta Loma, all of Calif., assignors to Unitek Corporation, Monrovia, Calif.

Filed Nov. 7, 1988, Ser. No. 267,570

Int. Cl.<sup>3</sup> A61D 3/00

U.S. Cl. 433—11

10 Claims



1. An orthodontic assembly comprising:

- a bracket having an archwire slot and tie wing means with an occlusal section;
- an archwire; and
- an elastomeric ligature connected to said tie wing means for retaining said archwire in a position at least partially in said slot, said ligature including an enlarged bumper portion disposed occlusally of said occlusal section for substantially preventing contact of said bracket with opposing teeth, said bumper portion extending in a buccal direction a distance sufficient to substantially cover said occlusal section.

4,950,159

# FILTER CARTRIDGE FOR DENTAL SYRINGE

James W. Hansen, 34 Mint Cir., Middleburg, Fla. 32068

Filed Aug. 28, 1989, Ser. No. 399,012

Int. Cl.<sup>3</sup> A61G 17/02

U.S. Cl. 433—80

9 Claims



1. In a dental syringe for selectively directing streams of air or water into a patient's mouth, a disposable filter cartridge having separate filters for air and for water comprising:

- (a) an elongated cartridge body having a forward wall, a rearward wall, and a side wall enclosing an internal space divided into two longitudinal half spaces by an internal axial wall extending from said forward wall to said rearward wall; the first of said longitudinal spaces being filled with water filtering material and the second of said spaces being filled with air filtering material; an entrance passageway for water through said rearward wall into said first space, an entrance passageway for air through said rearward wall into said second space; an exit passageway from said first space through said forward wall to a coupling means with said syringe; and exit passageway from said second space through said forward wall to a coupling means with said syringe; and means to couple said entrance passageways to separate sources of pressurized air and pressurized water.

4,950,160

# INSTRUMENT FOR STAIN REMOVAL AND POLISHING OF NATURAL TEETH

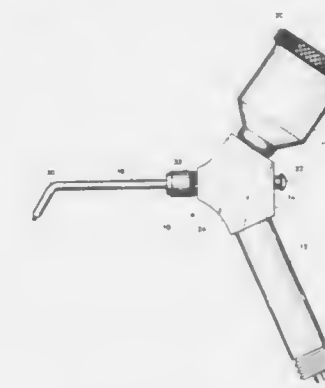
L. Emery Karst, 317 San Rodee Dr. SE, Salem, Oreg. 97301

Continuation-in-part of Ser. No. 886,443, Jul. 17, 1986, abandoned. This application Dec. 3, 1987, Ser. No. 128,157

Int. Cl.<sup>3</sup> A61C 3/02

U.S. Cl. 433—88

9 Claims



1. A dental tool for polishing teeth comprising:

- (a) a handle adapted to be grasped in piston-like fashion;
- (b) a manifold connected to the top of the handle, said mani-

fold including an air input line, an air output line, a water input line and a water output line;

(c) a spray nozzle connected to the manifold and including air and water conduits connected to the air output line and the water output line of the manifold respectively, said spray nozzle extending from the manifold at an obtuse angle of less than 180° with respect to the handle; and

(d) a mixing chamber for mixing air under pressure with an abrasive powder to create an abrasive-laden air stream, comprising a canister affixed to the manifold, said canister extending substantially vertically upwards from an upper side of the manifold when said handle is grasped in pistol-like fashion, thereby forming an obtuse angle with respect to both the handle and the nozzle, said canister having a bottom portion proximate said manifold, said bottom portion including air input means communicating with said air input line of said manifold for permitting air to pass from said air input line into said bottom portion of said canister, said canister further including a vertical output tube connected to said air output line of said manifold extending through said bottom portion of said canister to just below the top of said canister, whereby air entering said canister through said air input means agitates the abrasive powder forcing the abrasive-laden air stream down through said output tube to said manifold.

4,950,161

# ASSEMBLY FOR CONNECTING A CROWN PART TO AN IMPLANT

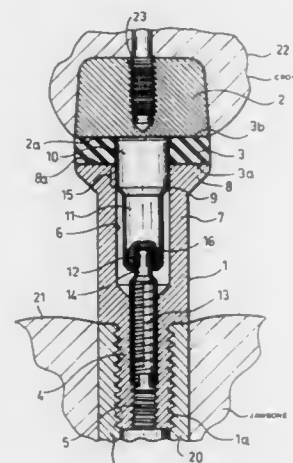
Ernst-Jürgen Richter, Schlossparkstrasse 56, 5100 Aachen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 247,110, Sep. 19, 1988, abandoned. This application Jun. 1, 1989, Ser. No. 359,959  
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731265

Int. Cl. A61C 8/00

U.S. Cl. 433—169

13 Claims



1. A jaw-implant connecting assembly for affixing a prosthetic crown part to a jaw implant, said assembly comprising:

an implant-connecting member having first and second end portions at opposite termini thereof, said member being affixed to an implant and having an end face on said first end portion turned away from said implant;

a crown-part-connecting member adapted to be affixed to said prosthetic crown part and having an end face juxtaposed with said end face of said implant-connecting member;

an elastic cushion which is an annular disk interposed between said members and, at least in regions of outer surfaces thereof in contact with said end faces, being fixedly connected to said end faces; and

wherein said implant-connecting member is elongated, said

second end portion is provided with a threaded bore opening into a cylindrical recess of larger diameter than said bore and interposed between said end face of said implant-connecting member in said bore, said second end portion having a smaller diameter than said first end portion.

4,950,162

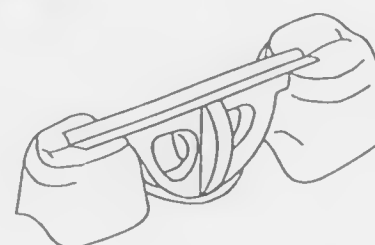
# FRAMEWORK FOR PRODUCING TOOTH-REPLACING BRIDGES

Karlheinz Korber, Hohrott 15, 2305 Heickendorf, and Klaus Ludwig, Auf der Tenne 14, 2300 Kronshagen, both of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 765,438, Aug. 14, 1985, abandoned. This application Jul. 27, 1988, Ser. No. 224,604  
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430448; European Pat. Off., Jul. 26, 1985, 85-109398.9  
Int. Cl. A61C 13/225

U.S. Cl. 433—180

17 Claims



1. A framework for use in producing tooth-replacement bridges, comprising

a support bar for spanning a gap that is to be closed between abutment teeth,

said support bar having opposed ends for positioning the support bar on said teeth,

at least one longitudinal reinforcing rib extending along the length of said support bar from the bottom thereof to resist bending of said support bar in a vertical plane, and

at least one lateral rib for resisting bending of said support bar in a horizontal plane.

4,950,163

# DENTAL SYRINGE FOR TREATING GUMS

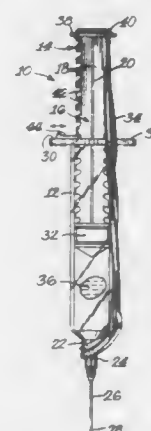
Alan W. Zimble, 2006 Limestone Rd. #2, Wilmington, Del. 19808-5553

Filed May 19, 1988, Ser. No. 195,791

Int. Cl. A61C 5/00

U.S. Cl. 433—215

1 Claim



1. A method of treating a user's gums comprising the steps of

supplying a treatment fluid into the cylinder of a syringe with the plunger of the syringe extending outwardly from the cylinder and with the cylinder having a front hub portion remote from a notched end plate at the outer end of the plunger, attaching a rubberband to the hub and to the end plate to create a resilient force when the plunger is fully extended from the cylinder to urge the plunger into the cylinder, resisting the inward movement of the plunger by the user applying resistance to the syringe to resist the resilient force of the rubberband, the user inserting the blunt end of the applicating tip of the syringe into a gum pocket of the user, releasing the resistance to permit movement of the plunger into the cylinder and force the treatment fluid out of the applicating tip and into the gum pocket, and flushing the gum pocket with the treatment fluid.

4,950,164

# DIET PLANNING AND CONTROL SYSTEM AND METHOD

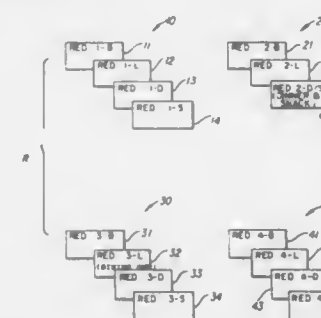
Doris L. Lennon-Thompson, Yorktown Heights, and Kathleen R. Raneri, Katonah, both of N.Y., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Nov. 17, 1989, Ser. No. 439,119

Int. Cl. G09B 1/06

U.S. Cl. 434—127

14 Claims



10. A method for controlling and regulating the intake by a dieter of calories as well as a plurality of macronutrients and micronutrients, comprising the steps of:

taking, a plurality of sets of coded cards, all cards of each set having a common visually perceivable code which is common to all other cards of that set and visually distinguishable from the codes of other sets of cards, wherein a majority of said sets include cards for at least three different eating occasions, there being a plurality of cards for most of the eating occasions within each set, any one of which can be substituted for any other within that eating occasion on any given day, and wherein each card contains information which is specific to certain food and beverage items, these being all of the food and beverage items to be consumed by the dieter on that particular eating occasion,

and selecting cards for each given day, including selecting an appropriate set of cards and then selecting the appropriate eating occasion cards within the selected set, whereby the selection of said cards by the dieter, and the consumption of food and beverage only as set forth on the selected cards will maintain a desired intake of calories, macronutrients and micronutrients for the dieter for that day.

4,950,165  
EDUCATIONAL TOY BLOCKS

Joseph Machaalani, 8628 - 66th Avenue, Ottawa, Edmonton, Alberta, Canada (T6E 0L3)

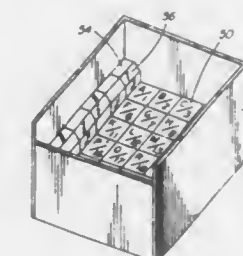
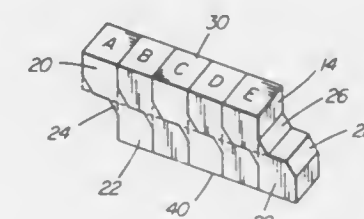
Filed May 12, 1989, Ser. No. 350,729

Claims priority, application Canada, Mar. 23, 1989, 594592

Int. Cl. G09B 1/00

U.S. Cl. 434—159

12 Claims



1. An educational toy comprising a container and a plurality of blocks adapted to be removably arranged in rows within said container; said container having a bottom and side walls; each of said blocks having a first, substantially cubic member including a top face, sides and a bottom; and a second, substantially cubic member including a top face, sides and a bottom; the bottom of said first member and the bottom of said second member being joined by an interconnecting member such that said first member is offset in one direction with respect to said second member, said top face of said first member having thereon indicia of a first sequential series and said top face of said second member having thereon indicia of a second sequential series, wherein said blocks may be placed in rows in said container thereby displaying sequentially said indicia of said first series of said indicia of said second series.

4,950,166

# EDUCATIONAL KIT FOR FAST CYCLING PLANTS

Paul H. Williams, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation of Ser. No. 934,403, Nov. 24, 1986, abandoned.

This application Mar. 13, 1989, Ser. No. 323,209

Int. Cl. G09B 23/00

U.S. Cl. 434—276

18 Claims

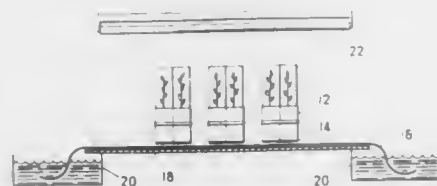
1. An educational kit for the classroom study of fast-cycling Brassica plants comprising

a compact plant growth environment for plants suitable for classroom use, including physical containers for plants, and a watering system to continually water plants in the containers with minimum maintenance; and

a stock of seeds of fastcycling Brassica plants having an



average growing cycle of not more than about sixty days and of a size appropriate for the compact growth environ-

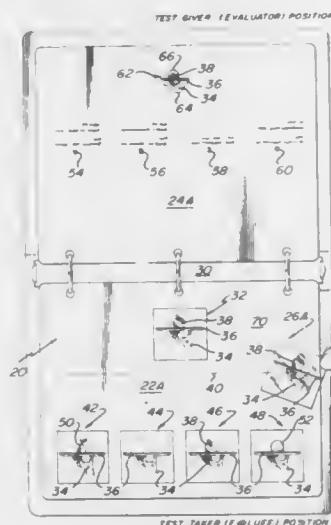


ment, the seeds selected to yield plants having easily observable traits of educational interest.

**4,950,167**  
**VISUAL DETAIL PERCEPTION TEST KIT AND METHODS OF USE**  
Jeffrey A. Harris, Cherry Hill, N.J., assignor to Jewish Employment and Vocational Service, Philadelphia, Pa.  
Filed Oct. 19, 1989, Ser. No. 423,920  
Int. Cl.<sup>5</sup> G09B 19/00

U.S. Cl. 434-322

13 Claims



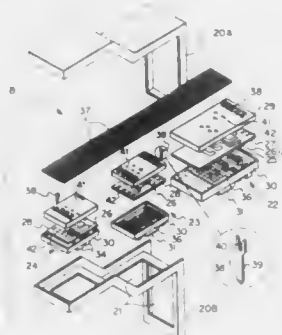
1. A test kit for testing the visual perception of a person comprising at least one indicia bearing test sheet, at least one associated, indicia-bearing, instruction sheet, one indicia-bearing marker for said one test sheet, and holding means for said test and instruction sheets, said test sheet bearing indicia forming one target icon and a plurality of answer icons, one of said answer icons being identical to said target icon, the others of said answer icons being similar to said target icon yet differing somewhat in appearance therefrom, said answer icons being located at predetermined locations on said test sheet, said holding means being arranged for holding said test sheet in front of the person being tested so that said icons are right side up as viewed by said person, said answer displaying marker comprising a transparent member bearing indicia corresponding exactly to said target icon and arranged to be placed on said target icon on said test sheet so that the target icon can be seen therethrough to show the identity of those indicia, said displaying marker also being arranged to be placed on said one answer icon on said test sheet so that said one answer icon can be seen therethrough to show the identity of those two indicia, and to be placed on any of said other answer icons on said test sheet so that any of said other answer icons can be seen therethrough to show the non-identity of thereof, said instruction sheet bearing respective instructional indicia in locations cor-

responding to the locations of said answer icons on said test sheet, said holding means also being arranged for holding said instruction sheet so that the indicia thereon appears right side up in front of the person giving the test and upside down to the person taking the test, each of said respective instructional indicia providing information to the person giving the test about the differences and/or similarities between the target icon and that answer icon which is located in the same respective position on the test sheet as the respective instructional indicia so that the person giving the test can readily point out those differences and/or similarities to the person taking the test.

**4,950,168**  
**ELECTRICAL CONNECTION BOX**  
Mitsugu Watanabe, and Kelichi Ozaki, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Filed Apr. 14, 1989, Ser. No. 338,086  
Claims priority, application Japan, Apr. 14, 1988, 63-90250  
Int. Cl.<sup>5</sup> H01R 13/518

U.S. Cl. 439-34

10 Claims



1. An electrical connection box for positioning along a wall surface of a vehicle dashboard, said connection box comprising:  
a plurality of connection blocks each having a first surface;  
a plurality of conductors traversing said first surfaces of said connection blocks and electrically connecting said connection blocks to one another, with said connection blocks being movable with respect to one another and positioned along said wall surface of said vehicle dashboard; and  
a single housing which encases said connection blocks at least on the side of said connection blocks furthest from said wall surface.

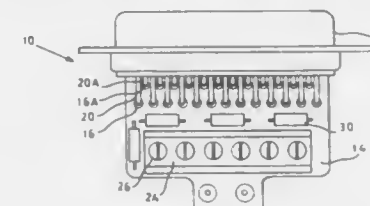
**4,950,169**  
**UNIVERSAL CABLE CONNECTOR FOR ELECTRONIC DEVICES**  
Fred L. Martin, and David N. Brozenick, both of Knoxville, Tenn., assignors to PC Industries, Inc., Knoxville, Tenn.  
Filed Mar. 13, 1989, Ser. No. 322,215  
Int. Cl.<sup>5</sup> H01R 13/68, 13/66

U.S. Cl. 439-44

9 Claims

1. An improved connector of the "D"-type for attachment to the ends of multi-wire cables used to convey signals between electronic components and the like, said components having complementary units to receive said connector, said connector comprising:  
a body member of the "D"-type connector, said body provided with an array of signal pins to coact with receptors of said complementary units, said body defining an internal volume;  
a circuit board;  
a plurality of junction points on said circuit board at least equal in number to said signal pins of said body member;

electrical connections joining each of said junction points to selected ones of said signal pins;  
a terminal strip mounted on said circuit board, said terminal strip provided with a sufficient number of terminals to receive ends of said wires of said cable; and

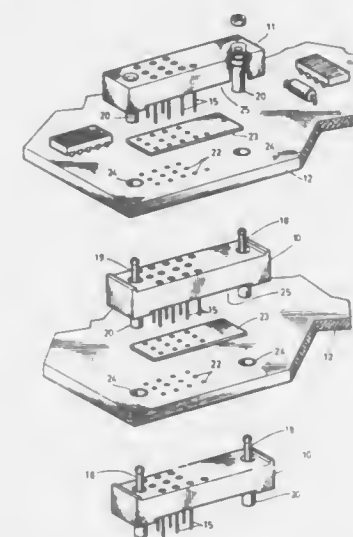


a fuse link network on said circuit board joining said terminals of said terminal strip and said junction points, said fuse link network adapted to permit passing current through selected fuse links of said network to destroy said selected fuse links and thereby retain remaining fuse links for carrying signals between said terminals and said junction points.

**4,950,170**  
**MINIMAL SPACE PRINTED CIRCUIT BOARD AND ELECTRICAL CONNECTOR SYSTEM**  
Grady A. Miller, Jr., Grand Prairie, Tex., assignor to LTV Aerospace & Defense Company, Grand Prairie, Tex.  
Filed Jun. 23, 1988, Ser. No. 210,751  
Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439-74

14 Claims



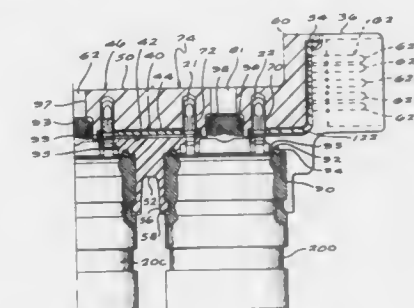
1. A connector for interconnecting printed circuit boards comprising:  
a. a connector body having opposite surfaces configured to fit against the surfaces of printed circuit boards, the connector comprising a dielectric material covered with a coating of an electrically conductive material;  
b. an electrical connecting element mounted within the connector body with a pin-type connecting end at one end and a socket-type connecting end at the other end sized to receive such a pin-type connecting end in a sliding electrical contact; and  
c. at least one of the two connecting ends projecting beyond the connector body a distance sufficient to pass through opposite surfaces of a printed circuit board and to make a sliding electrical contact with the opposite type connecting end of another such connecting element in another

connector body with each opposite surface of the circuit board fitting against a surface of a separate one of the two connector bodies.

**4,950,171**  
**FUEL INJECTOR CONNECTOR SYSTEM**  
Steven Z. Muzalay, Huntington Beach, Calif., assignor to ITT Corporation, New York, N.Y.  
Filed Aug. 11, 1989, Ser. No. 392,324  
Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439-76

6 Claims



1. Apparatus for use with an engine having power cylinders, a fuel injector rail for carrying pressured liquid fuel, a plurality of fuel injectors each mounted on said rail and coupled to one of said power cylinders to supply fuel from the rail thereto with each fuel injector controlled by an electrical signal, and a circuit for generating said signals, for coupling said circuit to said injectors, comprising:

an elongated assembly which includes a printed circuit board with opposite faces and a housing comprising upper and lower parts lying on opposite faces of said circuit board and trapping said circuit board between them to form an elongated sandwiched connector assembly, said connector assembly having an input connector end portion with an input connector and having an elongated output portion with a plurality of injector-connecting locations spaced therealong, said housing parts trapping said circuit board between them at both said input end portion and said output portion;  
said circuit board having a pair of connector assembly contacts at each of said injector-connecting locations, said circuit board having a plurality of connector terminals at said input connector including a bus connector terminal and a plurality of signal terminals, said circuit board having a bus conductor connecting said bus terminal to one contact of each of said pairs of contacts, and having a plurality of signal circuit conductors connecting selected ones of said signal connector terminals to another contact of each of said pairs of contacts to supply electrical signals received on one of said terminals to an injector at a corresponding one of said injector-connecting locations;  
said output portion of said connector assembly extending substantially in a straight line and said input connector end portion extending primarily perpendicular to said output portion;  
said circuit board being flexible in bending and said upper and lower housing parts being substantially rigid molded parts and hold said circuit board to extend substantially straight along said input and output portions and in a largely 90° bend at the intersection of said input and output portions.

4,950,172

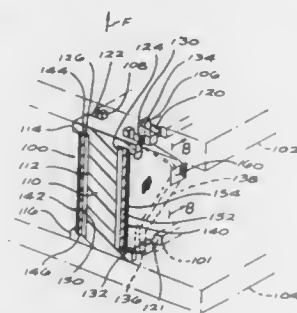
## CONNECTOR WITH INTERCEPTOR PLATE

John W. Anhalt, Orange; Edward Rudoy, Woodland Hills; William J. Clark, Mission Viejo, and Michael A. Lin, Anaheim, all of Calif., assignors to ITT Corporation, New York, N.Y.  
Filed Oct. 10, 1989, Ser. No. 419,405

Int. Cl.<sup>5</sup> H01R 13/648

U.S. Cl. 439—108

3 Claims



1. A connector comprising:
  - a housing having a support;
  - first and second rows of contacts in said housing with each row of contacts including a mounted part in said support and an elongated leg extending in a predetermined forward direction from said mounted part, with the legs of the contacts in a row all lying substantially in an imaginary plane;
  - a pair of interception plates of electrically conductive material, each interception plate lying in a plane extending parallel to a said imaginary plane of a said row of contact legs, said interception plates lying on opposite sides of the space between said first and second rows of contacts, and said interception plates each lying closer to the contacts of an adjacent row of contacts than the distance between contacts in said first and second rows, and each interception plate having at least a portion adjacent to a plurality of said contacts and at a predetermined constant potential; and
  - wherein said housing includes insulation between the contacts of a row and on a side of each plate opposite a corresponding row of contacts, but the space between each contact leg and an adjacent interception plate is substantially devoid of insulation.

4,950,173

## SERVICE TEMPERATURE CONNECTOR AND PACKAGING STRUCTURE OF SEMICONDUCTOR DEVICE EMPLOYING THE SAME

Tetsuro Minemura; Hisashi Ando, both of Hitachi; Yoshiaki Kita, Katsuta, and Isao Ikuta, Iwaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 619,943, Jun. 11, 1984, abandoned.

This application Mar. 24, 1986, Ser. No. 843,004

Claims priority, application Japan, Jun. 15, 1983, 58-105652

Int. Cl.<sup>5</sup> H01R 9/09

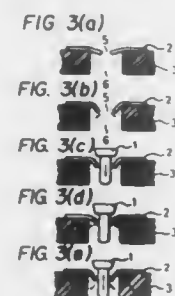
U.S. Cl. 439—82

12 Claims

1. A connector comprising:
  - a first insulating substrate having a plurality of through-holes and having a first circuit pattern formed on the insulating substrate;
  - female contacts of a thickness not more than 100  $\mu$ m, each of said female contacts being formed and fixed around the edge of the through-hole of said first insulating substrate and having an opening, an edge of which extends inwardly of the through-hole of said first insulating substrate, the female contacts being electrically connected to the first circuit pattern of said insulating substrate;
  - a male contact comprising a second insulating substrate having a second circuit pattern thereon and a plurality of male contact pins fixed to the second insulating substrate

and electrically connected to the second circuit pattern, the male contact pins each being located in a position corresponding to each of the openings of said female contacts,

said female contacts are made of a shape memory alloy and the edge of each of the female contacts is given, prior to insertion of each of the male contact pins, a shape memory such that said female contact is returned to a position to close the opening when said female contact is subjected to a temperature above the finishing temperature of the transformation from martensite to parent phase, and said male contact is inserted in the opening of said female contact at a temperature not higher than the starting temperature of the transformation from parent phase to



martensite of the shape memory alloy of said female contact, whereupon said female contact is maintained at a temperature over the finishing temperature of the transformation from martensite to parent phase of the shape memory alloy, and

wherein said female contacts, of the shape memory alloy, are made of a flat thin film and are arranged orthogonally to a direction of the insertion of the male contact, whereby said female contact and said male contact are electrically connected and are mechanically joined securely with each other in a service temperature, whereupon the connector is held over the finishing temperature of the transformation from martensite to parent phase in the service temperature.

4,950,174

## FIELD SEPARABLE ORDNANCE STEPOVER BRACKET

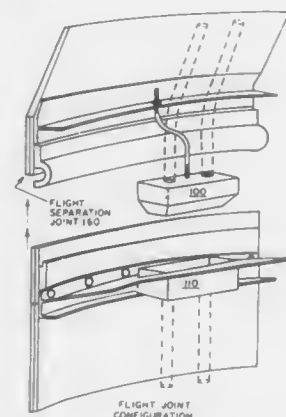
William R. Llewellyn, and Verne W. Carlson, both of Littleton, Colo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 21, 1989, Ser. No. 313,115

Int. Cl.<sup>5</sup> H01R 13/62

U.S. Cl. 439—158

1 Claim



1. In a multistage missile system which has a plurality of

ordnance transfer cables that traverse missile stages including a first set of ordnance transfer fuse cables in a first missile stage and a second set of ordnance transfer fuse cables in a second missile stage, an ordnance stepover bracket which connects said first and second set of ordnance transfer fuse cables across an interstage junction between said first and second missile stages, wherein said interstage junction in said missile includes a field separation joint which allows said first and second missile stages to be physically disconnected and separated for maintenance and inspections, and a flight separation joint which is lined with a linear shaped charge which detonates during flight to physically separate said first and second stages, wherein said ordnance stepover bracket comprises:

- a plug which is connected with and receives said first set of ordnance transfer fuse cables in its top, and which has a bottom exterior which has tapered edges and a first mating face, said first mating face of said plug being connected with said first set of ordnance transfer fuse cables;
- a receptacle which is connected with and receives said second set of ordnance transfer fuse cables in its bottom, said receptacle having a top indentation which has a complementary interior having interior dimensions into which said plug may be inserted such that said first and second mating faces come into contact, said interior dimensions of said complementary interior having a clearance which allows said plug to be easily removed upon any physical separation between said first and second missile stages across said interstage junction;
- a plurality of percussion charges which are housed in said plug and said receptacle at the ends of said first and second sets of ordnance transfer fuse cables, said plurality of percussion charges being ignited by said ordnance transfer fuse cables during flight separation to produce a percussion wave that ignites said linear shaped charge;
- a bracket which is fixed to said receptacle and which attaches it to said second missile stage in close proximity with said linear shaped charge so that said percussion charges will ignite said linear shaped charge upon their detonation during a flight stage separation event; and
- a spring which is fixed to said first missile stage at one end, and which is fixed to said plug at its other end, said spring having a length which allows said plug to reach into said receptacle for mateup of said plug and said receptacle.

4,950,175

## ELECTRICAL CONNECTOR

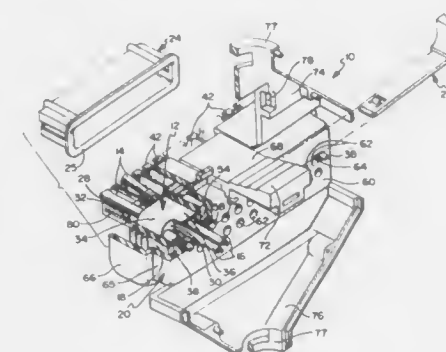
Robert G. Plyler, Vienna; Lyle B. Suverison, Fowler; John A. Yurtin, Southington, and Joseph H. Gladd, Cortland, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 7, 1989, Ser. No. 403,955

Int. Cl.<sup>5</sup> H01R 13/52

U.S. Cl. 439—274

10 Claims



1. An electrical connector comprising:
  - a connector body having a plurality of terminal cavities

extending axially through the connector body from a forward contact end to a rearward conductor end, an elastomeric seal mounted on the rearward conductor end of the connector body,

the elastomeric seal having an annular wall which includes a circumferential sealing lip which is adapted to provide an interface seal between the connector body and to a mating connector body,

the elastomeric seal having a back wall which seals the terminal cavities at the conductor end of the connector body,

the back wall having a plurality of apertures which are aligned with the respective terminal cavities of the connector body and which are adapted for sealing around insulated conductor wires which project out of the terminal cavities at the conductor end of the connector body, and

a backshell which is attached to the rearward conductor end of the connector body over the elastomeric seal to retain the elastomeric seal,

backshell having a back wall which is juxtaposed to the back wall of the elastomeric seal and which has a plurality of guide holes which are aligned with the apertures of the elastomeric seal and the terminal cavities of the connector body for guiding terminals attached to insulated conductor wires into the respective terminal cavities via the apertures of the elastomeric seal.

4,950,176

## MODULAR PLUG FOR TERMINATING CORDAGE

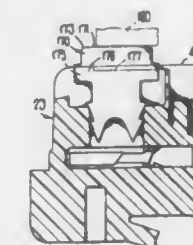
Eugene R. Cocco, Glendale, and Bobby W. Rothman, Phoenix, both of Ariz., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 18, 1988, Ser. No. 273,301

Int. Cl.<sup>5</sup> H01R 4/50

U.S. Cl. 439—344

8 Claims



1. A modular plug for making an electrical connection between conductors and components external to the plug, said plug comprising:

- a dielectric housing which includes a conductor-receiving end and a termination end, said housing including a cavity for holding end portions of conductors and a plurality of terminal-receiving slots each communicating with said cavity and opening to an inner surface of a well which opens to an exterior surface of said housing; and
- a plurality of electrically conductive flat blade-like terminals each of which is positioned in one of said slots, each said terminal comprising:

- a body portion having a first end adjacent to said termination end and a second end oriented toward said conductor-receiving end of said housing;
- an internal contact portion which extends from said body portion into said cavity for making electrical engagement with an aligned conductor;
- an external contact portion extending toward said exterior surface of said housing for engaging and establishing an electrical connection with an external component; and
- a reference edge surface which extends from said external contact portion to said termination end and which faces toward said exterior surface of said housing;

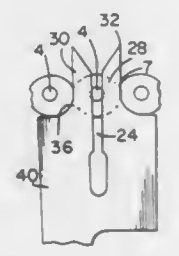
said dielectric housing also including a plurality of partitions



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with portions of said partitions extending from said inner surface of said well to said exterior surface of said housing, said portions of said partitions extending for only a portion of the distance between opposite ends of said well with any remaining length of said partitions therebeyond being recessed from said exterior surface of said housing and extending a distance from the inner surface of the wall toward said exterior surface of said housing which does not exceed the distance by which said reference surface of each said terminal extends from a slot toward said exterior surface of said housing when said terminals are seated fully in said housing.

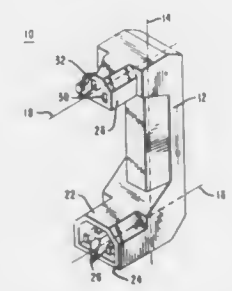
**4,950,177**  
**CONNECTOR FOR HIGH DENSITY RIBBON CABLE**  
David S. Szczesny, 7572 Morningstar Ave., Harrisburg, Pa. 17112  
Continuation of Ser. No. 110,624, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 845,087, Mar. 27, 1986, abandoned. This application Jan. 24, 1989, Ser. No. 302,102  
Int. Cl.<sup>5</sup> H01R 4/24  
U.S. Cl. 439—404 12 Claims



1. An electrical connector for insulation displacing termination of ribbon cable having conductors on predetermined close centerline spacing comprising:  
a housing having a mating face, an opposed cable receiving face, and at least one row of terminal receiving passages extending between said faces;  
a plurality of terminals received in respective passages, each terminal having a mating portion toward said mating face and a slotted plate toward said cable receiving face;  
said slotted plate comprising a conductor receiving portion, a base portion and a transition portion therebetween, said plate having a conductor receiving slot of selected depth passing through said conductor receiving portion and said transition portion and into said base portion, said conductor receiving portion extending beyond said cable receiving face and having mutually opposed outer edge surfaces which are spaced approximately as the predetermined centerline spacing of the conductors of the ribbon cable adapted to be terminated thereto, said base portion being wider than the conductor receiving portion and having mutually opposed outer edge surfaces which are spaced substantially greater than the predetermined centerline spacing of the conductors of the ribbon cable adapted to be terminated thereto, said base portion beginning approximately midway along the slot depth, said transition portion comprising outer edge surfaces which diverge from respective outer edge surfaces of said conductor receiving portion to respective outer edge surface of said base portion, at least a portion of the transition region extending above the cable receiving face, said transition portion adapted to receive on the diverging edges thereof an outer surface of insulation surrounding conductors adjacent to a conductor received in a respective slotted plate when a ribbon cable is terminated in the connector, whereby that portion of the transition region extending above the cable receiving face receives on the diverging edges thereof an outer surface of insulation surrounding adjacent conductors in the cable and normal contact force is maintained on a conductor received in the slot by strength imparted from

said base portion when a ribbon cable is terminated to the connector.

**4,950,178**  
**AC POWER INTERCONNECT FOR STACKED ELECTRONIC DEVICES**  
Robert T. Harvey, Wichita, Kans., and David C. White, Cincinnati, Ohio, assignors to NCR Corporation, Dayton, Ohio  
Filed Oct. 19, 1989, Ser. No. 424,049  
Int. Cl.<sup>5</sup> H01R 31/08  
U.S. Cl. 439—507 14 Claims

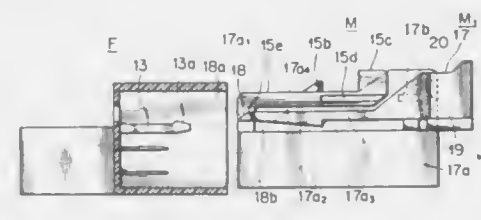


1. A device for electrically interconnecting two electronic devices, comprising:  
a first connector for making electrical contact with a first of said electronic devices;  
a second connector for making electrical contact with a second of said electronic devices stacked vertically with said first of said electronic devices; and  
a body member by which said first and second connectors are joined and having a conductor in said body member electrically connecting said first connector to said second connector, said body member and said first and second connectors integrated into a single rigid structure;  
said first and second connectors face in a common direction perpendicular to a longitudinal direction of said conductor to facilitate interconnection between said vertically stacked electronic devices;  
wherein a distance between said first connector and said second connector is substantially equal to a distance between an AC input of said first electronic device and an AC output of said second electronic device, such that said device makes electrical connections for AC power therebetween with no surplusage to waste space.

**4,950,179**  
**LOCKING SECURITY MECHANISM OF ELECTRICAL CONNECTOR**  
Kenji Takenouchi; Toshihiko Makita, and Mitsuru Matsumoto, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Filed May 11, 1989, Ser. No. 350,483  
Claims priority, application Japan, May 13, 1988, 63-63041[U]  
Int. Cl.<sup>5</sup> H01R 13/627  
U.S. Cl. 439—352 15 Claims

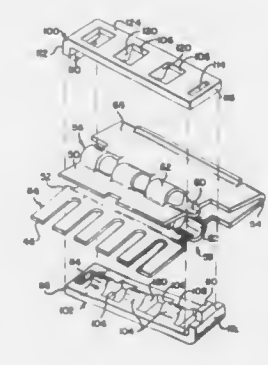
1. A locking security mechanism for an electrical connector having a pair of male and female connector members, the male connector member having a plurality of longitudinal compartments receiving terminal fittings and the female connector member having a rear portion having a plurality of longitudinal compartments corresponding to those of the male connector member and a front portion having a chamber for receiving at least a front portion of the male connector member, the locking security mechanism comprising:  
locking means provided in the male and female connector member; and

locking security means, having a locking security member mounted in one of the male or female connector members in a normally undetachable manner and maintained in a pre-engagement position in which it is prevented from coming into a position for securing the locking of the



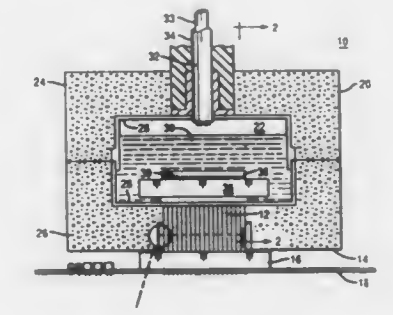
locking means, and a pre-engagement releasing means provided in the other of the male and female connector members for making the locking security member come into position for securing the locking means when the male and female connector members are engaged.

**4,950,180**  
**ELECTRICAL TERMINATION AND METHOD OF TERMINATING FLAT POWER CABLE**  
John K. Daly, Scottsdale, and Earl R. Kreinberg, Phoenix, both of Ariz., assignors to AMP Incorporated, Harrisburg, Pa.  
Continuation of Ser. No. 193,852, May 13, 1988, Pat. No. 4,859,204. This application Jul. 19, 1989, Ser. No. 382,604  
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> H01R 4/24  
U.S. Cl. 439—422 5 Claims



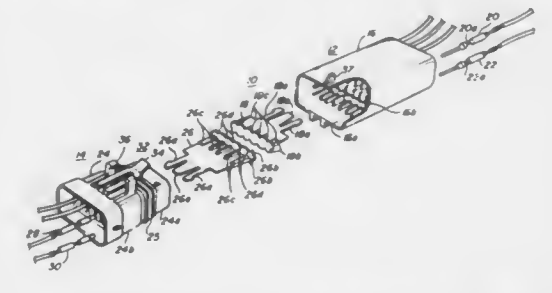
1. A termination of a terminating member to a flat power cable of the type having a flat conductor, comprising at least one terminating member disposed at least proximate a respective major surface of said flat cable, each said at least one terminating member being of relatively soft and deformable metal having good conductive properties and having a body section including an array of spaced apertures, said flat cable including a corresponding array of sheared and deflected conductor strip portions extending outwardly from the plane of said cable and exposing sheared conductor edges thereof, respective ones of said sheared and deflected conductor strip portions being disposed within respective said apertures of said terminating member with sheared conductor edges being laterally adjacent side surfaces of said apertures, and said terminating member being staked from a cable-remote surface beside said side surfaces of each said aperture and thereby being bulk deformed against said exposed edges of said sheared and deflected conductor strips, forming gas-tight electrical connections between said exposed sheared conductor edges and adjacent ones of said side surfaces of said terminating member apertures.

**4,950,181**  
**REFRIGERATED PLUG-IN MODULE**  
Warren W. Porter, Escondido, Calif., assignor to NCR Corporation, Dayton, Ohio  
Filed Jul. 28, 1988, Ser. No. 225,126  
Int. Cl.<sup>5</sup> H05K 7/20  
U.S. Cl. 439—485 7 Claims



1. A low thermal conductance electrical connection apparatus for use between a lead of a semiconductor device and a receptacle of a connector mounted upon a printed circuit board, comprising:  
a first member having a receptacle on a first end for receiving said lead of said semiconductor device and a second end opposite said first end;  
an electrical conductor member, including:  
a thin-walled stainless steel tube member having a low thermal conductance; and  
a coating, that is thin relative to the thickness of the wall of said stainless steel tube member, of a metal having a high electrical conductance;  
said electrical conductor member having a first end connected to said second end of said first member; and  
a second end of said electrical conductor member connected to the receptacle of the printed circuit board connector; whereby said electrical conductor member has a good electrical conductance and a low thermal conductance.

**4,950,182**  
**SECONDARY LOCK MECHANISM FOR AN ENVIRONMENTALLY SEALED CABLE ASSEMBLY**  
Thomas E. Zielinski, Saint Clair, and Paul W. Geyer, Rochester, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.  
Filed Jul. 24, 1989, Ser. No. 383,845  
Int. Cl.<sup>5</sup> H01R 13/436  
U.S. Cl. 439—595 6 Claims



1. An environmentally sealed cable assembly for connecting two separate cable circuits using female terminals in a socket and male terminals in a plug;  
wherein a pair of rows of male terminals are positioned in a plurality of arch-shaped terminal receiving channels disposed in a housing of the plug in a chosen manner;  
wherein a pair of rows of female terminals are positioned in

a plurality of arch-shaped terminal receiving channels disposed in a housing of the socket in a chosen manner; wherein each of the plurality of female and male terminals has a circular groove at a chosen position along the body of the terminal for use in locking the terminal into the housing;

wherein each of the plurality of female and male terminals include a pair of crimping arms at a rear end for crimping a wire to the terminal;

wherein each of the plurality of channels disposed in the socket and plug housings has a locking keeper arranged therein which snaps into the circular groove of the terminal for providing primary locking of each terminal in each channel to prevent accidental retraction of the terminal during use;

wherein the plug housing is comprised of two molded chambers, a front undivided chamber for receiving the socket and a rear divided chamber in which the plurality of terminals are positioned;

wherein the socket housing is a single chamber structure having the plurality of channels extending substantially the length of the housing in which the plurality of socket terminals are positioned; said cable assembly comprising:

(a) a lock bar receiving cavity disposed between the pairs of rows of male terminal receiving channels within the interior of the plug, said lock bar receiving cavity not being open peripherally to the exterior of the plug so as to maintain environmental integrity;

(b) another lock bar receiving cavity disposed between the pairs of rows of the female terminal receiving channels within the interior of the socket, said other lock bar receiving cavity not being open peripherally to the exterior of the plug so as to maintain environmental integrity;

(c) a male terminal lock bar for insertion in said plug lock bar receiving cavity, locking each of the plurality of locking keepers in the circular grooves of each of the male terminals in the pair of rows of male terminals, said male terminal lock bar having a pair of outer, laterally directed, triangularly shaped, resilient material locking fingers and at least one rectangular shaped finger disposed between said pair of outer fingers, said outer fingers flexing inwardly upon entry into the receiving cavity between the first pair of side walls and then outwardly when a pair of nibs of the outer fingers contact the second pair of side walls, thus locking said lock bar within said receiving cavity, said fingers extending rearwardly beyond the rear ends of said terminals; and

(d) a female terminal lock bar for insertion in said socket lock bar receiving cavity, locking each of the plurality of locking keepers in the circular grooves of each of the female terminals in the pair of rows of female terminals, said female terminal lock bar having a pair of outer, laterally directed, triangularly shaped, resilient material locking fingers and at least one rectangular shaped finger disposed between said pair of outer fingers, said outer fingers flexing inwardly upon entry into the receiving cavity between the first pair of side walls and then outwardly when a pair of nibs of the outer fingers contact the second pair of side walls, thus locking said lock bar within said receiving cavity, said fingers extending rearwardly beyond the rear ends of the terminals.

4,950,183

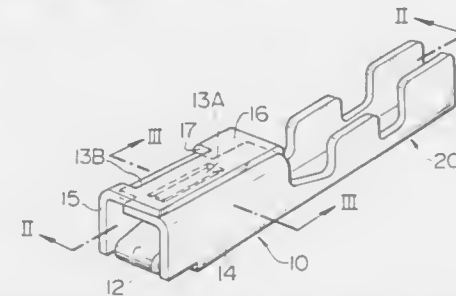
## ELECTRICAL CONNECTOR

Hiroshi Watanabe, and Katsuaki Terada, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Filed Sep. 22, 1989, Ser. No. 411,390

Claims priority, application Japan, Oct. 7, 1988, 63-131024  
Int. Cl.<sup>3</sup> H01R 13/00

U.S. Cl. 439—843

1 Claim



1. An electrical connector comprising: a substantially rectangular, sleeve-shaped electrically contacting portion in which a male terminal is to be inserted; and an electric wire connecting portion of a substantially U-shape in section which is formed integrally with the electrically contacting portion for fixedly securing an electric wire thereto, the arrangement being made such that a resilient contact piece formed by extending one wall of said electrically contacting portion is located in the electrically contacting portion, and a projection is formed by projecting part of the other wall of said electrically contacting portion opposite to the resilient contact piece towards the latter to thereby enable a male terminal to be gripped resiliently and held between the projection and said resilient contact piece, wherein a protective wall is formed by extending a side wall of said electrically contacting portion so that it may contact with and cover the outer surface of said other wall of said electrically contacting portion thereby preventing said projection from bulging towards said resilient contact piece.

4,950,184

## WALL PLATE ASSEMBLY

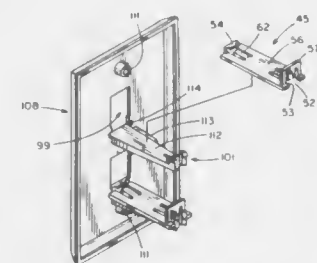
Jack E. Caveney, Hinsdale; John J. Bulanda, New Lenox; Richard L. Fischer, Lisle; Andrew J. Stroede, Tinley Park, and Donald C. Wienczek, Tinley Park, all of Ill., assignors to Panduit Corp., Tinley Park, Ill.

Division of Ser. No. 179,157, Apr. 8, 1988, Pat. No. 4,875,881.  
This application Oct. 13, 1989, Ser. No. 421,418

Int. Cl.<sup>3</sup> H01R 13/73

U.S. Cl. 439—536

4 Claims



1. A wall plate assembly for mounting connectors within a standard electrical mounting box, comprising: a connector and a connector mounting insert; a wall plate having means to secure the wall plate to the standard box; an insert supporting platform orthogonally projecting from

an inner surface of the wall plate adjacent a connector access window;  
a resilient latch means formed on the distal end of the platform for securing the insert to the wall plate; and  
a slot means on the wall plate and spaced from the latch means for trapping an edge of the insert opposite the latch means.

4,950,185

## STRESS ISOLATED PLANAR FILTER DESIGN

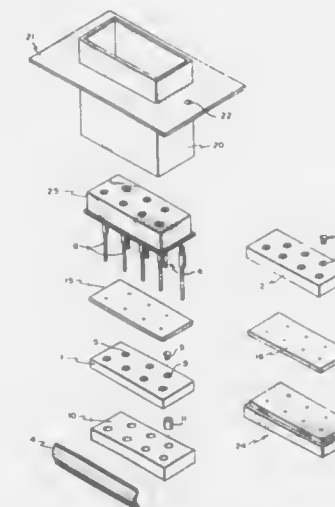
Kamal S. Boutros, Downsview, Canada, assignor to Amphenol Corporation, Wallingford, Conn.

Filed May 18, 1989, Ser. No. 353,480

Int. Cl.<sup>3</sup> H01R 13/66

U.S. Cl. 439—620

6 Claims



1. An electrical connector, comprising a connector housing and a substantially planar filter array sandwiched between substantially planar resilient members located within said housing, said planar resilient members being arranged to isolate said filter array from mechanical and thermal stresses to which the housing is subject, and further comprising grounding springs arranged between said housing and said array to electrically connect said housing with said filters, said grounding springs being arranged to support said array in said housing and to further isolate said array from shocks.

4,950,186

## ELECTRICAL CONTACT TERMINAL

Robert C. Kaley, Landisville, and James H. Wise, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 285,681, Dec. 15, 1988, abandoned, and a continuation-in-part of Ser. No. 359,196, May 31, 1989. This application Jun. 15, 1989, Ser. No. 366,817  
The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.

Int. Cl.<sup>3</sup> H01R 4/18

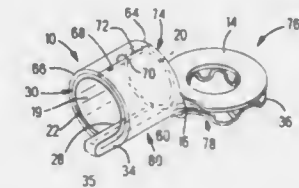
U.S. Cl. 439—882

4 Claims

1. A wire-receiving barrel terminal comprising: first and second terminal portions; said first terminal portion including at least one first contact section, a first transition portion being joined integrally with and extending rearwardly from said at least one first contact section and a first barrel section being joined integrally with and extending rearwardly from said first transition portion; said second terminal portion including at least one second contact section, a second transition portion being joined integrally with and extending rearwardly from said at least one second contact section and a second barrel sec-

tion being joined integrally with and extending rearwardly from said second transition portion; said first barrel section being joined integrally with and extending from said second barrel section, said first and second barrel sections being generally rectangular before being formed, each having at least one lateral edge and a respective lateral dimension at least equal to the circumference of a circle of a desired wire-receiving barrel inner diameter;

said first barrel section being formed into a barrelshaped member having its axis parallel to said at least one lateral edge of said first barrel section; and  
said second barrel section being formed circumferentially around and adjacent said first barrel section, said barrel



sections defining a wire receiving barrel having inner and outer walls, each said at least one lateral edge of said first and second barrel sections being disposed along a continuous wall portion of said second or first barrel section respectively such that said first contact section and said first transition portion extend along said second contact section and said second transition portion respectively with said first contact section adjacent and overlying said second contact section, said first and second contact sections being adapted to be connected to a first electrical article; whereby

the wire-receiving barrel has substantially two wall thicknesses circumferentially therearound with no open seam and said two transition portions provide a plurality of contact paths for current passed through said terminal.

4,950,187

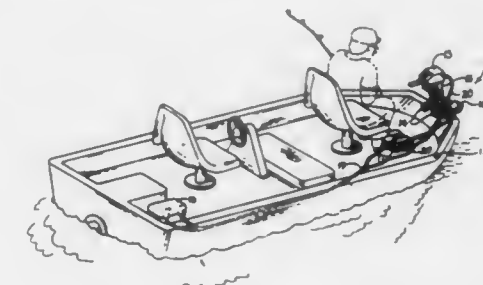
TROLLING MOTOR FOOT CONTROL APPARATUS  
Rodney L. Smith, 9608 Robla NE., Albuquerque, N. Mex. 87112

Filed May 22, 1989, Ser. No. 355,322

Int. Cl.<sup>3</sup> B63H 21/26, 25/02

U.S. Cl. 440—7

8 Claims



1. A trolling motor foot control apparatus in combination with a trolling motor for use with a boat wherein said trolling motor includes a steering shaft pivotally mounted with respect to the boat wherein said control apparatus comprises in combination, an electrical directional reversing steering motor including mounting means for securement of the steering motor to the boat remote from the trolling motor further including



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a steering motor output shaft, said output shaft secured to a drive gear, said drive gear operably associated with a gear collar, said gear collar mounted to a bifurcated steering bracket, said steering bracket mounted to said steering shaft, and

control means remotely mounted from the steering motor and in electrical communication with the steering motor to selectively actuate and control rotational direction of the steering motor in a clockwise or counter-clockwise direction, and

wherein the drive gear comprises an elongate worm gear extending axially of the output shaft and wherein the worm gear includes a first collar provided with an axially aligned bore relative to the output shaft and the worm gear to receive the output shaft therein, and securement means extending through the first collar and the output shaft to secure the output shaft and the worm gear together, and

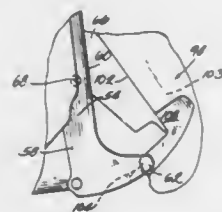
wherein the gear collar comprises an internally threaded collar, and further includes diametrically opposed blind bores formed through exterior surfaces of the collar and receiving within the blind bores flange tips integrally formed to the steering bracket to pivotally mount the gear collar to the steering bracket.

**4,950,188**  
**STERN DRIVE UNIT**  
Gerald F. Bland, Glenview; James C. Kantola, Waukegan; Martin J. Mondek, Wonder Lake, and Donald K. Sullivan, Prospect Heights, all of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 12, 1989, Ser. No. 351,446  
Int. Cl.<sup>5</sup> B63H 21/26

U.S. Cl. 440—53

13 Claims

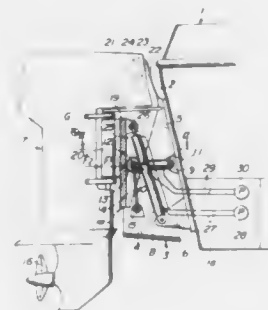


8. A stern drive unit comprising a gimbal ring adapted to be mounted on the transom of a boat for pivotal movement relative thereto about a generally vertical steering axis, said gimbal ring including a rearward surface, and a lateral support portion extending in the general direction of intended travel and rearwardly from said rearward surface, and a housing assembly including a pivot housing mounted on said gimbal ring for pivotal movement relative thereto about a generally horizontal tilt axis and including a rearward surface extending transversely with respect to the general direction of intended travel, and a gear housing secured to said rearward surface of said pivot housing and including a forward surface extending transversely with respect to the general direction of intended travel, and a lateral support portion extending in the general direction of intended travel, forwardly from said forward surface, and adjacent said gimbal ring lateral support portion.

**4,950,189**  
**ARRANGEMENT FOR SUPPORTING OUTBOARD MOTOR OF BOAT**  
Hideo Tahara, and Nobuo Makihara, both of Yokosuka, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Dec. 22, 1988, Ser. No. 288,355  
Claims priority, application Japan, Dec. 24, 1987, 62-327778  
Int. Cl.<sup>5</sup> B63H 21/26

U.S. Cl. 440—61

13 Claims



1. An arrangement for supporting an outboard motor of a boat, comprising:  
stationary means adapted to be fixed to a rear end of said boat,  
movable means for supporting said outboard motor, said movable means being connected with said stationary means so that said movable means is movable up and down, and said movable means is swingable about a swing axis,  
first actuator means provided between said stationary and movable means for causing said movable means to move up and down, and  
second actuator means provided between said stationary and movable means for causing said movable means to swing about said swing axis,  
wherein one of said stationary and movable means comprises guide rail means extending up and down, and comprises support means for supporting said second actuator means, and wherein said second actuator means, has a pivot end swingably connected with said support means, and a slide end which moves relative to and in contact with said guide rail means when said movable means moves up and down.

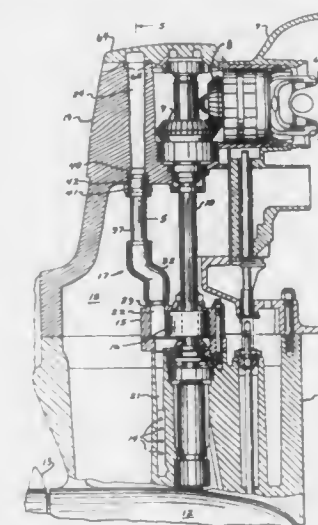
**4,950,190**  
**MARINE STERN DRIVE UNIT WITH IMPROVED WATER HANDLING**  
Gary L. Meisenburg, Fond Du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.  
Filed Apr. 12, 1989, Ser. No. 336,734  
Int. Cl.<sup>5</sup> B63H 21/10

U.S. Cl. 440—88

3 Claims

1. A marine stern drive unit (1) for connection to an inboard marine engine (4), comprising, in combination:  
(a) a generally vertically extending cast main drive shaft housing (11) having a water cavity (24) extending upwardly therethrough and with said cavity having a lower inlet portion (41) cast into an upper portion (19) of said housing,  
(b) water intake means (14) disposed in a lower underwater portion of said housing,  
(c) means fluidly connecting said water intake means (14) to said inlet portion (41) of said water cavity (24),  
(d) said upper portion (19) of said cast drive shaft housing (11) including:  
(1) a generally horizontal cored shift pocket (58) delineated in part by a continuous first housing side wall (60)

and a continuous first housing internal wall (61) adjacent said water cavity (24),  
(2) a generally horizontal cored water pocket (59) adapted for fluid connection to the said engine, and with said water pocket being delineated in part by a continuous second housing side wall (63) and a second housing internal wall (62) adjacent said water cavity,

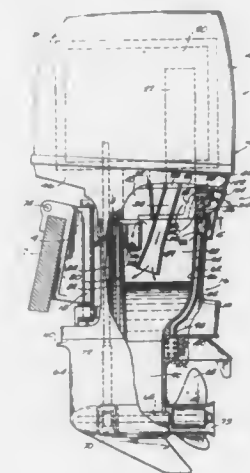


(c) cover means (64) sealingly attached to the upper end of said upper housing portion and with said cover means including an upper end portion of said water cavity (24),  
(f) and a drilled breakthrough passage (66,67) disposed in said second housing internal wall (62) and with said breakthrough passage fluidly connecting the said upper end portion of said water cavity in said cover means to said water pocket (59).

**4,950,191**  
**WATER JACKETED EXHAUST RELIEF SYSTEM FOR MARINE PROPULSION DEVICES**  
Thomas D. Wenstadt, Mobile, Ala., assignor to Outboard Marine Corporation, Waukegan, Ill.  
Division of Ser. No. 754,534, Jul. 12, 1985. This application Jan. 25, 1988, Ser. No. 219,409  
Int. Cl.<sup>5</sup> B63H 21/26

U.S. Cl. 440—89

9 Claims



9. An adaptor for an outboard motor including a lower unit, and an engine having an exhaust outlet, said adaptor comprising

ing an upper face adapted to be connected to the engine and having therein a first exhaust inlet adapted to communicate with the engine exhaust outlet, a lower face adapted to be connected to the lower unit and having therein a first exhaust outlet, a portion between said upper and lower faces, a first passage extending interiorly of said adaptor and communicating between said first inlet and said first outlet, a port located in said lower face, a low-speed exhaust outlet, and a second passage communicating between said port and said low-speed exhaust outlet and having a boundary defined at least in part by said portion of said adaptor.

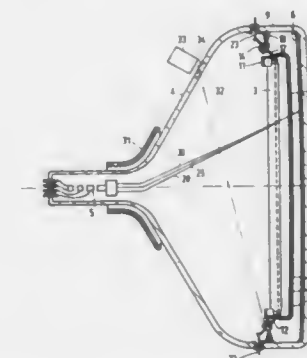
**4,950,192**  
**METHOD OF MANUFACTURING OF COLOR DISPLAY TUBE**  
Johan A. Rietdijk, and Piet C. J. Rens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 4, 1989, Ser. No. 389,670  
Claims priority, application Netherlands, Aug. 4, 1988, 8801944

Int. Cl.<sup>5</sup> H01J 9/44

U.S. Cl. 445—3

15 Claims



1. A method of manufacturing a colour display tube, in which a display window is provided with a display screen of phosphor elements luminescing in different colours, a shadow mask having a large number of apertures is suspended in the display window, and an enveloping part is secured to the display window in such a way that an envelope is formed, characterized in that after the envelope is formed, the shadow mask is displaced relative to the display window by means of movable positioning elements, until the shadow mask is in a desired position, after which the mask position is fixed.

**4,950,193**  
**MANUFACTURING METHOD FOR FLUORESCENT INDICATOR PANEL**  
Chul-Hyun Jang, Seoul, Rep. of Korea, assignor to Samsung Electron Devices Co., Ltd., Rep. of Korea  
Filed Oct. 24, 1989, Ser. No. 425,917  
Claims priority, application Rep. of Korea, Oct. 27, 1988, 88-14029

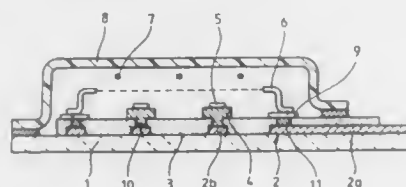
Int. Cl.<sup>5</sup> H01J 9/36

U.S. Cl. 445—24

3 Claims

1. A manufacturing method for a fluorescent indicator panel having: steps of forming a wiring layer, an insulative layer, a conductive layer and a fluorescent layer upon a base board, and attaching metal components thereupon, wherein, in the step of forming said insulative layer, elec-

trode plates are attached at the places where said metal components are to be attached,



then said conductive layer and said fluorescent layer are formed, and then, said metal components are attached on said electrode plates.

4,950,194

# **DOLL AND CASE HAVING FEATURES THAT SIMULATE SEED BEARING PLANTS**

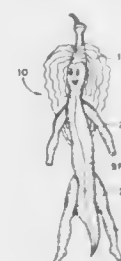
Marlene Gullace, 6317 Millwood Cir., Springfield, Va. 22152

Filed Oct. 10, 1989, Ser. No. 419,323

Int. Cl.<sup>5</sup> A63H 3/00, 3/02, 3/36; A01N 3/00

U.S. Cl. 446—72

17 Claims



1. A doll having a construction wherein a portion thereof duplicates the structural features of a dicotyledonous seed, comprising:

- a head means including a top most portion and a bottom most portion,
- said head means substantially divided into two halves indicative of the two cotyledons of a dicotyledonous seed,
- said halves encapsulated by sheath indicative of the seed coat of a dicotyledonous seed,
- said sheath having colored indicia indicative of the coloring pattern of a specific dicotyledonous seed,
- said head means having an ellipsoidal area disposed thereon indicative of the hilum of a dicotyledonous seed,
- said sheath having a pore disposed therethrough substantially near said ellipsoidal area indicative of the micropyle of a dicotyledonous seed,
- said head means having a ridge disposed along the edge where said halves are attached indicative of the raphe of a dicotyledonous seed,
- said ridge disposed substantially next to said ellipsoidal area indicative of the hilum of a dicotyledonous seed,
- said ridge indicative of the raphe having a bulbous portion indicative of the strophiole of a dicotyledonous seed disposed thereon at a bottom most portion of said ridge near said ellipsoidal area,

eyes affixed to said head means above a line horizontally bisecting said ellipsoidal area, wherein said bulbous portion indicative of the strophiole of a dicotyledonous seed being the tip of the nose of said doll, wherein said ridge indicative of the raphe of a dicotyledonous seed being the bridge of the nose of said doll, and wherein the ellipsoidal area indicative of the hilum of a dicotyledonous seed being the mouth of said doll.

4,950,195

# **CARTRIDGE FUSE TERMINAL ADAPTER**

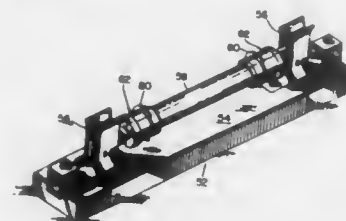
Richard J. Perreault, Amesbury, and David E. Sauronen, Newburyport, both of Mass., assignors to Gould, Inc., Rolling Meadows, Ill.

Filed May 16, 1988, Ser. No. 194,360

Int. Cl.<sup>5</sup> H01R 11/22

U.S. Cl. 439—830

6 Claims



1. An adapter for one of the ferrule-type terminals of a ferrule-type cartridge fuse, which makes it possible to couple the one terminal of the fuse to a fuse clip which is adapted to operably engage a ferrule terminal of a larger size, said adapter comprising:

- (a) a body;
- (b) a fuse clip engaging portion forming one end of said body;
- (c) a fuse engaging portion at the other end of said body, said fuse engaging portion having a bore therein for receiving the one ferrule-type terminal of the cartridge fuse, said bore having a diameter slightly less than the outside diameter of the ferrule-type terminal to be received therein, said fuse receiving bore being defined by a first circumferentially extending arcuate contact section, said first contact section being integrally formed with and substantially fixed with respect to said fuse clip engaging portion; and a second circumferentially extending arcuate contact section, said second contact section being integrally formed with said first arcuate section at a first longitudinally extending position on the circumference of said fuse receiving portion, said first arcuate section and said second arcuate section being separated from one another at a second longitudinally extending position which is angularly displaced from said first longitudinally extending position on the circumference of said fuse receiving portion; said second arcuate section being completely separated from said fuse clip engaging portion in the arcuate region extending between said first and second longitudinally extending positions;
- (d) said second circumferentially extending arcuate contact section having a wall thickness which allows it to circumferentially flex with respect to said first contact section and said fuse clip engaging portion; whereby upon insertion of the ferrule-type terminal into said bore said second arcuate section uniformly circumferentially expands to adapt to the outside diameter of the ferrule-type terminal.

4,950,196

# **HAND BASKET WITH ATTACHED TOY**

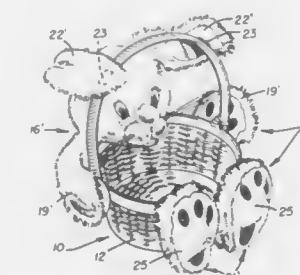
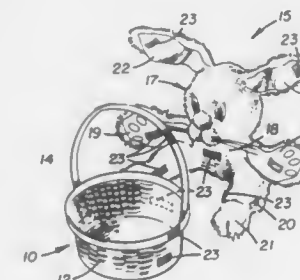
Frederick A. Fortune, and Timothy Bumb, both of San Jose, Calif., assignors to Fact Games, Ltd., San Jose, Calif.

Filed Oct. 20, 1989, Ser. No. 424,544

Int. Cl.<sup>5</sup> A63H 33/00; B65D 13/00

U.S. Cl. 446—73

9 Claims



1. The combination comprising,
  - a basket having a bottom and an upstanding sidewall defining a receptacle,
  - a three dimensional toy disposed exteriorly on said basket, said toy comprising a body portion having a head, a torso, a pair of arms and a pair of feet, and
  - fastening means for attaching said toy exteriorly on said basket, said fastening means releasably attaching said torso and said pair of feet exteriorly on the sidewall of said basket.

4,950,197

# **MODULAR ROTARY MOTION TOY**

Timothy T. Dove, Clarkston, and Roger L. Schlaifer, Atlanta, both of Ga., assignors to Schlaifer Nance & Co., Inc., Atlanta, Ga.

Filed Sep. 7, 1989, Ser. No. 404,189

Int. Cl.<sup>5</sup> A63H 33/08

U.S. Cl. 446—103

17 Claims

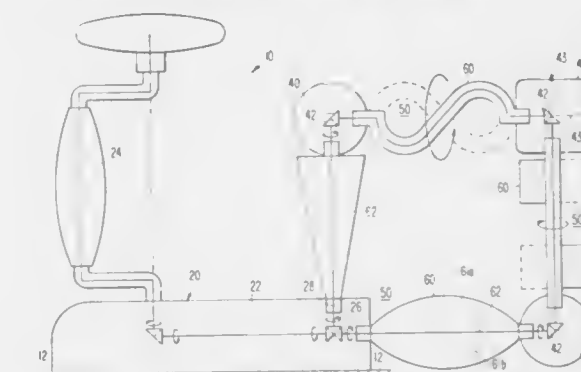
1. A modular toy for disposition on a play surface, the toy comprising:

- (a) a drive unit including
  - (i) a drive unit body for resting on the play surface;
  - (ii) a rotary motion imparting element coupled with said drive unit body;
  - (iii) at least one rotary output element in said drive unit body, said rotary output element having an axis of rotation, said rotary output element being coupled with said rotary motion imparting element and being rotatably driven thereby; and
  - (iv) a drive unit coupling on said rotary output element, said drive unit coupling being rotatable about the axis of rotation of said rotary output element,
- (b) at least two junction units, each junction unit including
  - (i) a junction unit body;
  - (ii) at least first and second rotary transfer elements in said junction unit body which transfer elements rotate about

different axes of rotation, said rotary transfer elements being rotatably coupled together such that rotation of one transfer element effects rotation of the other transfer element;

- (iii) at least first and second rotatable junction unit couplings, said first junction unit coupling being affixed to said first transfer element, said second junction unit coupling being affixed to said second transfer element, such that said first junction unit coupling rotates about the same axis as said first transfer element and said second junction unit coupling rotates about the same axis as said second transfer element, whereby a rotary drive motion imposed on said first junction unit coupling is transferred through said first transfer element to said second transfer element and thence to said second junction unit coupling,

(c) said drive unit and said junction units being spaced apart to create void spaces between said units; and



- (d) a plurality of means, extending completely across at least certain of said void spaces, for producing an animated display in said certain void spaces, said animated display producing means being arranged such that all animated display producing means extending across said certain void spaces rotate in their entirety as a result of being coupled with a pair of said units, which pair of units are selected from among the units of said drive unit and said junction unit, each animated display producing means extending across said certain void spaces having a pair of ends, one end being joined to one of said couplings of said pair of units, the other end being joined to another of said couplings of said pair of units, each animated display producing means having an axis of rotation, such that rotation of each animated display producing means about its axis produces the animated display, the axis of rotation of each animated display producing means coinciding with the axis of rotation of at least one of the couplings to which the animated display producing means is joined.

4,950,198

# **GAME CALL**

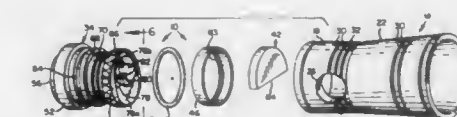
Edward R. Repko, Jr., 609 W. 143rd St., E. Chicago, Ind. 46312

Filed Jun. 2, 1988, Ser. No. 201,775

Int. Cl.<sup>5</sup> A63H 33/40

U.S. Cl. 446—207

9 Claims



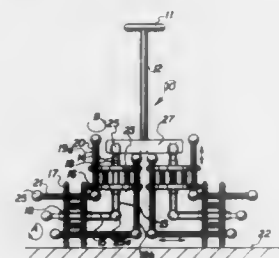
1. A game call comprising:
  - a rigid body having a substantially cylindrical outer surface and opposed inlet and outlet end surfaces;



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air passage means defining an internal air passage in said body, said air passage having an inlet opening in said inlet end surface and an outlet opening in said outlet end surface;  
a vibratable diaphragm; and  
fastening means for fastening said diaphragm to said body such that at least a portion of said diaphragm contacts said outlet end surface and overlies in sound reproducing relationship at least a portion of said outlet opening, whereby air forced through said air passage exits said outlet opening and causes said diaphragm to vibrate and produce a sound simulative of a form of wildlife;  
said inlet end surface including a recessed, substantially conical portion, said inlet opening being disposed within said conical portion.

**4,950,199**  
**MECHANICAL PUSH-TOY**  
Andrew J. Kaplan, Portsmouth, N.H., and Edward B. Seldin, Cambridge, Mass., assignors to Kinderworks Corporation, Portsmouth, N.H.  
Filed Nov. 28, 1989, Ser. No. 443,489  
Int. Cl.<sup>5</sup> A63H 1/00, 5/00  
U.S. Cl. 446—238 13 Claims



1. A push-toy including a handle having a main shaft, said main shaft being connected to an angular axle member, said angular axle member including a first arm rigidly connected to said main shaft, said axle member further including a second arm disposed at an angle with respect to said first arm and being connected thereto, said first arm having a first substantially circular member rotatably fitted thereon such that said first substantially circular member may rotate about said first arm, said second arm having a second substantially circular member rotatably fitted thereon such that said second substantially circular member may rotate about said second arm, said first and second substantially circular members being rotatably engaged with each other by at least one substantially circular member engaging means, said substantially circular member engaging means having a first shaft and a second shaft, said first and second shafts being connected to each other at an angle substantially corresponding to the angle of said angular axle member, said substantially circular member engaging means first shaft passing slidably through said first substantially circular member in a direction substantially parallel to said first arm of said angular axle member, said substantially circular member engaging means second shaft passing slidably through said second substantially circular member in a direction substantially parallel to said second arm of said angular axle member.

**4,950,200**  
**WHISPERING DOLL**  
Kenneth J. Curran, Thousand Oaks, Calif., assignor to CAL R & D, Inc., Culver City, Calif.  
Filed Aug. 26, 1988, Ser. No. 237,516  
Int. Cl.<sup>5</sup> A63H 3/28  
U.S. Cl. 446—302 3 Claims  
1. In a toy, a voice reproduction system responsive to the

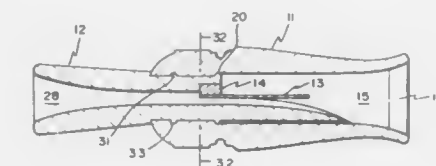
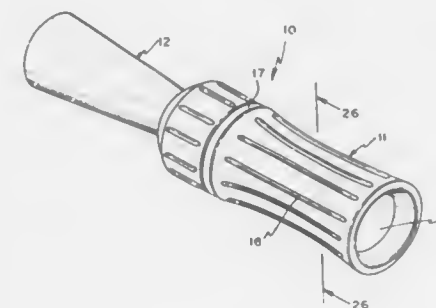
touching of switches located in the body of the toy, said voice reproduction system comprising:  
a multitrack tape recording/reproducing system located within the toy's body, said system comprising:  
at least a pair of magnetic reproducing heads;  
a selecting preamplifier means for receiving the signals from the reproducing heads and amplifying the signals from one of said heads as directed;  
a latching track selector means responsive to a plurality of switch closures for directing said selecting preamplifier means to select a respective one of said heads;  
audio amplifier means receiving the signals from the preamplifier and applying it to a speaker means;



said latching track selector means activating a tape transport in response to sensing a switch closure;  
spoken messages recorded on each track of said multitrack system in segmented lengths spaced along the length of tape;  
at least one track of recorded messages being in a normal speaking voice;  
at least one track of recorded messages being in a different speaking voice; and  
circuit means for turning off said multitrack tape recording/reproducing system whenever no recorded signal is sensed for a predetermined period of time on the track being reproduced.

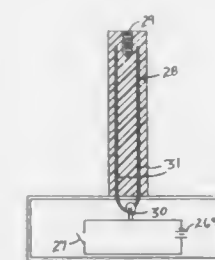
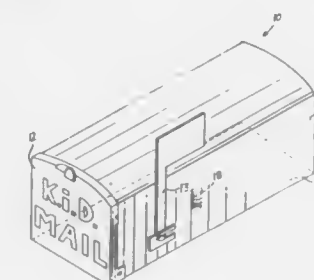
**4,950,201**  
**ANIMAL AND BIRD CALL**  
Ed. J. Sceery, 1949 Osage La., Santa Fe, N. Mex. 87501  
Filed May 5, 1989, Ser. No. 347,872  
Int. Cl.<sup>5</sup> A63H 5/00  
U.S. Cl. 446—207 13 Claims  
1. A game call comprising at least two tubular parts, namely a barrel and a voice unit, each open at both ends, said call including a vibratory reed, said voice unit providing a sound exit end and an engagement rib around said voice unit, said barrel serving as a mouthpiece, said barrel being constructed of resilient material and having an inner groove, said barrel having an axis with a plurality of flexible, longitudinal ribs spaced

circumferentially around a barrel external surface generally parallel to the axis of said barrel, whereby said barrel accepts



said voice unit in an interference fit with the groove engaging the engagement rib.

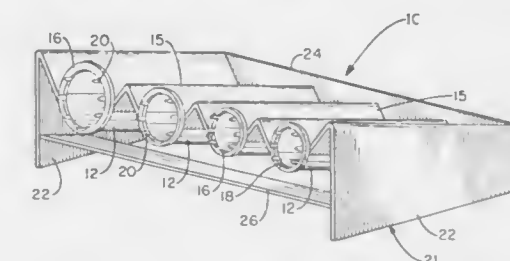
**4,950,202**  
**TOY MAILBOX**  
Robert J. Florio, 8745 Merrimoor Blvd. E., Largo, Fla. 34647  
Filed Oct. 2, 1989, Ser. No. 415,592  
Int. Cl.<sup>5</sup> A63H 33/22, 33/00; F21V 7/04; B65D 91/00  
U.S. Cl. 446—219 5 Claims



1. A toy mailbox assembly comprising in combination, an elongate hollow housing including a planar floor and spaced side walls, and  
a pivotally mounted door pivotally mounted to the side walls of the housing, and  
a signal member pivotally mounted to one of said side walls, and

polymeric card means for simulating correspondence selectively positionable interiorly of said housing, and support means for positioning said housing to a support surface, and  
wherein the card means is defined as a planar polymeric sheet and includes a rectangular stamp member selectively securable to the card means, the stamp member includes a first hook and loop fastener surface formed on a rear surface of the stamp member, and a second hook and loop fastener surface of a complementary shape to the first hook and loop fastener surface formed on an upper right hand corner of a forward face of the card means, wherein the first hook and loop fastener surface is selectively securable to the second hook and loop fastener surface, and  
wherein a threaded boss is selectively securable to the planar floor of the housing and is directed orthogonally downwardly from the planar floor, and the support means includes an "L" shaped member formed with a threaded bore in an upper end of the "L" shaped member and a "C" shaped bracket secured orthogonally to a lower end of the "L" shaped member, the "L" shaped bracket includes spaced parallel arms with a threaded aperture formed through one of said arms orthogonally aligned through one of said arms with a threaded bolt member orthogonally aligned through said threaded aperture and reciprocable therethrough for clamping of the "L" shaped member to a support post, and  
wherein the support means includes an illuminated support member, the illuminated support member includes a lower housing with a transparent post orthogonally and integrally mounted to an upper surface of the lower housing, and the lower housing includes illumination means for selectively illuminating the transparent post.

**4,950,203**  
**COIN COUNTER AND WRAPPER LOADING DEVICE**  
James Tomaiko, 364 N. Monroe, Tallmadge, Ohio 44278  
Filed Nov. 2, 1988, Ser. No. 265,916  
Int. Cl.<sup>5</sup> G07D 9/06  
U.S. Cl. 453—59 11 Claims



11. A process for packaging coins in a coin wrapper comprising aligning coins in a semicircular trough and subsequently forcing said coins through a guide ring attached at one end of said trough over flexible speculum finger members attached to said guide ring in an essentially parallel relationship to the trough in their non-flexed position and extending from said guide ring outwardly from said trough, by placing a human finger behind the last coin in the trough at the end remote from said guide ring and exerting finger pressure to push the aligned coins into the coin wrapper.

4,950,204

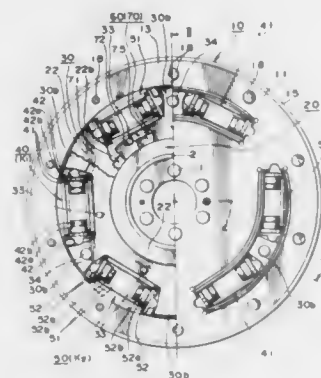
## FLYWHEEL WITH A TORSIONAL DAMPER

Mitsuhiko Umeyama, and Masaki Inui, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
Filed Aug. 26, 1988, Ser. No. 237,296

Claims priority, application Japan, Aug. 28, 1987, 62-130041; Aug. 31, 1987, 62-131399

Int. Cl.<sup>5</sup> F16D 3/14; F16F 15/12  
U.S. Cl. 464—68

17 Claims



1. A flywheel device with a torsional damper comprising:
  - a driving side flywheel and a driven side flywheel which have a common rotational axis and are rotatable relative to each other;
  - a control plate disposed between said driving and driven side flywheels so as to be rotatable relative to said driving and driven side flywheels;
  - a first spring mechanism directly and detachably connected between said control plate and one of said driving and driven side flywheel so as to extend in a circumferential direction of the flywheel device, said first spring mechanism having a synthetic spring constant K1;
  - a second spring mechanism directly and detachably connected between said control plate and the other of said driving and driven side flywheels so as to extend in the circumferential direction of the flywheel device, said second spring mechanism being arranged in series with said first spring mechanism as a spring arrangement, said second spring mechanism having a synthetic spring constant K2; and

second spring mechanism operation control means, provided against said second spring mechanism, for restricting deformation of said second spring mechanism when a torque acting between said control plate and said other flywheel is less than or equal to a predetermined value and allowing deformation of said spring mechanism when a torque acting between said control plate and said other flywheel is greater than said predetermined value.

wherein when said second spring mechanism operation control means restricts deformation of said second spring mechanism, the flywheel device has a spring constant equal to said K1, and when said second spring mechanism operation control means allows deformation of said second spring mechanism, the flywheel device has a spring constant K3, where K3 is determined by said K1 and K2 through the following equation:

$$1/K3 = 1/K1 + 1/K2.$$

4,950,205

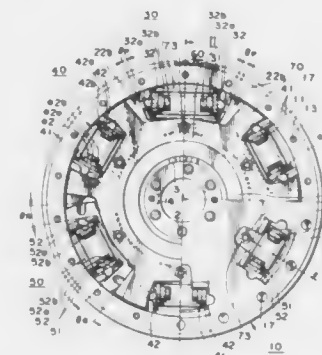
## FLYWHEEL WITH A TORSIONAL DAMPER

Mitsuhiko Umeyama, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
Filed Sep. 13, 1988, Ser. No. 243,843

Claims priority, application Japan, Sep. 14, 1987, 62-139367; Sep. 16, 1987, 62-140058; Sep. 17, 1987, 62-140916

Int. Cl.<sup>5</sup> F16D 3/14; F16F 15/12

19 Claims



1. A flywheel device with a torsional damper comprising:
  - a driving side flywheel;
  - a driven side flywheel arranged coaxially with respect to the driving side flywheel and rotatable relative to the driving side flywheel;
  - a first spring mechanism connecting the driving and driven side flywheels with a predetermined torsional angular gap; and
  - a second spring mechanism connecting the driving and driven side flywheels via a friction mechanism arranged in series with the second spring mechanism as a vibrational system, the series combination of the second spring mechanism and the friction mechanism being provided in parallel to the first spring mechanism, the second mechanism having a synthetic spring constant greater than a synthetic spring constant of the first spring mechanism.

4,950,206

## CONSTANT VELOCITY RATIO UNIVERSAL JOINTS

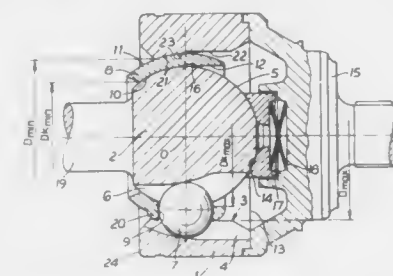
Werner Jacob, Frankfurt am Main, Fed. Rep. of Germany, assignor to Uni-Cardan AG, Siegburg, Fed. Rep. of Germany  
Filed Nov. 22, 1988, Ser. No. 275,077

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739867

Int. Cl.<sup>5</sup> F16D 3/223

U.S. Cl. 464—140

12 Claims



1. A constant velocity ratio universal joint for torque transmission, comprising:
  - a hollow outer joint member having an internal surface with a number of grooves circumferentially spaced about the axis of rotation of the joint member and extending in meridian planes;

an inner joint member disposed at least partially within the outer joint member and having an outer surface with a number of grooves circumferentially spaced about the axis of rotation of the joint member in meridian planes facing the grooves of the outer joint member in pairs, all the grooves in the joint members being undercut free;

a plurality of balls received one in each facing pair of grooves in the joint members for torque transmission therebetween;

the internal surface of the outer joint member between the grooves thereof being non-undercut, considered from one end of the member at which end the member has an internal diameter larger than at its other end, and including a part-spherical surface portion;

the outer surface of the inner joint member between the grooves thereof having a part-spherical portion;

and a cage of annular form disposed between the inner and outer joint members and having inner and outer part-spherical surface portions engaging said part-spherical surface portions of the inner and outer joint members, the cage holding the balls so that their centres occupy a plane guided to bisect the angle between the rotational axes of the inner and outer joint members; wherein:

the outer joint member is closed at said one end by a closure member;

the inner joint member, at its end adjacent said one end of the outer joint member, has a part-spherical end surface engaged by a complementary support surface provided in association with said closure member; and

the inner surface of the cage comprises said part-spherical portion which is engaged with the part-spherical surface portion of the inner joint member adjacent its other end, and which leads into a cavity extending to the end of the cage adjacent said one end of the outer joint member, said cavity having a size at least equal to the maximum diameter of the part-spherical inner surface portion of the cage and being undercut free considered from said end.

4,950,207

## BELT TENSIONER, KIT THEREFOR AND METHODS OF MAKING THE SAME

Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

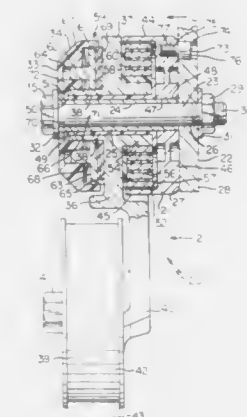
Division of Ser. No. 364,284, Jun. 12, 1989, Pat. No. 4,902,267. This application Nov. 30, 1989, Ser. No. 443,990

The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> F16H 7/12

U.S. Cl. 474—133

9 Claims



1. In the combination of a support means having a mounting surface means, a single bolt means, and a belt tensioner having a housing means secured to said support means in abutting relation to said mounting surface means thereof by said single bolt means that is carried by said housing means and said

support means, said support means having opening means interrupting said mounting surface means in offset relation to said bolt means, said housing means having a certain removable pin means provided with a head means extending therefrom and being received in said opening means of said support means to orient said tensioner relative to said support means and to prevent rotation of said housing means on said bolt means, the improvement wherein said housing means has a plurality of mounting arrangements each being adapted to have a removable pin means attached thereto for being received in an opening means of a support means, said certain removable pin means being attached to one of said mounting arrangements, said pin means having a free end, said head means comprising a removable part disposed over said free end to be carried thereby and thereby enlarge said free end to a size that is compatible with said opening means.

4,950,208

## VARIABLE RATIO POWER TRANSMISSION

Malcolm Tomlinson, 245 Turnpike Drive, Luton, Bedfordshire LU3 3RG, England

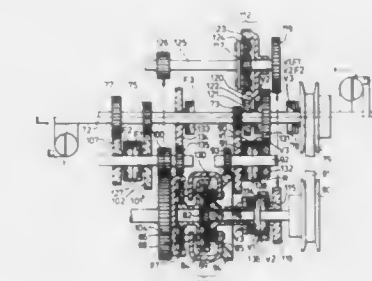
Filed Jun. 16, 1989, Ser. No. 367,162

Claims priority, application United Kingdom, Jun. 17, 1988, 8814525; Apr. 4, 1989, 8907524; Apr. 28, 1989, 8909830

Int. Cl.<sup>5</sup> F16H 9/00, 11/00

U.S. Cl. 474—71

31 Claims



1. A variable ratio power transmission comprising a variator and a geared drive operable in parallel along respective loading paths which unite at at least one gearset, whereby the power transmitted by the variator, in use, is less than the total input power to the transmission.

4,950,209

## AUTOTENSIONER

Kazuki Kawashima, and Hisashi Hayakawa, both of Iwata, Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Filed Aug. 15, 1989, Ser. No. 394,032

Claims priority, application Japan, Oct. 18, 1988, 63-135603[U]

Int. Cl.<sup>5</sup> F16H 7/12

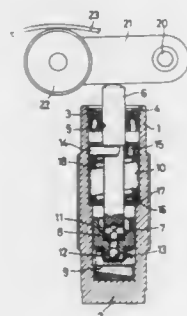
U.S. Cl. 474—138

2 Claims

1. An autotensioner comprising:
  - a cylinder having its bottom closed and filled with hydraulic oil and air;
  - an oil seal mounted in said cylinder to hermetically seal the hydraulic oil and air;
  - a rod slidably extending through said oil seal;
  - a piston slidably mounted in said cylinder so as to leave a small gap therebetween and having its top in abutment with the bottom of said rod, the interior of said cylinder being partitioned into a lower pressure chamber and an upper reservoir chamber by said piston, said piston being formed with a channel interconnecting said pressure chamber and said reservoir chamber;
  - a check valve provided in said pressure chamber to open said channel in said piston only when the pressure in said



pressure chamber is lower than the pressure in said reservoir chamber;  
a bearing slidably mounted in said reservoir chamber for supporting said rod; and



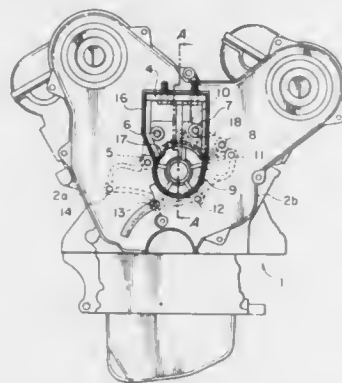
a spring mounted in said reservoir chamber to bias said rod in such a direction as to protrude from said cylinder and through said bearing.

**4,950,210**  
**TIMING BELT COVER DEVICE**  
Toshiyuki Kawauchi, and Seiji Nanba, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 29, 1989, Ser. No. 414,287  
Claims priority, application Japan, Oct. 4, 1988, 63-130607[U]

Int. Cl.<sup>5</sup> F16H 57/02  
U.S. Cl. 474—144

17 Claims



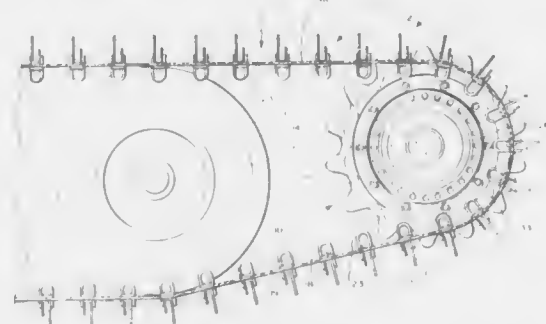
1. An engine peripheral structure comprising an engine body member, belt cover means mounted on the engine body member for covering a timing belt of the engine, an engine mount bracket mounted on the engine body member through an opening formed in the belt cover means, a water pump housing arranged adjacent to the engine mount bracket and integrally formed with annular rib, the annular rib being formed with an extended portion projected beyond surface of the belt cover means through the opening of the belt cover means, the extended portion of the annular rib of the pump housing being continued with outer surface portion of the engine mount bracket, the extended portion and the outer surface portion being extended along an edge portion of the opening of the belt cover means, the engine mount bracket being formed with a circular rib facing to a remaining portion of the annular rib other than the extended portion.

**4,950,211**  
**TRACK DRIVE SPROCKET WHEEL FOR SNOW GROOMING VEHICLE**  
M. Elmer James, Mendon, Utah, assignor to Logan Manufacturing Company, Logan, Utah

Filed Oct. 16, 1989, Ser. No. 422,024  
Int. Cl.<sup>5</sup> F16H 55/30

U.S. Cl. 474—152

8 Claims



1. A sprocket wheel for powering a continuous track of a snow traversing vehicle, the vehicle being supported upon the ground-engaging portion of the track by bogie wheels, the track comprising an endless loop of flexible belting having a side facing outwardly from and a side facing inwardly to the loop, elongate grousers secured transversely to the belt at equal intervals therealong, and a pair of spaced apart guiding projections mounted upon each grouser diverging inwardly to the loop to engage the bogie on its sides to restrain the track from movement lateral to the vehicle, said sprocket wheel comprising:

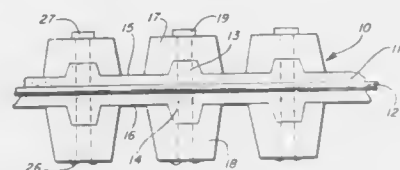
A metallic wheel member carrying a circumferential flange member defining a radially outward facing surface including valley and tooth side surfaces for engagement of substantially the entire length of the portion of each grouser between the guiding projections.

**4,950,212**  
**BELT FOR HIGH LOAD TRANSMISSION**  
Takashi Masuda; Kengiro Hashimoto, both of Kobe; Shinichi Takagi, Nishinomiya, and Masayuki Tanaka, Kobe, all of Japan, assignors to Mitsubishi Belting Ltd., Nagata, Japan

Filed Aug. 23, 1988, Ser. No. 235,162  
Claims priority, application Japan, Sep. 1, 1987, 62-133862  
Int. Cl.<sup>5</sup> F16G 1/22

U.S. Cl. 474—242

16 Claims



1. In a power transmission belt for transmitting high loads, said belt including:  
an elastomeric neutral belt defining an outer flat surface and an inner flat surface, said neutral belt surfaces defining longitudinal spaced outer and inner aligned projections having heights;  
a tensile cord extending longitudinally in said neutral belt;  
a plurality of pairs of aligned longitudinally, equally spaced first and second blocks adjacent said outer and inner surfaces respectively of said neutral belt, at least one of said blocks being provided with a recess for receiving one of said projections having a depth greater than the height of said projections and surfaces for contacting a neutral belt flat surface; and

means for securing said blocks to said neutral belt, said securing means extending through said neutral belt and the aligned blocks to said outer and inner surfaces, said securing means comprising means for causing said surfaces of said one block to be compressed against said neutral belt flat surface;  
whereby said belt flat surface and said surfaces of said one block are in clamped, high friction engagement.

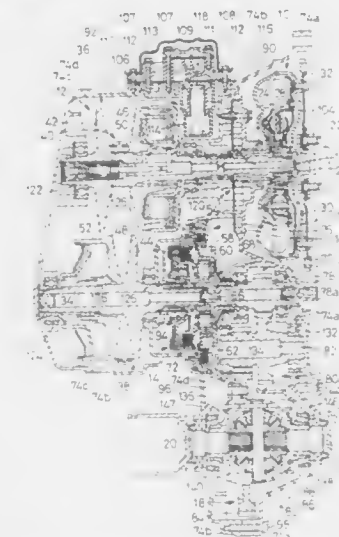
**4,950,213**  
**PLANETARY GEAR TRANSMISSION HAVING AN ARRANGEMENT FOR EFFICIENT LUBRICATION OF PLANETARY GEARS**

Kunio Morisawa, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 30, 1989, Ser. No. 373,588  
Claims priority, application Japan, Jul. 7, 1988, 63-169462  
Int. Cl.<sup>5</sup> F16H 37/08, 9/18, 57/04

U.S. Cl. 475—206

9 Claims



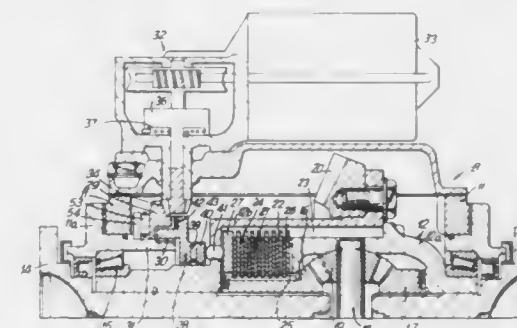
1. A planetary gear transmission comprising:  
a planetary gear mechanism including a sun gear and a ring gear which are disposed rotatably about a first axis, a plurality of planetary gears which engage said sun and ring gears, a carrier having a radially extending flange and a plurality of carrier pins which are fixed to said flange, for rotatably supporting said planetary gears, and a first gear disposed coaxially with said carrier, for rotation with said carrier about said first axis, said first gear engaging a second gear which is disposed rotatably about a second axis parallel to said first axis;  
said first gear having an externally toothed portion located on one of opposite sides of said radially extending flange of said carrier, as seen in an axial direction parallel to said first axis;  
said planetary gears being located on the other side of said flange;

means for defining at least one first lubricant passage which extends through said flange and each of which communicates with a corresponding one of said planetary gears, said each first lubricant passage having an open end which is open in one of opposite surfaces of said flange on said one side; and  
a generally annular lubricant receiver disposed coaxially with said carrier, for receiving a lubricant which is fed from a meshing point of said first and second gears in said axial direction from said first gear toward said planetary gears, said lubricant receiver directing said lubricant to said open end of said each first lubricant passage, for lubricating the corresponding planetary gear.

**4,950,214**  
**DIFFERENTIAL DRIVE**  
John Botterill, Saarbrücken, Fed. Rep. of Germany, assignor to Uni-Cardan AG, Siegburg, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 348,564, May 5, 1989. This application Aug. 10, 1989, Ser. No. 392,575  
Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815225; Mar. 20, 1989, 3909112  
Int. Cl.<sup>5</sup> F16H 1/44

U.S. Cl. 475—231

17 Claims



1. A differential drive with an externally variable controllable locking coupling, comprising:

a housing;  
a drivable differential carrier rotatably supported in the housing;  
two output shafts;  
output gears arranged coaxially and rotatable relative to the differential carrier, and nonrotatably connectable to their respective output shafts;  
differential gears rotatably held in the differential carrier so as to simultaneously engage the output gears; a friction assembly including alternating inner plates nonrotatably connected to a first of the coaxially positioned output gears, and outer plates nonrotatably connected to another of the coaxially positioned output gears or differential carrier and axially supported on a supporting face of a first of the coaxially positioned parts;  
actuating means; and  
a pressure plate, the actuating means and the pressure plate being provided so as to load the rotating discs, the actuating means including a pressure ring provided so as to be nonrotatable relative to the housing, but axially movable towards the friction assembly, an actuating ring provided to be rotatable relative to the pressure ring, constrained axially but with means for axially displacing the pressure ring, and rotary drive means for driving the actuating ring.

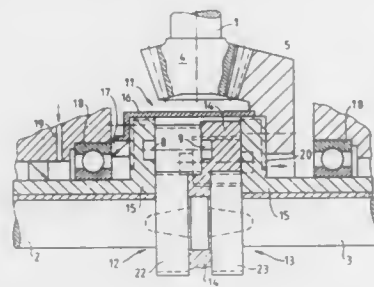
**4,950,215**  
**SELF-LOCKING DIFFERENTIAL GEARING**  
Tillmann Körner, Stuttgart, and Klaus Brosius, Heidenheim, both of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany  
Filed Mar. 27, 1989, Ser. No. 328,969  
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810169  
Int. Cl.<sup>5</sup> F16H 1/42

U.S. Cl. 475—252

3 Claims

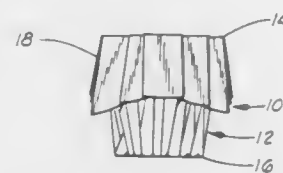
1. A self-locking differential gearing for the distribution of a torque from an input shaft to two driven shafts, comprising:  
a first gearing component comprising a drive gear drivingly connected to the input shaft, said first gearing component including an even number of pairs of parallel, mutually engaging pinions connected thereto, engaged said pinions functioning as gear pumps;  
a second and a third gearing component, each being connected respectively to the two driven shafts and in perma-

nent rotatable connection with said first gearing component, each said second and third gearing component being constructed as a spur gear equal in size to each other and having spur toothing, one set of said pinions meshing with one said spur gear and another set of said pinions meshing with the other spur gear, adjacent pinions of respective pairs meshing with the same said spur gear, the axis of rotation of said spur gears being mutually coaxial and parallel to the axes of rotation of said pinions; hydraulic self-locking means for mutual locking with controlled slip of said second and third gearing components, said means including a housing forming a part of said first gearing component in which said pinions and said spur



gears are tightly contained, the outer peripheries of said pinions being in close proximity to said housing to form throttling tip clearances for a hydraulic pressure medium, end faces of said pinions being in close proximity to said housing to form throttling face clearances for the hydraulic pressure medium; each of said pinions having only a single set of teeth thereon, said teeth meshing with a respective said spur gear and meshing with the other pinion of the respective pair; a pressure space being formed in the mutual meshing area of each pair of said pinions; and a casing enclosing said housing and rendering said housing liquid tight.

**4,950,216**  
**METHOD OF FORMING A FLOWER POT**  
Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.  
Continuation-in-part of Ser. No. 219,083, Jul. 13, 1988, Pat. No. 4,897,031, which is a continuation of Ser. No. 4,275, Jan. 5, 1987, Pat. No. 4,773,182, which is a continuation of Ser. No. 613,080, May 22, 1984, abandoned. This application Sep. 26, 1988, Ser. No. 248,961  
Int. Cl.<sup>5</sup> B31F 1/08; B31D 5/04  
U.S. Cl. 493—162 19 Claims

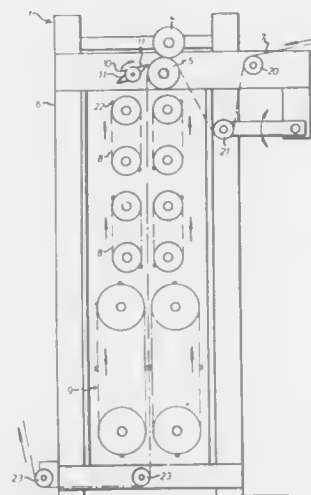


1. A method for making a flower pot or flower pot cover comprising the steps of:  
forming a sheet of material into a container having an outer periphery, an upper end and a lower end with an object opening through the upper end and extending a distance through the container, the container having a plurality of overlapping folds contributing to the rigidity of the container for cooperating in tending to maintain the formed shape of the container, the container having a skirt formed

on the upper end thereof and extending a distance generally outwardly therefrom; and  
forming the entire skirt in a generally downwardly direction after forming the sheet of material into the container with the overlapping folds with the skirt extending a distance generally outwardly from the upper end of the container, the entire skirt extending in a generally downwardly direction about the entire outer periphery of the container so that the skirt encompasses at least an upper portion of the outer periphery of the flower pot or flower pot cover, whereby the skirt is extendable downwardly during the growing of plants or flowers for protecting the outer periphery of the flower pot and, after the growing of such plants or flowers, the skirt is extendable upwardly and outwardly for forming a decorative skirt to enhance the displaying of the grown plants or flowers.

**4,950,217**  
**BAG MAKING MACHINE WITH COUPLING-CONTROLLED PERFORATING AND WELDING**

Jan N. Stenqvist, Kvidinge, Sweden, assignor to Fas Converting Machinery Aktiebolag, Ystad, Sweden  
PCT No. PCT/SE87/00518, § 371 Date Apr. 12, 1989, § 102(e) Date Apr. 12, 1989, PCT Pub. No. WO88/03474, PCT Pub. Date May 19, 1988  
PCT Filed Nov. 5, 1987, Ser. No. 347,043  
Claims priority, application Sweden, Nov. 5, 1986, 86047560  
Int. Cl.<sup>5</sup> B31B 23/14, 23/64  
U.S. Cl. 493—197 9 Claims

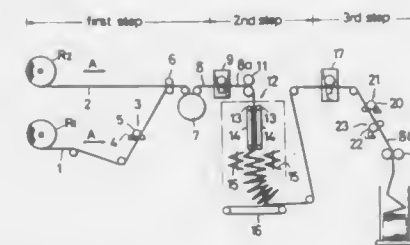


1. A bag-making machine for forming bag-defining lines of perforation and weld lines in an elongated web which is moving in a direction of travel, said machine comprising,  
a nip roller and a backup roller which provide a roller nip for feeding the elongate web through the machine,  
a cutting means which is elongated in a direction parallel to said rollers, said cutting means being rotatable about its longitudinal axis, said cutting means being movable into engagement with said backup roller to form lines of perforation in said web,  
a welding station having sealing jaws which are displaceable in the direction of travel of the web and are movable into engagement with the web to form weld lines in the web while the web is moving,  
at least one drive motor for driving said machine,  
first coupling means for adjusting the spacing between two consecutive lines of perforation by connecting and disconnecting the cutting means from a said drive motor independently of the operation of the roller nip, and  
second coupling means for adjusting the spacing between

the weld lines and the lines of perforation by separately connecting and disconnecting the welding station from a said drive motor.

**4,950,218**  
**MULTIPLE POT FOR RAISING AND TRANSPLANTING SEEDLINGS AND METHOD OF FABRICATING THE SAME**

Ryuzo Tsuru; Michinori Sakaki; Masashi Tanimura; Sumio Ito, and Hidekazu Terasawa, all of Obihiro, Japan, assignors to Nihon Tensaiseito Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 7, 1988, Ser. No. 268,275  
Claims priority, application Japan, Nov. 16, 1987, 62-287524; Nov. 17, 1987, 62-174470(U); Dec. 1, 1987, 62-301433  
Int. Cl.<sup>5</sup> B31B 1/62, 17/60  
U.S. Cl. 493—346 4 Claims



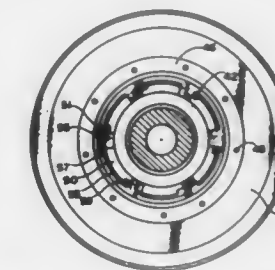
1. A method of fabricating a multiple pot in hexagonal shape for raising and transplanting seedlings, comprising:  
a first step consisting of continuously pulling a first thin film having a width and made of paper in a direction of pull, applying waterproof paste to form applied portions, each applied portion being of a width L, perpendicular to the direction of pull to form a given number of applied portions at intervals of 3L within a first region T, repeating this applying operation to form similarly applied portions in other similar regions T, so that a rear end applied portion of at least one region T is adjacent a front end applied portion of a successive region T, to form a paste portion of width 2L, placing and sticking a second thin film on the first thin film to form a continuous belt, the second thin film having the same width as the first film, the second film being made of paper;  
a second step consisting of machining the belt along a front end of each paste portion of width 2L in the direction of pull to make the belt easier to bend, bending the belt in a zigzag fashion about the direction of pull, and folding it; and  
a third step consisting of unfolding the folded belt, forming separation lines in the applied portions except for each paste portion of width 2L, to facilitate separation in the direction in which the paste is applied, applying a water-soluble paste to the front side and the rear side of each region T alternately, folding the belt in the same zigzag fashion as in the second step, and drying and stretching the belt.

**4,950,219**  
**ADJUSTABLE WEIR STRUCTURE FOR A DECANter CENTRIFUGE**

Joseph F. Luchetta, Doylestown, Pa., assignor to Alfa-Laval AB, Stockholm, Sweden  
Filed Oct. 20, 1988, Ser. No. 260,535  
Int. Cl.<sup>5</sup> B04B 1/12, 1/20  
U.S. Cl. 494—53 13 Claims

1. A decanter centrifuge apparatus for receiving a mixture comprising a light and heavy phase material and for separately discharging the light and heavy phase material, comprising: a rotatable bowl having an inlet for receiving a stream of said mixture to be separated and having a first outlet for discharging heavy phase material from said bowl; a conveyor screw rotatably and coaxially mounted within said bowl for convey-

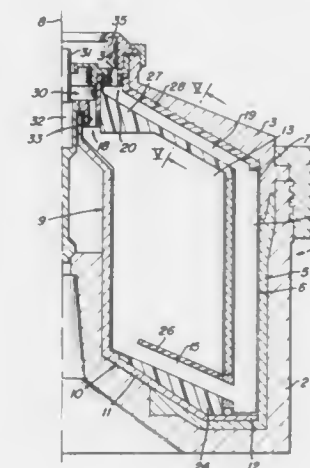
ing heavy phase material toward said first outlet, said bowl being rotatable at a speed sufficient to maintain the mixture within the bowl under centrifugal force, separating the mixture into respective outer and inner layers of light and heavy phase material, and the conveyor screw being rotatable at a speed slightly different from the speed of rotation of the bowl, said bowl further comprising a second outlet for discharging said light phase material, said second outlet being configured to maintain an annular pool of the mixture at a predetermined



depth within said bowl, said second outlet including a first annular plate having at least one notch and a second annular plate having at least one notch, said plates being in coaxial parallel juxtaposition, said notch of said first annular plate including a weir surface of variable length formed by a radially outer surface of the notch over which the light phase material is discharged, said notch of said first annular plate being operatively associated with said notch of said second annular plate for varying the length of the weir surface while its radial position remains fixed to control the depth of said annular pool.

**4,950,220**  
**THROUGHPUT CENTRIFUGE FOR INDUSTRIAL PRODUCTION OF PROTEINS FROM HUMAN BLOOD PLASMA**

John R. Wells, Galveston, Tex.; Gunthard Pautsch, Oelde; Detlef Grabbe, Ennigerloh, and Werner Kohlstedt, Oelde, all of Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany  
Filed May 19, 1988, Ser. No. 196,151  
Claims priority, application Fed. Rep. of Germany, Jul. 13, 1987, 3723092  
Int. Cl.<sup>5</sup> B04B 1/04  
U.S. Cl. 494—67 15 Claims



1. In a throughput centrifuge for the industrial production of proteins from human blood plasma, comprising a cylindrical centrifuge drum having means forming concentric zones that



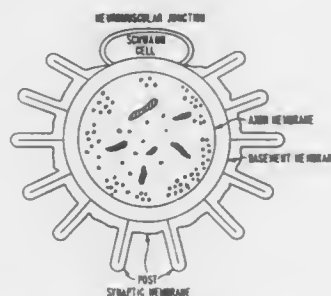
communicate at the bottom, wherein blood plasma and the like is supplied to a central zone and a liquid phase is continuously extracted from an outer zone, the improvement wherein the means forming the concentric zones comprises support members removably insertable in the drum to rest against inner surfaces of the drum and a plurality of pairs of radially inner and outer annular-segmental plastic containers configured as concentric at least annular-segmental chambers and having at least one channel at the bottom to provide liquid communication therebetween, an inlet connection disposed around the axis of rotation of the drum and an outlet channel at the top in communication with the outer zone, and wherein the containers, the communicating channel, the outlet channel and the inlet connection have outer surfaces which rest against inner surfaces of the drum and the support members and wherein each pair of inner and outer containers is connected by the communicating channel at the bottom thereof to form a single subassembly.

4,950,221

**PROCESS FOR AFFECTING MOLECULES IN TISSUE**  
Robert T. Gordon, 4936 W. Estes, Skokie, Ill. 60077  
Division of Ser. No. 886,616, Jul. 18, 1986, Mar. 21, 1989, Pat. No. 4,813,399. This application Sep. 27, 1988, Ser. No. 250,824  
Int. Cl.<sup>5</sup> A61N 2/00

U.S. Cl. 600—12

3 Claims



1. A process for affecting molecules in neurological or neuromuscular tissue and cells and subcellular structures in the tissue of a host organism, said process comprising the steps of: introducing particles into the cells of living tissue to affect the relative dipole moment in the tissue; thereafter, applying a constant magnetic field to the tissue and thereby enhancing the dipole moment in the tissue; and after said introducing step, applying an alternating electromagnetic field to the tissue.

4,950,222

**ISOLATOR FOR USE IN SURGERY OR AS A CLEAN ROOM AND METHOD OF USING THE SAME**

Frank B. Scott; Charley J. Fields, and James M. Fowler, Jr., all of Houston, Tex., assignors to Lone Star Medical Products, Inc., Houston, Tex.

Continuation of Ser. No. 75,249, Jul. 16, 1987, abandoned, which is a continuation of Ser. No. 726,088, Apr. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 676,204, Nov. 28, 1984, abandoned, which is a continuation of Ser. No. 485,210, Apr. 15, 1983, abandoned. This application Sep. 28, 1988, Ser. No. 251,072

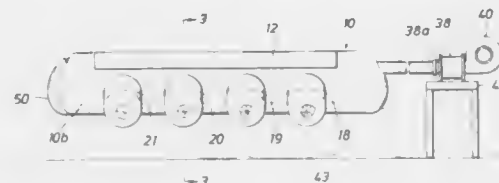
Int. Cl.<sup>5</sup> A61G 13/00

U.S. Cl. 600—21

18 Claims

1. An isolator for providing a continuously changing contamination-free atmosphere in which a surgical procedure can be performed or equipment that is sensitive to environmental contamination can be assembled, said isolator comprising an inflatable bag having a bottom, side walls, and end walls of flexible, impervious, material, and an upper side of relatively stiff, optically transparent, material forming a window through

which the inside of the isolator can be viewed, a plurality of open-ended sleeves attached to the bag through which hands for performing a surgical procedure or assembly can enter the bag, blower means for continuously supplying the bag from one end with a sufficient volume of air to maintain the pressure in the bag above atmospheric pressure and to change the air in



the bag at least two times per minute, means for filtering the air before the air enters the bag and exhaust means in the opposite end of the bag to cause the air to flow through the bag from one end to the other end to restrict the flow of air out of the bag sufficiently to maintain the pressure in the bag above atmospheric pressure sufficiently to inflate the bag.

4,950,223

**STOMA CLOSURE DEVICES**

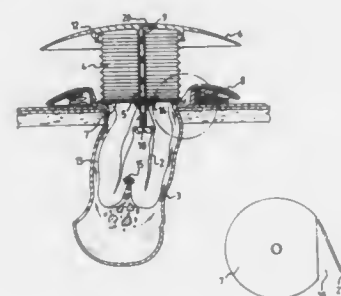
Beverly Silvanov, London, Great Britain, assignor to Trimark (R&D) Limited, Great Britain

Continuation-in-part of Ser. No. 46,873, Sep. 5, 1986, abandoned. This application Sep. 7, 1988, Ser. No. 241,600  
Claims priority, application United Kingdom, Sep. 5, 1985, 85 22037

Int. Cl.<sup>5</sup> A61J 1/00

U.S. Cl. 600—32

16 Claims



7. A closure device according to claim 1, further comprising: a neck portion for connection to a fluid supply capable of inflating the bung, wherein said neck portion has a diameter which is generally less than that of said body channel so that said neck portion is generally free from contact with said body channel; a first flared portion which extends from one end of said neck portion and has a resilient character and flares outwardly from said neck portion towards said walls of said body channel when said inflatable bung is inflated and positioned within said body channel; and a contact portion contiguous with an end of said first flared portion remote from said neck defining an open end of said inflatable bung, which contact portion is disposed inwardly of said body channel when inserted therein, said contact portion being arranged for contacting said walls of said body channel under influence of a pressure present within said body channel being greater than that outside of said body channel thereby effecting a seal to prevent outflow of fluid, solid material and/or flatus from said body channel.

4,950,224

**APPARATUS AND METHOD FOR IN VIVO PLASMA SEPARATION**

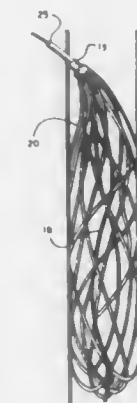
Reynolds G. F. Gorsuch, Yountville, and John Atkin, Corona Del Mar, both of Calif., assignors to Healthdyne, Inc., Marietta, Ga.

Filed Aug. 5, 1988, Ser. No. 229,007

Int. Cl.<sup>5</sup> H61M 37/00

U.S. Cl. 604—4

26 Claims



1. An apparatus for continuous in vivo plasma separation, comprising:

at least one elongated microporous fiber having a hollow interior, said fiber being dimensioned to be received within a blood vessel without significantly obstructing fluid flow through said blood vessel, the pore size of said fiber being sufficient to allow plasma to diffuse through said pores into said hollow interior of said fiber but not sufficient to allow cellular components larger than plasma to diffuse therethrough; and

said hollow interior of said elongated fiber being in fluid communication with a means for conducting plasma comprising a first discrete hollow tube which connects to one end of the fiber and permits passage of plasma from said hollow interior of said fiber and a second discrete hollow tube which returns plasma to said blood vessel such that plasma being removed from said fiber is kept separated from plasma being returned to the blood vessel.

4,950,225

**METHOD FOR EXTRACORPOREAL BLOOD SHEAR TREATMENT**

Alan A. Davidner, Claremont; Henry V. Roohk, and Max D. Lechtman, both of Westminster, all of Calif., assignors to American Immuno Tech, Inc., Claremont, Calif.

Filed Sep. 22, 1988, Ser. No. 247,767

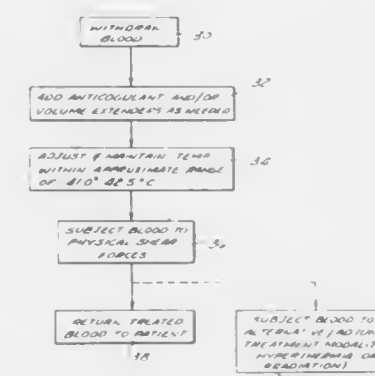
Int. Cl.<sup>5</sup> A61M 37/00

U.S. Cl. 604—4

3 Claims

1. A method for extracorporeally subjecting blood to mechanical shear forces, said method comprising the steps of: withdrawing a quantity of blood from the human subject; circulating said blood through a tubular recirculation loop at a rate sufficient to create frictional interaction between the flowing blood and the inner surface of said tubing; reinfusing said quantity of blood into the human subject; and

administering at least one chemical agent operative to cause migration of lymphocytes into the circulatory system of



the human subject prior to said withdrawal of a quantity of blood therefrom.

4,950,226

**SURGICAL SHUNT FOR LIVER ISOLATION**

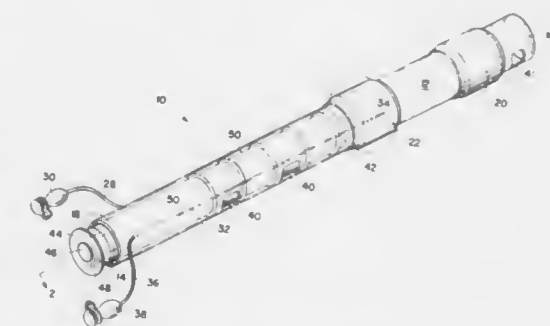
Bruce Barron, P.O. Box 430, Spruce Pine, N.C. 28777

Filed Sep. 11, 1989, Ser. No. 405,765

Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—8

10 Claims



1. A shunt for use in human surgical operations for isolating the liver and its hepatic veins from reperfusion of blood through the inferior vena cava, the shunt comprising:

an outer tube having a leading end for insertion into and advancement through the inferior vena cava from a selected venotomy location downstream of the hepatic veins to a location upstream of the hepatic veins and having a trailing end for disposition outside the inferior vena cava,

a first radially outwardly expansible cuff affixed to the outer tube adjacent the leading end thereof for sealing engagement with the inferior vena cava at the upstream location, a second radially outwardly expansible cuff affixed to the outer tube at an intermediate location therealong spaced from the first cuff for sealing engagement with the inferior vena cava at a location downstream of the hepatic veins and upstream of the venotomy location,

the outer tube having at least one opening formed there-through between the second cuff and the trailing end of the outer tube for disposition within the inferior vena cava,

an inner tube telescopically movable within the outer tube and having an operating end extending outwardly from the trailing end of the outer tube for actuating movement of the inner tube relative to the outer tube, and

at least a pair of annular sealing rings respectively attached

exteriorly to the inner tube at a spacing therealong greater than the lengthwise extent of the opening in the outer tube, whereby the cuffs prevent blood reperfusion through the inferior vena cava between the hepatic veins and the heart as well as backflow of blood downstream from the hepatic veins and selective movement of the inner tube with respect to the outer tube opens and closes the opening in the outer tube to selectively control fluid communication between the inferior vena cava and the interior of the outer tube for controlling normal blood reperfusion from the lower extremities.

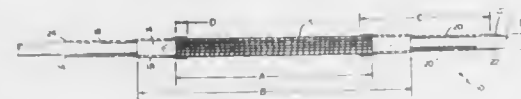
4,950,227

## STENT DELIVERY SYSTEM

Michael A. Savin, Norwood; James E. Windheuser, Watertown, and Richard A. Noddin, Holliston, all of Mass., assignors to Boston Scientific Corporation, Watertown, Mass.  
Filed Nov. 7, 1988, Ser. No. 267,575  
Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 604—8

36 Claims



1. A stent delivery system comprising: a catheter comprising an expansible distal portion constructed and arranged for expanding the outer diameter of said catheter from a contracted state to an expanded state, a stent positioned around said distal portion of said catheter, said stent having a contracted condition and being expansible to an expanded condition, and being sized in said contracted condition to closely surround said catheter in the contracted state, said stent having an end portion defining a margin lying over said expansible portion of said catheter, a sleeve in the region of said distal portion of said catheter positioned around said catheter, having a first end fixed to said catheter, and a second end defining a margin lying over said margin of said stent; said sleeve fixing said end of said stent on said catheter when said catheter is in the contracted state, said catheter and stent cooperatively constructed and arranged to cause expansion of said catheter from said contracted state to said expanded state to cause expansion of said stent, including said margin of said stent, from said contracted condition to said expanded condition, and therewith cause said margin of said sleeve to slide relatively axially from over the margin of said stent, thereby releasing said end of the stent from said catheter.

4,950,228

## URETERAL STENT

Peter M. Knapp, Jr., 1801 N. Senate Blvd., Suite 655, and Daniel M. Newman, 1801 N. Senate Blvd., both of Indianapolis, Ind. 46202

Filed Jan. 10, 1990, Ser. No. 463,297  
Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—8

8 Claims

1. A ureteral stent for providing drainage communication between the kidney and the bladder, which comprises: an elongated tubular member of substantially uniform outside diameter throughout its length, said member having proximal and distal ends connected by a body portion, the proximal end including retention means for retaining the proximal end in the bladder, the distal end including retention means for retaining the distal end in the kidney, the distal end retention means comprising the distal end being set in the shape of a helical curl and having three portions, the first portion extending from the body portion and being substantially straight, the second portion extending

from the first portion and being in the shape of a 360° helical curl having an outside radius, and the third portion extending from the second portion and terminating in a distal tip, the third portion being substantially straight and parallel to the first portion, the third portion being in



length between 1.2 and 2.0 times the outside radius of the helical curl of the second portion, said member including a central lumen and a plurality of holes communicating with the lumen to provide fluid communication between the proximal and distal ends.

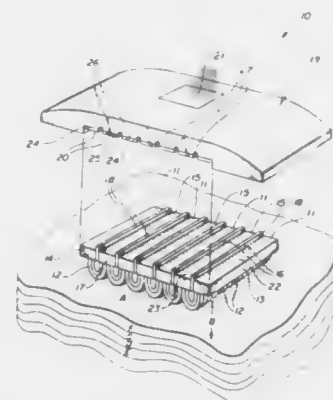
4,950,229

## APPARATUS FOR AN ELECTRODE USED FOR IONTOPHORESIS

Burton H. Sage, Jr., Raleigh, N.C., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.  
Filed Sep. 25, 1989, Ser. No. 412,056  
Int. Cl.<sup>5</sup> A61N 1/30

U.S. Cl. 604—120

18 Claims



1. An iontophoretic electrode array for placement against the skin in transdermal transport of ionic solutions through mammalian skin comprising: a plurality of ion transmitters for establishing electric field lines in an area of the skin and for transmission of ions along the field lines, each transmitter having a pair of longer sides and a pair of shorter sides; a plurality of receivers in position for accepting ions flowing along the electric field lines in the area of the skin, each receiver having a pair of longer sides and a pair of shorter sides; and a plurality of shields of a substance to resist the flow of ions thereacross, the shields interposed and located between

adjacent transmitters and receivers along the longer sides thereof so that the transmitters, shields and receivers are arranged in at least a sequence of transmitter, shield, receiver, shield so that the electric field lines are generally transverse to the longer sides as they pass through the area of the skin.

4,950,230

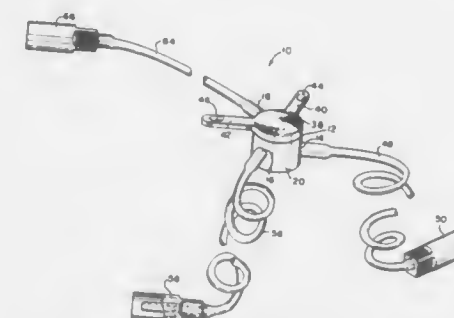
## METHOD AND APPARATUS FOR BAGLESS

CONTINUOUS AMBULATORY PERITONEAL DIALYSIS  
Lamar C. Kendell, Englishtown, N.J., assignor to Delmed, Inc., Freehold, N.J.

Continuation of Ser. No. 27,760, Mar. 19, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 327,418  
Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—28

6 Claims



1. A system for continuous ambulatory peritoneal dialysis apparatus, comprising: a valve having first, second and third fluid ports; a first tube having one end secured to the first fluid port and the other end secured to a first connector member, the first connector member being connectable to a mating connector member associated with a first fluid container to provide fluid communication between the first fluid port and the first fluid container; a second tube having one end secured to the second fluid port and the other end secured to a second connector member, the second connector member being connectable to a mating connector member associated with a second fluid container to provide fluid communication between the second fluid port and the second fluid container; and a third tube having one end secured to the third fluid port and the other end secured to a third connector member, the third connector member being connectable to a mating connector member associated with a catheter which has been surgically implanted in the abdominal wall of a user to provide fluid communication between the third fluid port and the peritoneal cavity of the user, the valve including an actuator moveable sequentially in either order between four positions, a first position in which all of the fluid ports are blocked to prevent the flow of fluid through the valve, a second position in which only the second and third fluid ports are interconnected to provide bi-directional fluid communication therebetween, a third position in which only the first and second fluid ports are interconnected to provide bi-directional fluid communication therebetween, and a fourth position in which only the first and third fluid ports are interconnected to provide bi-directional fluid communication therebetween, the location of the fluid ports and the structure of the actuator being established in a manner so that movement of the actuator between the second and third positions, in either direction, does not result in movement of the actuator through the fourth position and movement of the actuator between the third and fourth positions, in either direction, does not result in movement of the actuator through the second position, the system having a first configuration wherein said first connector member is located at a higher elevation than said third connector

member, and wherein said second connector member is located at a lower elevation than said third connector member, such that fluid flows through the valve in a first direction only from said third port to said second port, from said first port to said second port and from said first port to said third port, the system having a second configuration wherein said second connector member is located at an elevation higher than said third connector member, and wherein said first connector member is located at a lower elevation than said third connector member, such that fluid flows through the valve in a second direction only from said third port to said first port, from said second port to said first port and from said second port to said third port.

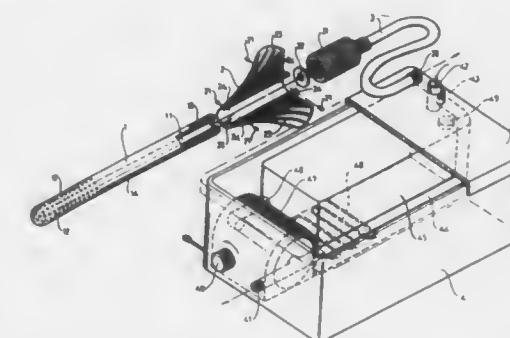
4,950,231

## VAGINA CLEANSING DEVICE

Su-Haw Liu, No. 41-2, Lane 24, Shin Kang Rd., Lin-Ya District, Taiwan  
Continuation of Ser. No. 245,804, Sep. 19, 1988, abandoned. This application Mar. 30, 1990, Ser. No. 503,117  
Int. Cl.<sup>5</sup> A61M 3/02

U.S. Cl. 604—39

3 Claims



1. A vagina cleaning device comprising: an elongated cleansing bar having a long small diameter and having an inner longitudinal water passage and a plurality of outlet openings at an outer end thereof; a connecting tube being connected to a rear end of the cleansing bar and connected at its other end to a source of cleansing water; a trumpet shaped cap increasing in (a) diameter from its front end to its rear end, (b) having a plurality of longitudinal grooves on its outer face from the front end to the rear end to facilitate the flow of water which has passed out through the outlet openings of the cleansing bar, (c) having a round opening at its front end to fit snugly and adjustably around the outer surface of the cleansing bar and (d) being adjustably connected thereto such that the length of the bar to be inserted into the vagina is adjustable according to the needs of a user; and a control case having a water tank for storing water to be fed to the connecting tube and a pump for drawing water in the tank through a control case outlet to the connecting tube, said control case having an inlet, and means for directing water received at said control case inlet either to the tank or bypassing the tank, directly to the control case outlet, and said control case having room therein beside the tank for storing the cleansing bar, cap and connecting tube.



4,950,232

## CEREBROSPINAL FLUID SHUNT SYSTEM

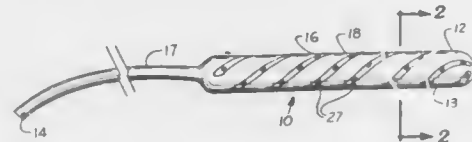
Petr Ruzicka, Millburn, N.J., and Milan Ruzicka, St. Paul, Minn., assignors to Surelab Superior Research Laboratories, St. Paul, Minn.

Continuation of Ser. No. 85,288, Aug. 11, 1987, abandoned, which is a continuation of Ser. No. 762,506, Aug. 5, 1985, abandoned. This application Jul. 11, 1988, Ser. No. 220,365

Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—43

13 Claims



2. A cerebrospinal fluid shunt system including a ventricular catheter comprising a length of biologically acceptable tubing having a ventricular end portion adapted for insertion in the ventricle of a brain, the ventricular end portion of the catheter having an exterior surface provided with at least one helical groove formed therein and a closed tip, a plurality of holes formed through the wall of the catheter within the grooves, the ventricular end portion of the catheter being axially elastically extensible, stylet means insertable within the catheter and having an end adapted to contact and press against the tip of the catheter to cause the ventricular end portion thereof to extend elastically with resultant reduction in its diameter for facilitating insertion or removal of the catheter into or from a ventricle, a flexible protective sheath sheathing the catheter and including means enabling the sheath to be drawn rearwardly of the catheter to expose the ventricular end portion thereof, a drainage tube for carrying cerebrospinal fluid from the catheter to a desired body location, connector means connecting the catheter and drainage tube and providing fluid communication therebetween, and flexible tubular cover means carried exteriorly of the drainage tube and from which the drainage tube can be drawn.

4,950,233

## NERVE BLOCK NEEDLE AND SAFETY METHOD OF USE

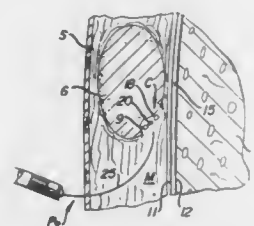
Joseph M. Abramowitz, 18 Covert St., Port Washington, N.Y. 11056

Filed Oct. 5, 1988, Ser. No. 253,777

Int. Cl.<sup>5</sup> A61M 31/00

U.S. Cl. 604—51

2 Claims



1. A safety method of administering a nerve block drug to an intercostal nerve in the channel of a rib which method comprises penetrating the body of a patient with an arcuate needle at an angle to the rib; pressing the needle so as to have it follow its own curvature in the body until the needle tip is re-entrant in a direction generally toward the nerve and away from the lung and within the area where a drug injected through the needle can reach the nerve; and injecting a nerve block drug through the needle.

4,950,234

## DEVICE FOR ADMINISTERING SOLID PREPARATIONS

Keiji Fujioka, Amagasaki; Nobuhiko Tamura, Toyonaka; Yoshihiro Takada, Takatsuki, and Kenji Himeshima, Toyonaka, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited and Nissho Corporation, both of Osaka, Japan

Filed May 25, 1988, Ser. No. 198,290

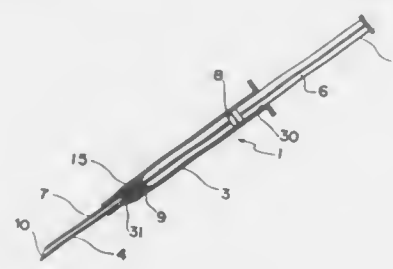
Claims priority, application Japan, May 26, 1987, 62-129439;

May 26, 1987, 62-79259[U]

Int. Cl.<sup>5</sup> A61M 5/18

U.S. Cl. 604—60

12 Claims



1. A device for subcutaneously administering a solid or semisolid preparation in an organism, which comprises a solid preparation injector and a guide member containing one or more solid preparations and being loaded with said injector, said solid preparation injector comprising a needle member with a pointed end, a barrel having a nozzle for attachment of said needle member, and a plunger slidably arranged in said barrel, said barrel having a front and rear end and having a lumen tapered at said front end to provide a seat for said guide member, said plunger comprising a plunger body and an elongated small-sized rod portion being connected at one end to the tip of said plunger body, said small-sized rod portion having an outside diameter equal to or smaller than the inside diameter of said needle member with the length of said small-sized rod portion being determined such that said tip of said small-sized rod portion is stopped within said pointed end of said needle member when said plunger is forced into said barrel loaded with said guide member until said plunger stops, said guide member having an outside diameter slightly smaller than the inner diameter of said barrel and having a guide hole for guiding said small-sized rod portion in said lumen of said needle member, said solid preparations being contained in said guide hole of said guide member.

4,950,235

## CONTAINER-SIDE OCCLUSION DETECTION SYSTEM FOR A MEDICATION INFUSION SYSTEM

John B. Slate, Studio City; James L. Henke, Simi Valley, and Soo H. Hong, El Monte, all of Calif., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.

Filed May 10, 1988, Ser. No. 192,280

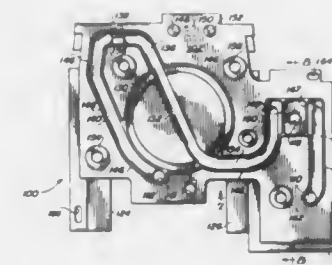
Int. Cl.<sup>5</sup> A61M 31/00

U.S. Cl. 604—65

23 Claims

1. A container-side occlusion detection system for use in a medication infusion system having a disposable cassette mounted onto a main pump unit, comprising:  
a reciprocating piston pump located in a disposable cassette, said pump having a fill stroke and a deliver stroke;  
a motor location in a main pump unit, said motor for driving said pump;  
means for monitoring motor current during said fill stroke of said pump, said motor current being indicative of the presence or absence of a container-side occlusion in a fluid line, said monitoring means comprising an integrator for taking the first integral of motor current and providing as

an output a CSOD value characteristic of said motor current;  
means for providing an alarm; and



means for comparing said CSOD value to a preselected alarm threshold value, said comparing means causing said means for providing an alarm to initiate an alarm when said CSOD value exceeds said preselected alarm threshold value.

4,950,236

## BREAST PUMP ADAPTER FOR FILLING INFANT NURSE HAVING DISPOSABLE LINERS

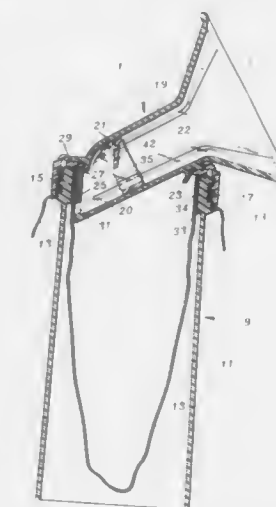
Michael J. Wilson, Delta, Canada, assignor to Aurora Search Ltd., Delta, Canada

Filed Oct. 21, 1988, Ser. No. 260,865

Int. Cl.<sup>5</sup> A61M 1/06

U.S. Cl. 604—74

12 Claims



1. An adapter for filling infant nurseries from a breast pump, where said infant nurser comprises a flexible, liquid-containing liner supported in a solid shell, said adapter comprising:

- (a) a breast shield adapted to receive a female breast;
- (b) a hollow chamber communicating at its upper end with and extending downwardly from said shield and substantially closed at its lower end, and having an extension of said lower end comprising an aperture for the passage of milk;
- (c) an air passageway communicating with said hollow chamber for connecting a pump; and
- (d) means for fixing said adapter relative to a flexible liner supported in a nurser wherein said extension is placed in sufficiently close proximity to a section of said flexible liner to thereby cause said section of said flexible liner to be releasably drawn toward and to cover said aperture upon a temporary reduction of pressure in said hollow chamber caused by a pump, thereby restricting the flow of air through said aperture, sufficiently quickly to prevent

significant reduction of pressure in the interior of said flexible liner and to be released from said aperture upon a temporary increase of pressure in said hollow chamber; and wherein said nurser comprises a nipple-retaining cap having a central opening forming an inner annular lip and said means for fixing comprises:

- (e) clip means extending from the exterior wall of said chamber near the upper end thereof and beneath said shield for releasably securing said adapter to said lip of said nipple-retaining cap; and
- (f) a groove in said adapter adapted for seating on the inner edge of said inner annular lip; and further comprising flange means extending horizontally from said hollow chamber and adapted to contact the upper surface of said lip of said nipple-retaining cap, wherein said flange is provided with an aperture for the passage of air between the exterior of the adapter and the interior of said flexible liner.

4,950,237

## DUAL CHAMBERED MIXING AND DISPENSING VIAL

Paul Henault, Clermont-Ferrand, France; Carleton H. Macartney, Lincroft, N.J.; Gilbert Lataix, Chatel-Guyon, France, and Ronald G. Saffron, Salisbury, England, assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 1, 1988, Ser. No. 265,745

Claims priority, application United Kingdom, Nov. 6, 1987, 8726062

Int. Cl.<sup>5</sup> A61M 37/00

U.S. Cl. 604—82

7 Claims



7. A dual chamber mixture dispensing device for selectively maintaining mixture components separate until mixing and dispensing is desired, comprising

- A. a mixture dispensing means comprising a droplet nozzle;
- B. a first chamber carrying the mixture dispensing means for storing one or more of the mixture components, having substantially rigid walls, one of said walls being a common wall to a second chamber, said common wall having an orifice open to said second chamber;
- C. a second chamber for storing one or more of the mixture components adjacent to said first chamber extending from said common wall, the other walls and base to said second chamber being selectively depressible toward said first chamber;
- D. a plugging means for selectively sealing said orifice having a first position sealing said orifice and a second position dislodged from said orifice; and
- E. a depressible stem located within said second chamber when said plugging means is in its first position and situated proximally between said plugging means and said flexible base of said second chamber so that depression of said base walls toward the first chamber will cause the depressible flexible stem to dislodge said plugging means from said orifice permitting commingling of the mixture components.

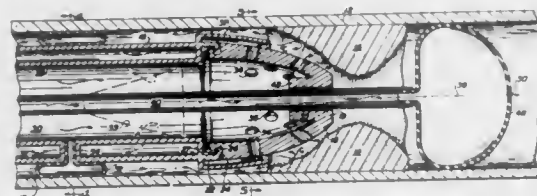
4,950,238

## HYDRO-ROTARY VASCULAR CATHETER

Dennis E. Sullivan, Phoenix, Ariz., assignor to Clarence E. Sikes, Glendale, Ariz., a part interest  
Continuation-in-part of Ser. No. 216,095, Jul. 7, 1988, abandoned. This application Jul. 20, 1989, Ser. No. 383,362  
Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 604—22

12 Claims



1. A catheter apparatus for removing undesired material from a constricted area in a vessel of a patient containing a body fluid, said apparatus comprising:

- a tubular shell for insertion within the vessel in the patient's body, said shell having a proximal end, a distal end, and a longitudinal axis;
- a non-abrasive rotary fluid-directing head secured to the distal end of said outer shell and mounted for rotation about the longitudinal axis of said shell;
- isolation means for isolating said constricted area from the rest of said vessel, said isolation means including (i) first isolation means mounted on said shell for placement upstream of said constricted area, and (ii) second isolation means mounted in the distal end of said shell for placement downstream of said constricted area;
- first supply means in said tubular shell for introducing a flushing fluid into said constricted area at a relatively high pressure;
- second supply means in said tubular shell for carrying the body fluid beyond said second isolation means to allow circulation of the body fluid downstream of said constricted area;
- spin means for imparting a spin to said rotary fluid-directing head, said spin means including primary outlet passages formed through said rotary fluid-directing head for directing streams of pressurized flushing fluid exiting said outlet passages to produce a torque causing said head to spin around the longitudinal axis of said shell;
- return means in said shell for carrying flushing fluid and debris created by action of said catheter apparatus away from the constricted area in said vessel out of the patient's body; and
- shield means for preventing fluid exiting said primary outlet passages from directly impacting said vessel.

4,950,239

## ANGIOPLASTY BALLOONS AND BALLOON CATHETERS

William J. Gahara, Nashua; Thomas R. Johnson, Milford, both of N.H., and Tilak M. Shah, Guilford, Conn., assignors to Worldwide Medical Plastics Inc., Nashua, N.H.  
Filed Aug. 9, 1988, Ser. No. 230,251  
Int. Cl.<sup>5</sup> A61M 25/10

U.S. Cl. 604—96

15 Claims



1. A medical dilatation balloon molded from a polyurethane which has a hardness of at least about 75D and a glass transi-

tion temperature of more than about 38° C. and which comprises the reaction product of

- an organic diisocyanate;
- a polyol having an average functionality of at least 1.9 and a molecular weight in the range of about 500 to about 20,000; and
- at least one chain extender having a functionality from 2 to 3 and a molecular weight from about 50 to about 400; said polyurethane being further characterized in that the proportion by weight of said polyol in said polyurethane is from about 2 to about 25 percent.

4,950,240

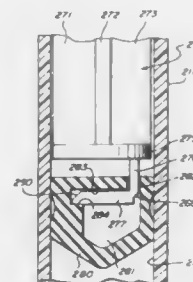
## HYPODERMIC SYRINGE FOR SINGLE USE

Eugene C. Greenwood, 2956-B Pepper Tree La., Costa Mesa, and John A. Holland, 1836 Port Abbey Pl., Newport Beach, both of Calif. 92660

Continuation-in-part of Ser. No. 253,137, Oct. 4, 1988. This application Apr. 6, 1989, Ser. No. 334,312  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—110

7 Claims



1. A hypodermic syringe for single use comprising: an elongated syringe body defining an interior syringe bore; a hollow needle supported by said syringe body in communication with said syringe bore;
- a piston sealingly fitted within said syringe bore defining an interior cavity and an aperture in communication therewith, said piston being movable within said syringe bore in a first direction away from said needle and a second direction toward said needle;
- a piston driver extending into said syringe bore defining an end flange, a shaft member extending into said cavity through said aperture, and a beam member fracturably joined to said shaft member and captivated within said interior cavity, said piston driver, said shaft member and said beam member being formed of a single unitary molded part,
- said beam members fracturing and separating from said shaft when said piston driver is moved in said second direction.

4,950,241

## DISPOSABLE SYRINGE

Alan B. Ranford, St. Louis, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.

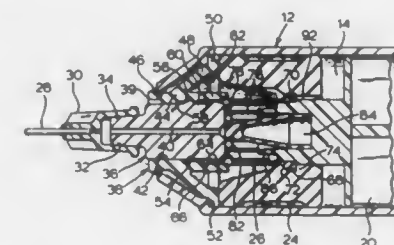
Filed Dec. 27, 1988, Ser. No. 290,494  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—110

47 Claims

1. A syringe comprising: a barrel; a plunger slidable in said barrel; an elastomeric member fixed within said barrel at a distal end thereof and having an opening therethrough; needle connector means positioned in said opening of said elastomeric member and having a passage therethrough for connecting a needle cannula in fluid communication with said barrel; anchor means on said elastomeric member for retaining said needle connector means within said opening; coupling means on said needle connector means and on said plunger for coupling said plunger to said needle connector means in response to prede-

terminated movement of said plunger; and said anchor means providing for release of said needle connector means from said elastomeric member in response to said predetermined move-



ment of said plunger to permit withdrawal of said needle connector means from said opening of said elastomeric member to within said barrel.

4,950,242

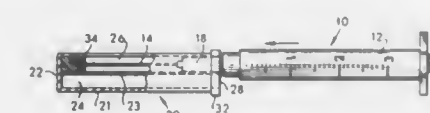
## HYPODERMIC NEEDLE COVER AND ASSEMBLY THEREWITH

Marcial Alvarez, 220 E. Jersey St., Elizabeth, N.J. 07206

Filed Sep. 15, 1989, Ser. No. 407,904  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—110

10 Claims



1. A cover for a hypodermic needle-syringe unit comprising wall means defining an elongated enclosure, a longitudinal partition dividing said enclosure into a first chamber and a second chamber, said first chamber having a mouth and said second chamber having a mouth, and means in said second chamber for disabling the discharge end of a hypodermic needle brought into contact therewith.

4,950,243

## SYRINGE FOR ONE SOLE USE

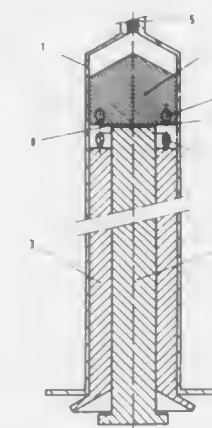
Miracle C. Estruch, Antonio Suárez, 4-17, 46021 Valencia, Spain

Filed Nov. 28, 1988, Ser. No. 276,591

Claims priority, application Spain, Nov. 27, 1987, 8703384  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—110

8 Claims



1. A single use hypodermic syringe, comprising, a cylinder having a tip which includes a fluid outlet opening,

a piston which is movable in the cylinder to expel liquid through the fluid outlet opening, a pusher for pushing the piston forwardly toward the fluid outlet opening, said pusher having a first part that is shorter than the piston and is detachably connected to the piston, said pusher having a second part that is long enough to move the piston to the end of the cylinder, and means for detachably connecting said pusher to the piston so that said piston will not move when the pusher moves rearwardly.

4,950,244

## PRESSURE SENSOR ASSEMBLY FOR DISPOSABLE PUMP CASSETTE

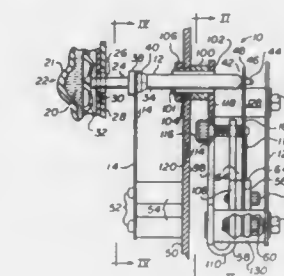
George H. Fellingham, San Jose, and Michael Lawless, Boulder Creek, both of Calif., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed May 1, 1987, Ser. No. 45,949

Int. Cl.<sup>5</sup> A61M 1/00

U.S. Cl. 604—118

9 Claims



1. A driver mechanism for driving a disposable pumping cassette with a pressure detection section, comprising: an elongated rod member with a first end in contact with the cassette pressure detection section, said rod member adapted to move in response to a change in pressure in the cassette;
  - a first flexible support with said first end of said elongated rod being supported by a first end of said first support, a second end of said first support being fixedly mounted in said driver mechanism whereby said first end of said first support flexes in response to movement of said rod;
  - a second flexible support with a second end of said elongated rod being supported by a first end of said second support; a second end of said second support being mounted on an adjustable mounting means whereby said first end of said second support flexes in response to movement of said rod; and
  - position detection means associated with one of said first or second supports for monitoring flexural movement of said one support;
- whereby the pressure in the cassette can be monitored by monitoring said position detection means.

4,950,245

## MULTIPLE FLUID CARTRIDGE AND PUMP

Eric W. Brown, Newport Beach; Charles Kienholz, San Dimas, and Steve Busak, Laguna Niguel, all of Calif., assignors to I-Flow Corporation, Irvine, Calif.

Filed Jul. 8, 1988, Ser. No. 216,512

Int. Cl.<sup>5</sup> A61M 5/00

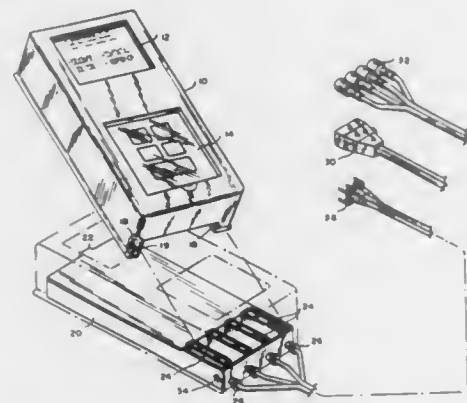
U.S. Cl. 604—153

4 Claims

1. A multiple fluid source cartridge comprising: a rigid housing;
- a plurality of fluid containing compartments located within said housing;
- a linear conduit connected to each one of said fluid containing compartments;



a plurality of plunger members superposed on each of said linear conduits; and



an output port accessible from outside said housing for each of said linear fluid conduits.

#### 4,950,246 INJECTION PEN

Robert H. Muller, Nieuwegein, Netherlands, assignor to Spruyt-Hillen B.V., Vianen, Netherlands  
Filed Apr. 27, 1988, Ser. No. 187,015  
Claims priority, application Netherlands, May 8, 1987, 87-01091

Int. Cl.<sup>5</sup> A61M 5/20

U.S. Cl. 604—154

17 Claims



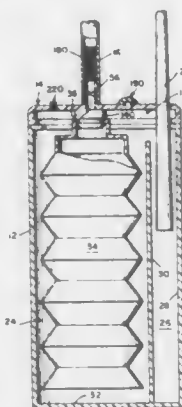
1. In an injection pen suitable for being carried in the clothes of a user-patient and for being connected to the patient only during distinct one at a time injections, the injection pen being of the type including an elongated housing having a handle means around the outside adapted to be gripped within the fingers of the user-patient, the housing incorporating a magazine for an injection fluid cartridge having a variable fluid volume, the cartridge further having an outlet formed therein and a piston disposed therein, the pen having a pump rod that can be biased against the piston disposed in said cartridge for altering the fluid volume thereof, a head portion at one end of the elongated housing adapted to receive a needle unit for transferring fluid expelled from the cartridge through the outlet thereof to the body of the user-patient, and a drive mechanism for moving said pump rod and the piston, wherein the improvement thereupon comprising, in combination, the drive mechanism including an electromotor which is controlled by an electronic control unit comprising memory means, said memory means having areas assigned as first dose memory means, for storing a data corresponding to a certain number of dose units of injection fluid, the pen further incorporating an externally operable dose set unit for setting said data, an indicator means controlled by said first dose memory means for representation of said certain number to the user-patient and a power source connected to the drive mechanism, the electronic control unit, the dose set unit and the indicator means for providing power thereto.

#### 4,950,247 ASPIRATOR FOR COLLECTION OF BODILY FLUIDS INCLUDING IMPROVED SAFETY AND EFFICIENCY ELEMENTS

Richard Rosenblatt, Beverly Hills, Calif., assignor to Rosenblatt/IMA Invention Enterprises, Beverly Hills, Calif.  
Continuation-in-part of Ser. No. 903,017, Sep. 2, 1986, Pat. No. 4,775,366. This application Jun. 22, 1988, Ser. No. 209,852  
The portion of the term of this patent subsequent to Oct. 3, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—181

21 Claims



1. An aspirator for removing bodily fluids through human suction and subsequent collection of the removed bodily fluids, comprising:  
a. a container having a bottom wall and a side wall;  
b. a top having a first aperture therein and a second aperture therein spaced apart from the first aperture, the top being removably attached to said container;  
c. said container further comprising an upstanding partition within said container to divide the container into a first chamber and a second chamber;  
d. said upstanding partition extending from the bottom of said container to a distance between the bottom of said container and said top to create a division opening between said first and second chambers to thereby permit gaseous communication but not liquid communication between said first and second chambers;  
e. said first aperture opening into said first chamber and said second aperture opening into said second chamber;  
f. a first hollow tube having two ends, with the first end inserted through said first aperture such that said first hollow tube extends for a distance below said division opening and into said first chamber for a total distance inside the container in the range from about one-third to about three-fourths of the length of the container and said second end extends for a distance beyond said top and further comprises at least one opening adjacent its tip;  
g. a flexible bellows member comprising an integrally formed flexible bellows and terminating in a sealed bottom at one end and affixed to a bellows cap at its other end;  
h. said bellows cap having an opening extending into the bellows and attached to the top of said container such that the opening in the bellows cap is aligned with said second aperture in the top of the container;  
i. the top of said container further comprising means for receiving a hollow tube in alignment with said second opening, the means comprising a central opening for fluid communication with the second aperture and bellows;  
j. a second hollow tube having two ends, with the first end attached to said means for receiving a hollow tube aligned with said second opening and the second end attached to a mouthpiece, to thereby provide a closed system permitting gaseous communication between the mouthpiece, the second hollow tube, the bellows cap and the bellows; and

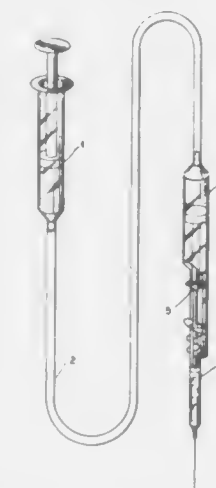
k. said flexible bellows extending into said second chamber for a distance beyond said division opening such that the flexible bellows is in its fully expanded position when in its equilibrium state;  
l. whereby in use, the second end of said first hollow tube is inserted into the patient from which bodily fluid is to be removed and the mouthpiece of the second hollow tube is sucked on by the person treating the patient, and suction through the mouthpiece will cause said flexible bellows to contract to thereby create a vacuum in said second chamber which through gaseous communication with said first chamber causes air and bodily fluids from the patient to be sucked into and remain in the first chamber while the airtight system from the mouthpiece through the flexible bellows prevents any direct communication of air or bodily fluids between the patient and the person treating the patient.

#### 4,950,248 DISPOSABLE INSTRUMENT FOR INJECTION

Omar M. A. A. Rawi, Ameria, Al-Firdous quarter No. 8/4/630, Baghdad, Iraq  
Continuation of Ser. No. 7,071, Jan. 22, 1987, abandoned. This application Aug. 3, 1988, Ser. No. 228,825  
Claims priority, application Iraq, Jan. 23, 1986, 18/86  
Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—181

2 Claims



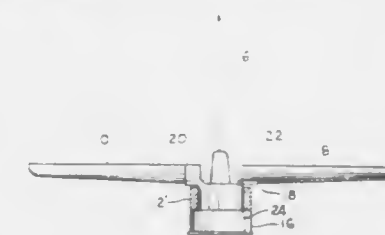
1. A disposable instrument for an injection, comprising:  
syringe-receiving means for holding by a hand and fixedly receiving therein a simple syringe having a plunger actuable for an injection;  
piston and cylinder plunger-actuation means integral with the syringe-receiving means and fluid actuable for actuating the plunger of the simple syringe for the injection with movement of the piston in response to fluid pressure in the cylinder;  
instrument-actuation means for holding by a hand and providing fluid pressure upon actuation; and  
an elongated, flexible tube flexibly connecting the instrument-actuation means to the plunger-actuation means for actuating the plunger-actuation means with the fluid pressure from the instrument-actuation means, wherein the syringe-receiving means comprises an extension of the plunger-actuation means having two wing clips spaced from each other on opposite sides of the axis of the cylinder of the plunger-actuation means for fixedly receiving the simple syringe therebetween.

#### 4,950,249 HYPODERMIC NEEDLE WITH RECLOSABLE SAFETY CAP

Janine C. Jagger, and Richard D. Pearson, both of Charlottesville, Va., assignors to University of Virginia Alumni Patents Foundation, Charlottesville, Va.  
Filed Jan. 9, 1989, Ser. No. 364,523  
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—192

5 Claims



1. A hypodermic needle apparatus comprising:  
a needle having a distal end and a proximal end,  
a needle hub having proximal and distal ends connected to a syringe or other device at its proximal end and connected to the proximal end of the needle at its distal end,  
a needle cap axially split into two halves along its length and having proximal and distal ends, the length of the halves being at least that of the needle so as to enclose the needle when the distal ends of the two halves are positioned adjacent each other, the closed position, and each half is pivotally connected at its proximal end by tabs to the needle hub, and  
a ring slidably supported on the hub and being vertically movable between upper and lower positions, wherein in the lower position the ring is below the pivotal connection of the two halves, and in the upper position the distal portion of the ring is slightly above the pivotal connection of the two halves and coacts with the exterior surfaces of the two halves to cause pivotally upward movement of the two halves to close the two halves around the needle when the ring is moved from its lower position to its upper position, wherein the tabs are made of an elastic material which are formed perpendicular with respect to the needle hub, so that the distal ends of the two halves are biased to a position spaced from each other and the halves are biased to extend perpendicular with respect to the needle hub, the open position, such that when the ring is moved from its lower position to its upper position, placing the two halves in its closed position, a spring force is created in the tabs due to the bending of the tabs upwards from their perpendicular position, and such that when the ring is moved from its upper position to its lower position, the spring force created in the tabs is released, causing an outward movement of the two halves to the open position.

#### 4,950,250 COLLAPSIBLE NEEDLE COVER

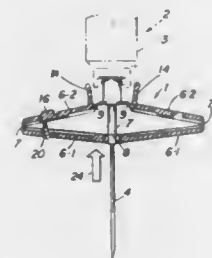
Terry M. Haber, El Toro, and John A. Lewis, Costa Mesa, both of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.  
Continuation of Ser. No. 159,373, Feb. 23, 1988. This application Sep. 8, 1989, Ser. No. 404,672  
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—192

13 Claims

1. A syringe including hollow cylinder means in which to receive a supply of fluid, a needle cannula communicating fluidically with said cylinder means so that the fluid can be expelled therefrom, means for expelling fluid from said cylinder means, and needle cover means, said needle cover means comprising:  
a needle cover that is collapsible from an open, expanded

configuration, at which the cannula is exposed so that an injection may be administered, to a closed, generally planar configuration, at which the cannula is surrounded and shielded to avoid an accidental needle strike, said needle cover being split longitudinally and cross-sectionally to form proximal and distal pairs of cover segments, each cover segment having a proximal and distal end, first hinge means to interconnect the distal ends of said distal cover segments to one another, an opening through said first hinge means which is coaxial with the needle cannula,



second hinge means to connect the proximal end of each distal cover segment to the distal end of the longitudinally adjacent proximal cover segment, third hinge means to interconnect the proximal end of each proximal cover segment with the needle cannula, and retaining means extending from a first cover segment and adapted to engage a second cover segment to releasably retain said needle cover in the open configuration or to engage a third cover segment to retain said needle cover in the closed configuration.

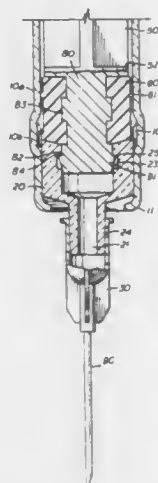
4,950,251

## SIMPLIFIED RETRACTABLE NEEDLE SYRINGE

Michael L. Haining, 6731 Ashmore, Houston, Tex. 77069  
Continuation-in-part of Ser. No. 322,282, Mar. 13, 1989,  
abandoned. This application Dec. 12, 1989, Ser. No. 449,971  
Int. Cl.<sup>5</sup> A61M 5/32

U.S. Cl. 604—195

4 Claims



1. A hypodermic syringe having a retractable needle, comprising:

- a hollow cylindrical barrel of semi-rigid deformable plastic open at both ends and having an inwardly projecting lip at the lower end and finger flanges at the upper end;
- a rigid cylindrical needle carrier mounted within said barrel and seated on said lip and retained in place by frictional

sealing engagement between the outer diameter of said carrier and the inner wall of said barrel, said needle carrier having an extension protruding through the opening at the lower end of said barrel;

- internal shoulders extending inwardly on the inner wall of said barrel directly above said carrier to aid in retaining said carrier in place during use;
- a hypodermic needle mounted on said extension;
- a plunger slidably mounted in said barrel through the upper open end and defining a fluid chamber between said carrier and said plunger;
- a central bore through said carrier and extension for fluid communication between said needle and said chamber;
- an enlarged bore in said carrier near said chamber and coaxial with said central bore;
- a shaft extending from the lower end of said plunger;
- a hub on the lower end of said shaft adapted to lock into said enlarged bore; and
- expansion means on said plunger to deform said shoulders and release said carrier when said hub engages said enlarged bore.

4,950,252

## SINGLE HAND ACTUATED LOCKING SAFETY CATHETER AND METHOD OF USE

Ronald B. Luther, Newport Beach, and Pradip V. Choksi, Northridge, both of Calif., assignors to Luther Medical Products, Inc., Tustin, Calif.

Continuation-in-part of Ser. No. 115,407, Nov. 2, 1987, Pat. No. 4,832,696, which is a continuation-in-part of Ser. No. 22,132, Mar. 5, 1987, Pat. No. 4,762,516. This application May 5, 1988, Ser. No. 191,286

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—198

21 Claims



1. An over-the-needle catheter assembly comprising:
  - a housing including sidewalls and a first portion of a detente lock;
  - a needle mounted to said housing and extending therefrom;
  - a needle guard slidably mounted to said housing including a second portion of a detente lock;
  - a catheter hub support formed on said needle guard;
  - a catheter mountable upon said needle, said catheter having a catheter hub sized to be registered upon said catheter hub support such that, following insertion of said needle and said catheter into a patient:
    - (i) said housing and said needle may be concomitantly retracted relative to said needle guard, said concomitant retraction of said housing and said needle being operative to withdraw said needle from said catheter and into said needle guard, and, thereafter;
    - (ii) said catheter hub may be separated from said catheter hub support allowing the housing, needle guard, and the needle positioned with said needle guard to be separated from the patient while the catheter and catheter hub remain with the patient.

4,950,253

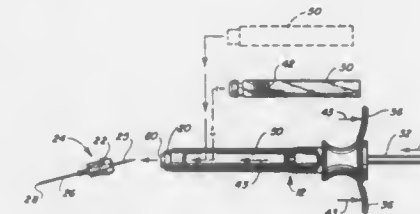
## NEEDLE EJECTOR STRUCTURE FOR A SYRINGE

Jerome Jacobs, 6415 Allison Rd., Miami Beach, Fla. 33141  
Filed Mar. 6, 1989, Ser. No. 319,090

Int. Cl.<sup>5</sup> A61M 5/315

U.S. Cl. 604—218

11 Claims



1. A needle ejector structure for use in a syringe having a plunger having a barbed distal end telescopically positionable within a hollow interior of an elongated barrel and an elongated slot extending along an outer wall of the barrel, the slot dimensioned and disposed to allow passage therethrough of a cartridge into and out of the hollow interior, said barrel including an open distal end structured to removably secure a hub portion of a needle thereto;

said needle ejector structure comprising:

- a. a push rod having an elongated configuration and adapted to pass through the slot into and out of the hollow interior;
- b. said push rod including a proximal end disposed in abutting engagement with the barbed end of the plunger when said push rod is within the hollow interior of the barrel, said push rod being axially movable within said barrel upon engagement with, and telescopic movement of said plunger, and
- c. said push rod further including a distal end structured to pass at least partially through said open distal end of said barrel into abutting engagement with the hub of the needle, thereby forcing the hub portion to separate from the distal end of the barrel upon movement of said push rod towards the open distal end.

4,950,254

## VALVE MEANS FOR ENTERAL THERAPY ADMINISTRATION SET

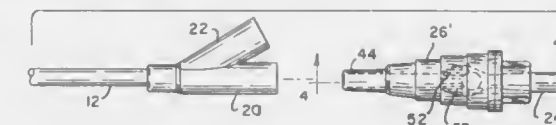
Erik Andersen, Vernon Hills, and Charles Dillon, Lincolnshire, both of Ill., assignors to Corpak, Inc., Wheeling, Ill.

Filed Oct. 14, 1988, Ser. No. 257,726

Int. Cl.<sup>5</sup> A61M 31/00

U.S. Cl. 604—247

2 Claims



1. In a pump administration set for enteral feeding of therapeutic fluids, the set including at least a tubing segment connecting a source of therapeutic fluids with a nasogastric feeding tube, the tubing segment having a portion being compressible by a peristaltic pump, and a male connector on a distal end of the tubing segment for coupling with a female connector on a proximal end of the nasogastric feeding tube, the improvement to the set comprising:

one way valve means carried within the male connector, the valve means being responsive to fluid backflow pressure to arrest retrograde fluid movement from the feeding tube through the tubing segment of the administration set; the one way valve means including a valve housing interposed along the tubing segment, the housing having a fluid inlet on one end joined to the tubing segment to receive

fluid from the source and a fluid outlet on an other end joined to the tubing segment to transmit fluid to the feeding tube, the housing having an internal axial bore connecting the fluid inlet with the fluid outlet;

- a valve chamber positioned along and coaxial with the bore, one side of the chamber opening to the fluid inlet and defining a valve seat thereon, an other side of the chamber opening to the fluid outlet; and,
  - a valve member disposed within the valve chamber, the valve member being movably responsive to fluid pressure from the fluid outlet;
- such that the valve member is urged against the valve seat by the fluid pressure thereby preventing fluid access to the fluid inlet and to arrest retrograde movement of fluid within the tubing segment.

4,950,255

## CATHETER CONNECTOR AND CLAMP

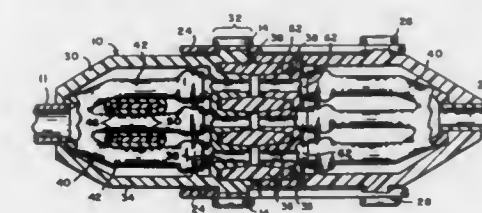
Eric W. Brown, Newport Beach; Charles Kienholz, San Dimas; Earl F. Robinson, El Toro, and Rex O. Bare, Irvine, all of Calif., assignors to I-Flow Corporation, Irvine, Calif.

Filed Apr. 7, 1988, Ser. No. 178,673

Int. Cl.<sup>5</sup> A61M 39/00

U.S. Cl. 604—250

23 Claims



1. A multilumen connector part comprising:

- a housing having a plurality of engagement parts at one end and means for receiving a multilumen catheter at an other end;
- a manifold having a plurality of compressible and resilient conduits within said housing, said manifold providing independent fluid communication between each lumen of said multilumen catheter and a different one of said conduits and said conduits each leading to a different one of said plurality of engagement ports; and
- clamping means attached to said housing for selectively closing off said plurality of conduits by pushing against all of said conduits in an area of said housing where said conduits are arranged in a non-overlapping manner.

4,950,256

## NON-THROMBOGENIC INTRAVASCULAR TIME RELEASE CATHETER

Ronald B. Luther, Newport Beach, and Edward Shanbrom, Santa Ana, both of Calif., assignors to Luther Medical Products, Inc., Tustin, Calif.

Continuation of Ser. No. 178,621, Apr. 7, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 462,911

Int. Cl.<sup>5</sup> A61M 5/325

U.S. Cl. 604—265

1 Claim

1. An invasive device comprising a structure constructed and dimensioned for insertion into a patient for residing in contact with a fluid in the patient which contains fibrinogen-fibrin capable of forming clots, and a coating on the structure, said coating consisting essentially of three-dimensional polymer formed of polyurethane polyene compositions obtained by reacting from about 10 to about 50 parts by weight of a polyene in the presence of about 100 parts by weight of a hydrophilic polyurethane resin, said coating having absorbed therein an amount of antimicrobial anticoagulant consisting essentially of polymyxin in amount effective to inhibit growth of bacteria and the formation of blood clots on said coating.

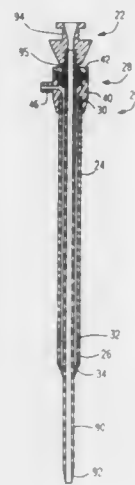


4,950,257

**CATHETER INTRODUCER WITH FLEXIBLE TIP**  
 Lee Hibbs, St. Louis, Mo.; Yue-teh Jang, Houston, Tex.; Vern Liebmann, Sugar Land, Tex., and Dennis Spinks, Angleton, Tex., assignors to Mallinckrodt, Inc., St. Louis, Mo.  
 Filed Sep. 15, 1988, Ser. No. 244,290  
 Int. Cl.<sup>5</sup> A61M 29/00

U.S. Cl. 604—265

36 Claims



1. A catheter introducer comprising a body portion formed from a thin-walled flexible tube for extending into a body cavity or blood vessel, the body portion being sized to receive a catheter therein and permit the catheter to pass therethrough so as to guide the catheter during insertion and placement of the catheter in the cavity or vessel,
- a valve housing at a proximal end of the body portion having a seal therein through which a catheter is inserted into the introducer so as to maintain a fluid-tight relationship with the body cavity or blood vessel to prevent leakage therefrom,
- a tip portion formed from a thin-walled flexible tube attached to the distal end of the body portion, said tip portion being sized to receive the catheter and permit the catheter to pass therethrough,
- said tube forming the body portion having sufficient rigidity and columnar strength to withstand forces applied by a physician to drive the tip portion through tissue stretched by a dilator around an opening through which a guide wire extends, and
- said tube forming the tip portion including a polymer material rendering the tip portion substantially more flexible than the tube forming the body portion.

4,950,258

**PLASTIC MOLDED ARTICLES WITH SHAPE MEMORY PROPERTY**

Tatsuya Kawai, and Takashi Matsuda, both of Hiroshima, Japan, assignors to Japan Medical Supply Co., Ltd., Hiroshima, Japan

Filed Jan. 25, 1989, Ser. No. 301,501

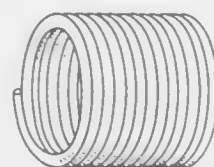
Claims priority, application Japan, Jan. 28, 1988, 63-17574  
 Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—281

12 Claims

1. A molded article which can be returned to a previously

memorized shape, consisting essentially of polymers selected from the group consisting of lactide homopolymers, glycolide



homopolymers and copolymers of lactide and glycolide, said polymers having a shape memory property.

4,950,259

**PERITONEAL DIALYSIS CATHETER SUITABLE FOR PERMANENT IMPLANT**

Denis F. Geary, Willowdale, and Andrej Bahoric, Don Mills, both of Canada, assignors to HSC Research Development Corporation, Toronto, Canada

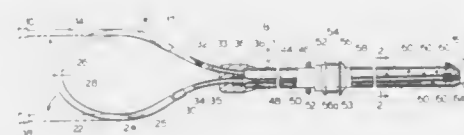
Filed Oct. 12, 1988, Ser. No. 256,456

Claims priority, application United Kingdom, Oct. 12, 1987, 87 23931

Int. Cl.<sup>5</sup> A61M 31/00

U.S. Cl. 604—282

8 Claims



1. A double lumen flexible catheter adapted for use in peritoneal dialysis by placement in a peritoneal cavity through an incision in body tissue defining a peritoneal cavity, said catheter comprising:

a double lumen structure having means for connecting said double lumen structure to body tissue defining a peritoneal cavity, a free end distal to said tissue connecting means, and means proximal to said tissue connecting means for delivering fluids to and from said double lumen structure;

said double lumen structure comprising an inner tube and an outer tube with an annulus between them, said outer tube having a plurality of openings extending through its tube wall to permit cavity fluids to flow into said annulus, said inner tube having a single outlet at said catheter free end for delivering fluids into a body cavity;

said inner tube and outer tube being each of a plastic material of sufficient feasibility to permit said catheter to lie loosely and freely in a body cavity;

first means for anchoring said inner tube at said distal catheter free end and second means for anchoring said inner tube at said proximal fluid delivery end, said inner tube being stretched between said first and second anchoring means to apply tension on said inner tube between said first and second anchor means, the extent of tension in said inner tube is such to avoid drawing back said catheter free end to cause distortion in said catheter.

4,950,260

**MEDICAL CONNECTOR**

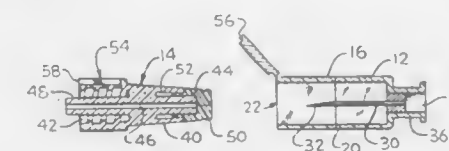
Jean M. Bonaldo, Upland, Calif., assignor to SafetyJect, Costa Mesa, Calif.

Filed Nov. 2, 1989, Ser. No. 431,850

Int. Cl.<sup>5</sup> A61M 25/00

U.S. Cl. 604—283

3 Claims



1. A medical connector including:
  - a male port element having a longitudinal passage extending therethrough and terminating at one end in sealing means which is of the self-sealing type;
  - a housing element having a longitudinal cavity therein open at one end thereof, said housing member being adapted to have said port element inserted there within through said open mouth with the sealing means disposed in the cavity;
  - a hollow needle fixed within said housing cavity and having a pointed tip at one end, said needle being disposed within the cavity so that the needle tip penetrates the sealing means upon insertion of the port element into the cavity; and
  - means for detachably locking the housing element and the port element together when said port element is inserted into the cavity, said locking means including a locking cap element flexibly attached to the housing at the open end thereof and selectively operable to seal the housing open end if inserted thereto and a locking recess formed on the port element and operable to receive the cap element when inserted thereto to lock the port element and the housing element together in a mating relationship, said cap element being selectively manually removable from said housing open end and from said port element locking recess.

4,950,261

**OSTOMY COUPLING**

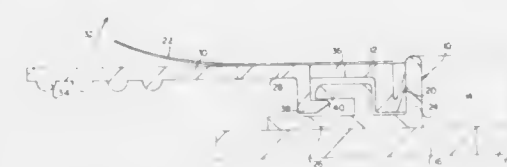
Peter L. Steer, Surrey, England, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 1, 1988, Ser. No. 150,610

Int. Cl.<sup>5</sup> A61F 5/44

U.S. Cl. 604—339

7 Claims



1. An ostomy coupling comprising a pair of coupling rings of which the body side ring has a radially extending flange attachable to a pad of medical grade adhesive and a chute wall surrounding a stomal aperture, and the bag side ring has a rib member integral with a seal strip, the rib member being received by a channel portion of the body side ring when the rings are coupled together, said bag side ring including an integral flexible latching arm having a hook portion positioned to engage under a hook flange on the body side ring when the rings are coupled, said radially extending flange extending from said chute wall to under said hook portion the hook portion being disengageable from the hook flange by a lifting movement of the arm.

4,950,262

**EXCRETION ABSORBING-AND-HOLDING DEVICE**

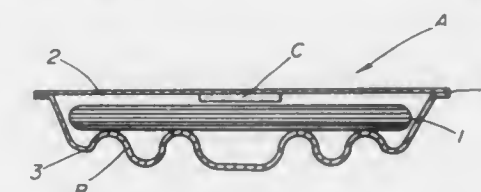
Katsumasa Takagi, Yokohama, Japan, assignor to Koyo Disposable Goods Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 101,527, Sep. 29, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 384,889

Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—385.1

10 Claims



1. A device, adapted to fit on a body for the collection of bodily excretion comprising:
  - a flexible covering member having a front surface and a rear surface and being formed of a liquid-impermeable material;
  - a flat surface member shaped so as to be disposed on the front surface of said flexible covering member, said flat surface member and said covering member being hermetically sealed together along their respective peripheries so as to form a shell with a space therebetween;
  - a liquid absorbent mass disposed in the space between said flat surface member and said flexible covering member; and
  - a storage member disposed integral with the rear surface of said flexible covering member, said storage member having a surface configuration with a concentric undulating form which permits expansion and enlargement of the volume between said flexible covering member and said flat surface member to contain the bodily excretion.

4,950,263

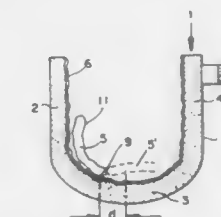
**UNIVERSAL HINGED CONTROL DIAPER**

Debra K. Lewis, 6839 SW. 114th Pl., Unit B, Miami, Fla. 33173  
 Filed Dec. 27, 1988, Ser. No. 290,632

Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—385.1

4 Claims



4. An absorbent diaper according to claim 1 wherein said bottom section is narrower than the front and rear sections.

4,950,264

**THIN, FLEXIBLE SANITARY NAPKIN**

Thomas W. Osborn, III, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 175,559, Mar. 31, 1988, abandoned. This application Jan. 4, 1989, Ser. No. 293,606

Int. Cl.<sup>5</sup> A61F 13/16

U.S. Cl. 604—385.1

28 Claims

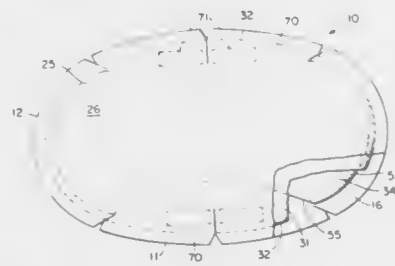
1. A sanitary napkin having a body surface and a garment surface, comprising:
  - an absorbent means having a first major surface and a second major surface; and

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a liquid impermeable barrier means adjacent to said second major surface of said absorbent means;



said sanitary napkin having a flexure-resistance of less than about 300.0 grams, a test capacity of at least about 8.0 grams, and a total capacity of at least about 20.0 grams.

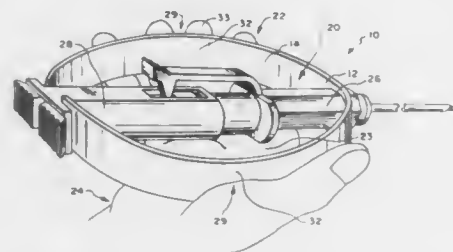
4,950,265

**ARMING DEVICE FOR A MEDICAL INSTRUMENT**  
Glenn N. Taylor, Longmont, Colo., assignor to Hart Enterprises, Inc., Wyoming, Mich.

Filed Oct. 17, 1988, Ser. No. 258,510  
Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—1

21 Claims



1. An arming device for use in manipulating with one hand a medical instrument comprising first and second telescoping members, said instrument members being longitudinally movable relative to one another along a longitudinal axis, said device comprising:

an arcuate flexible member having a forward portion and a rearward portion;

first means at said forward portion for engaging the first telescoping member and second means at said rearward portion for engaging the second telescoping member, said

first means for engaging and said second means for engaging being generally coaxial with the longitudinal axis of the instrument, whereby squeezing of said flexible member laterally toward said instrument causes the first and second telescoping members to move longitudinally away from each other thereby to cause arming or operation of the instrument.

4,950,266

**INFRARED LASER CATHETER SYSTEM**

Edward L. Sinofsky, Reading, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Continuation of Ser. No. 14,990, Feb. 17, 1987, abandoned, which is a continuation of Ser. No. 761,188, Jul. 3, 1985, abandoned. This application Oct. 14, 1988, Ser. No. 257,760  
Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 606—2

41 Claims

1. A system for the percutaneous removal of atherosclerotic plaque comprising:

a laser energy source including means for operating said laser energy source in a pulsed mode with an output wave-

length in the range of about 1.4–2.2 micrometers, and for operating said laser energy source at an energy level sufficient to remove atherosclerotic plaque;

an optical fiber for conducting laser energy from said laser energy source from a proximal end of said fiber to a surgical site at a distal end of said optical fiber; and means for directing the output of said laser energy source to the proximal end of said optical fiber.

4,950,267

**LASER BEAM TREATMENT DEVICE FOR AN ENDOSCOPE**

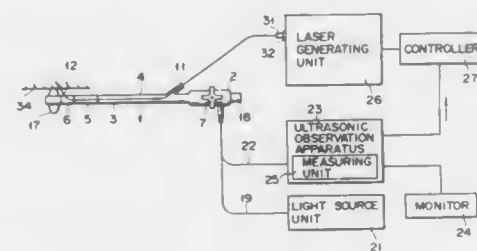
Koichiro Ishihara; Masaya Yoshihara; Ryouji Masubuchi; Fumiaki Ishii; Shinji Hata; Hiroki Hibino; Yutaka Ohshima; and Masaaki Hayashi, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,881

Claims priority, application Japan, Nov. 27, 1987, 62-299235  
Int. Cl.<sup>5</sup> A61B 17/36

U.S. Cl. 606—12

9 Claims



1. A laser beam treatment device for an endoscope comprising:

a laser generating device;  
laser beam irradiation means for applying a laser beam from the laser generating device to a region of an object of irradiation;

ultrasonic transmission/reception means for emitting ultrasonic waves toward the region to which the laser beam is applied by the laser beam irradiation means, for receiving reflected waves from the irradiated region, and for converting the reflected waves into an electrical signal;

measuring means responsive only to signals from the ultrasonic transmission/reception means for measuring the temperature of the region of the object of irradiation in accordance with the electrical signal from the ultrasonic transmission/reception means, and for generating a temperature signal corresponding to the measured temperature;

output adjusting means for adjusting the output of the laser generating device in accordance with the temperature signal from the measuring means; and

an endoscope including an insertion section, said insertion section having a distal end portion containing the ultrasonic transmission/reception means and a channel through which the laser beam irradiation means is passed.

4,950,268

**LASER DRIVER AND CONTROL CIRCUIT**

John L. Rink, San Francisco, Calif., assignor to Xintec Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 19,755, Feb. 27, 1987. This application Nov. 1, 1988, Ser. No. 265,565

Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 606—12

20 Claims

1. A control and driving apparatus for a laser having an optical pumping device, comprising:

AC power supply means operatively connected to said optical pumping device, including first rectifier means for

4,950,270

**CANNULATED SELF-TAPPING BONE SCREW**

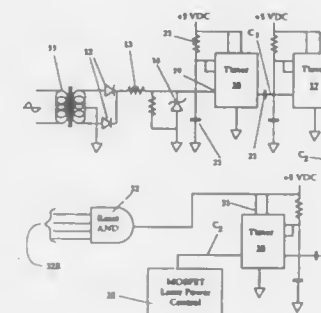
Jerald A. Bowman, and Richard V. Zile, both of Warsaw, Ind., assignors to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Feb. 3, 1989, Ser. No. 306,474  
Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 606—72

14 Claims

receiving an AC power signal and generating a power signal of periodic DC pulses,  
switching means connected between said first rectifier means and said optical pumping device for selectively applying portions of each of said periodic DC power pulses to said optical pumping device to actuate said laser to emit laser radiation in pulses corresponding to said portions of each of said periodic DC power pulses, and control circuit means connected to said switching means for



receiving said AC power signal and generating a control signal to actuate said switching means during each of said periodic DC power pulses,  
wherein said control circuit means includes power detector means disposed to sense electrical power flow to said optical pumping device, means for comparing said electrical power flow to a selectively variable maximum power level, and means for shutting off said switching means when said electrical power flow exceeds said selectively variable maximum power level.

4,950,269

**SPINAL COLUMN FIXATION DEVICE**

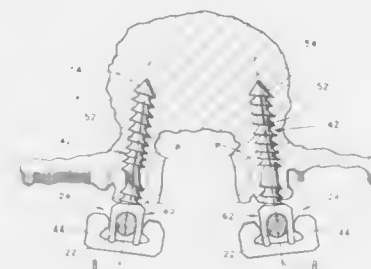
Robert W. Gaines, Jr., Columbia, Mo., assignor to AcroMed Corporation, Cleveland, Ohio

Filed Jun. 13, 1988, Ser. No. 206,007

Int. Cl.<sup>5</sup> A61F 5/01

U.S. Cl. 606—61

14 Claims



1. A spiral column fixation device comprising:

a bio-compatible screw including a threaded portion for connection with a vertebra of a spinal column, a bight portion fixed to said threaded portion and a pair of spaced apart resiliently deflectable legs extending from said bight portion, said pair of legs and said bight portion having surfaces defining a cavity in said screw;

a rod sized for connection with the spiral column of a patient including a portion receivable in the cavity in said screw; a cap receivable on said pair of legs of said screw; means for retaining said cap on said screw to block movement of said rod from the cavity in said screw; and wherein the fixation device is of a size and shape adapted for use with the spinal column of a patient.

4,950,271

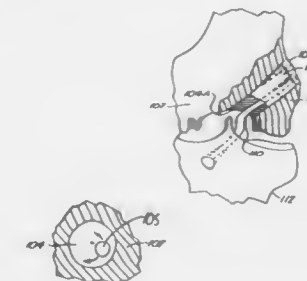
**LIGAMENT GRAFT APPARATUS AND METHOD**

Jack L. Lewis, Maple Plain; William D. Lew, Mendota Heights; Curtis W. Kowalczyk, St. Paul, and Robert E. Hunter, Mendota Heights, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Feb. 6, 1989, Ser. No. 307,662  
Int. Cl.<sup>5</sup> A61F 2/08, 2/76

U.S. Cl. 606—102

15 Claims



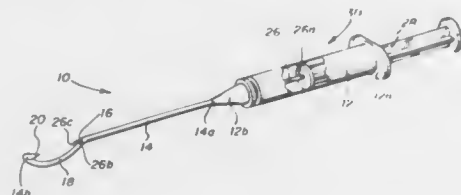
1. A method of replacing ligaments in a joint of a human body between first and second bone portions comprising the steps of:

temporarily fixing a replacement ligament graft at a first attachment site relative to a first of said bone portions, in a provided tunnel;  
passing the replacement ligament graft into a tunnel in a second bone portion;  
changing the location where the replacement ligament graft exits the tunnel in the first bone portion while measuring length changes of the replacement ligament graft as re-



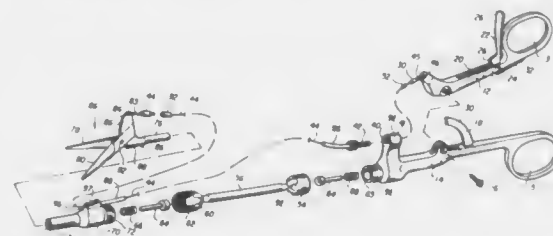
flected by total forces in the replacement ligament graft while under external load; and  
fixing the replacement ligament graft to the second bone portion at a second attachment site and fixing the location where the replacement ligament graft exits the tunnel in the first bone portion to minimize changes in length of such replacement ligament graft during a desired amount of flexion of the joint.

**4,950,272**  
**SURGICAL INSTRUMENT AND METHOD FOR REMOVING THE LENS OF AN EYE**  
Heinz J. Smirmaul, 1307 Brookstone La., Duncanville, Tex. 75137  
Filed Jun. 19, 1989, Ser. No. 367,937  
Int. Cl.<sup>5</sup> A61F 9/00  
U.S. Cl. 606—107 5 Claims



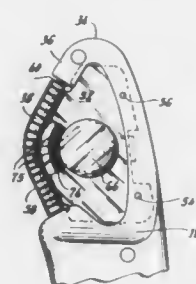
1. An ophthalmic surgical instrument for removing, in substantially one piece, the lens of an eye having an anterior chamber and a posterior chamber, comprising:  
a handle adapted for support in a hand of a user;  
an elongated tubular member having first and second ends, said first end thereof being attached to said handle, said elongated tubular member including an aperture communicating with the interior of said elongated tubular member and being disposed between said first and second ends, said elongated tubular member further including an arcuate portion extending from said aperture to said second end thereof defining an arc of conforming size and shape to the profile of the lens for receiving the entire lens therein and within the posterior chamber of the eye;  
said second end having engaging means for grasping a circumferential portion of the lens;  
actuator means mounted to said handle for movement between a forward position and a rearward position with respect to said handle; and  
an elongated rod disposed within said elongated tubular member and having first and second ends, said first end thereof being attached to said actuator means, such that movement of said actuator means to said forward position causes said rod second end to extend from said elongated tubular member aperture toward said second end of said elongated tubular member to engage in the lens, thereby lodging substantially the entire lens between said rod second end and said second end of said elongated tubular member for fixating the lens within said arcuate portion thereby preventing movement of the lens towards the anterior chamber of the eye and for removing the lens in substantially one piece from the eye, and movement of said actuator means to said rearward position causes said rod to retract within said elongated tubular member when not engaging the lens.

**4,950,273**  
**CABLE ACTION INSTRUMENT**  
Jeffrey M. Briggs, 48 Hemlock St., Newton, N.J. 07860  
Continuation-in-part of Ser. No. 112,464, Oct. 26, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,172  
Int. Cl.<sup>5</sup> A61B 17/28, 17/32  
U.S. Cl. 606—113 8 Claims



1. A cable action instrument comprising:  
(a) a control end comprising a cable control lever and a control lever handle pivotally attached thereto;  
(b) a reaction end comprising an instrument tip receptor and an attachable instrument tip;  
(c) an angle adjustment section comprising a connecting bar and two universal joints, said universal joints respectively attached to the control lever handle and the instrument tip receptor, said universal joints being independently adjustable and lockable; and  
(d) a flexible control cable assembly external to the angle adjustment section which transmits a force from the control end to the reaction end, said flexible control cable assembly comprising a cable of sufficient length and proper tension to permit operation of the instrument in a full range of hemispheric positions.

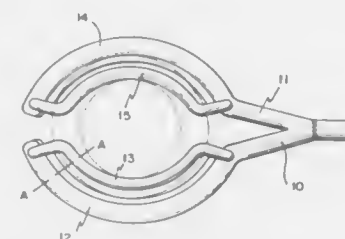
**4,950,274**  
**DEPILATORY DEVICE**  
David R. Locke, Bridgeport, Conn., and Nancy E. Terburne, Fair Lawn, N.J., assignors to Remington Products, Inc., Bridgeport, Conn.  
Filed Jan. 13, 1989, Ser. No. 297,247  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—133 4 Claims



1. An improved, hand-held, electrically energized depilatory device comprising:  
(a) a housing for said device;  
(b) said housing configured to be manually gripped for manipulation of said device;  
(c) a hair gripping and removal body mounted to said housing for rotation thereof;  
(d) electrically energized means positioned within said housing for causing rotation of said hair gripping body whereby said body when manipulated into contact with human body hairs engages and uproots said body hairs;

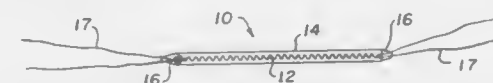
(e) said device including a guard member formed of a transparent material for said hair removal body;  
(f) a hair raising means comprising a brush having a base thereof which is integrally formed with said guard member; and  
(g) said brush positioned on said device adjacent said rotating body for raising and presenting to the removal body hairs which are to be gripped by said removal body and whereby placement of said brush may be viewed by the user.

**4,950,275**  
**BOWEL-ANASTOMOSIS-RING HOLDER PINCERS**  
Ippolito G. Donini, Ducentola di Voghera, Italy, assignor to Cyanamid Italia S.p.A., Catania, Italy  
Filed Jul. 19, 1989, Ser. No. 382,742  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 606—151 4 Claims



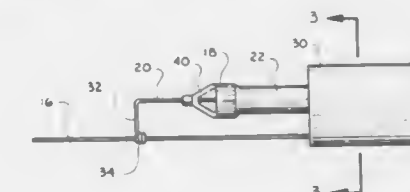
1. Bowel-Anastomosis-Ring holder pincers having two pivotally connected arms and a terminal head portion, angled with respect to said arms, characterized in that said head portion comprises two jaws which form in combination with one another an elliptical shape, each of said jaws including a lower claw upon which an upper claw is fixed as a staple member, having the same elliptical curvature as the lower claw and slightly inwardly staggered with respect thereto.

**4,950,276**  
**PROSTHESIS FOR BANDING OF AN ARTERY CAPABLE OF DILATION BY A BALLOON DILATOR**  
Dennis J. Vince, 610 - 943 West Broadway, Vancouver, British Columbia, Canada (V5Z 1K3)  
Continuation of Ser. No. 160,344, Feb. 25, 1988, abandoned. This application Oct. 10, 1989, Ser. No. 420,637  
Int. Cl.<sup>5</sup> A61B 17/08  
U.S. Cl. 606—158 6 Claims



1. A banding prosthesis comprising an expandable helical member having a series of coils that define a cylindrical volume having an outer surface, said outer surface being encased by an elongatable outer covering having a pair of sealed ends to completely enclose the cylindrical volume of said helical member said ends of said outer covering incorporating attachment means for joining the two ends of the banding prosthesis to form an encircling band about a circumference of a tubular organ so as to constrict the organ lumen whereupon an intraluminal balloon dilator inserted within the lumen of said organ in the region of said band and inflated can be used to permanently dilate said banding prosthesis and allow the constricted lumen to expand.

**4,950,277**  
**ATHERECTOMY CUTTING DEVICE WITH ECCENTRIC WIRE AND METHOD**  
Andrew F. Farr, Spring Valley, Calif., assignor to Interventional Technologies, Inc., San Diego, Calif.  
Filed Jan. 23, 1989, Ser. No. 299,146  
Int. Cl.<sup>5</sup> A61D 1/02  
U.S. Cl. 606—159 14 Claims



14. A method for removing obstructive tissue from the lumen of a vessel which comprises the steps of:  
inserting a first wire into the vessel across the obstructive tissue;  
engaging an end of a second wire with said first wire for sliding movement of said end along said first wire;  
positioning a cutter on said second wire for movement of said cutter with said second wire along said first wire to bring said cutter into contact with the obstructive tissue; rotating said cutter to cut the obstructive tissue; and manipulating said second wire to move said cutter in an arc about said first wire to increase the portion of obstructive tissue contacted by said cutter.

**4,950,278**  
**ENDOSCOPE FOR REMOVAL OF TISSUE**  
Hans E. Sachse, Lerchenstrasse 55, 8500 Nuremberg 90, Fed. Rep. of Germany, and Rainer Sachse, 720 NE. 72 Ter., Miami, Fla. 33138  
Continuation of Ser. No. 82,239, Aug. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 829,103, Feb. 14, 1986, Pat. No. 4,756,309. This application Aug. 30, 1989, Ser. No. 401,505  
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1986, 3626684  
U.S. Cl. 606—170 21 Claims



1. An endoscope having a front or tip end and a rear end, and comprising a tubular housing, a lens system with a light guide extending longitudinally in said housing and having its viewing aperture at the rear end of the endoscope, a continuously driven shaft also extending longitudinally in said housing in parallel relationship to said light guide and comprising at its front end, protruding in operation from the tip of the endoscope a rotating working head, and at least one flushing duct, and means for introducing flushing liquid into said flushing duct, wherein there are provided means for applying to said shaft independent axial and rotary movements, and

wherein said working head is a cutting instrument having a plurality of cutting blades with cutting edges.

4,950,279

## ACUPUNCTURE DELIVERY SYSTEM

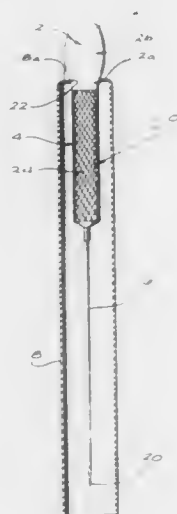
William Chang, Monterey Park, Calif., assignor to Jen-On Pharmaceutical Enterprises Corp., Monterey Park, Calif.

Filed Apr. 3, 1989, Ser. No. 333,132

Int. Cl.<sup>5</sup> A61B 17/34

U.S. Cl. 606—189

7 Claims



1. An acupuncture needle delivery system comprising: an axially extending needle having an upper head portion, having a mid portion a middle handle portion and a relatively slender lower body portion terminating in a leading point, the mid-portion of the head portion being slightly larger in cross-section than the end portions of the head portion, a deformable plastic tube having a first and a second end portions and a tube body disposed therebetween, said tube body having an inner diameter along substantially its entire length which is greater than any portion of the needle, the first end portion of the plastic tube being open and the second end portion having a circumferential lip means disposed thereon, said circumferential lip means defining a through-hole of a slightly lesser cross-section than the widest part of the head region, the needle being mounted within the tube for discharge therefrom, with its head region snugly grasped within said second end portion of the tube, the widest cross-section of the head portion being within the limits to which the circumferential lip means of the plastic tubing will expand upon the imposition of axially directed, manually exerted, downward pressure on the head region, whereby the needle is ejected from the other end of the tube.

4,950,280

NASAL TAMPON HAVING A COUNTER WEIGHT  
H. George Brennan, 1137 Granville, Newport Beach, Calif. 92660

Filed Aug. 2, 1988, Ser. No. 227,505

Int. Cl.<sup>5</sup> A61M 31/00

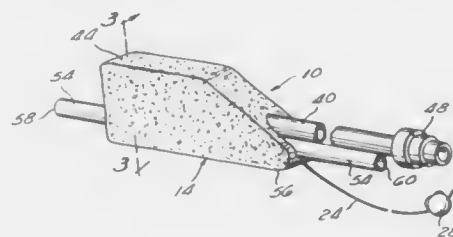
U.S. Cl. 606—196

16 Claims

1. An improved nasal tampon for controlling and arresting nasal hemorrhaging, said tampon having a proximal end and substantially eliminating the risk of slippage from the nasal cavity into the pharynx once it is installed, said nasal tampon comprising:

an absorptive member, having a proximal portion, sized and

shaped to fit the gross contours of the nasal fossa, said absorptive member readily compressible for easy insertion through the anterior nares of a patient, and resilient to expand once positioned within the nasal cavity; counterweight means flexibly attached to said proximal end



of said absorptive a member, to pass through the nares and provide sufficient force in a direction externally which would remove said nasal tampon from the nasal cavity, to prevent slippage thereof into the larynx of the patient to maintain the throat opening clear and allow continued normal respiration through the mouth.

4,950,281

## EVERTING FORCEPS

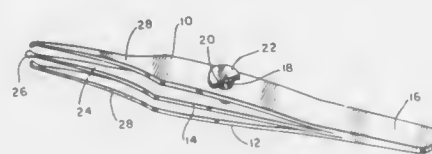
Wolff M. Kirsch; Yong H. Zhu, both of Albuquerque, and Robert Cushman, Cedar Crest, all of N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

Filed Feb. 13, 1989, Ser. No. 309,372

Int. Cl.<sup>5</sup> A61B 17/28

U.S. Cl. 606—207

9 Claims



1. An everting forceps comprising a pair of outer resilient legs rigidly interconnected at one end thereof, a third leg intermediate said pair of legs, externally manipulable means for enabling one to move the intermediate leg with respect to one of the first and second legs by manually applying pressure thereto, said intermediate leg terminating at a tip provided with a spherical jaw, and each of said outer legs terminating at a tip provided with an accurate jaw, each of said accurate jaws being positioned and configured to cooperate with said spherical jaw.

4,950,282

## WOUND CLOSURE STRIPS

Arthur A. Beisang, Roseville; Daniel G. Holman, Blaine, both of Minn., and Robert A. Ersek, Austin, Tex., assignors to Genetic Laboratories, Inc., St. Paul, Minn.

Continuation of Ser. No. 812, Jan. 6, 1987, abandoned, which is a continuation of Ser. No. 663,482, Oct. 22, 1984, abandoned.

This application Jan. 11, 1989, Ser. No. 295,937

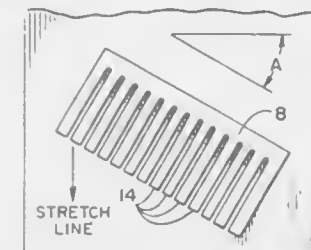
Int. Cl.<sup>5</sup> A61B 17/04

U.S. Cl. 606—216

6 Claims

1. A wound closure strip comprising: an elongate imperforated pad member formed from a polymeric material of a density to permit the pad member to breathe and expose the wound to ambient air, said pad

member being constructed of a material having an easy stretch axis and a hard stretch axis orthogonal to the easy stretch axis, thus exhibiting uni-directional stretch properties said pad member being cut from said material such that its longitudinal axis is oriented at a predetermined oblique angle relative to both said axis of said material



such that the pad member has modulus of elasticity ( $E_1$ ) irrespective of thickness, in the range of 0.5 to 110 pounds per inch, said material having a low elastic recovery characteristic; and adhesive means bonded to at least one surface of said pad member for adhering said pad member to human skin.

4,950,283

## SURGICAL CLIP

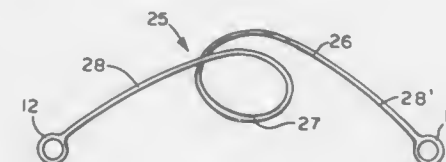
Leonard M. Dzubow, Bryn Mawr; Allan E. Wulc, Rydel, both of Pa., and Paul Weber, Fort Lauderdale, Fla., assignors to John Lezdey and Paul Weber, both of Philadelphia, Pa.

Filed Dec. 29, 1988, Ser. No. 291,774

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—216

3 Claims



1. A surgical clip attachment to a wound closing suture and for maintaining tension on the suture of a patient consisting of a spring means comprising a loop and two arms, and holding means at the end of each arm for holding tied ends of the suture whereby the suture is continuously and flexibly maintained under substantially even tension by means of said surgical clip outside of the wound.

4,950,284

## FASCIA CLIP

David T. Green, Westport, and Keith Ratcliff, Sandy Hook, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 116,627, Nov. 3, 1989, abandoned. This application Oct. 13, 1989, Ser. No. 421,278

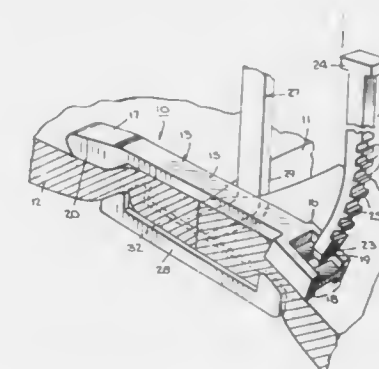
Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 606—216

36 Claims

1. A fascia clip comprising a base of elongated shape having a main body portion, a transverse opening at one end and gripping means at an opposite end; and a flexible strap of solid cross-section having a pointed distal end sized for passage through said opening of said base

and for gripping in said gripping means, a proximal end of greater size than said opening and an intermediate portion



in spaced parallel relation to said main body portion to contain tissue therebetween.

4,950,285

## SUTURE DEVICE

Peter J. Wilk, 185 W. End Ave., New York, N.Y. 10023

Filed Nov. 27, 1989, Ser. No. 441,314

Int. Cl.<sup>5</sup> A61B 17/00; B65D 63/00

U.S. Cl. 606—232

26 Claims



1. A suture device comprising: a thread member provided along at least a portion of its length with a series of resilient projections, said thread member having an outer diameter defined by said projections; a loop member defining an opening having a linear dimension at least two times as large as said outer diameter, and joining means for connecting one end of said thread member to said loop member, at least one of said joining means and said loop member defining at least in part an aperture having a linear dimension smaller than said outer diameter, said aperture communicating with said opening defined by said loop; and locking means, provided on at least one of said joining means and said loop member, for preventing a removal of said thread member from said aperture upon a passing of said thread member through said loop member and a subsequent pulling of said thread member into said aperture from said loop member.

4,950,286

## COMFORTER OF SILICONE RUBBER

Johann N. Meussdoerffer, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Dec. 12, 1988, Ser. No. 283,498

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743748

Int. Cl.<sup>5</sup> A61J 17/00

U.S. Cl. 606—236

4 Claims

1. In an improved rubber comforter or pacifier device for infants which comprises an outer shell and a filling material, the improvement comprises said outer shell being of silicone rubber of high tear propagation resistance having a Shore



A hardness of 30 to 60 and filled with a soft addition crosslinking silicone rubber having a Shore A hardness of less than 5, with a chemical bond, mechanical bond, or both being established between the outer shell and the filling material.

4,950,287

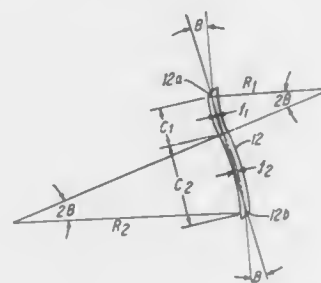
**BICURVED LEAFLET(S) PROSTHETIC HEART VALVE**  
Thomas H. Reif, Milton, Fla., assignor to Republic Medical Products, Inc., Milton, Fla.

Filed Jun. 30, 1989, Ser. No. 375,253

Int. Cl.<sup>5</sup> A61F 2/24

U.S. Cl. 623—2

3 Claims



1. A mechanical artificial heart valve comprising:
  - (a) one or more leaflets each having a leading edge as well as a trailing edge relative to a forward flow,
  - (b) means forming an annular shaped orifice,
  - (c) said leaflets being attached to said means forming the orifice, said attachment via a pivot being eccentrically hinged,
  - (d) said leaflets being bicurved in shape, said curvatures being formed by intersecting circular arcs,
  - (e) a tangent to an arc at said leading edge of said leaflets being parallel to forward flow,
  - (f) a tangent to an arc at a trailing edge of said leaflets also being parallel to forward flow with valve-open position thereof,
  - (g) a ratio of the chord of the leading edge arc to the chord of trailing edge arc of said leaflets being less than 1, and
  - (h) the forward flow through the heart valve remaining attached to the said leaflet because of the predominantly accelerating flow through the said orifice,
- radii of curvatures  $R_i$  of said intersecting circular arcs being unequal,
- said circular arcs sweeping two chords  $c_i$  having a line coincident therewith and each arc forming a small semi-circular shaped air foil with cambers  $F_i$  said two arcs intersecting at at least one point where two generating circles contact and as the two generating circles contact, the two chords are parallel,
- an apparent angle of attach  $B_i$  of a respective leaflet being an angle  $B$  between the forward flow and the line coincident with the two chords, and
- a mathematical relationship between the chords, cambers, radii and angle of attack is  $f_i = 0.5c_i \tan(B_i/2)$  and  $R_i = (-c_i^2 + 4f_i^2)/(8f_i)$ .

4,950,288

**CORRECTIVE INTRAOCULAR LENS**

Charles D. Kelman, 721 Fifth Ave., New York, N.Y. 10022

Continuation of Ser. No. 222,133, Jul. 21, 1988, Pat. No.

4,871,363. This application Apr. 25, 1989, Ser. No. 343,016

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623—6

7 Claims

1. Corrective intraocular lens for use as an anterior chamber lens with an intact natural eye lens for correcting high myopia

thereof, by insertion through an incision into the eye and implantation in the anterior chamber in spaced relation to the natural lens, which comprises

a lens body, and a pair of generally diametrically opposed resiliently deflectable position fixation haptics extending outwardly from the lens body and arranged for positioning the intraocular lens in the eye in spaced relation to the natural lens,

the haptics constituting a leading haptic and a trailing haptic, each comprising a pliable strand having a stem portion attached to the lens body and a limb portion extending from the stem portion and terminating in a transverse edge portion disposed crosswise of a longitudinal diametric line passing through the lens body and intersecting both transverse edge portions, each transverse edge portion having a pair of laterally spaced apart and outwardly projecting contact lobes at the corresponding transverse ends thereof for engaging an adjacent eye tissue portion at a corresponding pair of spaced apart tissue points, whereby to form two generally diametrically opposed pairs of laterally spaced apart fixation points for positioning the intraocular lens in the eye,

the trailing haptic transverse edge portion having a length of about 2–3 mm, and the lens body diameter and the leading



haptic transverse edge portion each having a length substantially larger than about 2–3 mm.

such that for implantation the intraocular lens may be inserted into the eye through an incision of length corresponding substantially to the lens body diameter, by first snaking the leading haptic through the incision, next passing the lens body through the incision and positioning the leading haptic contact lobes in engagement with a said eye tissue portion distal from the incision, and then passing the trailing haptic through the incision by maintaining the lips of the incision slightly spaced apart to form an enlarged gap between the lips in which the widest part of the gap is located centrally of the incision, and moving the trailing haptic through the widest part of the gap, while exerting minimum pressure on the intraocular lens in a direction towards the previously positioned leading haptic contact lobes just sufficient to deflect the trailing haptic inwardly of the gap, and while manipulating the trailing haptic transverse edge portion to clear the gap and approach and engage its contact lobes with a corresponding said eye tissue portion proximate to the incision, for positioning the intraocular lens in spaced relation to the natural lens, with minimum risk of contact with the natural lens by the intraocular lens during the implantation.

4,950,289

**SMALL INCISION INTRAOCULAR LENS WITH ADJUSTABLE REFRACTIVE POWER**

Gary N. Krasner, Irvine, Calif., assignor to CooperVision, Inc., Palo Alto, Calif.

Filed Nov. 3, 1986, Ser. No. 925,909

Int. Cl.<sup>5</sup> A61F 2/16, 9/00; A61B 17/00

U.S. Cl. 623—6

96 Claims

79. An intraocular lens comprising: a deformable soft optic, a collar positioned about said soft optic, an attaching means for attaching said collar to said soft optic, and a haptic means

attached to and extending out from said collar for remedially positioning said soft optic in the eye after said soft optic has been inserted therein, wherein the improvement comprises:

said collar having first and second collar ends which are in



a generally overlapping relationship when said collar is compressed for insertion thereof through a small incision into an eye, and which are in a generally abutting relation when said compressible collar is in a generally uncompressed condition.

4,950,290

**POSTERIOR CHAMBER INTRAOCULAR LENS**

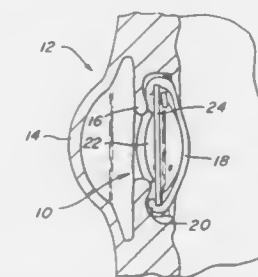
William Kamberling, 423 W. Clements Bridge Rd., Barrington, N.J. 08007

Filed Feb. 9, 1989, Ser. No. 308,339

Int. Cl.<sup>5</sup> A61F 2/16

U.S. Cl. 623—6

9 Claims



1. Posterior chamber intraocular lens (IOL) for reducing posterior chamber opacification (PCO), comprising:

an optic disc,  
a single, flexible, substantially helically shaped loop having a first end generally tangentially connected to the disc and a second end which is free, the loop not being connected to the optic disc other than at said first end,

the loop extending helically around the periphery of the disc for at least 270° from the first loop end at an angle of 8–10° with respect to the disc while being spaced radially outwardly therefrom at a distance which varies from a minimum proximate the first loop end to a maximum at the second loop end,

said flexible loop being radially inwardly compressible from its original shape to a generally circular shape with the spacing between the disc and the second loop end generally corresponding to said minimum spacing and the loop extending 360° or slightly less than 360° from the first loop end to provide an overall IOL diameter which is of a size to permit insertion of the IOL through a limbal incision into the posterior capsular sac, the shape and linear length of the loop, the original spacing of the loop from the disc, and the overall original diameter of the IOL being such that when inserted into the capsular sac, the loop expands outwardly and the IOL becomes generally circular, the optic disc is centered substantially on the visual axis and the loop extends radially outwardly from the disc and is in substantially 360° contact with the peripheral zone of the

posterior capsule so as to symmetrically and radially stretch the posterior capsule and to maintain uniform contact between the optic disc and the posterior capsule, the length and spacing of the loop being such that if the IOL is inserted into the ciliary sulcus, the loop expands outwardly from the optic disc to maintain uniform contact with the ciliary sulcus to center and stabilize the optic disc.

4,950,291

**BREAST PROSTHESIS**

Elisabeth Mulligan, Söllhuben, Fed. Rep. of Germany, assignor to Amoena Corporation, Marietta, Ga.

Filed Nov. 16, 1988, Ser. No. 272,069

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1987, 3742352

Int. Cl.<sup>5</sup> A61F 2/12

U.S. Cl. 623—8

16 Claims



1. An external breast prosthesis, comprising:  
a breast member comprising an inner layer of soft, flowable gel-like elastic material capable of conforming to irregularities in the chest of a wearer, and an outer layer of elastic material, said outer layer being stiffer than said inner layer.

4,950,292

**TISSUE EXPANDERS**

Werner Audretsch, Dusseldorf, Fed. Rep. of Germany, assignor to Dow Corning Corporation, Midland, Mich.

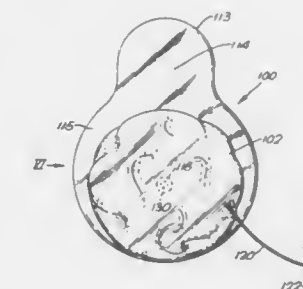
Filed Apr. 20, 1989, Ser. No. 340,958

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 8809294

Int. Cl.<sup>5</sup> A61F 2/12, 2/02

U.S. Cl. 623—8

9 Claims



1. An implantable tissue expander system for insertion in a human body to induce formation of a pocket into which a mammary prosthesis may be inserted comprising (a) an inflatable member which is flaccid and is adapted to be inflated progressively in the body to induce formation of said pocket, (b) a separate support plate which is sufficiently flexible that it may be bent or folded for insertion into or removal from the body through an incision in the body and to recover to its

original condition within condition within the body, (c) feed tube means attached to the inflatable member and having a valve through which inflating medium may be supplied into the inflatable member and (d) cooperating releasable securing means on each of the inflatable member and the support plate whereby the support plate and the inflatable member are connected together until it is desired to release the inflatable member from the support plate.

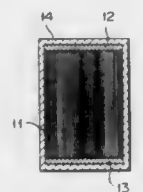
**4,950,293**  
**PROSTHETIC LIGAMENTARY DEVICE**  
Jonathan P. Beacon, Sewell Manor, Sewell, Dunstable, Bedfordshire, and Raymond C. Wadey, 18 Great Woods, Edington, Westbury, Wiltshire, both of United Kingdom  
Filed Nov. 14, 1988, Ser. No. 270,720  
Claims priority, application United Kingdom, Sep. 2, 1988, 8820766

Int. Cl.<sup>5</sup> A61F 2/08  
U.S. Cl. 623—13 20 Claims



1. A prosthetic ligamentary device comprising a first means which is relatively inelastic longitudinally of the device, and a second means which is relatively elastic transversely of the device, said first means, at said second means and in one longitudinal direction of said first means, diverging outwardly and then converging inwardly, so that the subjection of the first means to an anatomical tensile force increases the length of the first means against the action of the second means to a limited degree and thereupon said first means becomes virtually inextensible by said force.

**4,950,294**  
**COMPOSITE STRUCTURE USEFUL AS ARTIFICIAL BONES**  
Yasuharu Hakamatsuka, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 834,811, Feb. 28, 1986, abandoned.  
This application May 2, 1988, Ser. No. 188,697  
Claims priority, application Japan, Mar. 6, 1985, 60-43927  
Int. Cl.<sup>5</sup> A61F 2/28  
U.S. Cl. 623—16 30 Claims



1. A composite structure useful as an implant material in bone, comprising:  
a matrix made of  $Al_2O_3-ZrO_2-Y_2O_3$  ceramic material having a composition of 10 to 40 mol % of  $Al_2O_3$ , 88 to 58 mol % of  $ZrO_2$  and 0.5 to 2 mol % of  $Y_2O_3$ ;  
an amorphous surface layer; and

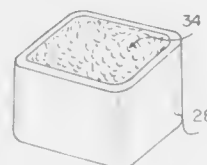
a bio-active layer covering at least said amorphous layer.

**4,950,295**  
**BONE PROSTHESIS ANCHORING METHOD USING A RESORBABLE MARROW CAVITY CLOSURE**  
Hans Weigum, and Robert Mathys, Jr., both of Bettlach, Switzerland, assignors to Robert Mathys Co., Bettlach, Switzerland  
Filed Apr. 24, 1989, Ser. No. 341,917  
Claims priority, application Switzerland, Apr. 22, 1988, 1518/88  
Int. Cl.<sup>5</sup> A61F 2/28, 2/36  
U.S. Cl. 623—16 5 Claims



1. A method of anchoring a prosthesis in a marrow cavity of a bone, comprising the steps of blocking the marrow cavity by placing a porous plug formed of randomly packed, crimped pieces of thread of a resorbable polymer material into the marrow cavity to a depth sufficient to allow a cement to fill a portion of the marrow cavity between the bone and the prosthesis, filling the marrow cavity portion with cement, and inserting the prosthesis into the cement in the marrow cavity portion.

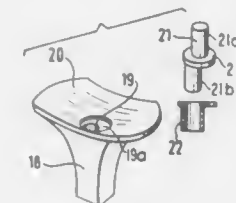
**4,950,296**  
**BONE GRAFTING UNITS**  
Jonathan L. McIntyre, 2384 Grove View Rd., San Diego, Calif. 92139  
Continuation-in-part of Ser. No. 179,282, Apr. 7, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 365,766  
Int. Cl.<sup>5</sup> A61F 2/28  
U.S. Cl. 623—16 15 Claims



1. A bone grafting unit comprising in combination:  
a shell formed of cortical bone having cavity and an outer shape and size for transplanting into a position between opposed faces of a bone structure with said cavity open to one of said faces; and  
a plug formed of cancellous bone fitted into said cavity.

**4,950,297**  
**KNEE PROSTHESIS**  
Martin A. Elloy, North Yorkshire, and Robert Johnson, Merseyside, both of England, assignors to Chas F Thackray Limited, West Yorkshire, England  
Continuation of Ser. No. 6/811,008, Dec. 19, 1985, abandoned.  
This application Jan. 14, 1988, Ser. No. 207,886  
Claims priority, application United Kingdom, Dec. 20, 1984, 8432267

Int. Cl.<sup>5</sup> A61F 2/38  
U.S. Cl. 623—20 7 Claims



1. An un-constrained knee prosthesis having a longitudinal axis extending in a direction corresponding to the general longitudinal direction of the long axis of the tibia, comprising in longitudinally successive relation along said axis:

an upper femoral component for attachment to a femur and having a pair of condylar tracks which are tangentially curved about medio-lateral axes and which are provided with posterior track portions having a bar extending therebetween;

a meniscal component disposed longitudinally below the femoral component and having an inferior convex frusto-conical bearing surface and a superior concave bearing surface, the meniscal component engaging in longitudinally un-constrained manner with the condylar tracks of the femoral component via said superior concave bearing surface for unconstrained longitudinal relative movement therebetween along said axis;

a tibial component disposed longitudinally below the meniscal component for attachment to a tibia and having a concave frusto-conical bearing surface, the latter surface engaging in longitudinally unconstrained manner with the inferior bearing surface of the meniscal component for unconstrained longitudinal relative movement therebetween along said axis;

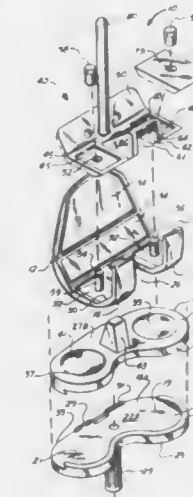
a selectively sized and shaped control peg extending upwardly from said bearing surface of the tibial component and being detachable from the tibial component;

a recess formed in the inferior bearing surface of the meniscal component to receive the control peg remote from the femoral component and in a manner which selectively controls subluxation of the meniscal component; and

a central projection provided in the superior bearing surface of the meniscal component and operable independently of the control peg to engage said bar during flexion of the knee in order firstly to limit relative sliding between the condylar tracks of the femoral component and the superior bearing surface of the meniscal component and thereafter to allow a backwards rolling motion of said tracks on the meniscal component as the knee approaches full flexion.

**4,950,298**  
**MODULAR KNEE JOINT PROSTHESIS**  
Ramon B. Gustilo, 825 8th St. S., Minneapolis, Minn. 55404; James A. Rand, 200 SW. First St., Rochester, Minn. 55905; Jeffrey G. Roberts, 6248 Rockledge Dr., Bartlett, Tenn. 38134, and Jennifer J. Lackey, 79 E. Lafayette Cir., Memphis, Tenn. 38111  
Filed Apr. 8, 1988, Ser. No. 179,524  
Int. Cl.<sup>5</sup> A61F 2/38

U.S. Cl. 623—20 16 Claims



1. A knee joint prosthesis, comprising:

(a) a tibial component comprising (i) an upwardly-facing bearing surface and (ii) means for fixedly connecting the tibial component to an exposed end of a tibia;

(b) a femoral component comprising (i) a simulated condylar bearing surface for registering and cooperating with the bearing surface of the tibial component for simulating movement of the natural knee, and (ii) a femoral contact surface with pin means projecting therefrom for fixedly connecting the femoral component to an exposed end of a femur;

(c) a femoral platform to be interposed between the femoral component and the exposed end of a femur, comprising (i) a base portion adapted to engage and register with the femoral contact surface and accommodate the pin means, and (ii) a central elongated fixation means dimensioned to be inserted in the canal with a length greater than the pin means to provide greater stabilization of the femoral component with respect to the femur for use in secondary implants.

**4,950,299**  
**BALL AND SOCKET BEARING FOR ARTIFICIAL JOINT**  
Douglas G. Noiles, New Canaan, Conn., assignor to Joint Medical Products Corporation, Stamford, Conn.  
Continuation of Ser. No. 942,298, Dec. 16, 1986, Pat. No. 4,801,301, which is a continuation of Ser. No. 473,431, Mar. 8, 1983, Pat. No. 4,692,123. This application Jan. 27, 1989, Ser. No. 303,166

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> A61F 2/34, 2/30

U.S. Cl. 623—22 3 Claims

1. A prosthesis for implantation in a patient's body as part of a ball and socket joint, said joint including a ball portion and a



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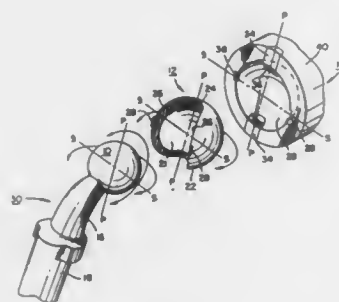
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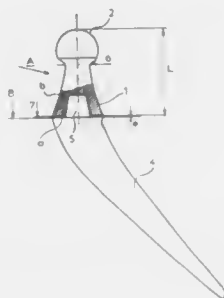
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socket portion, said ball portion including a ball connected to a neck, said socket portion including two spaced-apart coaxial pivoting means members, said prosthesis comprising a bearing shell having a polar axis, said shell comprising an inner surface at least a portion of which is spherically shaped which defines



a cavity for receiving the ball, an outer surface at least a portion of which is spherically shaped, and a rim joining the two surfaces, wherein said shell includes two coaxial, diametrically-opposed, cylindrically-shaped surfaces which intersect the outer surface and are substantially transverse to said polar axis for engaging the pivoting means members.

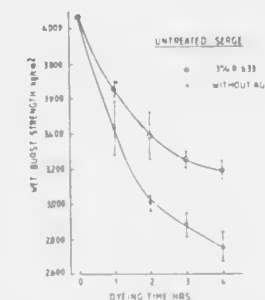
**4,950,300**  
**HIP PROSTHESIS WITH INTERCHANGEABLE EPIPHYSUS**  
Frantz Langlais, Rennes, France, assignor to OMCI SA, Quimper, France  
Continuation of Ser. No. 178,263, Apr. 6, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 379,711  
Claims priority, application France, Aug. 3, 1987, 87 11096  
Int. Cl.<sup>5</sup> A61F 2/36  
U.S. Cl. 623—23 8 Claims



1. A hip prosthesis comprising a femoral shank, a neck and a head, characterized in that head (2) forms with the neck (1) a one-piece assembly (A) having at its base a housing (b) that extends in the same direction as the longitudinal axis of the neck and is directed according to the length of the neck, and limited to said neck so that the strength of said head is not effected by the presence of said housing, said housing being provided for receiving a Morse cone (5) forming an integral part of the upper pole (a) of the femoral shank (4) in such a way that continuous circumferential clearance (e) is present between the base (7) of the neck (1) and the upper plane (8) of the shank (4).

**4,950,301**  
**KERATINOUS TEXTILE TREATMENT WITH ARYLATING COMPOUNDS CONTAINING FIBRE REACTIVE GROUPS**

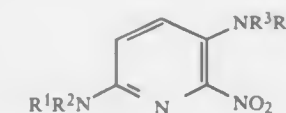
David M. Lewis, Otley, England, assignor to Wool Development International Limited, West Yorkshire, England  
Continuation of Ser. No. 775,136, Sep. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 577,131, Feb. 6, 1984, Pat. No. 4,563,189. This application Dec. 22, 1988, Ser. No. 290,887  
Claims priority, application United Kingdom, Sep. 14, 1984, 8423291; May 23, 1985, 8513081  
Int. Cl.<sup>5</sup> C07C 147/06; C07D 239/26; D06M 13/26; D06P 1/64  
U.S. Cl. 8—127.5 7 Claims



1. A method of treating keratinous textiles to reduce damage during dyeing which comprises applying to an untreated textile material during dyeing at the boil, under neutral or acidic conditions, an aqueous solution or dispersion containing from 1 to 20% on weight of fibre of an arylating agent having the formula  $Ar_m-(X-Y)_n$  wherein Ar is an unsubstituted or substituted benzene or naphthalene ring; Y is a chlorotriazine or a quaternary ammonium salt of triazine; and X is a divalent bridging group selected from  $-SO_2-$ ,  $-CO-$  or  $-NH-$ ; or where X and Y taken together form a vinyl sulphone, a vinyl sulphone precursor, a sulpho-S-triazine, 2,4-difluoro-6-chloropyrimidine, a haloacrylamide, a di-bromopropionylamide, a haloacetyl or an acyl-S-thiosulphate group; m is 1 or 2; and n=1, 2 or 3.

**4,950,302**  
**PROCESS FOR THE PRODUCTION OF 2,5-DIAMINO-6-NITRO-PYRIDINE DERIVATIVES, THEIR USE IN HAIR DYE COMPOSITIONS AND NEW 2,5-DIAMINO-6-NITROPYRIDINE DERIVATIVES**  
Thomas Clausen, Alsbach, and Eugen Konrad, Darmstadt, both of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany  
PCT No. PCT/EP88/00695, § 371 Date Apr. 6, 1989, § 102(e) Date Apr. 6, 1989, PCT Pub. No. WO89/01473, PCT Pub. Date Feb. 23, 1989  
PCT Filed Aug. 1, 1988, Ser. No. 348,660  
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727297  
Int. Cl.<sup>5</sup> A61K 7/13; C07D 211/84, 213/73  
U.S. Cl. 8—409 16 Claims

1. A 2,5-diamino-6-nitropyridine derivative having the general formula (V)



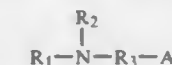
or a physiologically compatible water soluble salt thereof, wherein, independently of each other,  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$ , are each selected from a group consisting of hydrogen, alkyl radicals, hydroxyalkyl radicals, dihydroxyalkyl radicals, aminoalkyl radicals including alkyl-substituted aminoalkyl radicals and

## CHEMICAL

hydroxyalkyl-substituted aminoalkyl radicals and hydroxyalkyl-substituted aminoalkyl radicals, radicals in which a heterocyclic nonaromatic five-membered ring is formed by  $R^1$  and  $R^2$  and radicals in which a heterocyclic nonaromatic six-membered ring is formed by  $R^1$  and  $R^2$ , each of said alkyl radicals containing one to four carbon atoms and said rings additionally can contain an oxygroup, provided that  $R^1$  to  $R^4$  do not exclusively represent hydrogen and when  $R^1$  or  $R^2$  or  $R^1$  and  $R^2$  represent alkyl, or, when  $R^1$  and  $R^2$  combined form a heterocyclic nonaromatic ring of five or six members, then  $R^3$  and  $R^4$  differ from hydrogen.

**4,950,303**  
**COLOR-LOADED POLYMER MICROPARTICLES**  
Keizou Ishii, Hyogo, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan  
Filed Dec. 3, 1987, Ser. No. 128,267  
Int. Cl.<sup>5</sup> C08J 3/20; C09B 69/02  
U.S. Cl. 8—513 7 Claims

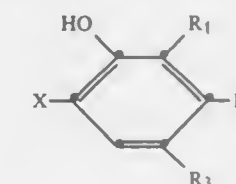
1. A method for dyeing a polymeric carrier with a water-soluble dye which comprises emulsion polymerizing a mixture of (a) at least one ethylenically unsaturated monomer, (b) a cross-linking monomer comprising a monomer having at least two ethylenically unsaturated bonds per molecule or a combination of two different monomers which have mutually reactive groups, and (c) an amino acid derivative of the formula:



wherein  $R_1$  is a group containing a polymerizable ethylenically unsaturated hydrocarbon moiety,  $R_2$  is H, or an unsubstituted or substituted  $C_1-C_6$  hydrocarbon radical,  $R_3$  is an unsubstituted or substituted  $C_1-C_6$  divalent hydrocarbon radical, and A is  $-\text{COOH}$  or  $-\text{SO}_3\text{H}$ , admixing the resulting emulsion with an aqueous solution of said water-soluble dye, removing water from the emulsion and resuspending the resulting dyed polymer microparticles in an organic solvent.

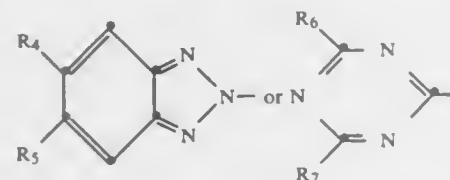
**4,950,304**  
**PROCESS FOR QUENCHING OR SUPPRESSING THE FLUORESCENCE OF SUBSTRATES TREATED WITH FLUORESCENT WHITENING AGENTS**  
Gerhard Reinert, Allschwil, and Kurt Burdeska, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.  
Filed Sep. 23, 1988, Ser. No. 248,076  
Claims priority, application Switzerland, Oct. 2, 1987, 3856/87  
Int. Cl.<sup>5</sup> D06L 3/12; D06M 13/34; D06P 1/62; C09B 67/00  
U.S. Cl. 8—566 8 Claims

1. A process for quenching or suppressing the fluorescence of natural or synthetic polyamide substrates treated, or to be treated, with fluorescent whitening agents, which process comprises applying to said substrates, before or after the treatment with the fluorescent whitening agent, the step of applying a liquor containing at least 1% of



wherein  $R_1$  is hydrogen, halogen,  $C_1-C_{12}$ -alkyl,  $C_5-C_6$ -cycloalkyl,  $C_7-C_9$ -phenylalkyl or sulfo.

R<sub>2</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, halogen, hydroxy or sulfo,  
 R<sub>3</sub> is hydrogen, C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, phenyl, C<sub>1</sub>-C<sub>8</sub>-alkylphenyl, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl, C<sub>2</sub>-C<sub>9</sub>-alkoxycarbonyl, halogen, carboxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>2</sub>-C<sub>9</sub>-phenylalkyl or sulfo, and  
 X is a radical of formula



wherein

R<sub>4</sub> is hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>2</sub>-C<sub>9</sub>-alkoxycarbonyl, carboxy or sulfo,  
 R<sub>5</sub> is hydrogen or halogen and  
 R<sub>6</sub> and R<sub>7</sub> are each independently of the other C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl, phenyl or phenyl which is substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl and hydroxy, and fixing said UV absorber thereon.

4,950,305

#### WATER-INSOLUBLE MONOAZO DYES, THEIR PREPARATION AND USE, AND MIXTURES OF THESE MONOAZO DYES

Ulrich Bühler, Alzenau; Margareta Boos, Hattersheim, and Reinhard Kühn, Frankfurt, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

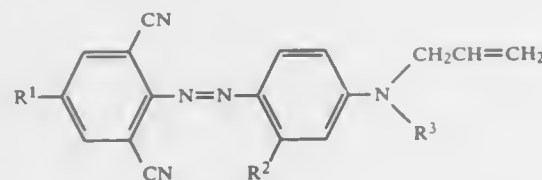
Filed Aug. 7, 1989, Ser. No. 389,945

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831356

Int. Cl.<sup>5</sup> C09B 29/00, 29/36, 29/09

U.S. Cl. 8—639

1. Monoazo dyes of the formula



in which

R<sup>1</sup> is fluoro, chloro or bromo;  
 R<sup>2</sup> is hydrogen or chloro; and  
 R<sup>3</sup> is allyl, alkyl having 1 to 4 carbon atoms, alkoxyalkyl having 2 to 4 carbon atoms in the alkyl portion and 1 to 4 carbon atoms in the alkoxy portion or cyanoalkyl having 2 to 4 carbon atoms.

4,950,306

#### DYEING AND PRINTING OF CELLULOSIC FIBRE MATERIALS WITH VAT DYES WITH MONO- OR DI-HYDROXYACETONE AS REDUCING AGENT

Walter Marte, Ullsbach, and Paul Rys, Zurich, both of Switzerland, assignors to Ciba-Gelby Corporation, Ardsley, N.Y.

Filed Jul. 27, 1989, Ser. No. 386,529

Claims priority, application Switzerland, Jul. 29, 1988, 2891/88

Int. Cl.<sup>5</sup> C09B 7/00, 67/00; D06P 1/24, 3/60

U.S. Cl. 8—607

1. A process for dyeing and printing cellulosic fibre materials with vat dyes in the presence of C<sub>2</sub>-C<sub>6</sub>-alpha-hydroxyketones or C<sub>2</sub>-C<sub>6</sub>-alpha-hydroxyaldehydes as reducing agents, alkali, and in addition organic water-miscible solvents wherein the organic water-miscible solvents are lower molecular

weight alcohols, ketones, ethers, acetals, glycols, glycol ethers, thioglycols, nitriles, pyridines, lactams, amides, ureas, sulfones or sulfoxides or low molecular weight alkanolamines.

4,950,307

#### PREPARATION OF A HIGH-SOLIDS CONCENTRATION LOW RANK COAL SLURRY

Mitri S. Najjar, Hopewell Junction; James R. Pascoe, Wappingers Falls, both of N.Y., and Ralph Garcia, Gulf Port, Fla., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 17, 1986, Ser. No. 840,234

Int. Cl.<sup>5</sup> C10L 1/32

U.S. Cl. 44—51

6 Claims

1. A method for preparing a high solids content low rank coal of a coal/water slurry for a coal gasification process which method comprises:

- dehydrating a low rank coal feed in the presence of a solvent and an inert atmosphere of nitrogen at a temperature ranging from about 90° to about 110° C. and under a pressure ranging from about 14.7 to about 1400 psi for a period of about 1.0 minute to about 1.0 hour;
- treating said dehydrated coal with about 1.0 to about 10.0 wt. %, by weight of coal of a straight chain hydrocarbon rehydrating inhibitor and wherein said hydrocarbon is selected from pentane, octane, hexadecane, heptane, and dodecane; and
- adding a surfactant to said treated coal, whereby the solids content of the coal/water slurry is increased from about 5 to about 20 wt. % and the BTU/lb of said coal feed is increased by about 5% to about 15%.

4,950,308

#### APPARATUS FOR PRODUCING A PRODUCT GAS FROM A FINELY-DIVIDED CARBON-BEARING SUBSTANCE

Michael Lang, Mülheim/Ruhr; Gerhard Wilmer, Hattingen, and Michael Kühn, Lünen, all of Fed. Rep. of Germany, assignors to Krupp Koppers GmbH, Essen, Fed. Rep. of Germany

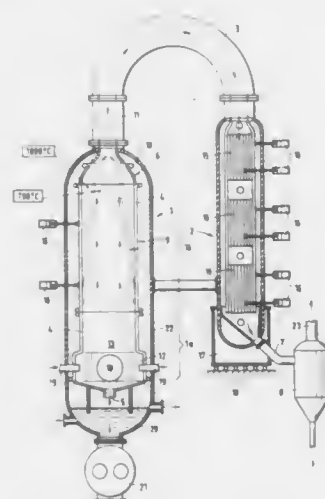
Filed Jul. 13, 1989, Ser. No. 379,803

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824233

Int. Cl.<sup>5</sup> C10J 3/86, 3/76

U.S. Cl. 48—62 R

12 Claims



1. In an apparatus for producing a flow including a product gas and accompanying cinder particles from a finely-divided carbon bearing substance in the course of a high-pressure gasification comprising:

a vertical gasifier and radiative cooling device having a head

4,950,310

#### PROCESS FOR THE PREPARATION OF CRYSTALLINE SHEET SODIUM SILICATES

Hans-Peter Rieck, Hofheim am Taunus; Martin Schott, Steinbach; Willy Ott, Kelkheim, and Werner Gohla, Niederkassel, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 8, 1988, Ser. No. 281,805

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742043

Int. Cl.<sup>5</sup> C01B 33/02

3 Claims

U.S. Cl. 34—295 R

1. A process for the preparation of x-ray crystalline sodium silicates of the formula  $\beta$ -Na<sub>2</sub>Si<sub>2</sub>O<sub>5</sub>, which has a sheet structure and whose x-ray diffraction spectrum is in accordance with Table 3, wherein an x-ray crystalline sodium silicate of the formula  $\delta$ -Na<sub>2</sub>Si<sub>2</sub>O<sub>5</sub>, having a sheet structure and whose x-ray diffraction spectrum is in accordance with Table 2 is dissolved in water at a concentrated solution sufficient to avoid hydrolysis and evaporated at temperatures of 20° to 445° C.

4,950,311

#### HEATERLESS ADSORPTION SYSTEM FOR COMBINED PURIFICATION AND FRACTIONATION OF AIR

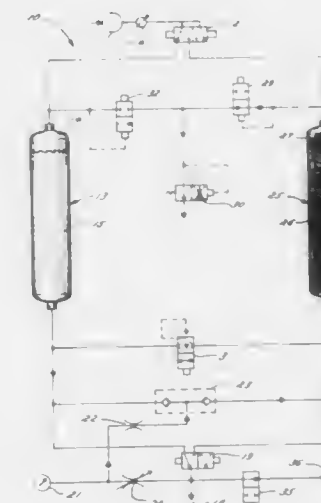
Donald H. White, Jr., 923 Alfred La., Homer, N.Y. 13077

Continuation-in-part of Ser. No. 164,816, Mar. 7, 1988, abandoned. This application Apr. 6, 1989, Ser. No. 334,915

Int. Cl.<sup>5</sup> B01D 53/04

U.S. Cl. 55—25

16 Claims



1. A process for the sequential purification and fractionation of air in a single column and in the absence of pretreating the air feed to remove moisture comprising passing an air feed containing a gaseous component harmful to humans through an adsorber column to produce product effluent, said column having at least two adsorption zones, said column having a first zone comprising a feed purification adsorber for purifying an air feed and having a first adsorbent therein for adsorbing the harmful gaseous component and water vapor from said feed to effect purification, said first adsorbent capable of being regenerated, and a second zone comprising an air fractionation adsorber for adsorbing at least one component of air and having a second adsorbent therein to effect fractionation of air, said second adsorbent capable of being regenerated, said first zone operating as a heaterless pressure-swing adsorber and said second zone operating as a purge sweep adsorber, said column being sized so that the heat of adsorption released during the adsorption of water vapor from the air feed is retained in said column and so that on application of a volume of purge gas to said column said first and second adsorbents are both regenerated, said second zone being sized so as to contain sufficient

4,950,309

#### PROCESS FOR THE CONVERSION OF TOXIC ORGANIC SUBSTANCES TO USEFUL PRODUCTS

Helmut W. Schulz, Harrison, N.Y., assignor to Dyncology Incorporated, Harrison, N.Y.

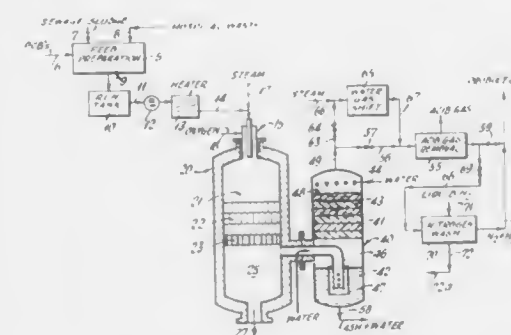
Continuation-in-part of Ser. No. 106,144, Oct. 7, 1987, Pat. No. 4,869,731, which is a continuation of Ser. No. 786,165, Oct. 9, 1985, abandoned, which is a continuation of Ser. No. 584,571, Feb. 29, 1984, abandoned. This application Oct. 14, 1988, Ser. No. 257,648

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C10J 3/46

U.S. Cl. 48—197 R

7 Claims



1. A process for the noncatalytic destruction and detoxification of toxic organic waste selected from the group consisting of sewage sludge, hospital wastes, halogenated hydrocarbons, organophosphates and mixtures thereof which comprises introducing a combustible stream of said waste with water or steam into a combustion chamber maintained at a temperature in the range of 2500° to 3500° F. into admixture with oxygen in an amount sufficient to autogenously maintain said temperature and to substantially completely convert said organic waste into a reducing gas stream of partial oxidation products comprising carbon monoxide, hydrogen, and methane in a first reaction zone, and contacting the hot reducing gas stream from the first reaction zone with incandescent solid carbon at a temperature in the range of 2500° to 3500° F. in a second reaction zone, cooling the effluent gaseous products from the second reaction zone, and recovering a product gas comprising hydrogen free from organic halides.



adsorbent to carry out the fractionation unaffected by the heat front generated by the heat of adsorption released in the first zone and to prevent breakthrough of the mass transfer front during fractionation, and removing the product effluent from said column.

4,950,312

# SILICA-BOUND CALCIUM-CONTAINING ZEOLITE A GRANULATE

Lothar Puppe, Burscheid, and Gerhard Reiss, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

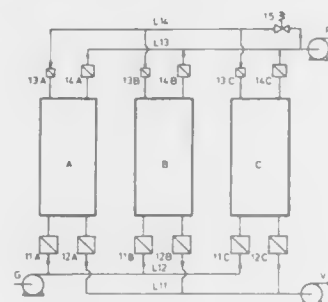
Filed May 11, 1988, Ser. No. 192,441

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718673

Int. Cl.<sup>5</sup> B01D 53/14; C01B 33/28

U.S. Cl. 55—68

5 Claims



1. A SiO<sub>2</sub>-bound, substantially carbonate-free activated, calcium-containing zeolite A granulate in which the calcium content of the zeolite A is 0.4 to 1 mole CaO/mole Al<sub>2</sub>O<sub>3</sub>.

4,950,313

# FINE DUST REMOVAL DEVICE

Francis A. L. Dullien, Kitchener; Donald R. Spink, Waterloo, and Wendy Mortimer, Toronto, all of Canada, assignors to University of Waterloo, Waterloo, Canada

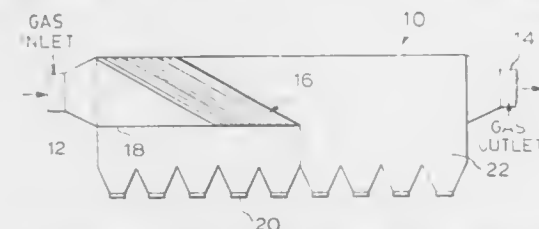
Filed Jan. 5, 1989, Ser. No. 293,523

Claims priority, application United Kingdom, Jan. 5, 1988, 8800101

Int. Cl.<sup>5</sup> B01D 46/12

U.S. Cl. 55—97

11 Claims



1. A method of removing particulates having a diameter of from about 0.3 to about 20 microns from a gas stream containing the same, which comprises:

conveying said gas stream at a velocity of about 1 to about 15 m/s through a dust agglomeration zone wherein are located about 40 to about 400 parallel mesh screens closely spaced apart from one another, each of said screens being formed of a criss-crossing pattern of elongate strands having a diameter of about 0.1 to about 2 mm and being spaced apart to define openings sized from about 2 to about 20 mm, said screens being angled with respect to the axis of flow of the gas stream at an angle of about 10 to about 60 degrees.

impinging said particulates on the upstream side of the elongate strands of successive ones of said screens to form a

deposit on said strands of a growing size as successive impingements occur, dislodging said deposits from said strands as they become sufficiently large to permit such dislodgement to occur by the joint action of gravitational forces and the flow velocity of the gas stream, and collecting the dislodged deposits.

4,950,314

# GAS SEPARATION MEMBRANE

Shinichi Yamada, and Kuniyasu Shiro, both of Ootsu, Japan, assignors to Toray Industries Inc., Tokyo, Japan

Continuation of Ser. No. 85,193, Aug. 14, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 319,801

Claims priority, application Japan, Aug. 14, 1986, 61-190930; Sep. 12, 1986, 61-214034; Oct. 3, 1986, 61-234428

Int. Cl.<sup>5</sup> B01D 53/22, 71/24

U.S. Cl. 55—158

16 Claims

1. A gas separation membrane consisting essentially of a crosslinked polyolefin or a crosslinked polyarylene oxide, which gas separation membrane is produced by evaporating a solution containing polyolefin or a polyarylene oxide having an active functional group which can autogenically form crosslinking sites therebetween.

4,950,315

# MULTIPLE HEAD PUMPING

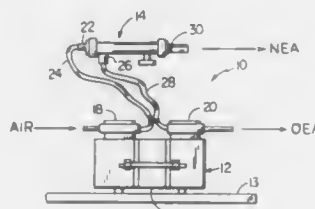
Arye Z. Gollan, Newton, Mass., assignor to A/G Technology Corporation, Needham, Mass.

Filed Jul. 14, 1989, Ser. No. 379,879

Int. Cl.<sup>5</sup> B01D 53/22

U.S. Cl. 55—158

14 Claims



1. Membrane-based gas separation apparatus comprising a motor, at least two pump heads connected to be driven by said motor, and one or more membrane separating devices, each said device having a semipermeable membrane or membranes that preferentially pass a gas component and divides said device into a feed channel or channels on one side of said membrane or membranes and a permeant channel or channels on the other side of said membrane or membranes, a feed inlet and a feed outlet communicating with said feed channel or channels, and a permeant outlet communicating with said permeant channel, one said pump head being connected to one said channel and another said pump head being connected to a different said channel.

4,950,316

# DEHUMIDIFICATION SYSTEM

Charles Harris, 5314 West Luke, Glendale, Ariz. 85301

Filed Jul. 28, 1989, Ser. No. 386,420

Int. Cl.<sup>5</sup> B01D 35/18

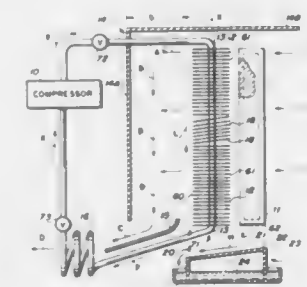
U.S. Cl. 55—269

9 Claims

1. A dehumidifier, including the (a) coil means for cooling air passing over said coil means

and causing water to condense from the air onto the coil means, said coil means including

- (i) a first entrance side, air flowing toward said entrance side to pass over said coil means and be cooled and condense water onto said coil means, and
- (ii) a second exit side spaced away from said entrance side, cooled air flowing in a selected direction of travel away from said second side and said coil means;



- (b) air deflection means shaped and dimensioned to deflect cooled air from said selected direction of travel such that said deflected air generates forces acting on at least a portion of said condensed water on said coil means to assist in moving said water over said coil means; and,
- (c) means for imparting motive force to air such that said air flows toward said entrance side, over said coil means, away from said exit side, and is deflected by said deflection means to assist in moving said water over said coil means.

4,950,317

# AIR FILTER ASSEMBLY AND METHOD OF PUTTING FILTER ELEMENT IN SAME

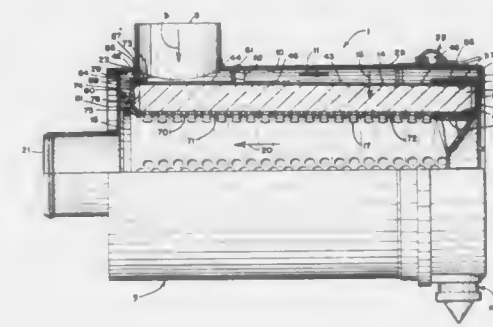
Jos Dottermans, Bertem, Belgium, assignor to Donaldson Company, Inc., Bloomington, Minn.

Filed Jan. 9, 1989, Ser. No. 295,258

Int. Cl.<sup>5</sup> H01D 35/30

U.S. Cl. 55—337

16 Claims



1. An air filter support arrangement defining an annular space to receive a filter element comprising:

- (a) an upper-pot member having:
  - (i) a first elongate tubular sleeve portion with first and second end portions;
  - (ii) and a first annular end flange covering a first end of said annular space;
- (b) an under-pot member having:
  - (i) a second elongate tubular sleeve portion with first and second end portions, said first and said second sleeve portions defining, when said arrangement is operationally assembled, said annular space therebetween;
  - (ii) a second annular end flange covering a second end of said annular space; and
  - (iii) a resilient lip member extending from said second end

flange and being substantially parallel to said second sleeve portion, said lip member and said second sleeve portion defining a recess therebetween for operational receipt of a portion of a filter element therein; and

- (c) said resilient lip member including a first resilient engagement member; said upper-pot member including a second resilient engagement member, said first engagement member resiliently engaging said second engagement member to releasably secure said upper-pot member to said under-pot member.

4,950,318

# METHOD OF JOINING SELF-ALIGNING OPTICAL FIBERS

Richard B. Dyott, Orland Park, Ill., assignor to Andrew Corporation, Orland Park, Ill.

Continuation of Ser. No. 77,388, Jul. 24, 1987, abandoned, which is a division of Ser. No. 778,407, Sep. 20, 1985, Pat. No.

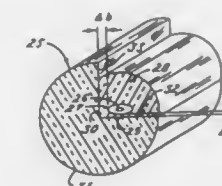
4,755,021, which is a continuation-in-part of Ser. No. 469,977, Feb. 25, 1983, Pat. No. 4,697,876, which is a continuation-in-part of Ser. No. 404,283, Aug. 2, 1982, Pat. No. 4,669,814. This

application Feb. 22, 1989, Ser. No. 314,318

Int. Cl.<sup>5</sup> C03B 23/00, 37/10

U.S. Cl. 65—4.21

5 Claims



1. A method of forming an optical fiber joint between a pair of elongated optical fibers each of which has a longitudinal axis surrounded by a core and cladding having different refractive indices and forming a single-mode light-guiding region, the core and cladding of each fiber having non-circular transverse cross-sections defining two polarization-maintaining axes of birefringence transverse to said longitudinal axis of said fiber, each of said fibers also having predetermined external flat reference surfaces for locating the core and cladding and said axes of birefringence within said each fiber from the exterior geometry of the fiber, said method comprising,

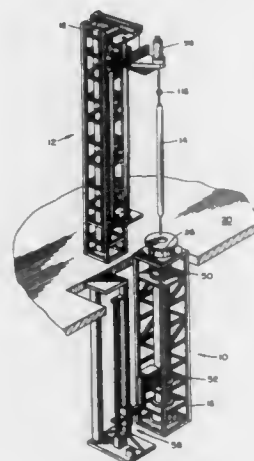
shaping an elongated glass preform to have a cross-sectional configuration with flat longitudinal surfaces extending along the preform length, which flat surfaces are large-scale complements of said external reference surfaces on the fibers to be joined, such that said preform longitudinal surfaces will mate with said fiber reference surfaces when said preform is drawn down to the scale of said fibers, heating the shaped preform to a softened condition and then drawing the softened preform in a longitudinal direction to reduce the scale of said complementary surfaces so that the cross-sectional configuration of the drawn preform matches the cross-sectional configuration of said external reference surfaces on the fibers to be joined, and so that the preform longitudinal surfaces and the fiber reference surfaces will mate together, cooling the drawn preform and placing the optical fibers to be joined thereon with the ends of the fibers butted together, with said external reference surfaces on the fibers matingly engaging said complementary longitudinal surfaces on the drawn preform, and bonding said fibers to the drawn preform and bonding the abutting ends of said fibers to each other.

4,950,319

HEATING OVEN FOR PREPARING OPTICAL  
WAVEGUIDE FIBERSKenneth R. Lane, Wilmington, N.C.; Donald L. Prusha, Painted  
Post, N.Y., and William E. Siebold, Horseheads, N.Y., assign-  
ors to Corning Incorporated, Corning, N.Y.Continuation of Ser. No. 189,232, May 2, 1988, abandoned,  
which is a division of Ser. No. 824,136, Jan. 30, 1986, Pat. No.  
4,741,748. This application Nov. 27, 1989, Ser. No. 443,087  
Int. Cl.<sup>3</sup> C03B 23/04, 19/09, 37/02

U.S. Cl. 65—12

8 Claims

1. A heating oven for processing glass materials from which  
optical waveguide fibers are prepared comprising:

- a vertically oriented, elongated cylindrical muffle for  
receiving a glass material to be processed;
- means for heating the muffle; and
- first means for supporting the muffle, said first means for  
supporting contacting the upper portion of the muffle;
- second means for supporting the remainder of the oven;
- the first means for support being substantially thermally  
independent of said second means for support.

4,950,320

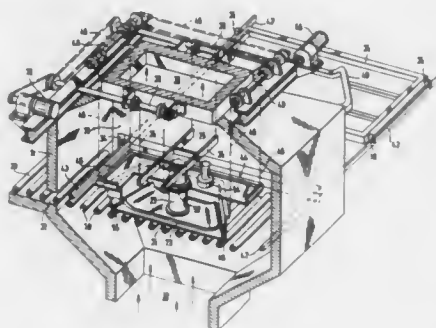
SUPPORT DEVICE ADAPTED FOR BENDING GLASS  
SHEETLuc Vanaschen, Eupen, Belgium, and Hans-Werner Kuster,  
Aachen, Fed. Rep. of Germany, assignors to Saint-Gobain  
Vitrage, Courbevoie, FranceContinuation of Ser. No. 214,958, Jul. 5, 1988, Pat. No.  
4,902,331. This application Sep. 14, 1989, Ser. No. 407,428  
Claims priority, application Fed. Rep. of Germany, Jul. 2,  
1987, 3721863Int. Cl.<sup>3</sup> C03B 23/025

U.S. Cl. 65—273

3 Claims

1. A support device for a glass sheet in a horizontal position  
heated to the bending temperature comprising:

- an enclosure in which a partial vacuum is established; and
- a contact surface provided with suction orifices directed  
downward against which the glass sheet is held by suction  
effect, wherein said enclosure comprises a box, said box  
having means for removably supporting one of a plurality  
of flat plates at the bottom of said box, each of said flat  
plates having an opening corresponding to the shape of  
the glass sheet to be grasped, wherein said plates can be  
interchanged to correspond to the shape of said glass sheet  
to be grasped, the opening of each one of said flat plates  
being dimensioned so as to be smaller than the glass sheet  
so that a narrow annular contact surface is defined by the  
edges of the glass sheet for contacting with said box along  
said opening in said flat plate and so that the partial vac-

uum prevailing in the box is limited to such a value as to  
compensate for the weight of the glass sheet; whereby saidsheet contact said opening in said flat plate only along said  
narrow annular contact surface.

4,950,321

## CERAMIC ORIFICE RING

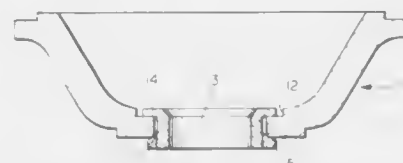
Frank J. DiFrank, Toledo, Ohio, assignor to Owens-Illinois  
Glass Container Inc., Toledo, Ohio

Filed Aug. 18, 1989, Ser. No. 395,869

Int. Cl.<sup>3</sup> C03B 5/26, 7/088

U.S. Cl. 65—325

3 Claims



1. The combination of a metal orifice ring insert and a ce-  
ramic orifice ring, said insert comprising a cylindrical metal  
insert member having a radially outwardly extending lip, said  
ceramic orifice ring comprising a ceramic bowl shaped ring  
member having a bottom wall with an orifice opening extend-  
ing therethrough for receiving said insert member with the lip  
overlying the opening and the end of said insert member oppo-  
site said lip extending below the bottom wall of said ring mem-  
ber, said insert member being sized so as to fit in the orifice  
opening of said ceramic ring member with a predetermined  
annular gap therebetween, external threads formed on said  
insert member around the end extending below the ring mem-  
ber, an internally threaded metal nut for threading onto the  
threaded end of the insert member, said nut formed with an  
outwardly and downwardly sloped upper surface contacting  
the bottom edge of the opening in the ring member when  
threaded onto the threaded end of said insert member, said  
sloped upper surface having a slope matching the thermal  
expansion characteristics of the metal insert member and the  
ceramic ring member.

4,950,322

CYCLOHEXANE HERBICIDES FOR GRAMINEOUS  
CROPSKenji Arai, Takarazuka; Kouichi Morita, Toyonaka; Nobuaki  
Mito, Takarazuka, and Naonori Hirata, Sakai, all of Japan,  
assignors to Sumitomo Chemical Company, Limited, Osaka,  
Japan

Filed Oct. 6, 1987, Ser. No. 104,932

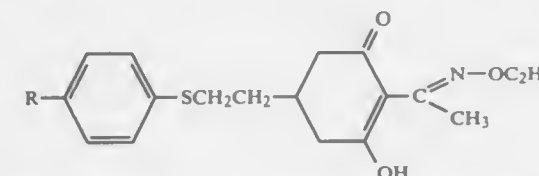
Claims priority, application Japan, Dec. 19, 1986, 61-304827

Int. Cl.<sup>3</sup> A01N 31/04

U.S. Cl. 71—98

4 Claims

1. A method for controlling undesired gramineous weeds in

a field of corn which comprises applying 0.05–2 g/are of the  
compound represented by the formula,wherein R represents a chlorine atom, a methyl group or a  
methoxy group, and an inert carrier and/or diluent to the  
field of gramineous crops.

4,950,323

HERBICIDAL BIS-FORMYL-N-ARYL-N'-ALKYL UREAS  
AND METHODS OF USE

Charles Kezerian, 26 Descanso Dr., Orinda, Calif. 94563

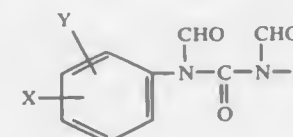
Filed Jan. 12, 1987, Ser. No. 2,465

Int. Cl.<sup>3</sup> C07C 127/15, 127/19, 127/22; A01N 9/20

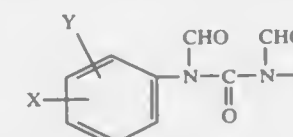
U.S. Cl. 71—120

9 Claims

1. A compound having the formula



in which

X and Y are the same or different and are selected from the  
group consisting of trifluoromethyl, chloro, bromo, fluoro,  
hydrogen, cyano, alkyl, thioalkyl, haloalkyl, alkoxy  
and sulfonylalkyl, wherein the alkyl groups have from one  
to four carbon atoms; andR is alkyl wherein the alkyl groups have from one to four  
carbon atoms.7. A method for controlling undesirable weed pests which  
comprises applying to the locus where control is desired a  
herbicidally effective amount of a compound having the for-  
mula

in which

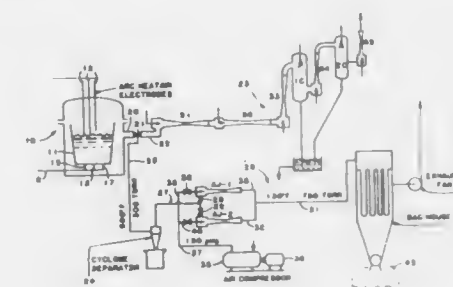
X and Y are the same or different and are selected from the  
group consisting of trifluoromethyl, chloro, bromo,  
fluoro, hydrogen, cyano, alkyl, thioalkyl, haloalkyl, alkoxy  
and sulfonylalkyl, wherein the alkyl groups have  
from one to four carbon atoms; andR is alkyl wherein the alkyl groups have from one to four  
carbon atoms.

4,950,324

TRI-LEVEL METHOD AND APPARATUS FOR POST  
MELTING TREATMENT OF MOLTEN STEELCharles W. Finkl; Bruce Liimatainen, both of Chicago, and  
Herbert S. Philbrick, Jr., Wilmette, all of Ill., assignors to A.  
Finkl & Sons Co., Chicago, Ill.Continuation-in-part of Ser. No. 261,444, Oct. 24, 1988, Pat. No.  
4,857,269. This application Jan. 24, 1989, Ser. No. 301,170Int. Cl.<sup>3</sup> C21C 5/52

U.S. Cl. 75—10.38

20 Claims

1. In a method of decreasing the content of undesired gases  
in a batch of molten steel comprising the steps of  
isolating at least a portion of the batch of molten steel con-taining undesired gases from ambient atmosphere  
whereby a non-atmospheric region is established above at  
least said portion of the molten steel,  
passing a purging agent upwardly through at least said por-  
tion of the molten steel from a location beneath the surface  
of said portion which is exposed to the non-atmospheric  
region,diverting gases in the region above at least said portion of  
the molten steel to air ejector means at a rate sufficient to  
create a sub-atmospheric pressure in the non-atmospheric  
region above the molten steel, and  
discharging the gases drawn from said region, and additional  
gases which may be added to the air ejector means, from  
the air ejector means at a temperature which is within the  
temperature tolerance range of a baghouse.

4,950,325

PROCESS FOR HEATING STEEL MELTS AND AN  
APPARATUS FOR CARRYING OUT THE PROCESSGerhard Mitter, Traun; Luzian Pochmarski, and Otto Köller,  
both of Leoben, all of Austria, assignors to Voest-Alpine Stahl  
Donawitz Gesellschaft m.b.H., Leoben-Donawitz, Austria

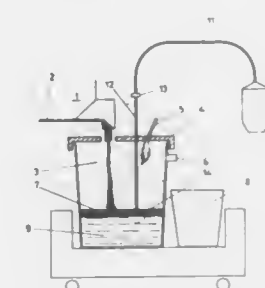
Filed Aug. 7, 1989, Ser. No. 390,243

Claims priority, application Austria, Aug. 8, 1988, 1996/88

Int. Cl.<sup>3</sup> C21C 7/02

U.S. Cl. 75—537

7 Claims

1. A method of heating steel melts which are covered by a  
slag rich iron oxide, comprising the step of injecting a metal  
which reacts exothermally with the melt and with oxygen  
contained in the slag into a phase boundary zone between the  
melt and the slag.

4,950,326

PROCESS FOR REMOVAL OF DISSOLVED COPPER  
FROM SOLUTIONJerry D. Holly, Hillsboro, Ore., assignor to Tektronix, Inc.,  
Beaverton, Ore.

Filed May 1, 1989, Ser. No. 345,865

Int. Cl.<sup>3</sup> C22B 3/46

U.S. Cl. 75—726

19 Claims

1. A process for removing dissolved copper from a solution



comprising dissolved copper and reducing agent, the process comprising: reversibly inactivating the dissolved copper in solution by inactivating said reducing agent; precipitating dissolved copper from the solution by mixing the solution with



aluminum particles after inactivating the dissolved copper; and separating metallic copper from the solution, thereby producing a treated solution having reduced levels of dissolved copper.

4,950,327

**CREEP-RESISTANT ALLOY OF HIGH-MELTING METAL AND PROCESS FOR PRODUCING THE SAME**  
Ralf Eck, and Gerhard Leichtfried, both of Reutte, Austria, assignors to Schwarzkopf Development Corporation, New York, N.Y.

PCT No. PCT/AT88/00002, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO88/05830, PCT Pub. Date Aug. 11, 1988

PCT Filed Jan. 26, 1988, Ser. No. 264,959

Int. Cl.<sup>5</sup> C22C 29/12

U.S. Cl. 75—232

7 Claims

1. Sintered, creep-resistant alloy with a tiered structural arrangement, comprising at least one high-melting metal selected from the group consisting of Mo, W, Nb, Ta, V, and Cr, and further comprising 0.005 to 10% by weight of at least one compound selected from the group consisting of the oxides, nitrides, carbides, borides, silicates and aluminates, including mixed phases thereof, said compound having a grain size of not greater than 1.5  $\mu\text{m}$  and a melting point in excess of 1500 °C.

4,950,328

**END MILL FORMED OF TUNGSTEN CARBIDE-BASE SINTERED HARD ALLOY**

Niro Odani; Katsuhisa Yamamoto, and Hitoshi Mayumi, all of Tokyo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,402

Claims priority, application Japan, Jul. 12, 1988, 63-173467

Int. Cl.<sup>5</sup> C22C 29/08

U.S. Cl. 75—240

3 Claims

1. An end mill formed of a tungsten carbide-base sintered hard alloy comprising a binder phase including a Co-base alloy, and a hard disperse phase consisting essentially of tungsten-carbide in proportions of:  
binder phase: 6–23 wt. %, and  
hard disperse phase: 77–94 wt. %, said binder phase comprising:  
Cr: 1–15 wt. %, and  
W: in an amount not more than 5 wt. %, and  
the balance of Co and inevitable impurities, said hard disperse phase having a mean grain size of 0.5–2  $\mu\text{m}$ .

4,950,329

**WOOD PRESERVATIVE COMPOSITION AND METHOD OF TREATING WOOD WITH SAME**

Craig R. McIntyre, Pittsburgh, and Eugene A. Pasek, Monroeville, both of Pa., assignors to Hirkson Corporation, Atlanta, Ga.

Filed Oct. 11, 1988, Ser. No. 255,742

Int. Cl.<sup>5</sup> C09D 5/14

U.S. Cl. 106—15.05

18 Claims

12. An improved wood preservative composition of the type comprising an emulsion of oil in a water solution of wood preservative wherein the oil is from 1 to 20 weight percent of the emulsion, wherein the water contains from 0.1 to 15 weight percent based on emulsion of a wood preservative selected from the group consisting of chromated copper arsenate, ammoniacal copper arsenate and ammoniacal copper zinc arsenate and wherein the composition contains from 0.3 to 2.5 weight percent of the emulsion of a surfactant material; wherein the improvement comprises a surfactant material consisting essentially of a first surfactant having an HLB of from 7 to 11 selected from ethoxylated alkyl phenols and ethoxylated alkyl alcohols having a mole ratio of ethoxy groups of from 1 to 5, and a second surfactant having an HLB of from 15 to 20 selected from ethoxylated alkyl phenols and ethoxylated alkyl alcohols having a mole ratio of ethoxy groups greater than 20 and the combined HLB of the first and second surfactants being from 10 to 13.

4,950,330

**AQUEOUS DISPERSION OF A DEVELOPER FOR PRESSURE-SENSITIVE RECORDING SHEET AND A PROCESS FOR PRODUCING THE SAME**

Toranosuke Saito; Shonichi Murata; Eiji Kawabata, all of Osaka; Tomoharu Shiozaki, and Tetsuo Shiraiishi, both of Hyogo, all of Japan, assignors to Sanko Kaihatsu Kagaku Kenkyusho, Osaka and Kanzaki Paper Manufacturing Co., Ltd., Tokyo, both of Japan

Continuation of Ser. No. 143,361, Jan. 12, 1988, abandoned. This application Sep. 7, 1989, Ser. No. 405,063

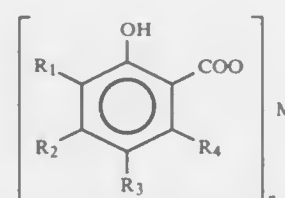
Claims priority, application Japan, Jan. 14, 1987, 62-5129; Jul. 30, 1987, 62-188930

Int. Cl.<sup>5</sup> C09D 11/00

U.S. Cl. 106—21

16 Claims

1. An aqueous dispersion of a developer for pressure-sensitive recording sheet, which developer is composed mainly of a salt of substituted salicylic acid expressed by the formula (I)



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> maybe the same or different and each represents hydrogen atom, halogen atom, alkyl group of 1 to 9 carbon atoms, alkylene group, cycloalkyl group, cycloalkylene group, phenyl group, nucleus-substituted phenyl group, aralkyl group or nucleus-substituted aralkyl group; n represents an interger of one or more; and M represents magnesium, calcium, zinc, aluminum, iron, cobalt, nickel or a base ion of the foregoing, and which developer has a softening point of 30° C. or higher and is dispersed in water, said developer having an average particle size of 0.3  $\mu\text{m}$  to 5  $\mu\text{m}$ , the proportion of right spherical particles in the total particles of the developer being 50% or more, and said developer dispersion being obtained by emulsifying-dispersing a developer composed mainly of a salt of substituted salicylic acid expressed by the formula (I) in an aqueous solution of a polyvinyl alcohol having a polymerization degree of 500 or more and a saponification

degree of 70% or more at a temperature higher by at least 30° C. than the softening temperature of said developer, followed by cooling the resulting aqueous dispersion.

4,950,331

**CERAMIC FLUX FOR WELDING LOW-ALLOY STEELS**  
Igor K. Pokhodnya, ulitsa Chkalova, 41a, kv. 25; Danil M. Kushnerev, ulitsa Vladimirskaia, 51/53, kv. 61; Sergei D. Ustinov, Lenina, 39, kv. 22, all of Kiev; Oleg G. Sokolov, prospekt Marshala Bljukhera, 57, korpus 1, kv. 194, Leningrad; Leonid V. Grischenko, ulitsa Gromova, 16, kv. 58, Leningrad; Gennady V. Baskakov, prospekt Slavy, 4, kv. 235, Leningrad; Marat V. Yamskoi, bulvar Trudyaschikhsya, 20, kv. 26, Leningrad, Kolpino; Andrei M. Zarubin, ulitsa Podlesnaya, 5/21, kv. 54, and Viktor V. Golovko, Chekhovskiy pereulok, 2, kv. 35, both of Kiev, all of U.S.S.R.

Filed Jul. 11, 1989, Ser. No. 378,168

Int. Cl.<sup>5</sup> C04B 35/00; B23K 35/34; C22B 4/00

U.S. Cl. 106—313

3 Claims

1. A ceramic flux for welding low-alloy steels, comprising: calcined magnesite, synthetic slag, containing two thirds of CaF<sub>2</sub> and one third of Al<sub>2</sub>O<sub>3</sub>, a component containing at least 95% of Al<sub>2</sub>O<sub>3</sub> in the alpha form, wollastonite, calcium carbonate, barium fluoride, hematite, ferrotitanium, ferroboron, manganese, sodium silicate in the following proportions of the components, in % by weight:

calcined magnesite	20.0–30.0
synthetic slag	30.0–40.0
component containing at least 95% of Al <sub>2</sub> O <sub>3</sub> in the alpha form	10.0–20.0
wollastonite	2.0–10.0
calcium carbonate	1.0–5.0
barium fluoride	1.5–4.0
hematite	0.1–5.0
ferrotitanium	0.4–2.0
ferroboron	0.1–0.5
manganese	1.0–2.5
sodium silicate	7.0–10.0

the ratio of the total content of calcined magnesite, two thirds of synthetic slag and one half of wollastonite to the total content of the component containing at least 95% of Al<sub>2</sub>O<sub>3</sub> in the alpha form, one third of synthetic slag, one half of wollastonite and two thirds of sodium silicate ranging from 1.30 to 1.45, and the ratio of titanium to boron ranging from 11.2 to 30.1.

4,950,332

**PROCESS FOR DECOLORIZING AQUEOUS SUGAR SOLUTIONS VIA ADSORBENT RESINS, AND DESORPTION OF COLOR BODIES FROM THE ADSORBENT RESINS**

Richard T. Stringfield; H. Robert Goltz; Seth I. Norman; Upen J. Bharwada, and Robert L. LaBrie, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 169,538, Mar. 17, 1988, abandoned, and a continuation-in-part of Ser. No. 169,537, Mar. 17, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 316,058

Int. Cl.<sup>5</sup> C13D 3/12, 3/14

U.S. Cl. 127—55

33 Claims

1. A process for decolorizing an aqueous sugar solution containing color bodies, comprising the step of contacting an aqueous sugar solution with an effective amount of an adsorbent resin so as to adsorb color bodies from said aqueous sugar solution onto said adsorbent resin, wherein said adsorbent resin is made from a macroporous copolymer of a monovinyl aromatic monomer and a crosslinking monomer, where the macroporous copolymer has been post-crosslinked in the swollen state in the presence of a Friedel-Crafts catalyst and functionalized with hydrophilic groups.

4,950,333

**WIRE PICKLING METHOD AND APPARATUS**

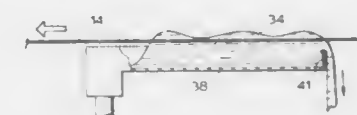
Michel R. Hone, St. Placide, and Jacques R. Martel, Bromard, both of Canada, assignors to Stelco Inc., Hamilton, Canada  
Filed Mar. 21, 1989, Ser. No. 326,643

Claims priority, application Canada, Oct. 18, 1988, 580453

Int. Cl.<sup>5</sup> B08B 1/02

U.S. Cl. 134—15

20 Claims



1. A method of pickling wire, which comprises: passing a wire horizontally from end to end of an enclosed pickling zone, and forming a wave of aqueous pickling liquor passing counter-current to the direction of movement of the wire through the enclosed pickling zone having a height which submerges said wire during its passage through said pickling zone.

4,950,334

**GAS CARBURIZING METHOD AND APPARATUS**

Nobuo Nishioka; Tadayoshi Juge, both of Kyoto; Yoshiaki Shimizu, Kameoka; Keishichi Namba; Hiroshi Shimura, both of Yokohama; Fumitaka Abukawa; Hitoshi Goh, both of Yokohama; Kazuyoshi Fujita, and Yuichi Takasu, both of Yokohama, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo and Tokyo Heat Treating Company, Ltd., Kanagawa, both of Japan

PCT No. PCT/JP87/00605, § 371 Date Apr. 11, 1988, § 102(e) Date Apr. 11, 1988

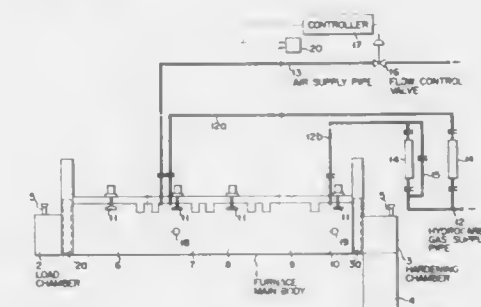
PCT Filed Aug. 12, 1987, Ser. No. 183,758

Claims priority, application Japan, Aug. 12, 1986, 61-189014; Aug. 12, 1986, 61-189015

Int. Cl.<sup>5</sup> F27B 9/40; C21D 9/00, 1/00

U.S. Cl. 148—16.5

5 Claims



1. A gas carburizing method for filling a furnace main body with an atmospheric gas having a carburizing property and carburizing a workpiece in said furnace main body in the absence of a separate furnace for generating a gaseous mixture adapted to adjust the carbon potential of the atmospheric gas, said process comprising:  
supplying a hydrocarbon gas at a constant flow rate and air directly to said furnace main body to thereby obtain a mixture of said hydrocarbon gas and air, reacting said mixture in said main body furnace to thereby generate an atmospheric gas having a carburizing property; and  
adjusting the flow rate of air to said furnace main body to thereby adjust the carbon potential of said atmospheric gas.

4,950,335

## PROCESS FOR PRODUCING ARTICLES FOR MAGNETIC USE

Georges Conderchoa, Sanvigny-les-Bois, France, assignor to Imphy S. A., Paris, France

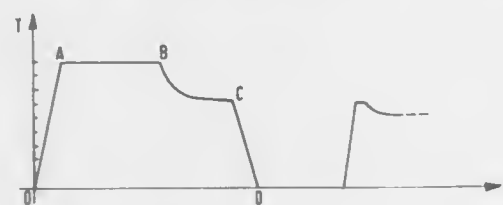
Filed May 25, 1988, Ser. No. 198,794

Claims priority, application France, May 25, 1987, 87 07343

Int. Cl.<sup>5</sup> C21D 1/04

U.S. Cl. 148—102

8 Claims



1. A method of producing articles for magnetic uses comprising the steps of

- producing a continuous strip or wire consisting of a metal magnetic alloy based on iron, cobalt and chromium;
- subjecting said strip to a first, initiating phase of an annealing operation by passing said strip or wire inside a tubular furnace having at least a part provided with means for producing a magnetic field, said strip being subjected inside said tubular furnace to a temperature between 600° C. and 650° C. with presence of a magnetic field which is lower than 80,000 A/m (1000 Oe);
- cutting out separate articles of a desired shape from said strip; and
- subjecting said articles to a second, ageing phase of said annealing operation in a second furnace where said articles are maintained at a temperature decreasing regularly and without magnetic field for a time sufficient to increase the coercivity and energy products thereof.

4,950,336

## METHOD OF PRODUCING NON-ORIENTED MAGNETIC STEEL HEAVY PLATE HAVING HIGH MAGNETIC FLUX DENSITY

Yukio Tomita, Ryota Yamaba, Yukio Tsuda, Katsuyoshi Yamanaka, and Tatsuya Kumagai, all of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

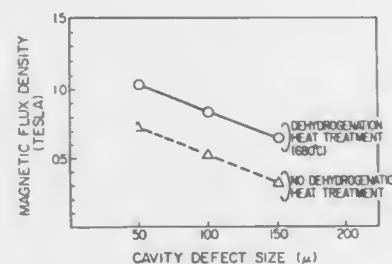
Filed Jun. 19, 1989, Ser. No. 368,031

Claims priority, application Japan, Jun. 24, 1988, 63-154640; Jun. 24, 1988, 63-154641; Jun. 24, 1988, 63-154642; Jun. 24, 1988, 63-154643; Jun. 24, 1988, 63-154644; Jun. 24, 1988, 63-154645; Jun. 27, 1988, 63-156718; Jun. 27, 1988, 63-156719; Jun. 27, 1988, 63-156720; Jun. 27, 1988, 63-156722

Int. Cl.<sup>5</sup> H01F 1/047

U.S. Cl. 148—111

11 Claims



1. A method of producing non-oriented magnetic steel heavy plate having high magnetic flux density comprising the steps of:

- preparing a steel slab comprising, by weight, up to 0.01

percent carbon, up to 0.20 percent manganese, up to 0.015 percent phosphorus, up to 0.010 percent sulfur, up to 0.05 percent chromium, up to 2.0 percent nickel, up to 0.01 percent molybdenum, up to 0.01 percent copper, up to 0.004 percent nitrogen, up to 0.005 percent oxygen and up to 0.0002 percent hydrogen, and one or more deoxidizing agents selected from a group consisting of up to 4.0 percent silicon, up to 0.20 percent titanium, 0.005 to 0.40 percent aluminum, and up to 0.01 percent calcium, with the remainder being substantially iron;

heating the slab to a temperature of 1150° to 1350° C.; carrying out at least one hot-rolling at a shape ratio A of at least 0.7 at a finish rolling temperature of at least 900° C.; applying dehydrogenation heat treatment at between 600° and 750° C. for heavy plate with a gage thickness of 50 mm or more;

annealing at a temperature of 700° to 950° C. or normalizing at a temperature of 910° to 1000° C., as required; annealing at a temperature of 750° to 950° C. or normalizing at a temperature of 910° to 1000° C. for hot-rolled heavy plate having a gage thickness that is at least 20 mm but less than 50 mm;

whereby a magnetic flux density of 0.8 tesla or more at a magnetic field of 80 A/m is imparted to the steel;

wherein the hot rolling is accomplished using a rolling roll having a radius R (mm) and wherein the steel heavy plate has an entry-side thickness  $h_1$  (mm) and an exit-side plate thickness  $h_0$  (mm) which exhibit a relationship with rolled shape ratio A of the hot rolling as follows:

$$A = 2 \sqrt{R(h_1 - h_0) / (h_1 + h_0)}.$$

4,950,337

## MAGNETIC AND MECHANICAL PROPERTIES OF AMORPHOUS ALLOYS BY PULSE HIGH CURRENT

James C. Li, 39 Crestview Dr., Pittsford, N.Y. 14534, and Huang Der-Ray, Rochester, N.Y., assignors to China Steel Corporation, Kaohsiung, Taiwan and James C. Li, Pittsford, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,895

Int. Cl.<sup>5</sup> C22C 45/00

U.S. Cl. 148—121

4 Claims



1. A method of improving the magnetic and mechanical properties of ferromagnetic amorphous alloys without causing annealing embrittlement, said method comprising the step of applying a pulsed high current to a ferromagnetic amorphous ribbon so as to rapidly heat the ribbon by the Joule effect, thereby relieving quenched-in stress of the amorphous ribbon.

4,950,338

## METHOD FOR THE CONTROLLED COOLING OF HOT ROLLED STEEL SAMPLES

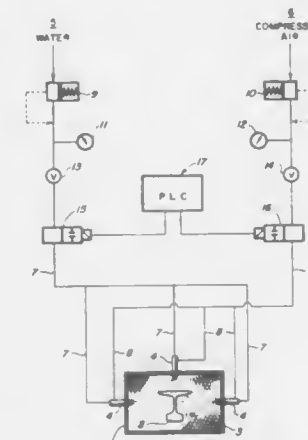
Gary D. Kotsch, Annville; Philip M. Giles, Jr., Bethlehem, and Raymond H. Blemiller, Harrisburg, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Division of Ser. No. 173,709, Mar. 24, 1988. This application

May 30, 1989, Ser. No. 358,315

Int. Cl.<sup>5</sup> C21D 9/04

U.S. Cl. 148—146



1. A method of cooling a sample of a hot rolled steel section in preparation for laboratory analysis comprising

- cutting the sample while the steel is at a temperature above 1800° F.,
- placing said sample in a closed container,
- directing predetermined amounts of compressed air and cooling water at said sample from a plurality of positions in said container for predetermined periods of time,
- removing said sample from said container when its temperature is below 100° F.

4,950,339

## PROCESS OF FORMING PHOSPHATE COATINGS ON METALS

Horst Gehmecker, Gross-Gerau; Werner Rausch, Oberursel, and Peter Jörns, Frankfurt, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 1, 1989, Ser. No. 305,214

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1988, 3803068

Int. Cl.<sup>5</sup> C23C 22/17, 22/86

U.S. Cl. 148—262

18 Claims

1. A process of forming a phosphate coating on a part which consists of metal and at least on part of its surface consists of iron or steel comprising:

- contacting the part at a temperature in the range of from 60° to 100° C. for 3 to 30 seconds with an aqueous phosphating solution virtually free of iron(II) ions and which comprises
  - 10 to 80 g/l zinc,
  - 12 to 80 g/l phosphate (calculated as  $P_2O_5$ ),
  - 40 to 150 g/l nitrate as accelerator and, in addition
  - 0.1 to 5 g/l fluoride,
  - 0.01 to 10 g/l nickel,
  - 0.001 to 0.1 g/l copper,
- and in which the ratio of free acid to total acid is (0.1 to 0.3):1 and which contains at least 80 points of total acid.

4,950,340

## INTERMETALLIC COMPOUND TYPE ALLOY HAVING IMPROVED TOUGHNESS MACHINABILITY AND WEAR RESISTANCE

Saburo Wakita, Noda, and Junji Hoshi, Ohmiya, both of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 229,019

Claims priority, application Japan, Aug. 10, 1987, 62-199275; Aug. 10, 1987, 62-199276; Aug. 10, 1987, 62-199277; Aug. 11, 1987, 62-200575; Aug. 11, 1987, 62-200576

Int. Cl.<sup>5</sup> C22C 19/00

U.S. Cl. 148—402

8 Claims

1. An intermetallic compound type alloy consisting essentially of:

- Ni or Co or both 45–60%;
- Si 0.01–1%;
- Re 0–2%;
- Hf 0–2%;
- C 0–2%;
- one or more elements selected from a group consisting of Zr, Fe, V, Nb, Ta, Cr, Mo, W and Mn from 0–5%;
- one or more elements selected from a group consisting of P, Cu, Zn, Ga, Ge, Cd, In, Sn, Sb, Pb and Bi from 0–2%;
- and the balance Ti and incidental impurities, and having excellent toughness, machinability and wear resistance, the % being atomic %.

4,950,341

## HIGH-PERFORMANCE PROPELLANT COMBINATIONS FOR A ROCKET ENGINE

H. F. R. Schöyer, Zoetermeer; Paul A. O. G. Korting, Kwintshoul, and J. M. Mul, Delft, all of Netherlands, assignors to European Space Agency, Paris, France

Filed Jul. 7, 1989, Ser. No. 376,838

Claims priority, application Netherlands, Jul. 8, 1988, 8801739

Int. Cl.<sup>5</sup> C06B 43/00

U.S. Cl. 149—22

2 Claims

1. A solid propellant combination for a rocket engine, comprising a combination of polyglycidylazide (GAP) ( $[C_3H_5N_3O]_n$ ) or poly-3,3-bis(azidomethyl)oxetane (BAMO) ( $[C_4H_8N_6O]_n$ ) with boron, aluminium, or aluminium hydride ( $AlH_3$ ) and a compound selected from the group consisting of hydrazinium nitroformate ( $N_2H_5C(NO_2)_3$ ), nitronium perchlorate ( $NO_2ClO_4$ ), and ammonium perchlorate ( $NH_4ClO_4$ ).

4,950,342

## POLYCAPROLACTONE-DETERRED NITROCELLULOSE PROPELLANT COMPOSITIONS AND METHOD

J. B. Canterbury, Crawfordville, Fla., assignor to Olin Corporation, Cheshire, Conn.

Filed Sep. 5, 1989, Ser. No. 402,323

Int. Cl.<sup>5</sup> C06B 45/28

U.S. Cl. 179—10

11 Claims

1. A nitrocellulose propellant powder composition having a desired burn rate gradient, said composition comprising granules which contain a major amount of nitrocellulose base and a minor amount by weight of a burn rate deterrent consisting essentially of a polycaprolactone polymer, said granules containing an outside surface coating of said polymer, and said granules containing at least a portion of said polymer inside said granules.



4,950,343

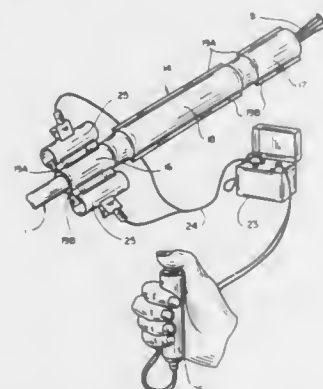
## METHOD OF CABLE SEALING

Gerald L. Shimrak, Danville; Paul S. Chan, San Francisco, both of Calif., and Per Jensen, Slangerup, Denmark, assignors to Raychem Corporation, Menlo Park, Calif.

Filed Sep. 8, 1988, Ser. No. 241,642  
Int. Cl.<sup>3</sup> H01B 13/06

U.S. Cl. 156—52

22 Claims



1. A method of sealing a cable at a conduit through which the cable passes, which comprises:

- (a) providing a tubular article comprising conductive polymeric material and having two or more elongate electrodes extending at least part way along the length of the article, at least one of which elongate electrodes is interrupted so that an electrical power source can be selectively connected to the article to cause electrical current to pass through
  - (i) a first heat-shrinkable end portion of the article
  - (ii) a second heat-shrinkable end portion of the article being opposite to the first end portion; and
  - (iii) an intermediate portion, between the first and second end portions.
- (b) positioning the tubular article around the cable such that the first end portion surrounds the cable and the second end portion surrounds the conduit;
- (c) connecting an electrical power source to the electrodes such that electrical current passes through the first end portion causing the first end portion to shrink into engagement with the cable; and
- (d) connecting an electrical power source to the electrodes such that electrical current passes through the second end portion causing the second end portion to shrink into engagement with the conduit.

4,950,344

## METHOD OF MANUFACTURING MULTIPLE-PANE SEALED GLAZING UNITS

Michael Glover, and Gerhard Reichert, both of Ottawa, Canada, assignors to Lauren Manufacturing Company, New Philadelphia, Ohio

Filed Dec. 5, 1988, Ser. No. 280,154  
Int. Cl.<sup>3</sup> C03C 27/06; B32B 17/10

U.S. Cl. 156—109

14 Claims



1. In a method of manufacturing a multiple-pane sealed glazing unit wherein a first glazing pane is spaced from a second pane by a spacer, which is located around the periphery

of said panes, and providing a UV-curable adhesive to connect at least part of said spacer and at least part of one pane, the improvement wherein a thin layer of said UV-curable adhesive is applied to opposite sides of said spacer and said spacer is located on at least one of said glazing sheets, and at a selected time, exposing said thin layer of adhesive to high intensity UV light so that said adhesive layer is at least partially cured.

4,950,345

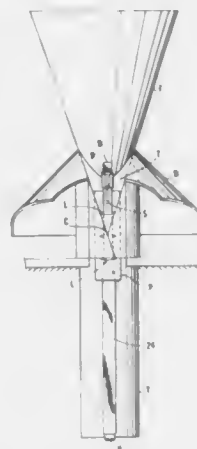
## METHOD AND APPARATUS FOR MAKING IMPROVED SEALS BETWEEN POLYMERIC FILM MATERIALS

William D. Kreager, Jr., Dallas, Tex., assignor to Frito-Lay, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 129,283, Dec. 7, 1987, abandoned. This application Feb. 7, 1989, Ser. No. 307,238  
Int. Cl.<sup>3</sup> B29C 53/00

U.S. Cl. 156—203

21 Claims



1. A method for longitudinally sealing a tube formed from polymeric plastic sheet film material comprising providing a back-up pad over an anvil surface of a back-up plate, and between the anvil surface and an opposing sealing face of a sealing die, the back-up pad having a slip surface on one side thereof and a spring surface on an opposite side thereof, the slip surface opposing the sealing face of the die, the spring surface comprising a plurality of outwardly extending resilient spring loops that act against the back-up plate during seal formation, the method further including the step of passing layers of sealable film material between the sealing die and the slip surface of the back-up pad while forming a seal between layers of film material, wherein said spring loops act against the back-up plate during seal formation and urge the layers of film material against the sealing face to effect seal formation between the layers of film material while cushioning the film layers to prevent damage to the film layers due to drag between the film layers and the die face.

4,950,346

## METHOD OF FORMING AN ADAPTOR FITTING AROUND A WORKPIECE

Harold A. Seele, 6636 Sherbourne Dr., Los Angeles, Calif. 90056  
Division of Ser. No. 7,156,415, Feb. 16, 1988, Pat. No. 4,872,655.

This application Feb. 14, 1989, Ser. No. 310,344  
Int. Cl.<sup>3</sup> B29C 39/10

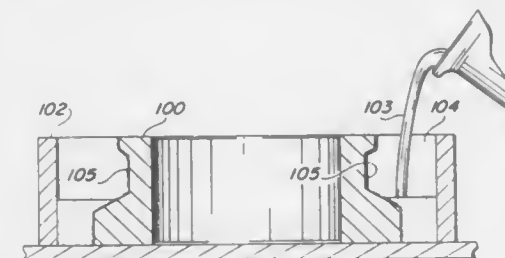
U.S. Cl. 156—245

4 Claims

1. A method of forming an adaptor fitting around a workpiece so that it can be held in a work-holding apparatus, comprising the steps of:

- (a) coating an outer portion of said workpiece with a parting agent;
- (b) applying an adhesive layer over said parting agent;
- (c) impregnating said adhesive layer with an abrasive grit;

- (d) placing said workpiece in an annular mold;
- (e) pouring a molding material between an inner periphery of said annular mold and an outer periphery of said workpiece;



- (f) allowing said molding material to harden; and
- (g) removing said workpiece and molding material from said mold.

4,950,347

## METHOD FOR WELDING THERMOPLASTIC RESIN

Hitoshi Futagawa, Otsu, Japan, assignor to Nissho Corporation, Osaka, Japan

Continuation of Ser. No. 125,318, Nov. 25, 1987, abandoned.

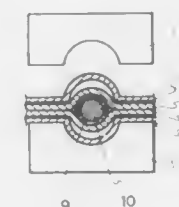
This application May 5, 1989, Ser. No. 348,133

Claims priority, application Japan, Jan. 12, 1986, 61-286248

Int. Cl.<sup>3</sup> B32B 31/28

U.S. Cl. 156—272.4

1 Claim



1. A method of manufacturing a medical bag formed by joining a medical bag, defined by thermoplastic resin sheets, with a tubular port wherein both said sheets and said port are made of a thermoplastic resin not capable of being molten by application of high frequency-wave energy, comprising the steps of:

- inserting a core mold for high frequency welding within the tubular port;
- inserting said tubular port between the sheets defining an opening into said bag;
- placing exothermic objects, which generate heat when applied with high frequency-wave energy selected from the group consisting of cardboard and cotton cloth, on the outer sides of said sheets;
- fitting the tubular port, the sheets and the exothermic objects between electrodes adapted to accommodate the shape of the tubular port, and for high frequency welding;
- welding sheets to the outside of the tubular port by applying high frequency-wave energy to the mold; and
- removing the exothermic objects from the medical bag after high frequency-wave energy is applied.

4,950,348

## METHOD FOR JOINING STRUCTURAL ELEMENTS BY HEATING OF A BINDER

Johan I. Larsen, Skien, Norway, assignor to Elva Induksjon A/S, Norway

Filed Oct. 13, 1988, Ser. No. 262,940

Int. Cl.<sup>3</sup> B32B 31/20

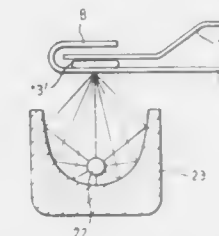
U.S. Cl. 156—275.3

9 Claims

1. A method for joining a first structural element to a second

structural element to form a panel assembly, said method comprising the steps of:

- providing first and second structural elements each having first and second faces and a perimetrical edge;
- applying to one of said first and second faces of said first structural element at at least one predetermined location, at least one bond of uncured, heat-curable binder;
- mating said first and second structural elements so that said at least one bond of uncured, heat-curable binder is juxtaposed with a corresponding predetermined location on one of said first and second faces of said second structural element;



inducing heat energy to at least one spot of said at least one bond of uncured, heat-curable binder through only one of said first and second structural elements using at least one heating element, thereby curing said uncured, heat-curable binder at said at least one spot for spot bonding said first and second structural elements together, while leaving a remainder of said uncured, heat-curable binder in said at least one bond substantially uncured; and thereafter subjecting said spot bonded first and second structural elements to an elevated temperature treatment wherein said cured binder at said at least one spot is post-cured and said remainder of said uncured, heat-curable binder is substantially fully cured thereby further bonding said first and second structural elements together.

4,950,349

## ENVELOPE FLAP FOLDING DEVICE

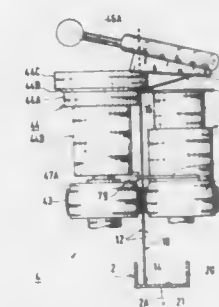
André Ferreol-Ragotin, Evry, France, assignor to Societe Anonyme dite : SMH Alcatel, Paris, France

Filed Dec. 9, 1988, Ser. No. 282,171

Int. Cl.<sup>3</sup> B43M 5/00, 5/04

U.S. Cl. 156—442.1

24 Claims



1. Device for folding over the flaps of envelopes received separately with the flap open at the entry to a guide path, the device comprising feed means for moving the envelopes along said path and deflector means for folding the flaps of the envelopes over from an open position to a closed position and said deflector means comprising first and second pulley wheels with parallel rotation axes disposed with respect to said entry and one on each side of said path so as to receive the envelopes between them, wherein said first pulley wheel is adapted to face towards the front of the envelopes and has a stepped

peripheral surface formed by a cylindrical first portion adapted to bear on at least that portion of each envelope adjoining the flap and a frustoconical second portion extending from said first portion and widening towards the flaps of the envelopes and said second pulley wheel has a peripheral surface formed by a cylindrical first portion opposite said first portion of said first pulley wheel and radially set back relative to the envelopes and a projecting disk at the end of said first portion situated beneath said frustoconical portion of said first pulley wheel and substantially aligned with the junction between said first and second portions of said first pulley wheel in order to fold the flaps of the envelopes down from said open position to an intermediate position in which the flap is substantially perpendicular to the remainder of the envelope.

4,950,350

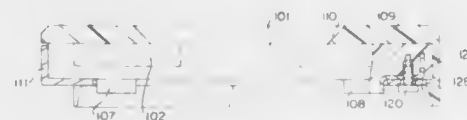
**MACHINE FOR LABELLING BOTTLES**

Rudolf Zedrow, Düsseldorf, and Wolfgang Rogall, Wuppertal, both of Fed. Rep. of Germany, assignors to Holstein und Kappert AG, Dortmund, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 197,653, May 23, 1988. This application Feb. 24, 1989, Ser. No. 315,885

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717463; Feb. 25, 1988, 3805854; Mar. 3, 1988, 3806919  
Int. Cl.<sup>5</sup> B65C 3/14, 9/04

U.S. Cl. 156—456

18 Claims



1. A labelling machine for a plurality of bottles comprising: means for labelling said bottles; a bottle support platform for supporting and advancing said bottles to said means for labelling; said bottle support platform having a plurality of bottle turntables mounted thereon; a plurality of support plates, each support plate having a base portion; a said support plate being mounted on each of said bottle turntables to prevent relative rotation between each of said support plates and a respective said bottle turntable; each of said support plates having an upper surface means; each said upper surface means having an upper contour in a central region thereof; said upper contour matching a bottom of a said bottle for receipt of a said bottom therein; each said support plate having means for removably mounting a said upper surface means on said base portion thereof; each said means for removably mounting including means for centering a said upper surface means and a said upper contour thereof on a said base portion; bottle feeding means for sequentially feeding said bottles onto said upper surface means of each said support plate; bottle removing means for sequentially removing said bottles from said upper surface means of each said support plate; said bottle support platform including means for selectively retaining a top of a said bottle when a said bottle has been positioned on a said upper surface means by said bottle feeding means prior to advancement to said means for labelling; said means for selectively retaining a said top being capable of producing an axial force between a bottom of a said bottle and a said upper surface means to prevent relative rotation between said bottles and said bottle turntables; and said means for removably mounting including at least one

resilient clamping means for clamping each said upper surface means to a said base portion.

4,950,351

**LABEL APPLIER**

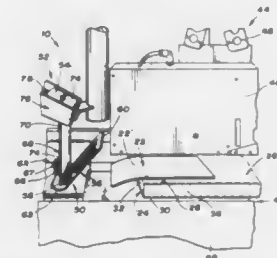
William P. Young, Southfield, Mich., assignor to William P. Young Company, Farmington, Mich.

Filed Aug. 31, 1989, Ser. No. 401,063

Int. Cl.<sup>5</sup> B65B 61/00

U.S. Cl. 156—475

15 Claims



1. A label applier for applying labels to box ends having spaced side and end surfaces, the label applier comprising: a horizontal conveyor for conveying the boxes horizontally while positioning the side surfaces thereof at upper and lower positions and one end surface thereof in a forward orientation with respect to the direction of conveyance; a label dispenser for applying an adhesively secured label to the upper side surface of each box upon conveyance along the conveyor with a flap of the label extending forwardly from the box a predetermined distance; an end presser for pressing the label flap against said one end surface of the box; and an inclined support that mounts the end presser for upward movement along the direction of box conveyance to permit the end presser to ride over the box after pressing the label against said one end surface.

4,950,352

**HOT AIR HEATER FOR WELDING PLASTIC MATERIALS TOGETHER AND METHOD OF HANDLING THE HOT AIR FLOW**

Peter Greller, Enkenbach, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Kaiserslautern, Fed. Rep. of Germany

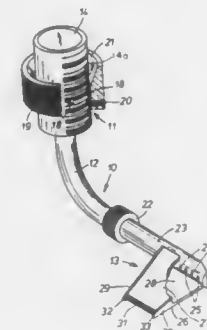
Filed Oct. 6, 1988, Ser. No. 254,450

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734137

Int. Cl.<sup>5</sup> B05B 1/34; B29C 65/10

U.S. Cl. 156—497

9 Claims



1. A hot air welding machine for connection of plastic mate-

rials, comprising a hot air supply, a duct extending out of said hot air supply, a nozzle connected to said duct, said nozzle having an ante-chamber portion aligned with and connected to said duct, said ante-chamber portion having a plurality of axially spaced radial apertures defining nozzle inlet openings, a swirl chamber member having one end connected to said ante-chamber portion and surrounding the openings and having an opposite end with a swirl chamber outlet opening having an area several times larger than the sum of the areas of said nozzle inlet openings.

4,950,353

**MANUFACTURING APPARATUS FOR SHEET-SHAPED MOLDING MATERIAL INCLUDING A SCATTERING AND SCRAPING ROLLER**

Yasuhiro Tsujimoto; Masayuki Kurita, and Masaru Aoki, all of Shimizu, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

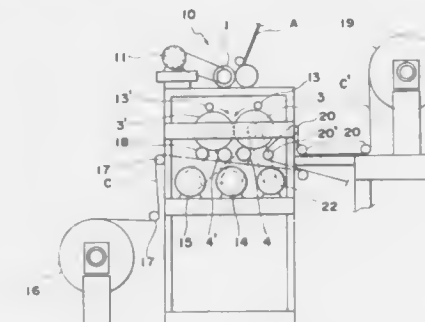
Filed Dec. 28, 1988, Ser. No. 291,302

Claims priority, application Japan, Dec. 28, 1987, 333757

Int. Cl.<sup>5</sup> B29C 39/20; B65B 9/02

U.S. Cl. 156—547

8 Claims



1. An apparatus for continuously manufacturing a sheet of a molded compound, said apparatus comprising: first means for continuously conveying a lower film in a feed direction, the lower film extending widthwise in a direction lateral to said feed direction; first and second impregnation rollers disposed above the lower film, said first and second impregnation rollers extending parallel to each other to define a mixing gap therebetween in a direction lateral to said feed direction, said first impregnation roller being positioned further upstream relative said feed direction than said second impregnation roller; means for rotating said first and second impregnation rollers in opposite rotational directions at a first rotational speed; first supply means disposed above said first and second impregnation rollers for supplying a viscous material and for depositing said viscous material along a surface of said first and second impregnation rollers to form a viscous layer on said first and second impregnation rollers; second supply means disposed above said first and second impregnation rollers for supplying a solid material and for depositing said solid material onto said viscous layer to be conveyed into said mixing gap during rotation of said first and second impregnation rollers to form a composite mixture, whereby said composite mixture is deposited on said lower film; first and second scraping rollers respectively disposed below said first and second impregnation rollers and above the lower film, said first scraping roller extending parallel to said first impregnation roller to define a first gap therebetween said second scraping roller extending parallel to said second impregnation roller to define second gap therebetween; means for rotating said first and second scraping rollers in a rotational direction respectively the same as said first and

second impregnation rollers and at a second rotational speed greater than said first rotational speed; said first and second scraping rollers respectively positioned to act upon rotation to remove said composite mixture from said first and second impregnation rollers; a scattering roller disposed below said first impregnation roller and above the lower film and upstream said first scraping roller relative said feed direction, said scattering roller extending parallel said first impregnation roller to define a third gap therebetween; means for rotating said scattering roller in a same direction as said first impregnation roller; said scattering roller positioned to act upon rotation to prevent scattering of portions of said composite mixture caused at least in part by said first scraping roller; second means for continuously conveying an upper film such that the upper film is conveyed over and along a portion of the lower film continuously conveyed by said first means; said second means including guide roller for guiding the upper film, said guide roller being disposed below and extending parallel said second impregnation roller downstream said second scraping roller relative said feed direction, the upper film being guided around said guide roller in a same direction as the rotational direction of said second impregnation roller; said guide roller positioned with said upper film disposed thereabout to prevent scattering of portions of said composite mixture caused at least in part by said second scraping roller; wherein said scattering roller is positioned substantially closer to said first impregnation roller than to said first scraping roller, and said guide roller is positioned substantially closer to said second impregnation roller than to said second scraping roller.

4,950,354

**METHOD OF MAKING A MICRO-BUBBLE LAMINATE**

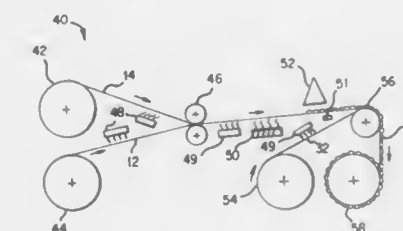
Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Aug. 25, 1989, Ser. No. 398,804

Int. Cl.<sup>5</sup> B32B 3/10

U.S. Cl. 156—145

6 Claims



1. A continuous method of making a micro-bubble laminate comprising: (a) laminating a perforated substrate to a first thermoplastic film; (b) passing the laminate through heated pinch rolls; (c) additionally heating the first thermoplastic film; applying vacuum or gas pressure to draw the heated first thermoplastic film through the perforations in the perforated substrate to create bubbles without the use of a forming surface to form and define the three-dimensional shape of the bubbles; and (e) adhering a second thermoplastic film to the first thermoplastic film to trap the air in the bubbles.



**4,950,355**  
**METHOD OF AND APPARATUS FOR**  
**MANUFACTURING A MINERAL FIBER INSULATING**  
**WEB**

Gerd R. Klose, Bundesrep. Fed. Rep. of Germany, assignor to Deutsche Rockwool Mineralwoll - GmbH, Fed. Rep. of Germany

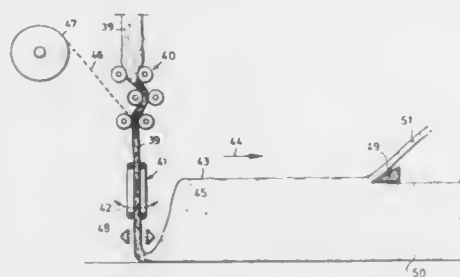
Division of Ser. No. 146,005, Jan. 20, 1988. This application Sep. 26, 1988, Ser. No. 249,137

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701592

Int. Cl.<sup>5</sup> B32B 31/18

U.S. Cl. 156—204

14 Claims



1. The method of manufacturing a laminated cured multi-ply mineral fiber folded web comprising the steps of providing an uncured primary nonwoven mineral fiber web treated with a binding agent, conveying the primary nonwoven mineral fiber web along a predetermined path of travel, compacting the primary nonwoven mineral fiber web, compressing the uncured primary nonwoven mineral fiber web substantially beyond the initial compaction thereof, applying air-permeable and thermally stable reinforcing material to the compressed mineral fiber web, fan-folding the compressed mineral fiber web by forming contiguous folds of a predetermined height with the folds being disposed generally transverse to the direction of travel as the folds form a fan-folded mineral fiber web, severing the fan-folded nonwoven mineral fiber web so as to form therefrom at least two secondary mineral fiber webs, performing the severing along a plane generally transverse to the direction of the fan-folds, subjecting at least one of the at least two severed secondary mineral fiber webs to at least one subsequent treatment step, thereafter positioning the at least one severed secondary mineral fiber web and the remaining severed secondary mineral fiber web into contiguous relationship to each other, and curing the binding agent to adhere the severed secondary mineral fiber webs to each other thereby forming a laminated cured multi-ply mineral fiber web.

**4,950,356**  
**METHOD OF AND APPARATUS FOR LINING PIPES**  
 John C. Grace, Prestbury, United Kingdom, assignor to Tate Pipe Lining Processes Limited, Manchester, England  
 PCT No. PCT/GB87/00869, § 371 Date Jun. 1, 1989, § 102(c) Date Jun. 1, 1989, PCT Pub. No. WO88/04387, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 3, 1987, Ser. No. 369,369

Claims priority, application United Kingdom, Dec. 6, 1986, 8629217

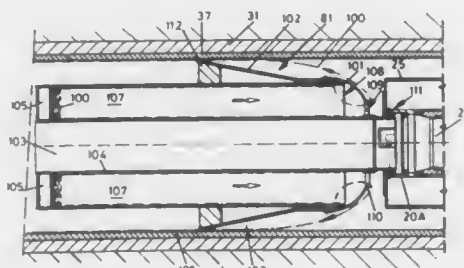
Int. Cl.<sup>5</sup> B29C 63/34

U.S. Cl. 156—259

10 Claims

1. A method of lining a pipe comprising the steps of laying hose means along the bottom of a pipe to be lined, the hose means having been filled with a predetermined quantity of settable lining composition, anchoring the hose means at each end along the bottom of the pipe, advancing a centrifugal lining machine along the length of the hose means, slitting the hose means in front of the advancing centrifugal lining machine to permit egress of the lining composition from the hose means, delivering an admixed settable composition to a centrifugal impellor of the centrifugal lining machine for application

of the settable composition to the pipe wall as the centrifugal lining machine advances along the pipe, and guiding the slit and emptied hose means through an axial bore in the centrifugal



gal lining machine to lie in a flattened condition on the bottom of the lined pipe wall rearwardly of the centrifugal lining machine.

**4,950,357**  
**APPARATUS FOR MAKING LIGHT TRANSFER**  
**DEVICES**

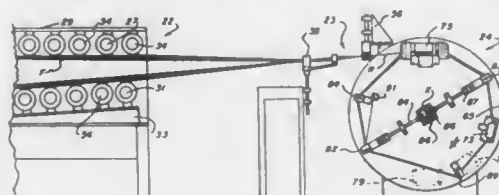
Steven R. Sedlmayr, Golden, Colo., assignor to Advance Display Technologies, Inc., Boulder, Colo.

Continuation of Ser. No. 25,282, Mar. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 575,816, Feb. 1, 1984, Pat. No. 4,650,280. This application Nov. 18, 1988, Ser. No. 273,235

Int. Cl.<sup>5</sup> G02B 6/06

U.S. Cl. 156—426

6 Claims



1. In apparatus for making fiber optic light transfer devices, the combination comprising:  
 supply means for providing a continuous ribbon of optical fibers,

ribbon wrapper means including a support member having a planar support surface with ribbon stacking first and second formers mounted on said surface a preselected distance apart and in alignment with one another, and drive means to effect relative movement between said supply means and said support member to cause said ribbon having an end attached to said support member to successively wrap about said first former under tension to form successive layers of ribbon and separators in said first former as separators are interposed between each layer of ribbon and successively wrap about said second former alternate layers of ribbon on locator elements as locator elements are interspersed between each layer of ribbon whereby to form a bundle of optical fiber ribbons having two spaced ribbon portions and two matrix portions of two fiber optic light transfer devices, a first guide means to converge the fibers from the spools to a loose ribbon, a second guide means that brings the loose ribbon into a close ribbon and a third guide means that moves up and down and rotates about a transverse horizontal axis to enable the ribbon to follow different wrapping radii.

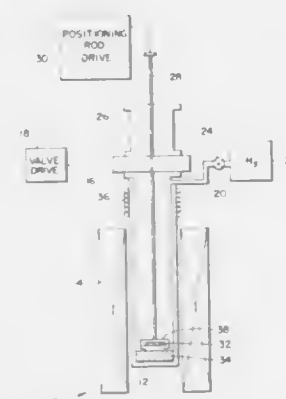
**4,950,358**  
**VAPOR PHASE EPITAXY OF SEMICONDUCTOR**  
**MATERIAL IN A QUASI-OPEN SYSTEM**  
 William L. Ahlgren, Goleta, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.

Filed Jul. 7, 1986, Ser. No. 882,642

Int. Cl.<sup>5</sup> C30B 23/06

U.S. Cl. 156—610

6 Claims



1. A method for forming an epitaxial layer upon a substrate, which method comprises:

providing a charge of source material within a lower portion of a vertically orientated cylindrical reaction chamber;  
 pressurizing said chamber with a gas;  
 heating the lower portion of the chamber so as to vaporize said charge to produce a vapor;  
 positioning said substrate within said chamber such that said vapor interacts with said substrate such that an epitaxial layer is formed upon said substrate;  
 controlling the pressure of the gas such that the relative concentrations of the chemical constituents of the vapor are varied, thereby varying the chemical constituents of the epitaxial layer; and  
 cooling a portion of said chamber such that said vapor which may enter said portion is condensed.

**4,950,359**  
**PROCESS FOR REMOVING A COATING CONTAINING**  
**NIOBIUM FROM A SUBSTRATE**  
 Gérard Parissis, Brussels, and Lucien Clerbois, Vilvoorde, both of Belgium, assignors to Solvay & Cie (Societe Anonyme), Brussels, Belgium

Continuation of Ser. No. 929,849, Nov. 13, 1986, abandoned. This application Aug. 17, 1989, Ser. No. 396,754

Claims priority, application France, Jul. 25, 1986, 86 11001

Int. Cl.<sup>5</sup> H01L 21/306

U.S. Cl. 156—627

19 Claims

1. A process for removing at least a part of a coating consisting of metallic niobium or a niobium alloy from a substrate, the process comprising:

dissolving at least a part of the coating by treatment thereof with a cleaning bath which is an aqueous solution comprised of hydrogen peroxide and an alkali metal hydroxide.

**4,950,360**  
**METHOD OF TREATING THE SURFACE OF A MOLDED**  
**ARTICLE COMPRISING LIQUID CRYSTAL POLYESTER**  
**RESIN**

Toshiro Murao, Fuji, Yoshiharu Suzuki, Shizuoka; Mitsuo Wada, Fuji, and Hiroaki Konuma, Shimizu, all of Japan, assignors to Polyplastics Co., Ltd., Japan

Filed Sep. 27, 1988, Ser. No. 249,691

Claims priority, application Japan, Oct. 9, 1987, 62-255915

Int. Cl.<sup>5</sup> B05D 3/10

U.S. Cl. 156—668

9 Claims

1. A method of treating the surface of a molded article comprising a liquid crystal polyester resin composition, said composition being composed of a melt-processable polyester capable of forming an anisotropic melt phase and at least one inorganic filler selected from the group consisting of the Group II elements of the periodic table and oxides, sulfates, phosphates, silicates, and carbonates thereof, and elements of aluminum, silicon, tin, lead, antimony, and bismuth and oxides thereof incorporated therein in an amount of 5 to 80% by weight based on the total amount of said molded article composition the method comprising bringing into contact said molded article with an acidic solution containing at least 80% by weight of sulfuric acid for treatment of said molded article.

**4,950,361**  
**PROCESS FOR CONTROLLING PITCH DEPOSITS IN**  
**THE PULP AND PAPERMAKING PROCESSES WITH**  
**ZIRCONIUM (IV) COMPOUND**

Gregory W. Bender, Maple Glen, Pa.; Stan D. Baratto, Vancouver, Wash., and Robert D. Evans, Warminster, Pa., assignors to Quaker Chemical Corporation, Conshohocken, Pa.

Filed Sep. 15, 1988, Ser. No. 244,728

Int. Cl.<sup>5</sup> D21C 9/08

U.S. Cl. 162—199

11 Claims

1. A process of controlling pitch present in pulping and papermaking processes comprising  
 (a) formulating a pitch control agent consisting essentially of a water-soluble zirconium(IV) compound, and  
 (b) adding the pitch control agent to a water stream that comes into contact with cellulose pulp fibers in the pumping and papermaking processes in an amount sufficient to reduce or remove the deposition of the pitch on machinery used in the pumping and papermaking processes and to reduce the deposition of the pitch in paper produced in the papermaking process, wherein the pitch is a naturally occurring resin-based deposit originating in an extractive fraction of wood used in the pumping and papermaking processes.

**4,950,362**  
**HEAT-INSULATING SHAPED FIBROUS ARTICLES AND**  
**A PROCESS FOR PRODUCING THEM**

Peter Steinau, Mainz; Ludwig Wirth; Ingo Elstner, both of Wiesbaden, and Andreas Naumann, Glessen-Rödgen, all of Fed. Rep. of Germany, assignors to Didier-Werke Ag, Wiesbaden, Fed. Rep. of Germany

Division of Ser. No. 140,238, Dec. 31, 1987. This application Jul. 11, 1989, Ser. No. 378,289

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701511

Int. Cl.<sup>5</sup> B29C 51/02, 51/14; B32B 31/20

U.S. Cl. 162—206

4 Claims

1. A process for producing a heat-insulating shaped article, which comprises:  
 providing an aqueous dispersion containing fibers selected from the group consisting of ceramic fibers, refractory fibers and fireproof fibers, a binder, 5 to 40 weight % of fibrils containing an organic polymer based on the dry weight of said article, and vermiculite in a ratio of said fibers to said vermiculite of from 80:20 to 30:70;

removing water from said dispersion while forming said dispersion into a mat shape;  
heating said mat shape which is either above the softening temperature or above the melting point of the organic polymer comprising said fibrils; and  
pressing the heated mat shape into a desired shape.

4,950,363

# FLASHING FEED INLET IN A VAPOR/LIQUID CONTACTING TOWER AND METHOD

Frank C. Silvey, Plainsboro, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

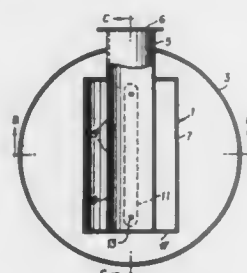
Continuation-in-part of Ser. No. 108,600, Oct. 15, 1987, Pat. No. 4,865,697. This application Jul. 19, 1989, Ser. No. 382,149

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 3/06, 3/14

U.S. Cl. 203—40

12 Claims



1. A method of introducing a liquid feed stream into a distillation tower, the feed stream having a temperature and/or pressure higher than those existing in the tower, comprising introducing the feed stream into the tower through a flashing feed inlet located inside the tower, whereby at least a portion of the feed stream is converted to a vapor, the feed stream being introduced initially through a feed pipe means containing at least one side opening cut at an angle  $\alpha$  of not greater than about 30° below or above the horizontal axis, wherein the angle  $\alpha$  is defined as an angle between the horizontal axis and the upper edge of the side opening, the side opening having a sufficient cross-sectional area to reduce the linear velocity of the feed stream to not less than 3 feet/second, the feed stream exiting the side opening and entering a flashing chamber which is operatively connected to, spaced from and which surrounds the feed pipe means, the feed stream striking the flashing chamber, which thereby promotes the separation of the vapor from the liquid, the flashing feed inlet decreasing the linear velocity of the vapor to substantially the superficial vapor velocity within the tower, thereby additionally promoting the disengagement of the vapor from the liquid and minimizing the maldistribution of the vapor in the tower.

4,950,364

# PROCESS FOR THE SEPARATION OF 1,1-DICHLORO-1-FLUOROETHANE AND 1,1,1,3,3-PENTAFLUOROBUTANE

John A. Wismer, Devon, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed May 4, 1989, Ser. No. 347,603

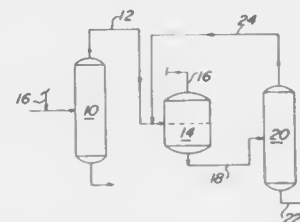
Int. Cl.<sup>5</sup> B01D 3/38; C07C 17/38

U.S. Cl. 203—50

12 Claims

1. A process for separating 1,1-dichloro-1-fluoroethane from its liquid mixture with 1,1,1,3,3-pentafluorobutane, comprising: separating the liquid mixture by distillation to obtain a top product comprising hydrogen fluoride and 1,1-dichloro-1-

fluoroethane, and a bottom product comprising 1,1,1,3,3-pentafluorobutane, by adding to the mixture a liquid containing at



least about 3 moles of hydrogen fluoride per mole of 1,1-dichloro-1-fluoroethane in the mixture.

4,950,365

# CORROSION FREE HARD COATED METAL SUBSTRATES

Joseph D. Evans, Lafayette, Colo., assignor to Vac-Tec Systems, Inc., Boulder, Colo.

Filed Dec. 22, 1988, Ser. No. 288,571

Int. Cl.<sup>5</sup> C25D 5/48; C23C 14/34

U.S. Cl. 204—38.7

17 Claims

1. A process for coating carbon steel substrates comprising: (a) applying onto the surface of said substrate a first coat of a thin hard coated layer of a metal compound selected from the group consisting of titanium nitride, titanium carbide, titanium carbonitride, zirconium nitride, zirconium carbide and zirconium carbonitride; and (b) applying onto the surface of said first coat a second coat of parylene.

4,950,366

# METHOD OF PRODUCTION OF D-ARABINOSE

Vladimír Jiricný; Vladimír Stanek, and Magda Borovcová, all of Prague, Czechoslovakia, assignors to Československá akademie věd Praha, Prague, Czechoslovakia

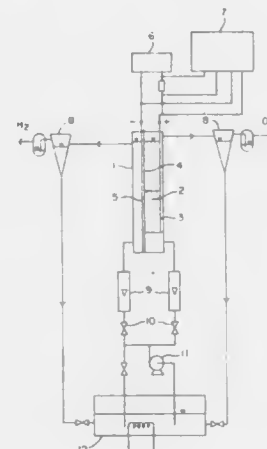
Filed Nov. 4, 1988, Ser. No. 267,228

Claims priority, application Czechoslovakia, Dec. 3, 1987, 8822-87

Int. Cl.<sup>5</sup> C25B 3/00

U.S. Cl. 204—59 R

2 Claims



1. A method of production of D-arabinose by direct electrochemical degradation oxidation of salts of D-gluconic acid characterized by that the solution of the salt of D-gluconic acid is subjected to direct electrochemical degradation oxidation by direct current with the use of fluidized bed anode with a layer of electrically conductive particles kept in suspension by the flow of the reaction mixture.

4,950,367

# PROCESS FOR THE PREPARATION OF FLUOROMALONIC ACID AND ITS DERIVATIVES

Steffen Dapperheld, Krefeld, and Rudolf Heumüller, Rodgau, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 302,440

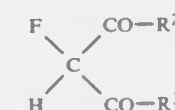
Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802745

Int. Cl.<sup>5</sup> C25C 3/00

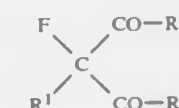
U.S. Cl. 204—59 R

23 Claims

1. A process for the preparation of fluoromalonic acid and derivatives thereof having the formula



wherein R<sup>2</sup> and R<sup>3</sup> are equal or different and represent hydroxyl, the group OX, wherein X represents an alkali metal, alkaline earth metal or NH<sub>4</sub><sup>+</sup> ion or a C<sub>1</sub>-C<sub>12</sub>-alkyl group, or represent the group NR<sup>4</sup>R<sup>5</sup>, wherein R<sup>4</sup> and R<sup>5</sup> are equal or different and are hydrogen or a hydrocarbon group of 1 to 12 carbon atoms, which comprises subjecting a compound of the formula



wherein R<sup>1</sup> is halogen of an atomic weight in the range from 35 to 127 and R<sup>2</sup> and R<sup>3</sup> have the meaning indicated above, to an electrolysis in an electrolyte liquid comprising water, an organic solvent or a mixture thereof, at a temperature in the range of from -20° C. to the boiling temperature of the electrolyte, at a current density in the range of from 1 to 600 mA/cm<sup>2</sup> at a cathode comprising lead, cadmium, zinc, copper, tin, zirconium, mercury, alloys of at least 2 of these metals or of carbon.

4,950,368

# METHOD FOR PAIRED ELECTROCHEMICAL SYNTHESIS WITH SIMULTANEOUS PRODUCTION OF ETHYLENE GLYCOL

Norman L. Weinberg, East Amherst; John D. Genders, Lancaster, and Duane J. Mazur, Amherst, all of N.Y., assignors to The Electrosynthesis Co., Inc., Amherst and SKA Associates, Buffalo, both of N.Y., a part interest

Filed Apr. 10, 1989, Ser. No. 335,894

Int. Cl.<sup>5</sup> C25C 3/00

U.S. Cl. 204—72

30 Claims

1. A method of conducting a paired electrochemical synthesis reaction which comprises the steps of:

- in a membrane divided electrochemical cell comprising an anode in an anolyte compartment and a cathode in a catholyte compartment, reducing electrochemically a formaldehyde containing catholyte to form ethylene glycol;
- providing a regeneratable redox reagent containing anolyte having higher and lower valence state ions;
- electrochemically oxidizing the lower valence state ions of said regeneratable redox reagent at the anode to the higher valence oxidizing state while simultaneously forming ethylene glycol at the cathode of the same electrochemical cell at an ethylene glycol current efficiency of at least 70 percent;
- chemically reacting the anolyte comprising the higher valence state ions of said regeneratable redox reagent with

an oxidizable organic substrate to produce an organic compound and spent redox reagent, and  
(e) anodically regenerating the spent redox reagent.

4,950,369

# PREPARATION OF TETRALIN DERIVATIVES, AND NOVEL TETRALIN DERIVATIVES

Dieter Degner, Dannstadt-Schauernheim; Bernd Potzold, Bad Dürkheim, and Lothar Janitschke, Kleinniedesheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,109

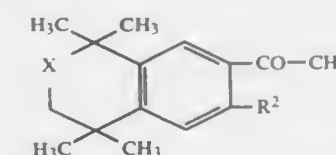
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 3814180

Int. Cl.<sup>5</sup> C25C 3/00

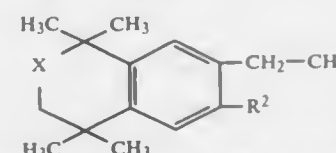
U.S. Cl. 204—78

1 Claim

1. A process for the preparation of tetralin derivatives of the formula Ib



where X is a —CH<sub>2</sub>—, —CH(OH)— or —CO—group, R<sup>2</sup> is hydrogen or methyl, which process comprises subjecting a compound of the formula IIb



to electrochemical oxidation in an aqueous medium.

4,950,370

# ELECTROLYTIC GAS GENERATOR

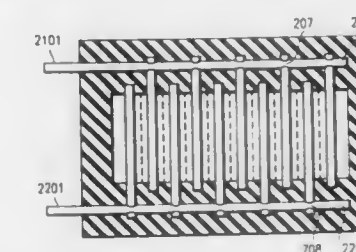
Gregorio Tarancon, Woodbridge, N.J., assignor to Liquid Air Corporation, Walnut Creek, Calif. and Tarancon Research & Engineering Services Inc., Lake City, Ga.

Filed Jul. 19, 1988, Ser. No. 221,366

Int. Cl.<sup>5</sup> C25B 1/24, 9/00

U.S. Cl. 204—128

31 Claims



28. A method of manufacturing fluorine comprising the steps of:

- providing a first source of a hydrodynamic hydrogen fluoride electrolyte;
- providing a second source of a hydrodynamic hydrogen fluoride electrolyte;
- flowing said hydrogen fluoride electrolyte of said first source past both sides of a first planar electrode;
- flowing said electrolyte from said second source past both sides of a second planar electrode;
- spacing said second electrode from said first electrode by a perfluorinated membrane;



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shaping each of said electrodes and shaping a fluid receiving area on each side of said electrodes as to prevent gas accumulation in said fluid receiving area and on said electrodes.

4,950,371

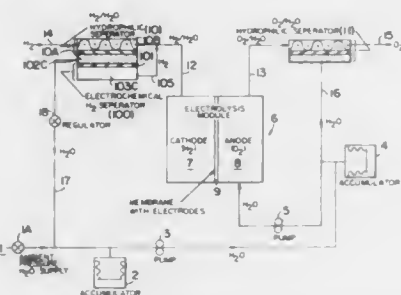
**ELECTROCHEMICAL HYDROGEN SEPARATOR SYSTEM FOR ZERO GRAVITY WATER ELECTROLYSIS**  
James F. McElroy, Suffield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 24, 1989, Ser. No. 328,279

Int. Cl.<sup>5</sup> C25B 1/04

U.S. Cl. 204—129

17 Claims



12. A method of separating out hydrogen gas from proton water produced in a water electrolysis system producing hydrogen and oxygen in gaseous product form from water, comprising the following step(s):

- using a water electrolysis system, including an electrolysis module having a cathode/hydrogen chamber and an anode/oxygen chamber with an electrolysis membrane separating the two electrolysis chambers; a water feed input line feeding, supply water to said anode/oxygen chamber of said module; a module hydrogen output line leading out of said cathode/hydrogen chamber carrying proton water from said module; a phase preferential, porous separator having an input line connected to said module hydrogen output line; and an electrochemical hydrogen separator associated with and being down-stream from said phase preferential, porous separator and including an electrochemical inlet chamber, an electrochemical outlet chamber, and a membrane and electrode assembly located between said electrochemical chambers;
- initially separating and releasing hydrogen gas from said proton water in said phase preferential, porous separator;
- then feeding the proton water with hydrogen in solution and without any separated hydrogen gas to said electrochemical separator to said electrochemical inlet chamber, providing said inlet chamber with proton water with hydrogen in solution from said phase preferential, porous separator;
- using said assembly to electrochemically separate out additional hydrogen gas from said proton water with hydrogen in solution using electrochemistry through the electrochemical action of said assembly, producing hydrogen gas in solution with the protonically pumped water in said electrochemical outlet chamber; and
- feeding back the hydrogen gas in solution with the protonically pumped water from said electrochemical outlet chamber back to the phase preferential, porous separator and supplying water electrochemically stripped of at least most of the hydrogen previously in solution from said electrochemical inlet chamber ultimately to said anode/oxygen chamber of said electrolysis module; separating the desired gaseous hydrogen product from water

in said phase preferential process separator without significant parasitic loss.

4,950,372

**CATHODIC PROTECTION SYSTEM USING CARBOSIL ANODES**

David F. McCready, P.O. Box 1971, Altoona, Pa. 16603  
Division of Ser. No. 166,347, Mar. 10, 1988, Pat. No. 4,828,665, which is a continuation of Ser. No. 20,905, Mar. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 492,146, May 6, 1983, abandoned, and a continuation-in-part of Ser. No. 880,875, Jul. 1, 1986, abandoned, which is a continuation-in-part of Ser. No. 817,656, Jan. 10, 1985, Pat. No. 4,647,353. This application May 5, 1989, Ser. No. 348,202

Int. Cl.<sup>5</sup> C23F 13/00

U.S. Cl. 204—147

19 Claims



16. The method of automotive cathodic protection comprising providing automotive battery power to pins of an integrated circuit timer and power control and periodically switching on and off from the integrated circuit timer and power control, periodically supplying cathodic protection current, charging storage means with the current, supplying the current and discharging the storage means over a wetted painted automotive surface and limiting the supplying of the current and the discharging of the storage means.

4,950,373

**PROCESS FOR THE PRODUCTION OF DISILANE FROM MONOSILANE**

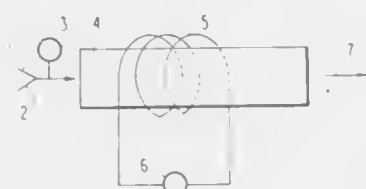
Wolfgang Sundermeyer, Neckargemünd; Michael Mueller, Heidelberg, and Hans-Juergen Klockner, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 118,140, Nov. 9, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 377,758

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1986, 3639202

Int. Cl.<sup>5</sup> H05F 3/00; C01B 33/04

U.S. Cl. 204—164

8 Claims



1. A process for the production of disilane from monosilane by means of plasma discharge, operated in a discontinuous mode comprising providing a mixture consisting of hydrogen and 2 to 30% by volume monosilane gas, conducting said mixture in a constant pressure range from  $1 \cdot 10^2$  to  $5 \cdot 10^3$  Pa through a reaction zone comprising a reaction vessel, said reaction zone being provided with high frequency luminous discharge as plasma discharge means wherein frequencies of 0.5 to 150 MHz are used and the residence time of the mixture in the reaction zone is between 0.01 and 25 seconds, introduc-

ing between 0.01 and 1 Watt/cm<sup>3</sup> of power input to said reaction zone to convert the monosilane to disilane, with little or no formation of an amorphous silicon layer on the inside wall of the reaction vessel, and thereby obtain a disilane product stream and recovering the disilane.

4,950,374

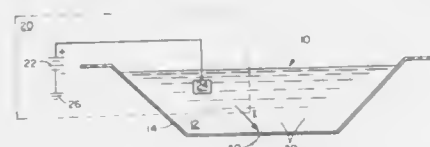
**ELECTROPHORETIC LEAK SEALING SYSTEM**  
Glenn T. Darilek, and Daren L. Laine, both of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Filed Feb. 14, 1989, Ser. No. 311,177

Int. Cl.<sup>5</sup> C25D 13/02, 13/12

U.S. Cl. 204—180.2

22 Claims



1. A method for electrophoretically sealing a leak in a thin-walled, non-conductive synthetic container, holding liquid or solid-liquid material, comprising the steps of:  
impressing a voltage difference between said liquid or solid-liquid material and an area outside of said thin-walled, non-conductive synthetic container,  
introducing a dilute solution of sealing particles into said liquid or solid-liquid material in said thin-walled, non-conductive synthetic container, said sealing particles having properties such that they are electrically charged when suspended in said liquid or liquid-solid material,  
conducting a concentrated electrical current from said leak to an area outside said thin-walled, non-conductive synthetic container, and  
sealing said leak by drawing said sealing particles from said dilute solution to said leak by electrophoretic motion induced by said voltage difference.

4,950,375

**DIE FOR ELECTROFORMING A PART**

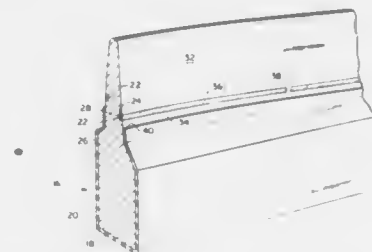
Donald F. Leger, Springfield, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 26, 1989, Ser. No. 358,292

Int. Cl.<sup>5</sup> C25D 1/10, 21/12, 1/00

U.S. Cl. 204—224 R

6 Claims



surface to thief current which would otherwise exist at the edge of said first surface.

4,950,376

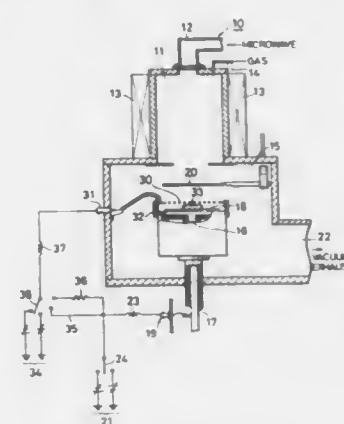
**METHOD OF GAS REACTION PROCESS CONTROL**  
Yutaka Hayashi; Yasushi Kondo; Kenichi Ishii, all of Tsukuba, and Eita Kinoshita, Tsuchiura, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, Tokyo, Japan  
Filed Feb. 28, 1989, Ser. No. 317,201

Claims priority, application Japan, Jun. 21, 1988, 63-153049

Int. Cl.<sup>5</sup> C23F 4/04

U.S. Cl. 204—192.32

9 Claims



1. A method of gas reaction process control wherein plasma gas generated in a location different from a location at which a specimen with a front surface and a rear surface is held is transported to said location at which said specimen is held and gas reaction processing of said specimen is carried out, the improved method comprising the steps of:  
providing a control electrode with a porous structure permeable to said plasma gas in said transportation route;  
measuring a surface potential difference between the front surface and the rear surface of said specimen;  
applying a control voltage to said control electrode; and  
adjusting said surface potential difference to a predetermined value.

4,950,377

**APPARATUS AND METHOD FOR REACTIVE ION ETCHING**

Holger Huebner, Baldham, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 388,804

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1988, 3832447

Int. Cl.<sup>5</sup> C23F 4/04

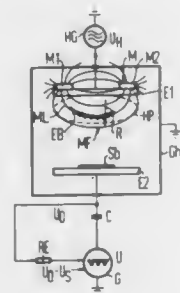
U.S. Cl. 204—192.32

13 Claims

9. A method for reactive ion etching of a substrate, comprising the steps of:  
generating a high frequency plasma between two electrodes by applying a high frequency voltage to one of said electrodes;  
arranging a substrate to be etched at another of said two electrodes;  
applying a low frequency voltage to said another of said two electrodes, said low frequency voltage having a negative wave portion of a shorter duration than a charging time constant for electrical charging of the substrate, said low frequency voltage having a positive wave portion of such dimension that the substrate remains free of charges on average or remains negatively charged.

12. An apparatus for reactive ion etching of a substrate, comprising:

- a housing filled with a process gas;
- first and second electrodes arranged in said housing at a distance from one another, a substrate to be etched being arranged on said second electrode;
- a high frequency generator having an output connected to said first electrode to apply a high frequency signal to said first electrode for generating a high frequency plasma;
- a low frequency generator having an output co to said sec-



ond electrode to apply a low frequency signal to said second electrode, said low frequency signal being a generally rectangular voltage with a negative signal portion of a duration less than a charging time constant of the substrate on said second electrode and a positive signal portion of a dimension to at least cancel any charging of the substrate by the negative signal portion; and means for generating a magnetic field between said first and second electrodes with magnetic field lines extending transversely relative to a direction between said first and second electrodes.

#### 4,950,378 BIOSENSOR

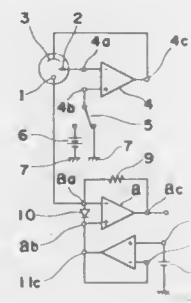
Yasuhiro Nagata, Kusatsu, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Jul. 6, 1988, Ser. No. 215,804

Claims priority, application Japan, Jul. 17, 1987, 62-179814  
Int. Cl.<sup>5</sup> G01N 27/327

U.S. Cl. 204—402

8 Claims



1. A biosensor comprising:
  - an enzyme electrode body;
  - a foundation electrode provided on the enzyme electrode body and including a working electrode, a counter electrode and a reference electrode;
  - an enzyme film provided on the surface of the foundation electrode and fixed with physiologically active material so that an electrical signal is generated in the foundation electrode on the basis of the result of the enzyme reaction to measure the density of an objective material, and an electrical circuit including:
    - a first operational amplifier having an inverting input and a non-inverting input and an output, said inverting input

being connected to said reference electrode and said output being connected to said counter electrode;

- a first constant voltage supplying means and a second constant voltage supplying means;
- a switching means for selectively connecting said non-inverting input of said first operational amplifier to said first constant voltage supplying means and to ground;
- a second operational amplifier having a non-inverting input and an inverting input and an output, said inverting input being connected to said working electrode and said non-inverting input being connected to said second constant voltage supplying means;

a resistance means connected between said inverting input of said second operational amplifier and said output of said second operational amplifier;

- a unipolar current carrying device connected between said inverting and non-inverting inputs of said second operational amplifier and arranged to conduct current only if a potential at said inverting input of said second operational amplifier is greater than a potential at said non-inverting input of said second operational amplifier;

wherein said switching means, when selectively connecting said non-inverting input of said first operational amplifier to said first constant voltage supplying means, places the biosensor in a refresh state for refreshing said working electrode while keeping a voltage drop in a vicinity of a surface of said working electrode constant and wherein when said selecting means connects said non-inverting input of said first operational amplifier to ground, the biosensor is placed in a measuring state such that a signal present at said output of said second operational amplifier is proportional to said electrical signal generated in said foundation electrode.

#### 4,950,379

##### POLAROGRAPHIC CELL

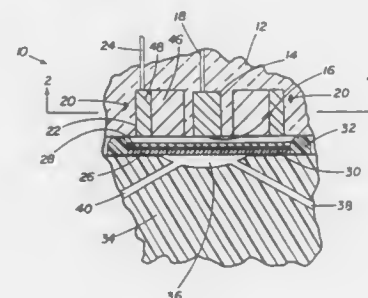
Chung C. Young, Weston; James E. Fowler, Watertown, and Alan R. Silverman, Hyde Park, all of Mass., assignors to Nova Biomedical Corporation, Waltham, Mass.

Continuation of Ser. No. 155,196, Feb. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 36,495, Apr. 9, 1987, Pat. No. 4,759,828, which is a continuation-in-part of Ser. No. 152,836, Feb. 5, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 418,775

Int. Cl.<sup>5</sup> G01N 27/31

U.S. Cl. 204—403

10 Claims



1. A polarographic cell comprising a sensor electrode and a reference electrode,
  - said reference electrode being a silver/silver chloride electrode comprising a ring of silver metal in contact with a concentric ring of silver chloride that has a thickness of at least 25μ, said reference electrode being capable of serving as a counter electrode to complete an electric circuit with said sensor electrode, a sufficient quantity of silver chloride being present so that 2,000 assays can be performed where the current used in each assay is 5 nanoamps and the length of each assay is 60 seconds.

wherein during the operation of said electrode assembly, current flows through said electric circuit and the silver ion from said silver chloride is reduced to silver metal, said cell being connected to means for measuring said current, and wherein said polarographic cell lacks a third electrode.

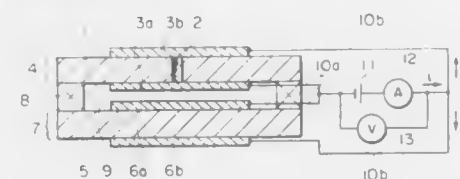
#### 4,950,380

LIMITING CURRENT-TYPE OXYGEN SENSOR  
Hideyuki Kurosawa; Kazuhiro Takahashi, and Yukio Nakanouchi, all of Kumagaya, Japan, assignors to Kabushiki Kaisha Riken, Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 388,670  
Int. Cl.<sup>5</sup> G01N 27/41

U.S. Cl. 204—406

4 Claims



1. A limiting current-type oxygen sensor comprising:
  - (a) a pair of sensor elements each comprising an oxygen ion-permeable substrate made of a zirconia solid electrolyte;
  - (b) at least one diffusion pore provided in at least one of said substrates, which pore extends substantially along the thickness of said substrate for causing oxygen diffusion through said diffusion port to be a rate-determining step;
  - (c) a sealing member for fixing said pair of substrates such that a closed chamber is defined between said substrates;
  - (d) a pair of porous electrodes provided on both outer and inner surfaces of the substrate in each sensor element; and
  - (e) a limiting current-detecting means connected between both inner electrodes and both outer electrodes.

#### 4,950,381

##### POLYSILAZANE AND METHOD FOR SYNTHESIS THEREOF

Hiroyuki Takeuchi; Kaneo Noake, both of Minamata, and Tamio Serita, Chiba, all of Japan, assignors to Chisso Corporation, Japan

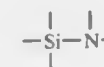
Filed Jun. 10, 1988, Ser. No. 205,277

Claims priority, application Japan, Jun. 12, 1987, 62-146657  
Int. Cl.<sup>5</sup> C08G 77/00

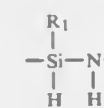
U.S. Cl. 528—10

6 Claims

1. An organic polymer comprising a polysilazane derived from a mixture of organohalosilanes comprising solely those represented by the formulas  $R_1SiH_2X_2$  and  $R_2R_3SiX_2$  and having cyclic units with the skeletal backbone units:



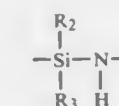
formed from the units:



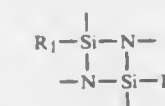
and

-continued

(B)



the cyclic units joined to one another by units:



wherein  $R_1$ ,  $R_2$ ,  $R_3$  each represents a lower alkyl group having 1 to 6 carbon atoms, a substituted or unsubstituted vinyl group, a substituted or unsubstituted allyl group, a substituted or unsubstituted lower aryl group having 6 to 10 carbon atoms, or tri(lower)alkyl- or di(lower)alkylsilyl group, or di(lower)alkyl-amino group, with  $R_1$ ,  $R_2$ , and  $R_3$  being the same or different from one another.

#### 4,950,382

##### PROCESS FOR IMPROVING THE LOW TEMPERATURE PERFORMANCE OF DEWAXED OIL AND FORMULATED OIL PRODUCTS

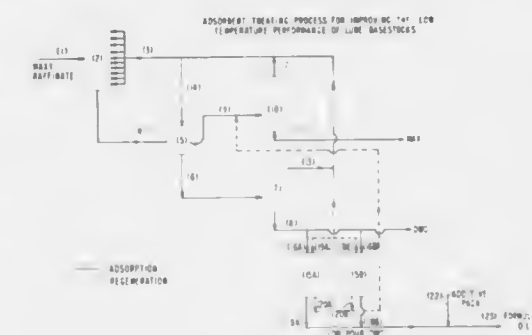
Kieth C. Yao, and Michael A. Fefer, both of Sarnia, Canada, assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Feb. 13, 1987, Ser. No. 14,582

Int. Cl.<sup>5</sup> C07C 7/13

U.S. Cl. 208—28

16 Claims



1. A process for producing a formulated dewaxed lube or specialty oil product wherein a waxy hydrocarbon oil stock is dewaxed in a first dewaxing procedure employing solvent dewaxing or catalytic dewaxing to produce a dewaxed oil having a pour point on the order of about  $-3^\circ\text{C}$  to  $-10^\circ\text{C}$ . deeply dewaxing this oil in a second dewaxing procedure to yield an oil stock having a pour point of between  $-12^\circ\text{C}$  to  $-40^\circ\text{C}$ , the second dewaxing procedure comprising contacting the dewaxed oil from the first dewaxing step with a hydrophobic molecular sieve adsorbent, and finally combining said deeply dewaxed oil with an effective amount of an additive package comprising detergent inhibitor components, VI improves and pour point depressants to yield the formulated oil product.



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4,950,383

## PROCESS FOR UPGRADING SHALE OIL

Andrew M. Tait, Naperville, Ill., and Albert L. Hensley, Jr., Munster, Ind., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 8, 1989, Ser. No. 448,186  
Int. Cl.<sup>5</sup> C10G 11/04

U.S. Cl. 208—59

10 Claims

1. A process for hydrocracking a hydrocracking feedstock with hydrogen at hydrocracking conversion conditions which comprises sequentially contacting said feedstock with a first catalyst comprising about 0.5 to 10 wt % NiO, 12 to 22 wt % MoO<sub>3</sub>, and about 0.1 to 3 wt % P<sub>2</sub>O<sub>5</sub>, balance alumina, and a second catalyst comprising about 0.5 to 5 wt % CoO, about 5 to 20 wt % Cr<sub>2</sub>O<sub>3</sub> and about 10 to 20 wt % MoO<sub>3</sub>, balance a support consisting essentially of crystalline molecular sieve material and alumina, said sieve material being present in an amount ranging from about 10 to about 60 wt % of total weight.

4,950,384

## PROCESS FOR THE HYDROCRACKING OF A HYDROCARBONACEOUS FEEDSTOCK

Dees J. W. Groeneveld, The Hague, and Swan T. Sie, Amsterdam, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 29, 1989, Ser. No. 373,711  
Claims priority, application United Kingdom, Aug. 11, 1988, 8819122

Int. Cl.<sup>5</sup> C10G 65/10

U.S. Cl. 208—59

8 Claims

1. A process for hydrocracking a hydrocarbonaceous feedstock which comprises:

- contacting said feedstock with hydrogen-containing gas in a first reaction zone maintained at first reaction zone temperature and pressure conditions and containing a first hydrocracking catalyst to obtain a first reaction zone effluent stream;
- separating said first reaction zone effluent stream at substantially said first reaction zone temperature and pressure conditions to form a first gaseous effluent phase and a first liquid effluent stream;
- contacting first liquid effluent stream in a second reaction zone at second reaction zone conditions of temperature and pressure in the presence of hydrogen and a second hydrocracking catalyst consisting essentially of a zeolite sensitive to nitrogen and hydrogen sulfide, and a catalytic metal selected from the group consisting of Group VIII, Group VIB and mixtures thereof, to form a second reaction zone effluent stream;
- combining said second reaction zone effluent stream with said first gaseous effluent stream to form a combined stream prior to separation of a said second reaction zone effluent and passing said combined stream to a fractionation zone;
- fractionating said combined stream at fractionation conditions to form at least one distillate product stream and at least one residual fraction stream; and
- recycling at least one residual fraction stream to either said first reaction zone or said second reaction zone or both.

4,950,385

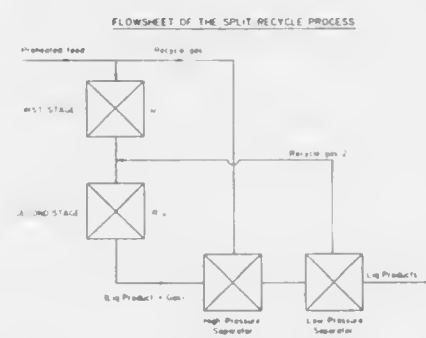
## REFORMING PROCESS FOR THE CATALYTIC CONVERSION OF PETROLEUM FRACTIONS TO A MIXTURE OF HYDROCARBONS RICH IN AROMATICS

Subramanian Sivasanker, and Paul Ratnasamy, both of Maharashtra, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Filed Jul. 10, 1989, Ser. No. 377,539  
Int. Cl.<sup>5</sup> C10G 39/00

U.S. Cl. 208—64

11 Claims



1. An improved naphtha reforming process which comprises:

- contacting a naphtha feed in admixture with hydrogen in a first reaction zone with a first reforming catalyst at reforming conditions to form a first reformate wherein first reforming catalyst comprises a refractory oxide support containing chlorine and one or more metals, and
- contacting the said first reformate in a second reaction zone with a second acidic reforming catalyst at reforming conditions to form a second reformate wherein second reforming catalyst includes a crystalline iron silicate containing acidic sites having disposed therein one or more metals, and
- stripping a first fraction from the said second reformate in a first separator maintained at a high pressure (5 to 30 Kg cm<sup>-2</sup>) and recycling substantially all of the said first fraction to the said first reaction zone, and
- stripping a second fraction from the second reformate in the second separator maintained at a pressure close to atmospheric and recycling substantially all of the said second fraction to the second reaction zone, and
- obtaining an aromatics rich liquid reformate from the second separator.

4,950,386

## ACIDIC PROMOTION OF TRANSITION METAL SULFIDE CATALYSTS FOR SELECTIVE HYDROGENATION

Manuel A. Francisco, Washington, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Aug. 15, 1988, Ser. No. 231,939  
Int. Cl.<sup>5</sup> C10G 47/06, 47/08, 45/52

U.S. Cl. 208—108

10 Claims

1. A process for selectively hydrogenating polycyclic aromatic compounds and mixtures thereof to obtain a hydrocarbon mixture containing increased amounts of mono-aromatic and di-aromatic compounds comprising:

- contacting a polycyclic aromatic compound or mixtures thereof with hydrogen in the presence of a catalyst consisting essentially of a transition metal sulfide and an acid selected from the group consisting of Lewis acids and acids having a pK<sub>a</sub> in the range of about 0 to -10, the contacting being at a temperature of from about 100° C. to about 300° C. and at a pressure of about 100 psi to about 2000 psi for a time sufficient to selectively hydrogenate said compound or mixture whereby increased amounts of mono-aromatic and di-aromatic compounds are obtained.

4,950,387

## UPGRADING OF CRACKING GASOLINE

Mohsen N. Harandi, Lawrenceville; Hartley Owen, Belle Mead; Francis P. Ragonese, Cherry Hill, all of N.J., and Sergei Yurchak, Media, Pa., assignors to Mobil Oil Corp., New York, N.Y.

Filed Oct. 21, 1988, Ser. No. 260,635  
Int. Cl.<sup>5</sup> C10G 57/00, 63/04

U.S. Cl. 208—49

11 Claims

1. An integrated catalytic cracking and gasoline upgrading process comprising the steps of:

- withdrawing a product stream from the riser reactor of a catalytic cracking process unit;
- charging said product stream to a primary fractionation zone;
- withdrawing an intermediate gasoline stream from said primary fractionation zone, said intermediate gasoline stream comprising olefinic gasoline having an ASTM D86 boiling range from about 90° to about 170° C.;
- contacting a first portion of said intermediate gasoline stream and a C<sub>2</sub>-C<sub>5</sub> olefinic stream with a catalyst under conversion conditions to form an upgraded gasoline stream; and
- charging a second portion of said intermediate gasoline stream together with said upgraded gasoline stream to a gasoline product storage facility.

4,950,388

## SEPARATION OF MIXTURES IN A WIND TUNNEL

Robert G. Stafford, 17 King Street, Bayswater, W.A. 6053, Australia, assignor to Robert G. Stafford, Manning Australia PCT No. PCT/AU87/00222, § 371 Date Jan. 31, 1989, § 102(e) Date Jan. 31, 1989, PCT Pub. No. WO88/00861, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 16, 1987, Ser. No. 328,126

Claims priority, application Australia, Aug. 1, 1986, PH7242  
Int. Cl.<sup>5</sup> B07B 9/00, 4/02

U.S. Cl. 209—135

19 Claims



1. Apparatus for the separation of a mixture of particulate material, said apparatus comprising a wind tunnel having an entry section, an exit section and a main section, fan means communicating with said exit section for creating a flow of air through wind tunnel from the atmosphere into the entry section through said main section and to the exit section, inlet means provided at a top side of the main section for introducing the particulate material into the main section across substantially the full width of the air flow for free fall through the influence of gravity, and a plurality of collectors spaced axially along a bottom side of said main section, each of said collectors extending transversely across said main section, said main section being substantially rectangular cross section width and height from the entry section to beyond said collectors and devoid of flow altering devices to minimize turbulence, and said entry section is open and is of a flared configuration converging in the direction of the air flow into said wind tunnel and being devoid of flow altering devices to minimize turbulence, the end of the entry section adjacent said main section and the end of the exit section adjacent said main section being of corresponding rectangular cross section to the cross section of the remaining section whereby the air flow through the main section is of substantially constant velocity across the cross section of the main section and is substantially laminar in nature.

4,950,389

## GRAVITY CONCENTRATOR

Boris V. Pilat, 1 mikrorajon 21-a, kv. 63; Alexandr I. Yakunin, Anosova, 47, kv. 20, and Edil K. Galimzhanov, Dekarta, 37, kv. 46, all of Alma-Ata, U.S.S.R.

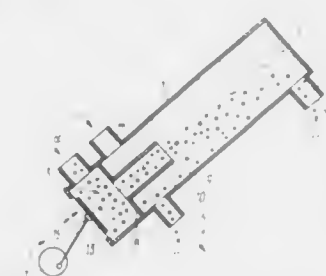
Filed Apr. 12, 1989, Ser. No. 337,043

Claims priority, application U.S.S.R., Apr. 14, 1988, 4409818[I]

Int. Cl.<sup>5</sup> B03B 5/66

U.S. Cl. 209—157

4 Claims



1. A gravity concentrator comprising: an inclined elongated hollow casing for receiving a material being treated, a bottom end and periphery of said casing; a pipe of said inclined casing for supplying a separating fluid; a pipe of said inclined casing for supplying a material being treated; a pipe of said inclined casing for discharging heavy fraction of the material being treated; a pipe of said inclined casing for discharging light fraction of the material being treated; at least one diaphragm of said casing designed for imparting pulsations to said material being treated and separating fluid within said casing; at least one drive for initiating pulsations in said casing connected to said diaphragm and designed for imparting reciprocations to said diaphragm.

4,950,390

## APPARATUS AND METHOD FOR FROTH FLOTATION

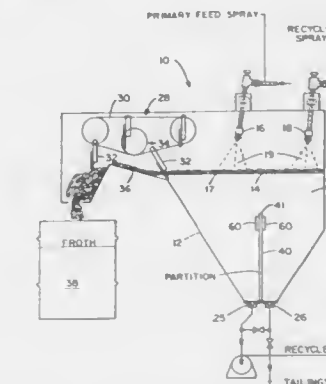
Alex Szertiaszloi, Hockessin, Del., and Earl T. Robinson, Aston, Pa., assignors to BP America Inc., Cleveland, Ohio

Filed Feb. 23, 1989, Ser. No. 314,458

Int. Cl.<sup>5</sup> B03D 1/14

U.S. Cl. 209—164

9 Claims



5. A method for froth flotation separation of the components of a slurry having particulate matter therein which is to be separated, said method comprising the steps of:

- spraying an input slurry or pulp of particulate matter into a liquid contained in a flotation tank through a primary spray nozzle to create a froth on the surface of said liquid

contained in said flotation tank, said froth having a substantial quantity of particulate matter floating therein, while a minor quantity of recycle particulate matter sinks in the liquid, in a first portion of the tank; providing a partition wall extending vertically from the bottom of the flotation tank to a point below the surface of the liquid contained in the tank and horizontally from one side to the opposite side of the tank thereby dividing the tank into the first portion above which the primary nozzle is located and a second portion above which a recycle spray nozzle is located; (c) collecting the recycle particulate matter sinking in said first portion and respraying the recycled particulate matter through said recycle spray nozzle into the liquid contained in said flotation tank to create further froth on the surface of the liquid and a minor quantity of tailings particulate matter which sinks in said second portion, said partition wall being of sufficient height to segregate said recycle particulate matter sinking in said first portion from said tailings particulate matter sinking in the second portion; and (d) withdrawing the froth formed in steps (a) and (c) withdrawing said tailings particulate matter from said second portion.

4,950,391

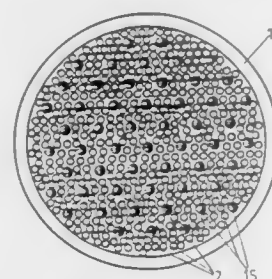
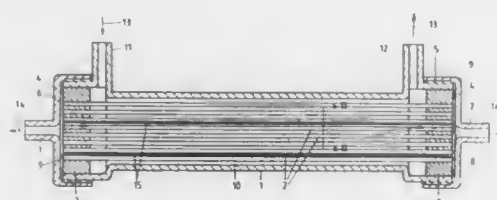
## CAPILLARY DIALYZER

Ludwig Weickhardt, Bovenenden, Fed. Rep. of Germany, assignor to Secom GmbH, Dransfeld, Fed. Rep. of Germany  
Filed Feb. 15, 1989, Ser. No. 311,099  
Claims priority, application Fed. Rep. of Germany, Feb. 22, 1988, 3805414

Int. Cl.<sup>5</sup> B01D 61/28, 63/02

U.S. Cl. 210—321.8

7 Claims



1. A hollow fiber dialyzer comprising a housing, embedding compositions in said housing defining a dialyzing chamber between said compositions and blood inflow and outflow chambers outside of said compositions between said compositions and said housing, hollow fibers that are fastened at both ends and sealed to said embedding compositions so that the interiors of said fibers communicate with said inflow and outflow chambers and the exteriors of said fibers are exposed in said dialyzing chamber, and spacing threads that are fastened at both ends in said embedding compositions, are parallel to each other and said fibers, are uniformly distributed in said dialyzing chamber, and are independent of individual hollow fibers.

4,950,392

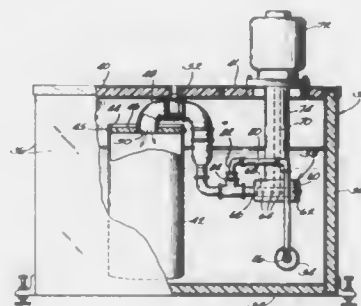
## FILTRATION TANK FOR FILTERING WASTE WATER USED IN WASHING MECHANICAL COMPONENTS

Mark D. Tiegs, Winona, Minn., and Reinald D. Liegel, Waukesha, Wis., assignors to Heln-Werner Corporation, Waukesha, Wis.

Continuation of Ser. No. 62,897, Jun. 15, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 296,856  
Int. Cl.<sup>5</sup> B01D 29/11

U.S. Cl. 210—167

22 Claims



1. An apparatus for use with a washing apparatus having a tank for containing washing fluid and for filtering contaminants from washing fluid, the apparatus comprising: a filtration tank adapted to contain washing fluid, means for providing for flow of washing fluid between the washing apparatus tank and the filtration tank, means for filtering washing fluid in the filtration tank, the means for filtering including a filter housed within the filtration tank, and means for forcing washing fluid in the filtration tank through the filter, the means for forcing washing fluid through the filter including a pump and a conduit having opposite ends, one of the opposite ends of the conduit being connected to the pump and the other of the opposite ends of the conduit discharging washing fluid through the filter.

4,950,393

## OPERATIVELY STATIONARY POOL CLEANING APPARATUS

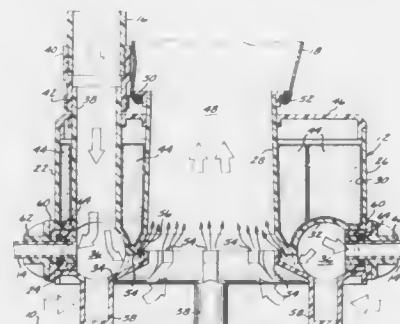
John M. Goettl, Phoenix, Ariz., assignor to Lewis D. Ghiz, Tempe, Ariz.

Filed Mar. 29, 1989, Ser. No. 330,193

Int. Cl.<sup>5</sup> E04H 4/16; B08B 9/08

U.S. Cl. 210—169

10 Claims



1. Operatively stationary pool cleaning apparatus comprising: a frame including a manifold adapted to be coupled to a source of feed water under pressure, a venturi chamber having open upper and lower ends, venturi jets in communication with the manifold and the venturi chamber to

4,950,395

## ARTIFICIAL KIDNEY WITH MODERATE EXCHANGE RATES

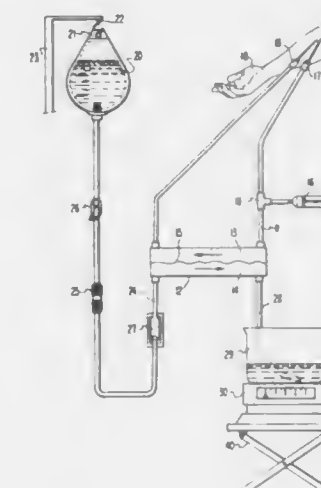
Gerard Richalley, Lyons, France, assignor to Hospal Industrie, France

Filed Nov. 27, 1987, Ser. No. 126,018

Claims priority, application France, Nov. 28, 1986, 86 16867  
Int. Cl.<sup>5</sup> B01D 61/24, 63/08

U.S. Cl. 210—195.2

19 Claims



1. An artificial kidney capable of ensuring the treatment of a patient's chronic renal failures by discontinuous sessions of a weekly total of less than or equal to about 24 hours, consisting essentially of:

- a source of dialysis liquid;
- means for collecting the used dialysis liquid and ultrafiltrate;
- a high permeability membrane exchanger of the hemodialyzer type comprising two compartments separated by a membrane, the first compartment adapted to be traversed by the blood and connected to the arterio-venous system of the patient by an extracorporeal blood circuit, and means for preventing the clotting of blood in said circuit, the second compartment being adapted to be continuously traversed by said dialysis liquid, to collect any ultrafiltrate, and to be connected at one end via a first conduit to said dialysis liquid source and at the other end via a second conduit to said means for collecting said used dialysis liquid and any ultrafiltrate;
- means for continuously flowing sterile and apyrogenic dialysis liquid using the force of gravity through said second compartment at a rate of between about 50–200 ml/minute;
- means for continuously flowing blood through said first compartment during said treatment session using the pressure of the patient's arterio-venous system;
- means for continuously maintaining a higher pressure in said first compartment than in said second compartment during said treatment session; and
- means for measuring the variation of the weight of the patient due to the balance of the quantities of the liquids injected and withdrawn during said treatment;
- wherein said membrane exchanger simultaneously provides a dialysis capacity exceeding or equal to about 40 ml/minute for the clearance of urea and an ultrafiltration capacity exceeding or equal to about 8 ml/h/mmHg.

receive a portion of the feed water from the manifold for upward discharge into the venturi chamber, a support means adapted to rest upon a pool bottom for spacing the lower end of the venturi chamber above the pool bottom for allowing an upward flow of pool water to be induced into the venturi chamber by the upward discharge of feed water into the venturi chamber, and ballast means for constraining the frame against movement relative to the pool bottom;

a plurality of elongated, flexible jet reactive sweep hoses in fluid communication with the manifold for receiving a portion of the feed water to sweep the hoses in a sinuous fashion, tending to place small particles of foreign matter in suspension and tending to draw larger debris toward the venturi chamber for passage into the venturi chamber under the action of the venturi jets; and

debris collection means attached to the upper end of the venturi chamber for collecting debris passing through the venturi chamber.

4,950,394

## ARRANGEMENT FOR DRIVING OUT VOLATILE IMPURITIES FROM GROUND WATER

Bruno Bernhardt, Reutlingen-Betzingen; Anton Hessner, Reutlingen, and Rainer Krug, Trochtelfingen, all of Fed. Rep. of Germany, assignors to IEG Industrie-Engineering GmbH, Reutlingen, Fed. Rep. of Germany

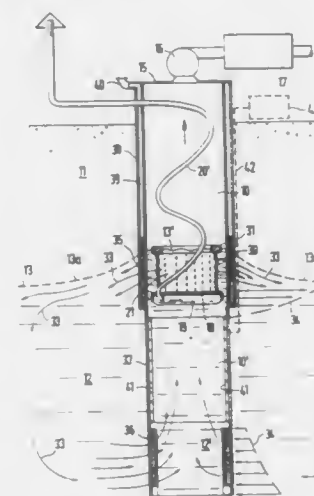
Filed Feb. 17, 1989, Ser. No. 312,900

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805200; Apr. 11, 1988, 3811926

Int. Cl.<sup>5</sup> E21B 43/00; B01D 29/04

U.S. Cl. 210—170

24 Claims



1. An arrangement for removing volatile impurities from a ground water, comprising a well shaft extending to a region of the ground water to be purified and having upper and lower sieve wall portions defining a water table in said well shaft; means for producing negative pressure in said well shaft; means for supplying a gas beneath the water table in said well shaft and including an inlet means located beneath the water table, within said upper wall portion spaced from the water table; and means forming a plurality of capillary openings in said upper sieve wall portion at least in a purification region between said inlet and the water table in said well shaft, to enhance a laminary flow of the ground water with a relatively high speed, said plurality of capillary openings forming a free passage area which has a greater permeability than a free passage area an adjacent portion of said well shaft.

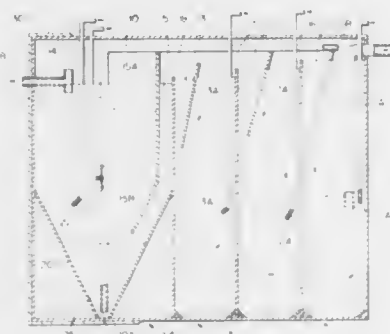


4,950,396

**BIOLOGICAL SEWAGE TREATMENT PLANT**  
 Roald Skaar, Maudal; Einar Linkjendal, Audnedal; Torstein Wremer, and Ragnar Skeie, both of Mandal, all of Norway, assignors to Bioscan A.S., Mandal, Norway  
 Filed May 5, 1989, Ser. No. 347,590  
 Int. Cl.<sup>5</sup> C02F 3/20

U.S. Cl. 210—195.3

7 Claims



1. Biological sewage treatment plant comprising a plurality of treatment tanks for a biological treatment process, having an inlet means for sewage, an outlet means for treated water and an air supply conduit with outlet means for supplying air down into each treatment tank, said air supply conduit in each treatment tank being located with its outlet adjacent to an upstream vertical wall in the treatment tank, all of said treatment tanks being connected in series so as to establish progressively lower water surface levels in each successive tank, correspondingly to successive treatment steps through the plant during operation, a settling tank with a conduit for feeding back sludge from the bottom thereof to a preceding treatment tank, a baffle plate constructed and arranged to extend from a level above a water surface level in each treatment tank at a downward and inward inclination towards a downstream vertical wall in the tank opposite said upstream vertical tank wall for establishing a clarifier chamber separated from a main part of the tank and communicating with the main part of the tank through a lower opening in the clarifier chamber, said clarifier chamber having a volume which is substantially smaller than the total volume of the treatment tank, all of said treatment tanks being arranged end to end in a direction corresponding to said successive treatment steps and with a vertical wall between two successive tanks being common to both tanks of the process, and the outlet from each treatment tank being provided in the form of an overflow sill from the clarifier chamber to the following treatment tank, said overflow sill being formed at least in part by a substantially horizontal edge at the top of the common wall between two successive tanks.

4,950,397

# **APPARATUS FOR ANALYZING DILUTED AND UNDILUTED FLUID SAMPLES**

Javier N. Oquendo, Denton, and Joseph A. Leone, Plano, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 130,831, Dec. 9, 1987, Pat. No. 4,872,992. This application May 8, 1989, Ser. No. 348,522

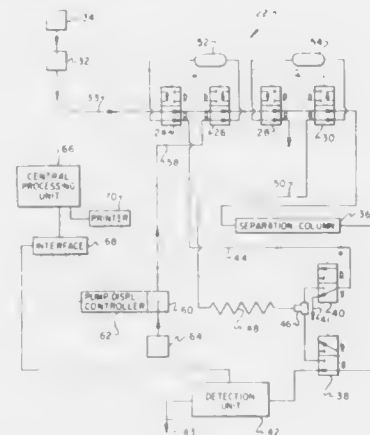
Int. Cl.<sup>5</sup> B01D 15/08

U.S. Cl. 210—198.2

3 Claims

1. Automated apparatus for measuring the concentration of ion components of a fluid sample to provide a chromatogram of the components of said fluid comprising:

a source of fluid to be analyzed and controllable fluid pump means in communication with said source of fluid;  
 a source of eluent and eluent pump means in communication with said source of eluent for pumping eluent through said apparatus;  
 first and second reservoir means for holding a diluted sample of said fluid and an undiluted sample of said fluid, respectively;  
 ion separation means and ion detection means adapted to be placed in communication with a selected one of said first and second reservoir means for receiving a fluid sample



stored in said selected one of said first and second reservoir means;  
 means for mixing an undiluted sample of said fluid with said eluent to provide said diluted fluid sample for storage in one of said first and second reservoir means; and  
 valve means for selectively switching said first and second reservoir means from communication with said fluid pump means to communication with said eluent pump means for displacing fluid samples stored in said first and second reservoir means, respectively, through said detection means in predetermined timed relationship.

4,950,398

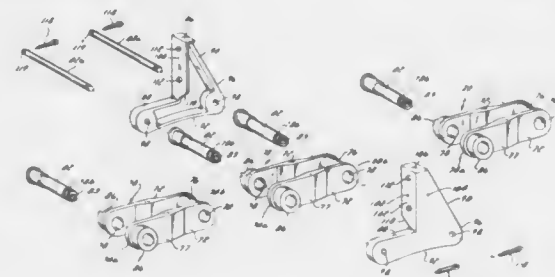
# **CANTILEVERED FLIGHT ATTACHMENT FOR NON-METALLIC CHAIN**

James H. Wiegand, Franklin, and Thomas J. Casper, Waukesha, both of Wis., assignors to Envirex Inc., Waukesha, Wis. Continuation of Ser. No. 89,001, Aug. 17, 1987, abandoned, which is a continuation of Ser. No. 824,820, Jan. 31, 1986, abandoned. This application Jan. 26, 1989, Ser. No. 302,137

Int. Cl.<sup>5</sup> B01D 21/18

U.S. Cl. 210—232

10 Claims



5. A polymeric collector flight attachment arrangement for a drive chain made up of a plurality of non-metallic links, each of said plurality of non-metallic links comprising a pair of sidebars, each of said sidebars having opposite ends, one end of one of the sidebars being joined by a polymeric spacer bushing to the one end of the other of the sidebars, and the other of the ends of the sidebars overlapping said one of the ends of the

sidebars of an adjacent one of said plurality of non-metallic chain links and being connected to said one of the ends of the sidebars of an adjacent one of said plurality of chain links by a chain pin extending transversely to the direction of chain travel and connecting the chain links for pivoting movement, the chain pin including a central longitudinally extending bore, said polymeric collector flight attachment arrangement comprising:

a pair of elongated polymeric flight brackets, one of the flight brackets being positioned on one side of a chain link adjacent to one of the pairs of sidebars of the chain link and the one of the flight brackets having opposite ends positioned adjacent the opposite ends of said one of the sidebars, and the other of the flight brackets being positioned on an opposite side of said chain link and adjacent to the other of the pair of sidebars of that chain link and the other of the flight brackets having opposite ends positioned adjacent to the opposite ends of the other of the pair of sidebars, said elongated polymeric flight brackets being positioned on opposite sides of said chain link, the opposite ends of the polymeric flight brackets including bores, and said polymeric flight brackets each including a projecting collector flight support portion having a forward-facing mounting surface for supporting the collector flight in suspended fashion with respect to the chain, the mounting surface being vertically elongated and having two lateral sides, and

a pair of extended length mounting pins each having opposite ends, one of said extended length mounting pins being housed in the central longitudinally extending bore in a first chain pin at one end of the chain link and with one of said opposite ends of the extended length mounting pin being housed in a bore in one end of one of the polymeric flight brackets and with the other of the opposite ends of the extended length mounting pin being housed in a bore in one end of the other of the polymeric flight brackets on an opposite side of the chain, the other of the extended length mounting pins being housed in the central longitudinally extending bore in a second chain pin at an opposite end of the chain link and with one of the opposite ends of the other extended length mounting pin being housed in a bore in the opposite end of said one of the polymeric flight brackets and with the other of the opposite ends of the other extended length mounting pin being housed in a bore in the opposite end of said another of the polymeric flight brackets on the opposite side of the chain link.

4,950,399

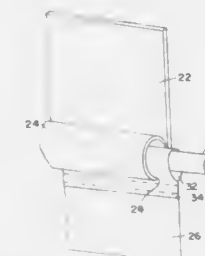
# **SIDE SEAL FOR A LIQUID FILTER DEVICE**

Wayne D. Hanna, Sr., Peapack, N.J., assignor to Komline-Sanderson Engineering Corporation, Peapack, N.J.

Filed Jul. 20, 1989, Ser. No. 382,382

Int. Cl.<sup>5</sup> B01D 33/048

U.S. Cl. 210—232



1. A side seal assembly adapted for sealing a side margin of a dewatering apparatus employing a liquid-permeable filter media, comprising a hollow elongated holder positioned at one side of said media and having a longitudinal slot extending the length thereof, a rod positioned within the holder, the rod being of a length approximately equal to the length of the

holder and of cross-sectional dimensions greater than the slot of the holder, and a flexible curtain secured to said rod along its length and extending outwardly through the slot in the holder and into contact with said filter media at a side margin thereof.

4,950,400

# **DISPOSABLE OIL FILTER UNIT WITH TRIPLE FILTRATION**

Giorgio Girondi, Mantova, Italy, assignor to Universal Filter Italiana S.p.A., Verona, Italy

Filed Mar. 24, 1989, Ser. No. 329,412

Claims priority, application Italy, May 10, 1988, 46845 A/88  
 Int. Cl.<sup>5</sup> B01D 35/02

U.S. Cl. 210—335

9 Claims



1. A disposable oil filter unit for the filtration of oil and containing triple filtration within a closed container which comprises

first and second filter cartridges having outside and inside surfaces and disposed within said closed container such that the oil flow traverses said first and second filter cartridges in parallel from the outside surfaces to the inside surfaces thereof, said first filter cartridge being confronted by a third filter cartridge disposed in front of and in series with said first filter cartridge, said first filter cartridge having a finer porosity than said third filter cartridge and said second filter cartridge having a porosity intermediate that of said first and third filter cartridges.

4,950,401

# **CENTRIFUGAL SEPARATOR**

Peter Unger, Stockholm; Eric Westberg, Lidingö, and Lars Ehnström, Tullinge, all of Sweden, assignors to Alfa-Laval Separation AB, Tumba, Sweden

PCT No. PCT/SE87/00399, § 371 Date Feb. 2, 1989, § 102(c) Date Feb. 2, 1989, PCT Pub. No. WO88/01907, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 7, 1987, Ser. No. 314,762

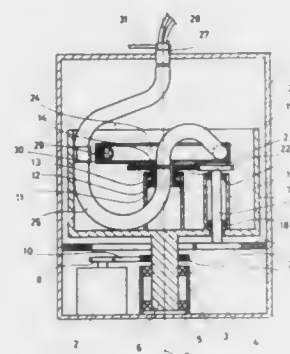
Claims priority, application Sweden, Sep. 12, 1986, 8603850  
 Int. Cl.<sup>5</sup> B04B 5/00

U.S. Cl. 210—360.1

8 Claims

1. A centrifugal separator comprising a rotor body having an axis and two ends axially separated, a cavity in said rotor body, an elongated flexible member extending from a location at said axis outside one of said ends of the rotor body, around the outside periphery of the rotor body and into the rotor body at said axis at the other of said ends of the rotor body, the flexible member forming an elongated separation chamber positioned in said cavity of the rotor body and extending with its longitudinal axis in the circumferential direction of the rotor body, the flexible member further forming an inlet channel extending from the axis of the rotor body to an inlet part of the separation

chamber and an outlet channel extending from an outlet part of the separation chamber to the axis of the rotor body, means for rotating the rotor body in a direction around the axis at a first velocity and for rotating the part of the flexible member situated outside the rotor body in the same direction around the



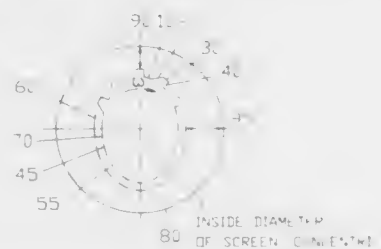
same axis at a second velocity which is one-half of said first velocity, and means for rotating the flexible member around its own longitudinal axis during rotation of the rotor body such that the separation chamber is rotated in said cavity relative to the rotor body.

#### 4,950,402 ROTATING ELEMENT FOR A SCREENING APPARATUS WITH A CONTOUR SURFACE

Frey Frejborg, Glens Falls, N.Y., assignor to A. Ahlstrom Corporation, Noormarkku, Finland  
Continuation-in-part of Ser. No. 41,241, Apr. 22, 1987, Pat. No. 4,776,957, and a continuation-in-part of Ser. No. 61,594, Jun. 11, 1987, Pat. No. 4,880,540, each is a continuation-in-part of Ser. No. 738,743, May 29, 1985, Pat. No. 4,676,903, which is a continuation-in-part of Ser. No. 472,742, Mar. 7, 1983, Pat. No. 4,529,520. This application Oct. 3, 1988, Ser. No. 252,810  
Claims priority, application Finland, Jan. 26, 1983, 830256  
The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.<sup>3</sup> B01D 29/62; B07B 1/20  
U.S. Cl. 210—413

25 Claims



1. In an apparatus for screening pulp which comprises a vessel, a screen cylinder having an envelope surface within the vessel, a rotor moving in the vicinity of the screen at a predetermined speed, an inlet for the unscreened pulp, a first outlet for the accept screened pulp in said vessel, and a second outlet for the reject, said first and second outlets being in operative communication with said screen, the improvement which comprises said rotor having a non-cylindrical shape and having a contour surface formed of a first bottom plane essentially parallel to the envelope surface, an upstream inclined plane, an upper plane and a downstream side plane, said side plane being essentially perpendicular to said first bottom plane, said inclined plane forming an angle between 5 and 60 degrees with said first plane, said upper plane being essentially parallel to said first plane whereby a lower frequency-pumping action and high frequency-high intensity positive pulse are generated

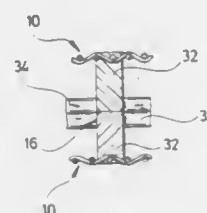
with improved screening and capacity at a pulp concentration up to 6%.

#### 4,950,403 SCREEN SEGMENT FOR FILTERS FOR THICKENING FIBER SUSPENSIONS

Siegfried Hauff, Heleenweg 1, 7410 Reutlingen 1, and Walde-mar Schäfer, Sonnenhalde 6, 7411 St. Johann-Bleichstetten, both of Fed. Rep. of Germany  
Filed Feb. 10, 1988, Ser. No. 154,634  
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706402

Int. Cl.<sup>3</sup> B01D 33/23  
U.S. Cl. 210—486

13 Claims



1. A screen segment for a rotary disk filter having an axis of rotation said screen segment comprising a frame means having opposed surfaces and substantially defining the outer periphery of said screen segment and extending substantially perpendicularly to the axis of rotation said frame means including radially spaced outer and inner legs as well as lateral legs connected to opposed ends of said outer leg and extending toward said axis of rotation and connected to opposed ends of said inner leg; screen carrier means having opposed supporting surfaces and encompassed by and joined to said frame means; spaced screens defining opposed outer main surfaces of said screen segment and supportably mounted on the opposed surfaces of said screen carrier means and said frame means; said screen carrier means and said frame means comprising molded elements in which said screens are supportably embedded.

#### 4,950,404 HIGH FLUX SEMIPERMEABLE MEMBRANES

Michael M. Chau, San Diego, Calif., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Aug. 30, 1989, Ser. No. 400,440  
Int. Cl.<sup>3</sup> B01D 61/00, 67/00, 69/00

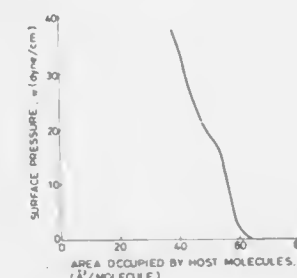
U.S. Cl. 210—500.27

20 Claims

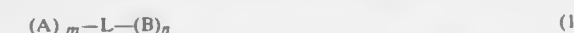
1. A semipermeable membrane having properties for providing increased flux while retaining salt rejection and chlorine resistance prepared by coating a porous support with an aqueous solution of a polyamine or bisphenol which contains a polar aprotic solvent not reactive with amines having properties for dissolving or plasticizing said support, removing excess of said solution, contacting the coated porous support with an organic solvent solution of an polyacyl halide, polysulfonyl halide, or polyisocyanate to form a reaction product within and/or on the surface of said porous support, and curing the resultant composite at curing conditions to form said high flux semipermeable membrane.

4,950,405  
FUNCTIONAL THIN ORGANIC MEMBRANE  
Tsutomu Miyasaka; Yukio Maekawa, and Hisashi Okamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Division of Ser. No. 138,773, Dec. 29, 1987, abandoned. This application Oct. 18, 1989, Ser. No. 423,640  
Claims priority, application Japan, Dec. 29, 1986, 61-315542  
Int. Cl.<sup>3</sup> B01D 61/00  
U.S. Cl. 210—500.28

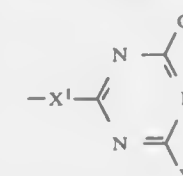
18 Claims



1. A functional thin organic membrane comprising a monomolecular film which contains at least one organic amphoteric host molecule having a reactive functional group capable of chemically binding with a nucleophilic functional group at room temperature, wherein said at least one organic amphoteric host molecule is represented by formula (1)



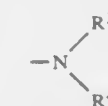
wherein A represents a functional group capable of binding with a nucleophilic functional group at room temperature; L represents a single bond or a group having a valence of (m+n); B represents an organic residual group which imparts a monomolecular film forming ability to the compound of formula (1); and m and n are each an integer of from 1 to 3, and wherein said functional group represented by A is represented by one of formulae (2) to (6):



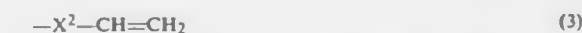
wherein X<sup>1</sup> represents



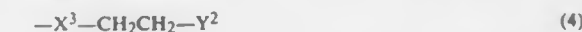
or —N—; Y<sup>1</sup> represents a hydrogen atom, —O—R<sup>2</sup> or



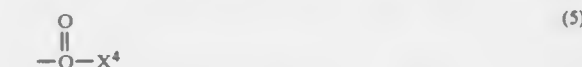
R<sup>1</sup> represents a hydrogen atom, an alkyl group having from 1 to 10 carbon atoms, an aryl group having from 6 to 10 carbon atoms, or an aralkyl group having from 7 to 10 carbon atoms; R<sup>2</sup> is either the same as R<sup>1</sup> or represents an alkali metal atom or an ammonium atom; R<sup>3</sup> and R<sup>4</sup>, which may be the same or different, each has the same meaning as defined for R<sup>1</sup>, provided that R<sup>3</sup> and R<sup>4</sup> may combine to form a ring:



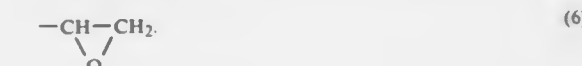
wherein X<sup>2</sup> represents —CO—, —SO—, or —SO<sub>2</sub>—;



wherein X<sup>3</sup> represents —CO—, —SO—, or —SO<sub>2</sub>—; and Y<sup>2</sup> represents a group capable of being released as a result of a  $\beta$ -elimination reaction upon contact with a base;



wherein X<sup>4</sup> represents a group capable of being released as a result of a substitution reaction upon reaction with a primary amino group; and

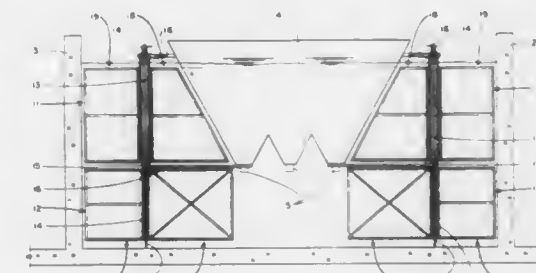


#### 4,950,406 FLOW ADJUSTING VANE FOR INTRA-CHANNEL CLARIFIER

Harold J. Beard; Raleigh L. Cox; Gary J. Beard; Mark B. Beard, and Michael D. Todd, all of Baton Rouge, La., assignors to United Industries, Inc., Baton Rouge, La.  
Continuation-in-part of Ser. No. 262,496, Oct. 25, 1988, which is a continuation of Ser. No. 3,943, Jan. 16, 1987, Pat. No. 4,780,206. This application Mar. 10, 1989, Ser. No. 322,071  
Claims priority, application European Pat. Off., Jan. 13, 1986, 86304559.7

Int. Cl.<sup>3</sup> B01D 21/28  
U.S. Cl. 210—521

16 Claims



4. In combination with a sewage treatment system having a sewage stream flowing within a channel and an intra-channel clarifier positioned in the sewage stream, said intra-channel clarifier having sidewalls and a bottom defining an interior and an exterior, an inlet and at least one sludge removal port opening into said sewage stream, the improvement comprising an apparatus for adjusting a velocity of said sewage stream flowing past said sludge removal port, said apparatus comprising a vane positioned in said stream between a wall of said channel and said exterior of said clarifier across from and upstream of said sludge removal port, means to support said vane against a flow of said stream and means to adjust an area of an upstream side of said vane presented against said stream.



4,950,407

**METHOD FOR THE TREATMENT OF SEWAGE**  
Nathan Stahl, Pardes Hana, Israel, assignor to American Israeli Paper Mills Ltd., Hedera, Israel

Filed Feb. 17, 1989, Ser. No. 311,850

Int. Cl.<sup>5</sup> C02F 3/12

U.S. Cl. 210—626 3 Claims

1. A process for the treatment of sewage by the activated sludge method comprising the steps of:

- supplying the sewage to an aeration basin in a sewage treatment plant;
- treating the sewage in said aeration basin with a biomass of microorganisms while simultaneously supplying air to said sewage;
- forwarding the mixture of sewage and biomass to a clarifier;
- separating the biomass from effluent formed in the clarifier; and
- removing the separated biomass from said effluent; wherein the improvement comprises the addition of calcium superphosphate to the aeration basin in step (b).

4,950,408

**PROCESS FOR REMOVING MERCURY FROM A NON-POLAR ORGANIC MEDIUM**  
Henricus A. M. Duisters, Budel, and Paul C. Van Geem, Beek, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Dec. 2, 1988, Ser. No. 278,718

Claims priority, application European Pat. Off., Dec. 11, 1987, 87202485

Int. Cl.<sup>5</sup> B01D 15/04

U.S. Cl. 210—660 8 Claims

2. A process for removing mercury from a non-polar organic medium which consists essentially in contacting said medium with a solid ion exchange resin adsorbent containing chemically-bound active -SH groups, and thereafter separating the ion exchange resin having mercury bound thereto from the now substantially mercury free non-polar organic medium.

4,950,409

**METHOD FOR TREATING HAZARDOUS WASTES**  
Robert R. Stanforth, 5510 Manitowish Way, Madison, Wis. 53704

Division of Ser. No. 205,458, Jun. 10, 1988, Pat. No. 4,889,640. This application Dec. 8, 1989, Ser. No. 448,064

Int. Cl.<sup>5</sup> C02F 11/14

U.S. Cl. 210—751 3 Claims

1. A method of treating solid hazardous waste containing unacceptable leachable levels of metals selected from the group consisting of lead and cadmium, the method comprising the step of mixing the solid waste with an agent lime and another agent selected from the group of carbon dioxide and bicarbonate, so that under conditions which support reaction between the agents and metals, the metals will be converted to nonleachable forms which are relatively stable under normal environmental conditions.

4,950,410

**FIRE EXTINGUISHING COMPOSITIONS AND METHODS**  
Edmond R. J. Pennartz, N. Vancouver, Canada, assignor to United American, Inc., Custer, Wash.

Filed Dec. 30, 1988, Ser. No. 292,417

Int. Cl.<sup>5</sup> A62D 1/00; A62C 1/00, 3/00

U.S. Cl. 252—7 3 Claims

1. A fire extinguishing composition formulated as follows:

Constituent	Percent by Weight
Sodium Chloride	24 to 70
Magnesium Chloride	7 to 40
Sodium Sulfate Decahydrate	3 to 26
Calcium Chloride	2 to 40
Magnesium Sulfate	2 to 20
Calcium Sulfate	0 to 45
Potassium Sulfate	0 to 29
Magnesium Bromide	0 to 26
Potassium Chloride	0 to 17
Water	58 to 87.

4,950,411

**CORROSION INHIBITOR COMPOSITIONS**  
Duane S. Treybig, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 136,571, Dec. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 847,966, Apr. 3, 1986, abandoned. This application Feb. 16, 1989, Ser. No. 311,690

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C23F 11/00

U.S. Cl. 252—8,555 5 Claims

1. A corrosion inhibitor composition which (A) at least one of

(1) the product resulting from reacting at a temperature of from about 25° C. to about 250° C. for a time sufficient to complete the reaction

(a) 2-vinylpyrazine, 2-methyl-5-vinylpyrazine or a combination thereof; and

(b) 1-decanamine, 1-undecanamine, 1-dodecanamine, 1-tridecanamine, 1-tetradecanamine, 1-pentadecanamine, 1-hexadecanamine, 1-heptadecanamine, 1-octadecanamine, 1-octadecen-1-amine, N-octyl-1,2-ethanediamine, N-hexadecyl-1,3-propanediamine, N-heptadecyl-1,3-propanediamine, N-octadecyl-1,2-propanediamine, N-octadecyl-1,3-propanediamine, tetraethylenepentamine, pentaethylenhexamine, hexaethylene-heptamine or combination thereof; or

(2) a mineral acid salt or carboxylic acid salt of said reaction product; or

(3) a combination of (1) and (2); and

(B) a carrier medium for component (A).

4,950,412

**FABRIC CONDITIONING COMPOSITION**  
Bryan Duffin, and Zia Haq, both of Merseyside, England, assignors to Lever Brothers Company, New York, N.Y.

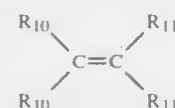
Continuation of Ser. No. 816,513, Jan. 6, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 326,479

Claims priority, application United Kingdom, Jan. 15, 1985, 8500958

Int. Cl.<sup>5</sup> D06M 9/00, 1/02

U.S. Cl. 252—8.6 8 Claims

1. A fabric conditioning composition comprising (1) an aqueous base, (2) a non-polymeric fabric softening agent selected from the group consisting of cationic and nonionic fabric softening agents, and (3) positively charged water-insoluble thermoplastic particles which comprise a polymeric drape imparting agent selected from polymers and copolymers of monomeric materials having the general formula:



4,950,415

**WATER WASHABLE DRY FILM LUBRICANTS**  
John T. Malto, Oswego, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Nov. 17, 1989, Ser. No. 437,738

Int. Cl.<sup>5</sup> C10M 105/32

U.S. Cl. 252—56 R 17 Claims

1. A dry film lubricant composition for metal working comprising an ester for lubricating the interface of a body of metal and metal working apparatus working the body and having a melting point of at least about 100° F. and a surfactant that is solid at room temperature and has an HLB number in the range of about 7–12, wherein the application of hot water to a metal body having the composition thereon will melt the ester and the surfactant will disperse the ester in the hot water for removal of the lubricant by washing in hot water.

6. A process for metal working utilizing a dry film lubricant composition comprising an ester having a melting point of at least about 100° F. and a surfactant that is solid at room temperature and has an HLB number in the range of about 7–12, wherein the application of hot water to a metal body having the composition thereon will melt the ester and the surfactant will disperse the ester in the hot water for removal of the lubricant by washing in hot water.

4,950,413

**ELECTRICALLY CONDUCTIVE PHTHALOCYANINE COMPLEX-FILLED LUBRICANTS**

David J. Boes, deceased, late of Monroeville (by Patricia K. Boes, executrix); Mary A. Alvin, Pittsburgh, and George R. Kelecava, Youngwood, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 17, 1988, Ser. No. 272,361

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> C10M 155/00

U.S. Cl. 252—25 12 Claims

1. A lubricating composition comprising:

- about 90 to about 99 weight percent of a lubricant; and
- about 1 to about 10 weight percent of a doped polymeric organometallic phthalocyanine complex, and nitrogen-substituted analogues thereof, wherein the dopant is selected from the group consisting of AsF<sub>5</sub>, I<sub>2</sub>, Br<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub>, HClO<sub>4</sub>, NOSbF<sub>6</sub>, SbF<sub>5</sub>, Na, K, Li and LiAlH<sub>4</sub>, the metal ion in said complex being of a Group IVA metal.

4,950,414

**LUBRICANTS FOR CONTINUOUSLY VARIABLE TRANSMISSIONS**

Manfred Wildersohn, and Siegfried Germann, both of Eschweiler, Fed. Rep. of Germany, assignors to UK-Mineralolwerke Wenzel & Weidmann, GmbH, Eschweiler, Fed. Rep. of Germany

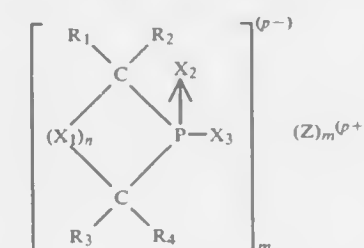
Filed Jan. 31, 1989, Ser. No. 304,778

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1988, 3803399

Int. Cl.<sup>5</sup> C10M 137/12, 137/14

U.S. Cl. 252—32.7 E 16 Claims

1. Lubricant, characterized in that it contains 10–80 weight-% of naphthenic hydrocarbons, 80–10 weight-% of polyisobutene with a degree of polymerization of molar weight of 200 to 10,000, and that it contains an additive of at least one of the phosphatane derivatives of the general formula



in a quantity of  $1.5 \times 10^{-5}$  moles to  $1 \times 10^{-2}$  moles, 1.5, based on 100 g of lubricant, whereby R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> can be H, linear, branched or cyclic saturated C<sub>1</sub>–C<sub>4</sub> hydrocarbon groups,

X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub> are independent of each other O (oxygen) or S (sulfur),

n is 1, if X<sub>1</sub> is O (oxygen) and 1–6, if X<sub>1</sub> is S (sulfur)

Z is a mono- or polyvalent, nitrogen containing, oil soluble, organic base

m is 1 or 2 and

P is 1 or 2.

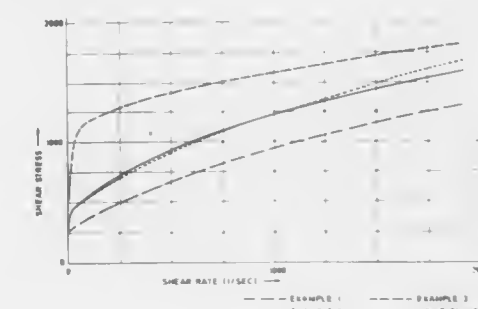
4,950,416

**LIQUID DISHWASHER DETERGENT COMPOSITION**  
Steven L. Baxter, Ponca City, Okla., assignor to Vista Chemical Company, Houston, Tex.

Filed Oct. 19, 1988, Ser. No. 259,857

Int. Cl.<sup>5</sup> C11D 7/16, 7/56

U.S. Cl. 252—99 16 Claims



1. In an aqueous, thixotropic automatic dishwasher composition containing from about 20% to about 70% by weight water, from about 2.5% to about 20% by weight sodium silicate, from about 8% to about 33% by weight of an alkali metal polyphosphate, an amount of a chlorine bleach compound sufficient to provide about 0.2% to about 4% by weight of available chlorine and from about 0.1% to about 5% by weight of a bleach stable, water-dispersible organic detergent active material, the improvement comprising a thickener comprised of from about 15% to about 35% by weight of an aqueous alumina dispersion and from about 0.2% to about 2% by weight of a stabilizer comprising a mixture of a long chain fatty acid and the polyvalent metal salt of a long chain fatty acid.

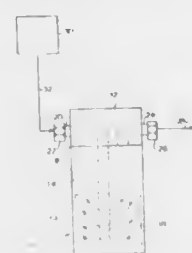
**4,950,417**  
**DETERGENT FORMULATIONS CONTAINING ALKALINE LIPASE DERIVED FROM PSEUDOMONAS PLANTARII**  
Nancy L. Bycroft, Constantine, Mich., and Graham S. Byng, Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.  
Filed May 1, 1989, Ser. No. 346,000  
Int. Cl.<sup>5</sup> C11D 3/38; D06M 16/00

U.S. Cl. 252—174.12 **9 Claims**  
1. A cleaning formulation comprising a detergent selected from the group consisting of anionics, nonionics and mixtures thereof and a lipase derived from a bacterium of the species *Pseudomonas plantarii* wherein said lipase is present in an amount of from 0.1 to 100 lipase units per milligram of the formulation.

**4,950,418**  
**REAGENT FOR REMOVING PROTECTIVE GROUPS IN PEPTIDE SYNTHESIS**  
Haruaki Yajima, Toyonaka; Nobutaka Fujii, Hirakata; Gilberto M. A. Guterres, Tokyo, and Tatsuhiko Hongu, Yokohama, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan  
Continuation of Ser. No. 104,070, Oct. 5, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 386,005  
Claims priority, application Japan, Oct. 9, 1986, 61-239059  
Int. Cl.<sup>5</sup> C09K 3/00

U.S. Cl. 252—182.12 **6 Claims**  
1. A reagent for removing protective groups attached to an amino acid during peptide synthesis which comprises trifluoroacetic acid and a combination of hard acid and soft base, where the hard acid is trialkylsilyltrifluoromethanesulfonate having the formula  $R_3SiO_3SCF_3$  in which the R is an alkyl group and the soft base is an ether selected from the group consisting of anisole, thioanisole, and diphenylsulfide.

**4,950,419**  
**PROCESS, COMPOSITION, AND APPARATUS FOR PURIFYING INERT GASES TO REMOVE LEWIS ACID AND OXIDANT IMPURITIES THEREFROM**  
Glenn M. Tom, New Milford, and Duncan W. Brown, Wilton, both of Conn., assignors to Advanced Technology Materials, Inc., New Milford, Conn.  
Continuation-in-part of Ser. No. 29,632, Mar. 24, 1987, Pat. No. 4,761,395. This application Mar. 17, 1988, Ser. No. 169,400  
Int. Cl.<sup>5</sup> C10K 1/00; B01D 53/04  
U.S. Cl. 252—194 **16 Claims**



1. A scavenger having utility for purifying inert gas mixtures to remove Lewis acid and oxidant impurities therefrom, and characterized by a water and oxygen removal capacity exceeding 5 liters of gaseous water and/or oxygen per liter of bed of the scavenger, said scavenger comprising:  
(a) an inert inorganic support having a surface area of from about 30 to about 1000 square meters per gram, and thermally stable up to at least about 300° C.; and  
(b) an active scavenging species, present on said support at a concentration of from about 1 mole to about 5 moles per liter of support, and formed by deposition on the support of an organometallic precursor and pyrolysis thereof at a selected elevated temperature on said support, said organometallic

precursor and said selected elevated temperature being selected from those of the group consisting of:  
(i) said organometallic precursor being an organometal compound of the formula MR, wherein M is a metal from Group IA and R is alkyl, and said selected elevated temperature being in the range of from about 150° C. to about 210° C.;  
(ii) said organometallic precursor being an organometallic metal compound of the formula M(R)<sub>2</sub>, wherein M is a metal from Group IIA and R is alkyl, and said selected elevated temperature being in the range of from about 150° C. to about 210° C.; and  
(iii) said organometallic precursor being an organometallic metal compound of the formula M(R)<sub>3</sub>, wherein M is a metal from Group IIIA and R is alkyl, and said selected elevated temperature being in the range of from about 150° to about 250° C.

**4,950,420**  
**ANTIFOAM/DEFOAMER COMPOSITION**  
James J. Svarz, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.  
Continuation of Ser. No. 238,382, Aug. 31, 1988, abandoned. This application Aug. 25, 1989, Ser. No. 399,409  
Int. Cl.<sup>5</sup> B01D 19/04

U.S. Cl. 252—321 **16 Claims**  
1. A method for controlling foam in a papermaking process comprising the steps of:  
adding to a pulp slurry and/or suspension an antifoam/defoamer composition consisting of:  
10–90% by weight of a polyether surfactant, said polyether surfactant comprising at least one compound selected from the group consisting of polyoxyalkylated glycerol, polyoxyalkylated sorbitol or sorbitan, polyoxyalkylated sucrose, and isomers thereof; wherein said polyoxyalkylated glycerol, sorbitol, or sucrose contains ethylene oxide in the range between about 0–60 weight % and/or propylene oxide in the range between about 30–100 weight % and has a molecular weight in the range between about 1000–10,000; and  
10–90% by weight of a polyhydric alcohol fatty acid ester, said polyhydric alcohol fatty acid ester comprising: a fatty acid mono and/or diester of polyethylene glycol and/or polypropylene glycol; whereby said antifoam/defoamer does not contain any oil, amides, hydrophobic silica or silicons, thereby avoiding deposition and felt filling caused by said oil, amides, hydrophobic silica or silicone.

**4,950,421**  
**DEWAR CRYOPUMPING USING MOLECULAR SIEVE**  
John A. Davis, Jr., Santa Barbara; Leonard E. Peck; Wesson P. Sargent, both of Goleta, and Benjamin K. Rich, Santa Barbara, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.  
Filed Oct. 20, 1988, Ser. No. 260,169  
The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G01J 5/06

U.S. Cl. 250—352 **13 Claims**  
1. In a dewar having a non-evacuated housing at substantially ambient temperature and a detector mounted to the tip of a coldfinger for cooling the detector during operation thereof, the improvement comprising:  
means including a molecular sieve mounted to the coldfinger adjacent the detector for adsorbing gas in the housing adjacent the detector when the coldfinger is cooled during operation of the detector;  
wherein the dewar is backfilled with an inert gas at substantially one atmosphere.

**4,950,422**  
**PEROXIDE EMULSIONS CONTAINING AN ANTI-FREEZING COMPOUND**  
Reinder Torenbeek, Twello, and Willem F. Verhelst, Gorssel, both of Netherlands, assignors to Akzona Incorporated, Chicago, Ill.  
Continuation of Ser. No. 534,264, Sep. 21, 1983, abandoned, which is a division of Ser. No. 417,759, Sep. 13, 1982, abandoned, which is a division of Ser. No. 222,844, Jan. 6, 1981, abandoned. This application Feb. 10, 1984, Ser. No. 578,594  
Int. Cl.<sup>4</sup> B01S 31/02

U.S. Cl. 526—200 **17 Claims**  
1. An aqueous peroxide emulsion consisting essentially of:  
(a) 20–60% by weight of an organic peroxide which is liquid at –5° C. and generally thermally unstable at temperature of about –5° C.;  
(b) an amount of at least 2% by weight of one or more alkanols containing 1–4 carbon atoms or alkane diols containing 2–4 carbon atoms which produces such a decrease in a melting point of said emulsion that said emulsion is liquid within a temperature range of –10° C. to –25° C.;  
(c) a surfactant and/or protective colloid;  
(d) water.

**4,950,423**  
**COATING OF EMI SHIELDING AND METHOD THEREFOR**  
F. Ryan Sullivan, Cleveland Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio  
Continuation-in-part of Ser. No. 99,571, Sep. 22, 1987, Pat. No. 4,826,631, which is a continuation-in-part of Ser. No. 821,310, Jan. 22, 1986, Pat. No. 4,715,989. This application Mar. 10, 1989, Ser. No. 322,319  
Int. Cl.<sup>5</sup> H01B 1/06

U.S. Cl. 252—512 **39 Claims**  
1. An electrically conductive water based paint comprising:  
(a) a sufficient amount of a metallic particulate selected from the group consisting of copper, silver, iron phosphide, gold, nickel and mixtures thereof and substrates coated therewith, wherein said paint forms a cured coating having a resistivity of not more than 10 Ω/square and the metallic particulate having dimensions not greater than passable through a spray nozzle intended for applying the paint;  
(b) an aqueous polymeric dispersion selected from the group consisting of polyurethanes or polyurethane/copolymeric latex blends, said dispersion being present in the paint in a ratio of about 15% by weight to about 100% by weight (polymer basis) of the metallic particulate present in the paint;  
(c) at least one air drying co-solvent being capable of agglomerating particles of the dispersion polymer to form a coherent coating upon a surface being painted in a quantity of at least 2% by weight and 75% by weight of the polymer in the dispersion;  
(d) at least one non-silicone, non-silicate based film forming enhancer in a quantity of between about 1% by weight and 5% by weight of the metallic particulate present in the paint; and  
(e) optionally, a pH adjusting compound in a quantity sufficient to adjust the pH of the paint to between about 5 and 11.

**4,950,424**  
**NON-AQUEOUS LIQUID DETERGENT COMPOSITIONS CONTAINING DI-SULPHONIC ACIDS AS DEFLOCCULANTS**  
Philippus C. van der Hoeven, Prinsenbeek; Nicolaas C. Laane, Rotterdam; Peter Versluis, Vlaardingen, and Adrianus Visser, Maassluis, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.  
Filed Apr. 13, 1989, Ser. No. 337,581  
Claims priority, application United Kingdom, Apr. 29, 1988, 8810191

Int. Cl.<sup>4</sup> C11D 1/22, 1/83, 3/12 **8 Claims**  
U.S. Cl. 252—540  
1. A non-aqueous cleaning composition comprising from 10% to 90% by weight of a liquid phase selected from liquid surfactants, non-surfactant liquid solvents and mixtures thereof and from 1% to 90% by weight of a particulate solid phase dispersed in said liquid phase, the composition further comprising from 0.1% to 15% by weight of a deflocculant for the solid phase, said deflocculant being selected from the group consisting of:  
(a) disulphonic acid compounds of formula (I):  
$$R^1-Ph^1-X-Ph^2-R^2 \quad (I)$$

wherein R<sup>1</sup> and R<sup>2</sup> are independently selected from linear or branched C<sub>2-20</sub> alkyl or C<sub>2-20</sub> alkenyl groups, Ph<sup>1</sup> and Ph<sup>2</sup> are phenylene linkages each substituted by a sulphonic acid group in its free acid form, and each optionally independently substituted by one or more minor substituents, and X is selected from oxa (—O—), thia (—S—), amine (—NH—) and methylene (—CH<sub>2</sub>) linkages; or partially neutralized mono acid salts wherein one sulphonic acid group is in the free acid form and the second sulfonic acid group is partially neutralized, of said disulphonic acid compounds;  
and (b) 20–20 carbon atom linear or branched alkyl and alkenyl benzene-disulphonic acids in their free acid form or partially neutralized mono acid salts thereof.

**4,950,425**  
**METHOD OF DECOMPOSING ALKYL PHOSPHATE**  
Kenneth T. Rowbottom, Warrington; John N. R. Wilkinson, Congleton; Terence M. Conboy, Warrington, and Graham V. Hutson, Seascale, all of England, assignors to Interlox Chemicals Limited, London, England  
Filed May 11, 1989, Ser. No. 350,191  
Claims priority, application United Kingdom, May 18, 1988, 8811784

Int. Cl.<sup>4</sup> G21F 9/08; C02F 1/72 **34 Claims**  
U.S. Cl. 252—631  
1. In a process for decomposing an alkylphosphate in which the alkyl-phosphate by itself or dissolved in a hydrophobic organic solvent is reacted with hydrogen peroxide in aqueous solution added progressively at a temperature that is above ambient temperature and in the presence of a transition metal catalyst, the improvement in which the catalyst comprises an effective amount of a chromium compound and the aqueous hydrogen peroxide phase is maintained in a pH window range of mildly acidic to mildly alkaline pH by the controlled introduction of alkali at a rate that is sufficient to neutralise the acid released by decomposition of the alkylphosphate, or is buffered by the presence of an alkali buffer to within the said pH range, thereby significantly accelerating the rate of decomposition of the alkylphosphate.

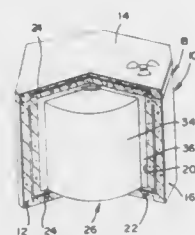


# 4,950,426

## GRANULAR FILL MATERIAL FOR NUCLEAR WASTE CONTAINING MODULES

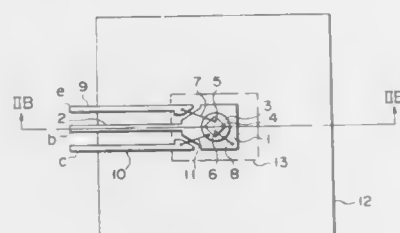
Joseph M. Markowitz, Baldwin Borough; Daniel C. Meess, and James B. Wright, both of Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 31, 1989, Ser. No. 331,341  
Int. Cl.<sup>5</sup> G21F 9/12, 9/24, 5/00, 9/00  
U.S. Cl. 252-633 20 Claims



1. A granular, particulate fill material for use in a storage module to substantially immobilize a nuclear waste package within the module by filling a void between the package and the module, said granular fill comprising a mixture of sand filler of an amount ranging from 20% to 80% by volume, bentonite clay of an amount between 10% to 40% by volume for absorbing water and adsorbing nuclides in solution, Fuller's earth of an amount between 10% to 40% by volume for absorbing organic liquids, and a radionuclide adsorptive getter material of an amount up to 25% by volume, wherein said granular fill remains in a particulate form in the storage module while the storage module is indefinitely stored.

4,950,427  
TRANSISTOR DEVICE  
Kazuo Endo, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Aug. 18, 1988, Ser. No. 233,508  
Claims priority, application Japan, Aug. 21, 1987, 62-207539  
Int. Cl.<sup>5</sup> H01L 23/28, 23/48 2 Claims



1. A transistor device comprising:  
a base terminal;  
an emitter terminal;  
a radiator plate continuous to said base terminal;  
a plate member made of thermal conductive material, and secured on said radiator plate, the upper and lower sides of said plate member being metallized;  
a transistor pellet, the bottom surface of said transistor pellet being secured on said plate member, said bottom surface serving as a collector electrode;  
a metal lead wire for connecting a base electrode of said transistor pellet to said radiator plate;  
a metal lead wire for connecting an emitter electrode of said transistor pellet to the emitter terminal;  
a metal lead wire for connecting the upper side of said plate member to the collector terminal; and  
an enclosure made of mold resin hermetically enclosing said respective elements, while said base, emitter and collector

terminals of those elements being partially extended outside said enclosure.

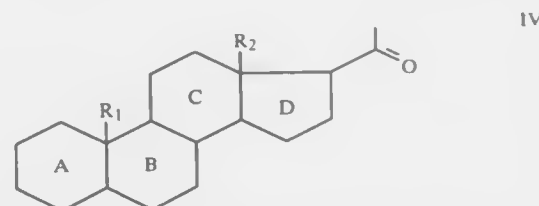
# 4,950,428

## NOVEL STEROIDS

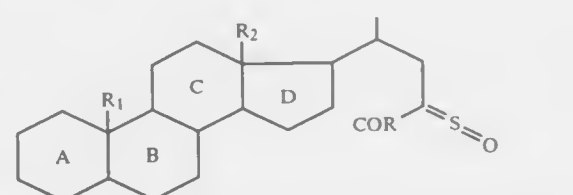
Michel Vivat, Lagny-sur-Marne, and Jean Buendia, Le Perreux-sur-Marne, both of France, assignors to Roussel Uclaf, Paris, France

Division of Ser. No. 129,658, Dec. 7, 1987, Pat. No. 4,847,014.  
This application May 25, 1989, Ser. No. 339,495  
Claims priority, application France, Dec. 5, 1986, 86 17050  
Int. Cl.<sup>5</sup> C07J 9/00, 1/00 7 Claims

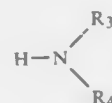
U.S. Cl. 552-548  
1. A process for the preparation of a compound of the formula



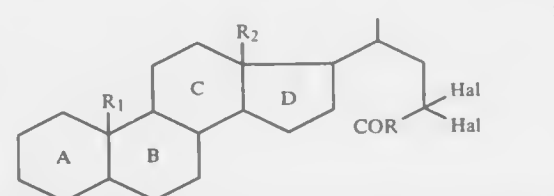
wherein R<sub>1</sub> is hydrogen or methyl, R<sub>2</sub> is methyl or ethyl, the A, B, C and D rings have at least one double bond and are optionally substituted with at least one member of the group consisting of halogen, alkyl and alkoxy of 1 to 4 carbon atoms and alkenyl and alkynyl of 2 to 4 carbon atoms comprising reacting a compound of the formula



wherein R is —OH optionally with an agent for the formation of an acid halide, reacting the resulting compound of formula 1 wherein R is halogen with a halogenation agent, reacting the resulting product with a member of the group consisting of water, alkanol, aralkanol, alkylthiol, arylthiol, aralkylthiol and



wherein R<sub>3</sub> and R<sub>4</sub> are individually selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms and aralkyl of 7 to 15 carbon atoms or R<sub>3</sub> and R<sub>4</sub> together with the nitrogen atom form a heterocycle may contain a nitrogen or oxygen atom to form a compound of the formula



and reacting the latter with a dehydrohalogenation agent and

then an oxidizing cleavage agent to obtain the corresponding compound of formula IV.

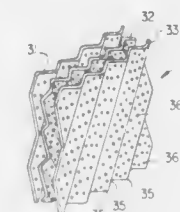
4,950,429  
PREPARATION OF 6-AMINOCAPROIC ACID  
Uwe Vagt, Speyer; Rolf Fischer, Heidelberg; Franz Merger, Frankenthal, and Hans-Martin Hutmacher, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Continuation of Ser. No. 7,472, Jan. 28, 1987, abandoned. This application Mar. 23, 1989, Ser. No. 327,432  
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3602374

Int. Cl.<sup>5</sup> C07C 227/00, 227/04  
U.S. Cl. 260-404 8 Claims

1. A process for preparing 6-aminocaproic acid by  
(a) reacting α5-formylvaleric acid ester with water in the presence of strongly acid cation exchangers at 50 to 120° C., while continuously separating the alcohol produced in the course of the hydrolysis from the reaction mixture by distillation and  
(b) reacting the resulting 5-formylvaleric acid, in the form of an aqueous solution obtained from step (a), with excess ammonia and hydrogen in the presence of a hydrogenation catalyst at 70 to 130° C. under super-atmospheric pressure.

4,950,430  
STRUCTURED TOWER PACKING  
Gilbert K. Chen, Farmers Branch, Tex., and Michele Acerra, Califon, N.J., assignors to Glitsch, Inc., Dallas, Tex.  
Continuation of Ser. No. 936,288, Dec. 1, 1986, abandoned. This application Oct. 24, 1988, Ser. No. 261,503  
Int. Cl.<sup>5</sup> B01F 3/04

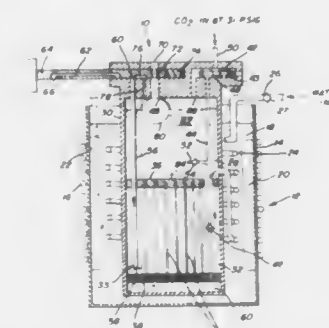
U.S. Cl. 261-112.2 27 Claims



1. A structured tower packing for vapor-liquid contact comprising a plurality of sheets of corrugated material, the sheets being arranged generally vertically and parallel to one another with the corrugations of adjacent sheets criss-crossing one another, said arranged, vertical sheets being provided with a plurality of holes for effecting both liquid and vapor distribution in said packing, said sheets having a fold-to-fold dimension of the corrugations as substantially being a select multiple of the horizontal spacing between holes of the packing, said holes being formed in said arranged sheets with said horizontal spacing between adjacent holes being no greater than about five times the horizontal extent of a hole, and in no event greater than about 5 millimeters and the horizontal extent of said holes being no greater than about 2 millimeters.

4,950,431  
MOTORLESS BATCH CARBONATOR  
Arthur G. Rudick, Marietta, and Jonathan Kirschner, Powder Springs, both of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Filed Jun. 28, 1989, Ser. No. 372,625  
Int. Cl.<sup>5</sup> B01F 3/04 20 Claims



1. Carbonator apparatus for a beverage dispenser, comprising:  
a carbonator tank for mixing uncarbonated water with a carbonating gas and thereafter holding and dispensing the carbonated water therefrom;  
a carbonating section in said tank including a semi-permeable membrane assembly including a plurality of hollow semi-permeable membrane fibers for providing a fluid conduit for carbonating gas;  
means for feeding carbonating gas to said semi-permeable membrane assembly from an external source of carbonating gas;  
means for feeding uncarbonated water into said tank from an external source and causing said uncarbonated water to flow around and contact said semi-permeable membrane fibers, whereby said carbonating gas passes through said membrane fibers and dissolves into said uncarbonated water to form carbonated water thereby; and  
means for dispensing carbonated water from said tank and including a carbonated water output tube extending into said carbonating section and a dispensing member having an outlet port registerable with said output tube when actuated to dispense carbonated water therefrom.

4,950,432  
POLYENE MICROLIDE PRE-LIPOSOMAL POWDERS  
Reeta Mehta, and Gabriel Lopez-Berstein, both of Houston, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Oct. 16, 1987, Ser. No. 109,813  
Int. Cl.<sup>5</sup> A61K 9/133, 9/127; B01J 13/02  
U.S. Cl. 264-4.6 18 Claims

1. A process for producing a powder which forms liposomes comprising an antifungal polyene macrolide upon suspension in an aqueous solution, said process comprising the steps of:  
(a) dissolving antifungal polyene macrolide and phospholipids in a quantity of first organic solvent and a quantity of second organic solvent respectively, to form a first solution and a second solution;  
(b) mixing the first solution and the second solution to form a mixture;  
(c) removing the first organic solvent and the second organic solvent from the mixture to form a residue;  
(d) dissolving the residue in a quantity of a third organic solvent to form a third solution, wherein the third organic solvent comprises tertiary butanol and methylene chloride;  
(e) extracting the third organic solvent from the third solution to leave a remnant;

- (f) forming a fourth solution by dissolving the remnant in a solvent consisting essentially of tertiary butanol;  
(g) passing the fourth solution through a filter having orifices with diameters of between about 0.05  $\mu$ m and about 0.5  $\mu$ m to produce a filtrate; and  
(h) lyophilizing the filtrate to remove the solvent consisting essentially of tertiary butanol.
2. The process of claim 1 wherein the antifungal polyene macrolide is nystatin, amphotericin B, partricin or a derivative thereof.

4,950,433

**METHOD OF SPRAY DRYING  
PHENOL-FORMALDEHYDE RESIN COMPOSITIONS**  
Shui-Tung Chia, Coquitlam, Canada, assignor to Borden, Inc., Columbus, Ohio

Filed Jul. 26, 1989, Ser. No. 385,571  
Int. Cl.<sup>5</sup> B29B 9/10; C08G 8/10, 14/04

U.S. Cl. 264—13

12 Claims

1. A method for preparing a curable phenol-aldehyde spray dried powder which comprises spray drying an aqueous phenol-aldehyde resole resin containing from about 0.05% to 5% by weight of a water soluble oxo boron compound, the quantity of said boron compound being on an anhydrous basis in relation to the resin solids of said resole.

4,950,434

**ARRANGEMENT FOR THE PRODUCTION OF  
LONGITUDINAL SCREED SLABS CONSISTING OF  
CONCRETE**

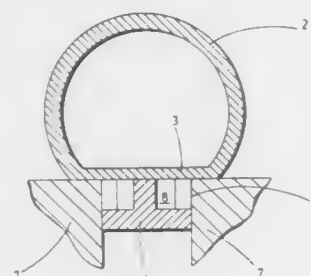
Stig-Åke Ljungkvist, Skövde, and Lennart Johansson, Mariestad, both of Sweden, assignors to Permaban Southeast, Inc., Matthews, N.C.

Continuation of Ser. No. 728,175, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 488,403, Mar. 16, 1983, abandoned. This application Feb. 5, 1987, Ser. No. 11,396

Int. Cl.<sup>5</sup> B28B 7/24

U.S. Cl. 249—50

4 Claims



1. Casting apparatus for casting concrete bodies comprising: a frame having a plurality of beams within the frame, the beams extending parallel to each other and having top edges; each top edge providing a lower boundary; a plurality of elongated pipes each of which has an underside and sides, each said providing a lateral boundary; a plurality of elongated T-rails, each T-rail joined and extending along an underside of a pipe, having a web, and defining a plurality of spaced T-rail gaps; and a plurality of plates, one for each T-rail gap, each plate having a recess for a T-rail web for securing the T-rail to the plate, and each plate joined to two adjacent beams between the top edges of the adjacent beams; each pipe being releasably mounted by T-rails and corresponding plates to the beams whereby the pipes are held to a high degree of linearity on the beams and the concrete bodies cast against the lower and lateral boundaries also have a high degree of linearity.

**4,950,435  
PROCESS FOR PRODUCING ALUMINUM NITRIDE  
SINTERED BODY**

Hitofumi Taniguchi, Chigasaki, and Nobuyuki Kuramoto, Sagami, both of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

Filed Jul. 8, 1987, Ser. No. 71,252

Claims priority, application Japan, Jul. 18, 1986, 61-168016  
Int. Cl.<sup>5</sup> C04B 35/44, 35/58

U.S. Cl. 264—65

10 Claims

1. A process for producing a sintered body of aluminum nitride, which consists essentially of an aluminum nitride powder with  
(A) an alkaline earth metal aluminate, and  
(B) an oxide or oxide-forming compound of yttrium or an element of the lanthanide series,  
the amount of component (A) being 0.3 to 10% by weight based on the total weight of the aluminum nitride powder and components (A) and (B), and the amount of component (B) being 0.2 to 5% by weight based on the total weight of the aluminum nitride powder and components (A) and (B),  
and firing the resulting mixture.

4,950,436

**PROCESS FOR PRODUCING HOSES OF HIGH  
IMPERMEABILITY TO GAS AND VAPOR**

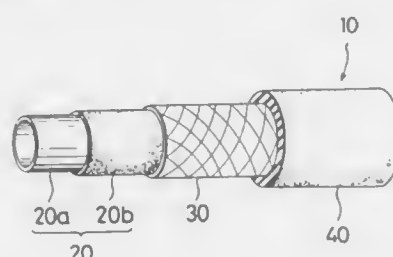
Tetsu Kitami, Hadano, Jun Mito, Kanagawa, and Tutomu Suyama, Nagoya, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Japan

Filed Apr. 20, 1989, Ser. No. 340,658

Claims priority, application Japan, Apr. 25, 1988, 63-100140  
Int. Cl.<sup>5</sup> B29C 35/06

U.S. Cl. 264—103

4 Claims



1. A process for the production of a hose construction comprising a core tube having a resinous inner wall and a rubbery outer wall, a reinforcement layer disposed around said outer wall, and a cover laminated over said reinforcement layer, which process comprises extruding a resin around a mandrel to form a tubular layer and provide said inner wall having a thickness of not more than 800  $\mu$ m, said mandrel being formed of an unplasticized or plasticized polymeric or elastomeric material and having a bending strength of 0.2 to 3 kgf, and said plasticized material containing a plasticizer in an amount of not more than 10% by weight, laminating said outer wall over said inner wall, forming said reinforcement layer over said outer wall, and forming said cover of a rubbery material around said reinforcement layers, whereby the hose has high impermeability to gas and to vapor and great flexibility.

4,950,437

**MOLDING PROCESS FOR MUSICAL INSTRUMENT  
NECK**

Thomas G. Lieber, 242 E. Argyle St., Valley Stream, N.Y. 11580  
Filed May 19, 1987, Ser. No. 51,412

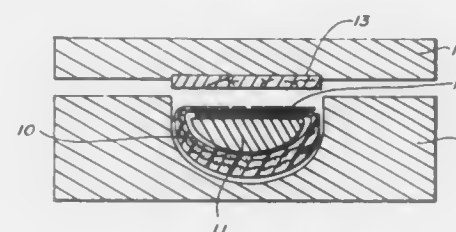
Int. Cl.<sup>5</sup> B29C 43/18, 67/14

U.S. Cl. 264—257

2 Claims

1. A process for the integral molding of a stringed musical instrument neck and fingerboard comprising:

wrapping a strip of fiber-reinforced plastic composite around a neck insert in a neck mold having a substantially U-shaped cavity, the U-shaped cavity having sufficient width to receive therein the fingerboard across its width, the fingerboard so received being in accurate alignment with the neck insert, and the amount of plastic composite being sufficient to form under pressure a bonding surface above the neck insert for the fingerboard,



placing over the U-shaped cavity of the neck mold a pressure plate releasably bearing the fingerboard right-side-up on its undersurface, and  
pressing the pressure plate against the neck mold with the fingerboard inside the U-shaped cavity thereof, such that the fingerboard is bonded to the upper surface of the strip of plastic composite with the accuracy of alignment required of an instrument having musical properties.

4,950,438

**MOLDING PROCESS FOR COATING A MOTOR STATOR**  
Kosei Nakamura, Hino, and Yoshiyuki Hayashi, Yamanashi, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

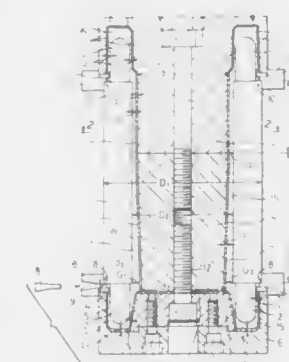
PCT No. PCT/JP88/00619, § 371 Date Feb. 8, 1989, § 102(e) Date Feb. 8, 1989, PCT Pub. No. WO88/10530, PCT Pub. Date Dec. 29, 1988

PCT Filed Jun. 22, 1988, Ser. No. 347,961

Claims priority, application Japan, Jun. 22, 1987, 62-153396  
Int. Cl.<sup>5</sup> B29C 39/10

U.S. Cl. 264—272.2

3 Claims



1. A molding process for coating a cylindrical motor stator entirely through a single cycle, the cylindrical motor stator comprising a cylindrical stator core having two opposite ends at axial ends thereof and coils partly projecting from both of the opposite ends, the method comprising steps of:  
placing the stator within a mold with the longitudinal axis of the cylindrical stator core extending vertically, the mold covering a whole surface of each of the coils and an inside surface of the cylindrical stator core; providing the mold with at least one inlet opening in proximity with a top end of the upwardly extending part of one mold and at least one drain hole at the junction between the core and the downwardly extending part of the one coil; and  
pouring a molten synthetic resin into a cavity defined by the

4,950,439

**GLOSSY FINISH FIBER REINFORCED MOLDED  
PRODUCT**

Rayna W. Smith, Harrisburg, Pa., and Glen W. Saidla, Stratham, N.H., assignors to C. H. Masland & Sons, Carlisle, Pa.  
Filed Jul. 10, 1987, Ser. No. 71,969

Int. Cl.<sup>5</sup> B29C 51/02, 51/04; B32B 31/20, 33/00

U.S. Cl. 264—294

21 Claims

1. A consolidated, heat and pressure-molded fiber reinforced thermoplastic composition produced from a non-needed non-woven of discrete reinforcing fibers and thermoplastic fibers, devoid of liquid binders and distinctly different fiber layers or alternating distinctly different layers, suitable for cosmetic or appearance applications, having a surface appearance value recorded at 20° and 60° gloss angle measurement for ASTM standard D-523 exceeding 10 and 50, respectively, thermoplastic material from providing the matrix for reinforcing fibers in the molded product.

7. A consolidated, heat and pressure molded thermoplastic sheet having an automotive Class A surface finish produced by subjecting a starting material devoid of distinctly different fiber layers or alternating distinctly different layers and liquid binder and containing from 10 to 60% by weight discrete reinforcing fibers, blended with fibers of thermoplastic resin, the blend resulting in the form of a loose non-woven web, to heat and pressure, thermoplastic material from melted thermoplastic fibers providing the matrix for reinforcing fibers in the molded product.

9. A process of making a three-dimensional shaped article comprising heating the thermoplastic sheet of claim 7 pressing the heated sheet into the desired shape.

4,950,440

**PROCESS FOR THE MANUFACTURE OF HIGH FATTY  
ACID MONOGLYCERIDE MONOSULFATE  
DETERGENTS**

Fahim U. Ahmed, Dayton, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.

Continuation-in-part of Ser. No. 96,102, Sep. 14, 1987, Pat. No. 4,832,876. This application Mar. 14, 1989, Ser. No. 323,461

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 303/24

U.S. Cl. 260—400

10 Claims

1. A process for the manufacture of a water soluble salt of a higher fatty acid monoglyceride monosulfuric acid which comprises reacting about three molar proportions of a sulfating agent with one molar proportion of glycerol in a low boiling, aprotic solvent, so that the glycerol is sulfated to the trisulfuric acid thereof, reacting the glycerol trisulfuric acid made with a higher fatty acid or higher fatty acid lower alkanol ester in such a solvent to produce higher fatty acid monoglyceride disulfuric acid, extracting the reaction mixture resulting with an aqueous-organic solvent for the monoglyceride disulfuric acid produced, and neutralizing and hydrolyzing such extracted monoglyceride disulfuric acid with an aqueous neutralizing agent to produce the water soluble salt of higher fatty acid monoglyceride monosulfuric acid.



4,950,441

## METHODS OF MANUFACTURING POLYGLYCEROL ESTERS

Igor Beseda, and Paul E. de Detrich, both of Unit 6, 20 Pacific St., Bronte, Australia

Continuation-in-part of Ser. No. 895,470, Jul. 23, 1986, abandoned, which is a continuation of Ser. No. 552,388, Nov. 16, 1983, abandoned. This application Jul. 15, 1988, Ser. No. 219,399

Claims priority, application Australia, Oct. 14, 1983, 20187/83

Int. Cl.<sup>3</sup> C11C 1/00

U.S. Cl. 260—410.6

6 Claims

1. A single stage method for the manufacture of polyglycerol esters comprising reacting a monoester of glycerine by itself in the presence of an acidic catalyst and heat.

4,950,442

## METHOD FOR MANUFACTURING THERMOPLASTIC RESIN RACKS

Shigekazu Tanimoto, Osaka; Toshiaki Nakamura, and Katsuyoshi Satoh, both of Fuji, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

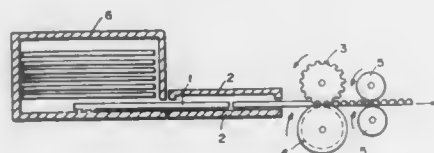
Filed Dec. 27, 1988, Ser. No. 289,676

Claims priority, application Japan, Feb. 24, 1988, 63-41230

Int. Cl.<sup>3</sup> B29D 15/00; B29C 59/04

U.S. Cl. 264—25

5 Claims



1. A method for manufacturing racks of thermoplastic resin comprising the steps of:

- heating a preformed rod which consists essentially of a polycrystalline thermoplastic resin until at least the surface temperature  $T_s$  of the rod is within a temperature range expressed by  $T - 20^\circ \text{C} \leq T_s < T$ , where  $T$  is the melting point of the polycrystalline thermoplastic resin; and thereafter
- forming a gear rack in at least one surface of the rod heated according to step (a) while said surface temperature  $T_s$  is within said temperature range, wherein said step of forming said gear rack includes the steps of:
  - heating the surface of a toothed roller so that the surface temperature  $T_r$  of the toothed roller is within a temperature range expressed by  $T - 30^\circ \text{C} \leq T_r < T$ , and
  - passing said heated preformed rod between said heated toothed roller and another roller opposite said toothed roller so as to cause gear teeth to be formed in said at least one surface of said preformed rod by means of said heated toothed roller.

4,950,443

## PROCESS FOR PRODUCING CARBON PRODUCT WITH COARSE AND DENSE STRUCTURE

Takamasa Kawakubo, Tano; Mitsuru Yoshida, Fujioka, and Yoshihisa Suda, Maebashi, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 141,415, Jan. 7, 1988, abandoned. This application May 9, 1989, Ser. No. 342,084

Int. Cl.<sup>3</sup> B05D 3/02

U.S. Cl. 264—29.5

12 Claims

1. A process for producing a composite carbon product, comprising:

molding a mixture of graphite particles and at least one member selected from the group consisting of organic

high molecular weight polymers, asphalt pitches and dry distilled pitches, thereby producing a dense molding; molding and fusing organic polymer particles to each other to produce a porous molding in which polymer particles are point contact bonded to each other; bonding said dense molding and said porous molding together using an organic liquid composition to produce a composite article; and carbonizing said composite article in an inert gas atmosphere.

4,950,444

## PROCESS FOR THE FORMATION OF FIBER FELT CONTAINING AN ADDITIONAL PRODUCT

Petit E. Debouffe, Petit Couronne, and Daniel Nouvier, Rouen, both of France, assignors to Saint-Gobain Recherche, Aubervilliers, France

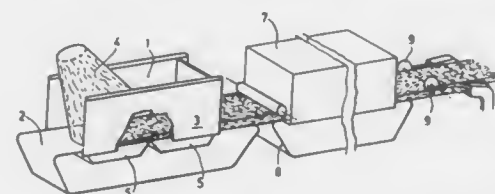
Continuation of Ser. No. 510,827, Jul. 5, 1983, abandoned. This application Oct. 21, 1988, Ser. No. 260,710

Claims priority, application France, Jul. 6, 1982, 82 11813

Int. Cl.<sup>3</sup> B29C 67/00

U.S. Cl. 264—37

5 Claims



1. A method for forming a fibrous felt hydroponic culture substrate, comprising:

forming fresh mineral fibers from a molten melt in a formation zone, which fibers are entrained in a turbulent gaseous stream and deposited on one side of an advancing support and retained there by suction applied to the opposite side of said support, said fibers being uniformly sprayed with a binder comprising a thermosetting resin prior to deposit on said support and prior to exiting said formation zone, at least partially curing said binder downstream of said formation zone to set the felt formed by said fibers, said felt having two exterior edges, applying a surface active agent to the portions of said felt adjacent to said exterior edges downstream of said formation zone, said surface active agent rendering said fibers hydrophilic, trimming said surface active agent treated fiber material from said felt, and recycling said trimmed fiber material into said turbulent gaseous stream in said formation zone whereby said surface active agent treated fiber material is distributed throughout a felt formed from said recycled fibers and additional fibers introduced into said turbulent gas stream, said felt comprising said recycled fibers being substantially similar to that from which said excess fiber was trimmed, said recycled fiber being present in said felt in amounts no greater than 20%, by weight, of said felt.

4,950,445

## METHOD OF VACUUM FORMING DISPOSABLE FACESHIELD

Arthur J. Salce, and Richard T. Metcalfe, both of Southbridge, Mass., assignors to Cabot Safety Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 152,624, Feb. 5, 1988, abandoned. This application Jun. 14, 1988, Ser. No. 206,597

Int. Cl.<sup>3</sup> B29C 51/10

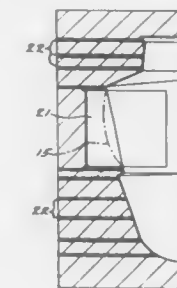
U.S. Cl. 264—549

10 Claims

1. A method of making a protective shield with an optically

clear viewing portion, the viewing portion including a pair of opposed sides which comprises the steps of:

providing a forming mandrel having lands for forming a pair of extensions and a pocket in the area of the viewing portion, wherein said pair of extensions extend outwardly along each opposed side of said viewing portion;



applying a vacuum through holes extending through the lands;

conforming said pair of extensions to the lands; and

maintaining said viewing portion of said protective shield out of contact with said forming mandrel to define an optically clear viewing portion.

4,950,446

## METHOD OF LINING PIPES

Namio Kinumoto, Osaka; Toshihiko Kikuchi, Nagaokakyo, and Akeshi Kegasa, Kobe, all of Japan, assignors to Osaka Gas Company Inc. and Osaka Bosui Construction Co., Ltd., both of Osaka, Japan

PCT No. PCT/JP87/01027, § 371 Date Aug. 19, 1988, § 102(e) Date Aug. 19, 1988, PCT Pub. No. WO88/04987, PCT Pub. Date Jul. 14, 1988

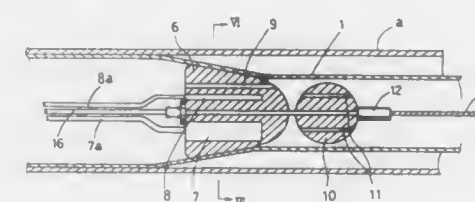
PCT Filed Dec. 24, 1987, Ser. No. 251,650

Claims priority, application Japan, Dec. 26, 1986, 61-311000; Feb. 19, 1987, 62-36998; Apr. 13, 1987, 62-91677; May 15, 1987, 62-119837; Jul. 27, 1987, 62-188198

Int. Cl.<sup>3</sup> B29C 63/20

U.S. Cl. 214—516

10 Claims



1. A method of lining a pipe with a plastic tube, comprising the steps of:

placing the plastic tube within the pipe to be lined, the plastic tube having a diameter smaller than that of the pipe; placing a substantially conical pig within the plastic tube at one end thereof, the conical pig having a heater and a through-hole air channel therein; heating the conical pig by the heater; supplying an air flow into the inside of an unexpanded portion of the tube ahead of the conical pig has been inserted through the through-hole air channel of the conical pig such that the air flow is heated by heat of the heated conical pig and the resulting heated air flow preheats the unexpanded portion of the tube; and moving the conical pig along an axial direction of the plastic tube such that the conical pig heats the tube and physically expands the heated tube to line the tube against an inside of the pipe.

4,950,447

## SNUBBER MONITORING SYSTEM FOR NUCLEAR POWER PLANTS

Aaron C. Y. Chan, Brea, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 14, 1989, Ser. No. 393,206

Int. Cl.<sup>3</sup> G21C 17/00

U.S. Cl. 376—247

9 Claims



1. A system for monitoring the operation of a plurality of elongated snubbers in a nuclear power plant wherein are the snubbers are disposed at various locations within a plant containment structure to support piping and equipment rigidly against seismic and vibratory loadings while permitting thermal expansion and contraction thereof, said system comprising:

means coupled to each of said snubbers for substantially continuously sensing axial displacement thereof and generating signals corresponding thereto; a sensor data highway system having means disposed within the plant containment for collecting the snubber displacement signals; means located outside the containment for receiving and processing the snubber displacement signals to provide substantially continuous monitoring thereof; and said data highway system further having cable means extending through the containment and coupling said signal collecting means to said receiving and processing means.

4,950,448

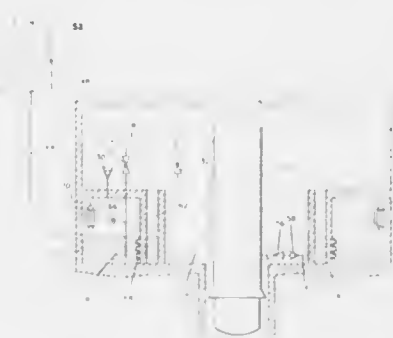
PASSIVE HEAT REMOVAL FROM CONTAINMENT  
Peng-Fei Gou, Saratoga, and Harold E. Townsend, Campbell, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed May 11, 1989, Ser. No. 350,189

Int. Cl.<sup>3</sup> G21C 15/18

U.S. Cl. 376—283

5 Claims



1. A heat removal system for removing heat from a containment of a nuclear reactor, comprising:

a sealed suppression chamber in said containment; means for venting steam from said nuclear reactor into said suppression chamber upon occurrence of an event requiring dissipation of heat from said nuclear reactor; said suppression chamber containing a quantity of water; said suppression chamber having a gas-containing space above said water; a heat exchanger disposed within the gas-containing space of said suppression chamber; said heat exchanger including an enclosed structure for holding a heat-exchange fluid; means for metering a supply of heat-exchange fluid to said heat exchanger to maintain a predetermined level thereof in said enclosed structure; said heat-exchange fluid boiling in said heat exchanger in consequence of heat transfer thereto from steam present in said suppression chamber; means for separating a heat-exchange fluid vapor in said heat exchanger from said heat-exchange fluid; and means for discharging said vapor immediately following its separation from heat-exchange fluid directly from said heat exchanger to a location exterior of said containment, whereby heat is discharged from said suppression chamber, and said containment is maintained at a temperature and pressure below its design value.

4,950,449

**INHIBITION OF RADIOACTIVE COBALT DEPOSITION IN WATER-COOLED NUCLEAR REACTORS**

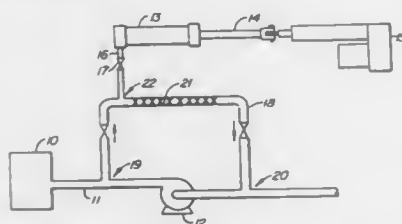
George E. Petersen, Fremont; Randall N. Robinson, San Jose; Carl P. Ruiz, Fremont; William J. Marble, Gilroy; Barry M. Gordon, Monte Sereno, and Gerald M. Gordon, Soquel, all of Calif., assignors to General Electric Company, San Jose, Calif.

Continuation-in-part of Ser. No. 900,927, Aug. 27, 1986, Pat. No. 4,759,900. This application Feb. 26, 1988, Ser. No. 160,725 The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G21C 9/00

U.S. Cl. 376—306

23 Claims



1. A method for inhibiting intergranular stress corrosion cracking and the deposition of radioactive cobalt in a water-bearing vessel of a water-cooled nuclear reactor, said method comprising: adding zinc oxide to water entering said water-bearing vessel continuously during operation of said water-cooled nuclear reactor, wherein the amount of zinc oxide is selected to achieve a concentration in the range from about 25 to 150 ppb.

4,950,450

**NEODYMIUM IRON BORON MAGNETS IN A HOT CONSOLIDATION PROCESS OF MAKING THE SAME**

Dilip K. Chatterjee; Thomas W. Martin, and Paul D. Askins, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 21, 1988, Ser. No. 222,591

Int. Cl.<sup>5</sup> B22F 1/00

U.S. Cl. 419—10

12 Claims

1. A method of making high energy Nd-Fe-B permanent magnets having a mass less than 30 grams and a remanence of

at least 7 kilogauss which comprises introducing into a cavity formed by a die and punch a Nd-Fe-B powder having a particle size of from 45  $\mu\text{m}$  to 250  $\mu\text{m}$  and a grain size of from 100  $\text{\AA}$  to 1500  $\text{\AA}$  compressing the powder under a vacuum of less than 200 millitorr at a temperature of from about 550° C. to 750° C. under a die-punch pressure of at least 10 kpsi.

4,950,451

**COPPER ALLOY FOR AN ELECTRONIC DEVICE AND METHOD OF PREPARING THE SAME**

Takashi Nakajima; Kenji Kubozono, both of Sagami; Takefumi Itou; Kimio Hashizume, both of Amagasaki, and Shinichi Iwase, Sagami, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,645

Claims priority, application Japan, Mar. 23, 1988, 63-68512; Sep. 20, 1988, 63-235372; Oct. 20, 1988, 63-262875

Int. Cl.<sup>5</sup> C22C 9/06

U.S. Cl. 420—481

1 Claim

1. A copper alloy for an electronic device consisting essentially of 1.0 wt %—4.0 wt % of Ni, more than 0.2 wt % and less than 0.8 wt % of P, 0.5 wt %—6.0 wt % of Zn, 0.05 wt %—1.0 wt % of Mg and the rest being copper and unavoidable impurities.

4,950,452

**HIGH STRENGTH, HEAT RESISTANT ALUMINUM-BASED ALLOYS**

Tsuyoshi Masumoto; Akihisa Inoue, both of Sendai, and Katsumasa Odera, Kurobe, all of Japan, assignors to Yoshida Kogyo K. K. and Tsuyoshi Masumoto, both of Tokyo, Japan, part interest to each

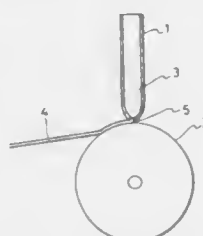
Filed Mar. 16, 1989, Ser. No. 324,049

Claims priority, application Japan, Mar. 17, 1988, 63-61878

Int. Cl.<sup>5</sup> C22C 21/00

U.S. Cl. 420—550

2 Claims



1. A high strength, heat resistant aluminum-based alloy having a composition represented by the general formula:



wherein:

M is at least one metal element selected from the group consisting of V, Cr, Mn, Fe, Co, Ni, Cu and Nb; and a, b and c are atomic percentages falling within the following ranges:

$$50 \leq a \leq 93, 0.5 \leq b \leq 35 \text{ and } 0.5 \leq c \leq 25.$$

said aluminum-based alloy containing at least 50% by volume of an amorphous phase.

4,950,453

**INHIBITING CORROSION BY WATER**

W. Bruce Murray, 28 Willow Grove, Garden Grove, Calif. 92714

Filed May 1, 1989, Ser. No. 345,449

Int. Cl.<sup>5</sup> C23F 11/06

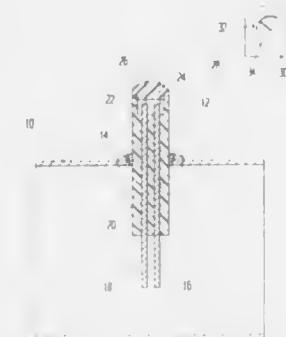
U.S. Cl. 422—3

13 Claims

1. A method for the treatment of municipal water to prevent

corrosion of metallic equipment and surfaces in contact with water, which comprises:

- adding to said water a water soluble zinc salt in an amount from 0.5 to about 5 parts zinc per million weight parts of water, and exposing said surfaces to said water containing said water soluble zinc salt;
- adding to said water, a water soluble alkaline material selected from the group consisting of sodium carbonate, sodium hydroxide, calcium hydroxide, and mixtures



- thereof, in an amount, as necessary to maintain the total alkalinity of the water above 100 milligrams per liter;
- maintaining said exposure of said surfaces to said water for a sufficient period of time to passivate said surfaces with a coating of zinc carbonate on said surfaces;
- thereupon ceasing the addition of said water soluble zinc salt, and adding to said water a water soluble silicate selected from the class consisting of sodium orthosilicate, sodium metasilicate, and mixtures thereof in an amount from 1 to about 10 parts per million weight parts of water.

4,950,454

**MEMBER OF ANALYTICAL ELEMENT FOR THE ANALYSIS OF LIQUID SAMPLE CONTAINING SOLID**

Nobuhito Masuda, and Takeshi Igarashi, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 98,735, Sep. 16, 1987, Pat. No. 4,855,108, which is a continuation of Ser. No. 728,404, Apr. 29, 1985, abandoned. This application Apr. 14, 1989, Ser. No. 338,992

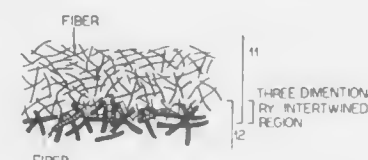
Claims priority, application Japan, Apr. 27, 1984, 59-87459; Apr. 27, 1984, 59-87460; Apr. 27, 1984, 59-87461

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 31/22

U.S. Cl. 422—56

10 Claims



1. A filtration element for use in the analysis of a liquid sample containing solid material which comprises a volume filtration layer and a spreading layer having a liquid retaining capacity larger than that of the volume filtration layer, wherein the volume filtration layer is made of fibrous material having a diameter of 0.1 to 1.0  $\mu\text{m}$  and a length of 10–4,000  $\mu\text{m}$  and has a density of 0.02 to 0.1 g/cm<sup>3</sup>, the spreading layer is made of fibrous material, the volume filtration layer and the spreading layer are united to give an integrated structure to have an interface between both layers, and the fibrous material of the volume filtration layer and the fibrous material of the

spreading layer are three-dimensionally intertwined with one another at the interface.

4,950,455

**APPARATUS FOR QUANTIFYING COMPONENTS IN LIQUID SAMPLES**

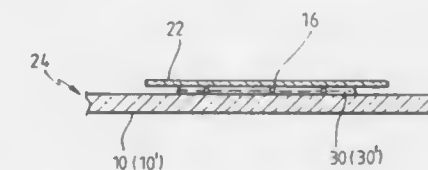
Kendall O. Smith, Boerne, Tex., assignor to Board of Regents, University of Texas System, Austin, Tex.

Filed Dec. 22, 1987, Ser. No. 137,410

Int. Cl.<sup>5</sup> G01N 1/28, 33/483

U.S. Cl. 422—56

19 Claims



1. A counting chamber for use in quantifying components in an aqueous liquid sample comprising: a microscope slide having an operative face; a plurality of substantially spherical beads of uniform diameter made of a substantially non-compressible material, which beads are located in a dried adhesive matrix on the operative face of the slide, wherein the adhesive matrix is soluble in an aqueous liquid sample having components to be quantified; and a cover slip for positioning over the operative face of the slide after dissolving the adhesive matrix in such a liquid sample, so that the cover slip will rest on the beads and will be spaced from the slide by a known distance determined by the diameter of the beads.

4,950,456

**APPARATUS FOR ANALYSIS OF A SAMPLE FOR SULPHUR**

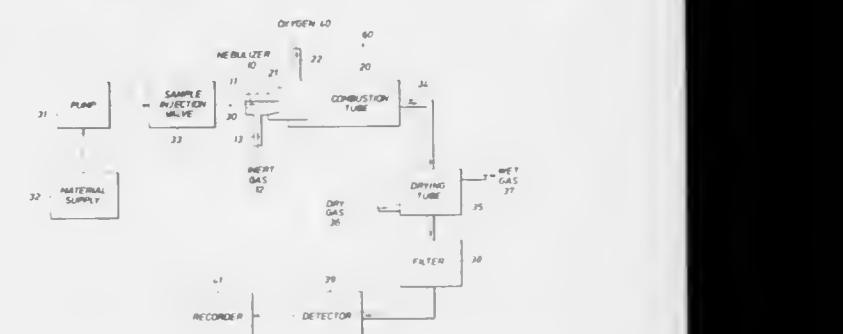
Alan R. Forster, and Gregory J. Kamla, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 20,293, Feb. 27, 1987, abandoned. This application Sep. 22, 1988, Ser. No. 249,255

Int. Cl.<sup>5</sup> G01N 25/24

U.S. Cl. 422—80

3 Claims



1. Apparatus for analyzing a sample for sulfur, comprising: a combustion tube with an inlet end containing therein a sample carrier tube, having an oxygen inlet adjacent said inlet end for supplying excess oxygen to said combustion tube, having at the opposite end from said inlet end a discharge end containing therein a combustion gases discharge outlet, a nebulizer operatively connected to said sample carrier tube so as to discharge into said carrier tube an aerosol of said sample and an inert gas,



a pump connected to said nebulizer for supplying a continuous flow of said sample to said nebulizer, and a detector for analyzing combustion gases from said combustion tube for sulfur connected to said outlet.

4,950,457

# DEVICE FOR THE EVAPORATION OF AN ACTIVE SUBSTANCE FOR THE TREATMENT OF THE AMBIENT AIR

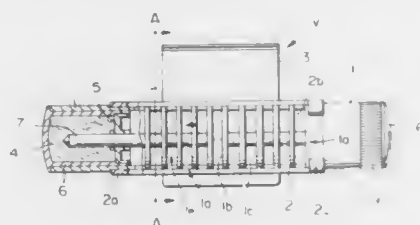
Heinz H. Weick, 94, rue de la Servette, CH-1202, Genf, Switzerland

PCT No. PCT/CH87/00156, § 371 Date Jul. 28, 1988, § 102(e) Date Jul. 28, 1988, PCT Pub. No. WO88/03881, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 24, 1987, Ser. No. 236,357  
Claims priority, application Switzerland, Nov. 28, 1986, 4802/86; Dec. 4, 1986, 4831/86; Feb. 5, 1987, 407/87  
Int. Cl.<sup>5</sup> A61L 9/00

U.S. Cl. 422-123

5 Claims



1. A device for the evaporation of an active substance, said device comprising:

- an outer tube having a longitudinal axis and defining a portion of a cylindrical plane extending along said longitudinal axis and including a segment of said portion having means extending in said cylindrical plane from opposed terminal edges of said segment and terminating separated from each other to define a space for receiving an inner tube inserted radially through the space and to be held concentrically and frictionally within said outer tube,
- an inner tube having an evaporation window and means for containing an active substance releasable to an air stream, said inner tube being rotatable to an open position within said outer tube to align said evaporation window with the space of said outer tube for release of the active substance into the air and being rotatable to a closed position within said outer tube to align said evaporation window with said segment so as to prevent release of the active substance into the air.

4,950,458

# PASSENGER AUTOMOTIVE RESTRAINT GENERATOR

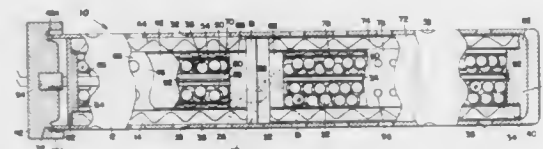
Donald J. Cunningham, North Ogden, Utah, assignor to Morton International, Inc., Chicago, Ill.

Filed Jun. 22, 1989, Ser. No. 369,874

Int. Cl.<sup>5</sup> B01J 7/10; A62B 35/04; B60R 21/26; C06D 5/06

U.S. Cl. 422-164

11 Claims



1. A gas generator comprising, a single impact extruded perforated elongated housing having a first end and a second end, an end cap base enclosing said first end of said housing,

an end cap enclosing said second end of said housing, a perforated bulkhead positioned at an intermediate location within said housing, said bulkhead forming first and second elongated chambers within said housing and having formed therein a ball valve including a ball valve chamber and first and second openings connecting said ball valve chamber to said first and second elongated chambers, respectively, with the entrance to said second chamber being denoted a first position and the entrance to said first chamber being denoted a second position, said ball valve chamber housing a ball therein that is movable, whereby, said ball is operable to move between said first and second positions to restrict flow of gas through said bulkhead, whereby, at a second instant, said first chamber is pressurized, forcing said ball of said ball valve into said first position, suppressing gas flow into the second chamber and thereby insulating said first chamber from said second chamber,

whereby, at a third instant, a pressure drop in said first chamber loosens engagement of said ball of said ball valve in said ball valve chamber from said first position and increased pressure in said second chamber forces said ball into said second position and isolates said second chamber from said first chamber,

first and second elongated gas generating charges of solid pyrotechnic material contained in said first and second elongated chamber, respectively, first and second elongated perforated igniter tubes provided in operative relation with said first and second elongated gas generating charges, respectively, each of said perforated igniter tubes having a first end and a second end, and an initiator provided in operative relation with only one of said perforated igniter tubes.

4,950,459

# VAPOR COLLECTION AND PROCESS FOR EBULLATED BED REACTORS

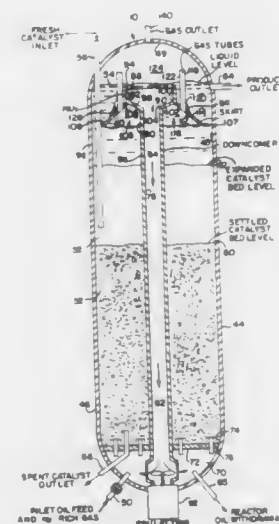
Robert D. Buttke, Lisle, and John R. Frey, Aurora, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 87,394, Aug. 20, 1987, Pat. No. 4,804,458. This application Sep. 26, 1988, Ser. No. 249,605

Int. Cl.<sup>5</sup> B01D 19/00; B01J 9/16

U.S. Cl. 422-220

20 Claims



1. An ebullated bed reactor, comprising: a vessel having a lower portion and an upper portion; oil feed means for feeding an oil feed comprising oil and hydrogen rich gases into said vessel;

4,950,461

# PROCESS FOR CATALYTIC REDUCTION OF NITROGEN OXIDES

Norbert Schwetje, Hanover, and Dieter Kipping, Burgwedel, both of Fed. Rep. of Germany, assignors to Kali-Chemie AG, Hanover, Fed. Rep. of Germany

Division of Ser. No. 104,064, Oct. 5, 1987. This application Feb. 21, 1989, Ser. No. 313,050

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1986, 3634243

Int. Cl.<sup>5</sup> B01J 8/00; C01B 21/00

U.S. Cl. 423-239

21 Claims

1. A process for catalytic reduction of nitrogen oxides (NO<sub>x</sub>) in exhaust gases comprising treating the exhaust gas in the presence of a hydrogen donor with a catalyst comprising a zeolite Y dispersed in an amorphous matrix of oxide gel, said zeolite Y having been subjected to ion exchange to replace from 40 to 90 mole-% of its exchangeable ions with at least one ion selected from the group consisting of lithium ion and rare earth metal ions.

4,950,462

# PROCESS FOR ABSORBING CO

Genroku Nakao, Hiroshima; Hiroshi Ishisaka, Kure; Shigehito Takamoto, and Yasuyuki Nishimura, both of Hiroshima, all of Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,168

Claims priority, application Japan, Sep. 30, 1987, 62-247679; Oct. 1, 1987, 62-248874

Int. Cl.<sup>5</sup> C01B 31/18; C10K 1/00

U.S. Cl. 423-246

13 Claims

4. A process for recovering CO from a CO-containing gas within an iron-containing apparatus and for preventing corrosion of said apparatus, which comprises contacting a CO-containing gas with an essentially non-aqueous CO-absorbing solution comprising 3 to 6 moles/l of hexametaphosphateamine, 1 to 4 moles/l of cuprous chloride, 0.1 to 1% by weight of water and an organic solvent, thereby absorbing CO into the CO-absorbing solution from the CO-containing gas and then atomizing the CO-absorbing solution, thereby stripping CO from the CO-absorbed solution and obtaining a CO gas, while recycling the CO-free absorbing solution to the absorption of CO from the CO-containing gas.

13. A process according to claim 4, wherein the organic solvent is toluene.

4,950,463

# PURPLE DIAMOND AND METHOD OF PRODUCING THE SAME

Shuichi Satoh, and Kazuo Tsuji, both of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Nov. 17, 1988, Ser. No. 272,725

Claims priority, application Japan, Nov. 17, 1987, 62-289748

Int. Cl.<sup>5</sup> C01B 31/06

U.S. Cl. 423-446

3 Claims

2. A method of producing a diamond, comprising the following steps:

- (a) using an Ib-type synthetic diamond crystal having an Ib-type nitrogen content in the crystal within the range of  $8 \times 10^{17}$ – $1.4 \times 10^{19}$  atoms/cm<sup>3</sup>,
- (b) subjecting said diamond crystal to an electron beam irradiation of  $5 \times 10^{16}$ – $2 \times 10^{18}$  electrons/cm<sup>2</sup> at 2 to 4 MeV, and
- (c) annealing in a vacuum of less than  $10^{-2}$  Torr at a temperature of 800°–1100° C. for more than 25 hours, for producing a transparent diamond having a distinctly purple color brilliance, whereby said diamond crystal has a first absorption coefficient of Ib-type nitrogen at 500 nm, within the range of 0.2–2 cm<sup>-1</sup>, a second absorption coefficient of the N-V center at an absorption peak of 570 nm, within the range of 0.3–10 cm<sup>-1</sup>, and third absorption coefficient

fresh catalyst feed means for feeding fresh hydrotreating catalyst into said vessel; ebullating pump means located in the lower portion of said vessel for circulating said feed in said vessel in the presence of said catalyst to hydrotreat said oil; a tubular downcomer extending generally upward above said pump means, said downcomer having an upper end and a lower end in proximity to said pump means; a stationary tubular pan connected to said upper end of said downcomer in said upper portion of said vessel for facilitating flow of said feed into said downcomer; and an annular skirt connected to said pan and extending downwardly and outwardly therefrom for collecting vapor comprising excess hydrogen, light hydrocarbon gases, hydrogen sulfide, ammonia, and steam, emitted in the reaction zone.

4,950,460

# GAS GENERATING DEVICE

John C. Goodwin; Roy Kirby; Philip S. Simons, all of Middlesex, and Andrew J. Carter, Essex, all of England, assignors to Dowty Maritime Systems Limited, Middlesex, England

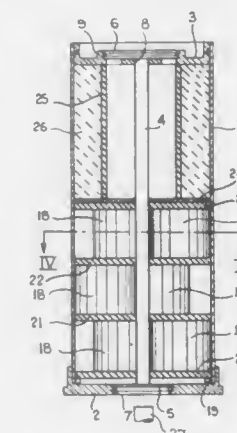
Filed Oct. 3, 1988, Ser. No. 252,134

Claims priority, application United Kingdom, Oct. 1, 1987, 8723034

Int. Cl.<sup>5</sup> B01J 7/02

U.S. Cl. 422-239

22 Claims



1. A gas generating device comprising a container having a pair of opposed walls each formed with an opening; a closure assembly comprising a pair of closure members each in sealing watertight engagement with a respective one of the openings and each being movable to break said sealing engagement, and a rod extending between and movable with the closure members; a water-reactive substance stored within the container; and trigger means provided to operate the closure assembly by moving the rod so that the sealing engagements of the closure members with their respective openings are broken substantially simultaneously to allow water to penetrate the container through the openings and react with the substance to produce gas that escapes from the container.

ents of the GR1 center, the H2 center, the H3 center, and the H4 center of less than  $0.2\text{ cm}^{-1}$ , in the visible region for achieving said transparent distinctly purple color brilliance.

**4,950,464**  
**PURIFICATION OF SULFURYL FLUORIDE BY SELECTIVE ADSORPTION**

George S. Fujioka, Walnut Creek; Brian G. Tobey, Pleasant Hill, and David D. Friese, Antioch, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.  
Filed Feb. 10, 1989, Ser. No. 309,459  
Int. Cl.<sup>5</sup> L01B 17/45

U.S. Cl. 423—468 30 Claims  
1. A process for purifying contaminated sulfonyl fluoride which comprises contacting the contaminated sulfonyl fluoride with at least one adsorbent selected from activated alumina and activated carbon, at a temperature of from about 0° C. to about 100° C. under conditions suitable for the selective adsorption of at least one impurity selected from hydrogen fluoride, hydrogen chloride, sulfur dioxide, and thionyl fluoride, and, thereafter, recovering the purified sulfonyl fluoride.

**4,950,465**  
**PHARMACEUTICAL COMPOSITION FOR RELIEVING SIDE EFFECTS OF PLATINUM-CONTAINING DRUGS**  
Toshio Sato, Tokushima; Yoshinosuke Fukuchi, and Kenji Toba, both of Tokyo, Japan, assignors to Mochida Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,686  
Claims priority, application Japan, Feb. 8, 1988, 63-26918  
Int. Cl.<sup>5</sup> A61K 35/22, 33/24, 31/28

U.S. Cl. 424—10 4 Claims  
1. A method for preventing or relieving side effects induced by the administration of cisplatin to a mammalian organism, said method comprising administering by injection of intravenous infusion to a mammalian organism in need of such prevention or relief an effective cisplatin-side effect relieving amount of ulinastatin.

**4,950,466**  
**REDUCTION OF THE SEVERITY OF 3'-AZIDO-3'-DEOXYTHYMIDINE-INDUCED ANEMIA USING A COMBINATION OF BENZYLACETYLURIDINE AND DIPYRIDAMOLE**  
Paul Calabresi, 27 Glen Ave.; James W. Darnowski, 6 Calderone St., both of Barrington, R.I. 02806, and Michael C. Wiemann, 11 Villa Ave., Providence, R.I. 02906

Filed Jun. 22, 1988, Ser. No. 210,882  
Int. Cl.<sup>5</sup> A61K 47/00, 31/505

U.S. Cl. 424—10 6 Claims  
1. A pharmaceutical composition comprising the active pharmaceutical agent a combination of dipyridamole and 5-benzylacetyluridine in association with a pharmaceutically acceptable carrier or diluent said dipyridamole and said 5-benzylacetyluridine being present in amounts sufficient to reduce anemia associated with the administration of a 3'-azido-3'-deoxythymidine.

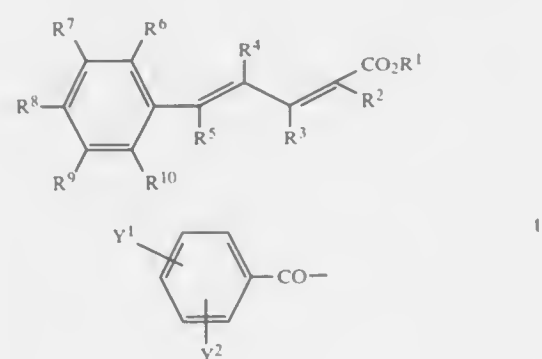
**4,950,467**  
**ULTRAVIOLET RADIATION ABSORBING COMPOSITIONS**

Charalambos J. Phalangas; Alfred J. Restaino, and Lau S. Yang, all of Wilmington, Del., assignors to ICI Americas Inc., Wilmington, Del.

Filed Nov. 14, 1986, Ser. No. 930,523  
Int. Cl.<sup>5</sup> A61K 7/40, 7/42, 7/44, 31/74

U.S. Cl. 424—59 9 Claims  
1. A method for protecting a plastic resin or skin of warm-blooded animal against the effects of ultraviolet radiation which comprises topically applying a composition comprising a oil, or solvent carrier having incorporated therein in an

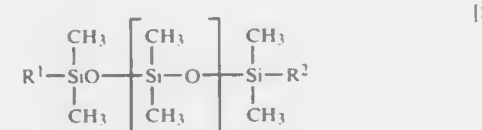
amount to provide protection against the harmful effects of ultraviolet radiation, a compound having formula I wherein R<sup>1</sup> is selected from the group consisting of an alkyl, alkenyl, alkynyl, aromatic and alkyl substituted aromatic group having up to 22 carbon atoms substituted or unsubstituted with monohydroxy or monoalkoxy groups, R<sup>2</sup> is selected from the group consisting of —H, R<sup>1</sup>, —CN and aryl, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are selected from the group consisting of R<sup>1</sup> and H and R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> are independently selected from the group consisting of H, alkyl groups having 1 to 10 carbon atoms, an —OR<sup>11</sup> group wherein R<sup>11</sup> is an alkyl group having 1 to 10 carbon atoms, and where R<sup>8</sup> can also be selected from the group consisting of —N(R<sup>12</sup>)<sub>2</sub> wherein R<sup>12</sup> is H or R<sup>11</sup>, —COR<sup>11</sup>, CO<sub>2</sub>R<sup>11</sup> or —COCH<sub>2</sub>COR<sup>11</sup> and wherein R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup> may be selected from the group consisting of a hydroxyl group or a group of the formula II wherein Y<sup>1</sup> and Y<sup>2</sup> may be hydrogen, hydroxyl or methoxy wherein said formulas are:



**4,950,468**  
**HAIR TREATING COMPOSITION**  
Takanari Nakamura, Takatsuki; Hiroshi Nishimura, Kyoto, and Makoto Tada, Takatsuki, all of Japan, assignors to Sunstar Kabushiki Kaisha, Osaka, Japan

Filed Sep. 8, 1988, Ser. No. 241,843  
Int. Cl.<sup>5</sup> A61K 7/075, 7/08

U.S. Cl. 424—70 1 Claim  
1. A hair treating composition comprising:  
(a) 0.05 to 2.5% by weight of a dimethyl silicone rubber of the formula:



wherein R<sup>1</sup> and R<sup>2</sup> are methyl or hydroxy; and n is an integer of 4000 to 9000, and  
(b) 0.1 to 5.0% by weight of a quaternary ammonium salt ingredient consisting of stearyltrimethylammonium chloride and behenyltrimethylammonium chloride, the weight ratio of said dimethyl silicone rubber: said quaternary ammonium salt ingredient being from 1:2 to 1:10 and wherein the weight ratio of stearyltrimethylammonium chloride: behenyltrimethylammonium chloride is from 9:1 to 1:9.

**4,950,469**  
**D-GL CONJUGATE THERAPY**  
David H. Katz, La Jolla, Calif., assignor to La Jolla Pharmaceutical Company, San Diego, Calif.  
Division of Ser. No. 869,393, May 30, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 254,597  
Int. Cl.<sup>5</sup> A61K 39/00, 37/66, 43/00

U.S. Cl. 424—85.1 8 Claims  
1. A method of inhibiting the proliferation of T-Cell Growth Factor-dependent tumor cells in a patient comprising introducing an effective amount of D-GL T-Cell Growth Factor conjugate into the patient.

**4,950,470**  
**METHODS AND COMPOSITIONS EMPLOYING INTERFERON-GAMMA**  
W. Robert Fleischmann, Galveston, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.  
Filed Oct. 6, 1986, Ser. No. 916,008  
Int. Cl.<sup>5</sup> A61K 45/02; C07K 15/26

U.S. Cl. 424—85.5 6 Claims  
1. An interferon-gamma containing composition prepared by a process comprising the steps of:  
(a) providing an aqueous preparation which includes interferon gamma;  
(b) treating the aqueous preparation with a reducing agent to reduce disulfide moieties to sulfhydryl moieties to produce a reduced preparation; and  
(c) treating the reduced preparation with an acylating agent to acylate the reduced sulfhydryl moieties and thereby inhibit the formation of disulfide bonds in the preparation.

**4,950,471**  
**ACETATE SELECTED BACILLUS THURINGIENSIS AND THE METHOD OF USE**  
Russell S. Travers, Takoma Park, and Phyllis A. W. Martin, Lanham, both of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 18, 1987, Ser. No. 50,450  
Int. Cl.<sup>5</sup> A01N 63/00; C12N 15/01, 1/22, 3/00

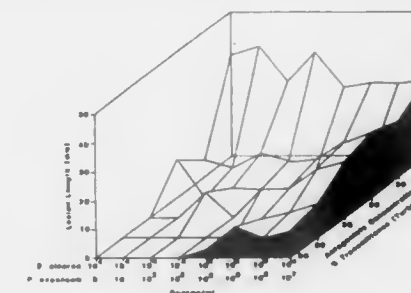
U.S. Cl. 424—93 14 Claims  
9. A method for controlling lepidopteran insects comprising subjecting the insects to an effective insecticidal amount of a sporogenic, crystalliferous mutant of *Bacillus thuringiensis* having the identifying characteristics of a strain selected from the group consisting of NRRL B-18195, NRRL B-18196 and NRRL B-18197, wherein said strain is characterized as having the ability to produce bypyramidal crystals composed of toxic protein and requiring a leucine and valine containing nutrient medium for growth, sporulation and crystal production.

**4,950,472**  
**BIOCONTROL OF GREY-MOLD IN POME FRUITS USING ACROMONIUM BREVE**  
Wojciech J. Janisiewicz, Martinsburg, W. Va., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 24, 1988, Ser. No. 159,915  
Int. Cl.<sup>5</sup> A01N 63/00

U.S. Cl. 424—93 7 Claims  
1. A process for biologically controlling the postharvest

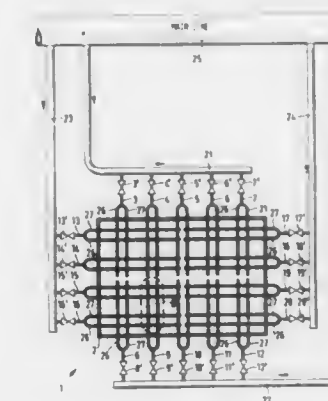
disease grey-mold in pome fruits comprising subjecting the fruit to an aqueous solution of a strain of *Acromonium breve*



having the identifying characteristics of NRRL 18307 in an amount effective to inhibit the development of *Botrytis cinerea*.

**4,950,473**  
**METHOD FOR REDUCING NITROGEN OXIDES IN FLUE GAS**  
Claus Flockenhaus; Manfred Galow; Klaus Merkel, all of Essen; Hans-Eugen Bühler, Königstein, and Hartmut Kainer, Wiesbaden, all of Fed. Rep. of Germany, assignors to Didier Engineering GmbH, Essen and Didier-Werke AG, Wiesbaden, both of, Fed. Rep. of Germany  
Filed Oct. 27, 1988, Ser. No. 263,470  
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736306

Int. Cl.<sup>5</sup> C01B 21/00; B01J 8/00  
U.S. Cl. 423—235 18 Claims



1. A method of reducing nitrogen oxides in flue gas comprising the steps of:  
flowing said flue gas through a flue gas duct having at least one cross section;  
establishing a plurality of cross-sectional portions of said cross section which said plurality of said cross-sectional portions are combined to form said cross section;  
determining for each of said cross-sectional portions an effective concentration of said nitrogen oxides within said flue gas in said each of said cross-sectional portions;  
distributing a reducing agent into said flue gas flowing through said each of said cross-sectional portions;  
said distributing of said reducing agent including controlling a quantity of said reducing agent distributed to said each of said cross-sectional portions which said quantity corresponds to said effective concentration of said nitrogen oxides as determined for said each of said cross-sectional portions; and  
passing said flue gas with said reducing agent therein to a catalytic means downstream of said cross section to cause



said quantities of said reducing agent to reduce said effective concentrations of said nitrogen oxides.

**4,950,476**  
**METHOD OF CATALYTICALLY OXIDIZING ALCOHOL VAPOR ACCOMPANIED BY VARYING AMOUNTS OF EXCESS OXYGEN**

Eugene C. Sa, Farmington Hills; Thomas J. Korniski, Livonia, both of Mich.; William L. H. Watkins, Toledo, Ohio, and Haren S. Gandhi, Farmington Hills, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 6, 1986, Ser. No. 927,889

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 53/36

2 Claims

**4,950,474**  
**COMBINATION CORROSION AND SCALE INHIBITING SYSTEM CONTAINING PHOSPHONATE/AMINE REACTION PRODUCT**

Charles J. Hinrichsen, and Frederick W. Valone, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Aug. 1, 1988, Ser. No. 226,332

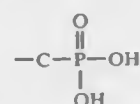
The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> C23F 11/167; E21B 41/02

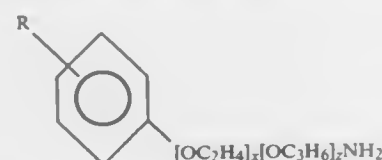
U.S. Cl. 422—15

17 Claims

16. A method of protecting metals from scale and corrosive agents in hydrocarbon and aqueous fluids which comprises contacting metal with an effective amount of the reaction product of a phosphonate compound having at least two phosphonate groups of the formula



with an amine compound represented by the formula



wherein R is an alkyl group containing about 5 to about 12 atoms, x equals about 1 to about 20, and z equals about 1 to about 20.

**4,950,475**  
**NOVEL FILM-FORMING GELS WITH HIGH CONCENTRATIONS OF HUMECTANTS AND EMOLLIENTS**

Mohan Vishnupad, Monroe, and Jose Ramirez, Trumbull, both of Conn., assignors to Imaginative Research Associates, Inc., Bridgeport, Conn.

Filed Jul. 19, 1988, Ser. No. 221,292

Int. Cl.<sup>5</sup> A61K 31/745, 31/21

U.S. Cl. 424—83

6 Claims

1. A film-forming gel comprising:  
(a) equal parts of a water-dissipatable polyester and water in a combined amount from 30% to 80% by weight of the total composition; and  
(b) humectant in an amount from 10% to 40% by weight of the total composition;  
said gel composition forming a non-transferrable film upon drying.

**4,950,477**  
**METHOD OF PREVENTING AND TREATING PULMONARY INFECTION BY FUNGI USING AEROSOLIZED POLYENES**

Heinz J. Schmitt, Millington, N.J.; Donald Armstrong, New York, N.Y., and Edward M. Bernard, Alandale, N.J., assignors to Memorial Hospital For Cancer and Allied Diseases, New York, N.Y.

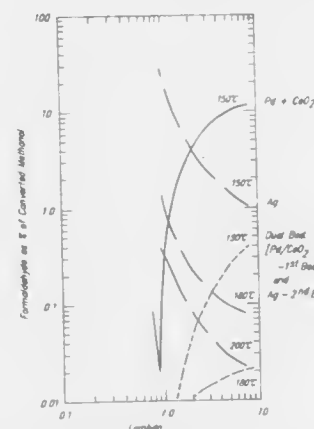
Filed Aug. 23, 1988, Ser. No. 236,040

Int. Cl.<sup>5</sup> A61K 9/12

U.S. Cl. 424—43

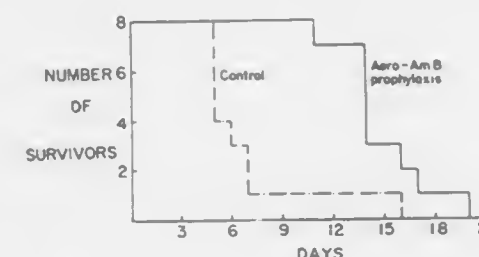
43 Claims

1. A method of preventing a pulmonary infection by Aspergillus in a subject susceptible to infection by Aspergillus comprising administering to the subject from about 0.01 mg/kg to about 6.0 mg/kg of a polyene or a pharmaceutically accept-



1. A method of substantially completely oxidizing alcohol and/or formaldehyde vapor contained in the exhaust gas of a methanol fueled engine, heated to a temperature of about 150° C., while using air/fuel mixtures of lambda from 0.9-7.0 for combustion in said engine, the method comprising the treatment of said exhaust gas mixture (i) by a first catalyst consisting substantially of palladium or palladium and rhodium in a weight ratio of Rh/Pd of 0-0.3, and (ii) subsequently immediately by a second catalyst, physically separate from said first catalyst, and consisting substantially of silver, whereby the oxidation process taking place within said first catalyst promotes more favorable conditions for increased alcohol or formaldehyde oxidation processes within said second catalyst, thereby to produce an oxidized exhaust gas mixture having less than 0.5% of the converted methanol as formaldehyde, and at least 96% conversion of said methanol vapor.

able derivative thereof in an aerosol of particles having an aerodynamic diameter between about 0.5 um and about 8.0 um



thereof, effective to prevent pulmonary infection by Aspergillus.

**4,950,478**  
**COSMETIC COMPOSITIONS CONTAINING NATURAL ESSENCES AND BENZYLIDENECAMPHOR DERIVATIVES**

Gerard Lang, Saint Gratien; Andre Deflandre, Orry-la-Ville, and Irena Beck, Villepinte, all of France, assignors to L'Oreal, Paris, France

Filed Jan. 23, 1984, Ser. No. 573,143

Claims priority, application Luxembourg, Jan. 26, 1983, 84608

The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 7/06, 7/42, 7/48, 9/12

U.S. Cl. 424—47

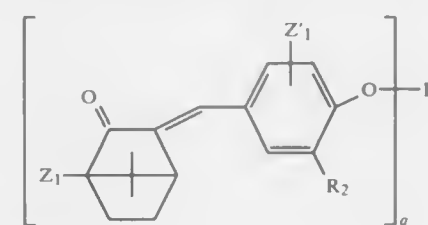
20 Claims

1. A detoxified cosmetic composition suitable for application to the skin in the form of a solution, a lotion, an emulsion, a gel, an aerosol or a solid stick which comprises

a radical essence containing a phototoxic dose of at least 10 ppm of furocoumarin, and

at least one benzylidenecamphor derivative which filters out Uv-A radiation and reduces the phototoxicity of said furocoumarin, said benzylidenecamphor derivative being selected from the group consisting of:

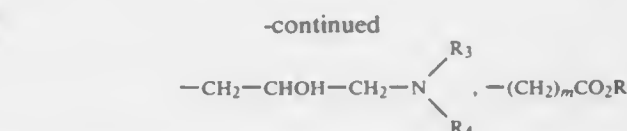
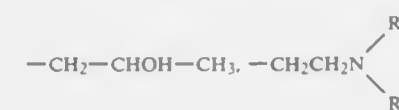
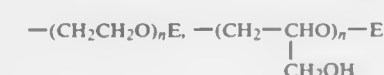
the 3-p-oxybenzylidenebornan-2-ones of the formula:



in which:

Z<sub>1</sub> and Z<sub>1</sub>' respectively denote a hydrogen atom, a radical SO<sub>3</sub>H or a salt of this sulphonic acid with an inorganic base, at least one of the two radicals Z<sub>1</sub> or Z<sub>1</sub>' representing a hydrogen atom;

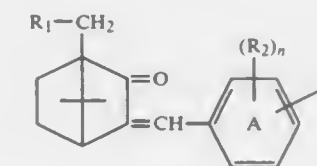
R<sub>1</sub> denotes a hydrogen atom, a linear or branched alkyl radical containing 2 to 18 carbon atoms, an alkenyl radical containing 3 to 18 carbon atoms or a radical



in which R denotes H, an alkyl radical containing 1 to 8 carbon atoms,  $-(\text{CH}_2)_3-\text{SO}_3\text{H}$  or a salt of this acid with an organic or inorganic base, or alternatively a divalent radical  $-(\text{CH}_2)_m$  or  $-\text{CH}_2-\text{CHOH}-\text{CH}_2-$ , m having the values 1 to 10 and n having the values 1 to 6, and R<sub>3</sub> and R<sub>4</sub> each representing a hydrogen atom or a linear or branched or hydroxylated alkyl radical, or together forming an aminoaliphatic heterocycle with the nitrogen atom;

R<sub>2</sub> denotes a hydrogen atom, an alkoxy radical containing 1 to 4 carbon atoms or a divalent radical-O- joined to the radical R<sub>1</sub> in the case where the latter is also divalent; and c denotes 1 or 2, is being understood that if c has the value 2, R<sub>1</sub> is a divalent radical, and that if R<sub>1</sub> denotes hydrogen, R<sub>2</sub> also denotes hydrogen; moreover, if R<sub>2</sub> denotes alkoxy, R<sub>1</sub> can also denote methyl;

the benzylidenecamphor derivatives of the formula:



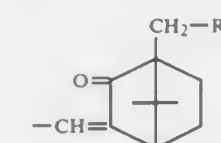
in which:

R<sub>1</sub> denotes a hydrogen atom or a radical  $-\text{SO}_3\text{M}$ , in which M denotes a hydrogen atom, an alkali metal or a group

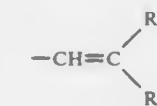


R denoting a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl or hydroxyalkyl radical;

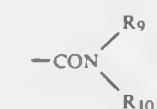
n=0, that is to say R<sub>2</sub> denotes a hydrogen atom; and Z represents a group



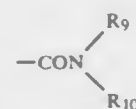
in which R<sub>4</sub> has the same meanings as R<sub>1</sub> and can be equal to R<sub>1</sub> or different from R<sub>1</sub>, or alternatively a group



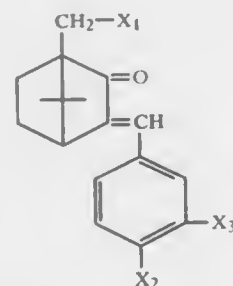
In which R<sub>3</sub> denotes a hydrogen atom, a C<sub>1</sub> to C<sub>4</sub> alkyl radical, an aryl radical unsubstituted or substituted by halogen atoms or by C<sub>1</sub> to C<sub>4</sub> alkyl or alkoxy groups, or a group  $-\text{CN}$ ,  $-\text{COOR}_7$  or



and R<sub>6</sub> denotes a group  $-\text{COOR}_8$  or

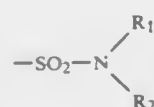


R<sub>7</sub> and R<sub>8</sub>, which are identical or different, being alkyl, alkenyl, cycloalkyl or aralkyl radicals containing at most 20 carbon atoms, which are unsubstituted or substituted by hydroxyl, alkoxy, amine or quaternary ammonium groups, and R<sub>9</sub> and R<sub>10</sub>, which are identical or different, denoting a hydrogen atom or alkyl, alkenyl, cycloalkyl or aralkyl radicals containing at most 20 carbon atoms, which are unsubstituted or substituted by hydroxyl, alkoxy, amine or quaternary ammonium groups, or alternatively if R<sub>5</sub> denotes a hydrogen atom or an alkyl or unsubstituted or substituted aryl radical, R<sub>6</sub> can also represent a radical —COO<sup>⊖</sup>M<sup>⊕</sup>, being defined as above, the methylenecamphor radical, on the one hand, and Z, on the other hand, being attached to the aromatic nucleus A in the para position relative to one another; and the sulphonates derived from 3-benzylidene-camphor of the formula:



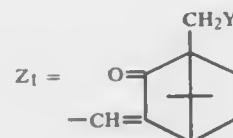
in which

X<sub>1</sub> denotes the radical Y;  
X<sub>2</sub> denotes a radical Z; and  
X<sub>3</sub> denotes a hydrogen atom,  
Y denoting the group



in which

R<sub>1</sub> denotes a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl or hydroxyalkyl radical and R<sub>2</sub> denotes a hydrogen atom, a linear or branched alkyl or alkenyl radical or a cycloalkyl, aryl or aralkyl radical, it being possible for these various C<sub>1</sub>-C<sub>20</sub> radicals to be substituted by one or more hydroxy, alkoxy or dialkylamino groups, it being impossible for R<sub>1</sub> and R<sub>2</sub> simultaneously to denote a hydrogen atom, and Z denoting one of the following groups:



**4,950,479**  
**METHOD OF INTERRUPTING THE FORMATION OF PLAQUE**  
Ira D. Hill, Clay Court, Locust, N.J. 07760, and Robert D. White, 4 Colonial Dr., Midland Park, N.J. 07432  
Filed Nov. 6, 1986, Ser. No. 927,805  
Int. Cl.<sup>5</sup> A61K 7/16, 7/30

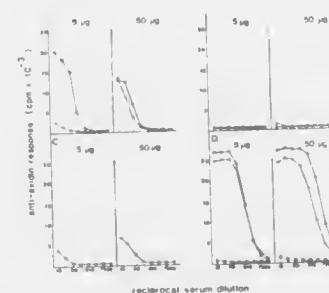
U.S. Cl. 424—49 18 Claims

1. A method of interrupting the formation of plaque comprising periodically introducing into the mouth an ingestible, nonfoaming, oral hygiene preparation that coats surfaces with a plaque matrix disrupting film, said preparation comprising a mixture of:

an ingestible surfactant;  
and an ingestible coating substance;  
wherein said coating substance is insoluble in said surfactant, and said mixture is nonfoaming during use.

**4,950,480**  
**ENHANCEMENT OF ANTIGEN IMMUNOGENICITY**  
Brian H. Barber, Mississauga, and George Carayannotis, Scarborough, both of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada  
Filed May 5, 1987, Ser. No. 46,095  
Claims priority, application United Kingdom, May 6, 1986, 8610983

Int. Cl.<sup>5</sup> A61K 39/00; C08H 1/00; G01N 53/00  
U.S. Cl. 424—85.8 21 Claims



1. A novel conjugate physiologically suitable for administration to a mammal to elicit an immune response, comprising at least one antigen which is a peptide or protein bonded to a monoclonal antibody specific for a histocompatibility antigen present on the surface of B-cells and macrophages.

**4,950,481**  
**SKIN REGENERATING AND HYDRATING COSMETIC COMPOSITIONS AND PROCESS FOR THE PREPARATION OF THE ACTIVE INGREDIENT**  
Tibor Kéri, and Jánosné Kristof, both of Debrecen, Hungary, assignors to Innofinace Altalanos Innovacios Penzintezet, Budapest, Hungary  
PCT No. PCT/HU85/00057, § 371 Date May 7, 1986, § 102(e) Date May 7, 1986, PCT Pub. No. WO86/01713, PCT Pub. Date Mar. 27, 1986  
PCT Filed Sep. 20, 1985, Ser. No. 879,113  
Claims priority, application Hungary, Sep. 21, 1984, 3568/84  
Int. Cl.<sup>5</sup> A61K 35/78

U.S. Cl. 424—195.1 8 Claims  
1. A skin-regenerating and hydrating composition which consists essentially of an aqueous or a water-miscible organic extract of maize waste pieces selected from the group consisting of nodulus cornstalk, corn hypsophyll, corncob and mixtures thereof as active ingredient together with a cosmetically acceptable vehicle or diluent.

**4,950,482**  
**ANTICOAGULANT/SURFACTANT RODENTICIDAL COMPOSITIONS AND METHOD**  
Garland G. Corey, Milltown, N.J., assignor to Sterling Drug Inc., New York, N.Y.  
Continuation-in-part of Ser. No. 780,136, Sep. 25, 1985, abandoned. This application Jul. 11, 1988, Ser. No. 217,728  
Int. Cl.<sup>5</sup> A01N 25/00, 25/08, 43/16, 25/02

U.S. Cl. 424—405 9 Claims

1. A rodenticidal composition containing an anticoagulant type rodenticide selected from the group consisting of warfarin, dicoumarol, bromodiolone, diphenacoum and brodifacoum and a fluorosurfactant selected from the group consisting of



and



where n, in each instance, is an integer from 3 to 8, said rodenticide and fluorosurfactant being present in a weight ratio from about 1:3 to about 1:30.

**4,950,483**  
**COLLAGEN WOUND HEALING MATRICES AND PROCESS FOR THEIR PRODUCTION**  
George Ksander, Redwood City, and Yasushi Ogawa, Pacifica, both of Calif., assignors to Collagen Corporation, Palo Alto, Calif.  
Continuation-in-part of Ser. No. 213,726, Jun. 30, 1988. This application Dec. 16, 1988, Ser. No. 286,303  
Int. Cl.<sup>5</sup> A61K 9/00

U.S. Cl. 424—422 10 Claims

1. A collagen sponge composition, comprising:  
a matrix having a density of about 0.01 to about 0.3 g/cm<sup>3</sup>, a thickness of about 1-20 mm, and having pores at least 80% of which are at least 35 µm in diameter, wherein said matrix comprises  
fibrillar atelopeptide collagen, wherein said fibrils are about 50-200 nm in diameter, and are not chemically cross-linked; and  
a synergistic wound-healing effective amount of TGF-β and FGF.

**4,950,484**  
**PHARMACEUTICAL TABLET, PHARMACEUTICAL GRANULATE AND PROCESS FOR THEIR PREPARATION**  
Margaretha Olthoff, Rijswijk; Leonardus W. T. De Boer, Hillegom, and Piet J. Akkerboom, Zoetermeer, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands  
Filed Mar. 2, 1988, Ser. No. 162,834  
Claims priority, application European Pat. Off., Mar. 2, 1987, 87200357.9  
Int. Cl.<sup>5</sup> A61K 9/20, 9/16

U.S. Cl. 424—464 22 Claims  
1. Pharmaceutical tablet comprising a mixture of an amphoteric beta-lactam antibiotic, and as disintegrants, low-sub-

stituted hydroxypropylcellulose and a cellulose product selected from the group consisting of microcrystalline cellulose, microfibrillar cellulose and mixtures thereof.

**4,950,485**  
**HAIR RELAXER CREAM**  
Muhammad Akhtar, Bolingbrook, and Florine Newell, Chicago, both of Ill., assignors to Johnson Products Co., Inc., Chicago, Ill.  
Continuation of Ser. No. 173,318, Mar. 25, 1988. This application Aug. 25, 1989, Ser. No. 399,385  
Int. Cl.<sup>5</sup> A45D 7/04

U.S. Cl. 424—71 33 Claims

1. A phase-stable, highly alkaline aqueous composition suitable for use as a cosmetic base for a no-base hair relaxer, the composition comprising an oil-in-water emulsion containing a sufficient amount of a non-volatile inorganic alkaline material selected from the group consisting of water-soluble alkali metal hydroxide and alkaline earth hydroxide dissolved therein to provide a pH of from about 12 to about 14 and non-water components, exclusive of the alkaline material, based on the total weight of the composition, on a dry solids basis, consisting essentially of:

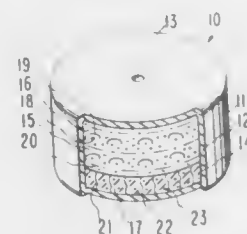
(a) about 15 to about 35 weight percent of a lipophilic oleaginous material including zero to about 2 weight percent of a lipophilic-modified clay gellant;  
(b) about 3 to about 15 weight percent of a primary nonionic emulsifier comprising a mixture of fatty alcohols having from about 12 to about 24 carbon atoms in their fatty carbon chain;  
(c) about 0.05 to about 10 weight percent of an auxiliary emulsifier comprising a hydrophilic nonionic emulsifier, an anionic emulsifier, and an amphoteric or zwitterionic emulsifier;  
(d) zero to about 5 weight percent of a polymeric quaternary nitrogen conditioning agent;  
(e) about 0.1 to about 10 weight percent of a water-soluble polyhydroxy compound having 3 to about 6 carbon atoms;  
the non-water components (a)-(e) co-emulsified together with the alkaline material making up no more than about 50 weight percent of the total weight of the composition, and all or a portion of the alkaline material providing an active alkaline hair relaxing agent.

**4,950,486**  
**DOSAGE FORM FOR TREATING CARDIOVASCULAR DISEASES**  
Atul D. Ayer, David R. Swanson, and Anthony L. Kuczynski, all of Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.  
Division of Ser. No. 104,006, Oct. 2, 1987, Pat. No. 4,816,263. This application Nov. 7, 1988, Ser. No. 267,904  
Int. Cl.<sup>5</sup> A61K 9/22

U.S. Cl. 424—473 1 Claim  
1. A composition for use in an osmotic device, said composition comprising about 2 weight percent to 30 weight percent of



isradipine, a polyethylene oxide comprising a molecular weight of about 200,000 to about 300,000 and a hydroxy-



propylethylcellulose comprising a number average molecular weight of about 9,000 to 15,000.

4,950,487

**TREATMENT, METHOD AND COMPOSITION FOR TREATING FUNGUS DISEASES OF DECIDUOUS TREES**  
Charles R. Freers, 2502 Lucas St., Muscatine, Iowa 52761  
Continuation of Ser. No. 580,829, Feb. 16, 1984, abandoned.  
This application Feb. 13, 1989, Ser. No. 310,853  
Int. Cl.<sup>5</sup> A01N 59/18

U.S. Cl. 424-645

13 Claims

1. A method of treating deciduous trees infected with fungi which produce toxins known to be harmful to trees, said method comprising:

introducing into the vascular system of trees a small but effective amount of an active composition of methanol in combination with a soluble inorganic mercury salt and with a *Pseudomonas* bacterial nutrient.

4,950,488

**PROCESS OF USING PRECIPITATED AMORPHOUS SILICA OR SILICATE AS GRINDING AID FOR FISH MEAL OR FISH FOOD**

Uwe Schweitzer, Karlstein, Fed. Rep. of Germany; Peter Hartwig, Ramsey, N.J.; Robert T. Herz, Jr., Norwalk, Conn., and Robert Steepy, Elmwood Park, N.J., assignors to DeGussa AG, Frankfurt am Main, Fed. Rep. of Germany  
Filed Aug. 22, 1989, Ser. No. 396,915  
Int. Cl.<sup>5</sup> A23K 1/10; A23L 1/326

U.S. Cl. 426-1

12 Claims

1. A process for preparation, of free-flowing fish food comprising the steps of: admixing a grinding aid additive selected from the group consisting of precipitated amorphous silica, precipitated amorphous silicate or amorphous silica gel with a feed selected from the group consisting of fish food and fish meal, and grinding the resulting admixture.

4,950,489

**PREPARATION OF DRIED FORMS OF LEAVENING BARMS CONTAINING AN ADMIXTURE OF CERTAIN LACTOBACILLUS AND SACCCHAROMYCES SPECIES**  
Monica A. Spiller, Los Altos, Calif., assignor to Alton Spiller, Inc., Los Altos, Calif.

Continuation-in-part of Ser. No. 187,163, Apr. 28, 1988, abandoned. This application Jan. 31, 1989, Ser. No. 304,131  
Int. Cl.<sup>5</sup> A21D 2/36, 8/04; A23L 1/105

U.S. Cl. 426-18

26 Claims

1. A dried form of a leavening barm comprising viable cells of a maltose-fermenting *Lactobacillus*, viable cells of a non-maltose-fermenting *Saccharomyces*, whole grain flour, nonvolatile fermentation products and 5-12% water.

4,950,490

**TACO SHELL AND METHOD OF MANUFACTURE**  
Katy Ghiasi, St. Anthony Village, and Leslie L. Skarra, Tonka Bay, both of Minn., assignors to The Pillsbury Company, Pillsbury, Minn.

Continuation of Ser. No. 791,200, Oct. 25, 1985, abandoned.  
This application Aug. 6, 1987, Ser. No. 82,969  
Int. Cl.<sup>5</sup> A21D 13/00

U.S. Cl. 426-138

31 Claims

1. A cooked and friable starch based food item made from flour, said food item including at least one delaminated portion having two walls defining a space therebetween with said walls being connected at the periphery of the space, the area of the delaminated portion being at least about 60% of the surface area of the food items, said food items having plasticizer including volatilizable plasticizer and nonvolatilizable plasticizer, said volatilizable plasticizer content above about 4% by weight of food item and a total plasticizer content of less than about 35% by weight of food item.

4,950,491

**PROCESS FOR PREPARING POWDERED FRUIT**  
Elemér Varga, Arany János ut 16, 1221 Budapest, Hungary  
Filed Aug. 9, 1989, Ser. No. 391,158

Int. Cl.<sup>5</sup> A23B 7/00

U.S. Cl. 426-242

8 Claims

1. A process for preparing powdered fruit, which comprises cutting fruit into smaller pieces, drying the cut fruit in a single step in microwave apparatus at a maximum temperature of about 65° C., and then grinding the dried matter.

4,950,492

**PROCESS FOR MAKING MICROWAVE PUFFED SNACK PRODUCTS**

Mimi A. Shachat, Rte. 1, Box 219, Riegelsville, Pa. 18077, and Sally J. Raphael, 315 East 72nd St., New York, N.Y. 10021  
Filed Oct. 2, 1989, Ser. No. 415,892  
Int. Cl.<sup>5</sup> A21D 6/00; A23L 1/00

U.S. Cl. 426-243

15 Claims

1. A process for preparing a puffed flavored food snack without the use of fats and/or oils comprising the steps of:  
A. forming a flour-free dough with a dry mix of starches comprising at least 20% by weight of tapioca starch, about 10-40% by weight of a flavoring agent and water;  
B. steaming said dough from part A until the dough is translucent, and then  
C. cooking the dough from part B with microwaves.

4,950,493

**PROCESS FOR MAKING ENZYME INACTIVATED VISCOUS FRUIT PULP AND PRODUCTS THEREFROM**  
Gerald W. Kobes, and Thomas A. Eisele, both of Selah, Wash., assignors to Tree Top, Inc., Selah, Wash.

Continuation of Ser. No. 935,291, Nov. 26, 1986, abandoned.  
This application Nov. 16, 1989, Ser. No. 437,290  
Int. Cl.<sup>5</sup> A23L 1/212

U.S. Cl. 426-399

24 Claims

1. A commercial process of making applesauce from apples having seeds embedded in a core within soft meat surrounded by a skin comprising:  
separating the skins and seeds from whole or large pieces of unpeeled apple having a cell structure that is not ruptured by cooking or macerating by pushing the apple meat, including the core, through small perforations to form pulp of finely divided meat pieces which are up to 3 millimeters in diameter and considerably smaller than the core size and free from stems, seeds, and skin;  
raising the temperature of the pulp almost instantaneously, and in less than the time necessary to cause discoloration from enzyme activity, to a discoloration enzyme-inactivating temperature, but less than final pasteurization

temperature to obtain a pulp which is substantially free from enzymatic discoloration;  
cooking the pulp to final pasteurization temperature; and  
dispensing the cooked pulp into containers.

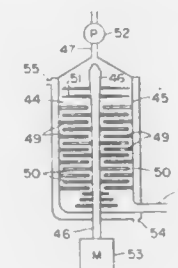
4,950,494

**PROCESS FOR PRODUCING FISH-PASTE PRODUCTS**  
Noboru Katoh, Kawagoe; Shuzo Sakuma, Urawa; Shiegi Sato, Funabashi; Sachio Wakayama, Tokyo, and Hisashi Nozaki, Shiki, all of Japan, assignors to Kabushiki Kaisha Kibun, Tokyo, Japan

Continuation of Ser. No. 57,523, May 26, 1987, Pat. No. 4,816,279. This application Jul. 18, 1988, Ser. No. 220,161  
Claims priority, application Japan, Sep. 26, 1985, 60-213075  
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A23P 1/00

U.S. Cl. 426-513

2 Claims



1. In a process for producing a fishpaste product comprising stirring and mixing a protein-containing starting material comprising principally a minced fish flesh by means of a stirring-mixing machine having pairs of rigid mating members which are movable relative to each other and which have a clearance therebetween through which the minced fish flesh is transferred, forming the resulting minced flesh into a specific shape, and then heating the thus formed minced flesh, the improvement which comprises continuously charging said starting material into said stirring-mixing machine, stirring and mixing the starting material so that shearing of the starting material occurs with minimum denaturation of the protein in the starting material, and continuously extruding the sheared material from said stirring-mixing machines.

4,950,495

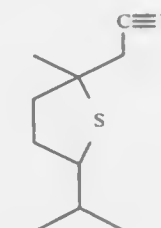
**TETRAHYDRO-5-ISOPROPYL-2-METHYL-2-THIOPHENE ACETONITRILE, ORGANOLEPTIC USES THEREOF AND PROCESS FOR PREPARING SAME**  
Richard M. Boden, Ocean, and Joseph A. McGhie, South Orange, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 273,016, Nov. 18, 1988, Pat. No. 4,883,884.  
This application Jul. 14, 1989, Ser. No. 379,944  
Int. Cl.<sup>5</sup> A23L 2/26

U.S. Cl. 426-536

1 Claim

1. A process for augmenting or enhancing the grapefruit aroma or taste of a foodstuff or chewing gum comprising the step of adding to said foodstuff or chewing gum from about 0.1 ppm up to about 50 ppm by weight based on the total weight of said foodstuff or chewing gum of tetrahydro-5-isopropyl-2-methyl-2-thiophene acetonitrile having the structure:



4,950,496

**FORTIFIED AND FLAVORED GLUTEN-BASED FOOD PRODUCT**

Sylvia Schur, 171 Sutton Manor, New Rochelle, N.Y. 10805  
Filed Apr. 28, 1989, Ser. No. 344,807  
Int. Cl.<sup>5</sup> A23J 1/12

U.S. Cl. 426-656

7 Claims

1. A palatable gluten-based self-sufficient food product consisting essentially of a gluten mass extracted from grain into which is kneaded L-lysine powder intermixed with a powdered seasoning agent which acts as a carrier for the L-lysine to distribute the L-lysine powder to provide a fortified and flavored mass which is divided into shaped units, the units being coagulated and set to provide a self-sufficient food product, the relative amount of L-lysine being sufficient to form in combination with the gluten a complete protein.

4,950,497

**METHOD AND APPARATUS FOR COATING INTERIOR SURFACES OF OBJECTS**

Donald J. Gillette, Guilford, and Bedrich Hajek, New Haven, both of Conn., assignors to S.L. Electrostatic Technology, Inc., New Haven, Conn.

Filed Jun. 15, 1989, Ser. No. 366,871  
Int. Cl.<sup>5</sup> B05D 7/22, 1/26; B05B 5/057

U.S. Cl. 427-28

23 Claims



1. Electrostatic fluidized bed coating apparatus adapted for coating of interior surfaces of objects comprising, in combination: a housing having a generally planar porous support member mounted therein to define within said housing a shallow fluidization chamber thereabove and a plenum therebelow, said housing being open at the top and having a peripheral wall portion with an upper peripheral edge component extending about the opening thereinto; charging means for electrostatically charging particulate material supplied to the upper surface of said support member; means for introducing air into said plenum for fluidization of particulate material disposed on





4,950,503

## PROCESS FOR THE COATING OF A MOLYBDENUM BASE

Jeremy D. Scherer, Dartmouth, and Paul E. Kutniewski, Fairhaven, both of Mass., assignors to Olin Corporation, New Haven, Conn.

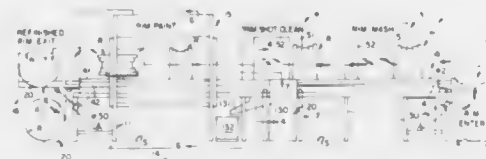
Filed Jan. 23, 1989, Ser. No. 299,372  
Int. Cl.<sup>5</sup> B05D 3/02, 3/04, 5/00, 1/32

U.S. Cl. 427—229 10 Claims

I. A process for coating a molybdenum base with an oxidation resistant layer of a sinterable second metallic material, comprising the steps of:

- coating at least a portion of said base with the powdered oxide of said second material;
- heating said base and said powdered oxide in a reducing atmosphere to a temperature sufficient to reduce any molybdenum oxide originally present on said base to molybdenum;
- further heating said base and said powdered oxide to a temperature sufficient to reduce said powdered oxide to said second material;
- sintering said second material to said base; and
- cooling said base and said second material in a neutral or reducing atmosphere.

central axis while in the second chamber, performing a second impact cleaning operation upon the rim/wheel while it rotates about its central axis in the second chamber, removing the rim/wheel from the second chamber after the second impact cleaning, applying a coating of protective material upon the rim/wheel, the second impact cleaning operation being performed by utilizing shot blast, the rim/wheel being subject to



the shot blast cleaning operation for a time and intensity sufficient to elevate the skin temperature thereof to an elevated temperature, the protective material being heat-curable, and the applying step being performed while the skin temperature of the rim/wheel is elevated whereby the latent elevated temperature relatively immediately dries the heat-curable protective material.

4,950,504

## MECHANICAL PLATING WITH OXIDATION-PRONE METALS

John J. Grunwald, Ramat Gan; Igal Klein, Karmiel, both of Israel, and Bryan Whitmore, New Haven, Conn., assignors to MacDermid, Incorporated, Waterbury, Conn.

Continuation of Ser. No. 921,961, Oct. 22, 1986, abandoned.  
This application Jan. 24, 1989, Ser. No. 302,108  
Int. Cl.<sup>5</sup> B05D 3/12, 7/14

U.S. Cl. 427—242 35 Claims

1. A process of mechanically plating a metal substrate comprising the steps of:

- providing an acidic plating liquid containing said metal substrate and an impaction media; and thereafter carrying out at least one sequence of the steps of:
- adding to said acidic plating liquid particulate aluminum, an immersion metal compound, in an amount which will permit immersion metal in its metallic state to coat the aluminum particles to prevent the aluminum from oxidizing, and an etching agent, in an amount effective to remove surface oxides from the particulate aluminum, the immersion metal compound and the etching agent being added in amounts to permit the aluminum to be mechanically plated onto said metal substrate; and
- agitating the acidic plating liquid, whereby said impaction media strikes said metal substrate and causes the particulate aluminum coated with the immersion metal in its metallic state to adhere to said metal substrate as a mechanically plated coating having a thickness of 0.1 to 5.3 mils.

4,950,505

## METHOD FOR REFINISHING A RIM/WHEEL

Robert D. Fogal, Chambersburg, Pa., assignor to International Marketing, Inc., Chambersburg, Pa.

PCT No. PCT/US87/01169, § 371 Date Jan. 23, 1989, § 102(e)  
Date Jan. 23, 1989, PCT Pub. No. WO88/09234, PCT Pub. Date Dec. 1, 1988

PCT Filed May 22, 1987, Ser. No. 333,381  
Int. Cl.<sup>5</sup> B05D 3/12

U.S. Cl. 427—327 31 Claims

1. A method of refinishing a rim/wheel comprising the steps of enclosing a rim/wheel in a first chamber, rotating the rim/wheel about its central axis while in the first chamber, performing a first liquid cleaning operation upon the rim/wheel while it rotates about its central axis in the first chamber, transferring the rim/wheel after the first liquid cleaning from the first chamber to a second chamber, rotating the rim/wheel about its

4,950,506

## WATER SHEETING ZWITTERIONOMERIC AMINOFUNCTIONAL SILOXANES

Daniel J. Halloran, Midland; Kenneth A. Kasprzak, Saginaw Township, both of Mich.; Stefano G. Savastano, Somerset, N.J., and Terence J. Swihart, Essexville, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 293,842, Jan. 5, 1989, Pat. No. 4,898,614.  
This application Jan. 4, 1990, Ser. No. 460,708  
Int. Cl.<sup>5</sup> B05D 3/02; B32B 9/04

U.S. Cl. 427—387 9 Claims

1. A method of sheeting water on a surface comprising applying to the surface before the surface is exposed to water a polish formulation containing as components thereof at least one member selected from the group consisting of waxes, solvents, surfactants, thickening agents, abrasives, dyes, odorants, and other ingredients normally used in making polishes, the polish formulation including therein a zwitterionometric composition which is the reaction product of an acid anhydride and an aminofunctional siloxane selected from the group consisting of (A) a combination of a hydroxyl endblocked polydimethylsiloxane having a viscosity in the range of about 10 to 15,000 cs at twenty-five degrees centigrade, and a silane selected from the group consisting of those having the general formulae  $R''(R'O)_3-Si(CH_2)_3NHR'''$  and  $R''(R'O)_3-SiR_nHCH_2CH_2NH_2$  wherein  $R''$  is a hydrogen atom or a methyl radical,  $R'''$  is a monovalent hydrocarbon radical free of aliphatic unsaturation and contains from one to six carbon atoms,  $n$  has a value of from zero to two,  $R'$  is an alkyl radical containing from one to four carbon atoms, and  $R$  is a divalent hydrocarbon radical free of aliphatic unsaturation and contains three to four carbon atoms, (B) a combination of a hydroxyl endblocked polydimethylsiloxane having a viscosity in the range of about 10 to 15,000 cs at twenty-five degrees centigrade, a silane selected from the group consisting of those having the general formulae  $(R_1O)_3-SiR_2NHR_3$  and  $(R_1O)_3-SiR_2NHCH_2CH_2NH_2$  wherein  $R_1$  is an alkyl radical containing from one to four carbon atoms,  $R_2$  is a divalent hydrocarbon radical free of aliphatic unsaturation and contains from three to four carbon atoms, and  $R_3$  is selected from the group consisting of the hydrogen atom and the methyl radical, and a silane having the general formula  $X_3SiZ$  wherein  $X$  is selected from the group consisting of alkoxy and acyloxy radicals containing from one to four carbon atoms, and  $Z$  is a nonhydrolyzable radical selected from the group consisting of hydrocarbon radicals, halogenated hydrocarbon radicals, and radicals composed of carbon, hydrogen, and oxygen atoms, wherein the oxygen atoms are present in hydroxyl groups, ester groups, or

ether linkages, there being from one to ten carbon atoms in the  $Z$  radical, and (C) a combination of a polydimethylsiloxane having a viscosity in the range of about one to 15,000 cs at twenty-five degrees centigrade, and a silane selected from the group consisting of those having the general formulae  $R''(R'O)_3-Si(CH_2)_3NHR'''$  and  $R''(R'O)_3-SiR_nHCH_2CH_2NH_2$  wherein  $R''$  is a hydrogen atom or a methyl radical,  $R'''$  is a monovalent hydrocarbon radical free of aliphatic unsaturation and contains from one to six carbon atoms,  $n$  has a value of from zero to two,  $R'$  is an alkyl radical containing from one to four carbon atoms, and  $R$  is a divalent hydrocarbon radical free of aliphatic unsaturation and contains three to four carbon atoms.

4,950,507

METHOD FOR APPLYING A COATING COMPOSITION HAVING A SPARKLING LUSTER CONTAINING  $FeO_3$  PARTICLES OF HEXAGONAL PLATE-LIKE SHAPE

Shizuo Miyazaki, Okazaki; Kazuyuki Kuwano, Toyota, and Norio Fujita, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki, Toyota and Kansai Paint Co., Ltd., Amagasaki, both of Japan

Filed Dec. 1, 1988, Ser. No. 278,508  
Claims priority, application Japan, Dec. 7, 1987, 62-310395; Mar. 4, 1988, 63-51823

U.S. Cl. 427—419.2 7 Claims

1. A coating method comprising the steps of applying a color coating composition to a substrate, applying a metallic coating composition containing a metallic pigment to the layer of the color coating composition and applying a clear coating composition to the layer of the metallic coating composition, the method being characterized in that the color coating composition is able to form a layer having a Munsell value of 0 to 6; that the metallic coating composition contains the metallic pigment and a vehicle as main components, the metallic pigment being iron oxide particles of hexagonal plate-like shape which contain at least 80% by weight of  $\alpha$ -iron oxide crystals; that about 90% by weight or more of the metallic pigment has a longitudinal size of about 30  $\mu m$  or less and 40% by weight or more of the pigment has a longitudinal size of about 5 to about 15  $\mu m$ ; that the thickness of the pigment is about 1/10 to about 1/20 of the longitudinal size of the pigment; and that the amount of the pigment used is about 0.1 to about 30 parts by weight per 100 parts by weight of the vehicle (as solids).

4,950,508

## ARTICLE, COMPRISING RIGID PLANAR PARTS ASSEMBLED AT AN ANGLE

Thierry Cherouse, 688, rue des Communaux, Grignon, France (73200), and Christophe Riviere, La Piderie - Saint Herblon, Ancenis, France (44150)

PCT No. PCT/FR85/00298, § 371 Date Aug. 19, 1986, § 102(e)  
Date Aug. 19, 1986, PCT Pub. No. WO86/02415, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 21, 1985, Ser. No. 882,911  
Claims priority, application France, Oct. 19, 1984, 84/16014  
Int. Cl.<sup>5</sup> E04B 2/74; F16B 12/10, 12/20

U.S. Cl. 428—12 13 Claims

1. An article which comprises two pieces having rectilinear slots which engage one another by mutual insertion to achieve an angular assembly of the said pieces; characterized in that the said pieces are in the form of rigid nondeformable panels which are relatively thin with respect to the length and width of their two major faces, which panels have openings passing through them from one major face to the other, wherewith the said slots open out into said openings from one side of the latter, portions of the slots being disposed beyond the openings which they have passed over across a solid part of the other piece which solid part is disposed opposite to the slot on the said other piece, across the respective opening from said slot on the said other piece, the two panels being aligned and the article

further including a locking key having the same height as the openings, which key is fitted in said openings and supported on two opposing sides of said openings which sides do not have slots in them, and which key is rigid and non-deformable in its



height dimension lengthwise of the slots so as to prevent the slots from being moved back through the said openings, which movement would result in the disengagement of the slots and the separation of the pieces.

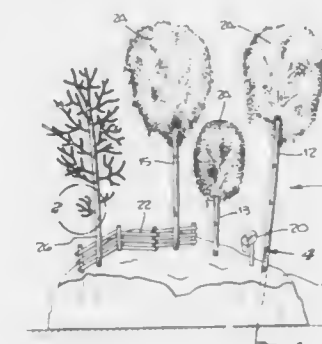
4,950,509

## MINIATURE TREE SCULPTURE

Donald T. DeMott, 1452 Branch Ave., Simi Valley, Calif. 93065  
Filed Jul. 17, 1989, Ser. No. 381,028

Int. Cl.<sup>5</sup> A47G 33/06 14 Claims

U.S. Cl. 428—18



1. A miniature tree sculpture comprising: a miniature tree comprising an imitation tree trunk and branch structure; and a plurality of imitation leaves adhesively bonded to said tree, said imitation leaves being selected from the group consisting of grass seeds and seed hulls.

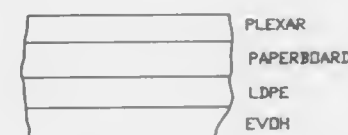
4,950,510

## MULTIPLE LAYER PAPERBOARD LAMINATE

Debra F. Massouda, Silver Spring, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Jun. 14, 1989, Ser. No. 365,860  
Int. Cl.<sup>5</sup> B65D 5/56, 5/62

U.S. Cl. 428—34.2 11 Claims



1. A paperboard container, the container being constructed from a laminate comprising:

- (a) a paperboard substrate having opposed inner and outer surfaces;
- (b) a layer of heat-sealable, modified polyolefin copolymer of ethylene and ethylene-vinyl acetate coated onto the outer surface of said paperboard substrate;
- (c) a layer of low density polyethylene polymer (LDPE) coated onto the inner surface of said paperboard substrate; and,
- (d) an inner, product-contact barrier layer coated onto said layer of low density polyethylene (LDPE), said barrier layer being selected from the group consisting of ethylene vinyl alcohol copolymer (EVOH), polyethylene terephthalate, polyethylene isophthalate, acid- or glycol- modified copolymers of polyethylene terephthalate and polyethylene isophthalate, polyamides, polycaprolactans and polycarbonates.

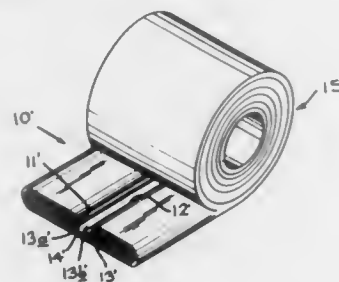
4,950,511

## PLASTIC FILM CONSTRUCTION

Michael A. Francis, Mechanicsville, Va., assignor to Tredegar Industries, Inc., Richmond, Va.  
Division of Ser. No. 946,938, Dec. 29, 1986, Pat. No. 4,795,415, which is a division of Ser. No. 735,655, May 20, 1985, Pat. No. 4,674,999, Continuation of Ser. No. 423,955, Sep. 27, 1982, abandoned. This application Sep. 2, 1988, Ser. No. 240,071. The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 31/02

U.S. Cl. 428—35.2



1. A roll of greenhouse film comprised of a large tubular plastic sheet having flattened longitudinal edges at least two plies in thickness, such edges being folded over about 180° toward an imaginary line drawn longitudinally along the upper median portion of the sheet such that there are at least four plies on each side of the imaginary line, said tubular plastic sheet further having a median surface longitudinally slit the length thereof thereby providing a pair of free film edges, said slit constituting or being proximate to the imaginary line, the so-folded and so-slit tubular plastic sheet being longitudinally rolled over the imaginary line into a cylindrically shaped object or roll in which said free film edges are separated from the superposed roll by at least two plies of said folded plastic sheet.

4,950,512

## LAMINATED MATERIAL AND FORMED ARTICLE FOR PACKAGING PHOTOGRAPHIC MATERIALS

Mutsuo Akao, Minami-Ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan  
Filed Jul. 6, 1984, Ser. No. 628,444

Claims priority, application Japan, Jul. 9, 1983, 58-124103

Int. Cl.<sup>5</sup> B27N 5/32

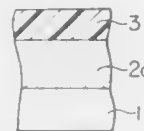
U.S. Cl. 428—35.8

17 Claims

1. A formed container having light shielding ability for packaging photographic materials, said container having an inner surface fully enclosing the photographic material and being comprised of a laminated material comprising:

- (a) a middle layer of a thermoplastic resin layer which con-

- tains any harmful substances adversely affecting photographic materials,
- (b) a photographically inactive outer layer of a thermoplastic resin layer having gas-permeability, and
- (c) a photographically inactive inner layer which is at least coextensive with the middle layer for closer proximity to



the photographic material than the middle and outer layers and having a lower gas-permeability than said outer layer (b) wherein the gas permeability of the outer layer is at least 1.2 times greater than the gas permeability of the inner layer, wherein at least one of the middle, outer and inner layers contains a light shielding substance.

4,950,513

## LAMINAR ARTICLES OF A POLYOLEFIN AND A NYLON/POLYVINYL ALCOHOL BLEND

Vinod K. Mehra, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 17, 1988, Ser. No. 181,119

Int. Cl.<sup>5</sup> B29D 7/24; C08F 29/30

U.S. Cl. 428—36.7

27 Claims

1. A laminar article comprising a combination of:

- (a) a polyolefin;
- (b) a melt blend of a polyamide and a polyvinyl alcohol component; and
- (c) an alkylcarboxyl-substituted polyolefin; wherein the blend (b) is present in the polyolefin (a) as a multitude of thin, substantially two-dimensional, parallel, and overlapping layers.

4,950,514

## PLASTIC PREFORM FOR FORMING BLOW MOLDED PLASTIC BODIES

Herbert Strassheimer, Windermere, Fla., assignor to Plasticon Patents, S. A., Geneva, Switzerland

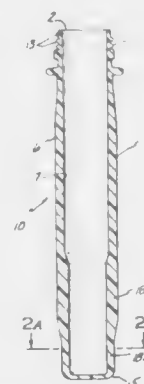
Continuation-in-part of Ser. No. 262,781, Oct. 26, 1988, Pat. No. 4,885,197. This application May 23, 1989, Ser. No. 354,461

The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B65D 1/02, 23/00

U.S. Cl. 428—36.92

11 Claims



1. A plastic preform for forming blow molded plastic bottles which comprises: a neck portion defining an opening; a tubular body portion depending therefrom; and an integral bottom structure depending from the tubular body portion wherein

said tubular body portion includes a lower portion with a thickened portion in said lower portion; said preform having an outside wall face and an inside wall face with the inside wall face of the tubular body portion adjacent the bottom structure and extending onto said bottom structure having a plurality of faces with terminal portions thereof; and scallop-shaped segments connecting the terminal portions of each face adapted to deform upon exposure to stresses prior to deformation of the faces and thereby become subject to an increased rate and degree of orientation.

4,950,515

## BLENDS OF POLYAMIDE, POLYOLEFIN, AND ETHYLENE VINYL ALCOHOL COPOLYMER

Charles D. Mason, Chatham; William Sacks, Gillette, both of N.J.; Theodore R. Engelmann, and Satyajit Verma, both of Baton Rouge, La., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 920,546, Oct. 20, 1986, abandoned.

This application Feb. 7, 1989, Ser. No. 309,009

Int. Cl.<sup>5</sup> C08L 77/00, 29/02, 23/04; C08J 5/18

U.S. Cl. 428—36.92

14 Claims

1. A bottle made of a composition comprising:

- from 50 to 99.4 percent by weight of a polyolefin; from 0.5 to 50 percent by weight of a polyamide; and from 0.1 to 10 percent by weight of an ethylene vinyl alcohol copolymer comprising from 77.4 to 95 mole percent ethylene groups and from 5 to 22.6 mole percent vinyl alcohol groups and less than 2.0 mole percent unhydrolyzed vinyl acetate groups, said bottle having discontinuous regions of said polyamide in a matrix of said polyolefin, said polyamide regions being in the form of platelets and being from 5 to 500 micrometers in their longest dimension and having a thickness of from 1 to 50 micrometers.

4,950,516

## POLYETHYLENE AS UV PHOTODEGRADANT FOR POLYSTYRENE

Frederick C. Schwab, Metuchen, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 11, 1989, Ser. No. 378,110

Int. Cl.<sup>5</sup> C08L 23/04, 23/18, 25/06

U.S. Cl. 428—36.92

12 Claims

1. An ultraviolet light exposed composition consisting essentially of crystal polystyrene which is clear and transparent and an amount ranging from 0.1 to 10 weight percent of the composition of a linear polymer of ethylene effective to accelerate the degradation of the polystyrene matrix on exposure to ultraviolet light, the exposed composition having a loss of molecular weight due to exposure to the ultraviolet light.

4,950,517

## BILATERAL ADHESIVE ASSEMBLY

C. Jim Loggins, Sheboygan, Wis., assignor to Mayline Company, Inc., Sheboygan, Wis.

Filed Aug. 1, 1988, Ser. No. 227,518

Int. Cl.<sup>5</sup> B32B 7/00

U.S. Cl. 428—40

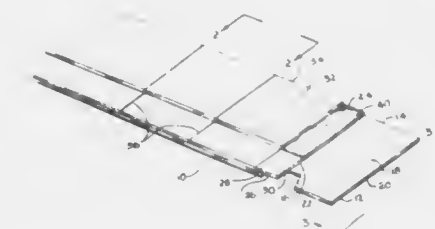
14 Claims

1. A bilateral adhesive assembly comprising:

- a thin carrier medium being substantially inhibiting to adhesive on at least one side thereof;
- a plurality of discrete stickers each having a first face and a second face, said first face having a pressure sensitive adhesive coated on at least a portion thereof and said second face having a pressure sensitive adhesive coated on a portion thereof, such that an adhesive bond formed between said first face and a surface is of greater adhesive strength than an adhesive bond formed between said second face and said surface, said stickers being contiguously disposed on said carrier medium with said first face of each sticker in contact with the same adhesive inhibiting side thereof and releaseably interconnected thereto by

means of the pressure sensitive adhesive compound coated on said first face; and

a plurality of protective tabs being substantially inhibiting to adhesive on at least one side thereof, each of said tabs having approximately the same length and width dimensions as each of said stickers and being disposed over the



pressure sensitive adhesive coated on said second face of one of said stickers with the adhesive inhibiting side of said protective tabs in contact with said pressure sensitive adhesive coated on said second face of said stickers, and releaseably interconnected thereto by means of the pressure sensitive adhesive compound coated on said second face of said stickers.

4,950,518

## CORE FOR SPOOLING STRIPS OF LABELS

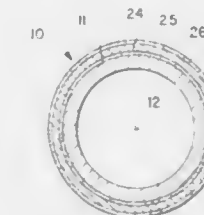
Carl J. Walliser, 1112 Windbrooke, Apt. 102, Prairie View, Ill. 60069

Filed Nov. 27, 1987, Ser. No. 126,237

Int. Cl.<sup>5</sup> B32B 7/00; B65H 75/28

U.S. Cl. 428—40

11 Claims



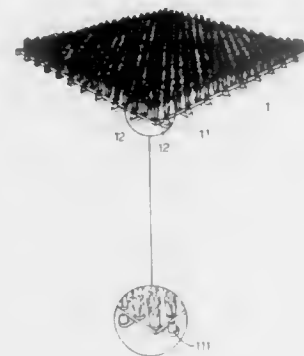
1. A core for spooling a web having the form of an elongated strip, said core comprising:

- (A) a substantially rigid smooth tube with cylindrical symmetry and an outer surface; and
- (B) a temporary, pressure-sensitive adhesive coating permanently adhered to the outer surface of said tube, said tube having said coating adhered its outer surface at some axial location on at least 85 percent of the circumference of said outer surface, said adhesive having a tack such that the removal of common bond paper adhered to said adhesive by pulling in a direction at 90 degrees will require less than about five ounces per inch of width of paper.
7. A core for spooling a web having the form of an elongated strip and including first and second web sections adhered to each other by a first temporary adhesive, said core comprising:
- (A) a substantially rigid smooth tube with cylindrical symmetry and an outer surface; and
- (B) a second temporary, pressure-sensitive adhesive coating permanently adhered to the outer surface of said tube, said tube having said coating adhered its outer surface at some axial location on at least 85 percent of the circumference of said outer surface, the force exerted by said second adhesive between said first section of said web and said tube, when said first section of said web is in contact with



said second temporary adhesive, being less than the force exerted by said first adhesive between said first and second sections of said web.

**4,950,519**  
**INTERCONNECTABLE ARTIFICIAL LAWN SECTIONS**  
 Dennin Huang, 2F, No. 1, Lane 9, Ningpo E. St., Taipei, Taiwan  
 Filed Apr. 21, 1989, Ser. No. 341,797  
 Int. Cl.<sup>5</sup> B32B 3/10  
 U.S. Cl. 428—44 6 Claims

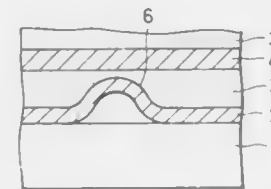


1. An artificial lawn section adapted for interconnection with similar lawn sections, comprising in combination a base member having first and second pairs of adjacent sides, said first pair of adjacent sides having a plurality of connecting members projecting outwardly therefrom, each connecting member having an upstanding projection member formed thereon, said base member having a plurality of throughbores formed therein, said throughbores having sets of different respective sizes, one of the sets including larger-sized bores, said throughbores being arranged in rows, wherein each row is formed with bores of the same size, a plurality of clusters of artificial grass being replaceably insertable from above into, and being non-rotatably retained in corresponding of said throughbores, and a plurality of cushioning members projecting from an underside of said base member, so as to facilitate drainage of rainwater passing to the ground through said larger-sized bores, and thereby keep the lawn-section substantially free of any water, whereby two rows of said throughbores respectively adjacent to the two sides constituting the second pair of adjacent sides formed with said larger-sized bores are capable of receiving corresponding of the upstanding projection members formed on an other lawn section below said base member, when the upstanding projection members of said other section are pushed upwardly into corresponding of said larger-sized bores formed in said base member.

**4,950,520**  
**OPTICAL RECORDING MEDIUM AND METHOD OF MANUFACTURING THEREOF**  
 Kunio Imai; Saburo Aso; Hideo Kudo, all of Saitama, and Masataka Uchidoi, Yamanashi, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo and Pioneer Video Corporation, Yamanashi, both of Japan  
 Filed Dec. 29, 1986, Ser. No. 947,304  
 Claims priority, application Japan, Dec. 27, 1985, 60-292911; Dec. 27, 1985, 60-292912  
 Int. Cl.<sup>5</sup> B32B 3/00  
 U.S. Cl. 428—64 5 Claims

1. An optical recording medium, comprising:  
 a substrate having a surface on which indent information bits

are formed, said substrate being made of a macromolecular material compound comprising components having a polar group at their side chains, and



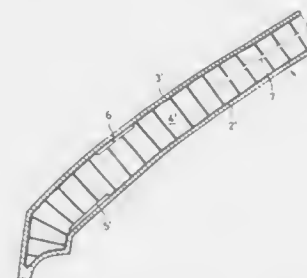
a reflective film formed on said surface of said substrate over said information signal bits, said reflective film being made of a metallic material, a crystal grain size of said reflective film being selected to be not larger than 50 nanometers.

**4,950,521**  
**COVERING MEMBER FOR CASING OF FIXED DISC MEMORY UNIT**  
 Tooru Takamura, and Noboru Shimamoto, both of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan  
 Filed Dec. 8, 1986, Ser. No. 938,813  
 Claims priority, application Japan, Dec. 11, 1985, 60-190477  
 Int. Cl.<sup>5</sup> B32B 3/14  
 U.S. Cl. 428—78 2 Claims



1. In a covering member for a casing of a fixed disc memory assembly of a computer, said covering member having a flange about its periphery and a sealing gasket secured thereto, the improvement which comprises said sealing gasket being made of a solid silicone rubber and being adhesively bonded to the flange with a silicone-based adhesive.

**4,950,522**  
**PLASTIC CONSTRUCTION MEMBER FOR A MOTOR VEHICLE**  
 Hans Vogt, Overath; Oskar Hurten, Koln, and Erwin Spiegel, Bergheim, all of Fed. Rep. of Germany, assignors to Ford Motor Company, Dearborn, Mich.  
 Filed Dec. 19, 1986, Ser. No. 944,639  
 Claims priority, application Fed. Rep. of Germany, Dec. 24, 1985, 3546050  
 Int. Cl.<sup>5</sup> B32B 3/12  
 U.S. Cl. 428—73 11 Claims



1. A motor vehicle body panel of sandwich construction, comprising a relatively rigid skin bonded to a surface of a core

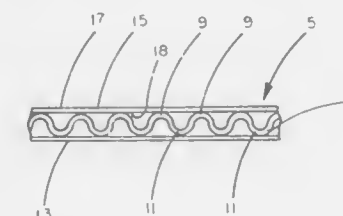
member and means defining crumple zones in limited selected areas for absorbing energy and dissipating impact forces, the connection of the skin to the core being selectively interrupted.

**4,950,523**  
**MANUFACTURE AND USE OF CUSHIONY PACKAGING**  
 Lewis R. Raszewski, Stevensville, Md., assignor to The Crowell Corporation, Newport, Del.  
 Continuation-in-part of Ser. No. 783,430, Oct. 4, 1985, Pat. No. 4,693,056, and a continuation-in-part of Ser. No. 873,819, Jun. 13, 1986, abandoned, and a continuation-in-part of Ser. No. 940,566, Dec. 12, 1986, Pat. No. 4,698,254. This application Aug. 6, 1987, Ser. No. 82,794  
 Int. Cl.<sup>5</sup> B32B 3/26  
 U.S. Cl. 428—159 7 Claims



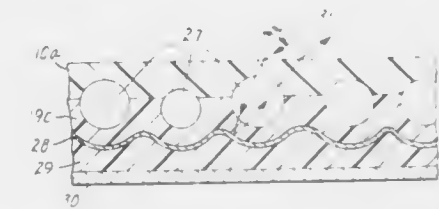
1. A cushiony support in the form of a sheet of open-face corrugated board to which is adhered a set of spaced stripes of cushiony plastic foam, the stripes being not over about 5 mm thick, about one to about fifteen mm wide and about 1/2 to about five mm apart.

**4,950,524**  
**BACON PAD**  
 Robert L. Hacker, 888 E. Shady La. #234, Neenah, Wis. 54956  
 Continuation-in-part of Ser. No. 156,217, Feb. 16, 1988, abandoned. This application Feb. 17, 1989, Ser. No. 311,729  
 Int. Cl.<sup>5</sup> B32B 3/02  
 U.S. Cl. 428—163 6 Claims



1. A bacon pad for cooking bacon or the like comprising:  
 a. a first outer ply of flat non-metallic liquid absorbent material having outside and inside surfaces and a size and shape suitable for holding a selected number of bacon strips thereon and for insertion into a microwave oven;  
 b. a center ply of non-metallic corrugated liquid absorbent material having opposed upper and lower peaks and being coterminous with the first ply, the lower peaks of the center ply being adhesively bonded to the inside surface of the first ply with an adhesive made from starch granules suspended in water; and  
 c. a second outer ply of non-metallic flat material, the second outer ply being adhesively bonded to the upper peaks of the corrugated center ply with an adhesive made from starch granules suspended in water and being coterminous therewith to create a three ply laminate, so that liquids secreted from the bacon during cooking is absorbed into the first outer ply and the center ply.

**4,950,525**  
**ELASTOMERIC RETROREFLECTIVE SHEETING**  
 Terry R. Bailey, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Continuation-in-part of Ser. No. 483,604, Apr. 11, 1983, Pat. No. 4,505,967. This application Oct. 23, 1984, Ser. No. 664,025  
 Int. Cl.<sup>5</sup> B32B 3/30, 27/40; G02B 5/128  
 U.S. Cl. 428—164 21 Claims



1. Elastomeric, embedded-lens retroreflective sheeting capable of being repeatedly stretched and relaxed while maintaining useful retroreflective properties comprising  
 (a) a monolayer of transparent non-stretchable microspheres;  
 (b) a sheet in which the microspheres are embedded comprising  
 (i) a transparent polymeric spacing layer underlying the back surface of the microspheres and having a back surface that is spaced from the back surface of the microspheres, and  
 (ii) a transparent polymeric cover layer covering the front surface of the microspheres; and  
 (c) a specularly reflective layer coated on said back surface of the spacing layer;  
 said transparent polymeric layers comprising elastomeric materials which may be repeatedly stretched and upon release of the stretching tension rapidly return to substantially their original dimensions.

**4,950,526**  
**WEB MATERIAL**  
 Michael Singleton, Yalding, Great Britain, assignor to Kimberly-Clark Limited, Larkfield, Near Maidstone, England  
 Continuation of Ser. No. 94,947, Sep. 9, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 337,217  
 Claims priority, application United Kingdom, Sep. 11, 1986, 8621917  
 Int. Cl.<sup>5</sup> A47K 3/02; B32B 5/26; D04H 3/14, 5/06  
 U.S. Cl. 428—166 9 Claims

1. Disposable mat material comprising an abrasion resistant pervious layer of a non-woven web having a basis weight of about 100 g/m<sup>2</sup> of bonded polypropylene filaments treated with or containing a surfactant and an absorbent layer having a basis weight of about 190 g/m<sup>2</sup> of microfibers, the pervious and absorbent layers being bonded intermittently, characterized in that the bonds are formed by ultrasonic means which acts to burn through the pervious layer and join the fibers in that layer by molten bonds with those in the absorbent layer whereby liquid may readily pass through the pervious layer to the absorbent layer in paths between the bonds.

4,950,527

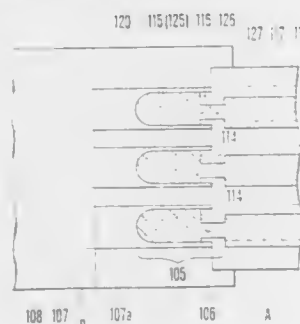
**STRUCTURE OF JOINING PRINTED CIRCUIT BOARDS AND PROCESS FOR PRODUCING THE SAME**

Akira Yamada, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 844,822, Mar. 27, 1986, Pat. No. 4,795,079. This application Dec. 5, 1988, Ser. No. 282,949

Claims priority, application Japan, Mar. 29, 1985, 60-065451; Mar. 29, 1985, 60-046106; Jul. 3, 1985, 60-102433  
Int. Cl.<sup>5</sup> B32B 9/00

U.S. Cl. 428—192



1. A printed circuit board for use in joining a plurality of printed circuit boards at joint pattern portions, thereof comprising,

- a plurality of joint patterns on a base plate cut to a comb teeth like shape so that a joint end portion of said joint pattern takes the form of extensions of said joint pattern; and
- base portions of said comb teeth shaped extensions being formed to a pattern of narrower width than said joint pattern.

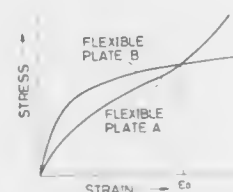
4,950,528

**ANTI-SEISMIC RUBBER**

Masao Iizuka; Atsuhiko Yasaka; Yoshide Fukahori, and Toshikazu Yoshizawa, all of Tokyo, Japan, assignors to Bridge-stone Corporation and Kajima Corporation, both of Tokyo, Japan

Filed Jan. 10, 1989, Ser. No. 295,625  
Claims priority, application Japan, Jan. 26, 1988, 63-15425  
Int. Cl.<sup>5</sup> B32B 7/02, 25/04

U.S. Cl. 428—212



1. An anti-seismic rubber comprising:

- a plurality of rigid plates; and
- a plurality of flexible plates laminated alternatively with the rigid plates to be firmly bonded together, said flexible plates being formed of at least one flexible plate A and a plurality of flexible plates B, said flexible plates A and B having modulus of elasticity and high and low strain zones so that the elasticity of the flexible plate A is lower than that of the flexible plate B in the low strain zone, and higher than that of the flexible plate B in the high strain zone, said anti-seismic rubber showing as a whole characteristics based on the flexible plate A when stress in the low strain zone is applied to the anti-seismic rubber, and said anti-seismic rubber showing as a whole characteris-

tics based on the flexible plates B when stress in the high strain zone is applied to the anti-seismic rubber.

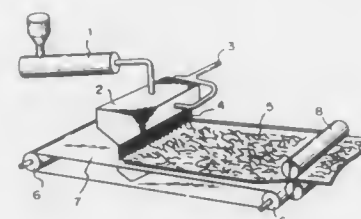
4,950,529

**POLYALLYLENE SULFIDE NONWOVEN FABRIC**

Masataka Ikeda, and Tsukasa Shima, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 9, 1988, Ser. No. 269,050  
Claims priority, application Japan, Nov. 12, 1987, 62-284346  
Int. Cl.<sup>5</sup> B32B 27/06

U.S. Cl. 428—224



1. A nonwoven fabric having a weight per unit area of 10 g/m<sup>2</sup> to 200 g/m<sup>2</sup> and a bulk density of 0.05 g/cm<sup>3</sup> to 0.50 g/cm<sup>3</sup> composed of an extra fine fiber obtained by melt-blowing a linear polymer of polyphenylene sulfide, wherein the mean diameter of the extra fine fiber is from 0.1 μm to 8.0 μm, and the melt flow rate of the extra fine fiber, measured under the condition of a load of 5 kg and a temperature of 315° C. in accordance with ASTM D-1238-82, is from 50 g per 10 minutes to 1,100 g per 10 minutes.

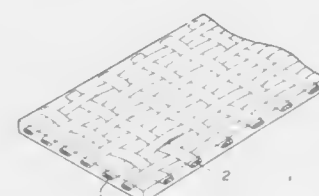
4,950,530

**CLUTCH FACING**

Kenji Shibutani, Osaka, Japan, assignor to Nippon Valqua Industries, Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 210,839  
Claims priority, application Japan, Jul. 14, 1987, 62-176655  
Int. Cl.<sup>5</sup> B03D 15/00

U.S. Cl. 428—259



1. In a generally annular clutch facing comprising a fibrous substrate embedded in a matrix of a cross-linked polymeric binder, the improvement in which said fibrous substrate comprises a blend of 100 parts by weight of rock wool, from 10 to 50 parts by weight of organic fiber and from 5 to 50 parts by weight of glass fiber in the form of yarn, strand or cord, or in the form of fabric made thereof.

4,950,531

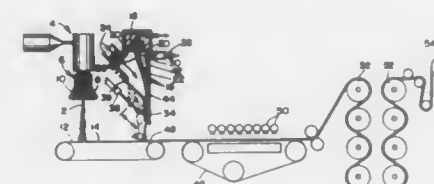
**NONWOVEN HYDRAULICALLY ENTANGLED NON-ELASTIC WEB AND METHOD OF FORMATION THEREOF**

Fred R. Radwanski, Norcross, Ga.; Lloyd E. Trimble, Dustin, Okla., and Leon E. Chambers, Jr., Roswell, Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 18, 1988, Ser. No. 170,200  
Int. Cl.<sup>5</sup> B32B 5/06

U.S. Cl. 428—284

18 Claims



1. A composite nonwoven non-elastic web material formed by hydraulically entangling a laminate comprising (a) at least one layer of meltblown fibers and (b) at least one layer of nonwoven material, said hydraulic entangling causing the entanglement and intertwining of said meltblown fibers and said nonwoven material so as to provide a nonwoven non-elastic web material.

4,950,532

**PROCESS FOR PRODUCING GLASS FIBER REINFORCED THERMOPLASTIC COMPRESSION MOLDED MATERIALS AND SAID MOLDED MATERIALS**

Balbadra Das, Allison Park; Narasimhan Raghupathi, Murrysville, and Thomas V. Thimons, Allison Park, all of Pa., assignors to Azdel, Inc., Shelby, N.C.

Filed Oct. 30, 1986, Ser. No. 925,015  
Int. Cl.<sup>5</sup> B29C 43/02, 67/14

U.S. Cl. 428—290

23 Claims



1. Process of molding fiber reinforced thermoplastic parts having at least one smooth surface, comprising:

- preheating at least one laminate of predominantly amorphous thermoplastic polymer, copolymer, terpolymer, blend or alloy that is reinforced with glass fiber strand reinforcing mat selected from the group consisting of needled, continuous glass fiber strand mat, chemically bonded glass fiber strand mat, and continuous glass fiber strand mat where the mat is present in an amount in the range of less than 40 weight percent of the laminate where preheating is at an effective temperature that is in the range of less than the degradation temperature of the polymer to a temperature to at least soften the amorphous polymer and to melt any semicrystalline polymer whereby the polymer has a viscosity less than 20,000 poise and whereby the laminate expands; and
- molding an effective charge of the heated laminate by compression molding at a pressure in the range of about 500 to about 6,000 psi and with at least one mold surface at a temperature in the range of from the T<sub>g</sub> temperature to 70° F. (39° C.) below the T<sub>g</sub> temperature of the polymer to reduce the shear modulus at the surface of the laminate

contacting said mold surface to produce the molded, reinforced, predominantly amorphous thermoplastic part.

4,950,533

**FLAME RETARDING AND FIRE BLOCKING CARBONACEOUS FIBER STRUCTURES AND FABRICS**

Francis P. McCullough, Jr., Lake Jackson; R. Vernon Snelgrove, Damon, both of Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 114,324, Jan. 28, 1987. This application Jul. 21, 1989, Ser. No. 383,836  
Int. Cl.<sup>5</sup> B32B 9/00; D02G 3/00

U.S. Cl. 428—292

10 Claims

1. A fire retarding and fire blocking fabric structure comprising: (a) an intimate blend of polymeric fibers selected from the group consisting of natural and synthetic fibers, and nonflammable, substantially irreversibly heat set, non-graphitic carbonaceous fibers having a carbon content greater than 65% and an LOI value of greater than 40, wherein said carbonaceous fibers are present in said blend in an amount greater than 7.5 percent by weight and (b) 0.5 to 20 percent by weight of materials selected from the group consisting of non-graphitic carbonaceous particles and platelets having a carbon content greater than 65%.

4,950,534

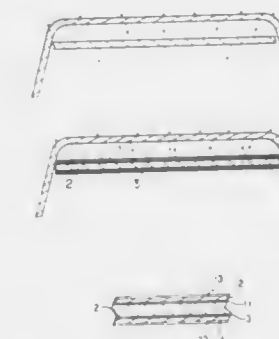
**MODIFIED CAR ROOF TRIM BOARD STRUCTURE**

San Y. Huang, 2 Lane 164, Pai-Lin 5th Rd., Pei-Tou, Taipei, Taiwan

Filed Feb. 28, 1989, Ser. No. 316,923  
Int. Cl.<sup>5</sup> B32B 3/26

U.S. Cl. 428—314.4

1 Claim



1. An automobile roof having in the interior surface a structure including:

- (a) an upper reflecting laminate (1) comprising a basic layer (11) of polyester covered by an upper layer of a metallic film layer (13), said metallic film being coated by a layer (12) of polyethylene by vacuum electroplating;
- (b) an intermediate heat insulating layer (2) made of polyethylene foam;
- (c) a lower reflecting laminate (3) comprising a basic layer of a polyester (31) coated with an upper layer of polyethylene (32), said polyethylene layer (32) being covered by a metallic film (33) by vacuum electroplating, said layer (1), (2) and (3) being attached to one another by heat pressing.



4,950,535

## MAGNETIC RECORDING MEDIUM

Hiroiyuki Arioka, Saku; Masharu Nishimatsu, Komoro, and Toshiaki Ide, Saku, all of Japan, assignors to TDK Corporation, Chuo, Japan

Continuation of Ser. No. 172,944, Mar. 22, 1988, abandoned, which is a continuation of Ser. No. 67,387, Jun. 24, 1987, abandoned, which is a continuation of Ser. No. 908,975, Sep. 17, 1986, abandoned, which is a continuation of Ser. No. 801,385, Nov. 22, 1985, abandoned, which is a continuation of Ser. No. 592,614, Mar. 23, 1984, abandoned. This application Dec. 6, 1988, Ser. No. 281,936

Claims priority, application Japan, Mar. 25, 1983, 58-48984 The portion of the term of this patent subsequent to Jan. 28, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—536

12 Claims

1. A magnetic recording medium comprising a substrate, a ferromagnetic metal film layer on one surface of said substrate having a thickness of 0.1 to 1  $\mu\text{m}$ , and a back coating layer formed on the other surface of said substrate from a composition comprising (a) a thermosetting resin binder comprising a vinyl chloride type copolymer, polyurethane, and an isocyanate compound, (b) a powder nonmagnetic substance dispersed in the binder, and (c) at least one lubricant selected from the group consisting of fatty acids and fatty acid esters, the back coating layer having a thickness of 0.1 to 3  $\mu\text{m}$  to reduce curling.

4,950,536

## PRESSURE-ACTIVATABLE LIFT-OFF CORRECTING TAPE

Ian Hogarth; Andrew Scott, both of Turriff; Christina Abbott, Aberdeen, and Robert I. Wilkinson, Turriff, all of Great Britain, assignors to Caribonum Limited, Turriff, United Kingdom

Filed Oct. 3, 1988, Ser. No. 252,852

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733394

Int. Cl.<sup>5</sup> C09J 7/02

U.S. Cl. 428—343

17 Claims

1. Pressure-activatable correcting tape having a conventional carrier and a lift-off layer for removing images, the lift-off layer comprising: approximately 5 to 35% by weight of butyl rubber; approximately 30 to 90% by weight of wax; and approximately 0.1 to 5% by weight of a dispersant selected from the group consisting of a cationic, anionic and non-ionic agent; and wherein said lift-off layer is first formed by dispersing said butyl rubber, wax and dispersant in an aqueous medium.

4,950,537

## COLORED FOAMLIKE PRESSURE-SENSITIVE ADHESIVE TAPE

George F. Vesley, Hudson, Wis., and Patrick G. Zimmerman, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 143,461, Jan. 13, 1988, abandoned. This application Feb. 22, 1989, Ser. No. 314,479

Int. Cl.<sup>5</sup> B32B 3/10, 27/30, 27/14

U.S. Cl. 428—345

9 Claims

1. A foamlike pressure-sensitive adhesive tape comprising a flexible carrier supporting one or more pressure-sensitive adhesive layers, at least one layer of said pressure-sensitive adhesive comprising from about 5 to about 65 volume percent pigment-coated microbubbles dispersed therein, said microbubbles having an average diameter from 5 to 200 micrometers, wherein said pigment coat comprises pigment particle aggregates with an average aggregate size being from about 0.5 microns to about 5 microns.

4,950,538

## FLUORERESIN-CONTAINING COATING COMPOSITION AND USE THEREOF

Norimasa Honda, and Masahiro Sano, both of Osaka, Japan, assignors to Daikin Industries Ltd., Osaka, Japan

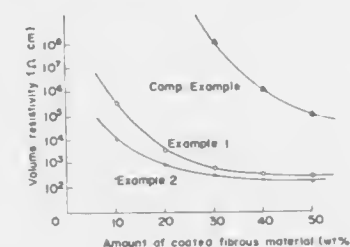
Division of Ser. No. 113,122, Oct. 27, 1987. This application Jul. 28, 1989, Ser. No. 386,115

Claims priority, application Japan, Oct. 28, 1986, 61-257181

Int. Cl.<sup>5</sup> B32B 5/02, 17/04, 27/12

U.S. Cl. 428—35.7

5 Claims



1. A fixing heater roller comprising a roller base member and a covering layer which comprises a fluororesin, a fibrous material having an electrically conductive oxide coated thereon, wherein said fibrous material has a diameter of from 0.01 to 10 micrometers and a length of from 1 to 100 micrometers and selected from the group consisting of fibrous potassium titanate, fibrous silicon carbide, fibrous silicon nitride, fibrous  $\alpha$ -alumina and fibrous boron carbide, an acrylic resin selected from the group consisting of polymethyl methacrylate, polymethyl acrylate and polyethyl acrylate and a liquid medium, wherein a weight ratio of the fluororesin to the fibrous material is from 95:5 to 50:50, and that of the fluororesin to the acrylic resin is from 100:0 to 85:15.

4,950,539

## PRODUCT AND METHOD OF PRODUCING A SMOOTH POLYESTER YARN

Hugo Specker, Sempach Stadt, and Paul Schaffner, Kriens, both of Switzerland, assignors to Viscosuisse SA, Emmenbrücke, Switzerland

PCT No. PCT/CH87/00143, § 371 Date Jun. 9, 1988, § 102(e) Date Jun. 9, 1988, PCT Pub. No. WO88/03185, PCT Pub. Date May 5, 1988

PCT Filed Oct. 20, 1987, Ser. No. 219,067

Claims priority, application Switzerland, Oct. 24, 1986, 4239/86

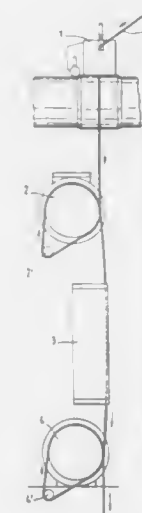
Int. Cl.<sup>5</sup> D02J 1/22; D01D 5/12

U.S. Cl. 428—364

5 Claims

1. A method of producing a smooth, cold-drawn multifila-

ment yarn from a polyester POY comprising the steps of homogeneously cold-drawing the polyester POY to a draw ratio of at least 1.6; and subsequently hot-relaxing the polyester POY under an overfeed of 10 to 20%.



4. A smooth, cold drawn, multifilament yarn comprising a polyester POY produced by homogeneous cold-drawing to a draw ratio of at least 1.6 and subsequent hot-relaxing under an overfeed of 10 to 20%, and having the following characteristics at one and the same time:

Initial modulus	200-800 cN/tex
Reversibility limit	4 to 12 cN/tex
Boil shrinkage less than	3%
Intrinsic viscosity	0.60-0.75 dl/g
Thermoshrinkage less than	2%
(at 160° C., 0.1 cN/tex pretension force)	
Shrinkage modulus	0-30 cN/tex
Uster less than	1.5%

4,950,540

## METHOD OF IMPROVING THE FLAME RETARDING AND FIRE BLOCKING CHARACTERISTICS OF A FIBER TOW OR YARN

Francis P. McCullough, Jr., Lake Jackson; R. Vernon Snelgrove, Damon; Frank W. Hale, Lake Jackson, all of Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 114,324, Oct. 28, 1987, Pat. No. 4,879,168. This application Jul. 11, 1989, Ser. No. 378,727

Int. Cl.<sup>5</sup> D02G 3/00

U.S. Cl. 428—369

7 Claims

1. A method of improving the flame retarding and fire blocking characteristics of a fiber tow or yarn of synthetic or natural fibers which comprises intimately blending into said tow or yarn at least 7.5% of heat set non-linear carbonaceous fibers having a carbon content of at least 65%, a nitrogen content between 5 and 35%, a LOI value greater than 40 and a reversible deflection of greater than 1.2:1 and an aspect ratio greater than 10:1.

4,950,541

## MALEIC ANHYDRIDE GRAFTS OF OLEFIN POLYMERS

Ricky L. Tabor, Lake Jackson; Gerald M. Lancaster, Freeport; Zdravko Jezic, Lake Jackson; Gene P. Young, Lake Jackson, and John O. Biesser, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 836,665, Mar. 5, 1986, abandoned, which is a continuation of Ser. No. 641,087, Aug. 15, 1984, abandoned, and a continuation-in-part of Ser. No. 836,667, Mar. 5, 1986, abandoned, and a continuation-in-part of Ser. No. 835,485, Mar. 3, 1986, abandoned, each is a continuation-in-part of Ser. No. 641,088, Aug. 15, 1984, abandoned, and a continuation-in-part of Ser. No. 229,078, Aug. 5, 1988, Pat. No. 4,927,888, which is a continuation-in-part of Ser. No. 905,099, Sep. 5, 1986, Pat. No. 4,762,890. This application Dec. 22, 1988, Ser. No. 289,084

Int. Cl.<sup>5</sup> D01F 8/06, 8/12, 8/14

U.S. Cl. 428—373

12 Claims

1. A bicomponent fiber comprising a core of a polyester or polyamide and a sheath of grafted linear ethylene polymer having succinic acid or succinic anhydride groups grafted thereon, said sheath covering or encapsulating said core.

4,950,542

## ARTICLES HAVING AROMA

Robert S. Barker, 47 George St., Bloomfield, N.J. 07003

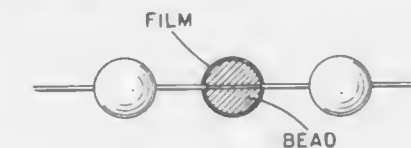
Continuation of Ser. No. 857,837, Apr. 30, 1986, abandoned.

This application Feb. 3, 1989, Ser. No. 307,210

Int. Cl.<sup>5</sup> C08G 14/00, 18/00

U.S. Cl. 428—403

4 Claims



1. A method of forming a coating composition for the sustained release of an essential oil fragrance, which comprises the steps of admixing 3 to 20 parts by weight of an essential oil and 97 to 80 parts by weight of an aqueous polyurethane latex; and mechanically agitating the admixture until a clear homogeneous colloidal dispersion is formed having a particle size between 0.1 and 1.0 micron and thereafter forming said dispersion into a clear cohesive film capable of sustained release of the essential oil fragrance.

4,950,543

## PROCESS FOR MAKING A STRUCTURAL ELEMENT SUBJECTED TO THERMAL STRESS WITH A PROTECTIVE COATING

Jörg Winter, Niederzier; Hans-Günter Esser, Linnich-Ederen; Francois Waelbroeck, and Peter Wlenhold, both of Linnich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany

Continuation of Ser. No. 94,122, Sep. 4, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 292,649

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1986, 3630419

Int. Cl.<sup>5</sup> B05D 3/06; B32B 9/00

U.S. Cl. 428—408

11 Claims

1. In a method for protecting a structural element, subject to a high thermal stress from at least brief exposure to electromagnetic radiation, with a layer covering the surface of said structural element, the improvement wherein said surface of said structural element which is made of a metallic material of high thermal conductivity and selected from the group which consists of molybdenum, tungsten, copper, aluminum and the alloys CuBe and TiZrMo is treated to remove surface impurities present on said surface and then an amorphous hydrogen-containing carbon layer is applied to coat the treated surface,

and thereafter the treated structural element is subjected to said electromagnetic radiation.

4,950,544

# POLYMER FILM COATED WITH WATER BASED COATING COMPOSITION

Robert E. Touhsaent, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 905,091, Sep. 8, 1986, Pat. No. 4,785,032.

This application Nov. 14, 1988, Ser. No. 270,888

Int. Cl.<sup>5</sup> B32B 9/04; H04B 1/00

U.S. Cl. 428—411.1

12 Claims

1. A polymer film possessing a substantially continuous, adherent coating of antistatic agent on at least one major surface thereof, the coating being applied to said film surface as a water based composition comprising:

- (a) at least one water soluble antistatic agent which is selected from the group consisting of N-acyl sarcosinates and N, N-bis-(2-hydroxyethyl) higher aliphatic amines;
- (b) at least one water soluble or water dispersible film-forming polymer; and
- (c) a solution of dispersion-forming amount of water.

4,950,545

# MULTIFUNCTIONAL FACIAL TISSUE

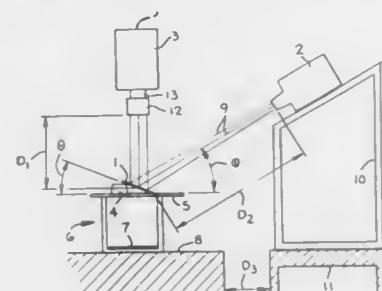
Rebecca S. Walter; Paulette M. Rosch, both of Appleton, Wis., and David N. Haney, San Diego, Calif., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Feb. 24, 1989, Ser. No. 316,048

Int. Cl.<sup>5</sup> B32B 27/00, 9/04; D04H 1/00

U.S. Cl. 428—446

4 Claims



1. A facial tissue comprising at least two tissue sheets, said facial tissue containing from about 0.1 to about 5 weight percent solids, based on the finished basis weight of the tissue sheets, of a silicone compound having a number average molecular weight of about 10,000 or greater and which is incorporated into the tissue with an aqueous carrier, said tissue having a Smear Index of 1.0 or less, a Lint Reduction Index of 5 or greater, and a Sink Time no more than 30 seconds greater than the Sink Time of the same facial tissue without the silicone compound.

4,950,546

# RADIATION GRAFTING OF ORGANOPOLYSILOXANES

Robert S. Dubrow, Redwood City; Catherine A. Dittmer, Mountain View, and William D. Uken, Fremont, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 57,707, Jun. 1, 1987, abandoned, which is a continuation of Ser. No. 730,691, May 2, 1985, abandoned.

This application Aug. 18, 1988, Ser. No. 233,941

The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 9/04

U.S. Cl. 428—447

10 Claims

1. An article comprising a polymeric support and grafted thereon a mixture of a crosslinked organopolysiloxane and from about 10 to about 90% by weight uncrosslinked organo-

polysiloxane oil which mixture has a cone penetration of about 100 to 350 (10<sup>-1</sup> mm) and an ultimate elongation of at least about 100%.

4,950,547

# MAGNETO-OPTICAL RECORDING MEDIUM HAVING PROTECTIVE FILM WITH INCREASED KERR EFFECT AND IMPROVED PROTECTION CHARACTERISTIC AND MANUFACTURING METHOD OF THE SAME

Yoshinori Maeno; Masanobu Kobayashi, and Kayoko Oishi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

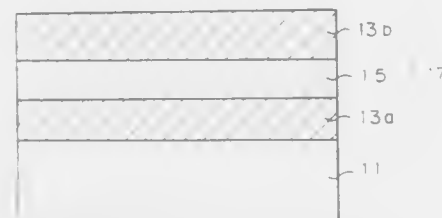
Filed Jul. 7, 1989, Ser. No. 376,591

Claims priority, application Japan, Jul. 8, 1988, 63-170567; Mar. 2, 1989, 1-50467

Int. Cl.<sup>5</sup> B32B 9/00; G11B 5/66

U.S. Cl. 428—471

3 Claims



1. A magneto-optical recording medium including a metal compound protective film and a magnetic film respectively formed on a substrate,

said protective film comprising at least one selected from the group consisting of a compound of strontium titanate (SrTiO<sub>3</sub>), a compound of barium titanate (BaTiO<sub>3</sub>), a nitrogen compound of strontium titanate (SrTiO<sub>3</sub>N<sub>x</sub>), and a nitrogen compound of barium titanate (BaTiO<sub>3</sub>N<sub>y</sub>), wherein the x in the compounds of strontium titanate and barium titanate is 2.7 ≤ x ≤ 3.0, and wherein the x and y in the nitrogen compounds of strontium titanate and barium titanate is 0 < x < 3 and 0 < y < 3.

4,950,548

# MAGNETIC RECORDING MEDIUM AND METHOD OF PRODUCING SAME

Kenji Furusawa, Yokohama; Katsuo Abe, Yokosuka; Hiroyuki Kataoka; Tokuho Takagaki, both of Yokohama; Yoshihiro Shiroishi, Hachioji, and Norikazu Tsumita, Kanagawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

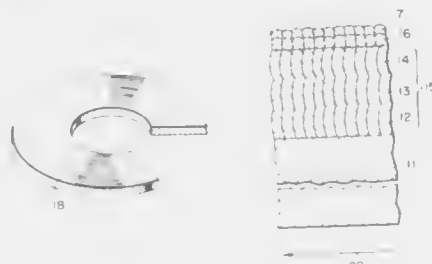
Filed May 23, 1989, Ser. No. 355,351

Claims priority, application Japan, May 27, 1988, 63-128177

Int. Cl.<sup>5</sup> G11B 5/66, 5/84; C23C 14/14, 14/34

U.S. Cl. 428—611

15 Claims



1. A magnetic recording medium comprising a nonmagnetic substrate, at least two sputtered layers of a chromium thin film having a bow-like columnar structure which chromium thin

film is laminated on the substrate, another sputtered layer of a magnetic alloy thin film laminated on the chromium thin film, and a protective layer laminated on the magnetic alloy thin film.

4,950,549

# POLYPROPYLENE ARTICLES AND METHOD FOR PREPARING SAME

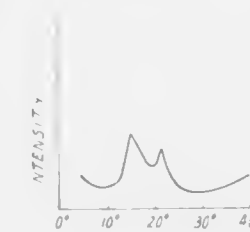
Richard J. Rolando, Oakdale, Minn.; Dennis L. Krueger, Hudson, Wis.; Daniel E. Meyer, Stillwater, and Thomas I. Insley, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 69,040, Jul. 1, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,409

Int. Cl.<sup>5</sup> B32B 27/00

U.S. Cl. 428—500

9 Claims



1. A polypropylene article comprising non-crystalline mesomorphous polypropylene having olefinic unsaturation-containing monomers graft-polymerized thereon by ionizing radiation in a dosage sufficient to degrade crystalline polypropylene, said non-crystalline mesomorphous polypropylene retaining useful tensile properties after storage periods of as long as at least about four months.

4,950,550

# COMPOSITE MEMBER FOR GENERATING VOLTAGE PULSES

Christian Radeloff, Bruchköbel; Gerd Rauscher, Alzenau, and Hans Warlimont, Freigericht, all of Fed. Rep. of Germany, assignors to Vacuumschmelze GmbH, Fed. Rep. of Germany

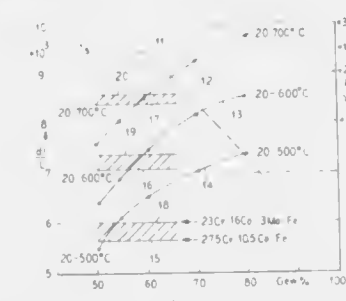
Filed Jun. 12, 1989, Ser. No. 364,964

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824075

Int. Cl.<sup>5</sup> B32B 15/01

U.S. Cl. 428—611

18 Claims



1. A composite marker element for generating a voltage pulse in the presence of a detection field, said marker element comprising:

- a soft-magnetic alloy core having a composition in weight percent of 55-82 nickel, 0-4 molybdenum, the remainder iron including melt-conditioned impurities;
- a hard-magnetic alloy jacket surrounding said core having a composition selected from the group consisting of a Co-V-Fe alloy having a composition 48-52 cobalt, 4-14 vanadium, the remainder iron including melt-conditioned impurities, and a Co-Cr-Fe alloy having a composition 21-30

chromium, 4-23 cobalt, 0.3 molybdenum, 0-1.5 silicon, the remainder iron including melt-conditioned impurities; and said core and said jacket having been mechanically stressed relative to each other by exposure to a temperature in the range of 500°-900° C.

4,950,551

# GAS BARRIER LAYER FOR METALLIC AND NONMETALLIC MATERIALS

Richard Doetzer, and Georg Iwantsch, both of Nuernberg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 250,946

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732806

Int. Cl.<sup>5</sup> B32B 15/04, 15/20

U.S. Cl. 428—624

3 Claims

1. A metallic material or a nonmetallic material with an electroconductive surface having a gas barrier layer on an electroconductive surface thereof, said gas barrier layer being an electroplated aluminum layer having a purity of greater than 99.99% aluminum.

4,950,552

# METHOD FOR PROTECTING STAINLESS STEEL PIPE AND THE LIKE IN GEOTHERMAL BRINE SERVICE FROM STRESS CORROSION CRACKING, AND ARTICLES MADE THEREBY

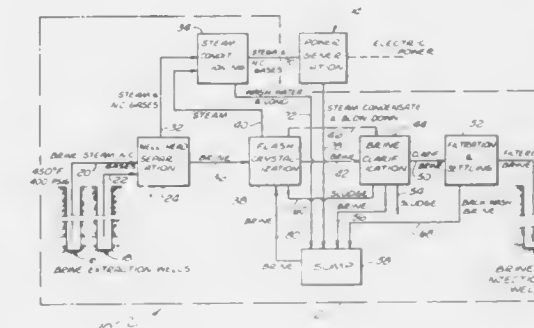
William E. Amend, Yorba Linda, and Kevin R. Kitz, La Quinta, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Sep. 30, 1988, Ser. No. 252,579

Int. Cl.<sup>5</sup> B32B 15/08

U.S. Cl. 428—626

48 Claims



1. A method for protecting a stainless steel flow-conducting component used in hot geothermal brine service from chloride stress corrosion caused by contact of geothermal brine with an exterior surface of said component comprising thermally coating said exterior surface with a metal having an electrode potential more negative than that of the stainless steel being protected.



4,950,553

**THERMALLY STABLE DUAL METAL COATED LAMINATE PRODUCTS MADE FROM POLYIMIDE FILM**

Daniel P. Walsh, Peabody, Mass., and Philip D. Knudsen, South Berwick, Me., assignors to Polyonics Corporation, Newburyport, Mass.

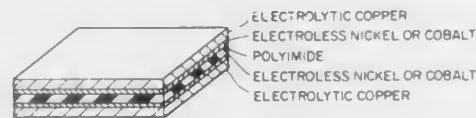
Continuation-in-part of Ser. No. 155,897, Feb. 16, 1988, Pat. No. 4,868,071, which is a continuation-in-part of Ser. No. 18,346, Feb. 24, 1987, Pat. No. 4,725,504, and a continuation-in-part of Ser. No. 18,342, Feb. 24, 1987, Pat. No. 4,806,395. This application Jan. 23, 1989, Ser. No. 300,044

The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B32B 15/08

U.S. Cl. 428—626

5 Claims



1. A polyimide laminate sheet product including as one layer of said laminate sheet product a polyimide sheet having two surfaces, each of said polyimide sheet surfaces being free of an adhesive and having a metal coating comprising an electroless nickel or cobalt coating and an electrolytic copper coating bonded to each of said nickel or cobalt coatings, said laminate sheet product being capable of passing the Modified Thermal Cycling IPC Test 2.4.9 Method E or F.

4,950,554

**COMPOSITE COPPER-MOLYBDENUM SHEET**

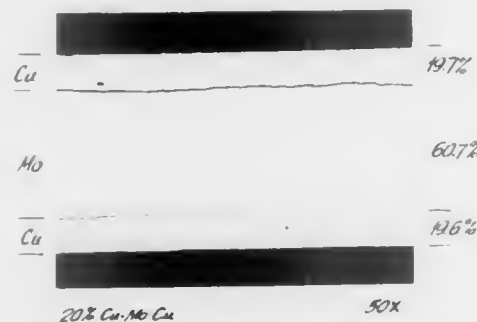
Ronald S. Fusco, Mentor, Ohio, assignor to AMAX Inc., New York, N.Y.

Filed May 30, 1989, Ser. No. 357,837

Int. Cl.<sup>5</sup> B32B 15/01

U.S. Cl. 428—663

5 Claims



1. A roll-bonded composite sheet product having at least one layer of copper and at least one layer of molybdenum, said product having been subjected to at least one hot working operation at a temperature in the hot working temperature range for copper and having a sharply defined cleavage-resistant interfacial zone between molybdenum and copper with no detectable diffusion between the two metals across said interface, said composite being resistant to the deleterious effects of multiple high temperature firings at temperatures up to 900° C.

4,950,555

**MAGNETIC RECORDING MEDIUM**

Tooru Michimori; Hideaki Nagasaka, both of Gunma, and Toshikazu Nakamura, Tokyo, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 54,500, May 27, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 294,998

Claims priority, application Japan, May 27, 1986, 61-120147; Sep. 4, 1986, 61-206898

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—694

21 Claims

1. A magnetic recording medium, having a coercive force squareness ratio of not less than 0.90, comprising a substrate having provided thereon by electroless plating a magnetic substance which is composed of an alloy comprising cobalt, phosphorus and at least one element selected from the group consisting of thallium, bismuth, arsenic and antimony in an amount of at least 0.05 to about 5 atomic percent.

4,950,556

**MAGNETO-OPTIC RECORDING MEDIUM**

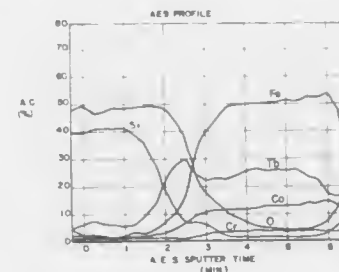
Richard F. Willson, Hudson, and Vaughn W. Halling, River Falls, both of Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 26, 1987, Ser. No. 112,735

Int. Cl.<sup>5</sup> G11B 5/66; H01F 1/00

U.S. Cl. 428—694

3 Claims



1. A magneto-optic recording medium comprising a substrate and a magneto-optic film on the substrate, the magneto-optic film having a magnetic anisotropy perpendicular to the film, the film including an alloy of terbium, cobalt, iron and chromium characterized by an oxygen content approximately between 2-6 atom percent midway through the thickness of the film.

4,950,557

**COMPOSITE TOOL AND A PROCESS FOR THE PRODUCTION OF THE SAME**

Tetsuo Nakai; Akio Hara, and Shuji Yazu, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 5,619, Jan. 7, 1987, abandoned, which is a continuation of Ser. No. 717,099, Mar. 28, 1985, abandoned.

This application Nov. 21, 1988, Ser. No. 275,653

Claims priority, application Japan, Apr. 3, 1984, 59-66125; Jun. 1, 1984, 59-113706; Jun. 1, 1984, 59-113707; Nov. 21, 1984, 59-247493

Int. Cl.<sup>5</sup> B22F 7/08; C23C 11/14; C04B 35/58

U.S. Cl. 428—698

5 Claims

1. A composite tool comprising an insert and a support of a hard metal or alloy, the insert and support being bonded by means of friction welding through an interlayer of a high strength iron group metals or alloys selected from the group consisting of Ni, Co, Fe, and alloys thereof with a thickness of at most 1 mm in which materials other than iron group metals are not diffused into said interlayer from said insert and support, wherein the insert is selected from the group consisting of (1) a sintered alloy containing, as a predominant component, at least one member selected from the group consisting of WC,

4,950,559

**RADIATION IMAGE STORAGE PANEL**

Satoshi Arakawa; Junji Miyahara, and Kenji Takahashi, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kaisei, Japan

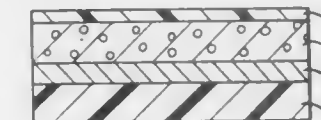
Continuation of Ser. No. 194,051, Jun. 30, 1987, abandoned, which is a continuation of Ser. No. 802,629, Nov. 29, 1985, abandoned, which is a continuation of Ser. No. 586,708, Mar. 6, 1984, abandoned. This application Apr. 4, 1989, Ser. No. 333,723

Claims priority, application Japan, Mar. 7, 1983, 58-37836

Int. Cl.<sup>5</sup> H05B 33/00

U.S. Cl. 428—690

7 Claims



1. A radiation image storage panel comprising:

a support;

a phosphor layer provided on said support, said phosphor layer comprising a binder and a stimutable phosphor dispersed therein;

a light-reflecting layer comprising a binder of material selected from natural polymers and synthetic polymers and a white pigment dispersed in said binder, said light-reflecting layer being provided between said support and said phosphor layer, said light-reflecting layer being colored with a colorant capable of absorbing a portion of stimulating rays for the stimutable phosphor.



pressure and high temperature directly or through an interlayer with a thickness of at most 0.5 mm to the BN compact, said hard sintered alloy of the substrate in the composite compacts of (2) and (3) being a cemented carbide consisting of at least one member selected from the group consisting of carbides, nitrides, carbonitrides of Group 4a, 5a, and 6a elements of the Periodic Table, solid solutions and mixtures thereof, bonded with an iron group metal, and wherein the hard metal or alloy support is steel or a hard sintered alloy.

4,950,558

**OXIDATION RESISTANT HIGH TEMPERATURE THERMAL CYCLING RESISTANT COATINGS ON SILICON-BASED SUBSTRATES AND PROCESS FOR THE PRODUCTION THEREOF**

Vinod K. Sarin, Lexington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Continuation of Ser. No. 103,332, Oct. 1, 1987, abandoned. This application Sep. 23, 1988, Ser. No. 250,980

Int. Cl.<sup>5</sup> B32B 7/04

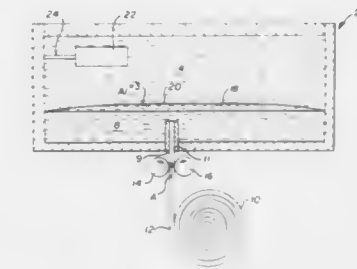
U.S. Cl. 428—698

17 Claims

1. A coated article comprising:

a fully dense shaped substrate body of a silicon nitride- or silicon carbide-based monolithic or composite material; an adherent, continuous, fully dense intermediate layer about 0.5-20 microns thick of an aluminum nitride material over and chemically bonded to the substrate body; and an adherent, continuous, fully dense first outer layer about 0.5-900 microns thick comprising an oxide of aluminum or zirconium over and chemically bonded to the intermediate layer;

wherein each layer is a graded layer changing in composition from the material over which it is deposited to the material of the layer and further to the material, if any, deposited thereon, so that no clearly defined compositional interfaces exist between the substrate and the layers, or between the layers.



1. An aluminum alloy comprising eutectic amounts of at least two alloying elements selected from the group consisting of bismuth, cadmium, scandium, gallium, indium, lead, mercury, thallium, tin, and zinc with the balance being aluminum and

said alloying elements being about 0.01 to 3.0 percent by weight of said alloy.

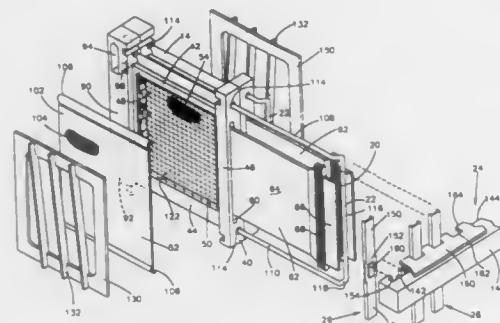
**4,950,561**  
**METAL-AIR BATTERY WITH EASILY REMOVABLE ANODES**

Andrew J. Niksa; Marilyn J. Niksa, both of Concord; Jay M. Noscal, Jefferson, and Thomas J. Sovich, Mentor-on-the-lake, all of Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed Jun. 29, 1989, Ser. No. 373,362  
Int. Cl.<sup>5</sup> H01M 8/02

U.S. Cl. 429—27

34 Claims



1. A metal-air battery comprising:  
one or more cells; each cell comprising:  
a frame having opposed faces; an air cathode sealed to each face of said frame;  
an access opening in said frame;  
an anode blank comprising a consumable end inserted through said access opening into the space between said air cathodes and an exposed end protruding from said opening for replacement of the anode blank through said opening; and  
a labyrinth seal molded directly onto the anode blank between said consumable end and said exposed end sealing said access opening.

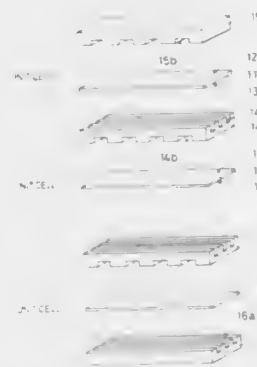
**4,950,562**  
**SOLID ELECTROLYTE TYPE FUEL CELLS**  
Toshihiko Yoshida; Tsukasa Shima; Fumiya Ishizaki; Hiroyuki Iwasaki; Isao Mukaizawa; Yoshiyuki Someya; Satoshi Sakurada, all of Saitama, and Osamu Yamamoto, Gifu, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,306  
Claims priority, application Japan, Apr. 21, 1988, 63-96757; May 23, 1988, 63-123958; Nov. 28, 1988, 63-300079; Dec. 28, 1988, 63-329105

Int. Cl.<sup>5</sup> H01M 8/10

U.S. Cl. 429—32

10 Claims



1. A solid electrolyte fuel cell comprising a plurality of solid

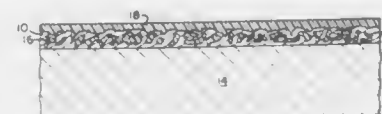
electrolyte plates, each being in the form of a flat plate and having a porous cathodic layer on one side and a porous anodic layer on the other side; the solid electrolyte plates are laminated together through at least one interconnector plate defined by a heat-resistant part composed of a metal complex oxide film formed on an electrically conductive heat-resistant alloy, the at least one interconnector plate having in both its sides grooves defining passages wherein an oxidizing agent and fuel gases are fed to the cathodic and anodic sides through said passages, and a current is obtained from anodic and cathodic electrodes located at upper and lower ends of an assembly of the connected electrolyte plates.

**4,950,563**  
**PHOSPHORIC ACID FUEL CELLS WITH IMPROVED CORROSION RESISTANCE**  
Robert C. Stewart, Jr., West Suffield, and Vincent J. Petraglia, Vernon, both of Conn., assignors to International Fuel Cells, South Windsor, Conn.

Filed Dec. 27, 1988, Ser. No. 289,869  
Int. Cl.<sup>5</sup> H01M 8/02

U.S. Cl. 429—34

4 Claims



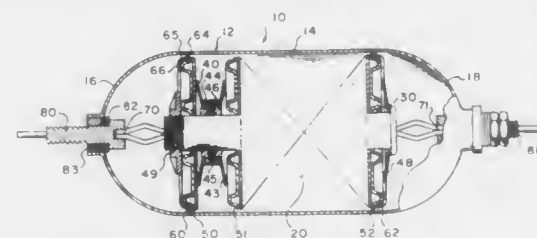
1. A phosphoric acid fuel cell having:  
(a) an anode for hydrogen oxidation,  
(b) a cathode for oxygen reduction, the anode and cathode being electrically connected external to the fuel cell;  
(c) a matrix impregnated with a phosphoric acid electrolyte in contact with said anode and cathode; and  
(d) corrosion prone ducts for supplying a hydrogen-rich gas to said anode, for supplying oxygen to said cathode, and for removing water produced at the cathode, wherein said ducts include a corrosion-resistant chromium fluorocarbon composite coating comprising a layer of pore-containing chromium plated on the duct surfaces, and perfluoroalkoxy polymer filling the pores of the chromium layer resulting in a corrosion-resistant coating which protects said ducts from the corrosive effects of said phosphoric acid, and demonstrates improved adhesion to the surfaces of said ducts.

**4,950,564**  
**METAL GAS CELL**  
Vincent J. Puglisi; Guy G. Rampel; Kenneth R. Richardson, and Orville G. Prickett, all of Gainesville, Fla., assignors to Gates Energy Products, Inc., Gainesville, Fla.

Filed May 2, 1988, Ser. No. 189,264  
Int. Cl.<sup>5</sup> H01M 2/10

U.S. Cl. 429—101

17 Claims



1. A metal gas cell comprising:

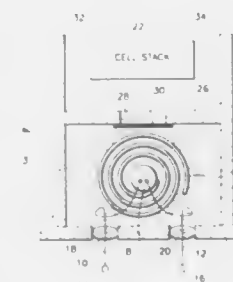
container means for containing a fluid at an elevated pressure;  
a plate stack positioned within said container means, said plate stack defining two ends and comprising a negative electrode plate, a positive electrode plate, and an electrically insulative, porous separator plate positioned between said negative electrode plate and said positive electrode plate; and  
securing means for inhibiting said plate stack from impinging said container means as a result of external forces acting on said cell, said securing means being fixedly secured to said container means at distant locations and being connected to both ends of said plate stack.

**4,950,565**  
**RESERVE ACTIVATED ELECTROCHEMICAL CELL**  
Paul F. Schisselbauer, Southampton, Pa., and Kurt F. Garoutte, Eden Prairie, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 9, 1989, Ser. No. 433,866  
Int. Cl.<sup>5</sup> H01M 6/38

U.S. Cl. 429—116

20 Claims



1. A reserve activated electrochemical cell comprising  
an electrochemical fluid storage reservoir having a fluid conduit through a wall of said reservoir for delivering the fluid from said reservoir,  
an expandable, free-floating capsule means located within said reservoir,  
an expandable, free-floating capsule means located within said reservoir,  
selectively operable means within said reservoir for expanding said capsule means to pressurize a fluid within said reservoir, and  
a selectively rupturable diaphragm means providing a fluid-tight rupturable seal across said conduit in the wall of said reservoir for releasing the electrochemical fluid from said reservoir upon a rupture of said seal by a pressurization of the fluid by said capsule means.

**4,950,566**  
**METAL SILICIDE ELECTRODE IN LITHIUM CELLS**  
Robert A. Huggins, 824 San Francisco Ct., Stanford, Calif. 94305, and Anaba A. Anani, P.O. Box 874, College Station, Tex. 77841

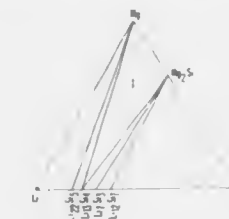
Filed Oct. 24, 1988, Ser. No. 261,512  
Int. Cl.<sup>5</sup> H01M 4/40

U.S. Cl. 429—218

4 Claims

1. In an electrochemical cell with lithium as the electroactive species, the cell having a positive electrode, a negative electrode and an electrolyte, the improvement comprising:

the negative electrode including a metal silicide, the metal silicide reacting with lithium and acting as a reversible



lithium reservoir during cell operation, the metal silicide including Mg<sub>2</sub>Si or Mn<sub>3</sub>Si.

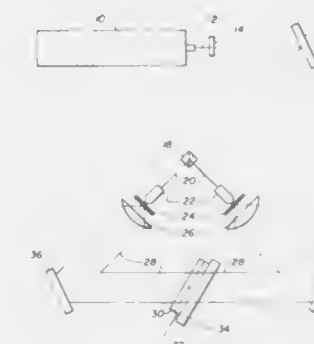
**4,950,567**  
**HOLOGRAPHIC OPTICAL COMBINERS FOR HEAD-UP DISPLAYS**

Dalen E. Keys, Wilmington; William K. Smothers, Hockessin; Albert F. Harrington, Claymont; Jacob Beutel, Hockessin, all of Del.; Scott R. Schicker, Logan, Utah, and Dillon F. Scofield, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 144,840, Jan. 15, 1988, abandoned. This application Jun. 22, 1989, Ser. No. 370,275  
Int. Cl.<sup>5</sup> G03H 1/04, 1/06

U.S. Cl. 430—1

30 Claims



1. An Optical Combiner for a Head-Up Display comprising a transparent substrate that bears a transparent polymeric film containing a mirror formed by a reflection hologram, said film having a refractive index modulation greater than approximately 0.001 and being formed by exposing to coherent light a composition consisting essentially of:

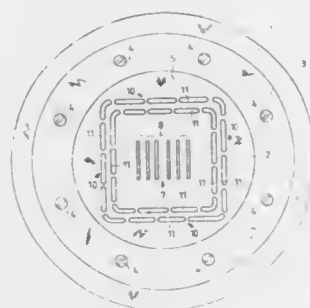
- (a) approximately 25 to 90% of a polymeric binder selected from the group consisting of polyvinyl acetate, polyvinyl butyral, polyvinyl acetal, polyvinyl formal, interpolymers containing major segments thereof and mixtures thereof;  
(b) approximately 5 to 60% of an ethylenically unsaturated liquid monomer containing at least one phenyl, biphenyl, phenoxy, naphthyl, naphthyloxy, heteroaromatic group containing up to three aromatic rings, chlorine or bromine moiety;  
(c) approximately 0 to 25% of a plasticizer; and  
(d) approximately 0.1 to 10% of a photoinitiator system activatable by actinic radiation  
wherein said percentages are weight percentages based on total film weight.



**4,950,568**  
**RADIATION MASK FOR THE LITHOGRAPHIC PRODUCTION OF PATTERNS**  
 Heinz Kraus, Traunreut, Fed. Rep. of Germany, assignor to Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Feb. 8, 1988, Ser. No. 155,070  
 Claims priority, application Fed. Rep. of Germany, Feb. 6, 1987, 3703582

Int. Cl.<sup>5</sup> G03F 1/00  
 U.S. Cl. 430—5 6 Claims



1. In a radiation mask for the lithographic production of patterns, including a carrier layer mounted in a support frame, the carrier layer having a structure corresponding to the pattern to be created, the improvement comprising an elastic portion defined in the carrier layer in the border portion thereof between the structure and the support frame whereby the dimensional accuracy of the structure is maintained during the occurrence of stress components.

**4,950,569**  
**ELECTROPHOTOGRAPHIC IMAGE ENHANCEMENT USING LUMINESCENT OVERCOATS**  
 John W. May, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

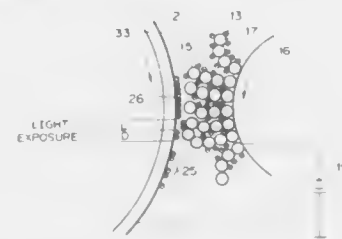
Filed Jan. 2, 1990, Ser. No. 459,612  
 Int. Cl.<sup>5</sup> G03G 13/22

U.S. Cl. 430—31 16 Claims  
 1. An electrophotographic recording process comprising the steps of:

- providing a photoconductive recording element comprising a photoconductive layer having an overcoat containing a luminescence-stimulable material, said material being responsive to luminescence-exciting incident actinic radiation to produce luminescence at a predetermined wavelength;
- forming a charge pattern on such overcoat by exposing the recording element to an imagewise pattern of actinic radiation, e.g. a pattern of x-rays;
- applying a toner to such overcoat to render the charge pattern visible, said toner being absorptive to both said luminescence-exciting actinic radiation and said luminescence;
- irradiating the toned overcoat to said actinic radiation to create an imagewise luminescence pattern modulated by the toner; and
- imagewise recording the resulting differences in luminescent intensity from the irradiated overcoat.

**4,950,570**  
**IMAGE-FORMING PROCESS USING PHOTSENSITIVE TONER**  
 Yumiko Sano; Kazuhito Takaoka, and Yosinobu Umetani, all of Osaka, Japan, assignors to MITA Industrial Co., Ltd., Osaka, Japan

Filed Nov. 28, 1988, Ser. No. 276,476  
 Int. Cl.<sup>5</sup> G03G 13/44, 13/24, 13/22  
 U.S. Cl. 430—55 22 Claims

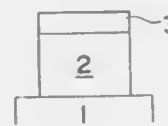


1. An image-forming process which comprises arranging two electrode surfaces, at least one having a curvature face and at least the other being transparent, to confront each other, forming a layer of a photosensitive toner on one of the electrode surfaces, applying a bias voltage so that the polarity of the toner layer-supporting electrode surface is the same as the polarity of charges on the toner and the polarity of the confronting electrode surface is reverse to the polarity of charges on the toner, imagewise irradiating the toner layer with light through the transparent electrode surface at a part where both the electrode surfaces are contacted with each other through the photosensitive toner layer, and transferring the unexposed toner toward the confronting electrode surface, thereby forming a positive image with the transferred toner.

**4,950,571**  
**PHOTSENSITIVE MEMBER COMPOSED OF CHARGE TRANSPORTING LAYER AND CHARGE GENERATING LAYER**  
 Hideo Hotomi, Suita; Izumi Osawa, Ikeda; Mitsutoshi Nakamura, Osaka, and Shuji Iino, Hirakata, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 35,508, Apr. 7, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 373,603  
 Claims priority, application Japan, Apr. 9, 1986, 61-83130; Apr. 9, 1986, 61-83131

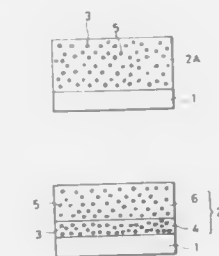
Int. Cl.<sup>5</sup> G03G 5/14  
 U.S. Cl. 430—58 7 Claims



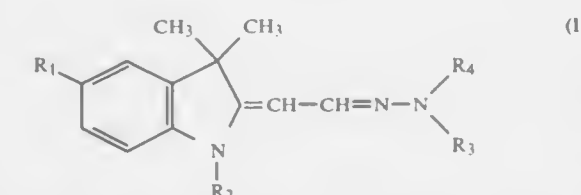
1. A photosensitive member comprising: an electrically conductive substrate; a charge generating layer; and a charge transporting layer comprising amorphous carbon containing hydrogen and having a thickness of about 5 to about 50 microns, said amorphous carbon comprising saturated carbon n<sub>1</sub> linked with hydrogen and saturated carbon n<sub>2</sub> free from linking with hydrogen, the ratio of the number n<sub>1</sub> to that of n<sub>2</sub> being 1:0.5 to 1:0.14, said hydrogen being contained in an amount of 20 to 67 atomic %.

**4,950,572**  
**PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY WITH THIENYL GROUP CONTAINING CHARGE TRANSPORT MATERIAL**  
 Masami Kuroda; Youichi Nakamura, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Mar. 16, 1989, Ser. No. 324,425  
 Claims priority, application Japan, Mar. 17, 1988, 63-64615  
 Int. Cl.<sup>5</sup> G03G 5/06, 5/12  
 U.S. Cl. 430—59 9 Claims



1. A photoconductor for electrophotography, comprising: an electroconductive substrate; and a photosensitive layer formed on said electroconductive substrate and including a charge generating substance and a charge transporting substance comprising at least one hydrazone compound represented by general formula (I):



wherein R<sub>1</sub> is selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, an alkoxy group, and a nitro group, each of R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is selected from the group consisting of an aryl group, an alkyl group, an aralkyl group, and an alkenyl group, each of which group may have a substituent(s), and at least one of R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is a thenyl group which may have a substituent(s).

3. A photoconductor as claimed in claim 1, wherein said photosensitive layer comprises a laminate of a charge transporting layer including a charge transporting substance selected from hydrazone compounds represented by the general formula (I) and a charge generating layer.

**4,950,573**  
**TONER FOR DEVELOPING LATENT ELECTROSTATIC IMAGES**  
 Kimitoshi Yamaguchi; Kazuhiko Umemura, and Yoshitohiro Nomura, all of Numazu, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 17, 1987, Ser. No. 121,483  
 Claims priority, application Japan, Nov. 20, 1986, 61-278069  
 Int. Cl.<sup>5</sup> G03G 9/10  
 U.S. Cl. 430—109 5 Claims

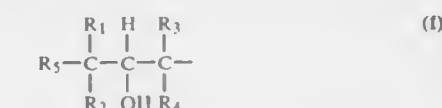
1. A toner for developing latent electrostatic images comprising: (a) thermofusible base particles A having a softening point of 80° C. or less, a flow starting temperature of 110° C. or less, and an average particle size of 5 to 25 μm, and (b) small particles B comprising as the main component an organic polymeric material having a softening point at

least 5° C. higher than the softening point of said base particles A or no practical softening point, and an average particle size ranging from 0.1 μm or more, but not more than 1/4 of the average particle size of said base particles A, which small particles B are embedded in the surface of said base particles A so as to cover the surface of said base particles A to a depth of less than the particle size of said small particles B, the coverage area ratio of said small particles B on the surface of said base particles A being in the range of 40-100% of the surface area of said base particles A, wherein softening point, flow starting temperature and coverage area ratio have the meanings defined in the specification.

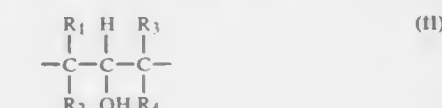
**4,950,574**  
**TONER FOR DEVELOPING ELECTROSTATIC IMAGE COMPRISING VINYL POLYMER HAVING HYDROXYL NUMBER OF 50 TO 350**  
 Yuugo Kumagai; Isamu Moribe, and Ikutoshi Shibuya, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Feb. 4, 1985, Ser. No. 697,755  
 Claims priority, application Japan, Feb. 6, 1984, 59-20604  
 Int. Cl.<sup>5</sup> G03G 9/08  
 U.S. Cl. 430—109 11 Claims

1. A particulate toner for developing electrostatic images comprising at least one colorant and/or magnetic powder and a vinyl polymer having at least one group of the formula:



wherein R<sub>1</sub> through R<sub>5</sub> are independently hydrogen or a hydrocarbon group, in side chains of the polymer,



said vinyl polymer having a hydroxyl number of 50 to 350 and a glass transition point of 35 to 100° C.

**4,950,575**  
**TONER FOR DEVELOPING ELECTROPHOTOGRAPHIC IMAGES AND PROCESS FOR PREPARATION THEREOF**  
 Masaya Shiozaki, Kyoto, and Nobuhiro Hirano, Osaka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan  
 Filed Feb. 23, 1989, Ser. No. 313,851  
 Claims priority, application Japan, Feb. 26, 1988, 63-44686  
 Int. Cl.<sup>5</sup> G03G 9/08

U.S. Cl. 430—110 10 Claims  
 1. A toner for developing electrostatically charged images, which comprises:

- a binder resin;
- a colorant; and
- a charge-controlling agent, wherein said charge-controlling agent is a copolymer of an oil-soluble monomer and 0.2 to 50% by weight, based on the copolymer, of a water-soluble monomer having a group —SO<sub>3</sub>X in which X stands for hydrogen, sodium, potassium or calcium, and said copolymer is present in such an amount that the content of the water-soluble monomer unit based on the total toner is 0.05 to 5% by weight.

4,950,576

**CHROMIUM, MOLYBDENUM AND TUNGSTEN COMPOUNDS AS CHARGING ADJUVANTS FOR ELECTROSTATIC LIQUID DEVELOPERS**  
James R. Larson, West Chester, Pa., assignor to E. I. DuPont De Nemours and Company, Wilmington, Del.  
Filed May 10, 1989, Ser. No. 350,026  
Int. Cl.<sup>5</sup> G03G 9/12

U.S. Cl. 430—115

32 Claims

1. An electrostatic liquid developer having improved charging characteristics consisting essentially of  
(A) a nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,  
(B) thermoplastic resin particles, the resin particles having an average particle size of less than 30  $\mu\text{m}$ ,  
(C) a solid inorganic metal compound, wherein the cationic component of said compound is one of the metals of Group 6B of the periodic table having an oxidation state of +3 or higher, and the anionic component of said compound is selected from the group consisting of fluoride, chloride, hydroxide, carbonate, citrate, acetate, oxalate, trifluoroacetate, sulfate, borate, nitrate, phosphate, chlorate, ethylhexanoate, potassium oxalate, potassium sulfate, and phenoxide, and  
(D) a nonpolar liquid soluble ionic or zwitterionic charge director compound.

4,950,577

**PRE-PRESS LIGHT-SENSITIVE COLOR PROOFING ARTICLE INCORPORATING ANTIHALATION LAYER**  
Duncan M. A. Grieve, Saffron Walden; Ronald W. Burrows, Harlow, both of England, and John Souter, Plymouth, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 23, 1985, Ser. No. 737,810  
Claims priority, application United Kingdom, Jun. 11, 1984, 8414867

Int. Cl.<sup>5</sup> G03C 1/495, 1/52, 1/68, 1/84

U.S. Cl. 430—158

16 Claims

1. A presensitized sheet for colour proofing comprising a removable carrier sheet bearing on one major surface thereof one or more layers constituting a light-sensitive medium sensitive to radiation within the wavelength band 325 to 700 nm, which medium is photohardenable, photoadherent, photoin-solubilisable, or photosolubilisable, the presensitized sheet additionally comprising an antihalation effective amount of one or more antihalation dyes absorbing radiation within the wavelength band 325 to 700 nm, characterised in that the antihalation dye is readily removable and is present:

- (i) within the carrier sheet when the carrier sheet is transparent, and/or  
(ii) in an antihalation layer positioned between the carrier sheet and the light sensitive medium, which antihalation layer is distinct from any layer of coloured material intimately associated with the photosensitive layer for formation of a coloured image and is either physically removed from the light-sensitive medium upon removal of the carrier sheet or is removable upon treatment with solvent after removal of the carrier sheet, with the proviso that this antihalation layer is physically removable from the light-sensitive medium upon removal of the carrier sheet either by the removal of the carrier sheet or by solubilisation of the antihalation layer in a solvent selected from the group consisting of aqueous alkaline solutions and water.

4,950,578

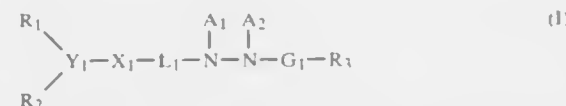
**SILVER HALIDE PHOTOGRAPHIC MATERIAL**  
Morio Yagihara, and Kazunobu Katoh, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jul. 18, 1989, Ser. No. 381,209  
Claims priority, application Japan, Jul. 19, 1988, 63-179760  
Int. Cl.<sup>5</sup> G03C 1/06

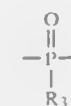
U.S. Cl. 430—264

17 Claims

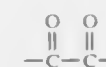
1. A silver halide photographic material comprising a support having thereon at least one of silver halide photographic emulsion layers and other hydrophilic colloid layers, wherein at least one of said silver halide photographic emulsion layers and other hydrophilic colloid layers contains a compound represented by formula (I):



wherein at least one of  $A_1$  and  $A_2$  represent a hydrogen atom and the other represents a hydrogen atom, a sulfonyl group or an acyl group;  $G_1$  represents a carbonyl group, a sulfonyl group, a sulfoxy group, a



group, a



group, or an iminomethylene group;  $L_1$  represents a bivalent group;  $X_1$  represents  $-O-$  or an



group wherein  $R_4$  is hydrogen, an alkyl group or an aryl group;  $Y_1$  represents



$R_1$  and  $R_2$  each represents an aliphatic group, an aromatic group, a heterocyclic group,  $-OR_5$  or  $-NR_5R_6$  wherein  $R_5$  is an aliphatic group, an aromatic group or a heterocyclic group, and  $R_6$  is a hydrogen atom, an aliphatic group, an aromatic group or a heterocyclic group; and  $R_3$  represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aralkyl group, an aryloxy group, a hydrazino group or an amino group.

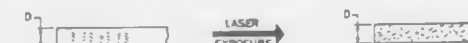
4,950,579

**OPTICAL DISC RECORDING MEDIUM HAVING A MICROSTRUCTURE-DERIVED INHOMOGENEITY OR ANISOTROPY**

Mark K. Debe, Stillwater; Kam K. Kam, Woodbury, and Daniel R. Field, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed Jul. 8, 1988, Ser. No. 216,905  
Int. Cl.<sup>5</sup> G03C 1/73, 1/735, 5/00

U.S. Cl. 430—270

25 Claims



1. A method of recording information in which a recording medium is exposed to electromagnetic radiation to receive information wherein said recording medium comprises a substrate having on at least one surface thereof at least one layer of organic material capable of absorbing electromagnetic radiation and comprising nonspherical molecules, said organic material prior to exposure to said radiation having a physical microstructure which is uniaxially anisotropic such that at least 10% of all the molecules of the organic material are uniformly preferentially oriented within 35 15 degrees of an arbitrary angle relative to the plane of the layer and providing to said layer a refractive index profile which is anisotropic with respect to the direction perpendicular to the plane of the layer before exposure to radiation, and upon exposure to electromagnetic radiation reducing the level of anisotropy to the exposed portions of the layer such that at least 5% fewer of the molecules remain preferentially oriented without formation of pits, holes, or bubbles or ablation of the exposed portions of the layer.

3. An optical recording medium for use with an optical recording and playback apparatus, by which the medium receives electromagnetic radiation to record information, said medium comprising a substrate, and containing on at least one surface of said substrate at least one layer of organic material capable of absorbing electromagnetic radiation and comprising nonspherical molecules and having a minimal thermal stability such that said organic material can be evaporated or sublimed under a pressure of 0.1 mTorr or less, without decomposition, by heating to at least 100° C, which material prior to exposure to said radiation has a physical microstructure which is uniaxially anisotropic, wherein the physical microstructure of said uniaxially anisotropic layer is inhomogeneous and provides to said layer a non-uniform density, said density constituting a continuously graded physical density gradient along the direction perpendicular to the plane of the layer before exposure to radiation, the extent of the density gradient is reduced to enable subsequent optical detection of said density of the organic layer varying over substantially the whole thickness of the layer, from a value at the substrate interface which is at least 10% above the entire layer average density, to a value at the air interface which is at least 10% below the entire layer density, said average layer density being any value not less than 10%, and not greater than 90% of the maximum bulk density of the organic material, whereby upon exposure to said radiation, the extent of the density gradient is reduced to enable subsequent optical detection of recorded information.

11. The optical recording medium according to claim 9 wherein the layer thickness is in the range of 1.5  $\mu\text{g}/\text{cm}^2$  to 300  $\mu\text{g}/\text{cm}^2$ .

24. A method of recording information in which a recording medium is exposed to electromagnetic radiation to receive information wherein said recording medium comprises a substrate having on at least one surface thereof at least one layer of organic material capable of absorbing electromagnetic radiation and comprising nonspherical molecules, said organic material prior to exposure to said radiation having a physical microstructure which is uniaxially anisotropic such that at least 10% of all the molecules of the organic material are uniformly preferentially oriented within 35 15 degrees of an arbitrary

angle relative to the plane of the layer and providing to said layer a refractive index profile which is anisotropic with respect to the direction perpendicular to the plane of the layer before exposure to radiation, and upon exposure to electromagnetic radiation reducing the level of anisotropy of the exposed portions of the layer such that at least 5% fewer of the molecules remain preferentially oriented without thermal deformation or ablation of the exposed portions of the layer.

4,950,580

**PROCESS FOR PRODUCTION OF A PHOTOPOLYMERIZABLE RECORDING MATERIAL**  
Manfred Hilger, Konz, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany  
Continuation of Ser. No. 840,051, Mar. 17, 1986, abandoned.  
This application Aug. 24, 1987, Ser. No. 89,034

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1985, 3510219

Int. Cl.<sup>5</sup> G03C 1/76

U.S. Cl. 430—281

6 Claims

1. A process for the production of a photopolymerizable recording material comprising the steps of  
(1) providing a layer support;  
(2) coating the layer support with a solid, dry photopolymerizable layer which consists essentially of an admixture of  
(a) a water-insoluble polymeric binder containing carboxyl acid groups in an amount such that the binder becomes soluble in aqueous-alkaline solutions,  
(b) an acrylic or methacrylic acid ester of a polyhydric alcohol, which is polymerizable by a free-radical process, and  
(c) an initiator capable of photo-inducing the free-radical polymerization; and  
(3) contacting the admixture with an amount of ammonia, wherein said amount (i) is sufficient to reduce the cold flow of the solid, dry photopolymerizable layer and (ii) corresponds to between about 10% and 100% of the stoichiometric amount required to neutralize said carboxyl acid groups.

4,950,581

**PHOTOPOLYMERIZABLE COMPOSITION**  
Mitsuru Koike, and Nobuyuki Kita, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jul. 5, 1988, Ser. No. 215,353  
Claims priority, application Japan, Jul. 6, 1987, 62-168194  
Int. Cl.<sup>5</sup> G03C 1/68

U.S. Cl. 430—281

27 Claims

1. A photopolymerizable composition comprising:  
(i) a polymerizable monomer compound in an amount such that a light-exposed portion thereof will separate from a light-unexposed portion thereof when treated with a developer, said compound having at least one ethylenically unsaturated group, which is capable of being photopolymerized by active light, and  
(ii) a photopolymerization initiator in an amount effective to initiate polymerization of said polymerizable monomer compound wherein said initiator comprises a combination of (a) an organic compound represented by formula (I):



wherein  $R^1$ ,  $R^2$ , and  $R^3$ , and  $R^4$ , which may be the same or different, each represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted alkenyl group, or a substituted or unsubstituted heterocyclic group, and at least two of said  $R^1$ ,  $R^2$ ,  $R^3$ , and  $R^4$  may combine



to form a cyclic structure, with the proviso that at least one of  $R^1$ ,  $R^2$ ,  $R^3$ , and  $R^4$  is an alkyl group, and where  $Z^+$  represents an alkali metal cation or a quaternary ammonium cation, and (b) an organic non-ionic dye.

4,950,582

## LIGHT-SENSITIVE COMPOSITION

Toshiaki Aoi; Keitaro Aoshima, and Yasuo Okamoto, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Mar. 31, 1988, Ser. No. 176,196

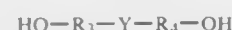
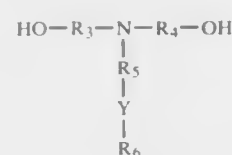
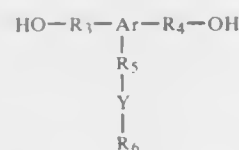
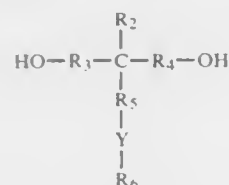
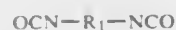
Claims priority, application Japan, Apr. 20, 1987, 62-97040

Int. Cl.<sup>5</sup> G03C 1/60

U.S. Cl. 430—175

10 Claims

1. A light-sensitive composition comprising, in admixture, (i) a light-sensitive positive working o-quinone diazide compound in an amount of from 10 to 50% by weight or a light-sensitive negative working diazonium compound in an amount of from 1 to 50% by weight, based on the total weight of the composition and (ii) an aqueous alkaline-soluble polyurethane resin having a N-sulfonyl-amido groups in an amount of from 5 to 90% by weight based on the total weight of the composition, the polyurethane resin having a structure, as basic skeleton, derived from a reaction product of diisocyanate compound represented by the following formula (I) with a diol compound represented by the following formula (II), (III), (IV) or (V):



wherein

$R_1$  represents a bivalent aliphatic or aromatic hydrocarbon group which may have substituents selected from the group consisting of alkyl, aralkyl, aryl, and alkoxy groups and halogen atoms, with the proviso that  $R_1$  may have other functional groups which are not reactive with the isocyanate groups;

$R_2$  represents a hydrogen atom or an alkyl, aralkyl, aryl, alkoxy or aryloxy group which may have substituents selected from the group consisting of cyano, nitro, halogen atoms,  $-\text{CONH}_7$ ,  $-\text{COOR}_7$ ,  $-\text{NHCONHR}_7$ ,  $-\text{NHCOOR}_7$ ,  $-\text{NHCOR}_7$ ,  $-\text{OCONHR}_7$ , and  $-\text{CONHR}_7$ , wherein  $R_7$  represents an alkyl group having 1 to 15 carbon atoms;

$R_3$ ,  $R_4$ , and  $R_5$  may be the same or different and each represents a single bond or bivalent aliphatic or aromatic hydrocarbon group which may have substituents selected from the group consisting of alkyl groups, aralkyl groups, aryl groups, alkoxy groups and halogen atoms, provided that  $R_3$  to  $R_5$  may optionally have other functional groups which do not react with the isocyanate groups and that

two or three of  $R_2$  to  $R_5$  may optionally have other functional groups which do not react with the isocyanate groups and that two or three of  $R_2$  to  $R_5$  may form a ring together with the carbon atoms to which these are bonded;

$R_6$  represents a monovalent aliphatic or aromatic hydrocarbon group which may have substituents selected from the group consisting of alkyl groups, alkoxy groups and halogen atoms;

$\text{Ar}$  represents a trivalent aromatic hydrocarbon group optionally having substituents, and  $Y$  denotes N-sulfonylamido group.

4,950,583

## ADHESION PROMOTING PRODUCT AND PROCESS FOR TREATING AN INTEGRATED CIRCUIT SUBSTRATE THEREWITH

Terry Brewer, Rolla; Tony D. Flaim, St. James, and Mary G. Moss, Rolla, all of Mo., assignors to Brewer Science Inc., Rolla, Mo.

Filed Sep. 17, 1986, Ser. No. 908,360

Int. Cl.<sup>5</sup> G03C 5/00

U.S. Cl. 430—311

22 Claims

1. In a method of producing microelectronic components by photolithography the improvement comprising applying an adhesion promoting alkoxysilane to a microelectronic component substrate, the adhesion promoting alkoxy silane being selected from the group consisting of p-aminophenyltriethoxysilane; beta-trimethoxysilylethyl-2-pyridine; 4,5-dihydro-1-(3-(triethoxysilyl)propyl)-1H-imidazole, and (aminoethylaminomethyl)phenylethyltrimethoxysilane, the adhesion promoter being effective to increase the bond of a microelectronic coating to the substrate.

4,950,584

## HEAT-PROCESSABLE COLOR PHOTOSENSITIVE MATERIAL

Tawara Komamura; Masaru Tsuchiya, and Ken Okauchi, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 29, 1988, Ser. No. 277,231

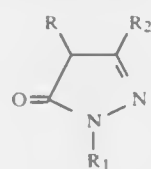
Claims priority, application Japan, Dec. 17, 1987, 62-320599

Int. Cl.<sup>5</sup> G03C 5/54, 7/26

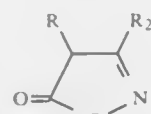
U.S. Cl. 430—351

46 Claims

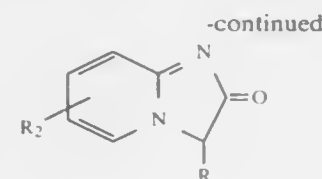
1. A method of processing a heat-processable color photosensitive material comprising a support, provided thereon, a photosensitive layer containing a photosensitive silver halide, a dye-donor, a reducing agent and a binder, and a non-photosensitive layer containing at least a binder, wherein a coupler capable of coupling with an oxidized product of the reducing agent to form a substantially colorless product is contained in at least one layer selected from the group consisting of the photosensitive layer and the non-photosensitive layer, and is represented by Formulas (2) to (9);



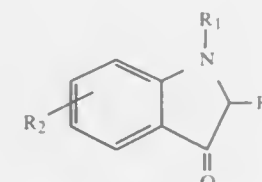
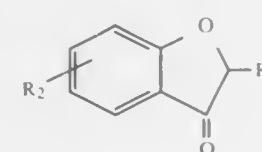
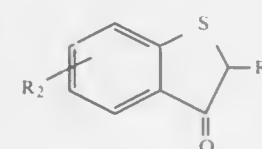
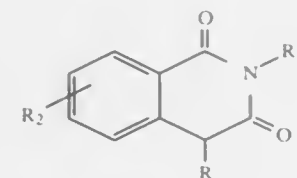
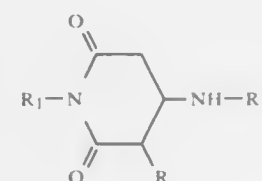
Formula (2)



Formula (3)



-continued



wherein  $R$  represents one selected from the group consisting of an alkyl group and an aryl group;  $R_1$  and  $R_3$  independently represent an alkyl group or an aryl group;  $R_2$  represents an alkyl group, an aryl group, an alkylamino group, an arylamino group, an acylamino group, an ureido group, a cyano group or a carbamoyl group.

4,950,585

## COUPLER FOR PHOTOGRAPHIC USE

Kimie Tachibana, and Yutaka Kaneko, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 3, 1988, Ser. No. 227,753

Claims priority, application Japan, Aug. 18, 1987, 62-203450; Aug. 18, 1987, 62-203451

Int. Cl.<sup>5</sup> G03C 7/16

U.S. Cl. 430—385

7 Claims

1. A method of forming a photographic dye image, said method comprising: imagewise exposing to light, a silver halide photographic light-sensitive material comprising a support having thereon a silver halide emulsion layer containing a coupler represented by the following formula:

Formula (4)

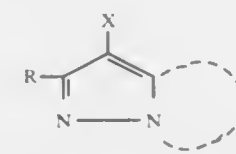
Formula (5)

Formula (6)

Formula (7)

Formula (8)

Formula (9)



Formula 1

wherein  $Z$  is a group of non-metal atoms necessary to complete a nitrogen-containing six-member heterocyclic ring condensed with the pyrazole ring, said six-member ring being optionally substituted; provided that said six-member ring is not condensed with any ring other than said pyrazole ring;  $R$  represents a hydrogen atom or a substituent, and  $X$  represents a hydrogen atom or a substituent capable of splitting off upon reaction with an oxidized product of a color developing agent and; developing said silver halide photographic light-sensitive material with a color developer containing a color developing agent.

4,950,586

## SOLID PARTICLE DISPERSIONS OF FILTER DYES FOR PHOTOGRAPHIC ELEMENTS

Donald R. Diehl, and Ronda E. Factor, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

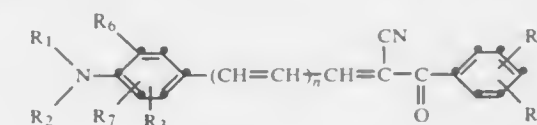
Filed Dec. 23, 1988, Ser. No. 290,601

Int. Cl.<sup>5</sup> G03C 1/00

U.S. Cl. 430—507

10 Claims

1. A photographic element comprising a support having thereon a radiation-sensitive silver halide emulsion layer and layer, which is the same as or different from the silver halide layer, comprising a hydrophilic binder and an amount effective as a photographic filter dye of a dispersion of solid particles having mean diameters of from about 0.01 to 10  $\mu\text{m}$ , said particles consisting essentially of a compound having the formula:

 $n$  is 0 or 1,

$R_1$  and  $R_2$  each independently represents substituted or unsubstituted alkyl or substituted or unsubstituted aryl, or taken together with  $R_6$ ,  $R_7$ ,  $N$ , and the atoms to which they are attached, represent the atoms necessary to complete a julolidyl ring.

$R_3$  is H, substituted or unsubstituted alkyl, or substituted or unsubstituted aryl.

$R_4$  and  $R_5$  each independently represents H, substituted or unsubstituted alkyl, substituted or unsubstituted aryl, secondary or tertiary amino,  $\text{CO}_2\text{H}$ , or  $\text{NHSO}_2\text{R}_8$ , with the proviso that at least one of  $R_4$  and  $R_5$  or a substituent on an aryl ring in  $R_4$  or  $R_5$  is  $\text{CO}_2\text{H}$  or  $\text{NHSO}_2\text{R}_8$ .

$R_6$  and  $R_7$  each independently represents H, or  $R_7$  taken together with  $R_2$ , or  $R_6$  taken together with  $R_1$ , represent the atoms necessary to complete a carbocyclic ring, and  $R_8$  is substituted or unsubstituted alkyl or substituted or unsubstituted aryl.

**4,950,587**  
**J-AGGREGATING DYE POLYMERS AS SPECTRAL SENSITIZERS FOR SILVER HALIDE PHOTOGRAPHIC COMPOSITIONS**

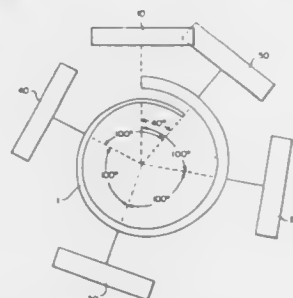
Michael R. Roberts; Derrick C. Tabor, both of Rochester, and Paul B. Gilman, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,864

Int. Cl.<sup>5</sup> G03C 1/12, 1/29

U.S. Cl. 430—570

4 Claims



1. A photographic composition comprising silver halide spectrally sensitized by a dye polymer comprising a coiled polymer backbone having covalently bonded thereto, in an amount sufficient to J-aggregate, a plurality of cyanine dye units comprising two benzimidazole nuclei.

**4,950,588**  
**PROLONGED ENHANCED CHEMILUMINESCENCE**  
 Nanibhushan Dattagupta, New Haven, Conn., assignor to Molecular Diagnostics, Inc., West Haven, Conn.

Continuation of Ser. No. 840,636, Mar. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 753,749, Jul. 10, 1985, abandoned. This application Sep. 27, 1988, Ser. No. 250,985

Int. Cl.<sup>5</sup> C12Q 1/68, 1/28; G01N 35/566

U.S. Cl. 435—6

19 Claims

1. In a chemiluminescence process comprising the contacting of a chemiluminescence precursor, an oxidant, an enzyme, and a chemiluminescence enhancer, the improvement comprising conducting the process in the presence of a nitrogen compound selected from the group consisting of ammonia, an aromatic heterocyclic compound and a water-soluble organic amine.

**4,950,589**  
**GENUS-SPECIFIC LISTERIA ANTIGEN IDENTIFIED BY MONOCLONAL ANTIBODIES**

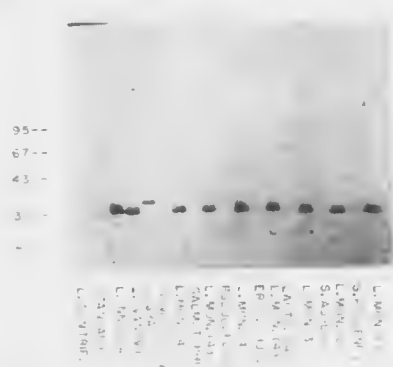
Bryan T. Butman, Walkersville, and Jerome A. Mattingly, Gaithersburg, both of Md., assignors to Akzo N.V., Arnhem, Netherlands

Filed Aug. 10, 1987, Ser. No. 83,619

Int. Cl.<sup>5</sup> G01N 33/569, 33/577

U.S. Cl. 435—7

16 Claims



1. A *Listeria* antigen comprising a protein found in *Listeria*

heat extracts, said antigen having a molecular weight of from about 30 to about 38 KD, the antigen comprising three immunogenically different epitopes to which antibodies produced by spleen cells of mice immunized with said *Listeria* heat extracts are specifically reactive, said antigen being found in heat extracts of all species of *Listeria* except *L. dentrificans* and not found in *Micrococcus varians*, *Staphylococcus aureus*, *S. epidermidis*, *S. haemolyticus*, *Streptococcus cremoris*, *S. bovis*, *S. pyogenes*, *S. thermophilus*, *S. fecalis*, *Lactobacillus casei*, *Actinomyces pyogenes*, *Bacillus cereus*, *Erysipelathrix rhusiopathiae*, *Pseudomonas fluorescens*, *Citrobacter freundii*, *Enterobacter aerogenes*, *Escherichia coli* or *Salmonella typhi*.

**4,950,590**  
**METHOD AND KIT FOR ASSAY FOR MEASUREMENT OF SERUM THYMOSIN ALPHA<sub>1</sub>**

Milton G. Mutchnick, Ann Arbor, and Frederick E. Weller, Ypsilanti, both of Mich., assignors to Board of Governors of Wayne State University, Detroit, Mich.

Filed Jan. 13, 1986, Ser. No. 817,897

Int. Cl.<sup>5</sup> G01N 33/53

U.S. Cl. 435—7

15 Claims

1. In an assay method for detecting an amount of a specific thymic polypeptide in a solution from body fluids using an antibody the improvement which comprises:

- reacting a specific thymic polypeptide containing solution from body fluids which is free of cells with a known amount of a first antibody specific to binding said thymic polypeptide, wherein the specific thymic polypeptide is selected from the group consisting of thymosin alpha<sub>1</sub>, thymosin beta<sub>4</sub>, thymosin beta<sub>5</sub>, thymosin beta<sub>10</sub> and thymosin beta<sub>11</sub> to form a first complex of the antibody with the specific thymic polypeptide at a temperature between about 0° to 37° C. wherein there is unreacted antibody remaining in the solution in an amount depending upon the amount of the specific thymic polypeptide;
- reacting the unreacted antibody with an additional amount of the specific thymic polypeptide bound to a solid phase at a temperature between about 0° to 15° C. to form a second complex of the specific bound thymic polypeptide and antibody and discarding the solution with the first complex; and
- determining the amount of second complex which is inversely proportional to the specific thymic polypeptide in the solution.

**4,950,591**  
**MEMBRANE NA<sup>+</sup> CHANNEL PROTEIN AND RELATED THERAPEUTIC COMPOUNDS**

Bruce D. Cherksey, 608 Garden St., Hoboken, N.J. 07030

Filed Aug. 14, 1987, Ser. No. 85,462

Int. Cl.<sup>5</sup> G01N 33/53; C07K 3/20

U.S. Cl. 435—7

7 Claims

1. A method for screening a chemical entity for activity in modulating membrane transport, cellular volume or cellular pressure, said method including the step of measuring the ability of said chemical entity to bind to a channel protein, wherein said channel protein is a Na<sup>+</sup> channel protein produced by extracting said channel protein from cell membrane material with an affinity gel, said affinity gel comprising amiloride or a derivative of amiloride bonded to a support material.

4. A process for isolating a Na<sup>+</sup> channel protein including the step of extracting said channel protein from cell membrane material with an affinity gel, said affinity gel comprising amiloride or a derivative of amiloride bonded to a support material.

**4,950,592**  
**BLEND OF MONOCLONAL ANTIBODIES**  
 John L. Daiss, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1987, Ser. No. 48,847

Int. Cl.<sup>5</sup> G01N 33/53; C12Q 1/48

U.S. Cl. 435—7

9 Claims

- A blend of monoclonal antibodies comprising:
  - a first monoclonal antibody that
    - inhibits the activity of creatine kinase-MM 55 to 65 percent;
    - is a non-inhibitor of the catalytic activity of creatine kinase-MB;
    - binds creatine kinase-MM and fails to bind creatine kinase-MB; and
    - is secreted by a hybridoma having the designation 14.5 and an ATCC Deposit Number HB9420;
  - a second monoclonal antibody that
    - inhibits the catalytic activity of creatine kinase-MM 85 to 95 percent;
    - inhibits the catalytic activity of creatine kinase-MB 35 to 45 percent;
    - binds creatine kinase-MM and creatine kinase-MB equally; and
    - is secreted by a hybridoma having the designation 14.15 and an ATCC Deposit Number HB9419; and
  - a third monoclonal antibody that
    - inhibits the catalytic activity of creatine kinase-MM 85 to 95 percent;
    - inhibits the catalytic activity of creatine kinase-MB 35 to 45 percent;
    - has greater binding strength to creatine kinase-MM than to creatine kinase-MB; and
    - is secreted by a hybridoma having the designation 14.52 and an ATCC Deposit Number HB9421.

**4,950,593**  
**IMPROVED METHOD FOR ASSAYING PROTEOLYTIC ENZYMES**

Michael S. Matta, Edwardsville, and Raymond E. O'Bear, Granite City, both of Ill., assignors to Vitek Systems, Inc., St. Louis, Mo.

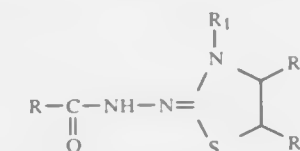
Filed Aug. 15, 1986, Ser. No. 896,824

Int. Cl.<sup>5</sup> C12Q 1/38

U.S. Cl. 435—23

5 Claims

- A method for detecting the presence of proteolytic enzymes in an assay sample comprising:
  - contacting an assay sample with a thiazolinone hydrazone compound having the formula:



wherein RCO - is an enzyme reactive acyl constituent which, in the presence of proteolytic enzyme, will release from the hydrazone substituent, said acyl being selected from the group consisting of amino acids, peptides, and substituted peptides; and wherein R<sub>1</sub> is selected from the group consisting of hydrogen, aliphatic, cyclic, aromatic, carboxylic, halogen, hydroxyl, amino, and thio substituents; and wherein R<sub>2</sub> and R<sub>3</sub> are selected from the group consisting of aliphatic, cyclic, aromatic, carboxylic, halogen, nitro, hydroxyl, amino, thio, fused cyclic, and fused aromatic;

- adding oxidative coupling agents and oxidizing agents for the thiazolinone to develop blue-green chromogens; and
- monitoring the increase in absorbance at 590 nanometers; whereby the color develops while retaining the enzymatic activity of the proteolytic enzyme and the concentration

of the chromogens is directly proportional to the degree of enzymatic activity.

**4,950,594**  
**MICROBIOLOGICAL ASSAY USING BIOLUMINESCENT ORGANISM**  
 Arthur V. Stiffey, Slidell, La., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 21, 1987, Ser. No. 135,969

Int. Cl.<sup>5</sup> C12Q 1/18, 1/02; C12R 1/90

U.S. Cl. 435—32

13 Claims

- A method of assaying drilling fluids for toxicity, comprising the steps of:
  - preparing a drilling fluid sample to obtain a suspended particulate phase sample,
  - preparing a non-toxic control containing *Pyrocystis lunula* in suspension,
  - removing aliquots from said suspended particulate phase sample,
  - placing said aliquots in a growth medium containing *Pyrocystis lunula* in suspension to provide a mixture of said aliquots and said *Pyrocystis lunula*, said mixture being contained within a test vial of light-transmitting material,
  - imparting rotary motion to said mixture to subject said suspended *Pyrocystis lunula* of said mixture to a shear stress for a predetermined time,
  - simultaneously with step (e), detecting the light production of said mixture for said predetermined time,
  - subjecting said suspended *Pyrocystis lunula* of said non-toxic control to a shear stress for said predetermined time,
  - simultaneously with step (g), detecting the light production of said non-toxic control for said predetermined time, and
  - comparing the light production of said mixture with the light production of said non-toxic control to determine diminution of light production which is an indication of the presence of a toxic substance in said sample.

**4,950,595**  
**MOUSE-HUMAN HYBRIDOMA WHICH PRODUCES ANTIVIRUS-HUMAN ANTIBODY, PROCESS FOR PREPARATION THEREOF, AND ANTIVIRUS-HUMAN MONOCLONAL ANTIBODY**

Yasuhiko Masuho, Hino; Yoh-ichi Matsumoto, Tokyo; Toru Sugano, Machida, and Katsuhiko Tomibe, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

PCT No. PCT/JP85/00537, § 371 Date May 28, 1986, § 102(e) Date May 28, 1986, PCT Pub. No. WO86/02092, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 27, 1985, Ser. No. 871,436

Claims priority, application Japan, Sep. 28, 1984, 59-201992; Oct. 8, 1984, 59-209630; Apr. 10, 1985, 60-74520

Int. Cl.<sup>5</sup> C12P 21/00; C12N 5/00; C21N 33/53

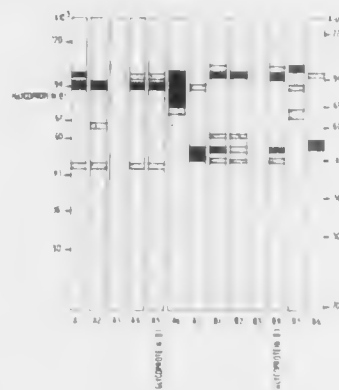
U.S. Cl. 530—387

11 Claims

- Mouse-human hybridoma and a cell line arising therefrom both of which produce antiviral-human antibody, obtained by



fusing a human antibody producing cell which has been sensitized in vitro with virus of the Herpesvirus family or protein or



glycoprotein from said virus in the presence of mitogen with a mouse myeloma cell.

4,950,596

**STABILIZATION OF INTRACELLULAR ENZYMES**  
Roberta C. Cheng, Midland; Norman G. Moll, Sanford; Robert A. Houtchens, and Karen M. McCoy, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 707,773, Mar. 4, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 20,407. The portion of the term of this patent subsequent to Mar. 4, 2002, has been disclaimed.

Int. Cl.<sup>5</sup> C12P 19/24; C12N 11/08

U.S. Cl. 435—94 46 Claims

1. A process for stabilizing intact or ruptured glucose isomerase-producing microbial cells having high glucose isomerase associated therewith which comprise

- (1) flocculating said microbial cells with a partially carboxyalkylated- or partially phosphonoalkylated-cationic polyelectrolyte having a positive charge carried by a nitrogen atom to obtain flocculated microbial cells,
- (2) crosslinking said flocculated microbial cells to obtain flocculated-crosslinked microbial cells,
- (3) encapsulating said flocculated-crosslinked microbial cells with a partially carboxyalkylated- or partially phosphonoalkylated-cationic polyelectrolyte having a positive charge carried by a nitrogen atom to obtain encapsulated microbial cells, and
- (4) crosslinking said encapsulated microbial cells.

4,950,597

**MODIFICATION OF CELLULOSE NORMALLY SYNTHESIZED BY CELLULOSE-PRODUCING MICROORGANISMS**

Inder M. Saxena; Eric M. Roberts, and R. Malcolm Brown, Jr., all of Austin, Tex., assignors to The University of Texas Board of Regents, Austin, Tex.

Filed May 25, 1988, Ser. No. 198,784

Int. Cl.<sup>5</sup> C12P 19/04, 33/18; C12R 1/01; C12N 1/22

U.S. Cl. 435—101 16 Claims

1. A process for selecting cellulose II-producing Acetobacter, the process comprising:

- plating out cellulose-producing Acetobacter from a first culture on a nutrient agar plate and incubating the plate to form microbial colonies from single Acetobacter, said colonies having visible configurations;
- inoculating samples of liquid nutrient medium with Acetobacter from colonies having a smooth configuration and incubating inoculated samples to facilitate Acetobacter proliferation, said incubating involving conditions which

result in pellicle formation by Acetobacter which produce cellulose I; and  
selecting Acetobacter from samples exhibiting proliferation and cellulose production without pellicle formation, said selected Acetobacter producing cellulose II.

4,950,598

**PROCESS FOR MAKING T CELL HYBRIDOMAS**

Edgar G. Engleman, Atherton; James W. Larrick, Woodside; Andrew A. Raubitschek, Palo Alto, and Steven K. Fong, San Francisco, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford and Cetus Corporation, Emeryville, both of Calif.

Continuation of Ser. No. 421,060, Sep. 22, 1982, abandoned, which is a continuation-in-part of Ser. No. 376,191, May 7, 1982, abandoned. This application Sep. 19, 1985, Ser. No. 777,947

Int. Cl.<sup>5</sup> C12N 15/00, 5/00, 5/02

U.S. Cl. 435—172.2 14 Claims

1. A process for making a T cell hybridoma comprising:
  - a. Fusing an azaserine-hypoxanthine sensitive human T leukemia cell line with normal human T cells; and
  - b. culturing the product of step a. in a selective azaserine-hypoxanthine medium, wherein said human T leukemia cell line is derived from the Jurkat human T cell line.

4,950,599

**METHOD FOR EXCHANGING HOMOLOGOUS DNA SEQUENCES IN A CELL USING POLYOMA ENCAPSULATED DNA FRAGMENTS**

Wolf Bertling, 423 Whitehead Cir., Chapel Hill, N.C. 27514

Filed Jan. 29, 1987, Ser. No. 8,262

Int. Cl.<sup>5</sup> C12N 15/00, 5/10, 7/01

U.S. Cl. 435—172.3 18 Claims

1. A method of altering, by homologous recombination, a preselected chromosomal DNA sequence encoding a protein in a polyoma-permissive cell, said method comprising the steps of:

- (a) providing a polyoma capsid having at least one single-stranded exogenous DNA sequence encapsulated therein, said exogenous DNA sequence consisting essentially of a DNA sequence sufficiently homologous to said preselected chromosomal DNA sequence and of a length suitable to anneal to the complement of said homologous DNA sequence, and
- (b) contacting said polyoma capsid to said polyoma-permissive cell so that said exogenous DNA sequence is introduced within said cell, anneals to the complement of said homologous DNA sequence, and exchanges with said chromosomal DNA sequence by homologous recombination.

4,950,600

**METHOD OF IMMOBILIZING ENZYMES OR MICROBES WITH ALGINATE HAVING A LOW MANNURONIC ACID TO GULURONIC ACID RATIO**

Hideo Tanaka, Ibaraki, and Shinzi Irie, Chiba, both of Japan, assignors to Kabushiki Kaisha Kibun and Kabushiki Kaisha Kibun Fudokenifa, both of Tokyo, Japan

Filed Jan. 13, 1988, Ser. No. 143,525

Claims priority, application Japan, Jan. 16, 1987, 62-5887

Int. Cl.<sup>5</sup> C12N 11/10, 11/04

U.S. Cl. 435—178 7 Claims

1. A method of preparing an immobilized enzyme or an immobilized microbe comprising the steps of adding an enzyme or a microbe to an aqueous solution of sodium alginate containing D-mannuronic acid residues and L-guluronic acid residues in a ratio of D-mannuronic acid residue to L-guluronic acid residue of 0.01–0.3, and thereafter contacting the solution with an aqueous solution containing barium ion or strontium ion whereby said sodium alginate is gelled by said barium ion or strontium ion and said enzyme or microbe is immobilized.

4,950,601

**IMMOBILIZED BLUE-GREEN ALGAE IN SHEET FORM**  
J. Gavin MacDonald, Decatur; Ronald S. Nohr, Roswell, and William E. Maycock, Marietta, all of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 17, 1987, Ser. No. 27,282

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C12N 11/12, 11/08; C12M 1/40; C05F 11/08

U.S. Cl. 435—179 40 Claims

1. A nutrient-producing structure in the form of a sheet, which structure comprises a composite consisting essentially of a substantially water-insoluble support having a surface energy of from about 30 dynes per cm to about 115 dynes per cm to which nitrogen-fixing filamentous blue-green algal heterocyst cells are attached, said support being particulate or fibrous and substantially free of substances which have a significant deleterious effect on the viability of the attached algae, which attached algal heterocyst cells, when allowed to grow in a nitrogen-deficient environment, fix nitrogen at a rate which is substantially greater than that of such cells not so attached.

4,950,602

**INHIBITION OF LACTATE PRODUCTION BY PYRUVATE ADDUCTS**

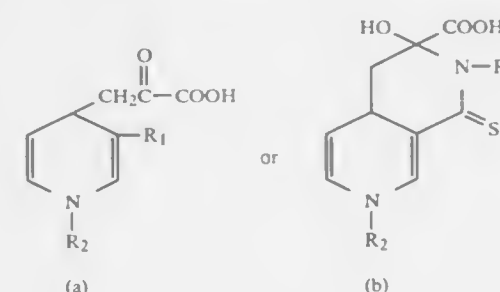
Arthur J. L. Cooper, Croton-on-Hudson, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Feb. 20, 1987, Ser. No. 16,894

Int. Cl.<sup>5</sup> C12N 9/99; C07D 471/02

U.S. Cl. 435—184 11 Claims

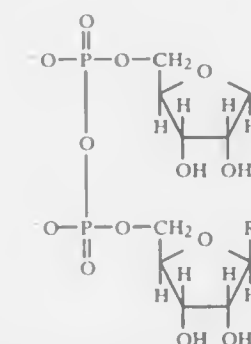
1. A compound corresponding to the formula



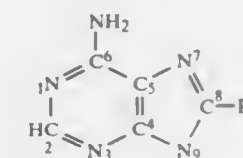
where R<sub>1</sub> is halogen, —CN,



R<sub>3</sub> is hydrogen or lower alkyl and where R<sub>2</sub> is



where x is 2 to 12 and where R<sub>4</sub> is



where R<sub>5</sub> is hydrogen, lower alkyl, halogen or —N(CH<sub>3</sub>)<sub>2</sub>.

4,950,603

**RECOMBINANT DNA EXPRESSION VECTORS AND DNA COMPOUNDS THAT ENCODE ISOPENICILLIN N SYNTHETASE FROM STREPTOMYCES LIPMANII**

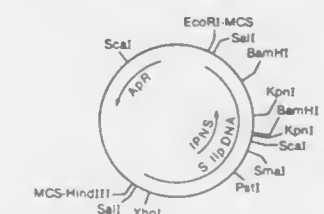
Thomas D. Ingolia, and Barbara J. Weigel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 2, 1987, Ser. No. 115,950

Int. Cl.<sup>5</sup> C12N 7/00, 15/00, 1/20; C07H 15/12

U.S. Cl. 435—235 23 Claims

Figure 1  
Restriction Site and Function Map of  
Plasmid pOG0230  
(5,500 bp)



1. An isolated DNA compound that comprises a DNA sequence that encodes isopenicillin N synthetase originated from *Streptomyces lipmanii*.

4,950,604

**CULTURE OF A MICROORGANISM OF THE GENUS KLEBSIELLA SP., HAVING A HIGH CONTENT OF RHAMNOSE**

Marianne G. P. Graber-Gubert; Joseph C. A. Morin, both of Toulouse; Francis L. Duchiron, Avon, and Pierre F. Monsan, Blagnac, all of France, assignors to Bioeurope, France

Filed Dec. 8, 1988, Ser. No. 281,542

Claims priority, application France, Dec. 11, 1987, 87 17285

Int. Cl.<sup>5</sup> C12R 1/22; C12N 1/20

U.S. Cl. 435—252.1 1 Claim

1. Cultures of biologically pure *Klebsiella* sp. microorganism possessing the characteristics of the strain BEC 441 deposited under No. 1-714 at the Collection Nationale de Cultures de Microorganismes (National Collection of Microorganism Cultures) of the Institut Pasteur, as well as strains obtained from the strain BEC 441 by mutation, said strains being capable of producing polysaccharides comprised of hexasaccharide repeating units consisting essentially of rhamnose, galactose and glucuronic acid units in molar ratio of 3:2:1, respectively, by fermentation in a nutrient medium containing assimilable sources of carbon and of nitrogen, and inorganic substances.

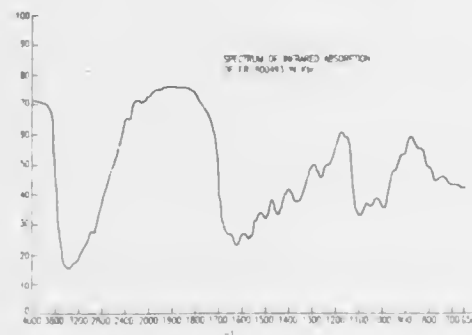
4,950,605

## FR-900493 SUBSTANCE, A PROCESS FOR ITS PRODUCTION AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Kozo Ochi; Masami Ezaki; Morita Iwami, all of Tsukuba; Tadaaki Komori, Takatsuki, and Masanobu Kohsaka, Tsukuba, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Mar. 6, 1989, Ser. No. 319,042

Claims priority, application United Kingdom, Mar. 18, 1988, 8806429

Int. Cl.<sup>5</sup> C12N 1/20, 1/02; C12R 1/085; A61K 35/00  
U.S. Cl. 435—252.5 6 Claims

1. A FR-900493 substance having the following physical and chemical properties.

- (1) Appearance: White powder
- (2) Nature: Amphoteric
- (3) Melting point: 157°–160° C. (dec.)
- (4) Specific rotation:  $[\alpha]_D^{25}$ : +27° (c 1.0, H<sub>2</sub>O)
- (5) Molecular formula: C<sub>20</sub>H<sub>33</sub>N<sub>5</sub>O<sub>11</sub>
- (6) Elemental analysis: Calcd. for C<sub>20</sub>H<sub>33</sub>N<sub>5</sub>O<sub>11</sub>·2H<sub>2</sub>O: C 43.23, H 6.71, N 12.61 (%)  
Found: C 43.34, H 6.56, N 12.68 (%)
- (7) Molecular weight: SI-MS: m/z 520 (M<sup>+</sup> + 1)
- (8) Solubility: Soluble: Water  
Insoluble: Methanol, Acetone, Ethyl acetate, Chloroform
- (9) Color reaction: Positive: each reaction with ninhydrin, iodine, cerium sulfate and potassium permanganate, Molish reaction±  
Negative: each reaction with ferric chloride and Diacetyl agent
- (10) Thin Layer Chromatography: Stationary phase: Silica gel (Kieselgel 60 F-254 made by Merck)  
Developing Solvent: n-butanol:ethanol:chloroform:28% aqueous ammonia=4:7:2:7 V/V  
R<sub>f</sub> Value: 0.10
- (11) UV:  $\lambda_{max}^{H_2O}$  262 nm (E<sub>1</sub> cm<sup>-1</sup>% 245) (ε12,700)  
 $\lambda_{0.1}^{max}$  0.1NHCL 260 nm (E<sub>1</sub> cm<sup>-1</sup>% 240) 9(ε12,450)  
 $\lambda_{max}^{0.1NNaOH}$  262 nm (E<sub>1</sub> cm<sup>-1</sup>% 190) (ε9,850)
- (12) IR (KBr):  $\nu_{max}$ : 3650–2200 (br), 1670, 1620, 1570, 1555, 1540, 1500, 1495, 1390, 1350, 1340, 1270, 1240, 1170, 1100, 1050, 1000, 950, 920, 860, 820 780 cm<sup>-1</sup>
- (13) <sup>1</sup>H NMR (D<sub>2</sub>O):  $\delta$ ppm: 1.70–2.00 (2H, m), 2.41 (3H, s), 2.44–2.68 (1H, m), 2.70–2.92 (1H, m), 3.00–3.31 (4H, m), 3.50 (1H, d, J=8

Hz), 4.05–4.34 (8H, m), 5.21 (1H, br s), 5.75 (1H, d, J=2 Hz), 5.82 (1H, d, J=8 Hz), 7.79 (1H, d, J=8 Hz)  
(14) <sup>13</sup>C NMR (D<sub>2</sub>O):  $\delta$ ppm: 175.7, 171.3, 155.2, 141.9, 110.1, 102.4, 91.4, 83.7, 80.7, 78.5, 75.4, 74.2, 71.4, 71.3, 69.9, 52.3, 41.8, 39.0, 38.7, 25.0

4,950,606

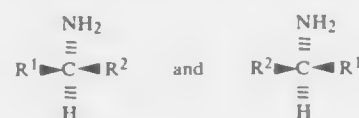
ENANTIOMERIC ENRICHMENT AND STEREOSELECTIVE SYNTHESIS OF CHIRAL AMINES  
David I. Stirling, Fanwood; Andrew L. Zeitlin, Green Brook, and George W. Matcham, Bridgewater, all of N.J., assignors to Celgene Corporation, Warren, N.J.

Filed Jun. 22, 1989, Ser. No. 369,723

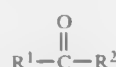
Int. Cl.<sup>5</sup> C12P 13/00, 7/26

U.S. Cl. 435—280 20 Claims

1. A process for the enantiomeric enrichment of a mixture of two enantiomeric chiral amines of the formula:



in which each of R<sup>1</sup> and R<sup>2</sup> is an alkyl or aryl group which is unsubstituted or substituted with an enzymatically non-inhibiting group and R<sup>1</sup> is different from R<sup>2</sup> in structure or chirality, which comprises bringing said mixture of chiral amines, in an aqueous medium and in the presence of an amino acceptor, into contact with an omega-amino acid transaminase which is enzymatically active with respect to the depicted amino group of one of said chiral amines, at least until a substantial amount of one of said chiral amines is converted to a ketone of the formula:

in which R<sup>1</sup> and R<sup>2</sup> are as defined for said amine.

4,950,607

## PROCESS FOR THE MICROBIOLOGICAL PRODUCTION OF GAMMA (R) DECANOLIDE AND GAMMA (R) OCTANOLIDE

Rosanna Cardillo; Claudio Fuganti, both of Milan; Giuseppe Sacerdote, Turin; Massimo Barbeni, Turin; Paolo Cabella, Turin, and Francesco Squarcia, Bologna, all of Italy, assignors to Pernod-Ricard, Paris, France

Filed Aug. 2, 1989, Ser. No. 388,674

Claims priority, application Italy, Aug. 4, 1988, 67742 A/88

Int. Cl.<sup>5</sup> C12N 9/20

U.S. Cl. 435—280 8 Claims

1. A process for the production of an optically active gamma-lactone selected from gamma-decalactone and gamma-octalactone comprising contacting a vegetable oil or a hydrolysate thereof or ricinoleic acid with a growing culture of a microorganism selected from the group consisting of *Cladosporium suaveolens*, *Phanerochaete chrysosporium*, and *Pichia etchellsii*, at a pH and temperature and for a time period sufficient for said microorganism to produce said gamma-lactone.

4,950,608

## TEMPERATURE REGULATING CONTAINER

Masaru Kishimoto, Tokyo, Japan, assignor to Seinics Co., Ltd., Tokyo, Japan

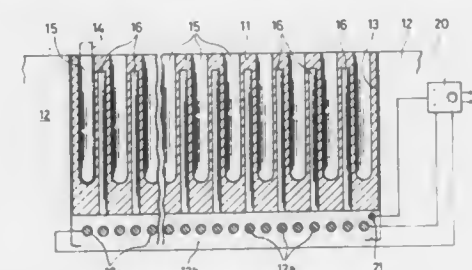
Filed Apr. 25, 1989, Ser. No. 342,805

Int. Cl.<sup>5</sup> C12M 1/38

U.S. Cl. 435—290 4 Claims

1. A temperature regulating container comprising a heater installed in said container, a metal block detachably installed in

said container in which test tubes or the like with test sample therein inserted, characterized in that a plurality of heat pipes with refrigerant sealingly charged therein are embedded in



said metal block such that one end of said heat pipe is heated by said heater, the heat pipes maintaining an equilibrium temperature between an upper surface and a lower surface of the metal block.

4,950,609

STABILIZED SARCOSINE OXIDASE PREPARATION  
Wilhelm Tischer, Peissenberg; Manfred Gloger, Weilheim, and Josef Heinle, München, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GMBH, Mannheim, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 844,691

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515586

Int. Cl.<sup>5</sup> C12Q 1/00, 1/34, 1/26; C12N 11/16

U.S. Cl. 435—18 14 Claims

1. A stabilized sarcosine oxidase preparation for determination of creatinine comprising sarcosine oxidase and creatinineamidohydrolase together with creatine amidohydrolase which is covalently bound to a water-soluble polysaccharide.

4,950,610

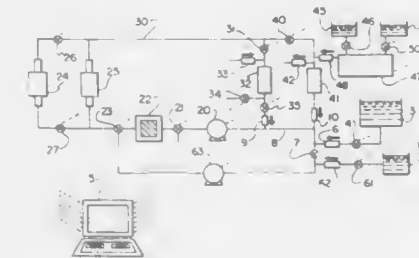
## TITRATING APPARATUS AND METHOD

Douglas L. Tittle, Willoughby, Ohio, assignor to Man-Gill Chemical Company, Cleveland, Ohio

Filed Sep. 28, 1987, Ser. No. 101,387

Int. Cl.<sup>5</sup> G01N 31/16

U.S. Cl. 436—163 24 Claims



1. A method for determining a chemical characteristic of a liquid comprising:  
disposing the liquid having a chemical characteristic in both reference and measuring test cells, said cells being at least partially transparent to light;  
adding an indicator to said liquid so that the liquid disposed in at least said measuring test cell contains the indicator, said indicator responding to a titrant to alter the optical transmission of the liquid containing the indicator;  
transmitting light through said reference and measuring cells;  
generating first and second electrical signals respectively

indicative of the amount of light transmitted through said reference and measuring cells;  
comparing said first and second signals to each other;  
adding a titrant to said measuring cell, said titrant responding to said chemical characteristic by altering the optical transmission of said liquid containing said indicator, and repeating said comparing and adding titrant steps until the difference between said first and second signals satisfies a prescribed condition; and  
determining the volume of titrant added to said liquid to satisfy said prescribed condition, whereby said chemical characteristic can be determined.

10. An apparatus for determining a chemical characteristic of a liquid comprising:

at least one light source;  
reference and measuring cells, each cell for receiving and containing a liquid and being transparent to at least some of the light produced by said at least one light source;  
means for disposing the liquid in both said cells;  
a first reservoir for containing a liquid indicator and first means for controllably introducing indicator into the liquid disposed in at least said measuring cell;  
a second reservoir for containing a liquid titrant and second means for controllably introducing titrant from said second reservoir into the liquid disposed in said measuring cell;  
first and second photosensors for receiving light transmitted from said at least one source through said reference and measuring cells, respectively, and for generating first and second electrical signals, respectively, indicative of the amount of light transmitted through said reference and measuring cells;  
comparing means for comparing said first and second electrical signals to each other; and  
control means for controlling operation of said second means for introducing in response to the comparison of said first and second signals.

4,950,611

## COLD STABLE LIQUID CREATININE REAGENT

Charles B. Seaton, San Diego, Calif., assignor to Beckman Instruments, Brea, Calif.

Filed Jun. 26, 1987, Ser. No. 67,365

Int. Cl.<sup>5</sup> G01N 33/70

U.S. Cl. 436—98 10 Claims

1. A cold stable liquid reagent system suitable for use in a Jaffe method for the determination of creatinine comprising:  
(a) a homogeneous liquid picric acid component comprising picric acid in an amount of no more than about 40 mM, such that the picric acid component remains visibly homogeneous at a temperature as low as about 0° C. up to one year or more  
(b) a homogeneous liquid alkaline buffer component comprising:  
(i) an alkaline material in sufficient amount to maintain the pH of the alkaline buffer component at more than about 13, for controlling the pH of the assay ready reagent formed by combining the picric acid and alkaline buffer components;  
(ii) at least one pH buffer material; and  
(iii) a detergent for reducing interference by proteins in the Jaffe method;  
wherein the alkaline buffer components contain substantially no metallic cations such that the component remains visibly homogeneous at a temperature as low as about 0° C. up to 1 year or more.



forming a semiconductor layer on an insulating substrate;  
forming a layer of silicon dioxide on said semiconductor layer;  
forming a layer of silicon on said silicon dioxide layer;  
forming a layer of silicon nitride on said layer of silicon;  
forming a patterned mask on the surface of said layer of silicon nitride;

UMI

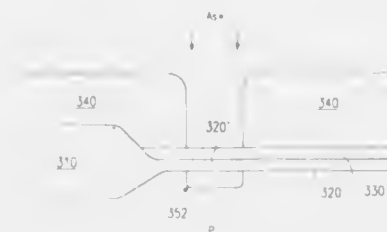
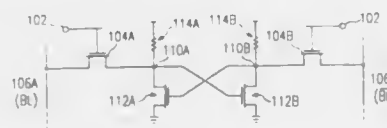
etching the exposed areas of said silicon nitride layer to expose said silicon layer;  
 etching the exposed areas of said silicon layer using an etch selective to silicon over silicon dioxide to expose said silicon dioxide layer;  
 implanting dopant ions into said semiconductive layer using the remaining portions of said silicon layer and said silicon nitride layer as an implantation mask and said silicon dioxide layer serving as a protective coating on said semiconductor layer during said implantation;  
 etching at least part of the exposed portion of said silicon dioxide layer to expose said semiconductive layer; and  
 etching said semiconductive layer to expose portions of said insulating substrate.

**4,950,620**  
**PROCESS FOR MAKING INTEGRATED CIRCUIT WITH DOPED SILICON DIOXIDE LOAD ELEMENTS**  
 Thomas E. Harrington, III, Carrollton, Tex., assignor to Dallas Semiconductor Corp., Dallas, Tex.

Filed Sep. 30, 1988, Ser. No. 252,268  
 Int. Cl.<sup>5</sup> H01L 21/265

U.S. Cl. 437—60

27 Claims



I. A process for making an integrated circuit, comprising the steps of:

- providing a substrate including monocrystalline semiconductor portions therein;
- forming a high-quality thin dielectric film on said monocrystalline semiconductor portions;
- covering said thin dielectric film with a thin capping layer;
- introducing dopant atoms into a predetermined area portion of said thin dielectric film, to induce a significantly increased leakage current therein;
- providing a gate layer over said capping layer, said gate layer being a thin film conductive layer which is patterned to form the gate electrode of multiple operable insulated-gate field-effect transistors in predetermined locations, other portions of said high-quality thin dielectric film providing the gate dielectric of said transistors, and said monocrystalline semiconductor portions providing the channel of at least some of said transistors; and
- interconnecting one of said transistors in circuit paths to implement a desired electrical function, wherein some of said circuit paths include current flowing vertically through said increased-leakage-current portions of said high-quality thin film to provide electrical load elements.

**4,950,621**  
**METHOD OF GROWING CRYSTALLINE LAYERS BY VAPOR PHASE EPITAXY**

Stuart J. Irvine, Malvern; John B. Mullin, West Malvern, and Jean Giess, Malvern, all of England, assignors to Secretary of the State for Defence in Her Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, United Kingdom

Filed Nov. 6, 1985, Ser. No. 795,447

Claims priority, application United Kingdom, Nov. 6, 1984, 8428032

Int. Cl.<sup>5</sup> H01L 21/20, 21/26

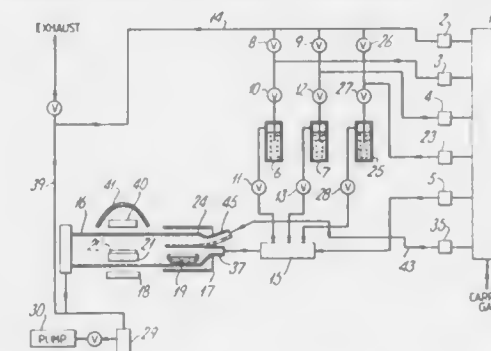
U.S. Cl. 437—81

29 Claims

I. A method of growing an epitaxial crystalline layer on a semiconductor substrate comprising the steps of:  
 providing in the reaction zone of a reaction vessel a heated semiconductor substrate;  
 establishing a carrier gas stream, said carrier gas comprising

at least 80% by volume of a gas which suppresses homogeneous nucleation of particles in the vapor phase, which carrier gas stream contains, in the vapor phase, at least one alkyl of an element selected from Group Vb and Group Vlb of the Periodic Table;

passing over the surface of the said substrate a carrier gas stream through the reaction zone and in contact with the heated substrate wherein the total gas pressure in the reaction zone is in excess of 0.1 atmospheres; and



irradiating at least a major part of the surface of the substrate with electromagnetic radiation of wavelength longer than 240 nm to provide photolytic decomposition on the surface of the substrate of the at least one alkyl and consequential epitaxial deposition of the layer containing the said element across at least a major part of the surface of the substrate.

**4,950,622**  
**METHOD FOR MANUFACTURING A SURFACE EMITTING TYPE ALGAS/GAAS SEMICONDUCTOR LASER DIODE**

Young Se Kwon, and Tae Kyung Yoo, both of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea

Filed Apr. 27, 1989, Ser. No. 344,317

Claims priority, application Rep. of Korea, Apr. 28, 1988, 4868

Int. Cl.<sup>5</sup> H01L 21/20

U.S. Cl. 437—129

3 Claims



I. A method for manufacturing a surface emitting type AlGaAs/GaAs semiconductor LASER diode by a selective epitaxy process comprising the following steps of:

- forming a silicon oxide layer or a silicon nitride layer on one side of a n-type single crystal GaAs substrate so as to be a mask;
- removing said mask of regions each for forming a 45° mirror reflective face and a LASER diode by making use of a photolithography method and a chemical etching method;
- forming a triangular 45° mirror reflective face and a LASER diode by removing the photoresistor on the remaining mask after a selective epitaxy process and depositing a p-type metal layer on those layers;
- forming a slant face of the LASER diode into a vertical face

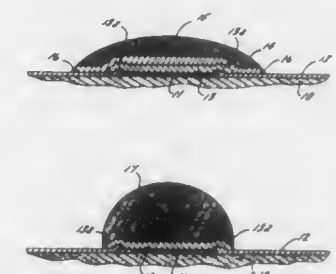
under the state of said p type metal layer being made as a mask; and  
 depositing a n-type metal layer on the other side of the n-type single crystal GaAs substrate, thereafter carrying out a heat treatment.

**4,950,623**  
**METHOD OF BUILDING SOLDER BUMPS**  
 Giora J. Dishon, Chapel Hill, N.C., assignor to Microelectronics Center of North Carolina, Durham, N.C.

Filed Aug. 2, 1988, Ser. No. 227,347  
 Int. Cl.<sup>5</sup> H01L 21/44, 21/48

U.S. Cl. 437—183

26 Claims



I. A method of forming a solder bump on a solder-wettable under bump metallurgy in which a contact pad on a substrate material is surrounded by a dielectric passivation layer upon the substrate material, and wherein the dielectric passivation layer is non-wettable by solder and in which the solder-wettable under bump metallurgy covers the contact pad, the method comprising:

- depositing a layer of solder soluble metal upon the solder-wettable under bump metallurgy and upon a portion of the surrounding dielectric passivation layer so as to cover the entire solder-wettable under bump metallurgy and a portion of the surrounding dielectric passivation layer with the solder soluble metal;
- coating the deposited layer of solder soluble metal with a layer of solder while substantially avoiding complete dissolution of the solder soluble metal in the solder so that the solder entirely covers the solder soluble metal and those portions of the passivation layer covered by the solder soluble metal; and
- heating the solder until the layer of solder soluble metal substantially completely dissolves in the solder and the surface tension of the solder draws the solder and dissolved solder soluble metal away from the non-wettable passivation layer and into a spheroid solder bump covering the solder-wettable under bump metallurgy and surrounded by the dielectric passivation layer.

**4,950,624**  
**METHOD OF DEPOSITING FILMS USING PHOTO-CVD WITH CHAMBER PLASMA CLEANING**

Takashi Inuzuma; Shigenori Hayashi; Toru Takayama, all of Atsugi; Seichi Odaka, Akita, and Naoki Hirose, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Division of Ser. No. 91,770, Sep. 1, 1987, abandoned. This application May 16, 1988, Ser. No. 194,206

Claims priority, application Japan, Sep. 9, 1986, 61-2118823; Sep. 9, 1986, 61-213324; Sep. 9, 1986, 61-213325; Jun. 5, 1987, 62-141050

Int. Cl.<sup>5</sup> H01L 21/469

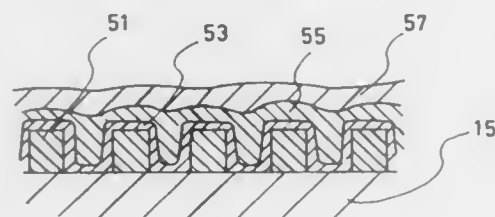
U.S. Cl. 437—235

6 Claims

I. A method of depositing films on a plurality of substrates by chemical vapor reaction, said method comprising the steps of:



mounting a plurality of substrates on side surfaces of a rotatable polygon substrate holder in a reaction chamber; depositing a first film on said substrates by a chemical vapor reaction enhanced by light rays emitted from a plurality of light sources which are located surrounding said polygon holder;



removing said substrates from said chamber; and cleaning the external surface of said light source by etching which is carried out by electric discharge between said substrate holder and an electrode located outside of said light source and surrounding said polygon holder.

4,950,625

#### DIAMOND LASER CRYSTAL AND METHOD MANUFACTURING THE SAME

Takeru Nakashima; Shuichi Satoh, and Kazuo Tsuji, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 8, 1989, Ser. No. 364,693

Claims priority, application Japan, Jun. 13, 1988, 63-145286; May 30, 1989, 1-137745

Int. Cl.<sup>5</sup> C04B 35/22

U.S. Cl. 501—86

25 Claims

1. A method for manufacturing a diamond laser crystal comprising the steps of preparing a synthetic type Ib diamond having a (111) plane growth sector taking up at least 60% of the diamond's volume; thermally treating said synthetic diamond under high temperature and high pressure sufficient for converting type Ib nitrogen contained in said synthetic diamond to type IaA nitrogen; irradiating said synthetic diamond with an electron or neutron beam thereby to generate vacancies in said synthetic diamond; and annealing said synthetic diamond to form H3 centers by coupling said type IaA nitrogen and said vacancies in said synthetic diamond, said annealing being performed under a pressure not more than  $10^{-1}$  Torr at a temperature within the range of 1300° to 1600° C. for at five hours.

4,950,626

#### PRODUCTION OF CERAMIC MATERIALS

James D. Birchall, Mouldsworth; Mary J. Mockford, Upton, and David R. Stanley, Kuntsford, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 27, 1987, Ser. No. 113,159

Claims priority, application United Kingdom, Oct. 31, 1986, 8626088

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C04B 35/00

U.S. Cl. 501—88

15 Claims

1. A process for the production of a refractory compound of a metallic or non-metallic element which process comprises producing an oxygen-containing polymeric product by reacting a mixture of a first reactant which comprises at least one compound of the metallic or non-metallic element other than aluminium having two or more groups reactive with hydroxyl groups and a second reactant which comprises at least one organic compound having two or more hydroxyl groups, and pyrolysing the polymeric product, in which the reaction mix-

ture comprises at least one aluminium compound having at least one group reactive with hydroxyl groups.

4,950,627

#### CERAMIC COATING ON METAL

Bozena Tokarz, Kungälv; Bernt Larsson, Hisings Backa, and Sven Järas, Kungälv, all of Sweden, assignors to Eka Nobel AB, Surte, Sweden

Filed Jul. 19, 1989, Ser. No. 381,946

Claims priority, application Sweden, Jul. 21, 1988, 8802689

Int. Cl.<sup>5</sup> C04B 14/00

U.S. Cl. 501—95

7 Claims

1. A composition for forming a heat-insulating ceramic coating on a metal, comprising:

- (i) 10 to 50% by weight of potassium silicate;
- (ii) 10 to 50% by weight of colloidal silica;
- (iii) 5 to 40% by weight of inorganic filler;
- (iv) 1 to 25% by weight of ceramic fibres;
- (v) 2 to 40% by weight of water;
- (vi) 2 to 20% by weight of hollow microparticles; and
- (vii) 0 to 5% by weight of surface active agent.

4,950,628

#### MATERIAL AND PROCESS TO PRODUCE LOW THERMAL EXPANSION CORDIERITE STRUCTURES

Thomas E. Landon, Painted Post; Martin J. Murtagh, Trumansburg, and Mark A. Spetsieris, Southport, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Apr. 19, 1989, Ser. No. 340,434

Int. Cl.<sup>5</sup> C04B 35/18

U.S. Cl. 501—119

12 Claims

1. A cordierite sintered structure consisting essentially of about 29 to 52 weight percent  $\text{SiO}_2$ , 20 to 48 weight percent  $\text{Al}_2\text{O}_3$ , 11 to 16 weight percent  $\text{MgO}$ , characterized by the improvement of being formed of a cordierite-forming batch containing about 1 to 40 weight percent of calcined mullite forming clay containing about 4 to 65 percent by weight mullite, having a true density ranging from 2.75 to 2.9 grams per cubic centimeter, the rest of the batch comprising conventional cordierite-forming materials and the structure has a coefficient of thermal expansion less than  $7.0 \times 10^{-7}/^\circ\text{C}$ . within the range of 25° to 800° C., has a thermal shock resistance failure temperature of greater than 800° C., and an I ratio greater than 0.750.

4,950,629

#### PROCESS FOR CATALYST RECOVERY

Christina C. Bodurow, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 27, 1988, Ser. No. 290,725

Int. Cl.<sup>5</sup> B01J 38/68

U.S. Cl. 502—24

20 Claims

1. A process for recovering a homogeneous catalyst from a catalytic reaction mixture comprising:

- (a) removing the reaction mixture solvent using temperatures such that decomposition of the catalyst is minimized;
- (b) simultaneously adding a lower alkanolic acid; and
- (c) recovering the precipitated homogeneous catalyst.

4,950,630

#### METHOD FOR PRODUCTION OF CATALYST COMPONENT FOR OLEFIN POLYMERIZATION

Masahide Murata; Masafumi Imai; Hiroyuki Furuhashi; Kouji Maruyama, and Hiroshi Ueno, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,400

Claims priority, application Japan, Nov. 30, 1987, 62-300072

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08F 4/64

U.S. Cl. 502—116

5 Claims

1. A titanium-containing olefin polymerization catalyst component obtained by contacting,

- I. a magnesium-containing carrier obtained by (i) first contacting (A) magnesium metal with (B) a halogenated hydrocarbon represented by the general formula,  $\text{RX}$  wherein R stands for an alkyl, aryl, or cycloalkyl group having 1 to 20 carbon atoms and X stands for a halogen atom, and
- (ii) thereafter the contact product therefrom contacted with a (C) an alkoxy compound of the general formula,  $\text{X}_n^1\text{M}(\text{OR}^1)_{m-n}$  wherein  $\text{X}^1$  stands for a hydrogen atom, a halogen atom, or a hydrocarbon group having 1 to 20 carbon atoms, M stands for a boron, carbon, aluminum, silicon, or a phosphorus atom,  $\text{R}^1$  stands for a hydrocarbon group having 1 to 20 carbon atoms, and m stands for the valency of said atom M, providing that  $m > n \geq 0$  is satisfied, and contacting the product therefrom with (D) a halogen-containing alcohol with

II. (E) an electron donor compound and (F) a titanium compound.

4,950,631

#### MODIFIED SILICA BASED CATALYST

Charles K. Buehler, Naperville; Richard W. Fries, Joliet, and Thomas J. Pullukat, Hoffman Estates, all of Ill., assignors to Quantum Chemical Corporation, New York, N.Y.

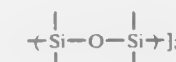
Continuation of Ser. No. 99,190, Sep. 21, 1987, abandoned. This application Mar. 21, 1989, Ser. No. 326,708

Int. Cl.<sup>5</sup> C08F 4/64

U.S. Cl. 502—119

21 Claims

- 1. A catalyst comprising the product obtained by: (a) treating silica to remove surface hydroxyl groups



- (b) contacting said treated silica with (1) a modifying compound selected from the group consisting of silicon halides, boron halides, aluminum halides, alkyl silicon halides and mixtures thereof; and (2) at least one hydrocarbon soluble magnesium-containing compound selected from the group consisting of hydrocarbyloxy magnesiums, hydrocarbyloxymagnesium halides and mixtures thereof; said contacting steps (1) and (2) occurring in random order;
- (c) contacting said product of step (b) with at least one titanium-containing compound having the structural formula  $\text{Ti}(\text{OR})_n\text{X}_m$ , where R is aryl, alkyl or mixtures thereof; X is halogen; n is an integer of 1 to 4; m is 0 or an integer of 1 to 3; and the sum of m and n is 4; and
- (d) treating the product of step (c) with a titanium-containing compound having the structural formula  $\text{TiX}^1_p(\text{OR}^1)_q$ , where  $\text{X}^1$  is halogen;  $\text{R}^1$  is aryl or alkyl; p is an integer of 1 to 4; q is 0 or an integer of 1 to 3; and the sum of p and q is 4, with the proviso that the titanium-containing compound of this step is not the same as the titanium-containing compound of step (c).

4,950,632

#### CATALYSTS AND CATALYST SUPPORTS, WITH INORGANIC NITRATES, FOR OLEFIN DIMERIZATION

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 5, 1989, Ser. No. 375,563

Int. Cl.<sup>5</sup> B01J 27/232, 23/04, 23/02; C07C 2/24

U.S. Cl. 502—184

13 Claims

I. A process for the preparation of a catalyst support comprising:

- (a) preparing a thick paste comprising an alkali metal carbonate; from about 1 to about 50 weight percent inorganic nitrate, based on the weight of the alkali metal carbonate; and water, at a temperature and in an amount sufficient to dissolve the inorganic nitrate, but insufficient to dissolve the alkali metal carbonate; and
- (b) forming a particulate product from said paste; and
- (c) calcining said particulate product at a temperature less than the decomposition temperature of said inorganic nitrate.

4,950,633

#### CATALYST FOR HYDROTREATING COAL LIQUEFACTION AND CIRCULATION SOLVENT

Toshio Yamaguchi, Tokyo; Kikoo Uekusa, Chiba; Naoto Kinbara; Eiji Funatsu, both of Ichikawa; Katsuzo Shiraiishi, Inba, and Yukuaki Mitani, Kamagaya, all of Japan, assignors to Sumitomo Metal Mining Company Limited, Japan

Filed Oct. 17, 1989, Ser. No. 422,428

Claims priority, application Japan, Oct. 17, 1988, 63-259308

Int. Cl.<sup>5</sup> B01J 21/04, 23/85, 23/88

U.S. Cl. 502—314

6 Claims

1. A catalyst for hydrotreating a coal liquefaction and circulation solvent, in which a carrier of gamma-alumina carries at least one selected from metals of Group VI of the Periodic Table in an amount of from 15 to 25% by weight as the oxide thereof and at least one selected from metals of Group VIII of the Periodic Table in an amount of from 3 to 10% by weight as the oxide thereof and the pore distribution as measured by mercury pressure porosimetry satisfies the conditions that the pores having a diameter falling within the range of from 40 to 600 Å have a mean diameter falling within the range of from 90 to 150 Å and the capacity of the pores having a diameter falling within the range of the mean diameter plus/minus 10 Å is 65% or more of the capacity of the pores having a diameter falling within the range of from 40 to 600 Å.

4,950,634

#### METHOD FOR PRODUCING DUAL ZONE MATERIALS BY USE OF AN ORGANOSILANE MIXTURE

Dwight E. Williams, and Thomas J. Tangney, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 154,754, Feb. 11, 1988. This application Sep. 22, 1988, Ser. No. 248,893

Int. Cl.<sup>5</sup> B01J 20/32, 20/22; B01D 15/08; B32B 5/14

U.S. Cl. 502—401

21 Claims

1. A method of silylating a porous material to form a silylated porous material having an external zone which comprises the external surfaces of the porous material and having an internal zone which comprises the internal surfaces of the porous material, comprising:

- (a) providing a hydroxyl-bearing porous support selected from the group consisting of porous metalloid oxides, porous metallic oxides, and mixtures thereof;
- (b) providing an organosilane mixture of (i) an amount less than or equal to two-thirds of a stoichiometric equivalent, based on the reactable hydroxyl content of said porous support, of a first organosilane having first organosilyl groups and having a leaving group which is capable of rapidly reacting with the hydroxyls on the external surfaces faster than said first

organosilane can migrate into the interior of said porous support, and

- (ii) more than 0.05 molecules per square nanometer of surface area of said porous support of a second organosilane having second organosilyl groups and a leaving group that will react slowly with the hydroxyls on the internal surfaces of said porous support but that will not substantially exchange with the leaving group of said first organosilane, said second organosilane being capable of diffusing into the interior of said porous support,
- (c) forming a porous support suspension by mixing said porous support with a solvent,
- (d) adding said organosilane mixture to said porous support suspension at a rate which is rapid with respect to the reaction rate of said second organosilane but slow with respect to the rate of mixing said suspension with said organosilane mixture,
- (e) maintaining contact between said porous support and said organosilane mixture for a time sufficient to permit rapid formation of said first organosilyl groups predominantly on the external surfaces of said porous support to form said external zone and said slow formation of said second organosilyl groups predominantly on the internal surfaces of said porous support to form said internal zone, and
- (f) subsequently isolating the so-treated porous support and thereby providing said silylated porous material.

4,950,635

#### METHOD FOR PRODUCING DUAL ZONE MATERIALS BY CATALYZED HALOSILYLATION

Dwight E. Williams, and Thomas J. Tangney, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 154,754, Feb. 11, 1988. This application Sep. 22, 1988, Ser. No. 248,737

Int. Cl.<sup>5</sup> B01J 20/32, 20/22; B01D 15/08; B32B 5/14

U.S. Cl. 502—401 34 Claims

1. A method of silylating a porous material having an external zone which comprises the external surfaces of the porous material and having an internal zone which comprises the internal surfaces of the porous material, comprising:

- (a) providing a hydroxyl-bearing porous support selected from the group consisting of porous metalloid oxides, porous metallic oxides, and mixtures thereof,
- (b) forming a porous support suspension by mixing said porous support with a solvent, said suspension also containing a lewis base catalyst,
- (c) adding to said suspension a halosilane in an amount which does not exceed 2.0 molecules per square nanometer of surface area of the porous support in said suspension and which is catalyzed by said catalyst so as to form silyl groups predominantly on the external surfaces of said porous support,
- (d) providing silyl groups predominantly on the internal surfaces of said porous support which are different from the silyl groups formed predominately on said external surfaces, and
- (e) subsequently isolating the so-treated porous support and thereby providing a silylated porous material.

4,950,636

#### SULFUR AND NITROGEN-CONTAINING HYDROCARBONS AND PROCESS OF USING SAME IN RECOVERING AND CONCENTRATING DESIRED IONS FROM SOLUTIONS THEREOF

Bryon J. Tarbet; Ronald L. Bruening; Jerald S. Bradshaw, and Reed M. Izatt, all of Provo, Utah, assignors to IBC Advanced Technologies, Provo, Utah

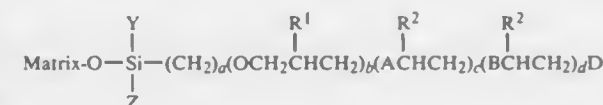
Filed Aug. 26, 1988, Ser. No. 236,763

Int. Cl.<sup>5</sup> B01J 20/22

U.S. Cl. 502—401

19 Claims

1. A compound of formula



wherein A and B are members selected from the group consisting of N(R<sup>3</sup>), N(R<sup>3</sup>)CH<sub>2</sub>, O, OCH<sub>2</sub>, S and SCH<sub>2</sub>, with the further proviso that if A is selected from the group consisting of O, OCH<sub>2</sub>, S and SCH<sub>2</sub> then B must be selected from the group consisting of N(R<sup>3</sup>) and N(R<sup>3</sup>)CH<sub>2</sub>; D is a member selected from the group consisting of H, SH, OH, NH(R<sup>3</sup>), lower alkyl and N(R<sup>3</sup>)CH<sub>2</sub>CH(R<sup>1</sup>)CH<sub>2</sub>O(CH<sub>2</sub>)<sub>6</sub>SiXYZ; X is a member selected from the group consisting of Cl, O-matrix, OCH<sub>3</sub> and OC<sub>2</sub>H<sub>5</sub>; Y and Z are members selected from the group consisting of Cl, O-matrix, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, methyl, ethyl and halogenated substituents thereof; R<sup>1</sup> is a member selected from the group consisting of H, SH, OH, lower alkyl and aryl; R<sup>2</sup> is a member selected from the group consisting of H and lower alkyl; R<sup>3</sup> is a member selected from the group consisting of H and [(CH<sub>2</sub>)<sub>6</sub>E]R<sup>4</sup>, where E is selected from the group consisting of S, Se and Te; and R<sup>4</sup> is a member selected from the group consisting of H, lower alkyl and aryl; a is from 2 to about 10; b is 0 or 1; c is from 1 to about 2000; d is from 0 to about 2000; f is from 2 to about 10; g is from 1 to about 10; and matrix is selected from the group consisting of sand, silica gel, glass, glass fibers, alumina, zirconia, titania or nickel oxide.

4,950,637

#### HEAT SENSITIVE RECORDING MATERIAL

Shuki Okauchi, Osaka; Toshitake Suzuki, Kobe; Yoshiyuki Nukushina, and Masato Kawamura, both of Amagasaki, all of Japan, assignors to Kanzaki Paper Manufacturing Co. Ltd., Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 334,061

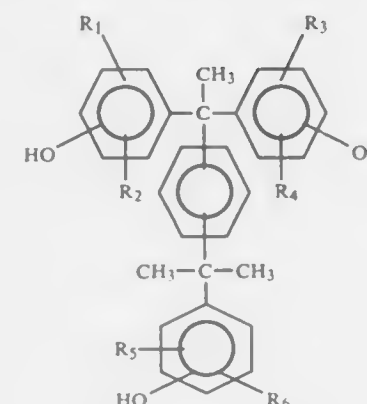
Claims priority, application Japan, Apr. 13, 1988, 63-90546

Int. Cl.<sup>5</sup> B41M 5/18

U.S. Cl. 503—209

7 Claims

1. In a heat sensitive recording material comprising a substrate and a heat sensitive recording layer thereon incorporating a colorless or light-colored basic dye and a color acceptor which is reactive with the dye to form a color when contacted therewith, the recording material characterized in that at least one of the compounds of the formula (I) is contained in the heat sensitive recording layer.



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> are the same or different and are hydrogen atom, halogen atom, C<sub>1</sub>—C<sub>5</sub> alkyl or C<sub>1</sub>—C<sub>5</sub> alkoxy.

4,950,638

#### THERMOSENSITIVE RECORDING MATERIAL HAVING RECORDING LAYER CONTAINING FLUORESCENT DYE COMPOSITION

Yukihiro Yuyama; Kenji Uematsu; Hiroaki Okuda, and Hideo Aihara, all of Numazu, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

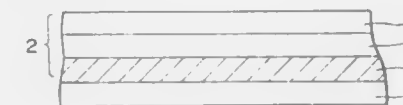
Filed Oct. 6, 1987, Ser. No. 105,189

Claims priority, application Japan, Oct. 9, 1986, 61-155378; Dec. 10, 1986, 61-190276; Dec. 10, 1986, 61-190277; May 14, 1987, 62-072531

Int. Cl.<sup>5</sup> B11M 5/18

U.S. Cl. 503—226

27 Claims



1. A thermosensitive recording material comprising: a support; and

a thermosensitive recording layer formed on one side of said support, said thermosensitive recording layer comprising (i) thermosensitive coloring layer comprising a thermosensitive coloring system capable of producing a colored image upon application of heat thereto, and (ii) a colored layer comprising a colored fluorescent dye composition and a first resin, said colored fluorescent dye composition comprising a second resin which is dyed with a fluorescent dye or in which a fluorescent dye is dissolved, wherein said colored layer forms a fluorescent colored background for said image.

4,950,639

#### BIS(AMINOARYL)POLYMETHINE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Charles D. DeBoer, and Steven Evans, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 16, 1989, Ser. No. 366,968

Int. Cl.<sup>5</sup> B41M 5/035, 5/26

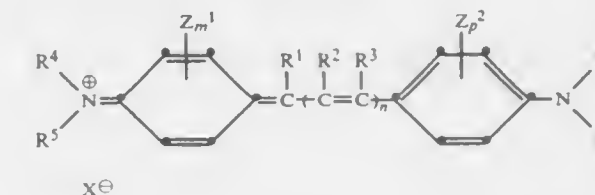
U.S. Cl. 503—227

17 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

(a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and

- (b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said infrared-absorbing material is a bis(aminoaryl)polymethine dye which is located in said dye layer and has the following formula:



wherein:

- R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxy-carbonyl, alkoxy-carbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any two of said R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> groups may be joined together or with an adjacent aromatic ring to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;
- R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> each independently represents hydrogen, a substituted or unsubstituted alkyl or cycloalkyl group having from 1 to about 6 carbon atoms or an aryl or hetaryl group having from about 5 to about 10 atoms; or R<sup>4</sup> and R<sup>5</sup> or R<sup>6</sup> and R<sup>7</sup> may be joined together to form a 5- to 7-membered heterocyclic ring;
- or R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> or R<sup>7</sup> may be joined to the carbon atom of the adjacent aromatic ring at a position ortho to the position of attachment of the anilino nitrogen to form, along with the nitrogen to which they are attached, a 5- or 6-membered heterocyclic ring;
- n is 1 to 5;
- X is a monovalent anion;
- Z<sup>1</sup> and Z<sup>2</sup> each independently represents R<sup>1</sup> or the atoms necessary to complete a 5- to 7-membered fused carbocyclic or heterocyclic ring; and
- m and p are each 4.

4,950,640

#### INFRARED ABSORBING MEROCYANINE DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Steven Evans, and Charles D. DeBoer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 16, 1989, Ser. No. 366,967

Int. Cl.<sup>5</sup> B41M 5/035, 5/26

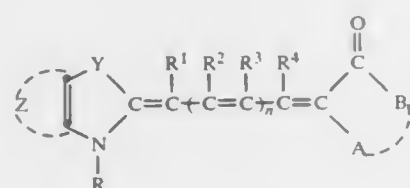
U.S. Cl. 503—227

17 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

- (a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and
- (b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image, the improvement wherein said infrared-absorbing material is a merocyanine dye having the following formula:





wherein:

R represents a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms or a substituted or unsubstituted aryl or hetaryl group having from about 5 to about 10 atoms;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> each independently represents hydrogen, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxy-carbonyl, alkoxy-carbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group; or any two of said R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> groups may be joined together to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

A represents hydrogen, —COR, —CO<sub>2</sub>R, —CONHR, —CONR<sub>2</sub>, —SO<sub>2</sub>R, —SO<sub>2</sub>NHR, —SO<sub>2</sub>NR<sub>2</sub>—SR, or —CN;

B represents —NHR, —NR<sub>2</sub>, —OR, —SR or —R;

or A or B may be joined together or with R<sup>3</sup> or R<sup>4</sup> to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

Y represents a dialkyl-substituted carbon atom, a vinylene group, an oxygen atom, a sulphur atom, a selenium atom, a tellurium atom, NR, or a direct bond to the carbon at the R<sup>2</sup> position;

Z represents the atoms necessary to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring; and n is 3 to 5.

4,950,641

# THERMAL TRANSFER PRINTING DYESHEET AND BACKCOAT COMPOSITION THEREFOR

Richard A. Hana, and Barry Pack, both of Ipswich, England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 26, 1988, Ser. No. 262,745

Claims priority, application United Kingdom, Oct. 30, 1987, 8725452

Int. Cl.<sup>5</sup> B41M 5/035, 5/26

U.S. Cl. 503—227

10 Claims

1. A dyesheet for thermal transfer printing, comprising a thermoplastic substrate film supporting on one surface a dye-coat containing a thermal transfer dye, and having a polymeric back-coat on the other surface, wherein the back-coat consists essentially of a reaction product of polymerising acrylic functional groups in a layer of a coating composition comprising:

(a) a polyfunctional organic resin having a plurality of pendant or terminal acrylic groups per molecule available for cross-linking, at least 10% by weight of the polyfunctional resin having 4-8 such acrylic groups per molecule;

(b) at least one linear organic polymer soluble or partially soluble in the resin, and comprising 1-40% by weight of the resin/polymer mixture;

(c) a slip agent selected from salts and esters of long chain carboxylic, hydrocarboxylic and phosphoric acids, long alkyl chain esters of phosphoric acid, and long alkyl chain acrylates;

(d) an antistatic agent soluble in the resin, and

(e) a solid particulate antiblocking agent less than 5 μm in diameter.

## 4,950,642 METHOD FOR FABRICATING SUPERCONDUCTING OXIDE THIN FILMS BY ACTIVATED REACTIVE EVAPORATION

Yukio Okamoto, Sagami-hara; Toshiyuki Aida, Chofu; Katsuki Miyauchi, Hino; Kazumasa Takagi, Tokyo; Tokumichi Fukazawa, Tachikawa, and Shinji Takayama, Mitaka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

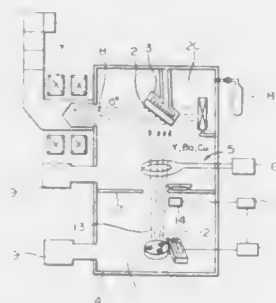
Filed Aug. 5, 1988, Ser. No. 228,750

Claims priority, application Japan, Aug. 7, 1987, 62-196186; Oct. 7, 1987, 62-251497

Int. Cl.<sup>5</sup> B05D 5/12, 3/06; C23C 14/00

U.S. Cl. 505—1

4 Claims



1. A method for fabricating a ceramic oxide superconducting thin film, comprising the steps of applying a mixture of vapor of metal elements, of which the superconducting thin film is to be composed, said vapor begin generated in an evaporation chamber evacuated to a high vacuum by a differential pumping mechanism, and a plasma gas containing oxygen ions generated in a plasma chamber separated from said evaporation chamber to a substrate, wherein said evaporation chamber is evacuated to a high vacuum higher than that of said plasma chamber; and reacting said vapor and said gas with each other on said substrate in a reaction chamber to grow a superconductive thin film by crystallization without further annealing.

4,950,643

## METALORGANIC DEPOSITION PROCESS FOR PREPARING HEAVY Pnictide SUPERCONDUCTING OXIDE FILMS

John A. Agostinelli; Gustavo R. Paz-Pujalt; Arun K. Mehrotra, and Liang-Sun Hung, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 214,976, Jul. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 172,926, Mar. 25, 1988, abandoned. This application May 31, 1989, Ser. No. 359,306

Int. Cl.<sup>5</sup> B05D 3/02, 5/12

U.S. Cl. 505—1

30 Claims

2. A process of forming on a substrate a uniform metal oxide coating which exhibits a superconducting transition temperature in excess of 90° K. containing a conductive oxide crystallization phase which satisfies the formula:



where

P is bismuth optionally in combination with less 10 mole percent antimony,

A is strontium,

A' is calcium,

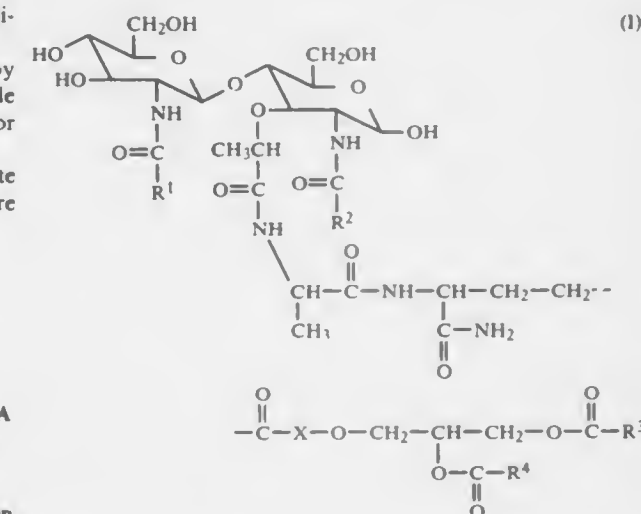
C is copper, and

x is 0.5 to 1.5,

comprising

applying to a surface of the temperature with a perovskite crystal structure or an alkaline earth oxide a coating of a solution consisting essentially of a volatilizable film solvent, metal-ligand compounds of each of P, A, and A' containing at least one thermally volatilizable organic

ligand, and at least one copper-ligand compound containing a thermally volatilizable carboxylic ligand, said ligands each containing less than 30 carbon atoms, removing the solvent and ligands from the substrate by heating in the presence of oxygen to form a heavy pnictide mixed alkaline earth copper oxide coating of 1.5 μm or less in thickness on the substrate, and forming the crystalline conductive coating on the substrate by heating the oxide coating to its crystalline temperature followed by cooling in the presence of oxygen.



## 4,950,644 METHOD FOR THE EPITAXIAL PREPARATION OF A LAYER OF A METAL-OXIDE SUPERCONDUCTING MATERIAL WITH A HIGH TRANSITION TEMPERATURE

Ludwig Schultz, Bubenreuth, and Joachim Wecker, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

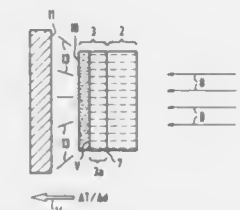
Filed Jan. 26, 1989, Ser. No. 302,823

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802348; Oct. 13, 1988, 3834963

Int. Cl.<sup>5</sup> H01L 39/12; B22F 9/04

U.S. Cl. 505—1

20 Claims



1. A method for the preparation of a layer of a superconducting material with a high transition temperature on the basis of a material system containing metallic components and oxygen, comprising applying a layer of a predetermined thickness of a metal-oxide precursor alloy of the components of the system with a structure which still contains faults with respect to the superconducting metal-oxide phase to be developed to a predetermined substrate with an ordered structure, and subsequently forming the desired superconducting metal oxide phase epitaxially, using a heat treatment in oxygen, further comprising, for an at least partial formation of the desired superconducting metal oxide phase, providing thermal pulses of short duration, where at least at the beginning of said step of providing, a boundary surface between the precursor alloy layer and the substrate is heated by said thermal pulses so that a temperature gradient descending from the boundary surface to a free surface of the layer and measured over the thickness of the layer of at least 10° K. per μ is obtained.

4,950,645

## COMPOSITION FOR MACROPHAGE ACTIVATION

Gerald J. Vosika; Dennis A. Cornelius, both of Fargo, N. Dak., and Karl E. Swenson, Gahanna, Ohio, assignors to Immunotherapeutics, Inc., Fargo, N. Dak.

Filed Jul. 8, 1988, Ser. No. 216,789

Int. Cl.<sup>5</sup> A61K 37/02; C07K 9/00

U.S. Cl. 514—8

14 Claims

1. A compound of the formula:

4,950,646

## DNA SEQUENCES, RECOMBINANT DNA MOLECULES AND PROCESSES FOR PRODUCING HUMAN LIPOCORTIN-LIKE POLYPEPTIDES

Barbara P. Wallner, Cambridge; R. Blake Pepinsky, Watertown, and Jeffrey L. Garwin, Bedford, all of Mass., assignors to Biogen, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 690,146, Jan. 10, 1985, Pat. No. 4,879,224, which is a continuation-in-part of Ser. No. 712,376, Mar. 15, 1985, Pat. No. 4,874,743, which is a

continuation-in-part of Ser. No. 765,877, Aug. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 772,892, Sep. 5, 1985, abandoned. This application Jan. 10, 1986, Ser. No. 929,199

Int. Cl.<sup>5</sup> A61K 37/02; C07K 13/00

U.S. Cl. 514—12

5 Claims

1. An essentially pure fragment of human lipocortin, selected from the group consisting of

- (a) Lipo-L
- (b) e-1,
- (c) e-2,
- (d) e-3,
- (e) e-4,
- (f) e-5,
- (g) the 26 Kd fragment of Lipo 8,
- (h) the 14.6 Kd fragment of Lipo 11, and
- (i) the 20.7 Kd fragment of Lipo 15.

4,950,647

## T CELL IMMUNOPOTENTIATOR

Roland K. Robins; Brahma S. Sharma, and Ganapathi R. Revankar, all of Irvine, Calif., assignors to Nucleic Acid Research Institute, Costa Mesa, Calif.

Filed Oct. 4, 1988, Ser. No. 253,050

Int. Cl.<sup>5</sup> A61K 31/395, 31/70; C07H 19/123

U.S. Cl. 514—45

10 Claims

1. A immunoenhancing composition comprising an antigen and a diluent amount of a physiologically tolerable carrier admixed with an immunoenhancing effective amount of the compound 6-amino-(2-deoxy-α-D-erythro-pentofuranosyl)-imidazo[4,5-c]pyridin-4-one or pharmaceutically acceptable salts thereof.

4,950,648  
ANALGESIC

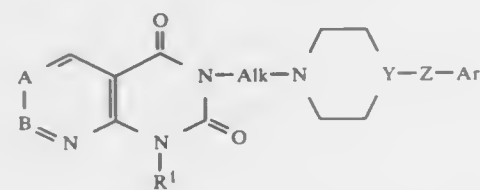
Peter Raddatz, Darmstadt; Wolf-Dietrich Weber, Reinheim; Andrew Barber, Darmstadt; Hans-Peter Wolf, Alsbach-Hähnlein, and Christoph Seyfried, Jugendheim, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany  
Filed Nov. 15, 1988, Ser. No. 271,463

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1987, 3738844

Int. Cl.<sup>5</sup> A61K 31/50, 31/505

U.S. Cl. 514—254 19 Claims

1. A method of controlling pain in a patient comprising administering to said patient an effective amount of a pyrimidine derivative of the formula



wherein

A=B is  $\text{CH}=\text{CH}$  or  $\text{N}=\text{CR}^2$ ;  
Alk is an alkylene group having 2-4 C atoms;  
 $\text{R}^1$  is H, dialkylaminoalkyl, carboxylalkyl, alkoxycarbonylalkyl, carbamoylalkyl, N-alkylcarbamoylalkyl or N,N-dialkylcarbamoylalkyl;  
Y is CH or N;  
Z is a bond or  $\text{CO}$ ;  
Ar is a phenyl, thienyl or pyridyl group which is unsubstituted or substituted one or more times by alkyl, alkoxy, F, Cl, Br, I and/or  $\text{CF}_3$ , and  
 $\text{R}^2$  is H, alkyl, alkoxy or alkylthio;  
in which the alkyl, alkoxy and alkylthio groups each contain 1-4 C atoms, and/or one of its physiologically acceptable salts.

## 4,950,649

## DIDEMNINS AND NORDIDEMNINS

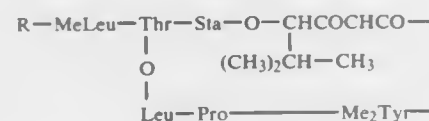
Kenneth L. Rinehart, Urbana, Ill., assignor to University of Illinois, Urbana, Ill.

Continuation-in-part of Ser. No. 894,442, Jul. 31, 1986, abandoned, and Ser. No. 457,615, Jan. 13, 1983, abandoned, which is a continuation-in-part of Ser. No. 299,897, Sep. 8, 1981, abandoned, which is a continuation-in-part of Ser. No. 186,932, Sep. 12, 1980, abandoned, said Ser. No. 894,442, is a continuation of Ser. No. 663,824, Oct. 22, 1984, abandoned, which is a continuation of Ser. No. 449,296, Dec. 13, 1982, abandoned, which is a continuation of Ser. No. 299,894, Sep. 8, 1981, abandoned, which is a division of Ser. No. 217,768, Dec. 18, 1980, abandoned, which is a continuation-in-part of Ser. No. 186,932, Sep. 12, 1980, abandoned. This application Dec. 23, 1987, Ser. No. 137,484

Int. Cl.<sup>5</sup> A61K 37/00

U.S. Cl. 514—10 1 Claim

1. A process for treating an animal or human host infected with an RNA or DNA virus which comprise the administration of an effective amount of a didemnin comprising the structural formula



where R is hydrogen,  $\text{CH}_3\text{CHOHCO-Pro-}$ , or  $\text{CH}_3\text{CHOHCO-}$ ; or a pharmaceutically acceptable salt thereof, to said host whereby said virus is controlled or eradicated.

## 4,950,650

## NOVEL ARGININE VASOPRESSIN-BINDING PEPTIDES

Howard H. Johnson, and Barbara A. Torres, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

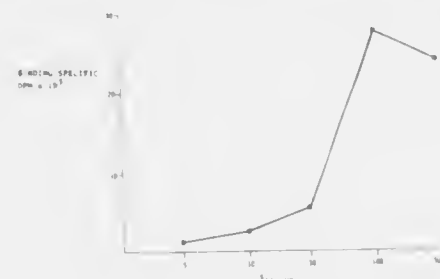
Division of Ser. No. 169,713, Mar. 18, 1988, Pat. No. 4,786,631.

This application Aug. 19, 1988, Ser. No. 234,243

Int. Cl.<sup>5</sup> A61K 37/34

U.S. Cl. 514—15

5 Claims



1. A process for the control of hypertension in a mammal which comprises treating a mammal with an effective antihypertension amount of an AVP-binding peptide having the formula



wherein X is selected from the group consisting of Lys, Arg, and Asp; B is OH,  $\text{NH}_2$ ,  $\text{NHAlk}$ , wherein Alk is lower alkyl of 1-4 carbons; in association with an inert pharmaceutical carrier.

## 4,950,651

NITROSO-N-( $\beta$ -CHLORO ETHYL)-CARBAMOYL PEPTIDES

Helga Suli; Kalman Medzihradzky; Hedvig Medzihradzky nee Schweiger; Karoly Lapis; Laszlo Kopper, and Andras Jeney, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termek Gyara R.T., Budapest, Hungary  
Continuation of Ser. No. 435,748, Oct. 21, 1982, abandoned.

This application Apr. 19, 1985, Ser. No. 725,146

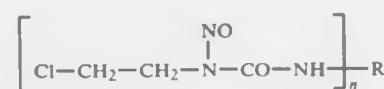
Claims priority, application Hungary, Oct. 22, 1981, 3073/81

Int. Cl.<sup>5</sup> A61K 37/02, 37/24

U.S. Cl. 514—18

6 Claims

1. A compound of the Formula (I)



wherein

R is an oligopeptide group having its N-terminal amino group removed and selected from the group which consists of:

Lys-Pro-Val- $\text{NH}_2$ ,  
Trp-Leu-Asp-Phe- $\text{NH}_2$ , and  
Gly-Lys-Pro-Val- $\text{NH}_2$ ; and

n is 1; or

R is Lys-Pro-Val- $\text{NH}_2$ , wherein the Lys residue has both its N-terminal and  $\omega$ -amino groups removed, and n is 2; or a pharmaceutically acceptable acid addition salt thereof formed with a therapeutically acceptable inorganic or organic acid.

## 4,950,652

## DSRNAs FOR COMBINATION THERAPY IN THE TREATMENT OF VIRAL DISEASES

William A. Carter, Birchrunville, Pa., assignor to HEM Research, Inc., Rockville, Md.

Continuation-in-part of Ser. No. 28,823, Mar. 23, 1987, abandoned. This application Nov. 25, 1987, Ser. No. 125,097

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—44

8 Claims

1. A pharmaceutical composition for the treatment of retroviral infections comprising an effective amount of an inhibitor of reverse transcriptase in combination with the mismatched dsRNA  $\text{rI}_n\text{r}(\text{C}_{11-14}\text{U})_n$  in an amount sufficient to result in a level of 0.1 to 1000 micrograms of the dsRNA per milliliter of the patient's body fluid.

## 4,950,653

## SOLID IODOPHOR COMPOSITION

Tjoe H. Jauw, Amsterdam, Netherlands, assignor to Eurocel-tique, S.A., Luxembourg

Filed Aug. 10, 1987, Ser. No. 85,634

Claims priority, application United Kingdom, Sep. 12, 1986, 8622012

Int. Cl.<sup>5</sup> A61K 31/00

U.S. Cl. 514—53

15 Claims

1. A solid iodophor composition in granular or powdered form, said composition being readily soluble in water and comprising a water soluble iodophor and a solubilizing agent selected from the group consisting of a urea and a sugar alcohol, said solubilizing agent having a particle size of up to 600 microns.

13. A process for the preparation of a solid iodophor composition according to claim 1 in the form of a powder, which comprises spraying said urea or sugar alcohol in a fluidised bed granulator with a solution of a water soluble iodophor in a solvent comprising water and an alkyl alcohol having a boiling point, at 760 mm Hg, below 100° C.

## 4,950,654

## HYDROPHILIC THEOPHYLLINE POWDER FORMULATION AND ITS PREPARATION

Dieter Horn, Heidelberg; Goetz Krueger, Aachen, and Reinhard Spengler, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 388,805

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827362

Int. Cl.<sup>5</sup> A61K 31/52, 31/715

U.S. Cl. 514—53

5 Claims

1. A hydrophilic theophylline powder formulation, consisting of:

- (a) from 5 to 15% by weight of theophylline,
- (b) from 15 to 30% by weight of lecithin,
- (c) from 45 to 80% by weight of a sugar,
- (d) from 0 to 5% by weight of a flow agent, and
- (e) from 0 to 30% by weight of at least one additive selected from the group consisting food colors, flavoring agents, antioxidants and extenders.

## 4,950,655

## COMPOSITION FOR TREATING AND PREVENTING DIARRHOEA IN HUMANS AND ANIMALS AND A METHOD OF PREPARING SAME

Poul Bachmann, Demstrupvej 31, DK-8900 Randers, Denmark  
PCT No. PCT/DK86/00116, § 371 Date Jan. 12, 1987, § 102(e)

Date Jun. 12, 1987, PCT Pub. No. WO87/02243, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 14, 1986, Ser. No. 67,303

Int. Cl.<sup>5</sup> A61K 31/00, 37/00; C08B 37/00

U.S. Cl. 514—54

11 Claims

1. A composition for treating and preventing diarrhoea in humans and animals, said composition comprising a pectinaceous material and an effective amount of an additive effective in increasing the effect of the pectinaceous material in binding bacteria capable of causing said diarrhoea,

wherein said additive is an amphophilic glycerol ester of at least one hydrophobic long chain ( $>12\text{C}$ ) carboxylic acid which is resistant to decomposition under the conditions prevailing in the stomach.

## 4,950,656

## METHODS AND COMPOSITIONS EMPLOYING UNIQUE MIXTURES OF POLAR AND NEUTRAL LIPIDS FOR PROTECTING THE GASTROINTESTINAL TRACT

Lenard M. Lichtenberger, Houston, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Division of Ser. No. 15,394, Feb. 17, 1987, Pat. No. 4,918,063.

This application Nov. 2, 1988, Ser. No. 266,155

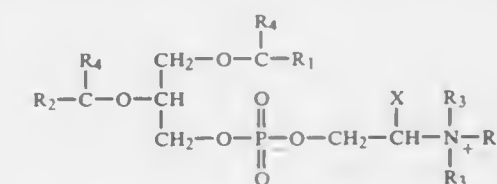
Int. Cl.<sup>5</sup> A61K 31/685

U.S. Cl. 514—78

23 Claims

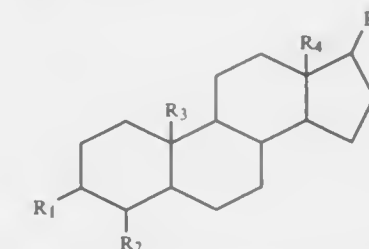
1. A pharmaceutical composition comprising an ulcer protective amount of an anti-inflammatory steroid-free combination of:

(a) an unsaturated phospholipid having the chemical structure.



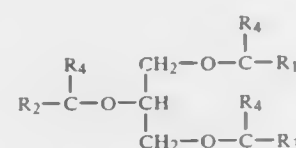
wherein  $\text{R}_1$  and  $\text{R}_2$  are unsaturated aliphatic substitutions ranging from 8 to 32 carbon atoms,  $\text{R}_3$  is H or  $\text{CH}_3$ ; x is H or  $\text{COOH}$ ; and  $\text{R}_4$  is  $\text{=O}$  or  $\text{H}_2$ ; and

(b) a non-anti-inflammatory steroid having the chemical structure



wherein the sterol contains zero, one or multiple double bonds in the perhydrocyclopentanophenanthrene moiety,  $\text{R}_1$  is either an H, O (ketone) or OH and,  $\text{R}_2$ ,  $\text{R}_3$  and  $\text{R}_4$  are either H or  $\text{CH}_3$ , and  $\text{R}_5$  is a straight or branched aliphatic chain of at between 1 and 10 carbon atoms in length; and (c) a triglyceride having the chemical structure





wherein  $R_1$ ,  $R_2$  and  $R_3$  are each aliphatic substitutions ranging from 4 to 32 carbon atoms; and  $R_4$  is either =O or  $H_2$ ;

together in a pharmaceutically acceptable diluent.

4,950,657

# 1-PIPERAZINYL CARBONYL PHOSPHORAMIDOTHIOATE ESTER INSECTICIDES

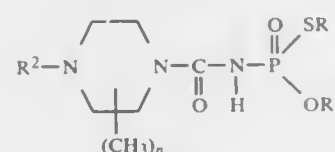
Walter Reifschneider, Walnut Creek; Barat Bisabri-Ershadi, Davis; James E. Dripps, Concord, and J. Brian Barron, Benicia, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 10, 1989, Ser. No. 420,083

Int. Cl.<sup>5</sup> A01N 57/32; C07F 9/6509

U.S. Cl. 514—85

1. A compound of the formula



wherein

$R$  and  $R^1$  each independently represent  $C_1$ – $C_4$  alkyl;

$R^2$  represents H,  $C_1$ – $C_8$  alkyl (optionally containing up to two substituents selected from F, Cl, Br, CN,  $CO_2$ ( $C_1$ – $C_4$  alkyl),  $C_1$ – $C_4$  alkoxy,  $C_1$ – $C_4$  alkylthio, or phenyl),  $C_3$ – $C_6$  cycloalkyl, phenyl, COH,  $CO(C_1$ – $C_4$  alkyl),  $COpheny$   $CO_2$ ( $C_1$ – $C_4$  alkyl), or  $CONHP(O)(SR)(OR^1)$ , each phenyl optionally containing up to three substituents selected from F, Cl, Br,  $CH_3$ ,  $CF_3$ , CN,  $OCH_3$ ,  $SCH_3$ ; and

$n$  represents 0, 1, or 2.

4,950,658

# METHOD OF MEDICAL TREATMENT OF ALZHEIMER'S DISEASE

Robert E. Becker, and Ezio Giacobini, both of Springfield, Ill., assignors to Board of Trustees of Southern Illinois Univ., Springfield, Ill.

Filed Dec. 6, 1988, Ser. No. 280,570

Int. Cl.<sup>5</sup> A61K 31/66

U.S. Cl. 514—129

6 Claims

1. The method of improving memory and accompanying symptoms in patients with Alzheimer's disease and related disorders of memory including the steps of

(1) administering to a patient having Alzheimer's disease by dosage a suitable brain concentration of 2, 2-dichlorovinyl dimethyl phosphate and

(2) maintaining said concentration at a level and over a sufficient period of time to provide said memory improvements.

## 4,950,659 16,17-ACETALSUBSTITUTED ANDROSTANE-17 $\beta$ -CARBOXYLIC ACID ESTERS POSSESSING HIGH BINDING AFFINITY TO THE GLUCOCORTICOSTEROID RECEPTOR

Paul H. Andersson, Södra; Sandby; Per T. Andersson, Lund; Bengt I. Axelsson, Genarp; Bror A. Thalen, Bjaärred, and Jan W. Trofast, Lund, all of Sweden, assignors to Aktiebolaget Draco, Lund, Sweden

Filed Mar. 25, 1986, Ser. No. 843,771

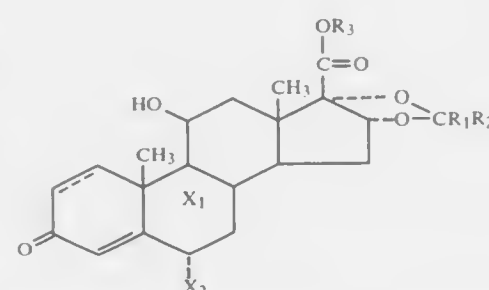
Claims priority, application Sweden, Apr. 4, 1985, 8501693

Int. Cl.<sup>5</sup> C07J 31/00, 71/00; A61K 31/56, 31/565

U.S. Cl. 514—172

9 Claims

1. A compound of the formula



of a stereoisomeric compound thereof, in which formula the 1,2-position is saturated or is a double bond  $X_1$  is selected from hydrogen, fluorine, chlorine and bromine  $X_2$  is selected from hydrogen, fluorine, chlorine and bromine  $R_1$  is selected from hydrogen or a straight or branched hydrocarbon chain having 1–4 carbon atoms  $R_2$  is selected from hydrogen or straight and branched hydrocarbon chains having 1–10 carbon atoms and  $R_3$  is selected from



$Y$  is O or S

$R_4$  is selected from hydrogen, straight or branched hydrocarbon chains having 1–10 carbon atoms or from phenyl  $R_5$  is selected from hydrogen or methyl and

$R_6$  is selected from hydrogen, straight or branched, saturated or unsaturated hydrocarbon chains having 1–10 carbon atoms, an alkyl group substituted by at least one halogen atom, a heterocyclic ring system containing 3–10 atoms in the ring system,



( $m=0,1,2$ ;  $n=2,3,4,5,6$ ), phenyl or benzyl groups which are unsubstituted or substituted by one or more alkyl, nitro, carboxy, alkoxy, halogen, cyano, carbalkoxy or trifluoromethyl group(s),

provided that when  $R_2$  is hydrogen  $R_1$  is a straight or branched hydrocarbon chain having 1–4 carbon atoms.

8. A compound of the formula

## 4,950,661 CEPHALOSPORIN DERIVATIVES, AND THEIR APPLICATION AS ANTIBIOTICS

Dominique Olliero, Montpellier, and Ali Salhi, Saint-Gely-du-Fesc, both of France, assignors to SANOFI, Paris, France

Continuation of Ser. No. 775,667, Sep. 13, 1985, abandoned. This application Apr. 28, 1988, Ser. No. 188,073

Claims priority, application France, Sep. 27, 1984, 84 14878

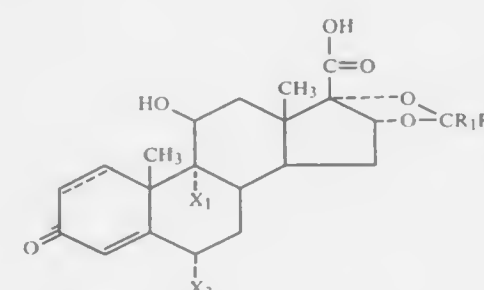
The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> C07D 501/34; A61K 31/545

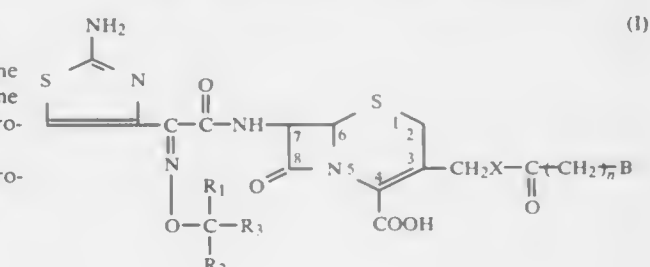
U.S. Cl. 514—202

2 Claims

1. Cephalosporin compounds of the general formula:



or a stereoisomeric compound thereof, in which formula the 1,2-position is saturated or is a double bond  $X_1$  is selected from hydrogen, fluorine, chlorine and bromine  $X_2$  is selected from hydrogen, fluorine, chlorine and bromine  $R_1$  is selected from hydrogen or a straight or branched hydrocarbon chain having 1–4 carbon atoms  $R_2$  is selected from hydrogen or straight and branched hydrocarbon chains having 1–10 carbon atoms, providing that when  $R_2$  is hydrogen  $R_1$  is methyl.



in which:

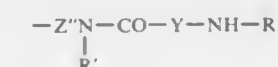
$x$  is an oxygen atom or a sulfur atom

$R_1$ ,  $R_2$ , and  $R_3$  each designate, a hydrogen atom or else  $R_1$  and  $R_2$  designate a hydrogen atom or a methyl group, and  $R_3$  designates a carboxyl or cyclopropyl group or else  $R_1$  and  $R_2$  taken together with the carbon atom to which they are linked form a cyclobutyl or cyclopentyl group and  $R_3$  is a carboxyl group,

$B$  is the residue of a primary or secondary amine selected from the following groups:

$Z-NH_2$  where  $Z$  is an alkylene group with a straight or branched chain having from 2 to 7 carbon atoms, possibly interrupted by a sulfur atom, or else  $Z$  is a 1,3-cyclohexylene or 1,4-cyclohexylene group and  $n$  is zero, 1 or 2,

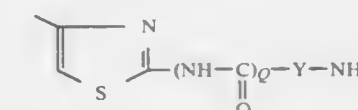
$Z'-Alk-NH-R$  where  $Z'$  is a 1,2-phenylene or 1,3-phenylene or 1,4-phenylene group possibly substituted by 1, 2 or 3 methyl groups or else  $Z'$  is a 1,2-cyclohexylene, 1,3-cyclohexylene or 1,4-cyclohexylene group,  $n$  is 1 or 2,  $Alk$  is a straight or branched alkyl group having from 2 to 3 carbon atoms, possibly interrupted by a sulfur atom, and  $R$  is a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms,



where  $Z''$  is a 1,3 phenylene or 1,4 phenylene group,  $Y$  is an alkyl group ( $CH_2$ ) $_m$  in which  $m=1,2$  or 3,  $R'$  is hydrogen or methyl,  $n$  is zero, 1 or 2 and  $R$  is as defined above,

$-Z''-CO-NH-Y-NH_2$  where  $Z''$  and  $Y$  are as defined above and  $n$  is zero, 1 or 2,

$-Z''-Y'-NH-CO-Y-NH_2$  where  $Z''$  and  $Y$  are as defined above and  $Y'$  is a straight or branched alkyl group with 1 or 2 carbon atoms,



where  $O=0$  or 1,  $n$  is zero, 1 or 2 and  $Y$  is as defined above,

a 2-piperidyl, 3-piperidyl or 4-piperidyl group possibly sub-

## 4,950,660 BETA-LACTAM COMPOUND AND PROCESS FOR PRODUCTION THEREOF

Kunio Atsumi; Yuichi Yamamoto; Kenji Sakagami; Ken Nishihata, and Shinichi Kondo, all of Yokohama, Japan, assignors to Meiji Seika Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 240,950

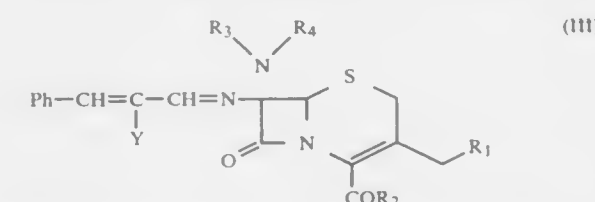
Claims priority, application Japan, Sep. 7, 1987, 62-223260

Int. Cl.<sup>5</sup> C07D 501/57; A61K 31/545

U.S. Cl. 514—201

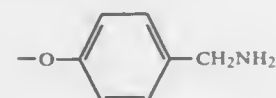
6 Claims

1. A cephem compound represented by formula (III)

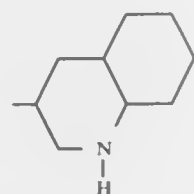


wherein  $R_1$  denotes a hydrogen atom or a group-A-B (where A denotes an oxygen atom or sulfur atom and B denotes (a) an acyl group, (b) a group selected from the group consisting of 1H-tetrazol-5-yl, 1-methyl-1H-tetrazol-5-yl, 1-carboxymethyl-1H-tetrazol-5-yl, 2-carboxymethyl-1H-triazol-5-yl, 1-sulfoethyl-1H-tetrazol-5-yl, 2-carboxymethyl-1-methyl-1H-triazol-5-yl, 4-methyl-5-oxo-6-hydroxy-4,5-dihydro-1,2,4-triazin-3-yl, pyridiniummethyl, a triazolyl and a thiadiazolyl, or (c) a substituted or unsubstituted carbamoyl group;  $R_2$  denotes a protective group for the hydroxyl group or carboxyl group;  $R_3$  and  $R_4$  are the same or different, each representing a hydrogen atom or a lower alkyl group having 1 to 4 carbon atoms, or  $R_3$  denotes a hydrogen atom and  $R_4$  denotes a lower alkoxy group having 1 to 4 carbon atoms; and  $Y$  denotes a chlorine atom or bromine atom.

stituted in the nitrogen atom by a  $-\text{CO}-\text{Y}-\text{NH}_2$  group where Y is as defined above and n is zero, 1 or 2, a group



wherein n is zero, 1 or 2, the bicyclic group



wherein n is zero, 1 or 2, as well as the pharmaceutically acceptable salts and esters thereof.

#### 4,950,662

### 2-OXA-ISOCEPHEM COMPOUNDS, COMPOSITIONS CONTAINING THE SAME AND PROCESSES FOR PREPARING THE SAME

Seturo Fujii, Kyoto; Hiroshi Ishikawa; Koichi Yasumura, both of Otsu; Koichiro Jitsukawa, Ashiya; Sachio Toyama, Otsu; Hidetsugu Tsubouchi, Otsu; Kimio Sudo, Otsu, and Koichi Tsuji, Otsu, all of Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

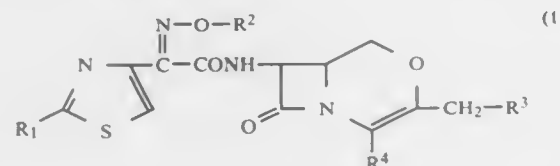
Filed Oct. 24, 1988, Ser. No. 261,293

Claims priority, application Japan, Oct. 22, 1987, 62-267659; Oct. 22, 1987, 62-267658

Int. Cl.<sup>5</sup> A61K 31/535; C07D 498/04

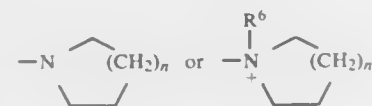
U.S. Cl. 514-210 14 Claims

1. A 2-oxa-isocephem compound of the formula (1):

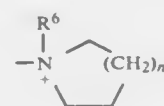


wherein

R<sup>1</sup> is an amino group which may have a protective group; R<sup>2</sup> is a C<sub>1</sub>-C<sub>6</sub> alkyl group, a C<sub>3</sub>-C<sub>8</sub> cycloalkyl group or a C<sub>2</sub>-C<sub>6</sub> alkenyl group; R<sup>3</sup> is a group of the formula:



wherein n is 1 or 2, R<sup>6</sup> is a C<sub>1</sub>-C<sub>6</sub> alkyl group, these groups may form a condensed ring with a benzene ring; and R<sup>4</sup> is a carboxylate group, a carboxy group or an esterified carboxy group; provided that when R<sup>2</sup> is an alkyl group, R<sup>3</sup> is not a group of the formula:



or the pharmaceutically acceptable salt thereof.

14. An antimicrobial composition comprising

(i) an antimicrobially effective amount of a 2-oxa-isocephem compound of the formula (1) as defined in claim 1 or a pharmaceutically acceptable salt thereof, and

(ii) a pharmaceutically acceptable carrier.

#### 4,950,663

### ANTIHYPERTENSIVE COMPOSITION

Louis Dumont, 1530 Algonquin, Fabreville, Québec, Canada (H7P 4R6), and Gilles Caillé, 1098 Pl. Pierre Dupaigne, Montréal, Québec, Canada (H2M 2S5)

Filed Feb. 15, 1989, Ser. No. 310,918

Int. Cl.<sup>5</sup> A61K 31/55

U.S. Cl. 514-211

3 Claims

1. A method for reducing hypertension which comprises administering to an individual suffering from hypertension a therapeutic dose of N-desmethyl, deacetyl diltiazem, said therapeutic dose being at least 800 mg/day when administered orally or at least 200 µg/kg when administered intravenously.

#### 4,950,664

### NASAL ADMINISTRATION OF BENZODIAZEPINE HYPNOTICS

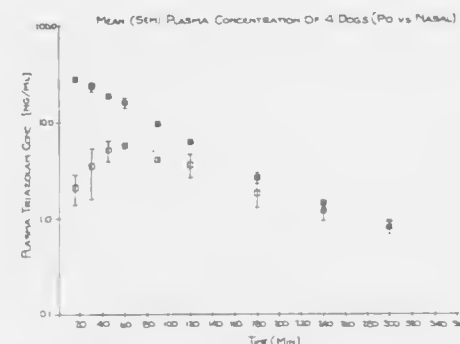
Arthur H. Goldberg, Montclair, N.J., assignor to Rugby-Darby Group Companies, Inc., Rockville Centre, N.Y.

Filed Sep. 16, 1988, Ser. No. 245,031

Int. Cl.<sup>5</sup> A61K 9/08, 47/22; C07D 243/10, 243/20

U.S. Cl. 514-219

16 Claims



10. A method for inducing an improved pharmacological response in a mammal comprising the nasal administration of a composition comprising a systemically effective amount of a benzodiazepine in a pharmaceutically acceptable nasal carrier.

#### 4,950,665

### PHOTOTHERAPY USING METHYLENE BLUE

Robert A. Floyd, Oklahoma City, Okla., assignor to Oklahoma Medical Research Foundation, Oklahoma City, Okla.

Filed Oct. 28, 1988, Ser. No. 264,088

Int. Cl.<sup>5</sup> A61K 31/54, 31/33; C07D 279/18, 279/00

U.S. Cl. 514-222.8

6 Claims

1. A composition for modifying nucleic acids in vivo comprising a thiazin dye in combination with a pharmaceutical vehicle, having a concentration to produce a thiazin dye dose concentration of less than or equal to 0.05 mM which is effective

tive to selectively convert guanosine to 8-hydroxyguanosine upon exposure to non-ionizing radiation.

#### 4,950,666

### DIFLUOROALKANE AND DIFLUOROALKENYLALKANE PESTICIDES

Clinton J. Peake, Trenton; Thomas G. Cullen, Milltown, and Anthony J. Martinez, Hamilton Square, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

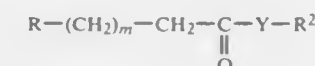
Filed Mar. 30, 1989, Ser. No. 331,563

Int. Cl.<sup>5</sup> A01N 37/02, 37/18; C07C 69/63, 103/127

U.S. Cl. 514-227.5

12 Claims

1. A difluoroalkane or difluoroalkenylalkane derivative of the structural formula I



in which R is a 1,1-difluoroalkyl group of 1 to 3 carbon atoms or a 1,1-difluoroalkenyl group of 2 to 4 carbon atoms, optionally carrying a halogen substituent selected from bromine and chlorine, m is an integer which produces a carbon chain length for the group R(CH<sub>2</sub>)<sub>m</sub> which is an even number in the range of 2 to 20, Y is  $-\text{NR}^1-$ , or  $-\text{O}-$ , R<sup>1</sup> is hydrogen or lower alkyl, and R<sup>2</sup> is:

- hydrogen, an alkali metal, or ammonium,
- alkyl of 1 to 12 carbon atoms,
- lower alkyl substituted with halogen, trifluoromethyl, ethenyl, difluoroethenyl ethynyl, lower alkoxy, C<sub>3</sub>-C<sub>6</sub> cycloalkyl which may be fluoro-substituted, lower alkyl-carbonyl, lower alkoxy-carbonyl, hydroxycarbonyl, cyano, phenylmethylfuryl, phenoxy, halophenoxy, phenyl, halophenyl, C<sub>1</sub>-C<sub>2</sub> alkoxyphenyl, thienyl, halothienyl, or a cyclopropyl group and a phenyl group which may be substituted with a substituent selected from halogen, methyl, trifluoromethyl and trifluoromethoxy, or a methyl group substituted with phenylmethyl and hydroxycarbonyl,
- phenyl which may be substituted with one to three substituents independently selected from lower alkyl, halogen, lower alkoxy, formyl, nitro, hydroxycarbonyl, ethenyl, lower alkoxy-carbonyl, and lower alkylamino(lower)alkoxy-carbonyl,
- pyridyl which may be substituted with halogen,
- a group of the formula  $-\text{SO}_2\text{R}^3$  in which R<sup>3</sup> is phenyl or phenylmethyl in which the ring may be substituted with a substituent selected from the group consisting of lower alkyl, halogen, and lower alkoxy, thienyl, pyridyl, or lower alkyl,
- a group of the formula  $-\text{N}=\text{CR}^4\text{R}^5$  in which R<sup>4</sup> is amino or dimethylamino and R<sup>5</sup> is phenyl or phenylmethyl optionally ring substituted with lower alkoxy or trifluoromethoxy, or thienyl,
- a group of the formula  $-\text{C}(\text{SR}^6)=\text{NR}^7$  in which R<sup>6</sup> is lower alkyl or  $\text{F}_2\text{C}=\text{CFC}_2\text{H}_4$  and R<sup>7</sup> is lower alkyl-carbonyl or phenyl which may be substituted with a halogen atom,
- a group of the formula  $-\text{NR}^8\text{R}^9$  in which R<sup>8</sup> is hydrogen or lower alkyl, R<sup>9</sup> is hydrogen, lower alkyl, alkylaminocarbonyl, phenyl-carbonyl,  $\text{F}_2\text{C}=\text{CHC}_3\text{H}_6\text{C}(\text{O})-$  or acetyl,
- a substituent selected from fluoroethoxy,  $\text{F}_2\text{CICCH}=\text{CHC}_9\text{H}_{18}-$ ,  $\text{F}_2\text{C}=\text{CHC}_{10}\text{H}_{20}-$ , 2,2-dimethyl-2,3-dihydrobenzofuranyl, 2,2-dimethyl-2,3-dihydrobenzofuranyloxy-carbonyl, dimethoxyindanyl, and



or Y and R<sup>2</sup> taken together are hydrogen or form a nitro-

gen containing group selected from (lower)alkenylamino, piperidyl, pyrrolidinyl, or thiomorpholinyl.

#### 4,950,667

### PYRIDINYL ACETAMIDE COMPOUNDS USEFUL IN TREATING ULCERS

Naomichi Mitsumori, Kobe; Yasuhiro Nishimura, Fujiidera; Katsuhiko Iwata, Higashiosaka; Shiro Okano, Osaka, and Motoko Suzuki, Ibaraki, all of Japan, assignors to Hamari Chemicals, Ltd., Osaka, Japan

Filed Aug. 16, 1989, Ser. No. 394,565

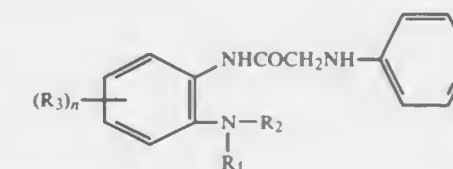
Claims priority, application Japan, Aug. 22, 1988, 63-208544

Int. Cl.<sup>5</sup> A61K 31/44

U.S. Cl. 514-227.8

5 Claims

1. An acetamide compound of the formula:



wherein R<sub>1</sub> and R<sub>2</sub> each independently represents hydrogen atom, a C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>2</sub>-C<sub>6</sub> alkenyl group of straight- or branched- chain, a C<sub>3</sub>-C<sub>6</sub> cycloalkyl or cycloalkenyl group, or a C<sub>6</sub>-C<sub>10</sub> aromatic group; or R<sub>1</sub> and R<sub>2</sub> when taken together with the nitrogen atom to which they are attached, present piperidyl, piperazinyl, morpholinyl, thiomorpholinyl, thiazolyl, imidazolyl, pyrrolidinyl or pyrrolyl group; R<sub>3</sub> represents hydrogen atom, a C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>2</sub>-C<sub>6</sub> alkenyl group of straight- or branched chain, a C<sub>3</sub>-C<sub>6</sub> cycloalkyl or cycloalkenyl group, a halogen atom, a C<sub>1</sub>-C<sub>6</sub> straight- or branched-chain alkoxy group, or a C<sub>3</sub>-C<sub>6</sub> cycloalkoxy or cycloalkenyl group; and n is an integer of 1 to 4; or a pharmaceutically acceptable salt thereof.

5. A method of treating ulcer in a mammal, which comprises administering a therapeutically effective amount of a compound according to claim 1 to a mammal in need of such treatment.

#### 4,950,668

### PYRAZOLE DERIVATIVE, INSECTICIDAL OR MITICIDAL COMPOSITION CONTAINING THE SAME AS THE EFFECTIVE INGREDIENT

Itaru Okada, Shiroyama; Shuko Okui, Tokyo; Yoichi Takahashi, Machida, and Toshiki Fukuchi, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Apr. 14, 1988, Ser. No. 181,695

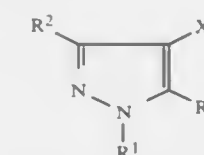
Claims priority, application Japan, Apr. 24, 1987, 62-101372

Int. Cl.<sup>5</sup> C07F 7/08; C07D 231/12, 231/16, 401/02

U.S. Cl. 514-232.2

7 Claims

1. A pyrazole derivative represented by the following formula (I)



wherein R<sup>1</sup> represents C<sub>1</sub>-C<sub>4</sub> alkyl group, C<sub>1</sub>-C<sub>4</sub> haloalkyl group, phenyl group or benzyl group; one of R<sup>2</sup> and R<sup>3</sup> represents





4,950,673

5-AMINO OR SUBSTITUTED AMINO 1,2,3-TRIAZOLES  
Richard J. Bochis, East Brunswick; Richard L. Tolman, Warren,  
and Elbert Harris, Westfield, all of N.J., assignors to Merck  
& Co., Inc., Rahway, N.J.

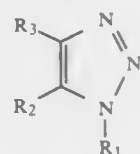
Division of Ser. No. 117,773, Nov. 6, 1987, Pat. No. 4,816,469,  
which is a division of Ser. No. 864,651, May 19, 1986, Pat. No.  
4,721,791, which is a continuation-in-part of Ser. No. 576,302,  
Feb. 2, 1984, abandoned. This application Aug. 18, 1988, Ser.  
No. 233,401

Int. Cl.<sup>5</sup> A61K 31/41

U.S. Cl. 514—314

4 Claims

1. A method for preventing or treating coccidiosis which  
comprises administering to an animal in need of such treat-  
ment, an effective amount of a compound having the formula:



wherein:

R<sub>1</sub> is pyridyl, pyridylmethyl, quinolyl or quinolylmethyl;  
R<sub>2</sub> is amino, mono or diloweralkyl amino, acetamido,  
acetimido, ureido, formamido, formimido or guanidino;  
and  
R<sub>3</sub> is carbamoyl, cyano, carbazoyl, amidino or N-hydrox-  
ycarbamoyl.

4,950,674

ARYLALKYLHETEROCYCLIC  
AMINES,N-SUBSTITUTED BY ARYLOXYALKYL  
GROUP IN A METHOD FOR ALLERGY TREATMENT  
John M. Yanni, Midlothian, and David A. Walsh, Richmond,  
both of Va., assignors to A. H. Robins Company, Incorporated,  
Richmond, Va.

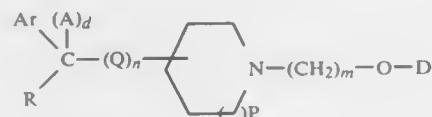
Continuation-in-part of Ser. No. 811,799, Dec. 20, 1985, Pat. No.  
4,810,713. This application Feb. 24, 1988, Ser. No. 159,940  
The portion of the term of this patent subsequent to Mar. 7,  
2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/445

U.S. Cl. 514—317

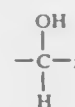
57 Claims

1. A method of inhibiting Type 1 allergic responses in a  
living animal body which comprises administering to said body  
an effective amount of a compound selected from the group  
having the formula:



wherein:

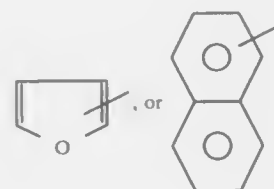
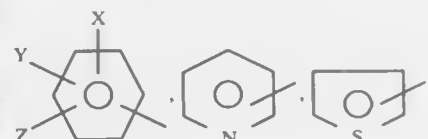
P is zero, one or two;  
m is one to six inclusive;  
A is hydrogen, hydroxy, or cyano;  
d is zero or one;  
Q is —CH—, —CH<sub>2</sub>— or



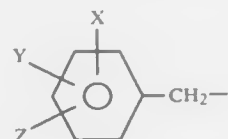
n is zero or one;  
and when Q is —CH— and n is 1, a double bond is formed

with one of the adjacent carbons, but not both, and when  
n and d are zero at the same time, a double bond is formed  
between the α-carbon and a carbon of the central hetero-  
cyclic amine ring;

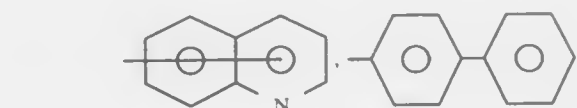
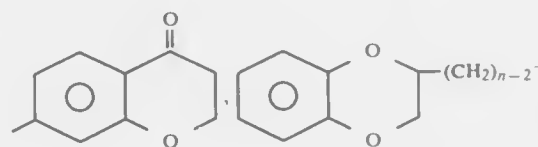
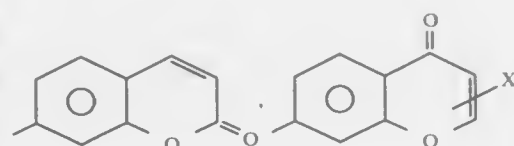
Ar, D and R are selected from the group consisting of:



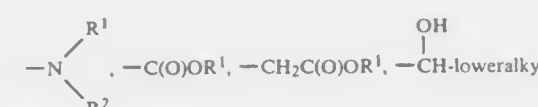
and in addition, R may have the values:



cycloalkyl or loweralkyl; and  
D may have additionally the values:

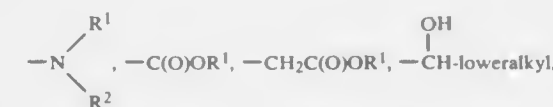
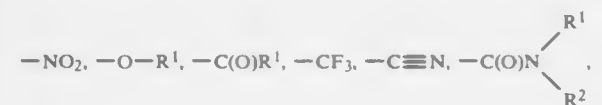
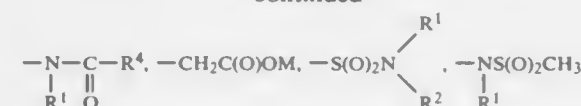


or Ar(CH<sub>2</sub>)<sub>1-4</sub>; X, Y and Z are selected from the group  
consisting of hydrogen, loweralkyl, halogen,

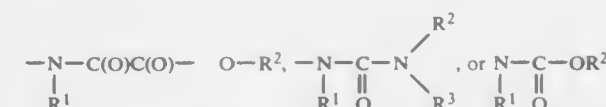
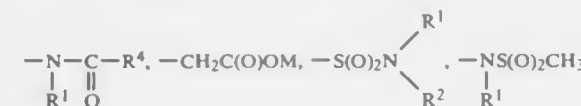


—S(O)<sub>2</sub>R<sup>4</sup>, lowerhydroxyalkanyl, —SR<sup>4</sup>, —S(O)R<sup>4</sup>,

-continued



—S(O)<sub>2</sub>R<sup>4</sup>, lowerhydroxyalkanyl, —SR<sup>4</sup>, —S(O)R<sup>4</sup>,



R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup>, same or different, are selected from hydro-  
gen, loweralkyl, phenyl and phenyl-loweralkyl;  
R<sup>4</sup> is selected from loweralkyl, phenyl and phenyl-loweral-  
kyl;

M is a pharmaceutically acceptable metal ion;  
and the pharmaceutically acceptable salts thereof, including  
acid addition salts, quaternary salts and hydrates and  
alcoholates thereof.

4,950,675

PYRIDINE DI-MEVALONO-LACTONES AS INHIBITORS  
OF CHOLESTEROL BIOSYNTHESIS

Alexander Chucholowski, Ypsilanti, Mich., assignor to Warner-  
Lambert Company, Morris Plains, N.J.

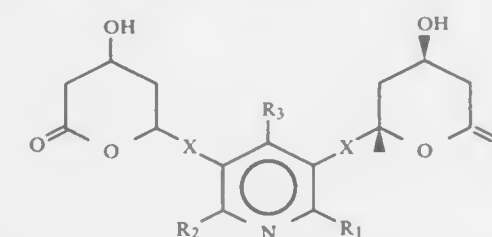
Filed Dec. 21, 1988, Ser. No. 287,497

Int. Cl.<sup>5</sup> C07D 405/14; A61K 31/445

U.S. Cl. 514—336

7 Claims

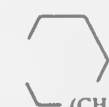
1. A compound of Formula I



wherein X is —CH<sub>2</sub>CH<sub>2</sub>— or —CH=CH—;

wherein R<sub>1</sub> R<sub>2</sub> are the same and are selected from

(a) alkyl of from one to six carbons;  
(b) trifluoromethyl;  
(c) cyclopropyl  
(d) cyclohexyl;  
(e) cyclohexylmethyl;  
(f) NR'R'' wherein R' and R'' are each independently hydro-  
gen, alkyl of from one to four carbon atoms, or together  
with the N to which they are attached from



wherein n' is an integer of from 0 to 5,



wherein Y is hydrogen or an alkyl of from one to four  
carbon atoms;

(g) phenyl;  
(h) phenyl substituted with

fluorine,  
chlorine,  
bromine,  
hydroxy,  
trifluoromethyl,  
alkyl of from one to four carbon atoms, or  
alkoxy of from one to four carbon atoms;

(i) phenylmethyl;  
(j) phenylmethyl substituted with

fluorine,  
chlorine,  
bromine,  
hydroxy,  
trifluoromethyl,  
alkyl of from one to four carbon atoms, or  
alkoxy of from one to four carbon atoms;

wherein R<sub>3</sub> is  
(a) alkyl of from one to six carbons;  
(b) trifluoromethyl;

(c) cyclopropyl;  
(d) cyclohexyl  
(e) cyclohexylmethyl;  
(f) phenyl;  
(g) phenyl substituted with

fluorine,  
chlorine,  
bromine,  
hydroxy,  
trifluoromethyl,  
alkyl of from one to four carbon atoms, or  
alkoxy of from one to four carbon atoms;

(h) phenylmethyl;  
(i) phenylmethyl substituted with

fluorine,  
chlorine,  
bromine,  
hydroxy,  
trifluoromethyl,  
alkyl of from one to four carbon atoms, or  
alkoxy of from one to four carbon atoms;  
or the corresponding N-oxide, all of the compounds being  
in the trans racemate of the tetrahydropyran moiety.





4,950,681

## KETONE DERIVATIVES

David J. Cavalla, and William L. Mitchell, both of London, England, assignors to Glaxo Group Limited, London, England  
Filed Sep. 2, 1988, Ser. No. 239,750

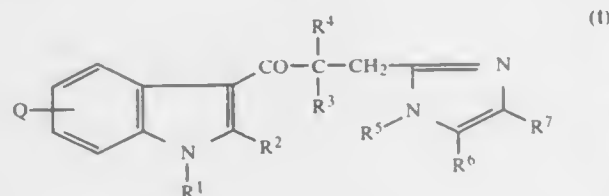
Claims priority, application United Kingdom, Sep. 3, 1987, 8720693

Int. Cl.<sup>5</sup> A61K 31/415; C07D 231/12

U.S. Cl. 514—397

10 Claims

1. A compound of formula (I):



wherein

R<sup>1</sup> represents a hydrogen atom, C<sub>1-6</sub>alkyl, C<sub>3-6</sub>alkenyl, C<sub>3-10</sub>alkynyl, C<sub>3-7</sub>cycloalkyl, C<sub>3-7</sub>cycloalkylC<sub>1-4</sub>alkyl, phenyl, phenylC<sub>1-3</sub>alkyl, —CO<sub>2</sub>R<sup>8</sup>, —COR<sup>8</sup>, —CONR<sup>8</sup>R<sup>9</sup> or —SO<sub>2</sub>R<sup>8</sup>, and wherein R<sup>8</sup> and R<sup>9</sup>, which may be the same or different, each represents a hydrogen atom, a C<sub>1-6</sub>alkyl, C<sub>3-7</sub>cycloalkyl group, a phenyl or phenylC<sub>1-4</sub>alkyl group, in which the phenyl group is optionally substituted by one or more C<sub>1-4</sub>alkyl, C<sub>1-4</sub>alkoxy or hydroxy groups or halogen atoms, with the proviso that R<sup>8</sup> does not represent a hydrogen atom when R<sup>1</sup> represents a group —CO<sub>2</sub>R<sup>8</sup> or —SO<sub>2</sub>R<sup>8</sup>;

R<sup>2</sup> and R<sup>3</sup> together represent —(CH<sub>2</sub>)<sub>n</sub>—, wherein n is 1, 2 or 3;

R<sup>4</sup> represents a hydrogen atom or a C<sub>1-6</sub>alkyl group; one of the groups represented by R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> is a hydrogen atom or a C<sub>1-6</sub>alkyl, C<sub>3-7</sub>cycloalkyl, C<sub>3-6</sub>alkenyl, phenyl or phenylC<sub>1-3</sub>alkyl group, and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C<sub>1-6</sub>alkyl group;

Q represents a hydrogen atom or a halogen atom or a hydroxy, C<sub>1-4</sub>alkoxy, phenylC<sub>1-3</sub>alkoxy or C<sub>1-6</sub>alkyl group or a group —NR<sup>10</sup>R<sup>11</sup> or —CONR<sup>10</sup>R<sup>11</sup> (wherein R<sup>10</sup> and R<sup>11</sup>, which may be the same or different, each represents a hydrogen atom or a C<sub>1-4</sub>alkyl or C<sub>3-6</sub>alkenyl group, or together with the nitrogen atom to which they are attached form a saturated 5 to 7 membered ring); or a physiologically acceptable salt or solvate thereof.

4,950,682

## ARTHROPODICIDAL COMPOSITIONS

László Pap; Péter Sárközi; Éva Somfai; András Szegő, all of Budapest; István Székely, Dunakeszi; György Hidas, Budapest; Sándor Zoltán, Budapest; Anikó Deákneé Molnár, Budapest; Ágnes Hegedüs, Budapest; Béta Bertók, Budapest; Sándor Botár, Budapest; Antal Gajáry, Budapest, and Lajos Nagy, Szentendre, all of Hungary, assignors to Chinoin Gyógyszer- és Vegyszer- Termékek Gyára Rt., Budapest, Hungary

Filed Feb. 6, 1989, Ser. No. 307,395

Claims priority, application Hungary, Feb. 5, 1988, 540/88

Int. Cl.<sup>5</sup> A01N 43/38, 43/30, 53/00

U.S. Cl. 514—417

14 Claims

1. A synergistic arthropodocidal composition ingredients causing no damage to warmblooded organisms which comprises a synergistic mixture of

(1) as pyrethroid component the following active ingredients:

(a) 0.1 to 20% by weight of 1StransR-alpha-cyano-3-phenoxy-benzyl-3-(2,2-dichlorovinyl)-2,2-dimethyl-cyclopropane carboxylate;

(b) 0.1 to 20% by weight of 1RtransS-alpha-cyano-3-phenoxy-benzyl-3-(2,2-dichlorovinyl)-2,2-dimethyl-

cyclopropane carboxylate, wherein the weight ratio of ingredient (a) to ingredient (b) is 0.7:1.3 to 1.3:0.7; and (c) 0.5 to 10% by weight of 3,4,5,6-tetrahydro-phthalimido-methyl(1RS-cis-trans-chrysanthemate; or 3,4,5,6-tetrahydro-phthalimido-methyl (1RS)-trans-chrysanthemate; and

(2) as a synergist component, 0.1 to 40% by weight of piperonyl butoxide.

4,950,683

## MACROLIDE ANTIBIOTICS

John B. Ward, Bushey; Hazel M. Noble, Burnham; Neil Porter, Pinner; Richard A. Fletton, Ruislip; David Noble, Burnham; Derek R. Sutherland, Chalfont St. Giles, and Michael V. J. Ramsay, South Harrow, all of England, assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 906,525, Sep. 12, 1986, abandoned. This application Nov. 10, 1987, Ser. No. 119,345

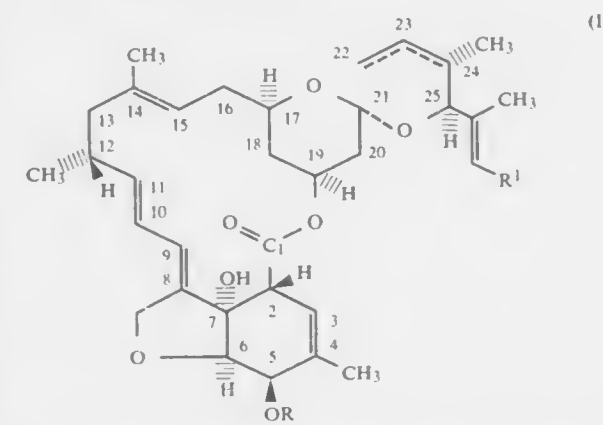
Claims priority, application United Kingdom, Sep. 13, 1985, 8522692; Sep. 13, 1985, 8522695

Int. Cl.<sup>5</sup> A61K 31/365; C07D 315/00

U.S. Cl. 514—450

8 Claims

1. A compound of formula (I)



wherein OR is a hydroxyl group or a substituted hydroxyl group —OCOR<sup>2</sup>, —OCO<sub>2</sub>R<sup>2</sup> where R<sup>2</sup> is C<sub>1-8</sub>alkyl, C<sub>1-8</sub>alkyl substituted by one or more halo, carboxy, C<sub>1-4</sub>alkoxy, phenoxy or silyloxy substituents; C<sub>2-8</sub>alkenyl C<sub>2-8</sub>alkynyl; C<sub>3-12</sub>cycloalkyl; phenylalkyl in which the alkyl portion has 1-6 carbon atoms or phenyl; a formyloxy group; a group —OR<sup>3</sup> where R<sup>3</sup> is as defined above for R<sup>2</sup>; a group —OSO<sub>2</sub>R<sup>4</sup> where R<sup>4</sup> is a C<sub>1-4</sub>alkyl or phenyl; a silyloxy group; a C<sub>5-7</sub>cyclic or a tetrahydropyranyloxy group, a group —OCO(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>R<sup>5</sup> where R<sup>5</sup> is a hydrogen atom or a group as defined for R<sup>2</sup> above and n represents zero, 1 or 2; or a group OCONR<sup>6</sup>R<sup>7</sup> where R<sup>6</sup> and R<sup>7</sup> independently represent a hydrogen atom or a C<sub>1-4</sub>alkyl group; R<sup>1</sup> represents a methyl, ethyl or isopropyl group and the broken line represents a double bond at the 22,23-position or at the 23,24-position.

4,950,684

2,2-DI-SUBSTITUTED BENZOPYRAN LEUKOTRIENE-D<sub>4</sub> ANTAGONISTS

Francis J. Koszyk, Chicago, and James R. Deason, Wilmette, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

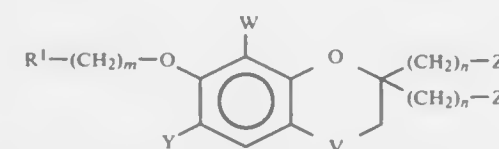
Filed May 20, 1988, Ser. No. 196,996

Int. Cl.<sup>5</sup> A61K 31/35; C07D 311/22

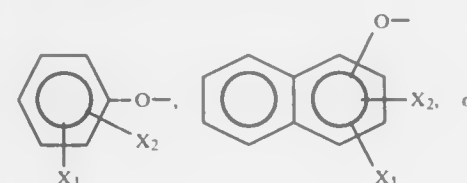
U.S. Cl. 514—456

45 Claims

1. A compound of the formula:



or a pharmaceutically acceptable addition salt thereof, wherein R<sup>1</sup> is methyl, phenyl,



wherein X<sub>1</sub> and X<sub>2</sub> may be the same or different and are members of the group consisting of hydrogen, —Cl, —Br, —CF<sub>3</sub>, —NH<sub>2</sub>, —NO<sub>2</sub>, or straight or branched chain alkyl of 1-3 carbon atoms;

wherein m is an integer from 1-9;

wherein n is an integer from 1-5;

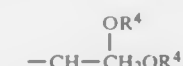
wherein V is



wherein W is hydrogen or straight or branched chain alkyl of 1-6 carbon atoms;

wherein Y is hydrogen or —COCH<sub>3</sub> with the proviso that when W is hydrogen Y is not hydrogen;

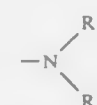
wherein both Z moieties are —CHO, —COOR<sup>2</sup>, —COR<sup>3</sup>,



or CH<sub>2</sub>OR<sup>4</sup> with the exception that when one Z moiety of Formula I is COOR<sup>2</sup>, the other Z moiety may be COR<sup>3</sup>; wherein R<sup>2</sup> is hydrogen, a pharmaceutically acceptable cation, straight or branched chain alkyl having 1-6 carbon atoms,



CH(CH<sub>2</sub>OR<sup>5</sup>) with the proviso that when Z is —COOR<sup>2</sup>, the R<sup>2</sup> substituent in one —COOR<sup>2</sup> moiety may be the same or different from the R<sup>2</sup> substituent in the other COOR<sup>2</sup> moiety; wherein R<sup>3</sup> is



and wherein R<sup>7</sup> and R<sup>8</sup> may be the same or different and

are members of the group consisting of hydrogen or straight or branched chain alkyl having 1-6 carbon atoms; wherein R<sup>4</sup> is hydrogen, or



wherein R<sup>5</sup> is hydrogen, benzyl-, or straight or branched chain alkyl of 1-3 carbon atoms; and wherein R<sup>6</sup> is straight or branched chain alkyl of 1-6 carbon atoms.

36. A pharmaceutical composition comprising a compound according to claim 1 in a pharmaceutically acceptable carrier.

37. A method of treating LTD<sub>4</sub> mediated allergic reactions or inflammatory conditions in mammals comprising administering a therapeutically effective amount of a pharmaceutical composition according to claim 36 to a mammal in need of such treatment.

4,950,685

## WOOD PRESERVATIVES

Hans A. Ward, New Kensington, Pa., assignor to Kop-Coat, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 286,971, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 890,015, Jul. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 700,031, Feb. 11, 1985, abandoned. This application Aug. 23, 1989, Ser. No. 397,692

Int. Cl.<sup>5</sup> A01N 47/10, 33/12

U.S. Cl. 514—479

8 Claims

1. A synergistic wood preservative composition comprising quaternary ammonium compound and 3-iodo-2-propynyl butyl carbamate and having the property of providing stain resistance to wood.

4,950,686

## ANTI-MYCOPLASMA AGENT

Eiji Kondo, Osaka; Yoshiyuki Hayashi, Shiga; Takao Konishi, Osaka; Teruo Hattori, Hyogo, and Junichi Shoji, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan  
Filed Aug. 18, 1987, Ser. No. 86,583

Claims priority, application Japan, Aug. 21, 1986, 61-196535

Int. Cl.<sup>5</sup> A61K 31/22, 31/215

U.S. Cl. 514—546

1 Claim

1. A method for the treatment of an animal infected by mycoplasma which comprises orally administering to said animal a composition which comprises o-acetyltropolone or a pharmaceutically acceptable salt thereof as the active ingredient dissolved in feed water or mixed with a feed in a concentration of 100 to 1000 parts of the compound or salt thereof per million parts of feed water or feed.

4,950,687

## DIACETYL RHEIN SALTS AND THEIR THERAPEUTICAL USE IN THE TREATMENT OF ARTHROSIS

Leone Dall'Asta, Pavia; Germano Coppi, Buccinasco, and Mario Ercole Scevola, Milan, all of Italy, assignors to Proter S.p.A., Opera, Italy

Continuation-in-part of Ser. No. 45,817, May 4, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 379,787

Claims priority, application Italy, May 2, 1986, 20298 A/86

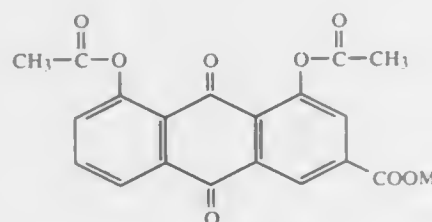
Int. Cl.<sup>5</sup> A01N 37/10

U.S. Cl. 514—548

2 Claims

1. A therapeutic method for the treatment of arthrosis diseases comprising administering by intraarticular route from 1 to 5 ml of an aqueous solution containing from 10 to 50 mg of diacetyl rhein salts having the general formula (I)





wherein M represents an alkali or an earth alkali metal or the residue of an organic base.

4,950,688

## SKIN TREATMENT COMPOSITION

Paul A. Bowser, Merseyside, United Kingdom; Albert Fröling, Vlaardingen, Netherlands; Lammert Heslinga, Maassluis, Netherlands; Udo M. T. Houtsmuller, Vlaardingen, Netherlands; Diederik H. Nugteren, Rhon, Netherlands; Hendrik J. J. Pabon, Vlaardingen, Netherlands, and Colin Prottey, Merseyside, United Kingdom, assignors to Conopco, Inc., New York, N.Y.

Filed Jun. 16, 1983, Ser. No. 505,005

Claims priority, application United Kingdom, Jun. 16, 1982, 8217413; Jun. 16, 1982, 8217414; Jul. 14, 1982, 8220442

Int. Cl.<sup>5</sup> A61K 7/40, 7/48, 9/07, 9/12

U.S. Cl. 514—847

6 Claims

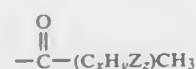
1. A composition suitable for topical application to human skin for restoring or enhancing skin barrier function so as to eliminate or at least reduce moisture loss particularly when the skin surface has become excessively dry, fissured, eroded or otherwise damaged, which composition comprising:

- (i) from 0.001 to 5% by weight of an active ingredient;
- (ii) from 15 to 99.989% by weight of a vehicle to act as a diluent, dispersant or solvent for the active ingredient; and
- (iii) from 0.01 to 10% by weight of a perfume, the active ingredient being an ester comprising one or more compounds having the structure:



where

R is chosen from N-sphingosyl and N-(glycosylsphingosyl);  
Z is —OH, or an epoxy oxygen;  
a is an integer of from 7 to 49;  
b is an integer of from 10 to 98;  
x is an integer of from 16 to 20;  
y is an integer of from 24 to 36; and  
z is 0, or an integer of from 1 to 4;  
the substructure



being an all-cis n-6,9 fatty acid.

4,950,689

## PECTIN DELIVERY SYSTEM

(1) Robert K. Yang, 12 Roc Etam Rd., Randolph, N.J. 07869; James J. Shaw, 34 Valley View St., Morristown, N.J. 07960; James E. Bagan, 2 Sadore La., Yonkers, N.Y. 10710; Amy J. Becker, 14 Medford Rd., Morris Plains, N.J. 07950, and Shan-Shan Sheu, 20 Jean Terrace, Parsippany, N.J. 07054

Filed Mar. 31, 1987, Ser. No. 32,840

Int. Cl.<sup>5</sup> A23C 1/29; A61K 47/36, 9/10

U.S. Cl. 514—777

34 Claims

1. An ingestible gel confectionary delivery system comprising a pectin gel component in an amount sufficient to form a gel confectionary unit, and an edible insoluble solid in an amount sufficient to strengthen the internal gel network such that the gel retains its structural integrity during mold removal.

4,950,690

## PROCESS FOR THE ANIMATION OF ALCOHOLS USING ACTIVATED PHOSPHORUS-CONTAINING CATALYSTS

Gene E. Parris, Revere, and Ronald Pierantozzi, Orefield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Nov. 28, 1988, Ser. No. 277,081

Int. Cl.<sup>5</sup> C07B 211/04; C07C 209/16

U.S. Cl. 546—184

17 Claims

1. In a process for aminating alcohols and diols by contacting an amine with a 1° or 2° alcohol or diol in the presence of a phosphorus-containing catalyst having acidic surface sites, the improvement for selectively producing N-alkylated amines which comprises: activating said phosphorus-containing catalyst by base treatment with an effective amount of a Group Ia or IIa cation metal salt sufficient to render basic the acidic sites on the surface of the catalyst.

4,950,691

## ENDOTHERMIC HYDROCARBON UPGRADING PROCESS

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,785

Int. Cl.<sup>5</sup> C07C 27/06

U.S. Cl. 518—702

7 Claims

1. A process for upgrading aliphatic hydrocarbons to aromatic hydrocarbons comprising the steps of:

- (a) burning a hydrogen-deficient fuel under oxygen-deficient conditions to evolve a hot flue gas containing essentially no oxygen;
- (b) providing an aromatization reaction zone containing a zeolite catalyst;
- (c) directly transferring a quantity of thermal energy from said hot flue gas to said aromatization reaction zone by flowing hot flue gas through said aromatization reaction zone, said quantity of thermal energy being sufficient to supply the endothermic heat of reaction to aromatize at least a portion of said aliphatic feedstream;
- (d) contacting an aliphatic hydrocarbon feedstream with said zeolite catalyst under primary conversion conditions in said aromatization reaction zone to evolve an aromatization reaction zone effluent stream containing aromatics;
- (e) withdrawing said aromatization reaction zone effluent stream from said aromatization reaction zone;
- (f) separating said aromatization reaction zone effluent stream into a product stream, a secondary conversion feedstream comprising CO, CO<sub>2</sub>, and H<sub>2</sub>, and a stream containing C<sub>3</sub>—C<sub>5</sub> aliphatics; and
- (g) charging said secondary conversion feedstream of step (f) to a methanol synthesis reaction zone containing a

catalyst to convert at least a portion of said secondary conversion feedstream to methanol.

4,950,692

## METHOD FOR RECONSTITUTING SUPERABSORBENT POLYMER FINES

William H. Lewis, Palos Heights, and Kristy M. Bailey, Naperville, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Dec. 19, 1988, Ser. No. 286,115

Int. Cl.<sup>5</sup> C08J 11/06

U.S. Cl. 521—45

17 Claims

1. A method for reprocessing superabsorbent polymer fines, said superabsorbent polymer fines being selected from the group consisting of starch graft superabsorbent polymers, synthetic superabsorbent polymers, and crosslinked superabsorbent polymers, comprising the following steps:

- wetting said superabsorbent copolymer fines with water to a swollen state sufficiently to form a continuous amorphous gel of said fines;
- grinding said gel; and
- drying the ground gel particles to form a superabsorbent polymer material having a moisture content between about 1 to 15%.

16. A method for reprocessing superabsorbent polymer fines, said superabsorbent polymer fines being selected from the group consisting of starch graft superabsorbent polymers, synthetic superabsorbent polymers, and crosslinked superabsorbent polymers, comprising the following steps:

- wetting said superabsorbent polymer fines with water to a swollen state sufficiently to form a continuous amorphous gel of said fines; and
- combining said gel of fines with a gel from an ongoing superabsorbent polymerization process.

4,950,693

## POROUS COPOLYMER RESINS

Zaev Sharaby, Cleveland Heights, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

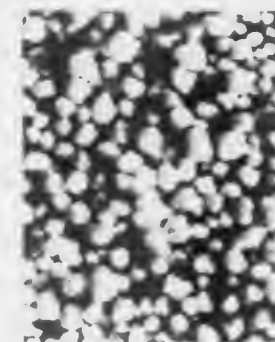
Division of Ser. No. 200,496, May 31, 1988, Pat. No. 4,871,780.

This application Aug. 30, 1989, Ser. No. 400,641

Int. Cl.<sup>5</sup> C08J 18/00, 9/00

U.S. Cl. 521—145

11 Claims



1. A vinyl halide copolymer having a Hg porosity of at least about 0.10 ml/g as measured by ASTM D-2873 comprising repeating units derived from vinyl halide monomer and acrylated caprolactone monomer, wherein said vinyl halide is present in an amount from about 80 to about 99 percent by weight and said acrylated caprolactone is present in the amount of about 20 to 1 percent by weight.

4,950,694

## PREPARATION OF POLYURETHANE FOAMS WITHOUT USING INERT BLOWING AGENTS

Stanley L. Hager, Crosslanes, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 29, 1989, Ser. No. 373,244

Int. Cl.<sup>5</sup> C08G 18/14

U.S. Cl. 521—167

47 Claims

1. A process for making low density, flexible conventional polyurethane slabstock foam having a substantially open cell structure without crushing which comprises reacting, in the presence of a highly stabilizing polyurethane foam stabilizer and under a condition which permits the foam to rise freely, a reaction mixture substantially free of chlorofluorocarbon blowing agents comprising:

- (a) polyether polyol or polyol blend having an equivalent weight between about 500 and about 1500 and a nominal functionality of at least two, a primary hydroxyl content of less than about 50% and an ethylene oxide content of less than 20%, and optionally containing a stably dispersed solid formed by in situ polymerization of monomers within the polyol;
- (b) water in an amount from about 2.0 to about 12 parts per hundred parts of polyol a);
- (c) organic polyisocyanate having a nominal functionality of approximately two, present in an amount yielding an isocyanate index between about 60 and about 95.
- (d) polyurethane foam catalyst; and
- (e) a foam processing aid comprising
  - (i) at least one crosslinking/extending agent having an average of at least two isocyanate reactive groups per molecule and an equivalent weight of less than about 200 in an amount needed to prevent foam splitting; and optionally
  - (ii) a polyurethane oxide monol and/or polyol having an ethylene oxide content of greater than 50% by weight.

4,950,695

## REDUCTION OF FIRMNESS IN FLEXIBLE POLYURETHANE FOAM BY ADDITION OF MONOFUNCTIONAL ALCOHOLS, POLYESTERS, AND POLYETHERS

Herman Stone, Hazleton, Pa., assignor to PMC, Inc., Sun Valley, Calif.

Filed Mar. 6, 1989, Ser. No. 321,530

Int. Cl.<sup>5</sup> C08G 18/14

U.S. Cl. 521—157

26 Claims

1. An improved flexible, open-celled polyurethane foam produced in situ from the reaction, in the presence of a catalyst, of an isocyanate, a blowing agent, a foam stabilizer, a polyol selected from the group consisting of polyether polyols, polyester polyols, and mixtures thereof, and a monofunctional additive selected from the group consisting of monofunctional alcohols, monofunctional polyethers, monofunctional polyesters, and mixtures thereof, wherein the monofunctional additive has a hydroxyl number greater than that of the polyol and is present in an amount from about 1 to about 50 parts by weight per 100 parts by weight of polyol, the foam being characterized by reduced firmness as compared with a foam of the same composition which contains substantially no monofunctional additive.

4,950,696

## ENERGY-INDUCED DUAL CURABLE COMPOSITIONS

Michael C. Palazotto, St. Paul; Katherine A. Brown-Wensley, Lake Elmo, and Robert J. DeVoe, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 28, 1987, Ser. No. 90,694

Int. Cl.<sup>5</sup> C08G 18/22, 18/04

U.S. Cl. 522—25

18 Claims

1. An energy polymerizable composition comprising

- (a) at least one ethylenically-unsaturated monomer different from each (b) precursor,  
 (b) polyurethane precursors, said polyurethane precursors comprising at least an additional different monomer which is one monomer having at least two isocyanate groups and at least one monomer having at least two isocyanate-reactive hydrogen atoms, and  
 (c) a curing agent comprising  
 (1) an organometallic compound, and  
 (2) an onium salt selected from the group consisting of halonium compounds and cationic compounds of hypervalent Group VIA elements  
 said organometallic compound having the formula,



wherein

$L^1$  represents none, or 1 to 12 ligands contributing pi-electrons that can be the same or different ligand selected from substituted and unsubstituted acyclic and cyclic unsaturated compounds and groups and substituted and unsubstituted carbocyclic aromatic and heterocyclic aromatic compounds, each capable of contributing 2 to 24 pi-electrons to the valence shell of  $M$ ;

$L^2$  represents none, or 1 to 24 ligands that can be the same or different contributing an even number of sigma-electrons selected from mono-, di-, and tri-dentate ligands, each donating 2, 4, or 6 sigma-electrons to the valence shell of  $M$ ;

$L^3$  represents none, or 1 to 12 ligands that can be the same or different, each contributing no more than one sigma-electron each to the valence shell of each  $M$ ;

Ligands  $L^1$ ,  $L^2$ , and  $L^3$  can be bridging or non-bridging ligands;

$M$  represents 1 to 4 of the same or different metal atoms selected from the elements of Periodic Groups IVB, VB, VIB, VIIB, and VIIIB; with the proviso that said organometallic compound contains at least one of a metal-metal sigma bond and  $L^3$ ; and with the proviso that  $L^1$ ,  $L^2$ ,  $L^3$ , and  $M$  are chosen so as to achieve a stable configuration.

4,950,697

#### THERMOPLASTIC AND INJECTABLE ENDODONTIC FILLING COMPOSITIONS

Tiang-shing Chang, Westfield, and Lisa N. Weddle Marchese, Cresskill, both of N.J., assignors to Block Drug Co., Inc., Jersey City, N.J.

Filed Sep. 15, 1988, Ser. No. 244,291

Int. Cl.<sup>5</sup> C08L 7/00; C08K 5/10; A61K 6/08  
 U.S. Cl. 523-116 12 Claims

1. A nonshrinkable, thermoplastic and injectable endodontic filling composition comprising transpolyisoprene and a plasticizing amount of at least one liquid ricinoleate ester plasticizer, wherein said transpolyisoprene has a molecular weight of about 30,000 to 100,000.

4,950,698

#### COMPOSITION FOR SELECTIVE PLACEMENT OF POLYMER GELS FOR PROFILE CONTROL IN THERMAL OIL RECOVERY

Paul Shu, West Windsor, N.J., and Winston R. Shu, Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 3, 1989, Ser. No. 292,799

Int. Cl.<sup>5</sup> C09K 7/00

U.S. Cl. 523-130 13 Claims

1. A cross-linked gel product obtained by activating components at a temperature greater than about 300° F. comprising:

- (a) water;  
 (b) a cross-linkable polymer selected from a member of the group consisting of polyvinyl alcohol, polyvinyl alcohol copolymers, and sulfonated polyvinyl alcohol which member has at least one functional group selected from a

- member of the group consisting of an amine, an amide, a hydroxyl, or a thiol group;  
 (c) a phenolic compound; and  
 (d) a water-dispersible aldehyde producing compound when heated to a temperature above about 300° F. in a formation yields sufficient formaldehyde to react with said phenolic compound thereby forming a phenolic resin which combines with the polymer and makes a solid cross-linked gel.

4,950,699

#### WOUND DRESSING INCORPORATING COLLAGEN IN ADHESIVE LAYER

Daniel G. Holman, Sun Lakes, Ariz., assignor to Genetic Laboratories, Inc., St. Paul, Minn.

Continuation of Ser. No. 142,713, Jan. 11, 1988, abandoned. This application May 11, 1989, Ser. No. 350,640

Int. Cl.<sup>5</sup> A61L 15/32; A61K 31/78; C08L 33/12, 99/00  
 U.S. Cl. 524-21 11 Claims

1. A wound dressing composition to be applied to a wound to reduce bleeding and aid healing consisting substantially of: an amount of bodily tissue compatible, water based acrylic adhesive material consisting of a blend of copolymers of N-butyl acrylate and acrylamide and a copolymer of N-butyl acrylate and methyl methacrylate adapted to removably adhere to the tissue surface of the body adjacent a wound;

an amount of collagen in homogeneous admixture with said formulation in an amount ranging between about 0.1% and 10% by weight of collagen on a dry basis in said adhesive; and

wherein said adhesive establishes and maintains contact between the collagen and the tissue at said wound site when the admixture is applied thereto.

4,950,700

#### POLYAMIDE-IMIDE SOLUTIONS AND A PROCESS FOR OBTAINING THEM

Maurice Balme, Sainte Foy les Lyon, and Pascal Barthelemy, Lyon, both of France, assignors to Rhone-Poulenc Fibres, Lyon, France

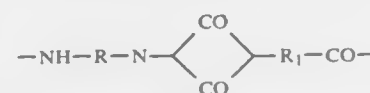
Filed Feb. 9, 1989, Ser. No. 308,009

Claims priority, application France, Feb. 22, 1988, 88 02328  
 Int. Cl.<sup>5</sup> C08J 3/00, 3/02

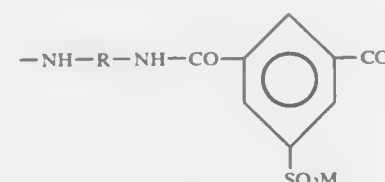
U.S. Cl. 524-111 20 Claims

1. Clear solutions which can be spun and shaped directly, characterized in that they contain:

- (a) 5 to 30% by weight of a polyamide-imide comprising amide-imide repeat units (A) of formula:



amide repeat units (B) of formula:



amide repeat units (C) of formula:



in which:

$R$ =divalent organic radical free from any ether group

$R_1$ =trivalent aromatic radical  
 $R_2$ =divalent aromatic radical  
 $M$ =alkali or alkaline-earth metal,

the units A representing 80 to 100% of all the units  
 the units B representing 0 to 5% of all the units  
 the units C representing 0 to 20% of all the units

(b) in a solvent mixture comprising:

- 40-80% by weight of anhydrous butyrolactone free from butyl alcohol  
 20-60% of an anhydrous aprotic amide solvent of high boiling point.

4,950,701

#### BONDING METHOD AND ADHESIVE USEFUL FOR THE METHOD

Naomi Okamura, Kuki; Hiroshi Aoki, Sugito; Junzo Makino, Omiya; Hajime Yagi, Tokyo; Yasuo Arai, Sugito, and Takashi Yamanaka, Chiba, all of, assignors to Cemedine Company, Ltd., Tokyo, Japan

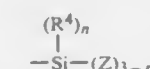
Division of Ser. No. 69,187, Jul. 2, 1987, Pat. No. 4,793,886.

This application Aug. 8, 1988, Ser. No. 229,458

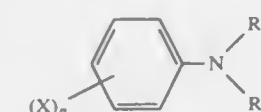
Int. Cl.<sup>5</sup> C08K 5/17, 33/00

U.S. Cl. 524-237 3 Claims

1. A room temperature self-curing adhesive containing from 0.05 to 50% by weight of an anion polymerization accelerator, said self-curing adhesive being a room temperature moisture-curing adhesive consisting essentially of an organic silicon compound having in its molecule at least two reactive silicon functional groups of the formula:



where  $Z$  is a hydrolyzable group selected from the group consisting of an acyloxy group, a ketoxime group, an alkoxy group, an alkenyloxy group, an amino group, an aminoxy group, and an amide group,  $R^4$  is a non-hydrolyzable group selected from the group consisting of an alkyl group, a cycloalkyl group, an alkenyl group, an aryl group, an aralkyl group and an iminoalkyl group, which groups are unsubstituted or substituted by halogen, an  $n$  is an integer of from 0 to 2, and wherein the anion polymerization accelerator is an aromatic tertiary amine compound of the formula:



wherein each  $R^4$  and  $R^5$ , which may be the same or different, is an alkyl group having from 1 to 3 carbon atoms,  $X$  is an alkyl group having from 1 to 17 carbon atoms, a phenyl group a cyclohexyl group, an amino group, a halogen atom, a hydroxyl group or an alkoxy group having from 1 to 4 carbon atoms, and  $n$  is 0, 1, 2 or 3, provided that when  $n$  is 2 or 3 the plurality of  $X$  may be the same or different.

4,950,702

#### POLYVINYL RESIN PLASTISOL COMPOSITIONS

William David Arendt, Mundelein, Ill., assignor to Velsicol Chemical Corporation, Rosemont, Ill.

Continuation-in-part of Ser. No. 69,482, Jul. 2, 1987, abandoned.

This application Dec. 8, 1988, Ser. No. 281,218

Int. Cl.<sup>5</sup> C08K 5/09

U.S. Cl. 524-292 2 Claims

1. A plastisol composition characterized by low viscosity at both low and high shear rates comprising a resin which is

selected from the group consisting of polyvinyl chloride homopolymers and copolymers of vinyl chloride and vinyl acetate plasticized with dipropylene glycol monomethyl ether benzoate or tripropylene glycol monomethyl ether benzoate and in which the plasticizer is present in the amount of 50-75 parts by weight per 100 parts by weight of said resin.

4,950,703

#### STABILIZED CARBONMONOXIDE-OLEFIN COPOLYMER COMPOSITIONS

Edgar J. Smutny, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 15, 1989, Ser. No. 351,369

Int. Cl.<sup>5</sup> C08K 5/13

U.S. Cl. 524-327 18 Claims

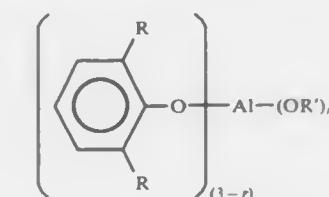
1. A composition stabilized against undue loss of crystallinity during melting and solidification which comprises:

a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the polymer is represented by the repeating formula



wherein  $G$  is a moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms polymerized through the ethylenic unsaturation and the ratio of  $y:x$  is no more than about 0.5; and

a stabilizing quantity of an aluminum phenoxide, wherein the aluminum phenoxide is represented by the formula



wherein  $R$  independently is a branched alkyl of from 3 to 5 carbon atoms,  $R'$  is an alkyl of up to 10 carbon atoms or phenyl, and  $r$  is 0, 1 or 2.

4,950,704

#### IMPROVING STABILITY AT MODERATE TEMPERATURES OF MOTOR VEHICLE COMPONENTS SHAPED FROM POLYVINYL CHLORIDE RESIN COMPOSITIONS

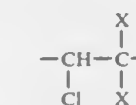
Michael A. Croce, Brooklyn; Kook J. Bae, East Northport, and Stuart D. Brilliant, Levittown, all of N.Y., assignors to Argus Chemical Corporation, Oakland, N.J.

Continuation-in-part of Ser. No. 162,705, Mar. 1, 1988. This application May 18, 1989, Ser. No. 353,567

Int. Cl.<sup>5</sup> C08K 5/07

U.S. Cl. 524-357 22 Claims

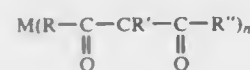
1. A shaped motor vehicle component having an improved stability at moderate temperatures of from about 150° F. to about 280° F. (corresponding to about 65° C. to about 138° C.), composed of a polyvinyl chloride resin composition comprising a vinyl chloride polymer formed at least in part of the recurring group,



and having a chlorine content in excess of 40%, where  $X$  is either hydrogen or chlorine, at least one heat stabilizer in a sufficient amount to impart heat processing stability during shaping, and a  $\beta$ -diketone in a sufficient amount to provide,



after shaping, stability at moderate temperatures not provided by any residual heat stabilizer, the  $\beta$ -diketone having the formula:



wherein M is a metal or hydrogen, n is the valence of M, R, R' and R'' are selected from the group consisting of aliphatic having from eleven to eighteen carbon atoms, cycloaliphatic having from eleven to eighteen carbon atoms, and aromatic hydrocarbon, haloaromathydrocarbon, alkoxyaromatic-hydrocarbon and alkylendioxyaromatic hydrocarbon having from six to about eighteen carbon atoms, and from none to seven halogen atoms, and from none to two alkoxy or alkylendioxyhydrocarbon groups, provided, that R' can also be hydrogen, and that only one of R and R'' can be aliphatic or cycloaliphatic.

4,950,705

## RUBBER COMPOSITIONS

Takeshi Kinoshita, Koichi Morita, and Yoshiyuki Kumamoto, all of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,362

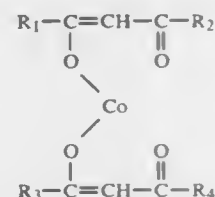
Claims priority, application Japan, Sep. 8, 1987, 62-224594; Oct. 13, 1987, 62-258152; Nov. 2, 1987, 62-275833

Int. Cl.<sup>5</sup> C08K 5/07

U.S. Cl. 524-357

2 Claims

1. A rubber composition for adhesion to metals which comprises 100 parts by weight of a rubber and 0.01-1 part by weight as a cobalt element content of at least one cobalt oxyketone complex compounded with said rubber, which complex is represented by the following general formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are same or different C<sub>1</sub>-C<sub>18</sub> alkyl, C<sub>5</sub>-C<sub>12</sub> cycloalkyl, C<sub>6</sub>-C<sub>14</sub> aryl, C<sub>6</sub>-C<sub>14</sub> aryl-C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>18</sub> alkoxy, C<sub>5</sub>-C<sub>12</sub> cycloalkoxy, C<sub>6</sub>-C<sub>14</sub> aryloxy, C<sub>6</sub>-C<sub>14</sub> aryl-C<sub>1</sub>-C<sub>4</sub> alkoxy groups, or C<sub>2</sub>-C<sub>18</sub> hydrocarbon groups having at least one double bond and, however, total number of carbon atoms in R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is at least 5.

4,950,706

## ANTI-FOGGING MATERIAL

Morio Kurasawa, Tokyo, Japan, assignor to Kurasawa Optical Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 77,423, Jul. 24, 1987, Pat. No. 4,833,105.

This application May 22, 1989, Ser. No. 354,846

Claims priority, application Japan, Jul. 26, 1986, 61-176366

Int. Cl.<sup>5</sup> C08K 3/08, 3/15, 3/22, 3/32

U.S. Cl. 524-415

5 Claims

1. An anti-fogging material comprising heat-molded plastic having therein a mixture of:

- (1) 1-10% by weight of niobium pentoxide;
- (2) 1-10% by weight of a magnesium compound selected from the group consisting of an oxide, hydroxide, fluoride, carbonate, phosphate, diphosphate and ammonium magnesium phosphate;
- (3) 1-10% by weight barium fluoride; and
- (4) 5-30% by weight lead.

4,950,707

## POLYETHER END-BLOCKED WITH HYDROLYZABLE SILYL GROUPS, METHOD OF MANUFACTURING AND ROOM TEMPERATURE CURABLE COMPOSITION USING THE POLYETHER

Chiuyuki Shimizu, and Tamio Yoshida, both of Ohta, Japan, assignors to Toshiba Silicone Co., Ltd., Japan

Division of Ser. No. 103,621, Oct. 1, 1987, Pat. No. 4,847,357.

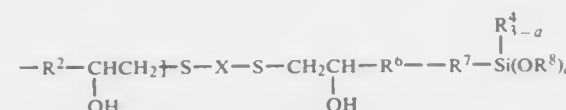
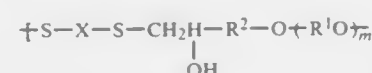
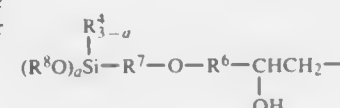
This application Apr. 20, 1989, Ser. No. 340,938

Int. Cl.<sup>5</sup> C08L 81/02

U.S. Cl. 524-609

5 Claims

1. A room temperature curable composition comprising:  
(1) 100 parts by weight of a polyether having a number average molecular weight from 1,000 to 50,000, end-blocked with hydrolyzable silyl groups represented by the general formula:



where R<sup>1</sup>, R<sup>2</sup>, R<sup>6</sup>, and R<sup>7</sup> individually represent a divalent hydrocarbon group, R<sup>4</sup> represents a monovalent hydrocarbon group, R<sup>8</sup> represents an alkyl group with 1 to 6 carbon atoms, a represents a number from 1 to 3, m represents a number from 10 to 500, n represents a number of 1 or greater and X represents an aromatic or heterocyclic ring.

(II) 3 to 300 parts by weight of an inorganic filler, and

(III) 0.001 to 20 parts by weight of a curing catalyst.

4,950,708

## STABLE POLYACRYLAMIDE GELS CONTAINING CHAOTROPIC AGENTS

Denis F. Hochstrasser, Geneva, Switzerland, assignor to Bio-Rad Laboratories, Inc., Hercules, Calif.

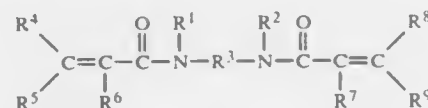
Filed Aug. 29, 1988, Ser. No. 237,819

Int. Cl.<sup>5</sup> C08K 5/20; C08F 271/02, 265/10

U.S. Cl. 524-728

7 Claims

1. A polyacrylamide electrophoresis gel containing urea in an amount ranging from about 8M to about 10M, and comprised of a polyacrylamide cross linked with a cross linking agent having the formula



in which:

R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are defined such that:R<sup>1</sup> and R<sup>2</sup> are independently C<sub>1</sub>-C<sub>3</sub> alkyl, and R<sup>3</sup> and C<sub>1</sub>-C<sub>4</sub> alkylene; orR<sup>1</sup> and R<sup>2</sup> are joined to form C<sub>1</sub>-C<sub>4</sub> alkylene, and R<sup>3</sup> is C<sub>1</sub>-C<sub>4</sub> alkylene; orR<sup>1</sup> is joined to R<sup>3</sup> to form a saturated hydrocarbyl group of 3 to 10 carbon atoms which together with the N atoms to which R<sup>1</sup> and R<sup>3</sup> are joined forms a N-containing ring, and R<sup>2</sup> is C<sub>1</sub>-C<sub>5</sub> alkyl; orR<sup>1</sup> and R<sup>2</sup> are joined to R<sup>3</sup> to form a saturated hydrocarbyl

group of 7 to 15 carbon atoms which together with the N atoms forms two N-containing rings; and  
R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup> are independently selected from the group consisting of H, CH<sub>3</sub> and C<sub>2</sub>H<sub>5</sub>.

4,950,709

## PROCESS FOR THE PREPARATION OF COARSE, AQUEOUS PLASTIC DISPERSIONS BY EMULSION POLYMERIZING WITH A BRANCHED POLYETHYLENE OXIDE

Herbert Schlueter, Marl; Bernhard-Peter Scholz, Oer-Erkenschwick; Wolfgang Holtrup, and Klaus Walther, both of Marl, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,940

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1988, 3806497; Dec. 1, 1988, 3840512

Int. Cl.<sup>5</sup> C08F 2/30, 2/26

U.S. Cl. 524-762

20 Claims

1. A process for the preparation of a coarse, aqueous plastic dispersion, which comprises emulsion polymerizing a monomer capable of being polymerized by free radical polymerization, in the presence of an aqueous phase, an anionic emulsifier, a branched poly(ethylene oxide) having a weight-average molecular weight,  $\bar{M}_w$  of 4,000 to 19,000 and present in an amount of 10<sup>-3</sup> to <0.02 parts by weight, based on 100 parts by weight of said monomer and a water-soluble alkali metal or ammonium salt present in an amount such that 1 to 250 mmol of the sum of alkali metal ions and ammonium ions which are not bound to said emulsifier are present per liter of said aqueous phase, wherein said poly(ethylene oxide) and said water-soluble salt are present before said polymerizing is initiated, and wherein said polymerizing is carried out under batch conditions at least until the particle formation phase is complete, to obtain a coarse, aqueous plastic dispersion of particles having a volume-average diameter (dv) in the range of 120 to 400 nm.

4,950,710

## FILLED POLYMERIC COMPOSITE CONTAINING A REACTIVE ALUMINUM COMPOUND

Max E. Roha, Brecksville, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Feb. 8, 1988, Ser. No. 153,763

Int. Cl.<sup>5</sup> C08K 3/36, 3/34, 3/22, 7/14

U.S. Cl. 524-786

20 Claims

1. A reinforced composite material comprising:

(a) about 10-70 wt% of a filler having a hydroxylated surface; and

(b) about 30-90 wt% of a matrix material comprising:

(1) a copolymer comprising:

- (a) a first monomer containing an alkenyl group, said first monomer being selected from the group consisting of styrene, vinyl acetate, vinyl chloride, acrylonitrile, acrylamide, alpha-methylstyrene, vinylidene chloride, methyl methacrylate, ethyl acrylate, butyl acrylate, and divinyl benzene; and
- (b) a second monomer containing an alkenyl group and a carboxyl group, said second monomer being selected from the group consisting of acrylic acid, methacrylic acid, trimellitic acid, crotonic acid, trimellitic acid, crotonic acid, isocrotonic acid, beta-ethylacrylic acid, isohydroascorbic acid, hydrosorbic acid, trans-2-heptenoic acid, 2'-octenoic acid, 2-nonenic acid, angelic acid, and tiglic acid; and

(2) an organoaluminum compound.

4,950,711

## BLISTER-RESISTANT PAPER COATING LATEX

David W. Suwala, and Igor B. Aksman, both of Dover, Del., assignors to Relchbold Chemicals, Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 295,435, Jan. 10, 1989,

abandoned. This application Jul. 19, 1989, Ser. No. 383,231

Int. Cl.<sup>5</sup> C08J 29/00

U.S. Cl. 524-819

14 Claims

1. In a coating composition for paper comprising a polymer latex prepared by emulsion polymerizing:

- (a) an aliphatic conjugated diene monomer,
  - (b) an non-carboxylic monoethylenic monomer, and
  - (c) an ethylenically unsaturated carboxylic acid monomer,
- the improvement which consists essentially of conducting the polymerization in the absence of an alkyl halide and in the presence of about 1.5 to 5% by weight of an organosulfur molecular weight modifier and about 0.5 to 5% by weight of a water soluble salt of a non-polymerizable organic acid.

4,950,712

## POLYMERS DERIVED FROM CROSSLINKED POLYSTYRENES AND DEXTRANS, THEIR METHODS OF PREPARATION AND THEIR APPLICATIONS FOR THE ANALYSIS AND PURIFICATION OF MOLECULES OF BIOLOGICAL ORIGIN

Didier Letourneur, Aulnay; Colette Douzon, Paris; Véronique Migonney, Eaubonne; Daniel A. Muller, Soisy Sus Montmorency, and Marcel Jozefowicz, Lamorlaye, all of France, assignors to Centre National de la Recherche Scientifique (C.N.R.S.), Paris, France

Filed Aug. 22, 1988, Ser. No. 235,113

Claims priority, application France, Aug. 21, 1987, 87 11813

Int. Cl.<sup>5</sup> C08F 37/02, 8/30, 8/34, 8/40

U.S. Cl. 525-54.2

10 Claims

1. A polymer derived from a crosslinked styrene polymer or copolymer, or from a crosslinked dextran, in which the chain of the base polymer or copolymer is substituted with one or more groups, which may be identical or different, belonging to the following categories:

-Z-A<sub>1</sub>;-Z-A<sub>2</sub>;-Z-A<sub>1</sub>-Z'-A<sub>2</sub>;-Z-A<sub>1</sub>-A<sub>3</sub>-A<sub>2</sub>;-Z-A<sub>1</sub>-A<sub>4</sub>

wherein:

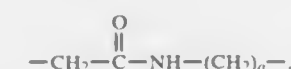
Z and Z' are chosen from the moieties:

-(CH<sub>2</sub>)<sub>n</sub>-, n being 1 to 12, optionally made hydrophilic by the replacement of at least one H by an OH; or

-O-(CH<sub>2</sub>)<sub>r</sub>-, r being 0 to 12, optionally being made hydrophilic by the replacement of at least one H by an OH; or

-SO<sub>2</sub>NH-(CH<sub>2</sub>)<sub>m</sub>-, m being 1 to 12, the moiety -(CH<sub>2</sub>)<sub>m</sub>- optionally being made hydrophilic by the replacement of at least one H by an OH; and

in the case of the modification of a crosslinked dextran, also



q being 1 to 12, the residue -(CH<sub>2</sub>)<sub>q</sub>- optionally being made hydrophilic by the replacement of at least one H or an OH;

-A<sub>1</sub> denotes a phosphorylated moiety

-A<sub>2</sub> denotes a chemical moiety derived from a purine base or a pyrimidine base;  
 -A<sub>3</sub> denotes a chemical group derived from a sugar; and  
 -A<sub>4</sub> denotes a moiety of a molecule participating in the polar structure of the various phospholipids.

4,950,713

# CONJUGATES OF D-GLUTAMIC ACID: D-LYSINE COPOLYMER AND CERTAIN BIOCHEMICALS

David H. Katz, La Jolla, Calif., assignor to La Jolla Pharmaceutical Company, San Diego, Calif.

Continuation of Ser. No. 869,393, May 30, 1986, abandoned.

This application Oct. 6, 1988, Ser. No. 254,249

Int. Cl.<sup>5</sup> C08H 1/00; C08L 89/00; A61K 39/00; C09K 11/04  
 U.S. Cl. 525—54.1 8 Claims

1. A D-GL-T-Cell Growth Factor conjugate useful for treating T-cell Growth Factor dependent malignancies.

4,950,714

# CROSS-LINKED POLYVINYL BUTYRAL SHEET

George E. Cartier, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 684,777, Dec. 21, 1984. This application Dec. 18, 1985, Ser. No. 810,431

Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525—61

1 Claim

1. Plasticized polyvinyl butyral sheet lightly cross-linked through intermolecular linkages developed through the hydrated form of formaldehyde, such cross-links being adequate to increase the viscosity of the polyvinyl butyral used to form the sheet by about 2% to about 85% over its viscosity in the absence of such cross-links.

4,950,715

SEALANTS AND ADHESIVES AND THE USE THEREOF  
 Edward W. Duck, Gaiberg, Great Britain; Ingolf Scheffler, Wiesloch, Fed. Rep. of Germany; Michael Hirthammer, and Norman Blank, both of Heidelberg, Fed. Rep. of Germany, assignors to Teroson GmbH, Heidelberg, Fed. Rep. of Germany

PCT No. PCT/EP88/00093, § 371 Date Dec. 16, 1988, § 102(e) Date Dec. 16, 1988, PCT Pub. No. WO88/06165, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 272,677

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705427

Int. Cl.<sup>5</sup> C08L 75/04

U.S. Cl. 525—127

7 Claims

1. A heat- and moisture hardening, one component polyurethane sealant and adhesive based upon telechelic isocyanate prepolymers made from aromatic diisocyanates in stoichiometric excess and polyols, characterized in that it comprises (a) a tin compound catalyst for moisture hardening and (b) a blocked cross-linking agent activatable by heating.

4,950,716

# COMPATIBLE

# POLYCARBONATE/METHYL-METH-ACRYLATE POLYMER MIXTURES

Jens-Dieter Fischer, Darmstadt; Winfried Wunderlich, Rossdorf, and Werner Siol, Darmstadt-Eberstadt, all of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 155,545, Feb. 12, 1988, abandoned.

This application Apr. 10, 1989, Ser. No. 334,769

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1987, 3709562

Int. Cl.<sup>5</sup> C08F 8/46; C08L 31/06, 33/12, 69/00

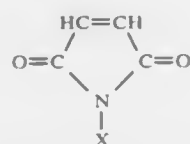
U.S. Cl. 525—148

8 Claims

1. A thermoplastic transparent polymer mixture, compris-

ing: (a) an aromatic polycarbonate and (b) a methacrylate copolymer, wherein said copolymer comprises:

- (i) 40–95 wt.% methyl methacrylate, and
- (ii) 5–40 wt.% maleimide monomers having formula



(1)

wherein X is an unsubstituted cyclohexyl group or a monosubstituted or polysubstituted cyclohexyl group, substituted with at least one substituent selected from the group consisting of C<sub>1-6</sub> alkyl groups, and wherein said copolymer has a molecular weight M<sub>w</sub> greater than 30,000.

4,950,717

# BLENDS OF POLYESTER-ETHERS WITH ETHYLENE-ACRYLIC ACID COPOLYMERS

Robert W. Seymour, and Thomas E. Flora, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 189,899, May 3, 1988,

abandoned. This application Jun. 2, 1989, Ser. No. 360,571

Int. Cl.<sup>5</sup> C08L 67/02, 33/02

U.S. Cl. 525—172

9 Claims

1. A composition comprising a compatible blend of:  
 A. about 10 to 90 weight percent of an unneutralized ethylene-acrylic acid copolymer containing about 10 to 50 mole percent acrylic acid monomer units; and  
 B. about 90 to 10 weight percent of a polyester-ether having an inherent viscosity of about 0.8 to 1.5 comprised of  
 (1) 1,4-cyclohexanedicarboxylic acid having a trans isomer content of at least 70 mole percent;  
 (2) a glycol component comprising:  
 (a) 1,4-cyclohexanedimethanol having a trans isomer content of at least 60 mole percent,  
 (b) from about 15 to 50 weight percent, based on the weight of the polyester-ether, of poly(oxytetramethylene)glycol having a molecular weight of about 500 to 1100; and  
 (3) from 0 to about 1.5 mole percent, based on the mole percent of the acid or glycol component, of a branching agent having at least three carboxyl and/or hydroxyl groups.

4,950,718

# ALLOYS OF VINYLIDENE CHLORIDE INTERPOLYMERS AND OLEFIN POLYMERS

Bill E. Burgert, Midland, and Dan E. Ranck, Sanford, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 83,331, Aug. 17, 1987,

abandoned, which is a continuation-in-part of Ser. No. 610,716, May 16, 1984, abandoned. This application Apr. 11, 1988, Ser. No. 179,789

Int. Cl.<sup>5</sup> C08L 23/08, 27/08, 33/04, 23/02

U.S. Cl. 525—185

43 Claims

1. A compatibilized blend of polymers comprising: (a) at least about 45 weight percent of a vinylidene chloride interpolymer having between 5 and 95 percent crystallinity as measured by the density method and having polymerized therein vinylidene chloride in an amount of from about 72 to about 98 percent by weight of interpolymer and at least one monoethylenically unsaturated monomer copolymerizable therewith in an amount of from about 28 to about 2 percent by weight of interpolymer; (b) at least about 9 weight percent of an olefin polymer and (c) a compatibilizing amount between about 4 and about 20 weight percent of a compatibilizing polymer, said compatibilizing polymer being selected from the group consisting of:

- (1) a copolymer of between about 80 to 95 weight percent ethylene and between about 5 to 20 weight percent esters of acrylic or methacrylic acid with 1 to 8 carbon alkyl groups;
- (2) a copolymer of between about 90 to 99 weight percent ethylene and about 1 to 10 weight percent carbon monoxide;
- (3) a copolymer of between about 72 to 82 percent weight ethylene and between about 18 to 28 weight percent vinyl acetate; and
- (4) a copolymer of between about 91 to 93 weight percent ethylene and between about 7 to 9 weight percent acrylic acid, modified by reaction with ethyl oxazoline.

4,950,719

# RUBBER COMPOSITION

Tetsuo Oyama, Kamakura; Fumitoshi Suzuki; Akio Ueda, both of Yokohama, and Akihiro Shibahara, Komaki, all of Japan, assignors to Nippon Zeon Co., Ltd. and Tokai Rubber Industries, Ltd., both of Japan

Filed Dec. 20, 1988, Ser. No. 286,880

Int. Cl.<sup>5</sup> C08L 7/00, 9/06

U.S. Cl. 525—212

12 Claims

1. A rubber composition capable of giving a rubber vibration insulator having excellent low-temperature properties, said composition comprising as a main rubber component a blend composed of (a) 10 to 90 parts by weight of a tapered styrene-butadiene copolymer rubber which has a Mooney viscosity (ML<sub>1+4</sub>, 100 °C.) in the range of 10 to 200, and an average bound styrene content of 10 to 40% by weight and a 1,2-bond content in the butadiene portion of at least 50% by weight and in which the bound styrene content increases or decreases in one direction along the copolymer molecular chain such that the bound styrene content at one end portion of the molecular chain is not more than 1/5 of the average bound styrene content, and (b) 90 to 10 parts by weight of natural rubber and/or synthetic polyisoprene rubber.

4,950,720

# MODIFIED POLYPROPYLENE, PROCESS FOR MAKING AND ARTICLE MADE FROM THE SAME

James C. Randall, Jr., Seabrook; Ferdinand C. Stehling, Baytown; Michael C. Chen, Deer Park, and Larry W. Colwell, Friendswood, all of Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Apr. 29, 1988, Ser. No. 188,260

Int. Cl.<sup>5</sup> C08L 23/12, 23/16; C08F 297/08

U.S. Cl. 525—322

44 Claims

1. A modified polypropylene comprising a reactor blend of higher molecular weight propylene/olefin random copolymer and a lower molecular weight substantially isotactic homopolypropylene, wherein said homopolypropylene comprises an isotactic content of at least about 97% meso diad units, said modified polypropylene further comprising:  
 a copolymer:homopolypropylene weight ratio of from about 1:20 to about 20:1;  
 a copolymer:homopolypropylene melt flow ratio of from about 1:1 to about 1:100;  
 an olefin content up to about 5.0 mol%, said olefin being selected from one or more of ethylene and alpha-olefins of the formula (CH<sub>2</sub>)<sub>n</sub>—CH—R, wherein R is a hydrocarbon group having at least two carbon atoms; and  
 an average of up to about 50 chain disruptors per 1000 propylene repeat units, said chain disruptors comprising racemic polypropylene diads and said olefin incorporated into a polypropylene chain wherein said olefin is incorporated into the upper end of the molecular weight distribution of said modified polypropylene.

4,950,721

# ION-EXCHANGE REACTIONS FOR POLYMERIC ALKALI METAL CARBOXYLATES

Anthony J. Dias, Linden, and Joseph A. Olkusz, Fanwood, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Oct. 3, 1989, Ser. No. 416,412

Int. Cl.<sup>5</sup> C08F 8/40

12 Claims

1. A method for preparing functionalized polymers of monomers capable of anionic polymerization comprising contacting a polymeric alkali metal carboxylate, formed by anionic polymerization and subsequent reaction with gaseous CO<sub>2</sub>, with a hydrocarbon soluble salt capable of abstracting the alkali metal from said polymeric alkali metal carboxylate and substituting therefore the cation of said hydrocarbon soluble salt, essentially without formation of a polymeric carboxylic acid.

4,950,722

# UNSATURATED EPOXY MOIETY, UNSATURATED MONOMER AND LIQUID EPOXY COMPOUND SOLUTION

Theodore L. Parker, Lafayette, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 725,851, Apr. 22, 1985, abandoned. This application Jan. 5, 1989, Ser. No. 294,927

Int. Cl.<sup>5</sup> C08G 8/30, 59/14; C08L 63/10

U.S. Cl. 525—502

5 Claims

1. A solution comprising an unsaturated-epoxy moiety having the formula R—NHCO<sub>2</sub>—E wherein R is an unsaturated group free of isocyanate functionality and E is a group having an oxirane ring and an unsaturated monomer other than said moiety dissolved in a liquid epoxy compound.

4,950,723

# ORGANIC ACID HALIDE NEUTRALIZING AGENTS FOR ANIONIC POLYMERIZATIONS

Corwin J. Bredeweg, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 23, 1989, Ser. No. 299,202

Int. Cl.<sup>5</sup> C08F 2/38, 6/02

U.S. Cl. 526—84

5 Claims

1. A process for preparing polymers by means of the anionic polymerization of polymerizable monomers, the steps of the process comprising:

- (a) contacting one or more anionically polymerizable monomers selected from the group consisting of monovinylidene aromatic monomers and alkenes with an alkali metal containing anionic initiator under anionic polymerization conditions;
- (b) terminating the polymerization by contacting the reaction mixture with a hydroxyl containing compound of the formula R—(OH)<sub>n</sub> wherein R is an aromatic or aliphatic group of up to 10 carbons and n is one or two;
- (c) neutralizing the alkali metal containing remnant resulting from the termination reaction of step (b) by contacting the reaction mixture with an organic acid halide; and
- (d) recovering the resulting polymer.

4,950,724

# SUSPENSION POLYMERIZATION OF VINYL AROMATIC MONOMERS TO POLYMER HAVING HIGH SYNDIOTACTICITY

Michael T. Malanga, and Thomas H. Newman, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 27, 1988, Ser. No. 249,752

Int. Cl.<sup>5</sup> C08F 2/14, 12/08

U.S. Cl. 526—144

8 Claims

1. A process for the coordination catalyzed polymerization of vinyl aromatic monomers comprising forming a suspension of a vinyl aromatic monomer and an inert liquid comprising a



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fluorinated aliphatic or aromatic organic compound that is a nonsolvent for the monomer and the resulting polymer; contacting the suspended monomer with a suitable coordination catalyst under polymerization conditions so as to form a vinyl aromatic polymer having syndiotacticity as measured by  $^{13}\text{C}$  NMR of 50 percent or greater; and recovering the resulting polymer.

4,950,725

**PARTICULATE POLYMERS, THEIR PRODUCTION AND USES**

Peter Flesher, Bingley; David Farrar, Bradford, and Adrian Allen, Skipton, all of Great Britain, assignors to Allied Colloids Limited, England

Filed May 19, 1989, Ser. No. 354,889

Claims priority, application United Kingdom, May 20, 1988, 8811958; Nov. 16, 1988, 8826822

Int. Cl.<sup>5</sup> C08F 220/06

U.S. Cl. 526—307.6

14 Claims

1. A particulate cross linked polymeric material formed from a water soluble ethylenically unsaturated monomer or blend of monomers comprising 10 to 100% ionic monomer and 0 to 90% non-ionic monomer and 0.005 to 3% (based on monomer) crosslinking agent and which has a dry particle size of below 20  $\mu\text{m}$ , the polymeric material having a storage modulus  $G'$  of 600 to 1400 dynes/cm<sup>2</sup>, a loss modulus  $G''$  of 500 to 700 dynes/cm<sup>2</sup> and a viscosity retention of at least 80%.

4,950,726

**ORGANOPOLYSILOXANE COMPOUND HAVING LIQUID-CRYSTALLINE PHASE**

Hiroshi Yoshioka, Tokyo, Japan; Yoshitaka Hamada, Madison, Wis., and Masanao Kamei, Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

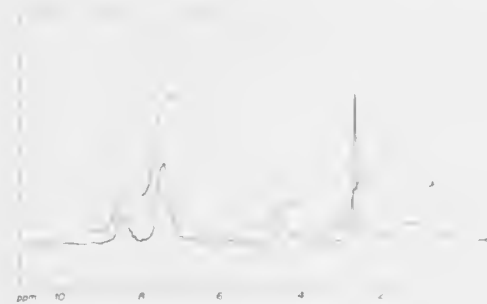
Filed Oct. 3, 1989, Ser. No. 416,341

Claims priority, application Japan, Oct. 24, 1988, 63-267674

Int. Cl.<sup>5</sup> C08G 77/04

U.S. Cl. 528—25

4 Claims



1. An organopolysiloxane compound represented by the average unit formula



(1)

in which  $\text{R}^1$  is an alkyl group having 1 to 4 carbon atoms or a phenyl group, Q is a group selected from the class consisting of alkylene groups having 2 to 18 carbon atoms and oxyalkylene groups having 2 to 18 carbon atoms, the oxygen atom or atoms being at the terminal of the alkyl group remote from the silicon atom or at an intermediate position of the alkylene group, M is a mesogen residue, X is an atom or a group selected from the class consisting of a nitrile group, trifluoromethyl group, fluorine atom, hydrogen atom, alkyl groups having 1 to 20 carbon atoms and alkoxy groups having 1 to 20 carbon atoms, G is a group represented by the general formula  $\text{—CH}_2\text{CH}_2\text{—(Y)—Si(R}^2)_3\text{—n(D)—}$ , Y being selected from the class consisting of alkylene groups having 1 to 18 carbon atoms and divalent groups formed of at least one alkylene group and one or more of ether linkages  $\text{—O—}$  or ester linkages  $\text{—CO—O—}$  or

$\text{—O—CO—}$  having 1 to 18 carbon atoms and bonded to the silicon atom by the carbon atom in the alkylene group,  $\text{R}^2$  being a group selected from the class consisting of alkyl groups having 1 to 20 carbon atoms, phenyl group and substituted phenyl groups, D being a hydrolyzable group, the subscript p being zero or 1 and the subscript n being 1, 2 or 3, the subscript a is a positive number in the range from 1 to 2, the subscript b is a positive number in the range from 0.2 to 0.99 and the subscript c is a positive number in the range from 0.8 to 0.01 with the proviso that  $b+c$  does not exceed 1.

4,950,727

**SPIRO(BIS)INDANE POLYAMIDE AND POLYIMIDE COPOLYSILOXANES AND METHOD OF PREPARATION**

Thomas L. Guggenheim, Scotia; James A. Cella, Clifton Park; Sharon J. McCormick, Schenectady; Alice M. Colley, Latham; Jonathan D. Rich, Rexford, and Philip J. McDermott, Clifton Park, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 146,154, Jan. 20, 1988, and a continuation-in-part of Ser. No. 157,009, Feb. 18, 1988, Pat. No. 4,814,496. This application Apr. 15, 1988, Ser. No. 182,020

Int. Cl.<sup>5</sup> C08G 77/26

U.S. Cl. 528—26

20 Claims

1. A linear polyamide or polyimide copolysiloxane composition comprising spiro(bis)indane moiety-containing amide or imide units and polydiorganosiloxane units.

4,950,728

**THERMALLY STABLE (IMIDE/AMIDE)/(UREA/SILOXANE) BLOCK COPOLYMERS**

Pascal Barthelemy, Lyons; Yves Camberlin, Caluire, and Philippe Michaud, Villeurbanne, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 6, 1988, Ser. No. 202,544

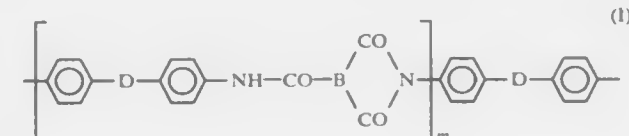
Claims priority, application France, Jun. 5, 1987, 87 08105

Int. Cl.<sup>5</sup> C08G 77/455

U.S. Cl. 528—26

10 Claims

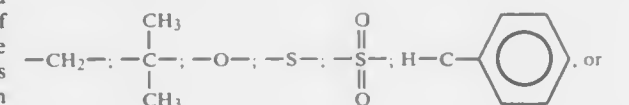
1. A thermally stable block copolymer comprising recurring imide/amide blocks of the formula:



(1)

in which:

D represents a simple valence bond or one of the groups selected from:



B represents a trivalent substituted or unsubstituted aromatic radical, or two such radicals joined together by a simple valence bond or one of the groups selected from:

4,950,730

**MOLDABLE/EXTRUDABLE THERMOTROPIC AROMATIC COPOLYESTERAMIDES**

Jean-Pierre Quentin, Lyon, France, assignor to Rhone-Poulenc Chimie, France

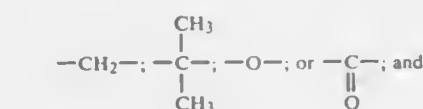
Continuation of Ser. No. 217,352, Jul. 11, 1988, abandoned. This application Jun. 2, 1989, Ser. No. 360,280

Claims priority, application France, Jul. 10, 1987, 87 10179

Int. Cl.<sup>5</sup> C08G 63/02, 63/18

U.S. Cl. 528—184

15 Claims



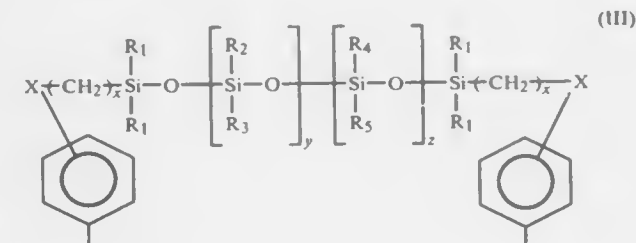
m is a positive number equal to at least 1; and recurring urea/siloxane blocks of the formula:



(II)

in which:

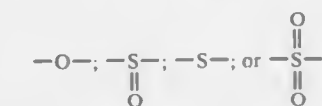
A represents a divalent diorganosiloxane radical of the formula:



(III)

in which:

X, which is in the ortho, meta- or para-position relative to the carbon atoms of the benzene ring with the valence bond depending therefrom, represents one of the following atoms or groups selected from:



$\text{R}_1, \text{R}_2, \text{R}_3, \text{R}_4$  and  $\text{R}_5$ , which may be identical or different, are each a linear or branched chain alkyl radical having from 1 to 12 carbon atoms, or a substituted such alkyl radical bearing one or more chlorine, bromine or fluorine atom substituents or a  $\text{—CN}$  group substituent, or a phenyl radical optionally substituted by one or more alkyl and/or alkoxy radicals having from 1 to 4 carbon atoms or by one or more chlorine atoms; the symbol x is an integer ranging from 2 to 8; and the symbols y and z represent identical or different integral or fractional numbers, the sum of which ranges from 0 to 100.

4,950,729

**AROMATIC POLYMER AND PROCESS**

James A. Daniels, Frodsham, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Oct. 28, 1986, Ser. No. 924,034

Claims priority, application United Kingdom, Nov. 11, 1985, 8527756

Int. Cl.<sup>5</sup> C08G 65/38, 65/40

U.S. Cl. 528—86

12 Claims

1. A polymer consisting essentially of the repeating units

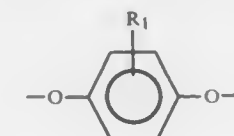


and



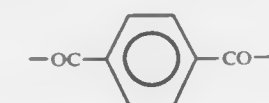
where  $\text{Ph}^1$  is para-phenylene, characterised in that

- the molar proportions of the two said repeating units, apart from any involved in chain-ends, is unequal; and/or
- the mutual succession of the two said repeating units is non-regular.

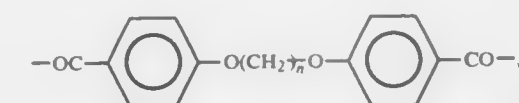


in which  $\text{R}_1$  is a methyl or ethyl radical or a chlorine or bromine atom, with the proviso that the units (I) are identical or different,

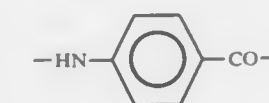
(II) represents the structure:



(III) represents the structure:



in which n is an integer ranging from 2 to 6, with the proviso that the units (III) are identical or different, (IV) represents the structure:



the molar ratio of the units (I) relative to the sum of the units (II)+(III) ranges from 0.95 to 1.05; the amount of the units (II) in the mixture of (II)+(III) ranges from 0 to 80 mol % and that of the units (III), on the same basis, ranges from 100 to 20 mol %; the amount of the units (IV), expressed relative to the amount of the units (I), ranges from 5 to 100 mol %; and said copolyesteramide having a flow temperature ranging from 200° to 350° C.

4,950,731

**METHOD FOR PREPARING SPIROBIINDANE POLYCARBONATES**

Gary R. Faler, and Jerry C. Lynch, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 20, 1987, Ser. No. 40,528

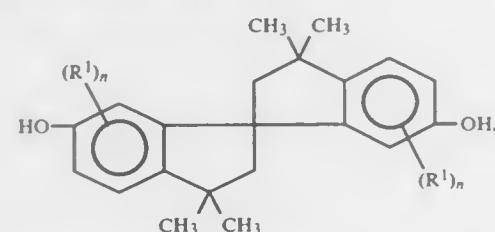
Int. Cl.<sup>5</sup> C08G 64/20

U.S. Cl. 528—201

18 Claims

1. A method for preparing a linear polycarbonate containing structural units derived from a spirobiindane bisphenol which comprises the steps of:

(A) preparing a heterogeneous mixture in which the aqueous phase has a pH in the range of about 9-11, said mixture consisting essentially of an aqueous alkali metal or alkaline earth metal base solution; a substantially pure spirobiindane bisphenol of the formula



wherein each  $R^1$  is independently  $C_{1-4}$  primary or secondary alkyl or halo and  $n$  is from 0 to 3, or a mixture thereof with at least one other dihydroxyaromatic compound; and a chlorinated aliphatic hydrocarbon constituting an organic phase in which said spirobiindane bisphenol or mixture is substantially insoluble;

(B) passing phosgene into said mixture at a temperature in the range of about  $10^{\circ}$ - $50^{\circ}$  C. while maintaining the pH of the aqueous phase at a value up to about 11, until maximum homogeneity is attained;

(C) adding an effective amount of an interfacial polycarbonate formation catalyst and continuing phosgene passage at a temperature in the range of about  $10^{\circ}$ - $50^{\circ}$  C. and a pH of the aqueous phase of at least about 10; and

(D) recovering the linear polycarbonate from the reaction mixture.

4,950,732

#### CONDENSATION COPOLYMERS CONTAINING BIS-METHINE MOIETIES AND PRODUCTS THEREFROM

Max A. Weaver; Clarence A. Coates, Jr.; Wayne P. Pruett, all of Kingsport, and Samuel D. Hilbert, Jonesborough, all of Tenn., assignors to Eastman Kodak Company

Continuation-in-part of Ser. No. 947,135, Dec. 29, 1986, abandoned. This application Nov. 24, 1987, Ser. No. 125,031 Int. Cl.<sup>5</sup> C08G 63/44, 63/76, 69/44

U.S. Cl. 528-288

19 Claims

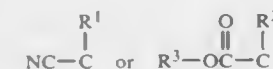
1. A composition comprising molding or fiber grade condensation polymer having copolymerized therein a total of from 1.0 to 10,000 ppm, of the reactant residue moieties of one or a mixture of bis-methine reactants of the formula



wherein

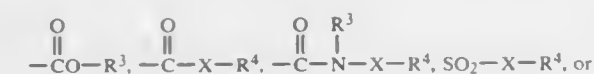
$Ar^1$  is an unsubstituted or substituted 1,4-phenylene radical; and

$M^1$  and  $M^2$  are the same or different and each is a disubstituted methylene group having the structure



wherein

$R^1$  is



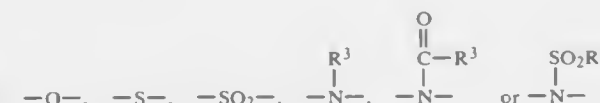
and  $R^2$  is



wherein

$R^3$  is hydrogen, allyl or an unsubstituted or substituted alkyl, cycloalkyl or phenyl radical;

$X$  is a divalent alkylene, cycloalkylene or phenylene radical or a combination thereof which may contain within the divalent chain one or two atoms or radicals selected from  $-O-$ ,  $-S-$ ,  $-SO_2-$ ,



wherein

$R^6$  is an unsubstituted or substituted alkyl, cycloalkyl or phenyl radical;

$R^4$  is a group that is reactive with one of the monomers from which the condensation polymer is prepared;

$Ar^2$  is an unsubstituted or substituted phenylene or heterocyclic arylene radical; and

$R^5$  is hydrogen,  $R^4$  or  $-X-R^4$ ; wherein the bis-methine moiety absorbs radiation significantly in the range of 250 to 390 nm and is non-extractable from said polymer and is stable under the conditions the polymer is prepared or processed.

4,950,733

#### CAPRYLOYLOXYALKYL ACRYLATES, THEIR POLYMERS AND COPOLYMERS AND THE METHOD FOR PREPARATION THEREOF

Rudolf Lukás; Stanislav Sevcik; Vera Palecková, all of Prague; Vladimír Pacovsk, Unhost; Zdenek Mrázek, Prague; Jareslava Nohová, Prague; Olga Prádová, Prague; Milos Melik, Valašské Meziříčí, and Miloslav Kolinsk, Prague, all of Czechoslovakia, assignors to Československa akademie ved, Prague, Czechoslovakia

Filed Nov. 9, 1988, Ser. No. 269,863

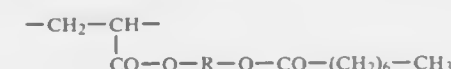
Claims priority, application Czechoslovakia, Nov. 17, 1987, 8242-87; Dec. 2, 1987, 8776-87

Int. Cl.<sup>5</sup> C08F 220/18

U.S. Cl. 526-323.1

3 Claims

1. A polymer containing capryloyloxyalkyl acrylate structure units of formula IV,



wherein  $R$  is an alkylene group with 2 to 6 carbon atoms.

4,950,734

#### COMPOSITIONS FOR PRODUCTION OF ELECTRONIC COATINGS

Allan A. Eisenbraun, and Wesley C. Blocker, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 11, 1988, Ser. No. 255,610

Int. Cl.<sup>5</sup> C08G 69/26, 12/00; B05D 3/02, 3/12

U.S. Cl. 528-353

14 Claims

1. A partially fluorinated polyamic acid composition especially adapted for use in spin coating wafers of semiconductive materials which composition comprises a solution of (i) a 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride/2,2-bis hexafluoropropane polyamic acid polymer having an inherent viscosity in the range of about 0.2 to about 1.5 dL/g (as measured in N-methylpyrrolidone at  $25^{\circ}$  C. at a concentration of 0.5 g/dL) in (ii) a solvent containing at least 40% by weight of one or more liquid aromatic hydrocarbons having a boiling

point of at least about  $110^{\circ}$  C. and at least 5% by weight of one or more dipolar aprotic solvents having a boiling point of at least about  $150^{\circ}$  C., such that the solution (a) contains on a weight basis from about 5% to about 40% of such polyamic acid and (b) does not undergo precipitate formation during spin coating in an atmosphere of up to at least about 55% relative humidity.

4,950,735

#### BIODEGRADABLE POLYAMIDES

David P. Vanderbilt; Donald R. Cowsar, both of Birmingham, Ala.; Richard L. Dunn, Fort Collins, Colo., and James P. English, Birmingham, Ala., assignors to Sharpoint L.P., Reading, Pa.

Filed Jul. 26, 1988, Ser. No. 224,316

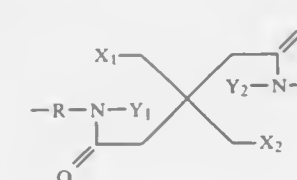
Int. Cl.<sup>5</sup> C08G 63/08, 69/26

U.S. Cl. 528-354

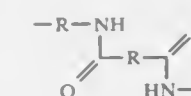
11 Claims

1. An organic polymer, the structural formula of which includes

a backbone containing  $n$  biradical units of the formula



joined randomly with  $m$  biradical units of the formula



wherein

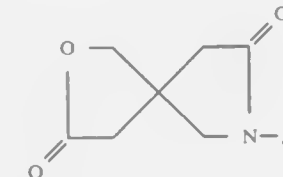
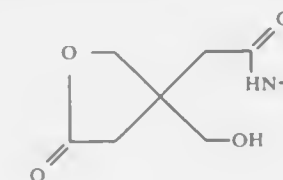
$n$  is a positive integer;

$m$  is either zero or a positive integer; each  $R$  independently is a hydrocarbon radical;

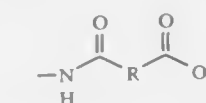
$X_1$  is  $-OH$  and  $Y_1$  is  $-H$ , or  $X_1$  and  $Y_1$  together constitute a chemical bond in a lactam ring;

$X_2$  is  $-OH$  and  $Y_2$  is  $-H$ , or  $X_2$  and  $Y_2$  together constitute a chemical bond in a lactam ring;

said backbone being capped with a radical selected from



$-NH_2$ , and also



when  $m$  is a positive integer;

with the proviso that the polymer backbone contains lactam units when  $m$  is zero.

4,950,736

#### POLYCARBONATE OR POLYESTERCARBONATE RESIN FROM BICYCLO POLYCYCLO DIMETHANOL

Shigeru Sasaki, and Mitsuo Matsumoto, both of Kurashiki, Japan, assignors to Kuraray Company, Ltd., Okayama, Japan

Filed Aug. 31, 1989, Ser. No. 401,014

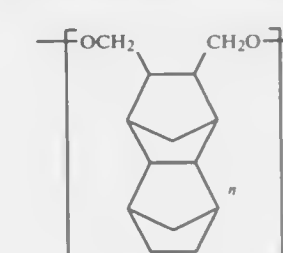
Claims priority, application Japan, Sep. 2, 1988, 63-220994; Sep. 2, 1988, 63-220995; Feb. 16, 1989, 1-37785

Int. Cl.<sup>5</sup> C08G 64/02, 64/16

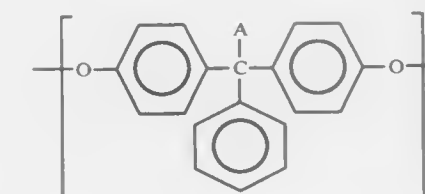
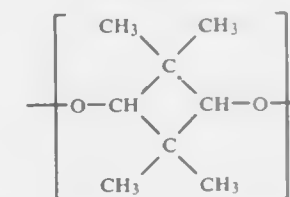
U.S. Cl. 528-370

11 Claims

1. A polycarbonate or polyester carbonate resin having a number average molecular weight of 10,000 to 100,000 and comprising structural units represented by the following formulae (I), (IV) and (V) or comprising these units and structural units represented by the following formula (II) or (III), the molar fraction of the structural unit (I) or the sum of molar fractions of the structural unit (I) and the structural unit (II) or (III) being substantially the same as the sum of molar fractions of the structural units (IV) and (V), the molar fraction of the structural unit (II) or (III) being 5 to 45 mol % and the molar fraction of the structural unit (IV) being 20 to 50 mol %:



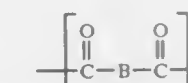
wherein  $n$  is 0, 1 or 2.



wherein  $A$  is an alkyl group or a phenyl group.



and



wherein  $B$  is a divalent saturated aliphatic hydrocarbon group, saturated alicyclic hydrocarbon group or aromatic hydrocarbon group.



4,950,737

## CATALYTIC/SOLVENT PREPARATION OF VINYLENE COPOLYMERS FROM ETHYLENE AND HALOAROMATIC COMPOUND

Walter Heitz, Kirchhain, and Andreas Greiner, Marburg-Moischt, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Jun. 3, 1988, Ser. No. 201,879

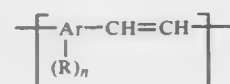
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719851

Int. Cl.<sup>5</sup> C08G 61/02

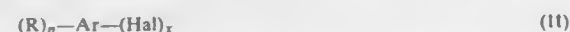
U.S. Cl. 528—392

1 Claim

1. Process for the preparation of vinylene copolymers having recurrent structural units of the formula (I)



wherein Ar denotes an aromatic or heterocyclic group, R denotes hydrogen or an inert substituent and n denotes an integer with a value from 0 to 8, comprising reacting aromatic halogen compounds corresponding to the formula (II)



wherein Ar denotes an aromatic or heterocyclic group, R denotes hydrogen or an inert substituent, Hal denotes halogen, n denotes 0, 1, 2 or 3 and x denotes 2, 3, 4 or a larger integer and ethylene in an inert polar solvent at 70 to 150 degrees C. in the presence of a catalyst.

4,950,738

## AMINE DERIVATIVES OF ANTHRACYCLINE ANTIBIOTICS

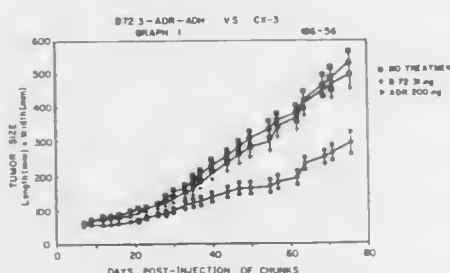
H. Dalton King, Yardley, Pa.; Anthony D. Lopes, Hopewell; Robert D. Radcliffe, Titusville, both of N.J.; John D. Rodwell, Yardley, Pa., and Daniel J. Coughlin, Robbinsville, N.J., assignors to Cytogen Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 650,375, Sep. 13, 1984, Pat. No. 4,867,973, and a continuation-in-part of Ser. No. 650,754, Jul. 13, 1984, abandoned, and a continuation-in-part of Ser. No. 356,315, Mar. 9, 1982, Pat. No. 4,671,958. This application Jun. 5, 1987, Ser. No. 58,440

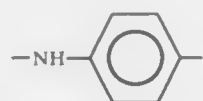
Int. Cl.<sup>5</sup> C07H 15/24

U.S. Cl. 530—322

14 Claims



1. An amine derivative of an anthracycline antibiotic which is an antineoplastic anthracycline antibiotic containing an introduced reactive amine attached at the 3' position of the anthracycline antibiotic via a linking group selected from the groups consisting of an amino acid, a peptide, an organic acid of the formula  $-\text{CO}(\text{CH}_2)_n\text{CO}-$  where  $n=2$  or 3 and an organic moiety of the formula  $-\text{Z}-\text{CONH}-\text{X}$  in which Z is



$-\text{OCH}_2-$ ,  $-\text{NH}-\text{CH}_2-$ ,  $-\text{NHCOCH}_2\text{CH}_2\text{CH}(\text{NH}_2)-$  or  $-\text{NHCOCH}(\text{NH}_2)\text{CH}_2\text{CH}_2-$  and X is an amino acid or a peptide, at the 13 position of the anthracycline antibiotic via a linking group selected from the group consisting of an amino acid, peptide and a hydrazide of the formula  $\text{H}_2\text{N}-\text{NH}-\text{CO}-(\text{R})-\text{CO}-$  in which R is an alkylene chain with 0-20 carbon atoms in the chain or at the 14 position of the anthracycline antibiotic via a thioether or tertiary amine linkage, said introduced reactive amine is selected from the group consisting of hydrazine, hydrazide, phenylhydrazine, phenylhydrazide, alkoxyamine, phenoxyamine, semicarbazide and thiosemicarbazide.

4,950,739

## MEMBRANE CALCIUM CHANNELS AND FACTORS AND METHODS FOR BLOCKING, ISOLATING AND PURIFYING CALCIUM CHANNELS

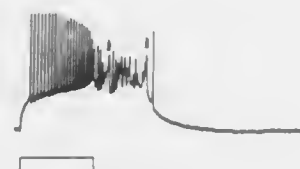
Bruce D. Cherksey, Hoboken, N.J.; Rodolfo R. Llinas, and Mutsuyuki Sugimori, both of New York, N.Y., assignors to New York University, New York, N.Y.

Continuation-in-part of Ser. No. 154,845, Feb. 10, 1988, abandoned. This application Jul. 14, 1988, Ser. No. 219,105

Int. Cl.<sup>5</sup> C07K 3/20, 15/08

U.S. Cl. 530—350

33 Claims



1. A purified calcium channel protein, said channel being of the type that is responsible for calcium conductance in central neurons.

12. A method for purifying mammalian cell membrane calcium channels of the type responsible for calcium conductance in central neurons, comprising subjecting an impure preparation of said channels to affinity chromatography using, as an affinity adsorbent, a calcium-channel blocking factor, which specifically and reversibly blocks said channels and is isolated from funnel-web spider venom, said factor being covalently bonded to a monosaccharide or polysaccharide chromatography support medium, thereby causing said channels to bind to said affinity adsorbent while excluding impurities; eluting said channels from said factor covalently bound to said chromatographic support medium; and recovering said channels in purified form.

15. A method for regulating calcium transport across a cell membrane possessing calcium channels of the type responsible for high-threshold calcium conductance in central neurons comprising exposing said cell membrane to a nonpolypeptide calcium channel blocking factor isolated from funnel-web spider venom and having an apparent molecular weight of less than 700 daltons based on column chromatography, thereby causing said factor to bind to the calcium channels and selectively block calcium ion transport through said channels.

4,950,740

## RECOMBINANT DIPHTHERIA VACCINES

Lawrence Greenfield, Albany; Anne W. Emerick, Oakland, and Walter J. Laird, Pinole, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 27,064, Mar. 17, 1987, which is a continuation of Ser. No. 697,860, Feb. 4, 1985, abandoned. This application Mar. 7, 1988, Ser. No. 164,522

Int. Cl.<sup>5</sup> C07K 13/00, 7/00

U.S. Cl. 530—350

3 Claims

1. A protein having immunological cross reactivity with diphtheria toxin, which comprises an enzymatically inactive diphtheria toxin A (DT-A) mutein, wherein the mutein is Gly<sub>158</sub>DT-A.

4,950,741

## ANTIBODY AGAINST RHEUMATOID ARTHRITIS SPECIFIC PROTEIN

Naoki Yamanaka, Nagoya, and Makoto Yoshida, Kawasaki, both of Japan, assignors to Asahi Medical Co., Ltd., Tokyo and Medecs Co., Ltd., Nagoya, both of Japan

Division of Ser. No. 776,022, Sep. 13, 1985, Pat. No. 4,742,157.

This application Feb. 16, 1988, Ser. No. 155,872

Claims priority, application Japan, Sep. 14, 1984, 59-191753; Sep. 14, 1984, 59-191754; Jul. 16, 1985, 60-155073

Int. Cl.<sup>5</sup> A61K 39/395; C07K 15/28; C12N 5/00

U.S. Cl. 530—387

6 Claims

1. A monoclonal antibody against a rheumatoid arthritis specific protein wherein said protein comprises light peptide chains and heavy peptide chains, said light peptide chains each having a molecular weight of about 25,000 to 30,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein, said heavy peptide chains each having a molecular weight of about 55,000 to 60,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein; and which protein has:

- (1) a molecular weight of about 150,000 to 170,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein;
- (2) an isoelectric point of about 7.3 to 7.8 in terms of a value as measured by a two-dimensional electrophoresis method as defined herein;
- (3) an electrophoretic mobility of about 0.30 to 0.45 in terms of a value as measured by a two-dimensional electrophoresis method as defined herein; and
- (4) an antigenic determinant common to that of human IgG, and wherein said monoclonal antibody comprises two light peptide chains and two heavy peptide chains, said light peptide chains each having a molecular weight of about 25,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein, said heavy peptide chains each having a molecular weight of about 50,000 to 60,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein; and which antibody has a molecular weight of about 150,000 to 160,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein, and has an isoelectric point of about 5.8 to 7.5 in terms of a value as measured by a two-dimensional electrophoresis method as defined herein.

4,950,742

## PROCESS FOR PRODUCING AZOIMINO ETHERS BY OXIDATION OF HYDIAZONITRILES

Kazuo Ichiriki, Tokyo; Motoaki Tanaka, Urawa; Toru Okugawa, Sayama, and Hiroshi Nawa, Fujimi, all of Japan, assignors to Wakó Pure Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 939,844, Dec. 9, 1986, abandoned. This application Mar. 6, 1989, Ser. No. 318,525

Claims priority, application Japan, Jan. 14, 1986, 61-6092

Int. Cl.<sup>5</sup> C07C 245/02, 251/02, 251/08, 251/12

U.S. Cl. 534—738

5 Claims

1. A one-step, one-vessel process for producing an azoimino ether from a hydrazonitrile consisting essentially of reacting a hydrazonitrile with chlorine gas in the presence of a primary alcohol at a temperature of 10° to 40° C. and under anhydrous conditions in a non-aqueous solvent selected from the group consisting of aromatic hydrocarbons and halogenated hydrocarbons.

4,950,743

## PROCESS FOR PREPARATION OF ALKYLGLYCOSIDES

Patrick M. McCurry, Jr., and Carl E. Pickens, both of Decatur, Ill., assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 29, 1987, Ser. No. 79,195

Int. Cl.<sup>5</sup> C07H 1/00, 15/04; C07G 3/00

U.S. Cl. 536—18.6

11 Claims

1. A process for the preparation of alkylglycosides which comprises:

- forming a mixture comprising at least one member selected from the group consisting of reducing monosaccharides and compositions hydrolyzable to reducing monosaccharides, at least one monohydric alcohol having from 8 to 20 carbon atoms and an acid catalyst for the reaction between the alcohol and the saccharide to produce an alkylglycoside;
- heating the mixture at a temperature to react the alcohol with the saccharide under a reduced pressure, with removal of water formed by the reaction of the alcohol with the saccharide to form a reaction mixture; and
- adding a sufficient amount of a caustic alkali metal borohydride to the reaction mixture to neutralize the acid catalyst and reduce the unreacted saccharide.

4,950,744

## PHOTOCHEMICAL NUCLEIC ACID-LABELING REAGENT HAVING A POLYALKYLAMINE SPACER

Nanibhushan Dattagupta, New Haven, Conn., and James P. Albarella, Elkhart, Ind., assignors to Molecular Diagnostics, Inc., West Haven, Conn.

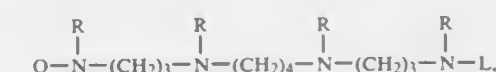
Continuation-in-part of Ser. No. 690,336, Jan. 10, 1985, abandoned. This application Mar. 18, 1987, Ser. No. 27,384

Int. Cl.<sup>5</sup> C07H 19/00; C12Q 1/68, 1/00

U.S. Cl. 536—27

27 Claims

1. A photochemical nucleic acid-labeling reagent of the formula



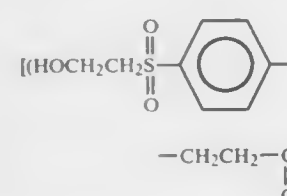
wherein Q is a photoreactive residue of a nucleic acid-binding ligand; L is a detectable label residue; R is hydrogen, C<sub>1</sub> to C<sub>7</sub>-alkyl, aryl, hydroxy, or C<sub>1</sub> to C<sub>7</sub>-alkoxy; and wherein R can be the same or different each time R appears in the formula.

**4,950,745**  
**PROCESS FOR SYNTHESIS OF OLIGONUCLEOTIDES**  
**AND COMPOUND FOR FORMING POLYMERIC**  
**PROTECTING GROUP**

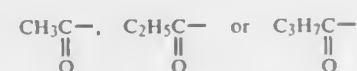
Yoshiharu Ishido, and Kazuo Kamaike, both of Tokyo, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan  
 PCT No. PCT/JP87/00836, § 371 Date Jun. 27, 1988, § 102(e)  
 Date Jun. 27, 1988, PCT Pub. No. WO88/03149, PCT Pub.  
 Date May 5, 1988

PCT Filed Oct. 30, 1987, Ser. No. 219,156  
 Claims priority, application Japan, Oct. 30, 1986, 61-256744  
 Int. Cl.<sup>5</sup> C08L 1/10, 1/12, 1/14; C07H 21/00

U.S. Cl. 536—58 2 Claims  
 1. A compound for forming a polysaccharide derivative protecting group, which is represented by the following general formula (I):



wherein C<sub>6</sub>H<sub>4</sub>O<sub>2</sub> stands for an anhydrous glucose residue, R stands for



n is a number of 10 to 2,000, x is a number of 0.4 to 0.8, and y is a number of 1.0 to 2.0.

**4,950,746**  
**PROCESS FOR SYNTHESIZING SUCROSE**  
**DERIVATIVES BY REGIOSELECTIVE REACTION**

Juan L. Navia, Athens, Ga., assignor to Norameco, Inc., Atlanta, Ga.

Filed Jul. 18, 1988, Ser. No. 220,641  
 Int. Cl.<sup>5</sup> C07H 13/00, 23/00; C08B 37/00; C07G 3/00  
 U.S. Cl. 536—119 49 Claims

1. The process which comprises reacting sucrose with a 1,3-di(hydrocarbyloxy)-1,1,3,3-tetra(hydrocarbyl)distannoxane at a temperature and for a period of time sufficient to produce a 1,3-di-(6-O-sucrose)-1,1,3,3-tetra(hydrocarbyl)distannoxane.

**4,950,747**  
**POLYSACCHARIDES**

David Farrar, Peter Flesher, and Kenneth C. Symes, all of West Yorkshire, England, assignors to Allied Colloids Ltd., United Kingdom

Continuation-in-part of Ser. No. 111,148, Oct. 20, 1987, abandoned, which is a continuation of Ser. No. 796,158, Nov. 8, 1985, abandoned, which is a division of Ser. No. 609,681, May 14, 1984, Pat. No. 4,571,422, which is a continuation-in-part of Ser. No. 552,591, Nov. 16, 1983, abandoned. This application Mar. 28, 1988, Ser. No. 173,946

Claims priority, application United Kingdom, May 17, 1983, 8313521; Sep. 23, 1983, 8325503; Dec. 23, 1983, 8334313; Mar. 26, 1987, 8707250

Int. Cl.<sup>5</sup> C07H 1/00; C07G 17/00  
 U.S. Cl. 536—124 13 Claims

1. In a process in which an emulsion in a non-aqueous liquid of an aqueous solution of microbial polysaccharide selected from the group consisting of xanthan, pseudomonas, an-throbacter and scleroglucan that is a fermentation solution is dehydrated by heating the emulsion at a temperature above 50° C. up to 120° C., the improvement comprising including in the

solution, during some or all of the heating above 50° C., at least 0.5% (based on the dry weight of polysaccharide) of an electrolyte having a molecular weight below 500 selected from the group consisting of alkali metal citrate acetates, tripolyphosphates and chlorides.

**4,950,748**  
**POLYSACCHARIDES**

David Farrar, Peter Flesher, and Kenneth Symes, all of West Yorkshire, England, assignors to Allied Colloids Ltd., United Kingdom

Continuation-in-part of Ser. No. 111,148, Oct. 20, 1987, abandoned, which is a continuation of Ser. No. 796,158, Nov. 8, 1985, abandoned, which is a division of Ser. No. 609,681, May 14, 1984, Pat. No. 4,571,422, which is a continuation-in-part of Ser. No. 522,591, Nov. 16, 1983, abandoned. This application Mar. 28, 1988, Ser. No. 173,947

Claims priority, application United Kingdom, May 17, 1983, 8313521; Sep. 23, 1983, 8325503; Mar. 26, 1987, 8707251

Int. Cl.<sup>5</sup> C07H 1/00; C07G 17/00  
 U.S. Cl. 536—124 10 Claims

1. A process of forming an intimate water soluble or water swellable blend of microbial polysaccharide derived from an aqueous fermentation solution containing up to 20% by weight microbial polysaccharide and synthetic polymer derived from water soluble ethylenically unsaturated monomer or monomer blend, the process comprising forming an emulsion in non-aqueous liquid of the aqueous fermentation solution of the microbial polysaccharide and the monomer or monomer blend, polymerizing the monomer or monomer blend to form a dispersion in the non-aqueous liquid of aqueous particles of the water soluble or water swellable blend, and then dehydrating the dispersion to increase the concentration of the blend in the particles to above 50% dry weight based on the weight of the aqueous particles.

**4,950,749**  
**RECOVERY OF GLUCAN BY EMPLOYING A DIVALENT**  
**CATION AT AN ALKALINE PH**

Sayit S. Johal, Sagamore Hills; George M. Coleman, Rocky; both of Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Jan. 6, 1989, Ser. No. 294,250  
 Int. Cl.<sup>5</sup> C07G 17/00; C07H 1/06

U.S. Cl. 536—127 11 Claims

1. A process for the recovery of a nonionic water soluble glucan comprising adding a divalent cation wherein the concentration of divalent cation in the solution is in the range of about 0.1% to about 20% volume of solution and the divalent cation is a divalent cation salt of a divalent metal of zinc, magnesium, manganese, iron, copper, cobalt, nickel and calcium combinations thereof, to a solution containing solubilized glucan and then adding a metal hydroxide until the solution has attained an alkaline pH in the range of about pH 10 to about pH 12 which results in the precipitation of the glucan.

**4,950,750**  
**GLYCOLIPID CONTAINING**  
**N-GLYCOLYLNEURAMINIC ACID AND METHOD OF**  
**PRODUCING THE SAME**

Tomoya Ogawa, Musashino; Masaaki Numata, Kawagoe; Mamoru Sugimoto, Niiza; Shohei Shibayama, Tokorozawa; Shoji Yoshimura, Iruma; Masayoshi Ito, Kunitachi, and Yoshiyasu Shitori, Tokyo, all of Japan, assignors to Meete Corporation, Tokyo, Japan

Filed Oct. 19, 1987, Ser. No. 110,133  
 Claims priority, application Japan, Oct. 20, 1986, 61-248981; Oct. 27, 1986, 61-254992

Int. Cl.<sup>5</sup> C07H 5/00, 1/00, 11/00  
 U.S. Cl. 536—18.7 19 Claims

1. A compound of the formula

**4,950,753**  
**PROCESS FOR 3-EXOMETHYLENECEPHAM**  
**SULFOXIDE ESTERS**

James D. Copp, Rockville, and Gregg A. Tharp, Terre Haute, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

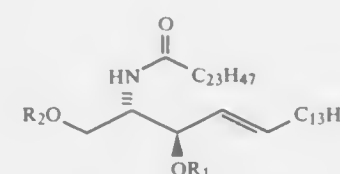
Filed May 17, 1989, Ser. No. 353,128  
 Int. Cl.<sup>5</sup> C07D 501/02

U.S. Cl. 540—230 20 Claims

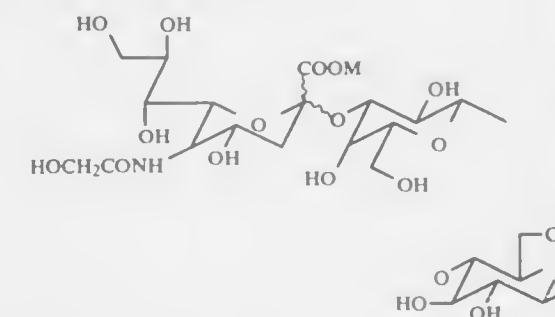
1. In the presence for preparing a 3-exomethylenecepham sulfoxide ester of the formula ,O130

wherein R is the residue of a carboxylic acid and R<sub>1</sub> is a carboxylic acid protecting group, which comprises adding to a solution of a 4-chlorosulfinylazetidin-2-one of the formula ,O131

in an inert solvent under substantially anhydrous conditions at a temperature between about -15° C. and about 45° C., between about 1.5 and about 3 moles of stannic chloride per mole of said azetidinone in the presence of between about 1 and about 4.0 moles per mole of said azetidinone of an oxo compound; separating the complex formed; and decomposing said complex, the improvement which comprises carrying out the addition of stannic chloride and said oxo compound in the presence of an unsaturated compound selected from the group of a C<sub>2</sub>-C<sub>10</sub> olefin, a C<sub>5</sub>-C<sub>10</sub> cyclic olefin, a C<sub>5</sub>-C<sub>10</sub> nonconjugated diolefin, a C<sub>3</sub>-C<sub>10</sub> allene, and a C<sub>6</sub>-C<sub>10</sub> nonconjugated cyclic diene.



wherein R<sub>1</sub> is hydrogen or SiR<sub>3</sub>R<sub>4</sub>R<sub>5</sub> wherein R<sub>3</sub> and R<sub>4</sub> are each methyl or phenyl, R<sub>5</sub> is tertiary butyl or dimethylphenyl-methyl, and R<sub>2</sub> is hydrogen, trityl, or



wherein M is an alkali metal atom.

**4,950,751**  
**METHOD OF ISOLATING ARABINOGLACTAN FROM**  
**LARCH**

Jill E. DeWitt, Raytown, Mo., assignor to The Nanci Corporation International, Tulsa, Okla.

Filed Jun. 2, 1989, Ser. No. 360,378  
 Int. Cl.<sup>5</sup> C07H 1/00; C08B 37/00

U.S. Cl. 536—128 11 Claims

1. In a method of extracting galactans from a source thereof including the steps of providing a quantity of solid particles of said source, forming a mixture of said particles and liquid extraction medium for said galactans, and recovering extracted galactans, the improvement which comprises subjecting said mixture to an effective amount of sonic energy for enhancing the extraction of said galactans from said source particles.

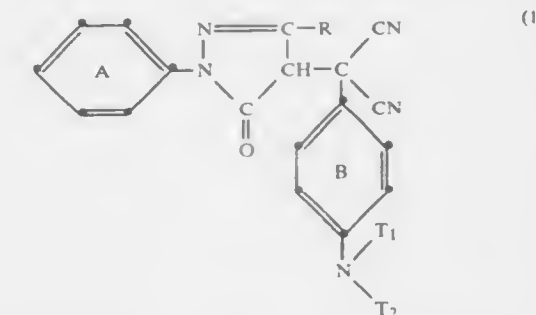
**4,950,752**  
**EXPRESSION METHOD**

R. John Whitaker, Cornwall RR2, Canada, assignor to Car-ratech, Inc., Charlottetown, Canada

Filed Aug. 19, 1987, Ser. No. 86,961  
 Int. Cl.<sup>5</sup> C08B 37/00; C07H 1/06

U.S. Cl. 536—128 4 Claims

1. Method of separating components from sea plants containing carrageenan which comprises heating said plants in contact with an aqueous alkaline medium to dissolve components of said plants soluble in said medium and to form a mixture of liquid and solid, intermittently advancing a porous septum through a deposition station and an expression station, depositing successive spaced apart batches of said mixture on said septum at said deposition station, enclosing each said batch within a chamber at said expression chamber by pressing the margin of an open-faced chamber against said septum around said batch, and successively pressing each said batch against said septum within said chamber at said expression station at a pressure of at least 2 MPa for 0.05 to 0.5 second while maintaining a pressure between said margin and said septum at least 0.6 MPa greater than the pressure against said batch to express said liquid through said septum while retaining residual plant solid on said septum, said expressed liquid containing at least 3% by weight of carrageenan.



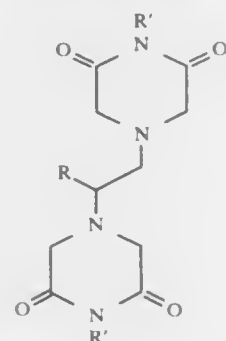
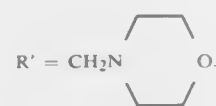
in which R is a heterocyclic radical, T<sub>1</sub> and T<sub>2</sub>, independently of one another, are each hydrogen, unsubstituted or halogen-, hydroxyl-, cyano- or lower alkoxy-substituted alkyl having a maximum of 12 carbon atoms, cycloalkyl having 5 to 10 carbon atoms or unsubstituted or halogen-, cyano-, lower alkyl- or lower alkoxy-(ring)substituted phenyl or phenyl, or T<sub>1</sub> and T<sub>2</sub> together with the nitrogen linking them are a five- or six-membered heterocyclic radical, and rings A and B, independently of one another, are unsubstituted or substituted by halogen, cyano, nitro, lower alkyl, lower alkoxy, (lower alkyl)-carbonyl or (lower alkoxy)carbonyl.



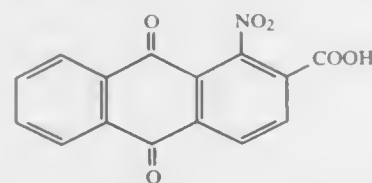
**4,950,755**  
**BIS(MORPHOLINOMETHYL) DERIVATIVE OF**  
**1,2-BIS(DIOXOPIPERIZINYL)PROPANE**  
 Donald T. Witlak, Mt. Vernon, and Hattiangadi B. Bhat, Columbus, both of Ohio, assignors to Ohio State University, Columbus, Ohio  
 Continuation of Ser. No. 764,484, Aug. 12, 1985, abandoned.  
 This application Sep. 28, 1988, Ser. No. 251,102  
 Int. Cl.<sup>5</sup> C07D 413/12

U.S. Cl. 544—82

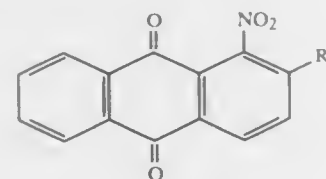
1. A water soluble compound of the formula:

wherein R is CH<sub>3</sub>,

**4,950,756**  
**PREPARATION OF**  
**1-NITROANTHRAQUINONE-2-CARBOXYLIC ACID**  
 Jochem Henkelmann, Bensheim; Helmut Hoch, Weisenheim; Thomas-Michael Kahl, Roemerberg; Gerhard Kilpper, Carlsberg, and Walter Maier, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
 Filed Oct. 30, 1989, Ser. No. 429,143  
 Claims priority, application Fed. Rep. of Germany, Nov. 30, 1988, 3840341  
 Int. Cl.<sup>5</sup> C07C 265/30, 207/00, 50/24, 97/24  
 U.S. Cl. 544—156  
 1. A process for preparing 1-nitroanthraquinone-2-carboxylic acid of the formula I

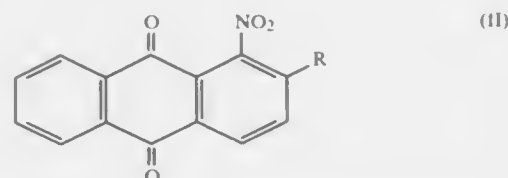


which comprises treating a 2-substituted 1-nitroanthraquinone of the general formula II

where R is —CH=CH—R<sup>1</sup> or —CH<sub>2</sub>—CHO, where R<sup>1</sup> is C<sub>1</sub>–C<sub>5</sub>-dialkylamino or a cyclic 5- or 6-membered amine which

may contain further hetero atoms, with an oxidizing agent free of heavy metal.

3. A 2-substituted 1-nitroanthraquinone of the general formula II

where R is —CH=CH—R<sup>1</sup> or —CH<sub>2</sub>—CHO, where R<sup>1</sup> is C<sub>1</sub>–C<sub>5</sub>-dialkylamino or a cyclic 5- or 6-membered amine which may contain further hetero atoms.

**4,950,757**  
**PROCESS FOR MANUFACTURE OF MELAMINE**  
**PYROPHOSPHATE**  
 John Tomko, Dobbs Ferry, and Alan M. Aaronson, Flushing Meadows, both of N.Y., assignors to Akzo America Inc., New York, N.Y.  
 Filed Aug. 14, 1989, Ser. No. 393,164  
 Int. Cl.<sup>5</sup> C07D 251/70; C07F 9/48

U.S. Cl. 544—195

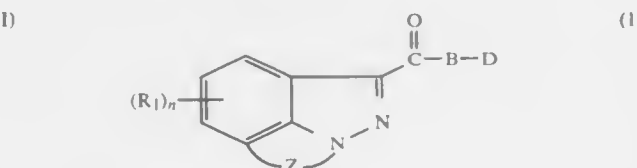
1. A process for the manufacture of melamine pyrophosphate which comprises the reaction of pyrophosphoric acid and melamine in aqueous media.

**4,950,758**  
**OPTICALLY-ACTIVE ISOMERS OF**  
**DIDEOXYCARBOCYCLIC NUCLEOSIDES**  
 Robert Vince, St. Paul, Minn., and Mei Hua, Beijing, China, assignors to Regents of the University of Minnesota, Minneapolis, Minn.  
 Continuation-in-part of Ser. No. 278,652, Dec. 5, 1988, Pat. No. 4,916,224, which is a continuation-in-part of Ser. No. 146,252, Jan. 20, 1988. This application Dec. 23, 1988, Ser. No. 287,321  
 The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.  
 Int. Cl.<sup>5</sup> C07D 473/18; A61K 31/52

U.S. Cl. 544—276

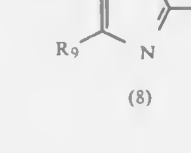
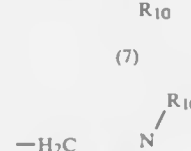
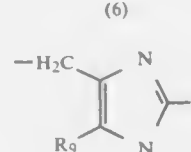
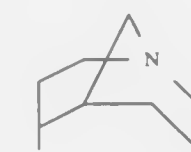
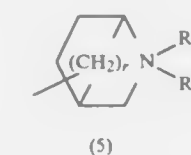
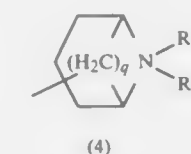
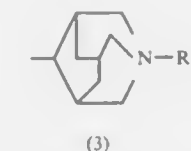
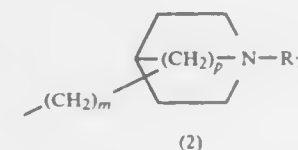
1. (±)-(1α,4β)-4-(2-Amino-6-hydroxy-9H-purin-9-yl)-2-cyclopentenyl carbinol.  
3. (1R,4R)-4-(2-amino-6-hydroxy-9H-purin-9-yl)-2-cyclopentenyl carbinol.

**4,950,759**  
**SUBSTITUTED 1,7-ANNELATED 1H-INDAZOLES**  
 Ineke van Wijngaarden; Derk Hamminga; Hans H. Haack, and Wouter Wouters, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands  
 Filed Jul. 3, 1989, Ser. No. 374,736  
 Claims priority, application Netherlands, Jul. 7, 1988, 8801715  
 Int. Cl.<sup>5</sup> C07D 453/00, 231/54; A61K 31/40, 31/415  
 U.S. Cl. 546—94  
 1. Compounds of formula (I)



wherein Z, together with the carbon and the nitrogen and the inter-

mediate carbon, forms a heterocyclic group consisting of 6 ring atoms;  
 B is oxygen or —CH(R<sub>4</sub>)— or —NR<sub>4</sub>—, wherein R<sub>4</sub> is hydrogen, straight or branched alkyl having 1–6 carbon atoms, or benzyl;  
 D is a group B—C—D of the formulae 2–9:

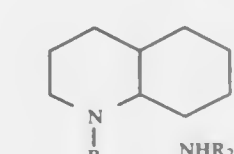
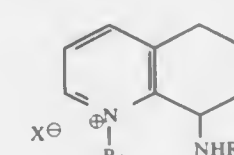
wherein p is 1 or 2; m is 0 or 1; q is 2, 3 or 4; r is 1, 2 or 3; R<sub>6</sub> is hydrogen or alkyl of 1–6 carbon atoms; one of R<sub>6</sub>, R<sub>10</sub> and R<sub>11</sub> is hydrogen, alkyl of 1–4 carbon atoms, cycloalkyl of 3–6

carbon atoms or alkenyl of 2–4 carbon atoms and the other two groups are independently of each other hydrogen or alkyl of 1–4 carbon atoms;  
 and the pharmaceutically acceptable acid addition salts thereof.

**4,950,760**  
**DECAHYDROQUINOLINES AND 5,6,7,8**  
**TETRAHYDROQUINOLINES**  
 Francois Clemence; Odile Le Martret, both of Paris; Francoise Delevallee, Fontenay Sous Bois, and Michel Fortin, Paris, all of France, assignors to Roussel Uclaf, Paris, France  
 Division of Ser. No. 84,456, Aug. 12, 1987, Pat. No. 4,877,796.  
 This application May 8, 1989, Ser. No. 348,766  
 Claims priority, application France, Aug. 12, 1986, 86 11620  
 Int. Cl.<sup>5</sup> C07D 215/04, 215/10, 215/18

U.S. Cl. 546—164

1. A compound having a formula selected from the group consisting of

wherein R<sub>1</sub> is alkyl of 1 to 5 carbon atoms, R<sub>2</sub> is hydrogen or alkyl of 1 to 5 carbon atoms and X is halogen.

**4,950,761**  
**(S)-[6-AMINO-4-[(1-METHYL-2-OXO-2-PHENYL-ETHYL**  
**AMINO]-5-NITRO-2-PYRIDINYL]CARBAMIC ACID,**  
**ETHYL ESTER COMPOUND**  
 Carroll G. Temple, Jr., Birmingham, Ala., assignor to Southern Research Institute, Birmingham, Ala.  
 Division of Ser. No. 176,909, Apr. 4, 1988, Pat. No. 4,866,059.  
 This application Jun. 2, 1989, Ser. No. 360,520  
 Int. Cl.<sup>5</sup> C07D 213/76

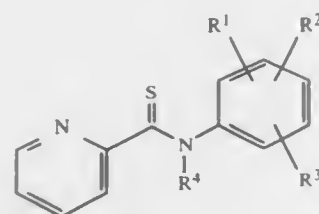
U.S. Cl. 546—308

1. The compound having the name [S-(R\*,S\*)]-[6-amino-4-[(2-hydroxyl-1-methyl-2-phenylethyl)amino]-5-nitro-2-pyridinyl]carbamic acid, ethyl ester or a pharmaceutically acceptable salt thereof.

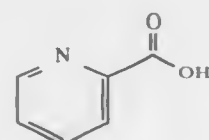
**4,950,762**  
**2-PYRIDINECARBOTHIOAMIDES, PROCESSES FOR**  
**PREPARATION THEREOF**  
 William A. Kinney, Langhorne, Pa.; Amadeo A. Failli, Princeton Junction, N.J., and Ghulam N. Mir, Buckingham, Pa., assignors to American Home Products Corporation, New York, N.Y.  
 Division of Ser. No. 123,740, Nov. 23, 1987, Pat. No. 4,886,821.  
 This application Jul. 10, 1989, Ser. No. 377,500  
 Claims priority, application Canada, Jan. 27, 1987, 528269; Oct. 27, 1987, 550348  
 Int. Cl.<sup>5</sup> C07D 211/70

U.S. Cl. 546—313

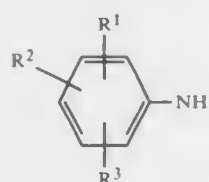
1. The process for producing compounds of structural formula (I)



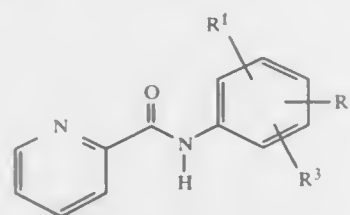
wherein  $R^1$  is fluorine,  $R^2$  and  $R^3$  are each hydrogen or fluorine, and  $R^4$  is hydrogen which comprises  
(a) activating the compound of structure



with 1,1'-carbonyldiimidazole to form the activated imidazolidine  
(b) reacting said activated imidazolidine with the substituted aniline



wherein  $R^1$ ,  $R^2$  and  $R^3$  are as defined above to form the amide



(c) and reacting said amide (IV) with Lawesson's Reagent to form the desired product (I).

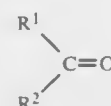
4,950,763

## PREPARATION OF KETONES

Charles Schommer, Ludwigshafen; Klaus Ebel, Mutterstadt; Toni Dockner, Meckenheim; Matthias Irgang, Heidelberg; Wolfgang Hoelderich, Frankenthal, and Harald Rust, Neustadt-Duttweiler, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

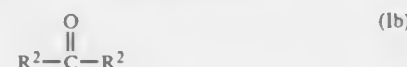
Filed Jul. 18, 1989, Ser. No. 381,469  
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825873; Jun. 21, 1989, 3920280  
Int. Cl.<sup>5</sup> C07C 45/48

U.S. Cl. 546—314 12 Claims  
1. In a process for the preparation ketone of the formula



where  $R^1$  and  $R^2$  independently of one another are each alkyl

of 1 to 17 carbon atoms, cycloalkyl having 3 to 8 ring members, arylalkyl, aryl or hetaryl, and one or more of the radicals  $R^1$  and  $R^2$  carry one or more hydrogen atoms on the  $\alpha$ -carbon atom, by reacting two carboxylic acids of the formulae  $R^1$ —COOH (IIa) and  $R^2$ —COOH (IIb) or by reacting a carboxylic acid  $R^1$ —COOH (IIa) and  $R^2$ —COOH (IIb) or by reacting a carboxylic acid  $R^1$ —COOH (IIa) and a ketone



or by reacting a mixture of IIa, IIb and Ib, in the gas phase in the presence of a catalyst, the improvement which comprises: carrying out the reaction with a catalyst in which the active material consists essentially of at least 50% by weight of titanium dioxide having a specific surface area greater than 10 m<sup>2</sup>/g and from 0.05 to 50% by weight of one or more metal oxides from the first or second main group of the Periodic Table.

4,950,764

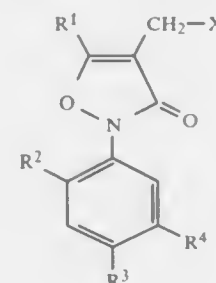
## 2-ARYL-4-ISOXAZOLIN-3-ONE DERIVATIVES

Koki Nakamura, and Shigeru Makamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 2, 1988, Ser. No. 189,072

Claims priority, application Japan, Apr. 30, 1987, 62-106896  
Int. Cl.<sup>5</sup> G03C 1/06

U.S. Cl. 248—243 19 Claims  
1. 2-Aryl-4-isoxazolin-3-one derivatives having the following formula (I):



wherein  $R^1$  represents an alkyl group containing 1 to 6 carbon atoms or an aryl group containing 6 to 24 carbon atoms,  $R^2$ ,  $R^3$ , and  $R^4$  each represents a hydrogen atom, a trifluoromethyl group, a carbamoyl group, a sulfonyl group, an alkoxy-carbonyl group, an aryloxy-carbonyl group, a sulfonyl group, a halogen atom, a cyano group, a nitro group, an alkoxy group, an aryloxy group, an acyl carboxy group or a sulfo group, with at least one of  $R^2$ ,  $R^3$ , and  $R^4$  being selected from a nitro group, a cyano group, a sulfamoyl group, a carbamoyl group, and a sulfonyl group, and X represents a monovalent group from mercaptoazole, a mercaptoazaindene, a tetrazaindene, a mercaptopyrimidine, a benzotriazole, and indazole, and a benzimidazole, and wherein said alkoxy group, acyl group, alkoxy-carbonyl group, aryloxy-carbonyl group, and sulfonyl group contain not more than 20 carbon atoms, and said carbamoyl group and sulfamoyl group contain not more than 36 carbon atoms.

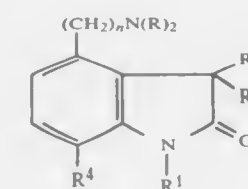
4,950,765  
PROCESS

Timothy C. Walsgrove, Tunbridge Wells, and Paul Oxley, Pembury, both of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England  
Filed Aug. 24, 1987, Ser. No. 88,774

Claims priority, application United Kingdom, Aug. 30, 1986, 8621040

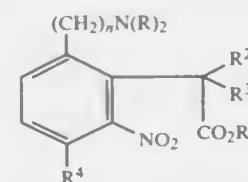
Int. Cl.<sup>5</sup> C07D 209/40

U.S. Cl. 548—486 8 Claims  
1. A process for the preparation of a compound of structure (I)



in which,  
each group R is hydrogen, C<sub>1-6</sub>alkyl, C<sub>3-6</sub>allyl, phenylC<sub>1-6</sub>alkyl or 4-hydroxyphenylC<sub>1-6</sub>alkyl;  
 $R^1$ ,  $R^2$  and  $R^3$  are hydrogen or C<sub>1-6</sub>alkyl;  
 $R^4$  is hydrogen or hydroxy; and  
n is 1 to 3

or a pharmaceutically acceptable salt thereof, which comprises reduction of a compound of structure (II)



in which R,  $R^2$  to  $R^4$  and n are as described above and  $R^5$  is hydrogen or a cation, followed by cyclisation of the intermediate so formed, and optionally, alkylating to form a compound of structure (I) in which  $R^1$  is C<sub>1-6</sub>alkyl and, optionally, forming a pharmaceutically acceptable salt thereof, characterised in that the reduction of the compound of structure (II) is carried out by catalytic transfer hydrogenation in water as a solvent in the presence of a hydrogen donor selected from hydrazine hydrate or sodium hypophosphite.

4,950,766

## PREPARATION OF BENZAMIDES USEFUL AS ANTIEMETIC AGENTS

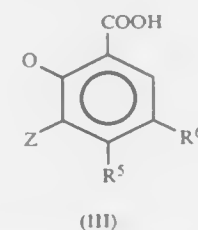
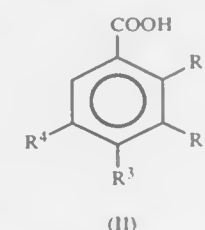
Jung-Hui Sun, Dublin, Ohio, assignor to Erbarmont, Inc., Dublin, Ohio

Continuation of Ser. No. 115,014, Oct. 29, 1987, abandoned.

This application Sep. 21, 1989, Ser. No. 411,207

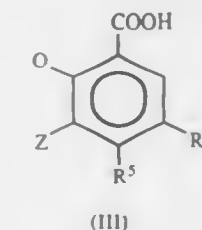
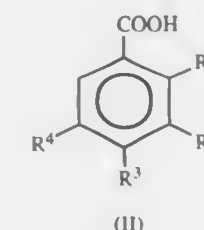
Int. Cl.<sup>5</sup> C07D 307/79, 405/06; C07C 231/02

U.S. Cl. 548—525 10 Claims  
1. A method for the preparation of a benzamide which comprises reacting a benzoic acid represented by the formula (II) or (III)



wherein  $R^1$  is an alkoxy group having 1 to 4 carbon atoms, a

hydroxyl group or a hydrogen atom,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$  and  $R^6$  are the same or different and selected from the group consisting of a hydrogen atom, a halogen atom, an alkoxy group, a nitro group, an alkyl group, an alkenyloxy group, an amino group, a monoalkylamino group, a dialkylamino group, a cyano group, a sulfamoyl group, a monoalkylsulfamoyl group, a dialkylsulfamoyl group, a lower acyl group, a lower acylamido group, an alkylmercapto group, and a halomethyl group; and Z represents the carbon atoms necessary to complete a 5 to 7-membered ring, and  $R^5$  and  $R^6$  have the same definition as  $R^2$ ,  $R^3$  and  $R^4$  in formula (II) with N,N'-carbonyldiimidazole in an inert solvent to produce an intermediate, and reacting said intermediate with a solution of an amine having a primary and a secondary amino group of the formula (IA) or (IB)



where W is a straight or branched chain alkylene group having 1 to 5 carbon atoms and m is 1 to 3,  $R^7$  is selected from the group consisting of an alkyl group having 1 to 4 carbon atoms, a cycloalkyl group having 4 to 8 carbon atoms, a phenyl group and a benzyl group; wherein said amine is reacted in an equimolar or greater amount and said reaction is carried out at a temperature such that said intermediate selectively reacts with said primary amino group and does not substantially react with said secondary amino group.

4,950,767

## PROCESS FOR THE PREPARATION OF THE (—)-ANTIPODE OF

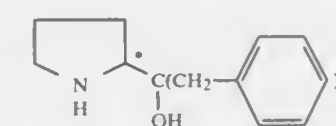
## (E)-1-CYCLOHEXYL-4,4-DIMETHYL-3-HYDROXY-2-(1,2,4-TRIAZOL-1-YL)-PENT-1-ENE

Udo Kraatz, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Division of Ser. No. 25,297, Mar. 12, 1987, Pat. No. 4,808,725.  
This application Oct. 31, 1988, Ser. No. 265,191

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609152

Int. Cl.<sup>5</sup> C07D 207/12

U.S. Cl. 548—570 1 Claim  
1. The optically active compound of the formula



or the hydrochloric acid addition product thereof.

4,950,768

## CYCLIC DISULFONIC ESTER CROSS-LINKING COMPOUNDS

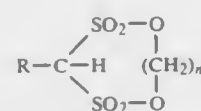
Marshall W. Cronyn, 3232 NW. Luvay Ter., Portland, Oreg. 97210

Filed Jan. 16, 1984, Ser. No. 570,786

Int. Cl.<sup>5</sup> C07D 339/00

U.S. Cl. 549—11 6 Claims  
1. A cyclic disulfonic ester compound of the form





where  $n=2-5$  when  $\text{R}=\text{H}$ ; and  $n=2$  when  $\text{R}=\text{—CH}_3$  or  $\text{—CH}_2\text{CH}_3$ .

4,950,769

# PROCESS FOR THE MANUFACTURE OF MALEIC ANHYDRIDE UTILIZING PEROXIDES TO IMPROVE CATALYTIC ACTIVITY

Henry A. McCandless, Joliet; John L. Cearley, and Hassan Taheri, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 23, 1989, Ser. No. 397,389  
Int. Cl.<sup>5</sup> C07D 307/60

U.S. Cl. 549—257

31 Claims

1. A process comprising the vapor-phase oxidation of benzene or C<sub>4</sub> hydrocarbon feedstock in a reactor to form maleic anhydride in which benzene or the C<sub>4</sub> hydrocarbon is contacted in the presence of air or molecular oxygen or other oxygen containing gas with a catalyst comprising vanadium and phosphorus wherein at least one peroxide is added to the reactor feed gas stream in an amount of from about 1.0 part per million to about 10,000 parts per million by weight of the total reactor feed gas stream.

4,950,770

# PSORALENS AMINOMETHYLATION

Ned D. Heindel, Easton, and Mridula D. Choudhuri, Whitehall, both of Pa., assignors to Elder Pharmaceuticals, Inc., Costa Mesa, Calif.

Continuation of Ser. No. 65,077, Jun. 16, 1987, abandoned, which is a continuation of Ser. No. 706,831, Feb. 28, 1985, abandoned. This application Jul. 14, 1988, Ser. No. 220,874  
Int. Cl.<sup>5</sup> C07D 493/04

U.S. Cl. 549—282

10 Claims

1. A process for introducing the aminomethyl moiety (CH<sub>2</sub>NH<sub>2</sub>) onto the furan ring of a psoralen or furocoumarin ring structure, said psoralen or furocoumarin ring structure being unsubstituted or substituted with a lower alkyl group at the C-4 position, said process consisting of:

- (1) reacting under anhydrous conditions, a mixture of a psoralen or furocoumarin and an aminomethylating agent selected from the group consisting of N-hydroxymethylphthalimide, N-hydroxymethylbenzamide, N-hydroxymethylacetamide, and N,N'-dimethyl-N-hydroxymethylurea suspended or dissolved in an anhydrous polar solvent with a strong protonic acid, Lewis acid or mixture of such acids, and
- (2) separating the aminomethylated psoralen or furocoumarin by hydrazine cleavage in hydrazine hydrate and ethanol to produce a 4' or 5' aminomethyl psoralen or furocoumarin.

4,950,771

# DIHYDROXY COMPOUND

Mitsubishi Masumoto; Toshiaki Asoh, both of Toyonaka; Youichirou Ezaki, Osaka, and Hiroshi Aibe, Higashiosaka, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo and Arakawa Chemical Industries, Ltd., Osaka, both of Japan

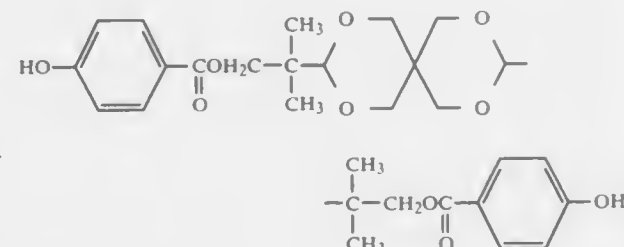
Filed May 19, 1989, Ser. No. 355,722

Claims priority, application Japan, May 30, 1988, 63-132191  
Int. Cl.<sup>5</sup> C07D 319/04

U.S. Cl. 549—335

1 Claim

1. 3,9-bis[1,1-dimethyl-2-(4'-hydroxybenzoyloxy)ethyl]-2,4,8,10-tetraoxaspiro[5,5]undecane represented by the formula:



4,950,772

# METHOD OF RACEMIZATION OF OPTICALLY ACTIVE TETRAHYDROFURAN-2-CARBOXYLIC ACID

Hiroyuki Nohira, Urawa; Shoko Takebayashi, Tokyo; Atsushi Yuzawa, Iwaki, and Masami Yajima, Kitaibaraki, all of Japan, assignors to Yamakawa Chemical Industry Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,425

Claims priority, application Japan, Nov. 1, 1988, 63-227129  
Int. Cl.<sup>5</sup> C07D 307/24

U.S. Cl. 549—484

6 Claims

1. A method of racemization of optically active tetrahydrofuran-2-carboxylic acid, which comprises heating the optically active tetrahydrofuran-2-carboxylic acid in a reaction medium to a temperature of 100° C. or higher in the presence of a strong base.

4,950,773

# SELECTIVE EPOXIDATION OF OLEFINS

John R. Monnier, Fairport, and Peter J. Muehlbauer, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 149,297, Jan. 28, 1988. This application Dec. 30, 1988, Ser. No. 292,589

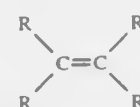
The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07D 301/10

U.S. Cl. 549—534

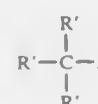
17 Claims

1. A process for the selective epoxidation of olefins having the structure:

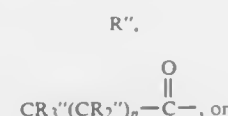


wherein each R is independently selected from the group consisting of:

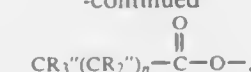
- (a) hydrogen,
- (b) aryl and substituted aryl groups having in the range of 7 up to 20 carbon atoms,
- (c) tertiary alkyl groups of the formula:



where each R' is independently:

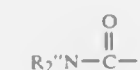


-continued



where R'' is H, C<sub>1</sub>-C<sub>10</sub> alkyl or substituted alkyl, an aryl or substituted aryl group having 6 up to 20 carbon atoms, and n is a whole number from 0-12;

- (d) CR<sub>3</sub>'—(CR<sub>2</sub>')<sub>x</sub>—O—, where x is a whole number from 1-12;
- (e)

(f) R<sub>2</sub>'N—;

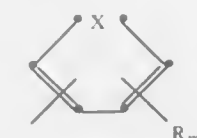
(g) R'S—;

(h)



where y is an integer from 0-20; and

(i)



where X is O, S or NR''; and m is an integer from 0-3, with the proviso that said olefin have no allylic hydrogens and that at least one R-group not be hydrogen;

said process comprising contacting said olefin with a sufficient quantity of an oxygen-containing gas so as to maintain the molar ratio of olefin to oxygen in the range of 0.01 up to 20, in the presence of a silver-containing catalyst which is promoted by at least one promoter selected from the group consisting of:

- the salts of alkali metals,
- the oxides of alkali metals,
- the salts of alkaline earth metals,
- the oxides of alkaline earth metals,
- organic halides,
- inorganic halides,
- acid halides, and
- elemental halogens,

as well as mixtures of any two or more thereof, and from 0.1 up to 1000 ppm (by volume of total feed) of an organic halide having the structure R''X, wherein R'' is a hydrocarbyl or halogenated hydrocarbyl radical having in the range of 1 up to 8 carbon atoms, and X is any one of the halogens, at a pressure in the range of 0.1 up to 100 atmospheres, at a temperature in the range of 75° up to 325° C. for a time sufficient to obtain olefin conversions in the range of 0.1 up to 75%.

4,950,774

# 2,5-DISUBSTITUTED-7,7,8,8-TETRACYANOQUINODIMETHANES

Takeo Kawabata, Hirakata, Japan, assignor to Nippon Gohsei Kagaku Kogyo Kabushiki, Osaka, Japan

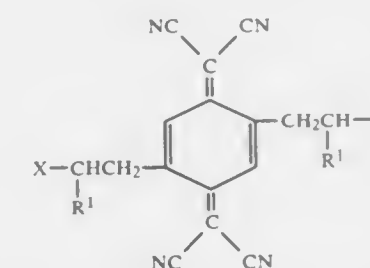
Filed Oct. 23, 1987, Ser. No. 111,744

Claims priority, application Japan, Oct. 27, 1986, 61-256255  
Int. Cl.<sup>5</sup> C07C 255/31

U.S. Cl. 552—303

4 Claims

1. A 2,5-disubstituted-7,7,8,8-tetracyanoquinodimethane of the general formula



wherein R<sub>1</sub> is hydrogen or methyl, X is —CONR<sup>3</sup>R<sup>4</sup>, in which R<sup>3</sup> and R<sup>4</sup> each is hydrogen or C<sub>1-4</sub> alkyl, or —CN.

4,950,775

# ANTIHYPERCHOLESTEROLEMIC COMPOUNDS AND SYNTHESIS THEREOF

Clayton H. Heathcock, Kensington, Calif., and Terry J. Rosen, Waukegan, Ill., assignors to University of California, Alameda, Calif.

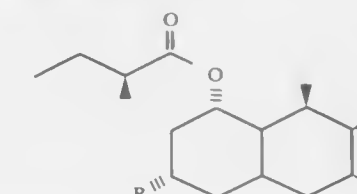
Filed Oct. 11, 1985, Ser. No. 786,839

Int. Cl.<sup>5</sup> C07F 7/08, 7/18

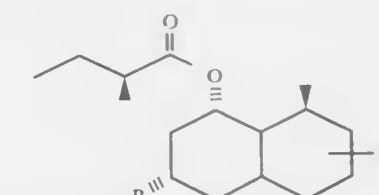
U.S. Cl. 550—438

19 Claims

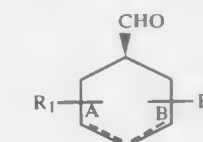
1. A structurally convergent process for synthesizing compactin, mevinolin and compounds related thereto in having a first moiety with the structure



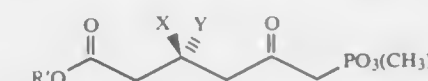
or having a second moiety with the structure



where R<sub>2</sub> is hydrogen or an alkyl of less than about 8 carbon atoms, comprising reacting an aldehyde having the structure



where R<sub>1</sub> and R<sub>2</sub> are hydrogen, alkyl, aryl or arylalkyl, with a ketophosphonate synthon having the structure



where R' is hydrogen, alkyl, aryl or arylalkyl, and X and Y are selected from the group consisting of hydrogen, alkyl, or —OR\*, where R\* is hydrogen, alkyl, aryl, arylalkyl, or trialkylsilyl, in a Wadsworth-Emmons coupling reaction.

4,950,776

PHARMACEUTICAL COMPOSITIONS FOR THE THERAPY OF INVOLUTIVE CEREBRAL SYNDROMES  
Carlo Scolastico, and Camillo M. Palazzi, both of Codogno, Italy, assignors to S. Team S.R.L. Corso Lodi, 47, Milan, Italy  
PCT No. PCT/EP87/00068, § 371 Date Oct. 8, 1987, § 102(e)  
Date Oct. 8, 1987, PCT Pub. No. WO87/05024, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 12, 1987, Ser. No. 112,000

Int. Cl.<sup>5</sup> C07F 9/10; A61K 31/685

U.S. Cl. 558—169

19 Claims

1. A pharmaceutical composition for the therapy of cerebral involutive syndromes comprising:  
an effective involutive cerebral syndrome treating amount of an alkali or alkali-earth metal salt of glycerophosphoryl-O-serine and a pharmaceutically acceptable carrier therefor.

4,950,777

HERBICIDALLY ACTIVE DERIVATIVES OF N-PHENYL-3,4,5,6-TETRAHYDROPHTHALIMIDE  
Georg Pissiotas, Lörrach, Fed. Rep. of Germany, and Beat Böhner, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 874,765, Jun. 16, 1986, Pat. No. 4,824,476.

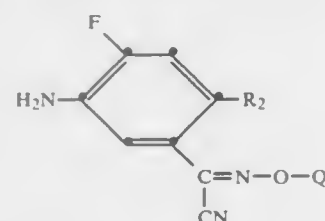
This application Jan. 30, 1989, Ser. No. 303,431

Claims priority, application Switzerland, Jun. 24, 1985, 2665/85; Jul. 25, 1985, 3237/85; Mar. 26, 1986, 1207/86  
Int. Cl.<sup>5</sup> C07C 121/66; C07D 317/16

U.S. Cl. 558—301

3 Claims

1. A 3-aminophenoxime of the formula Va



(Va)

wherein

R<sub>2</sub> is chlorine or bromine,  
Q hydrogen; an alkali metal ion; C<sub>1</sub>-C<sub>10</sub>-alkyl unsubstituted or mono substituted by halogen, cyano, C<sub>1</sub>-C<sub>6</sub>-alkoxy or C<sub>1</sub>-C<sub>6</sub>-alkoxycarbonyl; C<sub>3</sub>-C<sub>8</sub>-cycloalkyl; C<sub>3</sub>-C<sub>8</sub>-alkenyl unsubstituted or mono substituted by halogen; benzyl unsubstituted or mono substituted by halogen; or the 1,3-dioxolan-2-yl-methyl radical.

4,950,778

MANUFACTURE OF 5-CYANOVALERIC ACID AND ITS ESTERS USING CYCLIC COSOLVENTS

Patrick M. Burke, and James B. Sieja, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours & Company, Wilmington, Del.

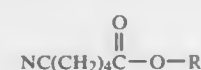
Continuation-in-part of Ser. No. 283,159, Dec. 12, 1988, abandoned. This application Nov. 8, 1989, Ser. No. 434,866

Int. Cl.<sup>5</sup> C07C 253/30

U.S. Cl. 558—353

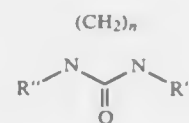
11 Claims

1. A high yield process for the preparation of a compound having the formula

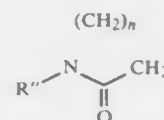


where R is hydrogen or an alkyl radical having 1 to 6 carbon atoms, which comprises reacting a mixture consisting essentially of pentenenitrile, carbon monoxide, at least one compound having the formula: ROH, where R is hydrogen or an alkyl radical having 1 to 6 carbon atoms, and one or more

cosolvents selected from the class consisting of cyclic ureas having the formula



and cyclic amides having the formula



where n is 2 or 3 and R'' is selected from hydrogen and alkyl groups having 1 to 6 carbon atoms, with a cobalt containing carbonylation catalyst, at a temperature in the range of about 130° to 220° C. and at a pressure of about 1500 to 8000 psi, where the combined weight of the cosolvents is between about 70% and 99% of the total weight of the reaction mixture, where the amount of cobalt containing catalyst is in the range of 0.5 to 5.0 parts by weight per 100 parts of pentenenitrile, where the ROH compound is present in amount at least stoichiometrically equivalent to the pentenenitrile and the cosolvents are present in the amount of from about 2 to 100 times, on a weight basis, the weight of the ROH compound.

4,950,779

NONAQUEOUS METHOD FOR MAKING SILICONE OLIGOMERS

Jeffrey H. Wengrovius, Scotia, and Virginia M. VanValkenburgh, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 4, 1989, Ser. No. 445,249

Int. Cl.<sup>5</sup> C07F 7/08

U.S. Cl. 556—457

10 Claims

1. A nonaqueous method for making silicone oligomers having from about 2 to about 10,000 condensed siloxy units selected from cyclic, linear, branched and mixtures of such structures, which comprises

- (1) agitating at a temperature of from 20° C. to 150° C., substantially equal molar amounts of formic acid and an organosilane selected from polyalkoxysilanes and polyaminosilanes until the resulting mixture is substantially free of organosilane, and
- (2) recovering the silicone oligomer from the mixture of (1).

4,950,780

N-OCTADECYL-3-(3,5-DI-T-BUTYL-4-HYDROXY-PHENYL)PROPIONATE WITH A NOVEL CRYSTALLINE FORM

Masaya Tanaka; Masayoshi Gohbayashi, and Kunihide Oka, all of Nakatsu, Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Sep. 5, 1989, Ser. No. 402,812

Claims priority, application Japan, Sep. 5, 1988, 53-223024

Int. Cl.<sup>5</sup> C07C 69/76

U.S. Cl. 560—75

2 Claims

1. n-Octadecyl-3-(3,5-di-t-butyl-4-hydroxyphenyl)propionate with a novel crystalline structure showing a sharp X-ray diffraction peak at the diffraction angle 2θ=19.10 when measured with X-ray of Cu-Kα wavelength.

4,950,781

PREPARATION PROCESS FOR AROMATIC HYDROXYCARBOXYLIC ACID

Takehisa Nakanishi; Toshizumi Miura, both of Takaishi, and Masao Hashimoto, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,701

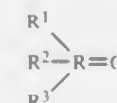
Claims priority, application Japan, Nov. 29, 1988, 63-299627

Int. Cl.<sup>5</sup> C07C 51/15

U.S. Cl. 562—424

12 Claims

1. A process for the preparation of an aromatic hydroxycarboxylic acid comprising reacting an alkali metal salt of phenol with carbon dioxide in a solvent containing at least one organic phosphine oxide represented by the formula (I):



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are a straight or branched alkyl group having from 1 to 8 carbon atoms or a phenyl group and may be same or different from each other.

4,950,782

LOW PLATE-OUT POLYCARBONATES

Daniel W. Fox, Pittsfield; Edward N. Peters, Lenox, and Paul D. Sybert, Pittsfield, all of Mass., assignors to General Electric Company, Mt. Vernon, Ind.

Division of Ser. No. 136,664, Dec. 22, 1987. This application

Dec. 20, 1988, Ser. No. 286,827

Int. Cl.<sup>5</sup> C07C 59/40, 59/48

U.S. Cl. 562—469

2 Claims

1. The compound 2,4-di-cumylphenoxyacetic acid.

4,950,783

TREATMENT OF HYPERTENSION

Elijah H. Gold, West Orange, and Wei K. Chang, Livingston, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation of Ser. No. 551,387, Nov. 14, 1983, Pat. No. 4,619,919, which is a continuation-in-part of Ser. No. 137,935, Apr. 7, 1980, abandoned, which is a continuation-in-part of Ser. No. 89,077, Oct. 29, 1979, abandoned, which is a

continuation-in-part of Ser. No. 944,516, Sep. 20, 1978, abandoned. This application Oct. 24, 1986, Ser. No. 922,598  
Int. Cl.<sup>5</sup> C07C 237/30; A61K 31/615, 31/165

U.S. Cl. 562—584

3 Claims

1. The chemical compound (—)-5-[(R)-1-hydroxy-2-[(R)-1-methyl-3-phenylpropyl]amino]ethyl]salicylamide or a pharmaceutically acceptable salt thereof, substantially free from its other optical isomers.

4,950,784

PREPARATION OF O-ALKYL, S,S-DIALKYLPHOSPHORODITHIOATES

Jean-Michel Brochard, Alfortville; Francois Frisou, Suresnes, and Pierre Le Roy, Thiais, all of France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

Continuation-in-part of Ser. No. 828,272, Feb. 11, 1986, abandoned. This application Jul. 24, 1987, Ser. No. 77,239

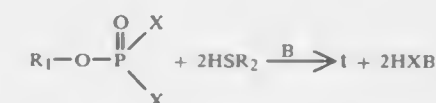
Int. Cl.<sup>5</sup> C07F 9/17

U.S. Cl. 558—100

19 Claims

1. A process for the preparation of an O-alkyl, S,S-dialkylphosphorodithioate having the general formula (I):  
wherein R<sub>1</sub> is a lower alkyl radical, and R<sub>2</sub> is a linear or branched chain lower alkyl radical, comprising reacting an alkylphosphate dihalogenide with a 1.5 to 8 molar excess of thiol, per mole of alkylphosphate dihalogenide, in the presence of a 0.1 to 5 molar excess of an acid acceptor, also per mole of

alkylphosphate dihalogenide, and according to the reaction scheme:



wherein R<sub>1</sub>, R<sub>2</sub> and (I) are as above defined, X is a halogen, and B is an inorganic or organic acid acceptor.

4,950,785

CATALYTIC PROCESS OF SYNTHETIZING ETHYLENE-TETRACARBOXYLIC ESTERS

(I) Roberto Santi, Novara, and Giuseppe Cometti, Verbania, both of Italy, assignors to Presidenza del Consiglio dei Ministri Ufficio del Ministro per il coordinamento delle iniziative per la ricerca scientifica e tecnologica, Rome, Italy

Filed Feb. 21, 1989, Ser. No. 312,932

Claims priority, application Italy, Feb. 24, 1988, 19507 A/88

Int. Cl.<sup>5</sup> C07C 67/343

U.S. Cl. 560—202

9 Claims

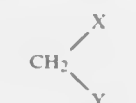
1. Process of synthesizing ethylenetetracarboxylic esters having the formula (I) or (II):



(I)

(II)

starting from compounds of the formula (III)



(III)

wherein X=COOR, Y=COOR' and R and R', the same or different, represent alkyl groups having from 1 to 18 carbon atoms, inert under the synthesis conditions, characterized by the fact that the duplication is an oxidative duplication, that is performed by use of oxygen or of another oxygen-containing gas, in the presence of a catalyst consisting essentially of the inorganic or organic salt of a transition metal selected from the group consisting of manganese, cobalt and copper.

4,950,786

METHOD FOR MAKING 2,6-NAPHTHALENE DICARBOXYLIC ACID

Paul A. Sanchez, Burr Ridge; David A. Young, Cresthill; George E. Kuhlmann, Naperville; Walter Partenheimer, Naperville, and Wayne P. Schammel, Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 145,299, Jan. 19, 1988, abandoned. This application May 4, 1989, Ser. No. 350,634

Int. Cl.<sup>5</sup> C07C 51/215

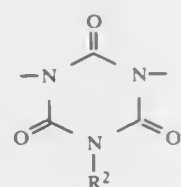
U.S. Cl. 562—416

15 Claims

1. A method for producing 2,6-naphthalene dicarboxylic acid comprising: exothermically oxidizing 2,6-diisopropyl-naphthalene or its oxidation derivative as the starting material with an oxygen-containing gas in the liquid phase in a solvent comprising an aliphatic monocarboxylic acid, in an oxidation reactor at an elevated temperature and pressure and in the presence of an oxidation catalyst comprising cobalt, manganese, bromine and cerium components, wherein the atom ratio



n is 2–20,  $\text{Ar}^1$  and  $\text{Ar}^2$  independently of one another are phenyl, tolyl, chlorophenyl or bromophenyl, R is a polymethylene radical having 4–30 C atoms which can be interrupted once or several times by  $-\text{O}-$ ,  $-\text{S}-$ ,  $-\text{N}(\text{R}^2)-$  or a group



and which can be mono- or polysubstituted by C<sub>1</sub>-C<sub>4</sub>alkyl, cyclohexyl, phenyl, halogen, C<sub>1</sub>-C<sub>4</sub>alkoxy, phenoxy, C<sub>7</sub>-C<sub>9</sub>phenylalkyl, C<sub>2</sub>-C<sub>8</sub>dialkylamino, morpholino or piperidino, R<sup>1</sup> is methyl or ethyl, R<sup>2</sup> is hydrogen, C<sub>1</sub>-C<sub>4</sub>alkyl, cyclohexyl, phenyl, tolyl, benzyl, acetyl, benzoyl or is a group —CH<sub>2</sub>CH<sub>2</sub>R<sup>6</sup> or —SO<sub>2</sub>—R<sup>5</sup> is C<sub>1</sub>-C<sub>12</sub>alkyl, phenyl or C<sub>7</sub>-C<sub>11</sub>alkylphenyl, R<sup>6</sup> is hydroxy or —OC(Ar<sup>1</sup>)(CO—Ar<sup>2</sup>)—O—R<sup>1-5</sup>Y.

4,950,796

## NOVEL BENZALDEHYDES

Bernd Wolf, Mutterstadt; Hans Theobald, Limburgerhof, and Norbert Goetz, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

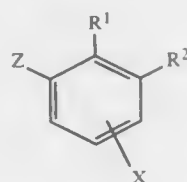
Filed Jun. 14, 1989, Ser. No. 365,794

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820896

Int. Cl.<sup>5</sup> C07C 47/54, 261/00

U.S. Cl. 568—440

1. A benzaldehyde of the formula I



wherein R<sup>1</sup> is methyl or ethyl, R<sup>2</sup> is alkyl, alkenyl, cycloalkyl, cycloalkenyl, bicycloalkyl, bicycloalkenyl, or C<sub>1</sub>-C<sub>5</sub>-alkyl-substituted cycloalkyl, cycloalkenyl, bicycloalkyl or bicycloalkenyl, X is hydrogen, chlorine or fluorine and Z is CHO, with the proviso that R<sup>2</sup> is not methyl when R<sup>1</sup> is methyl or ethyl.

4,950,797

## PREPARATION OF CARBONYL COMPOUNDS BY ISOMERIZATION OF ALLYL ALCOHOLS

Rudolf Kummer, Frankenthal; Werner Bertleff, Viernheim, and Michael Roeper, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 1, 1988, Ser. No. 201,064

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1987, 3718897

Int. Cl.<sup>5</sup> C07C 45/00

U.S. Cl. 568—450

10 Claims

1. In a process for the preparation of a carbonyl compound of the formula



where R<sup>1</sup> and R<sup>4</sup> are either separately hydrogen or methyl or together a saturated or olefinic hydrocarbon chain of from 3 to 6 carbon atoms, R<sup>2</sup> is hydrogen, methyl, or alkoxy-carbonyl, and R<sup>3</sup> is hydrogen, methyl or hydroxymethyl, by catalyzed isomerization of an allyl alcohol of the formula



in the presence of a rhodium compound at elevated temperatures, the improvement which comprises:

heating the allyl alcohol in a liquid reaction mixture consisting essentially of a molten tertiary phosphine or phosphite ester containing the rhodium compound dissolved therein in a molar ratio of the tertiary phosphine or phosphite ester to the rhodium compound of between 3:1 and 5000:1, at a temperature of from 80° C. to 180° C.; passing a carrier gas through the reaction mixture; and condensing the vapor of the carbonyl compound entrained in the gas stream by cooling.

4,950,798

## PROCESS FOR CATALYTIC HYDROFORMYLATION

Stephen R. Stohart; Stephen L. Grundy, and Frederick L. Joslin, all of Victoria, Canada, assignors to University of Victoria, Victoria, Canada

Filed Dec. 14, 1988, Ser. No. 284,366

Claims priority, application Canada, Jun. 29, 1988, 570803

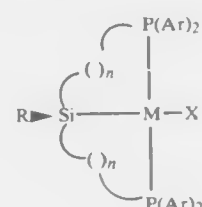
Int. Cl.<sup>5</sup> C07C 45/30

U.S. Cl. 568—454

23 Claims

1. A hydroformylation process for the conversion of an olefinic compound having up to 20 carbon atoms to its corresponding aldehyde which process comprises: reacting said olefinic compound in the liquid phase with carbon monoxide and hydrogen at a temperature between 60° and 200° C. and at a pressure of up to 1000 psi or more in the presence of a catalyst comprising a chelate in which a ligand is chelated at a metal center to produce at least one heterocyclic ring with the central metal atom as part of said ring, said catalyst being selected from the group consisting of

(A) a platinum group metal complex of bis(phosphinoalkyl)silane having the following Formula I:



Formula I

wherein:

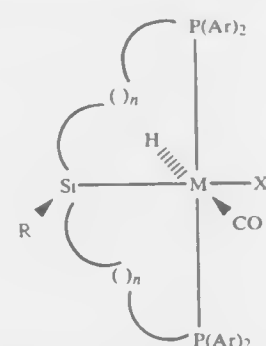
Ar is alkyl, phenyl or modified aryl, cyclohexyl or C<sub>6</sub>H<sub>4</sub>X;

X is Cl, Br, F, CO<sub>2</sub>Me or CO<sub>2</sub>CF<sub>3</sub>, or SnCl<sub>3</sub>;

R is Me, Et, n-Br, T-Bu or cyclohexyl or phenyl;

M is an operative metal selected from the group consisting of Pt, Pd, Rh, and Ir; and ( )<sub>n</sub> is 2, 3, or 4, thereby to provide 2, 3 or 4 C atoms respectively between Si and P;

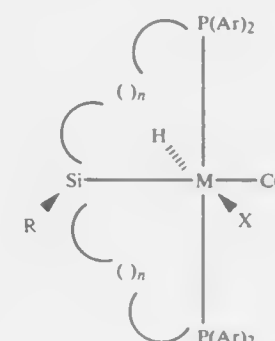
(B) a platinum-group metal complex having the Formula II



Formula II

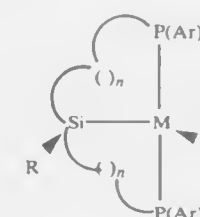
wherein Ar, X, R, M and ( )<sub>n</sub> are as defined above;

(C) a platinum-group metal complex having the Formula III



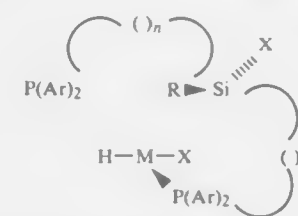
Formula III

wherein Ar, X, R, M and ( )<sub>n</sub> are as defined above;  
(D) a platinum-group metal complex having the Formula IV



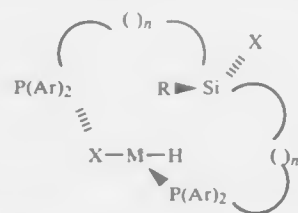
Formula IV

wherein Ar, X, R, M and ( )<sub>n</sub> are as defined above;  
(E) a platinum-group metal complex of the Formula V



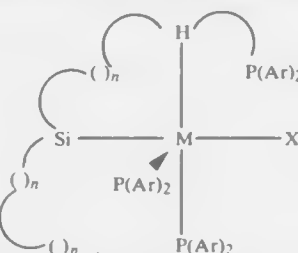
Formula V

wherein Ar, X, R, M and ( )<sub>n</sub> are as defined above;  
(F) a platinum-group metal complex of the Formula VI



Formula VI

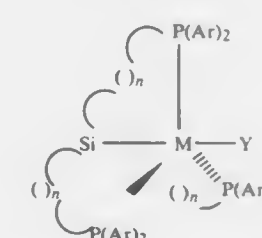
wherein Ar, X, R, M and ( )<sub>n</sub> are as defined above;  
(G) a platinum-group metal complex of tris(phosphinoalkyl)silane having the following Formula VII



Formula VII

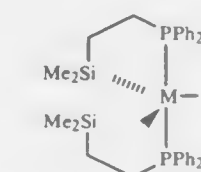
wherein Ar, X, M and ( )<sub>n</sub> are as defined above;

(H) a platinum-group metal complex having the Formula VIII



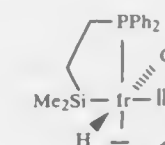
Formula VIII

wherein Ar, M and ( )<sub>n</sub> are as defined above, and Y = CO, P(Ar)<sub>3</sub>, or a similar neutral ligand molecule;  
(I) a platinum-group metal complex of the Formula IX



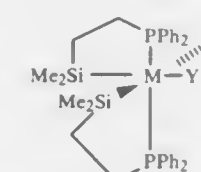
Formula IX

(J) a platinum-group metal complex of the Formula X



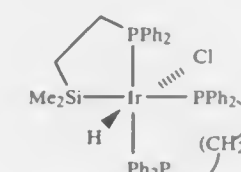
Formula X

(K) a platinum-group metal complex of the Formula XI



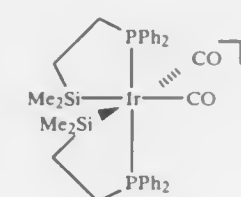
Formula XI

(L) a platinum-group metal complex of the Formula XII



Formula XII

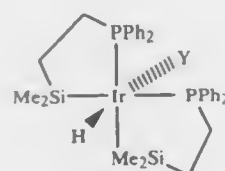
(M) a platinum-group metal complex of the Formula XIII



Formula XIII

and  
(N) a platinum-group metal complex of the Formula XIV





Formula XIV

**4,950,799**  
**PROCESS FOR CATALYTIC REDUCTION OF CARBOXYLIC ACIDS TO ALDEHYDES**  
 Duane C. Hargis, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed May 15, 1989, Ser. No. 351,925  
 Int. Cl.<sup>5</sup> C07C 45/00, 45/41  
 U.S. Cl. 568—484 21 Claims

1. A process which comprises reducing at an elevated temperature a monocarboxylic acid containing at least 7 to about 22 carbon atoms, or ester thereof, to an aldehyde in the presence of hydrogen and a vanadium catalyst such that said carboxylic acid or ester is reduced to the corresponding aldehyde, said vanadium catalyst comprising one or more vanadium catalysts selected from a group consisting of vanadium catalysts selected from a group consisting of vanadium oxides and vanadium sulfides.

**4,950,800**  
**PROCESS FOR THE PREPARATION OF 2-METHYLBUTANAL**  
 Jürgen Weber, Oberhausen; Peter Lappe, Dinslaken, and Helmut Springer, Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Dec. 20, 1988, Ser. No. 287,470  
 Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744212  
 Int. Cl.<sup>5</sup> C07C 45/78, 45/82

U.S. Cl. 568—492 27 Claims  
 1. A process for recovering 2-methylbutanal from a mixture of C<sub>5</sub> aldehydes comprising: adding formaldehyde to said mixture and distilling in the presence of an aldolization catalyst of the formula



wherein R<sup>1</sup> and R<sup>2</sup> are individually alkyl having 1 to 12 carbon atoms.

**4,950,801**  
**PROCESS FOR PRODUCING ALPHA-HYDROXYCARBOXYLIC ACID AMIDE**  
 Shuji Ebata; Hiroyuki Hirayama; Hirofumi Higuchi; Toshio Kondo, and Koichi Kida, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan  
 Filed Dec. 26, 1989, Ser. No. 456,312  
 Claims priority, application Japan, Jan. 19, 1989, 1-08714; Jan. 25, 1989, 1-13897  
 Int. Cl.<sup>5</sup> C07C 102/08

U.S. Cl. 564—126 7 Claims  
 1. In a process for producing α-hydroxycarboxylic acid amide represented by the formula (I):



wherein R<sup>1</sup> represents a hydrogen or an aliphatic hydrocarbon group having 1 to 10 carbon atoms and R<sup>2</sup> represents an

aliphatic, alicyclic or aromatic hydrocarbon group having 1 to 10 carbon atoms, by a catalytic hydration reaction of cyanohydrin represented by the formula (II):



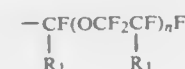
wherein R<sup>1</sup> and R<sup>2</sup> have the same meanings as defined above, the improvement which comprises using, as a catalyst, a modified manganese dioxide containing at least one element selected from alkali metal elements and an alkaline earth elements.

**4,950,802**  
**PROCESS FOR THE PREPARATION OF ARYL TRIFLUOROMETHYL ETHERS**  
 Bassam S. Nader, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.  
 Filed Dec. 9, 1988, Ser. No. 282,805  
 Int. Cl.<sup>5</sup> C07C 85/14

U.S. Cl. 568—655 15 Claims  
 1. The process of preparing an aryl trifluoromethyl ether which consists essentially of contacting:  
 (a) a phenolic compound wherein the ortho substituents are sterically compatible with the OH group and do not substantially reduce the reactivity thereof; with  
 (b) a compound of the following formula:



wherein X is a halogen, C<sub>1-10</sub> alkyl, C<sub>1-10</sub> perhaloalkyl, alkyl polyether, or a perfluoro-alkyl polyether moiety of the following formula



wherein R<sub>1</sub> is H or F or C<sub>3</sub>, and n is a whole number from 1-10; in the presence of  
 (c) a fluoroantimony pentahalide; under conditions sufficient to form an aryl trifluoromethyl ether, wherein the molar ratios of fluoroantimony pentahalide:phenolic compound and component (b):phenolic compound are each in the range of from about 1:1 to about 10:1.

**4,950,803**  
**ETHERIFICATION PROCESS**  
 Lawrence A. Smith, Jr.; Dennis Hearn, both of Houston, and Edward M. Jones, Jr., Friendswood, all of Tex., assignors to Chemical Research & Licensing Company, Houston, Tex.  
 Continuation of Ser. No. 442,359, Nov. 17, 1982. This application Jun. 1, 1987, Ser. No. 58,698  
 Int. Cl.<sup>5</sup> C07C 41/00

U.S. Cl. 568—697 14 Claims  
 1. An improvement in the process of the exothermic, liquid phase reaction of:

C<sub>4</sub> or C<sub>5</sub> isoolefins with C<sub>1</sub> to C<sub>6</sub> alcohol to form ethers thereof by contacting a downflow stream containing up to 60 weight percent of said isoolefins and alcohol with an acid cation exchange resin in a vertical fixed bed at a temperature in the range of 120° F. to 300° F. in a reactor to form a reaction mixture containing ether wherein the improvement is the operation of said reactor at a pressure to maintain said reaction mixture in said reactor at its boiling point within the temperature range of 120° F. to 300° F. whereby at least a portion but less than all of said reaction mixture is vaporized and recovered as a single stream exiting through the lower end of the reactor.

**4,950,804**  
**PROCESS FOR PREPARING BISPHENOL A**  
 Shigeru Iimuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,350  
 Claims priority, application Japan, Feb. 19, 1988, 63-35120  
 Int. Cl.<sup>5</sup> C07C 37/20, 37/70, 39/16

U.S. Cl. 568—727 4 Claims  
 1. A process for producing high-purity bisphenol A by reacting phenol with acetone in the presence of hydrochloric acid as the catalyst to obtain a product mixture removing the hydrochloric acid from the product mixture, thereby yielding a liquid mixture, adding water to the liquid mixture, evaporating a water-phenol mixture from the liquid mixture under reduced pressure, thereby cooling the liquid mixture and crystallizing an adduct of bisphenol A with phenol, and finally recovering bisphenol A from the adduct, wherein an improvement comprises treating the water-phenol mixture with a weakly basic ion-exchange resin and recycling and reusing the treated mixture as the water to be added to the liquid mixture.

**4,950,805**  
**PROCESS FOR WASHING AND OBTAINING SOLIDS OF SLURRY**

Shigeru Iimuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan  
 Filed Feb. 14, 1989, Ser. No. 310,345  
 Claims priority, application Japan, Feb. 19, 1988, 63-35121  
 Int. Cl.<sup>5</sup> C07C 45/78, 45/90, 45/81

U.S. Cl. 568—724 5 Claims  
 1. A process for washing and obtaining solids of a slurry which comprises feeding a slurry containing the adduct of bisphenol A with phenol crystallized from a phenol solution to bisphenol A to a first solid-liquid separator to separate solids from the slurry, transferring the solids separated by the first solid-liquid separator to an agitation tank in which the solids are reslurried, feeding the slurry obtained in the agitation tank to a second solid-liquid separator, said second solid-liquid separator being intended to obtain the solids from the slurry discharged from the agitation tank, and permitting the admission of a washing solvent consisting of phenol or water-containing phenol at a temperature of 35° to 45° C. to wash the solids, and permitting the filtrate and washings to be recovered independently, feeding the washing solvent to the second solid-liquid separator, feeding all of the washings from the second solid-liquid separator, feeding all of the washings from the second solid-liquid separator to the agitation tank, feeding a part of the filtrate from the second solid-liquid separator to the agitation tank, and discharging the remainder of the filtrate from the system.

**4,950,806**  
**PROCESS FOR CRYSTALLIZING ADDUCT OF BISPHENOL A WITH PHENOL**  
 Shigeru Iimuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan  
 Filed Feb. 17, 1989, Ser. No. 311,844  
 Claims priority, application Japan, Feb. 22, 1988, 63-37519; Feb. 22, 1988, 63-37520  
 Int. Cl.<sup>5</sup> C07C 37/84, 37/68

U.S. Cl. 568—724 3 Claims  
 1. A process for crystallizing an adduct of bisphenol A with phenol from a phenol solution of bisphenol A in the presence of water, said process comprising the steps of controlling the concentration of bisphenol A in said solution by removing a portion of the phenol from said solution or adding phenol to said solution according to feedback control based on the measurement of solution density to obtain an adjusted solution containing from 20 to 50 wt. % of bisphenol A, and feeding the adjusted solution to the crystallizer to form a content solution

having a temperature of 35 to 70° C. and maintaining the inside wall of the crystallizer at a temperature higher than that of the

content solution, provided the temperature difference is smaller than 5° C.

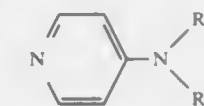
**4,950,807**  
**PROCESS FOR PREPARING BISPHENOL A**  
 Shigeru Iimuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 308,667  
 Claims priority, application Japan, Feb. 17, 1988, 63-32838  
 Int. Cl.<sup>5</sup> C07C 37/20, 37/70

U.S. Cl. 568—727 6 Claims  
 1. A process for producing high-purity bisphenol A which comprises reacting phenol with acetone in the presence of an acid catalyst to obtain a product mixture containing bisphenol A as a separate compound, removing the acid catalyst from the product mixture, thereby yielding a liquid mixture, treating the liquid mixture with a weakly basic ion-exchange resin having pyridyl groups as the exchange groups, and purifying the treated liquid mixture to obtain the high-purity bisphenol A.

**4,950,808**  
**PROCESS FOR THE PREPARATION OF 4,4'-DIHYDROXYBIPHENYL**  
 Udo Kowalczyk, Bochum; Martin Bartmann, Recklinghausen, and Juergen Finke, Marl, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany  
 Filed Apr. 21, 1989, Ser. No. 341,717  
 Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3819963

Int. Cl.<sup>5</sup> C07C 37/50, 39/12  
 U.S. Cl. 568—730 6 Claims  
 1. A process for the preparation of 4,4'-dihydroxybiphenyl, comprising the steps:  
 (i) reducing 3,3',5,5'-tetra-*t*-butyldiphenylquinone with 2,6-di-*t*-butylphenol in the presence of a 4-dialkylaminopyridine of the formula



wherein R<sub>1</sub> and R<sub>2</sub>, independently of one another, are an alkyl group with 1 to 6 carbon atoms, or R<sub>1</sub> and R<sub>2</sub> together with the nitrogen atom to which they are bonded form a pyrrolidine or piperidine ring, to obtain 3,3',5,5'-tetra-*t*-butyl-4,4'-dihydroxybiphenyl; and  
 (ii) dealkylating said 3,3',5,5'-tetra-*t*-butyl-4,4'-dihydroxybiphenyl in the presence of a phosphorus-containing acid; wherein said reducing and said dealkylating are carried out in the melt, wherein said phosphorus-contain-

ing acid has the formula  $H_3PO_n$  with  $n=2, 3$ , or  $4$ , wherein  $2$  to  $10$  moles of said  $2,6$ -di- $t$ -butylphenol,  $0.003$  to  $0.02$  moles of said  $4$ -dialkylaminopyridine, and  $0.003$  to  $0.02$  moles of said phosphorus-containing acid are used per mole of said  $3,3',5,5'$ -tetra- $t$ -butyldiphenoquinone, and wherein said reducing is carried out at a temperature of  $240^\circ$  to  $280^\circ$  C., and said dealkylating is carried out at a temperature of  $280^\circ$  to  $320^\circ$  C.

4,950,809

**PROCESS FOR PREPARING HYDROXYLATED AROMATIC DERIVATIVES BY THE BAEYER-VILLIGER REACTION**

Michel Gubelmann, Lyon, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Dec. 8, 1988, Ser. No. 281,408

Claims priority, application France, Dec. 11, 1987, 87 17323  
Int. Cl.<sup>5</sup> C07C 37/60

U.S. Cl. 568—741

19 Claims

1. A process for preparing a hydroxylated aromatic compound by the Baeyer-Villiger reaction, comprising: in a first stage, preparing a solution of peracetic acid by adding acetic anhydride to a solution of hydrogen peroxide in the presence of a strong acid catalyst; and in a second stage, adding an aryl ketone or an aromatic aldehyde or both to the solution of peracetic acid and maintaining the medium at a temperature below or equal to  $40^\circ$  C., for a time sufficient to obtain said hydroxylated aromatic compound, wherein each of the aryl ketone and the aromatic aldehyde is a compound of formula (I):



in which

Ar is a mono- or polycyclic, homo- or heterocyclic aromatic radical,

R40 is selected from the group consisting of alkyl radicals containing from 1 to 4 carbon atoms, alkoxy radicals containing from 1 to 4 carbon atoms and hydroxy, halo, acyloxy, alkoxy, carbonyl, perhaloalkyl, perhaloalkoxy, nitro, phenyl and phenoxy radicals, wherein said phenyl and phenoxy radicals are unsubstituted or substituted with a substituent selected from the group consisting of hydroxyl, formyl, acyloxy, and halo,

n is an integer equal to 0, 1 or 2, and

R is selected from the group consisting of hydrogen, an alkyl group containing 1 to 4 carbon atoms and a phenyl group.

4,950,810

**SELECTIVE PROCESS FOR PREPARING 2,4- OR 3,6-DI-SUBSTITUTED PHENOL COMPOUNDS**

Ryoichi Kinishi; Shuichi Wakamatsu, both of Fukuoka, and Tetsuji Ike, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Mar. 29, 1989, Ser. No. 330,062

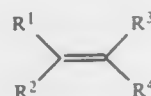
Claims priority, application Japan, Mar. 30, 1988, 63-79548; Mar. 30, 1988, 63-79549

Int. Cl.<sup>5</sup> C07C 37/14

U.S. Cl. 568—790

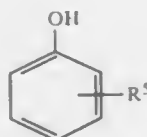
7 Claims

1. A selective process for preparing a 2,4- or 3,6-di-substituted phenol compound which comprises reacting an olefin compound of the formula:



wherein  $R^1$  is hydrogen,  $C_{1-8}$ -alkyl, phenyl or  $C_{1-4}$ -alkyl substituted-phenyl; and  $R_2$ ,  $R_3$  and  $R_4$  are the same or different

and each is hydrogen or  $C_{1-8}$ -alkyl; with a phenol compound of the formula:



wherein  $R^5$  is hydrogen,  $C_{1-8}$ -alkyl or  $-C(R^6)(R^7)CH(R^8)(R^9)$  (wherein  $R^6$  is hydrogen,  $C_{1-8}$ -alkyl, phenyl or  $C_{1-4}$ -alkyl substituted-phenyl; and  $R^7$ ,  $R^8$  and  $R^9$  are the same or different and each is hydrogen or  $C_{1-8}$ -alkyl); in the presence of a phosphorus compound selected from phosphoric acid, hypophosphoric acid, pyrophosphoric acid, phosphorous acid, hypophosphorous acid, polyphosphoric acid, phosphorus pentaoxide, a phosphorus halide, a phosphorus oxyhalide or an ester of phosphoric and phosphorous acid, and a carboxylic acid compound selected from formic acid, acetic acid, propionic acid, chloroacetic acid, dichloroacetic acid and  $\alpha$ -chloropropionic acid.

4,950,811

**PROCESS FOR THE PREPARATION OF TRIFLUORO-ETHANOL BY HYDROLYSIS, IN THE GAS PHASE, OF CHLOROTRIFLUOROETHANE**

Claude Doussain, Saint Fons; Michel Gubelmann, Lyons, and Philippe-Jean Tirel, Oullins, all of France, assignors to Rhone Poulenc Chimie, Courbevoie, France

Filed Aug. 3, 1989, Ser. No. 388,936

Claims priority, application France, Aug. 5, 1988, 88 10813  
Int. Cl.<sup>5</sup> C07H 31/38

U.S. Cl. 568—842

16 Claims

1. A process for the preparation of trifluoroethanol by hydrolysis of trifluorochloroethane which comprises contacting a gaseous mixture of 1-chloro-2,2,2-trifluoroethane and water with a solid catalyst comprising at least one phosphate, one hydrophosphate, or one oxide of a di- or trivalent metal, at a temperature greater than  $350^\circ$  C.

4,950,812

**SINGLE-STEP CATALYTIC PROCESS FOR THE DIRECT CONVERSION OF POLYSACCHARIDES TO POLYHYDRIC ALCOHOLS**

Pierre Jacobs, Gooik, and Herve Hinnekens, Gent, both of Belgium, assignors to Fina Research S.A., Belgium

Filed Feb. 22, 1989, Ser. No. 313,946

Claims priority, application European Pat. Off., Feb. 22, 1988, 88870023

Int. Cl.<sup>5</sup> C07C 29/132, 29/14, 31/18, 31/26

U.S. Cl. 568—863

23 Claims

1. A single-step process for the production of polyhydric alcohol from a polysaccharide comprising contacting said polysaccharide in an aqueous medium with hydrogen at elevated temperature and pressure in the presence of a catalyst which comprises: (i) a supported metal selected from the group consisting of ruthenium, copper, nickel, cobalt and mixtures thereof, and (ii) a solid having acidic functions, wherein (a) the metal is highly dispersed on the support to be capable of absorbing more than 0.58 molecules of CO per atom of metal, and (b) the solid has sufficient acid functions so that the rate constant of hydrolysis of sucrose on the catalyst is greater than 70% of the rate constant of hydrogenation of glucose on the catalyst.

4,950,813

**PREPARATION OF SUBSTITUTED BENZOTRICHLORIDES**

Frank Döschel, Langenfeld, and Karl-Erwin Schnalke, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,073

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730476

Int. Cl.<sup>5</sup> C07C 19/08

U.S. Cl. 560—127

2 Claims

1. A process for chlorinating 2,4-dichloro-5-fluorotoluene comprising initially introducing 600 to 1,000 parts by weight of 2,4-dibromo-5-fluorotoluene into a first enamel kettle and heating to  $100^\circ$  to  $150^\circ$  C., introducing 60 to 100 parts by weight of partially chlorinated 2,4-dibromo-5-fluorotoluene into a second enamel kettle, dissolving 2 to 6 parts by weight of a peroxide catalyst at  $30^\circ$  to  $60^\circ$  C. in the second kettle, and metering the catalyst solution from the second kettle into the first kettle at a rate of approximately 3 to 6 l/h along the chlorine thereby to form 2,4-dichloro-5-fluorobenzo-trichloride.

4,950,814

**LIQUID FLUOROCARBON AND A METHOD FOR PRODUCING THE SAME**

Toshiyuki Maeda, Kadoma; Akihiro Mabuchi, Kyoto, and Hiroyuki Fujimoto, Sakurai, all of Japan, assignors to Osaka Gas Company Limited, Japan

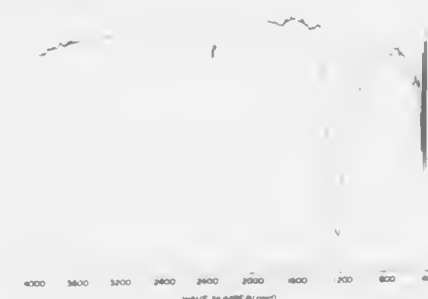
Filed Oct. 26, 1989, Ser. No. 427,419

Claims priority, application Japan, Oct. 26, 1988, 63-270342

Int. Cl.<sup>5</sup> C07C 17/02, 17/33, 19/08, 23/18

U.S. Cl. 570—130

7 Claims



1. A liquid fluorocarbon comprising carbon atoms and fluorine atoms and having no double bond, the atomic ratio of fluorine to carbon atoms being 1.50 to 1.93, the liquid fluorocarbon exhibiting:

- in the infrared absorption spectrum, a peak at about  $1215 \pm 7$   $cm^{-1}$  having a maximum intensity, a peak at about  $1025 \pm 7$   $cm^{-1}$  having an intensity lower than that of said peak appearing at about  $1215 \pm 7$   $cm^{-1}$  and a peak at about  $971 \pm 7$   $cm^{-1}$  having an intensity lower than that of said peak appearing at about  $1025 \pm 7$   $cm^{-1}$ ;
- a number average molecular weight of 680 to 950 as measured by the vapor pressure osmotic pressure method;
- in the thermogravimetric analysis and differential thermal analysis curves, an exothermic weight decrease with the temperature elevation up to  $420^\circ$  C., wherein a 100 % weight decrease is reached at  $420^\circ$  C.;
- a liquid state at room temperature; and
- in the  $^{19}F$ -NMR spectrum as measured taking the  $CF_3$  group of benzotrifluoride as a standard for chemical shift, two peaks respectively ascribed to  $CF_3CF-$  and  $CF_3CF_2$  groups at chemical shifts within the range of from 0 to  $-30$  ppm, a broad peak ascribed to a  $CF_2$  group at a chemical shift within the range of from  $-30$  to  $-90$  ppm and a peak ascribed to a  $CF$  group at a chemical shift within the range of from  $-100$  to  $-150$  ppm.

5. A method for producing a liquid fluorocarbon, which comprises reacting a pitch with fluorine in an atmosphere of

fluorine in a reaction zone while elevating the temperature of said reaction zone to a temperature within the range of from about  $200^\circ$  C. to about  $550^\circ$  C.

6. A method for producing a liquid fluorocarbon, which comprises heat-treating a solid pitch fluoride in an atmosphere of fluorine in a heating zone while elevating the temperature of said heating zone to a temperature which is sufficient for converting said solid pitch fluoride to a liquid fluorocarbon, with the proviso that the elevated temperature is not higher than about  $550^\circ$  C.

4,950,815

**TETRAFLUOROETHANE ISOMERIZATION**

Geoffrey J. Moore, Northwich, and Helen M. Massey, Leigh, both of Great Britain, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Filed Oct. 20, 1989, Ser. No. 424,108

Claims priority, application United Kingdom, Oct. 20, 1988, 8824571

Int. Cl.<sup>5</sup> C07C 17/10, 17/24, 19/02

U.S. Cl. 570—151

7 Claims

1. A method for the preparation of 1,1,1,2-tetrafluoroethane which comprises contacting 1,1,2,2-tetrafluoroethane with a fluorination catalyst at an elevated temperature whereby to effect isomerisation.

4,950,816

PURIFICATION OF 1,1-DICHLORO-1-FLUOROETHANE  
Hsueh S. Tung, Williamsville, and Addison M. Smith, Amherst, both of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 15, 1989, Ser. No. 451,074

Int. Cl.<sup>5</sup> C07C 17/38

U.S. Cl. 570—179

14 Claims

1. A process for the purification of 1,1-dichloro-1-fluoroethane comprising the steps of:

- reacting anhydrous hydrogen fluoride with 1,1,1-trichloroethane or vinylidene chloride containing dichloroacetylene to form said 1,1-dichloro-1-fluoroethane; and
- passing said 1,1-dichloro-1-fluoroethane through activated carbon to substantially remove unsaturated impurities.

4,950,817

**PROCESS FOR THE PREPARATION OF 4,4'-DIHALOBIPHENYLS**

Artur Botta; Hans-Josef Buysch, both of Krefeld, and Lothar Puppe, Burscheid, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 2, 1989, Ser. No. 318,087

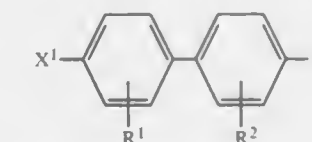
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809258; Jun. 14, 1988, 3820192

Int. Cl.<sup>5</sup> C07C 17/12, 25/18

U.S. Cl. 570—208

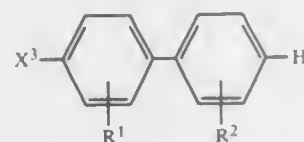
17 Claims

1. In a process for the preparation of 4,4'-dihalobiphenyl of the formula



by catalyzed halogenation of a biphenyl of the formula

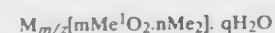




in which the formulae

$X^1$  and  $X^2$  independently of one another stand for chlorine, bromine or iodine,  
 $X^3$  stands for hydrogen, chlorine, bromine or iodine, and  
 $R^1$  and  $R^2$  independently of one another denote hydrogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -alkoxy, hydroxyl, fluorine, chlorine or bromine,

the improvement comprising reacting the biphenyl with an halogenating agent selected from the group consisting of  $Cl_2$ ,  $Br_2$ ,  $I_2$ ,  $SO_2Cl_2$ ,  $SO_2Br_2$ , N-chloro- and N-bromosuccinimide, bromine fluoride and bromine chloride in the presence of 1 to 100% by weight relative to the weight of biphenyl reacted of at least one zeolite of the formula



in which

M denotes an exchangeable cation,  
 Z denotes the valence of the cation,  
 $Me^1$  and  $Me^2$  represent the elements of the anionic skeleton,  
 $n/m$  denotes the ratio of the elements and adopts a value of at least 1 and  
 q denotes the amount of the water absorbed, wherein the zeolites have pore sizes of at least 5 Å the halogenation being conducted at from 0° to 300° C.

4,950,818

#### METHOD FOR TREATING ULCER

Yoshin Tamai, Shibata; Masahiro Torihara; Yoichi Kido, both of Niigata; Johji Yamahara, Otsu, and Masayoshi Ito, Yao, all of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan

Filed Jun. 21, 1989, Ser. No. 369,007

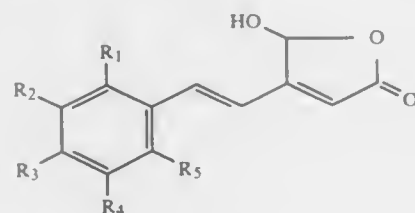
Claims priority, application Japan, Jul. 11, 1988, 63-172964

Int. Cl.<sup>5</sup> A61K 31/34; C07D 307/28

U.S. Cl. 514-471

10 Claims

1. A method for treating and/or preventing ulcer in human beings which comprises administering an effective amount of a pharmaceutical composition comprising at least one of the conjugated  $\gamma$ -oxybutenolide compounds represented by the general formula:



wherein  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are the same or different and represent hydrogen atoms, alkyl groups, hydroxyl groups, alkoxy groups, nitro groups, cyano groups or halogen atoms; and optionally at least one pharmaceutically acceptable carrier.

4,950,819

#### PROCESS FOR THE PREPARATION OF ALKALI METAL SALTS OF PHOSPHONIC ACID MONOALKYL ESTERS

Claus D. Weis, Pfeffingen, and Peter Sutter, Muttetz, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 19, 1988, Ser. No. 245,489

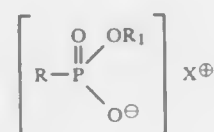
Claims priority, application Switzerland, Oct. 1, 1987, 3824/87

Int. Cl.<sup>5</sup> C07F 9/40

U.S. Cl. 558-131

5 Claims

1. A process for the preparation of an alkali metal salt of a phosphonic acid monoalkyl ester of the formula



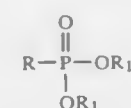
wherein

R is a straight chain or branched  $C_1$ - $C_{20}$ alkyl,

$R_1$  is  $C_1$ - $C_4$ alkyl, and

X is an alkali metal cation,

which comprises reacting 1 mole of a phosphonic acid ester of the formula



wherein R and  $R_1$  are as defined above, with 1 mole of a finely particulate alkali metal halide of the formula

XY

wherein

X is an alkali metal cation and

Y is a halogen anion,

in a temperature range from 30° to 220° C., for 30 minutes to 3 hours in the absence of a solvent.

4,950,820

#### PROCESS FOR THE HYDROGENATION OF OLEFINIC HYDROCARBONS IN HYDROCARBON MIXTURES CONTAINING TERT-ALKYL ALKYL ETHERS

Bernhard Schleppinghoff, Dormagen; Horst Reinhardt, Bergheim, and Hans-Joachim Krämer, Dormagen, all of Fed. Rep. of Germany, assignors to EC Erdölchemie GmbH, Cologne, Fed. Rep. of Germany

Filed Jul. 14, 1986, Ser. No. 885,042

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526443

Int. Cl.<sup>5</sup> C07C 5/02

U.S. Cl. 585-264

17 Claims

1. A process for the hydrogenation of a gasoline fraction suitable for use in automotive gasoline wherein said gasoline fraction contains olefinic hydrocarbons and tert-alkyl alkyl ethers with substantial preservation of the ethers, wherein said hydrogenation is conducted in the presence of a catalyst which has an active component for hydrogenation on a catalyst support having a specific surface area of more than 50 m<sup>2</sup>/g and a pore diameter of, in the main, 1,000nm.

4,950,821

#### PROCESS FOR THE CONVERSION OF NATURAL GAS INTO MIDDLE DISTILLATES

Paul Ratnasamy, and Subramanian Sivasanker, both of Maharashtra, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Filed Aug. 11, 1989, Ser. No. 392,348

Int. Cl.<sup>5</sup> C01C 1/00

U.S. Cl. 585-310

10 Claims

1. An improved process for the conversion of natural gas into middle distillates which comprises the steps of (1) converting natural gas into synthesis gas consisting essentially of CO and hydrogen, (2) contacting the syngas with a series of three catalyst beds comprising an admixture of oxides of copper, zinc and aluminum in the first bed, an oxide of aluminum in the second bed and the silicate salt of a rare earth metal in the third bed whereby are formed olefinic hydrocarbons admixed in an aqueous phase, (3) separating the olefinic hydrocarbons from the aqueous phase and converting the said hydrocarbons into oligomers boiling in the middle distillates range by contacting said olefinic hydrocarbons with a solid oligomerization catalyst, (4) converting the oligomers into middle distillates by mixing with hydrogen and contacting the mixture with a hydrogenation catalyst.

4,950,822

#### OLEFIN OLIGOMER SYNLUKE PROCESS

Thomas J. Dileo; Marshall B. Nelson, and Matthew J. Lynch, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jun. 27, 1988, Ser. No. 212,018

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 2/00

U.S. Cl. 585-310

3 Claims

1. A process for preparing a saturated olefin oligomer fraction suitable for use as an internal combustion engine lubricant, said process comprising:

- oligomerizing a  $C_8$ - $_{12}$   $\alpha$ -olefin with a promoted  $BF_3$  catalyst to obtain a crude unsaturated oligomer containing unsaturated monomer, dimer, trimer, tetramer and higher unsaturated oligomers,
- distilling said crude unsaturated oligomer to remove said monomer and dimer leaving a substantially dimer-free unsaturated oligomer,
- distilling said dimer-free unsaturated oligomer to obtain a distillate fraction containing at least 90 weight percent of trimer, and
- hydrogenating said distillate fraction to obtain said saturated olefin oligomer.

4,950,823

#### BENZENE UPGRADING REFORMER INTEGRATION

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Jul. 3, 1989, Ser. No. 375,172

Int. Cl.<sup>5</sup> C07C 2/12

U.S. Cl. 585-322

22 Claims

1. A continuous process for providing an integrated product recovery system for a primary catalytic hydrocarbon reforming reactor and a secondary catalytic olefins oligomerization-alkylation reactor, the process comprising:

- withdrawing reformer effluent from primary reformer reactor;
- separating in a primary separation zone the reformer effluent into a primary overhead stream comprising noncondensable light paraffins and a primary bottoms stream comprising  $C_6$  to  $C_8$  aromatic hydrocarbons;
- withdrawing oligomerization effluent from secondary oligomerization-alkylation reactor;
- separating in a secondary separation zone the oligomerization effluent into a secondary overhead stream comprising

$C_4$ -hydrocarbons and inert gases and a secondary bottoms stream comprising  $C_5$ +hydrocarbons;

maintaining a fractionation system comprising a fractionation column at a bottom temperature of about 127° C.-238° C. and a pressure of about 687-1374 kPa, and a reboiler unit;

adding the primary bottoms stream and the secondary bottoms stream to the fractionation column;

withdrawing from the top of the fractionation column a stream comprising  $C_4$ -hydrocarbons;

withdrawing from the bottom of the fractionation column a stream comprising  $C_5$ +hydrocarbons;

adding the  $C_5$ +hydrocarbon stream to the reboiler unit;

withdrawing from the reboiler unit a vapor stream comprising benzene and a liquid stream comprising  $C_5$ +hydrocarbons boiling in the gasoline range;

adding at least a portion of said vapor stream comprising benzene to the secondary catalytic olefins oligomerization-alkylation reactor; and

adding a light olefins feedstream comprising ethene, propene or mixtures thereof to the olefins oligomerization-alkylation reactor.

4,950,824

#### PROCESS FOR THE PRODUCTION OF 2,6-DIISOPROPYLNAPHTHALENE

Yoshimi Shiroto; Mitsueori Shimura; Kenji Shimokawa, all of Yokohama; Yoshio Fukui, Tokyo; Sachio Asaka, Yokohama; Hiroto Tajima, Kamakura; Kazuaki Ueda, Kawasaki; Yakudo Tachibana, Kasukabe; Kazuhiko Tate, Yokohama, and Hiroaki Taniguchi, Kuki, all of Japan, assignors to Chiyoda Corporation and NKK Corporation, both of Japan

Filed Aug. 2, 1989, Ser. No. 388,393

Claims priority, application Japan, Sep. 26, 1988, 63-242091; Dec. 26, 1988, 63-328473

Int. Cl.<sup>5</sup> C07C 4/00, 2/64, 2/66, 7/12

U.S. Cl. 585-320

31 Claims

1. A process for the production of 2,6-diisopropyl-naphthalene, comprising the steps of:

- reacting a monoisopropyl-naphthalene-containing feed with propylene to obtain a first mixture containing isopropylated naphthalenes;
- subjecting said first mixture to transalkylation with a triisopropyl-naphthalene-containing mixture to obtain a second mixture containing mono-, di- and tri-isopropyl-naphthalenes;
- separating said second mixture by a first distillation into a first fraction containing monoisopropyl-naphthalenes, a second fraction having a higher boiling point than that of said first fraction and containing diisopropyl-naphthalenes and a third fraction having a boiling point higher than that of said second fraction and containing triisopropyl-naphthalenes;
- recycling at least part of said third fraction to step (b) as said triisopropyl-naphthalene-containing mixture;
- separating said second fraction into a first product rich in 2,6-diisopropyl-naphthalene and a second product rich in diisopropyl-naphthalenes other than 2,6-diisopropyl-naphthalene;
- subjecting said second product to transalkylation with naphthalene to obtain a third mixture containing monoisopropyl-naphthalenes; and
- recycling said third mixture to step (a), as at least a portion of said monoisopropyl-naphthalene-containing feed, and/or step (c) with the proviso that when said third mixture is recycled only to step (c), at least part of said first fraction obtained in step (c) is recycled to step (a) as said monoisopropyl-naphthalene-containing feed.

4,950,825

**PREPARATION OF A DIMETHYLTETRALIN**  
David L. Sikkenga, Wheaton, Ill.; Joyce D. Lamb, Ringgold, Ga.; Ian C. Zaenger, Glen Ellyn, and Gregory S. Williams, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.  
Continuation-in-part of Ser. No. 211,000, Jun. 24, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 316,308  
Int. Cl.<sup>5</sup> C07C 15/24

U.S. Cl. 585—320

49 Claims

1. A method for preparing one or more dimethyltetralins from 5-(o-, m-, or p-tolyl)-pent-1- or -2-ene or 5-phenyl-hex-1- or -2-ene as the first feedstock comprising: contacting the first feedstock in liquid form with a solid cyclization catalyst comprising an acidic ultra-stable crystalline aluminosilicate molecular sieve Y-zeolite that has a silica-to-alumina molar ratio of from about 4:1 to about 10:1, pore windows provided by twelve-membered rings containing oxygen and a unit cell size of from about 24.2 to about 24.7 angstroms, and that contains from about 0.05 up to about 3.5 weight percent of sodium, calculated as elemental sodium, and based on the weight of the zeolite and that is substantially free of adsorbed water, and at a temperature in the range of from about 120° C. to about 250° at a pressure that is sufficiently high to maintain the first feedstock substantially in the liquid phase, to thereby cyclize the first feedstock to form a first liquid product comprising one or more dimethyltetralins, wherein water is at a concentration in the first feedstock of from zero up to less than about 0.5 weight percent, based on the weight of the feedstock, wherein (1) when the first feedstock comprises 5-(o-tolyl)-pent-1- or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,5-, 1,6-, 2,5- or 2,6-dimethyltetralin or a mixture thereof, (2) when the first feedstock comprises 5-(m-tolyl)-pent-1- or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,5-, 1,6-, 1,7-, 1,8-, 2,5-, 2,6-, 2,7- or 2,8-dimethyltetralin or a mixture thereof, (3) when the first feedstock comprises 5-(p-tolyl)-pent-1- or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,7-, 1,8-, 2,7- or 2,8-dimethyltetralin or a mixture thereof, or (4) when the first feedstock comprises 5-phenyl-hex-1- or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised of 1,3-, 1,4-, 2,3-, 5,7-, 5,8- or 6,7-dimethyltetralin or a mixture thereof.

4,950,826

**PROCESS FOR ADJUSTING THE CIS-TRANS-DOUBLE BOND CONFIGURATION IN POLYALKENAMERS**  
Dieter Zerpner, and Roland Streck, both of Marl, Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Aug. 22, 1986, Ser. No. 899,452

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529996

Int. Cl.<sup>5</sup> C08F 32/06

U.S. Cl. 585—353

14 Claims

1. In a process for producing polyalkenamers produced by ring-opening polymerization of cis,cis-1,5-cyclooctadiene in the presence of a ring-opening polymerization catalyst, the improvement comprising:

conducting the polymerization in the presence of 0.1 to 150 mol%, in relation to the cis,cis-1,5-cyclooctadiene, of a cyclic olefin with double bonds in the 1,3-position, whereby the proportion of cis double bonds in the polyalkenamer is increased.

4,950,827

**OXIDATIVE COUPLING OF ALIPHATIC AND ALICYCLIC HYDROCARBONS WITH ALIPHATIC AND ALICYCLIC SUBSTITUTED AROMATIC HYDROCARBONS**

Erek J. Erekson, LaGrange, and Anthony L. Lee, Glen Ellyn, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 172,808, Mar. 28, 1988, Pat. No. 4,826,796. This application Nov. 21, 1988, Ser. No. 274,454  
The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 2/00

U.S. Cl. 585—415

35 Claims

1. A process for producing higher molecular weight hydrocarbons by forming longer substituent hydrocarbon on an aromatic ring, said process comprising: oxidative coupling a compound selected from aliphatic hydrocarbon compounds, alicyclic hydrocarbon compounds, and mixtures thereof with a compound selected from aliphatic substituted aromatic hydrocarbon compounds, alicyclic substituted aromatic hydrocarbon compounds, and mixtures thereof to form a longer substituent hydrocarbon on an aromatic ring in the presence of oxygen and a mixed basic metal oxide catalyst having the formula:

 $x\text{A.yB.zC.qO}$ 

wherein

A is an alkali metal selected from lithium, sodium, potassium, rubidium, cesium and mixtures thereof;

B is action which has an ionization state 1 greater than the ionization state of C;

B is selected from the group consisting of scandium, yttrium, lanthanum, actinium, aluminum, boron and mixtures when C is selected from the group consisting of beryllium, magnesium, calcium, strontium, barium, radium, zinc, cadmium, mercury and mixtures thereof, and

B is selected from the group consisting of titanium, zirconium, hafnium, silicon and mixtures thereof, when C is selected from the group consisting of scandium, yttrium, lanthanum, actinium, aluminum, boron and mixtures thereof;

x and y are in mole fractions of z such that when z=1 then x=0.001 to 0.25, and y=0.001 to 0.25; and q is a number necessary to maintain charge balance with O being oxygen.

4,950,828

**PROCESS FOR UPGRADING LIGHT PARAFFINS**  
Victor K. Shum, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jun. 30, 1989, Ser. No. 375,139

Int. Cl.<sup>5</sup> C07C 2/52

U.S. Cl. 585—417

14 Claims

1. A process for converting a gaseous hydrocarbon feed containing C<sub>3</sub> through C<sub>5</sub> paraffinic hydrocarbons to aromatic hydrocarbons which comprises contacting the feed under conversion conditions with a catalyst composition comprising a borosilicate molecular sieve, a platinum metal component and a gallium metal component.

4,950,829

**AROMATIZATION WITH IMPROVED SELECTIVITY**  
Scott Han, Lawrenceville, N.J., and Sharon B. McCullen, Newtown, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 57,841, Jun. 6, 1987, abandoned. This application Aug. 8, 1988, Ser. No. 229,199

Int. Cl.<sup>5</sup> C07C 2/00

U.S. Cl. 585—417

26 Claims

1. A process for increasing the aromatic product selectivity

of a catalytic conversion of low octane hydrocarbons to aromatics by aromatization catalyzed by a zeolite, wherein the process comprises:

providing a feed of said low octane C<sub>2</sub>-C<sub>12</sub> hydrocarbons; contacting said feed with a catalyst free of a dehydrogenation/hydrogenation metal and comprising a silicate having the X-ray diffraction pattern of a zeolite of Constraint Index of 1 to 12, under aromatization conditions wherein the silicate has been modified to increase its selectivity for aromatic products under said aromatization conditions, wherein the silicate is modified by treating it with an oxyphile in an atmosphere inert to oxide formation of the oxyphile, wherein the oxyphile is a tetrachloride of titanium or silicon wherein treating comprises passing the tetrachloride in the vapor state over the silicate and thereby forming a precalcined catalyst and then calcining the precalcined catalyst; undertaking said contacting at conditions including a liquid hourly space velocity (LHSV) of 0.1 to 10, from ambient pressure to a pressure of 100 psig at a temperature of 300° C. to 600° C.; recovering said aromatics.

4,950,830

**DEHYDRATION OF ALIPHATIC AND ALICYCLIC HYDROCARBONS AND ALIPHATIC AND ALICYCLIC SUBSTITUTED AROMATIC HYDROCARBONS**

Erek J. Erekson, LaGrange, and Anthony L. Lee, Glen Ellyn, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 172,808, Mar. 28, 1988, Pat. No. 4,826,796. This application Nov. 21, 1988, Ser. No. 274,499  
Int. Cl.<sup>5</sup> C07C 5/333

U.S. Cl. 585—444

35 Claims

1. A process for producing unsaturated aliphatic and alicyclic hydrocarbon chains by dehydrogenation, said process comprising:

dehydrogenating a compound selected from aliphatic hydrocarbon compounds, alicyclic hydrocarbon compounds, aliphatic substituted aromatic hydrocarbon compounds, alicyclic substituted aromatic hydrocarbon compounds, and mixtures thereof in the presence of a mixed basic metal oxide catalyst having the formula:

 $x\text{A.yB.zC.qO}$ 

wherein

A is an alkali metal selected from lithium, sodium, potassium, rubidium, cesium and mixtures thereof;

B is a cation which has an ionization state greater than the ionization state of C;

B is selected from the group consisting of scandium, yttrium, lanthanum, actinium, aluminum, boron and mixtures thereof when C is selected from the group consisting of beryllium, magnesium, calcium, strontium, barium, radium, zinc, cadmium, mercury and mixtures thereof, and

B is selected from the group consisting of titanium, zirconium, hafnium, silicon and mixtures thereof, when C is selected from the group consisting of scandium, yttrium, lanthanum, actinium, aluminum, boron and mixtures thereof;

x and y are in mole fractions of z such that when z=1 then x=0.001 to 0.25, and y=0.001 to 0.25; and

q is a number necessary to maintain charge balance with O being oxygen.

4,950,831

COUPLING PROCESS

James S. Staton; Ronald A. Turnblad, Jr., and Robert B. Agee, all of Orangeburg, S.C., assignors to Ethyl Corporation, Richmond, Va.

Filed Sep. 28, 1989, Ser. No. 413,961

Int. Cl.<sup>5</sup> C07C 2/64

U.S. Cl. 585—447

16 Claims

1. In a process for coupling an alkene with an aromatic

4,950,832

**METHOD FOR PREPARATION OF DIALKYLNAPHTHALENES AND CATALYST FOR THE SAME**

Mitsuo Kojima, Yokohama, Japan, assignor to Nikki Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,304

Claims priority, application Japan, Jul. 29, 1987, 62-187682  
Int. Cl.<sup>5</sup> C07C 2/70

U.S. Cl. 585—463

4 Claims

1. A method for preparation of 2,6-dialkyl-naphthalene comprising: reacting naphthalene monoalkyl-naphthalene or mixtures thereof having an alkyl group of 1 to 4 carbon atom(s) with an olefin having 2 to 4 carbon atoms, in the presence of a silica-alumina catalyst containing 0.1-15 weight percent of fluorine, under conditions of molar ratio of the olefin to the naphthalene the monoalkyl-naphthalene or mixtures thereof of 0.5-3, a reaction temperature of 200°-450° C., a reaction pressure of 2-30 kg/cm<sup>2</sup>G and a LHSV of 0.2-10 Hr<sup>-1</sup>.

4,950,833

**PROCESS FOR THE REDUCTIVE DEHALOGENATION OF POLYHALOAROMATICS**

Jalal A. Hawari, Ville St-Laurent, and Réjean Samson, Fabreville Laval, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the National Research Council of Canada, Ottawa, Canada

Filed Sep. 28, 1989, Ser. No. 413,942

Int. Cl.<sup>5</sup> C07C 1/20

U.S. Cl. 585—469

10 Claims

1. A process for the reductive dehalogenation of polyhaloaromatic compounds which comprises reacting polyhaloaromatics, in a hydrocarbon or silicone-based oil or an organic diluent, with an excess alkali metal in the presence of an ammonium salt to reduce the polyhaloaromatics to hydrogenated aromatics and to convert the halogen content to metal halides.

4,950,834

**ALKYLATION OF ORGANIC AROMATIC COMPOUNDS IN A DUAL BED SYSTEM**

Robert P. Arganbright, and Dennis Hearn, both of P.O. Box 34687, Houston, Tex. 77034

Filed Jul. 26, 1989, Ser. No. 385,443

Int. Cl.<sup>5</sup> C07C 2/66

U.S. Cl. 585—446

22 Claims

1. A process for the production of cumene by the alkylation of benzene with propylene comprising the steps of:

(a) feeding a stream containing propylene into a distillation reactor column at a point below a bed of Omega molecular sieve catalyst prepared as distillation structures;

(b) feeding benzene into said distillation reactor column at a point above said bed of Omega molecular sieve catalyst;

(c) concurrently in said distillation reactor column:

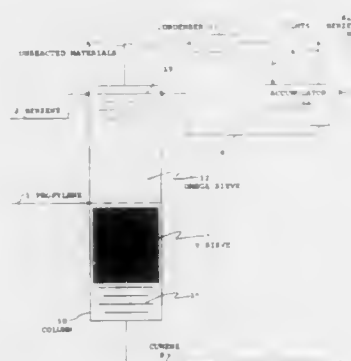
(1) reacting a portion of said propylene with said benzene within said bed of Omega molecular sieve catalyst to form a reaction mixture containing cumene, unreacted benzene, unreacted propylene and other reaction products, said other reaction products including dipropylbenzene and dimerized propylene, and

(2) fractionally distilling said reaction mixture within said bed of Omega molecular sieve catalyst to partially separate said cumene from said unreacted benzene, said unreacted propylene and said other reaction products forming a liquid phase containing cumene, unreacted



benzene, unreacted propylene and other reaction products, and a gaseous phase substantially free of said cumene;

- (d) contacting said liquid phase with a bed of zeolite Y molecular sieve catalyst to preferentially react said unreacted benzene contained therein with said unreacted propylene and propylene dimer and said dipropylbenzene contained therein to form additional cumene;



- (e) after contact with said zeolite Y molecular sieve catalysts, fractionally distilling said liquid phase in said distillation reactor column into said bed of Omega molecular sieve catalyst;
- (f) withdrawing cumene from a point below said bed of Omega molecular sieve catalyst; and
- (g) withdrawing unreacted benzene and unreacted propylene at a point above said bed of Omega molecular sieve catalyst.

4,950,835

#### NOVEL SILICON-MODIFIED CATALYST SI/HZSM-5, ITS PREPARATION, AND A PROCESS FOR SYNTHESIZING HIGH PURITY P-DIALKYL BENZENE FROM MONOALKYL BENZENE BY USING SAID CATALYST

Ikai Wang; Bing-Jye Lee, and Mei-Hwei Chen, all of Hsinchu, Taiwan, assignors to Taiwan Styrene Monomer Corporation, Taipei, Taiwan

Filed Oct. 24, 1989, Ser. No. 426,741  
Int. Cl.<sup>5</sup> C07C 2/68

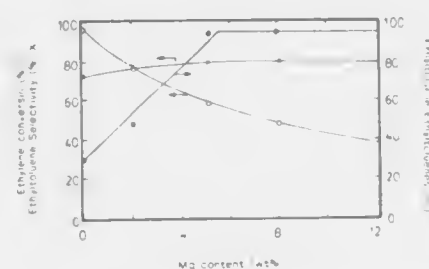
U.S. Cl. 585—467

7 Claims

1. A process for the preparation of p-alkyl benzene by contacting a mixture of monoalkyl benzene and C<sub>1</sub>–C<sub>4</sub> alkene or alkanol with a Si/HZSM-5 zeolite catalyst, characterized in that:

said Si/HZSM-5 zeolite is produced by depositing silicon sediment obtained by decomposing in vapor phase a sili-

con source of tetra alkyl orthosilicate or tetraalkoxy silane of the formula Si(OR)<sub>4</sub> (in which R represents alkyl group



containing 1–4 carbon atoms) on the surface of an HZSM-5 catalyst, said silicon sediment substantially not clogging the pores of said HZSM-5 catalyst.

4,950,836

#### OXIDATIVE METHYLATION OF ORGANIC COMPOUNDS

James B. Kimble, Bartlesville, and John H. Kolts, Ochelata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 947,235, Dec. 29, 1986, abandoned, Ser. No. 945,123, Dec. 22, 1986, Ser. No. 945,129, Dec. 22, 1986, abandoned, and Ser. No. 938,907, Dec. 8, 1986, Pat. No. 4,774,216, which is a division of Ser. No. 742,340, Jun. 7, 1985, Pat. No. 4,658,077, Ser. No. 938,895, Dec. 8, 1986, Pat. No. 4,775,654, which is a division of Ser. No. 713,674, Mar. 19, 1985, Pat. No. 4,672,145, Ser. No. 742,337, Jun. 7, 1985, and Ser. No. 742,335, Jun. 7, 1985. This application Apr. 13, 1988, Ser. No. 181,144

Int. Cl.<sup>5</sup> C07C 2/66

U.S. Cl. 585—467

11 Claims

1. A method for the oxidative methylation of a feed selected from the group consisting of propylene, isobutylene, and toluene, comprising the steps of:

- contacting said feed, a free oxygen-containing gas, and methane with a solid contact material comprising: (A) at least one metal selected from the group consisting of Group IA metals; (B) at least one metal selected from the group consisting of Group IIA metals, Lanthanum Series metals, zinc, and titanium; and (C) oxygen, under conditions sufficient to convert said propylene, when present, to significant amounts of at least one of ethylene and butenes, said isobutylene, when present, to signify amounts of isoprene, and said toluene, when present, to significant amounts of at least one of styrene and ethylbenzene.

## ELECTRICAL

4,950,837

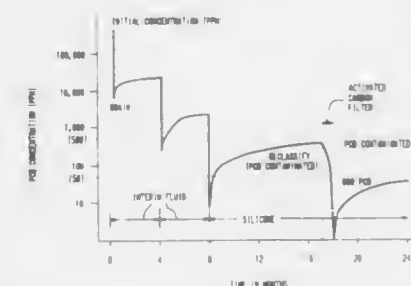
#### METHOD FOR RECLASSIFYING PCB TRANSFORMERS

Craig W. Horneck, Scotia; John B. McDermott, Rexford; Daniel P. Smith, Ballston Spa; Shiro G. Kimura, Schenectady, and Roger A. Shisler, Ballston Spa, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 18, 1989, Ser. No. 381,236  
Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 174—14 R

26 Claims



1. A method for reducing PCB concentration in an electrical induction apparatus containing a dielectric fluid with greater than 500 ppm PCB to a level of less than about 50 ppm PCB, comprising:

- (a) draining dielectric fluid containing greater than 500 ppm PCB from an electrical induction apparatus;
- (b) filling the drained apparatus with a first interim dielectric fluid comprised of tetrachloroethylene;
- (c) electrically operating said apparatus filled with said first interim dielectric fluid so as to attain about an equilibrium PCB concentration in the first fluid;
- (d) draining the first interim dielectric fluid from said apparatus after attaining the equilibrium PCB concentration of (c) and replacing said first fluid with a second interim dielectric fluid comprised of tetrachloroethylene;
- (e) electrically operating said apparatus filled with said second interim dielectric fluid so as to attain about an equilibrium PCB concentration in the second fluid;
- (f) draining the second interim dielectric fluid from said apparatus after attaining the equilibrium PCB concentration of (e) and replacing said second fluid with a permanent dielectric fluid comprised of silicone fluid;
- (g) electrically operating said apparatus filled with said permanent dielectric fluid; and
- (h) filtering said permanent dielectric fluid through a carbon filter while electrically operating said apparatus filled with said permanent dielectric fluid so as to attain PCB concentration in the permanent fluid of less than about 50 ppm.

4,950,838

#### ELECTRICAL CONNECTOR

Gregg Gordon, Manchester, N.H., assignor to Burndy Corporation, Norwalk, Conn.

Filed Jun. 26, 1989, Ser. No. 371,033  
Int. Cl.<sup>5</sup> H01R 11/28

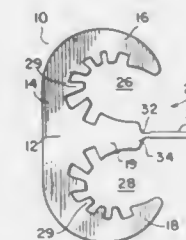
U.S. Cl. 174—94 R

11 Claims

1. An electrical connector comprising a body member of substantially E-shaped configuration, said body member being defined by a main body portion, an upper arm, a lower arm, and an intermediate member, said upper and lower arms each terminating in an end, an opening extending between said ends of said upper and lower arms, said opening communicating with the interior of said body member, said intermediate member extending from said main body portion toward said opening and terminating in a distal end, said main body portion, said upper arm and said intermediate member together defining an upper conductor receiving cavity, said main body portion, said lower arm and said intermediate member together defining a lower conductor receiving cavity, each of said conductor

receiving cavities being adapted to receive a conductor positioned longitudinally in said electrical connector, and at least one integral retaining member connected at one end to said distal end of said intermediate member, said retaining member projecting through said opening and terminating beyond said upper and lower arms, said retaining member being adapted to be manually grasped and rotated toward either one of said upper and lower arms so as to retain a conductor which is positioned in the conductor receiving cavity associated with the arm toward which said retaining member is rotated.

10. A method of using an electrical connector characterized by an integral generally E-shaped body member having a main body portion, upper and lower arms, and an intermediate member disposed between said upper and lower arms, an opening extending between said upper and lower arms and communicating with the interior of said body member, said body member, said upper arm and said intermediate member defining an upper conductor receiving cavity, said body mem-



ber, said lower arm and said intermediate member defining a lower conductor receiving cavity, a retaining member integrally and hingedly connected at one end to said intermediate member, said retaining member terminating in an end located exteriorly of said body member, said method comprising the steps of:

- (a) manually positioning a first conductor longitudinally within one of said conductor receiving cavities;
- (b) manually grasping said retaining member exteriorly of said body member;
- (c) manually rotating said retaining member toward the arm with which said one of said conductor receiving cavities is associated;
- (d) manually placing said connector on a second conductor so that said second conductor is longitudinally disposed within the other of said conductor receiving cavities; and
- (e) compressing said connector by means of a compression tool so as to bring said upper and lower arms together and closing said opening between said arms.

4,950,839

#### ELECTRICAL CORD TRANSITION ASSEMBLY FOR THE JUNCTURE OF A WORK SURFACE AND AN UPRIGHT WALL PANEL

Gail M. Quinn, Ada; Allen L. Palmbo, Jenison, and Brian J. Persing, Grand Rapids, all of Mich., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1989, Ser. No. 313,551  
Int. Cl.<sup>5</sup> H02G 3/22

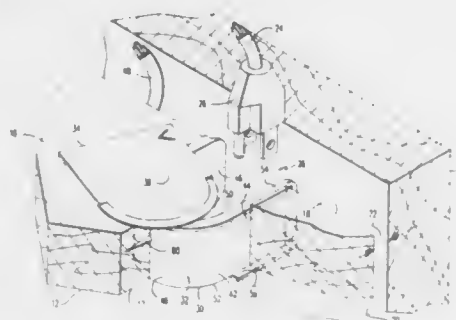
U.S. Cl. 174—48

10 Claims

1. In a desk having a desk top defining a work surface, and an adjoining upright wall panel at a predetermined edge of the desk top, an electrical cord transition assembly for accommodating an electrical plug of an electrically energizable object on the work surface which requires access to an electrical receptacle below the work surface, comprising:

- an inwardly extending slot defined by the predetermined edge of the desk top,
- a grommet lining said slot,
- and a grommet cover pivotally attached to said grommet via a substantially vertically oriented pivot axis, whereby the

grommet cover substantially covers the slot in a predetermined first position, and may be pivoted away from said



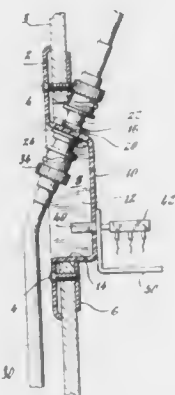
first position to a temporary second position which exposes the slot for passage of an electrical plug.

**4,950,840**  
**WALL RECESS CABLE CONNECTOR PERMITTING SIMPLIFIED INNERCONNECTION AND LIMITING PROTRUDING CABLES**

Maurice F. Zetena, 31 Lampost Dr., West Redding, Conn. 06876  
Division of Ser. No. 521,448, Aug. 8, 1983, Pat. No. 4,558,172.  
This application Sep. 16, 1985, Ser. No. 776,758  
The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.  
Int. Cl.<sup>5</sup> H02G 3/14

U.S. Cl. 174-66

2 Claims



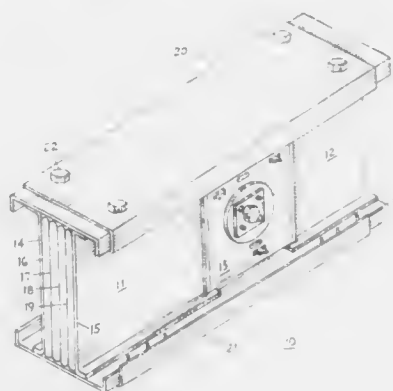
2. A flush type, wall mounted, connector assembly for interconnection of coaxial cables, for devices such as small office computers, with coaxial cables within structural walls, said assembly including

- a wall plate having an outer surface and an inwardly recessed chamber for receiving and interconnecting said coaxial cables, said recessed chamber including side and back walls and a coaxial connector on one of said side or back walls,
- said side and back walls defining a space adequate to hold said coaxial connector entirely within said chamber and to permit finger access for rotatably attaching a coaxial cable to a said coaxial connector on one of said side or back walls,
- a multi-positioned switch secured to one of said walls to interconnect a coaxial connector with coaxial cables within the structural walls, and said switch having actuating buttons projecting into said chamber, and means for mounting said assembly in a wall opening, whereby an external coaxial cable may be connected and disconnected within said wall assembly.

**4,950,841**  
**THERMALLY EFFICIENT SPLICE JOINT FOR ELECTRICAL DISTRIBUTION BUSWAY**  
Clarence W. Walker, Selmer, Tenn., and David A. Hibbert, South Windsor, Conn., assignors to General Electric Company, New York, N.Y.  
Filed May 30, 1989, Ser. No. 376,128  
Int. Cl.<sup>5</sup> H01R 13/20

U.S. Cl. 174-88 B

19 Claims

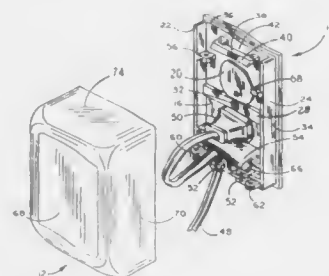


1. An electric power bus removable joint comprising: a pair of opposing apertured front and rear plates; a plurality of interleaved conductive splice plates and insulative isolation plated intermediate said front and rear plates;
- at least one spacer-connector means attached to said front and rear plates to fasten said front plates to said rear plates and to separate said front plates from said rear plates by a fixed separation distance; and
- an insulated thru-bolt extending through said front and rear plates, said splice plates and said isolation plates to thereby fasten said front and rear plates to said splice plates and said isolation plates.

**4,950,842**  
**ELECTRICAL OUTLET SAFETY COVER**  
Mark E. Menninga, 3811 48th Pl., Des Moines, Iowa 50310  
Filed May 22, 1989, Ser. No. 354,777  
Int. Cl.<sup>5</sup> H02G 3/18

U.S. Cl. 174-67

14 Claims



1. An electrical outlet safety cover, comprising: an apertured base plate to replace the conventional face plate on an electrical outlet,
- a first locking member on said base plate
- a box-like cover for encasing said base plate and that portion of an electric cord connected to the electrical outlet,
- a second locking member on the interior of said cover,
- said first and second locking members coacting when said cover is introduced to said base plate to effectively lock said cover to said base plate in a position where said locking members are completely enclosed by said cover and

inaccessible from outside of said cover so that said cover cannot be removed by manual manipulation, and said second locking member constructed and adapted for movement in response to the presence of a magnetic force provided from outside of said cover to release said locking members and permit removal of said cover.

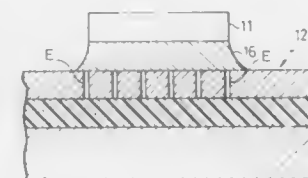
**4,950,843**  
**MOUNTING STRUCTURE FOR SEMICONDUCTOR DEVICE**

Yukitsugu Hirota, Kamakura, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Nov. 25, 1988, Ser. No. 275,836  
Claims priority, application Japan, Nov. 25, 1987, 62-178307[U]

Int. Cl.<sup>5</sup> H05K 1/00

U.S. Cl. 174-260

7 Claims



1. A mounting structure for a semiconductor device, comprising: a metal printed circuit board having a surface portion comprising a metallic wiring layer, the metallic wiring layer including a plurality of bonding portions defined by holes etched in the metallic wiring layer; and a semiconductor device having a body connected to the bonding portions of the metallic wiring layer by means of a bonding material interposed therebetween;
- wherein the metallic wiring layer is divided into the plurality of bonding portions such that a shearing strain caused in the bonding material due to heating of the semiconductor device and the metallic wiring layer is reduced.

**4,950,844**  
**METHOD AND APPARATUS FOR OBTAINING A CORE SAMPLE AT AMBIENT PRESSURE**

Bobby J. Hallmark, Fort Worth, and Milton B. Enderlin, Arlington, both of Tex., assignors to Halliburton Logging Services Inc., Houston, Tex.

Filed Apr. 6, 1989, Ser. No. 333,676

Int. Cl.<sup>5</sup> E21B 49/06

U.S. Cl. 175-59

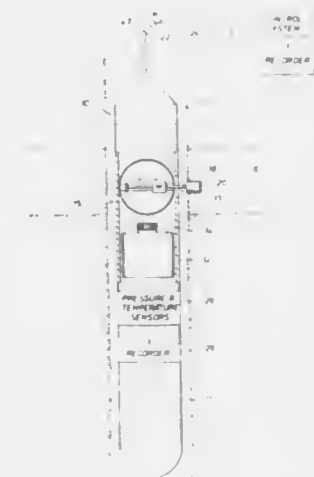
23 Claims

1. Apparatus for capturing a core sample cut from a formation of interest, comprising: (a) demountable chamber means having: (1) a surrounding housing; (2) a central, top located, core receiving opening; (3) a valve element with a core sized passage therethrough for receiving a core into said housing; (4) means for operating said valve element to open and close; and (5) an internal core receiving cavity formed by a surrounding resilient sleeve; (b) a fluid chamber surrounding said sleeve; (c) fluid pressure transfer means extending from the exterior of said chamber means to said fluid chamber; (d) first and second valve controlled fluid passage into said fluid chamber and internal cavity; (e) means for mounting said chamber means on a laboratory test instrument; and (f) means enabling a laboratory test instrument piston to

extend into said chamber means to load the core in said cavity.

2. A method of obtaining a core sample from a well borehole and placing the core sample in a removable core sample chamber including an internal core sample cavity and a fluid isolating wall defining said cavity around the core sample and the method comprises the steps of:

- (a) positioning the removable chamber in a sonde;
- (b) lowering in the borehole the sonde supporting a core cutter to enable cutting a core sample from a formation of interest;
- (c) controllably transferring the core sample by insertion of the core sample into the open removable chamber to receive the core sample and connate formation fluids;



- (d) isolating fluid in the chamber to equal the ambient pressure at the formation of interest after insertion of the core sample into the removable chamber;
- (e) sealing the cavity after core insertion;
- (f) opening a valve means to regulate fluid pressure on the wall to ambient pressure;
- (g) closing the core sample receiving removable chamber to capture the core sample;
- (h) measuring ambient conditions at the formation of interest;
- (i) retrieving the sonde from the well; and
- (j) removing the chamber with the core sample therein at the isolated pressure.

**4,950,845**  
**SWITCHING DEVICE**

Katsuya Kuroyanagi, Kazuhiro Kimura, Yoshitaka Itakura, Naotaka Hamada, and Hiroyuki Mori, all of Aichi, Japan, assignors to Kojima Press Industry Co., Ltd., Aichi, Japan  
Filed Jan. 4, 1989, Ser. No. 293,344

Claims priority, application Japan, Jan. 7, 1988, 63-1089[U]; Jan. 25, 1988, 63-8443[U]; Dec. 26, 1988, 63-167880[U]  
Int. Cl.<sup>5</sup> H01H 9/26

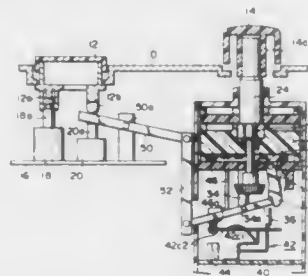
U.S. Cl. 200-5 B

5 Claims

1. A switching device comprising: a depression knob projecting from a plate and manipulated by a depressing operation;
- a depression switch for turning on in response to depressing operation of said depression knob;
- a rotation/depression knob provided on said plate, said rotation/depression knob being operable by rotation and depressing movement;
- a rotation/depression switch for turning on in response to rotation or depressing movement of said rotation/depression knob; and,
- a coupling mechanism between and for operating both said depression switch and said rotation/depression switch

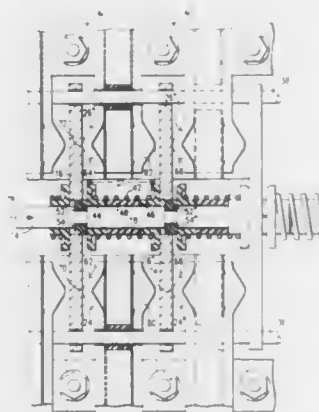


such that when one of said depression switch and said rotation/depression switch is turned ON by operation of



one of said depression knob and said rotation/depression knob, the other of said depression switch and said rotation/depression switch is turned OFF.

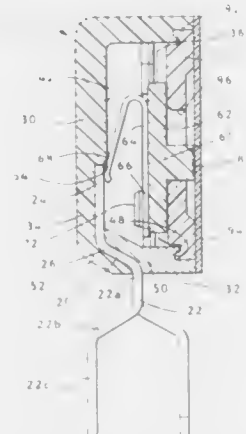
**4,950,846**  
**MULTIPLE POLE ELECTRIC RELAY**  
David D. Pollard, Lima, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Jun. 19, 1989, Ser. No. 352,436  
Int. Cl.<sup>5</sup> H01H 1/20, 15/00, 67/02  
U.S. Cl. 200—16 A 7 Claims



1. A relay comprising:  
a plurality of pairs of stationary electrical contacts for connection to an electric circuit;  
an actuating shaft;  
a plurality of conductive members, positioned at axially spaced locations along said shaft;  
means for moving said shaft in an axial direction between first and second positions;  
a plurality of compressible biasing assemblies positioned along said shaft between said conductive members, each of said assemblies having first and second ends;  
a plurality of stops positioned at said axially spaced locations along said shaft, each of said conductive members having an opening for receiving one of said stops and each of said conductive members being capable of axial displacement with respect to an adjacent one of said stops;  
wherein when said shaft is in said first position, each of said conductive members is in contact with a one of said pairs of said stationary electrical contacts, each of said first ends of said biasing assemblies is in contact with one of said stops and each of said second ends of said assemblies is in contact with one of said conductive members; and  
wherein when said shaft is in said second position, each of said conductive members is in contact with an alternate pair of said stationary electrical contacts, each of said second ends of said biasing assemblies is in contact with

one of said stops and each of said first ends of said assemblies is in contact with one of said conductive members.

**4,950,847**  
**SEALED PRINTED CIRCUIT BOARD SWITCH**  
Timothy B. Billman, Rt. 2, Box 115, King, N.C. 27021, and Roger L. Thrush, 6985 Lanvale Ct., Clemmons, N.C. 27012  
Filed Jul. 13, 1989, Ser. No. 379,517  
Int. Cl.<sup>5</sup> H01H 15/02  
U.S. Cl. 200—16 D 18 Claims

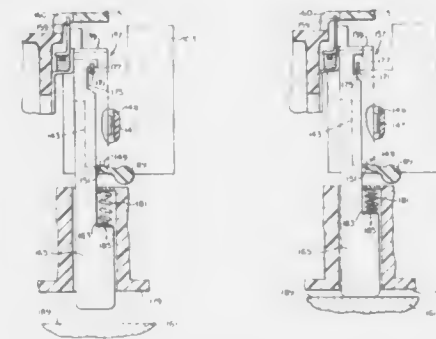


1. A printed circuit board slide switch actuated by movement towards and away from a printed circuit board on which the printed circuit board slide switch is mounted, comprising:  
an insulative body having a first side and a second side adjacent the first side;  
a plurality of side by side terminals each having leads extending from the first side and contact portions located within the insulative body adjacent to the second side;  
slide actuators shiftable towards and away from the printed circuit board, each slide actuator having a switch contact bridging side by side contact portions of adjacent terminals when the slide actuator is in a first position; and  
cam means on the housing engagable with the slide actuator when the slide actuator is shifted from the first to the second position for camming the switch contact out of engagement with at least one of the corresponding side by side contact portions of adjacent terminals when the slide actuator is shifted from the first to the second position;  
whereby the slide switch can be mounted on a printed circuit board with the first side of the insulative body positioned adjacent the printed circuit board with the leads engaging the printed circuit board and the slide switch can be actuated by movement of the switch actuators along the second side towards and away from the printed circuit board.

11. A switch for use on a printed circuit board to alternately connect and disconnect circuits on the printed circuit board, the switch comprising:  
an insulative body;  
a plurality of terminals each having leads extending from the insulative body and contact portions located on the interior of the insulative body;  
at least one slide actuator having a switch contact engagable with the contact portions of two terminals in a first position, the slide actuator being shiftable to a second position to disengage the switch contact from the contact portion of at least one terminal;  
the switch being characterized in that the leads of the terminals extend in a common plane through only one side of the insulative body;  
each lead being bent at a position spaced from the one side so

that adjacent leads are staggered in a ziz-zag configuration, and  
the portion of the leads extending through the one side having an embedded angular contour relative to the orientation of the contact portions.

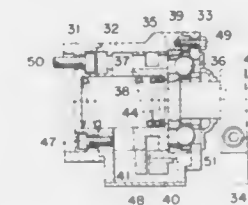
**4,950,848**  
**ADJUSTABLE CIRCUIT BREAKER WITH DRAW OUT INTERLOCK**  
Alfred E. Maier, Beaver Falls, Pa.; Antonio W. M. Cabral, Ilha Do Governador, and Carlos P. S. E. Silva, Rio de Janeiro, both of Brazil, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Sep. 22, 1989, Ser. No. 411,130  
Int. Cl.<sup>5</sup> H01H 33/42  
U.S. Cl. 200—50 AA 4 Claims



1. A circuit breaker releasably mountable on a mounting member in series electrical connection with electrical conductor means to be protected from abnormal currents, said circuit breaker comprising:  
electrical contacts operable between a closed position in which a circuit is completed through the conductor means and an open position in which the circuit through the conductor means is interrupted;  
a latchable operating mechanism operable to operate said electrical contacts to the open position when unlatched;  
a trip bar rotatable from a biased position to a trip position to unlatch said operating mechanism;  
an automatic trip assembly responsive to abnormal current flowing through said conductor means to rotate said trip bar to the trip position;  
an electrically insulating housing enclosing said electrical contacts, said latchable operating mechanism, said trip bar and said automatic trip assembly;  
electrical terminals connected to said electrical contacts within said electrically insulating housing and extending through said housing to releasably engage said electric conductor;  
a manual trip mechanism accessible through said electrically insulating housing and movable from outside said housing from an unactuated position to an actuated position to rotate said trip bar to the trip position; and  
a drawout interlock mechanism including an interlock member movable between a retracted position and an extended position, biasing means biasing said interlock member to the extended position, and coupling means coupling the interlock member to the manual trip mechanism to move said manual trip mechanism to the actuated position with movement of said interlock member from the retracted position to the extended position, but permitting the manual trip mechanism to be moved to the actuated position manually while the interlock member remains in the retracted position, said interlock member being retained in the retracted position by engagement through said housing with said mounting member when said circuit breaker is mounted on said mounting member and said electrical

terminals engage said electrical conductor means, and said interlock member being moved to the extended position by the biasing means as said circuit breaker is withdrawn from the mounting member to trip the circuit breaker through actuation of the manual trip mechanism before said electrical terminals disengage from the electrical conductor means.

**4,950,849**  
**CONTACT DETECTOR FOR MOVABLE OBJECTS**  
Kaoru Kimura, Shunji Sato, and Masahiko Ookura, all of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Kitakyushu, Japan  
Filed Jul. 19, 1989, Ser. No. 382,471  
Claims priority, application Japan, Jul. 23, 1988, 63-183875  
Int. Cl.<sup>5</sup> H01H 3/16 16 Claims  
U.S. Cl. 200—61.41



1. A contact detector for movable objects, comprising:  
a first member having a first surface;  
a second member having a second surface in opposing relationship with said first surface, said first and second surfaces including depressions arranged so as to form opposing pairs of depressions;  
spherical balls positioned between an opposing pair of depressions, and said depressions including a contact surface which conforms to the curvature of said spherical balls, said contact surfaces being formed by placing said spherical balls, which have a diameter larger than that of said depressions and a hardness higher than that of said members, between said members and by applying a pressurizing force to compress said spherical balls positioned between said members such that said contact surfaces are formed due to the spherical surface of said spherical balls being imparted to said depressions;  
biasing means for producing a biasing force smaller than said pressurizing force, but sufficient to hold said spherical balls between said opposing pairs of depressions and to bias one of the two members toward the other;  
support means for supporting said biasing means in position with respect to said members; and  
switching means operative upon movement of one member with respect to the other member, and said switching means having a first part in fixed relationship with respect to said support means and a second part which moves relative to said first part upon movement of said one member with respect to the other member.

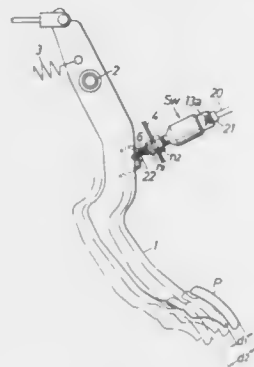
**4,950,850**  
**PEDAL SWITCH ASSEMBLY**  
Taiji Kamimura, and Norio Tomobe, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 20, 1989, Ser. No. 340,860  
Claims priority, application Japan, Apr. 20, 1988, 63-52915[U]  
Int. Cl.<sup>5</sup> H01H 3/14 12 Claims  
U.S. Cl. 200—61.89  
1. A pedal switch assembly for an automobile for providing change-over signals to at least first and second control devices

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used in the automobile as a pedal for operating the automobile is depressed, comprising,  
an actuator operatively associated with said pedal,  
a first switch mechanism operated by said actuator when the amount by which the pedal is depressed exceeds a first set value thereby producing the change-over signal for said first control device,  
a second switch mechanism operated by said actuator when the amount by which the pedal is depressed exceeds a second set value larger than said first set value thereby producing the change-over signal for said second control device, and



a contact bar for common use with said first and second switch mechanisms, said contact bar being movable by said actuator as the pedal is depressed and having an electrically conductive portion which is extended a distance in a direction of engagement of the contact bar with a first set of contacts for the first switch mechanism and a second set of contacts for the second switch mechanism, said electrically conductive portion of the contact bar being capable of simultaneously engaging said first set of contacts and said second set of contacts at longitudinally spaced locations thereof.

4,950,851

## FAST OPERATOR

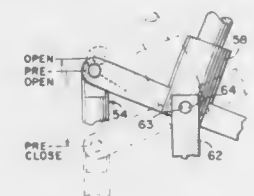
Donald J. Akers, Chicago, Ill., assignor to Joslyn Corporation, Ill.

Filed Aug. 15, 1988, Ser. No. 232,223

Int. Cl.<sup>5</sup> H01H 33/42

U.S. Cl. 200—148 F

17 Claims



1. A circuit interrupting device comprising:  
a housing;  
at least one pair of interrupting contacts disposed in said housing;  
means for electrically connecting said pair of interrupting contacts to an external electrical circuit;  
means for opening and closing said pair of interrupting contacts in a predetermined time period from a command;  
means for prearming said opening and closing means after each switch operation to reduce said predetermined

time period between a command and the opening or closing of said interrupting contacts.

4,950,852

## ELECTRIC CIRCUIT BREAKER ARC CHUTE COMPOSITION

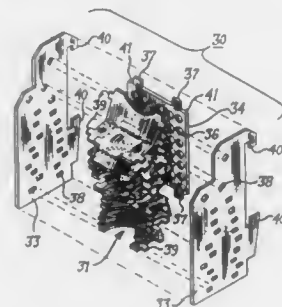
Ira B. Goldman, Waterbury, and Raymond K. Seymour, Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 3, 1989, Ser. No. 331,730

Int. Cl.<sup>5</sup> H01H 33/10

U.S. Cl. 200—144 C

19 Claims



1. A molded case circuit breaker comprising:  
a molded plastic case and cover;  
a pair of separable contacts within said case;  
an operating mechanism moving said contacts between open and closed positions; and  
an arc chute facing said contacts and extinguishing an arc which occurs when said contacts become separated during overcurrent conditions, said arc chute including a plurality of spaced metal plates supported between a pair of side supports and an apertured back support, said side supports each comprising a resin reinforced with wollastonite fibers.

4,950,853

## TAPERED STATIONARY CONTACT-LINE COPPER CROSS REFERENCE TO RELATED APPLICATIONS

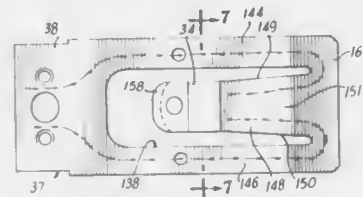
Ronald W. Crookston, Trafford, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 12, 1988, Ser. No. 256,879

Int. Cl.<sup>5</sup> H01H 33/02

U.S. Cl. 200—144 R

2 Claims



1. A circuit breaker having a housing, an operating mechanism and at least one pair of separable contacts, including a fixed main contact carried by a first stationary conductor and a movable main contact carried by a contact arm and electrically connected to a second stationary conductor, said first stationary conductor comprising:  
planar conductor means having a U-shaped slot defining a pair of spaced apart leg portions and a peninsula portion interconnected therewith by a non-coplanar connecting region, oppositely disposed edges of said peninsula portions being tapered outwardly for providing a peninsula

portion of increasing cross sectional area for reducing the temperature rise in said peninsula region.

4,950,854

## VACUUM OPERATED CIRCUIT BREAKER APPARATUS FOR REPLACING AIR-MAGNETIC CIRCUIT BREAKER ASSEMBLIES

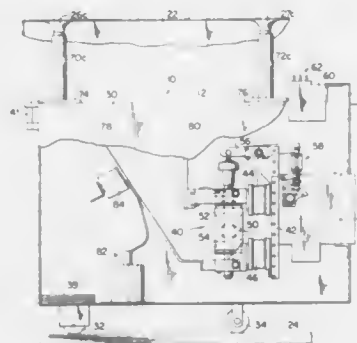
Ian P. Green, Orange, Conn., assignor to Electric Services, Inc., East Haven, Conn.

Filed Oct. 31, 1989, Ser. No. 429,702

Int. Cl.<sup>5</sup> H01H 33/66, 33/42

U.S. Cl. 200—144 B

12 Claims



1. A replacement power protection circuit breaker assembly for use in a switchgear having a cubicle, said cubicle having an interior enclosed by a top wall, a bottom wall, a first side wall and a second side wall, said top and bottom walls being in a spaced apart and generally parallel relationship, said first and second side walls being in a spaced apart and generally parallel relationship and also being generally perpendicular to and intersecting with said top and bottom walls, said cubicle having at least one pair of connectors extending through said top wall and into the interior of said cubicle, each of said at least one connector pairs forming an open electrical circuit to an associated external power circuit, said replacement circuit breaker assembly comprising,

means defining a frame, said frame having a size and shape and being arranged for insertion into the interior of said cubicle;

at least one vacuum operated circuit breaking means defining electrical contact means for providing an electrical circuit path to carry electrical current, each of said circuit breaking means having a first operative state wherein said contact means provide a discontinuous circuit path and a second operative state wherein said contact means provide a continuous circuit path;

control means for causing a selected one of said at least one vacuum operated circuit breaking means to switch from one of said first and second operative states to the other of said first and second operative states, and

means defining at least one pair of contact poles, each of said contact poles being non-conductively secured to said frame and projecting generally towards said cubicle top wall when said assembly is in orientation for insertion into said cubicle, each of said contact poles being generally adjustable along a plane generally defined parallel with said cubicle top wall for mechanical and electrical engagement with a respective cubicle connector, each of said at least one pair of contact poles being electrically coupled in series with a respective one of said at least one vacuum operated circuit breaking means whereby each of said at least one circuit breaking means is connected in electrical series with a respective one of said at least one connector pairs and across said associated external open circuit to provide a continuous electrical path for current to flow in said associated external electrical circuit when said breaking means is in said first operative state and to provide a

discontinuous circuit path to stop current from flowing when said breaking means is in said second operative state.

4,950,855

## SELF-EXPANSION ELECTRICAL CIRCUIT BREAKER WITH VARIABLE EXTINGUISHING CHAMBER VOLUME

Roger Bolongeat-Mobieu, Echirrolles; Regis Rival, Corenc Montfleury, and Gérard Menou, Seyssinet-Pariset, all of France, assignors to Merlin Gerin, France

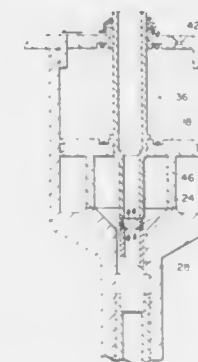
Filed Oct. 31, 1988, Ser. No. 265,393

Claims priority, application France, Nov. 4, 1987, 87 15467

Int. Cl.<sup>5</sup> H01H 33/88

U.S. Cl. 200—148 A

2 Claims



1. A self-expansion electrical circuit breaker comprising:  
a sealed enclosure filled with a high dielectric strength gas;  
an arc extinguishing chamber located inside said enclosure and having a communication orifice with the enclosure and a wall arranged as a piston, movement of which causes a variation of the volume of the extinguishing chamber, said piston being urged towards the minimum extinguishing chamber volume position and moving due to the action of a pressure increase in the extinguishing chamber to increase the volume of the latter;  
a pair of contacts disposed in the arc extinguishing chamber, said communication orifice being closed off in the closed position of said pair of contacts and opening when separation of the contacts occurs to allow the compressed arc puffing gas drawn between the contacts of the extinguishing chamber to be outlet to the enclosure;  
damping means for the piston movement in the direction of the minimum volume position to spread the gas supply by piston effect over a longer period;  
wherein said contacts are arcing contacts on which the arc drawn when said contacts separate remains rooted until it is extinguished and one of the contacts is semi-stationary and securedly united to said piston, in such a way as to increase the separation distance of the contacts when the piston moves due to the action of the pressure in the extinguishing chamber due to the arc drawn between the contacts.

4,950,856

## PUSH-BUTTON SWITCH WITH MOMENTARY-ON FEATURE

Joseph F. Valenzona, El Torro, Calif., assignor to Judco Manufacturing, Inc., Harbor City, Calif.

Continuation-in-part of Ser. No. 77,206, Jul. 24, 1987. This application Apr. 18, 1988, Ser. No. 182,915

Int. Cl.<sup>5</sup> H01H 13/56

U.S. Cl. 200—526

17 Claims

1. A miniature push-button switching apparatus comprising, in combination;

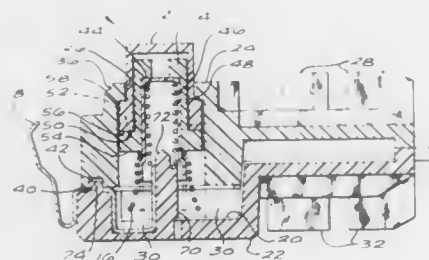


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a switching device;  
means for housing said switching device, said housing means comprising a top body portion and a bottom cover portion;  
a plunger mounted within and projecting through a vertically extending port of said top body portion for actuating said switching device;  
a ratchet mechanism for translating said switching device within said housing means and for connecting and disconnecting an electrical circuit through said switching device, said ratchet mechanism having a temporarily and a permanently energized position and a permanently deenergized position;



a metallic cup mounted within said ratchet mechanism for providing a connection to said electrical circuit through said switching device;  
a plurality of terminal conductors mounted within said bottom cover portion for contacting an electrical source and for completing said electrical circuit through said switching device;  
a biasing spring positioned between said bottom cover portion and said metallic cup for biasing said plunger; and  
a helical contact spring having a narrow diameter end and a wide diameter end, said narrow diameter end being rigidly affixed to an end of said metallic cup with said wide diameter end connecting said plurality of terminal conductors when said electrical circuit is connected through said switching device.

4,950,857

**SOLID STATE CERAMIC MICROWAVE HEATING SUSCEPTOR COMPOSITIONS WITH METAL SALT MODERATORS**

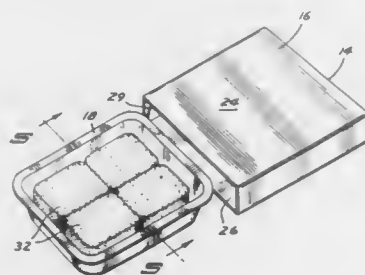
Jonathan Seaborne, Corcoran, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 110,246, Oct. 19, 1987, and a continuation-in-part of Ser. No. 56,201, Jun. 1, 1987. This application Nov. 21, 1988, Ser. No. 274,179

Int. Cl.<sup>5</sup> H05B 6/80

U.S. Cl. 219—10.55 E

14 Claims



1. An article for use as a microwave heating susceptor in a microwave radiation field which article will absorb micro-

wave radiation to produce heat and to raise the temperature of the article, comprising:

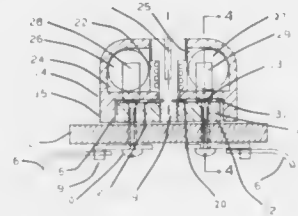
- a microwave absorptive body, said body fabricated from a ceramic composition comprising
- (a) a ceramic binder,
  - (b) a ceramic susceptor material which absorbs microwave energy and having a neutral lattice charge, and
  - (c) a metal salt temperature profile moderator and wherein the ceramic composition is unvitrified.

4,950,858  
**BOOT HEATER**

Stephen Slenker, 10 Crabapple Ln., Chelmsford, Mass. 01824  
Continuation of Ser. No. 342,868, Apr. 25, 1989. This application Dec. 12, 1989, Ser. No. 448,931  
Int. Cl.<sup>5</sup> A43B 7/04; H05B 3/36

U.S. Cl. 219—211

11 Claims



1. A boot heating system for use in a ski boot and the like comprising:  
an electrical heating element positioned in said boot and adapted when electrically energized to generate heat in said boot, conductive leads connected at one end to said elements;  
a mounting bracket secured to said boot having positive and negative electrical contacts on a face thereof and with open ends of said leads connected thereto;  
a battery housing shaped to receive said mounting bracket and contain at least one battery;  
means securing said housing and bracket together in one of a plurality of positions relative to each other;  
means permitting relative movement of said housing and bracket from one to the other of said positions; and  
electrical contact means for selectively electrically interengaging and disengaging said battery and said positive and negative electrical contacts whereby said heating element is energized when said housing and bracket are in, said one position and deenergized when in, said other position.

4,950,859

**BAG FOR CONTAINING EDIBLES DURING MICROWAVE COOKING**

Alan R. Anderson, 707 Pheasant Run, West Chester, Pa. 19382  
Filed Mar. 27, 1989, Ser. No. 329,026

The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

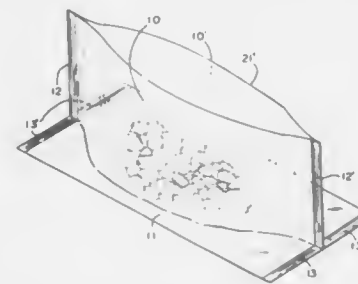
Int. Cl.<sup>5</sup> H05B 6/80; B65D 81/34

U.S. Cl. 219—10.55 E

25 Claims

1. A combination of a bag and an edible component to be cooked in a microwave oven, said combination comprising a bag comprising first and second opposing side panels, each having a top edge and opposing side edges, and an inwardly pleated bottom panel between said first and second opposing side panels, said bottom panel having opposing side edges, the side edges of said first panel being joined to the side edges of said second side panel, the side edges of said first and second side panels further being joined to said inwardly pleated bottom panel only at the side edges of said bottom panel; said side and bottom panels comprising a material substantially transpar-

ent to microwave energy and capable of withstanding temperatures reached during the microwave cooking of said edible



component; said edible component being placed on the inside surface of said bottom panel.

4,950,860

**ELECTRO-DISCHARGE MACHINING APPARATUS**

Mohamed F. El-Monshawy, Birmingham, England, assignor to Spark Tec Limited, Birmingham, England

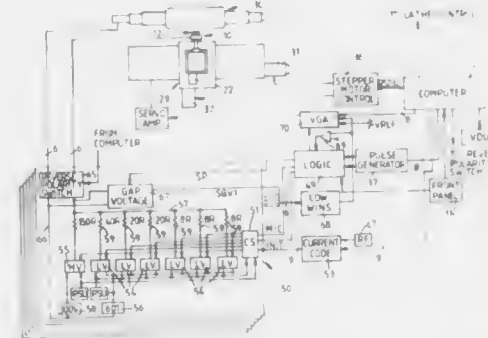
Filed Mar. 11, 1988, Ser. No. 167,268

Claims priority, application United Kingdom, Mar. 14, 1987, 8706091

Int. Cl.<sup>5</sup> B23H 1/02, 9/04, 7/32

U.S. Cl. 219—69.18

16 Claims



1. An electro-discharge machining control comprising first and second current sources of relatively high and low voltage respectively, first switch means for repeatedly connecting said second source to an output for a first duration for connection to an electrode and second switch means for repeatedly connecting said first source to said output only when said second source is connected to said output and for a constant duration which is shorter than the first duration of the connection of said second source to the output.

4,950,861

**COMBINATION PUNCH PRESS AND LASER CUTTING MACHINE WITH MOVABLE SLAG AND FUME COLLECTOR**

Werner Erlenmaier, Gerlingen, and Reiner Koch, Leonberg-Hoefingen, both of Fed. Rep. of Germany, assignors to Trumpf GmbH & Co., Ditzingen, Fed. Rep. of Germany  
Filed Sep. 11, 1989, Ser. No. 405,464

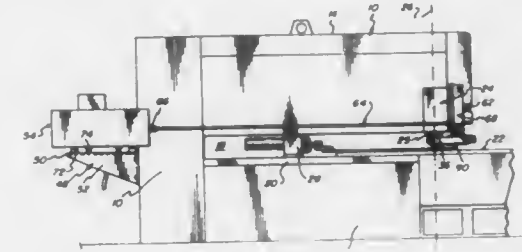
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.67

22 Claims

1. In a combination punch press and laser cutting machine, the combination comprising:  
(a) a frame having a base and a head extending in spaced relationship thereover;  
(b) a ram assembly in said head having a ram vertically

reciprocable therein relative to said base, the axis of reciprocation of said ram defining a work station;  
(c) a die support member in said base at said work station, said die support member having a first passage extending vertically therethrough and a second passage extending horizontally thereinto in a vertical face thereof;  
(d) a horizontally disposed fume and slag collection member having a portion cooperatively dimensioned and configured to move horizontally inwardly of said horizontal second passage in said die support member and substantially block said vertical first passage, said portion of said collection member having an upwardly opening cavity therein, said collection member also having coolant con-



duit means therein extending from an inlet to a distributor to distribute coolant about said cavity, waste collecting conduit means extending from the base of said cavity to an outlet; and fume collecting conduit means for collecting fume from the upper part of said portion and extending to an outlet;

- (e) means mounting said collection member in said base of said frame for horizontal movement between an operative position wherein said portion extends across said vertical first passage in said die support member and an inoperative position where it is disposed outwardly of said die support member; and
- (f) drive means for moving said collection member between said operative and inoperative positions.

4,950,862

**LASER MACHINING APPARATUS USING FOCUSING LENS-ARRAY**

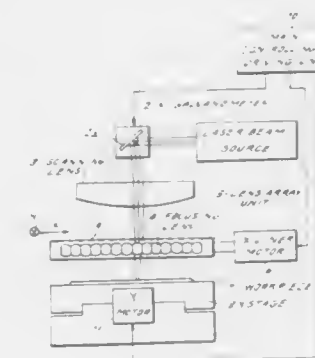
Toshikazu Kajikawa, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 12, 1989, Ser. No. 420,599

Claims priority, application Japan, Oct. 12, 1988, 63-254956  
Int. Cl.<sup>5</sup> B23K 26/00

U.S. Cl. 219—121.7

10 Claims



1. A laser machining apparatus for machining a workpiece by focusing a laser beam to a desired position on a surface of said workpiece, comprising:

a laser beam source for emitting the laser beam; scanning means for steering the laser beam from said laser beam source in a first direction; scanning lens means for converting the laser beam steered by said scanning means into a beam which is substantially perpendicular to the surface of the workpiece; a lens array unit having a plurality of miniature focusing lenses which are arranged in an array in the first direction for focusing a part of the laser beam from said scanning lens means to the desired position; a stage movable in a second direction perpendicular to the first direction while being loaded with the workpiece; first driving means for moving said lens array unit in the first direction by a small amount; second driving means for driving said stage; and control means for controlling said scanning means, said first driving means, and said second driving means; said control means controlling said scanning means such that an optical axis of the laser beam incident to said lens array unit is located in close proximity to the desired position on the workpiece; said control means controlling said first driving means such that an optical axis of one of said focusing lenses of said lens array unit coincides with the desired position; said control means controlling said second driving means such that said stage is positioned in the second direction.

4,950,863

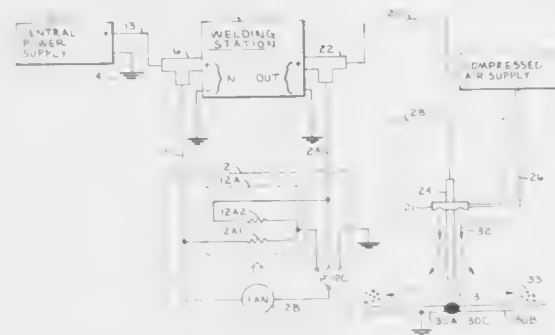
## APPARATUS FOR AIR ARC GOUGING

Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067  
Filed Jan. 22, 1990, Ser. No. 468,468

Int. Cl.<sup>5</sup> B23K 9/013

U.S. Cl. 219—130.1

6 Claims



1. An apparatus for providing gouging current to a gouging assembly for air arc gouging, comprising:  
a power supply;  
a welding station having a first output point for providing a first output current, said first output current having an average value which is less than a first predetermined average current value;  
an adapter circuit having a second output point for providing a second output current, said second output current having an average value which is less than a second predetermined average current value;  
means for connecting said power supply to said welding station and said adapter circuit; and  
means for connecting said first output point and said second output point to said gouging assembly;  
said adapter circuit comprising a resistor circuit connected between said power supply and said second output point and a fan for cooling said resistor circuit;  
wherein said gouging current is the sum of said first output current and said second output current.

4,950,864

## DC ARC WELD STARTER

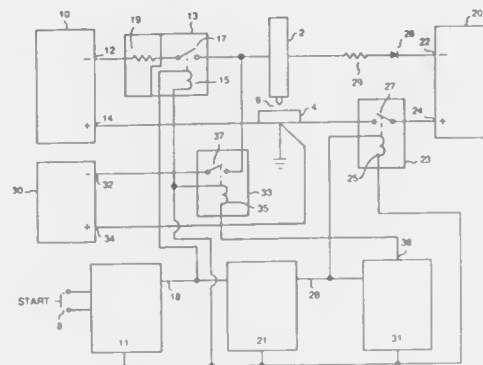
Richard H. Campiotti, Tracy, and James E. Hopwood, Oakley, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 17, 1989, Ser. No. 311,781

Int. Cl.<sup>5</sup> B23K 9/06

U.S. Cl. 219—130.4

5 Claims



1. A system for starting an arc welder having an electrically conductive electrode spaced across a gap from an electrically conductive workpiece, said system comprising:  
initial dc power supply means for providing a high voltage, low current, output of sufficient voltage to initiate an arc across said gap;  
intermediate dc power supply means for providing an intermediate voltage, intermediate current, output of sufficient power to sustain an arc across said gap;  
welding dc power supply means for providing a low voltage, high current output of sufficient power for arc welding;  
first control means for selectively connecting the output of said initial power supply means across said electrode and said work to initiate an arc;  
second control means for selectively connecting the output of said intermediate power supply means across said electrode and said work after said arc is initiated; said first control means disconnecting said initial power supply after said intermediate power supply has been connected; and  
third control means for selectively connecting the output of said welding power supply means directly across said electrode and said work after said initial power supply has been disconnected.

4,950,865

## METHOD AND APPARATUS FOR FORMING THERMOCOUPLE JUNCTIONS

Richard G. Aurandt, Los Angeles, Calif., assignor to The Aerospace Corporation, El Segundo, Calif.

Filed Dec. 18, 1989, Ser. No. 452,921

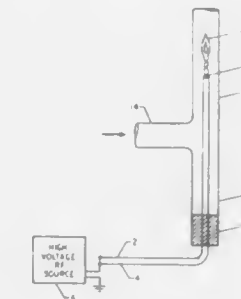
Int. Cl.<sup>5</sup> B23K 28/00

U.S. Cl. 219—137 PS

3 Claims

1. A method of making a thermocouple assembly from two metal wires comprising the steps of  
(a) flowing a stable gas through a container;  
(b) placing one end of each wire in proximity to one another in the container;

(c) attaching the remaining end of each wire to a high voltage, high frequency transformer;



(d) applying a voltage to the wires such that a corona forms at the unattached ends of the wire, thereby producing a high quality thermocouple.

4,950,866

## METHOD AND APPARATUS OF BONDING INSULATED AND COATED WIRE

Toosaku Kojima, Yokohama; Tsutomu Mimata, Akikawa; Susumu Okikawa, Oume; Michio Okamoto, Machida; Takeshi Kawana, and Satoshi Urayama, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

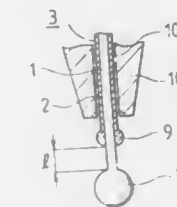
Filed Nov. 29, 1988, Ser. No. 277,645

Claims priority, application Japan, Dec. 8, 1987, 62-308540; Apr. 15, 1988, 63-91404

Int. Cl.<sup>5</sup> B23K 9/00

U.S. Cl. 219—137 PS

4 Claims



1. A method of bonding an insulated and coated wire which has an insulated coating on the outside of an electrically conductive wire, comprising:  
connecting one end of said insulated and coated wire to an anode side of an arc power source and connecting a discharge torch to a cathode side of said arc power source, generating an arc discharge between the other end of said insulated and coated wire and said discharge torch to form a ball on said one end;  
positioning said ball with respect to a bonding pad of an electrically conductive electrode and bonding said ball to said bonding pad by applying a specified pressure to said ball; and  
supplying said insulated and coated wire by unwinding it from a freely rotatable grounded metal spool and electrically connecting a conductive wire portion of said insulated and coated wire at said one end to said metal spool, and said arc power source generating and applying a voltage which decreases in proportion to a winding length of said insulated and coated wire left on the metal spool, and connecting the anode side of said arc power source to said metal spool in rotation with said metal spool, and connecting the cathode side to said discharge torch.

4,950,867

## WELDING GUN CONNECTOR

Robert N. Mann, c/o Bob Mann & Associates Inc., 1725/3 Matheson Blvd., Mississauga, Ontario, Canada (L4W 1Z1)

Filed Feb. 9, 1989, Ser. No. 307,921

Int. Cl.<sup>5</sup> B23K 9/00

U.S. Cl. 219—137.31

6 Claims



1. A welding gun, comprising:  
a welding gun head for applying a weld to a site,  
a conduit for an electrical power cable to said welding gun head,  
flexible bellows connection means connecting said welding gun head to said conduit to permit said welding gun head to be moved universally relative to said conduit, and  
a plurality of resilient rings disposed integrally and at longitudinally-spaced locations along the length of said bellows connection means to resist deformation of said bellows connection means upon the external application of radially-inward pressure thereto.

4,950,868

## HEATED GLOVES

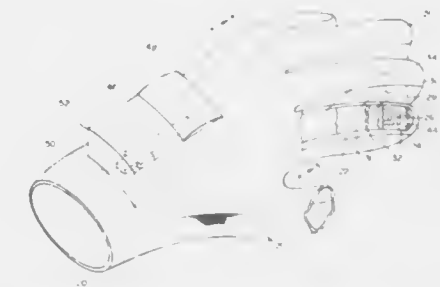
Gary J. Moss, Morton Grove; Michael Toler, Chicago, and Steven Rehkemper, Chicago, all of Ill., assignors to Marmot Holdings, Inc., Chicago, Ill.

Filed Mar. 3, 1989, Ser. No. 319,172

Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 219—211

20 Claims



1. A garment comprising a heating element, an insulating member, a reflective foil and an outer shell, means for energizing said heating element either directly or intermittently with a duty cycle depending upon a user setting, and temperature sensitive means for changing said duty cycle to supply energy to said heater over greater percentages of the time as the sensed temperature becomes lower or over lesser percentages of the time as the sensed temperature becomes higher, said



reflective foil being positioned to reflect heat from said heating element toward the person wearing the garment.

4,950,869

# FROST CONTROL SYSTEM FOR HIGH-SPEED MECHANIZED DOORS

Louis B. Mneller, Richfield, Wis., assignor to Rytex Corporation, Jackson, Wis.

Continuation-in-part of Ser. No. 144,572, Jan. 15, 1988, Pat. No. 4,855,567. This application Oct. 19, 1988, Ser. No. 259,689

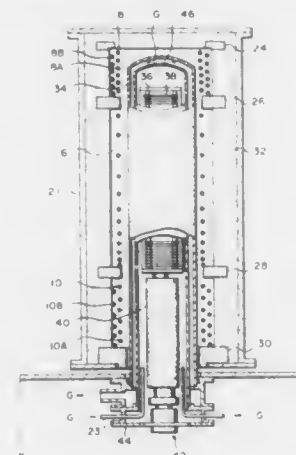
Int. Cl.<sup>5</sup> H05B 3/84; F25D 21/08

U.S. Cl. 219—218

18 Claims



adjustable, each of said independent heaters being formed of a resistance wire coil wound around the process tube,



and the wire diameter of at least the top heater being greater than that of the central heater.

4,950,871

# ARRANGEMENT FOR HEATING ROOMS UNIFORMLY THROUGH THE EQUALIZATION OF THE TEMPERATURE DISTRIBUTION BETWEEN THE CEILING AND THE FLOOR REGIONS

Walter Pollak, Olgastrasse 93, B D-7000 Stuttgart 1, and Joachim Förster, Pestalozzistr. 6, D-7012 Fellbach, both of Fed. Rep. of Germany

PCT No. PCT/EP86/00524, § 371 Date Jul. 13, 1987, § 102(e) Date Jul. 13, 1987, PCT Pub. No. WO87/01794, PCT Pub. Date Mar. 26, 1987

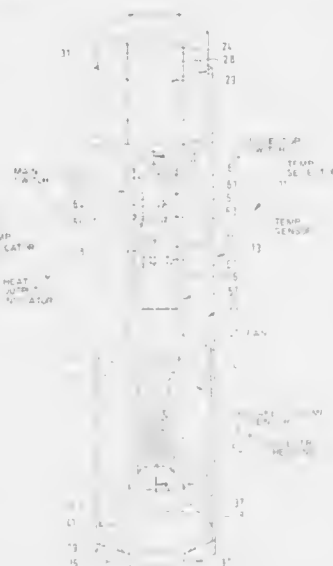
PCT Filed Sep. 12, 1986, Ser. No. 72,976

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1985, 3532820

Int. Cl.<sup>5</sup> F24H 3/04; F24F 7/06; F24D 9/00; H05B 1/00

U.S. Cl. 219—370

13 Claims



## 1. A slidable door comprising:

a header disposed along the top of a doorway, said header including a front, generally upright panel;

a downwardly depending curtain disposed below said header;

means connected to said header for movably supporting said curtain for movement between a closed, extended position and an open, retracted position in which an upper edge portion of said curtain is disposed in front of said front panel and in close proximity thereto;

front panel temperature raising means disposed on said header for raising the temperature of said front panel above a frost formation temperature, said front panel temperature raising means comprising:

front panel heat transferring means superposed on a face of said front panel to transfer heat to said front panel; and

retention means for securing said front panel heat transferring means to said front panel.

4,950,870

# HEAT-TREATING APPARATUS

Hiroyuki Mitsuhashi; Seishiro Sato, both of Machida, and Wataru Ohkase, Sagami-hara, all of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

Filed Nov. 21, 1988, Ser. No. 273,972

Claims priority, application Japan, Nov. 21, 1987, 62-294962

Int. Cl.<sup>5</sup> H05B 3/64

U.S. Cl. 219—390

6 Claims

## 1. A heat-treating apparatus comprising:

a process tube accommodating an object to the heat-treated therein; and

a plurality of independent heaters including at least three heaters

comprised of a top heater, a central heater and a bottom heater which are arranged at the top portion, the central portion and the bottom portion of a side wall of the process tube respectively, so as to surround the process tube, said plurality of independent heaters being absent any electrical connection to each other, the heating temperatures of said plurality of independent heaters being freely

1. An arrangement for the uniform heating of a room by equalization of the temperature distribution between the ceiling and floor levels of the room, comprising:

at least one upright column extending from the ceiling to the floor of the room and forming an air channel, each said at least one upright column comprising an upper member including an upper air inlet to the channel and a lower

member including a lower air outlet from the channel, each member comprising two channel-shaped shells fastened to each other, each said at least one upright column having a front recess, a front panel and an intermediate floor, said intermediate floor being fastened to the column below the front recess and being accessible through said front recess;

a modular unit attached to hang from said intermediate floor, said modular unit including a plate, a fan fastened to said plate, said fan creating an air current in said air channel, a cylindrical air duct, and a heating element in the shape of a tubular spiral body attached to hang from the lower surface of said plate, said heating element being surrounded by said cylindrical air duct; and

a control unit attached to said front panel and located within said front recess,

said modular unit and control unit being located between said upper air inlet and said lower air outlet, with said control unit being located closer to said upper air inlet.

4,950,872

# CONTROL CIRCUIT FOR A SOURCE OF HEAT

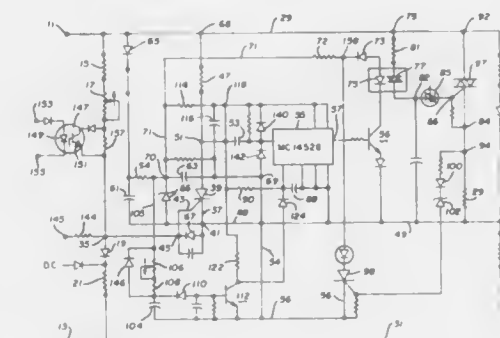
Tung C. Chen, Villanova, Pa., assignor to Therme, Inc., Wilmington, Del.

Filed Aug. 16, 1989, Ser. No. 394,752

Int. Cl.<sup>5</sup> H05B 1/02

U.S. Cl. 219—499

10 Claims



## 1. A circuit for controlling electrical energy which is transmitted to heatable means, comprising in combination:

first and second input lines, respectively connected to first and second terminals of an electrical power source and arranged with respect to said electrical power source such that when said first input line experiences a relatively positive electrical potential, said second input line experiences a relatively negative electrical potential and alternatively when said first input line experiences a relatively negative electrical potential said second input line experiences a relatively positive electrical potential;

bridge circuit means comprising first, second, third and fourth legs with said fourth leg including said heatable means, said bridge circuit means further formed to have both a first mid-terminal disposed between said first and second legs and a second mid-terminal disposed between said third and fourth legs, said bridge circuit connected across said first and second input line;

first switching circuit means formed to be in a conducting state and alternatively in a non-conducting state and connected to said first input line and to said first and second mid-terminals and formed so that the difference between the voltage values respectively at said first and second mid-terminals will determine whether said first switching means will be rendered conducting or non-conducting;

second switching means formed to operate in a stable state and alternatively in an unstable state, said second switching means connected to said first switching means whereby when said first switching means conducts said

second switching means will be transferred to operate in its unstable state;

third switching means formed to be in a conducting state and alternatively a non-conducting state and formed to have a control means, said control means being connected to said second switching means whereby when said second switching means is operating in its unstable state said third switching means is rendered conducting;

first bidirectional current means connected to said first input line and connected to said third switching means whereby when said third switching means conduct said first bidirectional current conducting means conducts current therethrough;

second bidirectional current conducting means connected to said first input line and connected to said first bidirectional current conducting means and connected to said second mid-terminal whereby when said first bidirectional current conducting means conducts said second bidirectional current conducting means will conduct relatively heavy current for further conduction through said heating means.

4,950,873

# SHEATH HEATER

Yoshiaki Shida, Ikoma; Hisao Fujikawa, Nishinomiya; Nobuyuki Maruyama, Amagasaki, and Shunichiro Akiyama, Joetsu, all of Japan, assignors to Sanitomo Metal Industries, Ltd., Osaka and Nippon Stainless Steel Co., Ltd., Tokyo, both of Japan

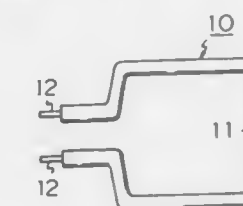
Filed Mar. 6, 1989, Ser. No. 319,917

Claims priority, application Japan, Apr. 27, 1984, 59-85554

Int. Cl.<sup>5</sup> H05B 3/10

U.S. Cl. 219—548

16 Claims



1. A method of heating an electrical cooking appliance having improved corrosion resistance under dry-corrosive conditions in the presence of chlorides comprising heating a metallic sheath heater tube in a dry corrosive environment, the metallic sheath heater tube including a metallic sheath consisting essentially of, in % by weight:

C: not more than 0.05%,  
Si: 0.1–2.0%,  
Mn: not more than 2.0%,  
Cr: 18–26%,  
Ni: 16–30%,  
Mo: 0.5–4.0%.

at least one of W: 0.001–4.00% and V: 0.01–4.00%, and the balance iron and incidental impurities.

4,950,874

# EXPANSION JOINT FOR KEYBOARD DOME SHEETS

Stephen S. Damitio, Spokane, Wash., and George P. English, Hayden Lake, Id., assignors to Key Tronic Corporation, Spokane, Wash.

Filed Sep. 22, 1989, Ser. No. 410,912

Int. Cl.<sup>5</sup> G06C 7/02; H01H 9/00

U.S. Cl. 235—145 R

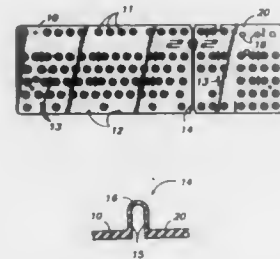
9 Claims

1. A dome sheet adapted to be positioned between aligned keyswitch actuators and switching elements in a keyboard, comprising:

a planar sheet of elastomeric material;

a plurality of elastomeric raised positioned about the sheet to

individually correspond with the positions of the switching elements of a computer keyboard with which the dome sheet is to be used; and  
an elongated web dividing the sheet into at least two sections, the web having adjacent wall portions extending



outward from the plane of the sheet to permit limited translational and angular movement of adjacent sheet sections relative to one another within the plane of the sheet during keyboard assembly without distorting the sections.

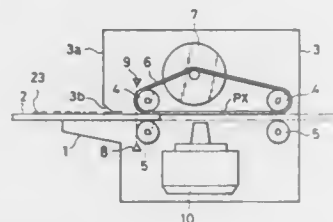
4,950,875

**APPARATUS FOR PROCESSING EMBOSSED CARDS**  
Yoshinori Koshida, and Minoru Isobe, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan  
Filed Jan. 25, 1988, Ser. No. 147,737

Claims priority, application Japan, Jan. 23, 1987, 62-13672; Jan. 23, 1987, 62-13673; Oct. 8, 1987, 62-252473  
Int. Cl.<sup>5</sup> G06K 7/04

U.S. Cl. 235-448

12 Claims



1. Apparatus for processing embossed characters on an embossed card comprising:  
a sensing head having sensing wires extending generally parallel with each other in a first direction, the tips of said sensing wires being disposed at different positions along a second direction orthogonal to said first direction;  
means for repeatedly actuating said sensing wires toward their tips;  
means for detecting advancement of each sensing wire exceeding a predetermined distance, and for producing an electrical signal indicating the result of detection, said detecting means comprising a piezoelectric element disposed to be compressed when the sensing wire advances said predetermined distance; and  
means for causing relative movement between the sensing head and the embossed card in a third direction orthogonal to said first and second directions, with the surface of the embossed card being held parallel with said second and third directions, and close to the tips of said sensing wires, such that the tip of each sensing wire hits or does not hit the surface of the embossed card before exceeding said predetermined distance depending on whether or not the sensing wire is confronting an embossment or not, the collection of the electrical signals produced by said detecting means forming an image signal representing the embossments.

4,950,876  
**OPTICAL CARD RECORDING/REPRODUCING APPARATUS WITH COMPENSATION FOR DISPLACEMENT DEVIATION BETWEEN DATA AREA OF OPTICAL CARD AND LASER BEAM**  
Akito Saito, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

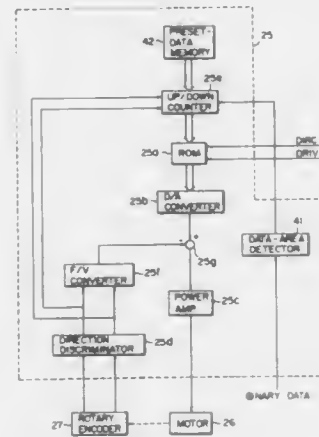
Filed Jul. 25, 1988, Ser. No. 224,051

Claims priority, application Japan, Jul. 31, 1987, 62-192411

Int. Cl.<sup>5</sup> G06K 13/067, 7/10

U.S. Cl. 235-476

7 Claims



1. An optical card recording/reproducing apparatus comprising:  
a holding section for receiving an optical card;  
an optical head for emitting a light beam;  
moving means which is drivable for moving said holding section and said optical head relative to each other to thereby scan a data area of an optical card received in said holding section with the light beam;  
detection means for detecting a positional relationship between the data area of said optical card and said holding section; and  
control means for controlling driving of said moving means based on a detection result attained by said detection means to thereby control a relative moving speed of said holding section and said optical head based on said detection result.

4,950,877

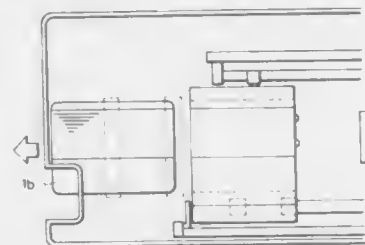
**APPARATUS FOR TRANSPORTING CARD-LIKE INFORMATION RECORDING MEDIUM**  
Hideo Kurihara, Tokyo, and Hitoshi Kurihara, Saitama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 5, 1988, Ser. No. 152,811

Claims priority, application Japan, Feb. 9, 1987, 62-026475

Int. Cl.<sup>5</sup> G06K 13/08

U.S. Cl. 235-480

29 Claims



1. An apparatus for transporting a card-like information recording medium, the card-like information recording me-

dium having an information recording area and anon-recording areas, said apparatus comprising:

receiving transport means for transporting the card-like information recording medium into said apparatus and for transporting the recording medium within said apparatus; and  
discharging transport means for discharging the card-like information recording medium outside said apparatus, said discharging transport means comprising means for transporting the card-like information recording medium and means for stopping the recording medium such that the information recording area remains within said apparatus.

4,950,878

**WAVEFRONT CONTROL SYSTEM USING OPTICAL COARSE/FINE GRADIENT SENSOR**

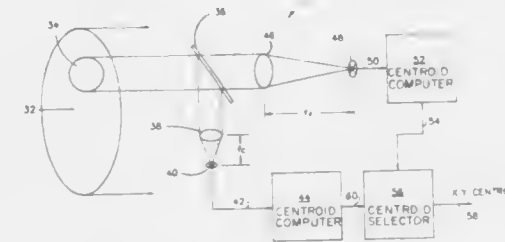
Bobby L. Ulich, Tucson, Ariz.; John D. G. Rather, Washington, D.C.; Gregory H. Ames; Albert J. Lazzarini, both of Colorado Springs, Colo., and Edward Conklin, Hermosa Beach, Calif., assignors to Kaman Aerospace Corporation, Bloomfield, Conn.

Filed Apr. 12, 1989, Ser. No. 336,719

Int. Cl.<sup>5</sup> G01J 1/20

U.S. Cl. 250-201.9

6 Claims



1. A coarse/fine wavefront sensor comprising:  
a plurality of subapertures;  
a beam splitter associated with each of said subapertures, said beam splitter being adapted to reflect a portion of an optical input beam and to transmit a portion of an optical input beam;  
a first lenslet for focussing a reflected input beam from said beam splitter with focal length  $f_c$ ;  
a first photosensitive quadrant cell for receiving a focused input beam from said first lenslet and producing a first electronic signal;  
first centroid computer means for receiving said first electronic signal and calculating a coarse centroid position;  
a second lenslet for focussing an input beam transmitted through said beam splitter with focal length  $f_f$ ;  
a second photosensitive quadrant cell for receiving a focussed input beam from said second lenslet and producing a second electronic signal;  
second centroid computer means for receiving said second electronic signal and calculating a fine centroid position; and  
centroid selector means communicating with said first and second centroid computer means, said centroid selector means selecting as its output said coarse centroid position when the radial coarse centroid error is above a predetermined threshold value P, and said centroid selector means selecting as its output said fine centroid position when the radial coarse centroid error is below said threshold value P.

4,950,879

**FOCUS DETECTING DEVICE FOR USE WITH CAMERAS**  
Tokuji Ishida, Daito, and Masataka Hamada, Minamikawachi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

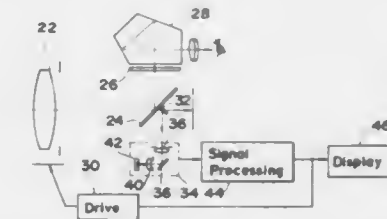
Continuation of Ser. No. 374,623, Jun. 29, 1989, abandoned, which is a continuation of Ser. No. 307,180, Feb. 3, 1989, abandoned, which is a continuation of Ser. No. 180,293, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 921,339, Oct. 20, 1986, abandoned, which is a continuation of Ser. No. 570,012, Jan. 10, 1984, Pat. No. 4,636,624. This application Dec. 19, 1989, Ser. No. 455,815

Claims priority, application Japan, Jan. 10, 1983, 58-2622; Jun. 23, 1983, 58-112936

Int. Cl.<sup>5</sup> G01J 1/20

U.S. Cl. 250-201.8

16 Claims



1. A focus detecting device for a camera, comprising optical means for forming an object image;  
first light receiving means which is adapted to receive the object image, said first light receiving means having a plurality of blocks of light receiving elements, each element generating a first signal corresponding to light incident thereon;  
second light receiving means which is adapted to receive the object image, said second light receiving means having a plurality of light receiving elements, each of which generates a second signal corresponding to light incident thereon;  
correlation detecting means for detecting correlation between the first signals generated by the elements of each block and the second signals generated by the elements of said second light receiving means;  
detection means for detecting a best correlation block on the result of the detection of said correlation detecting means, the correlation between the first signals from the best correlation block and the second signals from the second receiving means being greater than any other correlation, and  
defocus amount calculation means for calculating a defocus amount on the first signals from the best correlation block and the second signals from said second light receiving means.

4,950,880

**SYNTHETIC APERTURE OPTICAL IMAGING SYSTEM**  
David A. Hayner, Arlington Heights, Ill., assignor to Recon/Optical, Inc., Barrington, Ill.

Filed Jul. 28, 1989, Ser. No. 386,278

Int. Cl.<sup>5</sup> G01J 1/20

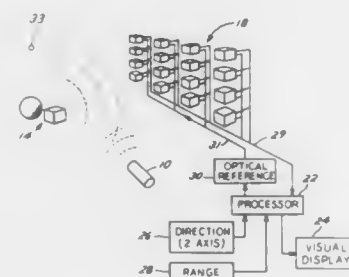
U.S. Cl. 250-201.9

29 Claims

1. An imaging system for producing an image of a target comprising, in combination  
a local oscillator for producing an optical local oscillator signal,  
an array of spatially separated optical sensors,  
means in each of said sensors responsive to an incoming light energy wavefront for generating a phase-related signal indicative of the phase and magnitude of said wavefront relative to said local oscillator signal,  
means for illuminating all of said sensors with a light energy



calibration wavefront having a known phase at the location of each of said sensors, means for adjusting the phase of said local oscillator signal at each sensor to a prescribed phase-displacement with respect to said calibration wavefront, a coherent light source for illuminating a target with coherent light,



means for deriving sample values of phase-related signals generated by each of said sensors in response to said coherent light reflected from said target, and means for processing said sample values to form an image of said target.

4,950,881

# METHOD AND APPARATUS FOR TRACKING A MISSILE

Horst Kaltschmidt, Neubiberg, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 8, 1988, Ser. No. 281,839

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741856

Int. Cl.<sup>5</sup> G01S 3/78

U.S. Cl. 250—203.6

14 Claims

1. A pixel individual modulation method for tracking a missile, comprising the following steps:

- directing incoming light onto a matrix having normally substantially opaque cells or small mirrors, which can be individually tilted arranged in a rectangular coordinate system,
- selectively applying alternating voltages having different frequencies, to electrodes of said normally substantially opaque cells or circuits which contract at said small mirrors for individually modulating said cells to make said cells selectively substantially transparent,
- controlling the application of said alternating voltages by a location determining central processing unit (12) in an "n×m" vicinity or area including a first cell receiving a useful incoming light beam and further cells receiving interfering light, wherein "n" and "m" are the numbers of cells forming said vicinity or area, whereby an alternating voltage of a determined frequency switches said first cell to be come transparent to pass useful alternating light while shutting out interfering light,

- applying said useful alternating light to a single photosensor (15) for producing a pixel signal, and
- passing said pixel signal through a band filter (16) into said central processing unit for producing respective tracking signals.

4,950,882

# OPTO-ELECTRICAL EXCLUSIVE OR LOGIC GATES

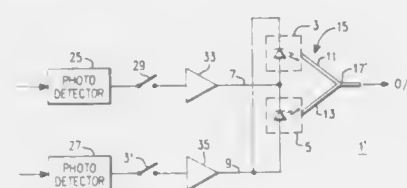
Anastasios P. Goutzoulis, Pittsburgh, and David K. Davies, Churchill Borough, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 17, 1989, Ser. No. 380,967

Int. Cl.<sup>5</sup> H01J 31/50

U.S. Cl. 250—213 A

16 Claims



1. An opto-electronic XOR gate for performing the logical XOR operation on first and second electronic logic signals, said gate comprising: first and second diode-type light sources each having a cathode and anode; first and second input leads to which said first and second electronic logic signals are applied connecting said first and second diode type light sources back to back with the anode of each connected to the cathode of the other; a fiber optic combiner having first and second inputs which gather light emitted from the first and second diode-type light sources respectively and a single output from which light from the first and second inputs is emitted; and a detector generating an electronic signal from light emitted from said output of the fiber optic combiner.

4,950,883

# FIBER OPTIC SENSOR ARRANGEMENT HAVING REFLECTIVE GRATINGS RESPONSIVE TO PARTICULAR WAVELENGTHS

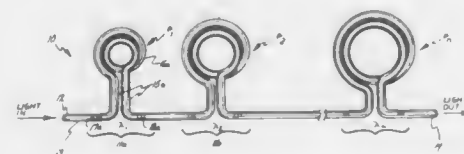
William H. Glenn, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 27, 1988, Ser. No. 289,864

Int. Cl.<sup>5</sup> H01J 5/16; G01D 5/34

U.S. Cl. 250—227.14

6 Claims



1. An arrangement for sensing changes in at least one monitored parameter exhibited by a body, comprising an optical fiber having two longitudinally spaced end portions and including at least one sensing fiber length disposed between said end portions, having two ends spaced by a predetermined distance from one another as considered longitudinally of said fiber, and including a sensing portion situated at a monitoring location of the body, and two periodic gratings of the same periodicity each situated in said fiber at one of said ends of said sensing fiber length and reflective to a predominant portion of any

4,950,885

# FLUID COUPLED FIBER OPTIC SENSOR

Charles H. Kershaw, Houston, Tex., assignor to I.V.P. Co., Houston, Tex.

Filed May 8, 1989, Ser. No. 348,570

Int. Cl.<sup>5</sup> H01J 5/16

U.S. Cl. 250—227.25

6 Claims

light that propagates in and longitudinally of said fiber and has a wavelength in a stopband range around a central wavelength corresponding to twice said periodicity while being substantially transparent to light of wavelengths outside said stopband range; means for launching broadband coherent light including sensing light with wavelengths within said stopband range into a first end of said optical fiber for propagation longitudinally of said fiber toward a first of said gratings for reflection of said predominant portion of said sensing light from said first grating and passage of the remainder of said sensing light into said sensing fiber length for resonant buildup therein of light at certain wavelengths that are located within said stopband range and depend on the length of said sensing portion as influenced by changes in the monitored parameter, and attendant rendering of said gratings substantially transparent to said sensing light at said plurality of wavelengths following said buildup; and means for detecting the effect of said gratings and of said sensing length on the wavelengths of the light emerging from one of said end portions of said optical fiber.



1. A method of using a transducer having a first and second fiber optic conductor to determine a liquid level condition of an optical coupling fluid, including the steps of: transmitting a light signal through the first fiber optic conductor; emitting at least a portion of the light signal from the first fiber optic conductor; coupling optically the first and a second fiber optic conductor with a coupling liquid having a changeable level condition; varying the coupling light path between the first and second fiber optic conductors in response to a change in position of the level of the coupling liquid to proportionally control the emitted light signal coupled to the second fiber optic conductor; capturing at least a portion of the emitted light signal from the first fiber optic conductor with the second fiber optic conductor; transmitting the light signal captured by the second fiber optic conductor through the second fiber optic conductor; sensing a value for the light signal conducted through the second fiber optic light conductor; and determining the level condition sensed by comparing the sensed value for the light signal conducted through the second fiber optic conductor with a reference value.

4,950,884

# ELECTRO-OPTIC MODULATOR AND MODULATION METHOD

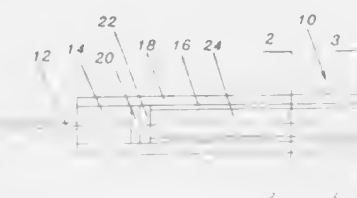
Frank J. Banks, Leucadia, Calif., assignor to Moog, Inc., East Aurora, N.Y.

Continuation-in-part of Ser. No. 138,320, Dec. 28, 1987, abandoned. This application Aug. 18, 1989, Ser. No. 395,589

Int. Cl.<sup>5</sup> G02F 1/03

U.S. Cl. 250—227.21

9 Claims



1. An electro-optic modulator assembly which comprises: a body having an elongated cavity therethrough; means for holding an end of an optical fiber adjacent to a first end of said cavity; lens means within said first end of said cavity in contact with said fiber, said lens means adapted to collimate light received from said optic fiber into a narrow collimated beam and to direct that beam along said cavity; polarizing means adjacent to said lens to polarize said beam; retarding means to retard said polarized light beam; modulating means comprising an elongated electro optic material lying within said cavity, receiving said beam and rotating its polarization, said modulation means comprises an elongated bar of modulating material, two parallel spaced apart grooves extending substantially the entire length of said bar of electro-optic material forming a thin rib therebetween, conductive layers on the two opposite sides of said rib form electrodes therealong, means to connect a source of variable voltage to said electrodes, and a cover strip bonded to the grooved face of said modulating material covering said grooves.

4,950,886

# PARTIALLY REFLECTING OPTICAL FIBER SPLICE FOR TEMPERATURE AND STRAIN MEASUREMENT

Richard O. Claus, Rte. 3, Box 138, Christiansburg, Va. 24073;

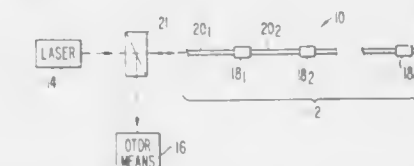
Kimberley D. Bennett, 1001 Montgomery St., Blacksburg, Va. 24060; Kent A. Murphy, 3364 Crittendon Ave., Roanoke, Va. 24012, and Sanjay Sudeora, 4630 Lake Trail Dr., Apartment 2D, Lisle, Ill. 60532

Filed Jun. 30, 1989, Ser. No. 373,561

Int. Cl.<sup>5</sup> H01J 5/16

U.S. Cl. 250—227.14

10 Claims



1. A fiber optic apparatus for measuring temperature comprising: (a) a first fiber having a first end;

- (b) a second fiber having a second end;  
 (c) a splice, said fibers being arranged within said splice along a common axis with said ends spaced from one another, said splice including a metal tube, holding material for holding a portion of said fibers within said tube along said common axis with a portion of each fiber adjacent the ends thereof exposed within said tube, said exposed portion being free to move independently of the tube;  
 (d) said fiber and said holding material cooperating to permit axial displacement of at least the exposed portion of said fibers when subjected to varying temperatures.

4,950,887

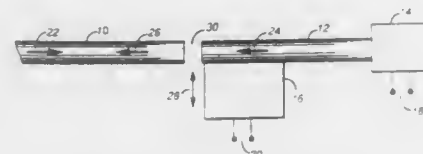
## OPTICAL FIBER INTERFACE

Richard P. Hughes, Kanata; Vincent C. So, and Paul J. Vella, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 26, 1989, Ser. No. 426,659  
 Int. Cl.<sup>5</sup> H01J 5/16

U.S. Cl. 250—227.21

21 Claims



1. An optical fiber interface, comprising:  
 an optical fiber;  
 means for continuously monitoring modulated light carried in a first direction by the fiber; and  
 means responsive to an electrical signal for effecting relative movement between the fiber and the monitoring means to modulate reflected light carried in a second direction, opposite to the first direction, by the fiber.

4,950,888

## SCANNING BEAM SYNCHRONIZATION SYSTEM

Akiyoshi Hamada, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

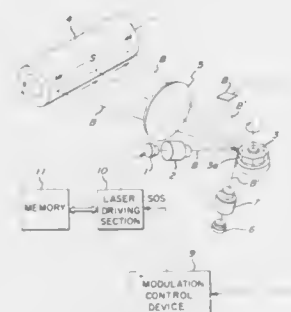
Continuation of Ser. No. 27,750, Mar. 19, 1987, abandoned. This application Jun. 15, 1989, Ser. No. 369,681

Claims priority, application Japan, Mar. 19, 1986, 61-62585; Mar. 19, 1986, 61-62586; Mar. 19, 1986, 61-62587; Mar. 20, 1986, 61-63753

Int. Cl.<sup>5</sup> H01J 3/14

U.S. Cl. 250—236

8 Claims



1. An optical scanning device, comprising:  
 first optical beam generating means for generating a first beam;  
 driving means for driving said first optical beam generating means;  
 modulating means for modulating the first beam based on an

image signal, said modulating means acting upon said driving means for driving said first optical beam generating means;  
 beam scanning means having at least one reflecting face for scanning the first beam on a photosensitive face;  
 second optical beam generating means for generating a second beam to be applied to said reflecting face;  
 a light receiving element, and  
 means for providing an optical path for said second beam from said reflecting face to said light receiving element without operatively modulating the intensity of the second beam, said second optical beam generating means being disposed on a plane including a scanning field of the first beam and at the same side as the first optical beam generating means with respect to said beam scanning means such that the respective scanning fields of said first and second beams scanned by said beam scanning means do not cross each other in order to prevent the second beam scanned by said beam scanning means from being applied to the photosensitive face, said light receiving element being disposed on said optical path so as to be illuminated by the second beam after having been reflected by the reflecting face when the first beam reaches an image forming starting spot on the photosensitive face and generating a beam detecting output as a start signal which is transmitted to said modulating means such that the second beam need not previously be modulated itself, the start signal commanding start of the modulation of the first beam by said modulation means.

4,950,889

## CHROMATIC AND MISALIGNMENT COMPENSATION IN A MULTIPLE BEAM LASER SCANNING SYSTEM

Russell A. Budd, Longmont; Bruce D. Gibson, Louisville; Sherwood Kantor, Boulder; Wayne A. Overby, and Mikel J. Stanich, both of Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 1, 1989, Ser. No. 388,537

Int. Cl.<sup>5</sup> H01J 3/14

U.S. Cl. 250—236

21 Claims



1. A method of correcting the picture element (pel) placement process to compensate for mechanical misalignment from laser beam to laser beam in the scan direction of a multiple beam laser scanning system comprising the steps of:  
 producing a start reference pulse with a reference laser beam;  
 producing a reference start of scan (SOS) pulse with said reference beam;  
 producing a reference end of scan (EOS) pulse with said reference laser beam;  
 producing an end reference pulse with said reference laser beam;  
 measuring the time period,  $T_{nom1}$ , between said start reference pulse and said reference SOS pulse and measuring the time period,  $T_{nom2}$ , between said end reference pulse and said reference EOS pulse;  
 producing a non-reference SOS pulse with a non-reference laser beam;

measuring the time period  $T_1$  between said start reference pulse and said non-reference SOS pulse;  
 producing a non-reference EOS pulse with said non-reference laser beam;  
 measuring the time period  $T_2$  between said end reference pulse and said non-reference EOS pulse; calculating the mechanical offset of said non-reference laser beam relative to said reference laser beam according to the following relationship:

$$\text{Mechanical Offset} = \frac{(T_{nom2} - T_2) + (T_{nom1} - T_1)}{2}$$

altering the start of scan for said non-reference laser beam to correct for said offset relative to the start of scan for said reference beam.

4,950,890

## METHOD AND APPARATUS FOR CORRECTING POSITION ERRORS USING WRITABLE ENCODERS

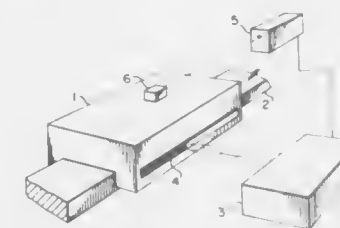
Daniel Gelbart, Burnaby, Canada, assignor to Creo Electronics Corp., Burnaby, Canada

Filed Jul. 13, 1988, Ser. No. 218,164

Int. Cl.<sup>5</sup> H01J 3/14

U.S. Cl. 250—237 G

3 Claims



1. In a system where position of a moving part is measured relative to a stationary part, a method for correcting position errors by using a writeable position encoder comprising: a laser diode based optical head apparatus mounted on said stationary part and capable of recording permanent marks on a light sensitive material mounted on said moving part when said laser diode is used at a high power level, said optical head capable of detecting but not altering said permanent marks when used at a low power level; means of initially accurately measuring the position of said moving part relative to said stationary part at a plurality of points and causing said optical head to mark said light sensitive material at a plurality of points according to the results of said accurate measurements, said accurate measurements performed only one time to calibrate said position encoder.

4,950,891

## HIGH RESOLUTION OPTICAL ENCODER HAVING A LONG DETECTION STROKE

Keiji Matsui, Ooguchi, Japan, assignor to Kabushiki Kaisha Okuma Tekkosho, Nagoya, Japan

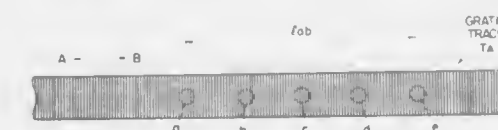
Filed Sep. 29, 1988, Ser. No. 251,089

Claims priority, application Japan, Sep. 30, 1987, 62-246726; Sep. 30, 1987, 62-246727; Oct. 27, 1987, 62-271530

Int. Cl.<sup>5</sup> H01J 3/14; G01D 5/34

U.S. Cl. 250—237 G

14 Claims



1. An optical encoder comprising a light source unit which emits coherent parallel light, a scale which is provided with a

grating track of uniform pitch but of a different ratio between each pair of non-transmission sections and transmission sections and which diffracts said coherent parallel light emitted from said light source unit, and a photo detecting unit which receives plural diffracted light beams of different orders out of light beams diffracted by said scale and converts said plural diffracted light beams of different orders into electric signals in accordance with intensities thereof.

4,950,892

## METHOD AND TOOL FOR GRAVEL PACK EVALUATION

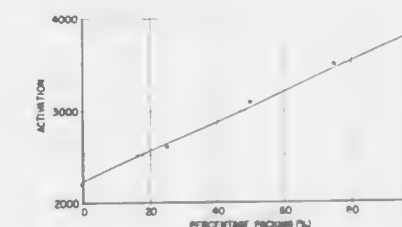
Jean-Remy Olesen, Sugarland, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Mar. 13, 1989, Ser. No. 322,795

Int. Cl.<sup>5</sup> G01V 5/10

U.S. Cl. 250—270

11 Claims



1. A method for investigating a gravel pack located in the annulus between the tubing/screen and the casing of a borehole, comprising the steps of:  
 moving a logging tool through the tubing/screen over the depth region of the gravel pack, said logging tool including a neutron source able to emit neutrons at such an energy that their interaction with a first set of atoms indicative of the gravel pack quality causes the production of gamma rays, and at least one gamma ray detector; and  
 deriving a measurement of the number of gamma rays resulting from the interaction of said neutrons and said first set of atoms of the gravel pack material, and which are detected by said detector over a predetermined counting time interval.

4,950,893

## METHOD AND APPARATUS FOR ENHANCED ION SPECTRA GENERATION AND DETECTION IN ION MOBILITY SPECTROMETRY

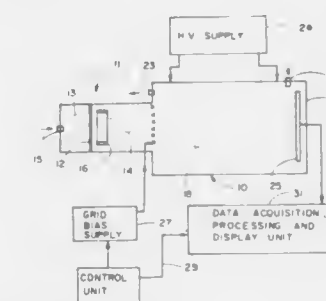
Julio A. Reategui, Hunt Valley; Glenn E. Spangler, Lutherville, and Joseph L. Mangum, Baltimore, all of Md., assignors to Environmental Technologies Group, Inc., Baltimore, Md.

Filed Apr. 27, 1989, Ser. No. 344,128

Int. Cl.<sup>5</sup> H01J 49/40

U.S. Cl. 250—282

8 Claims



1. A method for operating ion mobility spectrometry apparatus, said apparatus including:



an analyzer cell having a shutter grid for dividing said cell into a reaction region and a drift region;  
 means for introducing an analyte sample into said cell reaction region;  
 means in said cell reaction region for ionizing molecules of said analyte sample present therein;  
 means for establishing an electric field extending along the length of said drift region of said cell in a direction away from said reaction region of said cell;  
 means for establishing a flow of drift gas through said drift region of said cell in a direction opposite to the direction of said electric field;  
 an ion current detector, said detector being positioned in said drift region of said cell near the end of said drift region opposite said reaction region of said cell; and  
 means for supplying a bias potential to said shutter grid, the polarity of said bias potential being selectable to either permit the free flow of ions from said cell reaction region to said cell drift region or to prevent the free flow of ions from said cell reaction region to said cell drift region;  
 said operating method comprising the steps of:  
 selecting first the polarity of bias potential output from said supply means which permits the free flow of ions from said cell reaction region to said cell drift region;  
 applying said first selected polarity of bias potential to said shutter grid;  
 selecting second that said bias potential polarity which prevents the free flow of ions from cell reaction region to said cell drift region;  
 momentarily applying said second selected polarity of bias potential to said shutter grid to interrupt the flow of ions from said cell reaction region to said cell drift region;  
 restoring the application of said first selected polarity of bias potential to said shutter grid immediately after said momentary application thereto of said second selected polarity of bias potential;  
 observing the ion current produced by said ion current detector;  
 observing the elapsed time between the application of said second selected polarity of bias potential to said shutter grid and the occurrence of a reduction in ion current from said ion detector.

4,950,894

## RADIATION IMAGE READ-OUT METHOD

Makoto Hara; Yuuma Adachi; Masamitsu Ishida, and Nobuyoshi Nakajima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

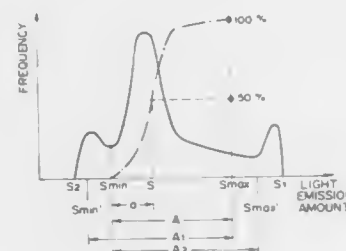
Continuation of Ser. No. 821,927, Jan. 24, 1986, and a continuation of Ser. No. 279,223, Nov. 28, 1988, which is a continuation of Ser. No. 77,344, Jul. 24, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,459

Claims priority, application Japan, Jan. 25, 1985, 60-11882; Jan. 25, 1985, 60-11883; Jul. 24, 1986, 61-174023; Jul. 24, 1986, 61-174024

Int. Cl.<sup>5</sup> G01N 23/04

U.S. Cl. 250—327.2

23 Claims



1. A radiation image read-out method including final read-out conducted by scanning a stimutable phosphor sheet carrying a radiation image stored therein with stimulating rays

which cause the stimutable phosphor sheet to emit light in proportion to the stored radiation energy, photoelectrically detecting the emitted light by use of predetermined read-out conditions, and obtaining an electronic image signal for reproducing a visible image,

wherein the improvement comprises the steps of:

- prior to said final read-out, conducting preliminary read-out for detecting the radiation image stored in said stimutable phosphor sheet by use of stimulating rays of a level lower than the level of stimulating rays used in said final read-out;
- predetermining a desired image information range having lower and upper boundaries as one of said predetermined read-out conditions,
- creating a cumulative histogram image information obtained by said preliminary read-out,
- selecting a characteristic value of said cumulative histogram which provides an indication of the frequency distribution of the light emission amounts from the scanned stimutable phosphor sheet;
- correcting said predetermined read-out conditions in accordance with the selected characteristic value of said cumulative histogram, including reducing said lower boundary of said desired image information range when said selected characteristic value is below a first threshold amount, and increasing said upper boundary of said desired image information range when said selected characteristic value is above a second threshold amount; and
- conducting said final read-out by use of said corrected read-out conditions.

4,950,895

## READ-OUT SYSTEM FOR A LUMINESCENT STORAGE SCREEN IN A X-RAY DIAGNOSTICS INSTALLATION

Hans-Erich Reinfelder, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

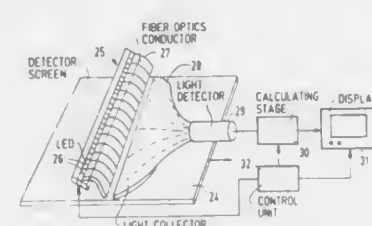
Filed Aug. 24, 1989, Ser. No. 397,899

Claims priority, application European Pat. Off., Sep. 14, 1988, 88115026.2

Int. Cl.<sup>5</sup> G01N 23/04

U.S. Cl. 250—327.2

10 Claims



1. A read-out system for a luminescent storage screen in an x-ray diagnostics installation wherein a latent x-ray image is stored in said luminescent storage screen divided into a plurality of pixels, said system comprising:

- a bank of side-by-side light emitting diodes for scanning pixels of said luminescent storage screen by irradiating said storage screen with stimulating radiation, each light emitting diode being associated with a pixel of said luminescent storage screen;
- means for driving said light emitting diodes in a succession of different groups so that different groups of pixels of said storage screen are successively stimulated to emit light;
- means for detecting the light emitted by each group of stimulated pixels of said storage screen and for generating an electrical brightness signal corresponding to the sum of the light from each of the stimulated pixels in the group;
- means for calculating a brightness value for each individual pixel in a group from said sum; and

means for generating a visual display of the latent image from the individual brightness values.

4,950,896

## MODIFIED FORWARD LOOKING IR DEVICE TO INCLUDE WIDE ANGLE BLACK HOLE RADIOMETER

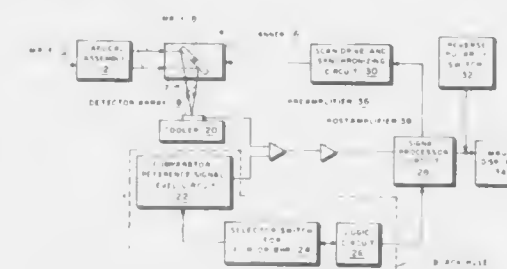
Wilbur Liebson, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 18, 1978, Ser. No. 926,977

Int. Cl.<sup>5</sup> G02B 26/10; H01L 25/00

U.S. Cl. 250—334

7 Claims



1. A means for providing black hole radiometer capability in the video channels of a forward looking IR scanning imaging common module device, the device comprising:

- a scanner having a tiltable oscillating reflecting mirror for providing a wide field of view of the scene being viewed;
- an afocal lens assembly for viewing a radiation image from said scene and projecting said radiation image on said tiltable oscillating reflecting mirror;
- an IR detector array in thermal contact with a thermal cooler cold finger, said IR detector array being swept by said radiation image reflected off said mirror in a plurality of narrow field of views for each detector in said IR detector array and wherein an electrical signal is generated at the output of each of the detectors in said detector array;
- a black hole radiometer capability circuit integrated into said forward looking IR scanning imaging common module, said black hole radiometer capability circuit having a logic circuit with a preprogrammed schedule built therein for selectively activating a selected number of video channels of the forward looking IR mode of operation into the black hole radiometer capability circuit mode of operation and a comparator reference signal level circuit and a selector switch that switches said selected number of video channels from forward looking IR scanning imaging module video processing to the black hole radiometer reference temperature signal level mode of operation for said logic circuit and said comparator reference signal level circuit;
- a plurality of preamplifiers having an IR electrical signal at a first input thereto from the output of one each of said detectors in said IR detector array when operating in the forward looking IR mode and having additionally a second input thereto from the output of said comparator reference signal level circuit only when said device is operating in the black hole radiometer mode wherein said plurality of preamplifiers selectively provides amplified electronic video signals therefrom in the forward looking IR scanning imaging and in the black hole radiometer modes when said black hole radiometer mode is selectively switched into said second input of said plurality of preamplifiers;
- a plurality of postamplifiers that further amplifies said electronic video signals;
- a signal processor circuit for processing the amplified electronic video signals into a visible image display, said logic circuit providing information to tell said signal processor

circuit that said selected number of video channels are operating in the black hole radiometer mode; and  
 a scan drive and synchronizing circuit that is controlled by said signal processor circuit to synchronize the scan of said scanner tiltable oscillating reflecting mirror with the processing of said electronic video signals in said signal processor circuit.

4,950,897

## THERMAL WAVE SUB-SURFACE DEFECT IMAGING AND TOMOGRAPHY APPARATUS

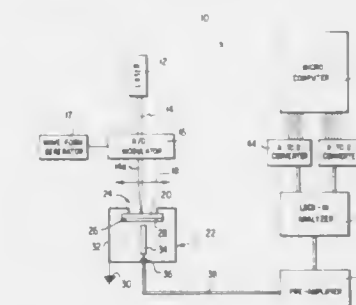
Andreas Mandelis, and Marek Mieszkowski, both of Toronto, Canada, assignors to University of Toronto Innovations Foundation, Toronto, Canada

Filed Jan. 4, 1989, Ser. No. 293,276

Int. Cl.<sup>5</sup> G01N 21/00

U.S. Cl. 250—334

22 Claims



1. A thermal wave detector comprising:

- a pyroelectric electret film having an electrode disposed on one side thereof, said electrode for supporting a solid material; and
- conductive detection means disposed on the other side of said film and being spaced from said electrode, said detection means being capacitively or thermally coupled to said film upon propagation of thermal waves through said material.

4,950,898

## METHOD OF POSITION MONITORING AND APPARATUS THEREFOR

Ian R. Fothergill, Davyholme, United Kingdom, assignor to United Kingdom Atomic Energy Authority, London, England

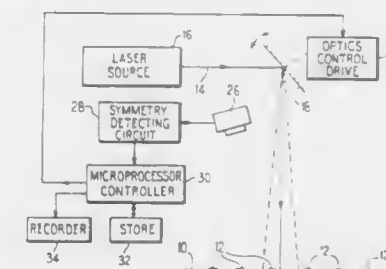
Filed Nov. 14, 1988, Ser. No. 270,021

Claims priority, application United Kingdom, Nov. 30, 1987, 8727963; Aug. 11, 1988, 8819118

Int. Cl.<sup>5</sup> G01B 15/06

U.S. Cl. 250—390.01

33 Claims



1. A method of monitoring the position of at least one target on a body, the method comprising projecting a beam of radiation onto a deflector arranged such that said radiation is deflected by the deflector onto the body, repeatedly angularly moving the deflector about a datum axis in a cyclic manner so that the deflected radiation is cyclically scanned across the target and reflected therefrom, receiving the reflected radiation

tion from the target, and analysing the reflected radiation to determine any change in position of the target.

4,950,899

# POSITION DETECTING CIRCUIT WITH CCD AND RELATIVELY MOVING SOURCE

Miyuki Tachibana, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

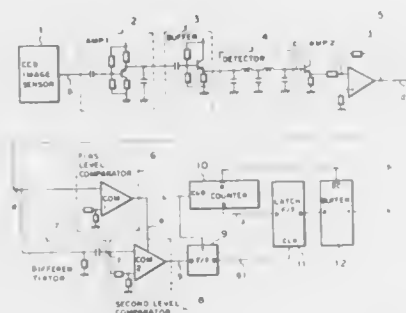
Filed Feb. 9, 1989, Ser. No. 307,915

Claims priority, application Japan, Apr. 4, 1988, 63-82676

Int. Cl.<sup>5</sup> G01D 5/34

U.S. Cl. 250—231.18

4 Claims



1. In an apparatus performing position control, a position detecting circuit comprising a light emitting device attached to one of a moving member of the apparatus and a fixed member disposed to confront said moving member, a CCD image sensor in the form of a one-dimensional array attached to the other of said moving member and said fixed member, a signal processing circuit for processing a signal waveform output from said CCD image sensor, and a counter generating an address designating the current position of said moving member, wherein said signal processing circuit includes a low-pass filter for detecting the signal waveform output from said CCD image sensor and a peak value detecting circuit for detecting a peak value of the output of said low-pass filter, said peak value detecting circuit having a differentiator for differentiating the output of said low-pass filter, a first level comparator for outputting an enable signal when the output of said low-pass filter exceeds a first reference value, and a second level comparator for outputting a peak value signal when both the output of said differentiator exceeds a second reference value and said enable signal is output from said first level comparator.

4,950,900

# HEATED INFRARED GAS ANALYZER USING A PYROELECTRIC INFRARED SENSOR

Kousuke Takeuchi; Kenichi Shibata, both of Hirakata; Toshiharu Tanaka, Higashiosaka; Seiji Nishikawa, Ibaraki; Kazuhiko Kuroki, Uji, and Shoichi Nakano, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Mar. 8, 1989, Ser. No. 320,651

Claims priority, application Japan, Mar. 10, 1988, 63-57114

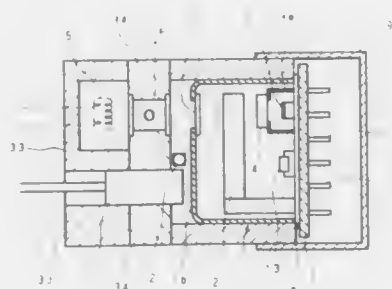
Int. Cl.<sup>5</sup> G01N 21/17, 21/71; G01J 1/00

U.S. Cl. 250—346

5 Claims

1. An infrared gas analyzer comprising: an infrared sensor having a pyroelectric infrared detecting unit; heating means for heating said infrared sensor to a predetermined temperature; a first temperature sensor for detecting a heating temperature by said heating means; a second temperature sensor for detecting a temperature in a vicinity of said pyroelectric infrared detecting unit; temperature setting means for setting a target value of temperature to be detected by said second temperature sensor; means for obtaining a first difference between the tempera-

ture detected by said second temperature sensor and said target value; and heating control means for controlling said heating means in order to bring the temperature in the vicinity of said



pyroelectric infrared detecting unit to said target value in response to a second difference between said first difference and a temperature detected by said first temperature sensor.

4,950,901

# SPECIMEN COOLING HOLDER FOR SIDE ENTRY TRANSMISSION ELECTRON MICROSCOPES

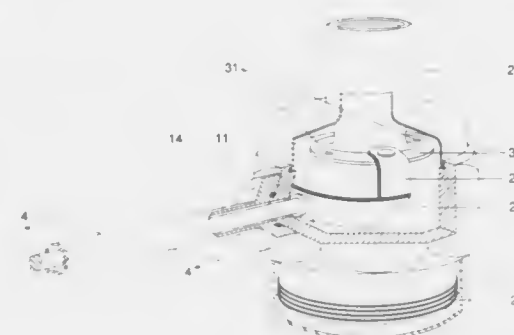
Joseph S. Jones, Pleasanton, and Peter R. Swann, Diablo, both of Calif., assignors to Gatan, Incorporated, Pleasanton, Calif.

Filed Nov. 6, 1989, Ser. No. 432,229

Int. Cl.<sup>5</sup> H01V 37/20

U.S. Cl. 250—443.1

6 Claims



1. A side-entry electron microscope specimen-cooling holder including: (a) a conductor for removing heat from a specimen, (b) a dewar comprising an inner vessel and an outer vessel, and (c) a flexible, conductive harness connecting said conductor to the inner vessel of said dewar, said harness describing arcs in a plurality of planes, whereby at low temperatures said harness is sufficiently flexible that there is good mechanical isolation of said conductor from said dewar.

4,950,902

# TOOTHBRUSH STERILIZER WITH AUTOMATIC CONTROL AND METHOD

Charles H. Ritter, P.O. Box 12126, Tallahassee, Fla. 32317

Continuation-in-part of Ser. No. 306,566, Feb. 6, 1989, Pat. No.

4,888,487, and a continuation of Ser. No. 21,252, Mar. 3, 1987,

Pat. No. 4,803,364. This application Sep. 1, 1989, Ser. No.

401,856

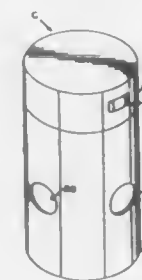
The portion of the term of this patent subsequent to Feb. 7, 2006,

has been disclaimed.

Int. Cl.<sup>5</sup> A61L 3/00

U.S. Cl. 250—455.1

20 Claims



1. A method for conditioning a toothbrush, comprising the steps of:

- providing a conditioning chamber;
- positioning the toothbrush to be conditioned inside said chamber;
- providing means within said chamber and proximate the toothbrush for conditioning the toothbrush; and
- automatically intermittently controlling said conditioning means.

4,950,903

# IRRADIATION DEVICE

Johannes A. Frankena, Olievismolenstraat 5, Drachten, Netherlands

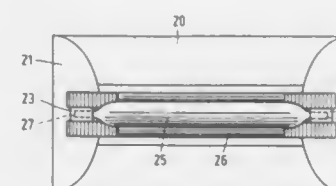
Filed Feb. 6, 1989, Ser. No. 307,660

Claims priority, application Netherlands, Feb. 9, 1988, 8800300

Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 250—504 R

2 Claims



1. An irradiation device for emitting ultraviolet radiation, comprising a housing accommodating at least one reflector and having a sheet material reflecting wall of substantially parabolic cross-sectional shape both ends of which are provided with reflecting side walls extending slightly obliquely towards the reflector opening said side plates comprising holders between which a tubular discharge vessel of a high-pressure discharge lamp can be incorporated whose longitudinal axis extends parallel to the longitudinal axis of the parabolic reflecting wall, characterized in that an elongate shielding plate extending beyond the location where the ends of the discharge vessel are incorporated in the holders is arranged between the discharge vessel and the reflecting wall.

4,950,904

# RADIATION IMAGE READ-OUT APPARATUS

Shigeru Saitome, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 26, 1990, Ser. No. 470,501

Claims priority, application Japan, Jan. 31, 1989, 64-22336

Int. Cl.<sup>5</sup> G21K 4/00; G01D 15/14

U.S. Cl. 250—327.2

27 Claims



1. A radiation image read-out apparatus comprising: i) a main scanning means which scans a stimuable phosphor sheet, on which a radiation image has been stored, with stimulating rays in a main scanning direction, the stimulating rays causing the stimuable phosphor sheet to emit light in proportion to the amount of energy stored thereon during its exposure to radiation, ii) a sub-scanning means which moves the stimuable phosphor sheet with respect to the stimulating rays in a sub-scanning direction approximately normal to the main scanning direction, iii) a light guide member which has a light input face extending along a main scanning line on the stimuable phosphor sheet and which guides the light emitted by the stimuable phosphor sheet and entering the light guide member at its light input face to a light output face of the light guide member, and iv) a photodetector which is connected to the light output face of the light guide member, wherein the improvement comprises the provision of a plurality of plate-shaped members which are secured to said light input face of said light guide member at predetermined intervals, said intervals being taken in said main scanning direction, so that said plate-shaped members are erect in a direction approximately normal to said light input face, and surfaces of adjacent plate-shaped members are located facing each other.

4,950,905

# COLORED TONER OPTICAL DEVELOPABILITY SENSOR WITH IMPROVED SENSING LATITUDE

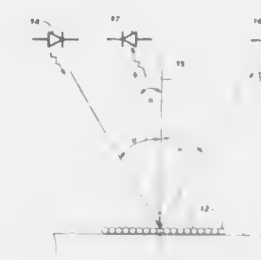
Michael A. Butler, Rochester; Dusan G. Lysy, Fairport, and Paul W. Morehouse, Jr., Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 6, 1989, Ser. No. 306,112

Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 250—358.1

14 Claims



1. An electrostatographic imaging device, wherein as part of a dry imaging process, non-light absorbing dry toner is deposited on an imaging surface, and including a toner mass density measuring arrangement comprising:



- a light source, arranged to illuminate the toner deposited on the imaging surface, and having an output wavelength selected so that the light is substantially not absorbed by the toner, and is substantially not reflected by the surface; and
- a light detector for detecting the intensity of light of the selected wavelength reflected from the toner and imaging surface combination, and positioned with respect to the surface and light source to detect the diffuse component of reflected light, while excluding from detection any specular component of reflected light, with an increased intensity of diffusely reflected light indicating increased toner mass density.

4,950,906

## IMAGE PICKUP DEVICE

Meindert J. M. Beerlage, MX Pijnacker, Netherlands, assignor to B.V. Optische Industrie "De Oude Delft", Delft, Netherlands

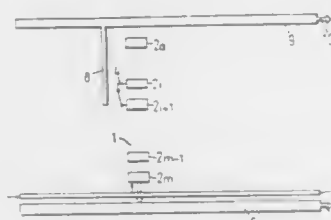
Filed Oct. 13, 1987, Ser. No. 108,083

Claims priority, application Netherlands, Oct. 17, 1986, 8602615

Int. Cl.<sup>5</sup> H01L 27/146

U.S. Cl. 250—370.08

8 Claims



1. Image pickup device, which comprises a matrix having horizontal rows and vertical columns of image pickup element, means for supplying clock signals to said matrix of image pickup elements for transferring image information in a column direction in a time-delay-and-integration mode, means for continuously reading image information out of a column, each column of image pickup elements comprising at least two regions containing image pickup elements and readout means for each region coupled to read out image information from an associated region.

4,950,907

## LUMINESCENT STORAGE SCREEN AND READ-OUT APPARATUS THEREFOR

Herbert Kuhn, Hessdorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

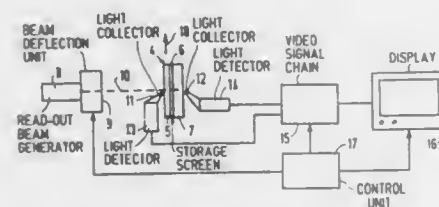
Filed Apr. 3, 1989, Ser. No. 332,493

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820582

Int. Cl.<sup>5</sup> G01T 1/105; G03B 42/00

U.S. Cl. 250—484.1

6 Claims



1. A luminescent storage screen for latently storing an x-ray

image of an examination subject and a read-out system for said screen comprising:

said storage screen consisting of a first storage layer and a second storage layer with a carrier disposed therebetween, each storage layer being responsive to stimulating radiation to luminesce and generate light corresponding to the image stored therein, said carrier being transmissive for x-ray radiation, transmissive for stimulating radiation, and opaque to the light generated by said storage layers; and

said read-out system consisting of a single means for generating a single read-out beam consisting of said stimulating radiation, means for deflecting said beam surface-wide, line-by-line over said screen from only one side of said screen to simultaneously cause luminescing of each storage layer, means for collecting and detecting light from a selected one of said storage layers and generating electrical signals corresponding thereto, and means for generating a visual image from said electrical signals.

4,950,908

## FLOCCULANT CONTROL SYSTEM

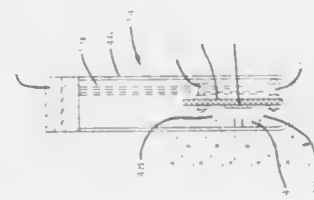
Hayward B. Oblad, and Gary F. Meenan, both of Bethel Park, Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Division of Ser. No. 325,837, Mar. 20, 1989. This application Dec. 11, 1989, Ser. No. 448,500

Int. Cl.<sup>5</sup> G01N 15/07

U.S. Cl. 250—574

3 Claims



1. An opto-electric detector having a tubular transparent housing receiving a platform mounting light emitting diodes and a photoconductor separated by an opaque shield extending toward the internal housing surface, including means to adjustably support said platform within said housing to vary the spacing between said shield and said surface.

4,950,909

## SAMPLE TILTING DEVICE IN ELECTRON MICROSCOPE

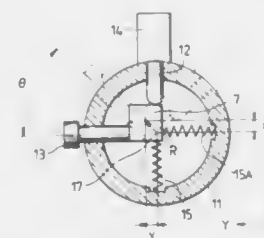
Takashi Yokoto, Shinjyou, and Shigeto Isakozawa, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 25, 1988, Ser. No. 223,643

Int. Cl.<sup>5</sup> G21K 5/00

U.S. Cl. 250—442.1

9 Claims



1. A sample tilting device for an electron microscope includ-

ing a microscope tube means for accommodating a sample illuminated by an electron beam, the sample tilting device comprising:

means for holding the sample in the microscope tube means; means for removably supporting the means for holding the sample in said microscope tube means so as to enable conical movement about a predetermined position; means for displacing the sample in a direction transverse to a longitudinal axis of the electron beam including a motor means, a coupling means connected to said motor means so as to be rotated thereby, a shaft means engageable with the coupling means and in contact with the means for supporting the means holding the sample, and means for preventing a rotation of the shaft means around a center axis thereof while permitting an axial movement of the shaft means; and

means for supporting the motor means by said microscope tube means so as to be rotatable together with the sample about a line passing through the predetermined position and crossing said longitudinal axis of the electron beam.

4,950,910

## ELECTRON BEAM EXPOSURE METHOD AND APPARATUS

Hiroshi Yasuda, Yokohama; Junichi Kai, Tokyo; Shinji Miyaki, Tokushima, and Yasushi Takahashi, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

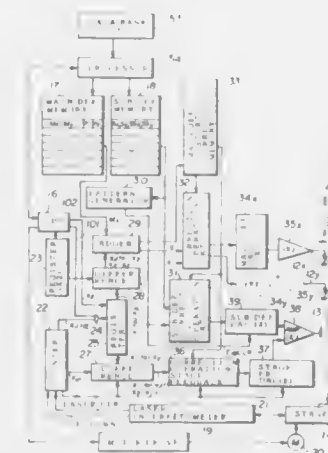
Filed Jan. 31, 1989, Ser. No. 304,242

Claims priority, application Japan, Feb. 4, 1988, 63-22795

Int. Cl.<sup>5</sup> H01J 37/302

U.S. Cl. 250—492.3

15 Claims



1. A method for depicting a pattern on a sample having a plurality of exposure areas placed on a movable stage by irradiating an electron beam, said method comprising the steps of:

- calculating a pattern density in each exposure area from data of a pattern to be exposed;
- comparing the calculated pattern density with a predetermined threshold value;
- depicting the pattern in a first exposure area of the exposure areas in which the sample is exposed while continuously moving the stage when the calculated pattern density in the first exposure area is less than the predetermined threshold value; and
- depicting the pattern in a second exposure area of the exposure areas by a step and repeat process when the calculated pattern density in the second exposure area is equal to or greater than the predetermined threshold value.

4,950,911

## APPARATUS AND METHOD FOR INSPECTING SHEET MATERIAL

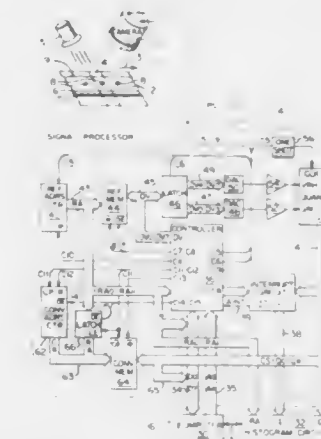
Paul Williams, Columbus; Thomas M. Domin, Galena; Gary N. Burk, Columbus; Thomas O. McCanney, Sunbury, and Steven M. Wilson, Grove City, all of Ohio, assignors to Process Automation Business, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 171,208, Mar. 17, 1988, abandoned, which is a continuation of Ser. No. 940,139, Dec. 10, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 299,723

Int. Cl.<sup>5</sup> G01N 21/88

U.S. Cl. 250—563

49 Claims



1. Apparatus for inspecting sheet material having known characteristics, said apparatus comprising:

means for providing a plurality of pixel signals, each having a magnitude representing the intensity of electromagnetic radiation received from a corresponding point on the sheet material;

signal processing means, responsive to said means for providing a plurality of pixel signals, for comparing the magnitude of each one of said pixel signals to a corresponding reference range defined by the known characteristics of the sheet material for each one of said pixel signals and generating a characteristic signal made up of an event signal for each of said magnitudes falling outside of said corresponding reference range and a data signal for each of said magnitudes falling within said reference range, said at a signal representing the magnitude of said pixel signal, and an address signal representing the point on the sheet material for which said characteristic signal is generated; and

system processing means, responsive to said signal processing means, for storing said event signals and said corresponding address signals to provided an indication of deviation from the known characteristics of the sheet material.

4,950,912

## MULTI-SEGMENT PLAY APPARATUS

Adolph E. Goldfarb, 1432 S. Eastwind Cir., Westlake Village, Calif. 91361, and Randall Klimpert, Studio City, Calif., assignors to Adolph E. Goldfarb, Westlake Village, Calif.

Filed Feb. 10, 1989, Ser. No. 309,335

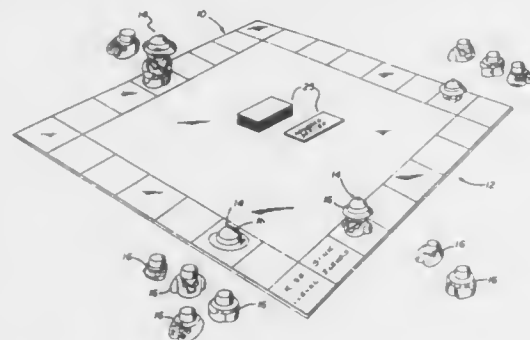
Int. Cl.<sup>5</sup> A63F 3/00; A63H 3/16

U.S. Cl. 273—249

2 Claims

1. A method of playing a game utilizing a game apparatus, the game apparatus comprising (a) game board having a generally flat upper surface and defining a pathway on said surface, said game apparatus also comprising (b) a plurality of multi-segment play pieces each adapted to be disposed upon and moved along said pathway, each of said play pieces comprising

a series of segments designed and arranged to be stacked in a predetermined order upon one another to thereby combine to form a recognizable object, said object being capable of standing upright on a generally flat support surface provided by the pathway, each of the segments having a generally flat lower end capable of maintaining itself and the segments stacked upon it in an upright position on the surface, each of the segments having first connecting means thereon for interengaging second connecting means on an adjacent other of the segment for maintaining the segments in stacked relationship to one another, whereby removing segments progressively from the bottom of the stack of an object creates the illusion that the object is sinking into the surface of the pathway, while adding segments to the bottom of the stack in the reverse order creates the illusion that the object is rising out of the surface of the pathway, said game apparatus also comprising (c) random



means for indicating movement of the pieces along the pathway, and (d) action means for indicating segments to be removed from or added to an object as the object moves along the pathway, said method comprising the steps of:

1. placing a play piece on the board pathway in an upright position, such that the segments are stacked on top of one another;
2. moving the play piece from one space to another space along the pathway while in an upright position;
3. removing one or more segments progressively from the bottom of the stack as the play piece moves from one space to another space, such removing being dictated by the action means; and
4. adding one or more segments progressively to the bottom of the stack as the play piece moves from one space to another space, such adding being dictated by the action means.

## 4,950,913

**PROGRAMMABLE TIMER POWER SWITCH UNIT**  
David A. Kephart, 813 Logan Blvd., Hollidaysburg, Pa. 16648  
Filed Apr. 21, 1989, Ser. No. 341,224

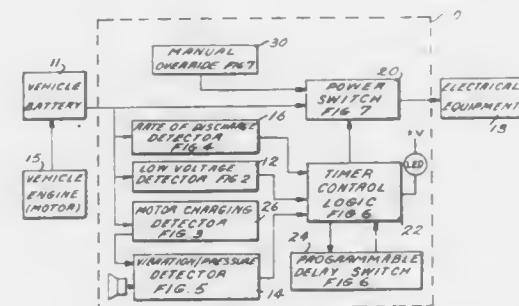
Int. Cl.<sup>5</sup> B60L 1/00; H02H 7/00

U.S. Cl. 307—10.7

20 Claims

1. A programmable timer power switch unit for use with a motor and battery means, said unit comprising:  
power switch means receiving power from the battery means and switching the power to equipment powered by the battery means;  
charge-discharge detector connected to the battery means for detecting a potential charge of the battery means;  
vibration-pressure detector connected to said charge-discharge detector for detecting vibrations and sounds of the motor;  
timer-control logic receiving signals from said charge-discharge detector and said vibration-pressure detector for disabling said power switch means based on the received signals;  
programmable delay means connected to said timer-control

logic for enabling said timer-control logic for a preselected time; and



manual override switch connected to said power switch means for overriding the disabling signal received from said timer-control logic.

## 4,950,914

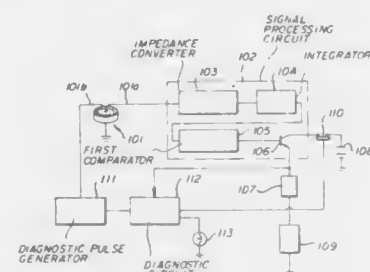
**COLLISION DETECTION SYSTEM FOR A VEHICLE**  
Norimitsu Kurihara, Yoshikazu Tsuchiya, Makie Morota, and Junichi Fukuda, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 29, 1988, Ser. No. 174,555

Claims priority, application Japan, Mar. 30, 1987, 62-74477; Oct. 16, 1987, 62-259641

Int. Cl.<sup>5</sup> B60R 21/08

U.S. Cl. 307—10.1

13 Claims



1. A collision detection system for a vehicle comprising:  
an acceleration sensor for sensing the acceleration and deceleration of the vehicle wherein said acceleration sensor is a piezoelectric sensor;  
signal processing means coupled to said piezoelectric sensor for generating a first output when the vehicle deceleration is greater than a predetermined amount; and  
diagnostic pulse generator means coupled to said piezoelectric sensor for applying a diagnostic pulse during starting of said vehicle and during operating of said vehicle to said piezoelectric sensor for distorting said piezoelectric sensor, therein causing said piezoelectric sensor to generate an electrical output, said electrical output being applied to said signal processing means wherein said signal processing means produces a second output in response thereto, said signal processing means includes a circuit means for decreasing a length of time said second output of said signal processing means in response to said diagnostic pulse applied to said piezoelectric sensor.

## 4,950,915

**IMPACT SENSOR WITH A TESTING CIRCUIT FOR A VEHICLE**

Hans Spies, Pfaffenhofen; Horst Laucht, Bruckmuehl, and Alfons Woehrl, Schrobenuhausen, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

PCT No. PCT/EP88/00161, § 371 Date Oct. 25, 1988, § 102(e) Date Oct. 25, 1988, PCT Pub. No. WO88/06541, PCT Pub. Date Sep. 7, 1988

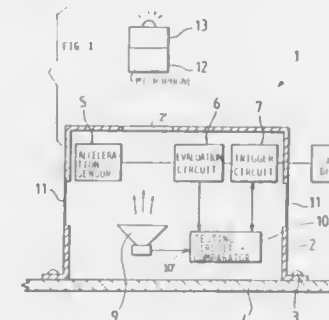
PCT Filed Mar. 3, 1988, Ser. No. 272,776

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1987, 3706765

Int. Cl.<sup>5</sup> B60R 21/00

U.S. Cl. 307—10.1

7 Claims



1. An impact sensor device for a vehicle, comprising a sensor housing, an acceleration sensor arranged in said sensor housing, an evaluating circuit connected to said acceleration sensor for evaluating electrical output signals from said acceleration sensor, a trigger circuit connected to said evaluation circuit for triggering a passive safety device when a given threshold value is exceeded, a testing circuit for testing the operability of said impact sensor device, electro-acoustic transducer means arranged in said sensor housing as part of said testing circuit, said electro-acoustic transducer means being acoustically coupled to said acceleration sensor for applying a characteristic acoustic testing signal to said acceleration sensor, and wherein said testing circuit compares said characteristic acoustic testing signal of said electro-acoustic transducer means with signals from said acceleration sensor for ascertaining the operability of said impact sensor device.

## 4,950,916

**LINE VOLTAGE REGULATOR**

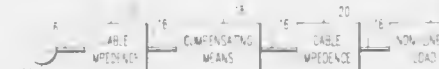
Steven A. Moran, Mt. Lebanon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 25, 1988, Ser. No. 236,429

Int. Cl.<sup>5</sup> G05F 1/68; H02J 3/18

U.S. Cl. 307—82

5 Claims



1. A line voltage regulator for a cable in an A.C. distribution system electrically connected to at least one load, the line voltage regulator located remotely from the load, comprising:  
a means for producing a cable voltage drop signal that corresponds to a voltage drop across the cable which separates the line voltage regulator and the load;  
a sensor circuit for detecting distortion voltage across the cable which separates the means for producing a cable voltage drop signal and the load, said sensor circuit also producing a drive signal that corresponds to the distortion

voltage, a fundamental voltage and the voltage drop in the cable; and

a means for providing voltage to the cable between the power supply and the means for producing a cable voltage drop signal such that the voltage is regulated and distortion voltage in the cable is essentially eliminated as applied to the load, said means for providing voltage to the cable being electrically connected to the sensor circuit and controlled by the drive signal therefrom;

wherein the sensor circuit further comprises: (i) a means for producing a harmonic and drop voltage signal corresponding to the distortion voltage and the voltage drop across the cable; (ii) a means for producing a fundamental voltage signal corresponding to the fundamental voltage in the cable; (iii) a first adder for adding the harmonic and drop voltage signal, and the fundamental voltage signal together and producing a distortion, fundamental and drop voltage signal corresponding thereto; and (iv) a pulse width modulator electrically connected to the first adder and to the means for providing voltage to the cable, said pulse width modulator producing the drive signal corresponding to the distortion, fundamental and drop voltage signal received from the first adder which controls the means for providing voltage to the cable.

## 4,950,917

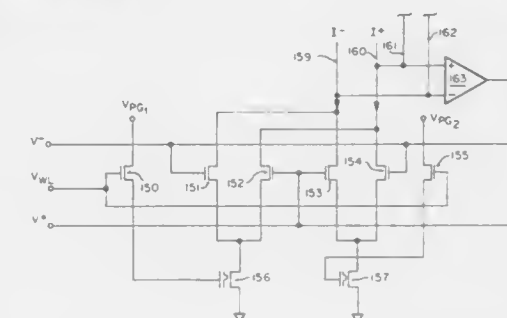
**SEMICONDUCTOR CELL FOR NEURAL NETWORK EMPLOYING A FOUR-QUADRANT MULTIPLIER**  
Mark A. Holler, Palo Alto; Simon M. Tam, Redwood City; Ronald G. Benson, Pasadena, and Hernan A. Castro, Shingle Springs, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 225,035, Jul. 27, 1988. This application Dec. 9, 1988, Ser. No. 283,553

Int. Cl.<sup>5</sup> G06G 7/12

U.S. Cl. 307—201

19 Claims



1. In a neural network having a plurality of programmable synapses, each of which has a differential input and a differential output, said output being a weighted function of said input, an improved synapse comprising:

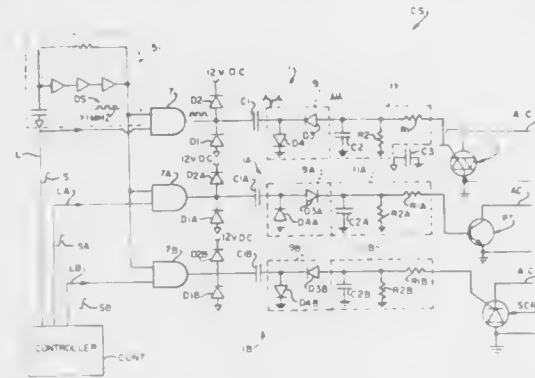
a four-quadrant multiplier for receiving said differential input and producing said differential output including a first and a second pair of differentially-coupled, field-effect devices, each of said pairs being connected to a floating gate device, said floating gate device having a floating gate and a control gate, such that the difference in the charge stored on said floating gates determines the current flow through each of said differentially-coupled pairs, thereby causing said output signal to be a multiple of said differential input and said charge difference;  
means for charging and discharging said floating gates to predetermined levels.



# 4,950,918 ISOLATED CONTROL CIRCUIT FOR ALTERNATING CURRENT SWITCHES

Ciaran O'Breartuin, St. Louis County, Mo., and Marco Venturini, Genoa, Italy, assignors to Emerson Electric Co., St. Louis, Mo.

Filed Dec. 7, 1988, Ser. No. 280,825  
Int. Cl.<sup>5</sup> H03K 17/56, 17/60, 3/01; G05F 1/40  
U.S. Cl. 307-242 18 Claims



1. In a control system employing a solid state switching device to control application of alternating current power to a load, the improvement comprising drive circuit means for applying a low voltage power signal to the solid state switching device, the drive circuit means providing isolation from the alternating current, said drive circuit means including:

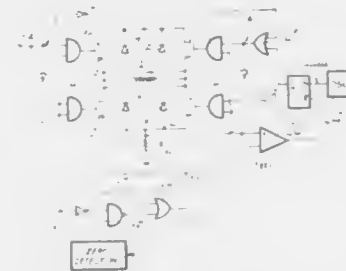
- oscillator means for generating a drive signal of a predetermined frequency;
- a logic gate having as a first input the drive signal from the oscillator means and as a second input a control signal from a control means for enabling the gate to pass the drive signal;
- a first capacitor connected to the output of the logic gate and to which the drive signal is applied;
- rectifier means connected to the first capacitor for rectifying the signal from the first capacitor; and
- a low-pass filter connected to the rectifier means, said filter including a second capacitor whose capacitance has a specified ratio to the capacitance of the first capacitor, the output of the filter being connected to the solid state device to switch the device to a conducting state when the logic gate is enabled.

4,950,919  
MOS-TRANSISTOR BRIDGE CIRCUIT  
Domenico Rossi, Cilavegna; Claudio Diazzi, and Carlo Cini, both of Milan, Italy, assignors to SGS-Thomson Microelectronics S.p.A., Catania, Italy

Filed May 16, 1988, Ser. No. 194,602  
Claims priority, application Italy, May 18, 1987, 20572 A/87  
Int. Cl.<sup>5</sup> H03K 17/74, 3/01, 17/687, 3/45  
U.S. Cl. 307-257 10 Claims

1. A MOS-transistor bridge circuit, comprising a first branch including a first and second MOS transistors connected in series, a second branch including a third and a fourth MOS transistors connected mutually in series and in parallel with said first branch, said first and third transistors being further connected to a first higher reference potential line and said second and fourth transistors being connected to a second lower reference potential line, each of said branches defining an intermediate tap for connection to a load, and four driving gate circuits, each associated with a respective transistor and comprising a first enable input terminal, a second switch input terminal and an output, said enable terminals being mutually connected and defining a common enable input, said switch input terminals of said gate circuits associated with said transistors of said first branch being mutually connected through a

first inverter element and defining a first common control input, said switch input terminals of said gate circuits associated with said transistors of said second branch being mutually connected through a second inverter element and defining a second common control input, each of said outputs of said gate circuits being connected to a gate terminal of the respective associated transistor, said common enable input and said common control inputs receiving a circuit enable signal as well as control signals for switching on at least said first transistor and, alternatively, one of said third and fourth transistors and supplying a current to said load, said bridge circuit further comprising a fast flyback control section having a flyback input, an enable output connected to said common enable input and first and second control outputs respectively connected to said first and second control inputs, said fast flyback control section comprising selective delay means and means for controlling



switching of said MOS transistors, said selective delay means having an input connected to said enable output and said means for controlling switching of said MOS transistors having a first input connected to said flyback input, a second input receiving a signal indicative of the current flowing in said load, and two outputs defining said first and second control outputs, said selective delay means receiving a fast flyback signal switching between a first and a second logical states and generating said enable signal at said common enable input when said fast flyback signal is in said first logical state and, maintaining said enable signal when said fast flyback signal is in said second logical state until the current in said load decreases to zero, and said switching means switching on said second and third, diagonally opposed MOS transistors for causing said current in the load to flow from said lower to said higher reference potential line with said fast flyback signal in said second logical state until said current in said load decreases to zero.

4,950,920  
COMPLEMENTARY SIGNAL OUTPUT CIRCUIT WITH REDUCED SKEW

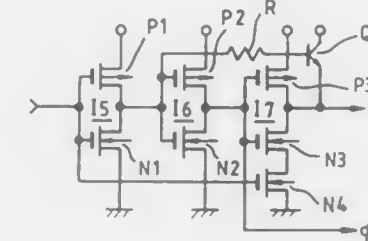
Hiroyuki Hara, Tokyo, and Masaji Ueno, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Aug. 10, 1988, Ser. No. 230,549  
Claims priority, application Japan, Sep. 30, 1987, 62-246767  
Int. Cl.<sup>5</sup> H03K 5/00, 19/02, 5/13  
U.S. Cl. 307-262 7 Claims

1. A complementary signal output circuit for supplying a first output signal and a second output signal in response to an input signal alternating between a high level state and a low level state in a predetermined phase and a power source voltage comprising:

- first inverter means for outputting a first signal in response to the input signal;
- second inverter means for receiving said first signal and for outputting said first output signal having substantially said predetermined phase of said input signal;
- third inverter means for receiving said first output signal and outputting said second output signal having a substantially opposite phase to the predetermined phase of said input signal;

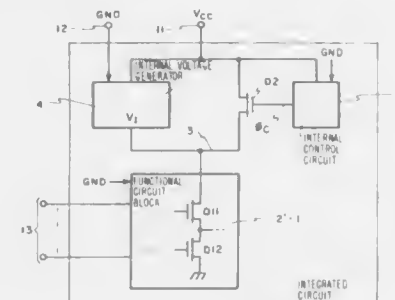
transistor means, responsive to said first signal and said power source voltage, for changing said second output signal from a low level state to a high level state substantially simultaneously with a change of said first output signal from a high level state to a low level state by out-



4,950,921  
SEMICONDUCTOR INTEGRATED CIRCUIT HAVING A BUILT-IN VOLTAGE GENERATOR FOR TESTING AT DIFFERENT POWER SUPPLY VOLTAGES

Masahide Takada, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Aug. 26, 1988, Ser. No. 237,043  
Claims priority, application Japan, Aug. 26, 1987, 62-213395  
Int. Cl.<sup>5</sup> H03K 3/01, 5/153  
U.S. Cl. 307-296.1 7 Claims

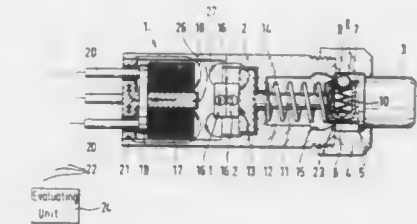


1. A semiconductor integrated circuit comprising a power voltage terminal for receiving an external voltage, at least one data terminal, an internal voltage line, an internal voltage generator coupled to said power voltage terminal and said internal voltage line, said internal voltage generator generating an internal voltage having a first value, said internal voltage appearing at said internal voltage line when a value of said external power voltage is larger than a second value, said second value being larger than said first value, a functional circuit coupled to said data terminal and said internal voltage line, said functional circuit operating with a power voltage supplied from said internal voltage line, a switching means coupled between said power voltage terminal and said internal voltage line for operatively providing a current path therebetween, a detection circuit coupled to said power voltage terminal for generating a detection signal when the value of said external power voltage is larger than a third value, said third value being larger than said second value, and a control circuit responsive to said detection circuit for controlling said switching circuit, said control circuit making said switching means conductive when said detection signal is present and non-conductive when said detection signal is not present.

4,950,922  
ELECTRICAL SWITCH  
Thomas Krummer, Weissenburg, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Jan. 20, 1989, Ser. No. 300,343  
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803284

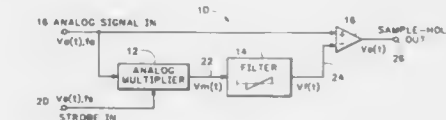
Int. Cl.<sup>5</sup> H03K 17/97, 17/90  
U.S. Cl. 307-309 7 Claims



1. Electrical switch comprising: a housing; a pushbutton protruding from said housing at a first end of said housing; a spring in said switch, said pushbutton being actuatable opposite the biasing action of said spring; a permanent magnet arranged as an axial extension of said pushbutton within said housing; a coil positioned in said housing at a second end of said housing, said coil having a first end surface facing said permanent magnet; and a Hall sensor being contacted by a second end surface of said coil opposite to said first end surface, said sensor being in electrical connection with contact pins.

4,950,923  
ANALOG MULTIPLIER BASED SAMPLE AND HOLD NETWORK  
Valdis E. Garuts, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

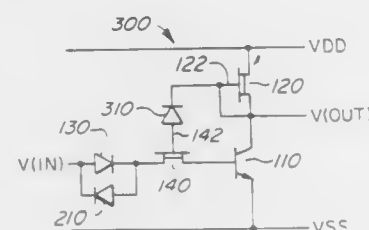
Filed Jul. 28, 1989, Ser. No. 386,318  
Int. Cl.<sup>5</sup> G11C 27/02  
U.S. Cl. 307-353 6 Claims



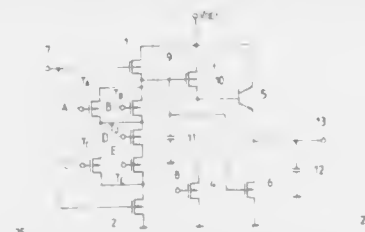
1. A sample and hold network responsive to an analog input signal comprising:

- (a) means for multiplying the analog input signal by a strobe signal to produce a multiplied signal wherein the strobe signal is generated independently of the analog input signal and has a frequency higher than twice that of the highest frequency of the analog input signal;
- (b) a bandpass differentiating filter for filtering the multiplied signal to produce a filter signal; and
- (c) means for combining the filtered signal with the analog input signal to provide an output signal having a waveform whose slope is substantially equal to zero for periods of time that are predetermined fractions of the wavelength of the analog input signal.

## 11 Claims

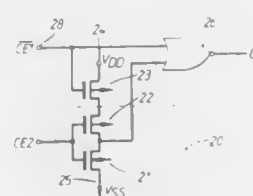


- and said second power source and having means for receiving a first clock signal;
- said first clock signal being received for complementarily switching said logic circuit network and said switch device so that the output of said first output node is substantially equal to the potential of said first or second power source;
- a first FET having a gate thereof connected to said first output node;
- a bipolar transistor having a base for receiving the output signal from an output terminal of said first FET, one end of a collector-emitter path of said bipolar transistor being



- connected to a fourth power source and the other end of said collector-emitter path being connected to a second output node; and
- a second FET having means for inputting said output of said first output node, one end of a source-drain path of said second FET being connected to said second output node and the other end of said source-drain path being connected to a third power source,
- wherein said bipolar transistor and said second FET are complementarily switched by said output of said first output node, and wherein the output potential of said second output node is determined by said fourth power source and said third power source.

## U.S. Cl. 307-451



1. A control signal output circuit for outputting a control signal for controlling a semiconductor device in response to first and second input signals and a power source voltage, the control signal having a first level for activating the semiconductor device and a second level for placing the semiconductor device in a stand-by state, comprising:
- inverter means responsive to the power source voltage for inverting the first input signal and outputting an inverted signal;
  - logic circuit means for outputting a control signal in response to both the inverted signal and the second input signal; and
  - switching means for disconnecting the inverter means from the power source voltage in response to the second input

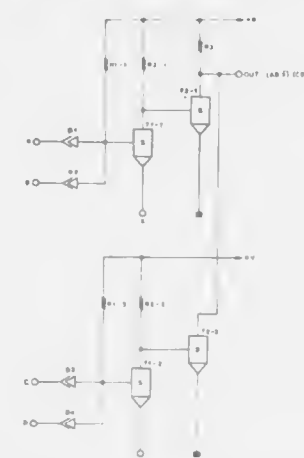
## U.S. Cl. 307-446

1. A semiconductor logic circuit comprising:  
a logic circuit network being connected to a first power source and having means for receiving a first clock signal, means for inputting at least one input signal and means for producing an output which sets a first output node to substantially the same potential as the potential of said first power source or a second power source in response to said input signal;  
a switch device connected between said first output node

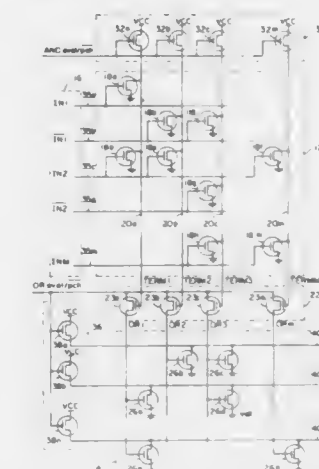
Continuation of Ser. No. 236,299, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 946,666, Dec. 24, 1986, abandoned, which is a continuation of Ser. No. 619,680, Jun. 11, 1984, abandoned. This application Sep. 5, 1989, Ser. No. 403,062. Claims priority, application France, Jun. 30, 1983, 83 430022.

U.S. Cl. 307-457

### 17 Claims



1. A circuit for performing a basic logic function derived from n input signals (A, B, . . . ) comprising (a) a ground, (b) a positive supply source having a positive end and other end, said other end being connected to said ground,
  - (c) first and second input transistor circuits and a single output transistor and said first input transistor circuit including
    - (1) a first input transistor having a first base, a first collector and a first emitter,
    - (2) a first plurality of input diodes each having a first electrode which receives one of a plurality of input signals, and
    - (3) each of said diodes including a second electrode connected to a first common node,
    - (4) said first common node being connected through a first resistor to a supply voltage, and said common node being connected to said first base,
  - (d) said second input transistor circuit including
    - (1) a second input transistor having a second base, a second collector and a second emitter,
    - (2) a second plurality of input diodes,
      - (i) each of said second plurality of input diodes having a first electrode which receives one of a plurality of input signals, and
      - (ii) each of said diodes including a second electrode connected to a second common node connected through a second resistor to said supply voltage,
    - (iii) said second common node being connected to said second base,
  - (e) said collectors of said first and second input transistors being connected through a third and fifth resistor, respectively, to said supply voltage,
  - (f) a first output inverter transistor
    - (1) whose base is connected to the collector of said first input transistor.



- (2) whose emitter is connected to ground, and
  - (3) whose collector is connected by a fourth resistor to said supply voltage,
  - (g) an output coupled to said collector of said output inverter transistor,
  - (h) a second output inverter transistor
    - (1) whose base is connected to the collector of said second input transistor,
    - (2) whose emitter is connected to ground, and
    - (3) whose collector is connected in common with said collector of said first output inverter transistor by said fourth resistor to said supply voltage,
  - (i) said emitter of said first input transistor being connected to emitter circuit means for providing an input signal X being positive with respect to ground,
  - (j) said emitter of said second input transistor being connected to emitter circuit means for providing an input signal Y being positive with respect to ground,
- whereby said emitter of said first input transistor circuit receives an input signal X and said emitter of said second input transistor receives an input signal Y, and whereby the output level at the common collector of the output transistors represents the logic function:

$(\bar{X}AB \dots)(\bar{Y}CD \dots)$  with A,B... being the input signals applied to the first electrodes of the input diodes of the first circuit and C,D... being the input signals applied to the second electrodes of the input diodes of the second circuit.

Filed Sep. 14, 1989, Ser. No. 407,000  
Int. Cl.<sup>5</sup> H03K 19/177

U.S. Cl. 307—468

### 9 Claims

1. A dynamic programmable logic array circuit comprising:  
AND logic plane means (12) for receiving input logic signals and performing predetermined logic operations thereon and for generating first output signals on a plurality of product term lines;  
said AND logic plane means (12) being formed of a plurality of N-channel AND plane programming transistors (18a, 18b, . . . 18m), each of said AND plane programming transistors having its drain electrode connected to a respective one of said plurality of product term lines and its source electrode connected to a power supply ground potential (VSS), the gate electrodes of said AND plane programming transistors being connected to receive a respective one of said input logic signals;



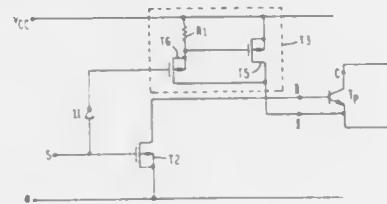
inter-plane buffer means (22) for receiving said first output signals and for generating second input logic signals on a plurality of OR input lines;  
 OR logic plane means (14) for receiving said second input logic signals and for performing a second predetermined logic function thereon and for generating second output signals on a plurality of sum term lines;  
 said OR logic plane means (14) being formed of a plurality of N-channel OR plane programming transistors (26a, 26b, . . . 26n), each of said OR plane programming transistors having its drain electrode connected to a respective one of said plurality of sum term lines and its source electrode connected to the power supply ground potential (VSS); and  
 said buffer means (22) being formed of a plurality of N-channel inter-plane FETs (23a, 23b, . . . 23n), each of said plurality of interplane FETs having its gate electrode coupled to a respective one of said plurality of product term lines and its source electrode connected to a respective one of said plurality of OR input lines, the drain electrodes of said plurality of inter-plane FETs being connected to receive an OR plane evaluation signal.

**4,950,929**  
**REDUCING RESISTIVE EFFECTS OF AN ELECTRICAL SWITCH**  
 Raymond Chan-Man Yan, Daly City, Calif., assignor to Tele-dyne Industries, Mountain View, Calif.  
 Filed Apr. 7, 1988, Ser. No. 178,566  
 Int. Cl.<sup>5</sup> H03F 1/26; H03B 1/04  
 U.S. Cl. 307—491 11 Claims



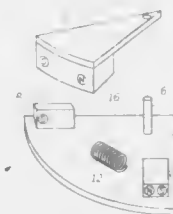
1. A circuit for coupling and decoupling a source signal to a device, said circuit comprising:  
 (a) a buffer including an amplifier having a first input, a second input and an output, said first input receiving the source signal and said output outputting a buffered source signal;  
 (b) a main switch connected between said output of said amplifier and a node coupled to the input of the device, said main switch selectively coupling said buffered source signal to the device in response to a control signal;  
 (c) means, coupled to said main switch and said buffer, for reducing the resistance of said main switch, said reducing means including a first switch and a second switch, said first switch connected between said output and said second input of said amplifier and said second switch connected between said node and said second input of said amplifier, and control means for providing said control signal to said main switch and said second switch and a complementary control signal to said first switch.

**4,950,930**  
**BRIDGE BASE CONTROL CIRCUIT WITH CONTROLLED BLOCKING EVEN IN THE AVALANCHE MODE**  
 Chandra K. Patni, London, United Kingdom, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France  
 Filed Jul. 19, 1988, Ser. No. 222,433  
 Claims priority, application France, Jul. 21, 1987, 87 10605  
 Int. Cl.<sup>5</sup> H03K 17/60, 17/687, 3/01; G05F 1/40  
 U.S. Cl. 307—570 15 Claims



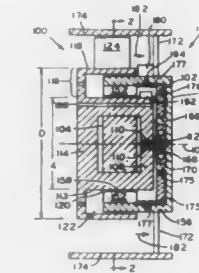
1. A bridge base control circuit means for controlling a power switch having a base and an emitter (Tp), wherein, at switching off, the base of said power switch being connected with a reference terminal (M) through a first switching means (T2) having a low impedance and the emitter of said power switch being connected with a supply terminal (Vcc) through a second switching means (T3) for allowing the flow of a reverse current in the base-emitter junction, and wherein the second switching means includes first circuit means for providing a low impedance immediately after switching on of said first and second switching means when the base-emitter voltage (V<sub>BE</sub>) is low due to stored charge in said power switch, and wherein said second switching means includes second circuit means for providing a higher impedance relative to said low impedance as the emitter voltage approaches the supply voltage (Vcc) due to dissipation of said stored charge.

**4,950,931**  
**VIBRATOR**  
 Michael Goldenberg, Boynton Beach, and John M. McKee, Hillsboro Beach, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.  
 Filed Jan. 17, 1989, Ser. No. 297,290  
 Int. Cl.<sup>5</sup> H02K 33/06  
 U.S. Cl. 310—36 7 Claims



1. A vibrator comprising: a massive, magnetic member arranged for movement about a reference position, said member comprising a first permanent magnet;  
 electromagnetic actuator means for causing said member to move, said actuator means comprising an electromagnetic coil; and  
 magnetic means arranged on either side of said member for suspending said member therebetween, said magnetic means comprising second and third permanent magnets arranged respectively on either side of said first permanent magnet.

**4,950,932**  
**AXIAL FLOW FAN INTEGRAL WITH ELECTRONICALLY COMMUTATED MOTOR**  
 Harold H. Harms, and David M. Erdman, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.  
 Filed May 30, 1989, Ser. No. 358,171  
 Int. Cl.<sup>5</sup> H02K 9/06, 5/16  
 U.S. Cl. 310—67 R 46 Claims



1. A rotatable assembly for use with a stationary assembly including an annular core having a central opening therein and having a plurality of winding stages thereon and including means for supporting the annular core and said rotatable assembly for rotation about an axis coaxial with the central opening, said winding stages adapted to be electrically energized to generate an electromagnetic field for rotating said rotatable assembly about the axis, said rotatable assembly comprising:

a substantially cylindric central portion adapted to be received within the central opening and supported for rotation about the axis coaxial with the central opening, said central portion having at least one permanent magnet element which rotates about the axis as the central portion rotates, said element being in magnetic coupling relation with the winding stages;  
 a blade assembly on said central portion and extending radially therefrom, said blade assembly spaced radially outwardly from said central portion, said blade assembly and said central portion defining therebetween an annular recess coaxial with the central opening for receiving said annular core, said blade assembly being adapted to axially move air which is located about the outer periphery of said rotatable assembly as said rotatable assembly rotates; and  
 means, connected to the winding stages and positioned between the supporting means and said central portion of said rotatable assembly, for applying a voltage to one or more of the winding stages at a time and for commutating the winding stages in a preselected sequence to rotate the rotatable assembly about the axis of rotation.

**4,950,933**  
**CARBON BRUSH HOLDER UTILIZING A WORN BRUSH DETECTOR**  
 James R. Pipkin, Orlando, and Edward D. Thompson, Casselberry, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Aug. 3, 1989, Ser. No. 388,890  
 Int. Cl.<sup>5</sup> H02K 13/00  
 U.S. Cl. 310—239 12 Claims

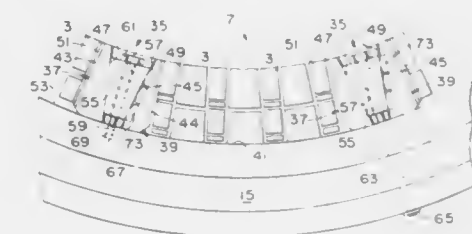
1. In a dynamoelectric machine having a rotatable shaft, at least one collector ring mounted on the shaft and rotatable therewith, and a plurality of stationary carbon collector brushes angularly supported about said collector ring and in sliding contact therewith, said brushes being grouped in a least one removable holder such that a portion of said brushes are singularly removable from contact with said collector ring, and a worn brush detector for detecting when at least one of said grouped brushes within one of said removable holders has

been worn down a predetermined amount, wherein said worn brush detector comprises:  
 a strip of electrically-conductive material secured to said removable holder;  
 at least one extending from said strip, said finger being disposed adjacent to a hole in said removable holder; and  
 an electrically insulated knob on an end of each of said finger



opposite to that of the strip and projecting through said hole such that when one of said brushes is inserted into said removable holder said finger is pushed away from said removable holder by the knob contacting one of the brushes, and when one of said brushes has worn down the predetermined amount it is disengaged from the knob so that the finger is causes to contact said removable holder whereby an electrical signal is generated.

**4,950,934**  
**ADJUSTABLE SECUREMENT SYSTEM FOR END WINDING CONDUCTORS**  
 Henry M. Holly, III, Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Aug. 14, 1989, Ser. No. 393,155  
 Int. Cl.<sup>5</sup> H02K 3/46  
 U.S. Cl. 310—260 7 Claims



1. A biased securement system for end windings of an electromechanical apparatus comprising:  
 a support ring disposed about a plurality of peripherally spaced said end windings;  
 a biased wedge system located between said spaced end windings to compress said end windings in both a radial and circumferential direction;  
 said biased wedge system including a pair of confronting spacer blocks having a confronting angular surface which converge in the direction of said support ring and a triangular shaped wedge slidable between said confronting spacer blocks;  
 means for securing said triangular shaped wedge to said support ring; and  
 biasing means, comprised of a plurality of Belleville washers, disposed between said triangular shaped wedge and at least one said confronting spacer blocks to bias the same in a circumferential direction.

4,950,935

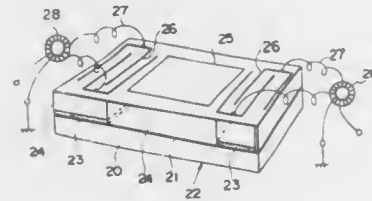
## SURFACE-ACOUSTIC-WAVE CONVOLVER

Katsuo Furukawa, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 255,103  
Claims priority, application Japan, Oct. 14, 1987, 62-259219  
Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—313 R

5 Claims



1. A surface-acoustic-wave device comprising: a semiconductor base; a piezoelectric substrate laid on said semiconductor base; at least one transducer laid on said piezoelectric substrate; and an associated matching circuit including a transmission line which has an inductance component to cancel the susceptance of said transducer, and has a capability of balance-to-unbalance conversion, said matching circuit including a toroidal core around which said transmission line is wound, said line having a length which is shorter than one fourth the line wave length at the frequency of the induced acoustic wave.

4,950,936

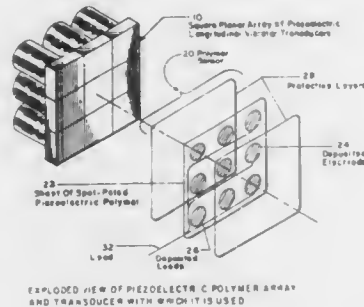
## PIEZOELECTRIC SANDWICH POLYMER TRANSDUCER

Edward F. Rynne, and Jay C. Brown, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 9, 1981, Ser. No. 241,873  
Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—337

30 Claims



1. A sensor having a sandwich configuration, which is able to sense a transducer output parameter in situ without significantly affecting the parameter, comprising: an inner sheet of a polymer having a transducer property; a conductive layer deposited on parts of the two surfaces of the inner sheet so as to form electrodes thereon; and a pair of outer sheets of plastic thermally attached to each side of the inner sheet.

4,950,937

## METHOD OF MAKING A RESONATOR FROM A BOULE OF LITHIUM TETRABORATE AND RESONATOR SO MADE

Arthur Ballato, Long Branch, and John A. Kosinski, Wall Township, Monmouth County, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 13, 1989, Ser. No. 406,933  
Int. Cl.<sup>5</sup> H01L 41/08

U.S. Cl. 310—360

2 Claims

1. In a resonator including a lapped and polished plate of lithium tetraborate with metallic electrodes deposited on the major surfaces of the plate and the plate mounted in an evacuated sealed enclosure, the improvement of providing the plate with a doubly rotated orientation of  $\phi=38^\circ$  to  $42^\circ$  and  $\theta=30^\circ$  to  $36^\circ$  where doubly rotated orientations are described by the IEEE notation widely known in the art as  $(YX\omega)\phi/\theta$ .

4,950,938

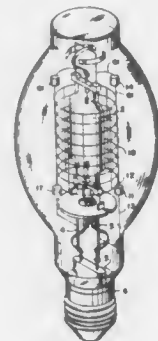
## DISCHARGE LAMP WITH DISCHARGE VESSEL RUPTURE SHIELD

Raghu Ramaiah, Painted Post, N.Y., assignor to North American Philips Corp., New York, N.Y.

Filed Nov. 16, 1988, Ser. No. 272,181  
Int. Cl.<sup>5</sup> H01J 61/34

U.S. Cl. 313—25

7 Claims



1. In a high-pressure metal halide discharge lamp of the type having an outer envelope, a quartz discharge vessel within said outer envelope, an ionizable fill material within said discharge vessel comprising mercury, sodium and a metal halide, and means for ionizing said fill material within said discharge vessel to emit light wherein said fill material develops a pressure within said discharge vessel in excess of one atmosphere; the improvement comprising:

a perforated metal shield within said outer lamp envelope at least partially surrounding said discharge vessel, having a plurality of openings to permit light emitted from said discharge vessel to pass therethrough and having a mechanical strength sufficient to contain discharge vessel fragments in the event said discharge vessel ruptures during lamp operation; and mounting means for mounting said metal shield in an electrically isolated condition within said outer lamp envelope and positioned partially surrounding said discharge vessel, and said mounting means being effective to mount said metal shield sufficiently electrically isolated to suppress a rise in lamp operating voltage which will occur over the operating life of the lamp.

4,950,939

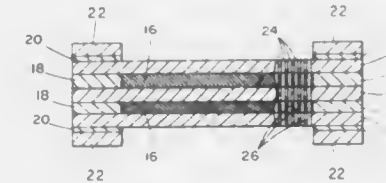
## CHANNEL ELECTRON MULTIPLIERS

Christopher H. Tosswill, Glen Cove, Me., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Sep. 15, 1988, Ser. No. 244,948  
Int. Cl.<sup>5</sup> H01J 43/04

U.S. Cl. 313—103 CM

15 Claims



1. A channel electron multiplier comprising: a multiplicity of first layers, each first layer of said first layers comprising at least one path of high conductivity and at least one amplifying hole through said layer, the inner surface of said amplifying hole having a coefficient of secondary electron emission above 1, and a plurality of second layers, each second layer of said second layers including at least one insulating portion and at least one passive hole through said insulating portion, the inner surface of said passive hole having a coefficient of secondary emission below 1, said amplifying hole and said passive hole being in registry, whereby, during operation, said inner surfaces of said passive holes fall to low potential and repel further input of electrons on them, and only said inner surfaces of said amplifying holes act in electron collection and emission.

4,950,940

## CATHODE RAY TUBE WITH MEANS FOR PREVENTING BACKSCATTER FROM ELECTRON MULTIPLIER

Alfred W. Woodhead, Caterham; Ronald W. A. Gill; Alan G. Knapp, both of Crawley; Daphne L. Lamport, Caterham, and Derek Washington, Wallington, all of United Kingdom, assignors to U. S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 626,962, Jul. 2, 1984, abandoned. This application Dec. 1, 1986, Ser. No. 936,967

Claims priority, application United Kingdom, Jul. 8, 1983, 8318494

Int. Cl.<sup>5</sup> H01J 29/80, 43/28

U.S. Cl. 313—103 CM

11 Claims



1. A cathode ray tube comprising an envelope having an optically transparent faceplate and, within the envelope, means for producing an electron beam, a channel plate electron multiplier including an input side having a multiplicity of openings defining entrances to respective channels having walls including secondary emissive material, said multiplier being mounted

adjacent to, but spaced from, the faceplate, scanning means for scanning the electron beam across the input side of the electron multiplier, and a layer having a low back-scatter coefficient covering the area of the input side of the electron multiplier between the openings, said back-scatter coefficient being lower than that of a smooth carbon layer.

4,950,941

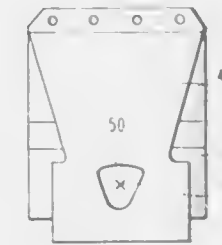
## COLOR PICTURE TUBE HAVING IMPROVED SHADOW MASK-FRAME ASSEMBLY SUPPORT

Frank R. Ragland, Jr., Lancaster, Pa., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Jul. 21, 1989, Ser. No. 383,396  
Int. Cl.<sup>5</sup> H05J 29/07

U.S. Cl. 313—404

3 Claims



1. In a color picture tube including an evacuated glass envelope having a rectangular faceplate panel, said panel including a shadow mask assembly mounted therein by support means located at peripherally spaced positions within said panel, said support means at each of said spaced positions including a stud attached to said glass envelope, a spring and a plate, said spring being attached to said plate and having an aperture therein engaging said stud, and said plate being welded to said mask assembly, the improvement comprising: said plate being welded to said mask assembly at only one location, said one location being on a line, perpendicular to said plate, that passes through the center of said aperture in said spring.

4,950,942

## CEMENTLESS LAMP BULB AND BASE COMBINATION

Alfred Braun, Herbrechtingen; Peter Helbig, Sontheim/Benz, and Hermann Steiner, Herbrechtingen, all of Fed. Rep. of Germany, assignors to Patent Treuhand Gesellschaft für elektrische Glühlampen, Munich, Fed. Rep. of Germany

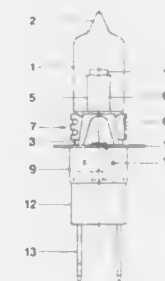
Filed Jan. 23, 1989, Ser. No. 300,485

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806978

Int. Cl.<sup>5</sup> H01J 5/50, 5/60

U.S. Cl. 313—318

21 Claims



1. Cementless lamp and base combination having a single-ended glass bulb (1) having a pinch or press seal (3) at one end;



current supply leads (5, 6) extending outwardly of the bulb from the pinch or press seal; at least one incandescent filament (4) in the bulb, electrically connected to the current supply leads; a two-part base having a base sleeve (9) of sheet metal and a base plug element (12) of insulating material; a holder element (7) surrounding the pinch or press seal (3) and coupled to the base sleeve (9); and terminal elements (13) secured in the base and electrically connected to the current supply leads (5, 6), wherein,

the base sleeve (9) is a hollow sheet metal cylinder formed at the end remote from the bulb with at least two spaced flange elements (28) which extend inwardly of the sleeve at essentially right angles to the axis of the lamp, and the base plug element (12) is located in part within the base sleeve and in part behind the base sleeve at a position remote from the bulb and comprises an essentially cylindrical solid body (29) formed with a circumferential collar (30) having a diameter reduced with respect to the diameter of the cylindrical solid body (29), said collar (30) being subdivided into a plurality of circumferential portions (31, 32); and wherein at least two of said circumferential portions (31) are formed with radially outwardly extending holding projections (33) which engage behind and around the flange elements (28) of the base sleeve (9); and wherein the flange elements (28) comprise spaced part-circular sectional portions.

4,950,943

#### SUPPORT FOR SHADOW MASK IN A CATHODE RAY TUBE

Hideya Ito, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

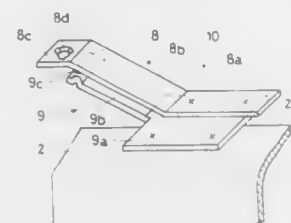
Filed Dec. 2, 1988, Ser. No. 278,740

Claims priority, application Japan, Dec. 3, 1987, 62-308067

Int. Cl.<sup>5</sup> H01J 29/07

U.S. Cl. 313—404

48 Claims



1. A shadow mask mounting apparatus in a cathode ray tube which includes an evacuated envelope having a longitudinal axis and a funnel section closed at one end by a generally cylindrical neck section and at the other end by a faceplate of generally cup-shaped configuration, the faceplate including a screen plate, which lies generally perpendicular to the longitudinal axis, and a side wall protrudes generally parallel to the longitudinal axis and which is sealed to the funnel section, said shadow mask mounting apparatus, comprising:

- a shadow mask assembly including a rigid support frame and a finely perforated shadow mask mounted across the support frame;
- a plurality of generally elongated support members distributed around the support frame, each of said support members being secured at one end to the support frame and at the other end to the side wall of the faceplate;
- anchoring means provided in said faceplate for anchoring said one end of each support member to the side wall of the faceplate; and
- a generally elongated resilient member provided for each of the support members, said resilient member for applying a biasing force, acting in a direction radially outwardly

from the shadow mask, to the respective support member, said resilient member having one end secured to the support frame;

wherein said shadow mask assembly, said support frame and said support members are made of a metallic material having a coefficient of thermal expansion equal to or less than  $4 \times 10^{-6}/^{\circ}\text{C}$ . and wherein the difference in coefficient of thermal expansion between the support frame and each support member is equal to or less than  $2.0 \times 10^{-6}/^{\circ}\text{C}$ .

4,950,944

#### TENSED SHADOW MASK ASSEMBLY

Takeo Fujimura, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Kyoto, Japan

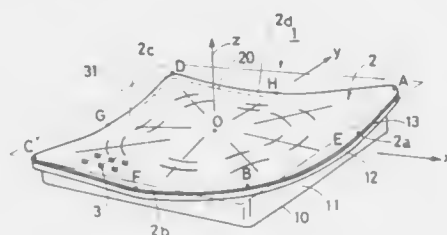
Filed Sep. 8, 1988, Ser. No. 241,958

Claims priority, application Japan, Sep. 10, 1987, 62-228813

Int. Cl.<sup>5</sup> H01J 29/07

U.S. Cl. 313—407

19 Claims



1. A tensed shadow mask assembly for use in a cathode ray tube, which comprises:

- a generally rectangular perforated plate having four corners and correspondingly four peripheral edge portions; and
- a four-sided frame member similar in shape to the contour of the perforated plate having four fitting faces to which the respective peripheral edge portions of the perforated plate are rigidly secured while said perforated plate is held under tension;

said perforated plate being generally scalloped with respect to the center thereof such that occurs of the perforated plate occupy respective positions facing in one direction away from an imaginary plane touching the center of the perforated plate and being perpendicular to the longitudinal sense of the cathode ray tube, while a midpoint of each said peripheral edge portion between the neighboring corners occupy respective positions in an opposite direction facing away from the imaginary plane.

4,950,945

#### TENSION MASK SECUREMENT MEANS AND PROCESS THEREFOR

James R. Fendley, Arlington Heights, and Janice L. Wichmann, Park Ridge, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Division of Ser. No. 58,095, Jun. 4, 1987, Pat. No. 4,828,523.

This application Apr. 14, 1989, Ser. No. 338,193

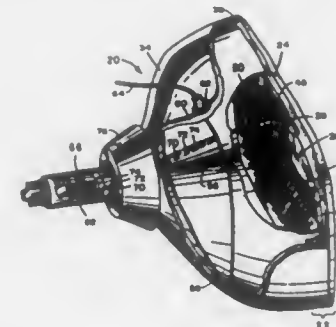
Int. Cl.<sup>5</sup> H01J 29/07

U.S. Cl. 313—407

22 Claims

1. A front assembly for a color cathode ray tube including a faceplate having on its inner surface a centrally disposed phosphor screen embraced by a peripheral sealing area adapted to mate with a funnel, and a faceplate-mounted, frame-like mask-support structure secured to said inner surface between said sealing area and said screen and having a mask-receiving surface for receiving and supporting a foil shadow mask and holding said mask in tension by laser weldments, said weldments being spaced close enough to hold said mask in tension without distortion to the material of said mask intermediate to said weldments due to said tension, yet spaced widely enough

to provide for relatively rapid welding and strong, independent welds, said weldments including initial tacking weldments



4,950,946

#### DISPLAY DEVICE COMPRISING A FLAT DISPLAY WINDOW AND LOW-MICROPHONICS LINEAR THERMIONIC WIRE CATHODES

Ronald Van der Wilk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

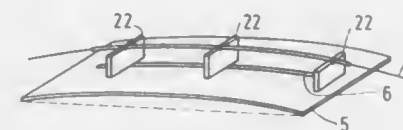
Filed Feb. 21, 1989, Ser. No. 313,215

Claims priority, application Netherlands, Feb. 19, 1988, 8800423

Int. Cl.<sup>5</sup> H01J 19/12, 63/02

U.S. Cl. 313—411

7 Claims



1. A display device comprising an evacuated envelope having a flat display window which is provided with a luminescing phosphor screen, which envelope accommodates a tensed linear thermionic wire cathode for emitting electrons and a first electrode having a slit for passing electrons, so that electron beams are formed, characterized in that the first electrode is bent convexly relative to the cathode and a number of juxtaposed positioning means are present between the linear thermionic wire cathode and the first electrode, the tensed wire cathode urging the positioning means against the slit in the first electrode.

4,950,947

#### CATHODE RAY TUBE CONTAINING AN ANODE WHICH YIELDS MINIMAL X-RAY EMISSION

Koji Nakamura, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Kyoto, Japan

Filed Nov. 7, 1988, Ser. No. 267,562

Claims priority, application Japan, Nov. 7, 1987, 62-281712

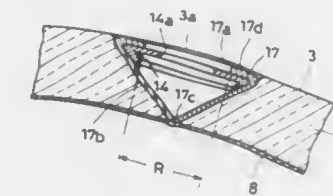
Int. Cl.<sup>5</sup> H01J 29/90; H01R 13/648

U.S. Cl. 313—477 HC

22 Claims

1. A cathode ray tube which comprises: a highly evacuated envelope including a funnel section having one end closed by a faceplate and the opposite end continued to a generally tubular neck section, said funnel section having a mounting hole defined therein completely through the thickness of a wall thereof; an internal electroconductive coating applied to an inner surface of at least the funnel section; and an anode button embedded in the mounting hole, having an

opening defined therein for the insertion of a high voltage applying contact element therethrough and, containing a wall area extending from said opening, continuously surrounding the perimeter of said anode button; said wall area being inclined relative to a direction generally



parallel to a portion of the envelope confronting the interior of the envelope in alignment with the mounting hole, said inclined wall area being in a position interiorly confronting the opening and having at least a portion thereof held in electric contact with the internal electroconductive coating on the inner surface of the funnel section.

4,950,948

#### MANGANESE ACTIVATED ZINC SILICATE PHOSPHOR

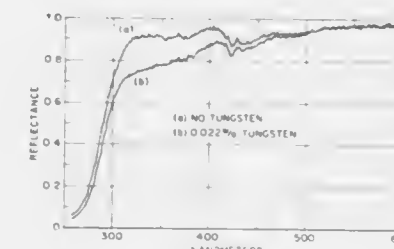
Thomas E. Peters, Chelmsford; Roger B. Hunt, Medfield, and A. Gary Sigai, Lexington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation of Ser. No. 267,834, Nov. 7, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 406,884

Int. Cl.<sup>5</sup> H01J 61/44

U.S. Cl. 313—486

9 Claims



1. A manganese activated zinc silicate phosphor having cations consisting essentially of zinc, silicon, manganese, and tungsten prepared by a method comprising the following steps:

- Step 1—heating in a furnace a manganese activated zinc silicate phosphor powder having cations consisting essentially of zinc, silicon, manganese, and tungsten and having a 350 nm reflectance less than 80%, and a 275 nm reflectance greater than 13.5% in a furnace to a temperature of about 1000° C. to about 1225° C. in air;
- Step 2—cooling said phosphor powder from Step 1;
- Step 3—wet milling said phosphor powder from Step 2 in an acid solution;
- Step 4—separating said phosphor powder from Step 3 from the acid solution;
- Step 5—washing said phosphor powder from Step 4 with water;
- Step 6—drying said phosphor powder from Step 5 to form a manganese activated zinc silicate phosphor powder having individual particles, a 350 nm reflectance equal to or greater than 80%, a 275 nm reflectance equal to or less than 13.5%, and a surface area from about 0.3 m<sup>2</sup>/gm to about 0.4 m<sup>2</sup>/gm;
- Step 7—coating said individual particles of said manganese activated zinc silicate phosphor powder with a continuous

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coating of alumina to form a manganese activated zinc silicate phosphor powder having a continuous coating of alumina on said individual particles;  
Step 8—annealing said manganese activated zinc silicate phosphor powder having a continuous coating of alumina on said individual particles at a temperature of about 700° C. to about 850° C. for a period of about 15 min. to about 20 hours to form an annealed coated phosphor.

4,950,949

**COLOR DISPLAY TUBE HAVING ASYMMETRIC DEFLECTION ELECTRODES**

Ronald van der Wilk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

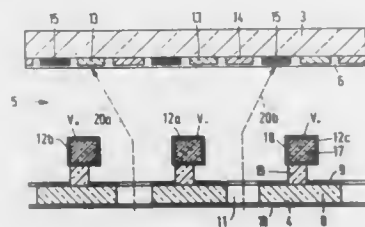
Filed Oct. 7, 1988, Ser. No. 255,188

Claims priority, application Netherlands, Oct. 9, 1987, 8702400

Int. Cl.<sup>5</sup> H01J 29/74, 63/02

U.S. Cl. 313—495

6 Claims



1. A colour display tube which comprises in a sealed envelope a display window, a phosphor pattern provided on the display window, an emission system for producing an emission pattern of juxtaposed rows of electron beams correlated with the phosphor pattern, and an array of parallel, strip shaped deflection electrodes between the emission system and the display window for deflecting the electron beams, in which each deflection electrode extends between adjacent rows of electron beams of the emission pattern, alternate ones being a first group of commonly connected electrodes and the remaining ones being a second group of commonly connected electrodes, characterized in that the array of deflection electrodes extends asymmetrically with respect to the emission pattern.

4,950,950

**ELECTROLUMINESCENT DEVICE WITH SILAZANE-CONTAINING LUMINESCENT ZONE**

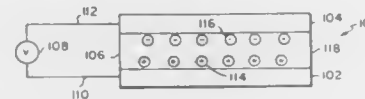
Robert J. Perry, Pittsford, and Ching W. Tang, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1989, Ser. No. 353,832

Int. Cl.<sup>5</sup> H05B 33/14

U.S. Cl. 313—504

20 Claims



1. An electroluminescent device comprising in sequence, an anode, an organic hole injecting and transporting zone, an electron injecting and transporting zone, and a cathode; characterized in that said organic hole injecting and transporting zone is comprised of (a) a layer in contact with said anode containing a hole injecting porphyrinic compound and (b) a layer containing a hole transporting silazane, interposed between said hole injecting layer and said electron injecting and transporting zone.

**4,950,951  
VENETIAN BLIND TYPE SECONDARY ELECTRON MULTIPLIER FOR SECONDARY ELECTRON MULTIPLIER TUBES**

Kazuyoshi Okano, Kimitsugu Nakamura, and Hiroyuki Kyushima, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

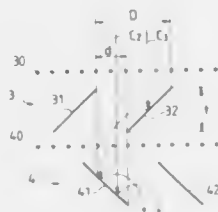
Filed Jan. 24, 1989, Ser. No. 300,098

Claims priority, application Japan, Jan. 26, 1988, 63-15325

Int. Cl.<sup>5</sup> H01J 43/22

U.S. Cl. 313—535

15 Claims



1. A secondary electron multiplier having a plural stage Venetian dynode assembly, comprising:

a first dynode having a first plurality of thin plates for receiving photoelectrons and emitting secondary electrons therefrom, each one of said thin plates being disposed substantially in parallel to one another and being spaced from one another to define a gap for passing part of the photoelectrons, and each thin plate having first and second edges opposite one another; and

a second dynode being spaced vertically from said first dynode, said second dynode having a second plurality of thin plates, each one of said thin plates being disposed substantially in parallel to one another and having nearer and farther edges with respect to the first dynode, the first edge of each of the thin plates of the first dynode being nearer a midplane between the first and second dynodes than the second edge of each of the plates is to the midplane, wherein the farther edge of the thin plate of said second dynode is vertically aligned with the first edge of the respective thin plate of the first dynode such that said gap between a respective pair of said first plurality of thin plates of said first dynode is aligned with the portion of the thin plate of the second dynode which includes the farther edge thereof, wherein voltages are applied to said first and second dynodes to satisfy the following equation:  $\delta 1 \cdot \delta 2 = \delta 2'$ , where  $\delta 1$  represents the secondary electron emission rate of the first dynode;  $\delta 2$ , the secondary electron emission rate of the second dynode when the electron emitted from the first dynode impinges on the second dynode; and  $\delta 2'$ , the secondary electron emission rate of the second dynode when the electron passing through the gap of said first dynode impinges on said second dynode.

4,950,952

**PHOTOCATHODE AND METHOD OF MANUFACTURING THE SAME**

Yoshimitsu Aramaki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 169,477, Mar. 17, 1988, abandoned.

This application Sep. 15, 1989, Ser. No. 408,462

Claims priority, application Japan, Mar. 18, 1987, 62-61070

Int. Cl.<sup>5</sup> H01J 40/06; B05D 5/12

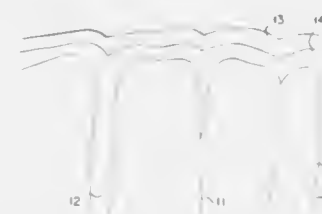
U.S. Cl. 313—542

12 Claims

1. A photocathode assembly comprising:  
a substrate consisting essentially a polycrystalline alkaline metal halide;  
a photocathode formed on said substrate and mainly consist-

ing of a semimetal and at least one element selected from alkaline metals; and

a chemical fill including a metal halide within said interior; and



an alkaline metal oxide layer being interposed between said photocathode and said substrate.

4,950,953

**HIGH PRESSURE SODIUM LAMP WITH SODIUM AMALGAM OF CONTROLLED AMOUNT SEALED THEREIN**

Akira Ito, Kazuyoshi Okamura, and Kazuiki Uchida, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

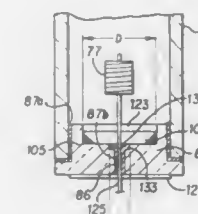
Filed Nov. 30, 1988, Ser. No. 277,999

Claims priority, application Japan, Nov. 30, 1987, 62-299908

Int. Cl.<sup>5</sup> H01J 61/30, 61/36, 61/28, 61/22

U.S. Cl. 313—564

12 Claims



8. A high pressure sodium lamp comprising:  
a light permeable arc tube having opposite ends;  
a pair of plugs disposed at corresponding opposite ends of the arc tube, one of the plug pairs having a central depression of a diameter D (mm), the central depression having a corner portion exposed to the inside of the arc tube and a substantially flat surface in which a central aperture is formed, the flat surface being provided with a step portion of a diameter d (mm) around the central aperture;  
electrode means extending into the arc tube through the central aperture of the plug for generating an arc;  
a sealing composition filled in the central aperture and the step portion for supporting said electrode means; and  
a sodium amalgam sealed in the arc tube and being condensed at the corner portion of the depression of the plug during operation of the lamp, said sodium amalgam provided in an amount so that the condensed sodium amalgam does not contact the sealing composition during operation of the lamp.

4,950,954

**METAL HALIDE DISCHARGE LAMP WITH ELECTRODES HAVING UNEQUAL THORIA CONTENTS**

Edmund M. Passmore, Gloucester, Mass.; Robert J. Karlotski, Weare, and Simone P. Bazin, Bedford, both of N.H., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 7, 1988, Ser. No. 280,849

Int. Cl.<sup>5</sup> H01J 61/06

U.S. Cl. 313—633

14 Claims

10. An arc tube comprising:  
a light-transmissive envelope hermetically enclosing an interior;



a pair of electrodes sealed in said envelope and protruding into said interior, each of said electrodes having a thoria content greater than zero, said electrodes comprising tungsten and having differing thoria contents.

4,950,955

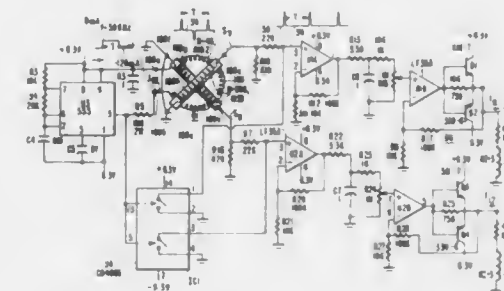
**MAGNETIC FIELD COMPENSATOR FOR A CRT**  
Alan A. Hoover, New Palestine, and Kenneth W. McGlashan, Indianapolis, both of Ind., assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Sep. 6, 1988, Ser. No. 240,321

Int. Cl.<sup>5</sup> H01J 29/06

U.S. Cl. 315—8

15 Claims



1. An apparatus for neutralizing a first magnetic field component to prevent said first magnetic field component from undesirably affecting electron beam landing in a cathode ray tube of a video apparatus, comprising:

a first sensing winding responsive to said first magnetic field component for generating a first sense signal that is indicative of a magnitude of said first magnetic field component and that varies when said first magnetic field component varies;

means responsive to said first sense signal for generating a first current that is determined in accordance with said first magnetic field component; and

a first magnetic field neutralizing coil coupled to said first current generating means for producing a neutralizing second magnetic field in said video apparatus at a magnitude that varies in accordance with said magnitude of said first magnetic field component such that said second magnetic field automatically neutralizes said first magnetic field component when a change in a position of said cathode ray tube occurs.



4,950,956

## PLASMA PROCESSING APPARATUS

Tatsuo Asamaki; Kiyoshi Hoshino; Katsumi Ukai; Yoichi Ino; Toshio Adachi, and Tsutomu Tsukada, all of Fuchu, Japan, assignors to Anelva Corporation, Tokyo, Japan

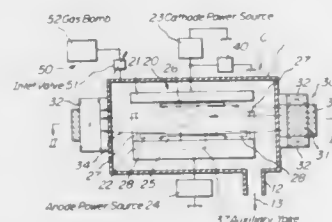
Filed Sep. 15, 1987, Ser. No. 96,862

Claims priority, application Japan, Oct. 8, 1986, 61-239764

Int. Cl.<sup>5</sup> H01J 7/24

U.S. Cl. 315—111.21

11 Claims



1. An apparatus for plasma processing a substrate comprising:
  - a vacuum vessel;
  - an anode and a cathode arranged in said vacuum vessel;
  - radio frequency power source means connected between said anode and said cathode for generating and controlling a weak discharge between said anode and said cathode;
  - direct current power source means connected between said anode and said cathode periodically switched for intermittently producing a main discharge therebetween at intervals of a period; switch means for connecting said direct current power source between said anode and said cathode; and,
  - magnetic field setting means provided outside said vacuum vessel and comprising magnetic coils arranged closely to said vacuum vessel, pole pieces and an alternate current power sources for said magnetic coils.

4,950,957

## EXTENDED ION SOURCES AND METHOD FOR USING THEM IN AN INSULATION DEFECT DETECTOR

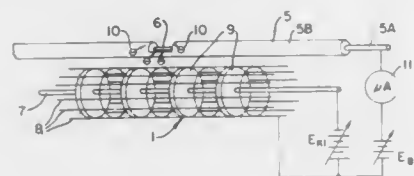
Juris A. Asars, Murrysville Boro, and Peter J. Chantry, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 4, 1988, Ser. No. 267,150

Int. Cl.<sup>5</sup> H01J 27/02

U.S. Cl. 315—111.81

13 Claims



1. A method for detecting defects in an insulation covered wire comprising the steps of:
  - (a) placing an extended ion source in close proximity to the insulation covered wire, the ion source comprising an extended ionizing electrode spaced apart from an extended field electrode by a plurality of insulated spacers;
  - (b) exciting the ionizing electrode to generate a plurality of ions, some of which flow to the insulation covered wire and penetrate through defects in the insulation; and
  - (c) measuring the current which flows in the insulation covered wire from the ions as a result of the ions passing through the defects.

4,950,958

## ELONGATED, BENDABLE LAMP

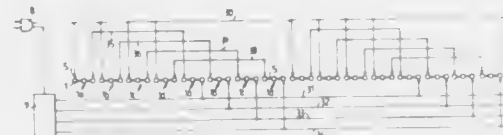
Ta-Yeh Lin, 2F., No. 16, Central S. Rd., Sec. 2, Peitou, Taipei, Taiwan

Filed Jun. 15, 1988, Ser. No. 206,662

Int. Cl.<sup>5</sup> H05B 37/00

U.S. Cl. 315—185 R

4 Claims



1. An elongated bendable lamp having a bendable lamp body defining a plurality of openings and a plurality of individual light bulbs disposed in the plurality of openings comprising:
  - (a) first electrical connection means electrically connecting a number of light bulbs in series wherein the number of light bulbs connected in series is less than the total number of light bulbs so as to divide the total number of light bulbs into a plurality of different sections;
  - (b) a main conducting wire extending through the bendable lamp body;
  - (c) a number of supplementary conducting wires extending through the elongated body wherein the number of supplementary conducting wires is equal to the number of different sections;
  - (d) second electrical connecting means electrically connecting a first light bulb in each of the different sections to the main conducting wire;
  - (e) third electrical connecting means electrically connecting a second light bulb in each of the different sections to one of the supplementary conducting wires such that each supplementary conducting wire is electrically connected to a different section; and,
  - (f) plug means connected to the main conducting wire and the supplementary conducting wires and adapted to be connected to an electrical power source.

4,950,959

## CASSETTE LIGHT, POWERING UNIT THEREFORE, MULTI-DYNAMIC SMART MAGNETIC STRUCTURE AND METHOD

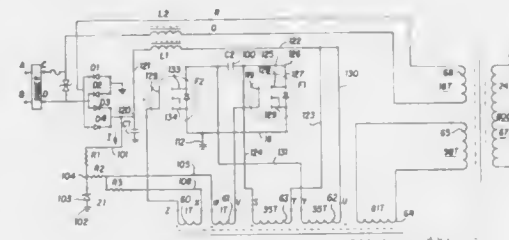
Anders V. Beckrot, Laguna Beach; James C. Helling, Newport Beach, and Scott V. Murray, Huntington Beach, all of Calif., assignors to LumiTech International, L.P., New York, N.Y.

Continuation-in-part of Ser. No. 206,336, Jun. 13, 1988, which is a continuation-in-part of Ser. No. 131,752, Dec. 11, 1987, which is a continuation-in-part of Ser. No. 891,263, Jul. 26, 1986, Pat. No. 4,751,434. This application Mar. 3, 1989, Ser. No. 318,703

Int. Cl.<sup>5</sup> H05B 37/02, 41/16, 41/24, 37/04

U.S. Cl. 315—219

7 Claims



1. A power converter operable from a relatively low frequency A.C. main to develop a relatively high frequency oscillatory power source to supply a cold cathode lamp load, comprising in combination:
  - an oscillator section means having a pair of FETs intercon-

connected to develop said oscillatory power from the A.C. main; isolation means for applying said oscillating power to said lamp load; and, an A.C. circuit connected to said A.C. main for supplying low frequency voltage to said load to even out the high frequency oscillatory power applied to said load.

4,950,960

## ELECTRONICALLY COMMUTATED MOTOR HAVING AN INCREASED FLAT TOP WIDTH IN ITS BACK EMF WAVEFORM, A ROTATABLE ASSEMBLY THEREFOR, AND METHODS OF THEIR OPERATION

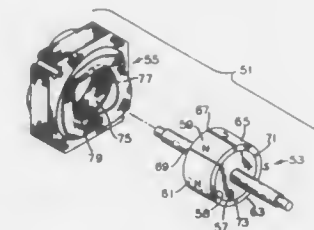
Ronald J. Krefta, Fort Wayne, and Franklin L. Forbes, LaOtto, both of Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Mar. 27, 1989, Ser. No. 328,674

Int. Cl.<sup>5</sup> H02K 37/00

U.S. Cl. 318—254

39 Claims



1. An electronically commutated motor comprising:
  - a stationary assembly having a plurality of winding stages adapted for commutation in at least one preselected sequence; and
  - a rotatable assembly having means, including a plurality of permanent magnet elements in magnetic coupling relation with said stationary assembly, for sequentially applying a magnetic field having a substantially constantly increasing magnetic flux to each respective winding stage during the period that current is supplied to the respective winding stage as said rotatable assembly rotates, and for sequentially applying a magnetic field having a substantially constantly decreasing magnetic flux to each respective winding stage during a period that current is not supplied to the respective winding stage as said rotatable assembly rotates.

4,950,961

## STARTING CIRCUIT FOR GASEOUS DISCHARGE LAMPS

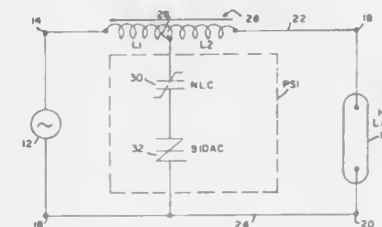
Gregory Zaslavsky, Brookline, and Sheppard Cohen, Danvers, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Nov. 28, 1986, Ser. No. 936,069

Int. Cl.<sup>5</sup> H05B 41/14

U.S. Cl. 315—289

12 Claims



1. A circuit for starting and operating an electric discharge lamp comprising:

a pair of input terminals for connection to an alternating current supply; a pair of output terminals for connection across said lamp; a ballast inductor connected between one of said input terminals and one of said output terminals, said ballast inductor having a tapping point; a connection between the other of said input terminals and the other of said output terminals; and a high voltage starting pulse means providing a high voltage starting pulse on said lamp connected between said tapping point and said other of said input terminals, said high voltage starting pulse means comprising a non-linear dielectric element means and a semiconductor switch means connected in series.

4,950,962

## HIGH VOLTAGE SWITCH TUBE

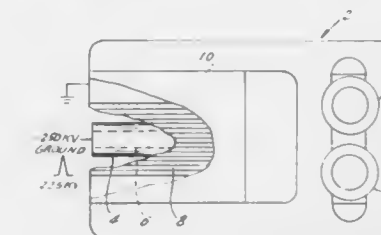
Curtis Birnbach, Bronx; Jay Tanner, Nesconset, both of N.Y., and Richard Heese, Westmont, Canada, assignors to Quantum Diagnostics, Ltd., Hauppauge, N.Y.

Continuation-in-part of Ser. No. 151,258, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 860,414, May 7, 1987, Pat. No. 4,723,263, which is a continuation-in-part of Ser. No. 736,136, May 20, 1985, Pat. No. 4,670,894. This application Oct. 25, 1988, Ser. No. 261,910

Int. Cl.<sup>5</sup> H01J 17/00

U.S. Cl. 315—351

14 Claims



1. A high voltage switch tube, comprising an elongated cold cathode, an elongated anode, and a grid which acts as a gate interposed between said cathode and said anode, said anode being axially symmetric to and enclosing said cathode and said grid, said cathode at a first potential, said anode at a second potential, and said grid rapidly switchable between potentials substantially the same as said first and second potentials, respectively, a pulse from said first potential to said second potential applied to said grid releasing electrons from said cathode toward said anode to generate a current flow on the order of 10<sup>6</sup> amps, the voltage  $KV_{peak}$  between said anode and cathode remaining substantially constant.

4,950,963

## AUTOMATIC LIGHT DIMMER FOR GAS DISCHARGE LAMPS

Richard L. Sievers, 1221 Gardenia, New Braunfels, Tex. 78130

Filed May 5, 1988, Ser. No. 190,638

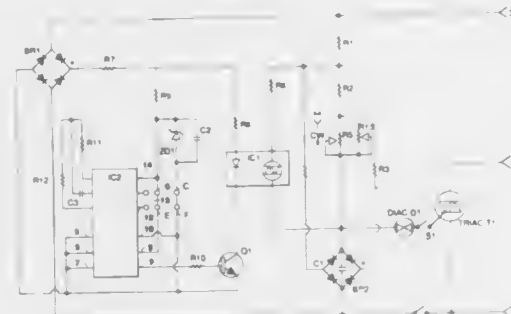
Int. Cl.<sup>5</sup> H05B 37/02

U.S. Cl. 315—360

7 Claims

1. A power-saving dimming apparatus for a gas discharge lamp comprising:
  - means for conducting a portion of the voltage waveform of an AC supply voltage to the lamp wherein the waveform portion conducting means comprises a triac connecting the lamp to the AC supply voltage, a diac connected to the gate of the triac, and a timing capacitor connected to the diac and to the AC supply voltage through a resistor network;
  - means for adjusting the portion of the waveform so conducted to the lamp; and

means for conducting the entire waveform of the AC supply voltage to the lamp for a preselected time upon initial



application of power to the apparatus and conducting an adjustable portion of the waveform thereafter.

4,950,964

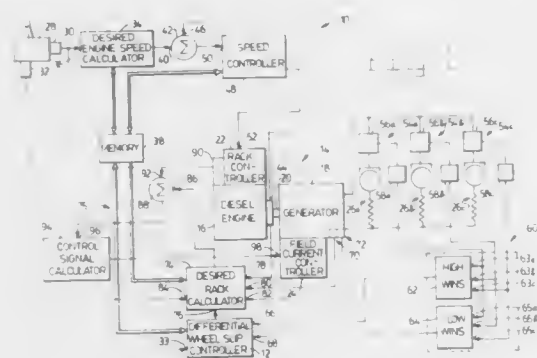
### LOCOMOTIVE DIFFERENTIAL WHEEL SLIP CONTROL

Raymond G. Evans, Washington, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Apr. 13, 1989, Ser. No. 337,237  
Int. Cl.<sup>5</sup> B61C 15/08

U.S. Cl. 318—52

16 Claims



1. An apparatus for controlling differential wheel slip of a locomotive having a plurality of electric traction motors powered by an engine-generator unit of the type having a field current controller, comprising:

- a motor current sensor means for sensing the current through each of said traction motors and producing motor current signals responsive to said sensed currents;
- a first comparison means receiving said motor current signals and producing a low logic signal responsive to the lowest of said motor current signals;
- a second comparison means receiving said motor current signals and producing a high logic signal responsive to the highest of said motor current signals;
- processor means for comparing said high and low logic signals, producing a motor current delta signal responsive to a difference between said high and low logic signals, processing said motor current delta signal to produce a lagged motor current delta signal, deriving a difference signal in response to a difference between said motor current delta and lagged motor current delta signals, and delivering a control signal to said field current controller in response to said difference signal being greater than a first preselected reference signal.

4,950,965

### THROTTLE CONTROL SERVOACTUATOR

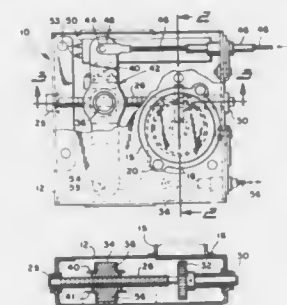
Andrew A. Kenny, Roselle, Ill.; Loren H. Uthoff, Canton, and Donald R. Haefner, Oak Park, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Nov. 6, 1989, Ser. No. 431,812

Int. Cl.<sup>5</sup> B60K 28/16, 31/00; F02D 9/08

U.S. Cl. 318—560

15 Claims



1. A servoactuator for a vehicle throttle comprising:

- (a) housing means;
- (b) a fulcrum member movably disposed on said housing means and guided thereon for movement in along a predetermined line of action;
- (c) lever means pivotally mounted on said fulcrum member, said lever means adapted for receiving and transmitting throttle action, and reaction forces, thereto on opposite sides of said pivot pivotal mount and in the direction of said line of action;
- (d) electric actuator means mounted on said housing means and responsive to an electrical control signal to provide rotation of an output member;
- (e) linkage means operatively connecting said output member for effecting said movement of said fulcrum member; and,
- (f) fulcrum position feedback means disposed on said housing means and operative to sense movement of said linkage means and provide an electrical indication thereof for use in generating said control signal.

4,950,966

### ADAPTIVE VIBRATION CANCELLER

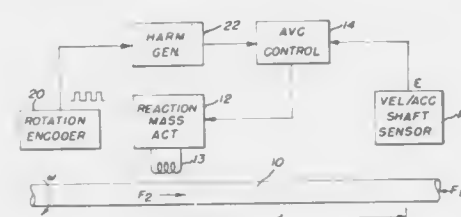
Clinton W. Moulds, III, Millersville, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 3, 1989, Ser. No. 375,227

Int. Cl.<sup>5</sup> G05B 13/00

U.S. Cl. 318—561

20 Claims



1. A method for adaptively cancelling the vibration caused by an external force acting on a dynamic body, comprising the steps of:

- measuring the external force acting on said body at a first point on said body;
- applying a reaction force to said body at a second point a predetermined distance away from said first point to counteract the external force acting on said body,

generating a time base signal related to the dynamics of said body;

generating a set of sinusoidal force component signals from at least one harmonic frequency of the time base signal;

determining the difference between the magnitude of the external force and the reaction force at said first point and generating an error signal therefrom;

generating a set of Fourier coefficient signals from the error signal and said set of sinusoidal force component signals;

estimating the phase shift and force existing between said first and second points from said set of Fourier coefficient signals;

generating a pair of adaptive weighting coefficients in accordance with a predetermined adaptation algorithm in response to said set of Fourier coefficient signals and the estimated phase shift;

multiplying said set of sinusoidal force component signals by a respective weighting coefficient of said set of Fourier coefficient signals to form weighted force component signals;

combining said weighted force component signals and generating a composite reaction force therefrom; and applying said reaction force to said body in response to said reaction force signal.

4,950,967

### SERVOMOTOR CONTROL APPARATUS

Keiji Sakamoto, Hachioji; Shinji Seki, Kokubunji, and Yasusuke Iwashita, Oshino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00867, § 371 Date Apr. 3, 1989, § 102(e) Date Apr. 3, 1989, PCT Pub. No. WO89/02185, PCT Pub. Date Mar. 9, 1989

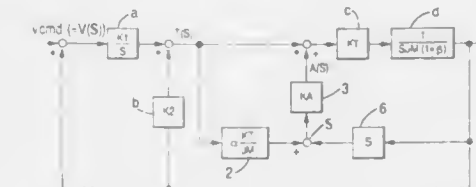
PCT Filed Aug. 31, 1988, Ser. No. 337,612

Claims priority, application Japan, Aug. 31, 1987, 62-217344

Int. Cl.<sup>5</sup> G05B 19/10

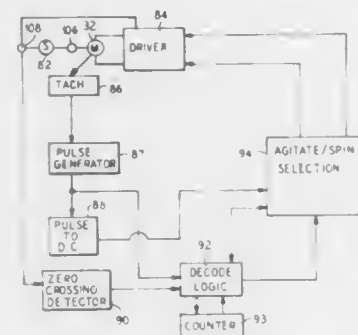
U.S. Cl. 318—567

3 Claims





means for producing a second signal indicative of a zero crossing of the AC line voltage;  
means for providing a timing function receiving said first and second signals and producing a second substantially square wave having an on time determined by said first signal and an off time determined by said second signal, said second square wave being said drive signal in the agitate cycle; and

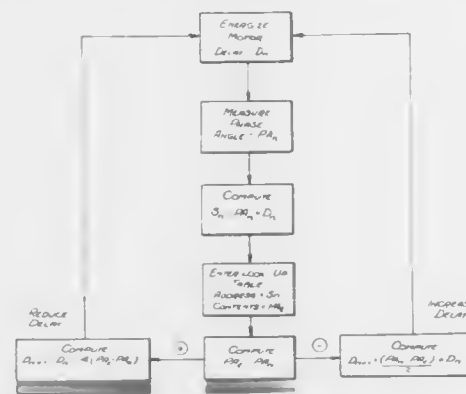


a selection logic circuit receiving said first and second square waves and for an agitate cycle providing said second square wave alternately on first and second drive lines to said motor to cause said motor to periodically reverse rotation and for a spin cycle providing said first square wave on only one of said drive lines to said motor to cause said motor to rotate in one direction.

**4,950,970**  
**INDUCTION MOTOR CONTROL SYSTEM**  
Ray E. Davis, Jr., Old Lyme; Michael J. Westkamper, Oakdale; Earle J. Timothy, Clinton; Richard H. Johnson, Ivoryton, and Ronald W. Parker, Clinton, all of Conn., assignors to Chesbrough-Pond's Inc., Greenwich, Conn.  
Continuation of Ser. No. 548,701, Nov. 4, 1983. This application Mar. 14, 1986, Ser. No. 840,476  
Int. Cl.<sup>5</sup> H02P 5/40

U.S. Cl. 318-809

22 Claims



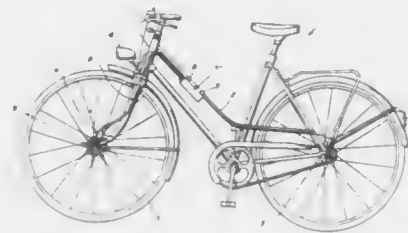
1. A digital method for operating a single phase induction motor control system comprising the steps of:  
(a) energizing a single phase induction motor using a firing delay;  
(b) measuring the phase angle between motor voltage and motor current zero crossings;  
(c) computing the sum of the measured phase angle and the firing delay;  
(d) using the sum to automatically calculate a new phase angle generated in accordance with the algorithm: phase angle =  $m$  (firing delay) +  $b$ , where  $m$  and  $b$  are constants,

$m$  is the slope and is negative, and  $b$  is the offset and is positive;  
(e) comparing the measured phase angle with the newly-calculated phase angle;  
(f) altering the firing delay based on said comparison; and  
(g) repeating steps (a) through (f).

**4,950,971**  
**DEVICE FOR POWERING ELECTRICAL LOADS, PARTICULARLY ON BICYCLES**  
Robert Hegi, Boppelsen, and Ernst Fluckiger, Wangen, both of Switzerland, assignors to Enform Ag, Switzerland  
Continuation-in-part of Ser. No. 852,546, Apr. 16, 1986, abandoned. This application Jul. 20, 1988, Ser. No. 221,677  
Int. Cl.<sup>5</sup> H02K 5/00

U.S. Cl. 322-1

19 Claims



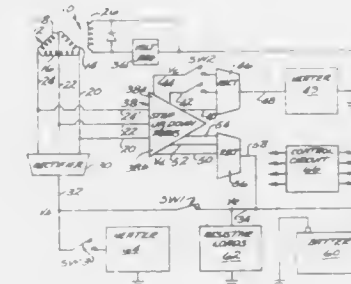
1. Apparatus for powering electrical loads on a moving vehicle such as a bicycle, comprising:  
a generator;  
drive means for the generator;  
transmission gear means connected in advance of the generator;  
an accumulator; and  
switching means for switching between powering of the loads by the accumulator, powering of the loads by the generator, and charging of the accumulator by the generator;  
the transmission gear means and switching means including means which enable continuous charging of the accumulator by the generator whenever the drive means is actuated, and the switching means including means for sensing the voltage of the accumulator such that when the voltage reaches a predetermined value the power from the generator is sent to the loads.  
3. Apparatus for powering electrical loads on a moving vehicle such as a bicycle, comprising:  
a generator;  
drive means for the generator;  
transmission gear means connected in advance of the generator;  
an accumulator; and  
switching means for switching between powering of the loads by the accumulator, powering of the loads by the generator, and charging of the accumulator by the generator;  
the transmission gear means and switching means including means which enable continuous charging of the accumulator by the generator whenever the drive means is actuated;  
the switching means including an electronic switch for switching between a first mode in which the loads are powered by the generator at vehicle speeds above a predetermined value and a second mode wherein the loads are powered by the accumulator at vehicle speeds below the predetermined value;  
the switching means including a manual switch for activating a third mode wherein the generator charges the accumulator whenever the vehicle is moving; and  
the switching means includes means for sensing the voltage of the accumulator, wherein in the third mode when the

voltage of the accumulator means reaches a predetermined value the power from the generator is sent to the loads.

**4,950,972**  
**ALTERNATOR SYSTEM FOR AUTOMOTIVE VEHICLES**  
Peter G. Berg, Attleboro Falls, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.  
Filed Dec. 14, 1988, Ser. No. 284,207  
Int. Cl.<sup>5</sup> H02J 7/14

U.S. Cl. 322-8

10 Claims



1. An alternator system for an automotive vehicle having an engine and a plurality of electrical loads, an alternator having a field winding drivable by an engine to provide electrical power for a plurality of electrical loads, a voltage regulator for controlling the field winding energization, a battery for supplementing the electrical power provided by the alternator where needed and for turning over the engine upon start up, the alternator having a stator with three stator windings, the stator windings coupled together to provide a three phase output on three output lines, the output lines connected to a first rectifier which has a DC output line connected to a circuit including the plurality of electrical loads and the battery through a first switch, the three output lines also coupled to a step up transformer and a step down transformer, the output of the step up transformer connected to a second rectifier through a second switch to turn on and off the output of the step up transformer, the output of the second rectifier coupled to a windshield heater, the output of the step down transformer connected to a third rectifier whose output in turn is connected to the electrical loads, the third rectifier will turn off if the output of the step down transformer is below a selected minimum value, the DC output line also connected to an electrical resistance heater through a third switch, the voltage regulator controlling the level of energization of the alternator field winding in order to provide a selected voltage level in the circuit.

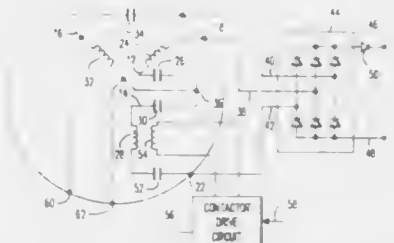
**4,950,973**  
**PERMANENT MAGNET GENERATOR SYSTEM**  
Carroll C. Kouba, Fort Shawnee, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Jun. 29, 1989, Ser. No. 373,716  
Int. Cl.<sup>5</sup> H02P 9/10

U.S. Cl. 322-69

6 Claims

1. A permanent magnet generator connect/disconnect system comprising:  
a permanent magnet generator having first, second and third output terminals;  
a first circuit branch electrically connected between said first output terminal and a neutral point;  
said first circuit branch including a series connection of a first armature winding a first pair of electrical contacts, said first pair of electrical contacts being connected to said neutral point;  
a second circuit branch electrically connected between said second output terminal and said neutral point;  
said second circuit branch including a series connection of a second armature winding and a second pair of electrical

contacts, said second pair of electrical contacts being connected to said neutral point;  
a third circuit branch electrically connected between said third output terminal and said neutral point;

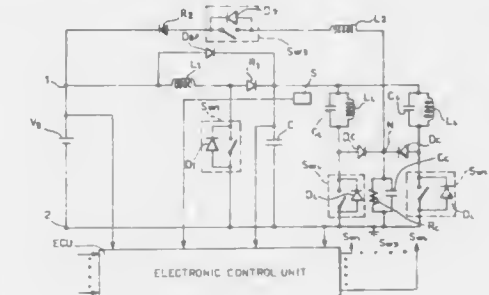


said third circuit branch including a third armature winding; and  
means for opening and closing said first and second pairs of electrical contacts in response to a control signal.

**4,950,974**  
**CIRCUIT FOR PILOTING AN INDUCTIVE LOAD, PARTICULARLY FOR CONTROLLING THE ELECTRO-INJECTORS OF A DIESEL ENGINE**  
Roberto Pagano, Turin, Italy, assignor to Marelli Autronica S.p.A., Milano, Italy  
Filed Oct. 25, 1989, Ser. No. 426,266  
Claims priority, application Italy, Oct. 27, 1988, 67970 A/88  
Int. Cl.<sup>5</sup> F02M 51/00

U.S. Cl. 323-222

3 Claims



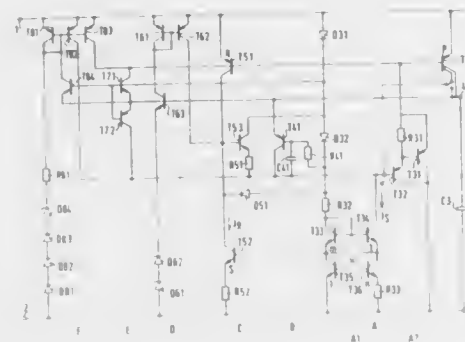
1. A circuit for piloting an inductive load, and particularly but not exclusively for controlling an electro-injector of a diesel engine, comprising:  
a low-voltage supply;  
reactive circuit means including a storage inductor interposed between a first pole of the supply and the load, a branch circuit including the load,  
a first electronic switch in parallel with the branch circuit including the load,  
a second electronic switch in series with the load, between the load and the other pole of the supply,  
a third electronic switch interposed between the first pole of the supply and the junction between the load and the second switch, and  
an electronic control unit which, in order to energise the load, is arranged to pilot the electronic switches in a predetermined manner so as to achieve the storage of energy delivered by the supply in the storage inductor, the rapid transfer of current from the storage inductor to the load, the maintenance of the current in the load at a predetermined average level for a prefixed time, and the de-energisation of the load and the return of the reactive energy stored in the load to the supply, wherein the storage inductor is permanently connected to

the first pole of the supply, a conductive bypass being provided between the first pole of the supply and the load, and the control unit is arranged to cause the second and third electronic switches to open and close successively in counterphase so as to maintain the current in the load at the predetermined average level.

**4,950,975**  
**PRELIMINARY STAGE OF A VOLTAGE REGULATOR WITH LOW LOSS OF VOLTAGE, AND VOLTAGE REGULATOR WITH SAID PRELIMINARY STAGE**  
 Ulrich Fleischer, Pliezhausen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
 PCT No. PCT/DE88/00081, § 371 Date Aug. 16, 1989, § 102(e) Date Aug. 16, 1989, PCT Pub. No. WO88/06757, PCT Pub. Date Sep. 7, 1988  
 PCT Filed Feb. 18, 1988, Ser. No. 399,481  
 Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706907  
 Int. Cl. G05F 1/563

U.S. Cl. 323—266

8 Claims



1. A preliminary stage of a voltage regulator with a low voltage loss to be connected with a further stage of the voltage regulator, said preliminary stage comprising an input voltage terminal; an output voltage terminal; a common voltage terminal for input voltage and output voltage; a capacitor serving as a charge storage element at an output side of said preliminary stage, said capacitor having a first terminal connected with said output voltage terminal, and a second terminal connected with said common terminal for the input and output voltage; a series branch including a transistor having an emitter connected with said input voltage terminal, a collector connected with said output voltage terminal, and an auxiliary collector; means for feeding said transistor with a base current such that said collector is able to supply a highest load current required at said output voltage terminal; means for limiting the output voltage of said preliminary stage of a voltage regulator occurring at said capacitor to a maximum output voltage; and means for reducing current flowing in said capacitor to zero before said transistor reaches saturation when the input voltage and the output voltage falls below a predetermined amount, said reducing means including means for influencing a potential of said collector and connected with said auxiliary collector and said input voltage terminal.

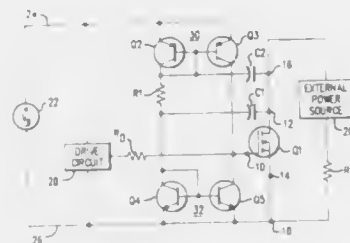
**4,950,976**  
**CURRENT VARIATION REDUCTION FOR MOSFET CURRENT SOURCES**  
 Robert G. Wagoner, Troy, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Sep. 29, 1989, Ser. No. 414,862  
 Int. Cl. G05F 3/26

U.S. Cl. 323—312

8 Claims

1. A metal oxide semiconductor field effect transistor (MOSFET) current source circuit comprising:

a metal oxide semiconductor field effect transistor having a source terminal, a drain terminal and a gate terminal; means for connecting said source and drain terminals to an external circuit; means for applying a drive voltage between said gate and drain terminals; and means for applying a compensation current to said gate terminal, said compensation current being of substantially equivalent magnitude and opposite polarity to current flow through a source to gate capacitance within said metal oxide semiconductor field effect transistor in re-

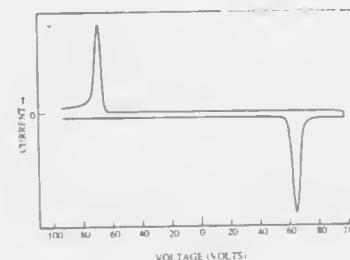


sponse to a change in voltage between said source and drain terminals, wherein said means for applying a compensation current includes first and second current mirror circuits electrically connected to each other by first and second circuit branches; said first circuit branch including a connection point electrically connected to said gate terminal; said second circuit branch including a first resistor; first and second capacitors; said first capacitor being electrically connected between a first end of said first resistor and said source terminal; and said second capacitor being electrically connected between a second end of said resistor and said source terminal.

**4,950,977**  
**METHOD OF MEASURING MOBILE ION CONCENTRATION IN SEMICONDUCTOR DEVICES**  
 Agustin M. Garcia; Cris W. Lawrence, both of Allentown, and Morgan J. Thoma, Macungie, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Dec. 21, 1988, Ser. No. 287,776  
 Int. Cl. H01L 21/00

U.S. Cl. 324—71.1

7 Claims

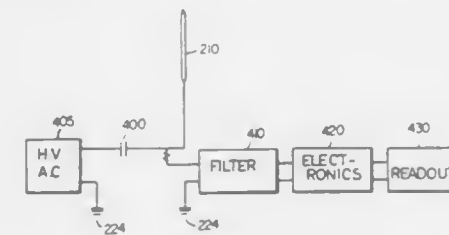


1. A method including the steps of fabricating a semiconductor device with a dielectric layer and identifying mobile ion contamination in said dielectric layer which is a part of the body of said device, characterized in the steps of: heating said device; applying across said dielectric a sweep voltage of maximum magnitude greater than 5 volts; and observing to detect a peak current at a voltage having a magnitude greater than 5 volts.

**4,950,978**  
**ATMOSPHERIC POTENTIAL MEASUREMENT DEVICE**  
 Johan A. Govaert, Peabody, Mass., assignor to Airborne Research Associates, Inc., Weston, Mass.  
 Filed Dec. 8, 1988, Ser. No. 281,842  
 Int. Cl. G01R 29/12

U.S. Cl. 324—72

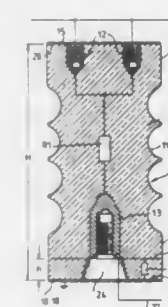
8 Claims



1. An electrostatic potential measuring device comprising a corona point made of a conductor connected in series with a capacitor which in turn is connected to a terminal of a high voltage power supply, said point also connected in series with a high ohm resistor which in turn is connected to a low pass filter, the output signal of said filter being the input signal to a device for determining the current flow through said corona point.

**4,950,979**  
**INSULATING MEMBER, FUNCTIONING AS A VOLTAGE DIVIDER IN A HIGH VOLTAGE SYSTEM**  
 Karl Stegmüller, Wiesent, and Erwin Reichl, Tegernheim, both of Fed. Rep. of Germany, assignors to Sachsenwerk Aktiengesellschaft, Regensburg, Fed. Rep. of Germany  
 Filed Aug. 17, 1989, Ser. No. 396,753  
 Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828016  
 Int. Cl. G01R 1/02; H01B 17/00  
 U.S. Cl. 324—126

17 Claims

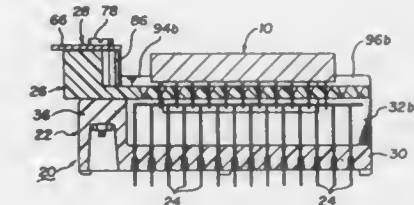


1. An insulating member which functions as a voltage divider for use in a high voltage system which measures high voltages and includes high voltage carrying components and electrically grounded components including a grounded frame portion, said insulating member comprising: an insulating body made of plastic, having a head section and a base section, and containing conductive fillers to reduce the active resistance of said body; a head fitting made of metal and embedded in said head section for connecting said head section with high voltage carrying components of a high voltage system and adapted for supporting such components; a base fitting made of metal and embedded in said base section, said base fitting including means for mechanically holding said insulating member at a grounded frame portion of a high voltage system; an electrode disposed in the region of said base fitting and

extending over a significant portion of the cross-sectional area of said insulating body; and an electrical terminal connected with said electrode, said insulating member including means for insulating said electrical terminal with respect to grounded components of a high voltage system; wherein said insulating member constitutes a resistor-type voltage divider and said electrode and electrical terminal constitute a voltage divider tap, the placement of said electrode defining the voltage divider ratio.

**4,950,980**  
**TEST SOCKET FOR ELECTRONIC DEVICE PACKAGES**  
 Wayne K. Pfaff, 309 Steeplechase, Irving, Tex. 75062  
 Filed Jul. 29, 1988, Ser. No. 225,869  
 Int. Cl. G01R 1/02, 1/04  
 U.S. Cl. 439—296

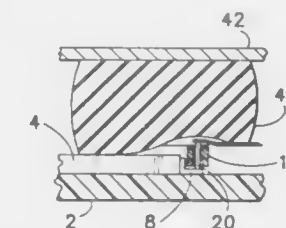
2 Claims



1. A socket for testing an electronic device package, said socket comprising: (a) a frame; (b) terminals formed of resilient material secured in said frame; (c) mounting means supported by said frame and movable relative to said terminals for carrying an electronic device package and aligning pins of the package proximate to edges of corresponding terminals; and (d) a cam mechanism rotatable from an open position to a closed position, wherein pins of an electronic device package carried by the mounting means are proximate to the corresponding terminal edges when the cam mechanism is in the open position and wherein the pins are in contact with corresponding terminal edges when the cam mechanism is in the closed position, and wherein said terminals bend from a rest state to a flexed state as the pins are forced into contact with the terminals so that the terminals provide a force in the flexed state tending to hold the cam mechanism in the closed position.

**4,950,981**  
**APPARATUS FOR TESTING A CIRCUIT BOARD**  
 Bozidar Janko, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
 Continuation-in-part of Ser. No. 338,712, Apr. 14, 1989. This application Apr. 14, 1989, Ser. No. 338,787  
 Int. Cl. G01R 31/02, 1/06  
 U.S. Cl. 324—158 F

22 Claims



1. Apparatus for testing a circuit board having a plurality of



test points distributed in a predetermined pattern at a main surface of the board, the apparatus comprising a locating member having a plurality of passages therein, the passages being distributed in a pattern corresponding substantially to said predetermined pattern, probe elements extending in said passages respectively, said probe elements being movable independently of one another in the respective passages, a flexible sheet of dielectric material to which the probe elements are attached, conductor runs adhered to the flexible sheet of dielectric material and connected to said probe elements respectively, and means for applying pressure to the flexible sheet of dielectric material when the locating member is in confronting relationship with the main surface of the circuit board and the passages are in register with the test points, whereby the flexible sheet of dielectric material is deflected and the probe elements are brought into pressure contact with the test points respectively.

4,950,982

**ELECTRIC PROBING TEST MACHINE**

Tadashi Obikane, Kofu; Hisashi Koike, Yamanashi, and Sumi Tanaka, Kofu, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Continuation of Ser. No. 278,246, Nov. 30, 1988, abandoned.

This application Jan. 26, 1990, Ser. No. 471,696

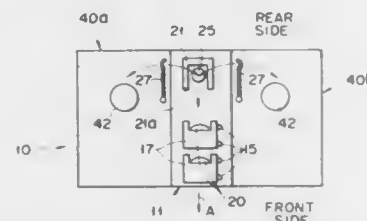
Filed Jan. 26, 1990, Ser. No. 471,696

Claims priority, application Japan, Nov. 30, 1987, 62-303761

Int. Cl.<sup>5</sup> G01R 31/22; B65G 47/24

U.S. Cl. 324—158 F

3 Claims



1. An electric probing test machine comprising: a pair of test stage units constructed as independent components of respective systems and used for testing the electrical characteristics of wafers under test while the wafers are mounted on said test stage units; and a loading/unloading unit constructed as an independent component of one system and used to load the wafers from a cassette and to unload the tested wafers one by one from one of said test stage units, said loading/unloading unit being combined with a side section of said one of said test stage units and disposed between said test stage units of said two systems, and said loading/unloading unit further comprising, means for separating and moving said loading/unloading unit away from said one of said test stage units, and means for pre-aligning wafers before the wafers are transferred from said wafer cassette to said one test stage unit.

4,950,983

**TACHOMETER SIGNAL CONDITIONING CIRCUIT**

Francis E. Krucos, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 9, 1989, Ser. No. 391,449

Int. Cl.<sup>5</sup> G01P 3/54

U.S. Cl. 324—169

7 Claims

1. A tachometer signal conditioning circuit for an internal combustion engine having a battery circuit, and an ignition coil with a primary low voltage lead and a secondary high voltage lead, comprising a timer circuit having an input responsive to ignition pulses from said primary lead, and having an output outputting a timing pulse terminating after a given time delay interval during which RFI, EMI and other transients on said primary lead are ignored, a one shot monostable multivibrator

circuit having an input responsive to said output of said timer circuit, and having an output outputting a trigger pulse at the termination of said timing pulse from said timer circuit after said given time delay interval, a switch circuit connected to said battery circuit and actuated to a given state by said trigger



pulse from said one shot monostable multivibrator circuit, said switch circuit having a node providing a tachometer input, said given state of said switch circuit changing the battery circuit voltage at said node at a frequency corresponding to the frequency of said ignition pulses.

4,950,984

**APPARATUS FOR DETERMINING THE PROPORTION OF A SUBSTANCE HAVING PARAMAGNETIC PROPERTIES IN A MIXTURE OF SUBSTANCES**

Johann Otten, Bad Schwartau; Scato Albarda, Gross Schenkenberg, and Hansjochen Schuck, Stockelsdorf, all of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

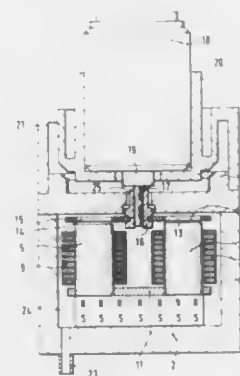
Filed Mar. 7, 1989, Ser. No. 319,965

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1988, 3840337

Int. Cl.<sup>5</sup> G01N 27/74; G01R 33/12

U.S. Cl. 324—204

11 Claims



1. Apparatus for the determining the proportion of a substance having paramagnetic properties in a mixture of substances, the apparatus comprising:

- a housing defining a longitudinal axis and having a first longitudinal end and a second longitudinal end opposite said first longitudinal end;
- a cuvette arrangement disposed between said longitudinal ends and having a plurality of cells for receiving the mixture of substances containing the substance having the paramagnetic properties;
- four magnetic field sources for providing respective magnetic fields for penetrating said cuvette arrangement;

said cuvette arrangement defining a rotational axis extending along said longitudinal axis and being rotatably mounted in said housing for rotating said mixture in said cells through said magnetic fields whereby said paramagnetic substance causes magnetic flux changes;

said cuvette arrangement having first and second rotating surfaces facing toward said first and second longitudinal ends of said housing, respectively;

a drive unit mounted at said first longitudinal end of said housing so as to face toward said first surface of said cuvette arrangement and having a drive shaft operatively connected to said cuvette arrangement for rotatably driving the same about said rotational axis;

a carrier plate disposed in the region of said second longitudinal end of said housing;

said four magnetic field sources having respective end faces; said magnetic field sources being mounted on said carrier plate so as to cause said end faces to face toward said second rotating surface and permit the cuvette arrangement and said cells to pass by above said end faces;

said drive shaft being mounted in said housing so as to be arranged between said first longitudinal end and said cuvette arrangement so as to avoid extending through said magnetic fields; and

each of said magnetic field sources including a measuring field coil for converting said magnetic flux changes into a electrical signal.

4,950,985

**APPARATUS FOR MEASURING ELECTROMAGNETIC VALUES OF A COIL, IN PARTICULAR FOR MEASURING THE POSITION OF ARMATURE OF A COIL/ARMATURE MAGNETIC SYSTEM**

Thomas Voss, Tettnang; Peter Winterhalter, Schlichten, and Günter Feier, Schorndorf, all of Fed. Rep. of Germany, assignors to Herion-Werke KG, Fellbach, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,704

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741734

Int. Cl.<sup>5</sup> G01B 7/14; H01H 47/00; G01R 27/26

U.S. Cl. 324—207.16

12 Claims



1. Apparatus for measuring the position of armature of a coil/armature magnetic system, comprising:

- a power source with a supply line for supplying energizing current to the coil of the coil/armature system;
- at least one capacitor connected parallel to said supply line so as to define a parallel resonant circuit containing inductance of said coil and capacitance of said capacitor, said resonant circuit having a resonant frequency which depends on the inductance of said coil;
- generating means connected to said supply line for introducing into said parallel resonant circuit an additional signal in form of an impulse without becoming attenuated so as to retain its strength and to be independent of the distance between the point of signal introduction and said coil, said parallel resonant circuit producing in response to said additional signal a response signal which is a function of said resonant frequency; and
- an evaluator connected to said supply line for interpreting

said response signal to thereby determine the armature position.

4,950,986

**MAGNETIC PROXIMITY SENSOR FOR MEASURING GAP BETWEEN OPPOSED REFINER PLATES**

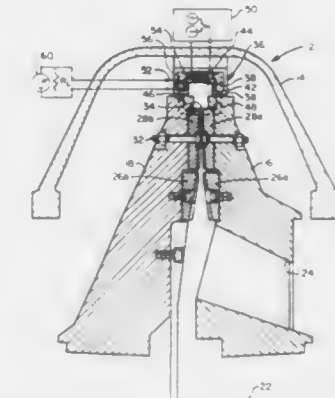
Hector N. Guerrero, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 27, 1988, Ser. No. 212,263

Int. Cl.<sup>5</sup> G01B 7/14; B02C 23/00

U.S. Cl. 324—207.19

13 Claims



1. A device for measuring the clearance gap between two magnetically conductive, relatively rotating coaxial plates, the plates having circumferential rim surfaces and confronting active surfaces separated by said clearance gap, comprising:

- a magnetically conductive core having a base portion, a first leg projecting from the base portion with a free end spaced radially from the rim surface of one plate, and a second leg projecting from the base portion and having a free end spaced radially from the rim surface of the other plate;
- an electrically conductive coil wrapped around the core;
- an AC power source for activating the coil with a primary voltage signal to induce a primary magnetic flux path through the core, through said radial spaces, through the plates and through said clearance gap; and
- means coupled to the core and responsive to changes in reluctance of the flux path, for indicating changes in the size of the clearance gap.

4,950,987

**MAGNETO-INDUCTIVE SENSOR FOR PERFORMING TACTILE AND PROXIMITY SENSING**

John M. Vranish, Crofton, and Pradeep K. Yadav, Bladensburg, both of Mass., assignors to University of North Carolina at Charlotte, Charlotte, N.C.

Filed Mar. 3, 1989, Ser. No. 319,411

Int. Cl.<sup>5</sup> G01B 7/14; G01R 33/00; B25J 19/00, 15/02

U.S. Cl. 324—207.23

34 Claims

1. A proximity and tactile sensor for sensing an object, comprising:

- magnetic field generating means;
- magnetic field proximity and tactile sensing means positioned within said magnetic field for sensing changes in the magnetic field generated by said magnetic field generating means in response to said object changing position within said magnetic field to provide proximity sensing; and
- means mounting said magnetic field generating means and said magnetic field proximity and tactile sensing means for relative movement in response to said object moving at





4,950,994

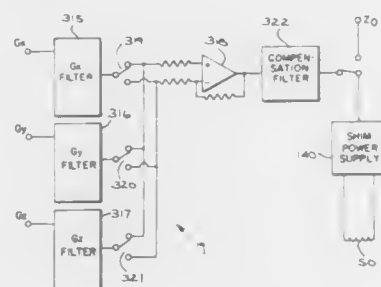
**GRADIENT AND POLARIZING FIELD COMPENSATION**  
Gary H. Glover, Delafield; Norbert J. Pelc, Wauwatosa, both of Wis., and Kenneth Marel Bradshaw, Idaho Falls, Id., assignors to General Electric Company, Milwaukee, Wis.

Filed Mar. 7, 1988, Ser. No. 164,687

Int. Cl.<sup>5</sup> G01R 33/22

U.S. Cl. 324—320

10 Claims



1. A method for MR scanner magnetic field compensation comprising the steps of:

- (a) positioning an NMR active sample at a first position with respect to the isocenter of an MR scanner apparatus;
- (b) applying a polarizing magnetic field to the sample;
- (c) applying a gradient pulse along one axis;
- (d) irradiating the sample with an RF excitation pulse within a predetermined time following application of said gradient pulse so as to generate an NMR signal;
- (e) measuring data indicative of the phase angle of the NMR signal and indicative of the field generated by the gradient pulse at said first position as a function of time following the application of the gradient pulse;
- (f) positioning an NMR active sample at a second position with respect to the isocenter of the MR scanner apparatus;
- (g) repeating steps (b) through (d);
- (h) measuring data related to the phase angle of the NMR signal and indicative of the field generated by the gradient pulse at said second position; and
- (i) calculating from the measured data the compensation values which are employed with the means for producing the polarizing magnetic field to offset spurious effects induced in the polarizing magnetic field by said magnetic field gradient pulses.

4,950,995

**METHOD OF TREATING A WELL BORE IN CONNECTION WITH ELECTRIC LOGGING OF SUBSURFACE FORMATION**

David O. Falk, Denver, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Mar. 31, 1989, Ser. No. 332,255

Int. Cl.<sup>5</sup> G01V 3/18; E21B 43/27, 47/00

U.S. Cl. 324—323

10 Claims



1. A method of treating a well bore in connection with the

electric logging of a subsurface formation penetrated by the well bore, comprising the steps of:

- displacing fluid in the portion of the well bore penetrating the subsurface formation with a readily flowable liquid composition of relatively low viscosity, the liquid composition being capable of gelling to a highly viscous moderately flowing state;
- causing some of the liquid composition to enter the formation immediately adjoining said portion of the well bore; allowing the liquid composition to gel to the extent whereby the gel in the adjoining formation prevents entry of crude oil and formation water into the well bore and the gel in the well bore permits electric logging equipment to be moved therethrough;
- logging the subsurface formation with electric logging equipment moved through the gel;
- causing the gel to revert to readily flowable liquid form; and removing the readily flowable liquid from the well bore.

4,950,996

**METHOD OF AND APPARATUS FOR ADJUSTING IGNITION TIMING BY ROTATING THE CRANKSHAFT WITH THE COIL AND SPARK PLUG TERMINALS DISCONNECTED FROM THE IGNITION CIRCUIT**

Koji Funatsuki, and Shigeru Hiramatsu, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

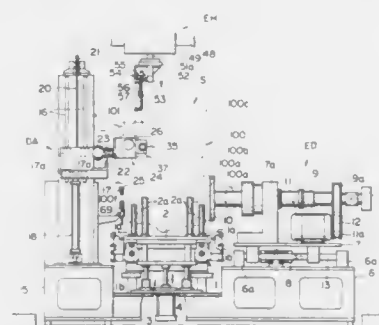
Filed Jul. 17, 1989, Ser. No. 379,789

Claims priority, application Japan, Jul. 16, 1988, 63-177783; Jul. 18, 1988, 63-179492

Int. Cl.<sup>5</sup> F02P 17/00

U.S. Cl. 324—391

19 Claims



1. A method of adjusting ignition timing for an internal combustion engine of an automotive vehicle comprising the steps of:

- idling said internal combustion engine having a distributor whose coil terminal and spark plug terminals are disconnected from ignition circuit;
- detecting an ignition signal for each cylinder of said internal combustion engine provided from said distributor;
- detecting an rotated angle of a crankshaft of said internal combustion engine;
- providing a top dead center signal at a time a piston of a specified one of said cylinders reaches the top dead center of its compression stroke;
- calculating a difference between said detected rotated angle of said crankshaft from a detection of said ignition signal to a provision of said top dead center signal and a predetermined angle for which said crankshaft is expected to rotate; and
- turning said distributor with respect to said internal combustion engine through an angle according to said difference.

4,950,997

**DIAGNOSTIC TESTING DEVICE FOR SEED TUBE SENSORS**

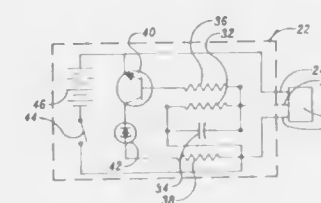
Glen A. Austin, 9906 Lincoln, Des Moines, Iowa 50322, and Brad Goode, West Des Moines, Iowa, assignors to Glen A. Austin, Des Moines, Iowa

Filed Jul. 28, 1989, Ser. No. 386,437

Int. Cl.<sup>5</sup> G01R 31/02

U.S. Cl. 324—556

20 Claims



1. A hand-held diagnostic testing device for a seed sensor on a seed planter tube, the sensor including a photo-electric cell with a light emitter, a light receiver and an electrical coupler for selectively connecting the sensor to a monitor, the testing device comprising:

a housing;

electrical circuitry within the housing, including a power means for supplying an electrical current and signal means capable of generating first and second signals; an electrical coupler operatively connected to the electrical circuitry and adapted to be selectively connected to the coupler of the seed sensor, such that the power means provides an electrical current to the photo-electric cell, and such that the signal means generates the first signal; and

whereby upon passing of a light-blocking means between the light emitter and light receiver, the signal means generates the second signal when the photo-electric cell is properly functioning and the signal means continues to generate the first signal when the photo-electric cell is malfunctioning.

4,950,998

**CONTINUOUS CONDITION SENSING SYSTEM**

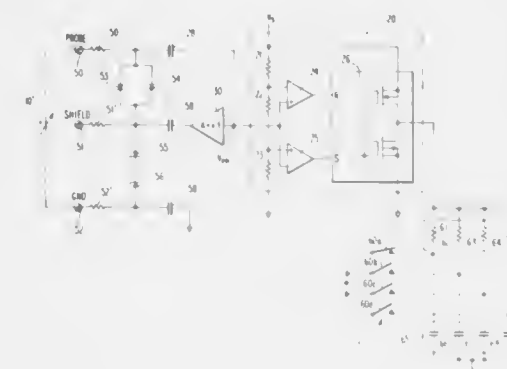
L. Jonathan Kramer, Warminster; Steven R. Petersen, Ambler, and Herbert A. Shauger, Jr., Doylestown, all of Pa., assignors to Drexelbrook Controls, Inc., Horsham, Pa.

Continuation of Ser. No. 917,958, Oct. 14, 1986, Pat. No. 4,788,488. This application Jul. 21, 1988, Ser. No. 222,498

Int. Cl.<sup>5</sup> G01R 27/26

U.S. Cl. 324—674

12 Claims



1. A system for continuous material condition monitoring comprising:  
probe means developing an admittance with a material to be

monitored, the admittance varying with changes in a condition of the material;

a R-C circuit operatively coupled to receive an admittance signal from the probe means and for providing a signal having a generally triangular waveform based upon the admittance;

oscillator means having an input coupled to receive the signal from the R-C circuit for generating an oscillating digital signal having a period varying with the admittance at the probe means and having an output operatively coupled in feedback to the R-C circuit; and

capacitor means disposed between said probe means and said oscillator means for capacitively isolating the probe means from the oscillator means, the capacitor means having a capacitance greater than any capacitance that is normally developed at the probe means so that the oscillator means operates over a linear range and preventing any substantial discharge of the R-C circuit in the event of substantial leakage to ground in the probe means.

4,950,999

**SELF-CONTAINED, REAL-TIME SPECTRUM ANALYZER**

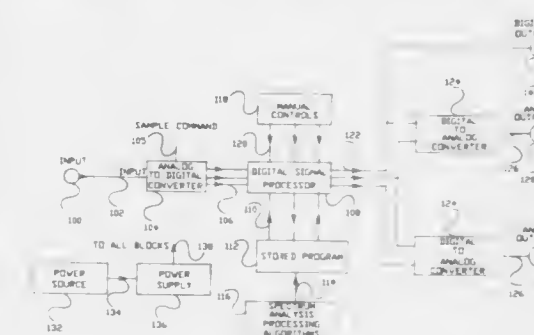
Anthony M. Agnello, 407 Prospect Ave., Princeton, N.J. 80504; Mark Clayton, Shore Dr., Box 541, Rd. 4, New Windsor, N.Y. 12550, and Jon D. Paul, 2800 Third St., San Francisco, Calif. 94107

Filed Mar. 6, 1989, Ser. No. 319,341

Int. Cl.<sup>5</sup> G01R 23/16

U.S. Cl. 324—77 B

20 Claims



1. A self-contained, real-time spectrum analyzer, comprising:

- (a) input means for accepting an externally applied electrical signal;
- (b) analog-to-digital converter means for sampling said externally applied electrical signal at said input means at periodic time intervals and for providing a digital representation of said externally applied input signal at said periodic time intervals;
- (c) digital signal processor means having an input port and an output port, said input port connected to receive said digital representation of said externally applied input signal from said analog-to-digital converter means, said digital signal processor means arranged to process said digital representation and supply the results of said process to said output port, said digital signal processor means comprising means for providing real-time resolution of said digital representation of said externally applied input signal into an array of coefficients in a frequency domain, said coefficients representing a frequency spectrum of said time-varying digital signal;
- (d) a display interface connected to said output port of said digital signal processor means for converting said results of said process into electrical signals of magnitude and waveshape suitable for driving a display; and
- (e) display means connected to said display interface for providing a graphic display of said frequency spectrum,

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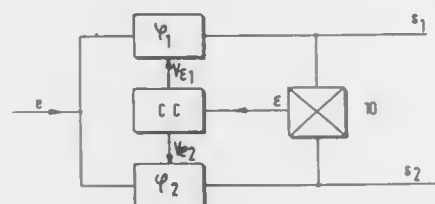
UMI

whereby the frequency spectrum of said externally applied electrical signal will be computed and displayed in real-time on said display means.

4,951,000

## WIDE-BAND PHASE SHIFTER

Pierre Dautriche, Chennevieres, France, assignor to U. S. Philips Corporation, New York, N.Y.  
Continuation of Ser. No. 145,856, Jan. 20, 1988, abandoned. This application Jun. 7, 1989, Ser. No. 363,437  
Claims priority, application France, Jan. 20, 1987, 87 00566  
Int. Cl.<sup>3</sup> H03K 5/00, 5/22  
U.S. Cl. 328—155 10 Claims

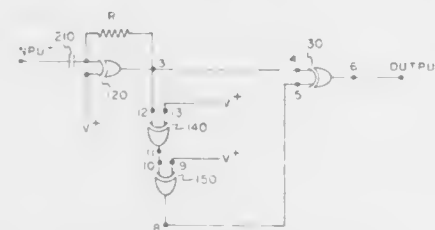


1. A wide-band phase shifter comprising a first and a second branch arranged in parallel and receiving the same input signal at their inputs and producing a first and a second output signal at their outputs, said output signals being phase-shifted with respect to each other by a given angle, the first branch comprising a first phase shift module producing said first output signal having a phase shift as a function of a first control signal, said control signal being processed by a negative feedback loop comprising a phase-sensitive detector and receiving said first and second output signals, characterized in that the second branch comprises a second phase shift module for producing said second output signal, said second phase shift module having the same structure as said first phase shift module, and in that the negative feedback loop comprises a control circuit receiving the output signal of said phase-sensitive detector and producing said first control signal as well as a second control signal for controlling said second phase shift module, the two control signals being generated so as to produce oppositely directed phase corrections in the two phase shift modules, wherein said control circuit controls the phase shifts of said first and second phase shift modules between 0° and 180°.

4,951,001

## LIMITER AND DETECTOR CIRCUIT AND METHOD

Clyde Smith, Lake Ronkonkoma, N.Y., assignor to Television Corporation of America, Bohemia, N.Y.  
Filed Sep. 12, 1989, Ser. No. 405,946  
Int. Cl.<sup>3</sup> H03K 9/06  
U.S. Cl. 329—343 18 Claims



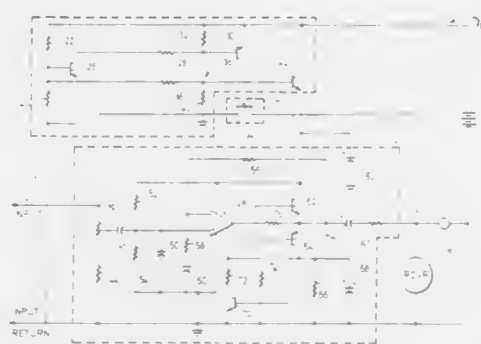
1. A method for converting a logic gate pack that includes four exclusive OR or exclusive NOR logic gates, each said logic gate having a pair of input terminals and an output terminal, into a circuit for limiting and detecting an FM input signal, comprising the steps of:

coupling said input signal to one input terminal of a first of said logic gates;  
coupling the other input terminal of said first logic gate to a reference potential;  
coupling the output terminal of said first logic gate to said one input terminal thereof in a feedback arrangement;  
coupling the output terminal of said first logic gate to one input terminal of a second of said logic gates, the other input terminal of said second logic gate being coupled to a reference potential;  
coupling the output terminal of said second logic gate to one input terminal of a third of said logic gates, the other of the input terminals of said third logic gate being coupled to a reference potential; and  
coupling the output terminal of said third logic gate to one of the input terminals of a fourth of said logic gates, and coupling the other input terminal of said fourth logic gate to the output terminal of said first logic gate;  
whereby the signal at the output terminal of said fourth logic gate is representative of a detected version of said FM input signal.

4,951,002

## BATTERY POWERED IN-LINE AMPLIFIER

David O. Hanon, Ringgold, Ga., assignor to Plantronics, Inc., Santa Cruz, Calif.  
Filed Apr. 13, 1989, Ser. No. 337,318  
Int. Cl.<sup>3</sup> H03G 3/20  
U.S. Cl. 330—151 12 Claims



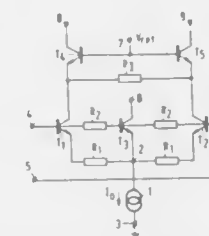
4. An apparatus for controllably amplifying an audio signal delivered to a receiver, comprising:  
amplifier means for receiving the audio signal, amplifying said audio signal, and delivering said amplified audio signal to said receiver, said amplifier means having first and second modes of operation and being controllably switchable therebetween in response to receiving first and second control signals respectively, said first and second modes of operation being discrete high and low power modes of operation respectively wherein the amplifier means consumes more power in the high power mode of operation than in the low power mode of operation;  
means for receiving the amplified audio signal and delivering said first and second control signals in response to said amplified signal respectively exceeding and being less than a predetermined magnitude.

4,951,003

## DIFFERENTIAL TRANSCONDUCTANCE CIRCUIT

Willem De Jager, Enschede, and Evert Seevinck, Eindhoven, both of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed May 16, 1989, Ser. No. 352,421  
Claims priority, application Netherlands, Jun. 3, 1988, 8801427  
Int. Cl.<sup>3</sup> H03F 3/45  
U.S. Cl. 330—252 3 Claims

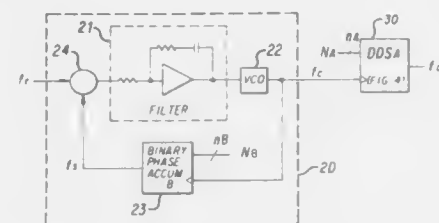


1. A transconductance circuit comprising  
a first and a second transistor of a first conductivity type having their bases coupled to input terminals for receiving an input signal and having their emitters connected to a common point by means of first resistors, which common point is coupled to a first power-supply terminal by means of a current source,  
a third transistor of the first conductivity type whose collector-emitter path is arranged between a second power-supply terminal and the common point and having its base coupled to a tap of a voltage divider comprising two substantially identical second resistors arranged between the bases of the first and the second transistor,  
a fourth and a fifth transistor of the first conductivity type, having their collector-emitter paths arranged in series with the collector-emitter paths of the first and the second transistor respectively, having their bases coupled to a reference-voltage terminal, and having their collectors coupled to the output terminals for supplying an output signal, and  
a third resistor arranged between the emitters of the fourth and the fifth transistor.

4,951,004

## COHERENT DIRECT DIGITAL SYNTHESIZER

Tzafir Sheffer, and Eric Drucker, both of Seattle, Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.  
Filed Mar. 17, 1989, Ser. No. 325,359  
Int. Cl.<sup>3</sup> H03B 19/00; H03L 7/18  
U.S. Cl. 331—1 A 10 Claims



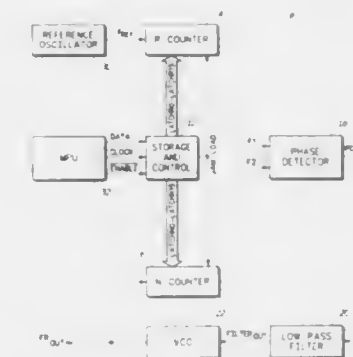
1. A frequency converter for producing a binary frequency from a reference frequency source having a non-binary radix, including  
a phase locked loop including a voltage controlled oscillator and a feedback path  
said path comprising  
(a) a binary radix phase accumulator receiving the output of said voltage controlled oscillator and dividing the

frequency of said output of said voltage controlled oscillator by an arbitrary, binary radix number, and  
(b) a phase detector controlling said voltage controlled oscillator, said phase detector generating a voltage dependent on the relative phase of the output of said binary radix phase accumulator and the output from the reference source,  
whereby said voltage controlled oscillator is made to oscillate at a frequency different from but coherent with the output of the reference source.

4,951,005

## PHASE LOCKED LOOP WITH REDUCED FREQUENCY/PHASE LOCK TIME

David C. Babin, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.  
Filed Dec. 27, 1989, Ser. No. 457,465  
Int. Cl.<sup>3</sup> H03L 7/18  
U.S. Cl. 331—16 10 Claims



1. A phase locked loop comprising:  
input means, for storing first and second predetermined numbers in response to a plurality of input signals;  
first counter means coupled to said input means, for receiving a reference signal, for storing said first predetermined number, for providing a first signal in response to either an occurrence of substantially said first predetermined number of cycles of said reference signal or to said input means storing either said first or said second predetermined number;  
second counter means coupled to said input means, for receiving an output signal, for storing said second predetermined number, for providing a second signal in response to either an occurrence of substantially said second predetermined number of cycles of said output signal or to said input means storing either said first or said second predetermined number;  
a phase detector coupled to said first counter means and to said second counter means, for providing a phase detect output signal in response to a difference in logic state between said first and second signals;  
filter means coupled to said phase detector, for providing a filtered signal having a voltage proportional to a length of time said phase detector output signal is in a predetermined logic state; and  
a voltage controlled oscillator, coupled to said filter means and said second counter, for providing said output signal having a frequency proportional to said voltage of said filtered signal.

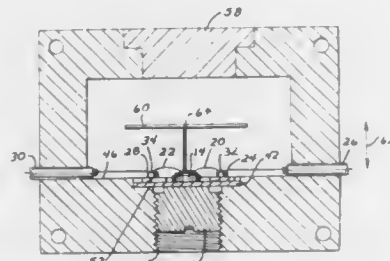


# 4,951,006

## ANTENNA COUPLED MILLIMETER WAVE OSCILLATOR

Leonard D. Cohen, Brooklyn, N.Y., assignor to Eaton Corporation, Cleveland, Ohio  
 Filed Sep. 12, 1988, Ser. No. 243,433  
 Int. Cl.<sup>3</sup> H03B 5/12, 7/06, 9/12  
 U.S. Cl. 331-74

20 Claims



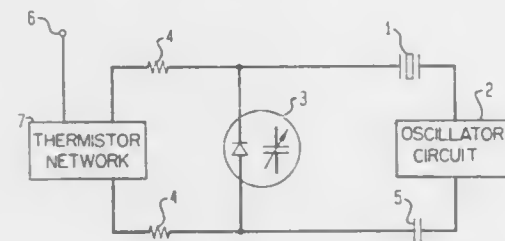
1. An oscillator operational in the millimeter wave range including frequencies greater than 30 GHz, comprising:
  - a lumped element active circuit including an active element with a negative resistance;
  - a lumped element resonator circuit in parallel with said first mentioned circuit and providing resonant circuitry in combination therewith;
  - an antenna extending directly from said oscillator without an intermediate impedance matching section therebetween and without an isolation element therebetween, said antenna having a length of nominally an odd quarter wavelength and having zero connection length from said oscillator.

# 4,951,007

## TEMPERATURE COMPENSATED CRYSTAL OSCILLATOR (TCXO) WITH IMPROVED TEMPERATURE COMPENSATION

John A. Kosinski, Wall Township, Monmouth County, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
 Filed Oct. 4, 1989, Ser. No. 417,132  
 Int. Cl.<sup>3</sup> H03B 5/32; H03L 1/04  
 U.S. Cl. 331-158

6 Claims



1. In a temperature compensated crystal oscillator (TCXO) having a series load capacitance that is temperature sensitive and in which said TCXO includes a crystal resonator electrically connected to an oscillator circuit to form a closed loop, a variable capacitance introduced into the loop to provide a means of frequency adjustment, resistors connected to the terminals of the variable capacitance to provide a path for DC voltage to be applied to the variable capacitance, a blocking capacitor inserted into the closed loop in order to isolate the oscillator circuit from the DC voltage and in which a DC voltage is applied to a thermistor network and the output voltage of the thermistor network applied to the open terminals of the resistors, the improvement wherein the temperature

sensitivity of the series load capacitance is chosen in accordance with the formula  

$$T_{CL} = T_{CO} + 2 T_K / (1 - \alpha_0)$$

wherein  $T_{CL}$  is the temperature coefficient of the series load capacitance,  $T_{CO}$  is the temperature coefficient of the resonator static capacitance,  $T_K$  is the temperature coefficient of the piezoelectric coupling for the resonator, and  $\alpha_0$  is the center value of load factor  $\alpha$  and wherein the load factor,  $\alpha$ , is defined as

$$\alpha = \frac{C_0}{C_0 + C_L}$$

wherein  $C_0$  is the resonator static capacitance and  $C_L$  is the series load capacitance.

# 4,951,008

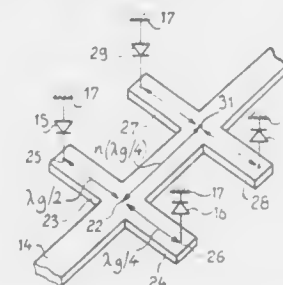
## SUSPENDED-LINE DIODE DEVICE COMPRISING A TRIPLE PLATE LINE

Christian Vedrenne, Le Perreux; Patrick Desmarest, Montigny les Corneilles, and Bernard Guerin, Aulnay Sous Bois, all of France, assignors to Thomson Hybrides et Microondes, Paris, France

Filed Mar. 3, 1988, Ser. No. 163,841  
 Claims priority, application France, Mar. 6, 1987, 87 03075  
 Int. Cl.<sup>3</sup> H01P 1/22

U.S. Cl. 333-17.2

7 Claims



1. A hyperfrequency diode device, which comprises:
  - a triple plate line formed by a suspended line placed between two ground planes,
  - at least two diodes connected respectively between said suspended line and said ground planes wherein said suspended line transports a hyperfrequency signal of a guided wave length  $\lambda_g$ , and
  - said suspended line comprises two subsidiary line sections connected to a main suspended line section and which are oriented substantially orthogonal thereto, each of said diodes being mounted at a free end of a respective one of said subsidiary line sections, each respective free end being point spaced by  $\lambda_g/2$  or a multiple of  $\lambda_g/2$  from a central point of the main suspended line and situated in the same plane, wherein the at least two diodes are connected to the two subsidiary line sections on the same side with respect to the plane formed by the main suspended line section and by the two subsidiary line sections.
2. The hyperfrequency device as claim 1, wherein said device comprises a hyperfrequency limiter.

# 4,951,009

## TUNING METHOD AND CONTROL SYSTEM FOR AUTOMATIC MATCHING NETWORK

Kenneth S. Collins, San Jose, Calif., assignor to Applied Materials, Inc., Santa Clara, Calif.  
 Filed Aug. 11, 1989, Ser. No. 392,874  
 Int. Cl.<sup>3</sup> H03H 11/30

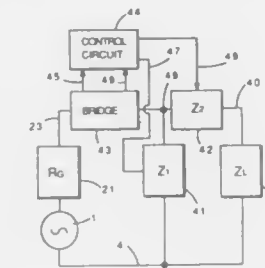
U.S. Cl. 333-17.3

35 Claims

1. In a system with a power generator having an output

impedance and a load having an input impedance, a method for using a matching network to match the output impedance of the power generator and the input impedance of the load, the matching network including a first magnetically saturable reactor composed of a transformer having primary and secondary windings wound around a non-linear ferromagnetic core and a second magnetically saturable reactor composed of a transformer having primary and secondary windings wound around a non-linear ferromagnetic core, the method comprising the steps of:

- (a) varying, by use of a first current amplifier, current through the secondary winding of the first magnetically saturable reactor at a first determined frequency;
- (b) varying, by use of a second current amplifier, current through the secondary winding of the second magnetically saturable reactor at a second determined frequency;



- (c) detecting changes in power reflected from the matching network to the power generator;
- (d) for the changes in power detected in step (c) separating an electrical component of change due to the varying of the current through the secondary winding of the first magnetically saturable reactor in step (a) from an electrical component of change due to the varying of the current through the secondary winding of the second magnetically saturable reactor in step (b); and
- (e) adjusting steady state current through the secondary winding of the first magnetically saturable reactor and current through the secondary winding of the second magnetically saturable reactor based on the electrical components separated in step (d).

# 4,951,010

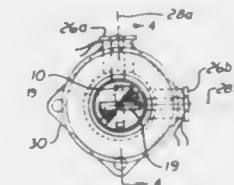
## POLARIZATION ROTATING APPARATUS FOR MICROWAVE SIGNALS

Fay Grim, Port Charlotte, Fla., assignor to Maxi Rotor, Inc., Port Charlotte, Fla.  
 Filed Mar. 15, 1989, Ser. No. 324,248  
 Int. Cl.<sup>3</sup> H01P 1/165

U.S. Cl. 333-21 A

10 Claims

1. Apparatus for rotating the polarization of a microwave signal comprising:
  - a circular waveguide having a cylindrical axis extending longitudinally therethrough, said waveguide being open on both axial ends and having opposed signal receiving and signal transmitting ends;
  - a support mounted within and extending transversely to said circular waveguide;
  - a shaft having opposed first and second ends and a longitudinal axis extending within said waveguide generally parallel to said cylindrical axis, said shaft first end being affixed to said support;
  - a septum comprising a plurality of discrete interlinked elements formed of electrically conductive material mounted on said shaft for rotational movement relative thereto, said septum having a first element adjacent said support and a last element distal said support;
  - rotating means for rotating said elements angularly about said shaft while said shaft remains substantially stationary; and



rotation of each element relative to an adjacent element is limited to a predetermined angle for that element.

# 4,951,011

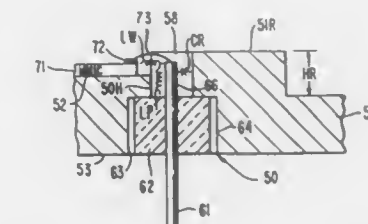
## IMPEDANCE MATCHED PLUG-IN PACKAGE FOR HIGH SPEED MICROWAVE INTEGRATED CIRCUITS

Douglas E. Heckaman; Dawn A. Larson, both of Indialantic; Jeffrey A. Frisco, Palm Bay, and David A. Haskins, Satellite Beach, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Jul. 24, 1986, Ser. No. 888,934  
 Int. Cl.<sup>3</sup> H03H 7/38; H05K 5/06

U.S. Cl. 333-33

11 Claims



1. A plug-in package for housing circuit components comprising:
  - a conductive support header upon which one or more circuit components are mounted, said support header having at least one aperture therethrough extending from an interior portion of said package, whereat a respective one of said one or more circuit components is mounted, to an exterior portion thereof;
  - a respective conductor pin supported within and extending through a respective one of said at least one aperture, said conductor pin being conductively coupled to said respective one circuit component at a first portion thereof at said interior portion of said package, said pin forming an inductive reactance component between said respective one circuit component and the exterior of said package; and
  - a respective dielectric insulator surrounding said respective conductor pin and being mechanically coupled to said header so as to support said respective conductor pin in a respective at least one aperture; and wherein

extends has a dielectric constant different from that of said insulator so as to form a prescribed capacitive reactance between said pin and said header, and forms with the inductive reactance of said pin a prescribed inductive-capacitance impedance matching network between said respective one circuit component and the exterior of said package, and wherein said support header has a pair of opposite, substantially parallel surfaces through which said respective at least one aperture extends, a first of said surfaces corresponding to said interior portion of said package and supporting said respective one circuit component thereon; and wherein

said package is adapted to be mounted on a conductive transmission line support member having a respective at least one aperture therein for receiving said conductor pin; and wherein

said aperture in said support header is a generally cylindrical aperture of a constant diameter extending through said header and the aperture in said conductive transmission line support member has a circular cross-section, a first portion of the support member aperture having a diameter corresponding to that of the generally cylindrical aperture in said header and is formed so as to be aligned with the aperture in said header, and wherein the thickness of said dielectric insulator through said header is less than the length of the aperture in said header so as to form an airspace surrounding a prescribed portion of said conductor pin in both the aperture in said header and the aperture in said support member in alignment therewith, said airspace corresponding to said prescribed region whereat said prescribed capacitive reactance is formed between said conductor pin and the conductive material of said header and said support member.

4,951,012

#### TRANSFORMER ARRANGEMENT TO ACCOMPLISH IMPEDANCE TRANSFORMATION

Ralph Oppelt, Weiher, and Markus Vester, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

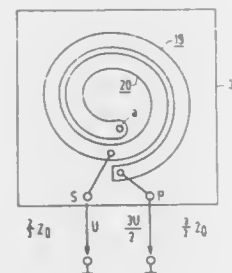
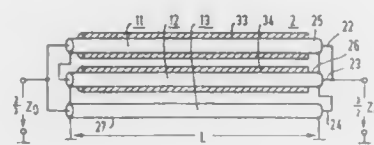
Filed Apr. 5, 1989, Ser. No. 333,286

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1988, 3811985

Int. Cl.<sup>5</sup> H01P 5/02

U.S. Cl. 333—33

10 Claims



1. A line transformer for impedance transformation comprising a plurality of elementary transformers which each have conductors which are all of equal length and all have the same characteristic impedance  $Z_0$  and each of which has primary and secondary sides which are connected in at least one combination of a parallel circuit and a series circuit comprising their inner conductors and their outer shielding conductors (parallel connection of 22, 25 to 23, 26 in series with 24, 27 at the pri-

mary side, FIGS. 1 and 2) such that at the primary side and at the secondary side of the elementary transformers (11 through 16) that an impedance transformation of  $U=1:2.25$  results.

4,951,013

#### PHASE SHIFT CONTROLLED BROADCAST SWITCHING SYSTEM

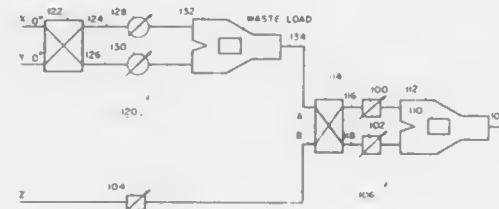
William A. DeCormier, West Poland; David B. Folsom, Bridgton, both of Me., and Philip C. Noll, Pennsauken, N.J., assignors to General Signal Corporation

Filed Jun. 3, 1988, Ser. No. 202,771

Int. Cl.<sup>5</sup> H01P 5/16

U.S. Cl. 333—117

11 Claims



6. The combination of first and second switchers of high-power, high-frequency signals from at least first, second, and third sources, each having an input power value, to a plurality of loads so as to provide a switchless switching operation, said combination comprising:

(1) a first switcher including:

(a) a first hybrid coupler having input and output ports, the input ports being connected respectively to a resultant source, resulting from the coupling of said first and second sources, and to said third source, the output ports of said coupler being connected to top and bottom legs defining respective conductive paths;

(b) a respective phase shifting means connected in each leg;

(c) a second hybrid coupler having input and output ports, its input ports being connected to said top and bottom legs respectively;

(d) a normal output load and a waste output load to which the respective output ports of said second hybrid coupler are connected;

(e) means for discretely selecting, in accordance with an input power ratio of said resultant source and said third source, the phase of each of said phase shifting means in the respective legs over an entire range of phase values with a phase delay between such phase shifting means such that any output power corresponding to any combination of input powers from said first and second sources can be achieved at the normal and waste loads for a full range of input power ratios.

(2) a second switcher including:

(a) a third hybrid coupler, having input and output ports, and means for connecting said first and second of said sources to the input ports of said third hybrid coupler, the outputs of said third coupler being connected to top and bottom legs defining respective conductive paths;

(b) a respective phase shifting means connected in each leg;

(c) a fourth hybrid coupler having input and output ports, its input ports being connected to said top and bottom legs respectively;

(d) a normal output load and a waste output load to which the output ports of said fourth hybrid coupler are respectively connected;

(e) means for connecting the normal output load of said second switcher, comprising said resultant source, to one of the input ports of said first hybrid coupler of said first switcher.

4,951,014

#### HIGH POWER MICROWAVE CIRCUIT PACKAGES

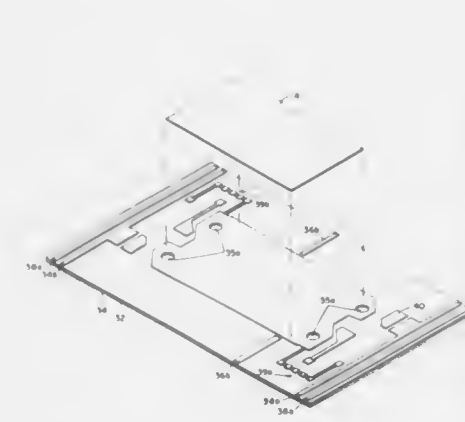
Albert C. Wohler, Townsend, and H. Barteld Van Rees, Newton Upper Falls, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed May 26, 1989, Ser. No. 358,279

Int. Cl.<sup>5</sup> H01P 1/00

U.S. Cl. 333—246

8 Claims



1. A packaged radio frequency circuit comprising:

a package comprising:

a base comprised of a metal matrix material;

a microwave circuit carrier disposed on said base of said package, said carrier comprising:

an aluminum nitride carrier having a selected thickness and a pair of opposing surfaces;

a ground plane conductor disposed over a first one of said surfaces;

a patterned conductive layer disposed directly on a second opposite one of said surfaces, electrically connected to said ground plane conductor through at least one plated via hole disposed through said aluminum nitride carrier;

a thin film resistor formed on the second opposite one of said surfaces, including a layer of high resistivity material disposed on the second opposite one of said surfaces and a pair of spaced electrical contacts, each contact comprised of an adherent conductive layer disposed on a portion of the high resistivity layer and a layer of conductive material disposed on said adherent layer;

a first strip conductor formed on the second opposite one of said surfaces, with said first strip conductor, said substrate, and said ground plane conductor providing a microstrip transmission line;

a plurality of D.C. bias lines each comprised of a second strip conductor disposed on and along peripheral portions of the second opposite one of said surfaces and comprised of a layer of high resistivity material disposed on the second opposite one of said surfaces, an adherent conductive layer disposed thereon, and a layer of conductive material disposed on said adherent conductive layer; and

a high power radio frequency circuit supported on the second opposite one of said surfaces of said aluminum nitride carrier and disposed directly on said patterned conductive layer, said circuit having an average thermal dissipation of at least about 0.3 watts.

4,951,015

#### CIRCUIT BREAKER WITH MOVING MAGNETIC CORE FOR LOW CURRENT MAGNETIC TRIP

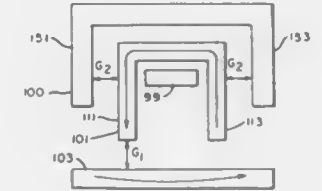
John J. Shea, Monroeville; Richard P. Sabol, Munhall, and Ronald A. Cheski, Stowe Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 5, 1989, Ser. No. 417,378

Int. Cl.<sup>5</sup> H01M 75/10

U.S. Cl. 335—38

14 Claims



1. A circuit breaker for responding to abnormal currents in a conductor in an electrical system, comprising:

electrical contacts operable between a closed position in which a circuit is completed through the conductor and an open position in which the circuit through the conductor is interrupted;

a latchable operating mechanism operable to open said electrical contacts when unlatched;

a magnetic trip assembly, comprising:

an elongated conductive member through which current from said conductor flows to generate a magnetic flux;

a pivotally mounted armature rotatable about a pivot axis and having a free end rotatable toward said conductive member in a latch position in which said armature latches said operating mechanism and which armature is attracted toward said conductive member by the magnetic flux produced by an abnormal current in said conductive member to an unlatched position which unlatches said operating mechanism;

a generally U-shaped fixed magnetic yoke having a base and two outwardly extending legs partially surrounding said conductive member with said legs extending beyond opposite sides of said conductive member toward said armature to concentrate the magnetic flux in the direction of the armature and to form a primary air gap therewith;

a generally U-shaped movable magnetic core having a base and two outwardly extending legs, the base of said movable core being adjacent the base of said fixed yoke and movable relative to said fixed yoke between an extended position and a retracted position with the legs of said movable core extending beyond the legs of said fixed yoke into said primary air gap to shorten said primary air gap between the armature and said fixed yoke in the extended position to further concentrate the magnetic flux and to generate the magnetic force required to attract the armature toward said fixed yoke at a lower current level, said movable core in the extended position is engaged by said armature as it pivotally rotates toward said fixed yoke, and said armature as it continues to rotate urges said core into said retracted position in which the legs of said movable core extend toward the armature about as far as the legs of said fixed yoke, said movable core also having means mounting said core in spaced relationship with respect to said yoke with said movable core being movable on said mounting means from said extended position to said retracted position; and

biasing means biasing said armature away from said conductive member to said latching position.



**4,951,016**  
**POLARIZED ELECTROMAGNETIC MULTI-CONTACT RELAY**

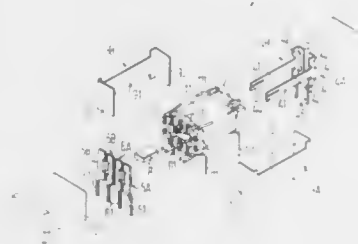
Gerhard Furtwaengler, Unterhaching; Ulrich Kobler, Wessling; Heinz Stadler, Munich, and Josef Weiser, Hohenschäftlarn, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany  
Filed Mar. 27, 1989, Ser. No. 328,958

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810226

Int. Cl.<sup>5</sup> H01H 51/22

U.S. Cl. 335—80

16 Claims



1. A polarized electromagnetic relay having a connecting plane, comprising:

a coil member carrying an excitation winding, said coil member having two flanges and a through cavity extending along an axis;

two armature contact tongues lying inside said coil member substantially parallel to said axis and having principle planes lying perpendicular to the connecting plane of the relay in planes parallel to one another, said two armature contact tongues being seated at one side of said coil member in a region of a first of said two flanges;

a plurality of stationary contact elements serving as pole pieces, said cooperating contact elements being twice in number as the number of said armature contact tongues, said cooperating contact elements being opposite one another in pairs in a region of a second of said two flanges with a free end of one of said armature contact tongues between each of said pairs to form working air gaps, said pole pieces being substantially flat and lying in a common plane perpendicular to the connecting plane of the relay and to the planes of the contact tongues, said pole pieces being next to one another at said second of said two flanges;

a permanent magnet arrangement coupled to said cooperating contact elements serving as pole pieces to oppositely polarize said pole pieces of each pair, said permanent magnet arrangement of each pole piece having a separate polarization region having polarization directions parallel to said axis of said coil member, one pole of every polarization region is coupled to a pole piece; and

a flux plate coupling an opposite pole facing away from said pole piece to a corresponding one of said contact tongues in a region of said first of said two flanges.

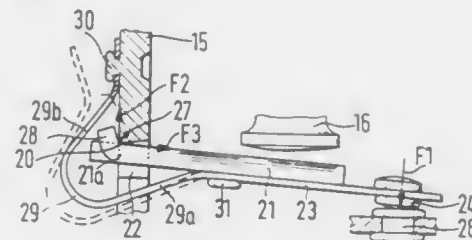
**4,951,017**  
**ELECTROMAGNETIC RELAY**

Emil Buchschmid, Rosstal; Anton Frenznick, Nürnberg; Klaus Lindner, Zirndorf; Olaf Schmid, Schwabach; Hans-Dieter Schmid, Nürnberg; Gerhard Schmidt, Weihenstephan, and Theodor Sturm, Sachsen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE87/00377, § 371 Date Jul. 8, 1988, § 102(e)  
Date Jul. 8, 1988, PCT Pub. No. WO88/04101, PCT Pub. Date Jun. 2, 1988

PCT Filed Aug. 25, 1987, Ser. No. 236,355  
Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640737

Int. Cl.<sup>5</sup> H01H 67/02  
U.S. Cl. 335—128

6 Claims



1. An electromagnetic relay having operating and non-operating positions and comprising contact and connection means; a base plate made of an insulating material for supporting said contact and connection means; a relay winding; a magnet yoke fastened to said base plate and including a coil core for supporting said relay winding; a folding armature which engages with said coil core in the operating position of said electromagnetic relay, said magnet yoke having a support for pivotally supporting said folding armature at an end of said folding armature; and a leaf spring for biasing said folding armature away from said coil core in non-operating position of said electromagnetic relay, said leaf spring including a hairpin-shaped curl surrounding said support and having first and second arms extending at acute angle to each other in the non-operative position of said electromagnetic relay, said first and second arms having, respectively, first and second end portions having first and second fastening locations, respectively, at which said leaf spring is fastened to said magnet yoke and said folding armature, respectively, at locations remote from said support, said hairpin-shaped curl having a prestress area between said first and second fastening locations, said first arm providing a first force component for biasing said folding armature into engagement with said support, and said second arm providing a second force component for pivoting said folding armature to its non-operative position.

**4,951,018**  
**ELECTROMAGNETIC CONTACTOR**

James P. Schmidel; Jon Hanson; Larry W. Schiffer, all of Raleigh, N.C.; Daniel P. Heckenkamp, Sussex, and Thomas F. Kurland, Cedarburg, both of Wis., assignors to Square D Company, Palatine, Ill.

Filed Jan. 26, 1989, Ser. No. 302,801  
Int. Cl.<sup>5</sup> H01H 67/02

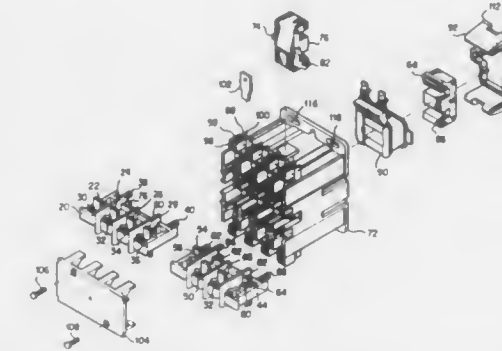
U.S. Cl. 335—132

7 Claims

1. In an electromagnetic contactor having a housing, a fixed contact connected to the housing, a moving contact, a contact carrier that holds the moving contact and moves the contact carrier with respect to the housing to make and break an electrical connection between the fixed contact and the moving contact, a movable armature connected to the contact carrier, and a coil assembly disposed to produce a magnetic field in the armature when an electric current is passed through the coil assembly, the improvement comprising:

(a) a stationary armature in the coil assembly to exert a

magnetic field in the movable armature when the electric current is passed through the coil assembly; and  
(b) a base that snaps into the housing to secure the stationary armature and the coil assembly in a predetermined loca-



tion in the housing, said base having two flexible portions which extend in opposite directions, which move relative to the housing as the base is inserted into the housing, and which engage the housing when the base is fully inserted in the housing.

**4,951,019**  
**ELECTRICAL CIRCUIT BREAKER OPERATING HANDLE BLOCK**

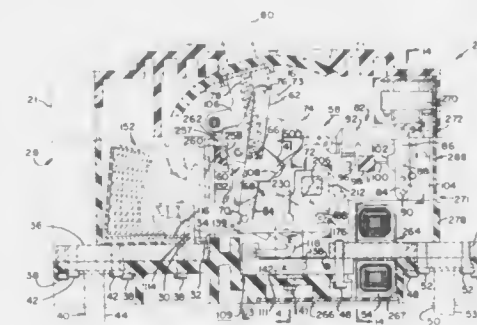
Lance Gula, Aliquippa, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 30, 1989, Ser. No. 330,549

Int. Cl.<sup>5</sup> H01H 9/20

U.S. Cl. 335—166

1 Claim



1. Apparatus for restricting the movement of the operating lever of an electrical circuit breaker to a predetermined limit which includes handle arm means, an operating lever which may assume an on position and an off position and electrical contacts, at least one of which is moveable disposed in either an open position or a closed position, comprising:

crossbar means mechanically connected to the moveable electrical contact and moveable therewith for assuming a projected position when the electrical contacts of the circuit breaker are closed and for assuming a retracted position when the electrical contacts of the circuit breaker are open;

linkage means including an upper and lower toggle link joined together and mechanically connected to said operating lever for causing said closed contacts to attempt to open when the operating lever is moved from the on position towards the off position; and

said lower toggle link including a lever restrictor means which projects therefrom for restricting the movement from the operating lever to a predetermined limit between the on position and the off position when the operating lever is moved from the on position towards the off posi-

tion and the electrical contacts of the electric circuit breaker remain in the closed position.

**4,951,020**  
**UNRIVETED UPPER LINK SECUREMENT CROSS-REFERENCE TO RELATED APPLICATIONS**  
Joseph F. Changle, Scott Township, Allegheny County, and Lance Gula, Aliquippa, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 21, 1988, Ser. No. 260,848

Int. Cl.<sup>5</sup> H01H 9/20

U.S. Cl. 335—167

18 Claims



1. A circuit breaker assembly having a contact assembly mechanically coupled to an operating mechanism for opening and closing said contact assembly, said operating mechanism including a cradle assembly including one or more U-shaped members and a toggle assembly, comprising:

a pair of upper toggle links disposed adjacent said U-shaped member;

a pair of lower toggle links pivotally coupled at one end to one end of said upper toggle links and pivotally coupled at the other end to said contact assembly;

means for pivotally coupling the other end of said pair of upper toggle links to said U-shaped member about a pivot point; and

means for reducing the possibility of failure of said coupling means due to axial movement of said upper toggle links with respect to said pivot point.

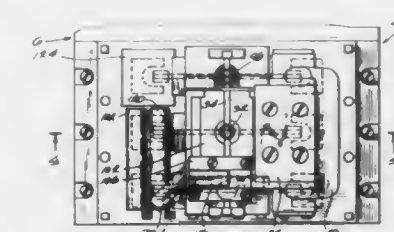
**4,951,021**  
**ELECTROMAGNETIC SWITCHING APPARATUS HAVING DYNAMICALLY BALANCED LATCH TRIP**  
Peter J. Theisen, West Bend; Richard G. Smith, Milwaukee; Mark A. Judd, New Berlin, and Daniel A. Wycklindt, Milwaukee, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Oct. 28, 1988, Ser. No. 263,844

Int. Cl.<sup>5</sup> H01H 9/20

U.S. Cl. 335—167

39 Claims



1. Electromagnetic switching apparatus comprising: an electromagnet having an armature biased to an open position and movable to a closed position upon energization of said electromagnet;

spaced pairs of stationary contacts; movable contacts dis-

posed to bridge respective pairs of said stationary contacts;  
 contact carrier means reciprocally movable in said apparatus and coupled to said armature, said movable contacts being resiliently affixed to said contact carrier means and movable therewith into and out of bridging engagement with said stationary contacts as said armature moves between closed and open positions, respectively, said movable contacts being biased with respect to said carrier means in a contact closing direction;  
 rotary latch means symmetrical about an axis of rotation thereof comprising:  
 an axially movable latch member having angularly relieved latching surfaces;  
 a spring biasing said latch member for axial movement;  
 a ball cage disposed around said latch member positioning a plurality of balls in engagement with said latch member, said balls individually being axially aligned with a respective one of said latching surfaces;  
 a latch release member disposed around said ball cage, said latch release member having an axially concentric internal cylindrical surface engaging said balls and holding said balls in engagement with said latching surfaces to restrain said latch member axially displaced against said spring bias in a latched position, said latch release member further having recesses in said internal cylindrical surface circumferentially aligned with said balls, said latch release member being rotatable about said axis to a release position wherein said recesses are aligned with said balls, permitting said balls to move into said recesses, releasing said latch member for axial movement by said spring; and means responsive to said latch member axial movement driving said movable contacts out of bridging engagement with said stationary contacts against said bias with respect to said carrier means.

4,951,022

## SENSITIVE LATCH AND TRIP MECHANISM

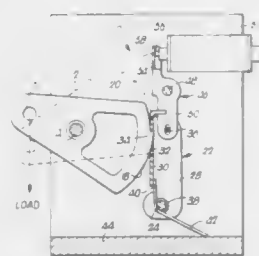
Eugene L. Kamp, Fulton, Mo., assignor to A. B. Chance Company, Centrafia, Mo.

Filed Dec. 15, 1988, Ser. No. 285,089

Int. Cl.<sup>3</sup> H01H 9/20

U.S. Cl. 335—167

13 Claims



1. A sensitive latch and trip mechanism comprising:  
 a latch plate including a pivot axis and presenting a first latching surface disposed in a reference plane that is substantially radial to the pivot axis;  
 means for supporting the latch plate for pivotal movement about the pivot axis within a first plane under the influence of a load applied to the plate;  
 a latch lever presenting a second latching surface disposed in a latching surface plane;  
 means for supporting the lever for pivotal movement about a lever axis, the lever axis being located a distance A from the latching surface plane in a direction perpendicular to the latching surface plane, and being offset from the second latching surface by a distance B in a direction parallel to both the first plane and the latching surface plane, the plate and lever being oriented for interengagement between the first and the second latching surfaces, a coefficient of friction U being defined between the surfaces, the

coefficient of friction and the distances A and B being correlated to follow the relationship  $U \geq B/A$ ; and means for selectively pivoting the lever about the lever axis in a direction for unlatching the latching plate.

4,951,023

## ELECTROMAGNETIC DRIVE APPARATUS HAVING A FLAT COIL

Ludwig Erd, and Klaus Menzel, both of Berlin, Fed. Rep. of Germany, assignors to Vacuumschmelze GmbH, Fed. Rep. of Germany

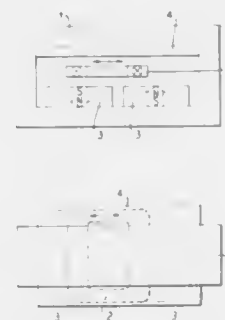
Filed Jul. 15, 1985, Ser. No. 755,275

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1984, 3426042

Int. Cl.<sup>3</sup> H01F 7/08; B41J 2/27

U.S. Cl. 335—222

17 Claims



3. An electromagnetic device comprising:  
 means for generating a current path in a current plane;  
 means operating on said current path for displacing said current path within a limited area of said current plane; and  
 stationary means magnetically operable on said current path for promoting rapid change in current direction in said current path being parallel to and spaced from said current path and coextensive with said area of said current plane.

4,951,024

## HIGH EFFICIENCY SATURATING REACTOR FOR STARTING A THREE PHASE MOTOR

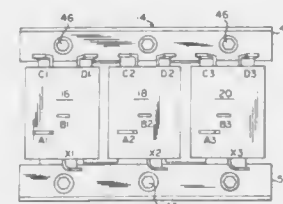
William F. Stelter, Libertyville, and James S. Nasby, Skokie, both of Ill., assignors to Master Control Systems, Inc., Lake Bluff, Ill.

Filed Dec. 27, 1989, Ser. No. 457,376

Int. Cl.<sup>3</sup> H01F 29/00, 27/26

U.S. Cl. 336—5

3 Claims



1. A three phase motor starting saturating reactor comprising:  
 a magnetic core including a plurality of thin E and I shaped laminations alternately stacked to minimize air gaps and defining three legs and two windows;  
 four identical frame members, two each being positioned on each side of said core;  
 a plurality of mounting apertures formed in said core;

a corresponding plurality of insulated bolts extending through respective ones of said apertures for securing said frame members and said core together; and  
 three individual multi-tapped electrical phase coils coupled to the legs of said core and substantially fully occupying said windows, said core being designed to be driven into saturation at about 5% of its rated current.

4,951,025

## THERMALLY MONITORED ELECTRICAL OUTLET RECEPTACLE RECEPTACLE APPARATUS

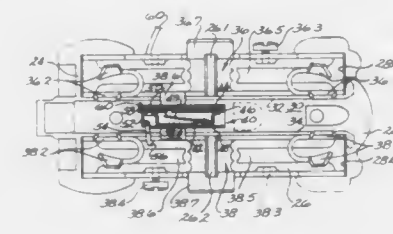
Francis Finnegan, Attleboro, Mass., and Anthony Azzara, Greenville, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 23, 1989, Ser. No. 372,397

Int. Cl.<sup>3</sup> H01H 37/04

U.S. Cl. 337—113

32 Claims



1. Electrical outlet receptacle apparatus comprising:  
 a housing having a front wall portion in which is defined at least one set of apertures adapted to receive male components of an electrical plug, the housing also having side and rear walls defining a cavity therein, first and second electrically conductive rail members mounted in the housing within the cavity in alignment with respective first and second apertures of the at least one set of apertures, means for disconnecting a power supply upon selected increase in temperature of either of the rail members comprising a switch disposed in the cavity in heat transfer relation with both the first and the second rail members, the thermally responsive switch having a stationary and a movable electrical contact, a thermostatic snap acting disc operatively connected to the movable contact movable between one dish configuration and an opposite dish configuration at preselected temperature conditions, the element being adapted to move the movable electrical contact into and out of engagement with the stationary contact, the movable contact normally being in engagement with the stationary contact, the switch having first and second terminals, one terminal electrically connected to one of the rail members, the other terminal connected to a first electrical connection means extending through the housing and adapted to be connected to one side of an electrical supply, a second electrical connection means connected to the other rail member and extending through the housing for connection to the other side of the electrical supply.

4,951,026

## WELD PROJECTIONS ON FUSE TERMINALS

Arlie H. Ehlmann, Barnhart, Mo., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 24, 1989, Ser. No. 344,719

Int. Cl.<sup>3</sup> H01H 85/14, 85/16

U.S. Cl. 337—231

14 Claims

1. A fuse comprising: a first end bell assembly comprising:  
 a first end bell;  
 an opening in said first end bell;  
 a first terminal having one end of said first terminal inserted in and passing through said opening and attached to said first end bell, said one end of said first terminal being

coined to provide weld projections; a second end bell assembly comprising:  
 an opening in said second end bell;  
 a second terminal having one end of said second terminal inserted in and passing through said opening and attached to said second end bell;



said one end of said second terminal being coined to provide weld projections;  
 an elongated fuse element having a planar cross section electrically connecting said first and second terminal and having ends welded to said weld projections on said first and second terminal; and  
 a tube surrounding said fuse element.

4,951,027

## LOAD CELL

Tohru Kitagawa, Mishima, and Takaharu Yamasita, Shizuoka, both of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

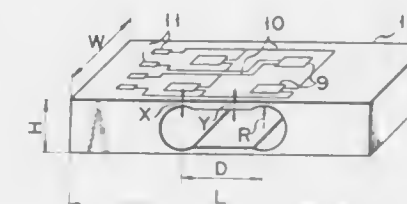
Continuation of Ser. No. 95,760, Sep. 11, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 418,712

Claims priority, application Japan, Sep. 22, 1986, 61-224574

Int. Cl.<sup>3</sup> G01L 1/22

U.S. Cl. 338—2

4 Claims



1. A load cell comprising:  
 a distortion generating body including first and second arms each of which has a thickness y and which are arranged in parallel, and thin deformable portions of a thickness x, which are coupled to the two ends of each of the first and second arms and each of which has flat and curved surfaces on both sides facing each other, the height of said distortion generating body, the distance between said two thin deformable portions coupled to the two ends of each of said first and second arms, and the radius of curvature of the curved surface of the thin deformable portions being set to predetermined values H, D, and R, respectively;  
 a plurality of strain gauges insulatively formed on the flat surfaces of the thin deforming portions coupled to the two ends of said first arm; and  
 a plurality of leading portions connecting said strain gauges to form a bridge circuit,  
 wherein the thickness y is given by a linear equation  $y = ax + b$  for a selected thickness x, and constants a and b are previously determined with respect to a plurality of standard load cells each of which includes the distortion generating body having a predetermined height H, a predetermined distance D between the two thin deformable portions coupled to both ends of each of the first and



second arms, and a predetermined radius R of curvature of each of the thin deformable portions, and wherein each of the thin deformable portions has a value of q for thickness x, and a value of p for thickness y of each of the first and second arms is set corresponding to said thickness value q, in accordance with the linear equation  $p=aq+b$  so as to provide a linear load weight-output voltage characteristic.

4,951,028

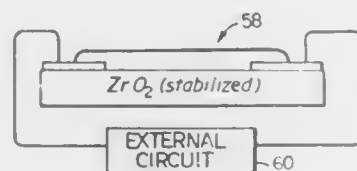
**POSITIVE TEMPERATURE COEFFICIENT RESISTOR**  
Harry L. Tuller, Wellesley Hills, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 3, 1989, Ser. No. 318,732

Int. Cl.<sup>5</sup> H01C 7/10

U.S. Cl. 338—22 R

30 Claims



1. A temperature sensitive circuit comprising:  
a temperature sensitive element comprising a copper oxide ceramic with perovskite related structures; and  
electrical circuitry for exploiting the temperature coefficient of resistance characteristics of the temperature element within a preselected temperature range, the preselected temperature range being located above 300° C.

4,951,029

**MICRO-PROGRAMMABLE SECURITY SYSTEM**  
Paul K. Severson, Richfield, Minn., assignor to Interactive Technologies, Inc., St. Paul, Minn.

Filed Feb. 16, 1988, Ser. No. 156,547

Int. Cl.<sup>5</sup> G08B 29/00

U.S. Cl. 340—506

27 Claims



1. In a security alarm network including a plurality of transducers, wherein each transducer communicates status data to a system controller of one of a plurality of subscriber systems and wherein each system controller communicates received transducer data to a central station, an improvement comprising:

(a) at least one system controller including means for detect-

ing an incapacitated communications link of said at least one system controller to said central station and further including means for transmitting an inability-to-communicate (IC) alarm to at least one other of said plurality of system controllers; and

(b) means coupled to at least one other of said plurality of system controllers responsive to a received IC alarm for communicating the identity of the incapacitated system controller to the central station.

4,951,030

**MONITORING SYSTEM**

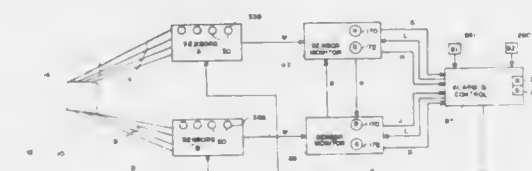
Gregory L. Jones, Madison County; Lance F. Jones, and Peter F. Watson, both of Jefferson County, all of Ala., assignors to Arbor Systems, Inc., Huntsville, Ala.

Filed Apr. 2, 1989, Ser. No. 332,627

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—677

19 Claims



1. A system for monitoring motion of thread-like elements in their passage to an apparatus which combines said thread-like elements to produce a workpiece, said system comprising:

at least one set of sensors wherein each set comprises a plurality of sensors, each sensor disposed for generating one signal state responsive to motion of a said thread-like element and for providing a different signal state in the absence of any said motion;

coding means responsive to the outputs of a set of sensors for providing a condition signal which is a function of the number of like signal states present but independent of identity of discrete sensors detecting motion of thread-like elements;

detection means responsive to said condition signal for providing a significant signal which is an additive function of the level of said condition signal, whereby the presence or absence of a selected number of thread-like elements in motion is continuously indicated; and  
output means responsive to a said significant signal for indicating a failure of operation.

4,951,031

**METHOD AND APPARATUS FOR MEASURING GRAIN LOSS IN HARVESTING MACHINES**

Gilbert J. I. Strubbe, Zedelgem, Belgium, assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 10, 1989, Ser. No. 335,658

Claims priority, application European Pat. Off., Apr. 26, 1988, 882008022

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—684

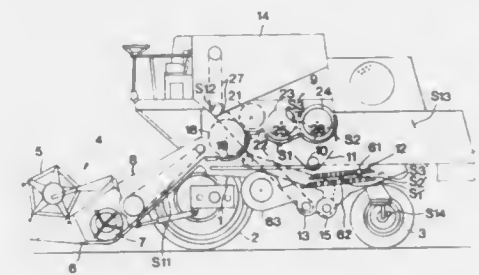
4 Claims

1. In an apparatus including detector means associated with a grain handling mechanism in a crop harvesting machine for measuring grain loss from said machine, said grain handling mechanism including threshing means for threshing grain from crop material, separating means for removing threshed grain from said crop material, and cleaning means in flow communication with said separating means to receive separated grain therefrom and clean trash material from said separated grain to create cleaned grain, said grain moving through said grain handling mechanism along a crop flow path terminating at the discharge of said grain from said grain handling mechanism, said crop material defining operating condition parameters

affecting the efficiency of said grain handling mechanism to harvest said crop material, the improvement comprising:

at least two detector means associated with said grain handling mechanism, each of said detector means being provided at spaced apart locations along the length of the flow path of the crop material through said grain handling mechanism and being operable to measure grain separation in said grain handling mechanism at each said location within the machine and to produce electrical output signals representative thereof;

processor means programmed with a plurality of grain loss algorithms against which the output signals are applied to



derive therefrom a substantially absolute indication of grain loss at a given instant, said processor means being operable to select one of said algorithms for utilization in response to said operating condition parameters, each said algorithm calculating the absolute indication of grain loss using a ratio of selected said output signals; and  
a grain flow detector operable to produce signals indicative of the rate of grain flow through said grain handling mechanism, said processor means being programmed to divide the signals derived from said algorithm by the signals derived from the grain flow detector so that the substantially absolute grain loss indication is expressed in terms of percentage.

4,951,032

**CRIB RAIL SAFETY ANNUNCIATOR**

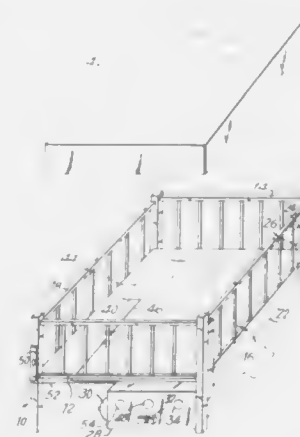
Andrew S. Langsam, 28 Limestone Rd., Armonk, N.Y. 10504

Filed Jun. 15, 1989, Ser. No. 366,632

Int. Cl.<sup>5</sup> G08B 21/00

U.S. Cl. 340—686

33 Claims



18. A safety monitor mechanism for a vertically movable side rail adjacent to a resting surface comprising:

(a) a side rail position detecting means for determining the raised or lowered position of said side rail and providing a first signal reflective thereof;

(b) a person's presence detecting means for determining the

presence or absence of a person on said resting surface and providing a second signal reflective thereof; and

(c) attendant alerting means for alerting an attendant for the resting surface that the side rail is in the lowered position, said alerting means only being responsive to both said first signal, if reflective of a lowered position of said side rail and said second signal, if reflective of the presence of an individual on said resting surface.

4,951,033

**INPUT DEVICE OF CHARACTER DATA**

Yasunori Sakaguchi, Kyoto, Japan, assignor to Murata Giken Kabushika Kaisha, Kyoto, Japan

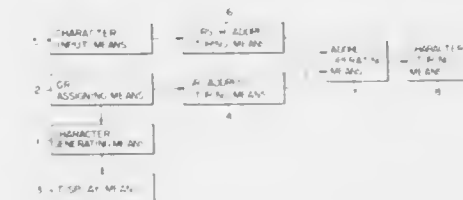
Continuation of Ser. No. 635,288, Jul. 27, 1984, abandoned. This application May 26, 1987, Ser. No. 56,255

Claims priority, application Japan, Jul. 30, 1983, 58-140203

Int. Cl.<sup>5</sup> G09G 5/00

U.S. Cl. 340—706

3 Claims



1. An input device of character data, comprising:

(a) a character generating means for storing a number of character groups and for generating a pattern signal corresponding to said characters in accordance with an assigned address;

(b) a display means for visually displaying the pattern signal generated by said character generating means, said display means displaying less than all of said character groups at any given time;

(c) a group assigning means for assigning an address to each of the character groups;

(d) a group address storing means for storing the address of the group assigned by said group assigning means;

(e) a character input means for inputting any character among the group displayed by said display means by selectively transferring a cursor to a position adjacent said character;

(f) a cursor address storing means for storing the address of the cursor during character inputting by said character input means;

(g) an address operating means for operating on the address stored in the group address storing means and the address stored in the cursor address storing means and calculating the address of the inputted character; and

(h) a character address storing means for storing the address of the character calculated by said address operating means.

4,951,034

**LIGHT BALL ELECTRONIC MOUSE**

Jean-Luc Mazzone, Apples, and Marc Bidiville, Pully, both of Switzerland, assignors to Logitech, Inc., Fremont, Calif. and Logitech SA, Apples, Switzerland

Filed Feb. 12, 1987, Ser. No. 13,646

Int. Cl.<sup>5</sup> G09G 5/00

U.S. Cl. 340—710

7 Claims

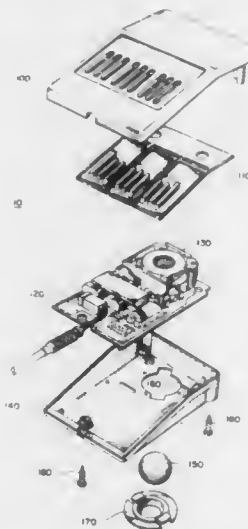
1. An electronic mouse comprising

a ball having a specific gravity between one and four grams per cubic centimeter,

a housing having a cavity therein capable of receiving the ball, the housing further having an opening in the lower surface thereof permitting the ball to roll across a surface,

a pair of encoders maintained at least partially within the housing and in contact with the ball by means of a pres-

logic means to provide a control signal representative thereof.



sure roller, the force applied by the pressure roller against the ball being less than thirty grams.

4,951,035

#### LIQUID CRYSTAL DISPLAY TOUCH SCREEN WITH CROSS-ALIGNED SCANNING

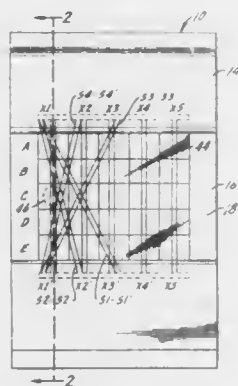
John L. Beiswenger, Salem, Wis., assignor to Technomarket, Inc., Buffalo Grove, Ill.

Continuation-in-part of Ser. No. 89,138, Aug. 25, 1987, Pat. No. 4,847,666. This application Dec. 13, 1988, Ser. No. 283,735

Int. Cl.<sup>5</sup> G09G 3/36

U.S. Cl. 340—712

9 Claims



1. An apparatus for providing a control signal including a liquid crystal panel and means for transiently forming transparent windows therein, a source of electromagnetic radiation (EMR) adjacent one side of said panel and positioned adjacent thereto, an EMR detector positioned adjacent an opposite side of said panel and positioned to detect EMR from said source which has passed through one or more of said first set of transiently open windows and which has passed through one or more of a second set of transiently open windows positioned adjacent said detector,

and timing and logic means correlating the opening of windows in said first set and in said second set whereby an EMR occluding object may be located relative to mutually perpendicular axes, one of which is parallel to both the first and second set of transiently open windows, the location of said occluding object causing said timing and

#### 4,951,036 TOUCHPAD JOGGER

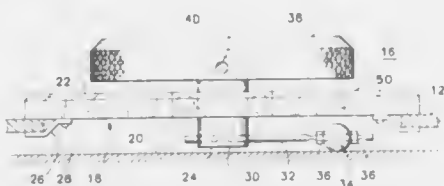
James R. Grueter, Grass Valley, and Alethea F. Mackinnon, Nevada City, both of Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Aug. 4, 1988, Ser. No. 228,094

Int. Cl.<sup>5</sup> G09G 3/02

U.S. Cl. 340—712

8 Claims



1. An apparatus for emulating operator contact on a touchpad surface comprising:  
means for contacting the touchpad surface;  
an axle;  
means for fixedly coupling the contacting means to one end of the axle, the contacting means being rotatably mounted on the coupling means, so that when the axle is rotated the contacting means rolls across the touchpad surface to emulate operator contact; and  
means for rotating the axle.

4,951,037

#### DISPLAY SEGMENT FAULT DETECTION APPARATUS

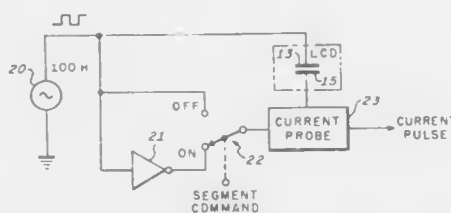
Emray R. Goossen, Albuquerque, N. Mex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 17, 1988, Ser. No. 169,540

Int. Cl.<sup>5</sup> G09G 3/20

U.S. Cl. 340—715

9 Claims



1. Apparatus for verifying the operational status of a digital display responsive to input display data, said display including display segments having a capacitive characteristic, said display including segment drivers for applying energization signals to said segments in accordance with said input display data, comprising:

segment status determining means including current probe means coupling said drivers to said segments for detecting current pulses resulting from applying said energization signals to said segments, said current pulses for an on segment being of substantially greater magnitude than said current pulses for an off segment because of said capacitive characteristic, said segment status determining means including means for providing segment status signals in accordance with said magnitude of said current pulses so as to detect whether a segment is on or off, and  
comparison means for comparing said segment status signals to said input display data with respect whether segments should be on or off for detecting discrepancies therebetween.

4,951,038

#### APPARATUS FOR DISPLAYING A SPRITE ON A SCREEN

Kimio Yamamura, Tokyo, Japan, assignor to Hudson Soft Co., Ltd., Hokkaido, Japan

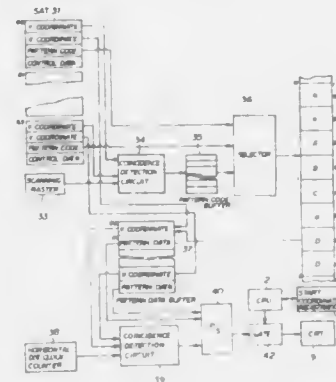
Filed Feb. 25, 1988, Ser. No. 160,154

Claims priority, application Japan, May 15, 1987, 62-118595; May 15, 1987, 62-118596; May 20, 1987, 62-123050; Sep. 25, 1987, 62-241172

Int. Cl.<sup>5</sup> G09G 5/30

U.S. Cl. 340—725

4 Claims



1. An apparatus for displaying a sprite on a display screen comprising:  
sprite attribute tables each including coordinates indicating a display position of a sprite, a pattern code defining said sprite in regard to pattern data, and control data defining a display mode of said sprite;  
first detection means for comparing a vertical position value of said coordinates with a raster number to detect a sprite to be displayed;  
a sprite generator storing pattern data of said sprite;  
second detection means for comparing a horizontal position value of said coordinates of said sprite to be displayed with a dot clock signal to detect pattern data to be displayed;  
a pattern data buffer for storing pattern data of said sprite to be displayed in accordance with the reading thereof from said sprite generator;  
means for storing standard coordinates of a display region on said screen;  
a gate circuit for providing said pattern data stored in said pattern data buffer to said screen; and  
means for controlling said screen to display said sprite to be displayed thereon in accordance with said pattern data to be displayed,  
wherein said controlling means decides selectively an allowance or an inhibition of said transmission of said pattern data in accordance with a comparison of said coordinates indicating said display position with said standard coordinates.

4,951,039

#### ANIMATED DATA DISPLAY INTERLEAVING

Robert J. Schwendeman, Pompano Beach; William J. Kuznicki, Coral Springs; Richard E. Johnson, Boca Raton, all of Fla., and David W. Davis, Loudonville, N.Y., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 18, 1988, Ser. No. 182,680

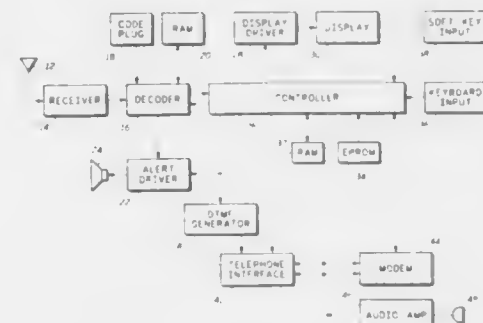
Int. Cl.<sup>5</sup> G09G 3/00

U.S. Cl. 340—725

23 Claims

1. A portable communications receiver comprising:  
a receiver for receiving and detecting transmitted selective call paging signals and periodically updated data signals, the data signals indicating the present position of a plural-

ity of moving objects each time the data signals are updated;  
a decoder, responsive to the detected selective call paging signals, for generating control signals in response thereto; display means; and  
processing means, coupled to said display means and respon-



sive to the control signals and periodically updated data signals, for generating for display graphic characterizations depicting the moving objects, wherein movement of the displayed graphic characterizations is produced when the periodically updated data signals representing the present position of the moving objects are received and displayed.

4,951,040

#### IMAGE TRANSFORMATION PROCESSING

Ian McNeil, Hungerford, and Michael J. Traynor, Newbury, both of Great Britain, assignors to Quantel Limited, Newbury, England

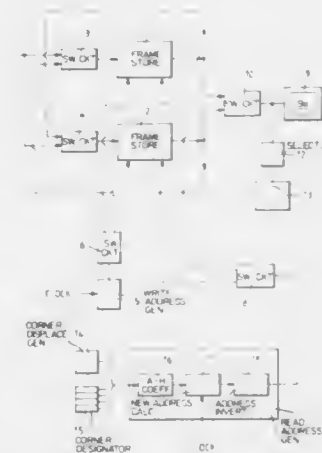
Filed Feb. 24, 1988, Ser. No. 159,780

Claims priority, application United Kingdom, Mar. 17, 1987, 8706348

Int. Cl.<sup>5</sup> G09G 1/00

U.S. Cl. 340—729

10 Claims



1. Image processing system comprising a source of picture video signals representing picture points at respective addresses in a first picture projected on a viewing screen, addressing means for providing address signals representing the addresses of at least four reference points defining corners of a polygon notionally projected on said screen, operator-controlled means for producing selective adjustment of said address signals to cause said reference points to define the corners of said polygon as projected on said screen after a movement of said polygon in 3D space, transformer means responsive to said address signals after said selective adjustment for trans-



forming the addresses of said picture video signals so as to cause the picture video signals to represent the picture as projected on said screen after undergoing the same movement in 3D space as said polygon.

4,951,041

# DRIVING METHOD FOR THIN FILM EL DISPLAY DEVICE AND DRIVING CIRCUIT THEREOF

Shuji Inada; Toshihiro Ohba; Hiroshi Kishishita, all of Nara, and Hisashi Ueda, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

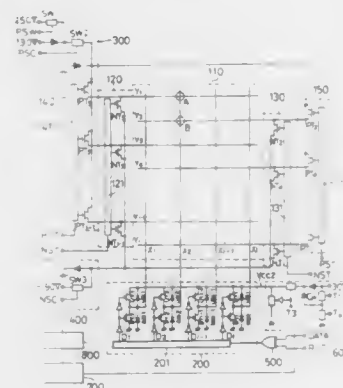
Filed Jul. 6, 1988, Ser. No. 215,772

Claims priority, application Japan, Jul. 7, 1987, 62-170611

Int. Cl.<sup>5</sup> G09G 3/20

U.S. Cl. 340—767

10 Claims



1. A method for driving a matrix display device comprising scan side electrodes interposed in a matrix type format with data side electrodes, comprising the steps of:

- (a) repeatedly displaying a first frame, utilizing a line sequential drive, said display of said first frame being formed by,
  - (1) applying voltage corresponding to display data to said data side electrodes,
  - (2) applying write impulses, which are negative with respect to the voltage applied to said data side electrodes, to odd number lines of said scan side electrodes, and
  - (3) applying write pulses, which are positive with respect to the voltage applied to said data side electrodes, to even number lines of said scan side electrodes;
- (b) repeatedly displaying a second frame, in an alternate manner with respect to said first frame, utilizing a line sequential drive, said display of said second frame being formed by,
  - (1) applying voltage corresponding to display data to said data side electrodes,
  - (2) applying write pulses, which are positive with respect to the voltage applied to said data side electrodes, to odd number lines of said scan side electrodes, and
  - (3) applying write pulses, which are negative with respect to the voltage applied to said data side electrodes, to even number lines of said scan side electrodes; and
- (c) controlling the width of said positive and negative write pulses in proportion to the number of light emitting picture elements of each scanning side electrode line which has been previously detected from said display data.

## PIXEL MEMORY ARRANGEMENT FOR INFORMATION DISPLAY SYSTEM

Francis R. Belch, Sale, England, assignor to Ferranti PLC, Cheshire, England

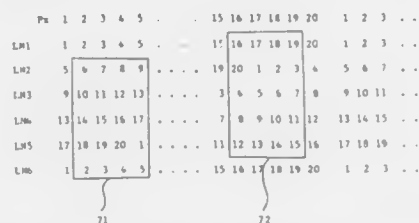
Filed Jan. 5, 1988, Ser. No. 141,001

Claims priority, application United Kingdom, Jan. 13, 1987, 87.00731

Int. Cl.<sup>5</sup> G09G 1/02

U.S. Cl. 340—799

2 Claims



1. A pixel data memory for use with an information display system having a raster scan display screen divided into a plurality of pixels each of which represents a separate area of the screen, the memory including a multiple-bit memory plane capable of providing a plurality of separate bit locations each of which may correspond to a separate display pixel and arranged to store pixel data in the form of a plurality of multiple-bit words, the memory plane comprising a number of memory chips equal to the number of bits in a word and each capable of storing a separate bit of each of said multiple-bit words which may represent pixel data on each line of the raster scan of the display, the stored bit being the same bit in each word representing pixel data on any one line of the raster scan and being stored in the memory plane in a location which is displaced cyclically within the word by  $n$  bits relative to the same bit in each word representing pixel data on an immediately preceding line of the raster scan, where  $n$  is an integer; address generating means operable to generate the addresses of required individual bit locations in the memory plane; and a number of separate control circuits equal to the number of bits in each word, associated one with each memory chip and each responsive to a generated address defining a bit location on that memory chip to access the pixel data identified by the bit at that location, and operable in an asynchronous manner so as to allow pixel data to be written into or read out from a number of bit locations independently.

4,951,043

## PAGER RECEIVER HELPFUL FOR EFFECTIVE USE OF CALL NUMBERS

Yoichiro Minami, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Mar. 2, 1987, Ser. No. 20,778

Claims priority, application Japan, Mar. 4, 1986, 61-45372

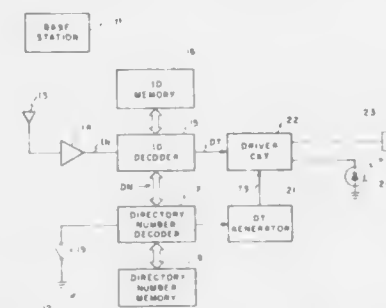
Int. Cl.<sup>5</sup> G08B 5/22

U.S. Cl. 340—825.440

5 Claims

1. In a pager receiver for use in a radio communication system which provides a mix of a message service and a tone service, said pager receiver operating responsive to an incoming signal to produce an audible tone without providing visual displays for said message service when said incoming signal includes a specific call number signal which is preassigned to said pager receiver, said specific call number signal being followed by a directory number signal carrying a directory number assigned to a calling subscriber, said pager receiver comprising:  
means for receiving a directory number signal including an identification symbol within said directory number, said identification symbol distinguished said directory number from another message signal for said message service, said

other message signal including no identification symbol which distinguishes it from said directory number;  
first detecting means responsive to said incoming signal for detecting said specific call number signal to produce a detection signal which is representative of a detection of said specific call number signal;  
second detecting means responsive to said incoming signal for detecting said identification symbol to produce an additional detection signal which is representative of a detection of said identification symbol;



signal producing means coupled to said second detecting means for producing a reproduction of said directory number signal when said additional detection signal is produced by said second detecting means; and means coupled to said first means and said signal producing means for producing said detection signal and said reproduction of the directory number signal as said audible tone.

4,951,044

## PAGING TERMINAL APPARATUS WITH USER SELECTABLE PAGE FORWARDING CAPABILITY AND METHODOLOGY THEREFOR

Leonard E. Nelson, Boynton Beach, and Philip P. Macnak, West Palm Beach, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

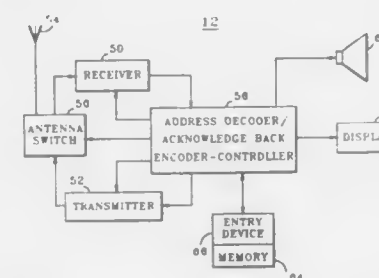
Filed Mar. 21, 1989, Ser. No. 326,700

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> H04B 7/00

U.S. Cl. 340—825.44

16 Claims



1. A paging receiver having acknowledge back capability for providing to a user the capability to select any one of a plurality of alternate paging receivers operating in a paging system to which a received message may be further forwarded, said paging receiver comprising:  
means for receiving addresses and associated messages that are directed to the paging receiver and transmitted in the paging system;  
means for selecting by the user the alternate paging receiver to which the received message is further to be sent; and means for generating an acknowledge back response identi-

fying the selected alternate paging receiver to which the received message is further to be sent.

4,951,045

## PORTABLE ELECTRONIC WARNING DEVICE FOR TEMPORARY CONDITIONS

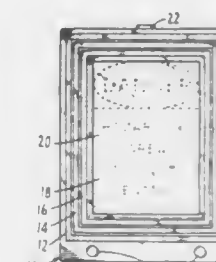
Floyd H. Knapp, Mountain View, and Gregory C. Rogers, Sunnyvale, both of Calif., assignors to Intelligent Safety Technology, Inc., Mountain View, Calif.

Filed Mar. 29, 1989, Ser. No. 330,068

Int. Cl.<sup>5</sup> G08G 1/095

U.S. Cl. 340—944

11 Claims



1. A portable electronic warning device for temporary conditions comprising:  
sensor means to detect the presence of a pedestrian at a minimum first distance from the device and to produce a signal in response thereto;  
circuitry means connected to said sensor means to receive said signal from said sensor means and to produce an output; and  
alerting means connected to said circuitry means to receive said output and to visually alert a pedestrian to a message, said alerting means including a plurality of focusing lights and an interchangeable message positioned adjacent said lights, said focusing lights comprising concentric bands of lights which are illuminated sequentially inwardly, focusing a pedestrian's attention to the message positioned within said concentric bands of lights.

4,951,046

## RUNWAY LIGHTING SYSTEM

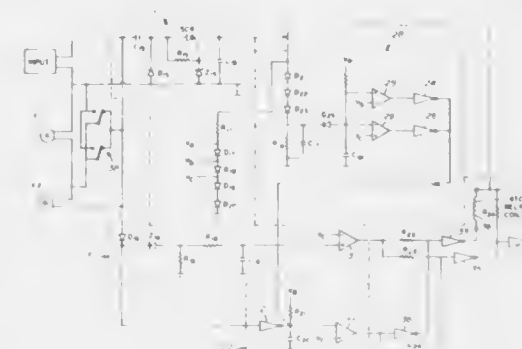
Robert E. Lambert, Enfield, Conn., and Simcha Ohrenstein, Tel-Aviv, Israel, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 17, 1988, Ser. No. 272,598

Int. Cl.<sup>5</sup> G08B 5/00

U.S. Cl. 340—953

20 Claims



1. An improved runway lighting system, comprising: a first set of lamps for providing illumination in a first direction along the runway;

1. A analog-to-digital converter comprising:
  - a) an integrator having an input that is a summing node for currents and having an output;
  - b) a source of input current to be measured, coupled to apply that input current to the summing node;
  - c) a first constant current source generating a first current originating with a voltage negative with respect to a circuit ground;
  - d) a first switching means, coupled to the first current source, to



the summing node, and to circuit ground, for routing the first current through the summing node or through circuit ground;

a second constant current source generating a second current originating with a voltage negative with respect to circuit ground;

second switching means, coupled to the second current source, to the summing node, and to circuit ground, for routing the second current through the summing node or through circuit ground;

a third constant current source generating a third current originating with a voltage positive with respect to circuit ground;

third switching means, coupled to the third current source,



to the summing node, and to circuit ground, for routing the third current through the summing node or through circuit ground;

a fourth constant current source generating a fourth current originating with a voltage positive with respect to circuit ground;

fourth switching means, coupled to the fourth current source, to the summing node, and to circuit ground, for routing the fourth current through the summing node or through circuit ground; and

control means, coupled to the first through fourth switching means, for selectively routing any selected pair of the first through fourth currents through the summing node, while routing the remaining pair of currents through circuit ground.

#### 4,951,054 FLOATING-POINT DIGITAL-TO-ANALOG CONVERTING SYSTEM

Takayuki Kobdaka, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Feb. 16, 1989, Ser. No. 311,059

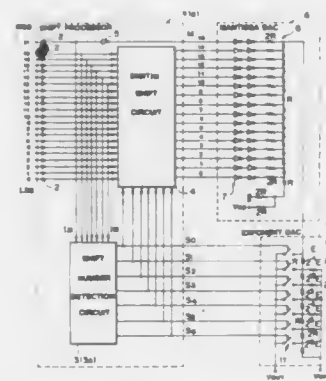
Claims priority, application Japan, Feb. 17, 1988, 63-34903  
Int. Cl.<sup>5</sup> H03M 1/70

U.S. Cl. 341—138 3 Claims

1. A floating-point digital-to-analog converting system comprising:

- a detecting means for detecting bit-shift numbers in response to digital exponent data included in floating point digital input data;
- shifting means for shifting said digital input data in accordance with detected bit-shift numbers to thereby produce digital mantissa data;
- mantissa converting means for converting said digital mantissa data into an analog mantissa; and
- exponent converting means for carrying out an exponent digital-to-analog conversion to produce an analog output by multiplying said analog mantissa by weights corresponding to said shift numbers, said analog mantissa being output as said analog output when an accuracy of said mantissa converting means is higher than that of said exponent converting means, while said shifting means and said exponent converting means are activated so that said

exponent converting means multiplies said analog mantissa by said weights each having a value other than "1" when an absolute value of said analog mantissa is less than



a predetermined value representing that accuracy of said mantissa converting means is lower than that of said exponent converting means.

#### 4,951,055 APPARATUS FOR DETECTING MATERIALS BURIED UNDER THE GROUND

Yukinori Katayama, Kanagawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

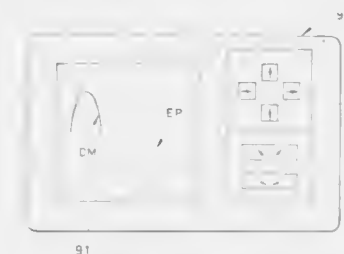
PCT No. PCT/JP87/00874, § 371 Date May 15, 1989, § 102(e)  
Date May 15, 1989, PCT Pub. No. WO88/04063, PCT Pub.  
Date Jun. 2, 1988

PCT Filed Nov. 11, 1987, Ser. No. 378,518

Claims priority, application Japan, Nov. 17, 1986, 61-273381;  
May 13, 1987, 62-116276; May 13, 1987, 62-116277

Int. Cl.<sup>5</sup> G01V 3/12

U.S. Cl. 342—22 3 Claims



1. A buried-object detecting apparatus which emits electromagnetic waves from a transmitter mounted on a mobile vehicle toward the ground, receives waves reflected on an object buried under the ground at a receiver mounted on said mobile vehicle and detects a position of said buried object on the basis of a propagation time of said reflected waves; characterized by comprising:

- means for displaying echo images of the buried object with parameters of a depth direction of the buried material and a movement direction of the mobile vehicle;
- first means, on the basis of said propagation time of the reflected waves obtained when the mobile vehicle is moved by a predetermined distance while emitting electromagnetic waves from said transmitter mounted on the mobile vehicle, for forming a hyperbolic echo image and causing said hyperbolic echo image to be displayed on said display means;
- second means for forming a hyperbolic false echo image having as a parameter a coefficient for converting underground propagation speed of the electromagnetic wave to distance information and for causing said false echo image to be displayed on the display means;

third means for obtaining a vertex position of said false echo image based on an operation for moving display position of said false echo image in which operation the vertex position of said false echo image is caused to be coincided with a vertex position of said echo image of buried object;

fourth means for obtaining said coefficient for converting the underground propagation speed into the distance information based on an operation for changing display modes of the false echo image in which operation an expansion of opening of said false echo image is caused to be overlapped with that of said echo image of the buried object; and

fifth means for obtaining the position of said buried object by correcting the coordinates of the vertex position of said false echo image obtained by said third means with the use of the coefficient obtained by the fourth means.

4,951,056

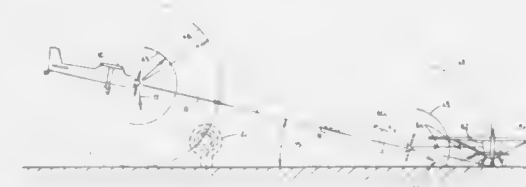
#### COLLISION DETECTION SYSTEM

Randall D. Cope, Ridgecrest, and Mark P. Egan, Inyokern, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 26, 1989, Ser. No. 374,127

Int. Cl.<sup>5</sup> G01S 03/02

U.S. Cl. 342—29 13 Claims



1. A method for sensing the arrival of a vehicle at a surface approached by the vehicle at a predetermined velocity along a path at a predetermined shallow angle to the surface; the vehicle having a system adapted to emit wave energy at a predetermined frequency generally toward the surface, adapted to receive reflected such energy returned from the surface when the vehicle is at a predetermined distance therefrom, and adapted to detect in such reflected energy doppler frequencies due to relative velocities between the vehicle and the surface, the method comprising:

prior to the vehicle reaching said predetermined distance from the surface, calculating from said predetermined velocity, said predetermined angle, and said predetermined frequency a threshold doppler frequency which is below a higher doppler frequency corresponding to said predetermined velocity and which is above a lower doppler frequency corresponding to a component of said predetermined velocity generally normal to the surface; determining that the vehicle has arrived at said predetermined distance from the surface in a direction along the path by detecting, in such reflected energy, a doppler frequency above said threshold frequency.

4,951,057

#### INDUCTIVE INPUT/OUTPUT COUPLING FOR A SURFACE ACOUSTIC WAVE DEVICE

Jon L. Nagel, Cupertino, Calif., assignor to X-Cyte, Inc., Mountain View, Calif.

Filed Nov. 13, 1989, Ser. No. 434,234

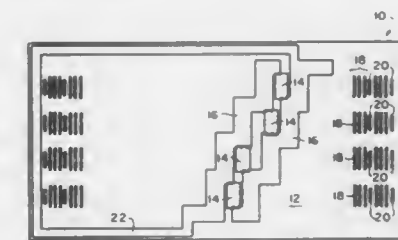
Int. Cl.<sup>5</sup> G01S 13/80

U.S. Cl. 342—51 19 Claims

1. Apparatus for coupling electrical energy into and/or out of a surface acoustic wave (SAW) device, such as a transponder, said SAW device having a piezoelectric substrate with an exposed surface; at least one SAW transducer, disposed on said substrate surface, for converting between electrical energy and SAW energy; and a conductive loop disposed on said substrate

surface and electrically connected with said transducer, said conductive loop forming an inductive element for coupling energy into and/or out of said SAW device; said apparatus comprising, in combination:

- a first inductive loop formed by at least a partial turn of an electrical conductor, said first inductive loop being inductively coupled to said conductive loop on said substrate surface; and



- means for transmitting and/or receiving an electrical signal to and/or from said SAW device, said means having a second inductive loop which is inductively coupled to said first inductive loop, whereby said first inductive loop forms an intermediate inductive coupling path between said second inductive loop of said transmitting/receiving means and said conductive loop on said substrate surface.

4,951,058

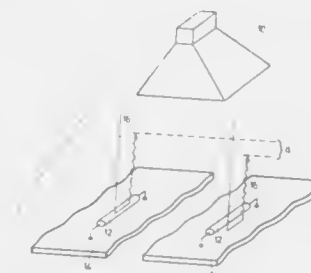
#### METHOD FOR REMOTE DETECTION OF ELECTRONIC BOMB FUZE

David A. Schriener, China Lake, and Richard J. Lamp, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 406,948

Int. Cl.<sup>5</sup> G01S 13/00

U.S. Cl. 342—61 8 Claims



1. A method of remote detection of an electronic bomb fuze having an active electronic element, said remote detection method comprising the steps of:

- transmitting a radar beam through an object which potentially encloses a suspected bomb having an active electronic element;
- receiving the reflections of the transmitted beam; and
- processing the reflections to detect signal modulations, if any, and provide an output resulting from any detected modulation which would indicate the presence of an active electronic element within the searched object.

4,951,059

## DUAL STACKED BEAM RADAR

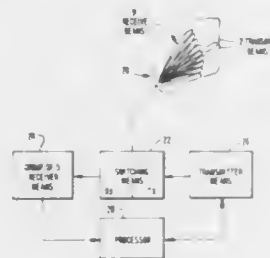
John W. Taylor, Jr., Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 2, 1988, Ser. No. 266,193

Int. Cl.<sup>5</sup> G01S 13/48

U.S. Cl. 342-155

14 Claims



## 1. A dual stacked beam radar, comprising:

an antenna;  
transmitter means for transmitting sequentially on two transmit beams having different elevation patterns;  
receiver means having a plurality of receivers for simultaneously listening to a plurality of receive beams in a vertical stack including high stack and low stack beams, said low stack beams having variable interpulse period sequences, dead time is the interpulse period utilized to transmit and receive echoes from the high stack beams; and  
switching means, connected to said antenna, said transmitter means and said receiver means, for switching between the two transmit beams and the two stacks of receive beams.

4,951,060

## DUAL FREQUENCY TRANSMIT-RECEIVE MODULE FOR AN ACTIVE APERTURE RADAR SYSTEM

Marvin Cohn, Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1988, Ser. No. 247,222

Int. Cl.<sup>5</sup> H01Q 3/26

U.S. Cl. 342-175

12 Claims



1. A dual frequency transmit/receive module, said dual frequency transmit/receive module being so operable in the transmit mode as to phase shift and amplify an original and a harmonically related radio frequency signal, said dual frequency transmit/receive module being further operable in the receive mode to receive said received reflected original and said harmonically related radio frequency signal from a circulator means, said circulator means operable to separate and isolate said original and said harmonically related radio frequency signal as received or transmitted from said antenna means, comprising:

- a transmission signal input port means, said transmission input port means being operable to receive from a transmission manifold said original or said harmonically related radio frequency signal;
- a transmission signal phase shifting means, said transmission signal phase shifting means being operable to phase shift

said original or said harmonically related radio frequency signal;

- a driver amplifier means, said driver amplifier means being operable to amplify said original or said harmonically related radio frequency signal;
- a dual port push-pull Class B power amplifier means, said dual port push-pull Class B power amplifier means being operable to amplify either said phase shifted original or said phase shifted harmonically related radio frequency signal;
- a local oscillating signal input port means, said local oscillating signal input port means being operable to receive from an oscillating signal generator a local oscillating radio frequency signal;
- a local oscillating signal phase shifting means, said local oscillating signal phase shifting means being operable to phase shift said local oscillating radio frequency signal;
- a mixer, said mixer operable to combine said local oscillating radio frequency signal and said received reflected original radio frequency signal; and
- a harmonic mixer, said harmonic mixer operable to combine said local oscillating radio frequency signal and said received reflected harmonically related radio frequency signal.

4,951,061

## TWO DIMENSIONAL ACOUSTO-OPTIC SIGNAL PROCESSOR USING CIRCULAR ANTENNA ARRAY AND A BUTLER MATRIX

Jim P. Lee, Nepean, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

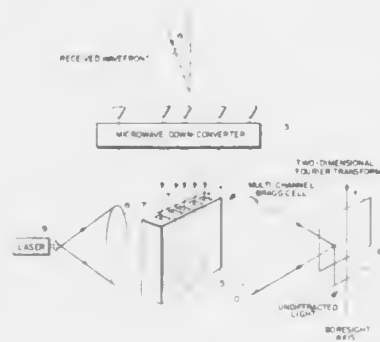
Filed Jun. 1, 1989, Ser. No. 360,019

Claims priority, application Canada, Nov. 2, 1988, 582013

Int. Cl.<sup>5</sup> G02F 1/33

U.S. Cl. 342-373

8 Claims



1. A two-dimensional acousto-optic receiver for detecting the power spectrum and bearing angle of an incoming signal, comprising:

- (a) a circular antenna array having a plurality of input antenna elements equispaced in the azimuth plane for receiving said incoming signal;
- (b) a feed network having a plurality of input ports connected to respective ones of said antenna elements, for receiving said signal from respective ones of said antenna elements and in response generating a plurality of phase shifted versions of said signal on successive output ports of said network, successive ones of said phase shifted versions of said signal being characterized by a phase difference which is proportional to said bearing angle;
- (c) a multi-channel Bragg cell receiver comprised of a plurality of transducers connected to respective ones of said output ports and mounted on a block of acousto-optic material, for receiving said phase shifted versions of said

signal from said feed network and applying said phase shifted versions to said block of acousto-optic material such that an acoustic field is created therein, said transducers being arranged with a ratio of transducer width to inter-transducer spacing of 1:3;

- (d) a laser for generating a beam of monochromatic collimated light on said block, said beam being diffracted within said block due to optical interaction with said acoustic field, said beam being modified to provide a Gaussian illumination profile truncated at the  $1/\exp(3.125)$  points, resulting in a maximum throughput loss of 5 dB for said receiver; and
- (e) a Fourier transform lens for receiving and focusing said diffracted beam at one or more predetermined points on a two-dimensional plane, each of said points being characterized by first and second coordinates in relation to a point of origin designative of an undiffracted beam, said first coordinates being proportional to said power spectrum and said second coordinates being proportional to said bearing angle.

4,951,062

## PAPER TRANSPORT MECHANISM

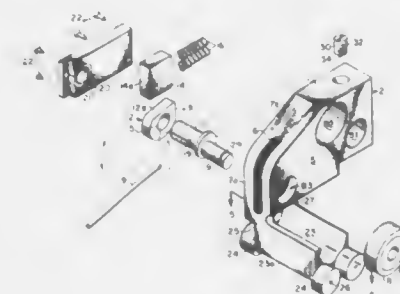
Jeffrey L. Page, 658 Cambridge Dr., Santa Clara, Calif. 95051, and Gary W. Zera, 693 Portofino La., Foster City, Calif. 94404

Filed Dec. 12, 1988, Ser. No. 282,485

Int. Cl.<sup>5</sup> G01D 9/00; B65H 5/02

U.S. Cl. 346-1.1

17 Claims



12. A method for offsetting flexing of a shaft when it is exposed to a point force transverse to its longitudinal axis the steps including:

- administering the point force from a frame,
- supporting an offsetting force administering instrumentality from the frame,
- orienting the instrumentality to diametrically oppose the point force on the shaft and
- administering the offsetting force through the shaft whereby the shaft sees forces of compression and not a bending moment,
- including administering the point of force by pressing a pressure roller against the shaft, and absorbing vibration associated with contact between the pressure roller and the drive shaft through biasing means.

4,951,063

## HEATING ELEMENTS FOR THERMAL INK JET DEVICES

William G. Hawkins; Olaf Muller, both of Webster, and James F. O'Neill, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 22, 1989, Ser. No. 354,941

Int. Cl.<sup>5</sup> B41J 2/05

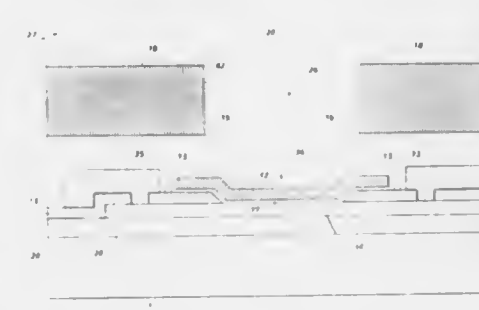
U.S. Cl. 346-1.1

11 Claims

1. An improved thermal ink jet printhead of the type having a plurality of ink channels with each containing a multi-layered thermal transducer therein, an ink reservoir, and a plurality of ink droplet emitting nozzles, said channels being in communi-

cation with the reservoir and the nozzles, so that ink fills the channels and selective application of electrical pulses representing digitized data to the thermal transducers momentarily vaporize the ink in contact therewith producing temporary bubbles which eject and propel ink droplets from the nozzles to a recording medium, wherein the improvement comprises:

said thermal transducers each having a bubble-generating resistive layer, an insulative layer deposited over the resistive layer and patterned to remove the insulative layer in a region whereat bubbles are to be produced by said electrical pulses and at opposing edges thereof for providing locations for interface with an addressing electrode and a common return electrode, a high temperature silicon nitride layer deposited over the insulative layer and exposed bubble generating and electrode interface regions of



the resistive layer, said high temperature silicon nitride layer being deposited at a temperature of at least about 600° C. or more and being located intermediate the opposing exposed edges of the resistive layer and spaced therefrom, the high temperature silicon nitride layer having a reduced hydrogen content and a predetermined relatively thin thickness to electrically isolate a subsequently formed cavitation stress protecting layer deposited thereon and delineated by an etching process, which low hydrogen content and relatively thin thickness of the high temperature silicon nitride layer improves the thermal efficiency and durability of the thermal transducers of the printhead, while said insulative layer combined with the high temperature silicon nitride layer increases the insulating spacing between the edges of the protecting layer and the resistive layer.

4,951,064

## THIN FILM ELECTROLUMINESCENT EDGE EMITTER ASSEMBLY AND INTEGRAL PACKAGING

Zoltan K. Kun, Churchill; David Leksell, Oakmont, and Norman J. Phillips, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 15, 1989, Ser. No. 351,495

Int. Cl.<sup>5</sup> G01D 15/14; 9/42

U.S. Cl. 346-107 R

21 Claims

1. A thin film electroluminescent edge emitter assembly and integral packaging, comprising:

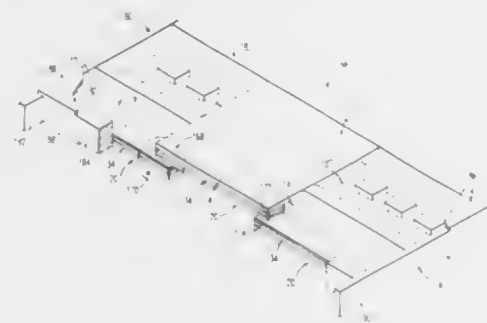
- a thin film electroluminescent edge emitter assembly formed from a thin film edge emitter structure disposed on a layer of substrate material, said structure having a configuration to define a linear array of spaced apart, light-emitting pixels, said substrate layer including a front edge portion and a pair of opposing lateral edge portions;
- each said pixel including a first surface disposed on said substrate layer, a second surface opposite said first surface, and a light-emitting edge surface extending between said first and second surfaces and disposed at a location adjacent to said front edge portion of said substrate layer; and
- packaging means surrounding at least a portion of said edge emitter structure and operable to enclose said linear array



of light-emitting pixels in a contaminant-free environment, said packaging means including

a first member positioned in overlying, spaced relation with said edge emitter structure and having a front edge portion substantially aligned with said front edge portion of said substrate layer, a rear edge portion opposite said front edge portion and a pair of lateral edge portions each substantially aligned with one of said substrate layer lateral edge portions,

a front member extending between and sealingly secured to said first member front edge portion and said substrate layer front edge portion, said front member having a pair of opposing lateral edge portions and being disposed adjacent to said light-emitting edge surfaces of said pixels of



said array, said front member being made from a preselected translucent material to permit light energy emitted by selected ones of said pixels of said array interior to said packaging means to pass through said translucent front member,

a pair of side members extending between and sealingly secured to said first member lateral edge portions, said substrate layer lateral edge portions and said front member lateral edge portions, and

a rear member disposed on said substrate layer and positioned rearward of said edge emitter structure, said rear member extending between and sealingly secured to said first member rear edge portion, said substrate layer and said pair of side members.

4,951,065

## PERIOD VARYING BEAM RECORDER

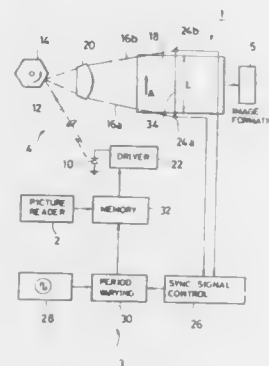
Yoshiharu Okino, Minami-asbigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 20, 1989, Ser. No. 325,714

Claims priority, application Japan, Mar. 18, 1988, 63-66926  
Int. Cl.<sup>5</sup> G01D 15/14

U.S. Cl. 346—108

4 Claims



1. A period varying beam recorder, comprising:

a light source for emitting a light beam carrying picture information;

an optical deflector for deflecting the light beam in a plane, the light beam being directed to a photosensitive material or member to conduct primary scanning, the light beam being deflected in the plane at least over an effective scanning width necessary for the primary scanning of the photosensitive material or member;

detector means, having at least one detector, disposed outside of at least one end of the effective scanning width for detecting the light beam for determining a scanning time over the effective scanning width;

period varying means for varying the period of a picture element sync signal for use in carrying picture information on the light beam; and

control means for controlling the period of the picture element sync signal on the basis of the scanning time such that the exposure timing of each picture element is optimized, wherein said exposure timing of said each picture element is optimized by alternately combining first and second picture element periods when said picture element period cannot be derived by said period varying means.

4,951,066

## INK JET RECORDING APPARATUS HAVING A DISCHARGE ORIFICE SURFACE AND A BLADE AND RUBBING MEMBER FOR CLEANING THE SURFACE INDEPENDENTLY OF EACH OTHER

Koji Terasawa, Mitaka; Akira Miyakawa, Tanashi; Hideki Yamaguchi, Yokohama; Shinya Matsui, Yokohama; Mikio Shiga, Yokohama; Shigeru Tsuyukubo, Kawasaki; Yoji Ara; Katsuyuki Yokoi, both of Yokohama; Masaaki Nakamura, Toyonaka; Yoshiaki Kaburagi, Tokyo; Takanori Mukai, Chichibu; Shoichiro Shoda, Yokohama, and Tetsuo Kimura, Sagami, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

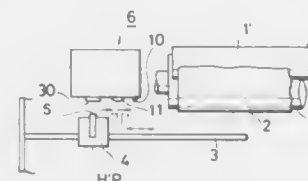
Filed Oct. 27, 1988, Ser. No. 263,021

Claims priority, application Japan, Oct. 30, 1987, 62-275034; Oct. 30, 1987, 62-275035; Nov. 5, 1987, 62-278175; Oct. 7, 1988, 63-253458

Int. Cl.<sup>5</sup> B41J 2/165

U.S. Cl. 346—140 R

32 Claims



1. A method of cleaning a surface in which are provided the discharge ports of an ink jet recording apparatus, the method comprising:

wiping the surface using a blade having a certain contact area with the surface; and

rubbing the surface using rubbing means having a contact area with the surface larger than the certain contact area independently of said wiping step, wherein said rubbing step is performed less often than said wiping step.

4,951,067

## CONTROLLED INK DROP SPREADING IN HOT MELT INK JET PRINTING

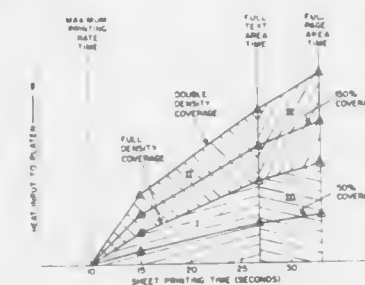
Charles W. Spehrley, Jr., Hartford, Vt., assignor to Spectra, Inc., Hanover, N.H.

Continuation-in-part of Ser. No. 94,664, Sep. 9, 1987, Pat. No. 4,751,528. This application Jun. 3, 1988, Ser. No. 202,488

Int. Cl.<sup>5</sup> G01D 14/15; B41J 2/01

U.S. Cl. 346—140 R

14 Claims



1. A hot melt ink system comprising a hot melt ink having a melting point, ink jet means for projecting the hot melt ink at elevated temperature toward a substrate to produce ink spots on the substrate, platen means for supporting the substrate, and temperature control means for controlling the temperature of the platen means to maintain the portion of a substrate which receives the hot melt ink from the ink jet means at a temperature in the range from about 25° C. below to about 25° C. above the melting point of the hot melt ink.

4,951,068

## CAMERA SYSTEM WITH FLASH DEVICE

Tsutomu Ichikawa; Masayuki Yoshii; Norio Ishikawa; Akihiko Fujino; Masayuki Nakasa; Masahito Kitaura, and Kenji Tsuji, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

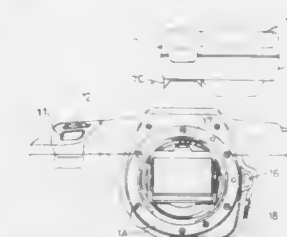
Filed May 16, 1989, Ser. No. 352,494

Claims priority, application Japan, May 17, 1988, 63-119682; May 17, 1988, 63-119683; May 17, 1988, 63-119686; May 17, 1988, 63-119687

Int. Cl.<sup>5</sup> G03B 15/05

U.S. Cl. 354—149.11

9 Claims



1. A camera system with a flash device comprising:

flashing means including a light emitter switchable between an emission permit state in which the light emitter is projected from a body of the flash device and an emission prohibit state in which the light emitter is retracted into the body, and operating means for selectively placing said light emitter in said emission permit state and said emission prohibit state;

switching means switchable between a first state for permitting operation of the camera system operation and a second state for prohibiting operation of the camera system; and

control means for controlling said operating means to place said light emitter in the emission permit state when said switching means is switched from the second state to the first state.

4,951,069

## MINIMIZATION OF COMMUNICATION FAILURE IMPACTS

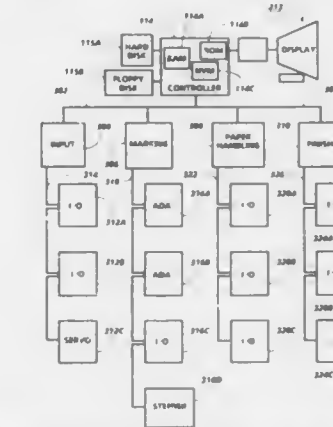
Douglas T. Rabjohns, Fairport; Gregory C. Sosinski, Penfield; Jeff C. Carter, Fairport; Ernest L. Legg, Fairport, and Robert M. VanDayn, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 30, 1989, Ser. No. 428,713

Int. Cl.<sup>5</sup> G01D 15/06; G06F 3/12

U.S. Cl. 346—154

12 Claims



11. In an image processing apparatus having image processing means for forming an image, a controller for directing the operation of the image processing means, the controller including a plurality of nodes and a software segment including an application portion and a communication portion, the method of resetting an arbitrary node in response to a communication portion fault in an arbitrary node during a real time job run comprising the steps of:

said arbitrary node initiating a self reset independent of any other node,

the remaining nodes refraining from initiating a self node reset,

resetting said node independent of said remaining nodes, and

continuing operation of said arbitrary node to complete the real time job run.

4,951,070

## CHARGE TRANSFER IMAGING CARTRIDGE MOUNTING AND PRINTER

Sotos M. Theodoulou, Bramalea; Andrzej Maczuszenko, Stouffville; Sabir H. Bajwa, Mississauga; Duncan J. Gibbons, Kitchener, and Wojciech Zalewski, Mississauga, all of Canada, assignors to 501 Delphax Systems, Mississauga, Canada

This application Oct. 26, 1989, Ser. No. 428,025

Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346—155

10 Claims



1. A printer comprising:

a drum mounted for rotation in one direction about an axis and having an imaging area for receiving the pattern of electrostatic charge;

a toner system positioned adjacent the drum for toning the pattern;  
transfer means for passing the toned pattern to another medium;  
a cartridge for creating the pattern on the drum, the cartridge having a rigid spine, a planar face spaced by a predetermined gap from the drum with the cartridge in an operative position, spacer means coupled to the cartridge for engagement with the drum outside the imaging area, and first and second side faces including first contacts for connecting the cartridge electrically; and  
a cartridge mounting including second contacts for electrical engagement with corresponding ones of said first contacts with the cartridge in the operative position, and operable to move the cartridge between said operative position and an access position where the cartridge has been moved away from the drum a selected distance sufficient to clear the second contacts, the cartridge mounting and the cartridge defining location means for slidably moving the cartridge into engagement with the mounting along a path substantially parallel with said axis and into the access position, and for holding the cartridge as it is moved between the operative and access positions, the cartridge mounting further including a location face engageable by the cartridge first face as the cartridge tends in use to be moved with the drum to thereby locate the cartridge accurately, and resilient biasing means for applying a load on the cartridge in the operative position to retain the cartridge spacer means in sliding contact with the drum.

4,951,071

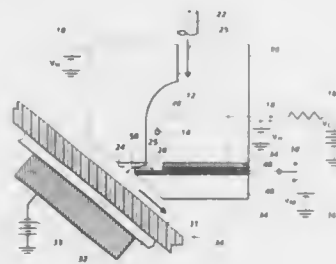
**RESISTIVE NIB IONOGRAPHIC IMAGING HEAD**  
Jeffrey J. Eolkins, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 25, 1989, Ser. No. 426,368

Int. Cl.<sup>5</sup> G01D 15/06

U.S. Cl. 346—159

24 Claims



1. In an ionographic imaging device, including a body, within which is supported a source of ions, means for moving a stream of ions towards an imaging surface moving in a process direction relative to said source of ions, modulation means to modulate the ion stream in imagewise fashion for the formation of intelligible charge patterns on the imaging surface, said modulation means including

a modulation channel defined by first and second surfaces, between which said stream of ions moves towards the imaging surface;  
said first surface including a conductive member, electrically connected to a first potential;  
said second surface, generally parallel to said first surface, supporting an array of control electrodes, each electrode including a resistive material element, electrically connected between a second potential and a switch, each said switch controllably connecting said resistive material element to either of a marking potential and a non-marking potential, disposition of said switch controlling the passage of said stream of ions therepast, whereby an electric field is produced through the modulation channel,

having a direction closely parallel to the second surface, and directed towards the imaging surface.

4,951,072

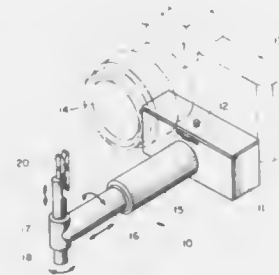
**UNIVERSAL MOUNT FOR A SPECIMEN HOLDER**  
James C. Harvey, P.O. Box 100486, Ft. Worth, Tex. 76185, and  
Bruce J. Russell, Box 457, Loomis, Calif. 95650

Filed Sep. 18, 1989, Ser. No. 408,204

Int. Cl.<sup>5</sup> G03B 29/00

U.S. Cl. 354—80

2 Claims



1. A universal mount for use in combination with a hand-held camera comprising:

a camera having a case and a horizontal optical axis;  
an elongated base housing having opposite ends;  
a screw fastener operably carried on said base housing for releasably securing said base housing to said camera case;  
telescoping means having an overall length outwardly extending from a selected side of said base housing mid-way between its opposite ends in a cantilevered manner;  
said telescoping means comprising a pair of coaxially disposed tubes in sliding relationship wherein one tube is an outer tube fixed at one end to said base housing, and the other end of said outer tube projected outwardly from said base housing in fixed spaced-apart relationship and the other tube of said pair is an inner tube having a first end arranged in sliding relationship with said one tube of said pair and a second end constituting a free end in movable disposition with respect to said base housing;  
a movable rod carried on said free end of said telescoping means other tube adjustable normal towards and away from said camera horizontal optical axis;  
holder means carried on a selected end of said rod for releasably holding a subject intended to be photographed;  
said telescoping means includes a central longitudinal axis in parallel spaced-apart relationship with respect to said camera horizontal optical axis;  
said telescoping means inner tube includes a fixed barrel outwardly projecting from said base housing and said outer tube constituting a movable focus tube extending from and carried by said fixed barrel so as to adjustably extend and shorten the overall length of said telescoping means;  
said focus tube mounts in friction bearings carried by said fixed barrel;  
an open-ended barrel carried on said free end of said outer focus tube having a central axis normal to the central longitudinal axis of said telescoping means and said camera optical axis;  
said movable rod slidably and rotatably carried on said open-ended barrel wherein said holder means is adapted to move towards and away from said camera optical axis as well as rotate about said camera optical axis as well as back and forth along said camera optical axis;  
said holder means includes a manual clip carried on said selected end of said rod adjacent to said camera optical axis.

4,951,073  
**SYNCHRONIZING DEVICE FOR DUAL CAMERA PHOTOGRAPHY**

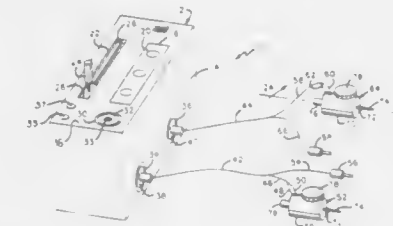
Frederick Slavitter, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 24, 1989, Ser. No. 342,524

Int. Cl.<sup>5</sup> G03B 17/40

U.S. Cl. 354—110

8 Claims



1. A synchronizing device for dual camera photography, comprising:

means for determining the difference in the time lags between camera actuation and sync pulse production in a pair of separate cameras,  
and means for delaying the actuation of one of the cameras relative to the other to assure that the sync pulse of one of the cameras chosen to be the strobe firing camera follows the sync pulse of the other camera by an amount sufficient to assure that the shutter of the non-strobe firing camera is open when the strobe is fired.

4,951,074

**CAMERA HAVING ZOOM STROBE DEVICE**  
Toshiaki Ueda, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

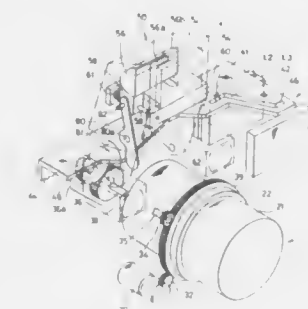
Filed Feb. 27, 1989, Ser. No. 315,944

Claims priority, application Japan, Feb. 26, 1988, 63-43394

Int. Cl.<sup>5</sup> G03B 3/10, 15/05, 13/12

U.S. Cl. 354—149.1

20 Claims



1. A camera with a camera body comprising a zoom lens having a variable power lens group for varying the focal length, a zoom strobe device having an illumination angle varying member, a zoom motor for driving the variable power lens group, and an illumination angle varying mechanism which drives the illumination angle varying member in association with the zooming operation of the zoom lens to vary the illumination angle, wherein the improvement comprises a movable strobe housing of the zoom strobe device, in which a light emitting portion is housed, supporting means for supporting the strobe housing to move between an inoperative position in which the strobe housing is retracted in the camera body and an operative position in which the strobe housing is projected outward from the camera body, said illumination angle varying member being housed in the strobe housing, and clutch means for transmitting the zooming operation to the

illumination angle varying member only when the strobe housing is in the operative position.

4,951,075

**ZOOM CAMERA**

Hisashi Tokumaru; Hisayuki Masumoto, and Yukio Maekawa, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

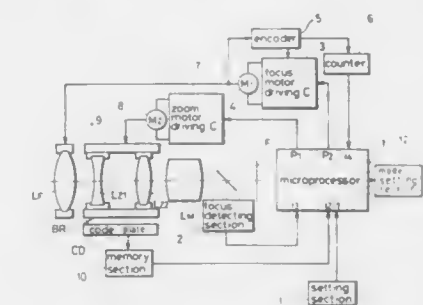
Filed Jan. 6, 1989, Ser. No. 294,121

Claims priority, application Japan, Jan. 8, 1988, 63-2990; Mar. 11, 1988, 63-58975

Int. Cl.<sup>5</sup> G03B 13/36

U.S. Cl. 354—400

22 Claims



1. A zoom camera comprising, a focusing lens group and a zoom lens group, a controllably driving system for controllably driving these lens groups in accordance with a program line, an object distance detecting means for detecting the distance from the camera to an object to be photographed, an image magnification setting means for setting the image magnification in accordance with a predetermined program based on the object distance and the depth of field, and a computing means for computing such a focal length as to obtain a specified value of image magnification based on output signals from the object distance detecting means and the image magnification setting means and feeding the obtained focal length data to the controllably driving system.

4,951,076

**PHOTOGRAPHIC COVE**

William J. Baillie-Hamilton, Wargrave, and Ronald J. Brown, Ascot, both of Great Britain, assignors to J R Group PLC, Reading, Great Britain

PCT No. PCT/GB87/00161, § 371 Date Sep. 1, 1988, § 102(e) Date Sep. 1, 1988, PCT Pub. No. WO87/05407, PCT Pub. Date Sep. 11, 1987

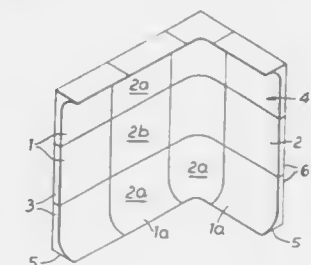
PCT Filed Mar. 6, 1987, Ser. No. 250,679

Claims priority, application United Kingdom, Mar. 7, 1986, 8605737

Int. Cl.<sup>5</sup> G03B 15/06; E04B 1/60

U.S. Cl. 354—291

11 Claims



1. A photographic cove comprising a plurality of stackable pre-fabricated modular units each of which has a front surface,



the front surface of at least one unit being concave, the units being secured one to another so that the front surfaces thereof combine to form a smooth at least partially concave surface, the units each having an integral rearwardly extending peripheral flange providing at least one mating side surface, said peripheral flange extending first rearwardly of said front surface to provide said at least one side surface and then inwardly substantially parallel to said front surface to impart additional rigidity to the unit, securing means extending into at least some of said flanges to releasably secure the units one to another and support means secured to said flanges for supporting the assembled units.

4,951,077

# METHODS AND DEVICE FOR MEASURING THE BRIGHTNESS OF AN OBJECT

Koji Kaneko; Kazuhisa Seki; Kazutsugu Ogata, and Satoshi Mikajiri, all of Omiya, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

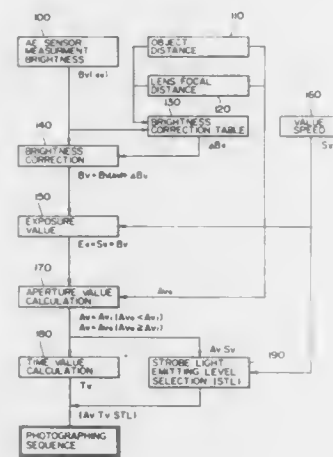
Filed Sep. 20, 1989, Ser. No. 409,860

Claims priority, application Japan, Oct. 7, 1988, 63-253142

Int. Cl.<sup>5</sup> G03B 13/00

U.S. Cl. 354—400

8 Claims



5. A device for measuring the brightness of an object, comprising:  
an AE sensor for measuring a measurement brightness by means of an averaged overall light reading method;  
distance measuring means for measuring the distance of said object;  
detecting means for detecting the focal distance of a taking lens;  
first operation means for determining a sensor ratio pertaining to a ratio of an expected area occupied by said object to a total light receiving surface area of said AE sensor in accordance with said object distance and taking lens focal distance respectively from said distance measuring means and detecting means;  
second operation means for finding a brightness correction value  $\Delta B_V$  in accordance with said sensor ratio and also with said measurement brightness  $B_{(AV)}$  measured by said AE sensor; and,  
third operation means for adding together said measurement brightness  $B_{(AV)}$  measured by said AE sensor and said brightness correction value  $\Delta B_V$  found by said second operation means to thereby find the brightness  $B_V$  of said object in photographing said object in flash synchronization.

## 4,951,078 CAMERA SYSTEM INCLUDING CATADIOPTRIC LENS AND CATADIOPTRIC LENS SYSTEM USED THEREIN

Takashi Okada, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

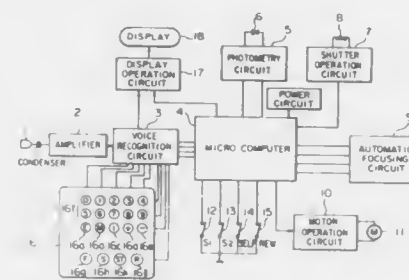
Filed May 15, 1989, Ser. No. 352,170

Claims priority, application Japan, May 16, 1988, 63-118611; May 16, 1988, 63-118612

Int. Cl.<sup>5</sup> G03B 13/00

U.S. Cl. 354—402

25 Claims



1. A camera system including a camera body and a catadioptric lens mountable on the camera body, comprising:  
means, provided in the camera body, for detecting a focusing condition of a lens mounted on the camera body, by detecting a distance of a pair of secondary images of an image formed by the lens; and  
means, provided in the catadioptric lens, for determining both an outside diameter of an exit pupil of the catadioptric lens and an inside diameter thereof so that light bundles forming the pair of secondary images are passed through the exit pupil.

4,951,079

# VOICE-RECOGNITION CAMERA

Yasushi Hoshino, Tokyo; Tsuyoshi Kakita, Hoya, and Makoto Yoshida, Hachioji, all of Japan, assignors to Konica Corp., Tokyo, Japan

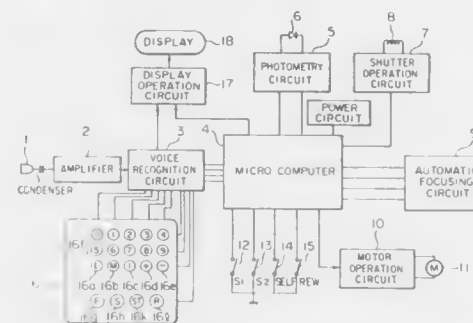
Filed Jan. 26, 1989, Ser. No. 302,175

Claims priority, application Japan, Jan. 28, 1988, 63-15890; Jan. 29, 1988, 63-16822

Int. Cl.<sup>5</sup> G03B 7/00

U.S. Cl. 354—412

3 Claims



1. A camera for taking a photograph by a voice recognition operation comprising:  
a voice input means for registering an operator's voiced command word, said voice input means having variable directivity adjustable to the view angles of the camera;  
a voice registration means for converting an operator's voiced command word into digital data and storing said data in a digital memory means;  
a voice recognition means wherein an operator's voiced command word is identified in accordance with the digital data stored in said voice registration means, and thereafter

activates the intended function of the camera corresponding to an operator's voiced command word; and  
a display means which indicates the functioning of said voice registration means and said voice recognition means as they are activated by an operator's voiced command word.

4,951,080

# DEVICE FOR CONTROLLING THE AMOUNT OF EMISSION OF ELECTRONIC FLASH APPARATUS

Hiroshi Sakamoto, and Norikazu Yokonuma, both of Tokyo, Japan, assignors to Nikon Corporation, Tokyo, Japan

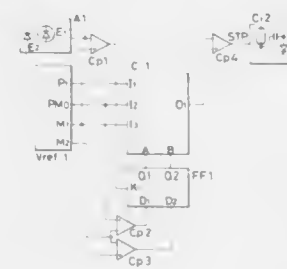
Filed May 19, 1989, Ser. No. 354,352

Claims priority, application Japan, May 24, 1988, 63-127682; Jul. 27, 1988, 63-187119

Int. Cl.<sup>5</sup> G03B 15/05; H05B 41/14

U.S. Cl. 354—414

22 Claims



1. A light emission controlling device for an electronic flash apparatus, comprising:  
first photometric means for metering a first region of an object field in a weighted manner and outputting first photometric information with a lapse of time;  
second photometric means for metering a second region of the object field in a weighted manner and outputting second photometric information with a lapse of time;  
comparing means for comparing said first photometric information with said second photometric information; and  
controlling means for determining a timing for outputting a light emission stop signal on the basis of the relationships between said first photometric information and said second photometric information.

4,951,081  
FLASH DEVICE

Hiroshi Hosomizu; Tsutomu Ichikawa; Makoto Kamiya; Masatoshi Yoneyama, and Kenzi Tuzi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,381

Claims priority, application Japan, Jul. 10, 1987, 62-173466

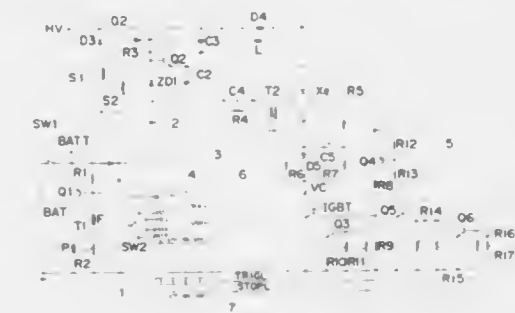
Int. Cl.<sup>5</sup> G03B 15/05

U.S. Cl. 354—415

10 Claims

1. A flash device comprising:  
a power source;  
a main capacitor adapted to be charged by the power source;  
a flash firing unit operable to consume charge stored in the main capacitor to emit a flash light;  
a switching means disposed in a discharge loop for the main capacitor through the flash firing unit;  
a trigger means for exciting the flash firing unit in response to a flash firing command;  
a pulse output means for outputting a pulse train;

a varying means for varying the duty factor of the pulse train outputted from the pulse output means; and



a control means for causing the switching means to be switched on and off repeatedly in response to the pulse train outputted from the pulse output means.

4,951,082

# THREE-DIMENSIONAL MULTI-PATTERN PHOTO-METERING APPARATUS

Tadao Takagi, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan

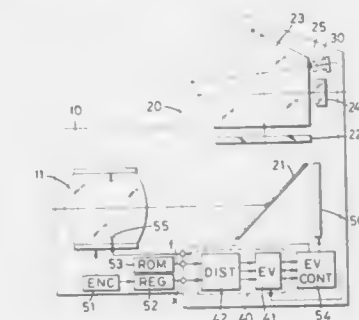
Filed Nov. 30, 1988, Ser. No. 277,867

Claims priority, application Japan, Dec. 11, 1987, 62-313190

Int. Cl.<sup>5</sup> G03B 7/08

U.S. Cl. 354—432

25 Claims



1. A photo-metering apparatus for a camera, comprising:  
photo-metering means for photo-metering a plurality of areas into which a field is divided and for producing a plurality of photometric outputs corresponding to brightness of the respective divided areas;  
means for producing first and second parameters relating to brightness of said areas in accordance with said plurality of photometric outputs;  
means for producing a third parameter regarding a ratio between a focal length of a camera lens and an object distance;  
means for providing a plurality of different tables of reference information, each table including different reference information relating to brightness of said areas and determined by different algorithms respectively;  
means for selecting one of said plurality of tables in accordance with one of said first, second, and third parameters; and  
means for selecting reference information from the selected table in accordance with the others of said parameters jointly.

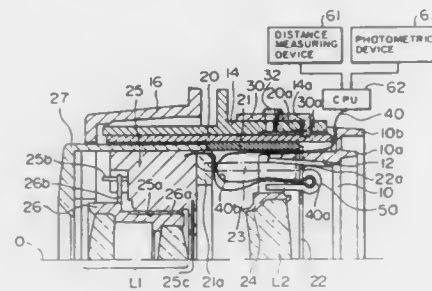
**4,951,083**  
**CAMERA WITH FLEXIBLE-MEANS GUIDE**  
**STRUCTURE**

Zenichi Okura, Ichikawa, and Shinsuke Kobmoto, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,625  
Claims priority, application Japan, Mar. 11, 1988, 63-32278[U]

Int. Cl.<sup>3</sup> G03B 7/00  
U.S. Cl. 354—485

13 Claims



**1. A camera comprising:**

- a camera body;
- a movable lens system arranged for movement relative to said camera body along a predetermined optical axis;
- a shutter unit mounted to said movable lens system for movement therewith along said optical axis;
- control means arranged within said camera body for supplying a control signal to said shutter unit for controlling operation of the same;
- flexible means for electrically connecting said control means to said shutter unit, a control signal from said control means being supplied to said shutter unit through said flexible means; and
- movable turning back means for turning said flexible means to form overlapping sections;

wherein said flexible means extends from said shutter unit to said control means in such a manner that said flexible means is turned back a plurality of times by said turning back means so as to have at least two first and second turned-back portions spaced away from each other along said optical axis, whereby said flexible means has at least three sections, including a first section extending between said shutter unit and said first turned-back portion, a second section extending between said first and second turn-back portions, and a third section extending between said second turned-back portion and said control means, said sections overlapping with each other in a direction normal to said optical axis.

**4,951,084**  
**PHOTOGRAPHIC COLOR COPYING APPARATUS AND**  
**EXPOSURE CONTROL PROCESS**

Werner R. von Stein, Hamburg, Fed. Rep. of Germany, and Walter Kraft, Zurich, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 14, 1988, Ser. No. 257,927  
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1987, 3734911; Switzerland, Sep. 12, 1988, 3394/88-2

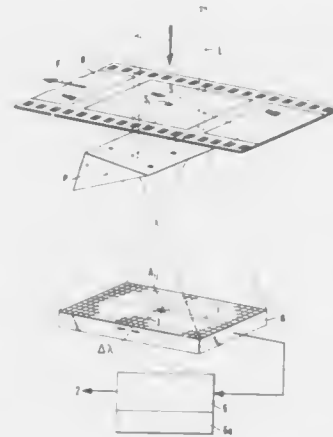
Int. Cl.<sup>3</sup> G03B 27/80

U.S. Cl. 355—38

91 Claims

- 22. Photographic color copying apparatus comprising:**
- a projection device for reproducing a copy original on a photosensitive copy material;
  - a measuring layout for photoelectrically scanning the original by regions and for determining for every scanning region, color extract values which are adapted to a spectral sensitivity variation of the copy material;
  - exposure controls cooperating with the measuring layout and the projection device for determining amounts of

copying light impacting the copy material, said measuring layout further including:  
spectrometric means for splitting measuring light which originates in every scanning region of the copy original into a plurality of narrow spectral regions and producing a spectral value for each spectral region; and



electronic computer means for determining the color extract values upon which the exposure controls are based from the spectral values by evaluating the spectral sensitivity variation of the copy material and integrating said spectral values.

**4,951,085**  
**IMAGE FORMING APPARATUS**

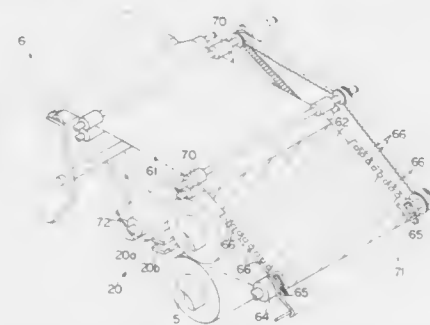
Yoshiaki Ibuchi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 12, 1989, Ser. No. 378,999  
Claims priority, application Japan, Jul. 20, 1988, 63-181195

U.S. Cl. 355—38

Int. Cl.<sup>3</sup> G03B 27/80

5 Claims



- 1. An image forming apparatus with a media cartridge that accommodates a roll of a light receiving sheet and that can be detached from the body of said apparatus, a leader sheet for automatic loading being connected to the leading edge of said light receiving sheet, wherein said apparatus comprises:**

- a detecting means for detecting the attachment of said media cartridge to the body of said apparatus;
- sensitivity information recording means, provided on the leader sheet, for recording information relating to the sensitivity of the light receiving sheet for the formation of a full color image;
- a sensitivity information sensor to read the sensitivity information recorded on the sensitivity information recording means;
- a nonvolatile memory;
- a means for delivering sensitivity data read by said sensitivity information sensor into said nonvolatile memory; and

a color correcting means for correcting colors of an image to be formed, in accordance with said sensitivity data stored in said nonvolatile memory.

**4,951,086**  
**METHOD FOR IMPROVING THE PRODUCTION OF**  
**PHOTOGRAPHIC REPRINTS**

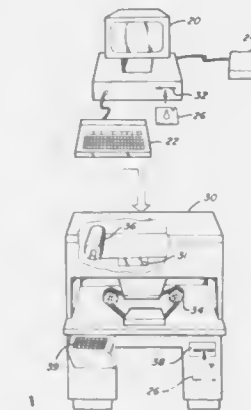
Ray Hicks, 2605 Corunna Road, Flint, Mich. 48503-3362

Filed Apr. 12, 1989, Ser. No. 336,849

U.S. Cl. 355—41

Int. Cl.<sup>3</sup> G03B 27/52, 27/32

15 Claims



- 1. A method for producing photographic prints, comprising:**
- a. Encoding frame and reel information on a photographic negative
  - b. Viewing said photographic negative
  - c. Establishing criteria for the exposure of photographic print paper from said negative
  - d. Encoding said criteria, said frame information and said reel information in machine-readable form on said photographic print paper
  - e. Producing a photographic print from said negative on said photographic print paper.

**4,951,087**  
**ALIGNMENT TECHNIQUE FOR A PHOTOGRAPHIC**  
**ENLARGER**

William R. Ziegler, 417 Shirley Way, Menlo Park, Calif. 94025

Filed Aug. 5, 1988, Ser. No. 228,991

U.S. Cl. 355—43

Int. Cl.<sup>3</sup> G03B 27/52

41 Claims



- 1. An alignment arrangement for use with a photograph enlarger apparatus which includes an enlarger head assembly having a frame for supporting a negative to be enlarged and which also includes an enlarger easel and means for supporting**

said enlarger head assembly above said easel so that said negative support frame forming part of said enlarger head assembly can be adjustably positioned in parallel relationship with said easel, said alignment arrangement comprising:

- (a) a first mirror member having a mirror body including a mirrored surface, said first mirror member being configured to lie on said enlarger easel such that its mirrored surface faces said negative support frame;
- (b) means including a second mirror member having a mirror body including a mirrored surface and a view hole through its mirror body and mirrored surface, said means being configured to replace temporarily said negative support frame so that said second mirrored surface faces said easel and said first mirrored surface and so that both mirrored surfaces can be viewed through said view hole in said second mirror member; and
- (c) indicia on at least one of said mirrored surfaces such that when said mirrored surfaces are viewed through said view hole, said indicia will take only one of many different forms if the two mirrored surfaces are parallel, whereby said means including said second mirror member and/or said easel, and first mirror member can be adjusted to provide said one form in order to insure that said negative support frame is parallel with said easel.

**4,951,088**  
**TONER MASS DEVELOPED CONTROL RATIO**  
**MODIFICATION SYSTEM**

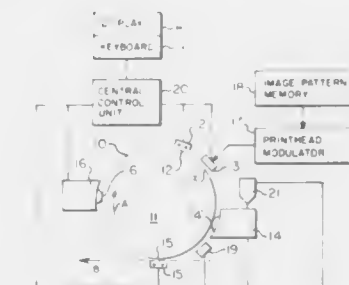
John C. Bonvallet, Jimmie Ray Brewster, both of Boulder, James R. Champion, Longmont, and Kenneth S. Shouldice, Louisville, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 13, 1988, Ser. No. 283,708

U.S. Cl. 355—77

Int. Cl.<sup>3</sup> G03G 15/00, 15/08

21 Claims

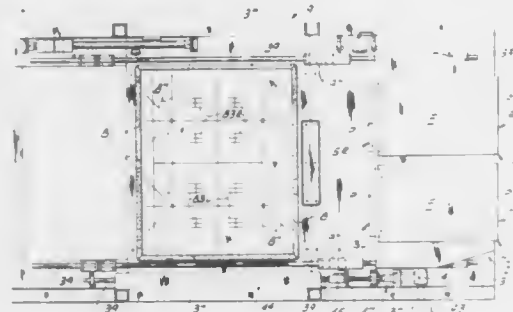


- 1. A method of controlling the toner mass developed in an image producing machine comprising the steps of:**
- producing a toned area and an area free of toner on image receiving material within said machine;
  - utilizing a reflectivity sensing unit to produce a first signal corresponding to the reflectivity of said toned area;
  - producing a second signal corresponding to the reflectivity of said area free of toner;
  - producing a third signal called the measured ratio which is the ratio of said first signal to said second signal;
  - calculating a control ratio setpoint wherein the control ratio calculation includes a variable which is dependent upon the particular sensing unit in use;
  - comparing said third signal to said control ratio set point; and
  - adjusting toner mass developed in accordance with said comparison.

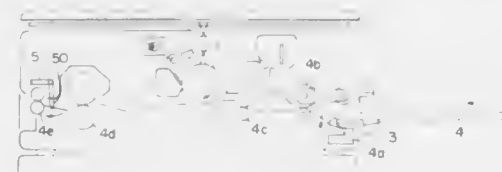


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4,951,089  
**PHOTOGRAPHIC PRINTING APPARATUS**  
John W. Powers, Battlefield, Mo., assignor to Western Litho Plate and Supply Company, St. Louis, Mo.  
Filed Jun. 9, 1989, Ser. No. 364,247  
Int. Cl.<sup>3</sup> G03B 27/04  
U.S. Cl. 355—85 17 Claims

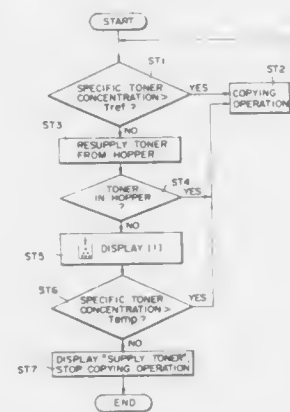


body of the copying machine, said handle being made usable when a paper feed tray is removed from said copying machine body; a paper feed tray sensor which is activated when said



paper feed tray is mounted onto said copying machine body; a jam sensor; and a means for detecting the occurrence of a jam only when said jam sensor and said paper feed tray sensor are both activated.

4,951,091  
**IMAGE FORMING APPARATUS HAVING TONER QUANTITY DETECTION MEANS**  
Yoshiaki Nawata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Nov. 30, 1988, Ser. No. 277,845  
Claims priority, application Japan, Nov. 30, 1987, 62-302636  
Int. Cl.<sup>3</sup> G03G 15/09, 15/00  
U.S. Cl. 355—206 5 Claims



1. Apparatus for exposing photosensitized plates to light through films operable selectively in a first mode for exposing single-page plates to light through single-page films and in a second mode for exposing double-page plates to light through double-page films, said apparatus comprising means for selectively holding side-by-side two stacks of single-page plates and two stacks of single-page films and one stack of double-page plates and one stack of double-page films with each stack of films above and offset in a rearward direction from a respective stack of plates so that each stack of plates extends forward from under the respective stack of films, an exposure station at which a single-page plate from each of the two single-page plate stacks may be simultaneously exposed to light through a single-page film from each of the single-page film stacks, or a double-page plate from the double-page stack may be exposed to light through a double-page film from the double-page film stack, with the said exposure station being located forward of the stack-holding means, means for selectively delivering a single-page plate from each of said single-page plate stacks and a single-page film from each of said single-page film stacks to exposure position at the exposure station and delivering a double-page plate from the double-page plate stack and a double-page film from the double-page film stack to exposure position at the exposure station, means at the exposure station for supporting, side-by-side, two single-page plates each with a single-page film thereon, or a double-page plate with a double-page film thereon, a carriage movable downwardly from a raised retracted position above said supporting means at the exposure station to a lowered position, said carriage having means for selectively holding a double-pane window frame having two single-page size windowpanes for operation of the apparatus in the first mode and a single-pane window frame having a double-page size windowpane for operation of the apparatus in the second mode.

4,951,090  
**HANDLE FOR PORTABLE COPYING MACHINE**  
Manabu Matsumoto, and Takahiro Fukunaga, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed May 16, 1989, Ser. No. 352,751  
Claims priority, application Japan, May 31, 1988, 63-135315  
Int. Cl.<sup>3</sup> G03G 15/00  
U.S. Cl. 355—200 4 Claims  
1. A copying machine comprising a handle on one end of the

1. A image forming apparatus comprising:  
means for forming a latent image on an image carrier;  
means for developing the latent image with a developing agent;  
means for supplying the developing means with a developing agent;  
first detection means for detecting a quantity of developing agent in the developing means;  
second detection means for detecting a quantity of developing agent in the supply means;  
means for displaying a first message indicating the need for replenishment of developing agent in the supply means and a second message indicating the need for replenishment of a developing agent in the developing means; and  
means for controlling the display means and the developing means such that when the display means indicates the first message the developing means allows the image forming operation in progress to continue, and for controlling the display means and the developing means such that the display means indicates the second message, the developing means stops the image forming operation when the first detection means detects the shortage of the developing agent after the second detection means detects the shortage of the developing agent in the supply means.

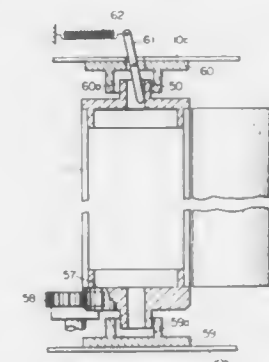
4,951,092  
**COPYING MACHINE WITH DETACHABLE DEVELOPING DEVICE**  
Masazumi Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 247,080, Sep. 21, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,449  
Claims priority, application Japan, Sep. 22, 1987, 62-238363  
Int. Cl.<sup>3</sup> G03G 15/00, 15/06  
U.S. Cl. 355—240 10 Claims



1. A copying machine, which is capable of executing an copying operation in a first copying mode, a second copying mode and a third copying mode, comprising:  
charging means for charging a photosensitive member to a predetermined potential;  
optical means for projecting an image of an original onto the photosensitive member charged by the charging means to form an electrostatic latent image thereon;  
developing means for developing the latent image on the photosensitive member;  
a mount portion provided between the position of image projection by the optical means and developing means;  
a developing unit, which is detachably mountable in the mount portion, for developing the latent image on the photosensitive member as mounted in the mount portion in the first copying mode;  
a character writing unit, which is detachably mountable in the mount portion, for forming an electrostatic latent image of additional data on the photosensitive member having the original latent image formed by the optical means as mounted in the mount portion in the second copying mode;  
a outline image forming unit, which is detachably mountable in the mount portion, for extracting outlines of the latent image formed by the optical means as mounted in the mount portion in the third copying mode, wherein one of said units is selectively mounted in the mount portion in accordance with the copying mode; and  
control means for outputting control signals to said unit selectively mounted in the mount portion in accordance with the copying mode.

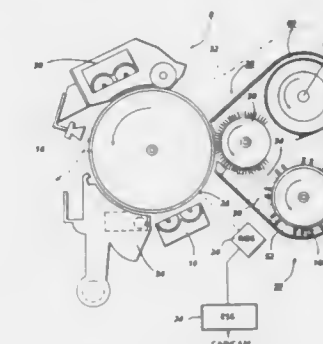
4,951,093  
**DEVELOPING UNIT FOR AN ELECTROSTATIC RECORDING APPARATUS**  
Kohji Ishii, Hiroyuki Honda, Kazuyuki Tanaka, and Noboru Koizumi, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Dec. 6, 1988, Ser. No. 280,638  
Claims priority, application Japan, Dec. 18, 1987, 62-320714; Dec. 18, 1987, 62-320716; Mar. 25, 1988, 63-71262; Mar. 25, 1988, 63-71263  
Int. Cl.<sup>3</sup> G03G 15/08  
U.S. Cl. 355—245 11 Claims  
1. An image forming apparatus comprising  
an image forming means being rotatable around an axis thereof and having an image surface for forming a latent image thereon;  
a developing means having a developer surface for carrying a developer layer thereon, said developer surface facing

toward said image surface so that the developer layer comes in contact with the image surface, thereby developing the latent image to become visible;  
a support means for supporting the axis of said image form-



ing means so that the image surface is movable in the direction to the developer surface; and  
a pressing means for pressing said image forming means so that the image surface presses the developer layer onto the developer surface.

4,951,094  
**DISPENSING CARTRIDGE FOR A ZEROGRAPHIC REPRODUCTION MACHINE**  
Conrad J. Bell, Webster; Paul Grasso, and John Webb, both of Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
Filed Jan. 12, 1990, Ser. No. 464,492  
Int. Cl.<sup>3</sup> G03G 15/06  
U.S. Cl. 355—245 4 Claims



1. A toner cartridge comprising:  
a tube-like cylinder adapted to contain a supply of toner, said cylinder having a plurality of toner discharge ports therein for the discharge of toner from said cylinder, said toner discharge ports extending at least partially along the longitudinal surface of said cylinder, and  
a flexible flap member attached to the exterior of said cylinder and adjacent said discharge ports so as to overlie said ports.

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**4,951,095**  
**COPYING APPARATUS WITH IMAGE SMEAR CONTROL**

Geoffrey L. Warden, Cookham, England, assignor to Xerox Corporation, Stamford, Conn.

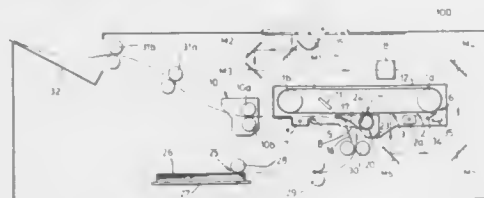
Filed Jan. 13, 1989, Ser. No. 297,629

Claims priority, application United Kingdom, Jan. 15, 1988, 8800867; Jan. 15, 1988, 8800868

Int. Cl.<sup>5</sup> G03G 15/16

U.S. Cl. 355—273

8 Claims



1. An electrostatographic copying machine comprising a circulating imaging member, a transfer region where a developed toner image may be transferred from the imaging member to a copy sheet, and sheet feed means for feeding the copy sheet to the transfer region wherein said sheet feed means are adapted (a) to feed a first leading portion of the sheet at a first speed substantially the same as the speed of said imaging member, (b) to feed a second subsequent portion of the sheet at a second speed greater than the first speed, and (c) to feed the remaining portion of the sheet at the first speed in order to induce a buckle in the sheet and thereby control image smear.

**4,951,096**  
**SELF-CALIBRATING TEMPERATURE CONTROL DEVICE FOR A HEATED FUSER ROLLER**

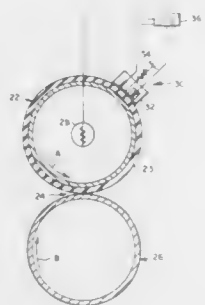
John E. Derimiglio, Fairport, and Hal E. Wright, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 26, 1989, Ser. No. 373,120

Int. Cl.<sup>5</sup> G03G 15/20

U.S. Cl. 355—285

14 Claims



1. In an electrostatographic copier or printer, a device for controlling the heat source, and hence the temperature of a heated fuser roller at a desired set point, the device including: (a) a compound having a known and precise melting point; (b) a housing containing said compound, said housing including a thermally conductive wall supported in heat transfer relationship with the heated fuser roller so as to allow the heated fuser roller to heat said compound; (c) a first temperature sensing element for sensing the temperature of said compound, said element producing output signals corresponding to the temperatures sensed; (d) a second temperature sensing element supported in heat sensing relationship with the heated fuser roller for directly sensing the temperature of the heated fuser roller; and (e) a control unit connected to the heat source of the heated

fuser roller, and to said temperature sensing elements, said control unit including means for detecting the melting point of said compound, as well as, means responsive to the detected melting point for calibrating said device.

**4,951,097**  
**METHOD AND APPARATUS FOR BONE HISTOMORPHOMETRY**

Shigeki Oguchi, Tokyo; Yasuhiro Uotani, Koshigaya, and Yoshio Hirano, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

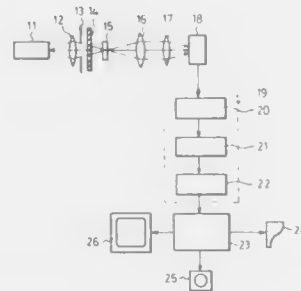
Filed Mar. 7, 1988, Ser. No. 165,058

Claims priority, application Japan, Mar. 5, 1987, 62-48840

Int. Cl.<sup>5</sup> G01J 3/51; G01N 21/64

U.S. Cl. 356—417

14 Claims



1. A method for bone histomorphometry by using a non-decalcified bone specimen, comprising the steps of: (a) obtaining two pictures A and B by recording different chromatic light transmitted through a same region of said non-decalcified bone specimen or by recording different chromatic fluorescence from the region of said non-decalcified bone specimen; (b) detecting the strength  $L_{An}$  and  $L_{Bn}$  of the corresponding image elements  $A_n$  and  $B_n$  of said two pictures A and B; (c) determining the ratio  $L_{An}/L_{Bn}$ ; (d) performing the steps (b) and (c) on all corresponding image elements of said two pictures A and B; and (e) with regard to the ratio  $L_{An}/L_{Bn}$ , calculating and expressing areas of three components of bone, said three components of bone being a calcified bone area, an osteoid area, and a bone marrow area, in said non-decalcified bone specimen.

**4,951,098**  
**ELECTRODE STRUCTURE FOR LIGHT EMITTING DIODE ARRAY CHIP**

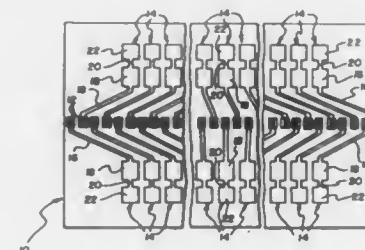
Christopher J. Albergo, Penfield, and Samuel Reece, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 21, 1988, Ser. No. 287,222

Int. Cl.<sup>5</sup> H01L 33/00

U.S. Cl. 357—17

13 Claims



4. The electrode structure defined by claim 1 in which said test pad and said bonding pad are offset relative to each other, said connecting strip extending diagonally between said pads.

**4,951,100**  
**HOT ELECTRON COLLECTOR FOR A LDD TRANSISTOR**

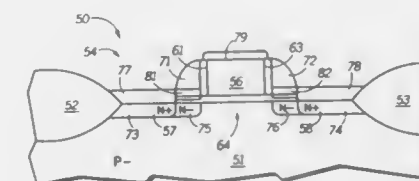
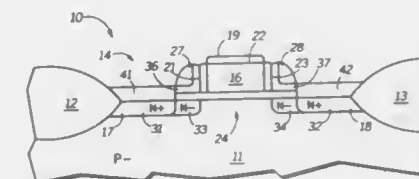
Louis C. Parrillo, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 3, 1989, Ser. No. 374,703

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—233

14 Claims



1. A transistor formed in an active region of a substrate, comprising:

- a first insulator layer on the active region;
- a gate overlying the first insulator layer at an intermediate portion of the active region leaving a first portion and a second portion of the active region uncovered by the gate, said gate having a first side and a second side, said first and second sides aligned with said first and second portions, respectively, of the active region;
- a second insulator layer coating the first and second sides of the gate;
- a lightly-doped source region in the first portion of the active region and aligned substantially with the first side of the polysilicon gate;
- a lightly-doped drain region in the second portion of the active region aligned substantially with the second side of the polysilicon gate;
- a channel region in the active region, under the gate, and between the lightly-doped source region and the lightly-doped drain region;
- a first heavily-doped region in the first portion of the active region, offset from the first side of the polysilicon gate, and adjoining the lightly-doped source region;
- a second heavily-doped region in the second portion of the active region, offset from the second side of the polysilicon gate, and adjoining the lightly-doped drain region;
- a first conductive strip adjoining the second insulator layer on the first side of the gate, over at least a portion of the lightly-doped source region, and separated from the lightly-doped source region by the first insulator layer; and
- a second conductive strip adjoining the second insulator layer on the second side of the gate, over at least a portion of the lightly-doped drain region, and separated from the lightly-doped drain region;
- a first conductive layer over the source region and in contact with the first conductive strip and the source region; and
- a second conductive layer over the drain region and in contact with the first conductive strip and the drain region.

**4,951,099**  
**OPPOSED GATE-SOURCE TRANSISTOR**

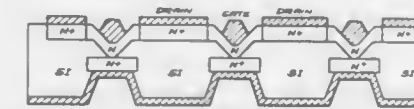
John J. Berenz, Lawndale, Calif.; G. Conrad Dalman, and Charles A. Lee, both of Ithaca, N.Y., assignors to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 727,208, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 347,226, Feb. 19, 1982, abandoned. This application Jan. 15, 1988, Ser. No. 144,452

Int. Cl.<sup>5</sup> H01L 29/80, 27/12, 29/06, 23/02

U.S. Cl. 357—22

7 Claims



1. A field effect transistor capable of operation at extremely high frequencies, comprising:

- a substrate;
- an active channel region formed in the substrate;
- a gate located on one face of the channel;
- a source region located directly opposite the gate on the opposite face of the channel, the source region having a contact interface with the channel region that is shorter in length than the contact interface between the gate and the channel region; and
- two drain regions located at opposite ends of the channel; wherein current flows in two parallel paths from the source region to the drain regions, thereby increasing the incremental transconductance of the transistor, and wherein the effective length of the gate is reduced by the effective length of the source region that shadows the gate, thereby improving the high frequency performance of the transistor.



# 4,951,101 DIAMOND SHORTING CONTACT FOR SEMICONDUCTORS

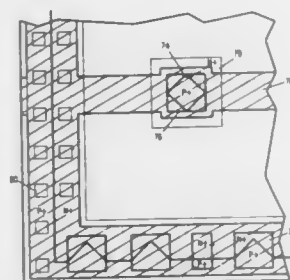
Martin J. Alter, Los Altos; Clyde M. Brown, Jr., Cupertino, and James B. Compton, Los Gatos, all of Calif., assignors to Micrel Incorporated, Sunnyvale, Calif.

Filed Aug. 25, 1988, Ser. No. 236,454

Int. Cl.<sup>5</sup> H01L 29/78, 23/48

U.S. Cl. 357—234

6 Claims



1. In a semiconductor element having substantially square first conductivity type region formed within a second conductivity type region, a shorting contact opening comprising: a substantially square contact opening overlapping at least a portion of each of said first and second conductivity type regions, but not completely overlapping said second conductivity type region, wherein sides of said first conductivity type region are at substantially 45° angles with respect to sides of said contact opening.

# 4,951,102 TRENCH GATE VCMOS

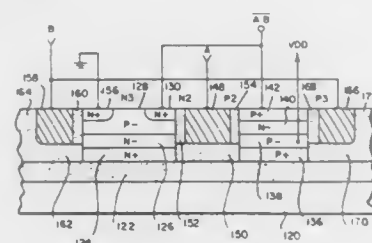
Bruce A. Beitman, Palm Bay, Fla., and Charles F. Boucher, Sunnyvale, Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 24, 1988, Ser. No. 235,543

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—23.4

20 Claims



1. An integrated circuit comprising: base insulative layer; a plurality of semiconductor islands on said base insulative layer separated laterally by dielectric trenches along vertical edges of said islands; a first MOS transistor in a first island having, along a first vertical edge of a first dielectric trench, drain and source regions of the same conductivity type separated by a channel region of an opposite conductivity type; a second MOS transistor in a second island separated from said first island vertically by said first trench and having, along a second vertical edge of said first dielectric trench, drain and source regions of the same conductivity type separated by a channel region of an opposite conductivity type; and a first gate in said first dielectric trench, separated from said first and second vertical edges of said first trench by gate dielectric layers and extending vertically at least across a vertical length of said channel regions, at said first and

second vertical edges to form a common first gate for said first and second MOS transistors.

# 4,951,103 FAST, TRENCH ISOLATED, PLANAR FLASH EEPROMS WITH SILICIDED BITLINES

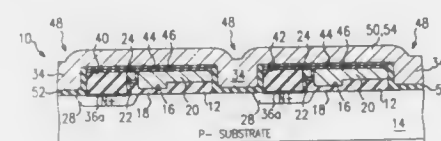
Agerico L. Esquivel, Dallas, and Allan T. Mitchell, Garland, both of Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Jun. 3, 1988, Ser. No. 202,766

Int. Cl.<sup>5</sup> H01L 29/78

U.S. Cl. 357—23.5

16 Claims



1. A nonvolatile memory cell, comprising: a substrate having a first conductivity type; a first diffusion formed in said substrate adjacent to a surface of said substrate, said first diffusion having a second conductivity type; a second diffusion formed in said substrate adjacent to said surface of said substrate, said second diffusion having said second conductivity type and being spaced from said first diffusion defining a channel region therebetween; a first insulating layer formed on a first portion of said channel region, said first insulating layer extending from said first diffusion, but not extending to said second diffusion; a floating gate formed on said first insulating layer; a second insulating layer formed on a second portion of said channel region, said second insulating layer extending from said second diffusion to an edge of said first insulating layer; a pass gate formed on said second insulating layer; a third insulating layer formed on said floating gate; and a wordline formed in conductive contact with said pass gate and on said third insulating layer.

# 4,951,104 SOLID-STATE IMAGE PICK-UP DEVICE WITH UNIFORM DISTRIBUTION OF DOPANT THEREIN AND PRODUCTION METHOD THEREOF

Yasaburo Kato, Toshihiko Suzuki, Nobuyuki Isawa, Hideo Kanbe, and Masaharu Hamasaki, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Division of Ser. No. 927,161, Nov. 5, 1986, Pat. No. 4,836,788.

This application Jan. 11, 1989, Ser. No. 295,515

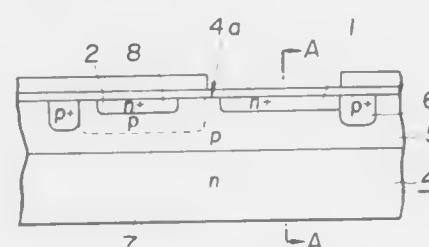
Claims priority, application Japan, Nov. 12, 1985, 60-253269;

Nov. 12, 1985, 60-253270; Nov. 12, 1985, 60-253271

Int. Cl.<sup>5</sup> H01L 29/78, 27/14, 29/167; H04N 3/14

U.S. Cl. 357—24

7 Claims



6. A solid state image pickup device, comprising: a silicon substrate formed from a silicon monocrystal by

irradiating said monocrystal with neutrons to form n-type impurities in said substrate, said substrate having a resistance rate in a range of 10 ohm-cm. to 100 ohm-cm.; and a plurality of photosensor elements and shift registers on said substrate.

# 4,951,105 SOLID-STATE IMAGE PICKUP DEVICE

Tetsuo Yamada, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

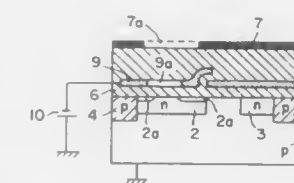
Filed Mar. 8, 1989, Ser. No. 320,617

Claims priority, application Japan, Mar. 8, 1988, 63-54494

Int. Cl.<sup>5</sup> H01L 27/14, 31/00

U.S. Cl. 357—30

4 Claims



1. A solid-state image pickup device comprising: a semiconductor layer of one conductivity type; a photosensitive pixel section having a plurality of photosensitive pixels formed at the surface portion of the semiconductor layer, said photosensitive pixel section being such that a plurality of impurity layers of an opposite conductivity type sensitive to light to generate signal carriers, are regularly arranged; an element isolation layer formed adjacent to each of said photosensitive pixels constituting said photosensitive pixel section to allow said photosensitive pixels to be isolated from each other; transfer means for transferring said signal carriers; and a storage electrode formed above the upper portion of each of said photosensitive pixels and responsive to the application of a voltage to allow carriers having a polarity opposite that of said signal carriers, to be injected from said element isolation layer of said one conductivity type into the surface portion of each of said photosensitive pixels, thus reducing a dark current at said surface portion of each of said photosensitive pixels, wherein said storage electrode is provided with an opening at a portion corresponding to an optical path to which light is incident.

# 4,951,106 DETECTOR DEVICE FOR MEASURING THE INTENSITY OF ELECTROMAGNETIC RADIATION

Morley M. Blouke, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 24, 1988, Ser. No. 172,511

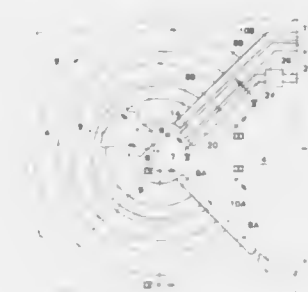
Int. Cl.<sup>5</sup> H01L 27/14, 29/78, 29/06

U.S. Cl. 357—30

11 Claims

1. A detector device for measuring the intensity of electromagnetic radiation in a given spectral region, comprising: a body of semiconductor material that responds to electromagnetic radiation in said given spectral region by generating charge carriers, the body of semiconductor material having a region of a first conductivity type and a channel of a second, opposite, conductivity type at one surface thereof and bounded by the region of said first conductivity type, the channel being part circular in configuration, a layer of dielectric material on said one surface of the body of semiconductor material and overlying said channel, a layer of resistive material on top said layer of dielectric material, the layer having two terminal regions such that when opposite terminals of a DC potential source are

connected to those terminal regions, an electric field that extends longitudinally of the channel is created, so that charge carriers are transported along the channel to an end region thereof, and



an output device having a charge collection region adjacent to said end region of the channel.

# 4,951,107 KINETIC ENERGY MODULATED HOT ELECTRON TRANSISTOR

En-Jun Zhu, Institute for Microelectronics Peking University, Beijing, China

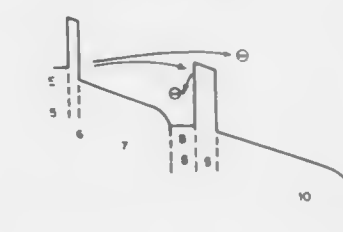
Filed Aug. 18, 1987, Ser. No. 87,069

Claims priority, application China, Aug. 21, 1986, 86105050

Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—34

7 Claims



1. A hot electron transistor comprising an emitter, a base and a collector, said base being separated from said emitter and from said collector by input and output heterojunctions respectively, said input heterojunction comprising a relatively thin barrier layer, through which electrons may be injected from said emitter by a tunnelling effect, and a relatively thick electron drift region disposed between said barrier layer and said base.

# 4,951,108 LATERAL TRANSISTOR WITH ELONGATED EMITTER

Pierre Leduc, Colleville-Montgomery, France, assignor to U.S. Philips Corp., New York, N.Y.

Filed Dec. 28, 1988, Ser. No. 291,928

Claims priority, application France, Dec. 30, 1987, 87 18388

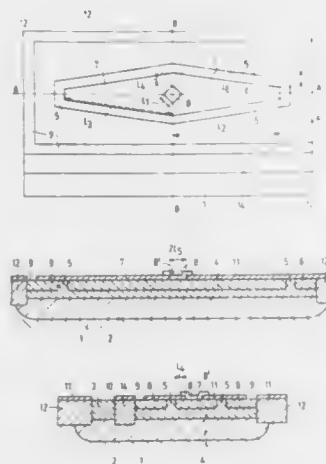
Int. Cl.<sup>5</sup> H01L 29/72

U.S. Cl. 357—36

8 Claims

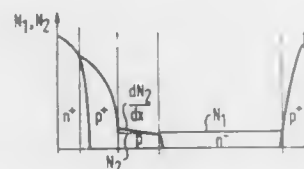
1. An integrated circuit having a lateral transistor comprising emitter and collector regions of a first conductivity type laterally spaced apart and extending from the surface of a region of a second conductivity type opposite to the first type, the lateral space of said region of the second type situated between the emitter and collector regions forming the base of the transistor, and comprising electrical emitter and collector connections, each of which has at least one zone in electrical contact through windows of an insulating layer with the emitter region and with the said collector region, respectively, the emitter region having a depth and a doping level such that the

diffusion length of the minority charge carriers vertically injected into the latter region during operation is greater than or equal to the thickness of said region, the ratio between the surface of the said emitter region and that of the said electrical



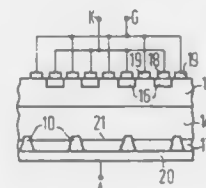
connection emitter zone being at least equal to 20, characterized in that the emitter region has at least one elongate branch in a first longitudinal direction, the ratio between the largest dimension in the said longitudinal direction and the largest width of said transversal branch being at least equal to 5.

**4,951,109**  
**TURN-OFF POWER SEMICONDUCTOR COMPONENT**  
Martin Bechteler, Kirchheim, and Wolfgang Gross, Unterfoehring, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Mar. 9, 1988, Ser. No. 165,874  
Int. Cl.<sup>5</sup> H01L 29/74  
U.S. Cl. 357—38  
14 Claims



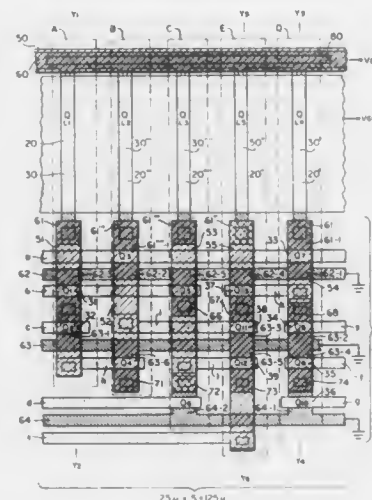
1. A turnoff power semiconductor device having a semiconductor body, the device comprising:  
at least two contiguous zones of opposite conductivity type that form a blocking p-n junction when subject to a turn-off condition, one zone having a constant dopant concentration ( $N_1$ ), and the other zone having a region at least  $20 \times 10^{-6}$  m wide contiguous with the p-n junction;  
the region having a basic dopant concentration  $N_2 = j/(e \cdot v)$  with  $j$  = maximum current density at turnoff,  $e$  = elementary charge, and  $v = 10^7$  cm/sec; and  
this region having a maximum doping gradient of  $dN_2/dx = 5 \times 10^{16} \text{ cm}^{-4}$ .

**4,951,110**  
**POWER SEMICONDUCTOR STRUCTURAL ELEMENT WITH FOUR LAYERS**  
Gerhard Miller, Penzing; Jenoe Tihanyi, and Peter Wehr, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Oct. 31, 1988, Ser. No. 264,416  
Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737288  
Int. Cl.<sup>5</sup> H01L 29/74  
U.S. Cl. 357—38  
5 Claims



1. A power semiconductor structural element comprising:  
at least one cathode-side emitter region;  
at least one cathode-side base region;  
a central region; and  
at least one anode-side emitter region, forming a pn-junction with said central region, and containing regions damaged by laser energy wherein:  
said damaged regions extend through said pn-junction between said anode-side emitter region and central region up into said central region.

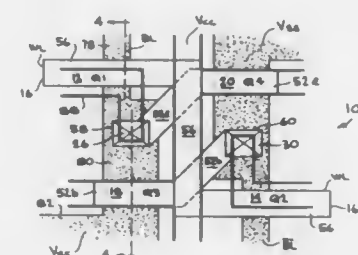
**4,951,111**  
**INTEGRATED CIRCUIT DEVICE**  
Hirohiko Yamamoto, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Japan  
Continuation of Ser. No. 427,883, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 199,278, Oct. 21, 1980, abandoned, which is a continuation of Ser. No. 15,758, Feb. 27, 1979, abandoned, which is a continuation of Ser. No. 844,395, Oct. 21, 1977, abandoned, which is a continuation of Ser. No. 694,829, Jun. 10, 1976, abandoned. This application Jan. 3, 1985, Ser. No. 689,491  
Claims priority, application Japan, Jun. 13, 1975, 50-71773  
Int. Cl.<sup>5</sup> H01L 27/105  
U.S. Cl. 357—41  
9 Claims



1. An integrated circuit device comprising a plurality of unit logic circuits arranged in parallel with each other and each

elongated in a longitudinal direction, each of said logic circuits including at least one insulated-gate field effect transistor as a logic element arranged in the longitudinal direction, an input signal polysilicon wiring layer formed of a laterally extended semiconductor layer on a semiconductor substrate as a first level of layer, an output signal wiring layer formed of a laterally extended semiconductor layer on said semiconductor substrate at said first level of layer, a metal conductive layer formed as a second level of layer above said first level of layer, said metal conductive layer extending in the longitudinal direction and connected to the drain of said at least one transistor at a first portion thereof over the drain of said transistor and to said output signal wiring layer at an intersection therebetween separate from said first portion, and a laterally extended diffusion region formed in the semiconductor substrate and connected to a reference potential, said input and output signal wiring layers and said diffusion region having substantially no superposition therebetween, the source of said at least one transistor being connected to said laterally extended diffusion region, part of said input signal wiring layer serving as the silicon gate electrode of said transistor, said unit logic circuits being interconnected to constitute a random gate logic circuit, said interconnection of said unit logic circuits including a connection of said output signal wiring layer of one of said unit logic circuits, through the area of another of said unit logic circuit, to said input signal wiring layer of still another of said unit logic circuits.

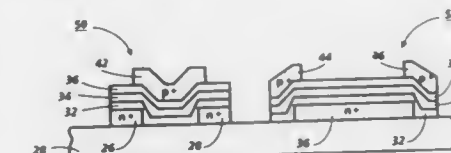
**4,951,112**  
**TRIPLE-POLY 4T STATIC RAM CELL WITH TWO INDEPENDENT TRANSISTOR GATES**  
Tat C. Choi, Milpitas; Richard K. Klein, and Craig S. Sander, both of Mountain View, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
Continuation of Ser. No. 88,215, Jan. 28, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 280,782  
Int. Cl.<sup>5</sup> H01L 27/11; G11C 11/412  
U.S. Cl. 357—41  
5 Claims



1. In a structure of an insulated gate field effect transistor static random access memory cell, comprising two pass-gate insulated gate field effect transistors and a flip-flop with two pull-down insulated gate field effect transistors, each pass-gate field effect transistor and each pull-down field effect transistor comprising source and drain semiconductor regions of first conductivity type spaced from each other by a channel region of second, opposite conductivity type, each channel being overlaid by a gate conductor separated from the corresponding channel by a gate insulator layer, the source to drain path of one pass-gate transistor being coupled in series with the source to drain path of one pull-down transistor at a first node, the source to drain path of the other pass-gate transistor being coupled in series with the source to drain path of the other pull-down transistor at a second node, with the gate of said one pull-down transistor being connected to said second node and the gate of said other pull-down transistor being connected to said first node to form said flip-flop, the improvement comprising: said one pass-gate transistor being located adjacent said other pull-down transistor, and said other pass-gate transistor being located adjacent said one pull-down transistor, such that

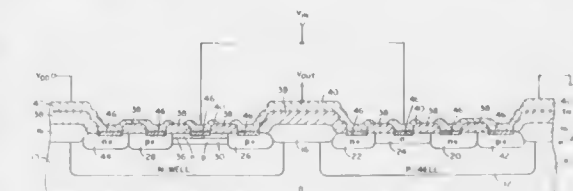
said pull-down transistors and said pass-gate transistors form a physically symmetrical structure, the gate conductor of said one pass-gate transistor and the gate conductor of said other pass-gate transistor being parts of a physically continuous conductor member which passes from said one pass-gate transistor, through an area between said pull-down transistors, to said other pass-gate transistor.

**4,951,113**  
**SIMULTANEOUSLY DEPOSITED THIN FILM CMOS TFTS AND THEIR METHOD OF FABRICATION**  
Tiao-Yuan Huang; Anne Chiang, both of Cupertino, and I-Wel Wu, San Jose, all of Calif., assignors to Xerox Corporation, Stamford, Conn.  
Filed Nov. 7, 1988, Ser. No. 268,832  
Int. Cl.<sup>5</sup> H01L 29/78  
U.S. Cl. 357—42  
3 Claims



1. A thin film SOI CMOS device including complementary transistors supported upon an insulating substrate, said transistors characterized by comprising:  
first source and drain elements of one transistor and first gate element of a complementary transistor all formed of a first doped semiconductor material, of one conductivity type, and disposed at a first level upon said substrate,  
second gate element of said one transistor and second source and drain elements of said complementary transistor all formed of a second doped semiconductor material, of the opposite conductivity type, and disposed at a second level above said substrate, and  
a tri-layer stack disposed at an intermediate level between said first and said second levels, including a pair of intrinsic or lightly doped semiconductor layers separated by a dielectric layer, and wherein one of said intrinsic or lightly doped layers is contiguous to said first source and drain elements and said first gate element and serves as the active channel layer for said one transistor and the other of said intrinsic or lightly doped layers is contiguous to said second source and drain elements and said second gate element and serves as the active channel layer for said complementary transistor.

**4,951,114**  
**COMPLEMENTARY METAL ELECTRODE SEMICONDUCTOR DEVICE**  
Edward T. Lewis, Sudbury, Mass., and Dale L. Montrone, Londonderry, N.H., assignors to Raytheon Company, Lexington, Mass.  
Filed Dec. 5, 1988, Ser. No. 279,735  
Int. Cl.<sup>5</sup> H01L 29/80  
U.S. Cl. 357—42  
4 Claims



1. A semiconductor device comprising:



an enhancement mode n-channel field effect transistor having a metal electrode for coupling to a first control signal; an enhancement mode p-channel field effect transistor having a metal electrode for coupling to a second control signal; an n-type barrier enhancement implanted into a shallow portion of the p-channel of said p-channel enhancement mode field effect transistor for providing an enhanced forward Schottky voltage; and means for serially coupling said enhancement mode n-channel field effect transistor to said enhancement mode p-channel field effect transistor.

4,951,115

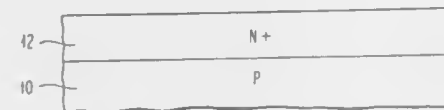
# COMPLEMENTARY TRANSISTOR STRUCTURE AND METHOD FOR MANUFACTURE

David L. Harame, Mohegan Lake; Gary L. Patton, Poughkeepsie, and Johannes M. C. Stork, Yorktown Heights, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,374  
Int. Cl.<sup>5</sup> H01L 27/02

U.S. Cl. 357—44

23 Claims



1. A transistor structure including a complementary pair of first and second vertical bipolar transistors on a common semiconductor substrate comprising:  
a first epitaxial layer of semiconductor material of a first conductivity type formed on the surface of a semiconductor substrate of a second conductivity type opposite to said first conductivity type, a sub-emitter region of said first conductivity type for said first transistor being formed in said first layer;  
a sub-collector region of said second conductivity type for said second transistor formed in the first layer;  
a second epitaxial layer of semiconductor material of said second conductivity type formed on the surface of said first layer;  
a third epitaxial layer of semiconductor material of said first conductivity type formed on the surface of said second layer;  
deep recessed isolation regions extending from the surface of said third layer into said substrate, said deep isolation regions surrounding each of said transistors;  
intrinsic base and collector regions of said first transistor formed in said second and third layers respectively and intrinsic collector and base regions of said second transistor formed in said second and third layers respectively;  
shallow recessed isolation regions formed in said second and third layers surrounding said intrinsic base and collector regions;  
a pair of extrinsic base regions of said first conductivity type for said second transistor and an extrinsic collector region of said first conductivity type for said first transistor formed on the surface of said third layer;  
a sub-emitter reach-through region of said first conductivity type formed in said second and third layers;  
an extrinsic base region of said second conductivity type for said first transistor overlying said collector region of said first conductivity type;  
a sub-collector reach-through region of said second conductivity type formed in said second and third layers; and  
an emitter region of said second conductivity type for said second transistor formed overlying said base region of said first conductivity type.

4,951,116

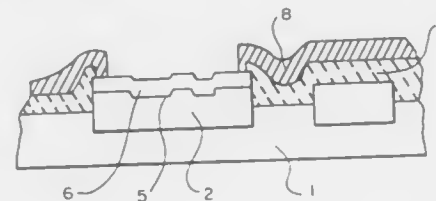
# READ-ONLY MEMORY WITH IDENTIFICATION PATTERN

Takayoshi Kagawa, Nara, and Suehiro Ishikura, Fukuyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 240,393, Aug. 29, 1988, abandoned, which is a continuation of Ser. No. 830,541, Feb. 18, 1986, abandoned. This application Jan. 19, 1990, Ser. No. 467,334  
Claims priority, application Japan, Mar. 6, 1985, 60-45334  
Int. Cl.<sup>5</sup> H01L 27/12

U.S. Cl. 357—49

4 Claims



1. A read-only memory into which data are written by ion implantation comprising  
a substrate having element areas thereon, and  
a field SiO<sub>2</sub> layer formed around said element areas on said substrate, said field SiO<sub>2</sub> layer having an ion-implanted surface area of a selected pattern, said pattern being indicative of the type of said memory, said surface area having unevenness formed thereon in a same fabrication process wherein said element areas are processed, said unevenness including indentations and protrusions in a visually distinguishable pattern to serve as an identification mark, said indentations and protrusions being covered by a polysilicon layer serving to make said identification mark more discernible.

4,951,117

# ISOLATION OF INSULATED-GATE FIELD-EFFECT TRANSISTORS

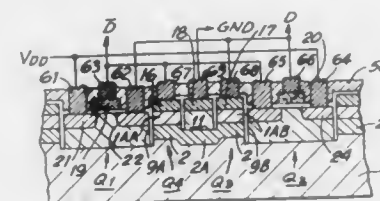
Naoki Kasai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 19, 1988, Ser. No. 234,358

Claims priority, application Japan, Aug. 21, 1987, 62-208723  
Int. Cl.<sup>5</sup> H01L 27/12

U.S. Cl. 357—49

5 Claims



1. A semiconductor device comprising a semiconductor substrate having a first portion, a second portion and a third portion arrayed therein laterally and adjacently in this order, a first thin insulator film projecting from a surface of said substrate down into said substrate and interposed between said first portion and said second portion of said substrate, a second thin insulator film projecting from the surface of said substrate down into said substrate more deeply than said first thin insulator film and interposed between said second portion and said third portion of said substrate, a first region of one conductivity type formed at the upper surface of said second portion of said substrate and extending laterally between said first and second thin insulator films a second region of said one conductivity type buried within said second portion of said substrate

under said first region and extending in the depthwise direction more deeply than said first thin insulator film and more shallowly than said second thin insulator film, a third region of the opposite conductivity type formed in said second portion of said substrate and interposed in the depthwise direction between said first region and said second region, said third region laterally extending between said first and second thin insulator films, a fourth region formed in said third portion of said substrate so as to contact with said second thin insulator film and to face said third region via said second thin insulator film, said fourth region being isolated from said first, second and third regions by said second thin insulator film, and a fifth region of said one conductivity type formed in said first portion of said substrate and electrically connected to said second region under said first thin insulator film, said fifth region being electrically isolated from said first region by said first thin insulator film, said first region working as one of a source and a drain of a vertical MOS transistor of one conductivity type channel, said second region working as the other of the source and the drain of said vertical MOS transistor, said fourth region working as the gate of said vertical MOS transistor, and said fifth region serving for electrical connection to said second region.

4,951,118

# SEMICONDUCTOR DEVICE HAVING RESISTOR STRUCTURE

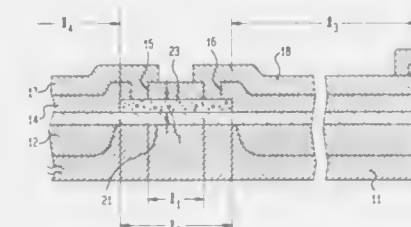
Toshio Nakamura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 916,409, Oct. 7, 1986. This application Jul. 25, 1988, Ser. No. 225,653

Claims priority, application Japan, Oct. 7, 1985, 60-224413  
Int. Cl.<sup>5</sup> H01L 27/02

U.S. Cl. 357—51

6 Claims



1. A semiconductor device comprising:  
a semiconductor substrate having a major surface;  
a field insulating layer selectively formed on said substrate and having a uniform bottom contacted to said substrate where any circuit element is free therefrom, said field insulating layer having a thickness ranging from 1.3  $\mu\text{m}$  to 3.0  $\mu\text{m}$ ;  
an island-like portion of said major surface of said substrate protruded from said uniform bottom of said field insulating layer, surrounded completely by said field insulating layer, and having a rectangular plan shape where by circuit element is free therefrom;  
an insulating film covering and attached to said island-like portion of said major surface of said substrate, entirely, said insulating film having a uniform thickness ranging from 0.05  $\mu\text{m}$  to 0.8  $\mu\text{m}$  so that said insulating film is thinner than the thickness of said field insulating layer;  
a resistor element formed on and attached to said insulating film only above said island-like protruded portion of said major surface of said substrate such that any part of said resistor element is not deposited on said field insulating layer and that all parts of said resistor element are isolated from said major surface of said substrate by said insulating film; and  
a pair of wiring layers connected to a pair of end parts, respectively, of said resistor element above said island-like portion of said major surface of said substrate and extending above said field insulating layer.

4,951,119

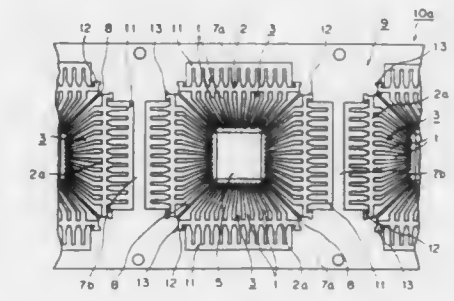
# LEAD FRAME FOR SEMICONDUCTOR DEVICES

Kazuo Yonemochi, Shimotakai; Akio Imoto, Koaboku, and Tokuji Harada, Suzaka, all of Japan, assignors to Shinko Electric Industries, Co., Ltd., Nagano, Japan

Filed Feb. 8, 1989, Ser. No. 307,841  
Claims priority, application Japan, Feb. 8, 1988, 63-27274  
Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357—70

6 Claims



3. A lead frame for semiconductor devices, comprising:  
a plurality of lead sets, each lead set being made of a metal strip including a plurality of leads arranged side by side with a small clearance therebetween and at least one connecting member for integrally connecting said leads;  
a stage support member made of a metal strip including a stage for mounting a semiconductor chip thereon, a frame structure including at least a pair of upper and lower rails defining respective side edges of said metal strip, and support bars extending from said stage to said frame structure, so that openings are defined between said stage and said frame structure and between said adjacent support bars, said stage, frame structure and support bars being coplanar; and  
said plurality of lead sets being arranged in positions in said openings of the stage support member such that tips of said leads are arranged opposite to a periphery of said stage;  
wherein said connecting member is provided at respective ends thereof with projections and said stage support member is provided with corresponding recesses so that said projections of said lead sets are fitted into said corresponding recesses of said stage support member so that the plurality of lead sets, the stage, frame structure and support bars are coplanar.

4,951,120

# LEAD FRAME AND SEMICONDUCTOR DEVICE USING THE SAME

Yasuhisa Hagiwara, Mitaka, and Masachika Masuda, Kodaira, both of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan

Continuation of Ser. No. 90,552, Aug. 28, 1987, abandoned, which is a continuation of Ser. No. 898,535, Aug. 21, 1986, abandoned. This application Dec. 13, 1988, Ser. No. 283,842

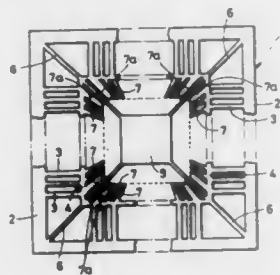
Claims priority, application Japan, Oct. 7, 1985, 60-221832  
Int. Cl.<sup>5</sup> H01L 23/48, 29/44, 29/52

U.S. Cl. 357—70

11 Claims

1. A semiconductor integrated circuit device comprising a tab having at least three tab suspending leads connected to said tab and extending outwardly therefrom, an integrated circuit chip having a plurality of bonding pads on a first surface thereof, said chip being bonded on said tab at a second surface of said chip, a plurality of leads comprising respective inner lead portions with free ends located in the vicinity of the peripheral side of said tab and outer lead portions, said inner lead portions comprising relatively narrow leads and relatively wide leads which are wide at least at their respective free end portions, the wide leads and the narrow leads being located in

substantially the same plane, bonding wires extending between and electrically connecting the inner leads portions at their free ends and said bonding pads, wherein said chip, tab, inner lead

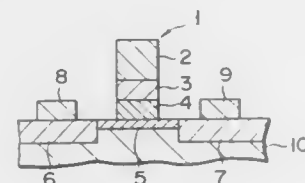


portions of said leads and said bonding wires are encapsulated in a material, and wherein said wide leads are located adjacent to said tab suspending leads.

**4,951,121**  
**SEMICONDUCTOR DEVICE WITH A 3-PLY GATE ELECTRODE**

Motoki Furukawa, Yokohama; Yoshihiro Kishita, Kawasaki, and Tatsuro Mitani, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 303,057, Jan. 27, 1989, which is a continuation of Ser. No. 191,772, May 2, 1988, which is a continuation of Ser. No. 797,496, Nov. 13, 1985, abandoned. This application Dec. 28, 1989, Ser. No. 456,628  
Claims priority, application Japan, Nov. 14, 1984, 59-238513  
Int. Cl.<sup>5</sup> H01L 23/48, 29/80, 29/48  
U.S. Cl. 357-71

5 Claims

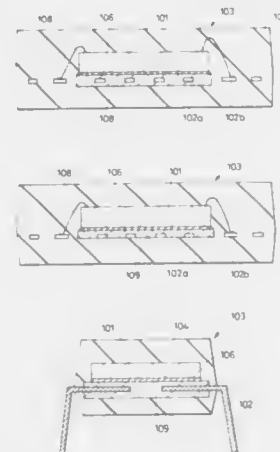


1. A semiconductor device comprising:  
a compound semiconductor substrate whose surface is provided with a source region, a drain region and an intervening channel region;  
a source electrode formed on said source region;  
a drain electrode formed on said drain region; and  
a 3-ply gate electrode mounted on said channel region and consisting of a high melting metal layer, a barrier metal layer and a gold layer, respectively, said high melting metal layer being TiW, and said barrier metal being Mo.

**4,951,122**  
**RESIN-ENCAPSULATED SEMICONDUCTOR DEVICE**  
Kunihiko Tsubosaki, Hino; Gen Murakami, Machida; Toshiyuki Sakuta, Hamura; Masamichi Ishihara, Hino; Satoru Ito, Tokyo, and Yasuo Mori, Ohme, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed May 27, 1988, Ser. No. 199,538  
Claims priority, application Japan, May 27, 1987, 62-128248; Aug. 20, 1987, 62-206913; Sep. 18, 1987, 62-234188  
Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357-72  
1. In a resin-encapsulated semiconductor device wherein a semiconductor pellet is fixed by die bonding to a pellet placing portion formed by a plurality of leads; a resin-encapsulated

semiconductor device characterized in that said semiconductor pellet is fixed by die bonding to a resin mold piece which is

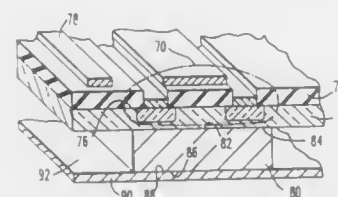


formed so as to cover at least a front surface and both side surfaces of said each lead.

**4,951,123**  
**INTEGRATED CIRCUIT CHIP ASSEMBLY UTILIZING SELECTIVE BACKSIDE DEPOSITION**

Soong H. Lee, Potomac, Md.; Chun L. Lau, Colorado Springs, Colo.; Daniel C. Buck, Hanover, and Dale E. Dawson, Glen Burnie, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Sep. 30, 1988, Ser. No. 252,234  
Int. Cl.<sup>5</sup> H01L 23/02  
U.S. Cl. 357-81

41 Claims

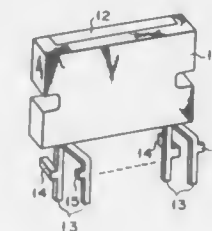


1. In an integrated circuit chip assembly having an integrated circuit and at least one microstrip transmission line disposed on a first side of a dielectric substrate and a ground plane acting at least as a heat sink, with the substrate further having a second surface and a predetermined thickness, the integrated circuit having at least one heat generating electronic device within the substrate occupying an area on the substrate, the ground plane having a first and second surface and the at least one transmission line disposed on the substrate first surface and spaced apart from the electronic device, the improvement comprising:

a spacing segment associated with each heat generating device comprised of a material having high thermal conductivity and low electrical conductivity selectively interposed between the first surface of the ground plane and the second surface of the substrate, the segment having an area approximately equal to and approximately conforming to the heat generating device area and positioned against the substrate second surface in a region opposite the heat generating device such that the segment provides a path for heat transfer from the electronic device on the substrate to the ground plane and each segment further provides structural reinforcement to the assembly to permit a smaller substrate thickness and enhance heat transfer from the device to the ground plane.

**4,951,124**  
**SEMICONDUCTOR DEVICE**  
Hiromichi Sawaya, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 88,285, Aug. 24, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 346,353  
Claims priority, application Japan, Oct. 24, 1986, 61-253215  
Int. Cl.<sup>5</sup> H01L 23/40, 23/34, 23/12, 23/48  
U.S. Cl. 357-81

3 Claims



1. A semiconductor device comprising:  
a package having a front surface, a back surface, and a bottom surface;  
a heat sink disposed in said front surface and a semiconductor pellet disposed between said front and back surfaces;  
a plurality of external lead-in wires extending from said bottom surface of said package, selected ones of said lead-in wires being bent at a predetermined interval toward said back surface of said package to form a first row of external lead-in wires, the remaining ones of said external lead-in wires forming a second row offset with respect to said first row; and  
projection means, formed on selected ones of said second row of external lead-in wires, for offsetting a force applied to said external lead-in wires by the weight of said heat sink to thereby prevent tilting of said package about said external lead-in wires and to prevent subsequently formed cracks in said pellet when the tilting is forcibly reversed, said projection means extending substantially perpendicular to respective ones of said outermost external lead-in wires toward said front surface of said package.

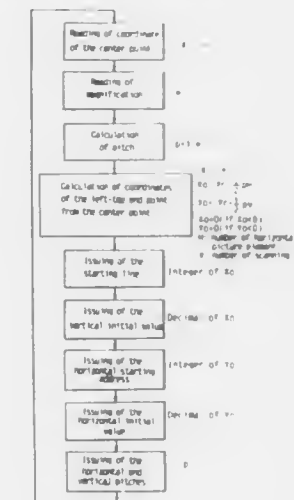
**4,951,125**  
**IMAGE PICKUP APPARATUS**  
Ichiro Kojima, Amagasaki, and Atsushi Morimura, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
Filed Apr. 12, 1989, Ser. No. 336,490  
Claims priority, application Japan, Apr. 12, 1988, 63-89827; Jul. 22, 1988, 63-184320; Nov. 16, 1988, 63-289297  
Int. Cl.<sup>5</sup> H04N 5/14

U.S. Cl. 358-22

9 Claims

1. An image pickup apparatus comprising:  
a solid-state image pickup element;  
a drive circuit which controls to execute and stop vertical scanning of said image pickup element in response to a control signal C1;  
n pieces of line memories (M1-Mn) for storing data of scanning lines;  
change-over means for selectively giving an output signal SO of said image pickup element to said line memories in response to a control signal C2;  
a selector for selecting output signals of m pieces of said line memories in response to a control signal C3;  
at least one multiplier for multiplying output signals S1-Sm of said selector by weight signals W1-Wm, respectively;  
an adder for adding output signals of said multiplier to each other; and  
a control signal generating circuit which issues said control signals C1, C2, C3 and W1-Wm and controls said change-over means to execute vertical transferring of said image pickup element, thereby to supply a new line's signal SON

and write said new line's signal SON to a line memory Mx selected from among said line memories M1-Mn, wherein signal stored in said line memory Mx is the oldest one among signals stored in said line memories M1-Mn; wherein  
said n, m and x hold the relations:

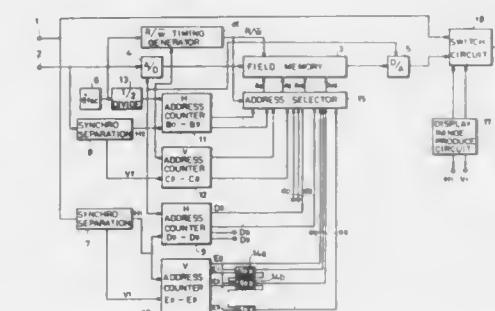


$$\begin{aligned} n &\geq 3, \\ 2 &\leq m < n, \\ 1 &\leq x \leq n. \end{aligned}$$

wherein  
n, m and x are integers.

**4,951,126**  
**VIDEO SIGNAL PROCESSING METHOD AND APPARATUS THEREFOR FOR CREATING A PICTURE-IN-PICTURE**  
Ichirou Ohta, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan  
Filed Jan. 28, 1987, Ser. No. 7,982  
Claims priority, application Japan, Feb. 10, 1986, 61-27667  
Int. Cl.<sup>5</sup> H04N 9/64  
U.S. Cl. 358-22

26 Claims



1. A video signal process method comprising the steps of:  
supplying a composite video signal including chrominance subcarrier having a constant frequency;  
sampling said composite video signal at regular intervals and at a frequency N/(N+1) (N: natural number) times said frequency of said chrominance subcarrier; and  
reading said sampled composite video signal at regular intervals and at a frequency N times said frequency of said chrominance subcarrier.



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AUGUST 21, 1990

4,951,127

**DIGITAL COLOR-SIGNAL-PROCESSING CIRCUIT THAT PROVIDES INDEPENDENT PROCESSING OF HUE AND SATURATION COMPONENTS IN A COLOR TELEVISION**

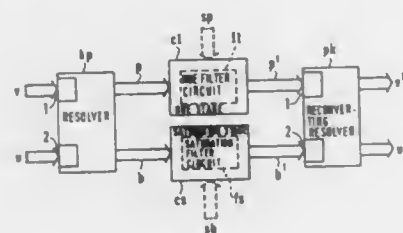
Soenke Mehrgardt, March-Neuershausen, and Peter M. Flamm, March, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany  
Filed Jan. 12, 1989, Ser. No. 296,092

Claims priority, application European Pat. Off., Jan. 21, 1988, 88 10 0829

Int. Cl.<sup>5</sup> H04N 9/64

U.S. Cl. 358—28

7 Claims



1. A digital color-signal-processing circuit for a color television receiver, said circuit receiving color information as a R-Y color-difference signal and a B-Y color-difference signal, said circuit comprising:

- a resolver that receives said R-Y color-difference signal and said B-Y color difference signal as a pair of cartesian coordinates and converts said pair of cartesian coordinates into polar coordinates comprising a phase-angle signal and a magnitude signal;
- a hue stage that receives said phase-angle signal and generates a modified phase-angle signal, said hue stage comprising an adder having a first input, a second input and an output, said first input of said adder receiving said phase-angle signal output of said resolver, said second input receiving a hue-control or hue-correction signal, said output providing a modified phase-angle signal;
- a saturation stage that receives said magnitude signal and generates a modified magnitude signal; and
- a first filter circuit having an input and an output, said input receiving said magnitude signal output of said resolver, said output providing said hue-control or hue-correction signal.

4,951,128

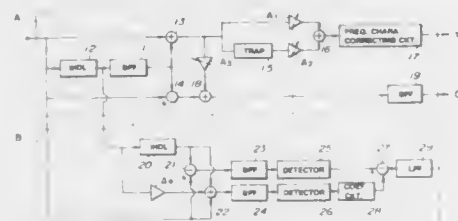
**CORRELATION DETECTING FOR INDICATING THE CORRELATION OF VERTICALLY ALIGNED PIXEL DATA**

Yoshitaka Miyake, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
Filed Oct. 5, 1988, Ser. No. 253,563

Claims priority, application Japan, Oct. 9, 1987, 62-255561  
Int. Cl.<sup>5</sup> H04N 9/78

U.S. Cl. 358—31

38 Claims



1. A correlation detecting method for use in a video process-

ing system supplied with a video signal having a chrominance component, comprising the steps of:  
combining three successive line intervals of the video signal to produce a first signal by obtaining the sum of said video signals of said three successive line intervals;  
combining at least two of said three successive line intervals of the video signal to produce a second signal by obtaining the difference between the video signals of said two line intervals;  
detecting absolute values of said first and second signals, respectively; and  
subtracting one of the absolute values of said first and second signals from the other to produce a difference signal representing correlation.

4,951,129

**DIGITAL PREFILTERING OF ENCODED VIDEO SIGNALS**

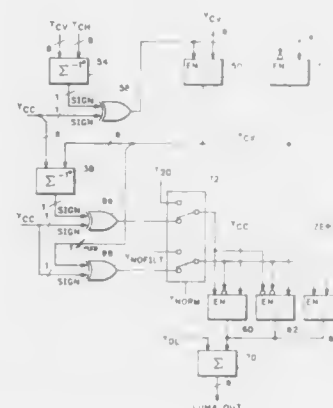
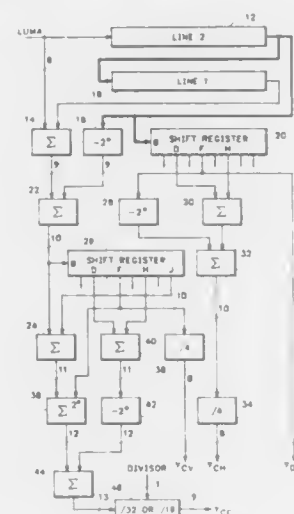
Stuart E. Lang, Montville, N.J., assignor to Dubner Computer Systems, Inc., Paramus, N.J.

Filed Jan. 9, 1989, Ser. No. 294,235

Int. Cl.<sup>5</sup> H04N 9/78

U.S. Cl. 358—31

14 Claims



1. A method of encoding a luminance and two chrominance components representing a color video image into an encoded video signal comprising the steps of:

- filtering the luminance component in multiple dimensions to produce a luminance limit signal that represents peaks and edges in the luminance component and to produce a luminance correction signal in each dimension;

AUGUST 21, 1990

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4,951,131

**REMOTE CONTROL FOR CONVERGENCE OF PROJECTION TELEVISION**

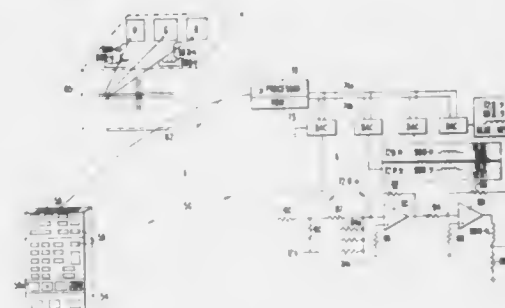
Clarence E. Lindahl, Knoxville, Tenn., assignor to North American Philips Corp., New York, N.Y.

Filed Feb. 21, 1989, Ser. No. 313,663

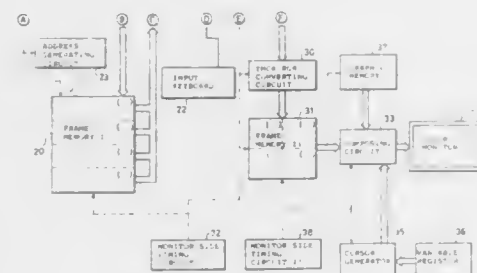
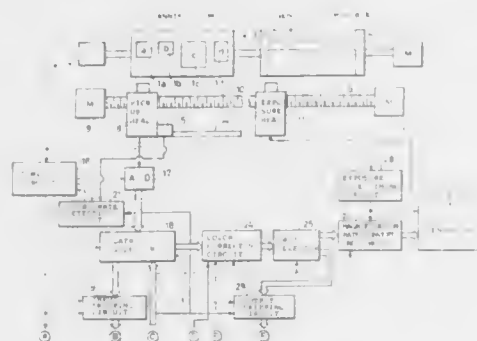
Int. Cl.<sup>5</sup> H04N 9/31

U.S. Cl. 358—60

20 Claims

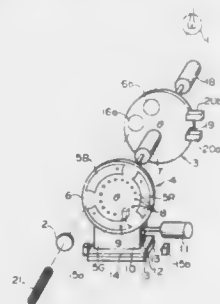


second memory means for storing said corrected image signals, said second memory means having a first memory capacity;  
means for displaying a plurality of images corresponding to said corrected image signals stored in said second memory means;  
said means for displaying a plurality of images comprising a



prescribed image display region and a third memory means for storing therein image signals which are effective for displaying images on said prescribed image display region,  
said third memory means having a second memory capacity, and  
said first memory capacity being equivalent to said second memory capacity.

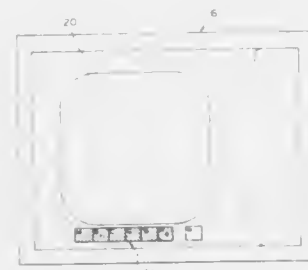
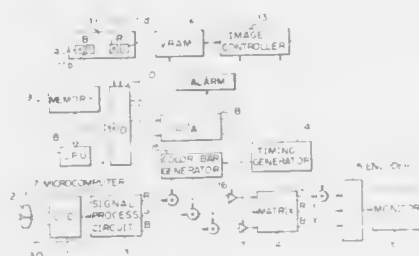
**4,951,133**  
**ENDOSCOPE LIGHT SOURCE APPARATUS**  
Fumiya Onoda, Fuchuu, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Filed Jul. 7, 1989, Ser. No. 376,458  
Claims priority, application Japan, Oct. 15, 1988, 63-260019  
Int. Cl.<sup>5</sup> H04N 7/18, 5/33; A61B 1/06  
U.S. Cl. 358-98 12 Claims



1. An endoscope light source apparatus to which a fiber-

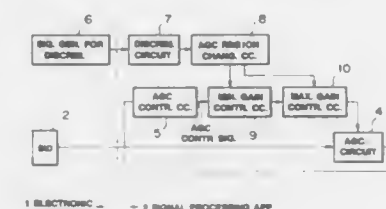
scope or an electronic endoscope can be connected comprising:  
a light source emitting illuminating light;  
an illuminating light emitting end for feeding a connected scope with said illuminating light output from said light source;  
a rotary filter means removably provided on an optical axis connecting said light source and said illuminating light emitting end, having a rotary filter sequentially transmitting light of a specific wavelength of the illuminating light from said light source in case said rotary filter means is inserted on the optical axis; and  
a character changing means having a plurality of character filters and changing a character of the illuminating light from said light source by selectively interposing said character filters on said optical axis corresponding to the connected scope.

**4,951,134**  
**COLOR TONE CONTROLLER FOR ENDOSCOPE**  
Masaaki Nakasima, and Tadashi Takahashi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed May 12, 1988, Ser. No. 192,926  
Claims priority, application Japan, May 18, 1987, 62-122334  
Int. Cl.<sup>5</sup> H04N 9/64; A61B 1/04  
U.S. Cl. 358-98 18 Claims



1. A color tone controller for an endoscope having converting means for converting an observed image into an electric signal and monitor means for reproducing an observed image on the basis of said electric signal input thereto, said controller comprising:  
color tone control means for selectively controlling the color tone of the image reproduced by said monitor means independently of the image reproduced by said monitor means, said color tone control means effecting color tone control by changing the intensities of at least two color components among the three primary colors; and  
color tone display means for quantitatively displaying on said monitor means the contents of color tone control effected with said tone control means, wherein said color tone display means digitally displays on said monitor means the intensities of the color components which are changeable in the form of numerals.

**4,951,135**  
**ELECTRONIC-TYPE ENDOSCOPE SYSTEM HAVING CAPABILITY OF SETTING AGC VARIATION REGION**  
Katsuyoshi Sasagawa; Masahiko Sasaki; Masao Uehara; Katsuyuki Saito, all of Hachioji; Jun Hasegawa, Hino; Masahide Kanno, Hachioji; Akinobu Uchikubo, Hachioji, and Shinji Yamashita, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan  
Filed Dec. 28, 1988, Ser. No. 290,943  
Claims priority, application Japan, Jan. 11, 1988, 63-277794; Feb. 26, 1988, 63-44706  
Int. Cl.<sup>5</sup> A61B 1/04, 1/06; H04N 5/20  
U.S. Cl. 358-98 23 Claims

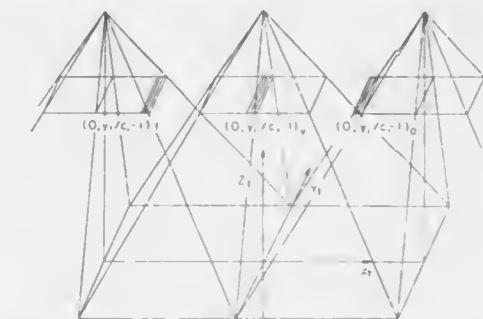


1. An electronic-type endoscope system comprising:  
(a) an electronic endoscope including an elongated inserting section, light emitting means for emitting illuminating light from one end of said inserting section, and imaging means constituted by an objective optical system attached to said one end of said inserting section and a solid state imaging device for photoelectrically converting an optical image obtained by said objective optical system;  
(b) signal processing means for converting an image signal output from said imaging means into a standard image signal;  
(c) monitor means for providing a display of said standard image signal output from said signal processing means;  
(d) automatic gain control means constituting said signal processing means and arranged to automatically output said standard image signal whose level is automatically adjusted to a proper level in accordance with a level of said image signal; and  
(e) gain variation region setting means for setting a gain variation region of said automatic gain control means based upon a control signal representing characteristics of an apparatus to be connected.

**4,951,136**  
**METHOD AND APPARATUS FOR REMOTE RECONNAISSANCE OF THE EARTH**  
Armin Drescher, Munich, and Burkhard Braumer, Neuried bei Munchen, both of Fed. Rep. of Germany, assignors to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne and Ingenieur-Burkhard Braumer, Neuried bei Munchen, both of, Fed. Rep. of Germany  
Filed Jan. 25, 1989, Ser. No. 301,092  
Claims priority, application Fed. Rep. of Germany, Jan. 26, 1988, 3802219  
Int. Cl.<sup>5</sup> H04N 3/15, 7/18  
U.S. Cl. 358-109 12 Claims

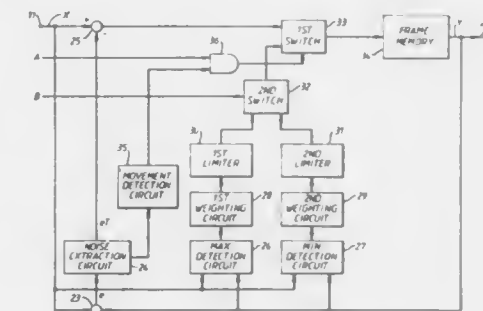
1. A method for remote aerial or satellite reconnaissance of the earth with the aid of line scanners, comprising taking a series of overlapping and stereoscopic frame pictures at regular time intervals with at least one optoelectronic frame camera associated with at least one line scanner;  
determination of the mutual orientation of the photographing positions of the frame cameras by corresponding pixels or picture zones in the overlapping zones of adjacent individual frame pictures; and

transmitting orientation data from the optoelectronic frame camera to the line scanners by fixed orientation or measurement of the relative orientation, reinforced by a chronological association of both data streams.



surement of the relative orientation, reinforced by a chronological association of both data streams.

**4,951,137**  
**IMAGE TRACK DISPLAY APPARATUS**  
Masaaki Kisou, Chiba; Kenji Shimoda, Kanagawa; Kazumasa Ikeda, Kanagawa; Shinji Yoda, Kanagawa, and Hisaharu Takeuchi, Saitama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Filed Mar. 31, 1989, Ser. No. 331,319  
Claims priority, application Japan, Mar. 31, 1988, 63-76599; Mar. 31, 1988, 63-78896  
Int. Cl.<sup>5</sup> H04N 7/18, 5/213  
U.S. Cl. 358-125 5 Claims



1. Image track display apparatus comprising:  
means for receiving an image signal;  
memory means for delaying the image signal by at least one vertical scanning period;  
a first subtraction means for taking a first difference signal between the image signal and the delayed image signal, the first difference signal including first and second polarity components;  
a non-linear processing means for multiplying one polarity component of the first difference signal by K times ( $0 < K < 1$ ) and for reducing the other polarity component of the first difference signal to the zero value when the other polarity component exceeds a prescribed value;  
a second subtraction means for taking a second difference signal between the output signal of the non-linear processing means and the image signal; and  
means for displaying the delayed image signal obtained through the memory means.



**4,951,138**  
**METHOD TO REDUCE THE THROUGHPUT RATE OF A SEQUENCE OF DATA FOR ASSISTANCE IN THE RECONSTRUCTION OF AN ELECTRONIC PICTURE USING A SUB-SAMPLED SIGNAL**

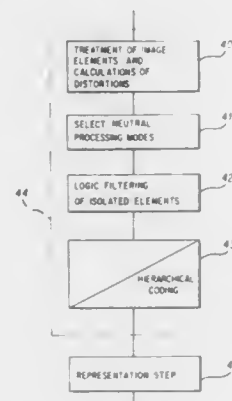
Jean-Pierre Henot, Thorigne, France, assignor to L'Etat Francais (CNET), Issy les Moulineaux and Telediffusion de France, Montrouge, both of, France

Filed Mar. 2, 1989, Ser. No. 317,729

Claims priority, application France, Mar. 2, 1988, 88 02650  
 Int. Cl.<sup>5</sup> H04N 7/12, 7/01, 7/18

U.S. Cl. 358—133

11 Claims



1. A method for the reduction of the throughput rate of a sequence of data for assistance in the reconstruction of an electronic picture from a sub-sampled source signal, notably a sequence of data for the selection of sub-sampled electronic picture,

wherein the sub-sampling processing used for each picture element comprises associating an optimum processing mode chosen from among several available processing modes tested in parallel, the efficiency of each processing mode being measured by a criterion of distortion of the processed signal with respect to the source signal, the method comprising the steps of:

selecting within the picture or picture image blocks, neutral processing mode picture elements said neutral processing mode picture elements being picture elements capable of accepting, without discrimination, at least two distinct sub-sampling neutral processing modes;  
 associating to each of said neutral processing mode picture elements, one of said neutral processing modes wherein said one neutral processing mode enables an optimal reduction in the throughput rate of the assistance data.

**4,951,139**  
**COMPUTER-BASED VIDEO COMPRESSION SYSTEM**  
 Eric R. Hamilton, Cupertino; John L. Douglas, Santa Cruz, and Jeffrey B. Widergren, Saratoga, all of Calif., assignors to StarSignal, Inc., San Jose, Calif.

Continuation of Ser. No. 175,074, Mar. 30, 1988, Pat. No. 4,897,717. This application Nov. 1, 1989, Ser. No. 430,748  
 Int. Cl.<sup>5</sup> H04N 7/13

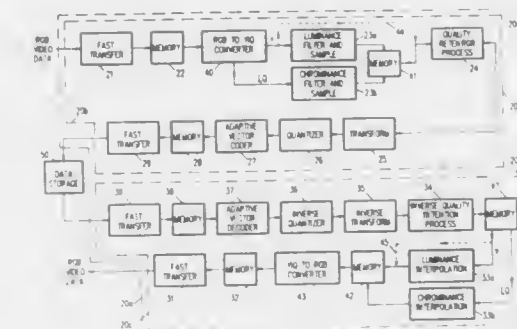
U.S. Cl. 358—135

31 Claims

1. A system for compression and expansion of digital data, said digital data consisting of lines of discrete points, comprising:

random access memory means (RAM);  
 means, operatively coupled to said RAM, for compressing data;  
 means, operatively coupled to said RAM, for expanding compressed data;  
 wherein said means for compressing data further comprises:  
 means for retrieving a selected portion of N of said lines

comprised of discrete points from said RAM wherein N is a selected integer;  
 means, operatively coupled to said retrieving means, for generating an error vector for a portion of N lines;  
 means, operatively coupled to said error vector generating means, for transforming data thereby forming a vector of transform coefficients;  
 means, operatively coupled to said compression means,



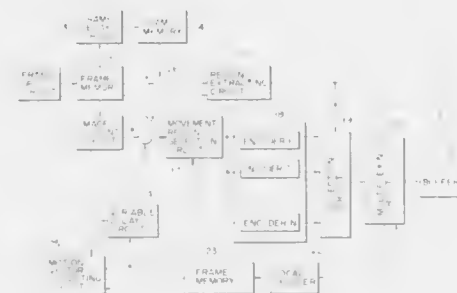
for variable quantization of each point in a vector of transform coefficients thereby forming a vector of quantized transform coefficients;  
 means, operatively coupled to said variable quantizing means, for encoding each point in a vector of quantized transform coefficients thereby forming a vector of compressed data; and  
 means, operatively coupled to said encoding means, for storing compressed data in said RAM.

**4,951,140**  
**IMAGE ENCODING APPARATUS**  
 Hideyuki Ueno, Fujisawa, and Kenshi Dachiku, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 22, 1989, Ser. No. 313,941  
 Claims priority, application Japan, Feb. 22, 1988, 63-37434; May 30, 1988, 63-132301; Aug. 5, 1988, 63-194520; Sep. 19, 1988, 63-232216

Int. Cl.<sup>5</sup> H04N 7/13  
 U.S. Cl. 358—136

20 Claims



1. An image encoding apparatus for encoding a plurality of image data corresponding to a movable object having a specific portion and sequentially produced for every frame, comprising:

storing means for storing the image data for every frame;  
 specific image extracting means for detecting a difference between at least two of the image data to obtain movement data representing a movement of the movable object and including specific movement data corresponding to

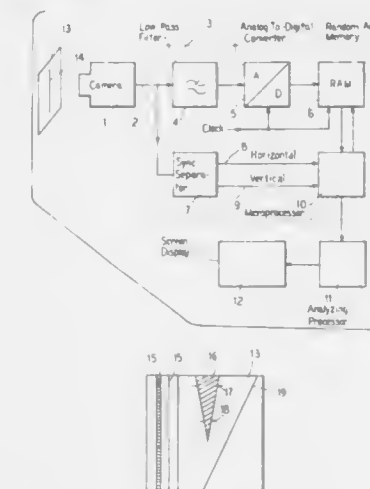
the specific portion, and extracting the specific movement data from the movement data corresponding to the difference; and  
 bit allocating means for allocating more bits to the image data corresponding to the extracted specific movement data than to the remaining image data.

**4,951,141**  
**METHOD OF DETERMINING THE TRANSMISSION FUNCTION OF A VIDEO CAMERA**  
 Walter Fischer, Moosburg, Fed. Rep. of Germany, assignor to Rohde & Schwarz GmbH & Co. KG, Fed. Rep. of Germany  
 Filed Sep. 11, 1989, Ser. No. 405,220

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836280

Int. Cl.<sup>5</sup> H04N 17/00  
 U.S. Cl. 358—139

11 Claims



1. A method of determining the transmission function of a video camera, comprising the steps of:  
 scanning a bar pattern with the video camera to produce narrow electrical pulses, the width of the bars of the bar pattern selected to be sufficiently small so that its influence on the amplitude and phase response of an electrical pulse produced in the camera upon scanning of a bar is negligible;  
 selecting the narrow electrical pulses thus produced at the output of the video camera; and  
 performing a Discrete Fourier Transformation of the selected pulses.

**4,951,142**  
**METHOD AND APPARATUS FOR TRANSMISSION OF SYNCHRONIZATION SIGNALS BETWEEN MICROPROCESSORS IN VIDEO SYSTEM**  
 Friedrich Glaab, Hochst; Uwe Ritter, Darmstadt, and Rainer Sturm, Gross-Gerau, all of Fed. Rep. of Germany, assignors to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

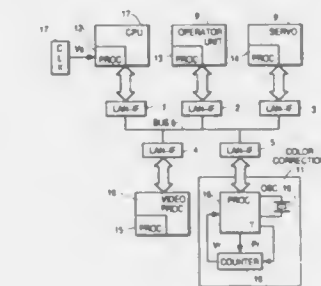
Filed Apr. 29, 1988, Ser. No. 188,420  
 Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715595

Int. Cl.<sup>5</sup> H04N 5/04  
 U.S. Cl. 358—148

6 Claims

1. In a data processing system having a plurality of individual processors (16) each generating a respective vertical-frequency synchronization signal, and connected together over data transmission means (6), a method of rendering said synchronization signals coincident, comprising the steps of:  
 obtaining each synchronization signal by counting clock pulses of the respective processor (16);  
 feeding to each said processor (16), via said data transmission

means, a reference signal, said reference signal having a frequency which is a whole-number fraction of the desired frequency of the synchronization signal; and



upon receipt in each said processor (16) of said reference signal, resetting a counter (19) provided for counting of said clock pulses.

**4,951,143**  
**MEMORY CONFIGURATION FOR UNSYNCHRONIZED INPUT AND OUTPUT DATA STREAMS**  
 Glenn C. Waehner, New Canaan, Conn., assignor to American Dynamics Corporation, Orangeburg, N.Y.

Filed May 24, 1989, Ser. No. 356,192  
 Int. Cl.<sup>5</sup> H04N 5/14, 5/95

U.S. Cl. 358—160

16 Claims



1. Circuitry for generating an output data stream in response to an output timing signal from an input data stream referenced to an input timing signal, wherein the input and output timing signals are unsynchronized, the circuitry comprising:  
 delay means responsive to the input data stream and the input timing signal to produce a delayed data stream;  
 selector means coupled to said delay means and responsive to the input data stream, the input timing signal and the output timing signal; and  
 dual-port memory means having an input port coupled to said selector means and having an output port for emitting the output data stream, said memory means being responsive to the input timing signal and the output timing signal, wherein said selector means is initially set to a first position to provide the input data stream to said input port, and said selector means provides said delayed data stream to said input port whenever said selector means is set to a second position by the output timing signal, and wherein the output data stream is emitted from said output port upon detection of the output timing signal by said memory means.

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## RECURSIVE VIDEO BLUR EFFECT

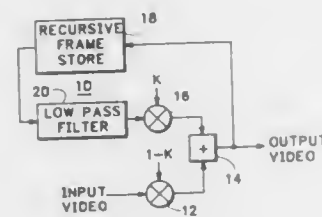
Philip A. Des Jardins, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Apr. 12, 1989, Ser. No. 337,230

Int. Cl.<sup>5</sup> H04N 5/272

U.S. Cl. 358—182

7 Claims



1. A circuit of the type having a recursive feedback loop including means for delaying an output video signal, means for decaying the delayed output video signal, and means for combining the decayed output video signal with an input video signal to produce the output video signal further comprising means for lowpass filtering the delayed output video signal before the combining means to produce a video blur effect in the output video signal.

4,951,146

## DIRECTIONALLY CONTROLLED DISPERSIVE FILTERING FOR REDUCING CO-CHANNEL INTERFERENCE

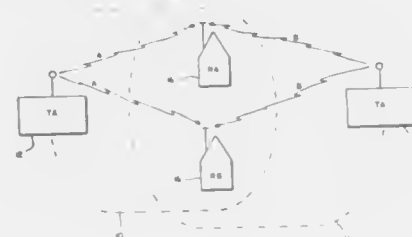
Richard W. Citta, Oak Park, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Jan. 17, 1989, Ser. No. 298,081

Int. Cl.<sup>5</sup> H04N 5/40

U.S. Cl. 358—186

6 Claims



1. A method of operating a television signal transmission system comprising the steps of: transmitting a first signal processed through a dispersal filter of one sense; transmitting a second signal processed through a dispersal filter of opposite sense; receiving said transmitted signals; and selectively processing said received signals through a receiver dispersal filter of said opposite sense for recovering said first signal and through a dispersal filter of said one sense for recovering said second signal.

4,951,147

## DIGITAL IMAGE ACQUISITION SYSTEM

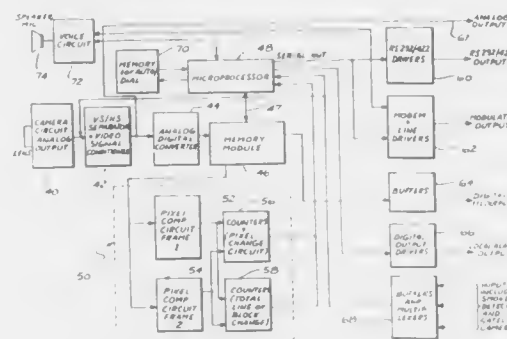
Atila Aknar, Auburn, and Andre Soussa, Mascot, both of Australia, assignors to Zone Technology Pty. Limited, Bankstown, Australia

Continuation of Ser. No. 242,189, Jul. 18, 1988, abandoned. This application Jul. 31, 1989, Ser. No. 387,450

Claims priority, application Australia, Nov. 25, 1986, PH9145 Int. Cl.<sup>5</sup> H04N 5/30

U.S. Cl. 358—209

13 Claims



1. A method of image acquisition using a dynamic random access memory (RAM) as an image sensor having a transparent window through which a lens can focus an image on an array of radiation sensitive cells of said dynamic RAM including the steps of:

- (i) setting the cells of said dynamic RAM to a fully charged state;
- (ii) scanning said image sensor to provide a series of digital images of variable exposure lengths;

4,951,145

## METHOD AND APPARATUS FOR KEYING TV SIGNALS

Martin G. Snashall, Reading; Mark R. Andrews, Northampton, and David F. Levy, Andover, all of United Kingdom, assignors to Abekas Video Systems Limited, United Kingdom

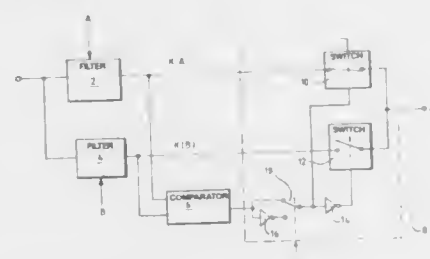
Filed Sep. 14, 1989, Ser. No. 407,267

Claims priority, application United Kingdom, Sep. 21, 1988, 8822163

Int. Cl.<sup>5</sup> H04N 5/272, 5/14, 9/74

U.S. Cl. 358—183

21 Claims



1. An apparatus for keying a video signal, which comprises means to receive a keying signal and for creating first and second modified keying signals, independently modified to commence at independent points in the time domain, means for logically comparing the first and second modified signals, and means responsive to said comparing means for creating a revised keying signal commencing at the leading edge of one modified keying signal and terminating at the trailing edge of the other modified keying signal.

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- (iii) storing the series of images of variable exposure lengths in a storage buffer;
- (iv) processing said series of images of variable exposure lengths to provide a resultant single frame of image having a plurality of levels of intensity, and
- (v) storing the resultant single frame of image in a memory means.

4,951,148

## CCD IMAGE SENSOR INCLUDING SMEAR SUPPRESSION MEANS

Leonard J. M. Esser, Jacobus G. C. Bakker, and Marnix G. Collet, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 121,447, Nov. 16, 1987, abandoned.

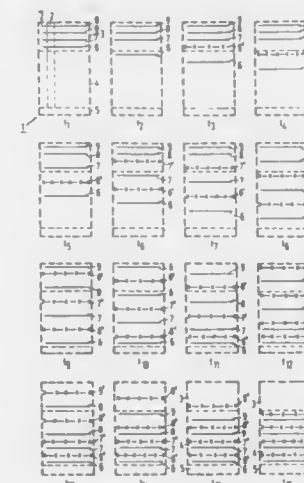
This application Dec. 9, 1988, Ser. No. 282,848

Claims priority, application Netherlands, Nov. 27, 1986, 8603008

Int. Cl.<sup>5</sup> H04N 3/14

U.S. Cl. 358—213.18

21 Claims



1. A CCD image sensor and charge transport arrangement having a semiconductor body comprising a charge-coupled device having a charge transport channel through which there is transported between two successive signal charge packets which are representative of the local intensity of a line of a trapped image a reference charge packet which is representative of a line of the overall smear charge and dark-current charge and which is collected during the said charge transport, characterized in that means are provided with the aid of which

- (a) only one reference charge packet is formed for a number P of image signal packets, where  $P > 2$ , storage means are provided which are utilized to store the associated reference packet during the read out of the P associated image signal charge packets,
- (b) there are induced before the said charge transport in a channel two potential wells which are separated from each other by a potential barrier and in which the two said signal charge packets are stored,
- (c) then at the beginning of the charge transport the distance between the signal charge packets is enlarged by displacing at least one of these signal charge packets, and
- (d) there is induced between these signal charge packets, a third potential well which is also transported during the charge transport, the reference charge packet then being formed.

4,951,149

## TELEVISION SYSTEM WITH VARIABLE ASPECT PICTURE RATIO

Yves C. Faroudja, 26595 Anacapa Dr., Los Altos, Calif. 94022

Filed Oct. 27, 1988, Ser. No. 263,534

Int. Cl.<sup>5</sup> H04N 5/65, 7/01

U.S. Cl. 358—230

18 Claims

1. A method for operating an improved television display device for displaying a television signal following a predetermined signal format and having within that format a variably preselectable aspect ratio, the method comprising the steps of: generating and putting out a television picture signal in accordance with the predetermined signal format which includes a predetermined constant number of horizontal scanning lines per vertical scanning period and in which the aspect ratio is preselected by selecting the number of horizontal scanning lines used for scanning active visual image picture content, and displaying on a screen of the improved television display device a picture image of the television picture signal without visible parallel edge bands at opposite top and bottom areas of the display by detecting the preselected aspect ratio of the television picture signal and by adjusting in equal amounts the amplitudes of horizontal and vertical deflection waveforms generated within the display device thereby to magnify or shrink the picture image in accordance with the detected preselected aspect ratio.

4,951,150

## OPTICAL PROJECTION SYSTEM

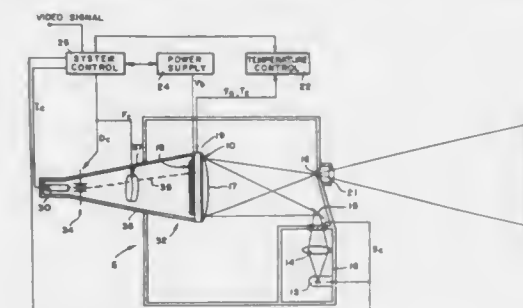
Iben Browning, Sandia Park, N. Mex., assignor to Foresight, Inc., Albuquerque, N. Mex.

Filed Mar. 1, 1989, Ser. No. 317,429

Int. Cl.<sup>5</sup> H04N 5/74

U.S. Cl. 358—231

17 Claims



1. An optical projection system for displaying a visible image on a screen, said system comprising:

- a reflective imaging member of the electro-optic type in the shape of a surface including a multiplicity of strip-like reflecting elements arranged thereon in the shape of said surface to form a mirror;
- an illumination source for irradiating said reflective imaging member with radiation of an intensity and wavelength which will pass through the member and will be reflected from the mirror of said reflective imaging member in a visible manner;
- means for writing an image in said reflective imaging member which changes the opalescence of certain areas of the member such that the areas modulate the scattering of said illuminating radiation being reflected from said mirror;
- means for selectively controlling said strip-like elements to modify the portion of the image written by said image writing means which corresponds to the area of an individual element; and
- means for displaying the reflected image from said reflective imaging on the screen.



4,951,151

## IMAGE DISPLAY SYSTEM AND METHOD

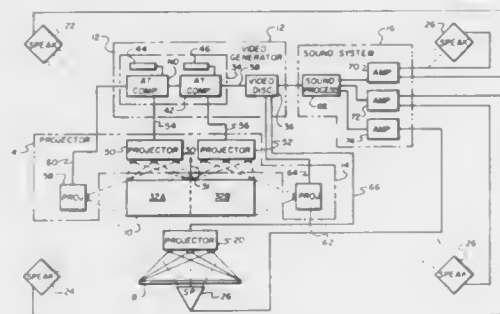
James L. Sorenson; Alan L. Madsen, and Ronald E. Madsen, Jr., all of Salt Lake City, Utah, assignors to Dawntreader, Inc., Salt Lake City, Utah

Filed Jul. 28, 1988, Ser. No. 225,349

Int. Cl.<sup>5</sup> H04N 5/74, 13/00, 9/31

U.S. Cl. 358—231

22 Claims



## 1. An image display system comprising:

a first substrate formed to have an uneven surface positioned for observation by a viewer, said uneven surface being scaled to reflect the topography of a remote surface and said uneven surface having a planar preselected scale and selected physical elevation features of said remote surface in a preselected scale different from said planar preselected scale;

video generator means operable by a user for generating first video image signals selected by the user;

first projector means interconnected to receive said first video image signals from said video generator means for converting them into first projectable video images, said first projector means being positioned to project said first projectable video images onto said uneven surface.

4,951,152

## CIRCUIT FOR CONTROLLING THERMAL ARRAY RECORDING HEAD

Kiyosuke Suzuki, Saitama, and Michihiro Hino, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

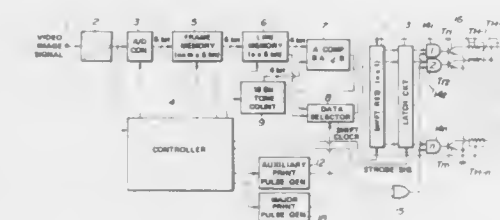
Filed Sep. 11, 1987, Ser. No. 95,230

Claims priority, application Japan, Sep. 18, 1986, 61-220196

Int. Cl.<sup>5</sup> G01D 15/10; H04N 1/23; B41J 2/36

U.S. Cl. 358—298

15 Claims



## 1. A pulse width modulation (PWM) control circuit for a printing apparatus, comprising:

memory means for storing digitized image information, wherein each dot of said image information has predetermined bits of gray scale data;

main converter means connected to said memory means for converting upper bits of each said dot data of said digitized image information into a main pulse-width converting signal based on a first unit time duration;

sub-converting means connected to said memory means for converting the rest of the bits of each said dot data of said digitized image information into a sub pulse-width con-

verting signal based on a second unit time duration, wherein said first unit time duration is longer than said second unit time duration; and

drive circuit means connected to said main-converting means and sub-converting means for generating a PWM head driving signal in accordance with said main pulse-width converting signal and said sub pulse-width converting signal.

4,951,153

## IMAGE RECORDING DEVICE WITH OPTICAL SWITCH PANEL OVER PHOTSENSITIVE BODY

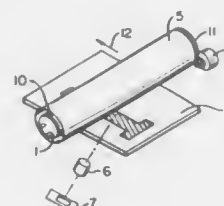
Kenichi Morimoto, Nara, and Takao Tagawa, Kashiwara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan Division of Ser. No. 225,628, Jul. 27, 1988, Pat. No. 4,855,818, which is a continuation of Ser. No. 120,699, Nov. 10, 1987, abandoned, which is a continuation of Ser. No. 943,815, Dec. 29, 1986, abandoned, which is a continuation of Ser. No. 748,487, Jun. 25, 1985, abandoned. This application May 17, 1989, Ser. No. 352,973

Claims priority, application Japan, Jul. 4, 1984, 59-130650; Jul. 4, 1984, 59-130651

Int. Cl.<sup>5</sup> H04H 1/21

U.S. Cl. 358—296

11 Claims



## 1. An image recording device comprising

a photosensitive member, and an optical system which includes a liquid crystal optical switch panel with a plurality of liquid crystal display dot elements between a first boundary layer and a second boundary layer, and serves to form on said photosensitive member an image displayed on said liquid crystal optical switch panel, said first boundary layer being disposed nearly or directly in contact with said photosensitive member and significantly thinner than said second boundary layer which is separated from said photosensitive member.

4,951,154

## MAGNETO-OPTIC RECORDING/REPRODUCING APPARATUS

Toru Sekiguchi, and Yoshihiro Sasaki, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jan. 28, 1988, Ser. No. 149,565

Claims priority, application Japan, Jan. 28, 1987, 62-19123; Mar. 26, 1987, 62-73273

Int. Cl.<sup>5</sup> H04N 5/85, 5/94

U.S. Cl. 358—336

4 Claims

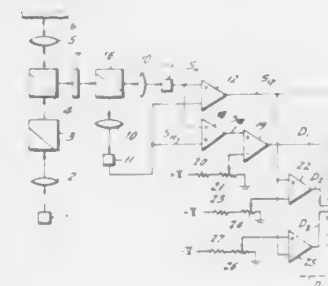
1. A video signal reproducing apparatus using a magneto-optic recording disk and compensating for a defect in said disk, the apparatus comprising:

two photodetector means for producing two respective, reproduced signals reverse in phase to each other from said magneto-optic recording disk in which a frequency-modulated video signal is recorded;

differential amplifier means for producing a signal representing a difference between said two reproduced signals delivered from said two photodetector means;

adder means for producing a signal representing a sum as between said two reproduced signals delivered from said two photodetector means;

comparator means for comparing said sum signal delivered from said adder means with a predetermined threshold to generate a detection signal indicating detection of a defect in said disk when said sum signal is above said threshold; demodulator means for demodulating said difference signal from said differential amplifier means to produce a processed video signal; and



video image compensating means responsive to said detection signal for compensating a component of said processed video signal impaired by a defect in said disk by producing a substitute video signal component derived from combining video signal components contiguous to said impaired component.

4,951,155

## APPARATUS AND METHOD FOR SYNCHRONIZING VIDEO DISC IMAGES WITH AUDIO SIGNALS

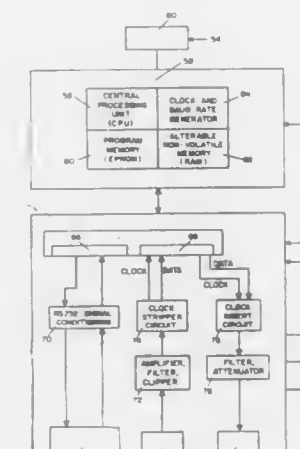
Carlton A. Andrews, Austin, Tex., assignor to Stokes Imaging Services, Austin, Tex.

Filed Nov. 23, 1987, Ser. No. 124,761

Int. Cl.<sup>5</sup> G11B 7/00

U.S. Cl. 358—342

12 Claims



memory means responsive to said means for converting for storing said coded data;  
 monitor means for monitoring the signal level of said inputted data signals by calculating the actual gain of an AGC (automatic gain control) as said data signals are received by said input means;  
 output means responsive to said monitor means for outputting said coded data stored in said memory means once an optional level of AGC is exceeded by the signal level of said data signal; and  
 display means responsive to said output means for displaying said coded data.

**4,951,157**  
**SYMMETRICAL IMAGE BLOCK SCANNING METHOD FOR REDUCING BLOCK EFFECT**

Jong S. Koh, and Jae K. Kim, both of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea

Filed Jul. 26, 1988, Ser. No. 224,362

Claims priority, application Rep. of Korea, Dec. 29, 1987, 15237/1987

Int. Cl.<sup>5</sup> H04M 1/415

U.S. Cl. 358—433

4 Claims



1. A scanning method for reducing block effect in the image block scanning comprising steps of: dividing two-dimensional whole image into a number of small image blocks; and scanning said respective small image blocks within said whole image symmetrically in the direction of their transversal and longitudinal axes so that the starting and ending points of each adjacent image block may be coincident.

**4,951,158**  
**IMAGE SCANNER APPARATUS WITH SCANNING MAGNIFICATION CORRECTING FUNCTION**

Tetsuro Ichitani, Mishima, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

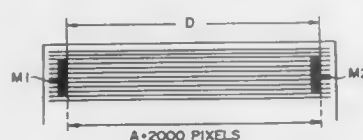
Filed Jul. 21, 1989, Ser. No. 384,262

Claims priority, application Japan, Jul. 28, 1988, 63-189160

Int. Cl.<sup>5</sup> H04M 1/393

U.S. Cl. 358—451

18 Claims



1. An image scanner apparatus comprising:  
 scanning means for optically scanning an original in a first direction to obtain an optical image;  
 mark means provided with a predetermined distance within a range in a second direction perpendicular to the first direction, the range being able to be scanned by said scanning means;  
 line sensor means arranged in the second direction to read the optical image line by line in cooperation with said scanning means;

converting means for converting a read output from said line sensor means into digital data;  
 instructing means for instructing to read said mark means to said scanning means and said line sensor means prior to reading of the original;  
 distance calculating means for calculating distance data corresponding to the predetermined distance of said mark means in accordance with the digital data from said converting means when said scanning means and said line sensor means cooperate to read said mark means in accordance with an instruction from said instructing means;  
 correction data calculating means for calculating correction data corresponding to a difference between reference data and the distance data calculated by said distance calculating means, the correction data representing the number of bits of data extraction or addition corresponding to the difference; and  
 read magnification correcting means for executing bit extraction from or addition to the digital data from said converting means in accordance with the number of bits represented by the correction data output from said correction data calculating means, so that a read magnification defined by said scanning means and said line sensor means is corrected to a defined read magnification corresponding to the reference data.

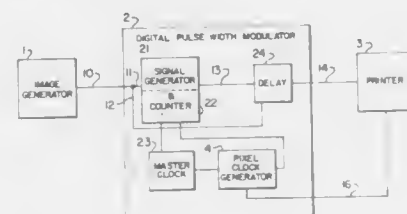
**4,951,159**  
**DIGITAL MODULATION TECHNIQUE**  
 Gary Van Beek, North Gower, Canada, assignor to A.I.T. Corporation, Ontario, Canada

Filed Oct. 10, 1989, Ser. No. 418,640

Int. Cl.<sup>5</sup> H04N 1/40

U.S. Cl. 358—455

11 Claims



1. In a method for producing an output image signal to drive a raster print engine from an multiple bit image input signal by generating in a signal generator a pulse having a width corresponding to the input image signal, the improvement comprising processing the multiple bit image input signal in a digital pulse width modulator which functions to reduce the number of bits in the multiple bit image input signal by separating from the input image signal at least one of the least significant bits in the input image signal; processing the remaining bits in the input image signals to provide an output signal pulse corresponding to acceptable number of grey scale levels; and simulating one of the separated bits by a delay signal which modifies the output signal pulse width in response to the value of the separated bit.

**4,951,160**  
**IMAGE REPRODUCING APPARATUS**  
 Yasumori Nagahara, Yokosuka; Kenichirou Asada, Tokyo; Takanobu Fujioka, Chofu; Yoshiaki Kanamoto, Machida; Mitsuo Hasebe, Tokyo; Kiyoto Nagasawa; Akio Katsumata, both of Yokohama, and Setsuo Soga, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 3, 1989, Ser. No. 374,783

Claims priority, application Japan, Jul. 5, 1988, 63-166034

Int. Cl.<sup>5</sup> H04N 1/04

U.S. Cl. 358—496

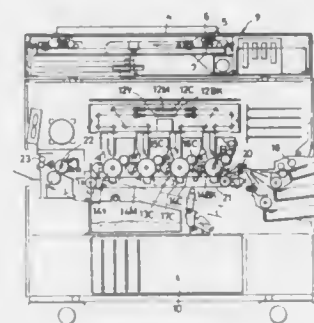
16 Claims

1. An image reproducing apparatus for reproducing an

image of an original by scanning the original to form an image of the original on a image forming medium and by fixing the formed image on the medium, a scanning speed of the scanning operation being variable in synchronization with a fixing speed of the fixing operation, said apparatus comprising:

means for selectively setting the fixing speed in accordance with a desired mode of operation;  
 scanning means provided with optoelectrical elements arranged in one line extended laterally to a predetermined scanning direction, for optically receiving an image of the

of a rate-indicating signal condition indicative of a rate of reel rotation beyond a given value; and  
 head-stopping means responsive to said detecting means for stopping the rotation of said head upon receipt of said head-stopping signal condition.



**4,951,162**  
**TRACKING CONTROL SYSTEM WITH PILOT SIGNAL PHASE SETTING CIRCUITRY**

Katsuji Yoshimura; Koji Takahashi; Kenichi Nagasawa; Shinichi Yamashita, all of Kanagawa; Motokazu Kashida, Tokyo, and Mitsuhiro Otokawa, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1987, Ser. No. 116,523

Claims priority, application Japan, Nov. 6, 1986, 61-264998; Nov. 7, 1986, 61-265897; Nov. 7, 1986, 61-265898; Nov. 10, 1986, 61-267048; Nov. 10, 1986, 61-267049; Nov. 11, 1986, 61-268183

Int. Cl.<sup>5</sup> G11B 5/584, 15/467

U.S. Cl. 360—77.14

9 Claims



original through said opto-electrical elements, said opto-electrical elements carrying out a scanning operation in said predetermined scanning direction to produce an image data representing a whole image of said original, an electrical scanning speed of said opto-electrical element being varied by changing a sweep spacing of said image data while a mechanical scanning speed of said optoelectrical elements being kept at a constant; and  
 means for fixing a reproduced image of an original image formed on said image forming medium at variable fixing speed in accordance with said operating means.

**4,951,161**  
**DEVICE FOR PREVENTING STICKING OF A MAGNETIC TAPE TO A ROTATING MAGNETIC HEAD DRUM**

Tetsuya Suzuki; Yukio Ito, and Kiyoshi Zogo, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

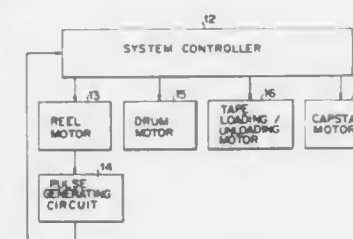
Filed Aug. 22, 1988, Ser. No. 235,117

Claims priority, application Japan, Aug. 28, 1987, 62-216026; Sep. 1, 1987, 62-218145; Sep. 11, 1987, 62-227749; Sep. 11, 1987, 62-227750

Int. Cl.<sup>5</sup> G11B 15/00, 5/52

U.S. Cl. 360—71

8 Claims



1. A tape protection device for use with a magnetic recording/reproducing apparatus of the helical scanning type, said player including take-up and supply reel drive means, a rotatably mounted magnetic drum head, means for rotating said supply reel, said take-up reel, and said head, and loading means for drawing a portion of magnetic tape from a cassette into engagement with said head, said device comprising:  
 detecting means for providing a rate-indicating signal condition indicative of the rate of rotation of one of said reels;  
 comparison means responsive to said detecting means for producing a head-stopping signal condition upon receipt

9. An information signal reproducing apparatus for reproducing an information signal from a recording medium on which a specific signal having a predetermined frequency is recorded along with said information signal in many parallel tracks, wherein, in relation to the phase of said specific signal recorded in a first track included in said many tracks, the phases of said specific signal recorded in second and third tracks which adjoin said first track on both sides thereof are shifted to equal phasic degrees in opposite directions in their positions in the second and third tracks aligned perpendicularly to the longitudinal direction of said first track, said apparatus comprising:

- (a) reproducing means including at least one rotary head for reproducing said information signal and said specific signal from said recording medium;
- (b) rotation detecting means for detecting the rotation phase of said rotary head to generate a rotation detecting signal accordingly;
- (c) reference signal generating means for generating a reference signal of the same frequency as that of said specific signal;
- (d) phase setting means for setting the phase of said reference signal according to said rotation detecting signal, said phase setting means including a phase locked loop circuit which is arranged to receive as an input said rotation detecting signal;
- (e) phase difference detecting means for detecting a phase difference between said reference signal and said specific signal reproduced by said reproducing means; and
- (f) tracking control means for controlling the position of said reproducing head and that of said recording medium relative to each other on the basis of said phase difference detected by said detecting means.



# 4,951,163 MAGNETIC RECORDING AND REPRODUCING APPARATUS

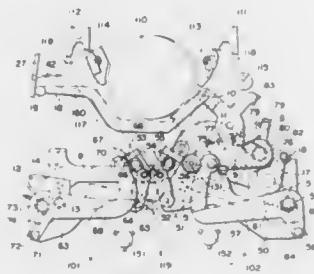
Nitro Nakamichi, South Laguna, Calif., assignor to Nakamichi Corporation, Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 276,394

Claims priority, application Japan, Nov. 27, 1987, 62-299535  
Int. Cl.<sup>5</sup> G11B 5/027, 15/60

U.S. Cl. 360—85

1 Claim



1. A magnetic recording and reproducing apparatus for recording signals on and reproducing signals from a magnetic tape in a tape cassette, comprising:

- a rotatable drum having transducer heads for recording signals on and reproducing signals from the magnetic tape;
- a mechanism for winding the magnetic tape partly around said rotatable drum through a predetermined angle;
- a capstan and a pinch roller pressable against said capstan for feeding the magnetic tape; and
- said mechanism comprising:

- a pair of skew blocks fixedly disposed laterally of said rotatable drum for guiding said magnetic tape at a magnetic layer surface thereof around said rotatable drum in order to allow said transducer heads to scan said magnetic layer surface at a predetermined skew angle;
- a pair of vertical guide rollers movable from a first position in which said vertical guide rollers are located in an opening in the tape cassette behind a back surface of said magnetic tape opposite to said magnetic layer surface toward a second position in which said vertical guide rollers are located near said skew blocks, respectively, for withdrawing the magnetic tape from the tape cassette and holding said magnetic layer surface of the magnetic tape against said rotatable drum and said skew blocks;

said pinch roller being movable from a position in which the pinch roller is located behind said back surface of the magnetic tape within said opening toward a position in which said pinch roller is pressed against said capstan; and

said vertical guide rollers having respective axes which are spaced from each by a distance of 15 mm or less when the vertical guide rollers are in said first position.

**4,951,164**  
**SINGLE MOTOR MAGNETIC RECORDING/PLAYBACK APPARATUS USING A WORM AND WORM WHEEL**  
Yoshio Yasaka, Gunma; Ken Motoi, Ota; Toshihiko Higashino, Gunma; Takahiro Okuie, Daito, and Kazuyoshi Ogino, Kiryu, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Feb. 24, 1989, Ser. No. 315,108

Claims priority, application Japan, Feb. 27, 1988, 63-43324  
Int. Cl.<sup>5</sup> G11B 15/665, 15/675

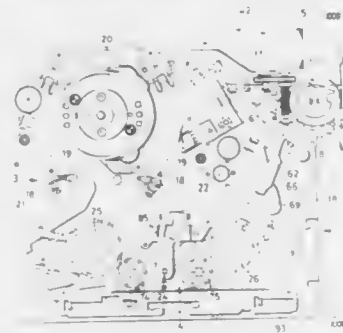
U.S. Cl. 360—85

3 Claims

1. A magnetic recording/playback apparatus in which rotational torque from a drive shaft of a single motor is capable of being transmitted to a cassette loading mechanism for loading a cassette onto the apparatus and a tape loading mechanism for

loading tape in the cassette onto a guide drum to operate said mechanisms, comprising:

- a worm secured to the drive shaft;
- a worm wheel for being meshed freely with said worm and for coupling the drive shaft to the cassette loading mechanism;



# 4,951,165 MAGNETIC HEAD HAVING IMPROVED HIGH DENSITY RECORDING AND/OR REPRODUCTION CHARACTERISTICS

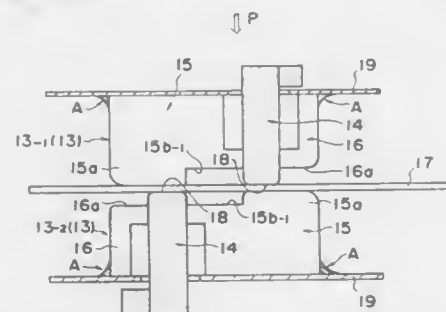
Jun Makabe; Hideoharu Kurata, Higashimurayama, and Hiroshi Matsunaga, Kunitachi, all of Japan, assignors to Teac Corporation, Japan

Filed Jan. 10, 1989, Ser. No. 295,301

Claims priority, application Japan, Jan. 13, 1988, 63-5385  
Int. Cl.<sup>5</sup> G11B 5/48, 5/60, 21/21, 21/16

U.S. Cl. 360—104

12 Claims



1. A magnetic head for carrying out at least one of a recording, reproduction and erasure of an information on and/or from a magnetic recording medium by making sliding contact with the magnetic recording medium, said magnetic head comprising:

- a first slider having a first surface which confronts the magnetic recording medium;
- a second slider having a second surface which confronts the magnetic recording medium and a contact portion for making sliding contact with the magnetic recording medium; and
- a magnetic head part sandwiched between said first and second sliders for carrying out at least one of the recording, reproduction and erasure of the information on and/or from the magnetic recording medium, said magnetic head part having a sliding contact surface for making sliding contact with the magnetic recording medium,

said magnetic head part projecting from the first and second surfaces of said first and second sliders so that said sliding

contact surface approximately coincides with the contact surface of said second slider, said first and second surfaces of said first and second sliders being located on both sides of said magnetic head part, said sliding contact surface of said magnetic head part making sliding contact with the magnetic recording medium in a vicinity of said magnetic head part, said second surface of said second slider being located between said magnetic head part and the contact portion of said second slider, only the contact portion of said second slider and the sliding contact surface of said magnet head part making contact with the magnetic recording medium.

# 4,951,166 THIN-FILM MAGNETIC HEAD WITH LAYER STRUCTURE AND WITH POLE PIECES OF VARYING WIDTHS

Herbert Schewe, Herzogenaurach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

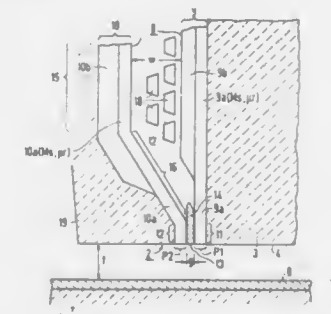
Filed Oct. 6, 1988, Ser. No. 254,451

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735147

Int. Cl.<sup>5</sup> G11B 5/187, 5/23, 5/147

U.S. Cl. 360—119

15 Claims



1. An apparatus including a thin-film magnetic head to be guided over a data track of a perpendicularly magnetizable recording medium comprising:

- a magnetic ring core head guide body for carrying a magnetic flux, including a first and a second magnetic shank, wherein each magnetic shank comprises at least one magnetic layer with a predetermined magnetic behavior;
- two magnetic poles facing the recording medium which are arranged sequentially relative to a direction of motion of the magnetic head with respect to the recording medium, each of said poles comprising an end region of one of said magnetic shanks, said end regions being largely of the same material, and wherein said poles are separated by a predetermined gap width and have predetermined widths that are transverse to the direction of motion;
- an intermediate area between said magnetic shanks, outside of the end regions, through which extend the windings of a write and/or read coil winding;
- a connecting region on the side of the guide body facing away from the recording medium where the two magnetic shanks are attached together; and
- wherein the first magnetic shank at least largely alone carries out the write function, whereas both magnetic shanks carry out the read function, and wherein the magnetic pole associated with the first magnetic shank, which is the leading magnetic shank of the magnetic head with respect to the relative direction of motion of the magnetic head with respect to the magnetizable recording medium, has a greater width transverse to said relative direction of motion than the magnetic pole of the second magnetic shank.

# 4,951,167 MAGNETIC TAPE CASSETTE WITH IMPROVED FRONT COVER SUPPORTING MECHANISM

Tsutomu Hiramoto; Masayuki Komeiji; Kimimoto Hirose; Hito-shi Okubo; Minoru Sato, all of Tamabo, and Yoshitaka Yasufuku, Hino, all of Japan, assignors to Konica Corporation, Tokyo, Japan

PCT No. PCT/JP87/00624, § 371 Date Apr. 22, 1988, § 102(e)  
Date Apr. 22, 1988, PCT Pub. No. WO88/01787, PCT Pub. Date Mar. 10, 1988

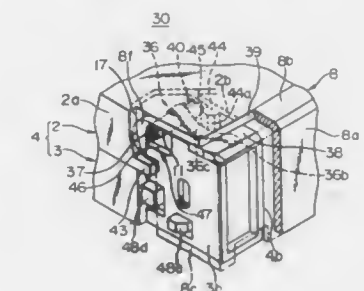
PCT Filed Aug. 24, 1987, Ser. No. 196,222

Claims priority, application Japan, Aug. 25, 1986, 61-129165; Aug. 26, 1986, 61-129632; Aug. 26, 1986, 61-129634; Sep. 8, 1986, 61-137785; Sep. 8, 1986, 61-137786; Sep. 17, 1986, 61-142427; Sep. 17, 1986, 61-142428; Sep. 22, 1986, 61-145702; Oct. 1, 1986, 61-151063; Oct. 2, 1986, 61-151808; Oct. 20, 1986, 61-160740; Oct. 20, 1986, 61-160741; Dec. 8, 1986, 61-189500; Apr. 15, 1987, 62-57118; Apr. 15, 1987, 62-57119; Apr. 16, 1987, 62-57933

Int. Cl.<sup>5</sup> G11B 23/087

U.S. Cl. 360—132

13 Claims



1. A magnetic tape cassette comprising an upper half having two side plates, one of said side plates having a hole and the other of said side plates having an opening toward an inserting direction of the cassette; a lower half complementary to the upper half forming a cassette body;

a front cover pivotally mounted on the upper half, said front cover having two side members facing said side plates, said side members having first and second shafts, said first shaft being mounted in said hole, said second shaft having a spring member for pivotally biasing the front cover attached thereto, said second shaft being in the said opening;

a supporting means adapted to support said second shaft, said supporting means being adjacent to the opening; whereby the front cover is pivotally attached to the upper half and is supported at a prescribed position by the supporting means, said supporting means having first and second supporting members, said first supporting member in the opening, and said second supporting member adjacent a tip of said second shaft remote from said first supporting member,

whereby said first supporting member prevents the second shaft from moving toward the lower half and said second supporting member prevents the second shaft from moving toward the inserting direction of the cassette.

**4,951,168**  
**TRANSFORMERS HAVING OVERLOAD PROTECTION**  
Herman A. Harrison, 6132 Springdale Rd., Cincinnati, Ohio 45247

Filed May 19, 1989, Ser. No. 354,488

Int. Cl.<sup>5</sup> H02H 7/04

U.S. Cl. 361—35

16 Claims

1. A transformer automatically capable of reuse after an overload or short circuit, said transformer comprising

UMI

1. A creeping discharge type igniter plug comprising:
  - a) an outer annular metallic shell having an annular ground electrode concentrically connected to a lower end thereof;
  - a) a tubular insulator having a center bore, and concentrically located within the metallic shell, to a lower end of which a semiconductor ring is axially connected;
  - a) a center electrode concentrically located within the center bore of the insulator with a lower portion of the center electrode surrounded by the semi-conductor ring (4) to form an annular space (6) between an outer surface of the center electrode (2) and an inner surface of the semi-conductor ring (4); and
  - a) a lateral distance between the outer surface of the center electrode and the inner surface of the semi-conductor ring in which the annular space (6) is formed, progressively decreasing toward a lower end of the semi-conductor ring (4) to maintain the least electrical resistance at a creeping discharge path defined from a lower end surface (3a) of the ground electrode (3) to a lower end surface (2a) of the center electrode (2) via a lower end surface (4b) of the



semi-conductor ring (4) when a voltage is applied across the center (2) and ground electrode (3).

#### 4,951,174 CAPACITIVE PRESSURE SENSOR WITH THIRD ENCIRCLING PLATE

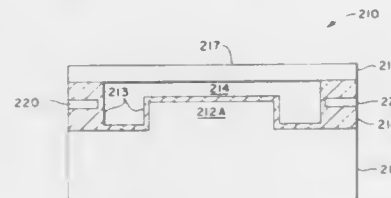
Daniel H. Grantham, Glastonbury, and Mario S. Latina, Wethersfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,276

Int. Cl.<sup>5</sup> H01G 7/00

U.S. Cl. 361—283

14 Claims



1. A capacitive pressure sensor of the conductive dielectric-conductive type, comprising:

- a conductive substrate forming a first capacitive plate;
- a conductive flexible, elastic diaphragm having an exterior side, said diaphragm being capable of flexing movement due to changes in pressure on its exterior side and forming a second capacitive plate; and
- a non-conductive, dielectric layer between said conductive substrate and said conductive diaphragm, said layer providing peripheral wall spacer(s) extending between and joining said conductive substrate and said conductive diaphragm; an evacuated chamber being formed between said substrate and said diaphragm and being closed off by spacer wall(s) formed by said dielectric layer between said substrate and said diaphragm; the flexing movement of said diaphragm due to the changes in pressure on its exterior side causing the capacitance of the sensor to vary; said chamber being at least generally cylindrical in its outer configuration defining a central region; and
- a third, conductive plate located in said wall(s) spaced and separated from both said conductive substrate and said conductive diaphragm by said dielectric layer and forming a third capacitive plate, said third conductive plate encircling said central region but being located substantially outside of said central region.

#### 4,951,175 SEMICONDUCTOR MEMORY DEVICE WITH STACKED CAPACITOR STRUCTURE AND THE MANUFACTURING METHOD THEREOF

Kei Kurosawa, Tokyo; Hidehiro Watanabe, Kawasaki, and Shizuo Sawada, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 18, 1989, Ser. No. 353,765

Claims priority, application Japan, May 18, 1988, 63-119201; Sep. 5, 1988, 63-221620

Int. Cl.<sup>5</sup> H01G 4/06; H01L 21/70; H02L 29/78

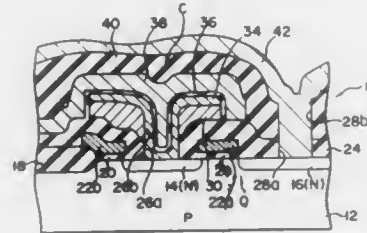
U.S. Cl. 361—313

26 Claims

- 11. A capacitor structure comprising:
- a semiconductor base layer;
- an insulative layer formed on said base layer and having a first opening;
- a first conductive layer formed on said insulative layer and around said first opening, said first conductive layer having a second opening;
- a second conductive layer formed on said first conductive layer so as to cover an inner wall of said first and second openings and to cover a surface portion of said base layer which is exposed through said first and second opening,

said second conductive layer having a recessed surface in said second opening; and

a third conductive layer insulatively disposed above said



second conductive layer and having a layer portion which is positioned in said first and second openings and which has a surface facing said recessed surface of said second conductive layer.

#### 4,951,176 HOLDER SYSTEM FOR FREE-STANDING ELECTRONIC COMPONENTS, ESPECIALLY HYBRID MODULES

Dietrich Bergfried, Böblingen; Gert Jakob, Stuttgart; Hans-Heinrich Maue, Bietigheim-Bissingen; Uwe Schaub, Vaihingen/Enz; Walter Roethlingshoefer; Ulrich Goebel, both of Reutlingen; Elmar Huber, Pliezhausen; Roland Schmid, Dettingen, and Gerhard Zucker, Reutlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

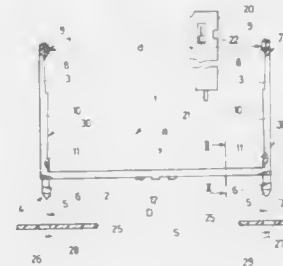
Filed Jun. 2, 1989, Ser. No. 360,353

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1988, 3844310

Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361—400

20 Claims



1. A holder adapted to hold a free-standing electric or electronic component (20), especially a hybrid module or circuit card, wherein the component has a plurality of terminal lugs projecting therefrom,

said holder being adapted for attachment on a circuit board (PCB) (25) formed with receiving openings (26, 27) therein,

said holder comprising

an essentially rectangular elongated base plate (2) formed with openings (14) therein adapted to permit insertion of terminal lugs of a component therethrough; and

two holder arms (30) extending from the narrow sides of the base plate, each holder arm having a module support portion (3) extending in a first direction, and a retention post (4) extending in a second direction which is opposite to said first direction, said posts being adapted for insertion into the receiving openings (26, 27) of the circuit board; and

wherein the holder arms (30) are elastically connected with the base plate (20), and of sufficient elasticity to transfer a tipping or tilting movement applied to said posts on said module support portions (30).

4,951,177

#### DISPLAY DEVICE

Hiroshi Nishizaki, Yokohama, and Miyako Nagasawa, Fujisawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 160,429, Feb. 25, 1988, abandoned.

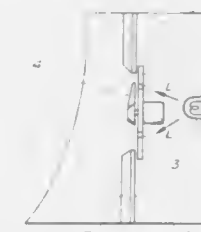
This application Jan. 11, 1990, Ser. No. 462,921

Claims priority, application Japan, Feb. 25, 1987, 62-28031

Int. Cl.<sup>5</sup> G01D 11/28; F21V 9/16

U.S. Cl. 362—28

8 Claims



1. A display device comprising:

- a housing;
- a display member provided in said housing;
- first lighting means, provided in said housing behind said display member, for emitting light toward said display member onto its back side, said light being transmitted through said display member toward its front side;
- second lighting means, provided in said housing forward of said display member, for emitting light toward said display member onto its front side,
- said first and second lighting means having first, second, and third operating modes;
- in said first mode, said first lighting means being turned on to illuminate said display member from its back side, while said second lighting means being turned off;
- in said second mode, said second lighting means being turned on to illuminate said display member from its front side, while said first lighting means being turned off;
- in said third mode, said first and second lighting means being turned on to illuminate said display member from both its back and front sides.

4,951,178

#### HEADLIGHT FOR MOTOR VEHICLE

Katsutada Shirai, and Yasushi Otsuka, both of Shizuoka, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

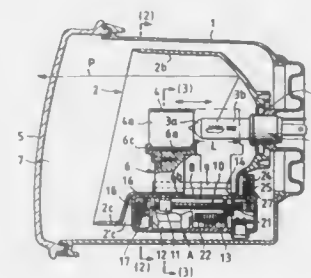
Filed Sep. 29, 1989, Ser. No. 414,497

Claims priority, application Japan, Oct. 5, 1988, 63-131285; Aug. 21, 1989, 64-97556

Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 362—61

17 Claims



1. A headlight for a motor vehicle, comprising:

- a bulb positioned adjacent said reflector;
- a yellow cover; and
- means for slidably moving said cover parallel to an axial direction of said bulb between a first position surrounding

at least a portion of said bulb where light from said bulb passes through said cover before reaching said reflector and a second position where light from said bulb proceeds directly to said reflector without passing through said cover.

4,951,179

#### LIGHTING DEVICE FOR VEHICLE

Tsutomu Machida, Shizuoka, Japan, assignor to Koito Manufacturing Co., Ltd., Tokyo, Japan

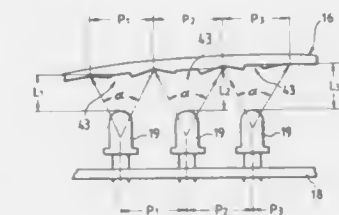
Filed Jul. 27, 1989, Ser. No. 385,843

Claims priority, application Japan, Aug. 2, 1988, 63-102021[U]

Int. Cl.<sup>5</sup> B60Q 1/00

U.S. Cl. 362—61

14 Claims



1. A lighting device for a vehicle, comprising: a lamp body comprising a base and a face lens, and a plurality of light-emitting diodes juxtaposed in said lamp body, said face lens being convexly curved at a predetermined curvature, an inside surface of said lens being formed with light control portions corresponding to said diodes so that the rays of light emitted from said diodes are directed in prescribed directions by said light control portions, and intervals between said diodes and intervals between said portions changing in a lengthwise direction along said face lens in an amount depending on said curvature so that said intervals are maximum at a center of said lens and gradually decrease toward both ends thereof.

4,951,180

#### LAMP REFLECTORS

Geoffrey W. Purdy, Hyde, England, assignor to Oldham Crompton Batteries, Stockport, England

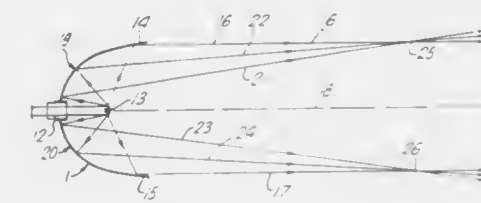
Filed Jan. 30, 1989, Ser. No. 302,880

Claims priority, application United Kingdom, Jan. 28, 1988, 8801883

Int. Cl.<sup>5</sup> F21V 7/06

U.S. Cl. 362—106

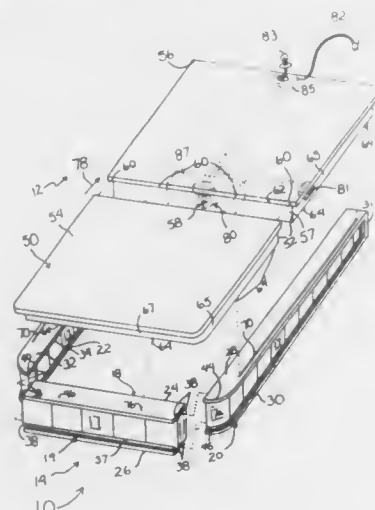
13 Claims



1. A lamp reflector having a pole, an axis and a substantially parabolic reflecting surface having a curvature extending outwardly from the pole towards an outer edge of the reflector wherein the curvature of the reflecting surface has a gradient variation from that of a true parabola curve  $Y_2=4MX$  along at least one line from said pole towards the outer edge of the reflector, wherein the gradient along said line has a value equal to that of a true parabola at a maximum value of X for the reflector but has a value greater than the gradient of a parabolic surface for a modified region located nearer said pole, the said gradient variation varying continuously over said modified region.

fied region, such that the said gradient variation is a minimum at a maximum value of X of the modified region and a said gradient variation is a maximum at a minimum value of X of the modified region.

**4,951,181**  
**LIGHT DIFFUSING GLASS BLOCK FURNITURE**  
 Jacob T. Phillips, Fort Myers, Fla., assignor to Hardman and Phillips Partnership, Ft. Myers, Fla.  
 Filed Oct. 4, 1989, Ser. No. 417,787  
 Int. Cl.<sup>5</sup> A47B 97/00  
 U.S. Cl. 362—134 16 Claims

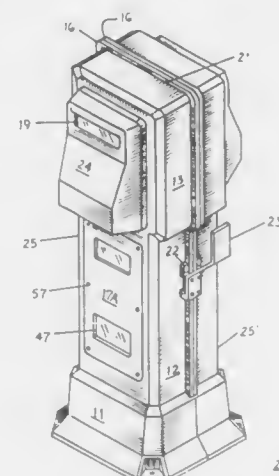


1. An article of furniture comprising:  
 a generally planar platform portion;  
 a base portion for supporting said platform portion, said base portion including a plurality of interengaged glass blocks and a frame for enclosing said glass blocks; and  
 a light source disposed beneath said platform portion for providing illumination through said glass blocks.

**4,951,182**  
**MODULAR PLASTIC POWER-LIGHT PEDESTAL ENCLOSURE**  
 Dale E. Simonson; Ronald J. Orchard, both of Mankato, and Donald H. Stott, No. Mankato, all of Minn., assignors to General Electric Company, New York, N.Y.  
 Filed Jul. 17, 1989, Ser. No. 380,362  
 Int. Cl.<sup>5</sup> F21S 1/02  
 U.S. Cl. 362—145 13 Claims

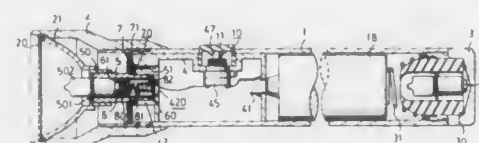
1. A modular marina light-power pedestal assembly comprising:  
 a pair of opposing unitary plastic sidepieces, each of said sidepieces having a perimetric flange integrally-formed therein, each of said sidepieces define a first and second rectangular opening defined therein;  
 a base piece attached to said sidepieces, said base piece having means integrally-formed therein for attachment to a dock;  
 an electric power center within said first rectangular opening at one end of said sidepieces opposite said base piece wherein said perimetric flange includes apertures and

wherein fastening means extend through said apertures to fasten said pair of sidepieces together; and



wherein each of said sidepieces further include top and bottom apertures defining a top lamp enclosure space and a bottom meter receiving space respectively.

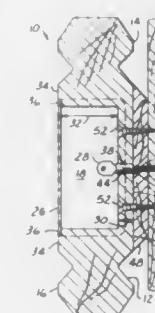
**4,951,183**  
**FOCUSABLE FLASHLIGHT**  
 Howard Wang, No. 7, Alley 14, Lane 64, Ching Ping Rd., Chung Ho City, Taipei Hsien, Taiwan  
 Filed Jan. 16, 1990, Ser. No. 464,900  
 Int. Cl.<sup>5</sup> F21L 7/00  
 U.S. Cl. 362—187 1 Claim



1. A flashlight comprising a tube with a head and a tail cap respectively provided at a front end and a rear end thereof; said tube being made in different lengths to receive a selected number of batteries; a circular hole being formed in said tube; a lens and a light reflector being disposed in a front end of said head; said head being rotatable and movable relative to said tube; a first spring being electrically contacted between said tail cap and a rearmost battery; a disc with a center hole being fixed on a front end of a casing which is inserted into said front end of said tube; a plurality of jaws being provided on a peripheral edge of said disc so as to be force-fitted within said front end of said tube; a cylinder of reduced diameter being formed on said front end of said casing; an opening being formed on one side of said casing; a rectangular hole being formed in said casing opposite to said opening; said round hole being aligned with said circular hole of said tube; a switch being fixed in said casing with a button thereof extending beyond said round hole of said casing and said circular hole of said tube so that said switch is operable by a depression of said button; a conductor which has two blades, each having a stop, being retained in said rectangular hole of said casing; said conductor which is electrically connected to a positive terminal of a foremost battery being electrically connected to said switch; an end cap, a second spring and an end plate with a protrusion being disposed in an insulator; an outward flange and an inward flange being respectively formed on a rear end and in a front end of said insulator; said end cap bearing against said inward flange of said insulator; said insulator being inserted into a retainer; said

outward flange of said insulator contacting a rear end of said retainer; a rear end of said retainer being force fitted into said cylinder; a cover with an inward flange being threadably engaged on a front end of said retainer so as to retain a light bulb therein; a center electrode of said light bulb being electrically contacted to said switch via said end cap, said second spring and said end plate; a case electrode of said light bulb being electrically connected to a negative terminal of a rearmost battery via said retainer, said disc, said tube and said first spring; said switch controlling an electrical circuit of said flashlight; said light bulb being stable relative to said tube so that a rotation of said head relative to said tube makes said light reflector move relative to said light bulb.

**4,951,184**  
**DECK LIGHTING FIXTURE**  
 Daniel S. Makurof, 34615 Koch Ave., Sterling Heights, Mich. 48310  
 Filed Feb. 27, 1989, Ser. No. 316,466  
 Int. Cl.<sup>5</sup> F21L 1/02  
 U.S. Cl. 362—362 22 Claims



1. A lighting fixture, comprising:  
 a wooden piece, said wooden piece having a central cavity, said central cavity forming a base portion, said wooden piece having an end on either side of said central cavity; illumination means within said central cavity of said wooden piece; and  
 a translucent lens releasably covering said central cavity of said wooden piece.

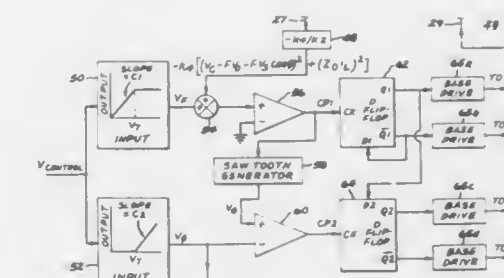
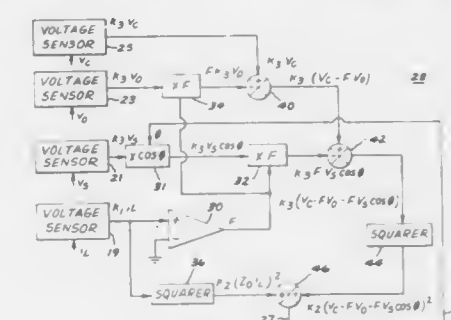
**4,951,185**  
**RESONANT INVERTER EMPLOYING FREQUENCY AND PHASE MODULATION USING OPTIMAL TRAJECTORY CONTROL**  
 Michael J. Schutten, Schenectady; John N. Park, Rexford, both of N.Y., and Ming H. Kuo, Fort Wayne, Ind., assignors to General Electric Company, Schenectady, N.Y.  
 Filed Jul. 13, 1989, Ser. No. 379,461  
 Int. Cl.<sup>5</sup> H02M 3/337  
 U.S. Cl. 363—17 9 Claims

1. An improved dc-to-dc converter, comprising:  
 a resonant inverter having two pairs of controllable switch means, the switch means of each pair being connected in series and each pair of the series-connected switch means being adapted to be connected in parallel across an external dc supply;  
 a series resonant circuit connected between the junctions of said controllable switch means and comprising a capacitor and an inductor, said inverter being adapted to apply a rectangular wave voltage to said series resonant circuit;  
 a full wave rectifier inductively coupled to said series resonant circuit, the output of said rectifier being adapted to supply a substantially constant pre-selected output voltage to a load;  
 state determinant sensing means for continuously monitoring converter state determinants comprising voltage across said capacitor, current through said inductor, the rectan-

gular wave voltage applied to said series resonant circuit, and the output voltage;

optimal control means responsive to said state determinant sensing means for generating an optimal control signal corresponding to the instantaneous values of said state determinants;

first control means responsive to said optimal control signal for controlling the output voltage by frequency modulating the rectangular wave voltage applied to said series resonant circuit so as to maintain stable operation of said series resonant circuit when the operating frequency of



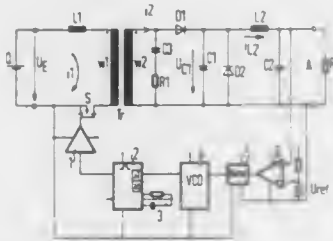
said controllable switch means is within the operable frequency range thereof; and  
 second control means responsive to said optimal control signal for controlling the output voltage by providing a phase modulation angle signal for phase modulating the rectangular wave voltage applied to said series resonant circuit and modifying said optimal control signal accordance therewith so as to maintain stable operation said series resonant circuit when the operating frequency of said controllable switch means is at an extremity of the operable frequency range thereof.

**4,951,186**  
**SINGLE-ENDED FORWARD FREQUENCY CONVERTER WITH A TRANSFORMER AND A DEMAGNETIZATION MEANS**  
 Bogdan Brakus, Stockdorf, and Herbert Heinzl, Schwabhausen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Dec. 19, 1988, Ser. No. 286,331  
 Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807120  
 Int. Cl.<sup>5</sup> H02M 3/335 9 Claims

1. A single-ended forward frequency converter comprising a transformer (Tr) which has a shunt inductance, a primary winding (w1) in the primary circuit of said transformer (Tr) connected to a dc source (Q) through an electronic switch (S) which can be alternately turned on and off by control pulses, and a secondary winding (w2) of the transformer (Tr) con-



ected to a storage capacitor (C1) through a rectifier (D1), said storage capacitor (C1) forming a main resonant circuit with an inductor (L1) connected in the primary, comprising, a demagnetization means for demagnetizing the core of the transformer (Tr) after the turn-on phases of the electronic switch (S), wherein the demagnetization means (C3) contains at least one



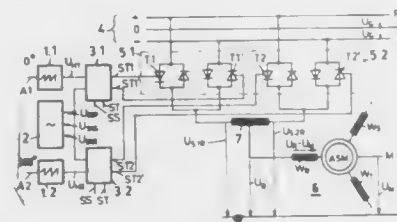
further capacitor (C3) connected to a winding (w2) of the transformer (Tr); and the capacitance of the further capacitor (C3) is selected such that a further resonant circuit formed by the capacitance of said further capacitor (C3) and the shunt inductance of the transformer (Tr) has approximately the same resonant frequency as the main resonant circuit (L1, C1).

#### 4,951,187 METHOD FOR CONTROLLING A THREE-PHASE INVERTER

Herbert Stemmler, Kirchdorf, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland  
Filed Nov. 22, 1989, Ser. No. 440,260  
Claims priority, application Switzerland, Dec. 14, 1988, 4617/88

Int. Cl.<sup>7</sup> H02M 7/527  
U.S. Cl. 363—96

10 Claims



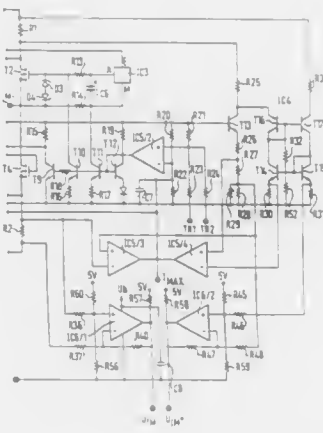
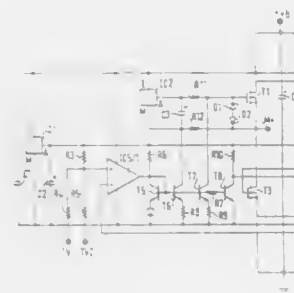
1. A method for controlling a three-phase inverter,
  - (a) comprising at least one inverter section (5.1, 5.2, 24) per alternating-current phase (R, S, T) of the inverter,
  - (b) in which valves (T1, T1', T2, T2') of the inverter section are controlled in dependence on intersections of two superimposition alternating-voltage signals ( $U_{SIR}$ ,  $U_{SIS}$ ,  $U_{SIT}$ ,  $U_{H1}$ ,  $U_{H2}$ ),
  - (c) of which a sinusoidal first superimposition alternating-voltage signal ( $U_{SIR}$ ,  $U_{SIS}$ ,  $U_{SIT}$ ) has the required frequency and phase angle of the output voltage of the respective inverter section (5.1, 5.2, 24), and
  - (d) a second superimposition alternating-voltage signal is at least a first variable-frequency and -amplitude auxiliary alternating-voltage signal ( $U_{H1}$ ,  $U_{H2}$ ), wherein
  - (e) the valves of the inverter sections of two first and second inverter phases, the first superimposition alternating-voltage signal of which has been intersected, are switched only in the case of two first and second intersections of the superimposition alternating-voltage signals which follow one another in time, and
  - (f) at a third intersection which follows in time, it is not the inverter of a third alternating-current phase, the first superimposition alternating-voltage signal of which has been intersected which is switched but the valves of the two inverter sections which belong to the two other alternating-current phases (R, S, T).

4,951,188  
FINAL STAGE OF A BRIDGE CIRCUIT  
Cornelius Peter, Ottersweier, and Thomas Riehemann, Bühler-tal, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE87/00282, § 371 Date Jan. 20, 1989, § 102(e)  
Date Jan. 20, 1989, PCT Pub. No. WO88/00770, PCT Pub. Date Jan. 28, 1988

PCT Filed Jun. 20, 1987, Ser. No. 314,576  
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1986, 3625091

Int. Cl.<sup>7</sup> H02M 7/5387  
U.S. Cl. 363—132

13 Claims



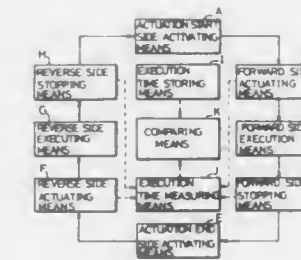
1. Device for controlling the current through an electric consumer connected in a diagonal of a bridge circuit assembled of four current control members in the form of field effect transistors, comprising two gate voltage supply circuits each connected to the gate of a field effect transistor in two branches of the bridge circuit; two current source circuits connected, respectively, to the gate voltage supply circuits to control voltages supplied to the gates; each voltage supply circuit including a voltage regulator assembled of a diode (D) having its anode connected to the positive terminal of a power voltage source, its cathode connected to an end of a resistor (R) and to the collector of a N-P-N transistor (T), a Zener diode (Dz) having its cathode connected to the other end of the resistor (R) and to the base of the N-P-N transistor (T), its anode connected via a resistor to a terminal of the electric consumer, and the emitter of the N-P-N transistor being connected via a resistor to the gate of the assigned field effect transistor.

4,951,189  
SEQUENCE CONTROL SYSTEM AND METHOD  
Masayuki Onodera, Isehara; Tatsuo Naito, Atsugi; Hisashi Kubota, Fujisawa; Takayuki Kawakami, Sagami; Takatoshi Ito, and Kei Shimizu, both of Zama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan  
Filed Oct. 31, 1988, Ser. No. 264,744

Claims priority, application Japan, Oct. 3, 1987, 62-276721; Oct. 30, 1987, 62-276720; Mar. 17, 1988, 63-61820; Mar. 17, 1988, 63-61819; Oct. 30, 1988, 62-276722

Int. Cl.<sup>7</sup> G06F 15/46; G05B 19/02  
U.S. Cl. 364—141

13 Claims



1. A sequence control system for controlling a plurality of processes in sequence, each process being achieved by actuating an actuation member in forward and reverse directions, said sequence control system comprising:
  - (a) forward side executing means for executing a forward process by driving at least one actuation member in a forward direction;
  - (b) forward side actuating means for actuating said forward side executing means;
  - (c) forward side stopping means for stopping said forward side executing means;
  - (d) reverse side executing means for executing a reverse process by driving at least one actuation member in a reverse direction;
  - (e) reverse side actuating means for actuating said reverse side executing means;
  - (f) reverse side stopping means for stopping said reverse side executing means;
  - (g) actuation start side activating means, coupled to said forward side actuating means and to said reverse side stopping means and activated when said reverse side stopping means is turned on, for causing said forward side executing means to be activated when said forward side actuating means is turned on; and
  - (h) actuation end side activating means, coupled to said forward side stopping means and to said reverse side actuating means and activated when said forward side stopping means is turned on, for causing said reverse side executing means to be activated when said reverse side actuating means is turned on, said actuation start side activating means for a present process and said actuation end side activating means for a preceding process being activated simultaneously when one of said actuation start side activating means for said present process and said actuation end side activating means for said preceding process is activated.

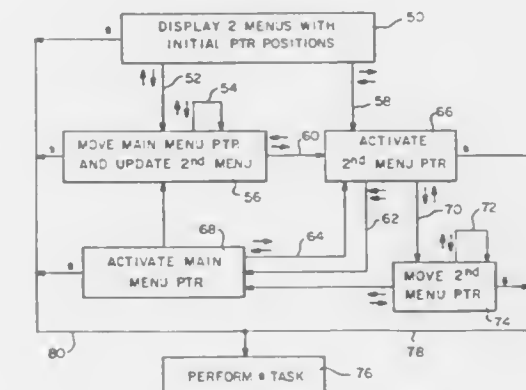
4,951,190  
MULTILEVEL MENU AND HIERARCHY FOR  
SELECTING ITEMS AND PERFORMING TASKS  
THEREON IN A COMPUTER SYSTEM

Leslie A. Lane, Santa Clara; Lynn V. Lybeck, Moss Beach; David S. Perloff, Sunnyvale, and Chester L. Mallory, Santa Clara, all of Calif., assignors to Prometrix Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 50,925, May 15, 1987, Pat. No. 4,873,623, which is a continuation-in-part of Ser. No. 864,024, May 16, 1986, Pat. No. 4,805,089, which is a continuation-in-part of Ser. No. 729,153, Apr. 30, 1985, Pat. No. 4,679,137. This application Jul. 6, 1989, Ser. No. 375,878

Int. Cl.<sup>7</sup> G06F 15/46  
U.S. Cl. 364—188

10 Claims



1. A method for performing tasks on selected sets of items in a computer system having a display device, the steps of the method comprising:
  - establishing at least three separate menu display regions on said computer display device, each display region capable of displaying multiple menu items and an associated selectively positionable pointer to an individual menu item;
  - defining a plurality of separate main menu items;
  - defining a plurality of separate groups of auxiliary menu items, each group being associated with at least one of said main menu items;
  - defining a plurality of groups of tertiary menu items, each group being associated with at least one of said auxiliary menu items;
  - defining and storing for each said menu item a plurality of parameter values;
  - displaying in a first one of said menu display regions at least a plurality of said main menu items;
  - displaying simultaneously in a second one of said menu display regions at least a portion of one of said groups of auxiliary menu items associated with a selected one of said main menu items being displayed in said first menu display region;
  - displaying simultaneously in a third one of said menu display regions at least a portion of one of said groups of tertiary menu items associated with a selected one of said auxiliary menu items being displayed in said second menu display region;
  - selecting one of said items displayed in said first and second display regions; and
  - then performing a predefined task on all of the items in the group of items corresponding to said selected item.

4,951,191

# PROCESS CONTROL HAVING IMPROVED COMBINATION OF FEEDFORWARD FEEDBACK CONTROL

Kazuo Hiroi, and Kojiro Ito, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

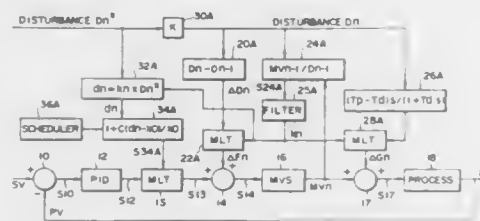
Filed Jun. 24, 1988, Ser. No. 211,263

Claims priority, application Japan, Jun. 26, 1987, 62-157910

Int. Cl.<sup>3</sup> G05B 13/02; G06F 15/46

U.S. Cl. 364-165

15 Claims



1. A process controller comprising:

(a) a feedback circuit including:

first means for outputting a first signal corresponding to a difference between a control target variable and a process result,

second means for outputting a second signal, which is obtained by converting the first signal based on a predetermined transfer function, and

third means, controlled on the basis of the second signal, for outputting a control result; and

(b) a feedforward circuit including:

fourth means, responsive to an external signal and coupled to said second means, for detecting a static characteristic compensation signal representing a product of the second signal and a quotient obtained by dividing a difference between present and previous external signals with the previous external signal, and

fifth means, coupled to said fourth means, said first means, and said second means, for supplying a composite signal of the first signal and the static characteristic compensation signal to said second means.

4,951,192

# DEVICE FOR MANAGING SOFTWARE CONFIGURATIONS IN PARALLEL IN A NETWORK

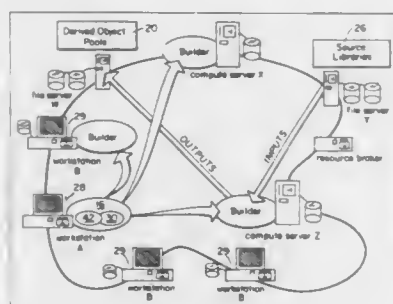
Robert P. Chase, Jr., Newton, and Howard Spilke, Shrewsbury, both of Mass., assignors to Apollo Computer, Inc., Chelmsford, Mass.

Filed Jun. 4, 1987, Ser. No. 58,330

Int. Cl.<sup>3</sup> G06F 9/44

U.S. Cl. 364-200

31 Claims



1. Apparatus for managing computer software comprising: a plurality of processors loosely connected in a network; and configuration management means, executable on at least one of the processors, for building from a configuration model a desired software system having a multiplicity of compo-

nents including independent components, the configuration management means determining which components are to be compiled and assigning each such to-be-compiled component to a processor to compile the component, the configuration management means assigning the independent components to different processors such that components in the desired software system which are independent of each other are automatically compiled in parallel by different processors to minimize total compilation time of the desired software system; the components of the desired software system being of user designated versions.

4,951,193

# PARALLEL COMPUTER WITH DISTRIBUTED SHARED MEMORIES AND DISTRIBUTED TASK ACTIVATING CIRCUITS

Akira Muramatsu, Kawasaki; Kousuke Sakoda, Hino; Ikuro Yoshihara, Tama; Kazuo Nakao, Sagami-hara; Makoto Nohmi, Kawasaki; Naoki Hamanaka, Tokyo; Shigeo Nagashima, and Teruo Tanaka, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

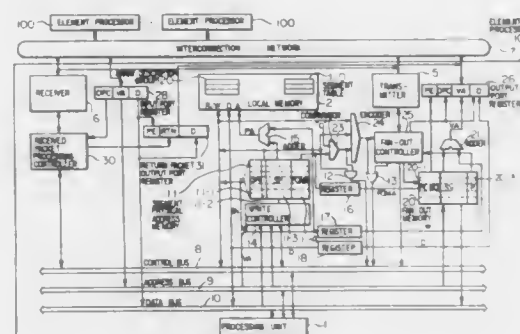
Filed Aug. 14, 1987, Ser. No. 85,646

Claims priority, application Japan, Sep. 5, 1986, 61-209253; Mar. 18, 1987, 62-61018

Int. Cl.<sup>3</sup> G06R 9/00

U.S. Cl. 364-200

12 Claims



1. A parallel computer, comprising:

(a) a plurality of element processors each for executing task programs assigned thereto among a plurality of task programs to be executed by said parallel computer;

(b) network means connected to said element processors for enabling signal transfer therebetween; and

(c) each element processor, which has substantially the same structure as the other, including:

(c1) first memory means for holding data and a group of task programs assigned thereto;

(c2) execution means connected to said first means for executing a task program, including first means responsive to a predetermined instruction included in the task program under execution for providing said network means with a control token signal, an element processor indication signal indicative of an element processor to which is assigned a succeeding task program which is allowed to be executed after execution of the task program under execution and a task program indication signal indicative of the succeeding task program, so as to request said network means to send the control token signal and the task program indication signal to the element processor indicated by the element processor indication signal;

(c3) second memory means for holding predetermined total numbers of control token signals which respective ones of the group of task programs require to receive before being executed; and,

(c4) control means connected to said network means, said second memory means and said execution means and responsive to control token signals and task program indication signals provided from said network means for detecting which one of the group of task programs is allowed to execute, depending upon the total numbers of control token signals predetermined for and total numbers of control token signals already received for respective task programs and for informing said execution means of the detected one task program so as to be executed next.

4,951,194

# METHOD FOR REDUCING MEMORY ALLOCATIONS AND DATA COPYING OPERATIONS DURING PROGRAM CALLING SEQUENCES

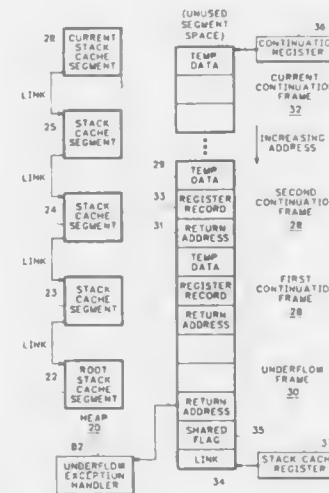
Alan C. Bradley, Portland; Steven R. Vegdahl, Beaverton, and Norman I. Adams, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jan. 23, 1989, Ser. No. 299,581

Int. Cl.<sup>3</sup> G06F 12/02

U.S. Cl. 364-200

6 Claims



1. For a computer including a memory for storing data and a program comprising callable routines, and including a processor for executing the routines when called, wherein each routine uses a separate continuation frame allocated to a stack cache for storing data, each continuation frame comprising a separate portion of the memory, wherein a routine currently being executed by the processor uses a last continuation frame allocated to the stack cache, and wherein the last allocated continuation frame is de-allocated from the stack cache when the routine using it returns to its caller, a method for allocating continuation frames to a stack cache and for capturing and invoking continuations, wherein a continuation is a record of the state of the stack cache as of the moment the continuation is captured, and wherein invoking a continuation restores a stack cache to a state recorded by the invoked continuation, the method comprising the steps of:

allocating continuation frames to the stack cache by successively allocating segments of the memory to the stack cache, and allocating successive portions of allocated segments as continuation frames of the stack cache, a new segment being allocated to the stack cache whenever a last allocated segment includes no unallocated portion of size sufficient for allocation of a next allocated continuation frame of the stack cache;

storing a link in each new segment when allocated to the stack cache, the link comprising data pointing to a next to last allocated segment of the stack cache;

storing a shared flag in a new segment when allocated to the stack cache, the shared flag comprising data initially indi-

cating the new segment is not included in a captured continuation; and

capturing a continuation by setting shared flags in a set of segments allocated to the stack cache to indicate the segments are included in a captured continuation, allocating a new segment to the stack cache such that the last allocated segment becomes the next to last allocated segment of the stack cache and the new segment becomes the last allocated segment of the stack cache, copying data stored in the next to last allocated segment of the stack cache into the last allocated segment, and setting the shared flag in the last allocated segment to indicate the last allocated segment is not included in a captured continuation.

4,951,195

# CONDITION CODE GRAPH ANALYSIS FOR SIMULATING A CPU PROCESSOR

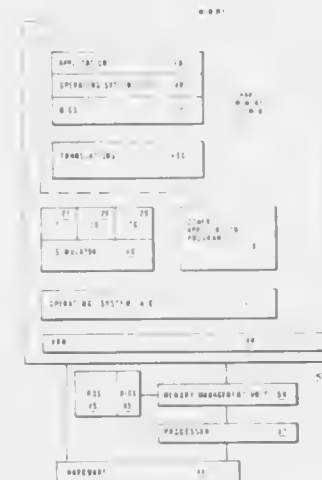
Richard G. Fogg, Jr., and Arturo M. de Nicolas, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 1, 1988, Ser. No. 151,136

Int. Cl.<sup>3</sup> G06F 9/00

U.S. Cl. 364-200

8 Claims



1. A method of reducing a number of translated instructions in a simulator having means for simulating a first processor having a first instruction set of a first processing system, said simulator running on a second processing system having a second processor having a second instruction set for running an application targeted for said first instruction set, said method comprising:

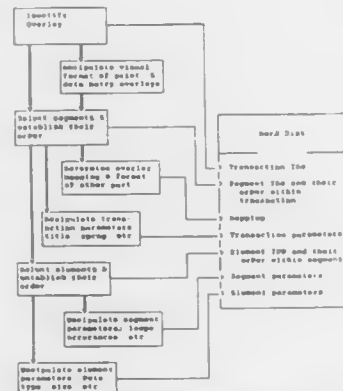
performing a graph analysis, by the simulator, on an instruction flow of control of said application;

determining, by the simulator, from the graph analysis, whether any one of a plurality of condition codes of each of a first one of a plurality of instructions of said flow of control are used by a subsequent one of said instructions of said flow of control; and

translating, by said simulator, said plurality of instructions of said flow of control into at least one translated instruction from said second instruction set, whereby a number of said translated instructions is reduced for at least one of said instructions of said flow of control if it is determined from the graph analysis that the condition codes are not needed by any subsequent at least one of said instructions.



**4,951,196**  
**METHOD AND APPARATUS FOR ELECTRONIC DATA INTERCHANGE**  
 Angela G. Jackson, Lincoln Park, Mich., assignor to Supply Tech, Inc., Southfield, Mich.  
 Filed May 4, 1988, Ser. No. 190,147  
 Int. Cl.<sup>5</sup> G06F 15/21, 15/24  
 U.S. Cl. 364-401



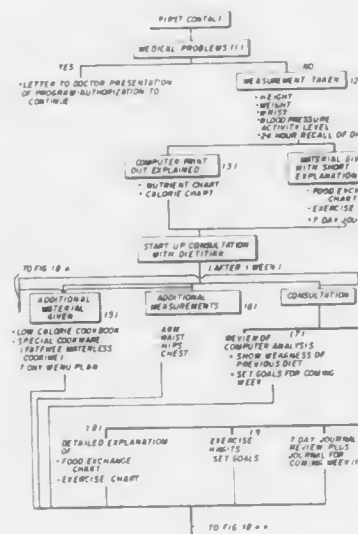
1. A programmable machine system for operating on business transaction data in a plurality of different dictionary-structured transaction formats, said machine system including a plurality of system components, said machine system comprising:

first means for defining an overlay for each of the different dictionary-structured formats, each such overlay having an ordered sequence of elements and mapping coordinates of given elements to related fields of a given system component; and  
 second means, using a selected overlay, for translating data in one of the dictionary-structured formats into a different format for use on the given system component; whereby the same programmable machine system is operated on different dictionary-structured transaction formats without software modification.

5. A programmable machine system having a plurality of system components for defining, entering, and translating business transaction data for transmitting said data among trading partners, said system comprising:

(a) input means for defining a dictionary-structured transaction format having a plurality of elements in a particular organization;  
 (b) selector means for selecting a given system component;  
 (c) overlay generator means cooperating with the input means and selector means for generating an overlay associated with the selected system component, said overlay being used to define at least one second format having positionable parts in the selected system component that are related to the elements in the dictionary-structured transaction format, the overlay also containing a mapping between the location of such parts in the selected system component to its associated elements in the dictionary-structured format;  
 (d) translating means for translating data entered in the second format into said dictionary-structured format; and  
 (e) transmitting means for transmitting the translated data in the dictionary-structured transaction format to a trading partner.

**4,951,197**  
**WEIGHT LOSS MANAGEMENT SYSTEM**  
 Gilbert Mellinger, Jacksonville, Fla., assignor to AMC of America, Jacksonville, Fla.  
 Continuation of Ser. No. 864,504, May 19, 1986, abandoned.  
 This application Feb. 10, 1989, Ser. No. 309,038  
 Int. Cl.<sup>5</sup> G06F 15/42  
 U.S. Cl. 364-413.2



1. A method of individualized weight management comprising:

(a) obtaining a medical history of a subject and determining the existence of any physiological abnormalities;  
 (b) obtaining a present physical profile of said subject said profile including data as to sex, physical measurements for determining frame size such as bone or wrist measurements, weight and height of said subject;  
 (c) obtaining specific information of recent food items caused by said subject and recent level of physical activity in terms of the number of calories burned per pound or per kilogram per day;  
 (d) entering data obtained from steps (a)-(c) into a computer for comparison with predetermined standards of food consumption given a specified sex, frame size, weight, height and said recent level of physical activity in terms of the number of calories burned per pound or per kilogram per day in relation to an ideal weight;  
 (e) obtaining a computer analysis of the comparison of the results of step (d) with the caloric and nutritional requirements for said subject at said ideal weight at said recent level of physical activity and employing said computer to calculate the deviation of the current eating habits from said requirements for said subject;  
 (f) computing with said computer to determine whether a subject should be placed on an intermediate diet plan

having a target weight above an ideal target weight by utilizing the formula:

$$(A \times C) - (B \times C) = D$$

wherein

A represents the actual current weight of the subject in pounds or kilograms;  
 B represents the ideal weight in the same unit of measure as A and as determined by said compute analysis;  
 C represents said activity level of said subject in terms of the number of calories burned per pound or per kilogram per day in which said activity level is represented by the values of 11 calories per pound for sedentary activity; the value of 13 calories per pound for light activity; the value of 15 calories per pound for moderate activity and the value of 20 calories per pound for vigorous physical activity;

D is a calculated number which if greater than 1,000 calories indicates said subject should be placed on a diet in which said target weight should be initially set above said ideal target weight;

(g) providing said subject with information as to a weight control program in which the eating habits are modified by selectively placing the caloric and nutritional intake at a targeted weight substantially at or above the value corresponding to said ideal weight;

(h) providing said subject with behavior modification instruction to alternatives to past food consumption wherein said behavior modification is selected from the group consisting of cooking, eating, exercise, nutrition or a combination thereof;

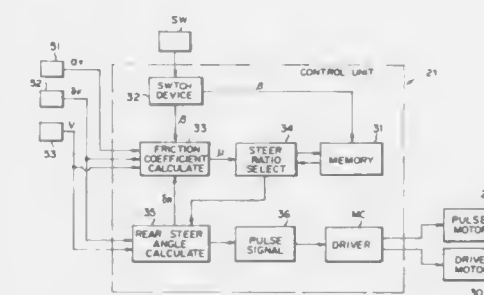
(i) providing said subject with periodic goals for achieving said behavior modification;

(j) providing periodic consultation with said subject and review to ascertain the attainment of goals resulting from step (i) and providing additional goals; and (k) following up said consultation and review with periodic computer analysis of said ideal with additional data gathered including the changes in weight and food consumption of said subjects in relation to said predetermined standards.

**4,951,198**  
**FRICTION DETECTING DEVICE FOR VEHICLES**  
 Kenichi Watanabe, Akihiko Miyoshi, and Shoichi Kamimura, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 14, 1988, Ser. No. 260,890  
 Claims priority, application Japan, Oct. 15, 1987, 62-260451; Oct. 15, 1987, 62-260454; Oct. 15, 1987, 62-260456; Oct. 15, 1987, 62-260457; Oct. 15, 1987, 62-260458

Int. Cl.<sup>5</sup> B62D 6/04  
 U.S. Cl. 364-424.05



1. A vehicle steering control system comprising running condition detecting means for detecting a running condition of a vehicle including a lateral acceleration acting on a gravity center of the vehicle, steering detecting means for detecting steering angle of front and rear wheels of the vehicle, vehicle speed detecting means for detecting a vehicle speed, memory

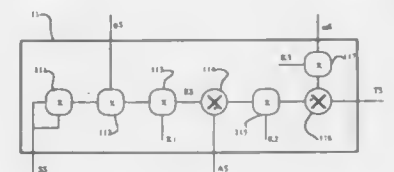
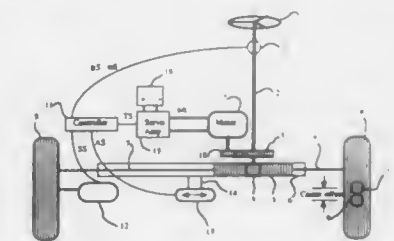
means for storing stability factors of the vehicle including a vehicle weight, respective distances between the gravity center and front and rear axles, cornering powers acting on the front and rear wheels at a standard condition and a yawing moment of inertia, and calculating means for calculating a frictional coefficient  $\mu$  of a road surface on which the vehicle is running by employing a following formula:

$$\mu = \frac{V[m(a^2K_F + b^2K_R) + IK]s - mV^2(aK_F - bK_R)}{ay/2cK_FK_R[V(b\delta_F + a\delta_R)s + V^2(\delta_F - \delta_R) - cay]} \quad (1)$$

wherein  $ay$  is the lateral acceleration acting on the gravity center of the vehicle,  $\delta_F$  is the steering angle of the front wheels,  $\delta_R$  is the steering angle of the rear wheels,  $V$  is the vehicle speed,  $m$  is the vehicle weight,  $a$  is the distance between the gravity center of the vehicle and the front axle,  $b$  is the distance between the gravity center of the vehicle and the rear axle,  $K_F$ ,  $K_R$  are the cornering powers for the front and rear wheels at the standard condition,  $I$  is the yawing moment of inertia of the vehicle,  $c = a + b$ ,  $K = K_F + K_R$  and  $s$  is a laplacian operator, and control means for controlling the steering angle for the rear wheels in accordance with said frictional coefficient  $\mu$  provided by the calculating means.

**4,951,199**  
**STEERING STABILIZING METHOD AND APPARATUS FOR SUPPRESSING THE WEAVE MODE**  
 John C. Whitehead, 3322 Biscayne Bay Pl., Davis, Calif. 95616  
 Filed Nov. 16, 1987, Ser. No. 120,648  
 Int. Cl.<sup>5</sup> G05D 17/02  
 U.S. Cl. 364-424.05

14 Claims



5. A steering torque controller for a steering system of a wheeled vehicle, for suppressing the weave mode of said vehicle, said weave mode being a natural oscillation of the steer angle and the lateral position of said vehicle at a frequency of approximately 2 Hz or lower, comprising:

a. means for automatically determining instantaneous natural steering torque, said natural steering torque being applied by forces exerted on the wheels of said vehicle by a road or other supporting surface;  
 b. means for calculating or approximately a desired steady-state restoring torque which is responsive to the instantaneous values of steer angle and speed of said vehicle;  
 c. means for comparing said instantaneous natural steering torque with said desired steady-state restoring steering torque to determine a torque difference;  
 d. means for applying a control steering torque to said steering system according to said torque difference in a manner increasing with increases in said torque difference, said control steering torque being applied in a direction which

opposes a rapid steer angle change by an operator of said vehicle and suppresses said weave mode of said vehicle.

4,951,200

# METHOD OF CONTROLLING THE APPLY ELEMENT DURING A KICKDOWN SHIFT FOR AN ELECTRONIC AUTOMATIC TRANSMISSION SYSTEM

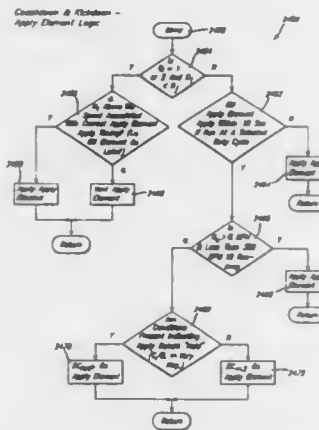
Maurice B. Leising, Clawson; Gerald L. Holbrook, Rochester Hills, and Howard L. Benford, Bloomfield Hills, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 188,591

Int. Cl.<sup>5</sup> B60K 41/02, 41/18; G05D 17/02

U.S. Cl. 364—424.4

11 Claims



1. In a vehicle having an engine and a transmission system including an input member, an output member, a torque converter assembly for transmitting torque between the engine and the input member, the torque converter assembly including a turbine, a gear assembly for changing the ratio of torque between the input member and output member, a plurality of friction elements for shifting the gear assembly, a fluid actuating device being movable axially for applying at least one friction element, at least one solenoid-actuated valve being movable and having logical operating states (ON and OFF) in response to the presence or absence of electrical power to the valve for directing fluid flow between a fluid source and the fluid actuating device, sensors providing signals indicative of measurement data for predetermined conditions, a controller having memory for processing and storing the signals and predetermined values and providing signals to control the solenoid-actuated valves, a method of controlling the speed change for a kickdown shift, said method comprising the steps of:

- sensing the speed of the turbine;
- sensing the speed of the output member;
- calculating a turbine speed based on the sensed speed of the turbine;
- calculating an output speed based on the sensed speed of the output member;
- calculating a target speed based on the calculated output speed;
- calculating an instantaneous turbine acceleration based on the calculated turbine speed;
- measuring a time to nearly fill the apply friction element;
- calculating a kickdown start value based on the time to nearly fill the friction element and a predetermined desired acceleration of the turbine stored in memory;
- comparing the calculated instantaneous turbine acceleration against the kickdown start value to determine when the calculated instantaneous turbine acceleration exceeds the kickdown start value; and
- turning ON the friction element by the controller once the calculated instantaneous turbine acceleration exceeds the

kickdown start value to control the rate at which the turbine of the torque converter assembly accelerates.

4,951,201

# METHOD OF AUTOMATICALLY DETERMINING IMAGED BODY POSTURE IN MEDICAL IMAGE DISPLAY

Hideya Takeo; Nobuyuki Tanaka, and Nobuyoshi Nakajima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

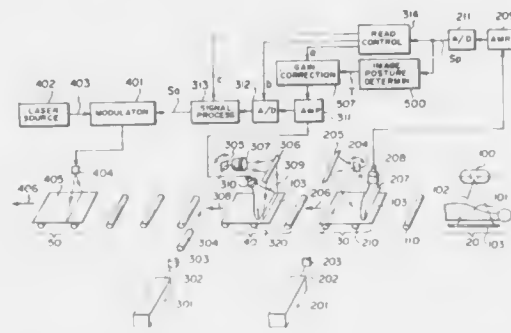
Filed Apr. 20, 1988, Ser. No. 183,809

Claims priority, application Japan, Apr. 20, 1987, 62-96709; Apr. 20, 1987, 62-96710; Apr. 20, 1987, 62-96711; Apr. 20, 1987, 62-96712; Apr. 20, 1987, 62-96713; Apr. 20, 1987, 62-96714

Int. Cl.<sup>5</sup> G06F 15/42

U.S. Cl. 364—413.13

18 Claims



1. A method of determining the imaged posture of a medical image, comprising the steps of:

- (i) determining a distribution of an image signal bearing a transmitted image of a human body, along a prescribed direction across the image;
- (ii) accumulating signal values of the distribution along said direction to find accumulated values at points along said direction;
- (iii) determining a rate of change of said accumulated values in a region along said direction; and
- (iv) determining the imaged posture of said image based on said rate of change.

4,951,202

# ORIENTAL LANGUAGE PROCESSING SYSTEM

Miin J. Yan, 4325 Bromyard Ave., Cincinnati, Ohio 45241

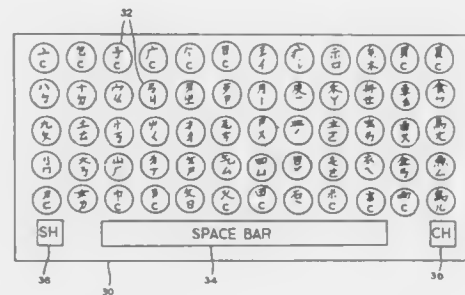
Continuation of Ser. No. 864,305, May 19, 1986, abandoned.

This application May 26, 1989, Ser. No. 358,486

Int. Cl.<sup>5</sup> B41J 1/52; G06F 15/38

U.S. Cl. 364—419

16 Claims



1. The method of entering into the keyboard of an information processor the identification of a series of ideographic characters which are a written form of an Oriental language and which are conventionally written in a certain stroke order,

comprising the following steps to identify each particular character of said series.

- (a) referring to keys on the keyboard marked with a first group of signs having phonetic value which indicates the spoken form of said language, and marked with a second group of signs which have determinative value and indicate radicals of ideographic characters;
- (b) selecting from the first group enough signs to describe the spoken form of pronunciation of said particular character in said language;
- (c) where a homonymic ambiguity remains after the first group selection for said particular character, selecting a sign from said second group to denote the radical identification of said particular character; and positioning said selected second group sign after said selection from the first group if the radical represented by the selected second group sign is in the latter portion of the sequence of conventional stroke order for writing said particular character, and if not, positioning said selected second group sign before said first group selection;
- (d) operating the keyboard to enter what has been so selected into said information processor; and
- (e) displaying what has been so entered in the form of the signs shown on the selection of keys, said display being readable to identify the intended character independently of operation of the information processor to display the intended character.

4,951,203

# COMPUTER CARD

John D. Halamka, 1100 Bayhills Dr., San Rafael, Calif. 94903

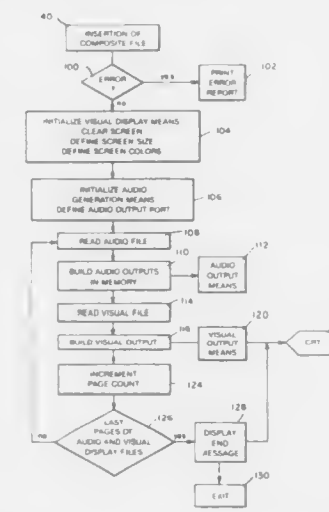
Division of Ser. No. 649,995, Sep. 13, 1984. This application

May 31, 1988, Ser. No. 200,234

Int. Cl.<sup>5</sup> G06F 15/38

U.S. Cl. 364—419

11 Claims



1. A computer greeting card created and readable by a digital computing machine comprising:  
a simple magnetic media means for storing (2) a plurality of messages a plurality of audio selections and (3) a control file to configure the digital computing machine to present said messages and said audio selections selected by the user in synchronization;  
the digital computing machine having an operating system, a visual display means, audio generation means and means to read said magnetic media means;  
said control file configured to be read by the digital computing machine from said magnetic media means upon initial operation of the machine, whereby the operating system of said digital computing machine directs the reading of said user preselected message and the output of said message on said display means and directs the reading of said

audio selection and the output of said audio selection through said audio generation means synchronously with said output of said preselected message.

4,951,204

# IRRIGATION CONTROLLER HAVING MEANS FOR WATERING AFTER FAILURE IN PRIMARY AND BACK-UP POWER SUPPLIES

John M. Mylne, III, Riverside, Calif., assignor to The Toro Company, Riverside, Calif.

Division of Ser. No. 237,658, Aug. 25, 1988, Pat. No. 4,852,051,

which is a continuation of Ser. No. 888,621, Jul. 18, 1986,

abandoned, which is a continuation of Ser. No. 581,030, Feb. 17,

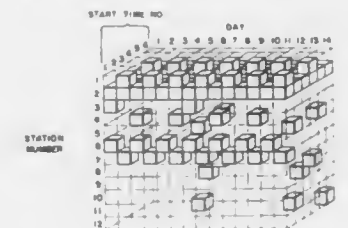
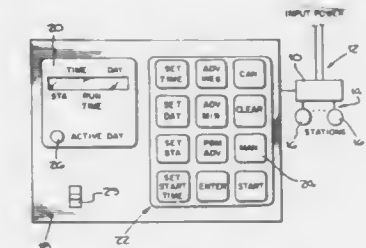
1984, abandoned. This application Jul. 10, 1989, Ser. No.

350,453

Int. Cl.<sup>5</sup> G06F 15/46; G05D 7/06

U.S. Cl. 364—420

4 Claims



1. An irrigation controller for automatically controlling the flow of water to a plurality of watering stations in accordance with a programmed watering schedule.

(A) connected to said irrigation controller are:

primary supply means for supplying power to said irrigation controller; and back-up supply means for supplying power to said irrigation controller if said primary supply means fails;

(B) said irrigation controller comprising:

(a) memory means for storing said programmed watering schedule as long as power to the memory is not interrupted, said memory means being the only means said irrigation controller has for storing said watering schedule; and

(b) logic means for initiating watering after a failure and then resumption of said primary supply means, said logic means comprising:

(i) means for initiating watering in accordance with said programmed watering schedule if the back-up supply means did not fail at any time during the failure of the primary supply means; and

(ii) means for activating watering at one or more of said watering stations at a hard wired pre-determined interval for a hard wired pre-determined period of time if the back-up supply means did fail at some time during the failure of the primary supply means.



UMI

1. Protective apparatus of a vehicle microcomputer, comprising:  
a microcomputer, connected to vehicle input and output

devices, for controlling output devices in accordance with a program;

a regulator for receiving an oscillating signal output from said microcomputer, said regulator inverting a reset signal therefrom when a period of the oscillating signal becomes longer than a predetermined period;

a monostable circuit triggered to a metastable state upon inversion of the reset signal from said regulator, said monostable circuit being kept in the metastable state for a predetermined period of time; and

an output inhibiting logic circuit for constraining output from said microcomputer to a predetermined output state in response to an output signal from said monostable circuit in the metastable state.

4,951,211

# **ELECTRONIC GUIDING AND INFORMATION SYSTEM FOR TRAFFIC**

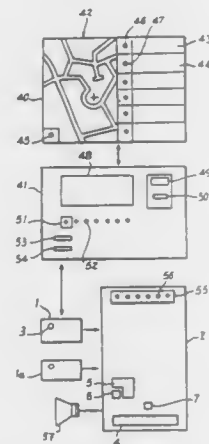
Gerard J. De Villeroche, 102, Rue de Pont-a-Mousson, 57158 Montigny, France

Continuation-in-part of Ser. No. 844,391, Mar. 26, 1986, abandoned. This application Apr. 28, 1989, Ser. No. 349,935. Claims priority, application European Pat. Off., Jul. 27, 1984, 84401584.2

Int. Cl.<sup>5</sup> G06F 15/50

U.S. Cl. 364-444

29 Claims



1. An electronic guidance and information system for traffic, comprising:

means for encoding and storing cartographic data and general information data relating to a zone, memory supports for receiving and storing said encoded cartographic data and said general information data, means coupled to said encoding and storing means for reproducing said encoded cartographic data and general information data on said memory supports, on-board electronic data processing and display means, able to receive at least one of said memory supports, for extracting data stored therein and including

a control keyboard for the input of information representing a departure location and a destination location, between which the said electronic data processing and display means define an optimized route, display screen means for displaying at least indications for the driver to follow said route, advance means operated at defined sections of the route, said advance means for causing said display screen means to provide a stepwise progression of successive display indications for the driver to follow said route.

4,951,212

# **AUTOMOBILE DRIVING GUIDE APPARATUS**

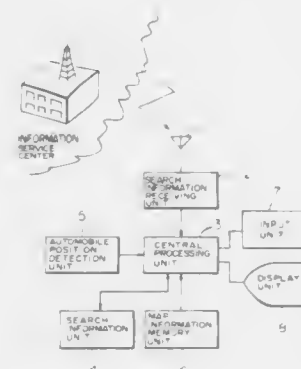
Nobuo Kurihara, Hitachiota; Minoru Osuga, Katsuta; Hideharu Takahasbi, Hitachi, and Akira Endo, Mito, all of Japan, assignors to Hitachi Ltd.

Filed Apr. 7, 1988, Ser. No. 178,922

Claims priority, application Japan, Apr. 8, 1987, 62-84756 Int. Cl.<sup>5</sup> G06F 15/50

U.S. Cl. 369-449

17 Claims



1. An automobile driving guide apparatus comprising:

- (a) input means for allowing a driver to input information indicating the purpose of use of certain facilities;
- (b) related information memory means for storing information concerning locations of facilities related to an inputted purpose of use;
- (c) search means for reading information identifying one or more locations of facilities corresponding to a specific purpose of use, inputted through said input means, from said related information memory means; and
- (d) display means for displaying indicia representing locations of facilities identified by information read by said search means on a road map showing routes to said one or more locations.

4,951,213

# **VEHICLE NAVIGATION**

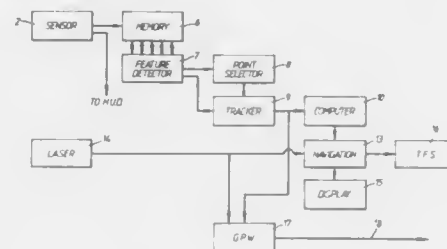
Ivor R. Baxter, Shenfield, and Thomas Hair, Chelmsford, both of United Kingdom, assignors to The General Electric Company, plc, London, England

Filed Jan. 27, 1989, Ser. No. 302,632

Int. Cl.<sup>5</sup> G06F 15/00

U.S. Cl. 364-456

17 Claims



11. A vehicle motion measurement system comprising;

- a an electro-magnetic radiation sensor having a field of view external to the vehicle,
- means for selecting a plurality of image points in the external field of view at a specified time.
- a distance measuring system for measuring and recording the bearings, relative to a fixed axis of said sensor, of each of said plurality of image points selected at said given time, and

computing means for operating on the data produced by said radiation sensor and by said distance measuring system at a first time to select a first plurality of image points in said external field of view at a first time, measure and record the bearings, relative to the fixed axis of said sensor, of said first plurality of image points, said means for selecting then determining a second plurality of image points which correspond to respective ones of said first plurality of image points, said distance measuring system operating to measure and record the bearings, relative to said fixed axis of said sensor, of said second plurality of image points, said computing means operating on the bearings measured for said first plurality of image points and for said second plurality of image points at said first time and said second time to calculate the apparent movement, relative to said sensor, of said second plurality of image points relative to said first plurality of image points, and using the apparent movement of said image points to calculate the direction of motion of the vehicle.

4,951,214

# **METHOD FOR PASSIVELY DETERMINING THE RELATIVE POSITION OF A MOVING OBSERVER WITH RESPECT TO A STATIONARY OBJECT**

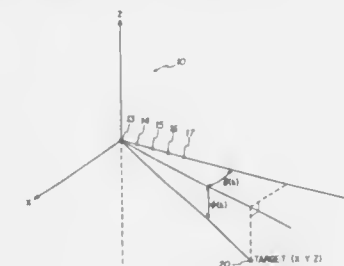
Floyd H. Hollister, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 273,648, Nov. 18, 1988, which is a continuation of Ser. No. 6,270, Jan. 5, 1987, abandoned, which is a continuation of Ser. No. 568,978, Jan. 6, 1984, abandoned. This application May 22, 1989, Ser. No. 356,583

Int. Cl.<sup>5</sup> G06F 15/20

U.S. Cl. 364-460

33 Claims



31. A method for determining the position of a moving vehicle relative to the Earth, comprising the steps of:

- (a) establishing a reference direction;
- (b) measuring angles between the reference direction and a plurality of stationary objects on the Earth at a first time;
- (c) maneuvering the vehicle;
- (d) measuring angles between the reference direction and the stationary objects at a second time whereby the position of the vehicle has changed between steps (b) and (c), wherein the position of the vehicle at the second time is known relative to the position of the vehicle at said first time;
- (e) calculating a position for the vehicle relative to the stationary objects using the Moore-Penrose pseudo-matrix-inverse technique wherein the known relative position and the angles measured in steps (b) and (d) are used as inputs thereto, and saving predetermined intermediate results generated during said calculating step;
- (f) continuing to maneuver the vehicle;
- (g) measuring additional angles between the reference direction and the stationary objects at additional times, wherein the position of the vehicle at each additional time is known relative to the position of the vehicle at each previous time;
- (h) Calculating updated positions for the vehicle relative to the stationary objects using the Moore-Penrose pseudo-matrix-inverse technique for the additional time, using said predetermined intermediate results saved from previ-

ous calculations made in steps (c) and (h), the known relative position, and the angles measured in step (g), and saving predetermined intermediate results generated during said calculation of updated positions;

- (i) constructing a digital representation of the Earth's surface supporting the stationary objects from the calculated positions;
- (j) matching the digital representation to a known map representation of the Earth's surface over which the vehicle is traversing;
- (k) determining the position of the vehicle relative to locations indicated by the map; and
- (l) thereafter using the map as a reference to control the position of the vehicle relative to said surface.

4,951,215

# **LINEAL OUTPUT MEASUREMENT CIRCUIT FOR USE WITH PRODUCT CUTTING APPARATUS**

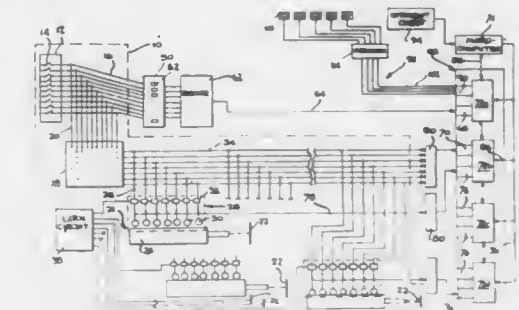
Paul K. Scherer, Gardena, Calif., assignor to Sanford-Lussien, Inc., Los Angeles, Calif.

Filed Feb. 21, 1989, Ser. No. 312,491

Int. Cl.<sup>5</sup> G06F 15/46; B26D 7/06

U.S. Cl. 364-474.09

22 Claims



1. A measurement circuit for measuring the product output of a production cutting apparatus capable of cutting different sized product sections from a piece of product stock and which production cutting apparatus generates a plurality of first electrical signals and a plurality of second electrical signals which can be used for controlling the operation of electrical control members which set the positions of cutting elements in response to operation of operator input controls, said circuit comprising:

- (a) a first conductive means for receiving the first electrical signals and producing first program signals which are representative of selected ones of a plurality of output indicators,
- (b) second conductive means for receiving the second electrical signals and producing second program signals which are representative of the sizes of product sections to be cut from the product stock, the second electrical signals also being delivered to each of the electrical control members and used for positioning the cutting elements on the cutting apparatus,
- (c) a port circuit receiving the first program signals and the second program signals, said port circuit also receiving the second electrical signals delivered to the control members,
- (d) processing means connected to the port circuit for receiving the first program signals and the second program signals for enabling the processing means to be programmed in a manner to correlate product sizes with an associated output indicator, said processing means enabling a calculation of the amount of the product sections cut from product stock and providing output signals representing the amount of each of the product sections, and
- (e) output indicator means for providing a visual indication

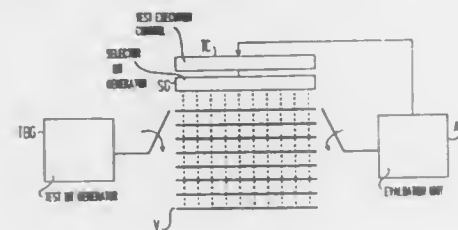


**U.S. Cl. 364—488** **Int. Cl.<sup>3</sup> G06F 11/16** **19 Claims**

1. An apparatus for producing a test-compatible, largely defect-tolerant configuration for redundantly implemented, systolic VLSI systems comprising:

UMI

a VLSI system having  $N'$  modules arranged in rows and columns, a test execution control, a test bit generator, an evaluation unit and a selector bit generator; the test execution control being connected to the VLSI system via the selector bit generator;



the selector bit generator having outputs connected column-by-column to each of the modules; outputs of the test bit generator that generates input variables being supplied row-by-row to the VLSI system; and the evaluation unit connected row-by-row to outputs of the modules in the VLSI system.

4,951,221

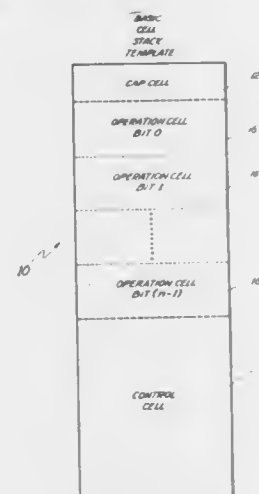
### CELL STACK FOR VARIABLE DIGIT WIDTH SERIAL ARCHITECTURE

Peter F. Corbett, Princeton, N.J., and Richard I. Hartley, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 18, 1988, Ser. No. 182,602  
Int. Cl.<sup>5</sup> G06F 1/00, 7/50

U.S. Cl. 364-489

16 Claims



1. A cell stack for digit-serial digital circuit systems, said cell stack being located adjacent to a major plane surface of a monolithic integrated circuit die, having a width dimension and another dimension orthogonal thereto in the plane of said major plane surface, and comprising:

- a cap cell having respective first and second opposed parallel sides, having respective third and fourth opposed parallel sides, and having between its said first and second sides a width dimension substantially the same as said cell stack;
- a control cell having respective first and second opposed parallel sides, having respective third and fourth opposed parallel sides, and having between its said first and second sides a width dimension substantially the same as said cell stack; and
- a plurality of operation cells, each of which is operable to carry out one or more single-bit operations, has respective first and second opposed parallel sides, has between its

said first and second sides a width dimension substantially the same as said cell stack, has respective third and fourth opposed parallel sides, has its third side vis-a-vis with the fourth side of a respective one of said cap cell and the others of said operation cells, and has its fourth side vis-a-vis with the third side of a respective one of said control cell and the others of said operation cells;

said cap cell being configured to provide power from a first polarity supply to said operation cells and to provide a conductive path extending between its first and second sides and parallel with its third and fourth sides for connecting adjacently disposed cell stacks to said first polarity supply; and

said control cell being configured to provide power from a second polarity supply to said operation cells and to provide a conductive path extending between its first and second sides and parallel with its third and fourth sides for connecting adjacently disposed cells stacks to said second polarity supply.

4,951,222

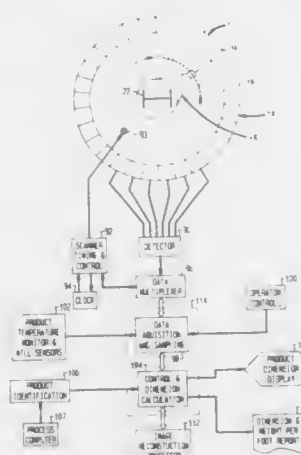
### METHOD AND SYSTEM FOR DIMENSIONAL AND WEIGHT MEASUREMENTS OF ARTICLES OF MANUFACTURE BY COMPUTERIZED TOMOGRAPHY

Carvel D. Hoffman, Bethlehem; R. Creighton Booth, Coopersburg; John C. Clymer, Bethlehem, all of Pa., and Richard J. Casler, Newtown, Conn., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Jun. 9, 1988, Ser. No. 204,588  
Int. Cl.<sup>5</sup> G01B 15/00

U.S. Cl. 364-507

12 Claims



1. A method for tomographic imaging of an inanimate object by fan rays detected by a set of detectors for determining a cross-sectional image of the object in a system having a display device, comprising the steps of:

- (a) generating a fan-shaped beam of radiation divided into a plurality of fan ray elements each element having radiation of magnitude sufficient to penetrate the object;
- (b) directing the fan ray elements through a planar section of the object;
- (c) detecting the fan ray elements by the set of detectors and producing signals from the detectors representative of respective intensities of radiation of detected ones of said fan ray elements;
- (d) determining from the intensity signals of the detectors selected coordinates defining a cross-sectional image of the object;
- (e) storing the determined coordinates of the cross-sectional image; and
- (f) displaying the coordinates on the display device.

4,951,223

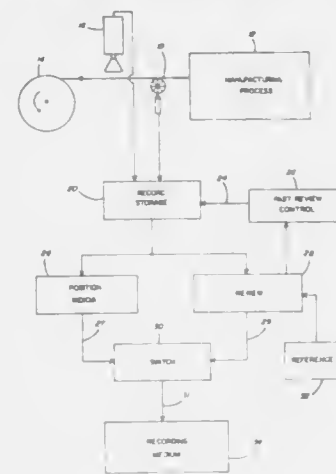
### WEB MATERIAL INSPECTION SYSTEM

R. Langdon Wales, Moccasin Hill, Lincoln, Mass. 01773, and H. W. Crowley, 310 Parker, Newton, Mass. 02159

Continuation of Ser. No. 329,445, Mar. 28, 1989, abandoned, which is a continuation of Ser. No. 149,683, Jan. 28, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 441,174  
Int. Cl.<sup>5</sup> G06F 15/46; G01B 11/30

U.S. Cl. 364-507

29 Claims



1. A system for inspecting and characterizing a continuous web material such as may lie wound into a roll, said system comprising recording storage means for providing a duplicate image of the web material, means for reviewing the recording storage means image to detect a predetermined characteristic of the image, means for determining a position along said image as the image is reviewed, and means responsive to the predetermined characteristic of the image being detected to record an indicia of image position corresponding to detection of said predetermined characteristic.

4,951,224

### CONTROL DEVICE FOR FLUID FLOW

Jiri Hokynar, Fraunhoferstrasse 11, 8033 Martinsried, Fed. Rep. of Germany

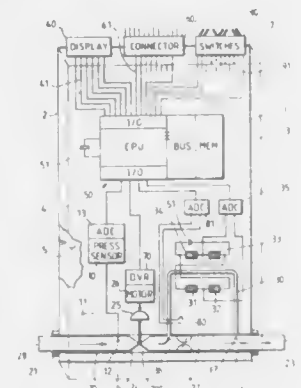
Filed Jul. 26, 1988, Ser. No. 224,338

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725312

Int. Cl.<sup>5</sup> G01F 1/00; G06F 15/20

U.S. Cl. 364-510

9 Claims



1. A fluid flow control apparatus comprising: a housing;

an inlet leading into the housing and a connecting inlet channel;

a first line connector mounted at the inlet for connecting a fluid source;

an outlet leading from the housing with an outlet channel connected thereto;

a second line connector mounted at the outlet for connecting a fluid user;

a control valve mounted in the housing between inlet channel and outlet channel with a mechanical flow limit means and an actuator element for actuating said flow limit means;

a microcomputer mounted inside the housing with:

a central processing unit (CPU),

a data bus (BUS),

data memory (MEM),

input/output units for processing data from the central processing unit and for converting data from the central processing unit into signals for peripheral units, the central processing unit (CPU) being connected with the data bus (BUS), and the data bus (BUS) being connected with the data memory (MEM),

a measurement line connected parallel to a section of the outlet channel being disposed inside of the housing;

a first resistor set being disposed within the housing contacting the measurement line adjacent the measuring line inlet;

a second resistor set being disposed within the housing contacting the measurement line adjacent the measuring line outlet, the first and the second resistor sets being connected with one another in a compensation circuit having an output, the output of said compensation circuit being dependent upon the said resistor sets;

an analog-to-digital converter being connected to the output of the compensation circuit and having an output, the output of said converter connected to the microcomputer;

an optical display unit mounted on the housing, the optical display unit being readable from outside the housing, the optical display unit being electrically connected to the microcomputer;

a multipole connector mounted on the housing, a mating connector being connectable to same from outside the housing, the multipole connector being electrically connected to the microcomputer;

a stepping circuit driver being disposed within the housing and having an input and an output, the input of the stepping circuit driver being connected with the microcomputer, the output of the stepping circuit driver being connected with the actuator element such that the signals supplied by the microcomputer actuate the flow limit means through the actuator element.

4,951,225

### UPDATING PATTERN-MATCHING NETWORKS

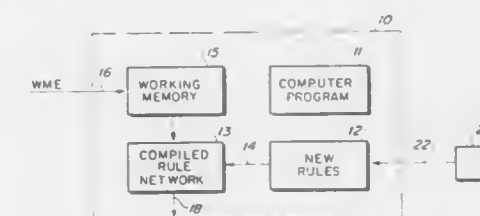
Ho S. Lee, Mount Kisco, and Marshall I. Schor, Katonah, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Nov. 14, 1988, Ser. No. 272,135

Int. Cl.<sup>5</sup> G06F 15/18

U.S. Cl. 364-513

19 Claims



1. In a machine-effected method of updating a pattern-matching network having a plurality of logically intercon-



nected join nodes, each said join node including two inputs, a left-hand sided (LHS) and a right-hand sided (RHS) input, and an output, predicate means in each node for enabling comparison of change tokens supplied to one of the inputs with data supplied to a second one of the inputs and for generating output logic results of the comparison in accordance with logic of the predicate means, said join nodes forming an array having hierarchical levels extending from an input side to an output side of the pattern matching network, from said input side to said output side being in a descending order of levels and from said output side to said input side being in an ascending order of levels;

the machine-executed steps of:

- providing a plurality of change tokens and match data at the input side, first predetermined ones of said change tokens being directed to RHS inputs and second predetermined ones of said match data being directed to LHS inputs of predetermined ones of said join nodes at diverse ones of said hierarchical levels;
- first supplying first ones of said change tokens to given ones of said join nodes in a descending order; and
- second supplying second ones of said change tokens to said given ones of said join nodes in an ascending order whereby the given join nodes are updated without error.

4,951,226

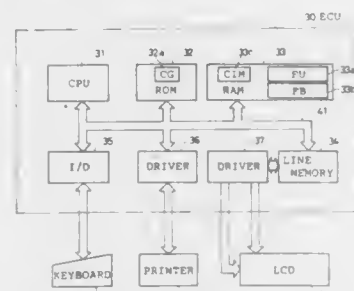
**CHARACTER DISPLAY DEVICE WITH REVERSING AND UNDERLINING EFFECTS**

Ryoichi Sasaki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Mar. 2, 1989, Ser. No. 317,954

Claims priority, application Japan, Mar. 7, 1988, 63-53327  
Int. Cl.<sup>5</sup> G06F 15/20, 9/00

U.S. Cl. 364—518



1. A display device comprising:
  - a monochrome, bit-map display panel for displaying a character by a dot-matrix including an underline portion;
  - a display memory for displaying bit-map character-pattern data corresponding to the structure of the display panel;
  - a character-pattern memory for storing bit-map character-pattern data for a plurality of characters;
  - means for receiving externally provided character code data;
  - means for receiving an externally provided reversing command;
  - a control means for reading out bit-map character-pattern data from the character-pattern memory in response to externally provided character-code data, for reversing the bit-map character-pattern data read out from the character-pattern memory except the underline portion in response to an externally provided reversing command, and for sending the character-pattern data to the display memory.

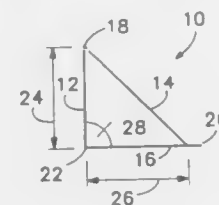
**4,951,227**  
**DIMENSION ANALYSIS OF DRAWINGS**  
Philip H. Todd, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 30, 1988, Ser. No. 251,270

Int. Cl.<sup>5</sup> G06F 15/62

U.S. Cl. 364—518

8 Claims



1. A computer-aided method of dimension analysis of a geometric figure comprising the following steps:
  - specifying to a computer a topologic definition of said geometric figure to establish a set of geometric entities interrelated by structure constraints, said structure constraints associating pairs of said geometric entities;
  - specifying to the computer a dimension definition of said geometric figure to establish stated dimension constraints interrelating selected ones of said geometric entities, said dimension constraints associating pairs of said geometric entities;
  - determining whether said topologic definition includes a geometric entity constrained by a predetermined number of associated constraints, and, if so,
  - removing such geometric entity and said predetermined number of associated constraints from said topologic definition and said dimension definition.

**4,951,228**  
**METHOD OF GENERATING RASTER DATA USEFUL IN REPRODUCING A MULTITONE IMAGE**

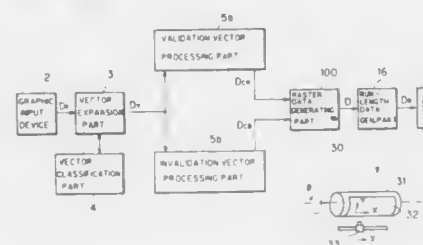
Takahide Hirawa, Hitoshi Matsuda, Akira Hikita, and Yoshikazu Kago, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Apr. 13, 1989, Ser. No. 337,572

Claims priority, application Japan, Apr. 28, 1988, 63-106759  
Int. Cl.<sup>5</sup> G06F 3/12

U.S. Cl. 364—520

13 Claims



1. A method of generating raster data for use in producing a multitone image that includes graphic figures by a raster scan of an imaging plane for each scanning line, the method comprising the steps of:
  - (A1) preparing sets of contour lines which express contours of said graphic figures, respectively;
  - (A2) determining an image condition and a priority grade of each graphic figure for production of said multitone image;
  - (A3) generating attributive data expressing said imaging condition and said priority grade for each graphic figure;
  - (A4) relating said attributive data to each contour line belonging to said sets of contour lines for each graphic figure;

- (A5) classifying contour lines belonging to said sets of contour lines into first and second groups according to respective locations of said contour lines in said contours, where said first group consists of first contour lines which face an upstream side of a main scanning in said raster scan, and said second group consists of second contour lines which face a downstream side of said main scanning;
- (A6) obtaining first cross points of said first contour lines and a scanning line;
- (A7) for each first cross point, generating first cross point data which includes a main scanning coordinate value of the first cross point and said attributive data related to a contour line from which the first cross point is obtained;
- (A8) obtaining second cross points of said second contour lines and said scanning line;
- (A9) for each second cross point, generating second cross point data which includes a main scanning coordinate value of the second cross point and said attributive data related to a contour line from which the second cross point is obtained;
- (A10) comparing respective main scanning coordinate values of said first cross points with each other to serially extract a first object point from said first cross points along an order from said upstream side to said downstream side;
- (A11) comparing respective main scanning coordinate values of said second cross points with each other to serially extract a second object point from said second cross points along said order;
- (A12) comparing respective main scanning coordinate values of said first and second object points with each other to specify a cross point which is located at a position nearer to said upstream side within said first and second object points;
- (A13) selectively conducting the following steps (A13a) and (A13b);
  - (A13a) when a specified cross point which is specified in the step (A12) is said first object point, registering said attributive data of said first object point in a first memory means;
  - (A13b) when said specified cross point is said second object point, deleting attributive data which are identical to said attributive data of said second object point from said first memory means;
- (A14) detecting a change of a maximum priority grade within attributive data which are currently registered in said first memory means, said change being caused by the step (A13);
- (A15) in response to said change of said maximum priority grade, finding attributive data in said first memory means to which a changed maximum priority grade belongs;
- (A16) generating a component of said raster data on the basis of said imaging condition belonging to said attributive data which is found in the step (A15) and said main scanning coordinate value of said specified cross point;
- (A17) repeating the steps (A11) through (A16) until all of said first and second cross point are extracted in the step (A11) to generate components of said raster data for said scanning line; and
- (A18) repeating the steps (A6) through (A17) for each scanning line arrayed in a subscanning direction to generate said raster data.

4,951,229

**APPARATUS AND METHOD FOR MANAGING MULTIPLE IMAGES IN A GRAPHIC DISPLAY SYSTEM**  
Paul D. DiNicola, Kingston, N.Y.; Francois N. Dumas, Cary, N.C., and John J. Lawless, Red Hook, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 22, 1988, Ser. No. 223,138

Int. Cl.<sup>5</sup> G06F 15/72

U.S. Cl. 364—521

6 Claims

1. A system for displaying graphics images on a display device, said system comprising:
  - memory means for storing graphics images represented by a

plurality of picture elements, said memory means organized into a plurality of memory buffers and operable in a first display system state wherein each of said picture elements is encoded as a plurality of bits and one of said encoded bits is stored in respective positions in each of said plurality of memory buffers, or a second display system state wherein each of said picture elements is encoded as a plurality of bits and said encoded bits are stored in successive positions of one of said memory buffers; state control means for selecting between said first display system state and said second display system state said state control means being connected to said memory means; control means for associating one or more of said plurality of memory buffers with one or more encoded graphics image creating application programs, said control means being



operable when said system is in said control display system state;  
selection means for enabling transmission of picture elements from one or more of said plurality of memory buffers to said display device;  
image mixing means for combining for display said picture elements from said one or more of said plurality of memory buffers according to an image display priority in said image mixing means;  
display generating means for generating display control signals to control said display device, said display generating means being connected to and responsive to said image mixing means; and  
linking means for linking one or more of said plurality of memory buffers to create a single large image, which can be smoothly scrolled on said display device.

4,951,230

**METHOD AND APPARATUS FOR TILING AN IMAGE**  
John C. Dalrymple, Portland; Suresh V. B. Kumar, and Peter B. Parkinson, both of Lake Oswego, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

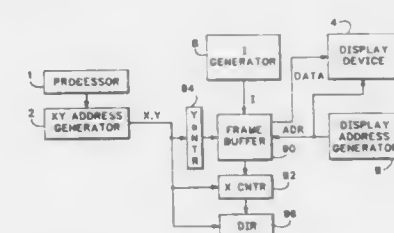
Continuation of Ser. No. 113,031, Oct. 26, 1987, abandoned.

This application Sep. 5, 1989, Ser. No. 403,059

Int. Cl.<sup>5</sup> G06F 15/20, 15/66

U.S. Cl. 364—521

12 Claims



1. A computer graphics system comprising:
  - (a) a display device having a display surface,
  - (b) display address means for generating a display address

- signal having an X component and a Y component such as to define a set of grid points on the display surface in a rectangular array at a pitch dX in the X direction and a pitch dY in the Y direction,
- (c) an electronic memory device having an equivalent set of addressable memory locations corresponding respectively to the grid points,
- (d) an XY address generator for automatically generating addresses of memory locations corresponding to grid points within a first selected area of the display surface and subsequently generating addresses of memory locations corresponding to grid points within a second selected area of the display surface, the second selected area and the first selected area being contiguous, and the XY address generator being such that it generates the address of each memory location in the first and second selected areas only once, and
- (e) loading means for calculating a value for a parameter Q for each of the memory locations whose addresses were generated in step (d) and loading the calculated values into the respective memory locations.

4,951,231

# IMAGE DISPLAY SYSTEM WITH TRANSFORMATION OPERATION ORDERING

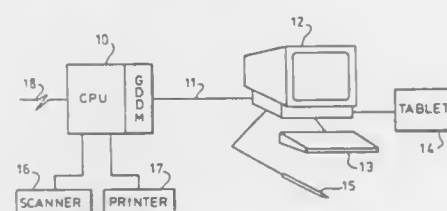
Barry Dickinson, Southampton; David J. Friend, Eastleigh; Ian G. Holden; Paul H. Jackson, both of Winchester, all of England, and Robert J. Padzieski, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y. Continuation of Ser. No. 62,273, Jun. 15, 1987, abandoned. This application Sep. 27, 1989, Ser. No. 414,735

Claims priority, application European Pat. Off., Jun. 16, 1986, 6304621.5

Int. Cl.<sup>5</sup> G06F 15/62

U.S. Cl. 364—521

3 Claims



1. A data display system in which image data are stored as a series of raster scan pel definition signals in a data processor system (10), and in which the position and size of selected portions of an image to be displayed on a display screen of a display device (12) connected to said data processor system can be transformed in a single pass in response to input signals received by said data processor system from a controlled input device (13,14,15) communicating with said data processor system, the system comprising:

- a display device control program store in which are stored control programs for a plurality of transform operations;
- means for receiving image transform orders, said means being responsive to said controlled input device;
- means for determining when two or more concurrent transforms of portions of an image will cause the image portions to be displayed on common areas of the display screen, said means being connected to said means for receiving image transform orders;
- means for ordering by priority and creating an ordered list of the image transforms received by said means for receiving, said means for ordering and creating operating in response to said means for determining and said means for receiving and;
- means to transmit signals to the display device, said signals defining the ordered list of transforms in response to said means for ordering and creating, so that when the image pel definition signals are transmitted to the display device,

where image portions occupy common areas of the display screen the pel definition signals relating to higher priority portions of the image control the final content of the common areas of the displayed image.

4,951,232

# METHOD FOR UPDATING PIPELINED, SINGLE PORT Z-BUFFER BY SEGMENTS ON A SCAN LINE

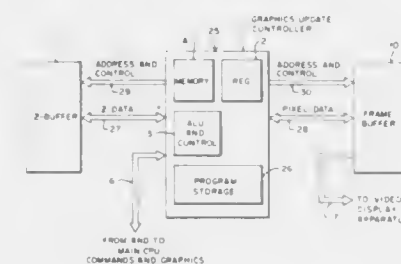
Marc R. Hannah, Menlo Park, Calif., assignor to Silicon Graphics, Inc., Mountain View, Calif.

Filed Sep. 12, 1988, Ser. No. 243,427

Int. Cl.<sup>5</sup> G06F 15/72

U.S. Cl. 364—522

4 Claims



1. In a raster scan, computer controlled video display system for presenting an image to an observer, said system having a Z-buffer for storing Z values and a frame buffer for storing pixel values, a method for updating said Z-buffer with new Z values to replace old Z values comprising:

- calculating a new pixel value and a new Z value for each pixel location in a plurality of pixel locations, each of said pixel locations having an old Z value and an old pixel value being stored respectively in said Z-buffer and in said frame buffer, said Z values representing a relative distance to said observer of a pixel displayed on said video display system;

performing a Z comparison for each new Z value by comparing said old Z value with said new Z value for each pixel location, said Z comparison being performed sequentially in one direction through said plurality of pixel locations, said Z comparison producing a fail condition for a particular pixel location when the old Z value at said particular pixel location represents a pixel being closer to said observer than the new pixel at said particular pixel location, said Z comparison producing a pass condition for said particular pixel location when the new pixel at said particular pixel location is closer to said observer than the old pixel being represented by said old Z value;

updating said Z-buffer only after the Z comparison produces a combination of a fail condition for a current pixel location subsequent to producing a pass condition for a pixel location immediately preceding said current pixel location, said pixel location immediately preceding said current pixel location being a last pixel location in a contiguous group of pixel locations having a pass condition, said Z-buffer being updated for the contiguous group of pixel locations having a pass condition, which contiguous group ends with the pixel location immediately preceding said current pixel location.

4,951,233

# DOCUMENT PRODUCING APPARATUS HAVING IN-DOCUMENT LAYOUT DISPLAY

Masaki Fujiwara, Hitachi; Masaki Kawase, Katsuta; Kiyoshi Masuda, Hitachi, and Shigeki Taniguchi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

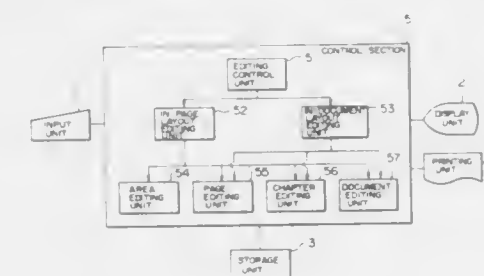
Filed Aug. 3, 1988, Ser. No. 227,891

Claims priority, application Japan, Aug. 5, 1987, 62-194494; Aug. 5, 1987, 62-194495

Int. Cl.<sup>5</sup> G06F 15/20

U.S. Cl. 364—523

5 Claims



1. A document producing apparatus, comprising: an input unit including means for inputting descriptive contents, such as characters or figures, which form a multi-page document and a format which defines a sheet size of a paper sheet to be used for each page of said document, a sheet direction of portrait or landscape in which the sheet is to be used, and a layout of the descriptive contents in each page;
- a storage unit including means for storing therein said descriptive contents and said format inputted from said input unit;
- a display unit for selectively displaying the contents stored by said storage unit; and
- in-document layout displaying means for simultaneously displaying on said display unit respective page patterns of plural pages included in said document so that page information of the respective pages are partitioned in successive order from a leading page and for every one of a predetermined number of pages of said document and are arranged in one display image, said page information including at least the sheet size and the sheet direction stored in said storage unit.

4,951,234

# MONITORING A PLURALITY OF IDENTICAL PROCESS PARAMETERS

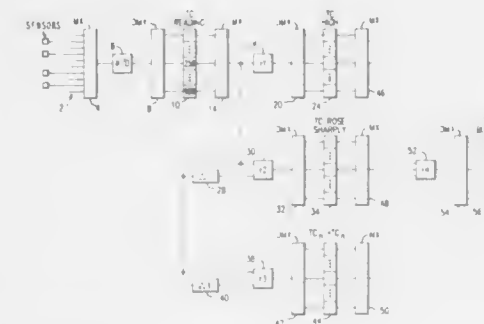
James C. Bellows, Maitland, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 22, 1988, Ser. No. 209,818

Int. Cl.<sup>5</sup> G01F 15/06

U.S. Cl. 364—550

19 Claims



1. A system for monitoring a plurality of processes which are

identical with respect to at least one process parameter, employing a plurality of sensors each connected for monitoring the at least one process parameter of a respective process, each sensor having a response and the sensors all having identical responses to the at least one process parameter, comprising: sampling means connected to the sensors for deriving a succession of sensor response samples, each successive sample being associated with a respective sensor; monitoring means connected to said sampling means for receiving each sample in succession and for evaluating a predetermined characteristic of the sensor response represented by each sample to produce an evaluating result, said monitoring means defining a processing path having an input to which all samples are applied in series and having an output for providing an indication of the evaluating result for each sample; and diagnosing means connected for receiving and interpreting the indication of the evaluating result of each sample in order to provide an indication of status of each process.

4,951,235

# OPTION UNIT DETECTING APPARATUS FOR ELECTRONIC EQUIPMENT

Isao Mori, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

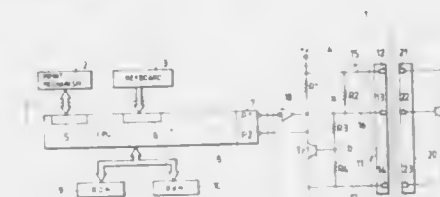
Filed Apr. 19, 1989, Ser. No. 340,453

Claims priority, application Japan, Apr. 20, 1988, 63-98966

Int. Cl.<sup>5</sup> G06F 3/00

U.S. Cl. 364—550

5 Claims



1. An option unit detecting apparatus for detecting a connection of an option unit to an electronic equipment, the option unit being connectable to or disconnectable from the electronic equipment wherein when the option unit is connected thereto, a current is flowed in the optional unit from the electronic equipment and when the option unit is disconnected therefrom, the current flow is interrupted, the electronic equipment including an electronic circuit having an input/output port, the option unit having at least one semiconductor device, said apparatus comprising:

- a reference voltage source for supplying a reference voltage, said reference voltage source being coupled to said input/output port for applying a reference voltage thereto;
- a switching means having an input terminal and an output terminal coupled to said reference voltage source, said switching means being selectively enabled in response to an enabling signal applied to said input terminal or disabled in response to a disabling signal applied to said input terminal, wherein said reference voltage is applied to said input/output port when said switching means is disabled and application of said reference voltage to said input/output port is interrupted when said switching means is enabled; and
- a driving means coupled to said switching means for applying said enabling signal to said input terminal when said current flow is interrupted and said disabling signal to said input terminal when said current is flowed in said semiconductor device, whereby whether or not said option unit is connected to said electronic equipment can be



detected depending upon whether or not said reference voltage is applied to said input/output port.

4,951,236

# LOW COST HIGH PRECISION SENSOR

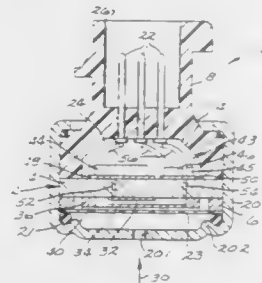
Keith W. Kawate, Attleboro Falls, Mass., and Anthony J. Sabetti, Greenville, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 859,561, May 5, 1986, abandoned. This application Nov. 6, 1989, Ser. No. 432,023

Int. Cl.<sup>5</sup> G06F 15/00; G01L 9/12

U.S. Cl. 364—571.01

11 Claims



1. A low-cost high-precision sensor comprising a separate transducer capacitor having a capacitance which varies with changes in a condition being monitored, a separate capacitance-to-voltage converter circuit having input means for receiving a supply voltage and output means for providing an output voltage, a reference capacitor, switch means for selectively connecting the transducer and reference capacitors in the circuit, clock means for operating the switch means in a predetermined sequence to cycle a supply voltage and feedback signal from the output voltage across the transducer and reference capacitors with opposite transitions with a predetermined frequency to establish an unbalance condition in the circuit corresponding to a change in transducer capacitance due to any change in the condition being monitored for adjusting output voltage to correct the unbalanced circuit condition and maintain the output voltage proportional to the capacitance of the transducer capacitor, the transducer capacitor, reference capacitor, and capacitance-to-voltage converter circuit being mounted on a common support for adjusting said application of supply voltage and feedback from the output voltage to the reference and transducer capacitors after mounting of the capacitors and circuit on the support for calibrating the sensor.

4,951,237

# DIRECT DIGITAL SYNTHESIZER WITH SELECTABLY RANDOMIZED ACCUMULATOR

Kenneth A. Essenwanger, Walnut, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 22, 1988, Ser. No. 184,642

Int. Cl.<sup>5</sup> H03K 13/32

U.S. Cl. 364—721

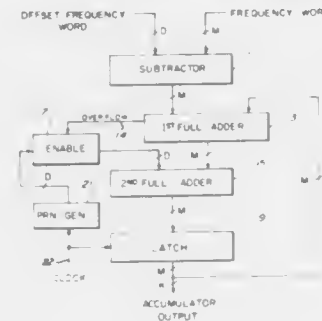
21 Claims

1. Direct digital frequency synthesis circuitry for use in synthesizing an output having a fundamental frequency from an input phase increment value comprising:

first adder means having first and second inputs and an output and receiving at least a portion of said phase increment value at said first input;

storage means having an input and an output; and means connected to said first adder means and said storage means for producing a signal at said output of said storage means having said fundamental frequency and exhibiting a plurality of spurs located at frequencies spaced apart from said fundamental frequency on each side thereof and for causing said signal to exhibit substantially nonvarying frequency deviation density in the vicinity of said spurs wherein the parameter "frequency deviation density"

represents the rms frequency deviation about a frequency  $f_m$  measured at the output of an FM discriminator having



a baseband filter 1-Hertz wide centered on the frequency  $f_m$ .

4,951,238

# PROCESSOR FOR EXECUTING ARITHMETIC OPERATIONS ON INPUT DATA AND CONSTANT DATA WITH A SMALL ERROR

Misayo Sasahara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

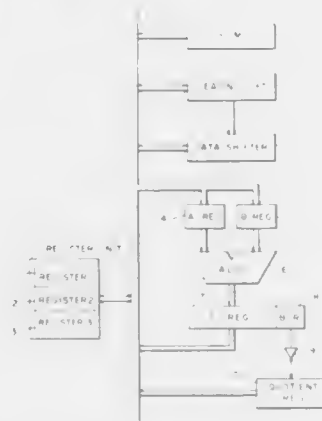
Filed Oct. 30, 1987, Ser. No. 114,975

Claims priority, application Japan, Oct. 30, 1986, 61-259868

Int. Cl.<sup>5</sup> G06F 1/02, 7/72

U.S. Cl. 364—729

6 Claims



1. A processor comprising:

memory means for storing more significant bits and less significant bits of a particular constant,

first arithmetic means for carrying out a subtraction operation of said more significant bits from input data to produce first data,

first normalizing means for normalizing said first data to produce second data,

shift means for shifting said less significant bits to align a digit of a most significant bit of said less significant bits to a corresponding digit of said second data,

second arithmetic means for carrying out a subtraction operation of shifted less significant bits from said second data to produce third data, and

second normalizing means for normalizing said third data.

4,951,239

# ARTIFICIAL NEURAL NETWORK IMPLEMENTATION

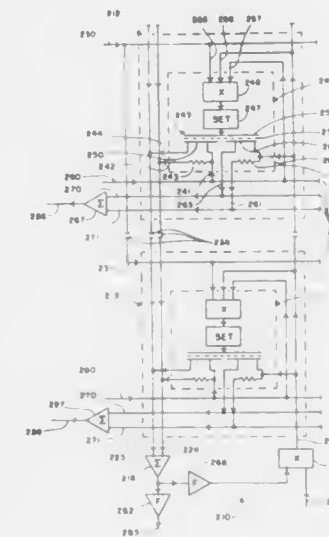
David K. Andes; Robert A. Licklider; Donald H. Witcher, and Richard M. Swenson, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 27, 1988, Ser. No. 263,455

Int. Cl.<sup>5</sup> G06C 7/12, 7/163

U.S. Cl. 364—807

7 Claims



6. An artificial neural network comprising:

a plurality of first input signal conductors;

a plurality of neural units, each neural unit having

a first weighted signal conductor,

a plurality of synapse circuits, each synapse circuit corresponding to one of said first input signal conductors and having

a metal oxide semiconductor field effect transistor having a floating gate and a plurality of channels, each of said channels being controlled by a charge on said floating gate,

means for storing on said gate such a charge representing a factor corresponding to said synapse circuit,

means for connecting said one first input signal conductor to said weighted signal conductor through a first one of said channels to generate a first weighted signal representing the product of said

factor and a signal on said one first input signal conductor, a second input signal conductor,

a second weighted signal conductor, and

means for connecting said second input signal conductor to said second weighted signal conductor through a second one of said channels to generate a second weighted signal representing the product of said factor and a signal on said second input signal conductor; and means connected to said first weighted signal conductor for generating a sum signal representing the sum of each said first weighted signal from said synapse circuits.

4,951,240

# ELECTRONIC PART MOUNTING SYSTEM FOR PRINTED CIRCUIT BOARD

Masahiro Fukino, Kamimachiya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

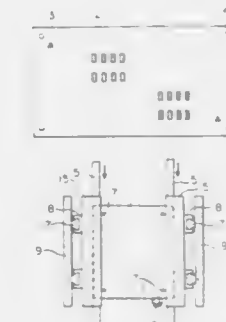
Continuation of Ser. No. 936,255, Dec. 1, 1986, abandoned. This application Jun. 5, 1989, Ser. No. 361,726

Claims priority, application Japan, Dec. 2, 1985, 60-270932

Int. Cl.<sup>5</sup> G06F 15/20; H05K 3/30; B23P 21/00

U.S. Cl. 364—489

5 Claims



1. An electronic part mounting system for a printed circuit board comprising:

a pair of electronic part positioning patterns provided on a printed circuit board commonly for a plurality of mounting lands for electronic parts provided on the printed circuit board,

a conveyor belt for conveying the printed circuit board, a guide rail disposed under the conveyor belt;

stopping means having a limit switch for stopping said conveyor belt when the printed circuit board arrives at a predetermined position over the guide rail,

a pattern recognition camera mounted adjacent to the predetermined position for reading said pair of electronic parts positioning patterns on the printed circuit board,

position fastening holding means having elevational movement projection rods to be engaged with openings formed in the printed circuit board when said conveyor belt is stopped, and a retainer means for retaining and flatly holding side edges of the printed circuit board at sides of the belt against the guide rail during the stopping time,

first calculating means for calculating central point positions of each of the plurality of mounting lands on the printed circuit board based on said pair of electronic part positioning patterns read by said pattern recognition camera using coordinate axes set in advance as a base,

second calculating means for calculating central point positions of the electronic parts picked up from a case containing electronic parts, and

mounting control means for placing each of the electronic parts on the lands when the central point of each electronic part coincides with that of a respective one of the mounting lands as the electronic part is conveyed above the printed circuit board.

4,951,241

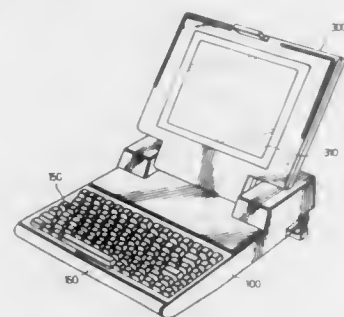
## PORTABLE APPARATUS HAVING AN ADJUSTABLE HANDLE-LEG MEMBER

Takashi Hosoi, and Katamaru Sasaki, both of Oume, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Continuation of Ser. No. 66,543, Jun. 26, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 408,408

Claims priority, application Japan, Jun. 30, 1986, 61-98839[U]  
Int. Cl.<sup>3</sup> G06F 1/00

U.S. Cl. 364—708

13 Claims



1. A portable apparatus, comprising:  
a body including a rear portion having a rear end wall and a rear upper surface having an upper case connecting part, and a front portion having a front end portion and a front upper surface;  
a keyboard located in the front upper surface of said front portion;  
an upper case having a display, pivotally connected to the body by the upper case connecting part, and covering the keyboard when the upper case is closed; and  
handle-leg means including a handle piece, movably connected to the rear portion and adjustable between first, second, and third positions, wherein said handle-leg means extends substantially vertically from a rear portion of said upper case for tilting the keyboard toward the front end portion in the first position, wherein said handle-leg means extends substantially longitudinally from said rear portion of said upper case for providing a handle for carrying the apparatus in the second position, and wherein said handle-leg means is substantially flush with said rear portion of said upper case in said third position.

4,951,242

## MEDIAN FILTERS HAVING MODULES FOR RECEIVING THE CURRENT VALUE OF AN INCOMING DIGITAL SIGNAL

Neville Hobson, Essex, United Kingdom, assignor to GEC Avionics Limited, Kent, United Kingdom  
Continuation of Ser. No. 87,037, Aug. 10, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 402,970

Claims priority, application United Kingdom, Aug. 20, 1986, 8620278

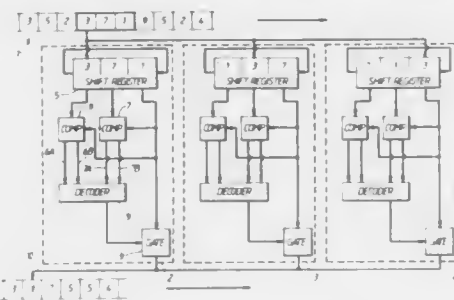
Int. Cl.<sup>3</sup> G06F 7/00

U.S. Cl. 364—715.01

2 Claims

1. A median filter comprising a plurality of identical modules each arranged to simultaneously receive the current value of an incoming digital signal, each module comprising a feedback shift register which is capable of being set to receive an input signal at any one of its stage, means for setting the feedback shift register of each module to receive an input signal at a stage different than that of the other shift registers, means for comparing the content of one stage of each of said feedback shift registers with the content of each other stage of said

feedback shift register to determine whether the content of said stage is the median value, and for passing the content of said



one stage to the output in response to such detection of said median value.

4,951,243

## PROBABILISTIC PULSE TRAIN RANDOMIZATION DEVICE

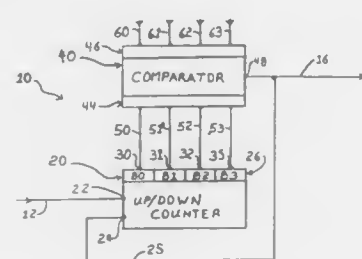
Max S. Tomlinson, Jr., Carlsbad, Calif., assignor to Analog Intelligence Corporation, Carlsbad, Calif.

Filed Oct. 12, 1989, Ser. No. 420,357

Int. Cl.<sup>3</sup> G06F 1/02

U.S. Cl. 364—717

3 Claims



1. A probabilistic pulse train randomization device for randomizing a probabilistic pulse train, for receiving an input probabilistic pulse train, for receiving a random number, and for outputting an output probabilistic pulse train that is a function of the input probabilistic pulse train, but is statistically independent from the input probabilistic pulse train comprising:

up/down counter means including:  
increment input port means for receiving the input probabilistic pulse train,  
decrement input port means connected to a comparator output port means for receiving the output probabilistic pulse train,  
storage means for storing a value of two or more bits, and  
plurality of storage output port means, each connected to one bit of the stored value of said storage means and each for transmitting its corresponding bit of the stored value;  
said up/down counter means  
for incrementing the stored value  
if said increment input port means receives a pulse  
and said decrement input port means does not receive a pulse, and  
for decrementing the stored value  
if said decrement input port means receives a pulse  
and said increment input port means does not receive a pulse;  
and comparator means including:

first input port means connected to said plurality of storage output port means for receiving the stored value,  
second input port means for receiving the random number, and  
comparator output port means for transmitting the output probabilistic pulse train;  
said comparator means for producing on said comparator output port means the output probabilistic pulse train, such that the produced output probabilistic train always has a pulse when the stored value is at its largest possible value, never has a pulse when the stored value is at its smallest possible value, and otherwise has pulses dependent on the random number and the stored value.

4,951,244

## LINEAR INTERPOLATION OPERATOR

Jacques Meyer, Corenc, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France

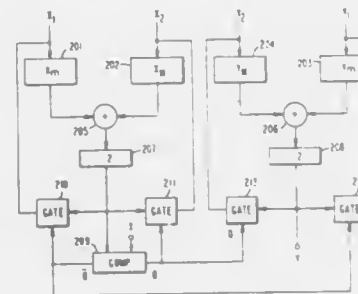
Filed Oct. 25, 1988, Ser. No. 262,306

Claims priority, application France, Oct. 27, 1987, 87 15242

Int. Cl.<sup>3</sup> B06F 15/353

U.S. Cl. 364—723

5 Claims



1. A linear interpolation operator apparatus for determining a value of  $y$ , wherein  $y$  is a function of  $x$ ,  $x$  is in a range between a known lower value  $x_1$  and a known higher value  $x_2$ , and known values  $y_1$  and  $y_2$  correspond respectively to  $x_1$  and  $x_2$ , comprising:

first calculation means for determining  $(x_m + x_M)/2$ , wherein the initial value of a lower range limit  $x_m = x_1$  and the initial value of an upper range limit  $x_M = x_2$ ;  
said first calculation means comprising input registers, an adder and a divider by two;  
second calculation means for determining  $(y_m + y_M)/2$ , wherein the initial value of a lower range limit  $y_m = y_1$  and the initial value of an upper range limit  $y_M = y_2$ ;  
said second calculation means comprising input registers, an adder and a divider by two;  
input means for inputting  $x$ ;  
comparing means for comparing  $x$  with  $(x_m + x_M)/2$ , said comparing means comprising a comparator including a first input terminal coupled to said divider by two of said first calculation means, a second input terminal coupled to said input means and an output;  
feedback means responsive to the output of said comparator for transmitting the output of said divider by two of each of said first and second calculation means to a respective input register to reset corresponding upper or lower range limits, said feedback means comprising controlling gates for transmitting said output of said divider by two as a function of the comparator output; and  
output means coupled to said divider by two of said second calculation means for providing the value  $y$  after a predetermined number of cycles.

4,951,245

## NETWORK TERMINAL DRIVER COMMUNICATIONS SUBSYSTEM

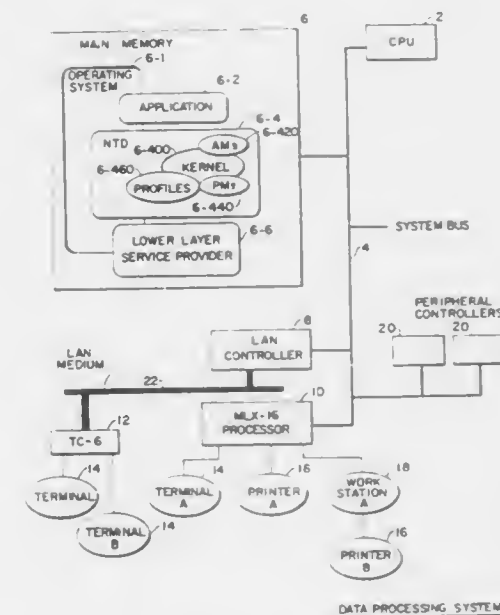
Christopher R. M. Bailey, Hollis, N.H.; John R. Mandile, Medford, Mass.; Daniel G. Peters, Nashua, N.H., and James W. Stonier, Tewksbury, Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed May 20, 1988, Ser. No. 196,597

Int. Cl.<sup>3</sup> G06F 3/00, 13/38

U.S. Cl. 364—900

2 Claims



1. In a data processing system comprising:  
a central processing unit (CPU);  
a memory unit connected to the CPU for storing system programs and application programs to be run by the CPU and for storing data to be operated upon by the programs;  
a plurality of terminals of one or more types at which users enter commands requesting application programs to be run by the CPU and view results of those programs; and  
one or more communications media of one or more types, each for interconnecting the CPU with certain of the terminals of the plurality of terminals,  
a network terminal driver operatively connected between the CPU and the communications media for facilitating communication between the application programs and the plurality of terminals, the network terminal driver comprising:  
a plurality of application modules, each associated with a different data format used by the application programs, for specifying data formats being used by each of the application programs;  
a plurality of provider modules, each associated with a different one of the types of communications media, for specifying the characteristics of each of the communications media;  
a plurality of device profiles, each associated with a different one of the types of terminals, for specifying the characteristics of each of the terminals; and  
means responsive to said specifications of data formats, communications media characteristics, and terminal characteristics for interpreting transmissions from the communications media and assembling messages to the communications media according to said specifications of data formats, communications media characteristics, and terminal characteristics.



# 4,951,246

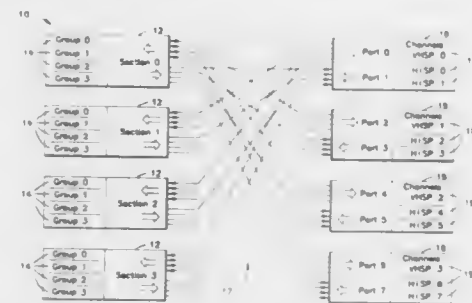
## NIBBLE-MODE DRAM SOLID STATE STORAGE DEVICE

Eric C. Fromm, Eau Claire, and Lonnie R. Heidtke, Chippewa Falls, both of Wis., assignors to Cray Research, Inc., Minneapolis, Minn.

Filed Aug. 8, 1989, Ser. No. 391,229  
Int. Cl.<sup>5</sup> G06F 12/00

U.S. Cl. 364—900

1 Claim



1. A nibble-mode solid state storage device, comprising:
  - a system clock;
  - one or more memory sections;
  - a plurality of memory groups within each said section;
  - port means for each said section, said port means for carrying parallel read and write data words out of and into said memory groups within each section;
  - a plurality of memory ranks within each said group;
  - each said rank including at least one nibble-mode DRAM bank, each said DRAM bank including a plurality of DRAM semiconductor cells each including storage cells and responsive to a column address strobe signal to retrieve and store data in said cells;
  - and assembly register for each said plurality of ranks, said register having a segment corresponding to each of said ranks, said segments connected to form a data pipeline into said group, each said segment providing at least one storage location for a word of data, said assembly register connected to receive data words from said port means;
  - a write data register connected to said assembly register including a segment corresponding to each of said ranks, each said segment providing a storage location corresponding to a storage location in said assembly register; means for connecting said write data register to said DRAM banks in said ranks;
  - a read data register for each said plurality of ranks, said read data register including a data storage segment corresponding to each of said ranks, each said segment providing at least one data storage location for a word of data, said segments connected to form a data pipeline out of said group, said segments including a parallel load input to receive read data words from said banks, a serial load input to receive read data words from a prior segment in the pipeline and a serial output to output read data words to the next segment in the pipeline;
  - means for connecting said segments of said read data register to receive data at said parallel load input from said DRAM banks in said ranks and to convey a serial stream of read data words to said port means; and
  - control and memory address means for controlling the transfer of data into said groups to be stored in said DRAM banks in a write cycle, and the transfer of data from said DRAM banks out of said groups in a read cycle,
    - (a) said control means active in said write cycle (i) to pipeline load said assembly register with a set of write data words received from said port means, said write data words loaded in synchrony with said system clock, (ii) to transfer said set from said assembly register to said write data register in parallel, (iii) to cycle said column address strobe signal after said set is loaded in said write

data register so that said set is transferred to said storage cells in said DRAM banks, and (iv) to pipeline load said assembly register with another set of write data words while the words in said write data register are transferred to and stored in the DRAM banks, and

(b) said control means active in a read cycle (i) to cycle said column address signal to retrieve a set of read data words from the storage cells of said DRAM banks, (ii) to parallel load said read data register from said banks with a set of read data words, said parallel load occurring through said parallel load input, (iii) to unload said set from said read data register in a pipeline fashion so that read data words are output to said port means in a serial stream, the read data words in said set being pipeline transferred from said serial data outputs to corresponding serial data inputs in synchrony with said system clock, and (iv) to cycle said column address strobe signal again so that another set of words are retrieved from said storage cells while said read data words are pipeline unloaded from said read data register.

# 4,951,247

## DATA EXCHANGE SYSTEM COMPRISING A PLURALITY OF USER TERMINALS EACH CONTAINING A CHIP CARD READING DEVICE

Dietrich Kruse; Albrecht Beutelspacher, both of Ottobrunn, and Annette-Gabriele Kersten, Wiesbaden, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

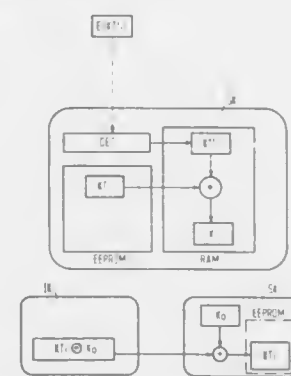
Filed Mar. 4, 1988, Ser. No. 164,480

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706958

Int. Cl.<sup>5</sup> G06F 3/00

U.S. Cl. 364—900

5 Claims



1. A data exchange system comprising a plurality of terminals each containing a chip card reading device, a security module for storing a secret key, which key is identical for all terminals, said secret key (K<sub>i</sub>) being formed of two sub-components (KT<sub>i</sub>, KT'<sub>i</sub>);
  - said security module having an erasable programmable read-only memory (EEPROM) for storing one sub-component (KT<sub>i</sub>);
  - a decoder means (DEC) provided in the security module; said decoder means having an input for receiving an encrypted data block (E(KT'<sub>i</sub>)) for the second sub-component (KT'<sub>i</sub>) from outside said security module;
  - said security module having a write-read memory (RAM), for receiving and storing the decoded output signals from said decoder means as a second subcomponent (KT'<sub>i</sub>) in a first sub-area of said write-read memory (RAM); and
  - said security module having means for operating on said two sub-components (KT<sub>i</sub>, KT'<sub>i</sub>) to form a result which is deposited in a second sub-area of the read-write memory (RAM) as an overall key (K<sub>i</sub>).

# 4,951,248

## SELF CONFIGURING MEMORY SYSTEM

Todd Lynch, Sunnyvale, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Mar. 4, 1988, Ser. No. 164,092

Int. Cl.<sup>5</sup> G06F 13/00

U.S. Cl. 364—900

9 Claims



1. In a computer system wherein data are represented by digital bytes, each of said digital bytes comprising a plurality of digital bits, and wherein said data are stored in a contiguous ordered memory space having sequentially addressable locations for storage of said digital bytes, said computer system including a central processing unit (CPU) and a chassis having a plurality of receptacles for receipt of digital circuit modules, a self configuring expandable memory comprising:
  - a CPU memory proximately coupled to the CPU for storing a predetermined number X of digital bytes;
  - a first signal line coupled to each of said plurality of receptacles and coupled to said CPU, said CPU including first output means for providing a digital signal on said first signal line representing the value of X;
  - a second signal line coupled between adjacent pairs of said plurality of receptacles for relaying memory size data from an output of a receptacle to an input of a next receptacle;

pull-up resistor means coupled to said second signal line at each of said plurality of receptacles for applying a predetermined signal value to said second signal line in the absence of memory size data thereon;

at least one expansion memory board selectively insertable in any one of said plurality of receptacles comprising:

a memory for storing a predetermined number Y of digital bytes;

first and second input means for receiving digital signals coupled to said first and second signal lines, respectively, upon insertion of said expansion memory board in said one receptacle;

means for providing a digital signal representing the value of Y;

decode logic means for combining the value of X with the value of Y if said predetermined value is received on said second signal line and otherwise combining the value of Y with said relayed memory size data;

output means for applying an output signal to said second signal line representing the combined value determined by said decode logic means;

whereby said output signal represents the total memory size of said CPU memory, said at least one expansion memory board and all intervening expansion memory boards.

# 4,951,249

## METHOD AND APPARATUS FOR CONTROLLED ACCESS TO A COMPUTER SYSTEM

Charles R. McClung, Baldwin, N.Y.; Thomas A. Hanson, Darlen, Conn., and Peter H. Roberts, Brooklyn, N.Y., assignors to Harcom Security Systems Corp., New York, N.Y.

Continuation of Ser. No. 922,600, Oct. 24, 1986, abandoned.

This application Mar. 23, 1989, Ser. No. 328,735

Int. Cl.<sup>5</sup> G06F 12/14; H04L 9/00

U.S. Cl. 364—900

27 Claims

1. A security device for a computer system having a keyboard entry device and a floppy disc drive, comprising:
  - (a) means for transferring control of said computer system to a security system interposed between an operating system

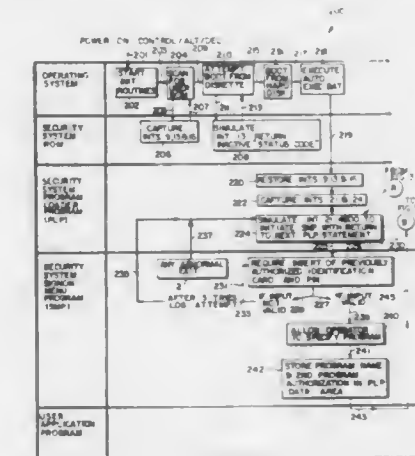
and all peripheral devices and application programs and data stored in said computer system;

(b) means under control of said security system for changing the computer system's keyboard address to an address in the security system;

(c) means under control of said security system for changing the computer system's floppy disc drive address to an address in the security system;

(d) means at said address in said security system for said floppy disc drive for blocking any input to the computer system from said floppy disc drive which would place the operation of the computer system outside the control of said security system;

(e) means at said address in said security system for blocking any keyboard input to the computer system which would



- place the operation of the computer system outside the control of said security system;
- (f) identifying means for identifying all operators of said computer system;
- (g) means for validating the operator's identification;
- (h) means responsive to validation by said validation means for restoring the address for said keyboard to said computer system's keyboard address;
- (i) means responsive to validation by said validation means for restoring the address for said floppy disc drive to said computer system's floppy disc drive address; and
- (j) means for allowing said validated operator access to only one or more of said programs and data and operating system for which said validated operator has been pre-authorized.

# 4,951,250

## COMBINED INPUT/OUTPUT CIRCUIT FOR A PROGRAMMABLE CONTROLLER

Ancil B. Cruickshank, 390 Raysford Cir., Earlysville, Va. 22936; Ronald E. Gareis, 9 Salisbury Sq.; Mark J. Kocher, 2120 Wisteria Dr., both of Charlottesville, Va. 22901, and Michael J. Tuso, Rte. 2 Box 826, Afton, Va. 22920

Filed Nov. 18, 1988, Ser. No. 272,973

Int. Cl.<sup>5</sup> G06F 13/00

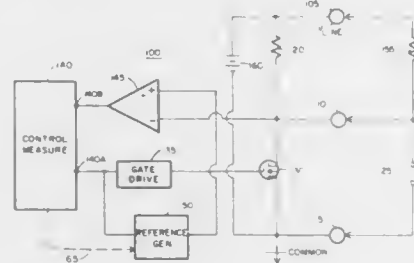
U.S. Cl. 364—900

8 Claims

1. An input/output (I/O) circuit for use with a programmable controller including a central processing unit (CPU), the circuit being selectively operable under the control of the CPU either as an input circuit for receiving input signals from an input device or as an output circuit for providing control signals to an output device, said circuit comprising:
  - a power terminal, an I/O terminal and a common terminal, said output device being connected between said power terminal and I/O terminal, said input device being connected between said I/O terminal and said common terminal;

nal, a resistor being coupled between said power terminal and said I/O terminal;  
controllable switching means connected between said I/O terminal and said common terminal for selectively coupling said I/O terminal to said common terminal, said switching means being switched between conductive and non-conductive states in response to a control signal, said switching means being selected to exhibit an approximately linear voltage to current relationship at low voltage levels and a current limiting characteristic at high voltage levels;

control processing means coupled to said switching means for generating a value of said control signal to maintain said switching means in a non-conductive state when said circuit is configured as an input circuit, and for generating values of said control signal for selectively switching said switching means between conductive and non-conductive states when said circuit is configured as an output circuit;

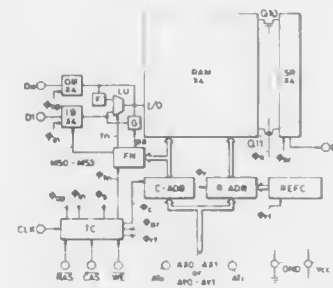


adaptive sensing means, having an output coupled to said control processing means, for determining when the voltage at said I/O terminal exceeds a first predetermined threshold reference voltage when said circuit is configured as an input circuit and for determining when the voltage at said I/O terminal exceeds a second predetermined threshold reference voltage when said circuit is configured as an output circuit; and means operatively associated with said processing means for determining, when said I/O circuit is configured as an output circuit, if said I/O terminal voltage exceeds said second reference voltage after a predetermined time interval after generation of a signal for gating said switching means into conducting, said processing means removing said gating signal if said I/O voltage exceeds said second reference voltage.

**4,951,251**  
**SEMICONDUCTOR MEMORY DEVICE**  
Yasunori Yamaguchi, Tachikawa, and Jun Miyake, Musashino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Division of Ser. No. 874,106, Jun. 13, 1986, Pat. No. 4,766,570.  
This application Jul. 26, 1988, Ser. No. 224,375  
Claims priority, application Japan, Jun. 17, 1985, 60-129826  
Int. Cl.<sup>5</sup> G11C 7/00

**U.S. Cl. 365—189.02** **42 Claims**  
1. A semiconductor memory device formed on one chip used for image processing comprising:  
a memory portion for storing image data;  
an internal circuit coupled to said memory portion to provide said image data to said memory portion, wherein said internal circuit has a plurality of operation modes which are respectively selected in accordance with a function signal so that the image data to be provided to said memory portion in each operation mode is determined by said function signal;  
an address input terminal; and  
a function setting circuit coupled to receive an input signal from said address input terminal, said function setting circuit including means for forming said function signal in accordance with said input signal;

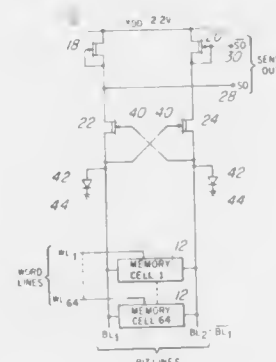
an output terminal; and  
a parallel to serial converter coupled between said memory



portion and said output terminal for storing signals read out in parallel from said memory portion and for supplying said signals to said output terminal serially.

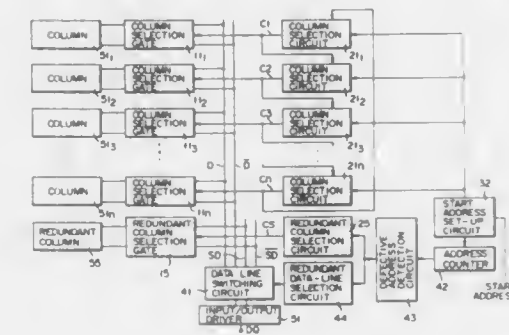
**4,951,252**  
**DIGITAL MEMORY SYSTEM**  
William A. White, Garland, Tex., and Albert H. Taddiken, Dallas, both of, assignors to Texas Instruments Incorporated, Dallas, Tex.  
Filed Oct. 25, 1988, Ser. No. 262,402  
Int. Cl.<sup>5</sup> G11C 7/00

**U.S. Cl. 365—189.11** **14 Claims**



1. A digital memory system comprising:  
at least one column of memory cells;  
a plurality of word lines connected for selecting a memory cell;  
a first bit line connected to each memory cell in the column for determining the state of a selected cell;  
a bit line pull-up transistor having first, second and third terminals, the first terminal connectable to a source of power and the third terminal connected to form a current source at the second terminal;  
an amplifier transistor having first and second source/drain electrodes and a gate electrode, the first source/drain electrode connected to the second terminal of the pull-up transistor, the second source/drain electrode connected to the bit line and the gate electrode connected to receive a bias voltage; and  
an output node between the pull-up and amplifier transistors providing an amplified bit line signal corresponding to the state of a selected memory cell.

**4,951,253**  
**SEMICONDUCTOR MEMORY SYSTEM**  
Hiroshi Sahara, Tokyo; Haruki Toda, Yokohama, and Shigeo Oshima, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Oct. 31, 1988, Ser. No. 264,741  
Claims priority, application Japan, Nov. 2, 1987, 62-278045  
Int. Cl.<sup>5</sup> G11C 7/00  
**U.S. Cl. 365—200** **17 Claims**

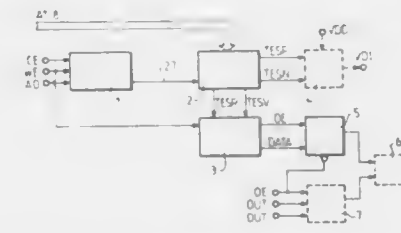


1. A semiconductor memory system of the serial column access type comprising:  
"n" regular columns, where "n" is a positive integer;  
"n" column selection gates provided respectively corresponding to said regular columns;  
regular data lines connected through said column selection gates respectively to said columns;  
"n" column selection circuits respectively provided for said column selection gates, in which said column selection circuits comprise a shift register;  
a redundant column used for replacing a defective column;  
a redundant column selection gate provided for said redundant column;  
redundant data lines connected to said redundant column through said redundant column selection gate;  
a data input/output driver;  
defective address detection means for detecting the address of a defective column to select said redundant column; and  
data line switching means for switching, in redundant column select mode, the data lines connected to the data input/output driver from said regular data lines to said redundant data lines.

**4,951,254**  
**STATIC MEMORY UNIT HAVING A PLURALITY OF TEST MODES, AND COMPUTER EQUIPPED WITH SUCH UNITS**  
Hans Ontrop; Roelof Salters; Betty Prince; Thomas J. Davies; Cathal G. Phelan; Cormac M. O'Connell; Peter H. Voss, all of Eindhoven; Leonardus C. M. G. Pfennings, deceased, late of Eindhoven, and by Henricus J. Kunnen, legal representative, Valkenswaard, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Nov. 16, 1988, Ser. No. 272,180  
Claims priority, application France, Nov. 20, 1987, 87 16115  
Int. Cl.<sup>5</sup> G11C 7/00, 29/00

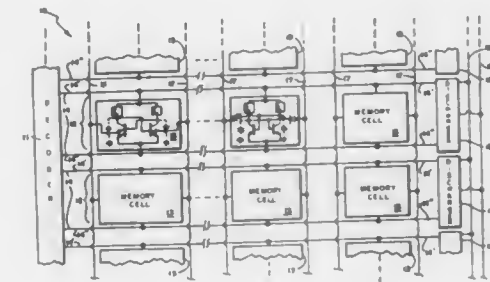
**U.S. Cl. 365—201** **15 Claims**  
1. A random access memory unit with direct access, comprising a parallel multi-bit address input and at least one data output, a write mode input for placing the unit in write mode, a unit selection input, and means for detecting whether a predefined sequence of logic signals, which violates specifications for said unit of a normal set of sequences which are used for said direct access so as to be normally prohibited, but the amplitudes of which are nevertheless included within a range of amplitudes specified for such signals, is supplied at said multi-bit address input and said write mode input, and for

placing the unit in test mode when such predefined sequence has been detected wherein the predefined sequence comprises a modification of at least one of only the address data bits at



said multi-bit address input while the unit has been placed in write mode, this constituting an aforesaid normally prohibited sequence.

**4,951,255**  
**MEMORY CURRENT SINK**  
James B. Hobbs, Minneapolis, Minn., assignor to Atmel Corporation, San Jose, Calif.  
Filed Apr. 14, 1989, Ser. No. 338,708  
Int. Cl.<sup>5</sup> G11C 13/00  
**U.S. Cl. 365—207** **12 Claims**



1. A discharge circuit for memory cell selection interconnection line pairs each having first and second interconnection members and each operated by a decoder means in a memory circuit, said memory circuit having multiple pluralities of such memory cells with each plurality being electrically connected between said first and second interconnection members in a corresponding one of said interconnection line pairs, including a first plurality of memory cells electrically connected between said first and second interconnection members of a first said interconnection line pair, said discharge circuit comprising:  
a first voltage difference sensing means having first and second inputs and an output with said first input thereof being electrically connected to said first pair second interconnection member and said second input thereof terminal means adapted for connection to a first source of voltage, said first voltage difference sensing means being capable of providing an output signal value on said output thereof in a first value range for one polarity of voltage difference between any voltages provided on said first and second inputs thereof but an output signal value in a second value range for an opposite voltage difference polarity; and  
a first controlled current sink means having first and second current pass regions and having a control region therein by which said first controlled current sink means is capable of being directed, through electrical energization thereof, to effectively provide a conductive path of a selected conductivity between said first controlled current sink means first and second current pass regions, said first controlled current sink means first current pass region being electrically connected to said first pair second inter-



connection member, said first controlled current sink means second current pass region being electrically connected to a second terminal means adapted for connection to a second source of voltage, said first controlled current sink means control region being electrically connected to said first voltage difference sensing means output.

4,951,256

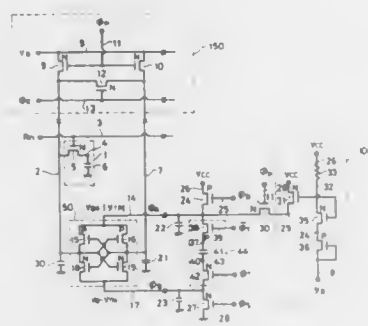
# **APPARATUS AND METHOD FOR DRIVING SENSE AMPLIFIER IN DYNAMIC RANDOM ACCESS MEMORY** Youichi Tobita, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,301

Claims priority, application Japan, Nov. 18, 1987, 62-292721  
Int. Cl.<sup>5</sup> G11C 7/00

U.S. Cl. 365—208

11 Claims



1. A sense amplifier driving apparatus in a dynamic random access memory having a plurality of bit line pairs (BL0, BLn to BLn, BLn) structured by repeatedly arranging first and second bit lines each having a plurality of memory cells connected thereto such that the first and second bit lines are paired with each other and a plurality of sense amplifiers each provided on each of said plurality of bit line pairs and responsive to a signal transmitted through first and second signal lines to be activated for differentially amplifying a signal on a corresponding bit line pair, comprising:

potential shift transmitting means provided between said first and second signal lines for transmitting the shift in potential on said second signal line to said first signal line, and

control signal generating means responsive to a control signal for defining timing for reading out information stored in said memory cells for generating a signal for controlling an operation of said potential shift transmitting means.

4,951,257

# **REFERENCE SETTING CIRCUIT FOR DETERMINING WRITTEN-IN CONTENT IN NONVOLATILE SEMICONDUCTOR MEMORIES**

Keniti Imamiya, Yokohama; Sumio Tanaka, Oomoriishi; Junichi Miyamoto, Yokohama; Shigeru Atsumi, Tokyo; Yumiko Iyama, and Nobuaki Ohtsuka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed May 23, 1988, Ser. No. 197,437

Claims priority, application Japan, May 27, 1987, 62-130805  
Int. Cl.<sup>5</sup> G11C 11/40, 13/00

U.S. Cl. 365—210

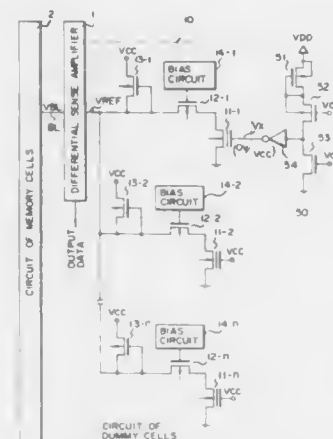
7 Claims

6. A reference setting circuit for determining the written-in contents of a nonvolatile semiconductor memory, comprising: a memory cell means for storing data of the nonvolatile semiconductor memory, said memory cell means operable in an ordinary readout mode and in a program verification mode in which the contents written in said memory cell means are verified;

sense amplifier means for comparing a bit line potential at a

bit line of said memory cell means and a reference potential, to read out data from said memory cell means; and a dummy cell means connected to said sense amplifier means and including reference changing means, connected to the memory cell means, for setting different references used for determining data in the ordinary readout mode and in the program verification mode in which the contents written in said memory cell means are verified, the reference changing means including:

variable potential generating means for generating a reference potential selection signal that is set to a first logic level in the program verification mode and to a second logic level in the ordinary readout mode;



a first MOS transistor, having a source connected to a first circuit kept at a potential corresponding to the first logic level and a gate set at a potential corresponding to the second logic level;

a second MOS transistor, having a source connected to the drain of said first MOS transistor and a gate connected to receive the reference potential selection signal;

a third MOS transistor, connected to said sense amplifier means and connected between a circuit, to which is applied the reference potential, and a second circuit kept at a potential corresponding to the second logic level; and

a fourth MOS transistor, having a gate that is set at a preset bias potential and a drain-source path connected between the circuit, to which is applied the reference potential, and the drain of said second MOS transistor.

4,951,258

# **DYNAMIC RANDOM ACCESS MEMORY SYSTEM INCLUDING PREDECODER MEANS**

Hidehiko Uehara, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,685

Claims priority, application Japan, Jul. 7, 1988, 63-169866  
Int. Cl.<sup>5</sup> G11C 7/00

U.S. Cl. 365—222

3 Claims

1. A dynamic random access memory system comprising:

(a) a memory cell matrix;

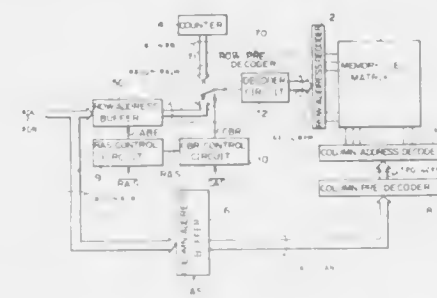
(b) a row address decoder connected to said memory cell matrix for selecting a specific row of said memory cell matrix;

(c) a counter for producing internal address signals, said internal address signals being used for refreshing the cells of said memory cell matrix;

(d) a row address buffer for receiving external address signals and converting said external address signals to row address signals in response to an address buffer enabling signal;

(e) a switching circuit having at least first and second inputs and an output, said first input being connected to said counter and said second input being connected to said row

address buffer for selectively switching said first and second inputs in response to an address switching signal; (f) a decoder circuit connected to the output of said switching circuit for decoding selected address signals and providing decoded address signals to said row address decoder; (g) a first control circuit connected to said row address buffer for providing said address buffer enabling signal to said row address buffer in response to a row address strobe signal; and (h) a second control circuit connected to said switching circuit for providing said address switching signal to said



switching circuit in response to said row address strobe signal and a column address strobe signal, said second control circuit including,

a NAND circuit responsive to said row address strobe signal and said column address signal; and

a flip flop circuit for producing said address switching signal in response to the row address signal and the output of said NAND circuit;

whereby refreshing of the cells of said memory matrix is independent of the sequence in which said address switching signal and said address buffer enabling signal are generated.

4,951,259

# **SEMICONDUCTOR MEMORY DEVICE WITH FIRST AND SECOND WORD LINE DRIVERS**

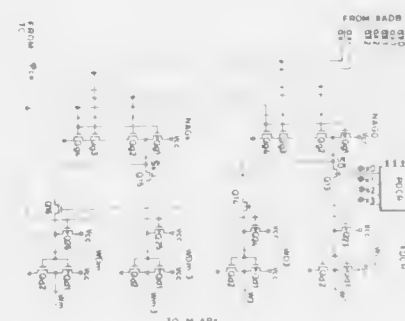
Yoichi Sato, Iruma, and Satoshi Shinagawa, Ohme, both of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Feb. 18, 1988, Ser. No. 156,742

Claims priority, application Japan, Feb. 18, 1987, 62-33201  
Int. Cl.<sup>5</sup> G11C 7/00, 8/00

U.S. Cl. 365—230.06

19 Claims



1. A semiconductor memory device comprising: a memory array having a plurality of word lines, a plurality of data lines formed to intersect with said plurality of

word lines and a plurality of memory cells formed at intersections of said word lines and said data lines;

a first word line driver for driving at least a first one of said word lines;

a second word line driver for driving at least a second one of said word lines;

a first logic decoding means coupled to receive a first group of address signals, and including means for providing an output signal at an output terminal in accordance with said first group of address signals;

a first switch for coupling said output terminal of said first logic decoding means to an input of the first word line driver;

a second switch for coupling said output terminal of said first logic decoding means to an input of the second word line driver; and

a second logic decoding means coupled to receive a second group of address signals, and including means for selectively activating a predetermined one of said first switch and said second switch based on said second group of address signals to selectively connect the output terminal of said first logic decoding means to one of the input terminals of said first word line driver and said second word line driver,

wherein said first switch comprises a MOSFET having a source-drain path coupled in series between the output terminal of the first logic decoding means and the input of said first word line driver and having a gate coupled to receive an output control signal generated by said second logic decoding means, and wherein said second switch comprises a MOSFET having a source-drain path coupled in series between the output terminal of the first logic decoding means and the input of the second word line driver and having a gate coupled to receive an output control signal generated by said second logic decoding means.

4,951,260

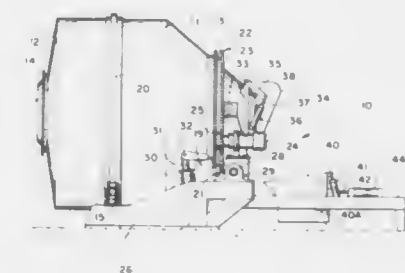
# **INTEGRAL DUST HOOD FOR TILT MIXER DRUM** Robert W. Strehlow, New Berlin, Wis., assignor to McNeilus Truck and Manufacturing, Inc., Dodge Center, Minn.

Filed Feb. 22, 1990, Ser. No. 483,172

Int. Cl.<sup>5</sup> B28C 7/16, 5/20

U.S. Cl. 366—045

13 Claims



1. An improved rotating, tilting drum mixer for blending batches of dry ingredients with water comprising:

a rear conical charging zone having a central charge opening for receiving materials to be mixed;

a front conical zone having a central discharging opening for discharging mixed materials;

a generally cylindrical central zone separating said charging and discharging zones;

drive means for rotating said drum about its longitudinal axis;

tilting means for tilting the drum to empty mixed material, said tilting means further comprising tilt pivot point means including rotatable axle support means to support said drum and connected devices and to form the pivot point

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for tilting said drum and means for causing said drum to tilt;  
an integral dust hood comprising a shroud member fixed to said axle support means of said tilt means juxtaposed said discharge opening of said drum, a pivotal hood member hinged to the shroud member in a manner that allows it to cover the discharge opening of said drum when closed and swing clear of said discharge opening when fully opened, and hood operating means for pivoting said dust hood on its hinges.

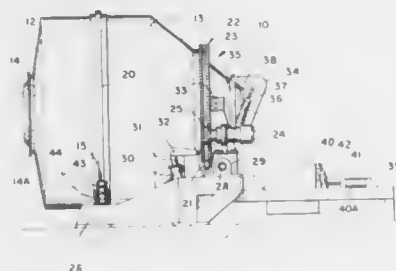
4,951,261

## DRIVE AND SUPPORT FOR MIXER DRUM

Robert W. Strehlow, New Berlin, Wis., assignor to McNeilus Truck and Manufacturing, Inc., Dodge Center, Minn.  
Filed Feb. 22, 1990, Ser. No. 483,176  
Int. Cl.<sup>5</sup> B28C 7/16, 5/20

U.S. Cl. 366—45

11 Claims



1. An improved drive for a tiltable rotating mixing drum for mixing concrete batch materials or the like comprising:

a rotatable mixing drum comprising a relatively flat rear conical charging zone having a central opening for receiving materials to be mixed from a charging chute, a front conical zone having a central discharge opening therein for discharging mixed materials and a generally cylindrical central zone disposed between said front and said rear conical zones;

support means for supporting said mixing drum for rotation about its longitudinal axis; drum drive means for causing and controlling the rotation of the drum about its longitudinal axis; and

tilting means for causing said drum to pivot from the horizontal mixing position to a discharge position, said tilting means further comprising rotating torque tube support means providing the pivot axis and support for the drum during the pivoting function.

4,951,262

## AGITATOR AND BAFFLES FOR SLURRY MIXING

Max L. Phillippi, and Vincent G. Reidenbach, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.  
Filed Apr. 18, 1989, Ser. No. 340,111  
Int. Cl.<sup>5</sup> B01F 7/22

U.S. Cl. 366—279

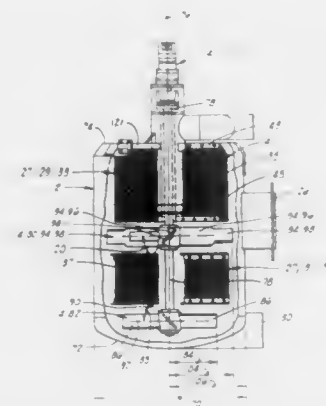
17 Claims

1. An apparatus for mixing a fluid, comprising:  
a mixing tub having a substantially circular horizontal cross-sectional shape; and  
an agitator assembly, including:

a drive shaft located within said tub and having a substantially vertically oriented axis of rotation;

a lower agitator means, attached to said shaft, for moving said fluid generally downward through a radially inner cross-sectional area defined within a first radius swept by said lower agitator means, said lower agitator means having a radially outermost extremity such that said first radius is defined between said axis of said drive shaft and said radially outermost extremity of said lower agitator means; and  
an upper agitator means attached to said shaft, for moving

said fluid within said first radius generally radially outward as said fluid is moved generally downward by said



lower agitator means, and for moving said fluid outside said first radius generally upward.

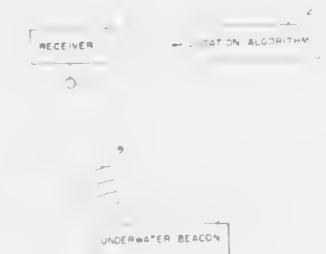
4,951,263

## SPREAD SPECTRUM UNDERWATER LOCATION BEACON SYSTEM

Steven M. Shope, Corrales, N. Mex., assignor to Sandia Research Associates, Inc., Corrales, N. Mex.  
Filed Jul. 20, 1989, Ser. No. 382,210  
Int. Cl.<sup>5</sup> H04B 1/59

U.S. Cl. 367—2

19 Claims



1. Underwater location system, comprising:

an underwater beacon apparatus having a housing, an attachment for attaching the housing to a device to be located underwater, an oscillator mounted in the housing for producing a continuous wave signal, a modulator connected to the housing for selectively phase-shifting the continuous wave signal, a sequence generator mounted in the housing and connected to the modulator for controlling the sequence of phase-shifts by the modulator, a driver connected to the modulator for receiving signals from the modulator and producing signals of sufficient power to drive a transducer, a transducer mounted in the housing and connected to the driver for receiving signals from the driver and transducing the signals to sound signals in water in which the apparatus is located; and  
a receiver for receiving the sound signals in the water, the receiver having a detector for detecting the sound waves and for converting the sound waves into electronic signals, a preamplifier connected to the detector for preamplifying the electronic signals from the detector, a bandpass filter connected to the preamplifier for eliminating noise in frequencies outside a beacon frequency, an analog to digital converter connected to the bandpass filter for converting signals from the bandpass filter in the beacon frequency to digital signals, a demodulator connected to

the demodulator for demodulating the digital information from the converter for obtaining components of the beacon frequency signal and a matched filter for matching the modulation sequence produced by the beacon.

the converter for demodulating the digital information from the converter for obtaining components of the beacon frequency signal and a matched filter for matching the modulation sequence produced by the beacon.

4,951,264

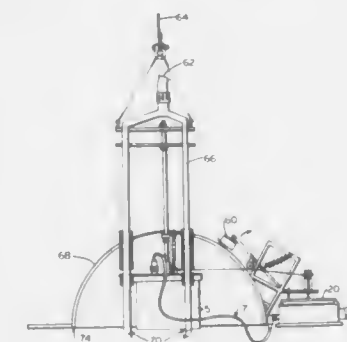
## METHOD OF MEASURING THE SHEAR MODULUS PROFILE OF A SEABED

Tokuo Yamamoto, Miami, Fla., assignor to University of Miami, Miami, Fla.  
Continuation-in-part of Ser. No. 863,980, May 16, 1986, Pat. No. 4,807,199. This application Oct. 27, 1988, Ser. No. 263,626  
The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> G01V 1/36

U.S. Cl. 367—15

11 Claims



1. A method of measuring the shear modulus profile of a seabed using at least one bottom shear modulus profile unit having means for measuring the motion of the seabed in three dimensions, means for measuring the water pressure at the seabed floor and means for converting the measurements of seabed motion in three dimensions and pressure at the seabed floor into a shear modulus profile, comprising coupling at least one bottom shear modulus profiler unit, attached to said converting means by a signal carrying cable, to the seabed floor.

4,951,265

## OIL FILL PROCEDURE FOR SEISMIC MARINE STREAMER

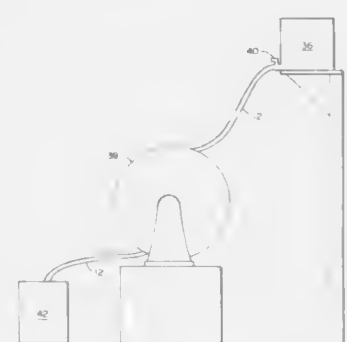
John J. Buckles, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 133,965, Dec. 16, 1987, abandoned. This application May 11, 1989, Ser. No. 350,281

Int. Cl.<sup>5</sup> G01V 1/00

U.S. Cl. 367—18

21 Claims



1. A method for improving signal quality in urethane foam

mounts utilized on hydrophones in conjunction with a seismic streamer comprising:

(a) purging a urethane foam mount with a fluid miscible with air and a hydrocarbonaceous liquid having a selected density which liquid is used to dampen noise in a hydrophone where said fluid is a member selected from the group consisting of carbon dioxide, fluorocarbons, C<sub>1</sub>-C<sub>4</sub> hydrocarbons, and mixtures thereof which member alone substantially displaces air from the streamer; and  
(b) thereafter filling said seismic streamer with said hydrocarbonaceous liquid which mixes with said fluid and substantially retains the density of said liquid thereby maintaining neutral buoyancy of said streamer, substantially isolating said hydrophones from noise, and improving signal quality.

4,951,266

## METHOD OF FILTERING SONIC WELL LOGGING DATA

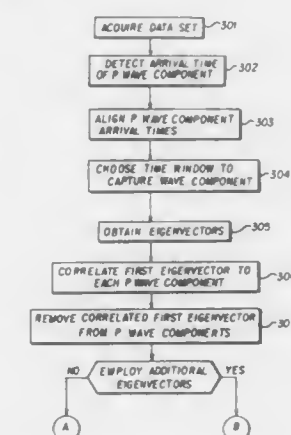
Kai Hsu, Danbury, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,510

Int. Cl.<sup>5</sup> G01V 1/36

U.S. Cl. 367—25

42 Claims



1. A method of filtering acquired sonic data, the sonic data comprising a data set of m waveforms, each of the waveforms including a formation wave component digitized into n samples, said filtering method to substantially remove undesired reflected wave components, undesired converted wave components and/or noise from the formation wave component, said method comprising the steps of:

characterizing the n samples of each digitized formation wave component as a vector, obtaining a first eigenvector based on said formation wave component vectors;  
correlating said first eigenvector to each of said wave component vectors, thereby obtaining a correlated first eigenvector for each of said wave component vectors;  
removing said correlated first eigenvectors from their respective wave component vectors, thereby obtaining a first residual component for each of said wave component vectors; and  
removing said first residual components from their respective formation wave components, thereby substantially removing the undesired reflected wave components, undesired converted wave components and/or noise from said formation wave component.



**4,951,267**  
**METHOD AND APPARATUS FOR MULTIPOLE**  
**ACOUSTIC LOGGING**

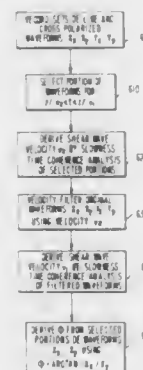
Shu-Kong Chang, West Redding; Benoit G. Froelich, Bethel, and Gyula Varga, Brookfield, all of Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Oct. 15, 1986, Ser. No. 919,293

Int. Cl. G01V 1/00

U.S. Cl. 367—31

22 Claims



1. In a logging tool for use in a borehole traversing an earth formation, the tool having a multiple dipole source connected to the tool in a fixed position and orientation to generate shear wave radiation in multiple directions in the formation upon excitation, and a plurality of multiple dipole detectors to receive shear waves in multiple directions radiated through the formation, wherein the detectors are connected to the tool in a fixed position and orientation and spaced apart from each other a predetermined distance along the longitudinal axis of the tool, a method of determining the magnitude and direction of an anisotropy in the formation, said method comprising the steps of:

- generating shear wave radiation in a first direction;
- receiving at each detector at least a portion of the generated shear wave in a second and a third direction;
- generating shear wave radiation in a fourth direction;
- receiving at each detector at least a portion of the generated shear wave in a fifth and a sixth direction;
- determining, for each detector, a composite dipole waveform for a plurality of azimuthal directions based on at least a portion of the received waveforms in the second, third, fifth and sixth directions received at each detector;
- determining, for each azimuthal direction, a shear wave velocity based on the composite dipole waveforms determined for each azimuthal direction; and
- obtaining the magnitude and direction of formation anisotropy, relative to the position of the logging tool, based on the minimum and/or maximum values of shear wave velocity determined for the plurality of azimuthal directions.

**4,951,268**  
**METHOD FOR THE SONAR CLASSIFICATION OF**  
**UNDERWATER OBJECTS, NOTABLY MOORED MINES**  
 Georges Grall, Le Conquet, France, assignor to Thomson-CSF, Puteaux, France

Filed May 10, 1989, Ser. No. 349,760

Claims priority, application France, May 10, 1988, 88 06277

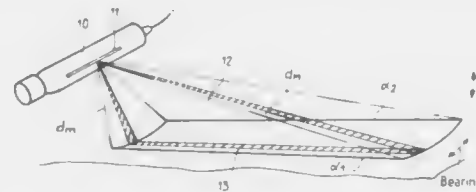
Int. Cl. G01S 9/66

U.S. Cl. 367—88

4 Claims

1. A method for the sonar classification of underwater objects such as moored mines, wherein sound emitted from a sonar travelling across the sea at a height H is diffused in a predetermined underwater sector having a vertical plane, wherein echos are sent back by seabed and by objects floating in water and wherein said echos are displayed according to a

bearing and distance mode, wherein said sector is sound-diffused according to a diagram having, in said vertical plane, two emission lobes separated by a central zero value, said second-diffusion providing a display of a dark zone surrounded by two luminous zones, whereby the objects floating in the water are distinguished from objects lying on the seabed by the fact that the display echo of an object floating in the water remains when the displayed echo travels from one of said luminous zones to said dark zone and the display echo of an object laid on the seabed disappears when said display of said object goes



from one of said luminous zones to said dark zones, and wherein, in order to measure the height Z of the object floating in the water, the displayed echo from said floating object crossing at a first instance a black zone located substantially in the center of the dark zone and corresponding to a distance Do from the sonar to the seabed, and said displayed echo disappearing later at a second instance, measurement is made of a distance ΔX travelled by the sonar between said two instants and said height Z is given by the formula:

$$z = h \Delta X / ((d_0)^2 - h^2)^{0.5}$$

**4,951,269**  
**ECHO CANCELLER WITH SHORT PROCESSING**  
**DELAY AND DECREASED MULTIPLICATION NUMBER**  
 Fumio Amano, Tokyo; Mohammad R. Asharif, Kawasaki; Shigeyuki Unagami, Atsugi, and Yoshihiro Sakai, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
 PCT No. PCT/JP87/00833, § 371 Date Jun. 24, 1988, § 102(e) Date Jun. 24, 1988, PCT Pub. No. WO88/03341, PCT Pub. Date May 5, 1988

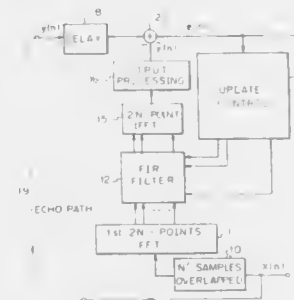
PCT Filed Oct. 29, 1987, Ser. No. 216,907

Claims priority, application Japan, Oct. 30, 1986, 61-256750; Nov. 10, 1986, 61-265470

Int. Cl. G01S 15/00

U.S. Cl. 367—135

12 Claims



1. An echo canceller for cancelling an echo signal passed through an echo path with an impulse response N, said echo canceller having an input end for receiving an input digital signal series and an output end for providing an error signal, said echo canceller comprising:

- N' sample overlap processing means, connected to the input end, for receiving the input digital signal series and for

outputting 2N' samples of the input digital signal series with N, samples being overlapped;

first 2N'-point fast Fourier transform means, connected to said N, sample overlap processing means, for effecting a fast Fourier transform on the 2N' samples output from said N' sample overlap processing means to output 2N' points of signals expressed in the frequency domain;

coefficient updating means, operatively connected to the output end, for generating estimates and for updating the estimate coefficients based upon the error signal;

finite impulse response filtering means, operatively connected to said first 2N'-point fast Fourier transform means, for dividing the impulse response N in the input digital signal series into k blocks each consisting of N' samples where k and N are integers, and for delaying the 2N' points of signals output from said first 2N'-point fast Fourier transform to generate delayed signals, respectively multiplying the delayed signals by the estimate coefficients to generate estimate impulse signals, and outputting output frequency response signals as the sum of the estimate impulse signals;

2N'-point inverse fast Fourier transform means, connected to said finite impulse response filtering means, for effecting an inverse fast Fourier transform on the output frequency response signals from said FIR filtering to output an impulse output signal;

output processing means, connected to said 2N'-point inverse fast Fourier transform means, for deleting the first N' samples from the impulse output signal of said 2N'-point inverse fast Fourier transform means and for outputting the last N' samples of the impulse output signal as an estimated echo signal;

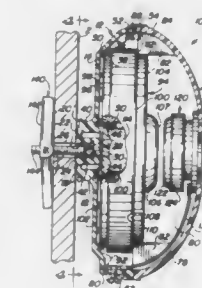
a delay circuit, connected to the echo path, for delaying the echo signal passed through the echo path by the N' samples to produce a delayed output; and

a subtractor, connected to said output processing means and said delay circuit, for obtaining the error signal corresponding to the difference between the delayed output of said delay circuit and the estimated echo signal.

**4,951,270**  
**AUDIO TRANSDUCER APPARATUS**  
 Jay E. Andrews, 32810 N. 227th Ave., Wittman, Ariz. 85361  
 Filed Jun. 20, 1989, Ser. No. 368,801  
 Int. Cl. H04R 11/00

U.S. Cl. 367—140

14 Claims



1. Transducer apparatus for transmitting electromagnetic signals to a wall, comprising, in combination:

- housing means for holding electromagnetic elements, including
- a base housing having a back portion,
- a voice coil extending inwardly from the back portion, and having a first diameter, for providing an electromagnetic output in response to an electronic input signal,
- a rear boss portion extending outwardly from the back portion of the base housing to the wall, having an outer surface disposed against the wall and having a pinched waist reduced diameter portion between the back por-

tion and the outer surface which has a second diameter which is less than the first diameter of the voice coil, first magnetic element means disposed in the base housing and responsive to the output of the voice coil for providing a first output,

a bore in the first magnetic element means into which the voice coil extends,

a top housing secured to the base housing, and means for securing the first magnetic element means to the base housing;

means for securing the housing means to the wall; and

means for providing an electronic input signal to the voice coil to provide an output transmitted to the wall from the first magnetic element means.

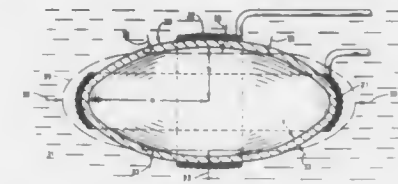
**4,951,271**  
**FLEXENSIONAL HYDROPHONE**  
 Steven L. Garrett, Pebble Beach, and Donald A. Danielson, Carmel, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 17, 1989, Ser. No. 341,594

Int. Cl. H04R 1/02

U.S. Cl. 367—141

20 Claims



1. A sensor for pressure variations in a fluid, such variations having a predetermined frequency range and the sensor comprising:

- an elastic and ellipsoidal shell having an interior surface and immersible in the fluid so that such variations induce in the shell deformations corresponding to the variations, and transducer means for providing a signal corresponding to said deformations, said transducer means including
- a mass disposed centrally within the shell,
- a resilient cylinder extending axially between said mass and said surface and having with said mass a natural frequency of oscillation substantially lower than said predetermined frequency range so that such variations thereof cause corresponding changes in the length and in the circumference of the cylinder, and
- an optical fiber having a plurality of turns wrapped in tension about the circumference of the cylinder so that the fiber has interferometrically detectable changes in length corresponding to said changes in said circumference.

**4,951,272**  
**SYSTEM AND METHOD FOR ACCESSING TRACKS FOR**  
**OPTICAL DISC APPARATUS**

Shigeaki Wachi, Tokyo, and Sumihiro Okawa, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan  
 Filed Nov. 16, 1988, Ser. No. 271,918

Claims priority, application Japan, Nov. 20, 1987, 62-291686

Int. Cl. G11B 21/08

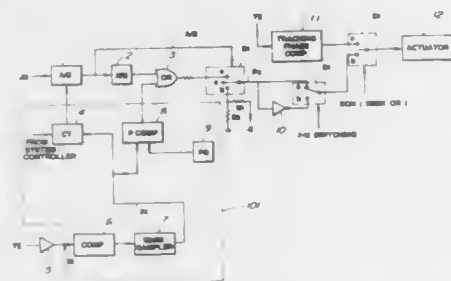
U.S. Cl. 369—44.11

8 Claims

1. A system for accessing tracks for an optical disc, comprising:

- (a) first means for generating and outputting an initial acceleration signal having a predetermined pulsewidth in response to a track jump instruction,.

- (b) second means for detecting a period of a traverse signal generated when a fine tracking actuator moves over tracks in a radial direction of the disc in response to the initial acceleration signal and outputting a control signal according to a result of detection, and



- (c) third means for supplying an acceleration pulse signal whose pulsewidth is controlled on the basis of the control signal outputted from the second means after the initial acceleration signal is outputted and for controlling a relative speed between a light spot and the optical disc to coincide with a predetermined speed in response to the acceleration pulse.

4,951,273

# OPTICAL RECORDING AND REPRODUCING DEVICE WITH NORMALIZATION OF SERVO CONTROL SIGNAL USING SWITCHABLE AUTOMATIC GAIN CONTROL CIRCUITRY

Toshifumi Yoshida, Suita; Mitsuo Nabae, Nagaokakyo; Yasuo Nishinaka, Hirakata, and Mitsuo Moriya, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

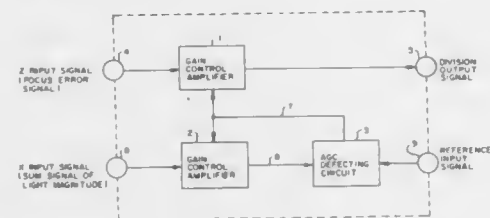
Continuation of Ser. No. 16,720, Dec. 10, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 311,409

Claims priority, application Japan, Apr. 10, 1985, 60-75616; Apr. 26, 1985, 60-90001; Apr. 26, 1985, 60-90011

Int. Cl.<sup>5</sup> G11B 7/09

U.S. Cl. 369—44.11

5 Claims



1. An apparatus for optical recording and reproducing on an optical disk comprising:
  - an optical system for impinging a laser light recording beam onto said optical disk to record information on said optical disk and impinging a laser light reproducing beam on said optical disk to reproduce information from said optical disk, said laser light recording beam having a higher power than said laser light reproducing beam;
  - a photoelectric device for generating electric signals in response to light from said laser light recording beam and said laser light reproducing beam from a surface of said optical disk;
  - a first circuit means for producing a first signal representing whole light magnitude information of said reflected light in response to said electric signals from said photoelectric device;
  - a second circuit means for producing a second signal representing servo error information of said laser light recording beam and said laser light reproducing beam on said

- optical disk in response to said electric signal from said photoelectric device;
- a division circuit comprising:
  - an automatic gain control circuit having a signal input that inputs said first signal and a reference input for producing a gain control voltage,
  - a gain control amplifier having a gain control input and a signal input that inputs said second signal for producing at an output terminal a division output signal,
  - means for coupling said automatic gain control circuit and said gain control amplifier so that said gain control voltage is input to said gain control input of said gain control amplifier, and
  - switching means for changing a dynamic range and a maximum gain of said gain control amplifier in accordance with a change between using said laser light recording beam and said laser light reproducing beam by said optical system;
- a phase compensation circuit having an input that inputs said division output signal for compensating a phase of said division output signal; and
- a driving circuit for driving said optical system in response to said compensated division output signal to control servo operation of said optical system.

4,951,274

# MAGNETO-OPTICAL HEAD CAPABLE OF SEPARATING BEAMS FOR READING RECORDED INFORMATION AND SERVO INFORMATION BY USE OF ONE OPTICAL ELEMENT

Toshiaki Iwanaga, Yoshinori Sasaki, and Shigeru Shimonou, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

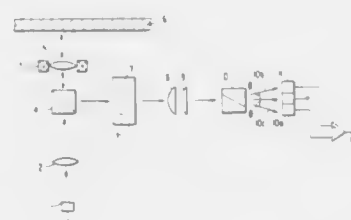
Filed Jan. 25, 1988, Ser. No. 148,310

Claims priority, application Japan, Jan. 23, 1987, 62-14905; Jan. 29, 1987, 62-18855; Jan. 29, 1987, 62-18856; Apr. 15, 1987, 62-93677

Int. Cl.<sup>5</sup> G11B 7/09, 7/13

U.S. Cl. 369—44.11

14 Claims



1. A magneto-optical head comprising:
  - a light source for generating a beam;
  - a first optical system for focusing said beam on a surface of a magneto-optical recording medium;
  - a beam splitter located on a first optical-path of a reflection or transmission beam reflected or transmitted from said magneto-optical recording medium for changing a direction of said first optical-path so as to form a second optical-path;
  - a second optical system located on said second optical-path for dividing said reflection or transmission beam into a first beam having a first beam axis directed substantially parallel to said second optical path, and second and third beams having second and third beam axes, respectively, said second and third beam axes having a predetermined separating angle with respect to said second optical path; and
  - a multi-division photodetector means for detecting a servo signal and an information signal from said first, second and third beams.

4,951,275

# APPARATUS FOR TRACKING OPTICAL DISK

Tadashi Saitoh; Takashi Takeuchi, both of Fujisawa; Masayuki Hirabayashi, Yokohama, and Junichi Iida, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

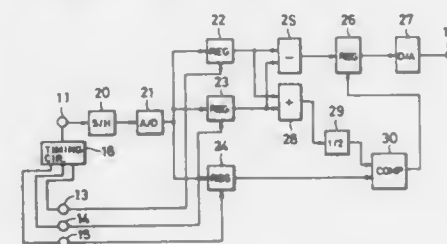
Filed Apr. 21, 1988, Ser. No. 184,363

Claims priority, application Japan, Apr. 24, 1987, 62-99707

Int. Cl.<sup>5</sup> G11B 7/00

U.S. Cl. 369—44.41

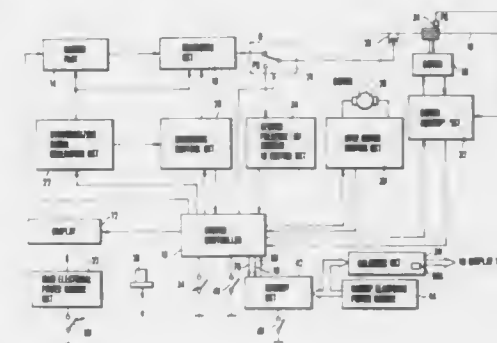
7 Claims



1. An apparatus for tracking an optical disk performing tracking according to a tracking error signal detected by use of signals reproduced from previously formed pits at regular intervals on the tracks, wherein said previously formed pits are made up of at least two pits, of which one is slightly offset from the track to one side and the other is slightly offset from the track to the other side, and wherein a third pit is formed on the track, comprising:

- means for detecting a difference between a signal amplitude of a signal reproduced from one of said pits and a signal amplitude of a signal reproduced from the other of said pits, said difference signal being used as the tracking error signal for performing tracking control;
- means for comparing a signal reproduced from said third pit on the track with a predetermined signal; and
- means for cutting off said tracking error signal either in the case where said reproduced signal of said third pit is larger than said predetermined signal in amplitude or in the case where conversely said reproduced signal of said third pit is smaller than said predetermined signal in amplitude.

- (b) electronic memory means for electrically memorizing the signal outputted by said switch means; and



- (c) a backup electrical power source for supplying electrical power to said electronic memory means.

4,951,277

# OPTICAL DISK PLAYER

Yoshifumi Masunaga, and Yoshitaka Simoda, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

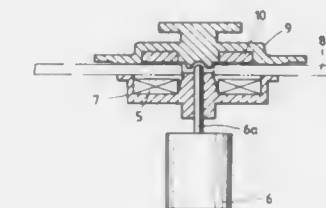
Filed Feb. 21, 1989, Ser. No. 312,985

Claims priority, application Japan, Aug. 31, 1988, 63-215107

Int. Cl.<sup>5</sup> G11B 25/04

U.S. Cl. 369—270

8 Claims



1. An optical disk player comprising:
  - a turntable rotatable for carrying a disk having information recorded thereon;
  - an optical pickup for reading the recorded information from said disk;
  - a clamping member, cooperating with said turntable, for holding said disk on said turntable;
  - a magnet disposed on one of said turntable and said clamping member and having a number of magnetized poles;
  - a magnetic material disposed on the other of said turntable and said clamping member,
  - said optical pickup including an objective lens, a magnetic circuit, a holding member for holding said objective lens, and an actuator for providing a control current to a coil disposed in said magnetic circuit so as to drive said holding member, said clamping member providing a clamping force by means of an attracting force generated between said magnet and said magnetic material,
  - wherein said holding member has a natural vibration frequency so as to prevent said holding member from vibrationally resonating with respect to an alternating field generated by said magnet when said pickup approaches an inner circumference of said disk.

4,951,276

# RECORDING APPARATUS WITH SWITCH ACTUATED MEMORY STORAGE OF RECORDING MEDIUM REMOVAL OR LOADING AND BACKUP POWER SUPPLY FOR MEMORY

Yuji Sakaegi; Nobuo Fukushima, and Ryosuke Miyamoto, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 2, 1987, Ser. No. 127,638

Claims priority, application Japan, Dec. 3, 1986, 61-288070

Int. Cl.<sup>5</sup> G11B 15/00

U.S. Cl. 369—58

16 Claims

1. A recording apparatus for recording on a recording medium which can be changed, comprising:
  - (a) switch means for outputting a signal in response to loading or removal of the recording medium;



# 4,951,278

## HIGH-LEVEL DATA LINK CONTROL PACKET ASSEMBLER/DISASSEMBLER

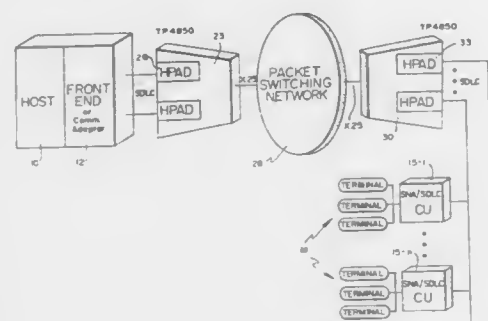
Jeffrey Biber, Sterling, Va.; Jeffrey Cohen, Silver Spring, Md.; John Holmbald, Oakton, Va.; Zon-Hong Hsieh, Potomac; Douglas Kay, Chevy Chase, both of Md., and Roy Spitzer, Vienna, Va., assignors to Telenet Communications Corporation, Reston, Va.

Filed Aug. 31, 1988, Ser. No. 238,581

Int. Cl.<sup>5</sup> H04L 11/00

U.S. Cl. 370—60

6 Claims



1. In a data communications system having layered communication architecture with network services protocols including a link layer and higher level protocols and having IBM or IBM-compatible synchronous data link control (SDLC) devices including a host computer and an end user device desiring to communicate across an X.25 packet switching network of said communications system, the improvement comprising packet assembler/disassembler (PAD) means for supporting X.25 communication across said packet switching network between said SDLC host computer and said SDLC end user device, said PAD means operatively coupled in said communications system between said packet switching network and at least one of said SDLC host computer and said SDLC end user device, each of said SDLC host computer and said SDLC end user device being adapted to generate a plurality of SDLC format frames of data, said plurality of SDLC format frames including (i) unnumbered format frames with link layer functions to manage connection modes in the link layer, (ii) information format frames carrying data having primary use at said higher level protocols, and (iii) supervisory format frames to control the flow of said information format frames.

said PAD means including

transmitting means responsive to any of a plurality of SDLC format frames of data generated by one of said SDLC host computer and said SDLC end user device for selectively transmitting X.25 data packets, representative of the data carried by said information format frames, across said packet switching network, while restricting at least some of said unnumbered format frames and said supervisory format frames to handling within said PAD means for communication with said one of said SDLC host computer and said SDLC end user device, and

generating means responsive to X.25 data packets containing information transmitted across said packet switching network from the other of said SDLC host computer and said SDLC end user device for generating additional SDLC format frames of data representative thereof to communicate with said one of said SDLC host computer and said SDLC end user device.

# 4,951,279

## TRANSCEIVER FOR USE IN EARTH STATION IN SATELLITE COMMUNICATIONS SYSTEM

Toshinori Hotta, Tokyo, Japan, assignor to Nec Corporation, Japan

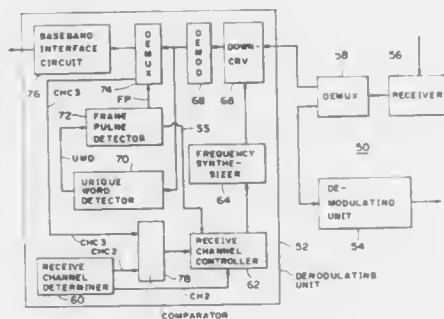
Filed Oct. 19, 1988, Ser. No. 259,849

Claims priority, application Japan, Oct. 20, 1987, 62-265645

Int. Cl.<sup>5</sup> H04J 1/12, 1/16

U.S. Cl. 370—75

7 Claims



1. A transceiver for use in a satellite communications system using frequency-division multiplexing, which transceiver comprises at least one transmitting arrangement and at least one receiving arrangement;

said at least one transmitting arrangement including a modulating section in which a first channel identification is added to a frame of data to be transmitted through a transmitting channel assigned to said at least one transmitting arrangement; and

said at least one receiving arrangement including a demodulating section, said demodulating section including:

- first means for detecting a second channel-identification added to a frame of data received;
- second means for comparing said second channel-identification with a third channel-identification, said third channel-identification indicative of a receiving channel assigned to said at least one receiving arrangement; and
- third means responsive to the difference between said second and third channel-identifications for, in the event that a difference is detected, adjusting channel reception frequency in a manner to receive a channel signal through said receiving channel assigned to said at least one receiving arrangement.

# 4,951,280

## METHOD AND APPARATUS FOR CONFIGURING DATA PATHS WITHIN A SUPERNET STATION

John F. McCool, Cupertino, and Rajiv V. Limaye, Santa Clara, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 9, 1988, Ser. No. 281,991

Int. Cl.<sup>5</sup> H04J 3/14

U.S. Cl. 370—85.12

20 Claims

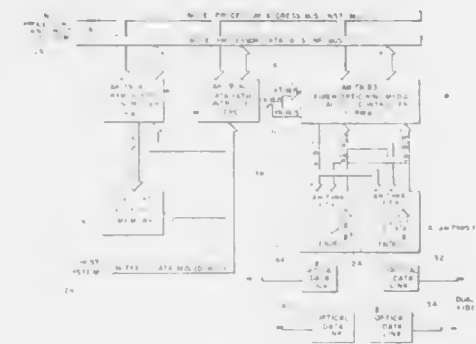
1. Apparatus for configuring the data signal paths within a local area network station having dual access to both a primary ring and to a secondary ring of a dual-ring local area network, comprising:

- a first media access controller MAC and a first encoder/decoder ENDEC, said first ENDEC having an input terminal coupled to the primary ring and having an output terminal coupled to the secondary ring;
- a second media access controller MAC and a second encoder/decoder ENDEC, said second ENDEC having an input terminal coupled to the secondary ring and having an output terminal coupled to the primary ring;
- first bus means for connecting signals between said first MAC and said first ENDEC;

second bus means for connecting signals between said second MAC and said second ENDEC;

first multiplexing means for selecting certain signals from said first bus means and for coupling said selected signals to said second bus means;

second multiplexing means for selecting certain signals from said second bus means and for coupling said selected signals to said first bus means;



means for controlling said first and said second multiplexing means to control connection of data signal paths within said local area network station through said first and said second MACs and ENDECs, to selectively configure the network station to operate in a predetermined operational mode.

# 4,951,281

## MULTIPLEX TRANSMISSION SYSTEM

Makoto Muto; Kyosuke Hasimoto; Yutaka Matsuda, all of Hiratsuka; Yusaku Himono, Tokyo; Kiyoshi Inoue, Hiratsuka; Teruhisa Inoue, Ichikawa; Osamu Michihira, and Yui-chi Ito, both of Hiroshima, all of Japan, assignors to Furukawa Electric Co., Ltd., Tokyo and Mazda Motor Corp., Hiroshima, both of Japan

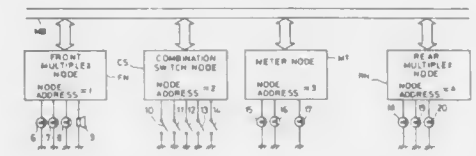
Filed Nov. 28, 1988, Ser. No. 277,060

Claims priority, application Japan, Nov. 30, 1987, 62-302421; Nov. 30, 1987, 62-302427; Aug. 8, 1988, 63-197601; Aug. 8, 1988, 63-197602

Int. Cl.<sup>5</sup> H04J 3/00

U.S. Cl. 370—95.2

15 Claims



1. A multiplex transmission method, in which one of plurality of nodes, as a transmission node, coupled together through a transmission path transmits data frame by frame to said transmission path, and all of said plurality of nodes, as reception nodes, each deliver a reception acknowledgement signal onto said transmission path upon proper reception of said frame of data, said multiplex transmission method comprising the steps of:

- providing, said frame, a reception acknowledgement signal area including a plurality of divisions assigned to said plurality of nodes, respectively;
- providing, in each of said plurality of nodes, a reception acknowledgement signal table consisting of information units each of which corresponds to a respective one of said plurality of divisions of said reception acknowledgement signal area;
- causing each of the reception nodes which properly received said frame of data to return the reception acknowl-

edgment signal specific thereto to that division in said reception acknowledgement signal area which corresponds to the respective node;

causing each of said plurality of nodes to discriminate the success/failure of signal transmission by comparing the information in said reception acknowledgement signal area with the information registered beforehand in said reception acknowledgement signal table; and

causing said transmission node to re-transmit the frame of data and updating said reception acknowledgement signal tables of all of said plurality of nodes when the information registered in said reception acknowledgement signal table does not coincide with the information of said reception acknowledgement signal area.

# 4,951,282

## METHOD AND APPARATUS FOR MEASURING THE QUALITY OF DIGITAL SIGNALS

Roland Mester, Darmstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

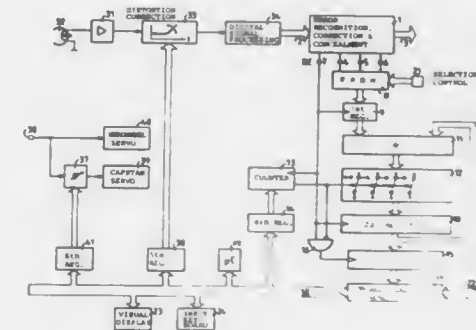
Filed Aug. 22, 1988, Ser. No. 234,910

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729882

Int. Cl.<sup>5</sup> G11B 20/18, 15/467

U.S. Cl. 371—5.1

13 Claims



1. Method of measuring the quality of a digital signal comprising data words and reproduced from a magnetic tape by an equipment having an error recognition circuit for tagging a signal portion containing an error with an error flag and error processing circuits for correcting correctable errors, concealing uncorrectable errors and identifying kinds of errors, and also having at least one binary number register used in registering the summing of errors detected by said error recognition circuit, said method comprising the steps of:

- pre-setting the duration of intervals to be used successively for error occurrence information;
- measuring the number of at least one kind of errors recognized in each of successive intervals of said pre-set duration and averaging the numbers so measured over a predetermined number of said intervals;
- changing the presetting of the duration of said intervals in the event the average number of errors per interval is less than 1 or approximates the number corresponding to overflow of said at least one register, for maintaining said average number within the range of said at least one register.

4,951,283

## METHOD AND APPARATUS FOR IDENTIFYING DEFECTIVE BUS DEVICES

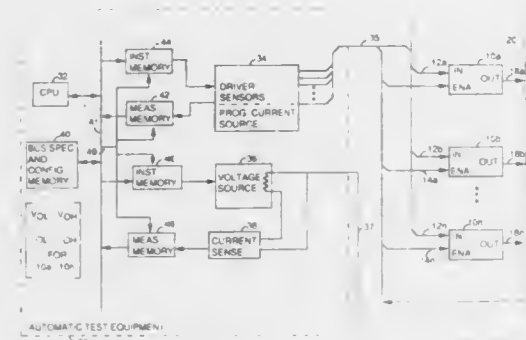
Aldo Mastrocola, Everett, and Mark Swanson, Arlington, both of Mass., assignors to GenRad, Inc., Concord, Mass.

Filed Jul. 8, 1988, Ser. No. 216,917

Int. Cl.<sup>5</sup> G06F 11/00

U.S. Cl. 371—29.5

13 Claims



1. Apparatus for diagnosing which of a plurality of electronic devices having output terminals connected to a common bus node has failed, comprising:
  - A. enabling means, coupled to input terminals of the devices, for selectively enabling or disabling output terminals of the devices connected to the bus, such that the device output terminals would be enabled or disabled if the devices were operating properly;
  - B. sensing means for sensing if the bus is stuck-at an asserted logic level when the enabling means disables the device output terminals of all devices connected to the bus;
  - C. forcing voltage means for applying a forcing voltage to the bus, the forcing voltage being a voltage closer to the asserted logic level than to the logic level opposite the asserted level;
  - D. disabled-bus current means for measuring a disabled-bus current sunk or sourced onto the bus by the forcing voltage means when all other devices connected to the bus are disabled by the enabling means;
  - E. driving means, for driving the logic inputs of a selected one of the devices so that the selected device would drive its output terminal to the stuck-at asserted logic level if it were operating properly;
  - F. enabled-bus current means, for measuring an enabled-bus current sunk or sourced onto the bus by the forcing means when the selected one of the devices connected to the bus is enable by the enabling means, and all other devices connected to the bus are disabled; and
  - G. determining means, responsive to the disabled-bus current means and the enabled-bus current means, for determining if the selected device is operational, and for generating an indication that the selected device is not operational if the enabled-bus current and disabled-bus current differ by less than a predetermined minimum difference amount.

4,951,284

## METHOD AND MEANS FOR CORRECTING RANDOM AND BURST ERRORS

Khaled Abdel-Ghaffar, Davis, and Martin A. Hassner, Palo Alto, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 14, 1988, Ser. No. 284,979

Int. Cl.<sup>5</sup> G06F 11/10

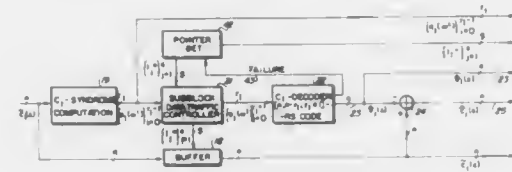
U.S. Cl. 371—38.1

22 Claims

17. Apparatus for correcting multiple error bursts in data recorded on a storage medium in blocks, each of which comprises subblocks of data bytes and subblock check bytes, and

block level syndromes from which block check syndromes are generated and stored after the last subblock of the block for which ECC syndromes are generated during reading, said apparatus comprising:

- means (10) operative during writing of the data for encoding the data in all subblocks of a block;
- means (11) for generating block level syndromes for said subblocks;
- means (13) for multiplying said syndromes by a series of preselected weighting factors ( $a^1, \dots, a^{(B-1)}$ ) according to a location index  $l$  of the subblock within the block;



- B buffers each for storing a syndrome as multiplied by a different weighting factor;
- means (14) for cumulatively summing the contents of said B buffers for all the subblocks within the block to produce block check syndrome ( $r_2B$ ) for that block; and
- means (including 17), operative after writing the last subblock of the block, for encoding said last-mentioned block check syndromes ( $r_2B$ ) to provide check bytes ( $r_3$ ) to protect said block check syndromes ( $r_2B$ ) so that encoded sums ( $r_2B+r_3$ ) of said block check syndromes and check bytes may be stored on the medium as block check syndromes.

4,951,285

## LASER WITH ADJUSTABLE MIRROR FOR MODE CONTROL

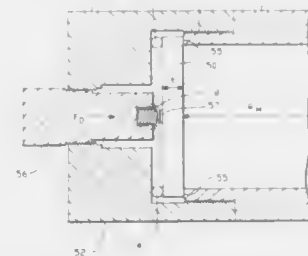
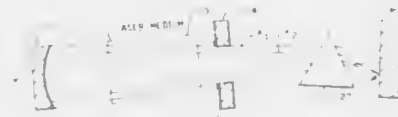
John L. Cole, Sunnyvale; David Wright, Redwood City; Alan B. Petersen, Palo Alto; Shinan-Chur S. Sheng, Sunnyvale, and Troy M. Artusy, Saratoga, all of Calif., assignors to Spectra-Physics, San Jose, Calif.

Filed Jul. 5, 1988, Ser. No. 214,747

Int. Cl.<sup>5</sup> H01S 3/098

U.S. Cl. 372—19

16 Claims



1. A laser resonator having a gain medium, excitation means and resonant cavity which are capable of supporting at least one longitudinal mode and a plurality of transverse modes of oscillation, the resonant cavity including a first mirror with a reflective surface having a shape, and a second mirror, mounted with the first mirror to define an optical path for the

4,951,287

## ATOMIC VAPOR LASER ISOTOPE SEPARATION PROCESS

Richard W. Wyeth, 887 Northwood Commons, Livermore, Calif. 94550; Jeffrey A. Paisner, 12 Silverlake Dr., San Ramon, Calif. 94593, and Thomas Story, 112 Klengel St., Antioch, Calif. 94509

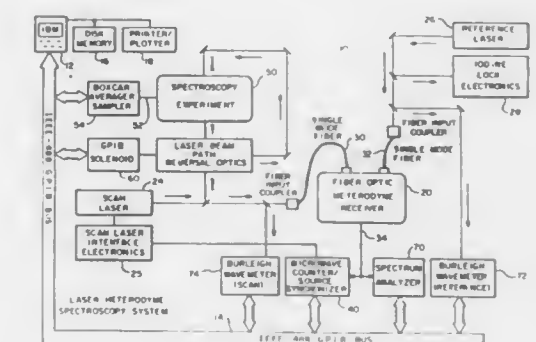
Division of Ser. No. 911,842, Sep. 26, 1986, Pat. No. 4,817,101.

This application Jun. 15, 1988, Ser. No. 206,997

Int. Cl.<sup>5</sup> H01S 3/13

U.S. Cl. 372—32

1 Claim



1. In an atomic vapor laser isotope separation process, a laser spectroscopy system comprising a first reference laser for generating a first laser beam having a first reference laser frequency, a second tunable laser for generating as an output a plurality of second laser beams having a range of laser frequencies, means for sweeping said second laser to generate said second laser beams including phase locked loop control means for adjusting said output of said second laser to predetermined frequency outputs, said control means including means for varying the frequency of said second laser, means for coupling said second laser beams into an atomic vapor having spectral isotope components, means for heterodyning said first referenced laser frequency and frequencies of said second laser beam to form heterodyned frequencies, and means for processing said heterodyned frequencies to determine said spectral components of said atomic vapor.

4,951,288

## APPARATUS FOR PROTECTING A LASER

Udo Barton; Gerhard Ruf, both of Munich, and Fritz Wondrazek, Pfaffenhofen, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

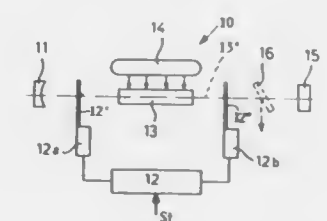
Filed Aug. 28, 1989, Ser. No. 399,262

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1988, 3830360

Int. Cl.<sup>5</sup> H01S 3/10

U.S. Cl. 372—33

14 Claims



1. An apparatus for protecting sensitive components in a laser, comprising failsafe beam switch means for interrupting a

transverse modes in the resonant cavity, wherein cross-sectional sizes of the transverse modes at a given location along the optical path within the resonant cavity are controlled by the shape of the reflective surface on the first mirror and including an aperture at the given location having a cross-sectional size; wherein an improvement comprises:

- means, mounted with the first mirror, for adjusting the shape of the reflective surface on the first mirror so that the cross-sectional size of a desired transverse mode at the given location matches the cross-sectional size of the aperture.

4,951,286

## DEVICE AND METHOD FOR SQUEEZED STATE GENERATION BY A COUPLED SYSTEM

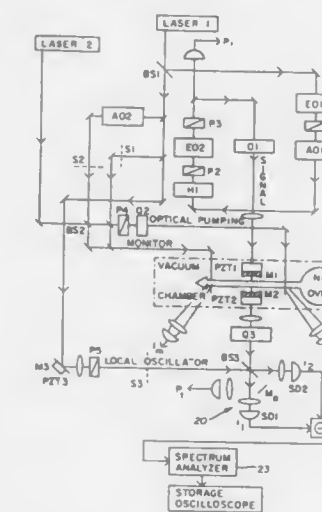
Harry J. Kimble; Mark G. Raizen, both of Austin, Tex., and Luis A. Orozco, Cambridge, Mass., assignors to The University of Texas System, Austin, Tex.

Filed Sep. 29, 1987, Ser. No. 102,039

Int. Cl.<sup>5</sup> H01S 3/10

U.S. Cl. 372—21

16 Claims

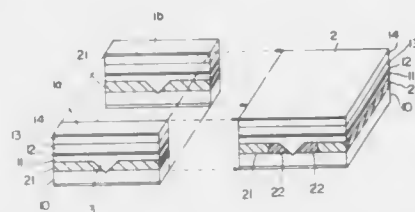


1. A device for modifying the quantum fluctuations of an electromagnetic field, comprising: a nonlinear medium having at least two quantum states and a rate of relaxation between said states; a region within which both an electromagnetic field and said nonlinear medium are present and interact, said electromagnetic field in said region having a rate of relaxation greater than said rate of relaxation of said nonlinear medium; and, excitation means for exciting said nonlinear medium in said region and exciting said electromagnetic field in said region having said greater rate of relaxation to thereby induce an oscillatory exchange of excitation between said nonlinear medium and said electromagnetic field, said oscillatory exchange of excitation occurring at a coupling frequency substantially equal to or greater than said rate at which said electromagnetic field decays.



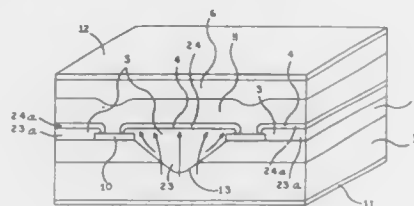
laser beam, said failsafe beam switch means comprising at least two beam switch sections movable back and forth between a beam interrupting position in a beam path and a beam releasing position, and means for shifting in unison said beam switch sections from one of said positions into the other and vice versa, one of said beam switch sections being located in said beam interrupting position between a lasing element and a first sensitive component of said laser, and wherein the other of said beam switch sections is located in said beam interrupting position between said lasing element and a second sensitive component of said laser, and wherein each of said beam switch sections carries a shutter for interrupting said laser beam, said shutters being located in said beam path directly in front of and directly behind said lasing element when said shutters are in said beam interrupting position for protecting said sensitive components against an initial laser beam surge.

that the amount of light to be absorbed at both edges of said striped channel in the vicinity of at least one of the light-emitting facets is smaller than that to be absorbed at both edges of said striped channel inside of the light-emitting facets.



ting facets is smaller than that to be absorbed at both edges of said striped channel inside of the light-emitting facets.

**4,951,289**  
**SEMICONDUCTOR LASER**  
Akihiro Shima, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 13, 1989, Ser. No. 310,370  
Claims priority, application Japan, Feb. 26, 1988, 63-45612  
Int. Cl.<sup>5</sup> H01S 3/19  
U.S. Cl. 372-46  
14 Claims

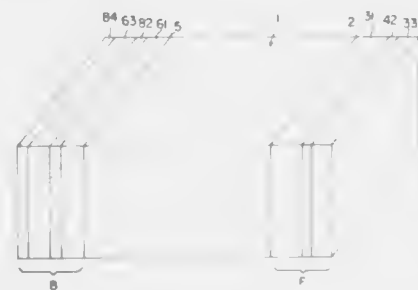


1. In a semiconductor laser, the combination comprising an active layer disposed between a first and a second cladding layer of opposite conductivity types, current confinement means including a grooved current blocking layer for confining current flow between the cladding layers and through the active layer to a longitudinal stripe region, and current leakage reduction means comprising high resistance means for creating a discontinuity in at least the active layer for suppressing transverse current flow from the stripe region of the active layer, the high resistance means comprising a pair of high resistance stripes formed on the current blocking layer, the high resistance stripes including surfaces which are positioned below the active layer but which resist crystal growth of the active layer thereon so as to form said discontinuity in the active layer.

**4,951,290**  
**SEMICONDUCTOR LASER DEVICE**  
Taiji Morimoto, Nara; Masahiro Yamaguchi, Tokai; Shinji Kaneiwa, Nara; Hiroshi Hayashi, Kyoto, and Hidenori Kawanishi, Higashiosaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Jul. 6, 1988, Ser. No. 215,619  
Claims priority, application Japan, Jul. 10, 1987, 62-173294; Jan. 19, 1988, 63-8749  
Int. Cl.<sup>5</sup> H01S 3/19  
U.S. Cl. 372-48  
2 Claims

1. In a semiconductor laser device, the combination of an active layer that constitutes a laser-oscillating resonator, and an inner-striped channel formed on a substrate in the resonating direction, light from said active layer being absorbed at both edges of said striped channel, resulting in an optical waveguide within said active layer, wherein the composition ratio of the mixed crystal constituting the edges of said striped channel in the vicinity of at least one of the light-emitting facets is different from that of the mixed crystal constituting the edges of said striped channel inside of the light-emitting facets, so

**4,951,291**  
**SEMICONDUCTOR LASER DEVICE WITH A PROTECTIVE FILM ON THE FACETS**  
Nobuyuki Miyachi, Nara; Hiroshi Hayashi, Kyoto, and Saburo Yamamoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 225,564, Jul. 28, 1988, abandoned, which is a continuation of Ser. No. 835,562, Mar. 3, 1986, abandoned. This application Apr. 7, 1989, Ser. No. 336,649  
Claims priority, application Japan, Mar. 11, 1985, 60-48961  
Int. Cl.<sup>5</sup> H01S 3/19  
U.S. Cl. 372-49  
3 Claims

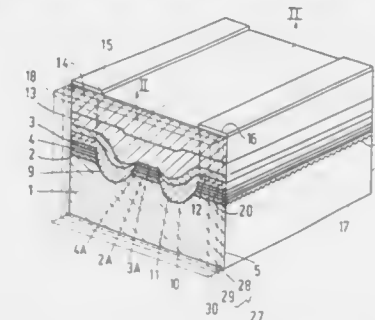


1. In a semiconductor laser device with a protective film on both the light-emitting facet and the other facet opposed to the light-emitting facet, said protective film is made of a multi-layered dielectric film composed of alternative layers consisting of at least two kinds of dielectric film, one of which is a first dielectric film of low refractive index and the other of which is a second dielectric film of high refractive index, the kind of the film which is closest to the facet being the first dielectric film, and the thickness of each layer of said multi-layered dielectric film which covers the light-emitting facet therewith being selected so as to provide a reflectivity of 30% or less to said multi-layered dielectric film which covers the light-emitting facet.

**4,951,292**  
**COATING FOR DFB/DBR LASER DIODES**  
Pieter I. Kuindersma; Wilma Van Es-Spiekman; Petrus P. G. Mols, and Ingrid A. F. M. Baele, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.  
Filed Jun. 26, 1989, Ser. No. 371,876  
Claims priority, application Netherlands, Jul. 1, 1988, 8801667  
Int. Cl.<sup>5</sup> H01S 3/19  
U.S. Cl. 372-49  
9 Claims

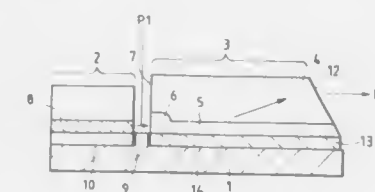
1. A semiconductor diode laser surrounded by a medium and comprising a semiconductor body having a pn junction, a layered semiconductor structure, a resonant cavity, a strip-shaped active region located within said resonant cavity for

producing coherent electromagnetic radiation during operation, the resonant cavity comprising over at least part of its length means for effecting a periodical variation in the effective refractive index in the longitudinal direction, the resonant cavity being bounded by surfaces which are substantially at right angles to the active region, at least one of said surfaces



being provided with an antireflection coating, characterized in that a phase layer is applied to the antireflection coating, whereby at least a part of the radiation transmitted by the antireflection coating is fed back into the resonant cavity, and in that means are provided for selecting the refractive index and the thickness of said layer so that a phase optimal for single mode operation is provided for the effective reflection.

**4,951,293**  
**FREQUENCY DOUBLED LASER APPARATUS**  
Kazuhisa Yamamoto, Osaka, and Tetsuo Taniuchi, Kobe, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed May 19, 1989, Ser. No. 354,324  
Claims priority, application Japan, May 26, 1988, 63-128914; Oct. 11, 1988, 63-255120  
Int. Cl.<sup>5</sup> H01S 3/19; H03F 7/00  
U.S. Cl. 372-50  
17 Claims

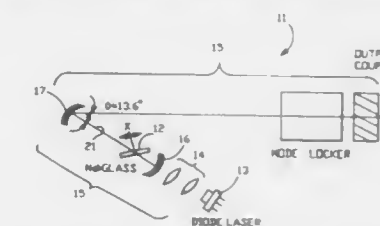


1. A laser source comprising:  
a sub mount;  
a semiconductor laser located on the sub mount and having an active layer formed at a surface thereof facing the sub mount;  
an optical nonlinear device located on the sub mount and having a waveguide formed at a surface thereof facing the sub mount;  
wherein the semiconductor laser and the waveguide are directly coupled to each other such that a fundamental wave from the semiconductor laser can be directly applied to the optical nonlinear device.

**4,951,294**  
**DIODE PUMPED MODELOCKED SOLID STATE LASER**  
Santanu Basu, Palo Alto, and Robert L. Byer, Stanford, both of Calif., assignors to The Board of Trustees of Leland Stanford, Jr. University, Stanford, Calif.  
Filed Apr. 22, 1988, Ser. No. 185,085  
Int. Cl.<sup>5</sup> H01S 3/091  
U.S. Cl. 372-75  
24 Claims

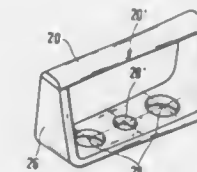
1. In a method for obtaining lasant radiation from a semicon-

ductive diode pumped member of solid state laser gain material, the steps of:  
focusing optical pumping radiation emanating from a semiconductor diode source onto a solid state member of laser gain material for optically pumping a mode volume region thereof to excite optical lasant radiation from said laser gain material;  
resonating the optical lasant radiation emanating from said



laser gain material between reflectors defining an optical resonator having an optical axis passing through the optically pumped region of said laser gain member;  
focusing the resonant lasant radiation between two concave reflectors of said optical resonator to form a beam waist within said optically pumped mode volume of said laser gain member; and  
modelocking said resonant lasant radiation within said optical resonator.

**4,951,295**  
**PREIONIZATION MEANS FOR A GAS-DISCHARGE LASER**  
Gerd Steinführer, Bovenden, Fed. Rep. of Germany, assignor to Lambda-Physik Forschungs-und Entwicklungs GmbH, Göttingen, Fed. Rep. of Germany  
Filed May 19, 1989, Ser. No. 354,142  
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819731  
Int. Cl.<sup>5</sup> H01S 3/097  
U.S. Cl. 372-86  
3 Claims

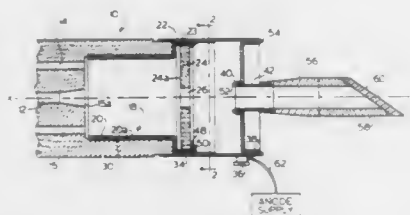


1. In a spark preionization means for use in a gas-discharge laser, the preionization means comprising:  
a stirrup member comprising a first material; and  
a preionization strip comprising a second material, secured to said stirrup member by an electrically conductive connection, wherein  
said first material is an easily-workable electrically-conductive material, and said second material is a difficulty-workable electrically-conductive material.

**4,951,296**  
**LASER ANODE CONSTRUCTION**  
William H. McMahan, Wendover, Nev., assignor to McMahan Laser Corporation, Salt Lake City, Utah  
Filed Jul. 10, 1989, Ser. No. 377,066  
Int. Cl.<sup>5</sup> H01S 3/097  
U.S. Cl. 372-87  
3 Claims

1. A gas laser construction, comprising:  
(a) a cylindrical gas laser tube formed of electrically insulat-

- ing material defining a longitudinally extending central bore for transmission of a laser beam, said tube having an anode end with an end wall portion of reduced thickness;
- (b) a cylindrical anode member formed of electrically conducting material having over a major portion of its length a first cylindrical portion serviceable as a laser anode and integral therewith a second enlarged cup shaped portion having an outer surface, said first portion of said anode member being snugly nested within said tube end wall portion with said cup shaped portion residing proximate thereto;
- (c) an open ended cylindrical shroud member formed of electrically conducting material having the inner surface of one end thereof secured to the outer surface of said tube end wall cup portion and an outer end extending therefrom;
- (d) a disc member having a central aperture providing an electrical path of high impedance and mounted within said cup shaped portion and formed of a material operative to establish an electrical discharge and heat barrier at the location of said cup shaped portion;



- (e) a cup member having a central aperture and an outer surface portion secured to an inner portion of said outer end of said shroud member and spaced lengthwise from said disc member;
- (f) a tubular structure joined to said cup member at its said central aperture and extending outwardly therefrom, said tubular structure providing an enclosed path for the laser beam and at its outermost end a support for a Brewster window;
- (g) a Brewster window mounted on said support;
- (h) an anode electrical supply connected through an anode lead to said shroud and operative when energized to establish an electrical discharge attached to said anode member; and
- (i) said tube bore, said anode member, said disc and its aperture, said cup member and its aperture and said tubular structure being arranged coaxially with the axis of the laser beam passing therethrough and in conjunction with said Brewster window forms a hermetically sealed space around said beam and during operation of said laser said anode electrical discharge is confined within said anode member and substantially prevented from migrating toward said cup member by the presence of said disc.

4,951,297

# CHEMICAL PROCESS YIELDING STIMULATED EMISSION OF VISIBLE RADIATION VIA FAST NEAR RESONANT ENERGY TRANSFER

James L. Gole, Atlanta, Ga.; James R. Woodward, Chagrin Falls, Ohio, and Stephen H. Cobb, Mayfield, Ky., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jan. 12, 1989, Ser. No. 296,512

Int. Cl.<sup>3</sup> H01S 3/095

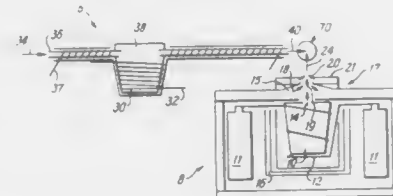
U.S. Cl. 372-89

29 Claims

1. A chemical process yielding stimulated emission of visible radiation via fast near resonant intermolecular energy transfer comprising the steps of:

- (a) providing a first source of vapor selected from the group consisting of metal and semimetal vapor to be reacted with an appropriate reactant to produce a metastable

- excited state reaction product which serves as an energy storage medium;
- (b) providing a second source of atomic vapor selected from the group consisting of metal and semimetal vapor to serve as receptor atoms to receive the energy from said metastable excited state of the reaction product;
- (c) providing a source of reactant to react with the first source of vapor generating a highly exothermic reaction which liberates energy exceeding 2.5 eV; said reactant being selected from the group consisting of ozone, nitrogen oxide, nitrogen dioxide, and halides;



- (d) chemically reacting the reactant and the first source of vapor to form metastable states of a final oxide or halide reaction product; and
- (e) transferring energy stored in the metastable states of the oxide or halide reaction product to the second source of atomic vapor serving as receptor atoms by means of near resonant energy transfer to form electronically excited receptor atoms in a population inversion relative to a lower level of excitation of said receptor atoms.

4,951,298

# CLOSED REMELTING FURNACE HAVING SEVERAL HORIZONTALLY MOVABLE FURNACE LOWER PORTIONS

Felix Müller, Biebergemünd, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

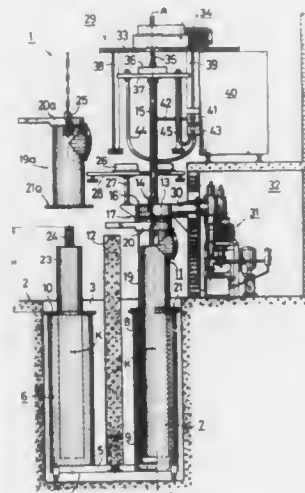
Filed Aug. 9, 1989, Ser. No. 391,958

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1989, 3917998

Int. Cl.<sup>3</sup> F27B 14/04; H05B 7/102

U.S. Cl. 373-67

13 Claims



1. Closed remelting furnace having a vertical furnace axis along which an electrode supporting rod for a consumable electrode can be moved, comprising:
- a furnace body which has a driving mechanism for an electrode supporting rod for a consumable electrode;

- a furnace upper portion including an electrode supporting rod for a consumable electrode;
- several furnace lower portions each of which includes an ingot mold which has an ingot mold axis and can individually, if desired, be aligned with the furnace axis by a lateral relative movement with respect to the furnace upper portion;
- said furnace upper portion including an upper limiting wall having a gas-tight sealed passage through which the electrode supporting rod passes;
- a device for generating a protective atmosphere and said furnace upper portion being connected therewith and in a melting position being concentrically aligned with the furnace axis and adapted to be gas-tight with one of the furnace lower portions;
- a separating groove for vertically subdividing the furnace upper portion into two partial segments, of which an upper partial segment including said upper limiting wall is configured to be short as compared to the total height of the furnace upper portion and is associated with the electrode supporting rod and of which a lower partial segment is movable out of the vicinity of the furnace axis.

4,951,299

# INTERMEDIATE MIXING GRID

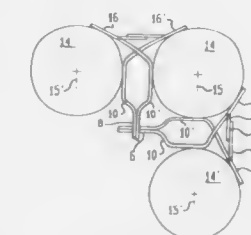
John F. Patterson, Richland; Richard H. Ewing, West Richland, and Jack Yates, Richland, all of Wash., assignors to Advanced Nuclear Fuels Corporation, Richland, Wash.

Filed Jan. 11, 1989, Ser. No. 295,966

Int. Cl.<sup>3</sup> G21C 3/34

U.S. Cl. 376-439

7 Claims



1. In a nuclear fuel assembly comprising a plurality of long, parallel fuel rods, a plurality of grid spacers distributed along said fuel rods and binding them together into a bundle, and at least one deflecting grid intermediate two of said grid spacers and adapted to deflect cooling water flowing through said assembly parallel to said fuel rods, the improvement wherein: said deflecting grid is formed of a first set of grid strips parallel to each other and extending in a first direction and a second set of grid strips parallel to each other and extending at an angle to an intersecting said first set of grid strips, at least some of said strips having deflecting means for deflecting said cooling water, said deflecting grid having no perimeter strip, each of said grid strips having at its outer ends gripping members which contact the outer-most rods of said assembly outwardly of a line connecting their centers to restrain movement of said rods; said deflecting grid being formed of double-member strips, the members of each strip being separated near their ends and bent apart so as to contact adjacent outer fuel rods of said assembly.

4,951,300

# PRECISION POSITION DETECTION DEVICE

Kazumasa Koike, Iida, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Tokyo, Japan

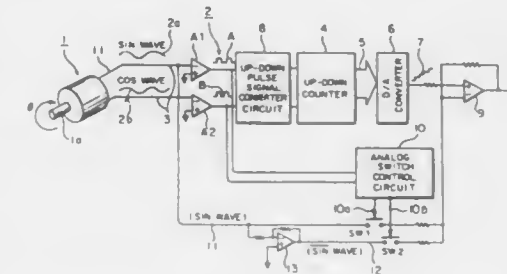
Filed Mar. 31, 1989, Ser. No. 332,528

Claims priority, application Japan, Dec. 1, 1988, 63-32180

Int. Cl.<sup>3</sup> G06M 3/00; G01R 25/08

U.S. Cl. 377-17

1 Claim



1. A precision position detection device comprising an encoder for outputting two-phase incremental position detection signals of SIN and COS waveforms, a pair of comparators for waveforming said two-phase incremental position detection signals into rectangular wave signals, an inverting amplifier for obtaining an inverted waveform of said SIN wave, an up/down pulse signal converter for converting said rectangular wave signals into up/down directive pulses, an up/down counter for receiving said directive pulses and outputting absolute digital signals, a digital to analog (D/A) converter for converting said absolute digital signals into analog position signals in the form of step signals, and an analog switch control circuit for receiving said rectangular wave signals and said absolute digital signals and summing said SIN wave and SIN wave to said analog position signals, said analog position signals obtained in synchronism with the rising and falling edges of the rectangular wave signal corresponding to said COS wave being summed to said SIN and SIN waves to produce precision analog position detection signal.

4,951,301

# TTL TECHNOLOGY DIGITAL TIMING UNIT

Ferruccio Zulian, Cornaredo, Italy, assignor to BULL HN Information Systems Italia S.p.A., Milan, Italy

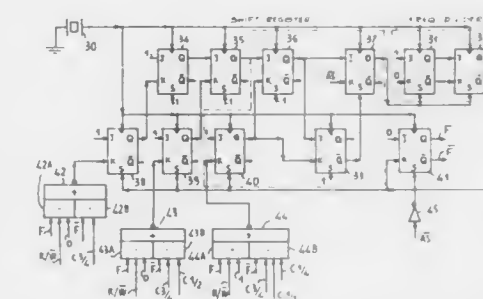
Filed Jun. 1, 1987, Ser. No. 56,915

Claims priority, application Italy, Jun. 10, 1986, 20731 A/86

Int. Cl.<sup>3</sup> H03K 23/54, 5/153, 5/13

U.S. Cl. 377-54

4 Claims



1. Timing unit for generating a timing signal for a data processing system using a synchronous microprocessor, said tim-



ing unit being capable of generating said timing signal with a normal timing period P and being capable of selectively modifying said period P by introducing wait states equal to  $\frac{1}{2}$  of said period P comprising:

- an oscillator for generating a clock signal having period equal to  $\frac{1}{2}$  P;
- a switching frequency divider, triggered by said clock signal and having a first switching control input for receiving a mask signal having one of two logic levels, the switching of said frequency divider being enabled when said mask signal is at a first logic level, thereby generating said timing signal with period P, the switching of said frequency divider being inhibited by said mask signal at the second logic level, thereby introducing said wait states in said period;
- a shift register, triggered by said clock signal and having a first input for receiving said timing signal and a second input for receiving a first control signal having one of two logic levels, said shift register providing at the output thereof said mask signal at said first level when said control signal is at a first logic level, and providing in output said mask signal at said second level for a duration equal to  $\frac{1}{2}$  P and in preestablished phase relation as to said timing signal, when said first control signal is at a second logic level, said frequency divider and said shift register being composed of JK flip flops cascade connected, each connection between output of one of said flip flops and input of another of said flip flops being direct, without interposition of any logical element.

4,951,302

**CHARGE-COUPLED DEVICE SHIFT REGISTER**

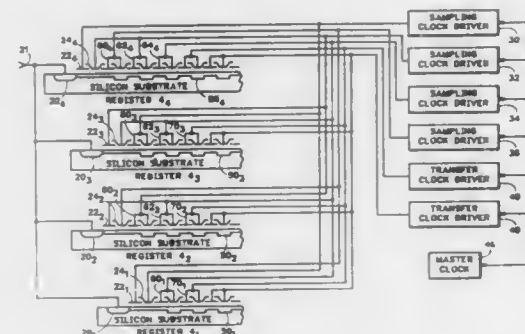
Joseph R. Peter, and Raymond Hayes, both of Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 30, 1988, Ser. No. 213,554

Int. Cl.<sup>5</sup> H03K 23/46, 5/159; G11C 11/34

U.S. Cl. 377-57

4 Claims



1. A shift register comprising four serial registers each having an input section for providing a sequence of charge samples, the four sequences of charge samples provided by the input sections of the four serial registers respectively being offset in phase relative to each other by 90° within the cycle of a clock signal, a transfer section, and a lead-in section disposed between the input section and the transfer section, and at least one of the serial registers comprising:

- at least first lead-in gate means and second lead-in gate means over the lead-in section, the second lead-in gate means being between the first lead-in gate means and the transfer section, and
  - means for driving the first lead-in gate means and the second lead-in gate means each at the frequency of the clock signal, the drive signal applied to the second lead-in gate means being retarded in phase relative to that applied to the first lead-in gate means by 90° within the cycle of the clock signal.
- wherein a first serial register comprises first lead-in gate

means, a second serial register and a third serial register each comprise first lead-in gate means and second lead-in gate means, and a fourth serial register comprises first lead-in gate means, second lead-in gate means and third lead-in gate means.

4,951,303

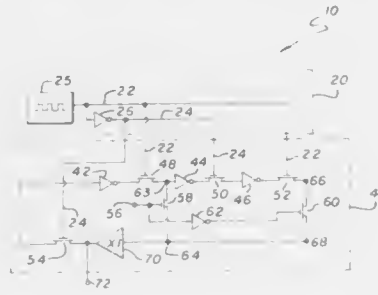
**HIGH SPEED DIGITAL PROGRAMMABLE FREQUENCY DIVIDER**

Lawrence E. Larson, 822 19th St., Santa Monica, Calif. 90403  
Filed Oct. 31, 1988, Ser. No. 264,935

Int. Cl.<sup>5</sup> H03K 23/44, 23/48

U.S. Cl. 377-110

3 Claims



1. A high speed frequency divider comprising: means for providing a periodic input waveform having a first period on a first line and the complement thereof on a second line and
- a clocked ring oscillator including first, second, third and fourth transmission gates connected in a series relation, each having an input terminal, with the input terminals of said first and third gates being connected to said second line and the input terminals of said second and fourth gates being connected to said first line,
- first, second and third inverters connected between said first and second gates, said second and third gates, and said third and fourth gates respectively, said first inverter connected to a first terminal of said first gate and said third inverter being connected to a first terminal of said fourth gate,
- a first switch having a first terminal connected to the junction between said second gate and said second inverter,
- a second switch having a first terminal connected to a second terminal of said fourth gate, a second terminal of said first switch connected to a second terminal of said second switch,
- a buffer connected between the second terminals of said first and second switches and a second terminal of said first gate, said output of said buffer providing the output of said oscillator and
- means for applying complementary inputs to said first and second switches.

4,951,304

**FOCUSED X-RAY SOURCE**

Melvin A. Piestrup, Woodside; David G. Boyers, Mountain View; Cary I. Pincus, Sunnyvale, and Pierre Maccagno, Stanford, all of Calif., assignors to Adelphi Technology Inc., Palo Alto, Calif.

Filed Jul. 12, 1989, Ser. No. 378,907

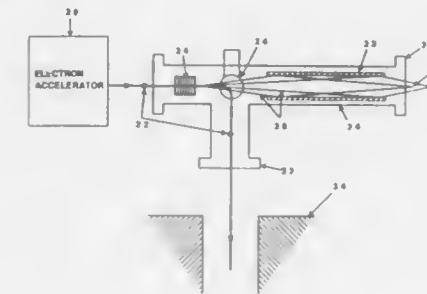
Int. Cl.<sup>5</sup> G21K 1/00

U.S. Cl. 378-119

5 Claims

1. An apparatus for generating high intensity X-rays comprising: X-ray means for generating conical X-rays having a directional axis by transition radiation;

focusing means for focusing said X-rays having grazing-angle optics; and



a housing means for holding said focusing means, an optical medium for the apparatus, and said X-ray means.

4,951,305

**X-RAY GRID FOR MEDICAL RADIOGRAPHY AND METHOD OF MAKING AND USING SAME**

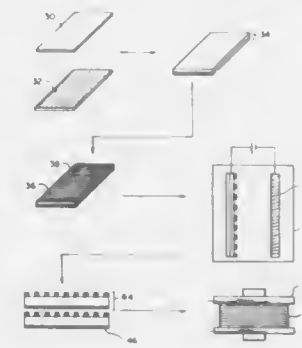
William E. Moore, Macedon, and David J. Steklenski, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,238

Int. Cl.<sup>5</sup> G21K 1/02, 1/00; G02B 5/13

U.S. Cl. 378-147

24 Claims



1. An X-ray collimating grid characterized by: a plurality of grid patterns of x-ray opaque material formed on sheets of flexible x-ray transparent material, arranged in a stack such that the grid patterns are in alignment and spaced apart from one another.

4,951,306

**X-RAY CASSETTES**

Frank W. Keene, Jr., Fairport, and Jeffrey C. Robertson, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 22, 1989, Ser. No. 369,810

Int. Cl.<sup>5</sup> G03B 42/04

U.S. Cl. 378-187

4 Claims

1. A cassette for holding sheet film during exposure to X-radiation, comprising: a first panel intended to face towards a source of X-rays and formed of fiber-reinforced plastics material; a second panel intended to face away from the source of X-rays;
- hinge means connecting said first and second panels for movement between an open condition in which a film sheet may be disposed between the panels, and a closed condition in which the panels overlies one another and the film sheet is disposed between the panels;
- latch means associated with the panels for releasably securing the panels in the closed condition, said latch means being disposed at the middles of the sides of the panels opposite said hinge means;
- intensifying screens associated one with each of said panels; a pad of resilient material between each of said intensifying screens and its associated panel;
- both said panels being so formed that when in the open condition each exhibits generally cylindrical curvature about an axis parallel to said hinge with their convex surfaces facing one another;
- said first panel having regions departing from the cylindrical and being curved out of the cylindrical towards the other panel, whereby while the cylindrical curvature is convex towards the second panel, the said regions exhibit same concavity towards the second panel.

**METHOD AND APPARATUS FOR RECORDING TELEPHONE MESSAGES**

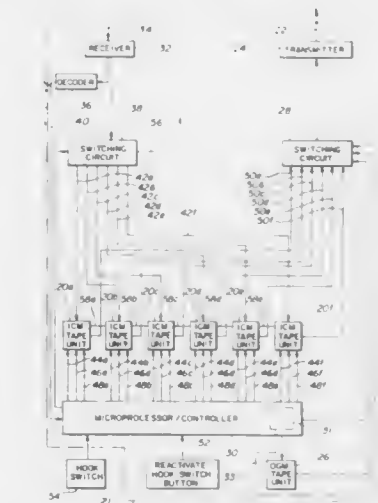
Dan E. Willard, 55 Blessing Road, Slingerlands, N.Y. 12159

Filed Jul. 13, 1989, Ser. No. 379,640

Int. Cl.<sup>5</sup> H04M 1/65

U.S. Cl. 379-74

34 Claims



25. An automatic telephone answering system comprising: a housing;
- signal receiving means disposed in said housing and connectable to an incoming telephone line for receiving incoming telephone signals, including ringing signals, touch tone frequencies and voice-frequency signals;
- decoding means disposed in said housing and operatively connected to said signal receiving means for decoding said incoming telephone signals;
- a plurality of tape recording units disposed in said housing;
- switching means disposed in said housing and operatively tied at an input end to said receiving means and at an output side to each of said tape recording units for selecting the panels in the closed condition, said latch means being disposed at the middles of the sides of the panels opposite said hinge means;
- intensifying screens associated one with each of said panels; a pad of resilient material between each of said intensifying screens and its associated panel;
- both said panels being so formed that when in the open condition each exhibits generally cylindrical curvature about an axis parallel to said hinge with their convex surfaces facing one another;
- said first panel having regions departing from the cylindrical and being curved out of the cylindrical towards the other panel, whereby while the cylindrical curvature is convex towards the second panel, the said regions exhibit same concavity towards the second panel.

tively routing incoming voice-frequency signals to said tape recording units;  
processing means disposed in said housing and operatively connected to said decoding means, to said switching means and to said tape recording units for operating said switching means to connect a selected one of said tape recording units to said receiving means and for activating said selected one of said tape recording units in response to a signal from said decoding means encoding the identity of said selected one of said tape recording units;  
signal transmitting means disposed in said housing and connectable to an outgoing telephone line for transmitting voice frequency signals over said outgoing line; and  
message storage means disposed in said housing and operatively connected to said processing means and said signal transmitting means for feeding thereto, in response to an enabling signal from said processing means, a prerecorded voice-frequency message indicating to a caller the identities of individuals and associated touch tone digits assigned to respective ones of said plurality of tape recording units.

4,951,308

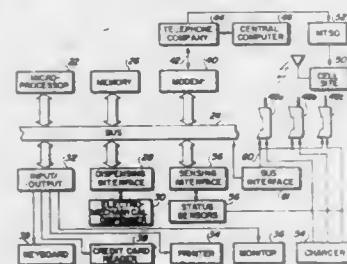
### AUTOMATED VENDING OF CELLULAR HAND-HELD TELEPHONES AND CELLULAR TELEPHONE SERVICES

Ronald D. Bishop, Irvine; Dana W. McClure, El Toro, and John A. Storch, Santa Ana, all of Calif., assignors to Cellular Communications Corporation, Houston, Tex.

Filed Dec. 29, 1988, Ser. No. 291,944  
Int. Cl.<sup>5</sup> H04M 1/57

U.S. Cl. 379-91

18 Claims



1. An apparatus for vending mobile telephones that include memory capability comprising:

- a microprocessor;
- a bus coupled to said microprocessor;
- a memory coupled to said microprocessor;
- storage means for holding a plurality of mobile telephone units;
- dispensing means for selectively dispensing one of said plurality of mobile telephone units from said storage means, said dispensing means being electrically coupled to said bus and thence to said microprocessor memory;
- input/output means coupled to said bus for communicating with said microprocessor with interactive communication with said microprocessor for selective control of said dispensing means; and
- bus connection means for electrically coupling through said plurality of mobile telephone units within said storage means, said bus connection means coupled to said bus for allowing selective communication between the memory of each of said plurality of mobile telephone units and said microprocessor to determine the identity and usage of each mobile telephone, whereby mobile telephone units are automatically dispensed and billed.

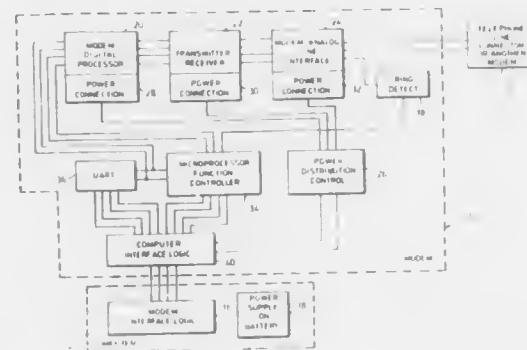
4,951,309  
POWER-DOWN MODEM

Allen E. Gross, Carrollton; Said S. Saadeh, Plano, and Lee F. McCrocklin, Carrollton, all of Tex., assignors to Compaq Computer Corporation, Houston, Tex.

Filed Oct. 14, 1988, Ser. No. 257,953  
Int. Cl.<sup>5</sup> H04M 11/00

U.S. Cl. 379-98

6 Claims



1. Apparatus for communication of data signals between a telephone network and a data terminal, comprising: a first interface connectable to the telephone network; a second interface connectable to the data terminal; means, including a digital signal processor and an analog receiver/transmitter, for providing modulation and demodulation to data signals being passed between the first and second interfaces in a state of modem activity; a power distribution controller providing operating power to the modulation and demodulation means; and a function controller monitoring modem activity and causing the power distribution controller to remove operating power from the modulation and demodulation means upon determining an absence of activity in the digital signal processor, in the analog receiver/transmitter, and on the telephone network; the function controller being responsive to an interrupt signal from the second interface to cause operating power to be reapplied to the modulation and demodulation means, the power distribution controller removing and reapplying operating power to the modulation and demodulation means without interruption of a supply of power to the data terminal.

4,951,310

### AUTOMATIC CALL DISTRIBUTION SYSTEM

Yosuke Honda, and Takako Akazawa, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

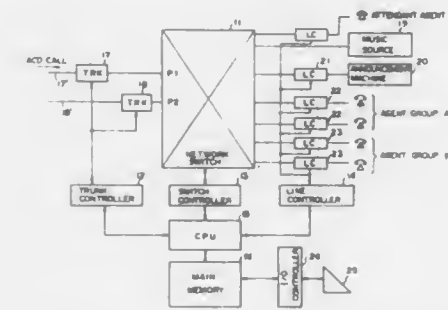
Filed May 16, 1989, Ser. No. 352,501  
Claims priority, application Japan, May 19, 1988, 63-120663  
Int. Cl.<sup>5</sup> H04M 3/50

U.S. Cl. 379-266

30 Claims

1. An automatic call distribution system comprising: a network switch having a plurality of pilot extensions; a plurality of agents split into a plurality of agent groups; trunk means, provided for each of said pilot extensions and connected to said network switch, for receiving a call terminating at a related one of said pilot extensions; line circuit means, provided for each of said agents and connected to said network switch, for coupling a related one of said agents to said network switch; memory means for storing a route table provided for each of said pilot extensions, said route table defining some agent groups among said plurality of agent groups to be connected to a corresponding one of said pilot extensions; and control means, coupled to said trunk means, said network switch, said line circuit means, and said memory means,

for seeking an idle agent relating to said agent groups defined by the corresponding one of said route tables and



for establishing a route between said call and said sought idle agent through said trunk means, said network switch, and said line circuit means.

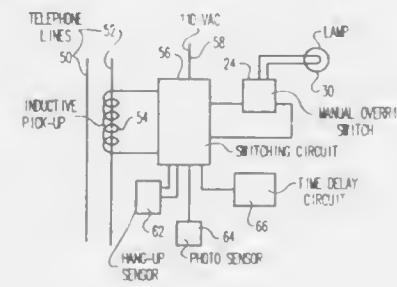
4,951,311  
TELEPHONE CALL INDICATOR

Kevin K. Sterr, P.O. Box 176, S. Milwaukee St., Theresa, Wis. 53091

Filed Jul. 10, 1989, Ser. No. 377,127  
Int. Cl.<sup>5</sup> H04M 1/00

U.S. Cl. 379-376

4 Claims



1. A telephone call indicator, comprising: a telephone connected to a telephone signal line; inductive sensing means for sensing an incoming call signal on said telephone line; photosensor means for sensing ambient light adjacent said telephone; current sensing means operably connected for sensing output current of said photosensor means; lamp means; switching means operably connected to said current sensing means, said inductive sensing means and said lamp means for energizing said lamp means upon detection of an incoming call on said telephone line only when ambient light adjacent said telephone is below a predetermined level; user actuated means for adjusting said predetermined level; hang-up sensor means operatively connected to said inductive sensing means for detecting disconnection of a call; time delay means operatively connected with said hang-up sensor means and said lamp means for de-energizing said lamp means at a predetermined time interval after disconnection of a call on said telephone line; user actuated means for adjusting said predetermined time interval; and manual override switching means for selectively energizing or de-energizing said lamp means independently of said signal sensing means and said photosensor means, without disabling said telephone call indicator.

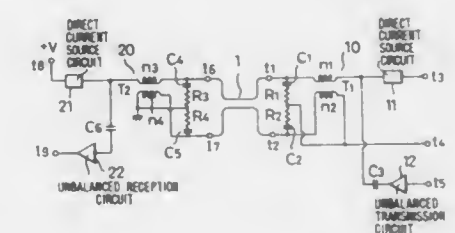
4,951,312  
BALANCED TRANSMISSION DEVICE

Yoshihiro Tanikawa; Yoshikazu Minakuchi, and Yoshiaki Ueno, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Apr. 27, 1989, Ser. No. 343,671  
Int. Cl.<sup>5</sup> H04M 19/00; H04B 3/30

U.S. Cl. 379-394

6 Claims



1. A balanced transmission device for a superposed transmission with noise influence restrained by means of a high impedance, the device comprising two parallel cables, superposed transmission means which superposes alternating current signals on a direct current source means and transmits them through said parallel two-wire cables, a pair of equal value, series connected impedance means connected respectively between a pair of terminals to which said two parallel cables are connected and an earthing point at a junction of the impedance means, and transformer means as a high impedance element, the transformer means including a pair of windings wound in the same direction, each winding having corresponding polarity first and second ends, the first ends being connected to said terminals, the second end of one of said windings being connected to said direct current source means and the second end of the other winding being connected to said earthing point.

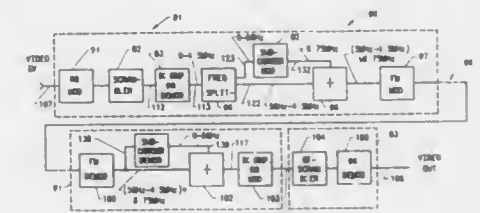
4,951,313  
SCRAMBLED FREQUENCY MODULATED VIDEO SIGNAL TRANSMISSION SYSTEM

Hermann Gysel, San Jose, Calif., assignor to Synchronous Communications, Inc., San Jose, Calif.

Filed Dec. 7, 1989, Ser. No. 447,363  
Int. Cl.<sup>5</sup> H04K 1/00

U.S. Cl. 380-10

38 Claims

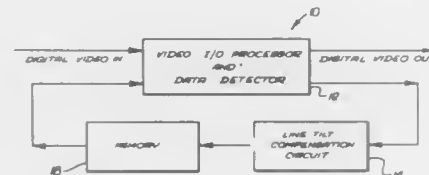


1. A scrambled FM video signal transmission system comprising: means responsive to a scrambled amplitude modulated video signal for removing the amplitude modulation therefrom, said removing means providing a scrambled video signal, said scrambled video signal having low and high frequency components therein; means responsive to said scrambled video signal for separating said low frequency components from said high frequency components therein; means responsive to said low frequency components for modulating a sub-carrier, said sub-carrier modulating means providing a modulated sub-carrier signal; means responsive to said modulated subcarrier signal and



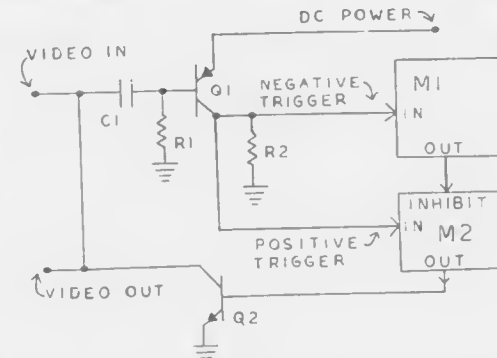
said high frequency components in said scrambled video signal for providing a scrambled frequency modulated video signal; and  
means responsive to said scrambled frequency modulated video signal for restoring said scrambled amplitude modulated video signal.

**4,951,314**  
**LINE TILT COMPENSATION METHOD AND APPARATUS**  
Gregory A. Shreve, Redondo Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.  
Filed Sep. 9, 1985, Ser. No. 773,488  
Int. Cl. H04N 7/167  
U.S. Cl. 380-14 20 Claims



1. A line tilt compensation method that compensates for line tilt in the active portions of video lines, comprising the steps of: measuring the amplitude of the line tilt in the active portion of a video line;  
generating a complementary ramp based on the measured amplitude; and  
summing the complementary ramp with the active portion of at least one of the video lines.

**4,951,315**  
**VIDEO SIGNAL NOISE EVALUATION AND REMOVAL CIRCUIT**  
Henry N. Switsen, 17236 Bircher St., Granada Hills, Calif. 91344  
Filed Dec. 30, 1988, Ser. No. 292,424  
Int. Cl. H04N 7/167  
U.S. Cl. 380-15 12 Claims



4. A circuit to remove unwanted extra pulses occurring between the normal horizontal sync pulses anywhere in the total field of a video signal, comprising:  
a sync separator first means normally passing the horizontal sync pulses, and blocking the serrations of the vertical sync pulses;  
a second means responsive to said first means that has an output to activate a third means only when said extra pulses are present between said normal horizontal sync pulses; and  
a said third means responsive to said second means to substantially remove said extra pulses from said video signal while activated, whereby said extra pulses cannot disturb equipment processing said video signal.

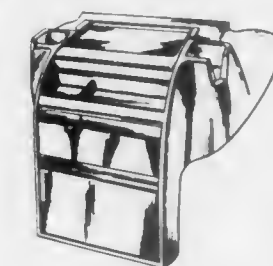
## DESIGNS

AUGUST 21, 1990

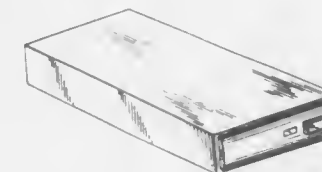
**309,975**  
**COMBINED EYEGLASS AND CONTACT LENS CASE**  
Mary Salmon Lake, 1332 Farrell St., Vallejo, Calif. 94590  
Filed Jan. 12, 1987, Ser. No. 2,343  
Term of patent 14 years  
U.S. Cl. D3-34



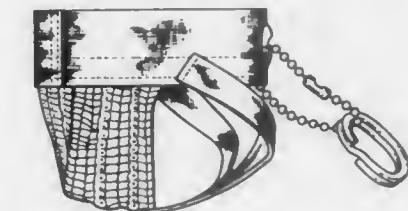
**309,978**  
**CENTER CONSOLE FOR VEHICLE**  
William J. Fluharty, Holland, Mich., assignor to Prince Corporation, Holland, Mich.  
Filed Jul. 2, 1987, Ser. No. 69,599  
Term of patent 14 years  
U.S. Cl. D3-40



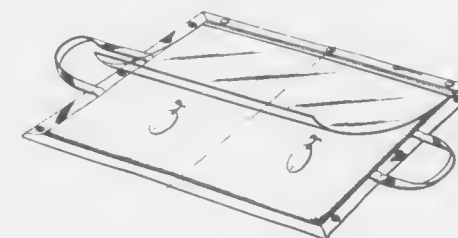
**309,976**  
**CONTAINER FOR CASSETTES**  
Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Chur, Switzerland  
Filed Nov. 26, 1986, Ser. No. 935,579  
Claims priority, application World Int. Prop. O., May 30, 1986, DM/006989  
Term of patent 14 years  
U.S. Cl. D3-35



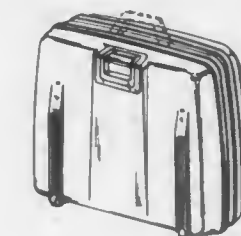
**309,979**  
**NOVELTY KEY CHAIN**  
James Wagner, Jensen Beach, and Donna Laihn, Port St. Lucie, both of Fla.  
Filed Dec. 22, 1987, Ser. No. 136,840  
Term of patent 14 years  
U.S. Cl. D3-65



**309,977**  
**FOLDABLE FISHING LURE HOLDER**  
Carl J. Whittier, 11 Marion Street, Caledon East, Ontario, Canada (L0N 1E0)  
Filed Jun. 2, 1987, Ser. No. 56,973  
Claims priority, application Canada, Dec. 2, 1986, 02-12-86-1  
Term of patent 14 years  
U.S. Cl. D3-38



**309,980**  
**LUGGAGE CASE**  
William L. King, Denver, Colo., assignor to Samsonite Corporation, Denver, Colo.  
Filed Mar. 30, 1987, Ser. No. 32,160  
Term of patent 14 years  
U.S. Cl. D3-72



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309,981

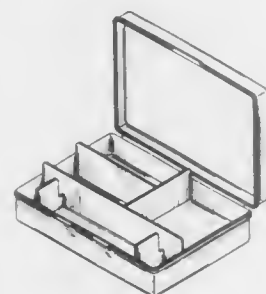
STORAGE CASE

Diana J. French, and Charlotte M. Oda, both of 2009 Linden Lake Rd., Fort Collins, Colo. 80524

Filed May 27, 1987, Ser. No. 54,614

Term of patent 14 years

U.S. Cl. D3—74



309,982

SMALL RIGID PORTABLE COMPARTMENTED CASE

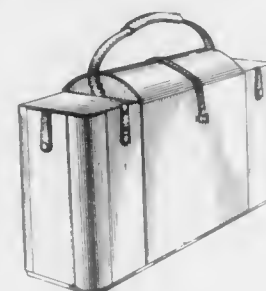
Maria Boitani, Via Bissolati, No. 54, Rome 00187, Italy

Filed Apr. 21, 1987, Ser. No. 41,738

Claims priority, application Italy, Oct. 31, 1986, 36221/86[U]

Term of patent 14 years

U.S. Cl. D3—74



309,983

WRITING CASE

Toshiaki Nakata, Tokyo, Japan, assignor to Plus Corporation, Tokyo, Japan

Filed Jan. 12, 1987, Ser. No. 2,683

Claims priority, application Japan, Jul. 15, 1986, 61-27640

Term of patent 14 years

U.S. Cl. D3—74



309,984

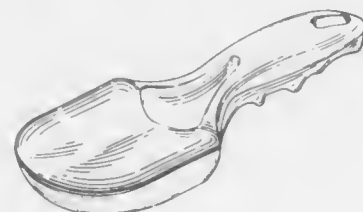
UTILITY BRUSH BLOCK AND HANDLE UNIT

Eric Gingras, Cross Junction, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.

Filed Dec. 3, 1987, Ser. No. 128,515

Term of patent 14 years

U.S. Cl. D4—138



309,985

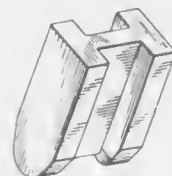
PICTURE FRAME JOINING DEVICE

Eugene J. Cox, Richmond, Va., assignor to Thumbnail Company, Bellingham, Wash.

Filed Feb. 19, 1987, Ser. No. 16,236

Term of patent 14 years

U.S. Cl. D6—300



309,986

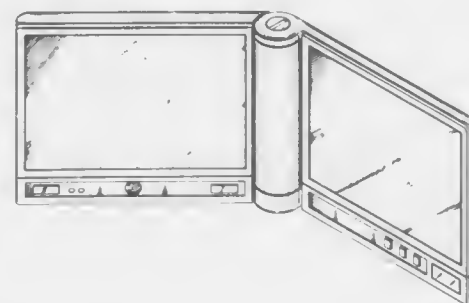
PHOTOSTAND

Seiji Sakai, No. 405, Kohno Mansions, 3-29-21 Ohmori Kita, Ohta-ku, Tokyo, Japan

Filed Jul. 17, 1987, Ser. No. 75,029

Term of patent 14 years

U.S. Cl. D6—308



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U.S. PATENT AND TRADEMARK OFFICE

1971

309,987

ROCKING CHAIR

Edward H. Dodd, III, R3/1281 Windmill Hill, Putney, Vt. 05346

Filed Aug. 4, 1987, Ser. No. 81,279

Term of patent 14 years

U.S. Cl. D6—347



309,988

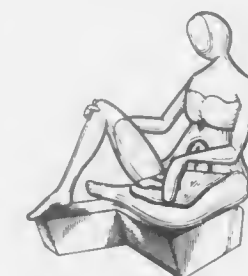
CHAIR

Matthew R. Oscar, 111-09 76 Rd., Apt. B4, Forest Hills, N.Y. 11375

Filed Mar. 18, 1987, Ser. No. 27,663

Term of patent 14 years

U.S. Cl. D6—359



309,989

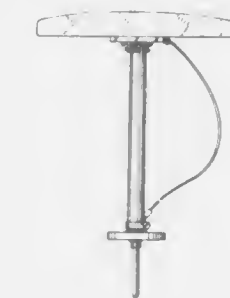
PORTABLE STOOL FOR USE PRIMARILY BY HUNTSMAN

Kenneth O. Gotts, 515 Fairfield Rd., Ypsilanti, Mich. 48197

Filed Jul. 13, 1987, Ser. No. 72,994

Term of patent 14 years

U.S. Cl. D6—364



309,990

ARMCHAIR

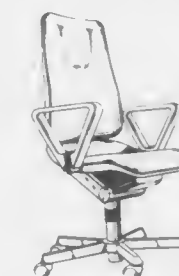
Hans von Klier, Milan, Italy, and Fredi Dubach, Bäretswil, Switzerland, assignors to Drabert Sohne GmbH &amp; Co., Minden, Fed. Rep. of Germany

Filed Aug. 7, 1987, Ser. No. 82,716

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 6a AR 12/87

Term of patent 14 years

U.S. Cl. D6—366



309,991

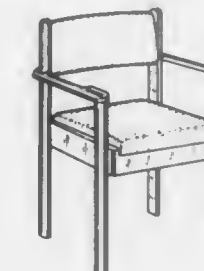
ARM CHAIR

Virgil Miller, Archbold, Ohio, assignor to Sauder Manufacturing Co., Archbold, Ohio

Filed Mar. 30, 1987, Ser. No. 31,123

Term of patent 14 years

U.S. Cl. D6—380



309,992

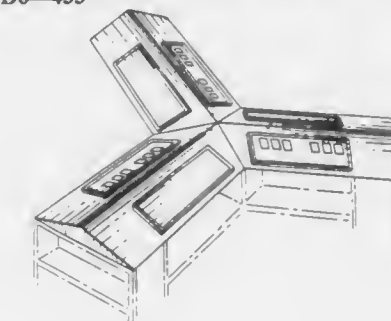
HEADER FOR A MERCHANDISING DISPLAY STAND OR THE LIKE

William Prendergast, Park Ridge, N.J., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Dec. 5, 1986, Ser. No. 938,777

Term of patent 14 years

U.S. Cl. D6—455





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FURNITURE PEDESTAL OR SIMILAR ARTICLE  
Frank Miklos, 11918 Avon Way, No. 204, Los Angeles, Calif. 90066

Filed Aug. 3, 1987, Ser. No. 80,688  
Term of patent 14 years

U.S. Cl. D6—495



309,995

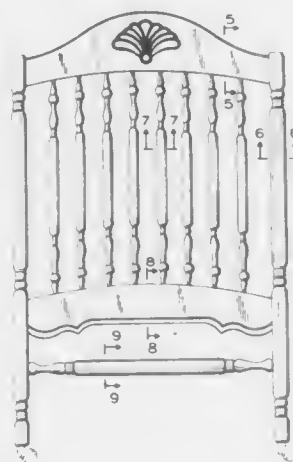
CRIB FOOTBOARD

Merlin A. Brunner, New London, and Harvey J. Draheim, Weyauwega, both of Wis., assignors to Simmons Juvenile Products Company, Inc., New London, Wis.

Filed Jul. 20, 1987, Ser. No. 75,917

Term of patent 14 years

U.S. Cl. D6—508



309,994

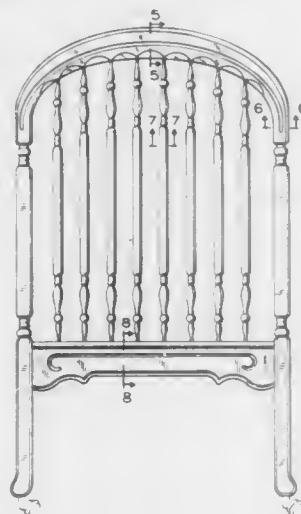
CRIB FOOTBOARD

Merlin A. Brunner, New London, and Harvey J. Draheim, Weyauwega, both of Wis., assignors to Simmons Juvenile Products Company, Inc., New London, Wis.

Filed Jul. 20, 1987, Ser. No. 75,922

Term of patent 14 years

U.S. Cl. D6—508



309,996

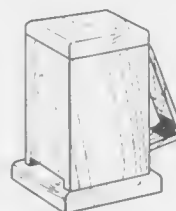
DISPENSER FOR PROPHYLACTICS

Thomas J. Gearing, 1701 Franklin St., San Francisco, Calif. 94109, assignor to Thomas J. Gearing, San Francisco, Calif.

Filed May 22, 1987, Ser. No. 53,419

Term of patent 14 years

U.S. Cl. D6—515



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U.S. PATENT AND TRADEMARK OFFICE

1973

309,997

COMBINED WALL-MOUNTED CABINET AND  
CONSOLE FOR BUSINESS AND HOME PLANNING  
ORGANIZATION SYSTEMS

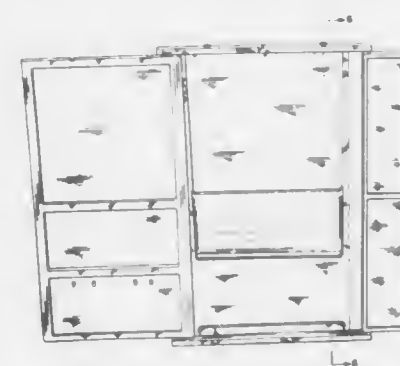
Bjarne B. Andersen, Holte, Denmark, assignor to Glen Ernest  
Ion, Monte Carlo, Monaco

Filed May 14, 1987, Ser. No. 49,413

Claims priority, application Denmark, Nov. 14, 1986, U.S. Cl. D6—583  
11571986

Term of patent 14 years

U.S. Cl. D6—561



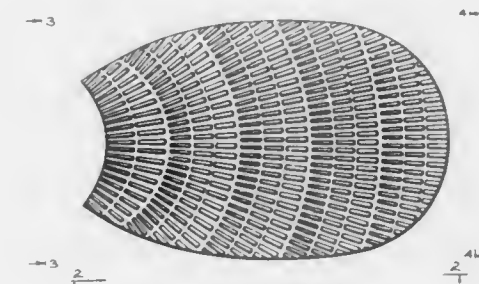
309,999

NON-SLIP SURFACE UNIT FOR BATHTUBS OR THE  
LIKE

Thomas W. Hillebrand, Janesville, Wis., assignor to Kohler Co.,  
Kohler, Wis.

Filed Apr. 30, 1986, Ser. No. 858,300

Term of patent 14 years



309,998

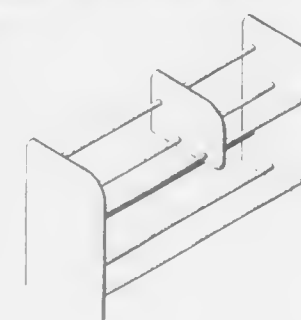
COMPACT DISC STORAGE RACK OR SIMILAR  
ARTICLE

K. Drew Sumrell, 127 Seven Oaks; Don R. Blair, Box 19 -  
Deerfield Estates, and Martha J. Sumrell, 127 Seven Oaks, all  
of Boone, N.C. 28607

Filed Jul. 24, 1987, Ser. No. 85,817

Term of patent 14 years

U.S. Cl. D6—567



310,000

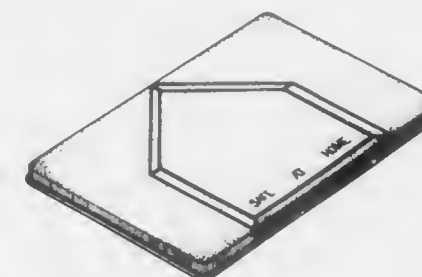
FLOOR MAT

Robert J. Livingstone, 23046 Ithaca, and Daniel K. Griffin,  
23111 Rosewood, both of Oak Park, Mich. 48237

Filed Jan. 27, 1987, Ser. No. 7,438

Term of patent 14 years

U.S. Cl. D6—583



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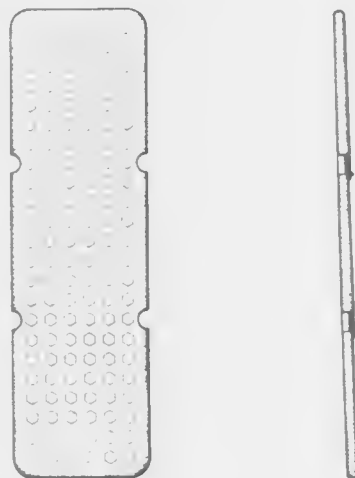
OFFICIAL GAZETTE

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310,001  
FITTED TERRY CLOTH ADJUSTABLE LOUNGE CHAIR  
COVER

Mary K. Harris, 1317 Greene St., Jasper, Ind. 47546  
Filed Nov. 30, 1987, Ser. No. 126,683

Term of patent 14 years  
U.S. Cl. D6—611

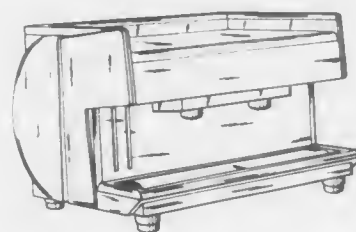


310,002  
COFFEE MACHINE CASING

Bruno Rossio, Milan; Giuseppe Bossi, Legnano, and Francesco Roggero, Milan, all of Italy, assignors to Rancilio Macchine Per Caffè S.p.A., Milan, Italy

Filed Mar. 11, 1987, Ser. No. 24,786  
Claims priority, application Italy, Sep. 26, 1986, 23218-B/86[U]

Term of patent 14 years  
U.S. Cl. D7—308



AUGUST 21, 1990

U.S. PATENT AND TRADEMARK OFFICE

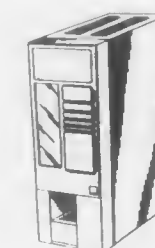
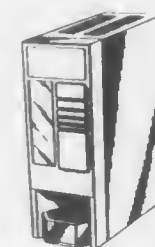
1975

310,003  
COFFEE MACHINE

Alan M. King, Montreal, Canada, assignor to Vendking International LTEE, Ville Lemoyne, Canada

Filed Jan. 16, 1987, Ser. No. 3,906  
Claims priority, application Canada, Oct. 10, 1986, 10-10-86-1

Term of patent 14 years  
U.S. Cl. D7—309

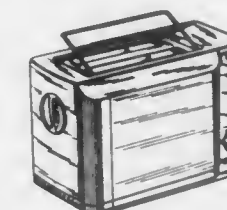
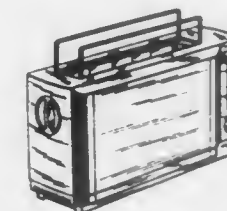


310,004  
COMBINED TOASTER AND BUN WARMING RACK

Günter Storsberg, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

Filed Oct. 14, 1987, Ser. No. 108,505  
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1987, 5 MR 9762

Term of patent 14 years  
U.S. Cl. D7—329

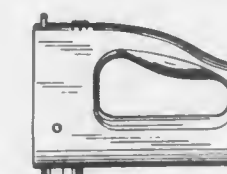


310,005  
PORTABLE ELECTRIC STIRRER

Hans J. Precht, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

Filed Apr. 20, 1987, Ser. No. 40,328  
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1986, 5MR9709

Term of patent 14 years  
U.S. Cl. D7—379





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310,006

**SHAKER FOR FOOD MATERIAL IN POWDERED FORM**

Ambrogio Rossari, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy

Filed Jul. 15, 1987, Ser. No. 73,419

Claims priority, application Italy, Jan. 20, 1987, 20546/87[U]

Term of patent 14 years

U.S. Cl. D7—596



310,009

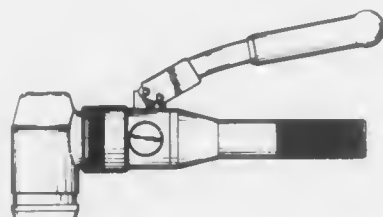
**HYDRAULIC PUNCH DRIVER**

Edward S. Freiwald, Rockford, Ill., assignor to Greenlee Textron Inc., Rockford, Ill.

Filed Nov. 17, 1987, Ser. No. 121,732

Term of patent 14 years

U.S. Cl. D8—67



310,007

**PORTABLE ELECTRIC SANDER**

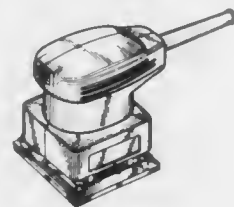
Toshiaki Saito, Tokyo, and Toshimitsu Hashii, Hiroshima, both of Japan, assignors to Ryobi Ltd., Hiroshima, Japan

Filed Nov. 20, 1987, Ser. No. 123,477

Claims priority, application Japan, May 21, 1987, 62-20059

Term of patent 14 years

U.S. Cl. D8—62



310,008

**CORDLESS RECIPROCATING SAW**

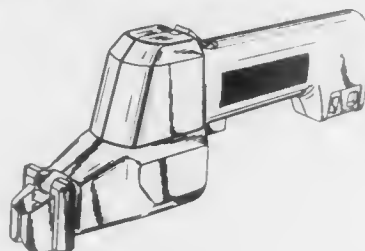
Ulrich Reiferscheld, Ravensburgh, Fed. Rep. of Germany, and Daniel Bone, Langley Moor, England, assignors to Black &amp; Decker Inc., Newark, Del.

Filed Dec. 23, 1987, Ser. No. 137,446

Claims priority, application United Kingdom, Jul. 10, 1987, 1043380

Term of patent 14 years

U.S. Cl. D8—64



310,010

**CLEARING SAW HARNESS**

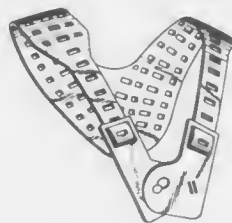
Erik O. Panth, Östhammar, Sweden, assignor to Panth-Produkt AB, Sweden

Filed Nov. 12, 1986, Ser. No. 929,663

Claims priority, application Sweden, May 12, 1986, 861171

Term of patent 14 years

U.S. Cl. D8—71



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U.S. PATENT AND TRADEMARK OFFICE

1977

310,011

**SCREWDRIVER**

Horst Holland-Letz, Neustadt, Fed. Rep. of Germany, assignor to Felo-Werkzeugfabrik - Holland-Letz GmbH, Neustadt, Fed. Rep. of Germany

Filed Sep. 8, 1987, Ser. No. 94,526

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, MR446

Term of patent 14 years

U.S. Cl. D8—82



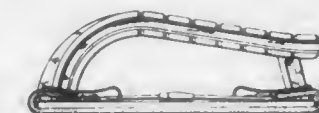
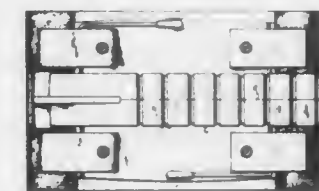
310,013

**HAND-HELD SANDER**

Philip B. Watson, Martinez, Ga., assignor to Gilt, Inc., Wrens, Ga.

Filed Jan. 15, 1988, Ser. No. 144,491

Term of patent 14 years



310,014

**POCKET KNIFE**

Michael J. Inman, 11241 Campbell, Riverside, Calif. 92505

Filed Apr. 27, 1987, Ser. No. 43,245

Term of patent 14 years

U.S. Cl. D8—99



310,012

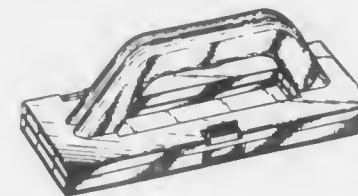
**HAND-HELD SANDER**

David R. Henke, Maple Grove, and David J. Ruha, Hopkins, both of Minn., assignors to Warner Manufacturing Company, Minneapolis, Minn.

Filed Sep. 11, 1986, Ser. No. 905,163

Term of patent 14 years

U.S. Cl. D8—90



310,015

**LETTER OPENER**

Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Jun. 11, 1987, Ser. No. 60,407

Term of patent 14 years

U.S. Cl. D8—102



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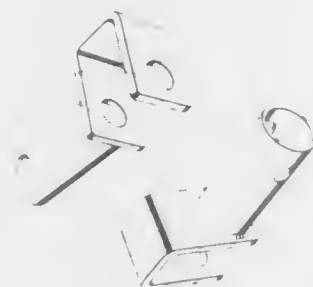
310,016

**LOCKING DEVICE HOUSING FOR AN OUTBOARD MOTOR OR SIMILAR ARTICLE**

Sven A. Johansson; Lars J. Y. Sandin, and Peter O. E. Stiebel, all of Saltsjöbaden, Sweden, assignors to Marine Protect AB  
Filed Aug. 19, 1986, Ser. No. 897,983

Claims priority, application Sweden, Feb. 27, 1986, 860484  
Term of patent 14 years

U.S. Cl. D8—354



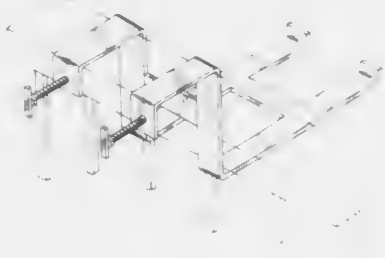
310,018

**BRACKET FOR SUSPENDING A HIBACHI FROM A PORCH RAILING**

Arthur Landrum, 8418 O'Bannon Ct., Richmond, Va. 23228  
Filed Dec. 10, 1987, Ser. No. 130,971

Term of patent 14 years

U.S. Cl. D8—373



310,019

**MOUNTING BRACKET FOR AN OPENER FOR REMOVING SCREW CLOSURES FROM CONTAINERS**

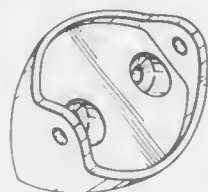
Thomas S. G. Kee, 4 Cultra Avenue, Hollywood, County Down, Northern Ireland

Filed Nov. 6, 1986, Ser. No. 928,304

Claims priority, application United Kingdom, May 8, 1986, 1033933

Term of patent 14 years

U.S. Cl. D8—373



310,017

**TIE DOWN DEVICE FOR TRUCK BEDS**

James R. Matthews, Hawthorne, Calif., assignor to James E. Irvin and Amy B. Irvin, both of West Lafayette, Ind.

Filed Jun. 8, 1987, Ser. No. 59,475

Term of patent 14 years

U.S. Cl. D8—356



310,020

**CLAMP FOR CLAMPING WIRES**

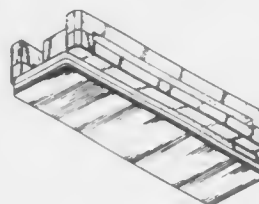
Akio Fujioka, Ichikawa, Japan, assignor to Kitagawa Industries Co., Ltd., Aichi, Japan

Filed Dec. 30, 1987, Ser. No. 139,710

Claims priority, application Japan, Oct. 7, 1987, 62-40982

Term of patent 14 years

U.S. Cl. D8—396



AUGUST 21, 1990

U.S. PATENT AND TRADEMARK OFFICE

1979

310,021

**AEROSOL SPRAY HOUSING**

Kenneth J. Anderson, Coloma, Mich., assignor to Assembled Components Co., Inc., Coloma, Mich.

Filed Apr. 8, 1987, Ser. No. 36,031

Term of patent 14 years

U.S. Cl. D9—300



310,023

**BAG**

Anita Dembiczak, and Benson Zinbarg, both of Stamford, Conn., assignors to Sun Hill Industries, Inc., Stamford, Conn.

Filed Nov. 6, 1989, Ser. No. 431,857

Term of patent 14 years

U.S. Cl. D9—305



310,022

**AEROSOL SPRAY HOUSING**

Kenneth J. Anderson, Coloma, Mich., assignor to Assembled Components Co., Inc., Coloma, Mich.

Filed Apr. 8, 1987, Ser. No. 36,032

Term of patent 14 years

U.S. Cl. D9—300



310,024

**PACKAGING CONTAINER**

Kyle S. Maschino, Dayton, Ohio, assignor to Dayton Nut Specialties, Inc., Dayton, Ohio

Filed Apr. 8, 1987, Ser. No. 35,712

Term of patent 14 years

U.S. Cl. D9—312





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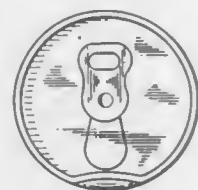
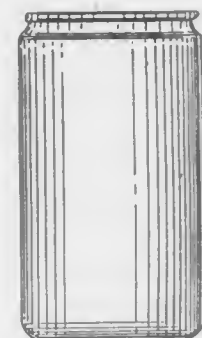
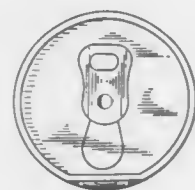
1980

OFFICIAL GAZETTE

AUGUST 21, 1990

310,025  
CAN

Michael S. Foley, 9284 Hickory St., Norfolk, Va. 23503  
Continuation-in-part of Ser. No. 652,085, Sep. 19, 1984. This  
application May 29, 1987, Ser. No. 55,778  
Term of patent 14 years  
U.S. Cl. D9—368

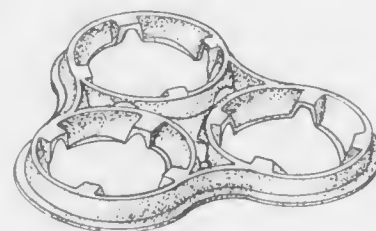


310,026  
BOTTLE WITH CAP

Nicholas B. Verebelyi, London, United Kingdom, assignor to  
Reckitt & Colman Products Limited, London, England  
Filed Jun. 3, 1987, Ser. No. 57,837  
Claims priority, application United Kingdom, Dec. 4, 1986,  
1038567  
Term of patent 14 years  
U.S. Cl. D9—373



310,027  
BEVERAGE TRAY  
Kenneth D. Bixler, Lake Forest, Ill., assignor to Packaging  
Corporation of America, Evanston, Ill.  
Filed Dec. 23, 1987, Ser. No. 137,451  
Term of patent 14 years  
U.S. Cl. D9—424



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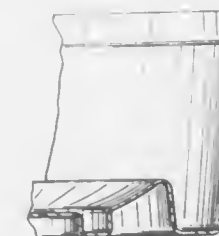
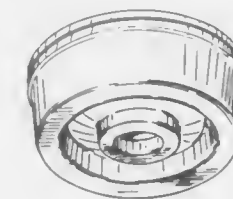
U.S. PATENT AND TRADEMARK OFFICE

1981

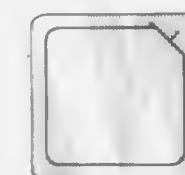
310,028

BASE CUP FOR A BOTTLE

Charles M. Brandt, and Stephen R. Lynn, both of Douglasville, Ga., assignors to Sewell Plastics, Inc., Atlanta, Ga.  
Filed Apr. 6, 1987, Ser. No. 35,155  
Term of patent 14 years  
U.S. Cl. D9—434



310,029  
LID FOR OVENABLE CARTON  
John E. Kea, New Castle, Del., and Louis C. Woyce, Jr., Malvern, Pa., assignors to Westvaco Corporation, New York, N.Y.  
Filed Feb. 27, 1987, Ser. No. 19,864  
Term of patent 14 years  
U.S. Cl. D9—438

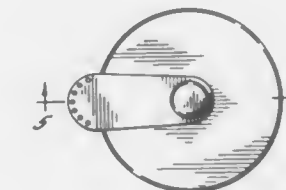


310,030  
BOTTLE CAP

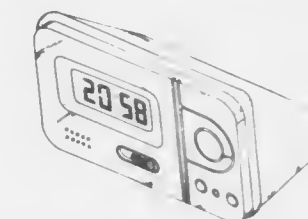
Serge Mansau, 45 Rue Ybry, 92200 Neuilly sur Seine, France  
Filed Sep. 22, 1987, Ser. No. 99,848  
Claims priority, application France, Jun. 4, 1987, 87 3342  
Term of patent 14 years  
U.S. Cl. D9—439



310,031  
BEVERAGE CAN COVER  
Robert R. Curasi, 5658 Wedgewood Dr., Charlotte, N.C. 28210  
Filed Sep. 17, 1987, Ser. No. 97,932  
Term of patent 14 years  
U.S. Cl. D9—449



310,032  
CLOCK  
Ryo Murata, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan  
Filed Jul. 7, 1987, Ser. No. 70,511  
Term of patent 14 years  
U.S. Cl. D10—15



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310,033

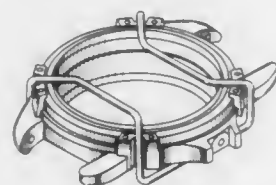
## WRIST WATCH CASE HAVING PROTECTOR

Makoto Ito, Fussa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jun. 11, 1987, Ser. No. 62,192

Term of patent 14 years

U.S. Cl. D10—30



310,036

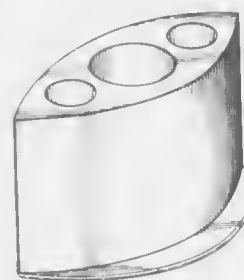
## TRANSDUCER POD

Jeremy Bird, Lymington, Great Britain, assignor to Brookes and Gatehouse Limited, United Kingdom

Filed Jan. 30, 1987, Ser. No. 9,351

Term of patent 14 years

U.S. Cl. D10—46



310,034

## COMBINED WATCH HOUSING AND BEZEL THEREFOR

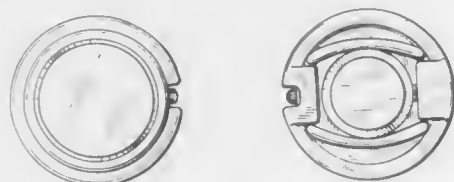
Rafael Braun, Woodmere; Bernard Fernandez, Douglaston, both of N.Y., and Li T. Wing, Tsuen Wan, Hong Kong, assignors to E. Gluck Corporation, Long Island City, N.Y.

Filed Oct. 15, 1987, Ser. No. 109,443

Claims priority, application United Kingdom, May 27, 1987, 1042455; May 27, 1987, 1042447

Term of patent 14 years

U.S. Cl. D10—30



310,037

## THERMOMETER

Sanae Aoki, and Tsunataka Konoike, both of Tokyo, Japan, assignors to Tanaka Manufacturing Company Limited, Tokyo, Japan

Filed Aug. 21, 1987, Ser. No. 88,102

Term of patent 14 years

U.S. Cl. D10—57



310,035

## COMBINED WATCH AND BAND THEREFOR

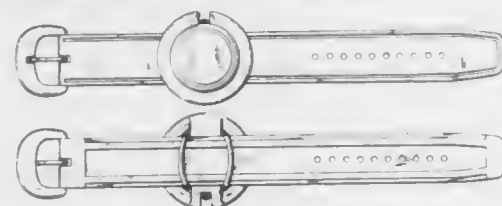
Rafael Braun, Woodmere; Bernard Fernandez, Douglaston, both of N.Y., and Li T. Wing, Tsuen Wan, Hong Kong, assignors to E. Gluck Corporation, Long Island City, N.Y.

Filed Oct. 15, 1987, Ser. No. 109,246

Claims priority, application United Kingdom, May 12, 1987, 1042099; May 12, 1987, 1042101

Term of patent 14 years

U.S. Cl. D10—32



310,038

## PROBE FOR ELECTRONIC CLINICAL THERMOMETER

Kenichi Kida, Tokyo, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1987, Ser. No. 103,261

Claims priority, application Japan, Jul. 31, 1987, 62-30899

Term of patent 14 years

U.S. Cl. D10—60



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U.S. PATENT AND TRADEMARK OFFICE

1983

310,039

## FUEL TANK FILLER GAUGE

Stanley G. Sumich, 1125 SW. Wright Ct., Troutdale, Ore. 97060-1499

Filed Jun. 29, 1987, Ser. No. 67,445

Term of patent 14 years

U.S. Cl. D10—64



310,042

## MEASURING TAPE

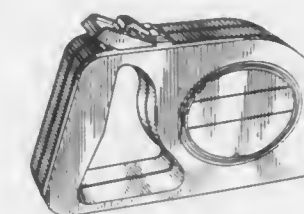
Dong M. Kang, Seoul, Rep. of Korea, assignor to Korea Measures Co., Busan, Rep. of Korea

Filed May 5, 1987, Ser. No. 46,340

Claims priority, application Rep. of Korea, Dec. 13, 1986, 17577/86

Term of patent 14 years

U.S. Cl. D10—72



310,043

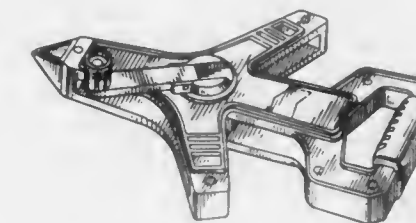
## MEASURING TAPE CASE

Dong M. Kang, Seoul, Rep. of Korea, assignor to Korea Measures Co. Ltd., Busan, Rep. of Korea

Filed Sep. 15, 1987, Ser. No. 97,431

Term of patent 14 years

U.S. Cl. D10—72



310,040

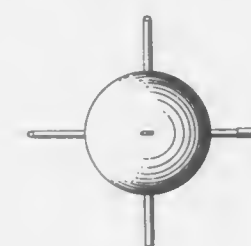
## SPHERICAL COMPASS

Fred Dibert, Flint, Mich., assignor to Lillian J. Dibert, Flint, Mich.

Filed Jan. 11, 1988, Ser. No. 142,417

Term of patent 14 years

U.S. Cl. D10—68



310,041

## MAGNETIC MEASURING SCALE

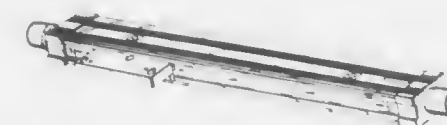
Kazuo Nagaoka, Yokohama, Japan, assignor to Sony Magnetscale, Inc., Tokyo, Japan

Filed Feb. 24, 1987, Ser. No. 18,007

Claims priority, application Japan, Aug. 27, 1986, 61-33402

Term of patent 14 years

U.S. Cl. D10—70



310,044

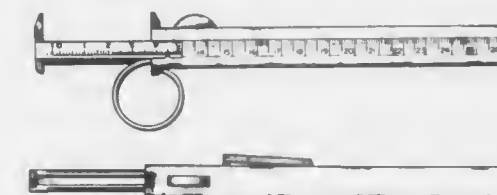
## INSTRUMENT FOR MEASURING TUMORS

David S. Alberts, 250 N. Indian Horse Rd., Tucson, Ariz. 85711, and Robert T. Dorr, 1130 S. Avenida Conalea, Tucson, Ariz. 85718

Filed Apr. 9, 1987, Ser. No. 36,245

Term of patent 14 years

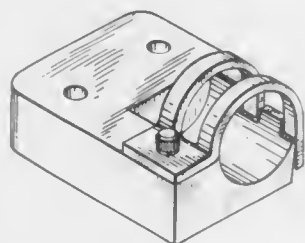
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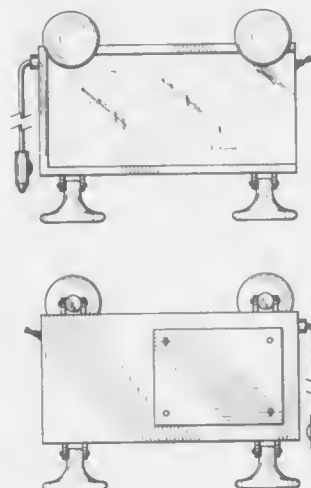


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310,045  
MAGNETIC MEASURING SCALE ACCESSORY  
Kazuo Nagaoka, Yokohama, Japan, assignor to Sony Magnets, Inc., Tokyo, Japan  
Filed Feb. 24, 1987, Ser. No. 18,001  
Claims priority, application Japan, Aug. 27, 1986, 61-33403  
Term of patent 14 years  
U.S. Cl. D10—74



310,047  
ILLUMINATED WARNING SIGNAL FOR VEHICLES  
Wilbur L. Vance, Sr., 5634 Arch St., Philadelphia, Pa. 19139  
Filed Nov. 9, 1987, Ser. No. 118,641  
Term of patent 14 years  
U.S. Cl. D10—114



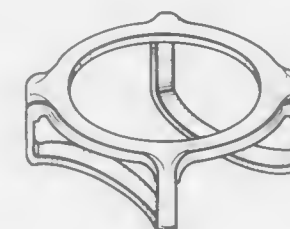
310,046  
FISH COUNTER  
Dale A. Matcham, 112 McKinley St., Wellington, Ohio 44090  
Filed Aug. 13, 1987, Ser. No. 84,740  
Term of patent 14 years  
U.S. Cl. D10—96



310,048  
WATCH DIAL FACE OR THE LIKE  
Jean-Louis Dumas, Paris, France, assignor to La Montre Hermes, S.A., France  
Filed May 18, 1987, Ser. No. 51,573  
Claims priority, application World Int. Prop. O., Nov. 28, 1986, DM/007.851  
Term of patent 14 years  
U.S. Cl. D10—126



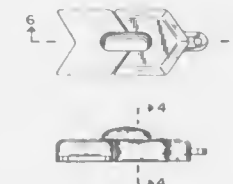
310,049  
PERIMETRICAL WATCH PROTECTOR  
James Hartman, 904 Elmwood Trail, and Blake Schwartzman, 913 Elmwood Trail, both of Cedar Park, Tex. 78613  
Filed Feb. 27, 1987, Ser. No. 19,775  
Term of patent 14 years  
U.S. Cl. D10—132



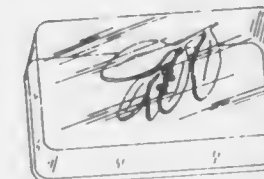
310,050  
NECKLACE  
Gail F. Merritt, P.O. Box 31, Main St., Bridgeport, Calif. 93517  
Filed Aug. 4, 1987, Ser. No. 81,180  
Term of patent 14 years  
U.S. Cl. D11—3



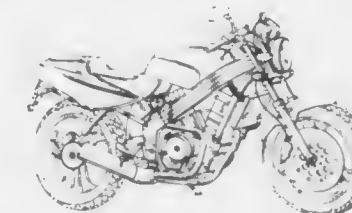
310,051  
LINK ELEMENT  
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy  
Filed Apr. 30, 1987, Ser. No. 44,111  
Claims priority, application Italy, Oct. 31, 1986, 36204/86[U]  
Term of patent 14 years  
U.S. Cl. D11—93



310,052  
BELT BUCKLE OR THE LIKE  
Barney Kohout, 112 Carol St., and Lee Williams, Jr., 110 Barns St., both of Carrboro, N.C. 27510  
Filed Dec. 11, 1987, Ser. No. 131,544  
Term of patent 14 years  
U.S. Cl. D11—241



310,053  
MOTORCYCLE  
Toshiaki Kishi, Tokyo; Shusei Sudoh, Yokohama, and Masaharu Yoshimura, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 19, 1988, Ser. No. 146,150  
Claims priority, application Japan, Jul. 20, 1987, 62-29426  
Term of patent 14 years  
U.S. Cl. D12—110



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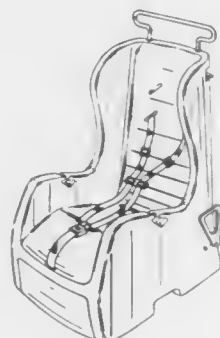
**COMBINED CAR SEAT AND BABY STROLLER**

J. Camille Tucker, and Klaus D. Weiswurm, both of San Antonio, Tex., assignors to Gee-I-Go, Inc., San Antonio, Tex.

Filed Mar. 4, 1987, Ser. No. 21,423

Term of patent 14 years

U.S. Cl. D12-129



310,056

**TIRE FOR VEHICLES**

John Martin, Sutton Coldfield; Nigel G. Nock, S. Yardly, and Howard M. Nock, Streetly, all of Great Britain, assignors to SP Tyres UK Limited, Birmingham, England

Filed May 21, 1987, Ser. No. 52,743

Claims priority, application United Kingdom, Nov. 21, 1986, 1038273

Term of patent 14 years

U.S. Cl. D12-147



310,057

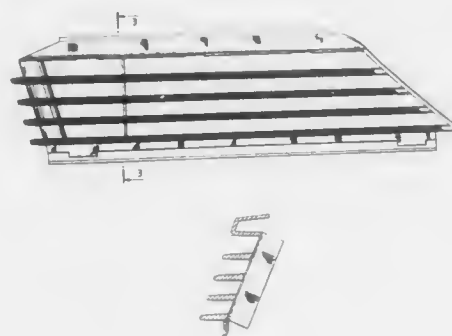
**AUTOMOTIVE VEHICLE GRILL**

Giorgio Guelfi, Milan; Ezio Villa; Franco Mendicino, both of Arese; Renato Pasquali, Garbagnate, and Alberto Alberti, Legnano, all of Italy, assignors to Alfa Lancia Industriale S.r.l., Arese, Italy

Filed Feb. 25, 1987, Ser. No. 18,981

Term of patent 14 years

U.S. Cl. D12-163



310,055

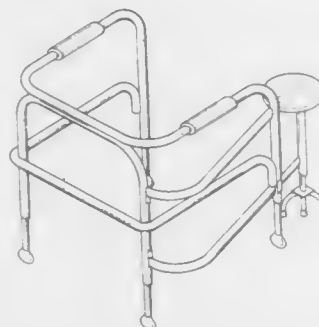
**INVALID WALKER**

Derek L. Dawkins, 1181 Pelican Dr., Memphis, Tenn. 38109

Filed Jan. 25, 1988, Ser. No. 147,678

Term of patent 14 years

U.S. Cl. D12-130



U.S. PATENT AND TRADEMARK OFFICE

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1987

310,058

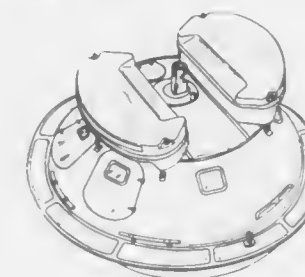
**SURVIVAL CAPSULE**

Albert M. Thompson, LaJolla, and Eric R. Hooper, Lakeside, both of Calif., assignors to Survival Systems International, Inc., Valley Center, Calif.

Filed Jul. 30, 1987, Ser. No. 79,489

Term of patent 14 years

U.S. Cl. D12-308



310,059

**TRANSOM PORTION OF A MOTORBOAT**

Victor B. Porter, Decatur, Ind., assignor to Thunderbird Products Corporation, Decatur, Ind.

Filed May 1, 1987, Ser. No. 45,665

Term of patent 14 years

U.S. Cl. D12-317



310,060

**SOLAR WATER HEATER OR THE LIKE**

Angel M. Salgado, 6060 W. Royal Palm Rd., Glendale, Ariz. 85303, and Harold L. Drury, 3852 W. Dalphin Rd., Phoenix, Ariz. 85021

Filed Jul. 1, 1987, Ser. No. 68,403

Term of patent 14 years

U.S. Cl. D13-102

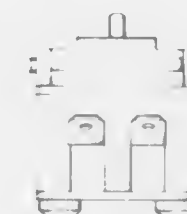
310,061  
SWITCH

W. Barry Krause, Spotsylvania, Va., assignor to Tower Manufacturing Corporation, Providence, R.I.

Filed Sep. 29, 1987, Ser. No. 102,573

Term of patent 14 years

U.S. Cl. D13-169



310,062

**CUTOUT INSULATOR**

Robert W. Harmon, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo.

Filed Oct. 28, 1987, Ser. No. 113,726

Term of patent 14 years

U.S. Cl. D13-132



310,063

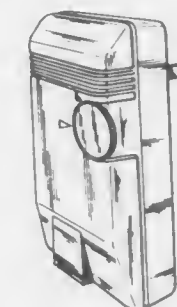
**PLUG-IN REMOTELY CONTROLLED SWITCH**

Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc., Taiwan

Filed Jul. 11, 1988, Ser. No. 216,979

Term of patent 14 years

U.S. Cl. D13-142





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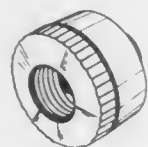
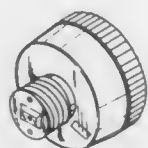
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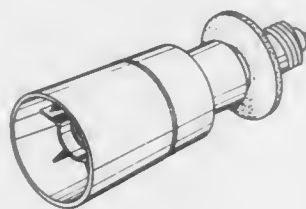
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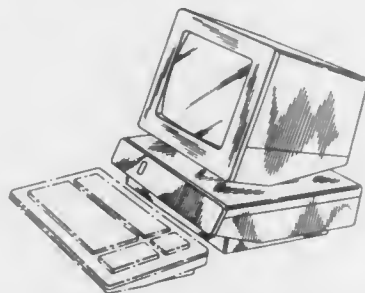
310,064  
**LIGHT SOCKET MOUNTED REMOTELY CONTROLLED  
 LIGHT SWITCH**  
 Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
 Taiwan  
 Filed Jul. 11, 1988, Ser. No. 216,975  
 Term of patent 14 years  
 U.S. Cl. D13—165



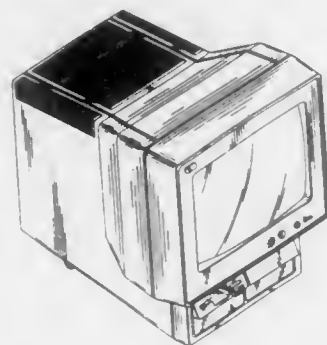
310,065  
**LIGHT SOCKET MOUNTED REMOTE CONTROLLED  
 LIGHT SWITCH**  
 Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc.,  
 Taiwan  
 Filed Jul. 11, 1988, Ser. No. 216,984  
 Term of patent 14 years  
 U.S. Cl. D13—165



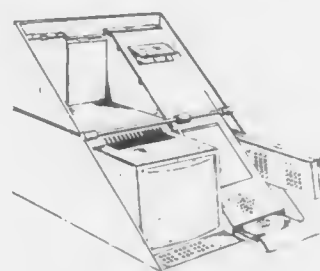
310,066  
**RETAIL TERMINAL OR SIMILAR ARTICLE**  
 Donald L. Forsythe, Byesville, Ohio, assignor to NCR Corpora-  
 tion, Dayton, Ohio  
 Filed Jul. 17, 1987, Ser. No. 75,154  
 Term of patent 14 years  
 U.S. Cl. D14—100



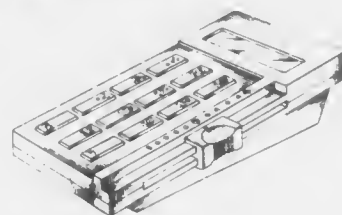
310,067  
**COMPUTER DISPLAY WORKSTATION**  
 Stanley E. Koprowski, Austin; Tristan A. Merino, Cedar Park,  
 and Edward J. Sabella, Georgetown, all of Tex., assignors to  
 International Business Machines Corporation, Armonk, N.Y.  
 Filed Aug. 3, 1987, Ser. No. 81,371  
 Term of patent 14 years  
 U.S. Cl. D14—106



310,068  
**INFORMATION TERMINAL**  
 Klaus Schröter, Berlin, Fed. Rep. of Germany, assignor to SY-  
 STEC Gesellschaft für Digital-Analog-Technik mbH, Berlin,  
 Fed. Rep. of Germany  
 Filed Dec. 24, 1987, Ser. No. 137,657  
 Claims priority, application Fed. Rep. of Germany, Jun. 25,  
 1987, 95MR5839  
 Term of patent 14 years  
 U.S. Cl. D14—100



310,069  
**SURVEY RESPONSE TERMINAL**  
 Holly Y. Leone, and Eli Bleich, both of Santa Monica, Calif.,  
 assignors to Quick Tally Systems, Beverly Hills, Calif.  
 Filed Feb. 11, 1988, Ser. No. 149,277  
 Term of patent 14 years  
 U.S. Cl. D14—100

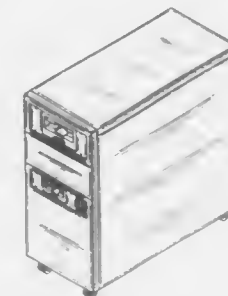


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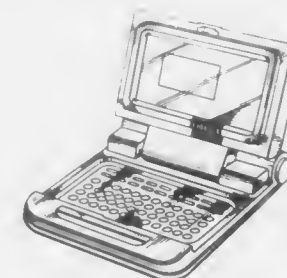
U.S. PATENT AND TRADEMARK OFFICE

1989

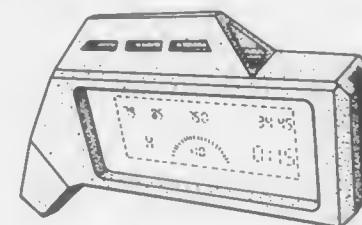
310,070  
**CENTRAL PROCESSING UNIT FOR ELECTRONIC  
 FILING SYSTEM**  
 Tooru Makidera, Osaka, Japan, assignor to Sharp Corporation,  
 Osaka, Japan  
 Filed Apr. 13, 1987, Ser. No. 37,565  
 Claims priority, application Japan, Oct. 17, 1986, 61-41427  
 Term of patent 14 years  
 U.S. Cl. D14—102



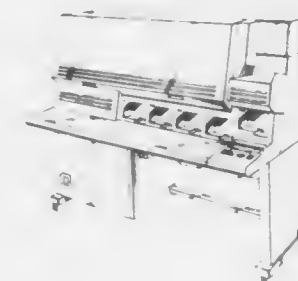
310,071  
**PORTABLE EDUCATIONAL COMPUTER**  
 Rijk L. Y. Kit, North Point, Hong Kong, assignor to Team  
 Concepts Electronics Limited, Shatin, Hong Kong  
 Filed Dec. 10, 1987, Ser. No. 130,981  
 Claims priority, application United Kingdom, Oct. 6, 1987,  
 1045415  
 Term of patent 14 years  
 U.S. Cl. D14—106



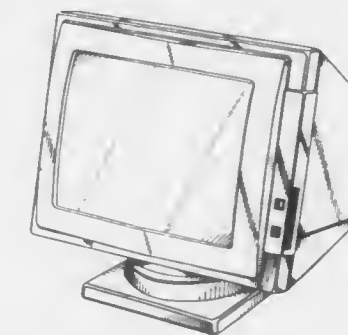
310,072  
**ENCLOSURE FOR A WATERTIGHT UNDERWATER  
 COMPUTER DISPLAY MODULE**  
 Robert Hollis, 14275 Catalina St., San Leandro, Calif. 94577  
 Filed Jan. 14, 1987, Ser. No. 3,219  
 Term of patent 14 years  
 U.S. Cl. D14—113



310,073  
**CURRENCY SORTING MACHINE**  
 Kenneth Sadler, and Clive J. Southernwood, both of Horsham,  
 England, assignors to De La Rue Systems Limited, England  
 Filed Aug. 21, 1987, Ser. No. 87,741  
 Claims priority, application United Kingdom, Feb. 25, 1987,  
 1040254  
 Term of patent 14 years  
 U.S. Cl. D14—110



310,074  
**DISPLAY**  
 Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C.,  
 S.p.A., Ivrea, Italy  
 Filed Dec. 7, 1987, Ser. No. 129,084  
 Claims priority, application Italy, Jun. 15, 1987, 53419/87[U]  
 The portion of the term of this patent subsequent to Jun. 5, 2007,  
 has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D14—113



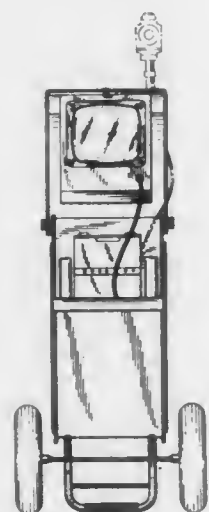
310,075

## PORTABLE VIDEO SYSTEM

William L. Mannion, Allendale, and Ira Diamond, Ramsey, both of, assignors to Sony Corporation, Tokyo, Japan  
Filed Dec. 24, 1987, Ser. No. 137,651

Term of patent 14 years

U.S. Cl. D14—129



310,076

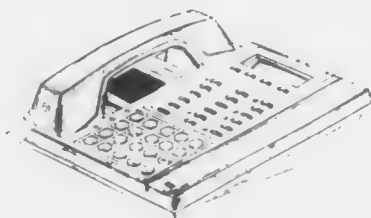
## TELEPHONE

Shigeaki Kido; Sadao Isozaki, and Yasuko Yajima, all of Tokyo, Japan, assignors to Meisel Electric Co., Ltd., Tokyo, Japan  
Filed Mar. 12, 1987, Ser. No. 25,170

Claims priority, application Japan, Oct. 4, 1986, 61-39343; Oct. 4, 1986, 61-39344; Oct. 4, 1986, 61-39345

Term of patent 14 years

U.S. Cl. D14—151



310,077

## COMBINED RADIO AND CASSETTE TAPE RECORDER

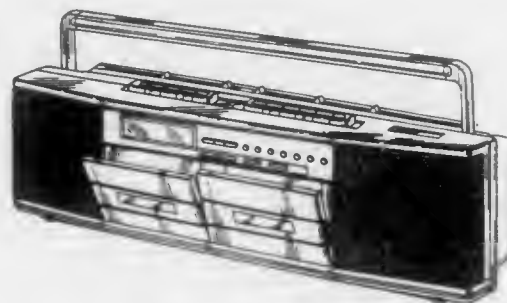
Kazuharu Yamamoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 22, 1988, Ser. No. 210,299

Claims priority, application Japan, Dec. 23, 1987, 62-52132

Term of patent 14 years

U.S. Cl. D14—163



310,078

## DIGITAL AUDIO TAPE RECORDER

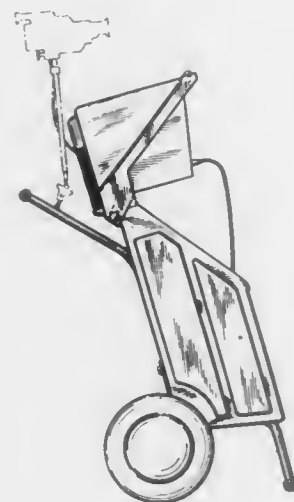
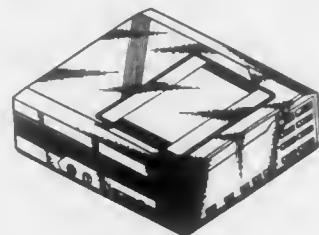
Yoshitaka Naito, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1987, Ser. No. 58,024

Claims priority, application Japan, Dec. 22, 1986, 61-50693

Term of patent 14 years

U.S. Cl. D14—164



310,079

## TAPE RECORDER

Akinori Mitsuse, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Dec. 9, 1987, Ser. No. 130,723

Claims priority, application Japan, Jul. 17, 1987, 62-29140

Term of patent 14 years

U.S. Cl. D14—165



310,082

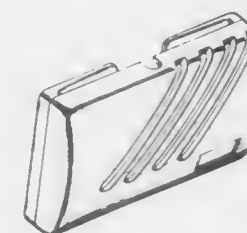
## SEAT BELT MICROPHONE

Joseph Kehl, Skokie, and Hari Matsuda, Evanston, both of Ill., assignors to Shure Brothers, Inc., Evanston, Ill.

Filed Oct. 26, 1987, Ser. No. 113,240

Term of patent 14 years

U.S. Cl. D14—227



310,083

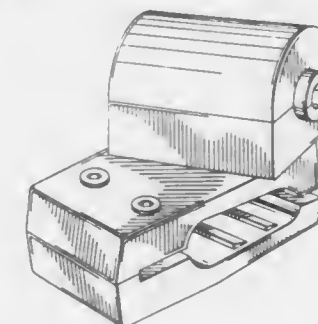
## MICROPHONE MOUNT

John J. Lazzeroni, and Melinda K. Lazzeroni, both of 7322 E. Stella Rd., Tucson, Ariz. 85730

Filed Jun. 24, 1987, Ser. No. 65,705

Term of patent 14 years

U.S. Cl. D14—229



310,080

## COMBINED CLOCK RADIO AND LIGHT

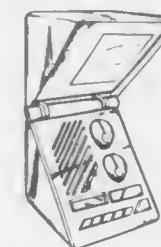
Touru Sato, Niigata, Japan, assignor to Twin Bird Industrial Co., Ltd., Japan

Filed Sep. 1, 1987, Ser. No. 91,942

Claims priority, application Japan, Jul. 2, 1987, 62-27262

Term of patent 14 years

U.S. Cl. D14—171



310,084

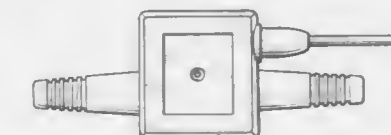
## COUPLING BLOCK FOR A GLASS MOUNTED ANTENNA

Tetsuo Shimazaki, Tokyo, Japan, assignor to Alliance Research Corporation, Chatsworth, Calif.

Filed Jul. 5, 1988, Ser. No. 215,883

Term of patent 14 years

U.S. Cl. D14—238



310,081

## HEADPHONE

Takefumi Daido, Tokyo, and Katsuo Takada, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 149,063

Term of patent 14 years

U.S. Cl. D14—205



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## LAWN MOWER

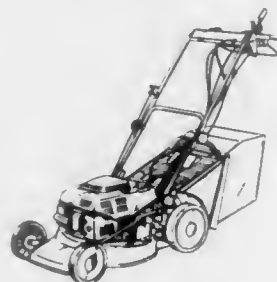
Kunisaburo Uemura, Tokyo, Japan, assignor to Yamaha Hatsudoki K. K., Shizuoka, Japan

Filed Jun. 1, 1988, Ser. No. 201,113

Claims priority, application Japan, Dec. 2, 1987, 62-49548

Term of patent 14 years

U.S. Cl. D15-14



310,088

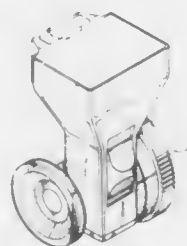
## INTEGRATED BEAM SPLITTER VIDEO CAMERA OR THE LIKE

Erik Sluyter, Santa Barbara, Calif., assignor to Circon Corporation, Santa Barbara, Calif.

Filed Jun. 18, 1987, Ser. No. 64,772

Term of patent 14 years

U.S. Cl. D16-130



310,086

## SEWING MACHINE

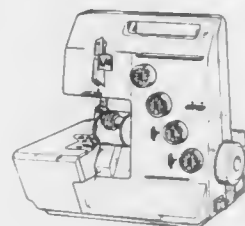
Sanae Takada, Kawasaki, and Toshiya Sekiguchi, Chiba, both of Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,643

Claims priority, application Japan, Aug. 31, 1987, 62-35490

Term of patent 14 years

U.S. Cl. D15-70



310,089

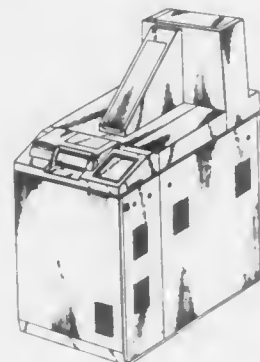
## FILM PROCESSOR

Monte D. Lavine, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1987, Ser. No. 12,902

Term of patent 14 years

U.S. Cl. D16-246



310,087

## END PIECE FOR EYEGLASS TEMPLES

Helmut Wiedmann, Heilbronn, Fed. Rep. of Germany, and Wilhelm Anger, St. Moritz-Suvretta, Switzerland, assignors to Eyemetrics-Systems AG, Chur, Switzerland

Filed May 22, 1987, Ser. No. 52,961

Term of patent 14 years

U.S. Cl. D16-123



310,090

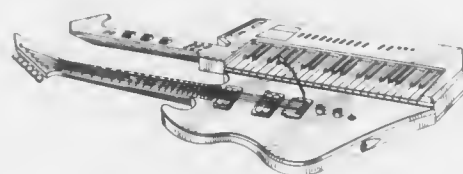
## COMBINED GUITAR AND KEYBOARD

Debra S. Stone, and Gary Hahn, both of 1300 Lambert Rd., La Habra, Calif. 90631

Filed Mar. 11, 1987, Ser. No. 24,396

Term of patent 14 years

U.S. Cl. D17-2



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310,091

## ELECTRONIC STRING INSTRUMENT

Keizo Tatsumi, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan

Filed Oct. 9, 1987, Ser. No. 107,514

Claims priority, application Japan, Apr. 11, 1987, 62-14227

Term of patent 14 years

U.S. Cl. D17-14



310,094

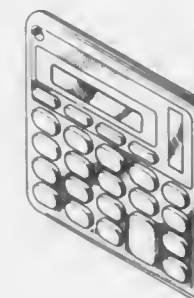
## ELECTRONIC CALCULATOR

Isoroku Noguchi, Roselle, N.J., assignor to Aurora Impex Corporation, N.J.

Filed May 19, 1987, Ser. No. 52,565

Term of patent 14 years

U.S. Cl. D18-7



310,092

## ELECTRONIC TYPEWRITER

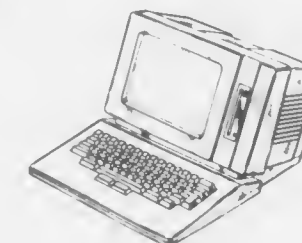
Aiko Endo, and Noriaki Haranishi, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1987, Ser. No. 99,523

Claims priority, application Japan, Mar. 26, 1987, 62-11436

Term of patent 14 years

U.S. Cl. D18-1



310,095

## ELECTRONIC CALCULATOR

Isoroku Noguchi, Roselle, N.J., assignor to Aurora Impex Corporation, N.J.

Filed May 19, 1987, Ser. No. 52,566

Term of patent 14 years

U.S. Cl. D18-7



310,093

## ELECTRONIC CALCULATOR WITH SOLAR CELL

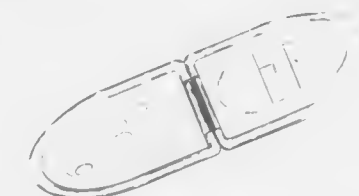
Hiroshi Sakaguchi, and Katsuhiro Iida, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed May 13, 1987, Ser. No. 49,605

Claims priority, application Japan, Nov. 14, 1986, 61-45134

Term of patent 14 years

U.S. Cl. D18-7



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## MULTIFORM PRINTER

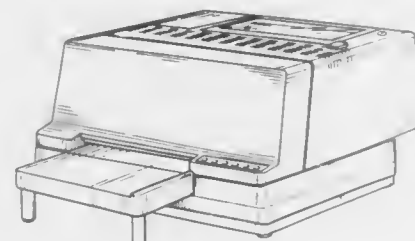
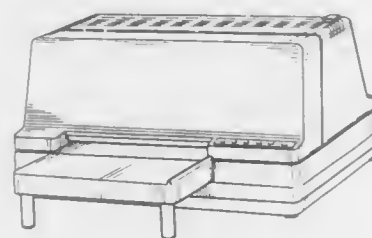
Alfons Heimburger, Niedereschach, Fed. Rep. of Germany, John Ristuccia, Sr., 453 E. Susan La., Tempe, Ariz. 85281  
 assignor to Mannesmann Kieze GmbH

Filed May 27, 1986, Ser. No. 867,872

Claims priority, application Hague, Feb. 24, 1986, U.S. Cl. D19—1  
 DM/006531

Term of patent 14 years

U.S. Cl. D18—13



310,098

## HOLDER FOR BUSINESS CARD

Filed Jan. 28, 1987, Ser. No. 7,828

Term of patent 14 years



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## BOOK HOLDER

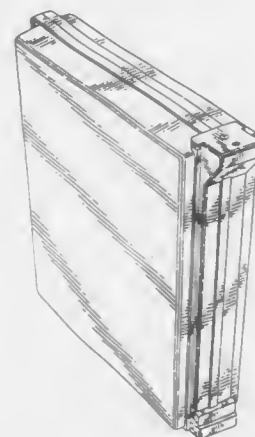
David R. Chapman, London, and Charles G. Shepherd, Oakville,  
 both of Canada, assignors to Chas Chapman Company Lim-  
 ited, Oakville, Canada

Filed Sep. 17, 1987, Ser. No. 99,833

Claims priority, application Canada, Mar. 16, 1987,  
 17-03-87-12

Term of patent 14 years

U.S. Cl. D19—26



310,097

## PRINTER

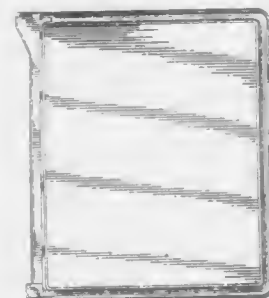
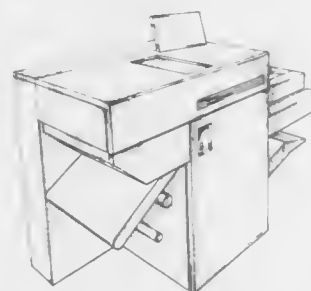
Stephan Feger, Stuttgart; Wolfgang Fischer, Bohligen; Norbert  
 Koller, Gaufelden, and Manfred Krautwald, Sindelfingen, all  
 of Fed. Rep. of Germany, assignors to International Business  
 Machines Corporation, Armonk, N.Y.

Filed Jan. 9, 1987, Ser. No. 1,927

Claims priority, application Fed. Rep. of Germany, Jul. 22,  
 1986, MR 6112

Term of patent 14 years

U.S. Cl. D18—36



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U.S. PATENT AND TRADEMARK OFFICE

1995

310,100

## PEN

Teruo Yubisui, Bancho Royal Court 801, 23-2, Ichiban-Cho,  
 Chiyoda-Ku, Tokyo, Japan

Filed Jul. 10, 1987, Ser. No. 71,878

Term of patent 14 years

U.S. Cl. D19—48



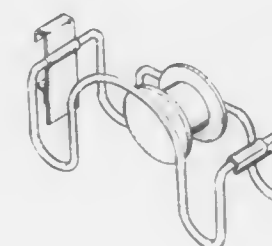
310,103

WALL-MOUNTABLE TAPE DISPENSER OR THE LIKE  
 Jean Beirise, and John Coons, both of Cincinnati, Ohio, assign-  
 ors to Herman Miller, Inc., Zeeland, Mich.

Filed Apr. 22, 1987, Ser. No. 41,586

Term of patent 14 years

U.S. Cl. D19—67



310,104

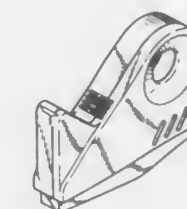
## ADHESIVE APPLICATOR

Hiromichi Uchida, c/o Toyo Chemical Co., Ltd., Nikko Mita  
 Bldg., 4-26, Takanawa 1-chome, Minato-ku, Tokyo, Japan

Filed May 27, 1987, Ser. No. 54,953

Term of patent 14 years

U.S. Cl. D19—67



310,101

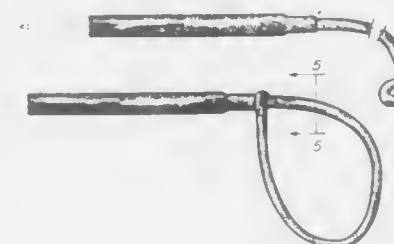
## COMBINATION COVER AND HOLDER FOR WRITING INSTRUMENT

Randolph A. Gauthier, Beverly, Mass., assignor to Deidre Stan-  
 ley, South Yarmouth, Mass., a part interest

Filed Aug. 17, 1987, Ser. No. 86,658

Term of patent 14 years

U.S. Cl. D19—55



310,102

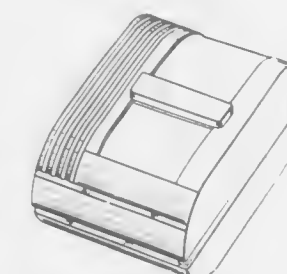
## STAMP DISPENSER

James M. Rittenhouse, Watchung, N.J., assignor to Ketcham &  
 McDougall, Inc., Roseland, N.J.

Filed Feb. 5, 1987, Ser. No. 12,120

Term of patent 14 years

U.S. Cl. D19—67



310,105

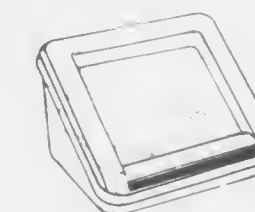
## PAPER CLIP HOLDER

Kent W. Murphy, Wooster, and Charles W. Craft, Jr., Apple  
 Creek, both of Ohio, assignors to Rubbermaid Incorporated,  
 Wooster, Ohio

Filed Oct. 19, 1987, Ser. No. 109,852

Term of patent 14 years

U.S. Cl. D19—75





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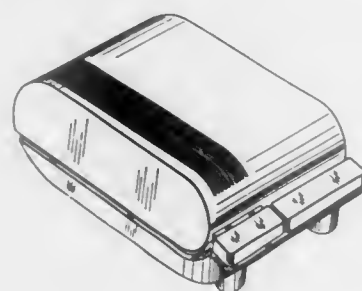
DESK INDEX FILE

James M. Rittenhouse, Watchung, N.J., assignor to Ketcham &amp; McDougall, Inc., Roseland, N.J.

Filed Feb. 5, 1987, Ser. No. 12,113

Term of patent 14 years

U.S. Cl. D19—76



310,107

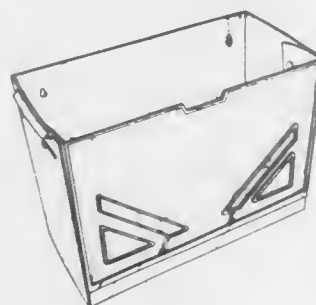
FILE BOX

Kent W. Murphy, Wooster, and Charles W. Craft, Jr., Apple Creek, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio

Filed Nov. 5, 1987, Ser. No. 117,648

Term of patent 14 years

U.S. Cl. D19—90



310,108

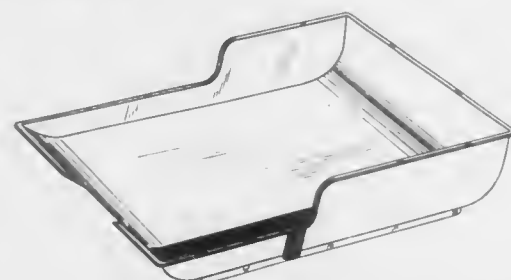
DESK TRAY

James M. Rittenhouse, Watchung, N.J., assignor to Ketcham &amp; McDougall, Inc., Roseland, N.J.

Filed Feb. 5, 1987, Ser. No. 11,658

Term of patent 14 years

U.S. Cl. D19—92



310,109

PAIR OF HAND SIGNS

Ruben A. Vega, 2598 Casper, Detroit, Mich. 48209

Filed Apr. 23, 1987, Ser. No. 41,365

Term of patent 14 years

U.S. Cl. D20—32



310,110

ELECTRONIC DIE SIMULATOR

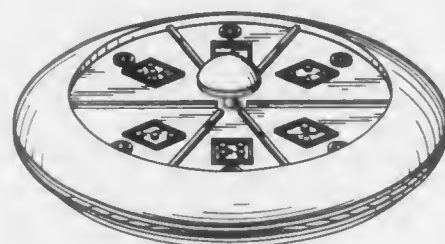
Joseph G. Dawson, Accelertron House, 83 Whittaker Lane, Prestwich, England

Filed Dec. 3, 1987, Ser. No. 128,544

Claims priority, application United Kingdom, Jul. 1, 1987, 1043262

Term of patent 14 years

U.S. Cl. D21—13



310,111

TOY AUTOMOBILE

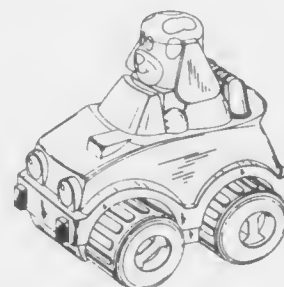
Ian T. Revell, Knutsford, and Ruth Elliott, Stockport, both of England, assignors to Hestair Kiddicraft Limited, Bristol, England

Filed Apr. 20, 1989, Ser. No. 341,068

Claims priority, application United Kingdom, Nov. 22, 1988, 1055142

Term of patent 14 years

U.S. Cl. D21—128



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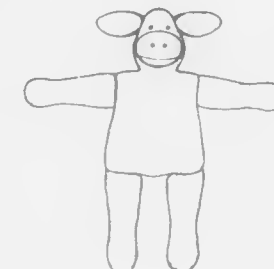
ANIMAL FIGURE

Hazel Metzler, 268-13th Ave. NE., Birmingham, Ala. 35215

Filed Nov. 9, 1987, Ser. No. 118,514

Term of patent 14 years

U.S. Cl. D21—148



310,115

GOLF CLUB HEAD

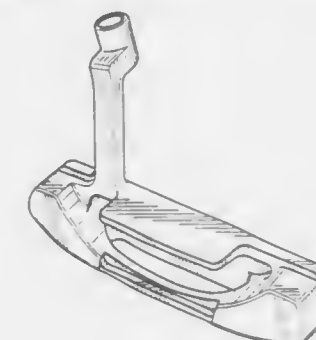
Kanji Inuma, Musashino, Japan, assignor to Daiwa Golf Co., Ltd., Tokyo, Japan

Filed Feb. 5, 1987, Ser. No. 11,218

Claims priority, application Japan, Aug. 7, 1986, 61-30912; Aug. 7, 1986, 61-30913

Term of patent 14 years

U.S. Cl. D21—217



310,116

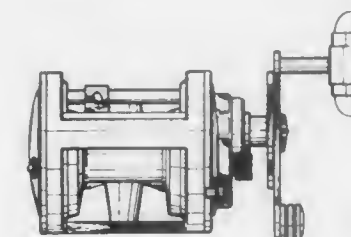
FISHING REEL

Rudolph Effinger, Feasterville, Pa., assignor to Penn Fishing Tackle Mfg. Co., Philadelphia, Pa.

Filed Jul. 16, 1987, Ser. No. 74,012

Term of patent 14 years

U.S. Cl. D22—140



310,117

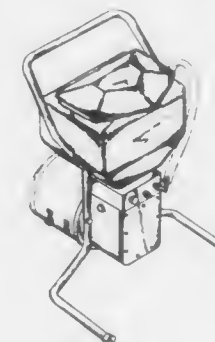
AIRLESS PAINT SPRAYER

James F. Mariol, Cincinnati, Ohio, assignor to Scott &amp; Fetzer Company, Westlake, Ohio

Filed Jan. 29, 1987, Ser. No. 8,646

Term of patent 14 years

U.S. Cl. D23—225



310,113

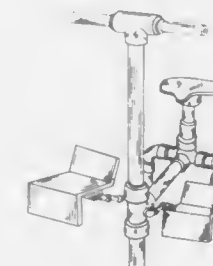
EXERCISE CYCLE

Rodney G. Stoner, 7004 Kinsbury Dr., Holiday, Fla. 34691

Filed Jan. 7, 1988, Ser. No. 141,661

Term of patent 14 years

U.S. Cl. D21—194



310,114

BAT

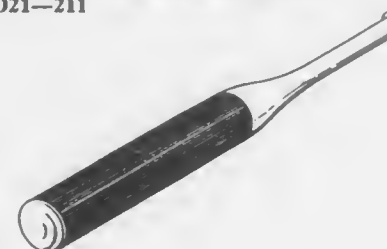
Raymond H. Catherall, 155 Channel Highway, Taroona, Tasmania 7006, Australia

Filed Apr. 30, 1987, Ser. No. 44,341

Claims priority, application Australia, Nov. 27, 1986, 7695/86

Term of patent 14 years

U.S. Cl. D21—211



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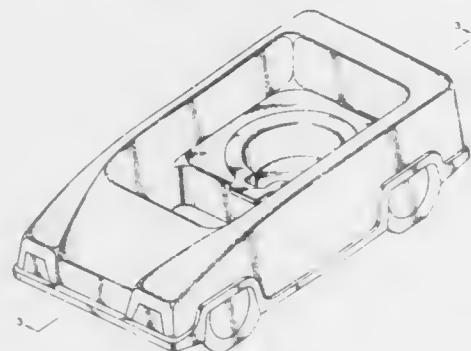
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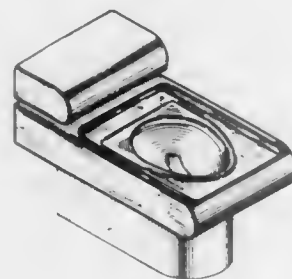
OFFICIAL GAZETTE

AUGUST 21, 1990

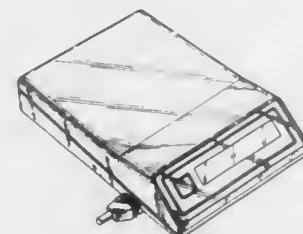
310,118  
TOILET TRAINER FOR CHILDREN  
Chester L. Lemon, 4937 Forest Bend Rd., Dallas, Tex. 75244  
Filed Oct. 2, 1987, Ser. No. 103,799  
Term of patent 14 years  
U.S. Cl. D23—297



310,119  
TOILET  
Herbert V. Kohler, Jr., Kohler, and Mary J. Reid, Sheboygan,  
both of Wis., assignors to Kohler Co., Kohler, Wis.  
Filed Jan. 12, 1988, Ser. No. 144,433  
Term of patent 14 years  
U.S. Cl. D23—301



310,120  
MEDICAL MONITOR  
John F. Wickham, Northamptonshire; Trevor A. Nunn, Witney,  
and Derek S. Jay, Wiltshire, all of United Kingdom, assignors  
to Oxford Medical Limited, Oxford, England  
Filed Dec. 21, 1987, Ser. No. 135,283  
Term of patent 14 years  
U.S. Cl. D24—17



310,121  
COMBINED EAR AND THROAT SPECULUM  
Daniel J. Pender, 325 E. Park Ave., Long Beach, N.Y. 11561  
Filed Oct. 22, 1987, Ser. No. 111,175  
Term of patent 14 years  
U.S. Cl. D24—18



310,122  
BLOOD SAMPLER  
Jon M. Masters, 6359 E. Reno, Midwest City, Okla. 73110  
Filed Sep. 10, 1987, Ser. No. 94,934  
Term of patent 14 years  
U.S. Cl. D24—25

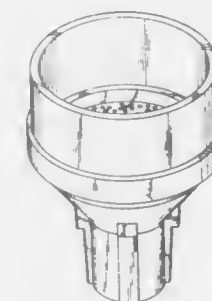


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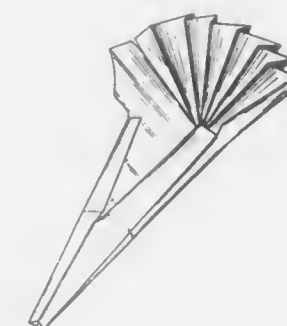
U.S. PATENT AND TRADEMARK OFFICE

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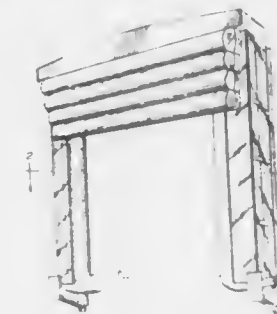
310,123  
FUNNEL WITH FILTER  
Eric V. Carlson, Lake Oswego, Oreg., assignor to Para Scientific, Inc., Lake Oswego, Oreg.  
Filed Oct. 19, 1987, Ser. No. 110,480  
Term of patent 14 years  
U.S. Cl. D24—29



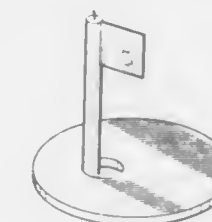
310,124  
FEMALE URINAL  
Adrienne Knowles, Middlebury, Conn., assignor to Comfy Catch-A-Spec Company, Middlebury, Conn.  
Filed Oct. 15, 1987, Ser. No. 108,736  
Term of patent 14 years  
U.S. Cl. D24—54



310,125  
DOCK SEAL  
David W. Moore, Ajax, Canada, assignor to Super Seal Mfg. Ltd., Ontario, Canada  
Filed May 5, 1987, Ser. No. 46,309  
Term of patent 14 years  
U.S. Cl. D25—35



310,126  
CANDLE  
Charles E. Wilson, 307 N. Washington St., Mt. Shasta, Calif. 96067  
Filed May 11, 1987, Ser. No. 47,998  
Term of patent 14 years  
U.S. Cl. D26—7



310,127  
CANDLE EXTINGUISHER OR THE LIKE  
Kaj G. Johnsson, Sando Strom 10900, Hanko, Finland  
Filed Nov. 30, 1987, Ser. No. 127,010  
Claims priority, application Finland, May 28, 1987, 435/87  
Term of patent 14 years  
U.S. Cl. D26—23





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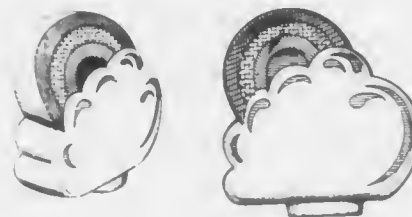
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310,128  
DUAL BEAM HEADLIGHT FOR BICYCLES OR THE  
LIKE  
Tobin George, 4732 Hampton Rd., La Canada, Calif. 91011  
Filed Aug. 13, 1987, Ser. No. 85,004  
Term of patent 14 years  
U.S. Cl. D26—35



310,129  
LIGHT DIFFUSER  
Alan A. Archambault, Smithfield; Nicholas R. Palumbo, Cum-  
berland, and Lyn C. Fletcher, East Providence, all of R.I.,  
assignors to General Electric Company, Schenectady, N.Y.  
Filed Nov. 24, 1986, Ser. No. 934,986  
Term of patent 14 years  
U.S. Cl. D26—125



## LIST OF PATENTEEES

TO WHOM

### PATENTS WERE ISSUED ON THE 21ST DAY OF AUGUST, 1990

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: See—  
Berg, Eero, 4,949,474, Cl. 34-102.000.  
Frejborg, Frey, 4,950,402, Cl. 210-413.000.
- A. B. Chance Company: See—  
Kamp, Eugene L., 4,951,022, Cl. 335-167.000.
- A. C. Innovations, Inc.: See—  
Levi, Avraham Y.; and Quarberg, Craig D., 4,949,809, Cl. 182-172.000.
- A. Finkl & Sons Co.: See—  
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- A/G Technology Corporation: See—  
Gollan, Arye Z., 4,950,315, Cl. 55-158.000.
- A. H. Robins Company, Incorporated: See—  
Yanni, John M.; and Walsh, David A., 4,950,674, Cl. 514-317.000.
- A.I.T. Corporation: See—  
Van Beek, Gary, 4,951,159, Cl. 358-455.000.
- A & M Cousin Etablissements Cousin Freres: See—  
Pipon, Yves; and Droulon, Georges, 4,950,088, Cl. 384-47.000.
- Aaronson, Alan M.: See—  
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- Abbott, Joshua B.; Kohls, Patrick E.; Schoenheit, Joseph W.; and Walden, Fred O., to VIP Company. Slat fence retainer. 4,950,098, Cl. 403-34.000.
- Abbott Laboratories: See—  
Fellingham, George H.; and Lawless, Michael, 4,950,244, Cl. 604-118.000.
- Abdel-Ghaffar, Khaled; and Hassner, Martin A., to International Business Machines Corporation. Method and means for correcting random and burst errors. 4,951,284, Cl. 371-38.100.
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Furusawa, Kenji; Abe, Katsuo; Kataoka, Hiroyuki; Takagaki, Tokuhiko; Shiroishi, Yoshihiro; and Tsumita, Norikazu, 4,950,548, Cl. 428-611.000.
- Abe, Toshiro; and Hashimoto, Atsunori, to Nissan Motor Company, Limited. System and method for controlling ignition timing for internal combustion engine. 4,949,691, Cl. 123-419.000.
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Snashall, Martin G.; Andrews, Mark R.; and Levy, David F., 4,951,145, Cl. 358-183.000.
- Abramczyk, William M., to Ford Motor Company. Collapsible steering column. 4,949,992, Cl. 280-777.000.
- Abramowitz, Joseph M. Nerve block needle and safety method of use. 4,950,233, Cl. 604-51.000.
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Nishioka, Nobuo; Juge, Tadayoshi; Shimizu, Yoshiaki; Namba, Keishichi; Shimura, Hiroshi; Abukawa, Fumitaka; Goi, Hitoshi; Fujita, Kazuyoshi; and Takasu, Yuichi, 4,950,334, Cl. 148-16.500.
- Accurate Metering Systems, Inc.: See—  
Schnitzler, James J., 4,949,577, Cl. 73-200.000.
- Acerra, Michele: See—  
Chen, Gilbert K.; and Acerra, Michele, 4,950,430, Cl. 261-112.200.
- AcroMed Corporation: See—  
Gaines, Robert W., Jr., 4,950,269, Cl. 606-61.000.
- Acushnet Company: See—  
Gobush, William, 4,949,976, Cl. 273-232.000.
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Asamaki, Tatsuo; Hoshino, Kiyoshi; Ukai, Katsumi; Ino, Yoichi; Adachi, Toshio; and Tsukada, Tsutomu, 4,950,956, Cl. 315-111.210.
- Adachi, Yuuma: See—  
Hara, Makoto; Adachi, Yuuma; Ishida, Masamitsu; and Nakajima, Nobuyoshi, 4,950,894, Cl. 250-327.200.
- Adams, Darryn R.: See—  
Pawlak, David M.; and Adams, Darryn R., 4,949,897, Cl. 229-2.50R.
- Adams, Maynard L.: See—  
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- Adams, Norman I.: See—  
Bradley, Alan C.; Vegdahl, Steven R.; and Adams, Norman I., 4,951,194, Cl. 364-200.000.
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- Adamson, Kenneth S.: See—  
Goodwin, Donald W.; and Adamson, Kenneth S., 4,949,750, Cl. 137-510.000.
- Adelphi Technology Inc.: See—  
Piestrup, Melvin A.; Boyers, David G.; Pincus, Cary I.; and Mac-cagno, Pierre, 4,951,304, Cl. 378-119.000.
- Aderans Co., Ltd.: See—  
Nakamura, Yukimichi; and Teratoko, Ryuji, 4,949,737, Cl. 132-54.000.
- Adidas Sportschuhfabriken, ADI Dassler Stiftung & Co. Kg.: See—  
Anderie, Wolf, 4,949,476, Cl. 36-129.000.
- Adomatis, Brandon J. Battery operated coping saw. 4,949,464, Cl. 30-509.000.
- Advance Display Technologies, Inc.: See—  
Sedlmayr, Steven R., 4,950,357, Cl. 156-426.000.
- Advanced Micro Devices, Inc.: See—  
Choi, Tai C.; Klein, Richard K.; and Sander, Craig S., 4,951,112, Cl. 357-41.000.
- McCool, John F.; and Limaye, Rajiv V., 4,951,280, Cl. 370-85.120.
- Schnizlein, Paul G., 4,950,928, Cl. 307-468.000.
- Advanced Nuclear Fuels Corporation: See—  
Patterson, John F.; Ewing, Richard H.; and Yates, Jack, 4,951,299, Cl. 376-439.000.
- Advanced Technology Materials, Inc.: See—  
Tom, Glenn M.; and Brown, Duncan W., 4,950,419, Cl. 252-194.000.
- Aeromover Systems Inc.: See—  
Meyer, Ronald A.; and Gerl, Neil D., 4,950,121, Cl. 414-428.000.
- Aeroquip Corporation: See—  
Heckler, Douglas J.; Hille, Richard S., Jr.; and Reynolds, Tony L., 4,949,470, Cl. 33-836.000.
- Aerosol Systems, Inc.: See—  
Flanner, Lloyd, 4,949,871, Cl. 222-95.000.
- Aerospace Corporation, The: See—  
Aurandt, Richard G., 4,950,865, Cl. 219-137.0PS.
- Agee, Robert B.: See—  
Staton, James S.; Turnblad, Ronald A., Jr.; and Agee, Robert B., 4,950,831, Cl. 585-447.000.
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Hayashi, Yutaka; Kondo, Yasushi; Ishii, Kenichi; and Kinoshita, Eita, 4,950,376, Cl. 204-192.320.
- Souma, Yoshie, 4,950,793, Cl. 568-34.000.
- Agnello, Anthony M.; Clayton, Mark; and Paul, Jon D. Self-contained, real-time spectrum analyzer. 4,950,999, Cl. 324-77.00B.
- Agostinelli, John A.; Paz-Pujalt, Gustavo R.; Mehrotra, Arun K.; and Hung, Liang-Sun, to Eastman Kodak Company. Metalorganic deposition process for preparing heavy pnictide superconducting oxide films. 4,950,643, Cl. 505-1.000.
- Ahlgren, William L., to Santa Barbara Research Center. Vapor phase epitaxy of semiconductor material in a quasi-open system. 4,950,358, Cl. 156-610.000.
- Ahmed, Fahim U., to Colgate-Palmolive Company. Process for the manufacture of high fatty acid monoglyceride monosulfate detergents. 4,950,440, Cl. 260-400.000.
- Ahrens, Fredrick J.: See—  
Wilson, Arthur J.; and Ahrens, Fredrick J., 4,949,760, Cl. 139-66.00R.
- Aibe, Hiroshi: See—  
Masumoto, Mitsuhiro; Asoh, Toshiaki; Ezaki, Youichirou; and Aibe, Hiroshi, 4,950,771, Cl. 549-335.000.
- Aida, Toshiyuki: See—  
Okamoto, Yukio; Aida, Toshiyuki; Miyauchi, Katsuki; Takagi, Kazumasa; Fukazawa, Tokumichi; and Takayama, Shinji, 4,950,642, Cl. 505-1.000.
- Aihara, Hideo: See—  
Yuyama, Yukihiko; Uematsu, Kenji; Okuda, Hiroaki; and Aihara, Hideo, 4,950,638, Cl. 503-226.000.
- Air-Lock, Incorporated: See—  
McKeon, John J., 4,949,745, Cl. 137-15.000.
- Air Plus, Inc.: See—  
Goode, Barry L., 4,949,412, Cl. 5-453.000.
- Air Products and Chemicals, Inc.: See—  
Norman, John A. T., 4,950,790, Cl. 564-278.000.
- Parris, Gene E.; and Pierantozzi, Ronald, 4,950,690, Cl. 546-184.000.
- Airborne Research Associates, Inc.: See—  
Govaert, Johan A., 4,950,978, Cl. 324-72.000.
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Fukami, Masanobu, 4,951,210, Cl. 364-431.110.
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Aizu, Yoshihisa; Ogino, Kouji; and Sugita, Toshiaki, to Kowa Company Ltd. Ophthalmological diagnosis method and apparatus. 4,950,070, Cl. 351-221.000.  
Akagawa, Minoru, to Intelmatic Corp. Actuator swing arm mechanism. 4,949,586, Cl. 74-96.000.  
Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Laminated material and formed article for packaging photographic materials. 4,950,512, Cl. 428-35.800.  
Akazawa, Takako: See—  
Honda, Yosuke; and Akazawa, Takako, 4,951,310, Cl. 379-266.000.  
Akers, Donald J., to Joslyn Corporation. Fast operator. 4,950,851, Cl. 200-148.00F.  
Akhtar, Muhammad; and Newell, Florine, to Johnson Products Co., Inc. Hair relaxer cream. 4,950,485, Cl. 424-71.000.  
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Akiyama, Kazuya: See—  
Nakade, Toshiaki; Asada, Shinji; Akiyama, Kazuya; and Yonezawa, Yasuharu, 4,951,132, Cl. 358-78.000.  
Akiyama, Shunichiro: See—  
Shida, Yoshiaki; Fujikawa, Hisao; Maruyama, Nobuyuki; and Akiyama, Shunichiro, 4,950,873, Cl. 219-548.000.  
Akkerboom, Piet J.: See—  
Olthoff, Margaretha; De Boer, Leonardus W. T.; and Akkerboom, Piet J., 4,950,484, Cl. 424-464.000.  
Aknar, Atilla; and Soussa, Andre, to Zone Technology Pty. Limited. Digital image acquisition system. 4,951,147, Cl. 358-209.000.  
Aksman, Igor B.: See—  
Suwala, David W.; and Aksman, Igor B., 4,950,711, Cl. 524-819.000.  
Aktiebolaget Draco: See—  
Andersson, Paul H.; Andersson, Per T.; Axelsson, Bengt I.; Thalen, Bror A.; and Trofast, Jan W., 4,950,659, Cl. 514-172.000.  
Akzo America Inc.: See—  
Tomko, John; and Aaronson, Alan M., 4,950,757, Cl. 544-195.000.  
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Butman, Bryan T.; and Mattingly, Jerome A., 4,950,589, Cl. 435-7.000.  
Akzona Incorporated: See—  
Torenbeck, Reinder; and Verhelst, Willem F., 4,950,422, Cl. 526-200.000.  
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Otten, Johann; Albarda, Scato; and Schuck, Hansjochen, 4,950,984, Cl. 324-204.000.  
Albarella, James P.: See—  
Dattagupta, Nanibhushan; and Albarella, James P., 4,950,744, Cl. 536-27.000.  
Albergo, Christopher J.; and Reele, Samuel, to Eastman Kodak Company. Electrode structure for light emitting diode array chip. 4,951,098, Cl. 357-17.000.  
Albertsson, Tor; and Bjorshammar, Thomas. Brake control system for preventing wheel blocking and/or spinning. 4,950,029, Cl. 303-117.000.  
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Albion Devices, Inc.: See—  
Wachtler, William R., 4,949,469, Cl. 33-702.000.  
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Luchetta, Joseph F., 4,950,219, Cl. 494-53.000.  
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Alfred Teves GmbH: See—  
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Reinartz, Hans-Dieter; and Steffes, Helmut, 4,950,027, Cl. 303-114.000.  
Allard, David D. Table having a part of which is adjustable upwardly. 4,949,650, Cl. 108-146.000.  
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Allen, David G.: See—  
Letts, Robert A.; Allen, David G.; and Bullen, Terence C., 4,949,602, Cl. 81-467.000.  
Allen, Donald R., to Frazier Industrial Company. Storage rack systems. 4,949,852, Cl. 211-151.000.  
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Farrar, David; Flesher, Peter; and Symes, Kenneth C., 4,950,747, Cl. 536-124.000.  
Farrar, David; Flesher, Peter; and Symes, Kenneth, 4,950,748, Cl. 536-124.000.  
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Chau, Michael M., 4,950,404, Cl. 210-500.270.  
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Thurston, John F.; and Golembiewski, Alan L., 4,949,755, Cl. 137-833.000.  
Tung, Hsueh S.; and Smith, Addison M., 4,950,816, Cl. 570-179.000.  
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Aluminum Company of America: See—  
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American Dynamics Corporation: See—  
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American Immuno Tech, Inc.: See—  
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Sanchez, Paul A.; Young, David A.; Kuhlmann, George E.; Parteneheimer, Walter; and Schammel, Wayne P., 4,950,786, Cl. 562-416.000.  
Shum, Victor K., 4,950,828, Cl. 585-417.000.  
Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., 4,950,825, Cl. 585-320.000.  
Amoena Corporation: See—  
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AMP Incorporated: See—  
Daly, John K.; and Kreinberg, Earl R., 4,950,180, Cl. 439-422.000.  
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Anderson, Dale D.: See—  
Jones, Gregory A.; and Anderson, Dale D., 4,949,905, Cl. 239-279.000.  
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Brakus, Bogdan; and Heinzl, Herbert, to Siemens Aktiengesellschaft. Single-ended forward frequency converter with a transformer and a demagnetization means. 4,951,186, Cl. 363-21,000.

Brammer, Norman; and Nobileau, Philippe C., to Vetco Gray Inc. Casing hanger seal locking mechanism. 4,949,787, Cl. 166-208,000.

Brandell, John T.: See—  
Szarka, David D.; Sullaway, Bob L.; Brandell, John T.; and Schwegman, Steven L., 4,949,788, Cl. 166-285,000.

Branz, Michael A.; and Fuhrmann, Ralph A., Jr., to Specialty Equipment Companies, Inc. Single pane, curved glass lid, frozen food merchandiser. 4,949,554, Cl. 62-248,000.

Braud, Yves, to Stein Heurtey. Air heater for corrosive atmospheres. 4,949,782, Cl. 165-34,000.

Braumer, Burkhard: See—  
Drescher, Armin; and Braumer, Burkhard, 4,951,136, Cl. 358-109,000.

Braun, Alfred; Helbig, Peter; and Steiner, Hermann, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen. Cementless lamp bulb and base combination. 4,950,942, Cl. 313-318,000.

Bredeweg, Corwin J., to Dow Chemical Company. The Organic acid halide neutralizing agents for anionic polymerizations. 4,950,723, Cl. 526-84,000.

Brell Mar Products, Inc.: See—  
Norton, Don S., 4,950,017, Cl. 296-77,100.

Brennan, H. George. Nasal tampon having a counter weight. 4,950,280, Cl. 606-196,000.

Brewer Science Inc.: See—  
Brewer, Terry; Flaim, Tony D.; and Moss, Mary G., 4,950,583, Cl. 430-311,000.

Brewer, Terry; Flaim, Tony D.; and Moss, Mary G., to Brewer Science Inc. Adhesion promoting product and process for treating an integrated circuit substrate therewith. 4,950,583, Cl. 430-311,000.

Brewster, Jimmie Ray: See—  
Bonvallet, John C.; Brewster, Jimmie Ray; Champion, James R.; and Shouldice, Kenneth S., 4,951,088, Cl. 355-77,000.

Brian, Chester J., Jr.; and Menapace-Burmeister, Karen M., to Ford Motor Company. Swashplate and sliding shoe assembly for an air conditioning compressor. 4,950,132, Cl. 417-269,000.

Bricheno, Terry; Fielding, Alan; and Day, Stephen, to STC PLC. Single mode couplers. 4,950,045, Cl. 350-96,160.

Bridgestone Corporation: See—  
Iizuka, Masao; Yasaka, Atsuhiko; Fukahori, Yoshide; and Yoshizawa, Toshikazu, 4,950,528, Cl. 428-212,000.

Kinoshita, Takeshi; Morita, Koichi; and Kumamoto, Yoshiyuki, 4,950,705, Cl. 524-357,000.

Brienza, Anthony R.; Liszewski, Casmier L.; Harloff, Richard R.; and Garland, William F., to Westinghouse Electric Corp. Replaceable longitudinal seal for a rotary combustor. 4,950,155, Cl. 432-115,000.

Briggs, Jeffrey M. Cable action instrument. 4,950,273, Cl. 606-113,000.

Briggs, Kerry D., to Simplex Wire & Cable. Graduated friction anchor. 4,950,001, Cl. 285-149,000.

Brilliant, Stuart D.: See—  
Croce, Michael A.; Bae, Kook J.; and Brilliant, Stuart D., 4,950,704, Cl. 524-357,000.

British-American Tobacco Company Limited: See—  
Clift, Roland; Legros, Robert; and Millington, Clive A., 4,949,735, Cl. 131-291,000.

Broadwin, Alan; and Logan, Joseph N., to Valleylab, Inc. Apparatus for assembling threaded members. 4,949,601, Cl. 81-52,000.

Brochard, Jean-Michel; Frisou, Francois; and Le Roy, Pierre, to Rhone-Poulenc Agrochimie. Preparation of O-alkyl, S,S-dialkylphosphorothioates. 4,950,784, Cl. 558-100,000.

Brockhaus, Peter B., to Volhard, Donald, a part interest. Retractable bed for truck. 4,950,123, Cl. 414-522,000.

Brogna, Salvatore J.; Riehm, George E.; and Shulman, Burt, to PepsiCo Inc. Lid dispenser for an automated drinkmaker system. 4,949,526, Cl. 53-306,000.

Brook, Derek. Method for performing in vitro diagnostic test on horses utilizing a blood sample. 4,949,728, Cl. 128-760,000.

Brooks, David A. Fluid operable engine. 4,949,622, Cl. 91-224,000.



Broom, Henry T., to NALCO Chemical Company. Fluidization of heavy slurries. 4,949,743, Cl. 137-13.000.  
Brosius, Klaus: See—  
Korner, Tillmann; and Brosius, Klaus, 4,950,215, Cl. 475-252.000.  
Broske, William F. Differential recoil diffuser. 4,949,491, Cl. 42-1.060.  
Brother Kogyo Kabushiki Kaisha: See—  
Mori, Isao, 4,951,235, Cl. 364-550.000.  
Sasaki, Ryoichi, 4,951,226, Cl. 364-518.000.  
Brown, Clyde M., Jr.: See—  
Alter, Martin J.; Brown, Clyde M., Jr.; and Compton, James B., 4,951,101, Cl. 357-234.000.  
Brown, Dale A.: See—  
Roerig, Arnold J.; Wedel, Gregory L.; and Brown, Dale A., 4,949,475, Cl. 34-115.000.  
Brown, Daniel E.: See—  
Leary, Steven G.; Benson, Clark K.; Caridis, Andrew A.; and Brown, Daniel E., 4,949,629, Cl. 99-386.000.  
Brown, Duncan W.: See—  
Tom, Glenn M.; and Brown, Duncan W., 4,950,419, Cl. 252-194.000.  
Brown, Eric W.; Kienholz, Charles; and Busak, Steve, to I-Flow Corporation. Multiple fluid cartridge and pump. 4,950,245, Cl. 604-153.000.  
Brown, Eric W.; Kienholz, Charles; Robinson, Earl F.; and Bare, Rex O., to I-Flow Corporation. Catheter connector and clamp. 4,950,255, Cl. 604-250.000.  
Brown, Herbert C. Novel process of producing phenyl or substituted phenylalkylamine pharmaceutical agents and novel chiral intermediates of high enantiomeric purity useful therein. 4,950,791, Cl. 564-304.000.  
Brown, J. Theodore. Specimen collection kit for mailing. 4,949,840, Cl. 206-204.000.  
Brown, Jay C.: See—  
Rynne, Edward F.; and Brown, Jay C., 4,950,936, Cl. 310-337.000.  
Brown, John E. Non-toxic shot and shot shell containing same. 4,949,644, Cl. 102-498.000.  
Brown, R. Malcolm, Jr.: See—  
Saxena, Inder M.; Roberts, Eric M.; and Brown, R. Malcolm, Jr., 4,950,597, Cl. 435-101.000.  
Brown, Ronald J.: See—  
Baillie-Hamilton, William J.; and Brown, Ronald J., 4,951,076, Cl. 354-291.000.  
Brown & Sharpe Manufacturing Company: See—  
Pesikov, Vitaly I., 4,949,465, Cl. 33-1.00M.  
Brown, Warner K.; and Adams, Maynard L., to Clark Equipment Company. Upright for lift truck. 4,949,816, Cl. 187-9.00E.  
Brown-Wensley, Katherine A.: See—  
Palazotto, Michael C.; Brown-Wensley, Katherine A.; and DeVoe, Robert J., 4,950,696, Cl. 522-25.000.  
Browning, Iben, to Foresight, Inc. Optical projection system. 4,951,150, Cl. 358-231.000.  
Browning, Robert L.: See—  
Dobson, William R.; and Browning, Robert L., 4,949,483, Cl. 40-155.000.  
Brozenick, David N.: See—  
Martin, Fred L.; and Brozenick, David N., 4,950,169, Cl. 439-44.000.  
Bruckner, Raimund: See—  
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Bruening, Ronald L.: See—  
Tarbet, Bryon J.; Bruening, Ronald L.; Bradshaw, Jerald S.; and Izatt, Reed M., 4,950,636, Cl. 502-401.000.  
Brugger, Stephan. Transportable inhalation device. 4,949,715, Cl. 128-204.210.  
Brun, Charles J., Jr.; and Newport, Anthony F., to Electra Form, Inc. Apparatus for producing preforms and blow molded articles. 4,950,152, Cl. 425-533.000.  
Brunin, Armand: See—  
Boudon, Gerard; Brunin, Armand; Denis, Bernard; Mollier, Pierre; and Stoppa, Philippe, 4,950,927, Cl. 307-457.000.  
Brunswick Bowling and Billiards Corporation: See—  
Gretzky, Anthony J., 4,949,962, Cl. 273-43.00E.  
Brunswick Corporation: See—  
Krucos, Francis E., 4,950,983, Cl. 324-169.000.  
Meisenburg, Gary L., 4,950,190, Cl. 440-88.000.  
Brusutti, Giancarlo. Sealing element for a rotary timing system of internal-combustion engines. 4,949,686, Cl. 123-190.00E.  
BTS Broadcast Television Systems GmbH: See—  
Glaab, Friedrich; Ritter, Uwe; and Sturm, Rainer, 4,951,142, Cl. 358-148.000.  
Bucci, Umberto: See—  
Garzia, Aldo; and Bucci, Umberto, 4,950,669, Cl. 514-237.500.  
Buchschmid, Emil; Frenznick, Anton; Lindner, Klaus; Schmid, Olaf; Schmid, Hans-Dieter; Schmidt, Gerhard; and Sturm, Theodor, to Robert Bosch GmbH. Electromagnetic relay. 4,951,017, Cl. 335-128.000.  
Buechter, Beat, to Buechter Formenhau AG. Quick-acting clamping device. 4,949,946, Cl. 269-203.000.  
Buechter Formenhau AG: See—  
Buechter, Beat, 4,949,946, Cl. 269-203.000.  
Buck, Daniel C.: See—  
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Buckeye Steel Castings Co.: See—  
Solomon, James E., 4,949,856, Cl. 213-62.00R.

Buckles, John J., to Mobil Oil Corporation. Oil fill procedure for seismic marine streamer. 4,951,265, Cl. 367-18.000.  
Buckley, James A. V.; Hinkens, George H.; and Dimsey, James J., to Hayes Industrial Brake, Inc. High production, torque limiting, one-way clutch. 4,949,824, Cl. 192-45.000.  
Budd, Russell A.; Gibson, Bruce D.; Kantor, Sherwood; Overby, Wayne A.; and Stanich, Mikel J., to International Business Machines Corporation. Chromatic and misalignment compensation in a multiple beam laser scanning system. 4,950,889, Cl. 250-236.000.  
Buddy L Corporation: See—  
Auer, Robert T.; Mayer, Richard J.; and Chung, Jore M., 4,949,466, Cl. 33-18.100.  
Bue, Richard C.: See—  
Terres, Mark A.; Thompson, Paul; and Bue, Richard C., 4,949,649, Cl. 108-116.000.  
Buehler, Charles K.; Fries, Richard W.; and Pullukat, Thomas J., to Quantum Chemical Corporation. Modified silica based catalyst. 4,950,631, Cl. 502-119.000.  
Buehler, Erich: See—  
Speich, Francisco; and Buehler, Erich, 4,949,762, Cl. 139-445.000.  
Buendia, Jean: See—  
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Buhler, Hans-Eugen: See—  
Flockenhaus, Claus; Galow, Manfred; Merkel, Klaus; Buhler, Hans-Eugen; and Kainer, Hartmut, 4,950,473, Cl. 423-235.000.  
Buhler, Ulrich; Boos, Margareta; and Kuhn, Reinhard, to Cassella Aktiengesellschaft. Water-insoluble monoazo dyes, their preparation and use, and mixtures of these monoazo dyes. 4,950,305, Cl. 8-639.000.  
Bulanda, John J.: See—  
Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wienck, Donald C., 4,950,184, Cl. 439-536.000.  
Bull HN Information Systems Inc.: See—  
Bailey, Christopher R. M.; Mandile, John R.; Peters, Daniel G.; and Stonier, James W., 4,951,245, Cl. 364-900.000.  
BULL HN Information Systems Italia S.p.A.: See—  
Zulian, Ferruccio, 4,951,301, Cl. 377-54.000.  
Bullen, Terence C.: See—  
Letts, Robert A.; Allen, David G.; and Bullen, Terence C., 4,949,602, Cl. 81-467.000.  
Bumb, Timothy: See—  
Fortune, Frederick A.; and Bumb, Timothy, 4,950,196, Cl. 446-73.000.  
Buratto, Stan D.: See—  
Bender, Gregory W.; Buratto, Stan D.; and Evans, Robert D., 4,950,361, Cl. 162-199.000.  
Burdeska, Kurt: See—  
Reinert, Gerhard; and Burdeska, Kurt, 4,950,304, Cl. 8-566.000.  
Burgert, Bill E.; and Ranck, Dan E., to Dow Chemical Company. The Alloys of vinylidene chloride interpolymers and olefin polymers. 4,950,718, Cl. 525-185.000.  
Burghart, Hermann; and Kuhbeck, Alois, to Alois Kuhbeck GmbH. Truck and/or trailer with a closed box body. 4,950,124, Cl. 414-537.000.  
Burk, Gary N.: See—  
Williams, Paul; Domin, Thomas M.; Burk, Gary N.; McCanney, Thomas O.; and Wilson, Steven M., 4,950,911, Cl. 250-563.000.  
Burke, Patrick M.; and Sieja, James B., to Du Pont de Nemours, E. I., and Company. Manufacture of 5-cyanovaleic acid and its esters using cyclic cosolvents. 4,950,778, Cl. 558-353.000.  
Burndy Corporation: See—  
Barnes, Donald E., 4,950,120, Cl. 414-331.000.  
Gordon, Gregg, 4,950,838, Cl. 174-94.00R.  
Burnham, David, to Oneida Labs, Inc. Bow release. 4,949,698, Cl. 124-35.200.  
Burns, Bruce P., to United States of America, Army. Temperature-compensated, acceleration-activated igniter. 4,949,639, Cl. 102-249.000.  
Burns, Danny. Livestock feeder apparatus. 4,949,676, Cl. 119-52.100.  
Burout, Charles J., III, to Warner-Lambert Company. Soft resilient razor handle. 4,949,457, Cl. 30-85.000.  
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Busak, Steve: See—  
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Butler, Mark A.: See—  
Lyle, William M.; Bordovsky, James P.; and Butler, Mark A., 4,949,656, Cl. 111-174.000.  
Butler, Michael A.; Lysy, Dusan G.; and Morehouse, Paul W., Jr., to Xerox Corporation. Colored toner optical developability sensor with improved sensing latitude. 4,950,905, Cl. 250-358.100.  
Butman, Bryan T.; and Mattingly, Jerome A., to Akzo N.V. Genus-specific listeria antigen identified by monoclonal antibodies. 4,950,589, Cl. 435-7.000.  
Buttke, Robert D.; and Frey, John R., to Amoco Corporation. Vapor collection and process for ebullated bed reactors. 4,950,459, Cl. 422-220.000.  
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Botta, Artur; Buysch, Hans-Josef; and Puppe, Lothar, 4,950,817, Cl. 570-208.000.  
B.V. Optische Industrie "De Oude Delft": See—  
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Bycroft, Nancy L.; and Byng, Graham S., to Miles Inc. Detergent formulations containing alkaline lipase derived from *Pseudomonas plantarii*. 4,950,417, Cl. 252-174.120.  
Byer, Robert L.: See—  
Basu, Santanu; and Byer, Robert L., 4,951,294, Cl. 372-75.000.  
Byng, Graham S.: See—  
Bycroft, Nancy L.; and Byng, Graham S., 4,950,417, Cl. 252-174.120.  
C. H. Masland & Sons: See—  
Smith, Rayna W.; and Saidla, Glen W., 4,950,439, Cl. 264-294.000.  
C. R. Bard, Inc.: See—  
Sinofsky, Edward L., 4,950,266, Cl. 606-2.000.  
Cabella, Paolo: See—  
Cardillo, Rosanna; Fuganti, Claudio; Sacerdote, Giuseppe; Barbeni, Massimo; Cabella, Paolo; and Squarcia, Francesco, 4,950,607, Cl. 435-280.000.  
Cabot Safety Corporation: See—  
Salce, Arthur J.; and Metcalfe, Richard T., 4,950,445, Cl. 264-549.000.  
Cabral, Antonio W. M.: See—  
Maier, Alfred E.; Cabral, Antonio W. M.; and Silva, Carlos P. S. E., 4,950,848, Cl. 200-50.0AA.  
Caille, Gilles: See—  
Dumont, Louis; and Caille, Gilles, 4,950,663, Cl. 514-211.000.  
CAL R & D, Inc.: See—  
Curran, Kenneth J., 4,950,200, Cl. 446-302.000.  
Calabresi, Paul; Darnowski, James W.; and Wiemann, Michael C. Reduction of the severity of 3'-oxido-3'-deoxythymidine-induced anemia using a combination of benzylacycloundine and dipyradimole. 4,950,466, Cl. 424-10.000.  
Callahan, Gerald A.: See—  
McFann, C. Joseph; and Callahan, Gerald A., 4,949,998, Cl. 282-29.00B.  
Callero, Antonio; and Callero, Vincenzo, to F.I.M.A.C. Fabbria Italiana Macchine Aria Compressa S.p.A. High-efficiency turbine, in particular for exploiting wind power in auxiliary power sources for aeronautical applications. 4,950,131, Cl. 416-87.000.  
Callero, Vincenzo: See—  
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Camberlin, Yves: See—  
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Camerini Porzi, Pier Cesare, to Officine Vittoria S.p.A. Circuit for monitoring and controlling the flow of hot air in equipment for roasting coffee, nuts and similar edible commodities. 4,949,632, Cl. 99-468.000.  
Cameron, Robert E. Log delivery mechanism. 4,949,769, Cl. 144-245.00A.  
Campiotti, Richard H.; and Hopwood, James E., to United States of America, Energy. DC arc weld starter. 4,950,864, Cl. 219-130.400.  
Canada, Her Majesty the Queen in right of, as represented by Minister of National Defence of Her Majesty's Canadian Government: See—  
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Candela, Lawrence M.; Cochran, Robert N.; and Sandler, Scott H., to Arco Chemical Technology, Inc. Ethylbenzene oxidation. 4,950,794, Cl. 568-320.000.  
Canelli, Giuseppe. Sink trap filter assembly. 4,949,406, Cl. 4-288.000.  
Canon Kabushiki Kaisha: See—  
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Sakaguchi, Yuji; Fukushima, Nobuo; and Miyamoto, Ryosuke, 4,951,276, Cl. 369-58.000.  
Terasawa, Koji; Miyakawa, Akira; Yamaguchi, Hideki; Matsui, Shinya; Shiga, Mikio; Tsuyukubo, Shigeru; Ara, Yoji; Yokoi, Katsuyuki; Nakamura, Masaaki; Kaburagi, Yoshiaki; Mukai, Takanori; Shoda, Shoichiro; and Kimura, Tetsuo, 4,951,066, Cl. 346-140.00R.  
Wada, Hiroyuki; Kaneda, Naoya; Hirasawa, Masahide; and Suda, Hirofumi, 4,950,054, Cl. 350-429.000.  
Yamada, Akira, 4,950,527, Cl. 428-192.000.  
Yoshimura, Katsuji; Takahashi, Koji; Nagasawa, Kenichi; Yamashita, Shinichi; Kashida, Motokazu; and Otokawa, Mitsuhiro, 4,951,162, Cl. 360-77.140.  
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Capro, Inc.: See—  
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Cardillo, Rosanna; Fuganti, Claudio; Sacerdote, Giuseppe; Barbeni, Massimo; Cabella, Paolo; and Squarcia, Francesco, to Pernod-Ricard. Process for the microbiological production of gamma (R) decanolide and gamma (R) octanolide. 4,950,607, Cl. 435-280.000.  
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Caribonum Limited: See—  
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Caridis, Andrew A.: See—  
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Carl Freudenberg, Firma: See—  
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Schapp, Udo; and Lohrer, Josef, 4,949,513, Cl. 51-287.000.  
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Carlson, John T. Mixing apparatus. 4,950,082, Cl. 366-130.000.  
Carlson, Verne W.: See—  
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Carmody, Burr T. Support fixture for mounting on railings and the like. 4,949,924, Cl. 248-215.000.  
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Carpenter, Scott: See—  
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Carson, Ronald H. Bracket for mounting auxiliary compressed air tank to a main tank. 4,949,889, Cl. 224-270.000.  
Carter, Andrew J.: See—  
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Cartier, George E., to Monsanto Company. Cross-linked polyvinyl butyral sheet. 4,950,714, Cl. 525-61.000.  
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Casket Shells, Inc.: See—  
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Casler, Richard J.: See—  
Hoffman, Carvel D.; Booth, R. Creighton; Clymer, John C.; and Casler, Richard J., 4,951,222, Cl. 364-507.000.  
Caspari, Robert: See—  
Spoon, Herbert; Vaillancourt, Vincent; and Caspari, Robert, 4,949,732, Cl. 128-839.000.  
Casper, Thomas J.: See—  
Wiegand, James H.; and Casper, Thomas J., 4,950,398, Cl. 210-232.000.  
Cassella Aktiengesellschaft: See—  
Buhler, Ulrich; Boos, Margareta; and Kuhn, Reinhard, 4,950,305, Cl. 8-639.000.  
Castro, Hernan A.: See—  
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Caterpillar Inc.: See—  
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Evans, Raymond G., 4,950,964, Cl. 318-52.000.  
Caterpillar Industrial Inc.: See—  
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Cavalla, David J.; and Mitchell, William L., to Glaxo Group Limited. Ketone derivatives. 4,950,681, Cl. 514-397.000.  
Caveney, Jack E.; Bulanda, John J.; Fischer, Richard L.; Stroede, Andrew J.; and Wienck, Donald C., to Panduit Corp. Wall plate assembly. 4,950,184, Cl. 439-536.000.  
Cazalis, Jean-Pierre; and Martin, Bernard S., to ISO Concept. Isolator for work in an aseptic environment. 4,949,863, Cl. 220-9.100.  
Cazes, Michel, to Societe Generale Des Eaux Minerales De Vittel. Reinforced pouring assembly and its method of construction. 4,949,870, Cl. 222-81.000.  
Cearley, John L.: See—  
McCandless, Henry A.; Cearley, John L.; and Taheri, Hassan, 4,950,769, Cl. 549-257.000.  
Cebal: See—  
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Cecchetti, Alfred E. Fishing rod holder support device. 4,949,498, Cl. 43-21.200.  
Celgene Corporation: See—  
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de Detrich, Paul E.: See—  
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Takasugi, Hideto; Ozeki, Akihiko; Komatsu, Masami; Nakada, Masayuki; and Fukase, Hisahiko, 4,949,776, Cl. 164-437.000.

Fukazawa, Tokumi: See—  
Okamoto, Yukio; Aida, Toshiyuki; Miyauchi, Katsuki; Takagi, Kazumasa; Fukazawa, Tokumi; and Takayama, Shinji, 4,950,642, Cl. 505-1.000.

Fukino, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Electronic part mounting system for printed circuit board. 4,951,240, Cl. 364-489.000.

Fukuchi, Toshiaki: See—  
Okada, Itaru; Okui, Shuko; Takahashi, Yoji; and Fukuchi, Toshiaki, 4,950,668, Cl. 514-232.200.

Fukuchi, Yoshinosuke: See—  
Sato, Toshio; Fukuchi, Yoshinosuke; and Toba, Kenji, 4,950,465, Cl. 424-10.000.

Fukuda, Junichi: See—  
Kurihara, Norimitsu; Tsuchiya, Yoshikazu; Morota, Makie; and Fukuda, Junichi, 4,950,914, Cl. 307-10.100.

Fukui, Megumu: See—  
Yoshida, Toshio; Nakamura, Kenichi; Matsuda, Yoshihisa; Hayaishi, Eiichi; Kinose, Kazuo; and Fukui, Megumu, 4,949,667, Cl. 118-60.000.

Fukui, Yoshio: See—  
Shirotu, Yoshimi; Shimura, Mitsunori; Shimokawa, Kenji; Fukui, Yoshio; Asaoka, Sachio; Tajima, Hiroto; Ueda, Kazuaki; Tachibana, Yakudo; Tate, Kazuhiko; and Taniguchi, Hiroaki, 4,950,824, Cl. 585-320.000.

Fukunaga, Takahiro: See—  
Matsumoto, Manabu; and Fukunaga, Takahiro, 4,951,090, Cl. 355-200.000.

Fukushima, Nobuo: See—  
Sakaegi, Yuji; Fukushima, Nobuo; and Miyamoto, Ryosuke, 4,951,276, Cl. 369-58.000.

Funatsu, Eiji: See—  
Yamaguchi, Toshio; Uekusa, Kikoo; Kinbara, Naoto; Funatsu, Eiji; Shirashi, Katsuzo; and Mitarai, Yukuaki, 4,950,633, Cl. 502-314.000.

Funatsuki, Koji; and Hiramatsu, Shigeru, to Mazda Motor Corporation. Method of and apparatus for adjusting ignition timing by rotating the crankshaft with the coil and spark plug terminals disconnected from the ignition circuit. 4,950,996, Cl. 324-391.000.

Furman International Ltd.: See—  
Richardson, Arthur W., 4,950,000, Cl. 285-15.000.

Furtwaengler, Gerhard; Kobler, Ulrich; Stadler, Heinz; and Weiser, Josef, to Siemens Aktiengesellschaft. Polarized electromagnetic multi-contact relay. 4,951,016, Cl. 335-80.000.

Furuhashi, Hiroyuki: See—  
Murata, Masahide; Imai, Masafumi; Furuhashi, Hiroyuki; Maruyama, Kouji; and Ueno, Hiroshi, 4,950,630, Cl. 502-116.000.

Furuhashi, Ryoichi: See—  
Kojima, Hiroshi; Sakata, Keikichi; Watanabe, Seigo; Mitsukuchi, Yukio; Hashimoto, Shuichi; Kato, Choji; Teshigahara, Mikio;

Furuhashi, Ryoichi; Momoi, Shoji; Inoue, Toshihiko; Uemura, Kazuki; and Oshima, Katsushi, 4,949,444, Cl. 29-27.00R.

Furukawa Electric Co., Ltd.: See—  
Muto, Makoto; Hasimoto, Kyosuke; Matsuda, Yutaka; Himono, Yusaku; Inoue, Kiyoshi; Inoue, Teruhisa; Michihira, Osamu; and Ito, Yuichi, 4,951,281, Cl. 370-95.200.

Furukawa, Katsuo, to Clarion Co., Ltd. Surface-acoustic-wave convolver. 4,950,935, Cl. 310-313.00R.

Furukawa, Motoki; Kishita, Yoshihiro; and Mitani, Tatsuro, to Kabushiki Kaisha Toshiba. Semiconductor device with a 3-ply gate electrode. 4,951,121, Cl. 357-71.000.

Furukawa, Yoshimi; Takei, Akihiko; Ishida, Shinnosuke; and Oono, Nobuyuki, to Honda Giken Kogyo Kabushiki Kaisha. Method for controlling the front wheel steer angle. 4,951,207, Cl. 364-424.050.

Furusawa, Kenji; Abe, Katsuo; Kataoka, Hiroyuki; Takagaki, Tokuhito; Shiroishi, Yoshihiro; and Tsumita, Norikazu, to Hitachi, Ltd. Magnetic recording medium and method of producing same. 4,950,548, Cl. 428-611.000.

Furusho, Noboru: See—  
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,950,572, Cl. 430-59.000.

Fusco, Ronald S., to AMAX Inc. Composite copper-molybdenum sheet. 4,950,554, Cl. 428-663.000.

Futagawa, Hitoshi, to Nissho Corporation. Method for welding thermoplastic resin. 4,950,347, Cl. 156-272.400.

G. D. Searle & Co.: See—  
Koszyk, Francis J.; and Deason, James R., 4,950,684, Cl. 514-456.000.

Gage, Douglas M., to Deere & Company. Hydraulic steering systems dampening devices. 4,949,802, Cl. 180-132.000.

Gahara, William J.; Johnson, Thomas R.; and Shah, Tilak M., to Worldwide Medical Plastics Inc. Angioplasty balloons and balloon catheters. 4,950,239, Cl. 604-96.000.

Gaines, Robert W., Jr., to AcroMed Corporation. Spinal column fixation device. 4,950,269, Cl. 606-61.000.

Gajary, Antal: See—  
Pap, Laszlo; Sarkoz, Peter; Somfai, Eva; Szego, Andras; Szekely, Istvan; Hidasi, Gyorgy; Zoltan, Sandor; Dea k nee Molnar, Aniko; Hegedus, Agnes; Bertok, Bela; Botar, Sandor; Gajary, Antal; and Nagy, Lajos, 4,950,682, Cl. 514-417.000.

Galhotra, Ashwani K., to Ford Motor Company. Interaxle differential for full time all wheel drive system. 4,949,594, Cl. 74-650.000.

Galileo Electro-Optics Corp.: See—  
Tosswill, Christopher H., 4,950,939, Cl. 313-103.0CM.

Galimzhanov, Edil K.: See—  
Pilat, Boris V.; Yakunin, Alexandr I.; and Galimzhanov, Edil K., 4,950,389, Cl. 209-157.000.

Gallatin, Norman W. Asymmetrical four-bar trailer hitch. 4,949,987, Cl. 280-459.000.

Galow, Manfred: See—  
Flockenhaus, Claus; Galow, Manfred; Merkel, Klaus; Buhler, Hans-Eugen; and Kainer, Hartmut, 4,950,473, Cl. 423-235.000.

Gandhi, Haren S.: See—  
Su, Eugene C.; Korniski, Thomas J.; Watkins, William L. H.; and Gandhi, Haren S., 4,950,476, Cl. 423-213.700.

Garcia, Agustin M.; Lawrence, Cris W.; and Thoma, Morgan J., to AT&T Bell Laboratories. Method of measuring mobile ion concentration in semiconductor devices. 4,950,977, Cl. 324-71.100.

Garcia Pastor, Daniel; and Garcia Pastor, Francisco. Mechanical drying process applicable to papermaking. 4,949,471, Cl. 34-23.000.

Garcia Pastor, Francisco: See—  
Garcia Pastor, Daniel; and Garcia Pastor, Francisco, 4,949,471, Cl. 34-23.000.

Garcia, Ralph: See—  
Najjar, Mitri S.; Pascoe, James R.; and Garcia, Ralph, 4,950,307, Cl. 44-51.000.

Gardner, Roger J.: See—  
Rudell, Elliot A.; and Gardner, Roger J., 4,949,489, Cl. 40-546.000.

Gareis, Ronald E.: See—  
Cruickshank, Ancil B.; Gareis, Ronald E.; Kocher, Mark J.; and Tuso, Michael J., 4,951,250, Cl. 364-900.000.

Garland, William F.: See—  
Brienza, Anthony R.; Liszewski, Casmier L.; Harloff, Richard R.; and Garland, William F., 4,950,155, Cl. 432-115.000.

Garrett, Edward V., to Figgie International, Inc. Aerial apparatus and stabilizing means therefor. 4,949,808, Cl. 182-17.000.

Garoutte, Kurt F.: See—  
Schisselbauer, Paul F.; and Garoutte, Kurt F., 4,950,565, Cl. 429-116.000.

Garrett, Samuel G. Continuously flowing display device having a plurality of visual effects. 4,949,485, Cl. 40-406.000.

Garrett, Steven L.; and Danielson, Donald A., to United States of America, Navy. Flexensional hydrophone. 4,951,271, Cl. 367-141.000.

Garshelis, Ivan J. Two region, remanently magnetized position sensor. 4,950,988, Cl. 324-207.240.

Garuts, Valdis E., to Tektronix, Inc. Analog multiplier based sample and hold network. 4,950,923, Cl. 307-353.000.

Garvey, Michael J.: See—  
Heindel, Timothy R.; Garvey, Michael J.; Dick, Daniel W.; Keller, Richard F.; Jordan, Mary P.; and Schleinz, Alan F., 4,949,668, Cl. 118-314.000.

Garwin, Jeffrey L.: See—  
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., 4,950,646, Cl. 514-12.000.



Garzia, Aldo; and Bucci, Umberto, to Cometec s.r.l. Methods and compositions for promoting growth of animals. 4,950,669, Cl. 514-237.500.

Gas Research Institute: See—  
McDonald, William C.; Pittard, Gerard T.; and Cohen, John H., 4,949,795, Cl. 175-40.000.

Gasser, Hermann, to Hollingsworth GmbH. Apparatus for compressing and automatically introducing a textile fiber sliver. 4,949,431, Cl. 19-150.000.

Gatan, Incorporated: See—  
Jones, Joseph S.; and Swann, Peter R., 4,950,901, Cl. 250-443.100.

Gates Energy Products, Inc.: See—  
Puglisi, Vincent J.; Rampel, Guy G.; Richardson, Kenneth R.; and Prickett, Orville G., 4,950,564, Cl. 429-101.000.

Gaudilliere, Bernard: See—  
Frost, Jonathan; Gaudilliere, Bernard; Rousseau, Jean; Dupont, Regis; Manoury, Philippe; and Obitz, Daniel, 4,950,670, Cl. 514-254.000.

Gaverick, Steven L.: See—  
Jacob, Philippe L.; and Gaverick, Steven L., 4,951,052, Cl. 341-122.000.

Gaylor, Thomas K.; Verriest, Erik I.; and Mirsalehi, Mir M., to Georgia Tech Research Corporation. Integrated optical givens rotation device. 4,950,042, Cl. 350-96.140.

Geary, Denis F.; and Bahoric, Andrej, to HSC Research Development Corporation. Peritoneal dialysis catheter suitable for permanent implant. 4,950,259, Cl. 604-282.000.

GEC Avionics Limited: See—  
Hobson, Neville, 4,951,242, Cl. 364-715.010.

GEC-Marconi Limited: See—  
Smith, Brian F., 4,950,056, Cl. 350-505.000.

Gehmecker, Horst; Rausch, Werner; and Jorns, Peter, to Metallgesellschaft Aktiengesellschaft. Process of forming phosphate coatings on metals. 4,950,339, Cl. 148-262.000.

Geiger, Friedrich, to Passat Maschinenbau GmbH. Control system with valve flaps for a drier. 4,949,477, Cl. 34-133.000.

Gelbart, Daniel, to Creo Electronics Corp. Method and apparatus for correcting position errors using writable encoders. 4,950,890, Cl. 250-237.000.

Geller, Joseph D.; and LeBlanc, Robert E. Cutting apparatus with workpiece rotation control. 4,949,605, Cl. 82-46.000.

Gen-Probe Incorporated: See—  
Arnold, Lyle J., Jr.; Waldrop, Alexander A., III; and Hammond, Philip W., 4,950,613, Cl. 436-546.000.

Genders, John D.: See—  
Weinberg, Norman L.; Genders, John D.; and Mazur, Duane J., 4,950,368, Cl. 204-72.000.

General Electric Company: See—  
Corbett, Peter F.; and Hartley, Richard I., 4,951,221, Cl. 364-489.000.

Faler, Gary R.; and Lynch, Jerry C., 4,950,731, Cl. 528-201.000.

Fox, Daniel W.; Peters, Edward N.; and Sybert, Paul D., 4,950,782, Cl. 562-469.000.

Glover, Gary H.; Pelc, Norbert J.; and Bradshaw, Kenneth Marel, 4,950,994, Cl. 324-320.000.

Goldman, Ira B.; and Seymour, Raymond K., 4,950,852, Cl. 200-144.000.

Gou, Perng-Fei; and Townsend, Harold E., 4,950,448, Cl. 376-283.000.

Guggenheim, Thomas L.; Cella, James A.; McCormick, Sharon J.; Colley, Alice M.; Rich, Jonathan D.; and McDermott, Philip J., 4,950,727, Cl. 528-26.000.

Haim, Elias S.; and Leard, Francis L., 4,950,053, Cl. 350-345.000.

Harms, Harold B.; and Erdman, David M., 4,950,932, Cl. 310-67.000.

Hines, William R., 4,949,544, Cl. 60-728.000.

Horneck, Craig W.; McDermott, John B.; Smith, Daniel P.; Kimura, Shiro G.; and Shisler, Roger A., 4,950,837, Cl. 174-14.000.

Iasillo, Robert J.; and Fedor, Stephen, 4,949,538, Cl. 60-39.465.

Jacob, Philippe L.; and Gaverick, Steven L., 4,951,052, Cl. 341-122.000.

Krefta, Ronald J.; and Forbes, Franklin L., 4,950,960, Cl. 318-254.000.

Patel, Manubhai M.; and Hoeft, Robert F., 4,950,129, Cl. 415-160.000.

Petersen, George E.; Robinson, Randall N.; Ruiz, Carl P.; Marble, William J.; Gordon, Barry M.; and Gordon, Gerald M., 4,950,449, Cl. 376-306.000.

Roberts, Victor D., 4,950,059, Cl. 350-345.000.

Schutten, Michael J.; Park, John N.; and Kuo, Ming H., 4,951,185, Cl. 363-17.000.

Simonson, Dale E.; Orchard, Ronald J.; and Stoll, Donald H., 4,951,182, Cl. 362-145.000.

Walker, Clarence W.; and Hibbert, David A., 4,950,841, Cl. 174-88.000.

Wengrovius, Jeffrey H.; and VanValkenburgh, Virginia M., 4,950,779, Cl. 556-457.000.

General Electric Company, plc. The: See—  
Baxter, Ivor R.; and Hair, Thomas, 4,951,213, Cl. 364-456.000.

General Engineering (Netherlands) B.V.: See—  
Haland, Lars Y.; Karlin, Mats A.; Ennerdahl, Leif; and Skanberg, Enar T., 4,949,995, Cl. 280-805.000.

General Mills, Inc.: See—  
Seaborne, Jonathan, 4,950,857, Cl. 219-10.55E.

General Motors Corporation: See—  
Plyler, Robert G.; Suverison, Lyle B.; Yurtin, John A.; and Gladd, Joseph H., 4,950,175, Cl. 439-274.000.

Zawisa, Kenneth M., 4,949,994, Cl. 280-802.000.

General Signal Corporation: See—  
DeCormier, William A.; Folsom, David B.; and Noll, Philip C., 4,951,013, Cl. 333-117.000.

Genetic Laboratories, Inc.: See—  
Beisang, Arthur A.; Holman, Daniel G.; and Ersek, Robert A., 4,950,282, Cl. 606-216.000.

Holman, Daniel G., 4,950,699, Cl. 524-21.000.

GenRad, Inc.: See—  
Mastrocola, Aldo; and Swanson, Mark, 4,951,283, Cl. 371-29.500.

Georgia Tech Research Corporation: See—  
Gaylor, Thomas K.; Verriest, Erik I.; and Mirsalehi, Mir M., 4,950,042, Cl. 350-96.140.

Gole, James L.; Woodward, James R.; and Cobb, Stephen H., 4,951,297, Cl. 372-89.000.

Gerard, Prevot; Laurent, Jumercier; and Philippe, Simoncelli, to Fercio International Usine de Ferrures de Batiment S.A.R.L. Lock for doors, windows or the like. 4,949,563, Cl. 70-279.000.

Gerber, Eugene A., to Product Innovation Corp. Arrow guide. 4,949,699, Cl. 124-44.500.

Gerl, Neil D.: See—  
Meyer, Ronald A.; and Gerl, Neil D., 4,950,121, Cl. 414-428.000.

Germann, Siegfried: See—  
Wildersohn, Manfred; and Germann, Siegfried, 4,950,414, Cl. 252-32.70E.

Getz, Edward H., to Whirlpool Corporation. Variable motor speed control for automatic washer. 4,950,969, Cl. 318-740.000.

Geyer, Paul W.: See—  
Zielinski, Thomas E.; and Geyer, Paul W., 4,950,182, Cl. 439-595.000.

Ghiasi, Katy; and Skarra, Leslie L., to Pillsbury Company. The. Taco shell and method of manufacture. 4,950,490, Cl. 426-138.000.

Ghiz, Lewis D.: See—  
Goettl, John M., 4,950,393, Cl. 210-169.000.

Giacobini, Ezio: See—  
Becker, Robert E.; and Giacobini, Ezio, 4,950,658, Cl. 514-129.000.

Gibbons, Duncan J.: See—  
Theodoulou, Sotos M.; Maczuszenko, Andrzej; Bajwa, Sabir H.; Gibbons, Duncan J.; and Zalewski, Wojciech, 4,951,070, Cl. 346-155.000.

Gibson, Bruce D.: See—  
Budd, Russell A.; Gibson, Bruce D.; Kantor, Sherwood; Overby, Wayne A.; and Stanich, Mikel J., 4,950,889, Cl. 250-236.000.

Giess, Jean: See—  
Irvine, Stuart J.; Mullin, John B.; and Giess, Jean, 4,950,621, Cl. 437-81.000.

Gilbert, Wes: See—  
Fabiano, Michael J.; Gilbert, Wes; Janover, Jeffrey S.; and Ward, Robert, 4,950,126, Cl. 414-590.000.

Gilder, Herbert J., to Sheaffer Eaton Inc. Binding and filing unit. 4,950,096, Cl. 402-4.000.

Giles, Philip M., Jr.: See—  
Kotsch, Gary D.; Giles, Philip M., Jr.; and Biemiller, Raymond H., 4,950,338, Cl. 148-146.000.

Giles, Randy K.; and Krausslich, Wolfgang, to Hearthstone Builders, Inc. Log surface hewing process and associate surface hewing machine. 4,949,768, Cl. 144-3.00R.

Gill, Ronald W. A.: See—  
Woodhead, Alfred W.; Gill, Ronald W. A.; Knapp, Alan G.; Lamport, Daphne L.; and Washington, Derek, 4,950,940, Cl. 313-103.0CM.

Gillette Company, The: See—  
Yorks, Charles H., 4,950,094, Cl. 401-75.000.

Gillette, Donald J.; and Hajek, Bedrich, to S.L. Electrostatic Technology, Inc. Method and apparatus for coating interior surfaces of objects. 4,950,497, Cl. 427-28.000.

Gilliland, Malcolm T. Apparatus for air arc gouging. 4,950,863, Cl. 219-130.100.

Gilman, Paul B.: See—  
Roberts, Michael R.; Tabor, Derrick C.; and Gilman, Paul B., 4,950,587, Cl. 430-570.000.

Girard, Frank; Russell, Raymond; and Hostland, George, to Wiz Innovations, Inc. Chimney cleaning apparatus. 4,949,418, Cl. 15-242.000.

Girondi, Giorgio, to Universal Filter Italiana S.p.A. Disposable oil filter unit with triple filtration. 4,950,400, Cl. 210-335.000.

Gist-Brocades N.V.: See—  
Olthoff, Margaretha; De Boer, Leonardus W. T.; and Akkerboom, Piet J., 4,950,484, Cl. 424-464.000.

Glaab, Friedrich; Ritter, Uwe; and Sturm, Rainer, to BTS Broadcast Television Systems GmbH. Method and apparatus for transmission of synchronization signals between microprocessors in video system. 4,951,142, Cl. 358-148.000.

Gladd, Joseph H.: See—  
Plyler, Robert G.; Suverison, Lyle B.; Yurtin, John A.; and Gladd, Joseph H., 4,950,175, Cl. 439-274.000.

Glaxo Group Limited: See—  
Cavalla, David J.; and Mitchell, William L., 4,950,681, Cl. 514-397.000.

Coatsworth, Trevor, 4,949,766, Cl. 141-67.000.

Glen R. Harding. Oral prophylactics. 4,949,731, Cl. 128-842.000.

Glenn, William H., to United Technologies Corporation. Fiber optic sensor arrangement having reflective gratings responsive to particular wavelengths. 4,950,883, Cl. 250-227.140.

Glennon, Thomas F.: See—  
Kenny, Andrew A.; Glennon, Thomas F.; Franz, Rudolph J.; and DeVera, Dennis, 4,949,779, Cl. 165-2.000.

Glimes, James A., to Meyer Plastics, Inc. Article lock. 4,949,559, Cl. 70-19.000.

Glinski, Jerome V., Jr.: See—  
Janson, David A.; Glinski, Jerome V., Jr.; and Preston, David M., 4,949,803, Cl. 180-140.000.

Glitsch, Inc.: See—  
Chen, Gilbert K.; and Acerra, Michele, 4,950,430, Cl. 261-112.200.

Gloger, Manfred: See—  
Tischer, Wilhelm; Gloger, Manfred; and Heinle, Josef, 4,950,609, Cl. 435-18.000.

Glover, Gary H.; Pelc, Norbert J.; and Bradshaw, Kenneth Marel, to General Electric Company. Gradient and polarizing field compensation. 4,950,994, Cl. 324-320.000.

Glover, Michael; and Reichert, Gerhard, to Lauren Manufacturing Company. Method of manufacturing multiple-pane sealed glazing units. 4,950,344, Cl. 156-109.000.

Go, Junichi. Three dimensional housing apparatus and control method thereof. 4,950,117, Cl. 414-254.000.

Gobush, William, to Acushnet Company. Multiple dimple golf ball. 4,949,976, Cl. 273-232.000.

Godwin, Oliver. Convertible dispensing system. 4,949,906, Cl. 239-663.000.

Goebel, Ulrich: See—  
Bergfried, Dietrich; Jakob, Gert; Maue, Hans-Heinrich; Schaub, Uwe; Roethlingshoefer, Walter; Goebel, Ulrich; Huber, Elmar; Schmid, Roland; and Zucker, Gerhard, 4,951,176, Cl. 361-400.000.

Goeke, Wayne C.: See—  
DesJardin, Lawrence A.; and Goeke, Wayne C., 4,951,053, Cl. 341-136.000.

Goettl, John M., to Ghiz, Lewis D. Operatively stationary pool cleaning apparatus. 4,950,393, Cl. 210-169.000.

Goetz, Norbert: See—  
Wolf, Bernd; Theobald, Hans; and Goetz, Norbert, 4,950,796, Cl. 568-440.000.

Gohara, Yoshihiro, to Sanshin Kogyo Kabushiki Kaisha. Starting system for internal combustion engine. 4,949,684, Cl. 123-179.0BG.

Gohbayashi, Masayoshi: See—  
Tanaka, Masaya; Gohbayashi, Masayoshi; and Oka, Kunihide, 4,950,780, Cl. 560-75.000.

Gohier, Pierre R., to United Tractor Company. Body and undercarriage for interconnectable baggage carts. 4,949,986, Cl. 280-410.000.

Gohla, Werner: See—  
Rick, Hans-Peter; Schott, Martin; Ott, Willy; and Gohla, Werner, 4,950,310, Cl. 34-295.00R.

Goi, Hitoshi: See—  
Nishioka, Nobuo; Juge, Tadayoshi; Shimizu, Yoshiaki; Namba, Keishichi; Shimura, Hiroshi; Abukawa, Fumitaka; Goi, Hitoshi; Fujita, Kazuyoshi; and Takasu, Yuichi, 4,950,334, Cl. 148-16.500.

Gold, Elijah H.; and Chang, Wei K., to Schering Corporation. Treatment of hypertension. 4,950,783, Cl. 562-584.000.

Gold, Peter N. Automotive window mounting assembly. 4,949,509, Cl. 49-502.000.

Goldberg, Arthur H., to Rugby-Darby Group Companies, Inc. Nasal administration of benzodiazepine hypnotics. 4,950,664, Cl. 514-219.000.

Goldberg, Edward M.: See—  
Melinshtyn, Lev; and Goldberg, Edward M., 4,949,756, Cl. 137-846.000.

Goldenberg, Michael; and McKee, John M., to Motorola, Inc. Vibrator. 4,950,931, Cl. 310-36.000.

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Goldman, Ira B.; and Seymour, Raymond K., to General Electric Company. Electric circuit breaker arc chute composition. 4,950,852, Cl. 200-144.000.

Gole, James L.; Woodward, James R.; and Cobb, Stephen H., to Georgia Tech Research Corporation. Chemical process yielding stimulated emission of visible radiation via fast near resonant energy transfer. 4,951,297, Cl. 372-89.000.

Golemiewski, Alan L.: See—  
Thurston, John F.; and Golemiewski, Alan L., 4,949,755, Cl. 137-833.000.

Gollan, Arye Z., to A/G Technology Corporation. Multiple head pumping. 4,950,315, Cl. 55-158.000.

Golovko, Viktor V.: See—  
Pokhodnya, Igor K.; Kushnerev, Daniil M.; Ustinov, Sergei D.; Sokolov, Oleg G.; Grischenko, Leonid V.; Baskakov, Gennady V.; Yamskoi, Marat V.; Zarubin, Andrei M.; and Golovko, Viktor V., 4,950,331, Cl. 106-313.000.

Goltz, H. Robert: See—  
Stringfield, Richard T.; Goltz, H. Robert; Norman, Seth I.; Bhawada, Upen J.; and LaBrie, Robert L., 4,950,332, Cl. 127-55.000.

Goode, Barry L., to Air Plus, Inc. Closed loop feedback air supply for air support beds. 4,949,412, Cl. 5-453.000.

Goode, Brad: See—  
Austin, Glen A.; and Goode, Brad, 4,950,997, Cl. 324-556.000.

Goodwin, Donald W.; and Adamson, Kenneth S., to Peerless Manufacturing Company. Surge reliever relief valve. 4,949,750, Cl. 137-510.000.

Goodwin, John C.; Kirby, Roy; Simons, Philip S.; and Carter, Andrew J., to Dowty Maritime Systems Limited. Gas generating device. 4,950,460, Cl. 422-239.000.

Goodwin, Max W.; and Melsheimer, Thomas T., to Goodwin, Max W. Target scoring and display system. 4,949,972, Cl. 273-371.000.

Goodwin, Vernon L., to SS1 Medical Services, Inc. Low air loss bed. 4,949,413, Cl. 5-453.000.

Goodyear Tire & Rubber Company, The: See—  
Schehr, Douglas K.; Hampshire, William J.; and Conger, Marvin T., 4,950,149, Cl. 425-345.000.

Goossen, Emray R., to Honeywell Inc. Display segment fault detection apparatus. 4,951,037, Cl. 340-715.000.

Gordon, Barry M.: See—  
Petersen, George E.; Robinson, Randall N.; Ruiz, Carl P.; Marble, William J.; Gordon, Barry M.; and Gordon, Gerald M., 4,950,449, Cl. 376-306.000.

Gordon, Gerald M.: See—  
Petersen, George E.; Robinson, Randall N.; Ruiz, Carl P.; Marble, William J.; Gordon, Barry M.; and Gordon, Gerald M., 4,950,449, Cl. 376-306.000.

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Hilger, Manfred, 4,950,580, Cl. 430-281.000.

Rieck, Hans-Peter; Schott, Martin; Ott, Willy; and Gohla, Werner, 4,950,310, Cl. 34-295.00R.

Weber, Jürgen; Lappe, Peter; and Springer, Helmut, 4,950,800, Cl. 568-492.000.

Hoefl, Robert F.: See—  
Patel, Manubhai M.; and Hoefl, Robert F., 4,950,129, Cl. 415-160.000.

Hoelderich, Wolfgang: See—  
Schommer, Charles; Ebel, Klaus; Dockner, Toni; Irgang, Matthias; Hoelderich, Wolfgang; and Rust, Harald, 4,950,763, Cl. 546-314.000.

Hofer, Alan, to Stanton Magnetics, Inc. Headset for underwater use, 4,949,806, Cl. 181-129.000.

Hoffman, Carvel D.; Booth, R. Creighton; Clymer, John C.; and Casler, Richard J., to Bethlehem Steel Corporation. Method and system for dimensional and weight measurements of articles of manufacture by computerized tomography, 4,951,222, Cl. 364-507.000.

Hoffmann-La Roche Inc.: See—  
Fischli, Albert; Krasso, Anna; and Szente, Andre, 4,950,677, Cl. 514-338.000.

Hogarth, Ian; Scott, Andrew; Abbott, Christina; and Wilkinson, Robert I., to Caribonum Limited. Pressure-activatable lift-off correcting tape, 4,950,536, Cl. 428-343.000.

Hokynar, Jiri. Control device for fluid flow, 4,951,224, Cl. 364-510.000.

Holbrook, Gerald L.: See—  
Leising, Maurice B.; Holbrook, Gerald L.; and Benford, Howard L., 4,951,200, Cl. 364-424.400.

Holden, Ian G.: See—  
Dickinson, Barry; Friend, David J.; Holden, Ian G.; Jackson, Paul H.; and Padzieski, Robert J., 4,951,231, Cl. 364-521.000.

Holk, Jon. Cassette and an appurtenant apparatus having a screen for cyclical displaying of a plurality of pictures, 4,949,488, Cl. 40-488.000.

Holland, John A.: See—  
Greenwood, Eugene C.; and Holland, John A., 4,950,240, Cl. 604-110.000.

Holler, Mark A.; Tam, Simon M.; Benson, Ronald G.; and Castro, Herman A., to Intel Corporation. Semiconductor cell for neural network employing a four-quadrant multiplier, 4,950,917, Cl. 307-201.000.

Hollingsworth GmbH: See—  
Gasser, Hermann, 4,949,431, Cl. 19-150.000.

Hollister, Floyd H., to Texas Instruments Incorporated. Method for passively determining the relative position of a moving observer with respect to a stationary object, 4,951,214, Cl. 364-460.000.

Holly, Henry M., III, to Westinghouse Electric Corp. Adjustable securement system for end winding conductors, 4,950,934, Cl. 310-260.000.

Holly, Jerry D., to Tektronix, Inc. Process for removal of dissolved copper from solution, 4,950,326, Cl. 75-726.000.

Holman, Daniel G., to Genetic Laboratories, Inc. Wound dressing incorporating collagen in adhesive layer, 4,950,699, Cl. 524-21.000.

Holman, Daniel G.: See—  
Beisang, Arthur A.; Holman, Daniel G.; and Ersek, Robert A., 4,950,282, Cl. 606-216.000.

Holmbald, John: See—  
Biber, Jeffrey; Cohen, Jeffrey; Holmbald, John; Hsieh, Zon-Heng; Kay, Douglas; and Spitzer, Roy, 4,951,278, Cl. 370-60.000.

Holmes, Maurice F.; Roller, George J.; and Moore, Steven R., to Xerox Corporation. Hybrid sequenced dadd duplexing system, 4,949,949, Cl. 271-3.000.

Holmes, Owen B.: See—  
Thorncraft, Irwin C.; Holmes, Owen B.; and Wolters, Harry, 4,949,562, Cl. 70-277.000.

Holmes, William A. Insulated multi-use seat cushion with closable hand and foot openings, 4,949,887, Cl. 224-151.000.

Holstein und Kappert AG: See—  
Zodrow, Rudolf; and Rogall, Wolfgang, 4,950,350, Cl. 156-456.000.

Holtrup, Wolfgang: See—  
Schlueter, Herbert; Scholz, Bernhard-Peter; Holtrup, Wolfgang; and Walther, Klaus, 4,950,709, Cl. 524-762.000.

Holtz, Gilbert J. Luggage cart, 4,950,003, Cl. 280-655.000.

Hon, Ng T. Y. C.: See—  
Encellaz, Robert; and Hon, Ng T. Y. C., 4,950,993, Cl. 324-313.000.

Honda Giken Kogyo Kabushiki Kaisha: See—  
Furukawa, Yoshimi; Takei, Akihiko; Ishida, Shinnosuke; and Oono, Nobuyuki, 4,951,207, Cl. 364-424.050.

Hirahara, Shinichi; Kawanishi, Hiroyuki; and Shibui, Naoto, 4,949,990, Cl. 280-750.000.

Iino, Takashi; and Maki, Kazuya, 4,949,596, Cl. 74-866.000.

Kamimura, Taiji; and Tomobe, Norio, 4,950,850, Cl. 200-61.890.

Kurihara, Norimitsu; Tsuchiya, Yoshikazu; Morota, Makie; and Fukuda, Junichi, 4,950,914, Cl. 307-10.100.

Oka, Yosio, 4,949,587, Cl. 74-333.000.

Honda, Hiroyuki: See—  
Ishii, Kohji; Honda, Hiroyuki; Tanaka, Kazuyuki; and Koizumi, Noboru, 4,951,093, Cl. 355-245.000.

Honda, Masami, to Kabushiki Kaisha Toshiba. Presentation device for overhead projector, 4,950,072, Cl. 353-122.000.

Honda, Norimasa; and Sano, Masahiro, to Daikin Industries Ltd. Fluorescent-containing coating composition and use thereof, 4,950,538, Cl. 428-35.700.

Honda, Yosuke; and Akazawa, Takako, to Fujitsu Limited. Automatic call distribution system, 4,951,310, Cl. 379-266.000.

Hone, Michel R.; and Martel, Jacques R., to Stelco Inc. Wire pickling method and apparatus, 4,950,333, Cl. 134-15.000.

Honeywell Inc.: See—  
Goossen, Emray R., 4,951,037, Cl. 340-715.000.

Schisselbauer, Paul F.; and Garoutte, Kurt F., 4,950,565, Cl. 429-116.000.

Hong, Son H.: See—  
Slate, John B.; Henke, James L.; and Hong, Son H., 4,950,235, Cl. 604-65.000.

Honguu, Tatsuhiko: See—  
Yajima, Haruaki; Fujii, Nobutaka; Gutierrez, Gilberto M. A.; and Honguu, Tatsuhiko, 4,950,418, Cl. 252-182.120.

Honn, Kenneth V.: See—  
Taylor, John D.; and Honn, Kenneth V., 4,950,680, Cl. 514-356.000.

Hoover, Alan A.; and McGlashan, Kenneth W., to RCA Licensing Corporation. Magnetic field compensator for a CRT, 4,950,955, Cl. 315-8.000.

Hoover Universal, Inc.: See—  
Elton, Robert D., 4,949,508, Cl. 49-502.000.

Hopmann, Mark E.; Murray, Douglas J.; and Strattan, Scott C., to Baker Hughes Incorporated. Method and apparatus for securing and releasing continuous tubing in a subterranean well, 4,949,791, Cl. 166-378.000.

Hoppestad, Gordon L., to Precision Brand Products, Inc. Punch and die set, 4,949,614, Cl. 83-681.000.

Hopwood, James E.: See—  
Campiotti, Richard H.; and Hopwood, James E., 4,950,864, Cl. 219-130.400.

Horgas, Jon C., to Tru-Bore Engineering. Movable support arm, 4,950,100, Cl. 403-405.100.

Hormansdorfer, Gerd. Screw seal, 4,950,002, Cl. 285-328.000.

Horn, Dieter; Krueger, Goetz; and Spengler, Reinhard, to BASF Aktiengesellschaft. Hydrophilic theophylline powder formulation and its preparation, 4,950,654, Cl. 514-53.000.

Horneck, Craig W.; McDermott, John B.; Smith, Daniel P.; Kimura, Shiro G.; and Shisler, Roger A., to General Electric Company. Method for reclassifying PCB transformers, 4,950,837, Cl. 174-14.00R.

Hornig, Liou-Liang: See—  
Griffith, Edward J.; Hornig, Liou-Liang; and Jason, Mark E., 4,950,787, Cl. 562-583.000.

Horvath, Agoston, to Rochester Gauges, Inc. Multi-positional thermometer, 4,950,085, Cl. 374-207.000.

Hoshi, Junji: See—  
Wakita, Saburo; and Hoshi, Junji, 4,950,340, Cl. 148-402.000.

Hoshino Gakki Co., Ltd.: See—  
Hoshino, Yoshihiro, 4,949,928, Cl. 248-286.000.

Hoshino, Kiyoshi: See—  
Asamaki, Tatsuo; Hoshino, Kiyoshi; Ukai, Katsumi; Ino, Yoichi; Adachi, Toshio; and Tsukada, Tsutomu, 4,950,956, Cl. 315-111.210.

Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, to Konica Corp. Voice-recognition camera, 4,951,079, Cl. 354-412.000.

Hoshino, Yoshihiro, to Hoshino Gakki Co., Ltd. Rotatable holder with position memory, 4,949,928, Cl. 248-286.000.

Hosoi, Takashi; and Sasaki, Katamaru, to Kabushiki Kaisha Toshiba. Portable apparatus having an adjustable handle-leg member, 4,951,241, Cl. 364-708.000.

Hosomizu, Hiroshi; Ichikawa, Tsutomu; Kamiya, Makoto; Yoneyama, Masatoshi; and Tuzi, Kenji, to Minolta Camera Kabushiki Kaisha. Flash device, 4,951,081, Cl. 354-415.000.

Hosotani, Koji: See—  
Saito, Kenji; Nozaki, Tsutomu; Oguchi, Yukio; Sorimachi, Kenichi; Nakato, Hakaru; Okuda, Haruji; Hosotani, Koji; Kinoshita, Katsuo; and Murata, Kenji, 4,949,778, Cl. 164-468.000.

Hospital Industrie: See—  
Richalley, Gerard, 4,950,395, Cl. 210-195.200.

Hostland, George: See—  
Girard, Frank; Russell, Raymond; and Hostland, George, 4,949,418, Cl. 15-242.000.

Hotkowski, Peter; and Todaro, Frank A., to VeloBind, Inc. Sheet justifier for automatic bookbinding machine, 4,949,952, Cl. 271-221.000.

Hotomi, Hideo; Osawa, Izumi; Nakamura, Mitsutoshi; and Iino, Shuji, to Minolta Camera Kabushiki Kaisha. Photosensitive member composed of charge transporting layer and charge generating layer, 4,950,571, Cl. 430-58.000.

Hotta, Toshinori, to Nec Corporation. Transceiver for use in earth station in satellite communications system, 4,951,279, Cl. 370-75.000.

Houtchens, Robert A.: See—  
Cheng, Roberta C.; Moll, Norman G.; Houtchens, Robert A.; and McCoy, Karen M., 4,950,596, Cl. 435-94.000.

Houtsmuller, Udo M. T.: See—  
Bowser, Paul A.; Froling, Albert; Heslinga, Lammert; Houtsmuller, Udo M. T.; Nugteren, Diederik H.; Pabon, Hendrik J. J.; and Prottey, Colin, 4,950,688, Cl. 514-847.000.

Howard, Forrest: See—  
Rubbo, Richard P.; Tilton, F. T.; Mullins, A. A.; Bangert, Daniel S.; Howard, Forrest; Carpenter, Scott; and Curington, Alfred R., 4,949,793, Cl. 166-382.000.

Howden, Joseph M.: See—  
Langenbeck, Keith A.; Devine, Andrew P.; and Howden, Joseph M., 4,949,531, Cl. 53-534.000.

Hoy, James C. Resettable target array, 4,949,980, Cl. 273-391.000.

HSC Research Development Corporation: See—  
Geary, Denis F.; and Bahoric, Andrej, 4,950,259, Cl. 604-282.000.

Hsieh, Zon-Hong: See—  
Biber, Jeffrey; Cohen, Jeffrey; Holmbald, John; Hsieh, Zon-Hong; Kay, Douglas; and Spitzer, Roy, 4,951,278, Cl. 370-60.000.

Hsu, Chi-chu; Yu, Chin-ching; Chao, Suyue; and Huang, Miguel; C. J. Muffler with a purifying system for car or motorcycle, 4,949,539, Cl. 60-275.000.

Hsu, Kai, to Schlumberger Technology Corporation. Method of filtering sonic well logging data, 4,951,266, Cl. 367-25.000.

Hua, Mei: See—  
Vince, Robert; and Hua, Mei, 4,950,758, Cl. 544-276.000.

Huang, Dennin. Interconnectable artificial lawn sections, 4,950,519, Cl. 428-44.000.

Huang, Miguel; C. J.: See—  
Hsu, Chi-chu; Yu, Chin-ching; Chao, Suyue; and Huang, Miguel; C. J., 4,949,539, Cl. 60-275.000.

Huang, San Y. Modified car roof trim board structure, 4,950,534, Cl. 428-314.400.

Huang, Tiao-Yuan; Chiang, Anne; and Wu, I-Wei, to Xerox Corporation. Simultaneously deposited thin film CMOS TFTs and their method of fabrication, 4,951,113, Cl. 357-42.000.

Hubbard, William F., to Wootton, David W. Small parts catcher for high pressure fluid cleaning apparatus, 4,949,738, Cl. 134-104.300.

Huber, Elmar: See—  
Bergfried, Dietrich; Jakob, Gert; Maue, Hans-Heinrich; Schaub, Uwe; Roethlingshoefer, Walter; Goebel, Ulrich; Huber, Elmar; Schmid, Roland; and Zucker, Gerhard, 4,951,176, Cl. 361-400.000.

Huber, Manfred, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Machine for the precision working of the tooth flanks of toothed workpieces, 4,950,112, Cl. 409-32.000.

Huber, Thomas, to Bavaria Cargo Technologie GmbH. Drive roller unit, 4,949,837, Cl. 198-782.000.

Huck Manufacturing Company: See—  
Sadri, Shahriar M., 4,950,115, Cl. 411-38.000.

Hudson Soft Co., Ltd.: See—  
Yamamura, Kimio, 4,951,038, Cl. 340-725.000.

Hudson, Wilbur G., Jr.: See—  
Pflaumer, Phillip F.; Smith, Edward D., III; and Hudson, Wilbur G., Jr., 4,950,140, Cl. 424-439.000.

Huebner, Holger, to Siemens Aktiengesellschaft. Apparatus and method for reactive ion etching, 4,950,377, Cl. 204-192.320.

Huels Aktiengesellschaft: See—  
Kowalczyk, Udo; Bartmann, Martin; and Finke, Juergen, 4,950,808, Cl. 568-730.000.

Schlueter, Herbert; Scholz, Bernhard-Peter; Holtrup, Wolfgang; and Walther, Klaus, 4,950,709, Cl. 524-762.000.

Zerpner, Dieter; and Streck, Roland, 4,950,826, Cl. 585-353.000.

Huggins, Robert A.; and Anani, Anaba A. Metal silicide electrode in lithium cells, 4,950,566, Cl. 429-218.000.

Hughes Aircraft Company: See—  
Essenwanger, Kenneth A., 4,951,237, Cl. 364-721.000.

Rosen, Harold A., 4,949,922, Cl. 244-168.000.

Hughes, John H., to ComCorp, Inc. Impeller for comminuter, 4,949,915, Cl. 241-245.000.

Hughes, Richard P.; So, Vincent C. Y.; and Vella, Paul J., to Northern Telecom Limited. Fiber optic coupler, 4,950,046, Cl. 350-96.180.

Hughes, Richard P.; So, Vincent C.; and Vella, Paul J., to Northern Telecom Limited. Optical fiber interface, 4,950,887, Cl. 250-227.210.

Hung, Liang-Sun: See—  
Agostinelli, John A.; Paz-Pujalt, Gustavo R.; Mehrotra, Arun K.; and Hung, Liang-Sun, 4,950,643, Cl. 505-1.000.

Hunt, Roger B.: See—  
Peters, Thomas E.; Hunt, Roger B.; and Sigai, A. Gary, 4,950,948, Cl. 313-486.000.

Hunter, James B.: See—  
Davis, Cecil J.; Matthews, Robert T.; York, Rudy L.; Luttmner, Joseph D.; Jakubik, Dwain R.; and Hunter, James B., 4,949,671, Cl. 118-725.000.

Hunter, Robert E.: See—  
Lewis, Jack L.; Lew, William D.; Kowalczyk, Curtis W.; and Hunter, Robert E., 4,950,271, Cl. 606-102.000.

Huntsman, Clayton D.: See—  
Clack, James B.; and Huntsman, Clayton D., 4,951,217, Cl. 364-474.200.

Hurlburt, Joseph C., to Ford New Holland, Inc. Conditioning roll biasing mechanism, 4,949,535, Cl. 56-16.400.

Hurten, Oskar: See—  
Vogr, Hans; Hurten, Oskar; and Spiegel, Erwin, 4,950,522, Cl. 428-73.000.

Husler, Rinaldo; Kirchmayr, Rudolf; Rutsch, Werner; and Rembold, Manfred, to Ciba-Geigy Corporation. Oligomeric benzil ketals and their use as photoinitiators, 4,950,795, Cl. 568-331.000.

Hutchinson, Thomas E., to University of Virginia. Eye movement detector with improved calibration and speed, 4,950,069, Cl. 351-210.000.

Hutmacher, Hans-Martin: See—  
Vagt, Uwe; Fischer, Rolf; Merger, Franz; and Hutmacher, Hans-Martin, 4,950,429, Cl. 260-404.000.

Hutson, Graham V.: See—  
Rowbottom, Kenneth T.; Wilkinson, John N. R.; Conboy, Terence M.; and Hutson, Graham V., 4,950,425, Cl. 252-631.000.

Huwald, Edmund: See—  
Arthur, Ronald W.; and Huwald, Edmund, 4,949,812, Cl. 182-234.000.

Hydro Systems Company: See—  
Haas, Richard E.; and Fegette, Thomas R., 4,950,136, Cl. 417-477.000.

Hyundai Electronics Industries Co., Ltd.: See—  
Yoon, Hee K.; Choi, Yeong S.; and Lee, Yoon J., 4,950,619, Cl. 437-47.000.

I-Flow Corporation: See—  
Brown, Eric W.; Kienholz, Charles; and Busak, Steve, 4,950,245, Cl. 604-153.000.

Brown, Eric W.; Kienholz, Charles; Robinson, Earl F.; and Bare, Rex O., 4,950,255, Cl. 604-250.000.

I.V.P. Co.: See—  
Kershaw, Charles H., 4,950,885, Cl. 250-227.250.

Iasillo, Robert J.; and Fedor, Stephen, to General Electric Company. Combustor gas feed with coordinated proportioning, 4,949,538, Cl. 60-39.465.

Ibata, Katsuhiko: See—  
Mitsumori, Naomichi; Nishimura, Yasuhiro; Ibata, Katsuhiko; Okuno, Shiro; and Suzuki, Motoko, 4,950,667, Cl. 514-227.800.

IBC Advanced Technologies: See—  
Tarbet, Bryon J.; Bruening, Ronald L.; Bradshaw, Jerald S.; and Izatt, Reed M., 4,950,636, Cl. 502-401.000.

Ibuchi, Yoshiaki, to Sharp Kabushiki Kaisha. Image forming apparatus, 4,951,085, Cl. 355-38.000.

Ichikawa, Hirokazu: See—  
Iizuka, Yasuo; and Ichikawa, Hirokazu, 4,951,130, Cl. 358-44.000.

Ichikawa, Katsumi: See—  
Maikuma, Yoshimata; and Ichikawa, Katsumi, 4,950,141, Cl. 425-33.000.

Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, to Minolta Camera Kabushiki Kaisha. Camera system with flash device, 4,951,068, Cl. 354-149.110.

Ichikawa, Tsutomu: See—  
Hosomizu, Hiroshi; Ichikawa, Tsutomu; Kamiya, Makoto; Yoneyama, Masatoshi; and Tuzi, Kenji, 4,951,081, Cl. 354-415.000.

Ichikawa, Wataru; and Matsuki, Yuji, to Kabushiki Kaisha SG. Absolute linear position detection device, 4,951,048, Cl. 341-15.000.

Ichinose, Yuuji; and Takahashi, Fuminobu, to Hitachi, Ltd. Method of detecting an object by use of laser light and laser radar, 4,950,075, Cl. 356-141.000.

Ichiriki, Kazuo; Tanaka, Motoaki; Okugawa, Toru; and Nawa, Hiroyoshi, to Wako Pure Chemical Industries, Ltd. Process for producing azoimino ethers by oxidation of hydrazonitriles, 4,950,742, Cl. 534-738.000.

Ichitani, Tetsuro, to Tokyo Electric Co., Ltd. Image scanner apparatus with scanning magnification correcting function, 4,951,158, Cl. 358-451.000.

ICI Americas Inc.: See—  
Phalagas, Charalambos J.; Restaino, Alfred J.; and Yang, Lau S., 4,950,467, Cl. 424-59.000.

Ide, Toshiaki: See—  
Arioka, Hiroyuki; Nishimatsu, Masharu; and Ide, Toshiaki, 4,950,535, Cl. 428-536.000.

IEG Industrie-Engineering GmbH: See—  
Bernhardt, Bruno; Hessner, Anton; and Krug, Rainer, 4,950,394, Cl. 210-170.000.

Igarashi, Takeshi: See—  
Masuda, Nobuhito; and Igarashi, Takeshi, 4,950,454, Cl. 422-56.000.



- Iguchi, Hiroaki: See—  
Itoyama, Seiji; Tada, Kichio; Telashima, Tsukasa; Tanaka, Shuji; Yamanaka, Hiromitsu; Yunde, Takao; Iguchi, Hiroaki; and Besho, Nagayasu, 4,949,777, Cl. 164-453.000.
- Iida, Junichi: See—  
Saitoh, Tadashi; Takeuchi, Takashi; Hirabayashi, Masayuki; and Iida, Junichi, 4,951,275, Cl. 369-44.410.
- Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for preparing bisphenol A, 4,950,804, Cl. 568-727.000.
- Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for washing and obtaining solids of slurry, 4,950,805, Cl. 568-724.000.
- Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for crystallizing adduct of bisphenol A with phenol, 4,950,806, Cl. 568-724.000.
- Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for preparing bisphenol A, 4,950,807, Cl. 568-727.000.
- Iino, Shuji: See—  
Hotomi, Hideo; Osawa, Izumi; Nakamura, Mitsutoshi; and Iino, Shuji, 4,950,571, Cl. 430-58.000.
- Iino, Takashi; and Maki, Kazuya, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling continuously variable automotive transmission, 4,949,596, Cl. 74-866.000.
- Iizuka, Masao; Yasaka, Atsuhiko; Fukahori, Yoshide; and Yoshizawa, Toshikazu, to Bridgestone Corporation; and Kajima Corporation. Anti-seismic rubber, 4,950,528, Cl. 428-212.000.
- Iizuka, Yasuo; and Ichikawa, Hirokazu, to Kabushiki Kaisha Toshiba. Color filter structure of color image sensor, 4,951,130, Cl. 358-44.000.
- Ike, Tetsuji: See—  
Kinishi, Ryoichi; Wakamatsu, Shuichi; and Ike, Tetsuji, 4,950,810, Cl. 568-790.000.
- Ikeda Bussan Company, Ltd.: See—  
Fujiwara, Mikio; Irie, Hideki; and Komohara, Minoru, 4,949,931, Cl. 248-429.000.
- Terai, Masanori, 4,949,932, Cl. 240-430.000.
- Ikeda, Kazumasa: See—  
Kisou, Masaaki; Shimoda, Kenji; Ikeda, Kazumasa; Yoda, Shinji; and Takeuchi, Hisaharu, 4,951,137, Cl. 358-125.000.
- Ikeda, Masataka; and Shima, Tsukasa, to Asahi Kasei Kogyo Kabushiki Kaisha. Polyallylene sulfide nonwoven fabric, 4,950,529, Cl. 428-224.000.
- Ikeda, Tokumi: See—  
Nomura, Hirotoshi; and Ikeda, Tokumi, 4,949,773, Cl. 164-91.000.
- Ikuta, Isao: See—  
Minemura, Tetsuro; Ando, Hisashi; Kita, Yoshiaki; and Ikuta, Isao, 4,950,173, Cl. 439-82.000.
- Imaginative Research Associates, Inc.: See—  
Vishnupad, Mohan; and Ramirez, Jose, 4,950,475, Cl. 424-83.000.
- Imai, Kunio; Aso, Saburo; Kudo, Hideo; and Uchidoi, Masataka, to Pioneer Electronic Corporation; and Pioneer Video Corporation. Optical recording medium and method manufacturing thereof, 4,950,520, Cl. 428-64.000.
- Imai, Masafumi: See—  
Murata, Masahide; Imai, Masafumi; Furuhashi, Hiroyuki; Maruyama, Kouji; and Ueno, Hiroshi, 4,950,630, Cl. 502-116.000.
- Imai, Toshiyuki: See—  
Ohga, Syogo; and Imai, Toshiyuki, 4,949,831, Cl. 192-107.000.
- Imamiya, Keniti; Tanaka, Sumio; Miyamoto, Junichi; Atsumi, Shigeru; Iyama, Yumiko; and Ohtsuka, Nobuaki, to Kabushiki Kaisha Toshiba. Reference setting circuit for determining written-in content in non-volatile semiconductor memories, 4,951,257, Cl. 365-210.000.
- Immel, Manfred, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Air conditioning device for a control panel, 4,949,867, Cl. 220-467.000.
- ImmunoTherapeutics, Inc.: See—  
Vosika, Gerald J.; Cornelius, Dennis A.; and Swenson, Karl E., 4,950,645, Cl. 514-8.000.
- Imoto, Akio: See—  
Yonemochi, Kazuto; Imoto, Akio; and Harada, Tokuji, 4,951,119, Cl. 357-70.000.
- Impact Systems Inc.: See—  
Socha, Jurgen, 4,949,478, Cl. 34-155.000.
- Imperial Chemical Industries PLC: See—  
Birchall, James D.; Mockford, Mary J.; and Stanley, David R., 4,950,626, Cl. 501-88.000.
- Daniels, James A., 4,950,729, Cl. 528-86.000.
- Hann, Richard A.; and Pack, Barry, 4,950,641, Cl. 503-227.000.
- Moore, Geoffrey J.; and Massey, Helen M., 4,950,815, Cl. 570-151.000.
- Imphy S. A.: See—  
Couderehon, Georges, 4,950,335, Cl. 148-102.000.
- Inaba, Takuya: See—  
Yamazaki, Takeo; Inaba, Takuya; and Suesaka, Kiyooki, 4,949,592, Cl. 74-512.000.
- Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, to Sharp Kabushiki Kaisha. Driving method for thin film el display device and driving circuit thereof, 4,951,041, Cl. 340-767.000.
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- Johnson, Robert: See—  
Elloy, Martin A.; and Johnson, Robert, 4,950,297, Cl. 623-20.000.
- Johnson, Thomas R.: See—  
Gahara, William J.; Johnson, Thomas R.; and Shah, Tilak M., 4,950,239, Cl. 604-96.000.
- Johnson, William C.; and Aurand, Mervin E., to Rand Farm Systems Inc. Animal feed bagging apparatus. 4,949,633, Cl. 100-65.000.
- Johnson, William J. Cuspitor convertor. 4,949,405, Cl. 4-258.000.
- Johnston, Graeme: See—  
Eckert, Lawrence A.; Johnston, Graeme; and Kent, Peter M., 4,949,786, Cl. 166-208.000.
- Johoku Industries, Ltd.: See—  
Yamazaki, Takashi, 4,949,617, Cl. 83-587.000.
- Joint Medical Products Corporation: See—  
Noles, Douglas G., 4,950,299, Cl. 623-22.000.
- Jolly, James D. Extendable cue stick. 4,949,964, Cl. 273-68.000.
- Jolly, Mark R.: See—  
Wolfe, Paul T.; and Jolly, Mark R., 4,949,573, Cl. 73-118.100.
- Jones, Allen M., to Williams International Corporation. Compliant foil bearing. 4,950,089, Cl. 384-103.000.
- Jones, Edward M., Jr.: See—  
Smith, Lawrence A., Jr.; Hearn, Dennis; and Jones, Edward M., Jr., 4,950,803, Cl. 568-697.000.
- Jones, Edward P.; Murdock, G. Duncan; and Dean, Geoffrey J. Board-supporting assembly for fluid jet cutting system. 4,949,610, Cl. 83-177.000.
- Jones, Gregory A.; and Anderson, Dale D., to Jones, Gregory A. Sprinkler head mounting system. 4,949,905, Cl. 239-279.000.
- Jones, Gregory L.; Jones, Lance F.; and Watson, Peter F., to Arbor Systems, Inc. Monitoring system. 4,951,030, Cl. 340-677.000.
- Jones, Harmon L. Universal accessories remover for locomotives. 4,950,012, Cl. 294-67.200.
- Jones, Joseph S.; and Swann, Peter R., to Gatan, Incorporated. Specimen cooling holder for side entry transmission electron microscopes. 4,950,901, Cl. 250-443.100.
- Jones, Lance F.: See—  
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- Jones, Larry E. Magnetizing head construction and related method. 4,950,989, Cl. 324-216.000.
- Jordan, James W., to Sandvik Hard Materials, Ltd. Indexable insert cutters. 4,949,615, Cl. 83-674.000.
- Jordan, Mary P.: See—  
Heindel, Timothy R.; Garvey, Michael J.; Dick, Daniel W.; Keller, Richard F.; Jordan, Mary P.; and Schleinz, Alan F., 4,949,668, Cl. 118-314.000.

- Jorns, Peter: See—  
Gehmecker, Horst; Rausch, Werner; and Jorns, Peter, 4,950,339, Cl. 148-262.000.
- Joslin, Frederick L.: See—  
Stobart, Stephen R.; Grundy, Stephen L.; and Joslin, Frederick L., 4,950,798, Cl. 568-454.000.
- Joslyn Corporation: See—  
Akers, Donald J., 4,950,851, Cl. 200-148.00F.
- Jozefowicz, Marcel: See—  
Letourneur, Didier; Douzon, Colette; Migonney, Veronique; Muller, Daniel A.; and Jozefowicz, Marcel, 4,950,712, Cl. 525-54.200.
- Judeo Manufacturing, Inc.: See—  
Valenzona, Joseph F., 4,950,856, Cl. 200-526.000.
- Juds, Mark A.: See—  
Theisen, Peter J.; Smith, Richard G.; Juds, Mark A.; and Wycklendt, Daniel A., 4,951,021, Cl. 335-167.000.
- Jue, Catharine, executrix: See—  
Pernick, Benjamin J.; and Jue, Suey, deceased, 4,950,050, Cl. 350-162.130.
- Jue, Suey, deceased: See—  
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- Julian, John C. Apparatus for slicing vegetables. 4,949,612, Cl. 83-403.000.
- Junek, Hans; and Klade, Manfred, to Ciba-Geigy Corporation. Chromogenic dicyanomethylenepyrzolinones. 4,950,754, Cl. 544-58.500.
- Jupiter Transportation Company: See—  
Lichter, Nicholas J., 4,949,985, Cl. 280-402.000.
- Justice, Donald R. Corrugated drainage tube. 4,950,103, Cl. 405-43.000.
- Kabelmetal Electro GmbH: See—  
Schauer, Friedrich; and Wolff, Manfred, 4,949,454, Cl. 29-860.000.
- Kaburagi, Yoshiaki: See—  
Terasawa, Koji; Miyakawa, Akira; Yamaguchi, Hideki; Matsui, Shinya; Shiga, Mikio; Tsuyukubo, Shigeru; Ara, Yoji; Yokoi, Katsuyuki; Nakamura, Masaaki; Kaburagi, Yoshiaki; Mukai, Takao; Shoda, Shoichi; and Kimura, Tetsuo, 4,951,066, Cl. 346-140.00R.
- Kabushiki Kaisha Cosmic: See—  
Harada, Shigeru, 4,949,522, Cl. 52-533.000.
- Kabushiki Kaisha Cubic Engineering: See—  
Nakanishi, Motoyasu, 4,950,148, Cl. 425-224.000.
- Kabushiki Kaisha Daikin Seisakusho: See—  
Ohga, Syogo; and Imai, Toshiyuki, 4,949,831, Cl. 192-107.00C.
- Tojima, Hiromi; Minakami, Hiroshi; Hashimoto, Yasuyuki; Okubo, Mamoru; Murata, Ikuo; and Takeuchi, Hiroshi, 4,949,829, Cl. 192-89.00B.
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- Tanaka, Hideo; and Irie, Shinji, 4,950,600, Cl. 435-178.000.
- Kabushiki Kaisha Kibun Fudokensa: See—  
Tanaka, Hideo; and Irie, Shinji, 4,950,600, Cl. 435-178.000.
- Kabushiki Kaisha Kobe Seiko Sho: See—  
Maikuma, Yoshimata; and Ichikawa, Katsumi, 4,950,141, Cl. 425-33.000.
- Kabushiki Kaisha Komatsu Seisakusho: See—  
Katayama, Yukinori, 4,951,055, Cl. 342-22.000.
- Kabushiki Kaisha Okuma Tekkosho: See—  
Matsui, Keiji, 4,950,891, Cl. 250-237.00G.
- Kabushiki Kaisha Riken: See—  
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- Kabushiki Kaisha SG: See—  
Ichikawa, Wataru; and Matsuki, Yuji, 4,951,048, Cl. 341-15.000.
- Kabushiki Kaisha Toshiba: See—  
Aramaki, Yoshimitsu, 4,950,952, Cl. 313-542.000.
- Endo, Kazuo, 4,950,427, Cl. 357-72.000.
- Furukawa, Motoki; Kishita, Yoshihiro; and Mitani, Tatsuro, 4,951,121, Cl. 357-71.000.
- Hara, Hiroyuki; and Ueno, Masaji, 4,950,920, Cl. 307-262.000.
- Hiroi, Kazuo; and Ito, Kojiro, 4,951,191, Cl. 364-165.000.
- Honda, Masami, 4,950,072, Cl. 353-122.000.
- Hosoi, Takashi; and Sasaki, Katumaru, 4,951,241, Cl. 364-708.000.
- Iizuka, Yasuo; and Ichikawa, Hirokazu, 4,951,130, Cl. 358-44.000.
- Imamiya, Keniti; Tanaka, Sumio; Miyamoto, Junichi; Atsumi, Shigeru; Iyama, Yumiko; and Ohtsuka, Nobuaki, 4,951,257, Cl. 365-210.000.
- Isobe, Mitsuo; and Nakauchida, Shinich, 4,950,926, Cl. 307-451.000.
- Ito, Akira; Okamura, Kazuyoshi; and Uchida, Kazuiki, 4,950,953, Cl. 313-564.000.
- Kisou, Masaaki; Shimoda, Kenji; Ikeda, Kazumasa; Yoda, Shinji; and Takeuchi, Hisaharu, 4,951,137, Cl. 358-125.000.
- Kodera, Nobukazu; and Kakuti, Takeo, 4,949,565, Cl. 72-10.000.
- Kumagai, Junpei; and Shinozaki, Satoshi, 4,950,617, Cl. 437-41.000.
- Kurosawa, Kei; Watanabe, Hidehiro; and Sawada, Shizuo, 4,951,175, Cl. 361-313.000.
- Nakabayashi, Kazuto; and Hanawa, Masatoshi, 4,950,992, Cl. 324-309.000.
- Nawata, Yoshiaki, 4,951,091, Cl. 355-206.000.
- Nishida, Shinichiro, 4,950,116, Cl. 414-5.000.
- Ogura, Masahiko, 4,950,968, Cl. 318-599.000.
- Sahara, Hiroshi; Toda, Haruki; and Oshima, Shigeo, 4,951,253, Cl. 365-200.000.
- Sawaya, Hiromichi, 4,951,124, Cl. 357-81.000.
- Ueno, Hideyuki; and Dachiku, Kenshi, 4,951,140, Cl. 358-136.000.
- Yamada, Tetsuo, 4,951,105, Cl. 357-30.000.
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Kimura, Kaoru; Sato, Shunji; and Ookura, Masahiko, 4,950,849, Cl. 200-61.410.
- Okumura, Shinji; Ito, Hiroaki; Nishikawa, Seigo; and Nakazato, Tatsumi, 4,951,218, Cl. 364-477.000.
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- Kago, Yoshikazu: See—  
Hirawa, Takahide; Matsuda, Hitoshi; Hikita, Akira; and Kago, Yoshikazu, 4,951,228, Cl. 364-520.000.
- Kahl, Thomas-Michael: See—  
Henkelmann, Jochem; Hoch, Helmut; Kahl, Thomas-Michael; Kilpper, Gerhard; and Maier, Walter, 4,950,756, Cl. 544-156.000.
- Kahng, Chang-Won; Min, Sung-Ki; and Youn, Jong-Mil, to Samsung Electronics Co., Ltd. Method for fabricating a BiCMOS device. 4,950,616, Cl. 437-31.000.
- Kai, Junichi: See—  
Yasuda, Hiroshi; Kai, Junichi; Miyaki, Shinji; and Takahashi, Yasushi, 4,950,910, Cl. 250-492.300.
- Kainer, Hartmut: See—  
Flockenhaus, Claus; Galow, Manfred; Merkel, Klaus; Buhler, Hans-Eugen; and Kainer, Hartmut, 4,950,473, Cl. 423-235.000.
- Kato, Takashi, to Seiko Instruments Inc. Process for repairing pattern film. 4,950,498, Cl. 427-38.000.
- Kajikawa, Toshikazu, to NEC Corporation. Laser machining apparatus using focusing lens-array. 4,950,862, Cl. 219-121.700.
- Kajima Corporation: See—  
Iizuka, Masao; Yasaka, Atsuhiko; Fukahori, Yoshide; and Yoshizawa, Toshikazu, 4,950,528, Cl. 428-212.000.
- Kakii, Toshiaki; Asano, Yasuo; Suzuki, Shuzo; Kashiara, Koji; Saito, Kazuhito; and Komiya, Takeo, to Sumitomo Electric Industries, Ltd. Optical connector ferrule. 4,950,048, Cl. 350-96.200.
- Kakita, Tsuyoshi: See—  
Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, 4,951,079, Cl. 354-412.000.
- Kakizaki, Shinobu; Yamaoka, Fumiyuki; Kikushima, Shigeru; and Emura, Junichi, to Atsugi Motor Parts Co., Ltd. Automotive suspension system with variable suspension characteristics and variable damping force shock absorber therefor. 4,949,989, Cl. 280-707.000.
- Kakuti, Takeo: See—  
Kodera, Nobukazu; and Kakuti, Takeo, 4,949,565, Cl. 72-10.000.
- Kale, Hemant D. Water heater having filling dip tube. 4,949,680, Cl. 122-17.000.
- Kaley, Robert C.; and Wise, James H., to AMP Incorporated. Electrical contact terminal. 4,950,186, Cl. 439-882.000.
- Kali-Chemie AG: See—  
Schwetje, Norbert; and Kipping, Dieter, 4,950,461, Cl. 423-239.000.
- Kallenbach, Dieter H. F., to BPH Patent Holding AG. Pool cleaner component. 4,949,419, Cl. 15-246.000.
- Kaltschmidt, Horst, to Messerschmitt-Boelkow-Blohm GmbH. Method and apparatus for tracking a missile. 4,950,881, Cl. 250-203.600.
- Kam, Kam K.: See—  
Debe, Mark K.; Kam, Kam K.; and Field, Daniel R., 4,950,579, Cl. 430-270.000.
- Kamaike, Kazuo: See—  
Ishido, Yoshiharu; and Kamaike, Kazuo, 4,950,745, Cl. 536-58.000.
- Kaman Aerospace Corporation: See—  
Ulich, Bobby L.; Rather, John D. G.; Ames, Gregory H.; Lazarini, Albert J.; and Conklin, Edward, 4,950,878, Cl. 250-201.900.
- Kamei, Masanao: See—  
Yoshioka, Hiroshi; Hamada, Yoshitaka; and Kamei, Masanao, 4,950,726, Cl. 528-25.000.
- Kamerling, William. Posterior chamber intraocular lens. 4,950,290, Cl. 623-6.000.
- Kamimura, Shoichi: See—  
Watanabe, Kenichi; Miyoshi, Akihiko; and Kamimura, Shoichi, 4,951,198, Cl. 364-424.050.
- Kamimura, Taiji; and Tomobe, Norio, to Honda Giken Kogyo Kabushiki Kaisha. Pedal switch assembly. 4,950,850, Cl. 200-61.890.
- Kamiya, Makoto: See—  
Hosomizu, Hiroshi; Ichikawa, Tsutomu; Kamiya, Makoto; Yoneyama, Masatoshi; and Tuzi, Kenzi, 4,951,081, Cl. 354-415.000.
- Kamla, Gregory J.: See—  
Forster, Alan R.; and Kamla, Gregory J., 4,950,456, Cl. 422-80.000.
- Kamp, Eugene L., to A. B. Chance Company. Sensitive latch and trip mechanism. 4,951,022, Cl. 335-167.000.
- Kampf, Eberhard, to Kampf GmbH & Co. Maschinenfabrik. Winding crossbeam. 4,949,911, Cl. 242-57.10R.
- Kampf GmbH & Co. Maschinenfabrik: See—  
Kampf, Eberhard, 4,949,911, Cl. 242-67.10R.
- Kanbe, Hideo: See—  
Kato, Yasaburo; Suzuki, Toshihiko; Isawa, Nobuyuki; Kanbe, Hideo; and Hamasaki, Masaharu, 4,951,104, Cl. 357-24.000.
- Kaneda, Naoya: See—  
Wada, Hiroyuki; Kaneda, Naoya; Hirasawa, Masahide; and Suda, Hirofumi, 4,950,054, Cl. 350-429.000.



Kaneiwa, Shinji: *See—*  
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Kaneko, Koji; Seki, Kazuhisa; Ogata, Kazutsugu; and Mikajiri, Satoshi, to Fuji Photo Film Co., Ltd. Methods and device for measuring the brightness of an object, 4,951,077, Cl. 354-400.000.

Kaneko, Yutaka: *See—*  
Tachibana, Kimie; and Kaneko, Yutaka, 4,950,585, Cl. 430-385.000.

Kanmoto, Yoshiaki: *See—*  
Nagahara, Yasumori; Asada, Kenichirou; Fujioka, Takanobu; Kanmoto, Yoshiaki; Hasebe, Mitsuo; Nagasawa, Kiyoto; Katsumata, Akio; and Soga, Setsuo, 4,951,160, Cl. 358-496.000.

Kanno, Masahide: *See—*  
Sasagawa, Katsuyoshi; Sasaki, Masahiko; Uehara, Masao; Saito, Katsuyuki; Hasegawa, Jun; Kanno, Masahide; Uchikubo, Akinobu; and Yamashita, Shinji, 4,951,135, Cl. 358-98.000.

Kansai Paint Co., Ltd.: *See—*  
Miyazaki, Shizuo; Kuwano, Kazuyuki; and Fujita, Norio, 4,950,507, Cl. 427-419.200.

Kantola, James C.: *See—*  
Bland, Gerald F.; Kantola, James C.; Mondek, Martin J.; and Sullivan, Donald K., 4,950,188, Cl. 440-53.000.

Kantor, Sherwood: *See—*  
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Kanzaki Paper Manufacturing Co. Ltd.: *See—*  
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Saito, Toranosuke; Murata, Shouichi; Kawabata, Eiji; Shiozaki, Tomoharu; and Shiraishi, Tetsuo, 4,950,330, Cl. 106-21.000.

Kaplan, Andrew J.; and Seldin, Edward B., to Kinderworks Corporation. Mechanical push-toy, 4,950,199, Cl. 446-238.000.

Kapur, Vijay K.: *See—*  
Basol, Bulent M.; and Kapur, Vijay K., 4,950,615, Cl. 437-5.000.

Karlin, Mats A.: *See—*  
Haland, Lars Y.; Karlin, Mats A.; Ennerdahl, Leif; and Skanberg, Enar T., 4,949,995, Cl. 280-805.000.

Karlotski, Robert J.: *See—*  
Pasmore, Edmund M.; Karlotski, Robert J.; and Bazin, Simone P., 4,950,954, Cl. 313-633.000.

Karst, L. Emery. Instrument for stain removal and polishing of natural teeth, 4,950,160, Cl. 433-88.000.

Kasai, Naoki, to NEC Corporation. Isolation of insulated-gate field-effect transistors, 4,951,117, Cl. 357-49.000.

Kashida, Motokazu: *See—*  
Yoshimura, Katsuji; Takahashi, Koji; Nagasawa, Kenichi; Yamashita, Shinichi; Kashida, Motokazu; and Otokawa, Mitsuhiro, 4,951,162, Cl. 360-77.140.

Kashihara, Koji: *See—*  
Kakii, Toshiaki; Asano, Yasuo; Suzuki, Shuzo; Kashihara, Koji; Saito, Kazuhito; and Komiya, Takeo, 4,950,048, Cl. 350-96.200.

Kasprzak, Kenneth A.: *See—*  
Halloran, Daniel J.; Kasprzak, Kenneth A.; Savastano, Stefano G.; and Swihart, Terence J., 4,950,506, Cl. 427-387.000.

Kassem, Gary M. Non-penetrating elastomeric membrane anchoring system, 4,949,523, Cl. 52-713.000.

Kastinger Skiboort GmbH of Seewalchen: *See—*  
Hercog, Milan; and Kubelka, Axel, 4,949,480, Cl. 36-119.000.

Kasuga, Noboru: *See—*  
Hanyu, Susumu; Kasuga, Noboru; Hara, Kazumasa; and Koike, Mikio, 4,949,657, Cl. 112-121.130.

Kataoka, Hiroyuki: *See—*  
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Katayama, Hideaki; and Murakami, Toshifumi, to Mitsubishi Jukogyo Kabushiki Kaisha. Green tire inserting apparatus in a tire vulcanizing machine, 4,950,142, Cl. 425-38.000.

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Kato, Choji: *See—*  
Kojima, Hiroshi; Sakata, Keikichi; Watanabe, Seigo; Mitsukuchi, Yukio; Hashimoto, Shuichi; Kato, Choji; Teshigawara, Mikiro; Furuhashi, Ryoichi; Momoi, Shoji; Inoue, Toshihiko; Uemura, Kazuki; and Oshima, Katsushi, 4,949,444, Cl. 29-27.00R.

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Kato, Yasaburo; Suzuki, Toshihiko; Isawa, Nobuyuki; Kanbe, Hideo; and Hamasaki, Masaharu, to Sony Corporation. Solid-state image pick-up device with uniform distribution of dopant therein and production method thereof, 4,951,104, Cl. 357-24.000.

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Yagihara, Morio; and Katoh, Kazunobu, 4,950,578, Cl. 430-264.000.

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Katsumata, Akio: *See—*  
Nagahara, Yasumori; Asada, Kenichirou; Fujioka, Takanobu; Kanmoto, Yoshiaki; Hasebe, Mitsuo; Nagasawa, Kiyoto; Katsumata, Akio; and Soga, Setsuo, 4,951,160, Cl. 358-496.000.

Katz, David H., to La Jolla Pharmaceutical Company. D-Gl conjugate therapy, 4,950,469, Cl. 424-85.100.

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Kawabata, Choji: *See—*  
Suzuki, Ryoichi; Maiya, Mitsuo; Kuwahara, Motoo; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 4,949,702, Cl. 126-263.000.

Kawabata, Eiji: *See—*  
Saito, Toranosuke; Murata, Shouichi; Kawabata, Eiji; Shiozaki, Tomoharu; and Shiraishi, Tetsuo, 4,950,330, Cl. 106-21.000.

Kawabata, Takeo, to Nippon Gohsei Kagaku Kogyo Kabushiki. 2-5-disubstituted-7,7,8,8-tetracyanoquinodimethanes, 4,950,774, Cl. 552-303.000.

Kawai, Tatsuya; and Matsuda, Takashi, to Japan Medical Supply Co., Ltd. Plastic molded articles with shape memory property, 4,950,258, Cl. 604-281.000.

Kawakami, Takayuki: *See—*  
Onodera, Masayuki; Naito, Tatsuo; Kubota, Hisashi; Kawakami, Takayuki; Ito, Takatoshi; and Shimizu, Kei, 4,951,189, Cl. 364-141.000.

Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, to Mitsubishi Pencil Co., Ltd. Process for producing carbon product with coarse and dense structure, 4,950,443, Cl. 264-29.500.

Kawamura, Masato: *See—*  
Okachi, Shuki; Suzuki, Toshitake; Nukushina, Yoshiyuki; and Kawamura, Masato, 4,950,637, Cl. 503-209.000.

Kawana, Takeshi: *See—*  
Kojima, Toosaku; Mimata, Tsutomu; Okikawa, Susumu; Okamoto, Michio; Kawana, Takeshi; and Urayama, Satoshi, 4,950,866, Cl. 219-137.0PS.

Kawanishi, Hidenori: *See—*  
Morimoto, Taiji; Yamaguchi, Masahiro; Kaneiwa, Shinji; Hayashi, Hiroshi; and Kawanishi, Hidenori, 4,951,290, Cl. 372-48.000.

Kawanishi, Hiroyuki: *See—*  
Hirahara, Shinichi; Kawanishi, Hiroyuki; and Shibui, Naoto, 4,949,990, Cl. 280-750.000.

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Hirata, Makizo; Tamba, Shinichi; and Miguchi, Akio, 4,949,807, Cl. 181-240.000.

Kawasaki Steel Corp.: *See—*  
Itoyama, Seiji; Tada, Kichio; Telashima, Tsukasa; Tanaka, Shuji; Yamanaka, Hiromitsu; Yunde, Takao; Iguchi, Hiroaki; and Bessho, Nagayasu, 4,949,777, Cl. 164-453.000.

Saito, Kenji; Nozaki, Tsutomu; Oguchi, Yukio; Sorimachi, Kenichi; Nakato, Hakanu; Okuda, Haruji; Hosotani, Koji; Kinoshita, Katsuo; and Murata, Kenji, 4,949,778, Cl. 164-468.000.

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Fujiwara, Masaki; Kawase, Masaki; Masuda, Kiyoshi; and Taniguchi, Shigeki, 4,951,233, Cl. 364-523.000.

Kawashima, Kazuki; and Hayakawa, Hisashi, to NTN Toyo Bearing Co., Ltd. Autotensioner, 4,950,209, Cl. 474-138.000.

Kawate, Keith W.; and Sabetti, Anthony J., to Texas Instruments Incorporated. Low cost high precision sensor, 4,951,236, Cl. 364-571.010.

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Kay, Douglas: *See—*  
Biber, Jeffrey; Cohen, Jeffrey; Holmbald, John; Hsieh, Zon-Hong; Kay, Douglas; and Spitzer, Roy, 4,951,278, Cl. 370-60.000.

Kay, Francis X., to F.X.K. Patents Limited. Fluid control valves, 4,949,746, Cl. 137-82.000.

Kazda, Stanislav: *See—*  
Schwenner, Eckhard; Stagemeyer, Hartmut; Kazda, Stanislav; and Knorr, Andreas, 4,950,676, Cl. 514-338.000.

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Kakii, Toshiaki; Asano, Yasuo; Suzuki, Shuzo; Kashihara, Koji; Saito, Kazuhito; and Komiya, Takeo, 4,950,048, Cl. 350-96.200.  
Komline-Sanderson Engineering Corporation: See—  
Hann, Wayne D., Sr., 4,950,399, Cl. 210-232.000.  
Komohara, Minoru: See—  
Fujiwara, Mikio; Irie, Hideki; and Komohara, Minoru, 4,949,931, Cl. 248-429.000.  
Komori, Tadaaki: See—  
Ochi, Kozo; Ezaki, Masami; Iwami, Morita; Komori, Tadaaki; and Kohsaka, Masanobu, 4,950,605, Cl. 435-252.500.  
Komurasaki, Satoshi, to Mitsubishi Denki Kabushiki Kaisha. Acceleration detector, 4,949,571, Cl. 73-35.000.  
Kondo, Eiji; Hayashi, Yoshiyuki; Konishi, Takao; Hattori, Teruo; and Shoji, Junichi, to Shionogi & Co., Ltd. Anti-mycoplasma agent, 4,950,686, Cl. 514-546.000.  
Kondo, Shinichi: See—  
Atsumi, Kunio; Yamamoto, Yuichi; Sakagami, Kenji; Nishihata, Ken; and Kondo, Shinichi, 4,950,660, Cl. 514-201.000.  
Kondo, Toshio: See—  
Ebata, Shuji; Hirayama, Hiroyuki; Higuchi, Hirofumi; Kondo, Toshio; and Kida, Koichi, 4,950,801, Cl. 564-126.000.  
Kondo, Yasushi: See—  
Hayashi, Yutaka; Kondo, Yasushi; Ishii, Kenichi; and Kinoshita, Eita, 4,950,376, Cl. 204-192.320.  
Kondoh, Fumio: See—  
Takehisa, Fumitaka; Yokoi, Mitsuyoshi; and Kondoh, Fumio, 4,949,775, Cl. 164-267.000.  
Konica Corporation: See—  
Hiramoto, Tsutomu; Komeiji, Masayuki; Hirose, Kimimoto; Okubo, Hitoshi; Sato, Minoru; and Yasufuku, Yoshitaka, 4,951,167, Cl. 360-132.000.  
Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, 4,951,079, Cl. 354-412.000.  
Ishii, Kohji; Honda, Hiroyuki; Tanaka, Kazuyuki; and Koizumi, Noboru, 4,951,093, Cl. 355-245.000.  
Komamura, Tawara; Tsuchiya, Masaru; and Okauchi, Ken, 4,950,584, Cl. 430-351.000.  
Tachibana, Kimie; and Kaneko, Yutaka, 4,950,585, Cl. 430-385.000.  
Konishi, Takao: See—  
Kondo, Eiji; Hayashi, Yoshiyuki; Konishi, Takao; Hattori, Teruo; and Shoji, Junichi, 4,950,686, Cl. 514-546.000.  
Konrad, Eugen: See—  
Clausen, Thomas; and Konrad, Eugen, 4,950,302, Cl. 8-409.000.  
Konuma, Hiroaki: See—  
Muraio, Toshiro; Suzuki, Yoshiharu; Wada, Mitsuo; and Konuma, Hiroaki, 4,950,360, Cl. 156-668.000.  
Kop-Coat, Inc.: See—  
Ward, Hans A., 4,950,685, Cl. 514-479.000.  
Kopper, Laszlo: See—  
Suli, Helga; Medzihradsky, Kalman; Medzihradsky nee Schweiger, Hedvig; Lapis, Karoly; Kopper, Laszlo; and Jeney, Andras, 4,950,651, Cl. 514-18.000.  
Kopper, Werner; Frank, Rudiger; Schramm, Herbert; Worner, Dieter; and Moller, Hubert, to Robert Bosch GmbH. Drive slip regulating system, 4,950,037, Cl. 303-110.000.  
Korber, Karlheinz; and Ludwig, Klaus. Framework for producing tooth-replacing bridges, 4,950,162, Cl. 433-180.000.  
Korea Advanced Institute of Science and Technology: See—  
Koh, Jong S.; and Kim, Jae K., 4,951,157, Cl. 358-433.000.  
Kwon, Young Se; and Yoo, Tae Kyung, 4,950,622, Cl. 437-129.000.  
Korner, Tillmann; and Brosius, Klaus, to J. M. Voith GmbH. Self-locking differential gearing, 4,950,215, Cl. 475-252.000.  
Kornett, Barry A.: See—  
Hancock, David A.; and Kornett, Barry A., 4,950,107, Cl. 405-186.000.  
Korniski, Thomas J.: See—  
Su, Eugene C.; Korniski, Thomas J.; Watkins, William L. H.; and Gandhi, Haren S., 4,950,476, Cl. 423-213.700.  
Korte-Jungermann, Hans-Werner. Racket for ball games, in particular tennis, as well as stringing device therefor, 4,949,968, Cl. 273-73.00A.  
Kortec AG: See—  
Weber, Ralph, 4,949,940, Cl. 266-100.000.  
Korting, Paul A. O. G.: See—  
Schoyer, H. F. R.; Korting, Paul A. O. G.; and Mul, J. M., 4,950,341, Cl. 149-22.000.  
Kos, Robert D., to Fluoroware, Inc. Wafer carrier, 4,949,848, Cl. 211-41.000.  
Koshida, Yoshinori; and Isobe, Minoru, to Oki Electric Industry Co., Ltd. Apparatus for processing embossed cards, 4,950,875, Cl. 235-448.000.  
Kosho, Akira: See—  
Saruwatari, Tatsuhiko; Otani, Atsushi; Kosho, Akira; and Togawa, Satoru, 4,949,443, Cl. 29-27.00C.  
Kosinski, John A., to United States of America, Army. Temperature compensated crystal oscillator (TCXO) with improved temperature compensation, 4,951,007, Cl. 331-158.000.  
Kosinski, John A.: See—  
Ballato, Arthur; and Kosinski, John A., 4,950,937, Cl. 310-360.000.  
Koss, Henning: See—  
Claassen, Ernst; Bodewein, Jakob; Koss, Henning; and Kollan, Rolf, 4,949,953, Cl. 271-218.000.  
Koszyk, Francis J.; and Deason, James R., to G. D. Searle & Co. 2,2-di-substituted benzopyran leukotriene-D<sub>4</sub> antagonists, 4,950,684, Cl. 514-456.000.  
Kotani, Matahira; Matsumoto, Masafumi; Morigami, Masanori; and Hachinoda, Masayuki, to Sharp Kabushiki Kaisha. Facsimile circuit monitor system, 4,951,156, Cl. 358-404.000.  
Kotsch, Gary D.; Giles, Philip M., Jr.; and Biemiller, Raymond H., to Bethlehem Steel Corporation. Method for the controlled cooling of hot rolled steel samples, 4,950,338, Cl. 148-146.000.  
Kouba, Carroll C., to Westinghouse Electric Corp. Permanent magnet generator system, 4,950,973, Cl. 322-69.000.  
Kovach, Joseph A.; and McCartney, Dale B., to Eaton Corporation. Method of making ring gear and ring gear therefrom, 4,949,456, Cl. 29-893.350.  
Kovacs, Bela V.: See—  
Keough, John R.; Keough, William R.; and Kovacs, Bela V., 4,949,774, Cl. 164-256.000.  
Kowa Company Ltd.: See—  
Aizu, Yoshihisa; Ogino, Kouji; and Sugita, Toshiaki, 4,950,070, Cl. 351-221.000.  
Mizuta, Susumu, 4,950,068, Cl. 351-208.000.  
Kowalezik, Udo; Bartmann, Martin; and Finke, Juergen, to Huels Aktiengesellschaft. Process for the preparation of 4,4'-dihydroxybiphenyl, 4,950,808, Cl. 568-730.000.  
Kowalczyk, Curtis W.: See—  
Lewis, Jack L.; Lew, William D.; Kowalczyk, Curtis W.; and Hunter, Robert E., 4,950,271, Cl. 606-102.000.  
Koya Seiko Co., Ltd.: See—  
Suzuki, Keiji, 4,950,110, Cl. 408-126.000.  
Koya-Sha Co., Ltd.: See—  
Endo, Yukio; Mitani, Kazuyuki; Matsuo, Tadashi; Ueki, Masayoshi; and Otake, Norio, 4,949,511, Cl. 51-295.000.  
Koyama, Takao: See—  
Murota, Kazuya; and Koyama, Takao, 4,949,821, Cl. 192-3.210.  
Koyo Disposable Goods Co., Ltd.: See—  
Takagi, Katsumasa, 4,950,262, Cl. 604-385.100.  
Koyou Jidouki Co., Ltd.: See—  
Yamashita, Kyouchi, 4,949,891, Cl. 226-30.000.  
Kraft General Foods, Inc.: See—  
Lennon-Thompson, Doris L.; and Raneri, Kathleen R., 4,950,164, Cl. 434-127.000.  
Kraft, Walter: See—  
von Stein, Werner R.; and Kraft, Walter, 4,951,084, Cl. 355-38.000.  
Kramer, Hans-Joachim: See—  
Schleppinghoff, Bernhard; Reinhardt, Horst; and Kramer, Hans-Joachim, 4,950,820, Cl. 585-264.000.  
Kramer, Jonathan; Petersen, Steven R.; and Shauger, Herbert A., Jr., to Drexelbrook Controls, Inc. Continuous condition sensing system, 4,950,998, Cl. 324-674.000.  
Krasner, Gary N., to CooperVision, Inc. Small incision intraocular lens with adjustable refractive power, 4,950,289, Cl. 623-6.000.  
Krasso, Anna: See—  
Fischli, Albert; Krasso, Anna; and Szenté, Andre, 4,950,677, Cl. 514-338.000.  
Kraus, Heinz, to Johannes Heidenhain GmbH. Radiation mask for the lithographic production of patterns, 4,950,568, Cl. 430-5.000.  
Krauss-Maffei A.G.: See—  
Schostek, Hubert, 4,949,836, Cl. 198-676.000.  
Krausslich, Wolfgang: See—  
Giles, Randy K.; and Krausslich, Wolfgang, 4,949,768, Cl. 144-3.00R.  
Kreager, William D., Jr., to Frito-Lay, Inc. Method and apparatus for making improved seals between polymeric film materials, 4,950,345, Cl. 156-203.000.  
Kreatz, Udo, to Bayer Aktiengesellschaft. Process for the preparation of the (—)-antipode of (E)-1-cyclohexyl-4,4-dimethyl-3-hydroxy-2-(1,2,4-triazol-1-yl)-pent-1-ene, 4,950,767, Cl. 548-570.000.  
Krecke, Edmond D. Fastening element for the cladding concrete method of construction, 4,949,515, Cl. 52-105.000.  
Krefta, Ronald J.; and Forbes, Franklin L., to General Electric Company. Electronically commutated motor having an increased flat top width in its back EMF waveform, a rotatable assembly therefor, and methods of their operation, 4,950,960, Cl. 318-254.000.  
Kreinberg, Earl R.: See—  
Daly, John K.; and Kreinberg, Earl R., 4,950,180, Cl. 439-422.000.  
Krenz, Horst M.; and Wahlemeier, Fred E., to Zenith Data Systems Corporation. Computer stand, 4,949,934, Cl. 248-676.000.  
Kripal, David: See—  
Raviv, Gil; Pal, Ivan; Koester, Dean; Kripal, David; and Towle, James N., 4,949,725, Cl. 128-731.000.  
Krishnakumar, Suppayan M.; Collette, Wayne N.; Schmidt, Steven L.; and Nahill, Thomas E., to Continental PET Technologies, Inc. Injection mold manifold arrangement, 4,950,143, Cl. 425-130.000.  
Kristof, Janosne: See—  
Keri, Tibor; and Kristof, Janosne, 4,950,481, Cl. 424-195.100.  
Krogh, Ole, to Tegal Corporation. Method and apparatus for low pressure plasma, 4,949,670, Cl. 118-723.000.



- Kropf, Charles W.; Lockridge, James E.; and Crow, Harvey L., Jr., to Arkla, Inc. Table or cart assembly. 4,949,701, Cl. 126-41.00R.
- Kruchowski, James N.: See—  
Neumann, Eugene F.; August, Melvin C.; Kruchowski, James N.; Nelson, Stephen; and Steitz, Richard R., 4,949,453, Cl. 29-620.000.
- Krueger, Dennis L.: See—  
Rolando, Richard J.; Krueger, Dennis L.; Meyer, Daniel E.; and Insley, Thomas I., 4,950,549, Cl. 428-500.000.
- Krueger, Goetz: See—  
Horn, Dieter; Krueger, Goetz; and Spengler, Reinhard, 4,950,654, Cl. 514-53.000.
- Krug, Rainer: See—  
Bernhardt, Bruno; Hessner, Anton; and Krug, Rainer, 4,950,394, Cl. 210-170.000.
- Krummer, Thomas, to Diehl GmbH & Co. Electrical switch. 4,950,922, Cl. 307-309.000.
- Kruncos, Francis E., to Brunswick Corporation. Tachometer signal conditioning circuit. 4,950,983, Cl. 324-169.000.
- Krupp Koppers GmbH: See—  
Lang, Michael; Wilmer, Gerhard; and Kuhn, Michael, 4,950,308, Cl. 48-62.00R.
- Kruse, Dietrich; Beutelspacher, Albrecht; and Kersten, Annette-Gabriele, to Siemens Aktiengesellschaft. Data exchange system comprising a plurality of user terminals each containing a chip card reading device. 4,951,247, Cl. 364-900.000.
- Ksander, George; and Ogawa, Yasushi, to Collagen Corporation. Collagen wound healing matrices and process for their production. 4,950,483, Cl. 424-422.000.
- Kubelka, Axel: See—  
Hercog, Milan; and Kubelka, Axel, 4,949,480, Cl. 36-119.000.
- Kubo, Hiromasa: See—  
Nagaishi, Hatsu; Sanbuichi, Hiroshi; Uchida, Masaaki; Miwa, Hiromichi; Takahata, Toshio; Seimiya, Yasuo; and Kubo, Hiromasa, 4,951,209, Cl. 364-431.040.
- Kubota, Hisashi: See—  
Onodera, Masayuki; Naito, Tatsuo; Kubota, Hisashi; Kawakami, Takayuki; Ito, Takatoshi; and Shimizu, Kei, 4,951,189, Cl. 364-141.000.
- Kubozono, Kenji: See—  
Nakajima, Takashi; Kubozono, Kenji; Itou, Takefumi; Hashizume, Kimio; and Iwase, Shinichi, 4,950,451, Cl. 420-481.000.
- Kuczynski, Anthony L.: See—  
Ayer, Atul D.; Swanson, David R.; and Kuczynski, Anthony L., 4,950,486, Cl. 424-473.000.
- Kudo, Hideo: See—  
Imai, Kunio; Aso, Saburo; Kudo, Hideo; and Uchidoi, Masataka, 4,950,520, Cl. 428-64.000.
- Kuhbeck, Alois: See—  
Burghart, Hermann; and Kuhbeck, Alois, 4,950,124, Cl. 414-537.000.
- Kuhlmann, George E.: See—  
Sanchez, Paul A.; Young, David A.; Kuhlmann, George E.; Partnerheimer, Walter; and Schammel, Wayne P., 4,950,786, Cl. 562-416.000.
- Kuhn, Herbert, to Siemens Aktiengesellschaft. Luminescent storage screen and read-out apparatus therefor. 4,950,907, Cl. 250-484.100.
- Kuhn, Michael: See—  
Lang, Michael; Wilmer, Gerhard; and Kuhn, Michael, 4,950,308, Cl. 48-62.00R.
- Kuhn, Reinhard: See—  
Buhler, Ulrich; Boos, Margareta; and Kuhn, Reinhard, 4,950,305, Cl. 8-639.000.
- Kuindersma, Pieter I.; Van Es-Spiekman, Wilma; Mols, Petrus P. G.; and Baele, Ingrid A. F. M., to U.S. Philips Corp. Coating for DFB/DBR laser diodes. 4,951,292, Cl. 372-49.000.
- Kujawa, Leonard T.: See—  
Barbaris, Joseph K.; and Kujawa, Leonard T., 4,949,862, Cl. 220-89.100.
- Kumagai, Junpei, and Shinozaki, Satoshi, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor device. 4,950,617, Cl. 437-41.000.
- Kumagai, Tatsuya: See—  
Tomita, Yukio; Yamaba, Ryota; Tsuda, Yukio; Yamanaka, Katsuyoshi; and Kumagai, Tatsuya, 4,950,336, Cl. 148-111.000.
- Kumagai, Yuugo; Moribe, Isamu; and Shibuya, Ikutoshi, to Hitachi Chemical Company, Ltd. Toner for developing electrostatic image comprising vinyl polymer having hydroxyl number of 50 to 350. 4,950,574, Cl. 430-109.000.
- Kumamoto, Yoshiyuki: See—  
Kinoshita, Takeshi; Morita, Koichi; and Kumamoto, Yoshiyuki, 4,950,705, Cl. 524-357.000.
- Kumar, Suresh V. B.: See—  
Dalrymple, John C.; Kumar, Suresh V. B.; and Parkinson, Peter B., 4,951,230, Cl. 364-521.000.
- Kumar, Viraraghavan S., to Teknocrate, Inc. Integrated pneumatic valve/sensor assembly for vacuum supply apparatus. 4,950,016, Cl. 294-64.200.
- Kummer, Rudolf; Bertleff, Werner; and Roeper, Michael, to BASF Aktiengesellschaft. Preparation of carbonyl compounds by isomerization of allyl alcohols. 4,950,797, Cl. 568-450.000.
- Kun, Zoltan K.; Leksel, David; and Phillips, Norman J., to Westinghouse Electric Corp. Thin film electroluminescent edge emitter assembly and integral packaging. 4,951,064, Cl. 346-107.00R.
- Kunnen, Henricus J., legal representative: See—  
Ontrop, Hans; Salters, Roelof; Prince, Betty; Davies, Thomas J.; Phelan, Cathal G.; O'Connell, Cormac; Voss, Peter H.; Pfen-
- nings, Leonardus C. M. G., deceased; and Kunnen, Henricus J., legal representative, 4,951,254, Cl. 365-201.000.
- Kuo, Ming H.: See—  
Schuttien, Michael J.; Park, John N.; and Kuo, Ming H., 4,951,185, Cl. 363-17.000.
- Kuo, Youti. Dispenser with integrated cover for paste-like material. 4,949,875, Cl. 222-156.000.
- Kuramoto, Nobuyuki: See—  
Taniguchi, Hitofumi; and Kuramoto, Nobuyuki, 4,950,435, Cl. 264-65.000.
- Kuraray Company, Ltd.: See—  
Sasaki, Shigeru; and Matsumoto, Mitsuo, 4,950,736, Cl. 528-370.000.
- Tamai, Yoshin; Torihara, Masahiro; Kido, Yoichi; Yamahara, Johji; and Ito, Masayoshi, 4,950,818, Cl. 514-471.000.
- Kurasawa, Morio, to Kurasawa Optical Industry Co., Ltd. Anti-fogging material. 4,950,706, Cl. 524-415.000.
- Kurasawa Optical Industry Co., Ltd.: See—  
Kurasawa, Morio, 4,950,706, Cl. 524-415.000.
- Kurata, Hedebaru: See—  
Makabe, Jun; Kurata, Hedebaru; and Matsunaga, Hiroshi, 4,951,165, Cl. 360-104.000.
- Kurihara, Hideo; and Kurihara, Hitoshi, to Canon Kabushiki Kaisha. Apparatus for transporting card-like information recording medium. 4,950,877, Cl. 235-480.000.
- Kurihara, Hitoshi: See—  
Kurihara, Hideo; and Kurihara, Hitoshi, 4,950,877, Cl. 235-480.000.
- Kurihara, Nobuo; Osuga, Minoru; Takahashi, Hideo; and Endo, Akira, to Hitachi Ltd. Automobile driving guide apparatus. 4,951,212, Cl. 369-449.000.
- Kurihara, Norimitsu; Tsuchiya, Yoshikazu; Morota, Makie; and Fukuda, Junichi, to Honda Giken Kogyo Kabushiki Kaisha. Collision detection system for a vehicle. 4,950,914, Cl. 307-10.100.
- Kurita, Masayuki: See—  
Tsujimoto, Yasuhiro; Kurita, Masayuki; and Aoki, Masaru, 4,950,353, Cl. 156-547.000.
- Kurland, Thomas F.: See—  
Hanson, Jon; Schiffer, Larry W.; Heckenkamp, Daniel P.; and Kurland, Thomas F., 4,951,018, Cl. 335-132.000.
- Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, to Fuji Electric Co., Ltd. Photoconductor for electrophotography with thienyl group containing charge transport material. 4,950,572, Cl. 430-59.000.
- Kurokawa, Noriharu: See—  
Nakamura, Keiichi; Oshima, Tsutomu; Kurokawa, Noriharu; and Kitai, Toshihiko, 4,949,455, Cl. 29-843.000.
- Kuroki, Kazuhiko: See—  
Takeuchi, Kousuke; Shibata, Kenichi; Tanaka, Toshiharu; Nishikawa, Seiji; Kuroki, Kazuhiko; and Nakano, Shoichi, 4,950,900, Cl. 250-346.000.
- Kurosawa, Hideyuki; Takahashi, Kazuhiro; and Nakanouchi, Yukio, to Kabushiki Kaisha Riken. Limiting current-type oxygen sensor. 4,950,380, Cl. 204-406.000.
- Kurosawa, Kei; Watanabe, Hidehiro; and Sawada, Shizuo, to Kabushiki Kaisha Toshiba. Semiconductor memory device with stacked capacitor structure and the manufacturing method thereof. 4,951,175, Cl. 361-313.000.
- Kuroyanagi, Katsuya; Kimura, Kazuhiro; Itakura, Yoshitaka; Hamada, Naotaka; and Mori, Hiroyuki, to Kojima Press Industry Co., Ltd. Switching device. 4,950,845, Cl. 200-5.00B.
- Kurt Manufacturing Company, Inc.: See—  
Bernstein, Leon M., 4,949,943, Cl. 269-32.000.
- Kushnerev, Daniil M.: See—  
Pokhodnya, Igor K.; Kushnerev, Daniil M.; Ustinov, Sergei D.; Sokolov, Oleg G.; Grischenko, Leonid V.; Baskakov, Gennady V.; Yamskoi, Marat V.; Zarubin, Andrei M.; and Golovko, Viktor V., 4,950,331, Cl. 106-313.000.
- Kuster, Hans-Werner: See—  
Vanaschen, Luc; and Kuster, Hans-Werner, 4,950,320, Cl. 65-273.000.
- Kutniewski, Paul E.: See—  
Scherer, Jeremy D.; and Kutniewski, Paul E., 4,950,503, Cl. 427-229.000.
- Kuwahara, Motoo: See—  
Suzuki, Ryoichi; Maiya, Mitsuo; Kuwahara, Motoo; Yamauchi, Kunio; Kawabata, Choji; Takeuchi, Akira; and Ando, Koki, 4,949,702, Cl. 126-263.000.
- Kuwano, Kazuyuki: See—  
Miyazaki, Shizuo; Kuwano, Kazuyuki; and Fujita, Norio, 4,950,507, Cl. 427-419.200.
- Kuwica, Daniel. Rivet remover. 4,949,446, Cl. 29-243.530.
- Kuznicki, William J.: See—  
Schwendeman, Robert J.; Kuznicki, William J.; Johnson, Richard E.; and Davis, David W., 4,951,039, Cl. 340-725.000.
- Kwon, Young Se; and Yoo, Tae Kyung, to Korea Advanced Institute of Science and Technology. Method for manufacturing a surface emitting type AlGaAs/GaAs semiconductor laser diode. 4,950,622, Cl. 437-129.000.
- Kyohzuka, Takahiro, to Mazda Motor Corporation. Throttle valve opening detecting apparatus for a vehicle engine. 4,951,206, Cl. 364-424.100.
- Kyushima, Hiroyuki: See—  
Okano, Kazuyoshi; Nakamura, Kimitsugu; and Kyushima, Hiroyuki, 4,950,951, Cl. 313-535.000.
- La Jolla Pharmaceutical Company: See—  
Katz, David H., 4,950,469, Cl. 424-85.100.

- Katz, David H., 4,950,713, Cl. 525-54.100.
- Laane, Nicolaas C.: See—  
van der Hoeven, Philippus C.; Laane, Nicolaas C.; Versluis, Peter; and Visser, Ardianus, 4,950,424, Cl. 252-540.000.
- LABINAL, societe anonyme: See—  
Pech, Guy, 4,949,451, Cl. 29-564.100.
- LaBrie, Robert L.: See—  
Stringfield, Richard T.; Goltz, H. Robert; Norman, Seth I.; Bharwada, Upen J.; and LaBrie, Robert L., 4,950,332, Cl. 127-55.000.
- Lackey, Jennifer J.: See—  
Gustilo, Ramon B.; Rand, James A.; Roberts, Jeffrey G.; and Lackey, Jennifer J., 4,950,298, Cl. 623-20.000.
- Lade, Robert W.; Schuttien, Herman P.; and Zuercher, Joseph C., to Eaton Corporation. Apparatus for measuring depth of a fluid chamber. 4,949,584, Cl. 73-865.800.
- Lafitte, Louis D., to Leon A. Robichaux, a part interest. Pressure relief system for down hole chemical cutters. 4,949,789, Cl. 166-298.000.
- Laguna Tectrix, Inc.: See—  
Stark, Duane P.; and Sweeney, Michael T., 4,949,993, Cl. 272-70.000.
- Lai, Hoi Kiong; and Davis, Robert A., to Uniroyal Chemical Company, Inc.; and Uniroyal Chemical Ltd./Ltee. Substituted 2-propenyl derivatives of pyridine. 4,950,671, Cl. 514-277.000.
- Laine, Daren L.: See—  
Darilek, Glenn T.; and Laine, Daren L., 4,950,374, Cl. 204-180.200.
- Laird, Walter J.: See—  
Greenfield, Lawrence; Emerick, Anne W.; and Laird, Walter J., 4,950,740, Cl. 530-350.000.
- Laitram Corporation, The: See—  
Lapeyre, James M., 4,949,663, Cl. 114-246.000.
- Lapeyre, James M.; and Gundlach, James O., 4,949,838, Cl. 198-853.000.
- Lakey, Lawrence D. Package end sealing and cutting method and apparatus. 4,949,846, Cl. 206-484.000.
- Lakier, Earl I. Paint brush holder. 4,949,864, Cl. 220-90.000.
- Lakios, Emmanuel N.; and McGraw, Michael F., to Veeco Instruments, Inc. Substrate transport and cooling apparatus and method for same. 4,949,783, Cl. 165-80.100.
- Lamb, Joyce D.: See—  
Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., 4,950,825, Cl. 585-320.000.
- Lambda-Physik Forschungs-und Entwicklungs GmbH: See—  
Steinfuhrer, Gerd, 4,951,295, Cl. 372-86.000.
- Lambert, Robert E.; and Ohrenstein, Simcha, to Cooper Industries, Inc. Runway lighting system. 4,951,046, Cl. 340-953.000.
- Lambke, Bernard J., to Komatsu Dresser Company. Latch assembly for a pivotal closure member and improved latch striker means therefor. 4,950,006, Cl. 292-216.000.
- Lamp, Richard J.: See—  
Schriner, David A.; and Lamp, Richard J., 4,951,058, Cl. 342-61.000.
- Lamport, Daphne L.: See—  
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- Lancaster, Gerald M.: See—  
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- Rawi, Omar M. A. A. Disposable instrument for injection, 4,950,248, Cl. 604-181.000.
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- Recon/Optical, Inc.: See—  
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- Reichert, Gerhard: See—  
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- Reinartz, Hans-Dieter; and Steffes, Helmut, to Alfred Teves GmbH Brake pressure regulator, 4,950,027, Cl. 303-114.000.
- Reinelt, Karlheinz, to Rheinmetall GmbH. Propellant charge container, 4,949,640, Cl. 102-282.000.
- Reinert, Gerhard; and Burdeska, Kurt, to Ciba-Geigy Corporation. Process for quenching or suppressing the fluorescence of substrates treated with fluorescent whitening agents, 4,950,304, Cl. 8-566.000.
- Reinfelder, Hans-Erich, to Siemens Aktiengesellschaft. Read-out system for a luminescent storage screen in a x-ray diagnostics installation, 4,950,895, Cl. 250-327.200.
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- Rens, Piet C. J.: See—  
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- Republic Medical Products, Inc.: See—  
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- Restaino, Alfred J.: See—  
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- Rheinmetall GmbH: See—  
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- Rhone-Poulenc Chimie: See—  
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- Gubelmann, Michel, 4,950,809, Cl. 568-741.000.
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- Richter, Ernst-Jurgen. Assembly for connecting a crown part to an implant, 4,950,161, Cl. 433-169.000.
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- Riegelman, Harry M.; and Davis, Steven P. Frame and muntin assembly, 4,949,521, Cl. 52-456.000.
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- Fleischer, Ulrich, 4,950,975, Cl. 323-266.000.
- Kopper, Werner; Frank, Rudiger; Schramm, Herbert; Worner, Dieter; and Moller, Hubert, 4,950,037, Cl. 303-110.000.
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- Roberts, Michael R.; Tabor, Derrick C.; and Gilman, Paul B., to Eastman Kodak Company. J-aggregating dye polymers as spectral sensitizers for silver halide photographic compositions, 4,950,587, Cl. 430-570.000.
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- Rosenberg, Peretz. Self-flushing fluid apparatus particularly useful in pulsator devices, 4,949,747, Cl. 137-107.000.
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- Rosenblatt, Richard, to Rosenblatt/IMA Invention Enterprises. Aspirator for collection of bodily fluids including improved safety and efficiency elements, 4,950,247, Cl. 604-181.000.
- Ross, Marion J., Jr.; and Kikel, David M. Pool stick shaft construction, 4,949,965, Cl. 273-68.000.
- Rossi, Domenico; Diazi, Claudio; and Cini, Carlo, to SGS-Thomson Microelectronics S.p.A. MOS-transistor bridge circuit, 4,950,919, Cl. 307-257.000.
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- Rudell, Elliot A.; and Gardner, Roger J. Edge-lit multiple image display device, 4,949,489, Cl. 40-546.000.
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- Saitoh, Tadashi; Takeuchi, Takashi; Hirabayashi, Masayuki; and Iida, Junichi, to Hitachi, Ltd. Apparatus for tracking optical disk. 4,951,275, Cl. 369-44.410.
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- Scharres, Harry J. Insulated blind rivet mounting and method of making. 4,949,450, Cl. 29-523.000.
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Ukai, Katsumi: See—  
Asamaki, Tatsuo; Hoshino, Kiyoshi; Ukai, Katsumi; Ino, Yoichi; Adachi, Toshio; and Tsukada, Tsutomu, 4,950,956, Cl. 315-111.210.  
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Dubrow, Robert S.; Dittmer, Catherine A.; and Uken, William D., 4,950,546, Cl. 428-447.000.  
Ulich, Bobby L.; Rather, John D. G.; Ames, Gregory H.; Lazzarini, Albert J.; and Conklin, Edward, to Kaman Aerospace Corporation. Wavefront control system using optical coarse/fine gradient sensor, 4,950,873, Cl. 250-201.900.  
Ullapara Holdings Pty. Ltd.: See—  
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Uni-Cardan AG: See—  
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Union Carbide Chemicals and Plastics Company Inc.: See—  
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Union Oil Company of California: See—  
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Uniroyal Chemical Company, Inc.: See—  
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 van der Wilk, Ronald, to U.S. Philips Corporation. Color display tube having asymmetric deflection electrodes, 4,950,949, Cl. 313-495.000.  
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 Vince, Dennis J. Prosthesis for banding of an artery capable of dilation by a balloon dilator, 4,950,276, Cl. 606-158.000.  
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Weller, Kip D. Rain gutter liner. 4,949,514, Cl. 52-12.000.

Wells, John R.; Pautsch, Gunthard; Grabbe, Detlef; and Kohlsette, Werner, to Westfalia Separator AG. Throughput centrifuge for industrial production of proteins from human blood plasma. 4,950,220, Cl. 494-67.000.

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Brienza, Anthony R.; Liszewski, Casmier L.; Harloff, Richard R.; and Garland, William F., 4,950,155, Cl. 432-115.000.

Chan, Aaron C. Y., 4,950,447, Cl. 376-247.000.

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Crookston, Ronald W., 4,950,853, Cl. 200-144.00R.

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Jeffers, Robert E., 4,949,519, Cl. 52-239.000.

Kouba, Carroll C., 4,950,973, Cl. 322-69.000.

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Lee, Soong H.; Lau, Chun L.; Buck, Daniel C.; and Dawson, Dale E., 4,951,123, Cl. 357-81.000.

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Meess, Daniel C.; Hamilton, William H., Jr.; Severson, Wayne J.; Wright, James B.; and Weiss, Thomas G., Jr., 4,950,105, Cl. 405-128.000.

Moran, Steven A., 4,950,916, Cl. 307-82.000.

Moulds, Clinton W., III, 4,950,966, Cl. 318-561.000.

Nagel, Russell A.; and Walker, Paul R., 4,949,518, Cl. 52-239.000.

Pipkin, James R.; and Thompson, Edward D., 4,950,933, Cl. 310-239.000.

Pollard, David D., 4,950,846, Cl. 200-16.00A.

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Shea, John J.; Sabol, Richard P.; and Cheski, Ronald A., 4,951,015, Cl. 335-38.000.

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Whiteley, Durwood J. Vise swivel mount. 4,949,945, Cl. 269-71.000.

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Willen, Don J.; and Cooper, Frank, to Computer Instruments Corporation. Method and apparatus for determining physical properties of liquids. 4,949,572, Cl. 73-53.000.

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Willard, Dan E. Method and apparatus for recording telephone messages. 4,951,307, Cl. 379-74.000.

Willard, Mark L.; Beatty, David E.; and Nyquist, Jeffery A., to Dutchess Bakers' Machinery Company, Inc. Dividing and rounding machine. 4,950,147, Cl. 425-185.000.

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Williams, Paul H., to Wisconsin Alumni Research Foundation. Educational kit for fast cycling plants. 4,950,166, Cl. 434-276.000.

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Yoshioka, Hiroshi; Hamada, Yoshitaka; and Kamei, Masanao, to Shin-Etsu Chemical Co., Ltd. Organopolysiloxane compound having liquid-crystalline phase. 4,950,726, Cl. 528-25.000.

Yoshitomi Pharmaceutical Industries, Ltd.: See—  
Kinishi, Ryoichi; Wakamatsu, Shuichi; and Ike, Tetsuji, 4,950,810, Cl. 568-790.000.

Tanaka, Masaya; Gohbayashi, Masayoshi; and Oka, Kunihide, 4,950,780, Cl. 560-75.000.

Yoshizawa, Toshikazu: See—  
Iizuka, Masao; Yasaka, Atsuhiko; Fukahori, Yoshide; and Yoshizawa, Toshikazu, 4,950,528, Cl. 428-212.000.

Yost, Michael G.: See—  
Steinman, Arnold J.; and Yost, Michael G., 4,951,172, Cl. 361-213.000.

Youn, Jong-Mil: See—  
Kahng, Chang-Won; Min, Sung-Ki; and Youn, Jong-Mil, 4,950,616, Cl. 437-31.000.

Young, Almon A.; and Martin, William T. Container repair apparatus. 4,949,569, Cl. 72-392.000.

Young, Chung C.; Fowler, James E.; and Silverman, Alan R., to Nova Biomedical Corporation. Polarographic cell. 4,950,379, Cl. 204-403.000.

Young, David A.: See—  
Sanchez, Paul A.; Young, David A.; Kuhlmann, George E.; Partenhimer, Walter; and Schammel, Wayne P., 4,950,786, Cl. 562-416.000.

Young, Gene P.: See—  
Tabor, Ricky L.; Lancaster, Gerald M.; Jezic, Zdravko; Young, Gene P.; and Biesser, John O., 4,950,541, Cl. 428-373.000.

Young, Richard. Automatic fishfood dispenser. 4,949,674, Cl. 119-51.040.

Young, Thomas M.: See—  
Madocks, John E.; and Young, Thomas M., 4,949,927, Cl. 248-276.000.

Young, William P., to William P. Young Company. Label applier. 4,950,351, Cl. 156-475.000.

Yu, Chin-ching: See—  
Hsu, Chi-chu; Yu, Chin-ching; Chao, Suyueh; and Huang, Miguel; C. J., 4,949,539, Cl. 60-275.000.

Yue, Lordson L.: See—  
Khan, Aurangzeb K.; and Yue, Lordson L., 4,951,050, Cl. 341-73.000.

Yuito, Fumio, to Fuji Photo Film Co., Ltd. Control system for web material cutting line. 4,949,607, Cl. 83-76.700.

Yunde, Takao: See—  
Itoyama, Seiji; Tada, Kichio; Telashima, Tsukasa; Tanaka, Shuji; Yamanaka, Hiromitsu; Yunde, Takao; Iguchi, Hiroaki; and Besho, Nagayasu, 4,949,777, Cl. 164-453.000.

Yurchak, Sergei: See—  
Harandi, Mohsen N.; Owen, Hartley; Ragonese, Francis P.; and Yurchak, Sergei, 4,950,387, Cl. 208-49.000.

Yurtin, John A.: See—  
Plyler, Robert G.; Suverison, Lyle B.; Yurtin, John A.; and Gladd, Joseph H., 4,950,175, Cl. 439-274.000.

Yuyama, Yukihiko; Uematsu, Kenji; Okuda, Hiroaki; and Aihara, Hideo, to Ricoh Company, Ltd. Thermosensitive recording material having recording layer containing fluorescent dye composition. 4,950,638, Cl. 503-226.000.

Yuzawa, Atsushi: See—  
Nohira, Hiroyuki; Takebayashi, Shoko; Yuzawa, Atsushi; and Yajima, Masami, 4,950,772, Cl. 549-484.000.

Zachanades, Anagnostis E. Rolling die for producing high modulus products. 4,950,151, Cl. 425-379.100.

Zaenger, Ian C.: See—  
Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., 4,950,825, Cl. 585-320.000.

Zalewski, Wojciech: See—  
Theodoulou, Sotos M.; Maczuszenko, Andrzej; Bajwa, Sabir H.; Gibbons, Duncan J.; and Zalewski, Wojciech, 4,951,070, Cl. 346-155.000.

Zanetos, Tom; and Reeder, Paul E., to Anthony-Thomas Candy Company. Apparatus for molding chocolate. 4,950,145, Cl. 425-140.000.

Zarubin, Andrei M.: See—  
Pokhodnya, Igor K.; Kushnerev, Daniil M.; Ustinov, Sergei D.; Sokolov, Oleg G.; Grischenko, Leonid V.; Baskakov, Gennady V.; Yamskoi, Marat V.; Zarubin, Andrei M.; and Golovko, Viktor V., 4,950,331, Cl. 106-313.000.

Zaslavsky, Gregory; and Cohen, Sheppard, to GTE Products Corporation. Starting circuit for gaseous discharge lamps. 4,950,961, Cl. 315-289.000.

Zawisa, Kenneth M., to General Motors Corporation. Height adjustable shoulder belt guide loop. 4,949,994, Cl. 280-802.000.

Zedrosser, Ulrich, to Steyr-Daimler-Puch AG. Firearm. 4,949,493, Cl. 42-15.000.

Zeitlin, Andrew L.: See—  
Stirling, David I.; Zeitlin, Andrew L.; and Matcham, George W., 4,950,606, Cl. 435-280.000.

Zeit, James H. Wheel compaction unit. 4,950,102, Cl. 404-121.000.

Zenith Data Systems Corporation: See—  
Krenz, Horst M.; and Wahlemeier, Fred E., 4,949,934, Cl. 248-676.000.

Zenith Electronics Corporation: See—  
Chitta, Richard W., 4,951,146, Cl. 358-186.000.

Fendley, James R.; and Wichmann, Janice L., 4,950,945, Cl. 313-407.000.

Zera, Gary W.: See—  
Page, Jeffrey L.; and Zera, Gary W., 4,951,062, Cl. 346-1.100.

Zerpner, Dieter; and Streck, Roland, to Huels Aktiengesellschaft. Process for adjusting the cis-trans-double bond configuration in polyalkenamers. 4,950,826, Cl. 585-353.000.

Zetena, Maurice F. Wall recess cable connector permitting simplified innerconnection and limiting protruding cables. 4,950,840, Cl. 174-66.000.

Zhu, En-Jun. Kinetic energy modulated hot electron transistor. 4,951,107, Cl. 357-34.000.

Zhu, Yong H.: See—  
Kirsch, Wolff M.; Zhu, Yong H.; and Cushman, Robert, 4,950,281, Cl. 606-207.000.

Ziegler, William R. Alignment technique for a photographic enlarger. 4,951,087, Cl. 355-43.000.

Zielinski, Thomas E.; and Geyer, Paul W., to Chrysler Corporation. Secondary lock mechanism for an environmentally sealed cable assembly. 4,950,182, Cl. 439-595.000.

Zile, Richard V.: See—  
Bowman, Jerald A.; and Zile, Richard V., 4,950,270, Cl. 606-72.000.

Zimble, Alan W. Dental syringe for treating gums. 4,950,163, Cl. 433-215.000.

Zimmer, Manfred, to Licentia. Method and a circuit for determining the momentary frequency of a signal. 4,951,219, Cl. 364-484.000.

Zimmerman, Patrick G.: See—  
Vesley, George F.; and Zimmerman, Patrick G., 4,950,537, Cl. 428-345.000.

Zip-Pak Incorporated: See—  
Boeckmann, Hugo; and Ausnit, Steven, 4,949,527, Cl. 53-412.000.

Zodrow, Rudolf; and Rogall, Wolfgang, to Holstein und Kappert AG. Machine for labelling bottles. 4,950,350, Cl. 156-456.000.

Zogo, Kiyoshi: See—  
Suzuki, Tetsuya; Ito, Yukio; and Zogo, Kiyoshi, 4,951,161, Cl. 360-71.000.

Zoltan, Sandor: See—  
Pap, Laszlo; Sarkozi, Peter; Somfai, Eva; Szego, Andras; Szekely, Istvan; Hidasi, Gyorgy; Zoltan, Sandor; Dea k nee Molnar, Aniko; Hegedus, Agnes; Bertok, Bela; Botar, Sandor; Gajary, Antal; and Nagy, Lajos, 4,950,682, Cl. 514-417.000.

Zone Technology Pty. Limited: See—  
Aknar, Atila; and Soussa, Andre, 4,951,147, Cl. 358-209.000.

Zucker, Gerhard: See—  
Bergfried, Dietrich; Jakob, Gert; Maue, Hans-Heinrich; Schaub, Uwe; Roethlingshoefer, Walter; Goebel, Ulrich; Huber, Elmar; Schmid, Roland; and Zucker, Gerhard, 4,951,176, Cl. 361-400.000.

Zuercher, Joseph C.: See—  
Lade, Robert W.; Schutten, Herman P.; and Zuercher, Joseph C., 4,949,584, Cl. 73-865.800.

Zulian, Ferruccio, to BULL HN Information Systems Italia S.p.A. TTL technology digital timing unit. 4,951,301, Cl. 377-54.000.

Zur, Yuval, to Elscint Ltd. Reduction of truncation caused artifacts. 4,950,991, Cl. 324-307.000.

Zygo Corporation: See—  
Sommargren, Gary E., 4,950,078, Cl. 356-349.000.

501 Delphax Systems: See—  
Theodoulou, Sotos M.; Maczuszenko, Andrzej; Bajwa, Sabir H.; Gibbons, Duncan J.; and Zalewski, Wojciech, 4,951,070, Cl. 346-155.000.

501 Tillotson Limited: See—  
Devine, John, 4,949,692, Cl. 123-440.000.

## LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF AUGUST, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice)

Bell, Marl J.: See—  
Miller, Donald L.; and Bell, Marl J., Re. 33,308, Cl. 318-444.000.

Denman, Stephan A.; and Taylor, Garthwood R., to Deuer Manufacturing Inc. Tire lift/carrier. Re. 33,303, Cl. 254-323.000.

Deuer Manufacturing Inc.: See—  
Denman, Stephan A.; and Taylor, Garthwood R., Re. 33,303, Cl. 254-323.000.

Hanon, David: See—  
Walker, Wesley F., Jr.; and Hanon, David, Re. 33,309, Cl. 379-395.000.

Hayashi, Hiroshi; and Satoh, Masahiro, to Sanyo Chemical Industries, Ltd. Secondary battery or cell with improved rechargeability. Re. 33,306, Cl. 429-194.000.

Imperial Chemical Industries PLC: See—  
Taylor, Stephen C.; and Turnbull, Michael D., Re. 33,307, Cl. 568-832.000.

Mason, James H. Macpherson strut alignment gauge and straightening apparatus. Re. 33,302, Cl. 33-608.000.

Miller, Donald L.; and Bell, Marl J., to Mist-Defy'r, Inc. Automatic window wiper control. Re. 33,308, Cl. 318-444.000.

Mist-Defy'r, Inc.: See—  
Miller, Donald L.; and Bell, Marl J., Re. 33,308, Cl. 318-444.000.

Nippon Seiko Kabushiki Kaisha: See—  
Yokote, Yoshihiro, Re. 33,304, Cl. 280-804.000.

Sanyo Chemical Industries, Ltd.: See—  
Hayashi, Hiroshi; and Satoh, Masahiro, Re. 33,306, Cl. 429-194.000.

Satoh, Masahiro: See—  
Hayashi, Hiroshi; and Satoh, Masahiro, Re. 33,306, Cl. 429-194.000.

Taylor, Garthwood R.: See—  
Denman, Stephan A.; and Taylor, Garthwood R., Re. 33,303, Cl. 254-323.000.

Taylor, Stephen C.; and Turnbull, Michael D., to Imperial Chemical Industries PLC. Cyclic hydroxy compounds. Re. 33,307, Cl. 568-832.000.

Thayer, C. Kenneth. Fixture for securing an electrical connector. Re. 33,305, Cl. 439-560.000.

Turnbull, Michael D.: See—  
Taylor, Stephen C.; and Turnbull, Michael D., Re. 33,307, Cl. 568-832.000.

Walker Equipment Corporation: See—  
Walker, Wesley F., Jr.; and Hanon, David, Re. 33,309, Cl. 379-395.000.

Walker, Wesley F., Jr.; and Hanon, David, to Walker Equipment Corporation. Telephone handset amplifier circuit. Re. 33,309, Cl. 379-395.000.

Yokote, Yoshihiro, to Nippon Seiko Kabushiki Kaisha. Automatic seat belt system. Re. 33,304, Cl. 280-804.000.

## LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Emmons, William D.; and Stevens, Travis E., to Rohm & Haas Co. Polyurethane thickeners in latex compositions. B1 4,079,028, 8-21-90, Cl. 524-804.000.

Fairfax Dental Ltd.: See—  
Smith, Andrew J., B1 4,189,834, Cl. 433-225.000.

Flowdril Corporation: See—  
Reichman, James R., B1 4,624,327, Cl. 175-67.000.

Lo, Allen K. W. Total focus-3-D camera and 3-D image structure. B1 4,800,407, 8-21-90, Cl. 354-114.000.

Reichman, James R., to Flowdril Corporation. Method for combined jet and mechanical drilling. B1 4,624,327, 8-21-90, Cl. 175-67.000.

Rohm & Haas Co.: See—  
Emmons, William D.; and Stevens, Travis E., B1 4,079,028, Cl. 524-804.000.

Smith, Andrew J., to Fairfax Dental Ltd. Dental reinforcing pins. B1 4,189,834, 8-21-90, Cl. 433-225.000.

Stevens, Travis E.: See—  
Emmons, William D.; and Stevens, Travis E., B1 4,079,028, Cl. 524-804.000.

## LIST OF DESIGN PATENTEES

A. B. Chance Company: See—  
Harmon, Robert W., 310,062, Cl. D13-132.000.

Ackeret, Peter, to IDN Inventions and Development of Noveltes AG. Container for cassettes. 309,976, 8-21-90, Cl. D3-35.000.

Alberti, Alberto: See—  
Guelfi, Giorgio; Villa, Ezio; Mendicino, Franco; Pasquali, Renato; and Alberti, Alberto, 310,057, Cl. D12-163.000.

Alberts, David S.; and Dorr, Robert T. Instrument for measuring tumors. 310,044, 8-21-90, Cl. D10-73.000.

Alfa Lancia Industriale S.r.l.: See—  
Guelfi, Giorgio; Villa, Ezio; Mendicino, Franco; Pasquali, Renato; and Alberti, Alberto, 310,057, Cl. D12-163.000.

Alliance Research Corporation: See—  
Shimazaki, Tetsuo, 310,084, Cl. D14-238.000.

Andersen, Bjarne B., to Ion, Glen Ernest. Combined wall-mounted cabinet and console for business and home planning organization systems. 309,997, 8-21-90, Cl. D6-561.000.

Anderson, Kenneth J., to Assembled Components Co., Inc. Aerosol spray housing. 310,021, 8-21-90, Cl. D9-300.000.

Anderson, Kenneth J., to Assembled Components Co., Inc. Aerosol spray housing. 310,022, 8-21-90, Cl. D9-300.000.

Anger, Wilhelm: See—  
Wiedmann, Helmut; and Anger, Wilhelm, 310,087, Cl. D16-123.000.

Aoki, Sanae; and Konoike, Tsunataka, to Tanaka Manufacturing Company Limited. Thermometer. 310,037, 8-21-90, Cl. D10-57.000.

Archambault, Alan A.; Palumbo, Nicholas R.; and Fletcher, Lyn C., to General Electric Company. Light diffuser. 310,129, 8-21-90, Cl. D26-125.000.

Assembled Components Co., Inc.: See—  
Anderson, Kenneth J., 310,021, Cl. D9-300.000.

Anderson, Kenneth J., 310,022, Cl. D9-300.000.

Aurora Impex Corporation: See—  
Noguchi, Isoroku, 310,094, Cl. D18-7.000.

Noguchi, Isoroku, 310,095, Cl. D18-7.000.

Beirise, Jean; and Coons, John, to Herman Miller, Inc. Wall-mountable tape dispenser or the like. 310,103, 8-21-90, Cl. D19-67.000.

Bird, Jeremy, to Brookes and Gatehouse Limited. Transducer pod. 310,036, 8-21-90, Cl. D10-46.000.

Bixler, Kenneth D., to Packaging Corporation of America. Beverage tray. 310,027, 8-21-90, Cl. D9-424.000.

Black & Decker Inc.: See—  
Reiferscheid, Ulrich; and Bone, Daniel, 310,008, Cl. D8-64.000.

- Blair, Don R.: See—  
Sumrell, K. Drew; Blair, Don R.; and Sumrell, Martha J., 309,998, Cl. D6-567.000.
- Bleich, Eli: See—  
Leone, Holly Y.; and Bleich, Eli, 310,069, Cl. D14-100.000.
- Boitani, Maria. Small rigid portable compartmented case. 309,982, 8-21-90, Cl. D3-74.000.
- Bone, Daniel: See—  
Reiferscheid, Ulrich; and Bone, Daniel, 310,008, Cl. D8-64.000.
- Bossi, Giuseppe: See—  
Rossio, Bruno; Bossi, Giuseppe; and Roggero, Francesco, 310,002, Cl. D7-308.000.
- Brandt, Charles M.; and Lynn, Stephen R., to Sewell Plastics, Inc. Base cup for a bottle. 310,028, 8-21-90, Cl. D9-434.000.
- Braun, Rafael; Fernandez, Bernard; and Wing, Li T., to E. Gluck Corporation. Combined watch housing and bezel therefor. 310,034, 8-21-90, Cl. D10-30.000.
- Braun, Rafael; Fernandez, Bernard; and Wing, Li T., to E. Gluck Corporation. Combined watch and band therefor. 310,035, 8-21-90, Cl. D10-32.000.
- Brookes and Gatehouse Limited: See—  
Bird, Jeremy, 310,036, Cl. D10-46.000.
- Brunner, Merlin A.; and Draheim, Harvey J., to Simmons Juvenile Products Company, Inc. Crib footboard. 309,994, 8-21-90, Cl. D6-508.000.
- Brunner, Merlin A.; and Draheim, Harvey J., to Simmons Juvenile Products Company, Inc. Crib footboard. 309,995, 8-21-90, Cl. D6-508.000.
- Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link element. 310,051, 8-21-90, Cl. D11-93.000.
- Canon Kabushiki Kaisha: See—  
Endo, Aiko; and Haranishi, Noriaki, 310,092, Cl. D18-1.000.
- Carlson, Eric V., to Para Scientific, Inc. Funnel with filter. 310,123, 8-21-90, Cl. D24-29.000.
- Casio Computer Co., Ltd.: See—  
Ito, Makoto, 310,033, Cl. D10-30.000.
- Murata, Ryo, 310,032, Cl. D10-15.000.
- Naito, Yoshitaka, 310,078, Cl. D14-164.000.
- Catherall, Raymond H. Bat. 310,114, 8-21-90, Cl. D21-211.000.
- Chapman, David R.; and Shepherd, Charles G., to Chas Chapman Company Limited. Book holder. 310,099, 8-21-90, Cl. D19-26.000.
- Chas Chapman Company Limited: See—  
Chapman, David R.; and Shepherd, Charles G., 310,099, Cl. D19-26.000.
- Cheng, Willis, to Woods Far East, Inc. Plug-in remotely controlled switch. 310,063, 8-21-90, Cl. D13-142.000.
- Cheng, Willis, to Woods Far East, Inc. Light socket mounted remotely controlled light switch. 310,064, 8-21-90, Cl. D13-165.000.
- Cheng, Willis, to Woods Far East, Inc. Light socket mounted remote controlled light switch. 310,065, 8-21-90, Cl. D13-165.000.
- Circon Corporation: See—  
Sluyter, Erik, 310,088, Cl. D16-130.000.
- Comfy Catch-A-Spec Company: See—  
Knowles, Adrienne, 310,124, Cl. D24-54.000.
- Coons, John: See—  
Beirise, Jean; and Coons, John, 310,103, Cl. D19-67.000.
- Cox, Eugene J., to Thumbnail Company. Picture frame joining device. 309,985, 8-21-90, Cl. D6-300.000.
- Craft, Charles W., Jr.: See—  
Murphy, Kent W.; and Craft, Charles W., Jr., 310,105, Cl. D19-75.000.
- Murphy, Kent W.; and Craft, Charles W., Jr., 310,107, Cl. D19-90.000.
- Curasi, Robert R. Beverage can cover. 310,031, 8-21-90, Cl. D9-449.000.
- Daido, Takefumi; and Takada, Katsuo, to Sony Corporation. Headphone. 310,081, 8-21-90, Cl. D14-205.000.
- Daiwa Golf Co., Ltd.: See—  
Iinuma, Kanji, 310,115, Cl. D21-217.000.
- Dawkins, Derek L. Invalid walker. 310,055, 8-21-90, Cl. D12-130.000.
- Dawson, Joseph G. Electronic die simulator. 310,110, 8-21-90, Cl. D21-13.000.
- Dayton Nut Specialties, Inc.: See—  
Maschino, Kyle S., 310,024, Cl. D9-312.000.
- De La Rue Systems Limited: See—  
Sadler, Kenneth; and Southernwood, Clive J., 310,073, Cl. D14-110.000.
- Dembiczak, Anita; and Zinbarg, Benson, to Sun Hill Industries, Inc. Bag. 310,023, 8-21-90, Cl. D9-305.000.
- Diamond, Ira: See—  
Mannion, William L.; and Diamond, Ira, 310,075, Cl. D14-129.000.
- Dibert, Fred, to Dibert, Lillian J. Spherical compass. 310,040, 8-21-90, Cl. D10-68.000.
- Dibert, Lillian J.: See—  
Dibert, Fred, 310,040, Cl. D10-68.000.
- Dodd, Edward H., III. Rocking chair. 309,987, 8-21-90, Cl. D6-347.000.
- Dorr, Robert T.: See—  
Alberts, David S.; and Dorr, Robert T., 310,044, Cl. D10-73.000.
- Drabert Sohne GmbH & Co.: See—  
von Klier, Hans; and Dubach, Fredi, 309,990, Cl. D6-366.000.
- Draheim, Harvey J.: See—  
Brunner, Merlin A.; and Draheim, Harvey J., 309,994, Cl. D6-508.000.
- Brunner, Merlin A.; and Draheim, Harvey J., 309,995, Cl. D6-508.000.
- Drury, Harold L.: See—  
Salgado, Angel M.; and Drury, Harold L., 310,060, Cl. D13-102.000.
- Dubach, Fredi: See—  
von Klier, Hans; and Dubach, Fredi, 309,990, Cl. D6-366.000.
- Dumas, Jean-Louis, to La Montre Hermes, S.A. Watch dial face or the like. 310,048, 8-21-90, Cl. D10-126.000.
- E. Gluck Corporation: See—  
Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,034, Cl. D10-30.000.
- Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,035, Cl. D10-32.000.
- Eastman Kodak Company: See—  
Lavine, Monte D., 310,089, Cl. D16-246.000.
- Effinger, Rudolph, to Penn Fishing Tackle Mfg. Co. Fishing reel. 310,116, 8-21-90, Cl. D22-140.000.
- Eldon Industries, Inc.: See—  
Evenson, Mel, 310,015, Cl. D8-102.000.
- Elliott, Ruth: See—  
Revell, Ian T.; and Elliott, Ruth, 310,111, Cl. D21-128.000.
- Endo, Aiko; and Haranishi, Noriaki, to Canon Kabushiki Kaisha. Electronic typewriter. 310,092, 8-21-90, Cl. D18-1.000.
- Evenson, Mel, to Eldon Industries, Inc. Letter opener. 310,015, 8-21-90, Cl. D8-102.000.
- Eyemetrics-Systems AG: See—  
Wiedmann, Helmut; and Anger, Wilhelm, 310,087, Cl. D16-123.000.
- Feger, Stephan; Fischer, Wolfgang; Koller, Norbert; and Krautwald, Manfred, to International Business Machines Corporation. Printer. 310,097, 8-21-90, Cl. D18-36.000.
- Felo-Werkzeugfabrik - Holland-Letz GmbH: See—  
Holland-Letz, Horst, 310,011, Cl. D8-82.000.
- Fernandez, Bernard: See—  
Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,034, Cl. D10-30.000.
- Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,035, Cl. D10-32.000.
- Fischer, Wolfgang: See—  
Feger, Stephan; Fischer, Wolfgang; Koller, Norbert; and Krautwald, Manfred, 310,097, Cl. D18-36.000.
- Fletcher, Lyn C.: See—  
Archambault, Alan A.; Palumbo, Nicholas R.; and Fletcher, Lyn C., 310,129, Cl. D26-125.000.
- Fluharty, William J., to Prince Corporation. Center console for vehicle. 309,978, 8-21-90, Cl. D3-40.000.
- Foley, Michael S. Can. 310,025, 8-21-90, Cl. D9-368.000.
- Forsythe, Donald L., to NCR Corporation. Retail terminal or similar article. 310,066, 8-21-90, Cl. D14-100.000.
- Fratelli Guzzini S.p.A.: See—  
Rossari, Ambrogio, 310,006, Cl. D7-596.000.
- Freiwald, Edward S., to Greenlee Textron Inc. Hydraulic punch driver. 310,009, 8-21-90, Cl. D8-67.000.
- French, Diana J.; and Oda, Charlotte M. Storage case. 309,981, 8-21-90, Cl. D3-74.000.
- Fujioka, Akio, to Kitagawa Industries Co., Ltd. Clamp for clamping wires. 310,020, 8-21-90, Cl. D8-396.000.
- Gauthier, Randolph A., to Stanley, Deidre, a part interest. Combination cover and holder for writing instrument. 310,101, 8-21-90, Cl. D19-55.000.
- Gearing, Thomas J., to Gearing, Thomas J. Dispenser for prophylactics. 309,996, 8-21-90, Cl. D6-515.000.
- Geel-Go, Inc.: See—  
Tucker, J. Camille; and Weiswurm, Klaus D., 310,054, Cl. D12-129.000.
- General Electric Company: See—  
Archambault, Alan A.; Palumbo, Nicholas R.; and Fletcher, Lyn C., 310,129, Cl. D26-125.000.
- George, Tobin. Dual beam headlight for bicycles or the like. 310,128, 8-21-90, Cl. D26-35.000.
- Gingras, Eric, to Rubbermaid Commercial Products Inc. Utility brush block and handle unit. 309,984, 8-21-90, Cl. D4-138.000.
- Glit, Inc.: See—  
Watson, Philip B., 310,013, Cl. D8-90.000.
- Gotts, Kenneth O. Portable stool for use primarily by huntsman. 309,989, 8-21-90, Cl. D6-364.000.
- Greenlee Textron Inc.: See—  
Freiwald, Edward S., 310,009, Cl. D8-67.000.
- Griffin, Daniel K.: See—  
Livingstone, Robert J.; and Griffin, Daniel K., 310,000, Cl. D6-583.000.
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Krause, W. Barry, 310,061, Cl. D13-169.000.
- Tucker, J. Camille; and Weiswurm, Klaus D., to Gee-I-Go, Inc. Combined car seat and baby stroller. 310,054, 8-21-90, Cl. D12-129.000.
- Twin Bird Industrial Co., Ltd.: See—  
Sato, Tsuru, 310,080, Cl. D14-171.000.
- Uchida, Hiromichi. Adhesive applicator. 310,104, 8-21-90, Cl. D19-67.000.
- Uemura, Kunisaburo, to Yamaha Hatsudoki K. K. Lawn mower. 310,085, 8-21-90, Cl. D15-14.000.
- Vance, Wilbur L., Sr. Illuminated warning signal for vehicles. 310,047, 8-21-90, Cl. D10-114.000.
- Vega, Ruben A. Pair of hand signs. 310,109, 8-21-90, Cl. D20-32.000.
- Vendking International LTEE: See—  
King, Alan M., 310,003, Cl. D7-309.000.
- Verebelyi, Nicholas B., to Reckitt & Colman Products Limited. Bottle with cap. 310,026, 8-21-90, Cl. D9-373.000.
- Villa, Ezio: See—  
Gueffi, Giorgio; Villa, Ezio; Mendicino, Franco; Pasquali, Renato; and Alberti, Alberto, 310,057, Cl. D12-163.000.
- von Klier, Hans; and Dubach, Fredi, to Drabert Sohne GmbH & Co. Armchair. 309,990, 8-21-90, Cl. D6-366.000.
- Wagner, James; and Luhn, Donna. Novelty key chain. 309,979, 8-21-90, Cl. D3-65.000.
- Warner Manufacturing Company: See—  
Henke, David R.; and Ruha, David J., 310,012, Cl. D8-90.000.
- Watson, Philip B., to Glit, Inc. Hand-held sander. 310,013, 8-21-90, Cl. D8-90.000.
- Weiswurm, Klaus D.: See—  
Tucker, J. Camille; and Weiswurm, Klaus D., 310,054, Cl. D12-129.000.
- Westvaco Corporation: See—  
Kea, John E.; and Woyce, Louis C., Jr., 310,029, Cl. D9-438.000.
- Whittier, Carl J. Foldable fishing lure holder. 309,977, 8-21-90, Cl. D3-38.000.
- Wickham, John F.; Nunn, Trevor A.; and Jay, Derek S., to Oxford Medical Limited. Medical monitor. 310,120, 8-21-90, Cl. D24-17.000.
- Wiedmann, Helmut; and Anger, Wilhelm, to Eyemetrics-Systems AG. End piece for eyeglass temples. 310,087, 8-21-90, Cl. D16-123.000.
- Williams, Lee, Jr.: See—  
Kohout, Barney; and Williams, Lee, Jr., 310,052, Cl. D11-241.000.
- Wilson, Charles E. Candle. 310,126, 8-21-90, Cl. D26-7.000.
- Wing, Li T.: See—  
Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,034, Cl. D10-30.000.
- Braun, Rafael; Fernandez, Bernard; and Wing, Li T., 310,035, Cl. D10-32.000.
- Woods Far East, Inc.: See—  
Cheng, Willis, 310,063, Cl. D13-142.000.
- Cheng, Willis, 310,064, Cl. D13-165.000.
- Cheng, Willis, 310,065, Cl. D13-165.000.
- Woyce, Louis C., Jr.: See—  
Kea, John E.; and Woyce, Louis C., Jr., 310,029, Cl. D9-438.000.
- Yajima, Yasuko: See—  
Kido, Shigeaki; Isozaki, Sadao; and Yajima, Yasuko, 310,076, Cl. D14-151.000.
- Yamaha Corporation: See—  
Tatsumi, Keizo, 310,091, Cl. D17-14.000.
- Yamaha Hatsudoki K. K.: See—  
Uemura, Kunisaburo, 310,085, Cl. D15-14.000.
- Yamamoto, Kazuharu, to Kabushiki Kaisha Toshiba. Combined radio and cassette tape recorder. 310,077, 8-21-90, Cl. D14-163.000.
- Yoshimura, Masaharu: See—  
Kishi, Toshiaki; Sudoh, Shusei; and Yoshimura, Masaharu, 310,053, Cl. D12-110.000.
- Yubisui, Teruo. Pen. 310,100, 8-21-90, Cl. D19-48.000.
- Zinbarg, Benson: See—  
Dembiczak, Anita; and Zinbarg, Benson, 310,023, Cl. D9-305.000.





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111	4,950,336	220	4,949,811	232	4,950,398	117.02	4,949,898	328	4,949,939	410	4,949,986
121	4,950,337	234	4,949,812	321.8	4,950,391	125.09	4,949,899	459	4,950,020	459	4,949,987
146	4,950,338	CLASS 184		335	4,950,400	125.26	4,949,900	615	4,950,021	615	4,949,988
262	4,950,339	6.14	4,949,813	360.1	4,950,401	CLASS 232		655	4,950,022	707	4,949,989
402	4,950,340	CLASS 149		413	4,950,402	15	4,949,901	750	4,950,023	756	4,949,990
22	4,950,341	CLASS 185		486	4,950,403	CLASS 235		777	4,950,024	802	4,949,991
CLASS 152		11	4,949,814	500.27	4,950,404	145 R	4,950,874	804	4,950,025	805	4,949,992
531	4,949,770	CLASS 187		500.28	4,950,405	448	4,950,875	816	4,950,026	816	4,949,993
CLASS 156		9 E	4,949,816	521	4,950,406	476	4,950,876	CLASS 281		CLASS 281	
52	4,950,343	20	4,949,815	626	4,950,407	480	4,950,877	45	4,950,027	45	4,949,997
109	4,950,344	CLASS 188		751	4,950,409	CLASS 236		CLASS 282		CLASS 282	
145	4,950,345	4 R	4,949,817	CLASS 211		49.3	4,949,902	29 B	4,949,998	29 B	4,949,998
203	4,950,346	251 M	4,949,818	41	4,949,848	CLASS 237		CLASS 283		CLASS 283	
204	4,950,347	322.17	4,949,819	55	4,949,849	2 A	4,949,903	CLASS 285		CLASS 285	
245	4,950,348	CLASS 192		69.7	4,949,850	CLASS 239		CLASS 286		CLASS 286	
259	4,950,349	0.092	4,949,830	151	4,949,851	5	4,949,904	CLASS 287		CLASS 287	
272.4	4,950,350	1.23	4,949,820	186	4,949,852	279	4,949,905	CLASS 288		CLASS 288	
275.3	4,950,351	3.21	4,949,821	CLASS 212		663	4,949,906	CLASS 289		CLASS 289	
426	4,950,352	4 C	4,949,823	147	4,949,854	CLASS 240		CLASS 290		CLASS 290	
442.1	4,950,353	45	4,949,824	147	4,949,855	400	4,950,440	CLASS 291		CLASS 291	
456	4,950,354	58 B	4,949,825	CLASS 213		404	4,949,932	CLASS 292		CLASS 292	
475	4,950,355	81 C	4,949,826	62 R	4,949,856	410.6	4,950,441	CLASS 293		CLASS 293	
497	4,950,356	84 R	4,949,827	CLASS 214		112.2	4,950,442	CLASS 294		CLASS 294	
547	4,950,357	85 CA	4,949,828	516	4,950,446	140.1	4,950,443	CLASS 295		CLASS 295	
610	4,950,358	89 B	4,949,829	CLASS 215		410.6	4,950,444	CLASS 296		CLASS 296	
627	4,950,359	107 C	4,949,831	253	4,949,857	4.6	4,950,445	CLASS 297		CLASS 297	
668	4,950,360	330	4,949,832	350	4,949,858	13	4,950,446	CLASS 298		CLASS 298	
CLASS 160		CLASS 198		341	4,949,859	13	4,950,447	CLASS 299		CLASS 299	
90	4,949,771	328	4,949,832	358	4,949,860	58.1	4,949,910	CLASS 300		CLASS 300	
201	4,949,772	358	4,949,833	392	4,949,861	67.1 R	4,949,911	CLASS 301		CLASS 301	
CLASS 162		392	4,949,834	464.4	4,949,862	68.3	4,949,912	CLASS 302		CLASS 302	
199	4,950,361	664.4	4,949,835	782	4,949,863	86.2	4,949,913	CLASS 303		CLASS 303	
206	4,950,362	676	4,949,836	853	4,949,864	118.3	4,949,914	CLASS 304		CLASS 304	
CLASS 164		782	4,949,837	CLASS 200		195	4,949,915	CLASS 305		CLASS 305	
91	4,949,773	853	4,949,838	121.67	4,950,861	CLASS 244		CLASS 306		CLASS 306	
256	4,949,774	5 B	4,950,845	121.7	4,950,862	3.16	4,949,917	CLASS 307		CLASS 307	
267	4,949,775	16 A	4,950,846	130.1	4,950,863	3.22	4,949,918	CLASS 308		CLASS 308	
437	4,949,776	16 D	4,950,847	130.4	4,950,864	35 R	4,949,919	CLASS 309		CLASS 309	
453	4,949,777	50 AA	4,950,848	137 PS	4,950,865	117 A	4,949,920	CLASS 310		CLASS 310	
468	4,949,778	61.41	4,950,849	137.31	4,950,866	123	4,949,921	CLASS 311		CLASS 311	
CLASS 165		61.89	4,950,850	211	4,950,867	168	4,949,922	CLASS 312		CLASS 312	
2	4,949,779	144 B	4,950,851	218	4,950,868	CLASS 248		CLASS 313		CLASS 313	
7	4,949,780	144 C	4,950,852	218	4,950,869	188.3	4,949,923	CLASS 314		CLASS 314	
11.1	4,949,781	144 R	4,950,853	218	4,950,870	215	4,949,924	CLASS 315		CLASS 315	
34	4,949,782	148 A	4,950,854	218	4,950,871	238	4,949,925	CLASS 316		CLASS 316	
80.1	4,949,783	148 F	4,950,855	218	4,950,872	243	4,949,926	CLASS 317		CLASS 317	
CLASS 166		526	4,950,856	218	4,950,873	251	4,949,927	CLASS 318		CLASS 318	
81	4,949,784	CLASS 203		218	4,950,874	276	4,949,928	CLASS 319		CLASS 319	
84	4,949,785	40	4,950,863	218	4,950,875	286	4,949,929	CLASS 320		CLASS 320	
208	4,949,786	50	4,950,864	218	4,950,876	300	4,949,930	CLASS 321		CLASS 321	
CLASS 167		CLASS 204		218	4,950,877	421	4,949,931	CLASS 322		CLASS 322	
285	4,949,788	38.7	4,950,865	218	4,950,878	429	4,949,932	CLASS 323		CLASS 323	
298	4,949,789	59 R	4,950,866	218	4,950,879	442.2	4,949,933	CLASS 324		CLASS 324	
307	4,949,790	72	4,950,867	218	4,950,880	676	4,949,934	CLASS 325		CLASS 325	
378	4,949,791	78	4,950,868	218	4,950,881	CLASS 249		CLASS 326		CLASS 326	
382	4,949,792	128	4,950,869	218	4,950,882	50	4,950,883	CLASS 327		CLASS 327	
CLASS 168		129	4,950,870	218	4,950,883	210	4,949,935	CLASS 328		CLASS 328	
52	4,949,794	147	4,950,871	218	4,950,884	201.8	4,950,879	CLASS 329		CLASS 329	
CLASS 174		164	4,950,872	218	4,950,885	201.9	4,950,880	CLASS 330		CLASS 330	
14 R	4,950,837	180.2	4,950,873	218	4,950,886	203.6	4,950,881	CLASS 331		CLASS 331	
48	4,950,838	192.32	4,950,874	218	4,950,887	213 A	4,950,882	CLASS 332		CLASS 332	
66	4,950,839	224 R	4,950,875	218	4,950,888	227.14	4,950,883	CLASS 333		CLASS 333	
67	4,950,840	402	4,950,876	218	4,950,889	227.21	4,950,884	CLASS 334		CLASS 334	
88 B	4,950,841	403	4,950,877	218	4,950,890	227.25	4,950,885	CLASS 335		CLASS 335	
94 R	4,950,842	406	4,950,878	218	4,950,891	231.18	4,950,886	CLASS 336		CLASS 336	
260	4,950,843	CLASS 206		218	4,950,892	236	4,950,887	CLASS 337		CLASS 337	
CLASS 175		45.32	4,949,839	218	4,950,893	237 G	4,950,888	CLASS 338		CLASS 338	
40	4,949,795	204	4,949,840	218	4,950,894	270	4,950,889	CLASS 339		CLASS 339	
59	4,950,844	254	4,949,841	218	4,950,895	282	4,950,890	CLASS 340		CLASS 340	
67	4,949,796	286	4,949,842	218	4,950,896	327.2	4,950,891	CLASS 341		CLASS 341	
209	4,949,797	315.7	4,949,843	218	4,950,897	334	4,950,892	CLASS 342		CLASS 342	
317	4,949,798	484	4,949,844	218	4,950,898	346	4,949,893	CLASS 343		CLASS 343	
CLASS 177		484.1	4,949,845	218	4,950,899	352	4,949,894	CLASS 344		CLASS 344	
134	4,949,799	626	4,949,846	218	4,950,900	358.1	4,950,895	CLASS 345		CLASS 345	
211	4,949,799	CLASS 208		218	4,950,901	370.08	4,950,896	CLASS 346		CLASS 346	
CLASS 179		28	4,950,382	218	4,950,902	390.01	4,950,897	CLASS 347		CLASS 347	
10	4,950,342	49	4,950,383	218	4,950,903	442.1	4,950,898	CLASS 348		CLASS 348	
CLASS 180		59	4,950,384	218	4,950,904	455.1	4,950,899	CLASS 349		CLASS 349	
9.21	4,949,800	64	4,950,385	218	4,950,905	484.1	4,950,900	CLASS 350		CLASS 350	
90.6	4,949,801	108	4,950,386	218	4,950,906	504 R	4,950,901	CLASS 351		CLASS 351	
132	4,949,802	CLASS 209		218	4,950,907	563	4,950,902	CLASS 352		CLASS 352	
140	4,949,803	135	4,950,388	218	4,950,908	574	4,950,903	CLASS 353		CLASS 353	
281	4,949,804	157	4,950,389	218	4,950,909	58	4,949,936	CLASS 354		CLASS 354	
333	4,949,805	164	4,950,390	218	4,950,910	129.11	4,949,937	CLASS 355		CLASS 355	
CLASS 181		CLASS 210		218	4,950,911	149.6	4,949,938	CLASS 356		CLASS 356	
129	4,949,806	167	4,950,392	218	4,950,912	CLASS 251		CLASS 357		CLASS 357	
240	4,949,807	169	4,950,393	218	4,950,913	58	4,949,936	CLASS 358		CLASS 358	
CLASS 182		170	4,950,394	218	4,950,914	CLASS 252		CLASS 359		CLASS 359	
17	4,949,808	195.2	4,950,395	218	4,950,915	402	4,949,938	CLASS 360		CLASS 360	
172	4,949,809	195.3	4,950,396	218	4,950,916	CLASS 253		CLASS 361		CLASS 361	
214	4,949,810	198.2	4,950,397	218	4,950,917	CLASS 254		CLASS 362		CLASS 362	

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CLASS 312	166	4,951,019	CLASS 354	455	4,951,159	201	4,951,254	4,950,091			
20	4,950,039	167	4,951,020	496	4,951,160	207	4,951,255	CLASS 400			
CLASS 313	222	4,951,021	80	4,951,072	71	4,951,161	4,951,256	CLASS 401			
25	4,950,938	110	4,951,073	110	4,951,074	210	4,951,257	4,950,092			
103 CM	4,950,939	114	4,951,075	114	4,951,076	222	4,951,258	4,950,093			
318	4,950,940	149.1	4,951,077	149.1	4,951,078	230.06	4,951,259	CLASS 402			
404	4,950,941	5	4,951,079	5	4,951,080	CLASS 366		CLASS 403			
407	4,950,942	CLASS 336		85	4,951,163	75	4,950,094	4,950,095			
411	4,950,943	CLASS 337		104	4,951,164	191	4,950,096	CLASS 404			
412	4,950,944	113	4,951,025	402	4,951,165	45	4,951,261	4,950,097			
414	4,950,945	231	4,951,026	412	4,951,166	85	4,950,081	CLASS 405			
415	4,950,946	CLASS 338		414	4,951,167	045	4,951,260	CLASS 406			
417 HC	4,950,947	2	4,951,027	415	4,951,081	130	4,950,082	4,950,098			
418	4,950,948	22 R	4,951,028	432	4,951,082	279	4,951,262	8	4,950,097		
419	4,950,949		485	4,951,083	47	4,951,168	348	4,950,083	CLASS 403		
504	4,950,950	CLASS 340		CLASS 355	90	4,951,170	CLASS 367	34	4,950,098		
535	4,950,951	506	4,951,029	38	4,951,084	2	4,951,263	348	4,950,099		
542	4,950,952	677	4,951,030		4,951,085	15	4,951,264	405 I	4,950,099		
564	4,950,953	606	4,951,031	41	4,951,086	18	4,951,265	CLASS 404	4,950,100		
633	4,950,954	684	4,951,032	43	4,951,087	25	4,951,266	CLASS 405	4,950,101		
CLASS 315	706	686	4,951,033	77	4,951,088	31	4,951,267	114	4,950,102		
8	4,950,955	710	4,951,034	85	4,951,089	88	4,951,268	121	4,950,103		
111.21	4,950,956	712	4,951,035	200	4,951,090	135	4,951,269	CLASS 406	4,950,104		
111.81	4,950,957		4,951,036	206	4,951,091	140	4,951,270	24	4,950,104		
185 R	4,950,958	715	4,951,037	245	4,951,092	141	4,951,271	24	4,950,104		
289	4,950,959	725	4,951,038		4,951,093	44 11	4,951,272	43	4,950,103		
351	4,950,960		4,951,039		4,951,094		4,951,273	128	4,950,105		
360	4,950,963	729	4,951,040	273	4,951,095		4,951,274	186	4,950,106		
CLASS 318	799	767	4,951,041	285	4,951,096		4,951,275	CLASS 408	4,950,107		
52	4,950,964	825.44	4,951,044	37	4,950,073	44 41	4,951,276	59	4,950,108		
254	4,950,966	825.440	4,951,043	133	4,950,074	58	4,951,277	82	4,950,109		
444	Re.33.308	944	4,951,045	141	4,950,075	270	4,951,278	126	4,950,110		
560	4,950,965	953	4,951,046	152	4,950,076	449	4,951,212	212	4,950,111		
561	4,950,966	970	4,951,047	328	4,950,077	60	4,951,278	CLASS 409	4,950,112		
567	4,950,967	CLASS 341		349	4,950,078	75	4,951,279	32	4,950,113		
599	4,950,968	15	4,951,048	417	4,951,097	85 12	4,951,280	134	4,950,114		
740	4,950,969	64	4,951,049		4,951,098	95 2	4,951,281	CLASS 410	4,950,115		
809	4,950,970	73	4,951,050	CLASS 357			4,951,282	82	4,950,116		
CLASS 322	118	4,951,051	17	4,951,098	141	4,951,189	CLASS 371	82	4,950,117		
1	4,950,971	122	4,951,052	22	165	4,951,191	5.1	4,951,283	CLASS 411		
8	4,950,972	136	4,951,053	23.4	188	4,951,192	29.5	4,951,284	38	4,950,118	
69	4,950,973	138	4,951,054	23.5	200	4,951,193	38.1	4,951,285	CLASS 412	4,950,119	
CLASS 323	22	4,951,055	24	4,951,104		4,951,194	CLASS 372		CLASS 413	4,950,120	
222	4,950,974	29	4,951,056	30	4,951,105	19	4,951,286	5	4,950,121	4,950,121	
266	4,950,975	22	4,951,057	34	4,951,106	21	4,951,287	254	4,950,122	4,950,122	
312	4,950,976	51	4,951,058	36	4,951,107	32	4,951,288	274	4,950,123	4,950,123	
CLASS 324	155	4,951,059	38	4,951,108	419	4,951,197	33	4,951,289	277	4,950,124	
71.1	4,950,977	175	4,951,060	41	4,951,109	46	4,951,290	331	4,950,125	4,950,125	
72	4,950,978	373	4,951,061	42	4,951,111	48	4,951,291	428	4,950,126	4,950,126	
77 B	4,950,999	CLASS 346		42	4,951,112	49	4,951,292	512	4,950,127	4,950,127	
126	4,950,979	1.1	4,951,062	44	4,951,113		4,951,293	522	4,950,128	4,950,128	
158 F	4,950,981		4,951,063	49	4,951,114	50	4,951,294	537	4,950,129	4,950,129	
169	4,950,982		4,951,064		4,951,115	75	4,951,295	569	4,950,130	4,950,130	
204	4,950,983	107 R	4,951,065	51	4,951,116	86	4,951,296	590	4,950,131	4,950,131	
207.16	4,950,984	108	4,951,066	70	4,951,117	87	4,951,297	694	4,950,132	4,950,132	
207.19	4,950,985	140 R	4,951,067		4,951,118	89	4,951,298	796.9	4,950,133	4,950,133	
207.23	4,950,986		4,951,068	71	4,951,119	424.4	4,951,299	CLASS 373	CLASS 415	4,950,134	
207.24	4,950,987	154	4,951,069	72	4,951,120	426.04	4,951,300	67	4,951,298	160	4,950,135
216	4,950,988	155	4,951,070		4,951,121	431.04	4,951,301	202	4,951,299	202	4,950,136
224	4,950,990	159	4,951,071	81	4,951,122	431.11	4,951,302	CLASS 374	CLASS 416	87	4,950,137
307	4,950,991	CLASS 350		81	4,951,123	444	4,951,303	144	4,950,084	CLASS 417	4,950,138
309	4,950,992	96.1	4,950,043	233	4,951,124	456	4,951,304	207	4,950,085	CLASS 418	4,950,139
313	4,950,993	96.14	4,950,044	234	4,951,125	460	4,951,305	CLASS 376	CLASS 419	269	4,950,140
320	4,950,994		4,950,045		4,951,126	474.09	4,951,306	247	4,950,447	269	4,950,141
323	4,950,995	96.16	4,950,046	22	4,951,127	472.2	4,951,307	283	4,950,448	312	4,950,142
391	4,950,996	96.18	4,950,047	28	4,951,128	477	4,951,308	293	4,950,449	383	4,950,143
556	4,950,997	96.20	4,950,048	31	4,951,129	484	4,951,309	306	4,950,450	410	4,950,144
674	4,950,998	96.23	4,950,049		4,951,130	488	4,951,310	339	4,951,299	477	4,950,145
CLASS 328	162.13	96.30	4,950,050		4,951,131	489	4,951,311	439	4,951,300	CLASS 418	4,950,146
155	4,951,000	269	4,950,051	44	4,951,132	490	4,951,312	CLASS 377	CLASS 419	26	4,950,147
CLASS 329	333	333	4,950,052	60	4,951,133	507	4,951,313	17	4,951,300	55.3	4,950,148
343	4,951,001	334	4,950,053	78	4,951,134	510	4,951,314	54	4,951,301	235	4,950,149
CLASS 330	418	345	4,950,054	98	4,951,135	513	4,951,315	57	4,951,302	CLASS 420	4,950,150
151	4,951,002	418	4,950,055	109	4,951,136	518	4,951,316	110	4,951,303	10	4,950,151
252	4,951,003	429	4,950,056	125	4,951,137	520	4,951,317	119	4,951,304	481	4,950,152
254	4,950,040		4,950,057	133	4,951,138	521	4,951,318	147	4,951,305	550	4,950,153
CLASS 331	432		4,950,058	135	4,951,139	522	4,951,319	187	4,951,306	CLASS 422	4,950,154
1 A	4,951,004	462	4,950,059	136	4,951,140	550	4,951,320	74	4,951,307	3	4,950,155
16	4,951,005	505	4,950,060	137	4,951,141	571.01	4,951,321	91	4,951,308	15	4,950,156
74	4,951,006	571	4,950,061	148	4,951,142	708	4,951,322	98	4,951,309	56	4,950,157
158	4,951,007	574	4,950,062	160	4,951,143	715.01	4,951,323	266	4,951,310	470	4,950,158
CLASS 333	631		4,950,063	182	4,951,144	717	4,951,324	376	4,951,311	80	4,950,159
17.2	4,951,008	CLASS 351		183	4,951,145	721	4,951,325	394	4,951,312	123	4,950,160
17.3	4,951,009	186	4,950,064	209	4,951,146	723	4,951,326	395	Re.33.309	164	4,950,161
21 A	4,951,010	106	4,950,065	213.18	4,951,147	729	4,951,327	CLASS 380	CLASS 423	220	4,950,162
33	4,951,011	169	4,950,066	230	4,951,148	807	4,951,328	10	4,951,313	239	4,950,163
117	4,951,012	208	4,950,067	231	4,951,149	900	4,951,329	14	4,951,314	CLASS 424	4,950,164
246	4,951,013	210	4,950,068	296	4,951,150		4,951,330	15	4,951,315	213.7	4,950,165
CLASS 335	221	4,950,070	298	4,951,151	336	4,951,152	43	4,950,087	235	4,950,166	4,950,166
38	4,951,015	225	4,950,071	342	4,951,153	342	4,951,154	CLASS 384	CLASS 425	246	4,950,167
80	4,951,016	CLASS 353		404	4,951,155	343	4,951,155	47	4,950,088	446	4,950,168
128	4,951,017	433	4,950,072	451	4,951,156	189.02	4,951,251	103	4,950,089	468	4,950,169
132	4,951,018	451	4,950,073		4,951,157	189.11	4,951,252	815	4,950,090	10	4,950,170
CLASS 337	451	4,950,074			4,951,158		4,951,253				
CLASS 339	451	4,950,075			4,951,159		4,951,254				
CLASS 340	451	4,950,076			4,951,160		4,951,255				
CLASS 341	451	4,950,077			4,951,161		4,951,256				
CLASS 342	451	4,950,078			4,951,162		4,951,257				
CLASS 343	451	4,950,079			4,951,163		4,951,258				
CLASS 344	451	4,950,080			4,951,164		4,951,259				
CLASS 345	451	4,950,081			4,951,165		4,951,260				
CLASS 346	451	4,950,082			4,951,166		4,951,261				
CLASS 347	451	4,950,083			4,951,167		4,951,262				
CLASS 348	451	4,950,084			4,951,168		4,951,263				
CLASS 349	451	4,950,085			4,951,169		4,951,264				
CLASS 350	451	4,950,086			4,951,1						

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43	4,950,466	663	4,950,554	158	4,950,174	172	4,950,659	208	4,950,817
47	4,950,477	690	4,950,555	274	4,950,175	201	4,950,660	CLASS 534	CLASS 585
49	4,950,478	694	4,950,556	296	4,950,176	202	4,950,661	738	4,950,742
59	4,950,479		4,950,557	344	4,950,177	210	4,950,662	CLASS 536	CLASS 586
70	4,950,480	698	4,950,558	352	4,950,178	211	4,950,663	18.6	4,950,743
71	4,950,481			404	4,950,179	219	4,950,664	18.7	4,950,744
83	4,950,482			422	4,950,180	222.8	4,950,665	58	4,950,745
85.1	4,950,483	CLASS 429		485	4,950,181	227.5	4,950,666	119	4,950,746
85.5	4,950,484	27	4,950,560	507	4,950,182	227.8	4,950,667	124	4,950,747
85.8	4,950,485		4,950,561	536	4,950,183	232.2	4,950,668	127	4,950,748
93	4,950,486		4,950,562	560	4,950,184	237.5	4,950,669	128	4,950,749
195.1	4,950,487		4,950,563	595	Re 33,305	254	4,950,670	444	4,950,750
405	4,950,488		4,950,564	620	4,950,185	277	4,950,671	446	4,950,751
422	4,950,489		4,950,565	830	4,950,186	288	4,950,672	463	4,950,752
439	4,950,490		4,950,566	882	4,950,187	314	4,950,673	467	4,950,753
464	4,950,491	CLASS 430			4,950,188	317	4,950,674	230	4,950,754
473	4,950,492		4,950,567	7	4,950,189	336	4,950,675	CLASS 540	CLASS 544
645	4,950,493		4,950,568	53	4,950,190	338	4,950,676	58.5	4,950,755
		CLASS 425		61	4,950,191	340	4,950,677	12	4,950,756
33	4,950,494		4,950,569	88	4,950,192	347	4,950,678	21	4,950,757
38	4,950,495		4,950,570	89	4,950,193	356	4,950,679	32	4,950,758
130	4,950,496		4,950,571		4,950,194	397	4,950,680	CLASS 546	CLASS 600
135	4,950,497		4,950,572		4,950,195	417	4,950,681	4	4,950,759
140	4,950,498		4,950,573		4,950,196	450	4,950,682	8	4,950,760
149	4,950,499		4,950,574		4,950,197	456	4,950,683	22	4,950,761
185	4,950,500		4,950,575		4,950,198	471	4,950,684	28	4,950,762
224	4,950,501		4,950,576		4,950,199	479	4,950,685	39	4,950,763
345	4,950,502		4,950,577		4,950,200	546	4,950,686	43	4,950,764
348 R	4,950,503		4,950,578		4,950,201	548	4,950,687	51	4,950,765
379.1	4,950,504		4,950,579		4,950,202	777	4,950,688	60	4,950,766
533	4,950,505		4,950,580		4,950,203	847	4,950,689	65	4,950,767
536	4,950,506		4,950,581		4,950,204		4,950,690	74	4,950,768
552	4,950,507		4,950,582		4,950,205	702	4,950,691	110	4,950,769
		CLASS 426			4,950,206	CLASS 518		118	4,950,770
1	4,950,488		4,950,583		4,950,207	486	4,950,692	154	4,950,771
18	4,950,489		4,950,584		4,950,208	525	4,950,693	181	4,950,772
138	4,950,490		4,950,585		4,950,209	570	4,950,694	192	4,950,773
242	4,950,491		4,950,586		4,950,210	CLASS 521		247	4,950,774
243	4,950,492		4,950,587		4,950,211	CLASS 522		265	4,950,775
399	4,950,493				4,950,212	CLASS 523		281	4,950,776
513	4,950,494				4,950,213	CLASS 524		339	4,950,777
536	4,950,495				4,950,214	CLASS 525		385.1	4,950,778
656	4,950,496				4,950,215	CLASS 526		416	4,950,779
		CLASS 427			4,950,216	CLASS 527		424	4,950,780
28	4,950,497				4,950,217	CLASS 528		469	4,950,781
38	4,950,498				4,950,218	CLASS 529		583	4,950,782
148	4,950,499				4,950,219	CLASS 530		584	4,950,783
197	4,950,500				4,950,220	CLASS 531		598	4,950,784
213.36	4,950,501				4,950,221	CLASS 532		22	4,950,785
229	4,950,502				4,950,222	CLASS 533		126	4,950,786
242	4,950,503				4,950,223	CLASS 534		278	4,950,787
327	4,950,504				4,950,224	CLASS 535		304	4,950,788
387	4,950,505				4,950,225	CLASS 536		335	4,950,789
419.2	4,950,506				4,950,226	CLASS 537		440	4,950,790
	4,950,507				4,950,227	CLASS 538		450	4,950,791
		CLASS 428			4,950,228	CLASS 539		454	4,950,792
12	4,950,508				4,950,229	CLASS 540		484	4,950,793
18	4,950,509				4,950,230	CLASS 541		492	4,950,794
34.2	4,950,510				4,950,231	CLASS 542		655	4,950,795
35.2	4,950,511				4,950,232	CLASS 543		697	4,950,796
35.7	4,950,512				4,950,233	CLASS 544		724	4,950,797
35.8	4,950,513				4,950,234	CLASS 545		727	4,950,798
36.7	4,950,514				4,950,235	CLASS 546		730	4,950,799
36.92	4,950,515				4,950,236	CLASS 547		741	4,950,800
	4,950,516				4,950,237	CLASS 548		790	4,950,801
40	4,950,517				4,950,238	CLASS 549		832	4,950,802
	4,950,518				4,950,239	CLASS 550		842	4,950,803
44	4,950,519				4,950,240	CLASS 551		863	4,950,804
64	4,950,520				4,950,241	CLASS 552		130	4,950,805
73	4,950,521				4,950,242	CLASS 553		151	4,950,806
78	4,950,522				4,950,243	CLASS 554		179	4,950,807
159	4,950,523				4,950,244	CLASS 555			
163	4,950,524				4,950,245	CLASS 556			
164	4,950,525				4,950,246	CLASS 557			
166	4,950,526				4,950,247	CLASS 558			
192	4,950,527				4,950,248	CLASS 559			
212	4,950,528				4,950,249	CLASS 560			
224	4,950,529				4,950,250	CLASS 561			
259	4,950,530				4,950,251	CLASS 562			
284	4,950,531				4,950,252	CLASS 563			
290	4,950,532				4,950,253	CLASS 564			
292	4,950,533				4,950,254	CLASS 565			
314.4	4,950,534				4,950,255	CLASS 566			
343	4,950,535				4,950,256	CLASS 567			
345	4,950,536				4,950,257	CLASS 568			
364	4,950,537				4,950,258	CLASS 569			
369	4,950,538				4,950,259	CLASS 570			
373	4,950,539				4,950,260	CLASS 571			
403	4,950,540				4,950,261	CLASS 572			
408	4,950,541				4,950,262	CLASS 573			
411.1	4,950,542				4,950,263	CLASS 574			
446	4,950,543				4,950,264	CLASS 575			
447	4,950,544				4,950,265	CLASS 576			
471	4,950,545				4,950,266	CLASS 577			
500	4,950,546				4,950,267	CLASS 578			
536	4,950,547				4,950,268	CLASS 579			
611	4,950,548				4,950,269	CLASS 580			
	4,950,549				4,950,270	CLASS 581			
624	4,950,550				4,950,271	CLASS 582			
626	4,950,551				4,950,272	CLASS 583			
	4,950,552				4,950,273	CLASS 584			
	4,950,553				4,950,274	CLASS 585			

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D3—	34	309,975	D7—	611	310,001	D10—	424	310,027	D12—	110	310,053	D15—	165	310,079	D20—	75	310,105	
	35	309,976		308	310,002		434	310,028		129	310,054		171	310,080		76	310,106	
	38	309,977		309	310,003		438	310,029		130	310,055		205	310,081		90	310,107	
	40	309,978		329	310,004		439	310,030		147	310,056		227	310,082		92	310,108	
	65	309,979	379	310,005	449		310,031	163	310,057	229	310,083		32	310,109				
	72	309,980	596	310,006	15		310,032	308	310,058	238	310,084		13	310,110				
	74	309,981	62	310,007	30		310,033	317	310,059	14	310,085		128	310,111				
		309,982	64	310,008			310,034	102	310,060	70	310,086		148	310,112				
		309,983	67	310,009	32		310,035	132	310,062	123	310,087		194	310,113				
		309,984	71	310,010	46		310,036	142	310,063	130	310,088		211	310,114				
D4— D6—	138	309,985	82	310,011	57	310,037	165	310,064	246	310,089	217	310,115	D17—	2	310,090	D22—	140	310,116
	300	309,986	90	310,012	60	310,038		310,065			14	310,091		225	310,117			
	308	309,987		310,013	64	310,039		310,066	169	310,061	1	310,092		297	310,118			
	347	309,988	99	310,014	68	310,040		310,067	100	310,068	7	310,093		301	310,119			
	359	309,989	102	310,015	70	310,041		310,069										
	364	309,990	354	310,016	72	310,042		310,070										
	366	309,991	356	310,017	73	310,044		310,067	102	310,070	13	310,095		18	310,121			
	380	309,992	373	310,018		310,045		310,071	106	310,071	36	310,096		25	310,122			
	455	309,993		310,019	74	310,045		310,072			1	310,097		29	310,123			
	495	309,994	396	310,020	96	310,046		310,073			26	310,099		54	310,124			
508	309,995	300	310,021	114	310,047		310,074			48	310,100	35	310,125					
515	309,996		310,022	126	310,048		310,075			55	310,101	7	310,126					
561	309,997	305	310,023	132	310,049		310,076			67	310,102	23	310,127					
567	309,998	312	310,024	3	310,050		310,077					35	310,128					
583	309,999	368	310,025	93	310,051		310,078					125	310,129					
	311,000	373	310,026	241	310,052													



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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

### PATENTS

01	4,949,641	4,949,760	4,950,280	4,951,099	4,949,894	4,950,342
	4,949,918	4,949,761	4,950,289	4,951,101	4,949,921	4,950,514
	4,950,191	4,949,785	4,950,296	4,951,112	4,949,952	4,950,564
	4,950,735	4,949,808	4,950,323	4,951,113	4,949,960	4,950,650
	4,950,761	4,949,842	4,950,343	4,951,139	4,949,998	4,950,902
	4,949,843	4,949,866	4,950,346	4,951,144	4,950,011	4,950,931
	4,951,030	4,949,877	4,950,358	4,951,149	4,950,011	4,950,933
04	4,949,679	4,949,717	4,950,404	4,951,163	4,950,274	4,950,934
	4,949,755	4,949,887	4,950,421	4,951,172	4,950,284	4,951,010
	4,950,033	4,949,914	4,950,447	4,951,190	4,950,299	4,951,011
	4,950,071	4,949,922	4,950,448	4,951,199	4,950,371	4,951,039
	4,950,176	4,949,927	4,950,449	4,951,203	4,950,419	4,951,044
	4,950,180	4,949,933	4,950,453	4,951,204	4,950,475	4,951,102
	4,950,238	4,949,954	4,950,464	4,951,215	4,950,497	4,951,181
	4,950,316	4,949,956	4,950,469	4,951,232	4,950,563	4,951,217
	4,950,393	4,949,993	4,950,483	4,951,237	4,950,588	4,951,234
	4,950,699	4,950,021	4,950,486	4,951,239	4,950,744	4,951,264
	4,950,878	4,950,035	4,950,489	4,951,243	4,950,840	Re. 33, 309
	4,951,270	4,950,036	4,950,509	4,951,248	4,950,852	4,949,401
05	4,949,701	4,950,041	4,950,546	4,951,271	4,950,854	4,949,430
	4,949,741	4,950,052	4,950,552	4,951,280	4,950,883	4,949,483
	4,949,796	4,950,064	4,950,566	4,951,284	4,950,970	4,949,654
06	Re. 33, 308	4,950,067	4,950,598	4,951,285	4,950,986	4,950,005
	4,949,407	4,950,078	4,950,611	4,951,287	4,950,018	4,949,789
	4,949,415	4,950,102	4,950,612	4,951,294	4,951,143	4,950,042
	4,949,424	4,950,104	4,950,613	4,951,303	4,950,049	4,949,838
	4,949,435	4,950,115	4,950,615	4,951,304	4,951,266	4,949,959
	4,949,459	4,950,133	4,950,647	4,951,308	4,951,267	4,950,125
	4,949,469	4,950,134	4,950,657	4,951,313	4,950,163	4,950,406
	4,949,484	4,950,151	4,950,678	4,951,314	4,950,601	4,950,594
	4,949,489	4,950,155	4,950,713	4,951,315	4,950,467	4,950,734
	4,949,517	4,950,157	4,950,722	4,949,448	4,950,513	4,950,799
	4,949,530	4,950,158	4,950,740	4,949,485	4,950,567	4,950,822
	4,949,540	4,950,171	4,950,775	4,949,716	4,950,711	4,950,822
	4,949,545	4,950,172	4,950,856	4,949,797	4,950,778	4,950,822
	4,949,549	4,950,181	4,950,864	4,949,905	4,950,807	4,950,822
	4,949,560	4,950,196	4,950,865	4,949,965	4,949,506	4,950,063
	4,949,569	4,950,200	4,950,884	4,949,972	4,949,521	4,949,506
	4,949,580	4,950,224	4,950,901	4,950,039	4,949,521	4,949,506
	4,949,586	4,950,225	4,950,912	4,949,522	4,949,522	4,949,506
	4,949,600	4,950,235	4,950,917	4,949,523	4,949,523	4,949,506
	4,949,627	4,950,240	4,950,929	4,949,524	4,949,524	4,949,506
	4,949,629	4,950,244	4,950,936	4,949,525	4,949,525	4,949,506
	4,949,661	4,950,245	4,950,959	4,949,526	4,949,526	4,949,506
	4,949,670	4,950,247	4,951,009	4,949,527	4,949,527	4,949,506
	4,949,672	4,950,250	4,951,036	4,949,528	4,949,528	4,949,506
	4,949,714	4,950,252	4,951,088	4,949,529	4,949,529	4,949,506
	4,949,719	4,950,255	4,951,050	4,949,530	4,949,530	4,949,506
	4,949,724	4,950,256	4,951,057	4,949,531	4,949,531	4,949,506
	4,949,728	4,950,260	4,951,058	4,949,532	4,949,532	4,949,506
	4,949,731	4,950,268	4,951,059	4,949,533	4,949,533	4,949,506
	4,949,739	4,950,277	4,951,062	4,949,534	4,949,534	4,949,506
	4,949,742	4,950,279	4,951,087	4,949,535	4,949,535	4,949,506

## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

4,949,901	4,950,471	4,951,200	4,950,697	4,949,520	4,950,015
4,949,923	4,950,510	4,951,205	4,950,698	4,949,736	4,950,105
4,949,924	4,950,523	4,949,408	4,950,721	4,949,845	4,950,153
4,950,006	4,950,589	4,949,497	4,950,739	4,949,851	4,950,177
4,950,184	4,950,893	4,949,525	4,950,783	4,949,889	4,950,186
4,950,188	4,950,966	4,949,550	4,950,823	4,949,913	4,950,219
4,950,216	4,950,987	4,949,579	4,950,829	4,950,226	4,950,283
4,950,221	4,951,059	4,949,581	4,950,937	4,950,229	4,950,329
4,950,254	4,951,060	4,949,649	4,950,999	4,950,319	4,950,338
4,950,318	4,951,123	4,949,682	4,951,007	4,950,599	4,950,361
4,950,324	4,949,452	4,949,707	4,951,051	4,950,623	4,950,364
4,950,383	4,949,546	4,949,720	4,951,129	4,950,847	4,950,372
4,950,415	4,949,605	4,949,809	4,951,169	4,951,018	4,950,413
4,950,420	4,949,613	4,949,848	4,951,221	4,949,805	4,950,426
4,950,459	4,949,652	4,949,853	4,949,957	4,950,645	4,950,439
4,950,485	4,949,860	4,949,892	4,950,187	Re. 33, 303	4,950,492
4,950,518	4,949,961	4,949,943	4,950,201	4,949,403	4,950,500
4,950,593	4,949,976	4,950,082	4,950,281	4,949,409	4,950,505
4,950,631	4,949,996	4,950,119	4,951,037	4,949,410	4,950,532
4,950,649	4,950,013	4,950,147	4,951,150	4,949,456	4,950,560
4,950,658	4,950,094	4,950,271	4,951,263	4,949,470	4,950,565
4,950,684	4,950,096	4,950,282	4,949,436	4,949,544	4,950,576
4,950,692	4,950,156	4,950,298	4,949,472	4,949,578	4,950,652
4,950,702	4,950,195	4,950,392	4,949,479	4,949,648	4,950,685
4,950,743	4,950,227	4,950,490	4,949,496	4,949,794	4,950,690
4,950,769	4,950,266	4,950,525	4,949,509	4,949,835	4,950,695
4,950,786	4,950,315	4,950,549	4,949,538	4,949,849	4,950,738
4,950,825	4,950,375	4,950,579	4,949,561	4,949,856	4,950,762
4,950,827	4,950,379	4,950,696	4,949,572	4,949,859	4,950,770
4,950,828	4,950,445	4,950,758	4,949,601	4,949,871	4,950,790
4,950,830	4,950,499	4,950,857	4,949,698	4,949,982	4,950,794
4,950,851	4,950,503	4,951,029	4,949,765	4,950,019	4,950,848
4,950,868	4,950,553	4,951,182	4,949,783	4,950,118	4,950,853
4,950,880	4,950,558	4,951,255	4,949,806	4,950,136	4,950,859
4,950,945	4,950,646	4,949,437	4,949,814	4,950,140	4,950,872
4,950,964	4,950,714	4,949,798	4,949,862	4,950,145	4,950,882
4,950,965	4,950,782	4,950,017	4,949,875	4,950,152	4,950,908
4,951,024	4,950,858	4,949,429	4,949,929	4,950,175	4,950,913
4,951,146	4,950,948	4,949,449	4,949,949	4,950,203	4,950,916
4,949,464	4,950,954	4,949,604	4,949,950	4,950,264	4,950,941
4,949,490	4,950,961	4,949,676	4,950,003	4,950,321	4,950,957
4,949,505	4,950,972	4,949,733	4,950,009	4,950,423	4,950,977
4,949,559	4,950,978	4,949,748	4,950,047	4,950,554	4,950,998
4,949,625	4,950,988	4,949,878	4,950,050	4,950,561	4,951,015
4,949,817	4,951,014	4,950,043	4,950,059	4,950,610	4,951,019
4,949,865	4,951,025	4,950,207	4,950,087	4,950,693	4,951,020
4,949,885	4,951,028	4,950,241	4,950,126	4,950,710	4,951,064
4,949,902	4,951,073	4,950,257	4,950,129	4,950,749	4,951,222
4,949,939	4,951,114	4,950,269	4,950,164	4,950,755	4,950,755
4,949,958	4,951,192	4,950,583	4,950,233	4,950,766	4,949,433
4,950,228	4,951,223	4,950,755	4,950,285	4,950,846	4,949,438
4,950,270	4,951,236	4,950,787	4,950,288	4,950,911	4,949,465
4,950,603	4,951,283	4,950,918	4,950,307	4,950,973	4,950,466
4,950,629	4,949,507	4,951,022	4,950,309	4,950,976	4,949,414
4,950,753	4,949,508	4,951,026	4,950,311	4,951,168	4,949,534
4,950,791	4,949,518	4,951,089	4,950,337	4,951,202	4,949,554
4,950,932	4,949,519	4,949,633	4,950,368	4,949,788	4,949,864
4,950,955	4,949,589	4,949,909	4,950,402	4,949,790	4,950,354
4,950,960	4,949,590	4,950,437	4,950,437	4,949,791	4,950,831
4,949,481	4,949,594	4,949,675	4,950,450	4,949,857	4,950,989
4,949,677	4,949,611	4,951,296	4,950,496	4,949,871	4,949,650
4,949,799	4,949,621	4,950,053	4,950,544	4,950,416	4,949,461
4,949,802	4,949,752	4,950,143	4,950,569	4,950,632	4,949,542
4,949,987	4,949,774	4,950,199	4,950,586	4,950,665	4,949,653
4,950,022	4,949,803	4,950,239	4,950,587	4,950,836	4,949,768
4,950,487	4,949,822	4,950,838	4,950,592	4,951,262	4,949,771
4,950,842	4,949,825	4,951,245	4,950,602	4,949,427	4,950,012
4,950,990	4,949,827	4,949,423	4,950,628	4,949,710	4,950,169
4,950,997	4,949,850	4,949,499	4,950,639	4,949,711	4,950,717
4,949,726	4,949,890	4,949,628	4,950,648	4,949,767	4,950,732
4,949,979	4,949,898	4,949,630	4,950,643	4,949,769	4,950,841
4,950,178	4,949,899	4,949,718	4,950,704	4,949,888	4,951,131
4,949,816	4,949,934	4,949,732	4,950,727	4,949,893	4,949,405
4,949,964	4,949,962	4,949,852	4,950,731	4,949,977	4,949,412
4,949,973	4,949,969	4,949,858	4,950,757	4,950,010	4,949,486
4,949,576	4,949,983	4,949,908	4,950,773	4,950,098	4,949,494
4,949,663	4,949,992	4,949,944	4,950,779	4,950,160	4,949,531
4,949,789	4,949,994	4,949,951	4,950,816	4,950,326	4,949,575
4,949,813	4,950,026	4,949,955	4,950,837	4,950,768	4,949,591
4,949,838	4,950,030	4,950,007	4,950,905	4,950,923	4,949,637
4,949,959	4,950,089	4,950,167	4,950,938	4,950,981	4,949,656
4,950,125	4,950,100	4,950,230	4,950,950	4,951,106	4,949,669
4,950,406	4,950,121	4,950,232	4,950,962	4,951,194	4,949,671
4,950,594	4,950,132	4,950,242	4,951,001	4,951,227	4,949,685
4,950,734	4,950,182	4,950,273	4,951,006	4,951,230	4,949,688
4,950,799	4,950,332	4,950,290	4,951,032	4,951,302	4,949,705
4,950,822	4,950,351	4,950,363	4,951,049	4,949,439	4,949,743
4,949,501	4,950,417	4,950,370	4,951,052	4,949,466	4,949,749
4,949,620	4,950,476	4,950,386	4,951,063	4,949,498	4,949,750
4,950,001	4,950,502	4,950,387	4,951,069	4,949,523	4,949,784
4,950,939	4,950,506	4,950,399	4,951,071	4,949,528	4,949,786
4,951,013	4,950,590	4,950,440	4,951,094	4,949,529	4,949,792
Re. 33, 305	4,950,596	4,950,477	4,951,096	4,949,535	4,949,793
4,949,402	4,950,634	4,950,479	4,951,098	4,949,573	4,949,795
4,949,432	4,950,635	4,950,482	4,951,115	4,949,608	4,949,846
4,949,567	4,950,675	4,950,495	4,951,185	4,949,647	4,949,917
4,949,626	4,950,680	4,950,515	4,951,225	4,949,655	4,949,925
4,949,639	4,950,718	4,950,516	4,951,229	4,949,699	4,950,004
4,949,643	4,950,723	4,950,542	4,951,249	4,949,713	4,950,066
4,949,738	4,950,724	4,950,591	4,951,305	4,949,740	4,950,085
4,949,840	4,950,802	4,950,606	4,951,306	4,949,781	4,950,170
4,949,896	4,950,839	4,950,664	4,951,307	4,949,872	4,950,220
4,949,920	4,950,969	4,950,666	4,949,413	4,949,937	4,950,222
4,950,073	4,951,086	4,950,673	4,949,440	4,949,945	4,950,251
4,950,149	4,951,184	4,950,689	4,949,441	4,949,978	4,950,272
4,950,194	4,951,196	4,950,691	4,949,491	4,949,980	4,950,344

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4,950,374	4,950,834	4,949,986	4,951,250	54	4,950,472	4,950,154
4,950,397	4,950,844	4,950,211	4,951,278		4,950,694	4,950,166
4,950,411	4,950,885	4,950,458	53	4,949,502	4,949,453	4,950,190
4,950,430	4,950,892	4,950,636		4,949,610	4,949,462	4,950,398
4,950,432	4,950,928	4,951,151		4,949,612	4,949,475	4,950,409
4,950,455	4,950,963	4,951,067		4,949,734	4,949,516	4,950,517
4,950,456	4,950,980	4,949,404		4,949,884	4,949,543	4,950,524
4,950,470	4,951,005	4,949,425	50	4,949,915	4,949,584	4,950,537
4,950,474	4,951,072	4,949,566	51	4,950,014	4,949,664	4,950,545
4,950,533	4,951,100	4,949,618		4,950,065	4,949,668	4,950,556
4,950,540	4,951,103	4,949,659		4,950,107	4,949,824	4,950,869
4,950,541	4,951,155	4,949,904		4,950,127	4,949,828	4,950,983
4,950,597	4,951,171	4,950,069		4,950,198	4,949,854	4,950,994
4,950,618	4,951,195	4,950,076		4,950,493	4,949,855	4,951,021
4,950,620	4,951,214	4,950,249		4,950,874	4,949,912	4,951,035
4,950,656	4,951,252	4,950,511		4,951,004	4,949,930	4,951,246
4,950,703	4,951,265	4,950,674		4,951,047	4,949,985	4,951,260
4,950,720	4,951,286	4,950,886		4,951,299	4,950,101	4,951,261
4,950,789	4,951,309	4,950,896		4,624,327	4,950,123	4,951,311
4,950,803	49	4,949,723				

DESIGN PATENTS

01	310,112	310,088	310,082	310,094	310,024	48	310,049
04	310,044	310,090	18	310,001	310,095		310,054
	310,060	310,126		310,059	310,102		310,067
	310,083	310,128	25	310,101	310,106		310,118
	310,098	309,980	26	309,978	310,108	50	309,987
06	309,975	309,981		309,989	310,105	51	309,984
	309,993	310,023		310,000	310,107		309,985
	309,996	310,124		310,021	310,117		310,018
	310,014	310,029		310,022	310,035	40	310,122
	310,015	309,979		310,089	310,089	41	310,039
	310,017	310,113		310,040	310,121		310,123
	310,050	310,013	27	310,109	309,998	42	310,047
	310,058	310,028	29	310,012	310,031		310,116
	310,069	310,009	34	309,992	310,052	44	310,129
	310,072	310,027		310,075	309,991	47	310,055

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06	7,303	7,305	48	7,304		
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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee: .....	170.00
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U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed .....	550.00
—Corresponding prior U.S. national application filed .....	380.00
—Supplemental search fee, per additional invention .....	150.00
European Patent Office as ISA .....	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA .....	400.00
—Additional examination fee, per additional invention .....	130.00
—ISA not the USPTO .....	600.00
—Additional examination fee, per additional invention .....	200.00
International fees	
Basic fee .....	436.00
Basic Supplemental fee (for each page over 30) .....	9.00
Designation fee per country or region for the first 10 national or regional offices .....	106.00
Designation fee for 11th and subsequent designations .....	No Charge
Handling fee .....	134.00

## U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA .....	185.00	370.00
USPTO was neither ISA nor IPEA .....	250.00	500.00

USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) .....	25.00	50.00
—For each independent claim in excess of 3 .....	18.00	36.00
—For each claim in excess of 20 .....	6.00	12.00
—For each application containing a multiple dependent claim .....	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT 1112 OG 2 Article 22 or 39(1) .....	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) .....	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks

## Patent Cooperation Treaty Update

The International Bureau of the World Intellectual Property Organization has informed the U. S. Patent and Trademark Office that, due to changes in the exchange rate of the U. S. dollar with regard to the Swiss Franc, the dollar amount of the international fees for international applications filed in the United States Receiving Office will increase, effective September 1, 1990.

Effective September 1, 1990 the amount of the international fees for international applications filed in the United States Receiving Office will be:

Basic fee (first 30 pages) .....	\$502.00
Basic Supplemental fee (for each page over 30) .....	\$ 10.00
Designation fee (per country or region up to 10) .....	\$122.00
Handling fee .....	\$154.00

June 20, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks

## Patent Cooperation Treaty Information

**The European Patent Office as an International Preliminary Examining Authority for International Applications filed with the United States Patent and Trademark Office as a Receiving Office**

Pursuant to a recent communication from the President of the European Patent Office (EPO) to the Commissioner of Patents and Trademarks, the EPO has confirmed that beginning July 1, 1990, it will continue to act as an International Preliminary Examining Authority (IPEA) for international applications filed with the United States Patent and Trademark Office as the Receiving Office. Furthermore, effective July 1, 1990, there will be no limit on the number of international applications originating in the United States which will be examined by the EPO as the

AUGUST 28, 1990

U. S. PATENT AND TRADEMARK OFFICE

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IPEA, provided that the EPO acted as the International Searching Authority for these applications.

June 18, 1990

HARRY F. MANBECK, Jr.  
Assistant Secretary and Commissioner  
of Patents and Trademarks

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on August 25, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,688,269 through 4,689,827  
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on August 23, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,399,567 through 4,400,828  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

## 37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....\$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....\$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (\$1.9(f)).....\$245.00  
By other than a small entity.....\$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug.

27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (\$1.9(f)).....\$495.00  
By other than a small entity.....\$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....\$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(\$1.9(f)).....\$60.00  
By other than a small entity.....\$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....\$550.00"

Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JUNE 17, 1990  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,334,379	06/275,644	6/15/82
4,334,445	06/243,250	6/15/82
4,334,458	06/236,393	6/15/82
4,334,485	06/255,805	6/15/82
4,334,493	06/231,908	6/15/82
4,334,548	06/234,417	6/15/82
4,334,605	06/225,738	6/15/82
4,334,633	06/251,170	6/15/82
4,334,672	06/252,189	6/15/82
4,334,758	06/252,732	6/15/82
4,334,846	06/247,129	6/15/82
4,334,878	06/240,636	6/15/82
4,334,882	06/249,778	6/15/82
4,334,890	06/231,205	6/15/82
4,334,896	06/287,359	6/15/82
4,334,900	06/224,636	6/15/82
4,334,904	06/241,055	6/15/82
4,334,913	06/249,649	6/15/82
4,334,922	06/222,716	6/15/82
4,334,977	06/225,283	6/15/82



Patient Number	Serial Number	Issue Date	4,595,718	06/734,548	6/17/86
4,595,380	06/575,519	6/17/86	4,595,739	06/665,448	6/17/86
4,595,381	06/541,345	6/17/86	4,595,747	06/682,718	6/17/86
4,595,388	06/601,280	6/17/86	4,595,759	06/701,797	6/17/86
4,595,391	06/569,726	6/17/86	4,595,766	06/664,916	6/17/86
4,595,395	06/665,094	6/17/86	4,595,767	06/791,160	6/17/86
4,595,410	06/456,471	6/17/86	4,595,770	06/390,093	6/17/86
4,595,414	06/262,540	6/17/86	4,595,784	06/669,096	6/17/86
4,595,420	06/666,120	6/17/86	4,595,798	06/571,789	6/17/86
4,595,422	06/609,238	6/17/86	4,595,799	06/349,123	6/17/86
4,595,437	06/654,788	6/17/86	4,595,808	06/647,781	6/17/86
4,595,440	06/559,396	6/17/86	4,595,809	06/641,894	6/17/86
4,595,450	06/736,865	6/17/86	4,595,818	06/526,124	6/17/86
4,595,458	06/734,990	6/17/86	4,595,831	06/549,852	6/17/86
4,595,472	06/742,348	6/17/86	4,595,838	06/608,940	6/17/86
4,595,475	06/509,402	6/17/86	4,595,840	06/624,933	6/17/86
4,595,477	06/637,415	6/17/86	4,595,848	06/509,948	6/17/86
4,595,494	06/650,258	6/17/86	4,595,852	06/599,199	6/17/86
4,595,495	06/704,201	6/17/86	4,595,863	06/545,639	6/17/86
4,595,504	06/582,323	6/17/86	4,595,867	06/755,268	6/17/86
4,595,512	06/533,621	6/17/86	4,595,872	06/716,907	6/17/86
4,595,546	06/551,749	6/17/86	4,595,877	06/662,263	6/17/86
4,595,564	06/626,726	6/17/86	4,595,893	06/606,015	6/17/86
4,595,576	06/413,419	6/17/86	4,595,905	06/578,935	6/17/86
4,595,579	06/700,739	6/17/86	4,595,933	06/731,136	6/17/86
4,595,582	06/515,924	6/17/86	4,595,955	06/530,983	6/17/86
4,595,586	06/771,450	6/17/86	4,595,963	06/355,376	6/17/86
4,595,616	06/662,644	6/17/86	4,595,967	06/570,178	6/17/86
4,595,626	06/695,678	6/17/86	4,595,970	06/618,744	6/17/86
4,595,627	06/698,679	6/17/86	4,595,975	06/662,339	6/17/86
4,595,675	06/688,325	6/17/86	4,596,014	06/581,629	6/17/86
4,595,677	06/554,735	6/17/86	4,596,019	06/536,432	6/17/86
4,595,681	06/665,214	6/17/86	4,596,023	06/526,467	6/17/86
4,595,683	06/664,062	6/17/86	4,596,041	06/505,442	6/17/86
4,595,702	06/719,592	6/17/86	4,596,042	06/559,262	6/17/86
4,595,716	06/645,692	6/17/86	4,596,044	06/541,519	6/17/86
		6/17/86	4,596,049	06/559,908	6/17/86

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,465,155	06/274,658	8/14/84	6/17/81	7/27/90
4,493,618	06/485,460	1/15/85	4/18/83	7/27/90
4,504,389	06/458,448	3/12/85	1/17/83	7/20/90
4,506,570	06/361,406	3/26/85	3/24/82	7/20/90
4,536,147	06/626,239	8/20/85	6/29/84	7/19/90
4,541,949	06/492,132	7/25/90	5/06/83	7/25/90

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,506,016**, Re. S. N. 07/550,635, Filed July 10, 1990, Cl. 435/237, HEPATITIS-A VIRUSES ADAPTED TO HUMAN FIBROBLAST CELLS, Betram Flehmig, Owner of Record: *Inventor*, Attorney or Agent: Irwin M. Aisenberg, Ex. Gp.: 184

**4,651,312**, Re. S. N. 07/550,945, Filed July 11, 1990, Cl. 369/010, PORTABLE TAPE PLAYER WITH RADIO IN LID, Hideo Honma, et al., Owner of Record: Sony Corp., Tokyo, Japan, Attorney or Agent: Jay H. Maioli', Ex. Gp.: 239

**4,758,457**, Re. S. N. 07/553,911, Filed July 16, 1990, Cl. 428/82, FLOOR MAT WITH INTEGRAL RETAINER MEANS, Mark Altus, Owner of Record: *The 2500 Corp., Farmington Hills, Mich.*, Attorney or Agent: Theodore W. Olds, Ex. Gp.: 158

4,758,556, Re. S. N. 07/551,615, Filed July 11, 1990, Cl. 514/206, CEPHEM DERIVATIVES, Walter Durckheimer, Owner of

Record: *Hoeschst Aktiengesellschaft, Frankfurt, Federal Republic of Germany*, Attorney or Agent: Robert F. Kirchner, Ex. Gp.: 125

**4,760,573**, Re. S. N. 07/551,578, Filed July 11, 1990, Cl. 370/55, MULTIPLEX INTERACE FOR A COMMUNACATION CONTROLLER, J. Calvignac et al., Owner of Record: *International Business Machine Corp., Armonk, N.Y.*, Attorney or Agent: John B. Frisone, Ex. Gp.: 263

**4,772,286**, Re. S. N. 07/529,319, Filed May 29, 1990, Cl. 623/13, LIGAMENT ATTACHMENT METHOD AND APPARATUS, E. Marlowe Goble, et al., Owner of Record: *Inventor*, Attorney or Agent: M. Reid Russell, Ex. Gp.: 332

**4,791,490**, Re. S. N. 07/553,701, Filed July 16, 1990, Cl. 358/209, DETECTOR FOR THREE-DIMENSIONAL OPTICAL IMAGING, Frederick K. Knight, et al., Owner of Record: *Masachusetts Institute of Technology, Cambridge, Mass.*, Attorney or Agent: James E. Maslow, Ex. Gp.: 262

**4,863,813**, Re. S. N. 07/552,800, Filed July 13, 1990, Cl. 429/33, PRIMARY SOURCE OF ELECTRICAL ENERGY USING A MIXTURE OF FUEL AND OXIDIZER, C. K. Dyer, Owner of Record: *Bell Communications Research, Inc., Livingston, N.J.*, Attorney or Agent: Leonard C. Suchyta, Ex. Gp.: 114

**4,908,951**, Re. S. N. 07/554,457, Filed July 19, 1990, Cl. 33/503, COORDINATE MEASURING AND TESTING MACHINE, Werner Gurny, Owner of Record: *Wegu-Messtechnik GmbH, Wadgassen, West Germany*, Attorney or Agent: Herbert C. Brinkman, Ex. Gp.: 246

**4,917,602**, Re. S. N. 07/550,979, Filed July 9, 1990, Cl. 433/8, ADJUSTABLE ORTHODONTIC BRACKET ASSEMBLY, Grafford J. Broussard, Owner of Record: *Inventor*, Attorney or Agent: Ben D. Tobor, Ex. Gp.: 333

**4,921,358**, Re. S. N. 07/553,127, Filed July 12, 1990, Cl. 384/15, UNDER SEAL ASSEMBLING STRUCTURE IN LINEAR GUIDE APPARATUS, Shinichi Kasuga, et al., Owner of Record: *Nippon Seiko Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Andrew R. Basile, Ex. Gp.: 245

#### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,342,442**, Reexam. No. 90/002,082, Requested July 5, 1990, Cl. 242/233, FISHING REEL, Sigurd Brantingson, Owner of Record: *Inventor, Short Hills, N.J.*, Attorney or Agent: Lerner, David, Littenberg, Krumholz & Mentlik, Ex. Gp.: 245, Requester: James R. Longacre, Squire, Sanders & Dempsey, Washington, D.C.

**4,345,348**, Reexam. No. 90/002,085, Requested July 9, 1990, Cl. 005/451, WATERBED MATTRESS WITH A BAFFLE, Charles P. Hall, Owner of Record: *Advanced Sleep Products, Carson, Calif.*, Attorney or Agent: Lyon & Lyon, Los Angeles, Calif., Ex. Gp.: 358, Requester: Owner

**4,408,150**, Reexam. No. 90/002,087, Requested July 10, 1990, Cl. 318/729, SPEED CONTROL SYSTEM AND METHOD FOR ELECTRIC MOTOR, Roger W. Halston, et al., Owner of Record: *Emerson Electric Co., St. Louis, Mo.*, Attorney or Agent: Polster, Polster & Lucchesi, Ex. Gp.: 217, Requester: Owner

**4,663,159**, Reexam. No. 90/002,084, Requested July 6, 1990, Cl. 536/043, HYDROPHOBIC SUBSTITUTED, WATER SOLUBLE CATIONIC POLYSACCHARIDES, George L. Brobe, et al., Owner of Record: *Union Carbide Chemical & Plastics Co., Danbury, Conn.*, Attorney or Agent: Henry H. Gibson, Ex. Gp.: 151, Requester: Owner

**4,761,324**, Reexam. No. 90/002,083, Requested July 2, 1990, Cl. 428/231, ELASTIC, LAMINATED, WATER-PROOF, MOISTURE-PERMEABLE FABRIC, Leonard J. Rautenberg, et al., Owner of Record: *Dash Partners, New York, N.Y.*, Attorney or Agent: William F. Dudine, Darby & Darby, Ex. Gp.: 154, Requester: Owner

**4,779,176**, Reexam. No. 90/002,081, Requested June 29, 1990, Cl. 362/222, LIGHT PATTERN GENERATOR, James M. Bornhorst, Owner of Record: *Vari-Lite, Inc., Dallas, Tex.*, Attorney or Agent: Richards, Harris Medlock & Andrews, Ex. Gp.: 346, Requester: Morpheus Lights, Inc., San Jose, Calif.

**4,886,167**, Reexam. No. 90/002,086, Requested July 9, 1990, Cl. 206/394, COMPACT CORE-WOUND PAPER PRODUCT, Donald D. Dearwester, Owner of Record: *The Proctor & Gamble Co., Cincinnati, Ohio*, Attorney or Agent: Thomas J. Sloane, Ex. Gp.: 244, Requester: Owner

#### Errata

"All reference to Patent No. 4,913,788 to Jozef Hanulik of Switzerland for 'PROCESS AND APPARATUS FOR THE ELECTROCHEMICAL SEPARATION OF METAL MIXTURES AND METAL ALLOYS' appearing in the Official Gazette of April 3, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,932,102 to Jacobus E. Hazenbroek et al. of Numansdorp, Netherlands for 'REVOLVING POULTRY THIGH DEBONER' appearing in the Official Gazette of June 12, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,934,942, to Albert Casciotti of Pa. for 'ELECTRICAL CONNECTOR' appearing in the Official Gazette of June 19, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,936,985 to Robert W. Hahn of Wash. for 'SELF CONTAINED CANISTER FOR FILTERING TAP WATER' appearing in the Official Gazette of June 26, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,937,231 to James W. Shilling of Calif. for 'RECOMBINANT ALVEOLAR SURFACTANT PROTEIN' appearing in the Official Gazette of June 26, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,938,794 to Masato Mizutani et al. of Japan for 'CINNOLINE DERIVATIVE, PROCESS FOR PREPARING THE SAME AND HERBICIDAL COMPOSITION CONTAINING THE SAME' appearing in the Official Gazette of July 3, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,940,863 to Hajime Fujita et al., of Japan for 'VACUUM INTERRUPTER CONTACTS AND PROCESS FOR PRODUCING THE SAME' appearing in the Official Gazette of July 10, 1990, should be deleted since no patent was granted."

#### Service by Publication

A petition to cancel the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Merritt Commercial Savings & Loan Association, Baltimore, Md., Reg. No. 1,362,392, for a miscellaneous design mark, Canc. No. 18,232.

John R. Strenger R & D Limited Partnership, Lake Bluff, Ill., Reg. No. 1,325,254, for the mark, "MIST & GROW", Canc. No. 18,420.

Stahl-Urban Company, Brookhaven, Miss., Reg. No. 631,837, for the mark "FORTY BELOW", Canc. No. 18,899.

Hanmee Trading Co., Inc., New York, N.Y., Reg. No. 1,558,075, for the mark "UNICORN" and design, Canc. No. 18,468.

Emotional Outlet, Inc., dba Addictions Boutique, N. Miami Beach, Fla., Reg. No. 1,442,524, for the mark "ADDICTIONS BOUTIQUE", Canc. No. 18,827.

JEAN BROWN  
Administrator of the  
Trademark Trial and  
Appeal Board  
For JEFFREY M. SAMUELS  
Assistant Commissioner for  
Trademarks

#### Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

United Teleplex Corp., Laguna Hills, Calif., Reg. No. 1,495,481, for the mark "DATAMAP", Canc. No. 18,651.  
Environmental Control Systems, Inc., Baltimore, Md., Reg. No. 1,010,824, for the mark "ENVIRONMENTAL CONTROL SYSTEMS", Canc. No. 18,600.

JEAN BROWN  
Administrator of the  
Trademark Trial and  
Appeal Board  
For JEFFREY M. SAMUELS  
Assistant Commissioner for  
Trademarks

#### ADVERSE DECISIONS IN INTERFERENCE

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,228,113, Rene L. E. Van Gasse, PROCESS FOR MAKING OBJECTS FROM MINERAL FILLERS BONDED WITH A THERMOSETTING RESIN, Interference No. 1,101,689, decided July 6, 1990, claims 1-13.

Patent No. 4,480,750, H. Gordon Dancy, BAG CONSTRUCTION, Interference No. 1,101,984, decided March 14, 1990, claims 1-11.

Patent No. 4,499,103, S. Jane DeSolms, BENZOTHAZOLE-2-SULFONAMIDE DERIVATIVES FOR THE TOPICAL TREATMENT OF ELEVATED INTRAOCULAR PRESSURE, Interference No. 101,698, decided February 20, 1990, claims 1-16.

Patent No. 4,505,923, Jacob M. Hoffman, Jr., Otto W. Woltersdorf, Jr., ETHERS OF HYDROXYBENZOTHAZOLE-2-SULFONAMIDE FOR THE TOPICAL TREATMENT OF ELEVATED INTRAOCULAR PRESSURE, Interference No. 101,699, decided February 20, 1990, claims 1-9.

Patent No. 4,525,439, Robert D. Simonton, CONNECTOR APERTURE SEAL FOR A GALVANIC CELL, Interference No. 102,187, decided May 4, 1990, claims 1-9.

Patent No. 4,549,986, Ronald M. Evans, Michael G. Rosenfeld, HUMAN CGRP, Interference No. 101,746, decided January 18, 1990, claims 1-5.

Patent No. 4,562,889, Britt O. Braddick, METHOD AND APPARATUS FOR ROTATING AND RECIPROCATING WELL BORE LINER, Interference No. 101,964, decided January 31, 1990, claims 1-11.

Patent No. 4,603,424, Gerhard Fuchs, Joachim Ehle, Helmut Karcher, Klaus Kimmer, FLUID-COOLED CARRIER MEMBER OF A COMPOSITE ELECTRODE OF AN ELECTRIC ARC FURNACE, Interference No. 102,210, decided May 23, 1990, claims 1-5 and 7-9.

Patent No. 4,630,327, Manfred Schmidt, Hans Trube, Hermann Grimm, SINGLE-ARM WINDSHIELD WIPER FOR MOTOR VEHICLES, Interference No. 101,835, decided March 20, 1990, claims 1-3 and 5-7.

Patent No. 4,661,507, Geoffrey E. Gymer, Kenneth Richardson, ANTIFUNGAL S-ETHERS OF 2-ARYL-3-MERCAPTO-1-(1H-1, 2, 4- TRIAZOL-1-YL) PROPAN-2-OLS AND CORRESPONDING SULFOXIDES AND SULFONES, Interference No. 102,243, decided June 13, 1990, claims 1-9.

Patent No. 4,676,924, Roman Dabrowski, Jerzy Dziaduszek, Jaroslaw Szulc, Zygfryd Witkiewicz, Zofia Stolarz, Krystyna Kenig and, Gabriela Adamska, LIQUID CRYSTALLINE ISO-THIOCYANATES WITH DIOXANE RING AND LIQUID CRYSTALLINE ADMIXTURES CONTAINING SAME, Interference No. 102,348, decided June 25, 1990, claims 1-12.

Patent No. 4,687,307, Toshifumi Ohsawa, INFORMATION READ-IN DEVICE FOR CAMERA, Interference No. 102,335, decided June 26, 1990, claims 9-11.

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Patent No. 4,694,335, Gregory A. Baxes, VIDEO SCRAMBLING SYSTEM WITH LINE TILT CORRECTION, Interference No. 101,849 decided February 13, 1990, claims 1-36.

Patent No. 4,726,889, Jack D. Love, Michael T. Elliott, Patricia L. Morgan, PROCESS AND APPARATUS FOR CONDUCTING ELECTROPHORESIS AND TRANSFER, Interference No. 101,972, decided June 21, 1990, claims 1-26.

Patent No. 4,752,793, Masaharu Kawamura, Yoshihito Harada, Ryuichi Kobayashi, Masayuki Suzuki, Tsunemasa Ohara, Yoichi Tosaka, CAMERA WITH MOTORIZED FILM REWINDING DEVICE, Interference No. 102,247, decided April 23, 1990, claims 1-6 and 11.

Patent No. 4,759,279, Josef Frerich, ROUND BALER HAVING CHAMBER FORMED BY FIXED ROLLS AND EXPANSIBLE BELTS, Interference No. 102,199, decided June 26, 1990, claims 1-4 and 8.

Patent No. 4,774,053, Satoshi Nakagawa, Shuji Kida, Yasuhiko Kawashima, Kosaku Masuda, SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL, Interference No. 102,392, decided June 18, 1990, claims 1-28.

Patent No. 4,795,565, Tsoung Y. Yan, CLEAN UP OF ETHANOLAMINE TO IMPROVE PERFORMANCE AND CONTROL CORROSION OF ETHANOLAMINE UNITS, Interference No. 102,221, decided June 6, 1990, claims 1-13.

Patent No. 4,829,611, Robert Fireman, Gary Shaffield, SOFA BED RECLINER, Interference No. 102,293, decided June 26, 1990, claims 1-4 and 6.

NANNIE B. HENRY, *Deputy Clerk*  
*Board of Patent Appeals and Interferences*

# REGISTRATION TO PRACTICE

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to effect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before September 24, 1990.

Bauer, Robert M., 9004 Taylor Ln., Ft. Washington, Md. 20744  
Freeman, John C., 1226 S. New Wilke Rd., #103, Arlington Hgts., Ill. 60005  
Kefoot, Jean-Therese, 11 Primrose Pl., St. Albert, Alberta, T8N 5G4, Canada  
McDaniel, James R., 24052 Sugar Cane Ln., Gaithersburg, Md., 20882  
Moore, Marvin L., 700 Lynn Cir., S.W., Atlanta, Ga. 30311  
Oen, William L., 3204 Valley Ln., Falls Church, Va. 22044  
Petrakes, John, 9005 LeVelle Dr., Chevy Chase, Md. 20815  
Phillips, Delbert R., 1280 West 1600 North, Provo, Utah 84604  
Schuster, David R., 85 Manor Oak Dr., Amherst, N.Y. 14228  
Scutch, Frank M., III., 841 Brookside, #307, Lansing, Mich. 48917  
Stout, Donald E., 8801 Jarrett Cir., Huntington Beach, Calif. 92647  
Vaas, Randall S., 2430 Glen Echo S.E., Grand Rapids, Mich. 49546  
Wagner, Richard W., 62 Revere Rd., Woburn, Mass. 01801

July 3, 1990

CAMERON WEIFENBACH, *Director*  
*Office of Enrollment and Discipline*

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The following is an update of the status of PTO services for July 1990:

Service Item	FY 1990 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	19
Trademarks	30	68
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	1
Mail Coupons	12	6
Letter Orders	16	16
Electronic Ordering Service (EOS)	11	2
Certified Copies:		
Trademark Registrations	21	29
Applications-As-Filed	17	9
File-Wrapper/Contents	N/A	10
Walk-up Certification	1	1
Patent Application Expedited	5	5
Trademark Search Library:		
Filing Pending Marks	23	45
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	14
Assignments:		
Recording Patent-New Applications	20**	20
Recording Patent-Mail Room Recpts.	20	20
Return Patents-New Applications	34**	42
Return Patents-Mail Room Recpts.	34	39
Recording Trademarks	20	20
Returning Trademark Documents	34	35
Avg. Days from Issue Fee Payment to Issue Date	90-100	91
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	95% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

\* Unless otherwise noted.

\*\* Goal reflects the number of days from the date the filing receipt is mailed.

IMPROVEMENTS TO SERVICES—Days to return assignment documents to customers are now being calculated as an average number of days. Prior to this month, a range of dates for return of documents was given. The change to an average number of days should make it easier to compare to goal.

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•*Unmatched/Unidentified Patent-Related Correspondence*—This notice is to alert all individuals and firms who send application-related correspondence/documents to the PTO of an April 30, 1990, ruling received from the National Archives and Records Administration (NARA) concerning unmatched/unidentified correspondence.

Since January 1, 1989, a rule has been in effect requiring all correspondence directed to the PTO concerning a patent application to include the application number which is comprised of both the series code and the serial number assigned to that application by the PTO (e.g., 07/123,456), or the serial number and filing date. Those papers that do not have this information are returned to the sender if a valid address is available. Those documents with no valid address are retained in an inactive status by the PTO.

Based on the recent ruling by the NARA, those papers which do not contain the application number and which have been in the Office for six months will be destroyed.

August 3, 1990

THERESA A. BRELSFORD  
*Assistant Commissioner*  
*for Administration*

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## PATENT NOTICES

Certificates of Correction For Week of August 28, 1990

### Erratum

In the notice of Certificate of Correction appearing at 1116 OG 61, delete Patent No. 4,826,853, the number was erroneously mentioned and should be deleted.

Re. 32,724	4,837,202	4,855,517	4,867,957
Re. 32,982	4,837,604	4,857,349	4,867,959
3,749,679	4,838,757	4,857,863	4,868,123
4,436,311	4,838,938	4,858,031	4,868,135
4,611,036	4,839,207	4,858,308	4,868,238
4,644,074	4,839,639	4,858,618	4,868,310
4,648,324	4,839,735	4,858,800	4,868,886
4,710,462	4,840,051	4,859,344	4,869,303
4,723,242	4,840,375	4,859,501	4,869,353
4,756,229	4,840,637	4,859,840	4,869,371
4,769,190	4,841,440	4,859,967	4,869,468
4,772,408	4,843,136	4,860,034	4,869,680
4,773,759	4,843,485	4,860,257	4,869,828
4,784,983	4,843,500	4,860,685	4,869,882
4,786,126	4,843,622	4,860,811	4,870,188
4,788,383	4,844,162	4,860,865	4,870,266
4,789,387	4,844,732	4,861,207	4,870,820
4,799,784	4,845,115	4,861,241	4,871,007
4,803,438	4,845,191	4,861,668	4,871,379
4,805,282	4,845,494	4,861,972	4,871,588
4,806,155	4,845,703	4,862,016	4,871,605
4,813,387	4,847,184	4,862,170	4,871,607
4,816,574	4,847,309	4,862,437	4,871,624
4,820,805	4,848,522	4,862,529	4,871,717
4,822,689	4,848,524	4,862,641	4,871,870
4,823,900	4,848,622	4,863,274	4,871,881
4,824,775	4,849,249	4,863,574	4,871,921
4,824,792	4,849,534	4,863,612	4,871,970
4,825,681	4,849,691	4,863,905	4,872,397
4,825,763	4,849,824	4,864,302	4,872,907
4,826,268	4,851,361	4,864,452	4,873,137
4,826,333	4,851,454	4,865,012	4,873,476
4,826,853	4,851,566	4,865,761	4,874,248
4,829,169	4,851,873	4,865,820	4,875,069
4,830,588	4,852,156	4,866,160	4,895,426
4,830,745	4,853,594	4,866,440	4,902,662
4,830,890	4,854,200	4,866,718	4,908,068
4,831,263	4,854,588	4,866,791	4,909,681
4,831,415	4,854,875	4,867,013	4,913,754
4,833,201	4,855,184	4,867,489	
4,834,526	4,855,457	4,867,685	

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AUGUST 28, 1990

U. S. PATENT AND TRADEMARK OFFICE

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## PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner  
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF July 14, 1990

## PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

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GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director .....	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director .....	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director .....	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director .....	4-20-88
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GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director .....	5-5-89

**Expiration of patents:** The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents .....	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents .....	3,370 to 3,384 inclusive

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## REEXAMINATIONS

AUGUST 28, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 4,697,884 (1342nd)**  
**LIQUID CRYSTAL DISPLAY HAVING DEGREE OF  
TWIST AND THICKNESS FOR IMPROVED  
MULTIPLEXING**

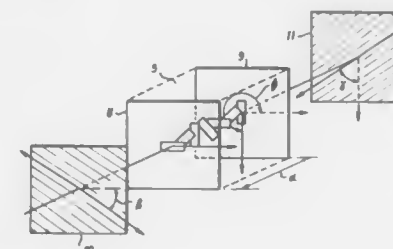
Hermann Amstutz, Mellingen; Dieter Heimgartner, Baden;  
Melnolph Kaufman, Baden-Rüttihof, and Terry J. Scheffer,  
Forch, all of Switzerland, assignors to BBC Brown, Boveri &  
Company Limited, Baden, Switzerland

Reexamination Request No. 90/001,925, Jan. 17, 1990.  
Reexamination Certificate for Patent No. 4,697,884, issued Oct.  
6, 1987, Ser. No. 908,667, Sep. 17, 1986.

Continuation of Ser. No. 626,380, Jun. 29, 1984, Pat. No.  
4,634,229.

Claims priority, application Switzerland, Jul. 12, 1983,  
3819/83; Oct. 28, 1983, 5835/83

Int. Cl.<sup>5</sup> G02F 1/13  
U.S. Cl. 350—334



**AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:**

The patentability of claims 1-15 is confirmed.

1. A multiplexible liquid crystal display comprising:  
front and rear plane-parallel support plates which form a cell  
with inner surfaces and a border;  
a nematic liquid crystal filled into the cell, said nematic  
liquid crystal having positive dielectric anisotropy and a  
chiral additive;  
electrode layers formed on the inner surfaces of the support  
plates;  
orientation layers formed on said electrode layers, which  
orientation layers align adjoining liquid crystal molecules  
in such a way that a local optical axis of the liquid crystal  
at said orientation layers has a tilt angle with respect to the  
plane-parallel support plates;  
polarizer means for polarizing light at least twice between  
entering and leaving the display, including at least a front  
polarizer;  
said support plates separated by a distance less than 10  $\mu\text{m}$ ;  
said liquid crystal exhibiting a total twist angle  $\Phi$  in the cell,  
said total twist having an absolute value which is greater  
than or equal to 180° and smaller than 360°;  
said liquid crystal having a layer thickness (d) and a pitch  
(p), wherein the ratio between layer thickness (d) and  
pitch (p) of the liquid crystal has an absolute value greater  
than or equal to 0.50 and less than or equal to 0.95;  
said front polarizer having a direction of vibration which  
makes an angle with the orientation direction of the front  
orientation layer such that, because of the total twist ( $\Phi$ )  
and the birefringence ( $\Delta n$ ) of the liquid crystal, the origi-  
nally linearly polarized light becomes elliptically polar-  
ized and the contrast ratio optimal;  
multiplexing means for switching of the display with operat-

ing voltages outside any bistable range of the transfer  
characteristic; and  
spacers distributed over the viewing area of the display.

**B1 4,720,332 (1343rd)**  
**NICKEL STRIP FORMULATION**  
Barry W. Coffey, Rte. 10, Box 683, Lenoir, N.C. 28645  
Reexamination Request Nos. 90/001,588, Aug. 29, 1988 and  
90/001,610, Sep. 26, 1988.

Reexamination Certificate for Patent No. 4,720,332, issued Jan.  
19, 1988, Ser. No. 854,309, Apr. 22, 1986.

Int. Cl.<sup>5</sup> C25F 5/00

U.S. Cl. 204—146

**AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:**

The patentability of claims 3-5, 7-8, 10-11 and 13-44 is  
confirmed.

Claims 1-2, 6, 9 and 12 are cancelled.

[1. A nickel stripping composition suitable for use in an  
aqueous electroless stripping bath, said nickel stripping compo-  
sition consisting essentially of:

- (1) a zwitterion,
- (2) an oxidizing agent in the form of a soluble organic nitro  
compound,
- (3) a pH-adjusting compound selected from the group con-  
sisting of a soluble salt that forms an alkaline solution  
when dissolved in water, sodium hydroxide and potassium  
hydroxide, to adjust the stripping solution to an operating  
pH range of 7 to 11, and
- (4) a compound that forms the sulfide ion in solution to act  
as a catalyst in the chemical stripping process.]

**B1 4,789,277 (1344th)**  
**METHOD OF CUTTING USING SILICON CARBIDE  
WHISKER REINFORCED CERAMIC CUTTING TOOLS**  
James F. Rhodes, Greer; Chester J. Dziedzic, Greenville, and  
Ronald L. Beatty, Greer, all of S.C., assignors to Advanced  
Composite Materials, Greer, S.C.

Reexamination Request No. 90/001,813, Jul. 26, 1989.  
Reexamination Certificate for Patent No. 4,789,277, issued Dec.  
6, 1988, Ser. No. 161,410, Feb. 23, 1988.

Int. Cl.<sup>5</sup> B23C 1/00; C04B 35/56

U.S. Cl. 409—131

**AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:**

The patentability of claims 1-5 is confirmed.

1. In a method of cutting metal wherein a cutting tool is  
brought into contact with a metal workpiece and the cutting  
tool and metal workpiece move relative to each other whereby  
metal is removed by the cutting tool from the metal workpiece,  
the improvement comprising using a sintered composite cut-  
ting tool having a matrix consisting essentially of alumina and  
2-40 volume percent silicon carbide whiskers distributed  
therethrough.

2001



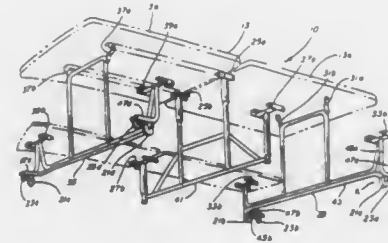
B1 4,819,569 (1345th)  
**MOVABLE TABLE WITH STABILIZING APPARATUS**  
 John M. Bastian, Manitowoc; David C. Pflieger, Two Rivers,  
 and Robert F. Seltz, Manitowoc, all of Wis., assignors to  
 Hamilton Industries, Inc.  
 Reexamination Request No. 90/001,904, Dec. 7, 1989.  
 Reexamination Certificate for Patent No. 4,819,569, issued Apr.  
 11, 1989, Ser. No. 158,204, Feb. 19, 1988.  
 Int. Cl.<sup>5</sup> A47B 3/00  
 U.S. Cl. 108—113

AS A RESULT OF REEXAMINATION, IT HAS BEEN  
 DETERMINED THAT:

The patentability of claims 1-5 is confirmed.

1. A movable table assembly operable between open and closed positions, said assembly comprising: a table top; a rigid leg support assembly subtending said table top and pivotally mounted to said table top, said leg support assembly supporting said table top in an open generally horizontal position and in a closed generally vertical position; primary caster means for engaging and rolling on a supporting surface when said table top is disposed in a closed generally vertical position, said primary caster means subtending said leg support assembly and

mounted to said support assembly; and auxiliary caster means for engaging said supporting surface when said table top is disposed in a closed generally vertical position and said table being to tip over to stabilize said table, said auxiliary caster



means mounted to said leg support assembly and disposed at a predetermined distance above said supporting surface when said table lies in an upright position and a predetermined distance away from said primary caster means.

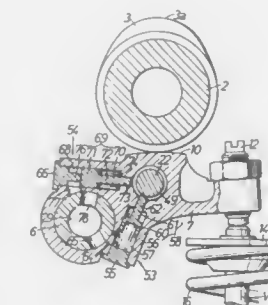
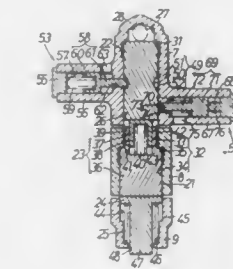
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## REISSUES

AUGUST 28, 1990

Re. 33,310  
**VALVE OPERATING AND INTERRUPTING MECHANISM FOR INTERNAL COMBUSTION ENGINE**  
 Yoshio Ajiki, Saitama, and Shigemasa Kajiwara, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Original No. 4,612,884, dated Sep. 23, 1986, Ser. No. 758,154, Jul. 23, 1985. Application for reissue Sep. 23, 1988, Ser. No. 248,995  
 Claims priority, application Japan, Jul. 24, 1984, 59-153806  
 Int. Cl.<sup>5</sup> F01L 1/34, 1/26  
 U.S. Cl. 123—90.16

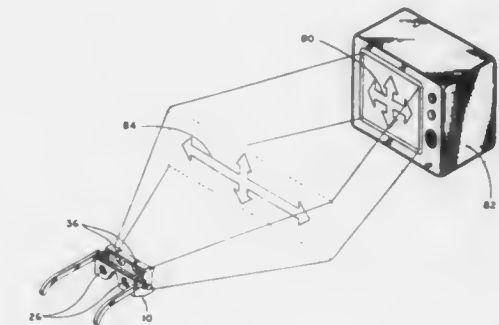
34 Claims



29. A valve operating mechanism for an internal combustion engine having at least one intake valve or exhaust valve for a cylinder, comprising, a camshaft having at least two cams of different profiles thereon for the cylinder, a rocker arm shaft having at least a pair of rocker arms pivotally mounted thereon in adjacent relationship, at least one of said rocker arms engaging the valve for that cylinder, each of said pair of rocker arms engaging a respective one of said cams, and piston means operably associated with said rocker arms selectively shiftable by oil pressure between a position connecting said at least a pair of rocker arms for pivotal movement in unison and a position disconnecting said at least a pair of rocker arms for independent movement, a high speed cam engaging one rocker arm of said at least a pair of rocker arms for operating said valve in a high speed mode when said at least a pair of rocker arms are connected for movement in unison, and a low speed cam engaging the other rocker arm of said at least a pair of rocker arms which said other rocker arm engages said valve for operating said valve in a low speed mode when said at least a pair of rocker arms are disconnected for independent movement.

Re. 33,311  
**BINOCULAR EYEGLASSES FOR IMAGE MAGNIFICATION**  
 Vaughn D. Wilkins, 19163 Olympia St., Northridge, Calif. 91326  
 Original No. 4,637,696, dated Jan. 20, 1987, Ser. No. 809,495, Dec. 16, 1985. Application for reissue Feb. 12, 1988, Ser. No. 155,474  
 Int. Cl.<sup>5</sup> G02C 7/08, 1/00  
 U.S. Cl. 351—41

12 Claims



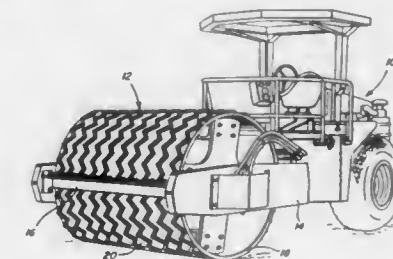
11. A system for broadcasting and viewing television images, comprising:

image means for displaying an image for viewing, wherein the image displayed by said image means comprises an image reduced from the normal state in the horizontal plane; and binocular eyeglasses for use in viewing the displayed image, said eyeglasses comprising a frame including means for supporting a pair of anamorphic eyepiece lenses and further including means for supporting a pair of anamorphic objective lenses in respective optical alignment with said eyepiece lenses, said anamorphic eyepiece and objective lenses being oriented for magnifying the image in the horizontal plane when said image is viewed through said lenses.

Re. 33,312  
**VIBRATORY ROLLER WITH AXIALLY SPACED ZIG ZAG IMPACT BARS AND WIRE ROPE CLEANERS**  
 Robert B. Elliot, Pond Reef Rd., Ketchikan, Ak. 99928  
 Original No. 4,523,873, dated Jun. 18, 1985, Ser. No. 524,154, Aug. 16, 1983. Application for reissue Jun. 17, 1987, Ser. No. 63,090

Int. Cl.<sup>5</sup> E01C 19/28, 19/26  
 U.S. Cl. 404—124

10 Claims



6. An apparatus suitable for use with a compaction vehicle of the type employed to compact the surface of a roadbed, the compaction

vehicle including a frame portion with a journal structure adapted to receive a compaction roller, said apparatus comprising:  
a roller attachable to the journal structure of the compacting vehicle frame portion, said roller acting to roll over the surface of the roadbed when the compaction vehicle is in operation;

means for vibrating said roller;

a cylindrical outer face structure disposed around said roller; and

a plurality of lug bands positioned on said cylindrical outer face structure to contact the roadbed surface as said roller rolls along the roadbed during operation of the compaction vehicle, each said lug band exhibiting an outer surface disposed over a circumferential zone on said outer face structure and separated from the outer surfaces of adjacent lug bands by distances which, at preselected points along said lug band, are greater than the distance across said outer surface, said outer surfaces of said plurality of lug bands operating simultaneously to contact the roadbed surface over a collective contact area of substantially less dimension than the entire area across said outer face structure, each said lug band further following along a path which alternates back and forth in substantially continuous fashion around said circumferential zone to promote breakage of rocks and solids and floating of fines in the roadbed in response to the transmission of vibrational forces from the roller through said collective contact area to the roadbed.

9. A method for breaking up surface rocks and solids in a roadbed during compacting and for distributing the resulting fines at the top surface of the roadbed, said method comprising the steps of applying vibratory force to a predetermined area of the roadbed surface in continuous fashion along a plurality of path each of which alternates back and forth in substantially continuous fashion within a predetermined zone of said predetermined area, the distance across each of said paths being substantially less than the distance between each of said paths such that the combined surface area of the plurality of alternating paths is less than said predetermined area of the roadbed surface.

Re. 33,313

METHOD FOR MAKING LOW ALPHA COUNT LEAD  
John A. Dunlop, Veradale, Wash.; Robert W. Smyth, and Gerald W. Toop, both of Trail, Canada, assignors to Cominco Ltd., Vancouver, Canada  
Original No. 4,770,698, dated Sep. 13, 1988, Ser. No. 98,853, Sep. 21, 1987. Application for reissue Sep. 12, 1989, Ser. No. 406,063

Int. Cl.<sup>5</sup> C22B 13/02, 15/00; B03B 5/00

U.S. Cl. 75—77

10 Claims

1. A method for the production of lead with a low emission of alpha particles which comprises the steps of selecting an orebody containing lead mineral in a coarsely-disseminated form substantially free of impurities, and in a host rock together with associated minerals and relatively low in alpha emitters; mining said ore body to produce a mined ore; milling said mined ore to form ground ore having particle sizes such that separation of lead mineral from said host rock and associated minerals can be effected; forming a fluid suspension of said ground ore; subjecting said suspension to a gravity separation to remove said host rock and associated minerals from said lead mineral; recovering said lead mineral as a lead concentrate; subjecting said concentrate to a reduction [with a reducing agent having no or a low emission of alpha particles to form molten lead;] without the introduction of alpha emitters; and recovering lead having an alpha count of 0.02 particles per cm<sup>2</sup> per hour or less from said reduction.

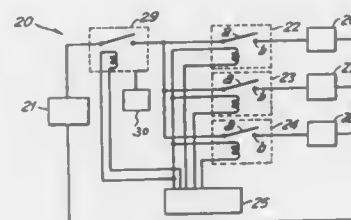
Re. 33,314  
VENDING MACHINE POWER SWITCHING  
APPARATUS

John C. Cowles, Bensalem, Pa., assignor to Mars Incorporated, McLean, Va.  
Original No. 4,604,557, dated Aug. 5, 1986, Ser. No. 659,385, Oct. 10, 1984. Application for reissue Jul. 7, 1987, Ser. No. 71,993

Int. Cl.<sup>5</sup> H02P 7/74

U.S. Cl. 318—98

24 Claims



12. An improved vending machine power switching apparatus comprising:

a plurality of individually selectable loads;

a plurality of load switch means each connectable in a separate series circuit with an associated load to define a plurality of separate series circuits;

means connecting said separate series circuits in a parallel circuit with one another to define a loading circuit;

a controllable power switching means connected in series with said loading circuit, whereby each of said load switch means is connected in a separate series circuit with said power switching means; and

control means for controlling the actuation and deactuation of said power switching means and of said plurality of load switch means, said control means effecting actuation and de-actuation of said load switch means only when the power switching means is in a de-actuated condition.

Re. 33,315

WHOLLY AROMATIC MESOMORPHIC POLYESTER AMIDE IMIDES AND THE PREPARATION THEREOF  
Bernd Hisgen, Limburgerhof; Michael Portugall, Wachenheim, and Rolf Steinberger, Schifferstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Original No. 4,788,272, dated Nov. 29, 1988, Ser. No. 938,057, Dec. 4, 1986. Application for reissue Jun. 9, 1989, Ser. No. 364,198

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542796

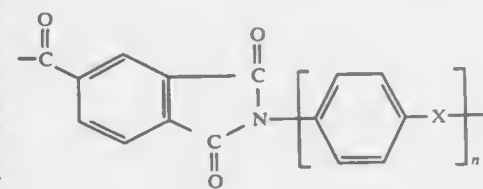
Int. Cl.<sup>5</sup> C06G 73/16

U.S. Cl. 528—170

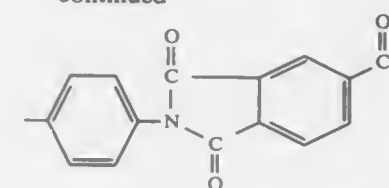
19 Claims

1. A wholly aromatic mesomorphic polyester amide imide which forms a liquid-crystalline fiber-forming melt below 320° C., composed of

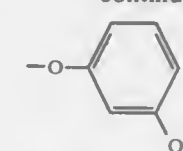
(a) from 5 to 35 mole % of repeat units of the formula I or II or mixtures thereof



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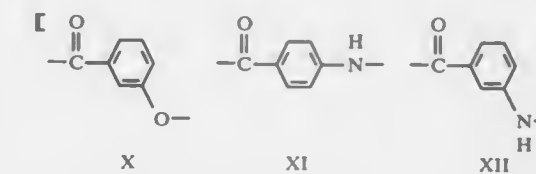
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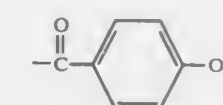
VIII

IX

II [from 5 to 25 mole % of repeat units of the formula X, XI or XII or mixtures thereof:]



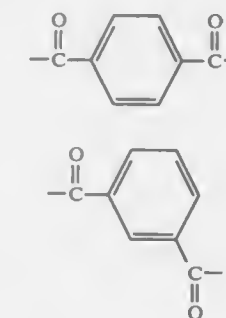
and  
(e) repeat units of the formula XIII



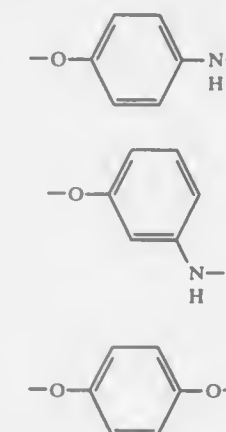
XIII

where the Xs in the formulae I and II are identical or different and each is —O—, —S—, —SO<sub>2</sub>—, —CO—, —CH<sub>2</sub>— or —C(CH<sub>3</sub>)<sub>2</sub>— and n is 0 or 1,

(b) from 0 to 30 mole % of repeat units of the [formulae] formula III or IV or mixtures thereof



(c) a molar amount corresponding to the total amount of components [a] (a) and [b] (b) of repeat units of the [formulae] formula V, VI, VII, VIII or IX or mixtures thereof, with the stipulation that a molar quantity greater than zero of V, VI or mixtures thereof must be present at all times



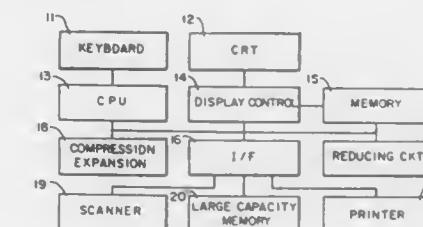
Re. 33,316  
APPARATUS FOR CATALOGING AND RETRIEVING  
IMAGE DATA

Yuji Katsuta, Sumio Kita, and Sakuharu Takano, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Original No. 4,829,453, dated May 9, 1989, Ser. No. 21,963, Mar. 5, 1987. Application for reissue Jul. 10, 1989, Ser. No. 377,122

Claims priority, application Japan, Mar. 18, 1986, 61-61585; Mar. 18, 1986, 61-61586; Oct. 17, 1986, 61-247869  
Int. Cl.<sup>5</sup> G06F 15/66

U.S. Cl. 364—521

10 Claims



1. An apparatus for cataloging and retrieving image data obtained by converting scannable documents into image signals, comprising

memory means for storing image data, search data for searching image data stored in said memory means and reduced image data obtainable by thinning image data stored in said memory means, display means, input means including a search key which can be operated and released for entering a search command, and



control means programmed to check whether said search key is operated, to sequentially display on said display means reduced image data from said memory means while said search key is operated, and to display particular image data from said memory means when said search key is released, said particular image data corresponding to the reduced image data being displayed on said display means when said search key is released.

Re. 33,317  
**ROBOTIC GRIPPER**  
 Lawrence F. Yuda, P.O. Box 176, Westminster, S.C. 29693  
 Original No. 4,566,727, dated Jan. 28, 1986, Ser. No. 672,861, Nov. 19, 1984. Continuation of Ser. No. 892,921, Aug. 4, 1986, abandoned, which is a continuation of Ser. No. 472,714, Mar. 7, 1983, abandoned. Application for reissue Jun. 25, 1988, Ser. No. 223,687

U.S. Cl. 294—88 Int. Cl.<sup>5</sup> B25J 15/08

2 Claims

2. A robotic gripper having a cylinder within a housing containing a fluid actuator supplying a limited axial power stroke to a clevis bracket carried within a reduced portion of the housing comprising:

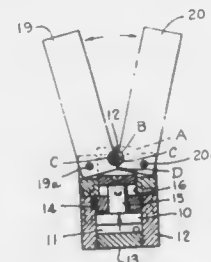
a transverse cylindrical bushing carried within said clevis bracket;

said cylindrical bushing having a shaft extending from each end and being journaled within said clevis bracket;

a pair of opposed fingers each pivotally mounted adjacent one end thereof within said housing on opposite sides of said bushing about spaced respective pivot points;

said fingers having opposed surfaces each having an arcuate

recess therein substantially entirely conforming to and receiving said bushing; and a relieved portion on each of said fingers carried within said housing beginning along the edges of said arcuate recesses closest to said fluid actuator and continuing outwardly such that outward movement of said fingers is permitted through a full power stroke of said fluid actuator; and said bushing and said pivot points being in substantial alignment when said fingers are approaching closed position; and



said spaced respective pivot points on opposite sides of the bushing being spaced past alignment with a midpoint of the bushing in a direction away from the relieved portion of each of said fingers when said fingers are in a closed position permitting further forceful movement of the bushing beyond the pivot points providing forceful engagement of opposed surfaces between the fingers;

whereby overgripping of the fingers is provided.

## PLANT PATENTS

GRANTED AUGUST 28, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,306  
**SPRAY CARNATION NAMED LONDISKRA**  
 Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Laboratoire de Physiologie Vegetale, La Londe-Les-Maures, France  
 Filed Oct. 11, 1988, Ser. No. 266,131  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. The new and distinct spray carnation plant, substantially as herein shown and described, characterized in particular by its substantially all white flower petals, each of which is edged in red, and the recurrent and profuse production of flowers during the Spring, midseason and Fall blooming seasons.

7,307  
**CARNATION NAMED DIGISUN**  
 Antonio DiGiorgio, and Renato DiGiorgio, both of San Remo, Italy, assignors to Laboratoire de Physiologie Vegetale, La Londe-Les-Maures, France  
 Filed Dec. 21, 1988, Ser. No. 294,518  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. The new and distinctive carnation cultivar substantially as herein shown and described, particularly characterized by the very large size of its light yellow colored blooms which have numerous petals with light red striae, the flowers being produced profusely at recurrent periods during the blooming season on long, strong and erect stems having moderately abundant foliage.

7,308  
**POINSETTIA PLANT 127**  
 Franz Fruehwirth, Encinitas, Calif., assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.  
 Filed Oct. 27, 1988, Ser. No. 263,492  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its stable and uniform bract coloration of light pink flecks on dark red bracts.

7,309  
**POINSETTIA PLANT '7-81'**  
 Franz Fruehwirth, Encinitas, Calif., assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.  
 Filed Oct. 27, 1988, Ser. No. 263,495  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its bicolored, pink on white bracts.

7,310  
**POINSETTIA PLANT '15-84'**  
 Wilhelm Neuhaus, Duisburg, Fed. Rep. of Germany, assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.  
 Filed Nov. 3, 1988, Ser. No. 266,902  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its large, pink flower bracts and vigorous, self-branching growth characteristics.

7,311  
**ASPARAGUS PLANT**  
 J. Howard Ellison, Milltown, and John J. Kinelski, Princeton, both of N.J., assignors to Rutgers University, New Brunswick, N.J.  
 Filed Aug. 11, 1989, Ser. No. 392,421  
 Int. Cl.<sup>5</sup> A01H 5/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct cloned variety of female Asparagus plant substantially as shown and described, characterized particularly as to novelty by the outstanding vigor and rust tolerance, yield of high proportion of large "jumbo" spears, which weight nearly twice as much as medium spears of varieties which produce only 30-40% jumbo spears, ability to maintain good plant stand and vigor under conditions which usually result in serious crown rot, and consistently maintaining these desirable characteristics over large quantities of Asparagus plants.

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## PATENTS

GRANTED AUG. 28, 1990

### ERRATA

For CLASS	See PATENT NO.
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192-070 .....	4,951,553
105-340 .....	4,951,560
409-136 .....	4,951,578
123-494 .....	4,951,647
175-004 .....	4,951,744
187-001 .....	4,951,786
182-121 .....	4,951,787
180-219 .....	4,951,791
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215-250 .....	4,951,845
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296-095 .....	4,952,007
296-097 .....	4,952,008
296-181 .....	4,952,009
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361-417 .....	4,950,061
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424-088 .....	4,952,569
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530-350 .....	4,952,682
548-416 .....	4,802,710
522-099 .....	4,952,711



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219-069 .....	4,952,790
358-148 .....	4,952,952
358-322 .....	4,952,958
357-015 .....	4,952,984
382-050 .....	4,953,114
360-077 .....	4,953,161
372-021 .....	4,953,166

## PATENTS

GRANTED AUGUST 28, 1990

## GENERAL AND MECHANICAL

4,951,316

## SUN VISOR WITH EYESHIELD AND METHOD THEREFOR

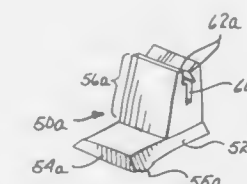
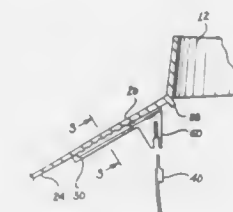
Monty L. Moody, 2720 N. 68th St., Suite 5-499, Scottsdale, Ariz. 85257

Filed Aug. 7, 1989, Ser. No. 390,414

Int. Cl.<sup>5</sup> A42B 1/20, 1/24

U.S. Cl. 2—10

1 Claim



1. An improved sun visor with eyeshield, comprising in combination:

a sun visor having an integral dovetailed channel with a plurality of grooves enclosed therein, said dovetailed channel having an opening at one end;  
 an eyeshield having a slot; and  
 means, for coupling said eyeshield to said visor, having a dovetailed, top portion having a rigid detent means, disposed along an edge of said top portion, for positively engaging said grooves and a bottom portion having snap lock means comprising two prongs, separated by a distance slightly less than the thickness of said eyeshield, for snap locking onto said slot of said eyeshield.

4,951,317

## ATHLETIC SLEEVE FOR PROTECTING LIMBS

Alfred H. Gray, 29361 Lower Valley Rd., Tehachapl, Calif. 93561, and Rose A. Vaughn, Star Rte. 3, Box 4500-16, Bear Valley Springs, Calif. 93561

Filed Apr. 10, 1989, Ser. No. 335,855

Int. Cl.<sup>5</sup> A41D 13/08

U.S. Cl. 2—16

2 Claims

1. An athletic arm sleeve conformed for rapid mounting and removal from the forearm and elbow of a person, comprising:  
 a generally frusto conical fabric enclosure defined by an upper and a lower edge, said upper edge being larger in circumference than said lower edge;  
 a resilient, elastomeric band fixed to said enclosure proximate said upper edge;  
 a first set of mating hook and pile fastener tabs fixed to the exterior of said enclosure proximate said upper edge, said tabs of said first set being spaced relative each other whereby the circumference of said enclosure is shortened by folding said fabric to effect mating engagement of said first set of tabs, to expand said elastomeric band;  
 a second set of mating hook and pile fastener tabs fixed to the exterior of said enclosure proximate said lower edge, said tabs of said second set being spaced relative each other whereby the circumference of said enclosure is shortened

by folding said fabric to effect mating engagement of said second set of tabs; and



a colored circumferential stripe fixed to the exterior of the enclosure proximate said upper edge for providing a visual indicating thereof and for providing an alignment index for the mating of said first set of tabs.

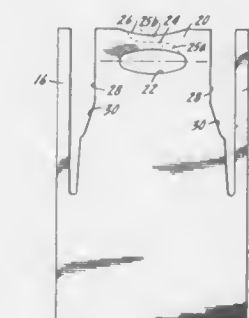
4,951,318

PROTECTIVE GOWN WITH INTEGRAL TIE STRAPS  
 Donald R. Harreld, Woodstock, and John J. Newton, Jr., Palatine, both of Ill., assignors to Sage Products, Inc., Cary, Ill.  
 Continuation of Ser. No. 270,246, Nov. 14, 1988, abandoned.  
 This application Feb. 1, 1990, Ser. No. 473,100

Int. Cl.<sup>5</sup> A41B 13/10

U.S. Cl. 2—49 R

9 Claims



1. A disposable protective gown comprising  
 a. a body portion having an upper part formed to extend over the shoulders of the wearer of the gown, said upper part having a central head aperture shaped to accommodate a wearer's head passing therethrough without severing of any portion of said upper part,  
 b. a pair of sleeves extending outwardly from opposite sides of and secured at one end to said upper part, and  
 c. means forming a pair of integral neck tie straps in said upper part, including a severable score in said upper part extending outwardly at an oblique angle from said head aperture and defining said tie straps on opposite sides of said score, said score being normally unsevered.

4,951,319

## COLD WEATHER HAT

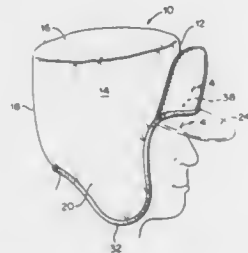
James G. Phillips, Jr., Pleasant Grove, Utah; James M. Clanton, Camp Hill, Ala.; Jerry W. Green, Alexander City, Ala., and Jimmy L. Haett, Alexander City, Ala., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 76,011, Jul. 21, 1987. This application Mar. 31, 1989, Ser. No. 331,370

Int. Cl.<sup>3</sup> A42B 1/00

U.S. Cl. 2—171

25 Claims



1. Headwear for cold weather environments comprising: a hat for substantially enclosing the head of an individual and including a hat body having top, side, front and back portions, said side portions including ear flaps for covering the individual's ears; said front portion extending downwardly from said top portion to overlie at least a portion of an individual's forehead and terminating in a lower edge, said ear flaps being movable between a first position overlying the individual's ears and a second position extending upwardly generally parallel to the side portions of the hat for exposing the individual's ears, said ear flaps in said first position having forward edges joining with said front portion edge to outline top and side portions of an individual's face with said forward edges of said ear flaps lying naturally in close fitting conformance and generally inwardly directed toward one another to and about the individual's face and throughout their lengths, the body of said hat being formed of an interior lining, an intermediate layer of primarily open-cell foam material, and an outer fabric layer, said interior lining and said outer layer being stitched to naturally curve said ear flaps inwardly when in said first position, to naturally conform to the downwardly and inwardly curved side portions of the individual's face, and a bill projecting from the lower edge of said front portion and movable between a first lowered position projecting generally forwardly of said hat and a second raised position projecting generally upwardly of said hat and generally conformal to said front hat portion, said front hat portion being formed in a natural shape with a predetermined radius approximating the average radius of an individual's forehead, said bill being secured to said front hat portion along a seam having a radius greater than the radius of said front hat portion whereby substantially no pressure is exerted against the forehead of an individual wearing the headwear.

4,951,320

## INNER RIM OF A CAP

Cheong-Sook Yoon, Jugong Apt. 120-101, Kajwa-dong, Buk-ku, Inchin-City, Rep. of Korea

Continuation of Ser. No. 832,679, Feb. 25, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 290,871

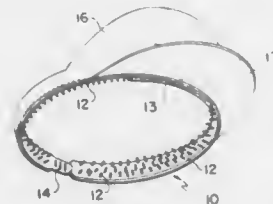
Int. Cl.<sup>3</sup> A42B 1/00

U.S. Cl. 2—181.2

7 Claims

1. An inner rim of a cap comprising a band having parallel inner and outer surfaces and a forehead portion, a plurality of spaced scalp massaging rigid projecting mem-

bers extending from said inner surface of said band only at locations other than said forehead portion, said plurality of rigid projecting members being disposed in rows which are arranged longitudinally along said band, said rows being staggered relative to each other for preventing the hairs from being contacted directly by said band, whereby said scalp massaging rigid projecting members provide a therapeutic effect on the scalp by direct massaging caused by the contact made by said rigid projecting members with the scalp, said spaced rigid projecting members providing for the passage of some air therebetween for ventilation purposes,



a forehead supported disposed at said forehead portion on said inner surface of said band, said forehead supporter having a single continuous inner surface for engagement with a forehead of a human body and a single continuous outer surface parallel to said continuous inner surface, said continuous outer surface of said forehead supporter being parallel to said inner surface of said band and attached directly thereto, and fastener means for forming said band into a substantially circular form whereby said band may be worn upon a human head.

4,951,321

## NOVELTY UNDERGARMENT

James D. Mortensen, and Theresa L. Mortensen, both of 10326 Karmont Ave., Southgate, Calif. 90280

Filed Apr. 25, 1989, Ser. No. 343,836

Int. Cl.<sup>3</sup> A41B 9/04

U.S. Cl. 2—408

1 Claim



1. A novelty undergarment organization comprising, a torso supported undergarment defined by a continuous waistband overlying a continuous elastomeric band with a left downwardly depending leg component oriented adjacent a right downwardly depending leg component, and a rear opening formed with the band and overlying the left and right leg component including a removably mounted rear cup-shaped panel removably overlying the rear opening, and a forward opening formed within a forward section of the band overlying forward portions of the right and left leg components including a removably mounted cup-shaped panel selectively secured overlying the forward opening, and wherein the forward and rear openings are symmetrically arranged about a plane bisecting the waistband wherein the plane is formed medially of the waistband and oriented between the right and left leg components, and wherein the forward opening includes a forward continuous hook and loop fastener strip arranged about the forward opening adjacent a forward edge defining the forward

opening, and wherein the forward panel is of a complementary configuration to the forward opening and includes a continuous forward panel hook and loop fastener strip arranged adjacent an exterior edge of the forward opening to selectively cooperate with the forward opening hook and loop fastener strip, and wherein the forward opening is defined by a rectangular upper section communicating with a downwardly tapering lower section terminating between the left and right leg components, and wherein the left and right downwardly depending leg components are each defined by a lower horizontal edge wherein each of the horizontal edges are aligned with one another, and wherein the rear opening is of a "D" shaped configuration, and wherein the rear panel is of a "D" shaped configuration complementary to that defined by the rear opening, and further including a continuous rear opening hook and loop fastener strip continuously formed adjacent a rear edge defining the rear opening, and the rear panel includes a rear panel hook and loop fastener strip continuously formed about the rear panel adjacent an exterior edge of the rear panel to cooperate with the rear opening hook and loop fastener strip.

4,951,322

## DETACHABLE MONO-GLASS SPORTS GOGGLES

David J. T. Lin, No. 2, Alley 24, Lane 9, Sec. 1 Nei Hu Road, Taipei, Taiwan

Filed Sep. 27, 1989, Ser. No. 413,036

Int. Cl.<sup>3</sup> A61F 9/02; G02C 5/02, 5/12

U.S. Cl. 2—439

3 Claims



1. A detachable mono-glass sports goggles, including: a curved rod-like spectacle frame having a hole made thereon in the center; two bows respectively connected to said spectacle frame at both ends by means of screws; a unitary glass having a hole made thereon at a position opposite to the hole of said spectacle frame; and a nose piece comprising a split pin unitarily made thereon at the back side at an upper position for insertion through the hole of said unitary glass into the hole of said spectacle frame to allow said unitary glass to be firmly and detachably attached to said spectacle frame.

4,951,323

## AUTOMATIC SEAT LIFTING DEVICE FOR WATER CLOSETS

Levin Shalom, 8/9 Simtat Rodan, Halfa 35590, Israel

Filed Sep. 19, 1989, Ser. No. 409,235

Claims priority, application Israel, Nov. 25, 1988, 88486

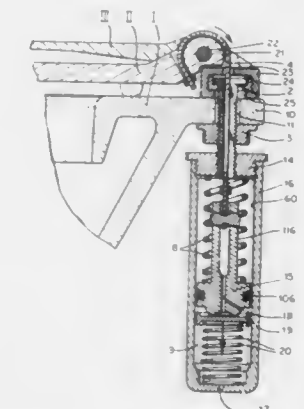
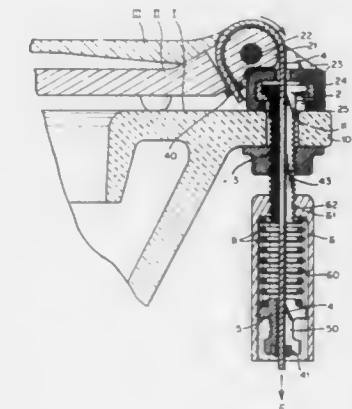
Int. Cl.<sup>3</sup> A47K 13/10

U.S. Cl. 4—251

6 Claims

1. A device for automatically lifting a toilet seat off a toilet bowl, said bowl containing said seat and a cover on top of said seat, wherein said seat is provided with two hubs in its rear

portion pivotally mounted on horizontal axles, and wherein said toilet bowl is provided with a rearwardly extending horizontal ledge perforated by at least two vertical holes serving for firmly attaching said axles to said bowl by means of suitably formed brackets and two screw-threaded bolts and nuts clamping each said bracket to said ledge, said device comprising: a perforation extending through the entire length of at least one of said screw-threaded bolts, a flexible core of cable fastened at its upper end to at least one side of said seat in front of said hub and extending along the upper surface of said hub to the rear and through said perforation in said at least one screw-threaded bolt and terminating at a predetermined distance from the underside of said ledge,



a bobbin fastened to the bottom end of said cord or cable in axial alignment, a plug provided with axial internal screw thread movably mounted on the lower protruding portion of said at least one screw-threaded bolt, a helical spring inserted into the space between said plug and said bobbin and tensioned by suitably adjusting the distance between said plug and said bobbin by rotation of said plug on said at least one screw-threaded bolt, tension of said spring being defined by a moment exerted by said cord or cable on said hub and said seat which is sufficient to lift said seat off said bowl whenever said cover is in an open position, and which is insufficient to lift both said seat and said cover in a closed state.



4,951,324

## TOILET SEAT AND LID LIFTER

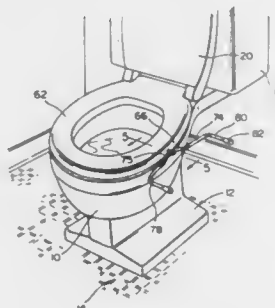
Hewitt P. Lirette, Rte. 2, Box 678, Chauvin, La. 70344

Continuation-in-part of Ser. No. 146,474, Jan. 21, 1988, abandoned. This application May 26, 1989, Ser. No. 357,292

Int. Cl.<sup>5</sup> A47K 13/10

U.S. Cl. 4—251

17 Claims



11. In combination with a toilet seat pivotally supported from the top portion of a commode bowl, a handle structure mounted on said seat for manually lifting the seat to an elevated position, said handle structure including an elongated rigid member, said elongated member having a laterally extending member at each end thereof and extending to the same side of the elongated member, and means intermediate the ends of said elongated member for pivotally supporting the elongated member from said seat with the elongated member positioned alongside the seat and oriented generally horizontally with one laterally extending member being oriented in position for engagement by the knee of a person facing the commode bowl whereby inward movement of the knee moving said one laterally extending member downwardly and inwardly while the other laterally extending member will be caused to move upwardly and outwardly to serve as a handle for manual grasping and exerting upward force thereon to lift the seat.

4,951,325

## TOILET SEAT RETURN DEVICE

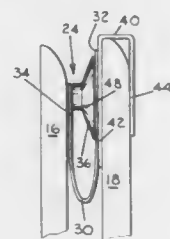
Newton G. Tack, 202 Three Degree Rd., Butler, Pa. 16001

Filed Dec. 22, 1989, Ser. No. 455,089

Int. Cl.<sup>5</sup> A47K 13/10

U.S. Cl. 4—251

14 Claims



1. For a toilet having a hinged seat and lid, a device for automatically starting the seat to pivot from its upright position toward its horizontal position, comprising:  
a base having securement means for mounting it against the undersurface of the lid;  
energy-storing means, including a movable member having a projecting end which in a first position is spaced from the base, for actuation as a function of manually raising the seat to its upright position, to cause it to store energy;  
time-delay releasable latching means in operative connection with the energy-storage means for delaying the release of the energy stored by the energy-storage means; and  
the releasable latching means being adapted to retain the

projected end of the movable member in a second position closer to the base than the first position and allow release of the stored energy which biases the movable member against the seat upon lapse of the time-delay and cause the seat to pivot from the upright to the horizontal position.

4,951,326

## RETURN FITTING WITH RELEASABLE CAP

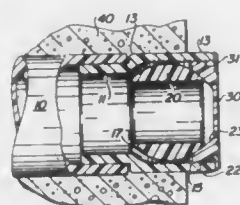
Steven R. Barnes, and Lester R. Mathews, both of Phoenix, Ariz., assignors to Caretaker Systems, Inc., Scottsdale, Ariz.

Filed Feb. 6, 1990, Ser. No. 475,909

Int. Cl.<sup>5</sup> E04H 3/18; F16L 35/00

U.S. Cl. 4—494

21 Claims



1. An improvement in spa and pool return fittings having a water discharge pipe portion with an open end, said improvement including in combination:

a retaining ring, with first and second ends, constructed for telescoping movement of the first end thereof into the inside of the open end of a water discharge pipe portion;  
a cover cap releasably attached to the second end of said retaining ring, said cap having an outer flange portion dimensioned to overlie, contact, and cover the open end of a water discharge pipe portion, with said retaining ring telescoped into the open end of such water discharge pipe portion a first predetermined distance; and  
means for effecting release of said cover cap when said retaining ring is moved into said water discharge pipe portion a second predetermined distance which is greater than said first predetermined distance.

4,951,327

## POOL COVER SUPPORT SYSTEM

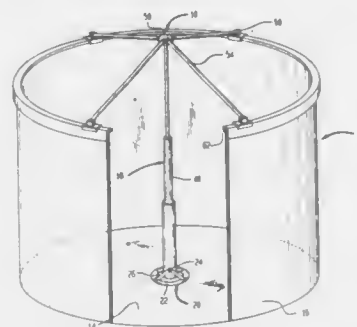
Vito J. Del Gorio, Sr., 318 Bryant Ave., Staten Island, N.Y. 10306

Continuation-in-part of Ser. No. 213,114, Jun. 29, 1988. This application Nov. 28, 1988, Ser. No. 276,693

Int. Cl.<sup>5</sup> E04H 3/19

U.S. Cl. 4—498

16 Claims



1. A pool cover support system for supporting a pool cover over the surface of a pool, the pool having a bottom surface and an outer side, said system comprising:  
a first central support member, having a bottom adapted to engage the bottom surface of the pool and a top, the

distance from said bottom of said first central support member to said top thereof being greater than a distance from the bottom surface of the pool to the top of the side of the pool;

a center joint, having engaging means to engage said top of said first central support member, and also having a plurality of first receiving means;  
a plurality of side braces, each of said side braces including means for engaging the side of the pool, and a second receiving means; and  
a plurality of support arms, each of said support arms having a first end adapted to engage a respective first receiving means in said center joint and a respective second receiving means in a respective one of said plurality of side braces;

whereby said support arms may be deployed radially about said first central support member, and may extend from said first central support member about the entire periphery of the pool, so that a pool cover may be arranged thereon above the surface of the pool.

4,951,328

## SWIVEL OPEN BOTTOM SEAT ASSEMBLY FOR INVALIDS

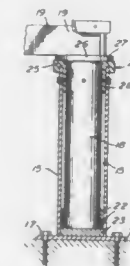
Alfred Potvin, Montreal, Canada, assignor to Promed Inc., Montreal, Canada

Filed Dec. 22, 1988, Ser. No. 288,222

Int. Cl.<sup>5</sup> A47K 3/12

U.S. Cl. 4—560

14 Claims



1. A swivel apertured toilet seat assembly for invalids, said assembly comprising a cylinder of circular cross-section having an attachment base for securement to a floor adjacent a facility, a pivot rod disposed concentrically in said cylinder for axial rotation therewith, and one or more spacer sleeves intermediate said pivot rod and an inner wall of said cylinder to provide for axial rotation of said pivot rod in said cylinder, an apertured toilet seat having a connecting arm extending therefrom and connected to said pivot rod to provide for said seat to be displaced on an arc relative to a central vertical axis of said rod to position said seat from an embarking position to a position of use and an annular support bushing disposed about an open top end of said cylinder, said connecting arm being secured to a top end of said pivot rod and having a seating annular flange at said top end of said pivot rod for seating engagement on a low friction annular top wall of said support bushing.

4,951,329

## CHILD'S PLAY SHOWER

Robert W. Shaw, Piscataway, N.J., assignor to Century Products Company, Macedonia, Ohio

Filed Sep. 14, 1988, Ser. No. 239,674

Int. Cl.<sup>5</sup> A47K 3/22

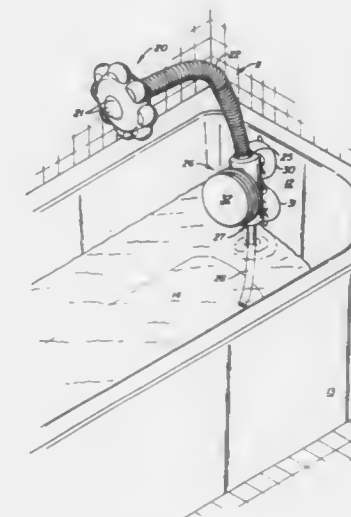
U.S. Cl. 4—568

3 Claims

1. A hand-operated child's play shower comprising:  
a length of outlet tubing terminating at one end in a shower head of decorative and amusing shape, said outlet tubing

being of corrugated plastic that is flexible and self-supporting;

a squeeze pump having a pair of suction cups and a bellows on opposite sides of said pump, said pump further having aligned inlet and outlet ports, said outlet port joined to the other end of said outlet tubing, said squeeze pump further having check valve means constructed and arranged



therein to cause ejection of fluid out of said pump through said outlet port when said bellows is squeezed and draw fluid into said pump through said inlet port when said bellows is released; and

a length of intake tubing affixed to said inlet port and adapted to extend into a container of water when said pair of suction cups are vertically aligned and attached to the side of said container above said water.

4,951,330

## KNOCK-DOWN CRIB CONSTRUCTION WHEREIN NO TOOLS OR EXTRANEEOUS FASTENINGS ARE NEEDED

Benjamin K. Burnham, Merrimack, N.H., assignor to Gem Industries, Inc., Gardner, Mass.

Filed Jun. 30, 1989, Ser. No. 374,184

Int. Cl.<sup>5</sup> A47D 7/00

U.S. Cl. 5—93 R

2 Claims



1. A crib construction comprising end walls, side walls, and interconnections therefor, and a mattress support frame, said

frame including end extending elements to hold the frame in the crib,

- a vertical slide guide for each corner of the frame, said guides being located on the end walls in vertical position, edge grooves on each guide, and a plurality of openings in each guide, said openings being mutually vertically spaced and including a void behind and below each opening;
- a bracket for each guide, each bracket having side elements received in the grooves, a pivoted spring biased hook on each bracket, the hook being continually urged toward the openings and automatically entering the openings when aligned therewith, the hook having an end portion entering the void by gravity and the hook being released from the guide manually;
- an aperture in each bracket to receive the respective end extending element to support the frame in vertically adjusted position in the crib.

4,951,331

**CRIB MATTRESS PATTING DEVICE**

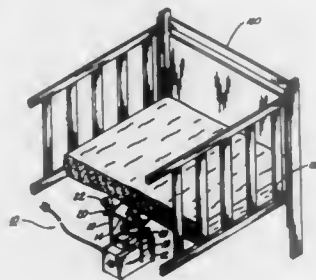
Fred A. Pereira, 222 Kukuau St., Hilo, HI. 96720

Filed Jan. 12, 1990, Ser. No. 464,316

Int. Cl.<sup>5</sup> A47D 9/02

U.S. Cl. 5—109

7 Claims



1. A device for imparting a pat to the underside of an infant crib for helping to soothe an infant or child, said device comprising:

- a frame;
- a reciprocating means attached to said frame;
- a "T" bar structure including a horizontal member having two ends with apertures therein, and a threaded vertical member secured to said horizontal member midway between said two ends, said vertical member being secured to said reciprocating means for reciprocating said "T" bar structure;
- a pair of elongated rods each having a top end and a bottom end, each of said elongated rods being adjustably vertically secured to an end of said horizontal member; and
- a resilient cup-like structure attached to said top end of each of said vertical members, said cup-like structures being disposed to contact the underside of the crib.

4,951,332

**SAFETY HAMMOCK**

Peter Barmettler, Allmendstrasse 9, CH-6374 Buochs, Switzerland

Filed Jun. 5, 1989, Ser. No. 361,253

Claims priority, application Switzerland, Jun. 6, 1988, 02152/88

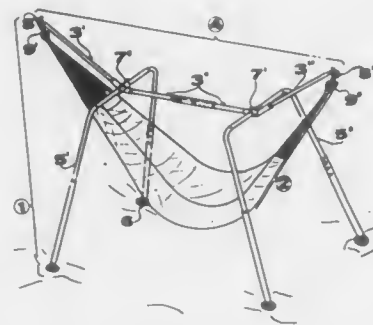
Int. Cl.<sup>5</sup> A45F 3/22, 3/24

U.S. Cl. 5—120

11 Claims

1. A hammock cot comprising,
  - a pair of leg sets, each set having a pair of legs with one end for contacting the ground and a central section,
  - a rotatable bearing mounted on the central section of each leg set,
  - a cradle having a center piece each end of which is coupled to one of the bearings and a pair of end pieces, each end

piece having one end coupled to the bearing to extend outwardly from the respective leg set,



a hammock, each end of the hammock coupled to the free end of a cradle end piece, a load on the hammock causing the cradle end pieces to deflect downwardly and rotate the bearings and to bow the cradle center piece upwardly.

4,951,333

**BEACH BLANKET**

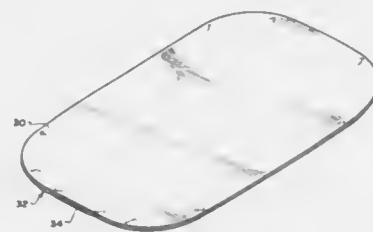
Richard Kaiser, 5761 Tuxedo Terr., Los Angeles, Calif. 90068; John T. Gutch, 16945 Sunset Blvd., Pacific Palisades, Calif. 90272, and Richard Rasof, 7923 Agnes St., #5, North Hollywood, Calif. 91605

Filed Dec. 19, 1989, Ser. No. 452,636

Int. Cl.<sup>5</sup> A47G 9/06

U.S. Cl. 5—417

10 Claims



1. A foldable, internally supported beach blanket comprising:

- a pair of similarly shaped membranes joined to each other about substantially all of their peripheral edges;
- a small slit opening along a portion of said peripheral edges;
- a single springable hoop of length approximately equal to the internal length of said peripheral edges, said hoop having a spring characteristic such as to permit a portion of the hoop to be compressed to a diameter small enough to allow the hoop to pass through said slit opening.

4,951,334

**PRESSURE RELIEF CUSHION**

Edmund K. Maier, 76 Woodside Dr., Penfield, N.Y. 14526

Filed Jul. 26, 1989, Ser. No. 385,567

Int. Cl.<sup>5</sup> A47C 27/00

U.S. Cl. 5—431

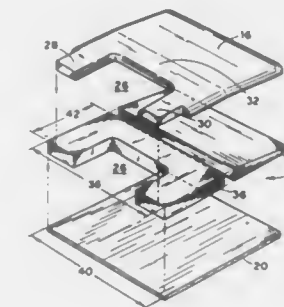
6 Claims

1. A substantially rectilinear, integral pressure relief cushion with a front edge, a back side, a right side, a left side, and a bottom side, wherein said cushion consists essentially of foam material and is comprised of at least four sections of foam material, and wherein:

(a) said cushion has an effective gross spring rate of from about 75 to about 300 pounds per inch;

(b) said cushion is comprised of a top layer, a middle layer, and a bottom layer, said middle layer having a front portion and a back portion and being comprised of a first section of foam material disposed in said back portion of said middle layer and a second section of foam material disposed in said front portion of said middle layer, wherein:

1. the force deflection rating for said first section of foam material is from about 100 to about 150 pounds,
2. the force deflection rating for said second section of foam material is from about 50 to about 90 pounds,
3. the force deflection rating of said first section of foam material is from about 1.25 to about 2.5 times as great as the force deflection rating for said second section of foam material; and



(c) said cushion is comprised of an aperture extending from about 50 to about 95 percent of the height of said cushion from said top side of said cushion towards said bottom side of said cushion, wherein:

1. said aperture defines a substantially U-shaped cavity as viewed from said top side of said cushion.
2. the width of said aperture is centered along said back side of said cushion, and is from about 25 to about 70 percent of the width of said cushion.
3. said aperture extends from said back side towards said front edge, and
4. the length of said aperture is from about 25 to about 95 percent of the length of said first section.

4,951,335

**MATTRESS ASSEMBLY**

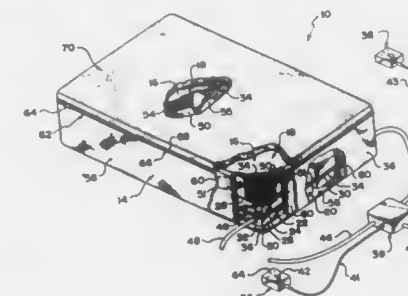
Donald Geoffrey Eady, West Vancouver, Canada, assignor to Donan Marketing Corporation, North Vancouver, Canada

Filed Jun. 5, 1989, Ser. No. 361,310

Int. Cl.<sup>5</sup> A47C 27/08

U.S. Cl. 5—450

7 Claims



1. A mattress, comprising:

- a lower portion having an inflatable member wherein said lower portion includes a shell having a top, a bottom and sides extending upwardly from the bottom, the inflatable member being within the shell;

a pile overlay on top of said lower portion; padding between the top of a substantial portion of the inflatable member and the pile overlay, said padding comprising a layer of silicone coated woolen knops contained within a flat, baglike enclosure; means for releasably securing the overlay to the lower portion; and a foam layer extending about sides of the mattress inside the shell, wherein said mattress is capable of being compressed and rolled up when said inflatable member is deflated.

4,951,336

**CONTOURED SUPPORT CUSHIONS**

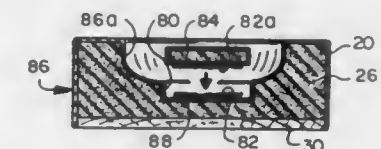
Michael W. Silverman, Highland Park, Ill., assignor to Pin Dot Products, Morton Grove, Ill.

Filed Apr. 3, 1989, Ser. No. 332,051

Int. Cl.<sup>5</sup> A47C 7/02

U.S. Cl. 5—481

16 Claims



16. A support cushion having a soft spot to compensate for areas of high support pressure and eliminate pressure sores, said support cushion comprising:

- a compressible, resilient core comprised of a first foam and having an upper contoured surface and a lower planar surface;
- a compressible, resilient insert disposed within and bonded to said core and extending between the upper and lower surfaces thereof, wherein said insert is comprised of a second foam which is softer than the first foam of said core to provide the cushion with a soft spot;
- a flexible cover disposed in tight fitting relation over the upper surfaces of said core and said insert, said cover including a folded portion disposed between adjacent upper portions of said core and said insert to accommodate the softer insert in preventing stretching and tearing of said cover;
- a rigid, generally planar base engaging and integrally bonded to the lower surface of said core; and
- positioning means comprised of a plurality of inserts disposed within said core and attached in a spaced manner to an inner surface of said cover adjacent to the lower surface of said core for maintaining said base in intimate contact with the lower surface of said core during the curing thereof so as to form an integral bond between said core and said base.

4,951,337

**MECHANIC'S SUPPORT PILLOW**

Harold L. Hull, 401 Canyon Way, Sp. 43, Sparks, Nev. 89431, and Roger Clark, P.O. Box 518, Portola, Calif. 96122

Filed Apr. 15, 1988, Ser. No. 182,126

Int. Cl.<sup>5</sup> A42B 1/00, 1/24; A47G 9/00

U.S. Cl. 5—434

4 Claims

1. In combination with a cap that has a strap in its back portion, a mechanic's support pillow comprising:

- (a) an elongated segment with a substantially homogeneous filling forming a pillow of generally rectangular shape sufficient to cover the back portion and a substantial portion of each side of the head of a user and being of a general constant thickness to not merely cushion the head but to support the head and neck of the user in a horizontal position on a plane substantially parallel with the torso when lying in a supine position;
- (b) strap means connected between the end portions of the



support pillow, adapted to secure the pillow to the head of a user; and  
(c) a flap portion located on the inside portion of the pillow,



in the area that contacts the back portion of the head of the user, a lower edge of said flap being adapted to be releasably attached to the pillow to thereby releasably engage the strap portion of the cap.

4,951,338

# MACHINE FOR PERFORMING A PROGRESSIVE OPERATION ON MARGINAL PORTIONS OF A SHOE IN THE MANUFACTURE THEREOF

Terence J. Brown, Wigston, and John Davies, Syston, both of England, assignors to British United Shoe Machinery, Ltd., Leicester, England

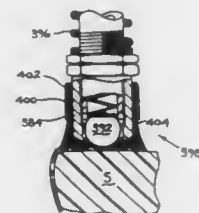
Filed Jul. 7, 1989, Ser. No. 377,237

Claims priority, application United Kingdom, Jul. 20, 1988, 8816985; Sep. 12, 1988, 8821333

Int. Cl.<sup>5</sup> A43D 95/00; C14B 1/44

U.S. Cl. 12-77

28 Claims



1. Machine for performing a progressive operation on marginal portions of a shoe in the manufacture thereof comprising a shoe support for supporting a lasted shoe such that the shoe bottom is positioned in a desired relationship with a height datum of the machine, and  
a tool support arrangement by which a tool holder is supported for pivotal movement about a first axis extending transversely of the bottom of a shoe support by the shoe support and about a second axis extending perpendicularly to the first axis lengthwise of the shoe bottom, wherein the holder supports a tool in such a manner that the point of intersection of the axes lies on a longitudinal centre line of the tool and a plane, in which an operating surface portion of the tool lies, extends perpendicularly to the longitudinal centre line of the tool and passes through said point of intersection and remains undisplaced therefrom when pivotal movement of the tool holder takes place about either of said axes, the machine further comprising

first drive means for effecting relative movement between the shoe support and the tool holder in directions extending lengthwise and transversely of the bottom of a shoe supported by the shoe support, whereby a tool supported by the tool holder can be caused to follow the plan contour of such shoe bottom,  
second drive means for effecting relative movement be-

tween the shoe support and the tool holder in a direction extending heightwise of the shoe bottom and thus for varying the relationship between a tool supported by said holder and said height datum whereby, as relative lengthwise and transverse movement takes place as aforesaid between the shoe support and the tool support arrangement, such tool can be caused to follow the height contour of the shoe bottom, and

third and fourth drive means for effecting such pivotal movement respectively about the first and second axes whereby, as a tool supported by the tool holder is caused to follow the plan and height contours of the shoe bottom as aforesaid, the longitudinal centre line thereof is maintained coincident with or parallel to a line extending substantially normally, in directions both lengthwise and transversely of the shoe bottom, to the portion of the surface of the shoe bottom at or laterally adjacent the region of engagement of the tool with the shoe.

4,951,339

# CLEANING MACHINE FOR GOLF CLUBS

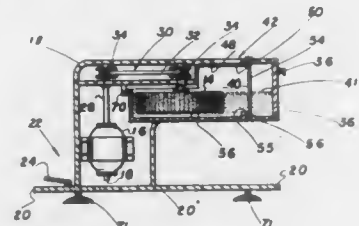
Stephen C. Braun, 420 Bay Tree La., Longwood, Fla. 32779

Filed Sep. 14, 1989, Ser. No. 407,006

Int. Cl.<sup>5</sup> A46B 13/04

U.S. Cl. 15-88.3

16 Claims



1. A cleaning assembly for golf club heads, said assembly comprising:

- (a) a housing including a hollow interior portion and a brush means rotatably mounted therein for cleaning the heads of golf clubs coming in contact therewith,
- (b) channel means formed in said housing in communicating relation with said brush means for positioning the club head relative to said brush means,
- (c) a tray means structured for holding cleaning liquid therein and removably attached to said housing,
- (d) said tray means including a chamber dimensioned and structured to at least partially receive said brush means therein and dimensioned and structured for adjacent, cooperative positioning of the brush means, cleaning fluid and club head within said chamber during a cleaning operation,
- (e) motor means mounted on said housing in driving connection to said brush means, and
- (f) control means electrically connected in current regulating relation between a source of electrical power and said motor means.

4,951,340

# CAR WASH WASHER INSTALLATION

Gilbert J. Rietsch, Rochester, Mich., assignor to Gilbert J. Rietsch, Jr., Troy, Mich.

Filed Jan. 23, 1989, Ser. No. 300,777

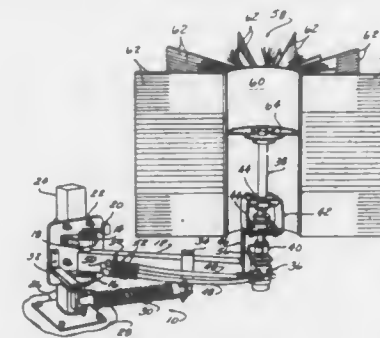
Int. Cl.<sup>5</sup> B60S 3/06

U.S. Cl. 15-97.3

4 Claims

1. An automated car wash line including an array of a plurality of vertically disposed washers, each comprising a cylinder having radially extending flexible wiper strips extending therefrom, said cylinder driven to be rotated to produce a scrubbing action, characterized by a mounting arrangement for each of said washers comprised of a pivotally mounted swing arm

located at the bottom of each washer, said swing arm having a drive motor located beneath a respective washer and coupled to an upwardly extending drive shaft, and means connecting said drive shaft to said drive cylinder to enable rotation of said



washer; said means connecting said drive shaft to said cylinder comprising a web plate fixed within said cylinder at a predetermined height therein and a flange attached to said drive shaft, said web plate resting atop said flange and secured thereto.

4,951,341

# WALL AND CEILING MOP

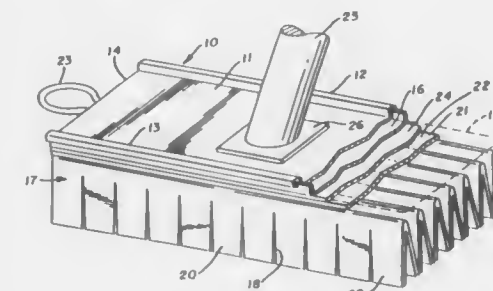
Mary Shears, 26 Crabwood Ct., Youngstown, Ohio 44515

Filed Feb. 24, 1989, Ser. No. 314,802

Int. Cl.<sup>5</sup> A47L 13/20

U.S. Cl. 15-228

8 Claims



1. A wall and ceiling mop comprising a support base having a first flexible attachment means secured thereto, a plurality of absorptive flaps interconnected to one another at multiple fold lines to form a continuous strip, a carrier means secured to said absorptive flaps at said fold lines, a secondary flexible attachment means secured to said carrier means for removable engagement with said first flexible attachment means, a handle extending from said support base, means for attaching said first flexible attachment means to said support base, severing said interconnected flaps at some of said multiple fold lines, opposite said carrier to form said plurality of absorptive flaps.

4,951,342

# STREET SWEEPING DRAG SHOE

Duffy Wilson, 58 Pride St., Westbrook, Me. 04092

Filed Mar. 13, 1989, Ser. No. 321,916

Int. Cl.<sup>5</sup> E01H 1/04

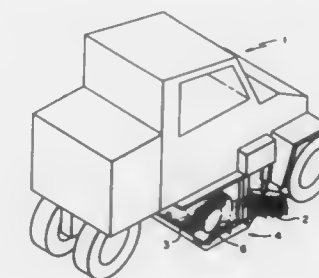
U.S. Cl. 15-246

8 Claims

8. A street sweeper drag shoe comprising:

- a. an essentially planar piece of polyurethane material having a top and a bottom, wherein the length dimension thereof is much greater than the thickness thereof, wherein said polyurethane material has a Shore A hardness of 80 to 90, and wherein said planar piece of polyure-

thane is essentially trapezoidal in shape, wherein the base of said trapezoid is said top of said drag shoe,  
b. a horizontal strip attached to and extending vertically above said drag shoe, wherein the height dimension of said horizontal strip is much greater than the thickness thereof,



c. attachment means to attach said drag shoe to a sweeper vehicle, and

d. a horizontal platform extending from said bottom of said drag shoe toward the interior of said sweeper vehicle, wherein said horizontal platform uniformly engages bristles of a cylindrical rotating brush attached to said sweeper vehicle.

4,951,343

# CONNECTOR FOR WIPER BLADES

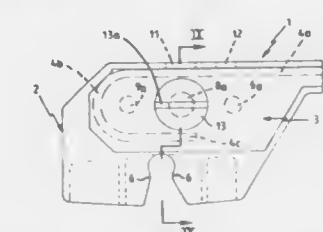
Marcello Scorsio, Turin, Italy, assignor to Champion Spark Plug Italiana SpA, Italy

Filed Nov. 23, 1988, Ser. No. 275,372

Int. Cl.<sup>5</sup> B60S 1/40

U.S. Cl. 15-250.32

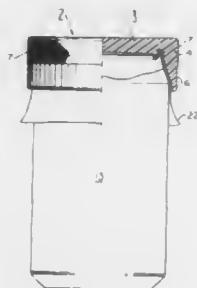
11 Claims



10. A connector for selectively connecting several types of wiper arms (4, 5, 15) of different transverse dimensions to a wiper blade for motor vehicles or the like, characterized in that it comprises a body (2) provided with a lateral recess (7a, 7b, 7c) capable of selectively receiving the free end portions (4a, 4b, 4c; 5a, 15a) of said wiper arms (4, 5, 15) and a laterally removable element (3) capable of being inserted into said lateral recess (7a, 7b, 7c) and capable of being secured to the body (2) of the connector (1) by means of a screw (13) and cooperating female element (8), said female element (8) comprising a hinged portion (10) capable of being pressed against the free end portions (4a, 4b, 4c; 5a, 15a) of the wiper arms (4, 5, 15) when said screw is screwed into said corresponding female element (8), wherein the female element (8) of the screw (13) is an integral part of the body (2) of the connector (1), the configuration of said recess (7a) is such that it is capable of selectively receiving wiper arms (5, 15) of which the free portions (5a, 15a) are straight, the laterally removable element (3) comprises at least one laterally projecting stud (3b) and the body (2) of the connector (1) comprises at least one corresponding opening (9a) for receiving said stud (3b) or studs (3b).

**4,951,344**  
**BEVERAGE CAN CLEANING DEVICE**  
Yonbert Alkhato, 6192 Cahalan Ave., San Jose, Calif. 95123  
Filed Jul. 28, 1988, Ser. No. 225,243  
Int. Cl.<sup>5</sup> A47L 25/00, 17/00  
U.S. Cl. 15—257 R

12 Claims



1. A device operable to facilitate cleaning the exterior end including the exterior top, rim and exterior side wall portions of a pop-top type beverage can which may be expected to be placed in direct contact with the mouth by a person who drinks directly from the can, comprising:

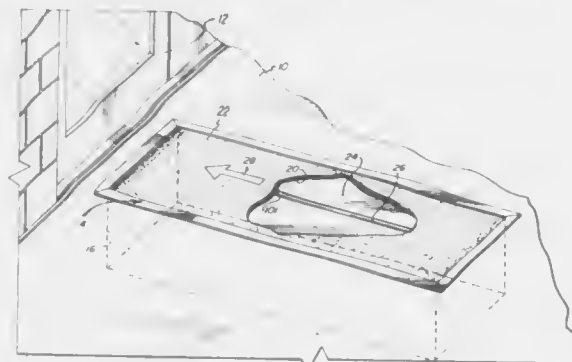
- (a) a monolithic body adapted to be superimposed in contiguous relationship on the exterior end of a beverage can on which it is intended to place the mouth to drink the contents of the can;
- (b) a peripheral flange portion on the monolithic body having inner and outer surfaces, at least a portion of said inner surface conforming to the configuration of the exterior side wall of a beverage can adjacent the top wall and rim thereof;
- (c) a groove formed in said monolithic body and adapted to receive at least a portion of the rim of a beverage can when said monolithic body is placed on the exterior end of the beverage can;
- (d) a bead integrally formed on said monolithic body and projecting substantially parallel to said peripheral flange portion and configured to extend into the bight between the beverage can rim and said beverage can top surface; and
- (e) a surface on said monolithic body conforming to the configuration of said top wall, such when paper toweling or a facial tissue is spread over the end of said beverage can and said monolithic body is superimposed over the toweling thereon, said paper toweling or facial tissue lies sandwiched between said monolithic body and said beverage can, rotation and of said monolithic body relative to said beverage can effects cleaning of the exterior end portion of the side wall of the can, said rim and said top wall, whereby visible contaminants are wiped from the beverage can by said toweling or facial tissue.

**4,951,345**  
**SELF-CLEANING ENTRY CARPET ASSEMBLY**  
John J. Nappi, Sr., Berlin, Conn., assignor to Liberty Products, Inc., Berlin, Conn.  
Filed Jun. 19, 1989, Ser. No. 368,267  
Int. Cl.<sup>5</sup> A47L 23/02; E04F 19/10  
U.S. Cl. 15—302

22 Claims

1. A self-cleaning entry rug assembly comprising:
- (a) a housing having a top plate extending over substantially the entire top of said housing and hingedly supported on a side thereof, said plate providing transversely extending openings into said housing adjacent its opposite ends;
  - (b) a frame supported on said housing and removable therefrom upon opening of said top plate;
  - (c) a pair of tread rollers rotatably supported on said frame and extending against said transversely extending openings of said top plate;
  - (d) a multiplicity of auxiliary rollers rotatably supported on

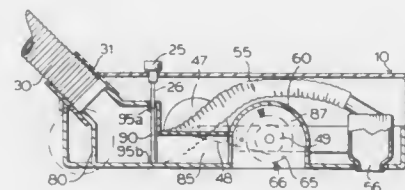
- said frame and extending transversely of said plate below said tread rollers;
- (e) an endless belt extending in a closed path about said tread rollers, over said top plate and about said auxiliary rollers in said housing;
- (f) an endless rug supported on said endless belt for movement therewith;
- (g) cleaning means in said housing below said closed path for cleaning said endless rug as it passes thereover;



- (h) means for movement of at least one of said auxiliary rollers to vary the length of said closed path and thereby the tension on said belt;
- (i) means for effecting rotation of at least one of said rollers to effect rotation of said belt and thereby said rug; and
- (j) control means for controlling said rotation means and cleaning means.

**4,951,346**  
**CLEANING ATTACHMENT**  
Carl Salmon, Unit 3, 646 Village Parkway, Unionville, Ontario, Canada (L3R 2S7), assignor to Carl Salmon, Unionville, Canada  
Filed Dec. 7, 1987, Ser. No. 129,530  
Claims priority, application Canada, Jun. 2, 1987, 538642  
Int. Cl.<sup>5</sup> A47L 5/36  
U.S. Cl. 15—322

31 Claims

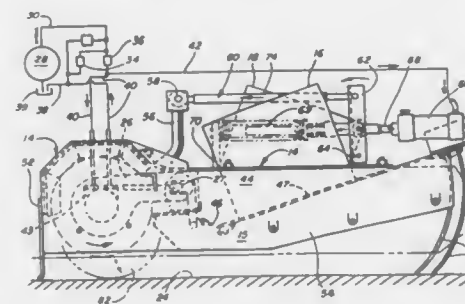


1. An improved integrated cleaning attachment for both dry vacuuming or wet cleaning carpets, upholstery or the like, for use with a powered cleaning unit, the cleaning attachment comprising a three dimensional frame having a top and bottom, the cleaning attachment having extending therefrom vacuum carrier means for conducting a created vacuum from a source of created vacuum to the three dimensional frame, the three dimensional frame having liquid supply means extending to a source of liquid supply away from the three dimensional frame, the liquid supply means having liquid distribution means connected thereto, the cleaning attachment having disposed therein proximate the bottom thereof at least two vacuum nozzle means, each having an opening therein, each opening extending substantially horizontally above a surface being cleaned, the at least two vacuum nozzle means and the vacuum carrier means having therebetween established diverting means to divert the created vacuum conducted by the vacuum

carrier means from any of the at least two vacuum nozzle means, the cleaning attachment having therein disposed at least one rotatable cleaning means; whereby in use the cleaning attachment may be used to dry vacuum or wash and wet vacuum carpets, upholstery or the like.

**4,951,347**  
**BRUSH-TYPE CLEANING SYSTEM**  
Roger D. Star, and Arvin Karas, both of St. Charles, Ill., assignors to Elgin Sweeper Co., Elgin, Ill.  
Continuation of Ser. No. 425,325, Oct. 26, 1989, abandoned, which is a continuation of Ser. No. 194,843, May 17, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 471,662  
Int. Cl.<sup>5</sup> E01H 1/08  
U.S. Cl. 15—340.3

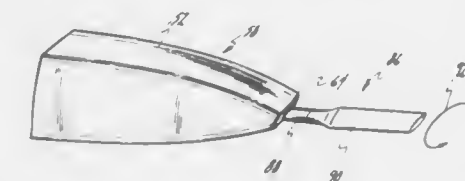
18 Claims



1. In apparatus for cleaning surfaces with recirculating air flow including a cleaning head defining an open-faced chamber for facing the surface to be cleaned; air recirculating conduit means for drawing air from said chamber through a first port in said chamber, and for blowing air through a second port into said chamber, said air recirculating conduit means including impeller means for circulating air through said conduit means and dirt collector means in said conduit means; the improvement comprising, in combination:
- a rotary brush positioned within said open-faced chamber for engaging and brushing the surface to be cleaned, said second port being positioned to direct flowing air from said air recirculating conduit in a stream that directly impinges the surface to be cleaned adjacent to and forward of said brush.

**4,951,348**  
**ROTATABLE INDEXABLE ACCESSORY VACUUM CLEANER TOOL**  
Charles Z. Krasznai, Trumbull; Richard B. Kosten, West Haven, both of Conn.; Ron Barker, Brewster, N.Y., and Burton E. Gerke, Jr., Newtown, Conn., assignors to Black & Decker Inc., Newark, Del.  
Filed Jan. 9, 1989, Ser. No. 294,614  
Int. Cl.<sup>5</sup> A47L 5/24  
U.S. Cl. 15—414

11 Claims

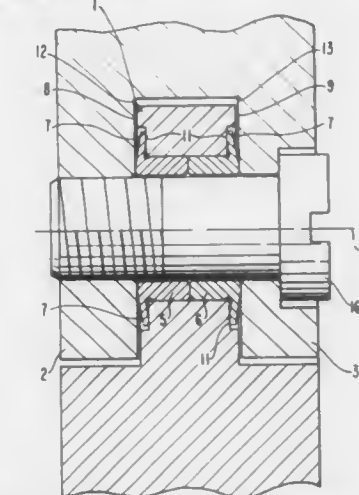


1. An accessory tool for a vacuum cleaner which has an inlet opening, said accessory tool comprising:
- a stationary portion;
  - a rotatable portion;
  - an adapter on said stationary portion;
  - said adapter being fittable into said inlet opening; and
  - means for engaging said stationary portion and said rotatable

portion together while permitting relative rotation therebetween and further including indexing means for maintaining said stationary portion and said rotatable portion in specific relative positions.

**4,951,349**  
**HINGE MOTION REGULATOR FOR EYEGLASSES**  
Anton Dietrich, Munich, and Detlef Kreuz, Haag, both of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany  
Filed Aug. 19, 1988, Ser. No. 233,802  
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1987, 3727706  
Int. Cl.<sup>5</sup> G02C 5/22  
U.S. Cl. 16—228

24 Claims



1. A motion regulator for a hinge including at least a first hinge tab and a second hinge tab, a hinge screw means for movably securing said first and second hinge tabs to each other, a rigid sleeve means for surrounding and accommodating the hinge screw means, said rigid sleeve means being disposed only in a hinge eye means of the second hinge tab for accommodating said rigid sleeve means, said rigid sleeve means having an axial length greater than an axial length of said hinge eye means so as to project beyond opposed edges defining respective ends of the hinge eye means of said second hinge tab in such a manner that the sleeve rotates with the second hinge tab, and at least one spring elastic means arranged between the first hinge tab and said second hinge tab under a pretensioning with said at least one spring elastic means being in contact with a contact surface of said first hinge tab means, said contact surface being radially symmetrically disposed with respect to a longitudinal center axis of the hinge screw means, and wherein said at least one spring means is, resilient in an axial direction with respect to the longitudinal center axis of said hinge screw means.

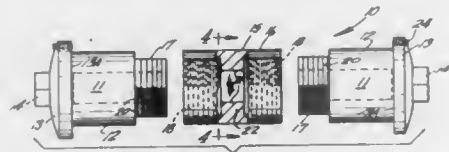
**4,951,350**  
**COMPOSITE HINGE PIN**  
Anthony M. Nunes, 1401 N. Elk Valley Rd., Crescent City, Calif. 95531  
Filed Jun. 5, 1989, Ser. No. 361,998  
Int. Cl.<sup>5</sup> E05D 5/10  
U.S. Cl. 16—263

8 Claims

8. A composite hinge pin comprising, end members and an intermediate member all having cylindrical outer surfaces to form a pin outer wall, screw threads on said end members and said intermediate member,

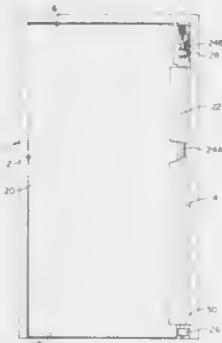


the screw threads on said intermediate member being female threads, and



said intermediate member having surfaces for torque tool application to said member.

**4,951,351**  
**AUTOMATIC CLOSURE MECHANISM FOR DOUBLE-ACTING DOORS**  
Alan Eckel, Westford, Mass., assignor to Eckel Industries, Inc., Cambridge, Mass.  
Continuation-in-part of Ser. No. 586,249, Mar. 5, 1984, abandoned. This application Apr. 9, 1985, Ser. No. 721,192  
Int. Cl.<sup>5</sup> E05F 3/20  
U.S. Cl. 16—254 26 Claims

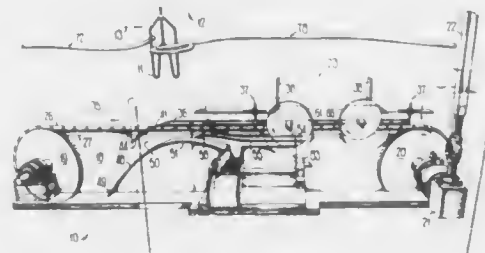


1. An automatic door closure for use in mounting a door to a door frame defining a door opening, said door comprising a door panel, a door post for determining an axis of rotation for said door panel, and door support means connecting said post to said door panel so that said door and post can rotate as a unit, said door closure comprising:

bearing means for rotatably mounting said door post to said door frame so that said door can rotate about said axis from a closed position to an open position;  
a roller adapted to be secured in a fixed position relative to said door frame;  
a cam surrounding said post having a contoured surface for engagement with said roller;  
coupling means for mechanically coupling said cam to said post so that (a) said cam must rotate with said post when said post rotates about said axis of rotation and (b) said cam is capable of limited movement relative to said post along said axis; and  
biasing means for resiliently urging said cam along said axis in a first direction to maintain said contoured surface engaged with said roller;  
said contoured surface being formed so that while engaged with said roller if (a) a turning force is applied to said door to cause it to rotate about said axis to an open position, said cam will be forced to rotate with said post and simultaneously to move relative to said post along said axis in a second direction against the force of said biasing means, and (b) if thereafter said turning force is removed, said biasing means and said roller will coact to force said cam to move relative to said post along said axis in said first

direction and simultaneously to rotate so as to restore said door to a closed position.

**4,951,352**  
**APPARATUS AND PROCESS FOR HARVESTING HEARTS AND LIVERS OF POULTRY**  
Grover S. Harben, III; Gene Petty, both of Gainesville, and Jerry Sosbee, Lula, all of Ga., assignors to Grover S. Harben, III, Gainesville, Ga.  
Filed Feb. 2, 1990, Ser. No. 473,900  
Int. Cl.<sup>5</sup> A22C 11/00  
U.S. Cl. 17—11 27 Claims

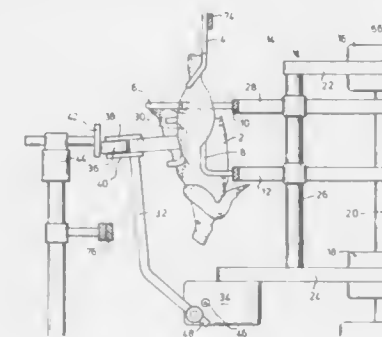


1. A process for separating visceral parts of poultry carcasses moving along a conveyor line, comprising the steps of: defining a package of interconnected viscera parts withdrawn from the carcass but remaining attached to the carcass by connective tissue; moving the viscera package with the carcass for a distance; selecting a certain first part of the viscera package to traverse a first product path as the viscera package moves with the carcass; selecting at least one certain other part of the viscera package to traverse a second product path as the viscera package moves with the carcass; severing the first part from the viscera package on the first product path; and severing the other part from the remainder of the viscera package on the second product path, so that any remaining parts of the viscera package can continue to move with the carcass along the conveyor line after moving said distance.

**4,951,353**  
**POULTRY THIGH DISJOINTING METHOD AND APPARATUS**  
Rudolf J. Tieleman, Doesburg, Netherlands, assignor to Linco Holland Engineering B.V., Doesburg, Netherlands  
Filed Dec. 18, 1989, Ser. No. 452,103  
Int. Cl.<sup>5</sup> A22C 21/00  
U.S. Cl. 17—11 21 Claims

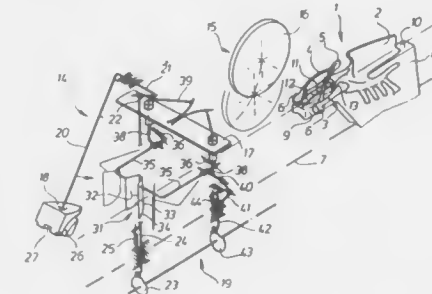
1. In an apparatus for automatically disjointing the thigh joints of birds in a poultry processing facility, each of said birds having a breast, a back side, and two thighs; said apparatus including means for supporting the birds and conveying them in a machine direction so that a first bird precedes a second bird as they move through the apparatus, and each bird has a leading leg and a trailing leg as it moves through the apparatus, said apparatus including a plurality of first members for retaining the breast sides of the birds, a plurality of second members for contacting the thighs of the birds on the back sides of the birds, actuating means for providing relative movement which moves the first members and the second members toward each other to disjoint the thigh joints of the birds, the improvement wherein a pair of said first members are fixed relative to each other and are arranged to contact simultaneously the breast of the first bird and the breast of the second bird, a pair of said second members which are fixed relative to

each other and are arranged to contact simultaneously the thigh of the trailing leg of the first bird and the thigh of the leading leg of the second bird, said actuating means being operable to provide relative movement which simultaneously moves said pair of first



members and said pair of second members toward each other, said apparatus locating the first and second birds at positions where said relative movement simultaneously disjoints the thigh joint of the trailing leg of the first bird and the thigh joint of the leading leg of the second bird.

**4,951,354**  
**PROCESS FOR GAINING THE MEAT FROM THE BODIES OF SLAUGHTERED POULTRY AND APPARATUS FOR PERFORMING THE PROCESS**  
Hans Calsen, Bad Schwartau; Detlef Meyer, and Peter Muuhs, both of Lübeck, all of Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud Baader GmbH & Co. KG, Lübeck, Fed. Rep. of Germany  
Filed Mar. 22, 1989, Ser. No. 327,050  
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811317  
Int. Cl.<sup>5</sup> A22C 25/16  
U.S. Cl. 17—46 3 Claims

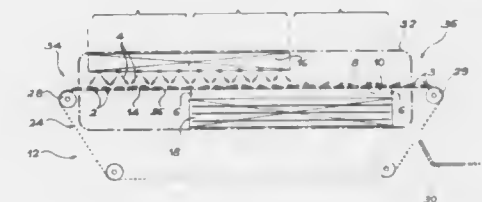


1. A process for gaining meat from at least parts of the bodies of slaughtered poultry, which parts are formed by a poultry skeleton including a clavicle (clavicula) having two branches, coracoid bones, a breast bone (sternum), and body joints of poultry wings, which have been removed, wherein, for detaching the meat from said clavicle, said clavicle is first of all positively fixed by partly embracing at least parts of the branches of said clavicle from the inside thereof, and the meat is subsequently completely separated from the skeleton by a peeling operation along the outer contour of said clavicle,

**4,951,355**  
**PROCESS FOR LOOSENING SCALES AND REMOVING SLIME FROM FISH**  
James G. Pack, Rte. 3, Box 106, Troy, N.C. 27317  
Filed Jul. 28, 1989, Ser. No. 386,819  
Int. Cl.<sup>5</sup> A22C 21/04 7 Claims

1. A process for loosening scales and removing slime from uneviscerated fish still having their scales and slime intact substantially without requiring mechanical action and without damaging skin and flesh underlying the scales, said process comprising the steps of preparing a treatment bath of an aqueous solution of an edible food acid having an acidic concentration of up to approximately five percent (5%) and, prior to eviscerating the fish, submerging the fish in the bath for a treatment period of no less than approximately five and no greater than approximately fifteen minutes, wherein said submerging substantially removes the fish slime and loosens the fish scales sufficiently to facilitate scale removal with a minimum of mechanical action while leaving the underlying fish skin and flesh substantially intact.

**4,951,356**  
**PROCESS AND INSTALLATION FOR OPENING SHELLFISH**  
Pascal Delplanque, Vannes, France, assignor to Electricite de France Service National, Paris, France  
Filed Nov. 15, 1989, Ser. No. 436,596  
Claims priority, application France, Nov. 16, 1988, 88 14883  
Int. Cl.<sup>5</sup> A22C 29/04 10 Claims

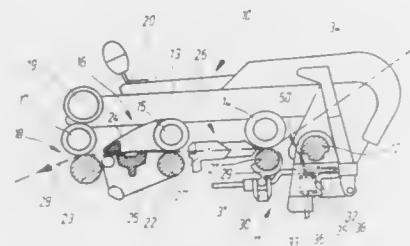


1. Process for opening shellfish (2) consisting of subjecting the latter to infrared radiation (4,6) with a wavelength between 0.75 and 2 micrometres and involving the following three successive phases:  
(a) exposure of the shellfish (2) to radiation from above (4) over a first half (8) of their outer surface,  
(b) exposure of the shellfish (2) to radiation from above (4) and below (6) over the entire outer surface (8,10) of the shellfish (2) and  
(c) exposure of the shellfish (2) to radiation from below (6) only over the second half of their outer surface.

**4,951,357**  
**STOP MOTION APPARATUS FOR A ROVING DRAFTING DEVICE OF A TEXTILE MACHINE**  
Gerhard Grau, Muellheim; Manfred Lattner, Ebersbach/Sul-pach, and Helmut Nickolay, Udingen, all of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany  
Filed Aug. 31, 1989, Ser. No. 400,987  
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3830069; Jan. 31, 1989, 3902715  
Int. Cl.<sup>5</sup> D01G 31/00; D01H 13/18 16 Claims

1. A stop motion apparatus for stopping the travel of roving through a nip defined by a pair of roving feed rollers of a drafting device of a textile machine, comprising:  
a stop member for selective insertion into the nip to separate the roving feed rollers and press the roving against one of the feed rollers;

an actuating rod longitudinally movable for manipulating said stop member;  
a frame movably supporting said actuating rod;  
means connecting said stop member to said actuating rod;  
urging means for urging said actuating rod from a disengaged position in which said stop member is held out of engagement with the roving feed rollers by said connecting means to an engaged position in which said stop member is disposed in the nip between the roving feed rollers;



said actuating rod having a notch formed therein, said notch opening transversely to the longitudinal extent of said actuating rod and having an undercut surface facing in the direction of urging by said urging means; and  
notch engaging means including a plunger element configured for receipt in said actuating rod notch against said undercut surface in the disengaged position of said actuating rod to prevent movement of said actuating rod from its disengaged to its engaged position by said urging means and means for selectively moving said plunger element into and out of said actuating rod notch.

4,951,358

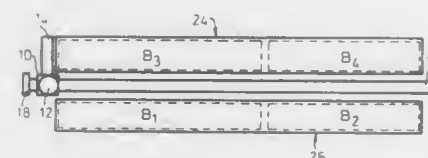
## FLOCK DELIVERY SYSTEM

Rolf Binder, Schottikon; Daniel Hanselmann; Walter Schlepfer, both of Winterthur, and Christoph Staeheli, Frauenfeld, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland  
Continuation of Ser. No. 352,692, May 4, 1989, abandoned, which is a continuation of Ser. No. 216,858, Jul. 8, 1988, abandoned, which is a continuation of Ser. No. 914,116, Oct. 1, 1986, abandoned. This application Feb. 1, 1990, Ser. No. 474,209  
Claims priority, application United Kingdom, Oct. 2, 1985, 8524304

Int. Cl.<sup>5</sup> D01B 1/48

U.S. Cl. 19—80 R

19 Claims



1. A flock delivery system comprising:  
a flock extracting unit adapted to move on a predetermined path,  
means to define a field in a predetermined relationship to the path,  
means operable to define blocks within the field, indicating means to indicate the relationship of said flock extracting unit to said defined blocks, and  
control means responsive to said indicating means to apply predetermined processing programs to said blocks individually.

4,951,359

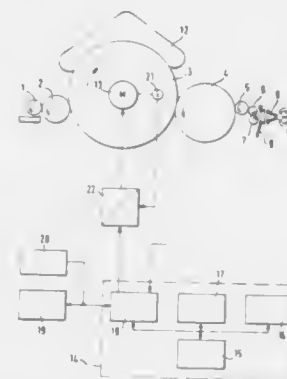
## METHOD FOR IMPROVING THE CARDING PROCESS OF A CARD OR A ROLLER CARD UNIT

Ferdinand Lelfeld, Kempen, and Fritz Hösel, Mönchengladbach, both of Fed. Rep. of Germany, assignors to Trübschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 170,132, Mar. 14, 1988, abandoned. This application Apr. 4, 1989, Ser. No. 333,826  
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708211

Int. Cl.<sup>5</sup> D01G 15/36

U.S. Cl. 19—98

2 Claims



1. A method of operating a carding machine having a main carding cylinder, an electromotor drivingly connected to said carding cylinder and a control device for controlling the rpm of the carding cylinder; a doffer cooperating with said carding cylinder and rotating at doffer rpm's; said control device including a memory; said main carding cylinder having a starting phase during which the main carding cylinder is accelerated to a working rpm and a stopping phase during which the main carding cylinder is decelerated from a working rpm to standstill; comprising the steps of

(a) storing in said memory sets each formed of a series of individual values representing carding cylinder rpm's for the starting phase, sets each formed of a series of individual values representing carding cylinder rpm's for the stopping phase and sets each formed of a series of individual doffer rpm's and corresponding respective carding cylinder rpm's; each set being material-specific; and  
(b) controlling the rpm of said main carding cylinder in the starting and stopping phases by said control device in accordance with respective said rpm values stored in said memory.

4,951,360

## TOP-COMB DRIVE MECHANISM FOR COMBING MACHINE

Katsutoshi Kishi, Hashima; Shigeyuki Tachi, Tsushima; Kazuhiro Inagaki, Kuwana, and Yoshinori Saruwatari, Nagoya, all of Japan, assignors to Howa Machinery, Ltd., Japan  
Filed Jul. 10, 1989, Ser. No. 377,578

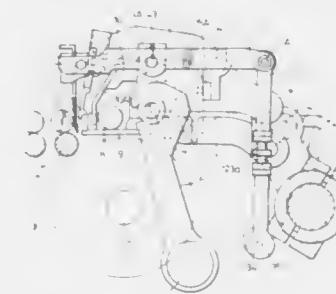
Claims priority, application Japan, Jul. 14, 1988, 63-175671  
Int. Cl.<sup>5</sup> D01G 19/16

U.S. Cl. 19—225

5 Claims

1. A top-comb driving mechanism applied to a conventional combing machine provided with a plurality of combing heads, each combing-head being provided with a nipper body capable of carrying out unit forward and rearward reciprocal displacing motion cycles, a pair of top-comb holding arms turnably mounted on said nipper body and a combing cylinder for carrying out an action of said combing machine, comprising in combination, a mechanism for carrying out said reciprocal forward and rearward motion of said nipper body, a rotation shaft driven synchronously with said combing cylinder, a

motion transmission mechanism for transmitting each one round rotation of said rotation shaft to each one of said top-comb holding arms in a form of one cycle of an upward and downward swinging motion of said top-comb holding arm synchronously with said forward and rearward displacing motion of said nipper body, whereby said forward and rearward reciprocal displacing motion of said nipper body is combined with said reciprocal upward and downward swinging



motion of said top-comb holding arms, each top-comb is reciprocally displaced along a locus of a forward displacement which is a gentle convex curve directed slightly downward and then along another locus of a rearward displacement which is a gentle concave curve directed slightly upward, between a front terminal of said forward displacement of said top-comb and a rear terminal, located at a position a little higher than said front terminal, of said rearward displacement of said top-comb.

4,951,361

## RELEASABLE LOOP RETAINER

Albert L. Stephens, Jr., 232 S. June St., Los Angeles, Calif. 90004  
Continuation-in-part of Ser. No. 167,530, Mar. 14, 1988, Pat. No. 4,847,955. This application Jun. 30, 1989, Ser. No. 374,284  
Int. Cl.<sup>5</sup> A45F 5/02

U.S. Cl. 24—3 K

3 Claims



1. A manual pressure operable key holder comprising:  
a length of resilient spring-like material formed into a closed loop disposed in a vertical plane, said loop having terminal fingers which join and lap each other side by side in a vertical lap interface coinciding generally with the plane of the loop and with the fingers pointing in opposite directions, said lapping fingers each being formed in to corresponding sinuous like segments wherein the lap-interface of each finger is flat and non-snagging and comprises a proximal section which bulges toward the other finger, and an adjoining distal section which includes a recess, shaped to receive the bulge section of the other finger; the internal stresses of the closed loop being such that in the absence of external pressure, the lapped fingers nest with each other and remain in snug and non-snagging contact along the entire length of the lap-interface presenting no obstruction to a key on the loop passing in either direction

across the lap juncture, but whereby, with the lap juncture at the top of the loop, upon the application of squeezing pressure to opposed sides of the loop to urge the sides toward each other, said fingers un-nest from each other and the tip of each finger is moved away from the other finger by the camming action of the opposed bulges sliding against each other thereby leaving only a small area of contact between the fingers and enabling a key having the orifice near one end to be threaded onto the tip of one of the fingers and passed between said fingers and onto the loop or alternatively to enable a key already on the loop to be passed onto one of the fingers from the proximal end, thence passing between the fingers, and off the loop; and the inherent resilience of the loop being such that upon termination of said squeezing pressure, said fingers return to their nested position.

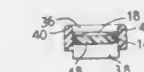
4,951,362

## LOW PROFILE BAG CLAMP

Philip W. Denemark, Bloomington, and Donald Santucci, St. Charles, both of Ill., assignors to Dek, Inc., St. Charles, Ill.  
Filed Sep. 11, 1989, Ser. No. 405,730  
Int. Cl.<sup>5</sup> B65D 63/10

U.S. Cl. 24—16 PB

5 Claims



1. A clamping device for applying a force around one or more objects including an elongated flexible strap, the strap having a first region with a plurality of teeth thereon and a second region with means for locking the first region thereto; each of the first region teeth having a sloped camming surface and an engagement surface; the locking means defining a channel into which the first region of the strap is inserted for locking engagement therein; at least two locking bars positioned at spaced intervals along the length of the channel, each locking bar having a sloped camming surface and an engagement surface, the locking bars being rigidly affixed at opposed ends thereof to the locking means and being elastically deformable upon passage of the strap first region through the channel; the locking means-channel being dimensioned such that the teeth and locking bars camming surfaces interfittingly engage upon insertion of the strap first region into the locking means thereby comprising a means for entirely elastically deforming the locking bars along substantially their entire lengths to admit passage of the strap first region, said locking bars returning to their non-deformed position after passage of each of the first region teeth whereby the respective teeth and locking bar engagement surfaces are in abutting and locking relationship preventing the withdrawal of the strap first region from the locking means and whereby locking engage between the first and second regions is achieved without use of cantilever pawl members.

4,951,363

## HOSE CLAMP

Yasuo Takahashi, and Toshinari Hojima, both of Yokohama, Japan, assignors to Kato Hatsujo Kaisha, Ltd., Kanagawa, Japan

Filed Jul. 19, 1989, Ser. No. 383,152  
Claims priority, application Japan, Aug. 9, 1988, 63-104991[U]; Aug. 9, 1988, 63-104992[U]  
Int. Cl.<sup>5</sup> B65D 63/02

U.S. Cl. 24—20 R

7 Claims

1. A hose clamp comprising:  
a clamp body including a normally contracted expandable annular ring part and means, comprising a pair of grip



parts mounted to said ring part, for expanding said ring part;  
means, comprising a holder, having a substantially U-shaped portion, formed separate from said clamp body, for engaging said pair of grip parts and releasably retaining said pair of grip parts in a mutually closely adjacent relationship to

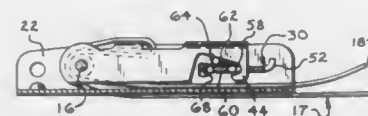
thereby releasably retain said ring part in an expanded state; and  
an elongated pulling arm piece integrally connected to said U-shaped portion of said holder and adapted to be held in a hand and manipulated so as to release said pair of grip parts from engagement in said engaging means.

**4,951,364**  
**LOCKING LEVER FOR SKI BOOTS**  
Antonello Marega, Montebelluna, Italy, assignor to Calzaturificio Tecnica SpA, Treviso, Italy  
Filed Jul. 5, 1989, Ser. No. 375,486  
Claims priority, application Italy, Jul. 5, 1988, 21551 B/88  
Int. Cl.<sup>5</sup> A43C 11/14  
U.S. Cl. 24—68 SK 8 Claims



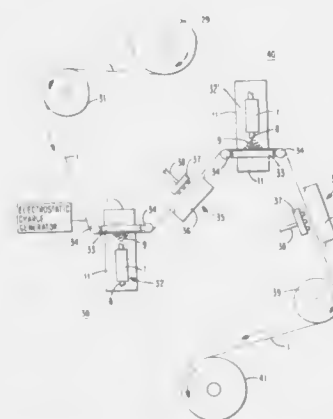
1. In a closing and locking lever for ski boots having a first actuatable arm pivotably connected at near a first end thereof to one portion of a ski boot upper and a second end thereof is configured for manual gripping and actuation thereof, a second actuatable arm hingably attached at a first end thereof to the first end of first arm, and a hook arm adjustably and hingably attached at a first end thereof to a second end of the second arm, and said hook arm having at a second end thereof a laterally disposed pin for engaging an upstanding rib of a hooking member attached to another portion of the ski boot upper, and wherein each of said arms have opposed side surfaces and top surfaces, the improvement wherein at least each of the opposed side surfaces of the first and second arms have a replaceable, preformed and preshaped plastic or rubber protection material detachably disposed thereon, and wherein the protection material covers substantially all of said opposed side surfaces of the first and second arms.

**4,951,365**  
**OVERCENTER BUCKLE**  
Bruce L. Loyd, Lawrence, Kans., assignor to Kinedyne Corporation, North Branch, N.J.  
Filed Jul. 20, 1989, Ser. No. 382,415  
Int. Cl.<sup>5</sup> A44B 21/00  
U.S. Cl. 24—68 CD 5 Claims



1. An overcenter buckle for tensioning straps comprising a frame body having a U-shaped configuration defining spaced parallel sides having end edges and connected by a base, a handle pivotally mounted upon the frame body intermediate the frame body sides pivotal between tension and release positions, strap mounting means defined upon the handle, and latch means interposed between the frame body and handle to releasably lock the handle in its tension position, the improvement comprising, in combination, a latch guide slot defined in each frame body side, said latch means comprising an elongated lock plate slidably mounted on the frame body within said guide slots, a spring interposed between the frame body and said lock plate biasing said plate toward said lock position, said lock plate having an abutment surface, a latch surface defined on the handle engaging with said abutment surface when the handle is in the tension position maintaining the handle in the lock position, movement of said lock plate toward said lock plate release position against said spring disengaging said abutment and latch surfaces to permit the handle to be pivoted to the handle release position, said lock plate including a manually engaged operating portion remotely spaced from the handle.

**4,951,366**  
**METHOD FOR MODIFYING FABRICS TO PRODUCE VARIED EFFECTS**  
George R. Geller, 448 Neptune Ave., Brooklyn, N.Y. 11224  
Filed Feb. 7, 1989, Ser. No. 308,995  
Int. Cl.<sup>5</sup> D06C 11/00, 23/02  
U.S. Cl. 26—28 23 Claims

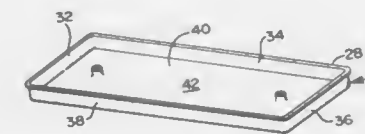


1. A method for the treatment of denim fabrics to produce an effect selected from a softening (soft-hand) effect, a worn effect, a laundered effect and combinations thereof, which comprises projecting under controlled conditions a stream of particles towards a surface of a denim fabric, the particles contacting said surface with a force effective to at least partially remove from said fabric at least one substance selected

from the group consisting of coatings, sizes, dyes and pigments.

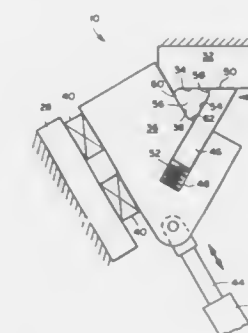
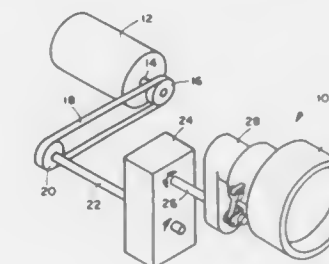
(c) means for moving said second member causing said mold cavity to vary in volume whereby material inserted in said

**4,951,367**  
**CASKET LINER**  
Martin D. Wolfe, 1136 State St., Lapeer, Mich. 48446  
Filed Jun. 12, 1989, Ser. No. 364,895  
Int. Cl.<sup>5</sup> A61G 17/04  
U.S. Cl. 27—19 8 Claims



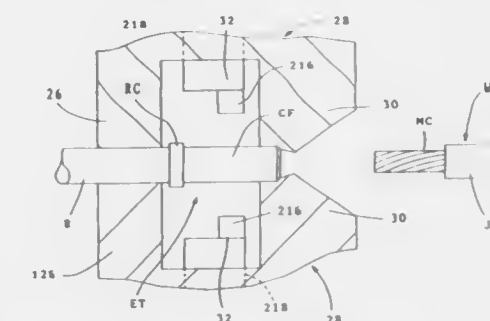
1. In a casket construction including a metal container having a bottom and side walls joined to surround a body support structure for supporting a body within the metal container above the bottom thereof, the metal container bottom and side walls formed of metallic material susceptible to corrosion the improvement comprising:

a shallow pan insert of non-corrosive material inserted in said metal container at a point below the body support structure; said shallow pan insert having side walls located below the body support structure within the metal container supported body and having a vertical height to shield the metal container from fluid drainage from the body;  
said side walls forming a cavity for collecting fluid drainage from the body at a point below the body and for isolating the collected fluid from contact with the bottom and side walls of the metal container.



mold cavity can be compressed into a compressed product and then be released from said mold cavity.

**4,951,369**  
**WIRE PROCESSING APPARATUS**  
Robert B. Verrall, Barnstable, Great Britain, assignor to AMP Incorporated, Harrisburg, Pa.  
Filed May 11, 1989, Ser. No. 350,421  
Claims priority, application United Kingdom, Jul. 8, 1988, 8816325.8  
Int. Cl.<sup>5</sup> H01R 43/00  
U.S. Cl. 29—33 M 18 Claims



**4,951,368**  
**APPARATUS FOR COMPRESSING MATERIAL INTO A TAMPON**  
Jeffrey L. Heinen, Larsen, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.  
Filed Jul. 20, 1989, Ser. No. 383,129  
Int. Cl.<sup>5</sup> A61F 13/20  
U.S. Cl. 28—118 34 Claims

1. An apparatus for compressing material to form a compressed product comprising:

(a) a housing;  
(b) a first member spaced away from said housing having a die surface;  
(c) a second member movable on said housing having a die surface;  
(d) a movable finger associated with said second member having a first surface which is biased against said first member and a second surface which cooperates with said die surfaces of said first and second members to form a mold cavity therebetween; and

1. Apparatus for stripping the insulation from an end portion of an insulated electrical wire, withdrawing an electrical terminal from a carrier tape therefor, and crimping the terminal to the stripped end portion of the wire, the apparatus comprising a wire gripper first unit, an insulation severing and stripping second unit, a terminal prefeed third unit, a pair of terminal gripping and terminal crimping heads and a carrier tape conveyor, the second unit being movable back and forth along a path of movement, between an advanced position proximate to the first unit, to receive and sever the insulation of the end

portion of an insulated wire gripped by the first unit, and a retracted position remote from the first unit to strip the insulation from said end portion, said heads being movable between an open position in which they are clear of said path and a closed, terminal gripping position intersecting said path, the third unit being actuatable partially to withdraw said terminal from said tape for positioning by said tape conveyor between said heads in the open position thereof and in the retracted position of the first unit, so that said heads grip the terminal when moved to their closed position, said heads being movable in that position, towards the first unit fully to withdraw the terminal from the tape and to insert the stripped wire end portion into the terminal and being then actuatable to crimp the terminal to the stripped wire end portion.

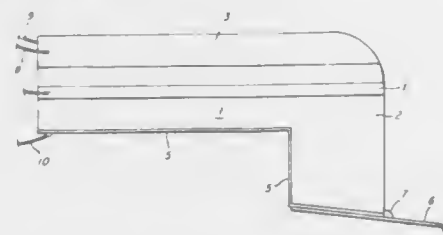
**4,951,370**  
**METHOD OF MAKING AN INTELLIGENT MULTIPROBE TIP**

Lee R. Reid, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 515,441, Jul. 19, 1983, Pat. No. 4,888,550, which is a continuation of Ser. No. 301,605, Sep. 4, 1981, abandoned, which is a continuation of Ser. No. 90,956, Nov. 5, 1979, abandoned. This application Sep. 1, 1989, Ser. No. 401,702 Int. Cl.<sup>5</sup> H01L 41/22

U.S. Cl. 29—25.35

3 Claims



1. A method of making a probe assembly comprising the steps of:

- forming a generally L-shaped mounting support member comprised substantially and integrally of piezoelectric material;
- depositing on the bottom surface of the downwardly extending portion of said mounting support member a thin layer of first metallization;
- depositing on the bottom surface of the longitudinal portion of said mounting support member a thin layer of second metallization;
- electrically coupling said first and second metallizations by depositing a thin layer of third metallization on an adjacent vertical surface of the downwardly extending portion of said mounting support member;
- conductively mounting and affixing to said first metallization, on the lower surface of the downwardly extending portion of said mounting support member, a needle-shaped probe tip comprised substantially of resilient conductive material;
- depositing generally along an upper quarter of one vertical surface of the longitudinal portion of said mounting support member a thin layer of fourth metallization, said fourth metallization formed so as to be electrically insulated from all other metallizations by said piezoelectric mounting support member material;
- depositing generally along an upper quarter of the opposite vertical surface of the longitudinal portion of said mounting support member a thin layer of fifth metallization, said fifth metallization formed so as to also be electrically insulated from all other metallizations by said piezoelectric mounting support member material.

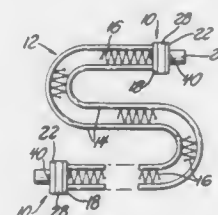
**4,951,371**  
**METHOD OF MANUFACTURING A LAMINATED FITTING FOR A HEAT EXCHANGER**  
Dominic N. Dalo, Buffalo, and Peter G. Wolf, Tonawanda, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 30, 1988, Ser. No. 213,748

Int. Cl.<sup>5</sup> B21D 53/08

U.S. Cl. 29—890.039

4 Claims



1. The method of making a fitting for a heat exchanger having flat tubing comprising the steps of; stamping from sheet stock first, second and third flat plates forming at least one oval shaped slot in the first plate to conform to flat heat exchanger tubing of oval shaped cross section, forming an opening in the second plate with an inwardly projecting nib adapted to block entry of the tubing, forming a port opening in the third plate, stacking the first, second and third plates with the second plate between the first and third plates and the second plate opening communicating with the port opening and the slot, and, bonding the plates at portions outboard of the opening and slot.

**4,951,372**  
**METHOD FOR ADJUSTING INJECTION PORTS IN A FUEL INJECTION VALVE**

Anton Messingschlager, Staffebach, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Division of Ser. No. 196,521, May 20, 1988, Pat. No. 4,907,745. This application Dec. 14, 1989, Ser. No. 450,720

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723698

Int. Cl.<sup>5</sup> B21D 53/00

U.S. Cl. 29—890.132

2 Claims



1. A method of precisely forming injection ports in a bottom plate for a nozzle body of a fuel injection valve which comprises:

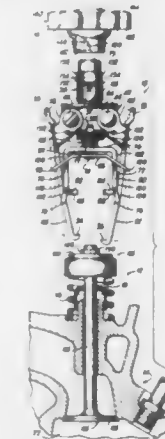
- producing a bottom plate being positioned in said nozzle body of said fuel injection valve downstream of a valve seat;
- forming injection ports in said bottom plate;
- subsequent to forming said injection ports applying a fluid mixture including a grinding paste under pressure to said injection ports to force the fluid mixture through the injection ports;
- measuring the quantity of fluid mixture passing through said injection ports per unit of time;
- comparing the volume of fluid flow per unit of time with a desired actual value; and

continuing the flow of fluid mixture through the injection ports until a desired volume is measured per unit of time.

**4,951,373**  
**VALVE SPRING COMPRESSION TOOL**  
William E. Shultz, 239 N. Main St., Lombard, Ill. 60148  
Filed Feb. 23, 1989, Ser. No. 314,110  
Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—217

18 Claims



1. A valve spring compressing tool including a pair of gripping leg members operatively connected to straddle a valve spring, on opposed sides thereof, said leg members each including a gripping means disposed on a lower portion thereof for gripping an undersurface of a coil spring; compression means for compressing the coil spring on opposite sides thereof at points above the gripping means, said compression means operatively interconnected on an elongated post such that rotation of the post in opposite directions will cause the compression means to move toward and away from the gripping means to compress the coil spring or allow the coil spring to expand, said elongated post including a plurality of planar surfaces on an upper portion thereof adapted to receive a removable handle; a removable handle having an internal bore adapted to be securely and removably connected to an upper portion of the elongated post, said elongated post including an elastomeric O-ring held within an annular groove disposed within the planar surfaces of the elongated post for removably securing the handle thereto.

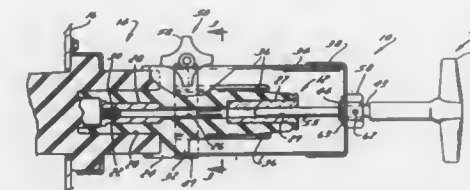
**4,951,374**  
**BUSHING INSTALLATION TOOL**  
William E. Barry, Brookfield, Wis., assignor to Speed Systems, Inc., Waukesha, Wis.

Filed May 9, 1988, Ser. No. 192,008

Int. Cl.<sup>5</sup> B23P 19/04

U.S. Cl. 29—240

15 Claims



14. A bushing installation tool for mounting a bushing insert onto a bushing well, the bushing insert including an elastomeric housing having a central bore, and an electrically conductive tube in the bore having a threaded socket at one end and a cylindrical shoulder proximate one end of the elastomeric housing, the bushing well including a threaded stud, said tool comprising,

a cylindrical housing formed from a flexible plastic material having a number of slots in one end, a cap mounted on the other end of said housing, a clamp assembly mounted on said one end of said housing for securing said housing onto the cylindrical shoulder of said bushing insert, a hexagonal nut mounted on said cap for rotating said cylindrical housing in one direction, and a limited torque ratchet wrench mounted on said nut for turning said cylindrical housing in the other direction to screw the threaded socket in the bushing insert onto a threaded stud in the bushing well, said wrench being set to release when a predetermined torque is exerted on the bushing insert.

**4,951,375**  
**PUNCH PRESS UTILIZING WORKPIECE GUIDANCE SYSTEM TO EFFECT TOOL CHANGING**

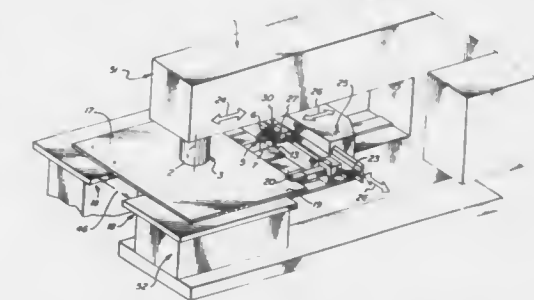
Werner Erlemaier, Gerlingen, Fed. Rep. of Germany, assignor to Trumpf GmbH & Co., Ditzingen, Fed. Rep. of Germany  
Filed May 23, 1989, Ser. No. 356,004

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818001

Int. Cl.<sup>5</sup> B23Q 3/155

U.S. Cl. 29—568

16 Claims

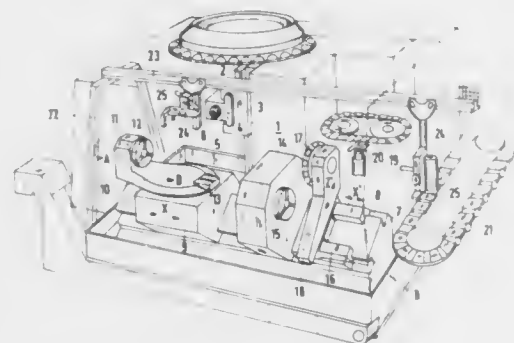


1. In a punching press, the combination comprising:

- a frame having a base and a head spaced thereabove with a ram reciprocatably mounted therein for movement relative to the base and defining a work station;
- tool mounting means in said head and base at said work station for releasably mounting a cooperating punch and die;
- a workpiece guidance system including a transversely extending elongated rail, said system being supported on said frame for clamping an associated workpiece and effecting its movement relative to said work station in horizontal perpendicularly oriented X and Y axes;
- at least one tool holder supported on said rail for movement therewith, said tool holder projecting forwardly therefrom and having tool seating portions at the forward end thereof; and
- means for moving said rail with said tool holder to cause said tool holder to abut the tool mounting means in said head and transfer a punch between said holder and said tool mounting means.

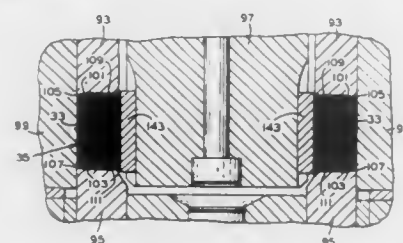


**4,951,376**  
**MACHINE TOOL**  
Peter Grund, Rieden, Fed. Rep. of Germany, assignor to Maho Aktiengesellschaft, Pfronten, Fed. Rep. of Germany  
Filed Nov. 14, 1989, Ser. No. 436,306  
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1988, 8814245[U]  
Int. Cl.<sup>5</sup> B23Q 3/155, 41/04  
U.S. Cl. 29—568 12 Claims



1. A machine tool comprising:  
a frame;  
a spindle case having means for mounting and rotating at least one machine tool by means of a working spindle;  
a pedestal mounted to said frame, said spindle case being mounted to said pedestal for mutually perpendicular horizontal and vertical movement with respect thereto;  
a rigid machine tool bed having linear guides thereon;  
a workpiece bench mounted for movement along said linear guides to position workpieces for milling by means of tools in said working spindle; and  
a lathe work unit mounted for movement along said linear guides and normally spaced from said workpiece bench, said lathe work unit comprising:  
means for retaining and rotating a workpiece;  
console means mounted for independent movement along said linear guides; and  
a tool turret head to which turning tools are removably secured for providing lathe work to the workpieces retained by said retaining and rotating means.

**4,951,377**  
**CORE SIZING METHOD**  
Harold L. Fritzsche, Rapid City, S. Dak., assignor to General Electric Company, Fort Wayne, Ind.  
Continuation of Ser. No. 220,800, Jul. 18, 1988, which is a division of Ser. No. 934,889, Nov. 25, 1986, Pat. No. 4,794,778, which is a continuation-in-part of Ser. No. 904,140, Sep. 4, 1986, Pat. No. 4,796,451, which is a division of Ser. No. 660,211, Oct. 12, 1984, Pat. No. 4,613,780. This application Aug. 4, 1989, Ser. No. 389,810  
Int. Cl.<sup>5</sup> H02K 15/02  
U.S. Cl. 29—596 40 Claims



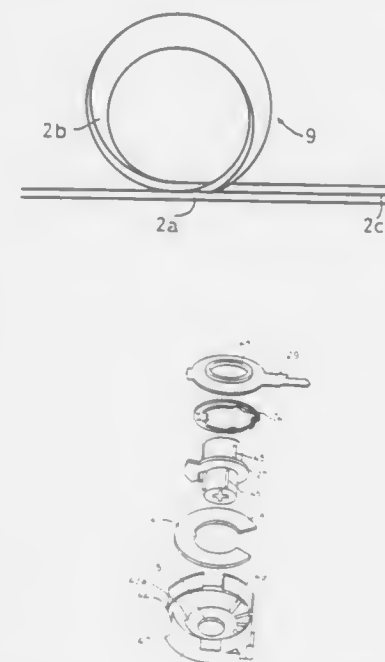
1. A method of fabricating an edgewise wound core from a lanced strip of generally thin ferromagnetic material having a

preselected thickness between a pair of generally opposite edges thereof and with a plurality of predeterminedly spaced apart tooth tips defining one of the opposite edges, the method comprising the steps of:  
deforming the strip generally edgewise thereof into a plurality of generally helical convolutions and forming thereby a generally tapered part along the other of the opposite edges on the helical convolutions with the thickness of the tapered part being less than the preselected thickness of the strip;  
accumulating the helical convolutions in a generally annular and axially extending stack thereof having a pair of generally opposite end faces thereby to comprise the core;  
disposing the tapered parts on the helical convolutions so as to define an outer circumferential surface of the core extending generally axially between the opposite end faces thereof and aligning the tooth tips on the helical convolutions generally in a plurality of tooth tip rows extending generally axially between the opposite end faces of the core thereby to define an inner circumferential surface of the core;  
supporting at least a part of one of the opposite end faces of the core;  
exerting a force against only the tapered part of one of the helical convolutions at the other of the opposite end faces of the core and deforming thereby only the tapered parts on at least some of the helical convolutions generally axially across the core between the opposite end faces thereof, respectively;  
compressing together only the tapered parts on the helical convolutions and abutting the tapered parts at least in part on axially adjacent ones of the helical convolutions in response to the deforming step, respectively;  
displacing the outer circumferential surface and the tooth tip rows of the core generally radially thereof in response to the compressing step and positively limiting the generally radial displacement of the outer circumferential surface and the tooth tip rows of the core thereby to predeterminedly size the inner and outer circumferential surfaces of the core.

**4,951,378**  
**PROCESS OF AUTOMATIC SEQUENTIAL PRODUCTION OF POTENTIOMETERS**  
Carlos L. Arriazu, Tudela, Spain, assignor to Compel, S.A., Pamplona, Spain  
Filed Jul. 12, 1989, Ser. No. 378,631  
Claims priority, application Spain, Jul. 14, 1988, 8802484; Jul. 14, 1988, 8802485  
Int. Cl.<sup>5</sup> H01C 17/28  
U.S. Cl. 29—593 10 Claims

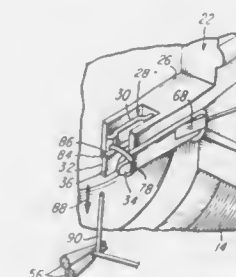
1. A process for the sequential and automatic production of potentiometers, said potentiometers comprising a non-conductive vessel-shaped casing, an arcuate resistance element disposed in said casing and being connected to said casing with connection terminals, a sliding unit-holder to which is attached a sliding unit by means of a generally circular collector plate parallel to and superimposed on the resistance element, said collector plate extending to form a collector terminal, said process for the sequential and automatic production of said potentiometers comprising the following steps: providing a continuous laminar band; moving said laminar band through process apparatus along a predetermined path of travel; forming at least two parallel rows of terminals in said laminar band for assembly along said path of travel; said terminals being positioned opposite one another and longitudinally displaced along said band to permit automated assembly thereof; positioning said casings proximate said band for operative engagement of said terminals within said casing; forming a first sub-assembly which integrates the casing, a resistance element and terminals in the form of a first continuous band, the terminals being initially formed from said continuous band; forming a second sub-assembly comprising said sliding unit-holder, said

sliding unit and said collector plate also on a second continuous band; coupling both sub-assemblies in the form of a third con-



tinuous band; and electrically and mechanically testing each potentiometer attached to said band.

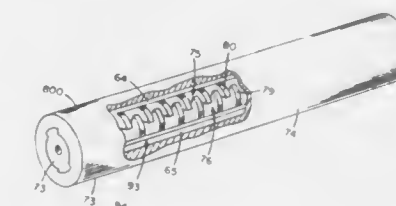
**4,951,379**  
**METHOD FOR CONNECTING WIRES TO TERMINALS HAVING TANGS AND CUTTING THE WIRES AT THE TERMINALS**  
Gary E. Clemenz, Greene County, Ohio, assignor to Globe Products Inc., Huber Heights, Ohio  
Filed Sep. 25, 1989, Ser. No. 412,316  
Int. Cl.<sup>5</sup> H02K 15/09  
U.S. Cl. 29—597 5 Claims



1. A method for connecting a wire segment having a fixed end and a free end to a terminal having a tang projecting from one face thereof and a side edge, said method comprising the steps of:  
laying a portion of said wire segment between one side of said tang and said face of said terminal;  
looping said wire segment around the other side of said tang; extending said wire segment past said tang and bending said segment so that a portion of said segment between said tang and said free end of said segment is extended over said edge of said terminal; and  
pulling said wire segment with sufficient force that said wire

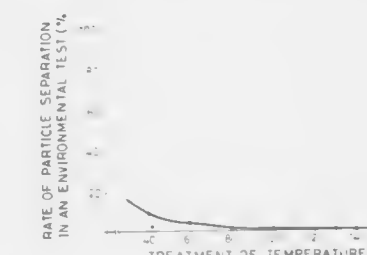
segment is so stretched that it breaks at a corner of said edge of said terminal.

**4,951,380**  
**WAVEGUIDE STRUCTURES AND METHODS OF MANUFACTURE FOR TRAVELING WAVE TUBES**  
Burton H. Smith, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.  
Filed Jun. 30, 1988, Ser. No. 201,730  
Int. Cl.<sup>5</sup> H01J 9/00  
U.S. Cl. 29—600 20 Claims



1. A method of making a slow-wave circuit comprising:  
forming a cylinder having an axis of symmetry of a first diameter from a bar of metal with axially diametrically opposed rails extending radially;  
first wire electric discharge machining with said first wire parallel to said axis providing a longitudinally extending hole through said bar centered on said axis;  
second wire electric discharge machining of said bar with said second wire in a transverse direction relative to said bar to form a first plurality of axially distributed electric circuits attached to said rails which in combination form said slow-wave circuit;  
said first and second machining of said electric circuits being performed while said bar is one integral body;  
inserting said machined bar into a cylindrical shell of greater internal diameter than said first diameter; and  
brazing said inserted bar to said shell to form said slow-wave circuit.

**4,951,381**  
**METHOD OF MANUFACTURING A MAGNETIC HEAD SLIDER**  
Koji Yamazaki, Shinichi Okuyama, Kazuhiko Watanuki, and Ken Toyoshima, all of Nagaoka, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan  
Filed Oct. 2, 1989, Ser. No. 416,215  
Claims priority, application Japan, Oct. 3, 1988, 63-249412; Oct. 3, 1988, 63-249414  
Int. Cl.<sup>5</sup> G11B 5/42  
U.S. Cl. 29—603 21 Claims



1. A process for manufacturing magnetic head sliders comprising the steps of:

separating a block of material comprised of sintered ferrite into a core block portion and a slider block portion; heat treating said core block portion and said slider block portion for a minimum of three hours at a temperature of at least 40° C., at an ambient air pressure of at least 1.5 Kg/cm<sup>2</sup> and at a relative humidity equal to or greater than 60%; processing said core block portion to form a head core and coupling said head core to said slider block portion such that a portion of said head core is separated from said slider block portion by an insulating material to form a magnetic gap; and shaping the coupled slider block portion and associated head core to produce a magnetic head slider.

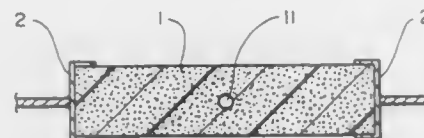
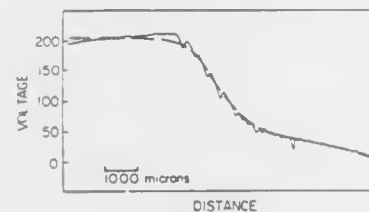
#### 4,951,382 METHOD OF MAKING A PTC CONDUCTIVE POLYMER ELECTRICAL DEVICE

Stephen M. Jacobs, Cupertino; Mary S. McTavish, Fremont, and Frank A. Doljack, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 656,046, Sep. 28, 1984, abandoned, which is a continuation of Ser. No. 364,179, Apr. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 250,491, Apr. 2, 1981, abandoned. This application Jan. 21, 1988, Ser. No. 146,653

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 29—611

18 Claims



1. A process for the preparation of an electrical device comprising (a) a cross-linked PTC conductive polymer element and (b) two electrodes which can be connected to a source of electrical power to cause current to flow through the PTC element, said process comprising cross-linking the conductive polymer by irradiating substantially the whole of the PTC element to a dosage of at least 120 Mrads.

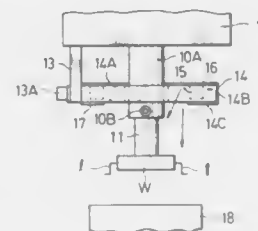
#### 4,951,383 ELECTRONIC PARTS AUTOMATIC MOUNTING APPARATUS

Kenji Amao, Chiyodamachi; Kazuyoshi Ohyama, Ashikaga; Kenji Mizoguchi, Ohizumimachi; Tsuneshi Akaishi, Chizumimachi, and Takayoshi Takeuchi, Ohizumimachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan  
Filed Nov. 9, 1989, Ser. No. 435,286

Claims priority, application Japan, Nov. 14, 1988, 63-286951; Aug. 21, 1989, 1-214389; Aug. 22, 1989, 1-216800  
Int. Cl.<sup>5</sup> H05K 3/30

U.S. Cl. 29—721

12 Claims



1. An electronic parts automatic mounting apparatus comprising:  
a removing head portion having a removing nozzle mounted thereon;  
part recognizing means for recognizing a tipped electronic part attracted by said removing nozzle; and  
part mounting means for correcting a deviation in position of the tipped electronic part on the basis of the recognized result of said part recognizing means to mount the part on a print substrate; characterized in that said part recognizing means comprises  
illumination means; first diffusion means for irradiating a light from said illumination means toward the tipped electronic part attracted by said removing nozzle;  
second diffusion means for transmitting, diffusing and irradiating the diffused light from the first diffusion means toward said tipped electronic part; and  
position detecting means for detecting a position of said tipped electronic part on which diffused light is irradiated through said first and second diffusion means by use of a part image pickup camera.

#### 4,951,384 METHOD OF MAKING A PTC CONDUCTIVE POLYMER ELECTRICAL DEVICE

Stephen M. Jacobs, Cupertino; Mary S. McTavish, Fremont, and Frank A. Doljack, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 656,046, Sep. 28, 1984, abandoned, which is a continuation of Ser. No. 364,179, Apr. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 250,491, Apr. 2, 1981, abandoned. This application Jan. 21, 1988, Ser. No. 146,652

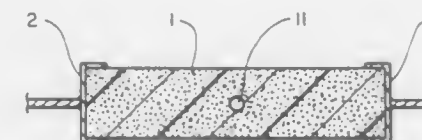
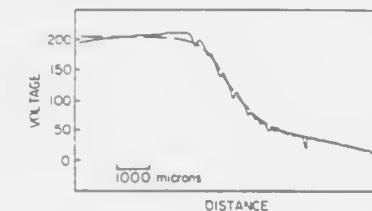
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> H05B 3/00

U.S. Cl. 29—611

14 Claims

1. A process for the preparation of an electrical device which comprises  
(1) melt-extruding a radiation cross-linkable PTC conductive polymer composition to form an extrudate which does not contain an electrode;  
(2) dividing the extrudate from step (1) into a plurality of discrete PTC elements, each PTC element being in the form of a strip with substantially planar parallel ends;  
(3) securing to each end of the PTC element an electrode in the form of a cap having (i) a substantially planar end which contacts and has substantially the same cross-section

tion as one end of the PTC element and (ii) a side walls which contacts the side of the PTC element; and



(4) irradiating substantially the whole of the PTC element to a dosage of at least 50 Mrads.

#### 4,951,385 ELECTRICAL HARNESS ASSEMBLY APPARATUS

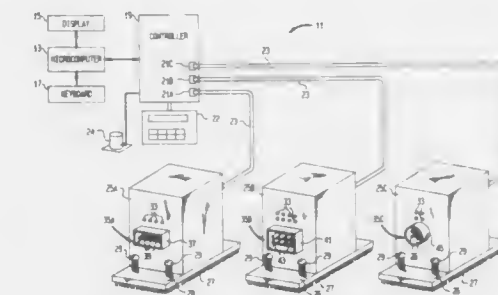
Joseph J. DeSanto, 14 Hillcrest Rd., Belle Mead, N.J. 08502

Filed May 16, 1989, Ser. No. 352,764

Int. Cl.<sup>5</sup> B23P 19/00

U.S. Cl. 29—754

18 Claims



1. An electric wire harness assembly apparatus comprising:  
a wiring surface having guide means for indicating the configuration of the harness to be assembled including the locations of a plurality of harness terminations;  
a plurality of termination modules each mounted adjacent a different one of the locations of the harness terminations;  
a plurality of harness terminators each mounted on one of the modules and having a plurality of assembly positions each for receiving a harness wire termination;  
a plurality of visual indicators each mounted on one of the modules adjacent one of the terminators, and each of the visual indicators having means for indicating which ones of the assembly positions is to receive a harness wire termination during assembly of a harness wire;  
a plurality of conductor terminals mounted on the modules adjacent each of the terminators in an array such that each assembled harness wire termination will contact a different one of the conductor terminals; and  
control means connected to said conductor terminals and said visual indicators for energizing said visual indicators to indicate the location of two positions of assembly for the wire terminations in said harness terminators.

#### 4,951,386 APPARATUS FOR DISASSEMBLING BEARING CAPS AND ASSEMBLING METALS

Katashi Itano, Okayama; Toshikazu Shirai, Kure; Yoshitomo Ishikawa, Higashihiroshima, and Yoji Nakao, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

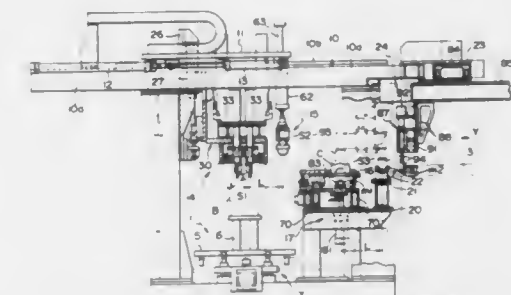
Filed Sep. 7, 1989, Ser. No. 403,929

Claims priority, application Japan, Sep. 8, 1988, 63-225359

Int. Cl.<sup>5</sup> B23P 21/00

U.S. Cl. 29—783

20 Claims



1. An apparatus for disassembling bearing caps from a cylinder block and assembling upper metals to the cylinder block, which apparatus comprising:  
a conveyor line on which a cylinder block to which the bearing caps are tentatively assembled is conveyed in an up-side down state;  
a disassembling/assembling station, arranged on said conveyor line, for disassembling the bearing caps from the cylinder block and assembling the upper metals to the cylinder block;  
a lower metal assembling station having lower metal assembling means, arranged beside said disassembling/assembling station, for assembling the lower metals to the bearing caps disassembled at said disassembling/assembling station;  
a metal feed station for feeding the upper and lower metals;  
a movable base which is reciprocally moved between a position above said lower metal assembling station and a position above said conveyor line;  
bearing cap disassembling means and upper metal holding means, commonly attached to said movable base, said bearing cap disassembling means disassembling the bearing caps tentatively assembled to the cylinder block and said upper metal holding means holding and assembling a plurality of upper metals to the cylinder block; and  
moving means, connected to said movable base, for moving said movable base so that a disassembling operation of the bearing caps from the cylinder block, an assembling operation of the upper metals to the cylinder block, and an assembling operation of the lower metals to the bearing caps are performed within one reciprocal movement of said movable base.

#### 4,951,387 INSTALLATION FOR MOUNTING AND REMOVING SCREWS OF AN EXTRUSION MACHINE

Jean Vannier, Mesvres Etang sur Arroux, France, assignor to Clextral, Courbevoie, France

Division of Ser. No. 127,998, Dec. 2, 1987, Pat. No. 4,839,955.

This application Mar. 15, 1989, Ser. No. 324,145

Claims priority, application France, Dec. 2, 1986, 86 16817

Int. Cl.<sup>5</sup> B23P 19/00

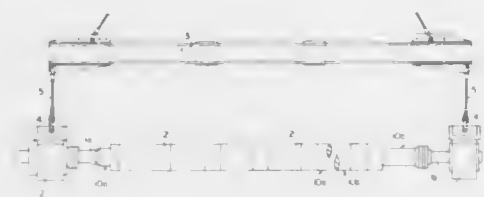
U.S. Cl. 29—799

10 Claims

1. Apparatus for selectively mounting and removing screws of an extrusion machine which comprises two screws driven in rotation and guided at opposite ends thereof by a bearing



forming with the screws a screwbearing assembly, each screw comprising a central driving shaft having splines, a plurality of hollow screw sections mounted on the driving shaft and having an inner wall defining grooves which are in engagement with the splines of the central shaft, and extrusion treating means on the periphery of the screw sections, said installation

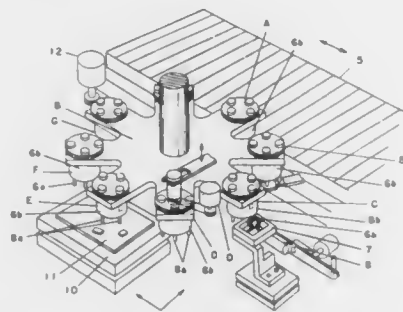


comprising means for hoisting the screw-bearing assembly of the extrusion machine, a work table provided with adjustable support means for said screws, a unit for withdrawing the screw sections from the respective shaft, a single section-hoisting device for removing each screw section withdrawn from the shaft, and a double section-hoisting device for simultaneously mounting a new section on the two splined shafts.

#### 4,951,388 METHOD OF MOUNTING ELECTRONIC COMPONENTS

Takao Eguchi, Nishinomiya, Masaru Nagaike, Hirakata; Moto-shi Shitanda, and Hiroshi Sawada, both of Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 20, 1989, Ser. No. 368,742  
Claims priority, application Japan, Jun. 21, 1988, 63-153195  
Int. Cl.<sup>5</sup> H05K 3/30; B32P 19/00  
U.S. Cl. 29—832 7 Claims



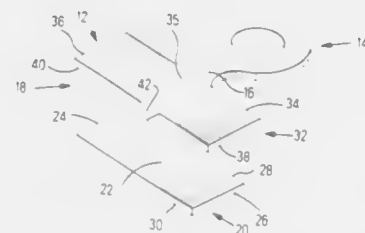
1. A method of mounting electronic components, comprising steps of:

sucking an electronic component by a suction nozzle provided at the tip of a mounting head;  
holding the sucked electronic component in position by a centering device having an opening and closing mechanism and provided separately from the mounting head, and while held by the centering device applying adhesive to a side of the electronic component opposite to that side sucked onto the suction nozzle; and  
mounting the electronic component to a designated position on a printed circuit board.

#### 4,951,389 METHOD FOR MAKING A WIRE BARREL TERMINAL

Robert C. Kaley, Landisville, and James H. Wise, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 31, 1989, Ser. No. 359,196  
Int. Cl.<sup>5</sup> H01R 4/20 6 Claims



1. A method for making a wire-receiving barrel terminal having a barrel with a desired inner diameter, comprising the steps of:

selecting a metal stock having the desired properties;  
stamping a terminal blank having a forward portion adapted to be formed into at least one contact section, an intermediate portion extending rearwardly from said forward portion, and a rearward portion adapted to be formed into first and second barrel sections, said second barrel section of said rearward portion being joined integrally with and extending rearwardly from said intermediate portion and said first barrel section being joined integrally with and extending from said second barrel section, said first and second barrel sections being generally rectangular, each having at least one lateral edge and a respective lateral dimension at least equal to the circumference of a circle of said desired wire-receiving barrel inner diameter;  
forming said first barrel section into a barrel-shaped member having its axis parallel to said at least one lateral edge of said first barrel section; and  
forming said second barrel section circumferentially around and adjacent said first barrel section, thus defining a wire receiving barrel having inner and outer walls, said at least one lateral edge of said first and second barrel sections being located along a continuous wall portion of said second and first barrel sections, respectively; whereby the resulting wire-receiving barrel has substantially two wall thicknesses circumferentially therearound and no open seam.

#### 4,951,390 TURBINE BLADE REPAIR

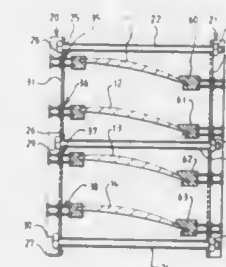
Michael J. Fraser, Broughton Hackett, and Raymond D. Le-gross, Henwick Park, both of United Kingdom, assignors to Refurbished Turbine Components Limited, Worcester, United Kingdom

Filed Sep. 15, 1989, Ser. No. 407,818  
Claims priority, application United Kingdom, Sep. 16, 1988, 8821766; Nov. 7, 1988, 8826019  
Int. Cl.<sup>5</sup> B21K 3/04 7 Claims

1. A method of repairing a turbine blade, said method including a repair step requiring the input of considerable thermal energy to the blade, said method further comprising the steps of:

(a) applying a physical force to a turbine blade to cause distortion in a direction opposite to the distortion expected to occur following the repair step incorporating the input of considerable thermal energy to the blade;

(b) carrying out said repair step requiring the input of considerable thermal energy;  
(c) removing any physical force applied to the blade;

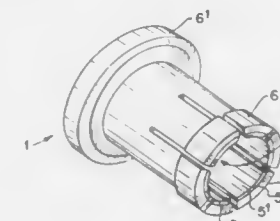


(d) carrying out a stress relieving heat treatment to said blade.

#### 4,951,391 METHOD OF MANUFACTURING FITTINGS FOR TUBE OR PIPE

Helio L. Seabra, Sao Paulo, Brazil, assignor to Alcon Corporation, Wayne, N.J.

Filed May 3, 1985, Ser. No. 730,391  
Int. Cl.<sup>5</sup> B23P 15/00 8 Claims



1. A method of manufacturing a sleeve insert for a tube fitting comprising the steps of:

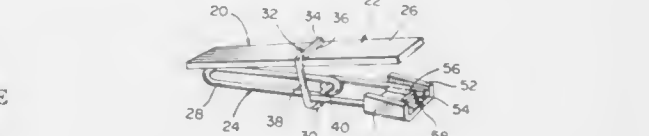
(a) forming a cylindrically shaped sleeve with:  
(1) an axial passage extending into one axial end thereof, and  
(2) a radial thickness at said one axial end that is larger than the radial thickness of the sleeve at an axially intermediate section to define a radially inwardly facing circumferentially extending gripping edge at said axial end;  
(b) forming a plurality of circumferentially spaced cut-aways into said gripping edge without forming burrs during the forming of the cut-aways, each of said cut-aways having a predetermined circumferential width and edges joining the gripping edge which are free of burrs; and  
(c) forming axially extending slots in said sleeve after step (b) to form a plurality of gripping fingers at the one axial end thereof, said slots extending radially through said sleeve and the gripping edge thereof and axially aligned with a separate one of said cut-ways, and also having a circumferential width in the gripping edge which is less than the circumferential width of said cut-aways.

#### 4,951,392 SYNTHETIC PRESS ROLL FOR PAPER MACHINES AND METHOD FOR MANUFACTURING THE SAME

Veijo Miihkinen, Jyväskylä, Finland, assignor to Valmet Paper Machinery Inc., Finland

Filed Jan. 6, 1986, Ser. No. 816,628  
Claims priority, application Finland, Jan. 9, 1985, 850107  
Int. Cl.<sup>5</sup> B21D 53/00 17 Claims

1. A press roll for use in paper machine, comprising:  
a cylinder mantle having a surface layer defining an outer surface of said press roll,  
said surface layer comprising a mixture of first metal particles and second particles of an inorganic compound, said first and second particles being dispersed throughout said surface layer.



4,951,393  
WIRE STRIPPER  
Archie C. Wallace, 718 Elmer Rd., Elmer, La. 71424  
Filed Jul. 18, 1989, Ser. No. 381,256  
Int. Cl.<sup>5</sup> B21F 13/00 10 Claims

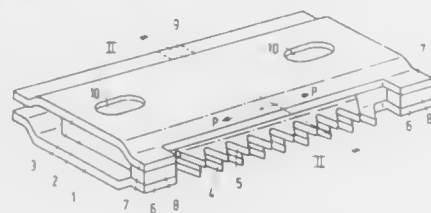
1. A wire stripper comprising a pair of elongated members oriented in overlying relation, means connecting said members and spacing them apart and enabling said members to rock about a transverse pivot axis to enable the ends of the elongated members to move toward and away from each other about the transverse axis, a blade mounted longitudinally on one end of one of said members with the blade projecting toward the other of said members and including a sharpened edge for forming a slit in insulation material on an insulated wire when the wire is positioned between said members and the end of the member having the blade thereon is biased toward the adjacent end of the other member and the insulated wire moved longitudinally, and means on the end of one of said members adjacent the blade forming a guide for movement of the insulated wire while in engagement with the blade, said member having the blade thereon being a generally U-shaped wire member having a transverse plate rigidly secured to the free ends of the wire member, said plate having said blade having said blade mounted thereon with the sharpened edge of the blade being inclined and facing toward the opposite end of said wire member, said wire member including a pair of generally parallel legs with each leg having a loop therein to receive the means connecting said elongated members.

#### 4,951,394 HAIR CUTTING UNIT

Albert J. Meijer, Drachten, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.  
Continuation of Ser. No. 159,819, Feb. 24, 1988, abandoned.  
This application Oct. 24, 1989, Ser. No. 430,092  
Claims priority, application Netherlands, Mar. 4, 1987, 8700516 8 Claims

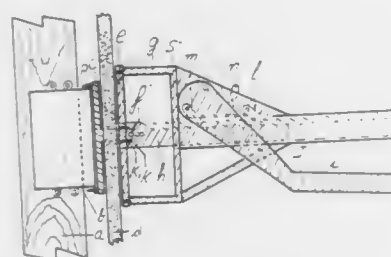
1. A cutting unit for cutting hair comprising a first and a second cutting member each comprising teeth, the second

cutting member being driven so as to perform a reciprocating movement with respect to the other cutting member, the second cutting member being present between the first cutting member and a locking member, wherein the first cutting mem-



ber and the locking member are connected together by means of spacers, the second cutting member reciprocating under a force that is discontinuously imposed on said second cutting member when hair is cut by the locking member.

**4,951,395**  
**DRYWALL DIE-CUTTING FOR ELECTRICAL OUTLET BOXES**  
Jose Lameiro, 137 Hillmount Ave., Toronto, Ontario, Canada (M6B 1X7)  
Filed Dec. 17, 1987, Ser. No. 135,239  
Int. Cl.<sup>5</sup> B26F 1/00  
U.S. Cl. 30—360 5 Claims

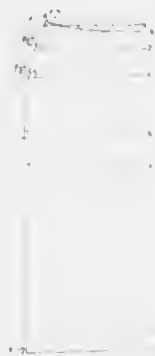


1. A die-cutting tool for locating and cutting openings of a given size and shape in installed drywall boards, to permit access to electrical outlet boxes, said die-cutting tool comprising:

- an interior male plate having a lengthwise and widthwise perimeter of the same shape as the front face of the given outlet box, said plate having front and back flat surfaces, and,
- a plurality of spring prongs on said back surface that provide a temporary means of support to the outlet box for said plate by penetrating through the existing holes of the outlet box or friction against the inner walls of the outlet box if no holes are present;
- a rectangular knife blade attached perpendicularly at the center of the front surface of the plate, said blade terminating in a rectangular pyramidal sharp point having a hole across the width side to provide a connection with an extracting mechanism,
- an exterior female plate having front and back flat surfaces with an interior opening of a slightly larger perimeter but identical shape as the male plate, with a plurality of fitting holes therein with which to secure the extracting mechanism;
- said extracting mechanism having as a base, a table with a plurality of legs corresponding to said fitting holes on said female plate, and further including
- a handle with an interior rectangular guide, housing a rectangular sliding ratchet shaft, said shaft capable of moving back and forth and defining means for attachment to said knife blade; said handle having attached

thereto a shaft-retaining pawl and an arm lever with a second pulling pawl co-operating with the ratchet shaft so that when the arm lever is pressed against the handle, a resulting backwards displacement is produced, pulling the male plate against the drywall board and the female plate, thus causing the said male plate to pass through the inside of the female plate, cutting out a piece of the drywall board in the same shape as the male plate and producing said opening in the panel in front of the outlet box.

**4,951,396**  
**BASIC FORMULA OF AN ACTIVE LAYOUT DRAWING IN SKIRTS TAILORING**  
Ding S. Huang, 5th Floor, No. 9-16, Lane 344, Nanking W. Rd., Taipei, Taiwan  
Filed May 24, 1988, Ser. No. 198,174  
Int. Cl.<sup>5</sup> A41H 3/00  
U.S. Cl. 33—17 R 5 Claims



1. In a method of preparing a pattern drawing of a custom-tailored skirt from at least some of the data obtained from a measure around a person's waistline, a measure of a first lower waistline around the person's abdomen 5 cm below said waistline, a measure of a second lower waistline around the person's abdomen 10 cm below said waistline, a measure around the largest part of the person's hip, a measure around the bottom part of the person's hip, and a measure of the desired length of the skirt, the steps comprising:

- drawing from a preselected point (1) a horizontal line in a leftward direction, and a vertical line in a downward direction,
- setting a point (2) 5 cm downward from said point (1) along said vertical line,
- drawing a horizontal line leftward from said point (2) at a length equal to at least  $\frac{1}{4}$  of said measure of said first lower waistline so as to obtain a point (3), and so as to take any desired slack into consideration,
- setting a point (4) downwardly from the vertical line originating from the point (1) so as to correspond to the depth from said waistline to said largest part of the hip, which depth should be about 10 cm,
- drawing a horizontal line leftward from the point (4) so as to correspond in length to at least  $\frac{1}{4}$  of said measure around said second lower waistline, so as to obtain a point (5), and so as to take any desired slack into consideration,
- setting a point (6) downwardly along said vertical line originating from said point (1) so as to correspond to the depth from said waistline to the largest part of the hip, which should be about 22 cm,
- drawing a line leftward from the point (6) at a length equal to at least  $\frac{1}{4}$  of the measure around the largest part of the hip so as to obtain a point (7), and so as to take any desired slack into consideration,
- setting a point (8) downwardly from the vertical line originating from the point (1) so as to correspond to the depth

from said waistline to said bottom of the hip, which should be about 28 cm,

drawing a horizontal line leftward from the point (8) at a length equal to at least  $\frac{1}{4}$  of the measure around the bottom of the hip, so as to obtain a point (9), and so as to take any desired slack into consideration,

setting a point (10) downwardly along said vertical line originating from the point (1) at a distance equal to the selected length of the skirt, and drawing therefrom leftwardly a horizontal expansion line for expansion of the skirt,

setting a point (11) at the same position as the point (7), drawing a vertical line downwardly from the point (7), denote a point obtained from an intersection of the last-named downwardly directed vertical line with said horizontal line for expansion of the skirt as point (12),

drawing a curved line (13) upwardly from the point (11) to cross with the horizontal line extending from the point (1), setting a point (14) at  $\frac{1}{6}$  of the spacing between the points [(8) and (9)] (6) and (7) above an intersection of the curved line (13) with the horizontal line extending leftwardly from the point (1),

setting a point (16) 1.3 cm downwardly along the vertical line originating at the point (1) at a distance equal to  $\frac{1}{4}$  of the measure around said waistline,

setting a point (17) leftwardly along the horizontal line emanating from the point (1) at a distance equal to  $\frac{1}{4}$  of the measure around the waistline (A') to yield a size for the waistline (A');

whereby, upon connecting a periphery of the points (1) through (17) with lines, a basic layout pattern is obtained.

**4,951,397**  
**PARKING SCALE**  
Charles K. Durio, 6445 Shady Brook Ln., Apt. 2346, Dallas, Tex. 75206  
Filed Apr. 7, 1988, Ser. No. 178,568  
Int. Cl.<sup>5</sup> B43L 7/00; G01B 3/02  
U.S. Cl. 33—494 3 Claims



1. A parking scale comprising a plurality of indicia defining increments corresponding directly to the width of adjacent side-by-side parking spaces when drawn according to a specified drawing scale, wherein said plurality of indicia define increments that directly correspond to the width of conventional parking spaces drawn according to scales selected from the group consisting of one inch equals 200 feet, one inch equals 100 feet, one inch equals 60 feet, one inch equals 50 feet, one inch equals 40 feet, one inch equals 30 feet, and one inch equals 20 feet.

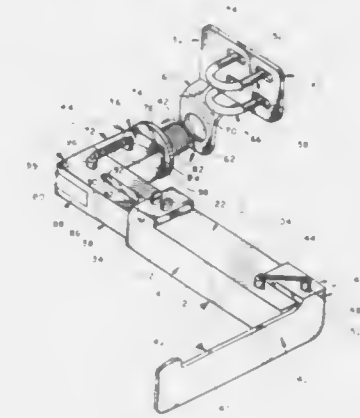
**4,951,398**  
**MEASURING AND GUIDING ATTACHMENT FOR A CHAIN SAW**  
Robert W. Bennett, and Arthur C. Mills, Sr., both of, Route 1 Box 1375, Yakima, Wash. 98901  
Filed Nov. 7, 1989, Ser. No. 432,848  
Int. Cl.<sup>5</sup> B27G 23/00; B27B 17/00  
U.S. Cl. 33—630 9 Claims

1. A measuring and guiding attachment for use on a chain saw comprising:

- a mounting unit which includes
  - a monolithic base having bracket holes defined there-through and an L-shaped outrigger arm having a bolt-receiving hole defined through one leg thereof, and
  - two U-bolt brackets which extend through said base

holes, each U-bolt bracket having external threads thereon to attach said mounting unit to a front handle-bar of a chain saw;

- a monolithic tenon element which includes
  - a body having a lower portion and a tenon on an upper portion and a spring anchor on said body,
  - a circular mounting element on said lower portion, and
  - an externally threaded shank extending from said tenon element circular mounting element to fit through said mounting unit outrigger arm bolt-receiving hole for threaded engagement with a bolt to attach said tenon element to said mounting unit;
- a monolithic mortise element which includes
  - a rectangular body having a mortise defining yoke on one end thereof and an elongated slot defined there-through, said slot having sides and a width dimension as measured between said sides,
  - a spring anchor near said mortise element body one end, and
  - said mortise defining yoke receiving said tenon element to form an end mortise and tenon joint to couple said tenon element to said mortise element;
- a first spring anchored at one end thereof to said tenon element spring anchor and at another end thereof to said mortise element spring element anchor;
- a monolithic telescoping collar element which includes



- an elongated rectangular body having a top surface and a bottom surface and a thickness dimension measured between said top surface and said bottom surface,
- a blind-ended bore in said telescoping collar element body and which extends longitudinally of said collar element body from a collar element body first end, said blind-ended bore being sized and shaped to slidably receive said mortise element rectangular body so that said mortise element body can slide into and out of said blind-ended bore,
- two jamming element receiving bores defined through said telescoping collar element body near said collar element body first end to intersect said blind-ended bore,
- a spring anchor on said top surface and located near a second end of said telescoping collar element body,
- coupling means for attaching said mortise element to said telescoping collar element, said telescoping collar element coupling means including two jamming elements each having
  - a fingerhold portion,
  - a body portion extending through one of said jamming element receiving holes,
  - a jamming portion which is elliptical in cross sectional shape and has a major axis that is larger than said mortise element blind-ended slot width and a



- minor axis that is smaller than said mortise element blind-ended bore slot width,
- (6) each of said jamming elements being rotatably received in said jamming element receiving holes to move between a jamming position with said jamming portions snugly engaging said mortise element body adjacent to said mortise element slot and a releasing position with said jamming portions disengaged from said mortise element body,
- (7) a pawl element pivot on said top surface and located adjacent to said telescoping collar element body second end;
- (F) a pawl element pivotally mounted on said pawl element pivot pin;
- (G) a monolithic caliper plate which includes
- (1) a body,
- (2) a lobar element on a distal end of said caliper plate body
- (3) two ears on a proximal end of said caliper plate body,
- (4) said ears being spaced apart a distance which corresponds to the thickness of said telescoping collar element body to receive said telescoping collar element body therebetween,
- (5) a spring anchor on one ear of said two ears, and
- (6) a ratchet gear mounting axle on said one ear;
- (H) a second spring anchored at one end thereof to said telescoping collar element spring anchor and at another end thereof to said caliper plate spring anchor; and
- (I) a ratchet gear mounted on said ratchet gear mounting pin for engaging said pawl element.

4,951,399

## POSITION MEASURING DEVICE

Alfons Ernst, Traunreut, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenbain GmbH, Traunreut, Fed. Rep. of Germany

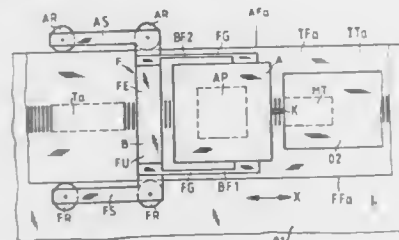
Continuation of Ser. No. 70,691, Jul. 7, 1987, abandoned. This application May 5, 1989, Ser. No. 394,263

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1986, 3624485

Int. Cl.<sup>5</sup> G01B 5/02

U.S. Cl. 33—706

12 Claims



1. In a position measuring device for measuring the relative position of two objects during a measurement interval, comprising a graduation in a graduation plane of a graduation carrier which is connected to one object, a scanning unit which is coupled to another object via a coupling link arranged in the direction of measurement, object guide means for guiding said one object relative to said other object, and auxiliary guide means for guiding said scanning unit relative to the graduation carrier independent of the guidance of said object guide means, the improvement comprising said coupling link (K) having only one rotational degree of freedom perpendicular to the graduation plane (TF) of the graduation carrier (TT) and being located between the scanning unit (A) and said other object (02), and said auxiliary guide means (F) including a guide element (FE) which guides said scanning unit (A) parallel to the direction of measurement (X) on a guide surface (FF) perpendicular to the graduation plane (TF) of the graduation carrier and a guide link (FG) for joining said guide element (FE) with said scanning unit (A), said guide link (FG) comprising at least one translational degree of freedom perpendicular

to the direction of measurement (X) during said measurement interval.

4,951,400

## METHOD FOR PROCESSING PLASTIC PACKAGED ELECTRONIC DEVICES

Blaine K. Elliott, Columbia, and Duane A. Briggs, Lexington, both of S.C., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 27, 1988, Ser. No. 289,858

Int. Cl.<sup>5</sup> F26B 3/00

U.S. Cl. 34—15

24 Claims

1. A method for processing an electronic device packaged in plastic comprising:

protecting said device with a carrier; and

baking said device and carrier to controllably drive off moisture absorbed by said plastic.

4,951,401

## SOLDER REFLOW APPARATUS

Ryoichi Suzuki, and Hidetoshi Nakamura, both of Tokyo, Japan, assignors to Senju Metal Industry Co., Ltd., Tokyo, Japan

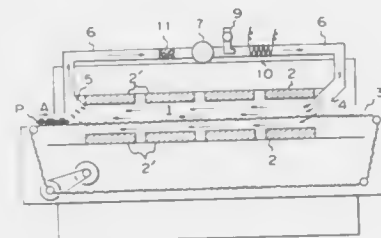
Filed Jan. 30, 1989, Ser. No. 303,201

Claims priority, application Japan, Sep. 16, 1988, 63-120425[U]

Int. Cl.<sup>5</sup> F26B 21/06

U.S. Cl. 34—77

17 Claims



1. A solder reflow apparatus of the tunnel type comprising:

a tunnel provided with a preheating zone and a main heating zone;

a passageway for circulating a hot gas through at least a portion of the tunnel;

flow-producing means for causing the gas to circulate through said passageway;

a conveyor for transporting an object to be soldered along a portion of said passageway; and

a filter which is disposed in said passageway for cleaning the gas as it circulates through said passageway.

4,951,402

## REAR-ENTRY SKI BOOT AND MANIPULATION APPARATUS THEREFOR

Louis Benoit, Frangy; Bernard Nerrinck, La Balme-De-Sillingy; Joseph Morell, Annecy, and Roland Petrini, Chambéry, all of France, assignors to Salomon S.A., Annecy Cedex, France

Continuation of Ser. No. 51,765, May 20, 1987, Pat. No. 4,790,081, which is a division of Ser. No. 700,302, Feb. 11, 1985, Pat. No. 4,698,920. This application Jun. 28, 1988, Ser. No. 212,708

Claims priority, application France, Feb. 10, 1984, 84-02900; May 18, 1984, 84 08598

The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

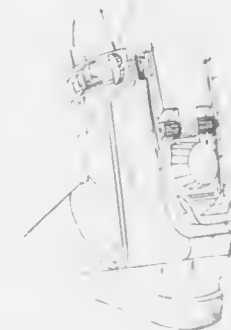
Int. Cl.<sup>5</sup> A43B 5/04

U.S. Cl. 36—50

22 Claims

1. A manipulation element for use with a ski boot having a rear spoiler, said manipulation element being movable in an opening direction and closing direction, said manipulation

element being operatively associated with it least one cable which is attached to said boot, said manipulation element adapted to be journaled relative to said rear spoiler and comprising at least two ribs for protecting at least a portion of said



at least one cable, said manipulation element further being configuration and adapted to be arranged relative to said ski boot such that pivoting of said manipulation element in a pre-determined direction relative to said rear spoiler moves said rear spoiler in said closing direction.

4,951,403

## SINGLE STAGE SNOWTHROWER

Jaroslav J. Olmr, Rock Hill, S.C., assignor to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 224,907, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 75,433, Jul. 20, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 365,211

Int. Cl.<sup>5</sup> E01H 5/09

U.S. Cl. 37—262

4 Claims



1. A single stage snowthrower, comprising:

an impeller housing having a top wall, a back wall, and spaced side walls defining a front opening into said housing, said top wall having a chute opening therein;

an impeller rotatably mounted between said side walls, and means for rotating said impeller to throw snow upwardly and through said chute opening;

a plate, having a bottom end, mounted on said top wall adjacent said chute opening, said plate being reciprocally movable relative to said top wall to define a variable throat area below said chute opening through which snow thrown by said impeller passes; and

means for locking said plate in a selected position relative to said back wall to vary the distance between said bottom end of said plate and said backwall.

4,951,404

## GREETING CARD OR THE LIKE

Stanley A. Lithwick, 10 Orrin Avenue, Ottawa, Ontario, Canada (K1Y 3X6)

Filed May 4, 1988, Ser. No. 190,193

Claims priority, application Canada, Nov. 17, 1987, 551980

Int. Cl.<sup>5</sup> G09F 1/00

U.S. Cl. 40—124.1

7 Claims



1. A greeting, display or the like card comprising, in combination, a first panel having an outer face and an inner face, a second panel having an outer face and an inner face, said panels being hinged to each other; and a container generally integral with the first panel and having transparent opposing surfaces, said transparent opposing surfaces being so arranged that the interior of the container is visible through said transparent surfaces when viewing either one of the faces of the first panel; and wherein a portion of the inner face of the second panel which is overlapped by the container when the greeting card is in a folded state, is visible through the container when viewing the outer face of the first panel in a direction generally perpendicular to the first panel, said second panel displaying a motif on said inner face thereof, the motif being disposed at a part of the inner face of the second panel which is overlapped by said container when the two panels are in a closed, overlapping state.

4,951,405

## APPARATUS FOR INTERCHANGEABLE OUTDOOR ILLUMINATED SIGNS

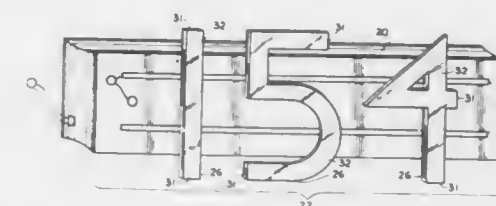
Edwin K. Sabala, 14100 Walsingham Rd., No. 20, Largo, Fla. 34644

Filed Mar. 23, 1988, Ser. No. 172,261

Int. Cl.<sup>5</sup> G09F 13/28

U.S. Cl. 40—551

16 Claims



1. An apparatus for the illuminated display of figures, the apparatus further comprising:

an elongated shroud housing one or more generally parallel slotted tracks, each of which are generally parallel with the length of said elongated shroud, and are adapted to house one or more insulated electrical conductors;

said slotted tracks each being further adapted to house, within said slots, an exposed conducting surface;

said slotted tracks each being further adapted to be in electrical communication with one of said insulated electrical conductors;

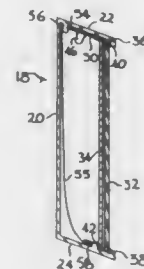
said apparatus further comprising one or more display figures, said display figures comprising one or more holding members, said holding members being adapted to snugly fit within a slotted track and spaced such that each said holding member will spatially correspond with a corresponding slotted track;

said holding members each being further adapted to hold a said display figure for illumination, said display figure having one or more electrical lights positioned so as to define a letter, numeral, or other selected design;

said elongated shroud further having a concave upper surface and a concave lower surface;

and in which said figures further comprise an upper holding element and a lower holding element said holding members adapted to snugly fit upon the said upper and lower concave shroud surfaces.

**4,951,406**  
**ILLUMINATED SIGN FOR RESIDENCE STREET ADDRESS**  
Honoré M. Lemire, 3685, Châteaufort, Longueuil, Quebec, Canada (J4L 4A1)  
Filed Jan. 17, 1988, Ser. No. 207,962  
Int. Cl.<sup>5</sup> G09F 13/04  
U.S. Cl. 40—576



1. An illuminated street address sign for residence adapted to be connected across electrical terminals of a button actuating a doorbell having a voltage of 8 to 16 volts, said sign comprising:

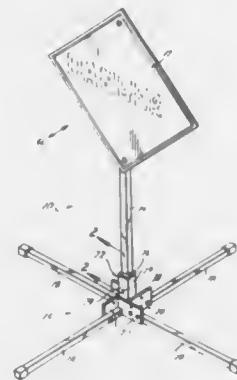
an elongated shallow casing, having a backwall and a roof portion forwardly extending from said backwall, said backwall being covered with a reflective surface, and said roof portion having a track tilted towards the reflective surface;

a set of juxtaposed miniature, light emitting diodes (LED) mounted adjacent said roof portion and oriented for directing light on said reflective surface, said roof portion shielding said LED from frontal projection;

a substantially flat translucent plate mounted in front of said roof portion and extending over said casing for closing the casing and enclosing the LED and said reflective surface, said translucent plate adapted to receive the light reflected from said reflective surface and to prevent glare, said plate adapted to receive substantially opaque digits on its surface for obstructing light received from the reflective surface;

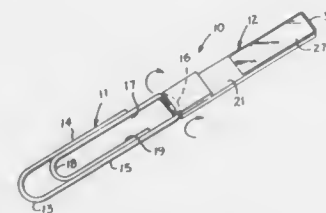
a circuit board mounted in said track, said circuit board comprising a printed circuit on which the LED's are mounted in series with said terminals, at least one pair of diodes in said circuit for maintaining the current in said LED's in a unidirectional direction, said casing having a removable lateral wall, the removal of said wall adapted to free the end of said track to allow the circuit board to slide in and out of said track, whereby the circuit is constantly energized to project light through the translucent plate and adapted to be obstructed by the opaque digits.

**4,951,407**  
**YIELDABLE SIGN STAND**  
William A. Werner, Salem, Oreg., assignor to Flex-O-Lite, Inc., St. Louis, Mo.  
Filed Nov. 4, 1987, Ser. No. 117,032  
Int. Cl.<sup>5</sup> G09F 15/00  
U.S. Cl. 40—608  
21 Claims



1. A wind resistant sign stand for supporting signs subjected to wind loads, the sign stand having a sign mounting means and a base supporting the sign stand on a surface, the sign stand including resilient means to permit a sign subjected to a wind load to move in response to the wind load without displacing the sign stand base, the resilient means including means to return the sign to its original position on removal of the wind load, the resilient means including a tension spring, the sign stand including an enclosure and the tension spring being mounted in the enclosure, the resilient means including a first means connecting a first end of the tension spring to the sign mounting means and a second means anchoring a second end of the tension spring to the enclosure at a location remote from the first connecting means, the sign stand including stop means to limit movement of a sign in response to a wind load, the stop means further including means for at least partially positioning the stop means.

**4,951,408**  
**PAPER CLIP TAB DEVICE**  
Thomas S. Banks, 1012 Summertree Circle, Plano, Tex. 75025  
Filed Feb. 16, 1989, Ser. No. 310,914  
Int. Cl.<sup>5</sup> G09F 3/16  
U.S. Cl. 40—641  
8 Claims



1. A paper clip tab device for visual indication of sheet material comprising, in combination,

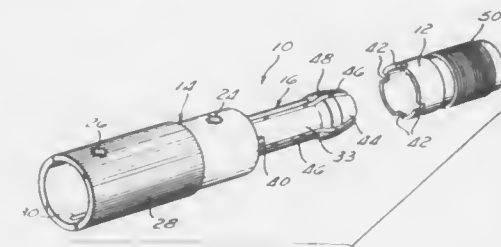
a paper clip including an aligned first loop, a second loop, and a third loop oriented medially of said first and second loops, and

a second leg joining the first and second loops, a third leg joining the second and third loops, and a first and fourth leg of the paper clip terminating in a free end depending from the first and third loops respectively, said first, second, third, and fourth legs are spaced and parallel to one another, and

the second and third legs define a predetermined width, and an elongate tab marker including securement means for selective securement of said tab marker to the first loop or the second loop, and

wherein the tab marker includes a lower plate hingedly mounted to an aligned upper plate, the lower plate and upper plate include parallel side edges and parallel upper and lower surfaces, and wherein the securement means includes a first hook and loop fastener section secured to an upper surface of the lower plate adjacent a pivot hinge pivotally securing the lower plate and upper plate together, and a second hook and loop fastener section secured to an upper surface of the upper plate adjacent the pivot hinge.

**4,951,409**  
**SHOTGUN CHOKE WRENCH AND CASE**  
Daniel Froid, Garden Grove, Calif., assignor to Qwikkee Products, Inc., Mineral Wells, Tex.  
Filed Oct. 26, 1988, Ser. No. 262,819  
Int. Cl.<sup>5</sup> F41C 27/00  
U.S. Cl. 42—90  
9 Claims



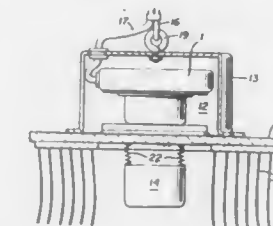
1. An apparatus for installing, removing and storing a shotgun choke, comprising:

an outer part having an opening sized to hold a shotgun choke;

an inner part slidably connected to said outer part for movement from a position in which the majority of said inner part is within said opening to a position in which the majority of said inner part is outside said opening; said inner part having means for releasably retaining the shotgun choke; and

a wrench engageable with the outboard end of the shotgun choke, said wrench being mounted on said inner part, said wrench and said outer part connected to rotate together whereby said outer part in combination with said wrench may be used as a choke wrench to remove or install the shotgun choke.

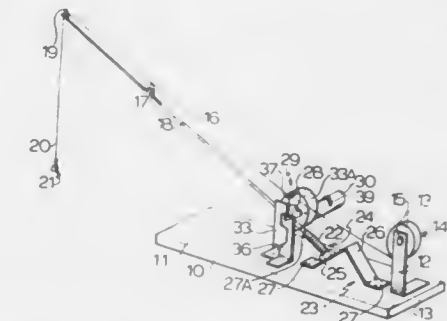
**4,951,410**  
**ELECTRONIC FISH ATTRACTOR WITH ACOUSTIC SOUNDER**  
Binh T. Ly, 9965 Nob Hill La., Sunrise, Fla. 33351  
Filed Nov. 14, 1988, Ser. No. 270,646  
Int. Cl.<sup>5</sup> A01K 97/00  
U.S. Cl. 43—17.1  
5 Claims



1. An electronic fish attractor comprising: at least one transducer for generating sound waves; a sounding board mechani-

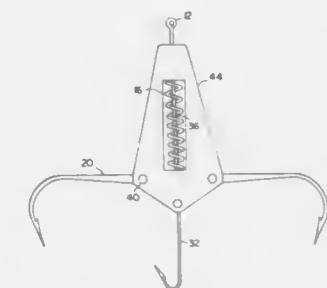
cally coupled to said transducer, and acoustically coupled to water containing the fish; a transfer plate disposed between said transducer and said sounding board; a low frequency electric wave power source for generating low frequency electric wave energy connected to said transfer plate via said transducer; a float chamber for floating the fish attractor in water; means for attaching a towing line to the attractor, a ballast attached to the attractor, said ballast being of a weight less than the buoyancy of the attractor including the buoyancy of the float chamber for maintaining the attractor floating in upright position in water, and including seaweed-like appendages to the attractor.

**4,951,411**  
**ELECTRICALLY OPERATED FISHING JIGGER**  
Vern J. Ecker, Box 871, Lynn Lake, Manitoba, Canada (R0B 0W0)  
Filed Sep. 12, 1989, Ser. No. 406,078  
Claims priority, application Canada, Sep. 13, 1988, 577268  
Int. Cl.<sup>5</sup> A01K 97/10  
U.S. Cl. 43—19.2  
20 Claims



1. A fishing jigger comprising in combination a substantially horizontal base, a source of power supported above said base, cam means rotatable in a substantially vertical plane by said source of power, support means on said base to support a fishing rod by the butt end thereof, said support means including a resilient means for connecting to the butt end of the rod and supporting said rod diagonally upwardly and outwardly and underneath said cam means, said resilient means normally urging part of said rod adjacent the butt end thereof, against said cam means, and fishing line reel means mounted on said base.

**4,951,412**  
**FISH CATCHING DEVICE**  
Richard P. Zappe, Fort Walton Beach, Fla., assignor to Zappe, Inc., Fort Walton Beach, Fla.  
Filed May 24, 1989, Ser. No. 356,720  
Int. Cl.<sup>5</sup> A01K 83/02  
U.S. Cl. 43—37  
1 Claim



1. A fish catching device comprising a first loop for attach-



ing a fishing line, said device further comprising a casing to which is attached a second loop where a hook or bait may be attached, said first and second loops being at opposite ends of said fish catching device;

said first loop being connected to, or part of, a rod which enters into said casing; said rod being free to move up and down in said casing when a force relative to said casing is applied to said fishing line; said rod being surrounded by a spring which keeps said rod extended within the casing when no force is applied to said fishing line relative to said casing; at one end of said rod is a first gear assembly which is capable of meshing with a second gear assembly; said fish catching device further comprising one or more tines which pivot about a stationary point(s), said stationary point(s) being located within said casing; connected to each of said tines and also pivoting about said stationary point(s) is said second gear assembly; said second gear assembly meshes with said first gear assembly such that movement of said rod causes said first and second gear assemblies to engage; the tines and pivot point of said fish catching device are positioned such that the engagement of said first and second gear assemblies causes the tines to rotate about said pivot point such that the end of said tines approach the proximity of said second loop.

4,951,413

TROLLING LINE DEPRESSOR

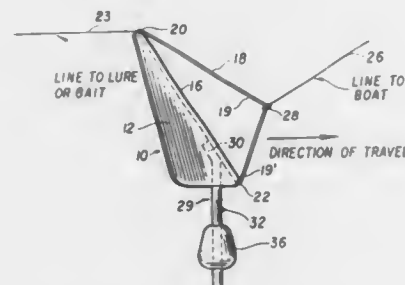
Bruce D. Blevins, 2101 Weaver Pike, Lot 31, Bristol, Tenn. 37620, and Steven Stone, P.O. Box 569, Abingdon, Va. 24210  
Filed May 24, 1989, Ser. No. 356,242

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.<sup>5</sup> A01K 85/00

U.S. Cl. 43—43.13

6 Claims



1. In a troll line depressor comprising a plate defining two triangular wings interconnected along a spine, the wings being symmetrical about a plane of symmetry containing the spine, the wings being swept backward with a dihedral angle of at least 100° therebetween, so as to provide lateral stability when the depressor is towed through water, and a weight affixed to the plate, with its center of gravity below the lowermost portion of the plate, the improvement comprising, in combination therewith,

- a rigid bridle affixed to said spine and extending within said plane of symmetry forward from the spine, said bridle comprising a single piece of rigid wire bent to define two straight segments joined at an apex, said apex lying at a perpendicular distance from the spine approximately one-third the length of the spine, and said legs being affixed to respective opposite ends of said spine, and
- a towing ring mounted on said bridle and normally positioned at said apex so that when the depressor is towed through water by a towing line attached to said ring, hydrodynamic drag is developed on the towing line, said ring further being slidable along said bridle to either end of said spine, to allow the depressor to tilt to an inactive position, thereby relieving the hydrodynamic drag, when external forces are applied at either end of the depressor.

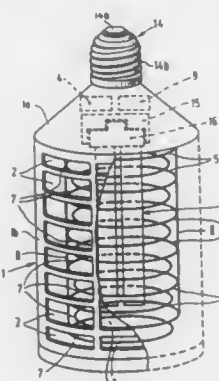
4,951,414  
DEVICE FOR ELECTROCUTING INSECTS  
Jan A. C. Mewissen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
Filed Mar. 31, 1989, Ser. No. 332,681

Claims priority, application Netherlands, May 9, 1988, 8801204

Int. Cl.<sup>5</sup> A01M 1/22

U.S. Cl. 43—112

15 Claims



1. A device for electrocuting insects, comprising:
  - a compact low-pressure mercury vapor discharge lamp, said lamp comprising a sealed discharge vessel defining a folded discharge path and having a pair of adjacent sealed ends, a lamp base holding said discharge vessel at said sealed ends, a pair of discharge electrodes disposed at said sealed ends, and a pair of contact pins extending from said lamp base each electrically connected to a respective electrode;
  - a housing comprising an elongate portion extending the length of said discharge vessel and an adjoining base portion, said elongate portion having a plurality of apertures, a lamp cap having first and second contacts and secured to the exterior of said base portion, said base portion comprising a lamp socket for receiving said contact pins of said lamp base, said lamp being secured in said socket;
  - first and second electrically conductive wire grids surrounding said discharge vessel; and
  - means for securing said wire grids in said housing such that said grids are electrically insulated from each other,
  - a transformer disposed in said base portion for generating high voltage for said grids, said transformer having a pair of outputs each connected to a respective grid and a pair of inputs each connected to a respective first and second lamp cap contact; and
  - a ballast disposed in said base portion for controlling lamp operating current, said ballast being connected between one of said lamp cap contacts and one of said discharge electrodes, and the other of said discharge electrodes being connected to said other lamp cap contact.

4,951,415

CULTURING APPARATUS

Waichiro Kawarabayashi; Koichi Matsubara; Toshihiro Yoshio; Hikaru Yamagata; Shigeru Takahashi; Yukimasa Hirata, and Yoshiko Shirane, all of Kuga, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan  
Filed Jul. 7, 1988, Ser. No. 216,863

Claims priority, application Japan, Jul. 7, 1987, 62-170629; Apr. 30, 1988, 63-108030

Int. Cl.<sup>5</sup> A01G 31/00

U.S. Cl. 47—60

9 Claims

1. A culturing apparatus, comprising:
  - a culturing tank for culturing in a culture medium a cellular material selected from the group consisting of cells, organs and tissue strips of a plant internally of said tank;

- a cutting means for cutting cultured plant bodies arranged within said culturing tank;
- a push-out means for urging said plant bodies against said

communicating with said nutrient solution in said nutrient solution container.

4,951,417

METHOD OF CONTAMINATED SOIL REMEDIATION AND APPARATUS THEREFOR

Steven L. Gerken; Brian M. Bell, and John P. Isley, all of Valparaiso, Ind., assignors to Canole Environmental Services Corp., Porter, Ind.

Continuation-in-part of Ser. No. 34,295, Apr. 3, 1987, Pat. No. 4,782,625. This application Nov. 4, 1988, Ser. No. 268,106  
The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> F23G 5/04

U.S. Cl. 47—1,42

72 Claims

- cutting means, said push-out means being movable so as to be urged against said plant bodies; and
- feeding means for feeding an oxygen-containing gas into said culture medium.

4,951,416

NUTRIENT SUPPLY SYSTEM FOR HYDROPONIC SYSTEMS

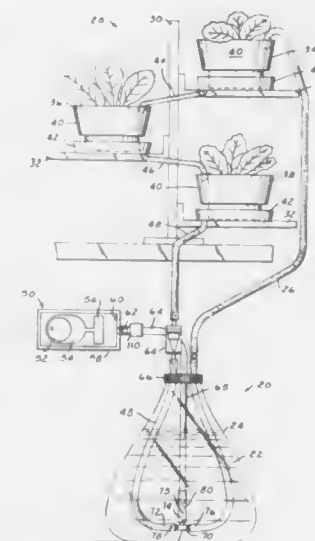
Dale H. Gutridge, 9410 Placid Way, Howell, Mich. 48843

Filed Apr. 26, 1989, Ser. No. 343,899

Int. Cl.<sup>5</sup> A01G 9/24, 31/02

U.S. Cl. 47—62

12 Claims



1. A hydroponic system comprising:
  - at least one plant container;
  - a nutrient solution container containing a nutrient solution;
  - an air pump supplying high-pressure air into an air line, said air line extending into said nutrient solution container;
  - a nutrient solution supply line extending from said nutrient solution container to said plant container to supply nutrient solution to said plant container;
  - a nutrient solution return line extending from said plant container into said nutrient solution container to return nutrient solution from said plant container back to said nutrient solution container; and
  - a T-connector having a return line connection at one end, said return line connection being connected to said nutrient solution return line, a supply connection being connected to said nutrient solution supply line at an opposed end of said T-connector from said return line connection, and an air line connection connected to said air line at a position intermediate said return and supply line connections, said T-connector having a small opening adjacent said return line connection portion, said small opening

1. A method of on-site remedial soil restoration activity of a work site contaminated with volatile substances disposed at said site at an earlier time, which substances have soaked into said soil, the steps comprising:

- removing contaminated soil from the ground and transporting it to an initial feed hopper means;
- conveying said contaminated soil from said initial feed hopper means to an inlet and of the interior of a low temperature thermal treatment chamber with the soil mixing capability;
- exposing granules of the soil to the ambient temperature in the chamber which is sufficient to cause a volatilization of said volatile substances but insufficient to result in any significant incineration, thereby causing said volatile substances to be volatilized inside said chamber;
- evacuating the interior of said chamber by drawing hot gases and entrained soil fines containing the volatilized substances therefrom;
- following an exposing of the granules of the soil to the ambient temperature in said chamber, conveying the now cleansed said from said chamber to a selected location;
- extracting any organics, acids and phosphorus present in the gas stream containing the volatilized substances; and
- discharging the now clean gas stream into the ambient atmosphere.

4,951,418

GLASS RUN MOLDING

James F. Keys, Port Clinton, Ohio, assignor to The Standard Products Company, Cleveland, Ohio

Continuation of Ser. No. 178,141, Apr. 6, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 483,323

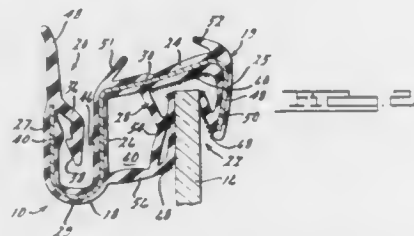
Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 49—440

7 Claims

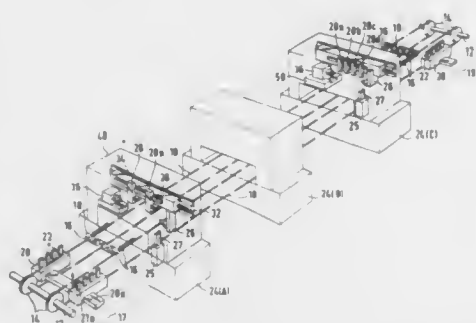
1. A glass run channel molding for an automobile window comprising:
  - a "U"-shaped cross-section portion forming a mounting channel;
  - an "L"-shaped cross-section portion, one end of said "L"-

shaped portion extending from an end of one leg of said "U"-shaped portion to form a glass run channel having inner and outer legs joined by a web, said inner leg being a leg of said mounting channel, said mounting channel and glass run channel having open mouths facing in opposite directions, at least one elastomeric rib extends from the outer leg of said glass run channel into said glass run channel toward said tubular biasing and sealing element; sealing member for sealing said molding with respect to an associated door frame, said sealing member extending from said L-shaped cross-section portion on a said opposite said opening; and



a tubular elastomeric biasing and sealing element secured in said glass run channel for sealing a window in said glass run channel and for biasing an edge portion of said window outwardly against the elastomeric rib on the outer leg of said glass run channel, said tubular element having a first wall joined intermediate said web of said glass run channel, a second wall joined to said second leg of said glass run channel, a third wall contiguous with a portion of said web, and a fourth wall contiguous with one leg of said "U"-shaped channel, said tubular biasing and sealing element having a pair of elastomeric ribs extending from said first wall into said glass run channel such that said elastomeric ribs extending from said outer leg and tubular biasing and sealing element oppose one another.

**4,951,419**  
**FLEXIBLE MANUFACTURING SYSTEM**  
Wilfried Weber, Freudenstadt, Fed. Rep. of Germany, assignor to Maschinenbau Grieshaber GmbH & Co., Wolfach, Fed. Rep. of Germany  
Filed Nov. 30, 1988, Ser. No. 278,036  
Claims priority, application Fed. Rep. of Germany, Nov. 30, 1987, 3740597  
Int. Cl. B24B 5/04  
U.S. Cl. 51—3  
3 Claims



1. Flexible manufacturing system for transporting parts comprising a random number (n) of processing stations, one station being arranged behind another station, transport belt means passing through said stations for transporting said parts to and from said stations and running transversely to said processing stations, workpiece holders arranged in groups on said transport belt for conveying said parts and comprising a

number of workpiece receptors, said conveying means receiving the workpieces at the beginning of the manufacturing system, lead in magazine means for filling said workpieces at the beginning of the manufacturing system, a lead out magazine at the end of said system, means for transferring the processed workpieces to said lead out magazine, said transferring means being an endless chain conveyor, said endless chain conveyor comprising two chains driven by a common shaft, means for laterally adjusting said chains relative to a remaining central axis, multiple lifts and single lifts positioned adjacent to said system, means for laterally adjusting said chains, multiple lifts, and single lifts, said lifts being positioned transversely to said endless conveying means and located exteriorly relative to said chains, said workpiece receptors being prismatically open at their tops, said work receiving station being positioned at the beginning of said endless conveying means, transfer means located at each station for transferring said workpieces to said stations and from said stations, and a workpiece discharging station at the end of said endless conveying means which when lowered causes all of the workpiece receptors to either receive or discharge workpieces as the movement of said chain stops.

**4,951,420**  
**POLISHING APPARATUS**  
Volkmar R. Sorg, 10610 Salisbury Drive, Surrey, British Columbia, Canada (V3R 6Z3)  
Filed May 16, 1989, Ser. No. 353,134  
Int. Cl. B24B 27/04, 27/027  
U.S. Cl. 51—58  
10 Claims

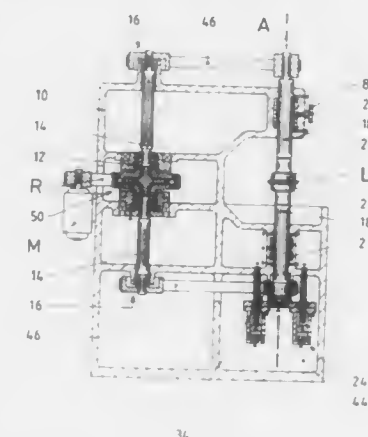


1. A polishing apparatus comprising:  
a support base;  
a power source to drive reciprocating means mounted to said support base;  
means mounted to said support base to vary the amplitude of reciprocation of said reciprocating means;  
an extension member mounted to said support base by a universal joint and connecting the reciprocating means to a remote polishing member comprising a gripping portion and a receiving member adapted to accept a polishing stone, said extension member comprising a rigid hollow outer tube having a movable inner core to transmit the reciprocating motion of said reciprocating means to the receiving member of said remote polishing member.

**4,951,421**  
**DEVICE FOR CENTERING OF OPTIC LENSES IN A MECHANICAL MOUNTING, IN PARTICULAR DURING EDGE CUTTING AND BEVELLING**  
Erhard Brueck, Heuchelheim, Fed. Rep. of Germany, assignor to Wilhelm Loh Wetzlar Optikmaschinen GmbH & Co. KG, Wetzlar, Fed. Rep. of Germany  
Filed Dec. 23, 1988, Ser. No. 289,920  
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744115  
The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.  
Int. Cl. B24B 5/04, 9/14; B23B 19/02, 23/04  
U.S. Cl. 51—105 LG  
6 Claims

1. A device for centering optic lenses in a mechanical mounting for edge cutting and beveling, comprising:  
a housing;  
a pair of first guide sleeves supported in said housing;

two coaxially aligned second guide sleeves snugly surrounded by and supported in a respective said first guide sleeve, said first guide sleeves being radially thinner than said second guide sleeves, said second guide sleeves having support bearings disposed therein;  
two coaxially aligned centering spindles supported in respective said second guide sleeves on said bearings for rotational movement relative to said respective second guide sleeves, at least one of said centering spindles being supported for limited axial movement relative to the associated said second guide sleeve, said centering spindles having respective ends which face one another, said facing ends carrying clamping cups for clamping a lens therebetween;

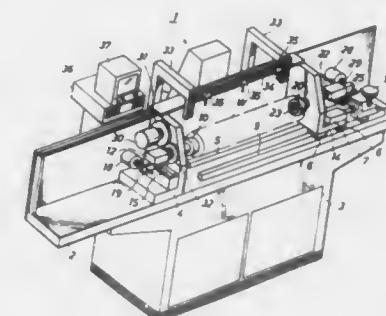


drive means for rotating said centering spindles;  
clamping means disposed in said housing for moving one said centering spindle axially toward the other said centering spindle; and  
means in said housing for defining cavities which respectively surround said first guide sleeves such that said cavity defining means and respective said first guide sleeves define respective pressure chambers radially therebetween, means for loading said pressure chambers with a pressurized fluid, each said first guide sleeve being radially inwardly deformable toward a respective said centering spindle in response to a predetermined pressure level in said pressure, whereby said second guide sleeves are grippingly clamped by said first guide sleeves.

**4,951,422**  
**EXTERNAL CYLINDRICAL GRINDING UNIT**  
Hiroyuki Ibe, and Takashi Mori, both of Fukui, Japan, assignors to Shin-Etsu Handotai Company Limited, Tokyo, Japan  
Filed Nov. 6, 1989, Ser. No. 432,432  
Claims priority, application Japan, Nov. 10, 1988, 63-282559  
Int. Cl. B24B 49/00  
U.S. Cl. 51—165.71  
5 Claims

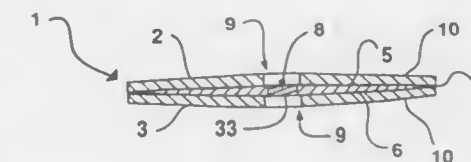
1. An external cylindrical grinding unit comprising not only the conventional grinding system, but also:  
(i) an improved supporting system for supporting a cylindrical body to be ground consisting of  
(a) a pair of coaxial tubular clamp means clamping the cylindrical body between the ends thereof, and to rotate about their common axis, and,  
(b) a pair of rod means reciprocally mounted through the hollow of the respective tubular clamp means said rod means which are translatable in a direction normal to their axes;  
(ii) a measurement system consisting of  
(a) a plurality of sensors measuring the dimensions of cross sections of the cylindrical body at different locations

along the common axis of the coaxial tubular clamp means;  
(iii) an arithmetic system for calculating an optimal center axis of the cylindrical body based on the dimensions of cross sections measured by the sensors;  
(iv) an alignment system for aligning the optimal center axis of the cylindrical body with the common rotation axis of the tubular clamp means, the alignment system consisting of



(a) a first drive means controllably rotatable at least one of the tubular clamp means,  
(b) two second drive means controllably translatable the respective rod means in a direction normal to the axis of the respective rod means; and  
(v) a driving system consisting of  
(a) a third drive means to move at least one of the tubular clamp means in the axial direction,  
(b) two fourth drive means to controllably move respective rod means in the axial direction.

**4,951,423**  
**TWO SIDED ABRASIVE DISC WITH INTERMEDIATE MEMBER**  
Courtland M. Johnson, P.O. Box 690 Prospect Hill Rd., Hancock, N.H. 03449, assignor to Cynthia L. B. Johnson and Courtland M. Johnson, Hancock, N.H.  
Continuation of Ser. No. 242,787, Sep. 9, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 440,465  
Int. Cl. B24B 41/00  
U.S. Cl. 51—168  
19 Claims

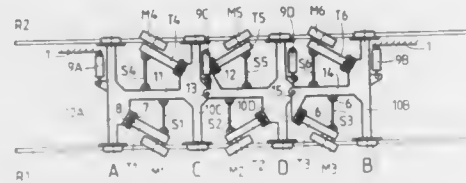


1. A disposable, flexible, nonvitrified double-sided sanding disc, for rotatable engagement with a support member having engaging means on one end thereof, said double-sided sanding disc comprising:  
flexible circular backing means defining a central opening and having two opposed substantial circular planar surfaces with abrasive material permanently affixed directly to and only on both said circular planar surfaces prior to use; and  
an intermediate member, defining a central bore, being positioned in said central opening and being attached to said backing means, said central bore and said central opening being coaxial with one another, a portion of said central bore being engagable with engaging means on one end of a support member for transmitting rotational movement



from said support member to said sanding disc wherein said engagable portion of said central bore lies substantially between said two planar surfaces whereby said sanding disc can be detachably connected to said support member by said intermediate member so that both abrasive surfaces can be used for finishing an article.

**4,951,424**  
**MACHINE FOR THE GRINDING OF RAILS**  
 Fritz Buhler, Ecublens, Switzerland, assignor to Les Fils d'Auguste Scheuchzer S.A., Switzerland  
 Filed May 15, 1989, Ser. No. 352,133  
 Claims priority, application European Pat. Off., May 30, 1988, 88810348.8  
 Int. Cl.<sup>5</sup> E01B 31/17  
 U.S. Cl. 51—178 18 Claims

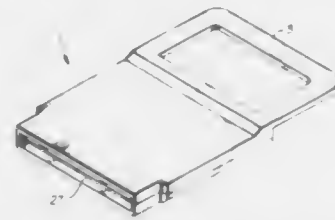


1. A machine for the grinding of rails, which is equipped with at least one carriage (3) guided by at least one rail line and which is provided with two end axles (10A, 10B) connected by means of a frame (10) and with at least one grinding head (T1 to T6) for each rail line (R1, R2), carrying at least one peripheral grinding wheel (M1 to M10) and installed adjustably between the two end axles (10A, 10B), said carriage being equipped with a system for guiding the grinding heads (T1 to T6), comprising at least one rail tracer (C) which is installed between the end axles and is displaceable in the transverse direction and which is designed to follow one of the rail lines (R1), and members for positioning the grinding heads (T1 to T6), these members consist of at least two successive articulated elements mounted between the end axles (10C) carrying the said tracers (C), the connection of said elements to the said frame (10) being only made, on one side, by means of a point of articulation (17, 27, 32) of a first element (16; 25, 26; 31) near one of the end axles (10A), and on the other side, by means of a point of articulation (20, 24, 30, 35) of a second element (18; 23, 28, 29; 34) near the other end axle (10B), at least one grinding head, preferably two grinding heads, for each rail line (R1, R2) being articulated on each element by means of connecting rods (S1 to S10), said members for positioning the grinding heads being controlled by the said tracer (C) and positioning the grinding heads (T1 to T6) in such a way that the contact point of each grinding wheel (M1 to M10) follows the rails independently of the curves.

**4,951,425**  
**COMPUTER AND VIDEO GAME CLEANING CARTRIDGE**  
 Herschel Naghi, 7962 Oceanus Dr., Los Angeles, Calif. 90046  
 Filed Nov. 2, 1989, Ser. No. 430,627  
 Int. Cl.<sup>5</sup> B24P 15/02  
 U.S. Cl. 51—205 WG 7 Claims

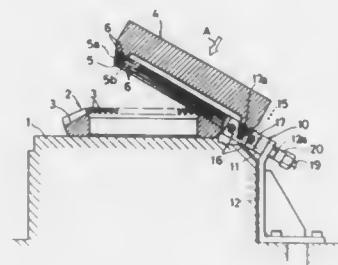
1. A cleaning cartridge for cleaning the electrical contacts of a printed circuit board connector block located within a computer or video game cartridge receptacle, the cleaning cartridge comprising:  
 a planar board comprising a layer of burnishing material on at least one planar surface adjacent one edge of the board; and  
 a housing configured to receive the planar board and to fit

within the cartridge receptacle, such that when inserted in the receptacle, the burnishing layer on the board engages



and cleans the electrical contacts of the printed circuit board connector block.

**4,951,426**  
**GRINDING FLUID FEEDER APPARATUS**  
 Hidehiro Kuroko; Yoshihiro Ikeda; Katsumi Nakayama, and Seiichi Sasaki, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Aug. 7, 1989, Ser. No. 390,303  
 Claims priority, application Japan, Aug. 11, 1988, 63-198883  
 Int. Cl.<sup>5</sup> B24B 55/02  
 U.S. Cl. 51—267 3 Claims

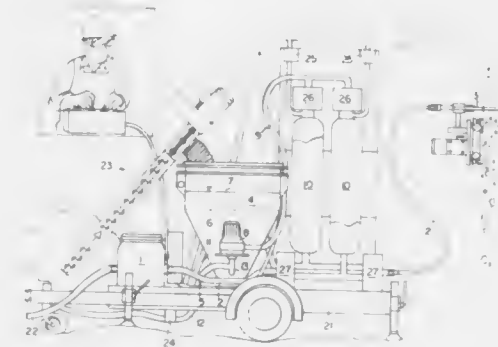


1. A grinding fluid feeder apparatus for a grinding machine for machining a spiral bevel gear in which a tapered annular grinding portion is formed of conical grinding faces provided on the inner and outer circumferences of an annular grinding wheel and a tooth surface of a workpiece is ground by said conical grinding faces, said grinding fluid feeder apparatus comprising:  
 a feeder block having a groove portion allowing the annular grinding portion to sink therein and a sump provided on a side surface of the groove portion;  
 a grinding fluid feed passage communicating with the groove portion; and  
 a cover plate provided at one of the openings of the groove portion on an end surface of the feeder block so as to abut on the annular grinding portion, wherein said feeder block is disposed to have the other of the openings of the groove portion abut on a tooth space of the workpiece.

**4,951,427**  
**REFRACTORY METAL OXIDE COATED ABRASIVES AND GRINDING WHEELS MADE THEREFROM**  
 Philippe D. St. Pierre, Worthington, Ohio, assignor to General Electric Company, Worthington, Ohio  
 Filed May 30, 1989, Ser. No. 358,728  
 Int. Cl.<sup>5</sup> B24D 3/00  
 U.S. Cl. 51—293 39 Claims

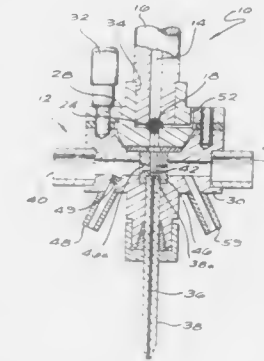
1. An abrasive particle having at least 20% by wt. refractory metal oxide selected from the group consisting of titania, zirconia, alumina and silica substantially covering the surface of said abrasive particles.

**4,951,428**  
**DEVICE FOR WORKING AT A HARD MATERIAL**  
 Carl A. Strömdahl, Enskede, Sweden, assignor to Conjet AB, Nacka, Sweden  
 Filed Jul. 26, 1989, Ser. No. 385,551  
 Claims priority, application Sweden, Sep. 27, 1988, 8803406  
 Int. Cl.<sup>5</sup> B24C 7/00  
 U.S. Cl. 51—436 3 Claims



1. A device for working at hard materials comprising a high pressure liquid pump (1) for supplying liquid via a high pressure conduit (2) to a nozzle (3) for creating a jet stream, and a container (4) for holding abrasive, characterized in that the container (4) has a sieve (6) for sieving said abrasive under a liquid surface (7) in the container, a low pressure pump (8) for feeding said sieved abrasive via a low pressure conduit (9) to a pressure vessel (10), and means (11) coupled to said high pressure liquid pump for pressurization of the pressure vessel for feeding said sieved abrasive to said high pressure conduit (2).

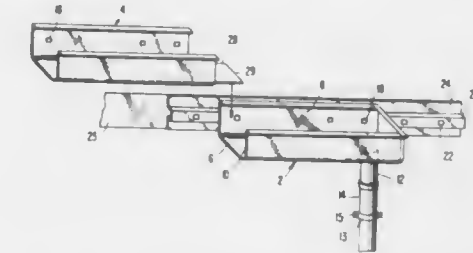
**4,951,429**  
**ABRASIVEJET NOZZLE ASSEMBLY FOR SMALL HOLE DRILLING AND THIN KERF CUTTING**  
 Mohamed Hashish, Kent, and Steven J. Craigen, Auburn, both of Wash., assignors to Flow Research, Inc., Kent, Wash.  
 Filed Apr. 7, 1989, Ser. No. 335,054  
 Int. Cl.<sup>5</sup> B24C 5/04  
 U.S. Cl. 51—439 17 Claims



17. An abrasivejet nozzle assembly for use in an abrasive jet cutting system comprising:  
 housing means having an inlet end for receiving high pressure liquid, and an outlet end downstream from the inlet end;  
 jet-forming orifice-defining means positioned between the inlet and outlet ends for forming a high velocity liquid jet from the high pressure liquid,  
 the housing means including an abrasive-conducting inlet passage for conducting abrasive from a source external to

the nozzle assembly to a mixing region downstream from the jet-forming orifice so that abrasive becomes entrained in the jet,  
 the housing means further including a discharge conduit downstream from the mixing region for conducting the jet and entrained abrasive out of the nozzle assembly.  
 the housing means further including a venting passage in communication at one end with the environment external to the nozzle assembly, and in communication at its other end with the high velocity jet at a region between the jet-forming orifice and the mixing region, thereby providing an alternative path for Bernoulli-induced flow of external environmental gasses toward the jet-forming orifice which is different than the path defined through the discharge conduit.

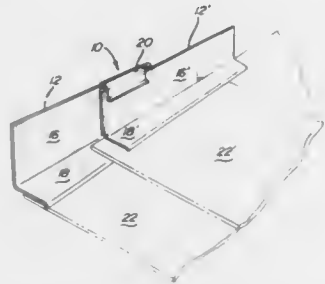
**4,951,430**  
**REMOVABLE GUTTER AND FASTENER SYSTEM**  
 David Gottlieb, P.O. Box 1170, Scarsdale, N.Y. 10583  
 Filed Sep. 11, 1989, Ser. No. 405,522  
 Int. Cl.<sup>5</sup> E04D 13/00  
 U.S. Cl. 52—11 8 Claims



1. A removable gutter and fastener system comprising:  
 at least one elongated detachable roof gutter section three feet in length comprising a substantially flat bottom member, substantially flat front and rear walls attached lengthwise along the bottom member's opposite edges forming a channel therebetween, each flat bottom member terminating at one end in a flat bottomed beveled extending lip approximately two inches in length which helps seal against leakage when inserted into the free end of an adjacent gutter section, said rear wall bearing three hooks along its outer surface, one of said three hooks being located one-half inch from the no lip end of the gutter section, a second of said three hooks being located eight inches from the beveled lip end of the gutter section, and the third of the said three hooks being located three inches from the beveled lip end of the gutter section,  
 a terminating end gutter section comprising a substantially flat bottomed member, substantially flat front and rear walls attached lengthwise along the bottom member's opposite edges forming a channel therebetween, the flat bottom member terminating at one end in a flat bottomed beveled extending lip approximately two inches in length which helps seal against leakage when inserted into the free end of an adjacent gutter section, said terminating end gutter section terminating at its other end with an end flap, said rear wall bearing three hooks along its outer surface, one of said three hooks being located one-half inch from the no end-flap end of the gutter section, a second of said three hooks being located eight inches from the beveled lip end of the gutter section, and the third of the said three hooks being located three inches from the beveled end of the gutter section,  
 an elongated removable downspout gutter section adapted for mating with said roof gutter section and comprising a substantially flat bottom member containing a hole near a first end, substantially flat front and rear walls attached lengthwise along the bottom member's opposite edges forming a channel therebetween, an end flap located at the

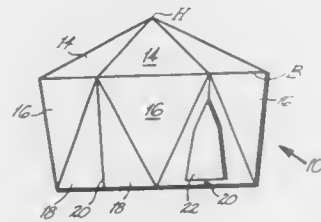
end near which the said hole is situated, said rear wall bearing three hooks along its out surface, one of said three hooks being located one-half inch from the no end flap end of the gutter section, a second of said three hooks being located eight inches from the end flap end of the gutter section, and the third of the said three hooks being located three inches from the end flap end of the section, and a downspout section attached to the hole along the bottom member, an elongated fastener strip approximately three inches in height including a plurality of slots spaced therein for releasably securing said hooks, said fastener strip containing hole means to accommodate nails for mounting such fastener strips along the margin the roof of a building.

**4,951,431**  
**CHIMNEY AND WALL FLASHING SYSTEM**  
Ronald L. Sweers, 6165 E. Atherton Rd., Burton, Mich. 48519  
Filed Aug. 7, 1989, Ser. No. 390,233  
Int. Cl.<sup>5</sup> E04D 1/36  
U.S. Cl. 52—58 22 Claims



1. A prefabricated roof flashing system for weatherproofing the intersection of an upright wall or chimney structure and an inclined shingled roof, said flashing system including an inclined segment comprising a vertical portion and a plurality of serially and overlappingly interconnected horizontal portions, a shingle of said roof being fittable between each of the overlapped and overlapping portions; said inclined segment comprises multiple sub-segments; said sub-segments being flexibly interconnected by intermediate segments, whereby said intermediate segments allow said sub-segments to be substantially folded over onto each other in a serially overlapping manner.

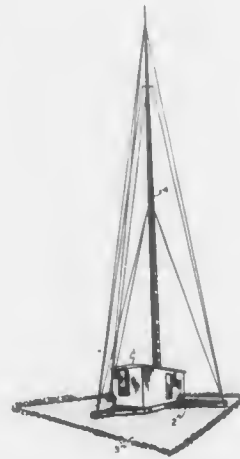
**4,951,432**  
**FOLDING BUILDING STRUCTURE**  
Don G. Wilkinson, 32 S. Palm Ave., Sarasota, Fla. 34236  
Filed Nov. 27, 1989, Ser. No. 441,524  
Int. Cl.<sup>5</sup> E04B 1/32  
U.S. Cl. 52—81 13 Claims



1. A folding building structure comprising: six isosceles triangular roof panels joined to form a roof; each of said isosceles triangular roof panels having side edges, a base edge and an apex opposite said base edge;

said apexes of said triangular roof panels all meeting at a common point; said base edge of each of said isosceles triangular roof panels having a length X and an altitude X; six isosceles triangular wall panels, each having side edges, a base edge having a length X and an altitude X; each isosceles triangular wall panel base edge being hingedly joined to one of said isosceles triangular roof panel base edges; a plurality of right triangular wall panels each having a hypotenuse edge, a base edge having a length  $\frac{1}{2}X$  and a side edge of length X; each hypotenuse edge of said right triangular wall panels being hingedly joined to, and coextensive with, a said side edge of a said isosceles triangular wall panel; at least some said side edges of said right triangular wall panels being hingedly secured to a said side edge of another of said right triangular wall panels.

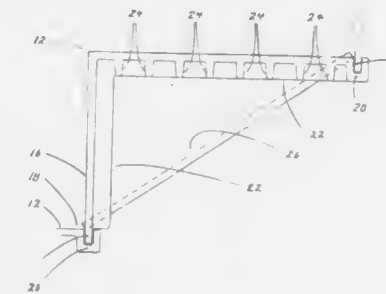
**4,951,433**  
**FOUNDATION FOR A CMR CELL SITE**  
Harmon R. Miller, 16631 Crommarty Ct., Houston, Tex. 77084; William J. Smith, 4403 Leeland, Houston, Tex. 77023, and Hollie M. Stanley, Jr., 6635 Gulston, Ste. 210, Houston, Tex. 77081  
Filed Dec. 21, 1987, Ser. No. 135,867  
Int. Cl.<sup>5</sup> E04B 5/58  
U.S. Cl. 52—126.6 47 Claims



1. A foundation for a transportable CMR cell site, the foundation comprising:  
(a) a rectangular center structure including a pair of mutually parallel horizontal side members and a pair of mutually parallel vertical side members, the side members defining four corners, one corner at each of the four points of intersection between a horizontal side member and a vertical side member; two leg members extending in respectively opposite directions from two adjacent corners defined by a first horizontal side member and by each of the two vertical side members; two exterior crossmembers, each joining one of the leg members to one of the vertical side members; and  
(b) a nose structure attached to and extending forwardly from a second horizontal side member, wherein the nose structure comprises:  
a vertical nose member attached to and extending orthogonally from a second horizontal side member;  
a first crosspiece attached (i) to one of two adjacent corners defined by the second horizontal side member and the two vertical side members and (ii) to the vertical

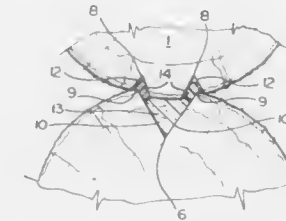
nose member at a position located at the approximate midpoint of the length of the vertical nose member; and a second crosspiece attached (i) to another of the two adjacent corners defined by the second horizontal side member and the two vertical side members and (ii) to the vertical nose member at a position located at the approximate midpoint of the length of the vertical nose member, wherein the nose structure further comprises a guy anchor affixed to the vertical nose member at a position along the length of the nose member generally farthest from the second horizontal side member.

**4,951,434**  
**PRE-FORMED STAIR CONSTRUCTION**  
George A. Schmidt, 1852 Kirby Rd., Glendale, Calif. 91208  
Filed Mar. 7, 1989, Ser. No. 320,547  
Int. Cl.<sup>5</sup> E04F 11/00  
U.S. Cl. 52—191 15 Claims



1. A prefabricated stairway having a plurality of preformed steps, each of said steps comprising:  
a riser portion extending inclined upwardly and forwardly and having a lower portion which curves forwardly and has a flange projecting downwardly and rearwardly from the edge of said lower portion;  
a tread portion extending horizontally rearward from the upper edge of said riser portion, and  
a generally U-shaped channel extending along the rear edge of said tread portion and extending downwardly and rearwardly from said tread portion for mating with adjacent steps to form said stairway.

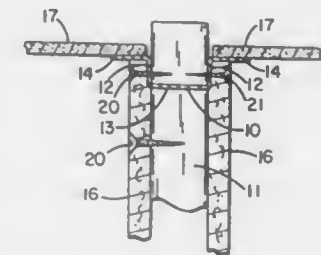
**4,951,435**  
**LOG BUILDING CONSTRUCTION**  
Lloyd Beckedorf, P.O. Box 26, Bragg Creek, Alberta, Canada (T0L 0K0)  
Filed Jan. 17, 1989, Ser. No. 297,851  
Int. Cl.<sup>5</sup> E04B 1/10  
U.S. Cl. 52—233 4 Claims



1. A log for use in constructing a wall by stacking similar logs on top of each other comprising a first longitudinally extending, substantially V-shaped groove in the top of the log; and a pair of second substantially inverted V-shaped, longitudinally extending grooves in the bottom of said log on opposite sides of a plane through the vertex of said first groove, the spacing between said second grooves being such that notional outward extensions of the sides of a first groove in one log

would intersect the outer sides of the second grooves of a superjacent log resting on said one log and contact between such logs would be limited substantially to the outer side edge areas of the second grooves and the surface adjacent the sides of the first groove, the bottom of the log between said second grooves being solid and unsplit.

**4,951,436**  
**CEILING RUNNER**  
Lowell E. Burkstrand, Rte. No. 1, Box 170, Braham, Minn. 55006, and George W. Burkstrand, 4335 - 4th St., Columbia Heights, Minn. 55421  
Continuation-in-part of Ser. No. 27,067, Mar. 7, 1987, Pat. No. 4,850,169, which is a continuation-in-part of Ser. No. 848,642, Apr. 7, 1986. This application Aug. 13, 1987, Ser. No. 84,998  
Int. Cl.<sup>5</sup> E04B 2/78  
U.S. Cl. 52—241 1 Claim



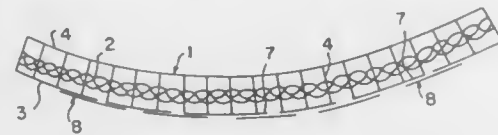
1. A ceiling runner to be extended around the periphery of a room for holding wallboard of predetermined thickness, comprising:  
(a) an elongated channel member having a transverse web element and a pair of upstanding leg elements, each one of which extends upwardly from opposite sides of said web element at right angles thereto and each of which has a terminal flange extending in a plane substantially parallel to said web element and having a free edge portion;  
(b) said web element having areas thereof cut out at locations spaced along the length of the web element and being constructed and arranged to receive upstanding studs therethrough;  
(c) an upright wallboard wall extending along one of said leg elements and having an upper end abutting against the terminal flange supported by said leg element and having an exposed outer surface; and  
(d) said channel member being constructed and arranged so that said terminal flange of said leg element along which said wall is arranged extends outwardly beyond said exposed outer surface of said wall with the free edge portion of said flange being in a plane immediately above the plane of said upper end of said wall, and being exposed to thereby provide a revealed trim edge thereat.

**4,951,437**  
**CURVED WALLS FROM FLAT PREFABRICATED PANEL FORMED FROM THREE-DIMENSIONAL METAL SCREEN WITH FORMED PLASTIC FILLING**  
Costantino Rozzi, Ascoli Piceno, Italy, assignor to R.E.I.N. S.p.A., Italy  
Division of Ser. No. 62,477, Jun. 12, 1987, Pat. No. 4,831,699.  
This application Jan. 9, 1989, Ser. No. 295,236  
Claims priority, application Italy, Jun. 16, 1986, 20795 A/86  
Int. Cl.<sup>5</sup> E04G 11/04  
U.S. Cl. 52—249 5 Claims

1. A curved-wall panel comprising a three-dimensional grid of metal wires having one face formed by a concave net of metal wire, an opposite face formed by a convex metal wire net



and an oblique cross-piece of metal are connecting said nets, said convex net being provided with gaps along lines parallel



to an axis of curvature of said convex net and with net-like flat connecting strips attached over said gaps.

4,951,438

## BUILDING CONSTRUCTION

Bjorn O. Thoresen, Honefoss, Norway, assignor to Ostspenn Holding a/s, Honefoss, Norway  
PCT No. PCT/NO88/00023, § 371 Date Feb. 15, 1989, § 102(e)  
Date Feb. 15, 1989, PCT Pub. No. WO88/08059, PCT Pub.  
Date Oct. 20, 1988

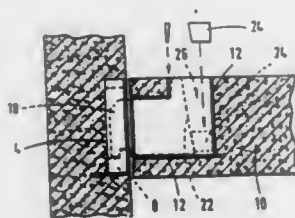
PCT Filed Apr. 6, 1988, Ser. No. 287,198

Claims priority, application Norway, Apr. 7, 1987, 871451;  
Feb. 17, 1988, 880703

Int. Cl.<sup>5</sup> E04B 1/20

U.S. Cl. 52—252

18 Claims



1. A joint for joining concrete beams and concrete columns in a building structure, said joint comprising:
  - a support casing imbedded in an end portion of a beam, said support casing having an open end flush with a transverse end surface of said beam;
  - a complementary support casing imbedded in a column for supporting said beam, said complementary support casing having an open end opening onto and flush with a side surface of said column;
  - a separate mountable and removable bridge element for positioning in and between said support casing and said complementary support casing so as to form a supporting bridge between said column and said beam, wherein said support casing of said beam has an upwardly open aperture opening onto an upper surface of said beam for enabling access to said bridge element when said bridge element is in said support casing; and
  - locking means to be positioned in said upwardly open aperture for horizontally fixedly locking said bridge element in place with respect to said support casing, said locking means comprising at least one wedge element for disposition between said bridge element and said support casing.

4,951,439

## INNER WALL TO AN OUTER WALL IN A WALL CONSTRUCTION

Constantinos Floros, 7475 Madrid St., Brossard, Canada (J4Y 1G1)

Filed Jan. 9, 1989, Ser. No. 294,747

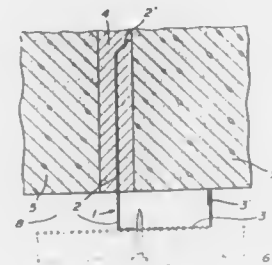
Int. Cl.<sup>5</sup> E04B 2/28

U.S. Cl. 52—351

4 Claims

1. An attachment to secure an inner wall to an outer wall, the inner wall consisting of dry-wall panels and the outer wall being composed of building units held together by mortar; the

attachment comprising: a rigid, elongated, one-piece, sheet metal strip of L-shaped cross-section, including one arm having an outer portion and an inner portion, said one arm outer portion adapted to be permanently embedded in the mortar between selected building unit; mortar anchoring means integral with said one arm outer portion to secure said one arm in said mortar; said one arm inner portion adapted to protrude



inwardly from said outer wall; and another arm connected to an normal to said one arm; adapted to project parallel to and spaced apart from the inner surface of the outer wall; said other arm being im perforate and forming a dry wall panel backing and a metal screw receiving sheet member; and an outer wall abutment means integral with said strip to maintain said other arm in such position, whereby inner dry wall panels may be secured by metal screws to said other arm.

4,951,440

## CONSTRUCTION SET FOR THE ERECTION OF A SUPPORTING STRUCTURE

Johannes E. O. Staeger, Neuweiler, Fed. Rep. of Germany, assignor to Octanorm-Vertriebs-GmbH für Bauelemente, Filderstadt, Fed. Rep. of Germany

PCT No. PCT/EP88/01029, § 371 Date Sep. 12, 1989, § 102(e)  
Date Sep. 12, 1989, PCT Pub. No. WO89/06724, PCT Pub.  
Date Jul. 27, 1989

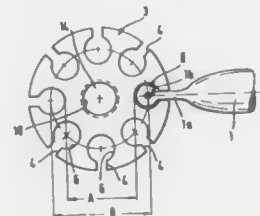
PCT Filed Nov. 12, 1988, Ser. No. 401,435

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800547

Int. Cl.<sup>5</sup> E04B 1/19, 1/58

U.S. Cl. 52—646

7 Claims



1. Construction set for the erection of support structures, comprising supporting rods and at least one connecting joint, said connecting joint containing a plurality of mutually parallel slots open at one end for receiving, in a positively locking manner, suspension heads of said rods which are wider than said slots, said suspension heads being held in said slots by a disk covering said one end of said slots, said slots opening into parallel and approximately cylindrical chambers of said connecting joint, said chambers having equal lengths corresponding to the lengths of said slots, said suspension heads being in the form of thickenings corresponding to the length of said chambers and adapted in shape to the cross-section of said supporting rods, said thickenings being in the form of generally cylindrical beads, said chambers being dimensioned to form a clearance relative to said beads to facilitate the inser-

tion of said beads into said chambers wherein said beads are formed by a rolling-in of the free ends of said flat pressed ends of the supporting rods.

4,951,441

## DAMPING DEVICE IN A STRUCTURE AND DAMPING CONSTRUCTION AND DAMPING METHOD USING THOSE DEVICES

Toshiyuki Noji, Chiba; Hidetoshi Yoshida, Tokyo; Eiji Tatsumi, Chiba; Shinichi Akao, Saitama, and Hideyuki Kosaka, Chiba, all of Japan, assignors to Mitshi Kensetsu Kabushiki Kaisha, Tokyo, Japan

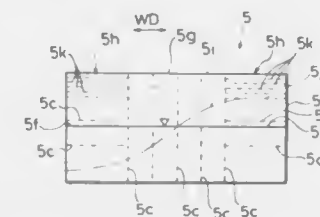
Division of Ser. No. 216,496, Jul. 8, 1988. This application Jun. 2, 1989, Ser. No. 360,872

Claims priority, application Japan, Dec. 1, 1987, 62-305379;  
Dec. 24, 1987, 62-327650; Mar. 22, 1988, 63-67950

Int. Cl.<sup>5</sup> E02D 27/34

U.S. Cl. 52—741

2 Claims



1. A damping method for damping a structure already having an elevated water tank thereon, said elevated water tank having a lid portion thereon, and said method comprising the steps of:

providing a plurality of damping members in said elevated water tank already on said structure and restricting the vibration occurring in said structure by means of the resistance occurring between said damping members and water in said elevated water tank; and  
disposing wave dissipation means at an upper portion of said elevated water tank adjacent said lid portion preventing waves in the water in said elevated water tank from reflecting off of said lid portion, said wave dissipation means comprising a porous block member, and waves being dissipated by colliding and flowing into said wave dissipation means when the waves are of sufficient amplitude to reach said wave dissipation means.

4,951,442

## METHOD FOR CONSTRUCTING FIRE-STOP COLLAR ASSEMBLY

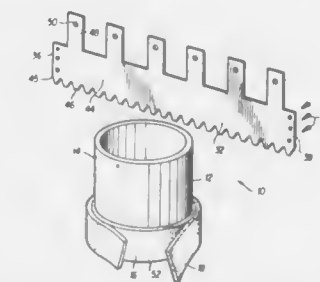
Gerald R. Harbeck, Jr., Boynton Beach, Fla., assignor to MSP Products, Inc., N. Lake Worth, Fla.

Filed Aug. 31, 1989, Ser. No. 401,111

Int. Cl.<sup>5</sup> F16K 13/00

U.S. Cl. 52—745

8 Claims



1. A method of constructing a fire-stop collar assembly at a factory separate from an installment site for permanent engage-

ment on a pipe at said installment site, said method comprising the steps of:

- at said factory, choosing a dummy pipe having an elongated cylindrically-shaped main body with an outer surface having an approximate size and shape of a pipe at said installment site on which said fire-stop collar assembly is to be mounted;
- at said factory wrapping an intumescent band into an approximate ring about the outer surface of said cylindrically-shaped main body so as to have ends abutting one another, said intumescent collar being constructed of a material which expands when it gets hot to close off the inner surface of said pipe at said installment site on which said fire-stop collar will be mounted;
- at said factory, wrapping a metallic band into a ring with overlapping ends about the intumescent collar while said collar is wrapped about said dummy pipe, said metallic band having one heat receiving edge at a first end thereof;
- at said factory, applying a fastening means to said metallic band for holding said metallic band in a ring about said intumescent collar while said intumescent collar is wrapped about said dummy pipe;
- at said factory, removing said dummy pipe from said intumescent collar and said metallic band while leaving the rings of said intumescent collar and said metallic band affixed together by said fastening means to form said fire-stop collar assembly;
- transporting said thusly assembled fire-stop collar assembly from said factory to be delivered to said separate installment site for engagement on said pipe thereat;
- thereby forming a fire-stop collar assembly at said factory separate from said installment site which is then shipped and stored as a unit and which can be later placed on a pipe of a pipe string at said installment site and the metallic band can be attached to a barrier wall thereat to form a fire proof pipe string through said barrier wall.

4,951,443

## CEILING PANEL AND T-RAIL MOUNTING ASSEMBLY

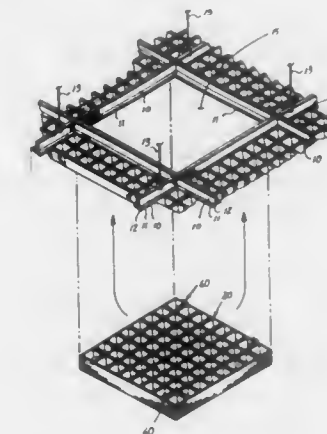
Ronald N. Caferro, Spokane, Wash., assignor to Ecolite Manufacturing Co., Spokane, Wash.

Filed Jun. 6, 1989, Ser. No. 362,796

Int. Cl.<sup>5</sup> E04B 1/60

U.S. Cl. 52—764

18 Claims



1. A ceiling panel for mounting to a T-rail ceiling support structure having a gridwork of intersecting T-rail support members defining an opening for receiving the ceiling panels and including T-rail support edges facing one another across and defining said opening, the panel comprising:
  - a panel body having a perimetral shape complementary to the opening defined by the T-rail support members;
  - a plurality of centering brackets mounted to the panel body

about the perimeter of the panel body and having end surfaces thereon; wherein the end surfaces are spaced apart across the panel body by distances substantially equal to corresponding distances between facing T-rail support edges, to thereby engage the T-rail support edges and center the panel within the opening; and clips on selected centering brackets, including a bias spring urging the clips against the T-rail support members to suspend the panel therefrom.

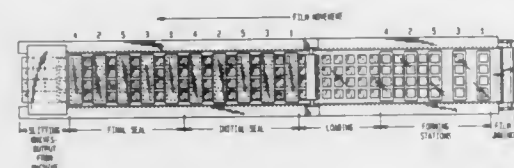
4,951,444

**MULTI-STATION DIE-LESS PACKAGING MACHINE**  
Moshe Epstein, Olympia Fields, and Paul Durden, Bellwood, both of Ill., assignors to Durden to A.M.E. Engineering, Inc., South Holland, Ill.

Filed Feb. 6, 1989, Ser. No. 306,683  
Int. Cl.<sup>5</sup> B65B 47/02, 57/00

U.S. Cl. 53—77

20 Claims



1. In a die-less product-packaging machine comprising a film-storage means for unwinding film, a film-forming station where packages are formed for storing products, a product loading-station where products are placed into the packages formed at said film-forming station, a heat-sealing station where the product-loaded formed-packages are covered with a cover-sealing film, and means for indexing the film from one said station to the next, said means for indexing comprising conveyor means and a motor means for moving said conveyor means, the improvement comprising:

computer-control means for controlling the operation of said means for indexing and for actuating said film-forming station and said heat-sealing station, said computer-control means actuating each of said film-forming station and said heat-sealing station in direct relationship to the position of said motor means; said computer control means actuating each said film-forming station and said heat-sealing station during operation of said motor means while said conveyor means is still conveying, whereby time-saving and greater productivity is achieved.

4,951,445

**HANDLING DEVICE AND ITS APPLICATION TO A CONDITIONING INSTALLATION**

Jacques G. A. Thibault, 35, rue Robert Legeay, F-94000 Creteil (Val de Marne), France

PCT No. PCT/FR86/00444, § 371 Date Nov. 3, 1988, § 102(c) Date Nov. 3, 1988, PCT Pub. No. WO87/03838, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 23, 1986, Ser. No. 97,961

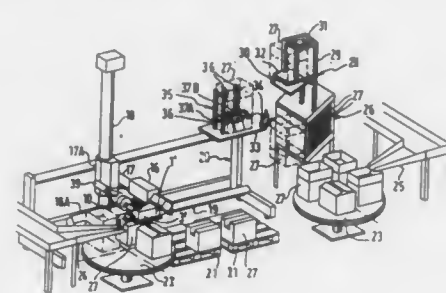
Claims priority, application France, Dec. 24, 1985, 85 19144  
Int. Cl.<sup>5</sup> B25J 15/00; B65B 43/18, 51/06

U.S. Cl. 53—167

11 Claims

1. A device for carrying out box handling and packaging operations comprising a support (20) and a gripping head comprising a horizontal arm (17) operatively connected to said support and a work tool situated on said arm wherein said horizontal arm (17) is adapted exclusively for moving transversely to itself, a carrying carriage, slidably mounted on said arm (17), wherein said gripping head is mounted, for pivoting

about a vertical axis and said handling and packing device further comprising:



a magazine (26) for storing boxes folded flat, accessible to the head, and  
a box filling station (22, 23) for filling packages.

4,951,446

**METHOD FOR MAKING FOIL PACKAGING**

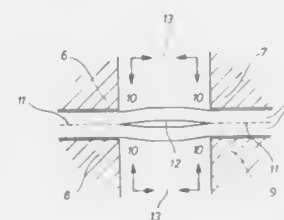
Walter Holzer, Drosteweg 19, Meersburg, Fed. Rep. of Germany (7758)

Filed Jan. 4, 1989, Ser. No. 293,317

Int. Cl.<sup>5</sup> B65B 7/02, 51/30, 61/18

U.S. Cl. 53—412

10 Claims



1. A method for producing tear open packaging for solid, liquid and gaseous material from packaging material which is elongated and has first and second ends and opposite longitudinal edges, one end being open for access to the interior thereof, said method comprising the steps of:

forming a first welding seam of the mutually confronting packaging material from the opposite longitudinal edges partially across the open end of the packaging material, the unwelded portion being located intermediate the longitudinal edges of packaging material; and  
forming a second welding seam transverse to the first seam, the second seam being formed from the unwelded mutually confronting packaging material;  
the first seam being formed by means of a cross-wise divided plural element welding tool which closes on the packaging material in a direction normal to the surface of the packaging material, leaving the unwelded portion thereof; the second seam being formed by means of the welding tool which then closes in a direction parallel to the packaging material surface, thus producing a cross-shaped welding edge;  
thereby forming grip surfaces to facilitate splitting the welding seam without requiring tearing of the packaging material.

4,951,447

**WRAPPING APPARATUS**

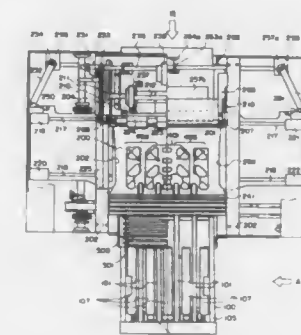
Toshio Denda, and Tadashi Takeuchi, both of Tokyo, Japan, assignors to Teraoka Seiko Co., Limited, Tokyo, Japan

Filed Oct. 16, 1989, Ser. No. 422,162

Claims priority, application Japan, Oct. 20, 1988, 63-264860  
Int. Cl.<sup>5</sup> B65B 11/18

U.S. Cl. 53—502

10 Claims



1. A wrapping apparatus of the type in which a predetermined cut length of film fed by a film feeding mechanism is extended at a predetermined portion of the wrapping apparatus, an article to be wrapped is raised into engagement with said extended film from therebelow by an elevator mechanism, and the edges of said film are folded under the bottom of said article, thereby wrapping said article in the film, by a film folding mechanism comprising left and right folding members and either a front or rear folding member, said wrapping apparatus comprising:

an article mount section of said elevator mechanism which has at least left and right head portions disposed at the left and right sides, respectively, and each constituted by a plurality of heads;  
at least one head among the heads constituting each of said left and right head portions which is closer to said front or rear folding member being arranged such that it can be tilted up to a predetermined angle by the corresponding one of said left and right folding members and either said front or rear folding member; and  
means for executing the starting of at least said left and right folding members and said front or rear folding member at different timings in accordance with the geometry of a tray selected to accommodate an article to be wrapped, whereby the timing at which said left and right folding members and said front or rear folding member advance to the bottom of the tray is made substantially constant irrespective of the shape of the tray.

4,951,448

**FACILITY FOR THE PRODUCTION OF ROLLS OF COINS**

Werner Schmechel, Berlin, Fed. Rep. of Germany, assignor to F. Zimmermann & Co., Berlin, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,762

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3809039

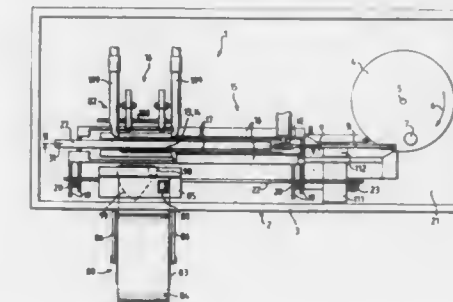
Int. Cl.<sup>5</sup> B65B 11/04

U.S. Cl. 53—532

17 Claims

1. A coin stacking and rolling arrangement comprising: feeding track means for transporting horizontally positioned coins from a first location to a second location, along a feeding track path in a transportation direction; tilting station means for changing the horizontal position of the coins to a vertical position, said tilting station means including first and second parallel tracks extending in the transportation direction, said first and second tracks being spaced a distance which is less than the diameter of the

coins, by said first and second tracks each having a first end positioned adjacent said second location and coin retaining means spanning the transportation direction of the coins adjacent said first and second tracks for forming stacks of vertical coins on said first and second tracks, said



retaining means including an angled surface member swivably movable against the transportation direction of the coins;  
wrapping station means for wrapping stacks of vertical coins to produce rolls of coins

4,951,449

**CONVERTIBLE LAWN MOWER**

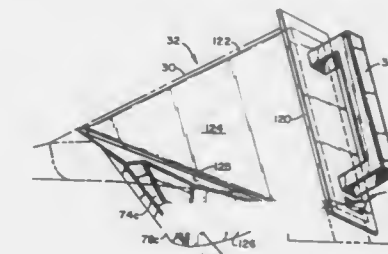
Richard A. Thorud, Bloomington, Minn., assignor to The Toro Company, Minneapolis, Minn.

Filed Jul. 28, 1989, Ser. No. 386,054

Int. Cl.<sup>5</sup> A01D 34/70, 34/72, 34/73

U.S. Cl. 56—2

23 Claims



1. A rotary convertible lawn mower having a mulching mode and a non-mulching mode, comprising:

(a) removable grass handling means;  
(b) a housing defining a cutting chamber, the housing having ground engaging wheels rotatably affixed thereto for supporting the housing above the ground surface, the housing having a top wall and a chute for allowing grass clippings to travel from the housing to the grass handling means;  
(c) a prime mover mounted atop the housing, the prime mover having an output shaft;  
(d) a cutting blade disposed within the cutting chamber for rotation about a generally vertical axis attached to the prime mover output shaft, the blade being disposed beneath the top wall of the housing and establishing a generally horizontal cutting path;  
(e) a removable plug for selectively blocking the chute to selectively put the mower into its mulching mode or its non-mulching mode, the removable plug carrying a kicker member, wherein when the chute is clocked the mower mulches the grass clippings and when the chute is unblocked the grass handling means can be connected to the mower; and



- (f) a plurality of kicker members mounted to the housing within the cutting chamber, each kicker member having a kicker surface lying generally in a plane oblique with respect to the generally horizontal cutting path, and disposed in the path of grass clippings to deflect the clippings generally downwardly into the cutting path when the mower is in its mulching mode, whereby the clippings are deposited beneath the surface of the grass.
23. A rotary convertible lawn mower having a mulching mode and a non-mulching mode, comprising:
- (a) removable grass handling means;
  - (b) a housing defining a cutting chamber, the housing having ground engaging wheels rotatably affixed thereto for supporting the housing above the ground surface, the housing having a top wall and a chute for allowing grass clippings to travel from the housing to the grass handling means;
  - (c) a prime mover mounted atop the housing, the prime mover having an output shaft;
  - (d) a cutting blade disposed within the cutting chamber for rotation about a generally vertical axis attached to the prime mover output shaft, the blade being disposed beneath the top wall of the housing and establishing a generally horizontal cutting path;
  - (e) a removable plug for selectively blocking the chute to selectively put the mower into its mulching mode or its non-mulching mode, wherein when the chute is blocked the mower mulches the grass clippings and when the chute is unblocked the grass handling means can be connected to the mower; and
  - (f) five kicker members operatively connected to the housing within the cutting chamber, each kicker member having a kicker surface lying generally in a plane oblique with respect to the generally horizontal cutting path, and disposed in the path of grass clippings to deflect the clippings generally downwardly into the cutting path when the mower is in its mulching mode, whereby the clippings are deposited beneath the surface of the grass, wherein the kicker members comprise front and rear generally diametrically opposed kicker members; right and left generally diametrically opposed kicker members; and a kicker member located generally between the right and rear kicker members, wherein the kicker members are roughly evenly spaced around the housing except for the front and left kicker members which are spaced substantially farther apart, and wherein the angle between adjacent kicker members, except for the front and left kicker members, is in the range between about 51 degrees and about 63 degrees.

4,951,450

## MOWING MACHINE

Maarten Koorn, Vlaardingen, and Sape Sikkema, Maassluis, both of Netherlands, assignors to C. Van Der Lely N.V., Maassland, Netherlands

Filed Apr. 20, 1989, Ser. No. 340,774

Claims priority, application Netherlands, Apr. 21, 1988, 8801039

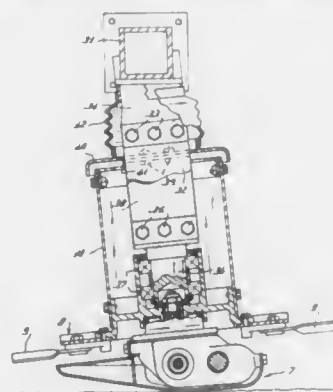
Int. Cl. A01D 34/66

U.S. Cl. 56—13.6

40 Claims

1. A mowing machine, comprising: a cutter bar which extends substantially transverse to the direction of operative travel over the field and having rotary mowing members arranged thereabove, said cutter bar connected for its support in at least two places to a carrier frame, at least one of said connections including a resilient element, said resilient element arranged in such a manner that movements of said cutter bar relative to said carrier frame are permitted in a substantially

vertical plane transverse to the direction of operative travel, wherein said resilient element comprises a plate-shaped mate-



rial extending in a substantially vertical plane parallel to the direction of operative travel.

4,951,451

## APPARATUS AND METHOD FOR HARVESTING CROPS BY STRIPPING

Wilfred E. Kliner, Beechwood, Heath Lane, Aspley Heath, Woburn Sands, Milton Keynes, Buckinghamshire MK17 8TN, United Kingdom

PCT No. PCT/GB88/00060, § 371 Date Aug. 7, 1989, § 102(e) Date Aug. 7, 1989, PCT Pub. No. WO88/05626, PCT Pub. Date Aug. 11, 1988

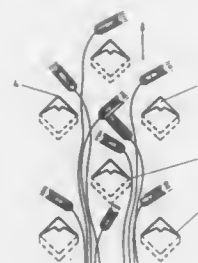
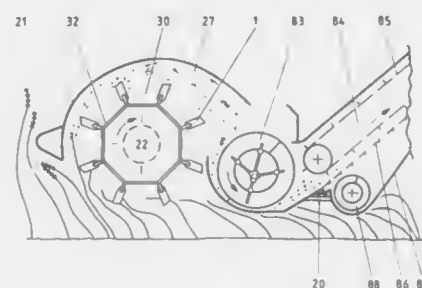
PCT Filed Feb. 1, 1988, Ser. No. 382,708

Claims priority, application United Kingdom, Feb. 5, 1987, 8702627; Apr. 2, 1987, 8707822; Jun. 4, 1987, 8713132

Int. Cl. A01D 41/06

U.S. Cl. 56—16.5

32 Claims



1. Apparatus for harvesting crops comprising:
- a mobile support structure for movement over the ground;
  - movable support means extending transversely across the direction of forward movement of the apparatus;
  - a plurality of crop engaging elements secured to the movable

support means and cantilevered therefrom to extend longitudinally outwardly from said support means;

means mounting said movable support means for movement, relative to said support structure, such as to cause said crop engaging elements to comb through a naturally disposed uncut crop into which the mobile support structure is moved;

at least some of the crop engaging elements comprising crop stripping elements, each having, at least in an outer region thereof, a form which, in section through the element substantially perpendicular to the direction of longitudinal extent of the element, presents the configuration of an acutely tapered wedge pointing in the direction of movement of the element consequent upon said movement of the movable support means whereby the crop stripping element presents a narrow leading edge facing in the direction of movement of the element during such movement of the movable support means;

means for imparting said movement to the movable support means; and

crop guide means extending over or under the apparatus, whereby, in operation as the apparatus is advanced through a standing, naturally disposed uncut crop, and the movable support means is moved by said driving means, the crop stripping elements will comb through the crop to split the crop mass apart and detach and recover wanted plant parts and the crop guide means will prevent detached wanted crop parts from becoming lost and will direct them rearward for collection.

28. A method of harvesting a crop comprising:

providing an apparatus for harvesting crops comprising:

- a mobile support structure for movement over the ground;
- movable support means extending transversely across the direction of forward movement of the apparatus;
- a plurality of crop engaging elements secured to the movable support means and cantilevered therefrom to extend longitudinally outwardly from said support means;
- means mounting said movable support means for movement, relative to said support structure, such as to cause said crop engaging elements to comb through a naturally disposed uncut crop into which the mobile support structure is moved;

at least some of the crop engaging elements comprising crop stripping elements, each having, at least in an outer region thereof, form which, in section through the element substantially perpendicular to the direction of longitudinal extent of the element, presents the configuration of an acutely tapered wedge pointing in the direction of movement of the element consequent upon said movement of the movable support means whereby the crop stripping element presents a narrow leading edge facing in the direction of movement of the element during such movement of the movable support means;

means for imparting said movement to the movable support means; and

crop guide means extending over or under the apparatus, whereby, in operation as the apparatus is advanced through a standing, naturally disposed uncut crop, and the movable support means is moved by said driving means, the crop stripping elements will comb through the crop to split the crop mass apart and detach and recover wanted plant parts and the crop guide means will prevent detached wanted crop parts from becoming lost and will direct them rearward for collection.

moving through the uncut crop said apparatus;

driving said movable support means so that said crop engaging elements comb through the naturally disposed crop at a front region of the apparatus, whereby said crop stripping elements form acutely beveled wedges effective in the direction defined by rotation of the elements around the transverse axis of the support means and movement of the apparatus through the crop, to split the crop mass apart and to detach wanted parts from the plants, and

impelling detached crop parts substantially laterally and rearwardly towards a collection facility.

4,951,452

## LARGE BALE HAY BALER

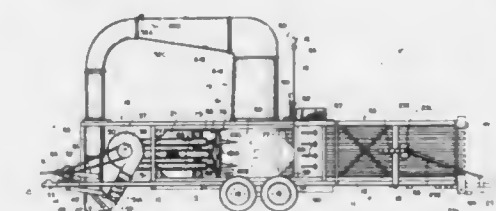
E. Cordell Lundahl, Providence; J. Gordon Wiser, Logan; Laurel H. Jensen, Hyrum, and Ernie Vandenwijngaert, Logan, all of Utah, assignors to Ezra C. Lundahl, Inc., Logan, Utah

Filed Jun. 9, 1989, Ser. No. 364,968

Int. Cl. A01D 39/00

U.S. Cl. 56—341

29 Claims



1. A large hay baler comprising:

a vehicle frame;

means on said vehicle frame defining an accumulator chamber, a compaction chamber connected to said accumulator chamber, a bale chamber connected to said accumulator chamber and having a tailgate carried by the frame and positioned at the end of the bale chamber;

means for picking up cut crop and for delivering said cut crop into the accumulator chamber;

means for selectively transferring material from said accumulator chamber to said compaction chamber;

means for compacting material in the compaction chamber;

ram means for moving said compacted material in said compaction chamber into the bale chamber thereby compressing said compacted material at a first rate;

said ram means further compressing at a second and slower rate and to a greater degree said compressed material in said bale chamber;

means for tying said compressed material in the bale chamber when compressed to a desired density into a bale; and

means for opening the tailgate to release the compacted and tied bale.

4,951,453

CROP HARVESTING APPARATUS AND METHODS

Wilfred E. Kliner, Milton Keynes, United Kingdom, assignor to National Research Development Corporation, London, England

Division of Ser. No. 879,109, May 27, 1986, Pat. No. 4,790,128.

This application May 24, 1988, Ser. No. 198,461

The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.

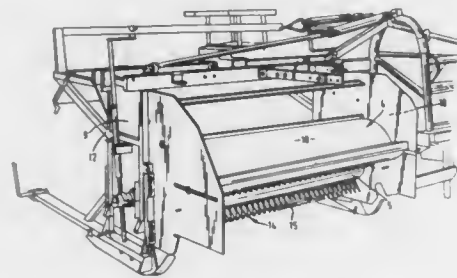
Int. Cl. A01D 00/00

U.S. Cl. 56—364

28 Claims

1. Apparatus for harvesting required crop parts from standing crop comprising
- a mobile frame for movement over the ground,
  - moveable support means mounted for driven movement relative to the frame,
  - a plurality of outwardly projecting crop engaging elements mounted on said moveable support means and having distal ends projecting outwardly from the moveable support means,
  - guide means co-operating with said crop engaging elements to form a crop flow passage, and
  - drive means for driving said moveable support means so as to detach from standing crop predetermined required parts of the crop and to move the detached crop parts along said crop flow passage, said moveable support

means being arranged to carry said elements upwardly and rearwardly at a front region of the apparatus, and said crop engaging elements being arranged to engage standing crop while projecting forwardly relative to the direction of forward travel of the apparatus, wherein at least some of said crop engaging elements provide edges facing away from the distal ends of the elements for detaching crop parts from regions of the standing crop which face forwardly relative to the intended direction of forward travel of the apparatus, and said crop engaging elements provide in operation a plurality of crop gathering regions, each said crop gathering region having an intake region with inwardly converging boundaries leading to at least one of said edges which face away from said distal ends of said elements.



ments for detaching crop parts from regions of the standing crop which face forwardly relative to the intended direction of forward travel of the apparatus, and said crop engaging elements provide in operation a plurality of crop gathering regions, each said crop gathering region having an intake region with inwardly converging boundaries leading to at least one of said edges which face away from said distal ends of said elements.

4,951,454

# DEVICE FOR STOPPING THE SUPPLY TO A SPINNING FRAME DRAWING SYSTEM IN CASE OF ABSENCE OF YARN AT THE OUTLET

C. Henri Genevray, Guebwiller, France, assignor to N. Schlumberger & Cie, France

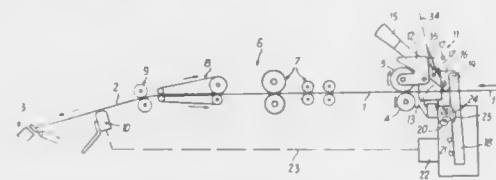
Filed Jul. 11, 1989, Ser. No. 378,385

Claims priority, application France, Jul. 12, 1988, 88 09462

Int. Cl.<sup>5</sup> D01H 13/16

U.S. Cl. 57—84

11 Claims



1. A spinning frame apparatus comprising: first and second supply rollers, said supply rollers having an engaged position in which said supply rollers are engaged in pressure contact to feed sliver and having a disengaged position in which said supply rollers are relatively displaced to prevent feeding of sliver, one of said supply rollers supported by a member which is spring biased toward a disengaged position of said rollers; means for overcoming said spring biasing comprising a traction spring, said overcoming means having an active position in which said traction spring generates a force opposing said spring biasing of said member to maintain said engaged position, and having an inactive position in which said traction spring generates a force in cooperation with said spring biasing of said member to maintain said disengaged position; means for transforming sliver fed from said supply rollers into yarn; means for detecting the presence of yarn output from said transforming means; and means responsive to said detecting means for relatively displacing said first and second supply rollers, said responsive means comprising: an arm connected to said means for overcoming, and means for controlling said arm to

move said overcoming means into said inactive position in response to the failure to detect yarn by said detecting means.

4,951,455

# APPARATUS FOR DISSIPATING HEAT FROM HEAT PRODUCING ELEMENTS OF A TEXTILE MACHINE

Karl Bösl, Süssen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

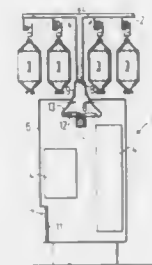
Filed Jun. 8, 1989, Ser. No. 363,052

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819867

Int. Cl.<sup>5</sup> D01H 13/28

U.S. Cl. 57—308

10 Claims



1. In a textile spinning or like machine of the type having an elongate longitudinal extent generally centered about a vertical plane extending longitudinally through the machine with textile supply packages situated above the machine at opposite sides of the longitudinal central plane and including a housing at one end of the machine for enclosing operational heat-producing elements of the machine, means for dissipating heat from the heat-producing elements, comprising:

an air intake opening in the end housing; an air discharge opening in the end housing at the longitudinal central plane; and means for drawing ambient air into the end housing through the intake opening, directing the ambient air through the end housing in heat-exchange relation with the heat-producing elements therein, and then exhausting the ambient air from the end housing outwardly through the discharge opening, the discharge opening having a lateral extent transversely with respect to the longitudinal central plane and a longitudinal extent generally aligned with the longitudinal central plane, the longitudinal extent of the discharge opening being of a relatively greater dimension than the lateral extent of the discharge opening and the lateral extent of the discharge opening being of a smaller dimension than the transverse spacing between textile supply packages at opposite sides of the longitudinal central plane to avoid contact of the air exhausted through the air discharge opening with the textile supply packages.

4,951,456

# CAP SPINNING DEVICE

Angelo Lucca, and Andre Lattion, both of Seuzach, Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Jan. 19, 1989, Ser. No. 298,699

Claims priority, application Switzerland, Jan. 21, 1988, 00204/88

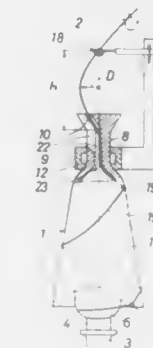
Int. Cl.<sup>5</sup> D01H 7/00, 7/26, 7/66, 13/04

U.S. Cl. 57—354

14 Claims

1. A cap spinning device, comprising: a drivable spindle having an axis of rotation; a cap arranged substantially coaxially with respect to said drivable spindle and capable of being rotated about an axis

extending substantially coaxially with respect to said axis of rotation of said drivable spindle; said cap being provided with a balloon forming thread introduction attachment; said balloon forming thread introduction attachment guiding a thread into said axis of rotation of said drivable spindle; said balloon forming thread introduction attachment containing a body provided with a substantially central bore having two ends;



one end of said two ends of said substantially central bore opening into the interior of the cap; and said body of said balloon forming thread introduction attachment containing at least one inlet passage extending at an inclination from an other end of said two ends of said substantially central bore through said body of said balloon forming thread introduction attachment.

4,951,457

# NARROW PITCH ARTICULATED CHAIN AND LINKS THEREFOR

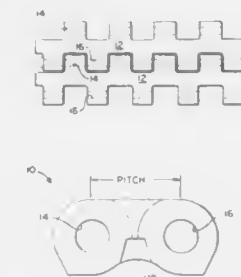
Douglas O. Deal, 9707 Straightaway La., Bahama, N.C. 27503

Filed Nov. 8, 1989, Ser. No. 433,517

Int. Cl.<sup>5</sup> F16G 13/06

U.S. Cl. 59—78

4 Claims



1. In combination a narrow pitch articulated chain for conveying selected items on the top surface thereof and adapted to travel in an endless loop, said chain comprising a plurality of plastic chain links with means for pivotally connecting said links to one another wherein each of said chain links comprises a body member having a greater width than length and a plurality of spaced-apart apertures extending in the widthwise direction or said body member so as to define first and second pivotal axes at the front and rear thereof, and further wherein said first and second pivotal axes of said chain links are spaced apart about 0.625 inches or less and said chain links each define a concave portion in the bottom surface thereof between said first and second pivotal axes and having a radius of 0.5 inches or less; and a nose bar having a radius substantially equal to the radius defined by the concave portion of said chain links.

4,951,458

# TUNNEL-TYPE WASHING MACHINE WITH ECCENTRIC AUGER AXIS

Hans Steinort, Hildesheim, Fed. Rep. of Germany, assignor to Seakingwerk GmbH, Hildesheim, Fed. Rep. of Germany

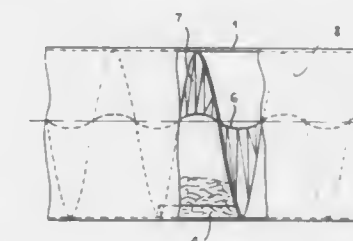
Filed Oct. 11, 1989, Ser. No. 420,057

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3835278

Int. Cl.<sup>5</sup> D06F 31/00

U.S. Cl. 68—27

6 Claims



1. A washing machine comprising: a generally cylindrical drum extending along and centered on a horizontal drum axis; a helicoidal auger-like wall centered on an auger axis offset radially from and extending substantially parallel to the drum axis; and at least two longitudinally extending ribs on an inner surface of the drum relatively closely flanking a plane including the drum and auger axes, the rest of the drum inner surface being substantially free of such ribs.

4,951,459

# METHODS FOR METERING FLUID AND APPARATUS FOR USE THEREWITH

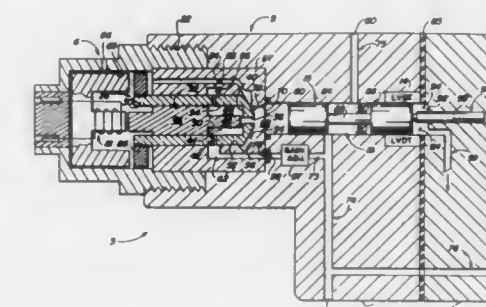
Robert S. McCarty, Phoenix, Ariz., assignor to Allied-Signal Inc., Morris Township, N.J.

Filed Aug. 30, 1988, Ser. No. 238,370

Int. Cl.<sup>5</sup> F02C 7/232, 9/26

U.S. Cl. 60—39.03

6 Claims



1. A method for metering flow of fuel delivered to a turbine engine, comprising the steps of: positioning a piston in a channel which partially defines a flow path extending from an inlet to an outlet of a metering valve body so that the piston partially blocks the flow path; pressurizing a chamber defined in part by the piston with fuel delivered from a source thereof through the metering valve body, through a single electrohydraulic solenoid valve rigidly secured to the body and defining in part the chamber, and then to the chamber, thereby causing the fuel in the chamber to exert on the piston a force that tends to move the piston along the channel in a direction such that the piston blocks the flow path to a greater extent; exerting on the piston by means contained in the metering



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valve body a second force opposing that exerted by fuel in the chamber, the second force tending to move the piston along the channel in a direction such that the piston blocks the flow path to a lesser extent; communicating a continual streak of electrical pulses to a solenoid of the solenoid valve and causing pressure in the chamber to change in response to the pulses; and varying the extent to which the piston blocks the flow path by duty cycle modulation of the pulses.

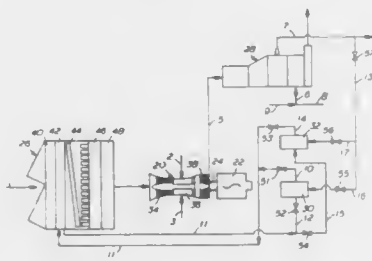
4,951,460

**APPARATUS AND METHOD FOR OPTIMIZING THE AIR INLET TEMPERATURE OF GAS TURBINES**  
James K. Prochaska, Houston, and Mark H. Axford, Katy, both of Tex., assignors to Stewart & Stevenson Services, Inc., Houston, Tex.

Filed Jan. 11, 1989, Ser. No. 295,869  
Int. Cl.<sup>5</sup> F02C 7/08

U.S. Cl. 60—39.161

15 Claims



1. An apparatus, comprising:  
a multi-shaft combustion gas turbine having a first inlet for receiving air, a second inlet for receiving fuel, and an outlet for exhausting hot gases from the turbine; and  
a heat exchanger for flowing the air therethrough to heat the air before entering the first inlet to increase the power output of the turbine.

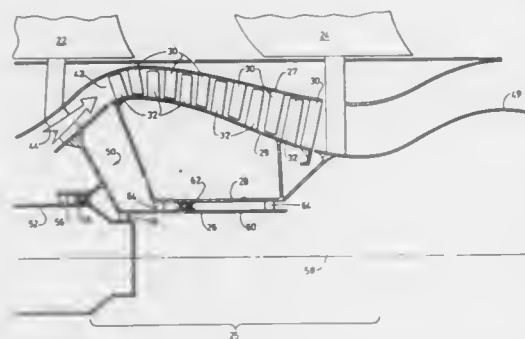
4,951,461

**POWER TURBINE SUPPORT ARRANGEMENT**  
Lawrence Butler, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Mar. 20, 1989, Ser. No. 325,728  
Int. Cl.<sup>5</sup> F02K 3/072

U.S. Cl. 60—39.162

7 Claims



1. A power turbine section in a gas turbine engine comprising:  
a stationary static structure centered about a longitudinal axis;  
an outer rotor and an inner rotor concentrically positioned about one another along the longitudinal axis and defining

an annular flowpath between said outer and inner rotors for passing a high energy gas stream through the engine; a first annular array of turbine blades coupled to said inner rotor and extending into said flowpath for transforming energy of the gas stream into movement of said inner rotor; a second annular array of turbine blades coupled to said outer rotor and extending into said flowpath for transforming energy of the gas stream into movement of said outer rotor, said second annular array of turbine blades being aligned coaxially with and adjacent to said first annular array of turbine blades; first bearing means disposed at one axial end of said inner rotor for rotatably securing said inner rotor to said static structure; and second bearing means disposed between said inner rotor and said outer rotor for rotatably securing said outer rotor concentrically about said inner rotor with a common axis of rotation decoupled from said static structure.

4,951,462

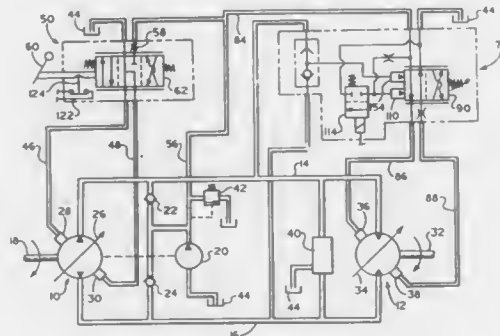
**HYDROSTATIC TRANSMISSION WITH MOTOR START CONTROL SYSTEM**

Kevin J. Graf, Eden Prairie, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 5, 1989, Ser. No. 361,516  
Int. Cl.<sup>5</sup> F16H 61/42

U.S. Cl. 60—444

14 Claims



1. A closed-loop hydrostatic transmission of the type including a prime mover driven variable displacement fluid pump; a variable displacement fluid motor, and conduit means interconnecting said pump and said motor; first fluid operable means for varying the displacement of said pump between a neutral position and an operating position; second fluid operable means for varying the displacement of said motor between a first, relatively lesser displacement and a second, relatively greater displacement; a source of pressurized control fluid for operating said first and second fluid operable means; main control means operable to communicate said pressurized control fluid to said first fluid operable means in response to movement of an input; motor stroking valve means operable to communicate said pressurized control fluid to said second fluid operable means, said motor stroking valve means including a stroking valve member movable, in response to first and second pressures, in a fluid pressure chamber, between a first position in which said control fluid is communicated to said second fluid operable means to command said first displacement of said motor, and a second position in which said control fluid is communicated to said second fluid operable means to command said second displacement of said motor; said motor stroking valve means further including an electromagnetically operated valve member operable between first and second positions to control the pressure in said fluid pressure chamber between said first and second pressures, respectively; characterized by:

(a) means operable to sense said input and to generate a neutral signal when said input corresponds to said neutral position of said variable displacement pump; and  
(b) means operable to transmit said neutral signal to said electromagnetically operated valve member, to operate said valve member in said second position, whereby said motor is commanded to said second, relatively greater displacement when said pump is in said neutral position.

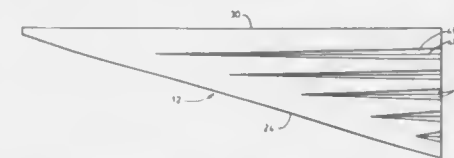
4,951,463

**HYPERSONIC SCRAMJET ENGINE FUEL INJECTOR**  
Ching-Pang Lee, Cincinnati; Kattalaicheri S. Venkataramani, Westchester; Daniel J. Lahti, Cincinnati, all of Ohio, and Vincent H. Lee, Jupiter, Fla., assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 245,181, Sep. 16, 1988, Pat. No. 4,903,480.  
This application Oct. 16, 1989, Ser. No. 421,905  
Int. Cl.<sup>5</sup> F02K 7/10

U.S. Cl. 60—270.1

4 Claims



1. A hypersonic scramjet engine fuel injector comprising a housing having a generally horizontal top wall, an inclined bottom wall, and a generally vertical end wall attached together to define in cross section a generally right triangle, said housing also having two generally vertical side walls having a said-generally-right-triangle shape, said side walls attached to said top, bottom, and end walls to define a fuel-tight, generally right-triangular wedge, said top wall having a fuel inlet orifice, said end wall having a convergent-divergent fuel outlet nozzle, and said side walls having a plurality of vertically-spaced-apart, generally-horizontally-extending exterior grooves deepening towards and reaching said end wall.

4,951,464

**CARBON BLACK FILTER MEANS FOR A DIESEL ENGINE**

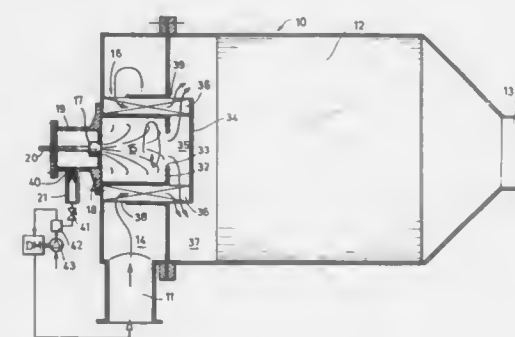
Heinrich Elckhoff, Rösarath, and Elmar Goller, Troisdorf, both of Fed. Rep. of Germany, assignors to Deutsche Forschungsanstalt für Luft- und Raumfahrt E.V., Cologne, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 240,270  
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729861

Int. Cl.<sup>5</sup> F01N 3/02

U.S. Cl. 60—274

9 Claims



9. A method of filtering soot from the engine exhaust gas of a Diesel engine, comprising the steps of:  
combining a compulsory, understoichiometric amount of air

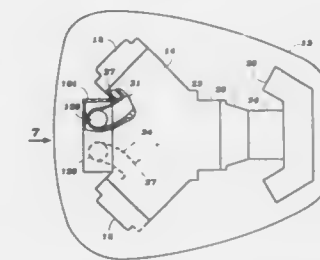
and fuel in a primary combustion chamber by an air flow atomizer nozzle having a plurality of swirl elements for producing annular current rolls in the primary combustion chamber, burning a portion of the fuel in the primary combustion chamber, combining the unburned portion of the fuel and the engine exhaust gas in a secondary combustion chamber, burning the unburned portion of the fuel in the secondary combustion chamber to thereby heat the engine exhaust gas, and filtering the heated exhaust gas to thereby burn down the soot, whereby a flame originating from the nozzle is restricted to the primary combustion chamber and whereby the secondary combustion chamber receives oxygen only in the form of residual oxygen contained in the exhaust gas.

4,951,465

**EXHAUST SYSTEM FOR MULTI-CYLINDER ENGINE**  
Katsumi Torigai, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan  
Continuation of Ser. No. 214,220, Jul. 1, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 463,785  
Int. Cl.<sup>5</sup> E01N 7/10

U.S. Cl. 60—323

7 Claims



1. An exhaust arrangement for an internal combustion engine having a cylinder block defining at least two cylinder bores, an exhaust port extending from each cylinder bore through said cylinder block and terminating in a respective exhaust opening formed in an external face thereof, an internal exhaust cover affixed to said cylinder block and covering said exhaust opening, and an exhaust manifold formed integrally by said exhaust cover and defining with said exhaust openings individual runners and a common collector section into which said runners discharge to form a complete exhaust passage extending from said exhaust openings through said exhaust cover and a discharge from said collector section for conveying exhaust gases from said exhaust ports to the atmosphere.

4,951,466

**WARM-UP CONTROL FOR TRANSMISSION HYDROSTATIC UNIT**

Jon A. Macht, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Jun. 12, 1989, Ser. No. 364,945  
Int. Cl.<sup>5</sup> F16H 59/72

U.S. Cl. 60—329

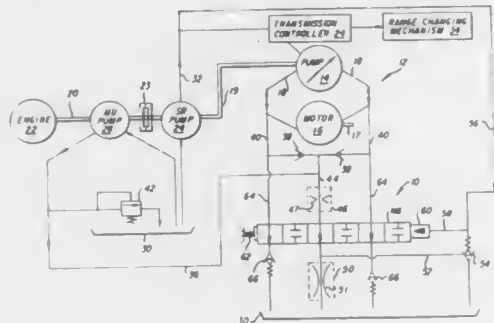
16 Claims

8. A warm-up control for a vehicle transmission including a hydrostatic propulsion unit having a hydraulic pump mechanically driven by an engine and a hydraulic motor connected in a hydraulic loop circuit with the hydraulic pump, said warm-up control comprising, in combination:

(A) a speed reference pump driven by the engine for developing a first fluidic signal proportional to engine speed in an output line;  
(B) a transmission controller connected with said speed

reference pump output line and responsive to said first fluidic signal;

- (C) a makeup pump driven by the engine for pumping hydraulic fluid from a transmission sump through a fluid makeup line to the hydraulic loop circuit of the hydrostatic unit to replenish fluid leakage losses therein;
- (D) a normally closed relief valve included in a signal line tapped into said speed reference pump output line ahead of said transmission controller;
- (E) a bleed line for withdrawing hydraulic fluid from the hydraulic loop circuit to inhibit over-pressurization thereof;



(F) a normally open control valve included in said bleed line and operable to close in response to said first fluidic signal in said signal line; and

(G) a fluid viscosity monitoring line connected into said makeup line and including first fluidic means for regulating hydraulic fluid flow therethrough to a uniform rate regardless of its viscosity and second fluidic means for developing a second fluidic signal varying as a function of the viscosity of the hydraulic fluid flowing therethrough, said second fluidic signal being applied to maintain said relief valve open until the hydraulic fluid is warmed to a safe viscosity operating range, said relief valve, while open, depressing said first fluidic signal to a level insufficient to close said control valve.

**4,951,467**  
**AUTOMATIC TRANSMISSION TORQUE CONVERTER FRONT COVER**

Michael J. Walsh, Oak Park, and Jesse S. Soper, Roseville, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

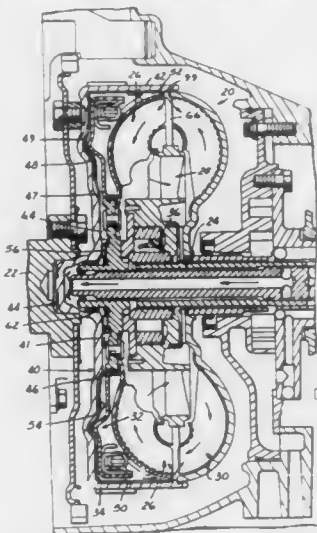
Filed May 11, 1989, Ser. No. 351,493  
Int. Cl.<sup>5</sup> F16D 33/00

U.S. Cl. 60—361

17 Claims

1. A housing cover for a torque converter comprising: a base having a cup means adapted for accepting fluid entering into said housing;

a continuous wall surrounding said base and extending substantially transverse from said base; and



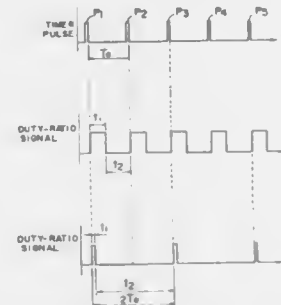
means for increasing fluid flow in the torque converter, said flow increasing means being formed on one of said housing base and said wall.

**4,951,468**  
**METHOD OF DETERMINING DUTY RATIO USED FOR OPERATIONAL CONTROL OF A SOLENOID**  
Koji Sasajima, Tokyo, and Yoshikazu Ishikawa, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,756  
Claims priority, application Japan, Nov. 16, 1987, 62-288944  
Int. Cl.<sup>5</sup> F15B 13/044

U.S. Cl. 60—487

5 Claims



1. A method of determining a duty ratio for operating a solenoid, comprising:  
calculating a duty ratio  $R_D$  in each of basic periods  $T_0$ ;  
determining an operational time  $t_1$  for which the solenoid is to be operated within each of said basic periods  $T_0$ , based on said calculated duty ratio  $R_D$ ; and  
when said duty ratio is reduced to the extent that said operational time  $t_1$  is shorter than a minimum allowable time  $t_0$  of operation for said solenoid, determining a new operational time for which the solenoid is to be operated within a new period, said new period being composed of a plurality of consecutive ones of said basic periods  $T_0$ .

**4,951,469**  
**HYDROSTATIC CONTINUOUSLY VARIABLE TRANSMISSION**

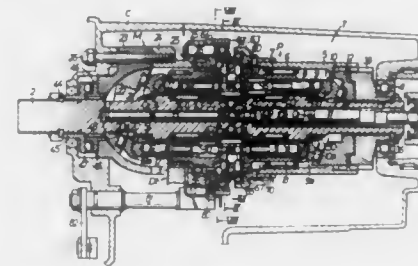
Tsutomu Hayashi, Tokyo; Goroel Wakatsuki, and Kiyoshi Katahira, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,867  
Claims priority, application Japan, Sep. 21, 1987, 62-236600; Aug. 22, 1988, 63-207832

Int. Cl.<sup>5</sup> F16D 39/00

U.S. Cl. 60—489

18 Claims



1. A hydrostatic continuously variable transmission comprising a hydraulic pump having a pump cylinder, a hydraulic motor having a motor cylinder, a hydraulic closed circuit between the hydraulic pump and the hydraulic motor, and a transmission shaft which relatively rotatably supports thereon the pump cylinder and the motor cylinder, wherein a pump swashplate is oppositely arranged at an outer end of the pump cylinder, a motor swashplate is oppositely arranged at an outer end of the motor cylinder, said pump cylinder and said motor cylinder being integrally rotatably connected with each other so as to form a transmission member, one of said pump swashplate and said motor swashplate being formed to be driven synchronously with the transmission shaft, and wherein said transmission shaft is formed as either an input section or an output section of the continuously variable transmission while the other of the input section or output section is integrally formed on an outer periphery of one of the pump cylinder and the motor cylinder.

**4,951,470**  
**TANDEM MASTER CYLINDER**

Hans-Dieter Reinartz, Frankfurt am Main; Helmut Steffes, Hattersheim, and Philipp Kilb, Eppstein, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

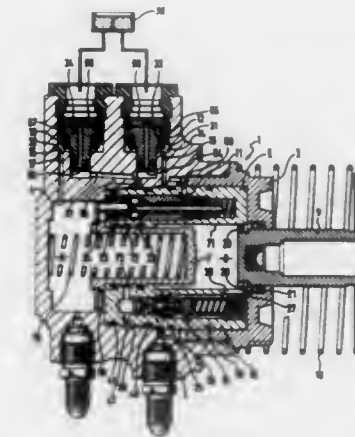
Filed Mar. 3, 1989, Ser. No. 318,994  
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808522

Int. Cl.<sup>5</sup> B60T 8/32, 13/12, 11/20  
U.S. Cl. 60—562

26 Claims

1. A tandem master cylinder for a hydraulic brake unit with slip control, said unit including a housing, a primary piston pre-loaded by a first return spring and a secondary piston pre-loaded by a second return spring to define a primary and a secondary pressure chamber within a longitudinal bore thereof, said pressure chambers being connected to a fluid reservoir through intake chambers and non-return valves and being associated with a first and a second control valve which

release or shut off a second connection between said pressure chambers and said fluid reservoir depending on an actuating



force, wherein said control valves are arranged outside of said pistons and are linearly controlled by said pistons.

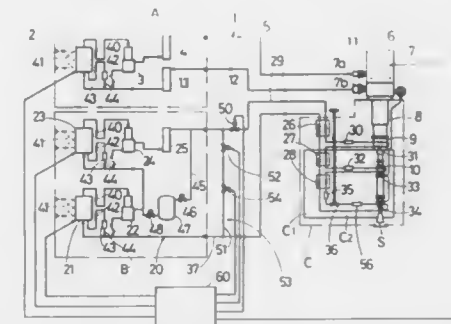
**4,951,471**  
**CRYOGENIC REFRIGERATOR**  
Katsumi Sakitani; Yoon M. Kang; Shinichiro Shinozaki; Shoichi Taneya; Kazuo Miura; Tadashi Ogura, and Satoshi Noguchi, all of Sakai, Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 50,475, May 18, 1987, Pat. No. 4,840,043. This application Sep. 29, 1988, Ser. No. 250,801  
Claims priority, application Japan, May 16, 1986, 61-113332; May 16, 1986, 61-113333

The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> F23B 19/02

U.S. Cl. 62—51.2

11 Claims



1. A cryogenic refrigerator for maintaining a low temperature working apparatus at a cryogenic level, said cryogenic refrigerator comprising:

a precooling refrigerating circuit including a compressor for compressing refrigerant gas, and an expander operatively connected to said compressor for expanding the gas compressed by said compressor thereby lowering the temperature of the refrigerant gas,  
said expander including heat stations which are maintained at respective lowered temperatures of the refrigerant gas;  
a J-T circuit including a pre-cooler in a heat exchange relationship with the heat stations of said expander of undergoing heat exchange therewith to pre-cool refrigerant gas in the J-T circuit, a J-T valve operatively connected to said pre-cooler for Joule-Thomson expanding the pre-cooled refrigerant gas into a gas/liquid state, and a cooler



operatively connected to and downstream of said J-T valve;

- a cryostat in which the heat stations of said expander, said J-T valve and said cooler are disposed, the low temperature working apparatus supported within said cryostat adjacent said cooler so that the low temperature working apparatus is maintainable at a cryogenic level resulting from evaporation of the liquid of the refrigerant gas existing in a gas/liquid state after the expansion thereof by said J-T valve disposed upstream of said cooler;
- a precooling refrigerating circuit stop means operatively connected to said precooling refrigerating circuit and said J-T circuit for stopping the operation of said precooling refrigerating circuit; and
- a control means operatively connected to said precooling refrigerating circuit stop means for activating said precooling refrigerating circuit stop means to stop the operation of said precooling refrigerating circuit while causing said J-T circuit to operate while the low temperature working apparatus is to be operated.

4,951,472

#### PROCESS AND APPARATUS FOR PRODUCING PARTICULATE FROZEN HIGH WATER CONTENT FOOD PRODUCTS

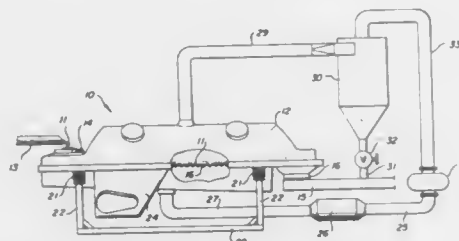
Ove Hansen, Columbia, Md.; G. Skov Nielsen, and Brian Wagstaff, both of Hudson, Wis., assignors to Niro Atomizer, Inc., Soborg, Denmark

Filed Aug. 8, 1989, Ser. No. 390,870

Int. Cl.<sup>5</sup> F25D 13/06

U.S. Cl. 62—63

16 Claims



1. A process for freezing particulate granules of high water content food products, comprising the steps of:
  - a. providing a freezing chamber having a feed inlet, an outlet and a perforated plate extending from said feed inlet to said outlet,
  - b. oscillating said perforated plate,
  - c. introducing a chilled gas through said perforated plate,
  - d. delivering particulate granules of said food product to said feed inlet,
  - e. oscillating and levitating said particulate food granules while simultaneously freezing said particulate food granules in said chilled gas,
  - f. moving said particulate granules to said outlet by said oscillating movement in combination with the passage of said chilled gas through said perforated plate,
  - g. recovering said frozen particulate food granules at said outlet,
  - h. recovering chilled gas containing fines of said food, and separating said fines from said recovered chilled gas.

4,951,473

#### HEAT PUMP DEFROSTING OPERATION

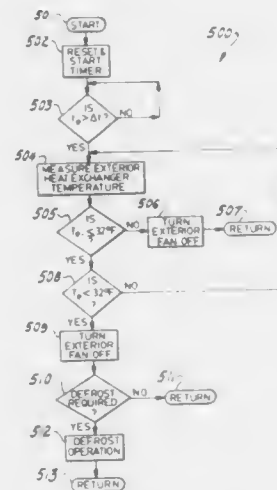
Michael Levine, Boca Raton, Fla.; James Russo, Ann Arbor, Mich.; Victor Rigotti, Ann Arbor, Mich., and Nicholas Skogler, Ypsilanti, Mich., assignors to Honeywell, Inc., Minneapolis, Minn.

Filed Oct. 12, 1988, Ser. No. 256,708

Int. Cl.<sup>5</sup> F25D 21/12

U.S. Cl. 62—82

16 Claims



1. A method of defrosting operation of a heat pump having a compressor, an interior heat exchanger, an exterior heat exchanger, an exterior fan for moving exterior air past the exterior heat exchanger, and a thermostatic control means for cycling the compressor ON and OFF in accordance with heating demand, the improvement comprising the steps of:
  - a. operating the exterior fan for a predetermined interval of time immediately after the compressor is cycled OFF by the thermostatic control means;
  - b. measuring the temperature of the exterior heat exchanger at the end of said predetermined interval of time; and
  - c. continuing to operate the exterior fan only if said measured temperature of the exterior heat exchanger is equal to freezing.

4,951,474

#### CRYO-REFRIGERATION SYSTEM

Salvatore T. DiNovo; John Schlaechter, both of Columbus, and Roy S. Brown, Worthington, all of Ohio, assignors to Guild Associates, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 170,438, Mar. 21, 1988, Pat. No. 4,850,199. This application Apr. 13, 1989, Ser. No. 336,782

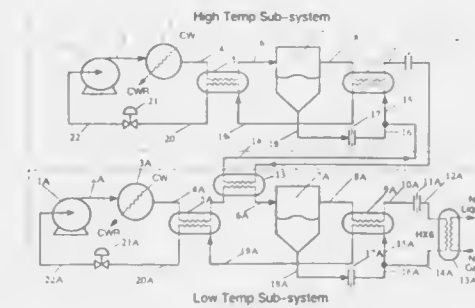
Int. Cl.<sup>5</sup> F25B 1/00

U.S. Cl. 62—114

9 Claims

1. A mechanical refrigeration process in which two or more systems are connected in series to provide successively lower temperature levels, refrigeration may be supplied to or from other processes at each temperature level, each system utilizes mixtures of refrigerants and/or inert gases having different boiling points and employing the following steps:
  - a. compression of the mixture to a suitable pressure,
  - b. rejection of compression heat to the environment,
  - c. cooling the mixture by heat exchange with mixture returning to the compressor,
  - d. separation of the liquid and gas phases,
  - e. further cooling of the separated gas mixture, to form liquid, by heat exchange with mixture returning to the compressor,
  - f. expansion of the liquid to a given lower pressure to achieve the desired low temperature,

- g. absorption of heat by the expanded fluid from step f to provide refrigeration,
- h. expansion of the liquid from step d to the lower pressure of step f and mixing of this expanded fluid with the used fluid of step g,



- i. heat exchange of the fluid from step h to satisfy the requirements of steps c and e,
- j. controlling the capacity of the system by throttling the compressor suction.

4,951,475

#### METHOD AND APPARATUS FOR CONTROLLING CAPACITY OF A MULTIPLE-STAGE COOLING SYSTEM

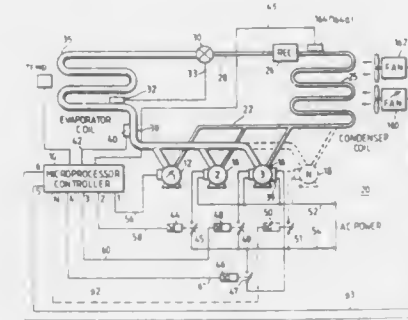
Richard H. Alsenz, Missouri City, Tex., assignor to Altech Controls Corp., Missouri City, Tex.

Continuation-in-part of Ser. No. 62,390, Jun. 15, 1987, Pat. No. 4,825,662, which is a continuation of Ser. No. 819,387, Jan. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 706,403, Feb. 27, 1985, Pat. No. 4,628,700, which is a continuation of Ser. No. 458,914, Jan. 18, 1983, abandoned, which is a continuation of Ser. No. 257,113, Apr. 24, 1981, Pat. No. 4,612,776, which is a continuation of Ser. No. 62,525, Jul. 31, 1979, abandoned. This application Jan. 21, 1988, Ser. No. 146,285

Int. Cl.<sup>5</sup> F25B 1/00

U.S. Cl. 62—117

7 Claims



1. A refrigeration system having in a closed loop connection a compressor for compressing a refrigerant, condensing means for condensing the compressed refrigerant from the compressor and discharging the condensed refrigerant at a discharge pressure into an outlet of said condensing means, said system further comprising:
  - a. a pre-selected number of condenser fans, at least one condenser fan being adapted to operate between a maximum and a minimum operating speed;
  - b. discharge pressure selection means for establishing a first and second discharge pressure range, each said discharge pressure range having an upper and a lower limit, the first discharge pressure range being associated with the vari-

4,951,476

#### MODE SWITCHING ARRANGEMENT FOR AUTOMOTIVE AIR CONDITIONER

Akihiko Yamamoto, Zama; Naoharu Shibuya, Tokyo; Eiji Takahashi, Tokyo, and Fumio Hagi, Tokyo, all of Japan, assignors to Calsonic Corporation, Tokyo and Nissan Motor Co., Ltd., Yokohama, both of Japan

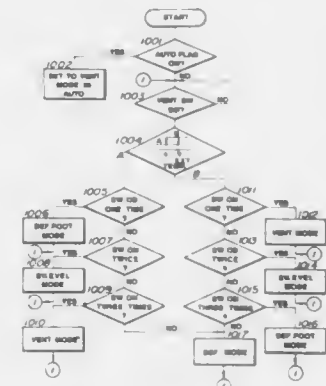
Filed Dec. 22, 1989, Ser. No. 454,986

Claims priority, application Japan, Dec. 28, 1988, 63-331065

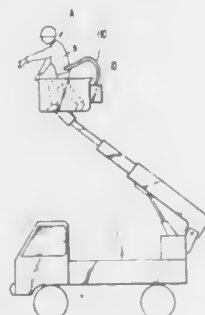
Int. Cl.<sup>5</sup> F25D 29/00; B60H 1/00

U.S. Cl. 62—163

6 Claims

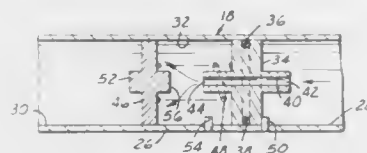


**4,951,477**  
**AIR CONDITIONING SYSTEM**  
 Shigenao Tomimatsu, Takasaki, Japan, assignor to Sanden Corporation, Japan  
 Continuation of Ser. No. 219,225, Jul. 19, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 445,100  
 Claims priority, application Japan, Jul. 15, 1987, 62-108660[U]; Jul. 15, 1987, 62-108662[U]  
 Int. Cl.<sup>3</sup> B05B 3/16  
 U.S. Cl. 62—217



1. In an air conditioning system mounted on an electrically isolated platform including a compressor, a condenser, an evaporator, a first fan for the condenser, a second fan for the evaporator, and an oil hydraulic motor for driving the compressor, an improvement comprising:  
 belt means coupling said first and second fans with said oil hydraulic motor for transmitting rotational force from said oil hydraulic motor to said first and second fans;  
 temperature control means for controlling the temperature of air output from the air conditioning system, said temperature control means including first damper means disposed between said second fan and said evaporator for selectively regulating the volume of air which passes through said evaporator; and  
 output control means for controlling the volume of air output from the air conditioning system, said output control means including second damper means disposed adjacent to an output port of said air conditioning system for selectively regulating the volume of air which passes through said output port.

**4,951,478**  
**VARIABLE CAPACITY CONTROL VALVE**  
 Larry K. McDonald, Canton, Mich., assignor to Chrysler Corporation, Highland Park, Mich.  
 Filed Oct. 24, 1989, Ser. No. 426,632  
 Int. Cl.<sup>3</sup> F25B 41/04  
 U.S. Cl. 62—222



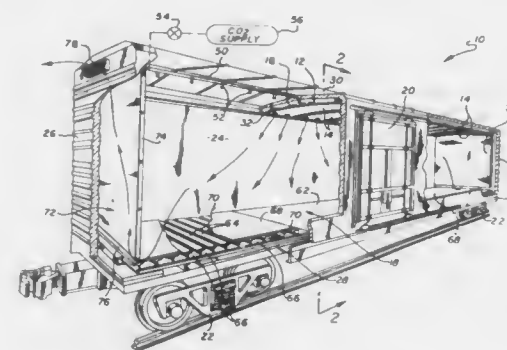
2. In an automobile air conditioning system, an improved refrigerant flow controlling device located between a condenser and an evaporator to restrict the flow of refrigerant into the evaporator from a pressurized condenser thereby maintaining evaporator internal pressure at a desired low level even when condenser pressure increases, the improved device comprising: hollow enclosure means having fluid inlet and outlet portions separated by a cylindrical passage; piston means supported within the cylindrical passage for reciprocal movement

8 Claims

therein, the piston means sealingly engaging the enclosure so that refrigerant is prevented from passing between the enclosure and pistons means; an orifice tube with a small passage extending through the piston means for normally regulating the passage of refrigerant from the condenser to the evaporator, the orifice passage having an outlet end portion located to one side of the piston means; stationary means extending across the cylindrical passage and spaced between the piston means and the outlet portion of the enclosure means, the stationary means defining a flat end surface extending in a plane normal to the axis of the cylindrical passage and with the end surface generally aligned with the axis of the orifice passage so that refrigerant flow exiting the orifice passage is directed toward the end surface; a compression coil type spring extending between the piston means and the stationary means urging them away from one another, whereby under normal condenser pressures corresponding to normal ambient temperatures the spring positions the outlet end portion of the orifice sufficiently far away from the end surface so that flow resistance is substantially unaffected by the end surface but is established solely by the orifice resistance itself and whereby under abnormally increased condenser pressures corresponding to the abnormally hot ambient temperatures a sufficient differential pressure force acting on the piston in opposition to the spring moves the piston so as to decrease the spacing between the outlet of the orifice and the end surface sufficiently to create a flow resistance in addition to the resistance of the orifice and resultantly decrease the flow rate through the device; piston stop means located downstream of the piston means to limit movement of the piston means toward the end surface of the stationary means whereby the stop means permits the outlet portion of the orifice to closely approach but not engage the end surface thereby increasing flow resistance through the device.

**4,951,479**  
**REFRIGERATION SYSTEM**  
 Mark E. Araquistain, Caldwell, and Edwin R. Brandt, Boise, both of Id., assignors to J.R. Simplot Company, Boise, Id.  
 Filed Nov. 24, 1989, Ser. No. 440,719  
 Int. Cl.<sup>3</sup> B06H 1/32  
 U.S. Cl. 62—239

10 Claims



1. A refrigeration system for a shipping container such as a rail car or the like having side walls and end walls cooperating with a floor and roof to define a storage compartment, said system comprising:

a plurality of modular ceiling panels of generally rectangular shape and each having a width sufficient to span between the side walls defining the storage compartment, each of panels further including a pair of upstanding wall members on one side thereof and extending across the width of said panel at positions spaced short distances from the opposite ends of said panel; and  
 means for mounting said panels in generally side-by-side relation within the shipping container at a position spaced

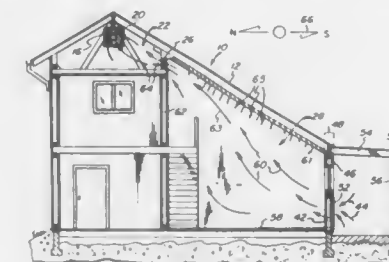
relatively close to the roof to define a false ceiling dividing said storage compartment into an upper ceiling compartment and a lower main storage compartment, said wall members of said panels being generally aligned to define a pair of partitions spaced at least a short distance from the roof;  
 said partitions dividing said upper ceiling compartment into a central bunker disposed between said partitions and adapted to receive a cryogenic material, and a pair of elongated plenum chambers extending along opposite sides of said bunker;  
 a plurality of said panels further defining downflow ports opening from both of said plenum chambers into said main storage compartment, whereby cryogenic gas sublimated from the cryogenic material flows over said partitions and into said plenum chambers, and further through said downflow ports into the main storage compartment.

**4,951,480**  
**EVAPORATIVE COOLING DEVICE AND PROCESS**  
 Anton C. Brence, 18118 NW. Walker Rd., #B, Beaverton, Oreg. 97006

Filed Nov. 23, 1988, Ser. No. 275,436  
 Int. Cl.<sup>3</sup> F28D 5/00

U.S. Cl. 62—304

11 Claims



1. A process for cooling a living space having a sloping ceiling comprising the steps of:  
 providing an evaporative cooling unit mounted relatively low and completely within an exterior wall of the living space;  
 shading an outside opening of the evaporative cooling unit from direct sunlight;  
 pulling air from outside into the evaporative cooling unit with at least one remote fan;  
 humidifying the outside air with the evaporative cooling unit to cool it;  
 circulating the cooled air through the living space with the remote fan to cool the living space;  
 as the cooled air warms and rises toward the sloping ceiling, drawing it along the sloping ceiling toward a vent high in a wall of the living space with the remote fan; and  
 exhausting the warm air from the living space with the remote fan.

**4,951,481**  
**REFRIGERATOR WITH EFFICIENT COLD ACCUMULATOR**  
 Kozaburo Negishi, Isesaki, Japan, assignor to Sanden Corporation, Japan

Filed Mar. 16, 1989, Ser. No. 324,028

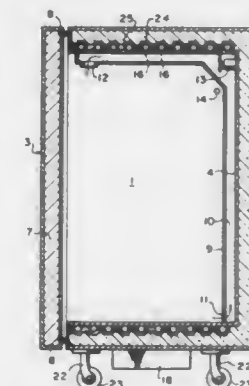
Claims priority, application Japan, Mar. 17, 1988, 63-61762  
 Int. Cl.<sup>3</sup> F25D 17/04

U.S. Cl. 62—406

26 Claims

1. A refrigerator comprising:  
 an inner box defining at least in part a refrigerator compartment therein, said inner box having an inner box outer surface;  
 an outer box generally covering said inner box;  
 cooling means for cooling said refrigerator compartment,

said cooling means including an evaporator tubing wound around said inner box outer surface and thereby positioned outside of said refrigerator compartment and through which refrigerant flows, said evaporator tubing directly cooling said refrigerator compartment;  
 flexible cold accumulator packaging enclosing therein cold regenerative material and covering said evaporator tubing;  
 heat insulating material disposed between said inner and outer boxes and covering said flexible cold accumulator packaging; and  
 circulating means for circulating cold air in said refrigerator



compartment, said circulating means comprising a cold air circulating path formed inside said inner box and in said refrigerator compartment and thereby separated from said evaporator tubing by said inner box, said cold air circulating path having an air inlet at a lower position of the inside of said refrigerator compartment and an air outlet at an upper position of the inside of said refrigerator compartment, a circulation fan having a power circuit and circulating cold air in said refrigerator compartment through said cold air circulating path, and a thermostat which detects the temperature inside of said refrigerator compartment and sends a signal associated with the detected temperature to said power circuit.

**4,951,482**  
**HYPOTHERMIC ORGAN TRANSPORT APPARATUS**  
 Gary L. Gilbert, 4350 Troost, #4, Studio City, Calif. 91604  
 Filed Dec. 21, 1988, Ser. No. 288,776  
 Int. Cl.<sup>3</sup> F25D 3/08

U.S. Cl. 62—457.1

3 Claims

1. A hypothermic organ transport apparatus comprising:  
 an inner container for storing a body organ;  
 an outer container for insertably receiving said inner container in spaced coaxial relationship;  
 a preservation medium carried in said inner container in communication with said body organ;  
 a thermoregulatory fluid substantially surrounding said inner container and occupying the space between said coaxial inner and outer containers;  
 sealing means operably securing said inner container with said outer container to maintain said preservation medium and said thermoregulatory fluid in their respective locations;  
 mounting means detachably coupling said inner container with said outer container to maintain said inner container in a suspended and coaxial position with respect to said outer container;  
 marker means carried on said outer container indicating level of said thermoregulatory fluid within said outer container preparatory to insertion of said inner container; an open-ended port disposed on the inside of said outer container selectively in communication exteriorly thereof

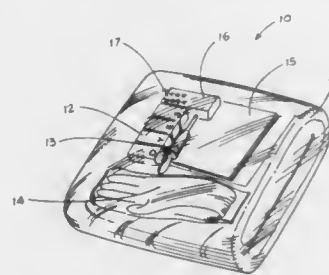


for discharging thermoregulatory fluid to the level of said marker means;  
said inner container includes an elongated bag composed of transparent material and said outer container includes a cylindrical sleeve about said inner container bag in spaced relationship composed of transparent material;



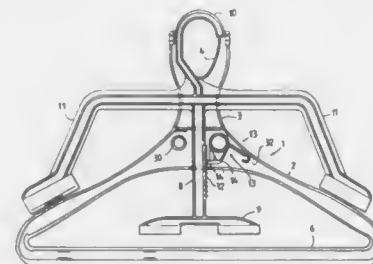
said outer container sleeve and said inner container bag are of flexible thin-walled construction; and  
said inner container downwardly depends within said outer container from said mounting means in close communication with said thermoregulatory fluid.

**4,951,483**  
**DO-IT YOURSELF TYE-DYE KIT APPARATUS AND METHOD**  
Beatrice T. van Olphen, 8255 E. Rockgate, Tucson, Ariz. 85715  
Filed Apr. 10, 1989, Ser. No. 335,510  
Int. Cl.<sup>5</sup> B65D 81/36; D06B 11/00  
U.S. Cl. 68—213 5 Claims



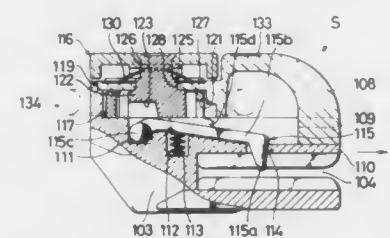
1. A composite, ready-to-use, do-it-yourself tie-dye kit apparatus for producing a tie-dye pattern on an article of clothing, said composite, ready-to-use, do-it-yourself tie-dye kit apparatus comprising:  
tye-dye instruction information source for instructing a user how to tie-dye said article of clothing, said information source having a plurality of illustrated tie-dye patterns in a finished product state for selection and for being duplicated by a user onto said article of clothing; and  
ready-to-use tie-dyeing supplies included with said instruction information source for tie-dyeing said article of clothing.

**4,951,484**  
**LOCK AND KEY COMBINATION**  
Stanley S. Rohald, Johannesburg, and Llewellyn De Wet, Roodepoort, both of South Africa, assignors to Nova International Corporation C.C., Johannesburg, South Africa  
Filed Mar. 24, 1989, Ser. No. 328,215  
Claims priority, application South Africa, Mar. 30, 1988, 88/2273  
Int. Cl.<sup>5</sup> E05B 69/00  
U.S. Cl. 70—59 9 Claims



1. A lock and key combination operable in a housing, comprising:  
a latch, having a hub mounted on a boss provided on the housing so as to permit rotation of the latch about an axis of rotation;  
means for biasing the latch towards a locking position;  
an end plate adapted to seat on the hub of the latch and arranged to be trapped on the latch to prevent rotation of the end plate relative to the latch, the end plate carrying a pin of non-circular form;  
a barrel key having a socket adapted to engage said pin of the end plate to permit the latch to be displaced about its axis of rotation against the means for biasing the latch.

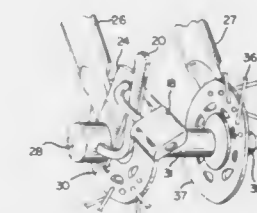
**4,951,485**  
**DIAL LOCK DEVICE FOR SLIDE FASTENERS**  
Kiyoyasu Wake, Kawasaki, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan  
Filed Oct. 26, 1989, Ser. No. 426,724  
Claims priority, application Japan, May 20, 1988, 63-66718; May 27, 1988, 63-70145  
Int. Cl.<sup>5</sup> E05B 67/38  
U.S. Cl. 70—68 11 Claims



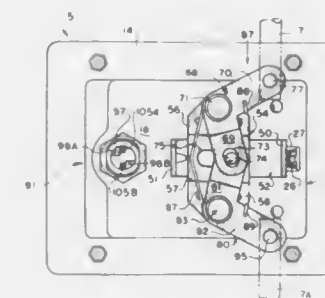
1. A lock device adapted to be used on slide fasteners for opening and closing the same, which comprises:  
(a) a slider body comprising upper and lower wings joined at their front ends by a neck so as to define therebetween a guide channel for the passage of two opposite rows of coupling elements of the slide fastener;  
(b) a lock prong disposed on a top plate in said upper wing and movable between a lock position to engage with the coupling elements and an unlocked position to disengage from the same, said lock prong being normally biased toward either one of said locked and unlocked positions;  
(c) a dial lock mechanism mounted integrally on a front end

of a top surface of said upper wing and adapted to move said lock prong in said locked and unlocked positions, said lock mechanism comprising a ring member, an annular sleeve, an engaging member, a disc presser and a dial superposed in this order; and  
(d) an arcuate lug extending in opposed relation to said lock mechanism from a rear end of said upper wing and having one end secured to said upper wing and an opposite end connected to said lock mechanism, said lug being adapted to pivotally mount a pull tab.

**4,951,487**  
**BICYCLE WHEEL LOCKING MEANS**  
Sheils Dennis, 45 Julie Dr., Glenview, Ill. 60025  
Filed Jul. 14, 1989, Ser. No. 379,874  
Int. Cl.<sup>5</sup> E05B 71/00  
U.S. Cl. 70—233 6 Claims

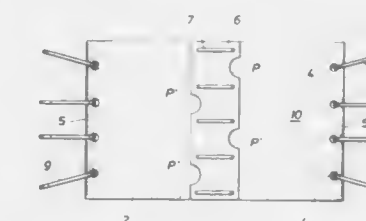


**4,951,486**  
**NESTED PADDLE LOCK ASSEMBLY**  
Jack A. Braun, Brunswick, and Michael J. Racbocki, Columbia Station, both of Ohio, assignors to Cleveland Hardware & Forging, Cleveland, Ohio  
Filed Nov. 7, 1989, Ser. No. 443,734  
Int. Cl.<sup>5</sup> E05B 13/10  
U.S. Cl. 70—208 17 Claims



1. A nested paddle lock assembly for a vehicle door or the like comprising:  
an outside pan assembly mounted to an outside door surface, said outside pan assembly including a first pan partially received in the door and a first outside paddle handle pivotally mounted to and normally received within the first pan and including a first actuation finger extending into the door;  
an inside pan assembly mounted to an inside door surface in alignment with said outside pan assembly, said inside pan assembly including a second pan partially received in said door and a second inside paddle handle pivotally mounted to and normally received within the second pan and including a second actuation finger extending into the door;  
a slide means mounted to said first and second pans and being reciprocally linearly movable relative thereto between a closed position and an open position, said first or second actuation fingers engaging said slide means to drive the same through a first linear movement from the closed position to the open position when either the inside or outside handle is pivoted away from the door;  
a pivotal lever means actuated by said first linear movement of the slide means from its closed to its open position and operative upon actuation to unlatch the door for opening; and  
lock means including a pivotal outside lock actuator mounted to said first pan and a pivotal inside lock actuator mounted to said second pan, selected pivotal movement of either the inside or outside lock actuator to a locking position obstructing slide means movement and locking the slide means in its closed position to preclude door opening.

**4,951,488**  
**KEYHOLDER**  
Joe R. Hogan, 8014 Bromley, Houston, Tex. 77055  
Filed Sep. 11, 1989, Ser. No. 405,648  
Int. Cl.<sup>5</sup> A44B 15/00  
U.S. Cl. 70—456 R 1 Claim



1. A keyholder comprising:  
a flat plate having opposed edges and a front and back surface;  
a plurality of spaced openings adjacent a pair of said opposed edges of said plate;  
keyhooks in said openings for supporting keys therein;  
strips extending across the front and back surface of said plate substantially midway between the openings in said pair of opposed edges;  
securing means securing said strips at spaced intervals to said front and back surfaces to form pockets for receiving keys therein; and  
said openings along said opposed edges being aligned alternately with a pocket on the front and back surfaces of said keyholder.

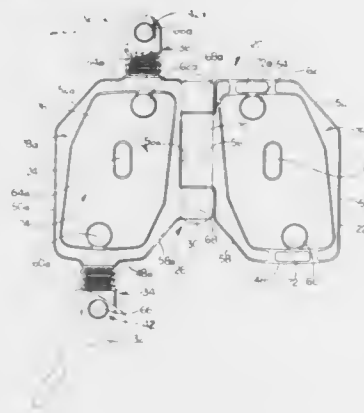
**4,951,489**  
**KEY HOLDER**

Nathan C. Proch, 2935 Marshall Ave., Apt. #16, Cincinnati, Ohio 45220

Filed Jun. 26, 1989, Ser. No. 372,541  
Int. Cl.<sup>5</sup> A47G 29/10

U.S. Cl. 70-456 R

2 Claims



1. A key holder for holding keys comprising a pair of shells for enclosing keys;  
at least one arm attached to at least one of said shells for holding said keys;  
a hinge connecting the shells together to allow the shells to open and close relative to each other wherein said hinge is comprised of three hollow cylindrical portions one of which has a notch on an interior portion thereof and a spring within said hinge which when wound tends to urge the shells open;  
said three cylindrical portions comprising a top cylindrical portion and a bottom cylindrical portion both of which are connected to one of said shells and a central cylindrical portion connected to the other shell and which lies in between the top cylindrical portion and the bottom cylindrical portion;  
a body which is generally cylindrical in shape and fits inside the three hollow cylindrical portions and is able to move longitudinally therein; and  
wherein the means for locking the hinge is a projection on the outside of the body which fits into the notch inside one of said cylindrical portions so that the hinge and shells are locked when the projection fits into the notch and when the body is moved so that the projection moves out of the notch, the spring releases to allow the hinge and shells to open.

**4,951,490**  
**METHOD FOR AUTOMATICALLY CONTROLLING SPINNING ROLLS**

Heinz Grönert, Emmering, and Manfred Eckert, Dachau, both of Fed. Rep. of Germany, assignors to Man Technologie GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 343,409  
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820742

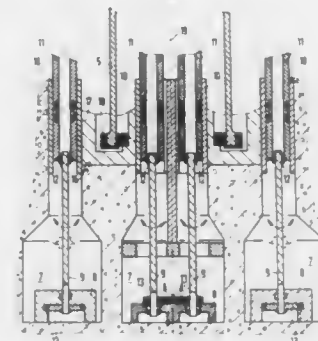
Int. Cl.<sup>5</sup> B21B 19/14

U.S. Cl. 72-9

14 Claims

1. A method for the automatic control in a spin rolling process of the set positions of spinning rolls in relation to a cylindrical, tubular workpiece in an opposed roll spinning lathe, said method comprising arranging first, second, third and fourth pairs of rolls in the spinning lathe in successive, axially spaced relation to form respective first, second, third and fourth rolling stages, each roll pair consisting of one inner roll and one outer roll, supporting each roll on a holder on a carrier so as to be radially adjustable in relation to the work-

piece, said pairs of rolls being arranged at an equal circumferential spacing about the workpiece with the roll pair of the first rolling stage placed diametrically opposite the roll pair of the second rolling stage, the roll pair of the third rolling stage being angularly offset by 90° in relation to said first roll pair and being diametrically opposite the roll pair of the fourth rolling stage, relatively displacing, during the spin rolling process, the pairs of rolls and the workpiece to produce rela-



tive translatory and rotary motion therebetween, continuously measuring the radial forces acting on the rolls during their displacement to their initially set positions and during the spin rolling process, comparing the radial forces at corresponding rolls of the respective opposite pairs of rolls and if a permissible differential force is exceeded radially displacing the roll of the preceding roll stage to compensate for lack of force equilibrium while keeping the other roll of said corresponding rolls in its initial radial position.

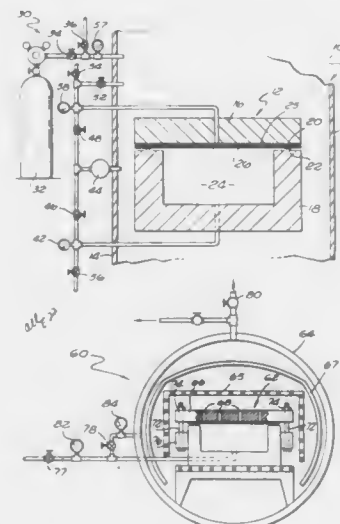
**4,951,491**  
**APPARATUS AND METHOD FOR SUPERPLASTIC FORMING**

Roy H. Lorenz, Rancho Palos Verdes, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 30, 1989, Ser. No. 428,677  
Int. Cl.<sup>5</sup> B21D 26/02

U.S. Cl. 72-60

4 Claims



1. A method of superplastic forming a workpiece, comprising the steps of:

(a) securing the workpiece within a die assembly located within an autoclave, said die assembly being of a type

suitable for use in the superplastic fabrication of workpieces, said die assembly including a lid, a die having a die cavity, and sealing means for effecting a seal between the die cavity and the workpiece, said sealing means including mechanical force application means for forcing the lid against the workpiece to effect the desired seal between the workpiece and the die,

(b) establishing a sufficient die cavity back pressure,  $P_b$ , so as to minimize grain boundary cavitation; and  
(c) establishing a minimal pressure differential,  $\Delta P = P_m - P_b$ , where  $P_m$  = the pressure in the main volume of the autoclave, which allows retention of the required sealing while concomitantly providing sufficient forming pressure,  $P_f$ , for the desired superplastic forming of the workpiece.

**4,951,492**  
**HYDRAULIC EXPANSION OF TUBING**

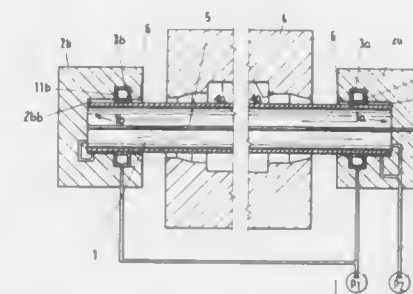
Gerd Vogt, Meerbusch, Fed. Rep. of Germany, assignor to Mannesmann AG, Düsseldorf, Fed. Rep. of Germany

Filed Jun. 15, 1989, Ser. No. 367,187  
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820952

Int. Cl.<sup>5</sup> B21D 26/02

U.S. Cl. 72-61

5 Claims



1. Device for expanding and forming a desired shape in a central portion of a hollow tubular blank by a hydraulic pressure means, said device further including two sealing heads for closing off open end portions of said hollow blank, the improvement comprising:

an outer tooling surrounding said central portion of said hollow blank and having an internal contour of the said desired shape, said outer tool being separated from the two sealing heads;

said two sealing heads being interconnected and engaging the open end portions of the hollow blank with play, the sealing heads each further including annular groove means and including respectively a hollow sealing ring in each such groove means for sealing off, under pressure, said open end portions of the hollow blank; and  
means for providing fluid pressure to respective hollow interiors of said sealing rings, said fluid pressure means supplying pressure greater than the hydraulic pressure applied to the interior of the hollow blank being expanded.

**4,951,493**  
**METHOD AND APPARATUS FOR MAKING A SPIRAL PIPE**

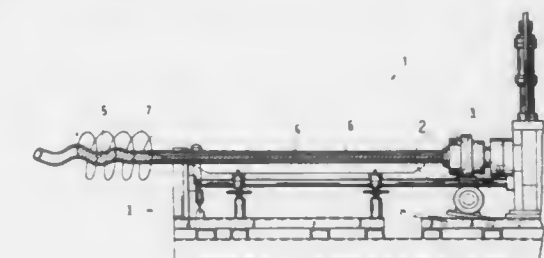
Hermann Fragge, Lohne; Ewald Westerkamp, Dinklage, and Felix Willenborg, Kohne/Kroge, all of Fed. Rep. of Germany, assignors to Siekmann Fittings GmbH & Co. KG, Lohne, Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,169  
Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818315; Jul. 4, 1988, 3822541

Int. Cl.<sup>5</sup> B21C 37/15

U.S. Cl. 72-69

22 Claims



1. A method of fabricating a spiral pipe for an eccentric spiral pump comprising axially advancing an elongated pipe over a die means consisting of a spiral die member having a cross-sectional diameter which is greater than one-half the overall outer diameter of said die means to thereby define a radial central solid die section which extends linearly along the longitudinal extent of said die member, and effecting relative rotation between said pipe and said die means as said pipe is axially advanced over said die means to thereby form a spiral pipe.

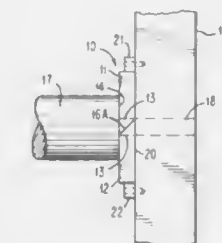
**4,951,494**  
**COMPRESSION ROLLERS WITH MOVABLE SHOULDER SHIELDS**

Joseph C. D'Alterio, 64 Sugar Maple Ln., Glen Cove, N.Y. 11542

Filed Oct. 10, 1989, Ser. No. 418,535  
Int. Cl.<sup>5</sup> B21H 1/22

U.S. Cl. 72-199

14 Claims



1. In a rolling mill having at least one pair of compression rollers, each of said rollers having a shoulder and an axle at its opposite ends, the improvement of a movable shield abutted against the shoulders at each of the opposite ends of said rollers, each said shield having at least one pair of circular openings in which the axles of said rollers are fitted and being a flat stiff plate of which at least the face that abuts said shoulders of said rollers is a material offering low frictional resistance to the rotation of said rollers.



4,951,495

## MACHINE TOOL WITH C-SHAPED FRAME

Peter Van Daalen, Hengelo, and Antonius H. Groot Zwaantink, Borne, both of Netherlands, assignors to Holding M. Brouwer & Co. B.V., Hengelo, Netherlands

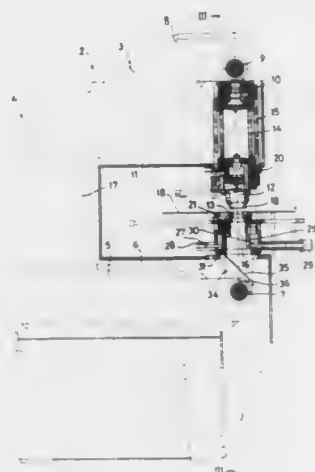
Filed Jul. 6, 1989, Ser. No. 376,018

Claims priority, application Netherlands, Jul. 14, 1988, 8801799

Int. Cl.<sup>5</sup> B30B 1/18

U.S. Cl. 72—455

5 Claims



1. A machine tool, in particular a machine for working with punches and dies on parts formed from sheet material, comprising an essentially C-shaped frame made up of two parallel-connected, essentially C-shaped frame parts, each having a top arm and a bottom arm, said arms each having an end, tools positioned between said arms the first frame part being designed to absorb the reaction forces from forces exerted by said tools to define a working direction of the tools, and the second frame part being designed to hold the tools in a desired position relative to each other, the two C-shaped frame parts near ends of the arms thereof being connected to each other only by means of a hinge joint between the bottom arm of the first C-shaped frame part and the neighboring bottom arm of the second C-shaped frame part, and a connecting element having one side hingedly connected to the top arm of the first C-shaped frame part by means of a hinge joint and having an other side connected to the top arm of the second C-shaped frame part, in such a way that said connecting element can be moved in the working direction of the tools, and the axes of the hinge joints being essentially at right angles to the principal plane of the C-shaped frame part, and intersect a common axis of tools placed between the arms of the C-shaped frame parts.

4,951,496

## METHOD OF, AND APPARATUS FOR, LEAK TESTING A PACKAGE

Mathias L. C. Aarts, Bilthoven, Netherlands, assignor to Product Suppliers AG, Zug, Switzerland

Filed Feb. 9, 1989, Ser. No. 307,933

Claims priority, application Netherlands, Feb. 9, 1988, 8800308

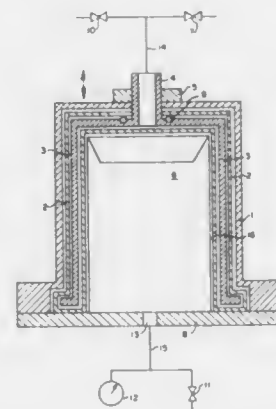
Int. Cl.<sup>5</sup> G01M 3/32

U.S. Cl. 73—49.3

8 Claims

1. A method of leak-testing a package, which comprises: (a) placing a compressible package within a sheet-like, gas-tight envelope so as to define a measuring space between the package and the envelope, (b) effecting a differential between the pressure on the outside and the pressure on the inside of the envelope so that the package becomes tightly enveloped by the envelope, (c) sealing the measuring space between the package and the

envelope pressed against the package, thereby providing an initial pressure in the sealed measuring space, and (d) measuring the change in pressure in the sealed measuring space for a pre-determined measuring time, said pressure differential effected in step (b) being so high



that the envelope reduces the volume in the package and thereby increases the internal pressure in the non-filled portion of the package, a lower pressure than the increased internal pressure created in the package in step (b) provided within the measuring space in step (c) as said initial pressure.

4,951,497

## PROCESS AND APPARATUS FOR MEASURING THE ROUGHNESS OF THE SURFACE OF A PIECE

Yvon Gilibert, Reims, France, assignor to A.R.M.I.N.E.S., Paris, France

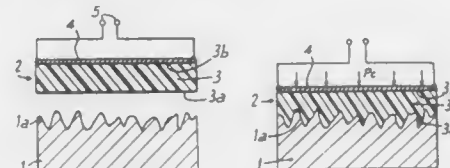
Filed Jan. 17, 1989, Ser. No. 298,183

Claims priority, application France, Jan. 22, 1988, 88 00708

Int. Cl.<sup>5</sup> G01B 5/28

U.S. Cl. 73—105

20 Claims



1. A process for measuring the roughness of a surface of a piece in which there is applied on the rough surface of the piece a first surface of a deformable flat element and there is exerted on a second surface of the deformable flat element, parallel and opposite the first surface, a constant pressure in the direction of the piece, so that the first surface of the deformable element closely follows the profile of the rough surface, penetrating between the peaks of this rough surface,

wherein the deformable flat element is made of an elastic material having a high degree of reversible elastic deformability so that the first surface of the element penetrates elastically and reversibly between the peaks of the rough surface, and the deformation (Poisson's contraction or dilatation) or the resultant displacement of the second surface of the deformable element is measured in situ, i.e., while the deformable flat element is being pressed against the rough surface.

4,951,498

## METHOD FOR TESTING INTERNAL COMBUSTION ENGINE

Naoyuki Kiuchi, Osaka, Japan, assignor to Daifuku Co., Ltd., Japan

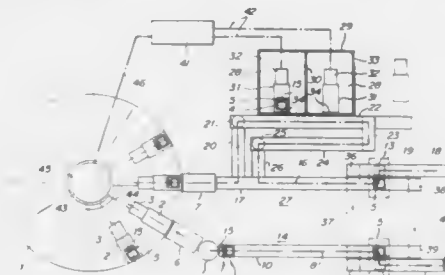
Filed Oct. 4, 1989, Ser. No. 416,861

Claims priority, application Japan, Nov. 4, 1988, 63-279595

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73—117.3

3 Claims



1. A method for testing internal combustion engines comprising: providing first testing units for internal combustion engines at a plurality of peripheral locations on a turntable, providing carrying-in and carrying-out paths for internal combustion engines outside the turntable, providing testing chamber means having second testing means at one side of the carrying-out path, delivering each internal combustion engine from the carrying-in path to one of the first testing means and subjecting the engine to warming up, adjusting operating conditions with respect to the internal combustion engine while the engine is in operation, and then stopping the engine, fetching the internal combustion engine onto the carrying-out path and then placing the engine in the testing chamber means, operating the internal combustion engine again in the testing chamber means and making measurement of abnormal noise and vibrations involved and collection of relevant data with respect to the engine in operation, and removing the internal combustion engine from the testing chamber means and transporting the engine outward through a carrying-out path.

4,951,499

## INTAKE AIR CALCULATING SYSTEM FOR AUTOMOTIVE ENGINE

Akira Akimoto, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 366,156

Claims priority, application Japan, Jun. 24, 1988, 63-157686; Jun. 27, 1988, 63-159760; Jul. 13, 1988, 63-175944; Jul. 20, 1988, 63-180848

Int. Cl.<sup>5</sup> G01M 19/00

U.S. Cl. 73—118.2

4 Claims

1. A system for calculating intake air quantity in an automotive engine, having a fuel injector for injecting a predetermined amount of fuel into said engine, a throttle valve mounted on an intake passage of said engine for controlling air-fuel mixture, an engine speed sensor for detecting engine speed and for producing a corresponding engine speed signal, a throttle position sensor for detecting opening degree of said throttle valve and for producing a corresponding throttle opening degree signal, an intake air quantity sensor for detecting air quantity passing through said intake passage and for generating a corresponding quantity signal, and a control system for controlling said amount of fuel and ignition timing, the improvement in the system which comprises:

a throttle passing air calculator responsive to said quantity

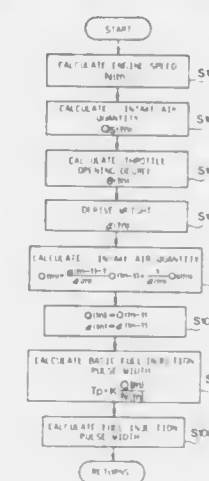
signal for calculating intake air quantity passing through said intake passage and for generating a corresponding intake air quantity signal;

weight deriving means responsive to said engine speed and said throttle opening degree signals for calculating a present weight corresponding to said engine speed and said opening degree at a present time and a last weight corresponding to said engine speed and said opening degree at a last time in order to correct said intake air quantity passing through said intake passage, and for producing corresponding present and last weight signals;

memory means responsive to said last and present weight signals for calculating a weight ratio derived from said last weight divided by said present weight and for storing said weight ratio;

calculator means responsive to said intake air quantity signal and said present and said last weight signals for calculating a present intake air quantity at a present time by adding a last intake air quantity multiplied by said last weight and said last intake air quantity multiplied by said weight ratio to said intake air quantity signal divided by said present weight and for producing a corresponding present intake air quantity signal;

storing means responsive to said present intake air quantity signal for storing said last and said present intake air quantities, said last and present weights and said weight ratio in



order to calculate said present intake air quantity in said calculator means; and

a fuel injection pulse calculator responsive to said present intake air quantity and said engine speed signals for deciding said ignition timing and said amount so as to inject an optimum amount of fuel at an optimum timing in accordance with transient operating conditions of said engine.

3. A method for calculating intake air quantity to an engine, comprising the steps of:

detecting engine speed, an intake air quantity and opening degree of a throttle valve in an intake passage to the engine;

calculating an actual intake air quantity passing through the intake passage of the engine;

deriving a weight corresponding to said engine speed and said opening degree in order to correct said actual intake air quantity;

storing a present intake air quantity and a present weight at a present time, and a last intake quantity and a last weight at a last time;

estimating a present intake air quantity at said present time by adding an estimated air quantity to said last intake air quantity divided by said present weight; and

controlling ignition timing and an amount of fuel so as to

inject an optimum amount of fuel at an optimum timing in transient operating conditions of said engine.

**4,951,500**  
**METHOD FOR DETERMINING THE UNTWIST OF TURBINE BLADES**

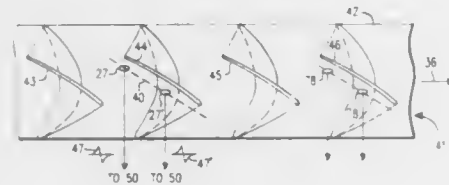
Michael Twerdochlib, Oviedo; Robert L. Osborne, Winter Springs, and Paul F. Rozelle, Fern Park, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 26, 1989, Ser. No. 385,753

Int. Cl.<sup>5</sup> G01M 15/00

U.S. Cl. 73—119 R

9 Claims



1. A method for determining the untwist of turbine blades under dynamic conditions, comprising the steps of: producing a first pair of blade passing event signals when a blade tip passes a first pair of fixed sensors; comparing said signals of said first signal pair to one another to establish a first differential value; producing another data point containing information relevant to the vibrational condition of the turbine blades; and evaluating said first differential value and said another data point to discriminate between blade untwist and synchronous vibration.

**4,951,501**  
**TIRE VALVE HAVING DUAL ELECTRIC CONDUCTING PATHS**

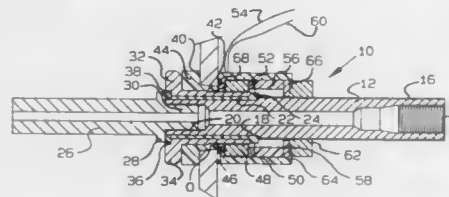
Milton B. MacAnally, Charlotte, N.C., and Carl G. A. Ruf, Dickson, Tenn., assignors to Schrader Automotive Inc., Charlotte, N.C.

Filed Oct. 16, 1989, Ser. No. 421,959

Int. Cl.<sup>5</sup> B60C 23/02

U.S. Cl. 73—146.8

4 Claims



1. A tire fill valve/electric dual lead-through having inner and outer ends with respect to an adjacent radial cross section of a tire/wheel on which the valve/lead-through is mounted, the valve/lead-through including parts having inner ends toward the inner end of the valve/lead-through and outer ends toward the outer end of the valve/lead-through, and comprising:

- a brass tubular stem exteriorly and internally threaded at its outer end, the internal threads adapted to receive a conventional valve core, its inner end being internally threaded,
- an elongate insulating bushing disposed over the inner end of the stem,
- a tubular terminal pin having an outward stop shoulder adjacent its outer end and being threaded at its outer end,

the threads snugly engaging in the threads in the inner end of the stem,

- a rubber washer being disposed against the outer face of the shoulder,
- a tubular brass body having threads on its exterior surface and tightly circumposing the elongate insulating bushing and providing a terminal flange on its inner end abutting the washer,
- a rubber grommet having a tapered sleeve section tapering toward its outer end and a radial outward flange about its inner end, the flange abutting the flange in the body,
- an anti-friction nylon washer surrounding the body toward the outer end of the body from the grommet,
- a brass clamping nut engaging the threads on the body and adapted to clamp a tire valve opening in a rim sealingly against the grommet,
- a first contact ring on the body against the outer end of the clamping nut,
- a tubular plastic spacer on the body against the outer end of the first contact ring,
- a second contact ring of lesser inside diameter than the elongate insulating bushing and disposed on the exteriorly threaded portion of the tubular stem, and
- a final brass compression nut threadedly engaging the exterior threads on the stem and compressing the contact rings and spacer against the clamping nut and electrically engaging the second contact ring whereby the terminal pin and terminal flange on the body are electrically integral with the rings respectively.

**4,951,502**  
**PRESSURE PROBE**

Reiner Dürfler, Nuremberg; Gerhard Hettich, Dietenhofen, and Hans-Dieter Schmid, Nuremberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00556, § 371 Date Aug. 18, 1989, § 102(e) Date Aug. 18, 1989, PCT Pub. No. WO88/06982, PCT Pub. Date Sep. 22, 1988

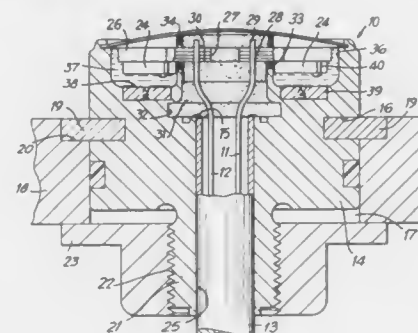
PCT Filed Nov. 28, 1987, Ser. No. 425,165

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1987, 3708937

Int. Cl.<sup>5</sup> B60C 23/04; G01L 9/16

U.S. Cl. 73—146.5

4 Claims



1. Pressure probe for determining the air pressure in the interior of tubeless tires of motor vehicle wheels, wherein the pressure probe is fastened in a bore hole of the area of a rim of the wheel, which area opens toward the interior of the tire, and comprises a substrate which is inserted in a front recess of a probe housing, which recess faces the interior of the tire, at least one sensing element is arranged at the substrate in the outer area on the side of the substrate remote of the tire interior, the central area of the substrate making contact with connection conductors, and is fastened in the additional recess of the probe housing, and wherein a circumferentially extending cut out portion is provided in the housing area below the sensing element, of which there is at least one, characterized in

that the circumferentially extending cut out portion (36) is filled with a non-conducting, magnetic fluid (37) and a permanent magnet (39) is arranged at its base (38), which permanent magnet (39) secures the magnetic fluid (37) for the purpose of covering the sensing element (24), of which there is at least one, in the cut out portion (36) so as to be free of stresses.

**4,951,503**  
**METHOD AND APPARATUS FOR DETERMINING THE HEATING VALUE OF A GASEOUS FUEL**

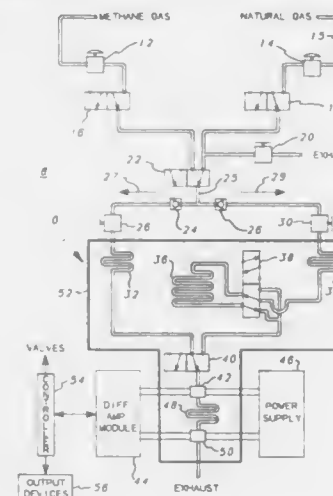
Anselmo Fini, Syracuse, N.Y., assignor to Niagara Mohawk Power Corporation, Syracuse, N.Y.

Filed Jan. 23, 1990, Ser. No. 469,012

Int. Cl.<sup>5</sup> G01N 30/78, 33/22

U.S. Cl. 73—23.1

21 Claims



1. An on-line combustionless method for determining the heating value per unit volume of a natural gas which contains at least one noncombustible gas, said method using a chromatographic column having an input and an output, and a first mass sensor and a second mass sensor connected in series to the output of the column, each of the sensors providing an output signal substantially proportional to the mass of the gas at said sensor, said method comprising the steps of:

- purging the first mass sensor with a known reference gas;
- introducing the natural gas to the first mass sensor such that said reference gas is transferred to the second mass sensor;
- determining the mass of the natural gas from the output signal of the second mass sensor and the output signal of the first mass sensor;
- purging the chromatographic column with the known reference gas;
- introducing the natural gas to the chromatographic column through its inlet such that said reference gas is expelled from the column as natural gas enters the column;
- waiting a sufficient period of time for a first gas mixture to be eluted from the column and present at the first mass sensor and for said reference gas to be present at the second mass sensor, said first gas mixture containing a first noncombustible natural gas constituent and said reference gas;
- determining the mass of the first mixture from the output signal of the second mass sensor and the output signal of the first mass sensor;
- determining the mole fraction of the first noncombustible natural gas constituent present in the first mixture using the mass of the first mixture determined in step (g) and the molecular weight of the reference gas;
- determining the mass of hydrocarbons present in the natural gas from the mass of the natural gas determined in

step (c) and the mole fraction of the first noncombustible natural gas constituent determined in step (h); and (j) determining the heating value of the natural gas from the determined mass of hydrocarbons present in the natural gas.

**4,951,504**  
**PROCESS AND APPARATUS FOR TESTING THE AXLES AND/OR SPRINGS AND/OR ADJACENT COMPONENTS OF COMMERCIAL VEHICLES**

Jürgen Klock, Oetzberg; Gerhard Fischer, Darmstadt, and Vatroslav Grubisic, Reinheim, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft Zur Förderung Der Angewandten Forschung E.V., Fed. Rep. of Germany

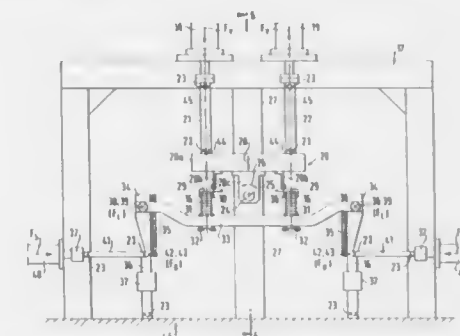
Filed Jul. 10, 1989, Ser. No. 377,470

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823764

Int. Cl.<sup>5</sup> G01M 19/00

U.S. Cl. 73—118.1

11 Claims



1. An apparatus for testing an axle assembly of a commercial vehicle, wherein said assembly includes at least an axle and springs and is subjected to testing under operational forces, including vertical operational forces, said apparatus comprising:

- axle support fixture means for supporting the axle of said axle assembly;
- a supporting assembly coupled to the springs of the axle assembly and effective for transferring the vertical operational forces to the axle assembly;
- frame means including means for movably guiding said supporting assembly; and
- at least two high displacement, vertical force actuators coupled to said supporting assembly and effective for simulating the vertical operational forces and for applying the same to said supporting assembly.

**4,951,505**  
**BLOCK POSITION SENSOR**  
Dale L. Seiler, Austin, Tex., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Feb. 12, 1987, Ser. No. 13,858

Int. Cl.<sup>5</sup> E21B 45/00

U.S. Cl. 73—151.5

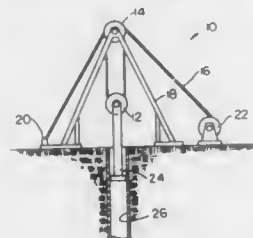
10 Claims

1. An apparatus responsive to the rotation of a drawworks drum for indicating change in position of a traveling block in a drilling rig, said apparatus comprising:

- an adjustable drive unit
- means for providing a first output having a fixed relationship to the rotation of said drum, said means having a rotatable component reflecting said output, said first output capable of driving the adjustable drive unit for providing a second output having an adjustable relationship to the rotation of the drum; and



sensor means adapted to detect angular rotation of said rotatable component of said means for providing a first



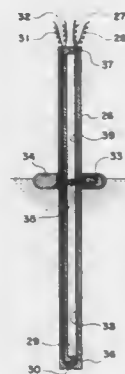
output and to provide a signal corresponding to amount of rotation of said rotatable component.

4,951,506

# ROLLING CONTACT OHMIC RESISTANCE POSITION SENSOR

Hyok S. Lew, Arvada, Colo.

Continuation-in-part of Ser. No. 071,776, Jul. 10, 1987, Pat. No. 4,796,472. This application May 12, 1988, Ser. No. 193,042  
Int. Cl.<sup>5</sup> G01F 01/24, 23/36; G01N 27/00; G01R 31/00  
U.S. Cl. 73—314 11 Claims



1. A device for measuring position of a rolling mass representing a variable position under measurement comprising in combination:

- a pair of elongated electrically conducting members disposed in a side by side arrangement with a generally constant distance of separation therebetween, wherein at least one of the pair of elongated electrically conducting members has a high specific ohmic resistance;
- an electrically conducting mass freely moveable along the pair of elongated electrically conducting members by rolling action; said electrically conducting mass attracted to a variable position by a physical force along and relative to the pair of elongated electrically conducting members;
- means for a first ohmic resistance of a first electric circuit comprising first portions of the pair of elongated electrically conducting members electrically connected to one another by the electrically conducting mass, and for measuring a second ohmic resistance of a second electric circuit comprising second portions of the pair of elongated electrically conducting members electrically connected to one another by the electrically conducting mass, said first and second portions of the pair of elongated electrically conducting members being two portions thereof respectively located on two opposite sides of the electrically conducting mass; and
- electrical circuit means for determining said variable position from a combination of said first and second ohmic resistances, wherein the contact ohmic resistance contributed by the contact between said electrically conducting

mass and said pair of elongated electrically conducting members is eliminated by electrical circuit means in determining said variable position by said electrical circuit means, whereby said variable position is determined independent of the contact ohmic resistance.

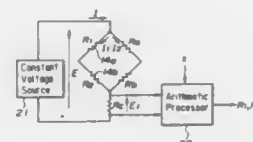
4,951,507

# GAS RATE SENSOR

Tsuneo Takahashi; Tomoyuki Nishio; Masayuki Ikegami, and Takahiro Gunji, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 11, 1989, Ser. No. 295,838  
Claims priority, application Japan, Jan. 13, 1988, 63-5396  
Int. Cl.<sup>5</sup> G01P 9/00

U.S. Cl. 73—497

2 Claims



1. A gas rate sensor which provides an output signal in response to any difference between the output signals from a pair of thermal sensing elements due to the effect which an angular velocity exerts on the gas flow ejected from an associated nozzle over the pair of thermal sensing elements, characterized in that said gas rate sensor is equipped with:
  - means to effect temperature compensation of the gas rate sensor output signal by subtracting an offset value from the gas rate sensor output signal;
  - means to determine the resistances of the pair of thermal sensing elements;
  - means to detect the situation in which the resistances of the pair of temperature sensor elements increase or decrease simultaneously;
  - means to make a decision as to whether or not the gas rate sensor output signal remains within a predetermined tolerance when such situation is detected; and
  - means to permit the gas rate sensor output signal to be used as a new offset value when the gas rate sensor output signal remains within a predetermined tolerance.

4,951,508

# VIBRATORY ROTATION SENSOR

Edward J. Loper, Jr., and David D. Lynch, both of Santa Barbara, Calif., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 788,291, Oct. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 546,826, Oct. 31, 1983, abandoned. This application Jun. 12, 1989, Ser. No. 366,223

Claims priority, application European Pat. Off., Oct. 25, 1984, 84307330.5

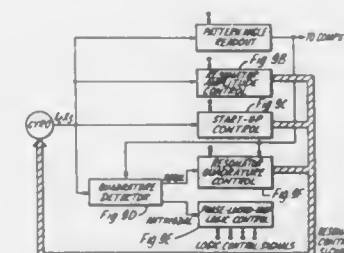
Int. Cl.<sup>5</sup> G01C 19/42, 19/56

U.S. Cl. 73—505

11 Claims

1. A vibratory rotation sensor comprising a resonator capable of sustaining a flexural standing wave pattern symmetrically distributed about an input axis, means supporting said resonator along said input axis, means for maintaining the amplitude of said pattern in said resonator, pick-off means responsive to resonator motion for producing first and second

pick-off signals proportional to two components of pattern flexure, means for generating timing signals, means responsive to the said first and second pick-off signals and said timing signals for producing a signal proportional to a readout angle  $\Theta$ , means responsive to said first and second pick-off signals and said timing signals for obtaining the quadrature component (cos quad) of said first pick-off signal relative to said timing signals and the quadrature component (sin quad) of said second



pick-off signals relative to said timing signals, means responsive to said quadrature components and said readout angle  $\Theta$  for obtaining an antinodal quadrature signal equal to  $((\cos \text{quad}) \cos 2\Theta + (\sin \text{quad}) \sin 2\Theta)$ , a phase locked loop responsive to said antinodal quadrature signal for regulating said timing signals by driving said antinodal quadrature signal to zero to thereby keep the phase of the timing signals locked to the phase of the antinodal component of the standing wave pattern.

4,951,509

# FLUID-PRESSURE DETECTOR

Toshio Yamauchi, Otsu, Japan, assignor to Nissho Corporation, Osaka, Japan

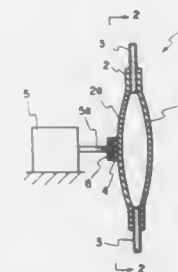
Filed Jul. 13, 1989, Ser. No. 379,317

Claims priority, application Japan, Aug. 22, 1988, 63-208865

Int. Cl.<sup>5</sup> G01L 7/02

U.S. Cl. 73—730

3 Claims



1. A disposable fluid-pressure detector for use in a blood line, comprising:

- an elongated pillow-like body having an inlet port and an outlet port at axial ends thereof and a flexible wall capable of expanding and shrinking to generate a reciprocal movement in a direction at a right angle to the axial direction thereof in response to a pressure of fluid flowing into the pillow-like body through the inlet port and flowing out through the outlet port;
- a detecting means for detecting an amount of expansion or shrinkage of the pillow-like body, the detecting means being fixedly placed outside the pillow-like body; and
- a connecting means for transferring the reciprocal movement of the flexible wall to the detecting means by detachably connecting a detecting portion extending from the detecting means to an outer surface of the flexible wall

such that the pillow-like body can be detached from the detecting means in order to dispose thereof.

4,951,510

# MULTIDIMENSIONAL FORCE SENSOR

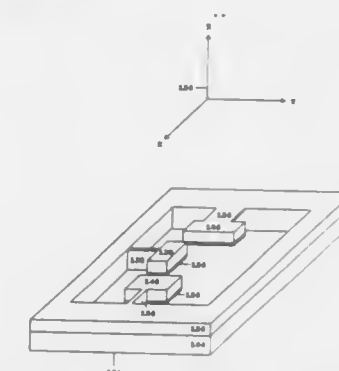
James W. Holm-Kennedy, Honolulu; Gordon P. Lee, Waipahu, and Michael H. Kaneshiro, Pearl City, all of HI., assignors to University of Hawaii, Honolulu, HI.

Filed Jul. 14, 1988, Ser. No. 220,073

Int. Cl.<sup>5</sup> G01L 5/16; G01P 15/08

U.S. Cl. 73—862.04

24 Claims



1. A multidimensional force sensor, comprising:
  - a substantially planar main body having an aperture;
  - a wide and thin first beam having opposing wide sides attached at a first end to said main body and projecting into said aperture in a direction substantially parallel to the plane of said main body, with the normal of the wide sides of said first beam oriented substantially perpendicular to the plane of said main body;
  - a wide and thin second beam having opposing wide sides attached at a first end to said main body and projecting into said aperture in a direction substantially parallel to the plane of said main body and substantially perpendicular to the direction of said first beam, with the normal of the wide sides of said second beam oriented substantially parallel to the plane of said main body;
  - a wide and thin third beam having opposing wide sides attached at a first end to said main body and projecting into said aperture in a direction substantially parallel to the direction of said main body and substantially perpendicular to the direction of said second beam, with the normal of the wide sides of said third beam oriented substantially parallel to the plane of said main body; and
  - sensing means coupled to each of said first, second and third beams, respectively, for sensing displacement of each of said first, second and third beams, respectively.

4,951,511

# APPARATUS FOR SAMPLING HETEROGENEOUS MATERIAL

Donald Perron, and Robert G. Metka, both of Rouyn-Noranda, Canada, assignors to Noranda, Inc., Toronto, Canada

Continuation of Ser. No. 201,830, Jan. 2, 1988, abandoned. This application Jul. 24, 1989, Ser. No. 384,075

Claims priority, application Canada, Mar. 8, 1988, 560777

Int. Cl.<sup>5</sup> G01N 1/00

U.S. Cl. 73—863.56

4 Claims

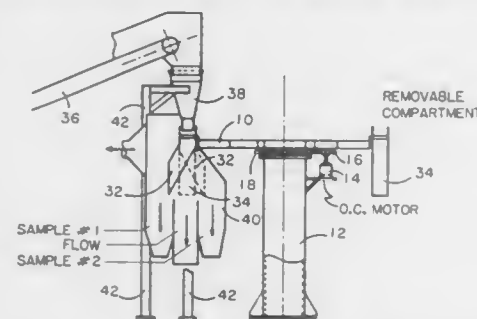
1. A system for sampling a flow of heterogeneous material falling under gravity comprising:

- a rotating table adapted for rotation about a vertical support column;
- a plurality of removable sampling passageways of identical aperture size mounted side by side around the periphery of said rotating table and adapted to cut the flow of material, said sampling passageways including deflection-

type passageways for sample collection and straight-type passageways for flow through, the number of deflection-type passageways with respect to the total number of passageways being proportional to the desired percentage of the sample to be retained, and said sampling passageways including an equal number of outside and inside deflection-type passageways which deflect material away and towards the center of the rotating table so as to allow simultaneous collection of duplicate samples;

(c) means for driving said rotating table at constant velocity;

(d) an inlet chute mounted on a fixed structure for receiving the material to be sampled and having a bottom opening located immediately above the sampling passageways for



allowing a flow of said material to fall directly into the sampling passageways as they move under the bottom opening of the inlet chute so as to form a closed system for preventing loss of heterogeneous material made up of shredded integrated circuits and electronic components as they are conveyed by said inlet chute directly into said sampling passageways; and

(e) a discharge chute also mounted on said fixed structure and having three sections through which flows the material passing through the sampling passageways, one section for each sample being collected and a third section for flow through whereby, all of the material flowing from each of the passageways respectively passes to each of the sections.

#### 4,951,512 SYSTEM FOR PROVIDING ACCESS TO SEALED CONTAINERS

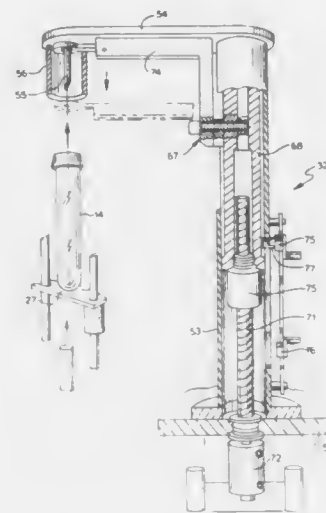
John C. Mazza, El Toro, and William A. Stark, Costa Mesa, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Filed Jun. 23, 1988, Ser. No. 210,695  
Int. Cl.<sup>5</sup> G01N 35/04, 35/06

U.S. Cl. 73—861.23 9 Claims

1. An automated system for providing access to a sealed container and performing sampling operations, said container including closure means, said system comprising: movable container transfer means for holding the container and moving the container to a first location; penetrating means disposed at the first location for penetrating the closure means of the container and temporarily defining an opening through the closure; driving means disposed at the first location for providing relative displacement between the container and the penetrating means at said first location, said driving means providing the force for moving the penetrating means into the container; probe means separate from the penetrating means for removing sample from the container, placing sample into the container, or sensing the properties of sample in the container, said probe means being movable between the first location and a second location disposed laterally outwardly of the container a predetermined distance from the first location, said probe means also being movable inwardly and outwardly of the opening at the first location

to extend in and out of said container through the opening; and

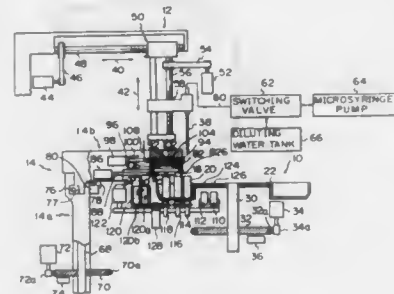


stripping means separate from the penetrating means and the probe means for disengaging the penetrating means from the container.

#### 4,951,513 AUTOMATIC PREPARATION APPARATUS AND FILTER THEREFOR

Toshio Koike, Kawasaki, Japan, assignor to Ajinomoto Company, Inc., Tokyo, Japan

Filed Dec. 12, 1988, Ser. No. 282,552  
Claims priority, application Japan, Dec. 14, 1987, 62-189809; Dec. 14, 1987, 62-315793; Oct. 19, 1988, 62-263526  
Int. Cl.<sup>5</sup> G01N 1/34, 35/06, 30/24  
U.S. Cl. 73—864.25 14 Claims

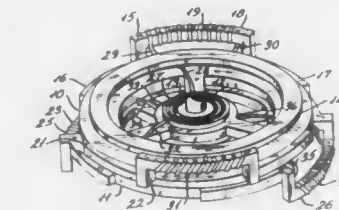


1. An automatic preparation apparatus for automatically preparing samples comprising: turntable means in which a plurality of test tubes can be disposed in radial directions thereof; filter robot means for moving a removable filter onto one of said test tubes; probe robot means capable of sampling a predetermined amount of liquid contained within said each one of the test tubes; and of injecting a predetermined amount of liquid into one of said test tubes and into said filter; and control means for controlling each of said means in accordance with a predetermined sequence to perform a desired preparation of the samples.

#### 4,951,514 DUAL GYROSCOPIC STABILIZER

Daniel Gubln, P.O. Box 159, Coosada, Ala. 36020, assignor to Daniel Gubln, Coosada, Ala.

Filed Sep. 9, 1988, Ser. No. 242,423  
Int. Cl.<sup>5</sup> G01C 19/08  
U.S. Cl. 74—5.37 3 Claims

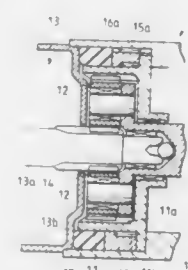


1. A gyroscope consisting of two gyroscopic wheels comprising the armature and field of a synchronous electric motor, each free to rotate about a fixed shaft.

#### 4,951,515 STARTER WITH PLANET GEAR SPEED REDUCER

Akira Morishita, and Shuzoo Isozumi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 330,858  
Claims priority, application Japan, Apr. 13, 1988, 63-50275  
Int. Cl.<sup>5</sup> F02N 15/04  
U.S. Cl. 74—7 E 5 Claims



1. A starter with a planet gear speed reducer which comprises:

a ring gear having an internal gear formed in an inner cylindrical wall thereof with which a plurality of planet gears are engaged, and ratchet-shaped teeth formed on an outer cylindrical wall thereof in such a manner as to extend axially;

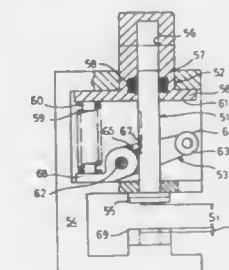
a movable cylinder having teeth in an inner cylindrical wall thereof which are engaged with said ratchet-shaped teeth of said ring gear, and a straight spline gear formed in an outer cylindrical wall thereof which is engaged with a starter frame, said movable cylinder being axially movably mounted on said ring gear; and

an elastic member arranged adjacent to said movable cylinder along the axis thereof, said elastic member receiving, when impact stress produced in the power transmission mechanism of said starter is applied to said ring gear to rotate said ring gear, a force of moving said movable cylinder axially into which resultant torque of said ring gear is converted through said ratchet-shaped teeth.

#### 4,951,516 FORCE MULTIPLICATION MECHANISM

Hideo Tamamori, Suzurandal, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Aug. 14, 1989, Ser. No. 393,616  
Claims priority, application Japan, Aug. 22, 1988, 63-208615  
Int. Cl.<sup>5</sup> F16H 27/02  
U.S. Cl. 74—110 11 Claims



1. A force transfer mechanism for transmitting an input force with force multiplication comprising:

(a) an actuator member movable from a retracted position to an operative position in response to said input force being applied to said actuator member;

(b) a push rod;

(c) means for frictionally connecting said push rod to said actuator member during movement of said actuator member from said retracted position until such time as said push rod encounters a resistance force greater than the frictional force of said connecting means;

(d) a force lever angularly disposed relative to said push rod and engageable therewith at a point intermediate the ends thereof;

(e) a fulcrum pin on which said force lever is rotatably mounted at its one end, another end of said force lever being engageable with said actuator member to transmit said input force from said actuator member to said push rod following such time as said push rod encounters said resistance force.

#### 4,951,517 ROTATIONAL DRIVING APPARATUS WITH FRICTIONAL ENGAGEMENT AND ROBOT USING THE SAME

Yusaku Azuma, Yokohama; Takeo Tanita, Kawasaki; Toshihiro Yamamoto, Yokohama; Shozo Kasai; Masateru Yasuhara, both of Kawasaki, and Yasuhiro Sawada, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

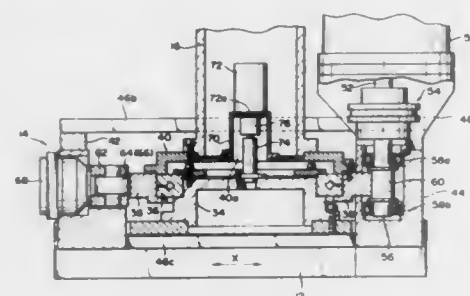
Filed Oct. 25, 1988, Ser. No. 262,309  
Claims priority, application Japan, Oct. 28, 1987, 62-270236; Sep. 16, 1988, 63-120462[U]

Int. Cl.<sup>5</sup> F16H 13/14; B25J 18/00, 19/02  
U.S. Cl. 74—209 9 Claims

1. A rotational driving apparatus for rotating a shaft which includes one end portion connected to a base and the other end portion connected to a load section, comprising: a rotating member, having an axis, connectable to the rotating shaft and being rotatably supported on the base; driving means for supplying a driving force to said rotating member, said driving means including a driving source, a driving roller being in rolling contact with said rotating member and transmitting the driving force from said driving source to said rotating member, and a driving housing for rotatably supporting said driving roller; pressing means for pressing said driving roller and said rotating member against each other, said pressing means including at least one pressing roller being in rolling contact with said rotating member, a pressing member for supplying a pressing force to said pressing roller, and a



pressing housing for rotatably supporting said pressing roller, with said driving housing and pressing housing being symmetrically arranged with respect to said rotating member such that the axis of said rotating member is centrally positioned between said driving and pressing rollers; and



fixing means for spatially adjusting the driving housing and pressing housing with each other, said fixing means including a connecting member for firmly connecting said driving housing and pressing housing on the base, with said connecting member defining set positions of said driving housing and pressing housing on the base so as to maintain the pressing condition of said driving and pressing roller against said rotating member.

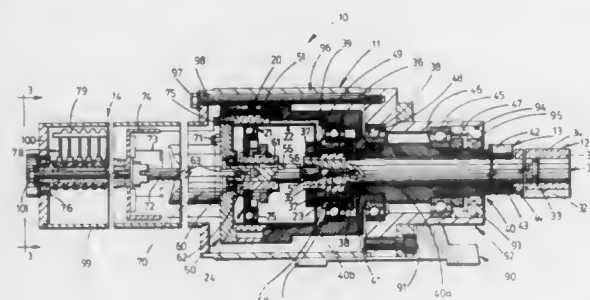
4,951,518

**ZERO BACK LASH PHASE ADJUSTING MECHANISM**  
Robert V. Hendershot, Evanston, Ill., assignor to Candy Mfg. Co., Inc., Evanston, Ill.

Filed Aug. 28, 1990, Ser. No. 381,310  
Int. Cl.<sup>5</sup> F16H 1/26, 1/48

U.S. Cl. 74—395

8 Claims



1. An electro-mechanical phase adjusting mechanism for synchronizing rotatable machinery components while moving or at rest, comprising:

- a pair of coaxially aligned rotatably mounted shafts, one of which is driven by the machinery;
- a cycloidal speed reducer comprising first rotatable gear means coupled to one of said shafts, second rotatable gear means coupled to the other of said shafts, rotatable means for intermeshing said gear means and selectively operable to effect a rotational differential between said gear means; and
- an electrically energized motor means having its stator coupled to one of said gear means for rotation therewith and its rotor coupled to said rotatable means for selectively operating the latter.

4,951,519

**ROTATION TRANSMITTER**

Naotoshi Ohtsuka, 49-7 Fujimidai, Mishima, Japan, assignor to Naotoshi Ohtsuka, Mishima; Yoshio Horiya and Nihon Seiki Company, Ltd., both of Numazu, all of Japan

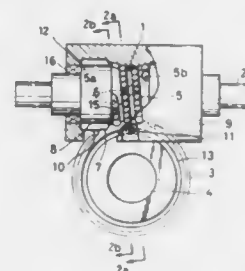
Filed Jun. 29, 1989, Ser. No. 373,282

Claims priority, application Japan, Jun. 29, 1988, 63-161409; Aug. 12, 1988, 63-201713

Int. Cl.<sup>5</sup> F16H 1/16, 55/22

U.S. Cl. 74—425

3 Claims



1. A rotation transmitter comprising:

- a worm shaft with a central hourglass-shaped portion having the outer periphery thereof formed with a helical ball guide groove constituting a ball circulation path in conjunction with a circulation bore penetrating said central portion obliquely from one side to the other side of the outer periphery thereof and having each end communicating via a tangentially curved guide hole with each associated end of said helical ball guide groove;
- a plurality of metal balls fitted closely in a row in said ball circulation path;
- a cylindrical housing having an axial slot and internally rotatably accommodating said worm shaft;
- a worm wheel inserted in said axial slot of said cylindrical housing and having ball fitting grooves formed in the outer periphery thereof for receiving said metal balls and annular grooves formed in the opposite side surfaces of a portion thereof inserted in said axial slot; and
- holding means comprising a pair of screws which face each other, project into said slot from opposite sides thereof, and are received in said annular grooves for holding said worm shaft in said cylindrical housing to be rotatably in mesh with said worm wheel via said metal balls.

4,951,520

**SINGLE LEVER CONTROL**

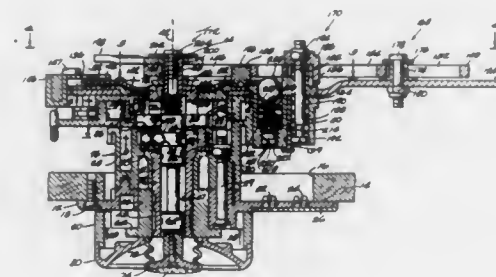
Anthony P. Prince, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 17, 1988, Ser. No. 272,544

Int. Cl.<sup>5</sup> B60K 41/04

U.S. Cl. 74—471 R

34 Claims



1. A single lever control comprising a housing having therein a recess, a shaft pivotably supported by said housing

and having therein an axial bore, a shift member pivotably supported by said housing coaxially with said shaft and adapted to be operably connected to a clutch, said shift member being movable relative to a neutral position and having therein a recess located radially inwardly of said first recess and aligned with said recess in said housing when said shift member is in said neutral position, a plunger housed in said bore for movement axially of said shaft between first and second positions, and means for fixing said shift member to said shaft and permitting rotation of said shift member relative to said housing when said plunger is in said first position, and for fixing said shift member to said housing and permitting rotation of said shaft relative to said shift member when said plunger is in said second position, said means including a member at least partially housed in said recess in said shift member, and means for moving said member radially outwardly of said recess in said shift member and into said recess in said housing when said shift member is in said neutral position and a response to movement of said plunger to said second position.

4,951,521

**GIMBAL MODULE**

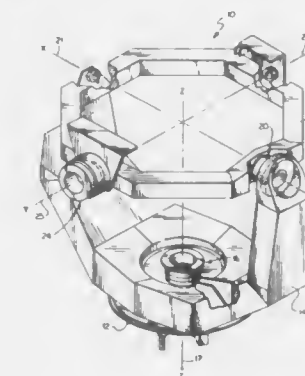
Peter E. Jacobson, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 30, 1989, Ser. No. 373,956

Int. Cl.<sup>5</sup> F16M 11/12; F16D 1/00; B23P 11/00

U.S. Cl. 74—479

12 Claims



1. A gimbal module for installation in a gimbal assembly having a first gimbal and having a second gimbal angularly displaceable about a common gimbal axis relative to the first gimbal comprising:

- a stator with a stator axis for alignment with the gimbal axis;
- a rotor with a rotor axis disposed coaxial with the stator axis;
- a first connector having a first component mounted on the stator and having a second component mounted on the first gimbal;
- spline means for aligning the stator axis with the gimbal axis and for connecting the first component to the second component;
- a second connector having a third component mounted on the rotor and having a fourth component mounted on the second gimbal; and
- actuator means for connecting the third component to the fourth component.

4,951,522

**STEERING COLUMN SUPPORT**

Dipak R. Chowdhury, Northville, and James A. Mark, Dearborn Heights, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sep. 22, 1989, Ser. No. 411,154

Int. Cl.<sup>5</sup> B62D 1/19

U.S. Cl. 74—492

10 Claims

1. For use with a vehicle energy absorbing steering column

having a steering axis about which steering takes place during operation of the vehicle, a support for mounting the steering column on the vehicle comprising: a metal strap that extends transversely with respect to the steering axis and has a central portion that mounts the steering column on the strap; the strap having opposite ends each of which includes a mounting portion for mounting on the vehicle; and the strap including a pair of U-shaped portions respectively located between the central



portion and the opposite ends thereof with the open end of each U-shaped portion opening in the same direction as the other along the steering axis whereby movement of the steering column along the steering axis deforms the strap to absorb energy as the U-shaped portions are opened to generally straight shapes extending between the opposite ends of the strap and the central portion thereof that mounts the steering column.

4,951,523

**CONTROL CABLE**

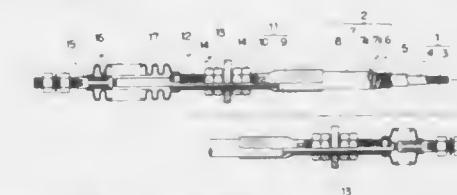
Makoto Shiota, Ikeda; Yukio Tomizawa, Hyogo, and Yoshiaki Ohoka, Kobe, all of Japan, assignors to Nippon Cable System, Takarazuka and Kawasaki Heavy Industries, Ltd., Kobe, both of Japan

Filed Dec. 27, 1989, Ser. No. 457,611

Claims priority, application Japan, Dec. 28, 1988, 63-335135  
Int. Cl.<sup>5</sup> F16C 1/10

U.S. Cl. 74—502.5

4 Claims



1. A control cable, comprising:

- (a) an inner cable having a core made of twisted plural wires and a cover provided on the core, the cover of the inner cable is made of a polyhexamethylene adipamide resin composition; and
  - (b) a conduit having a tubular liner made of a polybutylene terephthalate resin composition, a shield layer made of plural wires arranged around the liner, a taping helically wound on the shield layer with remaining a helical gap, a filler member filling the gap of the taping and an outer coat layer provided on the taping and the filler member.
3. A control cable, comprising:
- (a) an inner cable having a core made of twisted plural wires and a cover provided on the core; and
  - (b) a conduit having a tubular liner made of polybutylene terephthalate resin composition including 1 to 30% by weight of whiskers of potassium titanate, a shield layer made of plural wires arranged around the liner, a taping helically wound on the shield layer with remaining a helical gap, a filler member filling the gap of the taping and an outer coat layer provided on the taping and the filler member.

# 4,951,524

## REMOTE CONTROL ASSEMBLY INCLUDING ROTATING SLIDE SNAP

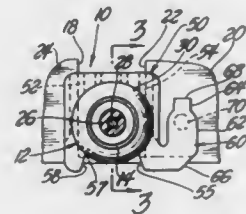
Don L. Niskanen, Livonia, Mich., assignor to Teleflex Incorporated, Limerick, Pa.

Filed Jul. 18, 1989, Ser. No. 381,528

Int. Cl.<sup>5</sup> F16C 1/10

U.S. Cl. 74—502.4

14 Claims



1. A motion transmitting remote control assembly of the type for transmitting forces along a curved path by a motion transmitting core element while being supported in a U-shaped seat (18) in a support structure (20), said assembly comprising: guide means (12) having first and second ends defining a first axis for extending through the U-shaped seat (18) in the support structure (20); a core element (28) movably supported by said guide means (12) for transmitting motion between said ends of said guide means (12); abutment means (50) for positioning said guide means (12) in the substantially U-shaped seat (18) on the support structure (20), said abutment means (50) being supported on said guide means (12) for allowing relative rotation between said abutment means (50) and said guide means (12).

# 4,951,525

## HANDLEBARS FOR CYCLES, PARTICULARLY BICYCLES FOR TRIATHLONS AND SPEED TRIALS

Lucio Borromeo, Turin, Italy, assignor to ST S.p.A., Turin, Italy

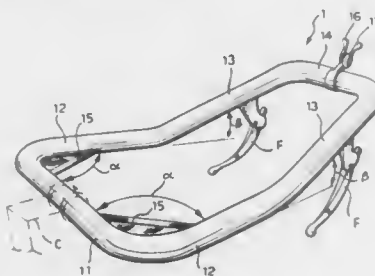
Filed Jun. 9, 1989, Ser. No. 364,044

Claims priority, application Italy, Dec. 13, 1988, 68105 A/88

Int. Cl.<sup>5</sup> B62K 21/12

U.S. Cl. 74—551.1

6 Claims



1. A handlebar for cycles, particularly but not exclusively for bicycles for triathlons and speed trails, comprising: a transverse element adapted to be connectible centrally to a steering column of a cycle so as to define two first gripping portions of the handlebar, two side extensions of the transverse element, one at each side of the transverse element, extending forwardly and converging inwardly of the handlebar so as to define two second gripping portions of the handlebar, two further side extensions each forming an inwardly converging extension of a respective side extension so as to define two third gripping portions of the handlebar, and a further transverse element connecting the further side

extensions so as to define two fourth gripping portions of the handlebar.

# 4,951,526

## RING BALANCER

Rene Linder, Genestrenio, Switzerland, assignor to Schmitt Industries, Inc., Portland, Oreg.

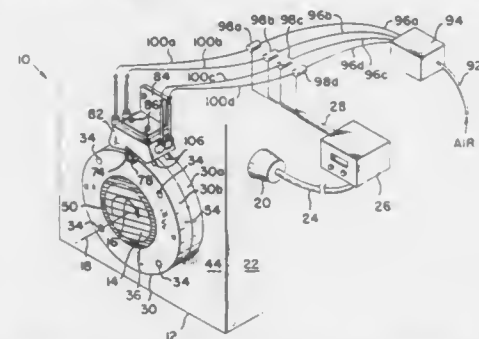
Filed Jun. 1, 1988, Ser. No. 201,482

Claims priority, application Switzerland, Dec. 3, 1987, 87810713

Int. Cl.<sup>5</sup> F16F 15/22

U.S. Cl. 74—573 R

36 Claims



1. A balancer for dynamically balancing a machine having an elongated rotatable element power driven in at least a first rotational direction about a longitudinal rotational axis, the balancer being usable with a vibration sensor providing control signals responsive to changes in vibration of the machine, comprising:

an annular case with a central aperture sized to receive the rotatable element therethrough, said case having an interior annular chamber extending about said central case aperture in substantially coaxial alignment with the rotatable element, and having a circumferential outer wall portion;

means for fixedly attaching said case to the rotatable element for rotational travel therewith;

a first fluid driven wheel mounted to said case for rotational travel therewith, said first wheel having outwardly projecting vanes and being rotatable about a first wheel rotational axis generally parallel to the rotatable element axis, said first wheel at least partially projecting outward beyond said case circumferential outer wall portion and being selectively rotatable in first wheel first and second opposing rotational directions about said first wheel rotational axis in response to engagement by first source first and second pressurized fluid flows, respectively;

a first stationary fluid source selectively applying in response to the sensor control signals said first source first pressurized fluid flow in a first direction generally transverse to the rotatable element rotational axis and tangential to said case to rotate said first driven wheel in said first wheel first rotational direction, and said first source second pressurized fluid flow in a second direction generally transverse to the rotatable element rotational axis and tangential to said case to rotate said first driven wheel in said first wheel second rotational direction;

a second fluid driven wheel mounted to said case for rotational travel therewith, said second wheel having outwardly projecting vanes and being rotatable about a second wheel rotational axis generally parallel to the rotatable element axis, said second wheel at least partially projecting outward beyond said case circumferential outer wall portion and being selectively rotatable in second wheel first and second opposing rotational directions about said second wheel rotational axis in response to engagement by second source first and second pressurized fluid flows, respectively, said first and second fluid driven wheels being axially offset in the direction of the rotatable element rotational axis

# 4,951,527

## TRANSMISSION ASSEMBLY

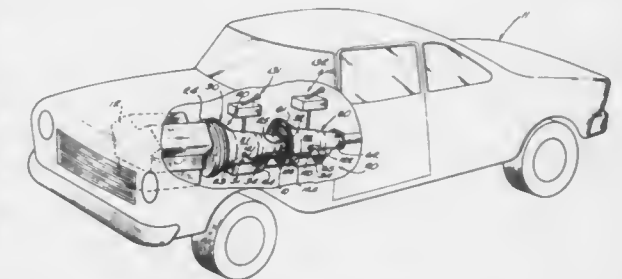
Kenneth Klazura, 2810 E. Eaton La., Cadahy, Wis. 53110

Filed Jan. 11, 1989, Ser. No. 295,916

Int. Cl.<sup>5</sup> F16H 57/02

U.S. Cl. 74—606 R

10 Claims



a second stationary fluid source selectively applying in response to the sensor control signals said second source first pressurized fluid flow in a first direction generally transverse to the rotatable element rotational axis and tangential to said case to rotate said second driven wheel in said second wheel first rotational direction, and said second source second pressurized fluid flow in a second direction generally transverse to the rotatable element rotational axis and tangential to said case to rotate said second driven wheel in said second wheel second rotational direction;

a shield positioned adjacent to each of said fluid driven wheels to a side thereof toward the other of said fluid driven wheels to at least partially shield said fluid driven wheels from unintended engagement by said pressurized fluid flow intended for the other of said fluid driven wheels;

first and second eccentrically weighted balancing rings coaxially and rotatably mounted within said case annular chamber for rotational travel with said case, each said ring being in substantially coaxial alignment with the rotatable element and selectively rotatable in first and second opposing ring rotational directions relative to the other of said rings and to said case, each said ring having a central aperture to receive the rotatable element therethrough, and having a surface with gear teeth extending at least partially about said rings;

a first reduction gear assembly mounted to said case for rotational travel therewith, said first reduction gear assembly drivably interconnecting said first fluid driven wheel and said first ring gear teeth to convert rotation of said first fluid driven wheel in said first wheel first and second rotational directions in response to said first source pressurized fluid flows into rotation of said first ring in said first ring first and second rotational directions, respectively, said first reduction gear assembly having a sufficiently large gear reduction ratio such that under normal operation said first ring exerts insufficient force on said first reduction gear assembly to rotate said first fluid driven wheel, whereby said first ring is locked in the rotational position to which moved by said first fluid driven wheel in response to said first source pressurized fluid flows; and

a second reduction gear assembly mounted to said case for rotational travel therewith, said second reduction gear assembly drivably interconnecting said second fluid driven wheel and said second ring gear teeth to convert rotation of said second fluid driven wheel in said second wheel first and second rotational directions in response to said second source pressurized fluid flows into rotation of said second ring in said second ring first and second rotational directions, respectively, said second reduction gear assembly having a sufficiently large gear reduction ratio such that under normal operation said second ring exerts insufficient force on said second reduction gear assembly to rotate said second fluid driven wheel, whereby said second ring is locked in the rotational position to which moved by said second fluid driven wheel in response to said second source pressurized fluid flows, whereby said first and second fluid driven wheels are rotated in selected directions under said fluid flows when selectively applied by said stationary first and second sources during each pass thereby as said first and second fluid driven wheels revolve with said case to progressively and independently rotate each of said rings until the machine is dynamically balanced.

1. A transmission assembly comprising: a first automatic transmission having a forward end adapted to be coupled to an internal combustion engine and a rearward end, the first automatic transmission including a drive shaft; a second automatic transmission having a forward end and a rearward end, and including a stator plate having a forward portion and a rearward portion, the stator plate located adjacent the forward end of the second automatic transmission, the drive shaft connecting the first automatic transmission in driving relation with the second automatic transmission; a coupling plate for connecting the rearward end of the first automatic transmission with the forward end of the second automatic transmission, the coupling plate rotatably supporting the drive shaft; and means for providing communication of pressurized transmission fluid between the first and second automatic transmissions.

# 4,951,528

## SHIFT CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Akihiro Ueki, Zama, and Kazuhiko Sugano, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

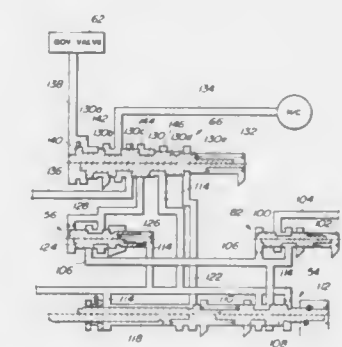
Filed Oct. 31, 1988, Ser. No. 264,717

Claims priority, application Japan, Oct. 30, 1987, 62-273223

Int. Cl.<sup>5</sup> B60K 41/10

U.S. Cl. 74—868

5 Claims



1. In a transmission a source of governor pressure indicative of vehicle speed; a throttle valve for producing a throttle pressure indicative of transmission load; a throttle pressure modifier valve for producing a modified throttle pressure which has a level higher than that of the



throttle pressure, said throttle valve and said throttle pressure modifier valve being arranged so that as the throttle pressure decreases the difference between said throttle pressure and said modified throttle pressure increases; and

a shift valve for selectively supplying pressurized hydraulic fluid to a friction element, said shift valve comprising a spool and a bore in which said spool is reciprocally received, said spool having a first section responsive to said governor pressure and which produces a bias which tends to move the spool toward an upshift position, and a second section, said second section being arranged to produce a bias which tends to move said spool valve toward a downshift position, said second section being exposed to said throttle pressure when said spool assumes said upshift position and said modified throttle pressure when said spool assumes said downshift position, said bore having first and second ports which are exclusively communicated with said throttle valve and modified throttle pressure valve, respectively, said spool having first and second lands which form part of said second section, said second land having a diameter which is larger than that of the first land, said first land being arranged to open said first port and permit throttle pressure to be supplied into said bore only when said spool assumes said upshift position, said second land being arranged to open said second port and permit modified throttle pressure to be admitted into said bore only when said spool assumes said downshift position.

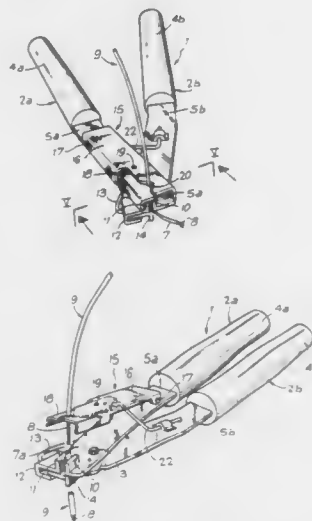
4,951,529

# COMBINED TOOL FOR CUTTING AND STRIPPING THE ENDS OF ELECTRICAL WIRES COVERED WITH AN INSULATING SHEATH

André Laurecot, L'Aigle, 25110 Baume les Dames, France  
Filed Sep. 29, 1989, Ser. No. 414,390  
Int. Cl.<sup>3</sup> H02G 1/12

U.S. Cl. 81-9.43

13 Claims



1. In a combined tool for cutting and stripping the ends of electrical cables covered with an insulating sheath, of the type comprising a wire cutter constituted by two levers forming, on either side of a common pivot pin, two gripping and actuation handles and two blades presenting two opposite cutting edges constituting shears,

at least one of the levers comprises, at its end and parallel to its cutting edge, a counter-jaw retractably mounted against the action of an elastic return member limiting pressure, behind the cutting edge of said blade, the second lever is associated, laterally, on its outer face, with a tool for cutting and stripping the sheath of a cable,

said tool comprising two jaws which are articulated on each other and on said lever, disposed laterally and externally and associated with a control member anchored on the second lever and adapted to provoke, during closure of the levers, firstly their own partial closure to cut the sheath then their lateral outward offset in order to extract the cable from the cut and gripped sheath part.

4,951,530

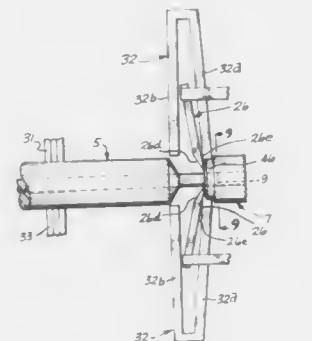
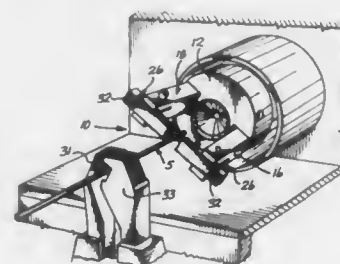
# WIRE GUIDE FOR ROTARY WIRE STRIPPER

Dan A. Cross, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 27, 1989, Ser. No. 441,178  
Int. Cl.<sup>3</sup> H02G 1/12

U.S. Cl. 81-9.51

10 Claims



1. For use in a rotary wire stripper characterized in that, when in operation, the stripper has at least one pair of diametrically opposed blades driven in a manner so that their cutting edges circle about the end portion of a wire to be stripped, and simultaneously move in a symmetrical, radially inward fashion until their cutting edges contact and cut the insulation surrounding the wire's center conductor, to permit stripping the insulation slug from the wire's end portion, an improved wire guide apparatus for centering and holding the wire's end portion during such operation, comprising:

a wire guide mounted adjacent each blade of said at least one pair of blades, said wire guides being driven by said rotary wire stripper in a manner so that said wire guides generally move along with their respective blades, but each wire guide being at least slightly movable toward and away from the wire independently of each blade's radial cutting movement, each wire guide having a gripping leg extending generally toward the wire on the blade's slug side, the end of said leg coming into contact with the insulation slug at least as early as the time the blade's cutting edge contacts the wire's insulation, with the end of said gripping leg of one wire guide cooperating with the end of the gripping leg of the other, to center and grip the outer surface of the slug as it is cut and stripped from the wire's end portion.

4,951,531

# TIRE PUNCTURE MENDING TOOL

Tatsuji Nishio, 2-52, Sarayama 3-Chome, Minami Ku, Fukuoka-Shi, Fukuoka, 815, Japan

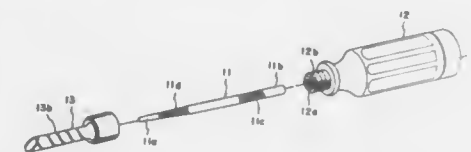
Continuation of Ser. No. 243,562, Aug. 18, 1988, abandoned.

This application Jul. 21, 1989, Ser. No. 385,939

Int. Cl.<sup>3</sup> B60C 25/16

U.S. Cl. 81-15.7

2 Claims



1. A tire puncture mending tool for inserting filling plugs into a tire comprising a tool rod having a distal end and a proximal end, said distal end having a pointed end section and a juxtaposed section having grooves, said proximal end having a blunt end section and a juxtaposed section formed with turn preventive-stopper means, a holder means formed as a handle and having a distal end and a proximal end, said holder means having a removable cap on said proximal end for providing access to said interior compartment, said distal end of said holder means having a generally cylindrical section, said holder means having an axial passage disposed axially of said generally cylindrical section and extending into said interior compartment of said holder means, said axial passage having a portion extending through said generally cylindrical section and formed with a plurality of elongated keyways, said generally cylindrical section of said holder means having an external side formed with male threads such that said male threads are disposed generally radially outwardly of said keyways in said axial passage, a sheath having a proximal end and a distal end, said sheath having a longitudinal axis, said distal end of said sheath having a beveled terminating end such that said terminating end is disposed at an acute angle relative to said longitudinal axis, said proximal end of said sheath having female threads matable with said male threads on said generally cylindrical section of said holder means, said sheath having an interior passage slidably receiving said tool rod, said tool rod having a first operable position in which said tool rod has its proximal end inserted into said holder means such that said proximal end is disposed in said interior compartment of said holder means and said turn preventive-stopper means engages said keyways to limit the extent of insertion of said tool rod into said holder means and to preclude relative rotation between said tool rod and said holder means, said distal end of said tool rod extending externally of said holder means where said tool rod is in said first operable position, said tool rod having a second operable position in which said tool rod has its distal end inserted into said holder means such that said distal end is disposed in said interior compartment of said holder means and said turn preventive-stopper means engages said keyways to limit the extent of insertion of said tool rod into said holder means and to preclude relative rotation between said tool rod and said holder means, said proximal end of said tool rod extending externally of said holder means when said tool rod is in said second operable position, said sheath being mountable and removable from said holder means by engaging and disengaging said male and female threads while said tool rod is in either of said first and second operable positions, said interior compartment of said holder means having a larger diameter than said tool rod such that said interior compartment has storage space to receive items of storage such as said filling plugs when said tool rod is in either one of said two operable positions, said removable cap providing access to said items of storage in said storage space.

4,951,532

# TOE-IN TOOL

Shelby W. Nelson, 170 - 15th Ave., NE., Minneapolis, Minn. 55413

Filed Feb. 13, 1990, Ser. No. 479,283

Int. Cl.<sup>3</sup> B25C 3/00

U.S. Cl. 81-44

6 Claims



1. A hand-held nail holder toe-in tool comprising: elongate handle means, a sectional triangular-shaped nail holding head rigidly secured to said handle and including a pair of flat leg surfaces and a flat base surface, the included angle between said leg surfaces being 90 degrees, and the included angle between each leg surface and base surface being 45 degrees, said sectional triangular head including a central section and a pair of outer sections, each outer section being normally disposed in abutting relation with said central section, the abutting surfaces between each outer section and the central section having mating grooves thereon, whereby a pair of openings is defined in the sectional head, each extending from one of the leg surfaces through said base surface, each opening having a cross-sectional size for accommodating conventional nails therethrough, the axis of each opening being disposed substantially normal to the plane of the base surface of said triangular-shaped head, said tool being operable to accurately position a nail at a 45-degree angle when the tool is positioned to dispose the tool head in engaging relation with a right angular stud joint whereby the tool head may be withdrawn after a nail extending through an opening in the tool head is partially driven into the right angular stud joint, and an outer head section is shifted laterally away from the central head section by a user manipulating said handle means.

4,951,533

# SCREWDRIVER WITH ENHANCED GRIP HANDLE

George Hillinger, Los Angeles, Calif., assignor to Alltrade, Inc., Commerce, Calif.

Filed Nov. 20, 1989, Ser. No. 438,182

Int. Cl.<sup>3</sup> B25B 23/16

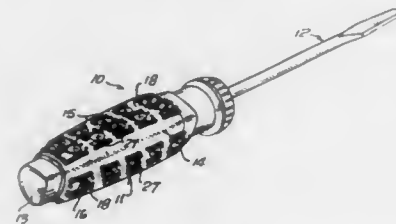
U.S. Cl. 81-177.1

11 Claims

1. An improved screwdriver with a longitudinal axis, said screwdriver being of the type having a handle and an elongated blade extending outwardly from the handle, wherein the improvement comprises:

an enhanced gripping handle comprising an elastomeric collar having an inner surface adhered to the outer surface of the handle and said collar having a base portion having an outer surface, said elastomeric collar including a plurality of first suction cups, each of said first suction cups having upper edges and being supported by said base

portion above the outer surface thereof by a generally cross-shaped base, said cross-shaped base having arms



being oriented at about a 45° angle with respect to the longitudinal axis of said screwdriver.

4,951,534

# **BELOW-FLOOR LATHE FOR REGRINDING THE TIRES OF RAILROAD-VEHICLE WHEEL SETS**

Dirk Brinkmann, Lünen-Niederaden, and Manfred Reyer, Dortmund, both of Fed. Rep. of Germany, assignors to Hoesch Maschinenfabrik Deutschland AG, Dortmund, Fed. Rep. of Germany

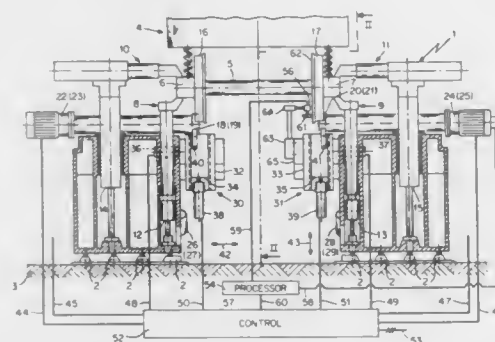
Filed Jul. 11, 1989, Ser. No. 378,080

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1988, 3823823

Int. Cl.<sup>5</sup> B23B 5/32, 21/00

U.S. Cl. 82—105

5 Claims



1. A below-floor turning lathe for reprofiling railroad-vehicle wheel sets having wheels with rims comprising: four driven friction rollers; two turning tool supports; and control means; each rim having an outer surface; means for forcing said friction rollers in pairs against the outer surface of each wheel rim in a wheelset to rotate the wheels; detector means for determining the level of slippage occurring between a friction roller and a rim outer surface; said turning tool supports including means for advancing turning tools against said rim outer surface said control means varying the rate at which said turning tool supports advance the turning tools against said rim outer surface dependent on the amount of slippage detected by said detector means so that reprofiling of said wheel sets occurs in minimum time without interruptions in operation by preventing said friction rollers from sliding over the rim outer surface during reprofiling of a wheelset.

## **4,951,535 APPARATUS FOR ACTUATING THE CLAMPING JAWS OF A CHUCK**

Karl Hiestand, Pfullendorf, Fed. Rep. of Germany, assignor to SMW Schneider & Weisshaupt GmbH, Meckenbeuren, Fed. Rep. of Germany

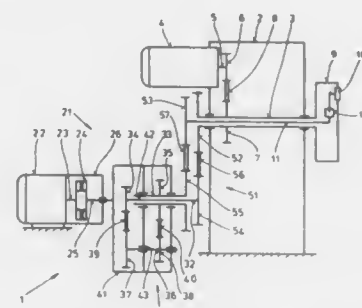
Filed Oct. 28, 1988, Ser. No. 263,823

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737190

Int. Cl.<sup>5</sup> B23B 31/26

U.S. Cl. 82—142

12 Claims



1. In an apparatus for actuating the clamping jaws of a power chuck disposed on a shop machine, including means with which clamping jaws are radially displaceably guided in a driven chuck body and including means with which clamping jaws are coupled with a shiftable adjustment member that, to produce a rotational adjustment movement, is drivingly connected with drive means including an actuator that is formed from a stationary reversible electric drive motor and a gear mechanism that is drivingly connected to the output side of said drive motor via a torque coupling, comprising the improvement therewith wherein:

said gear mechanism is embodied as a two-stage synchronized gear in the form of a transmission gear drive having central gear that include means for rotatably mounted relationship of said central gears within one another include means with which said central gears are drivingly connected, via a step-type gearing, to a drive member of aid chuck and to aid adjustment member, which is coupled with said clamping jaws; said central gears of said transmission gear drive furthermore include means for drivingly and synchronously coupled relationship via two transmission gears that are fixedly disposed on a transmission shaft of said transmission gear drive, with said transmission shaft being mounted via means so as to be rotatable about said central gears, and means for engaging, in a load-dependent manner, a drive member of said torque coupling relative to said drive motor; mans with which said central gears and said transmission gears are coordinated with one another to form reduction stages that correspond to transmission stages of the following step-type gearing.

4,951,536

## **TOOL HOLDER HAVING INTEGRAL WEDGE CLAMPING MECHANISM**

Robert J. Robertson, Raleigh, N.C., assignor to Kennametal Inc., Latrobe, Pa.

Filed Sep. 7, 1988, Ser. No. 241,521

Int. Cl.<sup>5</sup> B23B 29/04

U.S. Cl. 82—158

16 Claims

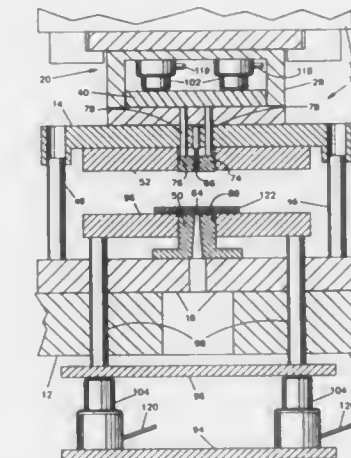
1. A tool holder with an integral clamping mechanism for use in connection with a lathe turret formed with a tool holder slot having inwardly facing side walls, comprising:

- (a) a clamping unit having a pair of outwardly facing side walls and adapted to be inserted into the tool holder slot;
- (b) a tool shank bore formed in the clamping unit;

- (c) a cutting unit having a tool insert pocket for receiving a cutting tool and a rearwardly projecting shank adapted to be inserted into the tool shank bore formed in the clamping unit;
- (d) means contained within the tool shank bore for engaging the shank of the cutting unit for securing the same within the clamping unit;
- (e) a wedge cavity formed in at least one side wall of the clamping unit and including a tip wall and a back bearing wall inclined with respect to an adjacent inwardly facing side wall of the tool holder slot and extending generally upward and outwardly with respect to the clamping unit;
- (f) an angled threaded opening extending through the clamping unit and through the top wall of the wedge cavity and including an axis which extends generally parallel to the inclined bearing wall of the wedge cavity; p1 (g) a wedge block integral with the clamping unit and disposed in the wedge cavity and movably mounted for bodily inward and outward movement within the cavity relative to an adjacent outwardly facing side wall of the clamping unit, the wedge block including a back bearing surface engage-

opening wherein the die edge defining the opening is radiused to cause metal flow, a stock engaging shedder displaceable within the die opening to engage and clamp stock, and a stripper encircling the blanking punch and displaceable therealong to remove surplus stock after a blanking operation, the improvement comprising:

- (a) the stripper being disposed to engage and clamp stock being punched by the blanking punch and die; and additionally comprising,



- (b) variable pressure means for causing the stripper to engage and clamp said stock during punching of said stock under a pressure low enough to permit said stock to flow away from the blanking punch and high enough to prevent said stock from bending and for causing the stripper to exert sufficient force on said stock following punching of said stock to strip said stock from the blanking punch.

11. The improvement to a stamping press of claim 7 and additionally comprising:

- logic means for setting the pressure of said variable pressure means.

4,951,538

## **SINGLE CUT DIE SET**

Alexander Borzym, 4769 Pebble Point St., West Bloomfield, Mich. 48322

Filed Apr. 7, 1989, Ser. No. 334,348

Int. Cl.<sup>5</sup> B23D 21/00, 25/04

U.S. Cl. 83—388

11 Claims

1. A single blade, single stroke cutoff device for a tube cutting machine, said device comprising:

- a cutoff blade mounted transaxially with respect to the tube and having a tip adapted to pierce the tube and at least one cutting edge adapted to sever the tube; and
- means for moving the blade along a concerted path of travel, said path having:

- a first component wherein the tip moves in a first direction along at least part of a first chord of a circular cross section of the tube to effect piercing thereof; and
- a second component wherein the tip moves in a second direction along at least part of a second chord of said circular cross section of the tube to effect severing of

4,951,537

## **APPARATUS FOR PRODUCING A BLANK FROM STOCK MATERIAL**

Edward D. Bennett, Pompano Beach, Fla., assignor to Ace Technology Corporation, Fort Lauderdale, Fla.

Filed Sep. 29, 1988, Ser. No. 250,936

Int. Cl.<sup>5</sup> B21D 45/02

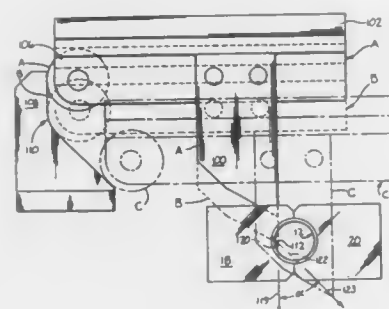
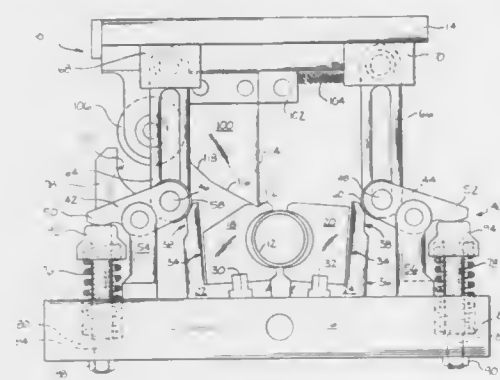
U.S. Cl. 83—76.6

18 Claims

7. In stamping press having a blanking punch and die combination comprising a blanking die defining an opening, a cooperating blanking punch dimensioned closely to mate with the



the tube by said at least one cutting edge, said second direction of tip movement being disposed at an acute



angle with respect to said first direction of tip movement.

4,951,539

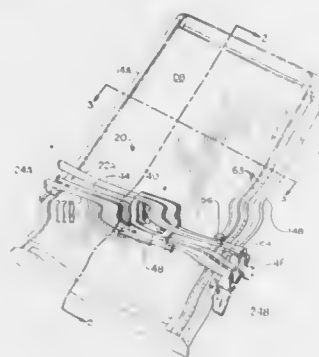
# APPARATUS FOR CUTTING DUCT BOARD AND THE LIKE

James A. Buckner, Rte. 1, Box 616, Providence, N.C. 27315  
Filed Jul. 5, 1989, Ser. No. 375,830

Int. Cl.<sup>5</sup> B26D 3/06

U.S. Cl. 83—884

2 Claims



1. An apparatus for sequentially cutting spaced-apart linear grooves in panels that are to be bent at the groove locations to form air ducts, said apparatus comprising:  
a substantially flat four-sided support surface for said panels;  
a pair of tracks mounted parallel to each other and adjacent opposite sides of said support surface;  
an elongate cross track extending across said support surface and slidably mounted adjacent each end thereof to a re-

spective one of said pair of parallel side tracks for movement along said side tracks;

a cutter head assembly slidably mounted on said elongate cross track for movement along said cross track and comprising a four-sided cutter head having a plurality of cutting blades secured in spaced-apart relationship to at least two sides thereof and which extend in the direction of movement of said cutter head assembly along said cross track, said cutter head being rotatable about a horizontal axis parallel to said cross track so as to selectively bring individual blades into operative position above said support surface as needed to sequentially cut said linear grooves in said panels;

indicator means provided adjacent at least one of the sides of said support surface for indicating locations for cutting the spaced-apart grooves for at least one size of air duct; and means for locking said cross track carrying said cutter head assembly at said locations along said indicator means comprising apertures corresponding to indicia on said indicator means and a stop pin carried by said cross track adapted to be removably inserted into selected apertures.

4,951,540

# SHINGLE RIDGE CAP CUTTER

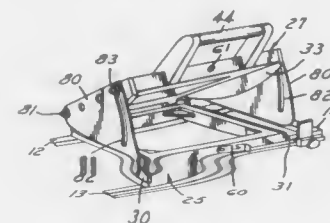
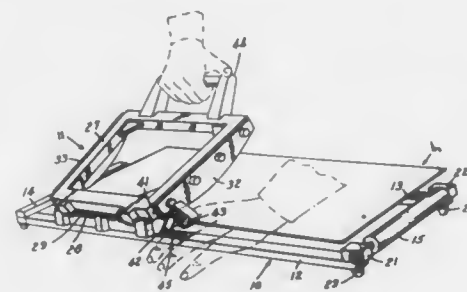
James Cross, Grandville; Jerry Henning, Spring Lake; James J. Rhoades, Garden City; Arthur B. Chubb, Romulus, and David B. Olsen, Dearborn, all of Mich., assignors to Tapeo Products Company, Inc., Detroit, Mich.

Filed Mar. 16, 1989, Ser. No. 324,309

Int. Cl.<sup>5</sup> B26D 1/12

U.S. Cl. 83—397

3 Claims



1. A shingle ridge cap cutter comprising a frame having an axis

means for guiding a shingle along said frame,

a fixed cutter member fixed on said frame and supporting longitudinally spaced transversely extending fixed cutter blades,

a movable cutter member movably mounted on said fixed cutter member and supporting longitudinally spaced blades movable to cooperate with said fixed cutter blades to sever a portion of a shingle, said fixed and movable center blades extending transversely

at an angle to the axis of the frame to permit the shingle to be cut along the slots of a shingle that are provided along the length of a shingle so that the section of the shingle which is cut comprises a combined rectangular portion and a trapezoidal portion,

means operable to prevent movement of the movable cutter member toward the fixed cutter member except when one hand is engaged with said means to permit the other hand to manipulate the movable cutter member to cut the shingle,

said last mentioned means comprising a safety catch which in one position prevents movement of the movable cutter member toward the fixed cutter member and in another position permits movement of the movable cutter member towards the fixed cutter member, said safety catch being manually movable to a position such that it interferes with the movement of the movable cutter member toward the fixed cutter member,

said safety catch comprising a member fixed to said frame and having a flexible portion adapted to engage a complementary portion on the movable cutter member when the cutter member is in closed position, said safety catch having a finger engaging portion such that when it is grasped and moved laterally, disengages the movable cutter member permitting operation of the movable cutter member with the other hand,

said safety catch including a finger engaging loop, said safety catch comprising a portion movable longitudinally of the frame and having a portion at one end for engagement by the hand and another portion at the other end extending toward the movable cutter member, said movable cutter member having a recess which can be engaged with said other portion of said safety catch, spring means yieldingly urging said safety catch in a direction such that when the movable cutter member is moved out cutting position the safety catch and, in turn, the other portion of the safety catch to a position such that said other portion projects toward the movable portion to a position where it is out of alignment with the recess such that it will prevent movement of the movable cutter member toward said fixed cutter member, such that the safety catch must be manually manipulated and held by one hand while the movable part is moved by the other hand to permit the movable cutter member to move so that the portion of the catch extends into the recess as the movable cutter member moves toward cutting position.

4,951,541

# ADJUSTABLE REST FOR A STRINGED INSTRUMENT

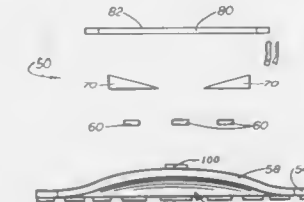
Steven W. McMillan, 2615 Waugh Dr. #177, Houston, Tex. 77006

Filed Oct. 11, 1988, Ser. No. 255,390

Int. Cl.<sup>5</sup> G10D 1/02

U.S. Cl. 84—280

20 Claims



1. An adjustable rest for a stringed instrument, comprising, in combination:

a rigid base plate bearing at least one securing strip adhesively bonded to a first major side portion of said rigid base plate, said at least one securing strip bearing a first group of outwardly extending hook or loop style fasteners;

at least one intermediate supporting member bearing on its

first side a second group of outwardly extending hook or loop style fasteners which second group of fasteners complements and releasably adheres to said first group of fasteners, and bearing on its second and opposite side a third group of outwardly extending hook or loop style fasteners identical in function to said first group of outwardly extending hook or loop style fasteners; and

a body contact member bearing on its first side a fourth group of outwardly extending hook or loop style fasteners which fourth group complements and releasably adheres to said third group of hook or loop style fasteners, and which fourth group is identical in function to said second group of outwardly extending hook and loop style fasteners;

wherein said at least one intermediate supporting member is releasably joined to said at least one securing strip borne by said rigid base plate, through face to face coupling of said first group of fasteners with said second group of fasteners, and said body contact member is releasably joined to said at least one intermediate supporting member through face to face coupling of said third group of fasteners with said fourth group of fasteners.

4,951,542

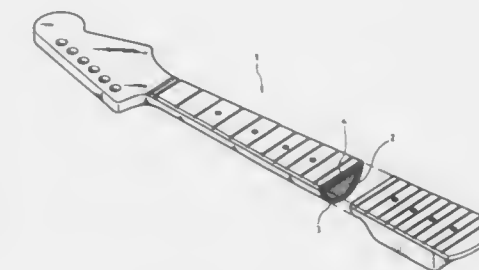
# ELECTRIC GUITAR NECK

Wen-Tsung Chen, Taoyuan, Taiwan, assignor to Tong Ho Musical & Wooden Works Co., Ltd., Taiwan, Taiwan  
Filed Aug. 28, 1989, Ser. No. 398,912

Int. Cl.<sup>5</sup> G10D 1/08

U.S. Cl. 84—293

3 Claims



1. An electric guitar neck, comprising:

a wood core;

a fiber reinforced plastics coating enclosing said wood core, the plastics contained in said fiber reinforced plastics coating being selected from epoxy resins, phenolic resins, diallyl phthalate resins, furan resins, silicone, acrylate resins, polyamides, and polyethylene, the fibers in said fiber reinforced plastics coating being selected from glass and carbon fibers; and

a fingerboard adhered on said fiber reinforced plastics coating for supporting strings.

4,951,543

# INCREASED TORQUE BRIDGE FOR GUITARS

Thomas J. Cipriani, 640 E. Park Ave., Long Beach, N.Y. 11561  
Continuation-in-part of Ser. No. 39,941, Apr. 20, 1987. This application Jun. 29, 1988, Ser. No. 213,157

Int. Cl.<sup>5</sup> G10D 3/04, 3/12

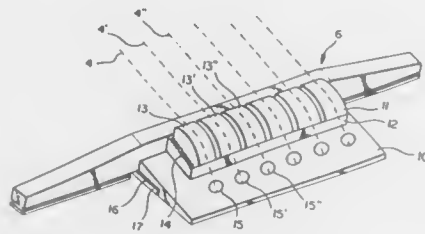
U.S. Cl. 84—298

22 Claims

1. In a stringed musical instrument having a resonating box, a sound board on the resonating box a plurality of strings extending longitudinally over the sound board, a bridge on which the strings pass in stretched condition, and tuning means remote from the bridge for varying the tension in the strings, an improvement according to which said bridge comprises:

a base on the sound board, said base having an upper surface;

a saddle on the upper surface of the base; anchor means for attaching the strings to the sound board in spaced relation from said saddle; said saddle having an upper surface elevated above said base and positioned so that the tensioned strings pass thereon and apply force to the saddle to press the saddle against the base and to urge the saddle longitudinally towards the tuning means, said base having an upstanding wall, said saddle having a front surface which abuts against said upstanding wall under the tension in the strings; said front surface of said saddle having a lower point of engagement with the base at the intersection of the upstanding wall and upper surface of said base; said upper surface of said saddle and said base being configured to provide a guide path for said strings so that each



string has first and second longitudinally spaced points of support on the bridge which have respective functional heights above the sound board, the first point of support being closer to the tuning means, said points of support being positioned so that each string undergoes a change of angle at each of said points of support to apply forces to the saddle directed towards said point of engagement of the front surface of the saddle with the intersection of the front wall and the upper surface of the base which forces, in turn, are applied to the sound board and the resonating box therebelow, means for longitudinally adjusting the position of said first point of support with respect to said second point of support to effect fine tuning of the string, said anchor means being at an intermediate location on the sound board for anchoring the string to the sound board above the resonating box.

4,951,544

#### APPARATUS FOR PRODUCING A CHORD PROGRESSION AVAILABLE FOR A MELODY

Junichi Minamitaka, Tokyo, Japan, assignor to Cadio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 335,213

Claims priority, application Japan, Apr. 6, 1988, 63-82884; Apr. 6, 1988, 63-82885; May 25, 1988, 63-125930

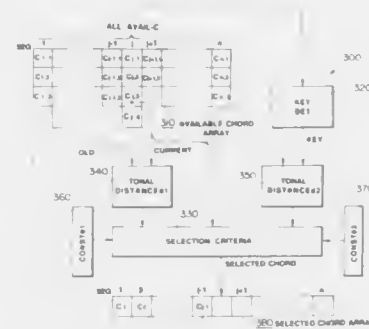
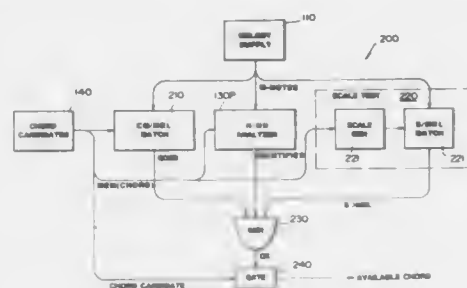
Int. Cl.<sup>5</sup> G10H 1/38

U.S. Cl. 84—613

62 Claims

1. An apparatus for selectively producing an available chord for a melody comprising: knowledge storage means for storing a musical knowledge of classifying nonharmonic tones in a melody in accordance with an analyzed stream of that melody and an available chord for that melody; melody supply means for supplying a melody; chord candidate supply means for supplying a chord candidate; execution means for executing classification of all nonharmonic tones in said melody from said melody supply means by applying said musical knowledge to an analyzed stream of said melody from said melody supply means based on the assumption that said chord candidate is available for said melody from said melody supply means; and determination means for determining from the classification

provided by said execution means as to whether said chord candidate is available for said melody from said



melody supply means, thereby to selectively produce an available chord for said melody.

4,951,545

#### ELECTRONIC MUSICAL INSTRUMENT

Satoshi Yoshida, Hamura, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

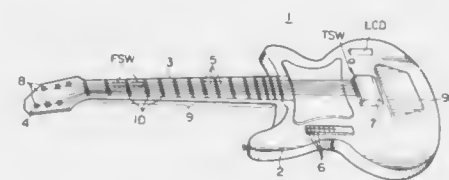
Filed Apr. 24, 1989, Ser. No. 342,742

Claims priority, application Japan, Apr. 26, 1988, 63-56238[U]; Jun. 15, 1988, 63-79085[U]

Int. Cl.<sup>5</sup> G10H 1/18

U.S. Cl. 84—646

27 Claims



1. An electronic musical instrument comprising: a fingerboard having pitch designation areas corresponding to strings, formed in a longitudinal direction thereof in a one-to-one correspondence; first detecting means, including contacts formed in said pitch designation areas and corresponding to pitches, for detecting, when a position in said pitch designation areas is depressed, the depressed position in the longitudinal direction of said fingerboard; second detecting means, including a plurality of contacts arranged in said pitch designation areas along a direction different from the longitudinal direction of said fingerboard, for detecting, when a position in said pitch designation areas is depressed, the depressed position in the direc-

tion different from the longitudinal direction of said fingerboard; pitch determining means for determining a pitch of a musical tone to be generated on the basis of a detection result of said first detecting means; and parameter value changing means for changing a value of a parameter of the musical tone to be generated on the basis of a detection result of said second detecting means.

4,951,546

#### ELECTRONIC STRINGED MUSICAL INSTRUMENT

Yojiro Takabayashi, and Takashi Norimatsu, both of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

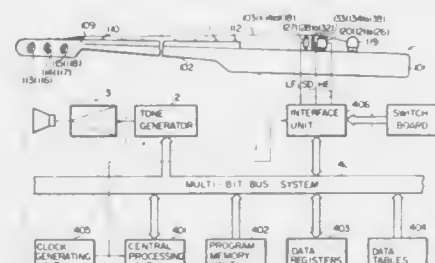
Filed Jan. 13, 1989, Ser. No. 296,807

Claims priority, application Japan, Jan. 14, 1988, 63-7273; Jan. 14, 1988, 63-7274; Jan. 14, 1988, 63-7275; Jan. 14, 1988, 63-7276; Jan. 14, 1988, 63-7277; Jan. 14, 1988, 63-7278; Jan. 14, 1988, 63-7279

Int. Cl.<sup>5</sup> G10H 1/32, 1/18, 3/00

U.S. Cl. 84—718

14 Claims



1. An electronic stringed musical instrument having a parameter adjusting mode and a playing mode of operation, comprising:

- a plurality of fret members located at predetermined spacings and respectively assigned to fret positions which in turn are assigned notes, respectively;
- a string stretched over said fret members and engageable any of said fret members;
- vibration generating and receiving means for producing super-sonic vibrations in said string and receiving the super-sonic vibrations reflected from any of said fret members through said string, the super-sonic vibrations transmitted from said vibration generating and receiving means being reflected from a fret member engaged by said string;
- fret position deciding means responsive to the super-sonic vibrations transmitted from and reflected to said vibration generating and receiving means for deciding the fret position assigned the fret member engaged by said string in said playing mode of operation;
- sound production controlling means for producing a sound with the note assigned to the fret position decided by said fret positions deciding means in said playing mode of operation;
- mode switching means for selecting one of said parameter adjusting mode and said playing mode; and
- fret position adjusting means operative to adjust the fret positions for the fret members, respectively, whenever said parameter adjusting mode of operation is selected by using said mode switching means, said fret position adjusting means comprising:
  - measuring means operative to measure propagation characteristic of said string;
  - calculating means operative to decide the fret positions of said fret members on the basis of the propagation characteristic; and
  - memory means operative to memorize the fret positions adjusted in said parameter adjusting mode of operation.

4,951,547

#### ENDLESS STORAGE AND CONVEYOR CHAIN IN AN AMMUNITION MAGAZINE

Hanspeter Novet, Volketswil, and Bruno Ruppen, Zürich, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zürich, Switzerland

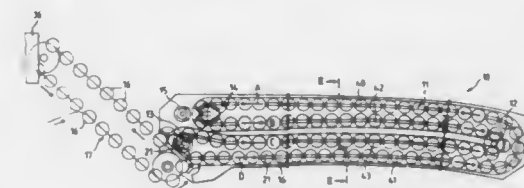
Filed Sep. 11, 1989, Ser. No. 406,280

Claims priority, application Switzerland, Sep. 28, 1988, 03610/88

Int. Cl.<sup>5</sup> F41A 9/04

U.S. Cl. 89—34

6 Claims



1. An endless storage and conveyor chain in an ammunition magazine, from which cartridges are delivered to an automatic firing weapon, comprising:

- a cartridge infedding device driven by said automatic firing weapon;
- the endless storage and conveyor chain with the ammunition thereupon forming at least one loop in the ammunition magazine;
- at least one drive wheel and at least one deflection roll;
- the endless storage and conveyor chain being trained over said at least one drive wheel and said at least one deflection roll;
- said at least one loop of the endless storage and conveyor chain being folded to form a double loop;
- the endless storage and conveyor chain folded into said double loop having a substantially central portion;
- means for drivingly coupling said substantially central portion of said endless storage and conveyor chain to said automatic firing weapon;
- a booster motor drivingly connected to said at least one drive wheel;
- said booster motor driving the storage and conveyor chain into said substantially central portion by means of said at least one drive wheel; and
- the endless storage and conveyor chain containing a plurality of individual chain elements telescopically interconnected for absorbing acceleration forces which occur at least at the beginning of a firing burst.

4,951,548

#### APPARATUS AND METHOD FOR SUPPLY OF BELT-LINKED AMMUNITION

Philip A. Wixon, and William Pitt, both of Wolverhampton, England, assignors to Lucas Industries, England

Filed May 22, 1989, Ser. No. 354,796

Claims priority, application United Kingdom, May 26, 1988, 8812464

Int. Cl.<sup>5</sup> F41A 9/79, 9/63

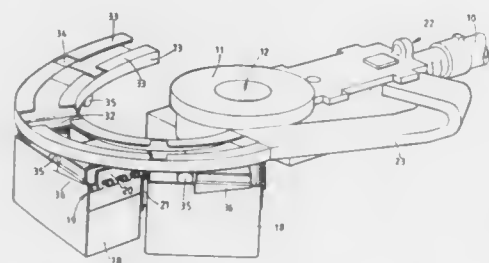
U.S. Cl. 89—33.14

4 Claims

1. An apparatus for supplying belt-linked ammunition to a traversable gun, comprising a support which is formed as a circular arc about an axis of curvature, said support being coupled to the gun for traversing movement therewith, means for mounting a plurality of ammunition boxes at distance intervals along said support, said boxes containing ammunition belts which are so disposed as to render both free ends of the belt accessible from an open upper side of the box, said support including guide means for directing said free ends respectively towards said gun and towards an adjacent box, said guide means having openings with side walls through which said free ends can pass from said boxes to said guide means, said side



walls of said openings being substantially aligned with respective radii extending from said axis of curvature, means for rigidly securing said boxes to said support so that a longer axis



extending from a nose to a base of each round of ammunition is substantially parallel to the side walls of a respective one of said openings, said boxes being substantially rectangular right prisms.

4,951,549

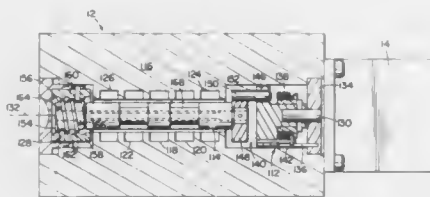
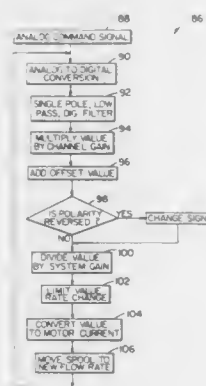
## DIGITAL SERVO VALVE SYSTEM

Zenny Olsen, Farmington; Albert J. Sperbeck, Glastonbury; Eric Hamman, Newington, and Gary D'Angelo, Southington, all of Conn., assignors to Olsen Controls, Inc., Bristol, Conn.

Filed Dec. 12, 1988, Ser. No. 283,190

Int. Cl.<sup>3</sup> F15B 9/03, 9/09

U.S. Cl. 91—363 R



1. A digital servo valve system for controlling a displaceable actuator, comprising:

- valve body having an interior longitudinal cavity with a plurality of channels spaced therealong, each of said channels respectively communicating with a fluid pressure source, a fluid pressure return and the actuator;
- a valve spool displaceable within said cavity along a longitudinal axis, said valve spool having a plurality of substantially cylindrical lands alternately spaced with a plurality of recessed regions, said spool cooperatively configured with said valve body to regulate fluid flow through said channels in dependence on said spool axial displacement;
- a rotary to linear translation means affixed to said valve body

and said spool for translating received rotational displacement to linear displacement of said spool;

feedback means for providing signals indicative of actuator displacement;

motor means connected with said rotary to linear translation means for providing discrete rotary displacement in response to position command signals;

a controller receiving said feedback signals and actuator control signals, said controller computing present actuator parameter values and comparing said computer values with nominal actuator parameter values and iteratively determining from said received and computed signals said position command signals;

said controller in computing said position command signals utilizes said feedback signals to compute actuator present position values and compares these values with a commanded final position to determine if the actuator is within a selected distance from the commanded final position; and

wherein when said controller determines that the actuator is within said selected distance, it alters said position command signals to cause said motor means to decelerate said valve spool along said selected distance such that the valve spool is positioned at the commanded final position without overshoot.

4,951,550

## BRAKE BOOSTER WITH KEY MEMBER HAVING AN ELASTIC MEMBER

Junichi Ohki, and Shintaro Uyama, both of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

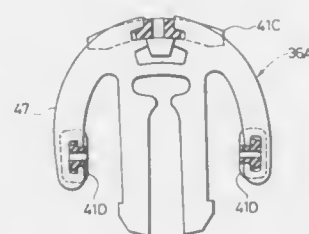
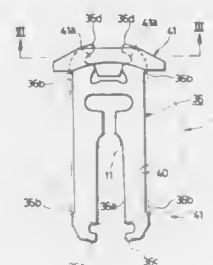
Filed Oct. 27, 1988, Ser. No. 263,642

Claims priority, application Japan, Oct. 30, 1987, 62-166697

Int. Cl.<sup>3</sup> F15B 9/10

U.S. Cl. 91—369.3

5 Claims



1. A brake booster including a power piston disposed for reciprocating motion within a shell, a valve mechanism received within a valve body which represents an axial portion of the power piston, an input shaft connected to a valve plunger which forms part of the valve mechanism for switching a fluid part within the valve mechanism, and a key member disposed for a reciprocating motion within a limited extent within the valve body and mechanically coupled to the valve plunger and disposed for abutment against the shell when the brake booster is inoperative, the valve plunger being main-

tained at an advanced position with respect to the valve body when the key member abuts against the shell the thereby reduce an idle stroke of the input shaft;

characterized in that the key member is provided with at least one elastic member so that the elastic member abuts against the shell at least when the brake booster is not connected with a source of hydraulic pressure and the elastic member is disposed for abutment by the valve body to limit the retracting movement of the valve body, an arrangement being such that when the input shaft is pulled rearward under the described condition to cause a retracting movement of the valve plunger and the key member, a retracting movement of the key member is allowed by an elastic deformation of the elastic member, the key member including a substantially rectangular member having a slit therein which is disposed for engagement with the plunger, the key member including a pair of opposing ears on its opposite sides at each lengthwise end thereof, and said at least one elastic member extending across one of the pairs of ears and being centrally formed with a projection which extends in the axial direction of the valve body.

4,951,551

## VARIABLE DISPLACEMENT HYDRAULIC MOTOR

Mitsuru Arai, and Yoshikazu Nagahara, both of Yokohama, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

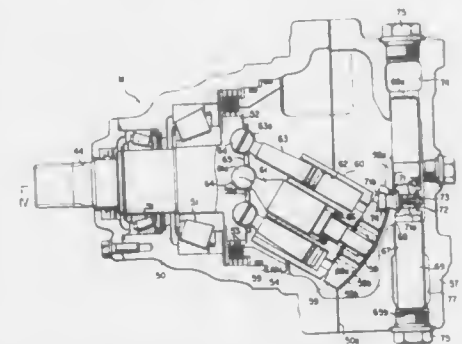
Filed Nov. 18, 1988, Ser. No. 299,922

Claims priority, application Japan, Mar. 20, 1987, 62-64382

Int. Cl.<sup>3</sup> F03C 1/06; F04B 1/24, 1/26, 1/30

U.S. Cl. 91—506

1 Claim



1. A variable displacement hydraulic motor comprising: an end cover fixedly mounted on an end surface of a substantially cylindrical main casing; a drive shaft rotatably mounted in said main casing; a center shaft a plurality of pistons, an end portion of each of which shaft and pistons is swingably engaged with a flange portion of said drive shaft, the flange portion being formed in a rear-end portion of said drive shaft; a cylinder block for slidably receiving the other end portion of each of said pistons therein, said cylinder block being provided with a through-hole through which said center shaft passes, the through-hole being formed in a central portion of said cylinder block; a valve plate fixedly mounted on a base-end portion of said cylinder block, said valve plate being provided with a central portion in which the other end portion of said center shaft is rotatably mounted; guide means for swingably guiding said valve plate, said guide means being provided in opposite sides of an inner portion of said end cover; a swinging means for moving said valve plate in a swinging manner, said swinging means being provided with a piston lever slidably mounted in a substantially central portion of said end cover and extending in a direction perpendicular to an axis of said drive shaft; and a pin for connecting said swinging means with said valve plate, said pin being mounted in a small bore at its base portion, and has a ball-like form at its front end portion slidably in a substantially circular hole, said small bore being formed in an

axial substantially central portion of said piston lever, said substantially circular hole being formed in an end portion of said valve plate at a position near an axis of said drive shaft and offset from an axis of said center shaft.

4,951,552

## LOCKING CYLINDER

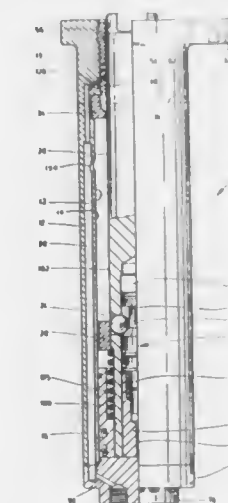
Anton F. Fox, 2542 Wharton Glen Avenue, Mississauga, Ontario, Canada (L4X 2A9)

Filed Nov. 27, 1989, Ser. No. 441,872

Int. Cl.<sup>3</sup> F15B 15/26

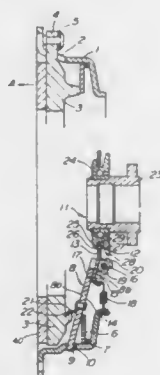
U.S. Cl. 92—27

20 Claims



1. A hydraulic actuator comprising: an actuator cylinder with an actuator head closing one end of said cylinder and a longitudinal passageway; a ram slidably in said passageway from a retracted position to an extended position, said ram having an axially extending chamber positioned in an end section of the ram located closest to said actuator head and a number of openings forming ball passageways extending between said chamber and an outer, circumferential surface of said ram; a number of locking balls positioned in said openings; a ring slidably mounted on said ram and at its forwardmost point of travel positioned to hold said balls so that they do not project from said openings; means for biasing said ring away from said actuator head to said forwardmost point of travel; a spool slidably mounted in said chamber and having first ball receiving recess means arranged about its circumferential periphery, at least a portion of said locking balls being located in said recess means during extension of said ram; stop means located in an end section of said cylinder opposite said actuator head for preventing further forward movement of said ring when the latter reaches said stop means and for causing said ring to slide rearwardly relative to said ram upon further extension of said ram; second ball receiving recess means located in said end section of said cylinder opposite said actuator head; first means for sliding said spool in a forwards direction in said chamber and thereby causing said locking balls to move radially outwardly to a position where they project into said second recess means, said sliding means moving said spool when said ring is slid rearwardly by said stop means; and second means for sliding said spool in a rearwards direction in said chamber and for causing said locking balls to move radially inwardly in order to permit retraction of said ram into said cylinder by pressurized hydraulic fluid.

**4,951,553**  
**FRICTION CLUTCH FOR TRANSMISSION**  
 Satoohi Kohno, Kanagawa, Japan, assignor to Atsugi Motor Parts Company, Limited, Kanagawa, Japan  
 Filed Mar. 29, 1989, Ser. No. 329,952  
 Int. Cl.<sup>5</sup> F16D 13/48  
 U.S. Cl. 192—70.13 15 Claims



1. A clutch for a transmission comprising:  
 a clutch cover installed on a flywheel;  
 a pressure plate, supported by said clutch cover so as to be allowed to move in the axial direction of the clutch;  
 a clutch disc disposed between said pressure plate and the flywheel and connecting to the shaft of a transmission;  
 a diaphragm spring for providing pressure to said pressure plate which is required to hold said clutch disc against the flywheel;  
 a release bearing movable in the axial direction of the clutch;  
 a release lever, provided independent of said diaphragm spring, for thrusting said diaphragm spring to release the pressure provided by said diaphragm spring so as to cause the clutch to disengage from the flywheel; and  
 wherein said release lever includes a movable lever which is movable with respect to said release lever so as to allow engagement between said release lever and said release bearing at a first position defined by relative movement between said release lever and said release bearing in the axial direction of the clutch, said movable lever moving along with said release lever so as to release the pressure provided by said diaphragm spring so as to cause the clutch to disengage from the flywheel according to movement of said release bearing in a direction away from the flywheel, said movable lever being movable so as to allow said release bearing to disengage from said release lever at a second position closer than said first position toward said clutch disc defined by relative movement between said release lever and said release bearing in the axial direction of the clutch.

**4,951,554**  
**LOW STRESS DIAPHRAGM**  
 Daniel G. Scott, Swissvale; William K. Mong, No. Huntingdon; Mark S. Krampitz, Hunker; Theodore B. Hill, North Versailles, and Willard P. Spalding, Penn Hills, all of Pa., assignors to American Standard Inc., Wilmerding, Pa.  
 Filed Jan. 19, 1989, Ser. No. 299,191  
 Int. Cl.<sup>5</sup> F16J 3/00; F01B 19/00  
 U.S. Cl. 92—103 F 11 Claims

1. A diaphragm member having coaxial inner and outer annular peripheries lying in spaced-apart, parallel planes that are perpendicular to the axis of said inner and outer peripheries, a first annular clamping point approximate said outer periphery about which said diaphragm member is clamped to said body and a second annular clamping point approximate said inner periphery about which said diaphragm member is clamped to a movable member that operates axially in a cavity

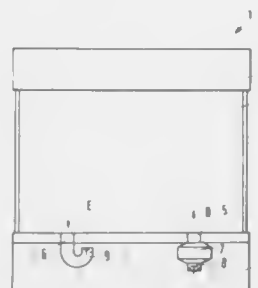
of said body in spaced-apart relationship therewith to provide a diaphragm piston assembly, said diaphragm member comprising:

- (a) a first annular arcuate segment having one end terminating approximate said outer periphery including said first clamping point;  
 (b) a second annular arcuate segment having one end terminating approximate said inner periphery including said second clamping point; and



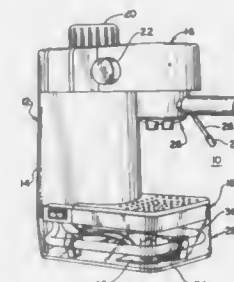
- (c) said first and second arcuate segments being interconnected with a reverse angle of curvature to form an annular skirt portion intermediate said first and second clamping points having a cross-sectional shape corresponding to an ogee-like curve in which a line of tangency common to said first and second arcuate segments forms an angle with said axis; and  
 (d) a layer of reinforcing fabric substantially centrally disposed throughout said diaphragm member.

**4,951,555**  
**SHOW CASE FOR KEEPING AND EXHIBITING OBJECTS**  
 Till H. Hahn, Frankfurt am Main; Klaus Seldel, Hanover, and Klaus Fischer, Niederdorfelden, all of Fed. Rep. of Germany, assignors to Glasbau Hahn GmbH & Co., KG, Frankfurt am Main, Fed. Rep. of Germany  
 Filed Feb. 17, 1989, Ser. No. 312,739  
 Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805212  
 Int. Cl.<sup>5</sup> B08B 15/02  
 U.S. Cl. 98—1.5 10 Claims



1. A show case for keeping and displaying objects, which has sides, a bottom, a cover and an interior therebetween, means for connecting said bottom, said sides and said cover which provide non-hermetic sealing therebetween, whereby said show case is exposed to variations in pressure and temperature in the interior thereof and in the environment and dust and harmful gases would enter the interior of said show case, means for preventing dust and gases from entering said interior of the show case, comprising air inlet means at least at the bottom or the cover and filtering means within said air inlet means for filtering and cleaning said air whereby when the pressure increases in the environment, filtered air flows into the interior of said show case.

**4,951,556**  
**ILLUMINATED COFFEE BREWING APPARATUS**  
 Norman Ng, San Francisco, Calif., assignor to Smart Kids, Inc., Oakland, Calif.  
 Filed Apr. 21, 1989, Ser. No. 341,343  
 Int. Cl.<sup>5</sup> A47J 31/00  
 U.S. Cl. 99—285 6 Claims



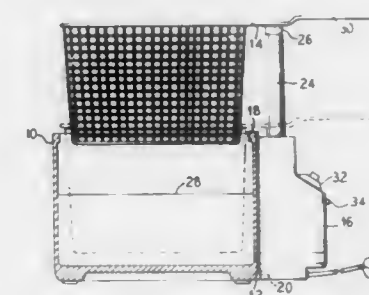
1. A coffee brewing apparatus comprising:  
 a housing including a base portion and a head portion;  
 means located within said housing for heating water for the brewing of coffee;  
 a thermal switch associated with the heating water for generating an electrical signal when the water reaches a predetermined temperature;  
 indicator means located within said base portion; and  
 means coupling said thermal switch to said indicator means for using the generated electrical signal to energize the indicator means and illuminate the entire base portion to give a visual indication that the water has reached said predetermined temperature.

**4,951,557**  
**APPARATUS FOR DECAFFEINATION OF AQUEOUS EXTRACTS**  
 Ismar M. Reich, Merrick, N.Y., assignor to Chock Full O'Nuts, New York, N.Y.  
 Division of Ser. No. 129,801, Dec. 7, 1987, Pat. No. 4,816,275, which is a continuation of Ser. No. 060,986, Jun. 15, 1987, abandoned, which is a continuation of Ser. No. 821,868, Jan. 23, 1986, abandoned, which is a continuation of Ser. No. 479,263, Mar. 28, 1983, abandoned. This application Oct. 12, 1988, Ser. No. 256,653  
 Int. Cl.<sup>5</sup> A23F 5/22, 5/24; A47J 31/00  
 U.S. Cl. 99—281 19 Claims

1. An extraction apparatus for use in a continuous counter-current extraction process in which two phases are brought into contact to extract a component from one phase into the other phase, comprising

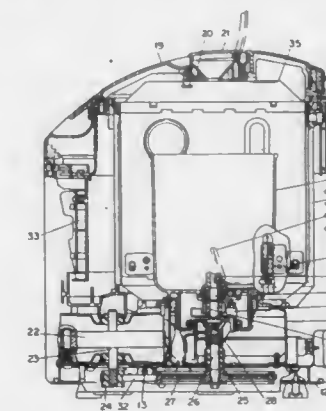
- (a) a perforated plate extraction column having a series of parallel plates for continuously contacting a liquid phase by a gas phase;  
 (b) liquid phase supply means for providing the liquid phase under pressure to an inlet port above the top plate of said column;  
 (c) gas phase supply means for providing the gas phase under pressure to an inlet port below the bottom plate of said column;  
 (d) means to break foam comprising as porous solid extended surface above each plate and extending across the column.

**4,951,558**  
**BASKET LIFTING MECHANISM FOR COOKING POT**  
 Vincent D. Figliuzzi, Rte. 1, Box 169-White Crow Rd., Fort Atkinson, Wis. 53538  
 Filed Apr. 3, 1989, Ser. No. 332,492  
 Int. Cl.<sup>5</sup> A47J 37/12 18 Claims



1. A device for raising and lowering a basket in a frying pot, comprising:  
 a housing adapted for fastening to a frying pot;  
 a generally vertically extending rod having an upper end adapted for attachment to a basket, said rod extending from said housing;  
 motor means for selectively raising and lowering said rod;  
 temperature control means for automatically activating said motor means in response to a predetermined temperature being achieved in the frying pot, said temperature control means causing the basket on said rod to lower into the frying pot;  
 timer means for activating said motor means in response to a predetermined interval having elapsed, said timer means causing the basket on said rod to rise out of the frying pot.

**4,951,559**  
**BREAD PRODUCING MACHINE**  
 Yuzuru Arai, Takatsuki; Morio Shibata, Amagasaki; Shigeru Yamaguchi, Kashiwara; Hirofumi Nakakura, Toyonaka; Tsuneo Shibata, and Yukitoshi Kunihiro, both of Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 PCT No. PCT/JP88/00516, § 371 Date Jan. 30, 1989, § 102(e) Date Jan. 30, 1989, PCT Pub. No. WO88/09143, PCT Pub. Date Dec. 1, 1988  
 PCT Filed May 27, 1988, Ser. No. 340,093  
 Claims priority, application Japan, May 29, 1987, 62-135284  
 Int. Cl.<sup>5</sup> A21D 8/00; A47J 27/00  
 U.S. Cl. 99—348 4 Claims



1. An apparatus for producing bread, comprising an outer case;



a baking chamber within said outer case, said baking chamber having at least one side wall;  
 a baking case detachably securable within said baking chamber for receiving bread raw materials;  
 means for kneading the bread raw materials within said baking case;  
 means disposed within said outer case for heating said baking case;  
 air inlet means allowing communication between the atmosphere and said baking chamber and therefore said baking case; and  
 air exhaust means allowing communication between said baking chamber, and therefore said baking case, and the atmosphere, said air exhaust means including an exhaust air inlet port located in said side wall of said baking chamber at a position at least partially above said baking case, an exhaust air exhaust port on said outer case, exhaust duct means providing air communication between said inlet port and said exhaust port, and fan means disposed within said exhaust duct means for drawing a flow of air into said inlet port and blowing the air out of said exhaust port, whereby the air pressure within said baking chamber, and therefore said baking case, is reduced during operation of said fan means.

4,951,560

**DOUBLE DECK RAIL CAR WITH BAGGAGE RACKS**  
 Claude Setan, Famars, France, assignor to Societe Anonyme dite : Compagnie Industrielle de Materiel de Transport C.I.M.T. Lorraine, Courbevoie, France

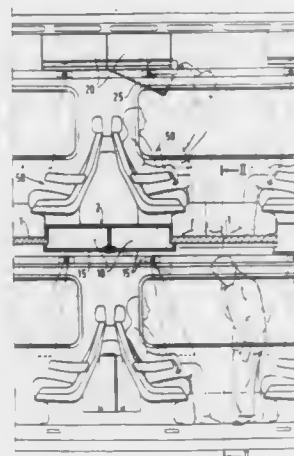
Filed Apr. 12, 1989, Ser. No. 336,494

Claims priority, application France, Apr. 14, 1988, 88 04946

Int. Cl.<sup>3</sup> B61D 37/00; B60R 11/00

U.S. Cl. 105—340

7 Claims



1. A double deck rail car including upper and lower levels, said upper level including a ceiling, a bottom deck for said lower level, a top deck for said upper level forming a ceiling for said lower level, and seats mounted by bases to said decks for said upper and lower levels, the improvement comprising: dropped, recessed sections of said top deck beneath and to opposite sides of an aisle formed by said top deck between said recessed sections, said seats being provided in rows along said dropped, recessed sections, holes within said recessed sections of said top deck, lower level baggage racks within said holes, having an upper portion protruding from said holes into said upper level and being integrated to the bases of said seats on the top deck recessed sections and having a bottom portion projecting from said holes within the lower level, and upper level baggage racks mounted beneath the ceiling of said upper level whereby by mounting the seats within said dropped, recessed sections of said top deck, sufficient space exists

between said ceiling for said upper level and said seats to mount said upper level baggage racks without discomfort to passengers occupying said seats while permitting ready access to said baggage racks of said lower level by passengers within said lower level.

4,951,561

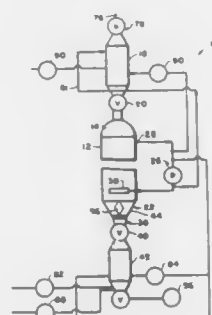
**APPARATUS FOR FLUID-SOLID BED PROCESSING**  
 Charles T. Moorman, Harrington Park; Joseph L. Sabadics, Nutley, both of N.J., and T. Anthony Royal, San Luis, Obispo, Calif., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Jun. 6, 1989, Ser. No. 362,156

Int. Cl.<sup>3</sup> A23F 5/18, 5/20, 5/22

U.S. Cl. 99—471

7 Claims



1. An apparatus for an extracting supercritical fluid-solid bed process comprising:  
 an elongated cylindrical vessel which is vertically oriented; a vessel top through which the solids are introduced into said vessel;  
 a vessel bottom upon which the solids accumulate to form a fluid-solids bed in said vessel, said vessel bottom including (a) a central bottom opening substantially smaller than the diameter of said cylindrical vessel and through which the solids can flow, (b) a valve means at said central bottom opening for controlling the flow of the solids through said central bottom opening, and (c) a frustoconical bottom wall portion extending downwardly and inwardly from said vessel to said bottom opening and having a wall angle from vertical;  
 a flow promoting insert having a lower conical wall extending from a lower tip to a central base region and having a wall angle from vertical substantially the same as the wall angle of said bottom wall;  
 means for mounting said insert adjacent to but parallel and spaced from said bottom wall whereby said insert promotes an even flow of the solids through said vessel and out through said bottom opening;  
 and a circulating means for countercurrent circulation of a supercritical fluid through the solids in said vessel, said circulating means including an outlet adjacent said vessel top and an inlet for conducting the fluid to the interior of said vessel above said insert.

4,951,562

**STRAPPING MACHINE FOR COMPRESSIBLE LOADS**  
 David A. Ribaldo, Deerfield, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Mar. 16, 1989, Ser. No. 324,200

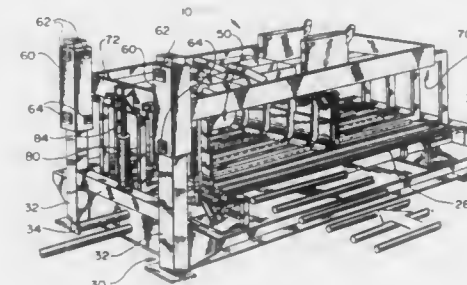
Int. Cl.<sup>3</sup> B65B 13/30; B30B 1/32

U.S. Cl. 100—8

21 Claims

1. In a strapping machine, which is arranged to compress a compressible load before strapping the load, a combination comprising:  
 (a) a frame;  
 (b) a table supported by the frame;

(c) a platen mounted to the frame, above the table, for vertical movement of the platen toward and away from the table, between an upper limit and a lower limit;  
 (d) means actuatable selectively for elevating the platen to the upper limit or for lowering the platen toward the lower limit;  
 (e) two load-end formers mounted between the table and the platen, in engagement with the platen at least after the platen has been lowered partially, and arranged for relative movement between the load-end formers and the platen and for relative movement of the load-end formers toward and away from each other, at any elevation of the platen between the upper and lower limits, even with the load-end formers in engagement with the platen; and



(f) means actuatable selectively for imparting relative movement of the load-end formers toward each other, at any elevation of the platen between the upper and lower limits, or for imparting relative movement of the load-end formers away from each other, at any elevation of the platen between the upper and lower limits;  
 whereby if such a load is positioned onto the table, below the platen, between the load-end formers, the load can be endwise compressed along a longitudinal, horizontal axis, between the load-end formers, while the load is confined between the platen and the table, and whereby the load can be also compressed along a vertical axis, between the platen and the table.

4,951,563

**FULLY AUTOMATIC CITRUS FRUIT JUICE EXTRACTOR**

Lloyd C. Warren, 220 Valencia Ct., Winter Garden, Fla. 32787, and Donald C. Brasher, 1819 Americana Blvd., Apt. #31M, Orlando, Fla. 32809

Filed Sep. 6, 1988, Ser. No. 241,087

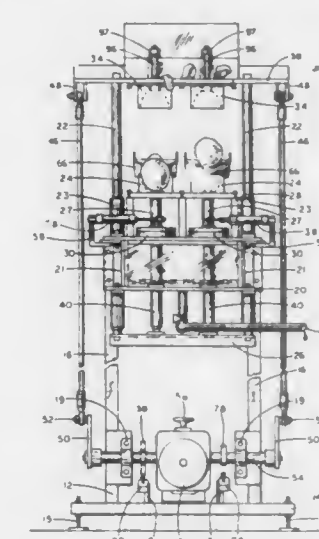
Int. Cl.<sup>3</sup> B30B 9/06, 9/02

U.S. Cl. 100—111

20 Claims

1. A fruit juice extraction machine for squeezing selected amounts of juice from at least one fruit item, said machine comprising at least one pair of cups disposed in a vertically aligned relationship, each of said cups being defined by a series of spaced apart fingers, with the lower of each related pair of cups being defined by a series of spaced, upwardly extending fingers and a centrally disposed fruit piercing means, each upper cup being mounted on a vertically movable member that is movable at selected times between preascertained upper and lower positions, each upper cup being defined by a series of spaced, downwardly extending fingers, the fingers of each said upper cup coinciding with the spaces between the fingers of the respective lower cup, such that an item of fruit received in said lower cup can be squeezed as a consequence of the upper cup descending with its fingers in meshing contact with the fingers of the related lower cup, power means for causing said vertically movable member to undertake recurring movements between the preascertained upper and lower positions, with said upper cup, when said vertically movable member is in said upper position, permitting the insertion of an item of fruit into each said lower fruit receiving cup, and when each said upper cup has been caused to move into the lowered position, it brings about the squeezing of the fruit item caused to reside in

the respective lower cup, a passageway extending downwardly away from each said lower cup, through which juice, pulp and seeds are caused to flow from the squeezed fruit as a result of the descent of said upper cup, valve means operatively mounted in an upper portion of said passageway and movable between open and passage-closed positions, strainer means located in a mid part of said passageway, through which only the juice can flow into a surrounding juice-receiving container, pulp squeezing means operatively disposed in a tight fitting manner in a lower part of said passageway, and slidably movable between lowered and raised positions, said valve means being in an open position at the time the juice is being squeezed out of the fruit as a result of the descent of said upper cup, to permit the juice to flow through said passageway and said



4,951,564

**PIGGYBACK RECORDER FOR ADDING SECOND RECORDER TO A PRINTER TERMINAL**

Hillis L. Wilson; Peter W. Yalchuk, both of Groton; Michael B. Davenport, Ithaca; Jack W. Stare, Dryden, and Thomas J. Bossack, Candor, all of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 26, 1989, Ser. No. 456,412

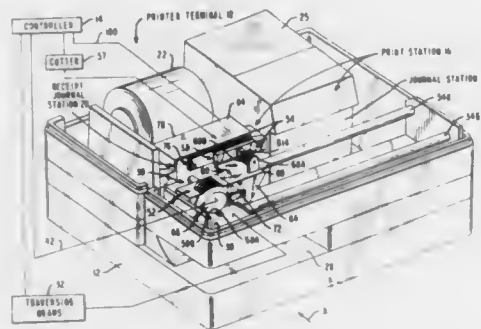
Int. Cl.<sup>3</sup> B41J 3/50

U.S. Cl. 101—93.12

14 Claims

1. A piggyback recorder which can be optionally added to a terminal having a first recorder located therein in order to provide a second recorder to the terminal, said terminal including a controller for controlling the operation of the terminal, said first recorder comprising:  
 a first platen;  
 a first print member operatively related to said first platen, said first print member being capable of printing a first set of data on a document when the document is located at a

printing station between said first print member and said first platen, said first print member also being coupled to the controller;  
said piggyback recorder comprising:  
a piggyback print member for printing a second set of data on the document;  
first mounting means for mounting said piggyback print member onto the first print member;  
a piggyback platen;



second means for mounting said piggyback platen onto the first platen;  
drive means for providing relative movement between said piggyback print member and said piggyback platen so as to effect the printing of the second set of data on the document when the document is at said printing station; and  
coupling means for coupling said drive means to the controller.

4,951,565

**PRINTING MECHANISM WITH TORQUE LIMITING DETENT ELEMENTS ON ACTUATING KNOB**  
Heinrich Volk, Beerfelden-Gammelsbach, Fed. Rep. of Germany, assignor to Esselte Meto International GmbH, Hirschhorn, Fed. Rep. of Germany

Filed Nov. 24, 1986, Ser. No. 934,037

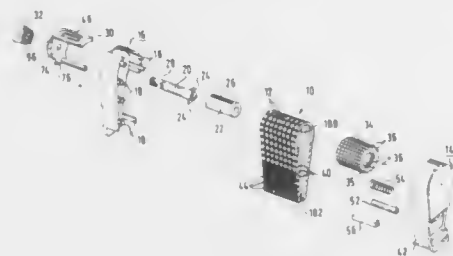
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1986, 3635734

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B41J 1/20

U.S. Cl. 101—111

4 Claims



1. Printing mechanism comprising in combination: a plurality of type carriers which at their outer peripheral face carry in one region printing types and in another region indicator types, the printing types being adapted by turning the type carriers to be brought into a printing position, stop means for limiting the turning travel of the type carriers, a setting means which is axially displaceable so as to selectively form a drive connection with each of the type carriers for rotation thereof, the setting means having a first component and a second component, the first and second components being rotatable together when the stop means is not engaged on the type carrier being driven by

the setting means, with said first component being an actuating knob and the second component being a setting shaft which carries said actuating knob on an end region thereof and which extends through central openings in the type carriers, a torque limiting means for limiting a transmitted torque between the first and second components of the setting means to a predetermined value, and a securing means for connecting the first and second components together against axial displacement while permitting relative rotational displacement between the first and second components upon application of a torque which exceeds the predetermined value, said torque limiting means including resilient detent elements in the form of axially extending detent fingers which are disposed on the actuating knob which engage complementary detent faces on the setting shaft, wherein the actuating knob includes an other sleeve and an inner sleeve connected thereto at an end wall of the actuating knob, the inner sleeve having axial slots forming the detent fingers, a portion of the end region of the setting shaft receiving the actuating knob being in cross-section a polygon whose side faces form detent faces with the number of detent faces being equal to the number of the detent fingers, and a connecting web is disposed between the free end of each detent finger and a point lying substantially in the center of the longitudinal extent of the outer sleeve, the securing means being disposed on the second component.

4,951,566

**SCREEN PRINTING APPARATUS**

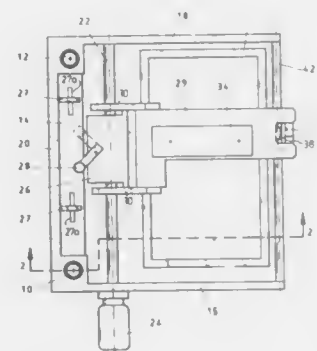
Roland Melzer, Glatzer Weg 9, and Rainer Melzer, Kaiserstrasse 24, both of D-5830 Schwelm, Fed. Rep. of Germany  
Filed Jun. 23, 1989, Ser. No. 370,794

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1989, 8903424

Int. Cl.<sup>5</sup> B41L 13/02, 13/18

U.S. Cl. 101—123

7 Claims



1. A screen printing apparatus comprising:  
a table for supporting a web to be printed,  
a screen frame overlying said table and supporting a printing screen,  
a support frame mounted on said table,  
a wiper carrier supporting a wiper blade and mounted on said support frame above said screen for reciprocation along a predetermined direction, a single shaft extending in said predetermined direction  
wiper carrier guide means for guiding said wiper carrier along said direction,  
pivot means for pivotally mounting said wiper carrier so as to pivot said wiper carrier away from said screen frame, and  
wiper carrier drive means including a motor mounted on said support frame for reciprocating said wiper carrier, said single shaft being rotated by said motor, said wiper carrier drive means further including means responsive to rotation of said single shaft to drive said wiper carrier

back and forth along said screen frame, said single shaft also serving as said wiper carrier guide means and said wiper carrier pivot means.

4,951,567

**ELECTRONIC SAFETY SYSTEM FOR A PRINTING MACHINE**

Anton Rodi, Leimen; Hans Müller, Sandhausen, and Michael Lehnert, Heidelberg, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 46,260, May 4, 1987, abandoned. This application Jul. 7, 1989, Ser. No. 376,937

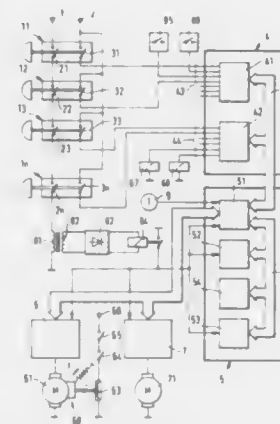
Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3614979

The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B41F 5/00, 33/12; F16D 67/06; B60K 41/24

U.S. Cl. 101—216

10 Claims



1. Safety system for a printing machine comprising at least one machine main drive having nominal and actual speed values; at least one main drive brake for braking the main drive; a master electronic control including a main brake monitoring circuit connected to said main drive brake for controlling the main drive brake, a main drive electronic circuit responsive to said master electronic control for electronically controlling said actual speed values of the main drive, a tachometer coupled to said main drive for generating said actual speed values, and connected to the master electronic control for transmitting said actual speed values, said master electronic control being responsive to said main brake monitoring circuit for operating the main drive brake in response to an impermissible high deviation between said nominal and said actual speed values of the main drive; further including an opposing spring engaging said main drive brake for applying a braking force to said main drive brake, and an electromagnet connected to said master electronic control, in operative engagement with said main drive brake for applying the main drive brake with the force of said opposing spring, in response to said electromagnet being switched off by said master electronic control, and further including emergency switch means connected to said master electronic control for feeding emergency stop signals in parallel with said main brake monitoring circuit to said main drive electronic circuit for initiating braking action in response to actuation of said emergency switch means.

4,951,568

**METHOD FOR MOUNTING PRINTING PLATE ON PRINTING PRESS**

Koziro Tsukamoto, Kariya; Yuzo Tatsuno, Tokyo; Masaki Kubo, Tokyo, and Yosio Kumano, Tokyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

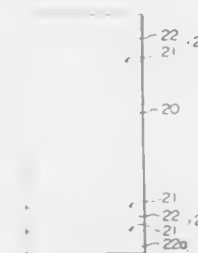
Filed May 24, 1988, Ser. No. 197,958

Claims priority, application Japan, May 25, 1987, 62-129421

Int. Cl.<sup>5</sup> B41F 1/28

U.S. Cl. 101—415.1

9 Claims



2. A method for mounting a printing plate having a synthetic resin film as a support on an offset rotary printing press, having a printing cylinder with a holding slit and a gripping rod in said slit, said gripping rod having a slit therein, said printing plate having two end parts, each of the two end parts of the printing plate being positioned in said holding slit of said printing cylinder and one of said end parts being in said slit of said gripping rod, comprising the following steps:

- Perforating intermittently the entire width of each of said two end parts of said printing plate along lines corresponding to said holding slit of said printing cylinder and said slit of said gripping rod, respectively;
- folding each of said two end parts of the printing plate along said perforated lines to form hooked portions;
- mounting the printing plate on the printing cylinder by inserting said hooked portions of said printing plate into said holding slit of said printing cylinder and one of said hooked portions of said printing plate also into said slit of said gripping rod; and
- fixing said printing plate on said printing cylinder by rotating the gripping rod to stretch the printing plate.

4,951,569

**METHOD AND APPARATUS FOR PROVIDING BEVELED EDGE PADS**

Donald R. McNab, 4407 S. 173rd, Seattle, Wash. 98188, and Floyd D. Smith, Kent, Wash., assignors to Donald R. McNab, Seattle, Wash.

Division of Ser. No. 136,109, Dec. 21, 1987, Pat. No. 4,854,202.

This application Apr. 21, 1989, Ser. No. 341,706

Int. Cl.<sup>5</sup> B26D 3/02

U.S. Cl. 101—483

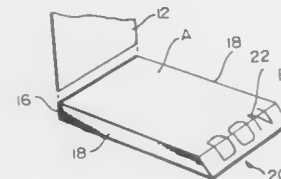
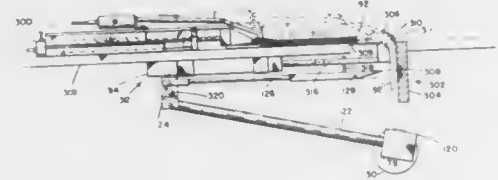
7 Claims

1. A method of manufacturing a paper pad with opposed first and second ends, the pad including a plurality of sheets of paper stacked to form a substantially planar tablet wherein each said sheet has a respective first and second edge and wherein said second end of the pad is beveled, said sheets further including a message printed on a face thereof toward said second end so that said message will appear in full as said sheets are removed with at least a part of said message appearing on said beveled portion of the pad, the manufacturing process comprising the steps of:

- printing a message on the second end of each sheet of the pad;
- linearly moving the pad from a first position to a second position such that the pad engages a bending assembly, thereby to bend the pad at a point intermediate its first and second ends in a manner such that the second end of at



least one sheet of paper is allowed to move relative to the second end of at least one remaining sheet of paper; and cutting the second end of the pad with a substantially perpendicular cut while the pad is in the bent configuration such that when the pad is returned to its original planar



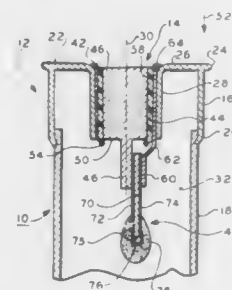
configuration, the second end of the pad is beveled thereby to provide a clearly legible message on the beveled edge thereof, wherein the edges of the printing of the message are substantially aligned from sheet to sheet within the pad.

**4,951,570**  
**ELECTRICALLY ACTIVATED DETONATOR WITH PYROTECHNIC DEVICE RECEIVING TERMINALS AND METHOD OF MAKING**

Joseph L. La Mura, West Caldwell, and Ronald C. Wallenburg, Pennsauken, both of N.J., assignors to Joannell Laboratories, Inc., Livingston, N.J.

Filed Jul. 24, 1989, Ser. No. 383,650  
Int. Cl.<sup>5</sup> F42B 3/10; F42C 11/00, 19/12  
U.S. Cl. 102—202.11

14 Claims



1. In an electrical detonator, including means for receiving an electrical pyrotechnic device having a pair of electrodes the construction comprising:

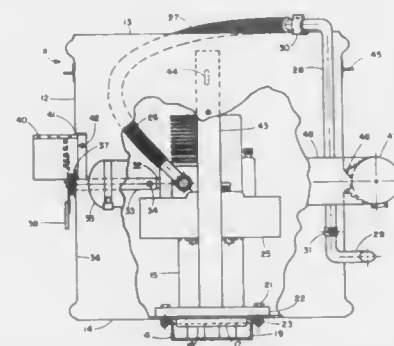
- a metal cylindrical body;
- a first terminal extending from the body;
- an electrical insulation tube;
- a tubular metal cylindrical member having a longitudinal bore;
- the body being received within the bore of the tube and the tube being received within the bore of the tubular member such that the body, member and tube are concentric; and
- a second terminal extending from the tubular member such that the first and second terminals are juxtaposed in spaced facing relation, said terminals being adapted to

receive and electrically couple the electrodes of the pyrotechnic device thereto and therebetween.

**4,951,571**  
**DRUM MINESWEEPER**  
Curtis G. Bane, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 13, 1975, Ser. No. 550,887  
Int. Cl.<sup>5</sup> F42B 22/42  
U.S. Cl. 102—402

12 Claims



1. A minesweeper for effecting the neutralization of acoustically and magnetically responsive mines located in a riverine environment, comprising in combination:

- float means, having a vertical axis and a horizontal axis, capable of being floated in water with the vertical axis thereof substantially normal to the effective surface of said water;
- means mounted on said float means for effecting the rotation thereof about said vertical axis while it is floating in said water;
- means connected to said float means rotation effecting means for generating and broadcasting acoustical energy throughout the water ambient to the bottom of said float means as it floats on said water; and
- means mounted on the bottom of said float means for broadcasting magnetic energy throughout the water ambient thereto when said float means is floating therein.

**4,951,572**  
**WARHEAD WITH DEVICE FOR FASTENING THE LINER OF A CHARGE TO THE CASING**

Jürgen Böcker, Oberhausen; Hans Orth, Düsseldorf; Torsten Niemeyer, Hilden, and Peter Tripptrop, Langenfeld, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Jan. 5, 1990, Ser. No. 461,276  
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901474

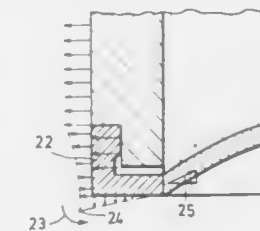
Int. Cl.<sup>5</sup> F42B 12/10

U.S. Cl. 102—476

11 Claims

- 1. A warhead for enclosing an explosive charge, comprising: a casing for surrounding the charge, said casing having an end presenting a frontal face;
- a liner having a circumferential area for attachment to said end of said casing and a coefficient of thermal expansion  $\alpha_E$ ; and
- an intermediate ring, having a coefficient of thermal expansion  $\alpha_R$ , connected to the circumferential area of said liner and having a portion which is brought around said frontal face of said casing, said portion having a pressure face

which presses against the exterior of said casing and the coefficient of thermal expansion  $\alpha_E$  of said liner being at



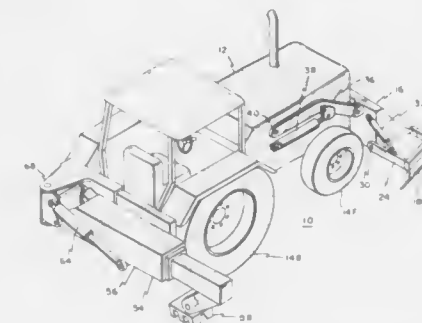
least as great as the coefficient of thermal expansion  $\alpha_R$  of said intermediate ring.

**4,951,573**  
**TIE REMOVER AND INSERTER**  
Harry Madison, Germantown, Tenn., assignor to Harsco Corporation, Wormleysburg, Pa.

Filed Sep. 6, 1988, Ser. No. 240,516  
Int. Cl.<sup>5</sup> E01B 29/06; E02F 5/22

U.S. Cl. 104—9

27 Claims



1. A machine for removing and inserting railroad ties comprising:

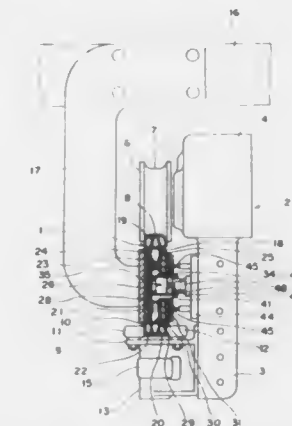
- a vehicle body having first and second ends and first and second sides;
- wheels attached to support said body;
- a tie remover/insert mechanism mounted to said vehicle body;
- a bucket having a front and back, and first and second sides and mounted to said first end of said body by at least one bucket support arm which is pivotable in a horizontal pivot axis at a horizontal pivot point;
- a bucket hydraulic cylinder connected to said body and to said bucket support arm and operable to lift and lower said bucket by causing said at least one bucket support arm to pivot about said horizontal axis; and at least a first grader blade mounted to said bucket such that pivoting of said bucket support arm about said horizontal axis changes an angle of said first grader blade relative to a horizontal plane, and

wherein said first grader blade is movably mounted to said first of said sides of said bucket and is disposable in a non-grading upper position and a grading lower position, and wherein said first grader blade is pivotably mounted to said first of said sides of said bucket by first front and back blade support arms and further comprising a first blade hydraulic cylinder operable to lift and lower said first grader blade.

**4,951,574**  
**CONVEYOR SYSTEM USING AUTOMOTIVE CART**  
Masayuki Tsuneda, Komaki, Japan, assignor to Daifuku Co., Ltd., Japan  
Continuation-in-part of Ser. No. 200,712, May 31, 1988, abandoned. This application Jul. 3, 1989, Ser. No. 375,188  
Int. Cl.<sup>5</sup> B61L 15/00

U.S. Cl. 104—295

3 Claims

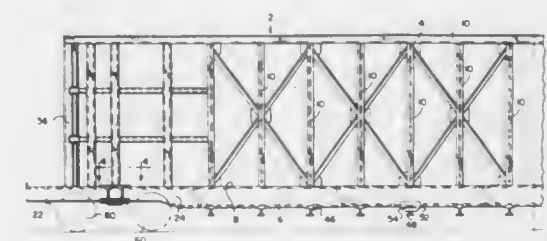


1. A conveyor system using an automotive cart, comprising: a conveyor rail for supporting and guiding an automotive cart and a pair of power supply rails installed in said conveyor rail, said automotive cart having current collectors adapted for slide contact with said power supply rails of supplying power to the automotive cart, magnetic sensor means for receiving a stop signal, and means for transmitting an automotive cart signal.
- said conveyor rail having electromagnet means for transmitting said stop signal to the magnetic sensor means on said automotive cart, and means for receiving said automotive cart signal,
- said electromagnet means being installed at stop positions of said automotive cart,
- said electromagnet means including coil means and magnetic pole plates attached to said coil means,
- said magnetic pole plates having along said conveyor rail a length which is almost the same as or longer than the distance said automotive cart moves to stop after receiving said stop signal.

**4,951,575**  
**DEPRESSED CENTER BEAM FLAT CAR**  
Danilo A. Dominguez, 1867 Piedras Cir., Danville, Calif. 94526, and James F. Flores, 4 Overhill Rd., Mill Valley, Calif. 94941  
Filed Jun. 9, 1989, Ser. No. 363,875  
Int. Cl.<sup>5</sup> B61D 17/00

U.S. Cl. 105—406.1

24 Claims



1. A flat car supported on end truck assemblies comprising a body formed by a longitudinally extending center sill, a

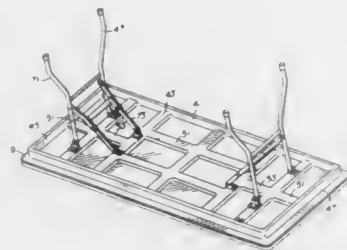
draft sill attached to each end of said center sill, and a pair of bulkheads mounted at each end, side sill means disposed on opposite sides of said center sill on said body, a vertical center beam assembly extending upward from said center sill, said vertical center beam assembly including an upper center sill extending parallel above said center sill between said bulkheads, said upper center sill being supported by a plurality of columns carried by at least said center sill, and floor means being arranged between said opposite side sill means, said floor means having end floor sections lying in a first generally horizontal plane and an intermediate depressed floor section disposed in a second generally horizontal plane lying below said first horizontal plane, said side sill means includes a pair of side sill assemblies disposed on opposite sides of said center sill, each of said side sill assemblies includes a pair of upper end sections extending along an upper axis for respectively supporting said end floor sections and an intermediate section extending along a lower axis disposed below said first axis for supporting said intermediate depressed floor section.

**4,951,576**  
**PLASTIC SUPPORT SURFACE STRUCTURE**  
Charles R. Cobos, Bryan, and Gary A. Ludwig, Brenham, both of Tex., assignors to Bryan Equipment Company, Inc., Bryan, Tex.

Filed Oct. 17, 1988, Ser. No. 258,924  
Int. Cl.<sup>5</sup> A47B 3/00

U.S. Cl. 108—131

16 Claims



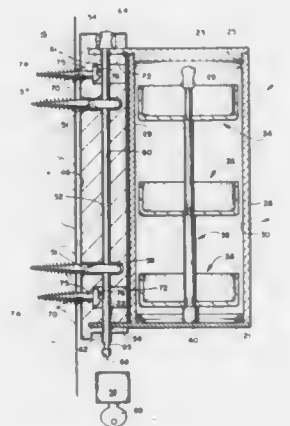
1. A plastic-sandwiched framework structure, comprising: a plastic upper half member; a plastic lower half member; a framework grid disposed between said upper and lower half member, said members being affixed to one another; said framework grid comprising at least one joist member running longitudinally axially of said structure and at least one cross member running transversely of said structure, said cross member being connected to said joist member; said lower half member including a planar main body portion having a lower exterior surface and a shell integrally formed in relief fashion in said lower half member and shaped to receive and partially enclose said framework grid, said shell having downwardly depending, spaced apart, opposed walls and a substantially planar bottom portion interconnecting said opposed walls, the walls of said shell being substantially perpendicular to said main body portion, said shell including at least one relatively deep portion with relatively long opposed shell walls for receiving said joist and at least one relatively shallow portion with relatively short opposed shell walls for receiving said cross member; the lower exterior surface of said lower half member including gusset means connected between the relatively long opposed shell walls and the lower exterior surface of the planar main body portion of said lower half member at selected locations where the planes of said relatively long opposed shell walls of said relatively deep portions of said shell intersect the planes of said lower exterior surface of

said planar main body portion for providing increased structural support and rigidity for the framework structure and for maintaining structural integrity of the plastic comprised in said lower half member; and fastening means disposed through said cross member and said lower half member and extending beyond the lower exterior surface thereof and adapted for attachment to an external supporting member for supporting said plastic-sandwiched framework structure off the floor or other base surface.

**4,951,577**  
**WALL SAFE ASSEMBLY**  
James K. Bentley, 3305 Starburst Ct., Bakersfield, Calif. 93309  
Filed Jan. 11, 1989, Ser. No. 295,514  
Int. Cl.<sup>5</sup> E05G 1/04

U.S. Cl. 109—51

6 Claims



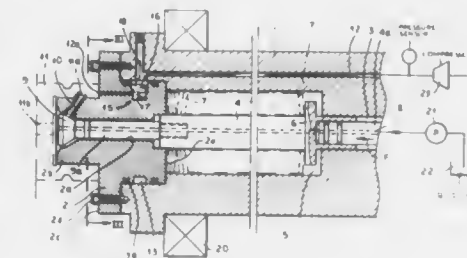
1. A wall safe assembly comprising: an elongated vertically oriented safe housing having a top wall and a bottom wall with upstanding side walls to form a chamber therein, one of said side walls being a front wall and another of said side walls being a rear wall; an elongated vertically oriented mounting block which is a solid member having a front wall and a rear wall spaced a predetermined distance from each other, at least one eye lag slot extends through said rear wall into the interior of said mounting block for receiving the ring portion of an eye lag that has been threaded into the wall of a room; eye lag fastening means for securing said mounting block to a wall, said eye lag fastening means being received in the eye lag slots that extend through said rear wall into the interior of said mounting block; interlocking structural members extending rearwardly from the rear wall of said safe housing and mating recesses extending through said front wall into the interior of said mounting block detachably receiving said interlocking structural members, the interlocking structural members extending rearwardly from the rear of said safe housing are a pair of vertically spaced horizontally oriented ear members having aligned vertical apertures and said mating recesses are horizontal slots extending through the front wall and into the interior of said mounting block; and means for locking said interlocking structural members to said mounting block comprising a bore hole that passes downwardly through the interior of said mounting block which is aligned with the apertures in said ear members and also with said eye lag slots, a locking rod is removably inserted downwardly into said bore hole and it passes through the apertures in said ear members and through the ring portions of said eye lags.

**4,951,578**  
**TOOL-MOUNTING ASSEMBLY**  
Rainer von Haas, Geesthacht, and Günter Ruther, Marl, both of Fed. Rep. of Germany, assignors to Krupp Widia GmbH, Essen, Fed. Rep. of Germany  
Filed Nov. 8, 1989, Ser. No. 433,534  
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838318

Int. Cl.<sup>5</sup> B23Q 11/00

U.S. Cl. 409—136

16 Claims



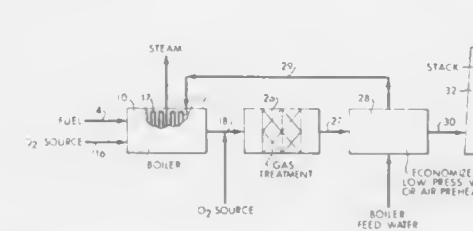
1. A tool-mounting assembly comprising: a tool holder for a machine tool formed with a receiver for a tool head; a tool head replaceably fitted on said receiver; a coupling mechanism on said tool holder at said receiver for engaging said tool head and clamping same on said receiver; a liquid coolant passage formed in said tool holder and communicating with said tool head at said receiver for delivering a coolant to a machining location at an elevated pressure; means forming a pressurized air passage in said holder opening in a region of said receiver for delivering air under pressure to a region at which said tool head is coupled to said receiver for carrying away chips and other contaminants on surfaces of said tool holder to be contacted by said tool head; and a checkvalve in said pressurized air passage on said tool holder to prevent flow of said coolant into said pressurized air passage.

**4,951,579**  
**LOW NOX COMBUSTION PROCESS**  
Ronald D. Bell, Austin, Tex., assignor to Radian Corporation, Austin, Tex.  
Continuation-in-part of Ser. No. 122,067, Nov. 18, 1987, Pat. No. 4,811,555, and a continuation-in-part of Ser. No. 252,681, Oct. 3, 1988. This application Mar. 3, 1989, Ser. No. 318,893  
The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> F23B 5/00

U.S. Cl. 110—212

10 Claims



1. A process for low NOx steam-generating combustion which comprises combusting in a combustion zone at temperatures of at least 2000° F., a mixture of fuel and an oxygen source, wherein said mixture contains fuel in stoichiometric excess of the oxygen in said mixture, whereby said combustion

takes place in a reducing atmosphere and produces heated oxygen-depleted gases, converting at least a portion of the heat in said oxygen-depleted gases into steam, thereby cooling said gases; forming said cooled oxygen-depleted gases into an effluent stream and adding air to said effluent stream to produce a stoichiometric excess of oxygen in the resultant stream relative to fuel present in said resultant stream, passing said resultant stream over an oxidizing catalyst to produce an oxidized gaseous stream, and passing the said oxidized stream on for venting.

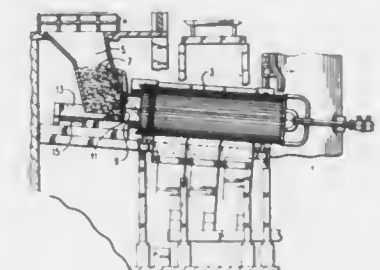
**4,951,580**  
**WASTE FEED ARRANGEMENT**  
Edward Samera, Jr., Anaheim, and Cesar U. Kosi, Garden Grove, both of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 1, 1990, Ser. No. 473,522

Int. Cl.<sup>5</sup> A47J 36/00, 36/24

U.S. Cl. 110—246

3 Claims



1. An improved waste feed arrangement having a hydraulic cylinder and a feed ram that feeds waste into a municipal waste incinerator which includes a rotary combustor that is disposed on an incline with a chute for receiving waste and an opening in a lower end of the chute through which the waste is fed into an upper end of the inclined rotary combustor, said improved waste feed arrangement comprising a support frame disposed at the bottom of the chute and on the same incline as the rotary combustor and having an upper and a lower portion; a wear plate disposed on the bottom of the ram in sliding engagement with the upper portion of the support frame; the hydraulic cylinder being disposed within the support frame and having its base attached thereto; the hydraulic cylinder having a piston and piston rod, a bracket attached to the ram on an end opposite the end that is adjacent the rotary combustor, the bracket having the piston rod attached thereto; and a roller rotatably attached to the bracket and disposed to roll on the lower portion of the support frame; the hydraulic cylinder, piston and piston rod being so disposed under the ram that the hydraulic cylinder applies its maximum force as it pushes the ram away from the rotary combustor and up the incline.

**4,951,581**  
**COMBINED OIL GUN AND COAL GUIDE FOR POWER PLANT BOILERS**

Michael R. Wiest, Coatesville, Pa., assignor to Aptec, Inc., Honey Brook, Pa.

Filed Jun. 21, 1989, Ser. No. 369,336

Int. Cl.<sup>5</sup> F23C 1/10, 1/12

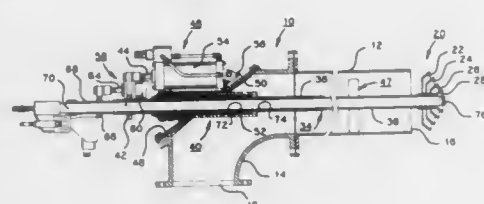
U.S. Cl. 110—262

8 Claims

1. Apparatus for introducing fuel into the combustion chamber of a power plant boiler comprising: a coal guide comprising a delivery pipe for introducing pulverized coal into the combustion chamber, said delivery pipe having an axis and having a coal delivery opening at one end, and elbow means at the other end of the delivery pipe for receiving pulverized coal moving in a direction transverse to the axis of the delivery pipe and guiding the received coal into the delivery pipe for movement along said axis;



a coal disperser;  
tubular disperser support means, extending along said axis of the delivery pipe and through the wall of said elbow means, and supporting said coal disperser at one of the ends of said tubular means adjacent to said coal delivery opening of the delivery pipe;  
an oil gun comprising an oil tube having an oil delivery nozzle at one end, said oil tube being longer than said tubular disperser support means and slidable therein;  
first actuator means, connected to said tubular disperser support means outside said elbow means, for moving said disperser support means along said axis of the delivery pipe to position said disperser alternatively at a location within said delivery pipe or within the combustion chamber at a location beyond said one end of the delivery pipe; and



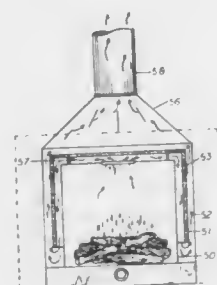
second actuator means, connected to said oil tube outside said elbow means, for moving said oil delivery nozzle relative to said tubular disperser support means, whereby said nozzle can extend into the combustion chamber beyond said one of the ends of said tubular means, and can be retracted into the interior of the tubular disperser support means;  
in which said first actuator means comprises first and second relatively movable elements and means for causing said first and second elements to move relative to each other, and said second actuator means comprises third and fourth relatively movable elements and means for causing said third and fourth elements to move relative to each other, and in which said first element is fixed to the coal guide, said second element is fixed to the tubular disperser support means at a location outside said coal guide, said third element is fixed to said second element, and said fourth element is fixed to said oil tube.

4,951,582

**WRAP-AROUND HEAT AND SMOKE EXTRACTOR**  
Henry T. Childs, Chattanooga, Tenn., assignor to Temperature Adjusters, Inc., Chattanooga, Tenn.  
Division of Ser. No. 76,041, Jul. 21, 1987, Pat. No. 4,831,941, and a continuation of Ser. No. 284,372, Dec. 14, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 446,659  
Int. Cl. F23B 7/00

U.S. Cl. 110—317

8 Claims



1. A method of conveying the hot exhaust gases from a fuel burn in a firebox into its chimney area and extracting heat and smoke, comprising the steps of  
a. having a firebox with a panel containing servicing doors

and controls and having chimney connections proximate its top area, forming a chimney area,  
b. converting the use of said firebox to an overall cover and installing inside said firebox cover a series of baffles, forming a chamber for housing the fire, and attaching same to the servicing panel, with said baffle fire chamber being of sufficient size to allow allotted air space to exist between its outside walls and top and the inside walls and top of said firebox cover and having an exhaust proximate its top,  
c. capping the baffle chamber exhaust area with an insulated, open base, cabinet type enclosure, supported by means for support and spacing, with said enclosure being sufficient in size to allow allotted air space to exist between its inside walls and top and the outside walls and top of the baffle chamber and between its outside walls and top and the inside walls and top of the firebox cover and sufficient in height to allow allotted air space to exist at its open base, thus forming a passageway for the hot exhaust gases to pass from a fire, within the chamber, into the chimney area.

4,951,583

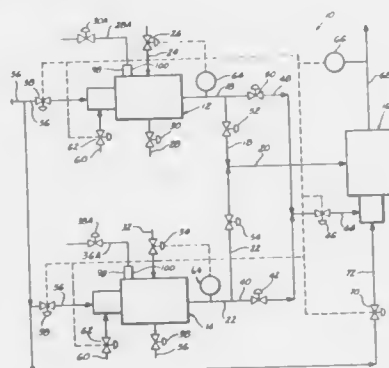
**THERMAL DESTRUCTION SYSTEM FOR TOXIC SUBSTANCES**

Eugene C. McGill, Skiatook, and Bob R. Cartwright, Bixby, both of Okla., assignors to McGill Environmental Systems, Inc., Tulsa, Okla.

Filed Jul. 27, 1989, Ser. No. 385,896  
Int. Cl. F23G 7/04

U.S. Cl. 110—346

21 Claims



1. A process for the safe destruction of toxic substances of unknown volatility, the process comprising the steps of:  
providing an opening in a container of the toxic substances to serve as a vapor outlet;  
placing the container of toxic substances in a pyrolysis furnace having a variable heat source;  
providing vapor communication from the vapor outlet of the container to a secondary combustor;  
providing heat to the container with the variable heat source to vaporize volatile constituents of the toxic substances in the container so that an overhead vapor stream is passed to the secondary combustor;  
monitoring the temperature of the overhead vapor stream;  
controlling the heat provided to the container in response to the temperature of the overhead stream so that the overhead stream is caused to increase at a controlled rate; and  
inserting a fluid injection lance into the container via the vapor outlet of the container such that controlled amounts of air can be injected into the toxic substances in the container in response to the temperature of the overhead vapor stream reaching a predetermined value, the fluid injection lance being sequentially advanced in the con-

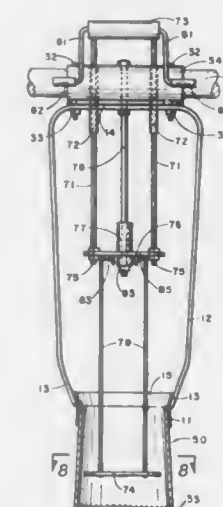
tainer so that the depth of penetration of the air is increased at a predetermined rate.

4,951,584

**TRANSPLANTER**

James E. Pearce, Rt. 1, Box 59, Broken Arrow, Okla. 74012  
Filed Aug. 16, 1989, Ser. No. 394,528  
Int. Cl. A01C 11/02; A01B 45/04  
U.S. Cl. 111—101

13 Claims



1. A transplanter comprising:  
a rigid frame;  
a stationary handle fixed to the upper portion of said frame;  
an open-ended coring means rigidly fixed to the lower portion of said frame, said coring means having circular horizontal cross-sections, the diameter of any lower cross-section of said coring means being greater than the diameter of any respective higher cross-section of said coring means;  
a pair of sliding, vertical rods disposed for selective reciprocal motion in relation to the upper portion of said frame and said handle and having a reciprocating handle fixed to the upper ends thereof and a horizontal plate fixed to the lower ends thereof;  
a pair of swinging vertical rods hinged to and extending downwardly from said plate and having means disposed on the lower ends thereof aligned for removable, downward penetration into the upper portion of said coring means;  
a vertical sleeve disposed through said plate cooperable with a vertical shaft fixed to the upper portion of said frame and extending through said sleeve for guiding the reciprocation of said plate.

4,951,585

**APPARATUS FOR FOLDING A STRIP OF MATERIAL AND SUPPLYING THE SAME TO A SEWING MACHINE**  
Kunio Haneda, Okazaki, and Hideo Kawaguchi, Inazawa, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Apr. 21, 1989, Ser. No. 341,476  
Claims priority, application Japan, Apr. 28, 1988, 63-57621[U]

Int. Cl. D05B 35/06

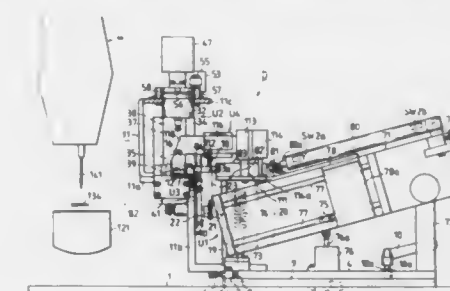
U.S. Cl. 112—121.27

7 Claims

1. An apparatus for folding a strip of material and supplying the same to a sewing machine, the sewing machine including a sewing needle (141), a sewing machine bed (121) for placing a base material (C), and a presser member (131,132) being relatively movable with respect to the sewing needle (141) in a horizontal direction, the presser member (131,132) being also

vertically movable between an upper position for forming a gap relative to the sewing machine bed (121) and lower position for pressing the strip of material (B) supplied onto the base material (C) against the sewing machine bed (121), the apparatus comprising:

a movable base (78) movably supported on a support frame (4) disposed adjacent said sewing machine bed (121);  
a first actuating means (80) for reciprocally moving said movable base (78) between its standby position and its supply position close to said sewing machine bed (121);  
a strip of material support member (87,88) mounted on said movable base (78) for receiving and supporting said strip of material (B) supplied when said movable base (78) is positioned at said standby position, and for transferring said strip of material (B) to said sewing machine bed (121) when said movable base (78) is positioned at said supply position, said strip of material support member (87,88) having opposite ends defining a length therebetween which is smaller than a length of said strip of material (B);  
a second actuating means (83) for reciprocally moving said strip of material support member (87,88) with respect to said movable base 78 for providing an advanced position



and a retracted position when said movable base (78) is positioned at said supply position, said strip of material (B) being inserted into said gap in said advanced position of said strip of material support member (87,88) for placing the strip of material (B) onto said base material (C), and said strip of material (B) being transferred onto said base material (C) in said retracted position of said strip of material support member (87,88);  
a pair of folding plates (117,118) mounted on said movable base (78) and disposed adjacent said opposite ends of said strip of material support member (87,88) positioned in said advanced position; and,  
a third actuating means (114,115,116) for moving said pair of folding plates (117,118) toward and away from said strip of material support member (87,88) in a first direction across said strip of material for bending said end portions of said strip of material (B) into L-shape, and in a second direction perpendicular to said first direction for bending said L-shaped end portions of said strip of material (B) into U-shape, so that said end portions of said strip of material (B) are foldably positioned below said strip of material support member (87,88).

4,951,586

**SEWING MACHINE ATTACHMENT FOR ALIGNING A REINFORCEMENT MEMBER IN A HEM**  
Albert E. Becherl, Germantown, Wis., assignor to B&B Manufacturing, Inc., Milwaukee, Wis.

Filed Mar. 17, 1989, Ser. No. 325,233

Int. Cl. D05B 35/00, 3/12

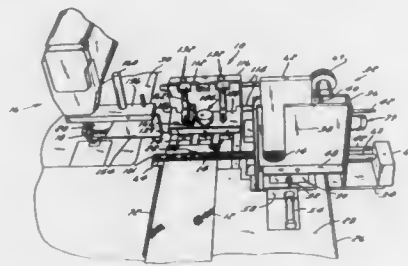
U.S. Cl. 112—147

16 Claims

1. The combination of a sewing machine having a sewing surface and an attachment for aligning a reinforcement member in the hem of a strip of material prior to sewing the end of

the strip of material to form the hem, said attachment comprising:

- a frame having a surface coplanar with the surface of the sewing machine;
- means mounted on said frame surface for holding a number of reinforcement members;
- means mounted on said frame for aligning a strip of material with respect to the sewing machine;
- means for engaging the end of said strip of material;
- means for transporting one of said members from said holding means to a position on said strip of material and spaced from the end of said strip of material;



means for folding the end of the strip of material between said one of said members and said engaging means around the edge of said member;

a shuttle mounted for movement into engagement with the folded end of said strip, said shuttle including;

means for clamping the folded end of the strip of material over the top of said member; and

means for moving said shuttle transversely toward the sewing machine wherein said folded end is stitched to the strip of material to enclose said member.

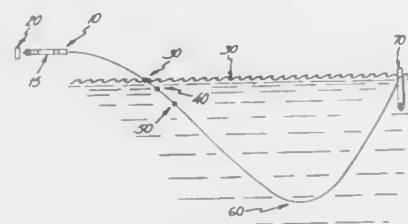
4,951,587

**RECOVERY SYSTEM FOR A TRAINING TORPEDO**  
Dwight J. Warner, Chaska, and Wayne B. Christenson, Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 9, 1989, Ser. No. 391,348  
Int. Cl.<sup>5</sup> F42B 19/42

U.S. Cl. 114—20.1

6 Claims



1. A recovery apparatus for a training torpedo, said training torpedo being an elongated hollow cylindrical housing replicating the housing of an operational torpedo with a nose portion and an aft portion, said recovery apparatus comprising:
  - (a) a cylindrical shell, said shell comprising said nose portion of said training torpedo and having forward and aft sections, said forward section having a centrally located cylindrical cavity extending longitudinally into said shell;
  - (b) a piston with a front portion and a rear portion, said front portion having a pressure receiving surface, said piston being adapted to be inserted into said cylindrical cavity, and said piston being movable forward and aft with respect to said shell;
  - (c) a retaining means attached to said piston and to a plurality of weights, said retaining means releasing said weights

- upon said piston moving aft a preselected distance with respect to said shell; and
- (d) a damping means located between said rear portion of said piston and said aft section of said shell, said damping means acting as a counter force with respect to said pressure on said forward portion of said piston.

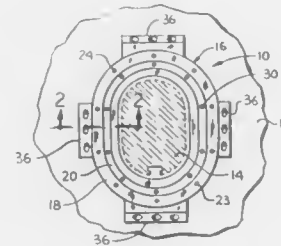
4,951,588

**SAILBOAT MAST DECK SEALING ASSEMBLY**  
Lawrence M. Hillman, 7119 Killdeest St., Long Beach, Calif. 90808

Filed May 18, 1989, Ser. No. 353,493  
Int. Cl.<sup>5</sup> B63B 15/00

U.S. Cl. 114—93

24 Claims



1. A sailboat having a deck and a mast with a sealing assembly between the deck and mast comprising:
  - a rigid flange member having a center opening formed in the same shape as said mast, said flange member also having an upper surface, a lower surface, an outer surface and an inner surface, said inner surface having an upper and lower edge, said inner surface also encircling and being adjacent to said mast;
  - a rubber gasket placed between said flange member and said deck for sealing said flange member to said deck;
  - means for securing said flange to said deck;
  - a triangular shaped annular groove formed by removing said inner surface upper edge to provide a flat sealing surface where said flat sealing surface forms an angle between said mast and said flange member;
  - a triangular shaped resilient annular member, having a base, formed to fit in said triangular shaped annular groove;
  - means for compressing said resilient triangular shaped annular member in said triangular shaped annular groove to form a watertight seal between said flat sealing surface and said mast.

4,951,589

**MAINSAIL CONSTRUCTION FACILITATING AIRFLOW THEREOVER**

Thomas T. Pfeffer, Timberlane Dr., Pennington, N.J. 08534  
Continuation-in-part of Ser. No. 187,599, Apr. 28, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 390,860  
Int. Cl.<sup>5</sup> B63H 9/04, 9/06

U.S. Cl. 114—103

21 Claims

21. A mainsail construction comprising:
  - (a) a mainsail boom means;
  - (b) a mainsail means attached with respect to said mainsail boom means, said mainsail means including a high pressure side and a low pressure side defined thereon;
  - (c) a barrier means detachably mounted with respect to said mainsail boom means and extending outwardly therefrom to minimize airflow circulation from said high pressure side of said mainsail means to said low pressure side of said mainsail means, said barrier means adapted to maximize the effective area of said mainsail means utilized for producing driving force, said barrier means being movable between a closed position and an opened position, said barrier means when in the closed position adapted to

extend over said mainsail means to facilitate covering thereof, said barrier means including:

- (1) a first barrier member detachably secured with respect to one side of said mainsail boom means and extending outwardly approximately horizontally therefrom, said first barrier member including a plurality of first rib members extending along said first barrier member to facilitate expansion thereof;
- (2) a second barrier member detachably secured with respect to the other side of said mainsail boom means and extending outwardly therefrom in an approximately opposite horizontal direction, said second barrier member including a plurality of second rib mem-



- bers extending along said second barrier member to facilitate expansion thereof;
- (d) a bracket means comprising:
  - (1) a first bracket member defining a first slot means therein adapted to receive said first rib member detachably retained therein to facilitate detachable securement of said first barrier member with respect to said mainsail boom means; and
  - (2) a second bracket member defining a second slot means therein adapted to receive said second rib member detachably retained therein to facilitate detachable securement of said second barrier member with respect to said mainsail boom means.

4,951,590

**UMBRELLA-LIKE APPARATUS FOR CLOSING AN UNWANTED APERTURE IN A SUBSTANTIALLY PANEL-LIKE MEMBER IN AN EMERGENCY**

Gary W. Kassbaum, 32 Earl Halg Avenue, Toronto, Ontario, Canada (M4C 1E1)

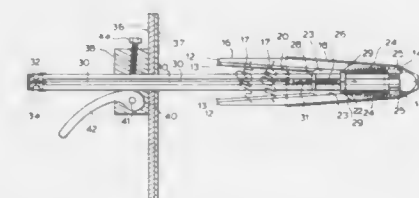
Filed Mar. 31, 1989, Ser. No. 331,138

Claims priority, application United Kingdom, Mar. 31, 1988, 8807719; Sep. 15, 1988, 8821561

Int. Cl.<sup>5</sup> B63B 43/16

U.S. Cl. 114—227

10 Claims



1. An apparatus for the emergency closing of an unwanted aperture in a substantially panel-like member, said apparatus comprising:
  - (a) a longitudinally extending shaft having a forward end of,

and a rearward end with a fixed abutment over said forward end;

- (b) a hub mounted on the forward end of said shaft rearwardly of said abutment;
- (c) a collar slidable on said shaft rearwardly of said hub and provided with a plurality of arms around said collar, each pivotally secured thereto at one end and extending toward the forward end of said shaft when in a first fold-down position;
- (d) a plurality of support struts around said hub each pivotally secured thereto at one end and extending rearwardly and pivotally secured at their opposite end to a corresponding one of said arms;
- (e) a retaining ring secured at the rearward end of said shaft, a spring axially mounted on said shaft and compressed between said retaining ring and said collar when said arms are in the first fold-down position;
- (f) a flexible liquid impervious covering having a central portion at the front end of said shaft and a peripheral portion extending therefrom and secured to the respective front ends of each of said arms;
- (g) securing means for maintaining said arms in the first fold-down position and means for releasing said securing means thereby causing said collar to slide forwardly along said shaft by the expansion of said spring and pivoting said arms upwardly and rearwardly to a second extended-open position.

4,951,591

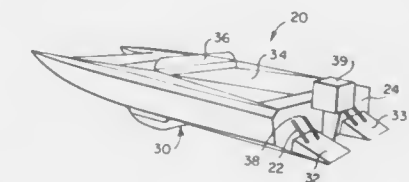
**POWERED BOAT HULL**

Charles F. Coles, Box 244, South Hamilton, Mass. 01982  
Continuation of Ser. No. 225,998, Jul. 29, 1988, Pat. No. 4,896,621. This application Dec. 13, 1989, Ser. No. 450,098  
The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> B63B 1/38

U.S. Cl. 114—274

6 Claims



1. A powered boat hull of the type modified to provide enhanced lift and rough water stability, comprising:
  - (a) a hull including bow and transom and having at least one axial tunnel extending from bow to transom;
  - (b) a pair of flexible foils supported upon each side of said bow beneath the water line and boat hull, so as to obstruct and create turbulence of dense spray in the forward end of said tunnel, while cushioning shock and lifting said bow, and
  - (c) a transom foil forming a skirt extending substantially across the axial tunnel so as to peripherally enclose said transom and prevent air escaping and to compress said turbulence and thereby lift said transom.

4,951,592

**PROCESS OF FORMING A BOAT ANCHOR**

Narciso P. Barongan, 501 Sterling Rd., Virginia Beach, Va. 23464

Filed May 22, 1989, Ser. No. 355,323

Int. Cl.<sup>5</sup> B63B 21/24

U.S. Cl. 114—294

1 Claim

1. A process of forming a boat anchor comprising the steps of,



providing an elongate beverage container including an elongate cylindrical body formed with an integral convex upper and lower end each symmetrically formed about an axis of the cylindrical body,

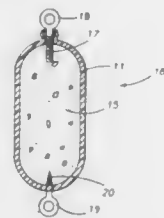
and the upper end including an axially aligned opening formed therethrough,

and completely filling the container with a cementitious material and directing said material through the opening,

and providing an eye hook formed with a threaded shank, and forcing the shank through the opening and into the cementitious material coaxially aligned with axis of the cylindrical body,

and permitting the cementitious material to cure,

and wherein the beverage container is formed with a support stand secured coaxially with the lower end of the con-



tainer in a surrounding relationship thereto, wherein the method further includes the step of removing the support stand prior to the filling of the container,

and further including the step of providing a lower eye hook formed with a screw threaded shank, and directing the screw threaded shank through the lower end coaxially aligned with the threaded shank through the lower end coaxially aligned with the threaded shank prior to curing of the cementitious material,

and including the step of forming a plurality of boat anchors and securing an outwardly extending eye hook from each of the boat anchors together,

and including the step of directing a plurality of laterally positioned eye hooks orthogonally through the cylindrical body orthogonally relative to the axis of the cylindrical body and coaxially aligning the eye hooks relative to one another prior to the curing of the cementitious material.

4,951,593

## ANCHOR WITH SNAG RELEASE MECHANICS

Kenneth R. Brown, and Phyllis B. Brown, both of 1154 Link St., Corning, Calif. 96021

Filed Aug. 15, 1989, Ser. No. 393,800

Int. Cl.<sup>5</sup> B63B 21/24

U.S. Cl. 114—297

4 Claims

1. A boat anchor having release mechanics adapted to allow retrieval of said anchor with at least one fluke of a double fluke structure of said anchor caught underneath an underwater snag comprising;

a main fluke member having at least one said double fluke structure rigidly attached thereto;

said main fluke shaft member with said attached double fluke structure forming a main body of said anchor;

two elongated shanks having a first and second end each; each elongated shank attached at said first end to said main body of said anchor, said two shanks extending

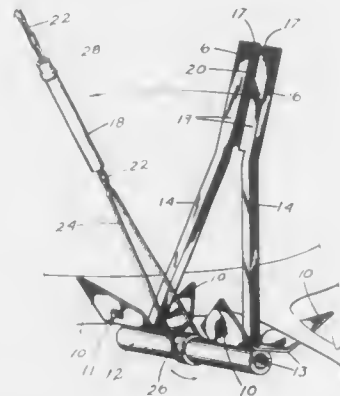
generally perpendicular from said main fluke shaft member;

said second end of each said shank having a generally contoured surface with each contoured surface facing the other contoured surface forming a contoured space between said second ends of said two shanks;

a contoured member cooperatively shaped and sized to be inserted into and releasably retained within said contoured space between said two shanks;

said contoured space adapted to retain said contoured member within said contoured space by spring biased pressure; said spring biased pressure provided by material composition and structure of said two shanks allowing said two shanks to temporarily separate and return;

an anchor line attached by rotational attachment means to said main fluke shaft member;



said contoured member positioned on said anchor line with said positioning adapted to allow said retention of said contoured member in said contoured space;

said contoured member when retained in said contoured space adapted to be released from said contoured space by a predetermined tension applied to said anchor line causing said two shanks to separate allowing said release of said contoured member;

said contoured member when released from said contoured space adapted to allow rotation of said attached anchor line on said main fluke shaft member with said rotation adapted to alter and angle said tension relative to said anchor;

said altered angled tension applied to said boat anchor adapted to allow said caught fluke of said double fluke structure of said anchor to be pulled from underneath said underwater snag in a generally reverse direction from which it became caught.

4,951,594

## RADAR ARCH

Orville A. Feikema, 6805 Riverview Blvd. W., Bradenton, Fla. 34209

Filed Aug. 22, 1989, Ser. No. 396,870

Int. Cl.<sup>5</sup> B63B 17/02

U.S. Cl. 114—361

10 Claims

1. A radar arch structured for connection onto a deck or superstructure of a boat comprising:

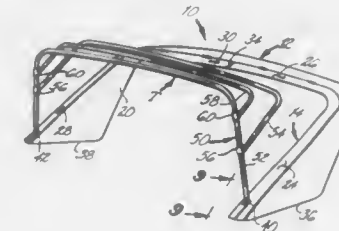
a rigid arch member having a generally inverted U-shaped configuration, a leading edge and a trailing edge, and including a transverse upper portion generally spanning the width of the deck or superstructure and a pair of downwardly extending side portions each structured at its lower end for connection to the deck or superstructure;

each of said sides and said upper portion including a continuous recess extending into one of said edge;

said recess structured to supportively receive and partially

enclose a collapsible convertible canvas top having a bow assembly supportively connected to a formed sheet of flexible fabric when the top is in its folded position;

a cover having an open and a closed position connectable to said arch member and cooperating with said recess to substantially completely enclose the folded top in its folded position when cover is in its closed position;



said cover structured in its open position to allow the top to be pivoted into its open position for use;

said cover having an outer surface configuration continuous and uninterrupted with the outer surface of said arch member when said cover is in its closed position.

4,951,595

## TEMPORARY INDICATORS

William Bedford, Jr., 5620 Palmyra Rd., Pittsford, N.Y. 14534

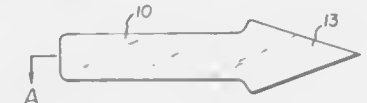
Continuation of Ser. No. 716,983, Mar. 28, 1985, abandoned.

This application Jun. 23, 1986, Ser. No. 877,285

Int. Cl.<sup>5</sup> G01D 11/00

U.S. Cl. 116—200

4 Claims



1. A method of temporarily indicating data on light transmitting substrates by

- (1) adhering to the substrate at the point of interest an indicator for temporary use on light transmitting substrates having text and or graphic information on the surface thereof which comprises in combination
  - (a) a flat, rigid, translucent base member whose width is substantially greater than its thickness, said base member containing a dye or pigment, said dye or pigment being present in such an amount and of such a color that when light for reading said substrate is passed through said substrate having indicating means adhered thereto there is produced a visual indicating contrast between said indicating means and said substrate, and
  - (b) a coating of light transmitting temporary adhesive on one of the flat surfaces of said base member for adhering indicating means to said substrate, and
- (2) passing light for reading said substrate through said substrate having said indicating means adhered thereto said indicator having a vision directing shape, said substrate being an x-ray film or positive photographic film.

4,951,596

## INDICATING MEANS FOR MEDICATION CONTAINERS

Jack B. Wallace, Jr., 436 Snyder Ave., Aromas, Calif. 95004

Filed Mar. 1, 1989, Ser. No. 317,832

Int. Cl.<sup>5</sup> G09F 9/40

U.S. Cl. 116—321

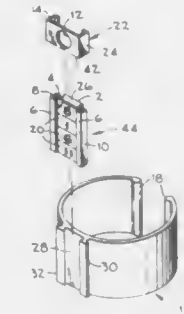
7 Claims

1. A device for affixing indicating indicia to an object comprising:

a c-shaped clamp having a pair of longitudinally aligned ribs means operable to grip said object;

a body portion having guide track means thereon; indicating means slideably supported on said guide track means;

a plurality of symbol elements for distribution on a face of said body portion;



said indicating means including a viewing aperture for alignment with selected one or more of said symbol elements on said face of said body portion; and means for attaching said body portion to said clamp.

4,951,597

## SOLDER COATING DEVICE WITH OXIDE COLLECTING TROUGH

Shigenaki Kataoka, Shizuoka Prefecture, Japan, assignor to Fuji Seiki Machine Works, Ltd., Shizuoka Prefecture, Japan

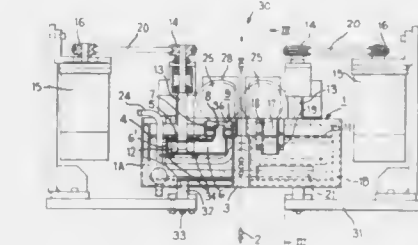
Filed Sep. 21, 1989, Ser. No. 410,613

Claims priority, application Japan, Sep. 29, 1988, 63-242356

Int. Cl.<sup>5</sup> B05C 1/02

U.S. Cl. 118—58

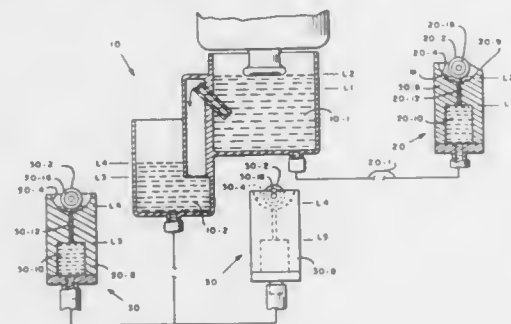
9 Claims



1. A roller solder coating device comprising tank means for containing a liquid solder bath; a rotatable coating roller for applying a solder coating to a surface of a workpiece, said coating roller being positioned in vertical orientation over said tank means; a pumping chamber contained within said tank means for receiving solder from said bath; nozzle means communicating with said pumping chamber for directing a flow of solder into contact with said coating roller; pump means within said pumping chamber for inducing said flow of solder from the pumping chamber and through the nozzle means; trough means for preventing solder delivered from said nozzle means from directly re-entering said solder bath, said trough means being positioned underneath said coating roller and said nozzle means; a solder oxide outlet disposed at a side of said tank means and partially bounded by said trough means; and a solder oxide receiving tank positioned with respect to said solder oxide outlet so as to be able to receive flow of solder oxide therefrom.

**4,951,598**  
**MOISTENING APPARATUS**  
 Steven A. Sapon, 11 Comstock Hill Ave., Norwalk, Conn. 06850

Filed Sep. 14, 1989, Ser. No. 407,391  
 Int. Cl.<sup>5</sup> B05C 1/08  
 U.S. Cl. 118—244



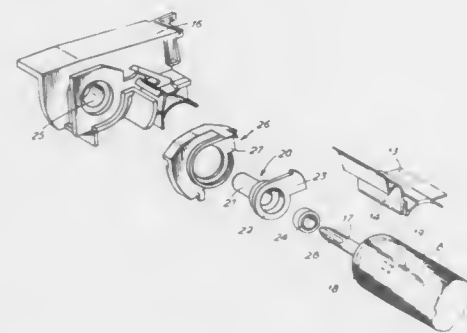
**1. Moistening apparatus, comprising:**

- (a) a reservoir;
- (b) a roller positioned above said reservoir for tangential contact with a sheet as said sheet moves transversely across said roller;
- (c) a trough substantially surrounding the lower portion of said roller and extending along the length of said roller;
- (d) capillary means defining a slit orifice in said trough extending generally along the length of said roller, and connecting said reservoir and said trough for maintaining a meniscus of fluid in said trough; wherein
- (e) as said sheet moves across said roller said roller rotates through said meniscus to transfer a film of fluid to said sheet.

**4,951,599**  
**BEARING FOR A ROTATABLE MEMBER**  
 Dharendra Damji, Biggleswade, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1988, Ser. No. 280,040  
 Claims priority, application United Kingdom, Jan. 20, 1988, 8801226

Int. Cl.<sup>5</sup> G03G 15/00  
 U.S. Cl. 118—657

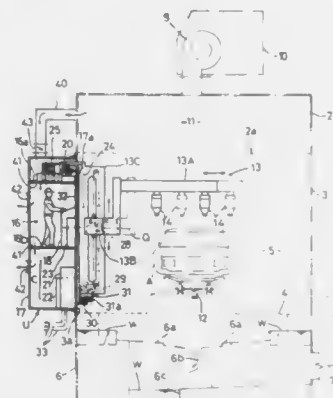


**1. Developer apparatus for an electrostatographic apparatus, said apparatus comprising:**

- a metallic developer roll forming a part of a magnetic brush system; and
- a bearing member for rotatably supporting said metallic developer roll, said bearing member including a cylindrical sleeve having an internal bearing surface and being fabricated from conductive plastic material.

**4,951,600**  
**PAINTING MACHINE AND CONTROL UNIT FOR USE IN A PAINTING BOOTH**  
 Fujio Soshi; Masaharu Okuda, and Kolchiro Asami, all of Tokyo, Japan, assignors to Talkisha, Ltd., Tokyo, Japan

Filed Jun. 20, 1989, Ser. No. 368,774  
 Claims priority, application Japan, Jun. 25, 1988, 63-157717  
 Int. Cl.<sup>5</sup> B05B 15/12  
 U.S. Cl. 118—696



**1. A painting machine unit comprising:**

- a painting booth having a side wall with a substantially vertical wall portion insertable in an opening in said booth side wall and having a viewing window therethrough;
- a painting machine attached to an inner side of said wall portion and having means for automatic painting of objects within said booth; and
- a control unit having means for controlling the means for automatic painting of objects within said booth, said control unit attached to an outer side of said wall portion and surrounded by a control chamber housing for accommodating painting booth operators.

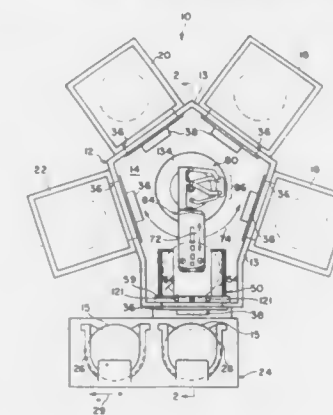
**4,951,601**  
**MULTI-CHAMBER INTEGRATED PROCESS SYSTEM**  
 Dan Maydan, Los Altos Hills; Sasson Somekh, Redwood City; David N. Wang, Cupertino; David Cheng; Masato Toshima, both of San Jose; Isaac Harari, Mountain View, and Peter D. Hoppe, Sunnyvale, all of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.  
 Continuation of Ser. No. 283,015, Dec. 8, 1988, abandoned, which is a continuation of Ser. No. 944,803, Dec. 19, 1986, abandoned. This application Jun. 23, 1989, Ser. No. 371,700  
 Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 118—719

22 Claims

- 1. An integrated vacuum processing system for workpieces such as semiconductor wafers, comprising:**
- a vacuum load lock chamber, having a closable entrance;
  - at least one vacuum processing chamber mounted to said load lock chamber and communicating therewith via openings in the adjacent chambers;
  - each of said processing chambers including a wafer support means and being adapted for performing a process selected from at least one of gas chemistry etching, gas chemistry deposition, physical sputtering and rapid annealing on at least one wafer positioned on the support and, further including means for reversibly moving a wafer along an axis from a selected internal position adjacent the wafer support means to and onto the wafer support means; and
  - a wafer handling robot mounted within the load lock chamber, comprising: a wafer support blade; a foldable dual four-bar link mechanism mounting the blade at a first, output end thereof and having a second, opposite actuator end comprising an input link rotatably mounted at a se-

lected location with the chamber for moving the four-bar link mechanism between a folded configuration with the output end on one side of the selected mounting position and selected extended orientations with the output end on the opposite side of the selected mounting position, in-



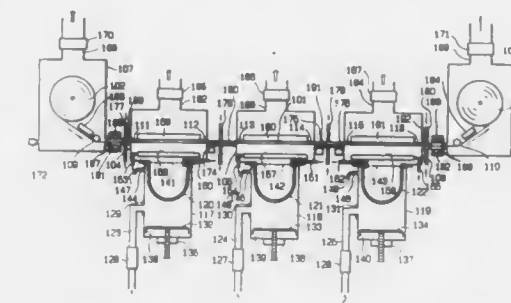
cluding an extended configuration with the wafer support blade at said selected internal position; means for rotating the input link to extend and retract the foldable dual four-bar link mechanism and support blade; and means for rotating the dual four-bar link mechanism and wafer support blade.

**4,951,602**  
**MICROWAVE PLASMA CHEMICAL VAPOR DEPOSITION APPARATUS FOR CONTINUOUSLY PREPARING SEMICONDUCTOR DEVICES**  
 Masahiro Kanai, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1989, Ser. No. 442,511  
 Claims priority, application Japan, Nov. 29, 1988, 58-299585  
 Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 118—719

7 Claims



**1. An apparatus for continuously preparing semiconductor devices each comprising a plurality of semiconductor layers being stacked on a moving substrate web; said apparatus comprising a plurality of film-forming chambers by a number equal to the number of said stacked semiconductor layers, each of said film-forming chambers having a film-forming space and being provided with means for evacuating said film-forming space, means for supporting said substrate web in said film-forming space, means for maintaining said substrate web at a desired temperature and means for supplying a film-forming raw material gas into said film-forming space; each of said film-forming chambers being provided with a plasma-generating chamber for generating a plasma reactive with said film-forming raw material gas to cause the formation of a semiconductor film on said substrate web in said film-forming space; said plasma-generating chamber comprising a microwave permeable bell jar disposed in a cavity resonator integrated**

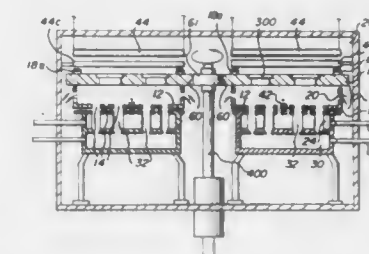
with two impedance matching circuits in a microwave circuit, said plasma-generating chamber being provided with a porous metal thin plate adjacent to said means for supplying a film-forming raw material gas, said plasma-generating chamber being provided with means for supplying a plasma-generating raw material gas selected from the group consisting of a hydrogen gas and a gaseous mixture composed of a hydrogen gas and a rare gas into said plasma-generating chamber; said apparatus being provided with a substrate web pay-out chamber provided with a mechanism for paying out said substrate web and a substrate take-up chamber provided with a mechanism for taking up said substrate web; said apparatus being provided with a substrate web-processing chamber at least between said substrate web pay-out chamber and the first film-forming chamber; each two of said chambers being connected by means of a connection pipe through which said substrate web can be moved; and said connection pipe being provided with means for preventing the gas of one of said chambers from entering into other chamber with an inert gas.

**4,951,603**  
**APPARATUS FOR PRODUCING SEMICONDUCTORS**  
 Akira Yoshino; Yoshinori Ohmori, and Toshiharu Ohnishi, all of Osaka, Japan, assignors to Daidousanso Co., Ltd., Osaka, Japan

Filed Sep. 12, 1988, Ser. No. 243,006  
 Int. Cl.<sup>5</sup> C23C 16/00

U.S. Cl. 118—719

2 Claims



**1. Apparatus for producing semiconductors comprising:**

- a vacuum chamber,
- a vertical shaft rotatably mounted in said vacuum chamber, a disc supported by and rotatable with said vertical shaft,
- a plurality of reaction zones located adjacent one another and around said vertical shaft, each said reaction zone including a reaction chamber comprised of a base, walls rising from a perimeter of said base and defining the side enclosures of said reaction chamber and a top plate, each of said top plates comprising a part of said disc positioned close to a top portion of said walls and including means for holding at least one substrate in a position facing the interior of each of said reaction chambers and spaced lifting means adapted to slidably receive a pair of rods, means for rotating said vertical shaft and disc to sequentially transfer each of said top plates holding at least one substrate from one to an adjacent one of said reaction zones, said base of at least one of said reaction chambers including a plurality of spaced discrete openings for uniformly feeding reactant gases toward the substrate holding top plate, a plurality of reactant gas exhaust ports provided in each reaction chamber between said base and said top plate, heating means above the top plate of each reaction chamber, an access opening to the interior of said vacuum chamber, and a lift member having two spaced rods adapted for insertion in said spaced lifting means and movable to lift and lower a top plate and to move a top plate through said access opening.



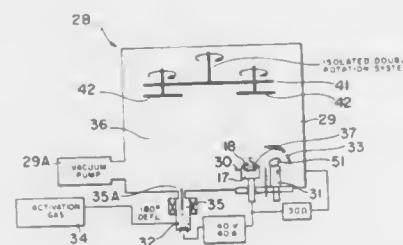
**4,951,604**  
**SYSTEM AND METHOD FOR VACUUM DEPOSITION**  
**OF THIN FILMS**  
 Michael D. Temple, and Richard I. Seddon, both of Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Filed Feb. 17, 1989, Ser. No. 312,527

Int. Cl.<sup>5</sup> C23C 16/50

U.S. Cl. 118—723

16 Claims



2. A system useful for vacuum evaporation of dielectric material onto a substrate, comprising:

a vacuum chamber;  
 means for evacuating said vacuum chamber;  
 a substrate holder mounted within said vacuum chamber for holding at least one substrate;  
 electrically conductive crucible means positioned within said vacuum chamber and comprising a conductive chamber adapted to contain a preselected source material and an outwardly extending cap covering the container, said cap having an opening for evaporation of the source material onto a substrate on the substrate holder, and said crucible being electrically insulated from said vacuum chamber but having a low electrical resistance connection therebetween;

a high voltage electron beam source positioned within said vacuum chamber in the vicinity of said crucible and including a high voltage electron gun and a deflection magnet system arranged for bending electrons from said gun into said crucible for evaporating said pre-selected material therein, said magnet system forming a magnetic field of pre-arranged characteristics in the region above said crucible;

a low voltage, high current plasma source, including a separate plasma generating chamber, positioned relative to said vacuum chamber to produce an intense first plasma of a selected activation gas species in said plasma generating chamber for injection into said vacuum chamber, said plasma source being positioned at any convenient location relative to said crucible and said electron beam source and being electrically interconnected with said crucible for current flow therebetween; and

said plasma source thereby filling said vacuum chamber with a generally distributed plasma, and said distributed plasma co-acting with said magnetic field above said crucible and evaporant material leaving said crucible to form an intense second plasma in the region above and extending into said crucible, thereby activating said evaporant material passing through said region toward said substrate to produce a vacuum deposited thin film comprising said material and having improved thin film characteristics and heating said cap, keeping the cap sufficiently free of evaporant material to maintain said low electrical resistance connection between the plasma and the crucible.

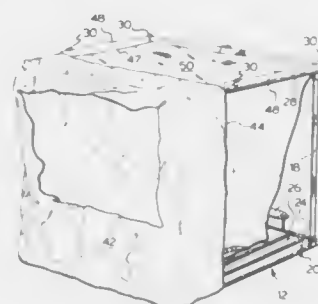
**4,951,605**  
**LITTER DISPOSAL SYSTEM**  
 Frank Brown, 8 Tyson Shepway, North York, Ontario, Canada (M2J 4R9)

Filed May 3, 1988, Ser. No. 189,944

Int. Cl.<sup>5</sup> A01K 29/00

U.S. Cl. 119—1

10 Claims



1. A litter disposal system comprising a receptacle, including a flexible bag having an open end and an adjacent side wall with a pair of exterior opposed flap portions extending orthogonally to the open end, and a structure supporting means for securing the flap portions, wherein the bag is oriented such that the flap portions extend along a top of the supporting structure and are secured to the securing means with the open end of the bag adjacent to a side of the supporting structure.

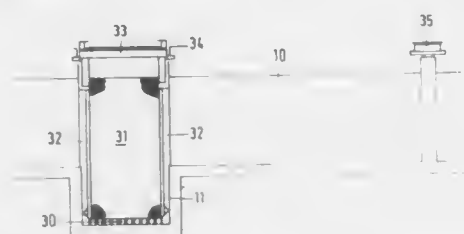
**4,951,606**  
**FISH TANK FOR INTENSIVE FISH FATTENING AND**  
**PROCESS FOR OPERATING SUCH A FISH TANK**  
 Christoph Hartung, Kelkheim, Fed. Rep. of Germany, assignor to Metz Mannheim GmbH, Mannheim, Fed. Rep. of Germany  
 PCT No. PCT/EP87/00302, § 371 Date Feb. 11, 1988, § 102(e)  
 Date Feb. 11, 1988, PCT Pub. No. WO87/07475, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 10, 1987, Ser. No. 162,338  
 Claims priority, application Fed. Rep. of Germany, Jun. 12, 1986, 3619757

Int. Cl.<sup>5</sup> A01K 63/00

U.S. Cl. 119—3

13 Claims



1. In a system having an elongated fish tank with a longitudinal center axis, the fish tank containing water and at least one filler with upwardly oriented flow channels having upper and lower ends, a method for intensive fish fattening which comprises:

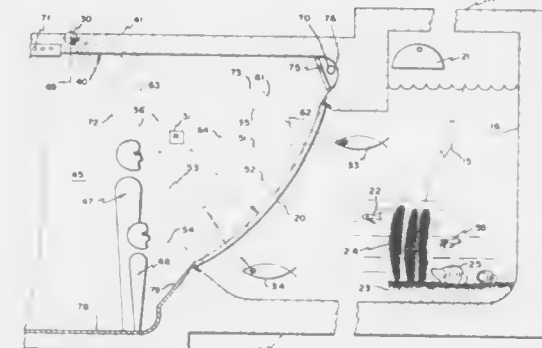
introducing at least one gas from the group consisting of air and oxygen into lower ends of the flow channels in the at least one filler disposed in a depression in the form of a pit formed along the longitudinal center axis in the fish tank, transporting water through the flow channels to the upper ends of the flow channels by aeration, and biologically purifying and nitrifying the water by microorganisms clinging to the at least one filler, in a first water treatment cycle;

sucking off water from the bottom of the fish tank through a suction line, supplying the sucked off water to a device for removing fish impurities and feed residues, and feeding clarified water from the device back into the fish tank through a return line, in a second water treatment cycle.

**4,951,607**  
**AQUARIUMS**  
 James M. Lapeyre, 13 Richmond Pl., New Orleans, La. 70115  
 Filed Apr. 10, 1989, Ser. No. 335,494  
 Int. Cl.<sup>5</sup> A01K 63/00

U.S. Cl. 119—5

10 Claims



1. An aquarium with a viewing window interface between a water body and an observation viewing chamber from which a viewing audience looks into the aquarium, said window interface being so constructed for affording observers in the observation chamber an improved viewing visibility of aquatic life from an observer environment in the presence of light rays external to the aquarium and directed onto the window interface, providing attenuated reflections and interference accompanying a direct view into the aquarium, comprising in combination,

a water body containing a viewing window located between the water body and the viewing audience for establishing a substantially unimpeded view for the viewing audience into the aquarium, said window being inwardly curved into the water body to present the viewing interface for observing therethrough the underwater behavior of aquatic life,

a light excluding wall opposite the viewing window, and said observation chamber being positioned outside the water body adjacent to said inwardly curved window.

**4,951,608**  
**BRISKET BAR APPARATUS FOR CONTROLLING THE**  
**POSITIONING AND MOVEMENT OF COWS IN A**  
**MILKING PARLOR**

Rolf W. Reigies, 3 Arbor Ct., Larry G. Larson, 107 Kingston Way, both of Waunakee, Wis. 53597, and Jay Crolis, R.D. 3-30, Booneville, N.Y. 11309

Filed May 15, 1989, Ser. No. 352,164

Int. Cl.<sup>5</sup> A01K 1/12

U.S. Cl. 119—14.03

16 Claims

1. Apparatus for controlling the positioning and movement of cows in a herringbone milking parlor having a plurality of milking stations in a row, with the cows oriented in a diagonal orientation with respect to the row of stations, comprising:

(a) an elongated brisket bar barrier extending along the length of the row of milking stations spaced away from the stations a distance sufficient to hold the cows in their diagonal orientation with respect to the stations, the brisket bar barrier formed of smooth sheet metal and having a cross section on the face of the brisket bar apparatus presented to the cows of sloping top and bottom surfaces, thereby presenting substantially no sharp corners or edges to the cows; and

(b) support means for supporting the brisket bar barrier in a lower blocking position at which the face presented to the cows is substantially at the height of the brisket of the

cows, and for raising the brisket bar barrier to an elevation above the heads of the cows to allow the cows to exit and

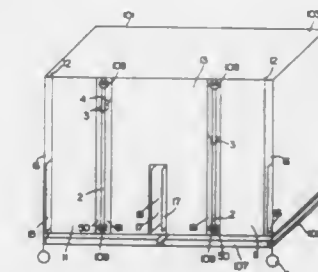


then returning the barrier back down to the lower blocking position.

**4,951,609**  
**POLE-HOUSING DEVICE FOR NONHUMAN**  
**PRIMATES, WITH SQUEEZE-BACK MEANS, AND**  
**CATCHING AND REMOVAL MEANS**  
 Bernard Migler, 1405 Autumn La., Cherry Hill, N.J. 08003  
 Filed Dec. 20, 1988, Ser. No. 286,809  
 Int. Cl.<sup>5</sup> A01K 1/04

U.S. Cl. 119—17

12 Claims

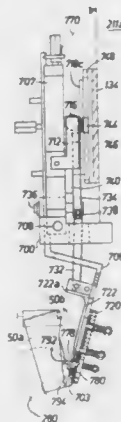


1. A pole-housing device for restraint or housing of nonhuman primates comprising:

(a) a base support;  
 (b) a frame attached to said base support, said frame having a perimeter in which front and rear walls are mounted;  
 (c) a plurality of poles secured in said perimeter of said frame, for the attachment, on each pole, of a sliding ring, slidably attached to one end of a tether, wherein the poles are disposed adjacent to the walls, doors and perches of the pole-housing device, to permit said sliding ring to slide on said pole; and

(d) a plurality of doors disposed so that one of said doors is adjacent to each pole and each door is disposed in relation to said adjacent pole and said door to form a gap allowing the tether to be pulled therethrough; whereby a nonhuman primate secured by a tether to a sliding ring on a pole is removed from the pole-housing device by pulling the tether through said gap, disconnecting the tether from the pole, opening the door adjacent to the pole, and removing said nonhuman primate from the pole-housing device.

**4,951,610**  
**METHOD AND APPARATUS FOR AUTOMATICALLY DEBEAKING POULTRY, SUCH AS YOUNG CHICKS, YOUNG TURKEYS, YOUNG GUINEA FOWL, AND DUCKLINGS**  
 Albert Gourlandt, Les Grésillons, 7895 0 Gambais, France  
 Filed Apr. 22, 1988, Ser. No. 185,096  
 Claims priority, application France, Apr. 23, 1987, 87 05767  
 Int. Cl.<sup>5</sup> A01K 37/00  
 U.S. Cl. 119—97.1 20 Claims

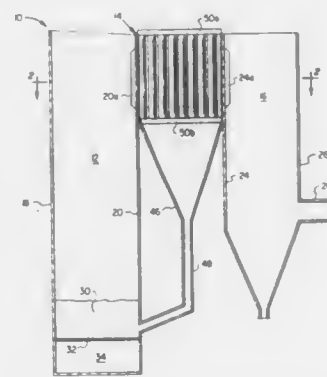


1. In a method of automatically debeaking poultry comprising the steps of:  
 providing a frame with holding and restraining means for holding and restraining a head of a bird substantially immobile and for treating the bird held in this way, in particular for debeaking purposes; and  
 providing a debeaking assembly in the vicinity of said holding and restraining means, said debeaking assembly including a debeaking element which is displaceable between a non-operative position and an operative position so that the debeaking element is in a debeaking position against the beak;  
 the improvement which comprises performing debeaking in two stages:  
 a first stage of bringing the debeaking assembly including the debeaking element into proximity with the beak while the beak is in a waiting position; and  
 a second stage of displacing the debeaking element relative to the debeaking assembly in order to perform debeaking.

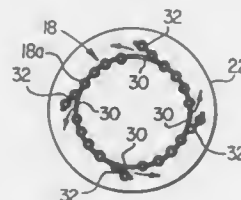
**4,951,611**  
**FLUIDIZED BED REACTOR UTILIZING AN INTERNAL SOLIDS SEPARATOR**  
 Iqbal F. Abdulally, Randolph, and Alfred S. Touma, West Caldwell, both of N.J., assignors to Foster Wheeler Energy Corporation, Clinton, N.J.  
 Filed Jun. 9, 1989, Ser. No. 363,804  
 Int. Cl.<sup>5</sup> F22B 1/00 6 Claims

U.S. Cl. 122—4 D  
 1. A reactor comprising a vessel, means for dividing said vessel into two sections, means for forming a bed of particulate material including fuel in one of said sections, means for passing air through said bed at a velocity to fluidize said material and promote the combustion of said fuel, said air and the combustion gases mixing and entraining a portion of said particulate material, passage means for permitting the mixture of air and gases and said entrained particulate material to pass from said one section to the other section, a plurality of spaced parallel tubes extending in a spaced relation in a plurality of spaced rows with said tubes in adjacent rows being staggered relative to each other and being disposed in the path of said

mixture and entrained particulate material as they pass through said other section to separate said entrained particulate material from said mixture, and means for passing water or steam through said tubes to cool same.

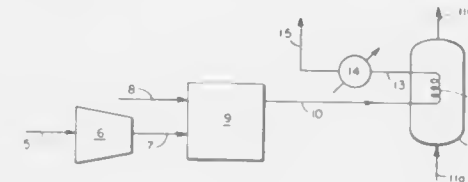


**4,951,612**  
**CIRCULATING FLUIDIZED BED REACTOR UTILIZING INTEGRAL CURVED ARM SEPARATORS**  
 Walter P. Gorzegno, Morristown, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.  
 Filed May 25, 1989, Ser. No. 356,485  
 Int. Cl.<sup>5</sup> F22B 1/00; F23G 5/00 13 Claims



1. A reactor comprising means for forming a furnace and a heat recovery section; means in said furnace for supporting a bed of solid particulate material including fuel; means for introducing air into said bed at a velocity sufficient to fluidize same and support the combustion or gasification of said fuel and form a mixture of said air; the gaseous products of said combustion, and the particulate material entrained by said air and said gaseous products of combustion, at least one slot formed through said furnace for discharging said mixture from said furnace, baffle means surrounding said furnace in a coaxial spaced relation to said furnace, and means for directing said mixture tangentially against said baffle means to separate said particulate material from said mixture; means for directing said mixture to said heat recovery section; a plurality of recycle conduits in communication with said baffle means for receiving the separated particulate material; and means connecting said plurality of recycle conduits to said furnace for returning the separated particulate material to said bed.

**4,951,613**  
**HEAT TRANSFER TO ENDOTHERMIC REACTION ZONE**  
 Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.  
 Filed Nov. 9, 1988, Ser. No. 269,032  
 Int. Cl.<sup>5</sup> F22B 1/00 34 Claims

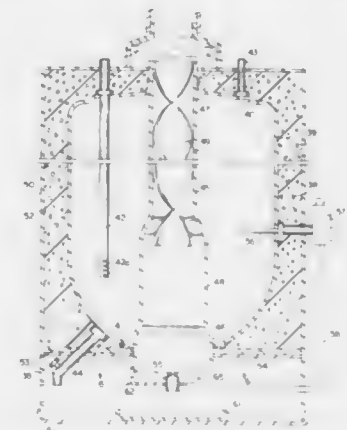


1. A process for transferring heat to a fluid-bed reaction zone containing a finely divided solid catalyst comprising the steps of  
 (a) evolving an oxygen-containing regenerator flue gas by charging a greater amount of oxygen-containing gas to a fluid-bed regeneration zone than is stoichiometrically required to oxidatively regenerate said finely divided solid catalyst;  
 (b) withdrawing said oxygen-containing regenerator flue gas from said fluidized-bed regeneration zone;  
 (c) charging fuel to a combustion zone;  
 (d) charging said oxygen-containing regenerator flue gas to said combustion zone to evolve a combustion zone flue gas;  
 (e) withdrawing said combustion zone flue gas from said combustion zone;  
 (f) flowing said combustion zone flue through a heat exchanger positioned within said reaction zone;  
 (g) transferring heat from said combustion zone flue gas to said reaction zone;  
 (h) withdrawing said combustion zone flue gas from said heat exchanger; and  
 (i) cooling said combustion zone flue gas.

**4,951,614**  
**WATER HEATER CONSTRUCTION**  
 Marc W. Akkala, New Berlin, and Dennis R. Hughes, Germantown, both of Wis., assignors to A. O. Smith Corp., Milwaukee, Wis.  
 Division of Ser. No. 170,789, Mar. 21, 1988, Pat. No. 4,817,564.  
 This application Jan. 9, 1989, Ser. No. 295,230  
 Int. Cl.<sup>5</sup> F22B 5/00 6 Claims

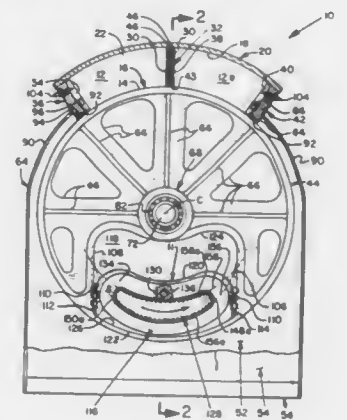
U.S. Cl. 122—17  
 1. In a water heater, a tank to contain water to be heated and including an upper head and a lower head, a flue disposed in aligned openings in said upper and lower heads and extending through said tank, a gas burner disposed adjacent said lower head and aligned with said flue, said gas burner having a smaller cross-sectional area than the cross-sectional area of said flue, said gas burner comprising a base having a central passage, gas supply means for supplying a gas fuel to one end of said passage, orifice means removably connected to the other end of said passage and defining an orifice, an inverted cup-shaped head having an inner end removably connected to the base and defining a closed chamber disposed in communication with said orifice, port means in the burner head for providing communication between said chamber and the exterior of said

burner, said port means comprising a plurality of ports each having a greater axial length than diameter and being con-



structed and arranged to discharge the gas fuel toward the lower end of the flue to provide combustion in said lower end.

**4,951,615**  
**MOTION-CONVERSION MECHANISM FOR A FOUR STROKE OSCILLATING PISTON INTERNAL COMBUSTION ENGINE**  
 Nikolaos S. Pabis, 8 Alpert Dr., Vernon, Conn. 06066  
 Filed Aug. 17, 1989, Ser. No. 394,745  
 Int. Cl.<sup>5</sup> F02B 53/00 4 Claims



1. In an internal combustion engine including rotor means having an opening provided therein, combustion chamber means formed on said rotor means, and means supported in said combustion chamber means for movement therewithin in response to the forces generated by the gases created when combustion takes place in said combustion chamber means acting thereon and operative as a consequence of the movement thereof to impart oscillating movement of said rotor means into a continuous circular motion, the improvement of a motion-conversion mechanism for converting oscillating motion to a continuous circular motion, said motion-conversion mechanism comprising:

(a) a gear carrier supported in mounted relation in the opening provided in said rotor means for slidable movement therewithin between a first position and a second position;  
 (b) a segment toothed gear supported in mounted relation on said gear carrier for movement therewith, said segment toothed gear including a first curvilinear portion having a plurality of teeth, a second curvilinear portion having a plurality of teeth, a first interconnection portion having a



plurality of teeth and a second interconnection portion having a plurality of teeth, said first curvilinear portion embodying a first radius of curvature R1, said first radius of curvature R1 being the radius of formation of a first gear pitch circle, said plurality of teeth of said first curvilinear portion lying on said first gear base pitch circle created by said first radius of curvature R1, said second curvilinear portion embodying a second radius of curvature R2, said second radius of curvature R2 being the radius of formation of a second gear base pitch circle, said plurality of teeth of said second curvilinear portion lying on said second gear base pitch circle created by said second radius of curvature R2, said first radius of curvature R1 and said second radius of curvature R2 defining therebetween a variable area denoted by the letter a, said variable area a having a variable width, said segment teether gear being confined within said variable area a, said first interconnection portion embodying a third radius of formation R3, said third radius of curvature R3 being the radius of formation of a third gear base pitch circle, said plurality of teeth of said first interconnection portion lying on said third base pitch circle created by said third radius of curvature R3, said second interconnection portion embodying a fourth radius of curvature R4, said fourth radius of curvature R4 being the radius of formation of a fourth gear base pitch circle, said plurality of teeth of said second interconnection portion lying on said fourth gear base pitch circle created by said fourth radius of curvature R4, said first curvilinear portion having a first end and a second end, said second curvilinear portion having a first end and a second end, said first interconnection portion interconnecting said first end of said first curvilinear portion to said first end of said second curvilinear portion, said second interconnection portion interconnecting said second end of said first curvilinear portion to said second end of said second curvilinear portion, and said first interconnection portion and said second interconnection portion collectively defining the 360 degree circumference of said segment teether gear;

- (c) an output shaft supported on said gear carrier for movement therewith, said output shaft being operative to provide an output from the internal combustion engine; and  
(d) a gear provided with external teeth supported on said output shaft in surrounding relation thereto, said gear being supported in mounted relation relative to said teether segment gear for movement around said 360 degree circumference of said segment teether gear as said gear carrier with said segment teether gear mounted for movement therewith moves between said first portion and said second portion, said gear as said gear moves around said 360 degree circumference of said segment teether gear imparting rotation to said output shaft so as to thereby produce an output from the internal combustion engine.

4,951,616  
V-TYPE ENGINE

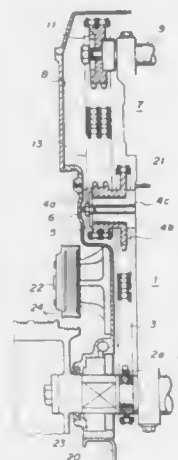
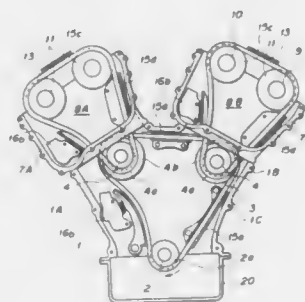
Tatsuo Aruga, Kawasaki, and Yoshio Iwasa, Nagareyama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 8, 1990, Ser. No. 476,930  
Claims priority, application Japan, Feb. 10, 1989, 1-29880  
Int. Cl.<sup>5</sup> F01B 77/00; F/2L 1/02

U.S. Cl. 123—195 A 3 Claims

1. In an internal combustion engine:  
a cylinder block including two cylinder banks angularly disposed to each other;  
two cylinder heads mounted on said two cylinder banks, respectively;  
two idler gears rotatably mounted to said two cylinder banks, respectively;  
a crankshaft rotatably mounted to said cylinder block;

a chain drivingly interconnecting said two idler gears and said crankshaft, said chain, said idler gears, and said crank-



shaft cooperating with each other to define a predetermined space adjacent to said cylinder block; and  
an auxiliary device mounted in said predetermined space.

4,951,617  
ATTACHABLE INTAKE VALVE ASSEMBLY AND  
METHOD FOR USING SAME

Fred Linamen, 7685 SE. Wren Ave., and Wilbert Hofstrand, 7675 SE. Wren Ave., both of Hobe Sound, Fla. 33455

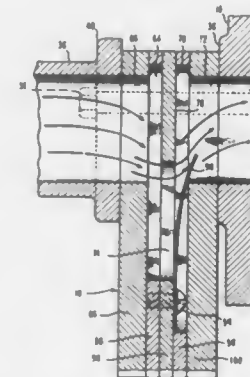
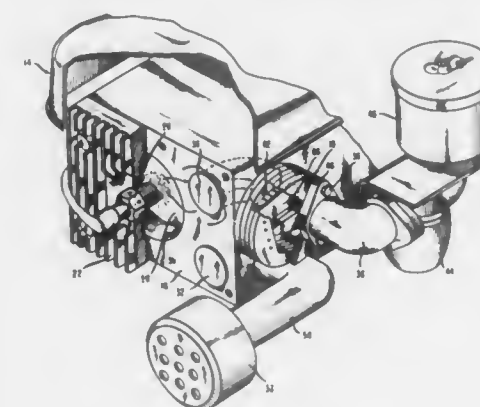
Filed Sep. 22, 1989, Ser. No. 411,401  
Int. Cl.<sup>5</sup> F02M 35/10

U.S. Cl. 123—52 MF 17 Claims

1. An attachable intake valve assembly for an engine having an engine intake port, comprising:  
a valve chamber having at least one inlet port, at least one outlet port and a flow passage between the inlet port and the outlet port, said inlet port and said outlet port each having radial boundaries;  
valve means disposed in the flow passage and adapted to permit gas flow from the inlet port to the outlet port, and to prevent gas flow from the outlet port to the inlet port, said valve means comprising at least one valve opening substantially offset from said radial boundaries of said inlet port and said outlet port; and  
means for attaching the valve chamber to the engine with the outlet port in fluid communication with the engine intake port, whereby said valve will permit gas flow into

the engine intake port, and will substantially prevent engine backflow out of engine intake port, and whereby

gear teeth on said flywheel/ring gear engaged said gear teeth on said sheave gears;



poor engine performance caused by the intake valve will be improved.

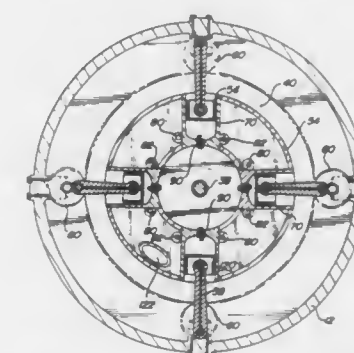
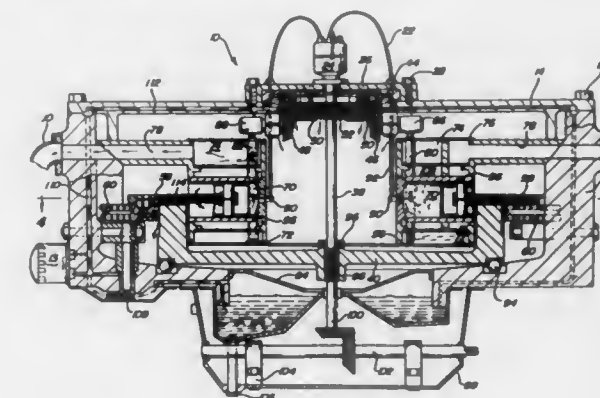
4,951,618  
ROTARY ENGINE

Zade Wilson, 8629 Ormes Rd., Vassar, Mich. 48768  
Filed Jun. 28, 1989, Ser. No. 372,887

Int. Cl.<sup>5</sup> F02B 75/22

U.S. Cl. 123—55 A 10 Claims

1. An engine comprising in combination:  
a cylinder block;  
a plurality of cylinders contained in said cylinder block;  
a matching plurality of pistons, each piston reciprocatingly received in one of said cylinders;  
a matching plurality of piston rods, each rod connected to one of said pistons and extending outwardly from said block;  
a plurality of sheave gears, each sheave gear having a sheave gear axis and a circumference disposed about said sheave gear axis bearing a set of gear teeth thereon;  
means connecting a respective one of said sheave gears to a respective one of said piston rods such that reciprocation of said pistons in said cylinders causes rotation of said sheave gears about said sheave gear axes;  
a combination flywheel/ring gear having a ring gear axis and an outer circumference disposed about said axis bearing a set of ring gear teeth thereon; and  
means positioning said flywheel/ring gear such that said



whereby said flywheel/ring gear is rotated about its axis by rotation of said sheave gears upon reciprocation of said pistons in said cylinders.

4,951,619

SELF-ADJUSTING HYDRAULIC VALVE TAPPET  
Georg Schaeffler, Herzogenaurach, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

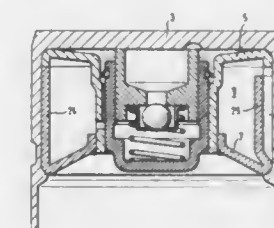
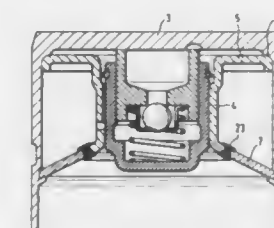
Filed Jan. 31, 1990, Ser. No. 472,722

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1989, 8902780[U]

Int. Cl.<sup>5</sup> F01L 1/24

U.S. Cl. 123—90.55

9 Claims



1. A self-adjusting hydraulic valve tappet arranged in a guide bore of a cylinder head of an internal combustion engine

and against one end face of which a control cam abuts and which on the other side bears against the end of a valve stem with its second end face, the valve tappet comprising a cup-shaped housing consisting of a hollow cylindrical wall closed at one end by a bottom against which the control cam abuts from outside and which is provided with a cylindrical guide sleeve concentric with the hollow cylindrical wall and extending at one end towards the bottom and at the other into the center of a disk member which with its outer periphery merges into the hollow cylindrical wall of the housing wherein between the hollow cylindrical wall and the cylindrical guide sleeve an annular oil reservoir supplied with oil through a bore leading to the outside is defined, the actual hydraulic clearance compensation element being guided longitudinally displaceably in the guide sleeve and formed by an inner piston and an outer piston engaging over this, the inner piston being guided longitudinally displaceably within the outer piston and together delimiting an oil pressure chamber which is connected through a bore in the inner piston closed by a non-return valve with a central oil reservoir arranged in the inner piston and delimited on one side by the ball of the inner piston and on the other by the inner surface of the bottom of the housing against which the inner piston bears with one end face whereas the outer piston is longitudinally displaceably mounted in the cylindrical guide sleeve and bears with its closed end against the end of the valve stem, the guide sleeve being provided at a location at a distance from the bottom and preferably in the vicinity of its end away from the bottom, with an inlet port opening into a canal which extends towards the bottom and is delimited on the one hand by the outer peripheral surface of the outer piston and on the other by the bore of the guide sleeve, an oil passage opening into the central oil reservoir being provided at the end of the inner piston facing the bottom, characterized in that the guide sleeve is provided at its end near the bottom with an almost radially outwards directed flange situated at a distance from the bottom and extending up to the bore of the hollow cylindrical wall, and the guide sleeve being radially inward of the disk member and in direct contact with the outer piston.

4,951,620

## POSITIVE STARTING CIRCUIT

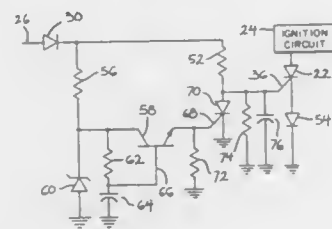
Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 22, 1988, Ser. No. 288,729

Int. Cl.<sup>5</sup> F02P 9/00

U.S. Cl. 123—179 BG

1 Claim



1. A positive starting circuit for a multi-cylinder two-cycle internal combustion engine subject to starter kick-out during initial cranking of the engine subject to starter kick-out during charge in a cylinder which is ignited by an ignition circuit and causes kick-out of the starter, wherein the following cylinder does not have a combustible charge and the engine ceases running, thus requiring re-engagement of the starter to start the engine, said positive starting circuit comprising a kill switch coupled to said ignition circuit and having a first state disabling ignition and a second state enabling ignition, initiating means responsive to initial cranking of said engine and triggering said kill switch to said first state, delay means responsive to said initiating means to initiate a delay interval and triggering said kill switch to said second state at the end of said delay interval, such that ignition of residual combustible charge in a cylinder

is prevented upon initial cranking, wherein said delay interval is chosen to be long enough to permit sufficient combustible charge to be developed in the remaining cylinder before ignition is enabled;

wherein said kill switch comprises a semiconductor switch having a control terminal controlling the conduction state thereof between said first and second states, said delay means comprises a timing circuit connected between said semiconductor switch and said initiating means;

wherein said timing circuit comprises a second semiconductor switch connected between said control terminal of said first mentioned semiconductor switch and said initiating means, a charging capacitor connected to said second semiconductor switch and controlling the conduction state thereof such that said second semiconductor switch is in a first state upon initial cranking of the engine and triggers said first semiconductor switch to its said first state, and such that during initial cranking said capacitor charges to a given voltage and triggers said second semiconductor switch to a second state at the end of said delay interval which triggers said first semiconductor switch to its said second state;

comprising a third semiconductor switch connected between said first and second semiconductor switches and having a first state upon initial cranking of the engine triggering said first semiconductor switch to its said first state, said third semiconductor switch being responsive to said switching of said second semiconductor switch to its said second state to switch to a second state of said third semiconductor switch to trigger said first semiconductor switch to its said second state;

wherein said initiating means and said third semiconductor switch are connected to said control terminal of said first semiconductor switch, and wherein said third semiconductor switch has a control terminal connected to said second semiconductor switch, and wherein said initiating means is connected to said second semiconductor switch, and wherein said second semiconductor switch has a control terminal connected to said capacitor;

wherein said first semiconductor switch is conductive in its said first state and nonconductive in its said second state, said second semiconductor switch is nonconductive in its said first state and conductive in its said second state, said third semiconductor switch is nonconductive in its said first state and conductive in its said second state, such that at initial cranking, a trigger signal from said initiating means is applied to said control terminal of said first semiconductor switch to turn the latter on to short said ignition circuit, and wherein said capacitor begins charging and when it charges to a given voltage said second semiconductor switch turns on which in turn turns on said third semiconductor switch which diverts said trigger signal away from said control terminal of said first semiconductor switch to turn the latter off.

4,951,621

## FOUR STROKE INTERNAL COMBUSTION ENGINE

Takao Tomita, Saitama; Masaaki Matsuura, Tokyo; Makoto Hirano, Saitama; Masao Handa, Tokyo, and Tomoo Shiozaki, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 14,707, Feb. 13, 1987, abandoned, which is a division of Ser. No. 823,337, Jan. 28, 1986, Pat. No. 4,671,228. This application Apr. 13, 1988, Ser. No. 183,445

Claims priority, application Japan, Jan. 29, 1985, 60-13513; Feb. 13, 1985, 60-25807; Feb. 13, 1985, 60-25808

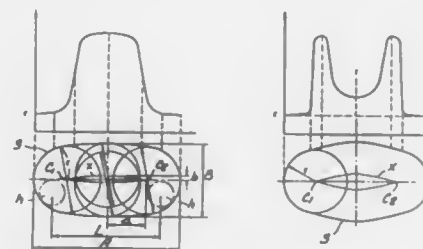
Int. Cl.<sup>5</sup> F02F 1/00

U.S. Cl. 123—193 C

2 Claims

1. For use in an internal combustion engine having a piston adapted to reciprocate in a cylinder, a cylinder comprising an axially elongate bore having a cross section defined by a closed curve, said axially elongate bore being generated by a cutter constrained to move in a closed path of continuous curvature

inwardly of said bore to create said bore at a constant normal distance outwardly from the closed path, the closed path hav-



ing a major axis of symmetry and a minor axis of symmetry and approaching a constant radius curvature on opposite sides of said major axis of symmetry.

4,951,622

## CYLINDER HEAD FOR DOHC INTERNAL COMBUSTION ENGINE WITH FOUR VALVES PER CYLINDER

Yoshio Takahashi; Takashi Yanagisawa, and Eichi Fujisawa, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

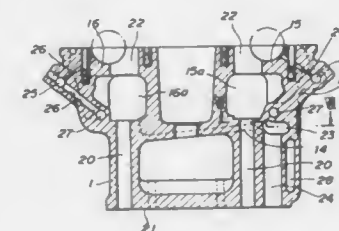
Filed Feb. 22, 1989, Ser. No. 313,424

Claims priority, application Japan, Feb. 22, 1988, 63-22068

Int. Cl.<sup>5</sup> F01M 1/00

U.S. Cl. 123—193 H

10 Claims



1. A cylinder head for a DOHC internal combustion engine of the type having four valves per cylinder, comprising:

a combustion chamber;  
two intake valve openings and two exhaust valve openings communicating with said combustion chamber;

two intake ports and two exhaust ports communicating with said intake valve openings and said exhaust valve openings, respectively;

two first supporting portions for slidably supporting two intake valves which open and close said intake valve openings;

two second supporting portions for slidably supporting two exhaust valves which open and close said exhaust valve opening;

a plurality of bearing portions for rotatably supporting thereon two camshafts for driving said intake valves and said exhaust valves, independently;

two third supporting portions for respectively supporting Y-shaped rocker arms for driving said two intake valves and said two exhaust valves, independently;

said third supporting portions being located outside of the axes of said camshafts;

a lower deck;

a plurality of head bolt disposed holes under said bearing portions, respectively and extending through said lower deck to open to the outside of said lower deck;

an upper deck;

a plurality of recesses disposed under said bearing portions and laterally outside of upper ends of said head bolt holes,

respectively and communicated with an upper side of said upper deck; and

a plurality of oil return passages disposed under said bearing portions and laterally outside of and in parallel with said head bolt holes to provide communication between said recess and a lower side of said lower deck.

4,951,623

## DOUBLE OVERHEAD CAMSHAFT ENGINE

Nobuhisa Jingu, Yokohama, and Yoshio Iwama, Nagareyama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

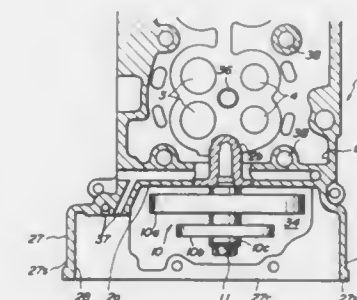
Filed Aug. 24, 1989, Ser. No. 397,854

Claims priority, application Japan, Sep. 1, 1988, 63-114019[U]

Int. Cl.<sup>5</sup> F02F 7/00

U.S. Cl. 123—193 H

10 Claims



1. A double overhead camshaft engine comprising:  
a cylinder head by which two camshafts are rotatably supported;

an idler gear through which said two camshafts are drivably connected with a crankshaft of the engine by drive chains;  
an idler gear installation bolt on which said idler gear is rotatably mounted, said idler gear installation bolt being fixedly secured only to a front end section of said cylinder head;

a surrounding wall structure disposed around said idler gear and extending from said cylinder head front end section in a direction of axis of said idler gear over said idler gear to form a front end section, said surrounding wall structure front end section defining an opening located on an opposite side of said cylinder head front end section with respect to said idler gear; and

a cover detachably disposed to close said opening of said surrounding wall structure front end section, said cover being spaced from said idler gear installation bolt.

4,951,624

## IGNITION CONTROL FOR AN ENGINE TO PREVENT OVERHEATING AND BACKFIRING

Yoshihide Hirano, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed May 24, 1989, Ser. No. 356,743

Claims priority, application Japan, May 24, 1988, 63-126324

Int. Cl.<sup>5</sup> F02B 77/00

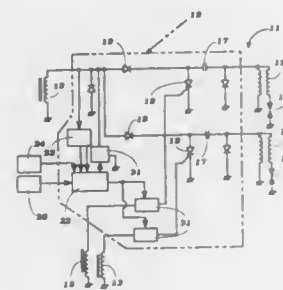
U.S. Cl. 123—198 D

4 Claims

1. In a control for a spark ignited engine having an exhaust system comprising an ignition circuit for firing a spark plug at a predetermined time in response to the output shaft angle of the engine and the speed of the engine, means for sensing an abnormal engine condition, means for effecting a change in the firing of said spark plug by said ignition circuit in response to the sensing of an abnormal condition for slowing the speed of the engine, and means for sensing a condition likely to cause

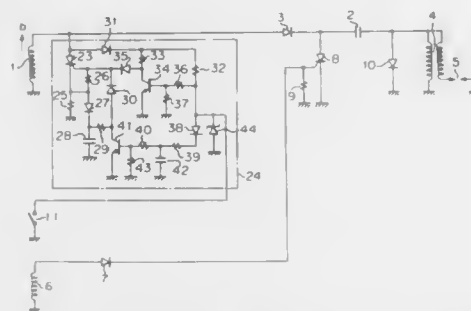


backfiring in said exhaust system in response to the operation of the means for effecting the change in the firing of said spark



plug to initiate an operation of the engine to prevent such backfiring.

**4,951,625**  
**INTERNAL COMBUSTION ENGINE STOP DEVICE**  
Hiroshi Okuda, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 6, 1989, Ser. No. 432,014  
Claims priority, application Japan, May 12, 1988, 63-63777[U]  
Int. Cl.<sup>5</sup> F02P 3/06, 11/00; F02B 77/08  
U.S. Cl. 123—198 DC



1. An internal combustion engine stop device comprising:
  - a power generation winding for generating electric power corresponding to the rotation of an engine and charging a capacitor for an ignition winding; and
  - a stop circuit for bringing the output of the power generation winding to a short-circuit state based on the actuation of the stop switch, wherein the stop switch is of a self-reset type, and wherein the stop circuit is constituted by a self-holding circuit for keeping the short-circuit state based on the actuation of the stop switch, and a delay circuit for actuating the self-holding circuit when a switched state of the stop switch is kept for a predetermined time.

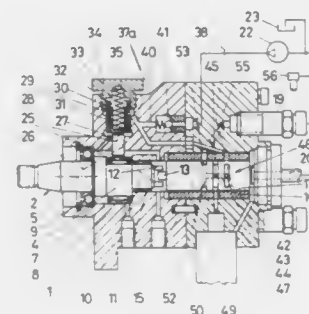
**4,951,626**  
**ELECTRICALLY CONTROLLED FUEL INJECTION PUMP**

Gottlob Haag, Markgroeningen; Ernst Linder, Muehlacker, and Helmut Rembold, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 299,587, Jan. 23, 1989, Pat. No. 4,879,984. This application Oct. 18, 1989, Ser. No. 423,062  
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804025; Oct. 22, 1988, 3836048; Dec. 31, 1988, 3844469  
Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123—300

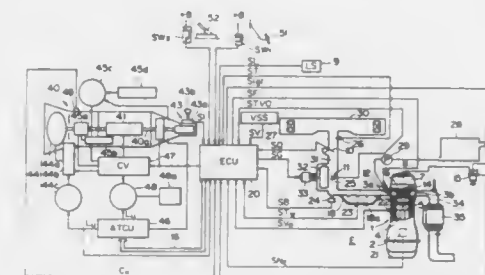
16 Claims



1. An electrically controlled fuel injection pump for direct fuel injection in internal combustion engines, which comprises a housing, a drive shaft in said housing, a drive cam on said drive shaft, a plurality of cylinder bores equally dispersed about said drive cam, pump pistons in each of said cylinder bores driven at a constant stroke by said drive cam rotated with said drive shaft, each of said pump pistons enclosing an associated pump piston work chamber pumping into said cylinder bore to pump fuel under injection pressure to an injection valve, a relief conduit extending from said pump piston work chamber to a low pressure chamber, an electrically controlled valve disposed to block a flow of fuel overflowing via said relief conduit, an overflow conduit into which a slide valve is disposed in said overflow conduit, said slide valve being moved in synchronism with said drive shaft to block communication between the pump work chambers and said overflow conduit; said overflow conduit having conduit segments, extending from the pump piston work chambers, a distributor driven in rotation by said drive shaft and embodied as a slide of a rotary slide valve, said overflow conduits discharge in a guide bore of said distributor, said distributor having a recess via which in a course of distributor rotation at least two at a time of said conduit segments of said overflow conduit of said pump pistons execute a pumping stroke that communicates with a distributor opening on said distributor, pressure lines juxtaposed said distributor, rotation of said distributor opening pressure lines that lead to injection sites which are connected to the overflow conduit in succession during the rotation of the distributor, an axial conduit (44) in said distributor, said axial conduit (44) of said distributor (46), discharging into control bores or control grooves (42, 47, 53) that are distributed over the circumference of the distributor (46) and communicating with the conduit segments (37a) originating at the pump piston work chambers (35) and cooperate with pressure lines (55) to said injection sites (56) and said axial conduit (44) is acted upon by the pump pressure of the pump pistons (29), said axial conduit (44) adjoined by at least one further control bore or control groove (57), which communicates with a pressure reservoir (62, 68).

**4,951,627**  
**ENGINE IDLING SPEED CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE**  
Yoji Watanabe, and Hiroyuki Ishibashi, both of Hiroshima, Japan, assignors to Mazda Motor Corp., Hiroshima, Japan  
Filed Sep. 18, 1989, Ser. No. 408,245  
Claims priority, application Japan, Sep. 16, 1988, 63-232988  
Int. Cl.<sup>5</sup> F02D 9/02  
U.S. Cl. 123—339

11 Claims



1. An engine idling speed control system for an internal combustion engine of an automotive vehicle equipped with an automatic transmission of a type having a torque converter, said idling speed control system comprising:
  - an engine operating condition detecting means for detecting at least an actual engine speed;
  - a vehicle speed detecting means for detecting a running speed of said vehicle;
  - an intake air feedback controlling system for increasingly or decreasingly controlling the amount of intake air fed to said internal combustion engine with an intake air controlling value increasingly or decreasingly variable in accordance with a difference between an actual engine speed detected by said engine speed detecting means and a predetermined engine idling speed even when said automatic transmission is shifted into a drive range, thereby controlling said internal combustion engine to drop speed to a desired engine idling speed; and
  - an intake air controlling value limiting means for limiting decreasing variations of said intake air controlling value to a limit value which is higher when said vehicle speed detecting means detects a running speed higher than a predetermined vehicle creeping speed than when said vehicle speed detecting means detects a running speed lower than said predetermined vehicle creeping speed.

**4,951,628**  
**IGNITION TIMING CONTROL DEVICE FOR AN INTERNAL COMBUSTION ENGINE**  
Atsuko Matsuoka, and Wataru Fukui, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 13, 1989, Ser. No. 421,034  
Claims priority, application Japan, Oct. 14, 1988, 63-257045  
Int. Cl.<sup>5</sup> F02P 7/067

U.S. Cl. 123—414

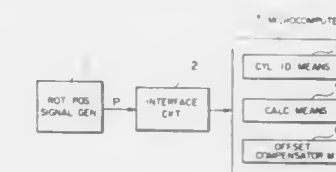
5 Claims

1. An ignition timing control device for controlling control timings of an ignition system of a multi-cylinder internal combustion engine, comprising:
  - a signal generator means, operatively coupled to a crankshaft of the internal combustion engine, for generating pulses whose leading and trailing edges correspond to first and second rotational positions of the crankshaft of the internal combustion engine with respect to respective cylinders thereof, said second positions occurring after respective first positions in a neighborhood of a top dead center between a compression stroke and a combustion stroke of respective cylinders, said first positions of the crankshaft being equal to each other with respect to all the cylinders of the engine, and said second positions of the crankshaft being equal to each other with respect to the

cylinders except for a predetermined specific cylinder, wherein the second rotational position of the crankshaft with respect to the predetermined specific cylinder is displaced by an offset angle, compared with the second rotational positions of the crankshaft with respect to the other cylinders;

cylinder identifying means, coupled to said signal generator means for identifying those pulses of said signal generator means whose leading and trailing edges correspond to the first and second rotational positions of the crankshaft with respect to said specific cylinder;

offset compensator means, coupled to said cylinder identifying means, for determining, in response to an identification of the specific cylinder by the cylinder identifying means, time intervals that should lapse from the second rotational position of the crankshaft with respect to the specific



cylinder to normal control timings of the ignition system, wherein said time intervals are compensated for the offset angle of the second rotational position with respect to the specific cylinder; and

timing determination means, coupled to said signal generator means, cylinder identifying means, and said offset compensator means, for determining the control timings of the ignition system with said first and second rotational positions of the crankshaft as reference points, wherein said timing determination means determines, in cases where the second rotational positions of the crankshaft with respect to respective cylinders are utilized as reference points, the control timings in accordance with the compensated time intervals determined by said offset compensator means in response to an identification of a pulse corresponding to said specific cylinder by said cylinder identifying means.

**4,951,629**  
**IGNITION TIMING SYSTEM**  
Mac P. McAbee, 4014 Lincoln Pl., Dr., Des Moines, Iowa 50312, and Scott G. Campbell, 2518 NE, 102nd Ave., Ankeny, Iowa 50021

Filed Dec. 8, 1989, Ser. No. 447,787  
Int. Cl.<sup>5</sup> F02P 5/06

U.S. Cl. 123—414

11 Claims

1. An ignition timing system for an internal combustion engine having at least one cylinder, a piston mounted within said cylinder for reciprocating movement therein, and a camshaft connected to said piston, said camshaft being rotatable 360 degrees during reciprocating movement of said piston and having a zero degree rotational position corresponding to a

1. A method for conducting a hot start in an internal combustion engine having a motor control system that increases a quantity of fuel injected into said engine during said hot start said method comprising the steps of:

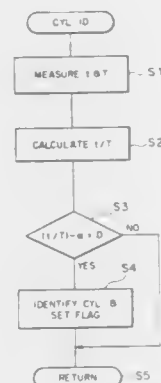
- monitoring a coolant temperature and an intake air temperature of said engine during a post-operation time occurring after said engine is turned off;
- recognizing a hot start condition when said coolant temperature and said intake temperature have both reached respective predetermined limit values, each at least once during said post-operation time;
- storing a hot start identifier when said hot start condition is present; and
- executing a hot start in succeeding starts of said engine when said coolant temperature is equal to or greater than a second predetermined limit value, and the hot start identifier is stored.



1. A rotational position detector device for detecting a rotational position of a crankshaft of a multicylinder internal combustion engine, said detector device comprising:

a signal generator means, operatively coupled to the crankshaft of the internal combustion engine, for generating pulses whose leading and trailing edges correspond to first and second rotational positions of the crankshaft of the internal combustion engine with respect to respective cylinders, thereof, said second positions occurring after respective first positions in a neighborhood of a top dead center between a compression stroke and a combustion stroke of respective cylinders, said first positions of the crankshaft being equal to each other with respect to all the cylinders of the engine, said second positions of the crankshaft being equal to each other with respect to the cylinders except for a predetermined particular cylinder, wherein the second rotational position of the crankshaft with respect to the predetermined particular cylinder is displaced to a retarding side compared with the second rotational positions of the crankshaft with respect to the cylinders other than said predetermined particular cylinder; and

cylinder identifying means, coupled to said signal generator means, for determining those pulses of said signal genera-



tor means whose leading and trailing edges correspond to the first and the second rotational positions of the crankshaft with respect to said predetermined particular cylinder, wherein said cylinder identifying means includes:

first time measurement means, coupled to said signal generator means, for determining a pulse width of each pulse of the signal generator means;

second time measurement means, coupled to said signal generator means, for determining each period between leading edges of two successive pulses;

calculation means, coupled to said first and second time measurement means, for calculating each ratio of the pulse width to the period between leading edges of two successive pulses; and

comparison means, coupled to said calculation means, for comparing to a predetermined level each ratio of the pulse width to the period between leading edges of two successive pulses, wherein pulses having said ratio greater than said predetermined level are judged to be those whose leading and trailing edges correspond to the first and the second rotational position of the crankshaft with respect to said predetermined particular cylinder.

4,951,640  
METHOD OF CONTROLLING IGNITION OF INTERNAL COMBUSTION ENGINE

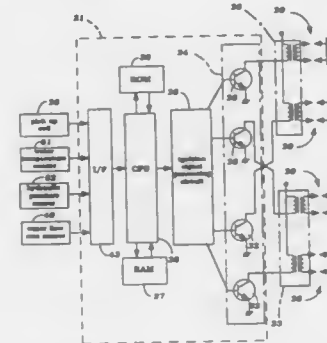
Itsushi Hirukawa; Satoshi Aoki, and Noboru Kudoh, all of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 8, 1989, Ser. No. 405,563

Claims priority, application Japan, Sep. 9, 1988, 63-225963  
Int. Cl.<sup>5</sup> F02P 9/00

U.S. Cl. 123—335

14 Claims



1. In an engine control system for an internal combustion engine having an exhaust system, an ignition system, means for sensing an abnormal engine running condition, means responsive to a sensed abnormal engine running condition for reducing engine speed by effecting misfiring of the ignition system and for retarding the spark advance of said ignition system for reducing the likelihood of backfiring occurring in said exhaust system, and means for sensing a condition indicative of an overtemperature in said exhaust system for returning the spark advance toward normal during the speed reduction mode.

4,951,641  
IGNITION COIL ASSEMBLY STRUCTURE FOR AN INTERNAL COMBUSTION ENGINE

Tadao Takaishi, and Tomokazu Umezaki, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

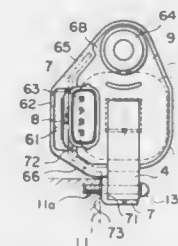
Filed Feb. 22, 1990, Ser. No. 484,609

Claims priority, application Japan, Feb. 23, 1989, 1-41885; Feb. 23, 1989, 1-41886

Int. Cl.<sup>5</sup> F02P 3/04; H01F 31/00

U.S. Cl. 123—647

6 Claims



1. An ignition coil assembly structure for an internal combustion engine, adapted to be attached to an attachment portion of a structure including the internal combustion engine, said ignition coil assembly comprising:

a rectangular core having a leg portion and a yoke portion running parallel to said leg portion;

a coil assembly wound around said leg portion of the rectangular core, said coil assembly including a primary and a secondary coil for generating a high ignition voltage;

a casing accommodating therein the coil assembly and said leg portion of the core, leaving exposed to an outside of

the casing at least a portion of said yoke portion of the core, and forming therewithin a space between an outer side surface of the coil assembly and a side wall of the casing;

a plate-shaped heat sink of a good heat-conducting material abutting on said yoke portion of the core at an end portion thereof, said heat sink extending within the casing between the coil assembly and the casing through said space, to form within said space a hollow receptacle between opposing surfaces of the casing and the heat sink, the ignition coil assembly structure being adapted to be attached to said attachment portion at a surface of the heat sink opposite to a surface abutting on said yoke portion of the core; and

a control circuit portion controlling the primary current flowing through the primary coil of said coil assembly, the control circuit portion being disposed on said heat sink within said hollow receptacle.

4,951,642  
COMBUSTION CHAMBER OF INTERNAL COMBUSTION ENGINE

Noboru Hashimoto; Yasuhiro Yuzuriha; Katsumi Okazaki, and Tetsuo Fukube, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

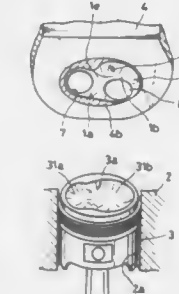
Filed Nov. 20, 1989, Ser. No. 438,257

Claims priority, application Japan, Nov. 19, 1988, 63-292809; Nov. 29, 1988, 63-303306; Nov. 30, 1988, 63-304611

Int. Cl.<sup>5</sup> F02B 23/00

U.S. Cl. 123—657

11 Claims



1. A combustion chamber structure for an internal combustion engine comprising a cylinder head having a bottom surface for defining an upper portion of a combustion chamber, a piston disposed in a bore of a cylinder block for reciprocating movement and having a top surface for defining a lower portion of the combustion chamber, an intake recess formed in the cylinder head for an intake port of the combustion chamber to define a part of the upper portion of the combustion chamber, an exhaust recess formed in the cylinder head for an exhaust port to define a part of the upper portion of the combustion chamber, said intake recess being smaller than said exhaust recess in diameter, an extended wall portion formed at a boundary portion between the intake and exhaust recess in the cylinder head to extend along the intake port and project into the exhaust recess, and an ignition plug arranged in the vicinity of a tip end of the extended wall portion.

4,951,643  
FUEL VAPOR TREATMENT APPARATUS

Hideori Sato, Kariya; Takashi Umeno, Chiryu; Michiyasu Nosaka, Kariya, and Nobuhiko Koyama, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

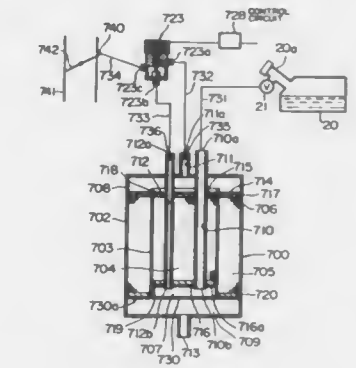
Filed Sep. 16, 1988, Ser. No. 245,166

Claims priority, application Japan, Sep. 16, 1987, 62-231348; Mar. 28, 1988, 63-73973; Mar. 29, 1988, 63-75553; Jul. 20, 1988, 63-180627

Int. Cl.<sup>5</sup> F02M 39/00

U.S. Cl. 123—520

9 Claims



1. A fuel vapor treatment apparatus for a vehicle comprising:

a casing in which a first space, a first fuel vapor adsorbent, a second space, a second fuel vapor adsorbent, and a third space are disposed in such a manner that they communicate with each other in succession, said casing having an inlet port which opens into said first space and which is connected to a fuel tank, an air port which opens into said third space which communicates with the atmosphere, and a purge port which opens into said first space and through which the fuel vapor adsorbed by said first and second fuel vapor adsorbent are drawn to enter a suction pipe by a vacuum in said suction pipe, wherein said first space acts as a diffusing chamber in which the fuel vapor introduced through said inlet port diffuses to allow a component of the fuel vapor velocity in the direction in which the fuel vapor is adsorbed by said adsorbent to be reduced, wherein said casing has a second purge port which opens into said first space and through which the fuel vapor adsorbed by said fuel vapor adsorbent is drawn to enter said suction pipe by virtue of the vacuum in said suction pipe, and a conduit which connects said purge port and said second purge port to said suction pipe which incorporates an opening means adapted to provide connection between said pipe and said second purge port which is switched-over in accordance with the running state of the vehicle.

4,951,644  
PNEUMATIC LAUNCHER

David R. Bon, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1984, Ser. No. 633,361

Int. Cl.<sup>5</sup> F41B 11/06

U.S. Cl. 124—75

5 Claims

1. A pneumatic launcher comprising:

a source of pressurized gas;

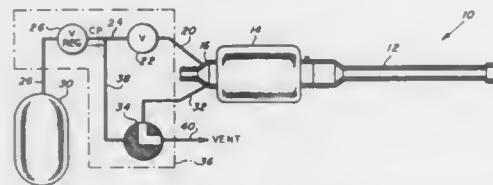
a tubular barrel for receiving an object to be launched;

a breech body connected to said barrel and having an axial first bore opening into said barrel;

a reservoir chamber defined in said breech body for storing gas under pressure;



charging valve means for charging said reservoir chamber with gas from said source;  
 a piston housing extending through said reservoir chamber and having an axial, stepped second bore including an enlarged diameter portion and a smaller diameter portion, said smaller diameter portion opening into said first bore, said piston housing having first port means defined therein between said chamber and said smaller diameter portion of said second bore;  
 a piston disposed in said larger diameter portion of said second bore and a first valve member connected for movement with said piston and having a normal position occluding said first port means;  
 first spring means yieldably urging said piston to said normal position;  
 passage means in said piston housing communicating with said second bore on the side of said piston opposite said first spring means;  
 venting and discharge valve means, connected to and cooperable with said passage means and said source, for alternatively venting said passage means to ambient pressure



or placing said passage means in communication with pressurized gas so as to move said piston and said first valve member from said normal position, whereby pressurized gas flows from said chamber through said first port means to effect increase in pressure in said barrel for expulsion of said object therefrom; and  
 throttling valve means mounted in said axial first bore of said breech body and comprising a throttling valve body having an axial third bore and having second port means communicating between said first and said third bores, a throttling valve member disposed in said third bore and having third port means in registration with said second port means when said throttling valve member is in a fully open position, and second spring means yieldably urging said throttling valve member to said full open position, said throttling valve member being responsive to increases in pressure in said barrel to move away from said fully open position to a throttling position limiting flow of pressurized gas through said second and third port means to said barrel, whereby the pressure in said barrel is limited to a predetermined maximum.

4,951,645

#### STACKED DUAL MODULE COMMERCIAL HOT AIR IMPINGEMENT COOKING OVEN

Clement J. Laebke, Burlington, Vt.; Gerald W. Sank, Pasadena, Md., and Frank A. Slade, Mountain Top, Pa., assignors to Welbilt Corporation, New Hyde Park, N.Y.

Continuation-in-part of Ser. No. 279,094, Dec. 2, 1988. This application Dec. 13, 1988, Ser. No. 283,783

Int. Cl.<sup>5</sup> A21B 1/08

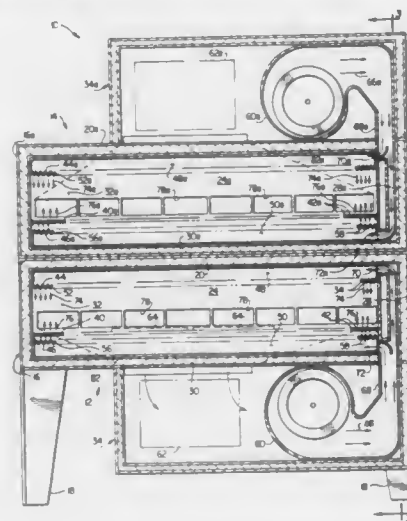
U.S. Cl. 126—20.1

14 Claims

1. A dual module, hot air impingement cooking oven comprising:

a lower module having a main housing supportable in an elevated position by floor support legs secured thereto and having an internal cooking chamber, a relatively large area heat conductive food support plate member horizontally supported in said cooking chamber, and a fan and heater housing depending from said main housing; and  
 an upper module having a main housing substantially identical

to said lower module main housing and removably stacked thereon, said upper module main housing having an internal cooking chamber in which a relatively large area heat conductive food support plate is horizontally supported, a top side wall, and a fan and heater housing secured to and projecting upwardly from said top side wall and being substantially identical to said lower module fan and heater housing, said lower and upper modules having substantially identical internal air handling and heating components which include:  
 means including fan and heater means disposed in said fan and heater housings, for creating in said lower and upper modules recirculating flows of heated air, at food cooking temperatures, which traverse said cooking chambers, and



multiple jet forming means, disposed in said cooking chambers on opposite sides of said food support plate members, for converting portions of said recirculating flows of heated air into mutually spaced series of relatively high velocity heated air impingement jets which strike and evenly blanket major portions of the upper and lower side surfaces of said food support plate members in a manner transferring air heat to said food support plate members without requiring movement of the supported food items within said cooking chambers and essentially regardless of the horizontal positioning of the food items on said support plate members.

4,951,646

#### VENTILATED GLASS-TOP COOKING UNIT

Helmuth Diekmann, Menden; Gunter Krohn, Hemer, and Wilhelm Cramer, Sundern, all of Fed. Rep. of Germany, assignors to Cramer GmbH & Co. Kommanditgesellschaft, Menden, Fed. Rep. of Germany

Filed Nov. 28, 1989, Ser. No. 441,902

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1988, 3844081

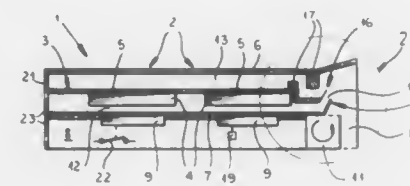
Int. Cl.<sup>5</sup> F24C 3/00

U.S. Cl. 126—39 J

10 Claims

1. A cooking unit comprising:  
 a housing having a front and a rear and formed at the rear with an upwardly open upright vent passage;  
 a ceramic panel on the housing defining a plurality of cooking spots;  
 a burner plate in the housing spaced underneath the panel

and defining therewith an upper compartment opening upward into the passage;  
 respective gas burners supported on the plate underneath the spots, whereby the burners can heat the respective spots of the panel;  
 an equipment plate in the housing spaced underneath the burner plate and defining therewith an intermediate compartment also opening upward into the passage, the equipment plate defining beneath itself in the housing a lower compartment that is open to the outside at the front of the housing;



control equipment in the lower compartment of the housing;  
 a blower in the lower compartment having an intake therein and an outlet in the vent passage; and  
 means for powering the blower and thereby drawing a primary stream of air in from the front of the housing and through the lower compartment and expelling it upward into the passage and for aspirating secondary streams of air from the upper and intermediate compartments by venturi action of the primary stream in the passage.

4,951,647

#### ENGINE CONTROL APPARATUS

Koji Ezumi, Odawara; Masaaki Miyazaki, Himeji; Shotchi Washino, Amagasaki, and Hajime Kako, Himeji, all of Japan, assignors to Mikuni Corporation and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

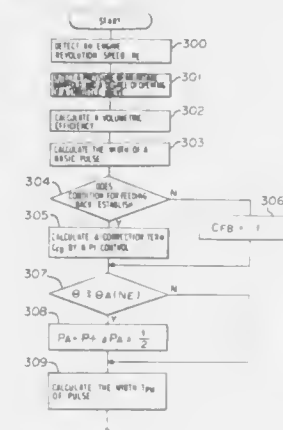
Filed May 5, 1989, Ser. No. 347,626

Claims priority, application Japan, May 6, 1988, 63-110045; May 6, 1988, 63-110046; May 6, 1988, 63-110047; May 6, 1988, 63-110048

Int. Cl.<sup>5</sup> F02D 41/04, 41/26

U.S. Cl. 123—494

18 Claims



1. An engine control apparatus which comprises:  
 a throttle valve sensor for detecting a degree of opening of a throttle valve for limiting a quantity of intake air to an engine,  
 a pressure sensor for detecting a pressure in an air intake manifold, as a value of the absolute pressure, contiguous to an intake air passage at a downstream side of said throttle valve,

an engine revolution speed detecting means for detecting a revolution speed of the engine,  
 a zone detecting means which receives a signal representing a degree of opening of the throttle valve ( $\theta$ ) from said throttle valve sensor and a signal representing the engine revolution speed ( $N_e$ ) from said engine revolution speed detecting means and detects when the values of said signals fall in an atmospheric pressure detection zone determined by a relation of the engine revolution speed and the degree of opening of the throttle valve at which a pressure loss in said intake air passage is at a specified value ( $\Delta P_A$ ) or lower, and  
 a processing unit which receives a detection signal from said zone detecting means and calculates an atmospheric pressure by adding a set value ( $\Delta P_A/2$ ) to a signal representing pressure from said pressure sensor.

4,951,648

#### CONVEYOR OVEN

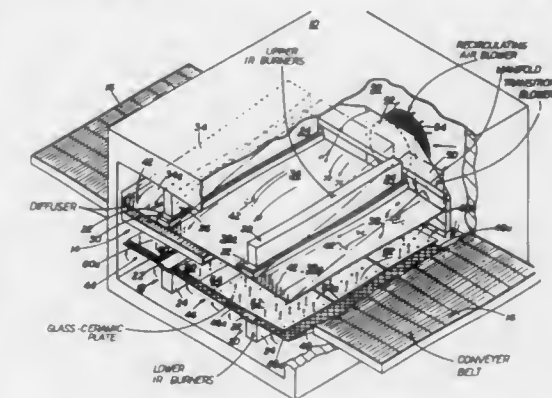
Kailash C. Shukla, Stow; James R. Hurley, Weymouth; Conrad J. Orcheski, Maynard, and Michael P. Grimsalis, Medford, all of Mass., assignors to Tecogen, Inc., Waltham, Mass.

Filed Mar. 23, 1989, Ser. No. 327,825

Int. Cl.<sup>5</sup> A21B 1/00; F24C 15/32

U.S. Cl. 126—21 A

49 Claims



1. A conveyor oven, comprising a cabinet defining an oven tunnel for receiving food products;  
 a conveyor for moving food products along a cooking path in said tunnel,  
 at least one composite heating unit in said cabinet on either side of said cooking path, said heating units each including at least two spaced elongated forced air convection ducts, each having a porous wall facing said cooking path and defining a plurality of openings for directing parallel streams of hot air toward the food products, and between said ducts, an infrared (IR) strip heater element substantially coextensive with the width of said oven tunnel; and  
 a primary source of input heat energy for said IR heater separate from and independent of said ducts,  
 said oven operable to heat food products on the conveyor simultaneously by convective energy and infrared radiant energy.

4,951,649

#### METHOD AND APPARATUS FOR HEATING AND GENERATING INFRARED RAYS

Katsuyoshi Inouchi, 1-2-601, Namiki 2-chome, Kanazawa-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Feb. 3, 1988, Ser. No. 152,035

Claims priority, application Japan, Feb. 6, 1987, 62-024645

Int. Cl.<sup>5</sup> F24C 3/00

U.S. Cl. 126—91 A

20 Claims

1. In a heating system which produces far infrared rays: combustion chamber means for burning fluid fuel with a

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UMI

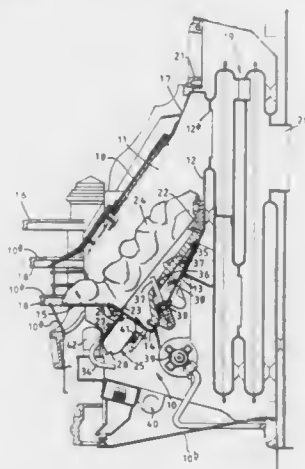
fuel-air ratio not greater than 1.6, said combustion chamber means having an exhaust outlet, fluid chamber means associated with said combustion chamber means for carrying away so much heat from said combustion chamber means so that the temperature at said exhaust outlet is reduced at least as low as 800° C. above ambient and

radiating means for radiating infrared rays in which most of the radiated energy has a wavelength in the far infrared range, said radiating means comprising an exhaust system which receives exhaust gases from said exhaust outlet and directs them along a circuitous path to provide an extended radiating area.

**4,951,650**  
**GAS FIRE APPLIANCE**  
Michael Boyes, Derby; Alan M. Lloyd; Martin L. Smith, both of Birmingham, and Alan Constable, Coleshill, all of England, assignors to Valor Heating Limited, England  
Filed Mar. 10, 1989, Ser. No. 322,072  
Claims priority, application United Kingdom, Mar. 16, 1988, 8806228

Int. Cl.<sup>5</sup> F24C 3/00  
U.S. Cl. 126—92 R

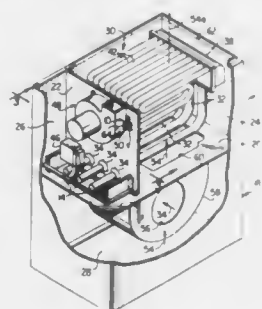
11 Claims



1. A gas fire appliance comprising a casing including inclined support means on which solid fuel simulating elements are supported, a heater burner, to which, in use, gas to be burnt is supplied, the heater burner being arranged to direct gas to be burnt below the solid fuel simulating elements for the purpose of heating those elements, at least one flame effect burner remote from the heater burner for producing a visible flame effect between and/or in front of the solid fuel simulating elements, said casing having an angled rear face, said member being supported by the angled rear face of the casing, and the or each flame effect burner projecting through said member.

**4,951,651**  
**VENT OVERPRESSURIZATION DETECTION SYSTEM FOR A FUEL-FIRED, INDUCED DRAFT FURNACE**  
Timothy J. Shellenberger, Fort Smith, Ark., assignor to Rheem Manufacturing Company, New York, N.Y.  
Filed Sep. 28, 1989, Ser. No. 413,989  
Int. Cl.<sup>5</sup> F24H 3/00  
U.S. Cl. 126—116 R

20 Claims



1. A fuel-fired, induced draft furnace comprising: a heat exchanger through which hot combustion products may be flowed; a burner operative to generate hot combustion products; a supply air blower operative to flow air externally across said heat exchanger; a draft inducer fan connected to said heat exchanger and operative to draw hot burner combustion products there-through, said draft inducer fan having an outlet section connectable to an exhaust flue to discharge hot burner combustion products from said outlet section into and through the exhaust flue, said outlet section having a positive internal pressure during operation of said burner and said draft inducer fan; and safety means for detecting a flow restriction within the exhaust flue, during operation of said burner and said draft inducer fan, and responsively deactivating said burner, said safety means including: means for creating an inflow of ambient air along an external flow path into said outlet section of said draft inducer fan during normal burner combustion product discharge flow through the exhaust flue, means for terminating said ambient air inflow, and creating an outflow of hot burner combustion products from said outlet section of said draft inducer fan along said external flow path, in response to an increased combustion product flow resistance within the exhaust flue, and temperature sensing means, positioned in said external flow path to sense the temperature therein, for deactivating said burner in response to a sustained outflow of hot combustion products from said outlet section of said draft inducer fan along said external flow path.

**4,951,652**  
**DOMESTIC OVEN WINDOW HAVING A LOW TEMPERATURE EXTERNAL SURFACE**  
Bruno Ferrario, and Fabrizio Doni, both of Milan, Italy, assignors to SAES Getters SpA, Milan, Italy  
Filed Jul. 1, 1988, Ser. No. 214,487  
Claims priority, application Italy, Jul. 17, 1987, 21337 A/87  
Int. Cl.<sup>5</sup> F23M 7/00

U.S. Cl. 126—200

9 Claims

1. A window for a domestic oven, said window comprising: A. an internal glass wall; and B. an external glass wall substantially parallel to the internal glass wall; spaced from the internal glass wall; said external glass wall having an internal surface having thereon a layer of material which reflects radiation in the infra-red range and is transparent to visible radiation; and

C. a peripheral edge uniting the internal glass wall and the external glass wall and defining a space in which is:

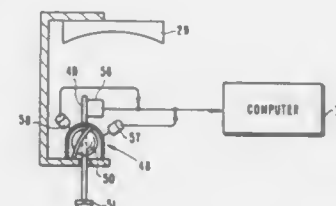


1. a vacuum; and  
2. a non-evaporable getter material.

**4,951,653**  
**ULTRASOUND BRAIN LESIONING SYSTEM**  
Francis J. Fry, and Narendra T. Sanghvi, both of Indianapolis, Ind., assignors to Laboratory Equipment, Corp., Mooresville, Ind.

Filed Mar. 2, 1988, Ser. No. 163,260  
Int. Cl.<sup>5</sup> A61B 17/00  
U.S. Cl. 128—24 A

8 Claims



1. A non-invasive ultrasound treatment system for translating visualization data of a diseased site in a patient into movement data for guiding an ultrasound transducer relative to said diseased site for treatment thereof, said ultrasound apparatus comprising: transducer control means for an ultrasonic transducer moving said ultrasound transducer relative to said diseased site; data transfer means for converting visualization data of the diseased site into spatial coordinate data and placing said spatial coordinate data into said transducer control means; fixation means adapted to be attached to the patient and including landmark reference elements, said fixation means enabling a spatial relationship between said patient and said reference elements to be established; and spatial translation means coupled to said transducer control means and designed and arranged for contacting with said landmark reference elements for establishing a spatial frame of reference for said ultrasound transducer relative to said patient and in turn relative to said diseased site.

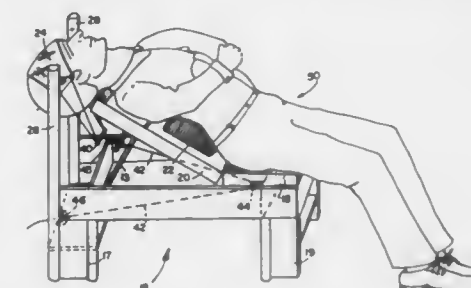
**4,951,654**  
**TRACTION TABLE**  
Anthony G. Gambale, 11 Stratford Ave., Avon, Mass. 02322, and Dwight J. DeGeorge, 10 Kings Rd., Lynnfield, Mass. 01024  
Filed Jul. 24, 1989, Ser. No. 383,407  
Int. Cl.<sup>5</sup> A61H 1/02

U.S. Cl. 128—75

11 Claims

1. An extension traction table for directing the spine of a person toward an optimum shape and alignment comprising a horizontal support surface for supporting the buttocks of the person, one end of a backwardly inclined surface connected to and disposed at an angle to said horizontal support surface for

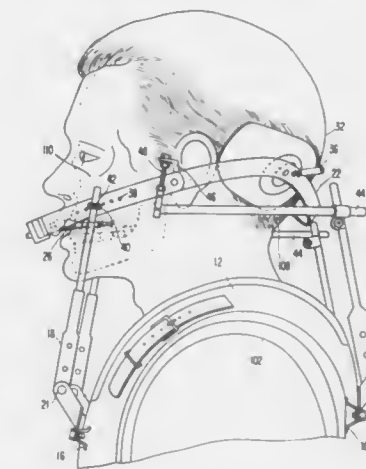
supporting the back of said person at an acute angle to said horizontal support surface, said inclined surface being of a length permitting the head of said person to extend beyond the other end thereof, means for positioning at least one fulcrum cushion between the selected points on said inclined surface and the back of said person, a forehead sling disposed above said person and the extension traction table, means connected



between said forehead sling and said table for pulling said sling substantially in the direction of said buttocks, whereby compressive extension force are applied to the forehead of said person and extension traction is applied to the spine of said person, and means for adjustably positioning fulcrum cushion whereby a predetermined curve may be imparted to said spine of said person.

**4,951,655**  
**MAXILLARY FIXED CERVICAL SPINE ORTHOSIS**  
Michael MacMillan, both of Gainesville, Fla., assignor to University of Florida, Gainesville, Fla., by said Michael MacMillan  
Filed Mar. 27, 1989, Ser. No. 329,278  
Int. Cl.<sup>5</sup> A61F 5/08  
U.S. Cl. 128—76 R

19 Claims



1. A cervical spine orthosis comprising: upper body engaging means for securely engaging an upper body of a wearer of said orthosis; maxillary tooth splint means for securely engaging a plurality of superior maxillary teeth of said wearer; occipital bone support means for engaging a posterior portion of a head of said wearer at a region where an occipital bone of said wearer's skull is located; and means rigidly connecting said maxillary tooth splint means and said occipital support means to said upper body engaging means, wherein relative movement between said maxillary tooth splint means, said occipital support means



and said upper body engaging means is substantially prohibited.

# 4,951,656 ORTHOPAEDIC STRUCTURES FROM POLYMERIC MATERIALS

Robert J. Gorka, Leominster, and Ervin R. Dan, Lexington, both of Mass., assignors to Polysar Financial Services S.A., Fribourg, Switzerland

Filed Nov. 9, 1988, Ser. No. 269,118  
Int. Cl.<sup>5</sup> A61F 5/04

U.S. Cl. 128—90

4 Claims

1. A method of producing an orthopaedic structure which is substantially transparent, formable and reformable at temperatures of from about 45° to about 65° C., essentially rigid at ambient temperatures of below about 30° C. and which has a desirable balance of strength properties, which method comprises:

- providing a sheet of polymeric material,
- heating said sheet to a temperature of from about 45° to about 65° C.,
- shaping said heated sheet to form the orthopaedic structure about the desired part of the body, and
- allowing the so-shaped orthopaedic structure to cool to below about 30° C.,

wherein said polymeric material comprises as the essential components, all parts being parts by weight, (A) from about 55 to 70 parts of styrene, (B) from 0 to about 10 parts of methyl methacrylate, (C) from about 15 to about 40 parts of a C<sub>2</sub>-C<sub>8</sub> alkyl acrylate and (D) from about 2 to about 15 parts of one or more block copolymer selected from the group consisting of styrene-butadiene, styrene-butadiene-styrene and styrene-isoprene block copolymers having a weight average molecular weight of not less than about 75,000 and a styrene content of about 20 to about 50 weight per cent, for a total of 100 parts, said polymeric material being produced by the polymerization of A, B and C in the presence of D to produce a polymeric material containing said block copolymer having grafted thereto at least a portion of A, B, and C.

# 4,951,657 HEAT SEALABLE MEMBRANE FOR TRANSDERMAL DRUG RELEASE

William R. Pfister, Bay City; Chi-Long Lee, and Gerald A. Gornowicz, both of Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 22, 1988, Ser. No. 184,750  
Int. Cl.<sup>5</sup> A61K 9/00

U.S. Cl. 128—156

10 Claims

1. In a transdermal drug delivery system, comprising in combination:

- an impermeable backing member;
  - a release rate controlling membrane heat and pressure sealed to said backing member without the use of a separate adhesive;
  - a reservoir positioned between said backing member and said membrane containing a medicinally active ingredient;
  - means to attach said system to the skin of a patient;
- said member comprising a substantially linear block copolymer which is a reaction product of a polydiorganosiloxane oligomer which forms soft segments in a said reaction product and a diisocyanate which forms hard segments, said copolymer having a glass transition temperature between 75° C. and 200° C. said soft segments comprising from 60 to 90 percent by weight, based on the weight of said copolymer and said hard segments comprising from about 10 to 40 percent by weight thereof.

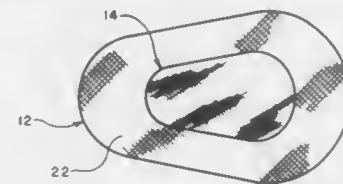
# 4,951,658 EYE PATCH WITH HYDROCOLLOID ADHESIVE

Kirk M. Morgan, 6811 Mayfield Rd. #1679, Mayfield Heights, Ohio 44124, and Richard E. Wyszynski, 3508 Woodridge Rd., Cleveland Heights, Ohio 44121

Continuation of Ser. No. 188,412, Nov. 6, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,117  
Int. Cl.<sup>5</sup> A61F 13/12

U.S. Cl. 128—163

4 Claims



1. An eye patch for covering an individual's eye comprising: a backing member, and an inner member, wherein said backing member includes a layer of polymeric foam, and a pressure sensitive hydrocolloidal adhesive, said backing member being dimensioned to engage an individual's skin surrounding the eye, and wherein said inner member is made of a fabric like material which is attached to said adhesive inwardly of the periphery of said backing member, said inner member being dimensioned to protect an individual's eyelid, and wherein further, a portion of said eye patch disposed over the individual's eyelid is substantially opaque.

# 4,951,659 NEBULIZER WITH COOPERATING DISENGAGEABLE ON-LINE HEATER

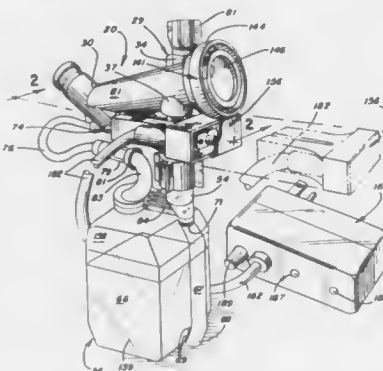
Gerhard H. Weller, South Barrington, and Henry Komendowski, Des Plaines, both of Ill., assignors to Automatic Liquid Packaging, Inc., Woodstock, Ill.

Filed Nov. 4, 1988, Ser. No. 267,071

Int. Cl.<sup>5</sup> A61M 11/02, 16/10

U.S. Cl. 128—200.18

15 Claims



1. A nebulizer device for use in inhalation therapy comprising in combination:
  - a hollow, elongated housing defining a mixing chamber communicating and serially interconnected with a droplet disengaging chamber, disposed relative to said mixing chamber at an angle less than a straight angle; said mixing chamber having an ambient air inlet aperture and said droplet disengaging chamber having an outlet port;
  - an elongated manifold body mounted in said housing and

extending transversely through said mixing chamber; said manifold body defining therewithin:

- (1) a nebulizing chamber situated in a mid-region thereof,
- (2) a gas conducting channel extending from one end of said manifold body to said nebulizing chamber and communicating therewith,
- (3) a liquid conducting channel extending from the opposite end region of said manifold body to said nebulizing chamber and communicating therewith; and
- (4) aspirating means positioned in said nebulizing chamber and defining in combination with said nebulizing chamber:
  - a gas passageway for conducting a pressurized gas stream from said gas conducting channel to a gas orifice which opens into said mixing chamber in a direction generally towards said disengaging chamber;
  - a liquid passageway for conducting a liquid stream from said liquid conducting channel to an annular opening located in said nebulizing chamber adjacent to said gas orifice and extending circumferentially thereabout; and
  - a aerosol discharge orifice in substantial registry with said gas orifice and downstream therefrom; the interrelationship between said gas orifice and said annular opening being such that a pressurized gas stream issuing from said gas orifice entrains droplets of said liquid stream from said annular opening and disperses entrained droplets in said so issuing pressurized gas stream;
- (5) a spray deflector means located in said mixing chamber and in the path of said so issuing gas stream from said aerosol discharge orifice, the relationship between the size of said spray deflector and the distance thereof from said aerosol discharge orifice being such that a major portion of liquid droplets emerging from said aerosol discharge orifice in such gas stream strike said spray deflector means, thereby breaking up said spray droplets into an aerosol which disperses into the issuing gas stream;
- (6) gas connector means for connection of said gas conducting channel to a source of pressurized gas;
- (7) liquid connector means for connection of said liquid conducting channel to a source of liquid to be nebulized and situated below said nebulizer device; and
- (8) a transversely extending heat exchanger means in said liquid conducting channel, said heat exchanger means comprising:
  - a hollow tubular member having an open end and a closed end;
  - a chamber circumscribing wall portions of said tubular member, said circumscribing chamber being integral with said manifold body and having interior wall surfaces which are provided with inwardly projecting rib portions adapted to define a flow path for liquid moving through said liquid conducting channel and to provide wall spacing means for centering said tubular member therewithin; and
  - sealing means circumferentially located around the outside of said tubular member for providing a sealing engagement between said tubular member and said chamber wall portions circumferentially adjacent said open end, whereby such combination coacts to circulate a liquid received from said liquid channel as a relatively thin layer over exterior wall surface portions of said tubular member.

# 4,951,660 DIVER'S RESCUE APPARATUS

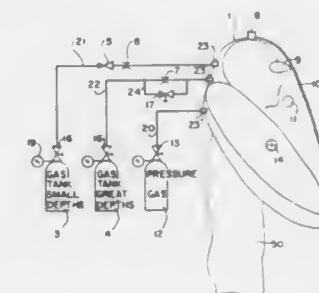
Wolfgang Lubitzsch, Stockeladorf, Fed. Rep. of Germany, assignor to Drägerwerk AG, Lübeck, Fed. Rep. of Germany

Continuation of Ser. No. 924,356, Oct. 28, 1986, abandoned. This application Mar. 2, 1988, Ser. No. 166,732  
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3538960

Int. Cl.<sup>5</sup> B63C 11/02

U.S. Cl. 128—201.27

9 Claims



1. A diver's rescue apparatus comprising a fillable buoyancy element, a breathing bag exposed to ambient pressure attached to said fillable buoyancy element, a respiratory gas mixture system connected to said breathing bag including a first compressed gas tank containing a gas mixture for great depths and second compressed gas tank containing a gas mixture suitable for lesser depths, a first connecting line from said first compressed gas tank to said breathing bag having a first fixed throttle, a second connecting line from said second compressed gas tank to said breathing bag, the second connecting line having a pressure reducer reducing the pressure of the gas mixture supplied to the breathing bag from the second tank to below the pressure of the gas mixture supplied to the breathing bag from the first tank, and, a second fixed throttle in the second connecting line whereby, throughout operation of the rescue apparatus, ignoring any depletion of the gas supply, the difference between the pressures of the gas mixtures supplied from the first and second tanks is constant so that the quantities of gas mixture flowing from respective tanks into the breathing bag are determined substantially entirely by the ambient pressure to which the breathing bag is exposed.

# 4,951,661 QUICK-CONNECT ADAPTER VALVE FOR CONNECTING NEBULIZER AND FLUID VENTILATOR HOSE

David T. Sladek, Tucson, Ariz., assignor to Thayer Medical Corporation, Tucson, Ariz.

Continuation of Ser. No. 204,014, Jun. 8, 1988, abandoned. This application Jul. 31, 1989, Ser. No. 387,401

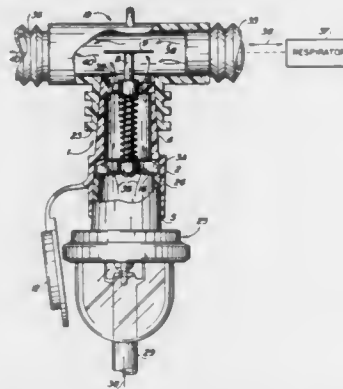
Int. Cl.<sup>5</sup> A62B 9/04

U.S. Cl. 128—202.27

5 Claims

1. An adapter/valve device for quick-connect coupling or decoupling of an accessory such as a nebulizer or a drain container to a three port coupler of a ventilator hose without interrupting positive pressure of gas in the ventilator hose or exposing the interior of the ventilator hose to outside contamination, the adapter valve comprising in combination:
  - a generally tubular housing with a tapered upper end adapted for insertion into a port of the three port coupler, the housing including
    - a generally cylindrical lower cavity adapted to receive insertion of an open-ended tubular connector of the accessory,
    - a generally cylindrical upper cavity coaxial with the lower cavity, the lower cavity and upper cavity forming a passage through the housing, an upper end of the housing forming a planar, circular lip which is approxi-

- mately flush with a wall of a passage of the ventilator hose extending through the three port coupler;
- (b) a stationary hub centered in the upper cavity adjacent to the lip and a plurality of spaced spokes attaching the stationary hub to a wall of the upper cavity;
- (c) a valve assembly including
- a planar circular disc forming a valve plate,
  - a rod perpendicular to the disc and passing through a hole in the stationary hub and having an upper end rigidly attached to the disc,
  - a compression spring disposed around the rod and having an upper end abutting the stationary hub,



- a movable hub located in the lower cavity and rigidly attached to a lower end of the rod, a lower end of the spring abutting the movable hub, urging the disc against the lip to form a seal therewith, and a plurality of spaced abutment spokes each having an inner end rigidly attached to the movable hub and an outer end adjacent to and spaced from a wall of the lower cavity, the abutment spokes being adapted to abut a circular wall end of the tubular connector as it is inserted into the lower cavity and thereby raise the disc away from the lip, exposing an interior of the ventilator tube and the three port coupler to an interior of the accessory, the valve assembly resealing the disc with the lip when the tubular connector is withdrawn from the first cavity.

4,951,662

## AIR CIRCULATING SURGICAL MASK UNIT

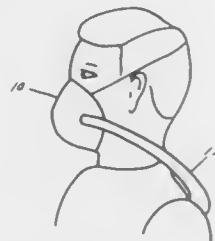
Andrew L. Townsend, Jr., 900 Wildwood, East Lansing, Mich. 48823

Filed May 8, 1989, Ser. No. 349,167

Int. Cl.<sup>5</sup> A62B 18/02

U.S. Cl. 128—205.25

1 Claim



1. A surgical mask unit comprising, in combination, a mask adapted to be placed over the wearer's mouth and nose defining a cavity of given volume, a port defined in said mask in communication with said cavity, and a lightweight housing located adjacent said mask in communication with said port, said housing defining a chamber having a volume several times that of said cavity given volume whereby the wearer's breath expands into said chamber during each breathing cycle, said

housing being in the form of a loop for encircling the wearer's neck, first and second ports defined in said mask, said housing loop having first and second ends disposed adjacent said mask, said first port communicating with said housing first end and said second port communicating with said housing second end, and an electric circulating fan located within said housing for circulating air within said chamber loop and mask, said fan having a pressurized side and an exhaust side, said pressurized side being in communication with said first port and said exhaust side being in communication with said second port, a fresh air inlet port defined in said housing on said fan exhaust side for drawing fresh air into said housing, and a valve defined on said housing controlling the size of said inlet port to regulate the amount of fresh air drawn into said housing.

4,951,663  
METHOD FOR ENHANCED STERILIZATION OF A LIVING-TISSUE AREA OF PROSPECTIVE SURGICAL INVASION

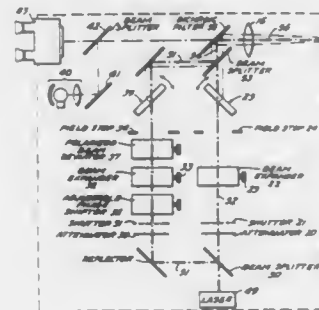
Francis A. L'Esperance, Jr., Eaglewood, N.J., assignor to L'Esperance Medical Technologies, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 148,890, Jan. 27, 1988, Pat. No. 4,931,053. This application Dec. 19, 1988, Ser. No. 286,330

Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 128—395

38 Claims



1. The method of preparing an area of living tissue for surgical invasion, by destroying infective target micro-organisms within said area, said method comprising irradiating said area with first and second separate laser beams of intensity and wavelength selected for interaction with said target micro-organisms, each of said beams having properties of spatial and temporal coherence, and said beams having different physical properties at tissue impingement within said area, wherein the difference is in respect of at least one physical property the combined power of said beams being at least 10 milliwatts and the intensity of said beams being less than sufficient to induce photocoagulation, photovaporization, photonochemical breakdown or photoablative decomposition of living tissue and/or cells, whereby within said area to effect intra-micro-organism changes leading to destruction in the micro-organism.

4,951,664

## MASK AND METHOD OF MANUFACTURE

Trenton A. Niemeyer, St. Paul, Minn., assignor to Filcon Corporation, St. Paul, Minn.

Filed Sep. 9, 1988, Ser. No. 242,720

Int. Cl.<sup>5</sup> A62B 18/08

U.S. Cl. 128—206.24

13 Claims

6. A mask, comprising, a dome means for enclosing a person's nose and mouth, said enclosing means having an irregularly shaped perimeter to substantially conform to said person's face and surround said person's nose and mouth, said enclosing means including means for filtering dust and other particulates from air;

an endless support strip adjacent to said perimeter of said

enclosing means, said endless support strip having a plurality of flexible, cantilevered fingers extending into said enclosing means;

said endless support strip having an arcuate portion with the curvature thereof being convex opposite from said dome means, said arcuate portion includes a rearwardly extending outer wall portion which projects toward the face of a user and said arcuate portion being curved centrally of the mask from the outer wall portion and thence forwardly to provide a forwardly extending wall portion that presses toward the face with a free edge that extends forwardly, the forwardly extending free edge of the arcuate portion being separated into a plurality of circumferentially spaced apart portions defining said cantilevered fingers, said finger being separated from one another by means of a plurality of rearwardly extending circumferen-



tially spaced apart notches in the endless support strip, said fingers being thereby individually and separately yieldable in an outward direction and each exerting a centrally directed force toward the face;

means for sealing between said enclosing means and said person's face, said sealing means resting on said fingers, said sealing means being impermeable to air;

means for attaching said enclosing means, said endless support strip, and said sealing means together; and

means, attached to said enclosing means, for holding said sealing means against the face, said endless support strip and the fingers thereof being fairly stiff relative to said sealing means whereby compression is applied by the cantilevered finger portions of the supporting strip to the sealing means so that the fingers flex to conform to the face and press the sealing means snugly against the face of the wearer.

4,951,665

## INSULATING, ANTI-KINKING Y CONNECTOR FOR ARTHROSCOPIC SURGERY AND METHOD OF MAKING

Barry L. Schneider, Deerfield, Ill., assignor to Hollister Incorporated, Libertyville, Ill.

Filed Feb. 8, 1989, Ser. No. 308,419

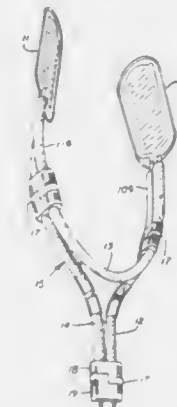
Int. Cl.<sup>5</sup> A61F 7/00

U.S. Cl. 128—400

18 Claims

1. An insulating, anti-kinking Y connector for conducting a thermal fluid between a source and a pair of heating/cooling pads for thermal treatment of a patient following arthroscopic surgery or the like, comprising first and second members of flexible, resilient, thermal-insulating material each having two parallel cylindrical walls defining a pair of parallel lumens with said cylindrical walls of each member being connected by an integral web; one of said cylindrical walls of said first member being continuous for the full length of said first member and the other of said cylindrical walls of said first member being divided along a transverse plane, with portions of said web removed on each side of said transverse plane, to provide a pair of first stub ends; said second member having a portion of its web removed adjacent one end thereto to provide a pair of second stub ends; connecting means joining each one of said first stub ends with one of each of said second stub ends; flexible tubes for carrying fluid extending through the lumens of said members; said Y connector having three free end portions

each provided with a double-lumen coupling element joined to and communicating with said flexible tubes for detachably



coupling said Y connector to mating elements of a pair of pads and a fluid source.

4,951,666

## THERMAL PACK

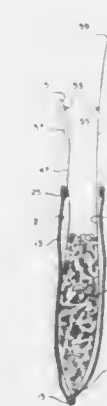
Joel D. Inman; Gary W. Pedersen, and Timothy J. McKibben, all of Arlington, Tex., assignors to Anago, Inc., Fort Worth, Tex.

Filed Oct. 17, 1988, Ser. No. 258,812

Int. Cl.<sup>5</sup> A61F 7/10

U.S. Cl. 128—402

6 Claims



1. An ice pack wrapable about a limb, the ice pack comprising:
  - a cloth outer bag having an exterior, an interior and an open top;
  - a plastic inner bag received within the outer bag, the inner bag having an exterior formed by opposing planar portions, an interior and a mouth opening for receiving ice, the inner bag being foldable between a retracted position wholly contained within the interior of the outer bag and an extended position in which the inner bag protrudes from the open top of the outer bag for filling;
  - seal means for securing the mouth opening of the inner bag; a flap located above the seal means on a selected one of the opposing planar portions of the plastic inner bag for creating a funnel to facilitate filling the inner bag with ice;
  - fastening means for securing the open top of the outer bag when the inner bag is sealed and folded to the retracted position within the outer bag; and
  - a cuff formed on the exterior of the other of the opposing planar portions of the plastic inner bag, opposite the flap for receiving the fingers of a user's hand.



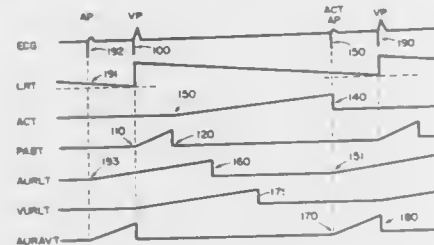
4,951,667

**DUAL CHAMBER ACTIVITY RESPONSIVE PACER**  
H. Toby Markowitz, Roseville; Kevin Prest-Berg, Stillwater,  
and David L. Thompson, Fridley, all of Minn., assignors to  
Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 125,422, Nov. 25, 1987, Pat. No.  
4,890,617. This application Dec. 12, 1989, Ser. No. 450,958  
Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—419 PG

3 Claims



1. A cardiac pacemaker for implantation in a patient, said pacemaker comprising:

ventricular output means for generating ventricular pacing stimuli;  
atrial output means for generating atrial pacing stimuli;  
atrial sensing means for sensing natural heart activity in the atrium;

first timer means responsively coupled to said atrial sensing means and said ventricular output means for determining a first A-V interval following sensing of natural heart activity in the atrium and for triggering generation of a ventricular pacing stimulus by said ventricular output means at the expiration of said first A-V interval;

second timer means responsively coupled to said atrial and ventricular output means for determining a V-A interval following generation of a pacing stimulus by said ventricular output means and for triggering generation of a pacing stimulus by said atrial output means at the expiration of said V-A interval;

sensor means responsive to the physical activity of the patient in which said pacemaker is implanted for regulating the duration of said V-A interval;

third timer means for determining an atrial refractory period following generation of a ventricular stimulus by said ventricular output means and for preventing initiation of said first A-V interval by said first timer means in response to the sensing of natural heart activity in the atrium during said atrial refractory period; and

means for delaying generation of an atrial pacing stimulus by said atrial output means beyond the expiration of said V-A interval in response to the sensing of natural heart activity in the atrium during said atrial refractory period.

4,951,668

**ELECTRICAL IMPULSE APPARATUS**  
Don R. Reed, 316 Capitol, Fort Gibson, Okla. 74434

Filed Jul. 18, 1989, Ser. No. 381,316  
Int. Cl.<sup>5</sup> A61N 1/00

U.S. Cl. 128—419 R

4 Claims

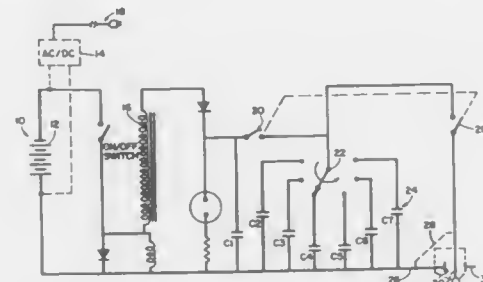
1. A field portable electrical impulse apparatus useful for reducing the adverse effects on living tissue of pest attacks and poison injection, comprising:

housing containing a source of direct current (DC) electrical energy;

means within the housing for increasing the voltage output from the source of direct current (DC) electrical energy, the increased voltage means including a grounded contact and an output contact;

a plurality of capacitors each having a different amperage output, each capacitor being in operative contact with the grounded contact;

a selection means being in operative contact with the output contact of one of said capacitors at one time; and  
probe adapted for contact with living tissue comprising a first exposed electrode being in operative contact to the grounded contact, and a second exposed electrode being



in operative contact by way of a momentary switch with an output of the selection means.

whereby different levels of current can be applied via the probe to living tissue to reduce the adverse effects on living tissue of pest attacks and poison injection.

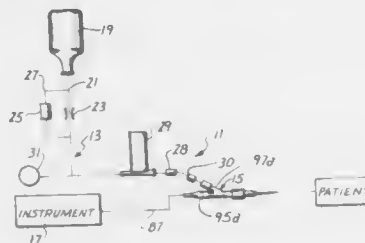
4,951,669

**BLOOD PARAMETER MEASUREMENT SYSTEM**  
Thomas P. Maxwell, Santa Ana, and Thomas G. Hacker, Anaheim, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 8,937, Jan. 30, 1987, Pat. No. 4,830,013. This application Aug. 8, 1988, Ser. No. 229,703  
Int. Cl.<sup>5</sup> A61B 5/00

U.S. Cl. 128—637

71 Claims



1. An assembly for the sensing of a blood parameter comprising:

a catheter having a proximal end, a distal end, and a lumen extending therethrough, said lumen having an opening in said distal end, said catheter being sized and adapted so that at least said distal end and said opening are receivable within a blood vessel of a patient, said catheter acting to carry a fluid other than blood from a fluid source, through said lumen and opening, and into said patient;

sensor means, in fluid communication with said lumen, for sensing said blood parameter and providing a signal in response thereto;

a multi-legged fitting coupled to said catheter, said multi-legged fitting having two legs which form the only primary fluid flow path through said multi-legged fitting, said sensor means being located in said multi-legged fitting; and

a volume oscillator element in fluid communication with said lumen and being capable of acting to periodically cause blood to enter said lumen and to exit said lumen as desired, said volume oscillator element not interfering with the flow of said fluid through said lumen and opening when said volume oscillator element is inactive.

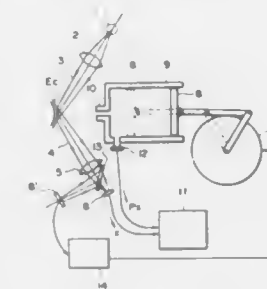
4,951,670

**NON-CONTACT EYE PRESSURE METER**  
Shinya Tanaka, Tokyo, and Koichi Yano, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 26, 1988, Ser. No. 161,168

Claims priority, application Japan, Mar. 6, 1987, 62-51784  
Int. Cl.<sup>5</sup> A61B 3/16

U.S. Cl. 128—648

15 Claims



1. A non-contact tonometer comprising:  
non-contact pressurizing means for deforming a cornea of an eye to be examined by applying pressure, the intensity of which becomes larger with time, thereto;

first cornea deformation detecting means for detecting a first degree of cornea deformation;

calculating means for calculating intraocular pressure based on said first degree of cornea deformation detected by said first cornea deformation detecting means;

intermediate second cornea deformation detecting means for detecting a second degree of cornea deformation before the first degree of cornea deformation of the eye to be examined, said second degree of cornea deformation being less than said first degree of cornea deformation; and

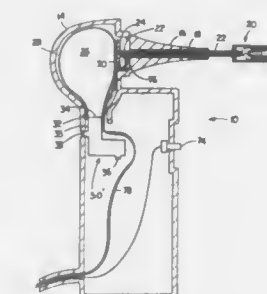
control means for reducing the degree of pressurization of said pressurizing means after said second cornea deformation detecting means detects said second degree of cornea deformation before said first degree of cornea deformation.

4,951,671

**TONOMETRY APPARATUS**  
William M. Coan, 39 Southfield Cir., Concord, Mass. 01742  
Filed Aug. 23, 1988, Ser. No. 235,347  
Int. Cl.<sup>5</sup> A61B 3/16

U.S. Cl. 128—652

20 Claims



1. Apparatus for measuring pressure within an eye, comprising:

an air chamber supported by a housing, said air chamber having a deformable wall portion,

a pressure sensor responsive to pressure within said air chamber for measuring the pressure within said air chamber, and

a member interposable between a surface of the eye and said deformable wall portion, said member having a rear end

and a front end, said member being substantially non-compressible along its front-to-rear direction, said member being engaged with said housing such that said member is frontwardly-and-rearwardly moveable with respect to said deformable wall portion of said air chamber,

whereby when said member is interposed between the eye surface and said deformable wall surface and said housing is moved relative to the eye surface in a direction that shortens the distance between the eye and the air chamber said front end inwardly deforms the eye surface and said rear end inwardly deforms said deformable wall portion, raising the pressure within said air chamber, measured by said pressure sensor.

4,951,672

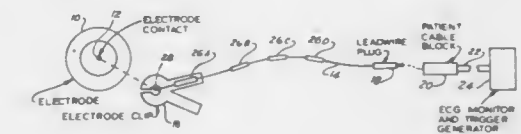
**CONTROLLED IMPEDANCE MONITORING LEAD WIRES**

Randall H. Buchwald; Robert S. Stormont, both of Waukesha, and Jeffrey P. Noonan, Dousman, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Continuation-in-part of Ser. No. 751,161, Jul. 2, 1985, abandoned. This application Dec. 22, 1987, Ser. No. 136,662  
Int. Cl.<sup>5</sup> A61B 5/05

U.S. Cl. 128—653 SC

9 Claims



1. An improved lead wire assembly for coupling an electrode on a subject in an NMR study to a device for monitoring an electrical signal picked up from said subject by said electrode across an electrode/subject interface having a specified impedance, said subject and said assembly proximate to a radio frequency magnetic field generated in the course of the NMR study, said assembly comprising:

conductor means for establishing an electrically conductive path for the electrical signal between the electrode and the monitoring device;

resistor means included in the conductive path for providing the conductive path with an impedance exceeding the specified impedance of the electrode/subject interface; and

said resistor means having a voltage coefficient of resistivity selected to provide the conductor means with a linear transfer characteristic.

4,951,673

**MAGNETIC RESONANCE IMAGING WITH PERFLUOROCARBON HYDRIDES**

David M. Long, El Cajon, Calif., assignor to Alliance Pharmaceutical Corp., Otisville, N.Y.

Filed Aug. 19, 1988, Ser. No. 234,193  
Int. Cl.<sup>5</sup> A61L 15/00

U.S. Cl. 128—653 A

21 Claims

1. A method for imaging a selected non-vascular body space of an animal body using magnetic resonance imaging, comprising:

introducing an imaging composition comprising a perfluorocarbon hydride having from 6 to 10 carbon atoms into the non-vascular body space to at least partially fill the space; and

imaging the space and surrounding tissue with a magnetic resonance proton imaging system to contrast the fluorocarbon-occupied space with surrounding space or tissue containing substantially greater concentrations of protons.

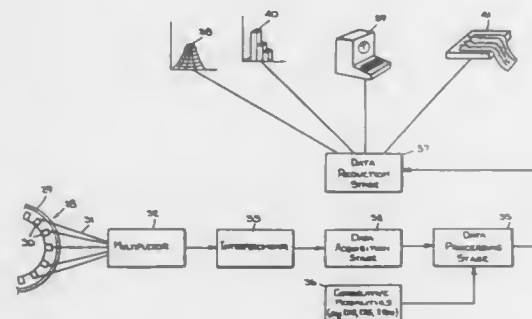
# 4,951,674

## BIOMAGNETIC ANALYTICAL SYSTEM USING FIBER-OPTIC MAGNETIC SENSORS

Michael F. Zankas, 60 Martin Rd., Livingston, N.J. 07039, and Philip A. Femano, 69 Alexander Ave., Nutley, N.J. 07110  
Filed Mar. 20, 1989, Ser. No. 325,942  
Int. Cl.<sup>3</sup> A61B 5/04

U.S. Cl. 128—653 R

8 Claims



1. A biomagnetic analytical system for sensing and indicating minute magnetic fields emanating from the brain or any other tissue region of interest in a subject being diagnosed, said system comprising:

- (a) a magnetic pick-up device having an outer shell contoured to conform generally to the region of interest, said shell being formed of magnetic shielding material to exclude from its inner confines extraneous magnetic fields, whereby the emitted magnetic fields exist within the confines of the shell, and an array of fiber-optic magnetometer sensors which conforms to the contours of the shell, the sensors being mounted within the shell at positions distributed throughout the inner confines thereof, whereby each sensor is related to a site in the region and yields a light beam modulated in accordance with the magnetic field emanating from this site; and
- (b) means including an interferometer to compare the modulated light beam yielded by each sensor in the array with a reference light beam to produce an output signal that is a function of the magnetic field emitted at the related site.

4,951,675

# BIODEGRADABLE SUPERPARAMAGNETIC METAL OXIDES AS CONTRAST AGENTS FOR MR IMAGING

Ernest V. Groman, Brookline; Lee Josephson, Arlington, and Jerome M. Lewis, Newton, all of Mass., assignors to Advanced Magnetics, Incorporated, Cambridge, Mass.

Division of Ser. No. 67,586, Jun. 26, 1987, Pat. No. 4,827,945, which is a continuation-in-part of Ser. No. 882,044, Jul. 3, 1986, Pat. No. 4,770,183. This application Sep. 14, 1988, Ser. No. 244,432

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> A61B 6/00

U.S. Cl. 128—653 C A

4 Claims

1. A method for obtaining an in vivo MR image of an organ or tissue of an animal or human subject which comprises (a) administering to such animal or human subject an effective amount of a contrast agent in a physiologically acceptable carrier, which contrast agent comprises a biodegradable superparamagnetic metal oxide, said biodegradable superparamagnetic metal oxide being characterized by biodegradation in such subject within about 2 weeks or less after administration, as evidenced by a return of the proton relaxation rates of said organ or tissues to preadministration levels; and (b) obtaining an MR image from such subject.

# 4,951,676

## ULTRASONIC ECHOGRAPHY DEVICE WITH REDUCED INTERFERENCE NOISE

Antoine Collet-Billon, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

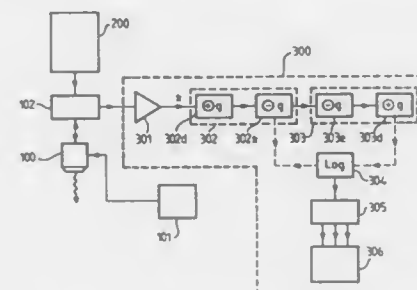
Filed May 4, 1989, Ser. No. 347,553

Claims priority, application France, May 31, 1988, 88 07210

Int. Cl.<sup>3</sup> A61B 8/00

U.S. Cl. 128—660.01

11 Claims



1. An ultrasonic echography device, comprising at least one piezoelectric transducer, a stage for transmitting an ultrasonic beam, and a stage for receiving and processing echographic signals returned to the at least one transducer, said receiving and processing stage comprising at least one grey-scale morphological filter, said at least one morphological filter comprising a closing filter including first dilation means followed by first erosion means applied to said echographic signals, said dilation means and erosion means being respectively defined by the following operations:

$$(e+g)(x,y)=\text{Max}[e(x+x',y,y')+g(x',y')] \quad (1)$$

$$x',y'\Sigma D$$

$$(e\ominus g)(x,y)=\text{Min}[e(x+x',y,y')-g(x',y')] \quad (2)$$

$$x',y'\Sigma D$$

wherein  $g$  is a structuring element in a domain  $D$ , said closing filter being followed by a morphological opening filter comprising second erosion means followed by second dilation means.

4,951,677

# ACOUSTIC IMAGING CATHETER AND THE LIKE

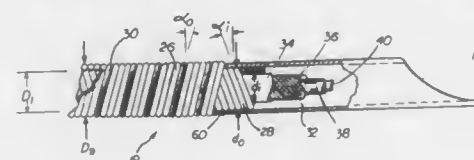
Robert J. Crowley, Wayland; Lucien A. Convillon, Jr., and John E. Abele, both of Concord, all of Mass., assignors to Prutech Research and Development Partnership II, San Jose, Calif.

Filed Mar. 21, 1988, Ser. No. 171,039

Int. Cl.<sup>3</sup> A61B 8/12

U.S. Cl. 128—662.06

50 Claims



1. An elongated, flexible, ultrasonic probe of the type comprising a coil-form drive shaft and an acoustic transducer head carried on the distal end of the drive shaft, wherein,  
(a) the drive shaft comprises at least a pair of inner and outer, concentric, oppositely and closely wound, multifilar coils, there being no mandrel within the innermost coil,  
(b) each coil has a ratio of outer radius of coil to thickness of

coil filament in the radial direction of between about  $2\frac{1}{2}$  and 10,

- (c) the coils are joined together at their respective ends with interfering contact with each other along their mutual length, and
- (d) the filament of each coil have a pitch angle of about  $20^\circ$  or greater, so that when drive torque is applied to the drive shaft from the proximal end in the direction tending to reduce the diameter and lengthen the outer coil of a pair of said coils and increase the diameter and shorten the inner coil of said pair, a substantial component of the resultant stress on each filament of the coils is aligned with the axis of the filament,

whereby substantial mechanical fidelity of angular displacement between the transducer and the proximal end of the drive shaft is maintained during rotation of the drive shaft, said acoustic transducer head having an outer diameter corresponding to the outer diameter of said drive shaft and mounted coaxially therewith, said drive shaft and transducer head forming a core that can be slidably inserted via the proximal end into a tubular sheath having a closed distal end to a directly, rotatably supported relationship with said sheath and after use can be slidably removed from said sheath for repeated re-use in other such sheaths.

4,951,678

# METHODS AND APPARATUS FOR MONITORING VITAL SIGNS

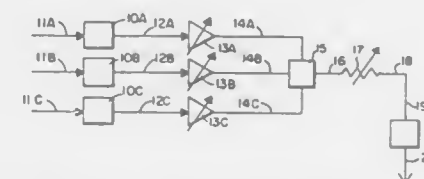
Jeffrey I. Joseph, Philadelphia, and Daniel M. Benson, Springfield, both of Pa., assignors to Thomas Jefferson University, Philadelphia, Pa.

Filed May 23, 1988, Ser. No. 197,571

Int. Cl.<sup>3</sup> A61B 5/08

U.S. Cl. 128—671

18 Claims



1. An apparatus for monitoring the heart and breath sounds of a patient comprising:

- (a) a first sound sensing device, comprising means for detecting first sounds of biological origin and for producing a first electrical signal representative of said first detected sounds;
- (b) a second sound sensing device comprising means for detecting second sounds of biological origin and for producing a second electrical signal representative of said second detected sounds;
- (c) means for independently and adjustably amplifying said first electrical signal;
- (d) means for independently and adjustably amplifying said second electrical signal;
- (e) means for mixing said amplified signals to produce a mixed electrical signal comprising said first and said second electrical signals; and
- (f) means for converting said mixed electrical signal into a display signal representative of said first and second sounds.

4,951,679

# PULSE WAVE DETECTING APPARATUS HAVING PLACEMENT-CONDITION DETECTING MEANS

Chikao Harada, Nagoya, Japan, assignor to Colin Electronics Co., Ltd., Aichi, Japan

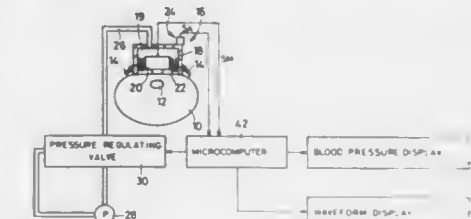
Filed Jan. 23, 1989, Ser. No. 299,409

Claims priority, application Japan, Jan. 29, 1988, 63-19825

Int. Cl.<sup>3</sup> A61B 5/02

U.S. Cl. 128—672

7 Claims



1. A pulse wave detecting apparatus comprising:  
a housing which is adapted to be placed on a body surface of a subject;  
a pulse wave sensor supported by said housing, for detecting a pulse wave produced from an artery of said subject;  
pressing means supported by said housing, for pressing said pulse wave sensor against said body surface so as to detect said pulse wave;  
control means for determining an optimum pressing force of said pressing means applied to said pulse wave sensor, based on the pulse wave detected by said pulse wave sensor as the pressing force of said pressing means is varied, and maintaining the optimum pressing force;  
detecting means for detecting whether or not said housing is placed on said body surface of said subject, said detecting means generating a placement signal when detecting that said housing is placed on said body surface; and  
inhibiting means for inhibiting said pressing means from pressing said pulse wave sensor, when said placement signal is not generated by said detecting means.

4,951,680

# FETAL MONITORING DURING LABOR

Derrick L. Kirk, Nottingham, and Henry Murray, Giltbrook, both of England, assignors to National Research Development Corporation, London, England

Filed Sep. 27, 1988, Ser. No. 250,254

Claims priority, application United Kingdom, Sep. 30, 1987, 8722899

Int. Cl.<sup>3</sup> A61B 5/04

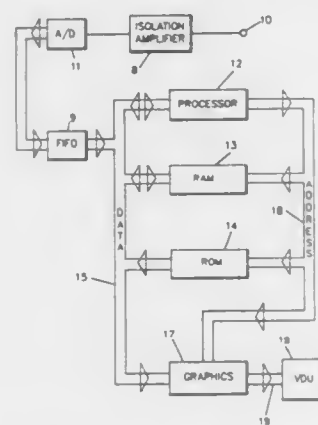
U.S. Cl. 128—698

24 Claims

1. An apparatus for monitoring fetal health during labor comprising:  
means for continually sampling the electrocardiogram of a fetus and for continually outputting sampled signals; and  
processing means for receiving said output sampled signals and in response thereto deriving signals representative of the P-R interval of the fetal heart, for repeatedly deriving a signal representative of the fetal heart rate, and for obtaining an indication relationship between directions of change, of the P-R interval and in the fetal heart rate or a

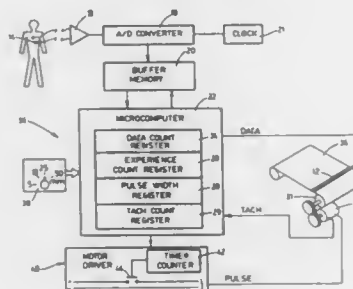


repetition period of the fetal heart, for providing an indication of fetal health whereby an indication is given of



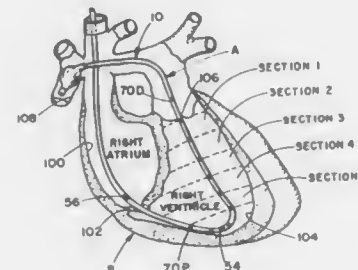
shortening or lengthening of the P-R interval as the fetal heart rate increases or decreases.

**4,951,681**  
**ELECTROCARDIOGRAPHIC RECORDING METHOD AND APPARATUS**  
David W. Mortara, River Hills, Wis., assignor to Mortara Instrument, Milwaukee, Wis.  
Filed Nov. 14, 1988, Ser. No. 271,106  
Int. Cl.<sup>5</sup> A61B 5/04  
U.S. Cl. 128—710 31 Claims



1. A method of controlling a D.C. drive motor and digital printhead of an electrocardiogram to produce a chart record at a constant time scale regardless of temporary variations in the preselected nominal D.C. drive motor speed comprising: storing sensed digital ECG data by means of a buffer memory; controlling the speed of the D.C. drive motor in accordance with the amount of data stored in the buffer memory, so that the motor speed is increased if the buffer memory is storing more than a preselected amount of data, and so that motor speed is decreased if the buffer memory is storing less than the preselected amount of data; and outputting ECG data from the buffer memory to the printhead for recording at a rate proportional to the speed of the D.C. drive motor, so as to produce a constant time scale chart record of such data regardless of temporary variations in the D.C. drive motor speed.

**4,951,682**  
**CONTINUOUS CARDIAC OUTPUT BY IMPEDANCE MEASUREMENTS IN THE HEART**  
John H. Petre, Cleveland Heights, Ohio, assignor to The Cleveland Clinic Foundation, Cleveland, Ohio  
Division of Ser. No. 210,095, Jun. 22, 1988, Pat. No. 4,898,176.  
This application Apr. 26, 1989, Ser. No. 343,953  
Int. Cl.<sup>5</sup> A61B 5/04  
U.S. Cl. 128—713 16 Claims



8. Apparatus for measuring the instantaneous volume of blood in a chamber of the heart over an extended period of time, comprising in combination:

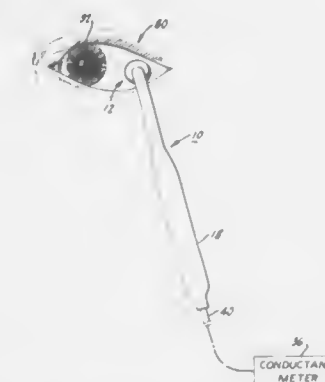
- (a) an elongated tubular intravascular catheter having a proximal end and a distal end with a pair of drive electrodes attached to a exterior surface thereof and spaced apart from one another by a predetermined distance,  $d_1$ , which is less than the length dimension of catheter section held in said chamber and a plurality of pairs of sense electrodes attached to the surface thereof and longitudinally spaced there along between said pair of drive electrodes, said pair of drive electrodes and said plurality of pairs of sense electrodes being electrically coupled, individually, to a terminal at said proximal end of said catheter;
- (b) a constant current source of frequency,  $F_1$ ;
- (c) a switching means joined to said terminal for coupling said constant current source to said pair of drive electrodes;
- (d) a signal detector means connectable through said switching means to predetermined pairs of said plurality of pairs of sense electrodes for producing signal waves corresponding to the impedance of the medium present between a sense electrode pair selected by said switching means attributable to said constant current source;
- (e) a computing means coupled to said signal detector means for sampling said signal waves at a predetermined rate and converting said signal waves to digital values representative of impedance values, said computing means being programmed to compute the volume of segments between selected pairs of said sense electrodes using the formula:

$$\text{Volume} = (I_c \times \rho \times L^2) / V_{EE}$$

where  $I_c$  is a known constant current source,  $\rho$  is the resistivity of the medium,  $L$  is the distance between said selected pair of electrodes and  $V$  is a voltage measured from end to end of the catheter; and

(f) an auto-positioning means for positioning the signal waves within a predetermined window, whereby changes in  $\rho$  over extended time periods can be accounted for such that extended monitoring can be accurately accomplished.

**4,951,683**  
**DEVICE FOR DETECTING KERATOCONJUNCTIVITIS SICCA**  
Jeffrey P. Davis, 2751 Chamberlain Ave., Madison, Wis. 53705  
Filed Jan. 19, 1989, Ser. No. 300,860  
Int. Cl.<sup>5</sup> A61B 5/00  
U.S. Cl. 128—734 14 Claims



1. A device for detecting keratoconjunctivitis sicca in an eye, being usable with an ocular tear fluid on the eyeball in vivo, comprising

- a. probe means for contacting the ocular tear fluid on the eyeball, said probe means including a body, said body having an end portion with an end surface capable of directly contacting the ocular tear fluid coating the eyeball;
- b. a plurality of electrical contacts being mounted in spaced configuration and being accessible at said end surface of said end portion of said body to simultaneously communicate with the ocular tear fluid coating the eyeball;
- c. means for providing an electrical potential on one of said plurality of electrical contacts; and
- d. means for measuring electrical activity between said one electrical contact and another of said plurality of electrical contacts while said electrical contacts communicate with the ocular tear fluid on the eyeball in vivo.

**4,951,684**  
**DEVICE FOR COLLECTING BIOLOGICAL MATERIAL**  
William A. McMillan, Cupertino, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.  
Continuation of Ser. No. 50,848, May 15, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,138  
Int. Cl.<sup>5</sup> A61B 10/00  
U.S. Cl. 128—758 39 Claims

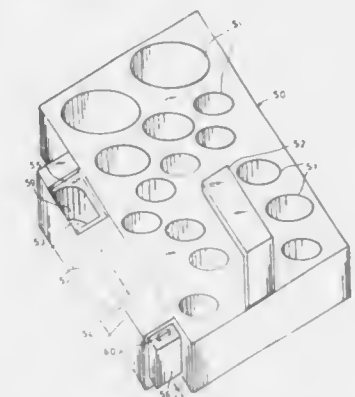


1. A device for collecting biological material adapted to collect said material from a body orifice of a patient comprising:

an elongated solid shaft member, said shaft member having a distal end, a proximal end and an external surface; said distal end of said shaft having a substantially elliptical loop defining an interior space including a first and a second section as defined by a central longitudinal axis of said shaft bisecting the perimeter of said loop, each section having an internal surface and an external surface, wherein at least one of said external surfaces is arched and the junction of said arched surface and its opposed internal surface define a non-cutting scraping edge which is a leading edge when said shaft is rotated; wherein said shaft has at least one longitudinal groove extending a portion of

the length of said shaft and communicating with said interior space; sample retention means including at least one member extending between the internal surfaces of said loop; and wherein said shaft member is in a fixed relationship with said loop.

**4,951,685**  
**BLOOD DRAWING SYSTEM**  
Paul A. Blair, 3621 NW. 23 St., Landerdale Lakes, Fla. 33311  
Filed May 12, 1988, Ser. No. 193,059  
Int. Cl.<sup>5</sup> B65D 85/24  
U.S. Cl. 128—760 1 Claim

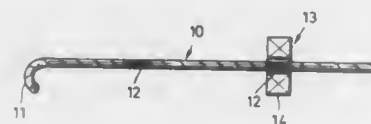


1. A phlebotomy tray means for carrying phlebotomy accessories including a plurality of recesses in a top surface of said tray for receiving said phlebotomy accessories and a contaminated needle receptacle for intermediate storage of contaminated needles, said needle receptacle including: an elongate sliding inner member having a vertical hole therethrough; and an elongate outer member connected to said tray, said outer member having an elongate inner channel closely fitting said inner member so that said inner member slides within said channel, a top opening in the upper surface of said outer member and a bottom opening in the lower surface of said outer member, wherein said openings are so arranged relative to said vertical hole in said inner member that said top opening and vertical hole combine to form a receptacle with a closed bottom for holding said needles in a first position of said sliding inner member and said bottom opening and said vertical hole provide a receptacle with a closed top and an open bottom in a second position of said sliding inner member, whereby needles stored in said receptacle are free to fall from said tray and are thereby removed from said tray without overturning said tray.

**4,951,686**  
**COLOR MARKS ON CATHETER GUIDE WIRE**  
Gerhard Herlitz, Baunatal, Fed. Rep. of Germany, assignor to B. Braun-SSC AG, Emmenbrucke, Switzerland  
Continuation of Ser. No. 823,465, Jan. 28, 1986, abandoned. This application Apr. 3, 1989, Ser. No. 333,800  
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506750  
Int. Cl.<sup>5</sup> A61B 5/00  
U.S. Cl. 128—772 11 Claims

1. A catheter guide wire comprising: an elongated flexible body defining a smooth outer surface; the surface having at least one indicia extending along a predetermined length thereof;

the smooth surface continuing throughout the predetermined portion along which the indicia extends; and



the indicia being disposed a predetermined distance from a distal end of the body and being spaced regularly along the wire for indicating the length of said wire; and wherein said indicia are temper colors of steel.

4,951,687

## MEDICAL ELECTRICAL LEAD CONNECTOR

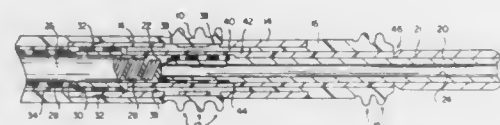
Keith A. Ufford, Maple Grove, and Timothy W. Holleman, Ham Lake, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Jan. 31, 1989, Ser. No. 304,756

Int. Cl.<sup>5</sup> A61N 1/05

U.S. Cl. 128—786

14 Claims



1. In a medical lead of the type having a proximal end and a distal end and having a connector assembly mounted to the proximal end of said lead, said connector assembly of the type having an exterior surface, a connector ring, an insulative sleeve exposed to the exterior surface of said connector assembly proximal to said connector ring and a rotatably mounted connector pin extending proximal to said insulative sleeve, said connector ring, connector pin and insulative sleeve all having proximal and distal ends and exterior surfaces, said insulative sleeve and said connector ring having interior lumens, the improvement wherein:

said connector pin extends distally within said insulative sleeve and said connector ring and wherein the distal end of said connector pin terminates distal to the proximal end of said connector ring; and wherein said connector assembly further comprises an elongated bearing sleeve having a proximal end and a distal end, said bearing sleeve extending proximally within said insulative sleeve to a point adjacent the proximal end of said insulative sleeve and extending distally to a point distal to the proximal end of said connector ring.

4,951,688

## HYPERTHERMIC POWER DELIVERY SYSTEM

Hanan Keren, Kfar Saba, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Aug. 30, 1989, Ser. No. 400,716

Claims priority, application Israel, Sep. 1, 1988, 87649

Int. Cl.<sup>5</sup> A61N 5/02; A61B 5/055

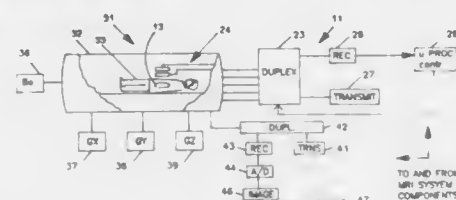
U.S. Cl. 128—804

7 Claims

1. A hyperthermic power delivery system for providing hyperthermic treatment of cancerous tissue, said system comprising:

a phased-array antenna including a plurality of antenna elements, non-invasive means for obtaining radio frequency (RF) signals from said cancerous tissue at said phased-array antenna, said non-invasive means for obtaining RF signals from said

cancerous tissue at said phased-array antenna comprising a magnetic resonance system, means responsive to said obtained RF signals for determining the relative amplitude of excitation in each element of said phased-array antenna and the relative phase of the excitation received by each of the elements of the phased-array antenna, and



means responsive to said determination for controlling the phase and amplitude of applied RF signals supplied to each element of said phased-array antenna in order to focus a transmitted RF signal to the cancerous tissue to exclusively, destructively heat the cancerous tissue.

4,951,689

## ARMORING SYSTEM FOR PROTECTIVE BODY COVERS

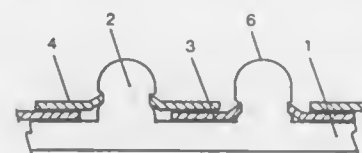
J. Paul Jones, 413 N. Saddlebrook Cir., Chester Springs, Pa. 19425

Filed Jan. 17, 1988, Ser. No. 207,867

Int. Cl.<sup>5</sup> A61F 13/00; F41H 1/02; A41D 19/00

U.S. Cl. 128—878

2 Claims



1. An armored cover comprising:

a flat, flexible elastomer base having a plurality of identical, cylindrically shaped, spaced apart projections extending outwardly from at least one face of the base and arranged in a plurality of parallel rows;

a plurality of identical discs made of metal and respectively disposed on said projections, the inside diameter of a disc being less than the outside diameter of its projection and conically shaped to develop forces to hold the disc on the projection; and

the distance between any pair of adjacent projections in any row is the same and the outside diameter of each disc being chosen so that the disc on any one projection and the disc on any adjacent projection overlap each other.

4,951,690

## METHOD OF DRILLING THROUGH A BONE STRUCTURE

John W. Baker, 4 Wachusett Dr., Acton, Mass. 01720

Division of Ser. No. 781,933, Sep. 30, 1985, Pat. No. 4,884,571, which is a continuation-in-part of Ser. No. 575,571, Jan. 31, 1984, Pat. No. 4,600,066. This application Jan. 23, 1989, Ser. No. 299,084

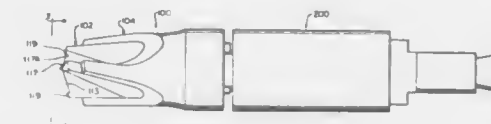
Int. Cl.<sup>5</sup> A61B 17/32

U.S. Cl. 128—898

8 Claims

1. A method of drilling through a bone structure comprising simultaneously drilling a cylindrical hole and an annular channel cut coaxial with and at the bottom of the hole, whereby a

cylindrical wafer or pillow is formed at the bottom of the hole when the thickness of the bone structure is at least partially



penetrated along said annular channel, and discontinuing drilling immediately upon formation of said wafer or pillow.

4,951,691

## METHOD OF TREATING AND CURING SMOKING HABITS AND THE LIKE IN ADULTS

Robyn Leary, 4101 Cathedral Ave., NW., Apt. 1109, Washington, D.C. 20016

Continuation of Ser. No. 383,551, Jun. 1, 1982, abandoned. This application Apr. 20, 1984, Ser. No. 602,537

Int. Cl.<sup>5</sup> A24F 47/00; G09B 14/00

U.S. Cl. 131—270

3 Claims



1. A method for treating an adult person's desire to smoke cigarettes and the like, comprising the following steps:

- providing to an adult a small, non edible solid, hard, disc shaped object of a size having a textured surface for creating traction to be put in the adult mouth and to fit on the tongue;
- when the urge to smoke and the like arises, placing the small object in the mouth;
- sucking the small object and moving it about the mouth under the action of the tongue, causing salivation, gastric acid secretion, and stimulation of the cranial nerve endings in the tongue, in like fashion to the stimulation caused by smoking cigarettes and the like, the textured surface of the small object causing traction and preventing the inadvertent sliding of the small object into the throat during use; and
- repeating steps "b" and "c" using the same small object until the desire to smoke cigarettes is reduced.

4,951,692

## VANITY CASE

Yukitomo Yuhara, Abiko, and Sumio Okojima, Yachimata, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,969

Claims priority, application Japan, Dec. 14, 1987, 62-188871[U]; Dec. 14, 1987, 62-188872[U]; Mar. 22, 1988, 63-36384[U]; Apr. 11, 1988, 63-47811[U]; Apr. 11, 1988, 63-47814[U]

Int. Cl.<sup>5</sup> A45D 33/00

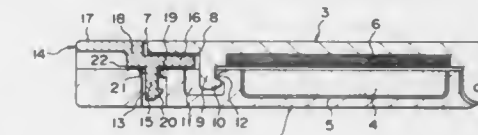
U.S. Cl. 132—293

15 Claims

1. A vanity case comprising: a receptacle member; a cover member hinged to said receptacle member at a rear

end thereof, said cover member having a front marginal portion with a cutout formed therein:

- a first latch tongue formed on said receptacle member;
- a second latch tongue formed on said cover member;
- said first and second latch tongues engaging each other to maintain said cover member in a closed position with respect to said receptacle member;
- a release member disposed between a periphery of said receptacle member and a periphery of said cover member, said release member including a generally planar inner part and a generally planar outer part extending parallel to said inner part and positioned at a level higher than said inner part and connected by a step with said inner part, wherein when said cover member is in said closed position



said inner part is directly below a lower surface of said cover member and said outer part is located in said cutout with an upper surface of said outer part being substantially flush with an upper surface of said cover member and with a lower surface of said outer part spaced from an upper surface of said receptacle member;

a hole formed in one of said release member and said receptacle member; and

a leg formed on the other of said release member and said receptacle member, said leg being fitted in said hole to thereby attach said release member to said upper surface of said receptacle member in such a manner that said release member is swingable relative to said receptacle member.

4,951,693

## AUTOMATIC DOOR OPENING SYSTEM FOR DOMESTIC DISHWASHERS

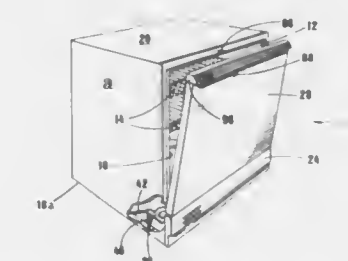
Jean Archambault, 500 Francois Street - Apt 207, Ile des Soeurs, Province of Quebec, Canada (H3E 1G4)

Filed Jun. 21, 1989, Ser. No. 369,242

Int. Cl.<sup>5</sup> B08B 3/02

U.S. Cl. 134—57 DL

7 Claims



1. In a dishwashing machine electrically operated to sequentially effect a washing, a rinsing and a drying cycle under the control of a timer-controlled switching means, said machine having a frame supporting a washing compartment with an access opening, a door hinged about said opening to pivot between open and closed positions and first biasing means to bias said door to closed position, the improvement including second biasing means to bias said door towards open position, exerting a door opening force greater than the door-closing force of said first biasing means and effective when the door is within a range of positions intermediate and including said closed position and a predetermined partially-open position; means to cease action of said second biasing means when said



door has attained said partially-open position, and an electrically-operated latch means to releasably latch said door in closed position and adapted to be operated by said switching means at the end of said rinsing cycle, so as to effect said drying cycle by free circulation of ambient air into said washing compartment through the partially-open door opening.

4,951,694

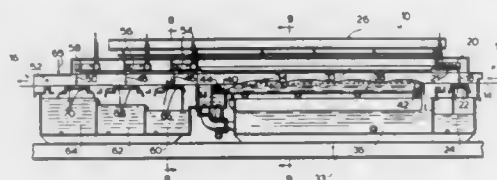
## WIRE PICKLING APPARATUS

Michel R. Hone, St. Placide, and Jacques R. Martel, Brossard, both of Canada, assignors to Stelco Inc., Burlington, Canada Division of Ser. No. 326,643, Mar. 2, 1989. This application Feb. 2, 1990, Ser. No. 473,816

Claims priority, application Canada, Oct. 18, 1988, 580453 Int. Cl.<sup>3</sup> C23G 3/02

U.S. Cl. 134—64 R

11 Claims



1. An apparatus for pickling wire, which comprises: an elongate housing having side walls, a top wall and a bottom wall and open at ends thereof, means for forming water curtains at the ends of said housing to provide an enclosure, a rectangularly cross-sectioned open-topped elongate tank extending longitudinally within said housing from an upstream location adjacent an entrance end of said housing towards a downstream location spaced from an exit end of said housing, said tank having an overflow weir at said upstream location and wave forming means at said downstream location for forming by a hydraulic jump in conjunction with pickling liquor in said tank a wave of pickling liquor passing from said downstream end and overflowing said weir at said upstream location, and means for passing at least one wire horizontally from said entrance end to said exit end of said housing at a location slightly above the open top of said tank at a level which permits said wire to be substantially submerged by said wave passing from said downstream location to said upstream location.

4,951,695

## ANTI-SLIPPING TELESCOPIC CENTERPOST OF MULTIPLE-FOLD UMBRELLA

Chi-Kuo Yang, P.O. Box 10160, Taipei, Taiwan Filed Nov. 29, 1989, Ser. No. 442,918

Int. Cl.<sup>3</sup> A45B 19/00

U.S. Cl. 135—25 R

9 Claims



1. A telescopic centerpost of multiple-fold umbrella comprising: a plurality of hollow tubes telescopically retracted or extended with one another having a slider for securing spokes or ribs of an umbrella canopy extendibly retained on an upper portion of the centerpost and a handle tube formed on a lower portion of the centerpost, a stabilizing retainer generally formed as an arcuate spring plate held in a first hollow tube of the hollow tubes having an upper catch protruding laterally through a side slot formed in said first tube, and a bottom plug fixed on a bottom portion of a lower hollow tube for limitingly coupling the handle tube with the lower hollow tube;

tended with one another having a slider for securing spokes or ribs of an umbrella canopy extendibly retained on an upper portion of the centerpost and a handle tube formed on a lower portion of the centerpost, a stabilizing retainer generally formed as an arcuate spring plate held in a first hollow tube of the hollow tubes having an upper catch protruding laterally through a side slot formed in said first tube, and a bottom plug fixed on a bottom portion of a lower hollow tube for limitingly coupling the handle tube with the lower hollow tube;

the improvement which comprises:

said slider including a polygonal bore portion formed inside said slider and a catch socket recessed radially in a secant wall portion adjacent to said polygonal bore portion and recessed upwardly from an arcuate opening of an annular flange formed on a lowest perimeter of said slider, said catch socket operatively engageable with said upper catch of said stabilizing retainer for preventing an unexpected collapsing of the slider and the canopy when opened.

4,951,696

## HUNTING STAND

Gordon E. Jones, Sr., 1111 Berkley Dr., Brownsville, Tenn. 38012

Filed Jul. 14, 1989, Ser. No. 379,617 Int. Cl.<sup>3</sup> A01M 31/00

U.S. Cl. 135—90

6 Claims



1. A portable hunting stand for erection in a tree or other elevated position comprising: a base designed to form a plane surface for use as a floor; a plurality of frame members adapted to engage and be supported by said base and extending upwardly therefrom; a top rail supported by said frame members and defining an enclosed area above said base and within said frame members; a seat supported by said frame members at a position intermediate said base and said top rail; and sleeves projecting outwardly from said base and adapted to receive the sidepieces of a ladder whereby said ladder will extend from said stand to the ground to provide stability and support to said stand.

4,951,697

## RUPTURE DISK FAILURE INDICATING APPARATUS

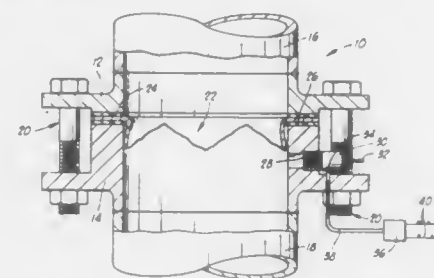
Donald K. Fritts, Tulsa, Okla., assignor to BS&B Safety Systems, Inc., Tulsa, Okla.

Filed Nov. 27, 1989, Ser. No. 441,771

Int. Cl.<sup>3</sup> F16K 17/16, 37/00

U.S. Cl. 137—68.1

8 Claims



1. Apparatus for indicating the failure of a rupture disk comprising:

an elongated cylindrical hollow body member having an open end which includes threads formed thereon for threadedly and sealingly connecting to a passageway for communicating pressurized fluid resulting from the failure of a rupture disk thereto and having an indicator opening in the other end, said body member having an internal annular groove formed therein at the end portion thereof connected to said passageway;

a snap ring disposed in said internal annular groove for retaining said piston in said body member;

a cylindrical piston disposed in said body member for moving therein from the end portion of said body member connected to said passageway to the other end of said body member in response to pressurized fluid pressure exerted on said piston, said piston including an annular groove formed therein within which an O-ring seal is disposed;

an elongated indicator pin positioned in said body member between said piston and said other end of said body member, said indicator pin being adapted to slide through said indicator opening so that when said piston is moved by said pressurized fluid to the other end of said body member, said indicator pin is extended through said opening to thereby provide a visual indication of the failure of said rupture disk; and said body member including a pressurized fluid exhaust port formed in a side thereof and positioned so that when said piston is moved to said other end of said body member, it moves past said port and allows pressurized fluid to be exhausted therethrough.

4,951,698

## PROCESS AND DEVICES FOR MAINTAINING THE GAS CONTAINED IN A SUBMERGED ENCLOSURE IN PRESSURE EQUILIBRIUM WITH THE OUTSIDE

Gilles A. Grosso, 58 Boucle de la Malogineste, 83140 Six Fours les Plages, France

Filed Jul. 12, 1989, Ser. No. 378,638

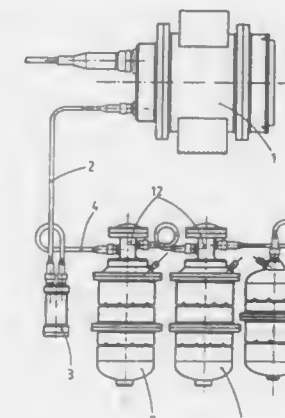
Claims priority, application France, Jul. 15, 1988, 88 09775 Int. Cl.<sup>3</sup> F16K 17/36; H04R 17/00

U.S. Cl. 137—81.2

10 Claims

1. A process for maintaining a gas contained in a submerged enclosure in pressure equilibrium with the ambient hydrostatic pressure of the type in which said enclosure and a gas-filled deformable bag which communicates with said enclosure are immersed simultaneously, wherein a plurality of deformable bags are filled with a gas compressed at different pressures from one bag to the other, then said bags are submerged simultaneously, and, during descent, communication is automatically established between said enclosure and each of the said

bags when the hydrostatic pressure attains substantially the pressure of said gas contained in said bag and, during rise to the



4,951,699

## FUEL TRANSFER SYSTEM WITH ASPIRATOR

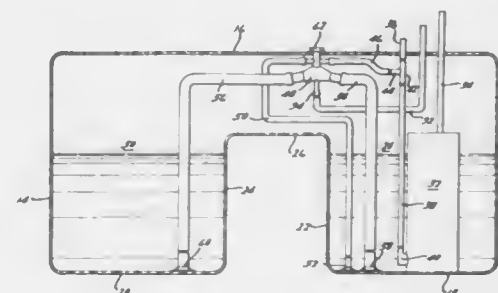
John M. Lipman, Norwich, England, assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 6, 1989, Ser. No. 431,814

Int. Cl.<sup>3</sup> F04F 10/00

U.S. Cl. 137—142

2 Claims



1. In combination with a vehicle fuel tank having a multiple interior compartments separated one from another by an upwardly directed channel forming means in the bottom wall of the tank so that liquid fuel is prohibited from flowing back and forth between the interior compartments when the liquid level of the fuel is below the uppermost portion of the channel forming means and with a fuel supply apparatus for an engine including a fuel pump to transfer fuel from the fuel tank to an engine and to return a portion of the fuel back to the fuel tank through a return line, a siphon action type liquid fuel leveling system to equalize liquid fuel levels in the interior compartments of the fuel tank; the leveling system including a housing supported within the fuel tank above the uppermost portion of the channel, the housing defining a siphon flow passage there-through with openings to the interior of the fuel tank; a first conduit means fluidly connecting one of the openings to a lower portion of one of the fuel tank's interior compartments; a second conduit means fluidly connecting the other of the openings to a lower portion of another of the fuel tank's interior compartments; the siphon flow passage in the housing having a configuration between the openings including an upwardly directed domed space, wherein air and fuel vapors tend to rise and collect; aspirator type means formed in the housing to withdraw air and fuel vapor from the domed space thereby initiating siphon action through the housing, the aspirator means including a venturi passage extending through the

housing in a position above the siphon flow passage, the venturi passage having an inlet and an outlet thereto; third conduit means between the venturi inlet and the return line for receiving liquid fuel and delivering it to the venturi passage; fourth conduit means between the venturi outlet and the interior of the fuel tank so that liquid fuel flows through the venturi passage; the venturi passage having a reduced dimension portion between the inlet and outlet which creates a restriction which increases fuel velocity and decreases fuel pressure; a small cross-passage formed in the housing connecting the upper portion of the domed space and the reduced dimension portion of the venturi passage, whereby air and fuel vapors are withdrawn from the siphon flow passage causing it to fill with liquid fuel from the interior compartments and thereafter facilitating two-way siphon flow of liquid fuel between the interior compartments so that the liquid level in each is maintained the same.

4,951,700

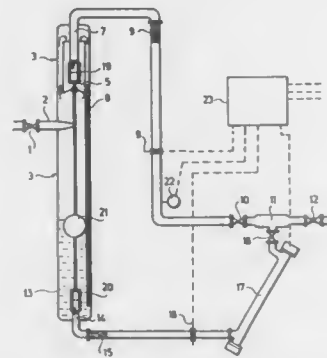
## EQUIPMENT FOR MEASURING THE YIELD OF OIL WELLS

Pintér A. Kálmán, Budapest, Hungary, assignor to Vegyiműveket Építő és Szerelő Vállalat, Budapest, Hungary  
Filed Jan. 23, 1989, Ser. No. 300,359

Claims priority, application Hungary, Mar. 10, 1988, 1145/85  
Int. Cl.<sup>3</sup> B01D 19/00

U.S. Cl. 137—174

7 Claims



1. In an apparatus for measuring the yield of oil wells, particularly where such yield may be irregular, which includes
  - (a) a two-phase separator for receiving oil-gas mixture recovered from the well,
  - (b) means for measuring the yield of the separated oil and gas flows,
  - (c) and a mixer for re-combining the oil and gas flows after measurement, the improvement characterized by,
  - (d) said apparatus including a combined pressure regulator and liquid level control,
  - (e) said combined control including (i) a chamber communicating with the separated oil and gas fluids in said separator,
  - (ii) a float member within said chamber and movable up and down therein as a function of the level of the separated oil, (iii) upper and lower pressure compensated slide valves in said chamber connected to said float and movable vertically therewith to progressively open one slide valve while progressively closing the other, and
  - (f) fluid conduits connecting said slide valves with said mixer.

4,951,701

## COMBINATION AIR VENT AND OVERPRESSURE VALVE

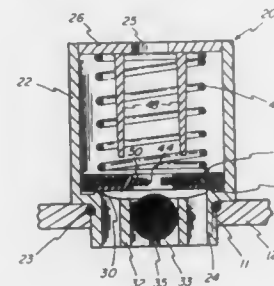
Dennis A. Boehmer, Xenia, Ohio, assignor to Vernay Laboratories, Inc., Yellow Springs, Ohio

Filed Jul. 17, 1989, Ser. No. 390,237

Int. Cl.<sup>3</sup> F16K 17/04

U.S. Cl. 137—199

5 Claims



1. A combined air vent and overpressure relief valve assembly for installation in an opening in the upper end wall of a chamber to be filled with liquid under pressure, comprising:
  - (a) a tubular housing proportioned for insertion in said opening in sealed relation with said wall,
  - (b) said housing having an upper end wall provided with a vent hole therethrough,
  - (c) means within said housing forming an annular valve seat facing said upper end wall,
  - (d) a valve disk within and proportioned to move lengthwise of said housing and including an annular portion proportioned for sealing engagement with said valve seat,
  - (e) means for maintaining said valve disk out of sealing engagement with the inner surface of said housing to provide for flow of liquid past the periphery of said valve disk when said disk is out of engagement with said seat,
  - (f) spring means in said housing for biasing said disk into sealing engagement with said seat,
  - (g) said valve disk having a bleed hole therethrough,
  - (h) a valve ball proportioned to seat in the lower end of and close said bleed hole,
  - (i) a guide cage for said ball fixed in the lower end of said housing for retaining said ball in aligned relation with said bleed hole,
  - (j) said cage being proportioned both to provide for travel of said valve ball into and out of sealing relation with said bleed hole while said valve disk is in said sealing engagement with said valve seat and to provide space for flow of fluid from within said chamber to said bleed hole when said valve ball is out of sealing engagement with said bleed hole,
  - (k) said cage being open at the lower end thereof to expose said ball and the lower surface of said disk to fluid under pressure from said chamber, and
  - (l) said ball and said valve disk constituting the sole members of said valve assembly which are movable with respect to said housing whereby following movement of said ball into seated and closing relation with said bleed hole, said valve and said disk are movable as a unit in response to pressure on the undersurface of said disk of sufficient magnitude to overcome said spring means.

4,951,702

## BIDET VALVE

John J. Brotcke, Germantown, Wis., assignor to Canceramic Limited, Tortola, British Virgin Is.

Filed Aug. 28, 1989, Ser. No. 399,582

Int. Cl.<sup>3</sup> F16K 24/02

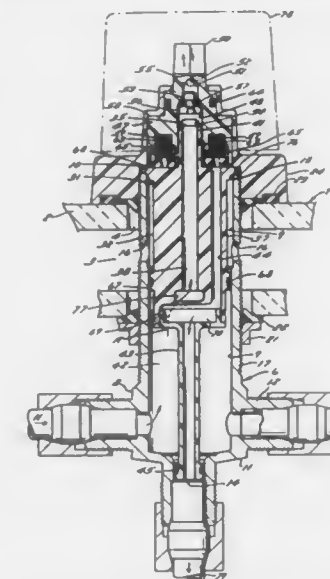
U.S. Cl. 137—218

11 Claims

1. A replaceable cartridge for insertion into an axially ex-

tending bore of a bidet valve housing for control of fluid flowing through said valve housing, said cartridge comprising:
 

- a spool element (32) including a body portion (33) having an axial extent and first and second ends (34, 36);
- a fluid outlet zone (37) between said first and second ends;
- a diverting zone (39) adjacent said first end; a fluid admitting opening (35) in said diverting zone;
- a fluid inlet zone (42) adjacent said second end;
- a fluid inlet passage (38) in said body portion in fluid communication between said diverting zone fluid admitting opening and said fluid inlet zone;
- a first fluid outlet passage (44) having a first discharge opening (14), said first fluid outlet passage connected in fluid communication between said diverting zone and said first discharge opening;
- a second fluid outlet passage (46) connected in fluid communication between said diverting zone and said fluid outlet zone;



- a diverter member (47) rotatably mounted on and supported by said spool element body portion in said diverting zone adjacent said first end and having,
  - a stem means (50) for rotating said diverter member,
  - a vacuum breaker chamber (51),
  - an air inlet (52) into said vacuum breaker chamber,
  - a vacuum breaker outlet opening (53) connecting said vacuum breaker chamber with said diverting zone, and
  - a diverting port (54) connecting said vacuum breaker chamber with said diverting zone;
- a seal means (62) on said diverter member for alternately closing either said first or said second fluid outlet passages; and
- a vacuum breaker valve (56) mounted in said vacuum breaker chamber for movement into closing relation with said air inlet.

4,951,703

## ELECTROMAGNETIC VALVE

Werner Brehm, Hemmingen, and Horst Staib, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 9, 1988, Ser. No. 206,870

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 8711602

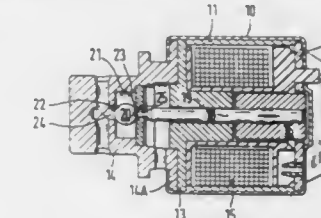
Int. Cl.<sup>3</sup> F16K 43/00, 31/06

U.S. Cl. 137—315

2 Claims

1. An electromagnet valve, comprising valve means including a valve body; armature means for controlling operation of said valve means; a cylindrical tubular casing for enclosing a portion of said valve body and said armature means; guide means for said armature means; cover means, said cylindrical

tubular casing being attached to said cover means and said cylindrical casing having two opposite flanged ends encompassing said guide means and said cover means of said electromagnetic valve, retaining parts of said electromagnetic valve therein, and having a straight inner cylindrical surface extending between said two opposite flanged ends and defining a



chamber in which said portion of said valve body, said armature means, said guide means, and said cover means are located; and a separate straight tubular cylindrical sleeve arranged in said chamber in a non-contacting relationship with regard to an armature for maintaining a predetermined spacing between said guide means and said cover means in said chamber.

4,951,704

## CONCEALED RELIEF SYSTEMS FOR CLOSED SYSTEM FIRE TANK TRUCKS

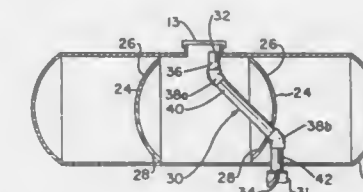
Larry F. Reber, 5963 Fountain Noon Rd., Apple Creek, Ohio 44606

Filed Aug. 22, 1989, Ser. No. 397,045

Int. Cl.<sup>3</sup> F16K 51/00

U.S. Cl. 137—351

9 Claims



1. An overflow relief system for a tanker truck having a tank of cylindrical cross-section mounted thereon and positioned such that said tank's longitudinal axis is parallel to the truck's direction of locomotion, said overflow relief system comprising,
  - a continuous unobstructed conduit having a first end and a second end;
  - said first end positioned at least as high as the top surface of said tank and substantially perpendicular thereto and being open;
  - said second end positioned rearward of the rearmost wheels of said truck and exiting said tank in a substantially perpendicular manner;
  - said second end having a valve means; and
  - said first and second ends of conduit being connected by a sloping section of conduit disposed at an angle of at least about 45° with the longitudinal axis of the tank.



4,951,705

**TWO-WIRE I/P CONVERTER WITH ENERGY STORAGE**  
David C. Carey; Neil V. Peers, both of West Yorkshire, and  
Stuart D. Stoney, Leeds, all of England, assignors to Watson  
Smith Limited, Leeds, England

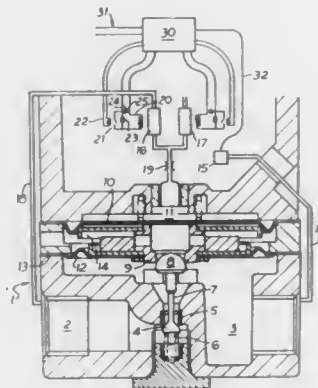
Filed May 8, 1989, Ser. No. 349,424

Claims priority, application United Kingdom, May 11, 1988, U.S. Cl. 137—512.1  
8811123

Int. Cl.<sup>5</sup> F16K 31/126

U.S. Cl. 137—487.5

13 Claims



1. A fail to a user-predetermined-pressure value, two wire, electrically controlled fluid pressure regulator capable of operation with full-range control on an electrical current input in the range of about 4–20mA to produce a proportionate output pressure, said regulator comprising:

- (a) an inlet for a fluid whose pressure is to be regulated;
- (b) an outlet for said fluid at said output pressure;
- (c) a passageway interconnecting said inlet and outlet;
- (d) a valve seat in said passageway;
- (e) a moveable valve element cooperable with said valve seat and operable by the pressure of a control fluid contained in a chamber, the pressure of said control fluid being variable in response to said electrical input current whereby the output pressure will be proportional to said electrical input current;
- (f) a normally closed, electrically operated inlet valve and a normally closed, electrically operated output valve connected to said chamber, whereby the control fluid pressure in said chamber may be increased by opening said inlet valve to admit fluid at a higher pressure or decreased by opening said outlet valve to permit fluid in said chamber to exhaust;
- (g) a pressure transducer for producing a signal indicative of said output pressure; and
- (h) electrical circuitry for controlling said valves to adjust the pressure of the control fluid in said chamber, in response to a comparison between said input current and the signal produced by said pressure transducer, an average current demand of said electrical circuitry being less than about 4mA and said circuitry including storage means for storing a residual inputted electrical energy, and for supplying the stored electrical energy to said electrical circuitry in the event of failure of said electrical input current to provide current to operate said inlet and outlet valves, whereby said output pressure will assume said user-predetermined value.

4,951,706

**FLAPPER CHECK VALVE**

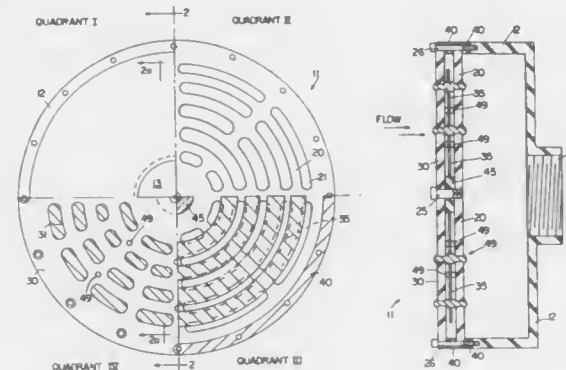
Peter Kardos, Longmeadow, Mass., assignor to Fulton Thermatec Corporation, Palaski, N.Y.

Filed May 26, 1989, Ser. No. 359,082

Int. Cl.<sup>5</sup> F16K 15/10; F23C 11/00

U.S. Cl. 137—512.1

16 Claims



1. A flapper check valve comprising:
- a valve housing having outlet means;
  - a valve backer plate having a plurality of arcuate backer through holes;
  - a valve port plate having a plurality of arcuate port through holes, said valve port plate positioned generally parallel to said valve backer plate and sealably secured with respect to said valve housing, in an open position of the flapper check valve said backer through holes in communication with said port through holes;
  - peripheral spacer/hermetic seal means secured between said valve backer plate and said valve port plate, said peripheral spacer/hermetic seal means positioned about a general periphery of said valve backer plate;
  - inner spacer/flapper guide means secured between said valve backer plate and said valve port plate, said inner spacer/flapper guide means and said peripheral spacer/hermetic seal means maintaining a fixed distance between said valve port plate and said valve backer plate, said inner spacer/flapper guide means comprising a plurality of inner spacer/guide pins positioned on an interior surface, relative to said general periphery, of said valve port plate, and said inner spacer/guide pins providing sufficient support to said valve backer plate whereby said valve backer plate can have a reduced thickness and resist deflection when subjected to relatively high pressures from within said valve housing, each said inner spacer/guide pin further comprising a rod having a central portion with a central cross-section area greater than an outer cross-sectional area of an outer portion at each end of said rod, a transition from said central portion to each said outer portion defining a shoulder that maintains said fixed distance between said valve port plate and said valve backer plate, and said rod secured relative to said valve port plate and said valve backer plate; and
  - flapper means freely moveable in a direction generally perpendicular to said valve port plate between said valve backer plate and said valve port plate, said inner spacer/flapper guide means retaining said flapper means in a position such that upon a positive pressure within said valve housing said flapper means abut said valve port plate and closes communication between said backer through holes and said port through holes.

4,951,707

**SEAL FOR A PUMP VALVE**

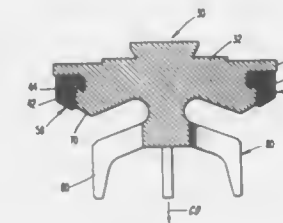
Jerry E. Johnson, Houston, Tex., assignor to National-Oilwell, Garland, Tex.

Filed Apr. 10, 1989, Ser. No. 335,725

Int. Cl.<sup>5</sup> F16K 15/02

U.S. Cl. 137—516.29

19 Claims



1. A valve element comprising:
- a valve body formed of a rigid material, said body defining a front-to-rear extending longitudinal axis and including:
  - a generally radially outwardly facing first contact surface of generally frusto-conical configuration tapering forwardly and forming an angle of from about 5 to about 10 degrees with said axis as viewed in longitudinal section,
  - a radially inwardly extending annular recess disposed rearwardly of said contact surface, and
  - a seal mounted on said body, said seal being ring-shaped and formed of an elastomeric material and including:
  - a generally radially inwardly projecting lip received in said recess,
  - an axially forwardly facing sealing face, and
  - a radially inwardly facing second contact surface disposed between said sealing face and said lip and tightly engaging said first contact surface to conform to the frusto-conical configuration thereof.

4,951,708

**VACUUM CHECK VALVE**

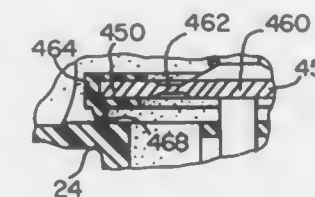
James W. Miller, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 30, 1988, Ser. No. 277,629

Int. Cl.<sup>5</sup> F16K 15/06

U.S. Cl. 137—526

10 Claims



1. In a vacuum check valve assembly for a vacuum powered brake booster having:
- a housing having a valve chamber formed therein, an inlet opening adapted to be connected to a vacuum powered brake booster, an outlet opening adapted to be connected to a source of vacuum pressure;
  - a check valve in said valve chamber having a normal closed position preventing vacuum communication between said outlet and said inlet and an open position permitting vacuum communication between said outlet and said inlet;
  - said check valve having an axially guided center disc including a disc body having a center and an annular rubberlike valve portion on the outer peripheral part of said disc body which sealingly engages said housing when said valve is in the normal closed position and is spaced from

said housing to permit air to flow therepast when said valve is in the open position;

the improvement comprising:

said check valve center disc having a flexible portion of said disc body radially intermediate the area of sealing engagement of said center disc annular rubberlike valve portion with said housing and said center of said disc body, said flexible portion being formed by an annular less thick portion of said disc body than the part of said disc body radially inward of said flexible portion, said flexible portion acting when said valve is in said normal closed position to permit slight axial movements of said disc body in response to pressure pulsations generated by said source of vacuum pressure without unsealing said rubberlike valve portion from said housing.

4,951,709

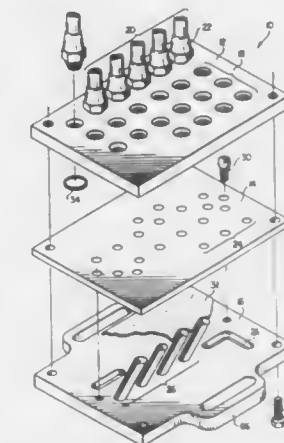
**HYDRAULIC SYSTEM AND MANIFOLD ASSEMBLY**  
Steven C. Kirkham, McHenry, Ill., assignor to Komatsu Dresser Company, Libertyville, Ill.

Filed Nov. 1, 1988, Ser. No. 265,880

Int. Cl.<sup>5</sup> F16D 1/00

U.S. Cl. 137—561 A

11 Claims



1. An improved manifold assembly for use in connecting lines in a hydraulic circuit according to a preselected circuit design, the improved manifold comprising:
- a baseplate having a plurality of inlet and outlet ports connected to components in the hydraulic circuit, the baseplate having a plate side and a hose side;
  - connecting means having segregated fluid passageways for connecting inlet ports with outlet ports in the baseplate according to a preselected hydraulic circuit design and said connecting means being assembled as a single unit and capable of independent removal from said baseplate without itself being disassembled;
  - one or more channel plates attached to said baseplate, and the channel plates having fluid channels formed therein for conducting fluid from one or more of the predetermined inlet ports to the corresponding preselected outlet ports in the baseplate; and
  - keying elements formed in the baseplate and channel plate(s) for assuring proper alignment of the channel plates with the baseplate, said keying elements being the heads of bolts used to secure the channel plates together and corresponding countersunk holes in the plate side of the baseplate.

4,951,710

## PIPE COUPLING

Naoyuki Kotake, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan

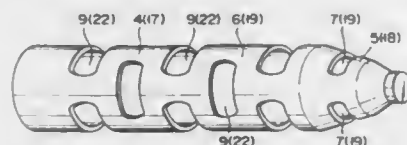
Filed Sep. 6, 1989, Ser. No. 403,441

Claims priority, application Japan, Sep. 14, 1988, 63-120705[U]

Int. Cl.<sup>5</sup> F16L 37/28

U.S. Cl. 137-614

2 Claims



1. A pipe coupling comprising a cylindrical body extending in an axial direction and having a fluid passage and valve means for opening and closing the fluid passage; said valve means having a head portion and a cylinder portion; said cylinder portion having a plurality of slots extending in a circumferential direction of said cylinder portion and penetrating said cylinder portion in radial directions, said slots being formed alternately in positions shifted in the circumferential direction and in the axial direction of the cylinder portion, such that said cylinder portion is provided with elasticity in the axial direction.

4,951,711

## MULTIWAY COCK

Peter Kunz, Schaffhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

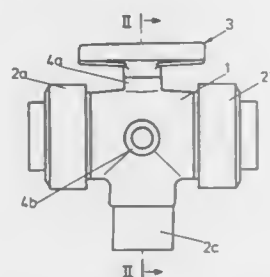
Filed Aug. 6, 1984, Ser. No. 637,898

Claims priority, application Switzerland, Aug. 9, 1983, 4315/83

Int. Cl.<sup>5</sup> F16K 11/087, 31/20, 31/60

U.S. Cl. 137-625.47

4 Claims



1. A multiway cock comprising a housing having an inside surface and an outside surface, three pipe connections located in said housing in a T-shaped arrangement extending between the inside surface and the outside surface, a spherical cock plug positioned within the inside surface of said housing, an operating element mounted on the outside surface of said housing and connected to said cock plug for selectively positioning said cock plug, wherein the improvement comprises that said housing is a monolithic member, at least two separate bearing bosses each formed on the outside surface of said housing monolithically with said housing in angularly spaced relation and each said bearing boss, aligned with said cock plug, is arranged to receive said operating element for supporting said operating element at a different angularly spaced position on said housing so that said operating element engages said cock plug, two of said pipe connections are arranged in axial alignment and a third pipe connection has an axis extending transversely of the axis of the other two pipe connections forming the T-shaped arrangement, one said bearing boss is aligned opposite said third pipe connection and the other said bearing

boss is offset by 90° on said housing from the axis of said one bearing boss and has an axis extending perpendicularly to the axial alignment of the two of said pipe connections, each said bearing boss on said housing comprises a recess extending inwardly from the outside surface of said housing and having a base spaced outwardly from the inside surface of said housing and a wall extending from the base of said recess to the inside of said housing and forming a seal between the inside of said housing and the outside of said housing and in the completed assembly of said multiway cock a bore is formed through said wall from the base of said recess to the inside surface of said housing forming a continuous bore for supporting said operating element.

4,951,712

## CONTROL SYSTEM FOR A VALVE

Manfred A. Becker, Frankenthal, Fed. Rep. of Germany, assignor to Deere &amp; Company, Moline, Ill.

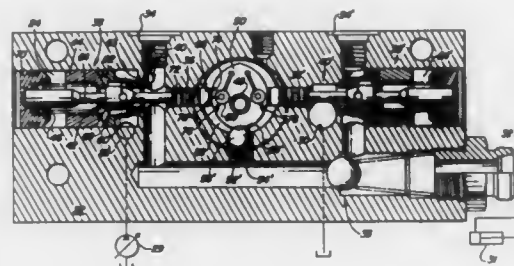
Filed Jun. 12, 1989, Ser. No. 364,762

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3821700

Int. Cl.<sup>5</sup> F15B 13/044

U.S. Cl. 137-636.1

6 Claims



1. A control valve system comprising:  
a valve housing having a chamber and first and second spaced-apart valve bores extending away from the chamber;  
a pair of valve members, each movable in one of the valve bores to control fluid flow therethrough;  
a pair of operating members, each extending from the chamber into a corresponding one of the valve bores and engaging a corresponding one of the valve members;  
a cam member received in the chamber and having a pair of cam surfaces on opposite sides thereof, each cam surface engaging a corresponding one of the operating means;  
a stepper motor coupled to the cam member, rotation of the stepper motor rotating the cam member thereby moving at least one of the operating members and the corresponding one of the valve members;  
a clutch for coupling, the stepper motor to the cam member only when the stepper motor is operated; and  
detent means for releasably holding the cam member in its neutral position.

4,951,713

## OVERFLOW CHECK SYSTEM HAVING AUTOMATIC START-UP

Foster A. Jordan, P.O. Box 132, Martindale, Tex. 78655, and Jack B. Alberts, 9850 Pagewood La. No. 604, Houston, Tex. 77042

Filed Sep. 2, 1988, Ser. No. 239,628

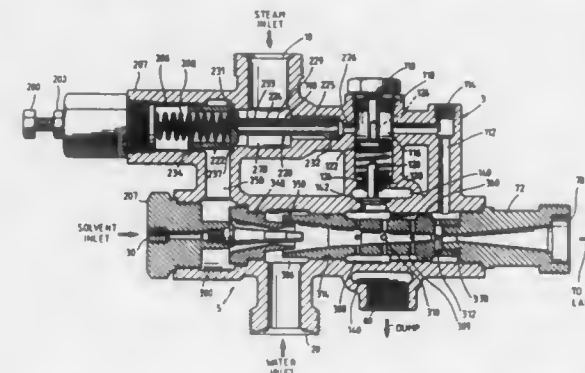
Int. Cl.<sup>5</sup> A01G 25/09; B05B 9/00

U.S. Cl. 137-895

28 Claims

1. A system to provide automatic suspension and restart of a vapor powered liquid pressure amplifier from a remote user location, said system comprising:

an overrideable first check valve oriented to block the supply of vapor into the system;  
means for applying the vapor pressure of said amplifier to override said check valve so as to allow the flow of vapor therethrough;



means for applying said vapor pressure of said amplifier to remove the override and enable said check valve to block said vapor flow.

4,951,714

## MEANS FOR VERTICALLY SUPPORTING A SEGMENTED HIGH-TEMPERATURE INTERNAL CONDUIT

Roger A. Detzel, Norton; Paul S. Knoebel, Clinton, and David J. Walker, Wadsworth, all of Ohio, assignors to The Babcock &amp; Wilcox Company, New Orleans, La.

Filed Nov. 6, 1989, Ser. No. 432,290

Int. Cl.<sup>5</sup> F16L 3/22

U.S. Cl. 138-106

9 Claims



1. An apparatus for vertically suspending a conduit subject to thermal expansion/contraction comprising:  
a. a vertically oriented conduit subject to temperature fluctuations due to the material being conveyed;  
b. first shear means fixedly secured to the outer perimeter of said conduit for supporting said conduit therefrom;  
c. a spool member for supporting said first shear means thereon, said first shear means resting upon and independently movable with respect to said spool member;  
d. first alignment means for maintaining alignment between said first shear means and said spool member whenever one is moved with respect to the other;  
e. second shear means fixedly secured to a support for supporting said spool member thereon, said spool member resting upon and independently movable with respect to said second shear means; and  
f. second alignment means for maintaining alignment between said second shear means and said spool member whenever said spool member moves with respect to said second shear means.

4,951,715

## TENSION SLEEVE SUPPORTED CASING ARTICLE

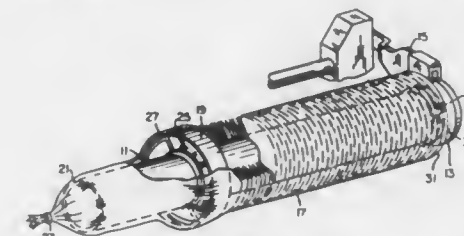
John H. Beckman, Downers Grove; George H. Mahoney, Country Club Hills, and Arthur L. Sheridan, Woodridge, all of Ill., assignors to Viskase Corporation, Chicago, Ill.

Continuation of Ser. No. 561,966, Dec. 16, 1983, abandoned, which is a continuation of Ser. No. 273,180, Jan. 12, 1981, abandoned. This application Jul. 13, 1989, Ser. No. 380,709

Int. Cl.<sup>5</sup> F16L 11/12

U.S. Cl. 138-118.1

5 Claims



1. A shirred casing stick tension sleeve article comprising in combination:

- a substantially straight, rigid hollow tubular tension sleeve core member having a bore size sufficient to slidably fit over the stuffing horn of a stuffing apparatus;
- a radially extending flange provided at one end of said tubular core member for connection to a reciprocally operable slacker mechanism of the stuffing apparatus;
- a casing sizing means on a second end of said tubular core member;
- a shirred and longitudinally compacted controllably moisturized cellulosic food casing disposed on said tubular core member, said casing having a packing efficiency of at least about 0.50 and a moisture content of from about 16% to about 35% by total casing weight, said compacted casing having one end contiguous to said flange and a deshirred portion at a second end extending over said sizing means;
- said tubular core member being sufficiently rigid to resist inward growth of the compacted casing disposed thereon; and
- said flange is provided with a shoulder element disposed between said compacted casing and a facia surface of said flange, said shoulder element providing a space between the compacted casing and said facia surface of said flange to accommodate the operable connection of said flange to the slacker mechanism of the stuffing apparatus.

4,951,716

## LOCKING MECHANISM

Mitsunori Tsunoda, and Norihiro Yoneyama, both of Toyota, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 279,021

Claims priority, application Japan, Dec. 17, 1987, 62-190648[U]

Int. Cl.<sup>5</sup> F16L 9/22

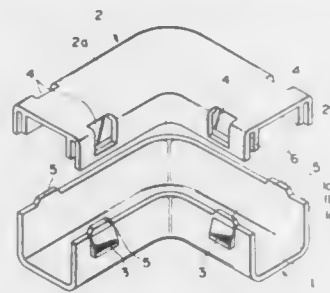
U.S. Cl. 138-162

17 Claims

1. A locking mechanism for securing a lid to a body having a sidewall, the sidewall having a side surface and an edge surface, the locking mechanism comprising:  
a lid having a side portion and a lid portion, said side portion having a first engagement hole and said lid portion having a second engagement hole;  
a first engagement projection extending outwardly from said side surface of said body;  
a second engagement projection extending from said edge surface of said body; and  
a holding plate disposed on said lid;  
whereby said lid is securable to said body by fitting said lid onto said body such that said lid portion is aligned with and supported by said body edge surface, said first engage-

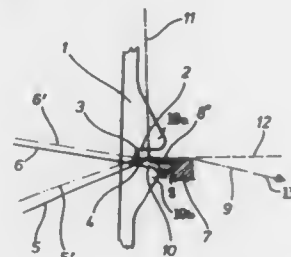


ment hole receives said first engagement projection, said holding plate engages said first engagement projection



received within said first engagement hole, and said second engagement hole receives said second engagement projection.

**4,951,717**  
**AIR JET WEAVING LOOM WITH AN EXPANDER HAVING AN EXTENSION**  
Rudolf Riemer, Neuenbora, Fed. Rep. of Germany, assignor to Lindauer Dornier Gesellschaft mbH, Lindau, Fed. Rep. of Germany  
Filed Apr. 7, 1989, Ser. No. 335,032  
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811653  
Int. Cl.<sup>5</sup> D03D 47/28  
U.S. Cl. 139—435.1 2 Claims

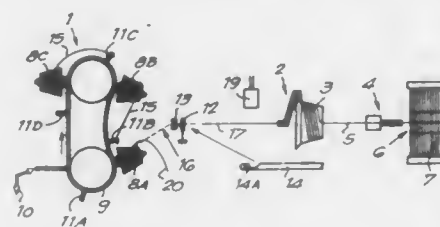


1. An air jet weaving loom, comprising a weaving reed including reed teeth forming a weft thread insertion channel, an expander table arranged alongside said weaving reed to face said weft thread insertion channel, said expander table having a table surface for supporting a fabric to keep said fabric spread, said expander table having an extension projecting toward said weft thread insertion channel, said extension having a free straight edge (8') facing in a direction substantially opposite to a fabric withdrawal direction, said extension further having a flat top surface (8'') forming an elongation of said table surface (7'), so that said table surface terminates in said free straight edge (8') reaching approximately to the center of said weft thread insertion channel during beat-up for positively locating an interlacing position for each weft thread.

**4,951,718**  
**REPAIR OF BROKEN WEFT THREADS USING PLURAL YARN SUPPLY PACKAGES**  
Henry Shaw, Vleteren, Belgium, assignor to Picanol N.V., Belgium  
Filed Sep. 2, 1988, Ser. No. 239,794  
Claims priority, application Belgium, Sep. 2, 1987, 8700981  
Int. Cl.<sup>5</sup> D03D 47/36 16 Claims  
U.S. Cl. 139—450  
9. An apparatus for repairing breaks in a weft thread on a weaving machine, said machine including a weft accumulator

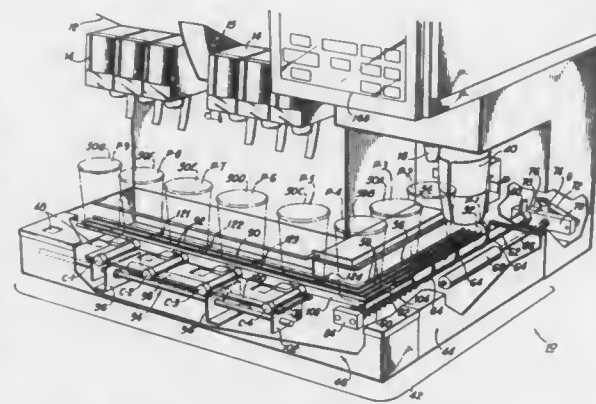
having means for accumulating weft threads prior to insertion into a shed, and yarn supply packages having means for supplying weft threads to the accumulator, a section of broken weft thread remaining connected to the accumulator after a break in the weft thread, comprising:

means for continually presenting yarn supply packages in order to supply weft threads to the accumulator such that, when a first package becomes empty during the supply of weft threads to the accumulator, said continuous presenta-



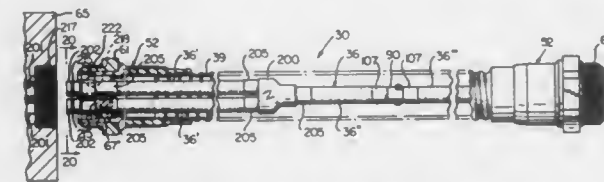
tion means replaces said first package with a second package;  
thread holding means for holding an end of a thread of at least said second package;  
monitor means for monitoring the weft threads for breaks between said first package and the accumulator; and  
means for gripping said thread end upon detection of a thread break by said monitor means and for joining said thread end to the broken weft section which is connected to the accumulator.

**4,951,719**  
**AUTOMATIC POSTMIX BEVERAGE DISPENSING SYSTEM WITH FLAVOR INDICATORS**  
Ronald L. Wiley, Marietta, Ga., and Benjamin D. Miller, Chicago, Ill., assignors to The Coca-Cola Company, Atlanta, Ga.  
Filed Feb. 27, 1989, Ser. No. 316,010  
Int. Cl.<sup>5</sup> B65B 3/04, 57/00  
U.S. Cl. 141—1 16 Claims



11. A method for operating an automatic postmix beverage dispenser comprising the steps of:  
(a) dispensing any one of a number of different selected beverages from a multiflavor valve into a cup;  
(b) automatically advancing said cup by a conveyor along a plurality of cup stations including a cup drop station, an ice drop station, a beverage dispense station, and a plurality of separate, spaced-apart, cup pick-up stations until said cup is removed by an operator; and  
(c) identifying the beverage flavor in each cup positioned at each of said cup pick-up stations, by a stationary flavor indicators positioned adjacent each of said plurality of cup pick-up stations.

**4,951,720**  
**HOSE ASSEMBLY AND METHOD OF MAKING THE SAME**  
Rodger P. Grantham, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio  
Continuation-in-part of Ser. No. 98,641, Sep. 18, 1987. This application Apr. 25, 1988, Ser. No. 192,253  
Int. Cl.<sup>5</sup> B67D 5/06  
U.S. Cl. 141—44 12 Claims

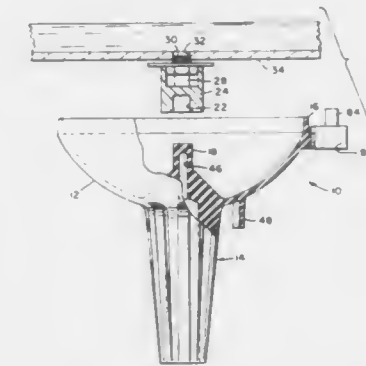


1. In the combination of a liquid fuel source, a dispensing nozzle and a hose assembly having a first fluid passage therein for conveying said liquid fuel in one direction from said source to said nozzle that dispenses said liquid fuel into a container and a second fluid passage therein for returning the vapors of said liquid fuel from said container, the assembly comprising a flexible inner hose unit having an outer peripheral surface and a defining said first fluid passage therein, and a flexible outer hose having an inner peripheral surface and being disposed around said inner hose unit, said inner peripheral surface of said outer hose and said outer peripheral surface of said inner hose unit defining said second fluid passage therebetween, said inner hose unit having a Venturi section therein that tends to remove liquid from a certain drap area of said hose assembly when the same is being utilized to dispense said liquid fuel into said container, said inner hose unit having adjacent intermediate ends, said Venturi section being located in said certain drap area of said hose assembly and having opposed ends respectively interconnected to said ends of said inner hose unit to provide said first fluid passage therewith, the improvement wherein said inner hose unit comprises a plurality of separate inner hoses extending in said one direction from said source to one end of said ends of said Venturi section and a single inner hose extending away from the other end of said ends of said Venturi section in said one direction to said nozzle, said inner hose unit comprising a coupling unit having a plurality of inlets and a single outlet interconnected to said plurality of inlets, said plurality of separate inner hoses being respectively interconnected to said plurality of inlets of said coupling unit, said inner hose unit comprising a flexible tubular length that interconnects said one end of said Venturi section to said outlet of said coupling unit and spaces said coupling unit from said Venturi section so that said coupling unit is disposed remote from said drap area.

**4,951,721**  
**OIL DRAIN FUNNEL**  
Arnold P. Moore, 601 S. First St., and Nobel Linn, Jr., 301 W. Washington, both of Benton, Ill. 62812  
Continuation-in-part of Ser. No. 74,712, Jul. 17, 1987, Pat. No. 4,800,933. This application Jan. 30, 1989, Ser. No. 303,332  
Int. Cl.<sup>5</sup> B25B 13/06; B67C 11/02  
U.S. Cl. 141—98 4 Claims

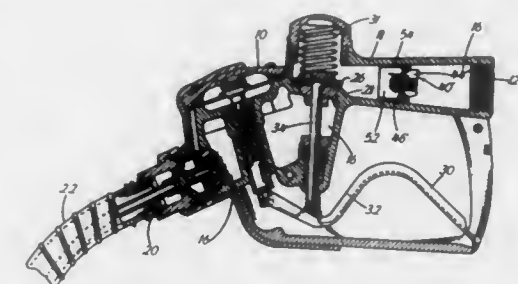
1. A funnel of a type having structure that, in cooperation with a socket member, can remove the plug of an automobile oil pan, said socket member having a first socket opening to drivably receive said plug and having a second socket opening, the improvement comprising:  
a bowl having an open upper end defined by a rim and having a rounded bottom defining an interior and having an opening through said bottom;  
an elongated nozzle stem having a bore throughout its length and said bore being in communication with the interior of said bowl through said opening;

a series of gripping ridges formed on the exterior surface of said stem;  
a drive member having an upper end dimensioned for driving engagement with said second opening;  
a bridge network supporting said drive member within said bowl without interrupting the communication between the interior of said bowl and said bore;  
a hanging lug formed on the exterior of said bowl and having an opening therethrough;



an auxiliary drive member having a bottom opening to snugly receive said drive member and an upper second end having a dimension adapted to drivably engage a socket opening different than said second socket opening; and  
a support member extending outwardly from said auxiliary drive member snugly interengaging with said hanging lug opening for releasably securing said auxiliary drive member to said hanging lug.

**4,951,722**  
**FUEL DISPENSING NOZZLE HAVING A FLOW RATE LIMITER**  
Leonard R. Nitzberg, and Paul D. Manhardt, both of Knoxville, Tenn.  
Filed Mar. 4, 1987, Ser. No. 21,399  
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B65B 57/04  
U.S. Cl. 141—206 11 Claims



1. A fuel dispensing nozzle having an inlet through which liquid fuel is supplied to said nozzle under pressure, an outlet, means adapted to discharge fuel into a fuel tank of a vehicle, an internal flow passage along which said fuel flows from said inlet to said outlet, manually operable valve means disposed within said passage intermediate said inlet and said outlet for selectively opening communication between said inlet and said outlet to permit fuel to flow from said inlet to said outlet, and flow rate limiting means for limiting the volumetric rate of fuel flowing through said nozzle to a predetermined maximum rate independent of the fuel inlet pressure and independent of the

amount of communication provided between said inlet and said outlet by said valve means, said flow rate limiting means comprising:

- flow restricting means mounted in said fuel dispensing nozzle in said internal flow passage along which said fuel flows from said inlet to said outlet;
- automatic operating means for automatically operating said flow restricting means for restricting said fuel flow along said passage to said predetermined rate when the flow rate of said fuel through said nozzle reaches said rate whereby the rate of fuel flowing through said nozzle is prevented from exceeding said rate; and
- means for automatically reducing the restriction of said flow along said passage when the rate of flow of said fuel through said nozzle is less than said rate.

4,951,723

**MOTORCYCLE ENGINE OIL DRAIN PLUG**

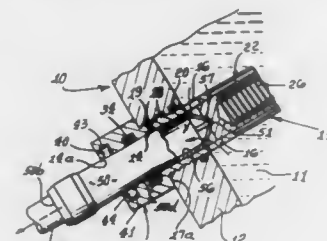
Herbert W. Hoeptner, III, Morgan Hill, Calif., assignor to Custom Chrome, Inc., Morgan Hill, Calif.

Filed Oct. 2, 1989, Ser. No. 416,376

Int. Cl.<sup>3</sup> B65B 3/04; F16N 1/00; F01M 11/04

U.S. Cl. 141—351

7 Claims



1. A tank oil drain device, comprising
  - (a) a tank, and a drain receptacle including a tubular body associated with the tank, the receptacle defining a bore having a mouth opening to the tank exterior, the tubular body having a sidewall defining a first port communicating between the tank interior and said bore,
  - (b) a tubular plunger received in said bore, and a spring urging the plunger toward a position in the bore in which said first port is blocked, and a drain plug receivable in said bore,
  - (c) a seal means normally sealing off between the bore and plunger at a location between and spaced from said first port and said mouth, and until the drain plug is received sufficiently into the bore to displace the plunger beyond the seal means, the plunger beyond the seal means,
  - (d) lock means carried by the receptacle, near said mouth, for retaining said tubular drain plug pushed into the bore for displacing the plunger in said bore sufficiently to unblock said first port thereby establishing oil draining communication via said first port and said plug to the exterior, said first port remaining blocked by the plunger while the seal means engages and seals off about the drain plug through a predetermined range of movement of the drain plug and plunger in said bore,
  - (e) and a shoulder on the receptacle in axially spaced relation to said first port and said seal means for seating said plunger in said bore in an initial position in which the plunger blocks said first port.

4,951,724

**COUPLING DEVICE**

Sheron L. Dudding, Brough, England, assignor to International Ferry Freight Limited, North Humberside, England

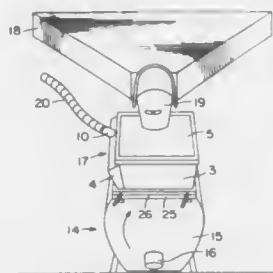
Continuation of Ser. No. 104,787, Oct. 5, 1987, abandoned. This application Dec. 4, 1989, Ser. No. 445,905

Claims priority, application United Kingdom, Oct. 6, 1986, 86/23970

Int. Cl.<sup>3</sup> B65B 1/04

U.S. Cl. 141—383

9 Claims



1. A coupling device for use in coupling a discharge outlet of a shipping container to a discharge pumping device, comprising:
  - a body, having an open bottom for mounting on top of a discharge pumping device and having an open top;
  - a discharge chamber, within the body, having an open bottom sized to fit a material inlet port on the discharge pumping device and open at the top;
  - a resilient diaphragm closing off the top of the discharge chamber; and
  - a deformable aperture, in the diaphragm, sized to fit a discharge outlet of a shipping container.

4,951,725

**METHOD OF CONTINUOUSLY PROCESSING ELONGATED ARTICLES SUCH AS COHERENT PAIRS OF CHOPSTICKS AND AN APPARATUS FOR CARRYING OUT THE METHOD**

Gert Schultz, Hillersød, Denmark, assignor to Stormax International A/S, Herlev, Denmark

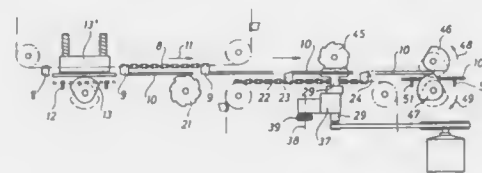
Continuation of Ser. No. 150,415, Feb. 1, 1988, Pat. No.

4,840,015. This application Apr. 11, 1989, Ser. No. 336,357

Int. Cl.<sup>3</sup> B27C 5/00, 9/00; B27M 1/00

U.S. Cl. 144—3 R

2 Claims



1. An apparatus for continuously processing matched pairs of elongated articles having respective mutually parallel outer surfaces and respective opposing surfaces inclining toward each other by the same degree relative to a common plane of symmetry, the apparatus comprising:
  - a longitudinal, substantially horizontal track guiding the articles during their passage through the apparatus, the plane of symmetry of said articles being situated along the vertical central plane of said track;
  - first and second continuous conveying means successively engaging the articles from the top and bottom sides, respectively, of said track for advancing the articles through said track;
  - process means for milling at least a portion of the articles during their passage along said track;

center means operating from respective sides of said track, and biased by uniform spring tension effected by spring means toward the center of said track for aligning the articles during milling by said process means.

4,951,726

**POWERED LOGSPLITTER**

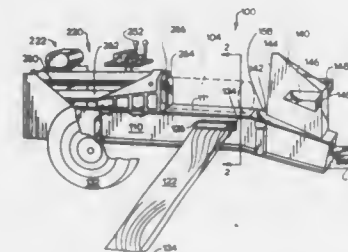
Walter J. Sieverin, 1310 Appaloosa Trail, McHenry, Ill. 60050

Filed Feb. 9, 1990, Ser. No. 477,515

Int. Cl.<sup>3</sup> B27L 7/00

U.S. Cl. 144—366

20 Claims



1. A powered log splitter for splitting a log having a housing, a splitting assembly mounted at a first end of said housing and a powered ram movably mounted at a second end of said housing, wherein:
  - a. said first end of said housing is oppositely disposed from said second end of said housing;
  - b. said splitting assembly splits said log with a single pass of said powered ram;
  - c. an electrical-mechanical solenoid actuated system is coupled to said powered ram;
  - d. said powered ram has a dual-cylinder mechanism;
  - e. said dual-cylinder mechanism includes a first hydraulic cylinder and a second hydraulic cylinder;
  - f. said first hydraulic cylinder moves said powered ram against said log;
  - g. a second cylinder actuating means activates said second cylinder as needed; and
  - h. said powered ram has a ram face means capable of pushing said log completely past a leading edge of said wedge assembly.

4,951,727

**LOW STORAGE-VOLUME CLOSURE DEVICE FOR CURVED SURFACE**

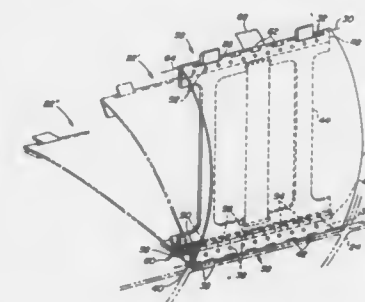
Robert A. Bybee, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Mar. 29, 1989, Ser. No. 333,063

Int. Cl.<sup>3</sup> E06B 3/00

U.S. Cl. 160—88

20 Claims



1. A closure for substantially closing an opening in a non-planar surface with said closure being in substantial conformity

with said non-planar surface when closing said opening comprising:

- a flexible member having a closed configuration and an open configuration, said closed configuration being different from said open configuration; and
- means for positioning said flexible member between said closed configuration and said open configuration so that when said flexible member is in said closed configuration it substantially closes said opening in said non-planar surface and substantially conforms to said nonplanar surface.

4,951,728

**LOUVER DEVICE FORMED BY SHEET-LIKE MATERIAL**

Kouichi Takano, 737-17 Miyashita, Yagawara-Machi, Ashigara-Shimo-Gun, Kanagawa-Ken, Japan (259-03)

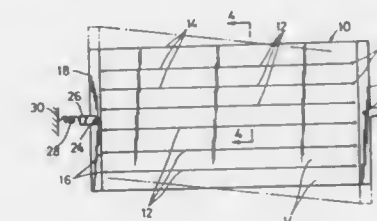
Continuation of Ser. No. 134,834, Dec. 18, 1987, abandoned.

This application Aug. 21, 1989, Ser. No. 397,361

Int. Cl.<sup>3</sup> E06B 9/26

U.S. Cl. 160—166.1

16 Claims



1. A louver device which uses a sheet-like material, comprising:
  - a main body formed of a flexible and deformable sheet-like material, said sheet-like main body having opposite main surfaces and opposing end portions, said sheet-like main body having a plurality of slits therein, said slits being parallel to a given line and extending from the vicinity of each of said end portions toward the other of said end portions, with said slits having their respective ends bent in opposite angles from being parallel to said given line, the portions of said sheet-like main body which are located between said slits serving as respective slats; and
  - holding and deforming means coupled to said sheet-like main body for supporting and holding said sheet-like main body in a predetermined shape, and including a support means and shearing means for shearing at least part of said sheet-like main body substantially in the direction of the plane of said opposite main surfaces of said sheet-like main body, said shearing means including: (1) respective frame members attached to each of said end portions of said sheet-like main body, and (2) means for moving at least one of said frame members relative to said support means for shearing and deforming said sheet-like main body to cause substantially all of said slats of said sheet-like main body to deform and to tilt or rotate relative to said end portions of said sheet-like main body and with respect to the direction of said plane of said opposite main surfaces of said sheet-like main body due to said movement of said frame members.

4,951,729

**VENETIAN BLIND STRUCTURE**

Simon S. Chi Yu, 3165 California St., Oakland, Calif. 94602

Filed Apr. 26, 1989, Ser. No. 343,906

Int. Cl.<sup>3</sup> E06B 9/38

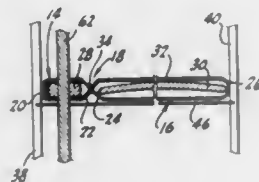
U.S. Cl. 160—178.3

10 Claims

1. A venetian blind structure comprising:
  - a. a slat unit including a first member having first and second edge portions, and a second member having first and



- second edge portions, said second edge portion of said first member being hingedly attached to said first edge portion of said second member;
- b. a first line, said first line including means for holding said first line relative to said first member of said slat unit;
- c. a second line, said second line including means for holding said second line relative to said second member of said slat

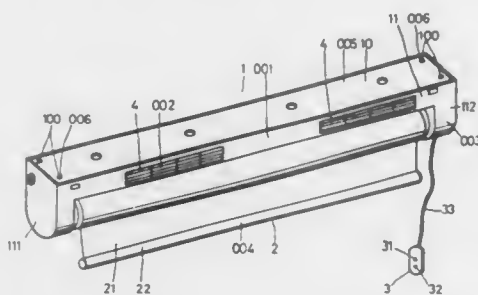


- unit, said member holding said first line relative to said first member and said second line relative to said second member including a bridging line connected to said first and second lines said bridging line spanning the slat unit between said first and second lines; and
- d. means for moving said first and second line simultaneously in opposite directions.

**4,951,730**  
**WINDOW BLIND SYSTEM**  
Chi-Hsueh Hsu, 4F, No. 144, Chu Lin Road, Yung Ho, Taipei, Taiwan

Filed Jul. 26, 1989, Ser. No. 385,088  
Int. Cl.<sup>5</sup> E06B 9/20  
U.S. Cl. 160—310

1 Claim



1. A window blind system for shading a window assembly comprising:
- a longitudinal casing having an open top portion defining a top chamber and a pair of opposed right-angled end portions extending downwardly defining a pair of side chambers in open communication with said top chamber;
- a cover member adapted for closing the opening in the top portion of the casing;
- means for securing the cover member to the casing;
- a roller blind mechanism carrying a blind and having a roller fitted with two spaced circular discs for retaining a wound blind therebetween;
- means for mounting said roller blind mechanism to the casing transversely between the right-angled end portions and under a longitudinal directed portion of the casing;
- power sources combining (1) a solar power system having a plurality of solar mirrors mounted in a side wall of the casing and exposed to the sunlight, (2) a home electric power system and, (3) a rechargeable battery power system mounted in the casing;
- driving means having a reversible power unit powered by the power sources combination and a driving unit engaged with the roller of the roller blind mechanism, said driving unit being mounted in one of said side chambers being

- coupled on opposing ends to said reversible power unit and said roller blind mechanism, said driving unit including a reduction gear mechanism for reducing the rotative speed of said power unit; and
- control means having a control circuit and control unit for operating the roller blind mechanism to roll out or rewind the blind.

**4,951,731**  
**PROCESS FOR WASHING A CASTING CORE**  
Robert E. Downing, Toledo, Ohio, assignor to Farley, Inc., Chicago, Ill.

Filed Oct. 10, 1989, Ser. No. 418,586  
Int. Cl.<sup>5</sup> B22C 3/00, 9/10

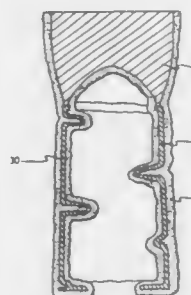
U.S. Cl. 164—14

7 Claims

1. A method for producing an expendable coated sand core to form undercut regions in a casting; the steps comprising:
- (1) mixing said sand with less than about 2% by weight of said sand with a resinous binder and a catalyst,
- (2) placing the mixture in a mold for shaping the core,
- (3) heating the mold to a temperature below about 450° F. until most of said resin in polymerized to produce a solid core,
- (4) cooling said core to about room temperature,
- (5) dipping the cooled core in a lower aliphatic alcohol to wash out unpolymerized residuals near the surface of said core,
- (6) drying said core to remove said alcohol,
- (7) coating said core with a liquid suspension of at least one refractory material, and
- (8) drying said core to remove said liquid from said suspension.

**4,951,732**  
**TRAVERSE DRUM MANUFACTURING METHOD**  
Shoji Yamada, Inuyama, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan  
Continuation of Ser. No. 67,714, Jun. 26, 1987, abandoned, which is a division of Ser. No. 774,296, Sep. 10, 1985, abandoned.  
This application Apr. 18, 1989, Ser. No. 339,931  
Claims priority, application Japan, Sep. 12, 1984, 59-191258  
Int. Cl.<sup>5</sup> B22D 18/00; B22C 9/04  
U.S. Cl. 164—35

2 Claims



1. A method for manufacturing a traverse drum having thin walls, comprising the steps of:
- producing an oxygen-free atmosphere;
- forming a soluble core with a first soluble substance;
- placing the soluble core in the middle of the segments of a mold having an inner configuration corresponding to the outer configuration of the desired traverse drum;
- pouring a molten second meltable substance into the space between the soluble core and the mold, said second meltable substance being solid under a condition which the first soluble substance forming the soluble core is dissolved;
- dissolving the soluble core to thereby form a model drum;
- coating the surface of the model drum with a film of a refrac-

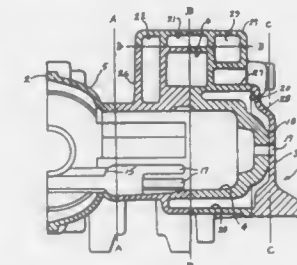
- tory substance to form a shell having walls of a thickness suitable for pouring molten metal therein and facilitating the removal of the casting therefrom;
- melting the model drum to thereby form a refractory shell; forming a casting by pouring a molten iron metal into the refractory shell in the oxygen-free atmosphere; and
- surface treating and finishing the casting;
- wherein the mold is a composite mold divided longitudinally into several segments capable of being radially divided.

**4,951,733**  
**EVAPORABLE FOAM PATTERN FOR CASTING AN ENGINE BLOCK OF A TWO-CYCLE ENGINE**  
David W. Kusche, Oshkosh; Gordon L. Stiller, Omro, and Steven W. Habeck, Oshkosh, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Feb. 13, 1989, Ser. No. 226,122  
Int. Cl.<sup>5</sup> B22C 7/02, 9/04

U.S. Cl. 164—246

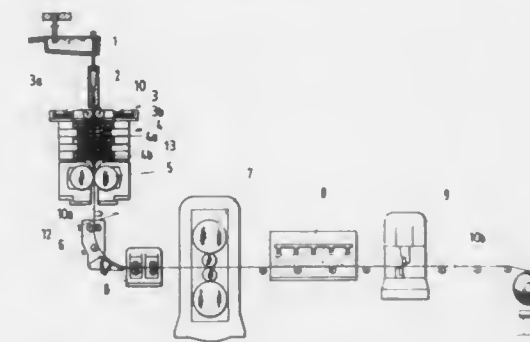
9 Claims



1. An assembled evaporable foam pattern to be used in casting a two-cycle metal engine block, the assembled pattern comprising a crankcase end and a head end, said pattern including at least one cylinder having an end open to the crankcase end of said pattern and the opposite end enclosed by a head, exhaust passage means connecting said cylinder to the exterior of the patter, said cylinder having at least one longitudinally extending transfer passage, water cooling passage means bordering said cylinder and said exhaust passage means, said pattern composed of a plurality of separate evaporable foam sections including a first section extending from said crankcase end to the corresponding crankcase end of said transfer passage, a second pattern section extending from the crankcase end of said transfer passage to a location intersecting said exhaust passage means, said second section being connected to said first section at a first planar interface located adjacent the crankcase end of said transfer passage, said pattern also including a third section extending from said exhaust passage means to said head end and including said head, said third section being connected to said second section at a second interface intersecting said exhaust passage means, a fourth pattern section disposed at the head end of the pattern and enclosing the portion of said water cooling passage means bordering said cylinder, said fourth section being connected to said third section along a third interface, a fifth pattern section connected to the corresponding sides of said second and third sections along a fourth interface and enclosing the side of said water cooling passage means bordering said exhaust passage means, and adhesive means disposed at said interfaces for joining the respective sections together.

**4,951,734**  
**PROCESS FOR THE PRODUCTION OF A STEEL STRIP**  
Erich Hoffken, Dinslaken; Hermann Lax, Düsseldorf, and Gunter Pietzko, Essen, all of Fed. Rep. of Germany, assignors to Thyssen Stahl AG, Duisburg, Fed. Rep. of Germany  
Filed Mar. 28, 1988, Ser. No. 173,847  
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1987, 3712537; Jul. 16, 1987, 3723543  
Int. Cl.<sup>5</sup> B22D 11/04, 11/12, 11/22  
U.S. Cl. 164—455

10 Claims



1. A process for the production of a steel strip comprising casting a steel strand having a thickness of 40 to 50 mm at a casting speed of 5 to 20 m/minute in an oscillating mold for continuous casting, said mold having cooled walls, squeezing the not yet completely solidified cast steel strand having a solidified strand shell with inner walls after emergence from the mold to weld the inner walls of the solidified strand shell to one another, and subsequently rolling out the squeezed strand with a 5 to 85% degree of deformation at a temperature in the range of 1000° to 1200° C. using casting heat to form a strip of a final thickness of 2 to 25 mm, thereby subjecting the steel strand to a change in cross-section by stretching it.

**4,951,735**  
**MELTING AND CASTING OF BETA TITANIUM ALLOYS**  
Douglas M. Berczik, Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.  
Filed Jan. 2, 1986, Ser. No. 815,607  
Int. Cl.<sup>5</sup> B22C 1/00

U.S. Cl. 164—138

2 Claims

1. A method of casting titanium alloy articles of the type based on Ti-V-Cr and containing more than about 10% Cr, more than about 20% V and more than about 40% Ti which comprises
- a. melting the alloy in a crucible having a carbon metal contacting surface, and without formation of a titanium skull;
- b. applying sufficient energy to heat the molten alloy to the desired superheat;
- c. casting said controlled superheat titanium alloy into a mold having a metal contacting surface which is essentially carbon.

4,951,736

## COOLING ROLL FOR PRODUCING QUENCHED THIN METAL TAPE

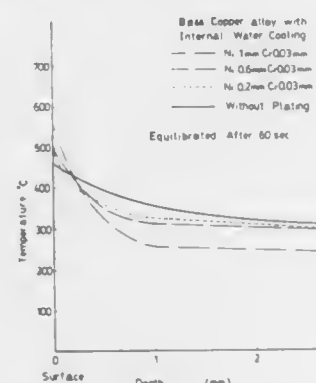
Masao Yukumoto; Michiharu Ozawa, and Takahiro Kan, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Continuation of Ser. No. 228,243, Aug. 4, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 379,680

Claims priority, application Japan, Dec. 17, 1987, 62-317313 Int. Cl.<sup>5</sup> B22D 11/06

U.S. Cl. 164-428

4 Claims



1. In a twin roll casting system, a cooling roll for producing quenched crystallized thin metal tape by absorbing sensible heat as well as latent heat and solidifying a downward flow of molten metal having high melting point and crystallization property, said cooling roll comprising a first layer of nickel plating 0.2 to 0.6 mm thick and a second layer of chromium plating 0.02 to 0.05 mm thick formed on the surface of a roll body made of copper alloy.

4,951,737

## MODULAR BLOWER AND HEATER ASSEMBLY FOR AIR CONDITIONER

John H. Tenhundfeld; Daniel R. Melchior, and Michael A. Duckworth, all of Cedar Rapids, Iowa, assignors to Amana Refrigeration, Inc., Amana, Iowa

Filed Oct. 31, 1988, Ser. No. 265,091

Int. Cl.<sup>5</sup> F28F 7/00; F24H 9/02; F25D 23/12

U.S. Cl. 165-1

9 Claims

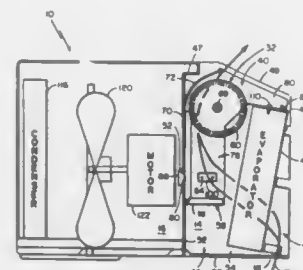
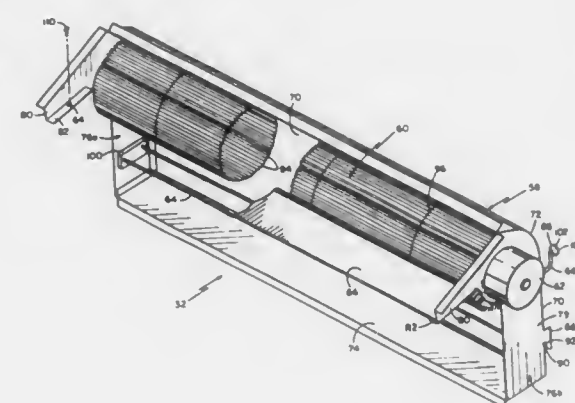
1. A blower and heater module adapted for removal intact from an air conditioner compartment having an electrical connector, said module comprising:

- a housing comprising a back scroll portion and a pair of opposing ends;
- a cross-flow blower wheel spaced adjacent said scroll portion and supported between said opposing ends;
- a motor affixed to said cross-flow blower wheel;
- a heating element connected to said housing;
- an electrical connector adapted for removably mating with said compartment connector for supplying electrical power to said motor and said heating element; and
- means for disengageably securing said housing in said air conditioner compartment wherein said module can readily be removed intact up through an open top of said compartment for servicing.

9. The method of installing intact a blower and heater module into a package terminal air conditioner having an open top compartment with a rear panel having a pair of slots and an indoor coil at the front, the compartment having an electrical connector, the module comprising a housing having a back scroll portion and a pair of ends with rearwardly extending tabs and top mounting brackets, the module further comprising a heating element affixed to the housing and a cross-flow blower wheel spaced adjacent the scroll portion and supported between the opposing ends with a motor affixed to the cross-

flow blower wheel, the module having an electrical connector connected to the motor and the heating element, comprising the steps of:

- lowering the module from above down through the open top of the compartment;



inserting the tabs of the module into the slots of the partition to support the back of the module; removably affixing the mounting brackets of the module to the compartment to support the front of the module; and connecting the module connector to the connector of the compartment.

4,951,738

## METHOD AND APPARATUS FOR RECOVERING HEAT ENERGY FROM POLLUTED WATER

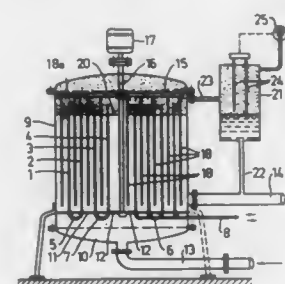
Lennart Litzberg, Stockholm, Sweden, assignor to Sical AB, Stockholm, Sweden

Filed Mar. 9, 1989, Ser. No. 321,639

Claims priority, application Sweden, Mar. 11, 1988, 8800882 Int. Cl.<sup>5</sup> F28D 7/10; F24H 1/00; F28G 3/04

U.S. Cl. 165-1

6 Claims



6. A method for recovering heat energy from a body of polluted water, comprising:

- (a) providing a closed casing housing a series of radially

4,951,740

## BELLWS HEAT PIPE FOR THERMAL CONTROL OF ELECTRONIC COMPONENTS

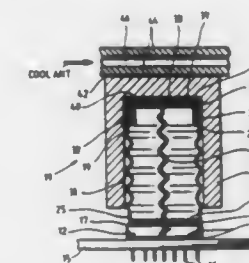
George P. Peterson, College Station, Tex., and Sergiu Oktay, Poughkeepsie, N.Y., assignors to Texas A & M University System, The College Station, Tex.

Filed Jun. 27, 1988, Ser. No. 211,571

Int. Cl.<sup>5</sup> E28D 15/02; F28F 27/00; H01L 23/427

U.S. Cl. 165-32

13 Claims



- (b) causing a stream of heat exchange fluid which is to be heated to flow into a first, radially outermost one of said panels, serially through each of said panels and out of a last, radially innermost one of said panels;
- (c) causing a stream of polluted water from a body of polluted water to flow into said casing, serially in externally bathing relationship with each of said panels, radially innermost first and out of said casing radially outwardly of the radially outermost one of said panels;
- (d) while conducting steps (b) and (c), sensing the upper level of said polluted water in said casing, providing a signal corresponding to excess and deficiency in said level, and, in the presence of a variable flow of polluted water through said casing, variably pressurizing a headspace maintained in said casing above said polluted water therein, preventing said polluted water from overflowing said upper edges of said panels while maintaining said polluted water at a level which is adjacent said upper edges; and
- (e) while conducting steps (b)-(d), brushing radially inner and outer surfaces of said panels using arms depending from above said panels into cleaning relationship therewith and rotated coaxially with said panels, for removing accumulating material from said surfaces.

5. Apparatus for conducting heat away from an electronic device, which comprises:

- (a) a heat pipe comprising a flexible bellows member terminating in an evaporator section at one end and a condenser section at an opposite end, a first wick lining said evaporator section; a second wick lining said condenser section, and a flexible wick longitudinally disposed within said flexible bellows member and interconnecting said first and second wicks;
- (b) said evaporator section adapted to be placed on an electronic device capable of generating heat energy when operating and causing said fluid to vaporize thereby building vapor pressure in said heat pipe and expanding it in the direction of the condenser section;
- (c) a housing enclosing said condenser section so as to leave an air gap between said condenser and said housing when said electronic device is not generating heat energy; and
- (d) a heat sink attached to said housing for conducting heat away from said electronic device.

4,951,739

## THERMAL STORAGE WITH TUBULAR CONTAINERS OF STORAGE MEDIUMS

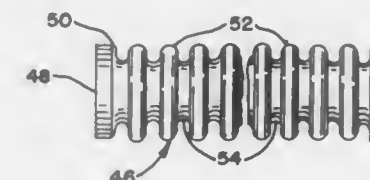
Robert E. Cates, Arnold, and Vladimir Kaplan, Silver Spring, both of Md., assignors to Baltimore Aircoil Company, Inc., Jessup, Md.

Filed Jan. 28, 1988, Ser. No. 149,353

Int. Cl.<sup>5</sup> F28D 20/00

U.S. Cl. 165-10

17 Claims



- 9. An improved thermal storage device comprising: a vessel for containing a body of fluid; fluid introduction means positioned to deliver fluid to said vessel; fluid circulation means positioned to remove fluid from said vessel; and a plurality of substantially parallel tubular containers ranged substantially parallel and adjacent one another throughout said vessel, each of said tubular containers being uniformly corrugated with successive ribs and valleys of dimensions that prevent nesting of adjacent tubes whereby to provide for fluid flow transverse to said tubular containers within said vessel through the corrugating valleys and each said tubular container confining a quantity of a thermal storage phase change medium having a fusion temperature different from the freezing temperature of the said body of fluid.

4,951,741

## CHEMICAL HEAT PUMP SYSTEM FOR PRODUCING HEAT AND COLD

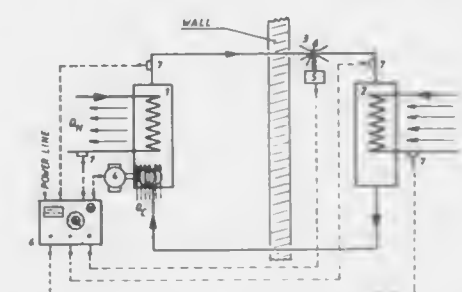
Elko A. Schuurman, Post Office Box 645, 3436 CZ Nieuwegein, Netherlands

Filed Nov. 15, 1989, Ser. No. 436,913

Int. Cl.<sup>5</sup> F28D 21/00

U.S. Cl. 165-104.12

15 Claims



1. A chemical heat pump system comprising a compressor and an exothermic reactor tank/heat exchanger utilizing the chemical reaction heat of a perfectly reversible chemical dimerization reaction system having only one (gaseous) compound characterized by a controlled variable expansion valve



and means for controlling the expansion of said valve as a function of the desired end temperatures of the system.

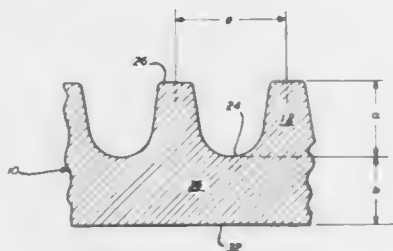
4,951,742

## REFRACTORY HEAT EXCHANGE TUBE

John M. Keyes, Roseland, Fla., assignor to High Performance Tube, Inc., Union, N.J.  
Continuation of Ser. No. 657,591, Oct. 4, 1984, abandoned, which is a continuation of Ser. No. 412,873, Aug. 30, 1982, abandoned, Division of Ser. No. 829,264, Aug. 31, 1979, Pat. No. 4,366,859, Continuation of Ser. No. 564,343, Apr. 2, 1975, abandoned. This application Jan. 15, 1989, Ser. No. 368,073  
Int. Cl.<sup>5</sup> F28F 1/14

U.S. Cl. 165—184

2 Claims



1. A refractory metal heat exchange tube made of iron-nickel alloy containing more than 10% nickel comprising at least one helical fin rolled into the outside surface of said tube wall integrally therewith having a fin height of from 0.022 inch to 0.045 inch and a fin density of from 26 to 50 fins per inch of tube length, the fin surface area being at least 2.4 times greater than the comparable surface area of the tube prior to finning.

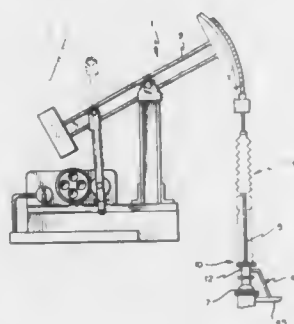
4,951,743

## ENVIRONMENTAL LEAKAGE PROTECTOR FOR RECIPROCATING ROD FLUID DISPLACEMENT ARRANGEMENTS

Tom Henderson, 301 E. Kern St., Taft, Calif. 93268-0253  
Filed Oct. 25, 1989, Ser. No. 426,568  
Int. Cl.<sup>5</sup> F21B 33/08; F16J 15/18, 15/52

U.S. Cl. 166—84

17 Claims



1. Leakage protector for reciprocating rod arrangements of the type having a reciprocating rod passing through a casing wall and a seal means for preventing leakage between the reciprocating rod and the casing wall, said leakage protector comprising:

(A) a leakage recovery unit having an adaptor means on a first end thereof for mounting of the recovery unit upon the casing wall in proximity to the seal means, said recovery unit having a hollow interior for enabling the reciprocating rod to pass therethrough with clearance when the leakage recovery unit is mounted upon the casing, and

having a seal for preventing leakage between said first end of the recovery unit and the casing wall;

(B) a bellows component, said bellows component being coaxially mounted upon said leakage recovery unit in fixed relationship to an opposite end of the recovery unit from said adaptor means, the hollow interior of said recovery unit communicating with an interior space of the bellows component at a first end of the bellows while being sealed relative to the environment;

(C) a bellows mount having means for securing a second end of the bellows component to the reciprocating rod in a manner that is fixed and sealed relative to the rod; and

(D) a recovery fitting means for communicating said hollow interior of the leakage recovery unit with a vacuum recovery line, said fitting means having valve means for blocking flow from the hollow interior of the leakage recovery unit to the vacuum recovery line when the pressure within said hollow interior is below a predetermined positive pressure and for permitting flow from the hollow interior of the recovery unit to the vacuum recovery line when said pressure is above said predetermined positive pressure.

4,951,744

## ANGULARLY SHAPED UNITARY STRUCTURED BASE STRIP COMPRISED OF A SPECIFIC MATERIAL ADAPTED FOR PHASING CHARGES IN A PERFORATING GUN

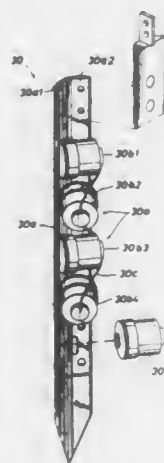
Gary L. Rytlewski, League City, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Aug. 16, 1989, Ser. No. 394,782

Int. Cl.<sup>5</sup> E21B 43/116; F42B 3/00

U.S. Cl. 175—4.57

7 Claims



1. A perforating gun adapted to be lowered through a production tubing disposed in a borehole, comprising:

a metallic base strip having a single unitary structure consisting of a first surface lying in a first plane and a second surface connected to and substantially coextensive with said first surface and lying in a second plane which is different than said first plane whereby said unitary structure of said first and second surfaces provide structural support and resistance to bending action to each other; mounting holes in said first surface for mounting a first plurality of capsule explosive charges to said first surface; and

mounting holes in said second surface for mounting a second plurality of capsule explosive charges to said second surface such that they are interleaved with said first plurality of capsule charges,

said strip being comprised of a special material which, together with said holes, will cause said strip to shatter into

a multitude of pieces in response to detonation of said first and second plurality of capsule explosive charges.

4,951,745

## STUFFING BOX AND GREASE INJECTOR FOR UNDERWATER WELLS

Ernest B. Gentry, Dallas, Tex., and Collin S. Boyle, Angus, Scotland, assignors to Otis Engineering Corporation, Dallas, Tex.

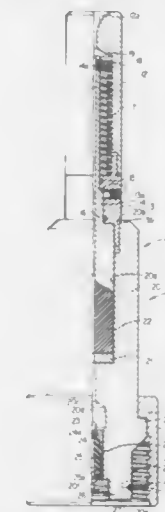
Filed Mar. 14, 1989, Ser. No. 324,029

Claims priority, application United Kingdom, Jan. 26, 1989, 8901660

Int. Cl.<sup>5</sup> E21B 33/076

U.S. Cl. 166—84

23 Claims



1. An hydraulically actuated underwater stuffing box having a through passageway for flexible line comprising:

- (a) a body;
- (b) a resilient seal in said body around the passageway;
- (c) pressure responsive means in said body for compressing said resilient seal into sealing engagement with flexible line in said passageway;
- (d) biasing means for biasing said pressure responsive means toward a position not compressing said resilient seal; and
- (e) valve means in said body below said resilient seal for preventing upward and downward flow through said passageway when no flexible line is in said passageway, said valve means including: an annular upper sealing surface in said body around said passageway below said resilient seal, a guide having an annular lower sealing surface slidably mounted around said passageway in said body below said body sealing surface, and a valve ball sealingly engageable with said body sealing surface and said guide sealing surface.

18. An underwater grease injector section having a through passageway for flexible line comprising:

- (a) an hydraulically actuated underwater stuffing box including,
  - a body having an outlet in communication with the passageway;
  - a resilient seal in said body around said passageway,
  - pressure responsive means for compressing said resilient seal into sealing engagement with flexible line in the through passageway,
  - biasing means for biasing said pressure responsive means toward a position not compressing said resilient seal;
- (b) a first inner tube around said passageway sealed in said body;
- (c) a first outer tube around said inner tube, said outer tube connected and sealed to said body;
- (d) a first connector connected to said first outer tube and sealed to said first inner and outer tubes;

(e) a second inner tube around said passageway, said inner tube sealed in said first connector;

(f) a second outer tube around said second inner tube, said second outer tube connected and sealed to said first connector;

(g) a second connector having an inlet communicating with said passageway, said second outer tube connected to said second connector and said second inner and outer tubes sealed to said connector;

(h) a third inner tube around said passageway, said inner tube sealed in said second connector below said inlet;

(i) a third outer tube around said third inner tube, said third outer tube connected and sealed to said second connector below said inlet; and

(j) a lower body having an appropriate connection thereon, an annular upper sealing surface in said lower body around said passageway,

a guide having an annular sealing surface slidably mounted around said passageway in said lower body below said annular upper sealing surface, and

a valve ball sealingly engageable with said annular upper sealing surface and said guide annular sealing surface.

4,951,746

## LATCHING SEAL UNIT

John R. Setterberg, Jr., Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Apr. 13, 1989, Ser. No. 337,360

Int. Cl.<sup>5</sup> E21B 23/00, 33/12

U.S. Cl. 166—114

23 Claims



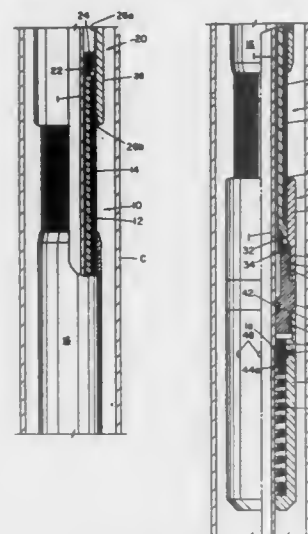
1. A latching seal unit for providing a fluid coupling between a well tubing string and a well device having a flow passage therethrough and internal latching lug means projecting into said flow passage, said seal unit comprising:

- body means having a flow passage therethrough;
- seal means on said body means for sealing around said body means with a wall surface of said well device defining said flow passage through said well device;
- collet means having lug receiving means on said body means for releasably latching with said lug means in said well device to permit detection of the installation of said seal unit in said well device responsive to a first force on the well tubing from a location remote from said seal unit and to permit release of said seal unit from said well device responsive to only a longitudinal second force greater than said first force applied to said seal unit in a direction away from said well device;
- said collet lug receiving means comprising slot means forming an interference fit along portions of said slot means with said lug means in said well device and having latch

surfaces providing a non-interference fit with said lug means; and means on said body means for connecting said seal unit to a well tubing string.

**4,951,747**  
**INFLATABLE TOOL**  
Martin P. Coronado, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.  
Filed Oct. 17, 1989, Ser. No. 422,634  
Int. Cl.<sup>5</sup> E21B 33/127  
U.S. Cl. 166—187

5 Claims

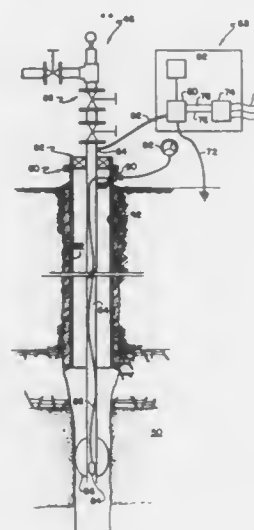


1. An inflatable tool for use in a subterranean well bore and carryable into said well bore on a conduit, comprising:
  - (a) a central tubular body having means on its upper end for selective engagement to said tubular conduit;
  - (b) an annular inflatable packing element concentrically surrounding said central tubular body and selectively movable from deflated to expanded positions;
  - (c) fluid passage means communicating between the bore of said central tubular body and the interior of said annular inflatable packing element, whereby pressured fluid may be transmitted to the interior of said annular inflatable packing element to expand said inflatable packing element to expanded position and into sealing engagement with said well bore;
  - (d) a first securing means engagable with said one end of said inflatable packing element for sealably securing said one end to said central tubular body;
  - (e) a second securing means engagable with the other end of said inflatable body element for slidably and sealably securing said other end to said central tubular body in an initial position prior to expansion of said inflatable element into sealing engagement;
  - (f) means for selectively securing said second securing means relative to said central tubular body to prevent axial movement of said second securing means in response to inflation forces produced by said pressured fluid until a pre-selected degree of axial tension is produced in said annular inflatable packing element; and
  - (g) means for biasing said second securing means relative to said central tubular body to resist axial movement of said second securing means in response to inflation forces produced by said pressured fluid until said pre-selected degree of axial tension is produced in said annular inflatable packing element, said means for biasing remaining passive until said means for selectively securing said second securing means is activated to release said second securing means relative to said central tubular body, said means for biasing said second securing means urging said second securing means in a direction away from said first

securing means and to said initial position of said second securing means during deflation of said packing element, said means for selectively securing said second securing means comprising a downwardly facing external shoulder on said central tubular body adjacent said second securing means; a stop ring surrounding said central tubular body and abutting said downwardly facing shoulder; and shearable means securing said second securing means to said stop ring.

**4,951,748**  
**TECHNIQUE FOR ELECTRICALLY HEATING FORMATIONS**  
William G. Gill, 245 Circle Dr., Corpus Christi, Tex. 78411, and Hugh Gill, 522 McClendon, Corpus Christi, Tex. 78404  
Filed Jan. 30, 1989, Ser. No. 303,455  
Int. Cl.<sup>5</sup> E21B 43/24, 47/06, 49/00  
U.S. Cl. 166—248

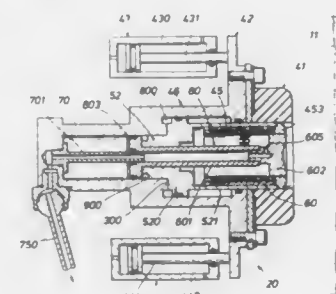
11 Claims



1. A method of producing oil from a subterranean formation comprising heating the formation by applying current to the formation and varying the frequency thereof in a range of 12-20 Hz including a harmonic thermal frequency of the formation; and producing oil from the formation.
11. A method of producing oil from a subterranean formation through a well extending from the surface to the formation, comprising electrically heating the formation including taking three phase alternating current electrical power from a three wire power line of an electric utility, converting substantially all of the three phase alternating current electrical power into a converted form of alternating current capable of being delivered through a power conductor and a ground conductor, and delivering the converted alternating current through the ground conductor to ground and through the power conductor and the well to the formation; and producing oil from the formation.

**4,951,749**  
**EARTH FORMATION SAMPLING AND TESTING METHOD AND APPARATUS WITH IMPROVED FILTER MEANS**  
Jim F. Carroll, Lafayette, La., assignor to Schlumberger Technology Corporation, Houston, Tex.  
Filed May 23, 1989, Ser. No. 356,310  
Int. Cl.<sup>5</sup> E21B 49/10  
U.S. Cl. 166—264

14 Claims



1. A method for obtaining samples of connate fluids from formations traversed by a borehole, comprising the steps of:
  - (a) isolating, from borehole fluids, a portion of the wall surface of said borehole adjacent to an earth formation believed to contain producible connate fluids from borehole fluids;
  - (b) communicating a sample test chamber in contact with said wall surface;
  - (c) opening said test chamber thereby allowing said connate fluids to fill said chamber; and
  - (d) filtering said fluids, at a location between said test chamber and said wall surface, so as to prevent any invasion of unwanted particles into said chamber;
 wherein, said filtering step includes making said connate fluids flow through porous material including particles of determined sizes bound together so as to form a rigid porous member.
8. An apparatus for collecting samples of connate fluids from earth formations traversed by a borehole, comprising:
  - (1) a body having a fluid passage adapted to receive connate fluids;
  - (2) fluid-admitting means on said body, including a sample-test chamber, and adapted to engage a wall of said borehole for isolating a portion thereof from borehole fluids;
  - (3) means on said body and selectively operable for positioning said fluid-admitting means against said wall to place said chamber in communication with earth formations beyond said wall; and
  - (4) filter means disposed in the path of said connate fluid between said borehole wall and said chamber, wherein, said filter means is made of a porous material including particles of predetermined sizes bound together so as to form a rigid porous member.

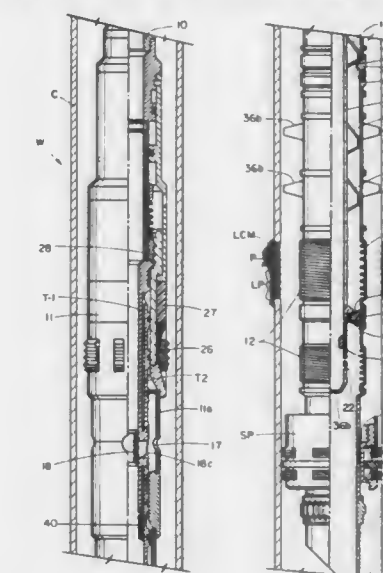
**4,951,750**  
**METHOD AND APPARATUS FOR SINGLE TRIP INJECTION OF FLUID FOR WELL TREATMENT AND FOR GRAVEL PACKING THEREAFTER**  
Rodney J. Wetzel, Jr., Lafayette, La., assignor to Baker Hughes Incorporated, Houston, Tex.  
Filed Oct. 5, 1989, Ser. No. 417,657  
Int. Cl.<sup>5</sup> E21B 37/08  
U.S. Cl. 166—278

28 Claims

1. A method of injection of fluid within a subterranean well for removal of lost circulation material which has been deposited within perforations through a first perforated well conduit section traversing a production zone, by first initiating removal of said material upwardly from the lowermost portion of said section and by subsequent continuation of removal of said

material downwardly from the uppermost portion of said section, comprising the steps of:

- (1) assembling a second conduit which carries a zone isolator and fluid communicating means comprising first and second communicating members;
- (2) running the second conduit into the well until the isolator is positioned above the production zone with the first communicating member being in proximity to the uppermost end of the perforations and the second communicating member being in proximity to the lowermost end of the perforations;
- (3) sealably securing the isolator within and against the first well conduit above said zone;
- (4) forming a first injection path for said fluid which extends from the top of the well, through the interior of said communicating means and out only the exterior of the second communicating member and into the lowermost of said perforations for contact with and removal of said lost circulation material therefrom until a loss of circulation of said fluid is established; and
- (5) forming a second injection path for said fluid which extends from the top of the well through the first communicating member of said communicating means while preventing said fluid from passing from the interior to the exterior of said second communicating member, said sec-



ond injection path for said fluid continuing out of said first communicating member and into the other of said perforations for contact with and removal of the remainder of said lost circulation material.

15. An apparatus for injection of fluid within a subterranean well for removal of lost circulation material which has been deposited within perforations through a first perforated well conduit section traversing a production zone by first initiating removal of said material upwardly from the lowermost portion of said section and by subsequent continuation of removal of said material downwardly from the uppermost portion of said section, comprising:

- (1) a second conduit which carries a zone isolator and fluid communicating means comprising first and second communicating members;
- (2) means for running the second conduit into the well until the isolator is positioned above the production zone with the first communicating member in proximity to the uppermost end of the perforations and the second communicating member being in proximity to the lowermost end of the perforations;
- (3) means for sealably securing the isolator within and against the first well conduit above said zone;
- (4) means for forming a first injection path for said fluid which extends from the top of the well, through the inte-



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rior of said communicating means and out only the exterior of the second communicating member and into the lowermost of said perforations for contact with and removal of said lost circulation material therefrom; and (5) means for forming a second injection path for said fluid which extends from the top of the well through the first communicating member of said communicating means while preventing said fluid from passing from the interior to the exterior of said second communicating member, said second injection path for said fluid continuing out of said first communicating member and into the other of said perforations for contact with and removal of the remainder of said lost circulation material therefrom.

4,951,751

# **DIVERTING TECHNIQUE TO STAGE FRACTURING TREATMENTS IN HORIZONTAL WELLBORES**

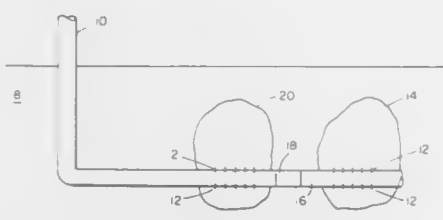
Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 14, 1989, Ser. No. 379,757

Int. Cl.<sup>5</sup> E21B 43/00

U.S. Cl. 166—285

5 Claims



1. A method for fracturing a formation containing a horizontal wellbore comprising:

- (a) perforating a horizontal wellbore at a desired first interval at a distance farthest from an angle of deviation from vertical of the wellbore thereby causing the wellbore to be in fluid communication with the formation;
- (b) fracturing hydraulically said formation at said first interval;
- (c) injecting a solidifiable gel containing a gel breaker into said wellbore which enters the first interval;
- (d) displacing with a wiper plug said solidifiable gel so as to force the solidifiable gel into said first interval and contain said gel in the wellbore in an area adjacent to said perforations;
- (e) allowing said solidifiable gel to remain in said formation and in said wellbore for a time sufficient to form a solid gel in said first interval and a solid gel plug in said wellbore which precludes fluid entry into the wellbore adjacent said first interval;
- (f) while said solid gel plug remains in said wellbore, perforating another section of said wellbore so as to cause fluid communication between a second interval of said formation and said wellbore; and
- (g) fracturing hydraulically said formation through perforations so as to cause a second interval to be in fluid communication with said wellbore.

4,951,752

# **STANDING VALVE**

Steven B. Coleman, Corpus Christi, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Apr. 20, 1989, Ser. No. 340,998

Int. Cl.<sup>5</sup> E21B 34/10

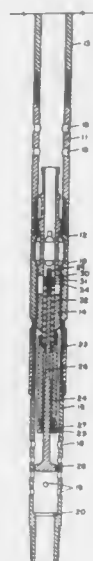
U.S. Cl. 166—325

16 Claims

1. An apparatus for removing fluids from a wellbore comprising:

- a valve housing fixedly secured to a wellbore tubing string,

said housing having a plurality of perforations and a valve seating surface;  
a valve stem alignment guide secured to the valve housing;  
a valve stem adapted for movement in the valve stem alignment guide; and



a valve seating device attached to the valve stem and capable of contacting the valve seating surface, thereby preventing fluid flow through the valve housing and past the valve seating surface when the seating device and valve seating surface are in contact.

4,951,753

# **SUBSURFACE WELL SAFETY VALVE**

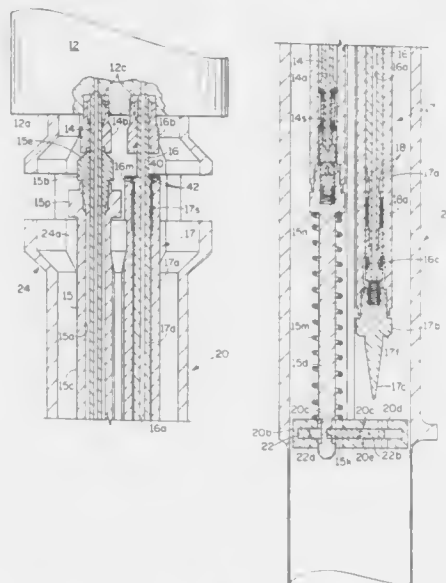
Erik P. V. Eriksen, Broken Arrow, Okla., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Oct. 12, 1989, Ser. No. 420,516

Int. Cl.<sup>5</sup> E21B 34/10, 43/12

U.S. Cl. 166—375

21 Claims



12. The method of operating a downhole well valve by pressurized control fluids supplied from the surface, said downhole valve having a valve actuating member shiftable between a valve closing and valve opening position;  
a primary fluid pressure actuator operable by a first pressurized control fluid;

a secondary fluid pressure actuator operable by a second pressurized control fluid, the steps comprising:

- (1) securing said primary fluid pressure actuator to said valve actuating member by a shiftable latch, whereby said valve may be shifted from its closed to its open position by said first pressurized control fluid; and
- (2) shifting said latch at any position of said primary actuator to concurrently disconnect said primary actuator from said valve actuating member and connect said secondary actuator to said valve actuating member by movement of said secondary actuator produced by said second pressurized control fluid.

4,951,754

# **FIRE EXTINGUISHING PLANT FOR THREE EXTINGUISHING AGENTS**

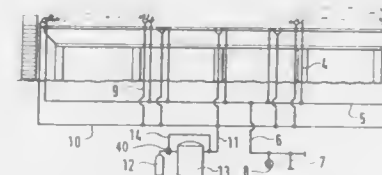
Odd Solheim, Brekke, N-4250 Kopervik, Norway

Filed Aug. 14, 1989, Ser. No. 393,583

Int. Cl.<sup>5</sup> A62C 35/44, 35/34, 35/16

U.S. Cl. 169—15

6 Claims



1. Fire extinguishing plant for three extinguishing agents, water, powder-mixed water and heavy foam, comprising water supply conduits (4, 5, 6) supplying water from a water source to a number of spraying nozzles (2, 3), and wherein into the water supply conduit there being provided an inlet (7) for the supply of foam agent, characterized in that there being provided supply conduits (9, 10, 11) for a noncombustible gas, e.g. nitrogen gas, for supplying said gas to each nozzle (2, 3), and a device (13) for admixing fire extinguishing powder into the gas; that the supply conduits (9, 10, 11) for the noncombustible gas, adjacent the nozzles, have a non-return valve (28), and that there being provided a bypass conduit (14) in the gas supply conduit, past the device (13) for admixing powder.

4,951,755

# **MANUAL ACTUATOR**

Charles B. Barnett, Akron, and Charles H. Riedy, Lakewood, both of Ohio, assignors to Automatic Sprinkler Corporation of America, Cleveland, Ohio

Filed Aug. 31, 1989, Ser. No. 401,182

Int. Cl.<sup>5</sup> A62C 35/00, 35/02, 37/14

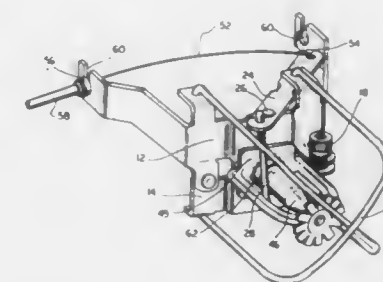
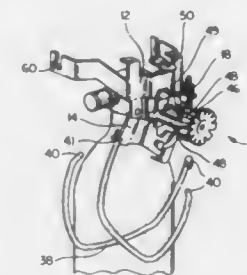
U.S. Cl. 169—26

9 Claims

9. A manual actuator for an automatic fire extinguisher having an automatic actuator attached thereto, comprising:

- a mounting means adapted to be secured to the body of an automatic actuator without removing the trigger element of the automatic actuator;
- a lever operatively attached to said mounting means and adapted for pivotal movement about a point on said mounting means;
- an arm connected to said lever, said arm being capable of being positioned between a trigger element of an automatic actuator and a frame arm of an automatic actuator; and
- said mounting means having two oppositely disposed securing means for oppositely disposed means to pivot the

lever, such that said lever and said arm may be positioned to permit attachment of the lever to the means to pivot the



lever, thereby permitting remote manual actuation through use of the mean to pivot the lever.

4,951,756

# **TORQUE CONTROL SCREWDRIVER**

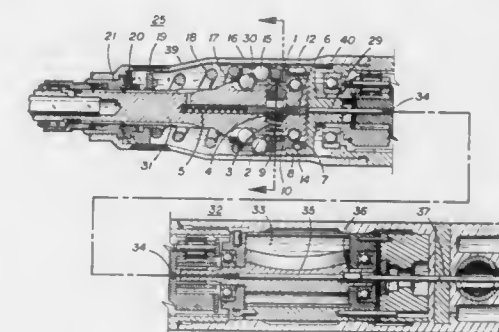
Richard J. Everett, New Hartford; David A. Giardino, Utica, and William K. Wallace, Barneveld, all of N.Y., assignors to Chicago Pneumatic Tool Company, Utica, N.Y.

Filed May 16, 1989, Ser. No. 352,270

Int. Cl.<sup>5</sup> B25B 23/14

U.S. Cl. 173—12

4 Claims



1. In a power tool having a throttle valve to control power to the tool, driving means, selectively operable in either a forward or reverse direction, spindle means adapted for holding a tool, control means, including a valve and an escapement plunger, for turning on and off the driving means, clutch means, including a ball spline, interconnecting the driving means and spindle means, whereby the ball spline transmits rotative force from the clutch to the spindle, and operatively connected to the control means, the said clutch means including driving cam means having a specially designed cam surface with ramps and extended dwell portions, including dwell slack portions, driven cam means having a cam surface with detents and balls intermediate the said driving and driven cam surfaces whereby resistance to movement of the driven cam causes at

least one ball to roll up a driving cam ramp to apply torque to the said spindle and activate the said control means to turn off the driving means, the ball then entering the designed dwell portion of the driving cam surface so no further forces are applied to the driven cam after the control means turns off the driving means, the said clutch means including a cam actuator having rise portions and having at least one slot therein, movable by the driving cam, the said cam actuator slot, when rotating in the reverse direction, allowing an angular slack in the movement of the cam actuator by the driving cam so as to provide a dwell time during which the ball rolls without impacting a cam surface and without actuating the said control means escapement plunger, in the absence of resistance to movement.

4,951,757

# HYDRAULIC STRIKING DEVICE WITH IMPACT FREQUENCY CONTROL

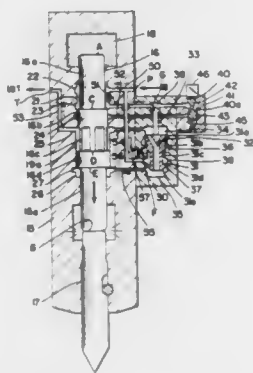
Takatoshi Hamada, Osaka, Japan, and Wen-Ho Huang, Taiwan, Switzerland, assignors to Nittetsu Jitsugyo Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 13,442, Feb. 10, 1987, Pat. No. 4,817,737. This application Dec. 27, 1988, Ser. No. 290,194 Claims priority, application Japan, Mar. 11, 1986, 61-54133; Sep. 17, 1986, 61-220613

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> B25D 9/18

U.S. Cl. 173—115

1 Claim



1. In a hydraulic breaker comprising:

a cylinder means;

a piston slidably mounted in said cylinder means for sliding therein between an uppermost position and a lowermost position,

said piston having a five-staged configuration including a first, a second, a third, a fourth and a fifth stage sequentially disposed along an axial direction of the piston, said piston also including a high pressure receiving surface extending between said first stage and said second stage, a lower pressure receiving surface extending between said fourth stage and said fifth stage and a gas pressure receiving surface,

said high pressure receiving surface having a diameter larger than that of said gas pressure receiving surface, and said low pressure receiving surface having an area that is larger than that of said high pressure receiving surface;

said cylinder means having a gas chamber therein for containing gas under pressure, said gas chamber open to said gas pressure receiving surface of said piston for urging said piston from said uppermost position to said lowermost position,

a high pressure port open to a source of high pressure oil for allowing high pressure oil to pass into said cylinder means,

a low pressure port for discharging oil from said cylinder means,

a piston high pressure chamber defined between an interior peripheral wall of said cylinder means and said piston, said piston high pressure open to said high pressure receiving surface of said piston,

said piston high pressure chamber and said high pressure port in constant open communication so that high pressure oil supplied through said high pressure port exerts a force on said high pressure receiving surface that acts in a direction to move the piston toward said lowermost position whenever the piston is being raised from said lowermost position or lowered from said uppermost position,

a piston low pressure chamber defined between the interior peripheral wall of said cylinder means and said third stage of said piston, said low pressure chamber in constant open communication with said low pressure port for allowing oil to be incessantly discharged therefrom through said low pressure port whenever said piston is being raised from said lowermost position or lowered from said uppermost position, and

a piston contradiction chamber open to said lower pressure receiving surface;

a main valve movably disposed within said cylinder means for moving between first and second positions therein, said main valve in operative hydraulic communication with said high pressure port and said low pressure chamber and said contradiction chamber, said main valve having a passageway extending therethrough,

said first position being a position at which a first flow path for oil is established from said contradiction chamber, through said passageway of said main valve and to said low pressure chamber for allowing oil in said contradiction chamber to be discharged therealong to said low pressure port as said piston is being lowered from said uppermost position,

said second position being a position at which said first flow path is closed and a second flow path for oil is established between said high pressure port and said contradiction chamber for allowing high pressure oil to flow therealong to act on said lower pressure receiving surface for raising said piston from said lowermost position, the improvement thereof characterized in that the piston low pressure chamber has substantially same dimension of diameter as that of the fourth stage which is larger than the diameters of the second and third stages so that a spare space is provided for reserving an excess oil when the piston is lowering down at high speed.

4,951,758

# METHOD OF DRILLING A BRANCH LINE APERTURE AFTER INTERNAL LINING OF A PIPELINE AND A WATER PLUG USED IN THE METHOD

Masahisa Sonku, Hikone; Yukio Yoshimura, Kurita; Minoru Yasuhara, Ise; Naoki Kitahashi, Kusatsu; Hirozo Hirayama, Koka; Harutoshi Miyazaki, Kitasoma, and Hisachi Ohi, Toride, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP89/00074, § 371 Date Sep. 26, 1989, § 102(e) Date Sep. 26, 1989, PCT Pub. No. WO89/07223, PCT Pub. Date Aug. 10, 1989

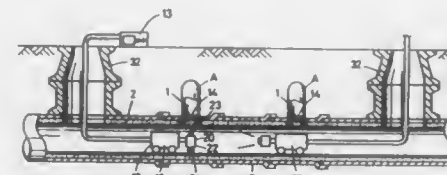
PCT Filed Jan. 26, 1989, Ser. No. 415,357  
Claims priority, application Japan, Jan. 27, 1988, 63-16386; Aug. 17, 1988, 63-204025; Aug. 17, 1988, 63-204026; Dec. 5, 1988, 63-307419; Dec. 5, 1988, 63-307420

Int. Cl.<sup>5</sup> E02D 29/00; E03F 3/06; E21B 47/09; F16L 55/18  
U.S. Cl. 175—40

8 Claims

1. A method of drilling apertures for branch lines blocked by renovation lining of a main pipeline having branch lines which is characterized by a plug mounting step for setting a water plug in each of openings of said branch lines, said water plug carrying a position marker comprising an antenna coil and a resonator adapted to oscillate in response to a driving signal

and, after stoppage of said driving signal, release a resonance signal remaining in said resonator from said antenna coil and said position marker being situated, upon setting of said water plug in position, in substantially concentric relation with the axis of the branch line,



a marker detecting step which comprises causing an antenna assembly for detecting said resonance signal to travel within the main pipeline to detect the position of said marker, and

an aperture drilling step which comprises driving a drilling means using said marker position as a target to drill an aperture for said branch line from within the main pipeline.

4,951,759

# OIL WELL RIG WITH PIPE HANDLING APPARATUS

Allan Richardson, Calgary, Canada, assignor to Canrig Manufacturing Ltd., Calgary, Canada

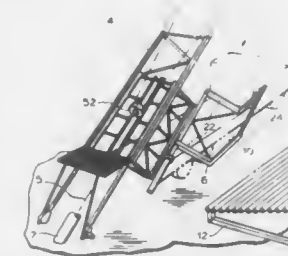
Filed Jun. 5, 1989, Ser. No. 361,362

Claims priority, application Canada, Jun. 9, 1988, 569089

Int. Cl.<sup>5</sup> E21B 19/15

U.S. Cl. 175—85

6 Claims



1. A rig of the type adapted to drill or service oil wells comprising:

a mast capable of alignment with said oil well;

elevators adapted to lift or lower a string or pipe protruding from said oil well along a portion of the length of said mast;

slips adapted to hold said pipe string in a position protruding from said hole;

torque wrench means adapted to rotate adjacent joints of pipe relative to each other to connect or disconnect said joints or pipe;

pipe handling means mounted laterally adjacent to said mast comprising a pair of loading arms and having clamp means on said loading arms adapted to grasp a joint of pipe;

means to pivot said loading arms between a first position in which said loading arm clamps are horizontally aligned in a position adapted to receive a joint of pipe located laterally adjacent said mast to a second position in which said loading arm clamps are aligned parallel to the longitudinal dimension of said mast;

means to rotate said loading arms about an axis parallel to said mast to move said clamp means from a position at one side of said mast to a position within said mast aligned with said well;

means to move said loading arm clamps in a direction of their alignment in line axially with said well; said axial movement means, said rotational means, and said pivot means, and said grasping means being capable of operating in the reverse direction and in the reverse order.

4,951,760

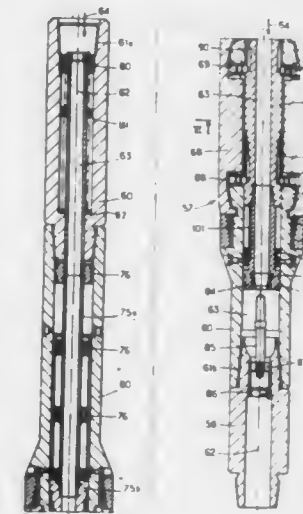
# REMOTE CONTROL ACTUATION DEVICE

André Cendré, Cosne-sur-Loire, and Jean Boulet, Paris, both of France, assignors to SMF International, Sur-Loire, France  
Continuation-in-part of Ser. No. 816,042, Jan. 3, 1986, Pat. No. 4,821,817. This application Dec. 30, 1988, Ser. No. 292,307  
Claims priority, application France, Jan. 7, 1985, 85 00142; Apr. 2, 1985, 85 04996

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> E21B 17/10, 21/10

U.S. Cl. 175—269

15 Claims



1. A remote controlled actuation device for the actuation of an appliance operatively connected to a drill-string having a bore of a substantially constant internal diameter that has an incompressible fluid circulating therein in an axial direction, the drill-string comprising a first end through which the incompressible fluid is introduced by a pumping means at an adjustable flow rate and a second end which is distant from the first end and wherein the incompressible fluid is used as a working fluid, the device being secured to the drill-string in a zone distant from the first end thereof, the device comprising:

a body connected to the drill-string, said body having a central bore coaxial with the drill-string bore;

a differential piston mounted so as to be movable in terms of translation in the axial direction and in terms of rotation about a longitudinal axis of said body within said central bore thereof, said piston having a tubular shape and having a central bore which is substantially coaxial with said body central bore and which comprises a profiled throttling portion the minimum internal diameter of which is smaller than the internal diameter of the central bore of the piston;

a protruding profiled element secured to the body downstream of said differential piston and disposed coaxially with the differential piston, said element having a profiled frustoconical external surface widening in the direction of circulation of the fluid and facing the profiled throttling portion of the piston bore;

a spring arranged between the piston and a part of the body for biasing the piston in a direction of movement opposite the direction of circulation of the incompressible fluid; and,



a means for measuring the pressure of the incompressible fluid at the first end of the drill-string, the actuation device allowing for the circulation of the fluid in the drill-string at a first, operating flow rate without any movement of the piston, wherein a movement of the piston in the direction of circulation of the fluid occurs when the fluid circulates at a second and constant actuation flow rate greater than said first operating flow rate and wherein an increasing loss of head is caused when the piston moves in the direction of circulation of the fluid by a cooperation of the profiled throttling portion of the piston bore and the frustoconical external surface of the protruding profiled element, the movement being stopped after the actuation has been carried out at which point a loss of head and a pressure of the working fluid at the first end of the drill string are at a maximum but working fluid still flows through said central bore, and wherein the pressure of the fluid is continuously measured thereby allowing a remote monitoring of the movement of the piston; and wherein said differential piston further comprises, on its outer lateral surface, longitudinal grooves relative to the axis of the drill-string, arranged one after the other over the periphery of the piston and connected to one another by means of connecting grooves to form a continuous actuating surface for a step-by-step rotary movement of the piston and for its return into an initial position when the flow rate of the fluid is decreased to the operating flow rate, and at least one actuating finger interacting with the actuating surface at one end and a movable part of the appliance on the other end, to actuate the latter during the movement of the piston.

#### 4,951,761 ROCK DRILL

Wolfgang Peetz, Blitzenreute; Bernhard Moser, Altshausen, and August Haussmann, Oberzell, all of Fed. Rep. of Germany, assignors to Hawera Probst GmbH & Co., Ravensburg, Fed. Rep. of Germany

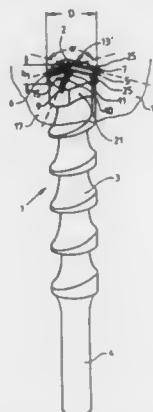
Filed May 31, 1989, Ser. No. 359,122

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820695

Int. Cl.<sup>3</sup> B28D 1/14, 7/02; E21B 10/44, 10/58

U.S. Cl. 175—398

11 Claims



1. A rock drill comprising a single-start or double-start conveying helix and a drilling head which has arranged on its end face pointing in the feed direction a carbide main cutting tip extending over the entire diameter of the drilling head, sloping in a roof shape and having two cutting edges, and at least one additional cutting element arranged asymmetrically relative to the cutting edges of the main cutting tip, wherein the additional cutting element is designed as a secondary cutting tip which has at least one cutting face and assumes an acute angle relative to the first cutting edge of the main cutting tip and an obtuse angle relative to the further cutting edge of

the main cutting tip, and wherein the drilling head is designed in a V-shape, Y-shape or triangular shape in cross section, having at least two flat, V-shaped or concavely arched side flanks to form drilling-dust grooves.

#### 4,951,762

#### DRILL BIT WITH CEMENTED CARBIDE INSERTS

Lars-Gunnar Lundell, Sandviken, Sweden, assignor to Sandvik AB, Sandviken, Sweden

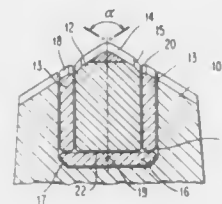
Filed Jul. 28, 1989, Ser. No. 386,424

Claims priority, application Sweden, Jul. 28, 1988, 8802749

Int. Cl.<sup>3</sup> E21B 10/52

U.S. Cl. 175—410

14 Claims



1. A drill bit comprising:  
a steel bit body having a front surface containing at least one slot;  
an insert formed of cemented carbide having side surfaces disposed in said slot, and a front end projecting from said slot; and  
support plate means disposed in said slot and including first side surface means brazed by a braze metal to said side surfaces of said cemented carbide insert and second side surface means brazed to opposing steel side walls of said slot, said support plate means being of substantially uniform thickness, said thickness being substantially smaller than that of said cemented carbide insert, said support plate means formed of cemented carbide or a metal alloy having a coefficient of linear expansion which for temperatures below 500° C. is substantially smaller than that for steel and the braze metal while being approximately the same as that of said cemented carbide insert.

#### 4,951,763

#### CHECKWEIGHER

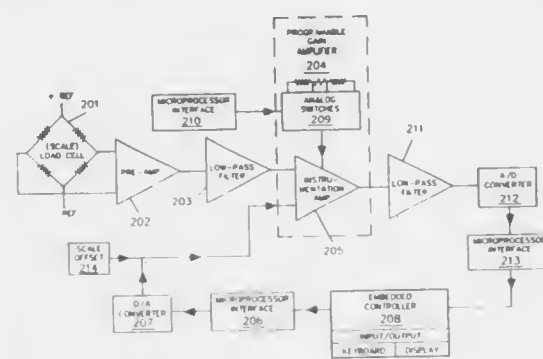
Scott E. Zimmerman, Spencer, and Alex J. Specker, Ithaca, both of N.Y., assignors to Hi-Speed Checkweigher Co., Inc., Ithaca, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,332

Int. Cl.<sup>3</sup> G01G 23/14, 23/10

U.S. Cl. 177—164

42 Claims



1. An automatic weighing system, comprising:  
a control box including switch means for setting and control-

ling operational parameters of said automatic weighing system;  
a transducer for producing an electrical signal which varies in response to a load;  
a programmable gain amplifier for amplifying said electrical signal;  
a microprocessor including means for digitally filtering the output of said programmable gain amplifier;  
a said microprocessor including a data input means electrically connected to the output of said programmable gain amplifier;  
said microprocessor including an output means for providing a signal for setting the gain of said programmable gain amplifier at a level which is a function of said electrical signal received at said data input means; and  
said microprocessor including means for providing control signals for setting the operating levels of said programmable gain amplifier.

#### 4,951,765

#### LOAD DETECTOR CIRCUIT

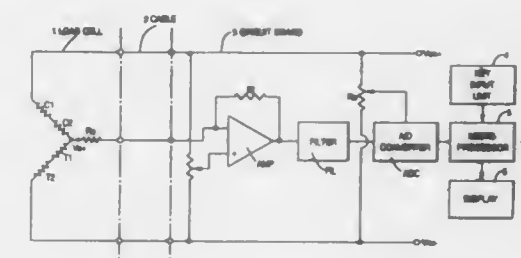
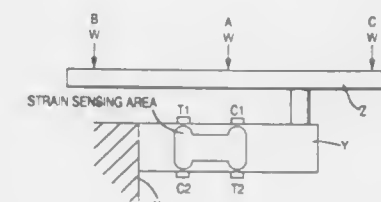
Kazufumi Naito, Ohtsu, and Seiji Nishide, Shiga, both of Japan, assignors to Ishida Scales Mfg. Co., Ltd., Kyoto, Japan  
Continuation of Ser. No. 219,482, Jul. 13, 1988, abandoned. This application Jul. 10, 1989, Ser. No. 377,743

Claims priority, application Japan, Jul. 16, 1987, 62-177745; Jul. 16, 1987, 62-177746

Int. Cl.<sup>3</sup> G01G 3/14; G01L 1/22

U.S. Cl. 177—211

6 Claims

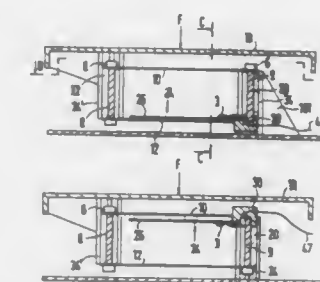


4,951,764  
DIGITAL DISPLAY SCALE  
Winfried Brand, Michelstadt, Fed. Rep. of Germany, assignor to Jakob Maas GmbH, Bad König-Zell, Fed. Rep. of Germany  
Filed Nov. 17, 1989, Ser. No. 436,505  
Claims priority, application Fed. Rep. of Germany, Nov. 18, 1988, 3836990

Int. Cl.<sup>3</sup> G01G 3/14; G01L 1/14

U.S. Cl. 177—210 C

12 Claims



1. In a digital display scale of the type including a load receiver which acts on an arrangement of two substantially parallel leaf springs which are movable relative to a base member, in which the leaf springs, a mounting support connected to the load receiver together form a parallelogram, and a capacitor with two capacitor plates the spacing between which changes when the scale is subjected to a load such that capacitance may be evaluated as a measure of load, at least one capacitor plate being located between the leaf springs and connected to the mounting support through an insulating part, the improvement comprising:

- one of the leaf springs forming one of the capacitor plates; and
- the other capacitor plate being between the leaf springs and close to said one leaf spring, said other capacitor plate being connected to the mounting support through an insulating part.

#### 4,951,766

#### ELECTRIC WHEEL-CHAIR

Hans Basedow, Kiel; Hans Körber, Kiel; Reinhard Küster, Kiel; Ruth Kruse, Laboe, and Dieter Lorenz, Kiel, all of Fed. Rep. of Germany, assignors to Octopodia GmbH, Kiel, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,522

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800648; Jan. 22, 1988, 3801874

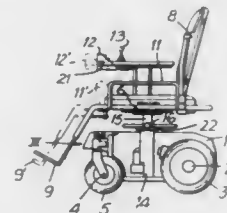
Int. Cl.<sup>3</sup> A61G 5/04

U.S. Cl. 180—6.5

17 Claims

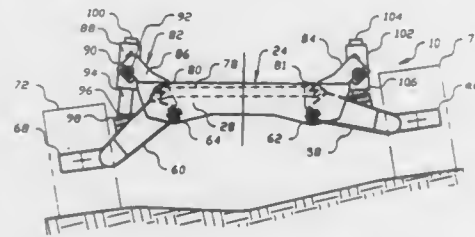
1. An electric wheel-chair comprising:  
a chassis;

- at least one first axle having drive wheels, which is connected to the chassis;
- a pair of second axles which are connected to the chassis, each having a swivel wheel;
- a seat assembly rotatively mounted on the chassis between the first and second axles, having an axis of rotation, the seat assembly having at least two lockable seating positions, including first and second end positions oriented 180° from each other and normal to rotational axes of the axles;
- a drive unit coupled to each drive wheel for driving that wheel in response to control signals that are routed to



- assigned signal receipt locations in the drive unit, which control signals are indicative of desired wheel-chair maneuvers to be executed by the drive unit with respect to one of the seating positions;
- an operating unit coupled to the drive units for generating the control signals; and
- means coupled to the operating unit and the drive units for rerouting the control signals from the operating unit to the drive unit signal receipt locations, so that the drive units execute the same desired wheel-chair maneuvers when the seat is positioned in at least said first and second end positions.

**4,951,767**  
**VEHICLE SUSPENSION LOCK SYSTEM**  
 Francis R. Keagline, Portland, Oreg., assignor to Allied Systems Company, Sherwood, Oreg.  
 Filed Oct. 28, 1988, Ser. No. 264,146  
 Int. Cl. B62D 55/00, 37/00; B60S 9/205  
 U.S. Cl. 180—9.52 17 Claims

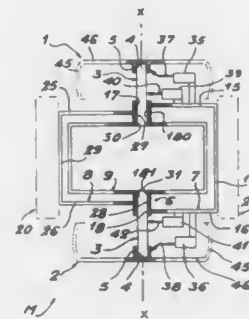


1. A vehicle suspension lock system comprising:
- a supporting arm pivotally mounted on one side of a chassis of a vehicle and having a track pod or wheel mounted on a free end thereof supporting a portion of the vehicle for forward and rearward movement;
- a first hydraulic cylinder extensibly disposed between said chassis and said supporting arm;
- a hydraulic fluid circuit means for providing pressurized fluid to said cylinder;
- means for detecting whether said vehicle is moving or stationary;
- valve means responsive to said detecting means for permitting fluid flow into and out of said cylinder when said vehicle is moving and blocking such flow when said vehicle is stationary;
- a second supporting arm pivotally mounted on said chassis;
- a second hydraulic cylinder operatively disposed between said chassis and said second supporting arm, said valve

means further including means for permitting fluid flow between said second hydraulic cylinder and said first hydraulic cylinder when said vehicle is moving; and

a rigid link pivotally connected at one end thereof to said first supporting arm and pivotally connected at the other end thereof to said second supporting arm.

**4,951,768**  
**MODULAR ARTICULATED VEHICLE MANOEVRING AMONG OBSTACLES AND MODULAR MEMBER INCORPORATED IN SAID VEHICLE**  
 François Littmann, Montigny le Bretonneux, and Eric Ville-dieu, Palaiseau, both of France, assignors to Commissariat à l'énergie Atomique, Paris, France  
 Filed Aug. 9, 1988, Ser. No. 230,062  
 Claims priority, application France, Aug. 28, 1987, 87 12029  
 Int. Cl. A63H 17/00; B62D 37/00  
 U.S. Cl. 180—14.1 7 Claims

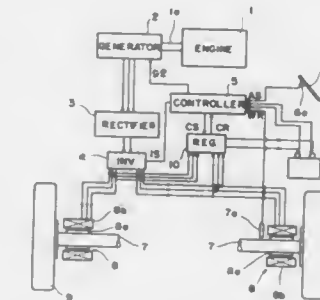


1. A modular element for an articulated vehicle, comprising a generally rectangular chassis (6) made of a front portion (7) and a rear portion (8) linked together through an articulation about a transverse axis (X), a pair of left and right concurrent, transverse axles (3) extending through said axis (X) for supporting the chassis, a pair of support wheels (1,2), each wheel being rotatably attached to an outer end of each of said axles, a platform (9) supported by said axles, said platform (9) being rotatably connected to the inner end of said left axle by a bearing (30) and fixedly connected to the inner end of said right axle, said front portion (7) being rotatably connected to said left and right axles, said rear portion (8) being fixedly connected to said left axle and rotatably connected to said right axle, selectively engageable motors (35,36) for driving said pair of wheels (1,2), and a regulating system including at least one inclination detector (71,72) fixedly mounted on said platform, a chassis motor (39) for rotating said left axle, and a platform motor (41) for rotating said right axle, each portion of the chassis carrying two vertically axed articulations (111 to 114) located at left and right sides of said front and rear portions, said articulations serving to receive one end of articulated bars (93,94), the other end of which is received in similar articulations of another adjacent modular element.

**4,951,769**  
**MOTOR VEHICLE DRIVING SYSTEM**  
 Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan  
 Continuation of Ser. No. 304,911, Feb. 2, 1989, abandoned, which is a continuation of Ser. No. 921,699, Oct. 22, 1986, abandoned. This application May 30, 1989, Ser. No. 361,762  
 Claims priority, application Japan, Oct. 29, 1985, 60-241868  
 Int. Cl. B60L 11/02  
 U.S. Cl. 180—65.4 4 Claims

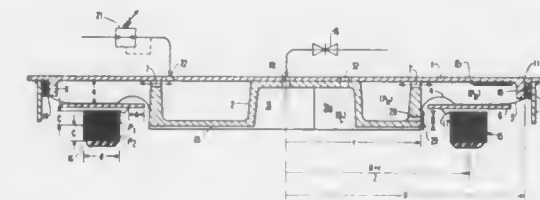
1. A motor vehicle driving system for a motor vehicle which is driven by a motor supplied with electric power generated by a generator coupled to an engine, comprising:

- an AC generator coupled to an engine;
- a rectifier for converting AC power generated by said AC generator to DC power;
- an inverter for converting DC power from said rectifier to AC power;
- an AC motor selectively operable in a generator mode and being energizable by the AC power from said inverter for driving a wheel of the vehicle;
- a battery chargeable by power generated by said AC generator and AC motor when operating in the generator mode;
- a regulator having an input terminal coupled to a circuit which connects said inverter and said AC motor to each other and an output terminal coupled to said battery;
- an accelerator sensor outputting a signal indicative of an amount of depression of an accelerator pedal which controls driving forces of the motor vehicle;



- a rotation sensor outputting a signal indicative of rotational speed of said wheel; and
- a controller outputting a conversion signal for operating said inverter and a charging signal for operating said regulator, and being operable to cut off the conversion signal to said inverter to stop operation of the inverter and to apply said charging signal to said regulator to operate the regulator to rectify the output from the AC motor acting in the generator mode, and apply the DC voltage to said battery when the rotational speed of the wheel is higher than a rotational speed of the engine corresponding to the amount of depression of the accelerator pedal based on a comparison of the signals from said accelerator sensor and said rotation sensor.

**4,951,770**  
**STRUCTURE TO FORM A LOAD-BEARING AIR CUSHION FOR A VEHICLE**  
 Jack F. Vanghen, 26807 Spring Creek Rd., Rancho Palos Verdes, Calif. 90274  
 Filed Jul. 14, 1989, Ser. No. 381,153  
 Int. Cl. B60V 1/04  
 U.S. Cl. 180—124 42 Claims



1. In a fluid cushion device comprising:
- base means to receive loads, and
- at least one sealing assembly to confine a fluid cushion, said sealing assembly including an annular hanger projecting from the base means and annular structure below the hanger and cooperative therewith to enclose the fluid cushion,
- said hanger made of flexible sheet material and inflatable for

vertical resilient deformability to yieldingly urge said annular structure away from the base means,

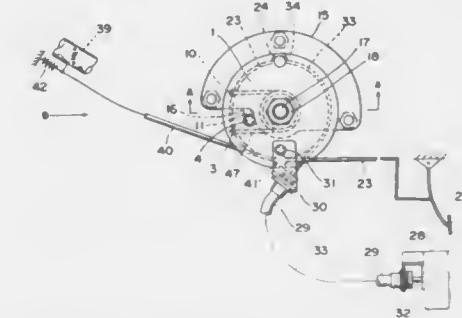
the hanger when inflated having an outer annular flexible sheet wall extending from the base means radially inwardly to the annular structure to act under tension to oppose lateral displacement of the annular structure in one respect relative to the base means, and

having an inner annular flexible sheet wall extending from the base means radially outwardly to the annular structure to oppose lateral displacement of the annular structure in the opposite respect relative to the base means,

attachment of said outer annular flexible sheet wall to said base means being at radius "R" and attachment of said inner annular flexible sheet wall to said base means being at radius "r" with the ratio

$$\frac{r}{R} \leq 0.6.$$

**4,951,771**  
**TRACTION CONTROL SYSTEM FOR AUTOMOBILE**  
 Toshifumi Machara, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd. and Akebono Research and Development Centre Ltd., both of Japan  
 Filed Jun. 26, 1989, Ser. No. 370,991  
 Claims priority, application Japan, Jul. 30, 1988, 63-190833  
 Int. Cl. B60K 31/00  
 U.S. Cl. 180—197 9 Claims

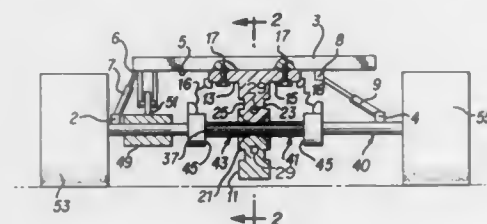


1. A traction control system for an automobile comprising:
- an accelerator pulley and a traction pulley which are provided such that they can rotate,
- wherein said accelerator pulley is arranged to be able to rotate in a first direction in which a throttle is opened by an accelerator wire connector to an accelerator pedal, said accelerator wire connected by a front end portion thereof to the outer periphery of said accelerator pulley, said accelerator wire surrounds at least a part of said accelerator pulley from said front end portion and projects over said accelerator pulley, and the base portion of said accelerator wire is connected to an accelerator pedal so that said accelerator pulley rotates in said first direction in which said throttle is opened by said accelerator wire when said accelerator pedal is applied with a force;
- while said traction pulley is arranged to be able to rotate in a second direction which is opposite to said first direction by an actuator with a traction cable,
- said throttle connected to a throttle cable is returned to the closing direction by the rotation of said traction pulley in said second direction,
- said accelerator pulley is urged in said second direction and said traction pulley is urged in said first direction by a traction spring;
- a bracket, said bracket fastened by means of a base portion to said accelerator pulley by a fastening bolt, an end portion of an outer cable whose base portion is fastened to the



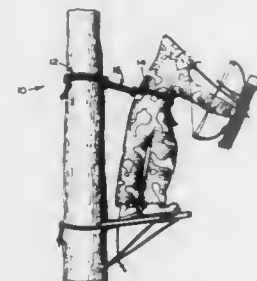
1. In an anti-theft system for a vehicle, said vehicle having an hydraulic brake system including a master brake cylinder and a brake line connected to the outlet of the master brake cylinder, the combination comprising: valve means having a fluid flow inlet, a fluid flow outlet, and an operating coil, said valve means being connected in series with the brake line near the outlet of the master brake cylinder for interrupting the operation of the brake system, said valve means having said fluid flow inlet connected to said brake line and said fluid flow outlet connected to an outlet of said master brake cylinder, said valve means including a valve body having a fluid flow passageway therethrough, and fluid flow control means in said passageway to permit fluid flow through said valve means from said fluid flow outlet to said fluid flow inlet while said valve means is unoperated, thereby permitting brake fluid to be transferred from said master cylinder to said brake line while said valve means is unoperated, said flow control means including a valve stem having a fluid flow passage therethrough, said valve stem including plunger means movable within said passageway between flow preventing and flow permitting positions, and sealing means sealing said valve stem relative to inner surfaces of passageway, and activating means coupled to said operating coil of said valve means for operating said valve means to move said plunger means to its flow permitting position, said valve means, when operated, enabling bidirectional flow of brake fluid between the master cylinder and the brake line, and when said valve means is unoperated said plunger means is at its flow preventing position, preventing the flow of brake fluid from said fluid flow inlet to said fluid flow outlet, thereby preventing release of the brakes, once set, until said valve means is subsequently operated, and said valve stem being constructed and arranged to permit leakage of brake fluid therethrough from said fluid flow inlet to said fluid flow outlet at a rate to provide release of the brakes, once set, after an extended period of time.

**4,951,777**  
**ALL-TERRAIN VEHICLE AXLE ASSEMBLY**  
 Marc J. Champenn, 919 Bay Shore Dr., Sister Bay, Wis. 54234  
 Filed Apr. 4, 1989, Ser. No. 333,030  
 Int. Cl.<sup>3</sup> B60G 9/00  
 U.S. Cl. 180—349 5 Claims



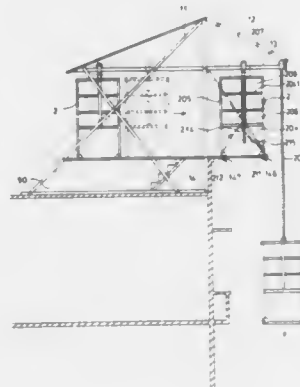
1. An improved axle assembly comprising:
  - (a) a housing mounted on a frame of an associated vehicle;
  - (b) a bearing in said housing having a central opening;
  - (c) an axle extending through said opening; and
  - (d) means interconnecting said axle and bearing for allowing rotation of said axle with respect to said housing as well as lateral translation of said axle with respect to said bearing comprising an elongated toothed surface on said axle and a structure mounted in said bearing and having an opening with an internal toothed surface meshed with said elongated toothed surface to allow rotary torque to be transmitted while allowing lateral movements therebetween.

**4,951,778**  
**SAFETY RESTRAINT FOR HUNTERS**  
 Terry E. Halvorson, 2518 Mountain View Pl., Eau Claire, Wis. 54703  
 Filed Aug. 29, 1989, Ser. No. 400,092  
 Int. Cl.<sup>3</sup> A62B 35/00  
 U.S. Cl. 182—9 16 Claims



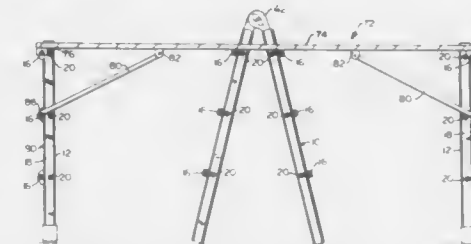
1. A safety restraint of the type wherein users are secured, comprising:
  - (a) a user member for connection to the user;
  - (b) an anchor member for connection to a stationary object; and
  - (c) a connecting member having first and second ends, a first link proximate said first end and a second link proximate said second end wherein said first link slideably receives said user member and said second link slideably receives said anchor member;
 whereby the sliding engagement of said links and members allows the user to move about the stationary object and allows positioning of the user relative to said connecting member while being restrained by the stationary object.

**4,951,779**  
**MULTIUSER HIGH-RISE BUILDING FIRE ESCAPE DEVICE**  
 Ching-Kun Tseng, No. 36, Lane 112, Seu Yuang Rd., Hsin Chuang City, Taipei, Taiwan  
 Filed Oct. 24, 1989, Ser. No. 427,271  
 Int. Cl.<sup>3</sup> A62B 1/02  
 U.S. Cl. 182—14 12 Claims



1. A multiuser high-rise building fire escape device, including:
  - a basic bearing frame assembly being fixedly mounted on the roof of a high-rise building and having a main frame structure comprised of several pairs of long and short rods respectively connected through screw joint or welding process, an upper track and a lower track respectively made thereon and disposed in parallel with each other at different level; and
  - several cabins respectively mounted on said tracks of said basic bearing frame assembly and controlled to slide thereon, each being comprised of a pair of side wall portions, a front wall portion, a back wall portion, a top wall portion and a bottom wall portion and defining therein an inner space divided by a division plate into an upper person carrying chamber and a lower control room, said cabins each being equipped with a manual-operated power transmission mechanism comprised of two wheel axles of different size being respectively mounted in said pair of side wall portions at a lower position transversely piercing therethrough for mounting thereon of a pair of pulley wheels respectively, a pair of bottom gear wheels being respectively mounted on said two wheels axles at one lateral side at a position in the inner side by the pulley wheels thereof, an upper gear wheel being set in the same side wall portion at an upper position in the mid-way between said two bottom gear wheels and manual controlled to rotate by a hand-wheel in the cabin, a closed chain mounted on said two upper gear wheels and said bottom gear wheel to rotate through a triangular course; a speed reducing gear, a double-groove cable reel, a motor assembly and a mid-way stop mechanism co-axially coupled together and received in said control room; a steel rope combination connected to said double-groove cable reel to wind theretround and bilaterally extending outward and turning upward through a pair of guide pulleys and said pair of side wall portions to further pass through a wheel carrier on the two parallel rails of said upper track to let the cabin be suspended from said basic bearing frame assembly; and a ladder door mounted on the front wall portion to control the access of said person carrying chamber.

**4,951,780**  
**COMBINATION LADDER AND HEIGHT ADJUSTABLE SCAFFOLD**  
 Myung H. Kim, 34 Rhodes St., New Hyde Park, N.Y. 11040  
 Filed Aug. 8, 1988, Ser. No. 229,628  
 Int. Cl.<sup>3</sup> E06C 1/39, 7/16, 7/50  
 U.S. Cl. 182—27 23 Claims



1. A combination folding ladder and height adjustable scaffold, comprising:
  - (a) a first assembly including:
    - (i) a first leg,
    - (ii) a second leg, and
    - (iii) a plurality of rungs connecting together said first and second legs in substantially parallel, spaced apart relation, each rung adapted to support one end of a scaffold platform;
  - (b) a second assembly including:
    - (i) a third leg,
    - (ii) a fourth leg,
    - (iii) means for connecting together said third and fourth legs in substantially parallel, spaced apart relation and for providing a scaffold support which supports an opposite end of the scaffold platform;
  - (c) joint means removably secured to upper ends of said first through fourth legs for pivotally securing said first and second assemblies together, said joint means including:
    - (i) an outer joint section formed by a central rotatable section and a leg section depending therefrom,
    - (ii) an inner joint section formed by a central rotatable section and a leg section depending therefrom,
    - (iii) means for rotatably securing together said central rotatable sections of said outer and inner joint sections; and
  - (d) securing means for removably securing said leg sections of said joint means to upper ends of said first through fourth legs.

**4,951,781**  
**SCAFFOLDING STRUCTURE**  
 Jeffrey J. Bliss, 110 Silver St., North Granby, Conn. 06060  
 Filed Dec. 4, 1989, Ser. No. 445,279  
 Int. Cl.<sup>3</sup> E04G 1/34  
 U.S. Cl. 182—152 13 Claims

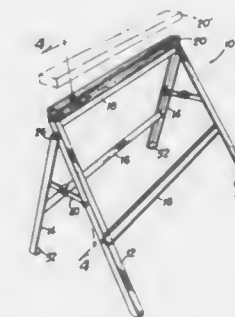
1. Scaffolding structure comprising first and second frame members having adjacent connected ends and remote free ends, said connected ends being hingedly connected for relative rotation of said frame members about a hinge axis between a closed position in which said frame members overlap each other and an open position in which said frame members are continuations of each other, a first leg member mounted on

said first frame member adjacent its said connected end, a second leg member mounted on said first frame member adja-



cent its said free end, and a third leg member mounted on said second frame member adjacent its said free end.

**4,951,782**  
**FOLDABLE SAWHORSE**  
 Paul B. Hanson, P. O. Box 291, Union City, Ga. 30291  
 Filed Apr. 27, 1989, Ser. No. 344,267  
 Int. Cl.<sup>3</sup> B27B 21/00; B25H 1/06  
 U.S. Cl. 182—153 15 Claims



1. A foldable sawhorse having operative and storage positions and adapted to be positioned on a base, comprising main leg members with supporting leg members pivotally joined at pivot points to said main leg members near the upper ends thereof, said supporting leg members being shorter than said main leg members and forming an inverted V-shaped structure in combination with said main leg members when in said operative position and wherein the distance along said main leg members between said pivot points and the lower ends of said main leg members is less than the distance along said supporting leg members between said pivot points and the lower ends of said supporting leg members, foldable strut means extending between and pivotally secured to said main leg members and said supporting leg members at each side of said V-shaped structure for selectively maintaining said leg members in said operative position, said strut means having right and left bar means pivotally secured together near their opposed end portions opposite the connection to said leg members and wherein the points of connection of said strut means to said main leg members are disposed below the points of connection of said strut means to said supporting leg members for disposing said strut means at an angle relative to said base, a support member secured to and extending between the upper ends of said main leg members and in substantially vertical alignment with the midpoint between said leg members when in said operative position, and pad means secured to the lower ends of said leg members.



4,951,783

# ARRANGEMENT AND PROCESS FOR SECURING A THREADED INSERT TO AN OIL PAN

Axel Kamprath, Eddingen, and Thomas Wehr, Ditzingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

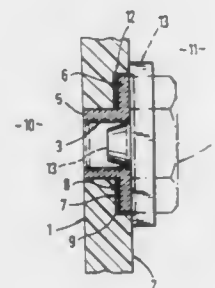
Filed Sep. 13, 1989, Ser. No. 406,540

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831308

Int. Cl.<sup>5</sup> F16N 33/00

U.S. Cl. 184—1.5

4 Claims



1. An arrangement for securing a metallic threaded insert to an oil pan made of plastic material for an internal combustion engine, the metallic threaded insert being constructed to be gastight and fluidtight with respect to the oil pan for receiving an oil drain plug, the threaded insert having a cylindrical section which rests in a wall of the oil pan, wherein the threaded insert, at an end area of the cylindrical section adjacent to an exterior side of the wall of the oil pan, has a collar which, by means of a sealing adhesive means, is held at an outer wall section of the oil pan,

wherein the adhesive means is a punched out adhesive film which holds the threaded insert in an axial direction thereof at the oil pan in a force locking manner.

4,951,784

# PROCESS AND DEVICE FOR SIMPLE, HIGH SPEED OIL CHANGE AND/OR FLUSHING AND AIR PURGING OF THE MOVING COMPONENTS OF THE CRANKCASE IN AN INTERNAL COMBUSTION ENGINE

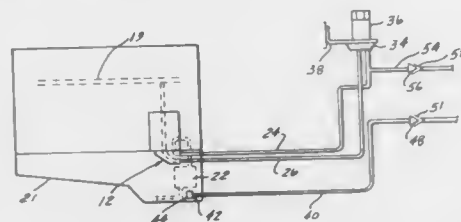
Ram D. Bedi, Birmingham, Mich., assignor to K. J. Manufacturing, Wixom, Mich.

Continuation-in-part of Ser. No. 413,008, Sep. 26, 1989, Pat. No. 4,884,660, which is a continuation-in-part of Ser. No. 350,303, May 22, 1989. This application Nov. 8, 1989, Ser. No. 433,355

Int. Cl.<sup>5</sup> F16N 33/00

U.S. Cl. 184—1.5

27 Claims



1. A device for facilitating flushing and scrub cleaning of moveable components in an internal combustion engine having an oil pan with a drain plug opening an internal lube oil distribution passage system, comprising:

an oil filter adapter adapted to be sealingly connected to an engine oil filter mounting boss located on the internal combustion engine, said adapter having at least two nozzles, a first nozzle in fluid communication with an engine oil pump located in the oil pan and a second nozzle in fluid

communication with the internal lube oil distribution passage system of the engine;

a remote oil filter mounting boss having first and second apertures, said mounting bracket positioned on the engine remote from said engine oil filter mounting boss;

an engine oil filter removably mounted on said remote oil filter mounting boss;

a first inlet hose connected to said first nozzle and said first aperture of said mounting bracket;

a second outlet hose connected to said second nozzle and said second aperture on said mounting bracket;

a pump-out line connected to the drain plug opening having a coupling member at a remote end, said coupling member adapted to removably contact an external pump device; and

a fill line connected to said first inlet hose, said fill line capable of transferring oil to said engine oil filter, the internal lube oil distribution passage system and the movable components, said fill line having a coupling member attached at a remote end, said coupling member adapted to removably contact said external pump device.

4,951,785

# CENTRALIZED GREASING DEVICE WITH MULTIPLE OPERATIONAL CHECKS

Christian Javelly, Allonnes, and Rene Paris, St. Hilaire St. Florent, both of France, assignors to Consortium de Recherches Pour L'Application Des Fluides, Craf., Allonnes, France

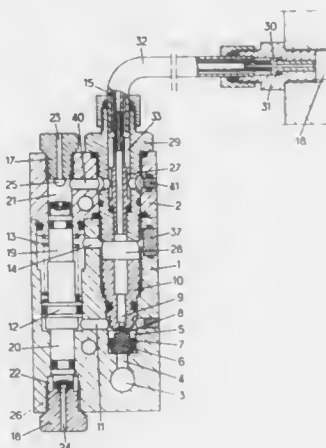
Filed May 19, 1989, Ser. No. 354,278

Claims priority, application France, May 20, 1988, 88 06817

Int. Cl.<sup>5</sup> F16N 27/00

U.S. Cl. 184—7.4

4 Claims



1. In a stage for a centralized greasing installation which has a certain number of such stages assembled in blocks; said stage having a lubrication air chamber, a resetting air chamber, and a metering piston located between said chambers; said air chambers each being provided with an adjusting stopper which has a bore connected to atmosphere, said piston having rods with ends which close said bores at opposite ends of piston travel; supply means for supplying lubricant to said piston, said supply means including a primary duct means, a branched connection, and a double acting valve for supplying intermittently pressurized lubricant to said piston; means for connecting said lubrication air chamber to lubrication air chambers of other such stages and to a common air source having a limited flow rate and to a common pressure switch; means for connecting said resetting chamber to resetting air chambers of other such stages and to another common air source having a limited flow rate and to another common pressure switch, whereby air pressure measurements permit verification that all of the metering pistons of said installation have completed their travel;

the improvement wherein said stage is provided with a secondary duct for conveying lubricant expelled by the metering piston to a point to be greased, said secondary duct including an encasing conduit with a smaller diameter tube therein to define a space, a leakage control air chamber in communication with said space, and means for connecting the leakage control air chamber to leakage control air chambers of other stages in order to check overall the absence of leakage in all secondary ducts of the installation.

4,951,786

# LOAD DISTRIBUTION DETECTING SYSTEM FOR ELEVATOR

Hiroshi Haraguchi, Narita, Japan, assignor to Otis Elevator Company, Farmington, Conn.

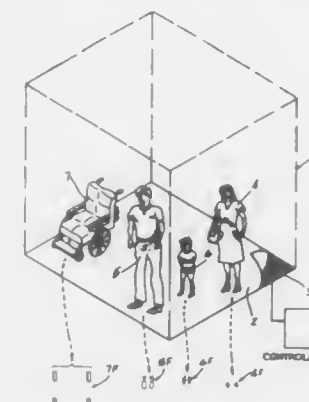
Filed Jun. 6, 1989, Ser. No. 362,115

Claims priority, application Japan, Jun. 9, 1988, 63-142383

Int. Cl.<sup>5</sup> B66B 9/00

U.S. Cl. 187—1 R

7 Claims



1. An elevator control system for modifying operation of an elevator, said system comprising a matrix of sensor means associated with the floor of an elevator cab for detecting the location and shapes of loaded areas on the cab floor caused by passengers in the cab, and microprocessor means connected to said sensor means for altering elevator movement or door operation in response to reception of predetermined signal patterns from said sensor means signifying pre-inputted information relating to a type of passenger in the cab or a type of passenger movement in the cab.

4,951,787

# ELEVATOR CONTROL AND INDICATOR DEVICE

Larry W. Lind, La Mesa, and Richard E. Watt, Spring Valley, both of Calif., assignors to U.S. Elevator, Corporation, San Diego, Calif.

Filed Feb. 17, 1989, Ser. No. 312,694

Int. Cl.<sup>5</sup> B66B 3/00

U.S. Cl. 187—121

14 Claims

1. An elevator control device, comprising:

a lens guide having an opening at one end;

means for mounting said lens guide in an operating panel with the open end of said lens guide facing outwardly;

switch means mounted in said lens guide, said switch means comprising a piezoelectric element having input and output electrodes for generating an output signal when force is applied to said piezoelectric element;

control means connected to said piezoelectric element for generating an elevator control pulse in response to the output signal from said piezoelectric element, said control means comprising:

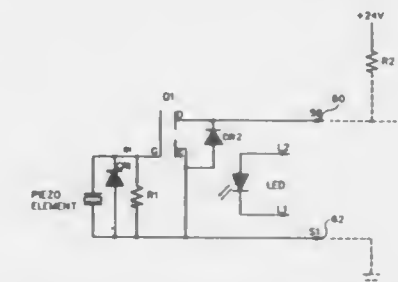
a transistor, the gate of said transistor connected to the output electrode of said piezoelectric element;

a first transient voltage suppression diode, the anode of said

first diode connected to the input electrode of said piezoelectric element and the cathode of said first diode connected to the gate of said transistor; and

a second transient voltage suppression diode, the anode of said second diode connected to the source of said transistor and the cathode of said second diode connected to the drain of said transistor;

push button means mounted in said lens guide for deflecting



said piezoelectric element to generate an output signal when force is applied to said push button means by an operator, said push button means being movable a predetermined distance between a first inoperative position and a second operative position whereby said push button means deflects said piezoelectric element; and

restraining means for limiting movement of said push button means to a predetermined distance sufficient to produce an output signal from said piezoelectric element.

4,951,788

# TORQUE CONVERTER MULTIPLATE BYPASS CLUTCH

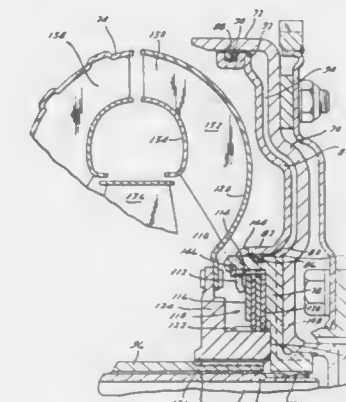
Dale E. Martin, Novi, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jun. 28, 1989, Ser. No. 372,486

Int. Cl.<sup>5</sup> F16H 45/02

U.S. Cl. 192—3.3

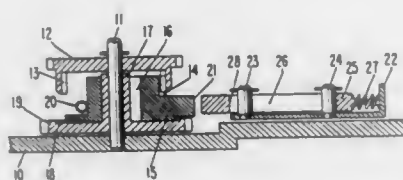
8 Claims



1. A torque converter assembly having a bypass clutch, said converter assembly comprising a bladed turbine including a turbine hub, a bladed impeller, a converter housing enclosing said turbine and said impeller, an annular piston plate located between said turbine and said converter housing a clutch pressure chamber defined between said piston plate and said converter housing, said pressure chamber having a radially outer margin and a radially inner margin, said inner margin being defined by a cylinder member having apertures at a location spaced axially toward said turbine from said housing, said cylinder member being connected to said housing; said annular piston plate having projections extending radially inward through said apertures, an assembly of friction

clutch discs located within said cylinder member, said projections engaging said friction disc assembly; at least one of said friction discs being carried by said cylinder member and an adjacent disc carried by said turbine hub, and a turbine sleeve shaft connected to said turbine hub.

4,951,789  
**CLUTCH ASSEMBLY**  
Shigeki Murata, Nara; Jiro Kajino, and Hitoshi Minabe, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 942,629, Dec. 16, 1986, abandoned.  
This application Oct. 24, 1988, Ser. No. 265,334  
Claims priority, application Japan, Dec. 17, 1985, 60-283479; Feb. 26, 1986, 61-41235  
Int. Cl.<sup>3</sup> F16D 11/02  
U.S. Cl. 192—28 29 Claims

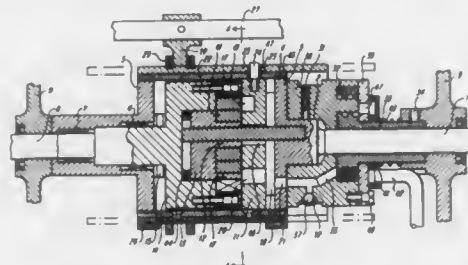


1. A clutch assembly, comprising:  
a driving member;  
an engaging member movable between an engaged position where said engaging member engages said driving member and a predetermined released position where said engaging member is apart by a predetermined distance from said driving member;  
a first thrusting means for thrusting said engaging member toward the engaged position;  
a driven member having mounted thereon said engaging member and said first thrusting means, said driven member being driven by said driving member through said engaging member when said engaging member is in the engaged position;  
a releasing means, comprising a releasing member movable between a position where said releasing member is apart from said engaging member and a position where said releasing member abuts against said engaging member, for enabling a driving force of said driving member transmitted through said engaging member to said releasing member to cause a reaction force of said releasing member to be applied to said engaging member to move said engaging member toward the released position until said engaging member disengages from said driving member; and  
said releasing means further comprising a second thrusting means for thrusting said engaging member through said releasing member toward the released position to move said engaging member to the released position after said engaging member has disengaged from said driving member.

4,951,790  
**GEROTOR-TYPE CLUTCH WITH ADJUSTABLE VALVE PLATE**  
William C. Blything, 37 Pendragon Rd. Perry Barr, Birmingham, B42 1RN, England  
Filed Sep. 2, 1988, Ser. No. 241,099  
Int. Cl.<sup>3</sup> F16D 31/04, 31/08  
U.S. Cl. 192—61 7 Claims

1. A hydraulic power transmission device comprising:  
a housing having opposed end faces through which extend axially aligned input and output shafts;  
a rotatable cylindrical casing positioned in said housing and

closed at each end by first and second flanged members rotatable therewith, said output shaft being journaled in said first member and said input shaft being secured to or integral with said second member;  
an annular member located within said casing and secured to said output shaft and having a plurality of inwardly directed contoured teeth;  
a rotor contained within said annular member having flat surfaces opposed to said first and second members, said rotor being carried on a driven shaft parallel to said input shaft and secured to said second flange member, said rotor having a smaller diameter than the inner diameter of said annular member and including a plurality of outwardly directed contoured teeth dimensioned to mesh with the teeth of said annular ring the rotor having fewer teeth than said ring, whereby rotation of said input shaft causes the rotor to rotate within said annular ring;  
a first plate member secured to said driven shaft and in mating relationship with the flat surface opposed to said first flange member and including a crescent shaped ele-

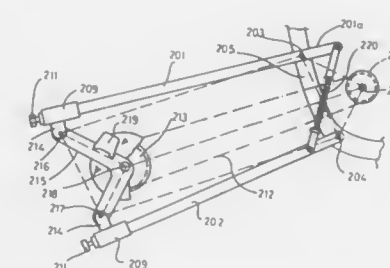
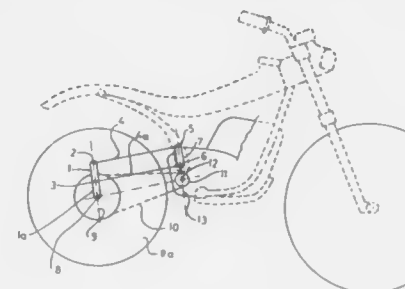


ment extending parallel to said shaft between the non-meshing teeth of said annular ring and said rotor;  
a second plate contained within said casing and having one surface in mating contact with the one flat surface of said annular ring and said rotor and an opposite surface spaced from said second flange member to define a fluid inlet cavity therebetween, said plate being secured to said casing for rotation therewith; means being provided to rotate said second plate between first and second positions within said casing, said plate containing an arcuate recess in said face contacting said other flat face, the recess being positioned to overlie the teeth of said annular ring and said rotor and an arcuate slot diametrically opposed to said recess and positioned to overlie said teeth to provide communication between said fluid inlet and the spaces between said meshing teeth said plate further including a central clearance passageway through which the rotor shaft extends;  
and a hydraulic pump means actuated by said input shaft, passageway means being provided to transfer fluid from said pump into said fluid inlet cavity.

4,951,791  
**REAR WHEEL SUSPENSION MECHANISM FOR MOTORCYCLES AND THE LIKE VEHICLES**  
Jose L. Belli Creixell, C. Homer, 40, 08023 Barcelona, Spain  
Filed Feb. 10, 1988, Ser. No. 154,990  
Claims priority, application Spain, Feb. 20, 1987, 8700720; May 22, 1987, 8701502; Oct. 23, 1987, 8703028; Nov. 17, 1987, 8703269; Nov. 25, 1987, 8703350  
Int. Cl.<sup>3</sup> B62K 25/10  
U.S. Cl. 180—219 11 Claims

1. A rear wheel suspension mechanism for motorcycles and like vehicles which have a rear-wheel drive including a first sprocket coupled to the rear drive wheel for rotation about a first axis, a second sprocket mounted at a gear box output for rotation about a second axis, and transmission means for cou-

pling said first and second sprockets, said rear wheel suspension means comprising:  
at least two oscillating arms extending substantially longitudinally relative to the motorcycle traveling direction;  
an oscillating axle support articulated to a first end of each of said oscillating arms at respective first joints;  
an axle for the rear driving wheel mounted in the oscillating support and coupled to the first sprocket;  
second ends of the oscillating arms opposite the first ends thereof being articulated to respective points of a motorcycle frame at respective second joints;

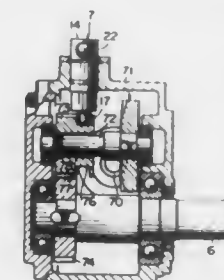


such that the oscillating arms constitute, together with the rear wheel axle oscillating support, an oscillating ensemble, said first and second joints defining the shape of an articulated polygon; and  
wherein two of said first and second joints defining the articulated polygon are movable while maintaining said first and second ends of said arms articulated to said axle support and motorcycle frame respectively to provide for continuous adjustment of the distance between said first and second joints formed by each of said oscillating arms.

4,951,792  
**CLUTCH MECHANISM IN GEAR TRANSMISSION**  
Masanori Egawa, Chiryu, Japan, assignor to Sumitomo Heavy Industries, Ltd., Tokyo, Japan  
Filed Mar. 23, 1989, Ser. No. 327,671  
Claims priority, application Japan, Mar. 29, 1988, 63-41684[U]  
Int. Cl.<sup>3</sup> F16D 11/10  
U.S. Cl. 192—67 R 1 Claim

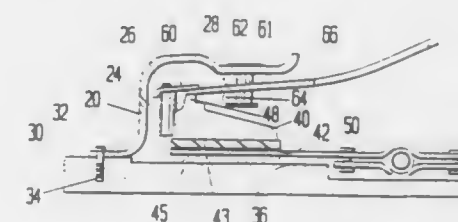
1. A clutch mechanism in a gear transmission comprising: a rotary output shaft and an intermediate rotary shaft disposed in parallel with each other; a hypoid gear fixed to said intermediate shaft, said hypoid gear and said intermediate shaft being driven by a hypoid pinion in engagement with said hypoid gear and mounted on an input shaft perpendicular to said intermediate shaft and said output shaft; a first gear fixed to said output shaft; a second gear operatively engaging with said first gear and having a fitting hole fitted on said intermediate shaft in such a manner that said second gear is rotatable and axially slidable relative to said intermediate shaft; splines formed on part of the outer peripheral surface of said intermediate shaft;

splines formed on the inner peripheral surface of said fitting hole of said second gear, said splines of said second gear being engaged with said splines of said intermediate shaft when said second gear is at a first axial position on said intermediate shaft,



and being disengaged therefrom when said second gear is at a second axial position; and a shifting device for moving said second gear along said intermediate shaft between said first and second positions.

4,951,793  
**CLUTCH ASSEMBLY WITH IMPROVED DUAL FRICTIONAL FACINGS**  
Bill J. Hays, 10582 Palladium Ave., Garden Grove, Calif. 92640  
Filed Jan. 25, 1989, Ser. No. 301,439  
Int. Cl.<sup>3</sup> F16D 13/60  
U.S. Cl. 192—70.27 9 Claims



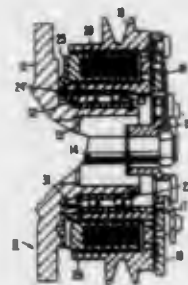
1. A clutch plate assembly wherein a clutch disc having first and second planar faces is clamped between a flywheel and a pressure plate, each having a respective face contiguous to and opposing one of said first and second planar faces of said clutch disc to rotationally secure said clutch disc between said flywheel and pressure plate, whereby said clutch assembly moves as a single assembly, the improvement comprising:  
a. an organic composite, frictional facing and no sintered metal facing on a first side of said clutch disc; and  
b. a sintered metal frictional facing and no organic composite frictional facing on the other side of said clutch disc.

4,951,794  
**ELECTROMAGNETIC CLUTCH WITH A STRUCTURE WHICH IS SIMPLE IN ASSEMBLY**  
Takashi Matsushita, Iseaki, Japan, assignor to Sanden Corporation, Gunma, Japan  
Filed Mar. 15, 1989, Ser. No. 323,810  
Claims priority, application Japan, Mar. 15, 1988, 63-33100[U]  
Int. Cl.<sup>3</sup> F16D 27/06  
U.S. Cl. 192—84 C 4 Claims

1. An electromagnetic clutch which comprises a first rotatable member, an armature plate mounted on the first rotatable member, a mount comprising a wall and a cylindrical support frontwardly projecting from the wall, a second rotatable member having a magnetic friction surface and rotatably mounted on the cylindrical support through a bearing, stopper means



fixed on the cylindrical support to stop the bearing from frontwardly moving on the cylindrical support, and electromagnetic means mounted through a supporting plate on the mount for generating a magnetic attraction force to attract the armature to the magnetic friction surface to thereby enable rotation transmission between the first and the second rotatable members, wherein said supporting plate comprises an annular region being in contact with the wall of the mount, a central boss



frontwardly projecting and extending around said cylindrical support to have a projecting end, and a radial inner flange radially inwardly extending from the projecting end to form a central hole through which said cylindrical support extends, said bearing having an axial end in press contact with said radial flange, whereby said bearing and said supporting plate are maintained on the cylindrical support without axial movement by the wall and the stopper means.

4,951,795

## MODULATION VALVE DEVICE

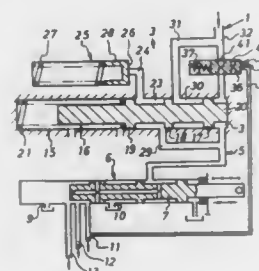
Mitsuyoshi Mori, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Neyagawa, Japan  
PCT No. PCT/JP88/00224, § 371 Date Sep. 2, 1988, § 102(e) Date Sep. 2, 1988, PCT Pub. No. WO88/07145, PCT Pub. Date Sep. 22, 1988

PCT Filed Feb. 29, 1988, Ser. No. 275,174

Claims priority, application Japan, Mar. 10, 1987, 62-54393  
Int. Cl.<sup>3</sup> F16D 25/00

U.S. Cl. 192—87.18

2 Claims



1. A modulation valve device comprising:  
an inlet passage adapted to be connected to a hydraulic pressure source;  
an outlet passage adapted to be selectively connected to one of a plurality of hydraulic clutches through a selector valve and passages between said selector valve and said hydraulic clutches;  
an operation chamber to which said inlet and outlet passages connect;  
a plunger facing said operation chamber and adapted to be moved in accordance with a pressure in said operation chamber; an accumulator controllably connected to said outlet passage through a passage means of which opening degree is controlled by said plunger;  
a variable orifice mechanism associated with said inlet pas-

sage and including a plurality of orifices having different flow resistance and are adapted to align with said inlet passage, respectively; and  
a control mechanism for selecting said orifice forming a part of said inlet passage among a plurality of said orifices in accordance with said hydraulic clutch selected by said selector valve,  
said variable orifice mechanism including a plunger which is movable laterally with respect to said inlet passage and is provided with said plurality of orifices; and said control mechanism includes a control chamber for hydraulically moving said plunger to said variable orifice mechanism and a connecting passage connecting at least one of said passages between said selector valve and said hydraulic clutches to said control chamber.

4,951,796

## RADIALLY ADJUSTABLE CLUTCH RELEASE BEARING ASSEMBLY

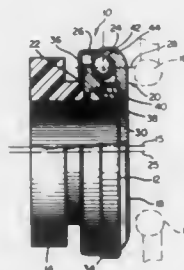
Richard F. Harrington, Lincolnwood, and James Selgrad, Des Plaines, both of Ill., assignors to Aetna Bearing Company, Chicago, Ill.

Division of Ser. No. 119,164, Nov. 10, 1987, Pat. No. 4,854,437, which is a division of Ser. No. 878,658, Jan. 25, 1986, Pat. No. 4,724,943. This application May 30, 1989, Ser. No. 358,893

Int. Cl.<sup>3</sup> F16D 23/14

U.S. Cl. 192—98

4 Claims



2. A self-aligning clutch release bearing and carrier sleeve assembly including a carrier sleeve which defines a first axis and a bearing adapted to be brought into engagement with rotating clutch fingers or the like of a clutch mechanism, which clutch fingers rotate about a second axis which may not be exactly coincidental with said first axis, said bearing and carrier sleeve assembly being adapted to adjust the rotational orientation of the bearing to coincide with the second axis of rotation of said clutch fingers, said bearing and carrier sleeve assembly comprising: a bearing including a generally annular thrust face for engagement with said clutch fingers and inner and outer annular raceways having a plurality of bearing elements disposed therebetween, said outer raceway rotating in unison with said thrust face and said inner raceway being coupled with said carrier sleeve; and mounting means for grippingly engaging said inner raceway for mounting the same to said carrier sleeve; said second raceway having an annular radially inwardly extending shoulder portion and said mounting means defining recess means of complementary form for receiving said shoulder portion therewithin; said shoulder portion terminating at a position radially spaced apart from a radially innermost end of said recess means for permitting a predetermined amount of radial movement of said bearing relative to said carrier sleeve while substantially preventing axial movement of said bearing relative to said carrier sleeve; wherein said carrier sleeve is formed of a plastics material and wherein said mounting means comprises a mounting portion formed integrally with said carrier sleeve and including elastically deformable means for snappingly engaging said shoulder portion therewith; and wherein said mounting portion of said carrier sleeve defines a generally annular, undercut notch

comprising said recess means for receiving said shoulder portion of said inner raceway therein and a cam lead-in surface axially spaced from said notch in the direction of said thrust face for receiving and guiding said shoulder portion of said bearing thereover and into snapping engagement with said notch.

4,951,797

## ELECTROMAGNETIC COUPLING DISC

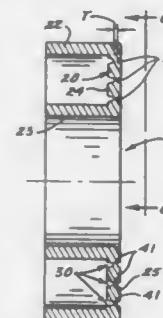
Dwight E. Booth, Janesville, Wis., and Daniel L. DeYoung, Roscoe, Ill., assignors to Dana Corporation, Toledo, Ohio

Filed Oct. 25, 1988, Ser. No. 262,358

Int. Cl.<sup>3</sup> F16D 27/14; H01F 3/00

U.S. Cl. 192—107 R

19 Claims



1. A multiple pole coupling disc for an electromagnetic coupling, said disc being made of magnetic material and having a working face and an oppositely facing non-working face, said working face being adapted to engage another coupling disc of the electromagnetic coupling, radially spaced rows of grooves formed in and extending generally circumferentially around the non-working face of said disc to delineate adjacent magnetic poles, each of said grooves having a closed end, having opposing side walls and terminating short of the working face of said disc whereby said grooves leave said working face free of interruptions.

4,951,798

## POROUS SINTERED METAL AND NONPOROUS FRICTION MATERIAL FOR CLUTCHES

Walter Knoess, Füssen, Fed. Rep. of Germany, assignor to Sinterstahl Gesellschaft m.b.H., Füssen, Fed. Rep. of Germany  
Filed Feb. 24, 1989, Ser. No. 315,338

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806828

Int. Cl.<sup>3</sup> F16D 13/74

U.S. Cl. 192—107 M

14 Claims

1. A lubricated friction clutch for a transmission of the synchronization ring and matching cone type, comprising a first clutch part and a second clutch part that can controllably engage one another, forming a friction pairing, in which the first and second clutch parts are made from differing materials the first clutch part having a first friction surface and the second clutch part having a second friction surface, the first and second friction surfaces being opposed to one another, wherein the first friction surface is a specific frictional material having desirable frictional properties, and the second friction surface is made from an iron-based material of high mechanical strength, the first friction surface being substantially non-porous, and the opposing second friction surface is made from microporous sintered material that is considerably harder than the specific frictional material used in the first friction surface, the second friction surface having pores and being microporous, the second friction surface having a friction-effective area A of  $50\% < A < 90\%$  of the portion of the geometrical area of the friction surface giving an effective contribution to

friction and having pores with a mean diameter of less than 300  $\mu\text{m}$ .

4,951,799

## METHOD OF CORRECTING COIN DATA AND APPARATUS FOR INSPECTING COINS

Osamu Kai, Tokyo, Japan, assignor to Tamura Electric Works, Ltd., Japan

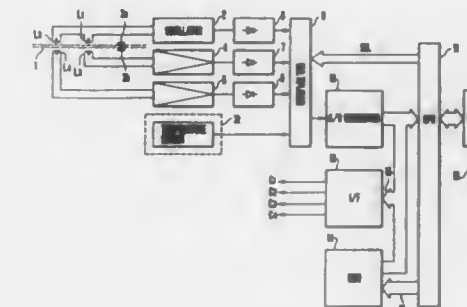
Filed Jan. 31, 1989, Ser. No. 304,347

Claims priority, application Japan, Feb. 10, 1988, 63-27447

Int. Cl.<sup>3</sup> G07F 3/02

U.S. Cl. 194—317

13 Claims



1. A method for correcting data used in a coin inspecting apparatus in which data representing at least one physical characteristic of an inserted coin is generated and used to determine the authenticity of the inserted coin comprising the steps of:

obtaining maximum and minimum values for said at least one physical characteristic representing authentic coins from reference data consisting of a reference average value for said at least one physical characteristic and a reference standard deviation of said at least one physical characteristic;  
comparing said data generated by coins inserted into said coin inspecting apparatus with said maximum and minimum values to determine the authenticity of said inserted coin;  
storing said data for each inserted coin determined to be authentic;  
calculating an average value of said stored data each time a first predetermined measurement parameter is detected;  
calculating a new reference average value from said average value calculated from said data and said reference average value;  
generating said maximum and minimum values from said new reference average value and said reference standard deviation for determining the authenticity of said coins inserted after said first predetermined measurement parameter is detected;  
calculating a new standard deviation from said stored data each time a second predetermined measurement parameter is detected; and  
generating said maximum and minimum values from said new reference average value and said new standard deviation for determining the authenticity of said coins inserted in said coin inspecting apparatus after said second predetermined measurement parameter is detected.

4,951,800

## COIN VALIDATOR

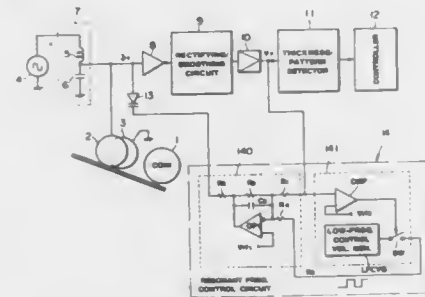
Kenzo Yoshihara, Kono, Japan, assignor to Kabushiki Kaisha Nippon Coilux, Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,048

Claims priority, application Japan, Jun. 30, 1988, 63-163374  
Int. Cl. 5 G07D 5/08

U.S. Cl. 194-317

15 Claims



1. A coin validator comprising:  
a coin sensor for sensing a coin passing through a coin path;  
an oscillator for outputting an oscillating signal of a predetermined frequency;  
a resonator resonant with the oscillating signal from the oscillator for applying a resonant output to the coin sensor;  
a detector for detecting a nature of the coin in accordance with the output signal from the resonator during coin passage;  
variable capacitance means added as a resonant element to the resonator; and  
a resonant frequency control circuit for restricting to within a predetermined range a change in the output signal from the resonator during coin non-passage by changing a capacitance of the variable capacitance means.

4,951,801

## ARTICULATED MOBILE CONVEYOR APPARATUS

Dennis Z. Mraz, Saskatoon, Canada, assignor to DM Enterprises Inc., Saskatoon, Canada

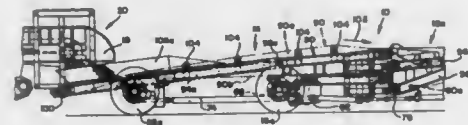
Continuation-in-part of Ser. No. 757,852, Jul. 22, 1985, Pat. No. 4,842,130, which is a continuation-in-part of Ser. No. 670,563, Nov. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 640,749, Aug. 14, 1984, abandoned. This application Jan. 14, 1988, Ser. No. 144,846

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl. 5 B65G 41/00

U.S. Cl. 198-303

11 Claims



1. A mobile articulated conveyor apparatus comprising, in combination, a plurality of pivotally interconnected modular carriages each of which has a pair of transversely aligned support wheels intermediate its longitudinal length so as to track behind the wheels of the preceding carriage during longitudinal movement of the conveyor apparatus, selected ones of said carriages having power means operative to selectively drive the support wheels on said carriages, and means supporting an endless conveyor belt on said modular carriages so as to define a continuous upper load carrying work run and a lower return run, said belt support means including a belt guidance arrangement between the adjacent ends of each connected pair

of carriages comprising a pair of vertically spaced guide rollers about which the work run is looped, one roller of each pair of guide rollers being supported on one of the corresponding pair of connected carriages and the other roller being supported on the other of said corresponding connected carriages, said rollers having axes of rotation lying in substantially parallel planes and being cooperative with said conveyor belt to define a reach between said guide rollers which is twisted generally about a longitudinal twist axis and is subjected to transverse components of tension forces acting on opposite sides of said longitudinal twist axis when the belt is turned through an angle by relative articulated movement between the corresponding connected carriages, said belt support means further including means supporting at least one roller of said pair of rollers to enable selective adjustment between the rollers in the longitudinal direction of belt movement in a manner to balance the sum of the transverse components of tension forces acting on opposite sides of said longitudinal twist axis and thereby maintain the conveyor belt in predetermined trained relation on said rollers.

4,951,802

## ASSEMBLY STATION, PARTICULARLY FOR WORKING ON AUTOMOTIVE VEHICLE BODIES

Folkner Weissgerber, and Hermann Kaspar, both of Wolfsburg, Fed. Rep. of Germany, assignors to Volkswagen Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

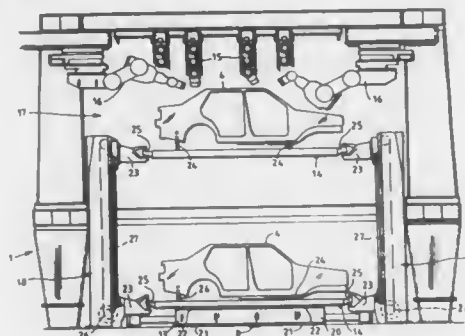
Filed Oct. 16, 1985, Ser. No. 788,151

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1984, 3437755

Int. Cl. 5 B65G 47/00

U.S. Cl. 198-346.1

3 Claims



1. In a vehicle body assembly line having an assembly station including tools installed in a work zone of said assembly station; a transporting carriage arranged for advancing on a floor and having a generally horizontal travel path passing through said assembly station; said transporting carriage being arranged for carrying all vehicle body parts into the assembly station for being joined therein and for carrying joined vehicle body parts out of the assembly station along said travel path; the improvement wherein the work zone and said tools are situated at a level above that of said travel path; the improvement further comprising a hoist means situated in said assembly station laterally of said travel path for lifting the vehicle body parts to be joined together into said work zone from said travel path and for lowering the vehicle body parts joined together from said work zone into said travel path.

4,951,803

## METHOD AND APPARATUS FOR STORING STACKS OF ARTICLES AND SUBSEQUENTLY UNSTACKING THE ARTICLES AND FEEDING THE ARTICLES TO WORKING EQUIPMENT

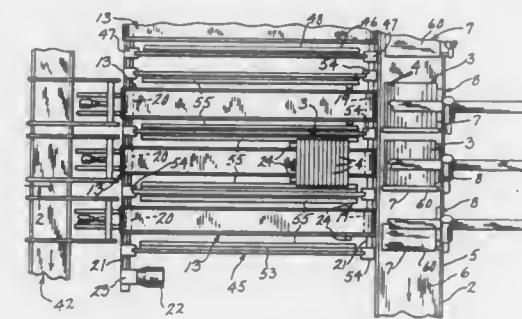
Wolfgang C. Dörner, Oconomowoc, Kenneth N. Hansen, Todd A. Eggebrecht, both of Waukesha, and John C. Redding, Oostburg, all of Wis., assignors to Dörner Mfg. Corp., Hartland, Wis.

Filed Sep. 6, 1988, Ser. No. 240,717

Int. Cl. 5 B65G 1/00

U.S. Cl. 198-347.1

16 Claims



1. An apparatus for storing and feeding objects, comprising first conveyor means to convey a plurality of objects, second conveyor means having an upstream end disposed normal to a side edge of said first conveyor means and having a downstream end, transfer means for transferring said objects from said first conveyor means to said second conveyor means, movable stop means associated with said second conveyor means for stopping a first of said objects on said second conveyor means and enabling the leading end of a second object to engage the trailing end of said first object to form a train of objects, lift means associated with said second conveyor means for lifting said train above said second conveyor means to a storage site and for lowering the train onto said second conveyor means, and means associated with the downstream end of said second conveyor means for individually separating each object from said train.

4,951,804

## CONVEYOR FOR TURNING CONVEYED PARTS

Charles E. McCulloch, Ferndale, and Michael Peabody, Bloomfield Hills, both of Mich., assignors to Durr Automation, Inc., Davisburg, Mich.

Filed May 17, 1989, Ser. No. 353,078

Int. Cl. 5 B65G 47/26

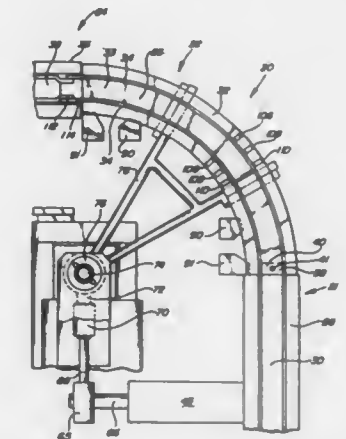
U.S. Cl. 198-457

9 Claims

1. A conveyor for moving parts comprising:  
a first straight lift and carry conveyor section extending along a first axis and having a frame, a lift and carry bar being received in said frame and periodically being lifted vertically above and out of said frame and driven at a vertical position above said frame in a first direction along said first axis;  
a second straight lift and carry conveyor section extending along a second axis, said second axis being skew with respect to said first axis by a first angle, said second straight lift and carry section having a frame, a lift and carry bar being received in said frame and periodically being lifted vertically above and out of said frame and driven at a vertical position above said frame in a second direction along said second axis;  
a corner lift and carry section having a frame, a lift and carry bar being received within said frame, said corner lift and carry bar extending along an arc equal to said first angle and being driven to pivot about an axis, said corner lift and carry bar periodically being lifted vertically above and out of said frame and driven to pivot about said pivot axis, said corner lift and carry section being positioned between said

first and second straight lift and carry sections, said arc extending between and connecting said first and second axes;

wherein said first straight lift and carry section having a drive causing said first lift and carry bar to be periodically lifted and driven in a first direction along said first axis, said first lift and carry section drive consisting at least of a rotating shaft operably connected to cause said corner lift and carry bar to be periodically lifted vertically above and out of said corner frame such that a part may be conveyed along said first lift and carry section, be transferred to said corner lift and carry section, be turned through said arc on said corner lift and carry section and be transferred to said second lift and carry section; and



wherein said operable connection includes an eccentric shaft extension with a rocker arm mounted thereon for relative rotational movement therewith, said rocker arm being caused to rock about a small angular extent due to rotation of said eccentric shaft extension, said rocker arm being connected to cause a lift post to be periodically moved vertically upwardly and downwardly, said lift post being rotatably received within a bracket member, said bracket member being fixed to said corner lift and carry bar, alternate movement vertically upwardly and downwardly of said lift post causing said bracket member and said corner lift and carry bar to be moved vertically upwardly along therewith.

4,951,805

## FEED HOPPER WITH DISTRIBUTOR ELEMENTS

John Gordon, Bridgewater, and Erich W. Sodalbers, Washington, both of N.J., assignors to Komline-Sanderson Engineering Corporation, Peapack, N.J.

Filed Mar. 22, 1989, Ser. No. 327,248

Int. Cl. 5 B65G 47/19

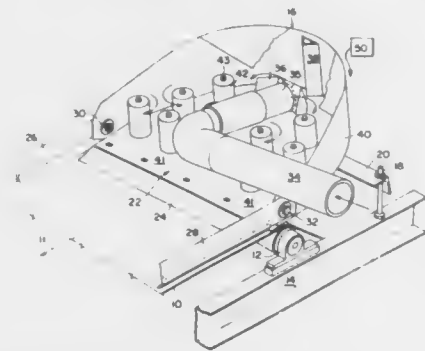
U.S. Cl. 198-525

14 Claims

1. A hopper for the distribution of liquid or semi-solid materials therefrom, comprising a feed hopper assembly including a housing having a bottom and a splash guard extending around the periphery thereof, said bottom and splash guard together forming an opening at one end of said housing, and a plurality of distributor elements mounted on said bottom, said distributor elements during said distribution of materials from said housing being freely rotatable about their respective axes with



regard to said bottom so that an imbalance of forces on a distributor element will cause that element to rotate in the



direction of the greater force until the balance of forces on that element has been restored.

4,951,806

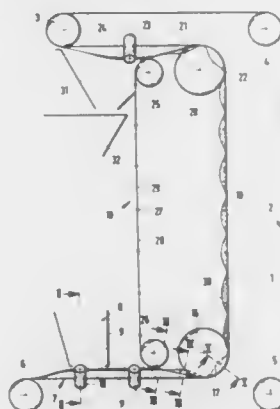
## DOUBLE BELT CONVEYOR BAND

Friedrich W. Schwing, and Gerhard Schwing, both of Herne, Fed. Rep. of Germany, assignors to Friedrich Wih. Schwing GmbH, Herne, Fed. Rep. of Germany  
Filed Jan. 3, 1987, Ser. No. 57,499  
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1986, 3619246

U.S. Cl. 198—605

Int. Cl.<sup>5</sup> B65G 15/14

13 Claims



1. In a double-belt conveyor having a steep conveyor track and a continuously revolving conveyor band, which includes a conveyor belt which is supported on a band feeder and on trough roller assemblies, and is supported flatly on the steep conveyor track and a continuously revolving covering belt which is buckled in the conveyor seam for the formation of closed conveyor spaces, and having traction reinforcements positioned externally of the conveyor belt, and shear-resistant lateral reinforcements acting in cooperation with the traction reinforcements and in which the longitudinal edges of the belts are pressed on one another and the long edges of the belts are held together, the improvement comprising:

fasteners (35,36) which are disposed on and project externally of both longitudinal edges (33,34) of the covering belt (29) and are provided with opposing apertures (37,38) for receipt of the longitudinal edges (45,46) of the conveyor belt (2), during the running of the trough roller assemblies (10,11), the conveyor belt being buckled along its longitudinal center line and longitudinal edges of the belts approaching or moving away from each other during the running of the conveyor belt (2) over the trough roller assemblies; at least one band guide roller (53) having

fastener engaging means on its opposed ends installed in the conveyor direction downstream of the last trough roller assembly (11) of the band feeder (9); said band guide roller lying flatly beneath the conveyor belt (2) whereby the conveyor belt (2) is flattened to engage the fasteners (35,36) with its longitudinal edges (45,46) to press the belt edges of the conveyor and covering belts (2,29) on one another; said fasteners (35,36) of each edge of the covering belt being included in a strip (39,40) which has an angular section (41,42) with a vertical blade (41) vertical to the plane of the covering belt (29), and another blade (42) parallel to the plane of the covering belt (29).

4,951,807

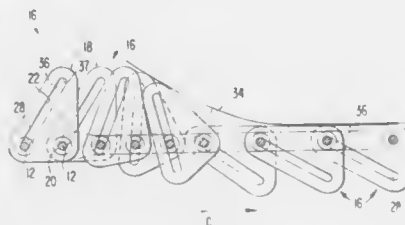
## NON-COLLAPSING INSIDE EDGE CONVEYOR BELT WITH DUAL PITCH LINKS

Gerald C. Roinestad, and Michael R. Straight, both of Winchester, Va., assignors to Ashworth Bros., Inc., Fall River, Mass.  
Continuation-in-part of Ser. No. 83,272, Aug. 10, 1987, abandoned, and a continuation-in-part of Ser. No. 171,390, Mar. 21, 1988, Pat. No. 4,867,301. This application Jan. 29, 1988, Ser. No. 213,171

Int. Cl.<sup>5</sup> B65G 21/18

U.S. Cl. 198—778

60 Claims



1. In a conveying system with a conveyor belt for conveying in both a straight line direction and around lateral curves and means for pivoting links between a first and a second position, the conveyor belt comprising:

a plurality of rods extending transversely of the length of the belt, having first and second transverse ends, said rods arranged adjacent one another longitudinally along the length of the belt; and

means for connecting said rods to form a length of the belt including link means, disposed approximately adjacent said first and second transverse ends of said rods for coupling adjacent pairs of each of said rods to one another, for holding the first and second transverse ends of each of said rods at a substantially same first pitch during straight line motion of said belt, for holding the transverse ends of each of said rods located at the inside concave edge of a lateral curve to the first pitch during motion of the belt about the lateral curve, for moving, by cooperation with the pivoting means, the opposite transverse ends of each of said rods to a second greater pitch along the outside convex edge of the lateral curve as the belt moves from straight line to lateral curved motion, and for returning, by cooperation with the pivoting means, the opposite transverse ends of each of said rods to the first pitch as the belt moves from lateral curved to straight line motion.

4,951,808

## ACCUMULATING CONVEYOR

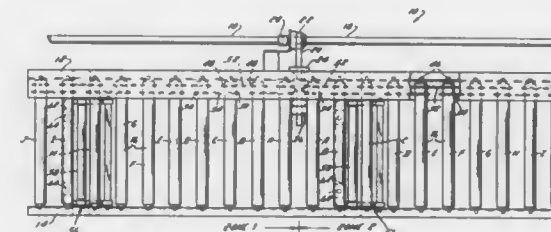
Ellsworth H. Collins, Shepherdsville; James F. Mattingly, and David B. Reed, both of Louisville, all of Ky., assignors to The Interlake Companies, Inc., Shepherdsville, Ky.  
Filed Jan. 4, 1990, Ser. No. 461,008  
Int. Cl.<sup>5</sup> B65G 13/06

U.S. Cl. 198—781

7 Claims

1. An accumulating conveyor, comprising:  
a conveyor frame having a length and a width;

a plurality of rollers rotatably mounted widthwise across the conveyor frame, with the rollers grouped into zones, each zone including a plurality of adjacent rollers;  
a drive shaft extending along the length of the conveyor;  
at least one clutch shaft extending at an angle to the drive shaft;



a gear-driven power take-off located between the drive shaft and the clutch shaft for transmitting power from the drive shaft to the clutch shaft;  
a clutch mounted on the clutch shaft; and  
drive means between the clutch and its respective zone of rollers for driving the rollers in that zone.

4,951,809

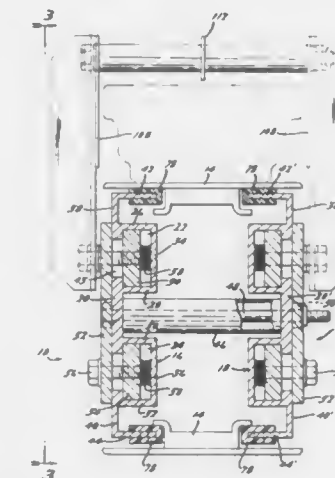
## CONVEYOR CONSTRUCTION

David V. Boothe, Rochester, and David R. Barnwell, Rochester Hills, both of Mich., assignors to Steel Master Transfer Inc., Pontiac, Mich.  
Continuation of Ser. No. 167,645, Mar. 14, 1988, abandoned.  
This application Jul. 14, 1989, Ser. No. 380,689

Int. Cl.<sup>5</sup> B65G 15/60

U.S. Cl. 198—841

16 Claims



1. A conveyor assembly comprising:  
an endless conveyor chain loop supported for continuous movement to transfer workpieces from a first location to a second location; and  
means for movably supporting said conveyor chain loop, said supporting means comprising  
first and second substantially identical separately fabricated elongated rail members;  
a plurality of spaced means securing said rail members in substantially parallel spaced relationship at a plurality of points spaced along the length thereof,  
each of said rail members incorporating upper and lower substantially identical laterally projecting flange portions, said upper flange portions being spaced apart and operative to guide a first portion of said conveyor chain loop while said lower flange portions are spaced apart and operate to guide another return portion of said conveyor loop, each of said first and second rail mem-

bers further being substantially symmetrical laterally about a longitudinally extending midline thereof, each of said first and second rail members including a pair of spaced substantially parallel channels extending along the length thereof,

said assembly further comprising third and fourth elongated rail members adapted to be joined in end-to-end abutting relationship with said first and second rail members respectively, said third and fourth rail members being substantially identical to said first and second rail members, first and second plate means overlying the juncture between said first and third rail members and the juncture between said second and fourth rail members respectively and fastening means for clamping said plate member to respective pairs of said rail members, said fastening means including nut plates captured within each of said channels, said nut plates having threaded openings therein and said channels being further operative to prevent relative rotation of said nut plates.

4,951,810

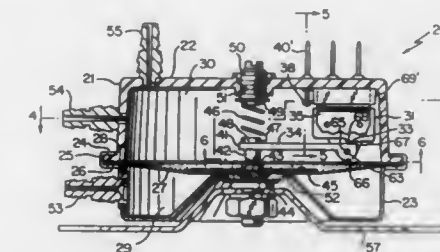
## FLUID CONTROL DEVICE FOR ELECTRICAL SWITCH UNIT

Charles J. Everett, Killingworth, Conn., assignor to Robertshaw Controls Company, Richmond, Va.  
Division of Ser. No. 419,825, Oct. 11, 1989, which is a division of Ser. No. 217,398, Jul. 11, 1988, Pat. No. 4,914,264. This application Feb. 26, 1990, Ser. No. 485,385

Int. Cl.<sup>5</sup> H01H 35/34

U.S. Cl. 200—83 A

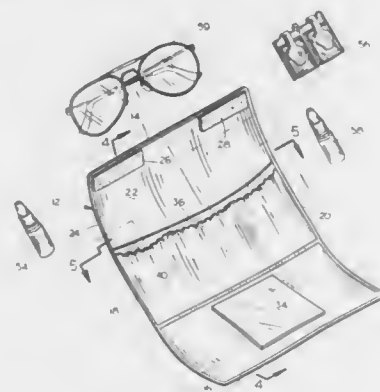
9 Claims



1. In a control device comprising a housing means divided into two chambers by a movable wall means that is responsive to a pressure differential created between said chambers, an electrical switch means carried by said housing means and having a movable actuator, and a lever pivotally carried by said housing means and having opposed ends one of which is interconnected to said wall means so as to be pivoted by the movement thereof, said lever being operatively interconnected to said actuator to operate said switch means between the different conditions thereof in relation to the pivoted position of said lever, the improvement comprising a pair of mounting plate means respectively having holding means that holds said switch means between said plate means and respectively having pivot means that pivotally mount said lever between said plate means and between said opposed ends of said lever whereby said plate means, said switch means and said lever form a self-supporting unit that is carried by said housing means and has the other end of said lever acting on said actuator of said switch means, said housing means having an opening means therein, one of said plate means having an extension disposed in said opening means in said housing means and being secured therein so that said self-supporting unit is carried by said housing means.

**4,951,811**  
**COMBINED EYE GLASS, CONTACT LENS AND ACCESSORIES CASE**  
 Dale O. Lines, 921 3rd Ave., S., Great Falls, Mont. 59405  
 Continuation of Ser. No. 220,667, Jul. 18, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 414,540  
 Int. Cl.<sup>5</sup> A45C 11/04  
 U.S. Cl. 206—5

2 Claims



1. A combined eye glass, contact lens and accessories case comprising:

a foldable panel member having an upper end, a lower end, opposite side edges, an inside surface, and an outside surface;

said panel member being foldable from a substantially flat condition to a folded condition wherein the panel member is folded upon itself;

said panel member including an upper panel portion, an intermediate panel portion, and a lower panel portion; said upper, intermediate and lower panel portions being substantially the same size;

said lower panel portion being foldable upwardly to contact and cover said intermediate panel portion;

said upper panel portion being foldable downwardly to contact and substantially cover said folded lower panel portion;

cooperable fastener means, for selectively maintaining said panel member in its folded condition, having a first half mounted on the inside surface of said upper panel portion and a second half mounted on the outer surface of said lower panel portion, said first and second halves being selectively cooperable;

a first rectangular partition member, of a size substantially equal to said intermediate panel portion having an upper and lower edge and opposing side edges, the lower edge and side edges of said first partition member being affixed to the inside surface of said intermediate panel portion of said panel member to substantially cover said intermediate panel portion so as to define an eye glass compartment between said first rectangular partition member and said intermediate panel portion, said eye glass compartment being open along the entire upper edge of said first rectangular partition member;

said first rectangular partition member having inner and outer surfaces;

a second rectangular partition member, of a size substantially equal to said first partition member, having an upper and lower edge and opposing side edges, the lower edge and side edges of said second partition member being secured to the lower edge and side edges of said first partition member, such that said second partition member substantially covers the first partition member, said second partition member being further secured intermediate its side edges, and parallel thereto to the outer surface of said first partition member to define first, second, and third parallel compartments having upper ends, said parallel compart-

ments being open along the entire upper edge of said second partition member;

said upper edge of said second partition member having a stretchable elastic member affixed thereto so as to yieldably close the open upper ends of said first, second and third compartments by elastically biasing said upper edge of said second partition member against the outside surface of said first partition member.

2. A combined eye glass, contact lens and accessories case comprising:

a foldable panel member having an upper end, a lower end, opposite side edges, an inside surface, and an outside surface;

said panel member being foldable from a substantially flat condition to a folded condition wherein the panel member is folded upon itself;

said panel member including an upper panel portion and a lower panel portion, said upper panel portion being foldable downwardly and of a size so as to contact and substantially completely cover said lower panel portion;

means for selectively maintaining said panel member in its folded condition;

a first rectangular partition member, of a size substantially equal to said lower panel and having an upper and lower edge and opposing side edges, the lower edge and side edges of said first partition member being affixed to the inside surface of said lower panel portion of said panel member to substantially cover said lower panel so as to define an eye glass compartment between said first rectangular partition member and said lower panel portion, said eye glass compartment being open along the entire upper edge of said first rectangular partition member;

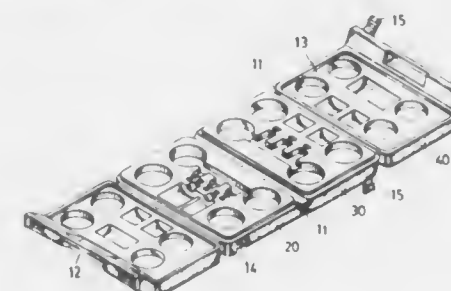
said first rectangular partition member having inner and outer surfaces;

a second rectangular partition member, having an upper and lower edge and opposing side edges, the lower edge of said second partition member being secured to the outer surface of said first rectangular partition member intermediate the upper and lower edges of said first partition member, the side edges of said second partition member being secured to the outer surface of said first partition member adjacent portions of the side edges of the first partition member, such that said second partition member substantially covers the outer surface of the first partition member from the lower edge of the second partition to the upper edge of the first partition member, to define a contact lens compartment between said second rectangular partition member and said first rectangular partition member, said contact lens case compartment being open along the entire upper edge of said second rectangular partition member; and

a third rectangular partition member, having an upper and lower edge and opposing side edges, the lower edge of said third partition member being secured to the outside surface of said first partition member along the lower edge of said first partition member, the side edges of said third partition member being secured to the outside surface of said first partition member adjacent the side edges of said first partition member, such that said third partition member substantially covers the outer surface of the first partition member from the lower edge of the first partition member to the lower edge of the second partition member, said third partition member being further secured intermediate its side edges, and parallel thereto, to the outer surface of said first partition member to define first and second parallel compartments having upper ends, said parallel compartments being open along the entire upper edge of said third rectangular partition member.

**4,951,812**  
**STRUCTURE OF TOOL CASE**  
 Kun-Chen Chen, No. 6, Lane 609, Sec. 1, Chung Shan Rd., Ta Chia Chen, Taichung, Taiwan  
 Filed Jan. 12, 1990, Ser. No. 464,074  
 Int. Cl.<sup>5</sup> B65D 25/14  
 U.S. Cl. 206—45.11

1 Claim



1. A tool case, including a plurality of pairs of casings unitarily made through shape molding process, said casings having symmetrically a variety of recess holes thereon for the setting therein of a variety of hand tools, a pair of retainer means or retaining holes each for the connection with one another, and being respectively connected in series by means of a connecting strip portion between each two casings, permitting two casings to relatively turn outward with adjacent two casings capable of being relatively turned inward so that the intermediate casings can be completely received inside a space which is defined by the first casing and the last casing when the first casing and the last casings are relatively turned to close up together, said first and last casings having hand-hold portions incorporated together for the holding of the hand when said casings are respectively closed up together.

**4,951,813**  
**BOX OF SHEET MATERIAL FOR PACKING ARTICLES**  
 Josephus C. H. M. Santer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Oct. 26, 1989, Ser. No. 427,280  
 Claims priority, application Netherlands, Nov. 8, 1988, 8802731

Int. Cl.<sup>5</sup> B65D 5/50

U.S. Cl. 206—45.19

5 Claims



1. A box of sheet material for packing articles, said box comprising

a rectangular base portion,

a first pair of opposing walls and second pair of opposing walls, each joined to the base portion along first folding lines and second folding lines, respectively,

a cover portion joined to one of said first walls along a third folding line parallel to the first folding lines, and fixing means for holding the box in an assembled state, said fixing means comprising

a panel provided with recesses for receiving articles to be packed, said panel having fourth folding lines parallel to the third folding line and side edges extending along the second walls, characterized in that:

said panel is joined to the base portion along a fifth line and to a first wall along a sixth line, the distance between the sixth line and the nearest fourth folding line of the panel is greater than the distance be-

tween the sixth line and the first folding line along said first wall, and the distance between the fifth line and the sixth line, measured along the panel, is substantially equal to the distance between the fifth line and the sixth line, measured along the base portion and said first wall.

**4,951,814**  
**STORAGE CONTAINER FOR DIGITAL AUDIO TAPE CASSETTES**

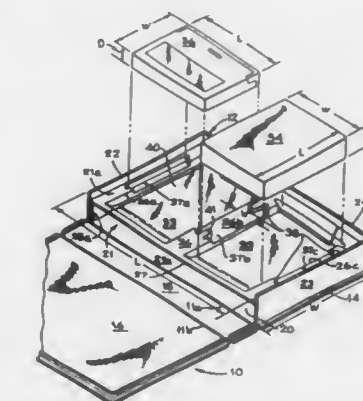
Richard E. Belmont, Valley, Ala., assignor to Ampex Corporation, Redwood City, Calif.

Filed Feb. 21, 1989, Ser. No. 314,347

Int. Cl.<sup>5</sup> B65D 85/672

U.S. Cl. 206—387

4 Claims



1. A storage container for storing tape cassettes and companion cases that house said cassettes, each said cassette of a generally rectangular configuration having a length larger than a width of said companion case, comprising:

interconnected walls forming a housing of a generally rectangular configuration, having length and width dimensions defining an interior space having two substantially coplanar, generally rectangular receptacles, each receptacle for interchangeably receiving only one of a cassette and a companion case, respectively;

a first and a second pair of seats disposed within each said receptacle, said first pair of seats disposed within each receptacle at opposite first ends thereof to store cassettes with their lengths aligned in an end-to-end relationship in the direction of the length dimension of said housing, said second pair of seats disposed within each receptacle at opposite second ends thereof orthogonal said first ends, to store companion cases with their widths aligned in an end-to-end relationship in the direction of the length dimension of said housing, whereby cassettes and companion cases are stored in said housing with their lengths aligned in an orthogonal relationship relative to each other.

**4,951,815**  
**MEDICAL GLOVE AND LUBRICANT DISPENSING PACKAGE**

Paul Ulbrich, 75 Rainbow Bridge Pl., San Ramon, Calif. 94583

Filed Nov. 24, 1989, Ser. No. 440,698

Int. Cl.<sup>5</sup> B65D 85/18

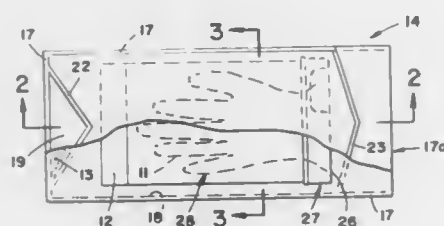
U.S. Cl. 206—213

14 Claims

1. A medical glove and glove lubricant container comprising a package having a first sheet of material that overlays a second sheet of material and which is bonded thereto along zones that define a sealed glove compartment at a first location between said sheets of material and a separate sealed lubricant compartment at a spaced apart location between said sheets of material, the bonding of said sheets of material along said zones



being weaker than said material enabling said first sheet of material to be peeled away from said second sheet of material to open both of said compartments with a single motion of a



persons hands, a medical glove disposed in said glove compartment and a quantity of lubricant disposed in said lubricant compartment.

4,951,816

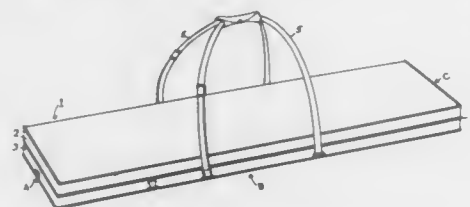
# CONVERTIBLE CONTAINER FOR CARRYING CLOTHES AND CARRYING AND PROTECTING VARIOUS LENGTHY ITEMS

Harrison C. Smith, 2911 B S. Woodstock St., Arlington, Va. 22206

Filed May 21, 1985, Ser. No. 736,353  
Int. Cl.<sup>3</sup> B65D 85/18; A45C 7/00

U.S. Cl. 206-279

8 Claims



1. A container for carrying clothes, equipment, toiletries and other items with skis or other lengthy items, comprising:
  - (a) an elongated outer housing having a length longer than the lengthy items to be carried therein, said length being longer than that of standard length skis, said housing being foldable about a longitudinal axis thereon to fold from an open position to a closed position and being foldable about at least three transverse axes thereof to at least one folded configuration;
  - (b) housing fastening means for allowing the housing to be opened to the open position thereof when said fastening means is open and fastening said housing in the closed position thereof when said fastening means is closed; (c) at least three interior compartments disposed on said housing on the side thereof which is the interior when said housing is in the closed position, at least one of said compartments being disposed between one longitudinal end and the first of said transverse axes, at least one of said compartments being disposed between said first and second transverse axes or said second and third transverse axes, and at least one of said compartments being disposed between the third transverse axis and the other longitudinal end of the container, said compartments and axes being sized and disposed such that the fully folded configuration is about one third the length of the unfolded configuration; and
  - (d) securing means disposed on said housing on the side thereof which is the interior when said housing is in the closed position, for securing said lengthy items therein; whereby clothes, equipment, toiletries and other items may be carried in said interior compartments at the same time that said skis or other lengthy items are secured inside said housing by said securing means, and when the lengthy

items are not present, the clothes and other items may be carried with the housing in the folded configuration.

4,951,817

# BEEPER SLIP ON COVER

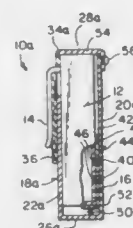
Anthony Barletta, 1876 69th St., Brooklyn, N.Y. 11204; Joseph V. Ottomaneli, 3826 Cypress Ave., Seagate, N.Y. 11224, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Sep. 27, 1989, Ser. No. 413,087

Int. Cl.<sup>3</sup> B65D 85/38

U.S. Cl. 206-305

3 Claims



1. A carrier adapted to receive a portable electronic paging device of the type having a mounting clip attached thereto and a speaker therein, said carrier comprising:
  - (a) a receptacle having interconnected walls comprising spaced front and rear walls, a pair of spaced side walls, a bottom wall and a top opening adapted for closely receiving a paging device therewithin;
  - (b) said rear wall having a cutout extending down from said top opening;
  - (c) a band extending across said cutout along said top opening whereby said mounting clip on the paging device can project through said cutout below said band and attach onto a belt of a person using the paging device;
  - (d) said front wall of said receptacle, having a plurality of holes therethrough and a track therein;
  - (e) an L-shaped slide member having a plurality of holes in a vertical long arm which rides in said track;
  - (f) a spring disposed between said bottom wall of said receptacle and a short arm of said slide member;
  - (g) a cover extending from an upper edge of said rear wall over said top opening; and
  - (h) a fastener for securing said cover to said front wall, so that the paging device can be placed within said receptacle to bear against said short arm causing said slide member to move down within said track, compressing said spring and allowing said holes in said long arm of said slide member to be in alignment with said holes in said front wall in which sound from the speaker in the paging device will exit therefrom.

4,951,818

# EQUIPMENT CARRIER AND METHOD OF USING SAME

Alan Johnson, 705 Catalina Ave., Seal Beach, Calif. 90740

Filed Jun. 29, 1989, Ser. No. 373,349

Int. Cl.<sup>3</sup> A45C 5/14, 13/00, 7/00

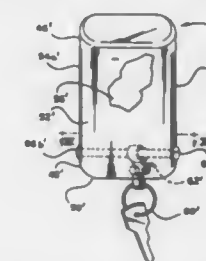
U.S. Cl. 206-315.1

9 Claims

1. A carrier comprising:
  - a body member having end, side, top and bottom walls for defining a long, narrow hollow interior which is adapted to receive equipment, said member being boxlike in configuration and having a plurality of soft, pliable walls; said side, top and bottom walls being substantially longer in their respective widths relative to the widths of the end walls to enable the body member to receive and to store long, narrow athletic equipment, such as skis;
  - wheel means for supporting the carrier rollably along a supporting surface;
  - one of said walls including a long narrow compartment;

a single rigid panel for rigidifying said one of said walls and supporting said equipment, said panel being disposed within said long narrow compartment; fastening means for affixing to the exterior of said one of said walls said wheel means, said fastening means extending through a portion of said long narrow compartment and through said rigid panel; each one of the other walls having means defining a compartment therewithin, each one of said compartments having a given dimension and having closure means for closing the respective compartments; each one of said compartments extending over substantially the entire interior surface area of its corresponding wall; a plurality of impact absorbing panels, for distributing forces

and lowering said key ring from said cavity through said opening of said lower end portion, said means including a single wheel-shaped member having an H-shaped configuration with a crossmember of the H riding along said slot with a left leg of the H in said cavity and a right leg of said H outside said cavity adjacent said sidewall, said key ring being held in a raised position in said cavity solely by said



slot acting in concert with said crossmember, said longitudinal slot tapering near said upper end portion and said sidewall having a transverse slot intersecting said longitudinal slot at a location adjacent said upper end portion, said wheel-shaped member holding said key ring raised in said cavity adjacent said upper end portion in response to being urged through said longitudinal slot taper into said transverse slot.

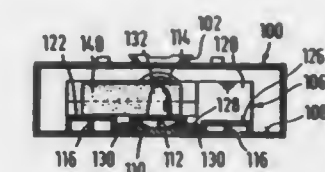
4,951,820

STORAGE CONTAINER FOR COMPACT CASSETTES  
Peter Ackert, Küssnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Chur, Switzerland  
Division of Ser. No. 109,706, Oct. 16, 1987, Pat. No. 4,856,653, which is a division of Ser. No. 817,232, Jan. 8, 1986, Pat. No. 4,702,372, which is a continuation of Ser. No. 645,063, Aug. 28, 1984, abandoned. This application Jan. 5, 1989, Ser. No. 361,408  
Claims priority, application European Pat. Off., Aug. 29, 1983, 83106473

Int. Cl.<sup>3</sup> B65D 85/672

U.S. Cl. 206-387

13 Claims



exerted against the exterior of said walls over the surface of at least one of said panels; each one of said panels being disposed within a corresponding compartment; said compartment having a dimension somewhat less than the given dimension of said corresponding panel; each one of said panels being flexible end-to-end about its midplane extending transversely of the given dimension for permitting said panels to be received within each of their corresponding compartments; and each one of said panels being flexed about its midplane within the interior of its compartment for impact absorbing purposes and for tensioning said compartment to cause its corresponding wall to be maintained in a taut tensioned aesthetically pleasing manner.

4,951,819

# FLEXIBLE KEY CASE

Paul Gebert, Cartersville, Ga., assignor to Key Keepr, Inc., Cartersville, Ga.

Continuation-in-part of Ser. No. 397,657, Aug. 23, 1989. This application Dec. 11, 1989, Ser. No. 448,676

Int. Cl.<sup>3</sup> A45G 11/32

U.S. Cl. 206-37.2

8 Claims

1. A key case, comprising:
  - an upper end portion;
  - a lower end portion having an opening;
  - a sidewall having a longitudinal slot extending from a location adjacent said lower end portion to a location adjacent said upper end portion, said sidewall extending between said upper and lower end portions and defining a cavity, said cavity being accessible through said opening of said lower end portion and through said longitudinal slot;
  - a single key ring having a size sufficient for holding a plurality of keys; and
  - means, connected to said key ring and acting in concert with said longitudinal slot, for raising said key ring into said cavity to a fixed position adjacent said upper end portion

1. Apparatus for the storage of cassettes containing recording media comprising:
  - a housing, said housing being open at one narrow side and having a floor, said housing open side defining a plane which is generally transverse to said floor, said housing including internal guide rails which are integral with said floor, said guide rails extending in a direction which is generally transverse to said plane, at least a first of said guide rails cooperating with said floor to define at least a first open-sided guide channel;
  - a slider member, said slider member having a front wall, a rear wall and bottom which extends between said front and rear walls, said slider member further comprising guide bar means extending from said bottom and being received in said guide channels and overlapped by said housing guide rails whereby said slider member is guided for movement relative to said housing;
  - spring means for biasing said slider member in the direction of said housing open side;

stop means for limiting the motion of said slider member in the direction of said spring means bias; retaining projections extending from said bottom of said slider member in a direction which is away from said housing floor, said retaining projections being sized and shaped to receive and lock against rotation the winding hubs of a recording media cassette inserted in said slider member, said projections being arranged one behind the other in the direction of movement of the slider member, the length of said guide rails and guide bars and the position of said stop means being selected such that both of said retaining projections are displaced outwardly with respect to said plane when said slider member is positioned at its limit of movement under the influence of said spring means; and

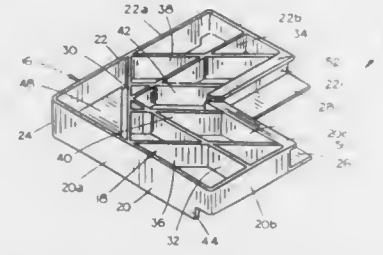
manually releasable locking means for retaining said slider member in said housing against the bias of said spring means,

wherein said bottom of said slider member comprises a central bottom plate, a first lateral bottom plate and a second lateral bottom plate, each of said lateral bottom plates including a respective one of said guide bar means positioned adjacent said central bottom plate, said central bottom plate and said first lateral bottom plate having substantially planar cassette supporting surfaces flush with each other, said second lateral bottom plate having a substantially planar surface portion depressed with respect to said cassette supporting surfaces.

4,951,821  
PACKING CORNERS FOR PHOTOGRAPHS  
Duane E. Kempke, 10026 Kings Plz., Omaha, Nebr. 68122  
Filed Oct. 18, 1989, Ser. No. 423,003  
Int. Cl.<sup>5</sup> B65D 85/48

U.S. Cl. 206—453

7 Claims



1. A packing corner for retaining photographs and the like on a support sheet, comprising:
  - a resilient exterior frame member formed from first and second generally J-shaped leg members;
  - each said J-shaped leg member including a back portion having first and second ends, a bottom portion extending from the first end of the back portion, and a leg portion extending from the bottom portion;
  - said back portions of said J-shaped legs being connected together at their second ends such that said leg portions are oriented at an angle to abut the edges of a photograph corner.

4,951,822  
RIB OF BOTTLES FOR PHARMACEUTICAL, COSMETIC AND OTHER PRODUCTS

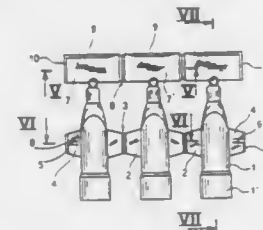
Antonio Fontana; Giovanni Ferrari, both of Carpi, and Euro Fabbri, Rovereto di Novi, all of Italy, assignors to Lameplast S.R.L., Modena, Italy

Filed Jan. 30, 1989, Ser. No. 303,883

Claims priority, application Italy, Jan. 28, 1988, 40015 A/88; May 4, 1988, 40066 A/88; Jan. 11, 1989, 40007 A/89  
Int. Cl.<sup>5</sup> B65D 1/08, 17/24, 85/62

U.S. Cl. 206—530

10 Claims



1. A strip-like structure including a plurality of phials for pharmaceuticals, cosmetics and other products, comprising:
  - a succession of phials formed of a heat-sealable plastic, molded with their respective bases open and mouths each closed by a removable stopper element, each phial having a first set of webs disposed transversely and about the middle of the longitudinal axes of the respective phials, and a second set of webs formed at the mouth ends with narrow stiffening ribs on either side of an uppermost edge thereof, said first and second webs serving to interconnect the phials and the removable stopper elements closing the same, respectively, said interconnecting webs being provided with relatively weakened creases located mid-way between each two adjacent phials and disposed parallel to the phial longitudinal axes,
  - wherein each terminal web of the second set has a transverse butt portion disposed on the ends of and at right angles to the plane of the web and of a width not greater than the width of the phial and of a height equal to a depth of the second web,
  - wherein said second set of webs comprises terminal webs at each end and intermediate webs therebetween, said terminal webs each being formed with a transversely-oriented butt portion formed integrally with the respective stiffening ribs of said terminal webs,
  - wherein the first set of webs also comprise terminal webs at each end and intermediate webs therebetween; the terminal webs of the first set being formed as lugs, each having a transverse butt portion disposed on the ends of and at right angles to the plane of the lugs and being provided with a pair of triangular entanglement-prevention ribs that bridge the dihedral angles between the planes occupied by the lug and the transverse butt portion, and
  - wherein each pair of intermediate webs interconnecting two adjacent phials connect at a weakened crease located mid-way between the axes of the two adjacent phials.

4,951,823  
PAPERBOARD LOAD BLOCK  
Robert A. Butkus, Oakland; Robert C. Olsen, Cupertino, and William K. Sambrallo, Watsonville, both of Calif., assignors to Container Corporation of America, Clayton, Mo.  
Filed Nov. 16, 1989, Ser. No. 437,348  
Int. Cl.<sup>5</sup> B65D 81/04

U.S. Cl. 206—586

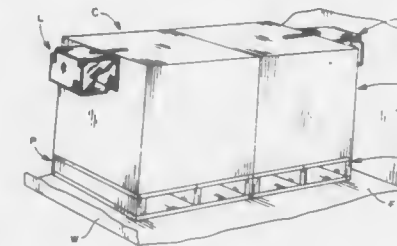
17 Claims

1. A collapsible, self-locking load block for use as dunnage to prevent cargo from shifting in a transportation vehicle, said

load block being formed from a unitary blank of foldable sheet material, and comprising:

- (a) first, second, third, and fourth side walls operatively joined to each other to form an open-ended, tubular structure that is generally rectangular in cross-section with its width, length, and height of different dimensions;
- (b) a pair of center panels foldably joined to certain of said side walls and disposed to extend diagonally between opposite corners of said tubular structure;
- (c) said center panels being positioned in face-to-face relation with each other and including integral connecting means providing interlocking engagement therebetween;
- (d) said load block presenting a plurality of openings for selectively and alternately receiving a portion of an elongated retaining member to assist in the positioning of said load block adjacent an item of cargo in a transportation vehicle.

14. A unitary blank of foldable sheet material, for use in forming a collapsible, self-locking load block adapted to prevent cargo from shifting in a transportation vehicle, said blank being cut and scored to provide:



- (a) the following panels serially arranged and foldably joined to each other along parallel fold lines in the following sequence:
  - (i) a first side wall inner panel;
  - (ii) a first center panel;
  - (iii) a fourth side wall panel;
  - (iv) a first side wall outer panel;
  - (v) a second side wall outer panel;
  - (vi) a third side wall panel;
  - (vii) a second center panel;
  - (viii) a second side wall inner panel;
- (b) each of said center panels including at one end thereof, a lock tab formed from material of the center panel and foldably joined thereto and adapted to be received within a complementary recess at an opposite end of the other center panel, and each of said center panels having at its opposite end a recess adapted to receive a lock tab of said other center panel when said blank is erected into a load block;
- (c) said first and second side wall outer panels having adjacent portions cut out to form a common opening.

4,951,824  
CARTON HAVING AN OPENING FEATURE AND A CARTON BLANK

Morris W. Kuchenbecker, Neenah, Wis., and Steven J. Block, Augusta, Mich., assignors to James River Corporation, Richmond, Va.

Filed May 12, 1989, Ser. No. 351,032

Int. Cl.<sup>5</sup> B65D 5/54

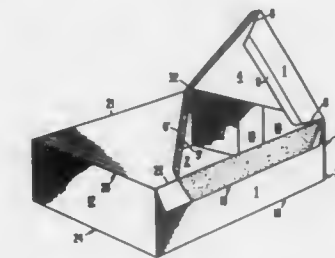
U.S. Cl. 206—625

36 Claims

1. An opening device formed in a panel of a paperboard carton for facilitating the formation of an opening in said carton comprising:

an opening force receiving means adjacent said panel, at least one uncut line of weakness formed in an outer surface of said panel extending from said opening force receiving means adjacent one edge of the desired opening; and

at least one cut line of weakness formed in said outer surface of said panel being substantially parallel to and spaced apart from said uncut line of weakness forming a region of weakness;



wherein a ply separation of said paperboard carton occurs at said region of weakness between said uncut line of weakness and said cut line of weakness when said opening force receiving means is drawn away from said carton.

4,951,825  
APPARATUS FOR CLASSIFYING PARTICULATE MATERIAL

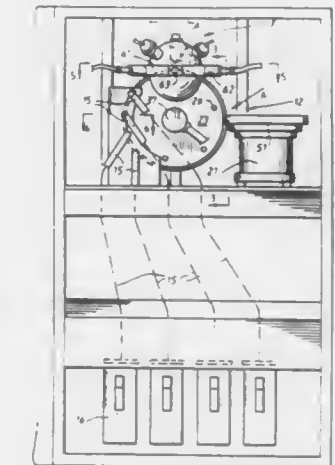
Albert P. Hawkins, Caulfield, and David Santwyk-Anderson, Hurstbridge, both of Australia, assignors to CRA Services Ltd., Melbourne, Australia

Continuation of Ser. No. 82,636, Apr. 23, 1987, abandoned. This application May 25, 1989, Ser. No. 390,101

Claims priority, application Australia, Sep. 30, 1985, PH2670  
Int. Cl.<sup>5</sup> B07C 5/342, 5/36

U.S. Cl. 209—558

12 Claims



1. Apparatus for classifying particulate material according to randomly variable attributes of the particles of that material, comprising:
  - particle feed means for feeding particulate material to be classified particle by particle along a feed path;
  - inspection means for inspecting each particle fed along the feed path and for deriving signals which are a measure of values of said attributes of that particle;
  - signal processing means having means for (a) storing a plurality of sets of specific values of attributes, each set of which is typical of one of a plurality of particulate classes within which the particulate material is to be classified, (b) establishing a range of values about each stored set of



values determining a tolerance range of values for the respective particular class of which the stored set is typical, (c) applying rankings to the particular classes, (d) comparing each subsequently measured set of values of attributes of successive particles with the tolerance ranges of values for said particular classes and determining the highest ranking class having a tolerance range of values embracing said measured set of values, (e) operating in response to said measured set of values falling within the tolerance ranges of a plurality of said classes of equal ranking to compare differences between the specific values of the measured sets of values and the stored values of each of said plurality of classes of equal ranking to determine a closest match with one of said plurality of classes of equal ranking, and (f) outputting a signal representative of the highest ranking class having a tolerance range of values embracing said measured set of values if there is only one such class, or the determined closest matching class if said measured set of values falls within the tolerance ranges of a plurality of said classes of equal ranking; and

classifier means operable in response to receiving said signal outputted by said signal processing means for directing the particles from said path selectively to multiple outlets, whereby the particulate material is classified.

4,951,826

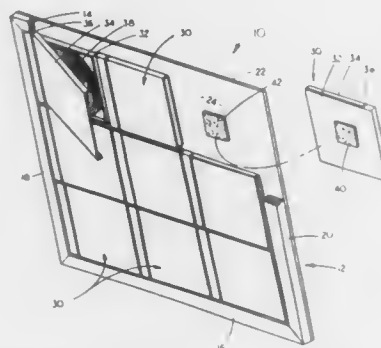
COMPACT DISC DISPLAY AND STORAGE BOARD  
Rodney R. Tompkins, 420 Douglas St., Wayne, Nebr. 68787

Filed May 26, 1989, Ser. No. 357,198

Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—40

6 Claims



1. A compact disc storage and display board, comprising: a rigid panel having a forward surface and a rearward surface; a plurality of fastener means, each including first and second cooperable halves, said first fastener halves being secured to the forward surface of said panel; and at least one operable storage case means having one said second fastener half affixed thereto for selective cooperable fastening to one of said first halves, to thereby selectively fasten said case means to said panel.

4,951,827

DISPLAY RACK

Charles Moransais, L'Ormale, Perouges, 01800 Meximieux, France

Filed Jan. 4, 1989, Ser. No. 293,449

Claims priority, application France, Jan. 5, 1988, 88 00224

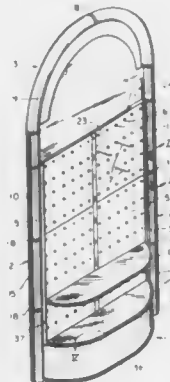
Int. Cl.<sup>5</sup> A47F 7/00

U.S. Cl. 211—59.1

15 Claims

1. A display rack comprising: two vertical tubular columns; arch means having two ends respectively connected to an upper portion of said two columns; a pedestal connected between bottom portions of said col-

umns and protruding from a plane containing said columns for supporting said display rack; a product presentation headpiece connected between upper portions of said two columns; panels connected between parallel sections of said two columns for linking said two columns together; and hook means adapted to be affixed to said panels for supporting items to be displayed, wherein each column comprising a plurality of tubular sections longitudinally placed one on top of another, each tubular section comprising two semicircular half shells,



- complementary fasteners placed in opposing fashion along at least one edge of the half shells for connecting the half shells together, and at least one inwardly oriented flange located on each end of said half shells substantially perpendicularly to a longitudinal axis thereof; and said column further comprising: a plurality of cylindrical assembly parts each having at least one circular groove for receiving said flange for enabling rotation of said tubular sections and for preventing axial movement of said tubular sections.

4,951,828

TOOTHBRUSH RACK DEVICE

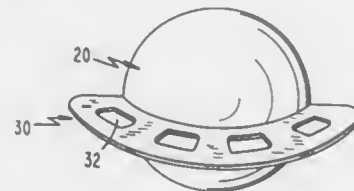
Edward J. Martin, 3388 Reedy Dr., Annandale, Va. 22003

Filed Aug. 13, 1986, Ser. No. 895,919

Int. Cl.<sup>5</sup> A47B 81/00

U.S. Cl. 211—65

1 Claim



1. A device mountable on the wall of a bathroom for holding a plurality of toothbrushes, said device comprising the combination of (a) a wall mountable unit having an overall shape and configuration approximating a hemisphere, (1) the flat side portion of said hemisphere containing means for attachment to a vertical wall, and (2) the remaining portion of said hemisphere being bisected by an arcuate recessed groove extending partially into the interior of said hemisphere, said arcuate groove being located in a single horizontal plane that is parallel to the floor of the bathroom, and

- a generally arcuate and planar rack member having an inner portion and an outer portion (1) that is configured and dimensioned so that the inner portion thereof will fit into and within said arcuate recessed groove of said hemisphere and the remaining outer portion thereof will extend outwardly from said arcuate recessed groove, (2) said planar rack member containing means for holding a plurality of toothbrushes, and (3) containing on its inner portion at least one inwardly extending projection that is adapted to releasably engage a portion of said arcuate recessed groove of said hemisphere so that said rack member can be readily engaged with said arcuate recessed groove by manual pushing and can be readily disengaged from said arcuate recessed groove by manual pulling.

4,951,829

EASY OPENING CROWN CAP

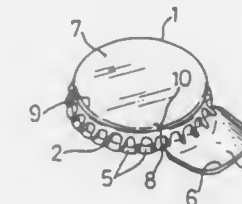
Shih C. Hsu, 14th Floor, No. 18, Alley 4, Lane 995, Min Sheng East Road, Taipei, Taiwan

Filed May 23, 1989, Ser. No. 356,321

Int. Cl.<sup>5</sup> B65D 41/42

U.S. Cl. 215—253

18 Claims



1. An easy opening cap comprising: a substantially circular cap body having a substantially flat top portion and a portion formed about the circumference of said cap body and extending downwardly therefrom; and a finger tab having a proximal edge, a distal edge and two side edges and being integrally joined at its proximal edge to said downwardly extending portion of said cap body; wherein a notch is formed at a lower edge of said downwardly extending portion adjacent one of said side edges of said finger tab, an elongated score line is formed in said cap body and extends from said notch upwardly and to a point on said substantially flat top portion, and only one such notch and elongated score line are formed in said cap body.

4,951,830

SNAP-ON CLOSURE WITH CORKING SKIRT

Benjamin A. Cochran, 181 Sonora Ave., Danville, Calif. 95426

Continuation-in-part of Ser. No. 947,043, Dec. 29, 1986, Pat. No. 4,819,906, which is a continuation-in-part of Ser. No. 709,534,

Mar. 8, 1985, Pat. No. 4,632,265, which is a continuation-in-part of Ser. No. 507,342, Jun. 24, 1983, abandoned. This application

Apr. 10, 1989, Ser. No. 335,767

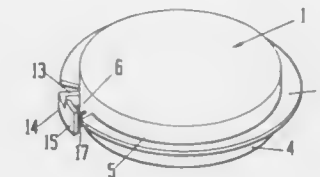
Int. Cl.<sup>5</sup> B65D 41/48

U.S. Cl. 215—256

13 Claims

1. In a snap on closure for a bottle having a neck finish which includes an inwardly directed lip about its upper edge, said closure having a top disc with a downwardly dependent cylindrical peripheral skirt, at least one annular bead on the inner wall of said skirt which resiliently seats in a mating annular groove about the neck of said bottle, the improvement comprising: an inner corking skirt formed by an annular cylindrical wall also downwardly dependent from the undersurface of said disc and concentric within said peripheral skirt and in-

wardly spaced therefrom by an annulus of a width slightly less than the annular width of said inwardly directed lip of said bottle, said sidewall of said corking skirt having a



significantly lesser thickness than said peripheral skirt and being sufficiently thin to permit its inward deflection by said lip of the neck of said bottle without causing said bead to dislodge from said annular groove of said neck.

4,951,831

ECOLOGIST FLEXIBLE TRASH BAG RECEPTACLE

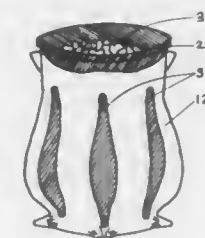
James F. Roesch, and Charleen B. Roesch, both of 10441 Variel Ave., Chatsworth, Calif. 91311

Filed Feb. 22, 1990, Ser. No. 483,390

Int. Cl.<sup>5</sup> B65B 67/12

U.S. Cl. 220—1 T

4 Claims



1. A flexible trash receptacle, improved to enable filling of a plastic trash bag liner to its approximate maximum designed capacity wherein: said receptacle comprises a circumferential sidewall, a closed bottom and an open top with a continuous circular rim, for holding an open mouth of said trash liner when placed inside said receptacle, said circumferential sidewall having a plurality of vertically extending slots spaced at regular intervals about the circumference of the sidewall, resulting in an equal number of reinforced flexible side panels, which are rigid enough to support the sidewall in an upstanding configuration when said trash liner is empty, yet are flexible enough to expand outwardly when said trash liner is filled and compacted to said maximum design capacity.

4,951,832

MULTI-FUNCTIONAL SPACE SAVING CONTAINER SYSTEM

Brian J. Tenney, and Kerry L. Tenney, both of 3371 Merrimac Dr., San Jose, Calif. 95117-3623

Filed Oct. 2, 1989, Ser. No. 416,049

Int. Cl.<sup>5</sup> B65D 21/02, 41/18

U.S. Cl. 220—23.83

20 Claims

1. A storage system which comprises: (a) a plurality of containers, each container having an open top and a bottom and a size different from the size of any of the other containers to permit storing all of said containers as a nested set of containers graduated in size; (b) a lid for each container, each of said lids being adapted to be attached to said top of its corresponding container and attachable to said bottom of said same container to permit said container and its lid to be secured together and stored

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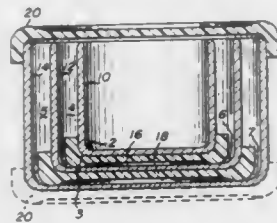
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with the lid on the bottom of its container as a part of said nested set; and



(c) said lid for each container having an outer rim, said outer rim being spaced from the inner wall of the next larger container in which it rests to provide a gap so that said lid does not get wedged in said next larger container.

4,951,833

### END CONSTRUCTION WITH HOLLOW BEAM CONSTRUCTION FOR A DRUM

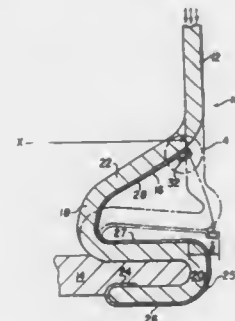
Herbert L. Carpenter, Jr., Cullman, Ala., and James A. Hale, Red Bank, N.J., assignors to Greif Brothers Corp., Delaware, Ohio

Filed Mar. 10, 1989, Ser. No. 321,965

Int. Cl.<sup>5</sup> B65D 3/30

U.S. Cl. 220—67

15 Claims



1. A drum comprising:
  - a vertical sidewall with a circular cross section;
  - a bottom circular end panel; and
  - a lower circular chime including:
    - an inwardly directed C-shaped portion with a first and a second leg at a lower circumferential end of said sidewall and forming a lower concave portion inwardly adjacent to said C-shaped portion on said sidewall;
    - said first leg extending horizontally along the lower circumferential end of said sidewall and terminating with an internal lip pointing to an interior of said C-shaped portion;
    - said lower concave portion formed by said second leg and a first diagonal flange inwardly adjacent to said second leg; and
    - wherein said lower circular chime engages said lower circumferential end of said sidewall so as to engage a peripheral circumference of said bottom circular end panel and wherein the internal lip of said lower circular chime is placed between said bottom circular end panel and a lower peripheral edge of said sidewall;
  - an upper circular chime including:
    - an upper lip engaging an upper circumferential end of said sidewall;
    - an upper concave portion formed by a horizontal portion inwardly adjacent to said upper lip and a second diagonal flange inwardly adjacent to said horizontal portion; wherein said upper circular chime engages an upper per-

ipheral edge of said sidewall, said upper lip providing a lid seating means; wherein said first and second flanges terminate with portions of increased cross section; and wherein longitudinal forces on said sidewall urge said first and second flanges from a diagonal toward a horizontal position thereby increasing a circumference of said portions of increased cross section as measured about a longitudinal axis of the drum.

4,951,834

### MOLDED GASKET FOR INSTRUMENT HOUSING

Brian S. Alkins, Everett, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Sep. 12, 1989, Ser. No. 405,894

Int. Cl.<sup>5</sup> B65D 7/00

U.S. Cl. 220—80

20 Claims



1. An instrument housing, comprising:
  - an upper housing portion and a lower housing portion together enclosing instrumentation circuitry;
  - a gasket forming a seal between said upper and lower housing portions; and
  - a gasket receiving surface of one of said upper and lower housing portions being formed circumferentially with a plurality of spaced apart gasket locking elements; said gasket comprising a strip of material formed circumferentially on one of said upper and lower housing portions and housing a plurality of longitudinally spaced apart housing locking elements complementary to and interlocking with said plurality of spaced apart gasket locking elements.

4,951,835

### BEVERAGE CONTAINER OPENING AND RESEALING DEVICE

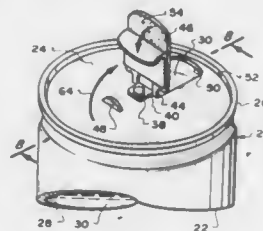
Robert A. DeMars, 6008 Weeping Banyon Ln., Woodland Hills, Calif. 91367, and Spencer L. Mackay, 28765 Placer St., Agoura Hills, Calif. 91301

Filed Jan. 16, 1990, Ser. No. 465,346

Int. Cl.<sup>5</sup> B65D 17/34

U.S. Cl. 220—269

18 Claims



1. In combination with a beverage container having an end wall commonly referred to as a top, said top being constructed of a thin walled rigid material, said beverage container having an internal compartment adapted to contain liquid contents, a contents removing aperture formed in said top, a tab normally closing said aperture, a frangible seal integrally connecting said top and said tab, an opening mechanism mounted on said top, said opening mechanism including a handle integrally connected with a lever, a pivot hole located between said lever and said handle, a pivot pin engaging said pivot hole, said pivot pin being mounted on said top, the improvement comprising:

a camming protuberance mounted on said top, said pivot pin being located directly between said camming protuberance and said aperture, said handle being movable between a stowage position and a frangible seal breaking position, when said handle is moved to rest on said camming protuberance said handle assumes a canted position relative to said top to thereby facilitate manual grasping of said handle and pivoting of said lever into contact with said tab and breaking of said frangible seal resulting in pivoting of said tab into said internal compartment, said handle to be movable back into substantial contact with said camming protuberance during pouring of the contents from said aperture, said handle having an undersurface, an adhesive mounted on said undersurface, said handle to be movable about said pivot pin covering said aperture when in said resealing position, when said handle is in said resealing position said lever is at a canted position by being located against said camming protuberance which also forces said undersurface of said handle against said top with said adhesive forming a fluid tight seal between said top and said handle and closing of said aperture.

4,951,836

### EASY-OPEN CONTAINER

Kunitoshi Yoshimura, Omiya; Akira Nakata, Ageo; Hitoshi Terai, Kasukabe, and Sakayu Iida, Iwatsuki, all of Japan, assignors to Hokkai Can Co., Ltd. and Kirin Brewery Co., Ltd., both of Tokyo, Japan

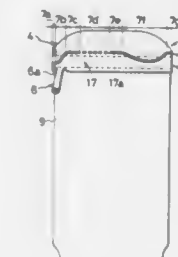
Filed Oct. 13, 1989, Ser. No. 421,117

Claims priority, application Japan, Oct. 13, 1988, 63-132873[U]

Int. Cl.<sup>5</sup> B65D 17/34

U.S. Cl. 220—271

5 Claims



1. An easy-open container comprising:
  - a container barrel having an open end;
  - a container end including a panel, a peripheral wall joined to and depending from a peripheral edge of said panel, and a pull tab joined to a lower edge of said peripheral wall, said peripheral wall being scored to provide a tear-off line joined to a side edge of said pull tab, said peripheral wall being fitted over the open end of said container barrel;
  - a bonded region by which an outer surface of said open end of the container barrel and an inner surface of said peripheral wall of the container end are bonded to each other; and
  - said tear-off line comprising a first continuous portion extending from the side edge of said pull tab through a bonded region of the peripheral wall above said pull tab into a non-bonded region of the peripheral wall above an upper edge of said bonded region, a second dotted-line portion joined to said first continuous portion and extending along the non-bonded region of the peripheral wall above the upper edge of said bonded region, and a third continuous portion joined to said second dotted-line portion and extending along the non-bonded region of the

peripheral wall above the upper edge of said bonded region.

4,951,837

### DISPENSER FOR DISPOSABLE FUNNELS

Allen C. Lentsch, 14030 Haywood Path, Apple Valley, Minn. 55124

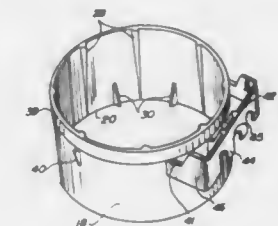
Continuation of Ser. No. 199,760, May 27, 1988, abandoned.

This application Oct. 11, 1989, Ser. No. 420,645

Int. Cl.<sup>5</sup> B65H 1/00

U.S. Cl. 221—45

18 Claims



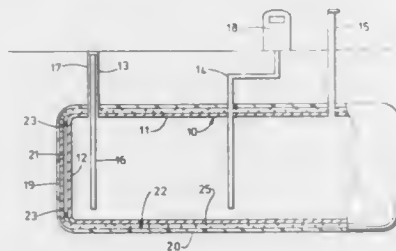
1. A wall-mountable disposable-funnel dispenser constructed of shape-retaining molded plastic material, said dispenser consisting essentially of a feeder member and a cover member,
  - a. said feeder member comprising a circumferentially continuous generally cylindrical housing wall having an open upper end and an open lower end and having a narrow reinforcing band on the exterior thereof at said upper end, said housing wall being of substantially uniform thickness except for said narrow reinforcing band, said housing wall having an interior fractionally decreasing in diameter from the open upper end to the open lower end, said housing wall having a plurality of spaced inwardly-projecting axially-parallel fins united to the interior thereof adjacent said lower end and increasing in inward projection from top to bottom such that each said fin forms an inclined plane of uniform slope at its interior edge the top end of said fins merging with said interior of said housing wall, each said fin having no inward projection greater than the bottom end of said slope and having a blunted vertical inward edge at the bottom end of said slope, each said fin having a lower edge which lies in substantially the same plane as said open lower end of said feeder member, said fins being oriented to receive the rim of a disposable funnel in resting condition thereupon, said fins being the sole inwardly directed structure at said open lower end of said housing wall for supporting a stack of disposable funnels and the sole inwardly directed structure contacted by a disposable funnel withdrawn through said open lower end by hand pulling of the same from said open lower end, said housing wall additionally carrying wall-mountable bracket means on the exterior surface thereof,
  - b. said cover member consisting essentially of a generally cylindrical cover wall of substantially uniform thickness and having a closed top end and an open bottom end, said cover wall at the open bottom end thereof having a sufficient internal diameter to slide over the exterior of the reinforcing band at the upper end of said housing wall of said feeder member in a non-interlocking friction fit relationship for convenient slideable disengagement, and
  - c. on one of said members, a plurality of circumferentially-spaced abutment means for terminating the extent of the slide of the bottom end of the cover wall over the upper end of the feeder member housing wall, said cover member being slideably removable for placing a stack of funnels in said feeder member through said open upper end of said feeder member without removing said feeder member from a wall mounted condition.



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- (a) a cylindrical-shaped storage tank with substantially flattened ends for storing the liquid;
- (b) an end plate mounted on each flattened end of the tank, said end plates mounted so that a closed space exists between the end plate and the tank;
- (c) a separating agent on the side walls of the storage tank and any portion of the flattened tank ends not covered by an end plate; and

(d) a jacket made of a fibrous reinforced resinous material which covers the surface area of the storage tank to form a closed space, said jacket being independent from the side walls of the storage tank because of the separating agent,



having sufficient structural strength to contain liquid in the storage tank which may leak therefrom, and being capable of withstanding external or internal load forces normally encountered by underground storage tanks without suffering cracking and/or collapsing.

4,951,845

## CLOSURE WITH FILTER

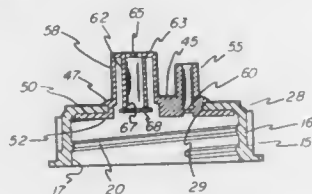
Paul A. Pezzoli, Worthington; Gary N. Smith, Dublin, both of Ohio, and Jerold Montgomery, Libertyville, Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jan. 17, 1989, Ser. No. 297,466

Int. Cl.<sup>3</sup> B65D 41/20

U.S. Cl. 215—250

14 Claims



1. A closure for a product container, said closure comprising, a first portion, said first portion having a generally cylindrical side wall, said side wall having threads along the inner surface thereof for threadedly engaging the neck of said container, an annular top surface, and a corresponding annular bottom surface, and

a second portion, said second portion having a central portion and an annular portion, said central portion having first and second projections extending upwardly therefrom, and an upper surface said annular portion having an annular top portion, said annular top portion positioned beneath said annular bottom surface.

4,951,846

## HOT MELT APPLICATOR WITH ANTI-DRIP MECHANISM

Craig D. Oster, Oakdale; Gerald W. Quinn, St. Paul, and Rodney J. Wilson, Forest Lake, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 2, 1989, Ser. No. 305,846

Int. Cl.<sup>3</sup> B67D 5/00

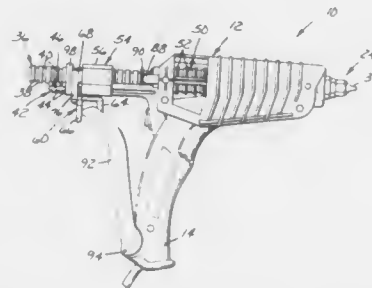
U.S. Cl. 222—146.5

5 Claims

1. An applicator for dispensing molten material from an elongated block of solid material comprising:

- a frame;
- a melting chamber connected to said frame and adapted to receive and melt a portion of an elongated block of solid material;
- a feeding mechanism coupled to said frame for selectively

advancing said block toward said melting chamber; said feeding mechanism including a retraction device for moving said block away from said melting chamber to a retracted position after said portion of said block has melted; said feeding mechanism including a release device for enabling essentially free-floating longitudinal movement of said block during thermal expansion of material within the melting chamber after said block has moved to said retracted position, wherein said feeding mechanism is operable to advance said block from an initial position and to a melting position at least partially within said melting chamber, and wherein said retracted position is located



between said melting position and said initial position, wherein said release device includes a sleeve having a resilient portion for frictional contact with said block such that said sleeve is movable with said block as said block is advanced a certain distance and such that said block is also movable relative to said sleeve as said block continues to be advanced past said certain distance, and wherein said release device includes spring means for urging said sleeve and said block therewith in a rearwardly direction, said sleeve being essentially free-floating together with said block for movement relative to said frame after said block has moved to said retracted position.

4,951,847

## TWO-CHAMBER COMPRESSED-GAS PACK

Jean Hardt, Benken, and Erich Hoefling, Kreuzlingen, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

PCT No. PCT/CH88/00067, § 371 Date Dec. 5, 1988, § 102(e) Date Dec. 5, 1988, PCT Pub. No. WO88/07964, PCT Pub. Date Oct. 20, 1988

PCT Filed Mar. 25, 1988, Ser. No. 297,258

Claims priority, application Switzerland, Apr. 9, 1987, 1370/87

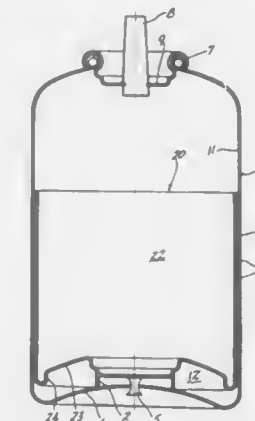
Int. Cl.<sup>3</sup> B65D 83/14

U.S. Cl. 222—386.5

9 Claims

1. A two-chamber compressed gas pack which comprises: a cylindrical can body having an inner wall, an upper valve and a lower base; a diaphragm within said can and forming two chambers within the can, said diaphragm having an entirely rigid bottom adjacent the can base and a flexible collar adjacent the can inner wall, wherein the collar is fastened to the inner wall substantially over its entire region and wherein the collar separates from the inner wall and reverses itself during movement in the can body; said bottom including an area of transition to the collar having a formed region extending cir-

cumferentially adjacent said inner wall therein; wherein said collar reverses itself and separates from the inner wall adjacent



the formed region along said fastened region and the collar bottom moves in the direction of the valve.

4,951,848

## VISCOUS MATERIAL DISPENSER WITH VENTED DELIVERY PISTON

Wilhelm A. Keller, Riedstrasse 1, CH-6330 Cham, Switzerland

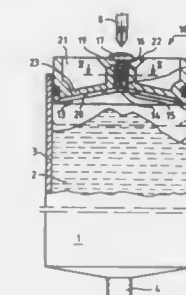
Filed Jun. 1, 1989, Ser. No. 359,590

Claims priority, application Switzerland, Jun. 3, 1988, 02110/88

Int. Cl.<sup>3</sup> G01F 11/00

U.S. Cl. 222—386

4 Claims



1. A dispensing cartridge comprising:
  - a storage cylinder for holding contents for dispensing;
  - a self-sealing delivery piston sliding within said cylinder, said piston having a central vent hole leading to the outside of said cartridge, the inside face of said piston toward said contents of the cartridge having a number of radial groove-shaped depressions that connect with said central vent hole, said face of the delivery piston having a continuous concavity extending from the periphery of the piston toward said vent hole;
  - at least one longitudinal groove located in the surface of said vent hole, said at least one longitudinal groove extending to an outside surface of said piston, an annular sealing surface surrounding said at least one groove opening on the outside surface of said piston, said annular surface being oriented to provide axial seating for the head of said screw when said screw is threaded into said vent hole.

4,951,849

## SEALANT APPLICATOR AND METHOD FOR AN AUTOMATIC FASTENER MACHINE

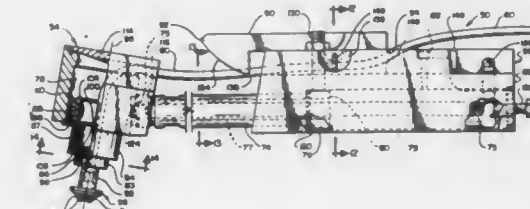
Harry E. Townsend, and Paul J. Shemeta, both of Seattle, Wash.; Anisam Zafir, Karmiel, Israel assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1988, Ser. No. 251,901

Int. Cl.<sup>3</sup> B05C 7/00; B21J 15/00

U.S. Cl. 222—523

11 Claims



1. An apparatus for applying a substance to a hole of a workpiece prior to fastener installation, the apparatus comprising:

- a. a base member;
- b. a head including a substance discharge means for discharging the substance;
- c. a first connecting means for connecting the head to the base to permit the head (i) in response to a first fluid force component which is responsive to variable fluid pressure, to be moved in a generally lateral direction from a first retracted position to a second extended position, so that the substance discharge means is located above the hole, and (ii) to be moved back to the first retracted position;
- d. a second connecting means for connecting the substance discharge means to the head to permit the substance discharge means (i) in response to a second fluid force component which is responsive to variable fluid pressure, to be moved from a third retracted position in a direction downward toward the hole and to terminate at a fourth extended position, and (ii) to be moved back to the third retracted position;
- e. a means for delivering the substance to the substance discharge means for discharge of the substance into the hole;
- f. a first biasing means arranged to exert a first biasing force so as to oppose the first fluid force component and to resist movement of the head from the first retracted position to the second extended position;
- g. a second biasing means arranged to exert a second biasing force so as to oppose the second fluid force component and to resist movement of the substance discharge means from the third retracted position to the fourth extended position;
- h. the first and second biasing means being arranged in a manner that the first and second biasing forces are related to the first and second fluid force components so as to sequence the movements of the head and of the substance discharge means, so that the substance discharge means is located above the hole prior to the substance discharge means reaching the fourth extended position.

4,951,850

## POURING SPOUT

Carl W. Clayton, 7609 Terry Dr., Omaha, Nebr. 68128

Filed Jul. 10, 1989, Ser. No. 377,047

Int. Cl.<sup>3</sup> B67D 3/00

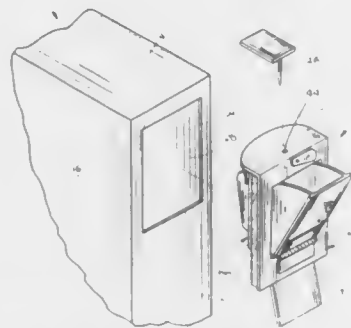
U.S. Cl. 222—535

4 Claims

1. A pouring spout for application to a generally rectangular package having a top wall, side walls, end walls and a bottom



wall, and a generally rectangular opening formed in one of said end walls adjacent the upper end thereof, comprising,  
 a flat, generally rectangular face plate for positioning adjacent the outer surface of one of said end walls adjacent the upper end thereof, said face plate including an upper end, a lower end, inner and outer surfaces, and opposite side edges,  
 said face plate having a spout opening formed therein having a spout means pivotally mounted therein and movable between open and closed positions,  
 said spout means comprising a spout door which closes said spout opening when said spout means is in its closed position,  
 said spout further comprising a pair of vertically disposed and horizontally spaced-apart spout walls extending inwardly from said spout door into the opening formed in the package,



a horizontally disposed upper support extending from the upper end of said face plate over a portion of the top wall of the package,  
 a removable pin means extending downwardly through said upper support into the top wall of the package to secure said spout means to the package,  
 a lower support operatively secured to said face plate adjacent the lower end thereof which extends downwardly therefrom and which engages the inside surface of the end wall of the package to secure said spout means to the package,  
 means for selectively maintaining said spout means in its closed position,  
 and a seal means positioned between the inner surface of said face plate and the outside surface of the said end wall.

4,951,851

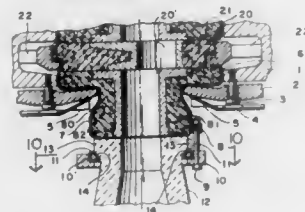
## TUBE HOLDER AND METHOD

Patrick D. King, Rantoul; Bruce Winter, Mahomet, and Leo T. Olsen, White Heath, all of Ill., assignors to Flo-Con Systems, Inc., Champaign, Ill.

Continuation-in-part of Ser. No. 931,730, Nov. 17, 1986, abandoned. This application Nov. 2, 1988, Ser. No. 268,370  
 Int. Cl.<sup>5</sup> B22D 41/34

U.S. Cl. 222—591

22 Claims



1. A pour tube holder and a submersible pour tube having a pouring orifice through said pour tube holder for use in a

sliding gate valve in compressive relationship with rockers of a slide gate valve comprising:  
 said pour tube holder having a plate portion, and a collector nozzle portion with a narrow throat portion therebetween,  
 said throat portion being proportioned to allow said rockers to engage the plate portion of the tube holder close to the pouring orifice,  
 said collector nozzle being thicker and longer than said narrow throat portion, said collector nozzle divergently increasing in thickness from a location substantially immediately downstream of said throat portion,  
 a metal encasement around the pour tube holder,  
 said submersible pour tube having a collar and an undercut at an upstream location, and,  
 means for clamping the pour tube to the pour tube holder and to exert a compressive force to said pour tube holder over substantially the entire length of said collector nozzle.

4,951,852

INSULATIVE COATING FOR REFRACTORY BODIES  
 Gilbert Rancouille, 54 Vanban A. Route de Mons, 59600 Maubeuge, France

Filed Jun. 23, 1988, Ser. No. 210,580  
 Int. Cl.<sup>5</sup> C23C 26/00; B22D 41/00

U.S. Cl. 222—591

7 Claims

1. An article for use in casting molten metals and the like comprising a ceramic refractory body having upon its molten metal contacting surfaces an insulative coating, said coating, in a dry condition, consisting essentially of about 45 to about 100 weight % fused silica, 0 to about 10 weight % ceramic fibers, 0 to about 7 weight % binder, and 0 to about 40 weight % frits.

4,951,853

## REFRACTORY PLATE ASSEMBLY FOR A SLIDING CLOSURE UNIT

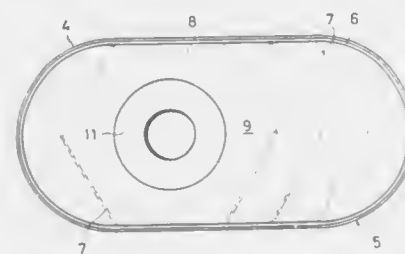
Herbert Schäfer, Weisbaden, and Rodolph Strohmayer, Marktreidwitz, both of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany  
 Filed Sep. 6, 1989, Ser. No. 403,488

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831386

Int. Cl.<sup>5</sup> B22D 41/34

U.S. Cl. 222—600

23 Claims



1. A refractory plate assembly for use in a sliding closure unit, said assembly comprising:  
 a shell including a base portion and an integral peripheral portion;  
 a refractory plate member having a sliding surface and positioned within said shell;  
 means within said shell for positioning within the interior thereof said plate member, said positioning means comprising at least one support member extending substantially transversely from said base portion of said shell, said plate member being supported within said shell by said at least one support member with at least one space defined between said plate member and said base portion; and  
 fiber or granular insulation material positioned within said

shell between said base portion thereof and said plate member.

4,951,854

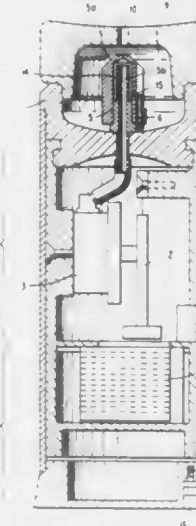
BACKUP-PROOF FLUID DISTRIBUTION APPARATUS  
 Didier Garnier, Oraison, and Max Giusti, Manosque, both of France, assignors to EBIM, Manosque Cedex, France

Filed Nov. 14, 1988, Ser. No. 270,018

Claims priority, application France, Nov. 13, 1987, 87 15715  
 Int. Cl.<sup>5</sup> B05B 7/24

U.S. Cl. 222—644

17 Claims



1. Apparatus for distributing a liquid material entrained within a carrier medium therefore, which comprises a container for such liquid material, means for entraining the fluid material within the carrier medium and an anti-back-up nozzle dispenser therefore, and control means for controlling the flow of the carrier medium, said nozzle dispenser comprising a central duct outlet communicating with an initiator of flow of the carrier medium, at least one lateral duct conduit parallel to said central duct outlet, and a head member defining, together with said central duct outlet a cavity coaxial with said central duct outlet along a portion of the length thereof, said cavity being adapted for the passage of carrier medium therein, said cavity including at least one port opening communicating with the at least one lateral duct conduit comprising said nozzle dispenser, said cavity connected to said central duct at an end of said cavity distal to said at least one port opening, and said at least one lateral duct conduit being adapted at its lower end to extend into the liquid material to be distributed and substantially communicating at its upper end with said at least one port opening.

4,951,855

## COUNTER STRESS BEAM HANGERS

Jeff A. Jacobson, Corona Del Mar, Calif., and James R. Duffield, Dana Point, Calif., assignors to Jeffrey A. Jacobson, Corona Del Mar, Calif.

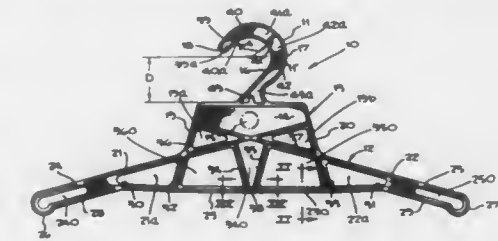
Filed Aug. 17, 1989, Ser. No. 395,267  
 Int. Cl.<sup>5</sup> A47G 25/16, 25/36, 25/48

U.S. Cl. 223—88

37 Claims

1. A hanger of a plastic material comprising:  
 a hook portion;  
 a main body portion, and an intermediate portion interconnecting the hook portion to the main body portion, said intermediate portion being connected to substantially a midpoint of said main body portion with said main body portion extending laterally outwardly from the midpoint thereof on both sides of said intermediate portion to form opposite terminal ends thereof, said main body portion

being a substantially open framework formed by a plurality of intersecting ribs, said main body portion having a main elongated upwardly opening arched counter stress cross-beam extending from one terminal end to the other



terminal end of said main body portion, said cross-beam having a cross-section adapted to resist twisting, the middle of said cross-beam being connected to said intermediate portion, and outside ends of said cross-beam being connected to said intermediate portion.

4,951,856

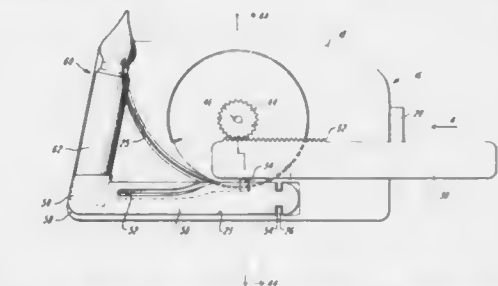
## PEN PACK

Gary A. Horgan, 214 Newton St., Waltham, Mass. 02154  
 Filed Mar. 30, 1989, Ser. No. 331,648

Int. Cl.<sup>5</sup> A45C 11/34; B43K 31/00

U.S. Cl. 224—218

12 Claims



1. A pen pack for mounting on a hand of a user to provide ready access to a writing implement, comprising:  
 a pen pack casing configured to define a predetermined internal volume;  
 means affixed to said pen pack casing for mounting said pen pack casing on the back of the hand of the user;  
 a telescopic writing means for writing, said telescopic writing means including a writing implement; and  
 mechanical means mounted in said predetermined internal volume of said pen pack casing to interact with said telescopic writing means for actuating said pen pack to automatically rotate said telescopic writing means from a position of nonuse into a writing position with respect to the hand of the user and for automatically and simultaneously telescoping said telescopic writing means to an extended position so that the user may grip said writing implement and utilize said writing implement for writing.

4,951,857

## PAINT BRUSH CARRIER

Michael Carr, 18704 Muncaster Rd., Rockville, Md. 20855  
 Filed Feb. 9, 1988, Ser. No. 154,172

Int. Cl.<sup>5</sup> A45F 5/02

U.S. Cl. 224—230

6 Claims

1. A paint brush carrier for holding a paint brush, wherein said paint brush includes a handle and a brush, comprising:  
 a pocket clip for clipping to a pocket of a pair of pants;  
 a flat member having a rectangular shape with a first surface and a second surface and with a first end and a second end, said flat member, at the first surface and near the first end

of said flat member, pivotally connected to said pocket clip;  
a handle clip connected to said flat member, at the second surface and near the first end of said flat member, for clipping the handle of said paint brush;  
at least a first attachment slot connected to said flat member, at the second surface and near the second end of said flat

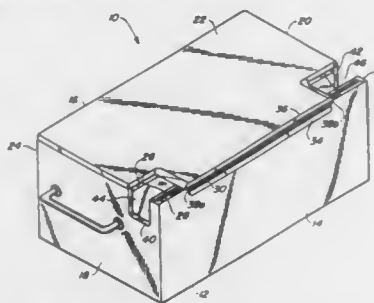


member, said first attachment slot projecting out from said second surface of said flat member;  
a paint brush container for holding the brush end of said paint brush; and  
an attachment hook connected to said paint brush container wherein said attachment hook inserts into said attachment slot on said flat member, for holding said paint brush container to said flat member.

**4,951,858**  
**WRAP DISPENSER**  
Kenneth Krall, P.O. Box 704, San Anselmo, Calif. 94960  
Filed Nov. 30, 1988, Ser. No. 277,755  
Int. Cl.<sup>5</sup> B65D 85/671

U.S. Cl. 225—19

2 Claims



1. A wrap dispenser comprising:  
a generally rectangular box structure having a front wall, left side wall, right side wall, and a top;  
a roll containment wall mounted parallel to but displaced a short distance inwardly from said front wall, defining the forward side of a central cavity for holding a roll of wrap;  
blade means for cutting wrap, said blade means carried on said front wall;  
a blade recess area on said front wall for exposing only a portion of said blade means; and  
a recessed front edge on said top that is wider than said front wall blade recess area, but narrower than said front wall.

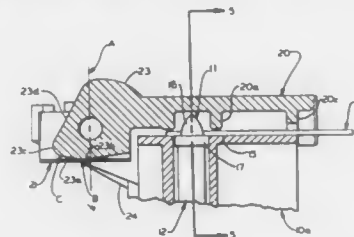
**4,951,859**  
**ANTI-FLUTTER TRACTOR DOOR**  
Jeffrey V. Gatto, Endwell, and Joseph T. Wilson, III, Endicott, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.  
Filed Mar. 10, 1989, Ser. No. 322,432  
Int. Cl.<sup>5</sup> B65H 20/20; B41J 11/26

U.S. Cl. 226—74

14 Claims

1. A feed mechanism for a printer for feeding a perforated web,  
a tractor body having a guide surface for said web,  
web drive means supported by said tractor body and having pin means which engage the web in its perforations for moving said web along said guide surface,  
a door pivotally mounted on said tractor body so as to be

rotatable between open and closed positions relative to said guide surface,  
said door having a surface engageable with the surface of said web when said door is in closed position,  
cam means rotatable with said door,  
said cam means having first and second cam surfaces angularly separated and defining said open and closed door positions respectively,

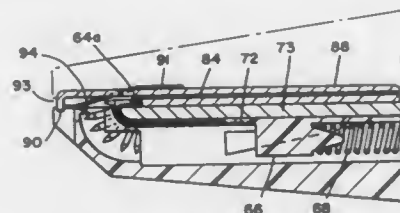


said cam means further including a third cam surface between said first and second cam surfaces defining a second closed door position, and  
spring means cooperable with said cam means for controlling the angular position of said door,  
said spring means cooperating with said second and third cam surfaces of said cam means for applying first or second closing forces to said door when in said first or second closed positions for resisting lifting forces applied to said door by said web during the feeding thereof by said drive means.

**4,951,860**  
**METHOD AND APPARATUS FOR STORING, DISPENSING AND APPLYING SURGICAL STAPLES**  
Ronald L. Peters; Rudolph Peters, and William Taylor, all of Danville, Calif., assignors to Edward Weck & Co., Research Triangle Park, N.C.  
Filed Dec. 28, 1987, Ser. No. 138,145  
Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 227—177

34 Claims



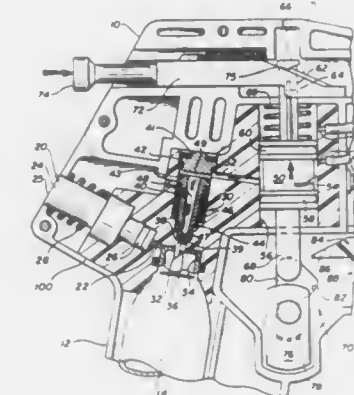
1. A device for storing, dispensing, and applying a plurality of surgical staples in serial fashion, including a housing, a staple track extending along a first axis for storing a said plurality of staples in parallel, stacked, column fashion, means for urging said staples toward a distal outlet end of said staple track, said staple track including a distal portion curved out of alignment with said first axis so that the staples in said distal track portion are urged into points-first alignment as said staples traverse said distal track portion, a form tool disposed in said housing parallel and adjacent to said staple track, means for translating said form tool reciprocally in a dispensing feed path parallel to said first axis, drag spring means coupled to said form tool and positioned with respect to said distal outlet end of said staple track to capture and move the distal-most staple in said staple track from said outlet end of said staple track to said dispensing feed path as said form tool translates proximally parallel to said first axis, a fixed anvil member disposed at a distal end of said dispensing feed path, said form tool including means for urging said staple in said dispensing feed path distally therealong into impingement with said anvil to crimp said staple thereabout.

**4,951,861**  
**SURGICAL STAPLER PRESSURE REGULATOR**  
Dale Schulze, Lebanon, Ohio; Bela Vincze, Flemington, N.J.; James Bedi, Cincinnati, Ohio; Jess Deniega, Flemington; Jack Pedlick, Butler, both of N.J., and William Fox, New Richmond, Ohio, assignors to Ethicon, Inc., Somerville, N.J.  
Filed Jan. 9, 1989, Ser. No. 294,222  
Claims priority, application United Kingdom, Jan. 15, 1988, 8800909

Int. Cl.<sup>5</sup> A61B 17/00

U.S. Cl. 227—178

23 Claims



1. A surgical stapling instrument including a handle, a stapler head having a clamping mechanism and a stapling mechanism, and means interconnecting said handle and said stapler head comprising:

a source of pressurized gas having an outlet;  
means, in fluid connection with said outlet, for controllably supplying pressurized gas to said clamping mechanism and said stapling mechanism; and  
indicator means in fluid connection with said outlet, for providing an indication of the presence of pressurized gas in said instrument, wherein said indicator means includes a movable member, spring-biased against the force of pressurized gas present in said instrument, said movable member being movable in response to the force of pressurized gas to indicate the presence of pressurized gas in said instrument.

3. A surgical stapling instrument comprising:  
a handle containing a source of pressurized gas;  
a stapler head having a clamping mechanism and a stapling mechanism;  
means connecting said handle and said stapler;  
means, coupled to said gas source for regulating gas at a lower pressure than provided by said source;  
means for controllably supplying pressure regulated gas to said clamping mechanism and said stapling mechanism; wherein said clamping mechanism includes a movable clamping member and said stapling mechanism includes a staple magazine having a plurality of staples, a plurality of drivers for driving said plurality of staples, said drivers operable by supplying pressure regulated gas to said drivers, and a plurality of anvils corresponding to said plurality of staples for clinching said staples after being expelled from said staple magazine by said drivers.

**4,951,862**  
**DISCRETE STRIP OF PAPER MATERIAL FROM WHICH TO FASHION A RIGID BOX WITH HINGED LID, IN PARTICULAR A FLIP-FLOP CIGARETTE PACKET, AND THE PACKET OBTAINED BY FOLDING SUCH A STRIP OF MATERIAL**

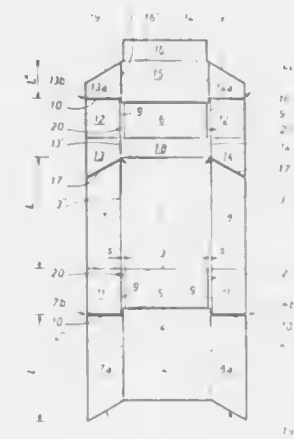
Pierino Taddia, Pian di Macina-Pianoro, and Silvano Boriani, Bologna, both of Italy, assignors to G.D. Società per Azioni, Bologna, Italy  
Filed Dec. 22, 1989, Ser. No. 454,981

Claims priority, application Italy, Dec. 23, 1988, 3709 A/88; Oct. 11, 1989, 3648 A/89

Int. Cl.<sup>5</sup> B65D 5/66

U.S. Cl. 229—160.1

7 Claims

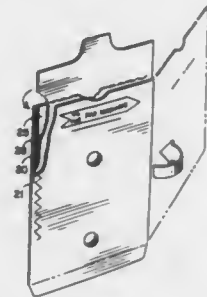


1. A discrete strip of paper material from which to fashion a rigid packet of the type consisting in a box and a hinged lid, identifiable in particular as a flip-top pack for cigarettes, comprising:

a plurality of creases serving to define the front and rear faces and the innermost and outermost side face flaps of the box, the innermost and outermost side face flaps of the lid, the top and the bottom faces of the packet and the front face and relative reinforcing tongue of the lid, of which the top and bottom faces exhibit a length dimension, measured transversely to the longitudinal axis of the strip, less than the corresponding width dimension of the front and rear faces of the box and lid;  
a plurality of longitudinal first cuts combining with extensions of the respective creases between the bottom and rear faces of the box and between the top and rear faces of the lid to create two pairs of tongues, located externally of and in alignment with the top and bottom faces as part of marginal portions on either side of the strip from which the side flaps of the box and lid are folded, and destined ultimately to reinforce the top and bottom faces;  
a plurality of transverse second cuts combining with the first cuts to complete the creation of the reinforcing tongues, which are effected normal to the longitudinal axis of the strip in positions adjacent and offset from the creases between the bottom and front faces of the box and between the top and front faces of the lid, in such a way as to shorten the length of the outermost side flaps of the box and the lid in relation to the respective innermost side flaps.

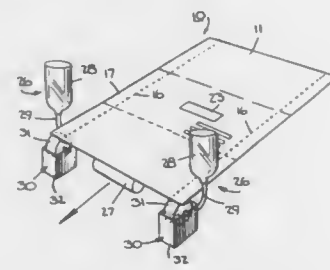


**4,951,863**  
**DOUBLE ENVELOPE CONSTRUCTION FOR FACSIMILE HANDLING AND METHOD**  
 Vicki Temple, Wheaton, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.  
 Filed Dec. 18, 1989, Ser. No. 451,781  
 Int. Cl.<sup>3</sup> B65D 27/08  
 U.S. Cl. 229—72



1. A double envelope for facsimile messages comprising a unitary, generally rectangular sheet having two transversely-extending fold lines dividing said sheet into a first end panel, a central panel and a second end panel, said central panel overlying said first end panel and said second end panel underlying said first end panel, the transverse sides of said central and second end panels being secured together to provide outer faces on said central and second end panels, said first end panel along one longitudinal side having an integral flap extension adapted to overlie either said central or second end panels, central and first and second end panels being unsecured to said sheet along said one longitudinal side thereof and secured to said sheet along the other longitudinal side thereof, said central panel on said outer face thereof being equipped with one of facsimile send/receive printed indicia, said second end panel on said outer face thereof being equipped with the complement of said one of said facsimile send/receive printed indicia, said indicia being printed so as to be readable when said first end panel extension is positioned uppermost.

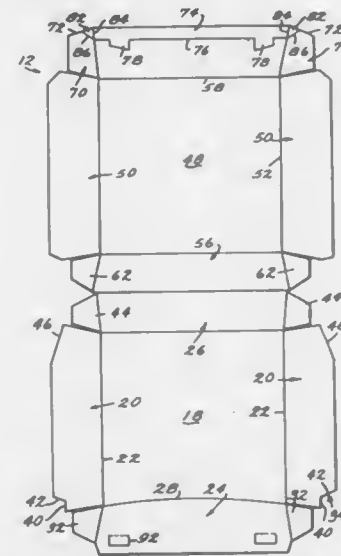
**4,951,864**  
**ONE-PIECE MAILER AND APPARATUS FOR FOLDING SAME**  
 David Dicker, Scarsdale, N.Y., assignor to Transkrit Corporation, Granville, N.Y.  
 Continuation-in-part of Ser. No. 942,349, Dec. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 856,574, Apr. 25, 1986, abandoned. This application Oct. 13, 1987, Ser. No. 108,075  
 Int. Cl.<sup>3</sup> B65D 27/14  
 U.S. Cl. 229—80



1. A one-piece mailer blank having at least two contiguous sections disposed for folding over on each other into overlying relation, each said section having remoistenable glue along the respective longitudinal edges for bonding said sections to-

gether, said glue characterized in being resistant to heat in excess of 400° F. and in providing lay flat characteristics.

**4,951,865**  
**PAPERBOARD CARTON WITH GUSSET LOCK**  
 Larry Eisman, Elkins Park, Pa., assignor to Dopaco, Inc., Downingtown, Pa.  
 Filed Dec. 7, 1989, Ser. No. 447,076  
 Int. Cl.<sup>3</sup> B65D 5/22  
 U.S. Cl. 229—146



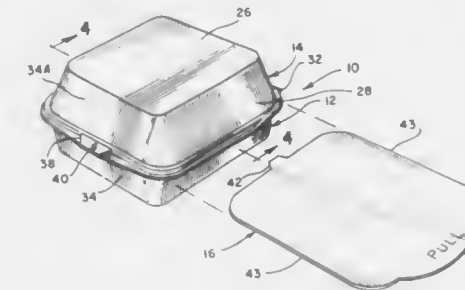
1. A carton for foodstuffs and the like comprising a tray and a cover for said tray; said tray comprising a bottom panel with upstanding peripheral walls thereabout, said walls including a front wall, and a pair of opposed side walls joined to and extending from said tray front wall; said cover comprising a top panel with depending peripheral walls including a front wall and a pair of opposed side walls joined to and extending from said cover front wall; said cover front wall including rearwardly directed flange means remote from said top panel, said flange means being joined to said opposed cover side walls, locking tab means integral with said flange means and extending forwardly of said cover front wall; said cover being selectively closable over said tray with the cover front wall received inward of and adjacent to said tray front wall, and with said cover side walls received outward of and adjacent to said tray side walls; said tray front wall including slot means defined therethrough and aligned with said tab means, said slot means receiving said tab means outwardly therethrough upon a closing of said cover over said tray, each said tray side wall including an upwardly directed shoulder adjacent said tray front wall, said cover flange means seating on said shoulders upon a closing of said cover over said tray and upon reception of said tab means through said slot means for stabilization of said flange means and said tab means.

**4,951,866**  
**FOOD CONTAINER AND METHOD**  
 Eileen M. Rusnak, La Grange Park, Ill., assignor to Restaurant Technology, Inc., Oak Brook, Ill.  
 Filed Nov. 7, 1988, Ser. No. 267,898  
 Int. Cl.<sup>3</sup> B65D 1/34  
 U.S. Cl. 229—120.07

1. A container for storing contents in separate compartments comprising:  
 (a) a first compartment defined by a bottom portion and side portions and having an open portion opposite said bottom portion;  
 (b) a second compartment defined by a bottom portion and side portions and an open portion opposite said bottom

portion, said second compartment being adapted to lie over the open portion of said first compartment with said open portion of said first compartment facing the open portion of said second compartment to close said container;

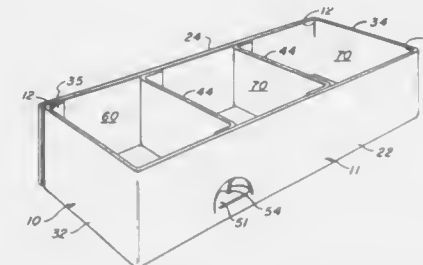
(c) a removable insert positionable over the open portion of one of said compartments when said container is open, said insert having a periphery and said insert further having a gripping tab that extends the periphery of said insert beyond at least one of the side portions of said container to



facilitate removal of said insert when said insert is positioned between said first and second compartments by grasping said tab portion and pulling said insert from said container while said container is closed;

(d) a support tab projecting from the periphery of said insert, opposite said gripping tab, for supporting said insert; and  
 (e) a slot in one of said side portions of said container, said slot located and dimensioned to permit insertion of said supporting tab when said removable insert is in position between said open portions to restrain movement of said insert.

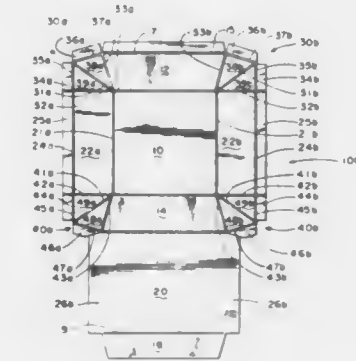
**4,951,867**  
**FOLDING SEPARATOR**  
 Dick McManus, 120 Kapuahi St., Makawao, HI. 96768  
 Filed Dec. 4, 1989, Ser. No. 445,391  
 Int. Cl.<sup>3</sup> B65D 5/48  
 U.S. Cl. 229—120.31



1. A collapsible containment structure comprising:  
 a substantially rectangular peripheral strip of elongate form having the ends thereof joined to each other to form a continuous loop and including a plurality of crease lines formed thereacross for defining folds therein, said crease lines being spaced to provide a front and a rear panel each of substantially equal rectangular plan form and a first and second lateral panel interspaced therebetween;  
 a separator panel extending between said front and rear panels, said separator panel including an arcuate edge cutout proximate said front panel; and  
 an arcuate flap formed in said front panel adjacent said edge cutout and including a notch at the apex thereof for engaging said edge cutout, whereby said notch upon the

engagement of said cutout aligns said separator panel substantially orthogonal to said front panel.

**4,951,868**  
**PRE-GLUED TAPERED TRAY WITH GUSSETS AND FLANGES**  
 Duane R. Mode, Bloomington, Minn., assignor to Waldorf Corporation, St. Paul, Minn.  
 Filed May 19, 1989, Ser. No. 354,631  
 Int. Cl.<sup>3</sup> B65D 5/24  
 U.S. Cl. 229—112

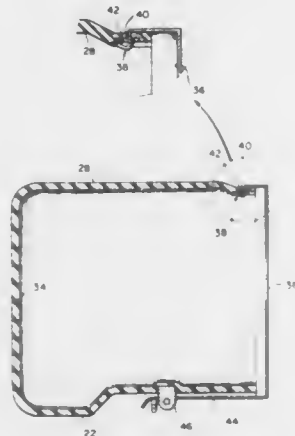


1. A structure for forming a tray container comprising:  
 a base panel and a top panel, each being generally rectangular and having four corners, said base panel and top panel lying parallel and opposed to each other;  
 a pair of generally rectangular, opposed side panels connecting opposed edges of the base and top panels at fold lines to form a collapsible tube of generally rectangular cross-section with a pair of open ends when erected;  
 a pair of generally rectangular, opposed end panels, one such end panel being connected at a fold line to an edge of said base panel at each of the open ends of said tube;  
 a pair of gussets connected to each such end panel at fold lines, each of said pair of gussets also being connected at a fold line to the side panel adjacent said end panel to form a link between each said end panel and the adjacent side panel, each said gusset further having a fold line extending away from each corner of said base panel; and  
 a lip flap connected to each said end panel at a fold line that is opposite the fold line connecting said end panel to said base panel, each said lip flap and at least one thickness of each gusset being gatherable upon folding of each end panel at its base panel fold line toward said top panel to form two end closures with outer and inner layers, each end closure extending between two corners of said top panel and having a top panel edge and the adjacent lip flap as its outer layers, with at least one thickness of each gusset being sandwiched between said top panel and said end panel lip flap as an inner layer at each corner of said top panel.

**4,951,869**  
**COIN TELEPHONE COLLECTION BOX**  
 Mathew Szapucki, 65 Kingsley Rd., Kendall Park, N.J. 08824, and Richard Kulkaski, 9 Jonathan Dr., Tinton Falls, N.J. 07724  
 Filed Aug. 5, 1988, Ser. No. 229,345  
 Int. Cl.<sup>3</sup> G07B 15/00

1. A telephone coin collection box to be closed with a cover comprising:  
 a substantially flat bottom side;  
 a front side imperviously attached to the bottom side and having a straight upper edge at an upper edge level;

means attached to the front side for lockingly engaging a cover;  
 a left side imperviously attached to the bottom side and to the front side and having a straight upper edge at the upper edge level;  
 a right side imperviously attached to the bottom side and to

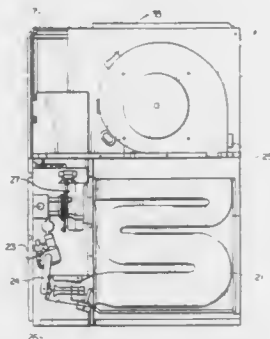


the front side and having a straight upper edge at the upper edge level;  
 a rear side imperviously attached to the bottom side and to the right side and to the left side and having a straight upper edge at the upper edge level;  
 triple hinge openings disposed in the rear side near the straight upper edge.

**4,951,870**  
**OVERTEMPERATURE CONTROL**  
 Gary W. Ballard, Plainfield, and John D. Stout, Indianapolis, both of Ind., assignors to Carrier Corporation, Syracuse, N.Y.  
 Filed Feb. 21, 1990, Ser. No. 482,466  
 Int. Cl. F23N 5/20

U.S. Cl. 236—11

7 Claims



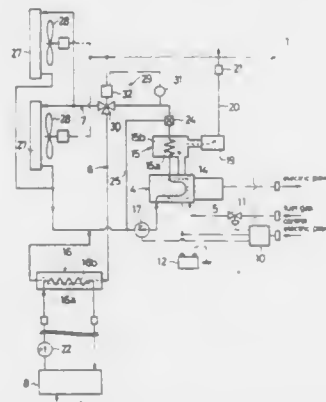
1. An improved control system for a furnace of the type having a fuel valve, a burner, a heat exchanger, a circulation blower, a thermostat, and at least one temperature sensor, comprising:

- a first sensor/switch which is responsive to sense an over-temperature condition within the furnace resulting from a blower motor failure and to responsively open when said sensed temperature reaches a first predetermined temperature limit and to automatically close after a time delay thereafter; and
- a microprocessor for monitoring the occurrences of said first sensor/switch openings and for locking out the furnace from further operation when said openings occur a prede-

termined number of consecutive times in a thermostat cycle of operation.

**4,951,871**  
**SOUND-PROOF TYPE ENGINE WORKING MACHINE WITH WASTE HEAT RECOVERY APPARATUS**  
 Tsugunori Hata; Akira Inoue; Toshihiko Teramoto; Kazuhiko Ogura, and Isamu Kubomoto, all of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan  
 Filed Apr. 10, 1989, Ser. No. 335,404  
 Claims priority, application Japan, Oct. 4, 1988, 63-250668; Oct. 12, 1988, 63-258161  
 Int. Cl. G05D 23/00  
 U.S. Cl. 237—12.1

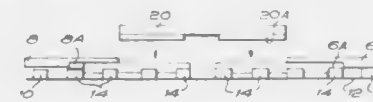
10 Claims



1. A sound-proof type engine working machine system with a waste heat recovery apparatus, comprising:
  - a sound-proof casing with an upper support frame fixedly secured on the upper side of the sound-proof casing;
  - an internal combustion engine connected to a working machine horizontally arranged side by side with respect to each other within the sound-proof casing in a longitudinal direction thereof;
  - an engine waste heat recovery circuit, comprising a water jacket of the internal combustion engine, a heat exchanger for the absorption of exhaust gas heat, a waste heat recovery heat exchanger and an engine cooling liquid circulation pump which are interconnected in a cooling liquid circulating manner;
  - an engine cooling circuit, comprising at least the water jacket, the radiator and the circulation pump which are interconnected in a cooling liquid circulating manner;
  - a radiated heat control device for controlling a rate at which heat is radiated from said radiator; and
  - a radiator fan;
- wherein said radiator and radiator fan are disposed on the upper support frame, with said radiator fan arranged in correspondence with the radiator, the radiators and the fans being located in corresponding suction spaces, each suction space having openings on three vertical sides to allow flow of sucked air therethrough, the sucked air passing through the radiators which have a generally U-shape to receive the sucked air flow from the openings in the three vertical sides, the radiator fans being disposed above the suction spaces in corresponding hoods.

**4,951,872**  
**TRACK JOINTERS**  
 Lance R. Sheffield, Sevenoaks, England, assignor to Sandpipe Computer & Model Services Limited, Keming, England  
 Filed Jan. 6, 1989, Ser. No. 294,388  
 Claims priority, application United Kingdom, Jan. 9, 1988, 8800473; Jan. 29, 1988, 8802062  
 Int. Cl. E01B 23/00  
 U.S. Cl. 238—10 E

8 Claims

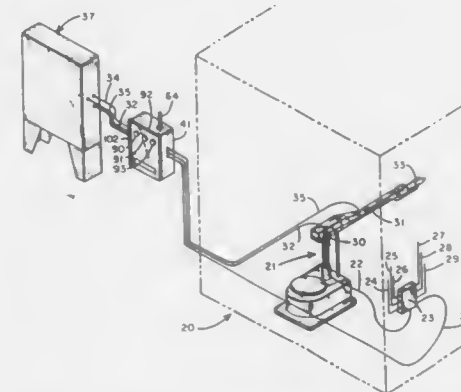


1. A track joining assembly for connecting together ends of tracks of a model track layout, each said track being formed by two rail members connected together by sleeper members, said assembly comprising:

- track jointer means for connecting together the ends of said tracks, said track jointer means including rail sections having opposite ends, each said rail section having an upper portion and a lower portion connected together by a narrow web portion; and
- resilient clip means for removably grasping the ends of said rail sections such that said rail sections are in line and adjacent to the ends of said rail members, each said clip means being permanently positioned directly on sleeper members and positioned adjacent the ends of said rail members, each said clip means being open at an upper end thereof so as to receive the lower portion of one end of a respective said rail section therein from a position substantially normal to and above said tracks, and each said clip means having a configuration corresponding to the lower portion of the rail sections of said track jointer means to as to securely grasp said rail sections therein.

**4,951,873**  
**MULTI-LINE ELECTRONIC MEDIA BARRIER**  
 John Ashworth, Canton, and Thomas Ingve, Redford, all of Mich., assignors to Graco Robotics, Inc., Livonia, Mich.  
 Filed Apr. 14, 1989, Ser. No. 338,046  
 Int. Cl. G01R 27/26  
 U.S. Cl. 239—67

8 Claims

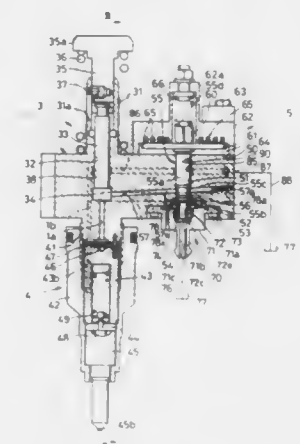


1. A safety system for detecting foreign media in pneumatic lines and for closing the lines in response thereto, comprising:
  - (a) a pneumatic line,
  - (b) a capacitive sensor positioned adjacent the pneumatic line for sensing the presence of foreign media in the pneumatic line, the sensor having means for generating a control signal upon the sensing of the foreign media in the pneumatic line, and
  - (c) valve means interposed into said pneumatic line and

coupled to said sensor, for controlling flow through said pneumatic line, wherein the valve means includes a main control valve electrically coupled to the sensor and a second pneumatically operated valve connected in the pneumatic line, the main control valve controlling the flow of air from an air supply to the second pneumatically operated valve and thereby controlling the second pneumatically operated valve, the main control valve being closed and shutting off the supply of air to the second pneumatically operated valve when the sensor senses foreign media in the line and sends the control signal to the main control valve, the second valve being closed and thereby blocking passage of air or foreign media through the pneumatic line when the main control valve closes and shuts off the supply of air to the second valve; the valve means providing for the flow blockage of the pneumatic line upon the receipt of said control signal from said sensor.

**4,951,874**  
**UNIT FUEL INJECTOR**  
 Masanori Ohnishi; Toshiaki Kasahara; Kouichi Saga, and Kin-he Li, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan  
 Filed Aug. 8, 1989, Ser. No. 390,893  
 Claims priority, application Japan, Sep. 1, 1988, 63-114008[U]; Oct. 31, 1988, 63-275248  
 Int. Cl. F02M 47/00  
 U.S. Cl. 239—88

6 Claims



1. A unit fuel injector comprises:
  - (a) a body having a fuel supply and return chamber, a fuel supply passage means connected to said fuel supply and return chamber so as to supply fuel to said chamber, and a drain passage means connected to said fuel supply and return chamber;
  - (b) pump means mounted on said body and including a cylinder hole formed in said body, and a plunger received in said cylinder hole so as to be reciprocally movable along said cylinder hole to achieve a pump stroke and a suction stroke, a pump chamber being defined by said cylinder hole and said plunger, and said pump chamber being connected to said fuel supply and return chamber;
  - (c) nozzle means mounted on said body and including an injection port connected to said pump chamber, and an injection valve for controlling the communication between said injection port and said pump chamber, said injection valve being opened upon increase of the pressure within said pump chamber to a predetermined level;
  - (d) electromagnetic valve means including a guide hole formed in said body and a valve member guided in said guide hole, said guide hole communicating at one end with said fuel supply and return chamber, a valve seat



being formed on a surface defining said one end of said guide hole, said valve member having a stem portion and a head formed at one end of said stem portion, said stem portion having a reduced diameter portion disposed adjacent to said head, said stem portion being slidably received in said guide hole, an annular space being formed between said reduced diameter portion and an inner peripheral surface of said guide hole, said annular space being in communication with said pump chamber, said electromagnetic valve means further including a stop portion facing said fuel supply and return chamber in opposed relation to said valve seat, said head of said valve member being disposed in said fuel supply and return chamber, said valve member being movable between a first position where said head is held against said stop portion and away from said stop portion to communicate said fuel supply and return chamber with said pump chamber via said annular space and a second position where said head is held away from said stop portion and against said valve seat to interrupt the communication between said pump chamber and said fuel supply and return chamber, said electromagnetic valve means further including an armature connected to the other end of said stem portion, a solenoid drive means for driving said armature so as to move said valve member, said valve member being disposed in said first position during said suction stroke so that the fuel is supplied to said pump chamber from said fuel supply and return chamber; when said valve member is moved from said first position to said second position during said pump stroke, the fuel pressure within said pump chamber being increased to thereby start the injection of the fuel from said injection port; and when said valve member is moved from said second position to said first position during said pump stroke, the fuel of high pressure within said pump chamber being spilled to said fuel supply and return chamber to thereby terminate the fuel injection; and

(e) auxiliary valve means for opening and closing said drain passage means, said auxiliary valve means comprising said head of said valve member, said stop portion and a valve port provided at one end of said drain passage means, said valve port being closed when said valve member in said first position.

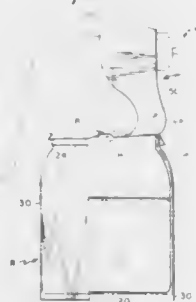
4,951,875

**DIPOSABLE LINER SYSTEM FOR SPRAY GUNS**  
Daniel A. Devey, 8692 Via Alta Way, Elk Grove, Calif. 95624  
Filed Sep. 19, 1988, Ser. No. 245,910

Int. Cl.<sup>5</sup> B05B 1/28

U.S. Cl. 239—104

17 Claims



7. A kit for minimizing both spray gun cleaning down time and the volume of solvent required, the kit comprising: three liners, a first liner which lines an interior of a spray gun reservoir, a second liner which circumscribes the reservoir's outer periphery, a third liner which both shields a spray head and serves as a gasket between the reservoir and the spray head.

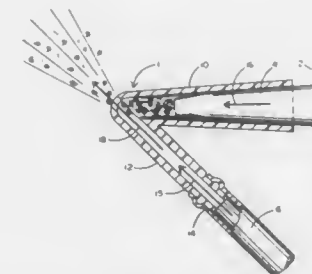
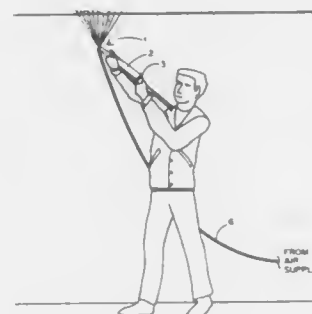
4,951,876  
**SPRAY TIP FOR A CAULKING TUBE**  
Gregory B. Mills, Santa Ana, Calif., assignor to Behr Process Corporation, Santa Ana, Calif.

Filed Feb. 9, 1989, Ser. No. 308,033

Int. Cl.<sup>5</sup> B05B 15/02

U.S. Cl. 239—117

10 Claims



1. A combination spray tip and supply tube, said supply tube containing a supply of relatively thick material of high viscosity to be sprayed onto a surface, said spray tip comprising: a material tube to be interconnected with said supply tube to receive material therefrom; an air tube to be interconnected with a source of air to receive air, under pressure, therefrom, said air and material tubes having respective flow paths which intersect one another at an angle; and an exit orifice having a uniform diameter extending through said spray tip and having the same diameter as and being coaxially aligned with said air tube to form a linear flow path therewith so that a mixture of air and material is sprayed through said exit orifice when material moves through the flow path of said material tube and air moves through the flow path of said air tube.

4,951,877

**HIGH-VERSATILITY DEVICE FOR CLEANING SURFACE BY MEANS OF A LIQUID JET**  
Giuseppe Arsi, Reggio Emilia, Italy, assignor to Interpump - S.p.A., Italy

Filed Jun. 14, 1989, Ser. No. 365,787

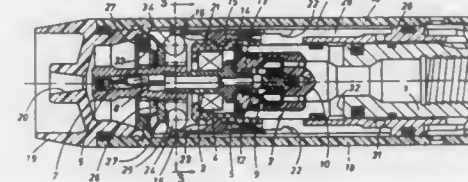
Claims priority, application Italy, Jun. 15, 1988, 46861 A/88  
Int. Cl.<sup>5</sup> B05B 3/04

U.S. Cl. 239—240

8 Claims

1. A device for cleaning surfaces by means of a liquid jet, which comprises a rotatable hollow shaft (3) connected to a liquid entry duct (1) and provided downstream with a delivery nozzle the axis or which is inclined to the longitudinal axis of said shaft; an impeller (9) fixed on the rotatable hollow shaft to be traversed by the liquid directed towards said nozzle; a braking unit (23, 24; 240) disposed external to said hollow

shaft (3) in order both to adjust the speed with which the shaft rotates and to vary, with respect to a plane, the direction of the nozzle when stationary, and a bypass ducting (28, 17) which connects the zone upstream of the impeller to the zone downstream of the nozzle and



is intercepted by a selector (88; 302) arranged to occupy a first position in which it closes the ducting, with the result that all the liquid discharges through the nozzle as a compact filiform jet, and a second position in which it opens said ducting, with the result that part of the liquid discharges directly downstream of the nozzle as a conical jet.

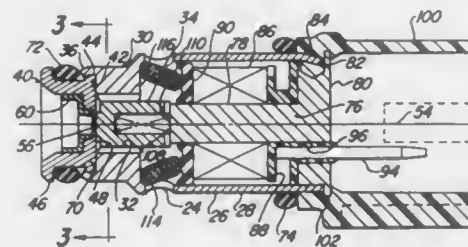
4,951,878

**PICO FUEL INJECTOR VALVE**  
Gary L. Casey, 3173 Roxbury, Troy, Mich. 48064, and Robert A. McArthur, 57 E. New York St., Pontiac, Mich. 48055  
Continuation of Ser. No. 121,236, Nov. 16, 1987, abandoned.  
This application Jan. 23, 1988, Ser. No. 211,202

Int. Cl.<sup>5</sup> B05B 1/30; F02M 61/18

U.S. Cl. 239—462

65 Claims



1. In a fluid injector valve of the type having a magnetically permeable housing, a valve seat, a stator, an armature, and an electrically actuated solenoid coil for generating a magnetic field operative to displace the armature from the valve seat, characterized by:

a magnetically permeable cylindrical housing having a central axis, a guide bore provided at one end thereof concentric with said central axis and a plurality of fluid inlet ports radially disposed about said cylindrical housing adjacent to an internal end of said guide bore; a valve seat member attached to said one end of said cylindrical housing, said valve seat member having an outlet port provided therethrough concentric with said central axis, a concentric orifice plate recess provided in the face of said valve seat member opposite said cylindrical housing, and a valve seat circumscribing said outlet port on the face opposite said orifice plate recess; an orifice plate attached to the bottom of said orifice plate recess, said orifice plate having a calibrated orifice concentric with said outlet port; a stator having a radial flange attached to the other end of said cylindrical housing and having a pole member extending axially from said radial flange towards said valve seat member, said pole member having one end attached to said radial flange and a free end; solenoid coil means circumscribing said pole member; a cylindrical armature reciprocally disposed in said guide bore between said valve seat member and said free end of

said pole member said armature having a valve element engageable with said valve seat and a return spring bore; a return spring compressively disposed between said armature and said free end of said pole member, said return spring received in said return spring bore and producing a force biasing said armature towards said valve seat member and said valve element into engagement with said valve seat; and seal means disposed in said cylindrical housing for providing a fluid tight seal between said plurality of fluid inlet ports and said solenoid coil.

4,951,879

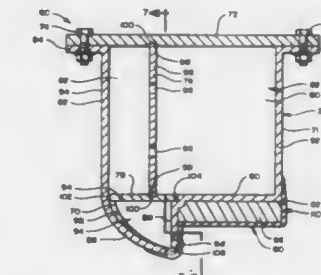
**LIQUID DISTRIBUTION DEVICE**  
James N. Fay, 2316 NE Parkview Dr., Vancouver, Wash. 98686, and Mark A. Cooper, 22512 NE 58th St., Vancouver, Wash. 98662

Filed Nov. 23, 1988, Ser. No. 275,207

Int. Cl.<sup>5</sup> B05B 1/20; D06B 1/02

U.S. Cl. 239—553.5

31 Claims



1. An apparatus for spraying a fluid onto a surface comprising:

(a) reservoir means for containing and dispensing said fluid, said reservoir means having an inlet and a plurality of reservoir outlets; and  
(b) discharge means for controlling a rate of discharge, spray configuration, and angle of application of said fluid being sprayed onto said surface, said discharge means communicating with said reservoir means through said reservoir outlets, said discharge means having a reinforced, enclosed, curved vane and a discharge wall, a lower end of said curved vane and a lower end of said discharge wall being integrally connected along a juncture, a plurality of spray outlets being formed along said juncture, said fluid being dispensed from said reservoir means onto said curved vane, said curved vane redirecting said fluid outward of said discharge means through said spray outlets.

4,951,880

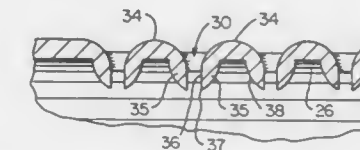
**BURNER CONSTRUCTION AND METHOD OF AND APPARATUS FOR MAKING THE SAME**  
Fred Riehl, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 13, 1989, Ser. No. 450,581

Int. Cl.<sup>5</sup> B05B 1/00

U.S. Cl. 239—568

16 Claims



1. In a burner construction comprising wall means having exterior surface means and having interior surface means that

define chamber means in said burner construction for receiving fuel from a fuel source, said wall means having a plurality of elongated ports formed through said surface means thereof and thereby communicating with said chamber means, said ports being disposed in spaced apart substantially parallel relation with each port being defined between a pair of adjacent edge means of said wall means that are disposed in spaced apart substantially parallel relation whereby fuel is adapted to flow from said chamber means out through said ports between said adjacent edge means thereof to burn adjacent said exterior surface means of said wall means, the improvement wherein said edge means are each extruded into said chamber means beyond said interior surface means of said wall means.

4,951,881

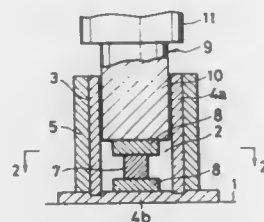
**PROCESS FOR CRUSHING HAFNIUM CRYSTAL BAR**  
Takuo Shioda, Sakura, and Jiro Yamada, Tachikawa, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 378,337

Claims priority, application Japan, Sep. 26, 1988, 63-238988 Int. Cl.<sup>5</sup> B02C 19/12

U.S. Cl. 241—23

8 Claims



1. A process for crushing a hafnium crystal bar, comprising the steps of:

- (A) maintaining the hafnium crystal bar at an extremely low temperature by holding the hafnium crystal bar in contact with a cryogenic refrigerant; and
- (B) crushing the hafnium crystal bar at the extremely low temperature by clamping and compressing the hafnium crystal bar between nickel-base superalloy members.

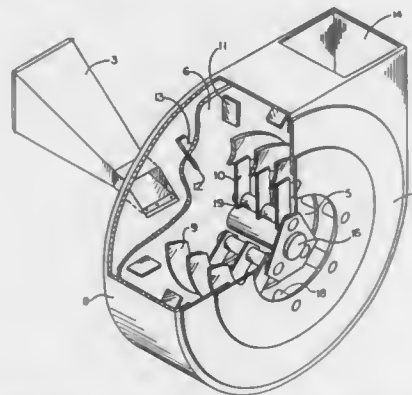
4,951,882

**COMBINATION LEAF AND LAWN DEBRIS COMMUNUTING VACUUM AND WOOD CHIPPER**  
Howard R. Ober, 17421 River Rd., Chagrin Falls, Ohio 44022  
Continuation-in-part of Ser. No. 326,630, Mar. 21, 1989, abandoned. This application Jul. 25, 1989, Ser. No. 385,945

Int. Cl.<sup>5</sup> B02C 13/04

U.S. Cl. 241—55

35 Claims



1. A reducing vacuum machine comprising:  
(a) a housing including a cylindrical wall, a first end wall and

- a second end wall, a first inlet opening in said first end wall and an outlet opening in said cylindrical wall;
- (b) a suction hose connected with said first inlet opening;
- (c) a disc revolvably mounted in said housing including a plurality of fan blades affixed to said disc;
- (d) a power means for rotating said disc, said power means mounted adjacent to said housing;
- (e) a plurality of circular bars mounted to said first end wall encircling said first inlet opening, said bars being in parallel spaced relationship to said first end wall;
- (f) a plurality of hammers pivotally connected to said disc, the outer end of said hammers being disposed closely adjacent to said circular bars, said hammers being in parallel spaced relationship to said first end wall; and
- (g) a discharge chute mounted to said outlet opening.

4,951,883

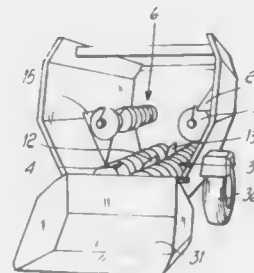
**SHREDDER-MIXER-DISTRIBUTOR TRAILER, PARTICULARLY FOR CYLINDRICAL AND PRISM-SHAPED BALES OF FORAGE, HAY AND GRASS SILAGE**

Giuseppe Loppoli, Grantorto, and Lino Zago, Campo San Martino, both of Italy, assignors to Seko S.p.A., Cartarolo, Italy  
Filed Jul. 27, 1989, Ser. No. 385,516

Claims priority, application Italy, Jul. 29, 1988, 30695/88[U] Int. Cl.<sup>5</sup> B02C 21/02

U.S. Cl. 241—101 B

10 Claims



1. A shredder-mixer-distributor trailer comprising an elongated box-like container defining lateral walls, a bottom, front and rear portions, said box-like container longitudinally accommodating lower and upper rotating scrolls, said lower scrolls being arranged mutually close and conveying material towards the front portion of said container, said upper scrolls being spaced apart from each other and transporting material in an opposite direction with respect to said lower scrolls, wherein said lower scrolls define a spiral with a substantially constant height, at least one vertical baffle being interposed between said lower scrolls, said upper scrolls having a variable-height spiral with portions extending along opposite directions, said container longitudinally accommodating wedge-like elements for adjusting material feed to said lower scrolls and avoiding accumulation of material towards the walls of the box-like container, and toothed-blade elements for improving shredding and keeping said scrolls clean, said container comprising a loading bucket integrated in said rear portion and at least one front unloading door.

4,951,884

**POWER AUGER MACHINE WITH BEARING SHIELD**  
Larry E. Koenig, Komar Industries, 4425 Marketing Pl., Groveport, Ohio 43125

Filed Apr. 28, 1989, Ser. No. 345,330

Int. Cl.<sup>5</sup> B02C 19/22

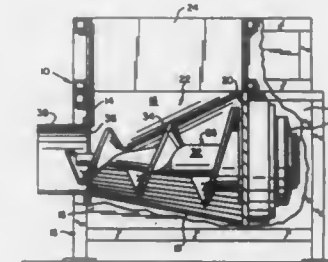
U.S. Cl. 241—101.2

19 Claims

1. In a power auger machine of the type having a frame defining a grinding chamber having a substantially vertical rear wall with a centrally-located, circular opening, auger

means rotatably mounted on said rear wall for crushing and shredding material in said grinding chamber, motor means mounted on said frame for rotating said auger, and main bearing means for rotatably supporting said auger means on said rear wall, a bearing shield comprising:

- an annular outer shield element attached to said auger and having an annular channel formed in a rearward face thereof, said channel having radially inner and outer concentric side walls joined by a radially-extending bottom wall;
- an annular inner shield element attached to said rear wall and being sized to fit within said annular channel and form gaps with said side walls, said inner shield element having



an outer face in opposing relation to said bottom wall thereby forming a labyrinth seal with said recess;  
said rear wall having an annular recess shaped to receive said annular outer shield element such that a forward face of said outer shield element is substantially flush with said rear wall and forms a portion of said labyrinth seal with said annular recess contiguous to said grinding chamber; and

means for forcing lubricant through said labyrinth seal such that lubricant bleeds outwardly between said outer shield element and said rear wall into said grinding chamber, whereby contaminants are prevented from entering between said inner and outer shield elements from said grinding chamber.

4,951,885

**CRUSHER UNIT FOR USE IN A MOBILE CRUSHING SYSTEM**

Heinrich Thüs, Duisburg, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Oct. 27, 1988, Ser. No. 264,010

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736966

Int. Cl.<sup>5</sup> B02C 21/02

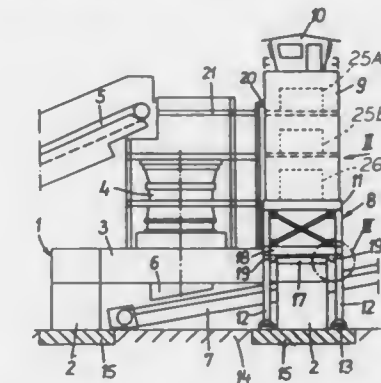
U.S. Cl. 241—101.7

20 Claims

1. A crusher unit for use in a mobile crushing system, said crusher unit comprising:

- a substructure, the substructure including first support means for supporting the substructure on the ground;
- a crusher mounted on the substructure;
- a housing;
- a frame on which the housing is disposed, the frame including second support means for supporting the frame on the ground when the crusher unit is in operation, the frame and housing being disconnected from the substructure and

crusher when the crusher unit is in operation to isolate the frame and housing from vibration of the crusher; and



third support means for supporting the frame on the substructure if the substructure is lifted.

4,951,886

**CONCRETE CRUSHER**

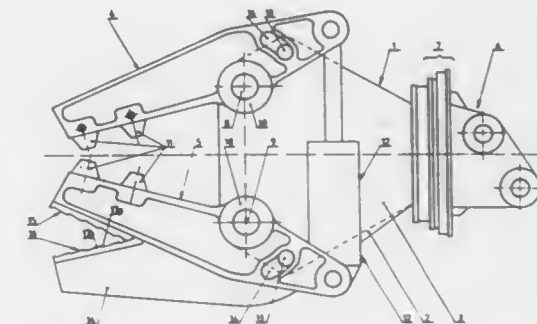
Michel Berto, Langolran, France, assignor to Societe AMECA, Artignac, France

Filed Sep. 29, 1989, Ser. No. 414,249

Claims priority, application France, Sep. 30, 1988, 88 12994 Int. Cl.<sup>5</sup> B02C 1/06

U.S. Cl. 241—101.7

10 Claims



1. Concrete crusher comprising:  
a frame formed by a pair of flanges, the frame being rotationally;  
a crushing member formed by a pair of crushing arms mounted on the frame; and  
a shearing member formed by a fixed arm and one of the pair of crushing arms wherein a maximum closed position of the crushing member corresponds to a maximum open position of the shearing member.

4,951,887

**SCREW MILL FOR COMMUNUTING AND COMPRESSING MATERIAL FOR GRINDING**

Max Gutnecht, Uf Punten, Niederneunforn, Switzerland

Filed Dec. 7, 1988, Ser. No. 281,119

Claims priority, application Switzerland, Dec. 7, 1987, 4778/87

Int. Cl.<sup>5</sup> B02C 18/06

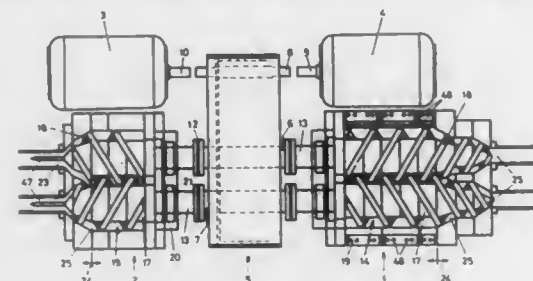
U.S. Cl. 241—260.1

5 Claims

1. A screw mill for comminuting and compressing a material for grinding, comprising a casing, two motor-driven rotary conveyor screws positioned in said casing in parallel with each other, said casing having an inlet side provided with a charging opening and a shaping and compressing head at an outlet side



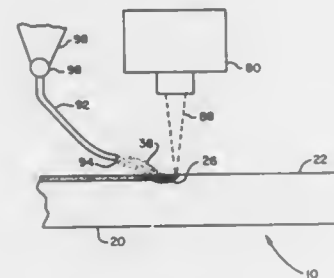
thereof, each of said conveyor screws including a first portion having threads thereon and a second portion integral with said first portion and also having threads thereon and being of a smaller diameter than that of said first portion, the first portions of said two conveyor screws being positioned so that the threads thereof mesh with each other to form a cooperating conveyor screw pair having a common working area whereas the second portions of said conveyor screws are spaced from



each other so that the threads of said second portion of one conveyor screw are radially spaced from the threads of the second portion of the other conveyor screw, said second portions forming two individual conveyor screws with separate working areas in said shaping and compressing head, wherein a transition from the diameter of the conveyor screws of the first portion of the smaller diameter of the screws of the second portion is constructed as a conical conveyor screw portion.

**4,951,888**  
**REFINING ELEMENT AND METHOD OF MANUFACTURING SAME**  
Patrick E. Sharpe, Williamsport, Pa., and Ole A. Sandven, Georgetown, Mass., assignors to Sprout-Bauer, Inc., Muncy, Pa.

Filed Aug. 24, 1989, Ser. No. 397,930  
Int. Cl.<sup>5</sup> B02C 7/12  
U.S. Cl. 241—296 35 Claims



1. A method of manufacturing a refining element for refining of fibrous material, the refining element having a comminuting surface of which at least a portion comprises an abrasive surface, said method comprising the steps of:

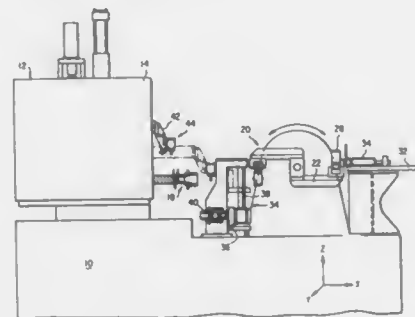
- providing a refining element having a metal comminuting surface;
- melting a relatively thin layer of the metal comminuting surface of said refining element to form a molten pool over the region of said refining element on which an abrasive surface is desired;
- depositing an abrasive material into the molten pool formed in the metal comminuting surface of said refining element; and
- allowing the molten pool in the metal comminuting surface of said refining element to solidify whereby the abrasive material deposited therein is strongly bonded into the

metal comminuting surface of said refining element to form an abrasive surface thereon.

**4,951,889**  
**PROGRAMMABLE PERFECT LAYER WINDING SYSTEM**

Marco Camardella, Lutherville, and William D. Staigerwald, Bel Air, both of Md., assignors to EPM Corporation, Baltimore, Md.

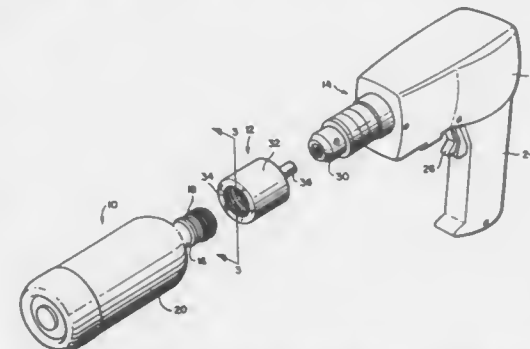
Filed Jun. 12, 1989, Ser. No. 364,308  
Int. Cl.<sup>5</sup> B65H 54/20, 54/12  
U.S. Cl. 242—25 R 17 Claims



1. A system for simultaneously winding elongated filaments in at least one layer of turns on rotating spindles, comprising: means for supporting a plural number of rotational spindles upon which spools may be mounted; variable speed motors for separately driving each of said spindles; a traverse movable along a traversing path substantially parallel to a axes of said spindles; at least two filament guides mounted on said traverse for guiding filaments to be wound on said spindles; means for separately detecting a position of each of said guides relative to said spindles along said traversing path; and control means responsive to said detecting means for independently controlling the rotational speed of each of said variable speed motors, whereby said filaments are wound in a desired pattern.

**4,951,890**  
**DRILL-OPERATED ADAPTER FOR UNWINDING FISHING LINE FROM REELS**

Terry Soesamon, 6721 Orr Rd., Charlotte, N.C. 28213  
Filed Oct. 13, 1989, Ser. No. 421,519  
Int. Cl.<sup>5</sup> B65H 54/00, 54/74, 75/00  
U.S. Cl. 242—47 4 Claims



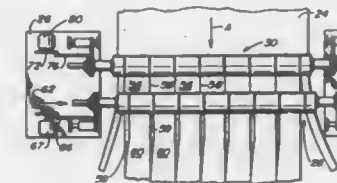
1. Apparatus for unwinding fishing line from a fishing reel comprising:  
(a) a bottle having a threaded neck portion and an enlarged

generally cylindrical body portion about which said fishing line can be wound;

(b) a drive means having a motor-driven rotatable chuck that is adapted to receive and engage a connecting means inserted therein;

(c) adapter means having a first connecting means for threadably engaging said neck portion to secure said adapter means thereto, and a second connecting means engaged by said chuck of said drive means to secure said adapter means thereto, whereby when said drive means is operated, said bottle will be rotated to withdraw said fishing line from said fishing reel and wind said fishing line on said bottle for disposal therewith.

**4,951,891**  
**WEB SLITTER AND GROOVER SYSTEM**  
Nestor Kozbur, and Richard Shankel, both of Antioch, Calif., assignors to James River Corporation, Oakland, Calif.  
Filed Jan. 23, 1989, Ser. No. 298,934  
Int. Cl.<sup>5</sup> B26D 7/06; B65H 35/02  
U.S. Cl. 242—56.200 5 Claims



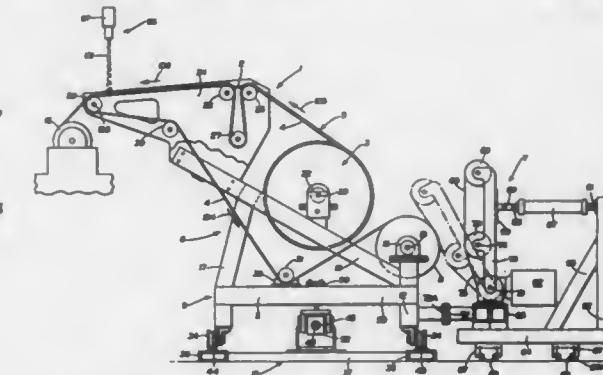
1. Apparatus for making a plurality of spirally wound roll products from a web of sheet material moving along a predetermined path of movement, each of said roll products having first and second spaced, circular grooves formed in at least one end thereof, said second groove being located a distance further from the center of the roll product than said first groove, said apparatus comprising, in combination:

- a framework;
- a first web cutting assembly movably mounted on said framework, said first web cutting assembly including a plurality of transversely spaced cutter blades disposed along said predetermined path of movement and engageable with said moving web to cut said web;
- a second web cutting assembly movably mounted on said framework, said second web cutting assembly including a plurality of transversely spaced cutter blades disposed along said predetermined path of movement and engageable with said moving web to cut said web;
- first drive means for selectively moving said first web cutting assembly transverse to said predetermined path of movement;
- second drive means for selectively moving said second web cutting assembly transverse to said predetermined path of movement;

control means for controlling said first and second drive means to sequentially move said first and second web cutting assemblies to form web segments of diminished width along spaced portions thereof; and means for winding said web segments into said spirally wound roll products and form said first and second spaced, circular grooves with the spirally wound web segment portions, said control means including sensing means operatively associated with said winding means adapted to directly sense when the roll products being wound by said winding means attain a first predetermined diameter, and for activating at least one of said drive means to move a cutting assembly transverse to said predetermined path of movement when said first predetermined diameter is sensed, said sensing means being mounted at said winding means and adjacent the outer peripheral surface of at least one of said roll products to

directly sense the location of the outer peripheral surface of said at least one roll product relative to said sensing means.

**4,951,892**  
**SERVER SYSTEM FOR RUBBERIZED SHEETS**  
Gregory D. Chaplin, Chippewa; John D. Rensel, Tallmadge, and Joseph C. Norka, Akron, all of Ohio, assignors to Bridgestone/Firestone, Inc., Akron, Ohio  
Filed Dec. 30, 1988, Ser. No. 292,031  
Int. Cl.<sup>5</sup> B65H 18/16, 23/032  
U.S. Cl. 242—57.1 28 Claims



1. A server system for feeding rubberized sheet to an assembly station from a supply roll of stock material which includes an intervening liner and the rubberized sheet; said system including:

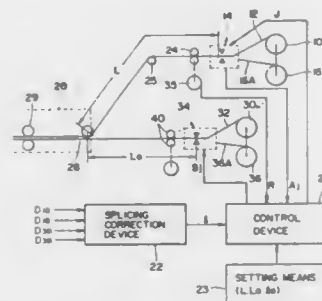
- a carriage assembly including a rotatably mounted liner take-up reel and a rotatably mounted supply roll of stock material;
- roll means for operatively stripping said liner from the rubberized sheet as the liner moves from the supply roll to the take-up reel at a position upstream from the assembly station and for depositing said rubberized sheet back onto the liner downstream therefrom and for carrying said redeposited rubberized sheet to a discharge end adjacent the assembly station on the liner; and
- drive means frictionally engaged with the liner at the take-up reel for maintaining tension on the liner as it moves from the supply roll to the take-up reel to remove stock material from the supply roll and deliver the rubberized sheet at a controlled rate and length to the discharge end on the liner by eliminating the formation of a free loop in the rubberized sheet as it is being carried by the liner to the discharge end.

**4,951,893**  
**METHOD AND APPARATUS FOR SPLICING WEBS**  
Fumio Yuito, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Mar. 6, 1989, Ser. No. 319,215  
Claims priority, application Japan, Mar. 7, 1988, 63-54399  
Int. Cl.<sup>5</sup> B65H 19/18 6 Claims

U.S. Cl. 242—58.1 4. A web splicing apparatus for use in a web supply line, said apparatus comprising:

- first splicing means responsive to a first web splicing command signal for splicing the following end of a first web wound around a first old roll to the leading end of a first web wound around a first new roll;
- second splicing means responsive to a second web splicing command signal for splicing the following end of a second web wound around a second old roll to the leading end of a second web wound around a second new roll;
- superposing means for superposing said first and second spliced webs, which are respectively supplied simultaneously and successively by means of said first and second

splicing means, on each other at a predetermined meeting point;  
measuring means for measuring the length of said first spliced web that is fed out after completion of said splicing of said first spliced web by said first splicing means or measuring the time that has elapsed since the completion of said splicing of said first web by said splicing means; setting means for setting a predetermined length or time for



which said first spliced web is to be fed from completion of said splicing of said first web by said first splicing means to starting of said splicing of said second web by said second splicing means; and, control means, when the length or time that is measured by said measuring means reaches said predetermined length or time set by said setting means, for outputting to said second splicing means said second web splicing command signal.

4,951,894

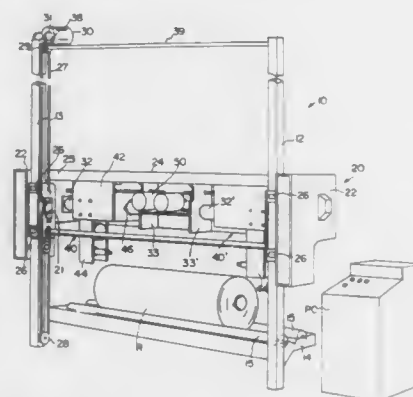
# METHOD AND APPARATUS FOR HANDLING ROLLS OF TEXTILE FABRICS AND OTHER WEBS

William O. Young, Jr., Spartanburg, and Eban Surka, Moore, both of S.C., assignors to Young Engineering, Inc., Spartanburg, S.C.

Filed Oct. 17, 1988, Ser. No. 258,371  
Int. Cl.<sup>3</sup> B65H 19/12

U.S. Cl. 242—58.6

21 Claims



1. Apparatus for handling rolls of web goods for the subsequent unwinding of said comprising:
  - (a) a support frame;
  - (b) a carriage received on said support frame for vertical movement between first and second roll positions, said carriage having a pair of stationary spaced-apart arms secured thereto and extending outwardly therefrom, said carriage further having a pair of movable support arms associated with said stationary arms, each said movable support arm having roll chuck means associated therewith;

- (c) independent drive means for said movable arms for moving said arms toward and away from each other; and
- (d) means for properly locating said chuck means with respect to an opening in the center of a roll of web located therebetween and actuating said chuck means when properly located with respect to said opening.

4,951,895

# TIRE CONSTITUTING MEMBER WINDING TENSION CONTROLLING APPARATUS

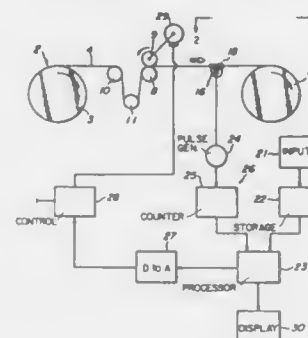
Takayuki Hirai, Kodaira, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed May 10, 1989, Ser. No. 349,616

Claims priority, application Japan, May 10, 1988, 63-113354  
Int. Cl.<sup>3</sup> B65H 59/18, 77/00; B29D 30/20

U.S. Cl. 242—75.51

4 Claims



1. A winding tension controlling apparatus for members constituting a portion of a tire for controlling tensile force to be applied to said member depending on a winding position of the member which is spirally wound about a building drum during running of the member in contact with a tension roller, comprising: storing means for storing patterns of tensile forces previously inputted for applying tensile forces to the member, a detecting sensor for detecting winding positions of the tire member relative to said building drum as said member is wound onto the building drum and generating an output, processing means for obtaining a tensile force value to be applied to said member in real time on the basis of a pattern of tensile forces received from the storing means and said output received from the detecting sensor and outputting the tensile force value as a control signal, regenerative control means for controlling, based on said control signal, a DC motor driving the tension roller to cause the tension roller to rotate at a speed slower than a predetermined value of a running speed of the member wound about the building drum, and means for displaying process information concerning winding of the member, whereby said member causes said tension roller to accelerate until its circumferential speed becomes substantially equal to the running speed of the member wound about the building drum so that a current generated in the DC motor is regenerated by means of said regenerative control means to provide the DC motor with a braking force, thereby causing a tensile force in the member to be substantially equal to said tensile force value to be applied to the member.

4,951,896

# SEAT BELT RETRACTOR

Udo Ritterdorf, Boenningstedt, Fed. Rep. of Germany, assignor to General Engineering (Netherlands) B.V., Utrecht, Netherlands

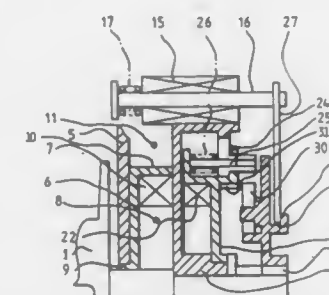
Filed Dec. 14, 1988, Ser. No. 284,022

Claims priority, application United Kingdom, Dec. 15, 1987, 8729213

Int. Cl.<sup>3</sup> B60R 22/44

U.S. Cl. 242—107

5 Claims



1. A retractor reel for a seat belt, comprising:
  - a fixed element;
  - a shaft means on which a safety belt may be retracted, said shaft means being rotatable relative to said fixed element;
  - a rotatable member rotatable relative to said shaft means and having engaging projections;
  - a first continuously operational resilient means for imparting a rotational bias to said shaft means and tending to retract the belt;
  - a second resilient means having one end thereof connected to said fixed element and the other end thereof connected to said rotatable member;
  - a shifting arrangement co-rotatable with said shaft means, said arrangement including a slidable element selectively slidable axially of said shaft means between two terminal positions, said axially slidable element carrying a locking member means for, in one terminal position of said slidable element, engaging with said projections on said rotatable member for effectively connecting said rotatable member to co-rotate with said shaft means; and
  - selectively operable means for connecting and disconnecting said rotatable member to said shifting arrangement for causing said second resilient means to provide, selectively, a rotational bias to said shaft means for retracting the belt.

4,951,897

# DRAG MECHANISM FOR A SPINNING REEL

Shinji Takeuchi, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Continuation of Ser. No. 174,409, Mar. 28, 1988, abandoned.

This application Jul. 27, 1989, Ser. No. 385,924

Claims priority, application Japan, Mar. 27, 1987, 62-45108[U]

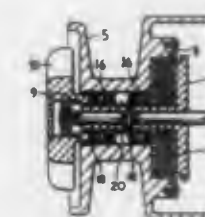
Int. Cl.<sup>3</sup> A01K 89/027

U.S. Cl. 242—246

4 Claims

1. An improved drag mechanism for a spinning reel comprising:
  - a spool shaft having a front end and a rear end and a flange portion formed at said rear end thereof;
  - bearing means mounted axially movably on said spool shaft;
  - spool means rotatably supported on said bearing means for winding a length of fishline thereon, said spool means having a fishline winding portion with a first outside diameter and a recessed rear portion;
  - a plurality of drag members, having a front end and a rear end and disposed around and in contact with said spool shaft and in said recessed rear portion of said spool means between said bearing means and said flange portion, each of said drag members having an outer diameter which is

larger than the first outside diameter of said fishline winding portion;  
a manually operable drag adjustment knob on said spool shaft, said knob operatively engaging said bearing means for applying a variable axial force to said bearing means, the amount of force varying the braking force of said drag members, said drag members being disposed to contact said bearing means at the front end thereof and said flange at the rear end thereof when a braking force is applied to said drag members;



means on said spool means for retaining said drag members within said recessed rear portion;  
a first biasing means for resiliently biasing said drag adjustment knob relative to said spool shaft;  
and wherein said bearing means comprises at least two collars surrounding said spool shaft and a plurality of ball bearings, and a second biasing means for resiliently biasing one of said collars relative to another of said collars.

4,951,898

# DOUBLE BEARING REEL

Noboru Sakaguchi, Tondabayashi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

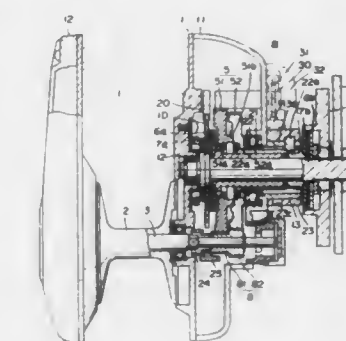
Filed May 30, 1989, Ser. No. 358,414

Claims priority, application Japan, Jun. 8, 1988, 63-76205

Int. Cl.<sup>3</sup> A01K 89/015

U.S. Cl. 242—255

6 Claims



1. A double bearing reel, comprising:
  - a reel body;
  - a spool shaft rotatably supported to said reel body and carrying a spool;
  - a handle shaft for driving said spool shaft;
  - a first main gear and a second main gear supported to rotate about said handle shaft; said first and second main gears having different diameters;
  - a sleeve rotatably supported to said handle shaft and including a shifter for selectively transmitting rotation of said handle shaft alternatively to one of said first and second main gears;
  - a drag mechanism including handle shaft side braking members rotatable together with said handle shaft and sleeve side braking members rotatable together with said sleeve,



said sleeve side braking members being disposed axially opposite to said handle shaft side braking members relative to an axial direction of said handle shaft;

operating means for operating said shifter to select between transmitting rotation of the handle shaft to one of said first and second main gears and including an operating member positioned outside of said reel body, and

a pinion means supported to said spool shaft to transmit to said spool shaft a driving force transmitted to said main gears and in turn to said pinion means, said pinion means comprising a first pinion engageable with said first main gear and a second pinion engageable with said second main gear, and

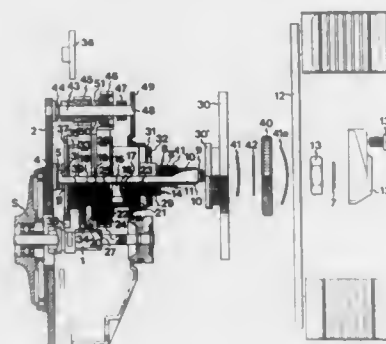
wherein said operating member includes an operating portion extending outwardly from said reel body, and said reel further comprises an unstable change-over mechanism provided between said operating portion and said reel body supporting said operating member, said unstable change-over mechanism comprising means for biasing said operating member alternately toward a low speed operation position or a high speed operation position and holding said operating member thereto.

4,951,899

**DUAL-TYPE GEAR UNIT FOR A MULTIPLIER REEL**  
Börje Moosberg, Mörrum, Sweden, assignor to Abu Garcia Produktion AB, Svängsta, Sweden  
Filed Jun. 20, 1989, Ser. No. 368,514  
Int. Cl.<sup>5</sup> A01K 89/015

U.S. Cl. 242—255

6 Claims



1. A gear unit for a fishing reel of the multiplier type having a mounting plate, a first spindle mounted on said mounting plate, a line spool and a line spool gear drive which are mounted on said first spindle, which gear unit is adapted to drive the line spool of the fishing reel for retrieving a line fixed thereto, by engaging the gear drive of the line spool, said unit comprising

- a main shaft mounted on said mounting plate and extending parallel to said first spindle;
- a handle for rotating said main shaft;
- a first driving gear rotatably mounted on said main shaft and meshing with the gear drive of the line spool;
- first friction means providing a friction coupling between said main shaft and said first driving gear;
- first setting means for setting the frictional force of said first friction means at a first value;
- a second driving gear having a smaller diameter than said first driving gear and rotatably mounted on said main shaft;
- second friction means providing a friction coupling between said main shaft and said second driving gear;
- second setting means for setting the frictional force of said second friction means at a second value which is higher than said first value;

a second spindle fixed to said mounting plate and extending parallel to said main shaft;

two driven gears of different diameter which are rotatably mounted on said second spindle and the smaller of which meshes with said first larger driving gear and the larger of which meshes with said second smaller driving gear; and

coupling means which is adapted in a first case when the two driven gears, by the rotation of the driving gears in a direction corresponding to the direction of line retrieve, are rotated in one direction and the smaller driven gear then is rotated at a higher speed than the larger driven gear, to disengage the two driven gears from each other, and in a second case when the larger driven gear, by the rotation of the smaller driving gear in the direction corresponding to the direction of line retrieve, is rotated in said one direction and the larger driving gear is not driven by the main shaft because the gear drive of the spool produces a braking effect exceeding the frictional force, set at said first value, of said first friction means, to couple said two driven gears with each other, such that the larger driven gear entrains the smaller driven gear, in turn driving the larger driving gear.

4,951,900

**CORE LOADING DEVICE FOR WEB-SLITTING MACHINES**

Bernd Goerner, Baden-Württemberg, Fed. Rep. of Germany, assignor to Beloit Corporation, Beloit, Wis.

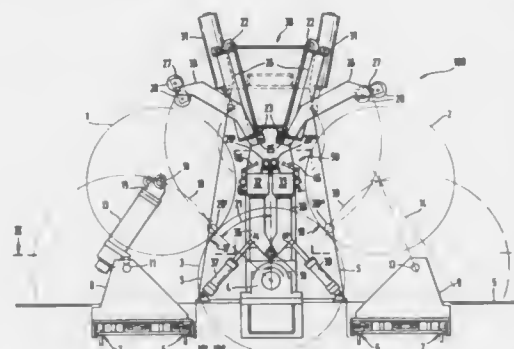
Filed Jan. 12, 1989, Ser. No. 296,544

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1988, 3800702

Int. Cl.<sup>5</sup> B65H 54/88, 18/08

U.S. Cl. 242—56.2

19 Claims



1. A web-slitting machine of the type wherein a wide web is unrolled from a wide supply roll, the web being longitudinally divided into a plurality of narrower webs at a cutting station, and the narrower webs then being rewound into a plurality of smaller, narrower rolls, said machine comprising:

- at least one support roller for receiving the narrower webs from the cutting station and about which the narrower webs are partially wrapped;
- a plurality of winding stations positioned at the periphery of the at least one support roller for operating in conjunction therewith to wind the smaller narrower rolls, one such winding station being provided for each smaller, narrower roll to be wound, and a plurality of such winding stations forming a set of winding stations, each station of each set being in substantial alignment along an axis parallel to the axis of the support roller in conjunction with which it operates, stations for adjacent narrower webs being in different sets;
- a pair of parallel support arms for each winding station, said support arms being pivotally mounted on one end about an axis parallel to the axis of the support roller with which it operates; said arms having on the other, nonpivotally

mounted end rotary driven clamping pins, the pins from the arms of each pair being disposed in facing relationship and rotatable about an axis parallel to the axis of the support roller, said pins being adapted for grasping therebetween a core adapted for receiving a narrower web to be wound thereon;

a feed device provided for each set of said winding stations, said feed device including trough means for each set of winding stations for holding a set of cores for each set of winding stations and transport means for moving said trough means from a first core-loading position in which cores are loaded into the trough means to a second transfer position in which the cores are presented in a manner permitting automatic grasping by said clamping pins between the arms of each pair of parallel support arms; and

said trough means being adapted for receiving, in sequentially alternating series, cores for alternate sets, said cores being inserted lengthwise at an end of said trough means, said cores for alternate sets of winding stations overlapping in radial cross-section during lengthwise insertion.

4,951,901

**SPIN-STABILIZED PROJECTILE WITH PULSE RECEIVER AND METHOD OF USE**

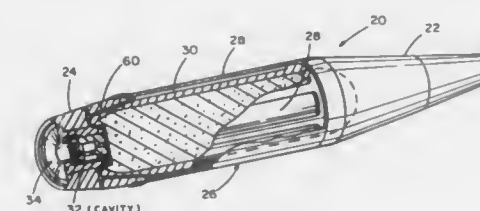
Brian B. Dunne, La Jolla, Calif., assignor to Ship Systems, Inc., La Jolla, Calif.

Continuation-in-part of Ser. No. 107,503, Oct. 8, 1987, abandoned, which is a division of Ser. No. 801,171, Nov. 22, 1985, Pat. No. 4,728,057. This application May 18, 1989, Ser. No. 355,085

Int. Cl.<sup>5</sup> F42B 15/18

U.S. Cl. 244—3.23

7 Claims



1. A spin-stabilized projectile the trajectory of which can be improved to increase accuracy, said spin-stabilized projectile comprising:

- a nose end;
- a midportion having a periphery disposed about which are a plurality of spaced masses and a high explosive charge associated with each said spaced mass for high explosive detonation acceleration of its corresponding said spaced mass to provide an impulse to said projectile which is applied substantially normal to a longitudinal axis of said projectile; and
- a boattail assembly including a microdetonator corresponding to each said spaced mass for detonating the corresponding said high explosive charge of the last-mentioned said spaced mass by firing metal fragments, said boattail assembly further including a mechanical safe-and-arm mechanism to prevent accidental firing of said explosive charges, said safe-and-arm mechanism including a ring having apertures, said ring being movable from a first position wherein said apertures are not in position to permit said microdetonators to detonate their corresponding said explosive charges, to a second position wherein said apertures are in position to permit said metal fragments from the microdetonators to pass through said apertures to detonate their corresponding said explosive charges, said boattail assembly including means for permitting said ring to move from said first position to said second position only by said ring first moving rearwardly, second by rotating, and third by moving forwardly.

4,951,902

**SUPPORT BRACKET FOR PIPES**

Hans H. Hardtke, Zeven, Fed. Rep. of Germany, assignor to Lisea GmbH, Fed. Rep. of Germany

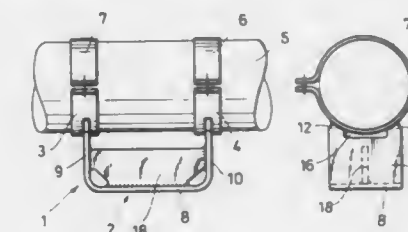
Filed May 15, 1989, Ser. No. 352,315

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 8806645

Int. Cl.<sup>5</sup> F16L 3/08

U.S. Cl. 248—74.1

19 Claims



1. A support bracket for pipes comprising a base, said base being of a generally U-shaped configuration defined by a base plate portion and a pair of spaced upstanding leg portions disposed in generally transverse relationship to said base plate portion, means carried by said upstanding leg portions for generally supportingly embracing an associated pipe positioned in spanning relationship thereto, clamping means for clampingly embracing the associated pipe in cooperative opposing relationship to said supporting embracing means, said supporting embracing means being a generally upwardly opening U-shaped clip carried by each leg portion, each U-shaped clip being appreciably wider than its associated leg portion as measured normal to the associated leg portion, each U-shaped clip having a plane normal to its generatrix center, each plane being disposed in the plane of its associated leg portion, and said generatrix centers being generally aligned and being in parallel relationship to an associated pipe embracingly supported thereby.

4,951,903

**BAG HOLDER**

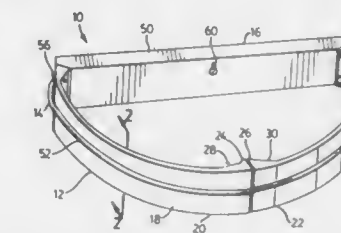
Wilfred Frey, 9655 Alcott Road, SE., Calgary, Alberta, Canada (T2J 0T7)

Filed Jun. 2, 1989, Ser. No. 360,796

Int. Cl.<sup>5</sup> B65B 67/12

U.S. Cl. 248—99

7 Claims



1. A bag holder for holding the mouth of a bag open comprising:

- a member defining a bow-shaped opening and adapted to be received in the mouth of a bag, the member including a substantially straight first portion and a separate, curved second portion, the free ends of the second portion being provided with projections and the ends of the first portion being provided with complementary recesses for receiving the projections, and the second portion being provided with an external recessed groove; and
- a flexible, resilient, elongate, continuous loop adapted for location around the exterior of the bag and the member to retain the bag on the member and hold the mouth of the

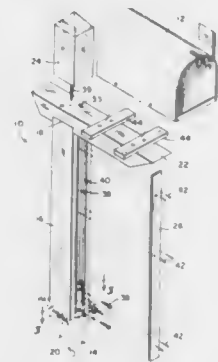
bag open, the loop being adapted for location in the external recessed groove in the second portion of the member. having third means for facilitating a fixed connection of said main portion to a support and said brace portion having fourth

4,951,904

**STAKE SUPPORTED MAILBOX POST**  
James R. Obenshain, Peebles, Ohio, assignor to The Cedar Works, Inc., Peebles, Ohio  
Filed Jan. 2, 1990, Ser. No. 459,434  
Int. Cl.<sup>5</sup> A47G 29/12

U.S. Cl. 248—156

10 Claims



1. A post assembly for use with mailboxes and the like comprising:

- a ground-engaging stake comprising a pair of elongated planar strips joined together along a common edge at a right angle, the stake having a lower penetrating portion and an upper protruding portion;
- a post including along one side a channel having a depth slightly greater than the thickness of one of the strips and a width slightly greater than the width of one of the strips, and including a slot along one edge of the channel having a depth of about the width of one of the strips and a width of about the thickness of one of the strips, the channel and slot extending from a lower end of the post at least the length of the stake upper protruding portion providing engagement between the post and stake; and
- a coverstrip having a length and width of about the length and width of the channel, and a thickness of about the depth of the channel covering the channel and upper protruding portion of the stake so as to appear as a solid post.

4,951,905

**MAILBOX SUPPORT BRACKET**  
Kevin R. Bronson, 2917 Rolling Hills, Portage, Mich. 49002, and Russell J. Bronson, III, 9288 Big Rock Dr., Kalamazoo, Mich. 49009

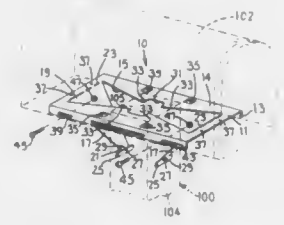
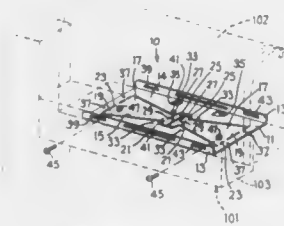
Filed May 16, 1989, Ser. No. 352,480

Int. Cl.<sup>5</sup> A47G 23/02

U.S. Cl. 248—152

14 Claims

1. A mailbox support device, comprising a generally horizontally extending main portion, first means for facilitating a fixed support of a mailbox with respect to said main portion, a brace portion having first and second ends, and second means for operatively coupling said first end of said brace portion to said main portion in a manner facilitating movement of said brace portion from a first position in which said second end is adjacent said main portion to a second position in which said second end is spaced from said main portion, said main portion



means in the region of said second end thereof for facilitating a fixed connection of said second end thereof to a support.

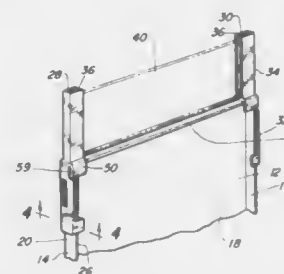
4,951,906

**SIGN ATTACHMENT**

Norman E. Morey, 5010 Jones, North Branch, Mich. 48461  
Filed Jan. 11, 1988, Ser. No. 142,433  
Int. Cl.<sup>5</sup> F16M 11/00; G09F 15/00

U.S. Cl. 248—201

6 Claims



1. An attachment for a sign of the type having two spaced apart side rails, said attachment comprising:

- a pair of elongated brackets, each having first and second longitudinally adjacent sections;
- means integrally formed with said brackets for detachably securing the first section of said brackets to the rails on the top and on opposite sides of the sign so that the second sections of said brackets extend upwardly from the sign and are spaced apart and parallel to each other, wherein said second sections of said brackets having facing slots adapted to receive and support a placard, wherein each rail has a cross-sectional shape with a side leg and a back leg, said legs intersecting each other at substantially a right angle and wherein said detachable securing means comprises means for engaging said legs of said rails, wherein said first sections of said brackets each include a channel dimensioned to slidably receive one of said rails, wherein each rail has an outside surface, an inside surface, a front surface and a back surface, said inside and outside surfaces being spaced apart and parallel, said front and back surfaces being spaced apart and parallel and generally perpendicular to said inside and outside surfaces, and wherein said detachable securing means of each bracket further comprises an inside wall, an outside wall, a front wall and a back wall which respectively overlaps said inside, outside, front and back surfaces of the rail, and

wherein said back wall comprises two spaced parts and wherein said inside walls are longitudinally positioned in between said spaced parts of said back wall.

4,951,907

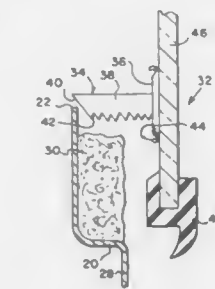
**AUTOMOTIVE WINDOW RETENTION SYSTEM AND RETENTION ELEMENT THEREFOR**

Peter Gold, 465 N. Wood Rd., Rockville Centre, N.Y. 11570  
Filed Mar. 14, 1989, Ser. No. 323,432

Int. Cl.<sup>5</sup> A63H 3/16

U.S. Cl. 248—205.5

1 Claim



1. A retention element for use in securing an automotive window onto a peripheral flange of a flanged window aperture formed in an automotive vehicle body, said window assembly to be adhesively secured thereto, said retention element comprising:

- a suction cup-shaped base portion having a concave inner side and having a resilient outer side;
- a generally perpendicular outwardly extending stem attached to said suction cup-shaped base portion at a joint formed between a first end of said stem and said resilient outer side of said suction cup-shaped base portion, said stem having a second free end being deflectable about said joint formed between said first end thereof and said resilient outer side of said suction cup-shaped base portion;
- means integral with said generally perpendicular outwardly extending stem for lockingly engaging the peripheral flange of the flanged window aperture; and
- curable adhesive means for application to said suction cup-shaped base portion, prior to the placement thereof on said window assembly, said adhesive means allowing movement of said base portion with respect to said window assembly prior to curing, and fixing said base portion with respect to said window assembly after curing.

4,951,908

**SHELF ASSEMBLY FOR A CLOSET**

James H. Kallio, Chapman Rd., S. Barre, Mass. 01074, assignor to James H. Kallio, S. Barre, Mass.

Filed Jul. 20, 1989, Ser. No. 382,406

Int. Cl.<sup>5</sup> E04G 3/08

U.S. Cl. 248—248

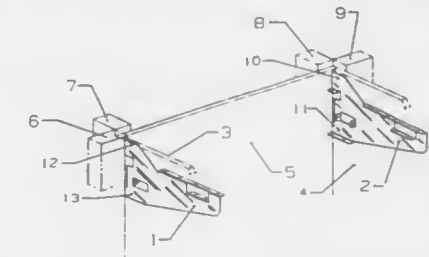
8 Claims

1. A support apparatus for a generally flat elongated shelf comprising: (a) a first bracket, said first bracket comprising:

- (1) a flat vertical rigid main body having a top edge, a bottom edge, a forward edge and a rearward edge, and a first horizontal tab which extends substantially horizontally from one side of said main body and which is substantially adjacent said rearward and bottom edges of said main body, and
- (2) a second tab which extends substantially horizontally from said one side of said main body and substantially adjacent to said top and forward edges of said main body, said second tab being located above and forward of said first tab,
- (b) a second bracket which is a mirror image of said first bracket so that the horizontal tabs of said first bracket face the tabs of said second bracket when the rearward edges

of said first and second brackets are at the same vertical height, and

(c) an elongated shelf support beam having a top surface and a bottom surface which rests on the first horizontal tabs of said first and second brackets, the vertical thickness of said support beam being such that said top surface is at the same vertical height as the top of said second horizontal tabs, whereby when a flat elongated shelf is supported by said first and second brackets, said shelf rests on said



support beam and the second tabs of said first and second brackets wherein each of said brackets has restraining means for preventing a support beam which is placed on said first horizontal tab from moving forwardly and rearwardly, said restraining means comprising a first vertical tab which is fixed to said one side of the bracket and which extends toward the other bracket in front of said support beam, and a second vertical tab which is fixed to said one side of the bracket which extends toward the other bracket in back of said support beam.

4,951,909

**MOUNTING MEANS FOR ADVERTISING DISPLAYS**

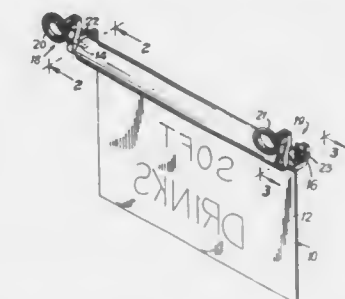
Roger A. Russo, 82 Lake Rd., Congers, N.Y. 10920, and Harris Taylor, 648 Piermont Ave., Piermont, N.Y. 10968

Filed Aug. 28, 1989, Ser. No. 399,121

Int. Cl.<sup>5</sup> F16B 47/00

U.S. Cl. 248—206.2

1 Claim



1. A mounting bracket construction for use with a retractable display shade on a roller, extending from which is a hardware pin at each end, the first of said pins being cylindrical in form and the second of said pins being rectangular in cross-section, comprising

- a pair of brackets, each of which includes a depending, C-shaped bracket element holder having a space along its periphery and a recess therein shaped for receiving and mating with an octagonally shaped bracket element, a suction cup provided at an uppermost end of each bracket element holder, and a means for tilting each suction cup relative to its corresponding bracket element holder;
- and a pair of octagonally shaped bracket elements corresponding to and inserted within the recesses of said



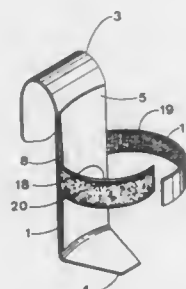
bracket element holders, the first bracket element of said pair of octagonally shaped bracket elements having a central, circular opening therethrough, and the second bracket element of said pair of octagonally shaped bracket elements having a rectangular slot extending from the center of the bracket element to an edge of the bracket element so as to correspond with said space along the periphery of said bracket element holder.

**4,951,910**  
**VERTICALLY ADJUSTABLE VELCRO STRAP DRINK HOLDER**

William B. March, 301 Hadrian, Mobile, Ala. 36606  
Filed Feb. 17, 1989, Ser. No. 312,886  
Int. Cl.<sup>5</sup> A47K 1/08

U.S. Cl. 248—311.2

13 Claims



1. A drink holder for use in a vehicle having comprising:
  - (a) A main vertical body having a means for attachment to the vehicle, a vertical stretch mounted on the means for attachment, and a bottom support rigidly attached at the lower end of the vertical stretch;
  - (b) A front sleeve connected at the top and bottom of the vertical stretch so that the middle of the back sleeve and the area of the vertical stretch facing the front sleeve define a groove;
  - (c) A horizontal strap inserted in the groove defined by the front sleeve and the vertical stretch;
  - (d) A semi-rigid outside strap attached to one end of the horizontal strap and extending out of the groove;
  - (e) A semi-rigid inside strap attached perpendicularly to the end of the horizontal strap opposite the outside strap extending out of the groove;
  - (f) One of two male-female velcro strips attached to the outside strap along the inner face of the outside strap;
  - (g) The corresponding opposite sexed female velcro strip of that attached to the outside strip attached to the inside strap along the outer face of the inside strap.

**4,951,911**  
**PORTABLE GAME SUPPORT**  
Edward J. Zatopek, and Alfred R. Guglielmo, both of Baton Rouge, La., assignors to Orenid, Inc., Baton Rouge, La., a part interest

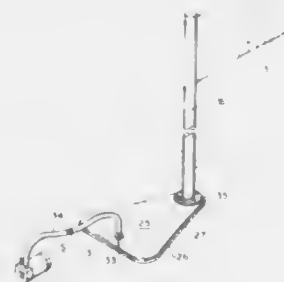
Filed Sep. 15, 1989, Ser. No. 407,757  
Int. Cl.<sup>5</sup> F16B 47/00

U.S. Cl. 248—362

9 Claims

1. In a game-playing apparatus, a combination game equipment, support means comprising column supporting said game equipment in a stationary, elevated position, and a horizontal, rigid, gas-imperious platform, said upper means being mounted near and edge of said platform, means to position said platform above the floor to provide a space therebetween, resilient means surrounding said platform to seal the platform to the floor when the space between the platform and the floor

is evacuated, said platform including means for interconnecting the underside of said platform with pump means for pro-



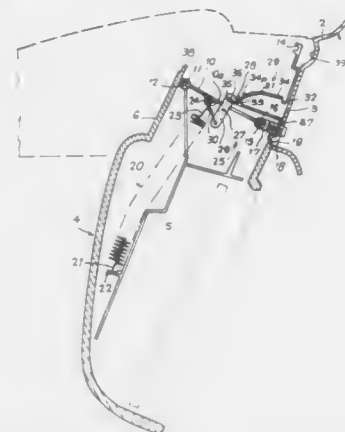
viding a desired vacuum to maintain a strong securement between the platform and the floor.

**4,951,912**  
**RETRACTABLE REARVIEW MIRROR SELF-LOCKED IN POSITION FOR PARKING AND IN POSITION FOR USE WITH RETURN WITHOUT RISK OF PINCHING THE FINGERS**

Bernard Manzoni, Saint-Claude, France, assignor to Societe Manzoni Bouchot, France  
Filed Nov. 16, 1989, Ser. No. 437,654  
Claims priority, application France, Nov. 16, 1988, 88 14898  
Int. Cl.<sup>5</sup> A47G 1/16

U.S. Cl. 248—475.1

12 Claims



1. A retractable rearview mirror self-locked in a position for parking and in a position of use with return without risk of pinching the fingers, comprising a base adapted to be fixed on a vehicle, a casing for holding a mirror applied, in said position of use, against said base via two pivoting members distant from each other in a front-to-rear direction, a spring tending to maintain contact between said casing and said base, as well as a mirror disposed in said casing and mobile relative thereto under the action of a control device, wherein said retractable rearview mirror also comprises a front-to-rear tilting piece disposed near said base in said casing, articulated by means of a front pivoting member for permanent forward pivoting relative to said casing and a rear pivoting member for permanent rearward pivoting relative to said base and coupled between said front pivoting and rear pivoting members to said casing by a return spring, said casing further being connected to said base at the front by a retractable pivoting member and the rear by a sliding pivoting member located nearer said base than said rear pivoting member of said tilting piece and more to the rear

than said rear pivoting member, so that, when said casing pivots from front to rear, said tilting piece pivots relative thereto, moving away from the point of attachment of said return spring in said casing and stretches said return spring more, and a locking member with elastic return mounted on said tilting piece and cooperating selectively with two locking notches in said base defining said position of use of said casing and said position for parking.

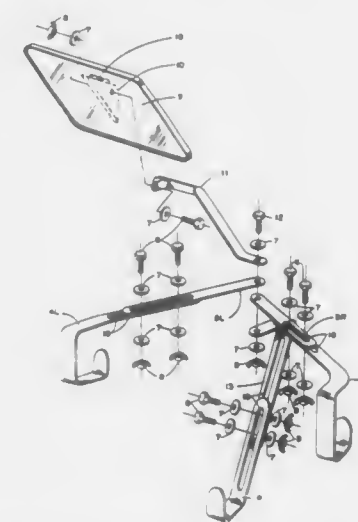
**4,951,913**  
**HITCH-VIEWING MIRROR ASSEMBLY EMPLOYING THREE CLAMPING ARMS FOR GRASPING PICKUP TRUCK'S TAILGATE PANEL**

David M. Quesada, 330 Ormonde Rd., Arroyo Grande, Calif. 93420

Continuation-in-part of Ser. No. 57,811, May 21, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 299,079  
Int. Cl.<sup>5</sup> B60K 1/06

U.S. Cl. 248—485

14 Claims



1. A trailer-hitch-viewing mirror assembly for use on a towing vehicle having a trailer hitch at its rear and for enabling a driver of said vehicle to view said hitch so as to be able to maneuver said vehicle into a position where said hitch is aligned with the mating hitch of a vehicle to be towed, comprising, in combination;

- (a) a mirror,
- (b) means for mounting said mirror on the rear of said towing vehicle, said means arranged to mount said mirror in a position spaced behind said vehicle and in a position facing forward and downward, such that said driver of said towing vehicle, while seated in a driver's seat in the front of said vehicle, can see said hitch in said mirror, so that said driver can accurately maneuver said towing vehicle while viewing said hitch in said mirror, and without assistance from another person, until said hitch is aligned for connection with the mating hitch of a vehicle to be towed, said means for mounting said mirror comprising:
  - (1) a bracket assembly for attaching said mirror to a vertically oriented tailgate panel of a pickup truck, said bracket assembly comprising three elongated tailgate panel-grasping arms which can be removably positioned on both sides of said tailgate panel to hold said mirror in a fixed position spaced behind said tailgate panel,
  - (2) each of said tailgate panel-grasping arms having a proximal end and an opposite distal end, the proximal ends of all three arms having apertures therein, said apertures being aligned and connected together at a

common junction for pivoting said grasping arms about a vertical axis,

- (3) said tailgate panel-grasping arms being bent and shaped so that when said common junction is positioned above said tailgate panel at a predetermined location, the distal ends of two of said said arms will contact and rest against one side of said tailgate panel and a portion of each of said two arms arm spaced in from said distal end thereof will contact and rest against the top of said tailgate panel, and the third of said arms will contact and rest against the other side of said tailgate panel, such that said three arms will mount said assembly in a stable position around said tailgate panel without drilling any hole in or affixing adhesives to said tailgate panel, and
- (4) a mirror support arm comprising an elongated member having proximal and distal ends, said distal end having a first aperture therein, said first aperture being aligned with and being connected to said common junction for pivotally connecting said support arm about said axis, said proximal end having a second aperture orthogonal to said first aperture and pivotally connecting said mirror so as to support said mirror in a position behind and above said tailgate panel where said driver, when driving said vehicle, can look rearwardly into said mirror and be able to see said hitch therein.

**4,951,914**  
**PIPE SEAL ASSEMBLY FOR POURED CONCRETE ON-SITE WASTE DISPOSAL SYSTEM COMPONENTS**  
Theodore W. Meyers, Inverness, Ill., and Steven R. Shelton, Provo, Utah, assignors to Tuf-Tite, Inc., Barrington, Ill.

Continuation-in-part of Ser. No. 46,461, May 4, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 276,220  
The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.  
Int. Cl.<sup>5</sup> E02D 29/16

U.S. Cl. 249—11

11 Claims



1. An improved seal apparatus for use in on-site waste disposal systems of the type having a poured concrete box member with sidewalls with a plurality of sidewall openings for receiving inlet and outlet lines extending therethrough, the seal apparatus being cast in place in the sidewalls of the poured concrete box member and comprising in combination:

- a cylindrical seal wall member carrying an inwardly-directed, reverse-angled, flexible wiper member having a free end, said seal wall member also having a radially outwardly directed attachment member for casting in place within the sidewall of the poured concrete box member for securement thereto;
- a seal plug member adapted when secured to the cylindrical seal wall member to seal off the internal diameter area of said cylindrical seal wall member and said wiper member from the entry of any unwanted substance;
- a unitary mandrel member having a frusto-conical shaped

outer wall conforming to the shape of said wiper member and terminating at one end in a gripper element for releasably gripping said free end of said wiper member from one side thereof so as to retainably secure said wiper member to said mandrel member without additional support means during the casting in place of said seal apparatus with the poured concrete box member, yet permit ready removal of said mandrel member from said wiper member after the casting process is completed; and

said gripper element comprising a cylindrically-shaped member so dimensioned relative to the diametral opening of said free end of said wiper member as to create a tight frictional retention of said wiper member when said wiper member is placed over said mandrel member during the casting process.

4,951,915

## ELECTRONIC WATER FLOW CONTROL DEVICE

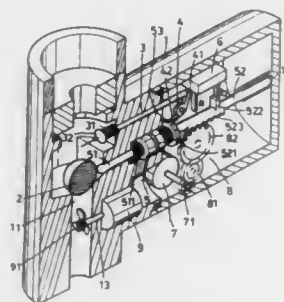
Lin C. Piao, 4F, No. 330, Chung Yang N. Rd., Sec. 4, Pei Tou, Taipei, Taiwan

Filed Jan. 10, 1990, Ser. No. 463,209

Int. Cl.<sup>5</sup> F16K 31/04, 31/16, 31/54

U.S. Cl. 251-14

6 Claims



1. An electronic water flow control device, including:
  - a housing defining therein a water inlet;
  - a ball valve releasably set to block up said water inlet;
  - a fluid axle actuator having a horn-shaped front end disposed in said water inlet at an upper position, and a compression spring thereon at the inner side of its horn-shaped front end, said horn-shaped front end being movable in response to water pressure within said water inlet;
  - a lever comprising an upper extension end and a lower extension end;
  - a piston rod comprising a left-hand part driven to push said ball valve away from said water inlet, said left-hand part having a compression spring mounted thereon, and a right-hand part with a compression spring mounted thereon and squeezed by a movable ring which is stopped by said lower extension end of said lever, said right-hand part comprising an upper projection and a lower rack portion; a switch having two terminals alternatively connected with said upper projection of said piston rod; said axle being movable into engagement with said upper extension end when said water pressure moves said axle to permit said lower extension end to engage said movable ring to compress said piston compression springs to move said piston rod downwardly to push said ball valve away from said water inlet to allow water therethrough, whereby upon a reduction in said water pressure within said water inlet said axle compression spring will permit said axle to disengage from said upper extension end to allow said piston compression springs to move said movable ring against said lower extension end to move said piston rod away from said ball valve so that said water pressure in said water inlet will move said ball valve to block off the water flow through said water inlet; said

flow control device further including an alternative actuator which comprises:

- a motor set to drive said piston rod to move forward and backward by means of a gear set which is engaged with said lower rack portion of said piston rod, so as to drive said ball valve to open or close said water inlet;
- a control circuit to control the operation of said motor; and
- a detector to detect the position of said upper projection relative to the two terminals of said switch so as to provide said control circuit with a corresponding signal for controlling the operation of said motor.

4,951,916

## PRESSURE-BALANCED ELECTROMAGNETIC VALVE

Yasumasa Kanameda, and Takeo Kushida, both of Saitama, Japan, assignors to Diesel KIKI Co., Ltd., Tokyo, Japan

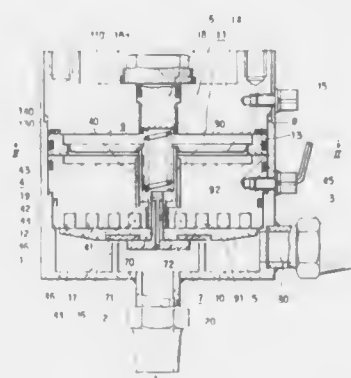
Filed Nov. 20, 1989, Ser. No. 439,268

Claims priority, application Japan, Nov. 21, 1988, 63-292441

Int. Cl.<sup>5</sup> F16K 31/06

U.S. Cl. 251-129.1

15 Claims



1. In a disc type electromagnetic valve disposed in the passage of a fluid represented by pressurized gases or air for controlling the flow of the fluid,
  - a pressure-balanced electromagnetic valve comprising:
    - a casing 1 having fluid inlet 20 and outlet 30 and equipped therein with an annular valve seat 16 around said inlet 20;
    - a stator 4 fixed in said casing to form a communication passage 10 between said inlet 20 and outlet 30 and made of a magnetic material arranged in its surface with a plurality of coils 44, the adjacent ones of which have inverse directions of power supply;
    - a valve member 5a adapted to be brought into and out of contact with said annular valve seat 16 in said communication passage 10;
    - a plate-shaped armature 5 made integral with or separate of said valve member 5a and facing said stator 4;
    - a spring 6 for biasing said armature 5 apart from the coil-arranged surface of said stator 4;
    - a confined chamber 11 formed in said casing 1 at the back of said stator 4;
    - a diaphragm 8 arranged in said chamber 11 and having its radially inner side connected to a spring force receiving portion; and
    - a passage hole 71 extending through said valve member 5a and said armature 5 for providing the communication between the back of said diaphragm 8 and said communication passage 10 around said annular valve seat 16.

4,951,917

## DYNAMIC RESPONSE TIME FOR ELECTROMAGNETIC VALVING

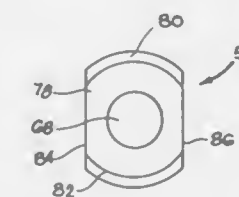
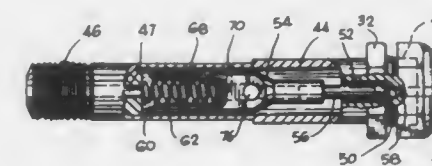
W. Harrison Faulkner, III, Salinas, Calif., assignor to Slautterback Corporation, Monterey, Calif.

Filed Dec. 6, 1989, Ser. No. 446,655

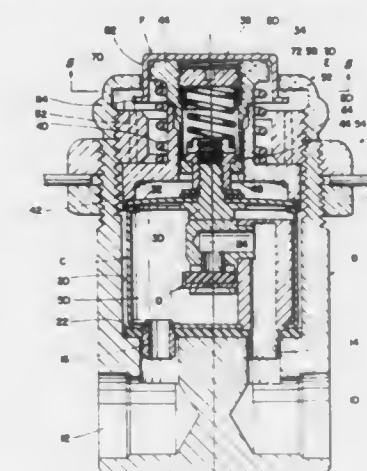
Int. Cl.<sup>5</sup> F16K 31/06

U.S. Cl. 251-129.15

17 Claims



in an outwardly extending flange having a flange surface facing back in a direction toward said base, said flange including



venting path means for preventing said flange surface from sealing against another surface.

4,951,919

## SEAL FOR GATE VALVE LINERS

Raymond E. Haglund, Hibbing, and Norman H. Carlson, Jr., Chisholm, both of Minn., assignors to Newcon Company, Hibbing, Minn.

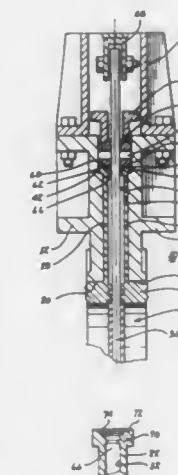
Filed Apr. 18, 1989, Ser. No. 340,047

Int. Cl.<sup>5</sup> F16K 3/02

U.S. Cl. 251-328

4 Claims

1. An electromagnetic valving assembly for viscous material comprising,
  - solenoid means for selectively generating a magnetic field, said solenoid means including a solenoid body having a flow passageway disposed for channeling a stream of viscous material through said magnetic field, said solenoid means having an armature-seating face within said flow passageway, said armature-seating face having an aperture for passage of said viscous material therethrough,
  - outlet means in fluid communication with said flow passageway for directing said stream of viscous material therefrom, said outlet means having an outlet port, and
  - an armature mounted within said flow passageway for reciprocating motion to open and close said outlet port, said armature biased in a closed position, said magnetic field of said solenoid means providing a force to displace said armature into an open position in which an upstream end of said armature contacts said armature-seating face,
  - one of said armature-seating face of said solenoid means and said upstream end of said armature recessed at an inner region and raised along an outside edge, contact between said armature-seating face and said upstream end being limited to said raised outside edge, wherein said raised outside edge includes a pair of C-shaped edge lips.



1. In a one piece liner having an upwardly extending rectangular in cross section hollow chest defining a passageway for sealingly supporting a gate of a gate valve, which gate is rectangular in cross section and extends from the top of the chest, and an apertured generally rectangular packing gland attachable to the gate valve for compressing packing about the extending gate and the top of the chest, the improvement comprising in combination:
  - (a) a rectangular collar disposed at the upper end of the chest; and
  - (b) an upper surface disposed upon said collar defining an apertured rectangular surface for supporting the packing disposed about a segment of the gate extending upwardly from the chest, said surface being angled downwardly and inwardly toward the chest circumscribed gate to urge migration of the packing against the gate in response to a compressive force applied by the packing gland;

4,951,918

## VALVE VENT

Gordon K. Wells, and Max L. Green, both of Mansfield, Ohio, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Apr. 6, 1990, Ser. No. 505,570

Int. Cl.<sup>5</sup> F16K 31/00

U.S. Cl. 251-321

18 Claims

9. A cup-shaped valve operating button including a base having a peripheral wall extending therefrom and terminating



- (c) at least one bead disposed within and about the passage-way within the chest proximate said collar for engaging the gate and for establishing a seal between the gate and the chest; and
- (d) at least one further bead disposed upon and extending along said upper rectangular surface for effecting a seal and substantially immobile relationship between said surface and the packing, said one further bead defining in planform a rectangularly extending ridge.

**4,951,920**  
**BACKFLOW-PREVENTING VALVES FOR INJECTION-MOLDING MACHINES**  
Nobuo Tsuno, Kasugai, Japan, assignor to NGK Insulators, Ltd., Nagoya, Japan  
Filed Sep. 26, 1988, Ser. No. 249,125  
Claims priority, application Japan, Sep. 30, 1987, 62-244160  
Int. Cl.<sup>5</sup> F16K 51/00  
U.S. Cl. 251—368 10 Claims



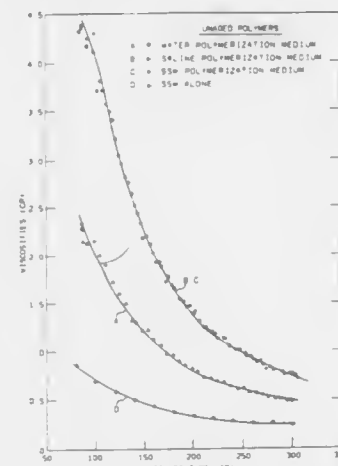
1. An annular backflow-preventing valve for use in a screw head of a screw type injection-molding machine, comprising: an annular ceramic member having a first end for accommodating an injection-molding screw therein and a second end opposing said first end; and an annular metallic member disposed on an outer peripheral surface of said ceramic member at said second end thereof; wherein said first end of said ceramic member constitutes an entire injection-molding screw receiving end of said valve and said ceramic member defines an entire inner peripheral surface of said valve.

**4,951,921**  
**POLYMERS USEFUL IN THE RECOVERY AND PROCESSING OF NATURAL RESOURCES**  
G. Allan Stahl; I. John Westerman; Henry L. Hsieh, and Ahmad Moradi-Araghi, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.  
Continuation-in-part of Ser. No. 461,707, Jan. 28, 1983, Pat. No. 4,644,020. This application Jan. 9, 1984, Ser. No. 568,363  
Int. Cl.<sup>5</sup> C09K 3/00; E21B 43/16  
U.S. Cl. 252—8,551 12 Claims

1. A process comprising:
- (a) introducing into a subterranean formation exhibiting hostile conditions as defined by a temperature and multivalent cation concentration above the infinite days line of FIG. 14 and having zones of varying permeability, a composition which is a polymerization inhibitor for subsequently injected monomers;
- (b) thereafter introducing into said formation a fluid flush material under conditions so as to selectively remove said polymerization inhibitor from the more permeable zones of said formation; and
- (c) thereafter introducing into said formation a monomer composition and a free radical initiator, together or independently, so that in the absence of said polymerization inhibitor, monomer or monomers of said monomer composition polymerize to produce a polymer which at least partially restricts the more permeable zones of said formation

wherein said monomer composition is selected from the group consisting of:

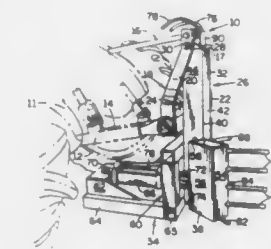
- (i) N-vinyl-2-pyrrolidone;
- (ii) N-vinyl-2-pyrrolidone/acrylamide in a weight ratio within the range of 10/90 to 90/10;
- (iii) N-vinyl-2-pyrrolidone/acrylamide/termonomer, wherein said termonomer is selected from methyl methacrylate, vinyl acetate, styrene, lauryl methacrylate, methyl acrylate, butyl acrylate, hydroxyethyl acrylate, acrylonitrile, 4-vinylpyridine, and 5-methyl 2-vinyl pyridine, wherein said N-vinyl-2-pyrrolidone and acrylamide are present in the polymer in a weight ratio relative to each other within the range of 10/90 to 90/10 and wherein said termonomer is present in an amount within the range up to 10 weight percent based on the weight of said N-vinyl-2-pyrrolidone and acrylamide;
- (iv) sodium 2-acrylamido-2-methylpropane sulfonate;
- (v) sodium 2-acrylamido-2-methylpropane sulfonate/N-vinyl-2-pyrrolidone/acrylamide, wherein each of said sodium 2-acrylamido-2-methylpropane sulfonate, N-vinyl-2-pyrrolidone and acrylamide are present in an amount of at least 10 weight percent;
- (vi) sodium 2-acrylamido-2-methylpropane sulfonate/N-vinyl-2-pyrrolidone wherein said sodium 2-acrylamido-2-



methylpropane sulfonate is present in an amount within the range of 65 to 75 weight percent and said N-vinyl-2-pyrrolidone is present in an amount within the range of 25 to 35 weight percent;

- (vii) N-vinyl-2-pyrrolidone/acrylamide/diacetone acrylamide, wherein said N-vinyl-2-pyrrolidone is present in an amount within the range of 30 to 50 weight percent, said acrylamide is present in an amount within the range of 35 to 50 weight percent and said diacetone acrylamide is present in an amount within the range of 5 to 20 weight percent;
- (viii) N-vinyl-2-pyrrolidone/acrylamide/N,N-dimethylacrylamide wherein said N-vinyl-2-pyrrolidone is present in the amount within the range of 45 to 47.5 weight percent, said acrylamide is present in an amount within the range of 45 to 47.5 weight percent and said N,N-dimethylacrylamide is present in an amount within the range of 5 to 10 weight percent;
- (ix) sodium 2-acrylamido-2-methylpropane sulfonate/N,N-dimethylacrylamide in a weight ratio of 60/40 to 70/30;
- (x) N-vinyl-2-pyrrolidone/N,N-dimethylacrylamide in a weight ratio of 50/50 to 40/60; and
- (xi) N-vinyl-2-pyrrolidone/N,N-dimethylacrylamide/sodium 2-acrylamido-2-methylpropane sulfonate in a weight ratio within the range of 25/10/65 to 25/15/60.

**4,951,922**  
**APPARATUS FOR EXTRACTING BRUSH WITH A TRACTOR**  
Austin E. Brown, II, Beeville, Tex., assignor to Brown, Beasley & Associates, Inc., San Antonio, Tex.  
Filed Dec. 7, 1989, Ser. No. 447,207  
Int. Cl.<sup>5</sup> E21B 19/00  
U.S. Cl. 254—124 8 Claims



1. An apparatus for extracting brush releasably attachable to a tractor, said tractor having a three-point hitch lifting mechanism, said mechanism, having lower lift arms and an upper guide arm comprising:

- a means for attachment to said hitch mechanism, said attachment means having an elevated end attachable to said upper guide arm and a lower end attachable to each of said lower lift arms;
- a puller assembly attached at a pivot point to said attachment means only at said elevated end, said puller assembly further comprising:
- a means extending forward of and below said pivot point for levering said puller assembly about said pivot point as said tractor is moved forward; and
- a means mounted on said levering means for releasably grasping said brush.

**4,951,923**  
**ELECTRICAL WIRE GUIDE TEMPORARILY PLACED IN AN ELECTRICAL WIRING JUNCTION BOX TO PROTECT THE INSULATION OF ELECTRICAL WIRES BEING GUIDED AND PULLED INTO THIS BOX AND THROUGH A CONDUIT TO THE NEXT JUNCTION BOX**  
Richard P. Couture, 1715 S. Washington, Tacoma, Wash. 98405  
Filed Sep. 14, 1989, Ser. No. 407,221  
Int. Cl.<sup>5</sup> B65H 59/00  
U.S. Cl. 254—134.3 R 6 Claims



1. An electrical wire guide to be temporarily placed in an electrical wiring junction box to protect the insulation of electrical wires being guided and pulled into this junction box and on through an electrical conduit to the next junction box, comprising, the integral arrangement of:

- (a) a top hollow cylindrical exit portion adapted for insertion into an electrical conduit;
- (b) a slightly tapered hollow guiding portion which tends to remain essentially in line with the top hollow cylindrical exit portion;
- (c) a continuing slightly tapered, guiding, and bendable hollow portion, commencing initially in line with the top hollow cylindrical exit portion, and after bending no longer being in line with the top hollow cylindrical exit portion;
- (d) a continuing slightly tapered, guiding, receiving, and positioning hollow portion commencing initially in line with the top hollow cylindrical exit portion, and then after bending of the continuing slightly tapered guiding and bendable hollow portion, no longer being in line with the top hollow cylindrical exit portion, then being in a position to receive insulated electric wires and to guide these wires through this electrical wire guide, when the wire guide is positioned in an electrical wiring junction box, and thereafter continue to guide these insulated electrical wires into an electrical conduit; and
- wherein this continuing slightly tapered, guiding, receiving, and positioning hollow portion has an essentially planar back side, having, in turn, spaced transverse position determining abutments, one of which is optionally selected to bear against an interior bottom transverse edge of a particularly selected type of an electrical junction box, to thereby hold this electrical wire guide temporarily in place with respect to this selected electrical junction box.

**4,951,924**  
**DEEPWATER SUBSEA LOWERING/LIFTING SYSTEM**  
Dennis E. Calkins, Houston, Tex., assignor to McDermott International, Inc., New Orleans, La.  
Continuation of Ser. No. 312,160, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 150,802, Feb. 1, 1988, Pat. No. 4,838,522. This application Sep. 14, 1989, Ser. No. 408,933  
Int. Cl.<sup>5</sup> B66C 1/00; B66D 1/00, 3/08  
U.S. Cl. 254—337 3 Claims



1. A lowering/lifting apparatus for intermittently deploying/retracting a tensile member in a marine environment comprising:
- (a) a support from which an elongated tensile member is suspended, said support comprising the boom of a heavy lift crane;
- (b) a fixed block secured to said support at a relatively fixed elevation;
- (c) a traveling block suspended underneath said fixed block and independently movable with respect to said fixed block;
- (d) a separate cable suspending said traveling block from said fixed block;

- (e) winch means for changing the elevation of said traveling block with respect to said fixed block via said cable;
- (f) a fixed grip assembly suspended from said fixed block and positioned intermediate said fixed and traveling blocks;
- (g) a traveling grip assembly suspended from and movable with said traveling block;
- (h) said elongated tensile member passing through said fixed and traveling grip assemblies and having one end coiled around a storage wheel, said storage wheel storing and maintaining tension on said tensile member;
- (i) said fixed and traveling grip assemblies each comprising a plurality of clamps configured to selectively engage and disengage said tensile member, each said clamp comprising multiple movable wedges configured to wedge against and seize said tensile member;
- (j) operating means for independently operating said fixed and traveling grip assemblies for alternate, intermittent engagement of said tensile member by said grip assemblies, said operating means operating to securely grip and support said tensile member by only one said grip assembly during the movement of said traveling block by said winch means;
- (k) whereby when said traveling grip assembly engages said tensile member and when said fixed grip assembly is disengaged from said tensile member, said tensile member is deployed/retracted with respect to said support upon the deployment/retraction of said traveling block; and,
- (l) whereby when said fixed grip assembly engages said tensile member and when said traveling grip assembly is disengaged from said tensile member.

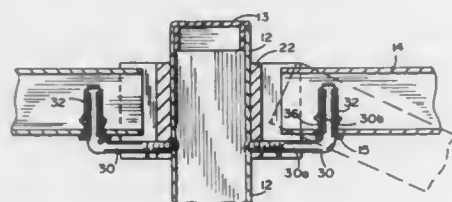
4,951,925

## FENCE CONNECTOR ASSEMBLY

David H. Schultz, Grand Haven; Steven W. Mattson, Muskegon, and Donald E. Heinz, West Olive, all of Mich., assignors to Alternate Number Thirteen, Grand Haven, Mich.  
Filed Jan. 28, 1988, Ser. No. 149,691  
Int. Cl.<sup>3</sup> E04H 17/14

U.S. Cl. 256—65

12 Claims



1. A connector assembly for joining or at least one generally horizontal rail having two ends, to a substantially vertical post in the formation of fencing, comprising:
- a connector bracket having a vertical sleeve defining a vertical cavity for receiving a post;
- said sleeve having at least one pair of laterally spaced side members projecting from at least one side of said sleeve, said members being substantially parallel to each other and spaced apart sufficient to receive therebetween one end of at least one rail;
- a threaded aperture through said sleeve;
- said side members being astraddle said aperture;
- at least one L-shaped mounting stud having a substantially horizontal leg and a substantially vertical leg, said horizontal leg being in threaded engagement with said aperture for securing said connector bracket to the post, and said vertical leg having a distal end spaced from said bracket sleeve;
- at least one generally horizontal rail having a vertical opening spaced from the end of said rail, said opening being larger than said distal end of said stud to fit freely thereover, and being spaced from said end of said rail an amount less than the spacing of said distal end from said

bracket sleeve to allow said rail to have limited vertical pivotal movement in an arc on said vertical stud leg and between said side members; and

a spring retainer at said opening of said rail securing said rail on said mounting stud vertical leg while allowing said limited vertical pivotal movement to accommodate uneven terrain.

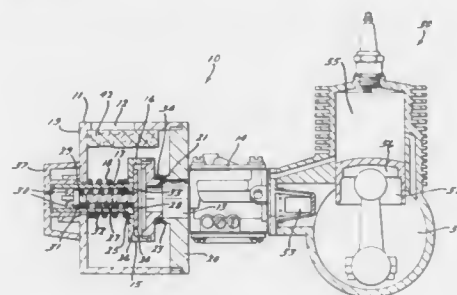
4,951,926

## CHOKE FOR INTERNAL COMBUSTION ENGINE

Patrick O'Shea, and John Devine, both of Tralee, Ireland, assignors to 501 Tillotson Limited, Tralee, Ireland  
Filed May 30, 1989, Ser. No. 358,837  
Claims priority, application Ireland, May 31, 1988, 1645/88  
Int. Cl.<sup>3</sup> F02M 1/14

U.S. Cl. 261—64.4

3 Claims



1. A choke for use with a carburetor of an internal combustion engine, the choke comprising a housing having an air inlet and an air outlet, the air outlet being adapted for communication with the air intake of a carburetor, and a valve means within the housing; the valve means comprising a valve member, a valve chamber, a first biasing means and a second biasing means; the valve chamber having an outlet port in communication with the air outlet of the housing and at least one aperture in communication with the interior of the housing; the valve member being contained within the valve chamber and being biased by the first biasing means in a direction to close the said at least one aperture; the valve chamber being biased by the second biasing means in a direction to block the passage of air between the air inlet and the air outlet of the housing; the valve means being responsive to engine vacuum to move the valve member in a direction against the first biasing means to permit air to enter the carburetor from outside the housing via the air inlet, at least said one aperture, the outlet port and the air outlet during starting of the engine; means for overriding the operation of the valve means to maintain a continuously open path between the air inlet and the air outlet during normal running of the engine, said overriding means including means for moving the valve chamber in a direction away from the air outlet against the second biasing means.

4,951,927

## METHOD OF MAKING AN ENCAPSULATED MULTIPLE GLAZED UNIT

Norman W. Johnston, and Edward W. Curtze, both of Perrysburg, Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

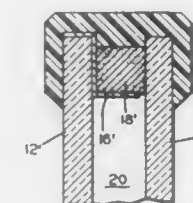
Continuation of Ser. No. 48,487, May 5, 1987, abandoned,  
Continuation of Ser. No. 710,213, Mar. 11, 1985, abandoned.  
This application Feb. 15, 1989, Ser. No. 311,420  
Int. Cl.<sup>3</sup> B29C 45/14, 45/16, 45/76

U.S. Cl. 264—129

3 Claims

1. A method of fabricating an encapsulated multiple sheet insulating glazing unit comprising the steps of:
- (a) cleaning the peripheral marginal surfaces and peripheral edges of at least two glass sheets;

- (b) applying at least one layer of a primer to the cleaned marginal surfaces and edges of said sheets;
- (c) placing a first one of said sheets into a first mold element having a first cavity surrounding said first sheet;
- (d) disposing spacer strip means on a surface of said first sheet continuously around the peripheral margin of said first sheet and spaced inwardly from the edges thereof;
- (e) placing the second one of said sheets opposite said first sheet in superposed aligned relationship therewith and with its facing surface in engagement with said spacer strip means, whereby said spacer strip means functions to space the facing surfaces of said first and second sheets at a predetermined distance from one another and define an enclosed space between said sheets;
- (f) disposing a second mold element over said second sheet in mating relationship with said first mold element, said second mold element including a second cavity cooperating with said first cavity to define, with said spacer strip means and the included surfaces and edges of said sheets, an enclosed mold cavity in surrounding and overlapping relation to the peripheral marginal edges of said spaced first and second sheets;
- (g) injecting into the mold cavity a composition which is



capable of polymerization and cure to form a polymerized frame encasing the marginal edges of said sheets to hermetically seal said enclosed space between said sheets, said composition, incident to curing, intimately contacting and thereby tightly adhering directly to the exposed primed peripheral marginal surfaces and edges of said sheets and to the spacer means as a result of the autogenous pressure generated incident to polymerization within the enclosed mold cavity;

- (h) regulating the pressure at which said composition is injected into the mold cavity to maintain a pressure within the mold cavity below that at which said glass sheets and spacer means would be damaged;
- (i) controlling the temperature of the mold cavity, the injection of the composition, and the amount of the composition injected so that as the composition polymerizes following its injection, it is urged into direct intimate contact with the mold cavity, spacer strip means and exposed, primed marginal surfaces and edges of said sheets by the autogenous pressure generated during the polymerization and cures while in such contact into an architectural frame; and
- (j) removing the glass sheets and integral frame from the mold elements as an assembly.

4,951,928

## BLOWING LANCE ARRANGEMENT

Manfred Eysa, Puchenaus; Ernest Fuhrmann, Altenberg; Hans Grabner, Linz; Ernst Höllwarth, Stiering, and Hellmuth Smejkal, Linz, all of Austria, assignors to Voest-Alpine Industrienlagenbau Gesellschaft m.b.H., Linz, Austria  
Filed Apr. 14, 1989, Ser. No. 337,920  
Claims priority, application Austria, Apr. 25, 1988, 1044/88  
Int. Cl.<sup>3</sup> C21C 7/072

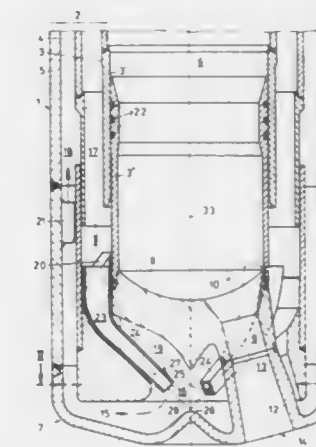
U.S. Cl. 266—225

4 Claims

1. In a blowing lance arrangement for use in treating a metallurgical melt having a bath surface, wherein said blowing lance includes a lance head having a front plate, at least one lance channel, a plurality of expan-

sion tuyeres communicating with said at least one lance channel and extending through said head and said front plate for direct access to the bath surface of said melt, wherein said lance includes coolant supply means and coolant return means peripherally surrounding said at least one lance channel with a flow deflection piece disposed above said front plate to thereby separate said coolant supply and said coolant return means, and

wherein said lance further includes at least one coolant connecting channel arranged to penetrate said flow deflection piece so as to connect said coolant supply and said coolant return means, and at least one coolant secondary channel having an outlet disposed directly towards the



center of said front plate capable of diverting a partial stream of said coolant to said connecting channel and thereby supply said partial stream to said connecting channel, the improvement,

wherein said outlet of said at least one coolant secondary channel has a cross-section such that its flow axis is disposed at an angle to the flow axis of the coolant flow prevailing in said one coolant connection channel at said outlet, said outlet being disposed radially asymmetrical to the center of said front plate and thereby cause an intensive swirling of the partial stream with the mainstream above the front plate to assure efficient cooling of said front plate.

4,951,929

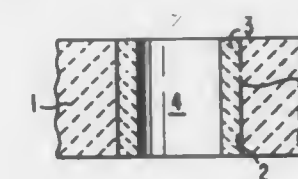
## REFRACTORY ASSEMBLY INCLUDING INNER AND OUTER REFRACTORY MEMBERS WITH INTERFERENCE SHRINK FIT THEREBETWEEN AND METHOD OF FORMATION THEREOF

Hans-Georg Schwarz; Vinay Shah, and Bernhard Schiefer, all of Cincinnati, Ohio, assignors to Didier-Taylor Refractories Corporation, Cincinnati, Ohio

Filed Apr. 6, 1989, Ser. No. 334,861  
Int. Cl.<sup>3</sup> B22D 41/54

U.S. Cl. 266—286

19 Claims



1. A refractory assembly comprising:



a refractory outer member having therein an opening defined by an inner surface;  
a refractory inner member having an outer surface; and  
said inner member being within said opening in said outer member with an interference shrink fit between said inner and outer surfaces, thereby forming a joint between said members.

4,951,930

# INSULATOR FOR USE IN AUTOMOTIVE SUSPENSION OR THE LIKE

Takaaki Uno; Hiroshi Yamahata, both of Zama, and Kazuo Chiba, Isehara, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Division of Ser. No. 619,482, Jun. 11, 1984, Pat. No. 4,889,328.

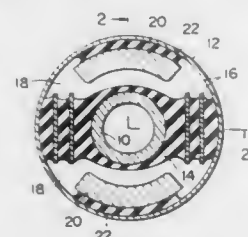
This application Jun. 23, 1989, Ser. No. 370,787

Claims priority, application Japan, Jul. 6, 1983, 58-122980

Int. Cl.<sup>5</sup> B60G 11/22; F16F 7/00

U.S. Cl. 267—293

5 Claims



1. An insulator for supporting a structural member subject to vibration on a chassis comprising:

- a first member connected to said structural member;
- a second member connected to said chassis;
- a first elastomeric body interconnecting said first and second members;
- a stiffening plate, said stiffening plate being disposed in said first elastomeric body at a location between said first and second members;
- a vibratable mass; and
- a second elastomeric body which is separate from said first elastomeric body, said second elastomeric body interconnecting said vibratable mass and one of said first and second members, said vibratable mass and said second elastomeric member defining dynamic damper means, said dynamic damper means having a resonance characteristic which is selected to suppress the transmission of vibration from said structural member to said chassis, and wherein said vibratable mass is arranged to vibrate at frequencies at which said first elastomeric body fails to damp the transmission of vibration therethrough and to have a mass greater than said stiffening plate.

4,951,931

# ADJUSTABLE LOCATING BLOCK

Cristiano G. Rossi, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Oct. 27, 1989, Ser. No. 427,394

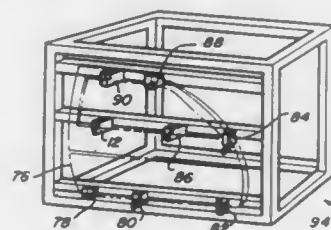
Int. Cl.<sup>5</sup> B23Q 3/18

U.S. Cl. 269—69

15 Claims

1. An improved adjustable locating block assembly for use on a fixture to hold, guide, restrain or otherwise control, a part to be worked on, the locating block assembly comprising: support means associated with said fixture;  
a locating block supported on said support means;  
means for incrementally adjusting said locating block with respect to said support means independent of shim plates; said means for incremental adjustment including an elongated slot formed in one side of said support means, an elongated slot formed in one side of said locating block and extending in a direction perpendicular to the slot formed in said fixture support when said locating block is

assembled to said fixture, an intermediate block having a raised surface portion on one side thereof to be movably positioned within said slot of said support means and having a raised surface portion on the other side of the intermediate block to be movably positioned within said slot of said locating block, said slots and mating raised surface portions having rows of incrementally spaced selectively alignable holes adapted to accommodate one



or more rods when positioned in aligned relationship and which may be removed from said holes and reinserted in other of said holes along said rows whereby said locating block may be locked in various positions; and means for manually relocating an initial reference position for said locating block after said locating block has been adjusted for one part and is then to be used for another part.

4,951,932

# ADJUSTMENT MECHANISM FOR WORK CLAMPING

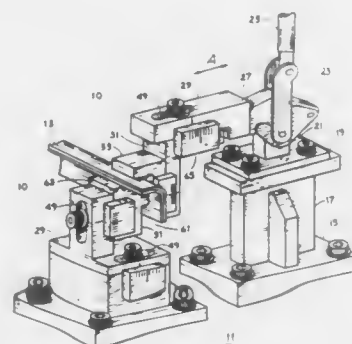
Jim R. Thomas, 8844 - 31st Ave., Kenosha, Wis. 53142

Filed Sep. 15, 1989, Ser. No. 407,562

Int. Cl.<sup>5</sup> B25B 1/02

U.S. Cl. 269—212

9 Claims



1. An improved mechanism for clamping a work piece in a stationary position while work is being performed thereon, the mechanism including:

- a support member attached to a supporting arm and having a horizontal, generally planar support face, said support face including a plurality of serrations regularly spaced thereacross;
- a clamping member releasably engaged with said support member and having a horizontal, generally planar clamp face, said clamp face including a plurality of serrations regularly spaced thereacross, said serrations on said clamp face being releasably engaged with said serrations on said support member, thereby permitting adjustment of the position of said clamping member with respect to that of said support member;
- said clamping member further including a vertical, generally planar face with a plurality of serrations regularly spaced thereacross;
- a locator block releasably engaged with said clamping mem-

ber, said locator block having a vertical, generally planar face with a plurality of serrations regularly spaced thereacross, said vertical face of said locator block being releasably engaged with said vertical face of said clamping member, thereby permitting adjustment of the position of said locator block with respect to that of said clamping member;

said support member and said clamping member thereby permitting adjustment of said position of said locator block along a horizontal axis prior to clamping said work piece, said clamping member and said locator block thereby permitting adjustment of said position of said locator block along a vertical axis prior to clamping said work piece.

4,951,933

# APPARATUS AND A METHOD FOR SEPARATING SHEET MATERIAL

Wilhelm Mitzel, Neuweilerhof; Karl-Helmut Leuthold, and Josef Geier, both of Munich, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft für Automation und Organisation mbH, Fed. Rep. of Germany

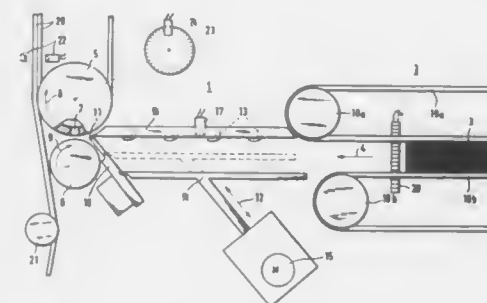
Division of Ser. No. 149,899, Jan. 28, 1988, Pat. No. 4,790,525, which is a continuation of Ser. No. 812,313, Dec. 23, 1985, abandoned. This application Dec. 9, 1988, Ser. No. 281,791

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447777

Int. Cl.<sup>5</sup> B65H 1/26

U.S. Cl. 271—146

12 Claims



1. In sheet separating apparatus for separating sheet material having variable degrees of geometric and physical condition, including a sheet material stack holding means, a sheet feeding means, a sheet withdrawing means and a stack retaining means, wherein the sheet material is conveyed in stacks in variable physical and geometric conditions via a stack transporting system to the stack holding means up to the stack retaining means, from which the sheet material is separated from the stack, sheet by sheet, by a separation process, fed sheet by sheet to a sheet feeding system leading on further by the interaction of feeding, withdrawing and retaining means, the improvement comprising: first means arranged to rearrange the geometric and physical condition of each stack so that a predetermined geometric and physical condition of the stack is effected by manipulation of the sheet material in the stack during the process of sheet by sheet separation; a second means to sense the geometric and physical condition of the stack of sheet material at a distance in advance thereof while said stack is conveyed by the stack transporting system to the place of separation, said second means including stack condition sensors disposed in the stack transporting system and a control unit in communication with said first and second means for activating the first means in response to an undue deviation from predetermined desired thresholds of stack geometric and physical condition.

4,951,934

# DEVICE FOR STACKING SHEET-LIKE ARTICLES SUCH AS LETTERS

Geert J. Prins, Delft, Netherlands, assignor to Staat Der Nederlanden Staatsbedrijf Der Posterijen, Telegrafie En Telefonie, The Hague, Netherlands

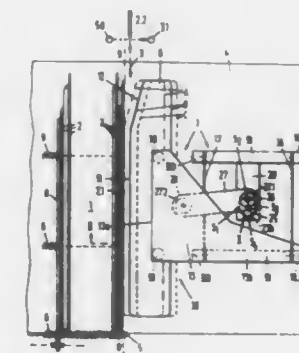
Filed Nov. 16, 1988, Ser. No. 272,511

Claims priority, application Netherlands, Nov. 20, 1986, 8702786

Int. Cl.<sup>5</sup> B65H 29/44

U.S. Cl. 271—181

14 Claims



1. Device for stacking sheet-like articles, such as letters, side by side in an upright state, which articles are separately supplied via a supply path which defines a plane of supply in the neighborhood of the device, which device comprises:

- a. a stacker head provided with first guide means movable across the supply path and with means for moving the first guide means in a to-and-fro motion, and
- b. a stacker bin, in which the articles are stacked to form a stack which is bounded on one side by the first guide means,

said to-and-fro motion causing the provision between the first guide means and the stack, at least on the side towards of the supply path, of a space during a short time interval for insertion of a next entering article to be stacked, characterized:

- in that the plane of supply is substantially the same as a plane of stacking in which the last previous of said sheet-like articles, if any, is aligned;
- in that the first guide means are aligned with said plane of supply, are movable perpendicular thereto and have a rest position in which position said guide means support the stack, and

in that said means for moving the first guide means include a spring coupling with a frame part forming part of the stacker head, and also a driving coupling with said frame part, such that the first guide means and the spring coupling form a mass and spring system which has a frequency of its own which is chosen approximately equal to the frequency which corresponds with the pulse movement applied via the driving coupling, for imposing on said first guide means discrete cycles of a to-and-fro pulse movement, from a stack-pressing rest position, which discrete cycles of pulse movement are synchronous with the supply of said respective articles, each of which movement cycles forms a translation approximately perpendicular to the plane of stacking, through it, up to beyond the plane of supply.

# 4,951,935 PAPER STACKER FOR AN IMAGE FORMING APPARATUS

Morio Oikawa, Sanriku, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

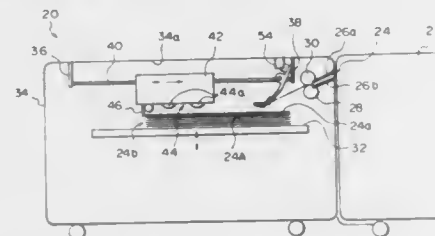
Filed Jun. 14, 1989, Ser. No. 365,854

Claims priority, application Japan, Jun. 15, 1988, 63-78305[U]

Int. Cl.<sup>5</sup> B65H 31/10

U.S. Cl. 271-208

4 Claims



1. A device for stacking paper sheets which are sequentially discharged from an image forming apparatus, comprising: an elevatable tray for receiving and stacking the paper sheets thereon; position sensing means for sensing a position of the top of a stack of the paper sheets on said tray; drive means for driving said tray up and down such that the highest position of the top of the stack sensed by said position sensing means is constantly held at a predetermined position; and trailing edge sensing means disposed above and upstream of said tray with respect to an intended direction of paper feed and making contact with the paper sheet which is discharged from the image forming apparatus, said trailing edge sensing means being responsive to an occurrence that a trailing edge of the top of the stack on said tray assumes a position higher than a predetermined position; whereby when said trailing edge sensing means senses that the trailing edge of the stack on said tray assumes a position higher than the predetermined position, the image forming apparatus is inhibited from performing any further paper feeding operations.

# 4,951,936 SEPARATION UNIT

Yoshiharu Taniyama, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

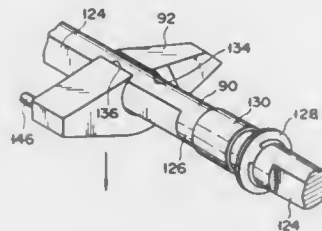
Filed Nov. 29, 1988, Ser. No. 277,326

Claims priority, application Japan, Nov. 30, 1987, 62-302630; Nov. 30, 1987, 62-302631

Int. Cl.<sup>5</sup> B65H 29/56

U.S. Cl. 271-307

14 Claims



1. A separation unit for separating paper from a paper carrier, comprising:
  - a separation member for separating the paper from said carrier, said separation member having a hole extending therethrough and a slit opening said hole; and
  - a support member for supporting said separation member, said support member having a first portion, fitted in said hole, for supporting said separation member, and a second

portion, formed continuous with said first portion, for passing through said slit, so that said separation member is removable from said support member.

# 4,951,937

## LOAD MECHANISM FOR EXERCISE DEVICES

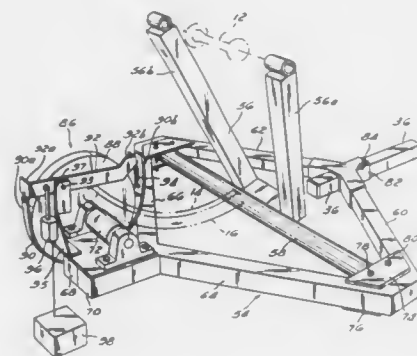
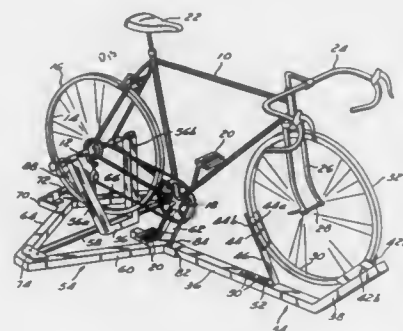
Mark J. Hoffenberg, Laguna Niguel, and Robert A. Walpert, El Toro, both of Calif., assignors to Schwinn Bicycle Company, Chicago, Ill.

Continuation-in-part of Ser. No. 169,987, Mar. 17, 1988, Pat. No. 4,815,730. This application Mar. 13, 1989, Ser. No. 322,560

Int. Cl.<sup>5</sup> A63B 21/00

U.S. Cl. 272-73

15 Claims



1. An apparatus for applying loads to a bicycle exercise device where a resistance load is applied to the pedals of the exercise device to simulate the loads experienced during riding a bicycle, comprising a resistance roller; means for mounting a bicycle to said apparatus so that the pedals of the bicycle resistively communicate with the roller;
  - a differential band brake to exert a resistance force; the differential band brake comprising:
    - a rotatably mounted drum having a friction surface at its outer periphery, the drum being selected to be of sufficient size to simulate the inertial loads of a bicycle and rider;
    - a link pivot member having a first and second end, the link being pivotally mounted intermediate the first and second ends;
    - a spring member connected to one end of the link member; and
    - a brake band adjacent a portion of the friction surface of the drum, the brake band having a first end connected to the first end of the link pivot member, and a second end connected to the spring member;
  - positioning means connected to the link pivot member intermediate the first and second ends of the link pivot member to position the link pivot member so as to cause the brake band to frictionally engage the drum to cause a resistance

force to be exerted and means for communicating the resistance force from the brake to the roller.

# 4,951,938

## EXERCISE SHOE

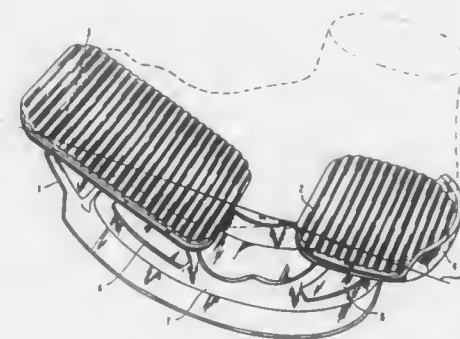
Christopher J. B. Smith, IV, Oceanport, N.J., assignor to Pro Stretch, Inc., Long Branch, N.J.

Filed Mar. 15, 1989, Ser. No. 323,763

Int. Cl.<sup>5</sup> A63B 23/04

U.S. Cl. 272-96

2 Claims



1. An exercise shoe, comprising:
  - a semi-circular base portion having a generally diametrical axis extending therethrough and including a semi-circular sole plate on which the exercise shoe rocks on a support surface and a support extending generally upwardly from said sole plate and lying in a generally vertical plane;
  - a heel support platform affixed to said support and a foot ball support platform affixed to said support, said platforms disposed in a generally V-shaped disposition with respect to each other on said support with said heel support platform lying in a first inclined plane intersecting said generally vertical plane at right angles and with said foot ball support platform lying in a second inclined plane intersecting said generally vertical plane at right angles, said heel support platform and said first inclined plane inclined at an angle of  $20^\circ \pm 5^\circ$  with respect to said axis and said foot ball support platform and said second inclined plane inclined at an angle of  $30^\circ \pm 5^\circ$  with respect to said axis; and
  - upon said exercise shoe rocking on said support surface said first and second inclined planes at all times intersecting said generally vertical plane at right angles.

# 4,951,939

## EXERCISE MACHINE

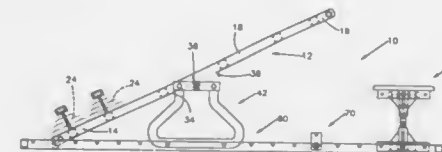
Dale W. Peters, 25761 Rose Rd., West Lake, Ohio 44145

Filed Oct. 11, 1988, Ser. No. 255,319

Int. Cl.<sup>5</sup> A63B 21/06

U.S. Cl. 272-117

19 Claims



1. An exercise machine, comprising:
  - a lever defining a longitudinal axis and having first and second ends;
  - a fulcrum for supporting the lever, the fulcrum being disposed intermediate the first and second ends;
  - a level base connected to the fulcrum and extending on

either side of the fulcrum for supporting the fulcrum in a stable position, the base adapted to lie atop a flat surface; a selected number of weight plates disposed adjacent the first end of the lever for resisting upward movement of the first end of the lever, the weight plates being disposed only intermediate the fulcrum and the first end of the lever, the weight plates remaining non-rotatably connected to the lever during operation of the machine; connecting means for connecting the weight plates to the lever; and a handle disposed at the second end of the lever for enabling a user to raise and lower the second end of the lever, the handle extending laterally relative to the longitudinal axis.

# 4,951,940

## WATER WEIGHT

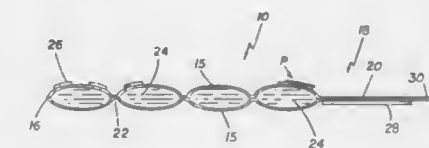
Frank T. Vitello, Medford, and Alfred J. Gallardi, Arlington, both of Mass., assignors to Medical Equipment & Devices, Inc., Weymouth, Mass.

Continuation of Ser. No. 117,027, Nov. 4, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 317,851

Int. Cl.<sup>5</sup> A63B 21/065

U.S. Cl. 272-119

7 Claims



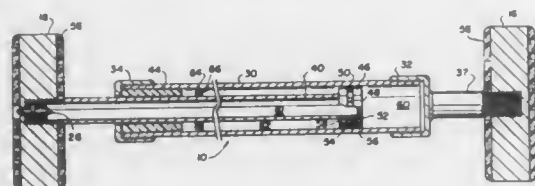
1. A band-form weight device adapted to be worn on and for the exercise of a limb of a body comprising:
  - an elongated, flat liquid-tight envelope defined, in an unfilled condition, by juxtaposed flat layers of plastic material heat sealed together along corresponding peripheral edges and further heat sealed together at a series of spaced apart, hinge joints each extending in the direction of the width of the envelope defining a series of at least three chambers which are substantially flat when unfilled, in fluid communication with each other, said layers being of the same size and constructed so as to be flat and closely spaced when empty and to separate during filling only to the extent necessary to receive liquid during filling so as to cause limited introduction of air during filling, said hinge joints facilitating filling of liquid with limited introduction of air, said envelope having a fill port for introduction and removal of liquid that is located near a longitudinal end of said envelope so as to facilitate filling with limited introduction of air; weighting liquid substantially evenly distributed among said chambers thereby providing a filled region of said envelope, the layers in the remaining, unfilled region of said envelope being proximate to each other an amount sufficient to exclude all but a minimum quantity of air in said unfilled region; a strap longitudinally joined to and extending from one of said envelope which, when said envelope contains weighting fluid and is



wrapped about a limb, wraps about said envelope, is fastened thereto and, as fastened, exerts pressure on said envelope and the weighting liquid therein whereby to substantially evenly distribute said weighting liquid in said envelope; and fastening means on a side of said envelope and on a complementary facing side of said strap; said tensioned, limb-molded envelope having a minimum of air in the space in said envelope not filled with weighting liquid sufficient to minimize sloshing of said weighting liquid.

**4,951,941**  
**PORTABLE MUSCLE TONER**  
William Resk, 140 Douglas Pl., Fleetwood, N.Y. 10852  
Filed May 15, 1989, Ser. No. 351,667  
Int. Cl.<sup>5</sup> A63B 21/00  
U.S. Cl. 272-130

10 Claims



1. A portable muscle toner comprising:
  - a cylinder assembly having a first closed end, a second open end and an interior chamber;
  - a piston assembly slidably mounted in said open end and into said interior chamber of said cylinder assembly, said piston assembly comprising a piston tube having opposite open ends and being slidably mounted in said open end of said cylinder assembly with part of said piston tube extending into said interior chamber and part of said piston tube extending out of said interior chamber, said interior chamber having an annular chamber (62) around the part of said piston extending into said interior chamber, and a main chamber (60) at said first closed end of said cylinder assembly, said piston assembly further comprising a piston head (46) around the open end of said piston tube which is on the part of said piston tube extending into said interior chamber for sliding along the interior chamber, and for separating said annular chamber from said main chamber, said piston head having an equalizing hole (54,56) there-through for equalizing pressure between said annular chamber and said main chamber;
  - sealing means operatively engaged between said piston tube and said cylinder assembly for sealing said interior chamber against the atmosphere;
  - a normally closed pin operated inflating valve positioned in and closing the open end of said piston tube which is in the part of the piston tube extending out of said interior chamber, said valve communicating with said interior chamber through said piston tube for inflating said interior chamber to a static elevated operating pressure with respect to the atmosphere, said piston assembly being constructed so that the static elevated operating pressure tends to move said piston assembly and said cylinder assembly in opposite directions;
  - first handle connected to said closed end of said cylinder assembly;
  - and
  - a second handle connected to said piston tube at the open of the piston tube containing said valve, said first and second handles being movable toward each other for moving said piston assembly and said cylinder assembly together against the static elevated operating pressure.

**4,951,942**  
**MULTIPLE PURPOSE EXERCISE DEVICE**  
Jerold A. Walden, 172 H Brandywine Dr., Westerville, Ohio 43081  
Filed May 22, 1989, Ser. No. 355,756  
Int. Cl.<sup>5</sup> A63B 21/02  
U.S. Cl. 272-135

19 Claims

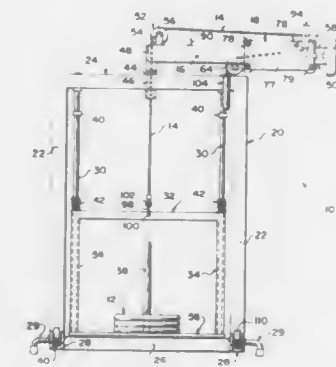


1. A portable multipurpose exercise apparatus comprises:
  - a portable lever arm having telescoping means with openings on the forward and rearward ends with a biasing means therethrough, and lever arm locking means for securing said lever arm at varying extended lengths,
  - a portable platform base having an upper surface allowing a user to stand on during various aerobic exercise programs, and to sit on during other various aerobic exercise programs, a lower surface which engages the ground, wherein the upper surface is supported horizontally above the lower surface by a plurality of downwardly extending side walls with openings on both the forward and rearward ends, and platform base locking means for securing said biasing means at various positions,
  - a portable framework having two framework sides, each of said framework sides having a forward side member and a rearward side member rotatably attached to each other and allowing said framework forward and rearward side members to be positioned in various angles in respect to each other within a vertical plane, a plurality of stabilizer means secured to the inner walls of said framework forward and rearward side members to support said framework forward and rearward side members in a perpendicular position in respect to the ground, and framework attachment means for receiving the platform base,
  - a plurality of portable rail units, each of said rail units having an elongated, generally rectangular shaped tubular rail member with a longitudinal channel on two opposite sides of said rail member, rail member fastening means on both the forward and rearward ends of said rail member to secure said rail member to the framework, and a gliding unit having a plurality of rollers for fully supporting and allowing movement of said guiding unit on said longitudinal channels, an upper surface gliding member having a recessed area forming a channel, a plurality of vertically positioned gliding side members attached perpendicularly to said upper surface gliding member, and a plurality of roller units perpendicularly attached to said gliding side members for guiding said biasing means therethrough to form a loop configurations for providing resistance to the portable multipurpose exercise apparatus,
  - a seat unit comprising a horizontal seat surface for supporting said user in a sitting position, and seat securing means for securing said seat unit to said gliding units during a rowing exercise program and said various aerobic exercise programs,
  - a plurality of foot pedals, each of said foot pedals having a horizontal foot pedal surface for supporting the user's

foot, and foot pedal securing means for securing said foot pedal to said gliding unit, and a support stand having a support stand rail member with support stand fastening means on the forward and rearward ends thereof to secure said support stand rail member to the framework, and a support member rotatably attached to said support stand rail member for restraining the user's forward motion during a cross country skiing exercise program and said various aerobic exercise programs, wherein said seat unit, said plurality of foot pedals, and said support stand are interchangeable for the desired exercise program.

**4,951,943**  
**EXERCISE AND TRAINING APPARATUS**  
Douglas W. Farenholtz, #8 - 6267 West Boulevard, Vancouver, B.C., Canada (V6M 3X4)  
Filed Apr. 21, 1989, Ser. No. 341,353  
Int. Cl.<sup>5</sup> A63B 21/00  
U.S. Cl. 272-143

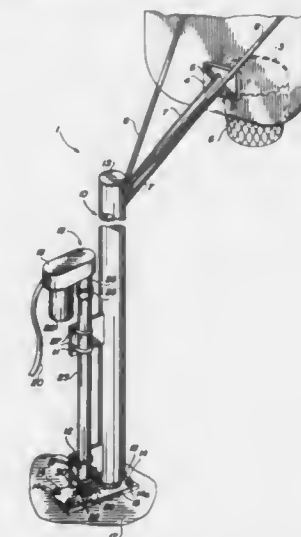
9 Claims



1. A training and exercise apparatus for applying force against a resisting force, comprising:
  - (a) an upstanding frame;
  - (b) a rotatable arm supported by said frame at a first end for rotation about the top said frame in a horizontal plane;
  - (c) force receiving means, communicating with said arm, for receiving force applied by a user;
  - (d) a resisting force;
  - (e) cable means for connecting said force receiving means to said resisting force, connected to said force receiving means adjacent a first end and to said resisting force at a second end, responsive to the application of pulling force on said force receiving means to cause force to be applied against said resisting force;
  - (f) said force receiving means including lower wheels and said arm including a longitudinal upper track adapted to receive said wheels for rolling on said track;
  - (g) a vertical opening, adjacent said first end, extending through said frame and said arm to receive said cable means therethrough;
  - (h) a first pulley on said arm for receiving said cable through said opening from said force resisting means;
  - (i) a second pulley on said arm adjacent to second end of said arm for receiving said cable from said first pulley;
  - (j) a third pulley on the bottom of said arm substantially intermediate between said first and second ends of said arm for receiving said cable from said second pulley;
  - (k) connecting means for connecting said force receiving means to said cable between said second and third pulleys.

**4,951,944**  
**ADJUSTABLE BASKETBALL GOAL**  
William K. Morgan, Rte. 1, Box 326, Hughes Springs, Tex. 75656  
Filed Mar. 27, 1989, Ser. No. 328,676  
Int. Cl.<sup>5</sup> A63B 63/08  
U.S. Cl. 273-1.5 R

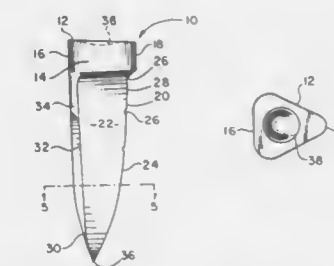
9 Claims



1. An adjustable basketball goal comprising a fixed support attached to a supporting surface; a backboard support slidably carried by said fixed support; a backboard fixedly attached to said backboard support and a rim attached to said backboard; a pair of plates fixedly attached to said backboard support in spaced relationship; an actuator support shaft attached to said plates and an actuator drive shaft carried by said actuator support shaft in selectively extendible and retractable relationship, with the extending end of said actuator drive shaft pivotally attached to the supporting surface, whereby said backboard support, said backboard and said rim are adjustable with respect to the supporting surface responsive to operation of said actuator drive shaft.

**4,951,945**  
**PLASTIC GOLF TEE**  
Robert M. Gamble, 450 N. Barfield Dr., Marco Island, Fla. 33937  
Continuation-in-part of Ser. No. 59,871, Jun. 8, 1987, Pat. No. D. 308,086. This application Aug. 14, 1989, Ser. No. 392,580  
Int. Cl.<sup>5</sup> A63B 57/00  
U.S. Cl. 273-33

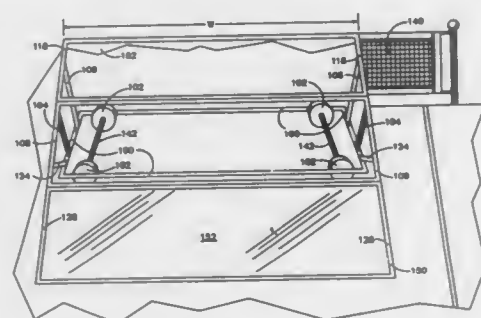
9 Claims



1. A golf tee formed from a high impact plastic comprising a sword shaped shaft having an enlarged triangular head integral therewith, said triangular head having an upper flat surface with a slightly concave area located therein, for supporting a

golf ball, side aprons connecting to form a front apex and a flat rear side, said shaft projecting downwardly from said triangular head and forming a pointed base for inserting into the teeing ground, wherein said tee is about three inches in height, and said triangular head is about 13/16 inch from the center of the rear side to the front apex, and about 11/16 inch at its widest point.

**4,951,946**  
**PORTABLE FOLDING GAME RAMP**  
Lee DeYoung, 904 Silver Spur Rd., Ste. 688, Rolling Hills Estates, Calif. 90274  
Filed Mar. 7, 1989, Ser. No. 319,678  
Int. Cl.<sup>5</sup> A63B 61/00  
U.S. Cl. 273—29 R 15 Claims



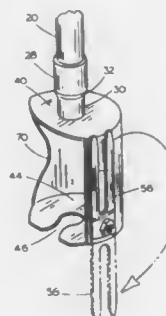
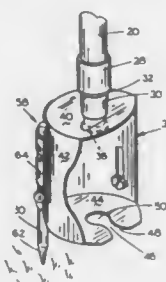
1. A portable folding game ramp in combination with a regulation lawn tennis court playing surface having a tennis net of regulation height and extending transversely there across wherein opposing players on foil playing surface propel an elastic projectile between each other over a said net of predetermined height, said portable folding game ramp comprising:

- (a) a portable base frame;
- (b) ramp means connected to said base frame, said ramp means characterized by a surface from which said projectile bounces upon impact therewith, said ramp means comprising,
  - (b1) first and second planar ramp sections, each of said ramp sections having opposing pairs of longitudinal and lateral edges,
  - (b2) center hinge means connecting said ramp sections together along a lateral edge of each of said ramp sections,
- (c) articulating means connecting said ramp means to said base frame whereby said ramp means is movable between a compact folded position and an extended position in which said ramp means extends from said predetermined height along a decending angle toward said playing surface.

**4,951,947**  
**GOLF BALL TEEING DEVICE**  
James F. Kopfle, 11803 Mason Plz., Omaha, Nebr. 68154  
Filed Dec. 6, 1989, Ser. No. 447,182  
Int. Cl.<sup>5</sup> A63B 71/00  
U.S. Cl. 273—32.5 6 Claims

1. A golf ball teeing device, comprising, an elongated hollow tubular member having upper and lower ends, an elongated shaft means longitudinally movably mounted in said tubular member, and having an upper end positioned above the upper end of said tubular member and a lower end positioned below the lower end of said tubular member, a housing mounted on the lower end of said tubular member including an arcuate vertical wall having an opening at

one side thereof and a bottom wall at the lower end of said vertical wall, said opening being sufficiently large so as to permit the passage of a golf ball therethrough, said bottom wall having a slot formed therein extending thereinto from the opening side of said housing to permit a golf tee to be positioned therein and supported thereby, said slot having a width such that the shank of the golf tee may pass therethrough but which will not permit the head of the golf tee to pass therethrough,



a ball engaging means at the lower end of said shaft means for selectively clamping a golf ball onto the head portion of the tee whereby the tee may be inserted into the ground by moving the device downwardly to cause the tee to be inserted into the ground, and a first ground, piercing member pivotally mounted on said housing and longitudinally movable between an inoperative retracted position and an operative extended position whereby said first ground piercing member may be inserted into the ground to support the device in an upright position.

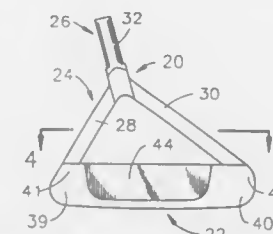
**4,951,948**  
**SHOCK ABSORBING BAT**  
Jung C. Peng, 11, Lane 10, Da Rong East Street, Taichung, Taiwan  
Filed Apr. 17, 1989, Ser. No. 338,780  
Int. Cl.<sup>5</sup> A63B 59/06  
U.S. Cl. 273—72 R 15 Claims



1. A shock absorbing bat comprising:

a main body having a tail end and a head end and an end piece; a central handle inserted into said main body from said tail end; an elastic ring set in between said main body and said central handle circumferentially; and an elastic connector having a first end connected to said end piece and a second end connected to an end of said central handle inserted into said main body; said main body and said central handle being held firmly together by means of said elastic ring and said elastic connector; said elastic ring includes a gas bladder means for providing a pneumatic spring effect to increase the elasticity, thus increasing shock absorbing and impulse increasing properties of the bat.

**4,951,949**  
**LIGHT WEIGHT SPLIT HOSEL AND PUTTER HEAD**  
Lawrence G. Kastenhuber, 1421 N. Geyer Rd., Kirkwood, Mo. 63122  
Filed Mar. 2, 1989, Ser. No. 318,079  
Int. Cl.<sup>5</sup> A63B 53/02, 53/10, 53/12  
U.S. Cl. 273—80 A 8 Claims

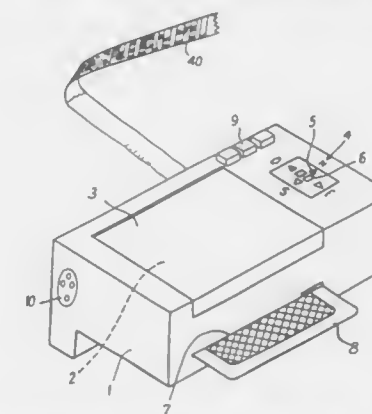


1. A split hosel and putter head, said putter head being integral and having a heel and toe portion at opposite ends of the putter head and bridging a hollowed out central portion at the rear of the putter head, said split hosel comprising a pair of light weight hosel arms having connecting means for affixation to said putter head, said hosel arms converging in an inverted V-shaped relationship at a top portion into a stub shaft connected to a lower tubular end of a putter shaft, said connecting means comprising a slot in each of the heel and toe portions in top surfaces thereof receiving lower ends of said hosel arms, said slots being aligned to simply and interfittingly receive the lower ends of said hosel arms through said top surfaces, said split hosel being constructed of a material having substantially less than one-half the specific gravity of the putter head.

**4,951,950**  
**MANUAL PLAYING CARD DEALING APPLIANCE FOR THE PRODUCTION OF PROGRAMMED DEALS**  
Gérard Normand, Besancon, and Michel Persuy, Le Vesinet, both of France, assignors to Acticiel S.A., France  
Filed Sep. 29, 1988, Ser. No. 250,882  
Claims priority, application France, Oct. 2, 1987, 87 13650  
Int. Cl.<sup>5</sup> A63F 1/14  
U.S. Cl. 273—149 P 7 Claims

1. A playing card distributing device which comprises: (a) a reception box for a pack of stacked cards to be distributed, (b) at least one roller carried by a shaft, protruding into the bottom of the reception box and on which a bottom card of the pack of cards presses, (c) a slot provided in a wall of the reception box, opposite said bottom card, (d) motor means driving in rotation said shaft for a limited period of time in the direction moving said bottom card through said slot, so that the bottom card projects partially through the slot to allow a user to grasp it manually,

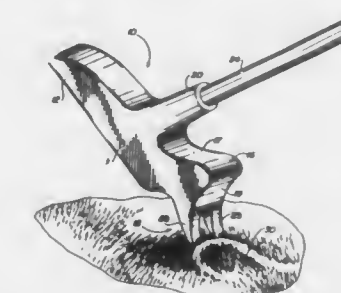
- (e) free wheel means disposed between said shaft and said motor means,
- (f) first reading means disposed in the bottom of the reception box for reading information carried by the bottom card,
- (g) a memory for storing prearranged deals,
- (h) a visual display device indicating, by comparison between the information read on the bottom card and infor-



mation stored in the memory concerning a deal in progress, to which player said bottom card should be dealt, and

- (i) second reading means disposed in the bottom of said reception box, in the vicinity of said slot, and connected to said motor means to automatically control, as soon as the bottom card has been fully removed from the slot, a limited rotation of the roller for unstacking a following card.

**4,951,951**  
**TURF FIXING PUTTER**  
Herman R. Meyer, Box 119, Green Valley, Ariz. 85622  
Continuation-in-part of Ser. No. 185,842, Apr. 25, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 315,493  
Int. Cl.<sup>5</sup> A63B 53/04, 57/00  
U.S. Cl. 273—162 F 7 Claims



1. A golf club head having a main body portion with a shaft securing neck, a toe, and a face for contact with a golf ball, said golf club head including in combination: a heel portion extending rearwardly and upwardly from said main body portion to a summit and then rearwardly and downwardly to form a forked projection, said forked projection having at least two spaced-apart prongs terminating in a plane located above the plane of the bottom of said main body portion, said prongs having an upper concave surface to penetrate and manipulate turf under the control of the movement of a shaft secured to the neck of said golf club head.



4,951,952

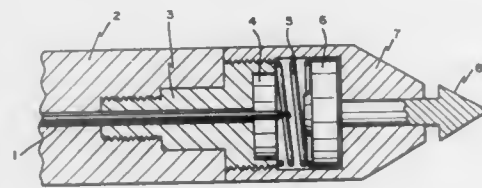
## AUTOMATIC PULSE TONE ARROW

Michael E. Saddler, 9 Royal St., RRI Box 197, N. Bennington, Vt. 05257, assignor to Michael Earl Saddler, N. Bennington, Vt.

Filed Oct. 31, 1988, Ser. No. 264,787  
Int. Cl.<sup>3</sup> F42B 6/04

U.S. Cl. 273-416

1 Claim



1. A sound emitting arrow to enable tracking of lost arrows or game shot therewith, said arrow comprising:

- (a) an arrow shaft,
- (b) a nock secured to the rear end of said arrow shaft,
- (c) a head secured to the front end of said arrow shaft, said head comprising a main body portion with hollow interior chamber and a bore extending forwardly from said chamber to the forward extent of the main body, a tip assembly slidably received on the forward portion of said main body portion comprising a forwardmost tip and a rearwardly extending shank, said shank being slidably received in said bore, with said forwardmost tip normally spaced forwardly of the main body,
- (d) a battery having opposite electrical poles normally located in a forward portion of said chamber and positioned in alignment with the bore,
- (e) a first electrical contact projecting into said chamber and in alignment behind and spaced from one of said battery electrical poles,
- (f) spring means for normally biasing said battery forwardly in said chamber out of contact with said first contact but permitting said battery to be moved rearwardly in said chamber with said one electrical pole in contact with said first contact,
- (g) means for emitting sound when electrically energized located in the rear of said arrow shaft, and
- (h) means forming a series electrical path between said first contact, said sound emitting means and the other of said battery electrical poles,

whereby when said arrow penetrates said target said tip is pushed rearwardly relative to said body causing said shank to push said battery rearwardly in said chamber, moving said one battery electrical contact into contact with said first contact thus forming a complete electrical circuit energizing said sound emitting means.

4,951,953

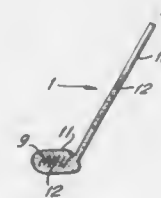
## GOLF CLUB

Dong S. T. Kim, Prides Crossing, Flanders, N.J. 07836  
Filed Feb. 15, 1990, Ser. No. 480,252

Int. Cl.<sup>3</sup> A63B 53/10

U.S. Cl. 273-80 B

16 Claims



9. A golf club comprising a head and a shaft, the shaft being attached to the head, and wherein a substantial portion of the shaft is covered with a coating comprising materials characterized by having a Young's Modulus of 50 million psi or higher.

4,951,954

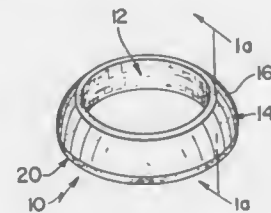
## HIGH TEMPERATURE LOW FRICTION SEAL

Gerald F. MacNeill, Bristol, R.I., assignor to ACS Industries, Inc., Woonsocket, R.I.

Filed Aug. 23, 1989, Ser. No. 397,314  
Int. Cl.<sup>3</sup> B32B 31/06, 5/28; F16J 15/12

U.S. Cl. 277-230

20 Claims



1. A high temperature low friction seal comprising a compressed wire mesh base portion and a shell portion on said base portion, said shell portion comprising between approximately 2% and 30% by weight of vermiculite having an aspect ratio of at least approximately 10 and a mean particle size of less than approximately 50 microns, between approximately 10% and 88% by weight of high temperature resistant fibers having a melting point of at least approximately 1400° F. and between approximately 10% and 88% by weight of a solid lubricant consisting of one or more materials selected from a group consisting of barium fluoride, calcium fluoride, cerium fluoride and a eutectic of barium fluoride and calcium fluoride, said shell portion defining a substantially smooth low friction mating surface on said seal.

4,951,955

## CHUCK FOR TOOLS

Iwao Sakamaki, Ojiya, Japan, assignor to Sakamaki Mfg. Co., Ltd., Niigata, Japan

PCT No. PCT/JP88/01049, § 371 Date May 17, 1989, § 102(e)  
Date May 17, 1989, PCT Pub. No. WO89/03267, PCT Pub.  
Date Apr. 20, 1989

PCT Filed Oct. 14, 1988, Ser. No. 362,433

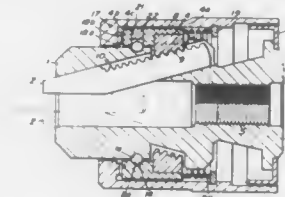
Claims priority, application Japan, Oct. 16, 1987, 62-261970  
Int. Cl.<sup>3</sup> B23B 31/10

U.S. Cl. 279-62

1 Claim

1. A chuck for a tool comprising:

- a chuck body having an axial central hole and a plurality of inclined holes extending radially therefrom;
- a plurality of jaws having male screw threads on an outer peripheral surface, said jaws set inside said inclined holes and capable of sliding;
- a rotating nut rotatably mounted on the chuck body, said rotating nut having female screw threads on the internal surface for engaging the male screw threads;
- a cylindrical rotating member rotatably and movably mounted to the axial direction of the chuck body, said rotating member positioned to cover the rotating nut, wherein the rotational force produced at the rotating member is transmitted to the rotating nut resulting in the male screw threads engaging the female screw threads and causing the jaws to contract or expand, by sliding along said inclined holes;
- a clutch mechanism including a locking ring, a form retaining ring, a clutch spring, a ring body integrally formed with the rotating member, first recessed portions and first convex portions formed equiangularly on the rotating nut, and second recessed portions and second convex portions formed on the ring body, said first and second recessed portions and first and second convex portions are opposite reciprocally, and cross at right angles, the locking ring is on the inner peripheral surface of the rear portion of the rotating member and the clutch spring is positioned between the form retaining ring and the locking ring and exerts directional tension on the rotating member and wherein the convexes transmit the force by engaging with the concaves and intercept the force by the lapping of the convexes;



Spherical bearing bodies for smooth operation positioned between the surface of the rotating nut and the surface of the chuck body, said surfaces rotating relatively and confronting reciprocally.

4,951,956

## HAND GRIP FOR A WHEELBARROW

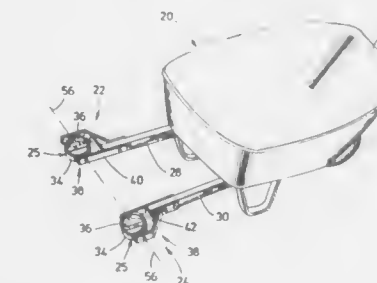
Larry W. Vittone, 309 Hannah Dr., Oliver Springs, Tenn. 37840

Filed Apr. 28, 1989, Ser. No. 345,440

Int. Cl.<sup>3</sup> B62B 1/20

U.S. Cl. 280-47.31

11 Claims



1. A hand grip assembly for a handle shaft of a wheelbarrow comprising:

handle means having a generally straight, elongate grip having opposite ends configured to be gripped by a hand along a length thereof and along a grip axis which gener-

ally coincides with the longitudinal axis of said elongate grip;  
means for pivotally mounting said handle means to the handle shaft of the wheelbarrow to provide pivotal movement of said handle means about a pivot axis which is continuously disposed generally transversely of the wheelbarrow handle shaft and parallel to a support surface underlying the wheelbarrow and which is disposed generally orthogonal to so as to intersect said grip axis approximately midway along the length of said elongated grip between the opposite ends thereof so that when the hand of a user grips the elongate grip, the pivot axis intersects the palm of the hand so that when lifting and lowering the wheelbarrow shaft with a hand grasped about the elongate grip, the handle means is permitted to pivot relative to the wheelbarrow shaft to accommodate movement of the grasping hand into a desired angular orientation relative to the handle shaft.

4,951,957

## TRAILER HITCH

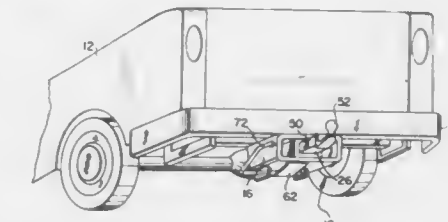
Russell C. Gullickson, 1001 West 4th St., Laurel, Mont. 59044

Filed Oct. 2, 1989, Ser. No. 415,562

Int. Cl.<sup>3</sup> B62D 53/00

U.S. Cl. 280-479.2

4 Claims



1. An improved wide-range hitch comprising:  
a rectangular open-ended tubular housing having a top wall, a spaced apart bottom wall, and a pair of spaced apart and opposing side walls;  
the tubular housing having a bore located in the top wall and a bore located in the bottom wall which bore is coaxially aligned with respect to the bore in the top wall;  
a rectangular receiver tube having a top wall, and a spaced apart bottom wall, and a pair of spaced apart and opposing side walls;  
the receiver tube being pivotally mounted within the housing for pivotal movement between the side walls of the housing in the space between the top and bottom walls of the housing;  
the receiver tube further having a bore located in the top wall and a bore located in the bottom wall which bore is coaxially aligned with the bore in the top wall, both of which bores may be coaxially aligned with the bores located in the top and bottom walls of the housing upon pivotal movement of the receiver tube;  
a cam member rigidly and transversely mounted to the bottom wall of the receiver tube;  
the cam member having a bore therethrough coaxially aligned with the bore in the bottom wall of the receiver tube, the cam member further covering the bore in the bottom wall of the housing when the bore in the bottom wall of the housing is not positioned in coaxial alignment with the bore in the cam member;  
a drawbar slidably positioned within the receiver tube and movable from a retracted position to an extended position; the drawbar having a bore therethrough which may be positioned in coaxial alignment with the bores of the receiver tube upon slidable movement of the drawbar;  
a pin sized to be received by the bores of the housing, the cam member, the receiver tube, and the drawbar when these bores are coaxially aligned;

a pin withdrawal member having a first end and a second end;  
the pin being hingedly and transversely mounted to the first end of the pin withdrawal member and extending in a direction to be received by the bore in the bottom wall of the housing;  
the second end of the pin withdrawal member being hingedly mounted to the exterior surface of the bottom wall of the housing;  
the pin having a first end positioned to normally rest within the bore in the bottom wall of the housing;  
resilient means connected between the pin withdrawal member and the housing for urging the first end of the pin in a direction from the bottom wall to the top wall of the housing and into the bore of the cam member, the bore in the bottom wall of the receiver, and the bore of the draw-bar when these bores are coaxially aligned.

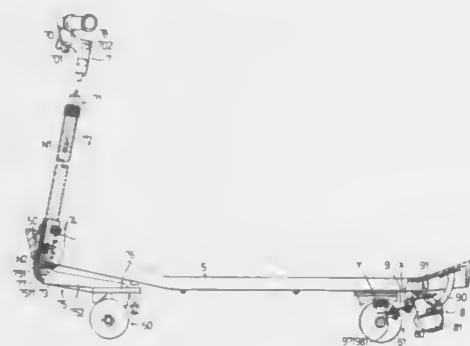
#### 4,951,958 SWINGABLE SKATEBOARD WITH TWO BRAKE ASSEMBLIES

Jung H. Chao, No. 12, Wen-Hua-1 St., Ta-Cheng Tsun, Pa-Te Hsiang, Taoyuan Hsien, Taiwan  
Continuation-in-part of Ser. No. 77,236, Jul. 24, 1987, Pat. No. 4,775,162. This application Aug. 15, 1988, Ser. No. 232,449  
The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> B62K 9/00

U.S. Cl. 280—87.041

7 Claims



1. A skateboard comprising:
  - a generally flat base board having a leading end portion and a tail end portion which can be depressed relative to the remaining portion of said base board and which tends to return to the original position after being depressed;
  - a crank member including a generally vertical crankshaft journaled on the leading end portion of said base board and a generally horizontal crank arm secured to a lower end of said crankshaft;
  - a pair of front rollers rotatably mounted on the crank arm of said crank member;
  - a handle assembly including a steering column connected securely to an upper end of the crankshaft of said crank member and two handlebars secured to an upper end portion of the steering column;
  - a pair of rear rollers rotatably mounted on said base board inwardly of the tail end portion;
  - a first brake assembly including a rubber cushion attached to an underside of said base board in such a manner that said cushion can come into contact with the ground when said handle assembly is moved upward to effectively rotate said base board about said rear rollers; and
  - a second brake assembly including two brake shoes normally disposed near said rear rollers, respectively, and a first linkage assembly connected between said brake shoes and the tail end portion of said base board; whereby, when the tail end portion of said base board is depressed, the first

linkage is activated to cause said brake shoes to engage with said rear rollers.

4,951,959

#### SUSPENSION SYSTEMS FOR VEHICLES

Kenichi Watanabe, Hiroshima; Takeshi Edaishi, Higashihiroshima, and Haruyuki Taniguchi, Hiroshima, all of Japan, assigns to Mazda Motor Corporation, Hiroshima, Japan  
Filed Feb. 22, 1989, Ser. No. 313,496

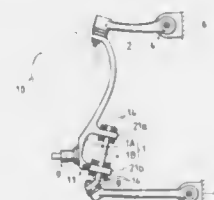
Claims priority, application Japan, Mar. 1, 1988, 63-45764;

Mar. 1, 1988, 63-45767

Int. Cl.<sup>5</sup> B62D 7/18

U.S. Cl. 280—96.1

18 Claims



1. A suspension system for a vehicle comprising:
  - a wheel supporting structure provided for supporting a steerable wheel rotatably and composed of upper and lower support members, a mounting portion on which said steerable wheel is mounted and a knuckle arm used for steering said steerable wheel each being provided on either of said upper and lower support members.
  - an upper suspension member extending to be movable up and down from a body of the vehicle for connecting said upper support member with the body in such a manner that said upper support member is movable up and down in relation to the body,
  - a lower suspension member extending to be movable up and down from the body for connecting said lower support member with the body in such a manner that said lower support member is movable up and down in relation to the body, and
  - an elastic joint structure provided for coupling said lower support member with said upper support member so that said lower support member is engaged with said upper support member only through said elastic joint structure and constituted to be relatively flexible in a vehicle longitudinal direction and relatively hard in a vehicle transverse direction.

4,951,960

#### SNOWBOARD

Stanley Sadler, Acregate, Kippen, Stirling, FK8 3EF, Scotland  
Filed Feb. 16, 1988, Ser. No. 156,316

Claims priority, application United Kingdom, Feb. 18, 1987, 8703801

Int. Cl.<sup>5</sup> A63C 5/03, 5/048

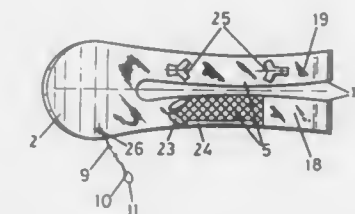
U.S. Cl. 280—607

20 Claims

1. A snow board suitable for use in controlled snow slope descent, said board having a generally flat elongate base, a forward portion with an upturned leading edge portion, a user support portion and a rearward portion with said user support and rearward portions being divided into at least partly independently moveable closely spaced left and right support portions extending generally alongside each other rearwardly from said forward portion and having opposed inner side edges disposed thereupon,

said base having outer side edges of generally angular cross-sectional shape for biting into the surface of said snow slope during turning in use of said board, said outer side

edges being concavely arcuate, in plan view, so that said board is substantially waisted intermediate its ends whereby, in use, said board can be controllably steered along an arcuate path when one of said outer edges is weighted and the other unweighted,  
said left and right support portions being torsionally flexible whereby during turning, in use of the board, the inner side edge at the rear end of one of said support portions can bite into said snow slope surface when the outer side edge of the other of said support portions bites into said snow slope surface,



said opposed inner side edges having sections which diverge rearwardly at the rearward portion of the board so as to each extend generally parallel to the respective remote outer side edge section at the forward portion of the board so that when one said outer side edge section is weighted for turning so as to bite into and engage said snow slope surface, the respective inner side edge section also bites into and engages the snow slope surface at the same time as a result of the user's natural weight distribution on the board, said engaging outer and inner side edge sections co-operating to drive the board in a substantially similar direction.

4,951,961

#### DEVICE FOR SUPPORTING THE SOLE OF A BOOT ON A SKI

Jean-Pierre Boussemart, Cholsy, and Jean-Philippe Gorliez, Aix Les Bains, both of France, assigns to Salomon, S.A., Cedex, France

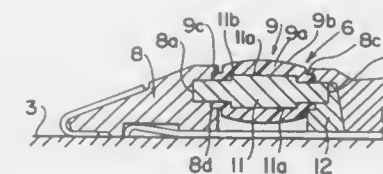
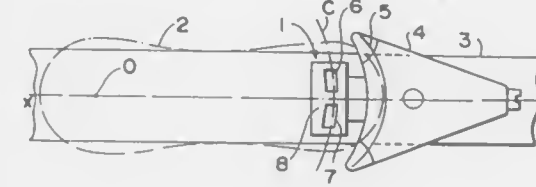
Filed Sep. 12, 1988, Ser. No. 242,863

Claims priority, application France, Sep. 18, 1987, 87 12952

Int. Cl.<sup>5</sup> A63C 11/00

U.S. Cl. 280—636

15 Claims



6. Support apparatus for supporting a portion of a ski boot upon a ski adjacent a binding, said support apparatus comprising a plurality of support elements, each of said support elements comprising an endless band, means for guiding said endless band for movement in a predetermined direction for facilitating release of the boot from the binding, a support member having an upper surface and respective openings

therein for receiving each of said plurality of support elements, wherein said means for guiding said endless band of each of said plurality of support elements is mounted within a respective opening of said support member, and wherein said endless band of each of said plurality of support elements comprises an exterior surface having at least a portion projecting beyond said upper surface of said support member for engagement with the sole of a ski boot, said openings in said support member comprising interior surfaces including seating openings, wherein said means for guiding comprises laterally spaced, longitudinally extending edge portions for engagement within said seating openings, and said endless band comprising lips along laterally spaced longitudinally extending edges, and wherein said interior surfaces of said support member comprises further openings for sealingly and slidingly engaging said lips.

4,951,962

#### VIBRATION-PROOF STRUCTURE FOR AXLE BEAM OF MOTOR VEHICLE

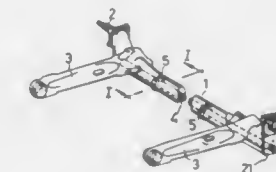
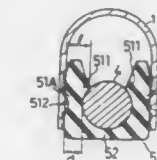
Mamoru Tomida, Kasugai; Sadao Kondo, Hashima; Masato Ueno, Komaki; Takamasa Suzuki, Koman; Masamitsu Takahara, Seki, and Yodiyuki Asakawa, Okazaki, all of Japan, assigns to Toyota Gosei Co., Ltd., Nishikasugai, Japan  
Filed Jun. 18, 1987, Ser. No. 63,406

Claims priority, application Japan, Jul. 8, 1986, 61-104646[U]; Jul. 15, 1986, 61-108449[U]

Int. Cl.<sup>5</sup> F16L 13/14

U.S. Cl. 280—689

11 Claims



7. A vibration-proof structure for an axle beam of a motor vehicle, comprising:
  - an axle beam comprising a long cylindrical body of U-shaped transverse cross-section, opening downwards and being disposed widthwise of a motor vehicle;
  - said axle beam being provided with axles at both ends of said long cylindrical body;
  - a stabilizer bar being disposed in the center of the interior of said long cylindrical body so as to connect both ends of said long cylindrical body;
  - at least one vibration-proof rubber body provided in at least one position of said long cylindrical body in its longitudinal direction and inserted between said long cylindrical body of said axle beam and said stabilizer bar from under said axle beam so as to be in elastic contact therewith, said vibration-proof rubber body having an inner surface and an outer surface conforming to respective opposed surfaces of said long cylindrical body and said stabilizer bar;
  - said vibration-proof rubber body being provided with an engaging portion in its upper end; said engaging portion having an original shape of a widthwise thickness larger than the minimum gap between said long cylindrical body and said stabilizer bar, and after said vibration-proof rubber body is inserted between said axle beam and said stabilizer bar from under said axle beam, said engaging



portion enlarging and returning to said original shape to come into contact with an upper half peripheral surface of said stabilizer bar thereby surely engaging said at least one vibration-proof rubber body with said stabilizer bar.

4,951,963

## SELF-ADJUSTING KNEE BOLSTER

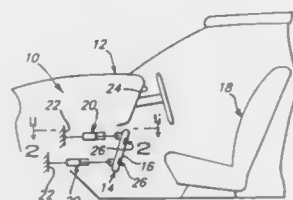
Leonard W. Behr, Pontiac, and Craig W. White, Grosse Pointe, both of Mich., assignors to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed Oct. 2, 1989, Ser. No. 415,720

Int. Cl.<sup>5</sup> B60R 21/02

U.S. Cl. 280—753

13 Claims



1. A safety device for protecting a passenger of a motor vehicle comprising:
  - a deformable, force-absorbing member forming an interior surface of said motor vehicle generally forward of said passenger when said passenger is normally seated in said motor vehicle;
  - means for sensing the position of said passenger relative to said deformable member; and
  - means responsive to said passenger sensing means for articulating and translating said deformable member relative to a fixed point on said motor vehicle so as to position said deformable member relative to said passenger to minimize injury to said passenger in the event of a subsequent collision or marked vehicle deceleration.

4,951,964

## STRUCTURE FOR SUPPORTING VEHICLE SUSPENSION SYSTEM

Toshinori Sakamoto, and Hideo Ono, both of Hiroshima, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

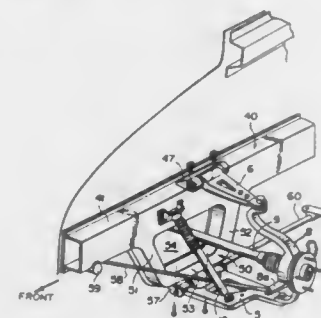
Filed Feb. 15, 1989, Ser. No. 310,432

Claims priority, application Japan, Feb. 17, 1988, 63-32907

Int. Cl.<sup>5</sup> B62D 21/02

U.S. Cl. 280—788

11 Claims



1. A structure for supporting a suspension system for a vehicle having a power plant which is disposed in an engine room formed at the front of the vehicle body with the center of gravity of the power plant positioned behind the wheel center of the front wheels, the structure comprising a pair of front side frames which extend in the longitudinal direction of

the vehicle body respectively along the left and right side walls of the engine room, and a pair of lower frame members provided on the respective front side frames so as to extend downward from the front side frames at intermediate portions thereof, each of the lower frame members being provided with a suspension supporting portion on which the suspension system for supporting the corresponding front wheel is supported, and having an opening formed between the lower frame member and the front side frame for permitting a drive shaft for the corresponding front wheel to project outside and beyond the front side frame.

4,951,965

## VEHICLE SEAT BELT RETAINER FOR A CHILD

Gregory Brown, Alberta, Canada, assignor to Innovations International Trading Corporation, Canada

Filed Jul. 22, 1988, Ser. No. 223,235

Int. Cl.<sup>5</sup> B60R 22/02

U.S. Cl. 280—801

11 Claims



1. A vehicle seat belt retainer for a child comprising a strap, means releasably securable to a lap belt of a conventional vehicle seat belt for attaching the strap to the lap belt, said strap adjustable in circumscribing the child's lower buttocks from the child's lap when the child is in seated position under the lap belt in the vehicle and thereby maintaining the lap belt in position about the child, the strap comprising a belt section having ends, both of which are attached to said means releasably securable to the lap belt, at least one of which is secured to releasable clip means, and co-operating releasable clip means secured to the means releasably securable to the lap belt, the belt section for releasably securing the lap belt in position about the child.

4,951,966

## SEAT SLIDE DEVICE WITH WALK-IN MECHANISM AND INERTIA LOCKING TYPE SEATBELT RETRACTOR

Masso Nihel, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan

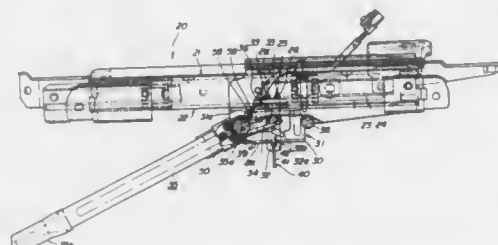
Filed Sep. 7, 1989, Ser. No. 403,884

Claims priority, application Japan, Sep. 10, 1988, 63-118928[U]

Int. Cl.<sup>5</sup> B60R 22/36; B60N 2/12

U.S. Cl. 280—807

14 Claims



1. In a motor vehicle, a combination which comprises: a seat with an inclinable seatback;

- a seat slide unit for sliding said seat to a desired position, said seat slide unit including movable and stationary rails;
- a belt retractor connected to said movable rail to move therewith, said belt retractor including a check mechanism which checks the feeding of a seatbelt from the retractor when a certain degree of acceleration is applied thereto;
- a lock mechanism incorporated with said seat slide unit to lock said movable rail at a desired fore-and-aft position relative to said stationary rail;
- an operation handle held by said movable rail and pivotally movable between a first position and a second position, said first position being a position to effect the locking of said movable rail relative to said stationary rail, and said second position being a position to cancel the locking of said movable rail relative to said stationary rail;
- a walk-in mechanism incorporated with said lock mechanism for cancelling the locking of said movable rail relative to said stationary rail when said seatback is inclined forward;
- first means for making said check mechanism inoperative when electrically energized;
- second means for energizing said first means when said operation handle assumes said second position; and
- third means for causing said operation handle to take a position other than said second position thereby to keep the first means deenergized when said seatback is inclined forward.

4,951,967

## SIGNATURE PERFORATING KNIFE AND SIGNATURE

Horst B. Michalik, Höchberg, Fed. Rep. of Germany, assignor to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany

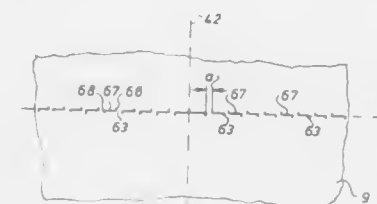
Filed Sep. 13, 1988, Ser. No. 243,722

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3731117

Int. Cl.<sup>5</sup> B42D 13/00

U.S. Cl. 281—2

5 Claims



1. A foldable signature having a plurality of paper sheets, said foldable signature being foldable along an elongated fold line, said elongated fold line having a plurality of spaced perforations extending through said plurality of paper sheets, each of said spaced perforations having a base cut which is generally at, and generally parallel to said elongated fold line, and a least a first lateral cut which extends outwardly from an end of said base cut, each of said perforations being spaced from adjacent perforations by a small web

4,951,968

## PERIODIC REMINDER SYSTEM

Mary Adams, 36 Main St. #13, North Reading, Mass. 01864

Filed Jun. 20, 1989, Ser. No. 368,806

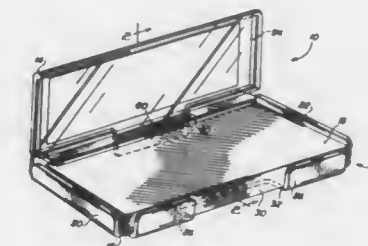
Int. Cl.<sup>5</sup> B42D 11/00; G09D 3/02

U.S. Cl. 281—45

6 Claims

1. A reminder system comprising a tray having a bottom and upstanding at least one said tray containing a packet of collated materials including a plurality of informational members having a plurality of remittance members interposed between selected of said informational members whereby removal of

selected one of said informational members will reveal selected one of said remittance members for the convenience of the



user, said remittance members being chronologically related to said informational members.

4,951,969

## APPARATUS AND METHOD FOR THE POSITIVE AND CONVENIENT CORRELATION OF THE IDENTITY OF THE DONOR OF A GIFT WITH THE GIFT

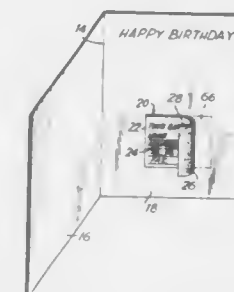
Jack Epstein, 155 E. 31st St., Apt. 28J, New York, N.Y. 10016; Morris Epstein, Kings Point, and Charles W. Socarides, New York, both of N.Y., assignors to Jack Epstein, New York, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,077

Int. Cl.<sup>5</sup> B42D 15/00

U.S. Cl. 283—67

16 Claims



1. A greeting card for use in conjunction with the donation of a gift by a donor to a recipient, said greeting card bearing indicia associated with a gift-giving occasion, donor identification means for identifying the donor of the gift, and re-usable means operatively associated with said donor identification means for attaching the same to said greeting card in readily detachable manner whereby, said donor identification means may be readily detached from said greeting card by a recipient of said gift upon receipt of the gift and attached to the gift through use of said re-usable attachment means to positively correlate the identification of the gift donor with the gift.

4,951,970

## PROTECTIVE LABEL FORM AND METHOD

Dennis M. Burt, 2208 E. North Ave., Anderson, S.C. 29625

Filed Sep. 29, 1988, Ser. No. 250,526

Int. Cl.<sup>5</sup> B42D 15/00; G09C 3/00

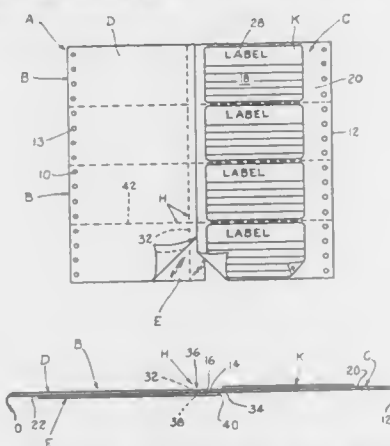
U.S. Cl. 283—67

23 Claims

1. A composite protective label on which matter may be printed by a computer printer and the like and said printed matter overlaid with a protective film for protection against deterioration of said printed matter comprising:

- a first panel having a first panel end;
- a second panel having a second panel end;
- said first panel and said second panel being coplanar and

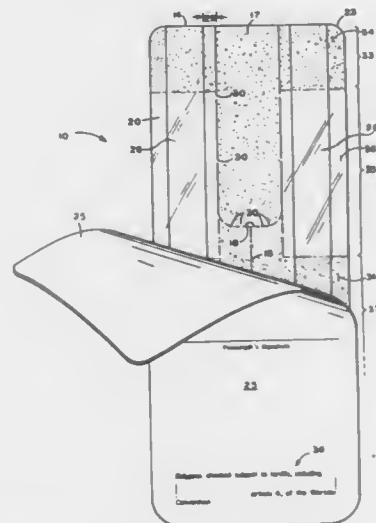
joined to one another with said first panel end and second panel end adjacent one another;  
 an imprintable surface carried on a front face of said first panel;  
 a protective film layer carried on a backside of said second panel;  
 hinge means joining said first and second panels together and forming a hinge between said first panel end and said second panel end about which said second panel is folded over said first panel; and



marginal tab means carried by said second panel for releasing a marginal portion of said second panel from said protective film layer to expose said film layer and by which said protective film layer is pulled over said imprintable surface on said first panel when said second panel is folded about said hinge means.

5. The device of claim 1 including a label carried on said front face of said first panel, said imprintable surface consisting of an exterior surface of said label.

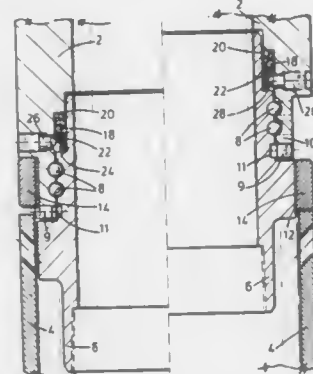
**4,951,971**  
**AIR BAGGAGE TAG**  
 Freddie L. Whited, Buckhannon, W. Va., assignor to Moore Business Forms, Inc., Grand Island, N.Y.  
 Filed Jan. 8, 1990, Ser. No. 462,037  
 Int. Cl.<sup>3</sup> G09F 3/20  
 U.S. Cl. 283—80 16 Claims



1. A luggage tag attachable to the handle of a piece of luggage comprising:

- (a) an elongate strip of flexible material having a first end, a second end, a front, and a back;
- (b) a longitudinal fold line scored into the tag and extending from the first end of the tag to terminate at a root point between the first end and the second end, the tag being foldable about the fold line;
- (c) a detachable ticket integrally formed in the center of the tag and extending from the root of the fold line to the second end of the tag;
- (d) tongues formed in the tag on each side of the detachable ticket, the detachable ticket and tongues being configured and arranged so that removal of the ticket from the tag allows passage of the handle between the tongues;
- (e) attaching means for attaching one tongue to the other to enclose the handle thereby securing the tag to the handle; and
- (f) reinforcing strips of tear resistant material extending along the back of said elongate strip of flexible material spaced from and generally parallel to said detachable ticket, said reinforcing tear resistant strips extending at least the length of said tongues.

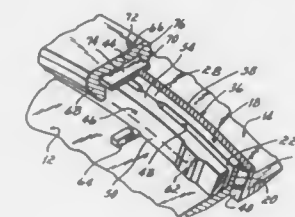
**4,951,972**  
**ROTATABLE SEALING ASSEMBLIES**  
 Brian Macintyre, Milngavie; Frank Close, Airdrie, and Sean McAvoy, Coatbridge, all of Scotland, assignors to Cooper Industries, Inc., Houston, Tex.  
 Filed Jul. 20, 1989, Ser. No. 382,530  
 Claims priority, application United Kingdom, Jul. 22, 1988, 8817555  
 Int. Cl.<sup>3</sup> F16L 21/08, 19/065  
 U.S. Cl. 285—23 8 Claims



4. An adjustment device for relatively rotatable members of an annular sealing assembly, including an attachment member to be sealed with respect to a bore through the intermediary of a tubular housing which is supported within a support tube, a sealing device comprising two annular sealing members, compression of which in an axial direction produces an increased radial diameter thereof for sealing said attachment member with respect to said tubular housing, the device further comprising said tubular housing adapted to be having a peripheral surface, an annular support member encircling said housing and movable axially thereof between two axially spaced positions on said peripheral surface, retaining members to maintain said support member in a first, out-of-the-way position until the housing is positioned in the bore, said retaining members being releasable to permit axial movement of the annular support member from said first position towards a second of said positions in which said member is in direct contact with a rim portion of said support tube, rotational adjustment means permitting rotation between said attachment member and said housing prior to the support member taking up its second position, an immobilisation means to immobilise said rotational adjustment means and an energisation ring means to energise

said sealing device by axial compression when the support member is in its second position.

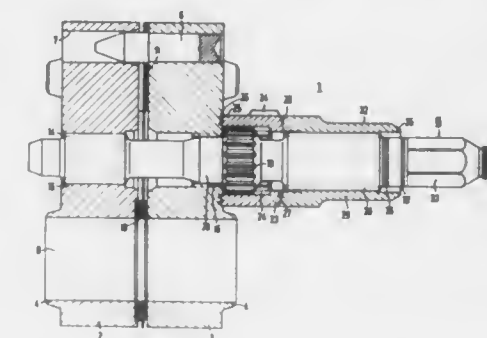
**4,951,973**  
**JOINT CONNECTION FOR ANNULAR FLANGES**  
 Robert J. Corrmeler, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio  
 Filed Mar. 17, 1988, Ser. No. 169,552  
 Int. Cl.<sup>3</sup> F16L 35/00  
 U.S. Cl. 285—24 56 Claims



1. Apparatus for connecting a first element to a second element, comprising:
  - a first flange formed on said first element, said first flange having an inner surface and an outer surface;
  - a second flange formed on said second element, said second flange having an inner surface and an outer surface, said inner surface of said second flange abutting said inner surface of said first flange;
  - a clamp having first and second clamp arms which straddle said outer surface of a first flange and said outer surface of said second flange;
  - a locking spring positioned between said first clamp arm and said outer surface of said first flange locking said backing spring having a planar surface;
  - first wedge lock elements extending outwardly from a surface of said locking spring planar surface, and mating second wedge lock elements extending outwardly from one of said first clamp arm and said outer surface of said first flange;
  - said locking spring being movable to a locked position between said first clamp arm and said first flange in which said first wedge lock elements engage said mating second wedge lock elements to force said locking spring against said first clamp arm and said outer surface of said first flange, said locking spring and said first and second flanges being tightly wedged between said first and second clamp arms for connecting the first and second elements together.

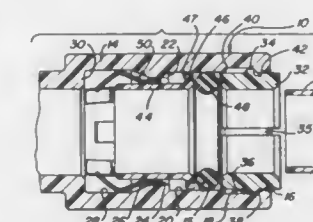
**4,951,974**  
**REMOTE-CONTROLLABLE SCREW CONNECTION**  
 Hans-Peter Schabert, Erlangen; Erwin Laurer, Moehrendorf, and Erich Strickroth, Buckenhof, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich and Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, both of, Fed. Rep. of Germany  
 Filed Jun. 21, 1989, Ser. No. 369,629  
 Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, 3821641  
 Int. Cl.<sup>3</sup> F16L 19/03; F16B 43/00  
 U.S. Cl. 285—39 15 Claims

1. Remote-controllable screw connection, comprising a nut, a first flange relatively closer to and a second flange relatively further away from said nut, at least one screw bolt connecting



means for making said sheath non-rotatable and displaceable with respect to said screw bolt.

**4,951,975**  
**COUPLING FOR CONDUITS**  
 Donald D. Bartholomew, Marine City, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.  
 Filed Oct. 24, 1988, Ser. No. 264,076  
 Int. Cl.<sup>3</sup> F16L 17/00  
 U.S. Cl. 285—111 14 Claims

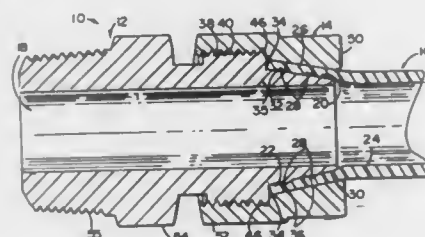


1. In a pressure or vacuum confining system, a coupling for connecting a tubular member to a mating member into which said tubular member is inserted, said mating member comprising:
  - a female housing:
    - said female housing having an interior being shaped so as to accept into the open end said tubular member, a gripping means, release bushing means, sealing means, and a retainer release operator;
  - said gripping means including a discontinuous band enabling insertion into said female housing and at least two spring like means, one of said spring like means adapted to engage said tubular member, the other spring like means cooperating with said interior of said female housing interior to prevent said gripping means from being translated into said female housing to an extent sufficient to disrupt a gripping releasing motion, both of said spring like means extending from said discontinuous band and with said first spring like means cooperating with said female housing preventing withdraw of said tubular member in response to a withdrawing movement of said tubular member;
  - said releasing bushing positioned in said interior of said female housing and shaped in a manner that said releasing bushing is operated to release said gripping means by the movement of said sealing means;
  - said sealing means constructed so as to seal the interior of said female housing to the exterior of said tubular member and be located between said releasing bushing and said retaining releasing operator; and
  - a retaining releasing operator constructed in a manner such



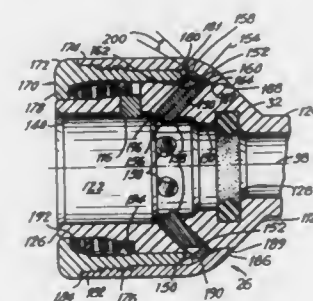
that said operator may be installed into said female housing, and once installed, resist removal from said female housing, whereby the retaining releasing operator being constructed so as to be moveable within said housing in a manner that will cause movement of said sealing means in response to an outside force applied to said retainer releasing means for purpose of releasing said tubular element from said mating member.

**4,951,976**  
**CONNECTOR FOR SOFT-WALLED CONDUIT SUCH AS POLYURETHANE HOSE**  
Wallace G. Boelkins, Grand Rapids, Mich., assignor to Uni-Mist, Inc., Grand Rapids, Mich.  
Filed Sep. 12, 1988, Ser. No. 242,971  
Int. Cl.<sup>5</sup> F16L 35/00  
U.S. Cl. 285—114 10 Claims



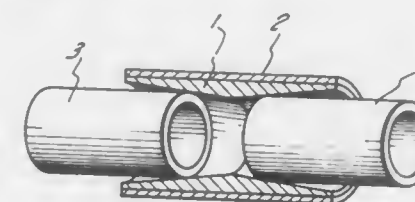
1. A hose assembly comprising:
  - a solid-walled polyurethane hose having an inner sidewall defining an internal passage through which fluid is conveyed;
  - a male member having connecting means thereon and including an axial bore and a frustum end having a substantially uniformly tapered generally conical exterior surface encircling said axial bore, said frustum end receiving an end portion of said hose in flared relation over said tapered exterior surface for attachment of the hose to such member, said frustum end further including at least one sharp annular barb encircling said tapered exterior surface to extend into said inner sidewall of said hose and prevent slippage of said hose from said frustum end;
  - a female member having connecting means thereon and including an axial cavity extending therethrough, said cavity receiving therein said hose end portion and said frustum end of said male member upon telescoping engagement of said female member thereover, said cavity including a generally conical portion having substantially the same uniform taper as said exterior surface of said frustum end, said female member being secured in place upon said male member by said connecting means with said conical portion positioned to contiguously overlie said flared end portion of said hose received on said frustum end exterior surface and hold such portion in tightly clamped relation therebetween with said at least one sharp annular barb embedded in said inner sidewall of said hose, thereby securing the hose in place upon the frustum end of said male member; and
  - mutually cooperating indexing means on said male member and female member for defining a predetermined point of full telescoping relation therebetween at which said barb is fully embedded in said inner sidewall and the wall section of said flared end portion of said hose is sufficiently compressed between said male and female members to maintain the secure connection of the hose thereto without physical degradation of the hose sidewall.

**4,951,977**  
**ARTHROSCOPIC SHEATH WITH QUICK COUPLING SOCKET**  
George V. Shutt, Glendora, Calif., assignor to Zimmer, Inc., Warsaw, Ind.  
Filed Feb. 2, 1989, Ser. No. 305,887  
Int. Cl.<sup>5</sup> F16L 37/18  
U.S. Cl. 285—316 10 Claims



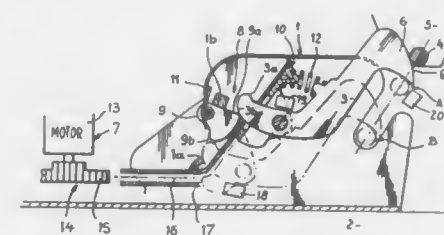
1. A quick coupling socket adapted for receiving therein and locking thereto an associated cylindrical plug member, said socket comprising:
  - a tubular cylindrical housing having a rear open end for receiving the associated plug member and a front end for being operatively connected to a selected member, said cylindrical housing provided with a plurality of annularly arranged and circumferentially spaced throughbores extending radially outwardly from the axis of said cylindrical housing and axially away from the rear end thereof;
  - a plurality of locking pins, each respectively situated within one of said throughbores and adapted to be non-rotatably slidable therein, each pin comprising:
    - a generally cylindrical member having at its most radially inward end a first end surface and, at its other end, a second end surface oriented at a first predetermined angle relative to the axis thereof, said cylindrical member having a notch formed substantially in its rearwardly facing cylindrical surface adjacent said second end surface, said notch comprising a first surface oriented at a second predetermined angle relative to the axis of said cylindrical member and a second surface oriented substantially parallel to the axis of said cylindrical housing;
  - a slidable cylindrical actuating assembly mounted coaxially to and radially outwardly of said cylindrical housing, said actuating assembly comprising:
    - an inner actuating sleeve having a first annular end comprising a radially inwardly directed first annular flange slidably situated on the external surface of said cylindrical housing adjacent said rear end thereof, a second annular end proximate to and selectively engageable with the first surface of the notch of each of said cylindrical members, a spring means interposed between said first annular flange and said external surface of said first cylindrical housing for maintaining rearward bias therebetween;
    - an outer actuating sleeve attached to and movable with said inner actuating sleeve, said outer actuating sleeve comprising, adjacent its front end, an annular retaining surface abutting each of said second end surfaces of said cylindrical members, the front ends of said inner and outer actuating sleeves being spaced a predetermined distance to enable said pins to move relative to same as said actuating assembly is moved relative to said housing.

**4,951,978**  
**HEAT-RECOVERABLE COMPOSITION COUPLING DEVICE**  
Charles L. Martin, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 878,525, Jun. 23, 1986, Pat. No. 4,874,193, which is a continuation of Ser. No. 552,711, Nov. 17, 1983, abandoned, which is a division of Ser. No. 29,212, Apr. 12, 1979, Pat. No. 4,455,041, which is a continuation of Ser. No. 608,206, Aug. 22, 1975, abandoned, which is a continuation-in-part of Ser. No. 404,723, Oct. 9, 1973, abandoned, and a continuation-in-part of Ser. No. 404,724, Oct. 9, 1973, abandoned. This application Aug. 1, 1989, Ser. No. 376,375  
Claims priority, application Sweden, Apr. 9, 1975, 7504070  
The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.  
Int. Cl.<sup>5</sup> F16L 17/02  
U.S. Cl. 285—369 23 Claims



1. A composite device for securely engaging at least one substrate which comprises:
  - (a) at least one tubular, heat-recoverable, metallic compression sleeve; and
  - (b) at least one tubular, metallic insert snugly and concentrically disposed within, adjacent to, and in contact with the compression sleeve so that when the compression sleeve is heated above its transition temperature, the insert is altered in at least one of its dimensions and is driven inwardly by the heat-recovered sleeve for securely engaging and forming a gas-tight seal with the substrate, the insert having an inner surface and an outer surface, the inner surface of said insert being tapered and the diameter of the outer surface being substantially constant.

**4,951,979**  
**LATCH, IN PARTICULAR FOR A MOTOR VEHICLE**  
Gerard Escaravage, Valentigney, France, assignor to Aclers Et Outillage Peugeot, Audincourt, France  
Continuation of Ser. No. 101,100, Sep. 25, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 314,222  
Claims priority, application France, Sep. 26, 1986, 86 13493  
Int. Cl.<sup>5</sup> E05C 5/02  
U.S. Cl. 292—110 13 Claims



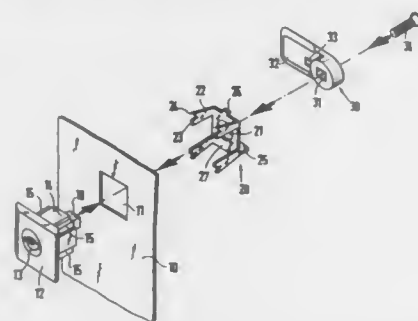
1. A latch assembly comprising in combination a first part and a second part of in particular a motor vehicle, which parts are relatively movable in a first path, and a latch for latching said parts,
  - said latch comprising a case mounted on said first part, a keeper mounted on said second part so that said keeper and said case are relatively movable toward and away from each other in said first path, a support movably

mounted in said case, a bolt movably mounted on said support and defining keeper hooking means, said support being movable relative to said case in a second path substantially parallel to said first path between a first position in which said keeper hooking means is capable of encountering said keeper upon said relative movement of said first part and said second part, and a second position in which said keeper is hooked in said case by said hooking means, actuating means connected to said support for shifting said support between said first position and said second position of said support, said actuating means comprising an electric motor, a power supply, conductors connecting said power supply to said motor, a first switch and a second switch inserted in said conductors, said first switch being operative to cause supply of power to the motor for automatically shifting said support from said first position to said second position of said support and said second switch being operative for supplying, when desired, power to said motor for shifting said support from said second position to said first position for releasing said keeper, said bolt being movable relative to said support transversely of said second path between an active position in which said keeper hooking means is located in said first path and a retracted position in which said keeper hooking means is retracted from said first path, said keeper hooking means defining a cam surface which is engageable by said keeper in said active position of said bolt and in said first position of said support and is operative to shift said bolt to said retracted position to permit hooking onto said keeper upon engagement with said cam surface, elastically yieldable means associated with said bolt for elastically biasing said bolt to said active position of said bolt, means for detecting the position of said keeper upon said hooking of said keeper by said keeper hooking means and associated with said first switch for actuating said first switch and automatically causing operation of said actuating means and thereby causing said support to be shifted to said second position of said support and locking said keeper in position by said keeper hooking means, and bolt retracting means which is positioned in said case to be engaged by said bolt for retracting said bolt from said active position to said retracted position of said bolt when said support is shifted from said second position toward said first position of said support, but is disengageable from said bolt and allows said bolt to resume said active position under the action of said elastically yieldable means before said support reaches said first position of said support, said retracting means allowing the undisturbed passage of said bolt and therefore being incapable of retracting said bolt when said support is shifted from said first position to said second position of said support.

**4,951,980**  
**CABINET LATCH ASSEMBLY WITH ELECTRICAL GROUNDING FEATURE**  
Manfred Wetzel, Dietzholztal-Ewersbach, Fed. Rep. of Germany, assignor to Rittal-Werk Rudolf Loh GmbH & Co. KG, Dietzholztal-Ewersbach, Fed. Rep. of Germany  
Filed Apr. 18, 1989, Ser. No. 339,404  
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1988, 3812972  
Int. Cl.<sup>5</sup> F05C 3/00  
U.S. Cl. 292—202 20 Claims

1. A cabinet latch assembly for electrically grounding a rotary bar attached to a cabinet having a non-conductive surface coating, the assembly including:
  - a housing;
  - a locking element received in said housing for rotary motion between a first latched position and a second open position, the locking element having a rotary bar coupled thereto;
  - a retaining cage for supporting said housing and said latching cylinder on a sheet metal door panel, said retaining

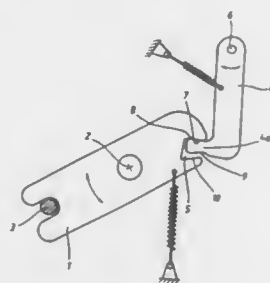
cage including a retainer plate and a plurality of supporting legs defining a space therebetween, each of said supporting legs terminating in a retainer extension and a support claw, the housing being received in the space defined by the plate and the supporting legs; said housing including depressions formed therein for receiving the supporting legs of said retaining cage;



said retainer extensions being received into said depressions in said housing and said support claws engaging the surface of said door panel when said latch assembly is mounted on said cabinet door, said claws piercing a non-conductive coating disposed thereon, the retaining cage and rotary bar thereby being electrically grounded to the door panel.

**4,951,981**  
**ROTARY-LATCH LOCK**  
Klaus Clear, Gochingen, and Jürgen Schröder, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany  
Filed Feb. 6, 1990, Ser. No. 475,860  
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1989, 3905504  
Int. Cl.<sup>5</sup> E05C 3/26  
U.S. Cl. 292—216

7 Claims

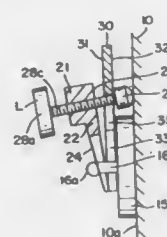


1. Rotary-latch lock comprising:  
a forked rotary latch which is blocked against pivoting in a position where it locks a closing bolt by a spring-loaded catch member;  
the spring loaded catch member has a detent end which engages behind a centrally directed catch edge on the forked rotary latch, which catch edge extends from a circumferential edge of the forked rotary latch;  
wherein the catch edge is formed as a side limiting edge of an approximately U-shaped catch recess;  
wherein the detent end of the catch member engages in the recess during a locking state;  
wherein a rear edge of the detent end is located opposite a limiting edge of the catch recess and at a distance which, in the event of oscillating movements of the forked rotary

latch, allows the limiting edge to butt against the rear edge of the detent end,  
wherein another side limiting edge of the recess and a corresponding rear edge of the detent end of the catch member are designed over a length of mutual contact as return surfaces;  
wherein during vibrations of the forked rotary latch, the return surfaces butt against one another to cause an engagement force to be transmitted to the detent end of the spring loaded catch member;  
wherein planes of the return surfaces form an acute angle with an engagement line determined by the direction of advance of the detent end;  
wherein the return surface of the detent end is a straight edge on the detent end, and  
wherein the return surface of the catch member is a straight limiting edge of the catch recess.

**4,951,982**  
**DOOR LOCK SECURITY APPARATUS**  
Clayton O. Sorkilmo, 72nd Cir. North, Brooklyn Center, Minn. 55429  
Filed Jul. 21, 1989, Ser. No. 382,910  
Int. Cl.<sup>5</sup> E05C 17/54  
U.S. Cl. 292—343

12 Claims



1. In combination with a door, the door having an interior surface, a door knob mounted by the door and extending inwardly of the interior surface and a dead bolt lock mounted by the door and having a lock housing mounted by the door, a dead bolt handle rotatably mounted by the housing and having a shaft portion extending away from the door interior surface and a cross bar portion that is of a larger transverse dimension than the shaft portion and joined to the shaft portion remote from the interior surface, and a longitudinally elongated security member removably mounted on the door and at least in part by the dead bolt lock, the security member having a first surface, a first longitudinal end portion having at least part of the first surface, and a second end portion joined to the first end portion to extend longitudinally away therefrom, the second end portion having a second surface opposite from the first surface for abutting against the cross bar portion, the second end portion having a first transverse terminal edge longitudinally opposite of the first end portion and a notch opening through said surfaces and to the transverse edge for having the dead bolt handle shaft portion extended there-through and first means for abutting against at least one of the door interior and the lock housing to selectively vary the spacing of the first end portion surface part from the door surface and moving the second surface into wedging relationship to the cross bar to prevent rotation of the dead bolt lock handle, the first means including foot means for abutting against one of the door interior and the lock housing, the foot means including a foot, and an adjustment member mounted by the first end portion and joined to the foot for selectively varying the spacing of the foot from the first end portion and thereby vary the angle of the second end portion relative to the door surface sufficiently to bindingly engage the cross bar portion when the dead bolt handle extends through the notch.

**4,951,983**  
**LOCKING APPARATUS FOR CASES**  
James A. Scott, 1002 S. Chantilly, Anaheim, Calif. 92806  
Filed Jan. 19, 1989, Ser. No. 299,172  
Int. Cl.<sup>5</sup> F05C 5/00  
U.S. Cl. 292—66

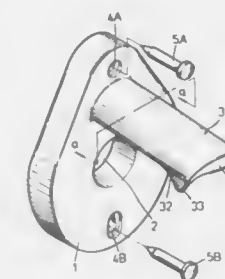
21 Claims



14. A locking arrangement comprising:  
a container having a top portion and a bottom portion, said bottom portion having a side surface and a recess formed therein;  
a sliding plate being slidably coupled to said bottom portion for movement toward and away from said top portion and disposed in said recess;  
a lever being pivotally coupled to said bottom portion and disposed in said recess;  
a link having a first end pivotally coupled to said sliding plate and a second end pivotally coupled to said lever;  
a latch member having a first end and a second end, said first end being pivotally coupled to said sliding plate; and  
means associated with said top portion for cooperating with the second end of said latch member.

**4,951,984**  
**DOOR CATCH**  
Chao-Ming Huang, No. 104, Hai Tien Road, Tainan, Taiwan  
Filed Jun. 23, 1989, Ser. No. 370,714  
Int. Cl.<sup>5</sup> F16F 1/36  
U.S. Cl. 292—76

2 Claims

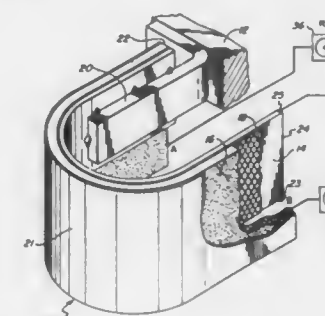


1. A one-piece integral door catch comprising:  
(a) a base member adapted to be mounted to a base surface, said base member having an opening formed therein for at least partial insertion of a portion of a doorknob, said base member having a pair of openings formed therethrough for passage therethrough of a pair of fastening elements

providing said mounting of said base member to said base surface; and,  
(b) an elastic hook member formed in a one-piece integral manner with said base member and extends therefrom, said elastic hook member forming a protuberance for passage over a doorknob, said elastic hook member having an inclined leading edge for displacing said protuberance when said hook member leading edge is contacted by said doorknob, said elastic hook member having a lower arcuate surface interfacing with said inclined leading edge for elastically capturing said doorknob.

**4,951,985**  
**BUMPER FOR IMPACT DETECTION**  
William Pong, Brookfield Center, and William S. Kazman, Danbury, both of Conn., assignors to Transitions Research Corporation, Danbury, Conn.  
Filed Nov. 1, 1988, Ser. No. 265,784  
Int. Cl.<sup>5</sup> B60R 19/00, 19/03  
U.S. Cl. 293—102

30 Claims



1. A bumper for impact detection with an object, comprising:  
an electrically conductive member;  
a compressible, electrically conductive material mounted adjacent said conductive member and having two ends;  
means for electrically insulating said conductive member from said conductive material when said conductive material is non-compressed but allowing an electrical connection between said conductive member and said conductive material when said conductive material is compressed at a point of impact with the object; and  
means for determining a position of the point of impact based on electrical measurements taken at the ends of the conductive material.

**4,951,986**  
**PLASTIC BUMPER**  
Kunio Hanafusa, Naoshige Fukuhara, and Takaaki Tachibana, all of Okayama, Japan, assignors to Minoru Industrial Co., Ltd., Okayama, Japan  
Filed Dec. 20, 1989, Ser. No. 453,942  
Claims priority, application Japan, Dec. 24, 1988, 63-327488; Dec. 24, 1988, 63-327489; May 15, 1989, 64-122290  
Int. Cl.<sup>5</sup> B60R 19/00

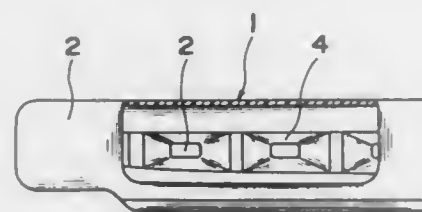
U.S. Cl. 293—120

8 Claims

1. A plastic bumper for use in an automobile comprising:  
a front wall member generally having a U-shape cross-section; and  
a rear wall member having a mid portion intermittently



indented to form a plurality of recesses each having a shape of pyramid frustum, an outer end face of each



pyramid frustum recess being adhered to an inside face of said front wall member.

4,951,987

## REFUSE COLLECTING TOOL

Jean G. Lebeau, Pte. Gatineau, Quebec, Canada J8T 6B9

Filed Oct. 16, 1989, Ser. No. 421,671

Int. Cl.<sup>5</sup> A01K 29/00; E01H 1/12

U.S. Cl. 294—1.4

4 Claims



1. A manually operable refuse collecting tool comprising: a scoop for receiving refuse, having side walls and end walls which define a closed hollow elongated scoop that is substantially elliptical in cross section, the scoop being divided along a plane coincident with the major axis of its elliptical cross-section into two opposed jaws which are hinged together along one of their adjacent longitudinal edges; means for urging the jaws of the scoop to a closed condition; a tubular handle having a grippable region on its top end and attachment means on its opposite end for affixing the handle to the hinged edge of the jaws of the scoop; means for opening the scoop located therewithin and displaceable from a position wherein the scoop is closed to a position wherein said means for opening the scoop contacts the upper regions of the interior walls of the jaws of the scoop to force the jaws outwardly to an opened condition; a lever for opening the scoop which is disposed beneath the grippable region on the top of the handle; and a linkage interconnecting the lever and said means for opening the scoop, whereby upward pressure on the lever moves the linkage to urge said means for opening the scoop upwardly to force the opposed jaws of the scoop outwardly to an open condition.

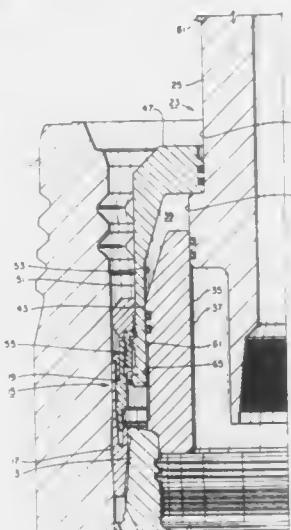
4,951,988  
CASING HANGER PACKOFF RETRIEVING TOOL  
Philippe C. Noblneau, Paris, France, assignor to Vetco Gray Inc., Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,218

Int. Cl.<sup>5</sup> E21B 31/12

U.S. Cl. 294—86.15

3 Claims



1. A retrieving tool for retrieving a packoff from a casing hanger, comprising: a mandrel having means on an upper end for connection to a string of conduit; a body carried by the mandrel having means for landing on the casing hanger, the body having a bore and an exterior wall; a mandrel piston located on the mandrel for movement therewith, the mandrel piston having a pressure area and sealingly engaging the bore of the body, defining a pressure chamber above the mandrel piston between the mandrel and the bore of the body; a retrieving sleeve piston carried for movement relative to the mandrel and to the body, the retrieving sleeve piston having a depending sleeve portion that has an inner wall that sealingly and slidably engages the exterior wall of the body, the retrieving sleeve piston having a lower side in communication with the pressure chamber, the retrieving sleeve piston having a greater pressure area than the pressure area of the mandrel piston; latching means on the exterior of the sleeve portion for latching to the packoff; and the pressure chamber being filled with a hydraulic fluid and sealed from the exterior of the retrieving tool, so that upward movement of the mandrel by pulling upward on the conduit causes the mandrel piston to increase pressure in the pressure chamber to cause the retrieving sleeve piston to move upward relative to the body to pull the packoff upward.

4,951,989

## FIRE HYDRANT SETTING TOOL

Roy Goodin, Rt. 1, Box 307A, Hartman, Ark. 72840

Filed Oct. 10, 1989, Ser. No. 419,587

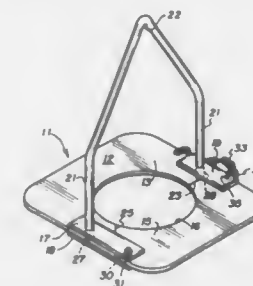
Int. Cl.<sup>5</sup> B66C 1/62

U.S. Cl. 294—90

7 Claims

1. A tool for grasping, lifting or lowering a fire hydrant or the like having a generally cylindrical body with an enlarged end, said tool comprising a collar member formed of a first rigid generally planar plate member, a second generally planar plate member, means for connecting said second plate member to said first plate member in a coplanar relation with freedom

of pivotal motion therebetween about a pivotal axis perpendicular to the plane of said plate members and passing through said second plate member, each said plate member having an arcuate opening such that said plate members may be arranged in a position with said arcuate openings forming an opening in the form of a circle, latch means for retaining said plate members in such position, at least one rigid guide plate secured on one of said plate members and overlying the other of said plate



members to resist forces tending to bend said plate members out of coplanar relation, and bail means with ends secured at two points on said first plate member located substantially on an extended diameter of said circle, said bail means reaching to a point above the center of said circle by a distance at least as great as the radius of said circle, said bail means being formed of a rigid rod which is secured in an opening passing through both said first plate member and said at least one rigid guide plate.

4,951,990

## FIFTY FIVE GALLON DRUM HANDLING APPARATUS

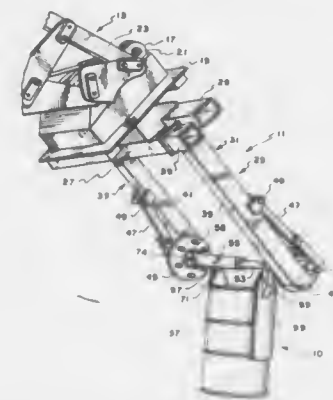
Brad L. Hollan, Oxnard, and James E. Osgood, Camarillo, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 3, 1989, Ser. No. 417,215

Int. Cl.<sup>5</sup> B66C 1/44; B66F 9/18

U.S. Cl. 294—119.1

13 Claims



1. A fifty five gallon drum handler adapted for use with a tire manipulating attachment having first and second L shaped members with each L shaped member being extendable and retractable from one of a pair of spaced, parallel tubular housings and having a rotatable gripping element positioned at a free end thereof, said fifty five gallon drum handler comprising: a first tubular shaped member; a second tubular shaped member in slidable engagement with and telescoping from said first tubular shaped member; first and second plates connected, respectively, to the free ends of said first and second tubular shaped members; said first and second plates, respectively, adapted to connect

to the rotatable gripping elements of said first and second L shaped members; and engaging means connected to said first and second tubular shaped members for gripping a drum when said first and second L shaped members are retracted, releasing said drum when said first and second L shaped members are extended, and rotating said drum when the gripping elements of said first and second L shaped members are rotated.

4,951,991

## TELESCOPING TRUCK BED EXTENSION

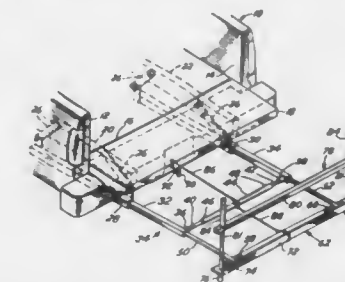
Dale C. Haigler, Benton Harbor, Mich., assignor to Load Helper, Inc., Benton Harbor, Mich.

Filed Sep. 8, 1988, Ser. No. 242,047

Int. Cl.<sup>5</sup> B62D 33/08

U.S. Cl. 296—26

1 Claim



1. A device adapted for connection to a vehicle having a bed means for carrying elongated objects said bed means having an effective length, said device connected to said vehicle constituting means for extending the effective length of said bed means, said device including a frame connected to said vehicle and being slidable between a retracted storage position beneath the bed means and an extended position extending longitudinally of the bed means, support means detachably connected to said frame and positioned in a substantially vertical support position when the frame is in its extended position, said frame includes spaced support tubes connected to said vehicle, a pair of spaced telescoping supports carried in said support tubes and interconnected by a cross member, said cross member including well means for supporting said support means in its said substantially vertical support position, said support means including spaced legs oriented generally perpendicular to said cross member, said legs positioned in said well means when said vertical support means is in its said substantially vertical support position, said cross member further defines holes, said holes for accommodating said legs of said support means in a generally horizontal position when said tubular frame is in its retracted storage position.

4,951,992

## CARGO SUPPORTING FLOOR FOR A MOTOR LORRY

Philip K. Hockney, Smithfield, Australia, assignor to Hockney Pty. Limited, Smithfield, Australia

Filed Feb. 6, 1986, Ser. No. 826,550

Int. Cl.<sup>5</sup> B62D 25/20

U.S. Cl. 296—204

5 Claims



1. A cargo supporting floor assembly for a motor lorry, said

assembly including at least two beams which are generally parallel and co-extensive, a plurality of generally planar planks which extend longitudinally generally transverse of said beams and are abutted so as to provide a generally horizontal load receiving surface, each plank having longitudinally parallel co-extensive edges, one of said edges being shaped so as to provide a recess and the other edge having a tongue matingly received within the recess of the next adjacent plank so that abutting edges of adjacent planks co-operate to prevent relative horizontal and vertical movement between adjacent planks in directions normal to said longitudinal edges, each plank further having longitudinal support portions extending longitudinally adjacent each said edge and generally transverse of and engaging said beams to that each plank is supported thereby, a plurality of clip means attached to said beams but movable therealong during construction of the floor assembly and engaging the planks to secure the planks to the beams to prevent relative movement of the planks vertically from said beams, each plank having clip engaging means and clip retaining means, with the retaining means spaced from the engaging means, the clips being positioned so as to extend between the clip engaging means of one plank and the clip retaining means of the next adjacent plank, and wherein the clips engage the clip engaging means to prevent vertical movement of the planks away from the beams and the clip retaining means retain the clips in position by preventing clip movement longitudinally of the beams.

4,951,993

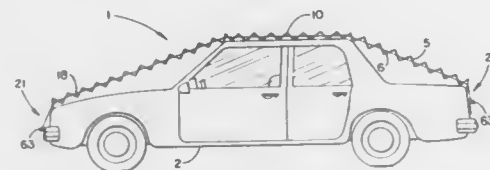
## ACCORDION PLEATED VEHICLE COVER

Vincent C. Taboada, 22 Ararat Ct., Sacramento, Calif. 95831  
Filed Jan. 5, 1990, Ser. No. 461,224

Int. Cl.<sup>5</sup> B60J 11/00

U.S. Cl. 296—136

13 Claims



1. A reversibly expandable cover for a vehicle, comprising: (a) a generally rectangular cover body having upper and lower surfaces, two opposing long side borders, front end and rear end short borders, and a plurality of transverse folding scores wherein each folding score serves as hinge thereby producing a plurality of panels hinged to each abutting panel at said folding scores and having alternating said hinges folding in opposite directions to produce an accordion pleated structure for said cover body wherein said plurality of panels terminates in a front end panel and a rear end panel each hinged to only one other panel at a folding score;
- (b) a plurality of guide cord members each comprising a length of elastomeric guide cord that slidably penetrates each of said panels through guide cord receiving openings in said panels and extends beyond said front end and rear end panels to terminate in front and rear end guide cord couplers with each of said elastomeric guide cords reversibly expandable to span a length of said vehicle; and
- (c) front end and rear end panel cord members each comprising a length of end panel cord with an end panel attachment terminus at one end and an end panel cord coupler at another end wherein said end panel attached terminus for said front end panel cord member is fastened to said front end panel and said end panel attachment terminus for said rear end panel cord member is fastened to said rear end panel.

4,951,994

## SUSPENDED TYPE AIR-DAM SKIRT

Tsutoma Miwa, 3010-8, Sayamagaoka 1-chome, Tokorozawa-shi; Saitama 359, Japan

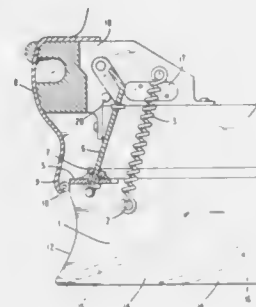
PCT No. PCT/JP87/00820, § 371 Date Jun. 27, 1988, § 102(e)  
Date Jun. 27, 1988, PCT Pub. No. WO88/03104, PCT Pub. Date May 5, 1988

PCT Filed Oct. 26, 1987, Ser. No. 237,732

Claims priority, application Japan, Oct. 27, 1986, 61-253761  
Int. Cl.<sup>5</sup> B62D 37/02

U.S. Cl. 296—180.1

12 Claims



1. A suspended type air-dam skirt for a body of a car, comprising: means for resiliently suspending said air-dam skirt from the car body; guide members mounted on one of said air-dam skirt and said car body; and regulating members mounted on the other of said air-dam skirt and said body, one of said guide members and said regulating members being adapted to vertically extend to thereby regulate a moving path of said air-dam skirt by mutual sliding engagement between said guide members and said regulating members.

4,951,995

## ARM HEIGHT ADJUSTMENT MECHANISM FOR A CHAIR

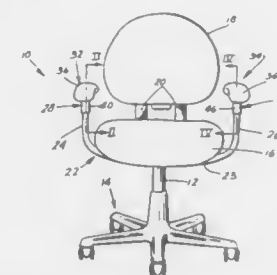
David S. Teppo, Wyoming; Thomas R. Demmon, Grand Rapids; Larry DeKraker, Holland, and James P. Steffens, Hopkins, all of Mich., assignors to Steelcase Inc., Mich.

Filed Oct. 10, 1989, Ser. No. 418,847

Int. Cl.<sup>5</sup> A47C 7/54

U.S. Cl. 297—411

23 Claims



1. An armrest height adjustment assembly for a chair having a pair of laterally spaced, fixed armrest supports, said assembly comprising: a first armrest slidably mounted on one of said supports for vertical movement; a second armrest slidably mounted on the other of said supports for vertical movement; and vertical motion translation means interconnecting said armrests for translating raising or lowering movement of said first armrest to said second armrest so that vertical movement of said first armrest causes synchronized, simultaneous vertical movement of said second armrest.

4,951,996

## MUSICIAN'S PORTABLE SEAT

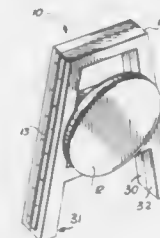
Daniel T. Shannon, 1353 W. Superstition Blvd., Apache Junction, Ariz. 85220

Filed May 4, 1989, Ser. No. 347,190

Int. Cl.<sup>5</sup> A47C 4/00

U.S. Cl. 297—42

7 Claims



1. A portable, collapsible seat comprising: first and second truncated, A-frame shaped members each having a first and a second side; pivotal means coupling a first side of said first member to a first side of said second member, whereby said pivotally coupled first sides form a bifurcated leg and the remaining said second sides of said first and second members form second and third legs, respectively, of a portable, three-legged seat frame; said first and second members each further comprise a first cross element coupling said first and second side of said member, each said first cross element being generally horizontal when the three-legged seat frame stands on a horizontal plane; a seat having coupling means for removably coupling said seat to at least one of said first cross elements; said first and second members each further comprise a second cross element coupling said first and second side of said member at a selected position between said first cross element and the distal ends of said first and second sides of said member, wherein a person sitting on said seat, when said seat is coupled to said first cross element, may utilize a said second cross element as a foot rest; and seat coupling means coupled to a said second cross element and complementary in form to said coupling means for removably coupling said seat to said first cross element, whereby, when said seat is decoupled from said first cross element, it may be coupled to said means coupled to said second cross element for ease of transport and storage of said three-legged frame and said seat.

4,951,997

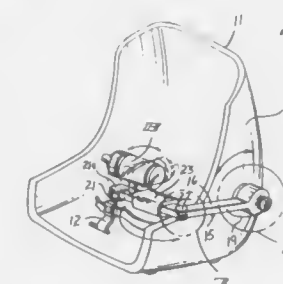
## INFANT FEEDING CHAIR

Claire L. Kenney, 381 Broad St., Apt. A415, Newark, N.J. 07104  
Filed May 22, 1989, Ser. No. 355,321

Int. Cl.<sup>5</sup> A47C 7/62

U.S. Cl. 297—188

7 Claims



1. An infant feeding chair comprising,

a substantially "L" shaped chair formed with parallel sides joined to a back and support base, and a first arm member pivotally mounted to one of said sides at a first pivot junction, and said first arm including a second pivot junction spaced from the first pivot junction and a second arm joined to said first arm at said second pivot junction, and said second arm including an upwardly projecting mount pivotally accepting a support shank, said support shank including a flexible adjustable strap means for securement of an infant bottle thereon, and wherein said second arm at the second pivot junction is pivotal to one of a plurality of positions relative to said first arm the second pivot junction including a latch member to latch said first arm to said second arm wherein said latch member is manually manipulatable and orthogonally displaceable relative to the first and second arms to pivotally release the second arm relative to the first arm.

4,951,998

## AUTOMOBILE HEADREST

Bill McClain, 10905 Curtis Plaza, Omaha, Nebr. 68164  
Filed Oct. 10, 1989, Ser. No. 419,387

Int. Cl.<sup>5</sup> A47C 7/38

U.S. Cl. 297—395

1 Claim



1. An automobile headrest of two pillow sections flexibly joined at the center wherein the improvement comprises: (a) the two elongated pillow sections flexibly joined in tandem; (b) the pillow sections having an outside cover of fabric or plastic; (c) the pillow sections filled with a suitable resilient filler material; (d) a pliable, flexible support cord fastened longitudinally along the top edge of the pillow sections; (e) the support cord extending some distance beyond the outside ends, of the joined pillow sections; and, (f) each end of the support cord passing through a slidable attached support ring to attach to a suction cup.

4,951,999

## HIGH LIFT DUMP TRUCK

Robert Rudolph, Vineland, and Paul Mercurio, Elmer, both of N.J., assignors to PM Equipment Sales, Inc., Vineland, N.J.  
Filed Feb. 15, 1989, Ser. No. 310,656

Int. Cl.<sup>5</sup> B60P 01/34

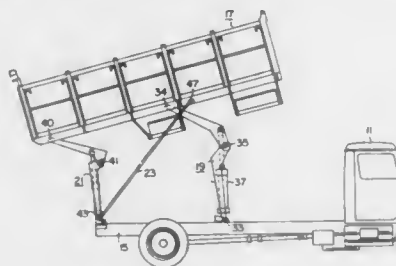
U.S. Cl. 298—11

11 Claims

1. A high lift dump truck 10 comprising: a chassis 15; a body portion 17 having a tailgate 29 and being positioned on said chassis; a multiple link front hoist means 19 having a first end pivotally mounted at a generally central location on said chassis, said front hoist means having a second end pivotally

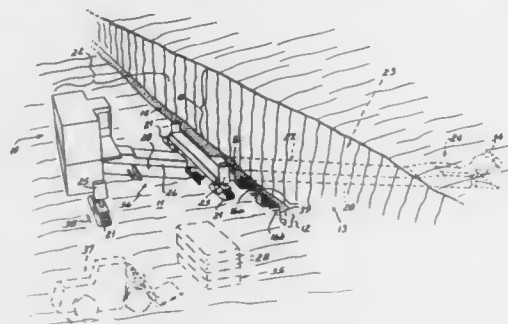


mounted on said body portion 17, said front hoist means being positioned to raise said body portion to a maximum front elevation above said chassis;  
a multiple link rear hoist means 21 having a first end pivotably mounted at a generally rear location on said chassis, said rear hoist means having a second end pivotably mounted on said body portion generally near the tailgate of said body portion, said rear hoist means being positioned to raise said body portion to a maximum rear elevation above said chassis;  
control link means 23 having a first end pivotably mounted



on said chassis adjacent said rear location and having a second end mounted to said body portion at a generally central location thereon, said control link 23 maintaining a fixed distance between said rear location on the chassis and said central location on the body portion; and control means for activating said front and rear hoist means independently to permit said body portion to be raised to said maximum front and rear elevations; whereby said first and second multiple link hoist means 19 and 21 and said control link 23 cooperatively translate said body portion rearwardly relative to said chassis when said body portion is raised.

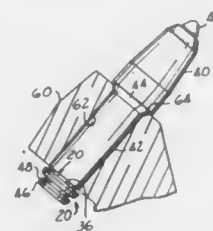
**4,952,000**  
**METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF HIGHWALL MINING**  
Thomas Lipinski, Winchester; Eugene Dunaway, Nicholasville, and Manfred Jasser, Versailles, all of Ky., assignors to Thin Seam Miner Patent B.V., The Netherlands, Netherlands  
Filed Apr. 24, 1989, Ser. No. 342,282  
Int. Cl. F21C 35/24; G06G 7/66  
U.S. Cl. 299—1 40 Claims



23. A method of controlling the operating efficiency of a highwall mining machine having a power head located on a bench adjacent the highwall, a cutter head operable to cut a mined hole into a coal seam when thrust thereagainst, and a compression beam extending between the power head and the cutter head for thrusting the cutter head forward against the seam with force delivered by the power head, said cutter head having a cutter controllably movable thereon for cutting the boundary of the hole in a selected direction relative to the

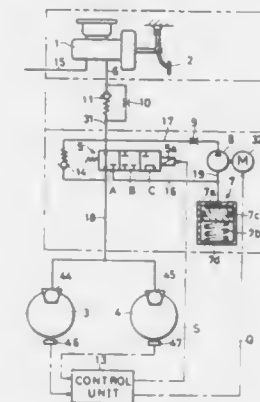
position of the cutter head; said method comprising the steps of:  
mining a hole into a coal seam with the mining machine; repeatedly measuring the position of the boundary of the mined hole along its length as the hole is being mined; automatically computing from data derived from the measurements the volume of coal mined from the seam; and generating an output signal representative of the amount of coal mined from the hole.

**4,952,001**  
**MINING BIT PRELOAD RETAINER**  
Kenneth C. Emmerich, Lexington, Ky., assignor to Fansteel Inc., North Chicago, Ill.  
Filed May 31, 1989, Ser. No. 359,844  
Int. Cl. F21C 35/18  
U.S. Cl. 299—92 6 Claims



1. In combination a bit and preload retainer means for mining and construction which comprises:  
(a) a mounting block having a receiving bore,  
(b) a bit having a cutting end and having a mounting shank to be received in the bore of the block and having an annular first groove forming a neck portion on the end of the mounting shank, said bit having a radial surface at the cutting end to limit the inward movement of said bit in a cutting phase, the retainer limiting the outward movement of the bit in a non-cutting phase but permitting axial motion inward and outward within said bore between said phases,  
(c) said preload retainer comprising:  
a generally circular, resilient body with an inner face and an outer face larger than said bore and having an annular first central recess to receive and be retained on the neck portion of the mounting shank, said body having a radial opening from said recess to permit installation of the body on the bit in a motion transverse to the bit axis to cause temporary widening of the opening due to the resilience of the body when said retainer is preloaded onto said groove prior to insertion of said mounting shank into said receiving bore, said radial opening being wide enough to allow circumferential collapsing of said retainer entirely within said first groove, and said first groove being deep enough to receive said retainer in circumferentially collapsed condition during said insertion,  
means to receive said preloaded retainer in expanded condition after passing through said bore, and  
a radial shoulder on said inner face of said retainer adjacent said recess for allowing said retainer in expanded condition to lock said shank in said bore.

**4,952,002**  
**BRAKE FLUID PRESSURE CONTROL APPARATUS IN SKID CONTROL SYSTEM**  
Teturo Arikawa, and Yasuhiro Maeda, both of Kanagawa, Japan, assignors to Nippon A.B.S., Tokyo, Japan  
Filed Dec. 21, 1988, Ser. No. 287,456  
Claims priority, application Japan, Dec. 29, 1987, 62-200181; Feb. 16, 1988, 63-19074  
Int. Cl. B60T 8/40  
U.S. Cl. 303—116 13 Claims

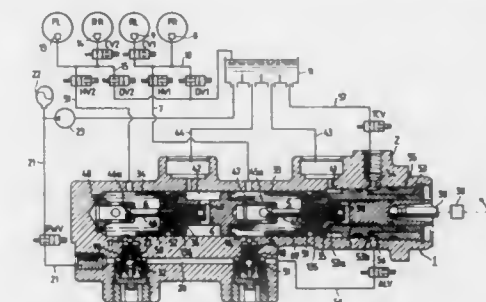


1. A brake fluid pressure control apparatus in a skid control system for a vehicle comprising:  
(A) a fluid pressure control valve means arranged between a master cylinder and wheel brake operating apparatus;  
(B) a brake relieving circuit connected to said fluid pressure control valve means;  
(C) a hydraulic reservoir for reserving brake fluid discharged through said fluid pressure control valve means and said brake relieving circuit from said wheel brake operating apparatus;  
(D) a fluid pressure pump for pressurizing brake fluid of said hydraulic reservoir and for returning the brake fluid into a pressurized fluid supply conduit connecting said master cylinder with said fluid pressure control valve means through a brake fluid returning circuit;  
(E) a valve apparatus arranged at the side of said master cylinder with respect to a connecting point between said pressurized fluid supply conduit and said brake fluid returning circuit in said pressurized fluid supply conduit, said valve apparatus being able at least to cut off the fluid communication in the direction extending from said connecting point towards said master cylinder; and  
(F) throttle means arranged in a conduit connecting the input side of said valve apparatus and the output side thereof.

**4,952,003**  
**APPARATUS FOR CONTROLLING BRAKE FLUID PRESSURE OF MOTOR VEHICLE**  
Satomi Okubo, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan and Akebono Research and Development Centre Ltd., Saitama, Japan  
Filed Jul. 19, 1989, Ser. No. 381,842  
Claims priority, application Japan, Aug. 4, 1988, 63-193431  
Int. Cl. B60T 8/32 16 Claims

1. A brake fluid pressure control apparatus, comprising:  
an accumulator;  
a reservoir;  
first fluid passage means communicating with the wheel cylinders of the vehicle;  
second fluid passage means communicating the wheel cylinders with said reservoir;  
valve means for increasing, holding and decreasing a brake fluid pressure supplied to the wheel cylinders of the vehicle

during an anti-lock control and a traction control, said valve means comprising a first valve means provided in said first fluid passage and a second valve means provided in said second fluid passage; and  
a master cylinder comprising:  
a housing;  
a fluid pressure chamber means provided in said housing, said fluid pressure chamber communicating with said first fluid passage means;  
a third fluid passage communicating said accumulator with said fluid pressure chamber;  
an intake valve means provided in said third fluid passage, said intake valve normally shutting off said third fluid pressure chamber, said intake valve means having an end which is movable into and out of said fluid pressure chamber means;  
a main piston means slidably provided in said housing, said main piston means being operated by the brake pedal of the vehicle;

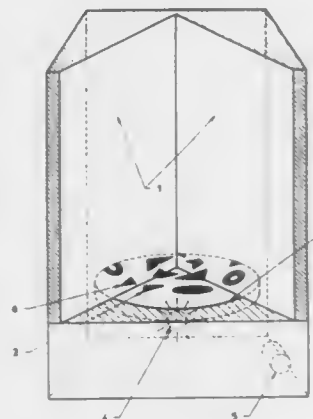


a valve operating means mounted on said main piston means, said valve operating means being engageable with said end of said intake valve means projecting into said fluid pressure chamber means while said intake valve means opens when the stroke of said main piston means reaches a predetermined value;  
an auxiliary piston slidably mounted around said main piston means, said auxiliary piston urging said main piston means to move during the traction control;  
an auxiliary fluid pressure chamber provided between said auxiliary piston and an inner peripheral surface of said housing, a fluid pressure within said auxiliary fluid pressure chamber acting on said auxiliary piston;  
a fourth fluid passage communicating said auxiliary fluid pressure chamber with a portion of said third fluid passage which is opposite said accumulator with respect to said intake valve means; and  
a fifth fluid passage communicating said auxiliary fluid pressure chamber with said reservoir.

**4,952,004**  
**IMPROVED KALEIDOSCOPE DEVICE**  
Steve Baird, and Ursula Baird, both of 307 Oreland Mill Rd., Oreland, Pa. 19075  
Filed Jun. 2, 1989, Ser. No. 360,344  
Int. Cl. G02B 23/00 6 Claims

1. A device which comprises:  
(a) a removable turnable translucent dish, which holds objects to be reflected;

(b) reflective surfaces not contained in a scope or tube, as a means of producing design images, and



(c) a light source below said dish to shine up through said dish to illuminate the objects to be reflected from below.

4,952,005

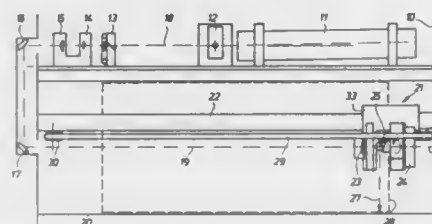
## ADJUSTABLE MIRROR ASSEMBLY

Marc F. Hamade, Lint, and Gerard J. Boeve, Edegem, both of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium  
Filed Dec. 7, 1989, Ser. No. 447,525

Claims priority, application Belgium, Dec. 15, 1988, 88202892  
Int. Cl.<sup>5</sup> G02B 5/08, 26/08

U.S. Cl. 350-6.1

11 Claims



7. An image-reproducing apparatus which comprises: a cylinder (20) which is arranged for receiving a light-sensitive recording sheet (28) on one of its surfaces, a reproducing head (21) for exposing the light-sensitive recording sheet line-wise to form an image thereon, the reproducing head bearing reflecting means (25) arranged for rotation about the axis (9) of the cylinder to reflect a light beam (19) that enters the cylinder axially against the surface of the cylinder, thereby causing the beam to move along a track of the cylindrical surface means resulting in a relative displacement between the cylinder and the head to effect a progressive displacement of the circular track along the cylindrical surface, and a laser (11) mounted outside of the cylinder, and an adjustable mirror assembly in the beam path of the laser for deflecting the laser beam to coincide with the axis of the cylinder, said adjustable mirror assembly having a mirror (16, 17), a substantially rigid support (33, 36) which constitutes part of the apparatus, an elastic layer (50, 51) integrally bonding the mirror along its rear side to the support and defining a gap therebetween, and three supporting studs, at least two of the studs being axially adjustable (52, 53, 54), that extend through said gap and abut with one end against one of such support and mirror, the length of the portions of the studs extending through the gap being greater than the thickness of the elastic layer in relaxed condition, whereby a tensioning force is exerted by each such stud on the

elastic layer and the elastic layer is correspondingly pre-stretched.

4,952,006

## HOOD SHIELD ASSEMBLY WITH BREAKAWAY MOUNTING

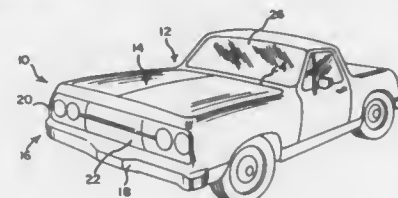
Barry A. Willey, Maywood, Ill., assignor to National Cycle, Inc., Maywood, Ill.

Filed Oct. 24, 1989, Ser. No. 426,722

Int. Cl.<sup>5</sup> B60J 1/20

U.S. Cl. 296-91

8 Claims



1. A shield assembly for attachment to the hood of a road vehicle, said shield assembly comprising, in combination, a one-piece deflector unit, a plurality of mounting brackets, and plural fasteners securing said brackets to said deflector unit, said deflector unit being formed in a single piece from a sheet of resinous plastic material and including a contoured principal section adapted to protect the exterior surfaces of said road vehicle hood from damage by airborne objects and a substantially horizontally extending mounting section joined to and extending rearwardly from the lower portion of said principal section, said mounting section having a rear margin terminating in a free trailing edge portion, said principal section, in position of use, being contoured so as to have portions lying generally parallel to and in spaced apart relation to adjacent sections of an associated vehicle hood, with said mounting section including plural, laterally spaced apart fastener-receiving openings of a given diameter, said openings lying forward of said rear margin so that the width of said margin substantially exceeds said given diameter of said openings, each of said mounting brackets including a hood attachment section with means for receiving a bracket mounting fastener, a shield attachment section with means for receiving a shield mounting fastener, and an intermediate shield positioning section, said assembly further including frangible fasteners securing each of said shield attachment sections of said brackets to said shield mounting section, with said frangible fasteners having an ultimate yield strength such that forces tending to separate said deflector unit from said brackets will cause breakage of said fasteners without stressing said one piece deflector unit beyond its elastic limits.

4,952,007

## TRANSPORTATION VEHICLE COVER AND REFASTENABLE EXTERIOR CONNECTING SYSTEM

Riaz D. Shahrokh, 6035 Rowan Way, Citrus Heights, Calif. 95621

Filed Jun. 19, 1989, Ser. No. 368,199

Int. Cl.<sup>5</sup> B60J 7/00

U.S. Cl. 296-95.1

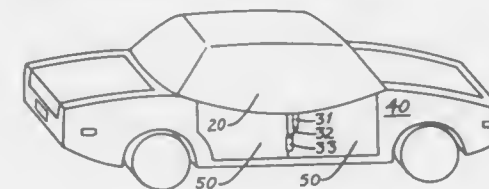
15 Claims

1. A shield including:

a cover means for shielding at least a majority portion of the exterior surface area around a passenger compartment of a vehicle from exposure to elements of the environment surrounding said vehicle, said vehicle being used for transportation of at least one person and having said passenger compartment and having at least one exterior closure member, said closure member meaning a door, a hood, or a lid of said vehicle,

at least one fastener means for releasable attachment outside

said vehicle of said cover means and at least one anchor member to each other, at least a portion of said anchor member being releasably held secure inside said vehicle by said closure member, at least said portion of said anchor member that is inside vehicle being prevented from leaving said inside of said vehicle by said closure member blocking the path of said anchor member to the outside of said vehicle when said closure member is in its closed position,



4,952,008

## VISOR WITH SNAP-IN RETRACTABLE GLARE SHIELD

Mark Lobanoff, Troy, and James A. Gavagan, Centerline, both of Mich., assignors to Irvin Industries, Inc., Rochester Hills, Mich.

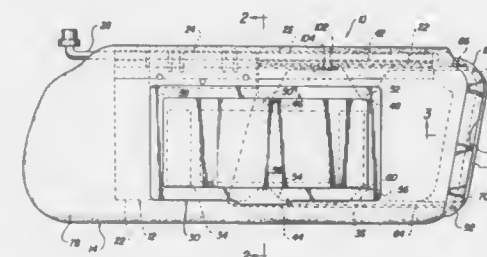
Continuation of Ser. No. 286,994, Dec. 19, 1988, abandoned.

This application Feb. 22, 1990, Ser. No. 484,468

Int. Cl.<sup>5</sup> B60J 3/02

U.S. Cl. 296-97.8

32 Claims



1. A visor for a motor vehicle having an auxiliary glare shield comprising:

an inner board,

an outer board having two leaves with generally symmetrical outlines which are folded and fastened together to envelop said inner board to form said visor having first and second opposite side edges and a bottom edge,

upper and lower guide tracks carried by said inner board and having ends extending to said first side edge,

an end cap attached to said outer board leaves adjacent said first side edge and having a central slot, wherein said end cap forms a pair of channels for receiving each of said leaves of said outer board assembly along said first side edge and separating said leaves to provide clearance for sliding movement of said glare shield, and

said auxiliary glare shield retained between said outer board leaves and slidable through said end cap slot and guided between retracted and extended positions by said guide tracks.

4,952,009

## CURTAINED DOORS FOR VEHICLE BODIES

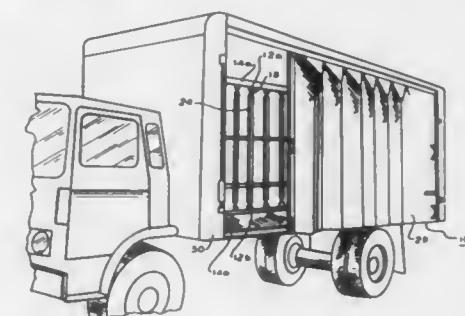
Elton E. Mountz, and Paul L. Whiteman, both of Morgantown, Pa., assignors to Morgan Corporation, Morgantown, Pa.

Filed Jan. 29, 1987, Ser. No. 68,179

Int. Cl.<sup>5</sup> B60J 5/06

U.S. Cl. 296-181

18 Claims



1. A van body comprising:

a curtain;

an upper track opposite the top of said van body;

an upper set of roller means rollably fitted in said upper track;

a lower track opposite the bottom of said van body;

a lower set of roller means rollably fitted in said lower track;

an upper bracket means attached to said upper set of roller means;

a lower bracket means attached to said lower set of roller means;

a first means for attaching said curtain to said upper bracket means;

a second means for attaching said curtain to said lower bracket means;

a plurality of spaced vertical reinforcing webs, said curtain being connected to the upper bracket means at said reinforcing web and said curtain being connected to the lower bracket means at said reinforcing web, and wherein said means for attaching the curtain to the upper bracket means is comprised of an upper strap portion extending from the upper portion of the web and being connected to the upper bracket, said upper strap portion including a free end, and wherein said means for attaching the curtain to the lower bracket is comprised of a lower strap portion extending from the lower portion of the web and being connected to the lower bracket, said lower strap portion including a free end; and

vertical tensioning means for applying vertical tension to said upper and lower brackets, said vertical tensioning means applying tension to the free ends of said straps whereby said brackets and said curtain are vertically tensioned.

4,952,010

## OPTICAL SPACE SWITCH

Peter Healey, Ipswich, and David W. Smith, Woodbridge, both of England, assignors to British Telecommunications public limited company, United Kingdom

PCT No. PCT/GB88/00102, § 371 Date Oct. 17, 1988, § 102(e) Date Oct. 17, 1988, PCT Pub. No. WO88/06393, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 18, 1988, Ser. No. 264,276

Claims priority, application United Kingdom, Feb. 20, 1987, 8704016

Int. Cl.<sup>5</sup> G02B 5/32

U.S. Cl. 350-3.77

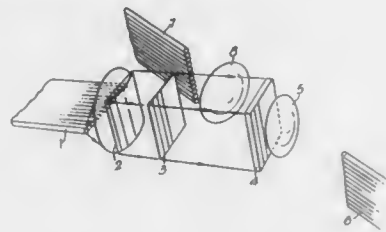
19 Claims

1. An optical space switch for connecting light from each of two or more inputs to a selected one of a number of outputs including:



a number of multiplexed phase volume holograms one corresponding to each of said inputs, and each multiplexed phase volume hologram including a superposition of a plurality of phase volume holograms, each of which corresponds to one of said outputs,

a spatial light modulator for imposing a selected phase change on light passing through it,



distribution means for coupling light from the inputs via the spatial light modulator to the multiplexed phase volume holograms, and

collection means for collecting light diffracted by the multiplexed phase volume holograms,

each multiplexed phase volume hologram diffracting light to a selected output in dependence upon the phase change imposed by the spatial light modulator on the light incident upon that hologram.

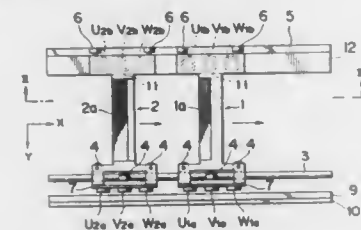
4,952,011

**MOVING APPARATUS FOR OPTICAL SYSTEMS**  
Hiroshi Ishii, Kashihiro, Tetuyuki Ueda, and Hiroyuki Sawai, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 22, 1988, Ser. No. 288,440  
Claims priority, application Japan, Dec. 25, 1987, 62-332634  
Int. Cl.<sup>5</sup> G02B 26/10

U.S. Cl. 350—6.5

11 Claims



1. An optical system moving apparatus for a duplicating machine, wherein an optical system scans images by the movement of two mirror platforms, each having a mirror thereon, one platform moving at a scanning speed and the other platform moving at one-half the scanning speed, comprising:

a stator for polyphase brushless motor located along a moving direction on both side portions of a moving region of each mirror;

two sets of rotors operatively acting with the stator, to form polyphase brushless linear motors; and

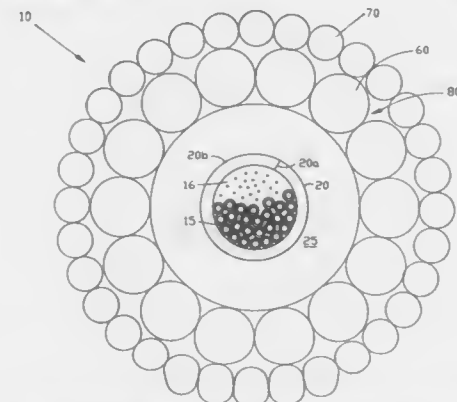
with the rotors of each set being mounted on opposite end portions of each mirror platform, whereby, when currents of respectively different values are applied to the two sets of rotors, the two mirror platforms will move in the same direction, one platform moving at the scanning speed, the other platform moving at one-half the scanning speed, and light from a document surface is reflected in a horizontal direction by the mirror platform moving at the scanning speed, and then is reversed in direction by the mirror platform moving at a speed one-half the scanning speed, so that an optical path distance from a document surface

to an exposure face of an exposure member is kept normally constant independently of a scanning position.

**4,952,012**  
**ELECTRO-OPTO-MECHANICAL CABLE FOR FIBER OPTIC TRANSMISSION SYSTEMS**  
Timothy C. Stamnitz, 168 Witham Rd., Encinitas, Calif. 92024  
Filed Nov. 17, 1988, Ser. No. 272,571  
Int. Cl.<sup>5</sup> G02B 6/44

U.S. Cl. 350—96.23

14 Claims



1. A cable having the capability for assuring the transmission of phase modulated optical data comprising:

a central thin-walled tubular member longitudinally extending coincident in the axis of the cable with the tubular member made from a material having a compressive strength to resist radial inward deformation and having the property to permit longitudinal flexure and shaped with an outer diameter equal to a multiple of about ten times the dimensions of its wall thickness and having a longitudinal welded seam to provide an integral construction with a hermetically sealed interior;

at least one optical fiber longitudinally disposed in said interior of the central thin walled tubular member;

a gel filling said interior of the central thin walled tubular member containing said at least one optical fiber therein to remove any voids and to provide mechanical coupling between said optical fiber and the interior of said central thin-walled tubular member therein;

an annular shaped dielectric region outwardly coaxial and adjacent said central thin walled tubular member and

at least a pair of contrahelical layers of load bearing metallic strands disposed outwardly of the dielectric region providing an overall torque-balanced cable, said metallic strands being fabricated to allow the cable to be coiled, deployed, and retrieved without creating loop formation that leads to kinking (hockling) as said cable is tensioned.

4,952,013

**OPTICAL WAVELENGTH CONVERTER DEVICE**  
Akinori Harada, Yoji Okazaki, Koji Kamiyama, and Shinsuke Umegaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 24, 1989, Ser. No. 328,266  
Claims priority, application Japan, Mar. 25, 1988, 63-72752;  
Mar. 25, 1988, 63-72753

Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.3

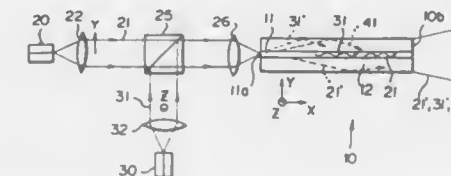
12 Claims

1. An optical wavelength converter device comprising:

(i) cladding means having a first refractive index; and

(ii) core means of a nonlinear optical material disposed in said cladding means and having a second refractive index higher than said first refractive index, said core means for converting first and second fundamental waves having different wavelengths being applied to said core means into a sum-frequency wave having a frequency equal to

the sum of frequencies of the first and second fundamental waves, and for radiating the converted wave into said cladding means, with phase matching being achieved between the sum-frequency wave radiated into said clad-



ding means and travelling in a radiation mode and a non-linear polarized wave in said core means which is produced by the first and second fundamental waves travelling through said core means in a waveguide mode.

4,952,014

**OPTICAL SYSTEMS WITH THIN FILM POLARIZATION ROTATORS AND METHOD FOR FABRICATING SUCH ROTATORS**

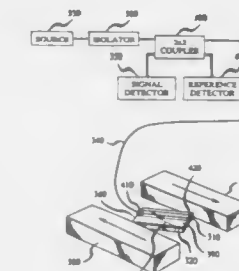
Robert A. Lieberman, and Raymond Wolfe, both of New Providence, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 109,989, Oct. 19, 1987, Pat. No. 4,886,332.  
This application Apr. 17, 1989, Ser. No. 339,541

Int. Cl.<sup>5</sup> G02B 5/30

U.S. Cl. 350—96.12

15 Claims



1. An optical system, comprising: a source of electromagnetic radiation; a detector of electromagnetic radiation capable of optical communication with said source; a magnetizable medium positioned such that said source and said detector optically communicate by transmission of electromagnetic radiation through said medium; and means for producing at least one magnetic domain wall in said medium separating at least two adjacent regions of said medium, characterized in that

said medium is disposed relative to said source and to said detector such that at least a portion of the electromagnetic radiation from said source is detected by said detector only after sequentially passing through one of said adjacent regions, then through said domain wall, and then through the other of said adjacent regions.

4,952,015

**RADIATION COUPLING DEVICE**

Lodewijk Van Ruyven, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Apr. 6, 1989, Ser. No. 334,942

Claims priority, application Netherlands, Apr. 12, 1988, 8800939

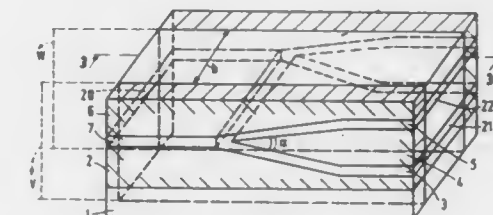
Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.12

6 Claims

1. A device for coupling electromagnetic radiation, comprising at least a strip-shaped first radiation guide which on at least

one end bifurcates into at least two further strip-shaped radiation guides, all of said radiation guides being bounded by a material having a smaller refractive index for the said radiation than the radiation guides, wherein the improvement comprises the radiation guides form part of a semiconductor layer structure having, in a cross-section in the direction of thickness, at least two radiation guiding layers which each comprise a further strip-shaped radiation guide and are separated by a passive layer having a lower refractive index for the said radiation, the passive layer being tapered in the direction of the strip-shaped



4,952,016

**OPTICAL POWER LIMITER**

Michael J. Adams, Woodbridge, and David A. H. Mace, Ipswich, both of England, assignors to British Telecommunications public limited company, Great Britain  
PCT No. PCT/GB89/00012, § 371 Date Aug. 11, 1989, § 102(e)  
Date Aug. 11, 1989, PCT Pub. No. WO89/06372, PCT Pub. Date Jul. 13, 1989

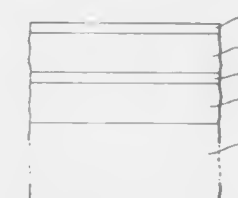
PCT Filed Jan. 3, 1989, Ser. No. 382,682

Claims priority, application United Kingdom, Jan. 5, 1988, 8800121; Jan. 6, 1988, 8800221

Int. Cl.<sup>5</sup> G02B 6/10

U.S. Cl. 350—96.12

12 Claims



1. An optical power limiter structure for use in limiting the power of an optical signal having a wavelength  $\lambda$ , comprising a direct-gap semiconductor material waveguide, having a core region of refractive index  $n_c$  bounded on a first side by a first cladding region of material of refractive index  $n_1$  and bounded on a second, opposing side by a second cladding region of material of refractive index  $n_2$ , wherein  $\lambda$  is slightly greater than the bandgap equivalent wavelength of the core region material,  $\lambda_c$ , but substantially greater than the bandgap equivalent wavelength of the second cladding region,  $\lambda_s$ , and wherein  $n_c$  varies inversely with the intensity of the optical signal at the wavelength  $\lambda$ , but  $n_1$  and  $n_2$  remain at least substantially constant, such that at a preselected threshold intensity of the

optical signal,  $n_c$  approaches  $n_s$  sufficiently to allow significant spread of the optical signal into the first cladding region.

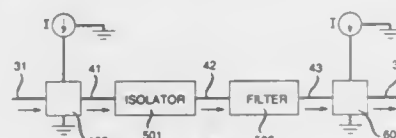
4,952,017

# POLARIZATION INDEPENDENT SEMICONDUCTOR OPTICAL AMPLIFIER

Charles H. Henry, Skillman; Rudolf F. Kazarinov, Martinsville, and Nils A. Olsson, Gillette, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 14, 1989, Ser. No. 323,462

Int. Cl.<sup>5</sup> G02B 6/26; H03F 3/04; H01S 3/098; H01L 29/66  
U.S. Cl. 350—96.15 10 Claims



1. A semiconductor optical amplifier structure, buried in a semiconductor body, for amplifying light of a given wavelength entering into and exiting from the body respectively at first and second mutually opposed facets of the body, the semiconductor optical amplifier structure containing an active region having a cross-section whose width and height differ from each other by a factor of less than about 2, the active region having input and output ends that are buried in the body so that each of first and second mutually opposite longitudinal extremities of the active region terminates within the body at a respective distance equal to at least about ten of the given wavelengths, as measured in the body, from the respective first and second mutually opposed facets of the body.

4,952,018

# OPTICAL IN LINE FILTERS

Terence P. Young, and Ian R. Croston, both of Essex, United Kingdom, assignors to GEC-Marconi Limited, Stanmore, United Kingdom

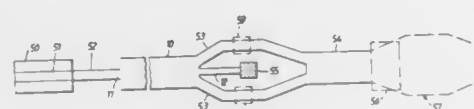
Filed Feb. 23, 1989, Ser. No. 313,787

Claims priority, application United Kingdom, Feb. 26, 1988, 8804569; Sep. 30, 1988, 8823005

Int. Cl.<sup>5</sup> G02B 6/26

U.S. Cl. 350—96.15

14 Claims



14. An optical in-line filter, comprising:  
a first multi-mode waveguide having an input end for receiving light and an output end, said first waveguide supporting at least three transverse modes; and  
a second waveguide having an open input end and being narrower than said first waveguide, said second waveguide being arranged in-line with said first waveguide with said open input end being coupled to the output end of said first waveguide at a predetermined transverse position of said first waveguide so that light entering said first waveguide undergoes interference between at least two of its modes and only light of a predetermined wavelength or wavelengths is passed to said second waveguide from said first waveguide and light of other wavelengths emerges elsewhere from the output end of said first waveguide.

# 4,952,019 GRATING-COUPLED SURFACE-EMITTING SUPERLUMINESCENT DEVICE

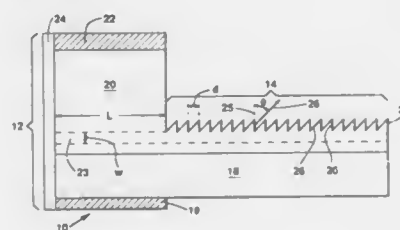
Gary A. Evans, West Windsor Township, Mercer County, and Nils W. Carlson, Lawrenceville, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 27, 1988, Ser. No. 263,464

Int. Cl.<sup>5</sup> G02B 6/34; H01L 33/00; H01S 3/08

U.S. Cl. 350—96.19

11 Claims



1. A device comprising:  
a superluminescent diode having a pair of ends;  
a reflecting coating disposed at one of said ends; and  
a distributed Bragg reflector having a first grating optically coupled to the other end.

4,952,020

# RIBBON CABLE WITH OPTICAL FIBERS AND ELECTRICAL CONDUCTORS

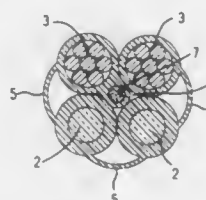
John H. Huber, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 9, 1989, Ser. No. 391,071

Int. Cl.<sup>5</sup> G02B 6/44; H01B 11/02

U.S. Cl. 350—96.23

20 Claims



1. A ribbon cable comprising, optical fibers and electrical conductors, the optical fibers and the conductors are spaced side to side within a surrounding, flexible jacket, wherein the improvement comprises:  
each optical fiber and each conductor is contained within a corresponding sleeve of the jacket,  
adjacent sleeves are connected by a corresponding flexible web extending transversely between the adjacent sleeves, the cable is rolled transversely of its length to form a roll, an interstitial space extends lengthwise of the roll and is bounded by the sleeves,  
an elongated cord extends in the interstitial space, the roll is constructed to be unrolled to space apart the sleeves one from another, and  
a removable sheath surrounds the roll and prevents the cable from being unrolled.

4,952,021

# PRESSURE TRANSPORTING SYSTEM

Tetsuji Aoki; Bang Lin, and Yoshiaki Terasawa, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries Ltd., Osaka, Japan

Filed May 10, 1989, Ser. No. 349,998

Claims priority, application Japan, May 18, 1988, 63-121496; Mar. 8, 1989, 1-55791; Mar. 8, 1989, 1-55792

Int. Cl.<sup>5</sup> G02B 6/44

U.S. Cl. 350—96.23

44 Claims



25. a pressure transporting system, comprising:  
at least one optical fiber unit;  
a pipe within which said at least one optical fiber unit can be transported by blowing with a pressurized gas; and  
means for reducing friction between said at least one optical fiber unit and said pipe, said friction reducing means being provided on at least one of said at least one optical fiber unit and said pipe, said friction reducing means comprising and antistatic agent.

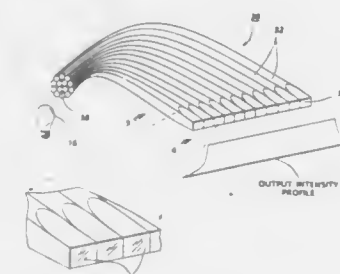
4,952,022

# FIBER OPTIC LINE ILLUMINATOR WITH DEFORMED END FIBERS AND METHOD OF MAKING SAME

Frank C. Genovese, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 2, 1989, Ser. No. 318,083

Int. Cl.<sup>5</sup> G02B 6/04; G03B 27/00; F21V 7/04; B54H 81/00  
U.S. Cl. 350—96.24 7 Claims



1. A linear illuminator comprising  
a light source and  
a plurality of optical fibers formed into a light conducting array; the fibers having a light-receiving end placed adjacent said light source and a light-transmitting end placed adjacent a linear plane to be uniformly illuminated, the light receiving ends of each of said individual fibers being circular and being grouped together to form a generally circular array, said light transmitting ends of each of said individual fibers being generally rectangular and aligned along a single non-staggered row to form a linear array.  
4. A method of forming an optical fiber light transmitting array having an output face arranged in a linear configuration including the steps of  
bonding a plurality of circular optical fibers formed in at least a single layer in close proximity to each other to form an integral array having a first and second face, compressing at least one of said faces in a heated environment to deform the circular ends of each fiber into a

generally rectangular configuration along a single, non-staggered linear row and  
cooling the array to preserve the heated and compressed end in a permanent deformed state.

4,952,023

# INTERNALLY ILLUMINATED RETROREFLECTIVE SIGN

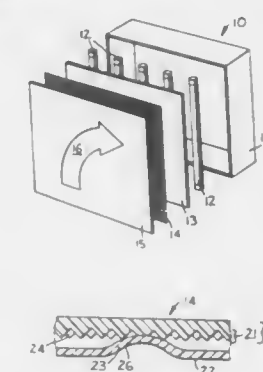
Thomas I. Bradshaw, Afton, and Edward S. Shinbeck, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 18, 1988, Ser. No. 165,881

Int. Cl.<sup>5</sup> G02B 5/122

U.S. Cl. 350—102

19 Claims



1. An internally illuminated sign comprising an enclosure transmissive to light on at least one side, designated the front side, and cube corner retroreflective sheeting positioned to reflect light incident on the front of the sign, wherein the cube corner retroreflective sheeting:

- (1) comprises a cover layer having a multiplicity of retroreflective cube corner elements and a base layer of transparent material partially bonded to the cover layer, and
- (2) has areas, where the base layer has been bonded to the cover layer, which are:
  - (a) optically transparent to internal light with an angle of incidence greater than or equal to zero degrees and less than 90 degrees,
  - (b) interspersed among the areas occupied by cube corner elements, the proportion of such transparent areas to the total sheeting area and their arrangement relative to each other being fixed to allow viewing the sign by means of either internal illumination, retroreflected light, or both.

4,952,024

# THREE-DIMENSIONAL SIGHT AND SOUND REPRODUCTION APPARATUS FOR INDIVIDUAL USE

Thomas S. Gale, 6 Ballater Court, Rexdale, Ont., Canada (M9V 3P3)  
Continuation-in-part of Ser. No. 901,946, Aug. 29, 1986, abandoned. This application Jun. 20, 1988, Ser. No. 209,169

Int. Cl.<sup>5</sup> G02B 27/22

U.S. Cl. 350—143

11 Claims

1. A three dimensional sight and sound reproduction apparatus for individual use comprising:  
a balanced headset having a center rib connecting a contoured eye covering portion, a pair of depending ear limbs, and a rear portion,  
the eye covering portion including adjustable means for substantially blocking ambient light from being seen by the wearer of the headset, at least a first and a second liquid crystal display screen spaced at an interocular distance apart on the same plane and means for focusing any images displayed thereon;  
the depending ear limbs containing a first and a second



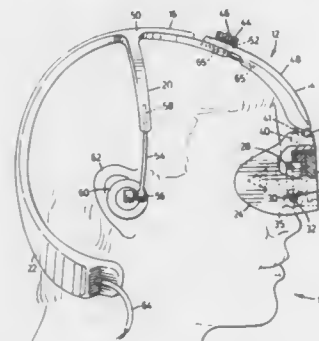
means for reproducing sound adjacent the ears of the wearer of the headset, and means for adjusting the location of the first and second sound reproducing means to suit the individual wearer of the headset;

the rear portion including means for connecting the headset, and thereby the liquid crystal display screens and the sound reproducing means, to a plurality of signal sources, including,

a first signal source for providing an image for the first liquid crystal display screen;

a second signal source for providing an image for the second liquid crystal display screen;

a third signal source for providing a sound for the first sound reproduction means;

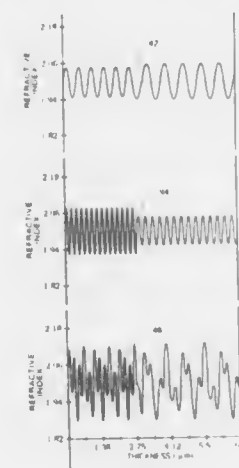


a forth signal source for providing a sound for the second sound reproduction means;

said first and second signal sources being oriented to and correspond to the spacing of a pair of human eyes, and said third and fourth signal sources being oriented to sense sounds in a like manner to human ears, the weight of the headset being generally balanced between the eye covering portion in the front and the rear portion, whereby the load of the headset is generally evenly distributed along said headset, wherein said rear portion includes a curved foot responsive to the wearer's neck to conform therewith, said foot including a weight to counterbalance the weight of the eye covering portion.

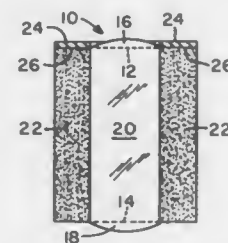
**4,952,025**  
**RUGATE FILTER INCORPORATING PARALLEL AND SERIES ADDITION**  
 William J. Gunning, III, Newbury Park, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
 Filed May 31, 1989, Ser. No. 359,457  
 Int. Cl.<sup>5</sup> G02B 5/00, 13/00  
 U.S. Cl. 350—164  
 12 Claims  
 9. A multiple-line rugate filter, comprising a thin optical film

having an index of refraction profile that varies multi-sinusoidally with thickness, the profile including a plurality of super-



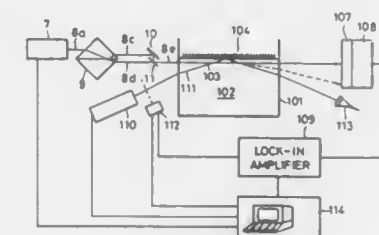
imposed subprofiles wherein at least one subprofile comprises a plurality of individual sine waves connected in series.

**4,952,026**  
**INTEGRAL OPTICAL ELEMENT AND METHOD**  
 Robert H. Bellman, Catlin; Nicholas F. Borrelli, Elmira, and Bruce H. Raeder, Horseheads, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.  
 Continuation-in-part of Ser. No. 257,947, Oct. 14, 1988. This application May 22, 1989, Ser. No. 354,843  
 Int. Cl.<sup>5</sup> G02B 1/00, 27/00  
 U.S. Cl. 350—167  
 40 Claims



1. In an optical element having opposed surfaces, an array of raised, transparent, optical lenses integral with a first surface, transparent channels extending between the raised optical lenses and the opposed second surface, and an opaque matrix surrounding the transparent channels, the improvement comprising a self-aligned metal mask extending over the matrix portion of the first surface, but not over the raised optical lenses, to form a precisely self-aligned boundary between the raised lenses and the mask, thereby optically isolating each lens and adapting it to selectively transmit light.

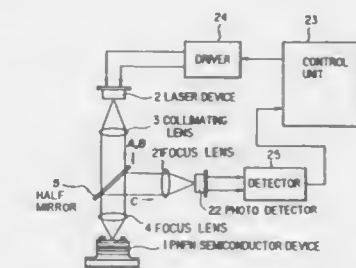
**4,952,027**  
**DEVICE FOR MEASURING LIGHT ABSORPTION CHARACTERISTICS OF A THIN FILM SPREAD ON A LIQUID SURFACE, INCLUDING AN OPTICAL DEVICE**  
 Kenji Saito, Tokyo; Ken Eguchi, Yokohama; Haruki Kawada, Kawasaki; Yoshinori Tomida, Yokohama; Toshihiko Miyazaki, Tokyo; Yukuo Nishimura, Sagamihara, and Takashi Nakagiri, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Division of Ser. No. 870,419, Jun. 4, 1986, Pat. No. 4,813,763.  
 This application Jan. 11, 1989, Ser. No. 296,028  
 Claims priority, application Japan, Jun. 5, 1985, 60-120612; Jun. 5, 1985, 60-120613; Jun. 5, 1985, 60-120614; Jun. 5, 1985, 60-120615; Jun. 7, 1985, 60-122702; Jun. 7, 1985, 60-122703; Jun. 7, 1985, 60-122704; Jun. 8, 1985, 60-123500; Jun. 8, 1985, 60-123501; Jun. 8, 1985, 60-123502; Jun. 8, 1985, 60-123503; Jun. 8, 1985, 60-123504; Jul. 8, 1985, 60-148321  
 Int. Cl.<sup>5</sup> G02B 27/14; G01N 21/00; B01J 1/10  
 U.S. Cl. 350—174  
 4 Claims



1. A device for measuring light absorption characteristics of a thin film spread on a liquid surface, comprising a liquid tank for containing liquid therein, with a thin film for a sample being formed on the surface of the liquid; an excitation light source for emitting excitation light; a light intensity modulator for modulating the intensity of the excitation light provided before a measuring site; a probe light source emitting a light beam; a light position detector for receiving the light beam; light splitting means for splitting the light beam emitted from said probe light source into two light beams; and a first optical system for projecting each of the two light beams through a measurement site of the sample onto said light position detecting surface, said light splitting means and said first optical system being provided for steadily maintaining the intensity center of the light beam projected onto a detecting surface of said light position detector at an invariable position without positional fluctuation independently of fluctuation of an emitting angle to the thin film of said probe light source.

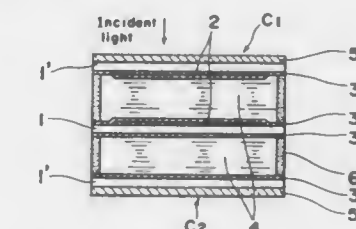
**4,952,028**  
**METHOD FOR DRIVING AN OPTOELECTRONIC SWITCHING DEVICE**  
 Yoshiharu Tashiro, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
 Filed Jul. 27, 1989, Ser. No. 385,744  
 Claims priority, application Japan, Jul. 27, 1988, 63-188756  
 Int. Cl.<sup>5</sup> G02B 26/00  
 U.S. Cl. 350—320  
 2 Claims  
 1. A method for driving an optoelectronic switching device, comprising:  
 applying a predetermined biased voltage to said optoelectronic switching device; and  
 supplying plural light inputs to said optoelectronic switching

device, intermittently with a predetermined period such that carriers excited by a first light input of said plural



light inputs do not become extinct before the next pulse starts.

**4,952,029**  
**TWO CELLED LIQUID CRYSTAL DISPLAY DEVICE WITH DEPENDENCY OF BIREFRINGENCE ON WAVELENGTH LARGER IN FIRST CELL**  
 Mariko Hayashi, Osaka; Naofumi Kimura, and Yukiko Ichimura, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Dec. 2, 1988, Ser. No. 278,727  
 Claims priority, application Japan, Dec. 3, 1987, 62-306184  
 Int. Cl.<sup>5</sup> G02F 1/133  
 U.S. Cl. 350—335  
 6 Claims



1. A liquid crystal display device comprising:  
 a double-layered-type liquid crystal cell which is composed of a first cell layer and a second cell layer, said liquid crystal cell containing liquid crystal molecules with a twisted nematic orientation therein; and  
 voltage applying means for applying voltage to said first cell layer;  
 wherein the twist angle of the liquid crystal in said first cell layer is opposite to that of the liquid crystal in said second cell layer, the orientation of the liquid crystal molecules in said first cell layer in the vicinity of said second cell layer is orthogonal to that of the liquid crystal molecules in said second cell layer in the vicinity of said first cell layer, and the dependency of the birefringence on the wavelength of light of said first cell layer is larger than that of said second cell layer such that when voltage is applied to said first cell layer, the dependency of the birefringence of the first cell layer is lowered to become approximately equal to that of the second cell layer.

4,952,030

**LIQUID CRYSTAL DISPLAY DEVICE WITH A 50°-80° TWIST ANGLE**

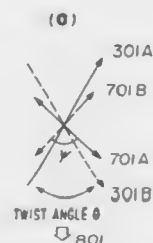
Yutaka Nakagawa, Ischana; Tetsuro Matsumoto, Kawasaki; Yuji Souda, and Yosinori Hirai, both of Yokohama, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan  
Filed Aug. 29, 1988, Ser. No. 237,417

Claims priority, application Japan, Sep. 4, 1987, 62-220380; Oct. 1, 1987, 62-245862

Int. Cl.<sup>3</sup> G02F 1/133

U.S. Cl. 350-337

8 Claims



1. A liquid crystal display device of negative display type, which comprises a liquid crystal cell comprising a nematic liquid crystal layer sandwiched between substrates provided with electrodes, a light shielding layer covering other than the area corresponding to a display pattern, a pair of polarizing films provided on both sides of the liquid crystal cell with their polarization axes arranged to permit light from a no voltage-applied portion to pass therethrough, said liquid crystal cell being adapted to apply a voltage sufficient to energize the nematic liquid crystal to the electrodes at a display pattern area other than a desired display pattern, wherein a twist angle of the liquid crystal layer is in a range of 50°-85°, and the polarizing films are so arranged that their polarization axes intersect at a crossed axes angle ranging from 91° to 100°.

4,952,031

**LIQUID CRYSTAL DISPLAY DEVICE**

Ichiro Tsunoda, Kawasaki, and Toshiyasu Eguchi, Tsukuba, both of Japan, assignors to Victor Company of Japan, Ltd. and Tokai University, both of Japan

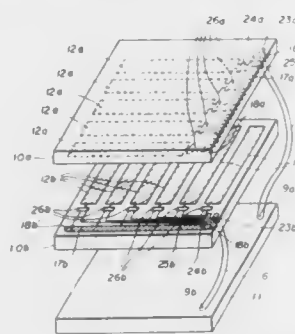
Filed Jun. 9, 1988, Ser. No. 204,608

Claims priority, application Japan, Jun. 19, 1987, 62-152460; Jun. 19, 1987, 62-152461; Jul. 8, 1987, 62-170524

Int. Cl.<sup>3</sup> G02F 1/13; G02B 6/28

U.S. Cl. 350-342

12 Claims



1. A liquid crystal display device for displaying an image by applying a video signal corresponding to the image to be displayed in a form of a voltage signal on the liquid crystal display device in a line sequential addressing manner, comprising:

first and second substrates disposed parallel to each other and carrying respectively thereon first and second groups of electrodes facing each other;

a liquid crystal layer interposed and defined between said first and second substrates;  
said first group of electrodes extending parallel to each other in one direction;

said second group of electrodes extending parallel to each other in another direction to intersect the first group of electrodes so that a plurality of pixels, in a form of rows and columns, of the liquid crystal layer are defined at intersections of said first and second groups of electrodes;  
a first conductor disposed on one of the first and second substrates for carrying a scanning signal to be supplied to the first group of electrodes for exciting the pixels of the liquid crystal layer along which the image is to be displayed;

a second conductor disposed on the second substrate for carrying the video signal to be supplied to a respective one of the second group of electrodes;

first radiation beam activated switch means provided on the substrate on which the first conductor is disposed, said first radiation beam activated switch means being activated by a radiation beam incident thereto for selectively supplying the scanning signal from the first conductor to said first group of electrodes responsive to the activation; and

second radiation beam activated switch means provided on the second substrate, said second radiation beam activated switch means being activated by a radiation beam incident thereto for selectively supplying the video signal from the second conductor to said second group of electrodes responsive to the activation.

4,952,032

**DISPLAY DEVICE**

Hiroshi Inoue, Yokohama; Tadashi Mihara, Atsugi; Atsushi Mizutome, Fujisawa; Osamu Taniguchi, Chigasaki, and Yoshihiro Onitsuka, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

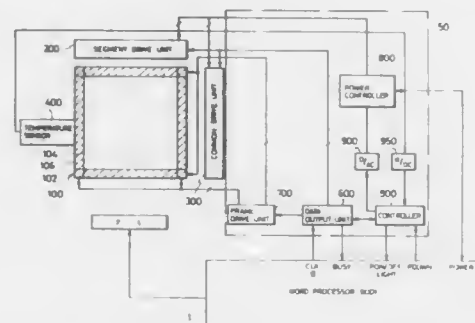
Filed Mar. 29, 1988, Ser. No. 175,040

Claims priority, application Japan, Mar. 31, 1987, 62-076356; May 13, 1987, 62-117440

Int. Cl.<sup>3</sup> G02F 1/13

U.S. Cl. 350-350 S

10 Claims



1. A liquid crystal display device comprising: scanning and information signal lines;

a liquid crystal element comprising a ferroelectric liquid crystal sandwiched between said scanning and information signal lines;

means for sequentially selecting said scanning lines and applying an information signal to said information signal lines in synchronism with an application of a scanning signal to said selected scanning line;

memory means for storing applied voltage data adapted to apply voltage to an intersection of a scanning line and a signal line in accordance with a temperature change; and control means operating in accordance with a temperature change, for varying a ratio of a voltage applied to an intersection of a non-selected scanning line and a selected

information signal line to a voltage applied to an intersection of a selected scanning line and a selected information signal line in accordance with the applied voltage data stored in said memory means after display-driving the last scanning line in an effective display area of the device formed by said scanning and information lines, but before display-driving the first scanning line in the effective display area.

4,952,033

**LIQUID CRYSTAL MEDICAL DEVICE**

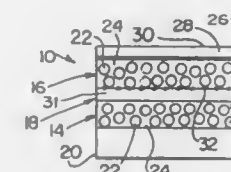
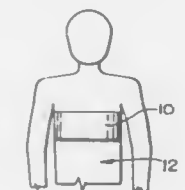
Frederick Davis, Livermore, Calif., assignor to James L. Ferguson, Menlo Park, Calif.

Filed Jul. 13, 1987, Ser. No. 72,360

Int. Cl.<sup>3</sup> G02F 1/13

U.S. Cl. 350-351

30 Claims



1. A liquid crystal device comprising at least two thermochromic means for providing a first type of optical response with respect to temperature, each thermochromic means being operative in a respective temperature range to provide a range of outputs corresponding to said first type of optical response, the temperature ranges of optical response of said at least two thermochromic means being different, distinguishing means for distinguishing between respective temperature ranges by providing a second type of optical response when the temperature is within the temperature range of at least one of said thermochromic means, and support means for supporting said at least two thermochromic means and said distinguishing means.

4,952,034

**LIQUID CRYSTAL PROJECTION DISPLAY**

Noboru Azusawa, Katsuta; Tadahiko Hashimoto, Katsuta; Hisayoshi Shiraiishi, Katsuta, and Yoshiharu Nagae, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 223,709, Jul. 22, 1988, Pat. No. 4,810,064, which is a continuation of Ser. No. 861,007, May 8, 1986, abandoned. This application Jan. 26, 1989, Ser. No. 301,533

Claims priority, application Japan, May 10, 1985, 60-97800 The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> G02F 1/13; G09G 3/02; G02B 26/08; H01S 3/10

U.S. Cl. 350-351

7 Claims

5. A liquid crystal projection display system comprising:

(a) means for generating a laser beam;

(b) a liquid crystal to which thermal writing or erasing is effected with said laser beam irradiated from said laser beam generating means;

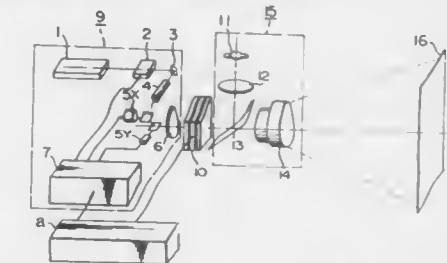
(c) a galvanometer type deflector having two galvanometer mirrors for an X-axis and a Y-axis perpendicular with each

other for irradiating said laser beam to said liquid crystal and for scanning said laser beam across said liquid crystal by means of mechanical displacement of said galvanometer mirrors;

(d) writing and erasing control means for supplying control signal to said galvanometer type deflector and for displacing mechanically said two galvanometer mirrors;

(e) position control means for outputting a speed instruction signal corresponding to a deviation between a position instruction signal from said writing and erasing control means and a position detecting signal;

(f) speed control means for outputting a current instruction signal corresponding to a deviation between said speed instruction signal and a scanning speed detecting signal of said galvanometer type deflector;



(g) current control means for controlling a current to be supplied to a drive source for driving said galvanometer type deflector in accordance with said current instruction signal;

(h) speed limit means provided between said position control means and said speed control means for limiting the magnitude of said speed instruction signal; and

(i) laser intensity varying means disposed between said laser beam generating means and liquid crystal for increasing the intensity of said laser beam in accordance with the increase of the scanning speed so as to maintain the energy of a laser beam spot on said liquid crystal constant during a full scanning period including acceleration period, constant speed period and deceleration period; thereby to obtain a constant width line thereon.

4,952,035

**OPTICAL ELEMENT AND DEVICE USING SAME**

Satoshi Yuasa, Yokohama; Yukuo Nishimura, Sagami-hara; Masahiro Haruta; Yoko Yoshinaga, both of Tokyo, and Hirohide Munakata, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

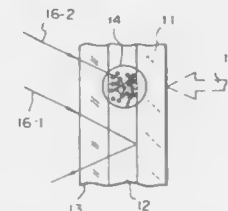
Filed Mar. 20, 1986, Ser. No. 841,770

Claims priority, application Japan, Mar. 22, 1985, 60-55698; Apr. 30, 1985, 60-91021; Jun. 3, 1985, 60-118769; Jun. 18, 1985, 60-130696

Int. Cl.<sup>3</sup> G02F 1/01

U.S. Cl. 350-354

11 Claims



1. An optical element comprising a substrate, a light modulation member and a transparent protective plate, characterized in that the light modulation member is composed of a solvent, an organic crosslinked polymer gel formed in the solvent and a light absorbing heat generating agent dissolved in the solvent, and the polymer gel exhibits a light scattering property when heated and exhibits transparency when cooled.

2. An optical element according to claim 1 in which the



polymer gel is an aqueous gel of acrylamide or methacrylamide type crosslinking polymers.

4,952,036

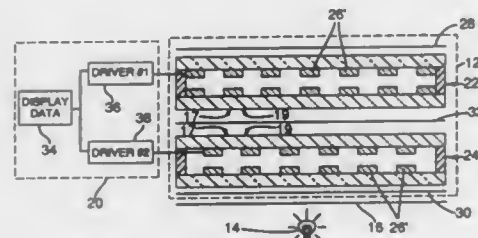
## HIGH RESOLUTION LCD DISPLAY SYSTEM

Paul E. Gulick, Tualatin, and Arlie R. Conser, Portland, both of Oreg., assignors to In Focus Systems, Inc., Tualatin, Oreg. Continuation-in-part of Ser. No. 363,099, Jun. 7, 1989, which is a continuation-in-part of Ser. No. 329,938, Mar. 28, 1989. This application Jul. 12, 1989, Ser. No. 378,997

Int. Cl.<sup>5</sup> G02F 1/13

U.S. Cl. 350—335

2 Claims



1. A method of providing a high resolution display comprising the steps:
  - providing a first liquid crystal cell of the supertwisted nematic type;
  - operating the first liquid crystal cell to define a first display row;
  - compensating wavelength-dependent optical effects exhibited by the first display row by providing a second liquid crystal cell of the supertwisted nematic type in an optical assembly with said first cell, said second cell having opposite twist sense from the first cell and presenting a passive area in superimposed relationship with the first display row, said passive area in the second cell providing an opposite twist counterpart to the first display row, thereby compensating for the first display row's wavelength dependent effects;
  - operating said second liquid crystal cell to define a second display row;
  - compensating wavelength-dependent optical effects exhibited by the second display row by providing in the first liquid crystal cell a passive area in superimposed relationship with the second display row, said passive area providing an opposite twist counterpart to the second display row, thereby compensating for its wavelength dependent effects.

4,952,037

## PLATE MICROLENS AND METHOD FOR MANUFACTURING THE SAME

Masahiro Oikawa, Ibaragi; Tetsuya Yamasaki, Sakura; Kouji Tanaka, Ibaragi, and Eiji Okuda, Sakura, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan Continuation of Ser. No. 119,249, Nov. 2, 1987, abandoned, which is a continuation of Ser. No. 836,339, Mar. 5, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 317,079

Claims priority, application Japan, Mar. 5, 1985, 60-43530; Jun. 10, 1985, 60-125896

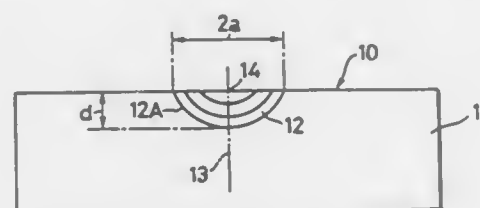
Int. Cl.<sup>5</sup> G02B 3/00, 1/00

U.S. Cl. 350—413

1 Claim

1. A plate microlens comprising gradient index lenses formed integrally in a transparent base, each of said gradient index lenses having an optical axis along a normal to a surface of said transparent base and each having a refractive index profile gradually changing along a direction of the optical axis and along a direction perpendicular thereto, each of said gradient index lenses having a ratio  $d/a$  of 0.5 to 0.69, where  $d$  is the thickness of the gradient index lens along the optical axis and  $2a$  is the diameter of the gradient index lens along said surface

of said transparent base, and each gradient index lens having an effective numerical aperture of at least 0.1, said base consisting essentially of a glass having the following composition:  $\text{SiO}_2$  of



45 to 80 mol %, an oxide of an alkali metal of 8 to 35 mol %,  $\text{ZnO}$  of 2 to 20mol %,  $\text{B}_2\text{O}_3$  of 0 to 8 mol %,  $\text{Al}_2\text{O}_3$  of 0 to 7 mol %,  $\text{ZrO}_2$  of 0 to 2 mol %, and  $\text{CaO} = \text{BaO} = \text{MgO}$  of 0 to 10 mol %.

4,952,038

## ZOOM LENS SYSTEM FOR USE IN COMPACT CAMERA

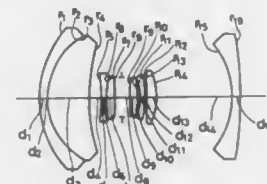
Takayuki Ito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,456

Int. Cl.<sup>5</sup> G02B 15/14

U.S. Cl. 350—427

15 Claims



1. A zoom lens system for use in a compact camera which comprises, in order from the object side, a first lens component having a positive focal length, a second lens component having a positive focal length and a third lens component having a negative focal length, and which satisfies the following conditions (A), (B), and (C):
  - (A) when zooming is made from the wide-angle end to the narrow-angle end, all of the first, second and third lens components are displaced toward the object side, with the distance between the first and second lens components being increased while the distance between the second and third lens components is decreased;
  - (B) the second lens component includes a diaphragm stop and is composed of a first unit that is positioned closer to the object than the diaphragm stop and which has a negative focal length, and a second unit that is positioned closer to the image than the diaphragm stop and which has a positive focal length, the first and second units being adapted to be displaced ensemble; and
  - (C)
    - (1)  $0.5 < f_s/f_1 < 0.9$
    - (2)  $0.9 < f_s/f_2 < 1.4$
    - (3)  $0.0 < X_2/X_1 < 0.7$
    - (4)  $-1.4 < f_s/f_{2a} < -0.7$
    - (5)  $1.4 < f_s/f_{2b} < 2.0$

where

$f_s$  is the focal length of the overall system at the wide-angle end;

$f_1$  is the focal length of the first lens component;

$f_2$  is the focal length of the second component;

$X_1$  is the amount of displacement of the first lens component

toward the narrow-angle end as compared with the amount of displacement toward the wide-angle end;  $X_2$  is the amount of displacement of the second lens component toward the narrow-angle end as compared with the amount of displacement toward the wide-angle end;  $f_{2a}$  is the focal length of the first unit; and  $f_{2b}$  is the focal length of the second unit.

4,952,039

## MACRO-ADAPTED ZOOM LENS SYSTEM CAPABLE OF HIGH ZOOM RATIO WHILE COVERING WIDE ANGLES

Takayuki Ito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

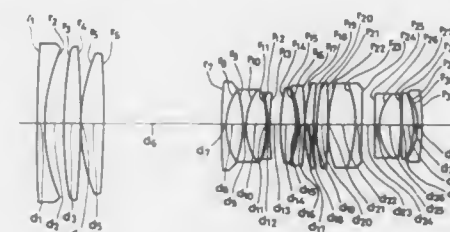
Filed Oct. 26, 1987, Ser. No. 112,171

Claims priority, application Japan, Oct. 24, 1986, 61-253137; Jul. 23, 1987, 62-184118

Int. Cl.<sup>5</sup> G02B 15/22

U.S. Cl. 350—428

18 Claims



1. In a macro-adapted zoom lens system capable of high zoom ratio and which covers wide angles, said lens system comprising, in order from the object side, a first lens group having a positive focal length, a second lens group having a negative focal length, a third lens group having a positive focal length, and a fourth lens group having a positive focal length, the focal length of the overall system being varied by displacing all of the four lens groups, and when zooming is telephoto end, a distance between the first and second lens groups being increased while a distance between the second and third lens groups and a distance between the third and fourth lens groups are decreased, with the first and fourth lens groups being situated closer to the object at the telephoto end than at the wide-angle end, the improvement wherein focusing is normally achieved by means of the first lens group and, when closeup shooting is to be made at a nearer distance, the first lens group is fixed at the telephoto end but the second lens group is displaced toward the object while at least the fourth lens group is displaced a distance less than the movement of said second lens group so as to increase the distance between the third and fourth lens groups.

4,952,040

## ILLUMINATION OPTICAL SYSTEM FOR AN ENDOSCOPE

Tsutomu Igarashi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 210,504, Jun. 23, 1988, abandoned.

This application Mar. 20, 1989, Ser. No. 324,974

Claims priority, application Japan, Jun. 26, 1987, 62-157484

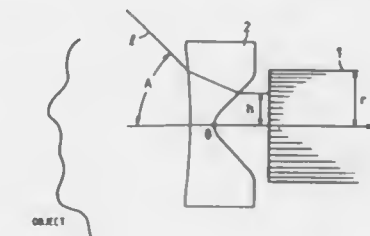
Int. Cl.<sup>5</sup> G02B 3/04, 3/08, 6/00, 23/26

U.S. Cl. 350—432

19 Claims

1. An illumination optical system for an endoscope comprising a plane light source having spread in the direction perpendicular to the optical axis, and an illumination lens system arranged on the object side of said plane light source, comprising at least one aspherical surface and used for directing rays from said light source toward an object for illumination, said illumination optical system for an endoscope being so designed as to satisfy the following conditions (1) through (3):

- (1)  $h$  satisfying  $d/dh \{ \sin A(h) \} < 0$  exists within a range of  $0 \leq h \leq r$
  - (2) A relation of  $\sin A(h_0) \geq 0.3$  establishes for a certain value  $h_0$  of  $h$  within a range of  $0 < h < r$  satisfying  $d/dh \{ \sin A(h_0) \} = 0$
  - (3)  $S < 0.5 S_0$
- wherein the reference symbol  $h$  represents height of incidence, on said illumination lens system, of the ray emitted from said light source in parallel to the optical axis, the reference symbol



$A(h)$  designates an angle formed between said ray and the optical axis when said ray emerges from said illumination lens, the reference symbol  $r$  denotes a distance as measured from the optical axis to the farthest point of said light source in the direction perpendicular to said optical axis, the reference symbol  $h_0$  represents height of ray when  $\sin A(h)$  has a maximum value (the largest of local maximum values when  $\sin A(h)$  has plural local maximum values), the reference symbol  $S_0$  designates the area of the light source and the reference symbol  $S$  denotes a partial area of the light source having  $|A(h)| \leq 15^\circ$ .

4,952,041

## SCOPE WITH POWERED ZOOM

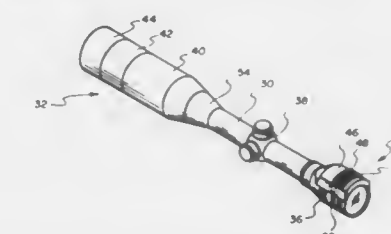
Vern R. Sandall, 113 S. Fort La., Layton, Utah 84041

Filed May 17, 1989, Ser. No. 352,972

Int. Cl.<sup>5</sup> G02B 7/10, 23/16, 23/00

U.S. Cl. 350—560

17 Claims



1. A powered zoom scope, comprising:
  - an elongate body tube constituting means for attachment to a rifle mount;
  - an eyepiece mounted at an ocular end of said body tube;
  - an objective lens mounted at an objective end of said body tube;
  - an erector lens mounted within said body tube and having crosshairs therein;
  - a zoom lens assembly mounted at said objective end and aligned with said body tube, wherein said zoom lens assembly includes a ring-like zooming gear mechanically linked with said motor;
  - a generally tubular housing mounted at said objective end, encasing said zoom lens assembly, and aligned on a collinear longitudinal axis with said body tube;
  - a drive means mounted within said housing for powering said zoom lens assembly, said drive means including a miniaturized motor mounted in said housing and mechanically linked with said zoom lens assembly; and
  - switch means mounted at said ocular end of said body tube and linked with said drive means for selective operation of said zoom lens assembly.

4,952,042

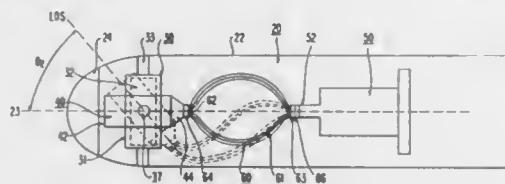
## MISSILE SEEKER HEAD

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Jun. 16, 1989, Ser. No. 367,258  
Int. Cl.<sup>3</sup> G02B 23/16, 6/06

U.S. Cl. 350—567

10 Claims



1. A missile seeker head for operative disposition proximate an optically transmissive dome fixed to one axial end of an elongated, cylindrical casing having a diameter and a centerline axis, said seeker head comprising:

- a gimbal mounting assembly fixed in said casing proximate said dome for selective movement about axes orthogonal to said centerline axis;
- a telescope having a line of sight axis including optical elements disposed for receiving optical signals through a first end and for focusing said optical signals along said line of sight axis onto a focal plane proximate a second axially-opposed end thereof, said telescope having an axial length less than the diameter of said casing and being supported between said opposed ends of said gimbal mounting assembly for movement therewith to selectively direct said first end through a field of regard;
- a camera fixed in said casing in coaxially spaced relation to said gimbal mounting assembly, said camera including an optical input element; and
- a coherent optical fiber bundle including a plurality of individual fibers each having opposed input and output ends and a length greater than the axial spacing between said gimbal mounting assembly and said camera, the input ends of said fibers being fixed to said telescope at the focal plane for receiving said optical signals, and the output ends of said fibers being fixed to said optical input element for conveying said focused optical signals to said camera, said fibers between said input and output ends being symmetrically disposed around said centerline axis and being free to move with respect to each other.

4,952,043

## SIZE ADJUSTABLE GLASSES SUN SHADE

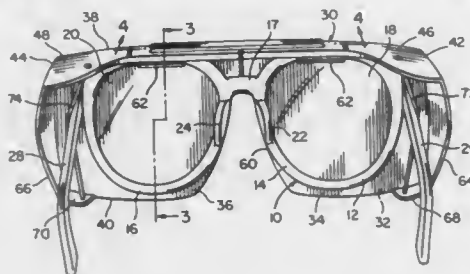
Peter J. Werner, 6300 Tropicana #199, Las Vegas, Nev. 89103, and Timothy T. Werner, 940 Yarger Dr., Cincinnati, Ohio 45230

Filed Jun. 26, 1989, Ser. No. 371,277

Int. Cl.<sup>3</sup> G02C 9/00

U.S. Cl. 351—47

16 Claims



1. A size adjustable sun shade for glasses of the type including front and rear sides, top and bottom margins and upright opposite side margins as well as elongated, rearwardly projecting opposite side temples pivoted at their forward ends from corresponding opposite side margins of said glasses for swinging movement into lengthwise overlapped positions extending

across and closely paralleling said rear side, said sun shade including a horizontally elongated upright transparent panel structure including front and rear surfaces, upper and lower margins and opposite side margins, said panel structure including rearwardly projecting support flange means extending along and projecting rearwardly from said upper margin for overlying and being supported by said top margin when said panel structure is disposed closely forward of said front side, at least the opposite ends of said lower margin including rearwardly projecting flange means supported therefrom closely adjacent said side margins of said transparent panel structure, and a pair of upstanding elongated flexible and elastic retaining members adjacent and rearward of said side margins of said transparent panel structure each having a lower end thereof anchored relative to the corresponding flange means and an upper end thereof anchored relative to the corresponding end portion of said support flange means, said retaining members being spaced sufficiently rearward of said rear surface to be engaged over the remote sides of said temples closely rearward of the pivot axes thereof.

4,952,044

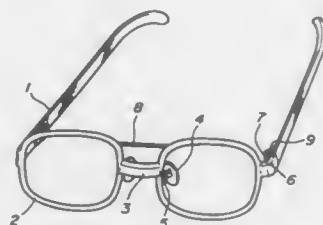
## METALLIC EYEGLASS FRAME AND METHOD OF MAKING THE SAME

Masaru Mural, Fukui, Japan, assignor to Sigma Industry Co., Ltd., Fukue, Japan

Continuation of Ser. No. 39,430, Apr. 17, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 344,470  
Int. Cl.<sup>3</sup> G02C 13/00

U.S. Cl. 351—41

2 Claims



1. An eyeglass frame comprising a bow fabricated from a Ni-Ti base alloy having a shape-memory effect and a hinge fabricated from a material selected from the group consisting of a Cu-Ni-Zn alloy and a Ni-Cr alloy, said bow having a portion soldered to said hinge, said bow portion being coated by a Ni or Ni-alloy plating having a thickness of from about 3 to 50 microns prior to being soldered to said hinge.

4,952,045

## CORNEAL CONTACT LENS AND METHOD FOR TREATING MYOPIA

Nick Stoyan, 3841 Diamante Pl., Encino, Calif. 91436

Filed May 26, 1989, Ser. No. 357,365

Int. Cl.<sup>3</sup> G02C 7/04

U.S. Cl. 351—160 R

16 Claims

- 1. A corneal contact lens comprising:
  - a central zone having a central zone radius of curvature and a central zone lateral thickness;
  - a tear zone located concentrically around said central zone, said tear zone being integral with said central zone and having a tear zone radius of curvature and a tear zone lateral thickness wherein said tear zone radius of curvature is smaller than said central zone radius of curvature; and
  - a peripheral zone located concentrically around said tear zone, said peripheral zone being integral with said tear zone and having a peripheral zone radius of curvature and a peripheral zone lateral thickness wherein said peripheral zone radius of curvature is greater than or equal to said

central zone radius of curvature and wherein said central zone and said peripheral zone each have a lateral thickness



which is greater than the lateral thickness of said tear zone.

4,952,046

## OPTICAL LENSES WITH SELECTIVE TRANSMISSIVITY FUNCTIONS

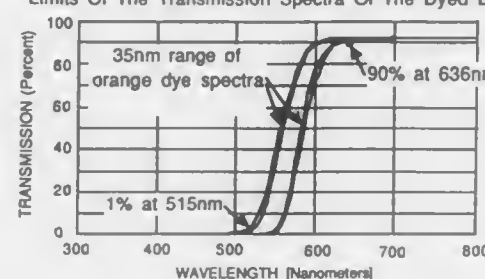
James B. Stephens, 2303 Maurice Ave., Glendale, Calif. 91214; Charles G. Miller, deceased, late of Pasadena, Calif., and by Anna S. Miller, Executrix, 841 Oak Knoll Ave., Pasadena, Calif. 91106

Continuation-in-part of Ser. No. 352,706, Feb. 26, 1982, abandoned. This application Jul. 25, 1988, Ser. No. 224,060  
Int. Cl.<sup>3</sup> G02C 7/10, 7/04

U.S. Cl. 351—163

10 Claims

Limits Of The Transmission Spectra Of The Dyed Lens



1. A lens worn in front of the eyes by humans, in an outdoor sunlit environment, where said lens is a filter barrier to photons deleterious to the eyes and that is also a transmitter of visible light most useful for high visual acuity, where said lens comprises:

- (a) a transparent, organic plastic matrix material, and
- (b) a sharp cut-on orange dye incorporated into said material that allows the lens to transmit at least 90% of the visible sunlight with wavelengths longer than 636 nm and block more than 99% of all sunlight with wavelengths shorter than 515 nm.

4,952,047

## PROGRESSIVE BRILLENGLAS LENS WITH ADDITIONAL CHANNEL OF VISION

Rudolf Barth, Vierkirchen, and Herbert Pfeiffer, Munich, both of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

PCT No. PCT/DE87/00475, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03277, PCT Pub. Date May 5, 1988

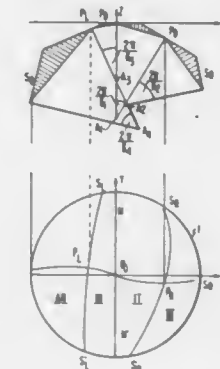
PCT Filed Oct. 21, 1987, Ser. No. 221,253

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1986, 3635777

Int. Cl.<sup>3</sup> G02C 7/06

U.S. Cl. 351—169

11 Claims



1. A progressive power ophthalmic lens having a convex front surface and a concave inner surface with at least one surface contributing to an increase in refractive power from a distant vision portion via a progression zone to a near vision portion along a plane or curved main meridian along which the overall astigmatism is <0.5 dpt, the at least one surface contributing to an increase in refractive power being provided with at least one additional line not intersecting the main meridian and extending from the distant vision portion to a bottom edge of the ophthalmic lens and on which the surface astigmatism has a minimum local value of  $\leq 0.5$  dpt so as to form at least one additional channel of vision.

4,952,048

## METHOD OF DESIGNING A NON-PROGRESSIVE MULTIFOCAL OPHTHALMIC LENS

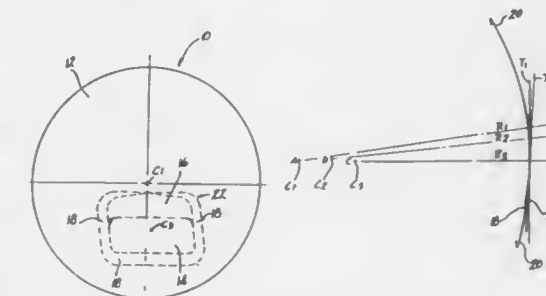
Philip M. Frieder, Miami, Fla., and Michael Walach, Toronto, Canada, assignors to Opticorp, Inc., Miami, Fla.

Division of Ser. No. 190,149, May 4, 1988, Pat. No. 4,869,588, which is a continuation-in-part of Ser. No. 95,891, Sep. 14, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 371,039

Int. Cl.<sup>3</sup> G02C 7/06

U.S. Cl. 351—177

6 Claims



1. A method of designing a non-progressive ophthalmic lens



having a distance viewing area and at least one other viewing area, said method comprising:

forming a first arc segment defining a portion of a substantially spherical far distance viewing area having a prescribed power;

forming a second arc segment defining a portion of a second viewing area having a desired power and a top portion coinciding with said first arc segment for a first distance; and

blending said first and second arc segments together in areas where said segments do not coincide, said lens being characterized by substantially no image jump, no visible line segment at said top portion and no separation through a center region of said top portion.

4,952,049

# APPARATUS FOR MEASURING THE REFRACTION OF EYE

Kazuhiko Matsumoto, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

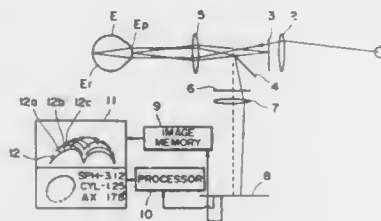
Continuation of Ser. No. 848,973, Apr. 7, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 237,161

Claims priority, application Japan, Apr. 12, 1985, 60-77938

Int. Cl.<sup>5</sup> A61B 3/10

U.S. Cl. 351-211

11 Claims



1. An eye refractometer comprising:

index mark forming means for providing a spot-like index mark;

a projection optical system for projecting the index mark onto a fundus of an eye to be examined through a first aperture stop disposed substantially optically conjugate with a pupil of the eye;

a measuring optical system for guiding a light beam of the index mark reflected by the eye fundus through a second aperture stop disposed substantially optically conjugate with the pupil of the eye, at least one of said first and second aperture stops having at least a semi-circular opening elongated in a circumferential direction around the center of the optical axis of said measuring optical system;

two-dimensional light detector means for receiving the light beam reflected by the eye fundus and for detecting the position of a continuously shaped image of the received light beam which is deformed from the shape of said elongated opening by the irregular distribution of the refractive power of the eye; and

processing means for calculating the refractive power of the eye on the basis of the detection of the continuously shaped image of the light beam received by said two-dimensional light detector means.

## OPHTHALMOLOGICAL DIAGNOSIS METHOD AND APPARATUS

Yoshihisa Aizu, Machida; Kouji Ogino, and Toshiaki Sugita, both of Hino, all of Japan, assignors to Kowa Company Ltd., Japan

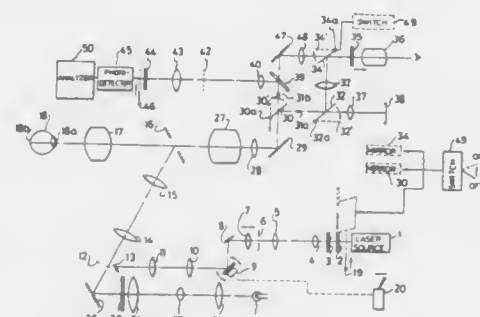
Filed Apr. 13, 1989, Ser. No. 337,393

Claims priority, application Japan, Apr. 15, 1988, 63-91672

Int. Cl.<sup>5</sup> A61B 3/10, 3/14

U.S. Cl. 351-221

13 Claims



7. An ophthalmological diagnosis apparatus in which the eye fundus is illuminated with a laser beam of a predetermined diameter, and light scattered and reflected from the eye fundus is evaluated to measure the blood state in the eye fundus tissue, comprising:

a laser source for producing a laser beam; optical means for illuminating a blood vessel to be measured with the laser beam produced by said laser source and having a predetermined beam spot whose diameter is substantially equal to or smaller than that of the blood vessel;

optical means for converging light scattered and reflected by the eye fundus to form diffraction-plane speckles at a Fourier-transform plane relative to the eye fundus which is taken as an object plane;

a detection aperture disposed at the Fourier-transform plane and formed thereon with a multiple detection aperture pattern comprised of a plurality of small apertures;

means for photoelectrically detecting boiling motion of the diffraction-plane speckles through said detection aperture to extract a fluctuation in a total amount of light passing through the multiple detection aperture pattern; and

means for evaluating a speckle signal obtained by said detecting means to measure the velocity of the blood flowing through the blood vessel concerned.

4,952,051

# METHOD AND APPARATUS FOR PRODUCING ANIMATED DRAWINGS AND IN-BETWEEN DRAWINGS

Douglas C. Lovell, and Rose M. Lorincz-Lovell, both of 40 Liss Rd., Wappinger's Falls, N.Y. 12590-1609

Filed Sep. 27, 1988, Ser. No. 249,834

Int. Cl.<sup>5</sup> G03B 21/32

U.S. Cl. 352-87

10 Claims

1. A system for making animated films comprising:

a. a list maintaining a sequential ordering of drawings on a storage device;

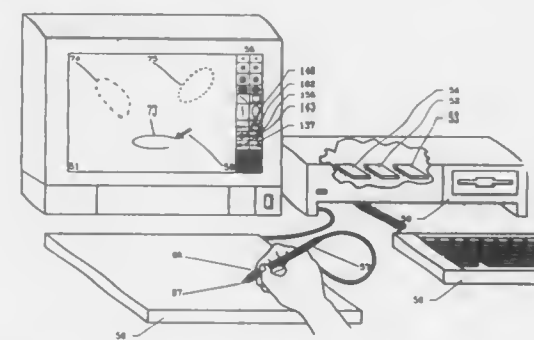
b. means for interposing additional drawings or removing existing drawings at any selected position in said list;

c. a display showing three or more drawings from said list together, in registration;

d. means for creating and editing any one of the drawings on said display; and

e. means for causing drawings from said list to be shown one

after another on said display at a speed which gives the effect of animation.



whereby the means for drawing and the means for experiencing the resulting animation are fully integrated.

4,952,052

# MICROFILM READER FOR MICROFICHE FILMS

Nobuo Ueda, and Hideaki Hirasawa, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

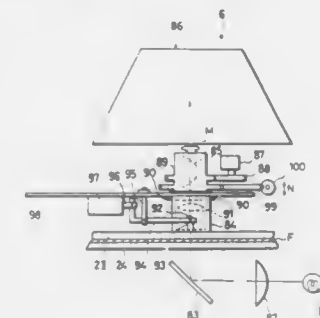
Filed May 6, 1988, Ser. No. 191,136

Claims priority, application Japan, May 8, 1987, 62-112784; May 8, 1987, 62-112785; May 8, 1987, 62-112786

Int. Cl.<sup>5</sup> G03B 23/08

U.S. Cl. 353-27 R

12 Claims



1. A microfilm reader for reading information from a microfiche film, comprising:

film support means for supporting the microfiche film, said film supporting means including an upper glass plate and a lower glass plate for sandwiching the microfiche film therebetween;

projecting means including a light source and a projecting lens for projecting micro-images recorded on the microfiche film sandwiched between said upper glass plate and said lower glass plate;

retrieving means for retrieving desired micro-images recorded on the microfiche film by moving said supporting means and said projecting lens relative to one another;

lens supporting means for positionally setting and supporting said projecting lens, said lens support means being movable between a projecting position where said projecting lens is in contact with said upper glass plate in order to maintain said projecting lens at a predetermined distance to said microfiche film and a retracted position where said projecting lens is out of contact with said upper glass plate; and

means for automatically moving said lens supporting means from said projecting position to said retracted position during the retrieving operation of said retrieving means.

4,952,053

# TRANSPARENCY OVERHEAD PROJECTOR

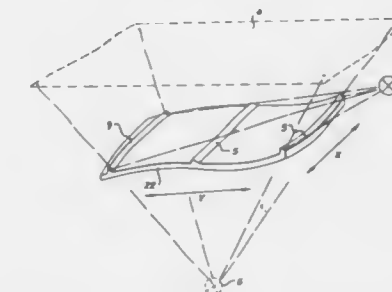
Karl-Günter Behr, Biebertal-Vetzberg, Fed. Rep. of Germany, assignor to Procent Patent und Verwaltungs AG, Zurich, Switzerland

Filed Aug. 22, 1988, Ser. No. 234,592

Int. Cl.<sup>5</sup> G03B 21/1

U.S. Cl. 353-65

6 Claims



1. An overhead projector having an optical axis, and comprising:

a base;

a light source;

a transparent platen supported on said base along said optical axis;

an objective lens supported above said platen;

a fresnel lens also supported along said optical axis and beneath said platen; and,

a specular surface mounted beneath said fresnel lens having mirrorized prismatic shoulders located on a top surface thereof which reflect light from said light source towards said platen and fresnel lens so that said reflected light appears to come from a light source positioned along said optical axis and beneath said fresnel lens, and wherein said specular surface is curved in a first direction with respect to said platen and said curvature is variably concave and convex.

4,952,054

# CORRECTION OF BLOOD COUNT TUBE READINGS

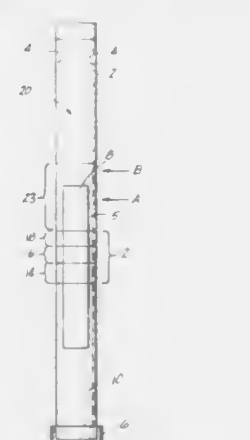
Robert A. Levine, 31 Pilgrim Ln., Guilford, Conn. 06437, and Stephen C. Wardlaw, 191 N. Cove Rd., Old Saybrook, Conn. 06475

Filed Jan. 30, 1989, Ser. No. 303,120

Int. Cl.<sup>5</sup> G01B 11/08, 11/12; B01D 21/26

U.S. Cl. 356-39

5 Claims

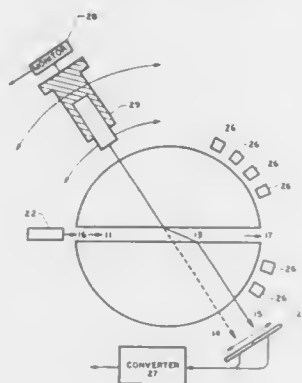


1. A method for detecting the magnitude of thickness deviations from a target radial thickness of an annulus formed between a transparent tube bore and a transparent solid cylinder.

cal body disposed coaxially with and in said tube bore, and said tube bore also containing a clear colored fluid with a first portion thereof being disposed in said annulus, and a second portion thereof being located beyond one end of said cylindrical body, said method comprising the steps of:

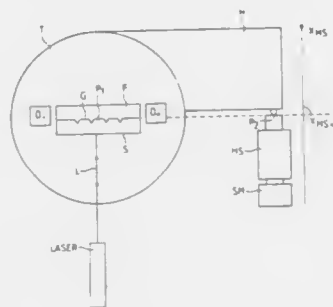
- determining the actual ratio of light absorbed from:
  - a first beam of light transmitted diametrically through the tube and body and through said first portion of said fluid; and
  - a second beam of light transmitted diametrically through the tube and through said second portion of said fluid;
- comparing said actual ratio with a predetermined ratio of light absorption of light beams transmitted along said first and second paths when the tube bore and body diameters are sized to create the target radial thickness in the annulus; and
- calculating any amount of deviation between said actual ratio and said predetermined ratio thereby providing an indication of the magnitude of actual annulus deviations from said target thickness.

**4,952,055**  
**DIFFERENTIAL REFRACTOMETER**  
Philip J. Wyatt, Santa Barbara, Calif., assignor to Wyatt Technology Corporation, Santa Barbara, Calif.  
Filed Oct. 3, 1988, Ser. No. 252,331  
Int. Cl.<sup>5</sup> G01N 21/41, 21/49  
U.S. Cl. 356—73



- A differential refractometer for measuring the refractive index change of a fluid, caused by a change in the concentration of a dissolved solute therein, comprised of
  - a fluid bearing capillary within a transparent medium, said medium being of a refractive index greater than that of said capillary borne fluid;
  - a light source producing a fine light beam coplanar with said capillary, said beam being directed to pass through said transparent medium and to intersect said fluid bearing capillary causing thereby said light beam to pass from said transparent medium after thereby having been twice refracted by said fluid bearing capillary;
  - a refracted beam detector element receiving said twice refracted beam and which is responsive to the displacement of said twice refracted beam caused by refractive index change of said fluid due to said dissolved solute and producing a signal corresponding to said displacement;
  - conversion means whereby said refracted beam displacement signal may be converted into a direct numerical or analog representation of  $dn/dc$  where  $dn$  is the refractive index change of said fluid caused by a concentration change  $dc$  of said solute within said fluid.

**4,952,056**  
**METHOD OF DETERMINING THE AUTOCOLLIMATION ANGLE OF A GRATING COUPLER**  
Kurt Tiefenthaler, Zürich, Switzerland, assignor to Entwicklungsgemeinschaft ASI, Zürich, Switzerland  
Filed May 5, 1989, Ser. No. 347,752  
Claims priority, application Switzerland, May 17, 1988, 01845/88  
Int. Cl.<sup>5</sup> G01N 21/84; G02B 6/34  
U.S. Cl. 356—73.1



- A method of determining, with respect to a light beam, the autocollimation angle of a grating coupler comprising a waveguiding structure which defines predetermine waveguiding modes in forward and rearward propagation directions, and a diffraction grating having a predetermine grating period and defining predetermine diffraction orders, comprising the steps of:
  - directing the light beam to the diffraction grating at different angles of incidence and thereby exciting at least one waveguiding mode in said waveguiding structure;
  - said step of exciting said at least one waveguiding mode in said waveguiding structure entailing the steps of exciting said at least one waveguiding mode in the forward propagation direction as well as in the associated rearward propagation direction and selecting respective positive and negative diffraction orders defined by said diffraction grating;
  - determining predetermined angles of incidence at which said at least one waveguiding mode is excited under resonance conditions in both said forward and said rearward propagation directions at the selected diffraction orders; and
  - determining, as said autocollimation angle, the mean value of the predetermined angles of incidence associated with the resonance excitation of said at least one waveguiding mode in said waveguiding structure in said forward and rearward propagation directions.

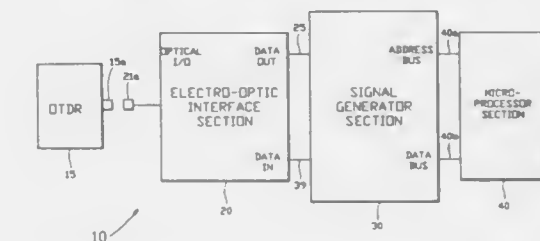
**4,952,057**  
**OPTICAL FIBER BACKSCATTER SIGNATURE GENERATOR (OFBSG)**  
Neil Kamikawa, Kaneohe; Arthur Nakagawa, Kailua; Grant Tanaka, Alea, and Ken Yamada, Honolulu, all of HI., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed May 3, 1989, Ser. No. 350,172  
Int. Cl.<sup>5</sup> G01N 21/84, 21/88  
U.S. Cl. 356—73.1

1. An apparatus for generating simulated optical fiber backscatter waveform signals to measure the performance of an OTDR comprising:

an electro-optic interface section means coupled to the OTDR to receive optical signals therefrom for converting them into representative electrical signals and for converting simulated electrical waveform signals into representa-

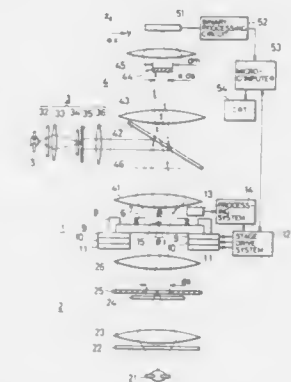
tive said simulated optical fiber backscatter waveform signals for the OTDR;

a microprocessor section means for providing preprogrammed data signals representative of said simulated optical fiber backscatter waveform signals in a virtual cable; and



a signal generator section means coupled to the electro-optic interface section means and the microprocessor section means for generating said simulated electrical waveform signals in response to said representative electrical signals and said preprogrammed data signals to feed said simulated electrical waveform signals to said electro-optic interface section means to assure that said simulated optical backscatter waveform signals are fed to the OTDR.

**4,952,058**  
**METHOD AND APPARATUS FOR DETECTING ABNORMAL PATTERNS**  
Minori Noguchi; Hiroaki Shishido, and Mitsuyoshi Koizumi, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Apr. 22, 1988, Ser. No. 184,787  
Claims priority, application Japan, Apr. 27, 1987, 62-101745; Jun. 19, 1987, 62-151121  
Int. Cl.<sup>5</sup> G01N 21/88  
U.S. Cl. 356—237



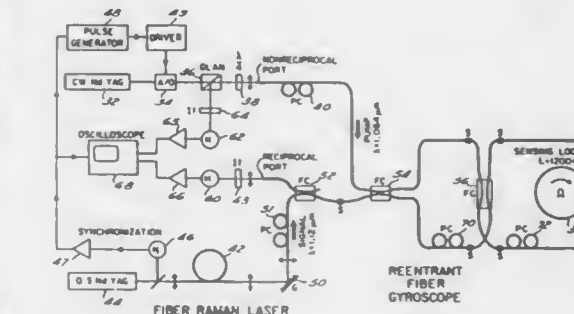
- A method of detecting an abnormal pattern on an object body comprising the steps of:
  - emitting an exposure light having a substantially single wavelength;
  - converting said exposure light into a diffused light with a first aperture;
  - focusing said diffused light onto said object body with a specified spatial coherency for substantially preventing generation of scattered light by an edge of a pattern on said object body;
  - imaging scattered light which is generated by a foreign particle on said object body;
  - shielding with a shielding means substantially all scattered light generated by said edge of the pattern while passing outside thereof a component of said scattered light generated by said foreign particle when a spatial frequency of said foreign particle is higher than that of said edge of the

pattern, said shielding means being disposed at a Fourier Transformed position of said object body with respect to said first aperture and having a second aperture which is slightly greater than said first aperture; and

detecting an image of said component of said scattered light generated by said foreign particle, thereby detecting said foreign particle without detecting said edge of the pattern.

**4,952,059**  
**REENTRANT FIBER RAMAN GYROSCOPE**  
Emmanuel Desurvire, Natick, N.J.; Byoung Y. Kim, Menlo Park, and Herbert J. Shaw, Stanford, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.  
Continuation of Ser. No. 872,052, Jun. 6, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 180,596  
Int. Cl.<sup>5</sup> G01B 9/02

U.S. Cl. 356—350



- A method of sensing rotation, comprising:
  - inputting an optical signal having a first wavelength into a loop of optical fiber comprising an active material which emits photons at said first wavelength in response to pumping at a second wavelength;
  - inputting pump light at said second wavelength into said loop for propagation therethrough to optically pump said active material such that photons are generated in said loop at the first wavelength to amplify the optical signal; coupling only a fraction of said optical signal out of said loop after propagation therethrough such that said optical signal recirculates a plural number of times in said loop; and
  - suppressing pump phase noise in the loop by coupling said pump light out of the loop after a single circulation to thereby prevent said pump light from recirculating in the loop.

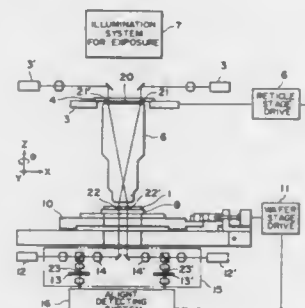
**4,952,060**  
**ALIGNMENT METHOD AND A PROJECTION EXPOSURE APPARATUS USING THE SAME**  
Hideki Ina, Kawasaki; Fumio Sakai, and Hitoshi Nakano, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 300,714, Jan. 24, 1989, abandoned, which is a continuation of Ser. No. 73,176, Jul. 14, 1987, abandoned. This application Jan. 10, 1990, Ser. No. 463,886  
Claims priority, application Japan, Jul. 17, 1986, 61-166786  
Int. Cl.<sup>5</sup> G01B 27/53

- An alignment method, for relatively aligning an original and a workpiece, in a projection exposure apparatus for projecting a pattern of the original upon a surface of the workpiece by use of a projection optical system, said method comprising:
  - an imaging step for forming an image of an alignment mark on the original through the projection optical system;
  - a first detecting step for reimagining, upon a predetermined



reference plane, the image of the alignment mark on the original through a detection optical system provided on a side of the projection optical system remote from the original, and then for detecting the alignment mark of the original by use of the image formed by said reimagining, said first detecting step being carried out with the workpiece located so as to not interfere with the detection of the alignment mark on the original;

an introducing step for bringing the workpiece to a position between the projection optical system and the detection optical system;



a second detecting step for imaging through the detection optical system upon the reference plane, an alignment mark provided on the side of the workpiece opposite the side thereof facing the projection optical system, and then for detecting the formed image of the alignment mark on the workpiece; and

an aligning step for relatively aligning the original and the workpiece on the basis of the detection at said first and second detecting steps.

4,952,061

#### METHOD AND APPARATUS FOR SENSING OR DETERMINING ONE OR MORE PROPERTIES OR THE IDENTITY OF A SAMPLE

Rodger F. Edgar, Maldon, England, assignor to Infrared Engineering Limited, England

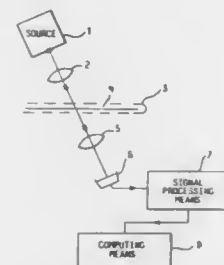
Filed Jun. 27, 1988, Ser. No. 211,708

Claims priority, application United Kingdom, Jul. 2, 1987, 8715608

Int. Cl.<sup>5</sup> G01B 11/02; G01N 21/27

U.S. Cl. 356—407

4 Claims



1. A method of sensing or determining one or more properties or the identity of a sample in which electromagnetic radiation is subject to optical interference, absorption or scatter, the method comprising the steps of:

(a) causing electromagnetic radiation to be transmitted through, or reflected from said sample, said radiation including at least two spectrally different components so that at least one of said components is subjected to said optical interference, absorption or scatter and so that said

components are transmitted through, or reflected from said sample by respectively different amounts;

(b) measuring the transmittance or reflectance of said sample for each of said components to derive respective measured values;

(c) correlating by means of either a zero dependent correlation function 'S', or a residual function 'Nres', respectively defined by:

$$S = \frac{\sum_{i=1}^n x_i y_i}{\left( \sum_{i=1}^n x_i^2 \cdot \sum_{i=1}^n y_i^2 \right)^{1/2}}$$

where:

i is an integer,

n is an integer representing a number of data points,

$x_i$  represents a set of said measured data values at respective data points,

$y_i$  represents a set of known data values at the same data points

$$Nres = \sum_{i=1}^n \left( \frac{x_i}{\left( \sum_{i=1}^n x_i^2 \right)^{1/2}} - \frac{y_i}{\left( \sum_{i=1}^n y_i^2 \right)^{1/2}} \right)^2$$

said measured values of transmittance or reflectance with different known values representing or relating to either different values of a property of a known material, or different values which are characteristic of different known materials; and

(d) selecting the known values having an optimum correlation with said measured values, the selected known values representing the property, or the identity of the sample which is sensed or to be determined.

4,952,062

#### METHOD AND APPARATUS FOR DETECTING FLAWS IN FABRIC

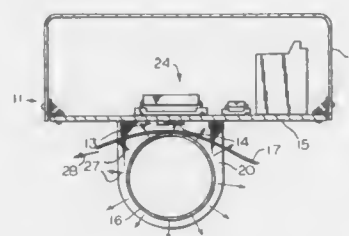
Vern W. Bean, III, 132 Hazel Way; Thomas H. Borders, 122 Ashling Dr., and Thomas M. Turner, Jr., 235 Westwood Dr., all of LaGrange, Ga. 30240

Filed Aug. 5, 1988, Ser. No. 228,436

Int. Cl.<sup>5</sup> G01N 21/89

U.S. Cl. 356—430

19 Claims



1. In the method of examining a web of fibrous material for the presence of flaws wherein measurements indicative of the intensity of light transmitted through the web are compared with a range of measurement values indicative of the intensity of light transmitted by a web of acceptable quality, THE IMPROVEMENT COMPRISING the steps of determining the difference between each measurement and a preselected value within the range, adding each determined difference to a running total of such differences and producing a signal when the running total exceeds a preselected limit indicative of the presence of a flaw.

4,952,063

#### METHOD AND APPARATUS FOR EVALUATING SURFACE AND SUBSURFACE FEATURES IN A SEMICONDUCTOR

Jon Opsal, Livermore; Allan Rosenzweig, Danville, and Walter L. Smith, Livermore, all of Calif., assignors to Thermo-Wave, Inc., Fremont, Calif.

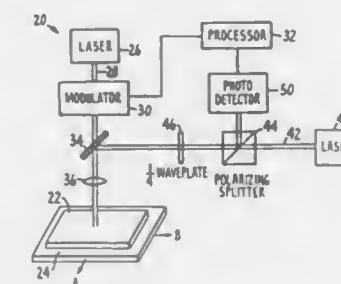
Continuation of Ser. No. 76,876, Jul. 23, 1982, Pat. No. 4,854,710, which is a continuation of Ser. No. 707,485, Mar. 1, 1985, abandoned. This application May 15, 1989, Ser. No. 351,540

The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.

Int. Cl.<sup>5</sup> G01N 21/41, 25/00

U.S. Cl. 356—432

34 Claims



1. An apparatus for evaluating surface and subsurface conditions in a semiconductor sample comprising:

a periodic excitation source for supplying energy to the surface of the sample sufficient to create an electron-hole plasma having a density sufficient to cause changes in the optical reflectivity of the sample;

a probe for emitting a beam of radiation of a fixed wavelength shorter than the wavelength corresponding to the band-gap energy of the sample;

means for directing the radiation probe beam within a portion of the surface of the sample which has been periodically excited in a manner such that said probe beam is reflected;

means for monitoring the modulated intensity changes in said reflected probe beam resulting from the variations in the optical reflectivity of the sample due principally to the presence of the electron-hole plasma; and

means for processing the measured intensity changes of the reflected probe beam to evaluate the sample.

4,952,064

#### METHOD FOR PREPARING MAGNETIC COATING COMPOSITIONS

Toshio Ono; Chiaki Mizuno; Yasuo Tamai, and Hiroshi Ogawa, all of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 29, 1989, Ser. No. 459,174

Claims priority, application Japan, Dec. 29, 1988, 63-330867; Dec. 29, 1988, 63-330868

Int. Cl.<sup>5</sup> B28C 7/04; B01F 7/02

U.S. Cl. 366—76

18 Claims

1. A method for preparing a magnetic coating composition wherein a single two-shaft continuous kneading and mixing machine, which is provided with a pair of shafts having blade members secured thereto and a barrel accommodating the shafts such that they can rotate, is used to carry out normal kneading of a mixture of magnetic grains and a solution which contains a binder in an organic solvent in a normal kneading region and thereafter to carry out dilution kneading of the mixture, which results from normal kneading, and an organic solvent in a dilution kneading region,

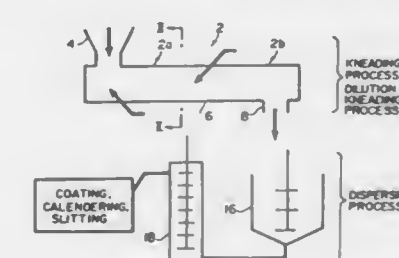
wherein the improvement comprises the steps of:

(i) in the course of said normal kneading being carried out, adjusting the solids concentration in the mixture sub-

jected to said normal kneading so that the solids concentration falls within the range of 65 to 95 wt%,

(ii) in the course of said dilution kneading being carried out, adjusting the solids concentration in the mixture subjected to said dilution kneading so that the solids concentration falls within the range of 30 to 60 wt%,

(iii) adjusting the widths of gaps in said dilution kneading region of said two-shaft continuous kneading and mixing machine, each of which gaps is formed between a blade member secured to one of said shafts and a blade member secured to the other shaft, said blade members



being positioned such that they face each other, so that they are smaller than the widths of such gaps in said normal kneading region of said two-shaft continuous kneading and mixing machine, and

(iv) adjusting the widths of gaps in said dilution kneading region of said two-shaft continuous kneading and mixing machine, each of which gaps is formed between each blade member and the inner surface of said barrel, so that they are smaller than the widths of such gaps in said normal kneading region of said two-shaft continuous kneading and mixing machine.

4,952,065

#### METHOD AND APPARATUS FOR MIXING VISCOUS OR PASTY MATERIALS

Wolf-Dieter Kreuziger, Theresienstrasse 17, A-1180 Vienna, Austria

Continuation of Ser. No. 842,177, Mar. 21, 1986, abandoned.

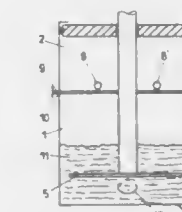
This application Nov. 28, 1988, Ser. No. 277,443

Claims priority, application Austria, Mar. 21, 1985, 857/85

Int. Cl.<sup>5</sup> B01F 7/26, 13/06, 15/02

U.S. Cl. 366—139

18 Claims



1. A method of mixing viscous or pasty materials comprising: introducing solid materials into a receptacle; closing the receptacle; supplying liquid components to be mixed to the receptacle; evacuating air from said receptacle; reducing the volume of the receptacle to the volume to be mixed; mixing the materials in the receptacle by a mixing tool that both rotates and reciprocates in an axial direction; expelling the materials through a discharge opening by reducing the volume of the receptacle; cleaning the receptacle by introducing cleaning fluid through said discharge opening as the volume of said receptacle is increased; agitating the mixing tool; and expelling

the cleaning fluid through said discharge opening as the volume of the receptacle is decreased.

communicating with the atmosphere, whereby hydraulic fluid leakage from the hydraulic actuator will flow to the atmo-

**4,952,066**  
**METHOD AND APPARATUS FOR DILUTING AND ACTIVATING POLYMER**

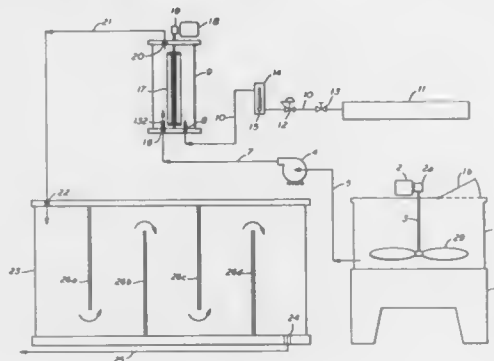
Robert O. Hoffland, 303 Silver Spring Rd., Conroe, Tex. 77303  
Filed Feb. 24, 1989, Ser. No. 314,891

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B01F 15/04

U.S. Cl. 366—160

9 Claims



1. An apparatus for continuously diluting and activating a polymer/carrier in water, comprising:
  - a storage tank for containing the polymer/carrier;
  - a stirred mixing tank for mixing and diluting said polymer/carrier with water, said mixing tank having a polymer inlet means, a water inlet means, and a mixing tank outlet means, said mixing tank being sized to provide a residence time of polymer/carrier and water in said mixing tank of between 30-45 seconds;
  - a polymer delivery means for continuously delivering said polymer/carrier from said storage tank to said polymer inlet means at precise rates;
  - a water delivery means for continuously providing water to said water inlet means at desired flow rates;
  - an aging tank for activating said polymer after dilution in the water, said aging tank being sized to provide a residence time of the diluted polymer/carrier in said aging tank of between 2-10 minutes; and
  - a means for continuously delivering the diluted polymer/carrier to said aging tank.

**4,952,067**  
**HOMOGENIZING APPARATUS**

Tolbert H. Dallas, Rte. 1, Box 357, Fulton, Ky. 42041

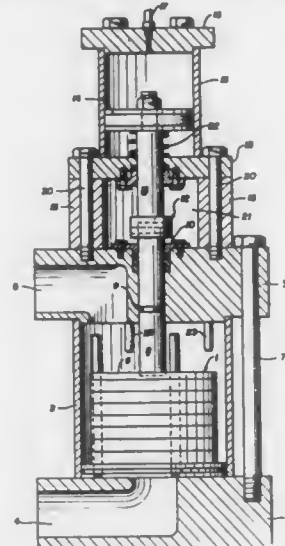
Filed Nov. 13, 1989, Ser. No. 434,313

Int. Cl.<sup>3</sup> B01F 5/06

U.S. Cl. 366—337

12 Claims

1. In a homogenizing apparatus of the type including a stacked configuration of valve disc members mounted within a housing and a hydraulic actuator operatively connected to the stack of valve discs for applying a downwardly biasing force on the stack of valve discs, the improvement comprising, the hydraulic actuator being spaced above the valve disc housing, the space between the hydraulic actuator and valve housing



sphere, to thereby prevent the fluid being homogenized within the valve housing from becoming contaminated.

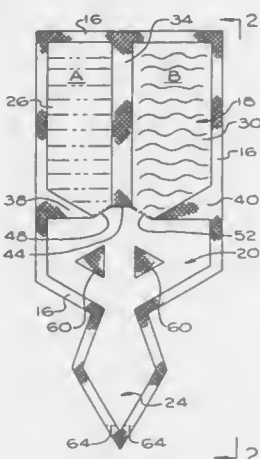
**4,952,068**  
**STATIC MIXING DEVICE AND CONTAINER**  
Theodore R. Flint, P.O. Box 83 "Isabella Furnace", Elverson, Pa. 19520

Filed Mar. 21, 1989, Ser. No. 326,325

Int. Cl.<sup>3</sup> B01F 5/06, 15/02

U.S. Cl. 366—337

23 Claims



1. A static mixing device for at least two components of a composition, comprising:
  - a collapsible container with at least two facing sheets, at least one of the facing sheets being flexible;
  - a storage portion in said container having walls defining at least two storage compartments for said components, said storage compartment having compartment outlets; and,
  - a mixing portion of said container communicating with said storage compartments through said compartment outlets, said mixing portion having at least one obstruction formed by fastened opposing portions of said facing sheets, said obstruction being positioned relative to said storage compartment outlets along a flow path between the compartment outlets and an outlet of the collapsible container such that flow from the storage compartments combines upstream of the obstruction along the flowpath, divides at the obstruction and re-combines downstream of the obstruction, whereby upon squeezing the device said com-

ponents exit said storage compartments through said storage compartment outlets and are mixed together along the flowpath to the outlet.

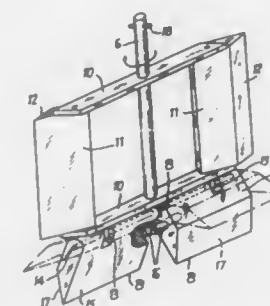
**4,952,069**  
**STIRRER, IN PARTICULAR FOR A MICROWAVE OVEN**  
Michel Boulard, 11 rue de Metz 80000, Amiens, France  
Filed Jun. 6, 1989, Ser. No. 362,158

Claims priority, application France, Jun. 7, 1988, 88 07555

Int. Cl.<sup>3</sup> B01F 7/18

U.S. Cl. 366—312

3 Claims



1. A stirrer comprising a drive shaft including coupling means for coupling to a drive motor, a frame associated with the drive shaft and supporting at least one bottom scraper segment mounted to pivot about a horizontal axis and extending beyond an end of the drive shaft which is furthest from said coupling means, and abutment means for limiting a downward pivoting movement of said at least one bottom scraper segment to a position where said at least one bottom scraper segment remains at an angle relative to a vertical plane.

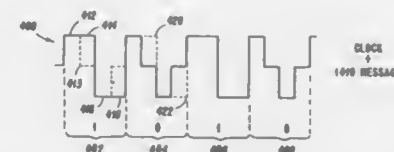
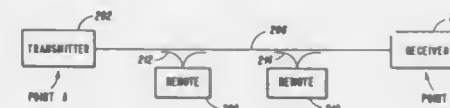
**4,952,070**  
**DIGITAL DATA CODING TECHNIQUE**  
David L. Leedke, Melbourne, and Fred J. Stadenberg, W. Melbourne, both of Fla., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 17, 1988, Ser. No. 258,923

Int. Cl.<sup>3</sup> H04J 3/08

U.S. Cl. 370—110.4

2 Claims



1. A time division multiplex message transmission technique, comprising the steps of:
  - a. transmitting, from a first location, a clock signal without a dc component, having a central reference level and having a plurality of positive pulses, with respect to the central reference level, each positive pulse being separated by a negative pulse, with respect to the central reference level, and a plurality of flat extension regions disposed at the central reference level;

- b. monitoring the clock signal, at a second location, which is spatially distinct from the first location;
- c. generating a message signal, at the second location, by transmitting either positive or negative augmentation pulses to be combined with the extension region thereby changing the flat extension regions into either positive pulses or negative pulses, depending upon the augmentation pulses transmitted; and
- d. receiving the clock and message signals at a third location, which is spatially distinct from both the first and second locations; whereby, a signal is transmitted from the first location to the third location with an additional signal being added at a second location.

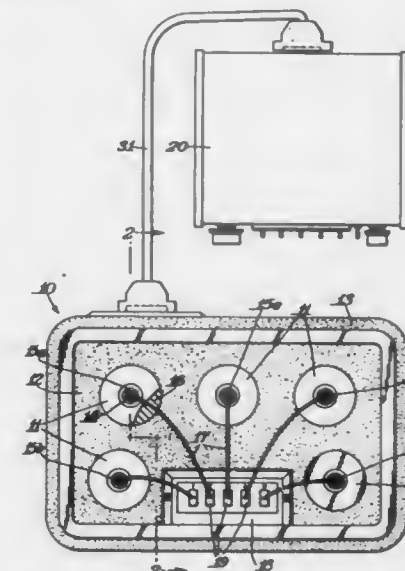
**4,952,071**  
**THERMOCOUPLE PSYCHROMETER**  
John S. Boyer, Lewes, Del., assignor to University of Delaware, Newark, Del.

Filed Feb. 24, 1989, Ser. No. 314,945

Int. Cl.<sup>3</sup> G01R 27/26

U.S. Cl. 374—24

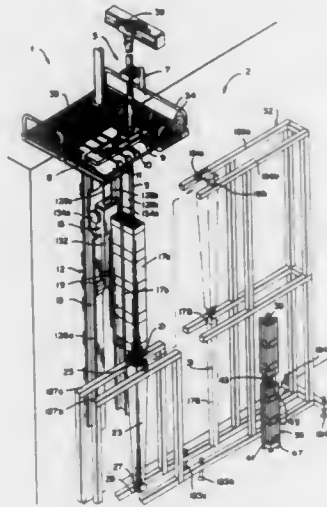
5 Claims



1. A system for measuring by the isopiestic technique comprising:
  - a plurality of thermocouples,
  - an observation means operably connectible to said thermocouples to display indicia of thermal voltage produced at said thermocouples,
  - a switching system operable to selectively connect individual thermocouples to said observation means,
  - said switching system comprising:
    - a latch-type relay connectible to each individual thermocouple operable to connect the respective thermocouple to said observation means,
    - each latch-type relay comprised of an electromagnet and a pair of contacts having contacting surfaces operated by said electromagnet,
    - said contacts comprised of metal layers of dissimilar compositions arranged in a sequence wherein the progression of the layers from the contact surface in each contact is the same,
    - so that current flowing through the relay moves through a succession of layers in a first contact and then flows through a reverse succession of layers in a second contact.



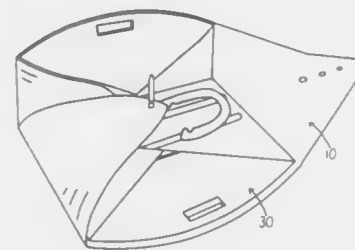
**4,952,072**  
**SYSTEM AND METHOD FOR REMOVING AND CONSOLIDATION FUEL RODS OF A NUCLEAR FUEL ASSEMBLY**  
 Frederick J. Ellington; Anoop Kapoor; Arthur W. Kramer, all of Murrysville Boro, and Donald G. Sherwood, Monroeville Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Continuation of Ser. No. 063,368, Jun. 18, 1987, abandoned.  
 This application Feb. 16, 1989, Ser. No. 311,435  
 Int. Cl.<sup>3</sup> G21C 19/32  
 U.S. Cl. 376—261 13 Claims



13. A system for removing and consolidating the fuel rods of a fuel rod assembly having a plurality of grids, each of which includes an array of rod-receiving cells for receiving and retaining a fuel rod, comprising

- (a) a pushing assembly that includes at least one push rod having a distal end insertable through the cells of the grids of the fuel assembly for pushing a selected fuel rod out of said cells, wherein said distal end terminates in a recessed tip for receiving the end of a fuel rod, a driving mechanism that includes a rack mounted on the proximal end of the push rod, a pinion engaged to said rack, and a reversible motor means coupled to said pinion for extending and retracting the distal end of the push rod, and an indexer means for positioning the push rod over a selected fuel rod in the assembly;
- (b) a fuel assembly positioner including an elevator and carriage means for lifting, lowering, and inverting a fuel rod assembly to provide access to the bottom nozzle and fuel rods of the assembly, also including a basket means for receiving and supporting the fuel assembly;
- (c) a rod-catching means detachably mountable onto one end of said basket for preventing the fuel rods that are pushed out of the fuel assembly by the push rod from falling including an array of rod-receiving cells;
- (d) a transition cannister means for funneling the rods pushed out of the assembly into a compact array having a triangular pitch including an inlet end positioned under the rod-catching means, a plurality of guide tubes whose upper ends are alignable with the rod-receiving cells of the rod-catching means, and whose lower ends are gathered in a dense array having a triangular pitch, and
- (e) an alignment plate having a plurality of recesses arranged in a triangular array for receiving the ends of the pushed out fuel rods, wherein said plate functions as both the bottom of the transition cannister means and the bottom of a storage cannister.

**4,952,073**  
**MATS CONVERTIBLE INTO A BAG**  
 Karl W. Wieland, 41 Brimfield Rd., Norristown, Pa. 19403  
 Filed Apr. 10, 1989, Ser. No. 335,489  
 Int. Cl.<sup>3</sup> B65D 33/08, 33/00  
 U.S. Cl. 383—4 5 Claims

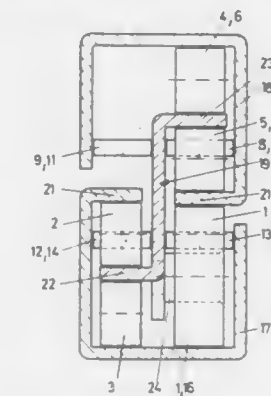


1. A pair of mats convertible into a bag consisting of a first mat and a second mat, each of said mats comprising:
- a generally diamond shaped larger sheet of flexible material, a rectangular panel of rigid material having opposite sides and ends, said panel being connected to the upper surface of said larger sheet at a central location, said sides being parallel with a longitudinal median line of said larger sheet,
  - a smaller sheet of flexible material having opposite ends in alignment with said ends of said panel, said smaller sheet extending between opposite perimetral edges of said larger sheet, said smaller sheet being connected to the upper surface of said panel and to the upper surface of two equal opposite side portions of said larger sheet adjacent said opposite sides of said panel, in semi-rigid fashion,
  - a central perforation shaped and sized to receive a horseshoe stake,
  - an equally shaped and sized cutout in each of said side portions at a medial position adjacent the perimetral edge thereof, said second mat being sufficiently smaller than said first mat to permit superimposition of said second mat over said first mat and to permit turning the opposite end portions of said larger sheet adjacent said ends of said smaller sheet of each of said mats upward and inward and to permit raising said side portions of said mats to form a single carrying bag.

**4,952,074**  
**PULL-OUT GUIDE FOR DRAWERS**  
 Erich Röck, Höchst, Austria, assignor to Julius Blum Gesellschaft m.b.H., Höchst, Austria  
 Filed Nov. 8, 1989, Ser. No. 433,203  
 Claims priority, application Austria, Nov. 10, 1988, 2752/88  
 Int. Cl.<sup>3</sup> F16C 29/04 6 Claims

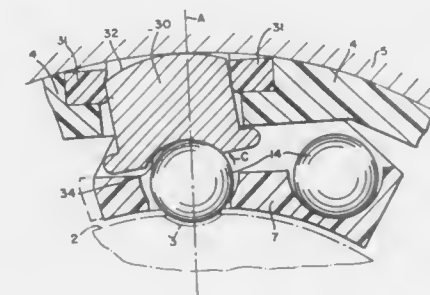
1. A pull-out guide assembly for drawers comprising a pull-out rail fastened to the drawer, a supporting rail fastened to the body of the piece of furniture and a center rail differentially running between said two rails on each side of the drawer, running carriages holding load-transmitting cylindrical bodies being arranged between said rails, and driving rollers running on the supporting rails and on the pull-out rails being mounted

on the center rails, wherein said center rails have Z-profiles and said supporting rails and said pull-out rails have U-profiles



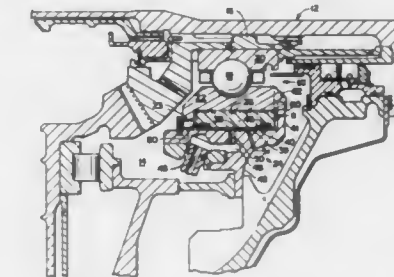
which are substantially half-covered and upwardly and downwardly open.

**4,952,075**  
**LINEAR MOTION BALL BEARING ASSEMBLY**  
 Alfred M. Rogers, III, Deer Park, N.Y., assignor to Thomson Industries, Inc., Mahanet, N.Y.  
 Continuation of Ser. No. 358,453, May 26, 1989, abandoned, which is a continuation-in-part of Ser. No. 174,746, Mar. 29, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 442,403  
 Int. Cl.<sup>3</sup> F16C 31/06  
 U.S. Cl. 384—43 18 Claims



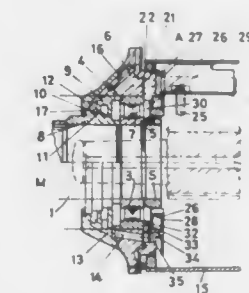
1. A linear motion ball bearing assembly for axial movement along a shaft having at least one ball conforming groove formed on the shaft, the bearing assembly having a plurality of raceways provided by ball retainers mounted to a bearing sleeve, each said raceway having a load-bearing track portion and a load-free track portion and being substantially filled with balls which re-circulate in the raceway, with a load-carrying plate forming part of each load-bearing raceway track portion and having a ball-conforming groove for receiving balls while under loading in the load-bearing track portion, said bearing assembly characterized in that each load-bearing plate which corresponds to a ball conforming shaft groove has one ball-conforming groove formed therein and is reorientable both to tilt about the line of balls under loading and to simultaneously roll about the interior surface of the housing in which the bearing assembly is retained such that each said reorientable load-carrying plate can reorient itself to accommodate misalignment between the ball-conforming shaft groove and its corresponding ball-conforming plate groove.

**4,952,076**  
**FLUID DAMPER FOR THRUST BEARING**  
 Walter H. Wiley, III; Charles D. Aaron, Jr., both of Palm Beach Gardens; Russell L. Carlson, North Palm Beach; Charles L. Davis, III, and Ronald A. Marmol, both of Palm Beach Gardens, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.  
 Filed Jul. 21, 1989, Ser. No. 383,389  
 Int. Cl.<sup>3</sup> F16C 27/00  
 U.S. Cl. 384—99 13 Claims



1. For a thrust bearing rotatably supporting a shaft having a plurality of spherical balls sandwiched between an inner race and an outer race, a fluid damper comprising a plurality of curved beam segments mounted end to end encapsulating said thrust bearing and each segment having an outer diameter surface disposed adjacent a complementary surface formed on the housing supporting said thrust bearing and an inner diameter surface disposed adjacent said outer race and complementing the outer diameter surface of said outer race, the outer race having a radially outward depending member juxtaposed to the front side face of each of said segments, each segment having at least one nib extending axially from said front side face to bear against said radially outward depending member and another nib on the rear side face of each of said segments to bear against said housing, and a fluid filled chamber formed on said outer diameter surface of each of said segments for defining the fluid damper for absorbing the energy created by shaft unbalance whereby the thrust loads transmitted by said thrust bearing passes through said outer race to said housing through said nibs.

**4,952,077**  
**HORIZONTAL-AXIS OIL-LUBRICATED CYLINDRICAL ROLLER-BEARING ARRANGEMENT**  
 Gottfried Kurt, Rudolfstetten, Switzerland, assignor to Asca Brown Boveri Ltd., Baden, Switzerland  
 Filed Jul. 7, 1989, Ser. No. 376,527  
 Claims priority, application Switzerland, Aug. 2, 1988, 2896/88  
 Int. Cl.<sup>3</sup> F01M 9/06; F16C 33/66; F16H 57/04  
 U.S. Cl. 384—462 3 Claims



1. Horizontal-axis oil-lubricated cylindrical roller bearing

arrangement for bearing traction motors of rail vehicles, comprising:

- a stationary bearing bracket;
- cylindrical roller bearing having an outer ring fastened to said stationary bearing bracket;
- a shaft on which an inner ring of the cylindrical roller bearing is fastened;
- an annular oil chamber arranged coaxially relative to the bearing and having an upper section connected with the bearing by an oil outlet in a chamber wall facing the bearing and connected by at least one duct with an oil-catcher device, the oil-catcher device placed on the inside of a gear case which supplies oil to said oil-catcher device and thereby serves as a lubrication oil reservoir to said oil catcher device, the oil-catcher device being structured and arranged to catch oil present in the gear;
- the oil-catcher device comprising means for metering the amount of oil to be caught by the oil-catcher device;
- means for feeding of the lubricating oil to the annular oil chamber at a level which is below the oil outlet from the annular oil chamber into the bearing;
- an annular interspace provided between the annular oil chamber and the bearing, the annular interspace including means for producing a lubricating oil mist for bearing lubrication; and
- an oil retention device for storing a residue amount of oil provided in the interspace to assure bearing lubrication after downtimes.

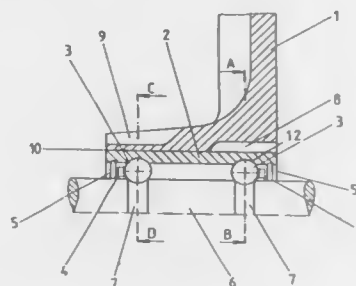
4,952,078

**DIE CAST ANTI-FRICTION BEARING HOUSING**  
Gerhard Ankenbauer, Rotenburg/Fulda, and Heinrich Hofmann, Schweinfurt, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schaeffer (KGaA), Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,449  
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906785

Int. Cl.<sup>5</sup> F16C 37/00  
U.S. Cl. 384—476

9 Claims



1. In combination, a cast bearing housing and an anti-friction bearing housed within the housing, the combination comprising:

- the bearing comprising: means defining an inner race for a row of bearing rolling elements; an outer ring around the inner race, the outer ring having an outer race defined in it which is placed axially for defining a cooperating set of the inner and outer races for rolling elements; a row of rolling elements received in the set of the inner and outer races for rolling therealong; and seals for the anti-friction bearing between the means defining the inner race and the outer ring and located axially to the sides of the row of rolling elements for defining a sealed space including the races and the row of rolling elements; the housing comprising: a cast housing cast around the outer ring, the cast housing being integrally cast in such a way as to include a plurality of circumferentially spaced apart, radially projecting ribs for rapidly diverting heat away from the bearing as the housing is cast, each of the ribs extending

axially, the ribs being located generally in the axial region of the rolling element races and of the seals.

4,952,079

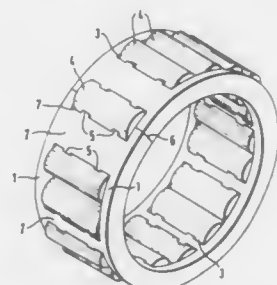
**ROLLER BEARING CAGE**

Horst Lingner, Herzogenaurach, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Dec. 1, 1986, Ser. No. 936,172  
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1985, 3543364

Int. Cl.<sup>5</sup> F16C 33/54  
U.S. Cl. 384—575

1 Claim



1. A roller bearing cage for cylindrical rollers comprising two parallel end rings (1) connected by a plurality of crossbars (2) distributed over the circumference of the cage to form pockets (3) for accommodating two adjacent rollers (4) in each pocket, the crossbars (2) being provided with holding projections (5) in the area of their inner and outer border edges projecting into the pockets (3), the cage being made of a flat sheet metal strip rolled into a round shape and welded at the abutment point (6) where the ends of the strip meet in the area of a pocket (7) being dimensioned to accommodate a single roller (4).

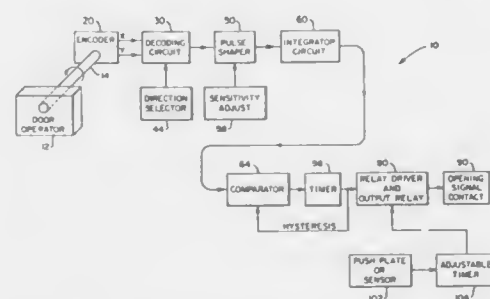
4,952,080

**AUTOMATIC ASSIST FOR SWING-DOOR OPERATOR**  
Leon Bolucaner, Farmington, and James J. Scott, New Britain, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed May 12, 1989, Ser. No. 351,093  
Int. Cl.<sup>5</sup> G05B 19/28

U.S. Cl. 388—811

20 Claims



1. A manually activatable assist control for an automatic door operator comprising:  
drive means comprising at least one rotatable shaft employable for moving a door;  
encoder means rotatably coupled to a said shaft for generating a train of pulses in response to rotary motion of said shaft;

direction selector means for selecting a pulse train of a predetermined rotatable direction;  
pulse shaper means for translating said directional pulse train to shape a wave form having pulses of pre-established width;  
integrator means for generating a DC signal having a DC wave form which is a function of the widths of said shaped wave form pulses;  
reference means for establishing a reference signal in response to the number of encoder pulses generated for a pre-established time interval;  
comparator means for comparing said DC signal to said reference signal and generating a power assist signal in the event said DC signal voltage exceeds said reference signal voltage;  
timer means responsive to said power assist signal for generating a hold open output signal for a pre-established time duration;  
output signal means responsive to said hold open output signal for transmitting an opening signal; and  
door control means for automatically controlling the drive means for opening and closing the door, said control means comprising an opening input means for triggering the door to an opening mode, said opening input means being responsive to said opening signal.

4,952,081

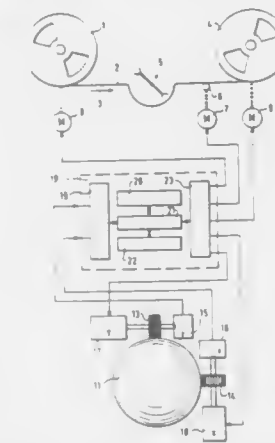
**MANUAL ROTARY SPHERE CONTROL OF AN ELECTRONIC EQUIPMENT WITH TOUCH SENSING OF SCALE MARKS**

Rolf Hedtke, Darmstadt, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,613  
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828416

Int. Cl.<sup>5</sup> H02P 7/00  
U.S. Cl. 388—825

5 Claims



1. A magnetic tape equipment for recording, playback or both recording and playback of video signals, comprising a tape transport mechanism for magnetic tape (2), tape scanning means (5), and a manual control assembly including a sphere always presenting a portion of its surface so as to make it available for manual rotary displacement of the sphere in any direction and mounted so that it always presents portions of its surface respectively to two transducer mechanisms responsive to rotary movement of said sphere respectively about two axes (x, y) for generating electronic signals designating direction and velocity to be produced by control of said tape transport mechanism in response to components of rotary displacement of said sphere about corresponding axes (x, y) at right angles to each other, and further comprising:  
controllable means having a braking means for braking

manual rotary displacement of said sphere about each of said axes (x, y) in the neighborhood of predetermined positions of said sphere with respect to said axes, said braking means for displacement about at least one of said axes (y) being used for controlling at least the direction in which said tape is moved by said tape transport mechanism.

4,952,082

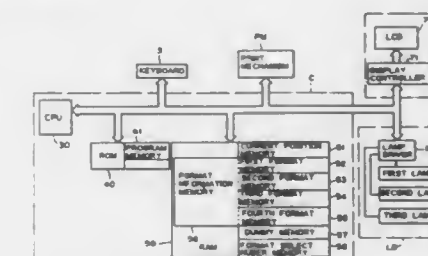
**TEXT PROCESSING SYSTEM FOR CYCLICALLY SHIFTING FORMAT MEMORY**

Hideo Sakakibara, Chita, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 190,777, May 25, 1988, abandoned.  
This application Jan. 8, 1990, Ser. No. 463,789  
Claims priority, application Japan, May 24, 1987, 62-130886  
Int. Cl.<sup>5</sup> B41J 11/44

U.S. Cl. 400—76

7 Claims



1. A text processing system which comprises:  
inputting means for inputting text data;  
format information memory means having a plurality of storage areas, each of said storage area respectively storing a set of format information, said format information memory means including a particular storage area from which the format information can be read out;  
control means for controlling said each of set of format information so as to be cyclically located at said particular storage area; and  
outputting means for visually representing the inputted text data in accordance with the format information located at said particular storage area.

4,952,083

**CONTROLLABLE PITCH PROPELLER ASSEMBLY**

Fred H. Kuehl, 2065 Lost Dauphin Rd., De Pere, Wis. 54115  
Filed Oct. 10, 1989, Ser. No. 418,528  
Int. Cl.<sup>5</sup> F01B 25/02

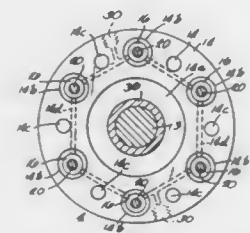
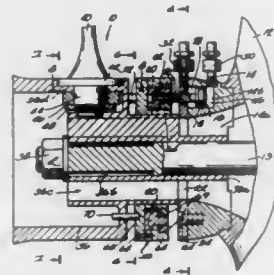
U.S. Cl. 416—157 R

3 Claims

1. A controllable pitch propeller assembly comprising:  
a main drive shaft rotatable with respect to a stationary mounting;  
a propeller hub connected to said shaft for rotation therewith;  
a number of propeller blades, each projecting radially outward from said hub and mounted to be rotatable about a respective radial, each of said blades having at its inner end a respective thrust collar;  
power cylinder means formed in a unitary cylinder member and mounted to said mounting, said power cylinder means comprising a number of power cylinders integrally formed within said cylinder member and spaced apart evenly about said cylinder member, each having an actuator rod movable with respect to said mounting in a direction substantially parallel to said drive shaft;  
said number of power cylinders being greater than said number of propeller blades;  
a journaled ring assembly surrounding said drive shaft and connected to each of said actuator rods so as to be axially



slidable by said power cylinders along said drive shaft, said ring assembly comprising a non-rotating ring affixed to said actuator rods and a pair of rotating rings slidably capturing said non-rotating ring in such a manner that said



rotating rings are rotatable with respect to said non-rotating ring;  
a plurality of link means, one for each of said propeller blades, each connected at one end to one of said rotating rings and at the other end to said respective thrust collar.

4,952,084

#### HEAD POSITION CONTROLLER FOR THERMAL PRINTER

Takahito Maruyama, Takizawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

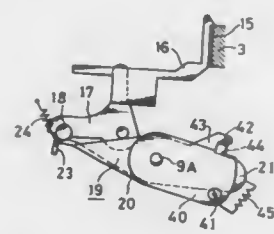
Filed Apr. 28, 1988, Ser. No. 187,260

Claims priority, application Japan, Aug. 6, 1987, 62-195242

Int. Cl.<sup>3</sup> B41J 3/20

U.S. Cl. 400—120

3 Claims



1. A head position controller for a thermal printer which includes a thermal head, a platen, and a carriage which is supported for movement relative to the platen by a reversible motor, the head position controller comprising:

- a head pressure contacting plate for moving the thermal head into separating and contacting positions relative to the platen,
- a first cam rotated by the motor which effects movement of the pressure contacting plate, the first cam having a first cam curve which is shaped to selectively move the thermal head with respect to the platen from the separating position to the contacting position,
- a cam lever having a first cam follower moveable along the first cam curve upon rotation of the first cam by the motor, the cam lever being connected to the head pressure

contacting plate for movement only at a predetermined angle,

a second cam having a second cam curve provided to define rotation of the cam lever, the second cam curve being engaged with a second cam follower which projects from the head pressure contacting plate, and an intermittent driving mechanism driven by the motor for transmitting intermittent movement to the carriage only after the motor rotates a predetermined distance.

4,952,085

#### PRINTER FOR GENERATING IMAGES WITH HIGH CONTRAST GRAY AND COLOR TONE GRADATIONS

Wolf-Helder Rein, Pforzheim, Fed. Rep. of Germany, assignor to Alcatel N.V., Netherlands

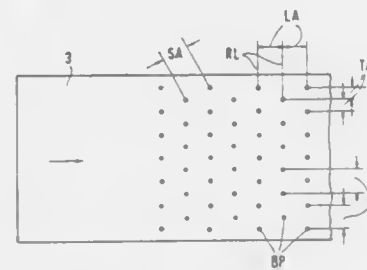
Filed Mar. 3, 1989, Ser. No. 318,276

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806935

Int. Cl.<sup>3</sup> B41J 2/385

U.S. Cl. 400—120

6 Claims



1. A printer for printing a matrix of image dots comprising a paper transporting device and a printing head having a plurality of closely spaced, electrically energizable printing elements, the printing elements being arranged in a row of odd and even numbered printing elements, means for alternately energizing the printing elements having an odd ordinal number and the printing elements having an even ordinal number with variable energy corresponding to the varying gray values of an image information so as to represent the varying gray values by different size image dots, wherein the paper transporting device advances paper to be printed by the printing head by the spacing of one matrix line between the alternating energization of the odd numbered and the even numbered printing elements, and each printing element receives, at a maximum, so much energy that the area of the printed image dot becomes approximately twice as large as the area of a printing element.

4,952,086

#### PRINTER WITH FEED REEL AND TAKE-UP REEL WINDING

Kouzou Yamaguchi, Kashihara, Japan, assignor to Sharp Kabushiki Kaisha, Japan

Continuation of Ser. No. 181,315, Apr. 13, 1988, abandoned.

This application Nov. 27, 1989, Ser. No. 442,488

Claims priority, application Japan, Apr. 13, 1987, 62-90412

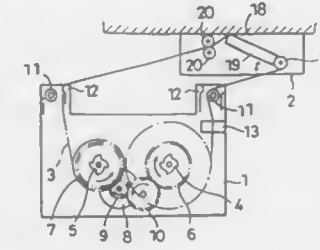
Int. Cl.<sup>3</sup> B41J 31/14

U.S. Cl. 400—223

4 Claims

1. A printer comprising:
- a feed reel winding one end of an ink ribbon;
  - a take-up reel winding the other end of said ink ribbon;
  - a ribbon cassette containing said feed reel and said take-up reel, said ribbon cassette being mounted stationarily on a body of the printer;
  - a carriage having a print head for printing by using said ink ribbon, said carriage being mounted on said body independently of said ribbon cassette and being movable in a printing direction thereof;
  - rotating means disposed on said body for applying a first

torque to said feed reel in a direction to wind said one end of said ink ribbon and a second torque to said take-up reel in a direction to wind said other end of said ink ribbon during both of printing by said print head and returning of said carriage, said first torque and said second torque being substantially identical in magnitude with each other;



reel control means disposed on said body for controlling said rotating means such that said rotating means decreases the respective magnitudes of said first torque and said second torque with respect to a ribbon discharge force of said print head during said printing by said print head, and restores the respective magnitudes of said first torque and said second torque during said returning of said carriage.

4,952,087

#### PRINTER FOR USE WITH CONTINUOUS FORM

Yasuo Iwata; Michio Kozumi, both of Tokorozawa; Kimihiro Kosugi, Tanashi; Kouzou Abe, Tokyo, and Takashi Majima, Tanashi, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

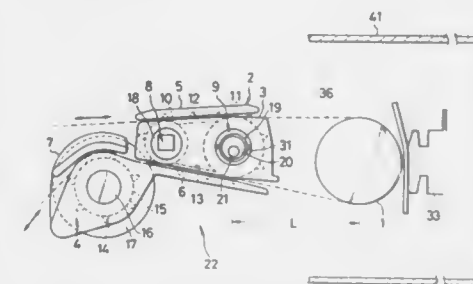
Filed Dec. 7, 1988, Ser. No. 281,056

Claims priority, application Japan, Dec. 15, 1987, 62-189514[U]

Int. Cl.<sup>3</sup> B41J 11/26

U.S. Cl. 400—616.1

10 Claims



1. A printer for use with a continuous form, comprising:

- a body frame;
  - a platen rotatably mounted to said body frame;
  - a bi-directional form feeder unit mounted to said body frame for feeding said continuous form along a predetermined transport path which extends from and to said form feeder unit around said platen;
  - drive means drivingly connected to said form feeder unit for driving the same to feed said continuous form along said predetermined transport path; and
  - means arranged adjacent said platen for printing information onto said continuous form on said platen,
- wherein said bi-directional form feeder unit comprises
- a tractor frame formed with a pair of opposed and spaced elongated slots having their respective longitudinal axes extending substantially perpendicularly to an axis of said platen,
  - a tractor drive shaft rotatably mounted to said tractor frame in parallel relation to the axis of said platen, said tractor drive shaft having opposite axial ends thereof which are received respectively in said pair of elongated slots in such

a manner that said tractor drive shaft is movable relatively to said tractor frame along said elongated slots, wherein one of said opposite axial ends of said tractor drive shaft is drivingly connected to said drive means for rotatively driving said tractor drive shaft,

a tractor guide shaft mounted to said tractor frame in parallel relation to said tractor drive shaft, said tractor guide shaft having a shaft body and a pair of support shaft sections extending respectively from opposite axial end faces of said shaft body, said pair of support shaft sections being supported by said tractor frame for angular movement relative thereto about an axis common to said pair of support shaft sections, said shaft body having an axis extending in eccentric relation to said axis common to said pair of support shaft sections,

a pair of tractors mounted on said tractor drive shaft and said shaft body of said tractor guide shaft in spaced relation to each other along said tractor drive shaft and said shaft body, said pair of tractors being movable along said tractor drive shaft and said shaft body of said tractor guide shaft and being capable of being fixed to said shaft body at respective desired locations along said shaft body, said shaft body of said tractor guide shaft being angularly movable about its axis relatively to said pair of tractors, and

operating means associated with one of said pair of support shaft sections of said tractor guide shaft for angularly moving said shaft body of said tractor guide shaft about said axis common to said pair of support shaft sections, to move said pair of tractors toward and away from said platen while moving said opposite axial ends of said tractor drive shaft along the respective elongated slots, thereby varying a distance between said platen and said pair of tractors to thereby adjust a tension acting upon said continuous form extending along said predetermined transport path,

said bi-directional form feeder unit further including driven means mounted on one of said opposite axial ends of said tractor drive shaft for rotation therewith, said driven means being drivingly connected to said drive means for rotatively driving said tractor drive shaft, and said driven means comprises a driven gear, wherein said drive means includes a drive gear in mesh with said driven gear, and wherein said longitudinal axes of the respective elongated slots extend arcuately in such a manner that the arcuate longitudinal axes have their respective radii of curvature whose respective centers are located at a central axis of said drive gear.

4,952,088

#### CLIP OF CAPS ADAPTED TO REMOVE SHAFT

Gerald Groetsch, Fürth, Fed. Rep. of Germany, assignor to J.S. Staedtler GmbH & Co., Nuremberg, Fed. Rep. of Germany

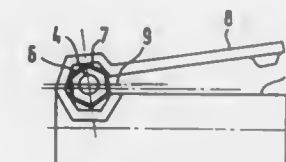
Filed Dec. 6, 1988, Ser. No. 280,385

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741885

Int. Cl.<sup>3</sup> B43K 9/00, 13/00

U.S. Cl. 401—195

13 Claims



1. A writing or drawing instrument having a writing insert which can be screwed in and out of the instrument shaft and a cap which can be placed over the writing insert and which has a clip and a receiving bore which can be placed onto the

writing insert, the writing insert being removable from or inserted into the instrument shaft by means of the cap having the mounting insert disposed within the receiving bore, the receiving bore being many sided and being formed in part by the clip and in part by the outer wall of the cap, a part of the clip forming one part of the receiving bore being shiftable with respect to the part of the outer wall of the cap forming the other part of the receiving bore to limit the torque which acts on the writing insert by expanding the receiving bore.

4,952,089

## WRITING IMPLEMENT

Roland Schneider, Tennenbronn, Fed. Rep. of Germany, assignor to Gebr. Schneider GmbH, Tennenbronn, Fed. Rep. of Germany

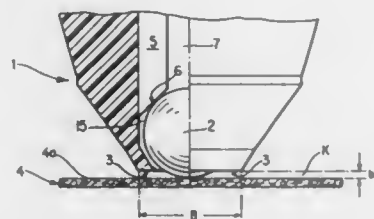
Filed Oct. 5, 1988, Ser. No. 254,192

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802746

Int. Cl.<sup>5</sup> B43K 7/10

U.S. Cl. 401—216

20 Claims



1. A writing implement, particularly for use in numerically controlled drafting machines, for the application of a flowable medium to the surface of drawing paper, foil or another carrier, comprising a tip having a front end face and a channel which delivers flowable medium to said front end face, said front end face having at least one capillary groove; and at least one distancing element carried by said tip and projecting beyond said front end face through a distance such that when said element contacts the surface of a carrier, the front end face and such surface define a capillary gap for the medium which issues from said channel.

4,952,090

APPARATUS FOR DISPENSING A SCENTED FLUID  
Aubrey W. Richardson, P.O. Box 524, Oregon City, Oreg. 97045

Filed Dec. 27, 1988, Ser. No. 290,649

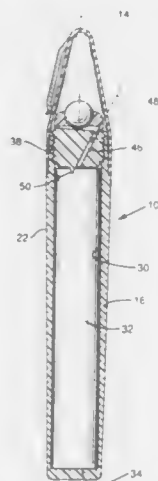
Int. Cl.<sup>5</sup> B43M 11/02

U.S. Cl. 401—209

20 Claims

1. An elongate dispenser for scented fluid comprising: an annular seat member having a front surface and a rear surface and further having a ball rollably constrained therein with a portion of said ball being exposed to the rear surface and a portion exposed to the front surface; a reservoir for holding scented fluid located along a common axis with said ball and positioned adjacent said rear seat surface and providing scented fluid to that portion of said ball exposed to the rear seat surface when the dispenser is tipped; and means defining an open channel between said ball and said

reservoir not parallel with said common axis for preventing scented fluid in the reservoir from reaching that por-



tion of said ball exposed to the rear seat surface when the dispenser is placed in a horizontal position.

4,952,091

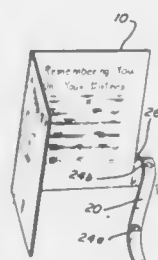
## GREETING CARD

Carol A. Sirko, 1761 S. Youngfield Ct., Lakewood, Colo. 80228  
Filed Dec. 4, 1989, Ser. No. 445,037

Int. Cl.<sup>5</sup> B42F 5/00

U.S. Cl. 402—79

2 Claims



1. A multiple page message card having pre-printed indicia thereon comprising:  
a front page and a back page contiguous with each other at a fold;  
said multiple page messages adapted to receive a senders message placed thereon;  
said back page having a retention strip;  
said retention strip extending outwardly along the outer most part of said back page and parallel to said fold;  
said retention strip separated from said back page by a perforation means running parallel to said fold and the length of said retention strip;  
said retention strip having a ring receptor means for retaining said multiple page message card in a binder notebook;  
said retention strip may be removed or folded into said multiple page message card along said perforation means to provide a sender a multiple page message card capable of fitting into a standard multiple page message card envelope.

4,952,092

## TUBULAR RAILING SYSTEM

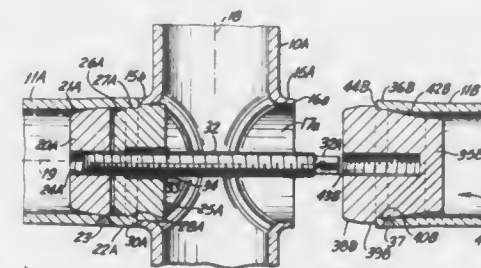
John E. Ballerstein, Fredericksburg, Va., assignor to Standard Steel Rail Technology, New Rochelle, N.Y.

Filed Apr. 21, 1989, Ser. No. 341,937

Int. Cl.<sup>5</sup> F16B 7/08

U.S. Cl. 403—174

7 Claims



1. A metal tube railing system comprising:  
(a) a plurality of vertically aligned metal tubular posts each post having an outer diameter and at least one circular annular boss, said boss being formed from said post and being integral therewith and having a flat annular end lip with an outer diameter;  
(b) a plurality of first tubular metal side rails extending between said posts with each rail having opposite ends, the outer diameter of each of said rails at said rail ends being the same as said outer diameter of said annular end lip of said boss and both ends of each rail having a flat annular edge;  
(c) a first round metal plug means within each said boss, a second round metal plug means within each said side rail, said first and second metal plug means forcing the respective tubular rail ends and bosses into being more perfectly than without said plug means;  
(d) joining means to join said side rail flat annular edges and said boss flat annular lips to thereby form circular joints.

4,952,093

## FASTENING DEVICE OF A PIPE SHAFT AND OF A HOLLOW SQUARE SHAFT, AND THEIR FASTENINGS FOR USE IN A BUSINESS MACHINE AND OTHER INDUSTRIAL MACHINES

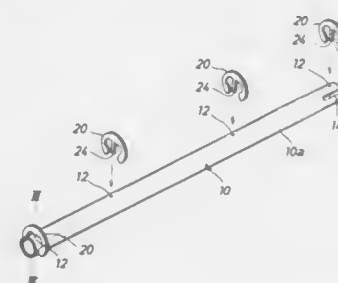
Yukiyoichi Murakami, 11-16, Minamimura 3-chome, Urawa City, Saitama Prefecture, Japan

Filed Jun. 16, 1989, Ser. No. 368,998

Int. Cl.<sup>5</sup> B25G 3/00

U.S. Cl. 403—261

7 Claims



3. In combination,  
a hollow shaft having a circular or polygonal cross-section for use in a business machine or other industrial machine, and having a length, a thickness and an outer and inner diameter, and having at least one small diameter radially

extending circular opening therein along the length of said shaft; and  
a fastening mounted on said shaft for holding an element on said shaft, said fastening comprising:  
a ring having a gap at a peripheral portion, the portions of said ring on opposite sides of said gap being a pair of holding arms extending peripherally toward said gap, said holding arms having the ends opposed to each other and spaced slightly less than the outside diameter of said shaft onto which the fastener is to be placed and positioned a little past a diameter through the center of said ring and perpendicular to a diameter extending through said gap, each holding arm having a curved holding surface at the end thereof on the inside of said ring for intimate engagement with the outer surface of said shaft, an insert integral with said ring at a portion diametrically opposite said gap and extending radially inwardly of said ring from the inner periphery of said ring and toward said gap, a pair of shoulders on the inner periphery of said ring, one on each side of said insert, said ring being on said shaft with said insert through said small diameter circular opening therein and said shoulders and curved holding surfaces engaged with the outer surface of the shaft, and the free end of said insert tightly engaging the inner surface of the shaft.

4,952,094

## GROUND WATER DRAIN

Hansruedi Spiess, Delemont, and Francois Galvanetto, Alle, both of Switzerland, assignors to Von Roll AG, Gerlafingen, Switzerland

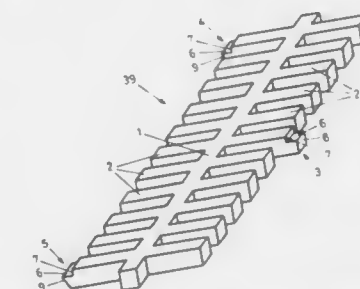
Filed Apr. 13, 1989, Ser. No. 337,285

Claims priority, application Switzerland, Apr. 15, 1988, 1407/88

Int. Cl.<sup>5</sup> E02D 29/14; E03F 5/06

U.S. Cl. 405—36

12 Claims



1. Ground water drain for covering a ground opening, comprising a frame to be laid in the ground, and a grating supported in said frame, the grating being made from a high elasticity material and being insertable in the frame utilizing the elasticity of said material, the grating being held in the frame with a positive fastening, said grating comprising at least one main bar extending in an axial direction of the grating, and a plurality of crossbars integral with said main bar and extending essentially in the same plane with and at right angles to said main bar, said grating including at least three projecting projections formed on said crossbars, said frame being provided with holding portions, said projecting portions of said crossbars cooperating with said holding portions so that, accompanied by the elastic deformation of said main bar, said projecting portions being situated at a side of said grating opposite to that carrying at least another of said projecting portions, at least one of said projecting portions being formed at a free end of the respective crossbar.

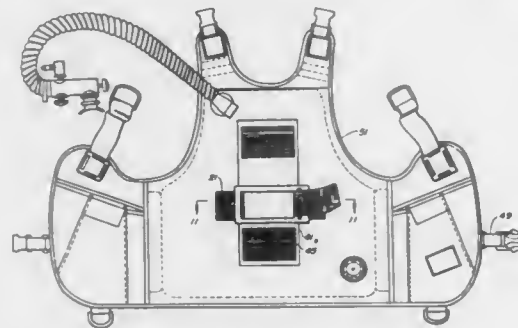


4,952,095

**SOFT BACKPACK FOR SCUBA DIVER AIR TANKS**  
William D. Walters, 2230 Biscay Ct., Byron, Calif. 94514  
Filed Dec. 14, 1988, Ser. No. 284,124  
Int. Cl.<sup>5</sup> B63C 11/02

U.S. Cl. 405—186

9 Claims



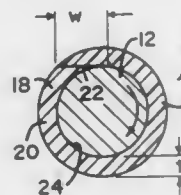
1. A soft backpack for at least one SCUBA diver air tank comprising a flexible liquid-filled closed bladder means having an air tank mount secured thereto to provide a cushion to conform to a space between a SCUBA diver's back and said air tank, and means for securing the bladder means to a SCUBA diver with the bladder means disposed between the diver's back and the air tank.

4,952,096

**DYNAMIC EARTH ANCHOR, AND A SLEEVE THEREFOR**  
Clifford A. McCartney, Salem, Va., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.  
Filed Aug. 2, 1989, Ser. No. 388,503  
Int. Cl.<sup>5</sup> E21D 21/00

U.S. Cl. 405—259

12 Claims



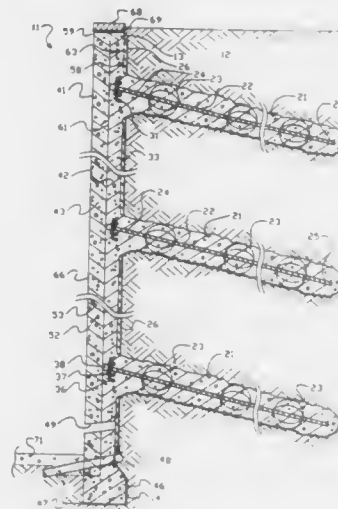
1. A dynamic earth anchor, for stabilizing a terrestrial formation, including a roof bolt, and a sleeve for (a) an insertion thereof into a terrestrial borehole, and (b) an insertion therein of said roof bolt, said sleeve comprising:  
a generally tubular body of deformable material;  
said body having an elongated wall of substantially circular cross-section;  
said wall having a given thickness;  
a slit, defined by two edge portions, extending along a substantial length of said body;  
said body has an interior surface and an exterior surface; and  
said slit extends between said interior and exterior surfaces, and intersects the interior surface at a substantial tangential angle;  
wherein when the anchor is in an inserted position, the wall maintains a substantially uniform cross sectional thickness about the circumference of the body, regardless of minor diameter variations of the borehole and a resultant relative sliding of the edge portions, the uniform thickness causes a substantially even force distribution between the bolt and the interior surface about the entire sleeve.

4,952,097

**PERMANENT CONCRETE WALL CONSTRUCTION AND METHOD**  
Steven A. Kulchin, Foster City, Calif., assignor to Kulchin & Associates, Oakland, Calif.  
Filed Mar. 18, 1988, Ser. No. 170,162  
Int. Cl.<sup>5</sup> E02D 29/02

U.S. Cl. 405—262

8 Claims



1. A permanent concrete wall construction disposed adjacent the face of an excavation cut in the earth and having a base comprising a plurality of soil anchors extending into the earth through the face of the excavation cut, the soil anchors including reinforcing elements which have a definite lifetime in excess of 50 years, the soil anchors having proximal extremities which extend outwardly away from the face of the cut and a permanent concrete wall extending upwardly from the base of the excavation with the proximal extremities of said anchors being buried within said permanent concrete wall so that said anchors do not protrude through the permanent concrete wall, said permanent concrete wall being free of piles and being formed of first and second applications of pneumatically applied concrete with a bonding surface therebetween, said second application having a finished architectural surface formed as an integral part thereof said wall further comprising reinforcing elements in each of said first and second applications.

4,952,098

**RETAINING WALL ANCHOR SYSTEM**  
Boyd H. Grayson, Lakeland, and Richard J. Beak, Tampa, both of Fla., assignors to Ivy Steel Products, Inc., Tampa, Fla.  
Filed Dec. 21, 1989, Ser. No. 454,711  
Int. Cl.<sup>5</sup> E02D 5/00, 29/02

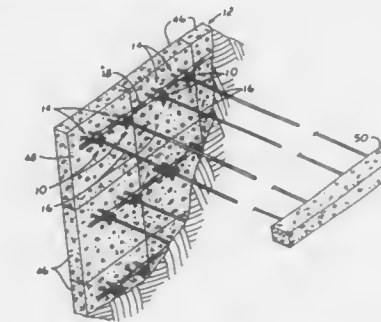
U.S. Cl. 405—262

8 Claims

1. A retaining wall anchor system of the type primarily intended for use in combination with a retaining wall and a dead man, said system comprising:  
at least one wall anchor, said wall anchor comprising a pair of spaced apart legs, each of said legs having a first end and a second end, said second ends being joined one to the other such that said legs define a substantially U-shaped portion, and said first ends being attached to the retaining wall, such that said joined second ends extend therefrom;  
at least one tie rod having a first end and a second end, said first end being attached to the dead man, and said second end being formed into a loop defined by bending said second end towards said first end of said tie rod, then around, toward, and past said tie rod such that said second end extends beyond said tie rod, said loop being dimensioned and configured to be insertable between said legs of

said wall anchor intermediate the wall and said joined first ends of said wall anchor so that said loop is located to one side of said legs and said second end is located to the opposite side of said legs; and

liquid discharge towards the fourth pipe for slurry discharge in an upward flow.



locking means removably insertable through said loop of said tie rod after said loop has been inserted between said legs of said wall anchor such that said tie rod may be attached to said wall anchor.

4,952,099

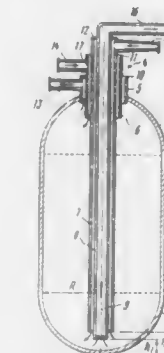
**DEVICE FOR HYDRAULIC CONVEYANCE OF LOOSE MATERIALS**  
Valery P. Drobachenko; Olga A. Lukonina, both of Moscow; Vladimir P. Koval, Dnepropetrovsk; Vladimir I. Sokolov, and Boris A. Maltsev, both of Volgograd, all of U.S.S.R., assignors to Moskovsky Geologorazvedochay Institut Imeni Sergo Ordjonikidze, Moscow, U.S.S.R.

Filed Aug. 28, 1989, Ser. No. 399,214

Int. Cl.<sup>5</sup> B65G 53/14

U.S. Cl. 406—50

4 Claims



1. A device for hydraulic conveyance of loose materials, comprising:  
a vertical chamber having a cylindrical side surface and hemispherical a bottom and a cover;  
a first, second, third and fourth pipe of said chamber, the first of which is for the liquid discharge, the second, for loose material charging, the third, for feeding the pressure liquid flow, and the fourth, for slurry discharge in an upward flow, said pipes being held in said hemispherical cover and arranged coaxially—the second pipe inside the first pipe, the third pipe inside the second pipe, and the fourth pipe inside the third pipe, all the pipes being arranged coaxially with the longitudinal axis of said chamber;  
portions of the first, second, third and fourth pipes respectively for the liquid discharge, loose material charging, pressure liquid flow feeding and slurry discharge in an upward flow, accommodated in said chamber and having a length consecutively increasing from the first pipe for

4,952,100

**PIPE SWITCH FOR PLANTS FOR PNEUMATICALLY CONVEYING BULK MATERIAL**  
Dieter Heep, Bergatreute; Paul Vogel, Weingarten, and Joachim Stengel, Ravensburg, all of Fed. Rep. of Germany, assignors to Waeschle Maschinenfabrik GmbH, Ravensburg, Fed. Rep. of Germany

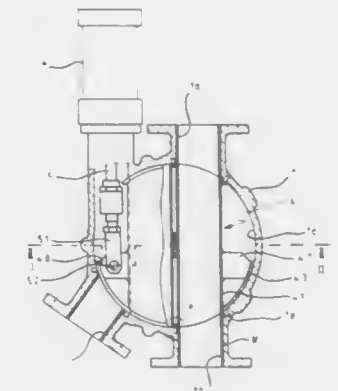
Filed May 17, 1989, Ser. No. 352,981

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817349

Int. Cl.<sup>5</sup> B65G 53/56

U.S. Cl. 406—182

11 Claims



1. A pipe switch for a plant for pneumatically conveying a material such as bulk material, comprising:  
a housing defining an inner wall surface and having a first port, a second port and a third port;  
regulating means accommodated in said housing and movable between two positions for selectively controlling the flow of material from said first port to said second port via a first flow path and from said first port to said third port via a second flow path, said regulating means including a first pipe section for defining said first flow path, and a second pipe section for defining said second flow path;  
support means for rotatably supporting said regulating means in said housing, said support means including a shaft extending perpendicular at a central area between said first and second pipe sections for connecting said first and second pipe sections with each other at the central area thereof; and  
linking means for connecting said first and second pipe sections in the area of their respective ends, said linking means including a first ring segment for connecting said first and second pipe sections at one end thereof, and a second ring segment for connecting said first and second pipe sections at the other end thereof, one of said ring segments having a circumferential area sufficiently dimensioned for sealingly barring said second port when said first port is connected to said third port and for sealingly barring said third port when said first port is connected to said second port.

4,952,101

**APPARATUS AND METHOD FOR ALIGNMENT OF DRILLING HOLES AND ASSEMBLY OF CABINETS**  
Donald W. Coombs, Tucson, Ariz., assignor to Donald E. Coombs, Trevor, Wis.

Filed Oct. 5, 1988, Ser. No. 254,177

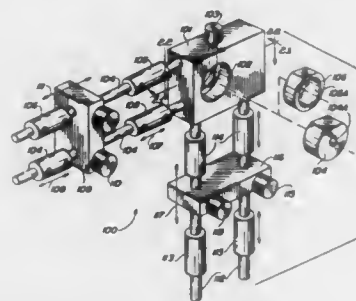
Int. Cl.<sup>5</sup> B23B 49/02

U.S. Cl. 408—115 R

5 Claims

5. A jiggig apparatus for drilling holes in boards for construction of a cabinet, comprising in combination:

- (a) a rectangular block having first and second opposed major surfaces and first, second, third, and fourth edge surfaces;
- (b) a first pair of smooth-surfaced cylindrical rods extending perpendicularly from the second edge surface and parallel to the major surfaces, the second edge surface being perpendicular to the first edge surface;
- (d) an adjustable first stop means slidable on the first pair of smooth-surfaced cylindrical rods for aligning the first rectangular block to the first edge surface of a first board;
- (e) first means for locking the first stop means on the first pair of smooth-surfaced cylindrical rods in fixed relationship to the rectangular block;
- (f) first and second limit stop means disposed on the first pair of smooth-surfaced cylindrical rods, the first stop means being intermediate the first and second limit stop means to provide for setting first and second positions of the first stop means;
- (g) an adjustable second stop means disposed on the second pair of smooth-surfaced cylindrical rods for aligning the



first rectangular block to a second edge surface of a board, the first edge surface of the board being perpendicular to the second edge surface of the board;

- (h) second means for locking the second stop means on the second pair of smooth-surfaced cylindrical rods in fixed relationship to the rectangular block;
- (i) third and fourth limit stop means disposed on the second pair of smooth-surfaced cylindrical rods, the second stop means being intermediate the third and fourth limit stop means to provide for setting first and second positions of the second stop means;
- (j) the rectangular block having a bushing receiving hole extending through the major surfaces and defining a longitudinal central axis, a first drill guide bushing received in said bushing receiving hole to provide a first drill guide hole, mean removably securing said first drill guide bushing to said rectangular block, and the first drill guide bushing being replaceable by a second drill guide bushing, alignable along the longitudinal center axis to provide a second drill guide hole aligned with the first drill guide hole and of larger diameter than the first drill guide hole.

4,952,102

## ANNULAR HOLE CUTTER

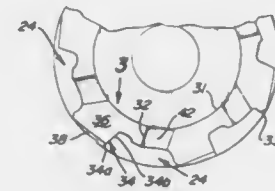
Everett D. Hungen, G-5072 Corunna Rd., Flint, Mich. 48504  
Continuation of Ser. No. 178,829, Apr. 1, 1988, Pat. No. 4,813,819, which is a continuation of Ser. No. 909,398, Sep. 19, 1986, abandoned, which is a continuation of Ser. No. 787,039, Dec. 30, 1986, Pat. No. 4,632,610, which is a continuation of Ser. No. 522,181, Aug. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 423,704, Sep. 27, 1982, abandoned. This application Mar. 20, 1989, Ser. No. 326,137  
Int. Cl. B23B 51/04

U.S. Cl. 408—204

19 Claims

1. An annular hole cutter comprising a generally cylindrical side wall provided with a plurality of alternate cutting teeth spaced circumferentially around the lower end thereof and a plurality of intermediate teeth interposed between said alternate teeth said plurality of alternate teeth configured differ-

ently than said plurality of intermediate teeth with each of said intermediate and alternate teeth having at least one cutting edge, a plurality of chip passages extending upwardly around the outer periphery of said side wall from said lower end with



each of said cutting edges having a chip passage directly adjacent thereto, said cutting edges being configured to cut a plurality of chips from a workpiece with each chip having a width as measured generally radially which is less than the radial depth of said directly adjacent chip passage.

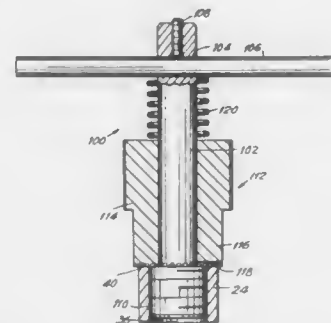
4,952,103

## OIL BURNER NOZZLE ADAPTOR RESURFACING TOOL AND METHOD

Elias H. Bresin, 1020 Northern Blvd., Baldwin, N.Y. 11510  
Filed Jul. 21, 1988, Ser. No. 222,017  
Int. Cl. B23B 45/06

U.S. Cl. 408—83.5

1 Claim



1. A cutting tool for cutting and resurfacing an annular end of an oil burner nozzle adaptor of the type including a tubular mount extending along an axis and having an interior thread for threadedly engaging an exterior thread on an oil burner nozzle of the type including a planar, annular surface abuttingly and sealingly engaging said annular end of the adaptor during oil burner operation in which pressurized oil is conveyed through the tubular mount and the nozzle mounted thereon, said tool comprising:

- (a) an elongated shaft having an alignment bit at one end region thereof, said alignment bit having a leading end insertable into the tubular mount after removal of the nozzle therefrom, said alignment bit extending from the leading end along said axis to a trailing end and having an exterior thread for threadedly engaging the interior thread of the tubular mount;
- (b) a cutter mounted on the shaft for rotation about said axis and having a plurality of cutting teeth arranged in an annulus concentric with said axis, said cutting teeth having case-hardened, tool steel, cutting edges lying in a common plane perpendicular to said axis and situated at the trailing end of the alignment bit;
- (c) means for jointly turning the cutter and the shaft for threading the bit into the tubular mount until the cutting teeth at the trailing end of the alignment bit directly engage said annular end of the adaptor to be cut and resur-

- faced, said joint turning means including a handle fixedly mounted on the shaft at an end region opposite to said one end region thereof, said handle being a rod extending transversely to the shaft and having a bearing surface, said joint turning means including a fastener engaging the bearing surface and anchoring the rod in place;
- (d) means for exerting a constant pressure along said axis against said cutter to axially urge the cutting edges into direct cutting engagement with said annular end of the adaptor, said exerting means including an elongated coil spring surrounding an intermediate region of the shaft with clearance, one end of the spring bearing against the cutter and an opposite end of the spring bearing against the handle; and
- (e) means for rotating the cutting edges about said axis and relative to said annular end of the adaptor in said common plane, for cutting and resurfacing said annular end to form a generally planar annular end against which said planar annular surface of the nozzle abuttingly and sealingly engages without oil leakage upon return of the nozzle during oil burner operation, said rotating means including a collar having an outer surface to facilitate manual gripping.

4,952,104

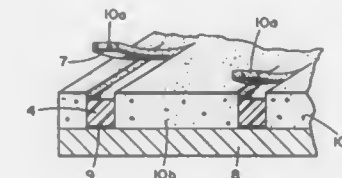
## METHOD OF FINISHING THE SURFACE OF A STRUCTURE

Hideharu Osada, 12-1, Tomokita 2-chome, Nara-shi, Nara, Japan

Filed Apr. 27, 1988, Ser. No. 186,877

Int. Cl. B32B 7/00; D03D 3/00; D04H 1/00; E01C 11/06  
U.S. Cl. 404—66

2 Claims



1. A method for providing a surface on a road or a wall to provide a pattern in the surface comprising:  
providing a pattern member having a body with a covering material releasably disposed on a top surface thereof, disposing the pattern member on portions of the road or wall,  
applying a curable coating material in an uncured state over the road or wall and the pattern member, to a thickness sufficient to cover both the pattern member and the road or wall itself;  
removing the covering material from the top surface of the pattern member, together with any uncured coating material thereover, leaving the pattern member body and remaining coating on the road or wall, and,  
curing by drying the remaining coating material.

4,952,105

## MACHINE TOOL

Kolchiro Kitamura, Takaoka, Japan, assignor to Kitamura Machinery Co., Ltd., Japan

Filed Jul. 25, 1989, Ser. No. 384,810

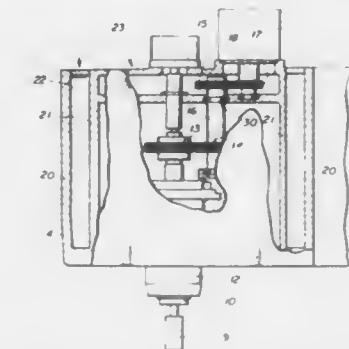
Int. Cl. B23Q 11/14

U.S. Cl. 409—135

5 Claims

1. A machine tool comprising:  
a bed;  
a table movable mounted on said bed for movement, relative to said bed, in a horizontal plane;  
a vertical column mounted on said bed;  
a spindlehead mounted on said vertical column for vertical

movement along said column, said spindlehead including a casing having a circumferential side wall portion, a spindle rotatably mounted on and extending from said casing and spindle drive means, housed within said casing, for rotatably driving said spindle;



a jacket surrounding and spaced from said circumferential side wall portion thereby defining a fluid space therebetween;  
means for circulating a coolant through said fluid space; and  
motor drive means for powering said spindle drive means.

4,952,106

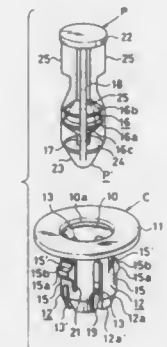
## FASTENER HAVING SEPARATE PORTIONS FOR ENGAGING TWO PANELS TO BE SECURED TOGETHER

Hisasi Kubogochi, and Youji Sato, both of Hiroshima, Japan, assignors to Nifco, Inc., Yokohama, Japan  
Filed Sep. 18, 1989, Ser. No. 408,359  
Claims priority, application Japan, Sep. 29, 1988, 63-126359[U]

Int. Cl. F16B 13/06

U.S. Cl. 411—48

8 Claims



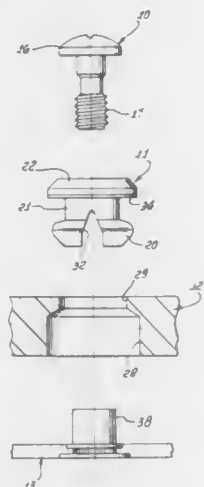
1. A fastener for fastening together two panel members which are respectively provided with hole means defined therein for permitting mounting of said fastener therewithin, comprising:

- a female member having a flange-like head for engaging an upper surface portion of a first one of said two panel members, an axially extending pin-insertion hole, flexibly resilient leg members dependently attached to said flange-like head at upper end portions thereof and surroundingly defining said pin-insertion hole, and elastic locking portions extending radially outwardly from said leg members within the vicinity of said upper end portions of said leg members so as to lockingly engage undersurface portions of said first one of said two panel members within the vicinity of said hole means defined within said first one of said two panel member; and



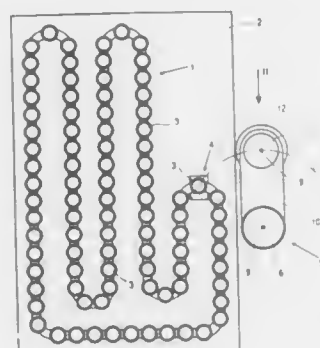
a male pin member for insertion within said pin-insertion hole of said female member, said male pin member having a large diameter portion for matingly engaging said leg members of said female member when said male pin member has been axially inserted within said female member to a predetermined extent so as to radially expand lower end portions of said leg members, which are axially remote from said upper end portions of said leg members and said elastic locking portions, so as to clampingly engage under-surface portions of said second one of said two panel members within the vicinity of said hole means defined within said second one of said two panel members.

**4,952,107**  
CAPTIVE PANEL SCREW ASSEMBLY  
James D. Dupree, South El Monte, Calif., assignor to Dupree, Inc., South El Monte, Calif.  
Filed Mar. 11, 1981, Ser. No. 242,704  
Int. Cl.<sup>5</sup> F16B 37/04, 39/00, 21/18  
U.S. Cl. 411—103 9 Claims



1. A washer for use with a screw having a head, a first threaded shaft section, a second shaft section between said head and first section, with said second section of lesser outside diameter than said first section such that said washer and screw form a captive panel screw assembly, said washer being unitary and having an outer end and an inner end with a central portion therebetween, and being formed entirely of a resilient material with a screw receiving passage therethrough, said washer having first lip means adjacent said outer end and projecting into and partially closing said passage for engaging the thread of the screw positioned therein, with said inner end of said washer having a greater outside diameter than said central portion, and with said inner end having second finger means deflectable inward for insertion through a panel opening of diameter less than said inner end outside diameter, and with the axial distance between said washer first lip means and the remote end of said second finger means being greater than the length of said screw first threaded shaft section such that said second finger means can be deflected inward and pass through the panel opening while said screw first threaded shaft section is within said washer screw receiving passage.

**4,952,108**  
APPARATUS FOR AUTOMATICALLY FEEDING A SEQUENCE OF CRUCIBLES TO A TEST OVEN  
Peter Weigand, Alzenau; Harald Langen, Babenhausen; Hans J. Kupka, Neoberg; Gerhard Rossel, Alzenau; Walter Weigand, Freigericht; Rudiger Wittenbeck, Hanau, and Karl-Helz Hessler, Mombis, all of Fed. Rep. of Germany, assignors to Foss Heraeus Analysensysteme GmbH, Hanau, Fed. Rep. of Germany  
Filed Feb. 6, 1989, Ser. No. 307,360  
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805321  
Int. Cl.<sup>5</sup> B65G 25/00  
U.S. Cl. 414—172 16 Claims



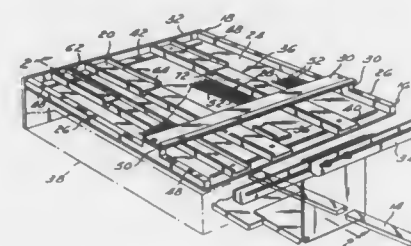
1. Apparatus for automatically feeding a sequence of crucibles (3) arranged on a conveyor (1) to a test oven (12), said crucibles each containing a sample, and being feedable by a vertical motion into a tubular oven (12), oriented with its longitudinal axis vertical, by a gripper head (13) with two claws (15) being used to cradle the crucible wherein, the gripper head (13) is rigidly secured to an end of an operating cylinder (7); the claws (15) comprise two parallel-running crosspieces (15) each having an overhanging edge (16), the operating cylinder (7) has an end, remote from said gripper head (13), which is connected to an end of a parallel-oriented lifting cylinder (6) via transverse crossbar (10), said gripper head (13) being reciprocable into and out of said tubular oven (12) and revolvable about a longitudinal axis (8) of said lifting cylinder (6), an on- and off-loading station (4) located on a circle of motion (11) of said operating cylinder (7) about said longitudinal axis of said lifting cylinder (6); said crucibles each having an outwardly extending circumferential flange (17), said crucibles being fed by said conveyor at intervals past said station (4), said crosspieces (15) of said gripper head (13) being so arranged that they engage under the circumferential flange (17) of the respective crucible.

**4,952,109**  
MODULAR FEEDING TRAY FOR VIBRATING CONVEYORS  
Ross D. Hendricks, Palos Verdes Peninsula, Calif., assignor to Excellon Automation, Torrance, Calif.  
Filed Feb. 19, 1988, Ser. No. 158,277  
Int. Cl.<sup>5</sup> H05K 3/30  
U.S. Cl. 414—224 6 Claims

1. A feed tray for advancing a plurality of components of varying sizes from a plurality of independent sources, each of said sources supplying components which are identical in size and shape for a given source, but which may vary among said

sources, each of said components from a given source being advanced by said feed tray toward a respective first predetermined location where said components may be lifted so as to be moved to a respective second predetermined location, said feed tray comprising:

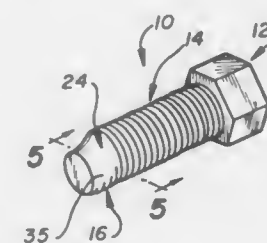
- a base plate, having a proximal end for receiving said components from said independent sources, and a distal end terminating proximate said first predetermined location;
- a pair of substantially parallel side bars, secured to said base plate on opposite sides thereof;
- a plurality of interchangeable modular troughs, removably



secured to said base plate and adapted to enable a versatile arrangement of said troughs on said tray, each of said troughs corresponding to one of said sources, wherein each of said sources comprises a tube, substantially rectangular in cross section, each of said troughs providing a path for guiding said components from one of said sources to said distal end of said base plate, each of said troughs sized to accommodate components of a particular size;

- a tube cover, secured to said feed tray for providing frictional resistance to movement of said tubes; and
- a holding plate, spanning said side bars, and adapted for sandwiching said tube cover therebetween.

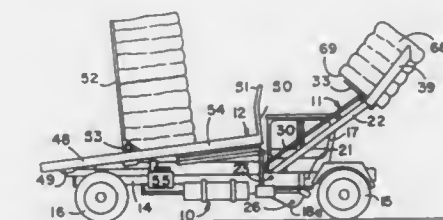
**4,952,110**  
ANTI-CROSS THREAD SCREW  
Gus G. Avgoustis, Westland; Louis Vasilevski, Sterling Heights; Ronald G. Weiss, Taylor, and Allan J. Theisen, Grosse Ile, all of Mich., assignors to Ring Screw Works, Inc., Madison Heights, Mich.  
Filed Oct. 13, 1989, Ser. No. 421,513  
Int. Cl.<sup>5</sup> F16B 25/00  
U.S. Cl. 411—386 10 Claims



1. A fastener comprising:  
a head; and  
a threaded shank projecting from said head, said shank having a desired radius, an arcuate peripheral surface, a substantially circular axial cross-section and a tip at its axial end opposite said head, said tip comprised of a first portion having a surface with one or more partial threads, the periphery of the one or more partial threads is on an arc substantially coincident and continuous with the peripheral arcuate surface of full threads on said shank such that a radius of said arc is substantially the same as said shank radius, and a second portion having a smooth peripheral surface with its edge defining a curve with respect to the longitudinal axis, the edge having an arcuate

slope of a predetermined radius when viewed in a side elevation direction with respect to said shank, said first portion and second portion being continuous with one another having a non-circular axial cross-section, and said tip including an axis being offset with respect to said shank axis.

**4,952,111**  
PICK UP AND STACKING DEVICE FOR LARGE HAY BALES  
Dean Callahan, P.O. Box 205, Royal City, Wash. 99357  
Filed Sep. 19, 1988, Ser. No. 245,706  
Int. Cl.<sup>5</sup> B65H 67/00  
U.S. Cl. 414—111 2 Claims



1. A mechanism to pick up and accumulate a plurality of large hay bales, approximating one ton in weight, comprising in combination:

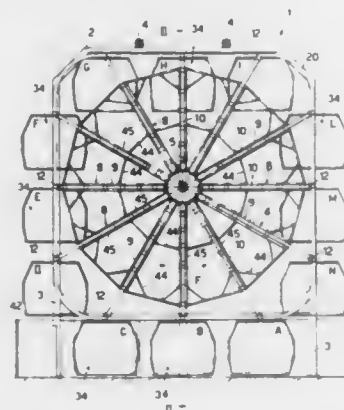
- a self-powered vehicle having a frame supported for locomotion by plural wheel trucks, said frame defining a pick up arm channel in its forward portion and having an operator cab laterally adjacent the pick up arm channel and an accumulating and stacking bed rearwardly of the pick up arm channel;
- pick up mechanism including an elongate pick up arm pivoted at its inner end upon a fixed axis on the vehicle frame forwardly of the accumulating and stacking bed and movable from a lowered position upwardly adjacent a supporting surface forwardly of the vehicle to a substantially vertical position above the forward portion of said bed, said pick up arm having
- a bale plate pivotally carried on its forward portion for motion in a plane parallel to the pick up arm, with a control arm pivotally mounted on the frame extending parallel to the pick up arm at a spaced distance thereabove and pivotally connected to the bale plate, said bale plate carrying two pivotally mounted bale arms extending forwardly from each of the lateral sides of the lower portion of the bale plate with hydraulic means of moving said bale arms toward and away from each other and
- at least one pick up arm return spring carried by the vehicle frame spacedly above its pivotal interconnection with the vehicle frame to contact the pick up arm spacedly forwardly of its vertical position to bias the pick up arm forwardly when it is in its vertical position, wherein each said control arm and pick up arm pivot about a fixed axis relative to said frame, and further wherein each said control arm and pick up arm consists of a single rigid beam;
- said bed being pivotally mounted in the rear portion of the vehicle for pivotal motion of its forward portion upwardly and rearwardly to a substantially vertical position, said bed having means to receive a plurality of bales in stacked array in its forwardmost portion, means to move said bales rearwardly and means to tilt said bed to deposit bales thereon in a stacked array on a supporting surface; and
- hydraulic powering means providing first valve and cylinder means to move the bale arms toward each other to positionally maintain a bale therebetween upon contact of

a sensor carried by the bale plate with a bale, second valve and cylinder means to move the pick up arm upwardly and rearwardly upon activation of said first valve and cylinder means, third valve means to release hydraulic pressure on the pick up arm responsive to bale arm vertical position above the forward portion of the stacking bed, and fourth valve means to remove hydraulic pressure from the bale arms.

4,952,112  
MECHANICAL-STORAGE MULTI-LEVEL CARPARK  
Giorgio Piacenza, Via Oberdan, 8, 26100 Cremona, Italy  
Filed Mar. 1, 1989, Ser. No. 317,683  
Int. Cl.<sup>5</sup> E04H 6/16

U.S. Cl. 414—251

20 Claims



1. An automobile parking structure comprising:  
a support structure including a continuous track; and  
a carousel structure including a center axle rotatably supported by said support structure, a plurality of telescopic arms extending radially from said center axle and a plurality of automobile platform assemblies;  
said telescopic arms having first and second ends, said first ends being attached to said center axle, said second ends slidably engaging said track;  
said automobile platform assemblies being rotatably attached to said second ends of said telescopic arms  
whereby the telescopicity of said arms permits said second ends to follow the contour of said track.

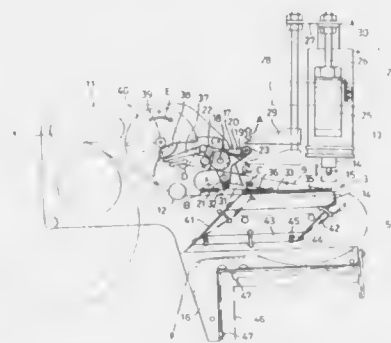
4,952,113  
CHIP FEEDER FOR CHIP MOUNTER  
Teruhiko Fujioaka, Tokyo, Japan, assignor to Tenryu Technics Co., Ltd., Shizuoka, Japan  
Filed Nov. 14, 1988, Ser. No. 270,962  
Int. Cl.<sup>5</sup> H05K 13/04

U.S. Cl. 414—416

10 Claims

5. A chip feeder for chip mouter for supplying a multiplicity of chip parts retained on a tape, including a protective tape portion, from a tape supply section to a chip parts takeout section of said chip mouter, comprising:  
a working lever having a first, a second and a third arm portion;  
a driving source for applying a driving force to said first arm portion of the working lever;  
a tape feed means interlockingly connected to said second arm portion of the working lever, for intermittently feeding the tape at a predetermined pitch;  
a protective tape peel-off means interlockingly connected to said third arm portion of the working lever, for peeling the protective tape portion off the tape intermittently fed by said tape feed means; and

a chip takeout means for taking out the chip parts from the tape, from which the protective tape has been peeled off; wherein said driving source and said chip takeout means are, respectively, a driving source and a chip takeout means for the chip mouter itself, and said working lever is interlocked in operation with the chip mouter; and



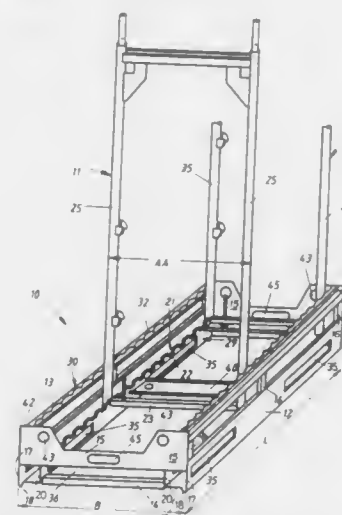
wherein said tape that is intermittently fed by the tape feed means is clamped at upper and under surfaces thereof and guided while being clamped by a fixed guide means on the upper surface thereof and a movable guide means on the under surface thereof, respectively, and said movable guide means is supported by a resilient means flexing in a tape feeding direction in accordance with the thickness of said tape.

4,952,114  
DEVICE FOR TRANSPORTING ADJUSTING FRAMES FOR SCAFFOLDING  
Ruth Langer, nee Layher, IM Weinberg 13, D-7129 Gueglingen (Baden-Wuerttemberg), Fed. Rep. of Germany  
Filed Mar. 13, 1989, Ser. No. 322,164  
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808098.2

Int. Cl.<sup>5</sup> B66F 9/06

U.S. Cl. 414—608

40 Claims



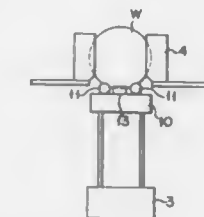
1. A conveying system for transporting and storage of trestle frames of scaffolds, to be utilized in an upright position, the system comprising scaffold poles, a lower platform frame of sheet material having receiving means for receiving forks of forklift and holding means for retaining the trestle frames in an upright position, wherein the holding means for retaining the trestle frames in an upright position includes a pair of lower

holding rails having a plurality of toothed means for engagement with a side of lower ends of the scaffold poles and lower cross connection means of the scaffold poles, and upper lateral holding rack rails lying above the lower holding rails, said upper lateral holding rack rails including inwardly directed lateral rack teeth defining therebetween holding recess means for respectively accommodating the scaffold poles, said lateral rack teeth being arranged in such a manner that an inner spacing of the holding recess means corresponds to an outer spacing of the scaffold poles, and wherein lower ends of the scaffold poles are disposed between the inner surface of the lower holding rails and an inner surface of the upper lateral holding rack rails.

4,952,115  
WAFER SUPPORT DEVICE  
Wataru Ohkane, Sagamihara, Japan, assignor to Tel Sagami Limited, Kanagawa, Japan  
Filed Feb. 24, 1989, Ser. No. 315,311  
Claims priority, application Japan, Feb. 29, 1988, 63-46048  
Int. Cl.<sup>5</sup> B65G 65/00

U.S. Cl. 414—618

7 Claims

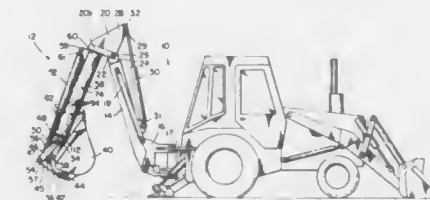


1. A wafer support device comprising:  
at least one support member shaped like a rotatable rod and having a row of wafer support grooves formed at a certain pitch on the outer surface of said member in the longitudinal direction thereof and also having another row of wafer support grooves formed on the outer surface of said member in the longitudinal direction thereof;  
a mechanism for rotating the support member so as to select in which of said rows of wafer support grooves a wafer is supported  
a member for holding said support member; and  
a means for raising and lowering said support member.

4,952,116  
ROTARY DIPPER STICK  
Paul P. Weyer, 48811-284th Ave. SE., Enumclaw, Wash. 98022  
Division of Ser. No. 337,749, Apr. 13, 1989, This application  
Feb. 15, 1990, Ser. No. 480,553  
Int. Cl.<sup>5</sup> E02F 3/75

U.S. Cl. 414—694

19 Claims



1. A fluid-powered, rotary dipper stick assembly, usable with a vehicle having a boom arm and a selectively operable dipper stick actuator associated therewith for pivotal movement of the dipper stick assembly through a boom plane containing the boom arm, the dipper stick assembly being usable with a work implement such as a bucket having a selectively operable work implement actuator associated therewith for

pivotal movement of the work implement through a dipper stick plane containing the dipper stick assembly, the dipper stick assembly comprising:

a boom attachment head having a first attachment portion attachable to the vehicle boom arm, and a second attachment portion attachable to the dipper stick actuator to provide pivotal movement of said boom attachment head through the boom plane upon actuation of the dipper stick actuator, said first attachment portion and said second attachment portion being selectively detachable from the boom arm and the dipper stick actuator;  
a work implement attachment head having a third attachment portion attachable to the work implement to provide pivotal movement of the work implement through the dipper stick plane upon actuation of the work implement actuator, said third attachment portion being selectively detachable from the work implement;  
an elongated, generally cylindrical inner body having a longitudinal axis and generally extending at least partially between said boom attachment head and said work implement attachment head, with a first inner body end toward said boom attachment head and a second inner body end toward said work implement attachment head;  
a shaft extending longitudinally with in said inner body in general coaxial arrangement with said inner body, said inner body being rigidly attached to said boom attachment head, and said shaft being rigidly attached to said work implement attachment head, said inner body and said shaft being selectively rotatable relative to each other about said body longitudinal axis;  
an elongated, generally cylindrical outer body generally extending longitudinally between said boom attachment head and said work implement attachment head in generally coaxial arrangement with said inner body, with a first outer body end toward said boom attachment head and a second outer body end toward said work implement attachment head, said outer body having a fourth attachment portion spaced away from said work implement attachment head and attachable to the work implement actuator to apply a counterforce upon actuation of the work implement actuator to rotate the work implement in the dipper stick plane, said inner body being disposed within said outer body with an outward wall portion thereof positioned immediately adjacent to an inward wall portion of said outer body, said inner body extending from said first inner body end positioned toward said first outer body end to said second inner body end positioned toward a midportion of said outer body between said first and second outer body ends, said outer body being rigidly attached to said shaft toward said second outer body end, said outer body and said shaft being selectively rotatable as a unit relative to said inner body about said body longitudinal axis, and the assembly further includes first radial bearings disposed between said inward wall portion of said outer body and said outward wall portion of said inner body toward said first inner body end and second radial bearings disposed between said inward wall portion of said outer body and said outward wall portion of said inner body toward said second inner body end, said first and second inner body ends being spaced apart by a sufficient distance to provide increased stability against forces generated during use of the dipper stick assembly tending to move said outer body out of coaxial alignment with said shaft; and  
linear-to-rotary transmission means disposed within said outer body and operable for producing rotational movement of said shaft relative to said inner body, said transmission means including a piston for the selective application of fluid pressure to one or an other side thereof to produce linear movement of said piston within said outer body selectively toward said first and second outer body ends, and means for translating linear movement of said piston toward one of said first or second outer body ends



into clockwise relative rotational movement between said shaft and said inner body and translating linear movement of said piston toward the other of said first or second outer body ends into counterclockwise relative rotational movement between said shaft and said inner body to selectively rotate said work implement attachment head and hence the work implement about said body longitudinal axis independent of said boom attachment head and hence the boom arm, whereby the dipper stick assembly is capable of handling significantly increased loads without interfering with the operation of said linear-to-rotary transmission means such as can occur on misalignment. interfering with the operation of said linear-to-rotary transmission means, such as can occur on misalignment.

4,952,117

# APPARATUS FOR BALANCING OF POSITIONAL TOLERANCES

Klaus K. Nerger, Witten, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

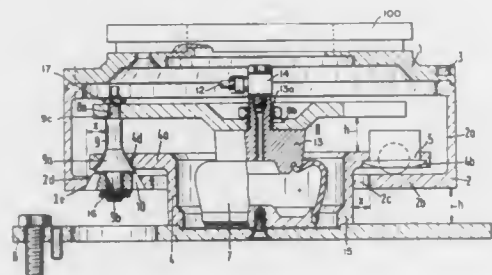
Filed Mar. 22, 1989, Ser. No. 327,254

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3810045; Jun. 23, 1988, 3821548

Int. Cl.<sup>5</sup> B25J 9/00

U.S. Cl. 414—732

17 Claims



1. A device for balancing of spatial and positional tolerances for a gripper comprising:
  - a. an end section of a work arm;
  - a flange for attaching a gripper;
  - a fixed plate attached to the end section of the work arm, disposed at a distance relative to the end section of the work arm, having a tapered centering means, and having an opening disposed toward the flange for attaching the gripper;
  - a movable plate having a tapered centering means and intermediately disposed between the end section of the work arm and the fixed plate having an opening, wherein the movable plate protrudes with an attachment part for the flange passing through the opening of the fixed plate, wherein the flange is attached to the attachment part of the movable plate, wherein the attachment part is disposed with a lateral play distance relative to the opening of the fixed plate for allowing lateral movement relative to the fixed plate, and wherein the movable plate is guided via the tapered centering means of the fixed plate into a fixed-point position;
  - a centering element support retained by the end section of the work arm and disposed away from the gripper as seen from the movable plate;
  - a pressure medium supply system;
  - a pressure-medium bellows cylinder connected to the pressure-medium supply system and disposed between the flange for the gripper and the centering element support for cushioning and moving the movable plate and the flange for the gripper relative to the fixed plate;
  - a pin furnished with a centering taper and having a bolting attachment and attached with its bolting attachment in one of the fitted bores of the centering element support, wherein said pin is guided through tapered centering

means of the movable plate and through the tapered centering means of the fixed plate allowing a lateral play for relative lateral motion of the movable plate relative to the fixed plate.

4,952,118

# SYSTEM AND APPARATUS FOR STORAGE OF WHEELED TRAILER FRAMES IN HORIZONTAL STACKS

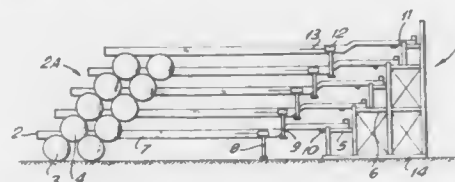
Robert N. Macmillan, Roselle, N.J., assignor to RNMAC Services Inc., Roselle, N.J.

Filed Sep. 8, 1988, Ser. No. 242,048

Int. Cl.<sup>5</sup> B65G 1/00

U.S. Cl. 414—788.2

61 Claims



1. A horizontal storage system for wheeled trailer frames of the detachable cargo container type, each of said trailer frames having a tandem set of rear wheels, longitudinally extending side rails having at least one downward facing surface and a front end, said storage system comprising:
  - a. an overhead yard crane comprising a spreader,
  - b. trailer frame holding means on the spreader arranged to releasably clamp and support a trailer frame thereto, including at least one pair of opposed side-rail engaging and supporting clamp jaw members at least one of which is movable toward and away from the other, and
  - c. at least one multi-level storage rack means for removably receiving from above and for supporting the front ends of a plurality of trailer frames stacked horizontally one upon another in at least one stack with their tandem sets of rear wheels in nested relationship.

4,952,119

# TIP BRAKE MECHANISM FOR A WIND GENERATOR BLADE

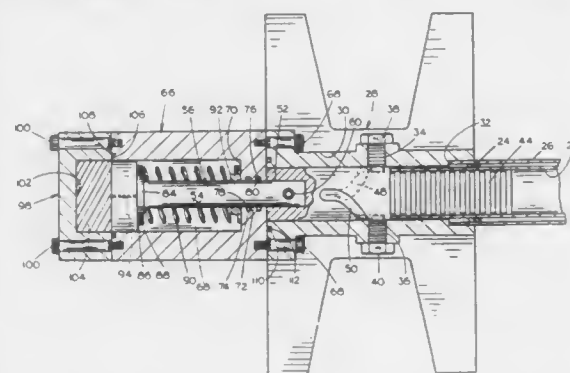
Richard A. Widseth, Crookston, Minn., assignor to Phoenix Industries of Crookston Ltd., Crookston, Minn.

Filed Sep. 21, 1989, Ser. No. 410,592

Int. Cl.<sup>5</sup> F03D 7/04, 7/06

U.S. Cl. 416—3

3 Claims



1. In combination,
  - a rotor blade for a wind generator including a main blade portion having inner and outer ends, and a blade tip portion mounted at the outer end thereof,
  - a tip brake mechanism interconnecting said main blade portion and said blade tip portion for rotating said blade tip

relative to said main blade portion, to slow the rotational speed of said rotor blade when the blade is subjected to a predetermined centrifugal force, thereby preventing damage to the wind generator,

said tip brake mechanism comprising,

a cylinder block means positioned in said main blade portion and having inner and outer ends,

said cylinder block means having an elongated, longitudinally extending cylinder formed therein which has inner and outer ends,

a piston mounted in said cylinder and being movable from an inner set position to an outer deployed position, said piston having a piston head portion at its inner end and a rod portion extending longitudinally therefrom,

a magnet block means at the inner end of said cylinder block means and having a magnet means, of a predetermined magnitude, positioned therein which is positioned adjacent said piston head portion, when said piston is in its inner set position, to yieldably maintain said piston head portion adjacent thereto until sufficient centrifugal force is exerted on said piston to move said piston away therefrom towards its deployed position,

said cylinder block means having a bore formed in its outer end,

said piston rod portion slidably extending outwardly through said bore,

a reset spring means in said cylinder which embraces said piston rod portion between said piston head portion and the outer end of said cylinder block means for resetting said piston head portion adjacent said magnet means,

said cylinder being filled with a hydraulic fluid which is compressed when said piston moves towards its deployed position,

said piston head portion having at least one bore extending therethrough for permitting the hydraulic fluid to flow therethrough for slowing the movement of said piston between its said set position and its said deployed position and for slowing the movement of said piston between its said deployed position and its said set position,

the magnet force of said magnet means being larger than the force of said reset spring means so that centrifugal force greater than the total of the magnet force of said magnet means and the force of said reset spring means is required to move said piston means from its set position towards its deployed position, and so that said piston means is moved from its said deployed position towards its said set position by the smaller force of said reset spring means acting thereon,

and means operatively interconnecting said piston rod portion and said blade tip for rotating said blade tip relative to said main blade portion when said piston means moves from its said set position to its said deployed position.

4,952,120

# CONTROL DEVICE FOR MONOCYCLIC PITCH IN A FIXED REFERENCE SYSTEM AND MULTICYCLIC PITCH IN A ROTATING REFERENCE SYSTEM FOR BLADES OF ROTORS OF ROTOR CRAFT

Jacques A. Aubry, Cabries, and Jean J. Mondet, Pellissanne, both of France, assignors to Societe Nationale Industrielle et Aerospatiale des Poudres et Explosifs, Paris, France

Filed Sep. 11, 1989, Ser. No. 405,266

Claims priority, application France, Sep. 16, 1988, 88 12141

Int. Cl.<sup>5</sup> B63H 3/00

U.S. Cl. 416—114

23 Claims

1. A control device for monocyclic pitch in a fixed reference system and multicyclic pitch in a rotating reference system for the blades (7) of a rotor of a rotor craft, comprising, in order to ensure the control of collective and monocyclic pitch in a fixed reference system, a swashplate (27, 38) assembly comprising:
  - a nonrotating plate (27) mounted, on the one hand, so as to slide axially about a fixed cylindrical guide (4), integrally attached to the structure (6) of the rotor craft and substantially surrounding coaxially the rotor mast (1) and, on the

other hand, oscillating angularly by means of a universal joint (25) on the axis (A) of the rotor mast (1),

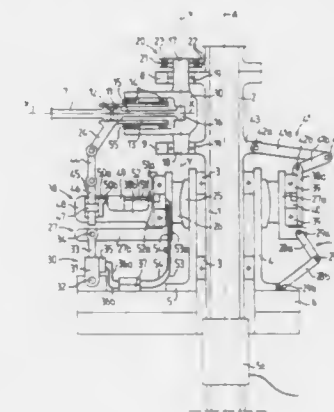
at least one nonrotating compass (28) articulated, on the one hand, on said structure (6) of the rotor craft and, on the other hand, on said nonrotating plate (27),

at least three actuators (30), under pilot control, each of which is connected, on the one hand, to said structure (6) of the rotor craft and, on the other hand, to said nonrotating plate (27) in order to control the translation and tilt movements of said nonrotating plate (27) respectively along said guide (4) and on said universal joint (25),

a rotating plate (38) mounted in rotation by means of at least one bearing (39) on said nonrotating plate (27) and substantially coaxially to the latter,

at least one rotating compass (41) articulated, on the one hand, on said rotating plate (38) and, on the other hand, on said rotor (1, 2), and

pitch control rods (44) in a number equal to the blades (7) of the rotor and each of which is connected, on the one hand,



to said rotating plate (38) and, on the other hand, to a pitch control lever (24) of a corresponding blade (7) of the rotor, the device also comprising, to ensure the multicyclic pitch control in a rotating reference system, multicyclic linear actuators (45), in a number equal to the blades (7) of the rotor, disposed outside the rotor mast (1) and substantially longitudinally with respect to the axis (A) of said rotor mast (1), and mounted so as to rotate with the rotor (1, 2) about said axis (A) such that each multicyclic actuator (45) drives a pitch control rod (44) of a corresponding blade (7) of the rotor, wherein the multicyclic linear actuator of each blade (7) is a dual-action hydraulic jack (45) with at least one body implanted on said rotating plate (38) by means of one of the two elements constituted by its cylinder (48) and its rod (46), whilst the other element of the jack (45) is directly articulated on said pitch control rod (44) of the corresponding blade (7), each body of said jack (45) being supplied from at least one hydraulic power circuit by means of at least one electrohydraulic control servovalve (49).

4,952,121

# RADIAL PISTON PUMP WITH MEANS PREVENTING OVALIZATION OF PISTON CHAMBER

Sisto L. De Matthaeis, Modugno; Mario Ricco, Bari, and Alessandro Valetto, Turin, all of Italy, assignors to Weber S.r.l., Turin, Italy

Filed Aug. 25, 1988, Ser. No. 236,452

Claims priority, application Italy, Aug. 25, 1987, 53609/87[U]

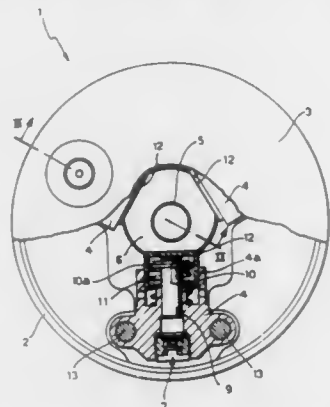
Int. Cl.<sup>5</sup> F04B 1/04

U.S. Cl. 417—273

3 Claims

1. A radial piston pump comprising a plurality of cylinders disposed radially in a star formation around a shaft with an

eccentric in a body formed by first and second members, a casing and a lid respectively, joined together by means of a plurality of axial clamping members, each cylinder being clamped in position between the clamped first and second members of the body between a pair of said clamping member, facing surfaces of each cylinder and of at least one of the member of the pump body being spaced in correspondence



with the central portion of the cylinder in which is formed a chamber in which an associated piston is movable, at least one surface of each cylinder facing a member of the body having a recess or central rebate in correspondence with that portion of the cylinder in which the chamber is formed, so that contact between the cylinder and the at least one member of the body of the pump is limited to surfaces outside the central portion of the cylinder.

4,952,122

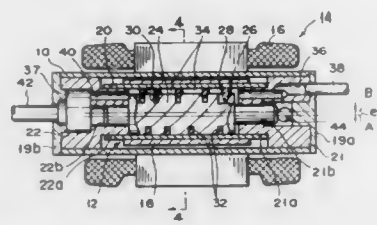
## FLUID COMPRESSOR

Toshikatsu Iida, Yokohama, and Takayoshi Fujiwara, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 7, 1989, Ser. No. 376,530  
Claims priority, application Japan, Jul. 8, 1988, 63-170694  
Int. Cl.<sup>5</sup> F04B 29/00

U.S. Cl. 417—356

6 Claims



1. A fluid compressor comprising:
  - a substantially cylindrical casing;
  - a cylinder having a suction end and a discharge end and arranged rotatably in said casing;
  - a columnar rotary body located in the cylinder to extend in the axial direction thereof and be eccentric thereto, and rotatable relative to the cylinder while part of the rotary body is in contact with the inner circumferential surface of the cylinder, said rotary body having a spiral groove formed on the outer circumferential surface thereof, said groove having pitches narrowed gradually with a distance from the suction end toward the discharge end of said cylinder;
  - a spiral blade fitted in the groove to be slidable, substantially in the radial direction of the rotary body, having an outer surface in tight contact with the inner circumferential surface of the cylinder, and dividing the space between the inner circumferential surface of the cylinder and the

outer circumferential surface of the rotary body into a plurality of operating chambers; and drive means, including a stator fixed to the outer periphery of the casing and a rotor located within the casing and fixed to the cylinder, for rotating the cylinder and the rotary body to sequentially transport a fluid, drawn in the cylinder through the suction end thereof, through the operating chambers to the discharge end of the cylinder.

4,952,123

## AUXILIARY DRIVE ON AN INTERNAL COMBUSTION ENGINE FOR AN AIR COMPRESSOR

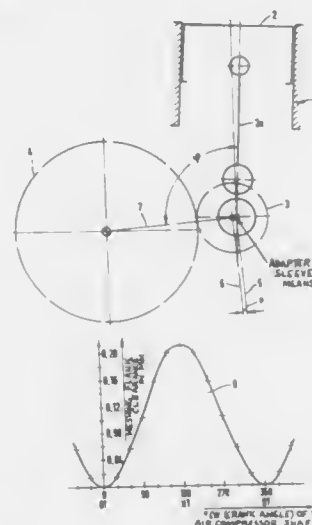
Hans Gebhardt, Langensass, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, München, Fed. Rep. of Germany

Filed Feb. 3, 1989, Ser. No. 306,344  
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1988, 3804574

Int. Cl.<sup>5</sup> F04B 35/00

U.S. Cl. 417—380

2 Claims



1. In an auxiliary drive of an internal combustion engine for an air compressor, which is constructed as a piston compressor having a piston that is guided in a cylinder and is driven via a connecting rod by a crankshaft, which is connected with a drive gear wheel that has tooth flanks and that is driven by the drive shaft of the internal combustion engine via gear wheels also having tooth flanks, with the air compressor drive gear wheel having tooth flanks meshing with a gear wheel also having tooth flanks and being mounted on the camshaft of said engine, comprising the improvement therewith wherein:

said air compressor drive gear wheel has a specific eccentricity, said eccentricity being associated with an upper dead center position of said air compressor piston, this being obtained by an aligned arrangement of said air compressor drive gear wheel relative to said air compressor crankshaft, said air compressor drive gear wheel and said gear wheel on the camshaft of said engine in the upper dead center position of the air compressor piston having minimal spacing therebetween due to a maximum in said eccentricity being attained at the upper dead center position of said air compressor piston with which reduction of noise generation of the tooth flanks particularly in a region of the upper dead center position of the air compressor piston is attained while also avoiding increased rotational bending strain on the air compressor crankshaft and the camshaft.

4,952,124

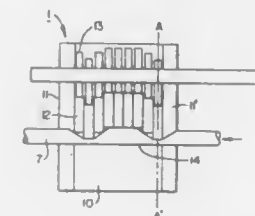
## MEDICINE INJECTOR AND METHOD OF USING SAME

Mitsuji Ogami, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1986, Ser. No. 843,067  
Claims priority, application Japan, Apr. 1, 1985, 60-69369  
Int. Cl.<sup>5</sup> F04B 43/12

U.S. Cl. 417—474

6 Claims



1. A medicine injector with a finger pump which comprises an ejection tube containing a liquid and a plurality of fingers adapted to move in a specified sequence to compress said tube, said medicine injector comprising

a first means for effectively varying the widths of said fingers by simultaneously compressing said tube with specified two or more of said plurality of fingers, and a second means for controlling the amount of liquid ejected out of said tube by said first means.

4,952,125

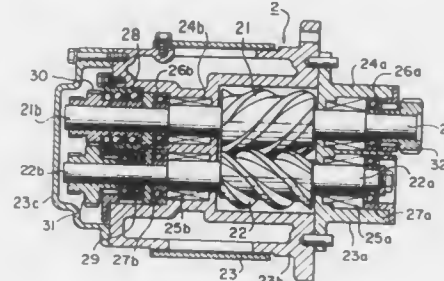
## NONLUBRICATED SCREW FLUID MACHINE

Toshiaki Nagai, Shimizu, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 330,476  
Claims priority, application Japan, Apr. 6, 1988, 63-82962  
Int. Cl.<sup>5</sup> F04C 18/16

U.S. Cl. 418—194

4 Claims



1. A nonlubricated screw fluid machine comprising a pair of rotors including a male screw rotor and a female screw rotor capable of being engaged with each other within a casing of the screw fluid machine, said male rotor and said female rotor each having a forward plane, a rearward plane, and a smaller diameter at an outlet side thereof than a diameter at an inlet side thereof, wherein at least one of said male rotor and female rotor is provided with a tooth profile having different helix angles between the forward plane and the rearward plane thereof.

4,952,126

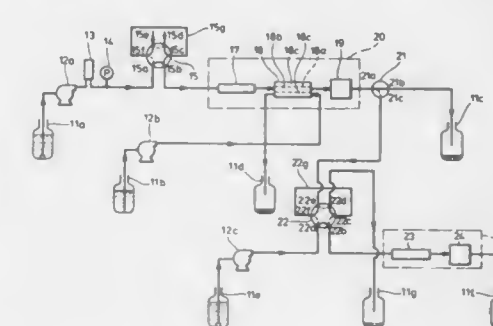
## APPARATUS FOR DETERMINATION OF MICROCONSTITUENTS

Yuzuru Hanaoka, Takeshi Murayama, and Tamizo Matsuura, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Filed Apr. 10, 1985, Ser. No. 721,563  
Claims priority, application Japan, Apr. 16, 1984, 59-76166  
Int. Cl.<sup>5</sup> G01N 30/88

U.S. Cl. 422—70

4 Claims



1. An apparatus for determining a microconstituent in a solution containing such a microconstituent in combination with a major constituent, said apparatus comprising, in combination,

a first sample valve for collecting a prescribed amount of a solution being tested;  
a first separation column comprising a first filler and having a first separation mode for separating microconstituents from a solution being tested conveyed from said first sample valve;  
a suppressor for depriving effluent conveyed from said first separation column of background of physical quantity;  
a first detector for detecting a physical quantity of effluent conveyed from said suppressor;  
a switch valve for fractionating only a portion of effluent conveyed from said first detector which corresponds to a neighborhood of a microconstituent;  
a second sample valve interconnected directly and solely to said switch valve and a second separation column for collecting a prescribed amount of fractionated solution conveyed from said switch valve;  
said second separation column for separating a microconstituent from fractionated solution conveyed from said second sample valve, said second separation column comprising a second filler and having a second mode of separation different from said first separation mode of said first separation column; and  
a second detector for detecting a physical quantity of effluent conveyed from said second separation column.  
3. An apparatus for determining a microconstituent in a solution containing such a microconstituent in combination with a major constituent, said apparatus comprising, in combination,  
a first sample valve for collecting a prescribed amount of a solution being tested;  
a separation column for separating microconstituents from a solution being tested conveyed from said first sample valve and from a fractionated solution conveyed from a second sample valve;  
a suppressor for depriving effluent conveyed from said separation column of background of physical quantity;  
a detector for detecting a physical quantity of effluent conveyed from said suppressor;  
a switch valve for fractionating only a portion of effluent conveyed from said detector which corresponds to a neighborhood of a microconstituent; and  
said second sample valve connected to said switch valve and



said separation column for collecting a prescribed amount of fractionated solution conveyed from said switch valve and for introducing said prescribed amount of fractionated solution into said separation column.

**4,952,127**  
**METHOD AND APPARATUS FOR SEPARATION OF HIGH-MOLECULAR-WEIGHT SUBSTANCES FROM A FLUID CULTURE MEDIUM**

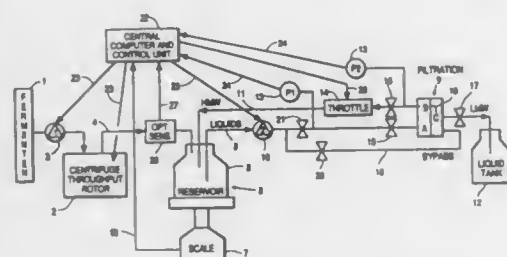
Holger Schmeisser, Göttingen, and Heinz-Gerhard Köhn, Dransfeld, both of Fed. Rep. of Germany, assignors to Heraeus Sepatech GmbH, Osterode, Fed. Rep. of Germany  
Filed Sep. 6, 1989, Ser. No. 403,708

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1988, 3821771

Int. Cl.<sup>5</sup> B04B 11/02

U.S. Cl. 494—1

20 Claims



1. A method of separating solids, for example bacteria, yeasts, and animal and/or human cells, from liquid nutrient media and concentrating the proportion of high-molecular-weight substances contained in the remaining liquid, including taking liquid nutrient medium from a fermenter or supply tank (1), separating said medium by centrifugation (2) into its solid and liquid components and concentrating the proportion of high-molecular-weight substances in the liquid component simultaneously in a subsequent method step by filtration in a filtration unit (9), wherein the improvement comprises, centrally monitoring & controlling (22) each method step, continuously supplying a continuous flow rotor (2) of a centrifuge cells suspended in with liquid nutrient medium from the fermenter or supply tank (1) until a centrally stored preset value for the volume of liquid components has been supplied by the centrifuge into an intermediate reservoir (5), continuously feeding these liquid components from said intermediate reservoir (5) directly to the filtration unit (9), subsequently recycling (11) the high-molecular-weight components of said liquid components to the intermediate reservoir (5), centrally monitoring (22,24) pressure in the filtration unit (9) and adjusting (14,28) said filtration pressure as a function of the rate of a pump (10) associated with the filtration unit (9), and controlling the supply (3,23) to the centrifuge within preset values of the current filling level of the intermediate reservoir (5).

**4,952,128**  
**TRANSVERSE WEB FORMING APPARATUS**  
Gerald M. Marshall, Somerville, and Allan P. Farrington, Englishtown, both of N.J., assignors to Chicopee, New Brunswick, N.J.

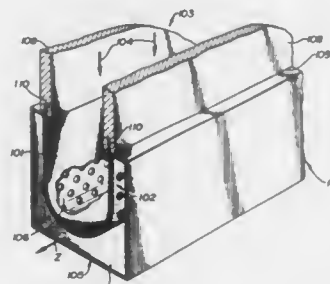
Filed Sep. 22, 1987, Ser. No. 99,877  
Int. Cl.<sup>5</sup> B29C 43/22

U.S. Cl. 425—82.1

1. A cylindrical web forming apparatus comprising:

14 Claims

first feed means for feeding fibrous material to at least two first fiberizing stations;  
second feed means for feeding fibrous material to at least two second fiberizing stations;  
first and second lickerins mounted for rotation toward each other about respective parallel axes, a portion of the outer periphery of said first and second lickerins being adjacent to said first and second feeding means, respectively, at the first and second fiberizing stations, respectively, said first and second lickerins being engageable with the fibrous materials fed to the respective fiberizing stations so as to open the materials and produce individualized fibers;  
doffing means for directing the fibers from said first and second lickerins in first and second fiber streams, respectively, in trajectories toward each other;

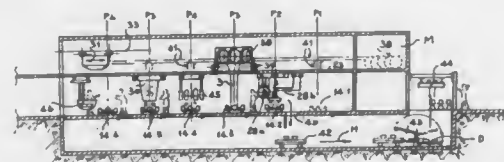


mixing means defining a mixing zone between said fiberizing stations for receiving and selectively blending the fiber stream;  
condensing means including a continuous conveying belt that moves parallel to the lickerin axes and is located opposite said mixing zone from said lickerins, said conveying belt receiving the fiber streams and accumulating fibers to form a web of material, said conveying belt being U-shaped to form a trough over at least a portion of its length passing beneath said mixing zone,  
duct plates extending from said mixing zone to form a seal with said U-shaped portion of said condensing means, and guide means for forming said conveying belt into a cylindrical shape.

**4,952,129**  
**PLANT TO MANUFACTURE ELONGATED ELEMENTS OF PRESTRESSED REINFORCED CONCRETE**  
Amilcare Molin Zan, Milano, Italy, assignor to S.C.A.C. Società Cementi Armati Centrifugati SpA, Milan, Italy  
Filed Apr. 29, 1988, Ser. No. 188,201  
Int. Cl.<sup>5</sup> B28B 15/00, 23/06

U.S. Cl. 425—88

15 Claims



1. Plant to manufacture elongated concrete elements, the plant comprising:  
(a) a plurality of parallel configured, longitudinally-extending rectilinear tracks;  
(b) at least one elongated support carriage slidably displaceable along each of said tracks, each of said support carriages supporting a plurality of elongated forms arranged on said support carriage so as to establish at least one set of aligned, longitudinally-extending forms;  
(c) means for positioning a reinforcement and prestressing

strand along a longitudinal axis of each of said support carriages so as to extend through said aligned set of elongated forms;  
(d) means for tensioning said reinforcement and prestressing strands, at least a portion of said reinforcement and prestressing strand tensioning means being mounted directly to an end of each of said carriages;  
(e) a sheltered working area comprising a predetermined central portion of said plurality of tracks;  
(f) a series of operating machines each for performing a different work operation on the forms, said operating machines being positioned in said sheltered working area and mounted above said tracks so as to be displaceable transversely across said tracks between a plurality of positions, each of the positions being substantially fixed with respect to a longitudinal axis of each of said tracks, each of said operating machines performing a predetermined work operation on said plurality of aligned forms while said supporting carriages are advanced along said tracks to displace the forms relative to said operating machines, said series of operating machines comprising at least one concrete casting machine for continuously casting concrete successively on the plurality of aligned forms of said carriage, and a machine including tensioning means for tensioning said reinforcement and prestressing strand; and  
(g) a curing area for said cast concrete forms positioned externally from said working area.

**4,952,130**  
**APPARATUS FOR INJECTION-MOULDING A PLASTICS PORTION ON A PAPER TUBE USING A SUPPORT PORTION**

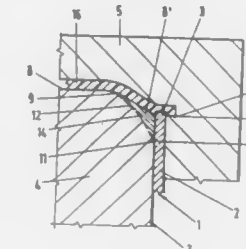
Wilhelm Reil, Bensheim, Fed. Rep. of Germany, assignor to Tetra Pak Finance & Trading S.A., Pully, Switzerland  
Filed Mar. 15, 1989, Ser. No. 324,299

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809275

Int. Cl.<sup>5</sup> B28B 21/56, 23/18

U.S. Cl. 425—117

5 Claims



1. Injection moulding apparatus for sealing an exposed end surface of a quadrangular tubular plastic coated paper casing with a plastic moulded portion, comprising an injection-moulding core and outer mould complementally configured so as to form a mould cavity in which the plastic moulded portion is sealed about the exposed end surface, wherein the injection moulding core is complementally configured so as to receive the casing and position the casing within the mold cavity so as to expose a quadrangular end surface of the casing to the sealing plastic portion, said injection moulding core having outer flat faces being configured to receive the casing, an end face exposed to the mould cavity and relieved surfaces formed between said end face and said outer flat faces, wherein said relieved surfaces have at least one support portion extending

therefrom and affording a plane surface thereof for support of a portion of the corresponding portion of the quadrangular casing throughout the exposed length thereof within the mould cavity, and wherein said support portion has an outer end face of a length less than that to which the exposed end surface of the casing is exposed within the mould cavity.

**4,952,131**  
**METAL MOLD EXCHANGING APPARATUS FOR USE IN INJECTION MOLDING MACHINES**

Kanji Shirai, Kazuharu Maruyama, Hiroshi Ito, Hajime Kitamura, and Owaishi Yataka, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 26, 1989, Ser. No. 386,405

Claims priority, application Japan, Aug. 5, 1988, 63-195342  
Int. Cl.<sup>5</sup> B29C 45/10

U.S. Cl. 425—190

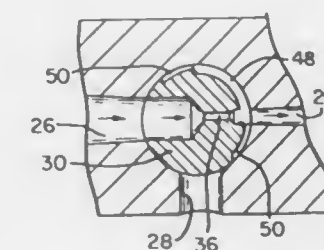
4 Claims

1. In a metal mold exchanging apparatus for use in an injection molding machine including a stationary die plate, a movable die plate, operating means for reciprocating said movable die plate toward and away from said stationary die plate for clamping a metal mold between said stationary and movable die plates and means for loading and unloading said metal mold on and from said injection molding machine, the improvement wherein said loading and unloading means comprises two metal mold supporting means which are vertically spaced with a predetermined distance enough to accommodate said metal mold, and elevator means for simultaneously raising or lowering said two metal mold supporting means for rendering a height of one of said metal mold supporting means to be equal to a height of a position at which said metal mold is exchanged.

**4,952,132**  
**REVERSE-PURGING PLASTIC INJECTION NOZZLE**  
Lynn Lundquist, Portland, Oreg., assignor to Nickerson Machinery Co., Accord, Mass.  
Continuation-in-part of Ser. No. 431,044, Sep. 30, 1982, abandoned. This application Aug. 7, 1984, Ser. No. 620,068  
Int. Cl.<sup>5</sup> B29B 17/02

U.S. Cl. 425—197

11 Claims



1. A purgeable plastic injection filter nozzle for trapping and eliminating contaminants from molten plastic material in a plastic injection molding apparatus, the nozzle comprising:  
(a) a nozzle body having an internal main channel there-through, said main channel having upstream and downstream ends, the nozzle body also having a purging hole

- intersecting the main channel and exiting the side of the nozzle body,
- (b) a rotatable housing mounted in the nozzle body at the intersection of the main channel and the purging hole,
- (c) a transverse bore through the rotatable housing having upstream and downstream end portions and an intermediate contaminants-blocking portion having a diameter smaller than the end portions and the main channel,
- (d) the housing being rotatable between a first position wherein the upstream and downstream end portions of the transverse bore are in communication with the upstream and downstream ends, respectively, of the main channel for flow of molten plastic material through the main channel, and a second position wherein the upstream end portion of the transverse bore is in communication with the purging hole and the downstream end portion of the transverse bore is in communication with the upstream end of the main channel, whereby contaminants collected in the upstream end portion of the transverse bore while the rotatable housing is in said first position are discharged through the purging hole by the pressure of molten plastic material in the upstream end of the main channel upon rotation of the rotatable housing to said second position,
- (e) a bleed channel disposed between the nozzle body and the rotatable housing operable to conduct molten plastic material under pressure from the upstream end of the main channel to the normally downstream end position of the transverse bore when the rotatable housing is in the said second position, thereby causing a reverse flow of molten plastic material through said transverse bore, and
- (f) a pressure relief channel between the nozzle body and the rotatable housing operable to communicate the upstream end of the main channel with the downstream end of the main channel or the purging hole when the rotatable housing is in a position intermediate said first and second positions, whereby to provide a continual outlet and pressure relief for molten plastic material under pressure in the upstream end of the main channel.

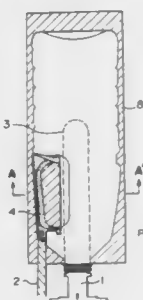
4,952,133

#### APPARATUS FOR FORMING A BLOWN BOTTLE WITH A HANDLE

Hideo Hasegawa, Toshio Takahashi, and Masayuki Miyagawa, all of Hiratsuka, Japan, assignors to Mitsubishi Plastics Industries Limited, Tokyo, Japan  
Division of Ser. No. 192,927, May 12, 1988, Pat. No. 4,909,978.  
This application Aug. 8, 1989, Ser. No. 390,899  
Int. Cl.<sup>3</sup> B29C 49/20, 49/64

U.S. Cl. 425—503

8 Claims



4. An apparatus forming a blown bottle having an integrally attached handle, which comprises:  
a blow mold,  
means for heating a thermoplastic parison to a temperature suitable for molding;  
means for separately holding said parison and said handle in a predetermined positional relationship;  
means for simultaneously moving said parison and said han-

dle via said means for separately holding said parison and said handle into said blow mold while maintaining said predetermined positional relationship; and  
means for blowing a pressurized fluid into said parison and for expanding said parison into contact with said handle to thereby form a blown bottle having said handle integrally attached thereto.

4,952,134

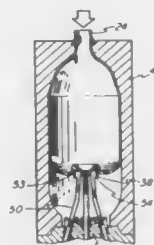
#### APPARATUS FOR FORMING A BLOW-MOLDED BOTTLE WITH BI-AXIALLY STRETCHED SKIRT

Harold D. Bartley, Springfield, and William R. Gaiser, Dayton, Ohio, both of Ohio, assignors to Broadway Companies, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 157,449, Feb. 19, 1988, Pat. No. 4,861,260. This application Mar. 17, 1989, Ser. No. 325,169  
Int. Cl.<sup>3</sup> B29C 49/12

U.S. Cl. 425—525

3 Claims



2. Apparatus for the formation on a blow-molded container of a skirt on the container bottom to provide for the free standing of the container in an upright position, said container being blown in a mold cavity from a preform having an annular skirt portion at an end thereof remote from the container top and surrounding an end of the preform, comprising:  
a mold having a mold cavity with a mold top for supporting said preform in depending relation in said cavity and a mold bottom,  
a plurality of articulated fingers extending through said mold bottom into the interior of said mold cavity and arranged in an annular array, said fingers terminated in outwardly-facing skirt-spreading surfaces proportioned to be received within said preform skirt portion prior to blowing of said preform, said surfaces having a length in the axial direction less than the axial length of said skirt portion with a lower free end of said skirt portion extending below said finger surfaces,  
a finger support mechanism external to said mold cavity supporting said fingers for axial and radial movement with respect to said mold cavity, said external means including cam means in engagement with said fingers,  
said finger support mechanism being responsive to movement of said preform in said mold cavity during blowing thereof for causing a defined radial movement of said fingers in unison concurrently with axial movement thereof, to stretch said skirt portion into an annular support skirt on the container bottom and providing for the folding radially inwardly of said skirt portion lower free end to form an inwardly extending ledge on the bottom of said skirt.

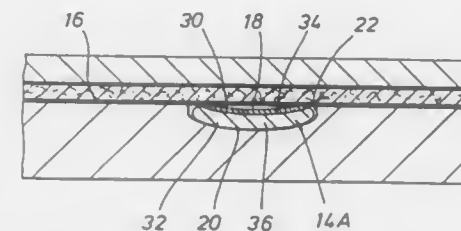
4,952,135

#### APPARATUS FOR REDUCTION OF MOLD CYCLE TIME

Paul I. Douglas, The Woodlands, Tex., assignor to Shell Oil Company, Houston, Tex.  
Division of Ser. No. 197,738, May 23, 1988, Pat. No. 4,880,583.  
This application Jun. 15, 1989, Ser. No. 366,712  
Int. Cl.<sup>3</sup> B29C 33/42, 45/30

U.S. Cl. 425—543

9 Claims



1. A molding apparatus for reducing the fabrication time of a molded article of manufacture, wherein a portion of said article is formed by a hardenable liquid, said molding apparatus comprising:

a mold having a surface, said mold surface having at least one channel with an associated channel surface and channel opening defined relative to said mold surface, said channel allowing accelerated flow of said hardenable liquid throughout said mold, and

heat recoverable material means previously having been deformed from a first configuration to a compressed second configuration, said material means when subjected to a suitable temperature of recovery capable of recovery to or towards said first configuration, said heat recoverable material means in said compressed second configuration being located within a portion of said channel.

4,952,136

#### BURNER ASSEMBLY FOR OIL FIRED FURNACES

Raymond L. Collins, Jr., Hudson, and Stephen A. Bryk, Moga-dore, both of Ohio, assignors to Control Systems Company, Stow, Ohio

Continuation of Ser. No. 49,804, May 12, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 263,712  
Int. Cl.<sup>3</sup> F23M 9/00

U.S. Cl. 431—183

31 Claims

1. A burner assembly for the combustion of liquid fuels in furnaces and the like comprising:

fuel gun means carrying an atomizer tip providing a plurality of small passageways open directly to said furnace interior through which a mixture of combustible fuel and an atomizing medium is injected directly into the interior of said furnace;

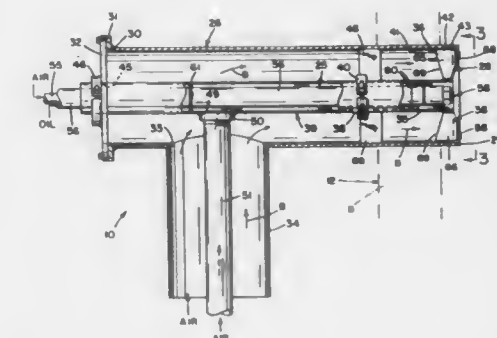
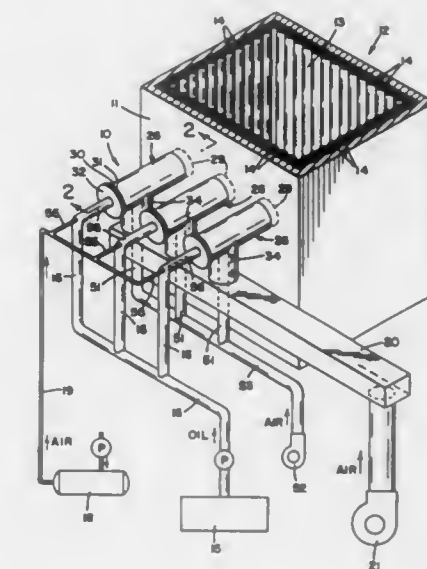
housing means supplying a first flow of air into said furnace to encompass said injected fuel mixture therein having an end open directly to said furnace interior and encompassing said atomizer tip,

said housing means being attachable to said furnace, so that said combustible fuel mixture is delivered directly to the interior of said furnace for combustion;

holding tube means carrying said fuel gun means and carried within said housing means for supplying a second flow of air unrestricted, directly into said furnace interior separate from said first flow of air; and

swirler means having a plurality of overlapping blades, carried by said holding tube, foreclosing direct axial passage of the majority of said first flow of air therethrough, extending radially outwardly from said holding tube, terminating with a free outermost edge spaced a short distance from said housing means and providing a narrow axial space for the passage of a minor portion of said first

flow of air, each said blade having a leading edge and a trailing edge, said blades being arranged so that said trail-



ing edge of each said blade overlaps said leading edge of the adjacent blade.

4,952,137

#### FLARE GAS BURNER

Robert E. Schwartz, Roger K. Noble, and Michael R. Keller, all of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Continuation of Ser. No. 904,506, Sep. 8, 1986, abandoned. This application May 11, 1990, Ser. No. 522,169  
Int. Cl.<sup>3</sup> F23D 14/00

U.S. Cl. 431—202

6 Claims

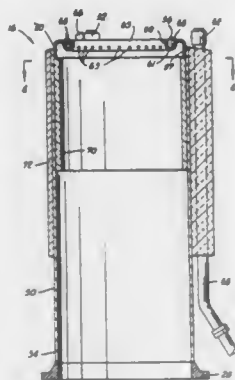
1. A flame impingement and heat shielded flare gas burner comprising:

a tubular member having a discharge end and an inlet end; an external protective covering formed of a refractory material attached over the external wall of at least the discharge end portion of said tubular member, said external covering including at least one longitudinal channel formed therein;

pilot flame burner conduit means having a protective covering of refractory material attached thereto disposed in said channel whereby said conduit means are shielded and an



aerodynamically improved external surface is provided on said tubular member; and



pilot flame burner means positioned adjacent the discharge end of said tubular member attached to said conduit means.

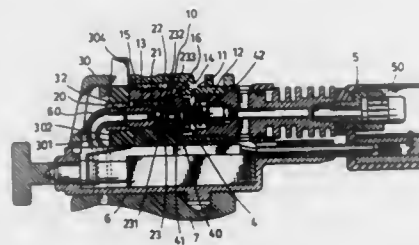
4,952,138

## STRUCTURE OF HANDY TORCH

Alex Ho, No. 17, Yung An Street, Hsin Tien City, Taiwan  
Filed Jan. 8, 1990, Ser. No. 461,908  
Int. Cl.<sup>5</sup> F23Q 7/12

U.S. Cl. 431—255

2 Claims



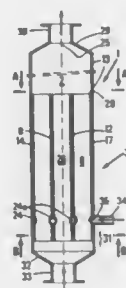
1. A handy torch comprising an ignition device, a combustion device, a fuel tank, and a main control device, wherein said main control device includes a valve device comprising a chamber having a positioning hole, a bolt hole, an orifice tube between said chamber and said bolt hole, a sliding hole above said bolt hole and communicating with said chamber; a screw rod being inserted in said bolt hole and having a toothed knob portion, and a through-hole communicating with said fuel tank via a gas pipe; a washer assembly pushed by said screw rod to permit the communication of said orifice tube with said gas pipe through said through-hole; a valve plug assembly comprised of a cushion and a valve disc and being constantly pressed by a spring to block up said orifice tube; a valve rod inserted in said sliding hole, said valve rod having its one end stopped against said valve plug assembly and its other end disposed in parallel with said screw rod; a regulator device comprising a thumb portion and a ring portion, said ring portion having a toothed boring bore connected with said toothed knob portion of said screw rod, a circular bevel recess on its side face cooperating with said valve rod, said circular bevel recess being turned to force said valve rod to axially move forward or backward so as to push said cushion and said valve disc to move apart from or block up said orifice tube to further regulate the gas flow rate coming from said fuel tank.

4,952,139  
GAS FEED DEVICE COMPRISING TUBES WITH  
NARROWED ZONES

Emmanuel Goldenberg, Poissy, France, assignor to Institut Français du Pétrole, Rueil Malmaison, France  
Continuation of Ser. No. 137,106, Dec. 23, 1987, abandoned.  
This application Jan. 9, 1990, Ser. No. 463,016  
Claims priority, application France, Dec. 23, 1987, 86 18032  
Int. Cl.<sup>5</sup> F23D 15/02

U.S. Cl. 431—353

11 Claims



1. A device for conveying separately at least two gases to a mixing zone, said device including several tubes, means for supplying said tubes with one of the gases and further including means for holding said tubes in position with respect to each other, said means holding the tubes together jointly to cause an exterior wall of each of said tubes to have a line contact along a length of an exterior wall of another tube and define empty intertube gaps therebetween, at least some of said tubes having narrowed zones each being placed substantially at the same level so as to form a network of passages outside of the tubes for distributing the other gas to at least some of the intertube gaps.

4,952,140

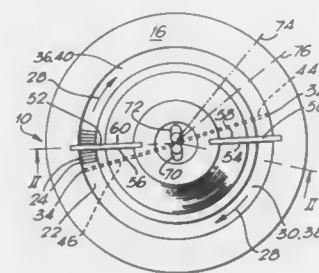
## TREATING FLUID MATTER

Christopher E. Dodson, Reading, England, assignor to Mortimer Technology Holdings Limited, England  
Filed Mar. 23, 1988, Ser. No. 172,247  
Claims priority, application United Kingdom, Mar. 23, 1987, 8706852

Int. Cl.<sup>5</sup> F26B 3/10

U.S. Cl. 34—10

20 Claims



1. A method of treating fluid matter, comprising moving a bed of particulate material in a band continuously along an annular path by passing fluid media having both circumferential and vertical components through said bed along said path, said fluid media comprising fluid and fluid matter to be treated which pass through said bed along alternately disposed first and second portions of said annular path, such that the particulate material is treated as it passes through said first portions in which fluid is passed through the bed and the fluid matter is treated in said second portions as it passes through the particulate material.

late material which has been treated during its passage through said first portions.

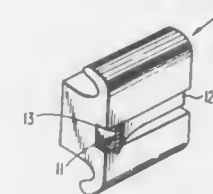
4,952,141

## HIGH VISIBILITY ORTHODONTIC ARCH WIRE SLOT

Arthur L. Wool, P.O. Box 6499, Wyomissing, Pa. 19610  
Filed Mar. 22, 1988, Ser. No. 171,781  
Int. Cl.<sup>5</sup> A61C 3/00

U.S. Cl. 433—8

3 Claims



1. An orthodontic bracket comprising a bracket body adapted to be bonded to a tooth surface, a slot provided in a face of the bracket body to receive an arch wire, and means provided in the slot to provide high contrast and visibility of the slot for alignment purposes, wherein said means is a strip having a color on one surface which is in high contrast to the bracket body and adhesive on another surface for removably securing the strip in the slot.

4,952,142

## METHOD OF BONDING ORTHODONTIC BRACKETS

James Nicholson, 128 S. 28th Ave., Hattiesburg, Miss. 39401  
Continuation-in-part of Ser. No. 691,101, Jan. 14, 1985, Pat. No. 4,749,352, which is a continuation-in-part of Ser. No. 632,931, Jul. 20, 1984, abandoned. This application May 27, 1988, Ser. No. 199,755

The portion of the term of this patent subsequent to Jun. 7, 2005, has been disclaimed.  
Int. Cl.<sup>5</sup> A61C 3/00

U.S. Cl. 433—9

9 Claims



1. A method for bonding orthodontic brackets to teeth comprising the steps of:  
cleaning the surface of the tooth in the area to which the bracket is to be applied;  
etching the surface of the tooth and drying the etched area where the bracket is to be placed;  
applying a photopolymerizable liquid bonding mixture to the etched area of the tooth;  
applying a photopolymerizable bonding agent composite to the base of the bracket wherein the composite is sufficiently viscous in an uncured state to retain the bracket in position on the tooth when the bracket is applied thereto;  
applying the base of the bracket to the etched area of the tooth by applying sufficient pressure to the bracket to expel composition therefrom;  
insuring proper positioning of the bracket;  
applying sufficient pressure to the bracket to insure the base is securely seated against the tooth and to expel any remaining excess composition or air from the tooth bracket

interface to insure intimate contact at the tooth bracket interface;  
directing a primarily visible light source from the bracket side of the tooth to the interface between the tooth and the base of the bracket to cure the bonding agent and securely fix the bracket to the tooth in a period of less than twenty seconds.

4,952,143

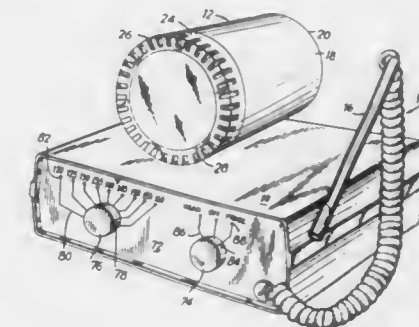
## DENTAL BLEACHING INSTRUMENT

William J. Becker, 3 Twin Brooks Rd., New Milford, Conn. 06776, and Kenneth S. Magid, 3 Finch La., Bedford, N.Y. 10506

Filed May 17, 1988, Ser. No. 195,086  
Int. Cl.<sup>5</sup> A61C 3/00

U.S. Cl. 433—32

9 Claims



1. A dental bleaching instrument comprising  
(a) a heat generating means capable of directing heat onto at least one tooth surface for activating bleaching means thereto;  
(b) electrical power means for controlling the temperature of said heat generating means; and  
(c) temperature sensing means electrically connected to said electrical power means; said temperature sensing means including means for positioning proximal to the tooth to be bleached and yet distanced from said heat generating means for sensing the temperature of the heat generated by said heat generating means substantially close to the tooth surface after said heat has passed from said heat generating means to said tooth surface and for providing a signal means responsive to said sensed temperature.

4,952,144

## APPARATUS FOR IMPROVING QUALITY OF METAL OR CERAMIC POWDERS PRODUCED

Bernard Hansz, Vert le Petit, and Michel Houdayer, Paris, both of France, assignors to Commissariat à l'Energie Atomique, Paris, France

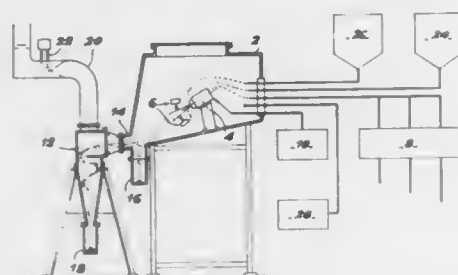
Filed Feb. 2, 1989, Ser. No. 305,559  
Claims priority, application France, Feb. 4, 1988, 88 01296  
Int. Cl.<sup>5</sup> B22F 9/08

U.S. Cl. 425—10

8 Claims

1. An apparatus for forming powder comprising:  
means for generating a plasma including a plasma torch and means for delivering a gas to said torch;  
a source of material in the form of powder particles;  
projecting means coupled to said plasma generating means and said source of material for passing said material through said plasma to melt said powder particles and then projecting a stream of said plasma and said material via an outlet;  
means for containing said projected stream;  
a source of liquid coolant;  
means located within said containing means and coupled to said source of liquid coolant for diffusing a spray of said liquid coolant, said spray diffusing means being positioned

to direct said cooling spray into a space through which said projected stream travels, whereby said projected stream is quenched by said cooling spray; and



means for controlling the flow rates of said powder particles and said gas passing into said projecting means.

4,952,145

# APPARATUS FOR THE HEAT TREATMENT AND/OR DRYING OF A WEB OF MATERIAL PASSING CONTINUOUSLY THROUGH

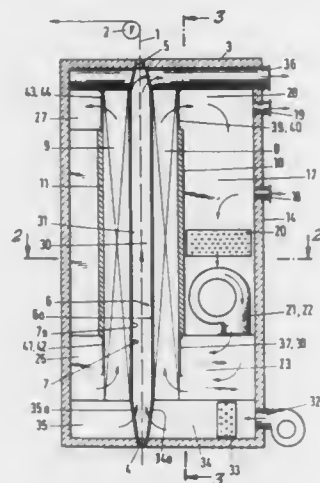
Kurt v. Kwiatkowski, Bonn; Erich Gorissen, and Udo Unger, both of Leichlingen, Fed. Rep. of Germany, assignors to Vits Maschinenbau GmbH, Langensfeld, Fed. Rep. of Germany  
Filed Apr. 6, 1989, Ser. No. 334,635

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811620

Int. Cl.<sup>5</sup> F27B 9/28

U.S. Cl. 432—59

17 Claims



1. An apparatus for the heat treatment or drying of a web of material (1), comprising guiding and transporting means (2) for the web of material (1) for moving the web in one direction, infrared radiators (6,7) disposed on at least one side of the web of material (1) at a distance therefrom and extending over the width of the web of material and in the longitudinal direction and comprising at least one radiating plate, means forming ducts (8,9) arranged on a rear side of the at least one radiating plate (6a, 7a) for receiving a heating medium flowing there-through to heat the at least one plate, wherein the means forming the ducts (8, 9) comprises a plurality of elongated hot-air ducts extending closely disposed parallel to one another and extending in the direction of movement of the web of material (1) and control means (37-34), for controlling at least one of flow rate and temperature of hot air in each hot air duct (8, 9).

4,952,146

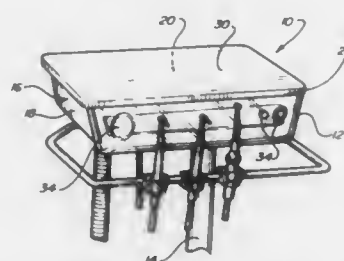
## DENTAL CONTROL UNIT

Susan Doty, 7901 Dearhill Dr., Clarkston, Mich. 48016  
Filed Mar. 2, 1989, Ser. No. 317,758

Int. Cl.<sup>5</sup> A61G 1/14

U.S. Cl. 433—77

7 Claims



1. In combination a shield assembly and a dental cart, said dental cart having a housing with a plurality of side walls and an open top, a lid, means for pivotally mounting said lid to one of said side walls so that said lid is movable between an open position and a closed position, wherein in said closed position said lid overlies and covers the open top of said housing while in said open position said lid uncovers the open top of said housing and enables access into the interior of the housing, said housing having at least one control member on one of said side walls, said shield assembly comprising:

a panel, said panel being constructed of a transparent material, means securing said panel to said lid so that, when said lid is in said closed position, said panel overlies and covers said at least one control member and wherein said panel is dimensioned so that, when said lid is in said open position, said panel is spaced from said control member to thereby provide access to said control member, wherein said panel has a smooth and easily wipeable outer surface.

4,952,147

## LIME SLUDGE KILN

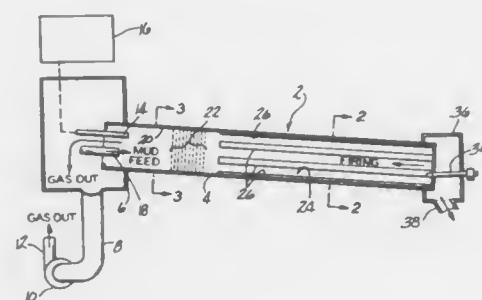
John W. Boyden, II, Webster, and James F. Schooling, Jr., Houston, both of Tex., assignors to Champion International Corporation, Stamford, Conn.

Filed Oct. 1, 1986, Ser. No. 914,482

Int. Cl.<sup>5</sup> F27B 7/00

U.S. Cl. 432—103

2 Claims



1. A lime sludge calcining kiln comprising:  
(a) a rotatable shell having an inlet end and a discharge end in a downstream direction from said inlet end;  
(b) a castable refractory layer forming the innermost surface in said shell, said refractory layer extending from said inlet end to said discharge end;  
(c) a chain system in said shell downstream of said inlet end, said chain system comprising a plurality of chains suspended from one end only in said shell, said chains being

operable to form a heat retaining curtain in said shell, to intimately contact lime sludge passing through said shell to transfer heat to the lime sludge, and to comminute chunks of the lime sludge;

- (d) a plurality of tumbling ribs formed from precast bricks of a castable refractory material and disposed in said shell between said chain system and said discharge end of the shell, said tumbling ribs being circumferentially spaced apart from each other and elongated axially of said shell, and said tumbling ribs projecting inwardly beyond said castable refractory layer to form means for tumbling the lime sludge as the latter passes through said shell as the shell rotates;
- (e) a single burner at said discharge end of said shell, said burner being operable to project an elongated flame over said tumbling ribs and toward said chain system;
- (f) an oxygen measuring probe disposed in said inlet end of said shell upstream of said chain system and operable to measure the percent of oxygen present in said inlet end of said shell;
- (g) an emission stack operably connected to said inlet end of said shell for venting combustion gases from said shell to the atmosphere; and
- (h) a variable speed fan positioned between said inlet end of said shell and said emission stack to draw combustion gases from said shell into said emission stack, and also to provide a controlled drawing of oxygen into said shell at said discharge end thereof, based on the measurement of oxygen by said oxygen measuring probe.

4,952,148

## FINE FILLING METHOD AND FINE FILLER FOR DENTAL PURPOSES

Yoshinori Kuboki, Sapporo, Japan, assignor to Kabushiki Kaisha Sanga, Japan

Continuation of Ser. No. 183,616, Apr. 19, 1988, abandoned.

This application Sep. 14, 1989, Ser. No. 407,711

Claims priority, application Japan, Jun. 30, 1987, 62-161367

Int. Cl.<sup>5</sup> A61K 5/01

U.S. Cl. 433—228.1

13 Claims

1. A dental fine filling method for protecting or restoring pits, fissures or minute decalcified surface lesions in the enamel of a tooth which method comprises rubbing on the surface of the tooth a fine filler containing finely divided particles of hydroxy-apatite or tetracalcium phosphate, whereby said hydroxy-apatite or tetracalcium phosphate is bonded to the tooth and recalcification of the tooth is promoted due to the presence of saliva.

4,952,149

## PROCESS AND APPARATUS FOR TAKING A MEDICAL CAST

Francois Duret, Le Grand Lemp, and Jean-Louis Blouin, Vienne, both of France, assignors to Hennson International, Vienne, France

Filed Feb. 12, 1988, Ser. No. 155,325

Claims priority, application France, Feb. 13, 1987, 87 02339

Int. Cl.<sup>5</sup> A61C 5/00

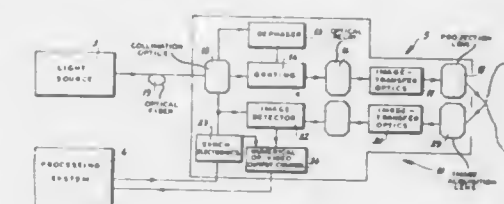
U.S. Cl. 433—215

32 Claims

1. A process for taking medical impressions, the process comprising the steps of:

- projecting onto part of a body whose impression is to be obtained a grid with a sinusoidal profile, and repeating this projection at least twice for a very brief period of time so as to generate projected grids with a phase shift between two successive projections of a value equal to  $2\pi/n$  where  $n$  is the number of projections;
- reading an image projected optically for each projection with an optical system having a detector plane defined by a detector;
- memorizing each of said images;
- correlating the memorized images while observing variations in intensity resulting from variations of the phase

shift for each of a multiplicity of points of said part of said body; and



determining by calculation the depth of each of said points in relation to a reference plane, each of said points having two other dimensions defined in relation to the optical system used in the detector plane.

4,952,150

## ROOT POST

Harry Schiwiora, and Manfred Stuenkel, both of Pforzheim, Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,434

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741847

Int. Cl.<sup>5</sup> A61C 5/08

U.S. Cl. 433—220

8 Claims



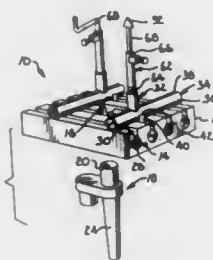
1. A root post with a fixation part made of metallic material selected from a group consisting of precious-metal and base-metal alloys that can be inserted into the curved root canal of the root of a tooth, wherein the metallic material of the fixation part has mechanical properties that permit local adaption and fitting of the fixation part to a curved root canal, said fixation part in the longitudinal direction, has typically differing ductilities or flexural rigidities, the fixation part having a portion adapted for lying in the root tip and having the greatest ductility or the least flexural rigidity and said fixation part having a portion adapted for lying toward the oral end of the fixation part which is increasingly less ductile or increasingly more flexurally rigid.



4,952,151  
**METHOD AND APPARATUS FOR PREPARING REPLACEMENT DENTAL STRUCTURES**  
 Edwin R. Metcalfe, 503 Armstrong, Apartment 1, Kansas City, Kans. 66101

Filed Sep. 6, 1988, Ser. No. 240,713  
 Int. Cl.<sup>5</sup> A61C 5/10  
 U.S. Cl. 433—223

23 Claims



1. An apparatus for use in preparing dental crowns utilizing a model of a patient's dental anatomy comprising:
  - a base having means for defining a plurality of first linear pathways extending transversely of said base;
  - a plurality of upright supports having means for coupling said supports with said base and accommodating rectilinear movement of said supports over said pathway;
  - at least one arm extending from each of said supports and being coupled with the latter for vertical movement relative thereto;
  - means for holding said arm in a selected vertical position; and
  - cap means disposed on said arms for engagement with a tooth on said model which is opposite the position of the tooth to be crowned.
17. A preformed, imitation dental crown for use in preparing a porcelain crown having a base and a plurality of layers of porcelain thereon for a dental structure comprising:
  - a first preformed layer formed in a manner to surround said dental structure;
  - a second preformed layer formed in a manner to surround said first preformed layer and being separable from the latter;
  - a third preformed layer formed in a manner to surround said second preformed layer and being separable from the latter; and
  - a fourth preformed layer formed in a manner to surround said third preformed layer and being separable from the latter,
 whereby said layers cooperate to form an imitation dental crown on said dental structure with separable layers corresponding to the layers of said porcelain crown, said layers being separable one at a time to accommodate stepwise buildup of the layers of porcelain which comprise said porcelain crown.

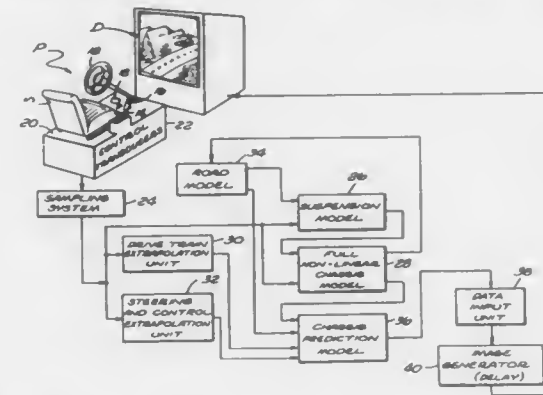
4,952,152  
**REAL TIME VEHICLE SIMULATION SYSTEM**  
 John A. Briggs; Roderic C. Deyo, both of Salt Lake City, Utah, and Edward J. Haug, Coralville, Iowa, assignors to Evans & Sutherland Computer Corp., Salt Lake City, Utah  
 Filed Jun. 19, 1989, Ser. No. 368,000  
 Int. Cl.<sup>5</sup> G09B 9/00

U.S. Cl. 434—69

11 Claims

1. A system for use by a driver to simulate a vehicle in real time, comprising:
  - control means actuable to provide control signals representative of control actions for the simulated vehicle;
  - vehicle simulation model means coupled to receive said control signals and responsive to provide representative

positional signals indicative of the positional state of the simulated vehicle;  
 vehicle prediction model means coupled to receive said control signals and said representative positional signals, said vehicle prediction model means for predicting from said representative positional signals and said control



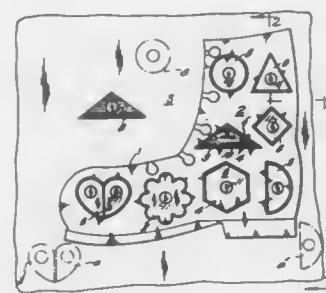
signals to provide predicted positional signals indicative of a future positional state of the simulated vehicle; and  
 reaction display means responsive to said predicted positional signals for manifesting a positional state of said vehicle to said driver, wherein the future predicted positional signals substantially compensate for the inherent response time delay of said display means.

4,952,153  
**SURFACE MOUNTED MAGNETIC TOY**  
 Norma J. McAllister, 82302 N. Bear Creek Rd., Creswell, Oreg. 97426

Filed May 1, 1989, Ser. No. 345,693  
 Int. Cl.<sup>5</sup> G09B 1/06

U.S. Cl. 434—259

7 Claims

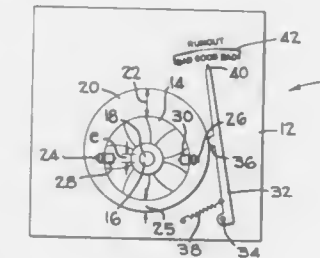


1. A toy for use on a metallic surface and comprising,
  - a three-dimensional base having a frontal surface, interior walls defining plural recesses, a magnetic backing sheet partially defining said recesses and enabling base attachment to said metallic surface,
  - pieces one can for placement within one of said recesses, said pieces having magnetic properties for alternative retention in said recesses by said magnetic backing sheet or on the metallic surface, and
  - said pieces and said recesses having corresponding shapes requiring selection of one of said pieces for placement in one of said recesses.

4,952,154  
**DEMONSTRATOR DEVICE FOR TIRE ECCENTRICITIES**  
 Carl W. Pruitt, Rte. 4, Box 124A, Conway, Ark. 72032-9410, and Niall F. Davidson, 14701 Cecil Dr., Little Rock, Ark. 72212-1972

Filed Sep. 14, 1989, Ser. No. 407,484  
 Int. Cl.<sup>5</sup> G09B 250/000  
 U.S. Cl. 434—376

5 Claims



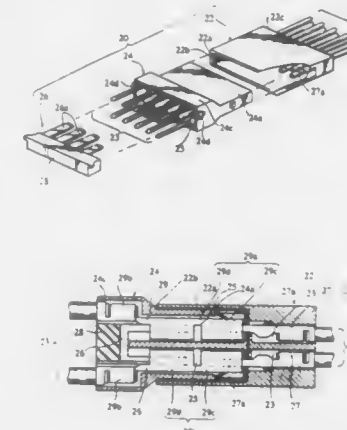
1. A device for demonstrating the benefits of match-mounting a tire on a rim comprising:
  - a generally circular member representative of a rim having a geometric center;
  - means supporting said circular member for rotation about a center different from said geometric center;
  - an annular member representative of a tire of being positioned and retained on said circular member at a plurality of angular positions relative thereto; capable said annular member having a varying radial dimension representative of tire eccentricity; and indicator means operatively associated with said annular member for indicating tire runout.

4,952,155  
**ELECTRICAL CONNECTOR**  
 Katsutoshi Kuzano; Shigeo Ishizuka, and Naoki Ito, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan  
 Filed Apr. 27, 1989, Ser. No. 343,668  
 Claims priority, application Japan, Apr. 28, 1988, 63-56763[U]

Int. Cl.<sup>5</sup> H01R 29/00

U.S. Cl. 439—49

5 Claims



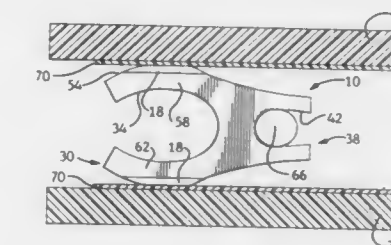
1. An electrical connector, comprising:
  - (a) a connector housing having a plurality of terminal compartments arranged in upper and lower rows each having the same number of compartments;
  - (b) a plurality of terminals, each of the terminals being accommodated in each terminal compartment of the connector housing, wherein each of the terminals has both

- longitudinal ends and has an upper side and a lower side opposite to the upper side, which comprises:
  - (i) an electrical wire connecting section to which an electrical wire is connected, the electrical wire connecting section being formed at one end of the terminal on the upper side thereof; and
  - (ii) a tab receptacle section provided at the other end of the electrical terminal on the lower side thereof, the tab receptacle section comprising a first tab receptacle to which a mating terminal in a mating connector housing is to be fitted and a second tab receptacle adjacent to the first tab receptacle, which are aligned toward the longitudinal direction of the terminal, wherein the terminals are accommodated in the terminal compartments in such a manner that the tab receptacle sections of the terminals in the upper and lower compartments are face to face through a partition between the upper and lower compartments; and
- (c) a joint terminal to be fitted to the second tab receptacle of selected terminals for achieving electrical connection between selected terminals, the joint terminal comprising at least two tab portions to be fitted to the second tab receptacle of the terminals, a base portion connected between the tab portions, and an insulating holder mounted on the base portion of the joint terminal, wherein the insulating holder of the joint terminal is placed between the electrical wire connecting sections of the terminals accommodated in the upper and lower rows of the terminal compartments when the joint terminal is properly fitted to the terminals in the connector housing.

4,952,156  
**CONNECTOR AND A METHOD OF MANUFACTURING A PLURALITY OF CONTACT TERMINALS MOUNTED ON A CONTINUOUS CARRIER STRIP**  
 George R. Schmedding, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.  
 Filed Feb. 23, 1989, Ser. No. 314,620  
 Int. Cl.<sup>5</sup> H01R 9/09

U.S. Cl. 439—66

12 Claims

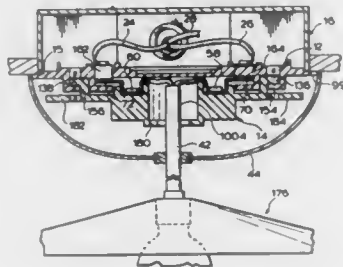


1. An electrical connector comprising an electrically insulating, flexible carrier strip,
  - a plurality of adjacent contact terminals, each of said contact terminals being crimped on said carrier in a spaced apart fashion to form a continuous, uninterrupted contact strip, the contact terminals having electrically insulating material provided on side surfaces thereof, the electrically insulating material providing the spacing between the respective contact terminals, whereby the contact terminals may be bent as required.

4,952,157

## LIGHT FIXTURE CONNECTOR

Trudy M. Hudson, and Henry R. Hudson, both of 10819 63 Avenue, Edmonton, Alberta T6H 1P9, Canada  
Continuation-in-part of Ser. No. 336,695, Apr. 12, 1989. This application Nov. 22, 1989, Ser. No. 440,505  
Claims priority, application Canada, Nov. 25, 1988, 584099  
Int. Cl.<sup>3</sup> H01R 13/625, 4/66  
U.S. Cl. 439—92 5 Claims



1. An electrical coupling device for detachably securing a fixture to an electrical junction box, said coupling device comprising male and female interconnecting components, said fixture being connected to said female component when said male component is secured to said female component by rotating one component relative to the other, said female component having a plurality of catches, said male component having a plurality of studs for insertion and engagement with said catches by way of rotational movement of said studs into said catches, said catches and studs being spaced apart in circular arrays at a first radius, the improvement comprising:

- (1) three spaced-apart female resilient clips of electrically conductive metal, said clips being in a circular pattern at a second radius on said female component;
- (2) said male component having a pair of live contacts and a ground contact, said contacts being spaced-apart and comprising electrically conductive metal, and said contacts being located in a circular pattern at said second radius;
- (3) said male contacts being in register with said clips when said studs are in register with said catches, whereby rotation of said male component to engage said studs with said catches simultaneously engages said contacts with said clips to depress said clips slightly to ensure electrical contact; and
- (4) a ground strap forming an electrical connection between said fixture and said ground contact for electrically grounding said fixture.

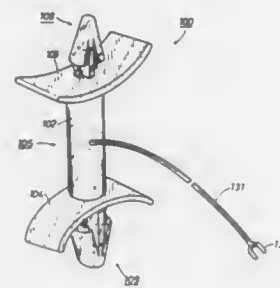
4,952,158

## CONDUCTIVE BOARD SPACER

Asaharu Nakagawa, Yokkaichi, Japan, assignor to Kitagawa Industries Co., Ltd., Aichi, Japan  
Filed Nov. 20, 1989, Ser. No. 438,007  
Claims priority, application Japan, Dec. 12, 1988, 63-314462  
Int. Cl.<sup>3</sup> H01R 4/66 5 Claims

1. A conductive board spacer comprising:  
a supporting member for supporting upper and lower boards a certain distance apart; and  
upper and lower locking members extending from both ends

of the supporting member for detachably engaging holes in the upper and lower boards:



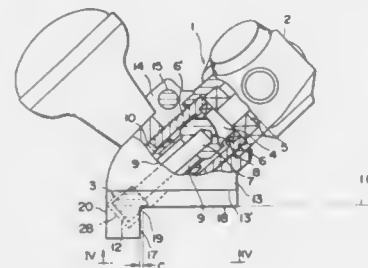
the conductive board spacer being molded as one piece from synthetic resin with carbon fiber mixed therein.

4,952,159

## CHAMFERING MACHINE

Kenji Fukuda, and Yasuo Kazama, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 290,366, Dec. 29, 1988, abandoned.  
This application Nov. 6, 1989, Ser. No. 432,353  
Claims priority, application Japan, Jan. 14, 1988, 63-3640[U]  
Int. Cl.<sup>3</sup> B23C 3/12 8 Claims

U.S. Cl. 409—138



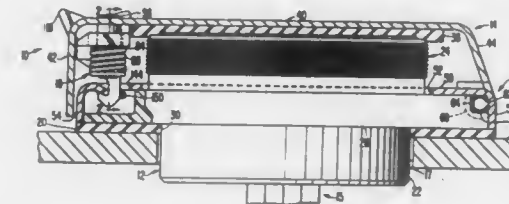
1. A machine for chamfering the corner of an object comprising:  
a machine body having an underside;  
a rotating cutter arranged in the machine body, which projects out from said underside, tilted with respect thereto;  
a slide guide, rotatably supported with respect to the underside for swinging movement about a first axis located remote from said rotating cutter, having a side adjacent to the machine body and an opposite other side, and having guide planes perpendicular to each other and slidable along the corner of the object and also having a space between the planes into which at least a part of the cutting blades of the rotating cutter is projected;  
a slot formed in said machine body; and  
a stopper screw screwed into said slide guide through the slot;  
said slide guide further comprising a stepped through-hole, located at said first axis and having a small diameter portion on the side adjacent to the machine body and a large diameter portion on the other side, and a stud projected into said through-hole for rotating said machine body and slide guide relative to each other when said screw is loosened, said stud having a screw portion fixed on said machine body side, a barrel portion arranged in the small-diameter portion of said through-hole, a length of said barrel portion being longer than the depth of said small diameter portion, and a head portion received in said large-diameter portion of said stepped through-hole.

4,952,160

## MARINE HULL INLET FOR ELECTRICAL CABLES

Charles A. Olson, Milford, Conn., assignor to Habbell Incorporated, Orange, Conn.  
Filed Apr. 17, 1989, Ser. No. 338,677  
Int. Cl.<sup>3</sup> H01R 13/44 19 Claims

U.S. Cl. 439—142



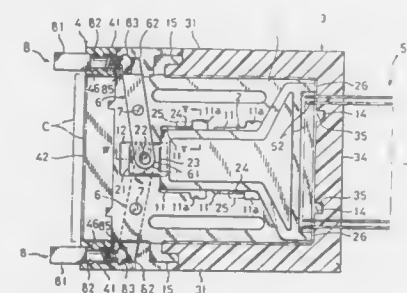
1. A marine hull inlet assembly adapted to be mounted to the hull of a boat for providing a connection point on the boat for shore-based electrical cables, the combination comprising:  
receptacle means for containing therein connection points for shore-based electrical cables; and  
means, coupled to said receptacle means, for selectively sealing said receptacle, said means for selectively sealing comprising  
a first member adapted to be coupled to the hull of the boat,  
a second member coupled to said first member, said second member having a sealing element coupled thereto,  
a latching assembly for releasably coupling said first and second members between latched and unlatched positions, said latching assembly having a latching element movably coupled to said second member for releasably coupling said first and second members together and means for biasing said first and second members together when in said latched position, and  
a biasing element positioned adjacent said latching element when in said latched position, said biasing element applying pressure to said latching element when said latching element moves between said latched and unlatched positions,  
whereby said sealing element engages said receptacle means to maintain a watertight seal therebetween, when said first and second members are in said latched position.

4,952,161

## CARD CONNECTOR

Yasuhiro Komatsu, Osaka, Japan, assignor to Hosiden Electronics Co., Ltd., Yao, Japan  
Filed Jan. 27, 1989, Ser. No. 302,329  
Claims priority, application Japan, Mar. 3, 1988, 63-28842[U]  
Int. Cl.<sup>3</sup> H01R 13/62 3 Claims

U.S. Cl. 439—155



1. A card connector comprising:  
a metallic plate-like frame having an upper side and a lower side;  
a frame member having a front end, a rear end, and provided

at the front end thereof with a card insertion and removal opening;  
a connector body disposed at the rear end of said frame member;  
a slider longitudinally slidably attached to said frame;  
a spring for biasing said slider normally in the advancing direction thereof;  
a shaft swingingly attached to said frame; and an actuator, said frame being fitted in said frame member;  
said frame member having card guide grooves;  
said slider having at least one engagement pawl adapted to be opposite to the tip of a card when the card is inserted into said card guide grooves; and  
said shaft having one end swingingly connected to said slider and the other end opposite to said actuator.

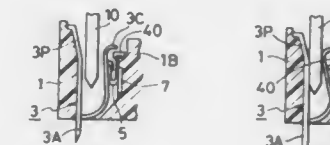
4,952,162

## ZERO INSERTION FORCE CONNECTOR ACTUATED BY A STORED SHAPE MEMBER

Toshiya Hikami, Koji Yoshida, Yuichi Obara, and Kenichi Fuae, all of Hiratsuka, Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 94,756, Sep. 10, 1987, Pat. No. 4,846,729. This application Jan. 17, 1989, Ser. No. 297,327  
Claims priority, application Japan, Sep. 10, 1986, 61-21143; Sep. 10, 1986, 61-211491; Sep. 17, 1986, 61-219060; Jan. 30, 1987, 62-18652; Feb. 26, 1987, 62-43947; Feb. 26, 1987, 62-43948; Mar. 3, 1987, 62-46766; Mar. 9, 1987, 62-52173; May 15, 1987, 62-71774; Jun. 4, 1987, 62-138936; Jun. 18, 1987, 62-150228

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.  
Int. Cl.<sup>3</sup> H01R 13/629 3 Claims

U.S. Cl. 439—161



1. An electronic connector comprising:  
a plurality of resilient contacts associated in one or more rows in a connector housing, and  
a shape memory spring having an initial shape and provided to extend longitudinally with respect to each row in the connector housing for driving the contacts, the shape memory spring, one end of which is associated with an operation transmitting member of electrically insulating material and which spring drives said contacts through said operation transmitting member, transmitting a recovery force to the contacts generated when the shape memory spring reaches a transformation temperature or higher while recovering a stored shape and returning to the initial shape by the spring force of the contacts when the shape memory spring falls below its transformation temperature,



said shape memory spring being common to two or more of said contacts and having a length in the direction of alignment of said contacts, said contacts having (1) portions inserted through said operation transmitting member, (2) contact portions to contact an inserted contact, (3) a contact weak spring portion supported in a cantilever fashion at one end by said connector housing and so positioned to contact, at the time of inserting of the inserted contact, the inserted contact with a contacting portion thereof, and (4) a contact strong spring portion provided integrally with another end of the contact weak spring portion, said contact strong spring portion being engaged with said operation transmitting member, the member causing a contacting portion of the strong spring portion to contact the inserted contact when said spring transmits the recovery force.

4,952,163

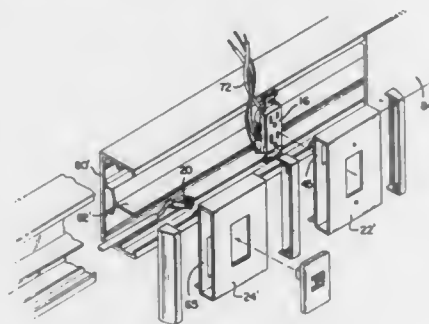
## OUTLET FOR SURFACE ACCESSIBLE WIRING

Frank P. Dola; Steven Feldman; John H. Lautherbach, all of Hudson, and William G. Mengelson, Clearwater, all of Fla., assignors to AMP Incorporated, Harrisburg, Pa.  
Continuation of Ser. No. 249,539, Sep. 26, 1988, abandoned. This application Dec. 12, 1989, Ser. No. 449,462

Int. Cl.<sup>5</sup> H01R 25/16

U.S. Cl. 439—211

27 Claims



1. An outlet cover for use with an electrical channel comprising:  
a one-piece enclosure member having a front wall and an rear wall joined by bottom and top walls, the enclosure member being open on both ends, the front wall having an opening spaced from the ends of the front wall, the rear wall having a wire access slot comprising a cutout, the rear wall having mounting means located on the exterior of the rear wall protruding beyond the wire access slot, the mounting means comprising means for attaching the enclosure member to the electrical channel with the rear wall in front of the electrical channel and comprising a part of the one-piece enclosure member, whereby an outlet can be positioned in the opening in the front wall with conductors extending through the cutout in the rear wall into the electrical channel.

4,952,164

## PLUG-IN OUTLET UNIT FOR MODULAR FURNITURE POWER DISTRIBUTION SYSTEM

Ronald M. Weber, Lebanon; Jay L. French, Middletown; John L. Himes, Jr., Hummelstown; and James H. Wise, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 16, 1989, Ser. No. 394,781

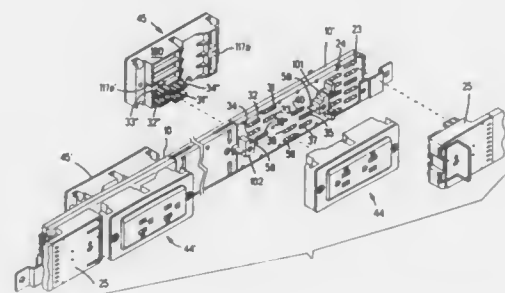
Int. Cl.<sup>5</sup> H01R 25/16, 23/02

U.S. Cl. 439—215

16 Claims

12. An outlet system for plug-in connection of an outlet unit at an outlet site to a selected pair of conductors in a power distribution system containing multiple pairs of conductors,

each of said conductor pairs being separately energized for powering an electrical load connected therebetween;  
said power distribution system including an insulating housing for enclosing said pairs of conductors, said housing having a longitudinal center line at said outlet site;  
said conductor pairs being disposed symmetrically within said housing with respect to said longitudinal center line of said housing, both conductors of each pair being on a common side of said longitudinal center line, one pair being above said longitudinal center line and one pair being below thereof;  
said housing having a front face with a plurality of openings therein, one each of said openings being aligned with and providing access to one each of said conductors of said pairs of conductors;  
said openings being arranged in first and second groups, the pattern of openings of said first group and the pattern of openings of said second group being symmetrical with respect to one another and to said longitudinal center line and on opposite sides thereof;  
said outlet unit comprising:  
an insulating housing having a front face and a rear face and including a horizontal median corresponding to said longitudinal center line of said insulating housing of said system upon assembly thereto at said outlet site thereof;



first and second contacts contained within said outlet unit housing and accessible through said front face of said outlet unit housing for receiving mating contacts of a connector attached to an electrical load to be connected across a selected one of said pairs of conductors of said distribution system;  
third and fourth contacts projecting from said rear face of said outlet unit housing for engaging the conductors of a selected one of said pairs of conductors within said distribution system housing when said outlet unit is assembled to said distribution system housing;  
said third and fourth contacts being positioned on said rear face of said housing vertically displaced from said horizontal median of said outlet unit and on a common side thereof, so as to enter the ones of said openings of said first group aligned with the conductors of a first one of said pairs when said outlet unit is assembled to said distribution system housing in a first angular orientation and, upon turning said outlet unit housing end to end for assembly of said outlet unit to said distribution system housing in a second opposed orientation, so as to enter the ones of said openings of said second group aligned with the conductors of a second one of said selected pairs; and  
means within said outlet unit housing for respectively connecting first and second contacts to said third and fourth contacts.

4,952,165

## ASSEMBLY FOR REMOTE HANDLING OF AN ELECTRICAL PLUG CONNECTOR

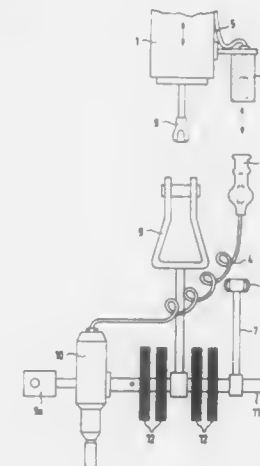
Klaus Blaseck, Ehlershausen, Fed. Rep. of Germany, assignor to Deutsche Gesellschaft Für Wiederaufarbeitung Von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany  
Filed May 2, 1989, Ser. No. 346,590

Claims priority, application Fed. Rep. of Germany, May 3, 1988, 3815033

Int. Cl.<sup>5</sup> H01R 13/60

U.S. Cl. 439—247

9 Claims



1. An assembly for remote handling of an electrical plug connector, comprising:  
a hook-type bottom block attachable to a crane;  
first plug member fixed to said bottom block and electrically connectable to a power supply;  
second plug member electrically connected to a load;  
means for retaining said second plug member in a position for coupling with and decoupling from said first plug member by mere movement of said bottom block through operation of said crane; whereby when said first and second plug members are vertically aligned coupling and decoupling can be achieved by only lowering and raising said bottom block;  
said retaining means also selectively retaining said second plug member in either a locking position or a withdrawing position, said second plug member being movable between said locking and said withdrawing position by horizontal shifting of said bottom block; whereby said second plug member may be removed from said retaining means when in said withdrawing position but not when in said locking position.

4,952,166

## SCREW-FASTENING TYPE MULTI-CONNECTOR

Yasuhiro Nagasaka, Toyota; Yuji Hatagishi, Shizuoka, and Naoki Manabe, Kosal, all of Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 367,593

Claims priority, application Japan, Jun. 21, 1988, 63-81124[U]

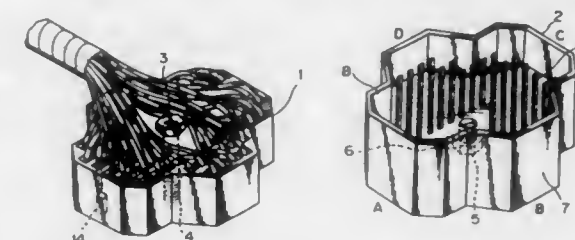
Int. Cl.<sup>5</sup> H01R 13/621

U.S. Cl. 439—364

2 Claims

2. A screw-fastening type multi-connector comprising:  
a first connector housing having a bolt rotatably mounted along a longitudinal centerline of said first connector housing and a plurality of female terminals lying longitudinally parallel to said centerline bolt, said female terminals being arranged in rows perpendicular to and surrounding said centerline bolt such that said rows are located at progressively increasing distances from said centerline bolt and the number of female terminals per row decreases as the distance of the said row from said centerline bolt increases, said centerline bolt having a threaded

shank portion along a protruding end of said centerline bolt; and  
a second connector housing having a female screw member mounted along a longitudinal centerline of said second connector housing and a plurality of male terminals being arranged identically to said plurality of said female terminals



nals of said first connector housing, said centerline screw member being adapted for receiving said threaded shank portion of said centerline bolt and said male terminals adapted to connect with said female terminals, said first and second connector housings being connectable and held together via said centerline bolt and centerline screw member.

4,952,167

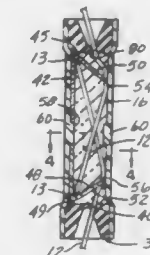
## ELECTRICAL CONNECTOR

Chris Hertelendy, 3364 Newburg Rd., Louisville, Ky. 40218  
Filed Feb. 29, 1988, Ser. No. 162,177

Int. Cl.<sup>5</sup> H01R 4/24

U.S. Cl. 439—395

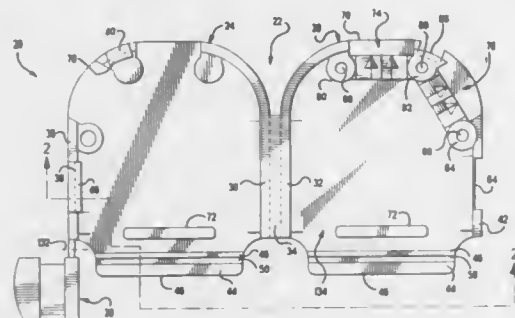
12 Claims



1. An electrical connector for establishing a splice connection between electrical leads having an insulating jacket and a conductor core, comprising:  
a hollow, elongated connector body of an electrically insulating material having a series of walls defining a cavity therein and having an opening at each end;  
a C-clip of a strip of resilient, conductive material disposed in said cavity, said C-clip having a pair of legs, each extending from a respective end of an elongated main portion lying against the inside of one of said walls of said connector body and extending lengthwise within said cavity, each of said legs inclined towards each other and away from a respective adjacent opening of said connector body to form a crotch at either end of said C-clip, each leg having a terminal edge lying at a point closely adjacent the inside of another of said walls of said connector body opposite the inside of said first mentioned wall, a contact recess formed into each terminal edge comprised of a slot having closely spaced opposite edges adapted to slice through said insulating jacket and contact said conductor core as an electrical lead is pulled back after insertion into said connector body to be seated within a contact recess, whereby an electrical lead may be inserted at either end to engage and deflect a respective C-clip leg and move past said terminal edge and thereby be gripped against pullout

by the edges of said contact recess sliced into said insulating jacket.

**4,952,168**  
**COVER ASSEMBLY**  
Stephen B. Schieferly, and Steven M. Weldon, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Filed Jan. 11, 1990, Ser. No. 463,045  
Int. Cl.<sup>5</sup> H01R 13/58  
U.S. Cl. 439—467 7 Claims



1. A cover assembly for receiving a connector terminated to conductors of a cable, the cover assembly comprising:  
latchable cover means having an exterior contoured surface, a cavity for receiving the connector and first and second cable exits from the cavity to the exterior contoured surface, each cable exit adapted to receive either the cable or a cable exit plug; and  
a cable exit plug, said cable exit plug having first and second surfaces, said cable exit plug adapted to be received in the first cable exit with said first surface facing outwardly from said cavity, said first surface contoured to conform to the exterior surface of the cover means surrounding the first cable exit, said cable exit plug adapted to be received in said second cable exit with said second surface facing outwardly from said cavity, said second surface contoured to conform to the exterior surface of the cover means surrounding the second cable exit, whereby when a connector terminated to conductors of a cable is received in the cover means and the cable is passed out through a selected one of the cable exits, the cable exit plug is adapted to be positioned in the other cable exit.

**4,952,169**  
**SEALED ELECTRICAL CONNECTOR EMPLOYING INSULATION DISPLACEMENT TERMINALS**  
Earl J. Hayes, Sr., Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.  
Filed Jun. 27, 1989, Ser. No. 372,067  
Int. Cl.<sup>5</sup> H01R 4/24  
U.S. Cl. 439—403 9 Claims

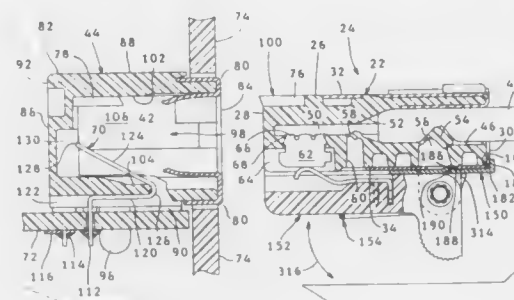
1. An electrical terminal for establishing an insulation displacement electrical connection to two wires and for establishing a disconnectable electrical interconnection between both wires and a mating terminal, the electrical terminal comprising:  
a stamped and formed member including:  
a first slotted plate contact in which the slot faces in a first direction;  
a second slotted plate contact and a second additional slotted plate contact in which slots in the second and second additional slotted plate contacts face in a second direction opposite from the first direction, the second slotted plate contact and the second additional slotted plate contact being intermediate the ends of the terminal in a box section with the second slotted plate contact and the second additional slotted plate contact being located in mutually

parallel planes each extending transversely relative to a plane containing the first slotted plate contact;



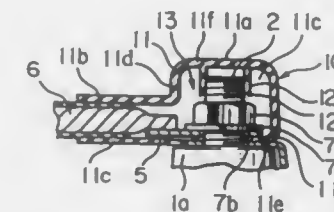
a disconnectable contact section on the end of the terminal opposite from the first slotted plate contact, the second slotted plate contact being between the first slotted plate contact and the disconnectable contact section.

**4,952,170**  
**SHUNTED CONNECTOR ASSEMBLY AND INTERDIGITATED SHUNT ASSEMBLY THEREFOR**  
James Pritulsky, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.  
Filed Feb. 23, 1989, Ser. No. 314,621  
Int. Cl.<sup>5</sup> H01R 31/08  
U.S. Cl. 439—509 14 Claims



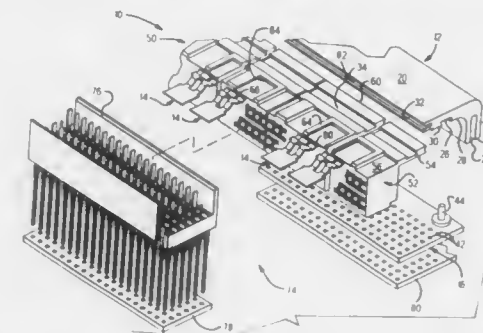
1. A shunt connector assembly, comprising:  
an electrical connector having a housing with spaced contacts therein, said contacts having exposed contact portions along a side wall of said housing;  
contact support means pivotally mounted to said housing, said contact support means having at least one shunt contact secured therein, said shunt contact having means for engaging a surface of the exposed contact portions of two of said spaced contacts, said contact support means moveable through a limited arc from a first position with said shunt contact engaging said two spaced contacts, to a second position where said shunt contact is electrically isolated from said two spaced contacts; and  
bias means engaging said contact support means for biasing said contact support means toward said first position.

**4,952,171**  
**TERMINAL COVER**  
Takeshi Sugiama, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jan. 4, 1989, Ser. No. 293,388  
Claims priority, application Japan, Jan. 20, 1988, 63-6585[U]  
Int. Cl.<sup>5</sup> H01R 13/52  
U.S. Cl. 439—522 3 Claims



1. A terminal cover for covering an electrical terminal assembly including a terminal bolt and a terminal conductor electrically connected to the terminal bolt, comprising:  
a cover main body defining an interior space for containing therein said electrical terminal assembly; and  
a tubular member extending from said cover main body into said interior space and having an inner diameter substantially equal to the outer diameter of a threaded portion of said terminal bolt so as to be slidable over said threaded portion;  
said terminal cover, when in use, being maintained in position relative to said electrical terminal assembly by frictional engagement of said tubular member with respect to said terminal bolt;  
said cover main body defining said interior space comprising a substantially cylindrical wall open at one end for receiving therethrough said terminal assembly and closed at the other end by a top wall and a tube for receiving therein said terminal conductor, said tubular member extending from said top wall, and said open end of said cylindrical wall simply elastically touching an upper surface of a base of said electrical terminal assembly to thereby avoid the need for providing separate retaining elements for engaging said open end of said cover main body;  
wherein said tubular member has an inwardly bevelled tip for guiding said terminal bolt during insertion in said tubular member.

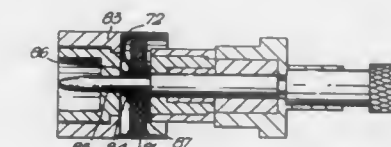
**4,952,172**  
**ELECTRICAL CONNECTOR STIFFENER DEVICE**  
Lee A. Barkus, Millersburg, and David B. Sinisi, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Filed Jul. 14, 1989, Ser. No. 380,067  
Int. Cl.<sup>5</sup> H01R 13/639  
U.S. Cl. 439—532 7 Claims



1. An improvement to an elongated, rigid stiffener device for

being attached to and used to prevent bowing of electrical connectors of the type having conductive leads extending outwardly therefrom for electrical engagement with printed circuit cards, said improvement comprising:  
an outwardly open channel extending along one free edge of the stiffener device;  
means to removably attach said stiffener device to both at least one electrical connector and a printed circuit card electrically engaged to said at least one electrical connector; and  
locking clips having plate means at one end for being attached to a connector and a spring section at another end for being frictionally received in said channel to prevent relative movement between the connector and the stiffener device.

**4,952,173**  
**CIRCUIT PROTECTION DEVICE**  
Guillaume M. G. Peronnet, Mountain View, Calif., and Jean-Christian C. Delamotte, Henonville, France, assignors to Raychem Pontolse, France  
Continuation of Ser. No. 300,768, Jan. 23, 1989, abandoned, which is a continuation of Ser. No. 92,808, Sep. 3, 1987, abandoned. This application Oct. 2, 1989, Ser. No. 418,773  
Claims priority, application United Kingdom, Sep. 5, 1986, 8621429  
Int. Cl.<sup>5</sup> H01R 17/18  
U.S. Cl. 439—583 15 Claims



1. A circuit protection device, which is suitable for incorporation within a connector for a coaxial cable that includes a screen, to protect an electrical circuit associated with the connector from a voltage transient, the device comprising an annulus, having a radially outwardly directed surface and a side surface, that is arranged to be held within the connector and has a central aperture for receiving a central conductive element of the connector, the annulus:

(a) being formed from an electrically insulating material; and  
(b) having a central electrode in the region of the aperture for electrical connection with the central conductive element of the connector; and  
(c) also having a peripheral electrode for electrical connection with a portion of the connector that is connected to, or arranged to be connected to, the coaxial cable screen;  
wherein a portion of the central electrode overlaps a portion of the peripheral electrode, the area of overlap being not more than 25% of the area of the side surface of the annulus, and the overlapping portion of the electrodes being separated from each other by a layer of a semiconductor foldback switching material that will electrically isolate the two electrodes in normal operation but will become electrically conductive when subjected to a voltage transient and thereby form a short circuit between the central and peripheral electrodes, but revert to its initial, high resistance, state when the current or voltage is reduced below a predetermined holding value.

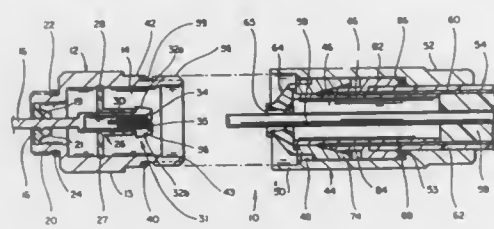


**4,952,174**  
**COAXIAL CABLE CONNECTOR**  
 Gayle A. Sacht, Mountain View, and John S. Mattis, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 351,738, May 15, 1989, abandoned.  
 This application Feb. 22, 1990, Ser. No. 485,798  
 Int. Cl.<sup>3</sup> H01R 13/36

U.S. Cl. 439—584

35 Claims



1. A coaxial cable connector for installation and use with a prepared end of a coaxial cable including a center conductor, dielectric core disposed radially about the center conductor, an outer metal conductor jacket concentric with the center conductor and spaced therefrom by the dielectric core, and optionally an outer protective sheathing surrounding the outer metal jacket, the connector comprising:

a body and a nut threadably tightenable to the body, the body including center pin chuck means for engaging the center conductor of the cable when the nut is tightened to the body,

the nut defining an interior space including a mandrel assembly freely rotatable within the interior space until the nut is tightened to the body,

the mandrel assembly including:

insulator cone means for guiding the center conductor and having clamping means for engaging and clamping the center pin chuck means as the nut is tightened to the body,

mandrel means slideably mounted under said outer metal jacket in a space provided after removal of a portion of said dielectric core incident to preparation of said end,

ferrule means slidably mounted over said outer jacket means and including collet fingers disposed over a portion of said mandrel means,

said mandrel means including ferrule collet closure means for closing the collet fingers of said ferrule means to cause them to compress said outer metal jacket against said portion of said mandrel means as said nut is tightened to said body during installation of said connector to said prepared cable end.

**4,952,175**  
**KEY RETENTION SYSTEM**  
 Mark H. Waters, Harrisburg, and Robert N. Whiteman, Jr., Middletown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 90,294, Aug. 31, 1987, Pat. No. 4,832,624. This application Feb. 28, 1989, Ser. No. 317,306  
 The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.  
 Int. Cl.<sup>3</sup> H01R 13/64

U.S. Cl. 439—681

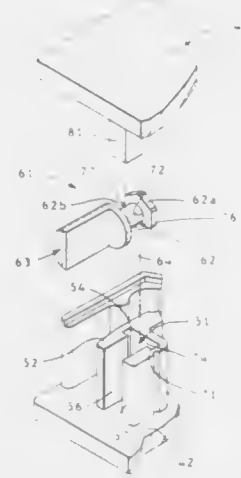
16 Claims

1. An electrical connector comprising:

a housing having a slot extending thereto, said slot having a wider first region and a narrower second region, said narrower second region opening onto the wider first region and an exterior surface of the housing; and

a key having a body section adapted to be received within said slot and a keying section adapted to extend out of said slot beyond said exterior surface of said housing, said body section including a wider first body portion adapted to be received in the wider first region of said slot and a nar-

rower second body portion adapted to be received in the narrower second region of said slot, at least one of said regions of said slot having opposed side walls which are



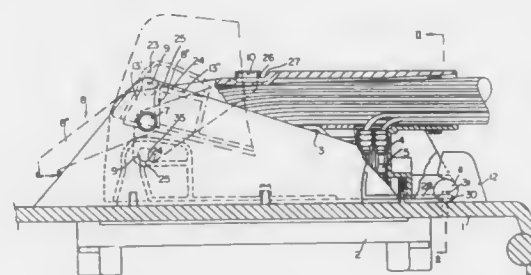
adapted to cooperate with the body portion of said key which is adapted to be received within said at least one region of said slot to prevent rotation of said key when said key is received within said slot.

**4,952,176**  
**ELECTRICAL COUPLING DEVICE**  
 Josef Kolner, Pommelsbrunn, and Helmut Steinhardt, Nuremberg, both of Fed. Rep. of Germany, assignors to TRW Dant & Rietz GmbH, Nuremberg, Fed. Rep. of Germany  
 PCT No. PCT/DE88/00475, § 371 Date Apr. 25, 1989, § 102(e)  
 Date Apr. 25, 1989, PCT Pub. No. WO89/02167, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 1, 1988, Ser. No. 353,644  
 Claims priority, application Fed. Rep. of Germany, Aug. 28, 1987, 3728733; Feb. 25, 1988, 3805897  
 Int. Cl.<sup>3</sup> H01R 13/629, 13/645

U.S. Cl. 439—681

8 Claims



1. Electrical coupling device with a blade strip rigidly arranged on an equipment frame, a casing adapted for suspension in bearings of the frame by means of two pivot pins formed equiaxially next to each other with a spacing in between; with a sleeve strip accommodated in such casing, and with levers for swinging the casing against the equipment frame, such levers being linked on the equipment frame and adapted to engage link grooves of the casing with link blocks, as well as with coding means arranged on the equipment frame and casing, characterized in that the sleeve strip casing (3) has slottings (30) prepared next to each other between the pivot pins (11) on contours designed to be broken out, such slottings having open ends in front in the plugging direction; and that the equipment frame (1) supports at least one rigidly and exchangeably inserted coding pin (31) between the pivot pin

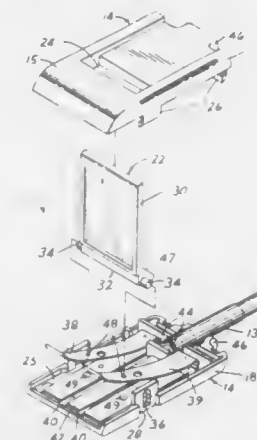
bearings (12), such coding pin being adapted to engage slottings (30) of the sleeve strip casing (3).

**4,952,177**  
**CLAMP FOR ELECTRO-SURGICAL DISPERSIVE ELECTRODE**  
 Gerald E. Drake, St. Paul, Minn.; Robert L. Goodlad, Star Prairie, Wis., and William K. Welmer, St. Louis Park, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 19, 1989, Ser. No. 452,720  
 Int. Cl.<sup>3</sup> H01R 9/07

U.S. Cl. 439—828

11 Claims



1. A connector for releasably engaging a plurality of projecting tabs separated from one another and having opposed electrically conductive and insulated surfaces, comprising:

(a) a housing having an exterior surface, an interior surface being formed within said housing for receiving the projecting tabs, and a slot in said housing disposed between said exterior surface and said interior surface,

(b) a plurality of receiving means separated from one another and located on said interior surface, each receiving means for electrically contacting an electrically conductive surface on a corresponding projecting tab, and

(c) bridging means disposed on said interior surface for electrically contacting said plurality of receiving means whenever a plurality of electrically conductive surfaces of the projecting tabs contacting said corresponding plurality of receiving means also contact said bridging means.

**4,952,178**  
**FEMALE ELECTRICAL CONNECTOR**  
 Dieter Beer, Moesbach/Feldkahl, Fed. Rep. of Germany, assignor to C-A-Weidmüller GmbH & Co., Detmold, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 380,469  
 Claims priority, application European Pat. Off., Aug. 5, 1988, 88-112-759.1

Int. Cl.<sup>3</sup> H01R 11/22

U.S. Cl. 439—856

7 Claims

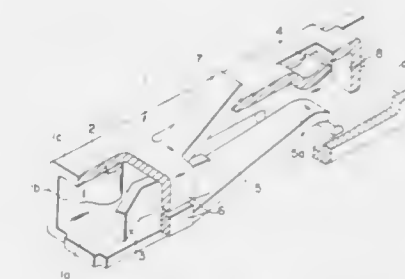
1. A female electrical connector adapted to receive a male electrical connector, comprising:

(a) a hollow generally tubular connector body member (1) formed from a sheet metal blank, said body member having a generally rectangular cross-section and including pairs of opposed side walls (1a, 1c: 1b, 1d); and

(b) first (2, 3) and second (4, 5) pairs of opposed contact tongues formed from said body side walls, respectively each of said contact tongues extending at one end inwardly within said body member, the contact tongues of said first pair being formed from said first pair of side walls, respectively, and the contact tongues of said second

pair being formed from said second pair of side walls, respectively, whereby said pairs of contact tongues are displaced 90° relative to each other;

(c) said first and second pairs of contact tongues extending longitudinally in opposite directions from opposite ends of



said body member, said pairs of contact tongues being arranged to define longitudinally spaced effective contact surfaces relative to said body member, respectively;

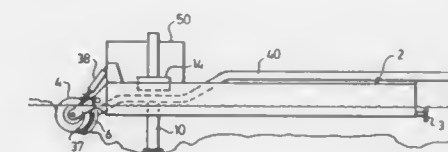
(d) one contact tongue of each pair being relatively short and rigid, and the other contact tongue of that pair being relatively long and flexible.

**4,952,179**  
**SALT MUSHROOM CUTTING APPARATUS**  
 Shlomo Klein, Herzlia, and Adi Zucker, Zahala, both of Israel, assignors to Contract Line Ltd. and Edoni Ltd., both of Tel-Aviv, Israel

Filed Apr. 24, 1989, Ser. No. 341,871  
 Claims priority, application Israel, May 24, 1988, 86481  
 Int. Cl.<sup>3</sup> B63H 19/08; E02F 3/88

U.S. Cl. 440—36

19 Claims



1. Salt mushroom cutting apparatus for removing salt mushrooms from a water body, comprising: a vessel floatable on the water body; propelling means for propelling the vessel forwardly through the water body; and a helical cutter carried by the vessel forwardly of its bow and extending transversely thereof for pulverizing the salt bodies as the vessel is propelled forwardly through the water body; said helical cutter being wider than said vessel and including a drum rotated about its longitudinal axis, and a helical array of cutter tips projecting from the outer surface of the drum.

**4,952,180**  
**COWLING FOR OUTBOARD MOTOR**  
 Eifu Watanabe, and Gaku Hashimoto, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 20, 1989, Ser. No. 340,857  
 Claims priority, application Japan, Apr. 21, 1988, 63-98750; Feb. 10, 1989, 1-31645

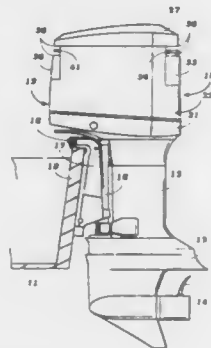
Int. Cl.<sup>3</sup> B63H 21/26

U.S. Cl. 440—77

9 Claims

1. A protective cowling and air inlet device for the power head of an outboard motor comprised of an internal combustion engine having an induction system, a first cowling assembly surrounding said engine and defining a generally closed cavity in which said engine is placed, air inlet means formed in

an upper rear surface of said first cowling assembly for supplying atmospheric air to said cavity for said engine induction system, a second cowling assembly affixed relative to said first cowling assembly and providing a closure extending across said air inlet means but spaced therefrom to define a flow path



for air to said air inlet means, a forwardly facing air inlet opening formed in a front surface of said protective cowling for inducting air from the atmosphere for flow to said air inlet means, and a rearwardly facing air inlet opening formed in a rear surface of said protective cowling for inducting air from the atmosphere for flow to said air inlet means.

4,952,181

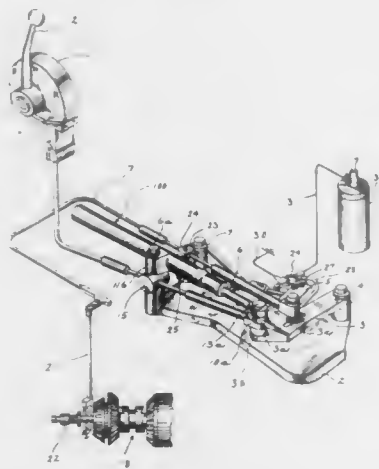
## MARINE SHIFT CABLE ASSEMBLY WITH SPRING GUIDE

David C. Entringer, Wautoma, and Terrel C. Warhurst, Oshkosh, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Sep. 8, 1988, Ser. No. 242,023  
Int. Cl.<sup>3</sup> B63H 5/13

U.S. Cl. 440—86

10 Claims



1. A shift cable assembly for a marine drive having a clutch and gear assembly, comprising:  
remote control means for selectively positioning said clutch and gear assembly into forward, neutral and reverse gears;  
cable means interconnecting said remote control means and said clutch and gear assembly;  
biasing means coupled to said cable means and biased to a loaded condition by movement of said remote control means from neutral to forward, and also biased to a loaded condition by movement of said remote control means from neutral to reverse, such that said bias minimizes chatter of said clutch and gear assembly upon shifting into gear, and such that said bias aids shifting out of gear and

minimizes slow shifting out of gear and returns said remote control means to neutral, all with minimum backlash of said cable means, wherein said biasing means comprises at least one spring, and wherein a loading force is applied to all of said springs during the shift from neutral to forward, without any unloading force applied to any of said springs during said shift from neutral to forward, and wherein a loading force is applied to all of said springs during the shift from neutral to reverse, without any unloading force applied to any of said springs during said shift from neutral to reverse.

4,952,182

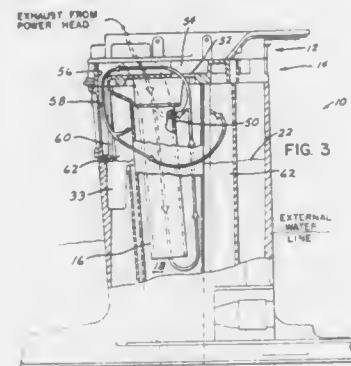
## NOISE ATTENUATING EXHAUST RELIEF SYSTEM FOR AN OUTBOARD MOTOR

Mark D. Curtis, Oshkosh, and James L. Wagner, Neenah, both of Wis., assignors to Brunswick Corp., Skokie, Ill.

Filed Jul. 7, 1989, Ser. No. 377,024  
Int. Cl.<sup>3</sup> B63H 21/26

U.S. Cl. 440—89

14 Claims



1. An exhaust idle relief system for an outboard motor, said outboard motor including a power head having an exhaust discharge opening; a drive housing mounted below and supporting said power head; an exhaust chamber provided within said drive housing; an exhaust flow path downstream of and in communication with said exhaust chamber and providing a submerged exhaust outlet; and a primary exhaust discharge passage in communication with said power head exhaust discharge opening and having an outlet for discharging exhaust into said exhaust chamber; wherein said exhaust flow path is filled with water under certain operating conditions to prevent exhaust flow therethrough; said exhaust relief system comprising:

- a first passage having an inlet at the upper end of said exhaust chamber and in communication with said chamber for receiving exhaust therefrom when water in said exhaust flow path prevents exhaust flow therethrough;
- an expansion chamber surrounding said exhaust chamber and having an inlet for receiving exhaust from said first passage;
- a second passage having an inlet for receiving exhaust from said expansion chamber; and
- an outlet for discharging exhaust to atmosphere from said second passage.

4,952,183

## COLLAPSIBLE PROPULSION AIDS FOR SWIMMER'S FEET

Yoram Gil, 1411 S. Beverly Glen Rd., Los Angeles, Calif. 90024  
Filed Jul. 17, 1989, Ser. No. 380,389

Int. Cl.<sup>3</sup> A63B 31/00

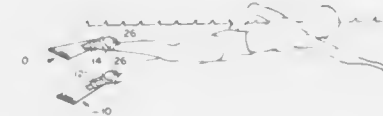
U.S. Cl. 441—64

7 Claims

1. In a flipper type swimming propulsion aid assembly for

attachment to each foot of a swimmer to increase the swimmer's effective foot area during flutter kick swimming procedures:

- (a) a collapsible frame comprised of side frame members of substantially equal length adapted for pivotal joinder to a heel plate at the heel end of said frame and a foldable cross frame member pivotably joined at its ends to the toe ends of the side frame member with the result that in its operative form said frame is of generally isosceles triangular configuration;
- (b) a web component for said frame and comprised of a flexible material selected from the group consisting of fabric and sheet plastic materials said web component being of a configuration matching the operative form and size of said frame from its toe end to at least the mid-point of the side frame members, said web component including side means for receiving and maintaining the side frame members and including means at its toe end for maintain-



ing said web stretched over the toe ends of said frame members and for maintaining said foldable cross frame member in its fully extended orientation across the toe end of said frame;

- (c) a foot strap affixed to the side frame members and extending therebetween proximate the heel end of said web component, said foot strap being of a length in its opposite end portions extending from said side frame members sufficient to surround the forward portion of the swimmer's foot and connectively mate to affix said swimming aid assembly to the forward portion of the swimmer's foot; and
- (d) ankle straps each affixed to the heel plate of said frame and of a length in their opposite end portions sufficient to cross over the swimmer's foot, surround the rearward portion of the swimmer's foot, cross back around the swimmer's ankle and connectively mate to affix said swimming aid assembly to the heel portion of the swimmer's foot.

4,952,184

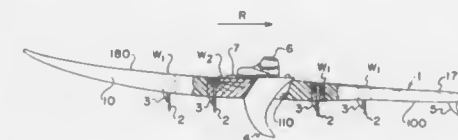
## CROSS-WATER SKI

Maria G. Graziano, 5325 Noyes Ave., Apt. 4, Charleston, W. Va. 25304

Filed Apr. 24, 1989, Ser. No. 341,914  
Int. Cl.<sup>3</sup> A63C 15/03

U.S. Cl. 441—77

21 Claims



1. A cross-water ski for walking on water, comprising:  
a buoyant member having an upper surface, a bottom surface, a front end, and a rear end;  
a flap rotatably secured to the bottom surface of said buoyant member, said flap adapted to rotate from a first position of low water resistance to a second position of higher water resistance;  
stopper means for preventing further rotation of said flap when said flap reaches said second position; and  
shoe connecting means positioned on the upper surface of said buoyant member for connection with a shoe being

worn by a user with a shoe having a forwardmost portion extending into two exterior side portions which in turn extend into a rear portion, said shoe connecting means including shoe locking means for releasably locking only the forwardmost portion of the shoe such that the two exterior side portions of the shoe are essentially free from attachment with said shoe connecting means and said shoe is detachable from said buoyant member upon a release of said locking means.

4,952,185

## SEPARATION OF COMPONENTS OF CATHODE RAY TUBES

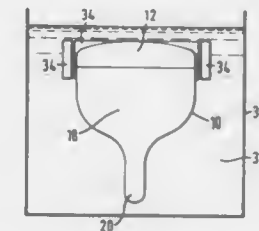
Robert A. Lee, Bridgend, Wales, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 14, 1986, Ser. No. 829,161  
Claims priority, application United Kingdom, Nov. 7, 1985, 8527488

U.S. Cl. 445—2

Int. Cl.<sup>3</sup> H01J 9/50

3 Claims



1. A method of separating a glass panel and a glass body of a cathode ray tube, said panel and said body being secured together at a junction by an adhesive comprising a frit and a binder susceptible to attack by nitric acid, said method comprising the steps of:

- at least partially immersing said cathode ray tube in a bath containing nitric acid such that at least said junction is immersed in said bath;
- ultrasonically exciting the nitric acid in said bath using at least one ultrasonic transducer; and
- relatively disposing said at least one transducer and said cathode ray tube in said bath to maximally excite said nitric acid in said bath in the region of said junction to promote attacking of said binder by said nitric acid and separation of said panel and said body.

4,952,186

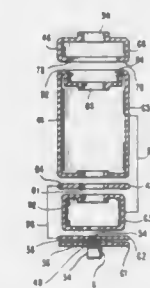
## METHOD OF MAKING A COLOR PICTURE TUBE ELECTRON GUN WITH REDUCED CONVERGENCE DRIFT

Loren L. Maninger, and Bruce G. Marks, both of Lancaster, Pa., assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Oct. 24, 1989, Ser. No. 427,275  
Int. Cl.<sup>3</sup> H01J 9/00

U.S. Cl. 445—36

1 Claim



1. In a method of making a color picture tube inline electron



gun, including the selection and assembly of a plurality of cathodes and a plurality of electrodes longitudinally spaced from said cathodes, the improvement comprising the additional steps of

determining the amount and direction of electron beam misconvergence at the tube screen caused by the thermal expansion of each individual electrode during warmup of said electron gun, wherein a first group of said electrodes cause misconvergence of the electron beams in a first direction, and a second group of said electrodes cause misconvergence in a second direction,

summing the individual contributions of the electrodes to electron beam misconvergence at the screen during electron gun warmup, wherein the net effect of thermal expansion of the entire electron gun is a misconvergence in the first direction,

forming at least one of the electrodes in said first group of electrodes from a material having a lower coefficient of thermal expansion than the coefficient of thermal expansion used in the first step of determining misconvergence caused by the thermal expansion of each individual electrode.

4,952,187

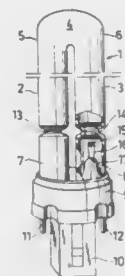
**METHOD FOR THE MANUFACTURE OF COMPACT LOW-PRESSURE MERCURY DISCHARGED LAMP**  
Björkman Åke, Karlskrona, Sweden, assignor to Lumalamp Aktiebolag, Sweden

Continuation of Ser. No. 196,865, May 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 865,045, May 19, 1986, abandoned. This application Aug. 7, 1989, Ser. No. 389,993  
Claims priority, application Sweden, May 23, 1985, 8502561

Int. Cl.<sup>5</sup> H01J 9/24

U.S. Cl. 445—22

10 Claims



1. A method of manufacturing a glass vessel for a compact low-pressure metal vapour discharge lamp, said lamp comprising at least two parallel straight glass tube sections each having a diameter, and an intermediate tube section, each of said straight glass tube sections having a first end and a second end, said intermediate tube section being positioned between said first ends of each of said parallel straight glass tube sections to form a discharge chamber between said first ends of said parallel straight glass tube sections, said lamp having a coating of fluorescent material on the inside surface of said parallel straight glass tube sections, said lamp further including two electrodes located in said discharge chamber with one of said electrodes adjacent to each of said second ends of said parallel straight glass tube sections, comprising the steps of forming constrictions close to each of said second ends of said parallel straight glass tube sections, said constrictions being formed adjacent each of said electrodes respectively, locating said constrictions in each of said parallel straight glass tube sections between said electrode and said first end of each of said parallel straight glass tube sections, thereby defining the length of said discharge chamber extending between said constrictions to be less than the length of said tube sections extending between said electrodes, providing no deformation in said parallel straight glass tube sections adjacent to said electrodes other than said constrictions, said step of forming said constrictions

being performed by the substeps of rotating a straight glass tube about its longitudinal axis at a predetermined speed, applying heat of a first predetermined temperature to selected zones of said straight glass tube at which said constrictions are to be formed, raising said first predetermined temperature of said straight glass tube in said zones to a second predetermined temperature, advancing constriction forming means into said heated zones of said rotating straight glass tube at a predetermined speed to thereby form said constrictions, forming said straight glass tube into said parallel straight tube sections and said intermediate tube section.

4,952,188

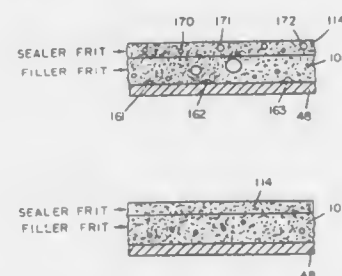
**METHOD FOR MAKING MASK SUPPORT STRUCTURE FOR A TENSION MASK COLOR CATHODE RAY TUBE**  
Siegfried M. Greiner, Crystal Lake, and Raymond G. Capek, Elmhurst, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 178,175, Apr. 6, 1988. This application Jul. 21, 1989, Ser. No. 383,784

Int. Cl.<sup>5</sup> C03C 27/02

U.S. Cl. 445—30

11 Claims



1. A method of making a mask support structure for a cathode ray tube, including the steps of: slowly rotating a quantity of solder glass paste in a container continuously over an extended period of time so that its viscosity is significantly below an original value, permitting the rotated solder glass paste to stand substantially still until it returns near its original viscosity value, dispensing the solder glass paste in a metallic mask support rail having a generally hollow cross-section, and connecting the rail to a CRT faceplate.

4,952,189

**SPINABLE DOLL**

Gordon A. Barlow, Highland Park, Ill., assignor to Gordon Barlow Design, Skokie, Ill.

Filed Dec. 26, 1989, Ser. No. 456,545

Int. Cl.<sup>5</sup> A63H 1/06, 3/46, 11/00

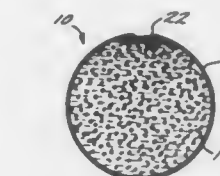
U.S. Cl. 446—241

9 Claims

1. A ballerina doll having a body, legs, feet, arms, hands and a head,  
a pushrod extending through the body and the head and mounted for reciprocal movement in and out of said body and head,  
means associated with said body and said pushrod to rotate said body relative to said pushrod as said pushrod is pushed into said body,  
means connecting each of said legs to said body and each of said feet to its leg to permit rotation of each leg relative to said body and each foot relative to its leg, and  
releasable detent means associated with said body, said legs

and said feet to permit each leg to be held in selected positions of rotation relative to said body and to permit

mixture of low density microspheres and a small amount of a compatible liquid, said small amount being effective to



provide cohesion and moldability to the filler medium and said deformable article exhibiting a low density.

4,952,191

**TUMBLING TOY**

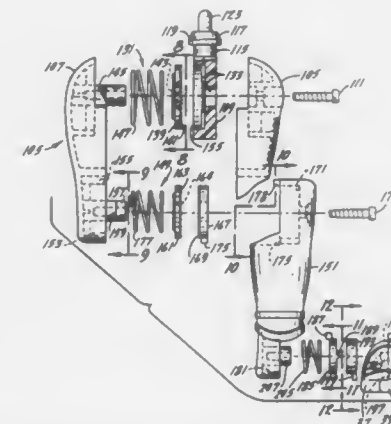
Gabriel A. Martinez, 11229 Columbia Pike, White Oak, Md. 20901

Filed Mar. 9, 1989, Ser. No. 321,189

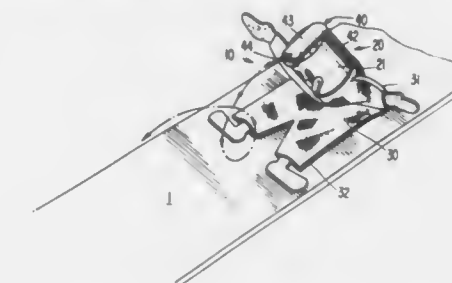
Int. Cl.<sup>5</sup> A63H 15/00

U.S. Cl. 446—324

19 Claims



each foot to be held in selected positions of rotation relative to its leg.



1. A tumbling toy comprising a substantially rigid housing forming an upper end portion of said toy, a ball disposed in the housing and a body portion being substantially non-rigid and extending therefrom, said toy including a layer of material bonded to a portion of the outer surface of said toy and having a coefficient of friction greater than that of said outer surface, said housing comprising means for permitting the ball to pass into the housing while restricting the ball from readily passing therethrough in the opposite direction.

4,952,190

**DEFORMABLE ARTICLE**

Howard R. Tarnoff, Easton, Pa., and Victor G. Relling, West Cornwall, Conn., assignors to Main Street Toy Company, Inc., West Simsbury, Conn.

Filed Jun. 14, 1989, Ser. No. 365,822

Int. Cl.<sup>5</sup> A63H 3/00; A63B 37/00

U.S. Cl. 446—267

13 Claims

1. A deformable article, comprising:  
a flexible bladder; and  
a cohesive and moldable filler medium substantially filling said flexible bladder, said filler medium comprising a

4,952,192

**MATERNITY SUPPORT UNDERGARMENT**

Frances S. Burke, 325 Sunset Dr., Athens, Ga. 30606

Filed Mar. 20, 1989, Ser. No. 325,442

Int. Cl.<sup>5</sup> A41C 1/00, 3/00

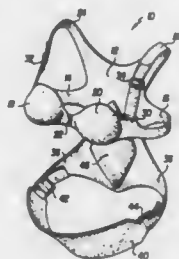
U.S. Cl. 450—15

12 Claims

1. A maternity support garment for supporting the lower

abdomen, breasts and lower back of a pregnant woman comprising:

- a back panel having two upper corners, two lower corners and an intermediate portion, said back panel further having two side edges extending between a respective upper and lower corner, each side edge being gradually inwardly contoured toward the other from the upper corner to the intermediate portion and from the lower corner to the intermediate portion such that the narrowest side-to-side dimension of the back panel is located at the intermediate portion thereof and the widest side-to-side dimensions of the back panel are located at the upper and lower corners thereof;
- a pair of brassiere cups;
- a first pair of straps extending from the opposite side edges of the intermediate portion of the back panel at the nar-



rowest side-to-side dimension thereof, each strap being connected to a respective brassiere cup and being adapted to pass about the torso of the pregnant woman such that said brassiere cups provide support for the breasts of the pregnant woman;

- a second pair of straps extending from the upper corners of the back panel and being adapted to pass over the shoulders of the pregnant woman;
- means for connecting a respective one of the second pair of straps to a respective one of the first pair of straps;
- an abdominal support sling; and
- a third pair of straps connected to the back panel at the lower corners thereof and spaced from the intermediate portion thereof, said third pair of straps adjustably connecting the abdominal support sling to the back panel for supporting the lower abdomen of the pregnant woman.

4,952,193

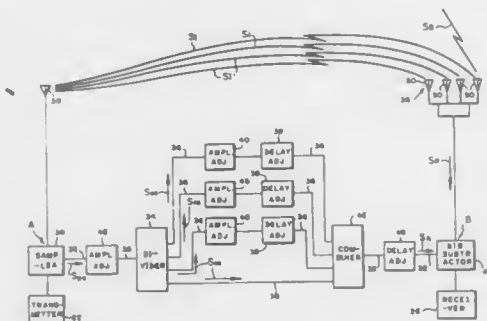
**INTERFERENCE CANCELLING SYSTEM AND METHOD**  
Ashok K. Talwar, Westlake Village, Calif., assignor to American Nucleonics Corporation, West Lake Village, Calif.

Filed Mar. 2, 1989, Ser. No. 317,923

Int. Cl.<sup>5</sup> H04B 1/10

U.S. Cl. 455—63

10 Claims



1. An interference cancelling system for cancelling or minimizing multiple signal components of a received signal in a radio receiver caused by an interfering signal from a radio

transmitter, which interfering signal follows multiple paths to the radio receiver, which comprises:

- sampling means for sampling the interfering signal transmitted from the radio transmitter, the sampling means having an output and providing on the output a primary sample signal corresponding to the interfering signal sampled;
- means for providing a primary sample signal path from the radio transmitter to the radio receiver;
- dividing means for dividing at least a portion of the primary sample signal path into a plurality of secondary sample signal paths, the number of secondary sample signal paths corresponding to at least the number of multiple paths which the interfering signal follows to the radio receiver, the primary sample signal being divided into a plurality of secondary sample signals, each secondary sample signal following a corresponding secondary sample signal path;
- at least one of the secondary sample signal paths being provided with delay adjusting means for adjusting the time delay of the secondary sample signal of said at least one path having said delay adjusting means;
- at least one of the secondary sample signal paths being provided with amplitude adjusting means for adjusting the amplitude of the secondary sample signal of said at least one path having said amplitude adjusting means;
- each of the secondary sample signals corresponding to one of the multiple components of the received signal caused by the multipath interfering signal;
- combining means for combining the plurality of secondary sample signal paths into said primary sample signal path, the combining means including an output and providing on the output an adjusted primary sample signal having signal components corresponding to the secondary sample signals;
- the delay adjusting means and amplitude adjusting means of the secondary sample signal paths being adjusted such that the signal components of the adjusted primary sample signal substantially equal in amplitude and time delay the corresponding multiple signal components of the received signal caused by the interfering signal; and
- subtracting means coupled to the primary sample signal path for subtracting the adjusted primary sample signal from the received signal, whereby the signal components of the adjusted primary sample signal cancel or minimize the corresponding multiple signal components of the received signal caused by the interfering signal.

4,952,194

**ROTATABLE ELASTIC COUPLING**

Hans-Gerd Eckel, and Heinz Seifert, both of Landenbach, Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

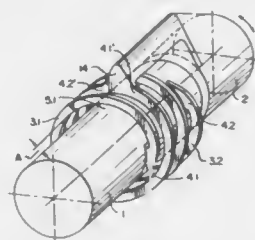
Filed Oct. 6, 1988, Ser. No. 254,362

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1987, 3734897

Int. Cl.<sup>5</sup> F16D 3/72

U.S. Cl. 464—60

10 Claims



1. A rotatable elastic coupling for two shaft ends, comprising:
  - (a) a first spring coiled in a first direction having first and second ends and an interior therebetween;
  - (b) a second spring coiled in said first direction having first

and second ends and an interior therebetween, said second spring being disposed adjacent to said first spring such that the second ends of said first and second springs are adjacent;

- (c) a first shaft having a first shaft end to which the first ends of said first and second springs are fixedly attached;
- (d) a second shaft having a second shaft end with a projection extending therefrom to which the second ends of said first and second springs are fixedly attached; and
- (e) an axial extension fixedly attached to one of said first and second shaft ends, said axial extension extending into the interior of the springs and including an outer surface radially spaced from a portion of the springs to define a gap therebetween in the region adjacent the first and second shaft ends whereby at a predetermined relative rotation of the shaft ends in the first direction the gap is eliminated as a portion of said first spring abuts against said outer surface and at a predetermined relative rotation of the shaft ends in a second direction opposite said first direction said gap is eliminated as a portion of said second spring abuts against outer surface.

4,952,195

**GRAPHITE DRIVE SHFAT ASSEMBLY**

John W. Traylor, Hillsdale, Mich., assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

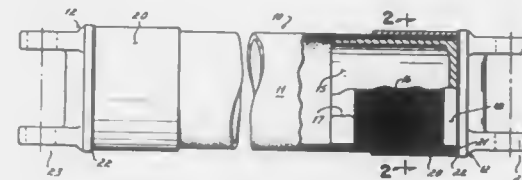
Division of Ser. No. 794,684, Nov. 4, 1985, Pat. No. 4,663,819.

This application Jan. 20, 1987, Ser. No. 4,897

Int. Cl.<sup>5</sup> F16C 3/02

U.S. Cl. 464—181

1 Claim



1. An automotive drive shaft comprising,
  - a tubular composite shaft having its end portions ground to a uniform circumference,
  - a steel ring placed on each end of said shaft, said steel ring having a radially inwardly-directed rim lying over a portion of the end of said shaft,
  - and an aluminum yoke mounted on each end of said shaft, each yoke having a shank whose outer surface is axially splined, said shank being inserted into said shaft with said splines biting into the internal surface of said shaft,
  - said shaft, steel ring and yoke having an interference fit that increases the diameter of said steel ring in the assembled condition by about 0.0025 inch over the unassembled diameter,
  - an annular groove at the outer end of said shank,
  - said shaft having an end portion overlying said groove and being pressed into said groove by said steel ring to provide a resistance to axial removal of said yoke from said shaft.

4,952,196

**VARIABLE DIAMETER SPROCKET ASSEMBLY**

Keith C. Chilcote, Pacifica, and Robert J. Malahowski, San Carlos, both of Calif., assignors to Antra-Bike Co., Inc., San Francisco, Calif.

Continuation-in-part of Ser. No. 112,225, Oct. 21, 1987, Pat. No. 4,850,939. This application Oct. 14, 1988, Ser. No. 256,336

Int. Cl.<sup>5</sup> F16H 9/24

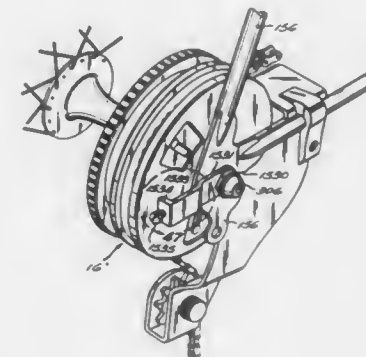
U.S. Cl. 474—70

12 Claims

1. A device that automatically controls the gear selection of a multi-gear shifting mechanism of a bicycle, comprising:
  - an electric motor engageable with the shifting mechanism so that rotation of said electric motor causes said shifting

mechanism to shift from one gear to another gear, the motor operational in a first direction to cause said shifting mechanism to select a higher gear, said motor operational in a second direction to cause said shifting mechanism to select a lower gear;

- a transducer that generates a transducer output signal having a characteristic that varies in accordance with the rotation rate of one of the wheels of said bicycle;
- a strain gauge that detects the strain applied to said bicycle when being pedalled by a rider, said strain gauge providing a strain gauge output signal responsive to the detected strain; and
- an electrical circuit that receives said transducer output signal and said strain gauge output signal, and that generates a motor power signal to operate said electric motor, said electrical circuit comparing the characteristic of said transducer output with first and second ranges of characteristics for the currently selected gear, said first and second ranges of characteristics varying in response to said strain gauge output signal, said electrical circuit generating said motor power signal with a first polarity to operate said electric motor in said first direction to select a higher gear when said transducer output is within said first range of characteristics, said electrical circuit gener-



ating said motor power signal with a second polarity to operate said electric motor in said second direction to select a lower gear when said transducer output is within said second range of characteristics.

9. A method of controlling an automatic shifting mechanism in a bicycle, comprising the steps of:
  - generating a sequence of pulses having a pulse repetition rate responsive to the rotation speed of a bicycle wheel;
  - counting the number of said pulses in said sequence in a predetermined amount of time;
  - comparing said counted number of pulses with a predetermined range of pulses for the currently selected gear of said shifting mechanism;
  - shifting said shifting mechanism to a selected one of a higher or a lower gear when said counted number of pulses is outside said predetermined range of pulses for the currently selected gear;
  - measuring the strain applied to the rear wheel of said bicycle by a rider on said bicycle; and
  - adjusting said predetermined range of pulses for the currently selected gear in response to the magnitude of said measured strain so that said shifting step occurs when said counted number of pulses is outside said adjusted predetermined range of pulses.

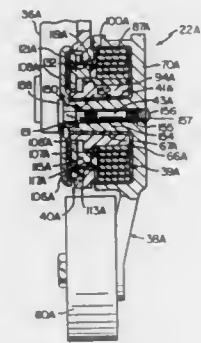


**4,952,197**  
**BELT TENSIONER AND METHOD OF MAKING THE SAME**

Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio  
Division of Ser. No. 395,112, Aug. 17, 1989, which is a division of Ser. No. 276,084, Nov. 23, 1988, Pat. No. 4,886,483. This application Dec. 13, 1989, Ser. No. 450,352  
The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> F16H 7/12

U.S. Cl. 474—135

6 Claims



1. In an antifriction annular disc-like member for a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, first spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and frictional dampening means operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, said dampening means having a longitudinal axis, said support means comprising a shaft means having a longitudinal axis and being fixed from movement relative to said belt engaging means, said belt engaging means having a portion thereof being rotatably carried by said shaft means so as to rotate relative to said shaft means, said dampening means comprising a pair of frictionally engaging first and second parts with said first part comprising an annular pad of friction material that is coaxially disposed and axially movable on said shaft means relative to said second part, and second spring means urging said first part against said second part with a certain spring force, said first part of said dampening means having guide means thereon, one of said support means and said belt engaging means having opening means therein that receive said guide means therein to guide axial movement of said first part, said tensioner having bearing means disposed in said opening means and receiving said guide means therein, said antifriction annular disc-like member being adapted to be disposed on said shaft means between said first spring means and said one of said support means and said belt engaging means, the improvement wherein said antifriction disc-like member carries said bearing means on one side thereof.

**4,952,198**  
**TENSIONER FOR POWER TRANSMISSION BELT**  
Maurice Cartaud, and Guy Blut, both of Vierzon, France, assignors to Hutchinson, Paris, France  
Filed Jun. 13, 1989, Ser. No. 365,455  
Claims priority, application France, Jun. 14, 1988, 8807897  
Int. Cl.<sup>5</sup> F16H 7/08

U.S. Cl. 474—138

5 Claims



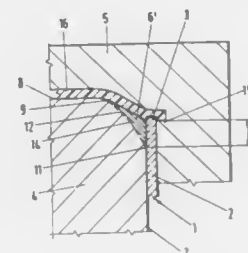
1. A tensioner for a power transmission belt comprising at least one return spring associated with a shaft of a tensioning roller with which the belt cooperates for controlling the displacement of said roller under the action of said spring, and two variable volume chambers each defined by an elastomer sheath filled with a liquid and communicating with each other at one of their ends through a valve device through which the liquid flows into or out of said chambers to introduce a damping effect of the vibrations likely to occur in the belt; wherein said sheath and a first spring portion associated with one of the chambers are fast with each other by enveloping said first spring portion in said sheath, and said sheath and said second spring portion associated with the other chamber are independent of each other, said second spring portion surrounding the sheath and working under extension.

**4,952,199**  
**TOOTHED SINTERED PULLEY**  
Tsutomu Saka, and Katsuaki Sato, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,077  
Claims priority, application Japan, Jul. 29, 1988, 63-100903[U]; Jul. 29, 1988, 63-100904[U]  
Int. Cl.<sup>5</sup> F16H 7/02, 55/17

U.S. Cl. 474—152

7 Claims



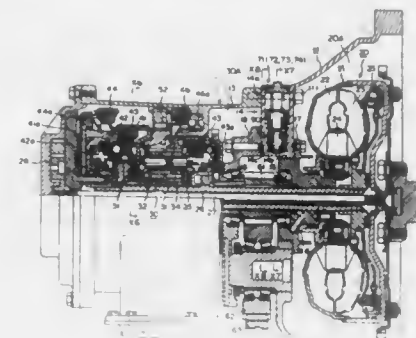
1. A toothed pulley of sintered material comprising a rim having outer and inner peripheral surfaces, a large number of teeth on said outer peripheral surface and lightening grooves at those portions of said inner peripheral surface which corre-

sponds to individual of said teeth, a boss located radially inside of said rim, and a connection which connects said inner peripheral surface of said rim with an outer peripheral surface of said boss, wherein the porosity of said sintered material in said rim is larger than the porosity of said sintered material in said boss.

**4,952,200**  
**AUTOMATIC TRANSMISSION**  
Yuzo Ohkawa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan  
Filed Apr. 22, 1988, Ser. No. 184,811  
Claims priority, application Japan, Apr. 28, 1987, 62-103304; Oct. 30, 1987, 62-273444  
Int. Cl.<sup>5</sup> F16H 47/08, 57/02

U.S. Cl. 475—47

18 Claims



1. An automatic transmission comprising an automatic transmission casing including a first case portion constituting a converter housing chamber and a second case portion constituting a transmission mechanism housing chamber, the first case portion being arranged integrally with the second case portion; a torque converter being journaled in said converter housing chamber; and a transmission gear mechanism journaled in said transmission mechanism housing chamber for switching a power transmission pathway, or shifting speed stages, a plurality of friction coupling elements, each of the friction coupling elements being operable by a hydraulic actuator; wherein

said transmission casing is further provided with a partition member for defining said converter housing chamber and said transmission mechanism housing chamber, said partition member being integral with said first and second case portions; and  
a plurality of accumulators through which operating fluid is fed to the respective actuators are arranged in said partition member along a peripheral direction of the torque converter.

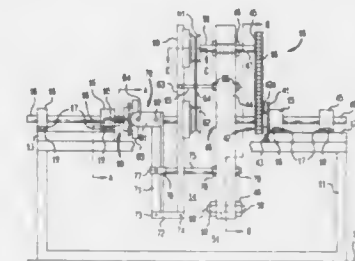
**4,952,201**  
**MECHANICAL POWER TRANSMISSION**  
Thomas A. Winsko, 83 Magnolia, and Jesse L. Colodner, 22 Walter St., both of Pearl River, N.Y. 10965  
Filed Sep. 6, 1988, Ser. No. 240,801  
Int. Cl.<sup>5</sup> F16H 3/44

U.S. Cl. 475—182

3 Claims

1. An improvement in continuously variable mechanical power transmissions of the type having a rotatable input shaft that is attachable to rotating power means and a rotatable output shaft which provides driving axle means, said improvement comprising,  
a planetary power transmission train including a drive input assembly, a variable-pitch pulley assembly and a power control mechanism, said planetary train being interconnected between said input shaft and said output shaft, and  
a power transmission support frame rotatably attachable to said input shaft and said output shaft,  
said drive input assembly comprising a support plate fixedly

attached to said power transmission support frame, a central stationary sprocket fixedly attached to said support plate, a planetary sprocket disposed in vertical alignment with said central sprocket, an endless link chain, said central sprocket and said planetary sprocket having similar diameter and teeth spacing for receipt of said endless link chain, and rotatable transmission drive arm, said drive arm being fixedly attached at its midpoint to said rotatable input shaft, said planetary sprocket being held in planetary relation to said central sprocket by a planetary shaft being transversely disposed through one end of said drive arm in rotatable engagement thereto, said drive arm having counter-balances disposed at the opposite end of said drive arm in fixedly attachment thereto,

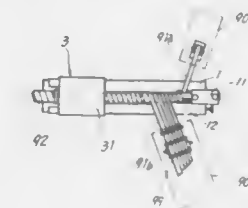


said variable-pitch pulley assembly comprising a pulley rocker arm, a planetary variable-pitch pulley fixedly attached at one end of said rocker arm in rotatable cooperation with said planetary shaft, a central variable-pitch pulley fixedly attached at the midpoint of said rocker arm in rotatable cooperation with said output shaft, an endless pulley belt, said planetary pulley and said central pulley being disposed to interact in open belt drive by means of said pulley belt, said rocker arm being pivotally attached to a pivot rod, said pivot rod being disposed at equal spacing between said planetary pulley and said central pulley.

**4,952,202**  
**APPARATUS FOR PRODUCING TUBE**  
Tomio Itoh, Kawanishi, Japan, assignor to Mitsuya Tekko Co., Ltd., Osaka, Japan  
Filed Feb. 16, 1989, Ser. No. 311,451  
Claims priority, application Japan, May 26, 1988, 63-128872  
Int. Cl.<sup>5</sup> B31C 1/00

U.S. Cl. 493—299

10 Claims

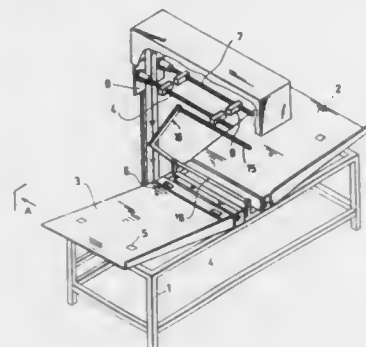


9. An apparatus for producing a tube comprising:  
(a) a straight mandrel supported at one end thereof by a base, for helically winding tape thereon,  
(b) tape feed means for feeding the tape to the mandrel in an oblique direction to helically wind the tape on the mandrel into a tubular form to make the tube, and  
(c) a tube rotating-drawing device for delivering the tube from the mandrel axially thereof, the tube rotating-drawing device comprising:  
(i) a fixed frame mounted on the base,  
(ii) a rotary frame rotatably supported by the fixed frame,

- (iii) rotary drive means coupled to the rotary frame for rotating the rotary frame around said mandrel,
- (iv) support members disposed on the rotary frame such that said mandrel is interposed therebetween, each of the support members being movable toward and away from the mandrel,
- (v) pressing means, connected to each of the support members, for controlling the support members to apply a force acting toward the mandrel,
- (vi) delivery assembly means, each associated with a said support member, for withdrawing the tube longitudinally of the mandrel and being in pressing contact with the tube, each of the delivery assembly means having a pair of wheels supported at front and rear end portions of the respective support member, respectively, each said wheel means being constituted by a sprocket, and a delivery member in the form of endless belt means, extending around the wheels, for making contact with the tube on the mandrel over a specified length between the two wheels, said belt means including an endless chain extending around the sprockets and having a plurality of links, a plurality of mount means attached to at least some of the links, and a resilient tread member attached to each said mount means, and
- (vii) delivery drive means, coupled to each of the delivery assembly means at one of the wheels thereof, for forcing the respective delivery member in a downstream direction while said delivery member rotates around the mandrel and frictionally contacts the tube.

4,952,203

**PROCESS AND APPARATUS FOR PAIRING A FRONT AND REAR PANEL OF A T-SHIRT**  
 Patrick Rouleau, 52, boulevard Carnot; Alain Rouleau, 3, rue Epinasse, both of 31000 Toulouse, and Jean-Pierre Touret, Route de Menville - Brext, 31530 Lezignan, all of France  
 Filed Jun. 6, 1989, Ser. No. 361,911  
 Claims priority, application France, Jun. 7, 1988, 8807957  
 Int. Cl.<sup>5</sup> B65H 39/043, 3/44; D05B 33/00  
 U.S. Cl. 493—480 13 Claims



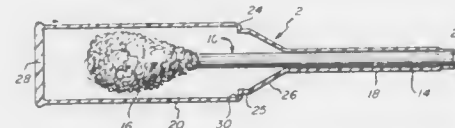
1. A process for pairing at least two flexible sheets of textile or knitted goods comprising forming a two stacks of the sheets to be paired and arranging said stacks on two plates (2, 3), gripping along a line at least one sheet from each stack by means of two movable gripper assemblies (7, 8) each sheet above one plate (2, 3) and moving said gripping assemblies between a lower gripping position of the sheets and an upper position where the gripped sheets are suspended above the plates (2, 3), moving a deposit member 15 above the plates (2, 3) to an intermediate height between said plates and the gripper assemblies (7, 8) in the upper position, and along a trajectory in which said deposit member comes into contact with the gripped sheets while sliding therealong to a position intermediate their height, and actuating the gripper assemblies (7, 8) so as to release the sheets onto the deposit member (15).

5. An apparatus for pairing at least two flexible sheets of an

article of textile or knitted goods, comprising in combination two plates (2, 3) having means (5, 6) for holding and positioning a stack of sheets thereon, two gripper assemblies (7, 8) and associated actuating means, each arranged above one plate, said assemblies being adapted to grip at least one sheet from a stack positioned on a plate and for releasing said sheet upon command, means (9, 10, 11) for causing translational movement of said gripper assemblies (7, 8) for displacing said gripper assemblies above the plates (2, 3), between a lower sheet gripping position and an upper position in which they are arranged at a predetermined height above said plates, a movable deposit member (15) positioned in an intermediate plane between the plates (2, 3) and the gripper assemblies (7, 8) in the upper position, and means (16, 17) for displacing the deposit member (15) for moving the deposit member above the plates (2, 3) between a retracted position above one plate and a deposit position above the other plate.

4,952,204

**DRY HANDLE SWAB ASSEMBLY AND UNIT**  
 Wayne Korteweg, Ledyard, Conn., assignor to GAM-MED Packaging Corporation, Antioch, Ill.  
 Filed Aug. 10, 1988, Ser. No. 230,511  
 Int. Cl.<sup>5</sup> A61M 35/00  
 U.S. Cl. 604—1 23 Claims



1. A sealable, manually openable applicator assembly comprising: a swab having an elongated, small diameter stick with an applicator element at one end thereof; and an elongated, thin-wall hollow sleeve assembled with said swab, said sleeve being integrally formed as a single piece from a relatively rigid plastic material that is manually compressible and severable in thin sections, and having a handle portion at one end, a receptacle portion at the other end, and a transition portion therebetween, said handle portion having an element frictionally engaging the other end of said stick, and said handle portion extending along a substantial part of the length of, and conforming to, said stick and being spaced slightly from the surface thereof, other than at said engaging element, to provide sufficient clearance for facile assembly while minimizing the gap therebetween, said receptacle portion being of substantially larger cross section than said handle portion, and the adjacent components of said receptacle and transition portions at the intersection therebetween cooperatively constituting means for creating stress in said sleeve, said adjacent components being so relatively configured as to assume incompatible configurations upon flattening of said sleeve, to thereby create a significant level of stress therebetween, compression of said sleeve thereat thereby facilitating manual severance of said sleeve at that location, the relative lengths of said stick and said handle portion being such that said applicator element of said swab is contained at least substantially within said receptacle portion of said sleeve.

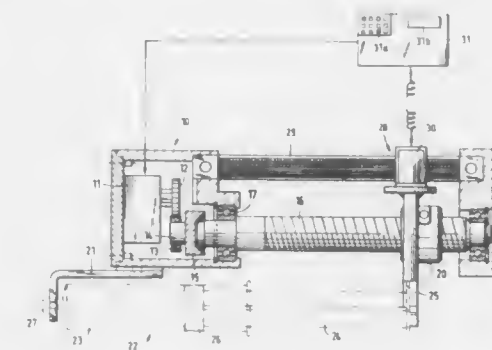
4,952,205

**PRESSURE INFUSION DEVICE**  
 Erich Maurer, Kassel, and Reiner Mengel, Nidenstein, both of Fed. Rep. of Germany, assignors to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany  
 Continuation of Ser. No. 173,642, Mar. 25, 1988, abandoned.  
 This application Oct. 27, 1989, Ser. No. 427,988  
 Claims priority, application European Pat. Off., Apr. 4, 1987, 87105034

Int. Cl.<sup>5</sup> A61M 37/00

U.S. Cl. 604—67

11 Claims



1. A pressure infusion device for squeezing out a syringe, comprising:  
 a holder for supporting the syringe,  
 an advance means for squeezing out the syringe,  
 a path sensor for detecting the position of the advance means over the total range of motion of the advance means and for generating a signal in response thereto,  
 control means responsive to the path sensor signal for controlling movement of the advance means in response to a prestored program or to external measuring data,  
 input means for inputting into the control means an empty state signal corresponding to the signal generated by the path sensor when the syringe is fully squeezed out, and  
 alarm means for releasing an alarm when the advance means reaches an alarm position, the alarm position being in advance of the empty state position of the syringe.

4,952,206

**OCCCLUSION APPARATUS FOR CONVERTING A SYRINGE INTO A NON-REVERSIBLE SINGLE USE SYRINGE**

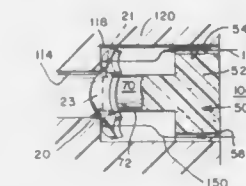
Paul Ibanez, Culver City, and Frederick J. Gray, Woodland Hills, both of Calif., assignors to Anco Engineers, Inc., Culver City, Calif.

Filed May 19, 1989, Ser. No. 354,214

Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—110

26 Claims



1. An occlusion apparatus to be used in conjunction with a syringe, said syringe having a chamber which leads to the interior opening of the syringe needle, wherein the occlusion apparatus comprises:  
 a. a conical washer;  
 b. said conical washer having a front surface and a rear

surface and a multiplicity of barbs which project from the periphery of the conical washer so as to incline the conical washer in the direction of the front surface of said washer;  
 c. an expandable plug member aligned with said conical washer such that a portion of the expandable plug member is placed immediately adjacent to the rear surface of said conical washer;  
 d. said conical washer placed into said chamber and supported against the interior wall of the chamber by said multiplicity of barbs such that the front surface of said conical washer lies adjacent the opening of said chamber leading to the needle and separated from the opening to permit the passage of fluid to flow between the opening of the chamber leading to the needle opening and the front surface of the conical washer;  
 e. said expandable plug member also placed into said chamber immediately adjacent the rear surface of the conical washer; and  
 f. said expandable plug member is made of fluid absorbing material which causes the expandable plug member to expand in size when it absorbs fluid;  
 g. whereby the flow of medication through the syringe requires the medication to come in contact with the expandable plug member and the expansion of the plug member after absorbing fluid from the medication causes the expandable plug member to push on the rear surface of the conical washer thereby forcing the conical washer into the chamber opening leading to the needle opening, thereby occluding further flow of fluid to the needle.

4,952,207

**I.V. CATHETER WITH SELF-LOCATING NEEDLE GUARD**

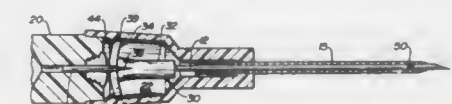
Francis P. Lemieux, Palm Harbor, Fla., assignor to Critikon, Inc., Tampa, Fla.

Filed Jul. 11, 1988, Ser. No. 217,246

Int. Cl.<sup>5</sup> A61M 5/18

U.S. Cl. 604—164

11 Claims



1. An I.V. catheter with a self-locating needle guard comprising:  
 a catheter assembly including a catheter attached to a hollow catheter hub;  
 an introducer needle assembly, including a hollow needle with a distal tip, said needle being affixed near its proximal end to a needle hub, the distal end of said needle hub being suitable for engagement with said hollow catheter hub, and said needle including means for engaging a needle guard; and  
 a needle guard including a proximal portion having means for engaging said engaging means of said needle and a distal portion for extending over said needle tip when said proximal portion is engaged with said engaging means of said needle, said needle guard located proximal said catheter and distal said needle hub and mounted for relative motion with respect to said needle as said needle is withdrawn from said catheter until said engaging means of said needle guard engages said engaging means of said needle; and  
 retaining means for retaining said needle guard within said catheter hub prior to engagement of said needle engaging means and said needle guard engaging means.



4,952,208

**INJECTION SYRINGE FOR MEDICAL PURPOSES**  
 Helmut Lix, Wasserburg, Fed. Rep. of Germany, assignor to Wasserburger Arzneimittelwerk Dr. Madaus GmbH & Co. KG, Fed. Rep. of Germany

Filed Jul. 22, 1988, Ser. No. 227,185  
 Claims priority, application Fed. Rep. of Germany, Jul. 21, 1987, 3724120; May 18, 1988, 3816961  
 Int. Cl.<sup>5</sup> A61M 5/00

U.S. Cl. 604—187

5 Claims



1. Injection syringe plunger having means for ensuring at least one flow connection between an interior of a cylinder and outer environment when the plunger is partially inserted into the cylinder,

wherein said means comprise

a short, substantially cylindrical attachment on the plunger of smaller diameter than the diameter of the plunger in a region of a sealing bead thereon, said attachment comprising at least three, projections mounted on a circumference thereof at a location where said attachment joins the plunger proper, and said projections being substantially equidistant from one another and situated at substantially the same level along an axial length of the plunger, and rising above the circumference of said attachment approximately as far as the sealing bead.

4,952,209

**APPLICATOR SYRINGE FOR A DENTAL COMPOUND**  
 Ernst Mühlbauer, Elbgaustrasse 248, 200 Hamburg 53, Fed. Rep. of Germany

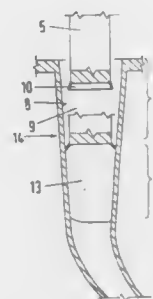
Division of Ser. No. 7/060,245, May 29, 1987, Pat. No. 4,798,596. This application Sep. 13, 1988, Ser. No. 243,681  
 Claims priority, application Fed. Rep. of Germany, Oct. 7, 1985, 8528512

The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61M 3/00

U.S. Cl. 604—218

5 Claims



1. A disposable applicator syringe for a dental compound, comprising:

a tubular member made from an elastically yielding polymeric material having a rear entrance end portion, a smoothly curved front discharge end portion, an intermediate portion between the end portions, and a continuous, substantially cylindrical central channel extending from

the entrance end portion to the discharge end portion through the intermediate portion, the channel at least in the intermediate portion having a smaller diameter than the channel in the entrance end portion and a clear cross sectional area no greater than about 10 mm<sup>2</sup>, the intermediate portion being adapted for receiving a predetermined quantity of viscous dental compound to be discharged through said discharge end portion, wherein the cross sectional area of the channel through the intermediate portion and discharge end portion reduces with substantially smooth continuity by no greater than a ratio of about three; and

a piston in the form of an elongated rod having a head portion including annular lip means defining the diameter of the head, which is less than the channel diameter in the entrance end portion, the piston adapted to be manually advanced through the entrance end portion and the intermediate portion into contact with the dental compound such that the lip means are pressed radially outwardly by the compound into sealing engagement with the wall of the channel, the head of the piston having a useful stroke in the intermediate portion while advancing the compound through the channel, said useful stroke being equal to at least about ten times the diameter of the channel in the intermediate portion.

4,952,210

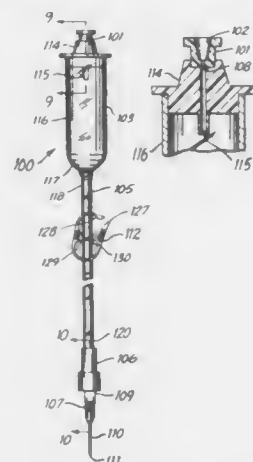
**PARENTERAL FLUID ADMINISTRATION SET**  
 Paul G. Alchas, Montclair, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Dec. 13, 1985, Ser. No. 809,093

Int. Cl.<sup>5</sup> A61M 5/68

U.S. Cl. 604—251

2 Claims



1. A non-vented parenteral fluid administration set in combination with a vented container including a housing having a chamber for retaining fluid and a frusto-conically shaped tip extending from said housing having a passageway there-through communicating with said chamber, comprising:

a non-vented adapter having a frusto-conically shaped recess therein removably engaging the frusto-conically tip of the vented container, said adapter having a bore therethrough communicating with said recess, said bore being positioned to allow fluid communication between said bore and the passageway in the vented container tip;

a drip chamber having an upper portion with a conduit therethrough and a flexible transparent body portion extending downwardly from said upper portion and terminating in a lower end, said upper portion being connected to said adapter so that said bore and said conduit are in fluid communication;

a flexible tube having a first end connected to said lower end of said body portion and a second end; and

fluid delivery means for facilitating the delivery of parenteral fluid from said tube to the patient connected to said second end of said tube.

4,952,211

**FEMININE TAMPON COATED WITH BEESWAX**  
 Dale Snider, 3404 Leigh Rd., Pompano Beach, Fla. 33062

Filed Sep. 12, 1988, Ser. No. 242,639

Int. Cl.<sup>5</sup> A61F 13/20

U.S. Cl. 604—285

7 Claims

1. A method of decreasing the fiber release characteristic of a tampon, comprising the step of: providing to the tampon a coating of beeswax sufficiently finely distributed upon the surface of the tampon to permit fluid permeability into the tampon.

4,952,212

**OCULAR TREATMENT**

Christopher G. Booth, Middlesbrough, and Raymond C. Rowe, Congleton, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 929,476, Nov. 12, 1986, abandoned.

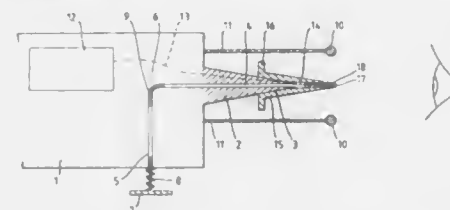
This application Jan. 23, 1989, Ser. No. 299,689

Claims priority, application United Kingdom, Nov. 13, 1985, 8528032

Int. Cl.<sup>5</sup> A61M 35/00

U.S. Cl. 604—294

10 Claims



1. An improved method of administering an ophthalmically active formulation to the corneal surface of an eye, said improvement essentially comprising the steps of:

providing a nozzle having an outlet adjacent an electrode, which electrode is spaced from said outlet and electrically insulated from said nozzle;

providing as said formulation a liquid mixture comprised of an ophthalmically active substance and an ophthalmically acceptable diluent;

placing said nozzle outlet and adjacent electrode in proximity to, but spaced from, said corneal surface;

causing a measured unit dose of up to 20 µl of said formulation to flow from said nozzle outlet simultaneously with applying to said formulation an electrical potential by means of a high voltage generator while maintaining said electrode at relative ground potential, said electrical potential being sufficiently large to atomize said formulation leaving said nozzle outlet into a spray of electrically charged droplets;

whereupon said electrically charged droplets of said formulation are drawn to said corneal surface and uniformly deposited thereover.

4,952,213

**TIBIAL CUTTING GUIDE**

Jerald A. Bowman, and Larry G. McCleary, both of Warsaw, Ind., assignors to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Feb. 3, 1989, Ser. No. 306,523

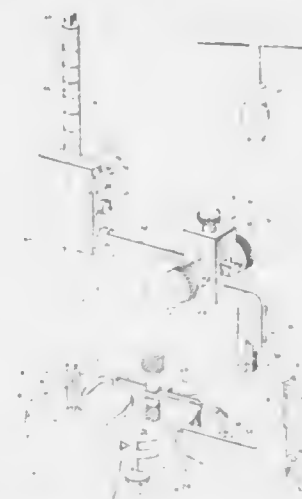
Int. Cl.<sup>5</sup> A61F 5/00

U.S. Cl. 606—79

16 Claims

1. An apparatus for preparing a proximal surface of a human tibia bone to receive a tibial portion of a knee prosthesis, the

tibia bone having an anterior-posterior axis, a medial-lateral axis, and a central longitudinal axis, the apparatus comprising, means for establishing a first axis generally parallel to the central longitudinal axis of the tibia bone, means for guiding a cutting blade into cutting engagement with a proximal portion of the tibia bone, means for selectively adjusting the position of the guiding means along the first axis, and



means for angularly adjusting the guiding means with respect to both the anterior-posterior axis and the medial-lateral axis to orient the guide means into a first plane defined by the anterior-posterior axis and the medial-lateral axis, such that the guiding means is properly positioned adjacent the proximal portion of the tibia bone to permit a portion of the proximal portion of the tibia bone to be resected to receive the tibial portion of a knee prosthesis.

4,952,214

**ARCuate OSTEOTOMY BLADE, BLADE GUIDE, AND CUTTING METHOD**

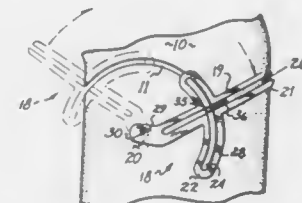
John E. Comparetto, Cincinnati, Ohio, assignor to Ohio Medical Instrument Co., Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 841,948, Mar. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 749,475, Jun. 27, 1985, Pat. No. 4,664,102, and a continuation-in-part of Ser. No. 721,640, Apr. 10, 1985, Pat. No. 4,708,133, and a continuation-in-part of Ser. No. 667,424, Nov. 1, 1984, Pat. No. 4,632,102, which is a division of Ser. No. 294,653, Aug. 20, 1981, Pat. No. 4,501,268. This application Feb. 8, 1989, Ser. No. 308,257

Int. Cl.<sup>5</sup> A61B 17/58, 17/14

U.S. Cl. 606—87

14 Claims



1. A bone cutting guide comprising, a body presenting a circular first slot within it, said first slot being an arc of constant radius of curvature, said body having a pivot hole at the center of the radius of curvature of said arc,

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said body also presenting a second slot within it, said second slot being coplanar with and intersecting said first slot.

**4,952,215**  
**VALVULOTOME WITH LEAFLET DISRUPTION HEADS AND FLUID SUPPLY**

Kenneth Oriol, Rochester; Karl D. Kirk, and Donald Lamond, both of New York, all of N.Y., assignors to Bolsurge, Inc., Henrietta, N.Y.

Filed Feb. 29, 1988, Ser. No. 161,817  
Int. Cl.<sup>5</sup> A61B 17/32

U.S. Cl. 606—159

15 Claims

1. A valvulotome for rendering various valve leaflets incompetent comprising:  
a rigid support  
a first disrupting head mounted on said support with a dis-

rupting surface mounted for disrupting action during retrograde motion of said valvulotome,  
said rigid support comprising a fluid supply tube having a fluid outlet, said fluid supply tube extending into said disrupting head so that said fluid outlet supplied fluid to a



location during a retrograde motion with respect to the direction of blood flow after said disrupting head has initially passed said location; and  
a second disrupting head located on said support and positioned ahead of said first disrupting head during said retrograde motion.

# CHEMICAL

**4,952,216**

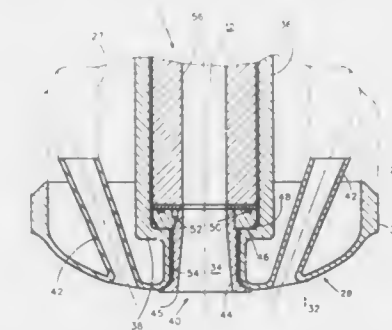
## COMBUSTIBLE LOG

Elmer H. Good, Simi Valley, Calif., assignor to Ronald G. Buday, Van Nuys, Calif., a part interest  
Filed Mar. 20, 1989, Ser. No. 325,884  
Int. Cl.<sup>5</sup> C10L 5/14, 5/40

U.S. Cl. 44—25

33 Claims

1. A combustible member, including,  
a first polyethylene having a density less than one (1) and constituting the major portion by weight in the member,  
a second polyethylene having a melt index less than approximately two thousand (2000) and constituting a relatively small percentage of the member by weight, and  
a wood pulp constituting a percentage by weight less than the percentage of the first polyethylene by weight and greater than the percentage of the second polyethylene by weight.  
3. A combustible member as set forth in claim 1 wherein the first polyethylene has a percentage by weight in the combustible member in the range of approximately sixty percent (60%) to approximately seventy six percent (76%).  
4. A combustible member as set forth in claim 1 wherein the wood pulp has a percentage by weight in the combustible member in the range of approximately twenty percent (20%) to approximately thirty six percent (36%).



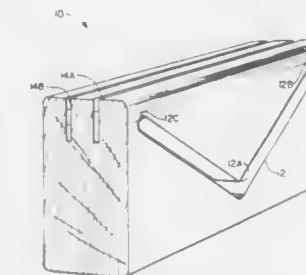
**4,952,217**

## FIRE KINDLER

Jerry Porter, Charlottesville, Va., assignor to John S. Fisher, Raleigh, N.C., a part interest  
Filed Jan. 9, 1990, Ser. No. 462,629  
Int. Cl.<sup>5</sup> C10L 11/06

U.S. Cl. 44—532

12 Claims



1. A fire kindler comprising a block formed from a single element of combustible material having a generally V-shaped aperture therethrough which extends between two opposing sides of said block and defines a V-shaped portion of combustible material between the upwardly extending sides thereof, and at least one slot extending across the top of said block and downwardly into said V-shaped aperture therethrough, said V-shaped portion of combustible material comprising a bottom tip which is easily ignited, whereby said fire kindler block may be easily ignited by placing a match or the like adjacent the bottom of the V-shaped aperture so as to ignite the bottom tip of the V-shaped portion of combustible material.

**4,952,218**

## TWO-FLUID NOZZLE FOR ATOMIZING A LIQUID SOLID SLURRY AND PROTECTING NOZZLE TIP

Charles W. Lipp; Clifton T. Knight; Larry L. Lafitte, all of Baton Rouge, and Marion H. Hunt, Brusly, all of La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 26, 1988, Ser. No. 238,217  
Int. Cl.<sup>5</sup> C10J 3/48

U.S. Cl. 48—86 R

10 Claims

1. A burner nozzle assembly tip in combination with a burner nozzle assembly, said assembly including means for discharge through a discharge orifice and combustion in a

combustion zone at relatively high temperature, said tip comprising a cap portion including a central outlet bounded by an exit tube having an upstream portion and a downstream portion and connected at its upstream portion to the discharge orifice and being open to a combustion zone at the downstream portion, said downstream portion flaring outwardly beginning at the location at said opening to a combustion zone to provide a smooth elliptical face ending at the downstream end in a right cylindrical section for attachment to the burner nozzle periphery, said exit tube having a shoulder intermediate an upstream end and the location adjacent said opening to a combustion

zone, and a heat shield portion including a thermally resistant metal alloy heat shield having a retaining ring which is located at said shoulder and, in contact therewith and said heat shield comprising a liner connected to said retaining ring and having an upstream end and a downstream end, the upstream end of which has a diameter less than said outlet, said liner diverging outwardly at its downstream end form a central longitudinal axis of said burner nozzle assembly to a diameter larger than said outlet, so that said outlet is partially covered by said liner and protects said outlet from the heat produced by a combustion temperature.

**4,952,219**

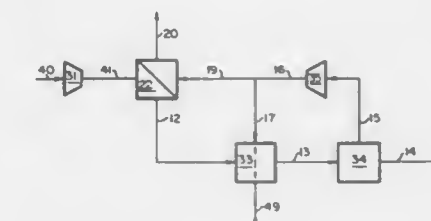
## MEMBRANE DRYING OF GAS FEEDS TO LOW TEMPERATURE UNITS

Stephen P. DiMartino, Sr., Tipton, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 29, 1989, Ser. No. 415,017  
Int. Cl.<sup>5</sup> B01D 53/22

U.S. Cl. 55—16

13 Claims



1. A process for separating and recovering a product component from a feed gas mixture containing at least one other component and water, said process comprising: bringing said feed gas mixture into contact with a membrane having a water to product component selectivity of at least 100 to initially remove a portion of the water from the feed gas mixture to produce a partially dried gas stream, feeding the partially dried gas stream through a molecular sieve to remove remaining water to produce dry gas stream, supplying a dry gas stream to a low temperature separation unit to separate the product component from the dry gas stream, and subsequently recovering the product component.



A detailed technical drawing of a mechanical assembly, likely a pump or engine component, shown in a side view. The assembly is mounted on a base. Key components and their labels are as follows:

- 1**: A long, horizontal shaft or rod.
- 2**: A circular component, possibly a flywheel or a pulley, attached to the end of the shaft.
- 3**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 4**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 5**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 6**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 7**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 8**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 9**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 10**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 11**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 12**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 13**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 14**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 15**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 16**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.
- 17**: A small, rectangular component, possibly a valve or a sensor, mounted on the shaft.

The drawing is a technical illustration, likely a patent or a technical manual, showing the internal components and their arrangement. The labels are in Cyrillic script.

1. A method of making an internally doped tube of transparent glass, said method comprising the following operations:

- making a tube blank of a base glass having a length between a first end of said tube blank and a second end, and having an inside surface surrounding an inside space;
- making a liquid doping liquor comprising a volatile carrier liquid and a rare-earth dopant;
- depositing said dopant in liquid form by depositing a small quantity of said doping liquor on the inside surface of said tube blank, such that the liquor remains in place on said inside surface after being deposited;
- drying said inside surface after depositing said dopant by evaporating said liquid carrier;
- depositing a covering layer of glass on said inside surface of said tube blank after said operation of drying said surface; and
- heating said tube blank and said covering layer after said layer has been deposited at least partially in order to raise said tube blank and said layer to a diffusion temperature and diffusing said dopant into the glass of said tube and said covering layer;

wherein said operation of depositing said dopant comprises the following sub-operations:

- making a mist of said doping liquor in order to obtain a doping mist constituted by droplets in suspension in a carrier gas;
- placing an outlet end of a mist delivery tube in said inside space of said tube blank, with an inlet end of said mist delivery tube outside said tube blank;
- feeding said doping mist to said mist delivery tube via said inlet end thereof to cause said delivery tube to emit said doping mist from said outlet end thereof in said inside space of the tube blank in such a manner that said dopant is deposited by depositing droplets of said mist on said inside surface; and
- displacing said mist delivery tube in controlled manner inside said tube blank while maintaining said feed in such a manner that said outlet end from said mist delivery pipe moves along the length of the starting tube blank, and said dopant is deposited over the entire inside surface thereof.

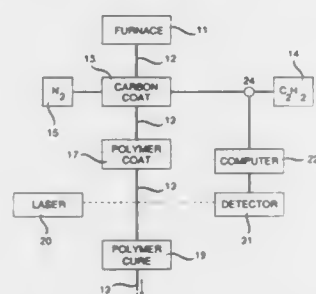
4,952,226

## LIGHTGUIDE COATING CONTROL

Ralph E. Frazee, Jr., Bricktown, and David H. Smithgall, Sr., East Windsor, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y.  
Filed Feb. 27, 1989, Ser. No. 316,192  
Int. Cl.<sup>5</sup> C03B 37/23

U.S. Cl. 65—3.12

8 Claims



1. A method for making optical fibers comprising the steps of drawing a glass fiber from a heated glass body, directing the fiber through a coating chamber, exposing the fiber in the coating chamber to a carbon-containing gas compound, thereby to coat the glass fiber with a carbonaceous coating to a thickness of 1000 angstroms or less, and thereafter coating the glass fiber with a polymer coating, characterized by:

directing a laser beam at the fiber after it has been coated with polymer, the impingement of the beam on the optical fiber resulting in a forward-scattered light pattern; using the intensity of said pattern to generate a signal which is a function of the thickness of the carbonaceous coating; and using the signal to control the thickness of the carbonaceous coating in the coating chamber.

4,952,227

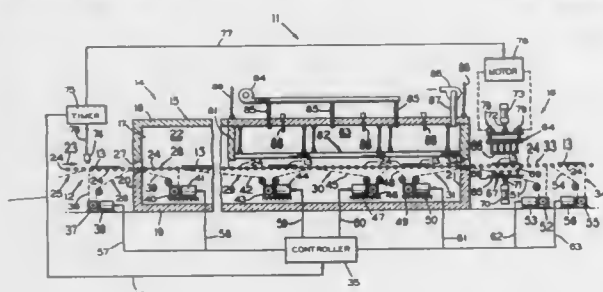
## APPARATUS FOR PROCESSING GLASS

Richard A. Herrington, Walbridge; Kevin L. Widman, Toledo, both of Ohio; Jeffrey R. Flaugher, Carleton, Mich., and Allan T. Eak, Toledo, Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed May 22, 1989, Ser. No. 355,169  
Int. Cl.<sup>5</sup> C03B 23/03

U.S. Cl. 65—162

20 Claims



1. In an apparatus for processing glass sheets including a furnace and a conveyor for transporting glass sheets through the furnace, an improved differential heating system comprising:

the plurality of heating means mounted in a furnace for heating associated areas of glass sheets being transported through the furnace on the conveyor;  
means for generating actual temperature signals representing the actual temperature values of each of said heating means; and  
means for generating temperature setpoint signals represent-

ing desired temperature values for each of said heating means;  
means connected to said heating means and to both said means for generating and responsive to said actual temperature signals and said temperature setpoint signals for controlling a heat output of each of said heating means; and  
means for sensing at least one identifying parameter indicative of the type of sheet of glass being transported by the conveyor and connected to said means for generating said temperature setpoint signals for changing a value at least one of said temperature setpoint signals based upon the sensed at least one identifying parameter.

4,952,228

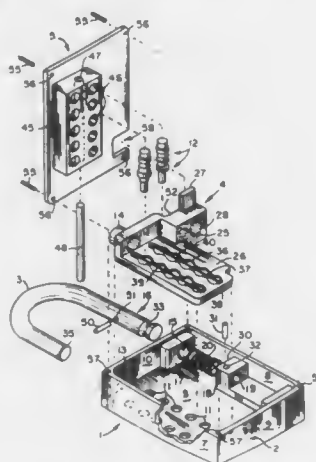
## PUSH-BUTTON PADLOCKS HAVING SWIVEL-ONLY SHACKLES

Jewell A. Taylor, Salinas, Calif., and Robert J. Bretl, Menominee, Mich., assignors to Lock-R-Lox, Inc., Salinas, Calif.  
Continuation-in-part of Ser. No. 220,586, Jul. 18, 1988, Pat. No. 4,862,714. This application Jul. 20, 1989, Ser. No. 382,214  
The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> E05B 37/18

U.S. Cl. 70—25

21 Claims



1. A padlock having a first locked mode and a second unlocked mode, comprising:

a housing including spaced front and back faces and a perimeter wall interconnecting said spaced front and back faces, said faces and said wall defining a hollow area within said housing, said perimeter wall having at least a first hole therethrough;

a generally inverted J-shaped shackle having a generally cylindrical first entrained portion which is at least partially rotatably mounted within the housing about the perimeter wall first hole and a second free end portion that is operatively positioned for locking and unlocking engagement;

latching means for operative engagement and disengagement relative to the free end portion of said shackle; and  
means for selectively locking said latching means to prevent pivoting of said shackle generally cylindrical first entrained portion and release of said shackle free end portion, said means upon selective unlocking of said latching means permitting pivoting of said shackle about its first entrained portion and disengagement of said free end portion from said latching means.

4,952,229

## PLANT SUPPLEMENT AND METHOD FOR INCREASING PLANT PRODUCTIVITY AND QUALITY

Hugh M. Muir, 2730 Puerta Del Sol, Santa Barbara, Calif. 93105, assignor to Hugh M. Muir, Hendersonville, N.C.  
Filed Sep. 27, 1983, Ser. No. 534,990  
Int. Cl.<sup>5</sup> C05F 11/08; C05G 3/08

U.S. Cl. 71—7

32 Claims

1. A soil and foliage supplement to improve crop growth and quality comprising:

a plurality of microbes species for fixing and stabilizing nitrogen, for digesting cellulosic matter, lipids and protein, and for converting starch and carbohydrates to plant and microorganism nutrients; and  
an organic acid selected from the group consisting of humic acid, fulvic acid, ulvic acid and mixtures thereof.

4,952,230

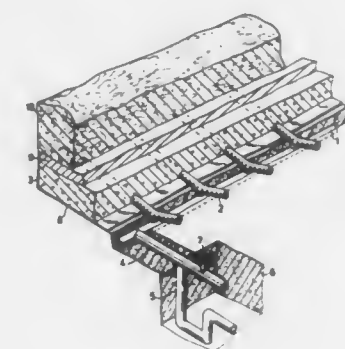
## METHOD OF BRINGING GASES INTO CONTACT WITH COMPOSTIBLE MATERIAL OR PARTIALLY COMPOSTED MATERIAL, AND AN ARRANGEMENT FOR CARRYING OUT THE METHOD

Tore Norlund, Torshälla, Sweden, assignor to Armerad Betong Vageorbattningar AB, Stockholm, Sweden  
Continuation of Ser. No. 270,990, Jun. 5, 1984, abandoned. This application Jun. 6, 1984, Ser. No. 617,935

Int. Cl.<sup>5</sup> C05F 7/00, 9/04

U.S. Cl. 71—9

14 Claims



1. A method for composting which comprises

(a) establishing a mostly horizontal network of pipes in excavated earth which can serve the dual functions of introducing air and removing liquids,

(b) covering at least the uppermost portion of said network of pipes with a first layer composed of relatively coarse particulate material, which material serves to protect the network of pipes and acts as a distributing filter for the air exiting from said network of pipes,

(c) covering said first layer with a second layer of less coarse particulate material in the form of asphalt concrete said second layer acting as a further distributing filter for the air passing upwardly thru said first layer,

(d) said second layer containing a binding agent which will bind the particulate material in said second layer together sufficiently so that said second layer will have enough rigidity to support the weight of heavy vehicles thereon while at the same time retaining sufficient porosity in said second layer so that air can be forced upwardly therethrough and liquid can drain downwardly therethrough,

(e) travelling over the upper surface of said second layer with appropriate conventional working vehicles so as to deposit compostible material on the upper surface of said second layer,

(f) forcing air through said network of pipes and upwardly through said porous first and second layers to promote composting of said deposited compostible material,

(g) allowing any liquid in said deposited compostible mate-

rial to drain downwardly through said compostible material, then downwardly through said second and first layers and outwardly through said network of pipes, and  
(h) travelling over the upper surface of said second layer with appropriate conventional working vehicles to turn the composting material and/or remove composted material that is resting on the upper surface of said second layer.

4,952,231

## PROCESS FOR TREATING PRODUCT OF RADIATION TREATMENT OF AMMONIA-ADDED EFFLUENT GAS

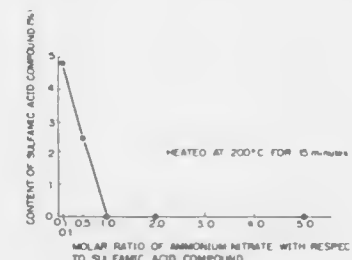
Mitsuyoshi Kaneko, Ryoji Suzuki, and Shinji Aoki, all of Tokyo, Japan, assignors to Ebara Corporation, Tokyo, Japan  
Continuation of Ser. No. 123,396, Nov. 20, 1987, abandoned.  
This application May 9, 1989, Ser. No. 349,082

Claims priority, application Japan, Nov. 26, 1986, 61-279791; Jun. 29, 1987, 62-159708

Int. Cl.<sup>5</sup> C05C 1/00, 1/02, 11/00

U.S. Cl. 71—59

13 Claims



1. A process for producing a fertilizer with a substantially reduced content of a sulfamic acid compound from an effluent gas comprising the steps of:

introducing an ammonia gas into an effluent gas comprising SO<sub>x</sub>, NO<sub>x</sub> and CO, the CO gas content being less than ten times the concentration of SO<sub>x</sub>;

irradiating the mixture with a radiation to form a solid product comprising ammonium sulfate and ammonium nitrate containing a sulfamic acid compound as an impurity;

heating said product at a temperature of from 130° C. to 250° C. in the presence of a molar amount of ammonium nitrate which is sufficient to reduce the amount of the sulfamic acid compound to a predetermined level equal to .01% or less with respect to 1% of the nitrogen content of the fertilizer and

obtaining a fertilizer consisting substantially of ammonium sulfate and ammonium nitrate.

4,952,232

## ANTIFUNGAL CARBINOLS

John Cuomo, Newark, Del.; Richard S. Greenberg, Fairlawn, N.J., and Richard E. Olson, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Continuation-in-part of Ser. No. 42,541, Apr. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 877,525, Jun. 23, 1986, abandoned. This application Dec. 17, 1987, Ser. No. 134,261

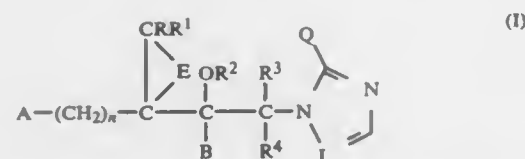
Int. Cl.<sup>5</sup> A01N 43/653; C07D 249/08

U.S. Cl. 71—92

84 Claims

1. A compound having the formula:



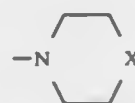


or a pharmaceutically or agriculturally suitable salt thereof wherein

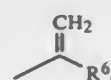
E is a bond;

A is perfluoroalkyl of 1-8 carbon atoms,  $N(CH_3)_2$ , OH, naphthyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and  $CF_3$ , phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from: haloalkyl of 1-4 carbon atoms, CN,  $CO_2R^{14}$ ,  $CH=NOR^{14}$ ,  $S(O)_mR^5$ ,  $R^6$ , 2-, 3-, or 4-pyridyl or an N-oxide thereof, imidazol-1-yl, 1,2,4-triazol-1-yl, and

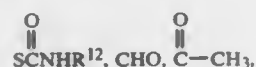


optionally substituted with 1 or 2 methyl groups; B is alkyl of 1-8 carbon atoms, naphthyl, biphenyl,



perfluoroalkyl of 1-8 carbon atoms, phenyl optionally substituted with 1-3 substituents each of which is independently selected from: halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from haloalkoxy of 1-4 carbon atoms, CN,  $CO_2R^{14}$ ,  $CH=NOR^{14}$ ,  $S(O)_mR^5$ , 2-, 3-, 4-pyridyl or an N oxide thereof.

benzyl optionally substituted on the phenyl ring with halogen or alkyl of 1-4 carbon atoms, or optionally  $\alpha$ -substituted with 1 or 2 methyl groups, or; Q is H, halogen,  $S(O)_mR^{11}$ ,



$CO_2R^{13}$ , SCN,  $SSR^{12}$ , or SH or its corresponding disulfide, provided however than when Q is other than H, then n is 0, R,  $R^1$ , and  $R^4$  are independently H or  $CH_3$ ,  $R_3$  is H, and A and B are each phenyl optionally substituted with from 1-3 substituents each of which is independently halogen,  $CH_3$ ,  $CF_3$ ,  $OCH_3$  or  $S(O)_mR^5$ ;

L is N;

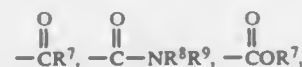
n is 0-4 with the proviso that when A is  $N(CH_3)_2$ , or OH, then n is other than 0;

m each occurrence is 0, 1 or 2;

X is C,  $NR^{10}$ , or O;

R and  $R^1$  independently are H, alkyl of 1-4 carbon atoms, halogen, or phenyl, or taken together form cycloalkyl of 3-7 carbon atoms;

$R^2$  is H, allyl, propargyl, alkyl of 1-4 carbon atoms,



or haloalkyl of 1-4 carbon atoms;  $R^3$  and  $R^4$  independently are H, F, or alkyl of 1-4 carbon atoms;

$R^5$  is alkyl of 1-4 carbon atoms;

$R^6$  is phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and  $CF_3$ ;

$R^7$  is alkyl of 1-4 carbon atoms, phenyl, or benzyl;

$R^8$  and  $R^9$  independently are H, alkyl of 1-4 carbon atoms, phenyl or benzyl;

$R^{10}$  is H, alkyl of 1-4 carbon atoms, or acetyl;

$R^{11}$  is alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms,  $CH_2CN$ ,  $CH_2SCN$ ,  $CH(CH_3)CN$ ,  $CH_2CO_2CH_3$ , or  $CH_2CO_2CH_2CH_3$ ;

$R^{12}$  is alkyl of 1-4 carbon atoms, allyl, phenyl optionally substituted with 1-2 substituents each of which is independently halogen,  $CH_3$ , or  $OCH_3$ , or benzyl optionally substituted with 1-2 substituents each of which is independently halogen,  $CH_3$ , or  $OCH_3$ ;

$R^{13}$  is H, or alkyl of 1-4 carbon atoms; and

$R^{14}$  is alkyl of 1-4 carbon atoms.

4,952,233

## HERBICIDAL

## SULPHONYLAMINO GUANIDINO AZINES

Klaus-Helmut Müller, Duesseldorf; Christa Fest, Wuppertal; Rolf Kirsten; Theodor Pfister, both of Monheim; Hans-Jochem Riebel, Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany Filed Aug. 2, 1988, Ser. No. 227,587

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726269

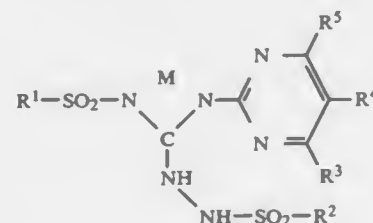
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> A01N 43/54; C07D 239/42, 239/48, 239/50

U.S. Cl. 71-92

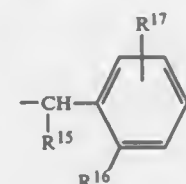
10 Claims

1. A sulphonylaminoguanidinoazine of the formula



in which

$R^1$  stands for the radical

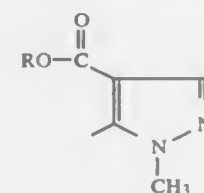


wherein

$R^{15}$  stands for hydrogen,

$R^{16}$  stands for fluorine, chlorine, bromine, methyl, methoxy, ethoxy, difluoromethoxy, trifluoromethoxy, methoxycar-

bonyl, ethoxycarbonyl, methylsulphonyl or dimethylaminosulphonyl and  $R^{17}$  stands for hydrogen; or  $R^1$  stands for the radical



wherein

R stands for  $C_1$ - $C_2$ -alkyl;

in addition

$R^2$  stands for  $C_1$ - $C_4$ -alkyl which is optionally substituted by fluorine or chlorine or for phenyl which is optionally substituted by fluorine, chlorine, bromine,  $C_1$ - $C_3$ -alkyl, trifluoromethyl, chlorodifluoromethyl, methoxy, ethoxy, difluoromethoxy, trifluoromethoxy, amino, acetamino, methoxycarbonyl and/or ethoxycarbonyl.

$R^3$  stands for hydrogen, fluorine, chlorine, bromine, methyl, trifluoromethyl, methoxy, ethoxy, difluoromethoxy, methylthio, ethylthio, ethylthio, amino, methylamino, ethylamino, dimethylamino or diethylamino,

$R^4$  stands for hydrogen, fluorine, chlorine or methyl,

$R^5$  stands for hydrogen, fluorine, chlorine, bromine, methyl, ethyl, methoxy, ethoxy, propoxy, isopropoxy, difluoromethoxy, methylthio, ethylthio, methylamino, ethylamino, dimethylamino or diethylamino, and

M stands for hydrogen or a sodium equivalent, potassium equivalent or calcium equivalent, an ammonium equivalent or a  $C_1$ - $C_4$ -alkyl-ammonium equivalent.

4. A method of combating unwanted vegetation which comprises applying to such vegetation or to a habitat from which it is desired to exclude such vegetation a herbicidally effective amount of a compound according to claim 1.

4,952,234

## IMIDAZOLE DIONE COMPOUNDS USEFUL AS HERBICIDES

Tatsuo Haneishi; Mutsuo Nakajima; Akio Torikata; Takao Okazaki, all of Hiromachi; Manbu Tohjiyamori, and Katsuhiko Kawakubo, both of Shiga, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 825,861, Feb. 4, 1986, abandoned. This application Jul. 29, 1988, Ser. No. 227,433

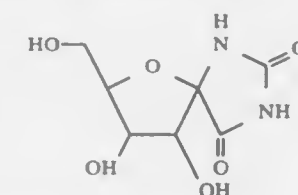
Claims priority, application Japan, Feb. 5, 1985, 60-20603

Int. Cl.<sup>5</sup> A01N 43/50; C07D 491/107

U.S. Cl. 71-92

5 Claims

1. A compound represented by formula:



5. A method of retarding the growth of a plant by applying to the growing plant, or to vegetative propagating material of the plant or to the environs of the plant a quantity of the compound of claim 1 effective to retard the growth of but not to kill the plant.

4,952,235

## (HETERO)ARYLOXYNAPHTHALENES HAVING SUBSTITUENTS BONDED VIA SULPHUR

Roland Andree, Langenfeld; Michael Haug, Bergisch-Gladbach; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

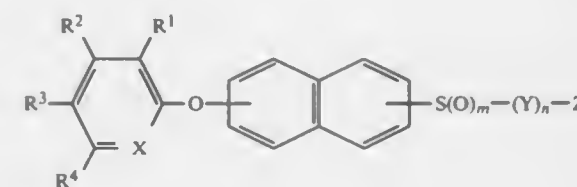
Filed Jun. 22, 1989, Ser. No. 370,354

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823318

Int. Cl.<sup>5</sup> A01N 43/40; C07C 323/17, 255/50, 317/12, 211/72 U.S. Cl. 71-94

7 Claims

1. An aryloxynaphthalene or heteroaryloxynaphthalene having a substituent bonded via sulphur and of the formula



in which

m represents the numbers 0, 1 or 2,

n represents the numbers 0 or 1,

$R^1$  represents hydrogen, halogen, cyano or trifluoromethyl,

$R^2$  represents hydrogen or halogen,

$R^3$  represents halogen, trifluoromethyl, trifluoromethoxy,

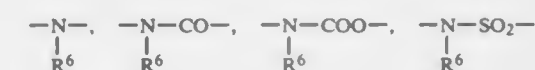
trifluoromethylthio or trifluoromethylsulphonyl,

$R^4$  represents hydrogen or halogen,

X represents nitrogen or the grouping  $C-R^5$ , wherein

$R^5$  represents hydrogen or halogen,

Y represents oxygen or one of the groupings



wherein  $R^6$  represents hydrogen,  $C_1$ - $C_4$ -alkyl,  $-CO-Z$  or  $-SO_2-Z$  and

Z represents hydrogen or halogen, or  $C_1$ - $C_6$ -alkyl which is optionally substituted by halogen, cyano, carboxyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_4$ -alkylcarbonyl,  $C_1$ - $C_4$ -alkoxy-carbonyl,  $C_1$ - $C_4$ -alkoxy-carbonyl- $C_1$ - $C_4$ -alkoxy-carbonyl and/or  $C_1$ - $C_4$ -alkylamino-carbonyl; or  $C_3$ - $C_6$ -cycloalkyl or  $C_3$ - $C_6$ -cycloalkyl- $C_1$ - $C_4$ -alkyl, in each case optionally substituted by halogen and/or  $C_1$ - $C_4$ -alkyl; or  $C_2$ - $C_6$ -alkenyl or  $C_2$ - $C_6$ -alkinyl, in each case optionally substituted by halogen, cyano, carboxyl and/or  $C_1$ - $C_4$ -alkoxy-carbonyl; or phenyl, naphthyl, phenyl- $C_1$ - $C_4$ -alkyl or naphthyl- $C_1$ - $C_4$ -alkyl, in each case optionally substituted by halogen, cyano, carboxyl, nitro,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_2$ -halogenoalkyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_2$ -halogenoalkoxy,  $C_1$ - $C_4$ -alkylthio,  $C_1$ - $C_2$ -halogenoalkylthio,  $C_1$ - $C_4$ -alkylsulphonyl,  $C_1$ - $C_4$ -alkylsulphonyl, di- $(C_1$ - $C_2$ -alkyl)-aminosulphonyl, di- $(C_1$ - $C_2$ -alkyl)-aminocarbonyl, di- $(C_1$ - $C_2$ -alkyl)-amino,  $C_1$ - $C_4$ -alkoxycarbonyl and/or  $C_1$ - $C_2$ -alkylenedioxy; or Z represents pyrazolyl, imidazolyl and triazolyl, which is optionally substituted by halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_2$ -halogenoalkyl,  $C_1$ - $C_4$ -alkoxy and/or  $C_1$ - $C_2$ -halogenoalkoxy, or a salt thereof.

**4,952,236**  
**METHOD OF MAKING HIGH STRENGTH, LOW MODULUS, DUCTILE, BIOCOMPATIBLE TITANIUM ALLOY**

Kathy K. Wang, Suffern, N.Y.; Larry J. Gustavson, Dover, and John H. Dumbleton, Ridgewood, both of N.J., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.  
 Division of Ser. No. 242,750, Sep. 9, 1988, Pat. No. 4,857,269.  
 This application May 25, 1989, Ser. No. 357,494  
 Int. Cl.<sup>5</sup> C22B 4/00

U.S. Cl. 148—2

5 Claims

1. A method for preparing a high strength, low modulus, ductile titanium base alloy which comprises mechanically blending particles of the following alloying components:  
 up to 24% by weight of at least one isomorphous beta stabilizer selected from the group consisting of molybdenum, tantalum, niobium and zirconium;  
 up to 3.0% by weight of at least one eutectoid beta stabilizer selected from the group consisting of iron, manganese, chromium, cobalt and nickel;  
 optionally up to 3.0% by weight of at least one metallic alpha stabilizer selected from the group consisting of aluminum and lanthanum;  
 and the balance titanium;  
 introducing the resulting blended feedstock into a plasma arc furnace wherein the blend is melted to form a homogeneous melt, allowing the melt to cool and solidify, vacuum arc remelting the resulting solid to assure that the hydrogen content does not exceed 0.02% by weight and thermomechanically processing the resulting solid at a temperature within the range of 710° to 1038° C. to provide an alloy having a modulus of elasticity not exceeding 100 GPa.

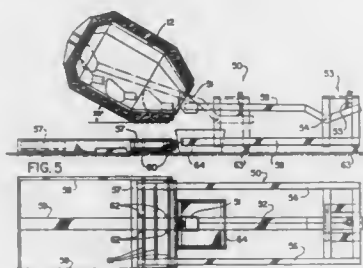
**4,952,237**  
**METHOD AND APPARATUS FOR RECOVERY OF NON-FERROUS METALS FROM DROSS**  
 Ghyslain Dube, Jean-Paul Huet, Serge Lavole, and Wesley D. Stevens, all of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Oct. 7, 1988, Ser. No. 255,060

Claims priority, application Canada, Dec. 22, 1987, 555114  
 Int. Cl.<sup>5</sup> C22B 7/00

U.S. Cl. 75—10.19

33 Claims



1. A process for recovering a non-ferrous metal from a dross containing the same, which comprises:  
 introducing the dross into a rotary furnace having a refractory lining;  
 heating the dross to a temperature above the melting point of the metal by directing a plasma torch into the furnace;  
 rotating the furnace in a manner selected from the group consisting of continuous rotation and intermittent rotation at a rotational speed of about 1 r.p.m. or less until the dross reaches said temperature above the melting point of the metal;  
 removing the molten metal thereby separated from a solid dross residue; and  
 removing said solid dross residue from the furnace.

**4,952,239**  
**MAGNETICALLY ANISOTROPIC BOND MAGNET, MAGNETIC POWDER FOR THE MAGNET AND MANUFACTURING METHOD OF THE POWDER**

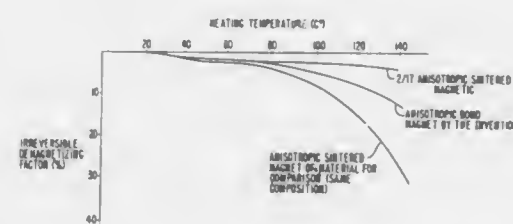
Masatoshi Tokunaga, Fukaya; Yasuto Nozawa, and Katsunori Iwasaki, both of Kumagaya, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan  
 Continuation of Ser. No. 26,969, Mar. 17, 1987, Pat. No. 4,921,553. This application Jun. 14, 1989, Ser. No. 366,160  
 Claims priority, application Japan, Mar. 20, 1986, 61-62174; May 9, 1986, 61-106187

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> H01F 1/047

U.S. Cl. 148—302

18 Claims



1. Anisotropic magnetic powder for a magnetically anisotropic bond magnet comprising an alloy powder of the R-TM-B-M system, wherein R is at least one of rare earth elements including Y, TM is Fe or Co, B is boron, and M is at least one additive selected from the group consisting of Si, Al, Nb, Zr, P and C, said powder having an average crystal size of 0.01–0.5 μm, an average grain size of 1–1,000 μm, a flattened grain structure with (c) greater than (a) in which (c) is the average size of the grain in the direction perpendicular to the C-axis and (a) is the average size of the grain in the C-axis direction, and has magnetic anisotropy.

**4,952,240**  
**SCRATCH REMOVER AND POLISH CONTAINING OLEIC DIETHANOLAMIDE, AN ABRASIVE ALUMINA AND A BENTONITE**

Ray E. Smith, Orlando, Fla., assignor to Pro-Max Performance, Inc., Memphis, Tenn.

Filed Jun. 15, 1989, Ser. No. 366,634

Int. Cl.<sup>5</sup> C09G 1/02, 1/18

U.S. Cl. 106—8

4 Claims

1. A metal polishing compound comprising:  
 tall oil fatty acid in an amount in the range of 30% to 65% by weight;  
 oleic diethanol amide in an amount in the range of 2% to 10% by weight;  
 aluminum oxide having particle sizes in the range of 0.1 to 1.0 microns in an amount in the range of 30% to 60% by weight; and  
 organo-treated bentonite in an amount in the range of 1% to 3% by weight.  
 4. A prepolish compound comprising:  
 mineral spirits in an amount of essentially 55% by weight;  
 oleic diethanol amide in an amount of essentially 6.7% by weight;  
 aluminum oxide having particle size of 19 grit in an amount of essentially 15% by weight; and  
 organo-treated bentonite in an amount of essentially 1.5% by weight.

**4,952,241**  
**(METH)ACRYLIC ACID DERIVATIVES CONTAINING URETHANE GROUPS**

Jürgen Reiners, Leverkusen; Wolfgang Podszus; Jens Winkel, both of Cologne; Carlhans Silling, Odenthal, and Gerhard Klein, Monheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
 Division of Ser. No. 72,467, Jul. 10, 1987. This application Jul. 13, 1989, Ser. No. 379,128

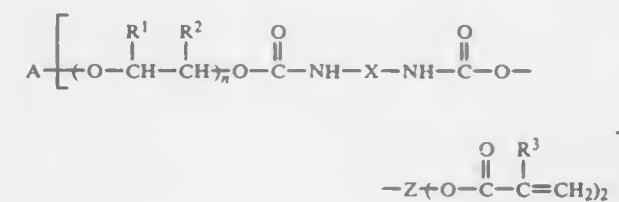
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 3625202; Feb. 3, 1987, 3703130

Int. Cl.<sup>5</sup> A61C 13/087; A61K 6/08; C07C 271/00

U.S. Cl. 106—35

7 Claims

1. A dental material containing a (meth)acrylic acid derivative containing urethane groups, of the formula



wherein

A is a straight-chain or branched aliphatic radical having 2 to 20 carbon atoms in a carbon chain and optionally containing 1 to 3 oxygen bridges, an aromatic radical having 6 to 24 carbon atoms, an araliphatic radical having 7 to 26 carbon atoms in a carbon chain or a monocycloaliphatic radical having 6 to 26 carbon atoms, or a cycloaliphatic radical having 6 to 26 carbon atoms,  
 n represents the number of chains starting from A and denotes a number from 2 to 6,  
 R<sup>1</sup> and R<sup>2</sup> are identical and denote hydrogen or are different and denote hydrogen and methyl,  
 n denotes a number from 0 to 5, independently for each chain starting from A,  
 X is a divalent, straight-chain or branched aliphatic radical having 2 to 24 carbon atoms in a carbon chain, an aromatic radical having 6 to 26 carbon atoms in a carbon chain, an araliphatic radical having 7 to 26 carbon atoms in a carbon chain or a monocycloaliphatic radical having 6 to 26 carbon atoms in a carbon chain, it being possible for the aliphatic, aromatic, araliphatic and/or monocycloaliphatic radicals to contain 1 to 2 oxygen bridges and for several of the aliphatic, aromatic, araliphatic and/or monocycloaliphatic radicals to be linked via optionally substituted methylene groups,  
 Z denotes a trivalent straight-chain or branched aliphatic hydrocarbon radical which has 3 to 15 carbon atoms in a carbon chain and can optionally contain 1 to 3 oxygen bridges and can optionally be substituted by 1 to 3 (meth)acrylate radicals, and  
 R<sup>3</sup> denotes hydrogen or methyl, independently for each chain starting from A and an effective amount of either a free radical polymerization initiator or a photoinitiator.

**4,952,242**  
**COMPOSITION FOR SOLIDIFICATION OR SEMI-SOLIDIFICATION OF WASTE MATERIALS**  
 Eugene F. Earp, 6026 Chattanooga Dr., Baton Rouge, La. 70817  
 Filed Mar. 29, 1988, Ser. No. 174,973  
 Int. Cl.<sup>5</sup> C04B 7/02

U.S. Cl. 106—709

6 Claims

1. A composition for converting wastes to a solid or semi-solid state comprising:  
 a. about 50 percent to about 65 percent by weight of Portland cement,  
 b. about 20 percent to about 28 percent by weight of a fixative selected from the group consisting of calcium sulfate,

compounds of calcium sulfate with water, calcium carbonate, and compounds of calcium carbonate with water, c. about 5 percent to about 20 percent by weight of biogenic, amorphous, silica ash, and  
 d. about 5 percent to about 10 percent by weight of an emulsifier selected from the group consisting of sodium phosphate and sodium carbonate, and mixtures thereof.

**4,952,243**  
**STATIC DEMOLITION-FACILITATING AGENT**  
 Waichi Kobayashi; Satoshi Otaka, and Masaaki Nagai, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Continuation-in-part of Ser. No. 14,471, Feb. 13, 1987, abandoned. This application May 24, 1988, Ser. No. 155,030  
 Claims priority, application Japan, Feb. 21, 1986, 61-35039

Int. Cl.<sup>5</sup> C04B 2/02; B02C 19/00

U.S. Cl. 106—672

18 Claims

1. A static demolition-facilitating agent consisting essentially of, as an effective principal component, quick lime particles having an apparent density of 2.0 or more, a unit volume weight of 1.0 kg/l or more, a particle size of 15 mm or less, and an average particle size of 0.1 mm or more, and 0.5% to 50%, based on the weight of the principal component, of rigid, porous inorganic grains having a maximum grain size of 12 mm and an average grain size of 0.5 mm or more, said rigid, porous inorganic grains selected from the group consisting of dehydrated zeolite grains, silica gel grains, cordierite grains, sintered clay porous grains, hardened cement porous grains and mixtures thereof.

**4,952,244**  
**PROTECTIVE COATINGS FOR POLYACETYLENIC RECORDING MEDIA**

David F. Lewis, Monroe, Conn.; Robert D. Schenfele, Caldwell, and Thomas Winkler, Maywood, both of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Oct. 17, 1988, Ser. No. 258,523

Int. Cl.<sup>5</sup> C09J 189/00; G03C 1/72

U.S. Cl. 106—135

5 Claims

1. A composition comprising imageable polyacetylenic crystals in a fixing medium coated with an aqueous solution of ascorbic acid and a binder compatible with said polyacetylenic crystals in said medium; said aqueous solution having a mole ratio of ascorbic acid to binder of between about 4:1 and about 10:1 and containing from about 0.1 to about 1 wt. % of a non-ionic surfactant.

**4,952,245**  
**NACREOUS PIGMENT CONTAINING A DYE AND COSMETIC COMPOSITION COMPRISING THE SAME**  
 Kazuko Iwano, Tokyo, and Momoko Suzumeji, Kashiwa, both of Japan, assignors to Kao Corporation, Tokyo, Japan  
 Filed Jul. 13, 1989, Ser. No. 379,073  
 Claims priority, application Japan, Jul. 22, 1988, 63-182871  
 Int. Cl.<sup>5</sup> C09C 1/62

U.S. Cl. 106—404

5 Claims

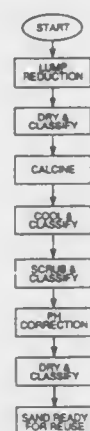
1. A nacreous pigment containing a dye comprising a nacreous pigment having an interference color which surface is coated with an insoluble salt of an acid dye and a basic aluminum salt.



**4,952,246**  
**PLANT AND METHOD FOR RECONDITIONING GREEN FOUNDRY SAND**  
 Robert J. Seeley, Muncy, Pa., assignor to Dependable Foundry Equipment Company, Inc., Sherwood, Oreg.  
 Filed Aug. 23, 1989, Ser. No. 397,754  
 Int. Cl.<sup>5</sup> C23G 1/02

U.S. Cl. 134—3

9 Claims



1. A method for reconditioning used green sand having a residuum of retained clay, comprising:  
 screening and predrying used green sand to about zero moisture;  
 calcining the sand to vaporize and burn organic matter contained therein;  
 cooling the calcined sand;  
 mechanically scrubbing the cooled sand to free mechanically bonded clay and a portion of the clay magnetically adhered to the sand;  
 removing the clay freed by the mechanical scrubbing;  
 mixing an acid/water solution with the sand to react with the remaining clay magnetically adhered to the sand to permit said remaining magnetically adhered clay to break free from the sand;  
 drying the sand to release the clay freed by the reaction of the acid/water solution with the sand; and  
 extracting the thus released clay from the sand.

**4,952,247**  
**PROCESS FOR THE CLEANING OF A PACKED COLUMN**

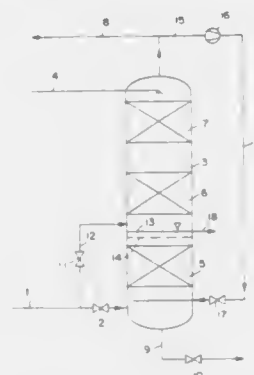
Ulrich Schrader, and Gerhard Alzner, both of Munich, Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 235,341  
 Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727191; Jun. 24, 1988, 3821349

Int. Cl.<sup>5</sup> B08B 9/00; B01D 53/34; C01B 17/05  
 U.S. Cl. 134—22.12 10 Claims

1. A process for cleaning a packed column comprised of packing elements retained in a plurality of spaced packed beds, "n" in number, superimposed in a vertical array from a lowermost to an uppermost packed bed, wherein the column is utilized in a scrubbing process for gas purification in which crude gas is scrubbed to remove H<sub>2</sub>S therefrom in an oxidative scrubbing operation with a scrubbing agent of a selected specific gravity to produce purified gas, and wherein the packed beds become obstructed by solid sulfur which accumulates during the scrubbing step, the cleaning process comprising:  
 selecting packing elements having a specific gravity lower than the specific gravity of the scrubbing agent;  
 flooding the column with a scrubbing agent from a level above the lowermost packed bed up to maximally a level above the packed bed (n-1) just beneath the uppermost packed bed to remove the solid sulfur from the elements in

the beds which have been immersed by suspending the solid sulfur in the scrubbing agent;  
 removing the solid sulfur from the packed column by removing a portion of the scrubbing agent suspending the



solid sulfur, and lowering the level of the scrubbing agents to a level beneath the packed beds, and continuing the scrubbing operation during the cleaning process.

**4,952,248**  
**VEHICLE AND METHOD TO CHEMICALLY ASSIST HIGH GLOSS BUFFING AND CLEANING OF A WAXED SURFACE**

Erik O. Aberg, P.O. Box 378, Solomons, Md. 20688  
 Continuation of Ser. No. 170,112, Mar. 17, 1988, abandoned, which is a continuation of Ser. No. 923,276, Oct. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 858,817, May 2, 1986, abandoned. This application Jul. 24, 1989, Ser. No. 384,078

Int. Cl.<sup>5</sup> B08B 3/08

U.S. Cl. 134—40 8 Claims  
 1. A method of chemically assisting high gloss buffing and cleaning pre-existing wax on a waxed surface thus improving the luster of a waxable surface without need for external water or wax, comprising the steps of:  
 providing a mixture consisting of effective amounts of ammonia, water, and alcohol;  
 momentarily fluidizing the wax at the microsurface of the waxed surface by applying the mixture in minute quantities to a limited portion of the waxed surface of waxable surface;  
 spreading said mixture and wiping the spread mixture from a limited portion of the surface of vehicle or other waxable surface rapidly with a highly absorbent paper towel pad to absorb grime released from said waxed surface during the fluidizing step; and  
 completing a polishing step with a clean dry paper towel pad once the surface wax produces a dry haze as fluidized wax resolidifies.

**4,952,249**  
**INTERMEDIATE COATING OF STEEL WIRE**  
 Paul Dambre, Kemmel, Belgium, assignor to N.V. Bekaert S.A., Zwevegem, Belgium  
 Filed May 9, 1988, Ser. No. 191,338  
 Claims priority, application European Pat. Off., May 20, 1987, 87.200954.3

Int. Cl.<sup>5</sup> C21D 9/52

U.S. Cl. 148—11.5 Q 9 Claims  
 1. A process of treatment of a drawn steel wire of a first diameter d<sub>1</sub> and in a patented state into a steel wire of a smaller diameter d<sub>2</sub> adapted for the reinforcement of rubber products, characterized by

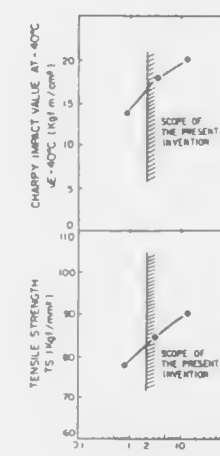
(a) drawing said wire by means of a lubricant to an intermediate work hardened state at an intermediate diameter d<sub>2</sub>, said lubricant comprising a zinc coating,  
 (b) pickling away said zinc coating,  
 (c) coating said wire at said intermediate diameter d<sub>2</sub> and work hardened state with a brass alloy,  
 (d) drawing said wire at said intermediate diameter d<sub>2</sub> and work hardened state to a final diameter d<sub>3</sub>.

**4,952,250**  
**METHOD FOR MANUFACTURING STEEL ARTICLE HAVING HIGH TOUGHNESS AND HIGH STRENGTH**  
 Kazuaki Matsumoto; Shinichi Suzuki, and Hisatoshi Tagawa, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Oct. 21, 1988, Ser. No. 261,240  
 Claims priority, application Japan, Oct. 29, 1987, 62-271667  
 The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> C21D 8/00

U.S. Cl. 148—12 F

6 Claims



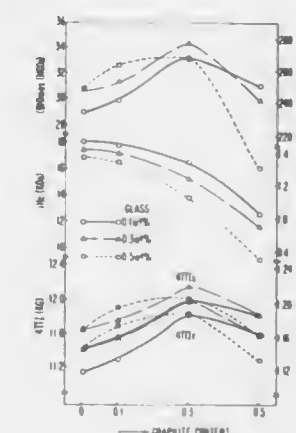
1. A method for manufacturing a steel article having a high toughness and a high strength, said steel article having a Charpy impact value at 25° C. (UE 25° C.) of at least 15.0 kgf.m/cm<sup>2</sup> and a Charpy impact value at -40° C. (UE -40° C.) of at least 10 kgf.m/cm<sup>2</sup> and having a yield strength (YS) of at least 60 kgf/mm<sup>2</sup> and a tensile strength (TS) of at least 80 kgf/mm<sup>2</sup> comprising providing a material comprising:

carbon : from 0.020 to 0.049 wt. %,  
 silicon : from 0.10 to 1.00 wt. %,  
 manganese : from 1.00 to 3.50 wt. %,  
 chromium : from 0.50 to 3.50 wt. %, the total amount of said manganese and said chromium being: 2.50 to 6.00 wt. %, aluminum : from 0.01 to 0.05 wt. %, boron : from 0.0003 to 0.0030 wt. %, titanium : from 0.005 to 0.030 wt. %, and the balance being iron and incidental impurities, the amount of nitrogen as one of said incidental impurities being up to 0.006 wt. %;  
 heating said material to an austenitization temperature sufficient so that said steel article will have said high toughness and said high strength;  
 hot-working said material at an austenitization temperature to prepare a steel article; and  
 cooling said steel article thus prepared from an austenitization temperature to a temperature of or lower than 300° C. at a cooling rate of from 2° to 200° C./second, thereby imparting said high toughness and said high strength to said steel article.

**4,952,251**  
**MAGNETICALLY ANISOTROPIC HOTWORKED MAGNET AND METHOD OF PRODUCING SAME**  
 Katsumori Iwasaki, Kumagaya; Shigeo Tanigawa, Kounosu, and Masaaki Tokunaga, Fukaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan  
 Filed May 23, 1989, Ser. No. 355,641  
 Int. Cl.<sup>5</sup> H01F 1/08

U.S. Cl. 148—101

6 Claims



1. A method for making a magnetically anisotropic hot-worked magnet comprising the steps of  
 (a) rapidly quenching a melt of an R-T-B alloy, wherein R is selected from the group consisting of rare earth elements, yttrium, and mixtures thereof, T is a transition metal, and B is boron;  
 (b) pulverizing said rapid-quenched melt material to form magnetic powder;  
 (c) mixing the magnetic powder with an internal lubricant comprising at least two additives including (i) an oxide glass material, and (ii) graphite;  
 (d) forming a green body from the mixture; and  
 (e) hot-working the green body to form a magnetically anisotropic magnet.

**4,952,252**  
**RARE EARTH-IRON-BORON-PERMANENT MAGNETS**  
 Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.  
 Division of Ser. No. 745,293, Jun. 14, 1985, Pat. No. 4,762,574.  
 This application Jun. 3, 1988, Ser. No. 201,949  
 Int. Cl.<sup>5</sup> H01F 1/09

U.S. Cl. 148—105

30 Claims

26. A neodymium-iron-boron permanent magnet containing added rare earth oxide prepared by the method comprising the steps of:  
 (a) mixing together components:  
 (i) a particulate alloy consisting essentially of neodymium, iron, cobalt, and boron; and  
 (ii) a particulate rare earth oxide selected from the group consisting of gadolinium oxide, terbium oxide, dysprosium oxide, holmium oxide, and mixtures thereof;  
 (b) aligning magnetic domains of the mixture in a magnetic field;  
 (c) compacting the aligned mixture to form a shape;  
 (d) sintering the compacted shape; and  
 (e) annealing the sintered shape.

**4,952,253**  
**GRAIN-ORIENTED SILICON STEEL SHEET HAVING A LOW IRON LOSS FREE FROM DETERIORATION DUE TO STRESS-RELIEF ANNEALING AND A METHOD OF PRODUCING THE SAME**

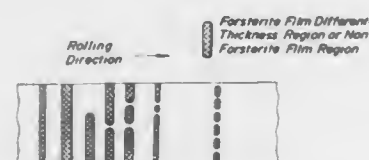
Ujihiro Nishikie, Michiro Komatsubara, Yoshiaki Iida, and Isao Matoba, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Continuation of Ser. No. 918,604, Oct. 10, 1986, abandoned, which is a continuation of Ser. No. 663,385, Oct. 22, 1984, Pat. No. 4,655,854. This application Nov. 5, 1987, Ser. No. 120,203 Claims priority, application Japan, Oct. 27, 1983, 58-201279; Oct. 27, 1983, 58-201280

Int. Cl.<sup>3</sup> H01F 1/04

U.S. Cl. 148—113

5 Claims



1. A grain-oriented silicon steel sheet having a low iron loss free from deterioration due to stress-relief annealing, said steel sheet containing about 2.0-4.0% by weight of Si, and having no plastically strained regions in a matrix surface layer and having a forsterite film said forsterite film locally having regions, which have a thickness different from that of the remaining regions in the film and have been periodically or regularly formed in the film, and said steel sheet further having a tension-giving type insulating coating film having a linear thermal expansion coefficient of not higher than  $9.8 \times 10^{-6}$  1/°C. formed on top of the forsterite film.

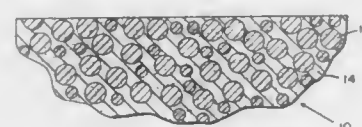
**4,952,254**  
**HIGH IMPULSE, NON-DETONABLE PROPELLANT**  
 Robert E. Betts, Huntsville; Lawrence B. Thorn, Madison, and William S. Melvin, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 7, 1989, Ser. No. 390,144

Int. Cl.<sup>3</sup> C06B 45/10

U.S. Cl. 149—19.4

3 Claims



1. A method of preparing a high impulse, non-detonable solid propellant grain from a first detonable propellant composition which is a cured propellant composition having a small critical diameter of less than one inch and having a propensity to detonate from an induced shock wave and a second detonable propellant composition which is an uncured propellant composition having a large critical diameter of at least several inches and having a propensity to detonate from an induced shock wave, said method comprising:

- selecting a predetermined amount of said cured propellant composition having a small critical diameter of less than one inch;
- grinding or cutting said cured propellant composition into granules less than its critical diameter in any direction;
- preparing a predetermined amount of said uncured propellant composition which is less than the critical diameter of said uncured propellant having a large critical diameter

of at least several inches, said uncured propellant composition serving as the binder and attenuator for said cured, solid propellant granules,

- adding an amount from about 80 to about 96 weight percent of said/cured propellant granules to an amount from about 20 to about 4 weight percent of said uncured propellant composition;
- mixing said cured propellant granules and said uncured propellant composition to form a homogeneous propellant blend; and,
- curing said homogeneous blend to yield a high impulse, non-detonable solid propellant grain having a critical diameter less than said critical diameter of said uncured propellant composition and having granules of said cured propellant composition having less than a critical diameter in any direction dispersed within said propellant composition having a large critical diameter.

2. A high impulse, non-detonable solid propellant grain prepared by the method of claim 1 wherein said first detonable propellant composition has a critical diameter of about 0.40 inch or less, wherein said second detonable propellant composition has a critical diameter of about 12 inches or more, and wherein said cured propellant grain has a diameter of about 10.00 inches with a critical diameter of greater than 10.00 inches, said propellant grain being nondetonable.

**4,952,255**  
**EXTRUDABLE PBX MOLDING POWDER**  
 Horace D. Stanton, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 2, 1984, Ser. No. 596,188

Int. Cl.<sup>3</sup> C06B 45/10

U.S. Cl. 149—19.91

2 Claims

1. An extrudable explosive molding powder comprising: about 20 percent by weight of an ethylene-vinyl acetate copolymer; and about 80 percent by weight pentaerythritoltetranitrate.

**4,952,256**  
**METHOD OF MAKING AN ELECTRICAL THROUGH CONNECTION BETWEEN A FLAT CONDUCTOR AND A ROUND CONDUCTOR**  
 Friedrich Schauer, Heroldsberg, and Hans Berthold, Eckental-Brand, both of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

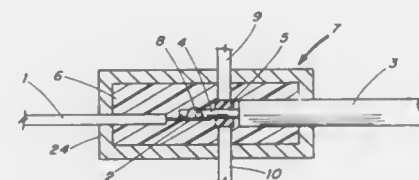
Filed Mar. 12, 1990, Ser. No. 491,718

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1989, 3912139

Int. Cl.<sup>3</sup> H01B 13/06

U.S. Cl. 156—49

3 Claims



1. Method of making an electrical through connection between a first conduction line comprising a first flat conductor, to a second conduction line comprising a first round conductor, comprising the steps of: removing end portions of insulation layers from said first flat conductor and said first round conductor to expose end portions thereof; placing a positioning ring about said exposed end of said first round conductor;

bonding an end segment of said exposed end portion of said first round conductor to said exposed end portion of said first flat conductor to achieve said electrical through connection therebetween; extending said first bonded conductors with said positioning ring, into an injection molding means, and axially fixing said first round conductor in said injection molding means by compressive engagement of said positioning ring by a plunger means; injecting a plastic material into said injection molding means to form an insulating seal longitudinally about said bonded conductors and said positioning ring; and disengaging said plunger means from said positioning ring.

**4,952,257**  
**LAMINATION REPAIR METHOD**  
 C. Richard Forler, St. Petersburg, Fla., assignor to E-P Corporation, St. Petersburg, Fla.

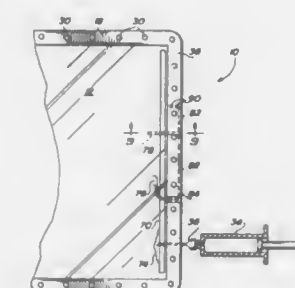
Continuation-in-part of Ser. No. 789,347, Oct. 21, 1985, which is a continuation of Ser. No. 704,896, Feb. 22, 1985, abandoned, which is a continuation of Ser. No. 546,809, Oct. 31, 1983, abandoned, which is a continuation of Ser. No. 413,079, Aug. 30, 1982, abandoned. This application Jun. 10, 1988, Ser. No. 205,202

The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> B32B 35/00

U.S. Cl. 156—94

4 Claims



1. A repair method for repairing electrical interconnect between electrical buss bars and electrically conductive ply of a heatable laminate, comprising the steps of: filling a syringe with an electrically conductive material, the syringe including a hypodermic needle affixed thereto; inserting the needle into the laminate parallel to the conductive ply and along the surface thereof in alignment with the buss bar until the needle reaches the interconnect such that the needle moves over the buss bar to the area proximate the interconnect; operating the syringe to inject an amount of the material into an area about the conductive ply; and withdrawing the needle.

**4,952,258**  
**PROCESS FOR PRODUCING LAMINATED SAFETY GLASS**  
 Gerhard Grollig, Moerfelden-Walldorf; Peter Boening, Wiesbaden; Manfred Kuechler, Oberursel, and Guenter Reinhard, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,060  
 Claims priority, application Fed. Rep. of Germany, Feb. 13, 1989, 3904191

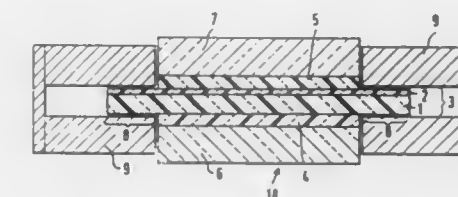
Int. Cl.<sup>3</sup> B32B 31/12, 17/10

U.S. Cl. 156—99

6 Claims

1. A process for producing laminated safety glass comprising a plurality of layers, at least one of which is a function layer, which comprises the steps of providing a plastic sheet layer,

depositing a film on said plastic sheet layer, inserting said plastic sheet layer between a plurality of further layers such that said plastic sheet layer projects beyond the edges of said



further layers, clamping said plastic sheet layer along its projecting sections without clamping the edges of said plurality of further layers, and laminating the stack of said plurality of layers while said plastic sheet layer remains clamped.

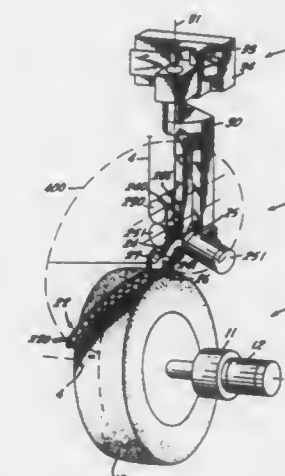
**4,952,259**  
**PROCESS FOR THE MANUFACTURE OF A TIRE REINFORCEMENT**  
 Claude Debroche, Cebazat, and Daniel Laurent, Meylan, both of France, assignors to Compagnie General des Etablissements Michelin, Clermont-Ferrand, France

Division of Ser. No. 57,250, Jun. 1, 1987, Pat. No. 4,804,436. This application Sep. 27, 1988, Ser. No. 249,713  
 Claims priority, application France, Jun. 2, 1986, 86 08011

Int. Cl.<sup>3</sup> B29D 30/08, 30/00

U.S. Cl. 156—117

6 Claims



1. A process for producing a tire reinforcement, the reinforcement comprising adjacent, substantially parallel cords, characterized by the fact that each reinforcement cord is projected individually to move in a plane and through an arc into its place in the reinforcement, the reinforcement being produced on the outer surface of an element which defines the geometry of the reinforcement, the cord being projected across the outer surface of the element, the outer surface of the element and the cord having self-adhering properties.



4,952,260

## PNEUMATIC RADIAL TIRE AND METHOD OF MANUFACTURING SAME

Kazuo Oda, Takarazuka, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

PCT No. PCT/JP87/00843, § 371 Date Aug. 19, 1988, § 102(e) Date Aug. 19, 1988, PCT Pub. No. WO88/03482, PCT Pub. Date May 19, 1988

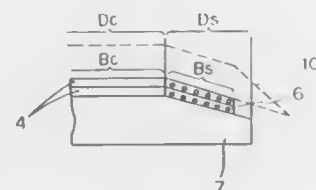
PCT Filed Oct. 30, 1987, Ser. No. 231,859

Claims priority, application Japan, Nov. 5, 1986, 61-263058

Int. Cl.<sup>3</sup> B29D 30/20

U.S. Cl. 156—130

2 Claims



1. A method of manufacturing a pneumatic radial tire comprising a carcass composed of at least one ply of substantially radially arranged cords and a belt layer disposed radially outside of said carcass and further comprising a center belt and two shoulder belts, said method comprising the steps of forming a belt layer, forming a tread and belt assembly, and forming a green tire, said method of forming a belt layer including utilizing a belt drum having a cylindrical face and tapered faces on each lateral side thereof, wherein the diameter of each tapered face gradually decreases in an axially outward direction of the belt drum, said method of forming the belt layer comprising the steps of: winding up a strip of rubber-coated cord fabric around the cylindrical face to form the ring-shaped center belt, the radially inner side of which being substantially constant in diameter over an entire width of the center belt; and continuously, spirally winding up at least one continuous cord around each of said tapered faces to form the ring-shaped shoulder belts, laterally disposed on opposite sides of said center belt, a radially inner side of each of said shoulder belts decreasing in diameter from an axially inner edge toward an axially outer edge thereof, said method of forming the tread and belt assembly comprising at least the step of winding up a belt-shaped tread around the circumference of the belt, and said method of forming the green tire comprising at least the step of applying said tread and belt assembly to the carcass shaped in a toroidal shape so as to be disposed around the circumference of the carcass.

4,952,261

## TOOTHED BELT MANUFACTURE INCLUDING DISPOSING STITCHED JOINT IN MANDREL GROOVE

Sokichi Nosaka, Kagawa; Takeshi Hamura, Komaki, and Takaji Nagai, Kobe, all of Japan, assignors to Mitsubishi Belting Ltd., Japan

Division of Ser. No. 94,518, Sep. 9, 1987, Pat. No. 4,813,919.

This application Dec. 19, 1988, Ser. No. 286,891

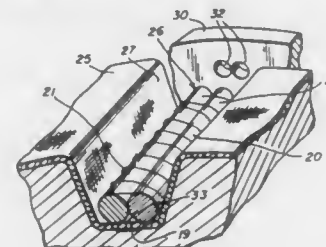
Int. Cl.<sup>3</sup> B29C 43/20, 53/60, 65/62

U.S. Cl. 156—138

27 Claims

1. The method of forming a toothed belt on a mandrel defining an axis and a peripheral surface having a plurality of circumferentially spaced tooth-forming grooves extending parallel to said axis, said method comprising the steps of: forming a sleeve from a preselected length of tooth-covering fabric by juxtaposing the opposite ends of said length, disposing at least one elongated element along said juxtaposed ends, and stitching said fabric opposite ends together to define a stitched joint, with said stitching extending about said element to releasably connect said element to said stitched joint;

disposing said sleeve in coaxial surrounding relationship with said mandrel and with said stitched joint disposed at a preselected position in one of said mandrel grooves; wrapping a tensile cord under preselected tension about the sleeve while maintaining said stitched joint at said preselected position;



withdrawing said element longitudinally from said stitched joint; and forming a rubber belt body in association with said tensile cord and fabric by forcing flowable rubber inwardly from about said tensile cord into said grooves to urge said fabric against said peripheral surface of the mandrel, with said stitched joint maintained accurately at said preselected position by the wrapped tensile cord, and causing said rubber to set to define a fabric covered toothed rubber belt.

4,952,262

## HOSE CONSTRUCTION

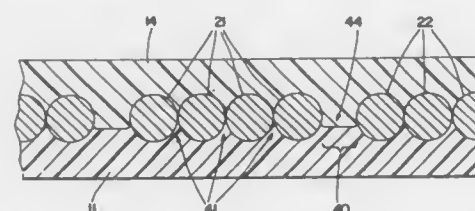
Donald E. Washkewicz, Aurora, and Harold Belofsky, Ravenna, both of Ohio, assignors to Parker Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 859,552, Mar. 5, 1986, abandoned. This application Nov. 8, 1988, Ser. No. 268,589

Int. Cl.<sup>3</sup> B32B 31/00

U.S. Cl. 156—149

24 Claims



1. The method of forming reinforced thermoplastic hose comprising the steps of extruding a thermoplastic core tube of continuous extended length, winding one or more layers of reinforcement over said core tube in closely spaced windings to form a reinforced core tube wherein the outer reinforcement winding material is ferrometallic wires having minute spaces between said wires, heating said outer wire windings by passing said reinforced core tube through heater apparatus while controlling such heating to limit extrusion of core tube material into said spaces between said wires to less than one-half the thickness of said outer reinforcement winding material, immediately thereafter, at elevated temperature, pressure extruding thermoplastic cover material over said reinforced core tube and through said spaces of said heated reinforcement wire to form a composite hose structure,

said cover material being extruded through said spaces to a depth exceeding the depth of any penetration of core tube material into said spaces, and cooling said composite hose structure to bond said cover material to said reinforcement wires to form an interlocking, integrated hose structure.

4,952,263

## METHOD OF MAKING AN OPTICAL CONNECTOR AND SPLICER

Toshiaki Kakii, Yasuo Asano, and Shuzo Suzuki, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 25,840, Mar. 13, 1987, Pat. No. 4,818,059.

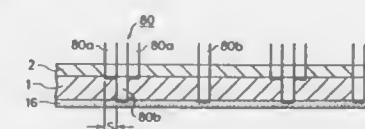
This application Sep. 30, 1988, Ser. No. 251,381

Claims priority, application Japan, Mar. 14, 1986, 61-57984; May 16, 1986, 61-113331; Aug. 26, 1986, 61-200409; Aug. 29, 1986, 61-204289; Sep. 26, 1986, 61-229238; Oct. 31, 1986, 61-261403

Int. Cl.<sup>3</sup> G02B 6/38

U.S. Cl. 156—153

15 Claims



1. A method of producing an optical connector having a positioning member comprising the steps of: preparing a substrate plate assembly from a single wafer made of a hard and brittle material; continuously forming a predetermined pattern of optical fiber grooves and guide pin grooves on a surface of said substrate plate assembly while grinding said surface of said substrate plate with a single blade; bonding at least one flat plate to said surface of said substrate plate assembly so that at least one optical fiber groove holding portion and at least one guide pin groove holding portion are provided to form a bonded assembly; cutting said bonded assembly into a plurality of sections each having predetermined dimensions of said positioning member, said bonded assembly being cut so that at least a part of the flat plate which is located on a fiber guiding portion is not cut off while an unnecessary portion is removed; inserting optical fibers from a side of an optical fiber groove holding portion having exposed area of said substrate plate into said optical fiber groove holding portion; and fixing a bare portion of inserted optical fibers in said optical fiber groove holding portion and simultaneously fixing a coated portion of said inserted optical fibers on a substrate plate step portion by bonding with an adhesive.

4,952,264

## METHOD FOR PRODUCING PLASTIC COMPONENTS

Michael Knape, Mari, Fed. Rep. of Germany, assignor to VTM-Verfahrenstechnik AG, Schweiz, Fed. Rep. of Germany

Filed Mar. 28, 1988, Ser. No. 174,250

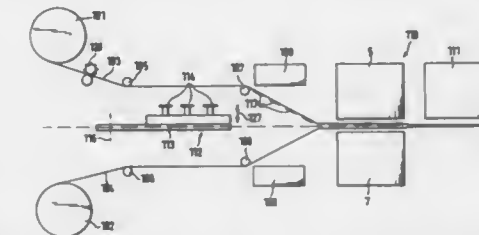
Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721780; Aug. 5, 1987, 3725932; Jan. 22, 1988, 3801854

Int. Cl.<sup>3</sup> B32B 31/08

U.S. Cl. 156—164

10 Claims

1. A process for producing plastic molded articles that are deep-drawn in a shaping apparatus into said molded articles from two plastic foil strips, one of which is provided with a hole pattern, bringing together the two plastic foil strips in the shaping apparatus, whereby, attached to one of the two foil strips, on its surface facing toward the other foil strip, are segments made of an absorbent material, shaping the two foil strips using a molding form and separating the molded articles



4,952,265

## MAT CONSISTING OF FILAMENT LOOP AGGREGATIONS AND METHOD AND APPARATUS FOR PRODUCING THE SAME

Minoru Yamanaka, Tokyo, and Tetsuo Amawa, Kasukabe, both of Japan, assignors to Kabushiki Kaisha Risuron, Tokyo, Japan

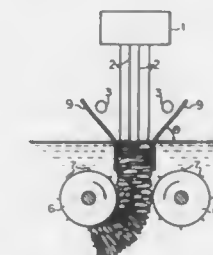
Filed Apr. 12, 1988, Ser. No. 180,534

Claims priority, application Japan, Feb. 9, 1988, 63-2683

Int. Cl.<sup>3</sup> B32B 33/00

U.S. Cl. 156—167

16 Claims



1. A method of producing a mat comprised of a plurality of filaments comprising the steps of: extruding a plurality of resin filaments from an extruder such that said filaments fall toward a cooling liquid held at a temperature of 60 to 80 degrees centigrade; heating the filaments as they fall toward the cooling liquid to keep said filaments at least close to their extrusion temperature; maintaining the surface of the cooling liquid in a boiling state thereby causing said filaments to loop and bond at a plurality of points upon reaching the surface of said cooling liquid, said boiling action causing said filaments to bond at more points than would normally occur absent such boiling; regulating the width of the filament loop aggregation created when said filaments loop and bond in the cooling liquid surface by means of a first pair of regulating means, said first pair of regulating means being situated opposite each other near the surface of said cooling liquid; and regulating the width of said filament loop aggregation as it sinks under the surface of said cooling liquid by means of

a second pair of regulating rollers having a plurality of engaging pins.

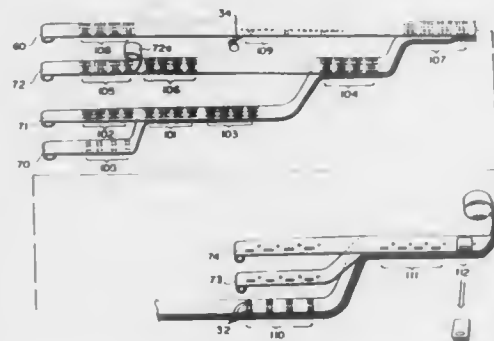
**4,952,266**  
**METHOD OF ASSEMBLING CHEMICAL ANALYSIS SLIDE**

Hikaru Tsuruta; Yuzo Tsunekawa, both of Kanagawa, and Yoshinori Torii, Saitama, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 8, 1988, Ser. No. 241,450  
Claims priority, application Japan, Sep. 8, 1987, 62-224877  
Int. Cl.<sup>3</sup> B29C 47/06

U.S. Cl. 156—243

2 Claims



1. A method of assembling a dry type chemical analysis slide having a plurality of plate members formed of thermoplastic resin and a mount which holds a detecting element formed by the use of an electrode film and is integrally sandwiched between the plate members, said method comprising the following steps:

- forming at least one of the plate members by extrusion into a continuous strip with a plurality of recesses on one side which respectively correspond to electrode receiving recesses of said at least one plate member;
- winding up the continuous strip into a roll;
- longitudinally unwinding and conveying said extruded continuous strip member in parallel with a plurality of other continuous strips which correspond to the other of said plurality of plate members while forming any required openings therein;
- laminating said extruded continuous strip and said plurality of other continuous strips together so as to form a single laminated strip; and
- stamping out individual chemical analysis slides from said laminated strip.

**4,952,267**  
**METHOD AND AN APPARATUS FOR BONDING TOGETHER AT LEAST TWO RUNNING LENGTHS OF MATERIAL**

Malcolm McPherson, Poole-Dorset, United Kingdom, and Reinhold Ernest, Stadthagen, Fed. Rep. of Germany, assignors to Grafotec Kotterer GmbH, Diedorf, Fed. Rep. of Germany

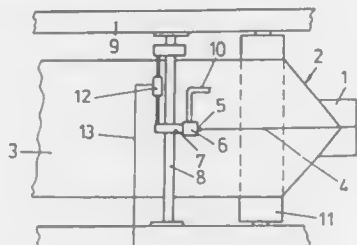
Filed Sep. 21, 1988, Ser. No. 247,341  
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735856; Nov. 26, 1987, 3740045

U.S. Cl. 156—291

12 Claims

1. A method for joining at least two paper webs or running lengths of material in a printing press together by means of at least one strip of adhesive, comprising the steps of:
- providing an adhesive having a viscosity ratio with that of water in the range of 1.5 to 2;
  - applying a low pressure to the adhesive;
  - filtering the adhesive prior to application to a web;

applying at least one strip of adhesive to at least one of the webs through a nozzle; and



changing over the nozzle from adhesive application to folding adjuvant liquid application for flusing the nozzle after turning off the press but before halting the web.

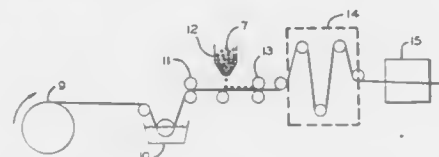
**4,952,268**  
**LAMINATED WATERPROOFING MATERIAL CONTAINING ASPHALT AND METHOD OF MAKING IT**

Martin H. Beck; Louis D. Tacito, both of Merrimack, N.H.; Warren Arseneau, Burlington, Canada; Robert J. Booth, Dalketh, Canada, and Khalid Jasim, Beaconsfield, Canada, assignors to Devtech Labs, Inc., Amherst, N.H.

Filed May 2, 1989, Ser. No. 346,239  
Int. Cl.<sup>3</sup> B32B 31/12, 31/20, 11/04

U.S. Cl. 156—295

28 Claims



15. A method of manufacturing waterproofing material, comprising the steps of:

- unrolling a continuous polyester film having a plurality of perforations therein;
- applying molten asphalt to both surfaces of the unrolled polyester film to form layers thereon;
- squeezing said polyester film, with the molten asphalt on both surfaces thereof, so that the asphalt is forced through the perforations in said polyester film to integrally join both asphalt layers together;
- depositing and impregnating a weather resistant material in at least one asphalt surface; and
- cooling said waterproofing material.

**4,952,269**  
**AUTOMATIC CLAMP ADJUSTER**

John L. Mortoly, deceased, late of Poughkeepsie, N.Y. (by Harriet E. Mortoly, executrix), and Bradley S. Quick, Pleasant Valley, N.Y., assignors to James L. Taylor Mfg. Co., Poughkeepsie, N.Y.

Continuation of Ser. No. 846,363, Mar. 31, 1986, Pat. No. 4,778,555. This application Sep. 14, 1988, Ser. No. 244,915

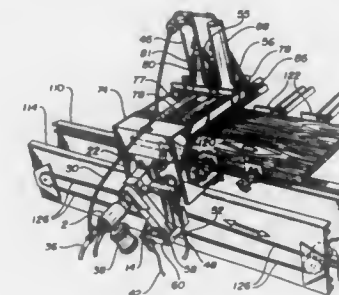
The portion of the term of this patent subsequent to Oct. 18, 2005, has been disclaimed.

U.S. Cl. 156—350

11 Claims

10. A machine for clamping a plurality of glued pieces of wood, the improvement comprising:
- an automatic clamp tightener and flattener assembly, said assembly comprising:
    - a base;
    - a frame attached to said base;
    - a tightener attached to said frame;

flattener means attached to said frame for flattening wood pieces at two adjacent work stations; and



means to sense the location of said assembly including automatic proximity sensors mounted on said frame, said sensors developing electrical signals as a function of clamp location.

**4,952,270**  
**BAND FEEDING AND TIGHTENING APPARATUS IN STRAPPING MACHINE**

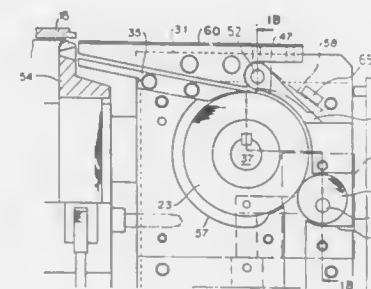
Yasunori Sakaki, Tokyo; Tsutomu Tagomori, Yokohama, and Eisaku Yamada, Tokyo, all of Japan, assignors to Strapack Corporation, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,433  
Claims priority, application Japan, Jan. 12, 1987, 62-154627[U]

U.S. Cl. 156—361

Int. Cl.<sup>3</sup> B65C 13/04

10 Claims



1. A band feeding and tightening apparatus in a strapping machine, comprising:

- a housing;
- a strapping band inlet means and strapping band outlet means defined within said housing;
- a feed roller rotatably mounted within said housing;
- motor drive means operatively connected to said feed roller for rotating said feed roller in first strapping band advancing and second strapping band retracting directions along a strapping band movement path;
- a follower roller operatively cooperative with said feed roller for advancing said strapping band from said strapping band inlet means toward said strapping band outlet means in said first strapping band advancing direction along said strapping band movement path, and for retracting said strapping band from said strapping band outlet means toward said strapping band inlet means in said second strapping band retracting direction along said strapping band movement path;
- outlet means defined within said housing within the vicinity of said feed roller for permitting a portion of said strapping band to escape from said housing under abnormal feeding and retracting movement conditions of said strapping band along said strapping band movement path; and
- chute guide means, disposed within the vicinity of said strap-

ping band escape outlet means and opposite a peripheral portion of said feed roller so as to define therewith a portion of said strapping band movement path, pivotably mounted at a forward end thereof disposed toward said strapping band outlet means such that a rearward end thereof disposed toward said strapping band inlet means pivotably moves away from said peripheral portion of said feed roller so as to permit said strapping band to escape from said housing through said strapping band escape outlet means.

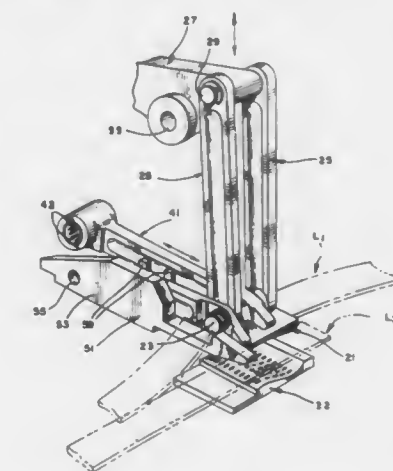
**4,952,271**  
**APPARATUS FOR FORMING AN OFFSET JOINT IN FLEXIBLE THERMOPLASTIC STRAP**

Nelson Cheung, Hoffman Estates, and Robert J. Nix, Algonquin, both of Ill., assignors to Signode Corporation, Glenview, Ill.

Filed Jan. 26, 1989, Ser. No. 371,217  
Int. Cl.<sup>3</sup> B29C 65/06; B65B 13/32

U.S. Cl. 156—502

42 Claims



1. An apparatus for providing an improved configuration of first and second lengths of flexible thermoplastic strap to accommodate the formation of an improved joint therebetween, said apparatus comprising:

- first and second opposed strap engaging members adapted to receive between them said strap lengths arranged in an overlapping relationship and to press said lengths together; each said member defining a contoured surface for engaging one of said strap lengths; each said contoured surface including a generally convex surface and a generally concave surface; said strap engaging members being disposed to align said concave surface of said first member generally in registry with said convex surface of said second member and to align said convex surface of said first member generally in registry with said concave surface of said second member.

6. Apparatus for providing an improved configuration of first and second lengths of flexible thermoplastic strap to accommodate the formation of an improved joint therebetween wherein said lengths each have a joint portion and an associated trailing portion extending from said joint portion in a direction away from the other strap length trailing portion, said apparatus comprising:

- first and second strap engaging members respectively defining first and second contoured surface means for engaging respectively said first and second strap lengths to position said joint portions between said members in an overlapping relationship along an interface region and to position at least part of the length of said trailing portion of each said strap length to extend in a plane generally parallel to a reference plane with at least a part of the length of said interface region being non-parallel to said reference plane.



4,952,272

## METHOD OF MANUFACTURING PROBING HEAD FOR TESTING EQUIPMENT OF SEMI-CONDUCTOR LARGE SCALE INTEGRATED CIRCUITS

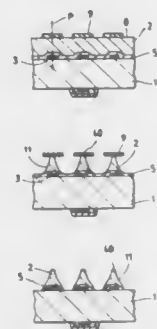
Hironobu Okino, Kawasaki; Akio Fujiwara, Chigasaki; Yutaka Akiba, Fujisawa; Susumu Kasukabe, Yokohama; Tsuyoshi Fujita, Yokohama; Masao Mitani, Yokohama; and Kazuo Hirota, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,252

Claims priority, application Japan, May 30, 1988, 63-130130  
Int. Cl.<sup>3</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06

U.S. Cl. 156—630

20 Claims



1. A method of manufacturing a probing head for testing equipment of semiconductor large scale integrated circuits (LSI), wherein the probing head comes into contact with an electrode pad of the semiconductor LSI to transmit an electric signal to a testing equipment body, the method comprising the steps of:

- preparing a multilayer circuit substrate accommodating therein a structure of multilayer circuit and in which electrode pad patterns are provided in a predetermined spaced relation on opposite surfaces thereof;
- coating and forming a pad protecting conductive layer on one surface of said multilayer circuit substrate;
- forming a probe pin conductive layer on said pad protecting conductive layer and flattening said surface;
- forming a first mask pattern having a center axis registered with said electrode pad on said probe pin conductive layer;
- forming a second mask pattern having a larger diameter of a hole than that of said first mask pattern on said first mask pattern, said second mask pattern being formed concentric with said first mask pattern;
- applying a first stage etching to said probe pin conductive layer using said second mask pattern as a mask to form a rough pin shape;
- removing said second mask pattern, applying a second stage etching and controlling a dimension of said pin tip and a peripheral edge of an electrode pad at a base; and
- removing said first mask pattern and etching and removing an exposed portion of said pad protective layer in a self-matching manner using said pin base as a mask.

4,952,273

## PLASMA GENERATION IN ELECTRON CYCLOTRON RESONANCE

Oleg A. Popov, Franklin, Mass., assignor to Microscience, Inc., Norwell, Mass.

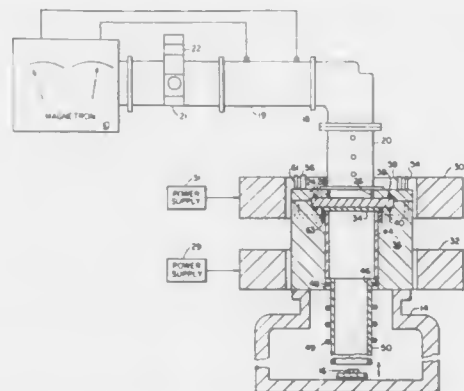
Filed Sep. 21, 1988, Ser. No. 247,416

Int. Cl.<sup>3</sup> H01J 27/00; B44C 1/22; B05D 3/06; C23C 14/00  
U.S. Cl. 156—643

35 Claims

15. Apparatus for generating a plasma from a gas, comprising introducing the gas into an evacuated chamber, delivering microwave power, via a window of the chamber, establishing, within the chamber, a magnetic field to cause

the motion of electrons in the chamber to be resonant with a frequency of the microwave power, and



causing the evacuated chamber to have a dimension that is non-resonant with respect to propagation of the microwave power within the chamber in the absence of the plasma.

4,952,274

## METHOD FOR PLANARIZING AN INSULATING LAYER

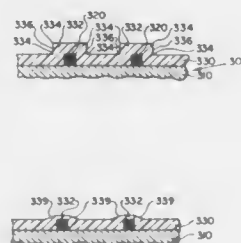
Thomas Abraham, Kanata, Ontario, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed May 27, 1988, Ser. No. 199,489

Int. Cl.<sup>3</sup> B44C 1/22; C03C 15/00

U.S. Cl. 156—643

19 Claims



17. A method for reducing the height of steps in a layer of SiO<sub>2</sub> while tapering side walls of the steps, the method comprising:

- forming a layer of photoresist between the steps; and
- etching the SiO<sub>2</sub> and the photoresist in a mixture comprising 5 part O<sub>2</sub>, 3 parts CHF<sub>3</sub> and 3 to 8 parts Ar at a pressure between 8 mtorr and 20 mtorr, and a power between 900 watts and 1300 watts.

4,952,275

## COPPER ETCHING SOLUTION AND METHOD

Charles W. C. Lin, and Ian Y. K. Yee, both of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Dec. 15, 1989, Ser. No. 452,458

Int. Cl.<sup>3</sup> C23F 1/00; B44C 1/22; C09K 13/00; C03C 15/00  
U.S. Cl. 156—666

10 Claims

10. A method of etching copper comprising the step of contacting the copper to be etched with an nonaqueous solu-

tion comprising dimethyl sulfoxide and a halocarbon compound.

cooking liquor in an amount effective to increase the yield of pulp.

4,952,276

## METHOD FOR MEASURING THE BLEACHING CONTENT OF PULP BLEACHING LIQUOR USING A CHEMILUMINESCENT REAGENT

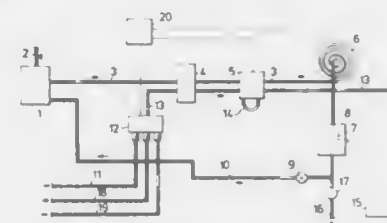
Claes-Göran Gidlund, Örnasköldsvik, and Håkan E. Östman, Sjölevad, both of Sweden, assignors to Moch Domajo AB, Örnasköldsvik, Sweden

Continuation of Ser. No. 211,162, Jun. 22, 1988, abandoned, which is a continuation of Ser. No. 937,290, Dec. 3, 1986, abandoned. This application Jan. 8, 1990, Ser. No. 463,824

Claims priority, application Sweden, Dec. 3, 1985, 8505714  
Int. Cl.<sup>3</sup> D21C 7/12, 9/10; G01N 21/76

U.S. Cl. 162—49

15 Claims



1. A method for measuring the bleaching chemical content of cellulose pulp bleaching liquor within the cellulose pulp industry, in which a sample of the bleaching liquor is brought together with one or more reagents, of which at least one is chemiluminescent so as to result in the emission of light, the intensity of which is determined as a measurement of said chemical content, said method comprising the steps of: continuously advancing a constant flow of reagent through a conduit system and introducing a small quantity of sample liquor intermittently into the flow of reagent, so as to produce a chemiluminescent reaction; causing the reaction, and therewith the emission of light, to continue over a given period of time of at least two seconds until the light intensity has reached its highest intensity and is decreasing so as to fall within the measuring range of a light responsive device; with repeated measurements, constantly measuring the light intensity after said given time period using said light responsive device; and converting the light intensity to the bleaching chemical content.

4,952,277

## PROCESS FOR PRODUCING KRAFT PULP FOR PAPER USING NONIONIC SURFACE ACTIVE AGENTS TO IMPROVE PULP YIELD

Cheng-I Chen, Jacksonville, and Theresa D. Hancock, Green Cove Spring, both of Fla., assignors to Bet PaperChem, Inc., Jacksonville, Fla.

Continuation-in-part of Ser. No. 163,043, Mar. 2, 1988, abandoned. This application May 19, 1989, Ser. No. 354,982

Int. Cl.<sup>3</sup> D21C 3/02, 3/20  
U.S. Cl. 162—72

9 Claims

1. A process for making paper or linerboard, the process comprising cooking wood chips in a kraft liquor to form a kraft pulp, the liquor excluding anthraquinone and including a surface active agent having the general formula:



where n is an integer from 8 to 12, and x is a positive integer from 1 to 100, the surface active agent being present in the

4,952,278

## HIGH OPACITY PAPER CONTAINING EXPANDED FIBER AND MINERAL PIGMENT

Paul E. Gregory, and Kenneth D. Vinson, both of Germantown, Tenn., assignors to The Procter & Gamble Cellulose Company, Memphis, Tenn.

Filed Jun. 2, 1989, Ser. No. 360,649

Int. Cl.<sup>3</sup> D21H 17/67, 11/18

U.S. Cl. 162—141

11 Claims

1. An opacified paper structure comprising cellulosic fibers, from about 1% to about 25% expanded cellulosic fibers, based on the dry weight of said opacified paper structure, and an effective amount of an opacifying mineral pigment, said paper having a basis weight from about 20 to about 120 grams per square meter, and a density of about 1.0 grams or less per cubic centimeter.

4,952,279

## PAPERMAKING METHOD

Hisao Ikeda; Fumio Suzuki; Yoshitane Watanabe; Mitsunobu Matsumura; Yasuhiro Takahashi; Hiroshi Murakami, and Koichi Maeda, all of Funabashi, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Division of Ser. No. 147,851, Jan. 25, 1988, Pat. No. 4,840,705.

This application Dec. 23, 1988, Ser. No. 289,550

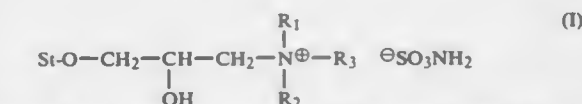
Claims priority, application Japan, Feb. 2, 1987, 62-22092

Int. Cl.<sup>3</sup> D21H 17/29; C08B 31/08

U.S. Cl. 162—175

8 Claims

1. A method for preparation of a starch ether derivative as represented by formula (I)



in which the degree of substitution of the ether bond is from 0.01 to 0.1, wherein a quaternary ammonium sulfamate of formula (II)



is reacted with a starch in a molar amount larger than the molar amount of the substituted ether bond of said starch derivative having the degree of substitution of from 0.01 to 0.1 but smaller than 10 times said molar amount of the substituted ether bond.

4,952,280

## PROCESS FOR CONTROLLING THE ADDITION OF RETENTION AIDS IN PAPERMAKING

Ralf Hemel, Lampertheim, and Jaroslav Melzer, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 14, 1989, Ser. No. 366,495

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822783  
Int. Cl.<sup>3</sup> D21C 7/06

U.S. Cl. 162—198

1 Claim

1. A process for controlling the addition of retention aids in papermaking, which comprises:

- (a) determining a set-point degree of flocculation of a stock suspension;
- (b) measuring the retention and degree of flocculation of a stock suspension;

- (c) determining the effect of variable stock values ( $X_1, \dots, X_n$ ), on the retention and the degree of flocculation with the aid of statistical methods;
- (d) using the determined effect of stock values to set up empirical equations:

$$Y_1 = f_1(X_1, \dots, X_n);$$

and

$$Y_2 = f_2(X_1, \dots, X_n);$$

- where  $Y_1$  represents the total retention and  $Y_2$  represents the set-point degree of flocculation;
- (e) storing the empirical equations as a control algorithm in a computer;
- (f) continuously inputting measured data of the stock values to the computer so that a maximum amount of retention-influencing stock components can be determined; and
- (g) sending control signals from the computer to a metering apparatus to control the input of retention aids so that the greatest possible retention can be achieved without exceeding the set-point degree of flocculation.

4,952,281

## SHEET CURLS REFORMER

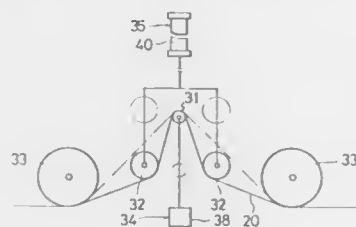
Sakurabayashi Akira, Shizuoka, Japan, assignor to Kobayashi Engineering Works, Ltd., Shizuoka, Japan  
Filed May 5, 1989, Ser. No. 348,068

Claims priority, application Japan, May 10, 1988, 63-111655; May 10, 1988, 63-111656

Int. Cl.<sup>5</sup> D21F 7/00; B65H 23/24

U.S. Cl. 162-270

2 Claims



1. An apparatus for straightening sheet curls in which a wrap angle  $\theta$  is provided for a sheet wound off from a winding roll having a changing diameter  $D$  as the sheet is wound off from it comprising a decurler bar which is applied to said sheet and is located between two backup rolls, a wrap angle adjusting device for adjusting said wrap angle of said sheet by relatively changing the position of both said backup rolls and said decurler bar, and a controller means for controlling said wrap angle adjusting device, means for continuously detecting the diameter  $D$  of said winding roll, and means for calculating an optimum wrap angle using the logical equation:  $\theta = A/D^q + B$ , wherein  $A$ ,  $B$  are constants which are previously determined based on the type of sheet to be decurled,  $q$  is a constant which is previously determined based on the type of sheet to be decurled,  $D$  is the diameter of said winding roll, from which said optimum angle  $\theta$  for the diameter  $D$  of said winding roll can be calculated, in correspondence with the change in said diameter of said winding roll, and said controller means, being structured and arranged to control said wrap angle based on said detection means and said calculation means.

4,952,282  
PATTERN PLATE FOR MAKING MOULDS INTENDED FOR THE PRODUCTION BY SAND CASTING OF WINDOW SEALS OR SIMILAR ARTICLES HAVING AN UNDERCUT BEAD

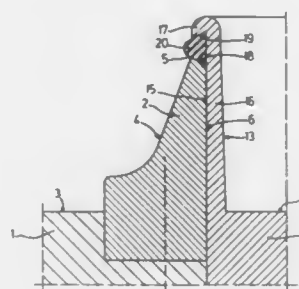
Claude G. Daumas, Arnage, France, assignor to Societe Man-celle De Fonderie, Arnage, France

Filed Jul. 6, 1989, Ser. No. 376,008

Claims priority, application France, Jul. 7, 1988, 88 09257  
Int. Cl.<sup>5</sup> B22C 7/04, 9/22

U.S. Cl. 164-245

10 Claims



1. A pattern plate for making moulds for sand casting articles having an undercut bead, said pattern plate having a fixed exterior part, an axially movable interior part mounted inside said exterior part, and an elastomeric bead-forming part, said bead-forming part having no undercut and being outwardly deformable to form a casting site for a bead in response to subjection of said pattern plate to compaction pressure of sand in a mould.

4,952,283

APPARATUS FOR VENTILATION, RECOVERY OF HEAT, DEHUMIDIFICATION AND COOLING OF AIR  
Ferdinand K. Besik, 2562 Oshkin Ct., Mississauga, Ontario, Canada (L5N 3Z3)

Filed Feb. 5, 1988, Ser. No. 152,808

Int. Cl.<sup>5</sup> F28D 17/02; F25B 17/08

U.S. Cl. 165-4

24 Claims

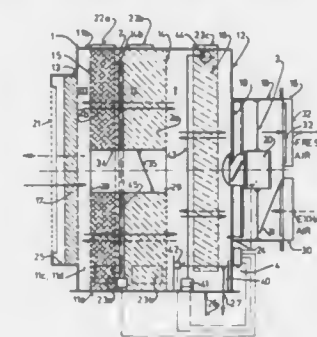
1. An apparatus for ventilation, recovery of heat, dehumidification and cooling of gas operating with stationary matrix means in a short cycle comprising a sorption period and a desorption period and removing particulates and transferring moisture and or heat between two gas streams, said apparatus comprising:

container means including at least one container for housing said matrix means, with each said container including front, rear and side walls and screen means, said screen means separating each said container into first, second and third consecutive chambers, said first and third chambers having at least one intake-exit opening for intake and exit of said two gas streams, said second chamber housing said matrix means and having flanged openings for replacement of said matrix means,

matrix means including fine heat-absorbing solids, means

retained by said screen means in each said container, said matrix means removing particulates, moisture, and or heat from one of said two gas streams during said sorption period of said operating cycle, and then releasing said particulates, moisture, and or heat into said other gas stream during said desorption period of said operating cycle,

air fan means in communication with each said container and pumping said two gas streams alternately into, through and out of each said container and countercurrently to each other through said matrix means during said sorption



and desorption periods of said operating cycle of each said container, and

process control means including a variable timer and relays interconnected with said matrix means and air fan means, and maintaining said operating cycle of each said container and matrix means by regular periodic switching of said air fan means, and maintaining said operation of said apparatus in either of a heat recovery mode, a cooling mode, a dehumidifying mode, and or a ventilating mode, and permitting a continuous operation of said air fan means when operating in a continuous ventilating mode.

4,952,284

## LOCKING DEVICE FOR AN OVEN DOOR

Wolfgang Becker, Bochum, Fed. Rep. of Germany, assignor to Ruhrkohle AG, Essen, Fed. Rep. of Germany

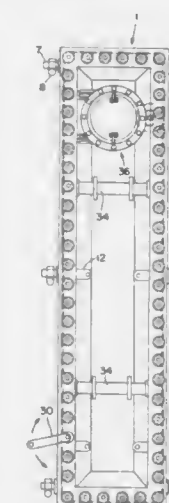
Filed Jul. 28, 1988, Ser. No. 225,682

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 3725537; Dec. 23, 1987, 3743679

Int. Cl.<sup>5</sup> C10B 25/06, 25/16

U.S. Cl. 202-248

13 Claims



1. A locking device for an oven door, wherein the oven extends horizontally and includes an interior defined by inte-

rior walls and a door opening which is surrounded by door frame means, the door frame means includes an external sealing surface, and the oven door includes a sealing unit having peripheral edge portions for overlying and making sealing contact with the sealing surface of the door frame means, said locking device comprising:

support frame means for generally surrounding the sealing unit to overlie the peripheral edge portions thereof;

means for anchoring said support frame means to the door frame means with the peripheral edge portions disposed therebetween;

a plurality of contact pressure elements disposed about said support frame means for being in alignment with the peripheral edge portions;

means for causing said contact pressure elements to produce a sealing force on the peripheral edge portions to produce the sealing contact with the sealing surface of the door frame means;

said support frame means including a pair of vertical support frame elements which are for being respectively located at opposite sides of the sealing unit and a pair of horizontal support frame elements which are for being respectively located at the top and at the bottom of the sealing unit;

said vertical support frame elements and said horizontal support frame elements having adjacent corresponding ends which are joined;

said plurality of contact pressure elements being evenly disbursed about said vertical support frame elements and said horizontal support frame elements;

each of said contact pressure elements including an outer end, an intermediate portion and an inner end;

each of said contact pressure elements being threadably mounted at said intermediate portion thereof to its corresponding one of said vertical support frame element and said horizontal support frame element so that rotation of said outer end of said contact pressure element produces axial movement of said inner end of said contact pressure element;

said outer end of said contact pressure element including a sprocket wheel; and

chain drive means connecting said sprocket wheels of said contact pressure elements for corresponding relative rotation thereof.

4,952,285

## ANTI-TARNISH TREATMENT OF METAL FOIL

Lifun Lin; Chung-Yao Chao, both of Hamden, and Ned W. Polan, Madison, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 338,711, Apr. 14, 1989, abandoned.

This application Dec. 22, 1989, Ser. No. 456,038

Int. Cl.<sup>5</sup> C25D 5/48, 7/06

U.S. Cl. 204-27

22 Claims

1. A process for imparting tarnish and oxidation resistance to copper and copper alloy foil material, said process comprising: applying a dilute aqueous chromic acid-sulfuric acid solution to said material, said solution having a concentration of chromic acid in the range of about 0.02 g/l to about 5 g/l and a concentration of sulfuric acid in the range of about 0.02 g/l to about 20 g/l.

4,952,286

## ELECTROPLATING PROCESS

John J. Bladon, Wayland; John N. Robinson, Ayer, and Michael Rousseau, Woburn, all of Mass., assignors to Shipley Company Inc., Newton, Mass.

Continuation-in-part of Ser. No. 71,865, Jul. 10, 1987,

abandoned. This application Feb. 8, 1988, Ser. No. 153,366

Int. Cl.<sup>5</sup> C25D 5/54

U.S. Cl. 204-15

10 Claims

1. A method for electroplating a nonconductor, said method comprising the steps of:



- a. treating the surface of said nonconductor with an acid solution of a reduced noble metal electroless metal plating catalyst to form a deposit of said reduced noble metal electroless metal plating catalyst on at least a portion of said surface;
- b. treating the surface of the nonconductor with a solution containing a dissolved chalcogen capable of reacting with the electroless metal plating catalyst to form a chalcogenide of said electroless metal plating catalyst as a coating on at least said portion of said surface; and
- c. metal plating the surface of the nonconductor by passing a current between electrodes immersed in an electrolyte containing dissolved plating metal where one of said electrodes comprises said nonconductor to be plated.

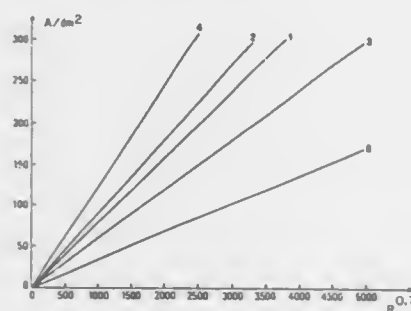
4,952,287

## ELECTROLYTIC GALVANIZING PROCESSES

Santa Alota; Nazzareno Azzetti; Roberto Bruno; Massimo Memmi, and Susanna Ramundo, all of Rome, Italy, assignors to Centaro Sviluppo Materiali S.P.A., Rome, Italy. Continuation of Ser. No. 07/13/288, Dec. 9, 1987, abandoned, which is a continuation of Ser. No. 06/886,786, Jul. 18, 1986, abandoned. This application Jun. 21, 1989, Ser. No. 370,169. Claims priority, application Italy, Jul. 18, 1985, 48371 A/85. Int. Cl.<sup>5</sup> C25D 7/06

U.S. Cl. 204—28

1 Claim



1. In an electrolytic galvanizing process in which steel strip to be zinc coated is passed continuously through an acid electrolyte solution containing zinc ions and is used as a cathode, while the electrolyte solution is made to flow in the space between the cathode and an anode in an electrolytic cell; the improvement comprising, in a given cell in which the range of current density (I) is 15-300 A/dm<sup>2</sup>, the range of concentration (C) of zinc in the electrolyte solution is 40-80 g/l and the range of Reynolds number (Re) is between 1,000 and 200,000, performing the following steps:

varying I, C and Re within the above ranges in said given cell until there is laid down on steel strip a deposit of zinc microcrystals in which the (0001) face of the crystals is parallel to the surface of the material plated, whereby the zinc coating consists of hexagonal grains adjacent to one another thus forming a very compact, smooth, virtually continuous layer;

changing the values of I, C and Re in said given cell within said ranges until another set of values of I, C and Re is found at which a zinc deposit formed of microcrystals as described above is formed;

inserting the two different sets of values of I, C and Re into the equation  $I = K C Re^n$  and simultaneously solving the two equations thus produced to determine respective values of K and n; and

subsequently operating said given cell to cast steel strip with zinc using still further different values of I, C and Re which satisfy the above equation when K and n have said determined respective values.

4,952,288  
PROCESS FOR THE PREPARATION OF  
4-ACYLOXYAZETIDIN-2-ONE BY ELECTROCHEMICAL  
METHODS

Joseph E. Lynch, Plainfield; Ralph P. Volante, East Windsor, both of N.J.; William L. Laswell, Perkasi, Pa., and Ichiro Shinkai, Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

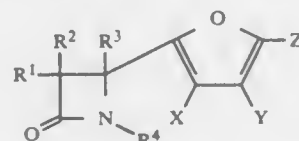
Filed Jun. 21, 1989, Ser. No. 369,167  
Int. Cl.<sup>5</sup> C25B 3/00

U.S. Cl. 204—59 R

10 Claims

1. A method for the production of 4-carboxyazetidin-2-one comprising the steps of:

(a) contacting, at temperatures from about 0°-20° C., an oxidizing combination of bromine and sufficient sodium chlorite to produce 4-carboxyazetidin-2-one with a 4-furanyl compound of the formula



wherein R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of hydrogen, C<sub>1-10</sub> alkyl, C<sub>1-10</sub> fluoroalkyl, alpha-carbon substituted C<sub>1-10</sub> alkyl, alpha-carbon substituted C<sub>1-10</sub> fluoroalkyl, where the alpha-carbon substituent is selected from the group consisting of hydroxyl and protected hydroxyl; R<sup>3</sup> is selected from the group consisting of hydrogen and C<sub>1-10</sub> alkyl; R<sup>4</sup> is selected from the group consisting of hydrogen and a protecting group for nitrogen; and X, Y and Z are independently selected from the group consisting of hydrogen, halogen, C<sub>1-10</sub> alkyl, C<sub>6</sub> or 10 aryl, C<sub>1-10</sub> alkoxy, C<sub>6</sub> or 10 aryloxy.

4,952,289

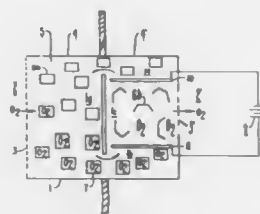
MACROCYCLIC AMINE COMPLEXES FOR LIGAND  
EXTRACTION AND GENERATION

Joseph P. Ciccone, Davis; Emory S. DeCastro, Emeryville, and John B. Kerr, Oakland, all of Calif., assignors to Aquanautics Corporation, Alameda, Calif.

Filed May 9, 1988, Ser. No. 191,519  
Int. Cl.<sup>5</sup> C25B 1/02

U.S. Cl. 204—129

20 Claims



1. A method for extracting a ligand from a first fluid environment, the method comprising the steps of:

contacting the first fluid environment containing ligand with a first surface of a first ligand permeable membrane having a first surface and a second surface wherein the membrane separates the environment from an interior space of a container;

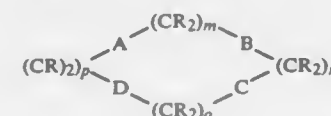
contacting a carrier fluid with the second surface of the membrane wherein the carrier fluid is confined in the container and the carrier fluid contains a carrier compound, whereby at least a portion of a ligand which diffuses through the membrane binds to the carrier compound to give bound ligand complex;

transporting the carrier fluid containing the bound ligand complex to a first electrode compartment of an electrochemical cell which forms a second portion of the container;

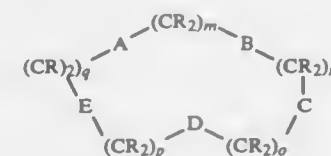
electrochemically modulating the carrier compound to an oxidation state having a relatively less binding affinity for the ligand, thereby releasing free ligand into the carrier fluid and producing a non-binding state carrier compound; removing ligand from the carrier fluid to give a ligand depleted carrier fluid;

transporting the ligand depleted carrier fluid containing the non-binding state carrier compound to a second electrode compartment of an electrochemical cell which forms a third portion of the container; and

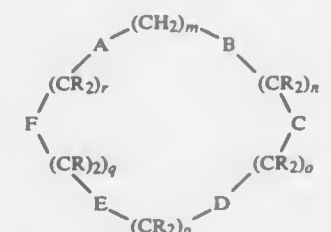
electrochemically modifying the non-binding state carrier compound to reform the binding state carrier compound; wherein the carrier compound comprises a metallic complex of a transition metal ion and a macrocyclic amine having the general formula:



or:



or:



where:

A, B, C, D, E, and F are each nitrogen, oxygen, sulfur, or phosphorous;

m, n, o, p, q, and r are each 2, 3, 4, 5 or 6; and

each R is selected from the group consisting of hydrogen, short chain linear alkyl, and short chain branched alkyl, or R<sub>2</sub> is ketyl.

4,952,290

WASTE WATER TREATMENT AND RECOVERY  
SYSTEM

Michael E. Carnarius, Camp Hill, and Srinivasan V. Sarma, Hummelstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 16, 1989, Ser. No. 324,774  
Int. Cl.<sup>5</sup> C02F 1/04

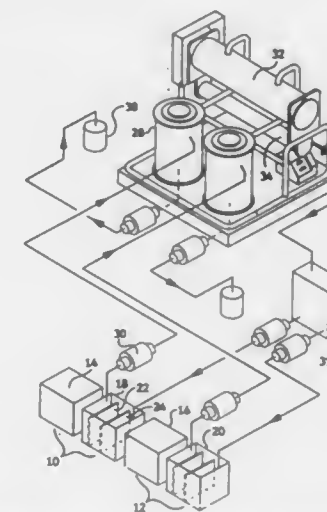
U.S. Cl. 204—149

3 Claims

1. A method of operating an electroplating system by fully recovering and recycling rinse solutions, which method includes a plurality of treatment stations, where each station comprises a treatment tank and a rinse tank, and means for sequentially moving metallic parts for treatment therein from a treatment tank and a rinse tank of a first treatment station, to a treatment tank and rinse tank of a second treatment station, said method comprising the steps of

(a) collecting and transferring overflow solution from each said rinse tank to a vacuum chamber, where said overflow treatment tank, and said overflow solutions are isolated

- from other overflow solutions within said vacuum chamber,
- (b) vaporizing said overflow solution,
- (c) condensing the vapors thereof and storing or directly transferring the condensate to said treatment stations,
- (d) collecting said chemical constituents as a residue of said overflow solution, and



(e) retaining said residue until a predetermined concentration of said chemical constituents is achieved, and transferring said residue to its corresponding treatment tank, whereby the electroplating system is fully recyclable without creating waste product.

4,952,291

PROCESS FOR THE PURIFICATION OF ALDEHYDES  
Neville E. Drysdale, Newark, Del.; Frederick W. Mader, Kennett Square, Pa., and Rudolf E. Svadlenak, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 6, 1989, Ser. No. 446,775  
Int. Cl.<sup>5</sup> B01J 19/08

U.S. Cl. 204—157.93

28 Claims

1. A process for purifying an aldehyde in a mixture which contains hemiacetals and hydrates of the aldehyde wherein the hemiacetals and hydrates are decomposed and liberated water and alcohol are removed, comprising the steps of:

- (a) treating the mixture with an effective amount of microwave radiation to decompose hemiacetals and hydrates, and
- (b) immediately removing liberated water and alcohol from the mixture with an absorbent.

4,952,292

PROCESS FOR MANUFACTURING  
2,4-HEXADIYNE-1,6-DIOL

Srinivasan Sridhar, Marl, and Helmut Westermacher, Haltern, both of Fed. Rep. of Germany, assignors to Huel Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 206,672

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721474

Int. Cl.<sup>5</sup> C07C 31/18

U.S. Cl. 204—180.1

16 Claims

1. A process for manufacturing 2,4-hexadiyne-1,6-diol by the oxidative catalytic coupling of propargyl alcohol, comprising:

- (1) charging a reactor with an oxidative coupling catalyst, propargyl alcohol, butanol and water to obtain a reaction mixture;

- (2) pressurizing said reaction mixture with oxygen to a gauge pressure of from 0.1 to 5 bar and heating said reaction mixture to a temperature of 5° to 80° C. with concomitant vigorous stirring;
- (3) obtaining a two-phase mixture at the end of the reaction by ceasing said stirring;
- (4) separating said two-phase mixture into a first solution of 2,4-hexadiyne-1,6-diol in butanol and a second aqueous solution;
- (5) subjecting said first solution of 2,4-hexadiyne-1,6-diol in butanol to electrodialysis as the process stream therein, using as the transfer stream in said electrodialysis a solution comprising propargyl alcohol, butanol, and water;
- (6) obtaining as the first product stream from said electrodialysis a desalinated solution comprising 2,4-hexadiyne-1,6-diol and as a second product stream a solution comprising catalyst salt, propargyl alcohol, water and butanol.

4,952,293

**POLYMER ELECTRODEPOSITION PROCESS**  
Donald Sypula, and Joseph Mammino, both of Penfield, N.Y., assigns to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1989, Ser. No. 459,240

Int. Cl.<sup>5</sup> C25D 13/06, 13/14

U.S. Cl. 204—180.7

20 Claims

1. An electrodeposition process for forming a free standing belt shaped film comprising providing at least one sleeve electrode coaxially spaced apart from and surrounding at least one other electrode in a bath comprising a dispersion of electrically charged, thermoplastic film forming polymer particles in an organic liquid dispersion medium substantially free of water, said polymer particles having a weight average molecular weight of at least about 35,000 and being substantially insoluble in said organic dispersion liquid medium at electrodeposition temperatures and sufficiently soluble in said organic dispersion liquid medium at elevated drying temperatures to coalesce and form a viscous coating, applying an electric field across the electrodes until a thick, substantially uniform deposit of polymer particles forms on the interior surface of said sleeve electrode, removing said sleeve electrode bearing said deposit of polymer particles and residual liquid dispersion medium clinging to said deposit of polymer particles from said bath, heating said deposit to initially solubilize said polymer particles in said residual organic liquid dispersion medium to form a coalesced, continuous viscous coating of the solubilized polymer particles, continuing said heating to evaporate said residual organic liquid dispersion medium and form a continuous, solidified, dry, belt shaped polymer film, cooling said continuous, solidified, dry, belt shaped polymer film from said interior surface of said sleeve electrode.

4,952,294

**APPARATUS AND METHOD FOR IN-SITU GENERATION OF DANGEROUS POLYATOMIC GASES, INCLUDING POLYATOMIC RADICALS**

George J. Collins, 807 W. Oak St., Fort Collins, Colo. 80521; John R. McNeil, 13423 Desert Hills N.E., Albuquerque, N. Mex. 87111, and Zeng-gi Yu, 500 W. Prospect, Apt. 7C, Ft. Collins, Colo. 80526

Continuation of Ser. No. 168,259, Mar. 15, 1988, abandoned.

This application Feb. 28, 1989, Ser. No. 317,103

Int. Cl.<sup>5</sup> C23C 14/00

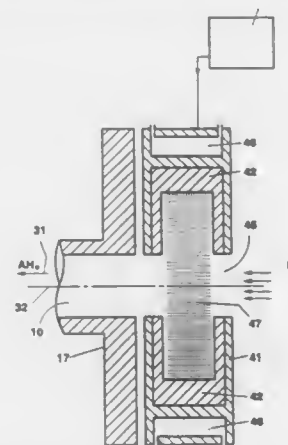
U.S. Cl. 204—192.11

11 Claims

1. A single-chamber apparatus for in-situ generation of dangerous polyatomic gases, including polyatomic radicals, for removal from and subsequent use outside the apparatus, the apparatus comprising:

- a discharge chamber having a feedstock gas entry port for admitting one or more feedstock gases into the discharge chamber and an exit port for removing the generated dangerous polyatomic gases, including polyatomic radicals, from the discharge chamber, the discharge chamber

containing a cathode maintained within a fixed temperature range, the cathode providing both an ion beam heat source as the result of ions impinging on the cathode and a plasma discharge within the discharge chamber, the cathode comprising a target material contained within a porous foamed structure that includes a desired elemental species, the fixed temperature range at which the cathode



is maintained being specifically chosen such that the elemental species is removed from the target material by evaporation induced by heat from said ion beam heat source impinging on said target material while at the same time preventing consumption by evaporation of the porous foamed structure itself; and power supply means for applying an electrical potential to the cathode.

4,952,295

**METHOD OF PRODUCING A DEPOSITION FILM OF COMPOSITE MATERIAL**

Hidetsugu Kawabata, Hirakata; Yoshihiko Kudoh, Yawata; Motoyoshi Murakami, Hirakata; Norio Miyatake, Kobe, and Masakazu Yamamoto, Kawanishi, all of Japan, assigns to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

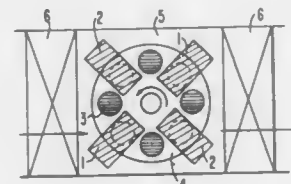
Filed Apr. 14, 1989, Ser. No. 337,888

Claims priority, application Japan, Apr. 15, 1988, 63-93758; Sep. 1, 1988, 63-219027

Int. Cl.<sup>5</sup> C23C 14/34

U.S. Cl. 204—192.15

1 Claim



1. A method of producing a protecting film for a magneto-optical recording medium, comprising the steps of: disposing at least one sputtering target of ZnSe, at least one sputtering target of SiO<sub>2</sub>, and a substrate in a vacuum chamber; and subjecting the substrate to sputtering from the sputtering targets sequentially while moving the substrate at an adequately high speed relative to a deposition rate from each sputtering target so that thin layers of the materials from the respective sputtering targets each having a thickness in the order of an inter-atom distance are sequentially stacked repeatedly a plurality of times to obtain a protec-

tive film of a composite material in which the ZnSe and the SiO<sub>2</sub> are uniformly distributed.

4,952,296

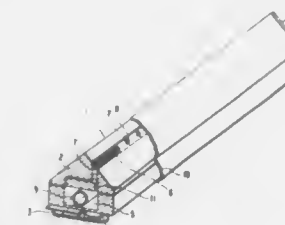
**DEVICE FOR SELECTIVE GALVANIC COATING**  
Peter Wingenfeld, Degenfelderstrasse 26/2, 7070 Weller, and Dietmar Holdt, Staufenstrasse 19, 7078 Leinzell, both of Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,405

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1988, 3839223

Int. Cl.<sup>5</sup> C25D 17/14

U.S. Cl. 204—206



1. An apparatus for the selective, galvanic coating of electrically conductive objects comprising a rod-like anode, said anode having a body and provided in its cross section with one or more edges, said edges being in contact with an electrolyte distributed on at least one electrolytic carrier, wherein said at least one electrolytic carriers are sunk into the anode body as strips terminating substantially flush with the anode surface in the immediate vicinity of said one or more anode edges, said strips parallel to a longitudinal direction of said anode, parallel to the edges, and that the electrolytic carriers are connected to a band comprising a liquid-permeable, adsorbent and wear-resistant material which closely surrounds the one or more anode edges, wherein the objects are coated by passing the objects along said one or more edges of the rod-like anode.

4,952,297

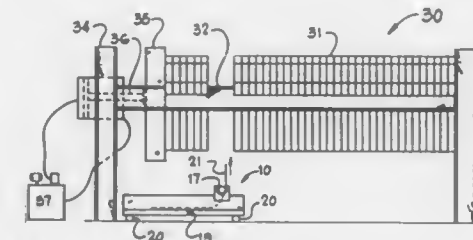
**STORAGE, TRANSPORTATION AND INSTALLATION CONTAINER FOR ION-EXCHANGE MEMBRANES**  
Roy L. Hicks, and James F. McDonnell, Jr., both of Lake Jackson, Tex., assigns to The Dow Chemical Company, Midland, Mich.

Filed Jul. 15, 1988, Ser. No. 220,057

Int. Cl.<sup>5</sup> C25B 9/00, 13/02, 13/08

U.S. Cl. 204—255

13 Claims



1. A combination storage, transportation and installation container for ion-exchange membranes comprising
  - (a) a container with at least four sides and a bottom, said container adapted for receiving at least one ion-exchange membrane in a substantially horizontal, planar position inside the container and
  - (b) a roller tension bar member disposed across at least two parallel side walls of the container near the end thereof, said tension bar member adapted for guiding an ion-ex-

change membrane being removed upwardly from inside the container to a use point above the container.

4,952,298

**CORRECTIVE CONTROLLER SYSTEM FOR ELECTROLYTIC CELLS**

Bernard Bouche-Pillon, Laver; Rene Clair, Martignes, and Jean-Pierre Canjolle, Chaponost, all of France, assigns to Atochem, Puteaux, France

Filed Mar. 17, 1989, Ser. No. 324,822

Claims priority, application France, Mar. 17, 1988, 88 03446

Int. Cl.<sup>5</sup> C25B 9/00, 15/08

U.S. Cl. 204—228

11 Claims

1. An electrolytic cell including an operation control system therefor, said control system comprising:
  - (a) measuring means for supplying signals of measurement of the flow rates of at least one of the inlet starting materials to the cell or of at least one of the outlet final products therefrom;
  - (b) optionally, means for controlling the flow rate of at least one of the inlet or outlet materials/products;
  - (c) at least one means for measuring the temperature of the electrolyte, and, optionally, at least one means for controlling this temperature;
  - (d) computing means linked to the means (a) for measuring flow rates, and to the means (c) for measuring the temperature of the electrolyte, and further wherein:
    - (i) the computing means (d) are linked to at least one means for measuring cell current;
    - (ii) the computing means (d) are adopted to conduct corrective coherence treatments of the flow rate measurements supplied by the measuring means (a) and of the measurement of the current; and,
    - (iii) the computing means (d) supply at least one signal improved by such corrective coherence treatment and applicable to at least one of (1) the measuring means (b) for controlling the flow rates, (2) a means for controlling the current and/or (3) the means for controlling the temperature.

4,952,299

**WAFER HANDLING APPARATUS**

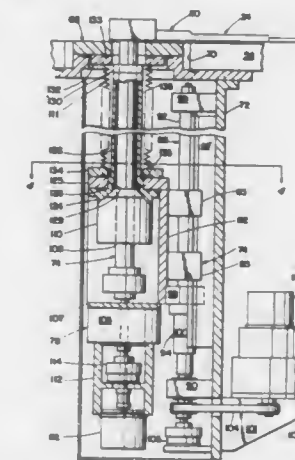
John M. Chisom, Beverly; Bertram F. Fowler, Jr., Danvers, and Richard S. Muka, Topsfield, all of Mass., assigns to Eaton Corporation, Cleveland, Ohio

Filed Oct. 31, 1988, Ser. No. 264,591

Int. Cl.<sup>5</sup> C23C 14/56

U.S. Cl. 204—298.25

6 Claims

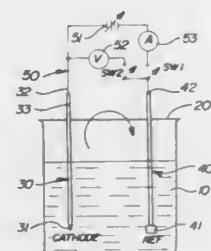


1. In apparatus for the vacuum processing of semiconductor wafers having a first chamber maintained under vacuum, a



second chamber at substantially atmospheric pressure, and a plate member defining a boundary between said first chamber and said second chamber, the improvement comprising: apparatus for handling said wafers within said first chamber including a wafer receiving arm disposed within said first chamber, a drive shaft fixed to said arm and extending from said first chamber into said second chamber, a flange member received in a hole formed in said plate member and in sealing engagement with said plate member, means mounting said shaft for linear movement relative to said flange member, said mounting means including frame means movable linearly with said shaft and supporting said shaft for rotary movement; means operatively connected to said shaft to rotate said shaft and to move said shaft axially, rotary seal means engaging said shaft and being effective to maintain a seal between said first chamber and said second chamber when said shaft is rotated, and a bellows assembly in surrounding relation to said shaft and being effective to maintain a seal between said first chamber and said second chamber when said shaft is undergoing its axial movement, said bellows assembly comprising a first annular member having a flat surface formed thereon in engagement with a flat surface of said flange member, a second annular member having a flat surface formed thereon in engagement with a flat surface of said frame means, and a bellows fixed at one end to said first annular member and at its opposite end to said second annular member.

**4,952,300**  
**MULTIPARAMETER ANALYTICAL ELECTRODE STRUCTURE AND METHOD OF MEASUREMENT**  
 Howard Diamond, 121 Huronview Blvd., Ann Arbor, Mich. 48103  
 Division of Ser. No. 27,846, Mar. 19, 1987, Pat. No. 4,798,655.  
 This application Sep. 14, 1988, Ser. No. 244,713  
 Int. Cl.<sup>5</sup> G01N 27/46, 27/48, 27/50  
 U.S. Cl. 204—406 7 Claims



1. An ion sensitive electrode device for simultaneously or sequentially measuring the concentrations of an ionizable analyte and a dissolved gaseous analyte contained in an aqueous medium, comprising:

- I. an electrode pair including:
  - a polarographically active base metal/metal oxide working electrode having the property of providing a stable electrochemical potential that is a quantitative measure of said ionic species and acting as a catalyst for electron transfer, allowing for a quantitative polarographic or amperometric measure of said dissolved gaseous analyte;
  - a reference electrode;
- II. means for supporting said electrodes in contact with the aqueous medium and in the same chemical environment;
- III. external circuit means in electrical communication with the electrode pair including:
  - means for measuring the voltage generated by the electrode pair in open circuit;
  - means for measuring the closed circuit current flow at a preselected impedance; and
  - means for comparing said voltage and current flow values with predetermined reference standards to provide two values representative of said analyte concentrations.

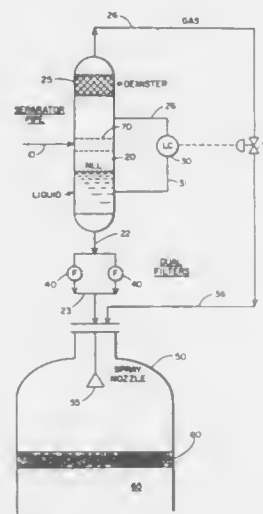
**4,952,301**  
**METHOD OF INHIBITING FOULING IN CAUSTIC SCRUBBER SYSTEMS**  
 Spencer S. Awbrey, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.  
 Filed Nov. 6, 1989, Ser. No. 432,699  
 Int. Cl.<sup>5</sup> C10G 19/00

U.S. Cl. 208—48 AA 27 Claims  
 1. A method for inhibiting the formation of polymeric based fouling deposits which, in the absence of inhibition treatment, are formed during the basic washing of hydrocarbons contaminated with oxygen-containing compounds, said method comprising adding to the wash an inhibiting amount of an ethylene-diamine compound of the formula



wherein x is an integer of from 1 to about 10.

**4,952,302**  
**VAPOR/LIQUID DISTRIBUTOR AND USE THEREOF**  
 Lyle A. Leach, Ewing, N.J., assignor to Mobil Oil Corporation, New York, N.Y.  
 Filed Sep. 27, 1988, Ser. No. 249,800  
 Int. Cl.<sup>5</sup> B01J 8/02  
 U.S. Cl. 208—85 16 Claims



1. A process for contacting a mixed phase, vapor-liquid stream with a bed of contact material in a closed vessel comprising

- (a) passing a two phase vapor/liquid stream into an external vapor/liquid separator located at an elevation above the closed vessel;
- (b) separating the two phase stream in the separator into a vapor phase and a liquid phase;
- (c) allowing the liquid phase to accumulate in the separator and form a pool having a liquid level and controlling the liquid level by use of a liquid level control means;
- (d) discharging liquid down from the separator to a distributor means located inside the closed vessel and above the bed of contact material;
- (e) discharging vapor from the separator via a vapor discharge line into the closed vessel above the bed of contact material and wherein there is a difference in pressure between the separator and the closed vessel and the liquid level in the external separator is controlled by changing the difference in pressure by controlling the vapor flow from the external separator to the closed vessel.

**4,952,303**  
**PROCESS FOR PREPARING A VERY HIGH QUALITY LUBE BASE STOCK OIL**  
 Robert W. Bortz, Woodbury Heights, N.Y., and Keaneth R. Graziani, Woodbury, N.J., assignors to Mobil Oil Corp., New York, N.Y.  
 Continuation-in-part of Ser. No. 173,389, Mar. 25, 1988, abandoned, which is a continuation of Ser. No. 753,478, Aug. 10, 1985, abandoned. This application Dec. 22, 1988, Ser. No. 289,341

Int. Cl.<sup>5</sup> C10G 45/08, 67/04, 45/50  
 U.S. Cl. 208—216 R 16 Claims  
 I. A process for obtaining a very high quality lube base stock suitable for use as a turbine oil which comprises:  
 (a) introducing a nitrogen-and sulfur-containing feedstock containing at least about 9% by weight polyaromatics and selected from the group consisting of a dewaxed oil obtained from refining distillate fraction and having a 60–700 SUS at 100° F. and a dewaxed oil obtained from refining vacuum resid and having a 2300–2700 SUS at 100° F., and hydrogen into a single stage hydrotreating reactor; and  
 (b) subjecting the feedstock to hydrotreating in said reactor in the presence of a sulfided cobalt/molybdenum hydrotreating catalyst at an average reactor temperature of from about 600° to about 700° F. at a hydrogen partial pressure of from about 2000 to about 2500 psia at the reactor outlet, an LHSV of from about 0.3 to about 0.6 and a hydrogen circulation rate of from about 1000 SCF to about 2000 SCF per barrel to provide a very high quality lube base stock in which the aromatic and sulfur content is substantially reduced and the nitrogen is reduced to a negligible level.

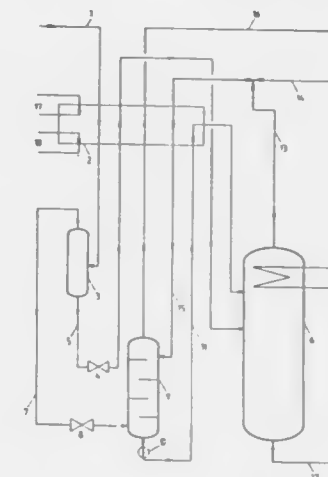
**4,952,304**  
**REMOVAL OF CATALYST RESIDUES**  
 Donald G. Timms, Beaulieu, England, assignor to Enlchem Elastomers Ltd., Southampton, England  
 Filed Sep. 19, 1988, Ser. No. 246,276  
 Claims priority, application United Kingdom, Sep. 22, 1987, 8722235

Int. Cl.<sup>5</sup> C10G 17/04  
 U.S. Cl. 208—251 R 4 Claims  
 1. A process for the removal of contaminating residues of a homogeneous hydrogenation catalyst comprising a hydrocarbon soluble compound of nickel and a metal alkyl or alkyl halide catalyst from a hydrogenated polymer solution, wherein the polymer solution is treated with an aqueous solution of a silicate, borate or carbonate and the hydrocarbon phase is separated and recovered.

**4,952,305**  
**PROCESS AND APPARATUS FOR THE SEPARATION OF HYDROCARBONS**  
 Paul Kumann, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany  
 Filed Jan. 27, 1989, Ser. No. 302,282  
 Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802553

Int. Cl.<sup>5</sup> F25J 3/02  
 U.S. Cl. 208—340 23 Claims  
 1. A process for the separation of higher-boiling hydrocarbons from a crude gaseous stream containing the latter and lower-boiling components, comprising:  
 cooling and partially condensing said crude gaseous stream, and separating the partially condensed gaseous stream into a liquid fraction and a gaseous fraction;  
 fractionating said liquid fraction by a rectification step into a produce stream containing essentially higher-boiling hydrocarbons and into a residual gas stream containing lower-boiling components;  
 conducting said gaseous fraction separated after partial condensation to a scrubbing column wherein higher-boil-

ing hydrocarbons are scrubbed out of said gaseous fraction using a scrubbing medium;  
 delivering a fraction enriched in higher-boiling hydrocarbons obtained from the bottom of said scrubbing column to said rectification step; and



wherein said scrubbing medium is an admixture formed by adding a liquid stream of C<sub>3</sub>+, C<sub>4</sub> or C<sub>5</sub> hydrocarbons to residual gas obtained in said rectification step, said residual gas being subjected to partial condensation prior to use of said admixture as a scrubbing medium.

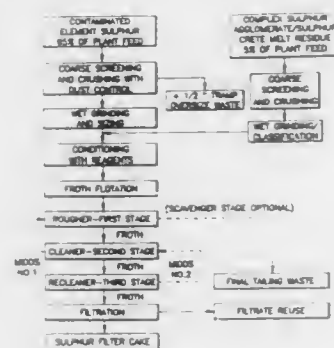
**4,952,306**  
**SLURRY HYDROPROCESSING PROCESS**  
 Willard H. Sawyer, Dallas, Tex.; Roby Bearden, Jr., Baton Rouge, La.; Russell R. Chianelli, Somerville, N.J., and William E. Winter, Jr., Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.  
 Filed Sep. 22, 1989, Ser. No. 411,149  
 Int. Cl.<sup>5</sup> C10G 45/46, 45/04

U.S. Cl. 208—216 R 16 Claims  
 1. A process for hydrotreating a mid-distillate of a hydrocarbonaceous material, comprising:  
 passing the mid-distillate in admixture with a hydrogen containing gas through a hydrotreating zone in contact with a hydrotreating catalyst slurry such that substantial nitrogen removal, hydrodesulfurization and aromatics hydrogenation is carried out and wherein the catalyst comprises catalyst particles 1 micron to 1/2 inch in average diameter and are characterized by a value of about 5 to 125 on an index defined as the excess catalyst index (ECI) according to the following formula:

$$ECI = \frac{W_s M_c}{W_f N_c}$$

wherein W<sub>s</sub> is the weight of the mid-distillate in lbs/hr, N<sub>c</sub> is the concentration of the nitrogen in distillate in ppm, W<sub>f</sub> is the rate of catalyst addition to the hydrotreating zone in lbs/hr and M<sub>c</sub> is the concentration of the metals on the catalyst in weight percent.

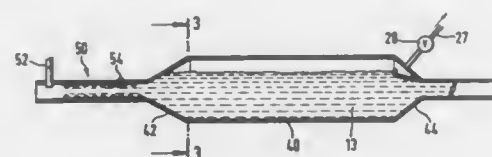
**4,952,307**  
**RECOVERY OF ELEMENTAL SULPHUR FROM PRODUCTS CONTAINING CONTAMINATED ELEMENTAL SULPHUR BY FROTH FLOTATION**  
 Ios I. Adamache, Calgary, Canada, assignor to Canterra Energy Ltd., Calgary, Canada  
 Division of Ser. No. 14,975, Feb. 17, 1987, Pat. No. 4,871,447.  
 This application Jan. 25, 1989, Ser. No. 220,521  
 Claims priority, application Canada, Feb. 20, 1986, 502290  
 Int. Cl.<sup>5</sup> B03D 1/02, 1/10  
 U.S. Cl. 209—166 21 Claims



1. A process for the recovery by a combined coarse and fine froth flotation of elemental sulphur, in the oil and gas industry and in other industries, from the complex sulphur agglomerate, reject by-product of hot melting processes, or otherwise referred to as "sulphur crete melt residue", which after some processing is to be mixed with a sized feedstock selected from:
  - (1) contaminated base pads of elemental sulphur blocks;
  - (2) stockpiles of contaminated elemental sulphur;
  - (3) contaminated elemental sulphur rejects from industrial handling and hauling; and
  - (4) other sources of contaminated elemental sulphur;
 said process comprising the steps of:
  - (a) coarse screening said reject complex sulphur agglomerate, and crushing the coarse screening undersize utilizing a jaw crusher;
  - (b) wet grinding and sizing said crushed coarse screening undersize utilizing a ball mill, thus forming a sulphur crete melt residue slurry;
  - (c) size classifying the sulphur crete melt residue slurry with a cyclone to form a resultant sulfur crete melt residue slurry with 98% of the particles in said slurry being finer than 200 mesh and a large particle slurry composed of particles larger than 200 mesh, recycling the large particle slurry to the wet ball milling, and adjusting the resultant sulphur crete melt residue slurry which is 98% composed of particles finer than 200 mesh to approximately 15-20% solids;
  - (d) combining the 15-20% solids resultant sulphur crete melt slurry of the cyclone overflow which has 98% of the particles finer than 200 mesh with a sized particle slurry from a coarse particle circuit whose feedstock source is said contaminated elemental sulphur; said sized particle slurry from said coarse particle circuit comprising particles finer than 10 mesh, and having a substantial amount of particles larger than 48 mesh; to form a combined slurry in which the ratio of the two feed stock particles is approximately 5% sulphur crete melt residue to approximately 95% contaminated elemental sulphur;
  - (e) conditioning the combined slurry thus formed from step (d) with two or three classes of reagents selected from frother reagents, promoter/collector reagents and regulating/dispersing reagents;
  - (f) subjecting the conditioned combined slurry to at least four stages of froth flotation—a rougher flotation stage

and at least three cleaning stages—to produce an elemental sulphur concentrate; and  
 (g) recovering the elemental sulphur by filtering and dewatering the resultant elemental sulphur concentrate.

**4,952,308**  
**PRESSURIZED FLOTATION MODULE AND METHOD FOR PRESSURIZED FOAM SEPARATION**  
 Jeffrey L. Chamberlin, Lebanon Springs, N.Y., and Michael A. McCool, Pittsfield, Mass., assignors to Beloit Corporation, Beloit, Wis.  
 Filed Dec. 10, 1986, Ser. No. 939,997  
 Int. Cl.<sup>5</sup> B03D 1/04, 1/24  
 U.S. Cl. 209—170 3 Claims

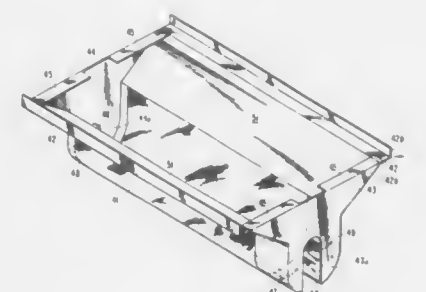
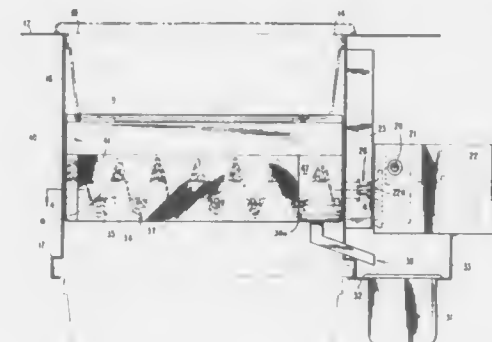


2. A foam flotation module for separating by flotation from a slurry fed therethrough, foam generated by mixing a gas with the slurry, said module comprising:
  - a sealed, horizontal, elongated body having a slurry inlet means near one end of said body, a slurry outlet means near the other end of said body, and a foam outlet means, each spaced apart from each other;
  - said slurry inlet means including a generally conically shaped wall diverging outwardly in the direction of slurry flow;
  - said body including a generally tubular shaped wall; and
  - said slurry outlet means including a generally conically shaped wall converging inwardly in the direction of slurry flow, a baffle which extends angularly upwardly, and inwardly from a wall of said conically shaped slurry outlet means and defines with said wall a limited access chamber around said foam outlet means, said baffle including a vertically upwardly extending plate on the distal end thereof;
- control means in flow communication with at least one of said inlet means and said outlet means for providing and maintaining a positive pressure in said body above atmospheric pressure; for controlling the flow of said slurry to less than fill said body, thereby generating a slurry surface; and for retaining the slurry between said inlet means and said outlet means for sufficient duration to permit gas near the bottom of said body to rise through said slurry to the surface thereof; and
- said control means directing gases escaping from the slurry to pass from said body with said foam through said foam outlet means.

**4,952,309**  
**AUGER-TYPE FLOUR SIFTER**  
 Donald E. King, Louisville, Ky., assignor to AyrKing Corporation, Louisville, Ky.  
 Filed Jun. 14, 1988, Ser. No. 206,354  
 Int. Cl.<sup>5</sup> B07B 1/46, 1/52  
 U.S. Cl. 209—235 14 Claims

1. A flour sifting apparatus for separating doughballs from fine particulate matter in a breeding mixture, comprising:
  - a hopper for receiving said breeding mixture, said hopper including a generally semi-cylindrical lower portion having a first longitudinal axis, said lower portion further including a sifting screen along said first longitudinal length, said sifting screen having a plurality of openings sized to allow only said fine particulate matter to pass therethrough, said lower portion also including a slot at

one end of said lower portion, said slot being large enough for said doughballs to pass therethrough;  
 an auger brush having a second longitudinal axis and including a helical pattern of bristles along said second longitudinal axis, each of said bristles having an end extending generally radially from said longitudinal axis;  
 means for readily removably rotationally mounting said auger brush within said hopper with said second longitudinal axis generally parallel to said first longitudinal axis, such that said ends of said bristles rotate at least adjacent to said sifting screen; and  
 means for rotating said auger brush within said hopper, whereby as said auger brush rotates, said helical pattern of

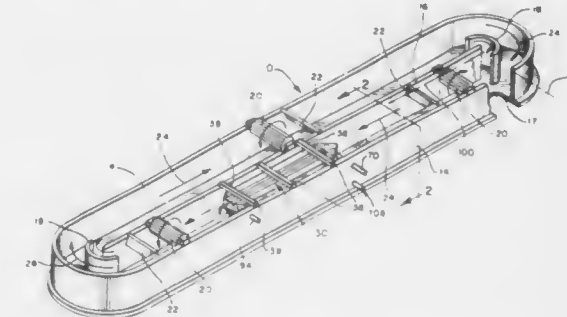


bristles urges said doughballs toward said slot in said lower portion, while said fine particulate matter passes through said sifting screen, wherein said auger brush includes:  
 a spiral rib having a central longitudinal opening;  
 means for affixing said bristles to said spiral rib;  
 a longitudinal shaft passing through said central opening of said spiral rib; and  
 means for readily removably engaging said spiral rib about said longitudinal shaft including:  
 a pin having a hook for engaging said spiral rib and a shaft which is fed through a bore in said shaft;  
 a nut which is fastened to an end of said shaft of said pin.

**4,952,310**  
**INTRACHANNEL CLARIFIER**  
 Anthony A. McMahan, 420 Bayberry Ln., Naperville, Ill. 60540, and Donald C. Vock, 934 Lorlyn Cir., Batavia, Ill. 60510  
 Continuation-in-part of Ser. No. 21,138, Mar. 3, 1987, abandoned. This application Jul. 7, 1988, Ser. No. 216,154  
 Int. Cl.<sup>5</sup> C02F 3/20  
 U.S. Cl. 210—195.3 21 Claims

12. In an oxidation ditch of the type comprising means for defining a flow path for a body of waste water, means for circulating the waste water along the flow path, and means for

aerating the waste water, an improved intrachannel clarifier comprising:  
 an enclosure positioned in the flow path, said enclosure comprising a front section, a rear section, an upper portion extending partially above the level of the waste water, and a lower portion, said enclosure defining a length axis extending along the flow axis;  
 a sludge removal trough extending along the length axis and mounted in the upper portion of the enclosure so as to extend above the level of the waste water;  
 at least one effluent removing means extending along the length axis and mounted in the upper portion of the enclosure so as to extend below the level of the waste water;  
 a waste water inlet port positioned in the lower portion along the length axis to introduce waste water into the enclosure;  
 a plurality of effluent removal ports in the effluent removal means spaced along the length axis to remove effluent



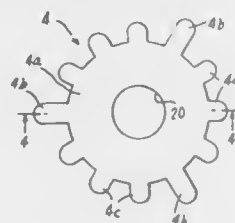
from the enclosure at a selected effluent removal rate, thereby creating an upward flow of waste water from the waste water inlet port in order to suspend solids in a filter zone situated between the waste water inlet port and the effluent removal ports;  
 at least one sludge removal manifold disposed in the filter zone and extending along the length axis, said manifold defining an array of sludge removal ports spaced along the length axis for removing sludge from the filter zone, said manifold communicating with the sludge removal trough to conduct sludge from the filter zone to the sludge removal trough; and  
 means for actively removing sludge out of the sludge removal trough at a selected sludge removal rate in order to remove sludge from the filter zone to reduce the residence time of sludge in the filter zone;  
 said waste water inlet port sized and dimensioned to ensure that substantially no sludge leaves the clarifier through the waste water inlet port.

**4,952,311**  
**FUEL OIL FILTER ELEMENT**  
 Herbert Lindtvelt, West Hempstead, N.Y., assignor to Sld Harvey, Inc., Valley Stream, N.Y.  
 Continuation of Ser. No. 148,287, Jan. 29, 1988, abandoned, which is a continuation of Ser. No. 38,045, Apr. 14, 1987, abandoned, which is a continuation of Ser. No. 713,299, Mar. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 538,267, Oct. 3, 1983, abandoned. This application Jan. 9, 1989, Ser. No. 366,200  
 Int. Cl.<sup>5</sup> B01D 27/07, 27/08  
 U.S. Cl. 210—232 4 Claims

1. A liquid filter assembly, comprising:
  - a cylindrical housing with opposed ends, having at one of said ends an axially located outlet with a periphery and an inlet radially displaced from the outlet; and
  - a generally cylindrical one-piece liquid filter element of filter material extruded axially and having opposed ends cut transversely to the direction of extrusion, said element



being inserted in said housing and including a portion of annular cross-section encircling and defining an axially extending central aperture and a plurality of peripheral, longitudinally extending flutes projecting radially outward from said portion, at least three of the flutes being equally peripherally spaced and of such radial dimension that they engage the inside of the housing and hold the filter element centered with its central aperture aligned with the outlet, the ends of said annular portion engaging snugly the periphery of the outlet and the end of the housing opposite said one housing end, so that little or not



cut filter material is exposed to the downstream side of the flow; said plurality of flutes also including more than three other flutes each having a radial dimension smaller than said first-mentioned at least three flutes such that they are spaced inwardly from the inside of the housing; said element being an integral piece of extruded porous compressible filter material wherein the aperture-defining surface and the external surfaces of said annular portion and said flutes are covered by a skin resulting from extrusion of the element, said skin being in as-extruded condition and having fewer pores than the interior parts of the element, said element being cut only at its said opposed cut ends.

4,952,312

#### METHOD FOR WINDING THE FIBRES OF EXCHANGE DEVICES, SUCH AS BLOOD OXYGENATORS AND THE LIKE, AND AN EXCHANGE DEVICE PRODUCED BY THIS METHOD

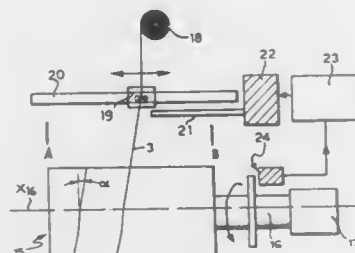
Piero Zantonelli, Borgosesia, and Sergio Graglia, Torrazza Piemonte, both of Italy, assignors to Sorin Biomedica S.p.A., Vercelli, Italy

Filed Nov. 23, 1988, Ser. No. 275,378

Int. Cl.<sup>5</sup> B01D 63/10, 69/08

U.S. Cl. 210—321.74

6 Claims



4. An exchanger in which at least one fibre is wound in several layers around a winding axis at a substantially constant winding angle to said axis along a path with a winding pitch (p) which is variable according to the equation:

$$p = p_0 + 2\pi \cdot \Delta r \cdot \tan \alpha$$

where:

$p_0$  is the pitch at which the innermost layer is wound,  $\alpha$  is the substantially constant winding angle, and  $\Delta r$  is the increase in the winding radius corresponding to the

layer which is being wound wherein said variable winding pitch is incrementally variable in successive steps so as to keep the winding angle ( $\alpha$ ) substantially constant to the axis.

4,952,313

#### APPARATUS FOR CARRYING OUT MEMBRANE SEPARATION PROCESSES

Detlef Skaletz, Mainz-Bretzenheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

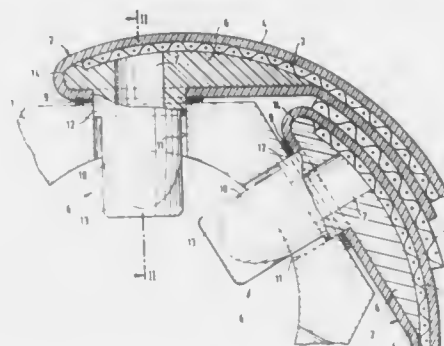
Filed Oct. 20, 1989, Ser. No. 425,008

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836308

Int. Cl.<sup>5</sup> B01D 63/10

U.S. Cl. 210—321.76

10 Claims



1. An apparatus for carrying out a membrane separation process, which comprises:

- a centrally arranged collection line having at least one aperture therein;
- at least one spirally wound-up membrane pocket arranged around said collection line, said membrane pocket containing at least one drainage layer and semipermeable membranes applied to both sides thereof, wherein said semipermeable membrane are mutually joined by energy-bonded seams at their edges to form said pocket;
- a spacer between individual windings of said membrane pocket, defining a space for receiving material to be separated;
- means defining a permeate passage from said drainage layer through said aperture into said collection line; and
- means for spring elastically sealing the permeate passage for the space for receiving the material to be separated sufficient for providing effective sealing of spacing changes resultant from temperatures of up to above 100° C.

4,952,314

#### APPARATUS FOR TREATING PULP

Kaj O. Henricson, Kotka; Seppo K. Kokkonen, Savonlinna; Olavi E. Pitka, Karhula; Harri T. Qvintus; Erkki A. Ruuskanen, both of Savonlinna, and Erkki E. Savolainen, Haapakkallio, all of Finland, assignors to A. Ahlstrom Corporation, Noormarkku, Finland

Filed Jul. 26, 1988, Ser. No. 224,467

Claims priority, application Finland, Nov. 11, 1987, 874967

Int. Cl.<sup>5</sup> D21C 9/06

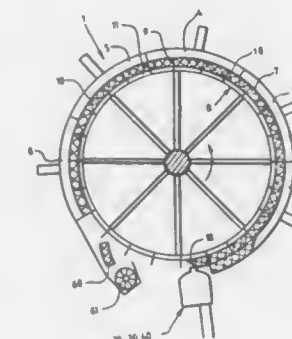
U.S. Cl. 210—404

12 Claims

1. An apparatus for treating fiber suspensions having a consistency of 8–20%, comprising:

- at least one rotatable filtering surface;
- a stationary counter surface, said at least one filtering surface and said stationary counter surface being arranged so as to form a treatment zone therebetween;
- means for feeding said suspension to the treatment zone, said

feeding means including at least one pressure chamber in which said suspension is fluidized, at least one inlet duct positioned for introducing said suspension to said at least one pressure chamber, and at least one feed opening positioned for transferring said suspension from said at least one pressure chamber to the treatment zone;



means for fluidizing said suspension positioned in said at least one pressure chamber so as to subject said suspension to a strong shear force field and to disrupt any fiber-to-fiber bonds; and means for discharging said suspension from said treatment zone.

4,952,315

#### METHOD, SYSTEM AND EMULSIFIER SUBSTANCE FOR TREATMENT OF MATERIALS CONTAINING HARMFUL SUBSTANCES

Nabil Saab, Goldene Linie 22, 2903 Bad Zwischenahn, Fed. Rep. of Germany

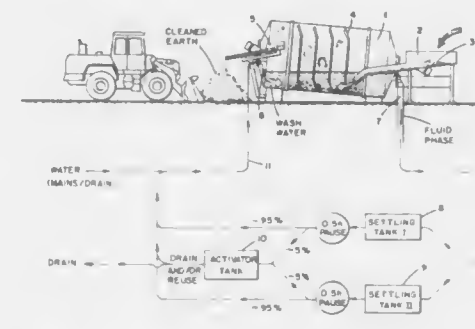
Filed May 4, 1988, Ser. No. 189,964

Claims priority, application Fed. Rep. of Germany, May 5, 1987, 3714918

Int. Cl.<sup>5</sup> B01D 17/04; C02F 3/00

U.S. Cl. 210—610

16 Claims



1. A method for treatment of a contaminated material constituting a solid or fluid material contaminated by undesirable lipophilic or oily substances or mixtures thereof, which comprises:

mixing the contaminated material with at least one emulsifying composition to produce an admixture of the solid or fluid material and a microdispersion of the undesirable substances with the emulsifying composition, wherein the emulsifying composition is a non-bactericide, is biocompatible, is absorbable by bacteria, and comprises at least one compound having hydrophilic and lipophilic functional groups that act together as an emulsifier, at least one compound which is a non-ionic or anionic tenside, and at least one compound having one or more functional groups that are recognized by receptors of bacterial cell membranes as absorbable, thereby promoting absorp-

tion of the emulsifying composition and undesirable substances through the cell membranes; mixing water with the admixture; separating the microdispersion and water from the solid or fluid material; and, treating the microdispersion with bacteria having cell membranes that absorb the undesirable substances and the emulsifying composition.

4,952,316

#### CONTINUOUS AERATION-BATCH CLARIFICATION WASTEWATER TREATMENT

Curtis D. Cooley, Rothschild, Wis., assignor to Zimpro/Passavant Inc., Rothschild, Wis.

Filed Sep. 25, 1989, Ser. No. 412,073

Int. Cl.<sup>5</sup> C02F 3/08, 3/20

U.S. Cl. 210—616

18 Claims

1. A process for biophysical treatment of wastewater to reduce BOD, COD and TOC therein comprising the steps:

- introducing a wastewater into an aeration zone to a first preselected level therein;
- continuously aerating the wastewater in said aeration zone with an oxygen containing gas in the presence of a sufficient concentration of biologically active solids and powdered adsorbent to reduce the BOD, COD and TOC of the wastewater to desired levels and form a biophysical mixed liquor;
- transferring a predetermined quantity of said mixed liquor from said aeration zone to a settling zone;
- settling said mixed liquor within said settling zone for a time sufficient to produce a clarified, substantially solids-free, liquid phase and a settled solids phase, while simultaneously adding wastewater to said mixed liquor aerating within said aeration zone to a second preselected level, lower than said first level, therein; and
- transferring all or a portion of said clarified liquid phase from said settling zone to further treatment or to the environment; and
- transferring all or a portion of said settled solids phase from said settling zone to said aeration zone wherein said settled solids phase transferred to said aeration zone raises the mixed liquor level from said second selected level to said first selected level therein.

4,952,317

#### DEVICE AND METHOD FOR FILTERING A COLLOIDAL SUSPENSION

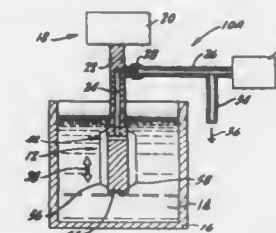
Bradley Culkin, 1552 Beach St., Ste. P, Oakland, Calif. 94608

Filed Mar. 10, 1989, Ser. No. 321,797

Int. Cl.<sup>5</sup> B01D 61/18, 61/22

U.S. Cl. 210—636

30 Claims



1. A device for separating selected components from a colloidal suspension formed of solid particles and liquids, comprising:

- a vessel capable of holding the colloidal suspension;
- a membrane having an exterior surface and an interior surface, said membrane being permeable to the selected components of the colloidal suspension;
- a support mounted at the interior surface of said membrane and sealed within said membrane, said membrane

and support member forming a leaf element, said leaf element extending into the colloidal suspension within said vessel, said leaf element further including an outlet for passage of the selected components of the colloidal suspension permeating said membrane;

d. means for vibrating said leaf element tangentially along the exterior surface of said membrane to induce shearing between said exterior surface of said membrane and the colloidal suspension; and

e. means for applying a pressure to motivate permeation of said membrane by said selected components of the colloidal suspension.

20. A method of filtration of selected components from a colloidal suspension comprising the steps of:

- placing the colloidal suspension in a vessel;
- immersing a leaf element into the colloidal suspension in said vessel, said leaf element including a membrane having an exterior surface and an interior surface, said membrane being permeable to the selected components of the colloidal suspension, said leaf element further including a support mounted at the interior surface of said membrane and sealed within said membrane;
- vibrating said leaf element tangentially relative to the exterior surface of the membrane to induce shearing between said exterior surface of said membrane and the colloidal suspension;
- selectively applying a negative and positive pressure to said leaf element to urge permeation of said membrane by the selected components of the colloidal suspension.

4,952,318

## SEPARATIONS OF OXYGENATES

Mordechai Pasternak, Spring Valley, and Tansukhlal G. Dorawala, Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Jan. 7, 1988, Ser. No. 141,449

Int. Cl.<sup>5</sup> B01D 13/00

U.S. Cl. 210—638

13 Claims

1. The method which comprises passing a charge aqueous dilute solution of an organic oxygen-containing component which is at least slightly soluble in water into contact with, as a pervaporation membrane, a high molecular weight ion exchange resin in membrane form comprising a perfluorinated resin containing carbon atoms in the backbone chain, bearing a pendant acid group which membrane has been contacted with a quaternary ammonium salt containing hydrocarbyl groups each of which contains at least four carbon atoms; maintaining a pressure drop across said pervaporation membrane thereby forming a retentate containing decreased content of organic oxygen-containing component and a permeate containing increased content of organic oxygen-containing component; and recovering said permeate containing increased content of organic oxygen-containing component.

4,952,319

## PROCESS FOR SEPARATING LIQUID MIXTURE

Yukio Yanaga, Tsukui; Asahi Hayashi, Jouetsu; Shizue Kamata, Yokohama, and Toru Imanara, Atsugi, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

PCT No. PCT/JP87/00965, § 371 Date Sep. 19, 1988, § 102(e) Date Sep. 19, 1988, PCT Pub. No. WO88/04569, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 11, 1987, Ser. No. 245,397

Claims priority, application Japan, Dec. 15, 1986, 61-298424

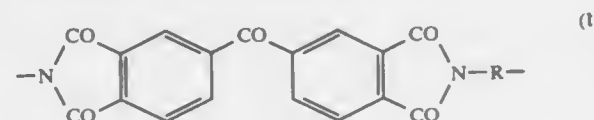
Int. Cl.<sup>5</sup> B01D 61/36

U.S. Cl. 210—640

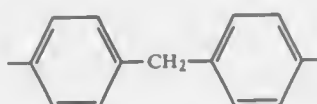
8 Claims

1. A separation method for removing water from a liquid mixture containing water by pervaporation, which comprises contacting the liquid mixture to be separated with one side of an asymmetric membrane while maintaining the other side of the asymmetric membrane as a gaseous phase, said pervapora-

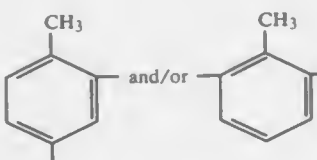
tion being at a pressure as low as atmospheric pressure or underpressure, the asymmetric membrane being subject to heat treatment at a temperature of not lower than 250° C. in the production thereof and comprising as the main constituent material a copolyimide comprising the constitutional repeating unit represented by the following formula (I):



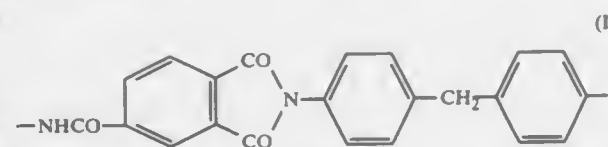
wherein R represents



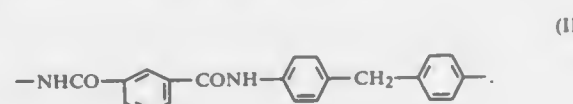
for from 10 to 30 mol % of said repeating unit, while R also represents



for from 90 to 70 mol % of said repeating unit, or a copolyamide-imide comprising from 90 to 10 mol % of the constitutional repeating unit represented by the following formula (II):



and from 10 to 90 mol % of the constitutional repeating unit represented by the following formula (III):



4,952,320

## CHROMIUM RECOVERY PROCESS

Paul Spekman, Minneapolis, Minn., assignor to Fremont Industries, Inc., Shakopee, Minn.

Continuation of Ser. No. 927,173, Nov. 5, 1986, abandoned. This application May 26, 1988, Ser. No. 199,996

Int. Cl.<sup>5</sup> C02F 1/42

U.S. Cl. 210—669

4 Claims

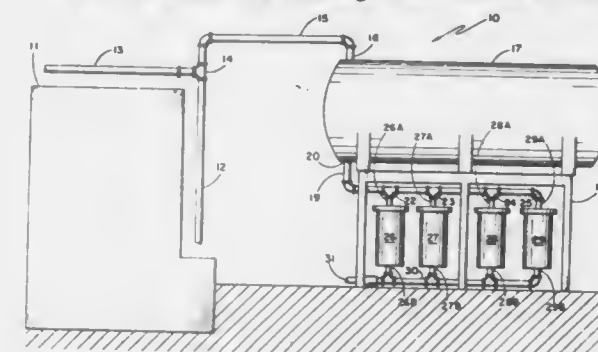
1. In a process for removal and recovery of chromium ions from aqueous waste water of spent chrome-based seal rinse surface treatment solutions and for recycling the treated spent waste water through replenishment of the chrome content of said treated waste water for reuse, said process including the steps of:

- withdrawing the spent aqueous waste from a first metallic surface treatment bath containing chromium ions at a concentration of about 160 ppm to a first reservoir for settling of solid impurities therefrom, holding said spent waste water in said reservoir until the chromium-contain-

ing solution becomes at least partially clarified through settling out of particulate solids so as to obtain a partially clarified chromium-containing effluent solution from said chromium-containing spent waste water solution;

(b) passing said effluent from said partially clarified chromium-containing solution directly to a holding vessel at an elevated disposition;

(c) thereafter passing said effluent from said holding vessel into a supply manifold to which there are coupled a plurality of anionic ion exchange resin column receiving



chambers where substantially all of the chromium ions are removed, and thereafter passing said chromium-free effluent solution into a discharge manifold and thence directly to a supply reservoir;

- recharging said chromium-free effluent solution in the supply reservoir with a supply of fresh chromium ions until the chromium ion content is at a desired level for metal surface treatment, introducing said recharged effluent into said first metallic surface treatment bath; and
- removing and replacing the anionic ion exchange resin columns when exhausted.

4,952,321

## PROCESS OF REMOVING AND CONCENTRATING DESIRED IONS FROM SOLUTIONS

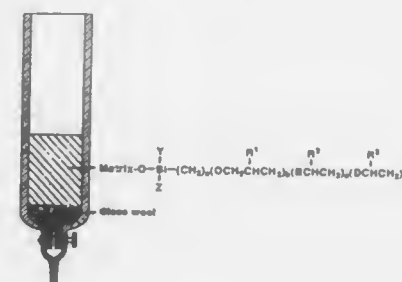
Jerald S. Bradshaw, Provo, Utah; Maria Bochenka, Gdansk, Poland; Krzysztof E. Krakowiak, Provo, Utah; Jan F. Blermat, Gdansk-Wrzeszcz, Poland; Bryon J. Tarbet, Provo, Utah; Ronald L. Bruening, Provo, Utah, and Reed M. Izatt, Provo, Utah, assignors to Brigham Young University, Provo, Utah

Filed Oct. 7, 1988, Ser. No. 255,353

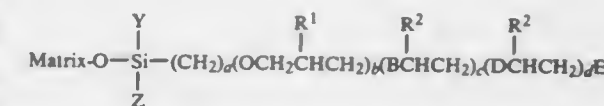
Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 210—670

21 Claims



1. The process of removing and concentrating desirable ions from a mixture thereof in solution with other ions which comprises complexing the desired ions in said solution with a compound comprising an inorganic support covalently bonded to a amine-containing hydrocarbon compound from the class consisting of



B and D are each a radical selected from the group of N(R<sup>3</sup>), N(R<sup>3</sup>)CH<sub>2</sub>, O, OCH<sub>2</sub>, S and SCH<sub>2</sub>, but B or D must be N(R<sup>3</sup>) or N(R<sup>3</sup>)CH<sub>2</sub>; E is a radical selected from the group consisting of H, NH(R<sup>3</sup>), SH, OH, lower alkyl, and N(R<sup>3</sup>)CH<sub>2</sub>CH(R<sup>1</sup>)CH<sub>2</sub>); O(CH<sub>2</sub>)<sub>a</sub>SiYZ(O-matrix); Y and Z are radicals selected from the group of Cl, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, methyl, ethyl and halogenated substituents thereof, and O-matrix; R<sup>1</sup> is a radical selected from the group consisting of H, SH, OH, lower alkyl and phenyl, naphthyl and pyridyl; R<sup>2</sup> is a radical selected from the group consisting of H or lower alkyl; R<sup>3</sup> is a radical selected from the group consisting of H, lower alkyl and aryl such as phenyl, naphthyl and pyridyl; a=2 to about 10; b=1; c=1 to about 2000; d=0 to about 2000

Where matrix is selected from the group consisting of sand, silica gel, glass, glass fibers, alumina, nickel oxide, zirconia, or titania

breaking said complex to liberate the complexed ions with and dissolving said liberated ions in a receiving liquid in much smaller volume than the volume of said solution from which the desired ions have been removed.

4,952,322

## METHOD FOR ABSORBING FREE HEMOGLOBIN FROM BLOOD

Masafumi Sugiyama, Kako, and Yoshiko Nagatsuma, Hiroshima, both of Japan, assignors to Japan Medical Supply Co., Ltd., Hiroshima, Japan

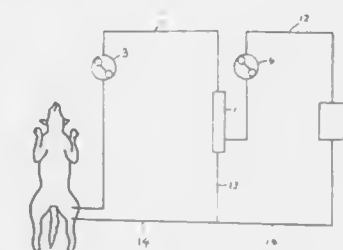
Filed Dec. 1, 1988, Ser. No. 278,667

Claims priority, application Japan, Dec. 7, 1987, 62-308905

Int. Cl.<sup>5</sup> B01D 15/00

U.S. Cl. 210—679

6 Claims



1. A method for extracting elevated amounts of free hemoglobin in blood comprising the steps of obtaining a sample of blood from a patient, said sample containing an elevated amount of free hemoglobin and contacting said blood with an absorbent comprising a carrier having phenyl and/or phenol groups on the surface of said carrier.

4,952,323

## B2 MICROGLOBULIN ADSORBENT

Nobuo Nakabayashi, Chiba; Shozo Koshikawa, and Tetsuro Ogawa, both of Tokyo, all of Japan, assignors to Asahi Kogyo Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 70,467, Jul. 7, 1987, abandoned. This application Oct. 7, 1988, Ser. No. 253,923

Claims priority, application Japan, Jul. 7, 1986, 61-158072

Int. Cl.<sup>5</sup> B01D 15/04

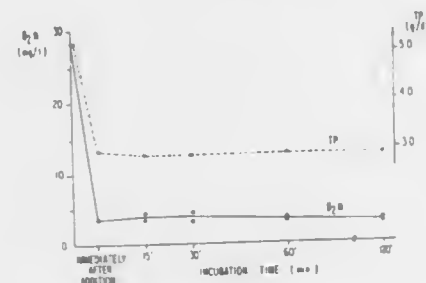
U.S. Cl. 210—691

8 Claims

1. A process for adsorbing β<sub>2</sub> microglobulins comprising

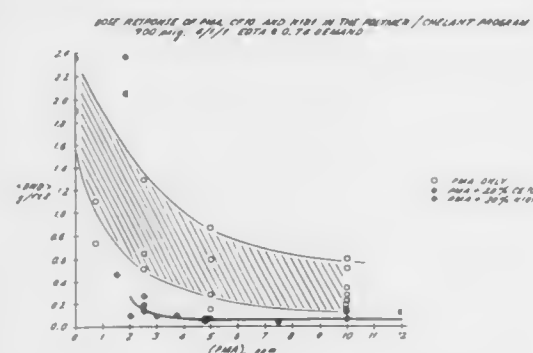


contracting whole blood or blood sera containing  $\beta_2$  microglobulins with a  $\beta_2$  microglobulin adsorbent composed of



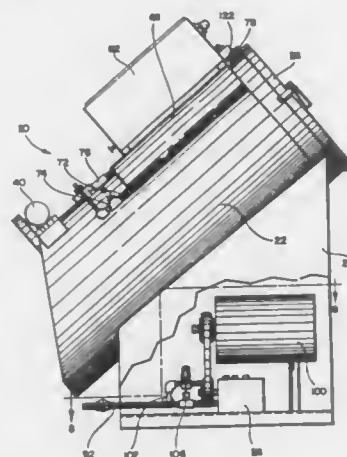
hydroxyapatite particles having an average size of 5 to 2,000  $\mu\text{m}$ .

**4,952,324**  
**BOILER WATER TREATMENT**  
Alexander C. McDonald, The Woodlands, and James L. Soos, Conroe, both of Tex., assignors to Betz Laboratories, Inc., Treviso, Pa.  
Continuation-in-part of Ser. No. 168,288, Mar. 15, 1988, Pat. No. 4,828,713. This application Feb. 21, 1989, Ser. No. 313,578. The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> C02F 5/14  
U.S. Cl. 210—697



1. A method of controlling the formation and deposition of materials including soluble salts of calcium, magnesium and iron on the structural parts of a steam generating system containing an aqueous system, which materials would deposit and/or form and deposit under steam generating conditions, which method comprises introducing into said aqueous system a sufficient amount for the purpose of a dispersant comprised of a water soluble methacrylic acid-containing polymer containing from about 5 to 100 mole % of methacrylic acid, a chelant selected from the group ethylenediaminetetraacetic acid, nitrilotriacetic acid, hydroxyethylethylenediaminetetraacetic acid, and water soluble salts thereof and/or a water soluble phosphate generating compound, and a nonionic surfactant, wherein the amount of said chelant and/or said phosphate and said surfactant introduced synergistically enhances the dispersant activity of said polymer.

**4,952,325**  
**APPARATUS AND METHOD FOR CLEANING FILTERED ACCUMULATION FROM AN ANNULAR FILTER**  
Graham F. Clifford, Stanley, N.C., assignor to Gaston County Dyeing Machine Co., Stanley, N.C.  
Filed Sep. 26, 1988, Ser. No. 249,600  
Int. Cl.<sup>5</sup> B08B 5/04, 3/02  
U.S. Cl. 210—741



25. A method of cleaning accumulated fibrous material from an interior surface of a cylindrical filter media in a textile filter normally housed and operable in a separate textile processing system, wherein said filter has an open interior and is adapted for normal filtration flow into the interior and radially outwardly therefrom through said cylindrical filter media causing said accumulated fibrous material to tend to become entangled in said filter media, said method comprising the steps of removing said filter from said textile processing system and containing said filter in a generally enclosed housing separate from said textile processing system, spraying a sufficiently highly-pressurized emission of a cleaning fluid within said housing for disengaging said accumulated fibrous material from said filter media while rotating said filter within said housing and moving the fluid emission of said spraying axially with respect to said cylindrical filter media along its outer periphery for applying said cleaning fluid to substantially the full circumferential and axial extents of said filter media, sensing the delivery pressure of said cleaning fluid and preventing said spraying, said relative rotation and said moving when said delivery pressure is below a predetermined minimum value.

**4,952,326**  
**DISPERSION OF PARTICULATES IN AN AQUEOUS MEDIUM**  
Zahid Amjad, Avon Lake, and William F. Masler, Hinckley, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio  
Continuation-in-part of Ser. No. 939,498, Dec. 8, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 235,266. The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> C02F 5/12  
U.S. Cl. 210—701

1. A method for dispersing particulate matter selected from clay, silt, iron oxide, and mixtures thereof, in the presence or absence of metal ions, and in the presence of calcium phosphate, in an aqueous medium comprising adding to said aqueous medium an effective amount of a water-soluble copolymer for the purpose of dispersing and maintaining dispersed said particulate matter, said copolymer consisting essentially of (a) 40 to 75% by weight carboxylic monomer selected from

acrylic acid, methacrylic acid, salts of such acids, and mixtures thereof, (b) 10 to 40% by weight of a sulfonic monomer selected from 2-acrylamido-2-methylpropane sulfonic acid, 2-methacrylamido-2-methylpropane sulfonic acid, salts of said acids, and mixtures thereof, (c) 5 to 30% of a primary copolymerizable comonomer selected from vinyl alcohol, styrene sulfonic acids, salts of such acids, and mixtures thereof, said copolymer has weight average molecular weight in the range of about 1,000 to 100,000, and (d) up to 20% by weight of one or more secondary copolymerizable monomers which do not deleteriously effect performance of said copolymer, said second copolymerizable monomer excludes substituted acrylamides, vinyl esters, and vinyl acetate; said copolymer has weight average molecular weight in the range of about 1,000 to 100,000 and said metal ions are selected from iron, manganese, zinc, and mixtures thereof.

**4,952,327**  
**SCALE CONTROL WITH TERPOLYMERS CONTAINING STYRENE SULFONIC ACID**  
Zahid Amjad, Avon Lake, and William F. Masler, Hinckley, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio  
Continuation-in-part of Ser. No. 939,333, Dec. 8, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 235,270. The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> C02F 5/12  
U.S. Cl. 210—701

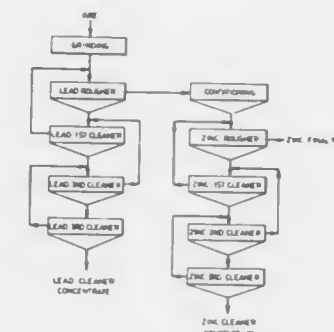
10 Claims  
1. A method of inhibiting precipitation of scale, including calcium phosphate, in an aqueous medium, in the presence or in the absence of iron, comprising adding to said aqueous medium an effective amount of a water-soluble copolymer for the purpose of inhibiting precipitation of said scale, said copolymer consisting essentially of (a) 40 to 70% by weight carboxylic monomer selected from acrylic acid, methacrylic acid, salts of such acids, and mixtures thereof, (b) 10 to 50% by weight of a sulfonic monomer selected from 2-acrylamido-2-methylpropane sulfonic acid, 2-methacrylamido-2-methylpropane sulfonic acid, salts of said acids, and mixtures thereof, (c) 5 to 30% of a styrene sulfonic acid, and (d) up to 20% by weight of one or more secondary copolymerizable monomer which does not deleteriously affect performance of said copolymer as antiscalant, said secondary copolymerizable monomer excluding substituted acrylamides, vinyl esters, and vinyl acetate; said copolymer having a weight average molecular weight in the range of about 1,000 to 100,000.

**4,952,328**  
**LUBRICATING OIL COMPOSITIONS**  
Kirk E. Davis, Euclid, and Calvin W. Schroeck, Eastlake, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio  
Continuation-in-part of Ser. No. 199,667, May 25, 1988, abandoned. This application Jun. 3, 1988, Ser. No. 202,795  
Int. Cl.<sup>5</sup> C10M 141/02  
U.S. Cl. 252—32.7 E

68 Claims  
1. A lubricating oil composition for internal combustion engines which comprises  
(A) at least about 60% by weight of oil of lubricating viscosity,  
(B) at least about 2.0% by weight of at least one carboxylic derivative composition produced by reacting (B-1) at least one substituted succinic acylating agent with (B-2) from about 0.70 equivalent up to less than one equivalent, per equivalent of acylating agent, of at least one an-ine compound characterized by the presence within its structure of at least one HN< group, and wherein said substituted succinic acylating agent consists of substituent groups and succinic groups wherein the substituent groups are derived from a polyalkene, said polyalkene being characterized by an Mn value of about 1300 to about 5000 and an Mw/Mn value of about 1.5 to about 4.5, said acylating

agents being characterized by the presence within their structure of an average of at least 1.3 succinic groups for each equivalent weight of substituent groups, and  
(C) from about 0.01 to about 2% by weight of at least one basic alkali metal salt of a sulfonic or carboxylic acid.

**4,952,329**  
**SEPARATION OF POLYMETALLIC SULPHIDES BY FROTH FLOTATION**  
Srdjan Bulatovic, and Robert S. Salter, both of Peterborough, Canada, assignors to Falconbridge Limited, Toronto, Canada  
Division of Ser. No. 192,567, May 11, 1988, Pat. No. 4,880,529. This application Aug. 29, 1989, Ser. No. 400,224  
Int. Cl.<sup>5</sup> B03D 1/016; C07G 1/00; C06B 37/00, 30/18  
U.S. Cl. 252—61



1. A reagent for enhanced mineral separation of metal sulphides present in sulphidic ores, comprising the reaction product of:  
(i) a mixture of quebracho and one member of the group consisting of: guar gum and dextrin, dissolved in water, and reacted in a first chemical reaction, adding thereto  
(ii) a water-soluble lignin sulphonate, and subjecting the mixture so obtained to a second chemical reaction, and finally adding thereto  
(iii) at least one member of the group consisting of: alkali metal cyanide, alkaline earth metal cyanide, water soluble metal sulphate, and a water soluble sulphite containing tetravalent sulphur atom, and subjecting the mixture so obtained to a third chemical reaction.

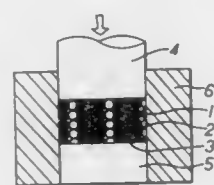
**4,952,330**  
**NONAQUEOUS ELECTROLYTE**  
Violeta Z. Leger, North Olmsted, and Jack W. Marple, Elyria, both of Ohio, assignors to Eveready Battery Company, Inc., St. Louis, Mo.  
Filed May 25, 1989, Ser. No. 356,490  
Int. Cl.<sup>5</sup> H01M 6/14  
U.S. Cl. 252—62.2

17 Claims  
1. An organic electrolyte solution for use in an electrochemical cell comprising a solute dissolved in a mixture of 32 to 45 volume percent of a linear aliphatic ether; 40 to 53 volume percent of a polymerizable component of a cyclic ether; and 8 to 18 volume percent of an alkylene carbonate.

**4,952,331**  
**COMPOSITE MAGNETIC COMPACTS AND THEIR FORMING METHODS**  
Kunio Okimoto; Tomio Sato; Toshio Yamakawa, all of Tosu, and Nanao Horiishi, Hiroshima, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan  
Filed Jan. 16, 1987, Ser. No. 3,767  
Claims priority, application Japan, Mar. 10, 1986, 61-51754  
Int. Cl.<sup>5</sup> H02K 21/06; C22B 18/04; H01F 1/26  
U.S. Cl. 252—62.54

9 Claims  
1. A composite magnetic compact made by forming into

shape a powder mixture consisting essentially of 1 to 50 percent by weight of a powder of a ferromagnetic substance and



the remains consisting essentially of a superplastic Zn-22Al alloy powder.

4,952,332

# DETERGENTS THAT CONTAIN ACYL DERIVATIVES OF DIHYDROXYDIOXANE AS BLEACH ACTIVATORS

Rolf Fikentscher, Ludwigshafen; Alfred Oftring, Bad Duerkheim; Werner Bochnitschek; Gerold Braun, both of Ludwigshafen; Johannes Perner, Neustadt; Ulrich Kaluza, Neckargemünd, and Hans-Ulrich Jaeger, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 397,890

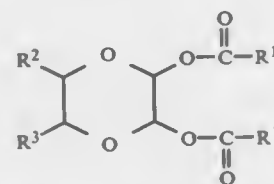
Claims priority, application Fed. Rep. of Germany, Sep. 6, 1988, 3830213

Int. Cl.<sup>3</sup> C11D 7/54, 7/38, 3/395; C01B 15/10

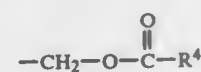
U.S. Cl. 252-95

4 Claims

1. A pulverulent or water-free liquid detergent which contains a surfactant, a builder and a bleaching agent as essential constituents, additionally containing a compound of the formula I



where the radicals R<sup>1</sup> are identical and each is straight-chain or branched alkyl of from 1 to 16 carbon atoms which may contain one or more olefinic double bonds and/or be substituted by carboxyl, by alkoxy of from 1 to 4 carbon atoms in the alkyl or by phenyl which may be monosubstituted or disubstituted by alkyl of from 1 to 3 carbon atoms or alkoxy of from 1 to 3 carbon atoms in the alkyl or be monosubstituted by carboxyl, wherein the carboxyl groups present are in the neutralized form, and R<sup>2</sup> and R<sup>3</sup> are identical or different and each is hydrogen, saturated straight-chain or branched alkyl of from 1 to 16 carbon atoms, the total number of carbon atoms of the two alkyls R<sup>2</sup> and R<sup>3</sup> not exceeding 16 and the alkyl radicals R<sup>2</sup> and R<sup>3</sup> may contain as a substituent a carboxyl group, present in neutralized, partially neutralized or esterified form, or be substituted by phenyl, or be a radical of the formula



where R<sup>4</sup> is identical to R<sup>1</sup>, in an effective amount as a bleach activator for peroxide.

4,952,333

# BLEACHING AND BRIGHTENING COMPOSITION AND METHOD

Randall J. Cramer, Hayward, Calif., assignor to The Clorox Company, Oakland, Calif.

Continuation of Ser. No. 220,977, Jul. 18, 1988, abandoned, which is a continuation of Ser. No. 96,749, Sep. 16, 1987, abandoned, which is a continuation of Ser. No. 748,306, Jun. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 574,565, Jan. 27, 1984, abandoned. This application Apr. 11, 1989, Ser. No. 338,365

Int. Cl.<sup>3</sup> A01N 27/00

U.S. Cl. 252-187.24

9 Claims

1. A liquid composition, useful for bleaching and brightening fabrics, formed by the steps comprising:

admixing a quantity of molten polymer, said polymer consisting essentially of oxidized polyethylene having a molecular weight between about 400 and about 3,000 or polyethylene-acrylic acid copolymer having a molecular weight between about 500 and 6,000, with sufficient base to saponify and neutralize said oxidized polyethylene or to neutralize said polyethylene-acrylic acid copolymer;

containing said molten polymer in the presence of an anionic or a nonionic surfactant with sufficient of an aqueous solution to form an emulsion;

dispersing a quantity of fluorescent whitening agent in said emulsion, said agent being in a weight ratio with respect to the emulsified polymer of from about 1:1.5 to about 1:3; and

slowly adding a water soluble salt to the dispersed fluorescent whitening agent and emulsified polymer at least until the emulsion collapses, wherein the polymer forms a matrix in which particles of the fluorescent whitening agent are entrapped.

4,952,334

# (I) COMPATIBLE BLENDS OF MAIN CHAIN AND SIDE CHAIN THERMOTROPIC LIQUID CRYSTAL POLYMERS

Hassan A. Hakemi, Milan, Italy; Husam A. A. Rasoul, and Robert W. Stackman, both of Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 320,355, Mar. 8, 1989, abandoned, which is a continuation of Ser. No. 111,179, Oct. 22, 1987, Pat. No. 4,842,754. This application Dec. 5, 1989, Ser. No. 449,221

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> C09K 19/52, 19/00

U.S. Cl. 252-299.01

4 Claims

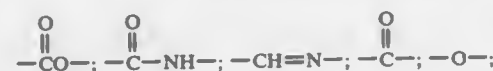
1. A compatible blend of thermotropic liquid crystal polymers comprising:

(i) at least one main chain thermotropic liquid crystal polymer containing a repeating mesogenic unit in the polymer backbone and corresponding to Formula I,

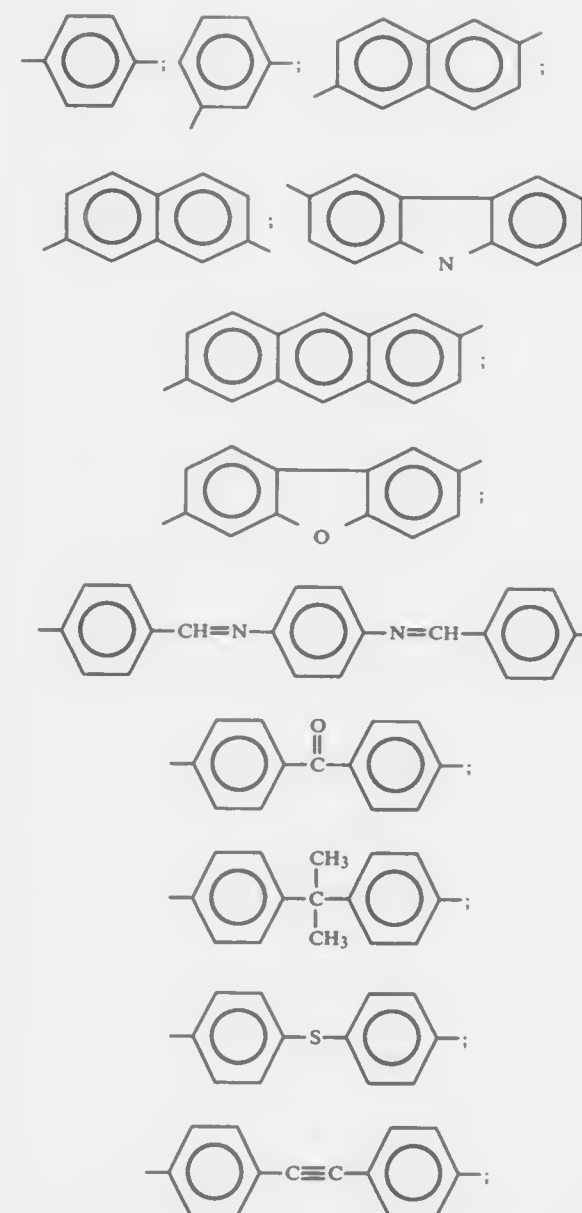
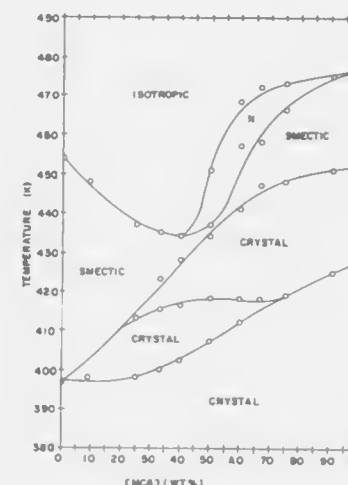


(I)

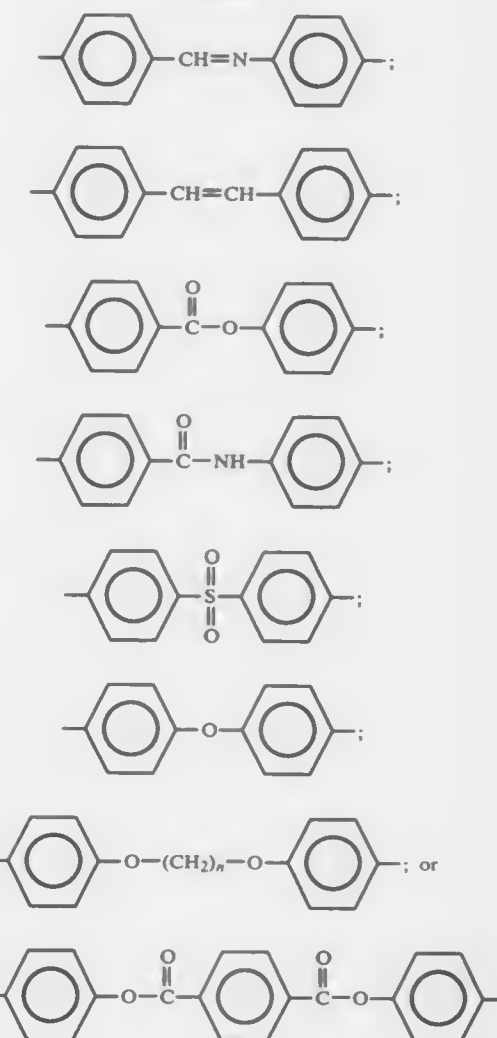
wherein X is A or (CH<sub>2</sub>)<sub>n</sub>; wherein n is an integer from about 3 to 10; wherein m is an integer from about 5 to 500; wherein Y and Z are either both non-existent or each



and wherein A is



-continued



wherein n is as defined above; and,  
(ii) at least one side chain thermotropic liquid crystal polymer, compatible with the main chain thermotropic liquid crystal polymer and containing a mesogenic unit and a spacer group of about 3-20 carbons and corresponding to Formula II,



(II)

wherein A, Y and Z are as defined above in Formula I; wherein S, the spacer group, is (CH<sub>2</sub>)<sub>n<sub>1</sub></sub>, wherein n<sub>1</sub> is an integer from about 3 to 20; wherein P is the repeating unit of the side chain thermotropic liquid crystal polymer backbone; wherein r is an integer from about 5 to 1500; and wherein D is either a C<sub>1</sub> to C<sub>6</sub> aliphatic hydrocarbon or C=N.



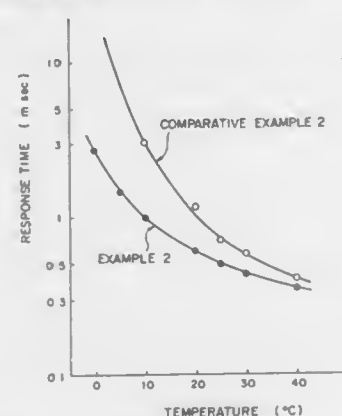
4,952,335  
FERROELECTRIC CHIRAL SMECTIC LIQUID CRYSTAL COMPOSITION

Kenji Furukawa; Kanetsugu Terahashi; Mitsuyoshi Ichihashi, and Makoto Kikuchi, all of Yokohama, Japan, assignors to Chisso Corporation, Osaka, Japan

Continuation of Ser. No. 871,981, Jun. 9, 1986, abandoned. This application Aug. 9, 1988, Ser. No. 230,041

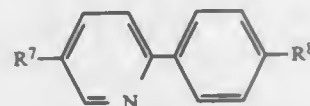
Claims priority, application Japan, Jan. 18, 1985, 60-132817 The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C09K 19/34, 19/52, 19/30, 19/20  
U.S. Cl. 252-299.61 6 Claims

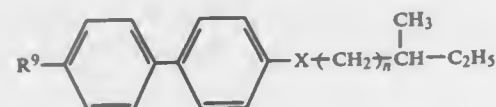


1. In a ferroelectric chiral smectic liquid crystal composition consisting essentially of at least one achiral smectic C compound and at least one chiral smectic C compound, an improvement which comprises:

(i) that said at least one achiral smectic C compound is selected from the group consisting of a compound expressed by the formula

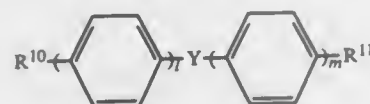


wherein R<sup>7</sup> represents an alkyl group of 7 to 10 carbon atoms and R<sup>8</sup> represents an alkoxy group of 4 to 12 carbon atoms, and having a smectic C phase; and a compound expressed by the formula



wherein R<sup>9</sup> represents an alkoxy group of 7 to 10 carbon atoms, X represents —O—, or a single bond; n represents an integer of 1 to 5 and having a smectic C phase;

(ii) that said at least one chiral smectic C component is a compound having a chiral smectic C phase and represented by the formula



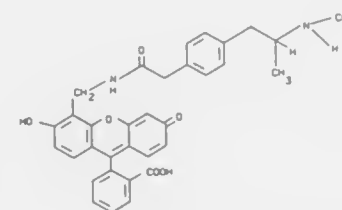
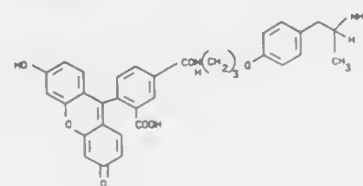
wherein l and m each are an integer of 1 or 2; Y is —COO—, —CH=N—, —CH<sub>2</sub>O—, —OCO—, —N=CH—, —OCH<sub>2</sub>—, or a single bond; R<sup>10</sup> is an alkyl or alkoxy group of 1 to 18 carbon atoms; and R<sup>11</sup> is (S)-2-methylbutyl, (S)-2-methylbutoxy, (S)-2-methylbutoxycarbonyl, (S)-1-methylheptyloxy, (R)-1-methylheptyloxy, (S)-1-methylheptyloxycarbonyl, or (R)-1-methylheptyloxycarbonyl.

4,952,336  
FLUORESCENCE POLARIZATION IMMUNOASSAY FOR AMPHETAMINE/METHAMPHETAMINE

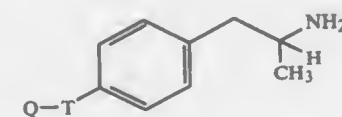
Paul J. Brynes, Libertyville; Cynthia M. Molina, Northbrook; Janis A. Martinus, Wildwood, all of Ill.; Kenward S. Vaughan, and Catherine M. Smith, both of Carlsbad, Calif., assignors to Abbott Laboratories, Abbott Park, Ill.

Division of Ser. No. 10,355, Feb. 3, 1987, Pat. No. 4,868,132. This application Jul. 22, 1989, Ser. No. 223,193

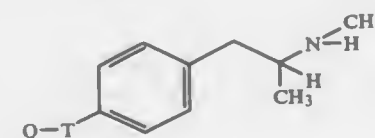
Int. Cl.<sup>5</sup> C09K 11/06 2 Claims  
U.S. Cl. 252-301.16



1. A tracer reagent useful in a fluorescence polarization immunoassay for determining phenethylamines, said reagent comprising a first tracer having a formula:



and a second tracer of the formula:



wherein Q is fluorescein or a fluorescein derivative and T is SO<sub>2</sub>, NH, HN(CH<sub>2</sub>)<sub>3</sub>O, COCH<sub>2</sub>, CO(CH<sub>2</sub>)<sub>2</sub>, CONH, HN(CH<sub>2</sub>)<sub>2</sub> or HN(CH<sub>2</sub>)<sub>2</sub>NHCOCH<sub>2</sub>, said first and second tracers being specifically recognizable by separate antibodies for amphetamine and methamphetamine.

4,952,337  
BIPHENYL ESTERS AND LIQUID CRYSTAL MATERIALS AND DEVICES CONTAINING THEM

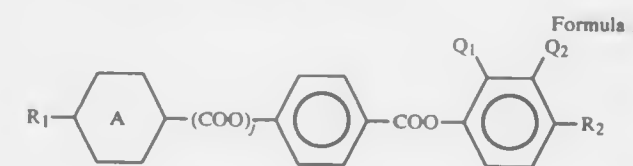
Madeline J. Bradshaw; Edward P. Raynes, both of Worcester; David I. Bishop, Dorset; Ian C. Sage, Dorset, and John A. Jenner, Dorset, all of England, assignors to The Secretary of State for Defence in her Majesty's Government of the United Kingdom, of Great Britain and Northern Ireland, London, England

Division of Ser. No. 923,825, Oct. 30, 1986, Pat. No. 4,769,176. This application Jun. 9, 1988, Ser. No. 204,604

Claims priority, application United Kingdom, Jan. 22, 1985, 8501509

Int. Cl.<sup>5</sup> G02F 1/10; C09K 19/20, 19/30; C07C 69/76  
U.S. Cl. 252-299.63 8 Claims

1. A compound having the formula I:



wherein R<sub>1</sub> represents C<sub>3</sub>-C<sub>12</sub> alkyl or alkoxy, represents C<sub>3</sub>-C<sub>12</sub> alkyl, one of Q<sub>1</sub> and Q<sub>2</sub> represents fluorine and the other represents hydrogen, ring



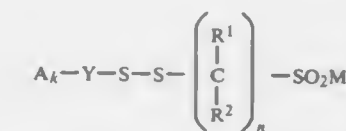
is trans-1,4-linked cyclohexyl or 1,4-linked cyclohexyl or 1,4-linked phenyl, j is selected from 0 or 1 provided that j is 0 if



is trans-1,4-linked cyclohexyl and 1 if



is 1,4-linked phenyl.



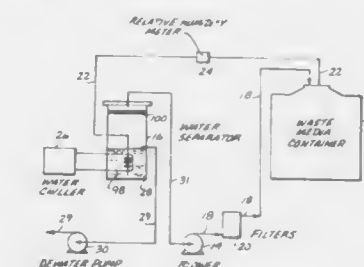
wherein A is OH, k is an integer of one to two, Y is a straight chain alkyl having from two to eight carbon atoms which may have a S—S group interposed therebetween, R<sup>1</sup> and R<sup>2</sup> are hydrogen or cycloalkyl, n is an integer from two through five, M is hydrogen, alkali metal or a straight chain alkyl having up to four carbon atoms.

4,952,339  
DEWATERING NUCLEAR WASTES

Charles J. Temus, Puyallup; Ronald E. Burnham, Auburn, and Gregory R. Allan, Redmond, all of Wash., assignors to Nuclear Packaging, Inc., Federal Way, Wash.

Continuation of Ser. No. 178,870, Mar. 25, 1988, abandoned, which is a continuation of Ser. No. 899,426, Aug. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 715,006, Mar. 22, 1985, abandoned. This application Mar. 24, 1989, Ser. No. 330,950

Int. Cl.<sup>5</sup> G21F 9/08 44 Claims  
U.S. Cl. 252-632



23. A method of dewatering a slurry containing radioactive particles to a condition for permanent storage, comprising the steps:

- removing substantially all interstitial water from the slurry;
- contacting the particles with a low humidity gas at a dewatering temperature, the dewatering temperature being greater than a predetermined storage temperature of about 55° F. to dewater the particles by removing a volume of adsorbed water from the particles such that at the predetermined storage temperature the particles will be just unsaturated with respect to adsorbed water; and
- sealing the dewatered particles in a disposable container.

4,952,340  
VIBRATORY ION VAPOR GENERATOR AND METHOD

Fred A. Wentworth, Jr., R.F.D. 4, 100 Brentwood Rd., Exeter, N.H. 03833

Filed Dec. 4, 1989, Ser. No. 445,457  
Int. Cl.<sup>5</sup> B01F 3/04 19 Claims

1. In an improved ion vapor generator device for creating a quantity of electrically charged negative ions, comprising

- a container for holding a quantity of a liquid including H<sub>2</sub>O and including head space for ion vapor within said container and above said liquid surface;
- means for withdrawing at least a portion of said ion vapor from said container;
- air pressure equalization means communicating with said container; and

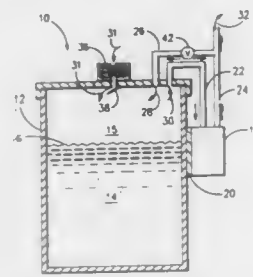
4,952,338  
UNSYMMETRICAL ORGANIC DISULFIDE COMPOUNDS USEFUL AS ANTIRADIATION AGENTS

Lamar Field, 610 Lynnbrook Rd., Nashville, Tenn. 37215; Hikmat Mussallam, 25900 Lasalle Ct., Damascus, Md. 20872; Jeffrey D. Macke, 15 Floral Ave., Ft. Mitchell, Ky. 41017, and Pramod K. Srivastava, 3, Dindayal Colony Nawabganj, Varanasi - 221005, U.P., India

Filed Sep. 16, 1986, Ser. No. 907,882  
Int. Cl.<sup>5</sup> C07C 145/00 2 Claims

U.S. Cl. 562-125 1. The compound of the formula

- (d) vibration means coupled to said liquid for imparting controlled agitation to said liquid surface and adjusted so



as substantially to maintain continuous surface tension on the liquid surface.

4,952,341

# MECHANICAL ENHANCEMENT OF THE BURNING RATE OF SOLID PROPELLANTS BY MEANS OF SHRINK TUBES OR SPHERES

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 9, 1979, Ser. No. 22,121

Int. Cl.<sup>3</sup> C06B 45/10, 21/00

U.S. Cl. 264—3.1

8 Claims

1. A method of enhancing the rate of consumption of a propellant as a result of having shrink tubing embedded in the propellant, said method comprising:

- (i) formulating and mixing a curable propellant composition selected from the group consisting of a difluoroamino containing propellant composition comprised of a predetermined weight percentages of an ethyl acrylate-acrylic acid copolymer binder plasticized with 1,2,3-tris[1,2bis(difluoroamino)ethoxy] propane, a 4,5-epoxycyclohexylmethyl 4',5'-epoxycyclohexylcarboxylate curing agent, ultrafine ammonium perchlorate oxidizer of about 1 micrometer particle size coated with tris[2-ethylaziridinyl]-1,3,5-benzene-1,3,5-tricarboxamide, carboranymethyl propionate, graphite linters, aluminum powder, aluminum flake, fine ammonium perchlorate oxidizer of about 0.9 micrometer, and lecithin; and a double-base propellant composition comprised of predetermined weight percentages of a binder of nitrocellulose lacquer, methyl nadic anhydride, carbon black, lead peroxide, stamic oxide, organic oxidizer of cyclotetramethylenetetranitramine, hexamethylene diisocyanate curing agent, triphenylbismuthine curing catalyst, maleric anhydride, and magnesium oxide;
- (ii) adding a predetermined amount, from about 1 weight percent to about 2 weight percent of said uncured propellant composition, of a heat-shrinkable tubing comprised of material selected from a polyurethane or a polyolefin resin having a predetermined inside diameter from about 0.030 inch to about 0.125 inch and as outer diameter from about 0.070 inch to about 0.165 inch;
- (iii) curing said propellant composition to form a solid propellant grain containing said heat shrinkable tubing dispersed throughout; and
- (iv) exposing said solid propellant grain to heat which causes said heat shrinkable tubing to shrink, and thereby increase the porosity of said solid propellant grain which provides a method of enhancing the rate of consumption of said solid propellant grain during the burning thereof.

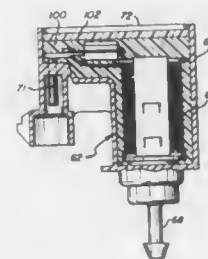
4,952,342  
DUAL CURE METHOD FOR MAKING A ROTTED ELECTRICAL/MECHANICAL DEVICE  
Kieran F. Drain, Meriden, and Larry A. Nativi, Rocky Hill, both of Conn., assignors to Loctite Corporation, Newington, Conn.  
PCT No. PCT/US87/01593, § 371 Date Aug. 19, 1987, § 102(e)  
Date Aug. 19, 1987

PCT Filed Jul. 2, 1987, Ser. No. 104,885

Int. Cl.<sup>3</sup> B32B 1/10, 31/28

U.S. Cl. 264—22

22 Claims



1. A method of potting a device including a mechanism in a housing, comprising:

- (i) providing in the housing a self-leveling liquid composition comprising an actinic radiation curable first resin component and a second resin component which is non-curable under actinic radiation conditions effective for curing the first resin component, wherein a first portion of the self-leveling liquid composition comprising the second resin component but not the first resin component is provided in the housing to form a first self-leveling liquid layer therein, and a second portion of the self-leveling liquid composition comprising the first resin component is provided in the housing to form a separate and discrete second self-leveling liquid layer overlying the first liquid layer;
- (ii) Prior to curing of the second resin component, exposing the self-leveling liquid composition to actinic radiation which is curingly effective for the first resin component, so that the second layer comprises a cured first resin component and overlies the first liquid layer comprising the uncured second resin component; and
- (iii) thereafter exposing the composition to conditions which are curingly effective for the second resin component, to cure the second resin component in the first layer.

4,952,343

# PROCESS FOR THE MANUFACTURE OF THIN PLATES WITH LOW BINDING STRENGTH

Norbert Gerharz, Hilscheld; Eduard Kessler, Bendorf; Albert Kleinevoss, Höhr-Grenzhausen; Hans Kleudgen; Jochen Kopka, both of Bendorf, and Bernd Stein, Neuwied, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed May 15, 1987, Ser. No. 50,890

Claims priority, application Fed. Rep. of Germany, May 21, 1986, 3617041

Int. Cl.<sup>3</sup> B29C 43/02

U.S. Cl. 264—109

15 Claims

1. A process for the manufacture of green plates having substantial green strength, said plates being manufactured from a ceramic material with a low binding strength, said plates being substantially thin compared to the height and length of said plates, and said plates, when initially formed and immediately thereafter, being so thin that they have a low strength to handling the process comprising the steps of:
  - mixing said ceramic material with a composition comprising a compound of sulfur, said ceramic material containing at least one iron compound;
  - molding said mixed ceramic material into molded shapes

substantially in the form of said thin plates having at least one substantially flat surface substantially forming a plane, said at least one substantially flat surface being defined by said length and said height;

ejecting each said molded shape, from said mold in the plane of said flat surface, onto a carrier;

heating said molded shapes at a temperature in the range of approximately 100° C. to approximately 1100° C. for a predetermined time while said molded shapes are lying substantially flat on their at least one flat surface on their



corresponding carrier, said predetermined time being in the range of approximately two to approximately seven minutes;

said heating for said predetermined time being conducted until iron sulfates form in said molded shapes and until said iron sulfates strengthen said molded shapes, thereby providing a substantially handleable thin plate having substantial green strength, whereby said thin plates subsequent to said heating and strengthening are transportable substantially without damage and whereby any damage thereto is substantially minimized.

4,952,344

# METHOD OF AND APPARATUS FOR MAKING A FISHING LINE

Paul D. Burgess, Brecon, Great Britain, assignor to Fly Fishing Technology Limited, Brecon, United Kingdom

PCT No. PCT/GB87/00491, § 371 Date Mar. 13, 1989, § 102(e)

Date Mar. 13, 1989, PCT Pub. No. WO88/00521, PCT Pub. Date Jan. 28, 1988

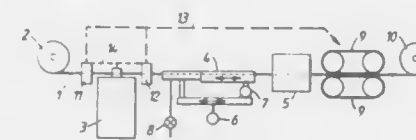
PCT Filed Jul. 13, 1987, Ser. No. 298,885

Claims priority, application United Kingdom, Jul. 12, 1986, 8617017; Jul. 19, 1986, 8617689; Sep. 26, 1986, 8623200

Int. Cl.<sup>3</sup> B29C 47/02, 47/92

U.S. Cl. 264—40.1

10 Claims



1. A method of manufacturing a tapered fishing line comprising continuously drawing a linear core from a supply by variable speed haul-off means, heating thermoplastic material predominantly comprising polyurethane and extruding it as a coating over said core upstream of the haul-off means using an extruder with a variable extrusion rate, monitoring the thickness of the line provided by the coated core immediately adjacent the extruder, cooling the line between the thickness monitoring means and the haul-off means, and selectively varying the speed of the haul-off means, the rate of extrusion, the heating of the thermoplastic material and the cooling of the coated line in response to the monitored thickness to taper the coated line according to a predetermined computer program.

7. Apparatus for manufacturing a tapered fishing line com-

prising supply means for a linear core, a thermoplastic extruder with a variable extrusion rate, means for heating thermoplastic material in the extruder, variable speed haul-off means for drawing the core from the supply means through the extruder which, in operation, applies a coating over the core, means for monitoring the thickness of the line provided by the coated core immediately adjacent the extruder, means for cooling the line between the thickness monitoring means and the haul-off means, and a computer programmed to vary through associated control means the speed of the haul-off means, the rate of extrusion, the heating of the thermoplastic material and the cooling of the coated line in response to the monitored thickness.

4,952,345

# METHOD FOR CONTROLLING POLYMER VISCOSITY

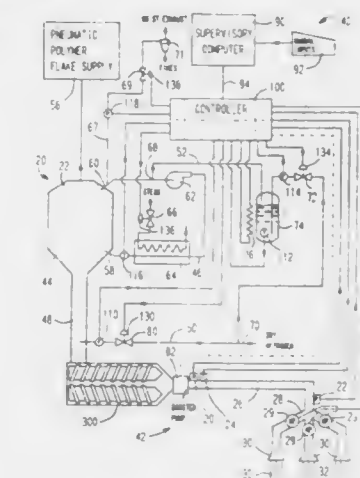
Sundar M. Rao, Richard P. Dale, and Laura A. Murphy, all of Seaford, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 10, 1989, Ser. No. 308,773

Int. Cl.<sup>3</sup> D01F 6/60; D01D 1/04

U.S. Cl. 264—40.6

9 Claims



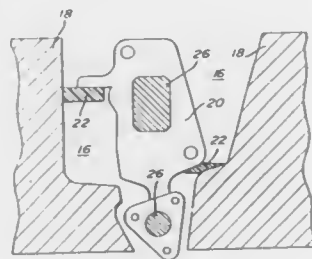
1. A process for spinning a synthetic linear polyamide comprising:
  - passing polyamide flake successively through first and second treatment chambers,
  - circulating a inert heated gas through the polyamide flake in the first treatment chamber,
  - passing a dry inert gas with a variable flow rate through the polyamide flake in the second treatment chamber,
  - adding a make-up gas flow with a variable moisture content to the circulating heated gas to control the moisture content of the circulating heated gas,
  - melting the polyamide flake,
  - determining a relative viscosity of the molten polyamide, concurrently varying both the rate of flow of the dry inert gas and the water content of the make-up gas in accordance with the determined relative viscosity of the molten polyamide to maintain a selected relative viscosity of the molten polyamide, and
  - extruding the molten polyamide through a spinning head to form filaments.



**4,952,346**  
**PROCESS FOR INDUCTION HEATING OF MELT-OUT CORES**

Kelly P. Gravelle, Ile Bizard, Canada, assignor to Electrovert Ltd., Toronto, Canada  
 Filed Nov. 8, 1988, Ser. No. 268,552  
 Int. Cl.<sup>3</sup> B29C 35/14, 41/46, 71/04  
 U.S. Cl. 264—25

4 Claims



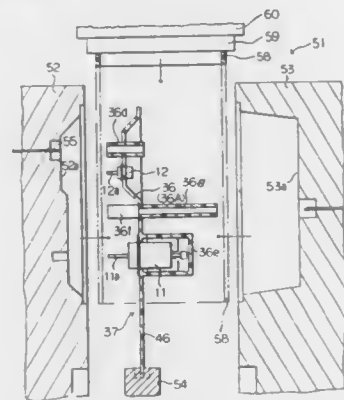
1. A process of melting a metal core from a molded plastic article placed in a hot liquid bath wherein the metal core is made of a low melting point alloy which has a melting temperature below the melting temperature of said plastic article comprising the steps of:

positioning at least one plastic article in the hot liquid bath in a gap between two magnetic nozzles attached to a high permeability magnetic core, so the article remains within a magnetic circuit of the magnetic core, the nozzles shaped to direct and position a desired pattern of flux lines for a specific shape of plastic article, and inducing eddy currents in a metal core of the molded plastic article to heat and melt the metal core.

**4,952,347**  
**METHOD OF MANUFACTURING A FUEL TANK FROM SYNTHETIC RESIN**

Joji Kasugai, Ichinomiya, Japan, assignor to Toyota Gosei Co., Ltd., Nishikasugai, Japan  
 Filed Apr. 19, 1989, Ser. No. 340,441  
 Claims priority, application Japan, May 28, 1988, 63-131198  
 Int. Cl.<sup>3</sup> B29C 49/20, 65/22  
 U.S. Cl. 264—26

18 Claims



10. Method of manufacturing a fuel tank of synthetic resin which is provided with an upper chamber filled with activated carbon to adsorb fuel evaporation gas, a lower chamber for storing fuel, an insert member arranged within the tank, and a tank outside wall constructed of a circumferential wall of the upper chamber and the lower chamber said outside wall covering said insert member and formed by blow molding using a parison of thermoplastic resin and a mold for blow molding to form a cavity of prescribed shape at a mold tightening state, said outside wall having an upper wall with a nipple portion

for fuel evaporation gas which projects upward, a bottom wall and a side wall, said insert member being composed of a component part with a nipple portion projecting from the lower chamber to upper side of the upper wall and a holding plate of synthetic resin holding said component part and acting as a partition wall between the upper chamber and the lower chamber, said holding plate having a base portion of a flat plate shape arranged in the horizontal direction and an upper pipe portion for fuel flow projecting to an upper side of the upper wall and penetrating it, and a lower pipe portion for fuel evaporation gas projecting from the base portion to a lower side of the bottom wall and penetrating it, said method comprising the steps of:

- arranging the axial direction of the nipple portion of the component part in a perpendicular direction to the base portion of the holding plate and fixing the component part to the holding plate and assembling said insert member;
- setting said insert member into the mold, which is in an open state, so that the base portion of the holding plate is arranged in a perpendicular direction to the mold tightening direction of the mold;
- arranging the parison around said insert member and the base portion of the holding plate;
- tightening the mold and thereby pressing the parison against the outer periphery of the holding plate and also thereby pressing an outer circumferential surface of the nipple portion of the component part and the outer circumferential surface of the upper and lower pipe portions of the holding plate, the parison surrounding said nipple portion to form a covering portion, said nipple portion being pressed into a protruded section of the mold cavity, and injecting air into the parison to thereby press the parison against an inner circumferential surface of the mold, thus forming said outside tank wall by blow molding;
- removing a molded article from the mold, said molded article being molded by the mold;
- cutting and removing the parison covering respective top end surfaces of the nipple portion of the outside tank wall and the nipple portion of the component part and the upper and lower pipe portions of the holding plate in the molded article removed from the mold; and
- filling the upper chamber with the activated carbon.

**4,952,348**  
**PROCESS FOR PREPARING SHAPED ARTICLE HAVING THICK SECTION**

Yoshiharu Ishimaru, Tokyo; Motoyuki Yamato, Kanagawa, and Koji Chono, Okayama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan  
 Filed Sep. 12, 1988, Ser. No. 242,842  
 Claims priority, application Japan, Sep. 18, 1987, 62-232542; Jul. 29, 1988, 63-188162  
 Int. Cl.<sup>3</sup> B29C 45/78; C08F 32/00  
 U.S. Cl. 264—40.6

9 Claims

1. A process for the preparation of a substantially pore-free shaped article having a thick section, composed of polycyclic norbornene polymer, which comprises bulk-polymerizing a monomer charge selected from norbornene monomers having tricyclic and higher cyclic structures with a metathesis catalyst in a mold, and cooling the polymerization product while controlling the temperature difference between the interior of the polymerization product and the exterior of the polymerization product below 80° C. during the cooling period spanning from the maximum exotherm temperature to the glass transition temperature of the polymerization product.

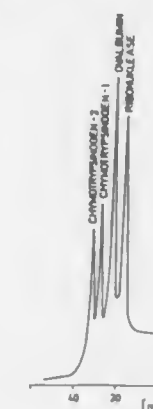
**4,952,349**  
**MACROPOROUS POLYMERIC MEMBRANES FOR THE SEPARATION OF POLYMERS AND A METHOD OF THEIR APPLICATION**

Frantisek Svec, Hrebek; Miroslav Bleha, Praha, both of Czechoslovakia; Tatiana B. Tennikova, and Boris G. Belenkii, both of Leningrad, U.S.S.R., assignors to Ceskoslovenska akademie ved, Praha, Czechoslovakia and Akademia Nauk SSSR, Moscow, U.S.S.R.  
 Division of Ser. No. 411,665, Sep. 25, 1989, Pat. No. 4,923,610, which is a division of Ser. No. 281,266, Dec. 7, 1988, Pat. No. 4,889,632. This application Jan. 23, 1990, Ser. No. 468,907  
 Claims priority, application Czechoslovakia, Dec. 10, 1987, 9034-87; Oct. 21, 1988, 6987-88

Int. Cl.<sup>3</sup> B01D 71/00

U.S. Cl. 264—45.1

3 Claims

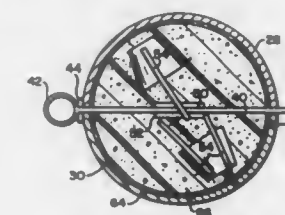


1. A method comprising: preparing macroporous polymeric membranes having properties for enabling substantially high efficiency separation of macromolecules on an industrial scale by dissolving a mixture of monomers together with a radical initiator, in a porogenic inert organic solvent selected from the group consisting of alcohols, esters of carboxylic acids, ketones, and their mixtures, placing the resultant solution into a space having a desired shape, formed by two temperature-controlled face plates and a spacing insert having a thickness corresponding to the required thickness of the membrane, and heating the solution to a temperature up to 80° C. for up to 24 hours in order to carry out radical polymerization.

**4,952,350**  
**METHOD FOR FORMING EXPANDED FOAM ROTOMOLDED PRODUCTS**

Keith Duffy, Johnstown, N.Y., assignor to Nelson A. Taylor Co., Inc., Gloversville, N.Y.  
 Filed Jan. 20, 1988, Ser. No. 208,912  
 Int. Cl.<sup>3</sup> B29C 67/22  
 U.S. Cl. 264—45.7

31 Claims



1. A method of producing a product comprising a thermoplastic outer shell and a foam plastic interior, said method comprising the steps of:

- charging a casting mold with a first charge containing a thermoplastic resin composition;
- placing within the casting mold a second charge, isolated

from and supported away from the first charge by mounting support means within the mold and placing the second charge in at least one holding means secured to said support means, said second charge containing an expandable foam composition;

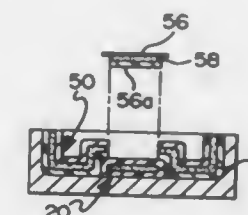
- rotating the mold within a heated chamber to cause said resin composition to flow about the mold walls and to fuse therein as an outer shell;
- after fusion of said resin composition, but while said shell is still heated, said second charge being released within said mold to permit contact of said expandable foam composition with said heated shell to cause expansion of said foam composition within said shell;
- continuing to rotate said mold until expansion of said foam composition is completed; and
- cooling the product and separating it from the mold.

**4,952,351**  
**METHOD OF FORMING A PLASTIC PANEL FOR COVERING AN INFLATABLE RESTRAINT**

Kent L. Parker, Hanover, and George Bleau, Rochester, both of N.H., assignors to Davidson Texttron Inc., Dover, N.H.  
 Filed Apr. 6, 1989, Ser. No. 334,286  
 Int. Cl.<sup>3</sup> B29C 67/22

U.S. Cl. 264—46.4

7 Claims



1. A method for integrally molding a pre-assembled door within a plastic panel of an interior trim product for an automobile wherein the plastic panel has an inboard surface and an outer appearance surface, comprising the steps of:

- molding said plastic panel about and over said door by providing an assembly of said pre-assembled door in a pocket of an outer skin of said plastic panel and thereafter loading said assembly in a mold cavity, and forming a foamed layer by foaming said layer against an inboard surface of said outer skin, thereby encapsulating an inboard face and sides of said door while leaving an outboard face thereof exposed and form fit with a surrounding outer skin of said plastic panel; and
- removing a portion of said foamed layer and said outer skin of said plastic panel overlying said door to define an opening therein to expose said inboard face of the door for operation of the door from the inboard surface of the plastic panel.

**4,952,352**  
**PROCESS FOR PRODUCING A LOW DENSITY FOAMED POLYETHYLENE**

Yong W. Shin, 150 W. 47th St., New York, N.Y. 10036  
 Continuation of Ser. No. 27,957, Mar. 19, 1987, abandoned, which is a division of Ser. No. 744,747, Jan. 14, 1985, Pat. No. 4,746,564. This application Jan. 27, 1989, Ser. No. 303,050  
 Claims priority, application Rep. of Korea, Apr. 4, 1985, 1985/2293

Int. Cl.<sup>3</sup> B29C 47/10

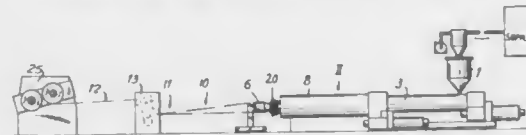
U.S. Cl. 264—51

9 Claims

1. A method of producing a flexible low-density polyethylene sheet or tube possessing superior buoyancy, cold-resistance and water-repellency comprising:

- mixing low density polyethylene in a hopper with about

- 1% by weight of azodicarbonamide as a blowing agent, about 0.1 to 0.2% by weight of a surface activation agent and about 0.3% by weight of zinc carbide as a separation agent to form a dry particulate mixture;
- (2) conveying the mixture, under air pressure provided from a pressure box, from said hopper and through a screw conveyor provided in a first portion of a heat tunnel while;
- (i) heating the mixture to a temperature of about 170 degrees C. to form a softened mass;
- (ii) raising the temperature of the softened mass to about 200 degrees C. to gasify the blowing agent for foaming and expanding the low density polyethylene to form gas-filled cells within the softened mass;
- (iii) reducing the temperature of the foamed and expanded polyethylene mass to about 150 degrees C. to partially shrink and harden the gas-filled cells;
- (iv) introducing gaseous dichlorofluoromethane as a blowing agent into the polyethylene mass for additional foaming and expansion of the polyethylene mass to strengthen the gas-filled cells of the mass; and



- (v) cooling the mass to a temperature of about 100 degrees C. to prepare the mass for cutting;
- (3) cutting a predetermined quantity of the polyethylene mass in a second portion of said heat tunnel to form a cut mass;
- (4) conveying the cut mass through a screwless conveyor provided in the second portion of said heat tunnel while reheating the cut mass to a temperature of about 105 degrees C. to prepare the mass for extruding;
- (5) extruding the reheated mass from the screwless conveyor out of a die into a free expansion zone at atmospheric pressure and room temperature, whereby the gas-filled cells expand naturally but not explosively at room temperature and pressure;
- (6) forming the extruded mass into a sheet or tube; and
- (7) cooling the sheet or tube at room temperature for at least 24 hours to provide a flexible low density polyethylene sheet or tube characterized by superior buoyancy and thermal resistance.

4,952,353

## HOT ISOSTATIC PRESSING

Jeffrey T. Neil, Acton, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 28, 1989, Ser. No. 458,056

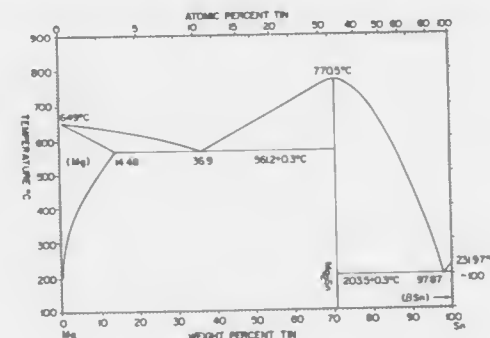
Int. Cl.<sup>5</sup> F27B 9/04

U.S. Cl. 264—65

11 Claims

1. A process comprising
- (a) providing a non-reactive container with a green article and sufficient solid encapsulating agent selected from the group consisting of tin and the tin-magnesium eutectic to encapsulate said green article when said agent is in the molten state;
- (b) raising the temperature of the container sufficiently to melt said agent and to encapsulate said article;
- (c) maintaining the resulting encapsulated article at a pressure below the infiltrating pressure of the green article while heating said encapsulated article sufficiently to create a surface on the article that is essentially free of connected porosity and thereafter,

- (d) increasing the pressure on the encapsulated article while maintaining the article at its sintering temperature for a



sufficient time to increase the density of said article to at least about 98% of theoretical.

4,952,354

## DEGATING METHOD

Hidetoshi Yokoi, Tokyo; Mikiya Niwa, Urawa; Yasuo Nomura, and Takeshi Takahashi, both of Toyama, all of Japan, assignors to Nissui Kako Co., Ltd, Saitama and Nachi-Fujikoshi Corporation, Toyama, both of Japan

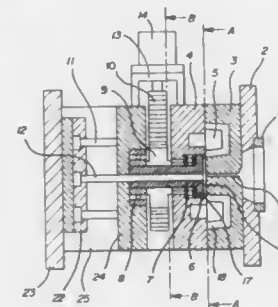
Filed May 8, 1989, Ser. No. 348,820

Claims priority, application Japan, Oct. 5, 1988, 63-249949

Int. Cl.<sup>5</sup> B29C 45/38

U.S. Cl. 264—69

6 Claims



1. A method for degating an injection molded article formed in a mold having a sprue, a runner and a gate interconnected to a mold cavity, comprising the steps of:
- filling said mold cavity with a molten synthetic polymeric resin;
- cooling the mold so as to seal said gate;
- thereafter oscillating a gate cut shaft member configured to slide in relation to said mold cavity proximate said gate to soften said resin in said gate; and
- displacing said gate cut shaft member with respect to said mold cavity once said resin in said gate is sufficiently softened so as to degate said resin.

4,952,355

## METHOD FOR MAKING A PLASTIC TOOL

Thomas J. Seward, 1421 Ralph, Garden City, Mich. 48135, and Daniel R. Seward, 220 N. Christine, Westland, Mich. 48185

Filed Sep. 12, 1988, Ser. No. 242,529

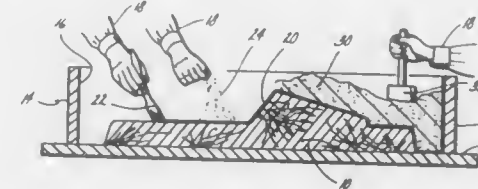
Int. Cl.<sup>5</sup> B29C 33/38

U.S. Cl. 264—112

11 Claims

1. A method for mass casting a plastic tool, comprising the steps of:
- making a model of a part to be cast;

- disposing the model in the cavity of a core box;
- applying a release agent on the surface of the model;
- applying first and second surface coats in the cavity containing the model over at least the exposed surface of the cavity, the second surface coat being applied on the first surface coat before the first coat has fully cured, and allowing the second surface coat to partially cure;
- distributing sand particles over the second surface coat such that the sand particles adhere to the second surface coat before it has fully cured;
- applying a thin coating of a laminating resin on the distributed sand;
- introducing a core material comprising a mixture of sand and an epoxy which hardens into a rigid mass, into the cavity, over the laminating resin to cover the model, and permitting the mass to harden so that the core material becomes connected to the surface coat by attachment to the sand particles distributed on the second surface coat.
6. A method for making a plastic tool, comprising the steps of:
- making a model of a part to be cast;
- disposing the model in the cavity of a core box so as to cover a portion of the interior surface thereof;



- the core box having vacuum tube means into the interior thereof;
- applying a parting agent to the surface of the model;
- applying an air impervious surface coat in the cavity containing the model through an opening over the uncovered surface of the cavity, but not over the exposed surfaces of the model, and allowing the surface coat to partially cure;
- distributing sand particles over the surface coat such that the sand particles adhere to the surface coat before it has fully cured;
- applying a thin layer of a laminating resin on the sand particles;
- introducing a porous core material comprising a mixture of sand and an epoxy which hardens into a rigid mass, into the cavity, over the laminating resin and the model and permitting the mass to harden so that the core material becomes connected to the surface coat by attachment to the sand distributed on the partially cured surface coat;
- removing the model to define a cavity having the configuration of the model in the core material; and
- closing said opening and connecting vacuum means to the vacuum tube means capable of drawing air through the core material.

4,952,356

## PROCESS FOR THE HOT PRESS MOULDING OF MOULDED ARTICLES

Ganter H. Kiss, Sontra, Fed. Rep. of Germany, assignor to Societe Generale, Paris, France

Filed Jun. 24, 1988, Ser. No. 210,870

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3721663

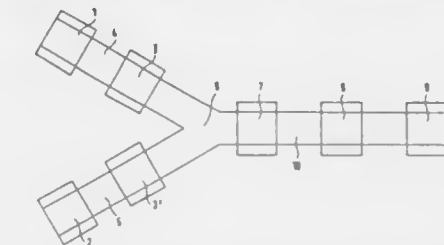
Int. Cl.<sup>5</sup> B29C 43/04, 43/18

U.S. Cl. 264—113

10 Claims

1. A process for preparing molded articles from binder-impregnated fibrous mats, comprising the steps of:
- (A) providing a binder-impregnated fibrous mat, having a surface;
- (B) providing a stabilizing support in superposed relation-

- ship to the surface of the binder-impregnated fibrous mat, the stabilizing support comprising a fibrous sheet material having opposing surfaces, which is substantially dimensionally stable in directions tangential to the opposing surfaces and flexible in directions normal to the opposing surfaces, the stabilizing support including a curable thermosetting resin;
- (C) adhering the stabilizing support to the surface of the binder-impregnated fibrous mat;



- (D) steam treating the binder-impregnated fibrous mat and adhered stabilizing support; and
- (E) press molding the binder-impregnated fibrous mat and adhered stabilizing support, whereby the stabilizing support thermosetting resin cures to form a substantially dimensionally stable, inflexible covering on the formed binder-impregnated fibrous mat.

4,952,357

## METHOD OF MAKING A POLYIMIDE BALLOON CATHETER

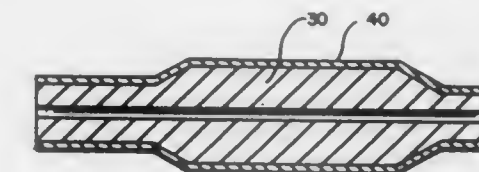
Charles L. Euteneuer, St. Michael, Minn., assignor to SciMed Life Systems, Inc., Minneapolis, Minn.

Filed Aug. 8, 1988, Ser. No. 229,313

Int. Cl.<sup>5</sup> B29C 41/14

U.S. Cl. 264—129

14 Claims



1. A method of forming a balloon for use in a balloon catheter, the method comprising the steps of:
- providing a substrate having an exterior surface configuration which corresponds to a desired shape of the balloon in a predetermined condition;
- depositing a film over the exterior surface of the substrate wherein the film is defined by a plurality of layers of substrate coatings, with at least one layer formed from a polyimide polymer material and another layer formed from a metallic material which heats in response to an application of electro-magnetic energy thereto; and
- removing the substrate within the film to leave a balloon of the desired shape.



4,952,358

## METHOD OF MANUFACTURING AN INTERIOR MEMBER FOR VEHICLES

Toyohiko Okina; Hiroshi Goto; Fumio Kousaka; Akinori Teranishi; Satoshi Kawabata; Tetsuo Ohya; Makoto Ohya; and Norio Kozaki, all of Anjo, Japan, assignors to Inoue MTP Kabushiki Kaisha, Japan

Division of Ser. No. 92,212, Sep. 2, 1987, Pat. No. 4,871,612.

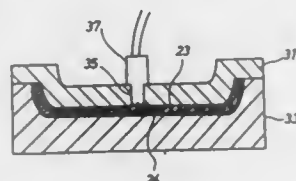
This application May 2, 1989, Ser. No. 346,459

Claims priority, application Japan, Sep. 5, 1986, 61-136966; Oct. 17, 1986, 61-247106; Oct. 24, 1986, 61-163018

Int. Cl.<sup>3</sup> B29C 45/14, 45/16

U.S. Cl. 264—134

16 Claims



1. A method for manufacturing an interior member for vehicles, comprising steps of:

- laying a surface layer in a cavity of a mold;
- placing a reinforcing fiber mat onto said surface layer;
- compressing said surface layer and said reinforcing fiber mat in the mold;
- injecting raw material for obtaining a polyisocyanurate into the cavity of the mold, said raw material comprising a trimerization catalyst, a polyol and a polyisocyanate, the amount of said raw material being so determined that the density of the obtained polyisocyanurate is 1.2 to 1.9 times as much as the density of the same polyisocyanurate in its free foaming state, the amount of polyisocyanate used for obtaining said polyisocyanurate being from 250 to 3,000 on the isocyanate index; and
- demolding an integrally-molded interior member from the mold after the completion of the reaction of the raw material.

4,952,359

## METHOD FOR MAKING SPLITTABLE CATHETER

Stanley C. Wells, Centerville, Ohio, assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

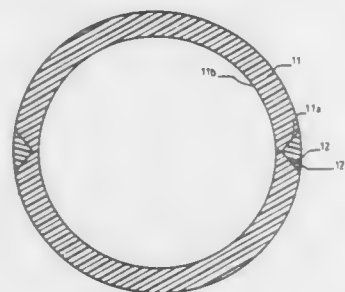
Division of Ser. No. 11,783, Feb. 6, 1987, Pat. No. 4,776,846.

This application Aug. 1, 1988, Ser. No. 227,040

Int. Cl.<sup>3</sup> B29C 47/06

U.S. Cl. 264—139

3 Claims



1. A method for producing a catheter assembly with a catheter configured to be readily split in half for ease of removal from insertion in a patient, said method comprising the steps of:

- simultaneously extruding a generally tubular catheter assembly with two diametrically formed v-shaped grooves formed therein, and v-shaped strips formed in

said grooves, said generally tubular catheter being comprised of a different polymer from said strips; said extruding step including

- (1) selecting in a first selecting step an elongated tubular body comprised of a first polymer;
- (2) said body being defined by a wall having a first radial cross-sectional thickness through the length thereof;
- (3) said wall having an inner surface and an outer surface;
- (4) the said inner surface of said wall defining a lumen extending centrally through the length of said body;
- (5) said wall having two diametrically opposed grooves therein;
- (6) each of said grooves having a continuously decreasing width in cross-section from said outer surface to form a v-shaped;
- (7) the bottom of each said v-shaped groove being at a point spaced from said inner surface of said wall;
- (8) said bottom of each said v-shaped groove cooperating with said inner surface of said wall to form a second radial cross-sectional thickness for said wall adjacent each of said diametrically opposed grooves;
- (9) selecting in a second selecting step a pair of strips;
- (10) said strips being v-shaped and the same size as said diametrically opposed grooves;
- (11) said strips being comprised of a second polymer different from said first polymer;
- (12) said first and second polymers having differing solubility parameters for promoting poor adhesion therebetween; and
- (b) stripping said strips from said v-shaped grooves for forming a catheter with a continuous tubular wall but readily split in half.

4,952,360

## METHOD OF MAKING MICROWAVE-HEATABLE HAIR CURLERS

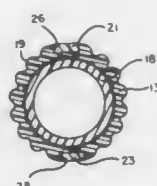
Robert M. Gibbon, Fort Worth, Tex., assignor to JMK International, Inc., Fort Worth, Tex.

Filed May 23, 1988, Ser. No. 197,156

Int. Cl.<sup>3</sup> B29C 47/00, 47/06, 65/56; B32B 1/08

U.S. Cl. 264—148

7 Claims



4. A method of forming a microwave heatable hair curler, comprising the steps of:

- blending a polyorganosiloxane gum with a particulate, electromagnetic absorptive material, a filler and a peroxide catalyst to produce a homogeneous, silicone rubber composition which is heatable by exposure to microwave energy;
- extruding said homogeneous, silicone rubber composition through a die to produce a cylindrical, flexible body having a length, an open interior and an exterior, said exterior having a plurality of elongate ribs running longitudinally for the length of said body;
- cutting said body into a plurality of curler segments, each of said curler segments having a desired length.

4,952,361

## SURFACE TREATMENT OF POLYOLEFIN OBJECTS

Stephen H. Cree, Edinburgh, United Kingdom, assignor to Dyacema V.o.F., Sittard, Netherlands

Filed Oct. 14, 1988, Ser. No. 257,802

Claims priority, application Netherlands, Oct. 14, 1987, 8702447

Int. Cl.<sup>3</sup> B29C 47/00, 71/00

U.S. Cl. 264—204

8 Claims

1. Process for the treatment of surfaces of highly oriented polyolefin objects, which objects are obtained by converting a solution of a linear polyolefin with a weight average molecular weight of at least 400,000 g/mol into a shaped object, at a temperature above a dissolution temperature, cooling this to form a solid, gel-like object, and stretching this object at increased temperature, after at least partial removal of the solvent wherein the surface of the object obtained after stretching is contacted with a solvent at a temperature above the dissolution temperature of the polyolefin for a contact time of 0.5–2 minutes.

4,952,362

## METHOD AND APPARATUS FOR THE PRODUCTION OF PIPE

Jyri Järvenkylä, Salpaugas, and Pauli Sillanpää, Lahti, both of Finland, assignors to Uposor N.V., Philipsburg, Netherlands Antilles

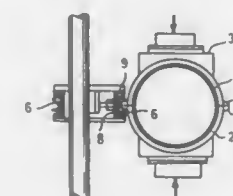
Continuation-in-part of Ser. No. 124,114, Oct. 27, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,165

Claims priority, application Finland, Mar. 24, 1986, 861227

Int. Cl.<sup>3</sup> B29C 47/00

U.S. Cl. 264—209.2

2 Claims



1. A method of producing a pipe, the method comprising: transporting first and second sets of chill moulds respectively along first and second endless paths, the chill moulds of each set being so transported one after another, and the endless paths being positioned such that junction faces of the respective chill moulds of the respective sets are positioned against each other in a pipe moulding zone of the endless paths, so positioning the respective chill moulds of the respective sets also defining outer surfaces thereof that are opposite the junction faces; locking the chill moulds together in the pipe moulding zone with locking surfaces that respectively extend along the outer surfaces of the chill moulds at least generally in the direction of the transporting of the chill moulds proximately along edges of the junction faces, locking pieces having recesses having U-shaped cross sections, and locking piece transporting means for transporting first and second sets of the locking pieces one after another respectively along two locking-piece endless paths at the same rate as the chill moulds are transported, the locking-piece endless paths being positioned in the pipe moulding zone such that supporting surfaces on side walls of the U-shaped recesses of the locking pieces engage the locking surfaces of the chill moulds to press together the junction faces of the chill moulds in the pipe moulding zone; oppositely pressing against the outer surfaces of the chill moulds while the chill moulds are in the pipe moulding zone for further pressing the junction faces of the chill

moulds together direction perpendicular to the junction faces of the chill moulds; and moulding a pipe having thin, high longitudinally spaced, transverse ribs, each in a height to thickness ratio of from about 3:1 to about 6:1, in the pipe moulding zone at a pressure of from about 2 bar to about 50 bar.

4,952,363

## METHOD OF DRAWING FILM

Yoshitomo Oshima, and Hideo Egami, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

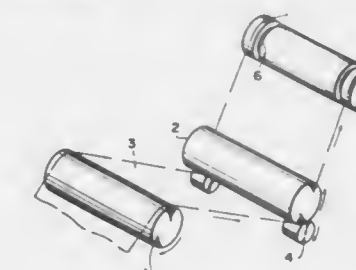
Filed Jul. 21, 1989, Ser. No. 382,929

Claims priority, application Japan, Aug. 11, 1988, 63-198857

Int. Cl.<sup>3</sup> B29C 55/06

U.S. Cl. 264—288.4

10 Claims



1. In a method of drawing a film which comprises drawing the traveling film in the longitudinal direction between rolls and thereafter cooling the drawn film by a cooling roll which is non-collinear with said rolls, wherein the improvement comprises frictionally engaging, without using nip rolls, both side ends of their vicinities of the film with engaging portions formed on both ends or their vicinities of the cooling roll in the circumferential direction.

4,952,364

## METHOD OF CONTROLLING INJECTION MOLDING MACHINE

Kazuo Matsuda, Kyoto; Nobuaki Inaba, Kanagawa; Masashi Kaminishi, Osaka; Tetsuji Funabashi, Osaka; and Nobukazu Tanaka, Osaka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP88/00434, § 371 Date Dec. 29, 1988, § 102(e) Date Dec. 29, 1988, PCT Pub. No. WO88/08783, PCT Pub. Date Nov. 17, 1988

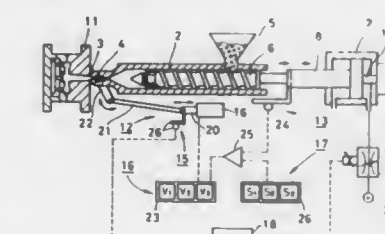
PCT Filed Apr. 28, 1988, Ser. No. 334,271

Claims priority, application Japan, May 8, 1987, 62-110783

Int. Cl.<sup>3</sup> B29C 45/77

U.S. Cl. 264—40.1

12 Claims



1. A method of controlling an injection molding machine having a nozzle and a cylindrical nozzle valve rotatably disposed at an end portion of said nozzle for changing a sectional area of an opening of said end portion of said nozzle, in which an injection speed in one injection process is controlled, comprising the steps of:

- switching a degree of opening of said nozzle valve to a

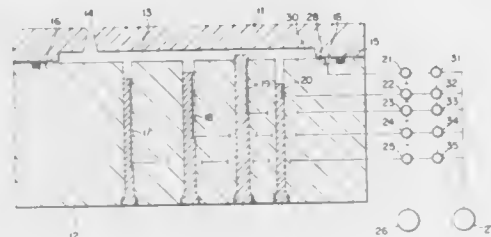
degree of opening preset corresponding to a position of a screw; and  
controlling a flow rate of a hydraulic oil for pressing said screw in accordance with the degree of opening of said nozzle valve.

4,952,365

**PROCESS FOR MOLDING OF A FOAMED ARTICLE**  
Takehiro Shibuya; Takashi Nagahara, both of Yokohama, and Susumu Imai, Zama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan  
Continuation-in-part of Ser. No. 776,139, Sep. 13, 1985, abandoned. This application Mar. 18, 1987, Ser. No. 27,487  
Claims priority, application Japan, Sep. 14, 1984, 59-191499  
Int. Cl.<sup>5</sup> B29C 67/22

U.S. Cl. 264—45.5

6 Claims



1. A process of making a foamed article having a smooth surface, a non-foamed outer shell and a foamed core portion, comprising:

- (1) plastifying, kneading, metering and accumulating a foamable resin at a pressure which is higher than its foaming pressure and sufficiently suppressing said foamable resin in an unfoamed state;
- (2) injection said foamable resin into a gas-pressurized mold cavity having plural gaps and set at a pressure which is lower than the foaming pressure and not lower than a surface smoothing pressure which is sufficient to form a smooth, swirl-mark free and sink-mark free surface on the non-foamed outer shell, the shell being successively formed at the surface where the resin contacts the mold cavity;
- (3) lowering the pressure within said mold cavity by simultaneously (a) discontinuing injection of said foamable resin, (b) discontinuing feeding of pressurized gas into said mold cavity and (c) releasing gas pressure in said mold cavity to an atmospheric pressure or lower; and
- (4) solidifying said foamed article by cooling and removing said foamed article after solidification wherein said mold cavity is controlled to a mold temperature which is between (a) the dew point of the steam in the air on the mold cavity surface and (b) a temperature 10° C. less than the heat distortion temperature of said resin.

4,952,366

**MOLDING PROCESS**

Robert J. Gelin, Newark, Ohio, assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio  
Continuation of Ser. No. 223,317, Jul. 25, 1988, abandoned, which is a continuation of Ser. No. 44,533, May 1, 1987, abandoned. This application Aug. 31, 1989, Ser. No. 401,590  
Int. Cl.<sup>5</sup> B29C 45/14, 43/36

U.S. Cl. 264—511

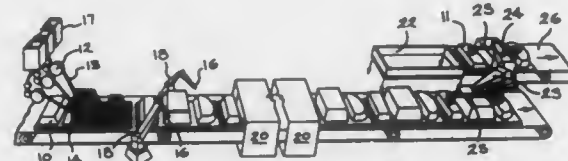
9 Claims

1. A process for the manufacture of a three-dimensional fiber preform having predetermined areas of enhanced structural integrity comprising the steps of:

- providing an air permeable screen having a three-dimensional preshaped surface defining such preform;
- dividing such screen into noded sections as if on a flat map wherein the three-dimensional plane at each such noded section is defined by the unit vector  $\lambda$  in cartesian coordi-

nate system as  $\lambda = \cos \theta_x i + \cos \theta_y j + \cos \theta_z k$  and  $i, j$  and  $k$  are unit vectors along the axes,  $\theta$  is the maximum angle between the horizontal flat map and the plane of each noded section on such screen, and the areal density of glass to be deposited at each such noded section is controlled by the equation  $\theta = \theta_j$ ;

calculating the areal density of glass to be applied at each such noded section and programming at least one glass fiber pullwheel to deposit glass in predetermined patterns and amounts in accordance with said calculations;



applying continuous glass fiber from at least one pullwheel of a glass fiber manufacturing apparatus to each such noded section of such screen in such calculated patterns and amounts;

drawing air through such screen; and  
passing such screen past such pullwheel at a predetermined rate of travel calculated to coordinate with said rate of application from such pullwheel and achieve said desired glass fiber densities over such screen.

4,952,367

**TIMER CHANNEL FOR USE IN A MULTIPLE CHANNEL TIMER SYSTEM**

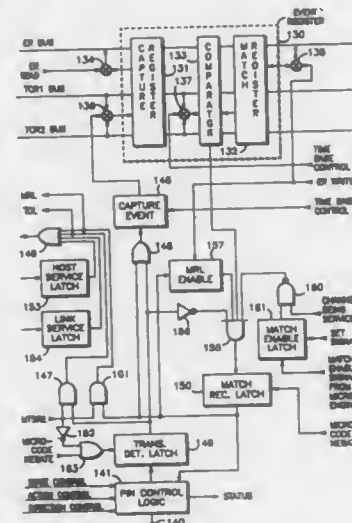
Robert S. Porter; Vernon Goler; Gary L. Miller, all of Austin; Stanley E. Groves, Round Rock, all of Tex., and Mario Nemirovsky, Goleta, Calif., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 19, 1988, Ser. No. 234,110

Int. Cl.<sup>5</sup> G06F 1/04

U.S. Cl. 364—200

24 Claims



1. A timer responsive to a timer reference signal comprising: a capture register; capture logic means for storing a value of said timer reference signal in said capture register; transition detect means responsive to a first input to the timer to produce a transition detect output; first service request means for generating a first service request signal; and

control means for operating said capture register, said capture logic means, and said first service request means in one of a first mode and a second mode, said one of said first and second modes being selected by means of a first control signal input to the timer, in said first mode said control means responds once to said output of said transition detect means by operating said capture logic means and said first service request means and in said second mode said control means responds continuously to said output of said transition detect means by operating only said capture logic means.

4,952,368

**ZINC ALLOYS FOR ELECTROCHEMICAL BATTERY CANS**

André Skenazi, Heverlee; Ivan A. Strauven, Neerpelt, and Michel L. Cauwe, Overpelt, all of Belgium, assignors to Metallurgie Hoboken-Overpelt, Hoboken, Belgium

Filed Sep. 22, 1989, Ser. No. 410,959

Claims priority, application Belgium, Sep. 23, 1988, 8801088

Int. Cl.<sup>5</sup> C22C 18/00, 18/04

U.S. Cl. 420—513

23 Claims

1. Lead bearing zinc alloys for electrochemical battery cans consisting essentially of the alloy concentration basis

- 0.05–0.8% of lead and either 0.005–1% of Al and 0.0005–0.1% of REM, REM being a rare earth metal or a mixture of rare earth metals or
- 0.005–1% of Mn or
- 0.005–1.5% of a mixture of Al, REM and Mn, the rest being zinc and unavoidable impurities.

4,952,369

**ULTRAVIOLET DEVICE AND ITS USE**

Moshe Bellor, 43 Ben Gurion Street, Bat Yam, Israel

Filed Apr. 5, 1988, Ser. No. 177,639

Claims priority, application Israel, Feb. 16, 1988, 85430

Int. Cl.<sup>5</sup> A61L 2/10; F21L 1/00

U.S. Cl. 422—24

3 Claims



1. A hand-portable pocket-size ultra-violet flashlight, comprising a housing containing an ultra-violet light source, a power source, an on/off switch and a gravity switch which are electrically interconnected in an electric circuit which can be broken by either or both of the respective switches, whereby the ultra-violet light source is activated by turning on the on/off switch and directing the flashlight in a downward position relative to the ultra-violet light source.

3. A method for sterilizing objects with which a person comes in contact comprising passing over said objects with ultra-violet radiation from a flashlight, said flashlight including a housing containing an ultra-violet light source, a power source, an on/off switch and a gravity switch which are electrically interconnected in an electric circuit which can be broken by either or both of the respective switches, whereby the ultra-violet light source is activated by turning on the on/off switch and directing the flashlight in a downward position relative to the ultra-violet light source.

4,952,370

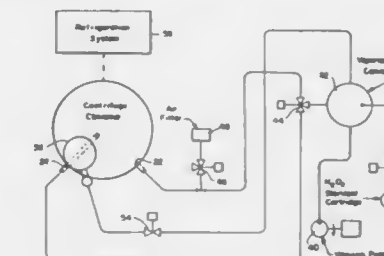
**HYDROGEN PEROXIDE STERILIZATION METHOD**  
Arthur L. Cummings, Ponca City, Okla., and Robert W. Childers, Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed May 6, 1988, Ser. No. 191,310

Int. Cl.<sup>5</sup> A61L 2/18, 2/20

U.S. Cl. 422—28

10 Claims



1. A process for sterilizing surfaces within a chamber, a portion of said surfaces being maintained at a temperature below about 10° C., comprising the steps of:

- introducing vapor phase hydrogen peroxide at a temperature above about 10° into said chamber;
- contacting said portion of said surfaces with said vapor phase hydrogen peroxide to effect condensation of said vapor phase hydrogen peroxide on said portion;
- applying a source of vacuum to said chamber; and
- continuing to introduce vapor phase hydrogen peroxide into said chamber until said surfaces are sterile while preserving said temperature of said portion of said surfaces below about 10° C.

4,952,371

**VOLATILE LIQUID CATALYST HANDLING SYSTEM INCLUDING DISTRIBUTION CABINET**

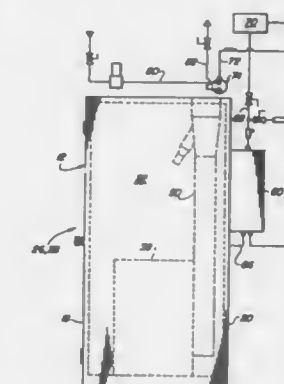
Craig M. Wehr, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jul. 17, 1989, Ser. No. 380,409

Int. Cl.<sup>5</sup> G01N 31/10; B22D 11/16; B65B 1/30, 31/04

U.S. Cl. 422—62

7 Claims



1. A system for delivering liquid catalyst to core-making machines, comprising: a fireproof cabinet having first, second and third floor areas arranged serially from one end to another thereof; a catalyst storage tank positioned at the first floor area and having inlet and outlet couplings; a catalyst-containing drum positioned at the second floor area; a drum pump located in the fireproof cabinet and having an outlet coupled to the inlet coupling of the storage tank and an inlet coupled to a siphon hose adapted for being placed within a catalyst-containing drum positioned on the second floor area whereby the



1. A method for neutralization of sulfuric acid containing Fe ions, comprising adding ions selected from the group consisting of Na ions, K ions, Mg ions, Ca ions and  $\text{NH}_4$  ions in the form of a compound containing chlorine to a sulfuric acid solution containing impurities comprising iron ions in an amount corresponding at least to the chemical equivalent to the  $\text{SO}_4^{2-}$  therein, and bringing the resultant solution into contact with an organic solvent (b) containing oxygen, an alkylamine and combinations thereof, to extract the Fe ions from said aqueous solution into the organic solvent as a chloride complex.

UMI

4,952,379

# METHOD FOR PURIFYING CALCIUM NITRATE MELT/SOLUTION WHICH IS SEPARATED FROM THE MIXTURE OBTAINED BY THE SOLUTION OF ROCK PHOSPHATE WITH NITRIC ACID

Johann Nikolaisen, Porsgrunn, Norway, assignor to Norsk Hydro A.S., Oslo, Norway

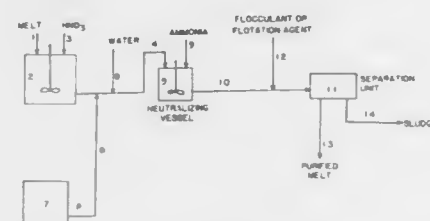
Filed Sep. 28, 1988, Ser. No. 250,848

Claims priority, application Norway, Oct. 6, 1987, 874186

Int. Cl.<sup>5</sup> C01F 11/36

U.S. Cl. 423—162

6 Claims



1. A method for purifying a crude calcium nitrate melt or solution separated from a mixture which is obtained by dissolution of rock phosphate with nitric acid, and which contains fluorine and phosphorus as main contaminants, which comprises:

- adjusting the mol-ratio phosphorus/fluorine in said crude calcium nitrate melt or solution to  $3.5 > P/F > 0.3$ ;
- neutralizing the resultant mixture with ammonia to a pH = 5–6, to form a precipitate;
- removing the precipitate; and
- evaporating and processing the resultant filtrate to produce purified calcium nitrate.

4,952,380

# PARTIAL OXIDATION PROCESS

Mitri Salim Najjar, Hopewell Junction, and Roger J. Corbeels, Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 51,982, May 19, 1987, Pat. No. 4,826,627, and a continuation-in-part of Ser. No. 62,018, Jun. 15, 1987, Pat. No. 4,801,438, and a continuation-in-part of Ser. No. 100,673, Sep. 24, 1987, Pat. No. 4,808,386, and a continuation-in-part of Ser. No. 32,157, Mar. 27, 1987, Pat. No. 4,774,021. This application Apr. 11, 1988, Ser. No. 179,931. The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.<sup>5</sup> B01D 53/34; C01B 3/36; C10J 3/46, 3/74

U.S. Cl. 423—210

38 Claims



18. The process of claim 1 wherein there is present in said liquid phase washing agent at least one additional element selected from the group consisting of Al, Ca, V, Si, Ti, Mg, Mn, Na, K, and mixtures thereof.

4,952,381

# METHOD FOR DENITRIZING NITROGEN OXIDES CONTAINED IN WASTE GAS

Horiaki Rikimaru; Tadao Nakatsuji; Toshikatsu Umaba; Kazuhiko Nagano; Kazuya Mishina; Hiromitsu Shimizu, all of Osaka; Shigeru Nojima, Hiroshima; Kozo Iida, Hiroshima; Yoshiaki Obayashi, Hiroshima; Tsuru Seto, Hiroshima; Shigeaki Mitsuoka, Hiroshima; Masayuki Hanada, Fukuoka; Morio Fukuda, Fukuoka; Kiyoshi Nagano, Fukuoka; Makoto Imanari, Ibaraki; Takeo Koshikawa, Ibaraki, and Akihiro Yamauchi, Tokyo, all of Japan, assignors to Sakai Chemical Industry Co., Ltd., Osaka; Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo; Mitsubishi Petrochemical Co., Ltd., Tokyo; Mitsubishi Petrochemical Engineering Co., Ltd., Tokyo and Catalysts & Chemicals Industries Co., Ltd., Tokyo, all of Japan

Division of Ser. No. 77,868, Jul. 27, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 284,764

Claims priority, application Japan, Jul. 25, 1986, 61-173813; Jul. 31, 1986, 61-178725; Sep. 13, 1986, 61-216356; Sep. 13, 1986, 61-216357

Int. Cl.<sup>5</sup> B01J 8/00; C01B 17/00

U.S. Cl. 423—239

7 Claims

1. A method for denitrizing nitrogen oxides contained in a waste gas which contains arsenic compounds therein in amounts of about 0.01–1.0 ppm, which comprises putting the waste gas into contact with a catalyst essentially consisting of:

- (a) titanium and
- (b) arsenic in amounts of about 0.01–35 parts by weight in terms of weight as  $As_2O_3$  in relation to 100 parts by weight of titanium in terms of weight as  $TiO_2$ , in the presence of a reducing gas at elevated temperatures, thereby to reduce the nitrogen oxides.

4,952,382

# PROCESS FOR REMOVING SULFUR OXIDES WITH AN ABSORBENT WHICH CONTAIN AN ANIONIC CLAY

Emanuel H. van Broekhoven, Monnickendam, Netherlands, assignor to AKZO N.V., Netherlands

Division of Ser. No. 137,939, Dec. 28, 1987, Pat. No. 4,866,019.

This application May 19, 1989, Ser. No. 354,243

Claims priority, application Netherlands, Jan. 13, 1987, 8700656

Int. Cl.<sup>5</sup> B01J 8/00; C01B 17/00

U.S. Cl. 423—244

9 Claims

1. A process comprising treating a gas which contains  $SO_2$ ,  $SO_3$  or a mixture thereof with an absorbent comprising 1 to 99 percent by weight of an anionic clay, and 1 to 99 percent by weight of matrix material, wherein said anionic clay has a crystalline structure of the pyroaurite-sjogrenite-hydrocalcite group, the hydrocalumite group or the ettringite group.

4,952,383

# BORON-ALUMINUM-PHOSPHORUS-OXIDE MOLECULAR SIEVE COMPOSITIONS

Edith M. Flanigen, White Plains; Brent M. T. Lok, New City; Robert L. Patton, Katonah; Stephen T. Wilson, Shrub Oak, all of N.Y., and Richard T. Gajek, New Fairfield, Conn., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 804,248, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 599,812, Apr. 13, 1984, abandoned. This application Mar. 24, 1987, Ser. No. 29,540

Int. Cl.<sup>5</sup> C01B 35/10

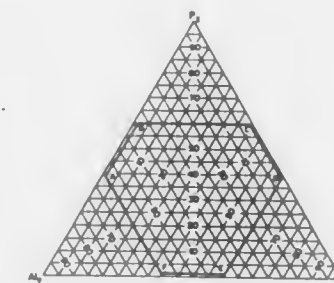
U.S. Cl. 423—277

65 Claims

1. Crystalline molecular sieves having three-dimensional microporous framework structures of  $BO_2$ ,  $AlO_2$  and  $PO_2$  tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of  $(B_xAl_yP_z)O_2$  and has a value of zero to about 0.3; "x", "y" and "z" represent the mole fractions of boron, aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being



such that they are within the hexagonal compositional area defined by points A, B, C, D, E and F of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A, B1, B2, C to H and J to V:

TABLE A

(BAPO-5)		
2θ	d (Å)	Relative Intensity
7.3–7.65	12.1–11.56	m-vs
19.5–19.95	4.55–4.46	m-s
20.9–21.3	4.25–4.17	m-vs
22.2–22.6	4.00–3.93	w-vs
25.7–26.15	3.47–3.40	w-m

TABLE B1\*

(BAPO-11)		
2θ	d (Å)	Relative Intensity
9.3–9.65	9.51–9.17	m-s
20.2–20.6	4.40–4.31	m-s
20.9–21.3	4.25–4.17	s-vs
22.0–22.5	4.04–3.95	m-s
22.5–22.9	3.95–3.92	m-s
23.0–23.4	3.87–3.80	m-vs

\*as-synthesized form

TABLE B2\*

(BAPO-11)		
2θ	d (Å)	Relative Intensity
8.0–8.2	11.05–10.78	w-s
9.5–9.9	9.31–8.93	m-s
16.0–16.2	5.54–5.47	s-vs
21.6–21.9	4.12–4.06	vs
22.1–22.6	4.02–3.93	m-s (doublet)
23.4–23.7	3.80–3.75	m-s

\*calcined form

TABLE C

(BAPO-14)		
2θ	d (Å)	Relative Intensity
8.6–8.9	10.3–9.93	vs
13.0	6.81	w
21.9–22.2	4.06–4.00	w
25.4	3.51	w
27.5	3.24	w
29.7	3.01	w

TABLE D

(BAPO-16)		
2θ	d (Å)	Relative Intensity
11.3–11.6	7.83–7.63	m-vs
18.7–18.9	4.75–4.70	w-s
21.9–22.3	4.06–3.99	m-vs
26.5–27.0	3.363–3.302	w-m
29.7–30.05	3.008–2.974	w-m

TABLE E

(BAPO-17)		
2θ	d (Å)	Relative Intensity
7.7–7.8	11.5–11.3	vs
13.4	6.61	s-vs
15.5–15.55	5.72–5.70	s
19.65–19.7	4.52–4.51	w-s
20.5–20.6	4.33–4.31	vs
31.8–32.00	2.812–2.797	w-s

TABLE F

(BAPO-18)		
2θ	d (Å)	Relative Intensity
9.6–9.65	9.21–9.16	vs
15.5–15.6	5.72–5.70	m
16.9–17.1	5.25–5.19	m
20.15–20.25	4.41–4.39	m
20.95–21.05	4.24–4.22	m
31.8–32.5	2.814–2.755	m

TABLE G

(BAPO-20)		
2θ	d (Å)	Relative Intensity
13.7–14.25	6.46–6.22	m-vs
19.55–20.0	4.54–4.44	w-s
24.05–24.5	3.70–3.63	m-vs
34.3–35.0	2.614–2.564	vw-w
42.5–43.0	2.127–2.103	vw-w

TABLE H

(BAPO-31)		
2θ	d (Å)	Relative Intensity
8.5–8.6	10.40–10.28	m-s
20.2–20.3	4.40–4.37	m
21.9–22.1	4.06–4.02	w-m
22.6–22.7	3.93–3.92	vs
31.7–31.8	2.823–2.814	w-m

TABLE J\*

(BAPO-33)		
2θ	d (Å)	Relative Intensity
9.25–9.55	9.56–9.26	w-m
12.5–12.9	7.08–6.86	vs
16.9–17.3	5.25–5.13	w-m
20.45–20.9	4.34–4.25	w-m
23.85–24.25	3.73–3.67	w-m
26.05–26.35	3.42–3.38	w-m
27.3–27.6	3.27–3.23	vs

\*as-synthesized form

TABLE K\*

(BAPO-33)		
2θ	d (Å)	Relative Intensity
13.15–13.4	6.73–6.61	vs
18.05–18.35	4.91–4.83	m
18.4–18.6	4.82–4.77	m



TABLE K\*-continued

(BAPO-33)		
2θ	d (Å)	Relative Intensity
26.55-26.7	3.36-3.34	m
32.0-32.1	2.80-2.79	m

\*calcd form

TABLE L

(BAPO-34)		
2θ	d (Å)	Relative Intensity
9.4-9.65	9.41-9.17	s-vs
15.9-16.2	5.57-5.47	vw-m
17.85-18.4	4.97-4.82	w-s
20.3-20.9	4.37-4.25	m-vs
24.95-25.4	3.57-3.51	vw-s
30.3-30.8	2.95-2.90	w-s

TABLE M

(BAPO-35)		
2θ	d (Å)	Relative Intensity
10.8-11.1	8.19-7.97	m
17.2-17.4	5.16-5.10	s-vs
21.0-21.25	4.23-4.18	m-s
21.8-22.0	4.08-4.04	vs
31.8-32.2	2.814-2.788	m

TABLE N

(BAPO-36)		
2θ	d (Å)	Relative Intensity
7.7-7.9	11.5-11.2	vs
16.2-16.6	5.47-5.34	w-m
18.9-19.3	4.70-4.60	m-s
20.6-20.8	4.31-4.27	w-s
21.8-22.0	4.08-4.04	m
22.2-22.5	4.00-3.95	w-m

TABLE O

(BAPO-37)		
2θ	d (Å)	Relative Intensity
6.1-6.3	14.49-14.03	vs
15.5-15.7	5.72-5.64	w-m
18.5-18.8	4.80-4.72	w-m
23.5-23.7	3.79-3.75	w-m
26.9-27.1	3.31-3.29	w-m

TABLE P

(BAPO-39)		
2θ	d (Å)	Relative Intensity
9.4-9.6	9.41-9.21	w-m
13.3-13.6	6.66-6.51	m-vs
18.0-18.4	4.93-4.82	m
21.2-21.5	4.19-4.13	m-s
22.5-23.0	3.95-3.87	s-vs
30.2-30.5	2.96-2.93	w-m

TABLE Q

(BAPO-40)		
2θ	d (Å)	Relative Intensity
7.5-7.7	11.79-11.48	vw-m
8.0-8.1	11.05-10.94	s-vs
12.4-12.5	7.14-7.08	w-vs
13.6-13.8	6.51-6.42	m-s
14.0-14.1	6.33-6.28	w-m

TABLE Q-continued

(BAPO-40)		
2θ	d (Å)	Relative Intensity
27.8-28.0	3.209-3.187	w-m

TABLE R

(BAPO-41)		
2θ	d (Å)	Relative Intensity
13.6-13.8	6.51-6.42	w-m
20.5-20.6	4.33-4.31	w-m
21.1-21.3	4.21-4.17	vs
22.1-22.3	4.02-3.99	m-s
22.8-23.0	3.90-3.86	m
23.1-23.4	3.82-3.80	w-m
25.5-25.9	3.493-3.440	w-m

TABLE S

(BAPO-42)		
2θ	d (Å)	Relative Intensity
7.15-7.4	12.36-11.95	m-vs
12.5-12.7	7.08-6.97	m-s
21.75-21.9	4.09-4.06	m-s
24.1-24.25	3.69-3.67	vs
27.25-27.4	3.273-3.255	s
30.05-30.25	2.974-2.955	m-s

TABLE T

(BAPO-44)		
2θ	d (Å)	Relative Intensity
9.4-9.55	9.41-9.26	vs
13.0-13.1	6.81-6.76	w-m
16.0-16.2	5.54-5.47	w-m
20.6-20.85	4.31-4.26	s-vs
24.3-24.4	3.66-3.65	w-vs
30.7-30.95	2.912-2.889	w-s

TABLE U

(BAPO-46)		
2θ	d (Å)	Relative Intensity
7.2-8.1	12.3-10.9	vs
21.2-21.8	4.19-4.08	w-m
22.5-23.0	3.95-3.87	vw-m
26.6-27.2	3.351-3.278	vw-w
28.5-29.0	3.132-3.079	vw-w

TABLE V

(BAPO-47)		
2θ	d (Å)	Relative Intensity
9.4	9.41	vs
15.9-16.0	5.57-5.54	w-m
20.5-20.6	4.33-4.31	s
24.5-24.7	3.63-3.60	w
25.8-25.9	3.45-3.44	w
30.4-30.5	2.940-2.931	w.

4,952,384

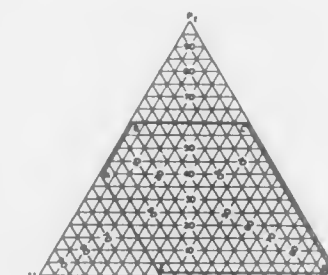
## MOLECULAR SIEVE COMPOSITIONS

Breat M. T. Lok, New City; Bonita K. Marcus, Rye; Celeste A. Messina, Ossining; Stephen T. Wilson, Shrub Oak, and Edith M. Flanigan, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 902,020, Sep. 2, 1986, abandoned, which is a continuation of Ser. No. 599,810, Apr. 13, 1984, abandoned. This application May 20, 1988, Ser. No. 197,407 Int. Cl.<sup>3</sup> C01B 25/36

U.S. Cl. 423-306

20 Claims



1. A crystalline molecular sieve having a three-dimensional microporous framework structure of  $\text{MO}_2$ ,  $\text{AlO}_2$  and  $\text{PO}_2$  tetrahedral oxide units having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "M" represents: (1) iron; and (2) at least one element from the class of cobalt, magnesium, manganese and zinc; "n" is 0, -1 or -2; "m" represents a molar amount of "R" present per mole of  $(\text{M}_x\text{Al}_y\text{P}_z)\text{O}_2$  and has a value of zero (0) to about 0.3; and "x", "y" and "z" represent the mole fractions of "M", aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables J, K, O, P, Q, R, S and U.

TABLE J\*

(XAPO-33)		
2θ	d (Å)	Relative Intensity
9.25-9.55	9.56-9.26	w-m
12.5-12.9	7.08-6.86	vs
16.9-17.3	5.25-5.13	w-m
20.45-20.9	4.34-4.25	w-m
23.85-24.25	3.73-3.67	w-m
26.05-26.35	3.42-3.38	w-m
27.3-27.6	3.27-3.23	vs

\*as synthesized form

TABLE K\*

(XAPO-33)		
2θ	d (Å)	Relative Intensity
13.15-13.4	6.73-6.61	vs
18.05-18.35	4.91-4.83	m
18.4-18.6	4.82-4.77	m
26.55-26.7	3.36-3.34	m
32.0-32.1	2.80-2.79	m

\*calcd form

TABLE O

(XAPO-37)		
2θ	d (Å)	Relative Intensity
6.1-6.3	14.49-14.03	vs
15.5-15.7	5.72-5.64	w-m
18.5-18.8	4.80-4.72	w-m
23.5-23.7	3.79-3.75	w-m
26.9-27.1	3.31-3.29	w-m

TABLE P

(XAPO-39)		
2θ	d (Å)	Relative Intensity
9.4-9.6	9.41-9.21	w-m
13.3-13.6	6.66-6.51	m-vs
18.0-18.4	4.93-4.82	m
21.2-21.5	4.19-4.13	m-s
22.5-23.0	3.95-3.87	s-vs
30.2-30.5	2.96-2.93	w-m

TABLE Q

(XAPO-40)		
2θ	d (Å)	Relative Intensity
7.5-7.7	11.79-11.48	vw-m
8.0-8.1	11.05-10.94	s-vs
12.4-12.5	7.14-7.08	w-vs
13.6-13.8	6.51-6.42	m-s
14.0-14.1	6.33-6.28	w-m
27.8-28.0	3.209-3.187	w-m

TABLE R

(XAPO-41)		
2θ	d (Å)	Relative Intensity
13.6-13.8	6.51-6.42	w-m
20.5-20.6	4.33-4.31	w-m
21.1-21.3	4.21-4.17	vs
22.1-22.3	4.02-3.99	m-s
22.8-23.0	3.90-3.86	m
23.1-23.4	3.82-3.80	w-m
25.5-25.9	3.493-3.440	w-m

TABLE S

(XAPO-42)		
2θ	d (Å)	Relative Intensity
7.15-7.4	12.36-11.95	m-vs
12.5-12.7	7.08-6.97	m-s
21.75-21.9	4.09-4.06	m-s
24.1-24.25	3.69-3.67	vs
27.25-27.4	3.273-3.255	s
30.05-30.25	2.974-2.955	m-s

TABLE U

(XAPO-46)		
2θ	d (Å)	Relative Intensity
7.2-8.1	12.3-10.9	vs
21.2-21.8	4.19-4.08	w-m
22.5-23.0	3.95-3.87	vw-m
26.6-27.2	3.351-3.278	vw-w
28.5-29.0	3.132-3.079	vw-w

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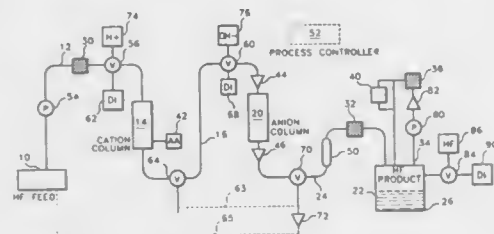
# 4,952,385 FERRISILICATE MOLECULAR SIEVE AND USE AS A CATALYST

Vinayan Nair, Atlanta, and Rosemarie Szostak, Covington, both of Ga., assignors to Georgia Tech Research Corp. and Georgia Institute of Tech., both of Atlanta, Ga.  
Filed Mar. 2, 1987, Ser. No. 20,369  
Int. Cl.<sup>5</sup> C01B 33/20

- U.S. Cl. 423—326 6 Claims
1. A process for preparing a ferrisilicate molecular sieve which comprises:
    - (a) adding a silica source and one or more compounds selected from the group consisting of primary, secondary and tertiary amines, and quaternary ammonium compounds to an acidic aqueous solution of an iron (III) compound, and maintaining said solution in the acidic state until the addition of said silica source is complete;
    - (b) heating the mixture obtained in step (a) at a temperature of about 100° to about 250° C. until molecular sieve crystals are formed; and
    - (c) thermally treating the molecular sieve crystals formed in step (b) at a temperature from about 250° C. to about 1000° C. in an inert atmosphere at about 450° to about 800° C. for about 6 to about 16 hours, then in air at about 400° to about 1000° C. for about 3 to about 8 hours, and then with steam at a temperature from about 300° to about 700° C. for about 1 to about 4 hours.

# 4,952,386 METHOD AND APPARATUS FOR PURIFYING HYDROGEN FLUORIDE

John B. Davison, Mission Viejo, and Chung-Tseng Hsu, Laguna Hills, both of Calif., assignors to Athens Corporation, Ocean-side, Calif.  
Filed May 20, 1988, Ser. No. 196,327  
Int. Cl.<sup>5</sup> C01B 7/19; B01J 47/14; B01D 15/04  
U.S. Cl. 423—484 20 Claims



1. A method for purifying hydrofluoric acid, comprising the steps of:
  - obtaining impure hydrofluoric acid containing particulate material and anionic and cationic impurities;
  - filtering the impure hydrofluoric acid to remove said particulate material;
  - extracting said ionic impurities by contacting said impure hydrofluoric acid with anion and cation ion exchange material having an affinity for said ionic impurities to provide a purified effluent, wherein said anion and cation ion exchange material is in separate beds and flow through the beds is sequential;
  - monitoring the hydrofluoric acid that has contacted at least a portion of said ion exchange material for the presence of an ionic impurity;
  - automatically stopping the contacting step when said monitoring step indicates an elevated level of said ionic impurity representative of exhaustion of at least a portion of said ion exchange materials; and
  - automatically regenerating said cation exchange material with an ultrapure strong acid having metallic impurities no greater than 50 parts per billion per metal and automatically regenerating said anion exchange material with an

ultrapure strong base having metallic impurities no greater than 50 parts per billion per metal.

# 4,952,387 PROCESS FOR SEPARATING METAL SULPHATES FROM SULPHURIC ACID

Günter Lallach; Rudolf Gerken, and Wolfgang Rens, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Jul. 13, 1988, Ser. No. 218,734  
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1987, 3726047

- U.S. Cl. 423—531 6 Claims
1. In a process for the separation of metal sulphates from dilute sulphuric acid comprising evaporatively concentrating the sulphuric acid to a concentration of from 55 to 75% by weight H<sub>2</sub>SO<sub>4</sub>, cooling the resulting solution or suspension and mechanically separating the resultant solid metal sulphates and/or hydrogen sulphates, the improvement comprising said dilute sulphuric acid prior to said concentrating having a Fe(III) content of less than 0.001% by weight and maintaining a Fe(III) content of at least 0.01% by weight before said mechanical separating and after said concentrating.

# 4,952,388 METHOD OF TREATING PHYLLOSILICATES

Hermann L. Rittler, Corning, N.Y., assignor to Corning Incorporated, Corning, N.Y.  
Continuation-in-part of Ser. No. 167,182, Mar. 11, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 405,273  
Int. Cl.<sup>5</sup> B01J 20/12; C01B 33/26; C04B 20/02  
U.S. Cl. 423—327 13 Claims



1. A method of delaminating a three-layer, mica phyllosilicate which consists in mixing, with mild stirring equivalent to magnetic stirring, the phyllosilicate with a source of hydrogen ions to hydrate hydroxyl ions on and within the phyllosilicate structure, whereby the phyllosilicate is delaminated to a particle thickness not over about 100 Angstrom units.

# 4,952,389 ALUMINA PARTICLES

Thomas Szymanski, Stow, Ohio; Kenneth R. Butcher, Hendersonville, N.C., and Donald J. Remus, Stow, Ohio, assignors to Norton Company, Worcester, Mass.  
Filed Sep. 15, 1989, Ser. No. 407,845  
Int. Cl.<sup>5</sup> C01F 7/02

- U.S. Cl. 423—625 26 Claims
1. Friable particles having an alumina content of at least about 98.5 weight percent, a surface area of less than about 1 m<sup>2</sup>/g, an attrition resistance of less than about 0.3 weight % per hour when tested in an air jet apparatus, a particle size ranging from about 30 to about 110 microns, a tap density of about 1.3 to about 1.9 g/cc, a generally spherical shape, and sufficient porosity to hold catalytic quantities of catalytic metals.

# 4,952,390 SUPERCONDUCTIVE OXIDE CRYSTAL AND A PRODUCTION PROCESS THEREOF

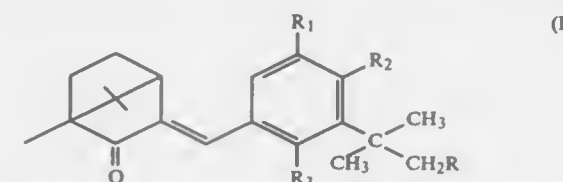
Humihiko Takei, 12-3, Kitaura 5-chome, Urawa-shi Saitama-ken, and Hiroyuki Takeya, Kawasaki, both of Japan, assignors to Humihiko Takei, Urawa and Ibsiden Co., Ltd., Ogaki, both of Japan  
Filed Jun. 30, 1988, Ser. No. 213,833  
Claims priority, application Japan, Jul. 3, 1987, 62-165226  
Int. Cl.<sup>5</sup> C01G 1/00

- U.S. Cl. 423—593 7 Claims
1. A process for the production of a superconductive oxide crystal comprising the steps of:
    - mixing a copper compound with a first complex oxide powder, said first complex oxide powder comprising a rare earth element, an alkaline earth metal, copper and oxygen in proportions corresponding substantially to the theoretical composition of a superconductive oxide crystal;
    - heating the mixture of said copper compound with said first complex oxide powder at a temperature in the range of from 950° C. to 1400° C. in an oxygen-containing atmosphere while contacting said mixture of said copper compound and said first complex oxide powder with a second oxide, said second oxide comprising substantially a rare earth oxide.

# 4,952,391 TERT-BUTYL DERIVATIVES OF BENZYLIDENECAMPHOR, PROCESS FOR PREPARING THEM, THEIR USE AS ANTIOXIDANT AGENTS AND COSMETIC AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Gerard Lang, Saint-Gratien; Serge Forestier, Claye-Souilly; Alain LaGrange, Chatou; Claudine Moire, Romainville, and Andre DeFlandre, Orlay-la-Ville, all of France, assignors to L'Oréal, Paris, France  
Filed Oct. 5, 1988, Ser. No. 253,970  
Claims priority, application Luxembourg, Oct. 5, 1987, 87008  
Int. Cl.<sup>5</sup> A61L 9/04

- U.S. Cl. 424—45 13 Claims
1. Benzylidenecamphor derivative, of the formula:



in which

- R denotes a hydrogen atom or a tert-butyl residue, R<sub>1</sub> denotes a C<sub>1</sub>—C<sub>8</sub> linear or branched alkyl residue or a C<sub>1</sub>—C<sub>8</sub> linear or branched alkoxy residue; and  
R<sub>2</sub> and R<sub>3</sub> denote a hydrogen atom or a hydroxyl radical, with the proviso that at least one of the symbols R<sub>2</sub> and R<sub>3</sub> denotes a hydroxyl radical.
5. Cosmetic composition according to claim 3, which is in the form of an oily or oleoalcoholic lotion, an emulsion, an oleoalcoholic, alcoholic or aqueous-alcoholic gel, a solid stick or an aerosol.

# 4,952,392 USE OF PERIWINKLE IN ORAL HYGIENE

Neville Thame, Montclair, N.J., assignor to Peri-Oral Dental Products, Inc., Taos, N. Mex.  
Continuation-in-part of Ser. No. 168,989, Mar. 16, 1988, Pat. No. 4,853,213, which is a continuation of Ser. No. 840,019, Mar. 17, 1986, abandoned. This application Jul. 27, 1989, Ser. No. 387,083

- The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> A61K 7/26, 7/16, 7/18

- U.S. Cl. 424—58 8 Claims
1. An oral hygiene method for reducing plaque and for the treatment of periodontal diseases of bacterial etiology, the method comprising reducing bacterial activity in the oral cavity by applying to the oral cavity a composition containing from about 0.03% to about 50% by weight of the total composition, a dried ethanol extract from the perennial herb periwinkle.

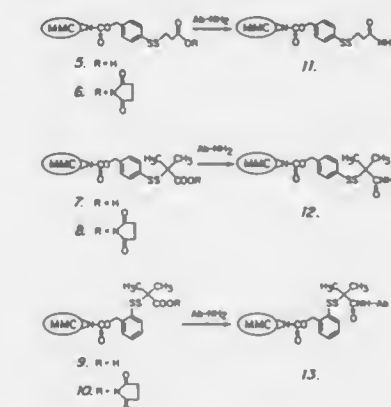
# 4,952,393 ORGAN INFARCT IMAGING WITH TECHNETIUM LABELLED GLUCARATE

Harvey J. Berger, Devon, Pa.; Ban A. Khaw, Milton, Mass.; Koon Y. Pak, Bluebell, Pa., and H. William Strass, Newton Centre, Mass., assignors to The General Hospital Corporation, Boston, Mass.  
Continuation-in-part of Ser. No. 34,003, Apr. 12, 1987. This application Oct. 7, 1988, Ser. No. 254,961  
Int. Cl.<sup>5</sup> A61K 49/02; C07F 13/00

- U.S. Cl. 424—1.1 4 Claims
1. A method of obtaining an image of a myocardial infarct in a subject, comprising the steps of:
    - injecting parenterally an effective imaging amount of <sup>99m</sup>Tc-glucarate into the subject;
    - allowing the <sup>99m</sup>Tc-glucarate to localize at the site of the myocardial infarct; and
    - scanning the subject with a gamma camera to obtain an image of the myocardial infarct.

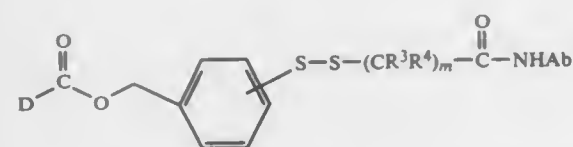
# 4,952,394 DRUG-MONOCLONAL ANTIBODY CONJUGATES

Peter D. Senter, Seattle, Wash., assignor to Bristol-Myers Company, New York, N.Y.  
Filed Nov. 23, 1987, Ser. No. 124,313  
Int. Cl.<sup>5</sup> A61K 39/44; C07K 15/28, 17/00  
U.S. Cl. 424—85.91 6 Claims



1. An anti-tumor drug-Monovalent antibody conjugate having the general structural formula:





wherein:

D is an anti-tumor drug moiety having pendant to the backbone thereof a chemically reactive functional group, by means of which the drug backbone is bonded to the disulfide benzyloxycarbonyl group, derived from the group consisting of a primary amino group represented by the formula  $R^1NH-$ , a secondary amino group represented by the formula  $R^1R^2N-$ , and an alcohol group represented by the formula  $R^1O-$ ;

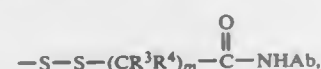
$R^1$ , when  $R^1$  and  $R^2$  are independent, is the backbone of said drug moiety when D is derived from the group consisting of a primary amino group, a secondary amino group, and an alcohol group;

$R^2$ , when  $R^1$  and  $R^2$  are independent, is selected from unsubstituted and substituted and branched and straight-chain alkyl groups having 1-10 carbon atoms wherein the substituent is selected from 1 to 3 alkoxy groups having 1 to 3 carbon atoms and 1 to 3 halo groups; unsubstituted and substituted phenyl wherein the substituent is selected from 1 to 3 alkyl groups having 1 to 3 carbon atoms, 1 to 3 alkoxy groups having 1 to 3 carbon atoms, and 1 to 3 halo groups; and unsubstituted and substituted phenalkyl wherein the phenyl moiety, when substituted, is substituted as defined above in the case of substituted phenyl and the alkyl moiety is a polyalkylene group having 1 to 3 carbon atoms;

$R^1$  and  $R^2$ , when taken together in a functional group derived from a secondary amine, represent the backbone of the drug moiety, D, having a divalent group chemically bonded to the nitrogen atom constituting said secondary amino group; and

$R^3$  and  $R^4$ , independently, are selected from H and unsubstituted and substituted, and branched and straight-chain alkyl groups having 1-10 carbon atoms wherein the substituent is selected from 1 to 3 alkoxy groups having 1 to 3 carbon atoms and 1 to 3 halo groups; unsubstituted and substituted phenyl wherein the substituent is selected from 1 to 3 alkyl groups having 1 to 3 carbon atoms, 1 to 3 alkoxy groups having 1 to 3 carbon atoms, and 1 to 3 halo groups; and unsubstituted and substituted phenylalkyl wherein the phenyl moiety, when substituted, is substituted as defined above in the case of substituted phenyl and the alkyl moiety is a polyalkylene group having 1 to 3 carbon atoms;

m is an integer selected from 1 to 10; and  
Ab represents a monoclonal antibody having a pendent amino group; and  
the orientation of the group,



on the phenyl ring of the benzylcarbamate moiety is selected from the ortho- and para-positions.

4,952,395

MYCOBACTERIAL RECOMBINANTS AND PEPTIDES  
Thomas Shinnick, Atlanta, Ga., and Richard Houghten, Solana Beach, Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Filed Feb. 26, 1987, Ser. No. 19,529

Int. Cl.<sup>5</sup> A61K 39/02; C12N 15/00; C07G 7/00

U.S. Cl. 424-92

3 Claims

1. A method for determining previous immunological expo-

sure, of a mammalian host to Mycobacterium tuberculosis or Mycobacterium bovis comprising the steps of:

- administering intradermally to an assayed mammalian host an inoculum that consists essentially of the purified 540 amino acid residue protein encoded for by the DNA sequence of FIG. 2, said protein dissolved or dispersed in a physiologically tolerable diluent and present in said diluent in an amount effective to induce erythema and induration in a mammalian host previously immunized with *M. tuberculosis* or *M. bovis*;
- maintaining said mammal for a time period of about 24 to about 72 hours; and
- assaying for the presence of erythema and induration at the site of intradermal administration at the end of said time period.

4,952,396

#### METHOD OF USING PHYTIC ACID FOR INHIBITING TUMOR GROWTH

Robert Sabin, Goosedown Estate, Horseshoe Rd., Mill Neck, Long Island, N.Y. 11765; Raxit Jariwalla, Mountain View, and Stephen Lawson, Menlo Park, both of Calif., assignors to Linus Pauling Institute of Science & Medicine, Palo Alto, Calif. and Robert Sabin, Long Island, N.Y.

Continuation-in-part of Ser. No. 932,661, Nov. 19, 1986, abandoned. This application Jan. 10, 1988, Ser. No. 205,140

Int. Cl.<sup>5</sup> A61K 37/54, 31/66

U.S. Cl. 424-946

10 Claims

1. A method of inhibiting tumor fibrosarcoma growth comprising the step of administering to a subject an effective tumor-inhibiting amount of a compound selected from the group consisting of phytic acid, a phytate salt, an isomer or hydrolyzate of phytic acid or a phytate salt, or a mixture of any combination thereof.

4,952,397

#### 2-QUATERNARY HETEROARYLALKYLTHIO CARBAPENEMS HAVING AN ACID MOIETY SUBSTITUENT

James V. Heck, Scotch Plains, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

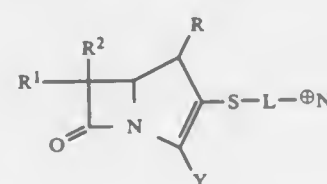
Continuation-in-part of Ser. No. 744,740, Jun. 17, 1985, abandoned, and a continuation-in-part of Ser. No. 744,741, Jun. 17, 1985, abandoned, and a continuation-in-part of Ser. No. 123,494, Nov. 10, 1987. This application Nov. 23, 1988, Ser. No. 275,811

Int. Cl.<sup>5</sup> C07D 487/04; A61K 31/40

U.S. Cl. 424-114

13 Claims

1. A compound of the formula:



wherein:

R is H or CH<sub>3</sub>;  
R<sup>1</sup> is CH<sub>3</sub>CH(OH)-;  
R<sup>2</sup> is H;



is a quaternary, monocyclic, substituted heteroaryl group comprising pyridinium, which is required to be substituted

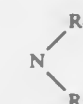
in the 4-position by an acidic sidechain of the structure -B, where B is optionally attached by way of a bridging group which is a member selected from the group consisting essentially of -CH<sub>2</sub>-; and

B is an acidic function which is a member selected from the group consisting essentially of sulfo (SO<sub>3</sub>H); SO<sub>2</sub>NHCN; and heteroarylsulfonamino (SO<sub>2</sub>NHR<sup>x</sup>), where R<sup>x</sup> is substituted or unsubstituted heteroaryl, selected from thiazole and thiadiazole; and where the heteroaryl group is substituted, it is mono- or disubstituted by a member or members independently selected from the group consisting essentially of C<sub>1</sub>-C<sub>4</sub>alkyl; CF<sub>3</sub>; carbamoyl, and cyano; the heteroaryl group



is optionally substituted by one to three of the radicals independently selected from the group consisting of:

- a trifluoromethyl group; -CF<sub>3</sub>;
- a halogen atom: -Br, -Cl, -F, or -I;
- C<sub>1</sub>-C<sub>4</sub> alkoxy radical; -OC<sub>1-4</sub> alkyl;
- a hydroxy group: -OH;
- an amino group, or a mono (C<sub>1</sub>-C<sub>4</sub> alkyl) amino or di(C<sub>1</sub>-C<sub>4</sub> alkyl) amino group:



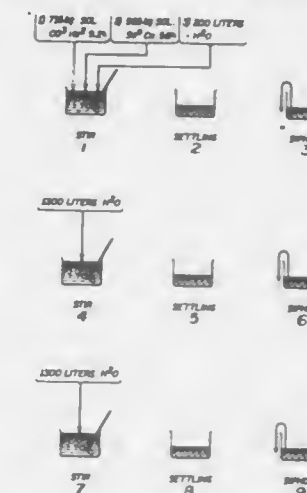
where R<sup>y</sup> and R<sup>z</sup> are independently H or C<sub>1</sub>-C<sub>4</sub>alkyl;

(f) C<sub>1</sub>-C<sub>6</sub> alkyl radical; and

L is -CH<sub>2</sub>CH<sub>2</sub>-; and

Y is selected from;

- COOH or a pharmaceutically acceptable thereof;
- COOM wherein M is an alkali metal or other pharmaceutically acceptable salt; and
- COOM where M is a negative charge in the case where a permanent positive charge exists elsewhere in the molecule.



cide, a bactericide, and a fungicide, and the copper salts function as an algicide.

4,952,399

#### PHARMACEUTICAL COMPOSITION WHICH INHIBITS THE GROWTH OF A TUMOR

Ari Lewenstein, Lugano, Switzerland, and Fouad K. Habib, Edinburgh, Great Britain, assignors to Cernitin SA, Barbengo, Switzerland

Continuation of Ser. No. 909,833, Sep. 19, 1986, abandoned. This application Jul. 20, 1989, Ser. No. 384,054

Claims priority, application Switzerland, Sep. 20, 1985, 4089/85

Int. Cl.<sup>5</sup> A61K 35/78

U.S. Cl. 424-195.1

11 Claims

1. A method of inhibiting the growth of tumor-cells and stimulating the metabolism of normal healthy cells including the step of administering a preparation containing as active ingredient a pollen extract recovered from plant pollen by an extraction with an aqueous extraction medium, which pollen extract contains not more than 5% by weight of proteins having a high molecular weight.

4,952,400

#### POWDER AND MICROCAPSULE FRAGRANCE ENHANCED SAMPLER

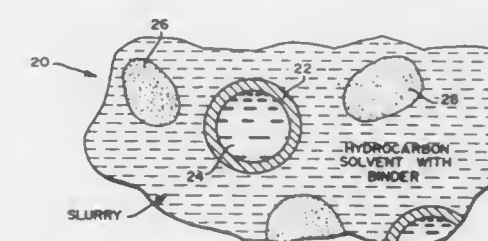
Christopher Tararuj, Mercerville, and Carl K. Schaab, Princeton Jct., both of N.J., assignors to Webcraft Technologies, Inc., North Brunswick, N.J.

Filed Jan. 17, 1988, Ser. No. 207,804

Int. Cl.<sup>5</sup> B32B 5/30, 5/16

U.S. Cl. 424-401

6 Claims



4,952,398

BIOCIDAL COMPOSITION WITH COPPER ALGICIDE  
Jean Tapin, 06550 LaRoquette, 770 Av. de La Republique, 1  
Domaine Des Lauriers Roses, France

Filed Mar. 17, 1988, Ser. No. 169,378

Int. Cl.<sup>5</sup> A01N 61/02

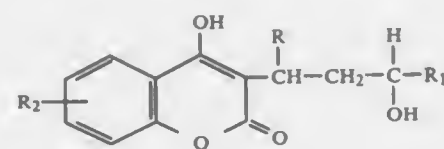
U.S. Cl. 71-67

28 Claims

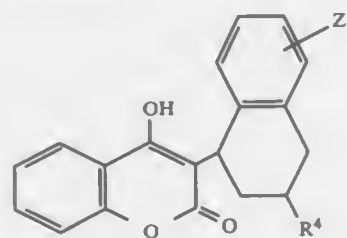
1. An improved composition for treatment of swimming pool water consisting of biocide constituents and a flocculent in which the biocide constituents are a mixture of quaternary

1. A particle and fragrance capsule sampler, comprising:  
(a) a substrate having a surface;

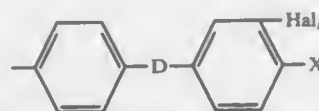
- (b) microencapsulated fragrance oil;  
 (c) solid powder particles;  
 (d) each of said powder particles being formed of homogeneous material;  
 (e) said microencapsulated fragrance oil and said solid powder particles forming a layer on said surface of said substrate;  
 (f) said microcapsules and said powder particles forming mixture;  
 (g) said mixture also including a binding material;  
 (h) said powder particles being held temporarily in fixed position with respect to each other by the set taken by the binding material; and  
 (i) said powder particles and said binding material taking a set within the layer as a residual dried layer after evaporation of a volatile liquid suspension medium originally mixed with the layer, whereby the particles lightly adhere to the substrate surface, and on application of light finger pressure, virtually all of said powder particles are removable therefrom as discrete free-flowing separate particles, having the property of a fragranced powder, and the microcapsules break to release the fragrance oils resulting in the consistency and scent of a fragranced powder.



wherein  
 R is hydrogen, phenyl, halophenyl, dihalophenyl, nitrophenyl, methoxyphenyl, tolyl, methylene, dioxyphenyl or furyl,  
 R<sub>1</sub> is methyl, phenyl, halophenyl, nitrophenyl, diphenyl, halodiphenyl, nitrodiphenyl and naphthyl radicals, and  
 R<sub>2</sub> is hydrogen or a halogen;  
 (C) a compound of the formula

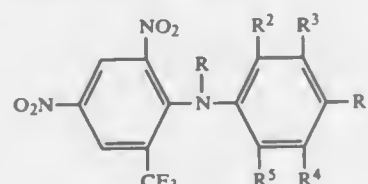


wherein  
 Z represents a chlorine atom,  
 n is 0, 1 or 2, and  
 R<sub>4</sub> represents



in which Hal is a fluorine or chlorine atom and n is 0 or 1, X is a fluorine, chlorine or bromine atom or a —CN, —CF<sub>3</sub> or —OCF<sub>3</sub> group and D represents —OCH<sub>2</sub>— or —(CH<sub>2</sub>)<sub>m</sub>—, where m is 2 to 3;

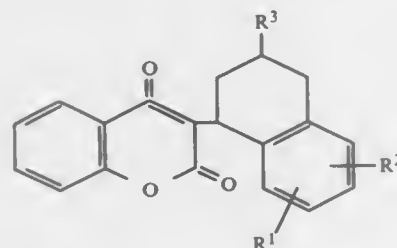
- (D) a compound selected from 1,1-diphenyl-2-acetyl-1,3-indandione, and (1'-parachlorophenyl-1'-phenyl)-2-acetyl-1, 3-indandione;  
 (E) monofluoroacetic acid; and  
 (F) a compound of the formula



wherein  
 R represents methyl, ethyl or propyl;  
 R<sup>1</sup> represents hydrogen, fluoro, chloro, bromo, iodo, cyano, methyl, nitro or trifluoromethyl;  
 R<sup>2</sup> and R<sup>3</sup> independently represent hydrogen, fluoro, chloro, bromo, nitro, methyl or trifluoromethyl, provided that no more than one of R<sup>2</sup> and R<sup>3</sup> represents nitro;  
 R<sup>3</sup> and R<sup>4</sup> independently represent hydrogen, methyl, fluoro, chloro, bromo or trifluoromethyl; provided that  
 (a) no more than one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> represents methyl, except that R<sup>3</sup> and R<sup>4</sup> may both represent methyl;  
 (b) when R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> represents methyl or fluoro, two or three of R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> represent chloro or bromo;



where n is 1 or 2, and  
 each R<sup>4</sup> is independently selected from the group consisting of halogen, a C<sub>2</sub>–C<sub>12</sub> alkyl, a C<sub>2</sub>–C<sub>12</sub> alkoxy group, cyclohexyl, benzyl, phenyl, halogenophenyl, phenoxy and halogenophenoxy provided that R<sup>3</sup> contains not more than 3 halogen atoms;  
 (B) a compound of the formula

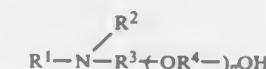


wherein  
 R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of hydrogen, halogen, a C<sub>1</sub>–C<sub>6</sub> alkyl and a C<sub>1</sub>–C<sub>6</sub> alkoxy group;  
 R<sup>3</sup> is an aryl group having the formula

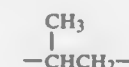
4,952,401  
**RODENTICIDE FOR TOXIC WICK**  
 David G. Hobbs, Goldsboro, N.C., assignor to ICI Americas Inc., Wilmington, Del.  
 Division of Ser. No. 933,801, Dec. 2, 1986, Pat. No. 4,868,206.  
 This application Jan. 12, 1990, Ser. No. 364,293  
 Int. Cl.<sup>5</sup> A01N 25/08; A01M 1/20

- U.S. Cl. 424—405 20 Claims  
 1. A homogeneous liquid composition for loading the wick of a rodent control apparatus comprising:  
 (I) a rodenticidally effective amount of at least one rodenticide selected from the group consisting of  
 (A) a compound of the formula

- (c) no more than one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> represents trifluoromethyl, except that R<sup>3</sup> and R<sup>4</sup> may both represent trifluoromethyl;  
 (d) when R<sup>2</sup> or R<sup>5</sup> represents trifluoromethyl, R<sup>1</sup> represents chloro or bromo;  
 (e) when one and only one of R<sup>3</sup> and R<sup>4</sup> represents trifluoromethyl, two or three of R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> represent chloro or bromo;  
 (f) no more than four of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> represent hydrogen;  
 (g) two fluorine atoms are not adjacent to each other;  
 (h) when R<sup>2</sup> or R<sup>5</sup> represents nitro, R<sup>1</sup> represents chloro, bromo or nitro;  
 (i) when R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> represents trifluoromethyl, none of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> represents fluoro or methyl; or  
 (G) a salt of either compound (A), (B), (C), (D), (E) or (F) formed by reacting the same with a salt-forming agent selected from the group consisting of  
 (a) an alkali metal or hydroxide thereof;  
 (b) ammonia or ammonium hydroxide;  
 (c) an alkanolamine of the formula N[(C<sub>n</sub>H<sub>2n</sub>)<sub>y</sub>OH]<sub>x</sub> (H)<sub>z</sub> wherein n=1 to 6, x and y are independently 1 to 3, z is 0 to 2 and further wherein x+z=3; and  
 (d) amine of the formula



wherein  
 R<sup>1</sup> and R<sup>2</sup> are independently hydrogen, methyl, ethyl, propyl or iso-propyl;  
 R<sup>3</sup> and R<sup>4</sup> are independently —CH<sub>2</sub>—, —CH<sub>2</sub>CH<sub>2</sub>—, —CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>—  
 and

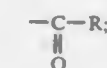


- and p is either 0 or 1; and  
 (II) between 70 and 90 weight percent of at least one additive which will  
 (a) absorb less than fifteen percent moisture when exposed to 55% humidity at 5° C. in a 3 inch diameter open petri dish for 72 hours;  
 (b) undergo less than five percent weight loss when exposed to 55% humidity at 50° C. for 72 hours in a 3 inch diameter open petri dish;  
 (c) have a viscosity less than 800 centipoise (cps) at 25° C.; and is selected from the group consisting of a  
 (i) polyoxyalkylated alkyl phenol comprising the reaction product of 1 mole of a phenol containing one or more C<sub>4</sub> to C<sub>12</sub> alkyl groups and between 1 and 12.5 moles of alkylene oxide;  
 (ii) a sorbitan fatty acid comprising the reaction product of 1 mole of sorbitan and between 1 and 3 moles of at least one C<sub>8</sub> to C<sub>16</sub> saturated or unsaturated fatty acid;  
 (iii) polyoxyalkylated sorbitan fatty acid ester comprising the reaction product of 1 mole of a sorbitan fatty acid and between 1 and 12.5 moles of alkylene oxide;  
 (iv) polyoxyalkylated fatty amine comprising the reaction product of 1 mole of a C<sub>12</sub> to C<sub>18</sub> fatty amine and between 1 and 16 moles of alkylene oxide;  
 (v) polyoxyalkylated branched or linear alcohol comprising the reaction product of 1 mole of a C<sub>10</sub> to C<sub>15</sub> alcohol and between 1 and 15 moles of alkylated oxide;  
 (vi) polyoxyalkylated branched or linear mercaptan comprising the reaction product of (a) 1 mole of a mercaptan of the formula RSH, wherein R is a C<sub>7</sub> to

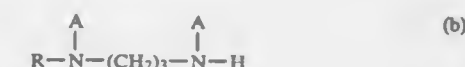
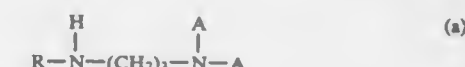
C<sub>30</sub> saturated alkyl group and (b) between 1 and 16 moles of alkylene oxide;  
 (vii) polyoxyalkylated ester of the formula



wherein  
 R is a saturated or unsaturated aliphatic or acyclic C<sub>10</sub>–C<sub>22</sub> group,  
 R<sup>1</sup> is —H or



and  
 X is between one and eighteen; and  
 (viii) polyoxyalkylated polyamine selected from the group consisting of



wherein  
 R is a C<sub>12</sub> to C<sub>18</sub> saturated alkyl group;  
 A is independently selected from (CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H and (CH<sub>2</sub>CH<sub>2</sub>O)<sub>x</sub>H wherein X is between 1 and 14 and further wherein the sum of all X's in any one compound is not greater than 15; with the proviso that when the rodenticide is selected from Group (I) (A), the additive of Group (II) is not (C) (iv).

4,952,402  
**CONTROLLED RELEASE POWDER AND PROCESS FOR ITS PREPARATION**  
 Randall T. Sparks, Gainesville, Ga., and Edward J. Geoghegan, Athlone, Ireland, assignors to Elan Corporation, p.l.c., Athlone, Ireland  
 Continuation of Ser. No. 792,801, Oct. 30, 1985, abandoned.  
 This application Mar. 17, 1988, Ser. No. 169,447  
 Claims priority, application Ireland, Oct. 30, 1984, 2788/84  
 Int. Cl.<sup>5</sup> A61K 9/58, 9/60, 9/68, 9/26  
 U.S. Cl. 424—419 52 Claims



1. A controlled release taste masked powder containing discrete micro-particles for use in edible pharmaceutical and other controlled release compositions, said powder comprising particles containing an active ingredient in intimate admixture with at least one non-toxic insoluble, permeable, impermeable,



or biodegradable controlled release polymer, or mixtures thereof, in an amount effective to provide a predetermined and controlled release of said active ingredient, each of said particles being in the form of a micromatrix with the active ingredient uniformly distributed throughout the matrix, but not entirely coated by the polymer, said particles having an average size of from 0.1 to 125  $\mu\text{m}$ , being unlikely to be significantly degraded or ground by any chewing action, and having a predetermined release of said active ingredient.

4,952,403

# IMPLANTS FOR THE PROMOTION OF HEALING OF MENISCAL TISSUE

Bert L. Vallee, Brookline, and Thomas V. King, Winchester, both of Mass., assignors to President and Fellows of Harvard College, Boston, Mass.

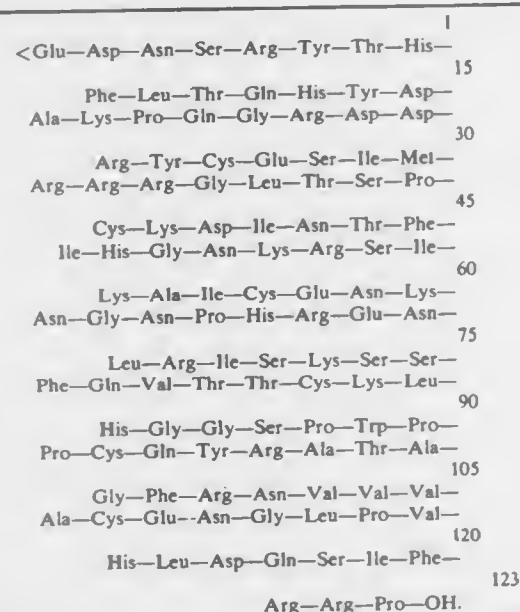
Continuation-in-part of Ser. No. 64,215, Jun. 19, 1987. This application Jun. 8, 1988, Ser. No. 204,097

Int. Cl.<sup>5</sup> A61K 9/52

U.S. Cl. 424-422

4 Claims

1. An implant for promoting healing of normally avascular tissue of a meniscus after injury which comprises a physiologically acceptable solid carrier which contains and releases for a period of at least about three weeks a vascularizing amount of an angiogenic polypeptide of the formula:



or polypeptides having substantially the same amino acid sequence and angiogenic activity.

4,952,404

# PROMOTION OF HEALING OF MENISCAL TISSUE

Bert L. Vallee, Brookline, and Thomas V. King, Winchester, both of Mass., assignors to President and Fellows of Harvard College, Boston, Mass.

Filed Jun. 19, 1987, Ser. No. 64,215

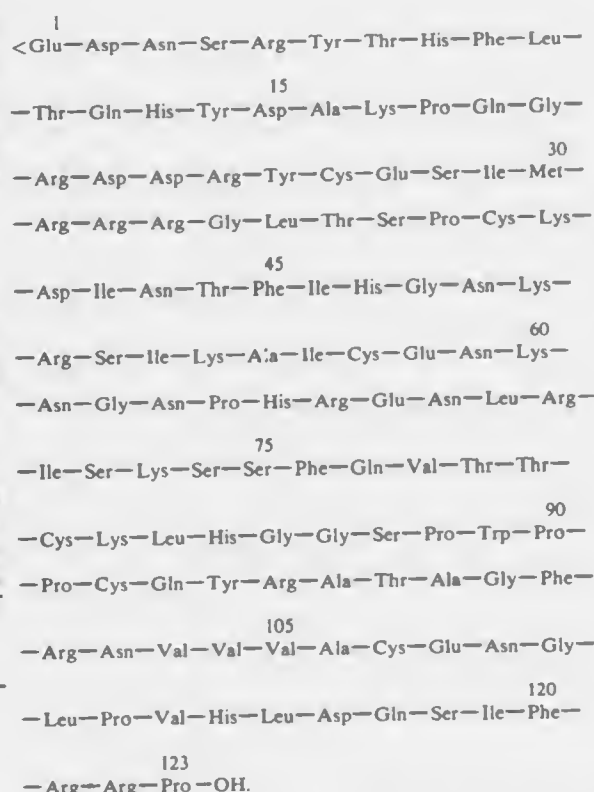
The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 9/52

U.S. Cl. 424-422

2 Claims

1. A method of promoting healing of normally avascular tissue of a meniscus after injury which comprises implanting at the site of the meniscus injury a physiologically acceptable polymer composition implant which contains and releases for a period of at least about three weeks a vascularizing amount of an angiogenic polypeptide of the formula:



and polypeptides having substantially the same amino acid sequence and angiogenic activity.

4,952,405

# METHOD OF TREATING *M. AVIUM* INFECTION

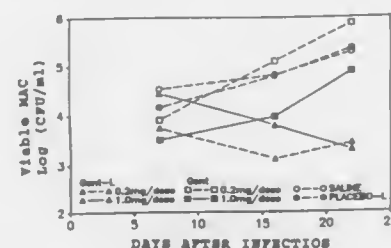
Annie Yau-Young, Los Altos, Calif., assignor to Liposome Technology, Inc., Menlo Park, Calif.

Filed Oct. 20, 1988, Ser. No. 260,258

Int. Cl.<sup>5</sup> A61K 9/127

U.S. Cl. 424-423

4 Claims



1. A method of treating a subject having infectious levels of *Mycobacterium avium* Complex in the bloodstream and in the reticuloendothelial tissue, comprising providing a suspension of liposomes containing entrapped gentamicin, administering intravenously to the subject the suspension containing an amount of gentamicin which is equivalent to a therapeutically effective amount of amikacin, when the amikacin is administered intravenously in liposome-entrapped form, repeating said administering, at dosing intervals of about once every 24 hours or more, until the level of infectious Complex in the bloodstream has been significantly reduced, and by said repeated administering, achieving a reduction in the level of the Complex in the bloodstream which is similar

to, and a reduction in the level of the Complex in the reticuloendothelial tissue which is several fold greater than, that which would be achieved by repeated administration of such therapeutically effective amount of amikacin, in liposome-entrapped form.

4,952,406

# FEEDBACK CONTROLLED RELEASE

Larry Brown, Brookline; Fariba Fischel-Ghodsian, Boston, and Robert S. Langer, Somerville, all of Mass., assignors to The Children's Medical Center Corporation, Boston, Mass.

Continuation of Ser. No. 749,946, Jun. 27, 1985, abandoned.

This application Apr. 3, 1987, Ser. No. 36,158

Int. Cl.<sup>5</sup> A61K 37/26; A61F 2/00

U.S. Cl. 424-425

25 Claims

1. A system providing feedback-responsive release of a protein to an aqueous biological fluid, wherein said protein participates in changing the concentration of a component of said fluid, said system comprising:

- said protein, which is selected to have an aqueous solubility at a first level when the pH of the aqueous microenvironment of said protein is in a first pH range, and an aqueous solubility at a second level higher than the first level when said microenvironment pH is in a second pH range;
- an aqueous-insoluble biocompatible material positioned to sequester said protein, said protein and said insoluble material being characterized in that said insoluble material is aqueous-fluid-penetrable, allowing controlled release of said sequestered protein therefrom, and changes in said aqueous solubility from said first to said second level effecting an increase in the rate of release of said sequestered protein from said insoluble biocompatible material; and
- an enzyme catalyzing a reaction capable of causing the pH of the microenvironment of said sequestered protein to change between said first pH range and said second pH range, responsive to concentration changes of said component in said aqueous biological fluid, said enzyme and said protein being further characterized in that concentrations of said component characteristic of an increased demand for said protein in said biological fluid cause the enzyme to change said microenvironment pH from said first pH range to said second pH range.

4,952,407

# CHEWING GUM CONTAINING GLYCEROL MONO LAURATE

David W. Record, River Forest, and Mansukh M. Patel, Downers Grove, both of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Sep. 12, 1988, Ser. No. 243,404

Int. Cl.<sup>5</sup> A61K 47/20

U.S. Cl. 424-440

20 Claims

1. In a chewing gum composition comprising 15 to 90% gum base, 5 to 80% bulking and sweetening agents, 1 to 10% glycerine and optional color and flavor, the improvement comprising including an amount of glycerol mono laurate in the gum composition effective to reduce dental plaque.

4,952,408

# LIPOSOME-ENCAPSULATED VINCA ALKALOIDS AND THEIR USE IN COMBATTING TUMORS

Aqilur Rahman, Gaithersburg, Md., assignor to Georgetown University, Washington, D.C.

Filed May 23, 1988, Ser. No. 197,648

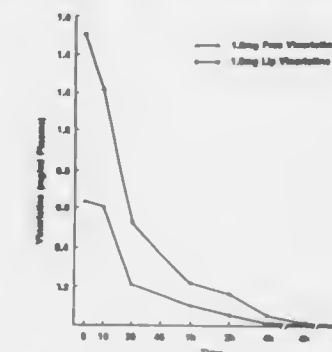
Int. Cl.<sup>5</sup> A16K 37/22; B01J 13/02

U.S. Cl. 424-450

11 Claims

1. A pharmaceutical composition, comprising a liposome-

encapsulated effective amount of a vinca alkaloid in complexation with cardiolipin, said vinca alkaloid being at least one



member selected from the group consisting of vincristine, vinblastine and vindesine.

4,952,409

# AGENT FOR PREVENTION AND REMEDY OF INJURIES CAUSED BY ISCHEMIA

Ko Bando, Baltimore, Md.; Yoshimasa Senoo, Okayama, Japan; Minoru Noji, Takasaki, Japan; Kazuo Otsuki, Tokyo, Japan; Hisao Ekimoto, Tokyo, Japan, and Yukio Irie, Maebashi, Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,752

Claims priority, application Japan, May 18, 1988, 63-119155 Int. Cl.<sup>5</sup> A61K 37/22

U.S. Cl. 424-450

4 Claims

1. A method for preventing and remedying injuries of a transplanted organ caused by ischemia, which comprises administering an effective amount of an SOD-containing liposome comprising a superoxide dismutase (SOD) retained in a liposome having an electrically neutral or negative membrane to a warm-blooded animal or an organ of a warm-blooded animal to be transplanted.

4,952,410

# PHARMACEUTICAL PRODUCTS OF MOXONIDINE AND HYDROCHLOROTHIAZIDE

Ben Armah, Hamburg; Wolfgang Stenzel, Reinbek, and Vera Pläntz, Henstedt-Ulzburg, all of Fed. Rep. of Germany, assignors to Beiersdorf AG, Hamburg, Fed. Rep. of Germany

Filed Nov. 17, 1988, Ser. No. 272,667

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739779 Int. Cl.<sup>5</sup> A61K 9/20

U.S. Cl. 424-465

13 Claims

1. Pharmaceutical composition containing 1 part by weight of moxonidine (4-chloro-6-methoxy-2-methyl-5(2-imidazolin-2-yl)amino-pyrimidin) or its pharmaceutically acceptable salts and 30 to 400 parts by weight of hydrochlorothiazide (6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulphonamide-1,1-dioxide).

4,952,411

# METHOD OF INHIBITING THE TRANSMISSION OF AIDS VIRUS

Charles L. Fox, Jr., New York, N.Y., and Shanta M. Modak, River Edge, N.J., assignors to Trustees of Columbia University in the City of New York, Morningside Heights, N.Y.

Continuation-in-part of Ser. No. 18,624, Feb. 25, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 262,165

Int. Cl.<sup>5</sup> A61K 33/38, 31/56, 31/28, 31/155

U.S. Cl. 424-618

14 Claims

1. A method of inhibiting the transmission of AIDS virus in

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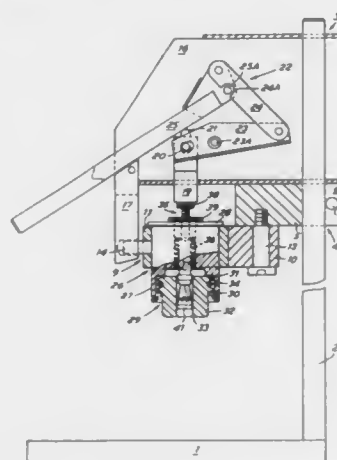
UMI

humans comprising topically applying an effective antiviral amount of an enhanced antiviral composition comprising an antiviral silver salt and an antiviral biquanide to a sexual canal of a human, wherein the silver salt and the biquanide are present in amounts such that the composition is effective to inhibit transmission of AIDS in humans.

**4,952,412**  
**CRIMPING AND DECAPPING PRESS**  
James A. Baxter, 73a Friern Barnet Lane, London, United Kingdom (N20 0XT), and Kenneth E. Marshall, Pinfold House, Almond Close, Barby, Rugby, Warwickshire, United Kingdom (CV23 8TL)

Filed Dec. 1, 1988, Ser. No. 278,527  
Claims priority, application United Kingdom, Dec. 1, 1987, 8728101

Int. Cl.<sup>5</sup> B67B 7/16  
U.S. Cl. 425—383



1. A crimping and decapping press comprising a base carrying a column, an arm, said arm being displaceable along the column, clamp means for retaining said arm in one of several selected positions of displacement along said column, the arm carrying an angularly displaceable cradle, a working unit carried by said cradle for crimping or decapping, means for locking the cradle in an operating position, a plunger for operating the working unit, and means for actuating the plunger.

**4,952,413**  
**SUGARLESS OR FAT FREE FOOD COMPOSITIONS**  
Robert G. LaBarge, Midland, Mich.; Clyde E. Baxter, Jr., Palm Bay, Fla.; Jimmie D. Christen, Lake Jackson, Tex., and Abraham I. Bakal, Parsippany, N.J., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 883,191, Jul. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 861,784, May 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 675,035, Nov. 26, 1984, abandoned. This application Jul. 26, 1989, Ser. No. 394,262

Int. Cl.<sup>5</sup> A23L 1/00

U.S. Cl. 426—6

1. A normally texturized, substantially sugarless or fat-free low-calorie foodstuff composition comprising having mixed therein a bulk texturizing amount of an essentially non-toxic, low-calorie polyalkylene oxide, having a molecular weight between about 800 and about 10,000, prepared from ethylene oxide, propylene oxide or butylene oxide or mixtures thereof in a concentration from about 8g/100g of the foodstuff composition which replaces at least thirty weight percent of sugar or fat in the foodstuff composition whereby an amount of sugar or fat has been removed to provide a reduction in calories of at

least ten percent compared to a sugar or fat containing food-stuff composition.

**4,952,414**  
**YOGURT WITH CRISP CEREAL PIECES**  
Stephen P. Kaufman, Minneapolis; James E. Langer, White Bear Lake, and Vinod W. Padhye, Maple Grove, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Sep. 6, 1989, Ser. No. 403,508  
Int. Cl.<sup>5</sup> A23C 9/154, 9/12

U.S. Cl. 426—93

1. A composite food product having food phases of differing texture without a discrete intermediate solid barrier, comprising:

- A. about 10% to 90% by weight of the product of a first, wet food phase having a first relatively higher water activity of at least 0.7, and
- B. about 10% to 90% by weight of the product of a second food phase in direct contact with the first food phase without an intermediate discrete solid barrier having a second relatively lower, below about 0.7 water activity said second food phase comprising:
  1. about 70% to 95% by weight of the second food phase of a water-in-oil emulsion including
    - (a) about 8% to 50% by weight of the emulsion of a continuous gelled oil phase, said oil phase comprising an edible oil having a melting point of less than 70° F.,
    - (b) about 50% to 92% by weight of the emulsion of a dispersed aqueous phase, said aqueous phase comprising sufficient quantities of water soluble solids to have a water activity ranging from about 0.4 to 0.8, and
    - (c) sufficient amounts of a water-in-oil emulsifier to form a stable emulsion.
  2. about 5% to 30% by weight of the product of dry, cereal pieces dispersed throughout the emulsion, said cereal pieces having a water activity of about 0.1 to about 0.3.

**4,952,415**  
**CARBOXYLIC POLYMER ANIMAL FEED BINDER**  
Thomas S. Winowski, Mosinee, and Stephen Y. Lin, Wausau, both of Wis., assignors to Daishowa Chemicals Inc., Rothschild, Wis.

Continuation of Ser. No. 114,624, Oct. 28, 1987, abandoned. This application Jan. 18, 1989, Ser. No. 298,847

Int. Cl.<sup>5</sup> A23K 1/00

U.S. Cl. 426—285

1. A method of compounding feed for animals, comprising the steps of:

- providing an organic animal feed;
- incorporating with said animal feed an effective amount of a binder to form a feed mixture, said binder selected from the group consisting of a polymer or salt of said polymer which includes a carboxylic containing compound having a monomer unit of the general formula  $-(RCHCR-COOH)_n$ —where R is hydrogen or a carboxylic acid and R<sup>1</sup> is hydrogen or an alkyl group, and a copolymer of a sulfonated lignin material and a monomer, polymer or polymer salt which includes a carboxylic containing compound having a monomer unit of said general formula; and forming said mixture into a desired discrete shape.

**4,952,416**  
**PROCESS FOR PRODUCING INSTANTIZED PARBOILED RICE**

Thomas E. Abraham; Jacques L. Malfait, and Arnold J. White, all of Cobourg, Canada, assignors to General Foods, Inc., Don Mills, Canada

Continuation-in-part of Ser. No. 236,565, Aug. 25, 1988, Pat. No. 4,857,348. This application May 1, 1989, Ser. No. 345,931  
The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A23B 9/00

U.S. Cl. 426—462

1. A process for producing an improved instantized parboiled rice which consisting essentially of incorporating about 68 to about 78 weight percent water into long grain milled parboiled rice in which the starch has been substantially gelatinized, drying said water-containing rice at temperatures from about 260° F. to about 325° F. to reduce the water content of said rice to about 6 to about 14% over a period of time to obtain rice having a texture with a shear press value in the range from about 60 to below 85 lbs/force and having about a 4½ to about 7½ minute stand recipe when an equal volume of rice is combined with an equal volume of boiling water to produce an instantized eating quality parboiled finished rice product.

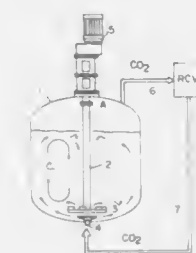
**4,952,417**  
**APPARATUS FOR INCORPORATING GAS INTO A SUGAR MASS**

Ramon Escola Gallart, c/Sebastian Altet No. 6, Sant Cugat del Valles, (08190) Barcelona, and Ramon Bayes Turull, c/Urgell 249.80.20, 08036 Barcelona, both of Spain

Division of Ser. No. 12,549, Feb. 9, 1987, Pat. No. 4,837,039. This application Mar. 20, 1989, Ser. No. 326,287

Int. Cl.<sup>5</sup> A23G 3/00

U.S. Cl. 426—572



1. An apparatus for incorporating gas under pressure into a fused sugar mass comprising:

- a pressure vessel for containing a fused candy mass, said vessel having an interior oriented to have a top region and a bottom region;
- an agitator disposed within said interior; and
- a bubble forming means for introducing compressed gas into said fused sugar mass as a curtain of gas bubbles, said bubble forming means being disposed within the bottom region of the pressure vessel below said agitator, wherein said bubble forming means comprises a lid situated over a nozzle of a gas inlet within a base so as to retain the compressed gas slightly, to reduce the speed of incorporation of the compressed gas, and to dispense the compressed gas as a curtain of gas bubbles below the agitator.

**4,952,418**  
**KOALA FEEDSTUFF**  
Ian D. Hume, Gordon, and Lester I. Pahl, Oxenford, both of Australia, assignors to University of Sydney, Australia and NY Zoological Society, Bronx, N.Y.

Filed Feb. 8, 1989, Ser. No. 308,132  
Claims priority, application Australia, Feb. 9, 1988, PI6650  
Int. Cl.<sup>5</sup> A23K 1/00

U.S. Cl. 426—636

1. A feedstuff for koalas, consisting essentially of 60 to 70 wt. % water; 10 to 50 wt. % ground forage selected from the group consisting of oaten hay, dried grass and lucerne hay; 5 to 10 wt. % binding agent selected from the group consisting of agar and gelatin; 0 to 5 wt. % of a sweetener selected from the group consisting of sucrose and artificial sweetener; 5 to 10 wt. % lactose-free milk substitute, and either 8 to 12 wt. % ground eucalypt leaf, an equivalent amount of eucalypt oil extract, or a mixture thereof.

**4,952,419**  
**METHOD OF MAKING ANTIMICROBIAL COATED IMPLANTS**

José De Leon, Canovanas, P.R.; Thomas H. Ferguson, Greenfield, and Daniel S. Skinner, Jr., Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 91,075, Aug. 31, 1987, Pat. No. 4,846,844. This application Mar. 12, 1989, Ser. No. 339,119

Int. Cl.<sup>5</sup> A01N 1/02; A61K 1/02

U.S. Cl. 427—2

1. A method for forming an adherent antimicrobial coating on a surface of an implant comprising the steps of applying a silicone fluid to form a film of silicone fluid on the surface of the implant and contacting the film-bearing surface with an antimicrobial agent in a film-adherent powder form.

**4,952,420**  
**VAPOR DEPOSITION PATTERNING METHOD**  
Glenn J. Walters, Duxbury, Mass., assignor to Advanced Dielectric Technologies, Inc., Taunton, Mass.

Filed Oct. 12, 1988, Ser. No. 256,695

Int. Cl.<sup>5</sup> B05D 5/12, 1/32

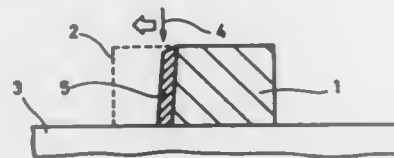
U.S. Cl. 427—97

1. An etchless patterning method for the direct vapor deposition of a desired material pattern on a substrate, the method comprising the steps of:

- a. immobilizing a reusable, patterned physical mask upon a mask carrier, the mask being cut out in a desired physical pattern;
- b. contacting the immobilized mask with a surface of the substrate in a manner such that the mask is immobilized upon such surface;
- c. removing the carrier from the immobilized mask on the substrate surface;
- d. vapor depositing a pattern material through said mask and onto the substrate thereby forming traces of the desired material pattern on said substrate;
- e. reimmobilizing the mask upon the mask carrier; and
- f. removing the patterned mask from the substrate surface in a manner such that the mask remains immobilized upon the mask carrier.



**4,952,421**  
**METHOD FOR REPAIRING A PATTERN**  
 Hiroaki Morimoto, Hiroshi Onoda, and Tadashi Nishioaka, all of Hyogo, Japan, assigns to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Nov. 8, 1988, Ser. No. 269,756  
 Claims priority, application Japan, Feb. 2, 1988, 63-23270  
 Int. Cl.<sup>3</sup> B05D 3/06  
 U.S. Cl. 427—43.1 11 Claims



1. A method for repairing a pattern of a first thin film formed on a substrate, comprising the steps of:
  - preparing a substrate having a main surface with said first thin film formed on the main surface selectively spaced apart in accordance with a prescribed pattern, wherein said first thin film has a defect portion which lacks said prescribed pattern thereby forming a void in said first thin film, said void having a side wall extending into said first thin film;
  - (a) supplying a gas comprising the same kind of material as said first thin film, or other material of a thin film having the same function as said first thin film has in the vicinity of said defect portion;
  - (b) selectively applying an energy beam having a prescribed energy to said side wall of said void, progressively directing said energy beam from an upper edge of said void, whereat said side wall intersects an upper surface of said first thin film, down to a lower edge whereat said side wall intersects said substrate, thereby decomposing said gas to form a second thin film on said wall of said void extending into said void whereby a new side wall of said void is formed, wherein said energy beam is successively applied so as at least to be always in contact with said side wall of said defect portion;
  - (c) disabling application of said energy beam to said substrate when said energy beam is not in contact with said side wall of said defect portion; and
  - successively repeating steps (b) and (c), thereby successively extending said side wall into said void until said void is substantially filled with said second thin film.

**4,952,422**  
**A METHOD OF COATING A LAYER OF AN YTTRIUM VANADATE PHOSPHOR CONTAINED IN A FLUORESCENT LAMP WITH Y<sub>2</sub>O<sub>3</sub> OR AL<sub>2</sub>O<sub>3</sub> AND LAMPS MADE THEREFROM**  
 Romano G. Pappalardo, Sudbury; Thomas E. Peters, Chelmsford, and Roger B. Hunt, Jr., Medfield, all of Mass., assigns to GTE Laboratories Incorporated, Waltham, Mass.  
 Division of Ser. No. 854,241, Apr. 21, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 161,643  
 Int. Cl.<sup>3</sup> B05D 5/16, 5/12  
 U.S. Cl. 427—67 3 Claims



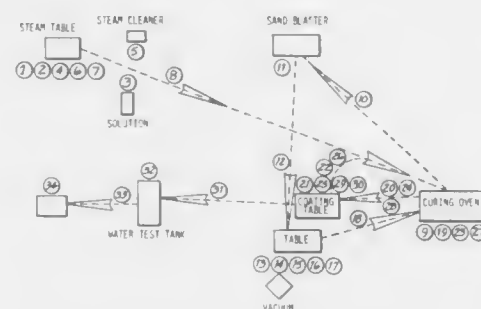
1. A process for applying a continuous protective coating of

an oxide overlying a layer of yttrium vanadate phosphor comprising the following steps:  
 Step 1—applying a physical vapor deposition (PVD) coating of a metal of said oxide on said phosphor to form a metallic coating; and  
 Step 2—lehring said metallic coating at about 500° C. to about 625° C. to form a continuous protective coating of said oxide overlying said layer of yttrium vanadate phosphor.

**4,952,423**  
**PRODUCTION OF A TRANSPARENT ELECTRIC CONDUCTOR**  
 Masahiro Hirata, Osaka; Masao Misonou, Hyog, and Hideo Kawahara, Osaka, all of Japan, assigns to Saint-Gobain Recherche, Aubervilliers Cedex, France  
 Filed Jan. 27, 1988, Ser. No. 148,827  
 Claims priority, application Japan, Jan. 27, 1987, 62-16387  
 Int. Cl.<sup>3</sup> B05D 5/12, 5/06  
 U.S. Cl. 427—109 9 Claims

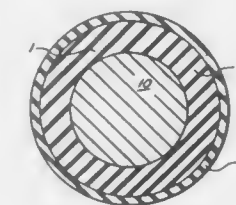
1. A method for manufacturing a transparent, electrically conductive member, by forming an electrically conductive layer on a transparent substrate, comprising the steps of: heating the substrate to a first deposition temperature; thermally decomposing and oxidizing a tin compound in the vicinity of the substrate under conditions such that a tin oxide layer is deposited on the substrate; bringing a halogen containing doping material into the vicinity of the substrate during the deposition step, whereby said tin oxide layer is doped as it is deposited; and without thereafter raising the temperature of the deposited doped layer above the deposition temperature, performing a heat treatment on the doped tin oxide layer at a temperature between 250° C. to 400° C.

**4,952,424**  
**METHOD FOR REPAIRING LEAKING FUEL TANKS**  
 Arthur R. Laviolette, 4444 Trapani Ln., Swartz Creek, Mich. 48473  
 Filed May 14, 1987, Ser. No. 49,378  
 Int. Cl.<sup>3</sup> B32B 35/00; B05D 7/22  
 U.S. Cl. 427—142 6 Claims



1. A method of repairing a low pressure vehicle fuel tank having holes which comprises the steps of: cleaning matter from the fuel tank that would prevent adhesion to polyvinyl chloride; filling the holes of the fuel tank by applying liquid polyvinyl chloride to the inside of the fuel tank; curing the liquid polyvinyl chloride at 370 degrees Fahrenheit for a minimum of six minutes; applying liquid polyvinyl chloride to the outside of the fuel tank; and curing the liquid polyvinyl chloride in an oven at 370 degrees for a minimum of 6 minutes so that the leaks of the tank are sealed.

**4,952,425**  
**METHOD OF PREPARING HIGH PURITY DOPANT ALLOYS**  
 Robert H. Allen, and Jameel Ibrahim, both of Baton Rouge, La., assigns to Ethyl Corporation, Richmond, Va.  
 Division of Ser. No. 126,203, Nov. 27, 1987, Pat. No. 4,789,596.  
 This application Jun. 27, 1988, Ser. No. 212,286  
 Int. Cl.<sup>3</sup> B05D 5/12  
 U.S. Cl. 427—213 12 Claims



1. A fluidized bed process for producing a particulate product having a nucleus or center portion of high purity elemental silicon and a substantially silicon-free layer deposited on said nucleus or center portion of at least one of a p or n carrier element, said process consisting essentially of passing a stream of deposition gas consisting essentially of binary hydride or halide of at least one of a p or n carrier element and an inert diluent carrier gas through a fluidized bed of substantially spherical particles of high purity elemental silicon in free flowing particulate form at a temperature above the decomposition temperature of said hydride or halide whereby said substantially silicon-free layer of at least one of a p or n carrier element is deposited on said particles of high purity elemental silicon.

**4,952,426**  
**REDUCING CANCER RISK FROM NEWSPAPERS**  
 Alvin Guttat, 6612 Whittier Blvd., Bethesda, Md. 20817  
 Filed Jun. 30, 1988, Ser. No. 213,342  
 Int. Cl.<sup>3</sup> B05D 1/36, 5/00  
 U.S. Cl. 427—258 23 Claims



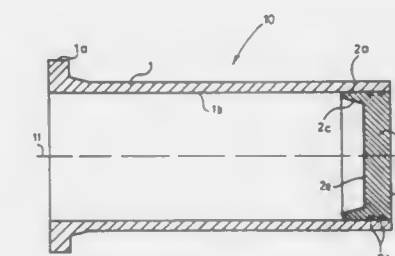
1. A process for coating paper having printed ink on its surface comprising applying and adhering a transparent plastic in matter or solid film form to said paper while said ink is wet.

**4,952,428**  
**FLAME RETARDANT COMPOSITIONS**  
 Michael J. Keogh, Bridgewater, N.J., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.  
 Filed Dec. 7, 1988, Ser. No. 280,980  
 Int. Cl.<sup>3</sup> A01N 3/00  
 U.S. Cl. 428—461 11 Claims

1. A cable comprising a metal core conductor having an electrical current running therethrough and at least one uncrosslinked layer surrounding the core consisting essentially of:
  - (i) a crosslinkable thermoplastic polymer;
  - (ii) a metal hydrate flame retardant compound; and
  - (iii) essentially unreacted organic peroxide crosslinking compound, which decomposes at a temperature of at least

about 140° C., but below the decomposition temperature of the polymer.

**4,952,429**  
**SEPARATING POT FOR GLANDLESS ELECTRICAL OR MAGNETIC DRIVE ASSEMBLIES**  
 Bernd-Horst Schmitz, Stolberg; Josef Hampert, Niederzier, and Horst Corr, Ubach-Palenberg, all of Fed. Rep. of Germany, assigns to Uranit GmbH, Jülich, Fed. Rep. of Germany  
 Filed May 19, 1989, Ser. No. 354,037  
 Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818832  
 Int. Cl.<sup>3</sup> E06B 3/24  
 U.S. Cl. 428—34.1 8 Claims

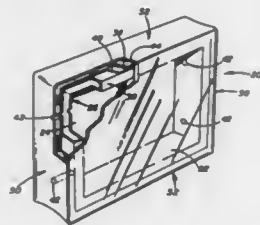


1. A separating pot for glandless electrical or magnetic drive assemblies, comprising:
  - a pot jacket having a generally tubular body with two ends and a flange portion at one of said two ends, said pot jacket being composed of fiber reinforced plastic with the fiber being wound in alternating layers of circumferential windings and helical windings, and with said flange portion being composed of additional circumferential windings; and
  - a bottom member disposed within and closing off the other of said two ends of said pot jacket, said one end of said pot jacket being an open end, said bottom member having a generally cup-shaped portion which includes a rim portion surrounding an interior bottom face, said rim portion facing said open end of said pot jacket and extending in an axial direction away from said interior bottom face, said bottom member being in a press fit with said pot jacket and being glued to said pot jacket, and said rim portion having a generally conically-shaped interior surface which is enlarged in a direction away from said interior bottom face.

**4,952,430**  
**INSULATED WINDOW UNITS**  
 George H. Bowser, New Kensington, and Stanley J. Pyzewski, Cheswick, both of Pa., assigns to PPG Industries, Inc., Pittsburgh, Pa.  
 Continuation-in-part of Ser. No. 129,399, Nov. 25, 1987, abandoned, which is a continuation of Ser. No. 49,004, May 7, 1987, abandoned, which is a continuation of Ser. No. 734,721, May 16, 1985. This application Aug. 29, 1988, Ser. No. 238,019  
 Int. Cl.<sup>3</sup> E06B 3/24  
 U.S. Cl. 428—34 19 Claims

1. A multiple-glazed unit, comprising:
  - a pair of sheets;
  - spacing and sealing means having a pair of opposed horizontal legs and a pair of opposed vertical legs joined at their ends positioned between said pair of sheets for maintaining said sheets in space relation to each other and defining a sealed insulating airspace between said sheets; and
  - a plurality of openings provided through said spacing and sealing means to put said insulating airspace in direct communication with atmosphere external to the unit to thereby allow the air pressure within said airspace and the

air pressure of said external atmosphere to equalize wherein said openings are sized and configured such as to cooperatively function to minimize haze formation within said airspace and to maintain haze level within said air-



space below a threshold level of about 7% haze as measured with a Hunter Model D554 instrument, after the unit is subjected to about one week exposure at about 140° F. (66° C.), 90% relative humidity, in a controlled testing environment.

4,952,431

# FIBROUS SUBSTRATES FOR SAUSAGE CASING AND METHOD FOR PRODUCING SAME

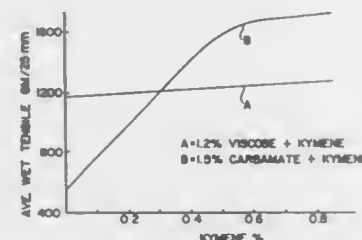
Diane M. Robertson, West Suffield; Ronald H. Pomeroy, Windsor Locks, and Alan W. Meierhoefer, West Hartford, all of Conn., assignors to The Dexter Corporation, Windsor Locks, Conn.

Filed Apr. 13, 1989, Ser. No. 336,779

Int. Cl.<sup>5</sup> A22C 13/00

U.S. Cl. 428—34.8

22 Claims



11. A fiber reinforced casing material for food products and the like comprising a cellulosic film encasing a bonded porous fibrous substrate, said substrate comprising a fibrous base web containing about 10% by weight or less of a bonding agent comprised of cellulose carbamate and an alkaline curing resin, the ratio of carbamate to resin being greater than 1:1 by weight, said substrate having a porosity of at least 300 liters/-min as determined by TAPPI test method T251-pm-75, a caustic tensile strength greater than 300 grams per 25 millimeters and being adapted to form reinforced casing films having excellent burst strength.

4,952,432

# ZIGZAG FOLDED TOWEL PACKET FOR USE WITH TOWEL DISPENSING APPARATUS

A. W. Ten Wolde, Bentveld, Netherlands, assignor to Vendor Holding B.V., Netherlands

Division of Ser. No. 341,291, Apr. 19, 1989, which is a continuation-in-part of Ser. No. 20,707, Mar. 2, 1987, abandoned, which is a division of Ser. No. 741,704, Jun. 5, 1985, abandoned, which is a continuation of Ser. No. 534,600, Sep. 22, 1983, abandoned. This application Oct. 10, 1989, Ser. No. 404,267

Claims priority, application Netherlands, Sep. 24, 1982, 8203720

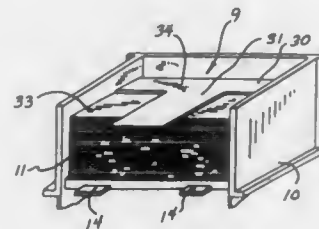
Int. Cl.<sup>5</sup> B32B 7/06, 7/12

U.S. Cl. 428—40

5 Claims

1. A packet of toweling adapted to be dispensed for hand drying from an apparatus having a supply chamber from which

the toweling is manually withdrawn for use and a storage roller operable in response to the withdrawal of toweling to roll up and store the used wet toweling, said package comprising a zigzag folded, continuous web of paper material extending between first and second web ends, said paper material having a reinforcement for providing said web with a tensile strength sufficient to prevent tearing during withdrawal, use and rolling up, said web having an adhesive area on the surface



adjacent one of said ends by which an additional, similar packet may be joined to said packet, said adhesive area having a removable paper cover comprising a first surface portion having a low adhesive coating in contact with the adhesive area and an integral pull tab extending beyond one vertical face of said packet and adapted to permit said paper cover to be pulled out from between said packet and said similar packet disposed with the other of its said ends in contact therewith.

4,952,433

# CONTINUOUS LABEL PAPER AND A METHOD TO PREPARE IT

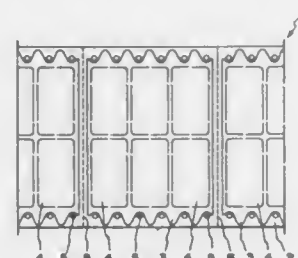
Motohiko Tezuka, Chiba; Junichi Tabuchi, Tokyo; Yoshihide Okubo, and Takeshi Kobayashi, both of Chiba, all of Japan, assignors to Toppan Moore Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 251,090

Int. Cl.<sup>5</sup> B32B 3/10, 7/06, 7/12

U.S. Cl. 428—42

3 Claims



1. Continuous label paper comprising:
  - a release sheet elongated in a longitudinal direction;
  - a plurality of longitudinally spaced transfer holes extending through said release sheet adjacent respective lateral ends thereof;
  - a plurality of perforation lines extending between said lateral ends of said release sheet and through said release sheet, said perforation lines being longitudinally spaced along said release sheet;
  - a plurality of label sheets, each defined by a pair of lateral cut lines and a pair of longitudinal cut lines, each said label sheet being adhesively attached to said release sheet between a respective adjacent pair of said perforation lines with said lateral cut lines spaced inwardly of said respective adjacent pair of said perforation lines, said longitudinal cut lines forming a pattern repetitious in the longitudinal direction and being spaced from said transfer holes;
  - a plurality of cut lines extending through each of said label

sheets to thereby define at least one label in each of said label sheets; and  
a plurality of small holes spaced over the area of, and extending through, said continuous label paper to thereby increase the air permeability of said continuous label paper.

4,952,434

# CUSHIONING FLOOR MAT

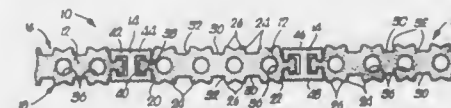
Roger L. Ramsey, Wichita, and Jorge O. Andreo, Belle Plaine, both of Kans., assignors to Balco International, Inc., Wichita, Kans.

Filed Oct. 18, 1988, Ser. No. 259,540

Int. Cl.<sup>5</sup> B32B 3/06, 3/10

U.S. Cl. 428—54

19 Claims



1. A floor mat for removing foreign matter from footwear of a person stepping thereon, said floor mat comprising:

- a plurality of elongated, flexible, resilient, spaced-apart rails; and
- coupling means for intercoupling adjacent ones of said rails, each of said rails including
- an upper surface,
- a plurality of elongated, upstanding, spaced-apart, cleaning structures extending upwardly from said upper surface and substantially along the length of said rail for dislodging foreign matter from the footwear of a person stepping on said floor mat,
- a respective transverse wall disposed between each adjacent pair of said cleaning structures,
- each transverse wall and adjacent pair of cleaning structures defining a corresponding collection trough for collecting foreign matter therein dislodged by said cleaning structures, and
- means defining a plurality of removal openings in each transverse wall and through said rail for passage of foreign matter therethrough in order to remove foreign matter from a corresponding collection trough.

4,952,435

# ADHESIVE FOR A BASE-MOUNTED FLEXIBLE MAGNETIC DISC

Tsutomu Okita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

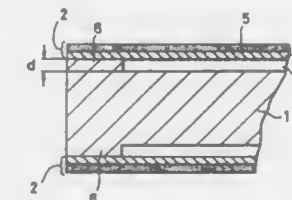
Filed Oct. 3, 1986, Ser. No. 914,958

Claims priority, application Japan, Oct. 3, 1985, 60-221031; Oct. 3, 1985, 60-221032

Int. Cl.<sup>5</sup> G11B 25/00

U.S. Cl. 428—64

13 Claims



1. A magnetic disc comprising:
  - a base including a recess formed between a mounting ring and a surface of said base;
  - a flexible non-magnetic sheet support;

a magnetic layer formed on a first surface of said support; and  
a non-solvent, hot melt adhesive agent bonding a second surface of said support to said mounting ring to form a gap of not less than 0.1 mm between said support and said base in a region of said recess.

4,952,436

# ADORNMENT OF FABRIC

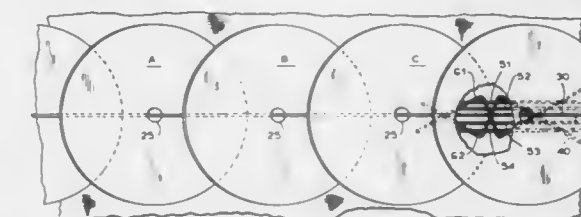
Roberta Ruschmann, P.O. Box 360, Meadowbrook Farm, Bernardsville, N.J. 07924

Continuation of Ser. No. 26,831, Mar. 17, 1987, abandoned. This application Nov. 14, 1989, Ser. No. 434,509

Int. Cl.<sup>5</sup> B32B 3/02

U.S. Cl. 428—65

26 Claims



1. An adornment for affixing the same to a surface, said adornment comprising a plurality of ornaments and at least one heat sealable thread means operatively engaging a plurality of such ornaments for affixing the same to a surface, said heat sealable thread means comprises fusible bonding thread which upon the application of heat becomes adhesive at a temperature less than the melting temperature at which the adornment is destroyed, and second thread means maintaining said ornaments in a predetermined relationship with respect to each other prior to affixing the same to a surface.

4,952,437

# HEAT-SHRINKABLE SLEEVE

Hans Winterhoff, Hagen; Christian Kipfelsberger, Hepberg, and Andreas Kapczyk, Hagen, all of Fed. Rep. of Germany, assignors to Firma RXS Schrumpftechnik-Garnituren GmbH, Fed. Rep. of Germany

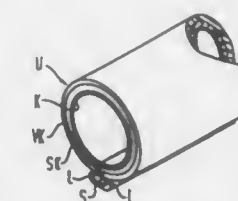
Filed Jul. 8, 1988, Ser. No. 216,587

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723397

Int. Cl.<sup>5</sup> B32B 1/00, 27/12, 31/20

U.S. Cl. 428—68

37 Claims



1. In a heat-shrinkable sleeve having at least one heat-shrinkable component and a mechanical reinforcing component, the improvements comprising the shrinkage component consisting of a foil, which is made of a shrinkable compound and which extends over the entire sleeve, said shrinkable component being cross-linked and stretched, said mechanical reinforcing component being arranged at least in sub-zones of the sleeve and being permanently bonded to the shrinkable component, said mechanical reinforcing component containing reinforcing elements which extend, at least, in the shrinkage direction where these reinforcement elements are such that a change in the shape corresponding to the shrinkage of the shrinkable



component is possible, said reinforcing elements consisting of synthetic material.

4,952,438

## HEAT-SHRINKABLE ENVELOPE

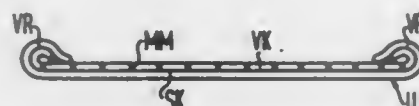
Christian Kipfelsberger, Hepberg, and Andreas Kupczyk, Hagen, both of Fed. Rep. of Germany, assignors to Firma RXS Schrumpftechnik-Caraituren GmbH, Fed. Rep. of Germany  
Filed Jul. 8, 1988, Ser. No. 216,492

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723399

Int. Cl.<sup>5</sup> B32B 1/00, 27/12, 31/20

U.S. Cl. 428—68

21 Claims U.S. Cl. 428—116



1. In a heat-shrinkable envelope composed of at least one heat-shrinkable component and of a mechanical reinforcing component, the improvements comprising the shrinkable component being constructed as a planar foil member for the envelope and, the mechanical reinforcing component being composed of at least a metallic matrix that is brought into union with the shrinkable component at least over sub-regions of the envelope and said metallic matrix being deformable during the shrinking process.

4,952,439

## PADDING DEVICE

Chris A. Hanson, Boulder, Colo., assignor to Alden Laboratories, Boulder, Colo.

Filed Oct. 14, 1988, Ser. No. 257,955

Int. Cl.<sup>5</sup> B32B 1/06

U.S. Cl. 428—72

12 Claims



1. A padding device comprising:

- (a) a first layer of flowable material which is resistant to flow in response to instantaneously applied pressure and which flows in response to continuously applied pressure, said flowable material further characterized in that it is capable of deforming into an irregular shape in response to said continuously applied pressure and is capable of substantially retaining said irregular shape after all applied pressure is removed, said flowable material located at selected portions of said padding device; and
- (b) a second layer of flowable material which is resistant to flow in response to instantaneously applied pressure and which flows in response to continuously applied pressure, said flowable material further characterized in that it is capable of deforming into an irregular shape in response to said continuously applied pressure and is capable of substantially retaining said irregular shape after all applied pressure is removed, said flowable material located sub-

stantially adjacent to at least selected portions of said first layer of flowable material.

4,952,440

## INSULATION ASSEMBLY DESIGNED FOR THERMAL PROTECTION OF A STRUCTURE SUBJECTED TO CONDITIONS OF INTENSE THERMAL AGGRESSION

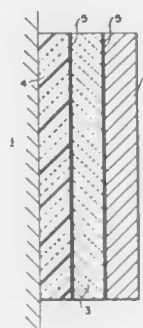
Marie-Louise Saumartin, Semeac, and Jean-Francois Fries, Tarbes, both of France

Filed Mar. 28, 1988, Ser. No. 174,162

Claims priority, application France, Mar. 13, 1987, 87 03477

Int. Cl.<sup>5</sup> B32B 3/12

14 Claims



1. An insulation assembly designed for thermal protection of an underlying structure on which said assembly is bonded, said assembly being subjected to a thermal aggression of a temperature of about 1000° C., said assembly comprising:

- an inner layer bonded or adjacent said structure, said inner layer consisting of a thermally insulating alveolar or synthetic material having a density of about 30 to 100 kg/m<sup>3</sup> and a thickness of about 10 to 100 mm;
- an intermediate layer bonded on said inner layer, said intermediate layer consisting of a refractory mineral material made of a lightweight felt of refractory fibers, said material having a density of about 150 to 400 kg/m<sup>3</sup>; and
- an outer surface layer bonded on said intermediate layer, said outer surface layer consisting of a composite material including a mineral or organomineral matrix coating structural reinforcement fillers made of metal, mineral or organic fibers, said outer surface layer having a specific gravity of about 1.1 to 1.4.

4,952,441

## THERMAL INSULATION BATT

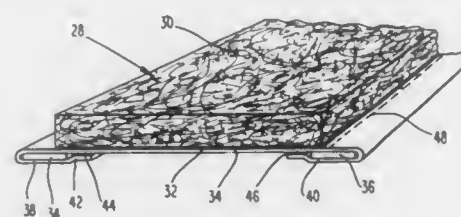
Ajit K. Bose, Lawrenceville, and Joseph J. Schulte, Mountain Lakes, both of N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Feb. 9, 1988, Ser. No. 154,159

Int. Cl.<sup>5</sup> B32B 3/04, 3/06; E04B 1/74

U.S. Cl. 428—121

7 Claims



1. A thermal insulation batt comprised in combination of:  
a. an elongated insulation layer comprised of a low density

insulation material, said layer having a predetermined width, a face surface, a back surface, and a first and second opposing longitudinal edges

- b. an elongated facing sheet of at least about said predetermined width, said facing sheet being formed from a water vapor impervious film of a thermoplastic material and being adhesively secured to and covering the face surface of the insulation layer
- c. first and second tab members being attached to the facing sheet in alignment with the respective first and second longitudinal edges of the insulation strip, each of said tab members, including an elongated paper strip containing a fold line adjacent to the longitudinal edge of the insulation layer and having deadfold characteristics sufficient for each tab member to remain in either a flat or folded back position so as to facilitate packaging of the thermal insulation and its subsequent installation by installing the tab members on supporting members, said elongated paper strips being substantially enclosed within said thermoplastic material.

4,952,442

## AUTOMOBILE SEAL

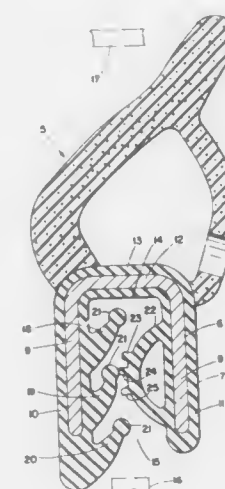
Douglas L. Warner, Marion, Ind., assignor to GenCorp Inc., Fairlawn, Ohio

Filed Nov. 6, 1989, Ser. No. 432,400

Int. Cl.<sup>5</sup> E06B 7/16

U.S. Cl. 428—83

8 Claims



1. An automobile seal, comprising:

- (a) a U-shaped metal conduit embedded in a correspondingly shaped rubber channel for receiving an outstanding flange around an opening to be covered and sealed from the ambient atmosphere, the conduit and channel being substantially coextensive with the flange, the channel having a pair of legs for straddling the flange and a web for connecting the legs and covering the free distal end of the flange;
- (b) a plurality of resilient rubber fingers extending angularly from one of the legs towards the web and other opposing leg;
- (c) a single, hollow half-moon shaped rubber protuberance extending from the other leg in the direction of the fingers, the fingers and protuberance being coextensive with the legs; and
- (d) means carried by the protuberance in close proximity to the fingers and coacting with the fingers to grip the flange therebetween.

4,952,443

## COVERING ELEMENT WITH A LIGHT CASCADE EFFECT FOR AGRICULTURAL APPLICATIONS

Philippe Gravière, 18-20, rue de Presles, 75015 Paris, France

Continuation-in-part of Ser. No. 45,023, Apr. 2, 1987,

abandoned. This application Mar. 17, 1989, Ser. No. 324,886

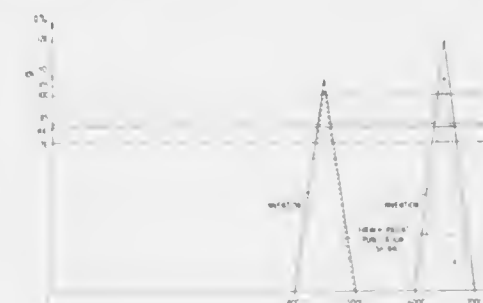
Claims priority, application France, Aug. 2, 1985, 85 11844;

World Int. Prop. O., Aug. 1, 1986, PCT/FR86/00276

Int. Cl.<sup>5</sup> B32B 3/10, 3/30; A01G 13/02

U.S. Cl. 428—131

18 Claims



1. A covering element comprising:

- (i) an organic matrix,
- (ii) luminescent doping materials, scintillating doping materials or mixtures thereof, which form at least one light cascade absorbing electromagnetic radiation in at least one first predetermined wavelength band in order to re-emit the same in at least one second predetermined wavelength band, and
- (iii) a diffusing material in a size and amount sufficient to diffuse the incident solar radiation.

4,952,444

## MAGNETIC RECORDING MEDIUM

Toshio Kawamata, and Kazuhiko Morita, both of Kanagawa, Japan, assignors to Fujl Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 26,412, Mar. 16, 1987,

abandoned. This application Mar. 18, 1988, Ser. No. 170,595

Claims priority, application Japan, Mar. 14, 1986, 61-54993;

Mar. 14, 1986, 61-54994; Mar. 31, 1986, 61-71300

Int. Cl.<sup>5</sup> G11B 23/00

U.S. Cl. 428—141

6 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon in order:

- (a) a non-magnetic layer including at least one cellulose derivative, at least one polyurethane and at least one polyisocyanate in which the concentration of said polyisocyanate is within a range from 15 wt % to 45 wt %, and
  - (b) a magnetic layer containing ferromagnetic particles.
- wherein said non-magnetic layer contains a lubricating agent and has a thickness of 1.0 μm or more, a surface roughness Ra of 0.02 μm or less, and a Young's modulus of 5×10<sup>4</sup> to 50×10<sup>4</sup> kg/cm<sup>2</sup> at a temperature of from 5° C. to 60° C.

4,952,445

## MARBLE TILE TRIM

Rick A. Dillon, 21 Cold Spring Rd., Stamford, Conn. 06905

Filed Apr. 13, 1989, Ser. No. 337,662

Int. Cl.<sup>5</sup> B32B 31/18, 3/30; E04B 1/41; B28D 1/30

U.S. Cl. 428—156

6 Claims

1. A strong marble tile trim for use with and color matched to a specific batch of standard marble tiles comprising two strips of marble, at least one of which is cut from tile of said batch, permanently bonded to each other at their major faces and said one strip having one exposed face formed as a quarter-round surface of a radius that is in the range of about 2.0 to 3.3 times the thickness of each standard tile with contiguous planar

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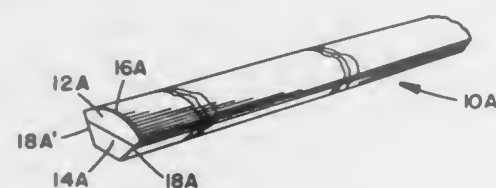
AG

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surfaces at opposite sides of said quarter-round surface and each planar surface lying in a plane that is oriented 90° from the plane of the other planar surface, so that the quarter-round



surface is wholly within said one strip and presents a gently rounded transition from a surface of standard marble tile in one plane to a standard marble tile in a second plane surface 90° therefrom.

4,952,446

## ULTRA-THIN SEMICONDUCTOR MEMBRANES

Kevin C. Lee, Charles A. Lee, and John Silcox, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 828,563, Feb. 10, 1986, abandoned, which is a continuation of Ser. No. 617,208, Jun. 4, 1984, abandoned, which is a continuation-in-part of Ser. No. 464,835, Feb. 8, 1983, abandoned. This application Dec. 14, 1988, Ser. No. 284,822

Int. Cl.<sup>3</sup> H01L 21/306, 21/465, 49/02

U.S. Cl. 428—220

8 Claims

1. A monocrystalline unsupported thin semiconductor material having a thickness variance of less than 10% over an area having a diameter greater than 100 times the thickness and having a thickness of less than one micron wherein the starting material used to form the thin material is a semiconductor material which was damaged by ion implantation, anodically etched to form the thin material and subsequently annealed to repair the damage.

8. A thin unsupported etching process-produced monocrystalline silicon device-quality semiconductor material having electrical characteristics essentially identical to the virgin semiconductor material used to form the thin semiconductor material or containing dopant ions comprising donor ions and having a thickness of less than one micron.

4,952,447

## BARRIER LAYER IN BETWEEN POLYURETHANE FOAM AND VINYL SKIN

John A. Phillips, Wales; Ernest E. McClellan, Delafield, and Robert C. Rock, Watertown, all of Wis., assignors to Plasto-meric, Inc., Waukesha, Wis.

Filed Oct. 28, 1988, Ser. No. 263,765

Int. Cl.<sup>3</sup> B32B 3/26

U.S. Cl. 428—318.6

13 Claims

1. A vinyl-skin-covered polyurethane foamed article, comprising:

- a polyurethane foam core;
- a vinyl skin covering the polyurethane foam core; and
- a continuous barrier layer between the polyurethane foam core and the vinyl skin that is incompatible with vinyl skin components and polyurethane foam components and that reduces the migration of polyurethane foam components into the vinyl skin and reduces the migration of vinyl skin components into the polyurethane foam core, said barrier layer comprising at least one member selected from the group consisting of cellulose acetate butyrate, cellulose acetate, polyvinyl alcohol, cellulose acetate propionate, polyvinylidene chloride, urethane, polyester, polyamide, acrylic, epoxy, shellac, ethylene vinyl alcohol.

4,952,448

## FIBER REINFORCED POLYMERIC STRUCTURE FOR EMI SHIELDING AND PROCESS FOR MAKING SAME

Daniel E. Bullock, Attleboro; Harold F. Giles, Jr., Cheshire, and Walter L. Hall, Pittsfield, all of Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed May 3, 1989, Ser. No. 347,104

Int. Cl.<sup>3</sup> B32B 5/16

U.S. Cl. 428—323

15 Claims

1. A thermoplastic structure comprising:
- (a) a shielding layer having from 95% to 40% by weight of a thermoplastic resin based on the total weight of said shielding layer, and from 5% to 40% by weight of conductive fibers based on the total weight of said shielding layer, said conductive fibers being dispersed in said resin of said shielding layer, said conductive fibers having an average length of from between 0.125 inch and 0.50 inch per fiber; and
  - (b) a supporting layer comprising a thermoplastic resin, said supporting layer being free of conductive fibers.

4,952,449

## BIAXIALLY ORIENTED POLYESTER FILM

Iwao Okazaki, Mukou; Koichi Abe, Kyoto; Shoji Nakajima, Ootsu; Kiyohiko Ito, Ootsu; Satoru Nishino, Ootsu, and Hidehito Minamizawa, Ootsu, all of Japan, assignors to Toray Industries, Inc.

Filed Oct. 5, 1988, Ser. No. 254,320

Claims priority, application Japan, Oct. 9, 1987, 62-255555; Nov. 20, 1987, 62-294847; Feb. 1, 1988, 63-25510

Int. Cl.<sup>3</sup> B32G 27/36, 3/00, 27/04

U.S. Cl. 428—147

7 Claims

1. A biaxially oriented polyester film comprising a polyester and inert particles, which film has at least one surface with protrusions formed by the existence of the inert particles, the surface having a parameter of surface topography  $\sqrt{(\beta/\sigma)}$  of 0.1 to 0.7, the average distance between adjacent protrusions on the surface being not more than 20  $\mu\text{m}$ , the coefficient of friction of the surface and the parameter of surface topography satisfying the following equations (1) and (2):

$$y \geq 0.171 \sqrt{(\beta/\sigma)} + 0.15 \quad (1)$$

$$y \leq 0.171 \sqrt{(\beta/\sigma)} + 0.25 \quad (2)$$

wherein  $y$  is the coefficient of friction,  $\beta$  is mean flatness of protrusions and  $\sigma$  is standard deviation of height distribution of protrusions.

4,952,450

## FOAM PANEL AND BLOCK CONSTRUCTIONS

Gert Noel, Hauset, Belgium, assignor to Noel, Marquet & Cie. S.A., Eupen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 931,236, Nov. 17, 1986, Pat. No. 4,755,408. This application May 19, 1988, Ser. No. 195,945. The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.

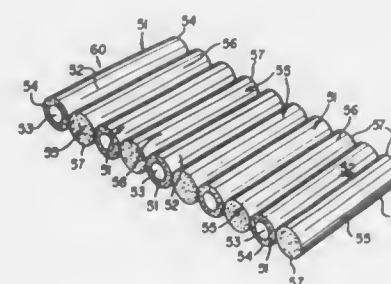
Int. Cl.<sup>3</sup> E04C 1/08, 2/44; B32B 3/20

U.S. Cl. 428—174

13 Claims

1. A panel comprising a plurality of independent, elongated members, each of said members
- A. consisting essentially of a synthetic resin foam material,
  - B. being securely, interconnected to the elongated member positioned adjacent thereto, and

- C. having a substantially identical, solid cross-section throughout its overall length;



whereby a resilient flexible, multi-purpose panel is attained in any desired configuration or appearance.

4,952,451

## STRETCH/SHRINK FILM WITH IMPROVED OXYGEN TRANSMISSION

Walter B. Mueller, Inman, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Nov. 17, 1988, Ser. No. 273,385

Int. Cl.<sup>3</sup> B32B 27/08; D03D 35/00

U.S. Cl. 428—218

13 Claims

1. A multiply film comprising:
- a first interior layer comprising a copolymer of ethylene and vinyl acetate;
  - at least one other interior layer comprising a very low density polyethylene having a density below 0.900 grams per cubic centimeter; and
  - two surface layers comprising a copolymer of ethylene and vinyl acetate; wherein the film has an oxygen transmission rate of at least about 15000 cc/m<sup>2</sup> mil 24 hours at standard temperature and pressure.

4,952,452

## ALUMINUM PROFILE COATED WITH ORGANIC RESIN AND NON-LEAFING PIGMENTS

Zvi Nir, Kiryat Bialik, Israel, and Wolfgang Rentsch, Ascheberg, Fed. Rep. of Germany, assignors to Khl Industries Ltd., Kiryat Motzkin, Israel

Filed Apr. 19, 1989, Ser. No. 340,501

Claims priority, application Israel, Jul. 10, 1988, 87056

Int. Cl.<sup>3</sup> B32B 15/08

U.S. Cl. 428—332

6 Claims

1. Aluminum profiles having a coating providing a metallic appearance, said coating being of uniform thickness of about 20–60 millimicrons, said profiles being weather and chemical resistant, said profiles being manufactured by spraying aluminum profiles with an organic coating comprising:

- (a) a highly elastic cross-linking polyacrylate coating resin;
- (b) a suspending agent;
- (c) a plasticizer;
- (d) polar solvent mixture of
  - (i) butyl alcohol; and
  - (ii) butyl glycol; and
  - (iii) aromatic solvents; and
- (e) a mixture of pigments consisting of
  - (i) non-leafing metallic pigment; and
  - (ii) coloured pigment.

4,952,453

## ACRYLIC FIBERS WITH HIGH PHYSICAL PROPERTIES

Akiyoshi Uchida, Okayama, Japan, assignor to Japan Exlan Company Limited, Osaka, Japan

Continuation of Ser. No. 889,889, Jul. 25, 1986, abandoned. This application May 27, 1988, Ser. No. 203,579

Claims priority, application Japan, Aug. 5, 1985, 60-172682; Jun. 19, 1986, 61-144626; Jun. 19, 1986, 61-144627

Int. Cl.<sup>3</sup> C08F 20/44

U.S. Cl. 428—364

1 Claim

1. Acrylic fibers with high physical properties composed of a polymer containing at least 85 weight % acrylonitrile with a weight average molecular weight of from 70,000 to 250,000, and having strength-elongation characteristics specified by the following formulas (I)–(IV):

$$10 \leq TS \quad (I)$$

$$140 \leq E \quad (II)$$

$$TE \leq 15 \quad (III)$$

$$1800 \leq E \times TE \quad (IV)$$

wherein TS represents tensile strength (g/d), E represents Young's modulus (g/d), and TE represents elongation (%), said fibers being produced by a method which comprises spinning a spinning solution of a polymer containing at least 85 weight % acrylonitrile while maintaining the linear velocity ratio of extrusion (defined below) at above 4; water-washing and stretching the thus-obtained gel filaments; subjecting the filaments after stretching to dry-heat treatment under tension or dry-heat stretching under the temperature condition of the temperature making possible the maximum stretching  $\pm 30^\circ\text{C}$ ; and thereafter cooling the filaments under tension so that the effective total stretching times will become more than 15 times, the linear velocity ratio of extrusion being defined as follows:

$$\text{Linear velocity ratio of extrusion} = \frac{V_o}{V}$$

wherein  $V_o$  represents the linear velocity of extrusion (m/min) of the spinning solution, and  $V$  represents the winding speed (m/min) of the extruded gel filaments.

4,952,454

## BONDING COMPOSITION FOR CERAMICS COMPRISING METAL OXIDE MELT AND METHOD FOR BONDING CERAMICS

Nobuya Iwamoto, Kobe, and Norimasa Umetsuki, Minoo, both of Japan, assignors to Sumitomo Cement Co., Ltd., Tokyo, Japan

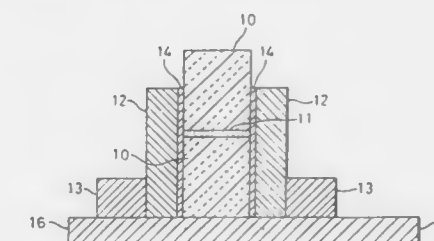
Division of Ser. No. 57,522, Jul. 29, 1987. This application Jun. 16, 1988, Ser. No. 207,620

Claims priority, application Japan, Sep. 30, 1985, 60-214864

Int. Cl.<sup>3</sup> B32B 96/04

U.S. Cl. 428—446

6 Claims



1. A ceramic body composed of a silicon nitride substrate member and adhered member composed of silicon nitride or a



metal, which are bonded via an interposed bonding composition comprising, based on the weight of the bonding composition, 5 to 95% by weight of a metal oxide bonding composition and 5 to 95% by weight of a high-melting-point metal or high-melting-point alloy; said metal oxide bonding composition consisting of, based on the weight of the metal oxide bonding composition, (a) 30 to 70% by weight of CaO, (b) 10 to 50% by weight of at least one oxide selected from the group consisting of SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> and (c) 5 to 60% by weight of TiO<sub>2</sub>.

4,952,455

## COMPATIBLE POLYMER MIXTURES

Werner Siol, Darmstadt-Eberstadt, and Ulrich Terbrack, Reinheim, both of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany Division of Ser. No. 233,753, Aug. 19, 1988, Pat. No. 4,897,441. This application Oct. 17, 1989, Ser. No. 422,670

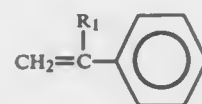
Int. Cl.<sup>3</sup> D01F 8/10; B32B 27/02, 27/30

U.S. Cl. 428—373

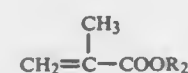
7 Claims

1. A polymer article formed of a compatible polymer mixture, comprising:

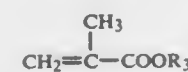
(I) 0.1–99.9 wt.% of a polymer P1 which is formed from monomer units of the formula I:



wherein R<sub>1</sub> is hydrogen or a methyl group; and  
(II) 99.9–0.1 wt.% of a copolymer P2 prepared from:  
30–90 parts by wt. of a methacrylic acid ester monomer of formula II:



wherein R<sub>2</sub> is methyl or ethyl;  
70–10 parts by wt. of a methacrylic acid ester monomer of the formula III:



wherein R<sub>3</sub> is a hydrocarbon group of 3–24 carbon atoms; and  
0–10 parts by wt. of a third monomer M which is copolymerizable with but different from the monomers of formulas II and III, said polymer P1 component forming the core portion of said polymer article while polymer P2 constitutes a coating on said core portion.

4,952,456

## EPOXIDE ADVANCEMENT

Ronald Metcalfe, Caudebec-les-Elbeuf, France, and Frederick A. Waite, Farnham Common, France, assignors to Imperial Chemical Industries PLC, London, England and Holden Europe S.A., Caudebec-les-Elbeuf, France

Filed Dec. 5, 1988, Ser. No. 279,618

Claims priority, application European Pat. Off., Dec. 4, 1987, 87402769.1

Int. Cl.<sup>3</sup> B32B 27/38; C08L 63/10, 63/00

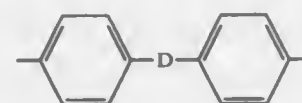
U.S. Cl. 428—413

16 Claims

1. A process for preparing a sterically stabilised non aqueous dispersion of a polyepoxide of epoxy equivalent weight in the range 350 to infinity, which comprises reacting a sterically stabilised non-aqueous dispersion of a compound with at least two epoxy groups with a diol of formula (I)



in which B is a group of formula (2)



where D is a methylene group or propane-2,2-diyl.

4,952,457

## LAMINATED SAFETY GLASS AND POLYMERIC LAMINATE FOR USE THEREIN

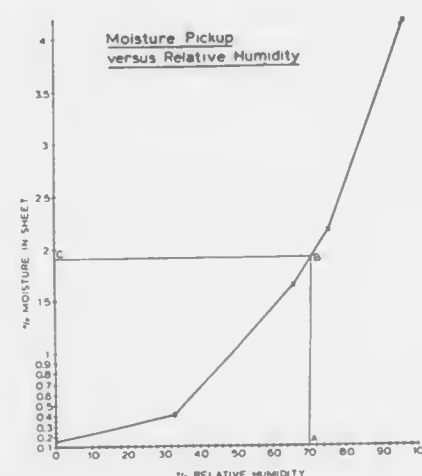
George E. Cartier, Springfield; Dean L. Kavanagh, and James R. Moran, both of Longmeadow, all of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 5, 1988, Ser. No. 279,742

Int. Cl.<sup>3</sup> B32S 27/00

U.S. Cl. 428—425.6

31 Claims



1. A polymeric laminate comprising a first layer of plasticized polyvinyl butyral in face to face contact with a second layer comprising a clear polymer film or coating, said first layer containing about 0.01 to 0.1 weight percent, based on polyvinyl butyral, of an adhesion control agent other than water, said polyvinyl butyral having a hydroxyl content, calculated as polyvinyl alcohol, of 17 to 22 weight percent; said laminate possessing the following properties at a water content in the first layer of:

- (a) 0.2 to 0.5 weight percent
  - (i) peel adhesion to glass at 21° C of less than 65 newtons per cm;
  - (ii) less than 3 percent optical haze.
- (b) 2 to 2.8 weight percent
  - (i) peel adhesion to glass at 21° C of at least 5 newtons per cm; and
  - (ii) less than 3 percent optical haze.

4,952,458

## MAGNETIC RECORDING MEDIUM

Takahito Miyoshi; Akihiro Matsufuji, and Nobuyuki Yamamoto, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Continuation of Ser. No. 810,251, Dec. 17, 1985, abandoned.

This application Apr. 28, 1989, Ser. No. 346,328

Claims priority, application Japan, Dec. 18, 1984, 59-268083; Dec. 18, 1984, 59-268084

Int. Cl.<sup>3</sup> G11B 23/00

U.S. Cl. 428—323

6 Claims

1. In a magnetic recording medium comprising a non-magnetic support and a magnetic recording layer provided on said support, the improvement wherein said magnetic recording layer comprises:

- a ferromagnetic metal powder having a specific surface area of not less than 40 m<sup>2</sup>/g;
  - a fatty acid having a melting point of lower than 50° C. which is oleic or lauric acid;
  - a fatty acid having a melting point of not lower than 50° C. which is stearic acid;
  - a fatty acid ester which is butyl stearate; and
  - carbon black powder having a mean particle size of 60–120 μm and a dibutyl phthalate-absorbing capacity of not more than 100 ml/100 g in an amount of not more than 10% by weight based on the amount of the ferromagnetic metal powder;
- the total amount of the two fatty acids and the fatty acid ester being in the range of 1 to 10% by weight based on the total amount of the ferromagnetic metal powder, wherein the total amount of the two fatty acids is in the range of 1 to 80% by weight based on the amount of the two fatty acids and the fatty acid ester, wherein the ratio of the fatty acid having a melting point of lower than 50° C. to the fatty acid having a melting point of not lower than 50° C. is in the range of 1/10 to 10/1.

4,952,459

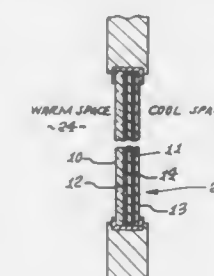
## GLASS SHEET AND LAMINATE AT ONE SIDE THEREOF

Jesse D. Thatcher, 931 Bennett St., Simi Valley, Calif. 93065 Filed Sep. 19, 1988, Ser. No. 245,503

Int. Cl.<sup>3</sup> B32B 17/10, 17/08

U.S. Cl. 428—426

12 Claims



1. In a glass and laminate composite, the combination comprising:

- (a) a glass sheet, and
- (b) a laminate at one side only of the sheet including
  - (i) a first, solid, layer of synthetic polyester material,
  - (ii) a first adhesive layer bonding said layer to one side of the sheet,
- (c) the remaining side of the sheet being free of any laminate adherent thereto,
- (d) the laminate including
  - (i) a second, solid, layer of synthetic polyester material, and
  - (ii) a second adhesive layer bonding said second polyester layer to said first layer.

(e) each adhesive layer consisting of pressure sensitive, synthetic resinous adhesive.

4,952,460

## PROCESS FOR THE PRODUCTION OF COMPOSITE SAFETY GLASS

Rolf Beckmann, Siegburg, and Wilhelm Knackstedt, Hennef, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Continuation of Ser. No. 114,180, Oct. 28, 1987, abandoned, which is a continuation of Ser. No. 2,068, Jan. 12, 1987, abandoned, which is a continuation of Ser. No. 843,892, Mar. 25, 1986, abandoned, which is a continuation of Ser. No. 206,511, Nov. 13, 1980, abandoned, which is a continuation of Ser. No. 13,934, Feb. 22, 1979, abandoned, which is a continuation of Ser. No. 847,275, Oct. 31, 1977, abandoned, which is a continuation-in-part of Ser. No. 738,402, Nov. 3, 1976, abandoned. This application Jan. 16, 1989, Ser. No. 367,912

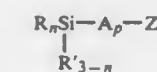
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1975, 2549474; Oct. 30, 1976, 2650119; Oct. 30, 1976, 2650120; Oct. 30, 1976, 2650118

Int. Cl.<sup>3</sup> B32B 17/06

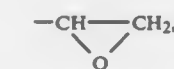
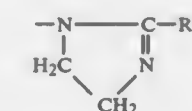
U.S. Cl. 428—429

18 Claims

1. A laminated safety glass consisting of  
(a) at least one silica glass sheet;  
(b) a plasticizer free soft film of a copolymer, said copolymer consisting essentially of ethylene and vinyl acetate, said copolymer having a vinyl acetate content of 8 to 45% by weight, said soft film having a Shore A hardness of 40 to 98, a number average of molecular weight determined in o-dichloro-benzene at 90° C. in a membrane osmometer between 20,000 and 100,000 melt flow index, as determined according to DIN 53 735, of between 0.1 and 20 g/10 minutes, and  
(c) a bonding agent consisting essentially of a functional silane, said functional silane being selected from the group consisting of a silicon-organofunctional silane of the formula



wherein  
R is a hydrolyzable residue, R' is an alkyl residue of 1–18 carbon atoms; A is a bivalent alkylene residue of 1–10 carbon atoms which can be branched, and is a residue containing a functional group, which functional group is selected from the group consisting of

halogen, NR<sup>2</sup>R<sup>3</sup> and

wherein  
R<sup>2</sup> is selected from the group consisting of H and an amino alkyl of 2–8 carbon atoms in the alkyl residue; and R<sup>3</sup> is H and R<sup>2</sup>; and R<sup>4</sup> is selected from the group consisting of H, CH<sub>3</sub> and C<sub>2</sub>H<sub>5</sub>; and n is 1 to 3 and p is 0 or 1, and a siliconfunctional silane of the formula



wherein

R' is identical or different, saturated, unbranched or branched alkyl residues of 1-18 carbon atoms, R is selected from the group consisting of halogen, identical or different saturated alkoxy groups of 1-8 carbon atoms and an acyl residue linked to the Si atom via an oxygen atom, and wherein n is 1 to 3.

4,952,461

# COMPOSITE-COATED FLAT-ROLLED STEEL CAN STOCK AND CAN PRODUCT

William T. Saunders, and Warren D. Livingston, both of Weirton, W. Va., assignors to Weirton Steel Company, Weirton, W. Va.

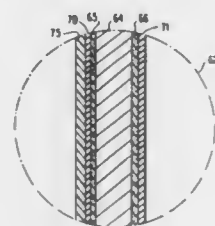
Division of Ser. No. 855,694, Apr. 25, 1986, Pat. No. 4,812,365.

This application Sep. 21, 1988, Ser. No. 247,487

Int. Cl.<sup>3</sup> B32B 15/08; B05D 3/02

U.S. Cl. 428—458

6 Claims



1. Composite-coated can stock preparation system combining in sequence continuous in-line apparatus including strip feed means providing continuous-strip steel having a gage in the range of about 35 to about 110 pounds per base box, then strip cleaning means for cleaning both surfaces of such steel strip in preparation for coating, chemical treatment bath means for applying about 300 to 500 micrograms per square foot of a coating consisting essentially of chrome oxide on each such surface of the steel strip, then organic coating means for applying and curing an organic base coating on each such chemically-treated surface, such base coating having a weight of about 2.5 to about 5 milligrams per square inch of each surface, then additional organic coating means for applying and curing an organic coating on at least one surface of the organic base coated substrate, such additional organic coating having a coating weight of at least about 5 milligrams per square inch of such one surface, and coiling means for such composite-coated can stock.

4,952,462

# DECORATIVE PANELS AND METHODS OF MAKING THE SAME

Elvis M. Bright, 17242 Bircher St., Granada Hills, Calif. 91344

Filed Feb. 29, 1988, Ser. No. 162,060

Int. Cl.<sup>3</sup> A47B 35/00

U.S. Cl. 428—542.2

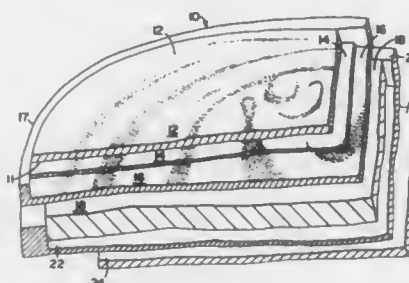
11 Claims

1. A decorative panel having the capability of withstanding the impact of 1½ pound steel ball dropped from 4' or greater, comprising:

- a glass upper layer having a flat undersurface;
- a non-deformable transparent interlayer of about 0.050" or greater in thickness disposed on the undersurface, the interlayer having an elastomeric characteristic and adhesive properties;
- a substrate of in excess of about ¼" thickness of resin, the resin having a first hardness rating, the resin having a volumetric shrinkage characteristic and an elastomeric property and attached to the interlayer on the opposite side from the glass layer, wherein the interlayer is more compliant than the resin and distributes shock waves thereto from impacts on the glass, wherein the glass,

interlayer and substrate are firmly united with no spaces or voids between them, wherein the glass layer is tempered glass, and wherein the substrate is of epoxy resin; and

- decorative effect means, the decorative effect means comprising in excess of 50% of dyed mineral frit in a decorative pattern within the substrate, the dyed mineral frit having a second hardness rating, wherein the first hardness rating and the second hardness rating are substantially identical, thereby permitting polishing of substrate edge surfaces to a mirror like finish.
8. A decorative glass covered planar structural unit comprising:
- a tempered glass top surface member having a slightly roughened surface;
  - a primer layer, the primer layer having a first side and a second side, the first side being disposed on the top surface of the glass surface in adherent relation thereto;



- an interlayer of cured flexible resin about 0.050" to 0.080" thick, the cured flexible resin having a first side and a second side, the first side of the resin being adhered to the second side of the primer layer disposed on the glass member;
- a cured substrate layer, the substrate layer having a first side and a second side, the substrate layer including a resin and in excess of 50% mineral frit, the first side of the substrate layer being adhered to the second side of the interlayer, the substrate layer having a thickness greater than about 3/16", the resin having a first hardness rating, the mineral frit having a second hardness rating, wherein the first hardness rating and the second hardness rating are substantially identical, thereby permitting polishing of substrate edge surfaces to a mirror like finish; and
- a planar core attached to the second side of the substrate layer.

4,952,463

# FERRITE-CERAMIC COMPOSITE POWDER AND METHOD OF MANUFACTURING THE SAME

Ogura Atsushi, Kamakura, Japan, assignor to Okura Techno-Research Kabushiki Kaisha (Okura Techno-Research Company Ltd.), Tokyo, Japan

Continuation of Ser. No. 921,679, Oct. 21, 1986, abandoned.

This application Aug. 26, 1988, Ser. No. 237,646

Claims priority, application Japan, Oct. 29, 1985, 60-240389

Int. Cl.<sup>3</sup> B22F 5/00; B05D 5/12

U.S. Cl. 428—552

23 Claims

1. A ferrite-ceramic composite powder comprising: fine particles of a ceramic material, said fine ceramic particles each having a precipitated ferrite crystalline film integrally and ionically bonded thereto in a reduction reaction of a complex ion solution, the film coating the entire particle surface.

4,952,464

# SODIUM SULFUR CELL FOR WEIGHTLESS ENVIRONMENTS

Howard H. Rogers, Torrance; Richard P. Seraka, Long Beach, and Steven J. Stadnick, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 19, 1989, Ser. No. 299,368

Int. Cl.<sup>3</sup> H01M 10/34, 4/36

U.S. Cl. 424—57

15 Claims



1. A sodium sulfur electrical storage cell, comprising: a sodium anode; a sulfur cathode; a solid ceramic electrolyte separating the sodium anode and the sulfur cathode; and means for avoiding bubbles in the sulfur, the means for avoiding being in contact with the sulfur.

4,952,465

# ADDITIVE FOR ENERGY STORAGE DEVICES THAT EVOLVE OXYGEN AND HYDROGEN

Jonathan H. Harris, Shaker Heights; Allan V. Marae, Independence; Michael A. Tenhover, Solon, and Richard M. Wilson, Medina, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

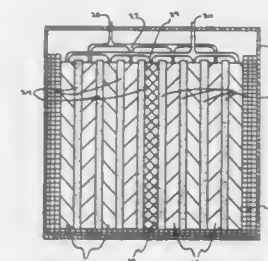
Continuation of Ser. No. 857,682, Apr. 30, 1986, abandoned.

This application Aug. 26, 1988, Ser. No. 237,635

Int. Cl.<sup>3</sup> H01M 10/52

U.S. Cl. 429—60

16 Claims



5. An energy storage device comprising a housing containing at least one negative electrode and at least one positive electrode, the electrodes of opposite polarities being electrically insulated from each other by means of at least one separator disposed therebetween, an electrolyte in contact with the electrodes and means for collecting electrical current therefrom, and an additive in said device capable of absorbing hydrogen and recombining oxygen that is a substantially amorphous alloy of the formula:



wherein

A is at least one element selected from the group consisting of Ag, Au, Hg and Pt;  
M is at least one metal selected from the group consisting of Ni, Co, Fe, Mn, Cu, Cr, Dc, Zn, Be and Al;  
M' is at least one element selected from the group consisting

of Ca, Mg, Ti, Zr, Hf, V, Nb, Ta, La, Y, the rare earths, Sr, Ba, Li, Na, K, Rb, Cs, Th, U, Pu and Sc; and wherein

a ranges from greater than zero to about 0.95;  
b ranges from greater than zero to about 0.95; and  
c ranges from about 0.05 to about 0.88; with the proviso that (a+b+c) equals about 1.00.

4,952,466

# SOLID ELECTROLYTE BATTERY

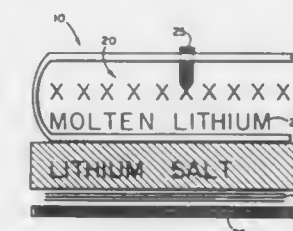
Robert A. Cipriano, Lake Jackson; R. Vernon Snelgrove, Damon, and Francis P. McCullough, Jr., Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 250,789, Sep. 28, 1988, U.S. Pat. 4,866,715, which is a continuation-in-part of Ser. No. 4003, Jan. 16, 1987, which is continuation-in-part of Ser. No. 3,974, Jan. 16, 1987. This application Nov. 1, 1988, Ser. No. 265,650

Int. Cl.<sup>3</sup> H01M 6/20

U.S. Cl. 429—104

11 Claims



1. A primary rechargeable electrical storage device comprising a housing, at least one cell position in said housing, each cell comprising an anode consisting of a metal selected from the group consisting of alkaline earth metal, alkaline earth metal alloy, alkali metal, alkali metal alloy and alkali metal eutectic mixtures, a separator surrounding said anode, said separator being capable of transporting or passing ionic species and electrically isolating said anode, a cathode, and an electrolyte associated with said cathode, said electrolyte comprising a membrane of a non-porous solid polymeric material containing a sulfonic acid group.

4,952,467

# PROCESS FOR PREPARING A COMPOUND USING A VANADIUM OXIDE DERIVATIVE FOR THE CATHODE OF A THERMAL CELL

Jean-Pierre Buchel, Cretell; Gilles Crépy, Evry; Véronique Danel, Rosay, and Anne de Guilbert, Paris, all of France, assignors to Societe Anonyme dite: SAFT, France

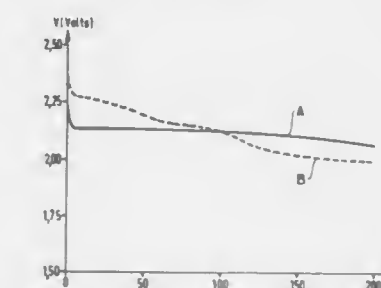
Filed May 19, 1989, Ser. No. 354,236

Claims priority, application France, May 25, 1988, 88 06945

Int. Cl.<sup>3</sup> H01M 4/04

U.S. Cl. 429—112

10 Claims



1. A process for preparing a composition based on a vana-



dium oxide derivative which is suitable for use as a cathode material in a thermal cell, wherein the process comprises:

preparing a powdered mixture by combining vanadium pentoxide  $V_2O_5$ , a carbon ranging from 3 percent to 20 percent inclusive by weight of  $V_2O_5$ , and a mixture of alkaline halides ranging from 15 percent to 50 percent inclusive by weight of  $V_2O_5$ ;

heat processing the prepared powdered mixture at a temperature which is higher than the melting point of said mixture of halides, wherein said temperature ranges from 365° C. to 650° C. inclusive, for a time period ranging from 15 minutes to 2 hours inclusive to produce a heat processed composition suitable for a cathode of a thermal cell.

4,952,468

## STORAGE BATTERY HAVING A PROTECTIVE SHIELD

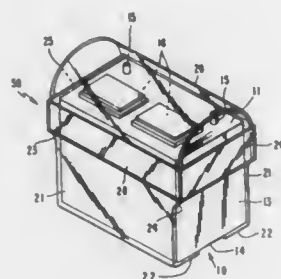
Carl J. Abraham, 3 Baker Hill Rd., Great Neck, N.Y. 11022, and Malcolm Newman, 12 Beal Ct., Huntington, N.Y. 11743

Filed Aug. 11, 1989, Ser. No. 392,833

Int. Cl.<sup>5</sup> H01M 2/04

U.S. Cl. 429—175

7 Claims



1. A storage battery comprising:  
an outer casing including a generally flat top wall,  
a cover located over the top wall, the cover having a generally inverted U-shape so as to define a space between the cover and top wall, the ends of the cover being open, and means for retaining the cover on the casing, characterized by:  
the cover being sufficiently flexible so that it can be flattened against the top wall of the casing without adversely affecting the structural integrity of the cover.

4,952,469

## LITHIUM-IODINE DEPOLARIZER

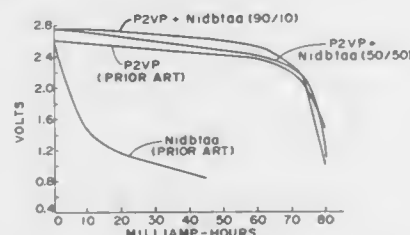
Steven P. Wicelinski, Reisterstown, and Henry J. Sunell, Baltimore, both of Md., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Jan. 3, 1990, Ser. No. 460,526

Int. Cl.<sup>5</sup> H01M 4/60

U.S. Cl. 429—213

10 Claims



1. A depolarizer for a lithium anode battery comprising a particulate charge transfer material of polyvinylpyridine having a molecular weight between about 30,000 to 400,000 and from 1% to 50% by weight of said polyvinylpyridine of a divalent metal dibenzotetraazaannulene, said charge transfer material being mixed with iodine in a ratio of about 14 to 50

parts by weight of iodine to each part of charge transfer material.

4,952,470

## ELECTROPHOTOGRAPHIC PHOTSENSITIVE MEMBER

Kiyoshi Tamaki; Koichi Kudo; Yoshihiko Etoh, and Yoshiaki Takei, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

PCT No. PCT/JP87/00489, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/00725, PCT Pub. Date Jan. 28, 1988

PCT Filed Jul. 9, 1987, Ser. No. 180,816

Claims priority, application Japan, Jul. 10, 1986, 61-162866; Jul. 10, 1986, 61-162867; Sep. 13, 1986, 61-217492; Sep. 13, 1986, 61-217493; Sep. 19, 1986, 61-221541

Int. Cl.<sup>5</sup> G03G 5/04

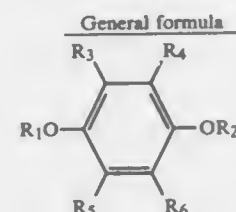
U.S. Cl. 430—56

1 Claim



1. An electrophotographic photosensitive member having improved anti-oxidation properties by ozone, comprising a conductive substrate and, disposed thereon, a photosensitive layer which includes, as principal constituents, a charge generating material and a charge transporting material, wherein the photosensitive layer contains at least one type of compound selected from a group of those represented by any of the following [A] through [D]:

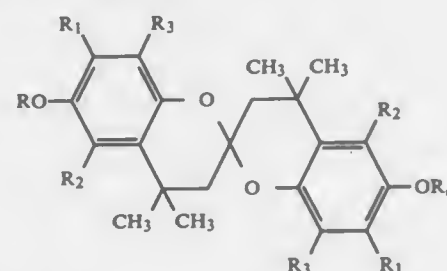
[A] Compounds represented by the following general formula [I];



[I]

[wherein  $R_1$  and  $R_2$  independently represent an alkyl group, alkenyl group, cycloalkyl group, aryl group or heterocyclic group;  $R_3$ ,  $R_4$ ,  $R_5$  and  $R_6$  independently represent a hydrogen atom, halogen atom, alkyl group, alkenyl group, cycloalkyl group, aryl group, alkoxy group, alkythio group, acyl group, acylamino group, alkylamine group, alkoxy carbonyl group, or sulfonamide group];

[B] Bisspiroindene compounds represented by the following general formula [II];



[II]

[wherein  $R_1$  represents an alkyl group, alkenyl group, cycloalkyl group, aryl group, alkoxy group, alkenoxy

4,952,471

## QUINACRIDONE PHOTOCONDUCTOR IMAGING MEMBERS

Giuseppa Baranyi; Ah-Mee Hor, both of Mississauga, and Rafik O. Loutfy, Willowdale, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 1, 1988, Ser. No. 214,353

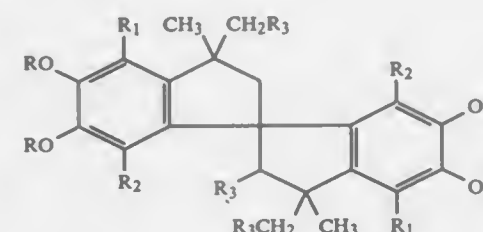
Int. Cl.<sup>5</sup> G03G 5/082

U.S. Cl. 430—59

29 Claims

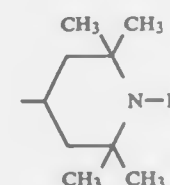
1. An improved photoconductive imaging member comprised of a supporting substrate; a vacuum evaporated photogenerating layer comprised of fractionally sublimed quinacridone compounds of the formulas of FIGS. 1 or 2, wherein X is independently selected from the group consisting of hydrogen, alkyl, alkoxy and hydroxy; and an aryl amine hole transport layer; and wherein the fractional sublimation is accomplished by subjecting the aforementioned quinacridone compounds to a temperature of from about 200° to about 500° C. whereby impurities and decomposition products more volatile than the quinacridones are separated at a temperature zone below 300° C., and there is obtained the desired quinacridone component of a purity of at least about 95 percent at a temperature zone of from about 400° to about 440° C.

[III]

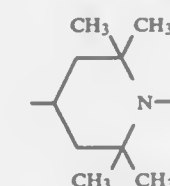


[wherein R represents an alkyl group, alkenyl group, aryl group, heterocyclic group,  $R_4CO$ — group,  $R_5SO_2$ — group, or  $R_6NHCO$ — group;  $R_1$  and  $R_2$  independently represent a hydrogen atom, halogen atom, alkyl group, alkenyl group, alkoxy group, or alkenoxy group;  $R_3$  represents a hydrogen atom, alkyl group, alkenyl group, or aryl group;  $R_4$ ,  $R_5$  and  $R_6$  independently represent an alkyl group, alkenyl group, aryl group, or heterocyclic group; and

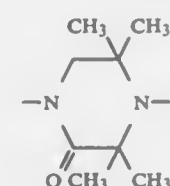
[D] Compounds having in the molecular structure thereof at least one structure selected from the following groups;



Structural formula (a)



Structural formula (b)



Structural formula (c)

[wherein R represents an organic substituent group.]

4,952,473

## PHOTSENSITIVE MEMBER FOR ELECTROPHOTOGRAPHY

Akio Suzuki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

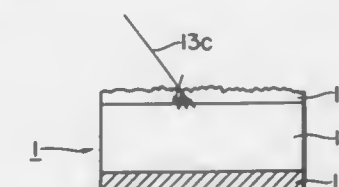
Continuation of Ser. No. 83,001, Aug. 5, 1987, abandoned, which is a continuation of Ser. No. 728,160, Apr. 30, 1985, abandoned, which is a continuation of Ser. No. 534,314, Sep. 21, 1983, abandoned. This application Jul. 17, 1989, Ser. No. 381,993

Claims priority, application Japan, Sep. 27, 1982, 57-166675

Int. Cl.<sup>5</sup> G03G 5/14, 5/082

U.S. Cl. 430—67

7 Claims



2. An electrophotographic photosensitive member for use with a developer comprising, in sequence, an electroconduc-

tive substrate, a photoconductive layer containing amorphous silicon containing at least one of hydrogen atoms and halogen atoms, wherein the total content of said hydrogen and halogen atoms is one to forty atomic percent and a light scattering means on said photoconductive layer capable of scattering coherent light, said light scattering means having fine concave-convex irregularities with dimensions greater than the wavelength of the incident light to be scattered, but sufficiently fine as compared with the particle size of the developer, wherein said light scattering means is provided as a layer on the surface of said photoconductive layer.

7. An electrophotographic photosensitive member according to claim 2 wherein the light scattering layer comprises silicon carbide.

4,952,474

# LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, A DISULFONAMIDO REDUCING AGENT AND POLYMERIZABLE COMPOUND

Jiro Tsukahara, Nobutaka Ohki, and Makoto Yamada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

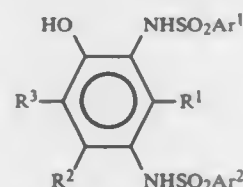
Filed Apr. 13, 1988, Ser. No. 180,934

Claims priority, application Japan, Apr. 13, 1987, 62-90441  
Int. Cl.<sup>3</sup> G03C 1/68, 1/72

U.S. Cl. 430—138

9 Claims

1. A light-sensitive material comprising a support and a light-sensitive layer containing silver halide, a polymerizable compound, a hydrazine derivative and a reducing agent of formula (I), said silver halide, polymerizable compound, hydrazine derivative and reducing agent being contained in microcapsules which are dispersed in the light-sensitive layer:



in which each of Ar<sup>1</sup> and Ar<sup>2</sup> independently is an aryl group, which may have one or more substituent groups; and each of R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> independently is a monovalent group selected from the group consisting of hydrogen, a halogen atom, an alkyl group, a cycloalkyl group, an aralkyl group, an aryl group, an alkenyl group, an alkynyl group, a heterocyclic group, an alkoxy group, an alkylthio group and an acylamino group, each of which may have one or more substituent groups.

4,952,475

# ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISING BINDER RESIN CONTAINING TERMINAL ACIDIC GROUPS

Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 9, 1989, Ser. No. 308,240

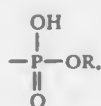
Claims priority, application Japan, Feb. 9, 1988, 63-26561; Feb. 24, 1988, 63-39691

Int. Cl.<sup>3</sup> G03G 5/08

U.S. Cl. 430—96

12 Claims

1. An electrophotographic photoreceptor comprising a support having provided thereon at least one photoconductive layer containing at least inorganic photoconductive particles and a binder resin, wherein said binder resin comprises (I) at least one resin (A) containing at least one acidic group selected from —PO<sub>3</sub>H<sub>2</sub>, —SO<sub>3</sub>H, —COOH, and



wherein R represents a hydrocarbon group, at the terminal of the polymer main chain thereof, and (2) at least one of a thermosetting resin (B) containing a crosslinking functional group and a crosslinking agent.

4,952,476

# ELECTROPHOTOGRAPHIC MAGNETIC TONER CONTAINING POLYALKYLENE AND VINYL POLYMER

Kiichiro Sakashita, Inagi; Toshiaki Nakahara, Tokyo; Hirohide Tanikawa, Yokohama, and Satoshi Yoshida, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,456

Claims priority, application Japan, Feb. 29, 1988, 63-044352  
Int. Cl.<sup>3</sup> G03G 9/14, 11/00

U.S. Cl. 430—106.6

20 Claims

1. A magnetic toner, comprising a binder resin, magnetic powder and 0.1–10 wt. % based on the resin component of a low-molecular weight polyalkylene, said binder resin comprising a vinyl-type polymer having 5 to 80 wt. % of a tetrahydrofuran-insoluble; said magnetic toner having a melt index of 0.2 to 12 g/10 min. at 125° C., and 10 kg load; the residual magnetization  $\sigma_r$  and the volume-average particle size d of said magnetic toner satisfying the following formula:

$$3.7 - 0.11d \leq \sigma_r \leq 6.5 - 0.23d,$$

wherein  $\sigma_r$  represents a residual magnetization in emu/g under an external magnetic field of 1 KOe and d represents a volume-average particle size of 3 to 16 microns; wherein the magnetic powder has an average particle size of 0.1–1 micron and is contained in an amount of 40–200 wt. parts per 100 wt. parts of resin component.

4,952,477

# TONER AND DEVELOPER COMPOSITIONS WITH SEMICRYSTALLINE POLYOLEFIN RESINS

Timothy J. Fuller, West Henrietta; Thomas W. Smith, Penfield; William M. Prest, Jr.; Robert A. Nelson, both of Webster; Kathleen M. McGrane, Rochester, and Suresh K. Ahuja, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 12, 1988, Ser. No. 231,338

Int. Cl.<sup>3</sup> G03G 9/08, 9/10, 13/22

U.S. Cl. 430—109

53 Claims

1. A toner composition comprised of an effective amount of resin particles selected from the group consisting of a semicrystalline polyolefin homopolymer and mixtures thereof with a melting point of from about 50° C. to about 100° C., and pigment particles.

4,952,478

# TRANSFER RECORDING MEDIUM COMPRISING A LAYER CHANGING ITS TRANSFERABILITY WHEN PROVIDED WITH LIGHT AND HEAT

Masashi Miyagawa, Kawasaki; Masanori Takenouchi, Atsugi, and Norio Ohkuma, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 2, 1987, Ser. No. 127,948

Claims priority, application Japan, Dec. 2, 1986, 61-285860; Dec. 2, 1986, 61-285865; Dec. 9, 1986, 61-291628

Int. Cl.<sup>3</sup> G03C 1/68, 1/72

U.S. Cl. 430—138

11 Claims

1. A transfer recording medium comprising a support and a transfer recording layer formed thereon; said transfer recording layer irreversibly changing its transferability when simulta-

neously provided with light and heat energy and the transfer recording layer comprising a colorant, a binder component and a functional component sensitive to said light and heat energy, the functional component comprising (i) a photo-initiator and (ii) a polymerizing component selected from the group consisting of monomers, oligomers and prepolymers, each having an unsaturated double bond, said functional component being a solid composition at room temperature; the binder component comprises a thermoplastic polymer having a glass transition temperature of 30° C. or higher in a weight-average molecular weight of  $5 \times 10^4$  or larger; and the thermoplastic polymer is contained in a proportion of ~70 weight percent of the transfer recording layer.

4,952,479

# DRY IMAGE FORMING PROCESS AND MATERIAL THEREFORE

Toshiaki Aono, and Koichi Nakamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Continuation of Ser. No. 592,195, Mar. 22, 1984, abandoned.

This application Jan. 20, 1986, Ser. No. 876,665

Claims priority, application Japan, Mar. 25, 1983, 58-48750; Mar. 25, 1983, 58-48751; Mar. 25, 1983, 58-48752; Mar. 31, 1983, 58-56422

Int. Cl.<sup>3</sup> G03C 5/54

U.S. Cl. 430—203

14 Claims

1. A dry image-forming process which comprises image-wise exposing a light-sensitive silver halide material to radiation and transferring a dye image-wise formed as a consequence of the image-wise exposing, wherein the silver halide light-sensitive material comprises a support having thereon a light-sensitive silver halide, a binder and a dye-forming compound which forms the dye in a chemical reaction of the dye-forming compound upon a reduction reaction of the exposed silver halide to silver by heat development of the light-sensitive material into a dye-fixing layer of a dye-fixing material having a mordant and a thermal solvent in an amount of 20 to 200% by weight of the total coating amount for the light-sensitive material and the dye-fixing material at high temperature at which the thermal solvent is in a molten state, wherein said dye-fixing material contains at least one of a base and a base precursor.

4,952,480

# PHOTOPOLYMERIZABLE COMPOSITION

Jun Yamaguchi; Fumiaki Shinozaki, both of Shizuoka; Masaki Okazaki, and Keiichi Adachi, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 3, 1988, Ser. No. 252,466

Claims priority, application Japan, Oct. 1, 1987, 62-248747

Int. Cl.<sup>3</sup> G03F 7/027

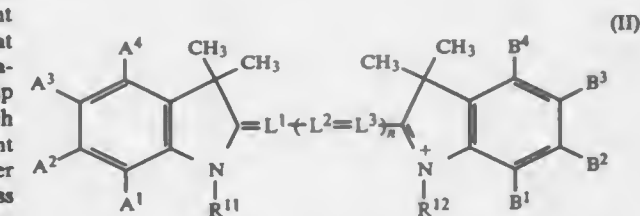
U.S. Cl. 430—281

9 Claims

1. A photopolymerizable composition which comprises (a) a polymerizable compound having at least one ethylenic unsaturated bond, and (b) a salt formed by an organic cationic dye compound and an organic boron compound anion, wherein the salt is represented by the following formula (I), with the organic cationic dye compound (D<sup>⊕</sup>) being represented by the following formula (II):



wherein D<sup>⊕</sup> represents a cationic dye represented by formula (II), R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup>, which may be the same or different, each represents an alkyl group, an aryl group, an aralkyl group, an alkaryl group, an alkenyl group, an alkynyl group, an alicyclic group, a heterocyclic group, an allyl group, and a derivative thereof, and two or more of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> may combine with each other to form a cyclic structure;



wherein R<sup>11</sup> and R<sup>12</sup> each represents an alkyl group, L<sup>1</sup>, L<sup>2</sup>, and L<sup>3</sup> each represents a methine group, n represents an integer of 0 to 4, and A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>, A<sup>4</sup>, B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup> and B<sup>4</sup>, which may be the same or different, each represents a hydrogen atom or an electron-attracting group, with the proviso that at least one of the A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>, A<sup>4</sup>, B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup> and B<sup>4</sup> represents an electron-attracting group.

6. A photopolymerizable composition as in claim 1, wherein said electron-attracting group is selected from the group consisting of a halogen atom, a nitro group, a carbamoyl group, an alkoxy carbonyl group, a sulfamoyl group and a cyano group.

4,952,481

# PHOTOSENSITIVE RESIN COMPOSITION

Mamoru Sato, Nishinomiyama; Hidefumi Kusuda, Takatsuki, and Masami Kawabata, Suita, all of Japan, assignors to Napp Systems (USA), Inc., San Marcos, Calif.

Continuation of Ser. No. 13,142, Feb. 11, 1987, abandoned, which is a continuation of Ser. No. 700,649, Feb. 12, 1985, abandoned. This application Dec. 27, 1988, Ser. No. 291,392

Int. Cl.<sup>3</sup> G03C 1/70

U.S. Cl. 430—284

7 Claims

1. A photosensitive resin composition for use in the preparation of relief printing plates, said composition consisting essentially of:

- a polymer (A) having a molecular weight of 5,000 to 500,000 which contains an amino group and a polymerizable double-bond moiety, said polymer being prepared by copolymerizing (a) 3 to 50 mol percent of an  $\alpha,\beta$ -ethylenically unsaturated monomer having an amino group, (b) 20 to 60 mol percent of a polymerizable unsaturated monomer selected from the group consisting of styrene,  $\alpha$  methyl styrene, vinyl toluene, acrylonitrile, vinyl chloride, vinylidene chloride, (meth) acryl amide, (meth) acrylic acid esters, dicyclopentenyl (meth) acrylate, dicyclopentenoxethyl (meth) acrylate, dicyclopentenoxpropyl (meth) acrylate, (meth) acrylate esters of diethylene glycol dicyclopentenyl monoether, and mixtures thereof, and (c) 20 to 60 mol percent of a conjugated diene monomer, (ii) a monomer (B) having an  $\alpha,\beta$ -ethylenically unsaturated bond and a free acid group which can quaternize the nitrogen atom of said polymer (A) and render said polymer water soluble of water dispersable, (iii) a nongaseous ethylenically unsaturated compound (C) having at least one terminal ethylenic double bond capable of being dissolved in said polymer (A) selected from the group consisting of carboxylic acid esters, unsaturated amides, (meth) acrylated urethanes, and mono and di (meth) acrylates of diepoxy polyethers, and (iv) a photopolymerization initiator (D), said composition, upon application to a support and imaging by exposure to ultraviolet light, being developable in the unexposed areas solely with water to form a relief printing plate that is resilient to swelling with water based inks.



4,952,482  
METHOD OF IMAGING OXYGEN RESISTANT  
RADIATION POLYMERIZABLE COMPOSITION AND  
ELEMENT CONTAINING A PHOTOPOLYMER  
COMPOSITION

Oliver A. Barton, Florham Park, and James D. Wright, Flemington, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 80,947, Aug. 3, 1987, abandoned. This application Jul. 5, 1989, Ser. No. 376,150  
Int. Cl.<sup>3</sup> G03C 5/44

U.S. Cl. 430—325

10 Claims

1. A method for producing a photographic image which consists essentially of

(i) coating and drying a radiation polymerizable composition layer onto a substrate, in the absence of any oxygen barrier layer on the polymerizable composition layer, which polymerizable composition consists essentially of

a. a polymerizable component which consists essentially of poly butane diol diacrylate having a molecular weight of from about 700 to about 800; and

b. a photoinitiator; and

c. an aqueous alkaline soluble binding resin; and

d. one or more additional components selected from the group consisting of solvents, acid stabilizers, exposure indicators, plasticizers, photoactivators, and colorants; wherein said binding resin is present in an amount of from about 180.0% to about 40.0% based on the weight of the solids in the layer; and wherein said photoinitiator is present in an amount of from about 2.0% to about 10.0% based on the weight of the solids in the layer; and wherein said polymerizable component is present in an amount of from about 180.0% to about 40.0% based on the weight of the solids in the layer; and wherein said additional components are present in a minor amount; and

(ii) imagewise exposing said polymerizable composition to sufficient radiant or particle beam energy to cause imagewise polymerization in the exposed areas; and

(iii) removing the non-image areas of said composition with a developer consisting essentially of an aqueous alkaline solution.

4,952,483  
DIRECT POSITIVE SILVER HALIDE PHOTOSENSITIVE  
MATERIAL AND METHOD FOR FORMING DIRECT  
POSITIVE IMAGE

Noriyuki Inoue, Morio Yagihara, Hisashi Okada, Tetsumi Matsushita, Satoshi Nagaoka, and Tetsuro Kojima, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 21, 1988, Ser. No. 171,356

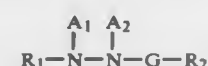
Claims priority, application Japan, Mar. 20, 1987, 62-66790; Mar. 20, 1987, 62-66791

Int. Cl.<sup>3</sup> G03C 7/00, 1/485

U.S. Cl. 430—378

6 Claims

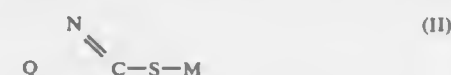
1. A method for forming a direct positive image comprising imagewise exposing a photosensitive material comprising at least one layer of a previously unfogged internal latent image-type silver halide emulsion on a support and then conducting a surface color developing at pH 9.8 to 11.5 in the presence of a p-phenylenediamine compound and a nucleating agent, said nucleating agent being expressed by the following formula (I):



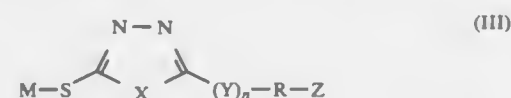
wherein A<sub>1</sub> and A<sub>2</sub> both denote hydrogen atoms or one of A<sub>1</sub> and A<sub>2</sub> denotes a hydrogen atom and the other denotes a sulfonic acid residue or an acyl group; R<sub>1</sub> denotes an aliphatic, aromatic or heterocyclic group; R<sub>2</sub> denotes a hydrogen atom or an alkyl, aryl, alkoxy, aryloxy or amino group, at least one

of R<sub>1</sub> and R<sub>2</sub> having at least one substituent which has a pK<sub>a</sub> of 6 or more and can dissociate into an anion; and G denotes a carbonyl, sulfonyl, sulfoxy, phosphoryl or iminomethylene group, and

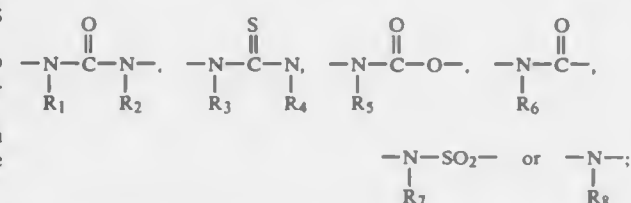
wherein said development is performed in the presence of at least one of a nitrogen-containing heterocyclic compound which serves as a nucleation accelerator for accelerating the function of said nucleation agent, and wherein said nucleation accelerator is expressed by the formulae (II), (III), (IV), (V), (VI), (VII) or (VIII):



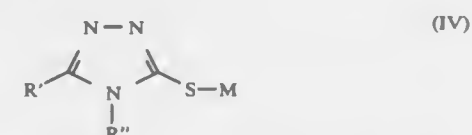
wherein Q denotes an atomic group necessary for forming a 5- or 6-membered heterocyclic ring which may be condensed with an aromatic carbon ring or an aromatic heterocyclic ring, M denotes a hydrogen or alkali metal atom, an ammonium group, or a group which can cleave under alkali conditions:



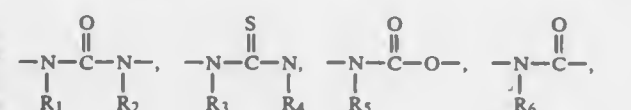
wherein M denotes the same as that of Formula (II); X denotes an oxygen, sulfur, or selenium atom, Y denotes —S—,



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub> each denotes a hydrogen atom, a substituted or unsubstituted alkyl, aryl, alkenyl or aralkyl group; R denotes a straight or branched chain alkylene, alkenylene or aralkylene group, or an arylene group; Z denotes a hydrogen or halogen atom, a nitro or cyano group, or a substituted or unsubstituted amino, quaternary ammonium, alkoxy, aryloxy, alkylthio, arylthio, heterocyclic oxy, heterocyclic thio, sulfonyl, carbamoyl, sulfamoyl, carbonamido, sulfonamido, acyloxy, sulfonyloxy, ureido, thioureido, acyl, heterocyclic, oxycarbonyl, oxysulfonyl, oxycarbonylamino or mercapto group; and n denotes 0 or 1:



wherein R' denotes a hydrogen or halogen atom, a nitro, mercapto, or unsubstituted amino group, or (—Y)—n—R—Z; and R'' denotes a hydrogen atom, an unsubstituted amino group or —Y<sub>m</sub>R—Z wherein Y' denotes



4,952,485  
SILVER HALIDE COLOR NEGATIVE PHOTOGRAPHIC  
MATERIALS

Yoshihiko Shibahara, Yasushi Nozawa, and Keiji Miyayoshi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

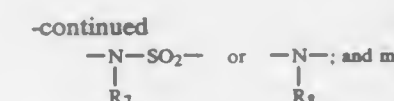
Continuation of Ser. No. 102,518, Sep. 29, 1987, abandoned. This application Nov. 28, 1989, Ser. No. 442,449

Claims priority, application Japan, Sep. 29, 1986, 61-228441; Oct. 17, 1986, 61-246983; Oct. 17, 1986, 61-246984; Jul. 15, 1987, 62-174784

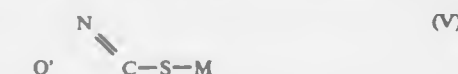
Int. Cl.<sup>3</sup> G03C 1/46, 7/52, 1/84

U.S. Cl. 430—502

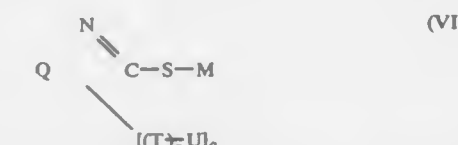
17 Claims



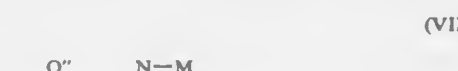
denotes 0 or 1; M, R, Z, Y, n, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub> and R<sub>8</sub> each denoting the same as that of Formula III:



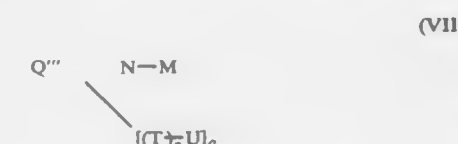
wherein Q' denotes a triazindene, tetraazindene or pentazindene; and M denotes the same as that of Formula (II):



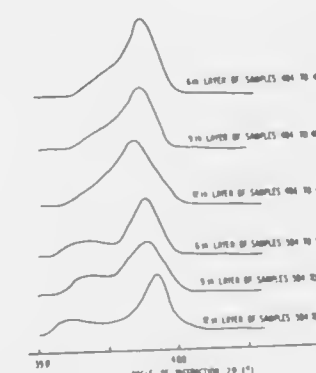
wherein T denotes a divalent connecting group consisting of an atom selected from the group consisting of carbon, nitrogen, oxygen and sulfur; U denotes an organic group containing at least one of a thioether, amino, ammonium, ether or heterocyclic group; p denotes 0 or 1; q denotes 1 or 2; and Q and M denote the same as those of Formula (II):



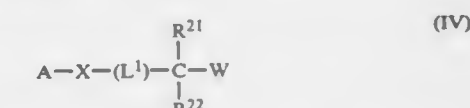
wherein Q'' denotes an atomic group necessary for forming a 5- or 6-member heterocyclic ring which can produce imino silver; and M denotes the same as that of Formula (II):



wherein Q''' denotes an atomic group necessary for forming a 5- or 6-member heterocyclic ring which can produce imino silver; M denotes the same as that of Formula (II); and —(T)<sub>p</sub>U<sub>q</sub> denotes the same as that of Formula (VI).



1. A silver halide color negative photographic material having at least one blue-sensitive silver halide emulsion layer, at least two green-sensitive silver halide emulsion layers and at least one red-sensitive silver halide emulsion layer on a support, wherein the highest sensitivity layer among the green-sensitive emulsion layers contains a 2-equivalent high-speed coupler, wherein the combined total of silver contents in the material is from 3.0 g/m<sup>2</sup> to 8.0 g/m<sup>2</sup> and the specific photographic sensitivity of the material is from 320 to less than 800, and wherein at least one layer selected from at least one emulsion layer among the blue-sensitive emulsion layer, the green-sensitive emulsion layers and the red-sensitive emulsion layer and an adjacent layer contain a DIR compound represented by the following formula (IV):



in which A represents a coupler component capable of releasing X and the following group by a coupling reaction with the oxidation product of an aromatic primary amine developing agent;

X represents an oxygen atom, a sulfur atom or a substituted imino group;

L<sup>1</sup> represents a substituted or unsubstituted ethylene group; l represents an integer of 1 or 2;

R<sup>21</sup> and R<sup>22</sup> each represent a hydrogen atom, an alkyl group or an aryl group;

W represents a component (moiety) capable of inhibiting the development of silver halide;

provided that when l represents 2, the ethylene groups may be the same or different, and that R<sup>21</sup> and R<sup>22</sup> may be the same or different.

4,952,484  
SILVER HALIDE PHOTOGRAPHIC MATERIAL  
Kazunobu Katoh, and Keiichi Adachi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 21, 1989, Ser. No. 313,004

Claims priority, application Japan, Feb. 18, 1988, 63-036165  
Int. Cl.<sup>3</sup> G03C 1/84, 1/32

U.S. Cl. 430—496

10 Claims

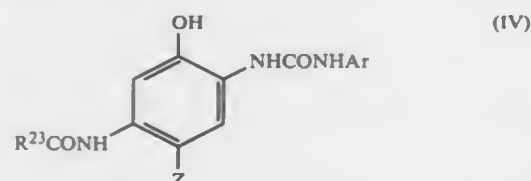
1. A silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer, wherein said emulsion layer or another hydrophilic colloid layer contains a colored polymer matting agent which comprises a dye absorbed to a polymer.





alkali metal, a quaternary ammonium, or a quaternary phosphonium and  $R^{21}$  and  $R^{22}$  each represents a hydrogen atom or a substituted or unsubstituted alkyl group) and  $M^1$  represents a hydrogen atom, an alkali metal, a quaternary ammonium, or a quaternary phosphonium;

wherein said silver halide emulsion layer contains a mono-dispersed silver halide emulsion wherein at least 95% by weight or number of silver halide grains in the emulsion have grain sizes within  $\pm 40\%$  of the mean grain size; and said phenolic cyan dye forming coupler is represented by formula (IV)



wherein  $R^{23}$  represents an aliphatic group, an aromatic group, or a heterocyclic group; Ar represents a substituted or unsubstituted aryl group; and Z represents a hydrogen atom or a group capable of releasing by a coupling reaction with the oxidation product of an aromatic primary amine developing agent.

#### 4,952,489 PHOTOGRAPHIC ELEMENTS COMPRISING LIGHT-SENSITIVE SILVER BROMO-IODIDE EMULSIONS

Marcello Amicucci, Savona, Italy, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 8, 1988, Ser. No. 216,670

Claims priority, application Italy, Jul. 24, 1987, 21423 A/87; Jul. 24, 1987, 21424 A/87; Jul. 24, 1987, 21447 A/87

Int. Cl.<sup>3</sup> G03C 1/02

U.S. Cl. 430—567

50 Claims



1. A light-sensitive emulsion comprising a dispersing medium and silver halide grains, characterized by the fact that at least 10% of the total projected area of the silver halide grains consists of silver bromo-iodide grains bound by at least one substantially concave-shaped major face, said grains having a diameter of at least 0.6  $\mu\text{m}$  and the half of their thickness in the deepest point of said concavity lower than 80% the half of their border thickness.

#### 4,952,490 PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL AND METHOD OF DEVELOPING THE SAME

Shunji Takada; Toshihiro Nishikawa; Kei Sakanoue, and Akira Abe, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Mar. 1, 1988, Ser. No. 162,554

Claims priority, application Japan, Mar. 2, 1987, 62-47225

Int. Cl.<sup>3</sup> G03C 1/06

U.S. Cl. 430—567

24 Claims

1. A photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion

layer, wherein at least 70% of a total number of silver halide grains contained in said emulsion layer are regular crystal grains not having a twinning plane, at least 50 mol % of said



regular grains are silver chloride, and said regular crystal grains have a (111) crystal plane on at least 30% of a total grain surface and are chemically sensitized in the presence of a gold compound or sulfur and gold compounds.

#### 4,952,491 PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL AND METHOD OF DEVELOPING THE SAME

Toshihiro Nishikawa, and Shunji Takada, both of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

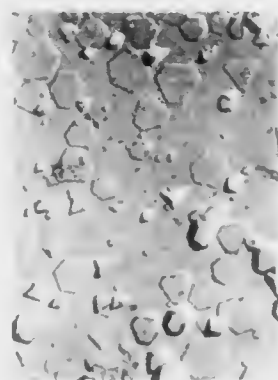
Filed Sep. 9, 1988, Ser. No. 242,351

Claims priority, application Japan, Sep. 10, 1987, 62-227338

Int. Cl.<sup>3</sup> G03C 1/02, 1/08, 7/26, 7/32

U.S. Cl. 430—570

29 Claims



1. A photographic light-sensitive material comprising, on a support, at least one silver halide emulsion layer containing silver halide grains, wherein at least 50% of the total projected surface area of silver halide grains contained in said silver halide emulsion layer is occupied by tabular grains comprising at least about 50 mol % of silver chloride, said tabular grains having been precipitated in the presence of a crystal habit controlling amount of a spectral sensitizing dye before and during nucleation and during precipitation of the silver halide grains, and having an aspect ratio of at least 2 and further wherein nucleation of said silver halide grains has been carried out under a chloride concentration of at least about 0.15 mol/liter.

#### 4,952,492 METHOD AND APPARATUS FOR MODULATING A RADIANT INFRARED BURNER

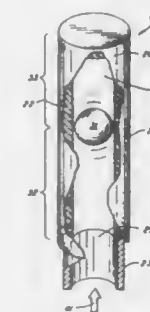
Daniel R. Clark, Fayetteville; Ian M. Shapiro, Syracuse, and David A. Lindstrand, Minoa, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 22, 1990, Ser. No. 468,445

Int. Cl.<sup>3</sup> F23D 14/00

U.S. Cl. 431—89

8 Claims



1. In a radiant infrared burner having a combustible gas supply, a gas permeable wall surrounding a central cavity, a combustible gas inlet end and an opposite end, a method for modulating the surface area of said wall on which combustion occurs comprising the steps of:  
slideably disposing a gas blocking piston within said cavity;  
and  
displacing said gas blocking piston toward said opposite end as the flow rate of said combustible gas supply increases and toward said combustible gas inlet end as the flow rate of said combustible gas supply decreases.

#### 4,952,493 PEPTIDE SUBSTRATES FOR DETECTING VIRUS-SPECIFIED PROTEASE ACTIVITY

Charles A. Kettner, and Bruce D. Korant, both of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 06/690,731, Jan. 11, 1985, abandoned. This application Apr. 13, 1987, Ser. No. 37,963

Int. Cl.<sup>3</sup> C12Q 1/70, 1/38, 1/36

U.S. Cl. 435—5

5 Claims

5. A method for detecting picornavirus activity in a sample, comprising  
(a) forming an assay mixture by contacting a quantity of the sample with a compound of the formula



or a physiologically acceptable salt thereof, wherein

$A^2$  is an amino acid residue Asn;

$A^2$  is an amino acid residue selected from the group consisting of Ala, Leu, Ile, and Val;

$A^3$  and  $A^4$  are, independently, amino acid residues of D- or L-configuration selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr, Val, and analogues thereof;

$R^1$  is hydrogen of an N-terminal protecting group; and  $R^2$  is —X, where X is a chromogenic, fluorogenic, chemiluminescent, radioactive, antigenic, or haptenic indicator group;

(b) incubating the assay mixture for a time sufficient to permit hydrolysis of the indicator group if protease activity is present; and

(c) detecting the presence of free indicator group in the assay mixture.

#### 4,952,494 ASSAY TO DETECT THE PRESENCE OF LIVE NON-A, NON-B HEPATITIS AGENTS IN VITRO

Jerome B. Zeldin, Carmichael; Robert P. Gale, Bel Air, both of Calif., and Howard N. Steinberg, Brookline, Mass., assignors to Beth Israel Hospital Association, Boston, Mass.

Continuation-in-part of Ser. No. 175,682, Mar. 21, 1988, abandoned. This application Dec. 6, 1988, Ser. No. 280,490

Int. Cl.<sup>3</sup> C12Q 1/70, 1/02, 1/18

U.S. Cl. 435—5

4 Claims

1. A method for detecting the presence of live non-A, non-B hepatitis virus in a sample of a body fluid or biological preparation comprising:

- providing a source of non-A, non-B hepatitis virus free cells obtained from bone marrow or peripheral blood;
- isolating mononuclear cells from the cells obtained in step (a);
- enriching the mononuclear cells with a growth factor; incubating the mononuclear cells with the sample to be tested under conditions which promote the proliferation of mononuclear cell colonies;
- counting the number of colonies that arise from the incubation;
- comparing the number of colonies to a control to detect the presence of live non-A, non-B hepatitis virus wherein the presence of live hepatitis virus is related to the inhibition of colony growth.

#### 4,952,495 HYDROLYZABLE COMPOUNDS WHICH RELEASE ELECTRON TRANSFER AGENTS AND ANALYTICAL USE OF SAME

Robert T. Belly, Ithaca; Patricia M. Scannay, Rochester; Annie L. Wu, Penfield, and Chung-yuan Chen, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 8, 1987, Ser. No. 59,667

Int. Cl.<sup>3</sup> C12Q 1/34; C07D 241/46

U.S. Cl. 435—18

14 Claims

1. A compound containing a non-functioning electron transfer agent which can be enzymatically hydrolyzed to release a functioning electron transfer agent, said compound represented by the formula:

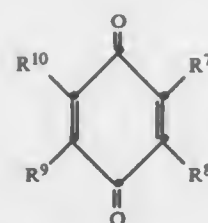
#### BLOCK-ETA

wherein BLOCK is an enzymatically hydrolyzable group selected from the group consisting of:

- CO—R\* wherein R\* is unsubstituted alkyl, alkenyl, aryl, cycloalkyl or a heterocyclic group, thioxophosphono or a salt thereof, a monovalent moiety derived by removal of a hydroxy group from a carboxy group of an amino acid or peptide, or a mono-, oligo- or polysaccharide linked in a glycosidic bond to ETA,

and ETA is said non-functioning electron transfer agent that when released provides a functioning electron transfer agent selected from the group consisting of phenazine, naphthazine, phenothiazine, a phenazonium compound or a p-benzo- or naphthoquinone electron transfer agent in its reduced form, said BLOCK and ETA being connected through an oxy in the 1- or 4- ring positions where said functioning electron transfer agent is a p-benzo- or naphthoquinone, and an imino linking group from a ring nitrogen where said functioning electron transfer agent is a phenazine, naphthazine, phenothiazine or phenazonium compound,

provided that when BLOCK is thioxophosphono or a salt thereof, or a mono-, oligo- or polysaccharide, ETA provides a p-benzoquinone or naphthoquinone electron transfer agent in its reduced form, said p-benzo- or naphthoquinone having the structure:



wherein R<sup>7</sup> and R<sup>8</sup> are independently hydrogen, hydroxy, halo, cyano, nitro, carboxy, carboxyalkyl, carboxamido, sulfonamido, trihaloalkyl, sulfonyl, carboxaldehyde, carbonylalkyl, alkyl, alkenyl, alkoxy, hydroxyalkyl, hydroxyalkoxy, alkoxyalkyl, alkoxyalkoxy, acetoxyalkyl, acetoxyalkoxy, aryl, alkaryl, heterocycle or heteroalkyl, R<sup>9</sup> and R<sup>10</sup> are independently selected from the groups defined for R<sup>7</sup> and R<sup>8</sup>, or taken together supply the atoms needed to complete a 4- to 8-membered fused carbocyclic or heterocyclic ring, provided at least one of R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> is not hydrogen.

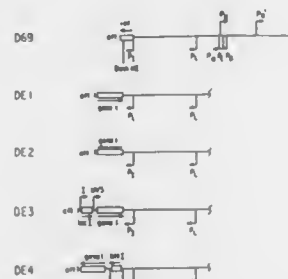
## 4,952,496

## CLONING AND EXPRESSION OF THE GENE FOR BACTERIOPHAGE T7 RNA POLYMERASE

F. William Studier, Stony Brook, N.Y.; Paricheh Davanloo, Basel, Switzerland; Alan H. Rosenberg, Setauket, N.Y.; Barbara A. Moffatt, East Lansing, Mich., and John J. Dunn, Bellport, N.Y., assigns to Associated Universities, Inc., Washington, D.C.

Continuation-in-part of Ser. No. 595,016, Mar. 30, 1984, abandoned. This application Dec. 29, 1986, Ser. No. 2,408

Int. Cl.<sup>3</sup> C12P 19/34; C12N 15/00, 7/00, 9/12  
U.S. Cl. 435—91 22 Claims



1. A process for obtaining clones of a DNA sequence encoding an enzymatically active RNA polymerase of any T7-like bacteriophage, comprising the steps of:
  - obtaining from the DNA of said T7-like bacteriophage a fragment that contains the complete coding sequence of a gene for said bacteriophage RNA polymerase;
  - eliminating from the fragment, or inactivating, any promoters that may lie to the 5' side of the 5' terminus of said coding sequence and which could direct the synthesis by any host cell RNA polymerase of active mRNA from the cloned gene;
  - eliminating from the fragment, or inactivating, any promoters that lie to the 5' side of the 5' terminus, to the 3' side of the 3' terminus and between said termini of said coding sequence and which are recognizable by said phage RNA polymerase, but retaining within the DNA fragment a sequence encoding an enzymatically active phage RNA polymerase; and
  - cloning said DNA fragment containing a sequence encoding enzymatically active phage RNA polymerase, but not containing functional promoters recognizable by said phage RNA polymerase, in a plasmid or other vector that contains no promoters recognizable by said phage RNA

polymerase, and at a site in the vector where functional mRNA for said phage RNA polymerase would be only minimally transcribed by any host cell RNA polymerase.

## 4,952,497

SIMPLE AND RAPID METHOD FOR DETECTION OF VIRULENT *YERSINIA ENTEROCOLITICA*

Saanya Bhaduri, Warminster; Lucille K. Conway, Sellersville, both of Pa., and Reynato V. Lachica, Natick, Mass., assigns to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 4, 1988, Ser. No. 140,501

Int. Cl.<sup>3</sup> C12Q 1/00, 1/02; G01N 33/48, 1/30

U.S. Cl. 435—34 15 Claims

1. A method for detecting a virulent plasmid-bearing strain of the bacterium *Yersinia enterocolitica* comprising:
  - a. incubating colonies of the bacterium at a time and temperature sufficient to express plasmid genes in said virulent strain, which strain binds crystal violet dye;
  - b. subsequently treating the colonies with an aqueous crystal violet dye solution for a period of time sufficient to allow the dye to bind to the virulent plasmid-bearing strain of the bacterium;
  - c. removing the dye solution from the colonies; and
  - d. thereafter, detecting the virulent plasmid-bearing strain of the bacterium by the dark violet appearance in color of the colonies of said strain due to binding with the dye.

## 4,952,498

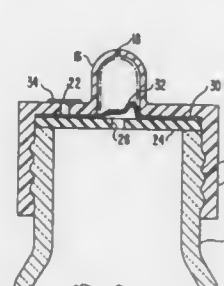
## METHOD AND APPARATUS FOR DETECTING MICROORGANISM ACTIVITY

John R. Waters, P.O. Box 271789, Tampa, Fla. 33688

Filed May 6, 1988, Ser. No. 191,197

Int. Cl.<sup>3</sup> C12Q 1/04; C12M 1/34, 1/24

U.S. Cl. 435—34 2 Claims



1. A method of detecting activity of microorganism in a sample comprising the steps of:
  - providing a vessel having substantially rigid walls and having an opening into the interior of the vessel;
  - providing a closure for closing the opening into the vessel, the closure including a membrane having a central region, deforming the central portion of the membrane to form a flaccid indicator region which is more movable by differences in pressure across the closure than the remainder of the membrane so that a difference in pressure causes the region to form a bulging dome,
  - securely fastening the closure across the opening to seal the vessel;
  - placing a sample of the material to be tested in the vessel;
  - placing the vessel with closure and sample in an incubating chamber having a controllable temperature, and incubating the vessel in said incubating chamber for a selected interval of time at a temperature and pressure selected to promote microorganism activity within the vessel and consequent generation of gas,
  - following said incubating changing the pressure within the incubating chamber until the dome assumes a substantially deflated state,

measuring the incubation chamber pressure at which the dome is in said substantially deflated state, repeating the steps of changing and measuring the chamber pressure, and comparing the measured pressure with previous measured pressures to evaluate changes in pressure indicating microorganism activity.

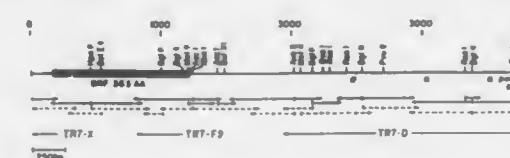
## 4,952,499

## GENES AND THEIR ENCODED PROTEINS WHICH REGULATE GENE EXPRESSION OF THE INTERLEUKIN-2 RECEPTOR AND OF HUMAN LYMPHOTROPIC RETROVIRUSES

Harvey I. Cantor, Wellesley, and Roberto Patarca, Brookline, both of Mass., assigns to Dana-Farber Cancer Institute, Boston, Mass.

Filed Feb. 11, 1988, Ser. No. 154,758

Int. Cl.<sup>3</sup> C12P 21/00, 21/02, 19/34; C12N 15/00  
U.S. Cl. 435—172.3 23 Claims



1. An isolated and purified DNA sequence as shown in FIG. 2.

## 4,952,500

## CLONING SYSTEMS FOR RHODOCOCCLUS AND RELATED BACTERIA

William R. Finnerty, Athens, and Mary E. Singer, Decatur, both of Ga., assigns to University of Georgia Research Foundation, Inc., Athens, Ga.

Filed Feb. 1, 1988, Ser. No. 151,319

Int. Cl.<sup>3</sup> C12P 21/00; C12N 15/00, 1/22; C12R 1/32, 1/04, 1/365, 1/465; C07H 15/12

U.S. Cl. 435—69.1 17 Claims

10. A method for cloning and expressing nucleic acid sequences in *Rhodococcus* and related bacteria capable of using the same origin of replication comprising:
  - providing a vector capable of stable replication in *Rhodococcus* containing an origin of replication for use in *Rhodococcus* present in *Rhodococcus* AS50-1 (pMVS100, pMVS200, pMVS301) (ATCC 53719);
  - transforming a host bacteria capable of recognizing the *Rhodococcus* origin of replication; and
  - culturing the transformed host bacteria under conditions wherein nucleic acid sequences are expressed.

## 4,952,501

## METHOD FOR ANALYZING AND SYNTHESIZING FUNCTIONAL POLYPEPTIDE SEQUENCES FOR ASSEMBLY INTO ENHANCED OR MULTI-FUNCTIONAL PROTEINS

Maria Jasin, Ft. Lauderdale, Fla., and Paul R. Schimmel, Lexington, Mass., assigns to Massachusetts Institute of Technology, Cambridge, Mass.

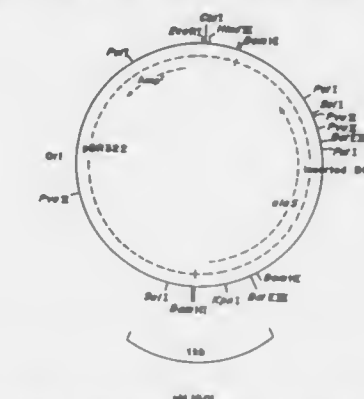
Filed Apr. 26, 1988, Ser. No. 188,133

Int. Cl.<sup>3</sup> C12P 21/00, 19/34; C12N 15/00, 1/20  
U.S. Cl. 435—69.2 16 Claims

1. A method for mapping and cloning nucleotide sequences that encode amino acid sequences having oligomeric or adhesive properties which can be used to impart greater stability to or restore or enhance the intrinsic activity of a protein molecule comprising:
  - (a) cloning in a first plasmid a first nucleotide sequence encoding a first polypeptide, not including regulatory sequences, comprising an amino acid sequence with a first activity joined to an amino acid sequence with oligomeric

activity, wherein oligomeric activity is defined as structure resulting in the assembly of a complex between the sequence with oligomeric activity and another polypeptide;

- (b) cloning in a second plasmid a second nucleotide sequence encoding a second polypeptide, not including regulatory sequences, wherein said second polypeptide comprises a portion of the amino acid sequences of said first polypeptide;



- (c) expressing said first and second nucleotide sequences cloned in steps (a) and (b) resulting in the synthesis of said first and second polypeptides;
- (d) permitting said first and second polypeptides synthesized from the nucleotide sequences cloned in steps (a) and (b) to combine;
- (e) screening the combined polypeptides for assembly of a complex between said first and second-polypeptides; and
- (f) measuring the activity of the complexed polypeptides of step (d) to determine if the polypeptide of step (b) has increased the activity of the polypeptide of step (a).

## 4,952,502

## CARBOMYCIN BIOSYNTHETIC GENE, DESIGNATED CARG, FOR USE IN STREPTOMYCES AND OTHER ORGANISMS

Janet K. Epp, and Brigitte E. Schoner, both of Indianapolis, Ind., assigns to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 24, 1987, Ser. No. 17,660

Int. Cl.<sup>3</sup> C12P 19/62, 19/34; C12N 1/21, 15/52  
U.S. Cl. 435—76 23 Claims

1. A method for increasing the carbomycin-producing ability of an organism that comprises:
  - (1) transforming said organism with a recombinant DNA vector that codes for expression of the carG activity; and
  - (2) culturing said organism transformed in step (1) under conditions that allow the production of carbomycin.

## 4,952,503

## PROCESS FOR THE PRODUCTION OF ETHANOL

Jürgen Granstedt, Vitalisvågen 11, S-112 55 Stockholm, Sweden

Filed Jan. 19, 1986, Ser. No. 882,924 PCT No. PCT/SE 85/00493 § 371 Date Jun. 19, 1986 § 102(e) Date Jun. 19, 1986

PCT Pub. No. WO86/03514 PCT Pub. Date Jun. 19, 1986

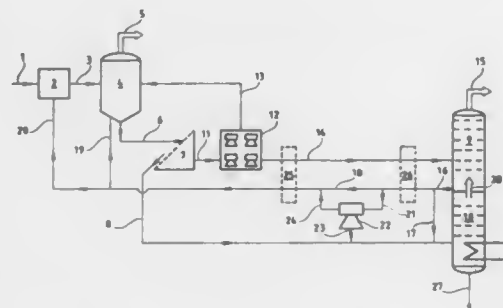
Claims priority, application Sweden, Dec. 7, 1984, 8406215

Int. Cl.<sup>3</sup> C17P 7/06 2 Claims

1. In a process for the production of ethanol through continuous fermentation of a carbohydrate containing substrate in the presence of yeast in a fermentor, wherein a stream of fermentation liquor is continuously withdrawn from the fermentor, said stream of fermentation liquor is divided in a first centrifugal separation step into a yeast enriched stream, which is recirculated to the fermentor, and an essentially yeast free stream, said yeast free stream is divided in a primary distillation stage into an overhead stream enriched in ethanol and a liquid bottoms stream at least a part of which is recycled to the fermentor, the



improvement which comprises straining the stream of fermentation liquor prior to said first centrifugal separation step to separate a stream of coarse particles, centrifuging the yeast free stream prior to said primary distillation stage or centrifuging the liquid bottoms stream directly after removal from the primary distillation stage, to give a stream impoverished in fine particles and a sludge stream enriched in fine particles, blending said stream of coarse particles with the stream enriched in



fine particles to form a combined stream, subjecting said combined stream to distillation in a secondary distillation stage, returning a vapor stream from said secondary distillation stage to said primary distillation stage, removing a sludge stream from said secondary distillation stage and discharging the sludge stream from the secondary distillation stage from the circuit which includes the primary distillation stage and the fermentor.

4,952,504

# METHOD FOR PRODUCING ETHANOL FROM BIOMASS

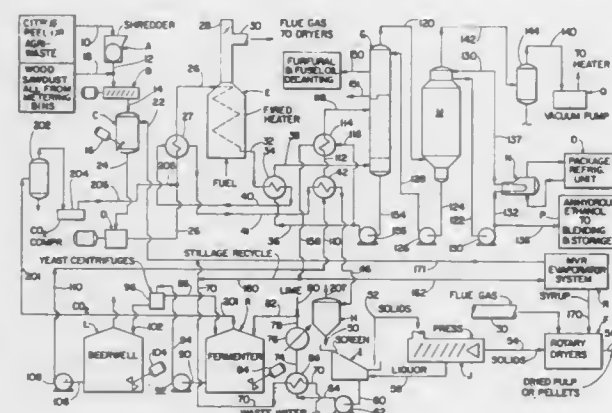
Stanley J. Pavilon, 18519 Lomond Blvd., Shaker Heights, Ohio 44122

Filed Jul. 28, 1987, Ser. No. 79,138

Int. Cl.<sup>5</sup> C12P 7/10

U.S. Cl. 435—163

11 Claims



1. A method of producing ethanol from biomass comprising the steps of providing biomass containing organic acid, mixing said biomass with water to form a biomass slurry, hydrolyzing said slurry in fuel fired hydrolysis means, utilizing said organic acid for catalyzing hydrolysis of said slurry, separating said slurry into liquid and solids after said hydrolyzing step, utilizing flue gas from said fuel fired hydrolysis means for drying said solids, and further processing said liquid to produce ethanol.

## 4,952,505 FERMENTATION OF TRICHODERMA REESEI AND APPARATUS THEREFOR

Michael Y. Cho, Tallahassee, Fla., assignor to Florida State University, Tallahassee, Fla.

Filed Aug. 8, 1988, Ser. No. 229,823

Int. Cl.<sup>5</sup> C12N 9/42; C12R 1/885

U.S. Cl. 435—209

6 Claims

1. A process for producing enzyme cellulases by the fermentation of *Trichoderma reesei* (ATCC 26921) in an aqueous nutrient medium containing assimilable sources of cellulose, nitrogen, phosphate magnesium and iron in the presence of an oxygen containing atmosphere, the method comprising fermenting the *Trichoderma reesei* at a temperature of between about 26° C. and 31° C. while maintaining the oxygen containing atmosphere at a pressure of about 1 atmosphere until the *Trichoderma reesei* enter the late stationary growth phase, thereafter, gradually and steadily increasing the pressure of the oxygen containing atmosphere until it is in excess of about 7 atmospheres and fermenting the *Trichoderma reesei* at said increased pressure and at an increased temperature of between about 40° C. and about 60° C., thereby resulting in the production of enzyme cellulases by the *Trichoderma reesei*, and recovering the enzyme cellulases.

4,952,506

# IMMOBILIZATION OF NONANCHORAGE-DEPENDENT CELLS

Michael J. Byers, Gwynedd; Eric G. Isacoff, Richboro, and John O. Naples, Dresher, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 28, 1986, Ser. No. 854,982

Int. Cl.<sup>5</sup> C12N 5/02, 1/00

U.S. Cl. 435—240.25

7 Claims

7. The method of claim 1 wherein the cells comprise a CHO cell line, mouse myeloma cells, mouse hybridoma cells, or *Saccharomyces cerevisiae* cells.

4,952,507

# PRODUCTION AND DIAGNOSTIC USE OF ANTIBODIES AGAINST PANCREATIC ALPHA-AMYLASE

Michael P. Woodward, Charlottesville, Va., assignor to Human Incorporated, Boca Raton, Fla.

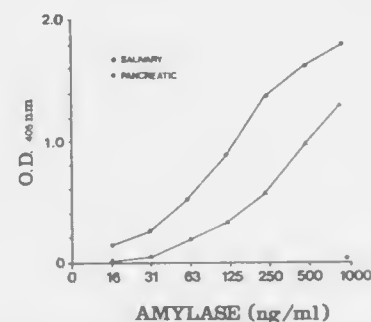
Continuation of Ser. No. 896,040, Aug. 13, 1986, abandoned.

This application Mar. 21, 1989, Ser. No. 327,404

Int. Cl.<sup>5</sup> C12N 5/00, 15/00

U.S. Cl. 435—240.27

2 Claims



1. The cell line designated, ATCC HB 9154.

## 4,952,508 METHOD AND VECTOR ORGANISM FOR CONTROLLED ACCUMULATION OF CLONED HETEROLOGOUS GENE PRODUCTS IN *BACILLUS SUBTILIS*

Shing Chang, Oakland; Hing C. Wong, San Ramon, and Vaughan P. Wittman, Napa, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 461,248, Jan. 26, 1983, abandoned, which is a continuation of Ser. No. 221,800, Dec. 31, 1980, abandoned, which is a continuation-in-part of Ser. No. 128,537, Mar. 10, 1980, abandoned. This application Jun. 19, 1987, Ser. No. 64,841

Int. Cl.<sup>5</sup> C12P 21/00; C12N 15/00, 1/20

U.S. Cl. 435—252.3

8 Claims

1. A bacterial vector capable of regulating expression of a predetermine heterologous protein, said vector comprising a gene encoding said predetermined protein, said gene operably linked to a promoter, wherein said promoter is regulated by an operator that binds a functional repressor protein encoded by a penI gene and wherein said operator comprises a pair of inverted repeat sequences and is selected from the group consisting of operators encoded by the penP and penI genes of *Bacillus licheniformis*.

4,952,509

# FERMENTATION BROTH DEGASSIFICATION

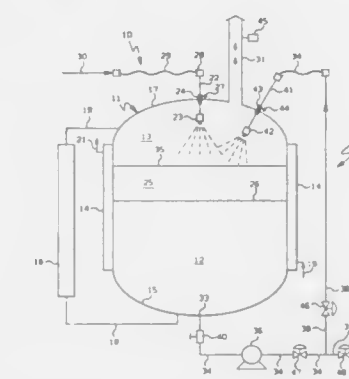
Eugene W. Wegner, and Michael T. Seals, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 14, 1988, Ser. No. 181,358

Int. Cl.<sup>5</sup> C12M 1/00; B01D 19/00

U.S. Cl. 435—287

3 Claims



3. In an apparatus for continuous pressurized fermentation with high air circulation of this type employing a pressurizable fermenter equipped with agitator means, sparging means including gas delivery and distribution means, nutrient supply means, bottom located harvesting part means and a throttle valve means associated therewith, and control means wherein the improvement comprises associating with said fermenter a degassing apparatus,

(A) said degassing apparatus comprising,

- a generally fluid-tight vessel having an upper wall portion and a lower wall portion,
- first pipe means extending through said upper wall portion and having an inner end and an outer end,
- first spray nozzle means adapted to pass particulate bodies having an average particle size of at least about 0.0005 millimeters, and to produce spray droplets having an average size not greater than about 2.5 millimeters in an upper interior part of said vessel and functionally associated with said inner end of said first pipe and oriented to direct a spray suspension therefrom and downwardly,
- orifice means associated with a bottom location of said

lower wall portion, including valve closing means therefor,

(e) vent means associated with an upper location of said upper wall portion,

(f) recycle means including (1) conduit means extending from association with a bottom location of said lower wall portion to and through an upper location of said upper wall portion to an interior end, (2) pump means associated with said conduit means for moving fluid through said conduit means at a predetermined pressure from said bottom location through said upper location, (3) flow control means for regulating flow of fluid through said conduit means, and (4) second spray nozzle means adapted to pass particulate bodies having an average particle size of at least about 0.0005 millimeters, and to produce spray droplets having an average size not greater than about 2.5 millimeters downwardly directed and associated with said interior end of said conduit means, and

(B) said associating being provided by conduit means functionally extending from said throttle valve means to said first pipe means.

4,952,510

# APPARATUS FOR DETECTING AND CULTURING MICROORGANISMS USING A BIPHASIC CULTURE VESSEL

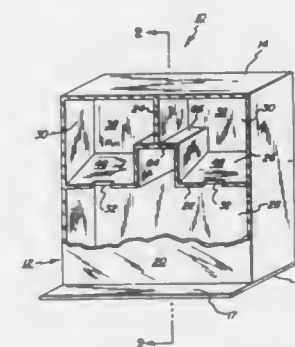
Michael G. Gabridge, Saranac Lake, N.Y., assignor to Bio-North, Inc., Saranac Lake, N.Y.

Filed Jan. 2, 1987, Ser. No. 93

Int. Cl.<sup>5</sup> C12M 1/24; B65D 1/24

U.S. Cl. 435—296

33 Claims



1. A culture vessel comprising:

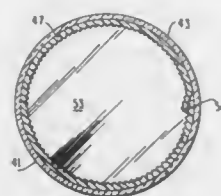
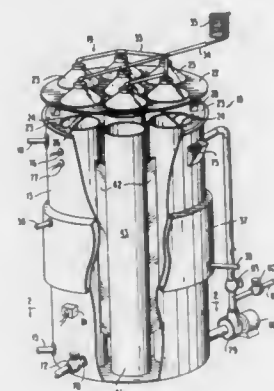
a container formed by a top surface, a bottom surface disposed so as to stably support said container when said container is placed in an upright position, and a side surface which connects said top surface to said bottom surface, with one of said surfaces having a sealable opening defined therein for introducing material into the volume enclosed by said container, at least one of said surfaces further including a portion which is formed from a flat, transparent material;

a first partition disposed inside said container between said top and bottom surfaces so as to divide the volume enclosed by said container into an upper portion and a lower portion; and

at least one second partition disposed inside said container so as to divide said upper portion of said container into two or more compartmental volumes, said first partition having at least one opening therein between said lower portion and each of said upper compartmental volumes, allowing communication between said lower portion and said upper compartmental volumes, said first and second partitions being configured with respect to said flat, transparent surface portion and to said con-

tainer opening so that at least a portion of each said compartmental volume is viewable through said transparent surface portion and so that material may be introduced through said opening into said lower portion of said container, and said first and second partitions, said side surfaces and the openings in said first partition all being further disposed so that liquid located in said lower container portion is introduced into preselected ones of said compartmental volumes by tipping said container at a predetermined angle with respect to said upright position so that such liquid will still through the at least one opening associated with each such preselected volume.

**4,952,511**  
**PHOTOBIOREACTOR**  
Richard J. Radmer, Catonsville, Md., assignor to Martek Corporation, Columbia, Md.  
Continuation of Ser. No. 60,609, Jun. 11, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,532  
Int. Cl.<sup>5</sup> C12M 1/08  
U.S. Cl. 435—314



1. A photobioreactor which comprises:
  - (a) a tank for containing a liquid microbial culture;
  - (b) a high-intensity light source whose light is substantially entirely directed into a light compartment;
  - (c) said light compartment having at least one transparent wall extending into said tank; and
  - (d) said light compartment containing a tube of internally reflective prismatic sheet, said tube extending substantially from said light source to an end wall of said light compartment opposite said light source and said tube having transverse dimensions sufficient to substantially surround said light source, said tube further including a mirror at the end thereof opposite said light source oriented to reflect light back into said tube, wherein the light source, the tube and the mirror are arranged, so as to distribute light from said high-intensity light source substantially uniformly across the interior surface of the transparent wall of said light compartment.

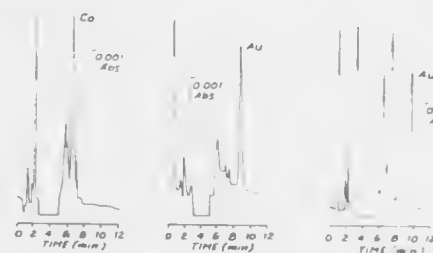
**4,952,512**  
**GENE ENCODING AN INHIBITOR OF TISSUE-TYPE AND UROKINASE-TYPE PLASMINOGEN ACTIVATORS**  
David J. Lookoff, 426 Glencrest Dr., Solana Beach, Calif. 92075; Tor Ny, Lodjursvagen 11, Umea, Sweden, and Michael Sawdey, 9232 (C) Regents Rd., La Jolla, Calif. 92037  
Continuation-in-part of Ser. No. 623,357, Jun. 22, 1984, Pat. No. 4,791,068. This application Aug. 19, 1986, Ser. No. 897,990  
Int. Cl.<sup>5</sup> C12N 15/12, 15/58

U.S. Cl. 435—320 10 Claims  
1. A biologically pure DNA molecule encoding human endothelial plasminogen activator inhibitor that is from about 1140 to about 3000 nucleotides in length that comprises the nucleotide sequence of FIG. 22 from nucleotide position 13 to about position 1153.

**4,952,513**  
**ASSAYS FOR QUALITATIVE AND QUANTITATIVE DETECTION OF ORGANIC AND INORGANIC ANALYTES OF DIVERSE CHEMICAL CLASSES VIA THE SELECTIVE FORMATION AND GROWTH OF LIGHT SCATTERING CRYSTALS**  
Martin Koocher, Lexington, Mass., assignor to Crystal Diagnostics, Inc., Woburn, Mass.  
Filed Oct. 24, 1988, Ser. No. 261,730  
Int. Cl.<sup>5</sup> G01N 33/00

U.S. Cl. 436—36 20 Claims  
1. An assay method for selectively detecting an organic analyte of interest which is neither an aldehyde nor a ketone and has not been converted into either an aldehyde or a ketone, said method comprising the steps of:  
obtaining a fluid believed to contain the organic analyte of interest, said organic analyte being devoid of reactive carbonyl groups and comprising at least one identifying reactive entity whose chemical composition and structure identifies the organic analyte as being of a specific chemical class;  
exposing the organic analyte of interest in said fluid to a derivatizing agent selectively reactive with with said identifying reactive entity of said organic analyte such that a reaction product is formed in-situ as a plurality of immobilized, nucleating sites;  
treating said immobilized, nucleating sites with a metastable supersaturated solution comprising a substance which is at least an analogue of the reaction product yielded by said derivatizing agent and said organic analyte such that a plurality of detectable crystals are formed; and  
detecting the presence of said formed crystals as a measure of the organic analyte of interest in the fluid.

**4,952,514**  
**ANALYSIS OF GOLD, PLATINUM OR PALLADIUM**  
Paul R. Haddad, Eastwood, Australia, assignor to Uniresearch Limited, New South Wales, Australia  
Filed Mar. 28, 1988, Ser. No. 172,797  
Int. Cl.<sup>5</sup> G01N 33/20; B01D 15/08  
U.S. Cl. 436—80 10 Claims



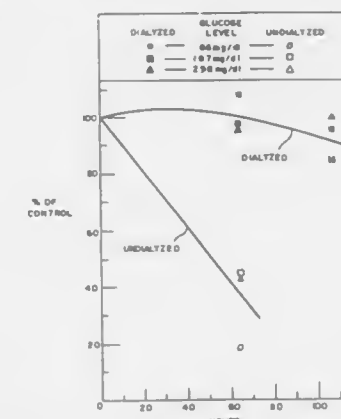
1. A method for the analysis of at least one of gold, platinum and palladium when present in a sample solution as gold (I)

cyanide, palladium (II) cyanide and platinum (II) cyanide, comprising the steps of:

- (a) conditioning a concentrator column containing a reverse phase material with a first relatively weak eluent which includes a moderately hydrophobic ion-interaction reagent;
- (b) loading said sample onto the concentrator column;
- (c) washing the concentrator column by flowing said first relatively weak eluent through said column in a direction the same as that used for loading the sample;
- (d) stripping said sample containing at least one of gold (I) cyanide, palladium (II) cyanide and platinum (II) cyanide from the concentrator column and onto an analytical column containing a reverse phase material by flowing said first relatively weak eluent through the concentrator column in a direction opposite to that used for loading said sample;
- (e) detecting said at least gold (I) cyanide, palladium (II) cyanide and platinum (II) cyanide, by eluting said analytical column with a second relatively strong eluent which includes a moderately hydrophobic ion-interaction reagent; and
- (f) determining the concentration of at least one of gold, platinum and palladium by comparing the response detected with that obtained from a standard solution of at least one of gold (I) cyanide, palladium (II) cyanide and platinum (II) cyanide.

**4,952,515**  
**METHOD OF DETECTION USING A TEST STRIP HAVING A NON PARTICULATE DIALYZED POLYMER LAYER**  
John M. Gleisner, Lynwood, Wash., assignor to Polymer Technology International Corp., Issaquah, Wash.  
Continuation of Ser. No. 53,079, May 22, 1987, Pat. No. 4,814,142. This application Feb. 10, 1989, Ser. No. 309,332  
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.  
Int. Cl.<sup>5</sup> G01N 21/78

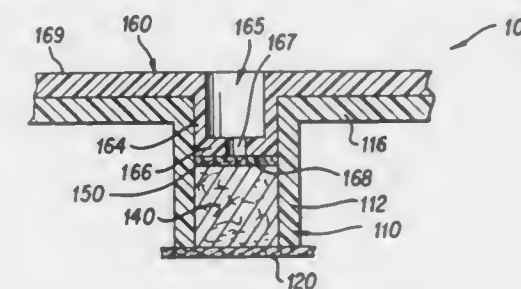
U.S. Cl. 436—169



1. A method for the detection of a predetermined substance in a fluid, the method comprising:  
contacting a sample of a fluid containing an unknown quantity of the predetermined substance with a support having thereon a reagent layer wherein the reagent layer contains a dialyzed non-particulate latex polymer and dispersed therein a reagent detection system which reacts with the substance to provide a detectable change; and detecting whether a reaction occurred; wherein the dialyzed latex polymer constitutes at least about 60% by weight of the dry reagent layer.

**4,952,516**  
**SELF-VENTING DIAGNOSTIC TEST DEVICE**  
Vlado I. Matkovich, Glen Cove, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.  
Continuation of Ser. No. 60,860, Jun. 12, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 325,003  
Int. Cl.<sup>5</sup> G01N 33/16

U.S. Cl. 436—170 16 Claims



1. A diagnostic test device comprising:
  - a liquid impervious receptacle having an aperture;
  - a gas permeable hydrophobic element forming at least part of one wall of said receptacle and adapted for venting gas therefrom while resisting passage of liquids;
  - an absorbent disposed within the receptacle;
  - a hydrophilic microporous reaction medium for a diagnostic test reagent disposed over the aperture in the receptacle, said reaction medium having an absolute pore size of from 0.002 to 20 microns and having first and second surfaces, the first surface contacting the absorbent;
  - and
  - a cover disposed on the second surface of the microporous reaction medium, the cover having an aperture communicating with the second surface of the microporous reaction medium.

**4,952,517**  
**POSITIVE STEP IMMUNOASSAY**  
Izak Bahar, Chestnut Hill, Mass., assignor to Hygeia Sciences, Inc., Newton, Mass.  
Filed Feb. 8, 1988, Ser. No. 153,081  
Int. Cl.<sup>5</sup> G01N 33/53, 33/543  
U.S. Cl. 436—518 42 Claims

1. An immunoassay procedure to determine the initial presence of at least a prespecified amount of a first immunoreactive substance in a liquid sample said procedure comprising, the steps of:  
establishing an immunochemical reaction phase by admixing a liquid sample containing an initially unknown amount of said first immunoreactive substance with (1) a known amount of a second immunoreactive substance that is specifically immunoreactive with said first substance and (2) a quantity of a third immunoreactive substance that has immunological reaction characteristics which are immunospecifically the same as the immunological reaction characteristics of said first immunoreactive substance, said known amount of said second substance being immunochemically equivalent to the total of said prespecified amount of first substance and said quantity of third immunoreactive substance, whereby, when the amount of said first immunoreactive substance in the liquid sample solution exceeds said prespecified amount, unreacted third substance will be available for further immunospecific reaction in the reaction phase;  
contacting the thus established reaction phase with a quantity of a fourth immunoreactive substance that has immunological reaction characteristics which are immunospecifically the same as the immunological reaction characteristics of said second substance, said fourth substance carrying a detectable tag; and  
determining the initial presence of more than said prespeci-



fied amount of first substance in said sample by detecting the existence of a specific immunoreaction product containing said detectable tag.

4,952,518

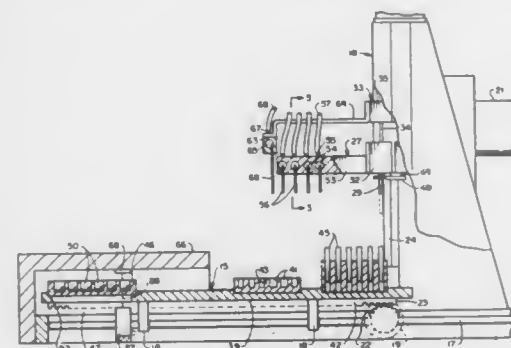
**AUTOMATED ASSAY MACHINE AND ASSAY TRAY**  
Larry J. Johnson, San Jose; Stephen R. Coates, Orinda, and Remying Loo, Hercules, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Division of Ser. No. 889,797, Jul. 24, 1986, abandoned, which is a division of Ser. No. 656,234, Oct. 1, 1984, Pat. No. 4,681,742. This application Dec. 28, 1987, Ser. No. 140,888

Int. Cl.<sup>3</sup> G01N 33/543, 35/02

U.S. Cl. 436—518

4 Claims



1. A method of performing an automated assay in a machine having a moveable tray support, a tray having a plurality of assay wells arranged in an array of rows and columns with each assay well made of light transmitting material and configured to cause a solid phase bead to assume a position in a known area of the well and configured to have a sump region having a flat portion where the bead can never come to rest and from which sump region liquid may be withdrawn and configured such that a light beam may be passed through said flat portion with a path that will never be obstructed by said bead, and having a plurality of dispensing tubes arranged in a plurality of rows with each row coupled to its own disengaging pump and its own surface of liquid used in said assay, and having a plurality of aspirating tubes arranged in a row and coupled to an aspirating pump said aspirating tubes and said dispensing tubes being mounted on moveable platforms so as to be individually, vertically moveable comprising the steps of:

- (1) placing the samples to be assayed and the appropriate control reagents in said assay wells of a tray;
- (2) placing a tray at a workstation on said table wherein each assay well has placed therein an immunosorbent bead which has immobilized thereon either a specific immunoglobulin for the antigen/hapten of interest or an antigen for which the antibody of interest is specific;
- (3) moving said table to register each row of wells in turn with the row of dispensing tubes coupled to a reservoir containing buffer solution and moving said dispensing tubes down into each row of assay wells in turn and activating the corresponding pump once for each row of wells for sufficient duration to pump an adequate amount of said buffer solution into all the wells;
- (4) incubating the contents of said tray;
- (5) moving said table to register each row of sump regions in each row of wells in turn with said row of aspirating tubes and moving said aspirating tubes down into said sump regions and activating said aspirating pump long enough for each row of wells to aspirate the samples and reagents out of each well;
- (6) moving the table and platforms for said aspirating and dispensing tubes and activating said dispensing pumps and

said aspirating pump appropriately to perform the following actions; registering each row of wells in turn with the row of dispensing tubes coupled to said buffer reservoir, filling each well with buffer solution, aspirating the buffer solution out of each said well, and repeating these 3 actions a sufficient number of times to wash each said well and each said bead;

- (7) moving said table and said platform for said dispensing tubes appropriately and activating the appropriate dispensing pump so as to fill each well with an enzyme labelled antibody reagent that binds specifically to the antigen/hapten bound to said bead;
- (8) incubating the contents of said wells;
- (9) moving said table and the platform for said aspirating tubes appropriately and activating the aspirating pump appropriately to aspirate the enzyme labelled antibody reagent out of each said well;
- (10) repeating the washing actions of step 6 above;
- (11) moving the table and platform for said dispensing tubes appropriately and activating the appropriate dispensing motor to fill all the wells with a substrate liquid;
- (12) incubating the contents of the wells; and
- (13) passing a beam of light from a spectrophotometer through said flat portion of said sump region and the liquid of each well and measuring the level of light absorption.

4,952,519

**PROTEIN IMMOBILIZATION WITH A POLY(ETHYLENIMINE) DERIVATIZED WITH A HYDROPHOBIC GROUP**

Phillip H. Lau, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 2, 1988, Ser. No. 188,956

Int. Cl.<sup>3</sup> G01N 33/547, 33/538, 33/53; C12N 11/06

U.S. Cl. 436—532

13 Claims

1. A method for preactivating a plastic surface and for immobilization of a member of a bioaffinity binding pair comprising:

- (a) coating the surface with a solution or suspension of poly(ethyleneimine) derivatized with a hydrophobic group; and
- (b) covalently coupling the member of the bioaffinity binding pair to the product of step (a).

4,952,520

**IMMUNOASSAY MAKING USE OF LATEX AGGLOUTINATION**

Naoya Okusa, and Taira Kanada, both of Tokyo, Japan, assignors to Daiichi Pure Chemicals Co., Ltd., Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,302

Claims priority, application Japan, Jun. 5, 1987, 62-141236

Int. Cl.<sup>3</sup> G01N 33/546

U.S. Cl. 436—533

2 Claims



1. An immunoassay making use of latex agglutination, which comprises providing a colored latex as a latex, subjecting the colored latex to an immune reaction to form agglutinated particles of the colored latex, capturing the particles by membrane filtration while using a thin membrane with capillary-shaped pores formed therethrough, and then determining the amount of the agglutinated particles thus captured by measuring a reflectivity under exposure to monochromatic light.

4,952,521

**PROCESS FOR FABRICATING A SEMICONDUCTOR DEVICE WITH SELECTIVE GROWTH OF A METAL SILICIDE**

Hiroshi Goto, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

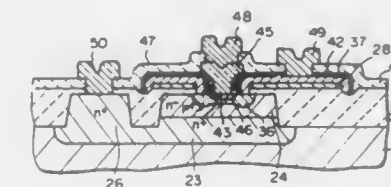
Continuation of Ser. No. 225,619, Jul. 27, 1988, abandoned, which is a continuation of Ser. No. 855,106, Apr. 23, 1986, abandoned. This application Nov. 20, 1989, Ser. No. 437,337

Claims priority, application Japan, Apr. 26, 1985, 60-0088750; Apr. 26, 1985, 60-0088751

Int. Cl.<sup>3</sup> H01L 21/283, 21/331

U.S. Cl. 437—33

1 Claim



1. A process for fabricating a semiconductor device on a silicon substrate of a first conductivity type, comprising the steps of:

- forming first and second insulating layers, resistant to metal or metal-silicide growth thereon, on the silicon substrate, the first insulating layer being shaped as an island, the second insulating layer being separated from the first insulating layer by a trench portion having a bottom surrounding the first insulating layer;
- forming a silicon seed layer having a predetermined pattern on the second insulating layer;
- forming a base region, of a second conductivity type opposite to the first conductivity type, on the silicon substrate below the trench portion, an exposed portion of the base region forming the bottom of the trench;
- selectively growing a metal or a metal silicide on the base region exposed below the trench portion and on the silicon seed layer, but not on the first insulating layer, forming a base taking-out electrode having the predetermined pattern on the second insulating layer and in contact with the base region;
- forming a third insulating layer on an exposed surface of the base taking-out electrode;
- forming an active base region of the second conductivity type and an emitter region of the first conductivity type in the substrate below a region surrounded by the base taking-out electrode and the third insulating layer from the principal surface into the inside thereof, the active base region being in contact with the base region, the emitter region being formed in the active base region; and
- forming a collector region using a region of the first conductivity type in the substrate and in contact with the active base region.

4,952,522

**METHOD OF FABRICATING COMPLEMENTARY SEMICONDUCTOR INTEGRATED CIRCUITS DEVICES HAVING AN INCREASED IMMUNITY TO LATCH-UP**  
Akira Yamada; Tsunenori Umeki, and Masatoshi Aikawa, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1988, Ser. No. 213,102

Claims priority, application Japan, Jun. 30, 1987, 62-164322; Jun. 30, 1987, 62-164323

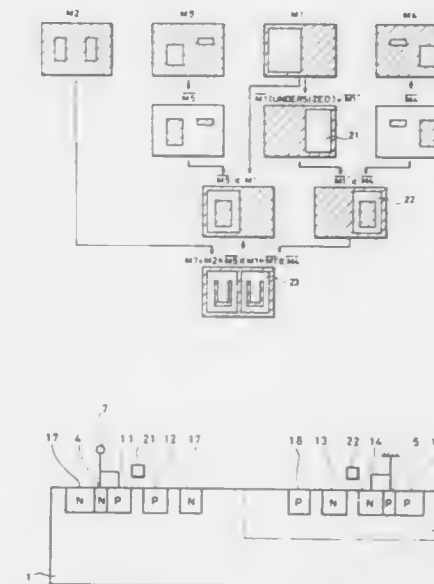
Int. Cl.<sup>3</sup> H01L 21/265

U.S. Cl. 437—34

13 Claims

1. A method of fabricating a complementary semiconductor integrated circuit device comprising the steps of: preparing a semiconductor substrate which has a major

surface and contains impurities of a first conductivity type having a predetermined concentration; preparing a first mask having a first mask area for defining a first impurity region of a second conductivity type in said major surface of said substrate, said first mask area comprising a masked area and an unmasked area; forming said first impurity region of the second conductivity type and having a predetermined impurity concentration in the predetermined area of said major surface of said substrate by applying said first mask at a predetermined location on said substrate, the area of said major surface of said substrate other than said first impurity region of the second conductivity type constituting a first impurity region of the first conductivity type; preparing a second mask having a second mask area for defining a second impurity region of the second conductivity type and a third impurity region of the second conductivity type in first impurity region of the first conductivity type and said first impurity region of the second conductivity type, respectively, said second mask area comprising a masked area and unmasked area; preparing a third mask having a third mask area for defining a second impurity region of the first conductivity type



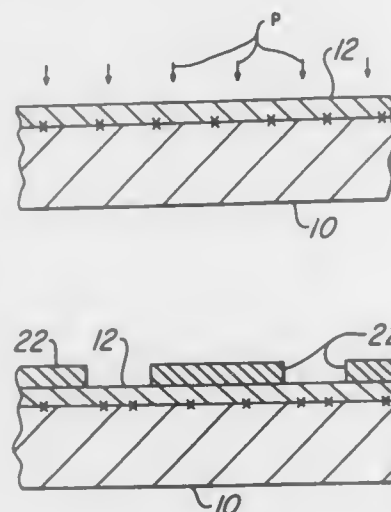
within said first impurity region of the first conductivity type in juxtaposition with said second impurity region of the second conductivity type, and for defining a third impurity region of the first conductivity type within said first impurity region of the second conductivity type in juxtaposition with said third impurity region of the second conductivity type, said third mask area comprising a masked area and unmasked area;

preparing a complement or negative mask of said third mask wherein the relation between the masked and unmasked areas are reversed with respect to that of said third mask; preparing a fourth mask having an unmasked area jointly defined by said unmasked areas of said first and second masks, and a masked area defined by said negative mask of said third mask;

forming a second impurity region of the second conductivity type within said first impurity region of the first conductivity type, and third and fourth impurity regions of second conductivity type within said first impurity region of second conductivity type by placing said fourth mask at a predetermined location on said major surface of said substrate,

whereby said first impurity region of second conductivity type is made to have a reduced electrical resistance.

**4,952,523**  
**PROCESS FOR FABRICATING CHARGE-COUPLED DEVICE WITH REDUCED SURFACE STATE AT SEMICONDUCTOR-INSULATOR INTERFACE**  
 Ichiro Fujii, Miho, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.  
 Division of Ser. No. 240,394, Aug. 29, 1988, Pat. No. 4,872,043, which is a continuation of Ser. No. 867,842, May 27, 1986, abandoned. This application Mar. 31, 1989, Ser. No. 331,701  
 Claims priority, application Japan, Jun. 21, 1985, 60-136509  
 Int. Cl.<sup>5</sup> H01L 21/476.3, 29/796, 21/339  
 U.S. Cl. 437—53 18 Claims

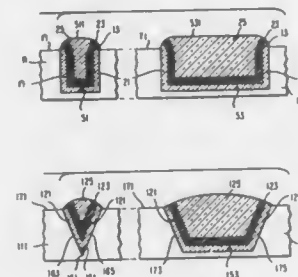


13. A process of fabricating a semiconductor charge-coupled device with a reduced surface state at the interface between a semiconductor substrate and an insulation layer disposed thereon of the charge-coupled device, said process comprising: providing a doped semiconductor substrate having an insulation layer disposed thereon and defining a semiconductor-insulator interface therebetween; exposing the surface of said insulation layer to a reactant gaseous atmosphere including silane and ammonia under conditions providing a high concentration of hydrogen ions; activating the reactant gaseous atmosphere by supplying RF energy thereto to produce hydrogen ion plasma and to deposit a nitride film on the surface of said insulation layer; selectively incorporating a multiplicity of hydrogen ions from the hydrogen ion plasma into said semiconductor substrate at a region adjacent to the top surface thereof and defining a hydrogen-rich portion of said semiconductor substrate disposed along said semiconductor-insulator interface in response to the activation of the reactant gaseous atmosphere; causing said hydrogen ions to combine with dangling bonds located along said semiconductor-insulator interface to provide said semiconductor-insulator interface with a reduced surface state due to the hydrogen ion-dangling bond combinations such that electron-hole recombination activity along said semiconductor-insulator interface is limited; and forming a plurality of spaced transfer electrodes on said insulation layer.

15. A process of fabricating a semiconductor charge-coupled device with a reduced surface state at the interface between a

semiconductor substrate and an insulation layer disposed thereon of the charge-coupled device, said process comprising: providing a doped semiconductor substrate having an insulation layer disposed thereon and defining a semiconductor-insulator interface therebetween; forming a metallized layer on the surface of said insulation layer to provide a metal-insulator interface therebetween; subjecting the resultant structure to an annealing procedure at a raised temperature; alloying atoms of metal in the metallized layer with atoms of semiconductor material contained in said insulation layer in response to said annealing procedure; diffusing metal atoms into the insulation layer as a consequence of alloying occurring between the metal atoms and the semiconductor atoms in the insulation layer to reorganize the atoms at the metal-insulator interface; and reducing the surface state at the semiconductor-insulator interface in response to reorganization of the atoms at the metal-insulator interface and the stress induced by such atom reorganization such that the fabricated charge-coupled device has a reduced dark current by virtue of electron-hole recombination activity being limited along said semiconductor-insulator interface.

**4,952,524**  
**SEMICONDUCTOR DEVICE MANUFACTURE INCLUDING TRENCH FORMATION**  
 Kuo-Hua Lee, and Chih-Yuan Lu, both of Lehigh County, Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed May 5, 1989, Ser. No. 347,975  
 Int. Cl.<sup>5</sup> H01L 21/76 13 Claims  
 U.S. Cl. 437—67



1. A method of semiconductor device fabrication comprising: forming a trench into a substrate; forming a diffusion barrier layer in said trench; characterized by the further steps of depositing a thermal stress-relief layer upon said barrier layer; depositing a filler material upon said thermal stress relief layer, said filler material having an outer surface and filling said trench, said filler material having a flow temperature which is lower than the flow temperature of said thermal stress relief layer; heating said filler material to at least its flow temperature to smooth said outer surface; and etching back said upper surface of filler material.

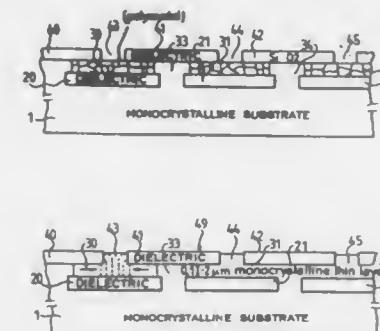
**4,952,525**  
**METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE IN WHICH A SILICON WAFER IS LOCALLY PROVIDED WITH FIELD OXIDE REGIONS**  
 Paulus A. van der Plas, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
 Continuation of Ser. No. 159,818, Feb. 24, 1988, abandoned.  
 This application Dec. 11, 1989, Ser. No. 453,092  
 Claims priority, application Netherlands, Mar. 6, 1987, 8700541

Int. Cl.<sup>5</sup> H01L 21/76  
 U.S. Cl. 437—69 8 Claims



1. In a method of manufacturing a semiconductor device including the steps of locally providing an oxidation mask on a surface of a silicon wafer, and thereafter subjecting said silicon wafer to an oxidation treatment to form a layer of field oxide at parts of said surface free of said oxidation mask, said layer having a first thickness equal to a required isolation thickness plus an additional thickness, the improvement comprising the steps of initially forming said layer of field oxide to a second thickness at least 100 nm larger than said first thickness and at most 250 nm larger than said first thickness, and thereafter etching said silicon wafer with a reactive ion plasma to reduce said second thickness to said first thickness, wherein edges of said layer of field oxide are maintained to eliminate failure of isolation regions.

**4,952,526**  
**METHOD FOR THE FABRICATION OF AN ALTERNATION OF LAYERS OF MONOCRYSTALLINE SEMICONDUCTING MATERIAL AND LAYERS OF INSULATING MATERIAL**  
 Didier Pribat, Paris; Leonidas Karapiperis, Bourg-La-Reine; Christian Collet, Limours, and Guy Garry, Rueil-Malmaison, all of France, assignors to Thomson-CSF, Puteaux, France  
 Filed Apr. 4, 1989, Ser. No. 333,083  
 Claims priority, application France, Apr. 5, 1988, 88 04437  
 Int. Cl.<sup>5</sup> H01L 21/20 21 Claims  
 U.S. Cl. 437—89

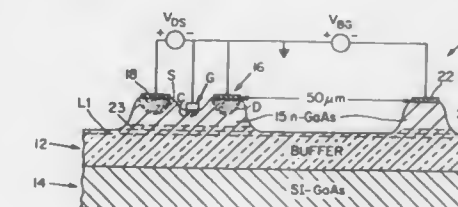


1. A method for the fabrication of at least one layer of mono-

crystalline semiconducting material on a first layer of an insulating material made on a monocrystalline semiconducting substrate, said method comprising the following steps:

- A first step for making said first layer of insulating material on the monocrystalline semiconducting substrate, said first layer of insulating material having a chemical attack selectivity with respect to the adjacent layers and permitting neither nucleation nor deposition from the species of said vapor phase on its surface exposed to the vapor phase.
- A second step for the etching of first apertures in the first layer of insulating material;
- A third step for making a layer of a semiconducting material in the first apertures and on the parts of the insulating layer that remain after the previous etching step, said layer of semiconducting material being monocrystalline in the apertures and polycrystalline on the insulator;
- A fourth step for the making of a second layer of an insulating material on the layer of semiconducting material;
- A fifth step of etching, in the second layer of insulating material, of at least one second aperture ending on a polycrystalline part of the layer of semiconducting material;
- A sixth step for the chemical attacking of the polycrystalline semiconducting material so as to eliminate all the polycrystalline semiconducting material and, possibly, so as to slightly attack the monocrystalline material;
- A seventh step for the selective growth, from a vapor phase of a monocrystalline semiconductor material in the space or spaces left free by the disappearance of the polycrystalline material.

**4,952,527**  
**METHOD OF MAKING BUFFER LAYERS FOR III-V DEVICES USING SOLID PHASE EPITAXY**  
 Arthur R. Calawa, Welleley; Frank W. Smith, Cambridge; Michael J. Manfra, Tewksbury, and Chang-Lee Chen, Sudbury, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.  
 Filed Feb. 19, 1988, Ser. No. 157,806  
 Int. Cl.<sup>5</sup> H01L 21/203, 21/20, 21/324 10 Claims  
 U.S. Cl. 437—107



1. A method of making an intermediate optically inert, electrically insulating crystalline layer of GaAs material on a substrate for growth thereon of high quality crystalline films comprising the steps of:

- forming in a chamber said crystalline layer of GaAs material by low temperature molecular beam deposition at less than 300° C. of a flux of Ga and As molecular beam species on a surface of a substrate formed of III-V materials;
- subjecting said layer to a heat treatment in an ambient containing arsenic;
- forming a thin stabilizing layer over said heat treated layer to minimize out diffusion of the arsenic.



**4,952,528**  
**PHOTOLITHOGRAPHIC METHOD FOR**  
**MANUFACTURING SEMICONDUCTOR WIRING**  
**PATTERNS**

Masahiro Abe, Yokohama; Yasukazu Mase, Fujisawa, and Toshihiko Katsura, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

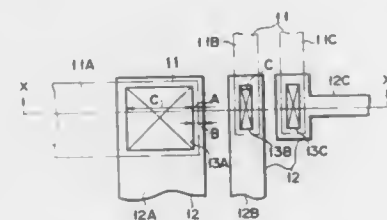
Filed Oct. 4, 1989, Ser. No. 416,779

Claims priority, application Japan, Oct. 6, 1988, 63-252701

Int. Cl.<sup>3</sup> H01L 21/47

U.S. Cl. 437—194

7 Claims



1. A method for manufacturing semiconductor devices comprising the steps of:  
 forming a first wiring pattern including at least first and second lower conductive layers formed on a semiconductor body;  
 forming an insulation film which covers said first wiring pattern;  
 forming a first contact hole of a first size and a second contact hole of a second size larger than the first size in first and second areas of said insulation film which lie over said first and second lower conductive layers; and  
 forming a second wiring pattern having first and second upper conductive layers respectively connected to said first and second lower conductive layers via said first and second contact holes;  
 wherein said contact hole formation step includes the sub-steps of forming a resist film which covers said insulation film; forming a resist pattern by effecting the photolithographic process of exposing said insulation film to light by using a mask pattern having a first contact hole defining area of a size substantially equal to the first size and a second contact hole defining area of a size smaller than the second size; and etching said insulation film with said resist pattern used as a mask; and the exposing light amount used in said resist pattern formation sub-step is previously determined so that the size of the first contact hole can be set equal to that of the first contact hole defining area, and the reduced amount of the second contact hole defining area is previously determined so that the size of the second contact hole obtained under the determined exposing light amount can be set equal to the second size.

**4,952,529**  
**METHOD OF COUPLING A TERMINAL TO A THICK**  
**FILM CIRCUIT BOARD**

Duane M. Grider, Eagan, Minn., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 19, 1988, Ser. No. 245,495

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> H01R 43/16

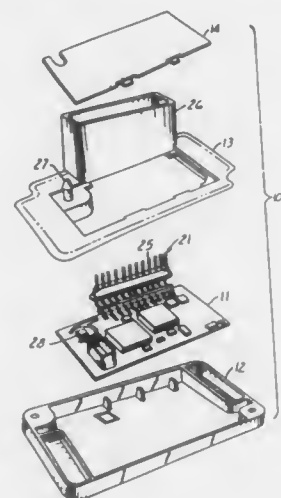
U.S. Cl. 437—209

9 Claims

1. A method of fabricating a thick film integrated circuit assembly having a thick film circuit board including the steps of:

forming a terminal having a plurality of parallel legs with an angled foot portion for connection to the thick film circuit board;  
 connecting the legs to each other for stabilization using a

elongated tie bar extending generally perpendicularly to the legs; and  
 forming the tie bar with sufficient mass and positioning it a sufficient distance from the foot so that, without damage



to the tie bar, heat can be applied to the foot to solder the terminal to the thick film circuit board thereby electrically and physically connecting the terminal to the thick film circuit board at the same time other components are connected to the thick film circuit board.

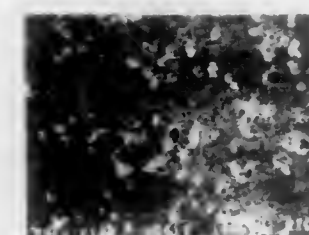
**4,952,530**  
**DENTAL COMPOSITE MATERIAL AND PROCESS**  
 Denis A. Brosnan, and Louis J. Colarusso, Jr., both of Solon, Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed Dec. 1, 1988, Ser. No. 278,792

Int. Cl.<sup>3</sup> C03C 11/00

U.S. Cl. 501—39

9 Claims



1. A process for forming a material suitable for incorporation into a dental composite comprising the steps of:  
 providing radio opaque a glass material having a softening range of at least 10° C. and having a particle size less than 250 mesh to provide a precursor powder;  
 mixing said precursor mix with a fugitive pore forming material and a binder to form a pressable mix;  
 pressing said pressable mix at a pressure in excess of 5,000 pounds per square inch to form a sinterable mix;  
 sintering said sinterable mix at an elevated temperature for a period of time sufficient to remove said fugitive pore forming material and to form a sintered mass;  
 crushing said sintered mass to form particles of less than 250 micrometers in size to be incorporated into a dental composite.

**4,952,531**  
**SEALING GLASS FOR MATCHED SEALING OF COPPER**  
**AND COPPER ALLOYS**

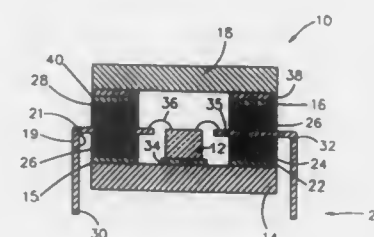
Satyam C. Cherukuri, West Haven, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 17, 1988, Ser. No. 169,635

Int. Cl.<sup>3</sup> C03C 3/085, 3/105, 3/091, 3/108

U.S. Cl. 501—69

8 Claims



1. A sealing glass comprised of a homogeneous mixture of oxides, consisting essentially of:  
 at least 50 molar percent SiO<sub>2</sub>;  
 from about 12 to about 15 molar percent BaO such that said sealing glass has a coefficient of thermal expansion of from about  $165 \times 10^{-7}$  in/in/°C. to about  $175 \times 10^{-7}$  in/in/°C.;  
 from about twenty to about thirty molar percent of an alkaline oxide component, said alkaline oxide component comprised of at least two alkaline oxides selected from the group consisting of Na<sub>2</sub>O, K<sub>2</sub>O and Li<sub>2</sub>O;  
 from about 0.5 molar percent to about five molar percent Al<sub>2</sub>O<sub>3</sub>; and  
 up to about ten molar percent of an additive selected from the group consisting of B<sub>2</sub>O<sub>3</sub>, P<sub>2</sub>O<sub>5</sub>, MgO, CaO, GeO<sub>2</sub>, SrO, PbO and mixtures thereof.

**4,952,532**  
**SINTERED BODY HAVING HIGH CORROSION**  
**RESISTANCE AND CONTAINING ZRB<sub>2</sub>**

Kei Itozaki, Omata; Hirotsugu Matsunaga, Okawa, and Yasuo Imamura, Omata, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 253,676

Claims priority, application Japan, Oct. 6, 1987, 62-250728; Oct. 6, 1987, 62-250730

Int. Cl.<sup>3</sup> C04B 35/56, 35/58

U.S. Cl. 501—87

6 Claims

1. A sintered body having high corrosion resistance and containing ZrB<sub>2</sub> obtained by sintering a starting powder material consisting essentially of 5 to 40% by weight of BN and not less than 50% by weight of a starting powder mixture consisting essentially of Cr<sub>3</sub>C<sub>2</sub> and a boride represented by the formula (XB<sub>2</sub>)<sub>n</sub> wherein n represents an integer of 1 or 2 and when n is an integer equal to 1, X represents a zirconium atom and when n is an integer equal to 2, X represents a zirconium atom and a titanium atom, respectively, and B represents a boron atom, the weight ratio of the Cr<sub>3</sub>C<sub>2</sub>: the boride being 50 to 0.5 : 30 to 99.5.

**4,952,533**  
**SILICON CARBIDE CERAMIC BONDING**  
**COMPOSITIONS**

Tatsuhiko Hongu, Yokohama, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 393,778, Aug. 15, 1989, abandoned. This application Feb. 2, 1990, Ser. No. 474,321

Claims priority, application Japan, Aug. 15, 1988, 63-202827

Int. Cl.<sup>3</sup> C04B 35/56

U.S. Cl. 501—90

7 Claims

1. A bonding composition for silicon carbide ceramics, comprising

silicon carbide powder having an average particle size of 1 to 50 μm,  
 carbon powder having an average particle size of up to 15 μm,  
 silicon powder having an average particle size of up to 10 μm,  
 a thermosetting resin selected from the group consisting of phenol resins, silicone varnishes, melamine resins, phenol-melamine resins and alkyd resins,  
 a catalytically curable resin selected from the group consisting of furan resins, epoxy resins, unsaturated polyester resins and urea resins, and  
 a curing agent for the catalytically curable resin,  
 wherein said carbon powder is blended in an amount of 5 to 30% by weight based on the total weight of said silicon carbide powder, carbon powder and silicon powder,  
 said catalytically curable resin is blended in an amount of 5 to 20% by weight based on the total weight of said silicon carbide powder, carbon powder and silicon powder,  
 said thermosetting resin is blended in an amount of one-half to one-third of the weight of said catalytically curable resin,  
 said curing agent is blended in an amount of 1 to 20% by weight of the amount of said catalytically curable resin, and  
 0.4 to 2.2 parts by weight of said silicon carbide powder and 1.9 to 4.2 parts by weight of said silicon powder are blended per part by weight of the total carbon in said carbon powder plus carbon present resulting from thermal decomposition of said thermosetting resin, said catalytically curable resin, and said curing agent, said total carbon being present in the resulting bonding layer in an amount of 10 to 50% by weight of said bonding layer.

**4,952,534**  
**SPRAYABLE PLASTIC REFRACTORY**  
 Allen R. Davis, and Elbert A. Willis, both of Mexico, Mo., assignors to A. P. Green Industries, Inc., Mexico, Mo.

Division of Ser. No. 120,187, Nov. 9, 1987, Pat. No. 4,810,537, which is a continuation of Ser. No. 933,264, Nov. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 910,059, Sep. 22, 1986, abandoned. This application Dec. 15, 1988, Ser. No. 285,087

Int. Cl.<sup>3</sup> C04B 35/66, 35/68

U.S. Cl. 501—94

10 Claims

1. A gunnable plastic refractory composition having a workability index of from about 8% to about 30% and containing from about 0.05% to about 0.2% by weight of a hydrocolloid selected from the group consisting of xanthan gum and an ether of a polysaccharide.

**4,952,535**  
**ALUMINUM NITRIDE BODIES AND METHOD**  
 Gregory A. Merkel, Painted Post, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Jul. 19, 1989, Ser. No. 381,848

Int. Cl.<sup>3</sup> C04B 35/00

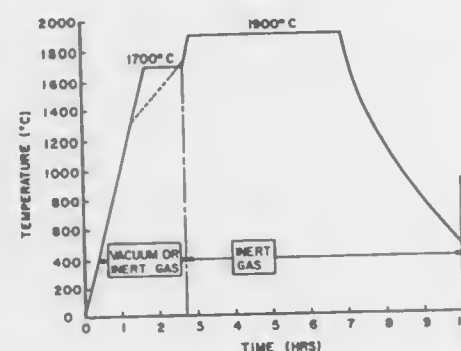
U.S. Cl. 501—96

53 Claims

26. A method of fabricating a sintered aluminum nitride ceramic body which comprises,

a. forming a compacted body from finely-divided aluminum nitride powder,  
 b. firing the porous aluminum nitride body at a moderate temperature to remove any organic components,  
 c. heating the body to about 1300° C. in a non-oxidizing environment,  
 d. maintaining the body in such atmosphere within the temperature range of 1300°–1750° C. for about one to five hours,

e. further heating the body to a sintering temperature in the range of 1800°–2000° C. in a non-oxidizing atmosphere,



f. maintaining the body in that temperature range and atmosphere for at least an hour but not over 24 hours, and g. cooling.

4,952,536

HIGH STRENGTH  $Al_2O_3$ 

Jacob Block, Rockville, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Feb. 23, 1989, Ser. No. 314,001  
Int. Cl.<sup>5</sup> C04B 35/10

U.S. Cl. 501—127

16 Claims

1. A method of producing an extruded  $Al_2O_3$  body having a high flexural strength comprising the steps of:

- forming an extrusion mixture of  $\alpha-Al_2O_3$  powder, an organic dispersing agent, up to 2.0wt % of an organic binder, and a zirconia sol, the amount of said sol being such that upon firing, the  $ZrO_2$  is present in the final body in an amount of no more than 1 w/o;
- extruding the mixture of step (a) to form an extruded body;
- sintering the extruded body to form a final  $Al_2O_3$  body containing no more than 1 w/o  $ZrO_2$  having high flexural strength and having a 3 point flexural strength greater than 55,000 psi.

4,952,537

## CERAMIC PRODUCTS AND PROCESS FOR PRODUCING THE SAME

Koichi Hayaishi, Kanagawa, and Takeshi Suzuki, Kanagawa, both of Japan, assignors to Toto, Ltd., Fukuoka, Japan  
Filed Mar. 25, 1988, Ser. No. 173,445

Claims priority, application Japan, Mar. 26, 1987, 62-72671; Mar. 26, 1987, 62-72672

Int. Cl.<sup>5</sup> C04B 35/10

U.S. Cl. 501—127

8 Claims

1. A ceramic sintered product consisting essentially of grains in a solid solution state, the grains consisting essentially of 0.7 to 3.0 weight % chromia and not more than 0.05 weight % magnesia and the balance alumina,

wherein the sizes of said grains are no greater than 4.0  $\mu m$ , and said grains have an average grain size no greater than 2.0  $\mu m$ ,

the sizes of pores remaining in the interior of said product being less than 0.1  $\mu m$ , and

wherein said product has a hardness greater than 2,000HV and a density of 3.99 gm/cm<sup>3</sup>.

4,952,538

## CERAMIC AND CIRCUIT SUBSTRATE AND ELECTRONIC CIRCUIT SUBSTRATE BY USE THEREOF

Motoo Kumagai, Yokohama; Keiichi Kato, Tokyo; Masato Nagano, Iwamizawa, and Michiaki Sakaguchi, Hokkaido, all of Japan, assignors to Canon Kabushiki Kaisha and Nippon Oil & Fats Co., Ltd., both of Tokyo, Japan  
Filed Jun. 30, 1988, Ser. No. 213,891

Claims priority, application Japan, Jul. 2, 1987, 62-166415  
Int. Cl.<sup>5</sup> C04B 35/46; B32B 3/00

U.S. Cl. 501—136

6 Claims

1. A ceramic comprising therein at least two dielectric regions including (a) a first region having (i) a principal composition consisting of from 49.50–54.00 mole percent of  $TiO_2$  and from 50.50–46.00 mole percent of  $SrO$ ; (ii) from 0.50–5.30 moles  $MnO_2$  per 100 moles of the principal composition and (iii) from 0.02–0.40 moles  $Y_2O_3$  per 100 moles of said principal composition; and (b) a second region having (i) a principal composition consisting of from 49.50–54.00 mole percent of  $TiO_2$  and from 50.50–46.00 mole percent of  $SrO$ ; (ii) from 0.50–5.30 moles  $MnO_2$  per 100 moles of the principal composition and (iii) from 0.02–0.40 moles  $Y_2O_3$  per 100 moles of the principal composition; and (iv) from 0.40–5.00 moles  $MgO$  per 100 moles of said principal composition.

4,952,539

## METHOD FOR THE MANUFACTURE OF TRANSPARENT ALUMINUM OXIDE CERAMIC

Jörg F. Greber, Schwandorf, and Heldemarle Melas, Trolsdorf, both of Fed. Rep. of Germany, assignors to Vereinigte Aluminium-Werke Aktiengesellschaft, Fed. Rep. of Germany  
Filed Jan. 23, 1989, Ser. No. 302,189

Int. Cl.<sup>5</sup> C04B 35/10

U.S. Cl. 501—153

12 Claims

1. A method for preparing an acid-containing aluminum oxide monohydrate for use in producing transparent ceramic comprising:

- providing an aluminum alkoxide in a solvent; peptisizing and hydrolyzing the aluminum alkoxide with a mixture of water vapor and an acid vapor; removing the solvent and any distillable byproducts from the mixture, leaving a residue;
- adding water to the residue;
- heating the residue and water until a homogeneous gel is produced; and,
- drying the gel which comprises an aluminum oxide monohydrate including about 12.5 to 25% by weight acid bound thereto.

4,952,540

## FINELY DIVIDED ALUMINOXANE, PROCESS FOR PRODUCING SAME AND ITS USE

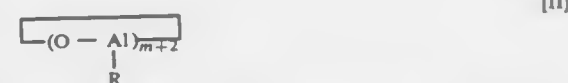
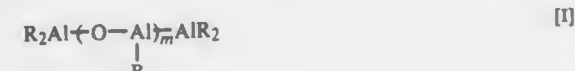
Mamoru Kioka, and Norio Kasaiwa, both of Iwakuni, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan  
Filed Feb. 11, 1988, Ser. No. 155,075

Claims priority, application Japan, Feb. 14, 1987, 62-31926  
Int. Cl.<sup>5</sup> C08F 4/64; B01J 31/14

U.S. Cl. 502—9

32 Claims

1. A finely divided aluminosilicate comprising an aluminosilicate represented by formula [I] or [II]



wherein R denotes a hydrocarbon group having 1 to 10 carbon atoms and m denotes an integer of 2 to 50,

an average particle size being 5 to 200  $\mu m$  and a specific surface area being 20 to 1,000 m<sup>2</sup>/g.

4,952,541

## ACRYLONITRILE DIMERIZATION PROCESS AND METHOD OF TREATING RESIDUAL CATALYST

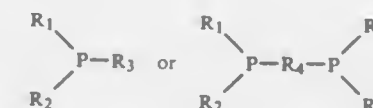
William A. Heckle; Marion J. Mathews, III, both of Pensacola, Fla., and P. Robert Peoples, St. Louis, Mo., assignors to Monsanto Company, Pensacola, Fla.  
Filed Sep. 1, 1989, Ser. No. 401,722

Int. Cl.<sup>5</sup> B01J 38/70

U.S. Cl. 502—22

4 Claims

1. A process for treating dicyanobutene containing residual dimerization catalyst selected from the group consisting of organic phosphorus (III) compounds represented by the formula:



wherein  $R_1$  is a hydrocarbyl group,  $R_2$  is an alkoxy or cycloalkoxy group,  $R_3$  is a hydrocarbyl, alkoxy or cycloalkoxy group, and  $R_4$  is a divalent hydrocarbyl group, said process comprising contacting the residual catalyst with an oxidizing agent and converting the catalytic phosphorus to the plus 5 oxidation state.

4,952,542

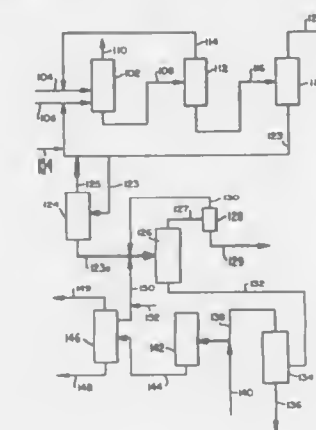
## PROCESS FOR THE PRODUCTION OF ALKYLENE CARBONATE AND RECOVERY OF CATALYST

Bernard C. Ream, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.  
Division of Ser. No. 63,977, Jun. 19, 1987, Pat. No. 4,877,886.  
This application Aug. 4, 1989, Ser. No. 389,515

Int. Cl.<sup>5</sup> B01J 38/60, 38/62

U.S. Cl. 502—27

6 Claims



1. A process for the separation of a salt having an inorganic cation from a liquid medium in which said salt is soluble and which liquid medium contains organohydroxide compound comprising contacting the liquid medium with sufficient amount of acylation agent comprising at least one lower organic acid having from 1 to 16 carbon atoms or acid anhydride under acylation conditions to acylate at least a portion of the organohydroxide compound and to reduce the solubility of the salt in the liquid medium and form precipitate of the salt, and separating precipitated salt from the acylated liquid medium.

4,952,543

## PROCESS FOR DISPERSING OR REDISPERSING A GROUP VIII NOBLE METAL SPECIES ON A POROUS INORGANIC SUPPORT

Yun-Yang Huang, Voorhees; Rene B. LaPierre, Medford, and William D. McHale, Swedesboro, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 89,654, Aug. 26, 1987, Pat. No. 4,849,385. This application Dec. 9, 1988, Ser. No. 282,363  
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> B01J 38/42, 38/04, 29/12, 23/96

U.S. Cl. 502—35

26 Claims

1. A process for dispersing or redispersing a Group VIII noble metal component of a catalytic material comprising the noble metal component supported on a porous inorganic support material containing no, or at most a minor, amount of carbonaceous material which process comprises:

- contacting the supported Group VIII noble metal component on the support with nitric oxide at a temperature of 200° to 1000° F. providing dispersion or redispersion of the noble metal component on the support; and,
- purging nitrogen oxide(s) at a temperature of 200° to 1000° F. from the catalytic material comprising a dispersed/redispersed noble metal component, the benzene hydrogenation activity of the catalytic material containing the supported dispersed/redispersed noble metal being substantially higher than the benzene hydrogenation activity of the catalytic material prior to contacting step (a).

4,952,544

## STABLE INTERCALATED CLAYS AND PREPARATION METHOD

John R. McCauley, Louisville, Md., assignor to UOP, Des Plaines, Ill.

Filed Mar. 5, 1987, Ser. No. 21,972  
Int. Cl.<sup>5</sup> B01J 21/16, 29/04

U.S. Cl. 502—68

56 Claims

1. A hydrothermally-stable clay composition having pillars comprising an oligomer of (a) at least one pillaring metal, (b) at least one rare earth element and (c) oxygen, intercalated between the layers of at least one colloidal expandable, swelling layered, lattice clay mineral or synthetic analogue thereof, wherein said oligomer imparts a surface area of at least 250 m<sup>2</sup>/g after hydrothermal treatment at 760° C. for five hours, when exposed to 100% steam.

15. Combination of a zeolite and the clay composition of claim 1.

26. Hydrothermally-stable clay composition comprising aluminum-rare earth elements-oxygen oligomers intercalated between the interlayers of a colloidal, expandable clay.

4,952,545

## PROCESS FOR REMOVING NITROGEN OXIDES FROM EXHAUST GASES

Makoto Imanari; Takeo Koshikawa, both of Ami; Akihiro Yamauchi, Koganei; Masayuki Hanada, Kitakyushu; Morio Fukuda, Kitakyushu, and Kiyoshi Nagano, Kitakyushu, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd.; Mitsubishi Jukogyo Kabushiki Kaisha; Catalysts & Chemicals Industries, Co., Ltd. and Mitsubishi Petrochemical Engineering Co., Ltd., all of Tokyo, Japan  
Division of Ser. No. 79,158, Jul. 29, 1987, Pat. No. 4,855,115.

This application Jun. 12, 1989, Ser. No. 365,111  
Claims priority, application Japan, Jul. 29, 1986, 61-178347; Jun. 19, 1987, 62-151450

Int. Cl.<sup>5</sup> B01J 21/06, 23/22, 23/24, 29/04

U.S. Cl. 502—73

3 Claims

1. A catalyst for treating an exhaust gas containing nitrogen oxides and an arsenic compound by reducing the nitrogen oxides in the exhaust gas and rendering them nontoxic, said



catalyst comprising the following components (A)', (B)', (C)' and (D)' as catalytically active ingredients:

- (A)' an oxide of titanium,
- (B)' an oxide of at least one metal selected from the group consisting of tungsten and molybdenum,
- (C)' an oxide of vanadium, and
- (D)' at least one metal selected from the group consisting of yttrium, lanthanum, cerium, neodymium, copper, cobalt, manganese and iron, said component (D)' being deposited on zeolite in the form of a metal ion which is ion-exchanged with the cation of the zeolite.

4,952,546

#### CATALYST SYSTEM FOR SELECTIVE ALKYLATION OF TOLUENE

Pekka Knautila, Porvoo; Erkki Halme, Helsinki; Leila Laitinen, Helsinki, and Salme Koskimies, Helsinki, all of Finland, assignors to Neste Oy, Finland  
PCT No. PCT/FI87/00174, § 371 Date Aug. 11, 1988, § 102(e) Date Aug. 11, 1988, PCT Pub. No. WO88/04955, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 29, 1987, Ser. No. 235,886  
Claims priority, application Finland, Dec. 31, 1986, 865362  
Int. Cl.<sup>3</sup> B01J 21/02, 23/10, 23/14, 27/232  
U.S. Cl. 502—174 6 Claims

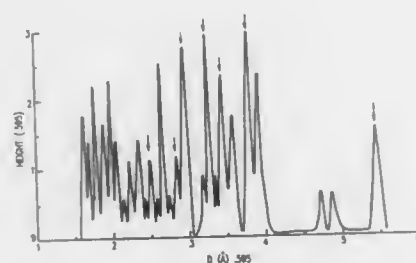
1. A catalyst system for selective alkylation of toluene with propylene, wherein said system contains metallic sodium on a K<sub>2</sub>CO<sub>3</sub> carrier, and a promoter which is selected from the group consisting of CeO<sub>2</sub>, Dy<sub>2</sub>O<sub>3</sub>, PbO<sub>2</sub>, and B<sub>2</sub>O<sub>3</sub>.

4,952,547

#### CATALYST FOR CONVERTING METHANE TO HIGHER HYDROCARBONS, INCLUDING AROMATIC COMPOUNDS

Ananth V. Annapragada, and Erdogan Gulari, both of Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.

Filed Jul. 25, 1988, Ser. No. 223,619  
Int. Cl.<sup>3</sup> B01J 27/185  
U.S. Cl. 502—213 17 Claims



1. A supported iron:phosphorous:oxide catalyst composition, wherein said catalyst has an Fe:P molar ratio of 0.1:1.0 to 2.0:1.0, said supported catalyst being obtained by a process comprising:

- (i) combining (ia) ferric nitrate or ferric ammonium nitrate and (ib) phosphoric acid or an alkali metal phosphate in an amount of water sufficient to obtain a slurry;
- (ii) adding to the slurry, under stirring, a catalyst support;
- (iii) drying the slurry of step (ii) in air to obtain a catalyst precursor; and
- (iv) heating the catalyst precursor to a temperature of at least 725° C. in a dioxygen-containing gas to activate said catalyst precursor and obtain said catalyst.

4,952,548

#### CATALYST FOR REMOVING NITROGEN OXIDES

Yasuyoshi Kato; Kunihiko Konishi; Hiroshi Akama; Toshiaki Matsuda; Nobue Teshima; Fumito Nakajima; Tadaaki Mizoguchi, and Masahiro Nitta, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 18, 1988, Ser. No. 259,178  
Claims priority, application Japan, Oct. 26, 1987, 62-270004  
Int. Cl.<sup>3</sup> B01J 21/06, 23/22, 23/28, 23/30

U.S. Cl. 502—217 4 Claims  
1. A catalyst for removing nitrogen oxides from exhaust gases which include catalyst-deteriorating heavy metals, said catalyst comprising:

- a first component comprising titanium oxide in crystallite form having a size of 185 Å to 300 Å, and being in the direction of a plane (101), with interplanar spacing of about 3.52 Å;
- a second component comprising molybdenum oxide and/or tungsten oxide;
- a third component comprising vanadium oxide and/or sulfate, the atomic ratios of Ti:Mo and/or W:V being 80-96.5:3-15:0.5-5, said TiO<sub>2</sub> crystallite having a size which prevents catalyst deterioration; and,
- adsorption sites on said titanium oxide crystallite which are covered with molybdenum oxide to prevent adsorption of heavy metals onto said titanium oxide crystallite, whereby the deterioration of said catalyst by the exhaust gas heavy metals is reduced.

4,952,549

#### RUTHENIUM CATALYST, PROCESS FOR ITS PREPARATION AND PROCESS FOR THE PREPARATION OF A MIXTURE OF CYCLOHEXYLAMINE AND DICYCLOHEXYLAMINE USING THE RUTHENIUM CATALYST

Otto Immel, and Hans-Helmut Schwarz, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 10, 1989, Ser. No. 295,319  
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801756  
Int. Cl.<sup>3</sup> B01J 23/56, 23/58; C07C 85/24, 87/36  
U.S. Cl. 502—330 17 Claims

1. A process for the preparation of a mixture of a substituted or unsubstituted cyclohexylamine and a substituted or unsubstituted dicyclohexylamine by hydrogenation of a substituted or unsubstituted aniline in the presence of a ruthenium catalyst, wherein the catalyst comprises ruthenium and palladium on a support containing the noble metals in a total amount of 0.05-5% by weight and a weight ratio of ruthenium to palladium such as 1:9-9:1 and furthermore containing 0.1-10% by weight of an alkaline alkali metal compound, all percentages being based on the total weight of the catalyst, said hydrogenation being carried out at 150°-220° C. and at a pressure of 0.5-10 bar.

4,952,550

#### PARTICULATE ABSORBENT MATERIAL

Donald F.H. Wallach, An-Cheng Chang, Nashua, both of Hollis, N.H., assignor to Micro Vesicular Systems, Inc., Nashua, N.H.

Continuation-in-part of Ser. No. 320,944, Mar. 9, 1989. This application Mar. 8, 1990, Ser. No. 490,356  
Int. Cl.<sup>3</sup> B01J 13/00, 20/22, 20/26

U.S. Cl. 502—404 20 Claims  
1. A method of making a particulate absorbent material comprising the steps of:

- A. reacting a carboxylated cellulosic material with
  - i. a cross-linking agent, and
  - ii. a hydrophobicity agent;
- B. separating the reaction product; and
- C. removing water from said reaction product until it is

substantially dehydrated and a particulate is formed of said absorbent material.

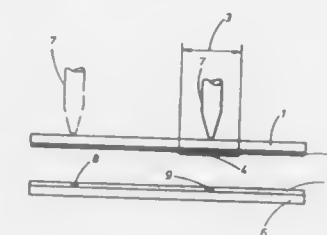
4,952,551

#### COPY FORM SET

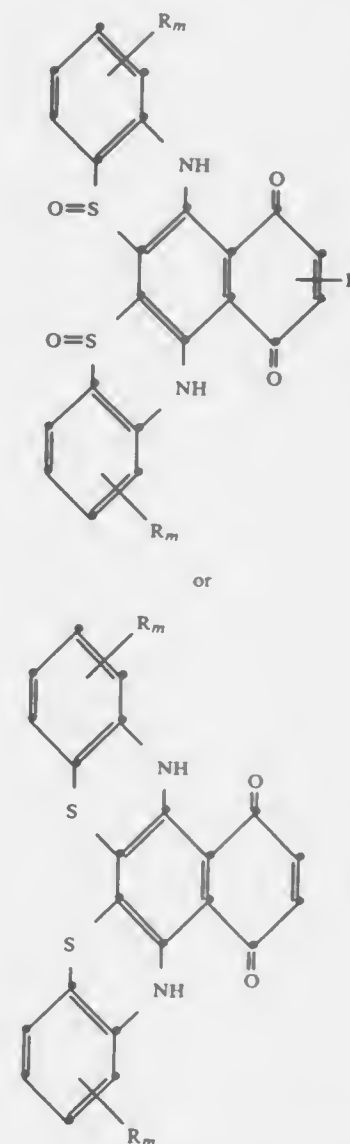
Walter Buehler, Edelweisring 38, D-8901 Koenigsbrunn, Fed. Rep. of Germany

Filed Apr. 6, 1988, Ser. No. 178,128  
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 8705322[U]

Int. Cl.<sup>3</sup> B41M 5/22 13 Claims  
U.S. Cl. 503—204



1. Copy form set which comprises, a transmitter sheet whose transmitter side is provided with a layer of microencapsulated dye precursors (CB substances), as well as a receiver sheet whose receiver side facing the transmitter side of the transmitter sheet is provided with color-developing adsorbing substances (CF substances), characterized in that the transmitter side of the transmitter sheet comprises an additional ink layer over said CB substances opposite said transmitter sheet which is adapted to be transmitted during the copying act on the receiver side of the receiver sheet in order to reinforce the writing on the receiver side.



wherein:

- Z represents the atoms necessary to complete a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;
- each R independently represents hydrogen, a substituted or unsubstituted alkyl or alkoxy group having from 1 to about 6 carbon atoms or an aryl or hetaryl group having from about 5 to about 10 atoms;
- m is 4; and
- n is 2.

4,952,552

#### INFRARED ABSORBING QUINOID DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER

Derek D. Chapman, and Charles D. DeBoer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Continuation-in-part of Ser. No. 369,493, Jun. 20, 1989. This application Jan. 10, 1990, Ser. No. 463,110

Int. Cl.<sup>3</sup> B41M 5/035, 5/26  
U.S. Cl. 503—227 18 Claims

7. In a process of forming a laser-induced thermal dye transfer image comprising

- (a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and
  - (b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image,
- the improvement wherein said infrared-absorbing material is located in said dye layer and is a quinoid dye derived from an anthraquinone or naphthoquinone having the following formula:

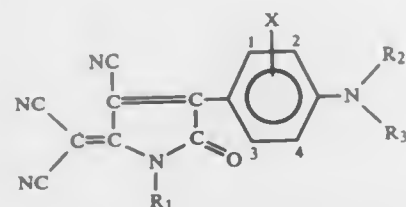
4,952,553

#### HEAT TRANSFER SHEET

Junpei Kanto, and Hitoshi Saito, both of Shinjuku, Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan  
Filed Jan. 31, 1989, Ser. No. 304,040

Claims priority, application Japan, Feb. 2, 1988, 63-21227  
Int. Cl.<sup>3</sup> B41M 5/035, 5/26

U.S. Cl. 503—227 4 Claims  
1. A heat transfer sheet, comprising a substrate sheet having opposed surfaces and a dye carrying layer formed on one of the opposed surfaces of said substrate sheet, said dye carrying layer comprising a binder and a dye represented by the formula (I) shown below:



wherein  $R_1$ ,  $R_2$  and  $R_3$  each represent a hydrogen atom, a substituted or unsubstituted alkyl, cycloalkyl, alkenyl, alkynyl or phenyl group, and  $X$  represents a hydrogen atom, a halogen atom, an alkyl or alkoxy group,  $-NHCOR$  or  $-NHSO_2R$ ,  $R$  having the same meaning as  $R_1$ .

4,952,554

#### APPARATUS AND SYSTEMS COMPRISING A CLAD SUPERCONDUCTIVE OXIDE BODY, AND METHOD FOR PRODUCING SUCH BODY

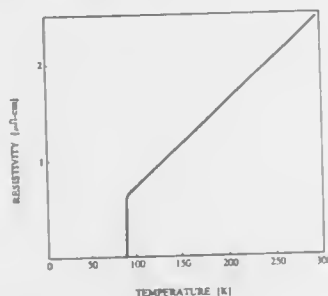
Sungcho Jin, Millington; Richard C. Sherwood, New Providence, and Robert B. van Dover, Berkeley Heights, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 34,117, Apr. 1, 1987, abandoned. This application Apr. 6, 1987, Ser. No. 36,160

Int. Cl.<sup>5</sup> H01L 39/12, 5/08, 39/24

U.S. Cl. 505—1

23 Claims



19. An article of manufacture comprising an elongate superconductive body, wherein the superconductive body comprises a normal metal cladding material contactingly surrounding substantially sintered oxide powder, with at least a portion of the cladding that is in contact with the oxide powder consisting essentially of normal metal that is substantially inert with respect to oxygen and with respect to the oxide powder under heat treatment conditions used during manufacture of the elongate body.

4,952,555

#### SUPERCONDUCTING MATERIAL $BA_{1-x}(Y_{1-w}Zr_w)CuO_z$ ( $\gamma = Ti, Zr, Hf, Si, Ge, Sn, Pb, \text{ or } Mn$ ) AND A PROCESS FOR PREPARING THE SAME

Kenichiro Sibata; Nobuyuki Sasaki; Shuji Yazu, and Tetsuji Jodai, all of Hyogo, Japan, assignors to Sumimoto Electric Industries, Ltd., Osaka, Japan

Filed Mar. 28, 1988, Ser. No. 173,940

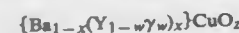
Claims priority, application Japan, Mar. 28, 1987, 62-74967

Int. Cl.<sup>5</sup> C01B 13/32; C01F 11/02, 17/00; C01G 3/02

U.S. Cl. 505—1

15 Claims

1. Superconducting material of oxide which have a composition represented by the general formula:



in which,

" $\gamma$ " represents at least one element selected from a group consisting of titanium (Ti), zirconium (Zr), hafnium (Hf),

silicon (Si), germanium (Ge), tin (Sn), lead (Pb) and manganese (Mn), and  
 $x$ ,  $w$  and  $z$  represent numbers which are selected in the following ranges:  
 $0.4 \leq x \leq 0.6$   
 $1 \leq z \leq 5$ ;  $0.1 \leq w \leq 0.2$   
 and which have crystal structures of perovskite type or quasi-perovskite type.

4,952,556

#### PATTERNING THIN FILM SUPERCONDUCTORS USING FOCUSED BEAM TECHNIQUES

Joseph V. Mantese, Washington; Aboud H. Hamdi, Detroit; Adolph L. Michell, Mt. Clemens, and Antonio B. Catalan, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 130,135, Dec. 8, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 226,220

Int. Cl.<sup>5</sup> B05D 3/06, 5/12

U.S. Cl. 505—1

8 Claims

1. A method for producing patterned films of superconductor materials comprising the steps of:

preparing a solution from the neodecanoates of yttrium, barium, and copper, said metals form an oxide mixture exhibiting superconductive properties characterized by a ratio of yttrium to barium to copper of approximately 1:2:4, said solution comprising up to approximately 25 volume percent pyridine in xylene;

depositing a film of said solution onto a substrate; exposing selective regions of said film to an electron beam in a substantially vacuum environment so that said exposed regions of said film become insoluble in a second organic solvent, said electron beam being focused to a beam diameter ranging between about 5 to 500 nanometers and an energy level ranging between about 20–50 keV, said electron beam emitting a dose of about 1200 micro-Coulombs per square centimeter;

immersing said film into said second organic solvent so that said insoluble, exposed regions of said film remain on said substrate, said second organic solvent comprising primarily xylene;

heating said film to a temperature of approximately 500° C. for a duration of approximately 5 minutes sufficient to thermally decompose said metal neodecanoates into a film containing metal oxides, but insufficient to significantly recrystallize said oxides; and

heating said oxide film at a second temperature ranging between about 850° C. to about 1000° C. for a duration of up to about 60 minutes that is sufficient to promote recrystallization and grain growth of said metal oxides within said film and induce a change therein by which said film exhibits superconducting properties.

4,952,557

#### FORMATION OF SUPERCONDUCTING ARTICLES BY ELECTRODEPOSITION

Ferenc Schmidt, Brynmawr, Pa., assignor to Ametek, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 118,657, Nov. 9, 1987, abandoned. This application Jul. 6, 1988, Ser. No. 215,581

Int. Cl.<sup>5</sup> C25B 7/00

U.S. Cl. 505—1

40 Claims

1. A method for forming an oxide superconducting material on an article comprising the steps of:

(a) preparing a mixture of components needed to synthesize the oxide superconducting material;  
 (b) preparing a colloidal dispersion of the mixture in a substantially non-conducting liquid medium;  
 (c) placing two electrodes in the liquid medium wherein one of the electrodes comprises the article upon which deposition is desired;  
 (d) applying a difference in electrical potential between the

two electrodes such that the mixture of components in the medium forms a deposit on the electrode which comprises the article; and  
 (e) heating the deposit in an oxygen-containing atmosphere to form the oxide superconducting material.

4,952,558

#### PREPARATION OF COPOLYMERS OF ETHYLENICALLY UNSATURATED DICARBOXYLIC ANHYDRIDES AND ALKYL VINYL ETHERS

Hans-Helmut Goertz, Freinsheim; Hans-Juergen Raubenheimer, Ketsch, and Walter Denzinger, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,046

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736996

Int. Cl.<sup>5</sup> C08F 222/04

U.S. Cl. 526—27.1

6 Claims

1. A process for the preparation of a copolymer of ethylenically unsaturated dicarboxylic anhydrides and alkyl vinyl ethers by copolymerization of

(a) an ethylenically unsaturated dicarboxylic anhydride of 4 to 6 carbon atoms,  
 (b) methyl vinyl ether or a mixture of methyl vinyl ether with up to 10 mol %, based on the mixture, of other alkyl vinyl ethers and  
 (c) from 0 to 2% by weight, based on the monomers (a) and (b), of a crosslinking agent containing two or more ethylenically unsaturated double bonds,

in the presence of a polymerization initiator in a medium consisting essentially of an ester of not less than 5 carbon atoms which is obtained from a saturated aliphatic carboxylic acid and a saturated monohydric alcohol, wherein the monomers are soluble in the ester and the resulting copolymer is virtually insoluble therein.

4,952,559

#### FRAGRANCE ADDITIVE

Robert B. Login, Oakland, and Michael W. Helioff, Westfield, both of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, and a continuation-in-part of Ser. No. 91,010, Aug. 28, 1987, Pat. No. 4,883,655, and a continuation-in-part of Ser. No. 91,008, Aug. 28, 1987, Pat. No. 4,830,858, and a continuation-in-part of Ser. No. 91,149, Aug. 28, 1987, Pat. No. 4,837,013, and a continuation-in-part of Ser. No. 67,195, Jun. 29, 1987, Pat. No. 4,834,970. This application Mar. 1, 1989, Ser. No. 317,394

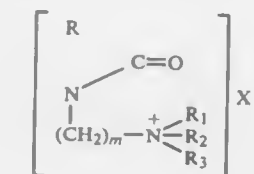
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 7/46

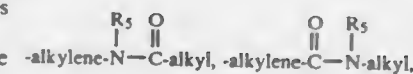
U.S. Cl. 512—10

23 Claims

1. The composition comprising a quaternary lactam having the formula:



wherein  $X^-$  is an anion;  $m$  is an integer having a value of from 1 to 4;  $R$  is linear alkylene having from 3 to 8 carbon atoms and is optionally substituted with  $C_1$  to  $C_4$  alkyl;  $R_1$ ,  $R_2$  and  $R_3$  are each independently selected from the group of alkyl, alkyleneoxyalkyl, alkoxy, alkyleneoxyalkenyl, alkylhydroxy, aryl, aralkenyl, aralkyl, alkaryl,



$R_5$  is hydrogen or alkyl, said groups each having up to 30 carbon atoms and at least one of  $R_1$ ,  $R_2$  and  $R_3$  is a radical having from 8 to 30 carbon atoms, except that alternatively  $R_2$  and  $R_3$  with the quaternized nitrogen can form a 5 to 14 membered heterocyclic ring having from 1 to 2 heteroatoms selected from the group of oxygen, nitrogen and sulfur, in which case  $R_1$  can be any of the aforementioned groups or can represent a bond in an unsaturated quaternized heterocyclic ring; and an odoriferous fragrance containing compound having an acidic hydrogen atom and from 3 to 50 carbon atoms wherein the weight ratio of fragrance to quaternary lactam is between about 1:0.05 and about 1:10.

4,952,560

#### ointment BASE

Kazuo Kigasawa; Hideaki Ohtani; Makoto Tanada, and Shigeru Hayashida, all of Tokyo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 720,402, Apr. 5, 1985, abandoned. This application Apr. 11, 1988, Ser. No. 183,307

Claims priority, application Japan, Apr. 5, 1984, 59-66711; Feb. 13, 1985, 60-24394

Int. Cl.<sup>5</sup> A61K 37/02, 47/38

U.S. Cl. 514—2

8 Claims

1. A method for providing superior percutaneous absorption of a drug or drugs on the skin surface characterized by applying an ointment containing:

(1) one or two water soluble proteins for promoting percutaneous absorption of a drug or drugs and being selected from the group consisting of gelatin, casein and soybean protein, in a range of 0.5 to 30 weight % based on the weight of the whole ointment;  
 (2) a monohydric alcohol having a carbon number of 2 to 4, in a range of 1 to 45 weight % based on the weight of the whole ointment;  
 (3) one or two wetting agents selected from the group consisting of alkylene glycol containing 2 to 6 carbon atoms, polyethylene glycol having average molecular weight of about 200 to 800, glycerin, trimethylolpropane and sorbitol, in a range of 1 to 35 weight % based on the weight of the whole ointment; and  
 (4) a drug or drugs absorbed percutaneously in a range of 0.01 to 15 weight % based on the weight of the whole ointment.

4,952,561

#### CARDIAC ATRIAL PEPTIDES

Edward M. Scolnick, Wynnewood, and Robert A. Zivin, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 577,658, Feb. 7, 1984. This application Jan. 4, 1985, Ser. No. 688,798

Int. Cl.<sup>5</sup> A61K 37/02; C07K 7/06, 7/08, 7/10

U.S. Cl. 514—12

6 Claims

1. A peptide or the amide thereof having the amino acid sequence: X-Cys Phe Gly Gly Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Ans Ser-Y wherein  $X$  is the N-terminal amino group of cysteine, or

Ser  
 Ser Ser  
 Arg Ser Ser  
 Arg Arg Ser Ser



-continued

Leu Arg Arg Ser Ser  
Arg Ser Leu Arg Arg Ser Ser  
Pro Arg Ser Leu Arg Arg Ser Ser  
Gly Pro Arg Ser Leu Arg Arg Ser Ser  
Ala Gly Pro Arg Ser Leu Arg Arg Ser Ser  
Leu Ala Gly Pro Arg Ser Leu Arg Arg Ser Ser

and wherein Y is the carboxyl group of serine or  
Phe  
Phe Arg  
Phe Arg Try  
Phe Arg Try Arg, or  
Phe Arg Tyr Arg Arg.

4,952,562

ANTI-THROMBOTIC PEPTIDES AND  
PSEUDOPEPTIDES

Scott I. Klein, Audubon; Bruce F. Molino, Hatfield; Mark Cz-  
kaj, Holland; Charles J. Gardner, Royersford, and Jeffrey C.  
Pelletier, Lansdale, all of Pa., assignors to Rorer Pharmaceu-  
tical Corporation, Fort Washington, Pa.

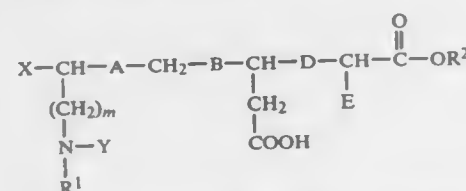
Filed Sep. 29, 1989, Ser. No. 415,006

Int. Cl.<sup>5</sup> A61K 37/00

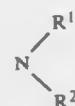
U.S. Cl. 514—18

12 Claims

1. A compound of the formula



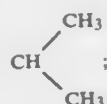
and pharmaceutically acceptable salts thereof wherein:  
X is H or



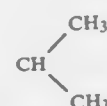
Y is H, alkyl, cycloalkyl, aralkyl or



A, B and D are independently:

E is H, CH<sub>3</sub>, or

R<sup>1</sup> and R<sup>2</sup> are independently: H or alkyl; and  
m is 2-8;  
provided that when X is NH<sub>2</sub>, then:  
m is 3;  
E is



and at least one radical in A, B and D is not



4,952,563

WATERFREE APPLICATION FORM OF LOW  
MOLECULAR WEIGHT ALKALI HUMINATES

Bernhard Seubert, Edingen-Neckarhausen; Helmut Beilharz,  
Schriesheim; Werner Fickert, Mannheim; Günter Jeromin,  
Heidelberg, and Ulrich Spitaler, Freinsheim, all of Fed. Rep.  
of Germany, assignors to Rutgerswerke AG, Fed. Rep. of  
Germany

Filed Mar. 1, 1988, Ser. No. 162,803

Claims priority, application Fed. Rep. of Germany, Mar. 21,  
1987, 3709353Int. Cl.<sup>5</sup> A61K 31/70; C07H 15/00

U.S. Cl. 514—33

4 Claims

1. A waterfree form of an alkali metal huminate with an  
average molecular weight of about 1,000 wherein the water-  
free alkali huminates are bound to an inorganic hydrogen  
bridge forming carrier material selected from the group con-  
sisting of titanium dioxide, aluminum oxide, highly dispersed  
silicium dioxide and clay with a volume ratio of huminate to  
carrier material of 1:0.2 to 1:5.0.

4. A wound healing composition comprising a waterfree  
salve, powder or adhesive paste containing an effective  
amount of the product of claim 1.

4,952,564

## ANTIALLERGIC AGENT

Toshio Sato, and Hitoshi Matsumoto, both of Tokushima, Japan,  
assignors to Dainippon Ink and Chemicals, Inc. and Nippon  
Hypox Laboratories Incorporated, both of Tokyo, Japan

PCT No. PCT/JP87/00143, § 371 Date Sep. 23, 1987, § 102(e)  
Date Sep. 23, 1987, PCT Pub. No. WO87/05215, PCT Pub.  
Date Sep. 11, 1987

PCT Filed Mar. 9, 1987, Ser. No. 110,709

Claims priority, application Japan, Mar. 8, 1986, 61-49530  
Int. Cl.<sup>5</sup> A61K 31/12, 31/35

U.S. Cl. 514—57

6 Claims

1. A method for the treatment and prevention of allergic  
diseases, comprising administering to a mammal in need of  
such treatment or prevention a medicine containing a thera-  
peutically effective amount for the treatment of allergic dis-  
eases of isoliquiritigenin "or a pharmaceutically acceptable salt  
thereof".

4,952,565

INCLUSION COMPLEX OF IBUPROXAM WITH  
BETA-CYCLODEXTRIN, A PROCESS FOR PREPARING  
THE SAME AND A PHARMACEUTICAL PREPARATION  
CONTAINING THE SAME

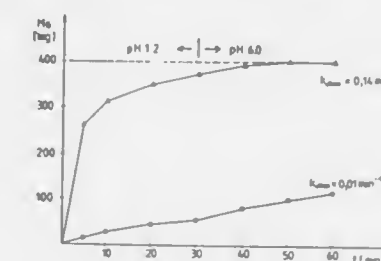
Janko Žmitek, Poklukarjeva 6; Jenny Milovac, Gotika 13, both  
of YU-61000 Ljubljana; Zdravko Kopitar, Muljava 7, YU-  
61234 Menge; Mirjan Žorž, Prešernova 53, YU/61290 Gro-  
suplje, and Boris Ruzjakovski, Linhartova 96, YU-61000  
Ljubljana, all of Yugoslavia

Filed Nov. 13, 1987, Ser. No. 119,933

Claims priority, application Yugoslavia, Nov. 13, 1986,  
1932/86Int. Cl.<sup>5</sup> A61K 31/00; C08B 37/00

U.S. Cl. 514—58

4 Claims

DISSOLUTION PROFILES OF IBUPROFEN IN ARTIFICIAL  
GASTROINTESTINAL JUICE AS FUNCTION OF TIME

— Ibuprofen powder, 400 mg  
--- Inclusion complex of ibuprofen with beta-cyclodextrin,  
2.87 g (equivalent to 400 mg ibuprofen)  
..... Solubility  
(average of 3 tests)

4. A pharmaceutical preparation having analgesic, antipy-  
retic and antiinflammatory activity, comprising a thera-  
peutically effective amount of the inclusion complex of ibuproxam  
with beta-cyclodextrin as the active ingredient together with  
pharmaceutically acceptable carriers.

4,952,567

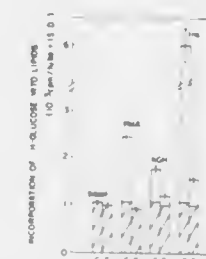
## INHIBITION OF LIPOGENESIS

Pierre DeMeyts; Jean Smal, both of Pasadena, and Yoko Fujita-  
Yamaguchi, Glendora, all of Calif., assignors to City of Hope,  
Duarte, Calif.

Continuation-in-part of Ser. No. 191,986, May 9, 1983,  
abandoned. This application Jul. 8, 1988, Ser. No. 216,379Int. Cl.<sup>5</sup> A61K 31/70, 31/715, 31/73

U.S. Cl. 514—54

20 Claims



1. A method which comprises administering a protein kinase  
antagonist to a mammal in an amount therapeutically effective  
to inhibit lipogenesis in said mammal.

4,952,568

REMEDIES AND PREVENTIVES FOR DIABETIC  
DISEASES

Kiichi Sawai, Funabashi; Masayasu Kurose, Miesken; Hiromoto  
Asai, Nagoya; Takahiko Mitani; Kazumasa Nakano, both of  
Mie, and Naohisa Ninomiya, Nagoya, all of Japan, assignors  
to Sanwa Kagaku Kenkyusho Co., Ltd., Higashi, Japan

Filed May 8, 1989, Ser. No. 348,922

Claims priority, application Japan, May 19, 1988, 63-122347

Int. Cl.<sup>5</sup> A61K 33/66

U.S. Cl. 514—103

4 Claims

1. A method for alleviating the symptoms of diabetes in an  
animal afflicted with diabetes which comprises administering  
to the animal phytic acid or a non-toxic salt thereof in an  
amount effective to lower the animal's blood sugar level.

4,952,566

STABILIZED ANTHRACYCLINE PREPARATION  
CONTAINING L-CYSTEINE

Yasuhisa Sakamaki, Hyogo; Yukio Ozaki, and Norihiko Tanno,  
both of Osaka, all of Japan, assignors to Sumitomo Pharma-  
ceuticals Co., Ltd., Osaka, Japan

Filed Aug. 2, 1988, Ser. No. 227,135

Claims priority, application Japan, Aug. 5, 1987, 62-197032

Int. Cl.<sup>5</sup> A61K 31/70

U.S. Cl. 514—34

7 Claims

1. A stable injectable composition consisting essentially of:  
(i) (7S, 9S)-9-acetyl-9-amino-7-[(2-deoxy-β-D-erythropen-  
topyranosyl)oxy]-7,8,9,10-tetrahydro-6,11-dihydrox-  
ynaphthacene-5,12-dione or salts thereof; and  
(ii) L-cysteine or salts thereof, wherein the L-cysteine or the  
salts thereof are contained in an amount of 0.1 - 50 mg for  
every 20 mg potency of (7S, 9S)-9-acetyl-9-amino-7-[(2-  
deoxy-β-D-erythro-pentopyranosyl)oxy]-7,8,9,10-tet-  
rahydro-6,11-dihydroxy-naphthacene-5,12-dione or salts  
thereof.

4,952,569

## ESTRIOL DERIVATIVES

Donald M. Simons, Wilmington, Del., assignor to E. I. du Pont  
de Nemours and Company, Wilmington, Del.

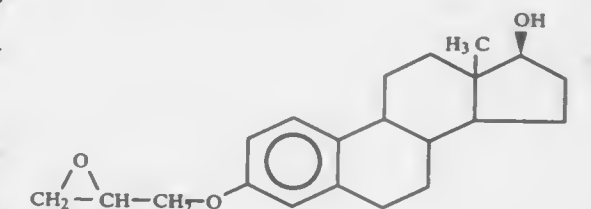
Filed Dec. 2, 1985, Ser. No. 803,221

Int. Cl.<sup>5</sup> A61K 31/58; C07J 1/00, 17/00; G01N 1/00

U.S. Cl. 424—88

6 Claims

1. Compounds of the formula

wherein R<sub>1</sub> is H or OH.

4,952,570

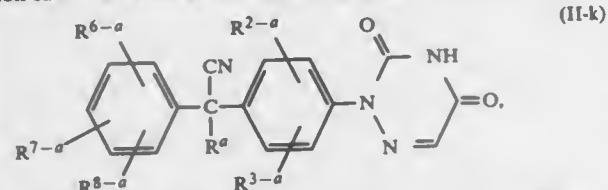
**5,6-DIHYDRO-2-(SUBSTITUTED PHENYL)-1,2,4-TRIAZINE-3,5(2H,4H)-DIONES**  
Gustaaf M. Boeckx, Oud-Turnhout; Alfons H. M. Raeymaekers, Beerse, and Victor Sipido, Merksem, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium  
Division of Ser. No. 184,740, Apr. 22, 1988, Pat. No. 4,912,106. Which is a division of Ser. No. 5,550, Jan. 21, 1987, Pat. No. 4,767,760

This application Nov. 24, 1989, Ser. No. 440,828  
Claims priority, application United Kingdom, Jan. 30, 1986, 8602342

Int. Cl.<sup>5</sup> A61K 31/53; C07D 253/06  
U.S. Cl. 514—242

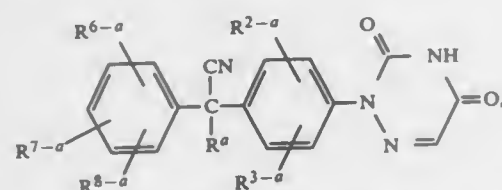
9 Claims

1. A pharmaceutically acceptable metal or amine substitution salt of a chemical compound having the formula



or a stereochemically isomeric form thereof, wherein R<sup>6-a</sup>, R<sup>7-a</sup> and R<sup>8-a</sup> are each independently hydrogen, halo, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylthio or C<sub>1-6</sub> alkylsulfonyl; R<sup>2-a</sup> and R<sup>3-a</sup> are each independently hydrogen, halo, trifluoromethyl or C<sub>1-6</sub> alkyl; and R<sup>a</sup> is hydrogen, C<sub>1-6</sub> alkyl, cyclo C<sub>3-6</sub> alkyl or phenyl optionally substituted with up to 3 substituents each independently selected from the group consisting of halo, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylthio and C<sub>1-6</sub> alkylsulfonyloxy.

7. A method of destroying or preventing the growth of Protozoa in subjects suffering from such Protozoa by the administration of an anti-protozoal effective amount of a pharmaceutically acceptable metal or amine substitution salt of a compound having the formula



or a stereochemically isomeric form thereof, wherein R<sup>6-a</sup>, R<sup>7-a</sup> and R<sup>8-a</sup> are each independently hydrogen, halo, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylthio or C<sub>1-6</sub> alkylsulfonyl; R<sup>2-a</sup> and R<sup>3-a</sup> are each independently hydrogen, halo, trifluoromethyl or C<sub>1-6</sub> alkyl; and R<sup>a</sup> is hydrogen, C<sub>1-6</sub> alkyl, cyclo C<sub>3-6</sub> alkyl or phenyl optionally substituted with up to 3 substituents each independently selected from the group consisting of halo, trifluoromethyl, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylthio and C<sub>1-6</sub> alkylsulfonyloxy.

4,952,571

**PYRIDAZINONE DERIVATIVES**

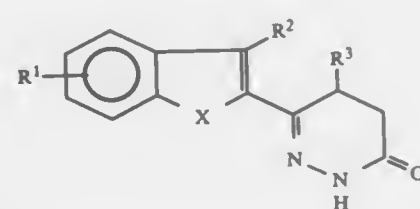
James Redpath, Bishopbriggs; Robert T. Logan, Lanark; Robert G. Roy, Larkhall, and George McGarry, Airdrie, all of Scotland, assignors to Akzo, N.V., Arnhem, Netherlands  
Filed Jul. 11, 1989, Ser. No. 378,342  
Claims priority, application European Pat. Off., Jul. 11, 1988, 88.306295.2

Int. Cl.<sup>5</sup> A61K 31/50; C07D 237/06  
U.S. Cl. 514—254

1. Pyridazinone compounds of the formula I:

6 Claims

3. An aqueous irrigating solution comprising a therapeutically effective amount of a compound selected from the group consisting of:



wherein

R<sup>1</sup> represents one to four substituents, which may be the same or different and are selected from H, OH, halogen, NO<sub>2</sub>, unsubstituted or C<sub>1</sub>-C<sub>4</sub> alkyl substituted amino, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> halogen substituted alkyl, O-ALK-NR<sup>4</sup>R<sup>5</sup>, C<sub>1</sub>-C<sub>4</sub> alkoxy, whereby two adjacent substituents taken together may also represent a methylenedioxy group; R<sup>2</sup> and R<sup>3</sup> represent independently H or C<sub>1</sub>-C<sub>4</sub> alkyl; R<sup>4</sup> and R<sup>5</sup> represent independently H or C<sub>1</sub>-C<sub>4</sub> alkyl, or form together with the nitrogen a 5- or 6- membered ring; X represents S or O; the dotted line represents an optional bond; and their pharmaceutically acceptable salts.

4,952,572

**BU-3420T ANTIFUNGAL ANTIBIOTIC**

Hiroaki Ohkuma, Tokyo; Masataka Konishi, Kanagawa; Kiyoshi Matsumoto, Kawaguchi; Toshikazu Oki, Yokohama, and Yutaka Hoshino, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 208,330, Jun. 10, 1988, Pat. No. 4,916,055.  
This application Nov. 13, 1989, Ser. No. 434,756

Int. Cl.<sup>5</sup> A61K 31/505

U.S. Cl. 514—279

2 Claims

1. A method for therapeutically treating an animal host affected by a fungal infection, which comprises administering to said host an effective antifungal dose of BU-3420T.

4,952,573

**COMPOUNDS HAVING GABA LIKE ACTIVITY, AND USE OF SAME IN TISSUE IRRIGATING SOLUTIONS**

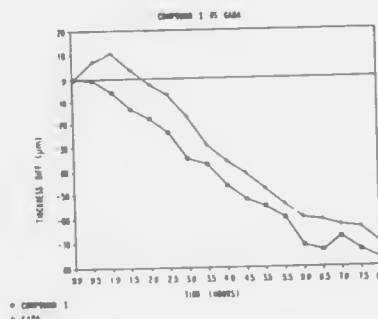
Gerard LeClerc; Beatrice Ruhland; Guy Andermann, all of Strasbourg; Georges de Burlet, Beblenheim, and Michel Dietz, Barr, all of France, assignors to Laboratoire Alcon S.A., Toulouse, France

Filed Mar. 23, 1988, Ser. No. 172,047

Int. Cl.<sup>5</sup> C07D 215/48; A61K 31/47

U.S. Cl. 514—311

15 Claims



3. An aqueous irrigating solution comprising a therapeutically effective amount of a compound selected from the group consisting of:

4,952,575

**SOLUTIONS OF OXAPHOSPHORINS HAVING IMPROVED STABILITY AND PROCESS FOR THE PREPARATION THEREOF**

Dieter Sauerbier, Werther; Klaus Molge, Bielefeld; Werner Weigert, Bielefeld, and Otto Isaac, Hanau, all of Fed. Rep. of Germany, assignors to Asta Pharma Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 72,454, Jul. 13, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 307,230

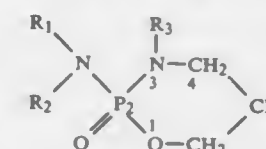
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623369

Int. Cl.<sup>5</sup> A61K 31/66

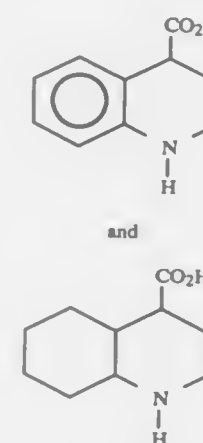
U.S. Cl. 514—110

6 Claims

1. A storable sealed vial containing a solution comprising an oxazaphosphorin having the general formula:



9. A method of maintaining tissue stability during surgery comprising: applying an irrigating solution according to claim 3 to the affected tissue.



4,952,574

**ANTIARRHYTHMIC SUBSTITUTED N-(2-PIPERIDYLMETHYL)BENZAMIDES**

Elden H. Banitt, Woodbury, Minn., assignor to Riker Laboratories, Inc., St. Paul, Minn.

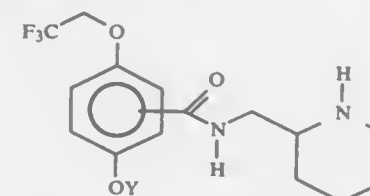
Filed Sep. 26, 1988, Ser. No. 248,814

Int. Cl.<sup>5</sup> C07D 211/30, 401/00

U.S. Cl. 514—315

23 Claims

1. A compound of the formula



wherein Y is:

straight chain or branched chain alkylene carboxylic acid of 2 to about 6 carbons, or a derivative thereof selected from the group consisting of a primary amide, a secondary lower alkyl amide, a secondary phenyl(lower)alkyl amide, a tertiary amide in which the substituents form a five- or six-membered saturated ring, a tertiary amide wherein the amide substituents are independently lower alkyl, a tertiary amide wherein one amide substituent is lower alkyl and the other is phenyl(lower)alkyl, and a lower alkyl ester; or  
straight chain or branched chain hydroxyalkyl of 2 to about 6 carbon atoms, or a phenyl ether or lower alkyl ether derivative thereof; or  
straight chain or branched chain alkenyl of three to about six carbon atoms wherein the olefinic unsaturation does not render the phenolic oxygen vinyllic; or  
straight chain or branched chain phenylalkenyl wherein the alkenyl group contains three to about six carbon atoms and wherein the olefinic unsaturation does not render the phenolic oxygen vinyllic;  
or a pharmaceutically acceptable acid-addition salt thereof. (wherein Z represents hydrogen or halo or

4,952,576

**UCY1003 DERIVATIVES**

Toru Yasuzawa; Hiroshi Sano; Hirofumi Nakano, all of Tokyo; Shunji Ichikawa, and Katsunori Shuto, both of Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Japan

Filed Jul. 22, 1988, Ser. No. 223,193

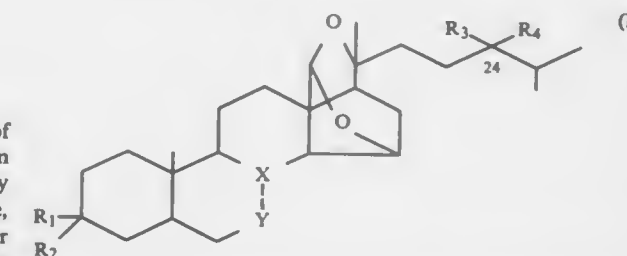
Claims priority, application Japan, Jul. 24, 1987, 62-184968

Int. Cl.<sup>5</sup> A61K 31/58; C07J 71/00

U.S. Cl. 514—172

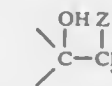
9 Claims

1. Compounds having the formula (I):



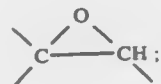
(wherein one of R<sub>1</sub> and R<sub>2</sub> represents hydrogen and the other represents OR (wherein R represents hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkanoyl group), or R<sub>1</sub> and R<sub>2</sub> in combination together represent a keto group; one of R<sub>3</sub> and R<sub>4</sub> represents hydrogen and the other represents methyl; or R<sub>3</sub> and R<sub>4</sub> in combination together represent CH<sub>2</sub>;

X and . . . Y - are combined together and represent





provided that when R<sub>1</sub> represents . . . H and R<sub>2</sub> represents -OH and when R<sub>3</sub> and R<sub>4</sub> in combination together represent CH<sub>2</sub>. X . . . Y are combined together and do not represent



4,952,577

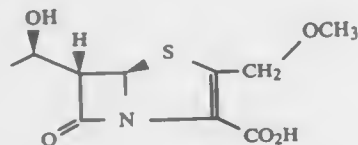
## METHOXYMETHYL PENEM COMPOUNDS

Marco Alpegiani; Giovanni Franceschi; Ettore Perrone; Franco Zarini, and Constantino Della Bruna, all of Milan, Italy, assignors to Farmitalia Carlo Erba S.r.l., Milan, Italy  
Filed Jun. 6, 1988, Ser. No. 202,542

Claims priority, application United Kingdom, Jun. 10, 1987, 8713515

Int. Cl.<sup>5</sup> C07D 499/00; A61K 31/425  
U.S. Cl. 514—192 11 Claims

1. A (5R, 6S, 1'R) penem of at least 95% optical purity of the formula:



or a pharmaceutically acceptable salt thereof.

4,952,578

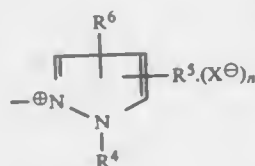
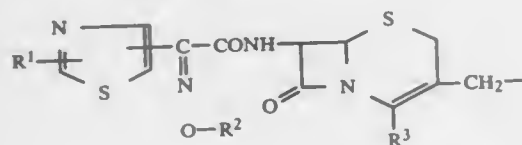
## CEPHEM COMPOUND AND A PROCESS FOR PREPARATION THEREOF

Kazuo Sakane, Kawanishi; Kohji Kawabata, Osaka; Kenzi Miyai, Kawanishi, and Yoshiko Inamoto, Toyonaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Sep. 7, 1988, Ser. No. 241,419  
Claims priority, application United Kingdom, Sep. 14, 1987, 8721568; Jun. 28, 1988, 8815361

Int. Cl.<sup>5</sup> C07D 501/46; A61K 31/545  
U.S. Cl. 514—202 8 Claims

1. A cephem compound of the formula:



wherein

R<sup>6</sup> is amino or a protected amino,  
R<sup>2</sup> is lower alkyl which may have 1 to 3 halogens,  
R<sup>3</sup> is COO<sup>-</sup>, carboxy or a protected carboxy,  
R<sup>4</sup> is hydroxy(lower)alkyl or protected hydroxy(lower)alkyl,  
R<sup>5</sup> is amino or a protected amino,  
R<sup>6</sup> is hydrogen or lower alkyl,  
X<sup>-</sup> is an anion, and

n is 0 or 1,

with proviso that

(i) when R<sup>3</sup> is COO<sup>-</sup>, then n is 0, and  
(ii) when R<sup>3</sup> is carboxy or a protected carboxy, then n is 1, and pharmaceutically acceptable salt thereof.

8. A method for the treatment of infectious diseases which comprises administering an effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof to a human or animal.

4,952,579

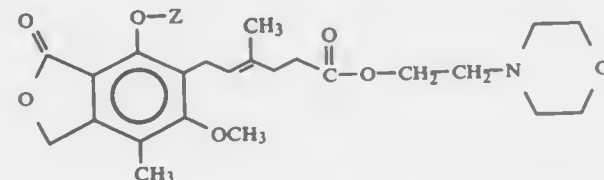
## METHOD OF TREATING DISEASES BY ADMINISTERING MORPHOLINO-ETHYLESTER OF MYCOPHENOLIC ACID OR DERIVATIVES THEREOF

Peter H. Nelson, Los Altos; Chee-Liang L. Gu, Synnyvale; Anthony C. Allison; Elsie M. Eugui, both of Belmont, and William A. Lee, Menlo Park, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 93,459, Sep. 4, 1987, Pat. No. 4,808,592, which is a division of Ser. No. 8,717, Jan. 30, 1987, Pat. No. 4,753,935. This application Nov. 14, 1988, Ser. No. 272,161  
Int. Cl.<sup>5</sup> A61K 31/535; C07D 413/12

U.S. Cl. 514—233.5 8 Claims

1. A method of treating malignant diseases in mammals, which comprises administering to a mammal suffering therefrom with a therapeutically effective amount of a compound represented by the formula:



wherein: Z is hydrogen or —C(O)R, where R is lower alkyl or aryl; a pharmaceutically acceptable salt thereof.

4,952,580

## PESTICIDAL POLYHALOALKENE DERIVATIVES

Anthony J. Martinez, Hamilton Square, and Thomas G. Cullen, Milltown, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 161,575, Feb. 29, 1988, abandoned, which is a continuation of Ser. No. 870,055, Jun. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 747,142, Jun. 20, 1985, abandoned. This application Nov. 9, 1988, Ser. No. 270,903

Int. Cl.<sup>5</sup> C07D 285/13, 271/113, 285/08; A61K 31/41  
U.S. Cl. 514—236.2 63 Claims

1. Polyhaloalkene compounds of the formula: wherein X is sulfur, oxygen, or nitrogen, Y<sup>1</sup> and Y<sup>2</sup> are fluorine, Z is hydrogen or the same as Y<sup>1</sup> and Y<sup>2</sup>, and n is 1-4; provided that:

(A) when X is sulfur, Z is fluorine and R is thienyl or substituted thienyl, thianaphthyl or substituted thianaphthyl, thiazolyl or substituted thiazolyl, oxadiazolyl or substituted oxadiazolyl, 3, 4, 4-trifluoro-3-butenyloxycarbonylmethyl, thiazolyl substituted by halogen or R<sup>2</sup>S, wherein R<sup>2</sup> is 3,4,4-trifluoro-3-butenyl or R<sup>2</sup> is phenylmethyl or phenylthiomethyl each optionally substituted by halogen or nitro, wherein the thienyl, thianaphthyl, thiazolyl and oxadiazolyl substituents are selected from aliphatic, aromatic and heterocyclic groups, halo, nitro, cyano, alkoxy, alkylthio, haloalkyl, haloalkoxy, halo-, nitro-, cyano-, alkoxy-, methylthio-, methylsulfinyl-, methylsulfoxy-, dimethylamino-, or phenoxy- substituted phenyl, polyhaloalkenylthio, phenylalkylthio, phenylthioalkylthio, propargylthio, and cycloalkylmethylthio; or R is thiazolyl substituted by R<sup>3</sup>, wherein R<sup>3</sup> is substituted

aryl, arylalkyl, aryloxyalkyl, alkylthio, haloalkylthio, haloarylthio, cyanoalkylthio, arylalkylthio, aryloxyalkylthio, arylthioalkylthio, heterocycloalkylthio, alkenylthio, haloalkenylthio, halocycloalkylalkenylthio, wherein said aryl or heterocyclo-substituents of R<sup>3</sup> may be mono-, di-, tri-, tetra-, or penta-substituted, wherein said substituents are selected from methylthio, methylsulfinyl, methylsulfoxy, dimethylamino, phenoxy, halo, haloalkyl, alkoxy, haloalkoxy, cyano, nitro, and phenyl, or R<sup>3</sup> is an amino group mono- or di- substituted with members independently selected from alkyl, alkylcarbonyl, haloalkylcarbonyl, aryl, arylaminocarbonyl, arylalkylcarbonyl, arylalkoxycarbonyl, and 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarbonyl;

(B) when X is oxygen, Z is fluorine and R is C(O)R<sup>1</sup>, wherein R<sup>1</sup> is perfluoroalkyl, phenyl or substituted phenyl, thienyl or substituted thienyl, furanyl or substituted furanyl, pyrrolyl or substituted pyrrolyl, or dihydrothiazolylthiomethyl, wherein the phenyl, thienyl, furanyl, pyrrolyl substituents are selected from aliphatic, aromatic and heterocyclic groups, halo, nitro, cyano, alkoxy, alkylthio, haloalkyl, haloalkoxy, halo-, nitro-, cyano- or alkoxy-substituted phenyl, polyhaloalkenylthio, phenylalkylthio, phenylthioalkylthio, propargylthio, and cycloalkylmethylthio; and

(C) when X is nitrogen, R taken with the nitrogen is an isothiocyanate, succinimide, or saccharine group; wherein the heterocyclo substituents of (A) and (B) are selected from thienyl, isoxazolyl, pyridinyl, thiazolyl, thiazolinyl, benzodioxanyl, benzodioxolyl, tetrazolyl, and furanyl.

4,952,581

## USE OF A PROSTAGLANDIN IN COMBINATION WITH AN ADRENERGIC BLOCKING AGENT FOR REDUCTION OF INTRAOCULAR PRESSURE

Laszlo Z. Blto, New York, N.Y., and Johan W. Stjernschantz, Uppsala, Sweden, assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation of Ser. No. 34,484, Apr. 3, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,321  
Int. Cl.<sup>5</sup> A61K 31/535, 31/215, 31/19

U.S. Cl. 514—236.2 23 Claims

1. A method for treating ocular hypertension or glaucoma in a subject's eye which comprises contacting the surface of the eye with a composition comprising a beta-adrenergic blocking agent and an ester of prostaglandin F<sub>2α</sub> or a derivative of an ester of prostaglandin F<sub>2α</sub> in an ophthalmically compatible carrier, the amounts in the mixture being between about 5 μg and about 500 μg and between about 0.01 μg and about 1000 μg, respectively, and being such as to be effective so as to reduce the intraocular pressure of the eye and maintain such reduced pressure.

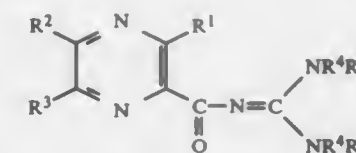
4,952,582

## PYRAZINOYL GUANIDINE AND DERIVATIVES THEREOF HAVING FEW POLAR SUBSTITUENTS AND BEING USEFUL AS HYPERURETIC AGENTS

Karl H. Beyer, Jr., P.O. Box 387, Penlynn, Pa. 19422  
Continuation of Ser. No. 844,365, Mar. 26, 1986, abandoned, which is a continuation of Ser. No. 336,735, Jan. 4, 1982, Pat. No. 4,594,349. This application Aug. 23, 1988, Ser. No. 235,801

Int. Cl.<sup>5</sup> A61K 31/495  
U.S. Cl. 514—255 17 Claims

1. A pharmaceutical composition in unit dosage form useful for treating hypertension or a hyperuremic condition comprising a pharmaceutically acceptable carrier and from about 5 to about 95 percent of the total composition of a compound of the formula;



wherein:

R<sup>4</sup> and R<sup>5</sup> are each independently selected from the group consisting of hydrogen; C<sub>1-10</sub> alkyl, straight or branched chain, C<sub>6</sub> aryl, C<sub>1-4</sub> alkyl; mono- or disubstituted C<sub>6</sub> aryl C<sub>1-4</sub> alkyl where the substituents are fluoro, chloro, bromo, iodo, or C<sub>1-10</sub> alkyl, straight or branched chain; one of R<sup>1</sup> and R<sup>2</sup> is, independently, selected from the group consisting of hydrogen, amino, and mono- or disubstituted amino where the substituents are C<sub>1-10</sub> alkyl, straight or branched chain, or C<sub>3-8</sub> cycloalkyl; and the other is hydrogen; and R<sup>3</sup> is hydrogen; or a pharmaceutically acceptable salt of said compound.

4,952,583

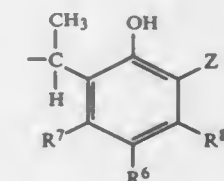
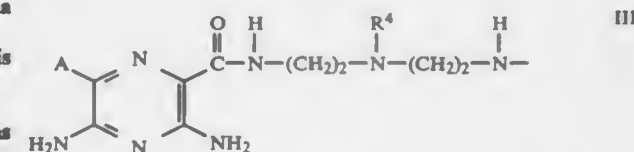
## AMINOPHENOL DERIVATIVES

John A. Schwartz, Macclesfield, United Kingdom, assignor to ICI Americas Inc., Wilmington, Del.

Filed May 19, 1989, Ser. No. 354,540  
Claims priority, application United Kingdom, May 25, 1988, 8812343

Int. Cl.<sup>5</sup> A61K 31/495; C07D 241/16, 241/20  
U.S. Cl. 514—225 10 Claims

1. A compound having the formula



wherein:

A is chloro or bromo; R<sup>4</sup> is hydrogen or (1-5)alkyl; R<sup>6</sup> is bromo, iodo or t-butyl; R<sup>7</sup> and R<sup>8</sup> are independently hydrogen, chloro, (1-5C)alkyl or (1-3C)alkoxy provided that when R<sup>6</sup> is bromo or iodo, then one or both of R<sup>7</sup> and R<sup>8</sup> are (1-3C)alkoxy; and Z is chloro, bromo, iodo, trifluoromethyl, methylsulfonyl or aminosulfonyl of formula SO<sub>2</sub>NR<sup>10</sup>R<sup>11</sup> wherein R<sup>10</sup> and R<sup>11</sup> are independently hydrogen or (1-5C)alkyl;

or a pharmaceutically acceptable salt thereof.

9. A method of inducing eukalemic diuresis in a mammal comprising administering to said mammal a pharmaceutically effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof.

10. A method of treating hypertension in a mammal comprising administering a pharmaceutically effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof to mammal in need of such treatment.

4,952,584

**9H-PYRIDO[2,6-B]INDOLE-3-CARBOXYLIC ACID  
ESTER COMPOUNDS HAVING USEFUL  
PHARMACEUTICAL ACTIVITY**

Mervyn Thompson, and Ian T. Forbes, both of Harlow, England, assignors to Beecham Group p.l.c., Brentford, England  
Continuation-in-part of Ser. No. 1,589, Jan. 9, 1987, abandoned.  
This application Feb. 6, 1989, Ser. No. 307,068

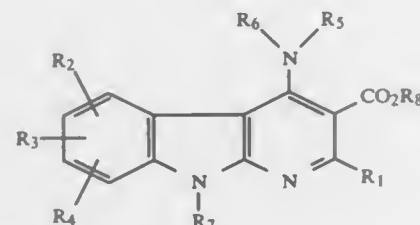
Claims priority, application United Kingdom, Jan. 11, 1986, 8600651; Jan. 19, 1989, 8900383

Int. Cl.<sup>5</sup> C07D 471/04; A61K 31/44

U.S. Cl. 514—292

14 Claims

1. A compound of formula (I) or a pharmaceutically acceptable salt thereof:



wherein:

R<sub>1</sub> is hydrogen, C<sub>1-6</sub> alkyl, phenyl or phenyl C<sub>1-4</sub> alkyl wherein the phenyl moiety is optionally substituted by one or more C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylthio, hydroxy, C<sub>2-7</sub> alkanoyl, halo, trifluoromethyl, nitro, amino optionally substituted by one or two C<sub>1-6</sub> alkyl groups or by C<sub>2-7</sub> alkanoyl, cyano, carbamoyl or carboxy groups;

R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently selected from hydrogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkoxy carbonyl, C<sub>1-6</sub> alkylthio, hydroxy, C<sub>2-7</sub> alkanoyl, chloro, fluoro, trifluoromethyl, nitro, amino optionally substituted by one or two C<sub>1-6</sub> alkyl groups or by C<sub>2-7</sub> alkanoyl, cyano, carbamoyl and carboxy, and phenyl, phenyl C<sub>1-4</sub> alkyl or phenyl C<sub>1-4</sub> alkoxy in which any phenyl moiety is optionally substituted by C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkoxy carbonyl, C<sub>1-6</sub> alkylthio, hydroxy, C<sub>2-7</sub> alkanoyl, chloro, fluoro, trifluoromethyl, nitro or amino optionally substituted by one or two C<sub>1-6</sub> alkyl groups or by C<sub>2-7</sub> alkanoyl, cyano, carbamoyl and carboxy;

R<sub>5</sub> and R<sub>6</sub> are independently selected from hydrogen, C<sub>1-6</sub> alkyl, C<sub>3-7</sub> cycloalkyl, C<sub>3-7</sub> cycloalkyl-C<sub>1-4</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>1-7</sub> alkanoyl, C<sub>1-6</sub> alkylsulphonyl, di-(C<sub>1-6</sub> alkyl)amino C<sub>1-6</sub> alkyl, 3-oxobutyl, 3-hydroxybutyl, phenyl, phenyl C<sub>1-4</sub> alkyl, benzoyl, phenyl C<sub>2-7</sub> alkanoyl or benzenesulphonyl any of which phenyl moieties are optionally substituted by one or two halogen, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, CF<sub>3</sub>, amino or carboxy, or R<sub>5</sub> and R<sub>6</sub> together form —CH<sub>2</sub>—, —(CH<sub>2</sub>)<sub>5</sub>—, —(CH<sub>2</sub>)<sub>2</sub>—O—(CH<sub>2</sub>)<sub>2</sub>— or —(CH<sub>2</sub>)<sub>2</sub>—NR<sub>9</sub>—(CH<sub>2</sub>)<sub>2</sub>— wherein R<sub>9</sub> is hydrogen or C<sub>1-6</sub> alkyl optionally substituted by hydroxy;

R<sub>7</sub> is hydrogen, C<sub>1-6</sub> alkyl, C<sub>3-6</sub> cycloalkyl, C<sub>3-6</sub> cycloalkyl-C<sub>1-4</sub> alkyl, C<sub>2-6</sub> alkenyl or C<sub>2-6</sub> alkynyl; and —CO<sub>2</sub>R<sub>8</sub> is a pharmaceutically acceptable ester group, wherein R<sub>8</sub> is C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>3-6</sub> cycloalkyl or C<sub>3-6</sub> cycloalkyl-C<sub>1-4</sub> alkyl.

12. A method of treatment or prophylaxis of anxiety or depression which comprises administering to the sufferer an effective amount of a compound according to claim 1.

4,952,585

**CASTANOSPERMINE ESTERS IN THE INHIBITION OF  
TUMOR METASTASIS**

Sai P. Sunkara, and Paul S. Liu, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

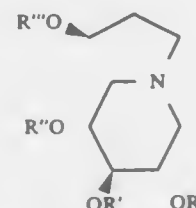
Filed Dec. 15, 1988, Ser. No. 284,510

Int. Cl.<sup>5</sup> A61K 31/44

U.S. Cl. 514—299

10 Claims

1. A method for inhibiting the formation of tumor metastases only which comprises administering an amount, which is safe and sufficient to inhibit the formation of tumor metastases, of a castanospermine ester of the formula:



(I) wherein R, R', R'' and R''' are selected so that three of them are hydrogen and the fourth is alkanoyl of 1 to 18 carbon atoms, benzoyl, (C<sub>1-4</sub> alkyl)benzoyl, (C<sub>1-4</sub> alkyl)<sub>2</sub>benzoyl, (C<sub>1-4</sub> alkoxy)benzoyl, halobenzoyl, dichlorobenzoyl, trichlorobenzoyl, trifluoromethylbenzoyl, (C<sub>1-4</sub> alkylsulfonyl)benzoyl, (C<sub>1-4</sub> alkylmercapto)benzoyl, cyanobenzoyl, dimethylaminobenzoyl, thiophenecarbonyl or furancarboxyl, or a pharmaceutically acceptable salt thereof, to a patient having melanoma, breast cancer, lung cancer or prostate cancer.

4,952,586

**EDROPHONIUM-ATROPINE COMPOSITION AND  
THERAPEUTIC USES THEREOF**

Robert B. Morris, Mill Valley; Roy Cronnelly, Pacifica, and Ronald Dean Miller, Greenbrae, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 918,633, Oct. 14, 1986, abandoned,

which is a continuation of Ser. No. 412,005, Aug. 27, 1982,

abandoned. This application Oct. 18, 1988, Ser. No. 262,175

Int. Cl.<sup>5</sup> A61K 31/44

U.S. Cl. 514—304

9 Claims

1. A composition useful for antagonizing nondepolarizing neuromuscular blockade in a patient of determined weight by rapid intravenous unit dosage administration consisting essentially of:

edrophonium in an amount of from about 21 to about 70 mg for each unit dosage of the composition, atropine in an amount of from about 0.42 to about 0.70 for mg each unit dosage of the composition, said edrophonium being in a weight ratio with respect to said atropine of about 50:1 to 100:1, said edrophonium and atropine being admixed.

4,952,587

**PHYSIOLOGICALLY ACTIVE 1,2,4-OXA- AND  
THIADIAZOLES**

Raymond Baker, Much Hadham; John Saunders, Bishops Stortford, and Christopher Swain, Duxford, all of England, assignors to Merck Sharp & Dohme Ltd., Hertfordshire, England

Filed Feb. 3, 1989, Ser. No. 306,007

Claims priority, application United Kingdom, Feb. 12, 1988,

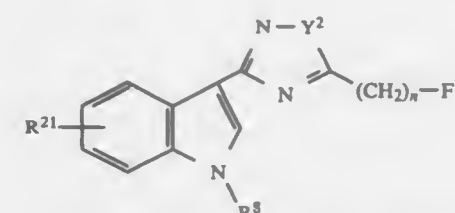
8803317; May 6, 1988, 8810789

Int. Cl.<sup>5</sup> C07D 413/14, 453/02; A61K 31/44, 31/42

U.S. Cl. 514—305

5 Claims

1. A compound represented by the formula IV or a salt thereof:



wherein R<sup>8</sup> is selected from the group consisting of hydrogen, C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl and C<sub>2-6</sub> alkynyl; Y<sup>2</sup> represents oxygen or sulphur; n is zero, 1 or 2; R<sup>21</sup> is selected from the group consisting of hydrogen, halogen, cyano and C<sub>1-6</sub> alkyl; and F<sup>2</sup> represents a non-aromatic azamocyclic or azabicyclic ring system containing from 4 to 10 atoms, with one nitrogen atom as the sole heteroatom.

4,952,588

**1-ARYL-3-QUINOLINE-AND  
1-ARYL-3-ISOQUINOLINE-CARBOXAMIDES**

Edward J. Glankowski, Warren, and R. Richard L. Hamer, Westfield, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 218,783, Jul. 14, 1988, abandoned, which is a division of Ser. No. 125,971, Nov. 27, 1987, Pat. No. 4,786,644.

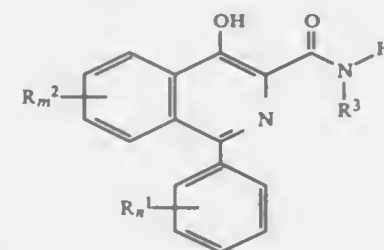
This application Aug. 31, 1989, Ser. No. 401,386

Int. Cl.<sup>5</sup> A61K 31/435; C07D 217/22

U.S. Cl. 514—309

13 Claims

1. A compound of the formula:



wherein R<sup>1</sup> and R<sup>2</sup> are monovalent radicals independently selected from the group consisting of halogen, loweralkyl and loweralkoxy; R<sup>3</sup> is substituted or unsubstituted monovalent radical selected from the group consisting of phenyl and pyridyl, and m and n are integers independently having values of zero or 1; the optical antipodes and pharmaceutically acceptable acid addition salts thereof.

11. A pain alleviating composition comprising an inert adjuvant and, as the active ingredient, an amount effective in alleviating pain of a compound as defined in claim 1.

4,952,589

**PYRIDINE COMPOUNDS**

Thomas H. Brown, Tewin; Robert C. Mitchell, Hertford; Ian R. Smith, Knebworth, and Rodney C. Young, Bengeo, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 788,261, Oct. 17, 1985, Pat. No. 4,681,883.

This application Jan. 3, 1987, Ser. No. 57,470

Claims priority, application United Kingdom, Nov. 3, 1984,

8427878; Jul. 13, 1985, 8517714

Int. Cl.<sup>5</sup> A61K 31/445, 31/47, 31/435; C07D 213/74, 215/38,

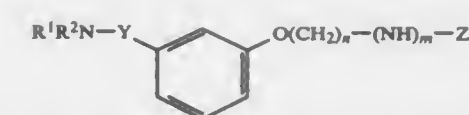
219/08, 401/10

U.S. Cl. 514—310

17 Claims

1. A compound of the formula (I):

(IV)



or a pharmaceutically acceptable salt thereof, wherein:

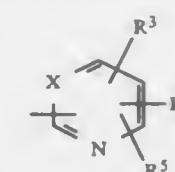
R<sup>1</sup> and R<sup>2</sup> are independently C<sub>1-6</sub> alkyl; or R<sup>1</sup> and R<sup>2</sup> together with the nitrogen atom to which they are joined represent a pyrrolidino, piperidino or hexahydroazepino ring;

Y is straight-chain or branched-chain C<sub>1-4</sub> alkyl;

n is 2 to 5;

m is 1;

Z is a group of sub-formula (a):



(a)

wherein

X is CR<sup>6</sup>;

R<sup>3</sup>-R<sup>6</sup> are independently hydrogen, C<sub>1-6</sub> alkyl, phenyl,

benzyl, halo, benzyloxy or C<sub>1-6</sub> alkoxy; or

any two of R<sup>3</sup>-R<sup>6</sup> on adjacent atoms may be joined to

form a benzene ring; said benzene ring being unsubsti-

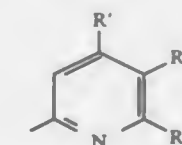
tuted or substituted by up to 3 moieties selected from

C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, halo, phenyl, benzyl or ben-

zyloxy;

with the proviso that Z is not a 2-pyridyl group of the for-

mula:



wherein R' is benzyloxy or C<sub>1-6</sub> alkoxy, R'' is hydrogen, C<sub>1-6</sub> alkyl or benzyl and R''' is hydrogen or C<sub>1-6</sub> alkyl or R'' and R''' are joined to form a benzene ring, said benzene ring being unsubstituted or substituted by C<sub>1-6</sub> alkyl.

14. A pharmaceutical composition for blocking histamine H<sub>2</sub>-receptors which comprises in an effective amount to produce said activity a compound according to claim 1 and a pharmaceutically acceptable carrier.

4,952,590

**ETHOXYQUIN SALTS OF ALKANOIC ACIDS AND USE  
THEREOF FOR PRESERVING FISH AND GRASS MEALS**

Niels W. von Magnus, Langörsen 7, Helsingborg S-253 72, Sweden

Continuation of Ser. No. 919,620, Oct. 15, 1986, Pat. No.

4,772,710, which is a continuation of Ser. No. 713,394, Mar. 15,

1985, abandoned. This application Aug. 11, 1988, Ser. No.

230,888

Int. Cl.<sup>5</sup> C07D 215/20; A23K 3/00

U.S. Cl. 514—311

10 Claims

1. A method for the antioxidative protection of bulk materials which comprises combining a bulk material with an antioxidative effective amount of a C<sub>1</sub>-C<sub>5</sub> alkanolic acid salt of ethoxyquin.

2. The method according to claim 1 wherein said bulk material is fish meal or grass meal.

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4,952,591

## ANTI-ULCER UREA DERIVATIVES

Hiroshi Matsukubo, Okaya; Toyomi Matsumoto, Minowa; Mitsutomo Miyashita, Okaya; Kyuya Okamura, Ohmura; Fukutaro Taga, Shiraoka; Haruo Sekiguchi, Ageo, and Katsuhiko Hamada, Nogi, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Jul. 21, 1988, Ser. No. 222,520

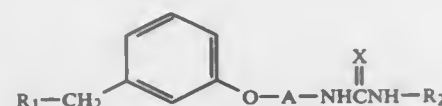
Claims priority, application Japan, Aug. 3, 1987, 62-194060; Jul. 8, 1988, 63-168887

Int. Cl.<sup>5</sup> A61K 31/445; C07D 211/46

U.S. Cl. 514—321

8 Claims

8. An anti-ulcer pharmaceutical composition containing a therapeutically effective amount of a compound of formula (I):



wherein R<sub>1</sub> indicates a piperidino group or a pyrrolidino group which may be substituted with a hydroxy group or a lower alkyl group having 1 to 3 carbon atoms; A indicates an ethylene, propylene, butylene or a butylenylene group; R<sub>2</sub> indicates a cycloalkyl group having 3 to 6 carbon atoms, a benzyl group, or a phenyl group which may have 1 to 3 substituents selected from the group consisting of lower alkyl having 1 to 3 carbon atoms, lower alkoxy having 1 to 3 carbon atoms, halogen, trifluoromethyl, amino, nitro or methylenedioxy; X is oxygen, the hydrate or a pharmaceutically acceptable acid addition salt thereof; and an inert pharmaceutically acceptable carrier.

4,952,592

## 1,4-DIHYDRO 2,6-DIMETHYL 4-(2,3-METHYLENEDIOXYPHENYL) 3-ALKOXY CARBONYL 5-[2-(SUBSTITUTED AMINO)ETHOXY]CARBONYL PYRIDINE

Carlos F. Torija, and Joaquin A. Galiano Ramos, both of Madrid, Spain, assignors to Instituto de Investigacion Y Desarrollo Quimicobiologico S.A., Madrid, Spain

Filed Aug. 2, 1988, Ser. No. 227,373

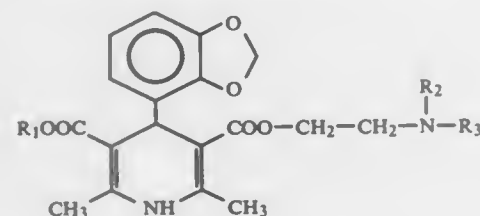
Claims priority, application European Pat. Off., Aug. 7, 1987, 87401799

Int. Cl.<sup>5</sup> C07D 405/02; A61K 31/455

U.S. Cl. 514—338

15 Claims

1. 1,4-Dihydropyridines of the following formula (III):



in which:

R<sub>1</sub> is a linear or branched C<sub>1</sub>-C<sub>4</sub> alkyl group,

R<sub>2</sub> is formyl or a C<sub>1</sub>-C<sub>2</sub> alkyl group,

R<sub>3</sub> is a 2-, 3- or 4- picolyl, 2-thienylmethyl, or 4-fluorobenzyl group,

or a pharmaceutically acceptable salt thereof with an inorganic or organic acid.

4,952,593

## 5-HETEROCYCLIC-2,4-DIALKYL-3H-1,2,4-TRIAZOLE-3-THIONES AND THEIR USE AS ANTIDEPRESSANTS

John M. Kane, Cincinnati, and Francis P. Miller, Loveland, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 792,367, Oct. 29, 1985,

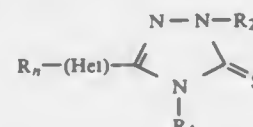
abandoned. This application Jul. 23, 1987, Ser. No. 76,588

Int. Cl.<sup>5</sup> A61K 31/34, 31/38, 31/41; C07D 249/12

U.S. Cl. 514—340

9 Claims

1. A compound of the formula



and the tautomers thereof, and the pharmaceutically acceptable salts thereof wherein

R is halogeno, C<sub>1</sub>-C<sub>6</sub> lower alkyl, C<sub>1</sub>-C<sub>6</sub> lower alkoxy, hydroxy or trifluoromethyl,

n is zero, 1 or 2,

R<sub>2</sub> and R<sub>4</sub> independently represent C<sub>1</sub>-C<sub>6</sub> lower alkyl, and

"Het" represents a heterocyclic moiety selected from the group consisting of 2-, 3- or 4-pyridyl, 2- or 3-furyl, 2- or 3-thienyl, 2- or 3-pyrrolyl, 6-isoquinolyl, 6-quinolyl and 3-quinolyl.

4,952,594

## REAGENTS AND METHOD FOR THERAPEUTIC TREATMENT OF MULTIPLE SCLEROSIS

James B. Mercer, 13109 W. 95th St., Lenexa, Kans. 66215

Continuation-in-part of Ser. No. 720,021, Apr. 19, 1985, Pat. No. 4,871,759, which is a continuation-in-part of Ser. No. 407,808,

Aug. 13, 1982, Pat. No. 4,537,775, which is a

continuation-in-part of Ser. No. 64,072, Aug. 6, 1979, Pat. No. 4,346,095, which is a continuation-in-part of Ser. No. 876,618,

Feb. 10, 1978, Pat. No. 4,177,281, which is a continuation-in-part of Ser. No. 656,336, Feb. 9, 1976, Pat. No. 4,073,928, which is a

continuation-in-part of Ser. No. 514,798, Oct. 15, 1974, Pat. No. 3,952,103, which is a continuation-in-part of Ser. No. 370,952,

Jun. 18, 1973, Pat. No. 3,856,966. This application Jun. 14, 1988,

Ser. No. 206,651

The portion of the term of this patent subsequent to Aug. 27,

2002, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/415, 31/52, 31/425

U.S. Cl. 514—398

4 Claims

1. A method for treating a human host having multiple sclerosis comprising repeatedly orally administering a dosage of a composition including metronidazole to a human host in need of said treatment, said dosage including metronidazole in a range from approximately 30 mg to 2500 mg on the average per 24 hour period.

4,952,595

## HETEROCYCLIC AMIDE DERIVATIVES

Graham Holmwood, Wuppertal; Joachim Weissmüller, Monheim; Wilhelm Brandes, Leichlingen, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 851,057, Apr. 11, 1986, Pat. No. 4,840,961.

This application Sep. 26, 1988, Ser. No. 249,480

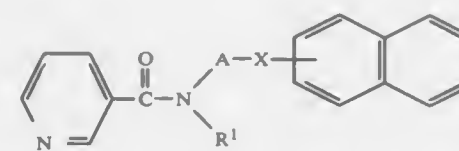
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1985, 3513259

Int. Cl.<sup>5</sup> C07D 213/56; A61K 31/44

U.S. Cl. 514—355

7 Claims

1. A heterocyclic amide derivative of the formula



in which

R<sup>1</sup> is alkyl with 1 to 12 carbon atoms or alkenyl with 3 to 12 carbon atoms, wherein the double bond must not be in the α-position relative to the nitrogen atom,

X is oxygen or a direct bond, and

A is a straight-chain or branched alkylene bridge with 1 to 8 carbon atoms if X denotes a direct bond, or is a straight-chain or branched alkylene bridge with 2 to 8 carbon atoms if X denotes oxygen, but wherein there must be at least 2 carbon atoms between the nitrogen atom and the radical X,

or an acid addition salt or a metal salt complex thereof.

6. A method of combating fungi which comprises administering to such fungi or to a fungus habitat a fungicidally effective amount of a compound or addition product according to claim 1.

4,952,596

## DERIVATIVES OF THIAZOLIDINE-4-CARBOXYLIC ACID HAVING PHARMACOLOGICAL ACTIVITY

Daide Della Bella, Milan; Angelo Carenzi, Busto Arsizio; Dario Chiarino, Monza, and Franco Pellacini, Sesto San Giovanni, all of Italy, assignors to Zambon S.p.A., Vicenza, Italy

Filed Dec. 21, 1988, Ser. No. 287,042

Claims priority, application Italy, Dec. 21, 1987, 23126 A/87

The portion of the term of this patent subsequent to Jun. 20,

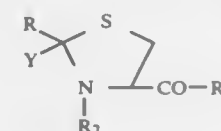
2006, has been disclaimed.

Int. Cl.<sup>5</sup> C07D 277/06; A61K 31/425

U.S. Cl. 514—365

9 Claims

1. A compound of the formula



wherein

Y is hydrogen or methyl; when Y=H

R is a radical chosen from:

(6-methoxy-2-naphthyl)-methyl,

1-(4-isobutylphenyl)-ethyl,

1-(6-methoxy-2-naphthyl)-ethyl,

5-(2,4-difluorophenyl)-2-hydroxyphenyl,

2-(3-trifluoromethyl-phenylamino)-phenyl,

(Z)-5-fluoro-2-methyl-1-(4-methylsulfinylbenzylidene)-

1H-inden-3-yl-methyl,

1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl-

methyl,

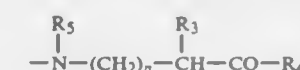
1-(3-benzoyl-phenyl)-ethyl,

2-(2,6-dichlorophenylamino)-benzyl,

1-[4-(2-thienyl-carbonyl)-phenyl]-ethyl, when Y=CH<sub>3</sub>

R is 2-(6-methoxy-2-naphthyl)-ethyl;

R<sub>1</sub> is hydroxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, amino, mono- or dialkylamino wherein the alkyl has from 1 to 4 carbon atoms, a radical of an aminoacid of the formula



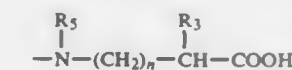
wherein

R<sub>5</sub> is hydrogen;

R<sub>3</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, optionally substituted by hydroxy, SH, SCH<sub>3</sub>, or a phenyl optionally substituted with 1 or 2 hydroxy groups;

n is an integer chosen from 0, 1 and 2; when n=0, R<sub>5</sub> and R<sub>3</sub> together may also form a —(CH<sub>2</sub>)<sub>3</sub>— or —CH<sub>2</sub>—S—CH<sub>2</sub>— group;

R<sub>4</sub> is hydroxy, C<sub>1</sub>-C<sub>6</sub> alkoxy or a radical of an aminoacid of the formula



wherein R<sub>5</sub>, R and n have the meanings already mentioned;

R<sub>2</sub> is an acyl radical of:

(a) a pharmaceutically acceptable monocarboxylic acid chosen from acetic, propionic, butyric, isobutyric, pentanoic, hexanoic, tertbutylacetic, octanoic, decanoic, lauric, lactic, palmitic, thiolactic, pivalic, phenylacetic, phenoxyacetic, glyceric, 2-phenylpropionic, benzoic, 3,5-dimethylbenzoic, cinnamic, sorbic, 2- or 4-hydroxybenzoic, 4-aminosalicylic, 5-bromo-acetylsalicylic, 2,5-dihydroxybenzoic, 4-methoxybenzoic, acetylsalicylic, betamercapto-propionic, 4-acetoxy-benzoic and 4-acetamidobenzoic acid;

(b) a pharmaceutically acceptable bicarboxylic acid chosen from tartaric, citric, succinic, malic, phthalic and hydroxyphthalic acid wherein the free carboxylic group is optionally salified by a pharmaceutically acceptable organic or inorganic base;

(c) a pharmaceutically acceptable heterocyclic acid selected among 2-pyridinecarboxylic, 3-pyridinecarboxylic and 4-pyridinecarboxylic acid.

4,952,597

## BENZO[C]CURBAZOLE DERIVATIVES, COMPOSITIONS AND USE

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 128,638, Dec. 4, 1987, Pat. No.

4,797,495, which is a continuation-in-part of Ser. No. 673,356,

Nov. 20, 1984, abandoned. This application Aug. 19, 1988, Ser.

No. 234,260

The portion of the term of this patent subsequent to Jan. 10,

2006, has been disclaimed.

Int. Cl.<sup>5</sup> A61K 31/40; C07D 209/80

U.S. Cl. 514—410

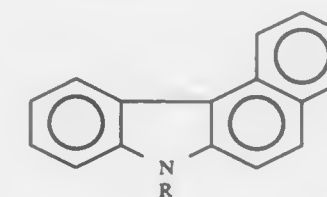
3 Claims

1. A compound of formula (I)



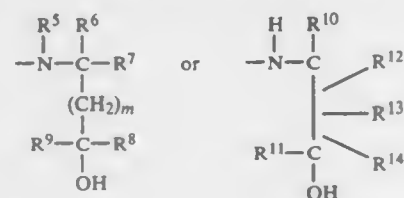
(I)

the compound of formula (I) may contain no more than 29 carbon atoms in total; and acid addition salts thereof; wherein Ar is:



where R is hydrogen, methyl or ethyl; the ring system unsubstituted or substituted by one or two substituents and the substituents contain not more than four carbon atoms in total when taken together and are halogen, cyano, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy, each optionally substituted by hydroxy or C<sub>1</sub>-C<sub>2</sub> alkoxy; halogen substituted C<sub>1</sub>-C<sub>2</sub> alkyl or C<sub>1</sub>-C<sub>2</sub> alkoxy; a group

$S(O)_nR^2$  wherein  $n$  is an integer 0, 1 or 2 and  $R^2$  is  $C_{1-2}$  alkyl optionally substituted by hydroxy or  $C_{1-2}$  alkoxy; or the heterocyclic ring is optionally substituted by a group  $NR^3R^4$  containing not more than 5 carbon atoms wherein  $R^3$  and  $R^4$  are the same or different and each is a  $C_{1-3}$  alkyl group;  $R^1$  contains not more than eight carbon atoms and is a group



wherein

$m$  is 0 or 1;

$R^5$  is hydrogen;

$R^6$  and  $R^7$  are the same or different and each is hydrogen or  $C_{1-5}$  alkyl optionally substituted by hydroxy;  $R^8$  and  $R^9$  are the same or different and each is hydrogen or  $C_{1-3}$  alkyl;  $-C-C-$  is a five- or six-membered saturated carbocyclic ring;

$R^{10}$  is hydrogen, methyl or hydroxymethyl;

$R^{11}$ ,  $R^{12}$  and  $R^{13}$  are the same or different and each is hydrogen or methyl;

$R^{14}$  is hydrogen, methyl, hydroxy, or hydroxymethyl.

2. A pharmaceutical composition comprising the compound or salt of claim 1 and a pharmaceutically acceptable salt thereof.

4,952,598

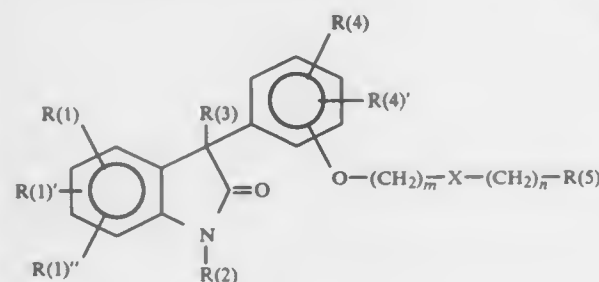
### 3-PHENYL INDOLINONE DERIVATIVES, PROCESSES FOR THEIR PREPARATION, MEDICAMENTS CONTAINING THEM, AND THEIR USE

Ulrich Lerch, Hofheim am Taunus; Henning Rainer, Hattersheim am Main, and Joachim Kaiser, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Division of Ser. No. 303,996, Jan. 30, 1989, Pat. No. 4,882,329, which is a continuation of Ser. No. 898,117, Aug. 20, 1986, abandoned. This application Nov. 1, 1989, Ser. No. 430,962  
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529994

Int. Cl.<sup>5</sup> A61K 31/40; C07D 209/34

U.S. Cl. 514-414

1. A compound of the formula I



in which

$R(1)$ ,  $R(1')$  and  $R(1'')$  are identical or different and are independent of one another and are hydrogen,  $(C_1-C_4)$ -alkyl,  $(C_1-C_3)$ -alkoxy, F, Cl, Br,  $CF_3$ , nitro, hydroxyl, acetamido or amino,

$R(2)$  is hydrogen,  $(C_1-C_{10})$ -alkyl, straight-chain or branched,  $(C_3-C_{10})$ -alkenyl, straight-chain or branched, phenyl- $(C_1-C_4)$ -alkyl, the phenyl ring being unsubstituted or substituted by one, two or three substituents from the group consisting of  $(C_1-C_4)$ -alkyl,  $(C_1-C_3)$ -alkoxy, F, Cl,  $CF_3$ ,  $(C_1-C_2)$ -alkylenedioxy or nitro,

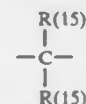
$R(3)$  is hydrogen,  $(C_1-C_{15})$ -alkyl, straight-chain or

branched,  $(C_3-C_{15})$ -alkenyl, straight-chain or branched,  $(C_4-C_8)$ -cycloalkyl,  $(C_4-C_8)$ -cycloalkyl- $(C_1-C_4)$ -alkyl, phenyl or phenyl- $(C_1-C_4)$ -alkyl, the phenyl radical being unsubstituted or substituted by one, two or three substituents from the group consisting of  $(C_1-C_4)$ -alkyl,  $(C_1-C_3)$ -alkoxy, F, Cl,  $CF_3$ ,  $(C_1-C_2)$ -alkylenedioxy or nitro,

$R(4)$  and  $R(4')$  are independent of one another, identical or different and are hydrogen,  $(C_1-C_4)$ -alkyl,  $(C_1-C_3)$ -alkoxy, F, Cl,  $CF_3$ , nitro, hydroxyl, acetamido or amino,  $m$  is 1, 2, 3 or 4,

$n$  is 0, 1, 2 or 3, but where  $X$  is a heteroatom only 2 of 3

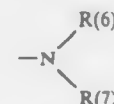
$X$  is a  $CH_2$  group, oxygen, sulfur, a carbonyl group, a  $CH(OH)$  group or a group



in which

$R(15)$  and  $R(15')$  are identical or different and are hydrogen or  $(C_1-C_4)$ -alkyl,

$R(5)$  is



in which

$R(6)$  and  $R(7)$ , independent of one another, are identical or different and are hydrogen,  $(C_1-C_{10})$ -alkyl,  $(C_4-C_8)$ -cycloalkyl,  $(C_4-C_8)$ -cycloalkyl- $(C_1-C_4)$ -alkyl, phenyl- $(C_1-C_6)$ -alkyl, benzhydryl or benzhydryl- $(C_1-C_4)$ -alkyl, the phenyl radicals each being unsubstituted or substituted by one, two or three radicals from the group consisting of  $(C_1-C_4)$ -alkyl,  $(C_1-C_4)$ -alkoxy,  $(C_1-C_2)$ -alkylenedioxy, F, Cl, Br,  $CF_3$  or hydroxyl,

or a salt thereof with a pharmaceutically acceptable acid.

4,952,599

### PHENYLTHIOUREAS, PHENYLISOTHIOUREAS, PHENYLCARBODIIMIDES, PESTICIDAL COMPOSITIONS CONTAINING THEM AND THEIR USE IN PEST CONTROL

Josef Ehrenfreund, Allschwil, Switzerland; Manfred Böger, Weil am Rhein, Fed. Rep. of Germany, and Josef Drabek, Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 20, 1988, Ser. No. 221,849

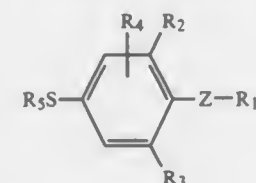
Claims priority, application Switzerland, Jul. 29, 1987, 2910/87; Jun. 2, 1988, 2092/88

Int. Cl.<sup>5</sup> C07D 249/12, 277/36, 285/08, 185/12

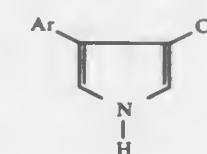
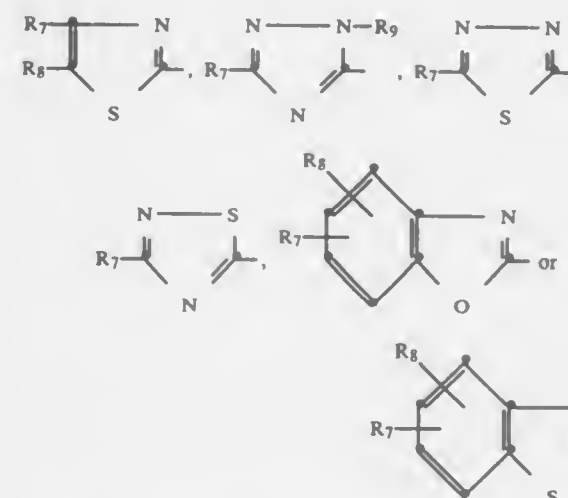
U.S. Cl. 514-363

12 Claims

1. A compound of formula I



wherein  $R_1$  is  $C_1-C_7$ alkyl which is substituted by one or more halogen atoms and/or  $C_1-C_5$ alkoxy groups;  $C_5-C_6$ cycloalkyl,  $C_3-C_5$ cycloalkyl- $C_1-C_3$ alkyl or di- $(C_3-C_5)$ cycloalkyl- $C_1-C_3$ alkyl;  $R_2$  is  $C_1-C_4$ alkyl or  $C_5-C_6$ cycloalkyl;  $R_3$  is  $C_1-C_4$ alkyl;  $R_4$  is hydrogen;  $R_5$  is



(I)

in which

Ar stands for phenyl which is trisubstituted, tetrasubstituted or pentasubstituted by identical or different substituents selected from the group consisting of fluorine, chlorine, bromine, methyl, methoxy, methylthio, trifluoromethyl, trifluoromethoxy, trifluoromethylthio at least one substituent being fluorine.

2. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

wherein  $R_7$  and  $R_8$  are each hydrogen, chlorine, bromine,  $C_1-C_4$ alkyl or  $C_1-C_4$ haloalkyl, and  $R_9$  is  $C_1-C_5$ alkyl;  $Z$  is  $-NH-CS-NH-$ ,  $-N=C(SR_6)-NH-$  or  $-N=C=N-$ ; and  $R_6$  is  $C_1-C_5$ alkyl.

4,952,600

### 3- OR 4-SUBSTITUTED OXOTREMORINE DERIVATIVES AND A METHOD OF TREATING CENTRAL CHOLINERGIC DYSFUNCTION THEREWITH

Eugene J. Trybulski, Bergen, N.J.; Richard H. Kramas, Newburgh, and Herbert J. Brabander, Nanuet, both of N.Y., assignors to American Cyanamid Company, Wayne, N.J.

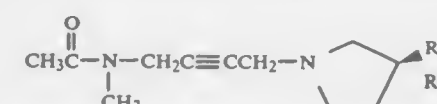
Division of Ser. No. 300,447, Jan. 23, 1989. This application Feb. 28, 1990, Ser. No. 481,924

Int. Cl.<sup>5</sup> C07D 207/12; A61K 31/40

U.S. Cl. 514-424

7 Claims

1. A compound selected from those of formula;



wherein  $R_7$  and  $R_8$  are independently selected from the group consisting of  $(C_1-C_6)$ acyloxy,  $(C_1-C_6)$ alkoxy, hydroxy, thio,  $(C_1-C_6)$ alkylthio,  $(C_1-C_6)$ alkyldithio with the proviso that one of  $R_7$  and  $R_8$  must be hydrogen.

6. A method of treating central cholinergic dysfunction in a mammal which comprises administering to said mammal an effective amount of a compound selected from those of claim 1.

4,952,601

### FUNGICIDAL 3-CYANO-4-PHENYL-PYRROLE DERIVATIVES

Detlef Wollweber, Wuppertal, and Wilhelm Brandes, Leichlingen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 2, 1988, Ser. No. 266,468

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3737983

Int. Cl.<sup>5</sup> A01N 43/36; C07D 207/34, 405/04

U.S. Cl. 514-427

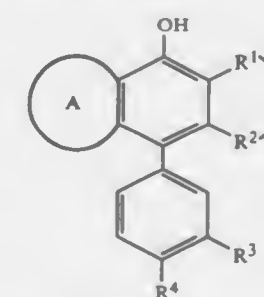
8 Claims

1. A 3-cyano-4-pyrrole of the formula

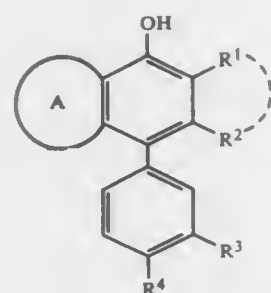


each of  $R^3$  and  $R^4$  is a lower alkoxy group; and Ring A is a thiophene ring, or a salt thereof.

7. A method for therapeutic treatment of prophylaxis of hyperlipidemia which comprises administering to a warm-blooded animal a therapeutically effective amount of a biphenyl derivative of the formula:







wherein each of  $R^1$  and  $R^2$  is a lower alkoxy carbonyl group, or  $R^1$  and  $R^2$  are combined together to form a group of the formula:



each of  $R^3$  and  $R^4$  is a lower alkoxy group; and Ring A is a thiophene ring, or a salt thereof.

4,952,603

# METHOD FOR THE ISOLATION OF ARTEMISININ FROM ARTEMISIA ANNUA

Farouk S. ElFeraly, 105 Virginia St., and Hala N. ElSohly, 41 Shelby Dr., both of Oxford, Miss. 38655

Filed Jun. 20, 1988, Ser. No. 208,763

Int. Cl.<sup>5</sup> A61K 31/335

U.S. Cl. 514—450

12 Claims

1. The process of producing artemisinin from the plant *Artemisia annua* comprising the steps of extracting the plant with hexane, partitioning the hexane extract between hexane and acetonitrile - water mixture, evaporation of the solvents to dryness, chromatographing the evaporated mixture on silica gel adsorbent with a solvent comprising ethyl acetate in hexane, and evaporating the acetonitrile phase followed by crystallization to produce substantially pure artemisinin.

4,952,604

# ANTIFUNGAL AGENT

Otto D. Hensens, Red Bank; Jerrold M. Liesch, Princeton Junction; James A. Milligan, Plainsboro, all of N.J.; Sagrario M. Del Val, Madrid, Spain; Robert E. Schwartz, and Carol Wichmann, both of Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

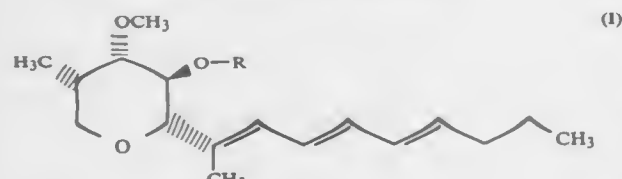
Filed May 3, 1989, Ser. No. 346,768

Int. Cl.<sup>5</sup> A61K 31/35; C07D 309/10

U.S. Cl. 514—459

6 Claims

1. A compound represented by the formula:



wherein R is  $\text{COCH}_2\text{NH}_2$  or  $\text{COCH}_2\text{N}(\text{CH}_3)_2$ .

6. A method for inhibiting fungal growth comprising applying to the area where growth is to be controlled, an antifungally effective amount of a compound of claim 1.

4,952,605

# MANOALIDE ANALOGS

Robert S. Jacobs, Santa Barbara, and D. John Faulkner, La Jolla, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

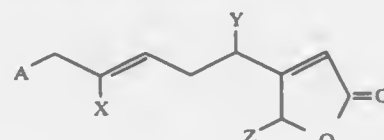
Continuation-in-part of Ser. No. 830,994, Feb. 19, 1986, Pat. No. 4,789,749, which is a continuation-in-part of Ser. No. 621,879, Jun. 18, 1984, Pat. No. 4,616,089, which is a continuation-in-part of Ser. No. 519,853, Aug. 3, 1983, abandoned. This application Nov. 18, 1988, Ser. No. 273,263

Int. Cl.<sup>5</sup> A61K 31/365; C07D 307/58

U.S. Cl. 514—473

4 Claims

1. A compound of the formula:



wherein

A is  $R_1$  or  $R_m$ , wherein  $R_1$  and  $R_m$  are

X is  $\text{CH}_3$ ;

Y is H;

Z is OH;

and the pharmaceutically acceptable 1-6C alkanoyl and 3-6C alkenoyl esters, and salts thereof.

3. A method of treating mammals in need of a drug having analgesic and/or an active agent, an analgesic and/or anti-inflammatory amount of the compound of claim 1.

4,952,606

# STRUCTURED LIPID CONTAINING DAIRY FAT

Vigen K. Babayan, Waban; George L. Blackburn, Jamaica Plain, and Bruce R. Bistrian, Ispwich, all of Mass., assignors to New England Deaconess Hospital Corporation, Boston, Mass.

Filed Apr. 5, 1988, Ser. No. 177,763

Int. Cl.<sup>5</sup> A61K 31/23

U.S. Cl. 514—552

20 Claims

1. A composition useful for nutritional applications comprising a structured lipid formed as a transesterification product of a mixture consisting essentially of 10-90% by weight dairy fat, 10-50% by weight additional medium-chain triglycerides and 0-80% by weight additional long-chain triglycerides, or hydrolysis products thereof.

4,952,607

# COPPER COMPLEX FOR TREATING CANCER

John R. J. Sorenson, Little Rock, Ark., and Larry W. Oberley, Iowa City, Iowa, assignors to International Copper Research Association, Inc., New York, N.Y.

Continuation of Ser. No. 382,557, May 27, 1982. This application Jan. 30, 1986, Ser. No. 823,968

Int. Cl.<sup>5</sup> C07F 1/08

U.S. Cl. 514—589

18 Claims

2. A method for treating cancer types in mammals, said cancer types being characterized by abnormal levels of superoxide dismutase activity, comprising administration to a mammal having a tumor characterized by abnormal superoxide dismutase activity of a therapeutically effective amount of (i) a copper salicylate complex selected from the group consisting of  $\text{Cu}(\text{II})(\text{salicylate})_2$ ,  $\text{Cu}(\text{II})(3,5\text{-diisopropylsalicylate})_2$ ,  $\text{Cu}(\text{II})(3,5\text{-diisopropylbutylsalicylate})_2$ ,  $\text{Cu}(\text{II})(\text{aspirinate})_4$ , (pyridine)<sub>4</sub> and  $\text{Cu}(\text{II})_2(\text{aspirinate})_4(\text{DMSO})_4$  and (ii) an anti-cancer drug.

4,952,608

# PROCESS FOR PREPARING SYNTHETIC RESINS HAVING ANION EXCHANGER PROPERTIES BY AMIDOMETHYLATING A BACKBONE POLYMER CONTAINING AROMATIC NUCLEI WITH A SPECIALLY PREPARED N-HYDROXYMETHYL PHTHALIMIDE

Reinhold M. Klipper, Cologne, and Peter M. Lange, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,441

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733033

Int. Cl.<sup>5</sup> C08F 5/20, 8/30; C08C 19/22

U.S. Cl. 521—32

7 Claims

1. In the process for the preparation of anion exchangers based on crosslinked, water-insoluble organic polymers containing aromatic nuclei, which process comprises (a) producing N-hydroxymethylphthalimide by reaction of phthalimide with aqueous formaldehyde solution in swelling agents in the presence of bases, (b) directly amidomethylating said polymers with N-hydroxymethylphthalimide prepared according to (a) in the presence of Friedel-Crafts catalysts and swelling agents and (c) finally saponifying the amidomethylated polymers to form the aminomethylated polymers, the improvement which comprises using in the first reaction step (a), as the base for producing N-hydroxymethylphthalimide a sodium hydroxide solution and adding this sodium hydroxide solution in such an amount and at such a rate that in the reaction mixture a pH-value is maintained in the range of 5 to 6, wherein the process improves the stability of the polymer.

4,952,609

# ACRYL RUBBER FOAMING COMPOSITIONS AND FOAMED ACRYL RUBBER

Motoo Fukushima, Kawasaki; Masaharu Takahashi, and Kunio Itoh, both of Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo

Filed Feb. 7, 1990, Ser. No. 476,595

Claims priority, application Japan, Feb. 7, 1989, 1-27851

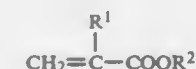
Int. Cl.<sup>5</sup> C08J 9/10

U.S. Cl. 521—94

4 Claims

1. An acrylic rubber foaming composition comprising in admixture:

(A) an acrylic polymer prepared by copolymerizing 90% to 99.99% by weight of an acrylate or methacrylate of the formula:



wherein  $R^1$  is a hydrogen atom or methyl radical, and  $R^2$  is a substituted or unsubstituted alkyl radical having 1 to 6 carbon atoms or an alkoxyalkyl radical having 2 to 6 carbon atoms, and being represented by  $-\text{R}^3-\text{OR}^4$  wherein  $R^3$  is a methylene or ethylene radical and  $R^4$  is a methyl, ethyl, propyl or butyl radical, with 10% to 0.01% by weight of a monomer having at least two aliphatic unsaturated bonds per molecule, wherein one of the aliphatic unsaturated bonds is attached to a silicon atom; (B) a pyrolytic organic foaming agent at about 2 to about 10 parts by weight per 100 parts by weight of the acrylic polymer; and (C) an organic peroxide at about 0.1 to about 10 parts by weight per 100 parts by weight of the acrylic polymer.

4,952,610

# SOUND DAMPING COMPOSITION AND METHOD OF USING THE COMPOSITION

Dan T. Moore, III, Cleveland Heights; Edward A. Collins, Avon Lakes, and Maurice E. Wheeler, Ashland, all of Ohio, assignors to Soundwich Incorporated, Cleveland, Ohio

Division of Ser. No. 103,392, Oct. 1, 1987, Pat. No. 4,851,271.

This application Mar. 6, 1989, Ser. No. 302,615

Int. Cl.<sup>5</sup> C08G 18/14

U.S. Cl. 521—99

6 Claims

1. A constrained layer sound damping composition for use in damping noise in the frequency range of about 50 Hz to about 5000 Hz transmitted from or through a housing surface comprising:

- from about 30 to 70% by weight of at least one urethane polymer;
- from about 10 to 30% by weight of an oil-insoluble olefin polymer; and
- from about 0 to 35% by weight of at least one filler, said urethane polymer and said olefin polymer being thoroughly intermixed with each other but substantially maintaining their separate identities in the composition mixture.

4,952,611

# POLYIMIDE FOAMS AND THEIR PRODUCTION

David M. Iadyke, Arlington Heights, Ill., assignor to Ethyl Corporation, Richmond, Va.

Filed May 26, 1988, Ser. No. 199,991

Int. Cl.<sup>5</sup> C08J 9/02

U.S. Cl. 521—185

9 Claims

1. A method of preparing a polyimide foam which comprises (1) reacting an essentially stoichiometric mixture of

- at least one aromatic or heterocyclic primary diamine, and
- a mixture of at least two organic tetracarboxylic acid esters, at least one of which is from 1 to 40 mol percent of an ester of a 2-(vicinal-dicarboxycyclohexenyl)-succinic acid and a second of which is an ester of an aromatic tetracarboxylic acid; and

(2) heating the reaction mixture to cure it into a polyimide foam.

4,952,612

# ENERGY-INDUCED CURABLE COMPOSITIONS

Katherine A. Brown-Wensley, Lake Elmo; Robert J. Devoe, and Michael C. Palazzotto, both of St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 28, 1987, Ser. No. 90,791

Int. Cl.<sup>5</sup> C08G 18/22, 59/68, 59/72

U.S. Cl. 522—25

18 Claims

1. A polymerizable composition consisting essentially of (a) polyurethane precursors comprising at least one monomer comprising at least two isocyanate groups and at least one monomer having at least two isocyanate-reactive hydrogen atoms, and (b) a curing agent comprising (i) an organometallic compound, said organometallic compound having the formula,



wherein

$L^1$  represents none, or 1 to 12 ligands contributing pi-electrons that can be the same or different ligand selected from substituted and unsubstituted acyclic and cyclic unsaturated compounds and groups and substituted and unsubstituted carbocyclic aromatic and heterocyclic aromatic compounds, each capable of contributing 2 to 24 pi-electrons to the valence shell of M;  $L^2$  represents none, or 1 to 24 ligands that can be the same or different contributing an even number of sigma-electrons

selected from mono-, di-, and tri-dentate ligands, each donating 2, 4, or 6 sigma-electrons to the valence shell of M;

L<sup>3</sup> represents none, or 1 to 12 ligands that can be the same or different, each contributing no more than one sigma-electron each to the valence shell of each M;

Ligands L<sup>1</sup>, L<sup>2</sup>, and L<sup>3</sup> can be bridging or non-bridging ligands;

M represents 1 to 4 of the same or different transition metal atom selected from the elements of Periodic Groups IVB, VB, VIB, VIIB, and VIIIB; with the proviso that said organometallic compound contains at least one of a metal-metal sigma bond and L<sup>3</sup>; and with the proviso that L<sup>1</sup>, L<sup>2</sup>, L<sup>3</sup>, and M are chosen so as to achieve a stable configuration, and

(2) an onium salt selected from the group consisting of salts of halonium compounds and compounds of hyper-valent Group VIA elements.

## 4,952,613

## DENTAL COMPOSITIONS BASED ON ORGANIC CARBOXYLIC ACIDS/ANHYDRIDES, METAL CHLORIDES, AND WATER

Hiroyasu Hosoda, Tokyo, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan

Filed Sep. 30, 1988, Ser. No. 252,053

Claims priority, application Japan, Sep. 30, 1987, 62-248631; Jan. 14, 1988, 63-6603

Int. Cl.<sup>3</sup> C08J 7/14; C08K 3/10, 3/16; A61K 6/04

U.S. Cl. 523—109

5 Claims

1. A dental composition for the treatment of the enamel or dentin of a tooth comprising an organic carboxylic acid or an anhydride thereof, a metal chloride and water, the concentration of said organic carboxylic acid or anhydride thereof being 5 to 50 weight percent based on the total weight of said composition, said metal chloride being potassium chloride or calcium chloride or a mixture thereof and the concentration of said metal chloride being 5 to 50 weight percent based on the total weight of said composition.

## 4,952,614

(METH)ACRYLIC ACID DERIVATIVES, CONTAINING URETHANE GROUPS, OF TRICYCLO[5.2.1.0<sup>2,6</sup>]DECANES

Jürgen Reiners, Leverkusen; Wolfgang Podszus, and Jens Winkel, both of Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 72,185, Jul. 10, 1987, abandoned. This application Feb. 22, 1989, Ser. No. 313,925

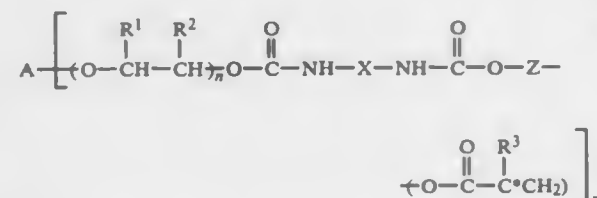
Claims priority, application Fed. Rep. of Germany, Jnl. 25, 1986, 3625204; Feb. 3, 1987, 3703120

Int. Cl.<sup>3</sup> A61K 6/08; A61C 5/00

U.S. Cl. 523—115

7 Claims

1. A dental material containing a (meth) acrylic acid derivative, containing urethane groups, of the formula



wherein

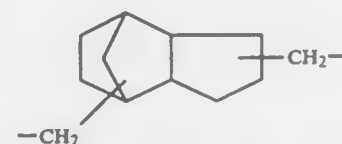
A is a straight-chain or branched aliphatic radical having 3 to 12 carbon atoms or is a straight chain or branched aliphatic radical having 3 to 12 carbon atoms containing 1 to 3 oxygen bridges, an aromatic radical having 6 to 14 carbon atoms, an araliphatic radical having 7 to 26 carbon

atoms or a cycloaliphatic radical having 6 to 14 carbon atoms,

r represents the number of chains starting from A and denotes a number from 2 to 6,

R<sup>1</sup> and R<sup>2</sup> are identical and denote hydrogen or are different and denote hydrogen and methyl,

n denotes a number of 0 to 5 for each chain starting from A, X denotes the group



Z denotes a divalent straight-chain or branched aliphatic hydrocarbon which has 3 to 10 carbon atoms or denotes a divalent straight-chain or branched aliphatic hydrocarbon which has 3 to 10 carbon atoms and which contains 1 or 2 oxygen bridges,

Z can be unsubstituted or substituted by 1 to 2 (meth) acrylate radicals, and

R<sup>3</sup> denotes hydrogen or methyl for each chain starting from A.

## 4,952,615

## COMPRESSIBLE FIREPROOF SEAL

Walton W. Welna, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 13, 1988, Ser. No. 193,897

Int. Cl.<sup>3</sup> C09K 3/28

U.S. Cl. 523—179

14 Claims

1. A fireproof seal which is compressible at low temperature and which swells at high temperature to provide a low and high temperature smoke, flame, and hose stream resistant barrier, said seal comprising halogenated rubber elastomers, vulcanizing agents, fillers, napthenic oil as a softening agent and an alkali metal silicate intumescent mineral.

## 4,952,616

## BINDERS

Martin J. Luxton; William C. S. Meredith, and Andrew Harrod, all of Kings Lynn, United Kingdom, assignors to Hepworth Minerals & Chemicals Limited, Sandbach, United Kingdom

Filed Nov. 15, 1988, Ser. No. 271,499

Claims priority, application United Kingdom, Nov. 18, 1987, 8727018

Int. Cl.<sup>3</sup> C08L 33/02; C08K 3/34

U.S. Cl. 523—141

12 Claims

1. A method of curing a binder comprising a source of polyvalent cations and a source of anions from polymeric organic acids, wherein a curing agent in liquid form comprising an ester is mixed with the binder.

8. A foundry composition comprising a foundry aggregate, a source of polyvalent cations, an ester which is a liquid at ambient temperature and a source of anions from polymeric organic acids.

## 4,952,617

## DISPERSION OF PIGMENTS IN RESINS AND COATINGS SYSTEMS

Jorge A. Ayala, and George A. Joyce, both of Monroe, La., assignors to Columbian Chemicals Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 118,216, Nov. 16, 1987. This application Jan. 17, 1989, Ser. No. 297,585

Int. Cl.<sup>3</sup> C08K 3/10, 9/04, 5/05; C08J 3/20

U.S. Cl. 523—200

7 Claims

1. A pigment dispersion of enhanced viscosity and heat stability characteristics for use in coatings systems, the pigment dispersion comprising:

a water-based pigment carrier dispersible in coatings systems;

a iron oxide pigment dispersed in said pigment carrier; and a surfactant selected from the group consisting of trimethylol ethane and trimethylol propane which is functional as a dispersant in a relatively non-polar matrix and which is present on the surface of the pigment in an amount effective to enhance the dispersibility of said pigment and the viscosity and heat stability characteristics of said pigment dispersion.

## 4,952,618

## HYDROCOLLOID/ADHESIVE COMPOSITION

Roger A. Olsen, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 3, 1988, Ser. No. 189,614

Int. Cl.<sup>3</sup> A61L 15/00; C08L 1/00, 5/02, 5/04

U.S. Cl. 524—17

20 Claims

1. A pressure sensitive adhesive composition comprising a rubbery elastomer having dispersed therein water absorbable or swellable hydrocolloid particles wherein at least some of said hydrocolloid particles are polycationic hydrocolloid particles, said composition having an Integrity Value of at least 60 percent and an Absorbency Value of at least 180 percent.

## 4,952,619

## ORGANIC POLYMER STABILIZATION

Alberto Greco, Dresano; Carlo Busetto, S. Donato Milanese; Luigi Casar, S. Donato Milanese, and Carlo Neri, S. Donato Milanese, all of Italy, assignors to Enichem Synthesis S.p.A., Palermo, Italy

Division of Ser. No. 733,526, May 13, 1985, Pat. No. 4,684,726. This application May 14, 1987, Ser. No. 50,311

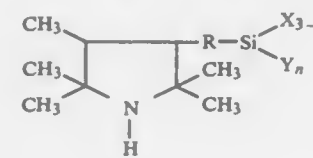
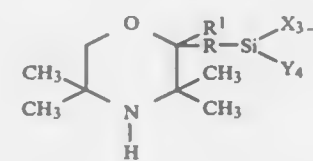
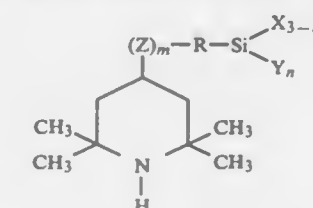
Claims priority, application Italy, May 21, 1984, 21023 A/84

Int. Cl.<sup>3</sup> C08K 5/34; C08F 8/00; C08L 83/00

U.S. Cl. 524—96

23 Claims

1. A stabilized polymer composition comprising a polyolefin and an amount of a product effective to stabilize said polyolefin against degradation from exposure to atmospheric agents and ultraviolet radiation wherein said product is obtained by the hydrolysis and resinification of a reactive stabilizing compound having one of the following formulas

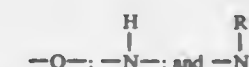


wherein;

m is 0 or 1;

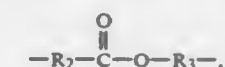
R<sup>1</sup> is selected from hydrogen and methyl;

z is selected from



wherein R<sub>1</sub> is a linear or branched alkyl group having from 1 to 5 carbon atoms;

R is a linear or branched alkylene group having from 1 to 10 carbon atoms; —R<sub>2</sub>—S—R<sub>3</sub>—; —R<sub>2</sub>—O—R<sub>3</sub>; and



wherein R<sub>2</sub> and R<sub>3</sub> are each linear or branched alkylene groups having from 2 to 10 carbon atoms;

x is selected from a linear or branched alkyl group having from 1 to 5 carbon atoms;

Y is selected from hydrogen, halogen, C<sub>1</sub>—C<sub>4</sub> acyloxy, C<sub>1</sub>—C<sub>4</sub> alkyloxy, amino, aminooxy and silyloxy; and

n is an integer selected from one, two and three.

## 4,952,620

## PHOTOLYTICALLY CLEAVABLE N-ACYLATED STERICALLY HINDERED AMINES

Godwin Berner, Binningen, and Mario Slomgo, Taers, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 899,133, Aug. 21, 1986, Pat. No. 4,785,102. This application Aug. 12, 1988, Ser. No. 231,315

Claims priority, application Switzerland, Aug. 27, 1985, 3668/85

Int. Cl.<sup>3</sup> C08K 5/34

U.S. Cl. 524—99

6 Claims

1. An organic polymer stabilised against the adverse action of actinic light, which polymer contains 0.1 to 5% by weight, of a compound of formula I



wherein

m is 1, 2 or 3,

A is a R<sup>1</sup>—CO— or R<sup>2</sup>—CH<sub>2</sub>—group, wherein

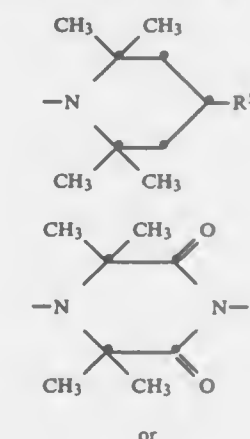
R<sup>1</sup> is phenyl or phenyl which is substituted by halogen,

C<sub>1</sub>—C<sub>12</sub>alkyl or C<sub>1</sub>—C<sub>4</sub>alkoxy or is unsubstituted naphthyl and

R<sup>2</sup> is —CN or CH<sub>3</sub>CO; and

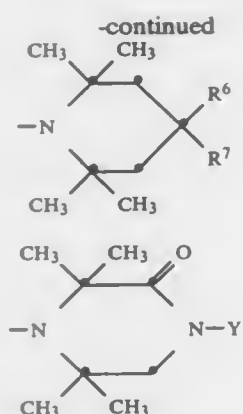
when m is 1,

B is a radical corresponding to the formulae

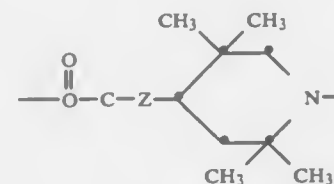
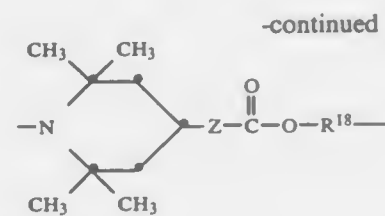


or

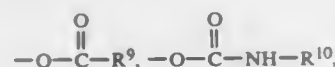
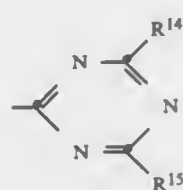




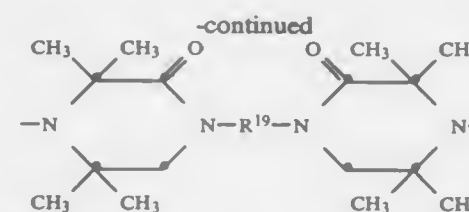
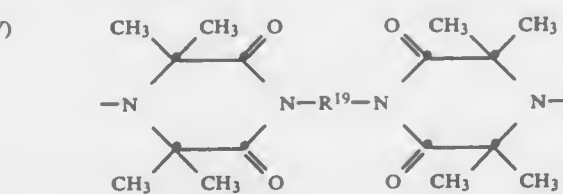
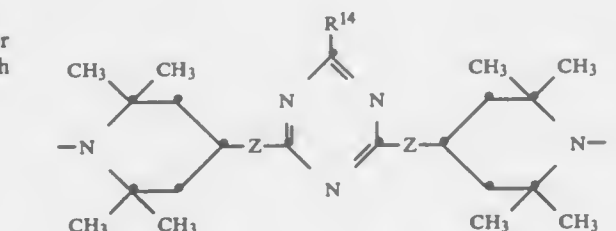
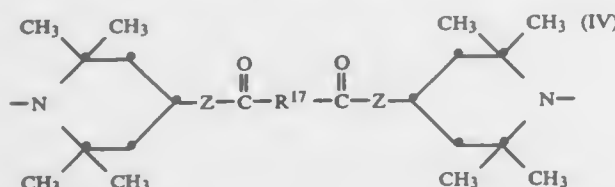
(III)



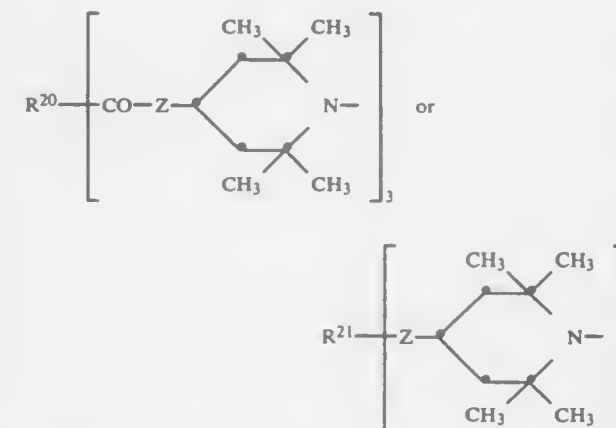
wherein

R<sup>5</sup> is hydrogen, —OR<sup>8</sup>,—N(R<sup>10</sup>R<sup>11</sup>),R<sup>6</sup> is —OH or —OR<sup>12</sup> and R<sup>7</sup> is —OR<sup>12</sup>, —CN, —COOR<sup>13</sup> or —CONH<sub>2</sub>, orR<sup>6</sup> and R<sup>7</sup> together are the oxo radical (=O), or R<sup>6</sup> and R<sup>7</sup>, together with the C-atom to which they are attached, form an unsubstituted 2-spiro-1,3-dioxolane, 2-spiro-1,3-dioxane, 5-spiro-1,3-oxazolidine, 2-spiro-1,3-oxazolidine or 5-spiro-1,3-imidazolidine ring or said ring substituted by one or more identical or different members selected from C<sub>1</sub>–C<sub>12</sub>alkyl or the oxo radical,R<sup>8</sup> is C<sub>1</sub>–C<sub>12</sub>alkyl, benzyl, allyl or 2-cyanoethyl,R<sup>9</sup> is C<sub>1</sub>–C<sub>18</sub>alkyl, C<sub>2</sub>–C<sub>12</sub>alkenyl, C<sub>3</sub>–C<sub>8</sub>cycloalkyl, phenyl or phenyl which is substituted by halogen, C<sub>1</sub>–C<sub>12</sub>alkyl, C<sub>1</sub>–C<sub>4</sub> alkoxy or hydroxyl, or is C<sub>7</sub>–C<sub>12</sub>phenylalkyl, C<sub>1</sub>–C<sub>4</sub> alkoxy or phenoxy,R<sup>10</sup> is C<sub>1</sub>–C<sub>12</sub>alkyl, cyclohexyl, phenyl, naphthyl, or phenyl which is substituted by C<sub>1</sub>–C<sub>4</sub>alkyl,R<sup>11</sup> is C<sub>2</sub>–C<sub>12</sub>alkanoyl, C<sub>3</sub>–C<sub>8</sub>alkenoyl, benzoyl or a group of the formulawherein R<sup>14</sup> and R<sup>15</sup> are each independently of the other C<sub>1</sub>–C<sub>8</sub>alkoxy, phenoxy, or a group —N(R<sup>10</sup>)(R<sup>16</sup>), in which R<sup>16</sup> is hydrogen or C<sub>1</sub>–C<sub>12</sub>alkyl,R<sup>12</sup> is C<sub>1</sub>–C<sub>12</sub>alkyl and R<sup>13</sup> is C<sub>1</sub>–C<sub>4</sub>alkyl, and Y is hydrogen, C<sub>1</sub>–C<sub>12</sub>alkyl, allyl or benzyl; when m is 2,

B is a divalent radical corresponding to the formulae



wherein

Z is —O—, —NH— or —NR<sup>10</sup>—,R<sup>17</sup> is methylene, 1,2-ethylene, C<sub>3</sub>–C<sub>20</sub>polymethylene, or branched C<sub>3</sub>–C<sub>20</sub>alkylene, C<sub>2</sub>–C<sub>10</sub>alkenylene, 1,4-cyclohexylene, 1,3-cyclohexylene, cyclohexane-1,4-dimethylene, 1,3- or 1,4-phenylene, 1,4- or 1,5-naphthylene, 4,4'-diphenylene, diphenylmethane-4,4'-diyl, diphenyl oxide-4,4'-diyl or m- or p-xylylene, or a radical —NH—R<sup>19</sup>—NH—,R<sup>18</sup> is 1,2-ethylene, 1,2-propylene, 1,3-propylene, 1,2-butylene, 1,4-butylene, hexamethylene, 1,4-cyclohexylene or cyclohexane-1,4-dimethylene,R<sup>19</sup> is 1,2-ethylene, trimethylene, tetramethylene, hexamethylene, octamethylene, dodecamethylene, 2,2-dimethyltrimethylene, trimethyloctamethylene, 1,4-cyclohexylene, cyclohexane-1,4-dimethylene, 1,3-phenylene, 4,4'-diphenylene, diphenylmethane-4,4'-diyl, diphenyl oxide-4,4'-diyl, or m- or p-xylylene, andR<sup>10</sup> and R<sup>14</sup> are as defined above; and, when m is 3, B is a trivalent radical corresponding to the formulae

wherein

R<sup>20</sup> is propane-1,2,3-triyl, butane-1,2,4-triyl, benzene-1,3,5-triyl, benzene-1,2,4-triyl or naphthalene-1,4,5-triyl, R<sup>21</sup> is a 1,3,5-triazin-2,4,6-triyl radical and Z is as defined above.

4,952,621

## URETHANE SEALANTS OR COATING ADMIXTURES HAVING IMPROVED SHELF STABILITY

Baldev K. Bandlish, S. Enclid, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 202,353, Jun. 6, 1988, abandoned. This application Oct. 10, 1989, Ser. No. 419,066

Int. Cl.<sup>5</sup> C08K 5/29

U.S. Cl. 524—195

19 Claims

1. A urethane sealant composition or coating admixture having improved shelf stability, comprising:

a blocked isocyanate-terminated urethane base prepolymer sealant composition or coating admixture, said urethane prepolymer made from a polyether polyol or a polyester polyol intermediate and a polyisocyanate having the formula R(NCO)<sub>n</sub> where n is 2, 3 or 4, and R is an aliphatic, an aromatic, or an aliphatic substituted aromatic having from 4 to 20 carbon atoms,

an effective amount of a polyamine or a polyimine curing

agent capable of curing the sealant composition or the coating admixture, and

an effective amount to improve viscosity stability during storage of an organic silane consisting essentially of an alkylalkoxysilane wherein said alkyl group has from 1 to 15 carbon atoms, wherein the number of alkoxy groups is from 1 to 3, and wherein the hydrocarbon portion of said alkoxy is an alkyl having from 1 to 6 carbon atoms, and from about 0.1 to about 4.0 parts by weight of a carbodiimide for every 100 parts by weight of said blocked base polymer to impart improved shelf age stability to said uncured isocyanate blocked urethane sealant composition or coating admixture so that the Shore A Hardness is substantially retained after storage and subsequent curing by exposure to atmospheric moisture.

4,952,622

## POLYMER PARTICLES WHICH CARRY, IMPLANTED ON THEIR SURFACE, AMPHIPHILIC MOLECULES CARRYING ION-FORMING OR REACTIVE GROUPS, A PROCESS FOR THE PREPARATION OF THESE PARTICLES AND THEIR USE IN BIOLOGICAL APPLICATIONS

Bernard Chauvel, Ermost; Jean-Claude Daniel, Fontenay/Sous-Bois, and Christian Pusineri, Saint Symphorien D'Ozon, all of France, assignors to Rhone Poulenc Chimie, Courbevoile Cedex, France

Filed May 6, 1988, Ser. No. 191,259

Claims priority, application France, May 11, 1987, 87/06549

Int. Cl.<sup>5</sup> C06K 9/00, 5/06

U.S. Cl. 524—376

8 Claims

1. Polymer particles wherein amphiphilic molecules are enmeshed in the peripheral layer of said particles comprising:

(a) particles of a homopolymer or a copolymer comprising units derived from vinylaromatic monomers, alkyl esters of alpha, beta-unsaturated acids, unsaturated esters of carboxylic acids, vinyl chloride, vinylidene chloride, dienes or monomers having nitrile functional groups, having a glass transition temperature T<sub>g</sub> above about 40° C. wherein the macromolecular chains in the peripheral layer of the particles become mobile at a temperature within the glass transition zone; and

(b) an amphiphilic compound having an HLB greater than or equal to 10, a molecular weight greater than or equal to 400 and a hydrophilic oligomer block terminated by at least one ion-forming or reactive group and a hydrophobic block, said hydrophobic block becoming enmeshed with the macromolecular chains of said polymer in the peripheral layer of said polymer particles, thus enmeshing said amphiphilic molecules on the surface of said polymer particles.

4,952,623

## AQUEOUS POLYMER DISPERSIONS HAVING A LONG SHELF LIFE

Gerhard Auchter, Mannheim; Thomas Schwerzel; Rainer Blum, both of Ludwigshafen; Gerhard Neubert, Battenberg; Eckhardt Wistuba, Bad Duerkheim, and Rolf Osterloh, Erftstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,496

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720859

Int. Cl.<sup>5</sup> C08J 3/10; C08K 5/25; C08L 33/06; C09D 3/80

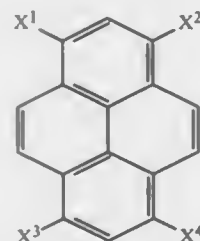
U.S. Cl. 524—517

2 Claims

1. An aqueous polymer dispersion essentially free of emulsifiers and having a long shelf life, which is obtained by polymerizing a mixture of 15 to 50% by weight of a copolymer (A) of (I) 1.5 to 15% by weight of copolymerizable compounds of 3 to 10 carbon atoms which contains a carboxyl or carboxylic anhydride group,

(II) 30 to 98.5% by weight of C<sub>1</sub>-C<sub>20</sub>-alkyl acrylates or methacrylates,  
 (III) 0 to 60% by weight of vinylaromatics,  
 (IV) 0 to 20% by weight of copolymerizable carbonyl compounds and  
 (V) 0 to 20% by weight of further copolymerizable organic compounds not stated under (I) to (IV), and  
 50 to 85% by weight of a copolymer (B) of 40 to 100% by weight of the monomers (II) and 0 to 60% by weight of one or more of the monomers (III) to (V),  
 wherein the copolymers (A) and (B) together contain, as components, up to 65% by weight of alkyl (meth)acrylates (II) whose homopolymers have glass transition temperatures of less than 0° C., and wherein one or both of the copolymers (A) and (B) contain the monomers (IV) as components, in an organic solvent in a manner such that first one of the two copolymers (A) and (B) is prepared by polymerization of the components, the other copolymer is produced in the resulting polymer solution, then dispersing the polymer mixture in water by adding ammonia, distilling off the solvent and adding one or more polyhydrazides (C) to the dispersion.

**4,952,624**  
**POLYARYLENE SULFIDE MIXTURES WITH REDUCED RADICAL FORMATION UNDER HIGHLY ACCELERATED WEATHERING**  
 Burkhard Köhler, Krefeld; Gerhard Heywang, Bergisch Gladbach, and Eberhard Zirnigle, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany  
 Filed Aug. 3, 1989, Ser. No. 389,267  
 Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827644  
 Int. Cl.<sup>5</sup> C08K 5/37, 5/42, 5/32, 5/03  
 U.S. Cl. 524-160 5 Claims  
 1. A mixture comprising  
 (A) 99.9 to 90% by weight polyarylene sulfides,  
 (B) 0.1 to 10% by weight of a pyrene corresponding to formula (I)



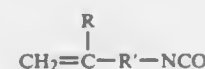
in which  
 X<sup>1</sup>-X<sup>4</sup> independently of one another represent the group  
 —S—R, hydrogen, F, Cl, Br, I, nitro groups or sulfonic acid groups or alkali salts thereof although only two of the substituents X<sup>1</sup> to X<sup>4</sup> may be hydrogen, and  
 represents C<sub>1</sub>-C<sub>22</sub> alkyl, C<sub>6</sub>-C<sub>22</sub> cycloalkyl, C<sub>7</sub>-C<sub>22</sub> aralkyl or alkylaryl, substituted or unsubstituted C<sub>6</sub>-C<sub>14</sub> aryl.

**4,952,625**  
**PROCESS FOR IMPROVING THE FLOWABILITY OF ULTRAHIGH-MOLECULAR-WEIGHT POLYETHYLENE COMPOSITION**  
 Tomoo Shiohara, Kyoto, and Hiroshi Abe, Takatsuki, both of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan  
 Continuation of Ser. No. 125,793, Nov. 27, 1987, abandoned, which is a continuation of Ser. No. 9,037, Jan. 16, 1987, abandoned, which is a continuation of Ser. No. 657,962, Oct. 5, 1984, abandoned. This application Jul. 10, 1989, Ser. No. 377,158

Claims priority, application Japan, Oct. 7, 1983, 58-189031; May 18, 1984, 59-101328; May 30, 1984, 59-110094  
 Int. Cl.<sup>5</sup> C08J 3/20; C08K 5/01, 5/03  
 U.S. Cl. 524-586 14 Claims  
 1. A process for producing a thermoplastic ultrahigh-molecular-weight polyethylene composition having excellent moldability, which comprises mixing at room temperature to 100° C. an ultrahigh-molecular-weight polyethylene having an average molecular weight of at least 2,000,000 with an amount of a flowability improver selected from the group consisting of (a) styrene, (b) alpha-methylstyrene, (c) chlorinated styrene and (d) a mixture of (a) and (b), wherein the amount of the flowability improver is 3 to 100 parts by weight for styrene and 3 to 30 parts by weight for alpha-methylstyrene, chlorinated styrene or a mixture of alpha-methylstyrene and styrene, per 100 parts by weight of the ultrahigh-molecular-weight polyethylene, and wherein the amount of the flowability improver is effective for acting as a solvent to the polyethylene and for improving the flowability of the polyethylene.

**4,952,626**  
**POLYESTER GRAFT COPOLYMERS, FLEXIBLE COATING COMPOSITIONS COMPRISING SAME AND BRANCHED POLYESTER MACROMONOMERS FOR PREPARING SAME - II**  
 Panagiotis I. Kordomenos, Wayne, Pa., and Rose A. Rynzt, Midland, Mich., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.  
 Continuation-in-part of Ser. No. 45,591, May 4, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 281,826  
 Int. Cl.<sup>5</sup> C08L 51/08

U.S. Cl. 525-28 22 Claims  
 1. Thermosetting, flexible, solvent-based coating composition comprising a hydroxy functional polyester graft copolymer and a hydroxy-reactive crosslinking agent, wherein the hydroxy functional graft copolymer has number average molecular weight between about 1,300 and 15,000, has a hydroxyl number between about 30 and 300, and is the reaction product of carbon-carbon double bond-reactive monoethylenically unsaturated monomer with hydroxy functional carbon-carbon double bond-bearing branched polyester macromonomer, under free radical polymerization reaction conditions, said monomer bearing substantially no functionality which is substantially reactive with hydroxy functionality of said macromonomer under said reaction conditions and said macromonomer being the reaction product of (i) isocyanato monomer having the formula:



wherein R is hydrogen or C<sub>1</sub> to about C<sub>7</sub> alkyl, and R' is a divalent hydrocarbon linking moiety which does not substantially interfere with the reactivity of either the isocyanato group or the ethylenic double bond of said isocyanato monomer with (ii) hydroxy functional saturated polyester reactant having about 0-10 urethane groups per molecule.

**4,952,627**  
**PROCESS FOR PRODUCING HIGH IMPACT STYRENE RESIN BY CONTINUOUS BULK POLYMERIZATION**  
 Tsuyoshi Morita, Chiba; Masaru Enomoto, Yokkaichi, and Kyotaro Shimazu, Chiba, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Japan  
 Continuation-in-part of Ser. No. 75,971, Jul. 21, 1987, abandoned. This application Jun. 22, 1988, Ser. No. 209,958  
 Claims priority, application Japan, Jul. 25, 1986, 61-173699; Jul. 31, 1986, 61-180763  
 Int. Cl.<sup>5</sup> C08F 279/02

U.S. Cl. 525-52 6 Claims  
 1. In a process for producing a high impact styrene resin by continuously polymerizing a styrene monomer in bulk in the presence of a rubbery polymer, the improvement wherein a polymerization line is used which is comprised of an initial-stage polymerization line (II) following a material feed line (I) and consisting of one or more tubular reactors having fixedly set therein a plurality of mixing elements having no moving parts, a main polymerization line (III) following the initial-stage polymerization line (II) and consisting of one or more tubular reactors having fixedly set therein a plurality of mixing elements having no moving parts, and a recycle line (IV) which branches between the initial-stage polymerization line (II) and the main polymerization line (III) and returns to the initial-stage polymerization line (II), and a major part of a flow of the initial-stage polymer solution leaving the initial-stage polymerization line (II) is recycled through the recycle line (IV) while the remaining nonrecycled initial-stage polymer flow is polymerized in the main polymerization line (II), the ratio R of the flow rate (F<sub>1</sub>) of the initial-stage polymer solution recycled via the recycle line (IV) to the flow rate (F<sub>2</sub>) of the starting material solution fed from the material feed line (I), F<sub>1</sub>/F<sub>2</sub>, being from 4 to 15.

**4,952,628**  
**BARRIER BLENDS BASED ON AMORPHOUS POLYAMIDE AND ETHYLENE/VINYL ALCOHOL, UNAFFECTED BY HUMIDITY**  
 Philip S. Blatz, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
 Continuation-in-part of Ser. No. 88,260, Aug. 24, 1987, abandoned. This application Jun. 17, 1988, Ser. No. 206,025  
 Int. Cl.<sup>5</sup> C08L 29/02; C08F 16/06

U.S. Cl. 525-58 14 Claims  
 1. A blend consisting essentially of about 50 to about 95 weight percent of an amorphous polyamide having a glass transition temperature of about 90° C. to about 200° C.; and about 5 to about 50 weight percent of a vinyl alcohol polymer having a copolymerized ethylene content of 0 to about 60 mol percent and a degree of saponification of at least about 90%, the percentages of the polyamide and vinyl alcohol polymers being based on the total weight of polymers in the blend.

**4,952,629**  
**THERMOPLASTIC POLYESTER BLENDS**  
 Yeon F. Liang, Kohler, Wis., assignor to Plastics Engineering Company, Sheboygan, Wis.  
 Filed Dec. 7, 1988, Ser. No. 281,202  
 Int. Cl.<sup>5</sup> C08L 67/02

U.S. Cl. 525-66 2 Claims  
 1. A polymer blend of improved impact resistance comprising:  
 (a) about 100 parts by weight of a polyethylene terephthalate;  
 (b) at least about 10 to about 25 parts by weight of a linear segmented thermoplastic polyesteramide; and  
 (c) about 5 parts by weight of a block copolymer selected from a styrene/ethylene butylene/styrene triblock copolymer and a styrene/ethylene-butylene/styrene maleic anhydride functionalized triblock copolymer; said blend containing about 20 to 25 parts by weight of the polyesteramide when the block copolymer is a styrene/ethylene-

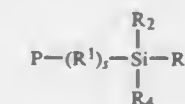
butylene/styrene triblock copolymer and about 10 to about 25 parts by weight of said polyesteramide when the block copolymer is a styrene/ethylene-butylene/styrene maleic anhydride triblock copolymer.

**4,952,630**  
**MODIFIED POLYTETRAFLUOROETHYLENE RESINS AND BLENDS THEREOF**  
 Richard A. Morgan, Vienna, W. Va., and Charles W. Stewart, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.  
 Division of Ser. No. 280,923, Dec. 9, 1988, Pat. No. 4,904,726, which is a continuation-in-part of Ser. No. 140,250, Dec. 31, 1987, abandoned, and a continuation-in-part of Ser. No. 140,249, Dec. 31, 1987, Pat. No. 4,879,362. This application Nov. 6, 1989, Ser. No. 431,948  
 Int. Cl.<sup>5</sup> C08L 27/16, 27/18, 27/20, 51/00

U.S. Cl. 525-72 13 Claims  
 1. Blend of  
 (a) a melt-processable plastic resin, and  
 (b) 0.1 to 200 parts per 100 parts of component (a) of a dispersion-process-produced, non-melt-processable, particulate, tetrafluoroethylene copolymer, the copolymer comprising recurring units of tetrafluoroethylene and modifying recurring units of a comonomer selected from the class consisting of hexafluoropropylene, perfluoro(alkyl vinyl ethers), perfluoro(alkyl vinyl ethers) wherein an alkyl group is replaced with a hexafluoropropylene oxide oligomer, chlorotrifluoroethylene, and a mixture thereof, the number of recurring units of comonomer in the blend being sufficient to enable the copolymer to compound uniformly with said resin without forming visible agglomerates but not in an amount great enough to cause the polytetrafluoroethylene to lose its non-melt-fabricable character.

**4,952,631**  
**COMPOSITIONS FOR PREPARING CEMENT-ADHESIVE REINFORCING FIBERS**  
 James J. McAlpin, and Wai Y. Chow, both of Houston, Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.  
 Division of Ser. No. 941,979, Dec. 23, 1986, Pat. No. 4,861,812, which is a continuation-in-part of Ser. No. 846,666, Mar. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 816,032, Jan. 3, 1986, Pat. No. 4,710,540. This application Aug. 4, 1988, Ser. No. 228,401  
 The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.  
 Int. Cl.<sup>5</sup> C08F 8/00

U.S. Cl. 525-101 5 Claims  
 1. Concrete adherent polyolefin fibers for reinforcement of concrete articles, comprising:  
 fibers composed of from about 90 wt % to about 99 wt % of an olefinic polymer containing from about 1 wt % to about 10 wt % of a modifying agent comprising:  
 a Si (IV) composition represented by the formula:



wherein R is a polyolefin having from about 50 to 1,000 monomeric units, s is 0 or 1, R<sup>1</sup> is a C<sub>1</sub>-C<sub>10</sub> alkylene group, C<sub>6</sub>-C<sub>20</sub> arylene or substituted arylene group, Si<sub>1-10</sub> oligomeric siloxane group, alkylene amide or imide, arylene amide or imide, alkylarylene amide or imide, alkylene or arylene sulfonyl amine, alkylene or arylene ester, alkylene or arylene carbonate with the alkylene and arylene having from 1 to 10 and 6 to 20 C atoms, respectively, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> which can be the same or different are hydrogen,



halogen, hydroxyl C<sub>1</sub>-C<sub>10</sub> alkyl or C<sub>1</sub>-C<sub>10</sub> alkoxy group, with the proviso that at least one of R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> must be hydrogen, halogen or alkoxy.

4,952,632

**TRANS-CYCLOHEXANE-1,4-DIISOCYANATE WHICH IS COMPLETELY OR PARTIALLY BLOCKED WITH EPSILON-CAPROLACTAM; AND THE MANUFACTURE AND USE OF THE SAME**

Rainer Gras, Bochum, and Elmar Wolf, Recklinghausen, both of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany  
Division of Ser. No. 915,001, Oct. 3, 1986, abandoned. This application Mar. 9, 1988, Ser. No. 165,820

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1985, 3536017

Int. Cl.<sup>5</sup> C08G 18/80

U.S. Cl. 525—124

23 Claims

1. A composition comprising a cured mixture of a polyol and an epsilon-caprolactam blocked trans-cyclohexane-1,4-diisocyanate, wherein said epsilon-caprolactam blocked trans-cyclohexane-1,4-diisocyanate has a melting point of about 100° to 210° C., and comprises from 0.1 to 15 weight percent free isocyanate groups, and from 15 to 22 weight percent of isocyanate groups blocked with epsilon-caprolactam.

4,952,633

**RUBBER COMPOSITION**

Akio Maeda, and Kei Uehama, both of Kawasaki, Japan, assignors to Nippon Zeon Co., Ltd. and The Yokohama Rubber Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 9,983, Feb. 2, 1987, abandoned. This application Jul. 26, 1988, Ser. No. 224,277

Claims priority, application Japan, Feb. 3, 1986, 61-21796

Int. Cl.<sup>5</sup> C08L 71/03

U.S. Cl. 525—187

6 Claims

1. A rubber composition comprising:  
(A) 85 to 55 weight % of a copolymer rubber;  
(B) 15 to 45 weight % of chloroprene rubber; and  
(C) a sulfur-containing curing agent; wherein said copolymer rubber (A) comprises  
(1) 10 to 60 mole % of epichlorohydrin;  
(2) 30 to 90 mole % of a component selected from the group consisting of (i) propylene oxide and (ii) a mixture of propylene oxide and ethylene oxide wherein the molar ratio of propylene oxide to ethylene oxide is at least 1; and  
(3) 2 to 15 mole % of an unsaturated epoxide.

4,952,634

**CURABLE CARBOXYLATED POLYMERS CONTAINING POLYMERIC POLYVALENT METAL SALT CROSSLINKING AGENTS**

Richard F. Grossman, Shelton, Conn., assignor to Synthetic Products Company, Cleveland, Ohio

Continuation of Ser. No. 5,600, Jan. 21, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 231,661

Int. Cl.<sup>5</sup> C08L 13/00, 87/00

U.S. Cl. 525—190

13 Claims

1. A curable carboxylated polymer composition comprising a curable carboxylated polymer and, as a crosslinking agent, a condensation polymer of a hindered polyvalent metal salt of an aromatic polycarboxylic acid, said condensation polymer of said salt being heat stable at crosslinking temperatures of said curable composition, said aromatic polycarboxylic acid is selected from the group consisting of terephthalic, trimellitic, pyromellitic and trimesic.

4,952,635

**PROCESS FOR THE MANUFACTURE OF AN IMPACT RESISTANT THERMOPLASTIC RESIN**

Philippe Helm, and Gerard Riess, both of Mulhouse, France, assignors to Norsolor, Paris, France

Filed Aug. 19, 1988, Ser. No. 234,055

Claims priority, application France, Aug. 20, 1987, 87 11759  
Int. Cl.<sup>5</sup> C08F 2/30, 265/04, 279/02

U.S. Cl. 525—243

13 Claims

1. A process for the manufacture of an impact resistant thermoplastic resin modified with an elastomeric latex, comprising the steps of:

- preparing the elastomeric latex in an aqueous emulsion from at least one ethylenically unsaturated monomer in the presence of a non-ionic surfactant;
- adding at least one vinyl monomer to the elastomeric latex from step (a), said vinyl monomer being insoluble or substantially insoluble in water, and adding at least one polymer or copolymer based on carboxylic units and capable of forming an interpolymeric complex with the non-ionic surfactant employed in step (a), and lowering the pH of the mixture sufficiently to transfer the particles of the latex from step (a) into said vinyl monomer and to cause formation of the interpolymeric complex; and, (c) polymerizing the elastomeric latex and the vinyl monomer from step (b).

4,952,636

**MODIFIED POLYTETRAFLUOROETHYLENE RESINS AND BLENDS THEREOF**

Richard A. Morgan, Vienna, W. Va., and Charles W. Stewart, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 280,923, Dec. 9, 1988, Pat. No. 4,904,726, which is a continuation-in-part of Ser. No. 140,250, Dec. 31, 1987, abandoned, and a continuation-in-part of Ser. No. 140,249, Dec. 31, 1987, Pat. No. 4,879,362. This application Nov. 6, 1989, Ser. No. 431,947

Int. Cl.<sup>5</sup> C08F 14/26, 259/08

U.S. Cl. 525—276

8 Claims

1. A dispersion-process-produced, non-melt-processible, particulate, tetrafluoroethylene copolymer comprising recurring units of tetrafluoroethylene and modifying recurring units of at least one ethylenically unsaturated comonomers that is copolymerizable with the tetrafluoroethylene and selected from chlorotrifluoroethylene and perfluoro(alkyl vinyl ethers) wherein the alkyl group is replaced with a hexafluoropropylene oxide oligomer, the number of recurring units of comonomer near the surface of the copolymer particles being sufficient to enable the copolymer to compound uniformly with an elastomer or plastic without forming visible agglomerates but not in an amount great enough to cause the polytetrafluoroethylene to lose its non-melt-fabricable character.

4,952,637

**HYDROCARBON COMPOSITIONS CONTAINING POLYOLEFIN GRAFT POLYMERS**

Maria M. Kapuscinski, Carmel; Larry D. Grina, Wappingers Falls; Ronald E. Jones, Glenham; and Rodney Lu-Dai Sung, Flahkill, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 726,567, Apr. 24, 1985, Pat. No. 4,820,776. This application Jul. 22, 1988, Ser. No. 222,870

Int. Cl.<sup>5</sup> C08F 255/04, 255/06

U.S. Cl. 525—279

2 Claims

1. The process for preparing a graft polymer which comprises intimately mixing in a reaction mixture  
(a) an oil-soluble, substantially linear, carbon-carbon backbone polymer of molecular weight  $M_n$  of 10,000-1,000,000;  
(b) as a first graft monomer amine containing a polymeriz-

able ethylenically unsaturated double bond, (i) N-vinylpyrrolidone, (ii) N-vinylimidazole, (iii) the reaction product of an amine and an epoxy of an aliphatic unsaturated carbocyclic acid, (iv) the reaction product of an amine and an ether containing an epoxy group and an ethylenically unsaturated carbon-to-carbon double bond, or (v) the reaction product of an amine and an aldehyde containing a carbon-to-carbon double bond;

(c) as a second functional monomer, a phenothiazine; and (d) a free radical initiator;

maintaining the temperature of the reaction mixture at a temperature at least as high as the decomposition temperature of said initiator thereby effecting decomposition of said initiator and bonding of said first and second monomers onto said backbone polymer to form graft polymer; and recovering said graft polymer.

2. The process for preparing a graft polymer which comprises

intimately admixing in a reaction mixture (i) an oil-soluble, substantially linear, carbon-carbon backbone polymer, (ii) first graft monomer amine containing a polymerizable ethylenically unsaturated double bond and (iii) a free radical initiator, maintaining the temperature of the reaction mixture at a temperature at least as high as the decomposition temperature of said initiator thereby effecting decomposition of said initiator and binding of said graft monomer onto said backbone polymer to form graft polymer; intimately admixing in a reaction mixture (i) said graft polymer and (iii) as a second functional monomer, a phenothiazine and (iii) a free radical initiator; maintaining the temperature of the reaction mixture at a temperature at least as high as said decomposition temperature thereby effecting decomposition of said initiator and bonding said second functional monomer onto said graft polymer to form product graft polymer; and recovering said product graft polymer.

4,952,638

**PROCESS FOR PRODUCING MACROMONOMERS**

Toshitsugu Arai, and Susumu Kawase, both of Sayama, Japan, assignors to Soken Kagaku Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1987, Ser. No. 52,601

Claims priority, application Japan, May 24, 1986, 61-119493  
Int. Cl.<sup>5</sup> C08F 291/10

U.S. Cl. 525—286

4 Claims

1. A process for producing a hydrophilic group containing macromonomers having an ethylenically unsaturated group at the terminal end thereof which comprises the step of reacting a hydrophilic group-containing polymer which contains hydroxyl groups, said polymer having a carboxyl group at the terminal end thereof, with an ethylenically unsaturated group-containing epoxy compound in the presence of a hydrophilic organic solvent having a hydroxyl group, said epoxy compound being selected from the group consisting of glycidyl acrylate, 2-methylglycidyl acrylate, glycidyl methacrylate 2-methylglycidyl methacrylate.

4,952,639

**NOVEL HYDROGENATED PETROLEUM RESIN AND PROCESS FOR PREPARING THE SAME**

Katsumi Minomiyu, Ichihara; Akira Takahashi, Sugito, and Koichi Murakami, Chiba, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Jun. 14, 1988, Ser. No. 206,358

Claims priority, application Japan, Jul. 30, 1987, 62-188980  
Int. Cl.<sup>5</sup> C08F 8/04

U.S. Cl. 525—327.9

2 Claims

1. A hydrogenated petroleum resin comprising, as its polymer chain major constituents, (I) 25-75% by weight of C<sub>5</sub> diolefin, (II) 10-45% by weight of C<sub>5</sub> monoolefin moieties and (III) 10-50% by weight of aromatic monoolefin moieties se-

lected from the group consisting of styrene, -methylstyrene, vinyl toluene and indene, wherein the ratio by weight of (I)/(II) is in the 1/1-4/1 range, at least 80% of unsaturated bonds derived from (I) and (II) are hydrogenated, up to 80% of aromatic nuclei derived from (III) are hydrogenated, and at least 10% by weight of moieties constituting the polymer chain are comprised of component (III) with its aromatic nucleus being unhydrogenated.

4,952,640

**NONLINEAR OPTICALLY ACTIVE POLYMERS**

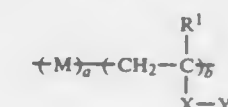
Cecil V. Francis, Steven M. Heilmann, Larry R. Krepek, and Gerald K. Rasmussen, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.  
Filed Apr. 21, 1989, Ser. No. 341,720

Int. Cl.<sup>5</sup> C08F 8/30, 8/32, 8/34

U.S. Cl. 525—328.2

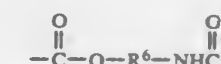
14 Claims

1. An organic polymer comprising organic groups having second or third order nonlinear susceptibilities, said groups being covalently bound pendant to the polymer backbone, said polymer being linear, having a molecular weight in the range of 2,000 to 5,000,000, and having units of the formula:



wherein

M is a polymer unit derived from one or more free radically polymerizable, ethylenically unsaturated monomers by polymerization with a reactive monomer;  
R<sup>1</sup> is hydrogen or methyl;  
X is the linking group

in which R<sup>6</sup> is alkylene;

Y is a group remaining after removal of a hydrogen atom from nonlinear optically active molecule HY; and  
a and b are independently integers, wherein a can be zero and b is at least 1, sufficient to provide the polymer with a weight percent of M units of between 0 and 99.

4,952,641

**ORGANYLOXSILYL-FUNCTIONAL THIURES WITH HALOGEN RUBBER MIXTURES**

Siegfried Wolff, Bornheim-Merten, and Heinz Grewatta, Cologne, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 357,727

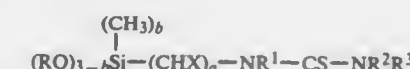
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 3821463

Int. Cl.<sup>5</sup> C08C 19/22, 15/02

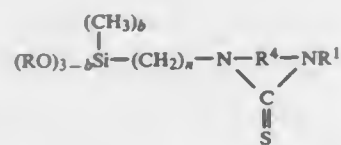
U.S. Cl. 525—332.7

9 Claims

1. In a vulcanizable rubber mixture containing at least one double bond containing halogen rubber and a silicate filler; the improvement in which said mixture contains at least one substituted organyloxysilyl-functional thiourea of the general formula (I)



or of the general formula (II)



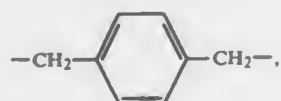
in an amount of 0.5–5.0 phr as accelerator, in which

a represents 1, 3, 4, 5 or 6

b represents 0, 1 or 2

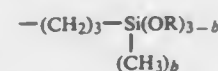
R represents alkyl with 1 to 6 carbon atoms cycloalkyl with 5 to 7 carbon atoms aryl,

X represents hydrogen, if a = 1, 3, 4, 5 or 6, or X represents



if a = 1

R<sup>1</sup> represents hydrogen,



R<sup>2</sup> represents hydrogen alkyl with 1 to 8 carbon atoms, alkenyl with 1 to 8 carbon atoms, aryl,

R<sup>3</sup> which may be the same as or different from R<sup>2</sup> represents alkyl with 1 to 8 carbon atoms,

alkenyl with 1 to 8 carbon atoms, aryl,

R<sup>4</sup> represents alkylene with 1 to 4 carbon atoms, arylene,

n represents a whole number from 1 to 6.

4,952,642

#### PROCESS FOR MAKING ACRYLAMIDO METHANE SULFONIC ACID POLYMERS

Dodd W. Fong, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 112,643, Oct. 26, 1987, Pat. No.

4,795,789. This application Aug. 15, 1988, Ser. No. 232,267

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08F 8/34

U.S. Cl. 525—344

4 Claims

1. A method of introducing acrylamido methane sulfonic acid groups into acrylic acid or methacrylic acid polymers containing from 20–80 mole percent of acrylic or methacrylic acid, which method comprises reacting at a temperature of from 100°–220° C., the carboxylic acid groups in such polymers with from 2–100 mole percent of an ammonia, formaldehyde and a water-soluble bisulfite mixture whereby about 1 to about 60 moles of the carboxylic acid groups in such polymers are converted to amido methane sulfonic acid groups.

4,952,643

#### CURABLE POLYMER COMPOSITION

Toshifumi Hirose, Kawakubo Kawakubo, and Katsuhiko Isayama, all of Kobe, Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan

Continuation of Ser. No. 197,976, May 24, 1988, abandoned.

This application Jan. 29, 1990, Ser. No. 471,058

Claims priority, application Japan, May 25, 1987, 62-128627

Int. Cl.<sup>5</sup> C08G 65/32

U.S. Cl. 525—407

10 Claims

1. A curable polymer composition comprising: (A) an organic elastomeric polymer having, in a molecule, at least one silicon-containing group which is cross linkable through formation of a siloxane bond, said organic elasto-

meric polymer being selected from the group consisting of a polyether which includes repeating units of the formula —R—O— in which R is a divalent alkylene group having 2 to 4 carbon atoms and a graft copolymer produced by polymerizing a vinyl monomer in the presence of said polyether, and

(B) an epoxy resin which has been cured with a curing agent in the presence of a solvent in which an uncured epoxy resin and the curing agent can be dissolved, and wherein the cured epoxy resin is insolubilized to precipitate in the form of fine powder.

4,952,644

#### SYNTHESIS OF ABA TRIBLOCK POLYMERS AND A<sub>n</sub>B STAR POLYMERS FROM CYCLIC ETHERS

Robert B. Wardle, Jerald C. Hinshaw, both of Logan, and William W. Edwards, Tremonton, all of Utah, assignors to Thiol Corporation, Ogden, Utah

Filed Jan. 7, 1989, Ser. No. 362,633

Int. Cl.<sup>5</sup> C08G 59/68, 65/04; C08L 71/00

U.S. Cl. 525—410

4 Claims

1. A method of forming an ABA triblock polymer or an A<sub>n</sub>B star polymer comprising

(1) polymerizing a cyclic ether monomer or monomers having 4 to 5 atoms in the cyclic ring from the hydroxyl groups of an alcohol having two or more hydroxyl groups in the presence of an acid catalyst that promotes cationic polymerization of cyclic ether monomers so as to produce a B block polymer having terminal hydroxyl functionality substantially equivalent to the hydroxyl functionality of said alcohol, and

(2) polymerizing a different cyclic ether monomer or monomers or different combination of cyclic ether monomers, having 4 or 5 atoms in the cyclic rings, from said terminal hydroxyl groups of said B block polymer in the presence of an acid catalyst that promotes cationic polymerization of cyclic ether monomers so as to produce polymeric A blocks at the ends of said B block,

the improvement comprising,

in each of steps 1 and 2, said catalyst being provided in an amount such that if said acid catalyst is a Lewis acid, the molar ratio of acid catalyst to hydroxyl group(s) on said alcohol is between about 0.05:1 and about 0.5:1, and if said acid catalyst is a proton acid, the molar ratio of hydrogen ions releasable from said acid to hydroxyl group(s) of said alcohol is from about 0.05:1 and about 0.5:1.

4,952,645

#### EPOXIDE RESINS CONTAINING POLYESTERS BASED ON POLYALKYLENE GLYCOLS

Rolf Mühlaupt, Marly, Switzerland, and Julia Möckel-Weber, Schopfheim, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 130,488, Dec. 9, 1987, abandoned. This application Dec. 16, 1988, Ser. No. 287,581

Claims priority, application Switzerland, Dec. 19, 1986, 5097/86

Int. Cl.<sup>5</sup> C08G 59/42

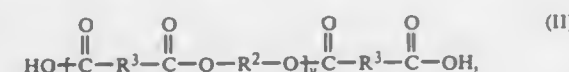
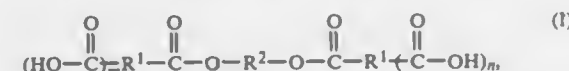
U.S. Cl. 525—438

13 Claims

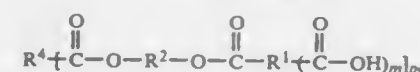
1. A curable, one-component adhesive composition which comprises

(a) at least one compound having at least one 1, 2-epoxide group in its molecule,

(b) at least one compound of the formulae I, II, or III



—continued



in which m and n independently of one another are 1 or 2, y is an integer from 2 to 10, p is 3 or 4, R<sup>1</sup>, R<sup>3</sup> and R<sup>4</sup> are derived from radicals of aliphatic, cycloaliphatic or aromatic carboxylic acids, R<sup>1</sup> being a divalent or trivalent radical, R<sup>3</sup> being a divalent radical and R<sup>4</sup> being a trivalent or tetravalent radical, after the removal of the carboxyl groups, and R<sup>2</sup> is the radical of an aliphatic or cycloaliphatic diol after the removal of the two hydroxyl groups, subject to the proviso that at least 70% by weight of the radicals R<sup>1</sup> or R<sup>3</sup>, relative to the total amount of these radicals, are derived from dimeric and/or trimeric fatty acids, that at least 70% by weight of the radicals R<sup>2</sup>, relative to the total amount of these radicals, are groups of the formula



in which x is an integer from 5 to 40, or up to 30% by weight within a radical of the above formula R<sub>2</sub> can also be groups —CH<sub>2</sub>CH<sub>2</sub>O<sub>x</sub>—CH<sub>2</sub>CH<sub>2</sub>—, and that the radicals R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> can be different within the definitions given, and

(c) dicyandiamide curing agent.

4,952,646

#### EPOXY RESIN COMPOSITIONS CONTAINING A POLYPHOSPHORIC/POLYPHOSPHONIC ANHYDRIDE CURING AGENT

Edward D. Weil, Hastings-on-Hudson; John Tomko, Dobbs Ferry, and Fred Jaffe, Ossining, all of N.Y., assignors to Akzo America Inc., New York, N.Y.

Filed Jul. 20, 1989, Ser. No. 382,360

Int. Cl.<sup>5</sup> C08G 59/40

U.S. Cl. 525—507

8 Claims

1. A curable epoxy resin composition which comprises a curable epoxy resin and an effective amount for curing of a polyphosphoric/polyphosphonic anhydride curing agent.

4,952,647

#### ALIPHATIC, NON-HYDROLYZABLE CHLORIDE-CONTAINING EPOXY RESINS AND PROCESS FOR THEIR PRODUCTION

Robert P. Shurtum, Freeport, and Walter Wernli, Angleton, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

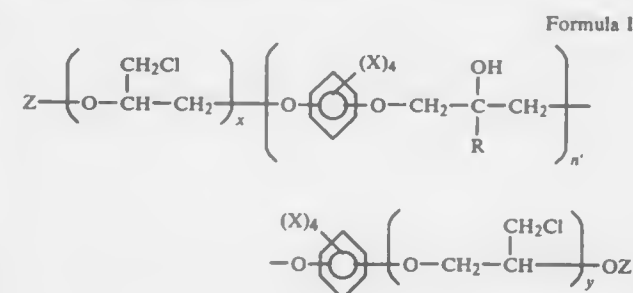
Division of Ser. No. 258,250, Oct. 14, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,005

Int. Cl.<sup>5</sup> C08G 59/06, 59/14

U.S. Cl. 525—523

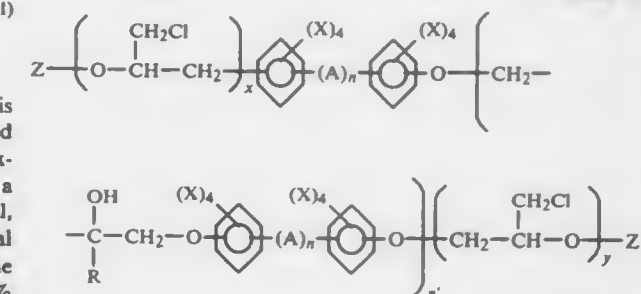
4 Claims

1. A process for the preparation of an epoxy resin represented by the following formulas I or II

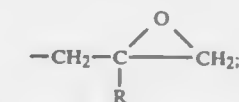


—continued

Formula II

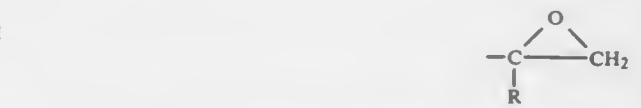
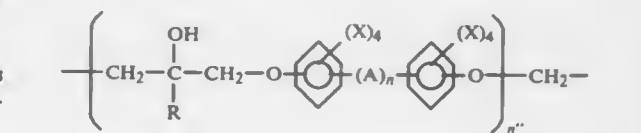
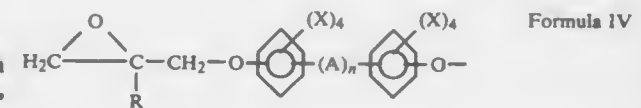
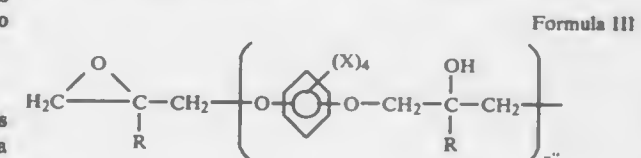


wherein each A is independently a divalent hydrocarbyl group having from 1 to about 12 carbon atoms, —O—, —S—, —S—S—, —SO—, —SO<sub>2</sub>—, or —CO—; each R is independently hydrogen or an alkyl group having from 1 to about 3 carbon atoms; each X is independently hydrogen, a hydrocarbyl or hydrocarbyloxy group having from 1 to about 12 carbon atoms or a halogen atom; Z is a group represented by the formula



n has a value of zero or 1; n' has an average value from zero to about 20; and x and y each have a value of 1; which process comprises

(1) hydrochlorinating an epoxy resin represented by the following formulas III or IV or a combination thereof



wherein each A is independently a divalent hydrocarbyl group having from 1 to about 12 carbon atoms; each R is independently hydrogen or an alkyl group having from 1 to about 3 carbon atoms; each X is independently hydrogen, a hydrocarbyl or hydrocarbyloxy group having from 1 to about 12 carbon atoms or a halogen atom; n has a value of zero or 1; n' has an average value from zero to about 20; with a suitable hydrochlorinating agent in the



presence of one or more non-reactive solvents at a temperature of from about 0° C. to about 100° C. at a pressure from atmospheric to superatmospheric for from about 0.5 to about 24 hours thereby producing a first chlorohydrin intermediate product;

- (2) reacting the resultant chlorohydrin product from step (1) with from about 0.01 to less than about 1 mole of epichlorohydrin per mole of chlorohydrin in said first chlorohydrin intermediate product in the presence of one or more Lewis acid catalysts and in the presence of one or more non-reactive solvents at a temperature of from about 0° C. to about 100° C. and a pressure from atmospheric to superatmospheric for from about 0.5 to about 24 hours thereby producing a second chlorohydrin intermediate product;
- (3) recovering the second intermediate product formed in step (2) by any suitable means and dissolving the recovered second chlorohydrin intermediate product in one or more non-reactive solvents and dehydrochlorinating said second chlorohydrin intermediate product with one or more suitable dehydrochlorinating agents at a temperature of from about 30° C. to about 90° C. and a pressure from about 0.1 psia to about 14 psia for from about 0.5 to about 24 hours employing from about 0.95 to about 1.1 equivalents of dehydrochlorinating agent per mole of chlorohydrin; and
- (4) recovering the resultant aliphatic, non-hydrolyzable chlorine-containing epoxy resin product.

4,952,648

**PRODUCTION PROCESS OF MULTIVALENT METAL-MODIFIED SALICYLIC ACID/STYRENE RESIN, COLOR-DEVELOPING AGENT USING THE RESIN AND SUITED FOR USE IN PRESSURE-SENSITIVE COPYING PAPER SHEET AND PRESSURE-SENSITIVE COPYING PAPER UNIT EMPLOYING THE AGENT**

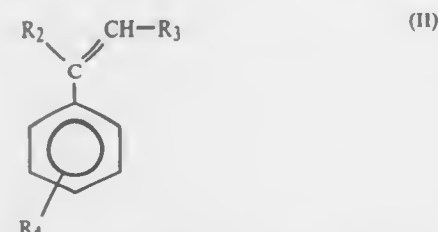
Keizaburo Yamaguchi, Kawasaki; Yoshimitsu Tanabe, Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,235  
Claims priority, application Japan, Aug. 14, 1987, 62-201831  
Int. Cl.<sup>5</sup> C08G 83/00

U.S. Cl. 525—539

7 Claims

1. A process for the production of a multi-valent metal-modified salicylic acid resin, which comprises reacting a styrene derivative, which is represented by the following general formula (II):



wherein R<sub>2</sub> and R<sub>3</sub> are independently a hydrogen atom or a methyl group and R<sub>4</sub> denotes a hydrogen atom or a C<sub>1-4</sub> alkyl group, with a salicylic acid ester represented by the following general formula (I):



wherein R<sub>1</sub> is a C<sub>1-12</sub> alkyl, aralkyl, aryl or cycloalkyl group, and subsequent to hydrolysis of the salicylic acid ester resin

thus obtained, reacting the resultant salicylic acid resin with a multivalent metal salt.

4,952,649

**PROCESS FOR PRODUCING OLEFIN POLYMERS OR COPOLYMERS AND CATALYST COMPONENTS USED THEREFOR**

Mamoru Kioka, Ohtake, and Norio Kashiwa, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 729,903, May 3, 1985, abandoned, which is a continuation of Ser. No. 604,421, Apr. 30, 1984, abandoned, which is a continuation of Ser. No. 428,140, Sep. 29, 1982, abandoned. This application Mar. 11, 1988, Ser. No. 169,171

Claims priority, application Japan, Nov. 13, 1981, 56-181019  
Int. Cl.<sup>5</sup> C08F 4/654, 10/00

U.S. Cl. 526—125

18 Claims

1. A process for producing olefin polymers or copolymers which comprises polymerizing olefins having 2 to 10 carbon atoms or copolymerizing said olefins with each other or with up to 10 mole % of dienes at a temperature of about 20° to about 200° C. and at a pressure of from atmospheric pressure to about 100 kg/cm<sup>2</sup>, in the presence of a catalyst composed of the following components (A), (B), and (C);

(A) a solid titanium catalyst component containing magnesium, titanium, halogen and an ester of polycarboxylic acids, said catalyst component being obtained by (1) contacting a liquid hydrocarbon solution of (i) a magnesium compound having no reducing ability, the hydrocarbon solution being obtained by mixing the magnesium compound and the hydrocarbon with or without heating the mixture, or by mixing a magnesium compound and the hydrocarbon in the presence of an alcohol with or without heating the mixture, with (ii) a tetravalent titanium compound of the formula Ti(OR)<sub>4-g</sub> wherein R represents a hydrocarbon group, X represents a halogen atom and g is a number represented by 0 ≤ g ≤ 4 in the liquid state to form a solid product or (2) first preparing a liquid hydro-

carbon solution of the magnesium compound (i) and the titanium compound (ii) and then forming a solid product therefrom, by adding an additional amount of the titanium compound (ii) or a precipitating agent selected from the group consisting of halogens, halogenated hydrocarbons, halogen-containing silicon compounds, halogen-containing aluminum compounds, halogen-containing lithium compounds, halogen-containing sulfur compounds and halogen-containing antimony compounds, said reaction of forming the solid product being carried out in the presence of (D) at least one electron donor selected from the group consisting of C<sub>2</sub>-C<sub>20</sub> monocarboxylic acid esters, C<sub>1</sub>-C<sub>20</sub> aliphatic carboxylic acids, C<sub>4</sub>-C<sub>20</sub> carboxylic acid anhydrides, C<sub>3</sub>-C<sub>20</sub> ketones, C<sub>3</sub>-C<sub>20</sub> aliphatic carbonates, C<sub>3</sub>-C<sub>20</sub> alkoxy group-containing alcohols and organic silicon compounds having an Si—O—C bond in which the organic group has 1 to 10 carbon atoms, and during or after the formation of the solid product, contacting the solid product with (E) an ester of polycarboxylic acid selected from the group consisting of C<sub>5</sub>-C<sub>30</sub> aliphatic polycarboxylic acid esters, C<sub>10</sub>-C<sub>30</sub> alicyclic polycarboxylic acid esters, C<sub>10</sub>-C<sub>30</sub> aromatic polycarboxylic acid esters and C<sub>8</sub>-C<sub>30</sub> heterocyclic polycarboxylic acid esters, wherein the amount of said at least one electron donor (D) is about 0.05 to about 0.5 mole per mole of magnesium compound (i) and the amount of said ester of polycarboxylic acid (E) is about 0.1 to about 0.5 mole per mole of magnesium compound (i),

(B) an organoaluminum compound catalyst component, and  
(C) an organic silicon compound catalyst component having an Si—O—C bond.

4,952,650

**SUSPENSION POLYMERIZATION**

Chung I. Young, and Rudyard M. Enanoza, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 104,092, Oct. 2, 1987, Pat. No. 4,833,179, which is a continuation-in-part of Ser. No. 78,209, Jul. 27, 1987, abandoned. This application May 22, 1989, Ser. No. 355,281

Int. Cl.<sup>5</sup> C08F 4/10, 4/16

U.S. Cl. 526—194

4 Claims

1. A method for suspension polymerization of a pressure-sensitive acrylate copolymer bead having a glass transition temperature of 0° C. or less, comprising the steps of:

- (a) making a monomer premix comprising  
(i) acrylic acid ester of non-tertiary alcohol, said alcohol having from about 1 to 14 carbon atoms, with the average number of carbon atoms being about 4 to about 12,  
(ii) a polar monomer copolymerizable with said acrylic acid ester,  
(iii) a chain transfer agent,  
(iv) a free-radical initiator, and  
(v) a modifier moiety;
- (b) combining said monomer premix with a water phase containing a suspension agent to form a suspension;
- (c) concurrently agitating said suspension and permitting polymerization of said monomer premix until copolymer beads are formed, and
- (d) collecting said copolymer beads, wherein said modifier moiety is a hydrophobic silica, and is present in an amount of from about 0.05 part to about 10 parts per 100 parts monomer premix.

4,952,651

**HIGHLY CROSSLINKED POLYMER PARTICLES AND PROCESS FOR PRODUCING THE SAME**

Kiyoshi Kasai, Kameyama; Masayuki Hattori, Aichi; Hiroshi Tadenuma, and Shiro Yasukawa, both of Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 226,200

Claims priority, application Japan, Mar. 30, 1988, 63-77007  
Int. Cl.<sup>5</sup> C08F 236/02

U.S. Cl. 526—201

19 Claims

1. Highly crosslinked polymer particles consisting essentially of a non-hydrophilic polymer of a polymerizable monomer mixture comprising at least 20% by weight of at least one non-hydrophilic, crosslinking polyvinyl monomer and satisfying the following conditions (a) to (e):

- (a) the average particle diameter ( $r_m$ ) is 0.1–1.0 μm and the proportion of particles having particle diameters falling within the range of 9.0  $r_m$  to 1.1  $r_m$  to the whole of particles is 80% by weight,
- (b) the polymer particles are substantially insoluble in toluene and substantially nonswellable with toluene,
- (c) when the polymer particles are heated on a thermobalance in a nitrogen atmosphere while elevating the temperature at a range of 10° C./min., the temperature at which the weight of the particles reduces by 10% is at least 380° C.,
- (d) when the polymer particles are heated at 300° C. for 5 hours in a nitrogen atmosphere, the weight reduction is at most 30%, and
- (e) the polymer particles are not melt-adhered to one another at 200° C. in a nitrogen atmosphere; with the following provisos:
- (1) monomers are added to an aqueous dispersion containing non-crosslinked, low molecular weight polymer particles having a weight average molecular weight of 500–10,000 as dispersoid,
- (2) the monomer mixture comprises at least 20% by weight of at least one non-hydrophilic, crosslinking polyvinyl monomer,
- (3) the proportion of the polymerizable monomer to the

low molecular weight polymer particles is 4 to 20 parts by weight and  
(4) the polymerizable monomer mixture is subjected to radial emulsion polymerization with stirring.

4,952,652

**UNSATURATED POLYESTER COMPOSITIONS AND MOLDED PRODUCTS THEREFROM**

Kenichi Nishino; Takashi Shibata, both of Osaka; Sanzi Aoki, Nara; Yasuhiro Mishima, Aichi; Hisayuki Iwai, Aichi, and Ken Hotta, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi and Takeda Chemical Industries, Ltd., Osaka, both of Japan

Filed Aug. 15, 1988, Ser. No. 232,027

Claims priority, application Japan, Aug. 25, 1987, 62-212568  
Int. Cl.<sup>5</sup> C08L 67/06

U.S. Cl. 523—522

10 Claims

1. A quickly curable unsaturated polyester composition with high surface quality, comprising  
an unsaturated polyester,  
an olefinic unsaturated monomer,  
50–150 weight parts of an aromatic vinyl-conjugated diene block copolymer or a hydrogenated aromatic vinyl-conjugated diene block copolymer per 100 weight parts of said unsaturated polyester,  
1–5 weight parts of a mixture of t-butylperoxy benzoate, t-butylperoxy octoate and 1,1-bis(t-butylperoxy) 3,3,5-trimethyl cyclohexane per 100 weight parts of said unsaturated polyester, unsaturated monomer and block copolymer, and  
at least one selected from organic compounds of cobalt, copper and manganese.

4,952,653

**PROCESS FOR PREPARING FLUORINE-CONTAINING COPOLYMERS**

Nobuyuki Tomihashi, Takatsuki; Masayuki Yamana, Osaka; Takayuki Araki, Kadoma, and Sachio Nomura, Settsu, all of Japan, assignors to Daito Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 168,073, Mar. 9, 1988. This application Apr. 20, 1989, Ser. No. 341,992

Claims priority, application Japan, Mar. 10, 1987, 62-54690; Jul. 29, 1987, 62-189590; Jul. 29, 1987, 62-189591; Apr. 20, 1988, 63-97980; Apr. 20, 1988, 63-97979; Aug. 25, 1988, 63-211119

Int. Cl.<sup>5</sup> C08F 14/20, 14/22, 14/24, 14/26

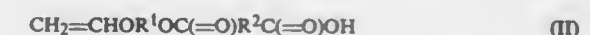
U.S. Cl. 526—249

11 Claims

1. A process for preparing fluorine-containing copolymers which comprises copolymerizing fluoroolefins with vinyl ether monomer compositions comprising vinyl ethers of the formula (I):



wherein R<sup>1</sup> is a divalent aliphatic residue of 2 to 10 carbon atoms, R<sup>2</sup> is a divalent organic residue, and M is an alkali metal, or a mono-functional basic compound which contains nitrogen atom or phosphorous atom and has a pKa of 6 to 12, and n is 0 when M is the alkali metal, and is 1 when M is other, and vinyl ethers of the formula (II):



wherein R<sup>1</sup> and R<sup>2</sup> are as defined above, and said monomer compositions containing the vinyl ethers (I) in an amount of 1 to 50% by mole of the vinyl ethers (II).

4,952,654

## HEAT DISTORTION RESISTANT, TRANSPARENT THERMOPLASTIC MOLDING MATERIAL, ITS PREPARATION AND ITS USE

Raiser Bueschl, Roedersheim-Grossau; Adolf Echte, and Jaergen Mertes, both of Ludwigshafen, all of Fed. Rep. of Germany, assigns to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 16, 1989, Ser. No. 324,015

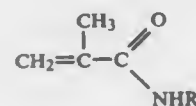
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811053

Int. Cl.<sup>5</sup> C08F 218/02

U.S. Cl. 526—307.7

6 Claims

1. A heat distortion resistant, transparent thermoplastic molding material, a copolymer of the monomers
  - (a) methyl methacrylate and
  - (b) an N-substituted amide of methacrylic acid, containing from 5 to 95% by weight of monomer (a) and from 95 to 5% by weight of monomer (b), the percentages being based on (a)+(b), wherein monomer (b) used is an N-substituted amide of the formula (I)



where R is a primary, secondary or tertiary alkyl radical of 2 to 12 carbon atoms, cycloalkyl, aryl or aralkyl of 2 or 6 or 7, respectively, to 12 carbon atoms.

4,952,655

## WATER-SOLUBLE COPOLYMERS, THEIR PREPARATION AND THEIR USE

Hans-Peter Seelmann-Eggebert, Schriesheim; Dieter Boeckh; Heinrich Hartmann, both of Limburgerhof; Wolfgang Trielselt, Ludwigshafen, and Alexander Kud, Eppelsheim, all of Fed. Rep. of Germany, assigns to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 19, 1988, Ser. No. 183,611

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1987, 3713348

Int. Cl.<sup>5</sup> C08F 20/10

U.S. Cl. 526—318.4

3 Claims

1. A water-soluble copolymer based on monoethylenically unsaturated carboxylic acids of 3 to 6 carbon atoms, wherein the copolymer has a K value of from 15 to 120 (determined on the sodium salt according to H. Fikentscher in aqueous solution at 25° C., a pH of 7 and a polymer concentration of the Na salt of 1% by weight) and contains, as copolymerized units,
    - (a) from 99.5 to 80 mol % of one or more monoethylenically unsaturated C<sub>3</sub>–C<sub>6</sub>-monocarboxylic acids and
    - (b) from 0.5 to 20 mol % of one or more comonomers which possess two or more ethylenically unsaturated, nonconjugated double bonds, are derived from esters and are obtainable by esterification of
      - (b1) monoethylenically unsaturated C<sub>3</sub>–C<sub>6</sub>-monocarboxylic acids with
      - (b2) polyhydric alcohols of 2 to 6 carbon atoms, water-soluble or water-insoluble polyalkylene glycols having a molecular weight up to about 400, water-soluble polyalkylene glycols having a molecular weight from above about 400 to 10,000, polyglycerols having a molecular weight of up to 2,000, polyvinyl alcohol having a molecular weight of up to 10,000 and mono-hydric, monoethylenically unsaturated C<sub>3</sub>–C<sub>6</sub>-alcohols and
      - (c) from 0 to 30 mol % of other water-soluble, monoethylenically unsaturated monomers which are copolymerizable with (a) and (b),
- with the proviso that the sum of the mol % data (a) to (c) is always 100 and the polymer segments consisting of units of monomers (a) and (c) and bonded to one another via units of

(b) are polymer segments having a weight average molecular weight of not more than 15,000.

4,952,656

## MANUFACTURE OF HIGH MOLECULAR WEIGHT POLY(VINYLAMINES)

Ta-Wang Lai, Macungie, and Bheema R. Vijayendran, Emmaus, both of Pa., assigns to Air Products and Chemicals, Inc., Allentown, Pa.

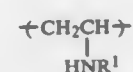
Continuation of Ser. No. 914,046, Oct. 1, 1986, abandoned. This application Jul. 12, 1989, Ser. No. 378,955

Int. Cl.<sup>5</sup> C08F 8/12

U.S. Cl. 525—328.2

12 Claims

1. A vinylamine homopolymer of about 3.6×10<sup>6</sup> to about 9×10<sup>6</sup> average molecular weight consisting essentially of units of the formula:



(I) wherein R<sup>1</sup> is hydrogen or a C<sub>1</sub>–C<sub>4</sub> alkyl group.

4,952,657

## SILICONE RELEASE COATING COMPOSITIONS

Karen D. Riding, Castleton; Judith Stein, Schenectady; Richard P. Eckberg, Saratoga Springs; James L. Desorcie, and Tracey M. Leonard, both of Clifton Park, all of N.Y., assigns to General Electric Company, Waterford, N.Y.

Filed Jul. 29, 1988, Ser. No. 225,986

Int. Cl.<sup>5</sup> C08G 77/04

U.S. Cl. 528—27

9 Claims

1. A UV-cured silicone release composition comprising:
  - (i) a release modified organopolysiloxane having a viscosity between 100 and 1500 centipoise at 25° C. and comprising units, in sufficient number to increase release, of the formula:



wherein R is hydrogen, C<sub>(1-8)</sub> alkyl, or C<sub>(1-8)</sub> aryl, R<sup>1</sup> is a monovalent phenolic radical of from 6 to 26 carbon atoms; a is 0, 1 or 2; b is 1, 2, or 3; and a+b is 1, 2 or 3, and comprising units, in sufficient number to properly cure said coating composition, of the formula:



wherein R and a are given above; R<sup>2</sup> is a monovalent epoxy functional organic radical; c is 1, 2 or 3 and a+c is 1, 2 or 3, and (ii) effective catalyst to promote cure with exposure to UV light.

4,952,658

## PROCESS FOR PREPARING ORGANOPOLYSILANES

Wilfried Kalchauer, Bernd Pachaly, and Norbert Zeller, all of Burghausen, Fed. Rep. of Germany, assigns to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Feb. 21, 1989, Ser. No. 312,275

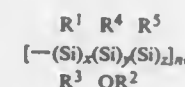
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811567

Int. Cl.<sup>5</sup> C08G 77/04

U.S. Cl. 528—34

16 Claims

1. A process for preparing organopolysilanes, which comprises reacting an organosilicon compound containing an Si—Si bond and having the general formula



where R<sup>1</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are each selected from the group consisting of hydrogen, an alkyl, alkenyl, aryl and alkoxy radical, R<sup>2</sup> is selected from the group consisting of hydrogen and an alkyl radical, x is in the range of from 0.1 to 0.9, y is in the range of from 0.01 to 0.5, z is in the range of from 0 to 0.5 n is in the range of from 2 to 1,000, with the proviso that the sum of (x+y+z) is 1, with boric acid.

4,952,659

## CATALYZED FAST CURE POLYURETHANE SEALANT COMPOSITION

Steven L. Hannah, Chagrin Falls, and Maureen R. Williams, Warrensville Heights, both of Ohio, assigns to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 30,773, Mar. 25, 1987, Pat. No. 4,798,879. This application Dec. 7, 1988, Ser. No. 281,132

The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C08G 18/20, 18/16

U.S. Cl. 528—45

20 Claims

1. A curable polyurethane composition, comprising:
  - a polyurethane prepolymer component, said polyurethane prepolymer component being made from a polyester polyol, a polybutadiene polyol, or a poly(oxyalkylene) polyol and an aromatic polyisocyanate, said alkylene group of said poly(oxyalkylene) polyol having from 2 to 6 carbon atoms, said polyurethane prepolymer having blocked isocyanate groups;
  - a curing agent component, said curing agent component comprising an amine curing agent containing at least two primary amines, and an amount of a bicyclic amidine catalyst or a derivative thereof capable of unblocking said blocked isocyanate groups, and wherein said amount is an effective amount to effect a cure within an hour at ambient temperature.

4,952,660

## COPOLYMER CONTAINING VINYL, UREA AND AMIDE CONSTITUENTS

I. Sloun Lin, Hong Kong, Hong Kong, assignor to ICI Americas Inc., Wilmington, Del.

Filed Jul. 25, 1989, Ser. No. 384,945

Int. Cl.<sup>5</sup> C08G 18/04

U.S. Cl. 528—49

16 Claims

1. A reaction system, comprising
  - A. an organic polyisocyanate;
  - B. an isocyanate-reactive composition which comprises an imino-functional softblock component and a chain extender;
  - C. an unsaturated monomer capable of forming an addition polymer; and
  - D. a crosslinking agent having within its structure a first chemical moiety capable of entering into a polymerization with said component (C) and a second chemical moiety capable of entering into a polymerization with said components (A) and (B).

4,952,661

## THERMOTROPIC LIQUID CRYSTALLINE POLYESTER FROM 2,5-DIHYDROXYBENZOPHENONE

Marco Foa; Francesco Casagrande; Alfredo Consolo, all of Novara, and L. Lawrence Chapoy, Leam, all of Italy, assigns to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 221,746, Jul. 20, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 449,381

Claims priority, application Italy, Jul. 22, 1987, 21389

Int. Cl.<sup>5</sup> C08G 8/02

U.S. Cl. 528—125

10 Claims

1. Thermotropic liquid crystalline polyester optically anisotropic in the melted state comprising:
  - (a) at least one moiety derived from a dicarboxylic aromatic acid;
  - (b) one moiety derived from 2,5-dihydroxybenzophenone; and
  - (c) optionally at least one moiety derived from substituted hydroquinones of the general formula:



in which R represents an atom of halogen or an alkyl, aryl, or aralkyl radical containing from 1 to 18 carbon atoms.

4,952,662

## MOLDING COMPOUNDS COMPRISING A THERMOPLASTICALLY PROCESSIBLE, AROMATIC POLYAMIDE

Juergen Fluke, Marl; Martin Bartmann, Recklinghausen; Joachim Muegge, Haltern, and Friedrich-Georg Schmidt, Munster, all of Fed. Rep. of Germany, assigns to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,616

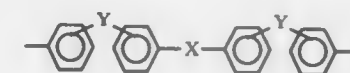
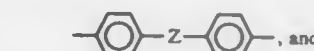
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 380401

Int. Cl.<sup>5</sup> C08G 73/14, 79/08

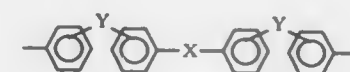
U.S. Cl. 528—182

15 Claims

1. A molding compound which comprises a thermoplastically processible aromatic polyamide which is prepared from the following starting materials:
    - (A) HOOC—Ar—COOH
    - (B) H<sub>2</sub>N—Ar'—NH<sub>2</sub>
    - (C) R'—CONH—R''
- wherein Ar is one member selected from the group consisting of 1,3-phenylene, 1,4-phenylene, 1,4-naphthylene, 1,5-naphthylene, 2,6-naphthylene, 2,7-naphthylene,



Ar' is



wherein

X is —SO<sub>2</sub> or —CO—,  
Y is —O— or —S—,  
Z is —O—, —S—, —SO<sub>2</sub>—, —CO— or —CR<sub>2</sub>—, and  
R is —H or C<sub>1</sub>–C<sub>4</sub>-alkyl; and

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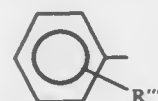
28

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R' and R'' are the same or different and are each one member selected from the group consisting of 1-naphthyl, 2-naphthyl, C<sub>1</sub> to C<sub>20</sub>-alkyl, and



wherein R''' is —H, C<sub>1</sub>–C<sub>4</sub>-alkyl or halogen, and wherein said material (C) is present in an amount of from 0.01 to 10 mole % based on the sum of said materials (A) and (B).

**4,952,663**  
**WHOLLY AROMATIC POLYESTERS WITH REDUCED CHAR CONTENT**  
James W. Cleary, Neenah, Wis., and Richard Layton, Augusta, Ga., assignors to Amoco Corporation, Chicago, Ill.  
Filed Jun. 17, 1988, Ser. No. 208,373  
Int. Cl.<sup>5</sup> C08G 63/60

U.S. Cl. 528—193

29 Claims

1. A wholly aromatic polyester which is essentially free of charred material, has good color and good thermal stability, and which comprises recurring units derived from the reaction of:

- an aromatic dicarboxylic acid component;
- a hydroxy aromatic carboxylic acid component; and
- an aromatic dihydroxy component;

wherein from about 0 to about 100 ppm magnesium is used as the reaction catalyst and from 0 to about 0.1 percent, by weight, based on the weight of the polyester, of a phosphite is used as a stabilizer; and wherein monomers used to prepare the wholly aromatic polyester have a total ash content of no more than 50 ppm and a total potassium content of no more than 20 ppm.

**4,952,664**  
**PROCESS FOR PRODUCING WEATHER-RESISTANT POLYCARBONATE WITH TRIAZINE-IMIDE CHAIN TERMINATOR**  
Mitsuhiko Masumoto, and Satoshi Kanayama, both of Osaka, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

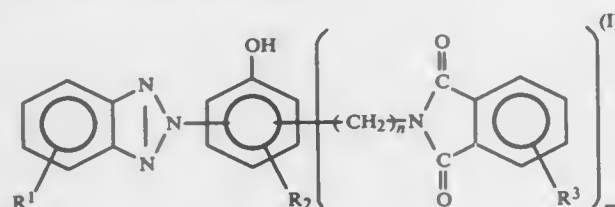
Filed Feb. 8, 1989, Ser. No. 307,703

Claims priority, application Japan, Feb. 8, 1988, 63-025693  
Int. Cl.<sup>5</sup> C08G 63/62

U.S. Cl. 528—199

2 Claims

1. A process for producing a weather-resistant polycarbonate resin by solution polymerization of at least one dihydric phenol and phosgene, in which a compound represented by formula (I) is used as a terminator;



wherein R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup>, each represents a hydrogen atom, a halogen atom, a nitro group, an alkyl group having from 1 to 20 carbon atoms, an alkoxy group having from 1 to 20 carbon atoms, or an aryl group having from 6 to 20 carbon atoms; m represents 1 or 2; and a represents an integer of from 1 to 10.

**4,952,665**  
**PROCESS FOR PRODUCTION OF AROMATIC POLYETHERS WITH ALKALI METAL CARBONATE/BICARBONATE/FLUORIDE COCATALYST**

Shuji Ebata, and Yasushi Higuchi, both of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Ltd., Tokyo, Japan  
Filed Aug. 22, 1988, Ser. No. 234,793  
Claims priority, application Japan, Sep. 4, 1987, 62-220331  
Int. Cl.<sup>5</sup> C08G 65/40

U.S. Cl. 528—219

31 Claims

1. A process for producing aromatic polyether which comprises condensation polymerizing an aromatic dihydroxy compound represented by the general formula:



wherein Ar is a divalent aromatic radical and an aromatic dichloro compound represented by the general formula:



wherein Ar<sup>1</sup> and Ar<sup>2</sup> are each a divalent aromatic radical, and Y is a carbonyl group, a sulfone group, a sulfoxide group, —CO—CO—, a divalent hydrocarbon group, a divalent fluorinated hydrocarbon group, an oxygen atom, or a sulfur atom or Y represents a direct bond, in the presence of alkali metal compounds comprising a combination of (i) at least one alkali metal carbonate which is the carbonate or the hydrogencarbonate of an alkali metal selected from the group consisting of potassium, rubidium and cesium, and (ii) a fluoride of an alkali metal selected from the group consisting of sodium, potassium, rubidium and cesium.

**4,952,666**  
**HEXAFLUOROISOPROPYLIDENE-CONTAINING POLYIMIDE OLIGOMERS AND POLYMERS**  
Abraham L. Landis, Northridge, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

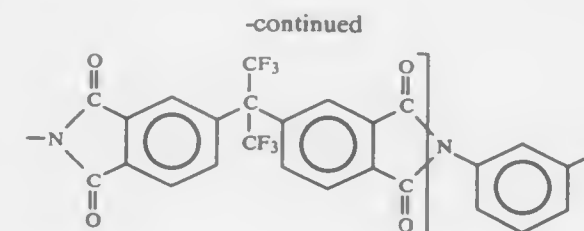
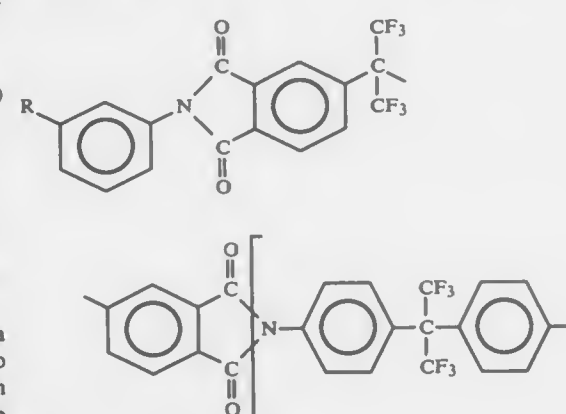
Filed May 6, 1988, Ser. No. 190,961

Int. Cl.<sup>5</sup> C08G 69/42, 75/00

U.S. Cl. 528—222

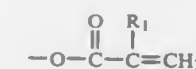
11 Claims

1. A polyimide oligomer capable of forming a polymer having a dielectric constant within the range of about 2.4 to 2.7 and being resistant to ordinary solvents, said oligomer having the formula



where R is selected from the group consisting of:

- C≡CH,
- CH=CH<sub>2</sub>,
- CN, and



where R<sub>1</sub> is —H or —CH<sub>3</sub> and n = 1–20.

**4,952,667**  
**NOVEL COPOLYMERS AND ELECTROACTIVE POLYMERS DERIVED FROM SAME**

Yutaka Shikata, Kawasaki; Hobuyuki Kuroda, Yokohama; Naoki Kataoka, Kawasaki; Yoshiyuki Shimo, Yokohama; Kazuo Matsuura, Tokyo; Etsuo Kawamata, Kawasaki, and Hiroshi Kobayashi, Yokohama, all of Japan, assignors to Nippon Oil Company, Limited, Japan

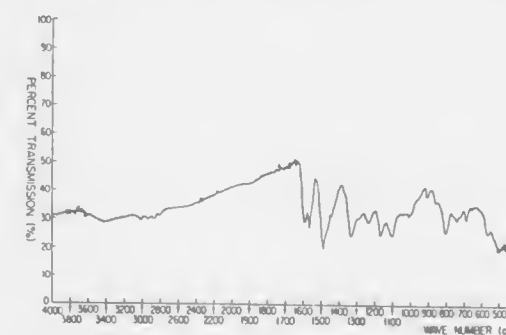
Filed Jun. 8, 1988, Ser. No. 204,083

Claims priority, application Japan, Jun. 22, 1987, 62-153429; Jun. 22, 1987, 62-153427; Oct. 6, 1987, 62-143267

Int. Cl.<sup>5</sup> C08G 10/02

U.S. Cl. 528—230

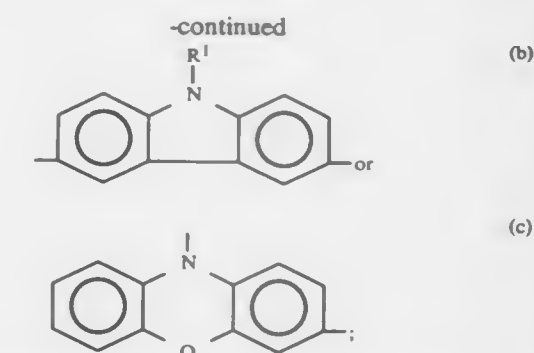
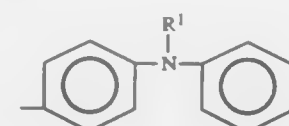
3 Claims



1. A copolymer represented by the general formula



wherein Ar is

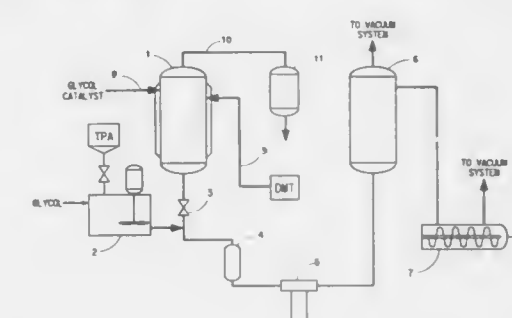


R<sup>1</sup> is hydrogen or a hydrocarbon group having 1 to 20 carbon atoms; R<sup>2</sup> is hydrogen, a hydrocarbon group having 1 to 20 carbon atoms, furyl, pyridyl, chlorophenyl, nitrophenyl or methoxyphenyl; n is an integer not less than 2 when Ar is (a) or (b), or n is an integer not less than 1 when Ar is (c); and x is an integer not less than 2.

**4,952,668**  
**PROCESS FOR THE PRODUCTION OF POLYETHYLENETEREPHTHALATE FROM DIMETHYLTEREPHTHALATE**  
Robert E. Michel, Wilmington, N.C., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.  
Filed May 22, 1989, Ser. No. 355,645  
Int. Cl.<sup>5</sup> C08G 63/78

U.S. Cl. 528—272

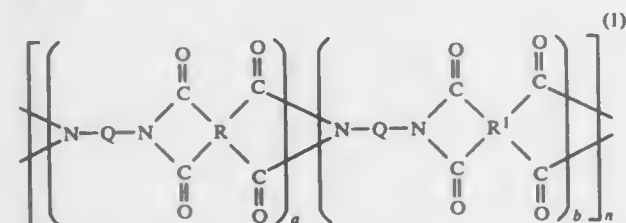
7 Claims



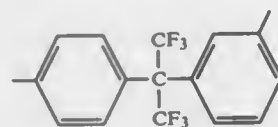
1. In the process for the preparation of high molecular weight polyethylene terephthalate by the reaction of dimethylterephthalate and ethylene glycol to form the bis glycol ester of terephthalic acid and methanol using a divalent manganese catalyst said divalent manganese catalyst being present in the amount of about 50 to 200 parts per million based on the amount of dimethylterephthalate, followed by the polymerization of the bis glycol ester, the improvement which comprises precipitating the divalent manganese catalyst after formation of the bis glycol ester by the addition of terephthalic acid and/or isophthalic acid in an amount at least about stoichiometrically equivalent to the amount of manganese present, and removing the precipitate before polymerizing the bis glycol ester product.

**4,952,669**  
**COPOLYIMIDES PREPARED FROM**  
**2-(3-AMINOPHENYL)-2-(4-AMINOPHENYL)**  
**HEXAFLUORO PROPANE**  
 Rohitkumar H. Vora, West Warwick, R.I., assignor to Hoechst Celanese Corp., Somerville, N.J.  
 Filed Sep. 30, 1988, Ser. No. 252,630  
 Int. Cl.<sup>3</sup> C08G 69/26, 69/32

U.S. Cl. 528—353 17 Claims  
 1. A copolyimide polymer comprising recurring groups having the structure:



wherein n is the number of repeating groups, a and b are whole numbers independently selected from 1 up to about 5, R and R' are different tetra-aminophenyl organic radicals, and Q is the residue having the formula:



**4,952,670**  
**POLYMERIC HYDRIDOTHIOSILAZANES, PROCESSES**  
**FOR THE PREPARATION THEREOF, SILICON**  
**NITRIDE-CONTAINING CERAMIC MATERIALS WHICH**  
**CAN BE PREPARED THEREFROM, AND THE**  
**PREPARATION THEREOF**

Tilo Vaas, Kelkheim; Hans-Jerg Kleiner, Kronberg; Marcellus Peuckert, and Martin Brück, both of Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
 Filed Dec. 22, 1988, Ser. No. 290,627  
 Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743826

Int. Cl.<sup>3</sup> C08G 77/20 8 Claims  
 1. A process for the preparation of a polymeric hydridothiosilazane, which comprises reacting an oligohydridoalkylsilazane of the formula (RSiH<sub>n</sub>)<sub>n</sub> in which n is approximately 3 to 12 and R is C<sub>1</sub>-C<sub>6</sub>-alkyl or C<sub>2</sub>-C<sub>6</sub>-alkenyl, with elemental sulfur in an ether as solvent at 30° to 120° C.

**4,952,671**  
**TERMINATED COPOLY(ARYLENE SULFIDE)**  
 David R. Fagerburg, Joseph J. Watkins, both of Kingsport; Paul B. Lawrence, Blountville, and Mark Rule, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,123  
 The portion of the term of this patent subsequent to Nov. 6, 2004, has been disclaimed.  
 Int. Cl.<sup>3</sup> C08G 75/14

U.S. Cl. 528—226 7 Claims  
 1. A copoly(arylene sulfide) corresponding to the structure



wherein A is a divalent substituted or unsubstituted aromatic radical, T is



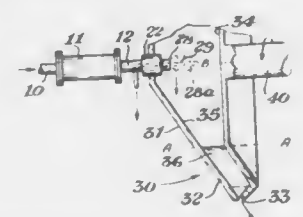
x is in the range of 0.5 to 0.001 n is at least 100.

**4,952,672**  
**METHOD FOR THE DEVOLATILIZATION OF**  
**THERMOPLASTIC MATERIALS**

Eugene R. Moore, and Robert A. Hay, II, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 11, 1988, Ser. No. 152,264  
 Int. Cl.<sup>3</sup> C08F 6/00

U.S. Cl. 528—481 10 Claims



1. A method for the devolatilization of the product of a polymerization process containing at least one volatile material, the steps of the method comprising:
  - (a) providing a volatile-containing polymerization product, said volatile-containing product being selected from the group consisting of monovinylidene aromatic polymers, polyolefins, vinylidene chloride copolymers, polyphenylene oxides, and blends thereof;
  - (b) feeding said product into a heated zone;
  - (c) heating said product in a temperature range of about 180° C. to about 300° C., whereby a substantial portion of the volatile material is placed in the vapor phase and the remainder of the volatile material becomes entrapped in the product in a liquid or gas form to form a partially devolatilized product;
  - (d) passing the partially devolatilized product into a rotatable chamber, said chamber having an inlet and means for the rotation;
  - (e) rotating the rotatable chamber at an angular velocity which produces a centrifugal gravity of between about 50 to about 2000 times the normal gravitational pull (g) to create a centrifugal force sufficient to move the partially devolatilized product along the inner surface of the rotatable chamber, thereby releasing a substantial amount of the volatile from the product to form a volatile vapor and a substantially devolatilized polymer liquid; and
  - (f) removing the separated polymer liquid from the rotatable chamber by means for withdrawing the polymer.

**4,952,673**  
**PURIFICATION OF COPOLYMERS OF**  
**TETRAHYDROFURAN AND ALKENE OXIDES**  
 Herbert Mueller, Frankenthal, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 1, 1988, Ser. No. 226,688  
 Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725577

Int. Cl.<sup>3</sup> C08G 65/20 9 Claims  
 1. A process of purifying the crude solution of a polyetherdiol as obtained by the cationic copolymerization of tetrahydrofuran and 1-alkene oxides, which process comprises: subjecting said crude solution of said polyetherdiol to a catalytic hydrogenation at temperatures up to 250° C. and for a period of time sufficient to substantially reduce the acidity and the proportion of oligomeric cyclic ethers of said polyetherdiol.

**4,952,674**  
**VACCINE AGAINST VARICELLA-ZOSTER VIRUS**  
 Paul M. Kellier, Lansdale; Ronald W. Ellis, Overbrook Hills; Robert S. Lowe, Harleysville; Mark W. Riemen, Doylestown, all of Pa., and Andrew J. Davison, Glasgow, Scotland, assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 2, 1986, Ser. No. 859,159  
 Int. Cl.<sup>3</sup> C07K 7/08, 7/10; A61K 39/25

U.S. Cl. 530—326 1 Claim  
 1. An immunogenic subunit comprising one of amino acid sequences

Phe Pro Asn Pro Leu Val Trp His Leu Glu Arg  
 Ala Glu Thr Ala Ala Thr Ala Glu Arg Pro,  
 Glu Arg Arg Gln Ala Ile Arg Met Ser Gly Gln Tyr,  
 or  
 Gly Asn Ser Arg Leu Arg Glu Tyr Asn Lys Ile Pro  
 Leu Thr.

**4,952,675**  
**METHOD FOR PURIFYING ANTIHEMOPHILIC**  
**FACTOR**

Rita W. Mathews, and Alan J. Johnson, both of New York, N.Y., assignors to New York University, New York, N.Y.  
 Continuation of Ser. No. 122,372, Nov. 19, 1987, Pat. No. 4,847,362, which is a continuation of Ser. No. 697,267, Feb. 1, 1985, Pat. No. 4,743,680. This application Dec. 29, 1988, Ser. No. 291,516

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> C07K 3/20; A61K 35/14, 35/16  
 U.S. Cl. 530—383 11 Claims

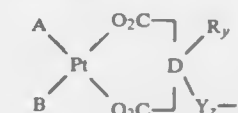
1. In a process for purifying a protein having antihemophilic factor activity by column chromatography in a column behaving predominantly as a hydrophobic affinity chromatography column, said process comprising the stages of:
  - (a) equilibrating said chromatography column;
  - (b) loading a sample containing said protein on said column, causing said protein to adsorb onto said column;
  - (c) washing said column;
  - (d) eluting said adsorbed protein from said column by causing it to desorb from said column; and
  - (e) recovering said protein in purified form; the improvement comprising:
    - adding to the column a substance consisting essentially of an effective amount for selectively increasing the electrostatic forces on the surface of said protein and concomitantly decreasing the hydrophobicity of said protein of a hydration additive selected from the group consisting of sugars and polyhydric alcohols during said stage (d) thereby promoting the desorption of said protein from said column; and subjecting said eluate

containing said protein from said stage (d) to a second purification using a second column behaving predominantly as an ion-exchange chromatography column prior to said stage (e).

**4,952,676**  
**MONOCLONAL ANTIBODY-PLATINUM**  
**CO-ORDINATION COMPOUND COMPLEX**  
 James G. Heffernan, Pangbourne; Michael J. Cleare, Reading, both of England, and Donald H. Picker, Narbert, Pa., assignors to Johnson Matthey PLC, London, England  
 Division of Ser. No. 873,131, Jun. 11, 1986, Pat. No. 4,760,156, which is a continuation-in-part of Ser. No. 625,250, Jun. 27, 1984, abandoned. This application Jul. 20, 1988, Ser. No. 193,097

Claims priority, application European Pat. Off., Jun. 11, 1985, 85304130.9

Int. Cl.<sup>3</sup> C07K 15/12; A61K 39/00 2 Claims  
 1. A conjugate platinum co-ordination compound/monoclonal antibody complex having the general formula



in which  
 A and B are the same or different selected from the class consisting of amine or monodentate amine or A and B together comprise a bidentate amine,  
 D is selected from the class consisting of substituted methylene or substituted dimethylene,  
 R is selected from the class consisting of hydrogen, lower alkyl, aryl, aralkyl, alkenyl, cycloalkyl, cycloalkenyl, alkoxy j or hydroxy,  
 y is 1 if D is substituted methylene or is 1 or 2 if D is substituted dimethylene,  
 z is 1 if D is substituted methylene or is 1 or 2 if D is substituted dimethylene, and  
 Y is a functionalised polymethylene moiety in which the functionalising group is selected from the class consisting of —CO<sub>2</sub>—, —O—, —S— or —NH—, and Z is a monoclonal antibody.

**4,952,677**  
**AZO COLORANTS FOR BALL POINT PEN AND RIBBON**  
**INKS**

Floyd G. Spence; Louis R. de Alvare, and Robert J. Allen, all of Holland, Mich., assignors to BASF Corporation, Parsippany, N.J.

Division of Ser. No. 18,299, Feb. 24, 1987, Pat. No. 4,800,043.  
 This application Sep. 15, 1988, Ser. No. 244,979  
 Int. Cl.<sup>3</sup> C09B 29/01, 29/15, 29/33, 29/42

U.S. Cl. 534—573 2 Claims  
 1. A colorant, prepared by the process comprising:
 

- (a) isolating the bottoms formed during the distillation of excess low-boiling aromatic amine following manufacture of parosaniline family dyestuffs;
- (b) preparing a diazonium salt by slurrying said bottoms with aqueous hydrochloric acid containing from 0.5 to 0.9 equivalents of sodium nitrite based on total nitrogen; and
- (c) coupling said diazonium salt with an azo coupling component.



4,952,678

## TRISAZO DYES

Karl-Heinz Eitzbach, Frankenthal, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 29, 1987, Ser. No. 113,910

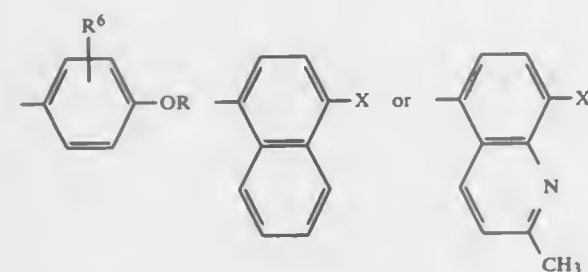
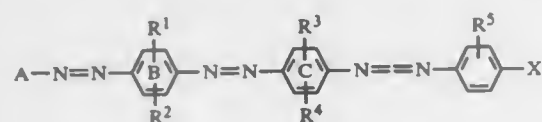
Claims priority, application Fed. Rep. of Germany, Nov. 15, 1986, 3639156

The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.

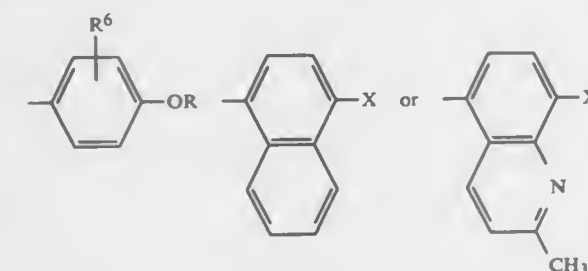
Int. Cl.<sup>3</sup> C07C 107/04, 107/00; C09B 31/16; C09K 19/24  
U.S. Cl. 534—577

2 Claims

1. A trisazo dye of the formula 1



where R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are hydrogen, R<sup>5</sup> is ethyl, X is C<sub>4</sub>-C<sub>12</sub>-alkoxy, benzyloxy, C<sub>4</sub>-C<sub>12</sub>-alkyl-, cyclohexyl-, 4-(C<sub>1</sub>-C<sub>12</sub>-alkyl)cyclohexyl- or C<sub>4</sub>-C<sub>12</sub>-alkoxy-substituted benzyloxy, C<sub>4</sub>-C<sub>12</sub>-alkylamino or unsubstituted or C<sub>4</sub>-C<sub>12</sub>-alkyl-, cyclohexyl-, 4-(C<sub>1</sub>-C<sub>12</sub>-alkyl) cyclohexyl- or C<sub>4</sub>-C<sub>12</sub>-alkoxy-substituted benzylamino, and A is a radical of the formula



where R is C<sub>4</sub>-C<sub>12</sub>-alkyl, benzyl or C<sub>4</sub>-C<sub>12</sub>-alkyl-, cyclohexyl-, 4-(C<sub>1</sub>-C<sub>12</sub>-alkyl)cyclohexyl- or C<sub>4</sub>-C<sub>12</sub>-alkoxy-substituted benzyloxy, R<sup>6</sup> is methyl, X has the abovementioned meaning, or the rings B, C or B and C being benzofused.

4,952,679

## FIBER-REACTIVE DYES CONTAINING A 5-FORMYLPYRIMIDINE MOIETY

Karl Hoegerle, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

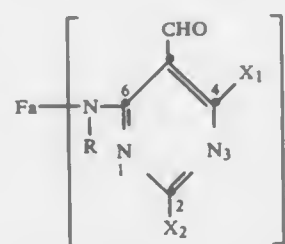
Filed Aug. 19, 1988, Ser. No. 233,782

Claims priority, application Switzerland, Aug. 27, 1987, 3289/87

Int. Cl.<sup>3</sup> C09B 62/20, 62/22, 62/24, 62/26, 62/038; D06P 3/66  
U.S. Cl. 534—618

19 Claims

1. A fiber-reactive dye of the formula



(I)

wherein Fa is a monoazo or polyazo, metal complex azo, anthraquinone, phthalocyanine, formazane, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, nitroaryl, naphthoquinone, pyrenequinone or perylene-tetracarboxylic dye radical, X<sub>1</sub> is halogen, C<sub>1</sub>-C<sub>4</sub>-alkylsulfonyl, phenylsulfonyl, a sulfonic acid or phosphoric acid group or a quaternized ammonium group, X<sub>2</sub> independently has the meaning of X<sub>1</sub> or is C<sub>1</sub>-C<sub>4</sub>-alkyl which is unsubstituted or substituted by halogen, hydroxy, cyano, carboxyl, sulfo, sulfato, C<sub>1</sub>-C<sub>4</sub>-alkoxycarbonyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy, R is hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl which is unsubstituted or substituted by halogen, hydroxy, cyano, carboxyl, sulfo, sulfato, C<sub>1</sub>-C<sub>4</sub>-alkoxycarbonyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy, and r is 1 or 2.

4,952,680

## PREPARATION OF STABLE SOLUTIONS OF AZO DYES OF M-PHENYLENEDIAMINE BY REACTION WITH FORMIC ACID

Karl Schmeidl, Ludwigshafen, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1988, Ser. No. 181,577

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1987, 3713618

Int. Cl.<sup>3</sup> C09B 37/00, 67/14, 67/34; D21H 3/80

U.S. Cl. 534—676

2 Claims

1. A process for preparing a stable solution of an azo dye obtained by diazotizing and coupling unsubstituted or C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted m-phenylenediamine in acetic acid, which comprises, after the reaction has ended, treating the resulting reaction mixture with from 0.1 to 1.2 moles of formic acid, based on 1 mole of m-phenylenediamine, at from 60° C. to the boiling point of the reaction mixture.

4,952,681

## DYES CONTAINING

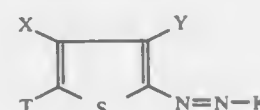
3,4-DISUBSTITUTED-2-DIAZA-THIOPHENE RADICALS  
Gunter Hansen; Ernst Schefczik, both of Ludwigshafen; Karl-Heinz Eitzbach, Frankenthal; Helmut Relchelt, Niederkirchen, and Hermann Loeffler, Speyer, all of Fed. Rep. of Germany, assignors to Sandoz AG, Basel, Switzerland  
Division of Ser. No. 860,573, May 7, 1986, abandoned. This application Jul. 27, 1988, Ser. No. 205,359

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1985, 3533546; Oct. 2, 1985, 3535133; May 14, 1986, 3517365  
Int. Cl.<sup>3</sup> C09B 62/35, 29/033, 29/33, 29/36

U.S. Cl. 534—766

16 Claims

1. A compound of the formula:



wherein:

X is fluorine; chlorine; bromine; SO<sub>2</sub>E; —OH; —SH; C<sub>1</sub>-6-alkoxy; benzyloxy; phenyloxy; methyl-substituted phenyloxy; chloro-substituted phenyloxy; —S—(C<sub>1</sub>-6 alkyl); benzylmercapto; —S—C<sub>2</sub>H<sub>4</sub>OH; —S—CH<sub>2</sub>COOCH<sub>3</sub>;

—S—CH<sub>2</sub>COOCH<sub>3</sub>; phenylmercapto; or methyl-substituted phenylmercapto;

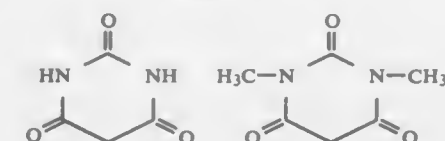
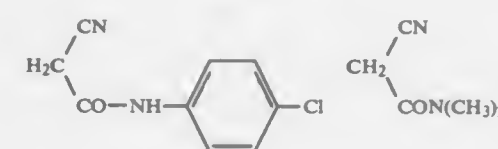
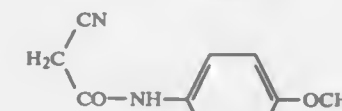
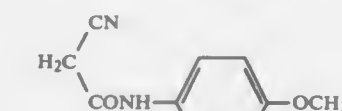
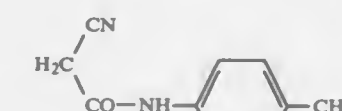
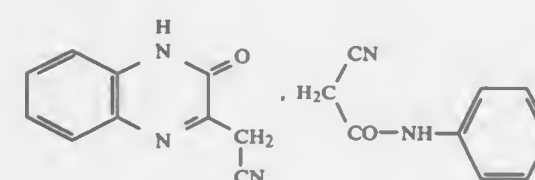
E is C<sub>1</sub>-8-alkyl; alkenyl; cycloalkyl; C<sub>7</sub>-C<sub>10</sub>-aralkyl; aryl; chlorine; hydroxyl; amino; C<sub>1</sub>-4-alkoxy; benzyloxy; C<sub>6</sub>H<sub>5</sub>—CH<sub>2</sub>CH<sub>2</sub>—O—; phenyloxy; chloro-substituted phenyloxy; methyl-substituted phenyloxy; C<sub>1</sub>-4-alkyl-mono-substituted amino; C<sub>1</sub>-4-alkyl-di-substituted amino; NHC<sub>6</sub>H<sub>5</sub>; NHC<sub>6</sub>H<sub>4</sub>CH<sub>3</sub>; NHC<sub>6</sub>H<sub>4</sub>Cl; and N(CH<sub>3</sub>)C<sub>6</sub>H<sub>4</sub>;

Y is —COO—(CH<sub>2</sub>-8-alkyl); —COOC<sub>2</sub>H<sub>4</sub>OH; —COOC<sub>3</sub>H<sub>7</sub>OH; —COOC<sub>2</sub>H<sub>4</sub>OCH<sub>3</sub>; —COOC<sub>2</sub>H<sub>4</sub>OC<sub>2</sub>H<sub>5</sub>; —COOC<sub>2</sub>H<sub>4</sub>OC<sub>4</sub>H<sub>9</sub>; —COOC<sub>6</sub>H<sub>5</sub>; —COOC<sub>6</sub>H<sub>4</sub>CH<sub>3</sub>; —CONH<sub>2</sub>; —CONH(C<sub>1</sub>-8-alkyl); —CON(CH<sub>3</sub>)<sub>2</sub>; —CON(C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>; —CON(C<sub>3</sub>H<sub>7</sub>)<sub>2</sub>; —CON(C<sub>4</sub>H<sub>9</sub>)<sub>2</sub>; —CON(CH<sub>3</sub>)C<sub>2</sub>H<sub>5</sub>;

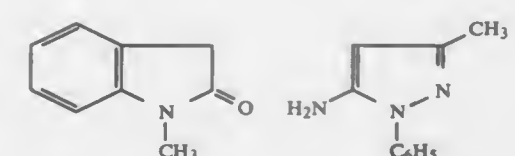
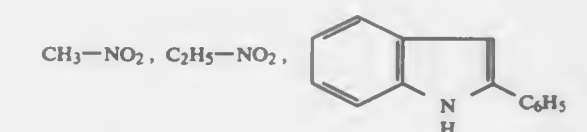
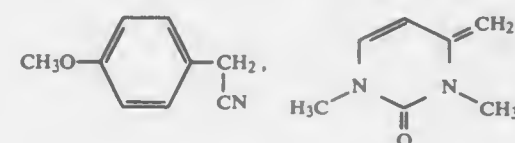
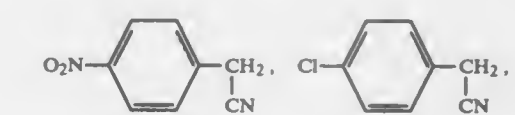
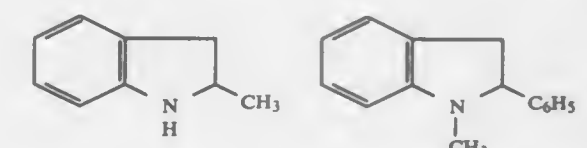
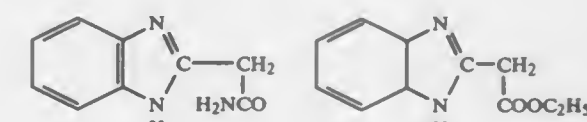
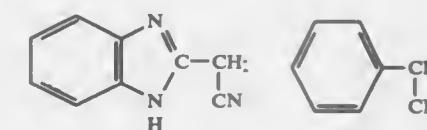
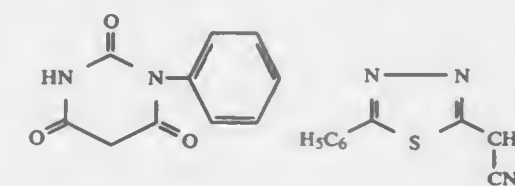
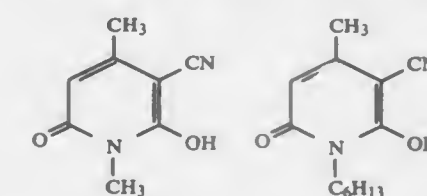
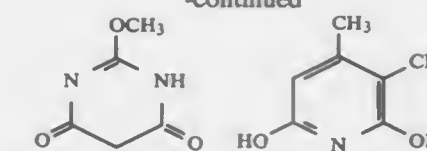


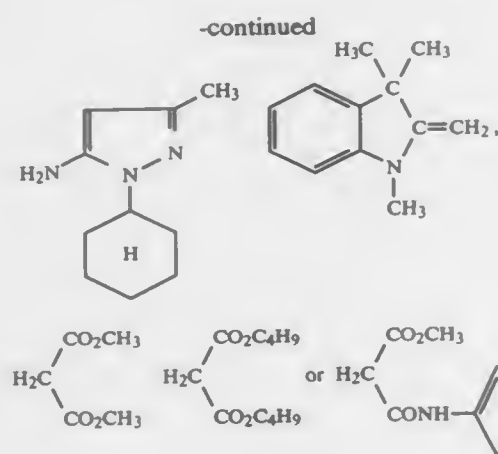
T is hydrogen; C<sub>1</sub>-4-alkyl; Cl; Br; NO; NO<sub>2</sub>; SO<sub>3</sub>H; CHO; CN; CH<sub>3</sub>CO; C<sub>2</sub>H<sub>5</sub>CO; C<sub>6</sub>H<sub>5</sub>CO; CH<sub>3</sub>SO<sub>2</sub>; C<sub>2</sub>H<sub>5</sub>SO<sub>2</sub>; or C<sub>6</sub>H<sub>5</sub>SO<sub>2</sub>; or —CH=CH—

B is C(CN)(Z) where Z is cyano; nitro; alkanoyl; aroyl; alkylsulfonyl; arylsulfonyl; carboxyl; a carboxylic C<sub>1</sub>-4 alkyl or phenyl ester group; unsubstituted carbamyl; C<sub>1</sub>-2 alkyl substituted carbamyl; or a group of one of the formulae:



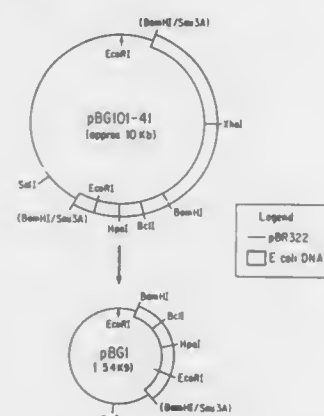
-continued





and  
K is a radical of a coupling component.

**4,952,682**  
**EFFICIENT PROKARYOTIC EXPRESSION SYSTEM**  
Algis Anilionis, and John L. Palmer, both of Arlington, Mass.,  
assignors to Repligen Corporation, Cambridge, Mass.  
Continuation of Ser. No. 109,003, Oct. 16, 1987, abandoned,  
which is a division of Ser. No. 686,344, Dec. 26, 1984, Pat. No.  
4,721,671. This application Sep. 30, 1988, Ser. No. 253,351  
Int. Cl.<sup>5</sup> C07K 13/00; C12P 21/00; C12N 15/00  
U.S. Cl. 530—350 1 Claim

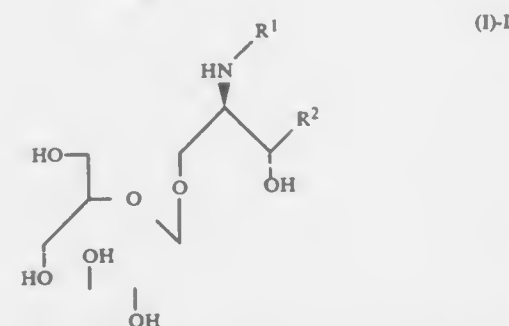
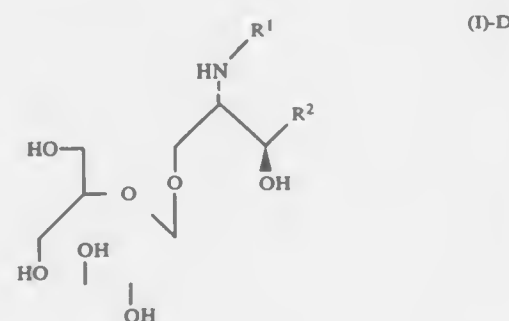


1. A hybrid protein prepared by a process which comprises culturing a Gram negative prokaryotic host expressing a DNA segment on a transfer vector, wherein said DNA segment comprises the promoter region of the  $\beta$ -glucuronidase gene of *E. coli* and wherein said promoter region is operably attached to a first DNA sequence encoding 17 or more amino acids of the N-terminus of the  $\beta$ -glucuronidase gene and wherein said first DNA sequence is fused to a second DNA sequence encoding an amino acid sequence foreign to *E. coli* and wherein said promoter is functional in said host directing the expression of said hybrid protein.

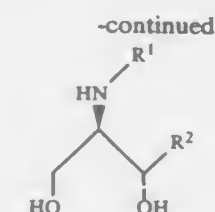
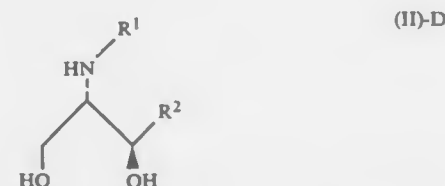
**4,952,683**  
**PROCESS FOR THE PREPARATION OF SPHINGOSINE DERIVATIVES**

Roland Tschannen, Basel; Wolfgang Fraefel, Grolley, both of Switzerland; Richard R. Schmidt, Konstanz, Fed. Rep. of Germany; Rudolf Klager, Eutingen, Fed. Rep. of Germany, and Peter Zimmermann, Villingen, Fed. Rep. of Germany, assignors to Solco Basel AG, Switzerland  
Continuation of Ser. No. 676,061, Nov. 29, 1984, abandoned.  
This application Dec. 24, 1987, Ser. No. 137,957  
Claims priority, application Switzerland, Dec. 5, 1983, 6493/83; Sep. 28, 1984, 4671/84  
Int. Cl.<sup>5</sup> C07H 5/06

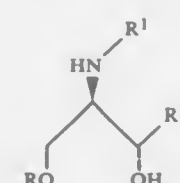
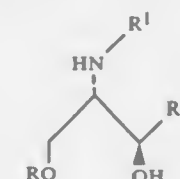
U.S. Cl. 536—186 23 Claims  
1. A process for preparing sphingosine derivatives selected from the formula (I)-D and (I)-L



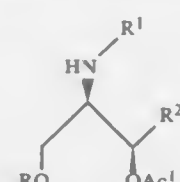
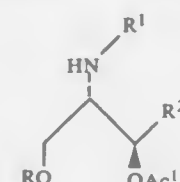
in which R<sup>1</sup> denotes an acyl radical selected from the group consisting of radicals of fatty acids having 14 to 24 carbon atoms and the corresponding acyl radicals having a hydroxyl group in the  $\alpha$ -position of having 1 or 2 double bonds in the cis configuration, and R<sup>2</sup> denotes a radical selected from the group consisting of the pentadecanyl and the heptadecanyl radical and the corresponding C<sub>15</sub> and C<sub>17</sub> radicals having 1, 2 or 3 double bonds, one of which in each case being located in the 1, 2-position and having the trans configuration, the other, or others, when present, having the cis configuration; comprising reacting an optical active compound of the formula (II)-D or (II)-L



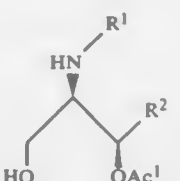
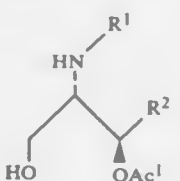
in which R<sup>1</sup> and R<sup>2</sup> are as defined above, or the corresponding racemate, with an organic reagent which is able selectively to react with a primary hydroxyl group, with the formation of compounds of the formula (III)



in which R denotes a hydroxyl protective group, esterifying the compound of the formula (III) with an organic carboxylic acid with the formation of a compound of the formula (IV)



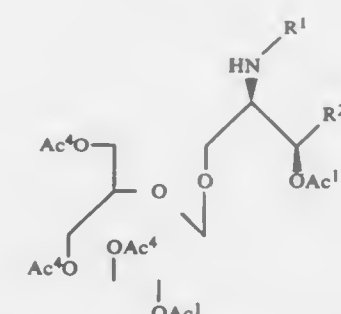
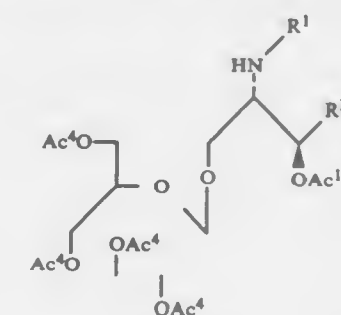
in which Ac<sup>1</sup> denotes the acyl radical or an organic carboxylic acid, removing the hydroxyl protective group R from the compounds of the formula (IV) by acid hydrolysis with the formation of corresponding compounds of the formula (VII)



(II)-L

-continued

reacting the compound of the formula (VII) with the O-trifluoroacetimidate or O-trichloroacetimidate of a D-glucose whose hydroxyl groups in the 2, 3, 4 and 6 positions are protected by acyl radicals Ac<sup>4</sup> in the presence of boron trifluoride etherate or trimethylsilyl trifluoromethanesulfonate, with the formation of compounds of the corresponding formula (X)



separating, if a racemate is used as starting material, into the diastereomers, by chromatography or fractional crystallization, the compound of the formula (X), and eliminating simultaneously the acyl groups Ac<sup>4</sup> and Ac<sup>4</sup> from the compounds of the formula (X), in each case compounds of the D- or L-series being produced from compounds of the D- or L-series, respectively.

**4,952,684**  
**PROCESSES FOR THE PREPARATION OF AMIDES AND AMINES FROM A MATERIAL HAVING CARBOXYL-CONTAINING POLYSACCHARIDES AND PRODUCTS THEREFROM**

Manasur Yalpani, and Magdy M. Abdel-Malik, both of Kirkland, Canada, assignors to Domtar Inc., Montreal, Canada  
Filed Jun. 2, 1988, Ser. No. 201,438

Int. Cl.<sup>5</sup> C07H 5/04, 15/00; C08B 3/00, 11/00  
U.S. Cl. 536—18.7 23 Claims

1. An amidogen of a carboxyl-containing polysaccharide selected from the group consisting of amido alkyl ether and amino alkyl ether of carboxyl-containing polysaccharides, wherein the nitrogen of the amido and amino group is directly attached to an alkyl group, said alkyl group itself joining an oxygen and said oxygen joining a carbon forming (a) one (poly)saccharide ring unit of said carboxyl-containing polysaccharide, at either:  
(a) position 5 or  
(b) at least one of the positions 2, 3 and 6 of said saccharide ring,  
said group selected from amino alkyl ether and amino alkyl ether defining in the case of (b) a side chain that is exocyclic of said polysaccharide ring, and in the case of (a) of amino alkyl and amino alkyl directly attached to the carbon of the position 5 of a polysaccharide unit, and in the case of (a), carboxyl groups being present on

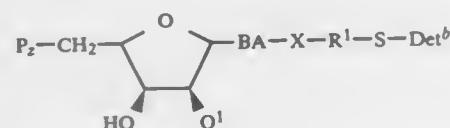


position 5 of saccharide ring units of said carboxyl-containing polysaccharide, and in the case of (b), alkyl carboxyl groups being present in at least one of the positions 2, 3 and 6 of saccharide ring units of said carboxyl-containing polysaccharide.

#### 4,952,685 DETECTABLE MOLECULES, METHOD OF PREPARATION AND USE

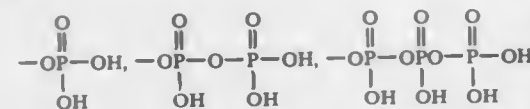
Jannis G. Stavrianopoulos, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.  
Division of Ser. No. 575,396, Jan. 30, 1984, Pat. No. 4,707,440.  
This application Apr. 28, 1987, Ser. No. 43,668  
Int. Cl.<sup>5</sup> C07H 13/00, 15/12; C12Q 1/68  
U.S. Cl. 536—27

1. A compound of the formula



where P<sub>2</sub> is

where P<sub>2</sub> is

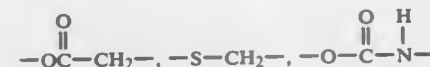
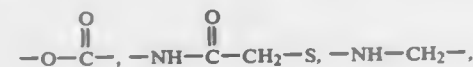
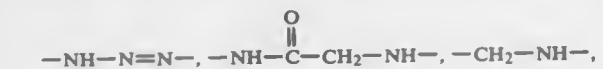


or metal or non-metal salts thereof;

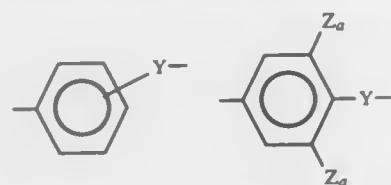
Q<sup>1</sup> is H or HO;

BA is a modified purine or pyrimidine base;

X is selected from the group consisting of



-R<sup>1</sup>- is selected from the group consisting of



and a C<sub>1</sub>-C<sub>10</sub> branched or unbranched alkyl or aralkyl which may be substituted by OH;

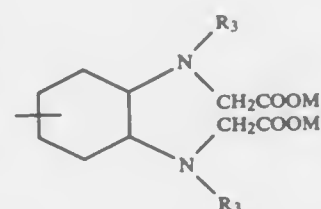
-Y- is a direct bond to -S-, or -Y- is -S-R<sup>2</sup>-

where -R<sup>2</sup>- is a C<sub>1</sub>-C<sub>10</sub> branched or unbranched alkyl;

Z<sub>a</sub> is chlorine, bromine or iodine;

-S- is an acyclic divalent sulfur atom;

Det<sup>b</sup> is a chemical moiety capable of being detected, comprising biotin or a metal chelator of the formula:



or the 4-hydroxy or acyloxy derivative thereof, where R<sup>3</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl or -CH<sub>2</sub>COOM, each M is a metal or non-metal cation.

#### 4,952,686 SOLUBLE DRIED CASSIA ALLOY GUM COMPOSITION AND PROCESS FOR MAKING SAME

Donald W. Renn, Glen Cove; George E. Lauterbach, Thomaston, both of Me., and Peter Henningsen, Hvidovre, Denmark, assignors to FMC Corporation, Philadelphia, Pa.  
Filed Dec. 1, 1987, Ser. No. 127,347  
Int. Cl.<sup>5</sup> C07G 17/001; C08B 37/00

U.S. Cl. 536—114

24 Claims

1. A solid alloy gum composition comprising galactomannan gum extracted by an aqueous medium from seeds of the genus Cassia coprecipitated with a solubilizing quantity of a gelling and thickening agent selected from the group consisting of carrageenan, furcellaran, agar, agarose, agarpectin, dextran, xanthan, algin, carboxymethylcellulose, gellan, low methoxyl pectin, hydroxyethylcellulose, locust bean gum, deacetylated chitin, polyacrylamide, polyethylene glycol and polyvinyl alcohol to form a solid alloy gum composition which forms a substantially clear, stable colloidal aqueous solution on rehydration.

13. A process for producing a solid hydratable alloy gum composition comprising galactomannan gum extracted from Cassia seeds and a gelling and thickening agent selected from the group consisting of carrageenans, furcellaran, agar, agarose, agarpectins, dextran, xanthan, algin, carboxymethylcellulose, gellan, low methoxyl pectin, hydroxyethylcellulose, locust bean gum, deacetylated chitin, polyacrylamide, polyethylene glycol, and polyvinyl alcohol, the alloy gum composition which forms a substantially clear, stable colloidal aqueous solution, the process comprising: extracting seeds of the genus Cassia with an aqueous medium to form a soluble extract portion and an insoluble residue portion, incorporating into the soluble extract portion a solubilizing quantity of said gelling and thickening agent and coprecipitating therefrom a solid alloy gum composition which forms a substantially clear, stable colloidal aqueous solution on rehydration.

#### 4,952,687 FATTY ACID ESTERS OF SUGARS AND SUGAR ALCOHOLS

Janos Bodor, Rijswijk, and Geoffrey Page, Palmerston North, both of New Zealand, assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 14,963, Feb. 17, 1987, abandoned. This application Aug. 18, 1987, Ser. No. 87,005  
Claims priority, application Netherlands, Feb. 19, 1986, 8600415

Int. Cl.<sup>5</sup> C07H 13/06

U.S. Cl. 536—119

29 Claims

1. Fatty acid esters of sugar or sugar alcohols, said sugars and sugar alcohols being polyols having from 4 to 8 hydroxyl groups, said esters comprising unsaturated fatty acid residues, containing a ratio of cis:trans double bonds of from 20:80 to 40:60.

24. A composition containing 0.5-99 wt. % of esters according to claim 1, the balance consisting of edible matter.

#### 4,952,688 WATER-SOLUBLE PHTHALOCYANINE COMPOUNDS Hartmut Springer, Königstein/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

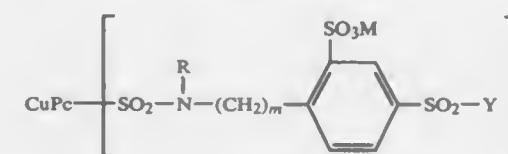
Filed Aug. 17, 1988, Ser. No. 233,161  
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727909

Int. Cl.<sup>5</sup> C09B 47/04

U.S. Cl. 540—134

6 Claims

1. A compound conforming to the general formula



wherein:

CuPc is a radical of copper phthalocyanine whose benzene nuclei can be substituted by chlorine or phenyl,

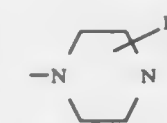
R is a hydrogen atom,

M is a hydrogen atom or an alkali metal,

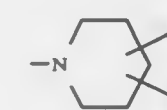
Y is a beta-sulfatoethyl group

m is the number 1, 2, 3 or 4, and

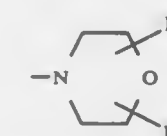
a is an integral or fractional number from 2 to 3.



wherein R<sup>5</sup> is a hydrogen atom, a phenyl group substituted by a halogen atom or an alkoxy group having 1 to 4 carbon atoms, a phenyl group, an alkyl group having 1 to 4 carbon atoms or a pyridyl group), a group represented by the formula



(wherein R<sup>6</sup> is a hydrogen atom, an alkyl group having 1 to 4 carbon atoms or a benzyl group, and R<sup>7</sup> is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms), a group represented by the formula



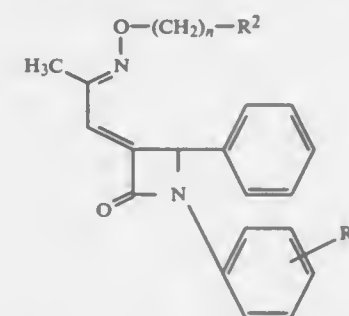
(wherein R<sup>8</sup> and R<sup>9</sup> are the same or different and each a hydrogen atom or an alkyl group having 1 to 4 carbon atom), a pyrrolidinyl group or a tetrahydroazepinyl group, and n is an integer of from 2 to 10), and a salt thereof.

#### 4,952,689 3-(SUBSTITUTED PROPYLIDENE)-2-AZETIDINONE DERIVATIVES FOR BLOOD PLATELET AGGREGATION Yutaka Kawashima, Tatebayashi; Masakazu Sato, Konohe; Masahiro Kawase, Ago; Yoshiaki Watanabe, Kodaira, and Katsuo Hatayama, Omiya, all of Japan, assignors to Taiho Pharmaceutical Co., Ltd., Japan

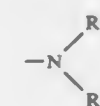
Filed Oct. 10, 1989, Ser. No. 419,206  
Claims priority, application Japan, Oct. 20, 1988, 63-265183  
Int. Cl.<sup>5</sup> C07D 205/08; A61K 31/535, 31/445, 31/395  
U.S. Cl. 540—200

3 Claims

1. A 2-azetidinone derivative represented by the formula



wherein R<sup>1</sup> is a halogen atom, an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms or an alkoxycarbonyl group in which the alkoxy group has 1 to 4 carbon atoms, R<sup>2</sup> is a group represented by the formula



(wherein R<sup>3</sup> and R<sup>4</sup> are the same or different and are each a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 5 carbon atoms, a phenyl group or a benzyl group), a group represented by the formula

#### 4,952,690 6-SUBSTITUTED THIA-AZA COMPOUNDS

Jacques Gestel, Basel; Ivan Ernest, Birsfelden, both of Switzerland; Marc Lang, Mulhouse, France, and Robert B. Woodward, Cambridge, Mass., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 152,526, Feb. 5, 1988, abandoned, which is a division of Ser. No. 57,082, Jun. 3, 1987, abandoned, which is a division of Ser. No. 208,105, Nov. 18, 1980, Pat. No. 4,692,442, which is a continuation of Ser. No. 7,453, Jan. 29, 1979, abandoned. This application Aug. 21, 1989, Ser. No. 396,783

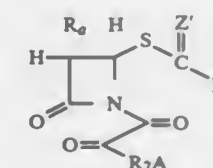
Claims priority, application Switzerland, Feb. 2, 1978, 1140/78-3

Int. Cl.<sup>5</sup> C07D 205/09, 205/08, 499/00; A61K 31/425

U.S. Cl. 540—357

12 Claims

1. A compound of the formula



wherein

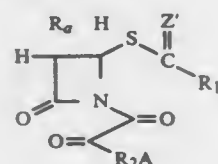
R<sub>2</sub> is (1R)-1-hydroxyethyl;

R<sub>2</sub>A together with the carbonyl to which it is attached is a protected carboxyl group;

R<sub>1</sub> is -R, in which R is C<sub>1-7</sub> alkyl, phenyl, phenylalkyl having 7-13 carbon atoms, or heterocyclyl or heterocyclylalkyl having up to 10 carbon atoms and up to 4 ring hetero atoms selected from nitrogen, oxygen, and sulphur, with the proviso that two oxygen atoms or two sulfur atoms or one oxygen atom and one sulfur atom are not adjacent to each other, each R being unsubstituted or

substituted by amino, mono C<sub>1-7</sub> alkylamino, di-C<sub>1-7</sub> alkylamino, hydroxy, C<sub>1-7</sub> alkoxy, mercapto, C<sub>1-7</sub> alkylthio, chloro, bromo, fluoro, or by carboxyl; and Z' is oxygen, sulfur, methoxycarbonylmethylidene or 1-methoxyloxycarbonylmethylidene; and the functional groups in the radicals designated R<sub>2</sub> and R<sub>1</sub> are either in protected or unprotected form.

2. A compound of the formula



wherein

R<sub>2</sub> is (1R)-1-hydroxyethyl;

R<sub>2</sub>A together with the carbonyl to which it is attached is a protected carboxyl group;

R<sub>1</sub> is SR, in which R is C<sub>1-7</sub> alkyl, phenyl, phenylalkyl having 7-13 carbon atoms, or heterocyclyl having up to 10 carbon atoms and up to 4 ring hetero atoms selected from nitrogen, oxygen, and sulphur, with the proviso that two oxygen atoms or two sulfur atoms or one oxygen atom and one sulfur atom are not adjacent to each other, each R being unsubstituted or substituted by amino, mono C<sub>1-7</sub> alkylamino, di-C<sub>1-7</sub> alkylamino, hydroxy, C<sub>1-7</sub> alkoxy, mercapto, C<sub>1-7</sub> alkylthio, nitro, chloro, bromo, fluoro, cyano or carboxyl; and

Z' is oxygen, sulfur, methoxycarbonylmethylidene or 1-methoxyloxycarbonylmethylidene; and the functional groups in the radicals designated R<sub>2</sub> and R<sub>1</sub> are either in protected or unprotected form.

4,952,691

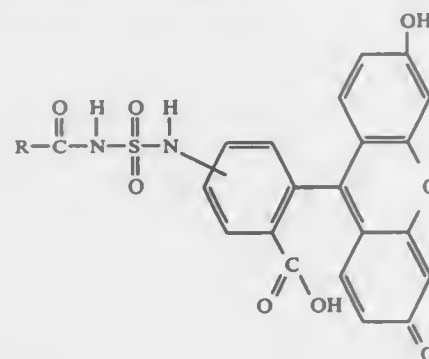
FLUORESCENCE POLARIZATION IMMUNOASSAY  
Chao-Huei J. Wang, Gurnee; Stephen D. Stroupe, Libertyville, and Michael E. Jolley, Round Lake, all of Ill., assigns to Abbott Laboratories, Abbott Park, Ill.

Division of Ser. No. 58,638, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 828,315, Feb. 10, 1986, abandoned, which is a division of Ser. No. 577,946, Feb. 8, 1984, Pat. No. 4,585,862, which is a continuation of Ser. No. 329,975, Dec. 11, 1981, abandoned. This application Jan. 17, 1990, Ser. No. 466,557

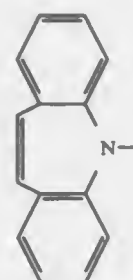
Int. Cl.<sup>7</sup> C07D 223/22

U.S. Cl. 540—589

1. A compound of the formula:



wherein R is:



4,952,692

BENZAZEPINE DERIVATIVES

John Krapcho, Somerset, N.J.; Joel C. Barrish, Holland, Pa., and Spencer D. Kimball, East Windsor, N.J., assigns to E. R. Squibb & Sons, Inc., Princeton, N.J.

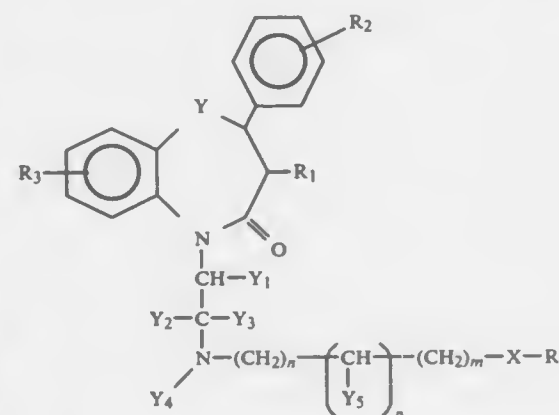
Filed Apr. 4, 1989, Ser. No. 333,358

Int. Cl.<sup>7</sup> C07D 223/16, 281/10; A61K 31/55

U.S. Cl. 540—491

24 Claims

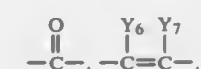
1. A compound of the formula



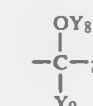
including pharmaceutically acceptable salts thereof wherein

Y is —CH<sub>2</sub>— or —S—;

X is —O—, —S(O)<sub>q</sub>—,

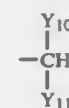


or



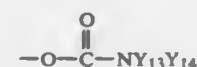
R is hydrogen, alkyl, aryl or heteroaryl;

R<sub>1</sub> is

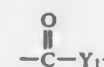


or —O—Y<sub>12</sub>;

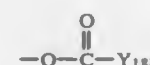
R<sub>2</sub> and R<sub>3</sub> are each independently hydrogen, halogen, alkyl, alkoxy, aryloxy, arylalkoxy, diarylalkoxy, arylalkyl, cyano, hydroxy, alkanoyloxy,



fluoro substituted alkoxy, fluoro substituted alkyl, (cycloalkyl)-alkoxy, —NO<sub>2</sub>, —NY<sub>15</sub>Y<sub>16</sub>, —S(O)<sub>q</sub>alkyl, —S(O)<sub>q</sub>aryl,



or



n is 0, 1, 2 or 3;

m is 0, 1 or 2;

p is an integer from 1 to 5;

q is 0, 1 or 2;

Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>, Y<sub>6</sub> and Y<sub>7</sub> are each independently hydrogen or alkyl;

Y<sub>4</sub> is selected from hydrogen, alkyl, cyclo-alkyl or arylalkyl; Y<sub>5</sub> and Y<sub>9</sub> are each independently hydrogen, alkyl, aryl or arylalkyl;

Y<sub>10</sub> and Y<sub>11</sub> are each hydrogen or alkyl, Y<sub>10</sub> is hydrogen and Y<sub>11</sub> is alkenyl, alkynyl, aryl, heteroaryl, or cycloalkyl, or Y<sub>10</sub> and Y<sub>11</sub> together with the carbon atom to which they are attached are cycloalkyl;

Y<sub>8</sub> and Y<sub>12</sub> are each independently hydrogen, alkyl, alkanoyl, alkenyl (provided that the double bond is at least 2 carbon atoms away from the oxygen to which Y<sub>3</sub> is attached), arylcarbonyl, heteroarylcarbonyl or



Y<sub>13</sub> and Y<sub>14</sub> are each independently hydrogen, alkyl, aryl or heteroaryl, or Y<sub>13</sub> and Y<sub>14</sub> together with the nitrogen atom to which they are attached are pyrrolidinyl, piperidinyl or morpholinyl;

Y<sub>15</sub> and Y<sub>16</sub> are each independently hydrogen, alkyl, alkanoyl, arylcarbonyl, heteroarylcarbonyl, or



Y<sub>17</sub> is hydroxy, alkoxy, aryloxy, amino, alkylamino or dialkylamino; and

Y<sub>18</sub> is alkyl, alkoxy or aryloxy;

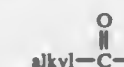
wherein the terms "alkyl" and "alkoxy" refer to both straight and branched chain groups having 1 to 10 carbon atoms;

the term "alkenyl" refers to both straight and branched chain groups having 2 to 10 carbon atoms;

the term "aryl" refers to phenyl and substituted phenyl wherein the 1, 2 or 3 substituents are independently selected from amino, alkylamino, dialkylamino, amino, ni-

tro, halogen, hydroxyl, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio of 1 to 4 carbon atoms, alkanoyloxy, carbamoyl or carboxyl groups;

the term "alkanoyl" refers to groups having the formula



and having 2 to 11 carbon atoms;

the term "heteroaryl" refers to groups selected from pyridinyl, pyrrolyl, imidazolyl, furyl, thienyl and thiazolyl;

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms;

the term "halogen" refers to fluorine, chlorine, bromine and iodine; and

the terms "fluoro substituted alkyl" and "fluoro substituted alkoxy" refer to alkyl and alkoxy groups in which one or more hydrogens have been replaced by fluorine atoms.

24. A compound in accordance with claim 1 wherein (3R-cis)-3-(Acetyloxy)-2,3-dihydro-2-(4-methoxyphenyl)-5-[2-methyl(3-phenyl-2-propenyl)amino]ethyl]-1,5-benzothiazepin-4-one, monohydrochloride.

4,952,693

OXAZOLO-PYRIMIDINE DERIVATIVES

Jagadish C. Sircar, and Garry W. Piater, both of Ann Arbor, Mich., assigns to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 767,202, Aug. 22, 1985,

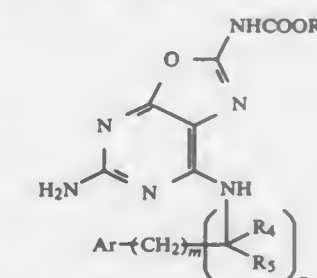
Continuation-in-part of Ser. No. 660,152, Oct. 12, 1984, abandoned. This application Dec. 15, 1987, Ser. No. 132,386

Int. Cl.<sup>7</sup> C07D 239/00

U.S. Cl. 544—255

18 Claims

1. A compound of the formula:



Wherein R<sub>6</sub> is alkyl of one to four carbon atoms, aryl wherein aryl is unsubstituted phenyl or phenyl substituted by halogen, alkyl or one to four carbon atoms, hydroxy, alkoxy of one to four carbon atoms or trifluoromethyl, or arylalkyl wherein aryl is as defined above and alkyl is a carbon chain of up to four carbon atoms; n is zero or one; m is zero, one, two, or three, with the proviso that m or n is at least one; R<sub>4</sub> and R<sub>5</sub> are each independently hydrogen, alkyl of one to four carbon atoms, aryl as defined above, arylalkyl as defined above, or cycloalkyl of three to six carbon atoms, hydroxy, alkyl of one to four carbon atoms and Ar is heteroaryl wherein the heteroaryl is 2- or 3-furanyl, 2- or 3-thienyl, 2-, 3-, or 4-pyridinyl which heteroaryl is unsubstituted or substituted by alkyl of one to four carbons, alkoxy of one to four carbon atoms, —C≡C—C≡C— attached to adjacent carbons so as to form a benzo radical, or halogen.



4,952,694

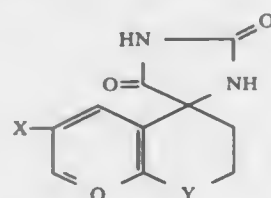
## NOVEL RESOLUTION PROCESS FOR RACEMIC SPIRO-HYDANTOINS

Marcus Brackeen, Durham, N.C., and Harry R. Howard, Jr., Hartford, Conn., assignors to Pfizer Inc., New York, N.Y.  
Filed Jul. 27, 1988, Ser. No. 224,966  
Int. Cl.<sup>5</sup> C07D 215/38, 491/10

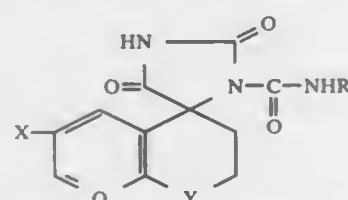
U.S. Cl. 546—15

13 Claims

1. A process for resolving a racemic spiro-hydantoin compound into its optical antipodes, which comprises the steps of (a) reacting a racemic compound of the formula:



wherein X is hydrogen, fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy, Q is methine or nitrogen and Y is methylene, oxygen or sulfur, in a reaction-inert polar organic solvent with at least an equimolar amount of an optically-active asymmetric isocyanate of the formula RNCO, wherein R is (S)- or (R)-1-phenylethyl or (S)- or (R)-1-(1-naphthyl)ethyl, in the presence of a base at a temperature that is in the range of from about 5° C. up to about 40° C. until the reaction to form the diastereomeric ureido compound of the formula:



wherein X, Q, Y and R are each as previously defined, is substantially complete;

- (b) separating the resulting diastereomeric mixture into its component parts; and  
(c) thereafter converting the separated ureido diastereomers obtained in step (b) to the corresponding optically-active hydantoin compounds by treatment with an excess in moles of an alkali metal lower alkoxide (C<sub>1</sub>-C<sub>4</sub>) in an aprotic organic solvent at a temperature that is in the range of from about 20° C. up to the reflux temperature of the reaction mixture, followed by acidification, whereupon the desired optical isomer is obtained.

4,952,695

## CYCLOPROPYL-6,7,8-TRIFLUORO-1,4-DIHYDRO-4-OXO-3-QUINOLINE CARBOXYLIC ACID, INTERMEDIATE FOR ANTIBACTERIALS

Klaus Groche, Odenthal; Uwe Petersen, Leverkusen; Hans-Joachim Zeller, Velbert, and Karl G. Metzger, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Division of Ser. No. 603,480, Apr. 24, 1984, Pat. No. 4,556,658.  
This application Jul. 18, 1985, Ser. No. 756,469

Claims priority, application Fed. Rep. of Germany, May 18, 1983, 3318145

Int. Cl.<sup>5</sup> C07D 215/18

U.S. Cl. 546—156

2 Claims

1. A compound which is 1-cyclopropyl-6,7,8-trifluoro-1,4-dihydro-4-oxoquinoline-3-carboxylic acid.

4,952,696

## PROCESS FOR RESOLVING THE ENANTIOMERS OF A BENZOPYRAN DERIVATIVE

Ralf M. Devant, Darmstadt-Arheilgen, Fed. Rep. of Germany, assignor to Merck Patent Gesellschaft mit Beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany  
Filed Feb. 14, 1990, Ser. No. 479,893

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904496

Int. Cl.<sup>5</sup> C07D 401/00

U.S. Cl. 546—269

12 Claims

1. A process for resolving the enantiomers of trans-3-hydroxy-3,4-dihydro-2,2-dimethyl-4-(2-oxo-1,2-dihydropyridin-1-yl)-2H-1-benzopyran-6-carbonitrile (I), comprising:

dissolving racemic I together with a small amount of either the enantiomer (−)-I or the enantiomer (+)-I in an inert solvent or solvent mixture;  
seeding the resultant solution with the enantiomer employed in the previous step;  
isolating the resultant precipitated enantiomer;  
dissolving additional racemic I in said solution;  
seeding said solution with the other enantiomer;  
isolating the precipitated enantiomer; and  
repeating the above steps one or more times.

4,952,697

## PROCESS FOR THE PREPARATION OF 2-NITRO-3-AMINOPYRIDINE, AND THE INTERMEDIATES WHICH ARE FORMED IN THE REACTION

Siegfried Planker, Königstein/Taunus; Klaus Warning, Eppstein/Taunus; Günter H. Herbst, deceased, lte of Kelkheim (Taunus) (Ingrid L.M. Herbst naée Badewitz, heir); Ulrike M. Herbst, Kelkheim (Taunus); Bettina S. Herbst, Kelkheim (Taunus), and Georg Schaeffer, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 932,170, Nov. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 818,125, Jan. 10, 1986, abandoned. This application Aug. 25, 1988, Ser. No. 238,968

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1985, 3500910

Int. Cl.<sup>5</sup> C07D 401/12

U.S. Cl. 546—265

8 Claims

1. A process for the preparation of 2-nitro-3-aminopyridine which comprises:

- (a) reacting 3-aminopyridine with phosgene (COCl<sub>2</sub>) or urea (H<sub>2</sub>NCONH<sub>2</sub>) to give N,N'-di-(3-pyridyl)-urea;  
(b) nitrating said N,N'-di-(3-pyridyl)-urea with a mixture of nitric acid and sulfuric acid in a ratio in which the nitric acid is acting as a nitration agent to give N,N'-di-(3-pyridyl)-urea and nitric acid in a molar ratio of 0.5 part of N,N'-di-(3-pyridyl)-urea to about 1 to 2 parts of nitric acid; and  
(c) hydrolyzing said N,N'-di-(2-nitro-3-pyridyl)-urea to give 2-nitro-3-aminopyridine.

4,952,698

## IMIDAZOLE DERIVATIVES

Helmut Biere; Andreas Huth; Dieter Rahtz; Ralph Schmichen; Dieter Seidelmann; Herbert H. Schneider, and David N. Stephens, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany  
PCT No. PCT/DE87/00342, § 371 Date Apr. 11, 1988, § 102(e)  
Date Apr. 11, 1988, PCT Pub. No. WO88/01268, PCT Pub. Date Feb. 25, 1988

PCT Filed Jul. 30, 1987, Ser. No. 189,511

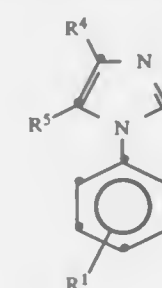
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1986, 3627155

Int. Cl.<sup>5</sup> C07D 233/90, 413/04

U.S. Cl. 548—131

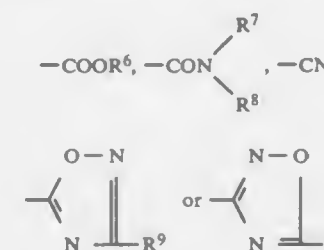
6 Claims

1. An imidazole of the formula



wherein

R<sup>1</sup> represents hydrogen or halogen in the o-, m- or p-position, and the halogen can occur once or repeatedly in the phenyl radical,  
R<sup>4</sup> represents



with R<sup>6</sup> and R<sup>9</sup> representing hydrogen or alkyl of 1 to 6 carbon atoms, R<sup>7</sup> and R<sup>8</sup> are the same or different and represent hydrogen or alkyl of 1 to 6 carbon atoms or R<sup>7</sup> and R<sup>8</sup> together with the nitrogen atom represent a saturated heterocyclic five-membered or six-membered ring optionally containing another heteroatom which is O or N, and

R<sup>5</sup> represents hydrogen, alkyl of 1 to 6 carbon atoms or C<sub>1</sub>-4-alkoxy-C<sub>1</sub>-4-alkyl.

4,952,699

## LIQUID-CRYSTALLINE, 2,5-DISUBSTITUTED, 1,3,4-THIAZAZOLES WITH EXTENDED SMECTIC C PHASES

Bak G Yong; Dietrich Demus; Horst Kresse; Annelore Mädicke, all of Halle; Gerhard Pelzl, Halle-Neustadt; Wolfgang Schäfer, Potsdam; Carsten Tschierske, and Horst Zschke, both of Halle, all of German Democratic Rep., assignors to VEB Werk fuer Fernsehelektronik im VEB Kombinat Mikroelektronik, Berlin, German Democratic Rep.

Filed Jun. 20, 1988, Ser. No. 209,400

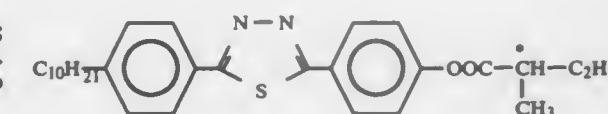
Claims priority, application German Democratic Rep., Jul. 1, 1987, 304402; Nov. 17, 1987, 309119

Int. Cl.<sup>5</sup> C07D 285/12, 285/14

U.S. Cl. 548—136

12 Claims

1. A liquid crystalline compound of the formula



4,952,700

## PREPARATION OF ISOXAZOLINES AND ISOXAZOLES

Sheldon B. Markofsky, Olney, and Steven A. Kothe, Baltimore, both of Md., assignors to W.R. Grace & Co.-Conn., New York, N.Y.

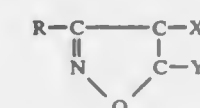
Filed Apr. 25, 1988, Ser. No. 185,657

Int. Cl.<sup>5</sup> C07D 261/04, 261/08, 261/12, 261/14

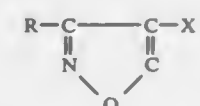
U.S. Cl. 548—240

26 Claims

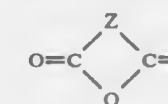
1. A process for forming a product selected from an isoxazoline having the formula:



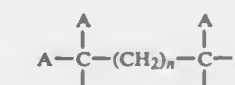
or an isoxazole of the formula:



by contacting a liquid solution of (1) a primary nitrocompound represented by the formula RCH<sub>2</sub>NO<sub>2</sub> in which R represents a C<sub>1</sub> to C<sub>20</sub> unsubstituted or substituted aliphatic hydrocarbon group or an unsubstituted or substituted phenyl group wherein said aliphatic substitution is selected from halogen, carboxylic acid esters and ethers and said phenyl substitution is selected from alkyl, halogen, carboxylic acid esters and nitro groups bonded directly on the ring, (2) a base selected from a tertiary amine, alkali metal hydroxide or alkali metal carbonate, (3) a cyclic orrganodicarboxylic acid anhydride, said acid anhydride represented by the formula



wherein Z is a divalent organic radical represented by



wherein each A independently represents hydrogen or lower alkyl or two of the A on different carbon atoms together represent a C<sub>4</sub>-alkylene group and n is an integer of 0 or 1; or Z represents a benzene ring in which two hydrogen atoms are removed from adjacent carbons, and (4) a dipolarophile selected from an olefin represented by the formula XCH=CHY to form compound I or an acetylene represented by the formula XC≡CY to form compound II wherein each X and Y independently represents a group which is inert to the reactants and the subject reaction; separating the formed isoxazoline (I) or isoxazole (II), respectively; and heating the remaining solution to remove water and reform the cyclic acid anhydride.

4,952,701

PREPARATION OF 4-AMINO-1,2,4-TRIAZOL-5-ONES  
Klaus-Helmut Müller, Duesseldorf; Klaus König, Odenthal, and  
Peter Heitkamp, Dormagen, all of Fed. Rep. of Germany,  
assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep.  
of Germany

Filed Dec. 15, 1988, Ser. No. 284,965

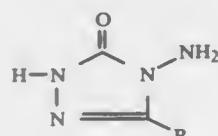
Claims priority, application Fed. Rep. of Germany, Dec. 22,  
1987, 3743493; Aug. 11, 1988, 3827264

Int. Cl.<sup>3</sup> C07D 249/12

U.S. Cl. 548—263.8

8 Claims

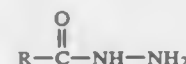
1. A process for the preparation of a 4-amino-1,2,4-triazol-  
5-one of the formula



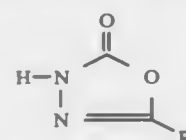
in which

R is alkyl,

comprising in a first step reacting phosgene with an acylhydra-  
zide of the formula



to produce an oxadiazolinone of the formula



and without isolation in a second step reacting the oxadiazoli-  
none with hydrazine hydrate.

4,952,702

PROCESS FOR THE PREPARATION OF  
(1,4-DIARYL-PYRAZOL-3-YL)-ACETIC ACIDS  
Luisa Saccarello, Milan, Italy, assignor to Seuref A.G., Vaduz,  
Liechtenstein

Filed Jul. 6, 1989, Ser. No. 376,398

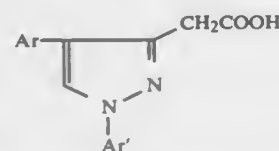
Claims priority, application Italy, Jul. 8, 1988, 21301 A/88

Int. Cl.<sup>3</sup> C07D 231/12

U.S. Cl. 548—378

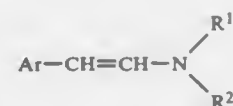
5 Claims

1. Process for the preparation of (1,4-diaryl-pyrazol-3-yl)-  
acetic acid of the formula I

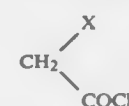


wherein Ar and Ar', which can be the same or different, repre-  
sent a phenyl group, optionally substituted with 1-3 halogen  
atoms, C<sub>1</sub>-C<sub>4</sub> alkyl groups or C<sub>1</sub>-C<sub>4</sub> alkoxy groups, which  
process comprises:

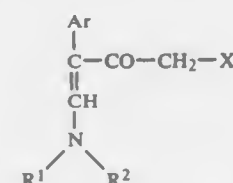
reacting 4-(β-styryl) amines of formula II



(wherein Ar is as above defined, whereas R<sup>1</sup> and R<sup>2</sup>,  
which can be the same or different, represent C<sub>1</sub>-C<sub>4</sub> alkyl  
group or, together with the N-atom, represent an hetero-  
cyclic group) with compounds of formula III



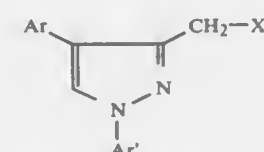
(wherein X represents a group selected from COOR,  
CONR<sup>3</sup>R<sup>4</sup> and CN, whereas R is an alkyl group or a  
benzyl or benzohydryl group and R<sup>3</sup> and R<sup>4</sup>, which can be  
the same or different, represent a hydrogen atom or an  
alkyl or a benzyl or benzohydryl group) to give intermedi-  
ates of



(wherein Ar and X have the above mentioned meanings);  
and condensing the enamine intermediates IV with an  
arylhydrazine of formula V



(wherein Ar' has the above mentioned meaning) to give  
pyrazole derivatives of formula VI.



(wherein Ar, Ar' and X are as above defined) which are  
finally hydrolyzed to the compounds of formula I.

4,952,703

INTERMEDIATES FOR MAKING  
2-OXINDOLE-1-CARBOXAMIDES  
Sarah E. Kelly, Mystic, Conn., assignor to Pfizer Inc., New  
York, N.Y.

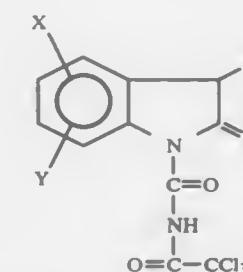
Filed May 25, 1989, Ser. No. 357,138

Int. Cl.<sup>3</sup> C07D 491/056, 209/42

U.S. Cl. 548—431

11 Claims

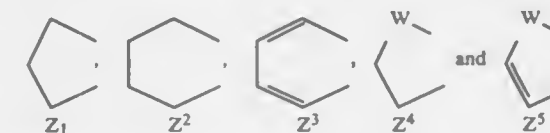
1. A compound of the formula (II)



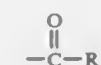
wherein

X is selected from the group consisting of hydrogen, fluoro,  
chloro, bromo, alkyl having 1 to 4 carbons, cycloalkyl  
having 3 to 7 carbons, alkoxy having 1 to 4 carbons,  
alkylthio having 1 to 4 carbons, trifluoromethyl, alkylsul-  
finyl having 1 to 4 carbons, alkylsulfonyl having 1 to 4  
carbons, nitro, phenyl, alkanoyl having 2 to 4 carbons,  
benzoyl, thenoyl, alkanamido having 2 to 4 carbons, ben-  
zamido and N,N-dialkylsulfamoyl having 1 to 3 carbons in  
each of said alkyls; and Y is selected from the group con-  
sisting of hydrogen, fluoro, chloro, bromo, alkyl having 1  
to 4 carbons, cycloalkyl having 3 to 7 carbons, alkoxy  
having 1 to 4 carbons, alkylthio having 1 to 4 carbons and  
trifluoromethyl;

or X and Y when taken together are a 4,5-, 5,6- or 6,7-methy-  
lenedioxy group or a 4,5-, 5,6- or 6,7-ethylenedioxy group;  
or X and Y when taken together and when attached to  
adjacent carbon atoms, form a divalent radical Z, wherein  
Z is selected from the groups consisting of



wherein W is oxygen or sulfur;  
R is hydrogen or



wherein

R<sup>1</sup> is selected from the group consisting of alkyl having 1 to  
6 carbons, cycloalkyl having 3 to 7 carbons, cycloalkenyl  
having 4 to 7 carbons, phenyl, substituted phenyl, phenyl-  
alkyl having 1 to 3 carbons in said alkyl, (substituted  
phenyl)alkyl having 1 to 3 carbons in said alkyl, phenoxy-  
alkyl having 1 to 3 carbons in said alkyl, (substituted phe-  
noxy)alkyl having 1 to 3 carbons in said alkyl, (thio-  
phenoxy)-alkyl having 1 to 3 carbons in said alkyl, naph-  
thyl, bicyclo[2,2,1]heptan-2-yl and bicyclo[2.2.1]hept-5-en-  
2-yl;

wherein the substituent on said substituted phenyl, said  
(substituted phenyl)alkyl and said (substituted phenoxy)al-  
kyl is selected from the group consisting of fluoro, chloro,  
bromo, alkyl having 1 to 4 carbons, alkoxy having 1 to 4  
carbons and

4,952,704

BIS-(PYRROLIDONYL ALKYLENE) BIGUANIDES  
John J. Merlanos, Middletown, N.J., assignor to GAF Chemi-  
cals Corporation, Wayne, N.J.

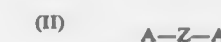
Filed May 12, 1989, Ser. No. 350,882

Int. Cl.<sup>3</sup> C01D 207/27; C07C 279/12, 277/02

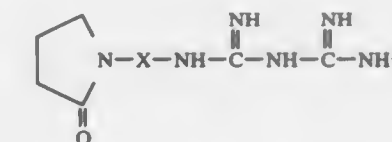
U.S. Cl. 548—519

12 Claims

1. Antimicrobial bis-(pyrrolidonyl alkylene) biguanides hav-  
ing the formula:



where  
A is:



X is a C<sub>2</sub> alkylene group, and  
Z is a hexamethylene, dodecamethylene or bis-(2-ethoxy)  
ethane bridging group, and  
acid addition salts thereof.

4,952,705

SUBSTITUTED DIHYDROBENZOPYRANS

Masateru Miyano, Northbrook; Robert L. Shone, Palatine, both  
of Ill., and Daniel D. Sohn, Uppsala, Sweden, assignors to G.  
D. Searle & Co., Chicago, Ill.

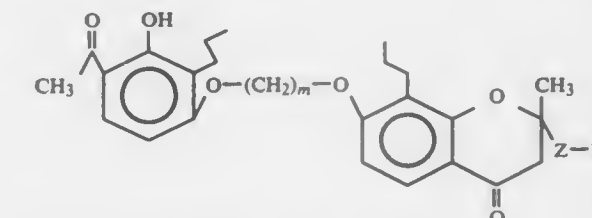
Division of Ser. No. 764,697, Aug. 12, 1985, Pat. No. 4,665,203,  
which is a division of Ser. No. 681,038, Dec. 12, 1984, Pat. No.  
4,778,903, which is a division of Ser. No. 560,355, Dec. 12, 1983,  
abandoned, which is a continuation-in-part of Ser. No. 520,973,  
Aug. 8, 1983, abandoned. This application Feb. 12, 1987, Ser.  
No. 13,807

Int. Cl.<sup>3</sup> C07D 311/22, 405/06

U.S. Cl. 548—525

9 Claims

1. A compound of the formula



wherein m is an integer of from 2 to 6 inclusive;  
wherein Z is —(CH<sub>2</sub>)<sub>n</sub>;  
wherein n is an integer of from 1 to 3 inclusive;  
wherein R<sub>4</sub> is

- (a) CO<sub>2</sub>H;
- (b) CO<sub>2</sub>R<sub>6</sub>, wherein R<sub>6</sub> is alkyl of 1 to 6 carbon atoms;
- (c) CONR<sub>7</sub>R<sub>8</sub>, wherein R<sub>7</sub> and R<sub>8</sub> are
  - (a) hydrogen;
  - (b) alkyl of 1 to 6 carbon atoms inclusive, R<sub>7</sub> and R<sub>8</sub> each  
being the same or different; or
  - (c) taken together to form a 5 or 6 member ring the balance  
of the members being carbon;

or the pharmacologically acceptable addition salts thereof.

4,952,706

DERIVATIVES OF 2-PYRROLIDONE-5-CARBOXYLIC  
ACID AND METHOD OF OBTAINING THEM

Hans-Peter Krimmer, Frankfurt, and Karlheinz Drauz, Freige-  
richt, both of Fed. Rep. of Germany, assignors to Degussa  
Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Ger-  
many

Filed Oct. 4, 1989, Ser. No. 417,089

Claims priority, application Fed. Rep. of Germany, Oct. 6,  
1988, 3833972

Int. Cl.<sup>3</sup> C07D 207/12

U.S. Cl. 548—534

3 Claims

3. A method of obtaining sodium L- or D-2-pyrrolidone-5-



carboxylate trihydrate comprising forming an aqueous solution of a member of the group consisting of sodium L-2-pyrrolidone-5-carboxylate, sodium D-2-pyrrolidone-5-carboxylate and mixtures of sodium D-2-pyrrolidone-5-carboxylate and sodium L-2-pyrrolidone-5-carboxylate containing at the most 15 mole % of the enantiomer whose trihydrate is not to be obtained, and adjusting (a) the concentration of the solution in a range between 40 and 73.65% by weight of said member of the group consisting of sodium L-2-pyrrolidone-5-carboxylate, sodium D-2-pyrrolidone-5-carboxylate and mixtures of sodium D-2-pyrrolidone-5-carboxylate and sodium L-2-pyrrolidone-5-carboxylate and (b) the temperature in a range between  $-20^{\circ}\text{C}$ . and  $+42^{\circ}\text{C}$ . so that at the resulting concentration and temperature the desired trihydrate is insoluble.

**4,952,707**  
**ENZYMATICALLY-CLEAVABLE**  
**CHEMILUMINESCENT FUSED POLYCYCLIC**  
**RING-CONTAINING 1,2-DIOXETANES**

Brooks Edwards, Cambridge; Irena Y. Bronstein, Newton; Allison A. Laird, Methuen, and John C. Voyta, North Reading, all of Mass., assignors to Tropix, Inc., Bedford, Mass.

Filed Jan. 30, 1988, Ser. No. 213,672  
 Int. Cl.<sup>5</sup> C07D 321/00; C07F 9/655

U.S. Cl. 549—221 18 Claims  
 1. An enzymatically cleavable chemiluminescent 1,2-dioxetane compound having the formula:

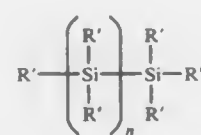


wherein  $R_1$  is hydrogen, or a bond when  $R_2$  is a substituent bound to the dioxetane ring through a spiro linkage, or an organic substituent that does not interfere with the production of light but satisfies the valence of the dioxetane ring carbon atom to which it is attached;  $R_2$  is a fused polycyclic ring-containing fluorophore moiety bound to the dioxetane ring through a single bond or a spiro linkage and having an enzymatically cleavable labile ring substituent containing a bond which, when cleaved, renders the polycyclic moiety electron-rich to in turn render the dioxetane compound decomposable to emit light, the enzymatically cleavable labile ring substituent's point of attachment to the fused polycyclic moiety, in relation to the fused polycyclic moiety's point of attachment to the dioxetane ring, being such that the total number of ring atoms separating these points of attachment, including the ring atoms at these points of attachment, is an odd whole number; and T is a stabilizing group that prevents the dioxetane compound from decomposing before the enzymatically cleavable labile ring substituent's bond is cleaved.

**4,952,708**  
**METHOD FOR PREPARING BIARYL COMPOUNDS**  
 Jonathan D. Rich, Rexford; Terry E. Krafft, Schenectady; Philip J. McDermott, Troy, all of N.Y., and Tony C. Chang, Ohta, Japan, assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 187,783, Apr. 29, 1988, abandoned. This application Apr. 3, 1989, Ser. No. 331,774  
 Int. Cl.<sup>5</sup> C07C 69/78; C07D 307/89

U.S. Cl. 549—241 27 Claims  
 1. A method for making biaryl compounds which comprises: (A) reacting, in an inert atmosphere, an aromatic acid halide having at least one strong electron-withdrawing group attached to or within the aromatic ring with at least one polysilane of the formula

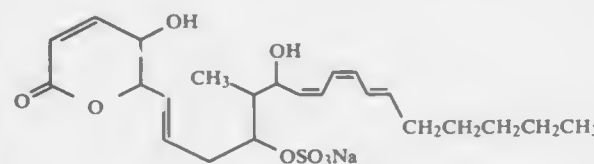


at a temperature of at least about  $145^{\circ}\text{C}$ ., in the presence of an aprotic nonpolar solvent and a catalytic amount of at least one transition metal complex, and (B) recovering a biaryl compound from the mixture resulting from step A; wherein each  $R'$  is independently selected from the group consisting of halogen, hydrogen, alkyl groups containing from about 1 to 10 carbon atoms, aromatic groups containing from about 6 to 20 carbon atoms, alkoxy groups containing from about 1 to 10 carbon atoms, and aryloxy groups containing from about 6 to 20 carbon atoms, and n is an integer in the range of about 1 to 50.

**4,952,709**  
**ANTITUMOR ANTIBIOTIC BU-3285T COMPOUNDS**  
 Hiroaki Ohkuma; Koji Tomita, both of Tokyo; Masataka Konishi, Kawasaki, and Hideo Kamel, Tokyo, all of Japan, assignors to Bristol Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 378,677, Jul. 12, 1989, abandoned. This application Nov. 3, 1989, Ser. No. 431,423  
 Int. Cl.<sup>5</sup> C07D 309/32

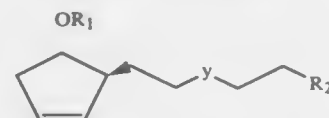
U.S. Cl. 549—292 2 Claims  
 1. The compound designated BU-3285T having the structural formula



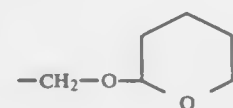
**4,952,710**  
**CYCLOPENTENEHEPTENOIC ACID DERIVATIVES**  
**AND METHOD OF PREPARATION THEREOF**  
 Kevin A. Babiak, Evanston, and Arthur L. Campbell, Glenview both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Oct. 7, 1988, Ser. No. 255,179  
 Int. Cl.<sup>5</sup> C07D 309/12

U.S. Cl. 549—416 3 Claims  
 1. A compound of the formula



wherein  $R_1$  is hydrogen,  $-\text{COCH}_3$ ,  $-\text{COCF}_3$ ,  $-\text{CO}$ -phenyl, or a hydroxyl protecting group selected from tetrahydropyranyl, tetrahydrofuranyl, or tri-lower alkylsilyl; wherein  $R_2$  is



wherein Y is a cis-vinylene, trans-vinylene, or acetylene.

**4,952,711**  
**CROSSLINKING OF (METH) ACRYLOXYALKENYLENE**  
**FUNCTIONAL SILOXANE PREPOLYMERS**

Anthony F. Jacobine, Meriden, and Steven T. Nakos, Andover, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Filed May 25, 1989, Ser. No. 357,053  
 Int. Cl.<sup>5</sup> C08F 2/46

U.S. Cl. 522—99 19 Claims  
 1. A composition curable to a solid crosslinked polyorganosiloxane comprising:

(a) an acrylic functional silicone prepolymer having a plurality of acrylic groups of the formula:



bound to silicon atoms thereof, where R is H or methyl, and  $R'$  is a divalent olefinically unsaturated hydrocarbon group, (b) a silicon prepolymer having a plurality of organothiol groups thereon, and (c) an effective amount thiol-ene cure catalyst.

**4,952,712**  
**PROCESS FOR THE PREPARATION OF**  
**2,3-DIMETHOXY-5-METHYLBENZOQUINONE**

Hideo Orita; Masao Shimizu; Takashi Hayakawa, and Katsuomi Takehira, all of Tsukuba, Japan, assignors to Director-General of Agency of Industrial Science and Technology, Japan  
 Filed Mar. 13, 1989, Ser. No. 322,416

Claims priority, application Japan, Jun. 13, 1988, 63-145099  
 Int. Cl.<sup>5</sup> C07C 46/10, 66/00

U.S. Cl. 552—307 11 Claims  
 1. A process for the preparation of 2,3-dimethoxy-5-methylbenzoquinone, comprising reacting 3,4,5-trimethoxytoluene with hydrogen peroxide, at a temperature of  $100^{\circ}\text{C}$ . or less, in the presence of a heteropolyacid selected from the group consisting of phosphomolybdic acids, phosphotungstic acids, silicomolybdic acids, silicotungstic acids and ammonium and alkali metal salts thereof.

**4,952,713**  
**BRIDGED TRANSITION-METAL COMPLEXES AND**  
**USES THEREOF FOR HYDROGEN SEPARATION,**  
**STORAGE AND HYDROGENATION**

Michael A. Lilga, and Richard T. Hallen, both of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Jun. 2, 1988, Ser. No. 202,097  
 Int. Cl.<sup>5</sup> C07F 7/02, 11/00, 15/02, 15/06

U.S. Cl. 556—60 5 Claims  
 1. Bridged transition metal complex dihydride compounds of the general formula



wherein:  $L_n$  and  $L'_n$  are ancillary ligands taken from the group consisting of CO and CNR, M and M' are transition metals taken from the group consisting of Cr, Fe, Mn and Co, Cp is the cyclopentadienyl group, R and R' are alkyl groups substituted for hydrogen on the Cp ring, m and m' represent integers from 0-4, n and n' represent integers from 1-6, and x is a bridging functionality taken from the group consisting of  $-\text{CH}_2-$ ,  $\text{SiR}_2$ ,  $-\text{O}-$ ,  $-\text{NR}-$  (R=alkyl) and  $-\text{CO}-$ .

**4,952,714**  
**NON-AQUEOUS PROCESS FOR THE PREPARATION OF**  
**ALUMOXANES**

Howard C. Welborn, Jr., Houston, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 210,881, Jun. 22, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,222  
 Int. Cl.<sup>5</sup> C07F 5/06

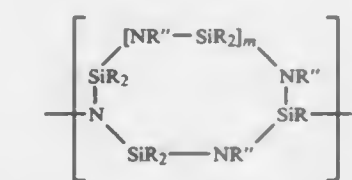
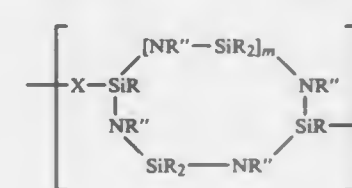
U.S. Cl. 556—179 6 Claims  
 1. A process for the preparation of a mixture of linear and cyclic hydrocarbylalumoxane which comprises adding a hydrocarbon solution containing trihydrocarbylboroxine to a hydrocarbon solution containing hydrocarbylaluminum and recovering the alumoxane.

**4,952,715**  
**POLYSILAZANES AND RELATED COMPOSITIONS,**  
**PROCESSES AND USES**

Yigal D. Blum, Menlo Park, Calif., and Edward J. Crawford, Danbury, Conn., assignors to SRI International, Menlo Park, Calif.

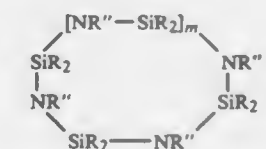
Continuation-in-part of Ser. No. 12,871, Dec. 1, 1986, which is a continuation-in-part of Ser. No. 908,685, Mar. 4, 1986, Pat. No. 4,788,300, which is a continuation-in-part of Ser. No. 727,415, Apr. 26, 1985, Pat. No. 4,612,383. This application Apr. 4, 1988, Ser. No. 176,824  
 Int. Cl.<sup>5</sup> C07F 7/10

U.S. Cl. 556—409 20 Claims  
 1. A method of making a polysilazane having n recurring units of the structures (I) or (II) or both



where m is O or an integer, n is an integer greater than 1, the R substituents may be the same or different and are selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, silyl, aryl, and amino, unsubstituted or substituted with 1 or 2 lower alkyl groups, X is  $-\text{NR}'-$  or  $-\text{NR}'-\text{Y}-\text{NR}'-$  where Y is an optional linking group which, if present, is lower alkyl or silyl, and the R' and R'' may be the same or different and are independently selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, silyl and aryl, wherein the method comprises

(a) providing a silazane precursor having one or more units of the formula



wherein the precursor contains either (i) at least one N—H bond and at least one Si—H bond, or (ii) at least two Si—H bonds, or both; and

(b) reacting the precursor in the presence of a transition metal catalyst.

4,952,716

## ETHYNYLCYCLOHEXENE COMPOUNDS

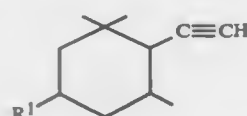
Teodor Lukac, Aesch, Switzerland, and Milan Soukup, Passaic, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 4, 1988, Ser. No. 164,304

Claims priority, application Switzerland, Mar. 27, 1987, 1191/87

Int. Cl.<sup>3</sup> C07F 7/18; C07C 31/00, 43/00; C07D 309/18  
U.S. Cl. 556—482

1. A compound of the formula



wherein R<sub>1</sub> is selected from the groups consisting of a hydroxy group and an etherified hydroxy group.

4,952,717

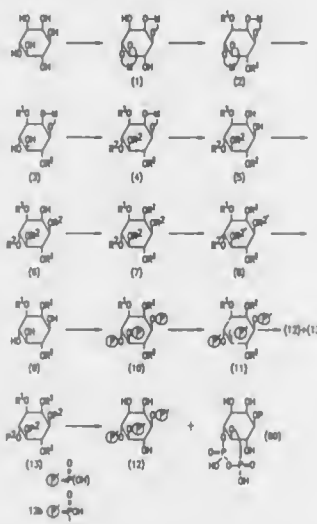
## MYOINOSITOL DERIVATIVES AND PREPARATION THEREOF

Shoichi Ozaki, Yutaka Watanabe, both of Matsuyama; Akira Aways, and Yusaku Ishizuka, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

PCT No. PCT/JP87/00149, § 371 Date Oct. 20, 1987, § 102(e) Date Oct. 20, 1987, PCT Pub. No. WO87/05598, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 11, 1987, Ser. No. 131,049  
Claims priority, application Japan, Mar. 11, 1986, 61-051325; Mar. 11, 1986, 61-051326; Sep. 3, 1986, 61-205895; Mar. 10, 1987, 61-053062

Int. Cl.<sup>3</sup> C07C 43/00; C07F 9/00  
U.S. Cl. 558—155



1. A process for the preparation of a myoinositol derivative, which comprises causing a phosphorylating agent in an amount sufficient to effect phosphorylation to act on a myoinositol derivative substituted with catalytic reduction removable substituent groups at positions, which are other than positions desired to be substituted by phosphoric acid residual groups, for a time and a temperature sufficient to effect phosphoryla-

tion, and then catalytically reducing the thus-phosphorylated myoinositol derivative.

4,952,718

## REDUCTION OF CYANOHYDRINS

Barbara C. Stahly, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 14, 1988, Ser. No. 271,225

Int. Cl.<sup>3</sup> C07C 253/30

U.S. Cl. 558—388

1. A process for preparing a arylacetonitrile of the formula ArCH(R)CN wherein Ar is phenyl, 3-phenoxyphenyl, 4-alkylphenyl where the alkyl group has 1 to 5 carbon atoms, naphthyl or 6-alkoxynaphthyl where the alkoxy group has 1 to 5 carbon atoms and R is hydrogen or an alkyl group having 1 to 20 carbon atoms which comprises reducing a cyanohydrin of the formula ArC(R)(OH)CN where Ar and R are as previously defined with phosphorus pentasulfide, the amount of said phosphorus pentasulfide being about 0.2 to 1.1 mole per mole of said cyanohydrin in an inert solvent having a boiling point of 50° to 150° C.

4,952,719

## PROCESS FOR THE PREPARATION OF HALO AROMATIC COMPOUNDS

James J. Maul, Grand Island, and David Y. Tang, East Amherst, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 825,505, Feb. 3, 1985, abandoned, which is a continuation-in-part of Ser. No. 660,765, Oct. 15, 1984, Pat. No. 4,590,315. This application Jan. 27, 1989, Ser. No. 303,862

Int. Cl.<sup>3</sup> C07C 121/52

U.S. Cl. 558—425

1. A process for the preparation of 3-chloro-4,5-difluorobenzonitrile which comprises the steps of  
(a) reacting an alkali metal fluoride with 4-chloro-3,5-dinitrobenzonitrile at a temperature of from about 50° to about 300° Celsius to form 4-fluoro-3,5-dinitrobenzonitrile;  
(b) chlorodenitrating the 4-fluoro-3,5-dinitro product of step (a) to form 3,5-dichloro-4-fluorobenzonitrile; and  
(c) reacting the 3,5-dichloro-4-fluorobenzonitrile compound prepared in step (b) at a temperature of from about 50° to about 300° Celsius with an alkali metal fluoride to form 3-chloro-4,5-difluorobenzonitrile.  
9. A process for the preparation of 3-chloro-4,5-difluorobenzonitrile which comprises reacting 3,5-dichloro-4-fluorobenzonitrile with an alkali metal fluoride at a temperature of from about 50° to about 300° Celsius.

4,952,720

## ORTHO-SUBSTITUTED BENZYL CARBOXYLATES AND FUNGICIDES WHICH CONTAIN THESE COMPOUNDS

Franz Schuetz, Ludwigshafen; Hubert Sauter, Mannheim; Ulrich Schirmer, Heidelberg; Bernd Wolf, Mutterstadt; Eberhard Ammermann, Ludwigshafen, and Ernst-Heinrich Pommer, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

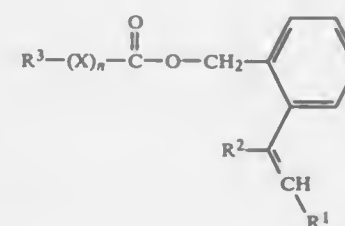
Filed Oct. 7, 1988, Ser. No. 254,696

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1987, 3733870

Int. Cl.<sup>3</sup> C07C 69/76

U.S. Cl. 560—106

1. Ortho-substituted benzyl carboxylate of the general formula



where

R<sup>1</sup> is C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-alkylthio, halogen or amino which is unsubstituted or mono- or disubstituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, R<sup>2</sup> is C<sub>1</sub>-C<sub>4</sub>-alkoxycarbonyl, cyano or the group CONH<sub>2</sub>, R<sup>3</sup> is hydrogen, halogen, cyano, aryl, aryloxy, the aromatic ring being unsubstituted or substituted by one or more of the following radicals: C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>4</sub>-alkenyl, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, aryl, aryl-C<sub>1</sub>-C<sub>2</sub>-alkyl, aryloxy, aryloxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, aryloxy-C<sub>1</sub>-C<sub>4</sub>-alkoxy, haloaryloxy-C<sub>1</sub>-C<sub>4</sub>-alkoxy, halogen, halo-C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-alkylthio, thiocyanato, cyano or nitro; or R<sup>3</sup> is a furyl or pyrrolyl radical, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, C<sub>5</sub>-C<sub>6</sub>-cycloalkenyl, adamantyl, fluorenyl or a substituted cyclopropyl radical which is substituted by methyl, halogen, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>3</sub>-C<sub>4</sub>-alkenyl, C<sub>2</sub>-C<sub>4</sub>-haloalkenyl, methoxycarbonyl-C<sub>3</sub>-C<sub>4</sub>-alkenyl, cyclopentylidenemethyl, phenyl, halophenyl, C<sub>1</sub>-C<sub>2</sub>-alkoxyphenyl or C<sub>1</sub>-C<sub>4</sub>-alkylphenyl, X is saturated or unsaturated C<sub>1</sub>-C<sub>12</sub>-alkylene which is unsubstituted or substituted by halogen or hydroxy, and n is 0 or 1.

4,952,721

## PROCESS FOR OXIDIZING ESTERS OF METHYL-SUBSTITUTED PHENOL COMPOUNDS TO AROMATIC CARBOXYLIC ACIDS

Kristi A. Fjare, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 156,708, Feb. 17, 1988, abandoned, which is a continuation-in-part of Ser. No. 16,679, Feb. 19, 1987, abandoned. This application Mar. 8, 1989, Ser. No. 389,274

Int. Cl.<sup>3</sup> C07C 51/215, 67/39

U.S. Cl. 560—131

1. A liquid-phase process for oxidation of an ester of a para- or meta-methyl-substituted phenol selected from the group consisting of a p-cresol, m-cresol, 3,4-dimethylphenol, 3,5-dimethylphenol and 3,4,5-trimethylphenol to oxidize the methyl groups on the phenol ester to carboxylic acid groups to the corresponding aromatic carboxylic or polycarboxylic acid which process comprises:

(a) oxidation of said ester with a source of molecular oxygen comprising air in the presence of a catalyst comprising heavy metals selected from the group consisting of cobalt and manganese, and cobalt, manganese and zirconium, in a solvent comprising a lower aliphatic carboxylic acid selected from the group consisting of acetic acid and propionic acid and in the presence of a promoter consisting essentially of an acid anhydride of a lower aliphatic carboxylic acid selected from the group consisting of acetic anhydride and propionic anhydride, at a temperature within the range of from about 200° F. to about 400° F., and at a pressure of from about 1.0 atmospheres to about 30 atmospheres, and  
(b) said promoter is present as an initial reactor charge in a mole ratio to said ester of at least 1.0:1 but less than 2.9:1, and  
(c) said promoter is added to said reactor charge during said oxidation in an amount of from 0.5:1 to 1.6:1 moles per mole of said ester wherein total of said initial charge plus

addition of said promoter is from about 1.5:1 to 3.0:1 moles promoter to said ester.

4,952,722

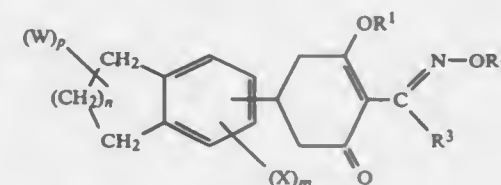
## COMPOUNDS AND COMPOSITIONS

Alexander Serban, Doncaster; Keith G. Watson, Victoria; Graham J. Bird, North Melbourne; Graeme J. Farquharson, Reservoir, and Lindsay E. Cross, Maribyrnong, all of Australia, assignors to ICI Australia Limited, Melbourne, Australia  
Filed Jan. 26, 1983, Ser. No. 461,003

Int. Cl.<sup>3</sup> C07C 67/02

U.S. Cl. 560—250

1. A compound of formula I



wherein:

W, which may be the same or different, are selected from the group consisting of C<sub>1</sub> to C<sub>8</sub> alkyl, C<sub>2</sub> to C<sub>6</sub> alkenyl and C<sub>2</sub> to C<sub>6</sub> alkynyl;  
X, which may be the same or different, are selected from the group consisting of: halogen, nitro; cyano; C<sub>1</sub> to C<sub>6</sub> alkyl; C<sub>1</sub> to C<sub>6</sub> alkyl substituted with a substituent selected from the group consisting of halogen, nitro, C<sub>1</sub> to C<sub>6</sub> alkoxy; C<sub>2</sub> to C<sub>6</sub> alkenyl; C<sub>2</sub> to C<sub>6</sub> alkynyl; hydroxy; C<sub>1</sub> to C<sub>6</sub> alkoxy; C<sub>1</sub> to C<sub>6</sub> alkoxy substituted with a substituent selected from halogen and C<sub>1</sub> to C<sub>6</sub> alkoxy; C<sub>2</sub> to C<sub>6</sub> alkanoyloxy; (C<sub>1</sub> to C<sub>6</sub> alkoxy)carbonyl; C<sub>1</sub> to C<sub>6</sub> alkylthio; C<sub>1</sub> to C<sub>6</sub> alkylsulfonyl; C<sub>1</sub> to C<sub>6</sub> alkylsulfonyle; sulfamoyl; N-(C<sub>1</sub> to C<sub>6</sub> alkyl)sulfamoyl; N,N-di(C<sub>1</sub> to C<sub>6</sub> alkyl)sulfamoyl;

benzyloxy; substituted benzyloxy wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy and C<sub>1</sub> to C<sub>6</sub> haloalkyl; the group NR<sup>8</sup>R<sup>9</sup> wherein R<sup>8</sup> and R<sup>9</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>2</sub> to C<sub>6</sub> alkanoyl, benzoyl and benzyl; the groups formyl and C<sub>2</sub> to C<sub>6</sub> alkanoyl; the group —C(R<sup>10</sup>)=NR<sup>11</sup> wherein R<sup>10</sup> is selected from hydrogen and C<sub>1</sub> to C<sub>6</sub> alkyl and R<sup>11</sup> is selected from the group consisting of hydrogen, C<sub>1</sub> to C<sub>6</sub> alkyl, phenyl, benzyl, hydroxy, C<sub>1</sub> to C<sub>6</sub> alkoxy, phenoxy and benzyloxy; and the group —(CH<sub>2</sub>)<sub>q</sub>— which bridges two adjacent carbon atoms of the benzene ring and wherein q is an integer selected from 2 to 5;

R<sup>1</sup> is selected from the group consisting of: hydrogen; C<sub>1</sub> to C<sub>6</sub> alkyl; C<sub>2</sub> to C<sub>6</sub> alkenyl; C<sub>2</sub> to C<sub>6</sub> alkynyl; substituted C<sub>1</sub> to C<sub>6</sub> alkyl wherein the alkyl group is substituted with a substituent selected from the group consisting of C<sub>1</sub> to C<sub>6</sub> alkoxy, C<sub>1</sub> to C<sub>6</sub> alkylthio, phenyl and substituted phenyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, cyano, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy and C<sub>1</sub> to C<sub>6</sub> alkylthio; C<sub>1</sub> to C<sub>6</sub> (alkyl)sulfonyl; benzenesulfonyl; substituted benzenesulfonyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, cyano, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy and C<sub>1</sub> to C<sub>6</sub> alkylthio; C<sub>2</sub> to C<sub>6</sub> alkanoyl; benzoyl and substituted benzoyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, cyano, C<sub>1</sub> to C<sub>6</sub> alkyl, C<sub>1</sub> to C<sub>6</sub> haloalkyl, C<sub>1</sub> to C<sub>6</sub> alkoxy and C<sub>1</sub> to C<sub>6</sub> alkylthio; 2-furoyl; 3-furoyl; 2-thenoyl; 3-thenoyl; and an inorganic or an organic cation selected from the alkali metal ions, the alkaline earth metal ions, transition-metal ions and the ammonium ion R<sup>4</sup>R<sup>5</sup>R<sup>6</sup>R<sup>7</sup>N<sup>+</sup> wherein R<sup>4</sup>,



$R^5$ ,  $R^6$  and  $R^7$  are independently selected from the group consisting of: hydrogen;  $C_1$  to  $C_{10}$  alkyl; substituted  $C_1$  to  $C_{10}$  alkyl wherein the alkyl group is substituted with a substituent selected from the group consisting of hydroxy, halogen and  $C_1$  to  $C_6$  alkoxy; phenyl; benzyl; and the groups substituted phenyl and substituted benzyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, cyano,  $C_1$  to  $C_6$  alkyl,  $C_1$  to  $C_6$  haloalkyl,  $C_1$  to  $C_6$  alkoxy and  $C_1$  to  $C_6$  alkylthio;

$R^2$  is selected from the group consisting of:  $C_1$  to  $C_6$  alkyl;  $C_2$  to  $C_6$  alkenyl;  $C_2$  to  $C_6$  haloalkenyl;  $C_2$  to  $C_6$  alkynyl;  $C_2$  to  $C_6$  haloalkynyl; substituted  $C_1$  to  $C_6$  alkyl wherein the alkyl group is substituted with a substituent selected from the group consisting of halogen,  $C_1$  to  $C_6$  alkoxy,  $C_1$  to  $C_6$  alkylthio, phenyl and substituted phenyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, nitro, cyano,  $C_1$  to  $C_6$  alkyl,  $C_1$  to  $C_6$  haloalkyl,  $C_1$  to  $C_6$  alkoxy and  $C_1$  to  $C_6$  alkylthio;

$R^3$  is selected from the group consisting of:  $C_1$  to  $C_6$  alkyl;  $C_1$  to  $C_6$  fluoroalkyl;  $C_2$  to  $C_6$  alkenyl;  $C_2$  to  $C_6$  alkynyl; and phenyl;

p is zero or an integer selected from 1 to 4;

n is zero or an integer selected from 1 to 3; and

m is zero or an integer selected from 1 to 3 provided that, when X is  $-(CH_2)_q-$  m is 1.

4,952,723

# PROCESS FOR PRODUCING N-PHOSPHONOMETHYLGLYCINE

Donald L. Fields, Jr., Manchester; Raymond C. Grabiak, Maryland Heights, and Dennis P. Riley, Ballwin, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

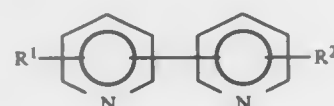
Filed Jul. 31, 1989, Ser. No. 386,738

Int. Cl.<sup>5</sup> C07F 9/38

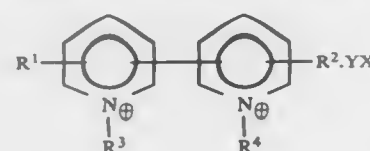
U.S. Cl. 562-17

25 Claims

1. A process for the production of N-phosphonomethylglycine comprising contacting N-phosphonomethyliminodiacetic acid with a molecular oxygen-containing gas in the presence of a catalyst selected from the group consisting of the salts and salt complexes of manganese, cobalt, iron, nickel, chromium, ruthenium, aluminum, molybdenum, vanadium and cerium, and an effective amount of a dipyriddy compound represented by the formula:



wherein  $R^1$  and  $R^2$  are independently selected from the group consisting of hydrogen, alkyl having from one to about 18 carbon atoms, ortho-phenylene, oxygen, sulfur,  $SO_2$ ,  $SO_3$ ,  $N-R^5$  wherein  $R^5$  is alkyl having from one to six carbon atoms and  $R^1$  and  $R^2$  together can form a bridge with groups selected from alkylene having from one to about six carbon atoms wherein the alkylene bridge can contain branching or double bonds; or salts thereof represented by the formula



wherein  $R^1$  and  $R^2$  are as defined above, Y is one or two depending on whether X is a dianion or a monoanion, and X is selected from the group consisting of halide, sulfate and nitrate, phosphate, and perchlorate; and  $R^3$  and  $R^4$  are individually selected from the group consisting of hydrogen or alkyl

having from one to about 18 carbon atoms, and  $R^3$  and  $R^4$  together can form a bridge with groups selected from alkylene having from one to about six carbon atoms wherein the alkylene bridge can contain branching or double bonds.

4,952,724

# PROCESS FOR PREPARATION OF ALPHA-ARYLOXY ACETIC ACIDS AND THEIR SALTS

Arthur L. Campbell, Glenview; Richard A. Mueller, Glenview; John S. Ng, Chicago, and Richard A. Partis, Evanston, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

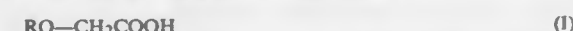
Filed Dec. 8, 1989, Ser. No. 447,740

Int. Cl.<sup>5</sup> C07C 59/48, 62/06, 59/90

U.S. Cl. 562-471

9 Claims

1. A process for preparing a compound of the formula



or a salt thereof, wherein R is aryl or substituted aryl having one or more substituents selected from the group consisting of straight or branched chain alkyl, alkoxy, alkoxyalkyl, halo, phenyl, substituted phenyl, hydroxy, and 2-methylene-1 oxobutyl; which comprises:

(a) reacting a compound of the formula



wherein R is defined as hereinbefore with a base in an aprotic organic solvent to form an aryloxide;  
(b) removing the organic solvent;  
(c) reacting the aryloxide with a salt of a monohaloacetic acid in an aprotic polar solvent to give an aryloxyacetate salt; and  
(d) optionally reacting the aryloxyacetate salt with an acid.

4,952,725

# PROCESS FOR THE PREPARATION OF 4,4'-DINITROSTILBENE-2,2'-DISULFONIC ACID AND ITS SALTS

Richard B. Land, Jackson; Wesley W. McConnell, Saraland, and Sam G. Ladd, Mobile, all of Ala., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 8, 1988, Ser. No. 165,648

Int. Cl.<sup>5</sup> C07C 143/24

U.S. Cl. 562-60

27 Claims

1. A process for the oxidation of 4-nitrotoluene-2-sulfonic acid to 4,4'-dinitrostilbene-2,2'-disulfonic acid which comprises gradually adding a solution or dispersion of 0.05 to 0.9 equivalents of an alkali metal hydroxide or alkoxide to a solution of an alkali metal salt of 4-nitrotoluene-2-sulfonic acid in dimethylsulfoxide as solvent, in the presence of a catalytically effective amount of a transition metal organic or inorganic salt, oxide or hydroxide while continuously saturating said solution with oxygen until the oxidation is essentially complete.

4,952,726

# PHENYLSULFONYL ISOCYANATES AND THIOISOCYANATES

Willy Meyer, Riehen, and Konrad Oertle, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 179,339, Apr. 8, 1988, Pat. No. 4,908,467, which is a division of Ser. No. 30,529, Mar. 27, 1987, Pat. No. 4,759,793, which is a division of Ser. No. 810,010, Dec. 17, 1985, Pat. No. 4,671,819, which is a continuation of Ser. No. 717,639, Mar. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 590,928, Mar. 19, 1984, abandoned. This application Nov. 21, 1989, Ser. No. 440,004

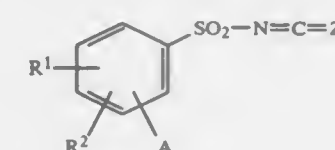
Claims priority, application Switzerland, Mar. 28, 1983, 1677/83; Aug. 11, 1983, 4393/83

Int. Cl.<sup>5</sup> C07C 303/00, 255/00, 307/00, 143/00

U.S. Cl. 562-870

2 Claims

1. A phenylsulfonylisocyanate or -isothiocyanate of the formula IV



wherein

A is 3,3,3-trifluoropropyl or 3,3-difluorobutyl,

$R^1$  is hydrogen, halogen, nitro, cyano,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_4$ -alkylthio,  $C_1$ - $C_4$ -alkylsulfinyl,  $C_1$ - $C_4$ -alkylsulfonyl,  $-CO-R^6$ ,  $-NR^7R^8$ ,  $-CO-NR^9R^{10}$  or  $-SO_2-NR^{11}R^{12}$ ,

$R^2$  is hydrogen, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_4$ -alkylthio,  $C_1$ - $C_4$ -alkylsulfinyl or  $C_1$ - $C_4$ -alkylsulfonyl,  $R^6$  is  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_4$ -haloalkoxy,  $C_1$ - $C_4$ -alkylthio,  $C_2$ - $C_6$ -alkoxyalkoxy, hydrogen,  $C_1$ - $C_4$ -alkyl or  $C_1$ - $C_4$ -haloalkyl,

$R^7$ ,  $R^8$ ,  $R^9$ ,  $R^{10}$ ,  $R^{11}$  and  $R^{12}$  independently of one another are each hydrogen or  $C_1$ - $C_4$ -alkyl and Z is oxygen or sulfur.

4,952,727

# PROCESS FOR THE PREPARATION OF MONOCARBOXYLIC ANHYDRIDES

Gerhard Luft, Mühlthal, and Peter Trabold, Dieburg, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Hurt Knapsack, Fed. Rep. of Germany

Filed May 3, 1989, Ser. No. 318,679

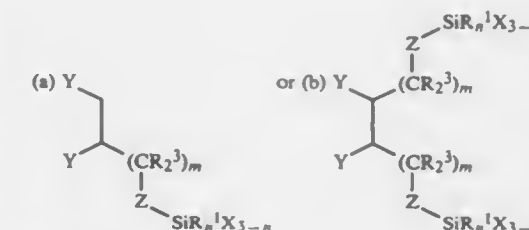
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808867

Int. Cl.<sup>5</sup> C07C 51/51

U.S. Cl. 562-891

17 Claims

1. A process for the preparation of a monocarboxylic anhydride of the formula  $(RCO)_2O$  by reacting a carboxylic acid ester or dialkyl ether of the formula  $RCOOR$  or  $ROR$ , where R in each case denotes the same alkyl radical having 1 to 4 carbon atoms, with carbon monoxide in the gas phase in the presence of iodine or bromine or an iodine or bromine compound, and in the presence of a supported catalyst, at a temperature of from 130° to 400° C. and a pressure of from 1 to 150 bar, where, in the supported catalyst, a chelate-forming organosilicon compound is bonded both to a support material and to a noble-metal compound from group VIII of the Periodic Table, said organosilicon compound being of the formula



where

X = Cl, Br or OR<sup>2</sup>;

Y = NR<sup>4</sup>, a nitrogen-containing aryl radical, PR<sup>4</sup>, AsR<sup>4</sup>, SR<sup>4</sup> or SH;

Z = arylene or phenylene, or Z is a direct bond, in which case the Si is bonded directly to CR<sup>2</sup>;

R<sup>1</sup> = C<sub>1</sub> to C<sub>3</sub>-alkyl;

R<sup>2</sup> = C<sub>1</sub> to C<sub>5</sub>-alkyl or -C<sub>6</sub>H<sub>5</sub>;

R<sup>3</sup> = H or C<sub>1</sub> to C<sub>3</sub>-alkyl;

R<sup>4</sup> = C<sub>1</sub> to C<sub>6</sub>-alkyl, C<sub>5</sub> or C<sub>6</sub>-cycloalkyl or -C<sub>6</sub>H<sub>5</sub> or -CH<sub>2</sub>C<sub>6</sub>H<sub>5</sub>;

n = 0 or 1 or 2;

m = 2 to 6.

4,952,728

# PROCESS FOR PREPARATION OF DERIVATIVES OF PHOSPHINOUS ACID AND INTERMEDIATE PRODUCT USED TO THAT EFFECT

Sylvain Juge, Orsay, and Jean-Pierre Genet, Fontenay-Aux-Roses, both of France, assignors to Societe Nationale Elf Aquitaine, France

Filed Aug. 26, 1987, Ser. No. 89,592

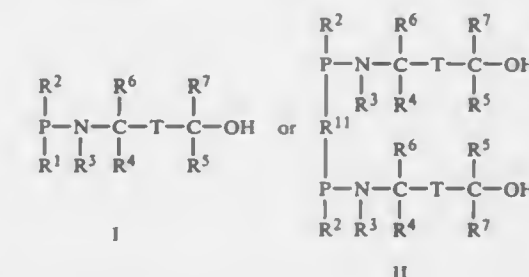
Claims priority, application France, Aug. 27, 1986, 86 12115

Int. Cl.<sup>5</sup> C07F 9/02

U.S. Cl. 564-12

12 Claims

1. A phosphine of the formula



in which the groups  $R^1$  to  $R^7$  are individually selected from the group consisting of hydrogen and 1 to 18 carbon atom alkyl, alkenyl, cycloalkyl and phenyl groups, T is alkylene, arylene or a bond and  $R^{11}$  is a 1 to 18 carbon alkylene, alkenylene, cycloalkylene or phenylene group.

4,952,729

# INTERMEDIATES IN THE PREPARATION OF ALPHA((1,1-DIMETHYLETHYL) AMINO) METHYL-4-HYDROXY-1,3-BENZENEDIMETHANOL

Esther Babad, West Orange; Nicholas Carruthers, Springfield, and Martin Steinman, Livingston, all of N.J., assignors to Schering-Plough Corp., Kenilworth, N.J.

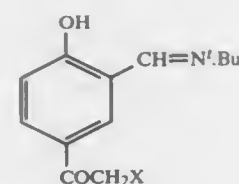
Division of Ser. No. 903,813, Sep. 5, 1986, abandoned. This application Nov. 3, 1989, Ser. No. 431,264

Int. Cl.<sup>5</sup> C07C 251/24

U.S. Cl. 564-274

3 Claims

1. The compound of the formula



wherein X is bromo or chloro

4,952,730

**PROCESS FOR INVERTING THE CONFIGURATION OF OPTICALLY ACTIVE COMPOUNDS, AND OPTICALLY ACTIVE INTERMEDIATES PRODUCED IN THIS PROCESS**

Hans-Jürgen Leuchs, Bad Soden am Taunus; Werner Mohler, Hofheim am Taunus, and Hanns-Eberhard Ertle, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 519,746, Aug. 2, 1983, abandoned. This application May 27, 1986, Ser. No. 868,889

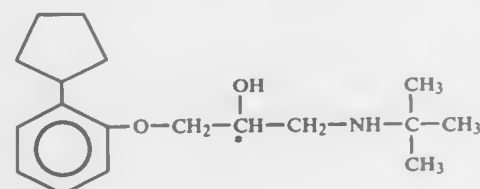
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1982, 3229046

Int. Cl.<sup>5</sup> C07C 82/00; C07D 263/12

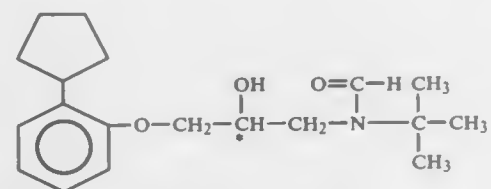
U.S. Cl. 564—302

4 Claims

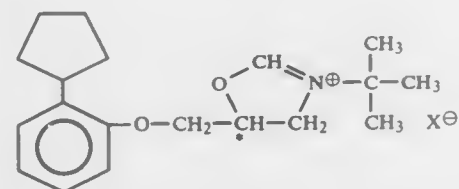
1. A process for inverting the configuration at the optically active carbon atom (\*) in a compound of the formula I



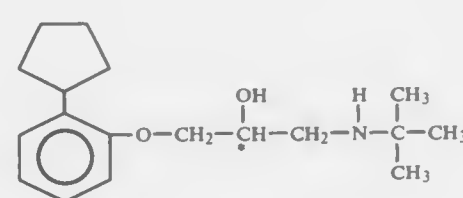
which comprises converting this compound by formylation into optically active compounds of the formula II



while maintaining the configuration at the carbon atom (\*), converting this compound, by treatment with a strong acid or an acid halide, into optically active cyclic compounds of the formula III



in which X<sup>⊖</sup> represents the anion of a strong acid or a halogen atom, and converting these oxazolinium derivatives (III), by acid or alkyl hydrolysis into the optically active compound of the formula IV



possessing the same structure as the starting material I, but having an opposite configuration at the carbon atom (\*).

4,952,731

**PROCESS FOR PRODUCING DIPHENYLAMINES OR N,N'-DIPHENYL-PHENYLENEDIAMINES**

Teruyuki Nagata; Akihiro Tamaki; Nobuyuki Kajimoto, and Masaru Wada, all of Ohmura, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Continuation of Ser. No. 80,440, Jul. 31, 1987, Pat. No. 4,804,783, which is a continuation of Ser. No. 903,427, Sep. 4, 1986, abandoned, which is a division of Ser. No. 710,662, Mar. 12, 1985, abandoned. This application Aug. 15, 1988, Ser. No. 232,011

Claims priority, application Japan, Mar. 14, 1984, 59-47119; Mar. 27, 1984, 59-57339; Jul. 6, 1984, 59-13889

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.<sup>5</sup> C07C 85/06

U.S. Cl. 564—402

4 Claims

1. A process for producing a N,N'-diphenylphenylenediamine, which comprises heat-reacting p-phenylenediamine with an excess of phenol or 3,5-dimethylphenol, said reaction being carried out in the presence of a hydrogen transfer catalyst and at least 0.5 mole per mole of the p-phenylenediamine of cyclohexanone corresponding to said phenol or 3,5-dimethylphenol, and said phenol being used in an excess of 4 to 20 moles per mole of said p-phenylenediamine.

4,952,732

**MANNICH CONDENSATES OF A SUBSTITUTED PHENOL AND AN ALKYLAMINE CONTAINING INTERNAL ALKOXY GROUPS**

George P. Speranza, Austin; Robert A. Grigsby, Jr., Georgetown, and Ernest L. Yeakey, Austin, all of Tex., assignors to Texaco Inc., White Plains, N.Y.

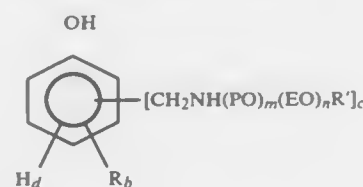
Filed Jun. 15, 1984, Ser. No. 621,332

Int. Cl.<sup>5</sup> C07C 91/30

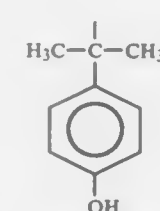
U.S. Cl. 564—390

13 Claims

1. A compound having the formula:



where b equals 0 to 2, c equals 1 to 2, d equals 2 to 4; and wherein:  
R represents an alkyl group containing 1 to 20 carbon atoms, and when b equals 1 and is in the para position, may also represent a group having the formula:



R' represents an alkyl group containing 1 to 20 carbon atoms;

PO represents an oxypropyl group;

EO represents an oxyethyl group;

m is a number having a value of 1-50; and

n is a number having a value of 0 to 50.

4,952,733

**PREPARATION OF 1,3,5-TRIAMINO-2,4,6-TRINITROBENZENE FROM 3,5-DICHLORANISOLE**

Donald G. Ott, Los Alamos, and Theodore M. Benziger, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 21, 1988, Ser. No. 289,653

Int. Cl.<sup>5</sup> C07C 209/10, 43/205, 205/06

U.S. Cl. 564—406

4 Claims

1. A method of preparing 1,3,5-triamino-2,4,6-trinitrobenzene from 3,5-dichloroanisole, comprising the steps of:  
a. nitrating 3,5-dichloroanisole to produce 3,5-dichloro-2,4,6-trinitroanisole;  
b. chlorinating the 3,5-dichloro-2,4,6-trinitroanisole so produced to yield 1,3,5-trichloro-2,4,6-trinitrobenzene; and  
c. ammonolyzing the 1,3,5-trichloro-2,4,6-trinitrobenzene.

4,952,734

**PROCESS FOR THE PREPARATION OF METHYLAMINES**

Jürgen Weber, Oberhausen; Detlef Kampmann, Bochum, and Claus Kniep, Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst AG Werk Ruhrchemie, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,633

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721539

Int. Cl.<sup>5</sup> C07C 85/02

U.S. Cl. 564—471

19 Claims

1. A process for the preparation of methylamines by the liquid phase reaction of the starting amine, formaldehyde and hydrogen under pressure and at a reaction temperature on a fixed-bed catalyst, the improvement comprising separately heating the formaldehyde containing a reduced percentage of water and the amine to a preset temperature and then mixing the reactants together in the presence of the fixed-bed catalyst while maintaining the amount of water present in the reaction mixture not more than 50% by weight.

4,952,735

**NOVEL PERFLUOROPOLYETHER AND PROCESS FOR PRODUCING THE SAME**

Kazuo Kobayashi; Masashi Fukazawa, and Shinji Ishikawa, all of Kitaibaraki, Japan, assignors to Nipon Mektron Ltd, Tokyo, Japan

Division of Ser. No. 115,841, Nov. 2, 1987, Pat. No. 4,859,299. This application Mar. 9, 1989, Ser. No. 321,172

Int. Cl.<sup>5</sup> C07C 179/00

U.S. Cl. 568—560

6 Claims

1. The process which comprises subjecting a polyether having a molecular weight of about 200 to about 25,000 and whose main chain is composed of a combination of the following structural units arranged linearly at random and which

contains 0.1 to 10% by weight of chlorine, bromine or iodine atoms as bonded in the molecule:



wherein

a+b=2-230,

b/a=0.1-10, and

c/(a+b)=0-0.1

to fluorine gas treatment at a temperature of about 150° C. to about 300° C., to thereby reduce the active chlorine, bromine or iodine atoms in the molecule.

4,952,736

**PROCESS FOR PRODUCING ALKOXYALKYL GROUP SUBSTITUTED PHENOLS**

Masahiro Iwahara, Tokuyama, Japan, assignor to Idemitsu Petrochemical Company, Limited, Tokyo, Japan

Filed Jan. 24, 1990, Ser. No. 469,724

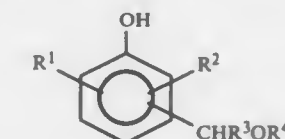
Claims priority, application Japan, Oct. 30, 1986, 61-259366; Nov. 6, 1986, 61-264195

Int. Cl.<sup>5</sup> C07C 41/00

U.S. Cl. 568—628

24 Claims

1. A process for production of an alkoxyalkyl group substituted phenol, characterized by producing an alkoxyalkyl group substituted phenol represented by the formula (1):



wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> each represents a hydrogen atom or an alkyl group and R<sup>4</sup> represents an alkyl group, by reacting a phenol, an alcohol and an aldehyde in the presence of a catalyst selected from the group consisting of a tertiary alkylamine, a tertiary unsubstituted benzylamine, a mixture of a tertiary alkylamine and a tertiary unsubstituted benzylamine, a carbonate of alkali metal, a hydrogencarbonate of alkali metal and a mixture of a carbonate of alkali metal and a hydrogencarbonate of alkali metal to form a reaction product; and recovering said alkoxyalkyl phenol from said reaction product.

4,952,737

**POLYOLEFIN POLYMERIZATION PROCESS AND CATALYST**

Kenneth E. Inkrott, Houston, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 68,506, Jul. 1, 1987, which is a continuation-in-part of Ser. No. 30,311, Mar. 26, 1987, and a continuation-in-part of Ser. No. 30,312, Mar. 26, 1987, which is a continuation of Ser. No. 487,393, Apr. 21, 1983, said Ser. No. 30,311, is a division of Ser. No. 487,393. This application Oct. 11, 1988, Ser. No. 255,289

Int. Cl.<sup>5</sup> C07C 31/30, 39/235

U.S. Cl. 568—851

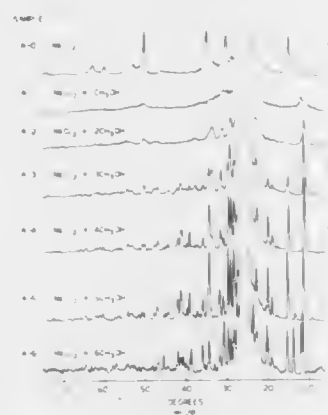
12 Claims

1. A crystalline adduct consisting essentially of MgCl<sub>2</sub> complexed with an electron donor selected from the group consisting of an alcohol and a phenol in an equal molar ratio, such that said crystalline adduct has the sharp x-ray diffraction spectrum



peaks associated with crystalline materials, said spectrum being characterized by the absence of the peak which normal crystal-

FTO SPECTRA OF  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$  (1+0+0) FROM  
BALL-MILLED MIXTURES OF  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$  +  $\text{SiO}_2$



line  $\text{MgCl}_2$  has at  $2\theta = 15^\circ$  and the absence of any substantial peaks in the  $2\theta$  range of  $45^\circ$ – $55^\circ$ .

4,952,738

#### COMPOSITION AND METHOD FOR FRICTION LOSS REDUCTION

Donald E. Gessell, and Paul H. Washecheck, both of Friendswood, Tex., assignors to Conoco Inc., Ponca City, Okla.  
Filed Nov. 14, 1988, Ser. No. 271,474  
Int. Cl.<sup>3</sup> F17D 1/16

U.S. Cl. 585—3

18 Claims

1. A composition having reduced friction loss comprising a hydrocarbon liquid having dissolved therein a friction loss reducing amount of a copolymer selected from the group consisting of copolymers of divinylbenzene and linear alpha-olefins and copolymers of vinyl siloxane and alpha-olefins.

4,952,739

#### ORGANO-AL-CHLORIDE CATALYZED POLY-N-BUTENES PROCESS

Frank J. Chen, Edison, N.J., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Oct. 26, 1988, Ser. No. 262,918  
Int. Cl.<sup>3</sup> C07C 2/18

U.S. Cl. 585—18

39 Claims

1. A process for preparing low molecular weight poly-n-butene having an  $M_n$  in the range of about 300 to about 900 and a molecular weight distribution less than about 1.4 from a feedstream mixture of  $C_4$  hydrocarbons containing less than about 5% by weight isobutylene and containing at least about 12 wt.% normal-butenes in a stirred reaction zone maintained at a temperature of less than about  $90^\circ\text{C}$ , which comprises:

- injecting HCl in an amount of from about 0.005 to 0.6 parts by weight per 100 parts by weight of said feedstream mixture into said feedstream mixture, in the substantial absence of said organo-aluminum catalyst and under conditions sufficient to substantially completely react said injected HCl with normal-butenes, thereby producing a treated feedstream mixture which contains less than 1.0 ppm free HCl;
- simultaneously introducing said treated feedstream mixture and said organo-aluminum chloride catalyst as separate streams into said reaction zone;
- contacting said introduced treated feedstream mixture and said introduced catalyst in the reaction zone for a time and under conditions sufficient to form a polymerization reaction mixture containing said poly-n-butene;

- withdrawing said polymerization reaction mixture from said reaction zone; and
- recovering said poly-n-butene product from said withdrawn polymerization reaction mixture.

4,952,740

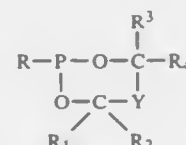
#### CYCLIC PHOSPHONITES

Sylvain Juge, Puteaux, and Yvonne Legras, Paris, both of France, assignors to Societe Nationale Elf Aquitaine, France  
Continuation of Ser. No. 15,166, Feb. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 719,473, Apr. 3, 1985, abandoned. This application Sep. 12, 1989, Ser. No. 407,702  
Claims priority, application France, Apr. 10, 1984, 84 05622  
Int. Cl.<sup>3</sup> C07F 9/547

U.S. Cl. 558—83

14 Claims

1. Cyclic phosphonite of the formula



or 5 to 11 ring elements wherein  
R is  $C_1$  to  $C_6$  alkyl,  $C_5$  to  $C_6$  cycloalkyl or phenyl,  
 $R^1$  is selected from H,  $C_1$  to  $C_6$  alkyl,  $C_5$  to  $C_6$  cycloalkyl or nitrophenyl;  
 $R^2$  is H,  $C_1$  to  $C_6$  alkyl,  $C_5$  to  $C_6$  cycloalkyl, allyl or phenyl;  
 $R^3$  and  $R^4$  are independently H,  $C_1$  to  $C_6$  alkyl or phenyl;  
Y is a bond,  $-\text{NHC}(\text{O})\text{CH}_3$  or  $-\text{NHC}(\text{O})\text{CH}_2$  substituted methylene, dimethyl bornanyl or a cyclopentene derivative, the molecule has an asymmetry with respect to a plane perpendicular to the plane of the formula passing through R, P and Y, characterized in that the ratio between the molecular weight  $M_1$  of the part of the molecule located on one side of this plane and the molecular weight  $M_2$  on the part of the molecule located on the other side of this plane is at least 3 or not greater than  $\frac{1}{3}$ .

4,952,741

#### PARAFFINIC MATERIAL TREATMENT FOR CATALYSTS AND OLEFIN DIMERIZATION PROCESSES THEREWITH

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 233,094, Aug. 17, 1988. This application  
Jan. 16, 1990, Ser. No. 465,712  
Int. Cl.<sup>3</sup> C07C 2/24

U.S. Cl. 585—516

18 Claims

1. A process for the dimerization of at least one dimerizable olefin which comprises contacting said olefin under dimerization conditions with a catalyst system comprising:

- at least one elemental alkali metal supported on an alkali metal carbonate support;
- wherein component (a) is then treated with at least one paraffinic material at a temperature sufficient to maintain both said paraffinic material and said elemental alkali metal in a liquid, or molten, state but not sufficient to destroy or decompose said component (a) or said paraffinic material, thereby forming a coated composition.

#### 4,952,742 PREPARATION OF POLYUNSATURATED HYDROCARBONS

Michael Hesse, Ludwigshafen, and Rainer Becker, Bad Dürkheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed May 10, 1989, Ser. No. 349,833

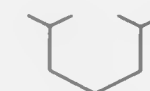
Claims priority, application Fed. Rep. of Germany, May 14, 1988, 3816576

Int. Cl.<sup>3</sup> C07C 4/04, 2/00, 4/00, 1/00

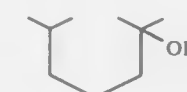
U.S. Cl. 585—534

20 Claims

1. A process for preparing a polyunsaturated hydrocarbon of the formula I



which comprises converting an unsaturated alcohol of the formula II



in the presence of a zeolite catalyst.

4,952,743

#### PROCESS AND APPARATUS FOR THE CONVERSION OF HYDROCARBONS

Guy-Marie Come, Nancy, France, assignor to Gaz de France, Paris, France

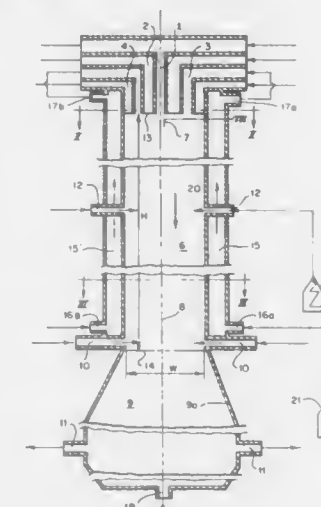
Filed Dec. 1, 1988, Ser. No. 278,521

Claims priority, application France, Dec. 3, 1987, 87 16804

Int. Cl.<sup>3</sup> C07C 2/78

U.S. Cl. 585—541

16 Claims



1. A process for converting hydrocarbons into a conversion product comprising:  
providing as starting substances at least one type of hydrocarbon and a first gas containing at least about 20% oxygen by volume;  
circulating these substances independently of each other and in parallel streams without mixing, while adopting a spatial distribution such that said first gas is surrounded on at least two sides by said hydrocarbons;  
allowing said starting substances to mix at a first given stage

of circulation and igniting the mixture of oxygen and hydrocarbon so as to induce the conversion reaction; introducing a quenching fluid into the resultant mixture at a second given stage of circulation, said second stage being situated downstream of said first given stage; and, recovering the resultant quenches conversion products.

4,952,744

#### NEW ZEOLITE SSZ-23 AND ITS USE IN CONVERSION OF LOWER ALKANOLS INTO HYDROCARBONS

Stacey I. Zones, San Francisco, and R. A. Innes, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 333,654, Apr. 5, 1989, Pat. No. 4,902,844, which is a continuation-in-part of Ser. No. 823,705, Jan. 29, 1986, abandoned. This application Oct. 20, 1989, Ser. No. 424,475

Int. Cl.<sup>3</sup> C07C 1/20

U.S. Cl. 585—640

3 Claims

1. A process for the conversion of lower aliphatic alcohols having 1 to 8 carbon atoms to form gasoline boiling range hydrocarbons which comprises contacting the alcohols under converting conditions with a zeolite having a mole ratio of an oxide selected from silicon oxide, germanium oxide and mixtures thereof to an oxide selected from aluminum oxide, gallium oxide, iron oxide, boron oxide and mixtures thereof greater than about 50:1, and having the x-ray diffraction lines of Table I.

4,952,745

#### CONTROL ACR PRODUCT YIELDS BY ADJUSTMENT OF SEVERITY VARIABLES

Cyril Tellis, Charleston, W. Va.; Saburo Hori, Iwaki, Japan, and David Milka, Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 547,001, Oct. 31, 1983, abandoned.  
This application May 4, 1988, Ser. No. 190,114

Int. Cl.<sup>3</sup> C07C 4/04

U.S. Cl. 585—648

2 Claims

1. An Advanced Cracking Reactor process wherein fuel is oxidized in a combustion zone to produce combustion gases having temperatures in the range of from about  $1200^\circ\text{C}$  to  $2400^\circ\text{C}$  comprising passing a stream comprising the combustion gases or an admixture of the combustion gases and steam to a Scorch Zone wherein a feedstock of shroud fluid and feedstock liquid mixes and impinges with said stream to produce an admixture, passing said admixture through a throat wherein the velocity of the admixture is increased, and thereafter moving said admixture more rapidly into a reaction zone wherein cracking occurs and the effluent from this zone is quenched, wherein the shroud fluid comprises hydrogen whereby the production of lower boiling species is reduced.

4,952,746

#### PROCESS FOR THE REMOVAL OF HYDROGENATABLE HYDROCARBONACEOUS COMPOUNDS FROM A HYDROCARBONACEOUS STREAM AND HYDROGENATING THESE COMPOUNDS

Russell W. Johnson, Elmhurst, and Lee Hilfman, Mount Prospect, both of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 930,624, Nov. 14, 1986, abandoned. This application Jan. 15, 1988, Ser. No. 144,207

Int. Cl.<sup>3</sup> C07C 7/13, 7/11, 7/12

U.S. Cl. 585—802

14 Claims

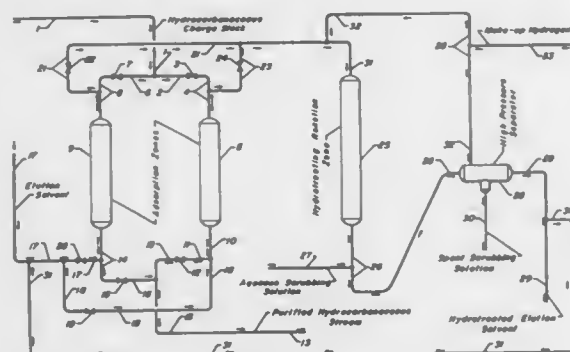
1. A process for the removal of hydrogenatable hydrocarbonaceous compounds comprising a component selected from the group consisting of halogen, metal, sulfur, oxygen and nitrogen from a hydrocarbonaceous stream which comprises the steps of:

- contacting said hydrocarbonaceous stream with an ad-

sorbent to remove at least a portion of said hydrogenatable hydrocarbonaceous compounds from said hydrocarbonaceous stream to provide a hydrocarbonaceous stream having a reduced concentration of hydrogenatable hydrocarbonaceous compounds;

(b) contacting spent adsorbent which has accumulated said hydrogenatable hydrocarbonaceous compounds from said hydrocarbonaceous stream with an elution solvent to remove said hydrogenatable hydrocarbonaceous compounds from said spent adsorbent thereby regenerating said adsorbent;

(c) contacting said elution solvent in admixture with said



hydrogenatable hydrocarbonaceous compounds which were removed from said spent adsorbent in step (b) in the presence of hydrogen with hydrogenation catalyst in a hydrotreating reaction zone;

(d) contacting hydrotreating reaction zone effluent with an aqueous scrubbing solution;

(e) introducing a resulting admixture of said reaction zone effluent and said aqueous scrubbing solution into a separation zone to provide a hydrocarbonaceous stream and a spent aqueous stream; and

(f) recycling at least a portion of said hydrocarbonaceous stream from step (e) to provide at least a portion of said elution solvent utilized in step (b).

4,952,747

#### REMOVAL OF DIAMONDROID COMPOUNDS FROM HYDROCARBONACEOUS FRACTIONS

Richard A. Alexander; Charles E. Knight, both of Mobile, Ala., and Darrell D. Whitehurst, Titusville, N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed May 26, 1989, Ser. No. 358,759

Int. Cl.<sup>5</sup> C07C 7/10, 7/12

U.S. Cl. 585—803

20 Claims

1. A process for removing diamondoid compounds from a hydrocarbonaceous fluid containing such, which comprises passing said fluid between two surfaces spaced apart up to about 0.01 inch at a temperature higher than the melting point of the lowest melting diamondoid in said fluid up to about 500° F., and at a temperature differential between said surfaces of at least about 10° F. for a time sufficient to recover therefrom a first stream enriched in said diamondoid compounds, and a second stream depleted in said diamondoid compounds.

4,952,748

#### PURIFICATION OF HYDROCARBONACEOUS FRACTIONS

Richard A. Alexander, and Charles E. Knight, both of Mobile, Ala., assignors to Mobil Oil Corp., New York, N.Y.

Continuation of Ser. No. 358,758, May 26, 1989, abandoned.

This application Sep. 7, 1989, Ser. No. 405,119

Int. Cl.<sup>5</sup> C07C 7/10, 7/12

U.S. Cl. 585—803

23 Claims

12. A process for extracting diamondoid compounds from a diamondoid-containing gas stream comprising the steps of:

(a) providing a gas stream containing a recoverable concentration of diamondoid compounds;

(b) mixing said gas stream containing diamondoid compounds with a solvent in which diamondoid compounds are at least partially soluble;

(c) controlling the conditions including temperature and pressure of said mixture of step (b) above to maintain at least a portion of said mixture in the liquid phase;

(d) separating said mixture under the controlled conditions of step (c), above into a partially purified gas stream and a diamondoid-enriched solvent stream;

(e) recovering diamondoid compounds from said diamondoid-enriched solvent stream;

(f) contacting said partially purified gas stream with silica gel in a first sorption zone for a period of time sufficient for said silica gel to sorb at least a portion of said diamondoid compounds from said hydrocarbon gas; and

(g) recovering diamondoid compounds from silica gel in a second sorption zone by contacting said silica gel with a regeneration fluid in which diamondoid compounds are at least partially soluble to desorb diamondoid compounds from said silica gel.

4,952,749

#### REMOVAL OF DIAMONDROID COMPOUNDS FROM HYDROCARBONACEOUS FRACTIONS

Richard A. Alexander; Charles E. Knight, both of Mobile, Ala., and Darrell D. Whitehurst, Titusville, N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed May 26, 1989, Ser. No. 358,760

Int. Cl.<sup>5</sup> C07C 7/12, 7/10

U.S. Cl. 585—803

35 Claims

1. A process for recovering diamondoid compounds from a fluid mixture thereof with other hydrocarbonaceous compounds which comprises contacting said mixture with a porous solid having pore opening large enough to admit said diamondoid compounds thereto and small enough so that at least about 50% of the external atoms of said diamondoid compounds are capable of simultaneously contacting the internal walls of the pores of said solid under conditions conducive to absorption of diamondoid compounds by said solid; and then desorbing the absorbate comprising diamondoid compounds from said solid absorbant.

4,952,750

#### PROCESS FOR MAKING P-XYLENE WITH A PURITY OF AT LEAST 99.5%

Guenter Puppel, Wulfen, Fed. Rep. of Germany, assignor to Krupp Koppers GmbH, Essen, Fed. Rep. of Germany

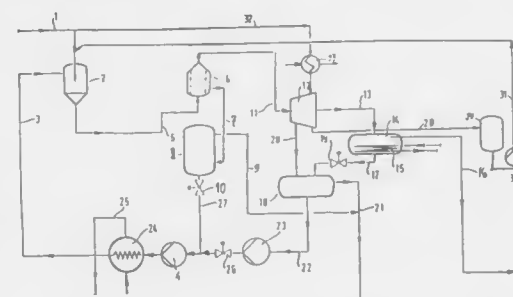
Filed Apr. 14, 1989, Ser. No. 339,233

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815324

Int. Cl.<sup>5</sup> B01D 9/04

U.S. Cl. 585—816

13 Claims



1. In a process for obtaining p-xylene with a purity of at least 99.5 % from a crude product with a high p-xylene content comprising conducting said crude product in a fluid state into

4,952,751

#### TREATMENT OF EVAPORATOR CONDENSATES BY PERVAPORATION

Ingo Blume, Hengelo, Netherlands, and Richard W. Baker, Palo Alto, Calif., assignors to Membrane Technology & Research, Inc., Menlo Park, Calif.

Filed Apr. 8, 1988, Ser. No. 179,490

Int. Cl.<sup>5</sup> B01D 13/00

U.S. Cl. 585—818

8 Claims

1. A separation process, comprising an evaporation step followed by a pervaporation step, wherein said evaporation step comprises:

(a) providing a feed solution comprising an aqueous solvent component and a non-aqueous solute component, said non-aqueous solute component including a volatile organic component;

(b) subjecting said feed solution to evaporation, to create an evaporated fraction wherein the concentrations of said aqueous component and said volatile organic component are enriched compared with said feed solution; and wherein said pervaporation step comprises:

(a) providing a permselective membrane having a feed side and a permeate side;

(b) contacting said feed side with said evaporated fraction;

(c) withdrawing from said permeate side a permeate vapor enriched in said volatile organic component compared with said evaporated fraction;

(d) maintaining an organic vapor pressure on said permeate side sufficient to provide a driving force for organic vapor permeation through said composite membrane by condensing said permeate vapor.



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## ELECTRICAL

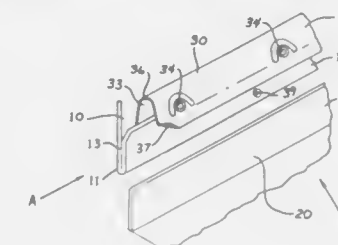
4,952,752  
CASINGBen Roun, Yun-Her, China, assignor to Acer Incorporated,  
China

Filed Jan. 12, 1989, Ser. No. 296,487

Int. Cl.<sup>5</sup> H05K 9/00

U.S. Cl. 174—35 R

7 Claims



1. A casing having a pair of casing members, respective walls of which can be removably connected; and a connecting member mounted to a first one of the walls and connectable to the second wall characterised in that the connecting member is generally U-shaped; in that an end of the first wall is folded to lie alongside another part of the first wall to define a cavity in which one of the arms of the connecting member is gripped; and in that the second wall is connected to the first wall when positioned in the receiving slot defined between the arms of the connecting member.

4,952,753

ELECTRIC CONNECTION BOX

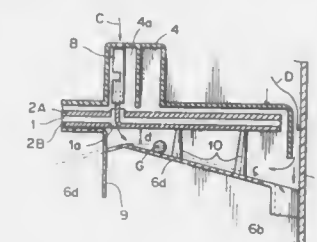
Hideharu Hayashi, and Takeshi Yanase, both of Kosai, Japan,  
assignors to Yazaki Corporation, Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,404

Int. Cl.<sup>5</sup> H05K 5/00

U.S. Cl. 174—52.1

5 Claims



1. An electric connection box structure comprising a box body having a floor means therein; a wiring circuit board set on said floor means; a surface cover set on top of said wiring circuit board; and spacer means provided between said wiring circuit board and said floor means to define a space therebetween larger than water droplets; and said floor means being inclined such that said water droplets flow down said inclined floor means.

4,952,754

VAPOR SEAL OUTLET BOX

Glen Rye, R.R. #2, Keswick, Ontario, Canada

Filed Mar. 20, 1989, Ser. No. 325,515

Claims priority, application Canada, Aug. 23, 1988, 575478

Int. Cl.<sup>5</sup> H02G 3/08

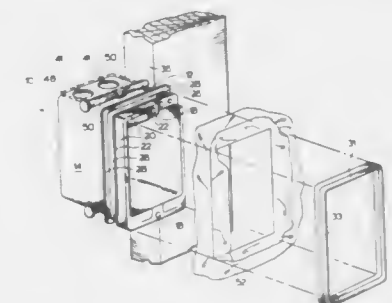
U.S. Cl. 174—53

20 Claims

1. Electrical outlet box in combination with a vapor barrier of flexible material, comprising:

a unitary molded outlet box having side walls and a front

opening, said outlet box being designed to receive and mount a conventional receptacle or switch therein, the side walls, adjacent their forward edges defining outwardly facing surfaces extending within a small angle of the forward-rearward direction which together substantially surround the front opening,



a ring member having surfaces designed to be complementary to and to slide upon said side wall surfaces, a flexible vapor barrier retained in place between said ring surfaces and said outwardly facing surfaces.

4,952,755

SAFETY PLATE FOR ELECTRICAL OUTLET

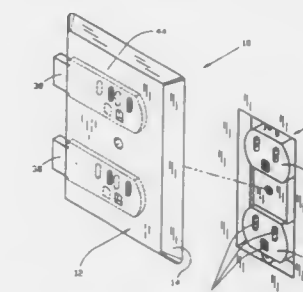
Stephen M. Engel, 512 North Highland, and Wallace W. Weiger, 1005 West 2nd, both of Pierre, S. Dak. 57501

Filed Jul. 11, 1989, Ser. No. 378,089

Int. Cl.<sup>5</sup> H01R 13/447

U.S. Cl. 174—67

5 Claims



1. A safety cover plate for an electrical wall outlet of the type having a pair of receptacles, each receptacle having apertures therein for receiving the prongs of an electrical plug, comprising:

a cover plate having apertures therein corresponding to the apertures in said receptacles, for receiving the prongs of an electrical plug, said apertures located so as to be aligned with receptacle apertures when the cover plate is fastened to a wall outlet;

said cover plate having a front surface, rearward surface, and a rearwardly projecting lip extending around the perimeter thereof;

the rearward surface of said cover plate having a pair of depressions therein for receiving slidable panels and a biasing means, the depressions surrounding the apertures in said cover plate;

a pair of panels slidably mounted for horizontal movement in the depressions in said cover plate; each said panel having a tab projecting from one end thereof;

said cover plate further including a pair of spaced-apart notches formed through a portion of said lip, oriented to slidably receive said tabs;

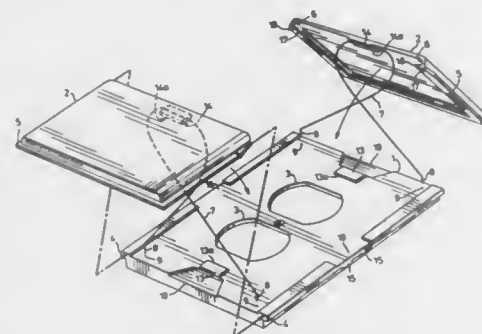
said panels having apertures therein corresponding to the apertures in said cover plate;  
said panels mounted for slidable movement between an operable position wherein the panel apertures are aligned with the cover plate apertures, and a storage position wherein said panel apertures are misaligned from the cover plate apertures;  
biasing means connected to the rearward surface of said cover plate adapted to bias said panels from their operable position to their storage position; and  
means for removably attaching said cover plate to a conventional outlet.

**4,952,756**  
**COVER PLATE FOR INDOOR RECEPTACLES**  
Joel Meyers, 11 Wynn Road, Willowdale, Ontario, Canada (M2R 1S5)

Filed Jul. 17, 1989, Ser. No. 380,496  
Int. Cl.<sup>5</sup> H05K 5/03

U.S. Cl. 174-67

10 Claims



1. A cover for a receptacle, comprising:  
a base plate having a top surface and a bottom surface, and having openings shaped to allow access to the receptacle;  
a cover plate having a top surface and a bottom surface;  
guide means to engage said base plate and cover plate together such that said cover plate may slide relative to said base plate between an open position and a closed position to alternately expose and cover said openings;  
a spring engaging said base plate and said cover plate, said spring exerting a force upon said cover plate biasing said cover plate from an open position to a closed position, said spring comprising a metal wire formed into a loop connected at its ends to the top surface of the base plate, and connected at its linear midpoint to the bottom surface of the cover plate whereby the spring is covered by the bottom surface of the cover plate when the cover plate is in the open and closed position.

**4,952,757**  
**LOW-POWER ELECTROMAGNETIC DIGITIZER TABLET**

Alexander M. Purcell, Guilford, and Thomas C. Zalenski, Killingworth, both of Conn., assignors to Summagraphics Corporation, Seymour, Conn.

Filed Nov. 15, 1989; Ser. No. 436,619  
Int. Cl.<sup>5</sup> G08C 21/00

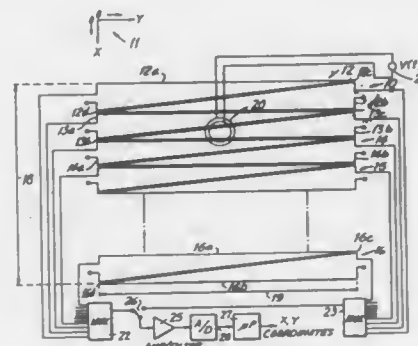
U.S. Cl. 178-19

10 Claims

1. A electromagnetic digitizer tablet comprising an electrode array under an active tablet area and a pointing device having an inductor which when energized when the pointing device is over the electrode array will electromagnetically induce electrical signals in the array, the improvement comprising:

(a) said electrode array comprising a plurality of triangular-shaped electrodes distributed side-by-side underneath the active tablet area such that the apices of adjacent triangu-

lar-shaped electrodes lie adjacent opposite sides of the active tablet area,  
(b) means connected to each electrode for determining the electrical signal induced in each triangular-shaped electrode,



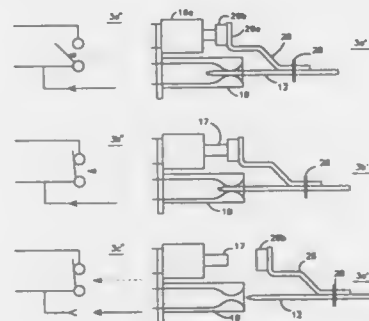
(c) means for locating the pointing device inductor position relative to the electrode array based upon the signal levels induced in each electrode of the array.

**4,952,758**  
**APPARATUS FOR HITLESS BY-PASS SWITCHING**  
Prithpal Dara, and Greg Abbott, both of Richardson, Tex., assignors to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Mar. 23, 1989, Ser. No. 327,685  
Int. Cl.<sup>5</sup> H01R 33/96

U.S. Cl. 200-51.09

4 Claims



3. An apparatus for providing a by-pass signal flow path for a signal flow path on a circuit board which circuit board signal flow path is conductive when said circuit board is partially inserted in a mounting means and also when said board is essentially fully inserted in said mounting means, said apparatus comprising:

(a) electrically actuatable by-pass switching means associated with said mounting means; and  
(b) means associated with said circuit board for opening and maintaining open said by-pass switching means only when said circuit board is essentially fully inserted in said mounting means, said by-pass switching means being otherwise closed.

**4,952,759**  
**CONTROL DEVICE FOR CONTROLLING A CIRCUIT BREAKER**

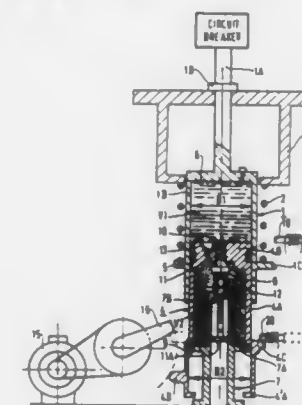
Michel Perret, Tramole, France, assignor to Societe Anonyme dite: Alsthom, Paris, France

Filed Mar. 8, 1989, Ser. No. 320,653

Claims priority, application France, Mar. 9, 1988, 88 03028  
Int. Cl.<sup>5</sup> H01H 35/38

U.S. Cl. 200-82 R

4 Claims



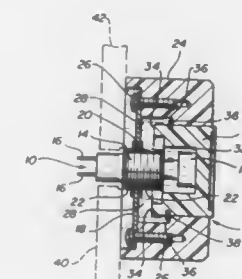
1. A mechanical control device for controlling a circuit breaker, said device comprising an engagement spring and a disengagement spring together with hydraulic means for transmitting a portion of the energy in the engagement spring to said disengagement spring, the device comprising a part which is moveable relative to a fixed frame, said part comprising a rod connected to an operating member of the circuit breaker and a first cylinder which is closed by a piston having a cylindrical body movably sliding in a sealed manner about a collar which is stationary relative to said frame, the disengagement spring surrounding said first cylinder and bearing firstly against said frame and secondly against a collar fixed to the first cylinder, the engagement spring being placed inside the cylindrical body and bearing firstly against said piston and secondly on a second collar which is fixed relative to said frame, with the inside volumes of the first cylinder and of said cylindrical body being filled with a liquid and being in communication with each other firstly via a piston orifice which is removably closed by a valve, and secondly via a non-return valve allowing liquid to pass only from the cylindrical body towards the first cylinder.

**4,952,760**  
**SWITCH COVER ARRANGEMENT**  
Edward M. Wilson, Jr., Eugene, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jan. 18, 1989, Ser. No. 298,045  
Int. Cl.<sup>5</sup> H01H 9/04

U.S. Cl. 200-302.1

13 Claims



1. A switch cover arrangement for a push-button electrical switch of the type having a switch actuation button, a switch body on which the button is mounted, and a pair of switch

terminals mounted on said switch body, said cover arrangement protecting said switch from its environment and preventing the application of excessive force to the switch actuation button, comprising:

a base plate to which said switch body is secured, said switch body extending through a central opening in said base plate,  
a housing to which said base plate is secured, said housing defining a central cavity, open at opposite ends, for receiving said switch body and said switch button, said central cavity being closed at a first end by said base plate, and a button cover mounted for movement with said button in said central cavity and closing a second end thereof, said button cover defining a generally cylindrical recess therein for receiving said button of said switch, said generally cylindrical recess being of a depth such that sliding movement of said button cover toward said switch is limited by said button cover contacting said base plate.

**4,952,761**  
**TOUCH CONTACT SWITCH**  
Hans-Joachim Viehrantz, Bad Nenstadt/Seale, Fed. Rep. of Germany, assignor to Preh-Werke GmbH & Co. KG, Seale, Fed. Rep. of Germany

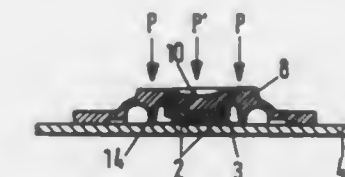
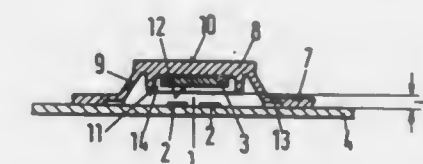
Filed Mar. 23, 1989, Ser. No. 327,997

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 3809770

Int. Cl.<sup>5</sup> H01H 13/52

U.S. Cl. 200-513

8 Claims

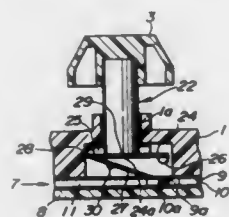


1. A touch contact switch comprising:  
a planar contact mechanism including a fixed contact and a movable counter contact, said movable counter contact contacting the fixed contact upon actuation of the touch contact switch;  
an elastic cover covering said contact mechanism;  
an operating member which is fixed elastically at a distance from said contact mechanism, said operating member travelling a distance in an operating direction with a clearly recognizable stroke H upon actuation of the touch contact switch by a force P, the operating member including a partial surface formed in a central portion on an inner side of the operating member, said partial surface effecting contact with the contact mechanism; and  
a stroke limiting means for limiting the stroke H of the operating member caused by the force P to prevent inadvertent actuation of the touch contact switch, said stroke limiting means including at least one supporting surface disposed along the periphery of said partial surface and protruding downwardly therefrom, wherein an additional force P' acting upon the central portion of the operating



member causes the partial surface to arch in the contacting direction to overcome the stroke limiting means and effect contact between the movable counter contact and the fixed contact.

**4,952,762**  
**KEYBOARD SWITCH**  
Masaharu Koyanagi, Mobara, Japan, assignor to Futaba Denchi Kogyo Kabushiki Kaisha, Mobara, Japan  
Filed Apr. 7, 1989, Ser. No. 334,569  
Claims priority, application Japan, Apr. 8, 1988, 63-046829[U]  
Int. Cl.<sup>5</sup> H01H 1/10  
U.S. Cl. 200—517 8 Claims

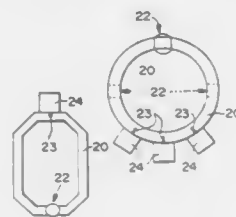


1. A keyboard switch comprising:  
a substrate;  
a membrane switch arranged on said substrate;  
an actuator for pressing said membrane switch;  
a frame in which said membrane switch and actuator are arranged;  
said actuator including a key stem provided at an upper portion thereof with a key top, a pressing member for forcedly pressing said membrane switch, spring means for forcedly pushing up said actuator, and a base member for joining said key stem, pressing member and spring means together, said actuator being made into an integral structure, wherein said pressing member comprises a pair of arms having an upper surface on which projections are formed, the height of said projections being such that said projections contact an inner surface of said frame before said pressing member contacts said inner surface of said frame, whereby noise when said pressing member comes into contact with said inner surface of said frame when said actuator is pushed up by said spring means is extinguished.

**4,952,763**  
**SYSTEM FOR HEATING OBJECTS WITH MICROWAVES**  
Karl Fritz, deceased, late of Freiburg, Fed. Rep. of Germany (by Curt Haeger, Executor), assignor to Snowdrift Corp. N.V., Curacao, Netherlands Antilles  
Continuation of Ser. No. 238,243, Aug. 30, 1988, abandoned, which is a division of Ser. No. 888,959, Jul. 24, 1986, Pat. No. 4,775,775, which is a continuation of Ser. No. 638,747, Aug. 8, 1984, abandoned. This application Dec. 19, 1989, Ser. No. 449,403  
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1983, 3411017; Aug. 10, 1983, 3333695; Nov. 17, 1983, 3341585; Dec. 14, 1983, 3345150; May 21, 1984, 3418843; Jun. 12, 1984, 3421778  
Int. Cl.<sup>5</sup> H05B 6/78  
U.S. Cl. 219—10.55 A 7 Claims

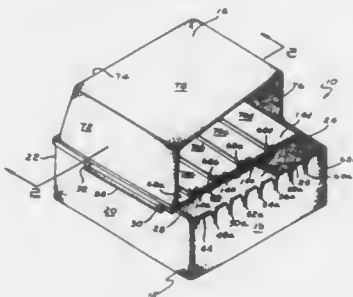
1. An apparatus for heating an object with microwaves, wherein said apparatus comprises:  
(a) a hollow annular waveguide having sides extending in a radial direction and sides extending in an axial direction, said waveguide having a substantially rectangular cross-sectional shape, said sides extending in said radial direction being shorter than said sides extending in said axial

direction, the ends of each of said sides being connected together so as to form a continuous annular waveguide; (b) a microwave emitter positioned perpendicular to the outer circumference of said continuously formed waveguide on one of said shorter sides of said waveguide, an



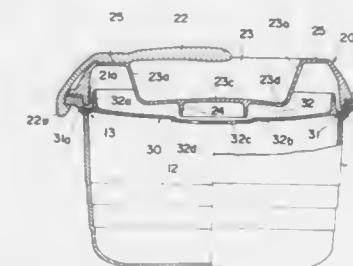
emitter dipole of said microwave emitter being located inside said continuous annular waveguide; and  
(c) a working area that is adapted to receive said object to be heated; said working area being positioned in said waveguide at a point that is at least ninety degrees away from the location of said emitter in said waveguide.

**4,952,764**  
**ADJUSTABLE FIN BACON RACK FOR MICROWAVE OVEN**  
Lawrence S. Harrington, R.D. #3, Burgess Rd., Bennington, Vt. 05201  
Filed Apr. 27, 1989, Ser. No. 343,680  
Int. Cl.<sup>5</sup> H05B 6/80; A47J 37/04  
U.S. Cl. 219—10.55 E 9 Claims



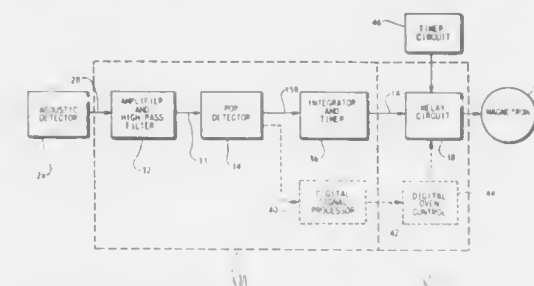
1. An apparatus for increasing the amount of food that can be cooked in an oven, comprising:  
a. a base pan having a bottom and side walls that define an open box-like enclosure;  
b. a plurality of fins that span an open top of the base pan, each fin having one end adjustably secured to a side wall of the base pan and the other end adjustably secured to an opposed side wall of the base pan, for supporting the food in different angles of alignment relative to the bottom of the base pan;  
c. a side wall of the base pan that includes a top edge that defines a plurality of adjacent receiving slots that are matched as pairs with aligned receiving slots in a top edge of an opposed side wall of the base pan, wherein each pair of receiving slots adjustably secures a fin; and  
d. angular lugs that have a cross-sectional structure in the approximate shape of a trapezoid whose non-parallel sides are broken by right angles such that the two sides of each right angle are parallel to the two sides of the opposed right angle, which angular lugs protrude from two opposed ends of the fins so that an angular lug protruding from one end is inserted into a receiving slot in a side wall and the angular lug protruding from the opposed end is inserted into an aligned receiving slot in an opposed side wall for adjustably securing the fin.

**4,952,765**  
**COOKER FOR USE IN MICROWAVE OVEN**  
Manabu Toyosawa, Tokyo, Japan, assignor to Daiya Sangyo Co. Ltd., Tokyo, Japan  
Filed Jul. 6, 1989, Ser. No. 376,023  
Claims priority, application Japan, Jul. 19, 1988, 63-95507; Jul. 19, 1988, 63-95508  
Int. Cl.<sup>5</sup> H05B 6/80  
U.S. Cl. 219—10.55 E 2 Claims



1. A cooker adapted for use in a microwave oven, comprising: a vessel for holding a material to be cooked and water; an outside lid for covering the vessel; and an inside cover disposed between the vessel and the outside lid and capable of storing components boiled over from the contents in the vessel during a boiling stage thereof, and capable of returning the boiled-over components to the vessel after the boiling stage; the inside cover being provided with a hole for returning the boiled-over components to the vessel and is supporting so as to be able to move in a vertical direction; a vapor path being formed by the inside cover, the vessel and the outside lid in a peripheral portion of the inside cover when the inside cover is raised by an inner pressure of the vessel, and a closing member being provided in the outside lid, which member is capable of closing said hole in said inside cover when the inside cover is raised by the inner pressure of the vessel.

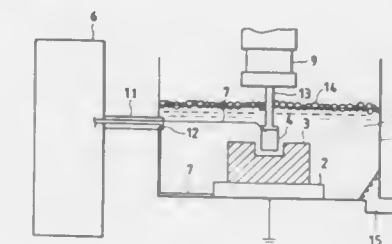
**4,952,766**  
**SENSOR AND POP DETECTOR FOR MICROWAVE POPCORN CONTROL**  
Charles W. McDonald, Memphis, Tenn., assignor to Microwave Products of America, Inc., Memphis, Tenn.  
Continuation-in-part of Ser. No. 113,646, Oct. 26, 1987, Pat. No. 4,873,409. This application Apr. 14, 1988, Ser. No. 181,494  
Int. Cl.<sup>5</sup> H05B 6/68  
U.S. Cl. 219—10.55 B 19 Claims



1. The combination of a sensor and improved pop detector for an electronic control for popping corn in a microwave cavity of a microwave oven comprising: (a) sensor means for monitoring the acoustic energy in the microwave oven cavity and for providing an output signal representative thereof; (b) means for determining a scaled value of ambient noise for the oven from the sensor output signal; and (c) ambient noise rejection means for adaptively rejecting the determined ambient noise from the sensor output signal and providing a pop signal

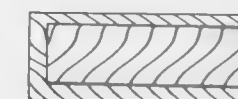
representative of the popping of popcorn in the microwave oven cavity.

**4,952,767**  
**EDM WITH AN ELECTROMAGNETIC SHIELD OF HOLLOW FERRITE BEADS FLOATING ON DIELECTRIC FLUID**  
Kazuhiko Uemoto, and Toshiaki Tanaka, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 2, 1989, Ser. No. 416,089  
Claims priority, application Japan, Oct. 3, 1988, 63-247338; Nov. 28, 1988, 63-298060  
Int. Cl.<sup>5</sup> B23H 1/00, 1/02, 1/08  
U.S. Cl. 219—69.11 6 Claims



1. An electric discharge machining apparatus in which a machining electrode and a workpiece to be machined are placed in a machining solution in a machining reservoir, and a pulse voltage is applied through a power supplying line between said machining electrode and said workpiece to cause spark discharge therebetween to thereby machine said workpiece, comprising:  
shielding means for shielding an interior of said machining reservoir magnetically, which comprises a plurality of shielding floats at least the surfaces of which are made of a magnetic material high in magnetic permeability, said shielding floats being floated to cover a surface of said machining solution in said machining reservoir in such a manner that said shielding floats are in contact with one another and in contact with a side wall of said machining reservoir and said machining reservoir being made of a magnetic material high in magnetic permeability.

**4,952,768**  
**ELECTRIC DISCHARGE MACHINING ELECTRODE**  
Naotake Mohri, No. 3837-3, Kuroishi, Shimada, Tenpaku-cho, Tenpaku-ku, Nagoya-shi, Aichi, and Nagao Saito, Tokyo, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Naotake Mohri, Aichi, both of Japan  
Continuation of Ser. No. 758,008, Jul. 23, 1985, abandoned. This application Mar. 17, 1988, Ser. No. 171,205  
Claims priority, application Japan, Jul. 24, 1984, 59-153351  
Int. Cl.<sup>5</sup> B23H 7/24  
U.S. Cl. 219—69.15 5 Claims



1. An electrode for precision discharge machining, comprising: a base made of an alloy of a low melting point metal which is a material selected from the group consisting of Si, ZnO, ZnO<sub>2</sub>, ZnSiO<sub>2</sub>, ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, GaAs, GaP, GaSb, GaN, GaS, GaSe, InAs, InP, InSb, AlAs, PbS, PbSe, PbTe, Bi<sub>2</sub>Te<sub>3</sub>, Bi<sub>2</sub>Se<sub>3</sub>, ZnFe<sub>2</sub>O<sub>4</sub>, and NiMn<sub>2</sub>O<sub>4</sub>; and a

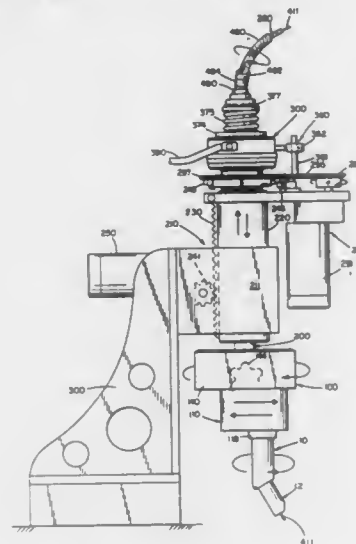
covering layer formed of one of a mixture and solutions of said low melting point metal, semi metals, semi conductors, and high resistivity inorganic compounds.

# 4,952,769 AUTOMATIC WELDING APPARATUS FOR WELD BUILD-UP AND METHOD OF ACHIEVING WELD BUILD-UP

Rees Acheson, Hill Rd., Alstead, N.H. 03602  
Division of Ser. No. 120,393, Nov. 12, 1987, Pat. No. 4,892,990, which is a continuation-in-part of Ser. No. 945,182, Dec. 23, 1986, Pat. No. 4,687,899, which is a continuation of Ser. No. 707,341, Mar. 1, 1985, abandoned, which is a continuation-in-part of Ser. No. 759,543, Jul. 23, 1985, abandoned. This application Jul. 31, 1989, Ser. No. 388,157

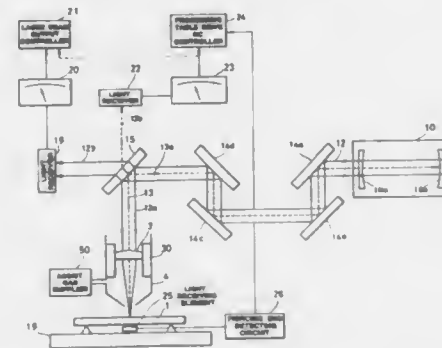
Int. Cl.<sup>3</sup> B23K 9/04

U.S. Cl. 219—76.14



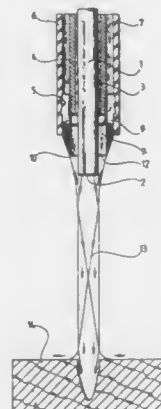
1. Apparatus for weld build-up on a surface of revolution, comprising:  
an elongated, rotatable assembly that supports, at one end, an electrical welding torch that terminates in a nozzle, said rotatable assembly being adapted to introduce electrical welding current, inert gas, and welding wire to the torch, characterized in that said assembly comprises  
an electrically conductive carrier (110) mounted in a radially adjustable, electrically continuous, offset relationship to a conductive body (140) joined to the end of a drive spindle (200), and  
a torch (10) held in electrically conductive relationship by said carrier, said electrically conductive body and carrier defining a gas tight passage (FIG. 6a) extending from said spindle to said torch, a connection cavity means being defined at a motion interface between said carrier and said body to maintain gas flow continuity therebetween over their range of offset adjustment.

4,952,770  
LASER-BEAM PROCESSING METHOD AND SYSTEM  
Seichi Hayashi, Ishikawa, Japan, assignor to Kabushiki Kaisha Komatsu Selsakusho, Tokyo, Japan  
PCT No. PCT/JP87/00933, § 371 Date Jun. 1, 1989, § 102(e) Date Jun. 1, 1989, PCT Pub. No. WO88/04214, PCT Pub. Date Jun. 16, 1988  
PCT Filed Dec. 1, 1987, Ser. No. 362,431  
Claims priority, application Japan, Dec. 1, 1986, 61-286488 Int. Cl.<sup>3</sup> B23K 26/00  
U.S. Cl. 219—121.67 10 Claims



1. A laser beam processing method in which a laser beam is irradiated at a portion of a material to be cut while an assist gas is blown against said laser-beam irradiating portion to thereby cut said cutting material off; said method being characterized in that said laser beam is converged upon or in the vicinity of a rear surface of the cutting material and a pressure of said assist gas is set to be higher than 6 Kg/cm<sup>2</sup>.

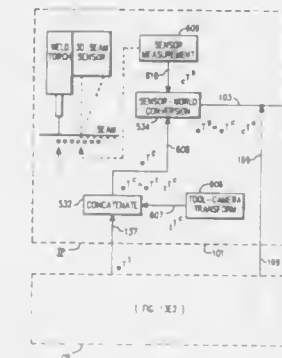
4,952,771  
PROCESS FOR CUTTING A MATERIAL BY MEANS OF A LASER BEAM  
Walter-Gerhard Wrobel, Tuttlingen, Fed. Rep. of Germany, assignor to Aesculap AG, Fed. Rep. of Germany  
PCT No. PCT/EP87/00790, § 371 Date Aug. 10, 1988, § 102(e) Date Aug. 10, 1988, PCT Pub. No. WO88/04592, PCT Pub. Date Jun. 30, 1988  
PCT Filed Dec. 18, 1986, Ser. No. 377,853  
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, 3643284  
Int. Cl.<sup>3</sup> B23K 26/00  
U.S. Cl. 219—121.67 10 Claims



1. Process for cutting a material (14) by means of a laser beam which exits from a light guide (1) and is directed in a non-contacting manner at the material (14) to be cut, charac-

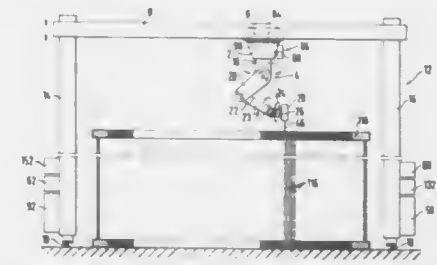
terized in that the laser beam is allowed to exit from an end face (2) extending perpendicularly to the longitudinal axis of a cylindrical light guide core (1), the light guide core (1) is surrounded on all sides in the region of the exit by a laser-radiation-transmissive liquid, this liquid is united adjacent to the end face (2) to form a compact jet of liquid (13) abutting on the end face (2) and this compact jet of liquid (13) is directed at the material (14) to be cut, the distance between the end face (2) and the material (14) to be cut being so selected that the jet of liquid (13) remains compact as far as into the region of impingement on the material (14).

4,952,772  
AUTOMATIC SEAM TRACKER AND REAL TIME ERROR CUMULATIVE CONTROL SYSTEM FOR AN INDUSTRIAL ROBOT  
Lawrence J. Zana, Wilkinsburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Nov. 16, 1988, Ser. No. 271,983  
Int. Cl.<sup>3</sup> B23K 9/127  
U.S. Cl. 219—124.34 8 Claims



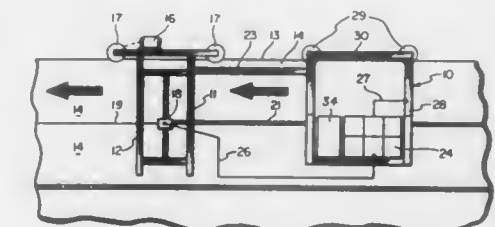
1. A method of tracking a seam path with an effector end controlled by a robot, under supervision of an image processor having a look-ahead sensor for deriving a series of seam samples by sensing the seam ahead of the effector end, using a control processor responsive to successive present positions of the effector end derived from the robot, comprising with said control processor the steps of:  
deriving from said successive effector end present positions an elapsed distance for the last position thereof;  
deriving for said series of seam samples corresponding elapsed distances;  
determining with at least two last ones of said present positions an anticipated elapsed distance for a subsequent position;  
generating with at least the last, and one before the last, of said successive present positions a representation of a parametric function of the elapsed distance characterizing the effector end path as defined geometrically by said at least the last positions, said function having specified parameters;  
determining in response to said anticipated elapsed distance and with said specified function parameters an anticipated effector end position;  
identifying with said seam sampled by interpolation with said anticipated elapsed distance a corresponding seam sample;  
comparing said anticipated effector end position with said corresponding seam sample for deriving an error therebetween; and  
controlling the robot in accordance with said derived error for bringing the effector end on track with the seam path.

4,952,773  
AUTOMATIC ARC-WELDING MACHINE OPERATING WITH ROD ELECTRODES AND A PREFERRED APPLICATION THEREOF  
Kalman Orsoo, Deggendorf; Gerhard Dietrich, Hengersberg; Alfons Berndt, Schaufling, and Franz-Josef Kufner, Deggendorf, all of Fed. Rep. of Germany, assignors to Deggendorfer Werft und Eisenbau GmbH, Deggendorf, Fed. Rep. of Germany  
Filed Aug. 18, 1989, Ser. No. 395,787  
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1988, 3828473  
Int. Cl.<sup>3</sup> B23K 9/12  
U.S. Cl. 219—124.34 20 Claims



1. In an automatic arc welding machine comprising a welding head; means for moving said welding head under program control; a replaceable rod electrode held in the welding head; means for automatically moving the electrode in relation to the welding head in the longitudinal direction of the electrode in dependence upon the arc voltage so as to sustain a certain arc length; and means for automatically replacing the electrode after use with a new electrode; the improvement comprising arc striking control means for placing the electrode on the workpiece while performing a rocking movement with the current limited to a value below the selected welding current, and then raising the electrode from the workpiece by an amount corresponding to a predetermined arc length with the full welding current applied thereto before beginning a longitudinal movement of the electrode in dependence upon the arc voltage.

4,952,774  
MOBIL POWER SOURCE FOR PRODUCING WELDING CURRENT FOR AUTOMATIC, SEMI-AUTOMATIC AND MANUAL WELDING  
Atsushi Sugimoto, and Jack C. Marvin, both of Spring, Tex., assignors to Chicago Bridge & Iron Technical Service Company, Oak Brook, Ill.  
Filed Mar. 14, 1989, Ser. No. 323,448  
Int. Cl.<sup>3</sup> B23K 9/12  
U.S. Cl. 219—133 5 Claims

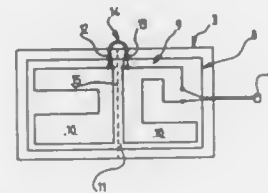


1. A self-powered, portable electric power source for supplying the electrical power required to operate welding equipment used in joining vertical plates along horizontal and vertical joints, comprising:  
a platform adapted for driven movement adjacent said verti-



cal plates and on and along a top horizontal edge of said plates;  
 an engine mounted on the platform including a fuel supply for operating the engine;  
 an AC electric generator mounted on the platform and driven by the engine;  
 a welding machine, mounted on the platform, including electric current inverter and transformer means by which AC electric current from the generator is converted to DC welding current;  
 electric power transmission means, from the generator to the welding machine, carried by the platform;  
 a first DC welding current transmission means from the welding machine adapted to be joined to a welding head;  
 a second DC welding current transmission means from the welding machine adapted to be joined to a grounding means; and  
 motor means coupled to drivingly move the platform on and along said top horizontal edge, including an electric motor electrically powered by the electric current supplied from the AC electric generator.

zones being electrically connected by flexible lead wires which extend out of the sheet and form free flexible loops, said sheet being adapted to be sewn to the lining cap along a seam within



each said intermediate zone and said loops having a height sufficient so that each said loop is outside of the seam zone when being spread out in the plane of the sheet.

4,952,775

## FLOOR HEATING PANEL

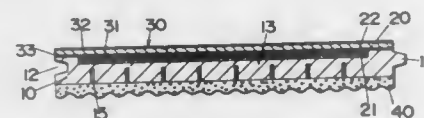
Seiko Yokoyama, Yahata; Hikomi Tanooka, Kadoma; Minoru Hibino, Katano, and Junichi Arakawa, Hirakata, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan  
 Filed Mar. 14, 1989, Ser. No. 323,368

Claims priority, application Japan, May 14, 1988, 63-63722[U]; Aug. 26, 1988, 63-212930

Int. Cl.<sup>5</sup> H05B 3/34

U.S. Cl. 219-213

9 Claims



1. A floor heating panel comprising:

- a substrate;
  - a heating element arranged on the top surface of the substrate;
  - a cover layer placed over said heating element to cover the entire top surface of said substrate; and
  - a cushioning layer disposed on the bottom surface of said substrate;
- said substrate being formed on its bottom surface with rows of slits by which said substrate is allowed to resiliently flex to a limited extent.

4,952,776

## SEAT HEATING DEVICE IN PARTICULAR FOR AN AUTOMOTIVE VEHICLE

Pascal Huguet, Hericourt, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly-Sur-Seine, both of, France

Filed Jun. 29, 1989, Ser. No. 373,161

Claims priority, application France, Jul. 1, 1988, 88 08952

Int. Cl.<sup>5</sup> H05B 3/36

U.S. Cl. 219-217

7 Claims

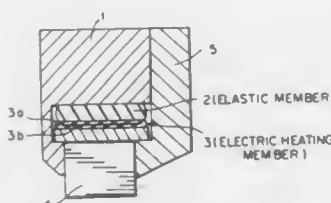
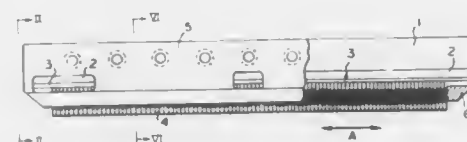
1. A seat heating device for a seat having a seat body covered by a lining cap, particularly for an automotive vehicle seat, said device comprising a sheet containing a network of lead wires for conducting an electrical current and forming heating elements, said sheet comprising a plurality of independent heating zones laterally shifted with respect to one another with each zone comprising a portion of said network of lead wires and an intermediate zone between adjacent zones, extending throughout the width of the sheet and devoid of conducting lead wires, the network portions of any two adjacent

4,952,777  
 ELECTRIC HEAT-SEALING HEATER HAVING A FLEXIBLE HEAT ACCUMULATING SEALING SURFACE  
 Yoshihiro Kogasaka, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
 Filed Apr. 13, 1989, Ser. No. 337,687

Claims priority, application Japan, Apr. 13, 1988, 63-90949  
 Int. Cl.<sup>5</sup> H05B 3/00; B30B 15/34

U.S. Cl. 219-243

2 Claims



1. A heat-sealing heater comprising a flat heating sheet member which consists of a flat flexible material and a long heater element embedded in the flexible material and is supported on a guide, characterized in that an elastic material is interposed between the flat heating sheet member and the guide, and a flexible heat-accumulating material of high heat conductivity is provided on the side of the flat heating sheet member opposite to the elastic material, the heat-accumulating material being adapted to be pressed against the material to be heat-sealed; wherein said heat-accumulating material comprises a block having a plurality of slits alternately extending in a direction transverse of said heater; and further comprising a holder having a pair of arms and being mounted to said guide for retaining said block at opposite ends thereof.

4,952,778

## HEATED TOOL WITH HEATED GAS SOURCE

Gero Zimmer, Munich, Fed. Rep. of Germany, assignor to Productech Inc., Rolling Hills Estates, Calif.

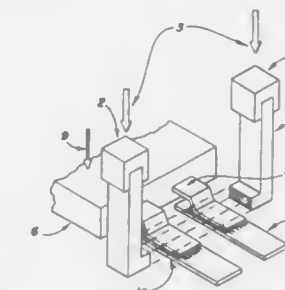
Filed Nov. 22, 1988, Ser. No. 275,332

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739750

Int. Cl.<sup>5</sup> H05B 1/00

U.S. Cl. 219-243

18 Claims



1. An apparatus for connecting one object to another by heating the objects, comprising:

- a heated tool having a heater bar with a heating surface for contacting a contact surface of at least one of the object;
- means for moving the tool into contact with the contact surface in a force direction toward at least one of the objects; and

gas directing means for directing a flow of heated gas at a non-zero angle to the force direction and against at least one of the objects adjacent the heater bar at a location spaced from the contact surface for providing additional thermal energy to at least one of the objects.

4,952,779

## HUMIDIFIER CONTROL MEANS

Raymond H. Eaton-Williams, "Heathers", Farnaby Drive, Sevenoaks, Kent, England (TN13 2LQ)

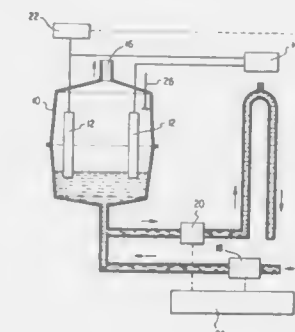
Filed Mar. 20, 1989, Ser. No. 325,722

Claims priority, application United Kingdom, Mar. 18, 1988, 8806486

Int. Cl.<sup>5</sup> H05B 3/60

U.S. Cl. 219-295

11 Claims



1. An electrode water boiler, preferably for the humidification of air, comprising a boiler, at least two electrodes in the boiler adapted to be connected to an electrical supply and between which current flows through the water during operation of the boiler in order to heat the water and generate steam, a steam outlet from the boiler, water feed means connected to the boiler for feeding water into the boiler, water discharge means leading from the boiler for discharging water therefrom, electrode current sensing means for sensing the current in at least one of the electrodes, and boiler water control means connected to the electrode current sensing means in order to

control the supply of water to and the discharge of water from the boiler in response to changes in the electrode current sensed by the electrode current sensing means, in which the boiler water control means are constructed and arranged to:

- (a) initiate the water feed means to supply water to the boiler when the electrode current sensed by the electrode current sensing means is below a predetermined lower value;
- (b) initiate the water discharge means to discharge water from the boiler after the electrode current sensed by the electrode current sensing means has risen above a predetermined higher value; and
- (c) again initiate the water feed means, following the above initial initiation of the feed water means, when the electrode current sensed by the electrode current sensing means subsequently rises to a predetermined intermediate value between the said lower value and the said higher value to effect the introduction, into the boiler, of a fixed measured quantity of feed water.

4,952,780

## COMPUTERIZED MULTI-ZONE CRYSTAL GROWTH FURNACE

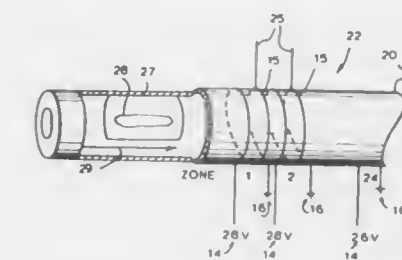
Victor Curreri, Setauket; John F. Klein, Port Washington; Janine E. Dubois, Shirley, and David J. Larson, Sr., Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,378

Int. Cl.<sup>5</sup> F27B 5/14; H05B 1/02

U.S. Cl. 219-390

42 Claims

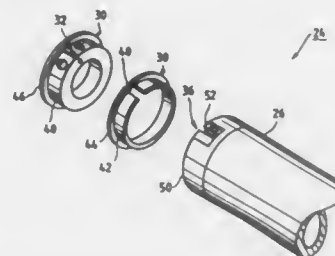


1. A temperature control system for heating an article at an elevated steady state temperature and controlling said steady state temperature within precise, given limits, said system comprising

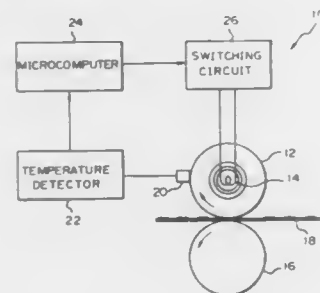
- heating means for receiving power to heat an article, said heating means comprising a substantially cylindrical hollow muffle formed of alumina ceramic in which the article to be heated is disposed, a number of heat generating windings wound upon the muffle, said windings being thermally coupled to said muffle to provide a quick heating response to power received by said heating means;
- light-actuated power control means connected to said heating means for passing power to said heating means in response to a light signal;
- light signal generating means for generating a light signal to actuate said power control means;
- a source of power connected to said power control means for providing power to said heating means when said power control means is actuated;
- temperature monitoring means associated with said article being heated for measuring the temperature of said article; and
- computer means operatively connected to said light signal generating means and said temperature monitoring means for providing commands to said light signal generating means in the form of a train of equidistantly spaced electrical pulses in response to a temperature measurement provided by said monitoring means, said temperature monitoring means comprising a plurality of thermocouples, at

least one thermocouple for each said heating zone, each of said thermocouples being disposed approximately 0.03 to 0.375 inch radially outward from an outer surface of its respective winding.

**4,952,782**  
**FIXING UNIT FOR ELECTROPHOTOGRAPHIC DEVICE**  
 Syaho Yokokawa; Shinichi Fukazawa; Yasuo Kikuchi; Takashi Suzuki; and Isao Nakajima, all of Ibaraki, Japan, assignors to Hitachi Koki Co., Ltd., Tokyo, Japan  
 Filed Nov. 7, 1988, Ser. No. 267,566  
 Claims priority, application Japan, Nov. 6, 1987, 62-281494  
 Int. Cl.<sup>3</sup> B21B 27/06; H05B 3/02; G03G 15/20  
 U.S. Cl. 219—469 15 Claims



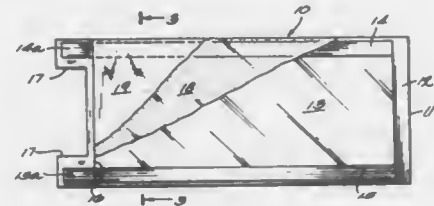
**4,952,781**  
**CONTROL OVER SURFACE TEMPERATURE OF A FIXING ROLLER OF A HEAT ROLLER TYPE FIXING DEVICE**  
 Kiyoto Kozuka, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
 Filed May 26, 1989, Ser. No. 357,605  
 Claims priority, application Japan, May 27, 1988, 63-128272  
 Int. Cl.<sup>3</sup> G03G 15/20  
 U.S. Cl. 219—469 3 Claims



1. A method of controlling surface temperature of a fixing roller of a heat roller type image fixing device such that the surface temperature remains in a predetermined range, said fixing roller having a heater thereinside, said method comprising the steps of:

- preparing temperature sensing means held in contact with a surface of the fixing roller for sensing the surface temperature of said fixing roller;
- sensing the surface temperature by the temperature sensing means;
- if the temperature sensed by the temperature sensing means when a power source is turned on is lower than a predetermined temperature, sensing the surface temperature again by said temperature sensing means when a predetermined period of time expires after said power source has been turned on;
- detecting an effective value of a power source voltage when the power source is turned on;
- determining a period of time theoretically necessary to reach a predetermined upper limit of temperature deviation based upon the detected power source voltage;
- comparing an amount of temperature elevation occurred during an interval between the turn-on of the power supply and the expiration of the determined period of time with an upper limit and a lower limit of temperature elevation of said interval; and
- when the amount of temperature elevation does not lie between the upper limit and the lower limit which are stored beforehand, determining that the surface temperature is not normal and inhibiting the heater installed in the fixing roller from being driven.

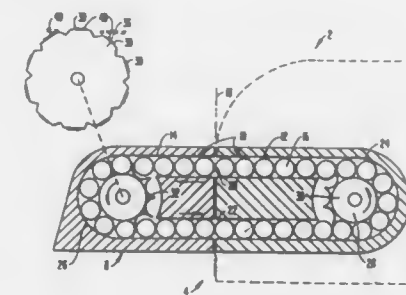
**4,952,783**  
**LIGHT TRANSMITTING FLEXIBLE FILM ELECTRICAL HEATER PANELS**  
 Brian E. Aufderheide, Cedarburg; Michael J. Robrecht, Whitefish Bay, and Wayne R. Kelley, Cedar Grove, all of Wis., assignors to W. H. Brady Co., Milwaukee, Wis.  
 Filed Mar. 20, 1989, Ser. No. 326,203  
 Int. Cl.<sup>3</sup> H05B 3/16  
 U.S. Cl. 219—528 14 Claims



2. A flexible light transmitting heater panel comprising, in combination:
- a flexible light transmitting plastic film substrate;
  - a vacuum deposited transparent conductive layer on a first surface of the substrate selected from the group consisting of:
    - a single lamina of tin oxide or indium tin oxide,
    - a first lamina of indium tin oxide on the first surface of the substrate and a second lamina of indium tin oxide over the first lamina, or
    - a first lamina of tin oxide, indium oxide or indium tin oxide on the first surface of the substrate, a second lamina of silver, platinum or palladium or an alloy of two or more of said metals over the first lamina, and a third lamina of tin oxide, indium oxide or indium tin

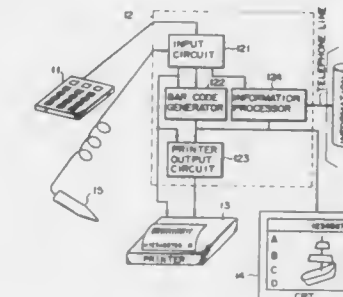
- oxide over the second lamina, the transparent conductive layer being in the range of about 200 to 5,000 Angstroms thick;
- a first conductive electrode extending over a first edge portion of the transparent conductive layer, and a second conductive electrode extending over a second edge portion of the transparent conductive layer spaced from and opposite from the first edge portion thereof, the first and second electrodes each including a section for connecting the heater panel to an AC or DC power source; and in which
  - the transparent conductive layer covers a first portion of the first surface of the substrate, a pair of conductive traces are formed on another portion of the first surface of the substrate, and a chip thermistor is connected between the conductive traces for detecting substrate temperature when the heater panel is activated.

**4,952,784**  
**UNIT DRIVE ASSEMBLY**  
 Timothy D. Pike, Castro Valley, Calif., assignor to f.m.e. Corporation, Hayward, Calif.  
 Filed Aug. 1, 1989, Ser. No. 388,276  
 Int. Cl.<sup>3</sup> G06F 1/00  
 U.S. Cl. 235—101 12 Claims



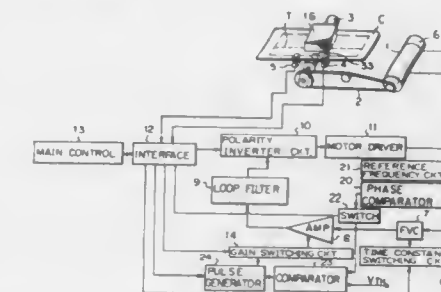
1. A unit drive assembly for use with a device having first and second modules movable relative to one another between at least first and second relative orientations, the unit drive comprising:
- a drive track including a first portion carried by the first module and a second portion carried by the second module, the first and second portions aligned with one another when the first and second modules are at the first orientation and misaligned with one another when the first and second modules are at the second orientation;
  - a plurality of drive elements movably positioned along the drive track;
  - a drive track seal positionable to retain drive elements within the first and second portions when the first and second portions are at the second orientation;
  - a driver, carried by the first module, operable to drive the drive elements along the drive track when the first and second portions of the drive track are aligned; and
  - a driven element, carried by the second module, operably coupled to at least one of the drive elements positioned along the second portion of the drive track, so that the driven element is driven in an amount corresponding to a distance which the at least one of the drive elements is driven along the drive track.

**4,952,785**  
**BAR CODE GENERATING APPARATUS FOR IMAGE COMMUNICATION TERMINAL DEVICE**  
 Yukio Kikuda, Kumagaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Apr. 29, 1988, Ser. No. 188,465  
 Claims priority, application Japan, May 1, 1987, 62-108502  
 Int. Cl.<sup>3</sup> G06F 15/12; G06K 3/12  
 U.S. Cl. 235—432 27 Claims



1. A bar code generating apparatus for an image communication terminal device, said apparatus comprising:
- extraction means for receiving image information including frame number information and extracting the frame number information;
  - bar code generating means for receiving the frame number information output from said extraction means and generating a corresponding bar code signal;
  - instruction means for instructing said bar code generating means to generate the bar code signal corresponding to the frame number information; and
  - output means, connected to said bar code generating means, for externally outputting the bar code corresponding to the frame number information generated by said bar code generating means, in response to the instruction from said instruction means, so as to print the bar code signal.

**4,952,786**  
**INFORMATION RECORDING AND REPRODUCING APPARATUS HAVING SWITCHING MEANS FOR DISABLING CONTROL OF MEDIUM DRIVE BY A PHASE LOCKED LOOP IN A PLAYBACK MODE**  
 Hiroshi Inoue, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Jul. 20, 1988, Ser. No. 221,678  
 Claims priority, application Japan, Jul. 31, 1987, 62-190447  
 Int. Cl.<sup>3</sup> G06K 13/04, 13/08  
 U.S. Cl. 235—480 8 Claims



1. An information recording and reproducing apparatus comprising:
- recording and reproducing means for recording and reproducing information on and from a recording medium;
  - driving means for reciprocally driving the recording me-



dium relative to said recording and reproducing means at a faster speed in a reproducing mode than in a recording mode;

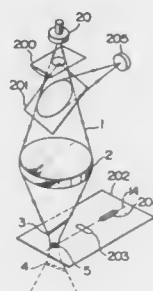
frequency signal producing means for producing a frequency signal representing a drive speed of the recording medium;

first control means comprising means for comparing an output signal of said frequency signal producing means with a reference clock signal for generating a phase error signal and means for feeding the phase error signal back to said driving means;

second control means comprising means for detecting the drive speed of the recording medium, means for comparing the detected drive speed and a target speed for generating a speed error signal and means for feeding the speed error signal back to said driving means; and

switching means comprising means for activating at least said first control means in the recording mode and deactivating said first control means and activating said second control means in the reproducing mode.

**4,952,787**  
**METHOD AND APPARATUS FOR DETECTING FOCUS ERROR USING PITS AND LIGHT BEAMS HAVING ASTIGMATISM**  
 Shigeru Nakamura, Tachikawa, and Takeshi Maeda, Kokubunji, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Nov. 30, 1988, Ser. No. 277,988  
 Claims priority, application Japan, Dec. 2, 1987, 62-303127; Apr. 28, 1988, 63-103904  
 Int. Cl.<sup>5</sup> G01J 1/20; G11B 7/00  
 U.S. Cl. 250—201.5 22 Claims

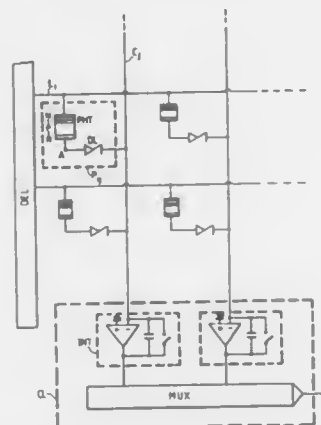


1. A focus error detection method comprising the steps of: focusing a light beam having an astigmatism onto a medium surface and scanning said medium surface by said light beam, said surface having two kinds of pits formed thereon for providing identical modulation to said light beam in an in-focus condition of the light beam on said medium surface and for providing different modulations to said light beam in an out-of-focus condition of the light beam on said medium surface;

detecting a reflected light from said surface by at least one photo-detector;

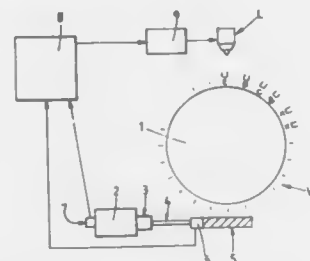
extracting a signal modulated by at least one of said two kinds of pits from the output of said photo-detector; and obtaining a focus error detection signal from either a phase or a level of said extracted signal.

**4,952,788**  
**METHOD OF PHOTOELECTRIC DETECTION WITH REDUCTION OF REMANENCE OF A PHOTOTRANSISTOR, NOTABLY OF THE NIPIN TYPE**  
 Jean L. Berger, and Marc Arques, both of Grenoble, France, assignors to Thomson-CSF, Puteaux, France  
 Filed Oct. 6, 1989, Ser. No. 418,186  
 Claims priority, application France, Oct. 14, 1988, 88 13540  
 Int. Cl.<sup>5</sup> H04N 5/214 11 Claims



1. A method of photoelectric detection wherein there is used, as a detection element, a phototransistor connected between a first electrode and a floating node, with a switch-over element connected between the floating node and a second electrode, the method including a detection step in which the phototransistor is biased in non-conductive mode and photoelectric charges generated in the phototransistor are stored at the floating node, and a reading step during which the switch-over element is made conductive and the stored charges are removed, a method wherein, after the reading step, a step is executed for the erasure of remanence, consisting in turning the phototransistor on.

**4,952,789**  
**MACHINING METHOD AND APPARATUS**  
 David G. Suttie, Cosington, England, assignor to Amchem Company Limited, Leicestershire, England  
 Filed Apr. 21, 1989, Ser. No. 342,901  
 Claims priority, application United Kingdom, Apr. 23, 1988, 8809666  
 Int. Cl.<sup>5</sup> B23K 26/00 9 Claims

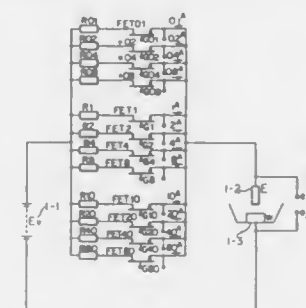


1. A method of machining a workpiece, said method comprising the steps of: providing a pulsed laser and directing the pulsed laser at a workpiece;

mounting the workpiece in a moveable holder for effecting adjustment of the altitude of the workpiece to the laser; simultaneously firing the laser while continuously adjusting

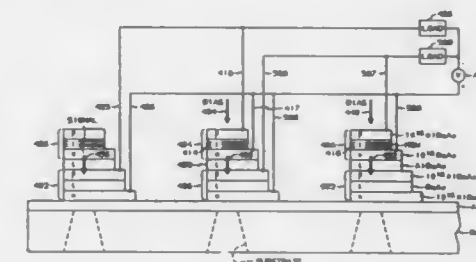
the altitude of the workpiece by movement of the holder whereby on successive pulses of the laser the laser beam is aligned with different work positions on the workpiece; synchronizing the firing of the laser with the movement of the holder whereby movement of the workpiece to a different work position occurs during non-firing of the laser to reduce dead time of the laser; and moving the workpiece a plurality of times past the laser whereby each work position is contacted by the laser beam more than once to bring the work positions to a preselected depth.

**4,952,790**  
**ELECTRICAL DISCHARGE MACHINING CONTROL CIRCUIT**  
 Shoji Futamura, Kawasaki, Japan, assignor to Institute of Technology Precision Electrical Discharge Works, Kanagawa, Japan  
 Filed Dec. 9, 1987, Ser. No. 130,564  
 Claims priority, application Japan, Dec. 12, 1986, 61-296373  
 Int. Cl.<sup>5</sup> B23H 1/02, 7/20 9 Claims



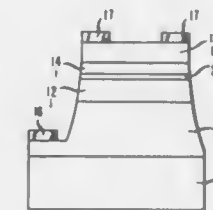
1. A machining control device for discharge machining equipment for controlling discharge machining performed by said discharge machining equipment by controlling the state of discharge generated by voltage application between an electrode and a workpiece, comprising: a closest distance information storage means for storing information on the closest distance between said electrode and said workpiece from the start of machining to a current moment in accordance with information on electrode travel; and, a discharge machining condition information storage means for storing information on discharge machining conditions for machining said workpiece more accurately as the distance between said electrode and said workpiece is reduced in the form of continuous function with respect to the distance between said electrode and said workpiece, said machining control device is adapted to control the state of discharge between said electrode and said workpiece in accordance with said information on discharge machining conditions stored in said discharge machining condition information storage means, said machining control device including a working distance detecting means for detecting that distance between said electrode and said workpiece is more than a predetermined value, operation of said closest distance information storage means being prevented to said workpiece, said value counted by said counter mean is latched in said latching means.

**4,952,791**  
**MONOLITHIC APPARATUS COMPRISING OPTICALLY INTERCONNECTED QUANTUM WELL DEVICES**  
 Harvard S. Hinton, Naperville, Anthony L. Lentine, St. Charles, both of Ill., and David A. B. Miller, Fairhaven, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Dec. 12, 1988, Ser. No. 283,336  
 Int. Cl.<sup>5</sup> H01J 40/14 15 Claims



1. Apparatus comprising a monolithic structure comprising a first group of photodetector layers including a quantum well region, and a second group of photodetector layers, where light transmitted through said quantum well region of said first group of photodetector layers is incident on said second group of photodetector layers, said structure having a plurality of individual substructures formed therein each comprising a first photodetector from said first group of photodetector layers and a second photodetector from said second group of photodetector layers, and means for electrically connecting ones of the first and second photodetectors of ones of said substructures for operation in a predefined electrical circuit comprising self electro-optic effect devices that are optically interconnected within individual ones of said substructures.

**4,952,792**  
**DEVICES EMPLOYING INTERNALLY STRAINED ASYMMETRIC QUANTUM WELLS**  
 Elisa A. Caridi, Rumson, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Oct. 13, 1989, Ser. No. 420,968  
 Int. Cl.<sup>5</sup> H01J 40/14; H01L 27/12 7 Claims



1. An optical device comprising means responsive to light for generating a photocurrent, a structure having a semiconductor quantum well region, and means responsive to said photocurrent for electrically controlling a coefficient of absorption of said semiconductor quantum well region in order to cause said index of refraction to vary in response to variations of said photocurrent, said optical device characterized in that, said semiconductor quantum well region includes first and second layers and a subregion between and in contact

with said first and second layers, said first and second layers comprising wide bandgap lattice matched semiconductor material, said subregion comprising at least one layer of substantially narrow bandgap semiconductor material, said subregion being lattice mismatched to cause a longitudinal strain along the  $\langle hhl \rangle$  direction for polarizing electrons and holes within said quantum well region in an opposite direction relative to a direction of an electric field applied to said structure, where  $h$  and  $l$  are integer numbers having values greater than or equal to 1.

4,952,793

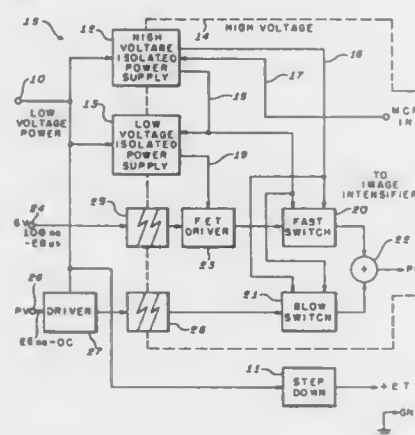
**CIRCUIT FOR GATING AN IMAGE INTENSIFIER**  
Clifford B. Cantrell, North Garden, and Lawrence H. Gilligan, Charlottesville, both of Va., assignors to Sperry Marine Inc., Charlottesville, Va.

Filed Apr. 14, 1989, Ser. No. 338,805

Int. Cl.<sup>3</sup> H01J 31/50

U.S. Cl. 250—213 VT

9 Claims



1. Apparatus for providing photocathode (PC) gating signals to the photocathode of an image intensifier having a microchannel plate input (MCPin) requiring a high negative MCPin potential for operation, said PC requiring a PC turn on potential more negative than said MCPin potential and a PC turn off potential more positive than said MCPin potential, comprising a low voltage section and a high voltage section, high voltage isolated power supply means having a positive output, a negative output, and a reference input in said high voltage section, said positive output and negative output providing positive and negative potentials, respectively, with respect to said reference input, said high voltage isolated power supply means providing high voltage isolation between said low voltage section and said positive and negative outputs and said reference input, said reference input being coupled to said MCPin potential so that said negative potential provides said PC turn on potential and said positive potential provides said PC turn off potential, a source of gating pulses in said low voltage section, isolation barrier means for conveying said gating pulses from said low voltage section to said high voltage section, and switch means in said high voltage section responsive to said positive and negative potentials for providing said PC gating signals to said PC in accordance therewith, said gating pulses conveyed across said isolation barrier means being coupled to said switch means for operating said switch means to provide said PC gating signals having durations equal to the durations of said gating pulses.

4,952,794

**X-RAY IMAGING SYSTEM**

Rudolf Kemner, Pieter Zaidhof, and Johannes J. Stonten, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

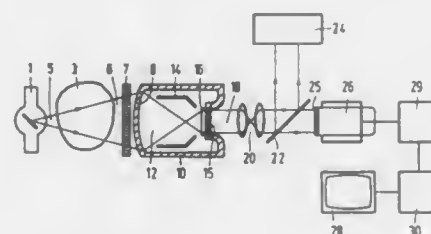
Filed Aug. 1, 1989, Ser. No. 388,284

Claims priority, application Netherlands, Aug. 4, 1988, 8801946

Int. Cl.<sup>3</sup> H01J 3/14, 5/16

U.S. Cl. 250—213 VT

6 Claims



1. An X-ray imaging system, comprising an X-ray image intensifier tube having an entrance screen and an exit screen for converting an X-ray image to be projected onto the entrance screen into an optical image to be detected on the exit screen, a television pick-up tube which cooperates with the exit screen in order to convert an optical image of the exit screen into a video signal for periodic formation of an image, characterized in that the exit screen exhibits a pulse response which decreases as from an instant  $t_0$  and that therefrom the television pick-up device can form, within a time interval  $T$  with a starting instant  $t_1 \geq t_0$  and a duration of at least one image period of the video signal, a video signal which is determined by the instantaneous optical image of the exit screen.

4,952,795

**CURRENT LIMITER AND AN OPTICAL RECEIVER MAKING USE THEREOF**

Claude Gauthier, Bouville, and Guy Balland, Paris, both of France, assignors to Societe Anonyme dite: ALCATEL CIT, Paris, France

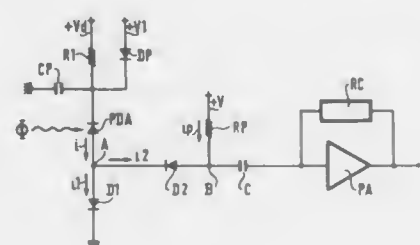
Filed Dec. 29, 1989, Ser. No. 458,268

Claims priority, application France, Dec. 30, 1988, 88 17508

Int. Cl.<sup>3</sup> H01J 40/14; H03K 5/08

U.S. Cl. 250—214 A

4 Claims



1. A current limiter circuit receiving an input current having a non-zero DC component whose value lies in a wide range of current values, and delivering a limited output current whose value lies in a narrower range of current values, the limiter circuit comprising a series connection of a first asymmetrical conductivity element followed by a second asymmetrical conductivity element which is followed in turn by a resistive element, the series connection extending between two poles of a voltage source so that a bias current flows through the asymmetrical conductivity elements and makes them conductive, with the input current being applied to the common point between the two asymmetrical conductivity elements and with the current-limited output being taken from the common point

between the second asymmetrical conductivity element and the resistive element, the direction of the input current flow being such that it splits into two fractions, with one of the fractions being subtracted from the bias current in the second asymmetrical conductivity element, while the other fraction is added to the bias current in the first asymmetrical conductivity element, thereby increasing the dynamic resistance of the second asymmetrical conductivity element and reducing the dynamic resistance of the asymmetrical conductivity element, thus limiting the output current.

4,952,796

**LIGHT DETECTION CIRCUIT HAVING A JUNCTION REVERSE-BIASED BY A CURRENT GENERATOR**  
Serge Fruhauf, Peyrier, and Laurent Sourgen, Aix en Provence, both of France, assignors to SGS-Thomson Microelectronics SA, Gentilly, France

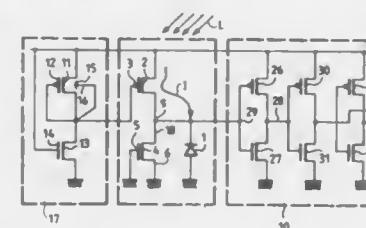
Filed Aug. 23, 1988, Ser. No. 235,365

Claims priority, application France, Aug. 31, 1987, 87 12069

Int. Cl.<sup>3</sup> H01V 40/14

U.S. Cl. 250—214 R

7 Claims



1. A light detection circuit comprising a junction that is to receive light to be detected, said junction being reverse biased by a current generator, wherein said current generator comprises a transistor biased at said transistor conduction limit to deliver a current of limited intensity to said junction, whereby the voltage across said junction varies according to light intensity.

4,952,797

**SYSTEM AND METHOD FOR OPTICALLY CONTROLLED ACOUSTIC TRANSMISSION AND RECEPTION**

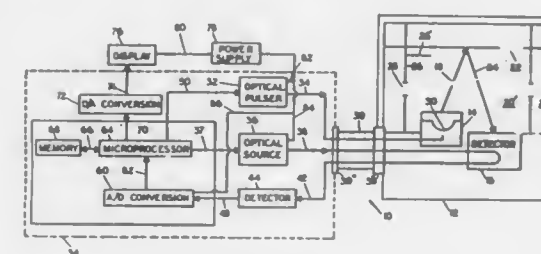
William B. Spillman, Jr., Charlotte, Vt., assignor to Simmonds Precision Products, Inc., Wilmington, Del.

Continuation of Ser. No. 246,103, Sep. 19, 1988, Pat. No. 4,900,921. This application Dec. 8, 1989, Ser. No. 447,729

Int. Cl.<sup>3</sup> G01N 15/06

U.S. Cl. 250—227.21

7 Claims



1. An optically controlled acoustic transmission and reception system, comprising:

- a tank,
- an electrically passive optically controlled acoustic transmitter,
- an electrically passive acoustic receiver,
- a first and a second source of electromagnetic radiation, and
- a first and a second optical fiber,

said transmitter and said receiver being connected to said tank, said transmitter being positioned to transmit acoustic wave pulses into said tank, said first optical fiber being connected to said transmitter and to said first source of electromagnetic radiation, said receiver being connected to said second optical fiber, said transmitter being adapted to convert said electromagnetic radiation into acoustic pulses, said transmitter being adapted to transmit said acoustic pulses into said tank, said receiver being adapted to receive said acoustic pulses from said tank, said receiver being adapted to modulate electromagnetic radiation from said second source passing through said second optical fiber, said receiver being adapted to modulate said radiation from said second source in response to said acoustic pulses received by said receiver, whereby said acoustic pulses transmitted from said transmitter into said tank are received by said receiver.

4,952,798

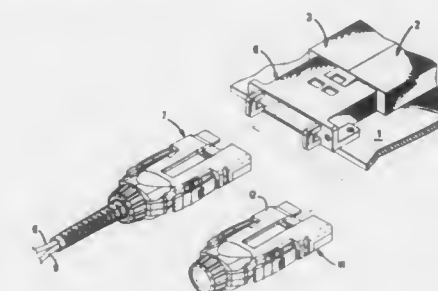
**OPTICAL SIMULATOR WITH LOOP-BACK ATTENUATOR AND OPTICAL THIN FILM**  
Bruce M. Graham, and Susan J. Lathan, both of Hummelstown, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 3, 1990, Ser. No. 460,446

Int. Cl.<sup>3</sup> H01J 5/16, 40/14; C01N 21/00

U.S. Cl. 250—227.11

14 Claims



1. An optical simulator shaped to be interchangeable with a complementary connector that intermates with an optical connector having an optical emitter and an optical detector, the optical simulator comprising; an alignment fixture with connectors for intermating with the optical emitter and the optical detector, and an optical fiber formed in a loop and installed within the alignment fixture with a first end face of the loop aligned, through a corresponding alignment fixture connector, with the emitter, and a second end face of the loop aligned, through a corresponding alignment fixture, with the detector of the optical connector; the optical fiber being formed in a loop with a film forming a thin membraceous skin on an end face of the fiber to provide controlled attenuation of optical power to the optical detector.

4,952,799

**REFLECTIVE SHAFT ANGLE ENCODER**  
Victor D. Loewen, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 10, 1989, Ser. No. 321,994

Int. Cl.<sup>3</sup> G01D 5/34

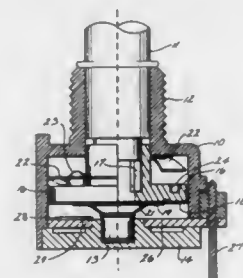
U.S. Cl. 250—231.16

20 Claims

1. A shaft angle encoder comprising:  
a rotatable code wheel comprising a plurality of alternating reflective and non-reflective areas extending in a circumferential path around the wheel;  
a light emitting device elongated in a radial direction for illuminating the circumferential path;



a plurality of photodetectors having elongated detection areas extending in a radial direction arrayed side by side on the same side of the code wheel as the light emitting device for receiving light from the light emitting device



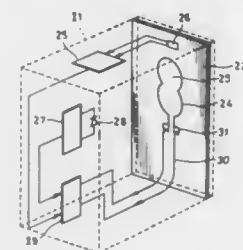
which is reflected from reflective areas on the code wheel; and comparator means for comparing signals from the photodetectors and producing signals indicative of code wheel rotation.

4,952,800

**PHOTOELECTRIC SWITCH WITH HEATING RESPONSIVE TO TEMPERATURE AND LIGHT**  
Atsuhito Kobayashi, Okaya; Shoichi Ono; Takayuki Shiraishi, both of Suwa, and Kohel Hosayama, Nagano, all of Japan, assignors to Chionon Kabushiki, Sawa, Japan  
Filed Aug. 17, 1989, Ser. No. 395,046  
Int. Cl.<sup>5</sup> H01J 7/24

U.S. Cl. 250—238

11 Claims



1. A photoelectric switch, comprising:

- a light receiving part;
- a light transmitting plate on said light receiving part;
- a beam transmission part in said light transmitting plate;
- a heating unit on said light transmitting plate surrounding said beam transmission part;
- means for producing a first signal when an environmental temperature falls below a first set value;
- means for producing a second signal when a quantity of light received through said beam transmission part falls below a second set value; and
- means responsive to the simultaneous presence of said first signal and said second signal for energizing said heating unit.

4,952,801

**LOGGING TOOL FOR MEASURING THE MACROSCOPIC THERMAL NEUTRON CAPTURE CROSS SECTION OF BOREHOLE FLUIDS**  
Randy Gold, Houston, Tex., assignor to Halliburton Logging Services Inc., Houston, Tex.  
Filed Apr. 11, 1989, Ser. No. 315,621  
Int. Cl.<sup>5</sup> G01V 5/04, 5/10

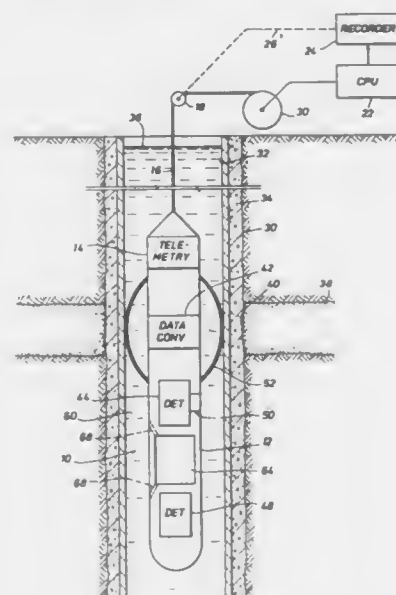
U.S. Cl. 250—269

6 Claims

1. For use in a downhole well logging sonde adapted to be

suspended on an armored logging cable in a cased well borehole, a measuring apparatus which comprises:

- (a) a fast neutron source supported by said sonde and adapted to provide a flux of fast neutrons of a selected energy level impinging on borehole fluids in a defined region of the borehole for collision with the element materials thereof;
- (b) thermal neutron detector means supported by said sonde for responding primarily to thermalized neutrons scattered from said source;
- (c) wherein borehole fluids exposed to neutrons from said



source and confined in the borehole initiate neutron scattering;

- (d) means for mounting said fast neutron source immediately adjacent to and coincident with said detector means, said source having essentially zero spacing along the sonde supporting said source, and wherein neutrons impinging on said detector means are primarily only those scattered from the borehole fluids; and
- (e) means for centralizing said sonde within the well borehole, and thereby defining in the sonde-casing annulus the borehole fluids in the immediate vicinity of said neutron source.

4,952,802

ION DETECTION APPARATUS

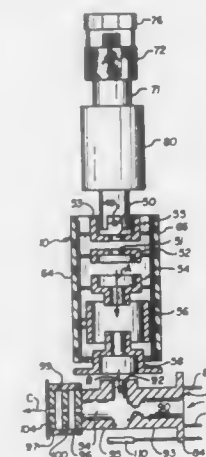
Anthony N. Duryea, Cheswick, Pa., assignor to Leybold Inficon, Inc., East Syracuse, N.Y.  
Filed Jul. 29, 1988, Ser. No. 226,262  
Int. Cl.<sup>5</sup> H01J 49/14, 37/063

U.S. Cl. 250—288

13 Claims

- 1. Ion detection apparatus comprising,
  - ionizer means having an ionizer volume for receiving a specimen to be analyzed,
  - electron gun means operatively associated with said ionizer means for bombarding said specimen with an electron beam and converting at least portions of said specimen into ions, said electron gun means having a filament and an extraction plate, said extraction plate being disposed on the ionizer means side of said filament,
  - analyzer means for receiving said ions from said ionizer volume, said analyzer means having detector means for detecting the presence of said ions; and

said electron gun means also having focusing means for varying the size of said electron beam, said focusing means



having means for varying the spacing between said filament and said extraction plate.

4,952,803

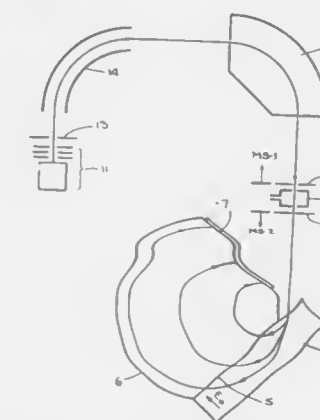
**MASS SPECTROMETRY/MASS SPECTROMETRY INSTRUMENT HAVING A DOUBLE FOCUSING MASS ANALYZER**

Hisashi Matsuda, Hyogo, Japan, assignor to Jeol Ltd., Tokyo, Japan  
Continuation of Ser. No. 313,486, Feb. 22, 1989, abandoned.  
This application Dec. 11, 1989, Ser. No. 449,438

Claims priority, application Japan, Feb. 23, 1988, 63-40195  
Int. Cl.<sup>5</sup> H01J 49/32

U.S. Cl. 250—296

8 Claims



1. A double mass spectrometry analysis apparatus comprising:

- an ion source for producing ions;
- a first mass analyzer for selecting precursor ions from the ions produced by said ion source;
- a dissociating apparatus for dissociating the precursor ions;
- a second mass analyzer comprising,
  - a region having a uniform electric field comprising an entrance point and an exit plane, wherein the electric field is perpendicular to said exit plane, wherein the dissociated ions from said dissociating apparatus are injected into said entrance point, wherein the dissociated ions travel along parabolic orbits in said uniform electric field, and wherein the dissociated ions exit said region through said exit plane, the dissociated ions

being separated in accordance with their respective energy levels, and

a magnetic sector having a mass-dispersive magnetic field applied to the ions exiting from said region; and a two-dimensional ion detector on which ions exiting from said magnetic sector impinge, wherein said detector is disposed along a focal plane of ions focused by said magnetic sector.

4,952,804

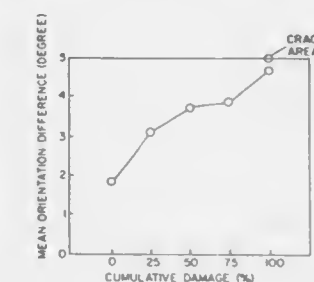
**ELECTRON DIFFRACTION METHOD OF DETERMINING THE DEGREE OF FATIGUE FOR METALLIC MATERIALS**

Yukiya G. Nakagawa, and Hinae Yoshizawa, both of Tokyo, Japan, assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jan. 11, 1989, Ser. No. 295,857  
Int. Cl.<sup>5</sup> H01J 37/30

U.S. Cl. 250—307

2 Claims



1. A method of determining the degree of fatigue for metallic materials comprising:

- taking electron diffraction patterns by a selected field method for plural number of object areas, arbitrarily selected in a sample taken from the metallic material concerned;
- calculating the mean angle of orientation deviation from the diffraction patterns obtained above; and
- comparing the mean angle of orientation deviation calculated above with the mean angles of orientation deviation separately determined for test pieces taken from the material concerned and fatigued to various degrees between 0% and 100%.

4,952,805

**METHOD OF JUDGING THE PRESENCE OR ABSENCE OF A LIMITED IRRADIATION FIELD, METHOD OF SELECTING A CORRECT IRRADIATION FIELD, AND METHOD OF JUDGING CORRECTNESS OR INCORRECTNESS OF AN IRRADIATION FIELD**  
Nobuyuki Tanaka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 22, 1988, Ser. No. 234,784  
Claims priority, application Japan, Aug. 20, 1987, 62-207213; Aug. 20, 1987, 62-207214; Aug. 20, 1987, 62-207215

Int. Cl.<sup>5</sup> G21K 4/00; G03B 42/00

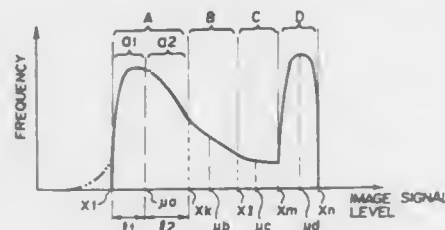
U.S. Cl. 250—327.2

9 Claims

1. A method of judging the presence or absence of a limited irradiation field on a recording medium in the case where a radiation image has been recorded on the recording medium, the method comprising the steps of:

- (i) creating a histogram of image signals detected from said recording medium,
- (ii) dividing said histogram into a plurality of small regions by an automatic threshold value selecting process using a discriminant criterion or a standard equivalent to said discriminant criterion,
- (iii) dividing the small region located on the lowest signal level side into a lower level division and a higher level

division with respect to a mean image signal level of said small region, and judging that said limited irradiation field is present in the case where a range of said lower level division is wider than a range of said higher level



division, and judging that said limited irradiation field is absent in the case where the range of said lower level division is narrower than the range of said higher level division.

#### 4,952,806 NOISE ERASING METHOD FOR STIMULABLE PHOSPHOR SHEETS

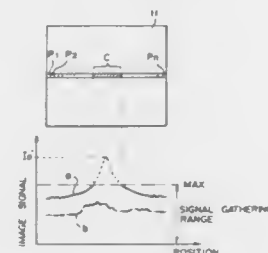
Nobufumi Mori, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 5, 1989, Ser. No. 402,599

Claims priority, application Japan, Sep. 6, 1988, 63-223322  
Int. Cl.<sup>5</sup> G01N 23/04

U.S. Cl. 250—327.2

4 Claims



1. A noise erasing method for a stimuable phosphor sheet wherein, after a stimuable phosphor sheet which has a radiation image stored thereon is exposed to stimulating rays causing the stimuable phosphor sheet to emit light, the amount of which emitted light being proportional to the amount of energy stored thereon during exposure to radiation, the emitted light is photoelectrically detected in order to obtain an image signal representing the radiation image, and then the stimuable phosphor sheet is exposed to erasing light in order to release the energy remaining thereon,

the noise erasing method comprising the steps of, in cases where the levels of components of said image signal (the components being obtained from the photoelectric detection of light emitted by part of said stimuable phosphor sheet) exceed a range of image signal levels from which the following information about the radiation image is detected accurately:

- (i) prediction of the levels of energy stored at said part of said stimuable phosphor sheet during exposure to radiation from how the levels of the other components of said image signal, which levels fall within said range of image signal levels, are distributed, and
- (ii) determination of the amount of said erasing light, which is to be irradiated to said stimuable phosphor sheet, on the basis of the predicted levels of energy stored at said part of said stimuable phosphor sheet.

#### 4,952,807 METHOD OF ADJUSTING RADIATION IMAGE READ-OUT CONDITIONS AND IMAGE PROCESSING CONDITIONS

Yuuma Adachi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

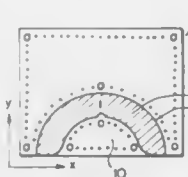
Continuation-in-part of Ser. No. 76,815, Jul. 23, 1987, abandoned, and a continuation-in-part of Ser. No. 195,381, May 10, 1988, abandoned, which is a continuation of Ser. No. 821,939, Jan. 24, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 299,151

Claims priority, application Japan, Jan. 24, 1985, 60-11397; Jul. 23, 1986, 61-173271

Int. Cl.<sup>5</sup> G01N 23/04

U.S. Cl. 250—327.2

10 Claims



5. A method of adjusting radiation image read-out conditions in which preliminary read-out conducted by exposing a stimuable phosphor sheet carrying a radiation image of an object stored therein by limitation of an irradiation field to stimulating rays of a level lower than the level of stimulating rays used in final read-out and detecting the radiation image stored in the stimuable phosphor sheet is carried out prior to the final read-out wherein the stimuable phosphor sheet is exposed to stimulating rays which cause the stimuable phosphor sheet to emit light in proportion to the stored radiation energy and the emitted light is photoelectrically detected to obtain electric image signals used for reproducing a visible image, and read-out conditions in the final read-out are adjusted on the basis of the image information obtained by the preliminary readout.

wherein the improvement comprises the steps of: subjecting said image information obtained by said preliminary read-out to a threshold value processing to detect a background portion inside of the irradiation field, selecting image information inside of the irradiation field constituted by said background portion and an object image portion surrounded by said background portion from said image information obtained by said preliminary read-out, and adjusting said read-out conditions in said final read-out on the basis of said selected image information wherein said image information inside of the irradiation field is selected by correcting the threshold value-processed image information so that the information at said background portion and the information at said object image portion have a value different from the value at the other portion, and ANDing said corrected, threshold value-processed image information with the original image information obtained by said preliminary read-out.

#### 4,952,808 THERMAL RADIATION DETECTION APPARATUS

Andrew A. Turnbull, and Andrew I. Cox, both of Reigate, England, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jun. 6, 1989, Ser. No. 362,189

Claims priority, application United Kingdom, Jun. 7, 1988, 8813424

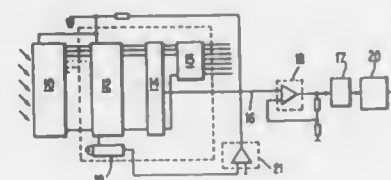
Int. Cl.<sup>5</sup> H01L 27/13; G01J 5/22

U.S. Cl. 250—338.3

11 Claims

3. A thermal radiation detection apparatus comprising at least one pyroelectric detector device for receiving radiation from a scene and generating a voltage signal at its output

which varies in accordance therewith, the detector device output being coupled to an output of the apparatus via a signal processing circuit for processing the voltage signal generated by the detector device, characterised in that the processing means is arranged to respond to a detector device signal to produce a correction factor derived at least in part from a first



signal which varies in accordance with the voltage signal from the detector device and to combine the correction factor with a second signal which varies in accordance with the rate of change of the device voltage signal in proportions according to the value of the thermal time constant of the detector device to produce a corrected output signal.

#### 4,952,809 IMAGING SYSTEM

Robert K. McEwen, Billericay, United Kingdom, assignor to GEC-Marconi Limited, Stanmore, United Kingdom

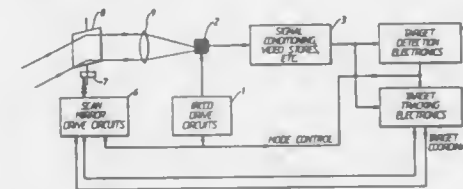
Filed Jul. 6, 1988, Ser. No. 215,507

Claims priority, application United Kingdom, Jul. 8, 1987, 8716037

Int. Cl.<sup>5</sup> G01J 1/20; H01L 25/00

U.S. Cl. 250—342

12 Claims



1. A method of imaging with selectively a wide or a narrow field of view, using the same two-dimensional array of detector elements for both, each element storing an electrical signal representative of the time-integrated intensity of the light incident on it, wherein, in a wide field of view mode of operation, the array is made to scan swathes of an object along respective columns of the array and periodically the stored electrical signals are shifted simultaneously in the direction of the scan from each element to its neighbour for continued time-integration, the stored electrical signal from the end element of each column of the array being provided as an output signal, the average speed at which the signals progress along the array being equal to the speed of the image scan whereby smearing of the image is minimised, each successive output signal of a column being representative of the intensity of radiation from a different portion of the object time-integrated by all the elements in succession, and wherein, in a narrow field of view mode, the array is held stationary relative to the image, the elements are made to perform a time integration over a stare period substantially greater than the period between successive simultaneous shifts in the wide field of view mode, and the stored signals are then read out from all the elements.

#### 4,952,810 DISTORTION FREE DEWAR/COLDFINGER ASSEMBLY

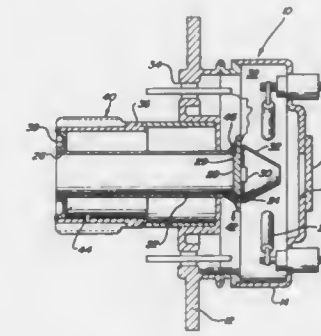
Kenneth L. Gustafson, Pollock Pines; Timothy S. Romano; Nevil Q. Maassen, both of Goleta, and Donald E. Salzer, Santa Barbara, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Aug. 23, 1989, Ser. No. 397,710

Int. Cl.<sup>5</sup> G01J 5/06

U.S. Cl. 250—352

17 Claims



1. An infrared detector assembly comprising: a dewar housing providing an evacuated cavity; a titanium coldfinger tube within said dewar housing, said tube having a cold end; cooling means for cooling said cold end of said titanium coldfinger tube; a tungsten end-cap having a first surface defining a planar mounting platform and a second surface configured to enclose said titanium coldfinger tube at said cold end; a metallurgical bond between said tungsten end-cap and said titanium coldfinger tube; an infrared detector mounted to said first surface of said tungsten end-cap; and said titanium coldfinger tube providing strength for supporting said detector, said tungsten end-cap providing thermal conductivity between said coldfinger tube and said infrared detector, and said metallurgical bond providing a hermetic seal for preserving the integrity of said evacuated cavity.

#### 4,952,811 FIELD INDUCED GAP INFRARED DETECTOR

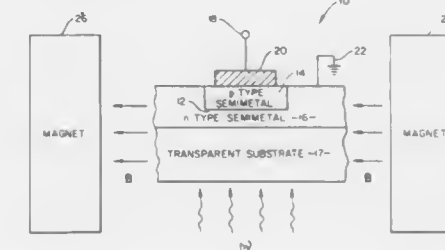
C. Thomas Elliott, Malvern, England, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 21, 1989, Ser. No. 369,403

Int. Cl.<sup>5</sup> G01J 5/00, 5/06

U.S. Cl. 250—370.13

16 Claims



1. A method for detecting long wavelength infrared radiation comprising the steps of: (a) providing a vanishing band gap semimetal;



- (b) applying a magnetic field to said semimetal material of strength sufficient to induce a band gap in said material of energy corresponding to the energy of the infrared radiation to be detected; and
- (c) detecting infrared radiation incident on said material by detecting electron/hole pairs created in the material by the incident infrared radiation.

4,952,812

## IRRADIATION OF BLOOD PRODUCTS

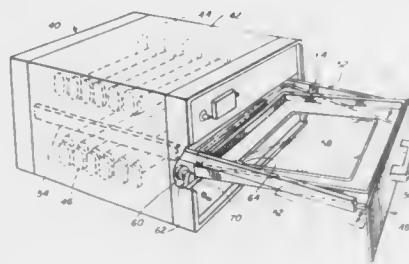
Jeffrey E. Miripol, Newark, Del.; Arnold Bilstad, Deerfield, Ill.; John Foley, Wheeling, Ill.; Dean Glash, McHenry, Ill., and William R. Bratten, Lake Villa, Ill., assignors to Baxter International Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 156,637, Feb. 17, 1988, Pat. No. 4,866,282, which is a division of Ser. No. 900,217, Aug. 26, 1986, abandoned. This application May 2, 1989, Ser. No. 346,202

Int. Cl.<sup>5</sup> A61N 5/06

U.S. Cl. 250—455.1

31 Claims



1. The method of irradiating a layer of a blood product containing white blood cells with ultraviolet radiation predominately of a wavelength of 280 to 320 nanometers, to provide a total energy exposure of 800 to 20,000 millijoules per square cm. of ultraviolet radiation, whereby said white blood cells substantially lose their capability to set off an immune reaction in an alloimmunized patient.

4,952,813

## RADIOGRAPHIC INTENSIFYING SCREEN AND PROCESS FOR THE PREPARATION OF THE SAME

Junji Miyahara, and Akira Kitada, both of Kaisel, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 527,492, Aug. 29, 1983, abandoned.

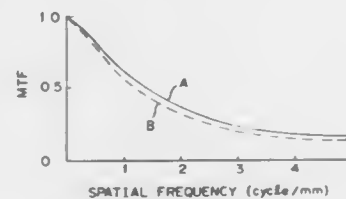
This application Jun. 13, 1988, Ser. No. 233,608

Claims priority, application Japan, Aug. 30, 1982, 57-149069; Aug. 30, 1982, 57-149070

Int. Cl.<sup>5</sup> G21K 4/00

U.S. Cl. 250—483.1

28 Claims



1. A radiographic intensifying screen comprising a support and a phosphor-containing resin layer coated on said support at atmospheric pressure and then subjected to a compression treatment, wherein said resin layer contains a binder comprising a mixture of a linear polyester and nitrocellulose and a phosphor in a binder-to-phosphor weight ratio within the range of 1:1 to 1:25, and said resin layer further contains voids such that the void ratio of the compression treated phosphor-

containing resin layer is not more than 85% of the void ratio of said layer prior to said compression treatment.

4,952,814

## TRANSLATING APERTURE ELECTRON BEAM CURRENT MODULATOR

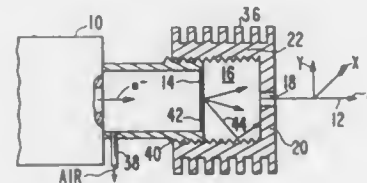
Calvin J. Huntzinger, Redwood City, Calif., assignor to Varian Associates, INC., Palo Alto, Calif.

Filed Jun. 14, 1989, Ser. No. 366,000

Int. Cl.<sup>5</sup> H01J 33/04

U.S. Cl. 250—505.1

17 Claims



1. An apparatus for reducing the current in a beam from an electron accelerator, comprising:
- a chamber made of low atomic number material of thickness sufficient to stop an electron from the beam;
  - a scattering foil, said foil being substantially perpendicular to a central axis of the electron beam and mounted in said chamber;
  - a wall of low atomic number material of thickness sufficient to stop any electron from the beam, said wall being substantially symmetrical about the central axis of the electron beam, said wall having a central aperture for passing a portion of electrons scattered from said scattering foil;
  - said scattering foil been position in thermal contact with said chamber;
  - said wall been position in good thermal contact with said chamber; and
  - heat dissipation means for moving heat from said chamber.

4,952,815

## FOCUSING DEVICE FOR PROJECTION EXPOSURE APPARATUS

Kenji Nishi, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

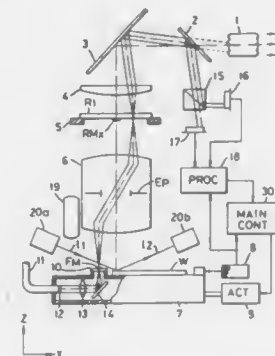
Filed Apr. 10, 1989, Ser. No. 335,428

Claims priority, application Japan, Apr. 14, 1988, 63-91953; Apr. 25, 1988, 63-101924

Int. Cl.<sup>5</sup> G01N 21/86

U.S. Cl. 250—548

10 Claims



1. A projection exposure apparatus for projecting the image

of an object on a first plane onto a second plane through a projection optical system, comprising:

reference mark means provided in the vicinity of said second plane;

illumination means for illuminating said reference mark means from a side opposite to said projection optical system with respect to said second plane;

separation means for separating an illuminating light beam, transmitted by said reference mark means and forming the image of said reference mark means in the vicinity of said first plane through said projection optical system, into two light beams respectively passing through mutually different two areas in the pupil of said projection optical system; detection means comprising at least a pair of light receiving elements respectively receiving said light beams separated by said separation means and releasing signals corresponding to the intensities of said light beams; and

position control means for detecting the position of the image plane of said projection optical system with respect to said reference mark means, based on the output signals of said detection means, and varying the optical path length between said first plane and said reference mark means.

4,952,816

## FOCUS DETECTION SYSTEM WITH ZERO CROSSING DETECTION FOR USE IN OPTICAL MEASURING SYSTEMS

Christopher C. Dunning, Bristol, United Kingdom, assignor to Renishaw plc, England

PCT No. PCT/GB88/00872, § 371 Date May 22, 1989, § 102(e) Date May 22, 1989, PCT Pub. No. WO89/04007, PCT Pub. Date May 5, 1989

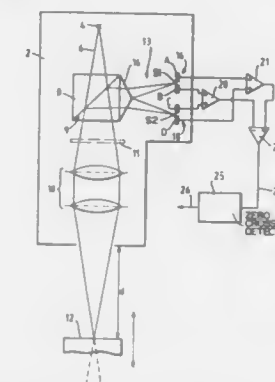
PCT Filed Oct. 17, 1988, Ser. No. 358,387

Claims priority, application United Kingdom, Oct. 20, 1987, 8724575

Int. Cl.<sup>5</sup> G01N 21/86; G01J 1/20

U.S. Cl. 250—560

11 Claims



1. An optical measuring system for use with a machine comprising a probe having a housing, a light source and a focussing device mounted within the housing for producing a light beam focussed at a point outside the housing, and a focus detection system for receiving light reflected from a surface towards which the light beam is directed, characterised in that the light source and the focussing device are mounted in fixed relationship within the housing, the focus detection system further comprising first and second detector means for producing two outputs indicative of the amount of reflected light falling on different parts thereof and function means for receiving said two outputs and for producing a focus error signal which has a zero value when the light beam is in focus on the surface and a non-zero value when the light beam is out of focus on the surface, and wherein the focus detection system further comprises a zero crossing detection circuit for detecting the zero crossing points of the focus error signal and for

producing an output each time a zero crossing is detected, the output being passed to the machine on which the probe is mounted.

4,952,817

## SELF-STARTING TEST STATION

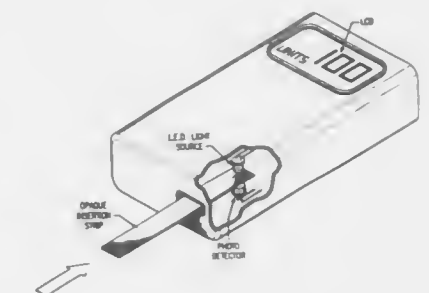
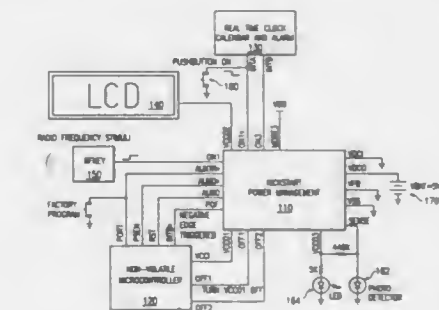
Michael L. Bolan, Dallas; Wendell L. Little, Denton, and Kevin E. Deierling, Dallas, all of Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed May 31, 1989, Ser. No. 359,446

Int. Cl.<sup>5</sup> H02J 1/00, 7/00

U.S. Cl. 307—39

32 Claims



1. A system, comprising:
- a standalone chassis, which does not include any power-line connection for use during normal operation;
  - at least one battery, mounted in said chassis;
  - a microprocessor, mounted in said chassis;
  - a proximity sensor subsystem, mounted to said chassis;
  - a testing subsystem, mounted to said chassis; and
  - logic which is connected
- to control the power supply to said microprocessor, and which is also connected
- to periodically activate said proximity sensor subsystem, without powering up said microprocessor, to determine whether a sample has been inserted by a user, and which is also connected
  - to provide power to said microprocessor if said proximity sensor subsystem, at the time of one of said periodic activations, indicates that a sample has been inserted by a user;
- wherein said microprocessor is connected and programmed to control said testing subsystem.

4,952,818

## TRANSMISSION LINE DRIVER CIRCUITS

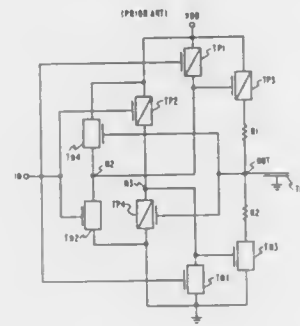
Charles K. Erdelyi, Essex Junction, Vt., and Timothy P. Reed, Cary, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 17, 1989, Ser. No. 353,378

Int. Cl.<sup>5</sup> H03K 17/16, 19/017, 19/21

U.S. Cl. 307—270

22 Claims



1. A driver circuit comprising first and second points of reference potential, an output circuit including an output terminal and a first transistor of one conductivity type coupled between said first and second points of reference potential, said transistor being disposed between said output terminal and one of said first and second points of reference potential, a voltage divider including serially arranged second and third transistors coupled between said first and second points of reference potential, respectively, each of said second and third transistors being of a conductivity type opposite to that of said first transistor, the common point between said second and third transistors being coupled to a control electrode of said first transistor, means for applying an input to a control electrode of said third transistor, and means for coupling said output terminal to a control electrode of said second transistor.

4,952,819

## CIRCUIT FOR LIMITING CURRENT PEAKS AT TURN-ON OF A SWITCHING TRANSISTOR

Dieter Herrmann, Büchenbach, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

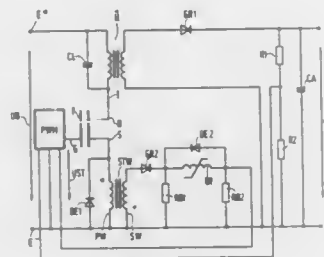
Filed Apr. 7, 1988, Ser. No. 178,705

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1987, 3712784

Int. Cl.<sup>5</sup> H03K 3/30, 3/01, 17/687

U.S. Cl. 307—282

17 Claims



1. A circuit arrangement for limiting switching-on current peaks in a switching transistor comprising: means for applying to a control input of the switching transistor a control voltage comprising rectangular switching pulses of the same height, characterized in that a connection lead of the switching transistor includes a coil through which an operating current of the

switching transistor flows, in that a voltage produced by self-induction in said coil counteracts the control voltage of the switching transistor, and in that the self-inductance of the coil is proportioned so that only the occurrence of switching-on current peaks produces an effective reduction of the control voltage of the switching transistor.

4,952,820

## REDUCTION OF INTERMODULATION DISTORTION IN LIGHT EMITTING DIODES

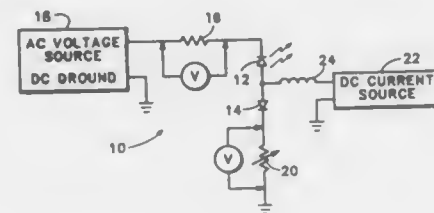
Arnold M. Frisch, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 27, 1989, Ser. No. 329,052

Int. Cl.<sup>5</sup> H03K 3/42

U.S. Cl. 307—311

6 Claims



1. A low distortion light source for use with an A.C. signal source, comprising: semiconductor light source means, compensating means having a forward resistance characteristic substantially similar to that of said light source means, said light source means and said compensating means being connected in anti-series with the signal source, and first biasing means for applying a biasing current through said light source means and second biasing means for applying a biasing current through said compensating means, wherein said first and second biasing means provide substantially equal biasing currents through said light source means and said compensating means.

4,952,821

## VOLTAGE DETECTION CIRCUIT AND COMPARISON VOLTAGE GENERATOR THEREFOR

Hiroshi Kokubun, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

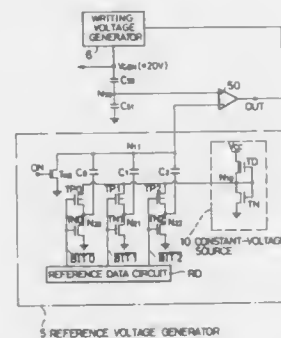
Filed Jun. 13, 1988, Ser. No. 206,864

Claims priority, application Japan, Jun. 12, 1987, 62-145186

Int. Cl.<sup>5</sup> H03K 5/08, 5/24

U.S. Cl. 307—350

21 Claims



1. A voltage detection circuit comprising:

- a detected-voltage node at which a voltage to be detected is applied;
- a comparison voltage node;
- a plurality of reference setting means each comprising: a reference setting capacitor having a first terminal connected to said comparison voltage node and a second terminal; and a switching circuit for selectively connecting said second terminal of said reference setting capacitor to one of either a first potential node and a second potential node; third and fourth potential nodes;
- a first voltage detecting capacitor having a first terminal connected to said comparison voltage node and a second terminal connected to said detected voltage node, and a second voltage detecting capacitor having a first terminal connected to said comparison voltage node and a second terminal connected to said third potential node; and
- a voltage comparison circuit for comparing a voltage on said comparison voltage node with a voltage on said fourth potential node to produce an output signal indicating the result of said comparison.

4,952,822

## INTEGRATED LOGIC CIRCUIT WITH INSTABILITY DAMPING

Jan Dikken, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

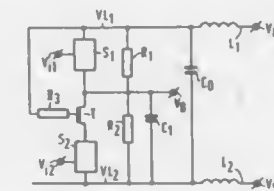
Filed Nov. 10, 1988, Ser. No. 270,155

Claims priority, application Netherlands, Nov. 20, 1987, 8702781

Int. Cl.<sup>5</sup> H03K 19/017, 19/003

U.S. Cl. 307—443

2 Claims



1. An integrated logical circuit, comprising a first subcircuit coupled between a first supply line and a circuit output, a second sub-circuit coupled between the circuit output and a second supply line, whereby at least between one of the subcircuits and the circuit output a current conduction path of an additional transistor is placed for reducing electrical fields in parts of the respective subcircuit, a control electrode of said additional transistor being coupled solely to the supply to which the other of the subcircuits is coupled, characterized in that said control electrode is coupled to said one supply line via a resistive element.

4,952,823

## BICMOS DECODER

Tzen-Wen Guo, Milpitas, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 3, 1989, Ser. No. 346,969

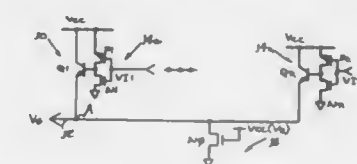
Int. Cl.<sup>5</sup> H03K 19/01, 19/003, 19/082, 19/094

U.S. Cl. 307—463

10 Claims

1. A bipolar/CMOS decoder circuit comprising: a plurality of pull-up gate circuits (14a), each of said gate circuits being formed of a pull-up P-channel MOS transistor (P1), a pull-down N-channel MOS transistor (N1), and a pull-up bipolar transistor (Q1); said pull-up P-channel transistor (P1) having its source connected to a supply potential (VCC), its gate connected to the gate of said pull-down N-channel transistor (N1), and its drain connected to the drain of said pull-down N-channel transistor (N1), said pull-down N-channel transistor (N1), said pull-down N-channel transistor (N1) having its source connected to a ground potential, said common gates of said P-channel and N-channel transistor (P1, N1) being connected to receive an input logic signal; said pull-up bipolar transistor (Q1) having its collector connected to the supply potential (VCC), its base connected to the common drains of said P-channel and N-channel transistors (P1, N1), and its emitter connected to a common emitter node for providing a decoded output signal; and a pull-down circuit (16) formed of a single pull-down current source N-channel MOS transistor (N2), said current source N-channel transistor (N2) having its drain connected to the common emitter node, its gate connected to a voltage source, and its source connected to the ground potential.

(N1) having its source connected to a ground potential, said common gates of said P-channel and N-channel transistor (P1, N1) being connected to receive an input logic signal; said pull-up bipolar transistor (Q1) having its collector connected to the supply potential (VCC), its base connected to the common drains of said P-channel and N-channel transistors (P1, N1), and its emitter connected to a common emitter node for providing a decoded output signal; and



1. A pull-down circuit (16) formed of a single pull-down current source N-channel MOS transistor (N2), said current source N-channel transistor (N2) having its drain connected to the common emitter node, its gate connected to a voltage source, and its source connected to the ground potential.

4,952,824

## ION IMPLANTATION PROGRAMMABLE LOGIC DEVICE

Seisufumi Kamuro, Matsudo, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

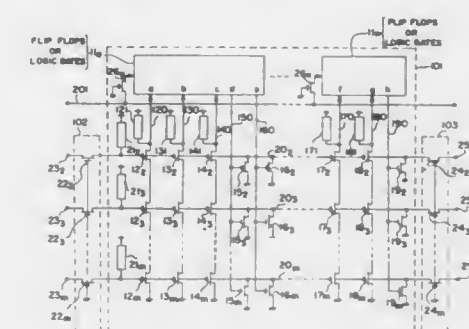
Filed Oct. 7, 1988, Ser. No. 255,450

Claims priority, application Japan, Oct. 7, 1987, 62-253044

Int. Cl.<sup>5</sup> H63K 19/177

U.S. Cl. 307—469

10 Claims





signal lines, each of which interconnects the gates of corresponding ones of said MOS transistors; load elements connected between each of said signal lines and another voltage level; and at least one output signal circuit having second MOS transistors each of which is connected between another voltage level and one of said signal lines, respectively, the gates of said second MOS transistors being connected to said at least one output of said at least one logic cell.

4,952,825

# SEMICONDUCTOR INTEGRATED CIRCUIT HAVING SIGNAL LEVEL CONVERSION CIRCUIT

Hiroshi Yoshida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

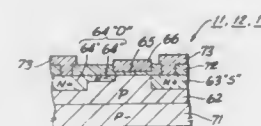
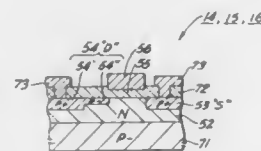
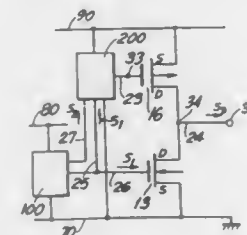
Filed Mar. 13, 1989, Ser. No. 322,787

Claims priority, application Japan, Mar. 14, 1988, 63-60858

Int. Cl.<sup>3</sup> H03K 5/02, 17/08, 17/28, 17/284

U.S. Cl. 307—475

19 Claims



1. A semiconductor integrated circuit comprising a reference voltage line for supplying a reference voltage, a first power supply line for supplying a first voltage, a second power supply line for supplying a second voltage higher level than said first voltage from said reference voltage, a first circuit connected between said first power supply voltage line and said reference voltage line so as to be driven by the voltage difference between said first voltage and said reference voltage, a second circuit connected between said second power supply voltage line and said reference voltage line so as to be driven by the voltage difference between said second voltage and said reference voltage, means for supplying a signal from said first circuit to said second circuit, and means for outputting a signal from said second circuit; said second circuit including a plurality of first insulated gate field effect transistors each having source and drain regions, a first gate insulating film and a gate electrode to which said signal from said first circuit is applied, a plurality of second insulated gate field effect transistors each having source and drain regions, a second gate insulating film having a thickness thicker than that of said first gate insulating film and a gate electrode, and a node connected to one of said source and drain regions of one of said first transistors, to one of said source and drain regions of one of said second transistors and to said means for outputting said signal.

4,952,826

# SIGNAL INPUT CIRCUIT UTILIZING FLIP-FLOP CIRCUIT

Katsuji Hoshi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 882,563, Jul. 7, 1986, Pat. No. 4,785,206. This application Jun. 3, 1988, Ser. No. 201,987

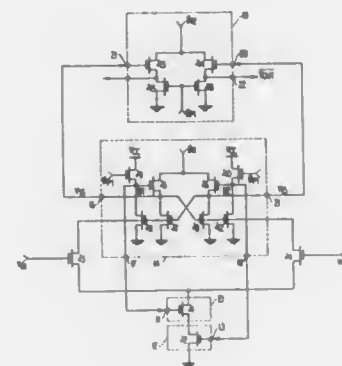
Claims priority, application Japan, Jul. 5, 1985, 60-148639

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.<sup>3</sup> H03K 3/356, 3/013, 17/04, 19/01

U.S. Cl. 307—530

7 Claims



6. A transistor circuit comprising a first input terminal supplied with an input signal voltage, a second input terminal supplied with a reference voltage, a first inverter having input and output terminals, a second inverter having input and output terminals connected respectively to said output and input terminals of said first inverter, a reference terminal, a first means coupled between said input terminal of said first inverter and said reference terminal and having a control terminal connected to said first input terminal for providing thereacross a first impedance representative of an amplitude of said input signal voltage, second means coupled between said input terminal of said second inverter and said reference terminal and having a control terminal connected to said second input terminal for providing thereacross a second impedance representative of an amplitude of said reference voltage, a third inverter having an input terminal, which is connected to said input terminal of said first inverter, and an output terminal, a fourth inverter having an input terminal, which is connected to said input terminal of said second inverter, and an output terminal, a first gate connected in series with said first means between said input terminal of said first inverter and said reference terminal and having a control terminal connected to said output terminal of said third inverter, a second gate connected in series with said second means between said input terminal of said second inverter and said reference terminal and having a control terminal connected to said output terminal of said fourth inverter, and third means coupled to said input terminals of said first and second inverters for producing an output signal having a first level when said first impedance is larger than said second impedance and a second level when said first impedance is smaller than said second impedance.

4,952,827

# CIRCUIT ARRANGEMENT FOR CONTROLLING THE LOAD CURRENT IN A POWER MOSFET

Ludwig Lelpold; Rainald Sander; Jenoe Tihanyi; Roland Weber, all of Munich, Fed. Rep. of Germany, and Nance: Paul, Sunnyvale, Calif., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

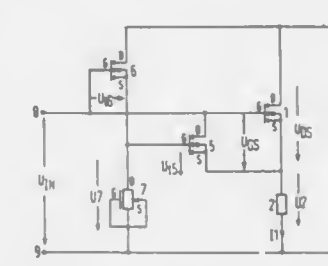
Filed Nov. 15, 1989, Ser. No. 438,342

Claims priority, application European Pat. Off., Nov. 15, 1988, 88119041.7

Int. Cl.<sup>3</sup> H03K 17/08, 17/16, 17/687/19/094

U.S. Cl. 307—571

3 Claims



1. A circuit arrangement for controlling a load current from a power MOSFET to a load connected in series with a source terminal of the power MOSFET, comprising:

- a second MOSFET having a drain-source path connected between a gate terminal and a source terminal of the power MOSFET, said second MOSFET having a threshold voltage that is higher than a drain-source voltage drop of the power MOSFET at nominal current;
- a third MOSFET having a source terminal connected to a gate terminal of said second MOSFET and having a drain terminal connected to a drain terminal of the power MOSFET, said third MOSFET having a gate terminal connected to the gate terminal of the power MOSFET; and
- a current source having first terminal connected to a gate terminal of said second MOSFET, said current source having a second terminal connected to a fixed potential.

4,952,828

# BRUSHLESS GENERATOR WITH FRONT COVER INNER-STATOR MOUNT

Ye Yu-fang, and Ye Yu-jing, Ye Yu-wei; Xu Yi-xin, all of Fujian, China, assignors to Fujian Xianyou Electric Machine Plant, Fujian, China

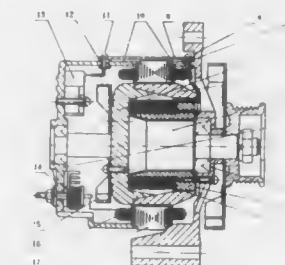
Filed May 22, 1989, Ser. No. 354,561

Claims priority, application China, May 20, 1988, 88103087.2

Int. Cl.<sup>3</sup> H02K 19/24, 5/00, 11/00

U.S. Cl. 310—68 D

4 Claims



1. A brushless generator comprising: front and rear covers; an inner stator mounted to the inner wall of said front cover, an exciting coil mounted to said inner stator; and outer stator; an armature coil mounted to said outer stator; a rotor spindle; rotor poles extending from said rotor spindle into a space between said inner and outer stators; an internal fan located between said rear cover and said rotor poles and mounted on

said rotor poles for rotation therewith, whereby said internal fan facilitates heat dissipation from the interior of said generator; an electrically conductive designation strip mounted to, but electrically insulated from, said front and rear covers by insulated mounting elements; a voltage regulating means mounted to said rear cover; first electrical conductor means for electrically connecting one electrical terminal of said exciting coil to said designation strip; and second electrical conductor means for electrically connecting said voltage regulator means to said designation strip, whereby said designation strip forms a portion of the electrically conductive path between said voltage regulator means mounted to the rear cover and the exciting coil mounted to the front cover mounted inner stator.

4,952,829

# RECTIFIER ARRANGEMENT

Franz Armbruster, Stuttgart; Hartmut Back, Marbach; Henning Festerding, Markgröningen; Wenzel Pabst, Eberdingen; Stefan Renner, Weissach-Flacht, and Karl-Heinz Koplin, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE88/00442, § 371 Date Apr. 4, 1989, § 102(e)

Date Apr. 4, 1989, PCT Pub. No. WO89/02161, PCT Pub. Date Mar. 9, 1989

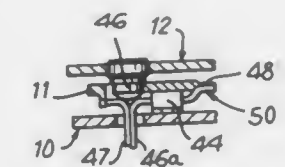
PCT Filed Jul. 16, 1988, Ser. No. 347,944

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728081

Int. Cl.<sup>3</sup> H02K 11/00; H02M 1/00

U.S. Cl. 310—68 D

19 Claims



1. Rectifier supporting device for attachment to a circular end shield of a housing of a generator designed for use in motor vehicles, comprising two facing carrier plates of a heat conducting material for supporting rectifying diodes having head wires; a circuit board of electrically insulating material in which conductors for circuit connections of the diodes and of stator wires of the generator are embedded; the circuit board being arranged between the carrier plates; each of the carrier plates and the circuit board having a shape of a circle segment approximating more than a half of the circular shape of the end shield to define a segment-like cutout for accommodating a brush holder of the generator; one of the carrier plates being constructed as a positive heat sink and the other carrier plate as a negative heat sink; and the two heat sinks and the circuit board being arranged coaxially in separate planes at an axial distance one from each other.

4,952,830

# BRUSHLESS MOTOR WITH HALL ELEMENTS

Hiroaki Shirakawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1989, Ser. No. 410,446

Claims priority, application Japan, Sep. 22, 1988, 63-239408

Int. Cl.<sup>3</sup> H02K 11/00

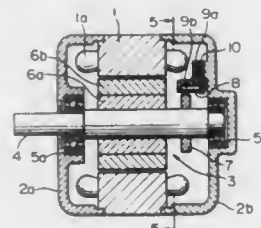
U.S. Cl. 310—68 B

5 Claims

1. A brushless motor having Hall elements for detecting the rotor position, comprising:

- a rotor having a rotor shaft rotatably supported by a housing structure of the motor, and a cylindrical main rotor magnet coaxially secured to said rotor shaft;
- a stator having stator coils supplied with currents whose

directions are changed over in succession in response to a position of the rotor so as to drive and rotate the rotor; an annular sub-magnet secured to the rotor shaft at a side of the main rotor magnet, said sub-magnet having magnetic poles formed at an outer circumferential surface thereof; a holder of non-magnetic material having a semicircular cylindrical extension portion extending over and opposing the outer circumferential surface of the sub-magnet across a small radial gap, said extension portion having a plurality of rectangular bores formed therein at a predetermined circumferential pitch, each bore extending in an axial direction to open at an axial end, wherein each bore has sufficient dimensions to receive and accommodate a Hall element completely therein;



- a plurality of Hall elements accommodated within bores of said holder to be separated from each other by a predetermined circumferential pitch and to oppose the outer circumferential surface of the sub-magnet across a small radial gap, said Hall elements detecting the magnetic field generated by the sub-magnet to determine the position of the rotor; and
- a printed circuit board attached to said holder to close openings of said bores and having a printed circuit pattern formed on a back surface thereof opposite to a surface thereof attached to the holder, wherein leads of the Hall elements extend through through-holes formed in the printed circuit board to be electrically connected to the printed circuit pattern, and the holder and the printed circuit board fixedly secured to each other are mounted together to the housing structure of the motor.

4,952,831

# DEVICE FOR WATERPROOFING AROUND TERMINAL BOLT

Shuzoo Isozumi, and Kelichi Konishi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

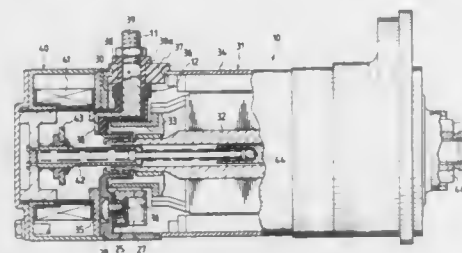
Filed Jun. 27, 1989, Ser. No. 371,880

Claims priority, application Japan, Jul. 7, 1988, 63-90267/88[U]

Int. Cl.<sup>3</sup> H02K 5/10, 5/00

U.S. Cl. 310—71

6 Claims



1. A device for waterproofing around a terminal bolt, having a shank and an outer portion projecting from a casing through an opening thereof having an opening edge, comprising: an electric insulator secured on the shank of said bolt, which is located inside said casing;
- a grommet made of an elastic material and having a top and bottom portion, said bottom portion being sized in one

dimension to be tightly fitted against said opening edge and sized in another dimension to be located in contact with said insulator, said grommet having an insertion hole through which the said outer portion of said bolt, which projects from said casing, extends; and

a rigid sleeve having a top end flange and a lower end and being tightly fitted in said hole between said outer portion and said grommet.

4,952,832

# SURFACE ACOUSTIC WAVE DEVICE

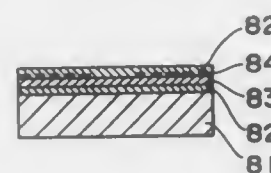
Takahiro Imai, Hideaki Nakahata, and Naoki Fujimori, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 24, 1989, Ser. No. 425,956

Int. Cl.<sup>3</sup> H01L 41/08

U.S. Cl. 310—313 A

12 Claims



1. A surface acoustic wave device which comprises a piezoelectric layer, a carbonaceous layer which is selected from the group consisting of a diamond layer and a diamond-like carbon layer and formed on at least one surface of the piezoelectric layer, and at least a pair of interdigital transducer electrodes.

4,952,833

# HIGH DENSITY SURFACE ACOUSTIC WAVEGUIDE CHANNELIZER

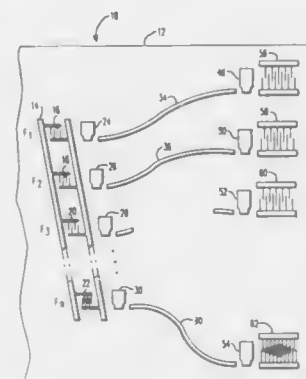
Carl E. Nothnick, Pasadena, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 22, 1989, Ser. No. 327,443

Int. Cl.<sup>3</sup> H01L 41/08

U.S. Cl. 310—313 D

20 Claims



1. A surface acoustic wave (SAW) channelizer for producing a band limited output signal on each channel comprising: an active substrate and metallization elements on the substrate including a wide band, multichannel, frequency stepped, input interdigital transducer having a plurality of input channel transducers, each having a different center frequency and having a relatively wide output aperture for producing a corresponding relatively wide aperture beam frequency stepped acoustic wave signal of reduced bandwidth on each corresponding channel;
- a beam width compressor for each channel responsively

coupled proximate to the input transducer for reducing the acoustic wave signal to a beam width of relatively narrower aperture;

a waveguide for each channel having an input responsively coupled proximate to the beam width compressor for such channel, said waveguide for isolating and carrying the acoustic wave signal therealong to its output end, the input and output ends of each waveguide being remote from and laterally displaced with respect to each other and separated from the other waveguide outputs by an amount sufficient to reduce cross talk between channels;

a beam width expander for each channel responsively coupled proximate to the output of the corresponding waveguide output for expanding the acoustic wave signal to a beam of relatively larger aperture;

a frequency selective, interdigital output transducer for each channel responsively coupled proximate to the waveguide output for producing an RF electrical signal of further reduced bandwidth centered at the frequency of the corresponding frequency stepped channel input transducer.

4,952,834

# CIRCUITRY FOR DRIVING ULTRASONIC MOTOR

Junji Okada, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

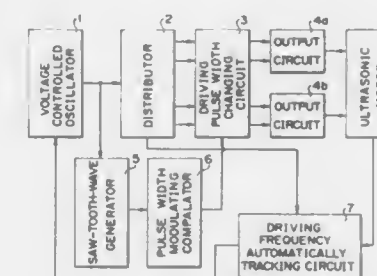
Filed Mar. 10, 1989, Ser. No. 321,993

Claims priority, application Japan, Mar. 14, 1988, 63-059583

Int. Cl.<sup>3</sup> H01L 41/08

U.S. Cl. 310—316

19 Claims



1. Circuitry for driving an ultrasonic motor in which a movable member which is in a frictional contact relationship with the surface of an elastic member is forcedly moved by applying an alternating voltage to a piezoelectric element secured to said elastic member to generate travelling vibration waves upon the surface of the elastic member, comprising:
- a voltage controlled oscillator for generating rectangular waves having a frequency 4n times (where n is an integer) greater than that of said applied alternating voltage;
- a distributor for separating said rectangular waves into four phase pulse wave ( $\phi_0$ ,  $\phi_1$ ,  $\phi_2$  and  $\phi_3$  wherein  $\phi_0$  and  $\phi_1$ ;  $\phi_2$  and  $\phi_3$  are 180° out-of-phase with each other,  $\phi_0$  and  $\phi_2$ ,  $\phi_1$  and  $\phi_3$  being 90° out-of-phase with each other);
- a saw-tooth-wave generator for generating saw-tooth-wave signals which are in synchronization with said rectangular waves;
- a pulse width modulating comparator for comparing the level of said saw-tooth-wave signals with that of a reference voltage;
- a reference voltage adjusting means for changing said reference voltage in response to an external operation;
- a driving pulse width changing circuit for changing the width of said four phase pulses in response to the output from said pulse width modulating comparator;
- an output circuit which combines 180° out-of-phase pulses  $\phi_0$  with  $\phi_1$ ;  $\phi_2$  with  $\phi_3$ , the pulse width of which have been changed by said driving pulse width changing circuit and amplifies the combined pulses to apply them to said

piezoelectric element as two 90° out-of-phase alternating voltages;

a feed-back piezoelectric element secured to said elastic member for generating a feed back signal developed due to the piezoelectric effect on driving of the ultrasonic motor; and

a driving frequency automatic tracking circuit responsive to said feed back signal for outputting to said voltage controlled oscillator a voltage signal representative of a difference between an optimum driving frequency and a current driving frequency.

4,952,835

# DOUBLE SAGGITAL PUSH STROKE AMPLIFIER

Paul H. Stahlhuth, Mission Viejo, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

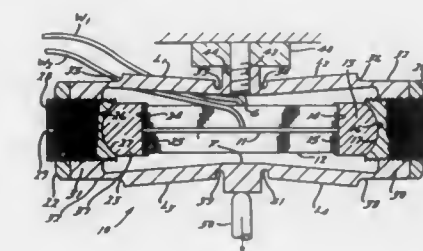
Filed Dec. 27, 1988, Ser. No. 289,884

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.<sup>3</sup> H01L 41/08

U.S. Cl. 310—328

9 Claims



1. A double sagittal stroke amplifier, comprising: an electroexpansive actuator energizable to responsively expand in length by a predetermined amount;
- a relatively rigid reference support frame;
- means providing a first sagittal linkage having first and second ends connected to respective ends of said electroexpansive actuator, and the midpoint of said first linkage being connected to said support frame;
- means providing a second sagittal linkage having first and second ends connected to respective ends of said electroexpansive actuator, and the midpoint of said second linkage being free to move in response to said electroexpansive actuator and with respect to the fixed midpoint of said first linkage;
- wherein said midpoints of said first and second linkages are separated from each other by a distance that is less than the distance between connected endpoints.

4,952,836

# PIEZOELECTROSTATIC GENERATOR

Glen A. Robertson, Harvest, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 27, 1989, Ser. No. 343,656

Int. Cl.<sup>3</sup> H01L 41/08

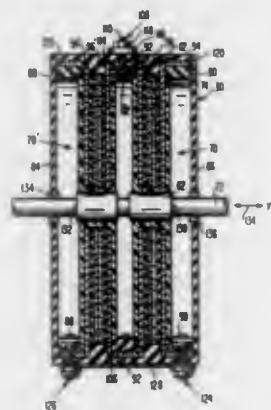
U.S. Cl. 310—339

13 Claims

1. A piezoelectrostatic element, comprising: first and second flat, elongated strips of piezoelectric material, each of said strips having first and second ends and first and second parallel planar surfaces, each said strip producing an electrical potential across its first and second surfaces in response to mechanical bending thereof, said strips being mounted in intimate surface-to-surface contact in a common plane and in electrical series to produce, upon bending, an electrical potential across the noncontacting surfaces of the mounted strips;



first and second elongated layers of dielectric material mounted on and being coextensive with, the noncontacting surfaces of said piezoelectric strips, respectively; first and second elongated electrode strips mounted on, and being at least coextensive with, said first and second dielectric layers, respectively, said electrode strips being parallel to said piezoelectric strip surfaces and spaced from said piezoelectric strips by said dielectric layers; and an insulating layer surrounding said piezoelectric strips,



dielectric layers and electrode strips to form a piezoelectrostatic element;  
means fixedly mounting said element at one end, the other end thereof being movable with respect thereto to bend said piezoelectric strips to produce said electrical potential, said potential appearing across said electrode strips; and  
means connected to said relatively movable end for driving said movable end to produce a component of motion along an axis perpendicular to said common plane.

4,952,837

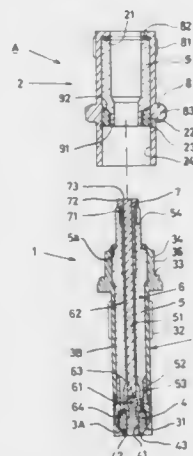
## SURFACE GAP TYPE IGNITER PLUG

Shuzo Matsumura, and Takahiro Suzuki, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan  
Filed Feb. 22, 1989, Ser. No. 313,744

Claims priority, application Japan, May 9, 1988, 63-112228  
Int. Cl.<sup>5</sup> H01T 13/20, 13/34

U.S. Cl. 313—135

9 Claims



1. A surface gap type igniter plug comprising:  
a cylindrical metallic shell;

a tubular insulator inserted into said metallic shell with a rear end projected from that of said insulator;  
a center electrode disposed to position at an inside of said insulator, the electrode making its rear end projected from the rear end of said insulator;  
a sleeve terminal located between an outside of said electrode and an inside of said insulator, the terminal being secured at a rear end to said center electrode by means of thermal fusion;  
a connector having an insulator sleeve interfit into an inside of a metallic sleeve, the insulator sleeve being terminated short of a front end of said metallic sleeve; and  
said connector being securely capped to said metallic shell at a time of assemblage with the rear end of said tubular insulator interfit into an inside of said insulator sleeve, and with said metallic shell interfit into an inside of said metallic sleeve.

4,952,838  
SURFACE MOUNT MINIATURE INCANDESCENT LAMP ASSEMBLY

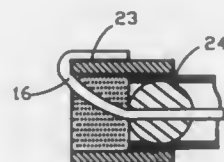
Richard E. DuNah, Sonoma County, Calif., assignor to Precision Lamp, Inc., Cotati, Calif.

Filed Jan. 11, 1989, Ser. No. 295,811

Int. Cl.<sup>5</sup> H01K 1/24

U.S. Cl. 313—318

3 Claims



1. A surface mount miniature incandescent lamp assembly of the type which includes an incandescent lamp having an elongated sealed cylindrical envelope with an axially extending filament having leads extending outwardly from the ends of the envelope comprising:

open cylindrical metal end caps adapted to receive the ends of said sealed envelope and spaced therefrom, and providing connection to an associated circuit, and  
resilient, pliable material which adheres to the metal end cap, lamp leads and lamp envelope, filling the end of the cap and extending between the lamp envelope and the adjacent end cap to resiliently support the lamp and means for connecting the leads to the end cap.

4,952,839  
PHOTOCONDUCTIVE DEVICE AND METHOD OF OPERATING THE SAME

Kenkichi Tanioka; Mitsuo Kosugi, both of Tokyo; Junichi Yamazaki, Kawasaki; Keiichi Shidara, Tama; Kazuhisa Taketoshi, Sagami; Tatsuro Kawamura, Tama; Eikyu Hiruma, Komae; Shiro Suzuki, Yokosuka; Takashi Yamashita, Sagami; Masaaki Aiba; Yochizumi Ikeda, both of Tokyo; Tadaaki Hirai, Koganei; Yukio Takasaki, Kawasaki, all of Japan; Sachio Ishioka, Burlingame, Calif.; Tatsuo Maki-shima, Mitaka, Japan; Kenji Sameshima, Hachioji, Japan; Tsuyoshi Uda, Kodaira, Japan; Naohiro Goto, Machida, Japan; Yasuhiko Nonaka, Nobara, Japan; Eisuke Inoue, both of Mobera, Japan; Kazutaka Tsuji, and Hirofumi Ogawa, both of Hachioji, Japan, assignors to Hitachi, Ltd and Nippon Hoso Kyokai, both of Tokyo, Japan

Continuation of Ser. No. 69,156, Jul. 2, 1987, Pat. No. 4,888,521.

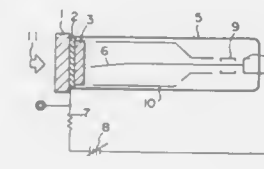
This application Oct. 12, 1989, Ser. No. 420,773

Claims priority, application Japan, Jul. 4, 1986, 61-156317; Oct. 29, 1986, 61-255671; Oct. 29, 1986, 61-255672; Nov. 25, 1986, 61-278635; Jan. 14, 1987, 62-4865; Jan. 14, 1987, 62-4867; Jan. 14, 1987, 62-4869; Jan. 14, 1987, 62-4871; Jan. 14, 1987, 62-4872; Jan. 14, 1987, 62-4873; Jan. 14, 1987, 62-4875; Jun. 17, 1987, 62-149023

Int. Cl.<sup>5</sup> H01J 31/38

U.S. Cl. 313—366

4 Claims



1. An imaging device having high sensitivity and low dark current comprising:  
a semiconductor region having an amorphous semiconductor layer into which photons are inserted and converted into electron-hole pairs by photoelectric conversion;  
means for applying a high electric field to the semiconductor region comprising an electrode and an electric power supply; and  
means for reducing dark current of the imaging device, wherein the amorphous semiconductor layer generates electron-hole pairs under said high electric field such that a number of said electron-hole pairs is larger than the number of incident photons.

4,952,840

## STRENGTHENING MEANS FOR A SIDEWALL OF A CUP-SHAPED MEMBER FOR AN ELECTRON GUN ASSEMBLY OF A CRT

John R. Hale, and Gerald J. McCauley, both of Lancaster County, Pa., assignors to RCA Licensing Corp., Princeton, N.J.

Filed Mar. 20, 1989, Ser. No. 325,840

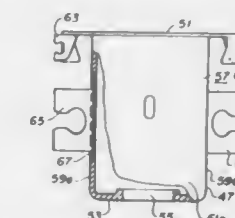
Int. Cl.<sup>5</sup> H01J 29/48

U.S. Cl. 313—456

2 Claims

1. In an electron gun assembly for use in a cathode-ray tube, said gun assembly including a plurality of electrodes longitudinally spaced along and attached to a plurality of insulative support means, said electrodes including at least one substan-

tially cup-shaped member having a base portion at one end, a supporting flange portion substantially parallel to said base portion at the oppositely disposed other end and a sidewall extending therebetween, and attachment means secured to said sidewall to facilitate attaching said cup-shaped member to said insulative support means, the improvement wherein



said sidewall includes at least one coiled weld area formed therein for providing a substantially flat welding surface having structural rigidity for securing said attachment means thereto.

4,952,841

## HIGH-PRESSURE DISCHARGE LAMP WITH IMPROVED ELECTRODES

Abraham Coomans, Eindhoven; Wilhelmus C. der Kinderen, deceased, late of Veldhoven, and Friedrich J. de Haan, administrator, Dommelen, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

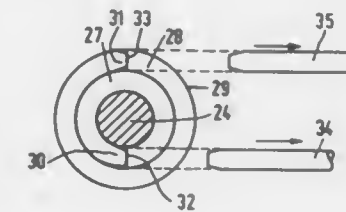
Filed Jul. 11, 1986, Ser. No. 884,693

Claims priority, application Netherlands, Jul. 17, 1985, 8502052

Int. Cl.<sup>5</sup> B01J 61/073

U.S. Cl. 313—631

9 Claims



1. A high pressure discharge lamp, comprising:  
(a) an outer lamp envelope; and  
(b) a high pressure discharge device energizable for emitting light within said outer envelope having a pair of discharge electrodes, each of said electrodes comprising an electrode rod and a length of wire having a nominal diameter wound in a coil disposed around said electrode rod, said length of wire terminating a burr-free end portions each with end faces having a diameter smaller than said nominal diameter and an annular bevelled surface extending between said end face and said nominal diameter to substantially define a truncated cone having its smallest diameter at said end face and its largest diameter at said nominal diameter, said end faces being rough and at least substantially flat.

**4,952,842**  
**DC/AC CONVERTER FOR IGNITING AND SUPPLYING A GAS DISCHARGE LAMP**

Pieter J. Bolhuis, Johannes M. Van Meurs, and Adrianus M. J. De Bijl, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

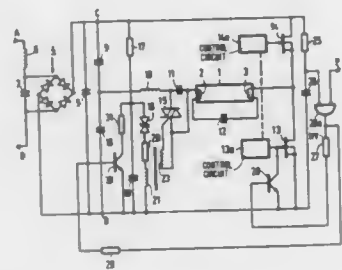
Filed Oct. 7, 1988, Ser. No. 255,072

Claims priority, application Netherlands, Oct. 19, 1987, 8702489

Int. Cl.<sup>3</sup> H05B 37/02

U.S. Cl. 315—106

12 Claims



1. A DC/AC converter for igniting and supplying a gas discharge lamp comprising: two input terminals for connection to a DC voltage source, said input terminals being connected together by means of a series arrangement of a load circuit comprising at least an induction coil and a parallel arrangement of the lamp and a first capacitor, as well as a first semiconductor switching element, said load circuit being shunted by a circuit comprising a second semiconductor switching element, said semiconductor switching elements being rendered alternately conducting and non-conducting by means of control circuits, a second capacitor connected in series with the induction coil and the lamp, which second capacitor is shunted by a third switching element which is non-conducting during a period of pre-heating of the lamp electrodes and is conducting at least during ignition of the lamp.

**4,952,843**  
**HIGH CURRENT ION SOURCE**

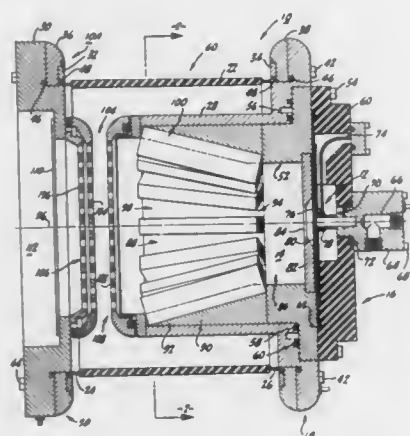
Ian G. Brown, 1088 Woodside Rd., Berkeley, Calif. 94708; Robert A. MacGill, 645 Kern St., Richmond, Calif. 94805, and James E. Galvin, 2 Commodore Dr. #276, Emeryville, Calif. 94608

Filed Mar. 8, 1989, Ser. No. 320,475

Int. Cl.<sup>3</sup> H01J 7/24; H05B 31/26

U.S. Cl. 315—111.81

20 Claims



1. A ion source utilizing a vacuum enclosure comprising:  
a. a cathode;

- b. an anode, said anode spaced apart from said cathode, within a first region in said vacuum enclosure;  
c. means for producing an electrical arc between said cathode and anode sufficient to vaporize and ionize a portion of said cathode to form a plasma in said first region and to permit travel of said plasma to a second region in the vacuum enclosure, said second region defined to permit physical expansion of said plasma transversely relative to a line between said first and second region, said second region of said vacuum enclosure including a first portion adjacent said first region and a second portion located further outwardly from said first region than said first portion of said second region, said second portion of said second region having a larger transverse dimension than said first portion of second region;  
d. means for producing a magnetic field in said second region which flattened the density profile of said plasma in said second region, said magnetic field producing means for including at least one magnetic member extending along the periphery of said second region, said magnetic member being electrically linked to said anode;  
e. means for extracting ions from said expanded plasma in a third region.

**4,952,844**  
**ELECTRONIC BALLAST CIRCUIT FOR DISCHARGE LAMP**

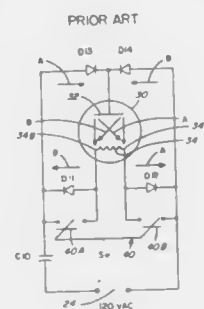
Valery Godyak, North Andover, and Fred Whitney, Salem, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 27, 1988, Ser. No. 290,617

Int. Cl.<sup>3</sup> H05B 37/00

U.S. Cl. 315—205

15 Claims



1. An electronic ballast circuit for operating a DC discharge lamp comprising;  
means defining a pair of input terminals for receiving an alternating cycle signal thereacross,  
a ballast capacitor coupled to one of said terminals,  
and a rectifier bridge intercoupling the ballast capacitor and the electrodes of said discharge lamp which are comprised of a lamp anode and lamp cathode,  
said rectifier bridge comprised of opposite bridge diode rectifier sides connected, respectively, to opposite ends of the lamp cathode,  
whereby DC lamp discharge current flows from said anode to opposite ends of the cathode during alternate respective half-cycles of the alternating cycle signal.

**4,952,845**  
**DC/AC CONVERTER FOR IGNITING AND OPERATING A DISCHARGE LAMP**

Paul R. Veldman, Oss, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

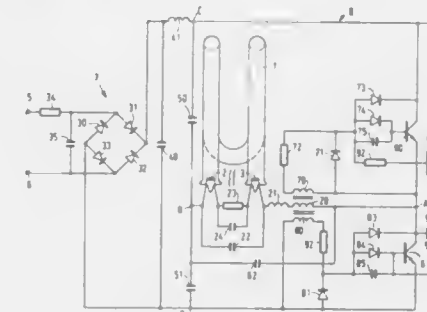
Filed Mar. 15, 1985, Ser. No. 712,289

Claims priority, application Netherlands, Mar. 23, 1984, 8400924

Int. Cl.<sup>3</sup> H05B 41/29

U.S. Cl. 315—209 R

24 Claims



5. A DC/AC converter for igniting and operating a discharge lamp comprising: a pair of input terminals for connection to a source of DC supply voltage, first and second transistor switches connected in a first series circuit across the input terminals, first and second capacitors connected in a second series circuit across the input terminals, a load circuit having first and second terminals connected to first and second junction points, respectively, between the first and second transistor switches and between the first and second capacitors, respectively, said load circuit having a further pair of terminals for connection to the electrodes of a discharge lamp and a circuit element coupled to said further pair of terminals so as to shunt the discharge path of a discharge lamp when connected thereto, a starting circuit including a series arrangement of a starting capacitor and a voltage-threshold element connected between a control electrode of one of the transistor switches and said first junction point between the first and second transistor switches, and a resistor coupled to the starting capacitor and to one input terminal of the DC supply voltage so as to form a charge circuit for the starting capacitor.

**4,952,846**  
**CIRCUIT ARRANGEMENT FOR OPERATING A HIGH-PRESSURE SODIUM DISCHARGE LAMP**

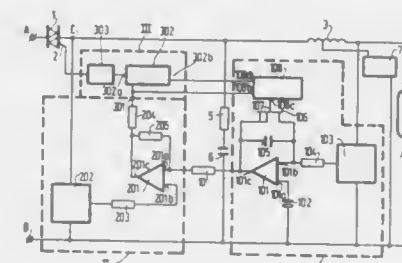
Petrus J. M. Van Der Burgt, and Hilbert Palmers, both of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Jun. 23, 1986, Ser. No. 877,611

Int. Cl.<sup>3</sup> H05B 37/02

U.S. Cl. 315—209 R

17 Claims



1. A circuit arrangement for operating at a supply voltage  $V_n$  a high-pressure discharge lamp having a lamp voltage  $V_{la}$  in conjunction with a current limiter circuit and with a first

controlled semiconductor switching element provided with a control electrode connected to a control circuit of the circuit arrangement, characterized in that the circuit arrangement further comprises control means whereby the lamp voltage  $V_{la}$  is kept substantially constant, said control means comprising

- a first part including a first comparison circuit for comparing a proportional part of the lamp voltage  $V_{la}$  with a reference voltage  $V_r$  and  
a second part including a second comparison circuit for comparing a proportional part of the supply voltage  $V_n$  with the voltage at an output terminal of the first comparison circuit the second comparison circuit having an output terminal electrically connected to an input control terminal of the control circuit.

**4,952,847**  
**STABLE IGNITION MEANS FOR FLUORESCENT LAMP OR THE LIKE**

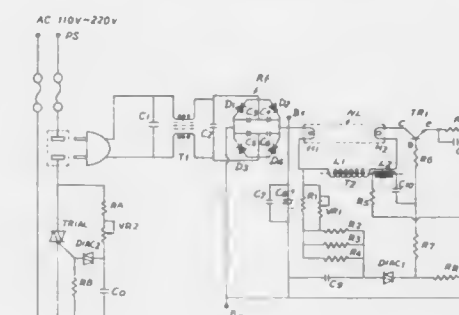
Tleng-Fu Lin, and Mouteh Liu, both of P.O. Box 10160, Taipei, Taiwan

Filed Jun. 5, 1989, Ser. No. 361,856

Int. Cl.<sup>3</sup> H05B 41/14

U.S. Cl. 315—290

2 Claims



1. A stable ignition means for fluorescent lamp or the like comprising:

- a transformer having coreless windings connected in parallel with a fluorescent lamp with the coreless windings of the transformer having inductive reactance matched with a capacitive reactance or internal resistance of the fluorescent lamp;  
a rectifier for rectifying a power source of alternative current for forming a positive terminal and a negative terminal of a rectified voltage;  
said transformer having a primary winding having one end of the primary winding connected to a first filament of the fluorescent lamp and the positive terminal of the rectified voltage and having the other end of the primary winding connected to a second filament of the fluorescent lamp opposite to the first filament and connected to a collector of a transistor, and having a secondary winding electromagnetically induced from said primary winding of said transformer having one end of the secondary winding connected to the negative terminal of the rectified voltage and having the other end of the secondary winding connected to a base of the transistor through a first capacitor;  
a first diode AC switch having its one end connected to the positive terminal of the rectified voltage through a second capacitor and having the other end of the first diode AC switch respectively connected to the base of the transistor and connected to an emitter of the transistor of which the emitter is connected to the negative terminal of the rectified voltage; and a first variable resistor secured between the first filament of the fluorescent lamp and the first diode AC switch; whereby upon a variation of the first variable resistor for adjusting an illumination of the lamp



and upon a saturation of the first diode AC switch for saturating the transistor, a harmonic oscillation will exert for stably igniting the fluorescent lamp by a multivibrator comprised of said secondary winding, said primary winding of said transformer, said lamp, said transistor and said first capacitor.

4,952,848

# SIGNAL GENERATING CIRCUIT FOR BALLAST CONTROL OF DISCHARGE LAMPS

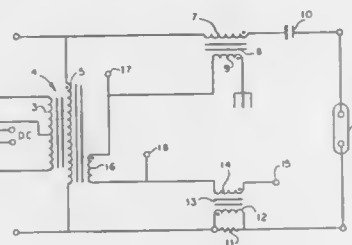
Robert A. Erhardt, Chicago, Ill., assignor to North American Philips Corporation, New York, N.Y.

Filed Jul. 5, 1988, Ser. No. 215,697

Int. Cl.<sup>5</sup> H05B 41/36, 37/02; G05F 1/00

U.S. Cl. 315—307

16 Claims



1. A ballast control apparatus for an electric discharge lamp comprising:
    - a pair of output terminals for connection to a discharge lamp,
    - a source of AC supply voltage for the lamp including a supply transformer having first and second magnetically coupled windings,
    - a ballast inductor,
    - a current sensing means including a second transformer having first and second magnetically coupled windings, means connecting said supply transformer first winding, said ballast inductor and said second transformer first winding in series circuit to said output terminals,
    - a second winding magnetically coupled to the ballast inductor,
    - means connecting the ballast inductor second winding, the supply transformer second winding and the second transformer second winding in a series circuit,
    - a first control terminal for supplying a first signal voltage ( $V_c$ ) derived from the summation of the voltages developed across the series combination of the three series-connected second windings, and
    - a control circuit responsive to said first signal voltage for deriving a control signal determined by said first signal voltage, and wherein
- said AC supply voltage source is responsive to said control signal for controlling current supplied to the lamp via said supply transformer as a function of lamp power.

4,952,849

# FLUORESCENT LAMP CONTROLLERS

Mark W. Fellows; John M. Wong, both of Buffalo Grove, Ill., and Edmond Toy, Sunnyvale, Calif., assignors to North American Philips Corporation, New York, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,923

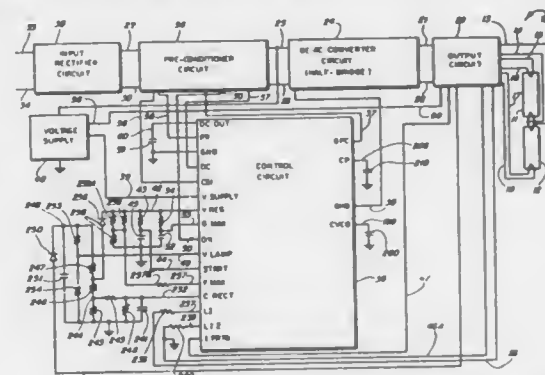
Int. Cl.<sup>5</sup> H05B 41/36

U.S. Cl. 315—307

45 Claims

1. A controller for a fluorescent lamp load, comprising:
  - DC-AC converter means having an input and an output, DC supply means coupled to said input, output circuit means coupled to said output and arranged for coupling to said fluorescent lamp load, and control means for controlling operation of said DC-AC converter and said DC supply means, said output circuit means including inductance means and resonant capacitor means forming a circuit which is resonant at no-load and

load-condition resonant frequencies with loads equivalent to those respectively obtained prior to and after lamp ignition, said control means being arranged to operate in a lamp ignition phase to operate said converter at a frequency within a range



offset from said no-load resonant frequency, and said control means being arranged to operate in an operating phase after lamp ignition to operate said converter in a frequency range offset in the same direction from said load-condition resonant frequency.

4,952,850

# HORIZONTAL DEFLECTION CIRCUIT

Masanori Ogino; Takeo Yamada, and Miyuki Ikeda, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

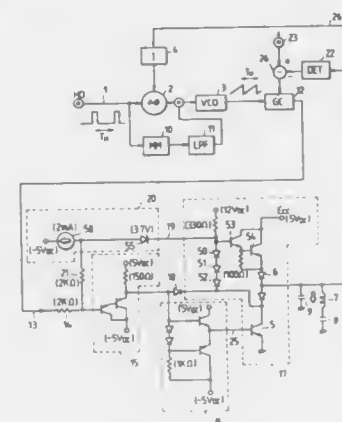
Filed Jul. 12, 1989, Ser. No. 378,905

Claims priority, application Japan, Aug. 3, 1988, 63-192614

Int. Cl.<sup>5</sup> H01J 29/70, 29/76

U.S. Cl. 315—387

5 Claims



1. A horizontal deflection circuit for a display incorporating a CRT, comprising:
  - horizontal deflection coil means for generating a flyback pulse signal;
  - bypass capacitor means connected in series to the horizontal deflection coil means;
  - resonant capacitor means connected substantially in parallel to the horizontal deflection coil means;
  - push-pull amplifying means for driving the horizontal deflection coil means; and
  - damper diode means for damping and for preventing reverse flow the damper diode means being connected in series to the push-pull amplifying means with the forward direction thereof along the direction of flow of a driving current produced by an amplifying unit of the push-pull amplifying means for a former half of horizontal deflection scanning;

diode detecting means for detecting a horizontal size of an image plane of the CRT; and control means for controlling the horizontal size of the image plane through control of output power of the push-pull amplifying means on the basis of an output of the diode detecting means without utilizing a choke coil means for supplying power directly to the deflection coil means.

4,952,851

# ELECTRONIC CRT CENTERING ALIGNMENT APPARATUS

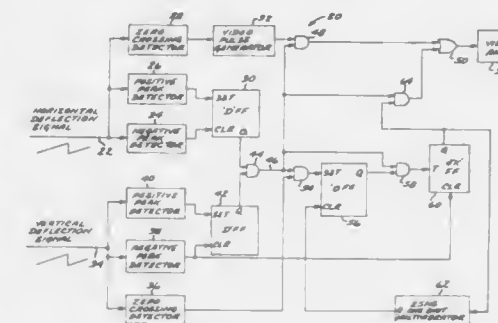
Malcolm Macanlay, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 13, 1989, Ser. No. 450,199

Int. Cl.<sup>5</sup> H01J 29/70; H04N 17/00

U.S. Cl. 315—398

9 Claims



1. Apparatus for indicating the deflection alignment of a raster-scanned CRT display, comprising:
  - means responsive to the CRT display horizontal deflection signal for generating a horizontal zero pulse each time a zero crossing is detected during an active scan interval of the CRT display;
  - means responsive to the CRT display vertical deflection signal for generating a vertical zero pulse each time a zero crossing is detected during an active scan interval of the CRT display;
  - video signal generator responsive to said horizontal zero pulse for generating a first CRT beam control signal in response to said horizontal zero pulse, said first CRT control signal generating a vertical line on the CRT marking the vertical deflection axis and the electrical center of horizontal deflection, said generator further responsive to said vertical zero pulse for generating a second CRT beam control signal in response to said vertical zero pulse, said second CRT control signal generating a horizontal raster scanned line on the CRT marking the horizontal deflection axis and the electrical center of vertical deflection.

4,952,852

# POWER SYSTEM AND SYNCHRONIZING BREAKERS FOR A VARIABLE SPEED GENERATOR MOTOR SYSTEM

Akira Bando, Hitachi; Osamu Nagura, Katsuta; Keiji Saito; Ikuro Miyashita, both of Hitachi; Hashime Nagai, Kitaibaraki; Hiroto Nakagawa, Osaka, and Yasuteru Oono, Kobe, all of Japan, assignors to Hitachi, Ltd., Tokyo and The Kansai Electric Power Co., Inc., Osaka, both of Japan

Filed Aug. 9, 1988, Ser. No. 229,995

Claims priority, application Japan, Aug. 14, 1987, 62-201709

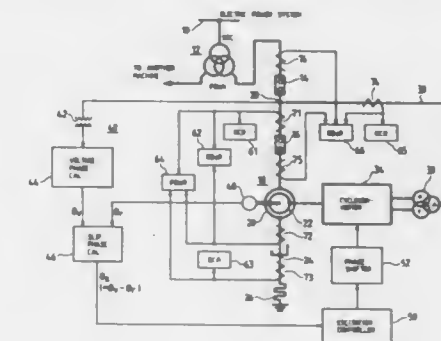
Int. Cl.<sup>5</sup> H02H 7/08

U.S. Cl. 318—140

6 Claims

1. A generator-motor apparatus, comprising:
  - a generator-motor with an armature winding and a field winding, a rotor of which is mechanically coupled with a prime mover-load;

a main transformer provided between one of the windings of said generator-motor and an electric power system; a synchronizing breaker for connecting the one winding of said generator-motor with the electric power system through said main transformer; an excitation circuit including a frequency converter for exciting the other winding of said generator-motor and a



converter transformer connected to the frequency converter; a power system breaker connected in series with said main transformer and connected between the electric power system and said synchronizing breaker; and said excitation circuit being branched from a junction between said synchronizing breaker and a series connection of said main transformer and said power system breaker.

4,952,853

# METHOD AND APPARATUS FOR SENSING DIRECT CURRENT OF ONE POLARITY IN A CONDUCTOR AND ELECTRONICALLY COMMUTATED MOTOR CONTROL RESPONSIVE TO SENSED MOTOR CURRENT

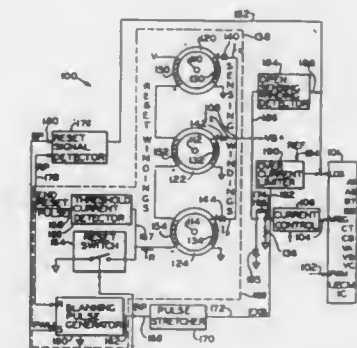
William R. Archer, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Aug. 24, 1988, Ser. No. 235,995

Int. Cl.<sup>5</sup> G05B 1/06

U.S. Cl. 318—254

70 Claims



1. Apparatus for generating a sensing signal which is a function of a direct current flowing in a particular direction in a conductor comprising:
  - means for producing an output signal comprising:
    - a core inductively coupled to the conductor, said core being subject to magnetic saturation after a period time as a result of a magnetic field generated by the direct current in the conductor, the aforesaid period of time being a function of the magnitude of the magnetic field generated by the direct current flowing in the conductor;
    - an output winding around said core for producing the

output signal which is a function of the direct current in the conductor when the core is not saturated but which is not a function of the direct current in the conductor after the aforesaid period of time; and means for periodically applying a magnetic field to the core of periodically reset the magnetic orientation of the core of a predefined state before the aforesaid period of time elapses whereby the output signal produced between periodic resets has a magnitude which is a function of the direct current in the conductor and comprises the sensing signal.

4,952,854

# CONTROL DEVICE FOR A DC MOTOR INTENDED FOR IN PARTICULAR DRIVING OPENING ELEMENTS ON AUTOMOBILE VEHICLES

Pierre Perleu, Cergy Pontoise, and Jean Dauvergne, Fosses, both of France, assignors to Rockwell-CIM, France

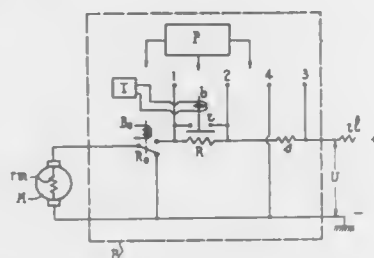
Filed Jan. 12, 1989, Ser. No. 296,115

Claims priority, application France, Jan. 19, 1988, 88 00572

Int. Cl.<sup>5</sup> H02P 1/00

U.S. Cl. 318—257

15 Claims



1. A control device comprising, in combination with a dc motor having two directions of operation, a voltage generator and a line having a given resistance which connects the generator to the motor, at least one control relay inserted in the line for the motor in one of the directions of operation of the motor, said device further comprising an auxiliary resistor in series with the motor whose value is chosen to be sufficient to ensure that the motor does not start up when the control relay is closed, means for shorting the auxiliary resistor, means for measuring the magnitude of the current which then passes through the auxiliary resistor and the voltage in the supply line of the motor, means for calculating the sum of the resistance of the line and the internal resistance of the motor from values measured for the magnitude of the current and the voltage, a time delay associated with the shorting means and capable of exciting the shorting means following on the calculation of said sum of resistances, and means comprising a microprocessor for automatically and continuously determining an instantaneous value selected from the speed and the speed and torque of the motor from a continuous measurement of the magnitude of the current after shorting the auxiliary resistor and measuring the voltage.

4,952,855

# SYSTEM FOR MONITORING THE CLOSING OF A DOOR

Jürgen Meins, Baldham, and Lutz Baur, Riedering, both of Fed. Rep. of Germany, assignors to Thyssen Industrie AG, Fed. Rep. of Germany

Filed Nov. 15, 1988, Ser. No. 272,008

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1987, 3738330

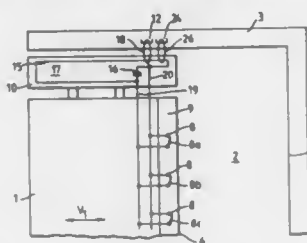
Int. Cl.<sup>5</sup> G08C 19/30

U.S. Cl. 318—467

19 Claims

1. A system for monitoring the closing state of a movable barrier which is mounted on a frame defining an opening and is movable between an open and a closed position, said system

comprising: first electric circuit means mounted on said barrier for being moved therewith and including first inductive means; and second electric circuit means mounted outside said barrier and including second inductive means and an oscillator means for producing, if switched on, an electric current in said second circuit means; said first and second inductive means being arranged with respect to each other in such a way that, if said



oscillator means is switched on, said second inductive means is enabled to contactlessly induce electric energy in said first inductive means for activating said first electric circuit means, and said first inductive means is enabled to contactlessly induce an electric signal characteristic of a closure state of said barrier in second inductive means in at least one selected position of said barrier.

4,952,856

# METHOD AND APPARATUS FOR MONITORING RESISTOR TEMPERATURE

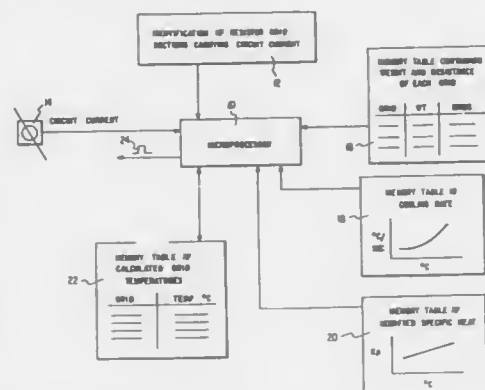
William E. Schmitz, Wilkingsburg, Pa., assignor to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.

Filed Nov. 13, 1989, Ser. No. 433,702

Int. Cl.<sup>5</sup> G05B 9/02; G05D 23/00

U.S. Cl. 318—471

17 Claims



1. Apparatus for automatically monitoring resistor temperature in a resistive controller, comprising: storage means for storing the predicted temperature of the resistor; processor means for calculating, at the beginning of each time interval of consecutive time intervals, a predicted temperature of the resistor at the end of a respective time interval, according to the following equation and storing the predicted temperature in said storage means for use in the calculation of the predicted temperature in the next consecutive time interval:

$$T_n = T_o - R_c \cdot DT + R_h \cdot DT, \text{ where}$$

$T_n$  = the calculated predicted temperature at the end of a time interval;

$T_o$  = the temperature of the resistor at the beginning of a time interval;

$DT$  = the time interval;

$R_c$  = the cooling rate of the resistor at  $T_o$ ; and  $R_h$  = the heating rate of the resistor at  $T_o$ ; and actuating means for producing an actuating signal when the predicted temperature  $T_n$  corresponds to a threshold temperature.

12. A method of monitoring the temperature of a resistor in a resistive current controller, comprising: determining a heating rate for the resistor; determining a cooling rate for the resistor; calculating automatically, at the beginning each time interval of consecutive time intervals, a predicted temperature of the resistor at the end of the respective time interval, by subtracting from the last temperature prediction for the resistor the product of the cooling rate of the resistor and the time interval and adding the product of the heating rate of the resistor and the time interval; and producing an actuating signal when the predicted temperature of the resistor for a given time interval corresponds to a threshold temperature.

4,952,857

# SCANNING MICROMECHANICAL PROBE CONTROL SYSTEM

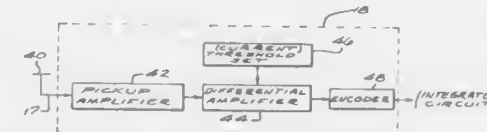
Paul E. West; Wilfred P. Charette, both of Glendale, and Arthur Young, Temple City, all of Calif., assignors to QnanScan, Inc., Pasadena, Calif.

Filed Mar. 24, 1989, Ser. No. 328,422

Int. Cl.<sup>5</sup> G05B 13/00

U.S. Cl. 318—561

11 Claims



1. A scanning apparatus for controlling relative movement between a probe and an adjacent surface, comprising: sensor means operatively connected between said probe and said surface for measuring a parameter which varies relative to the relative positioning of said probe and said surface; means for comparing said parameter with a reference threshold, and generating a two-state error signal in which one state of the error signal indicates that the measured parameter is less than said reference threshold, and the other state indicates that the measured parameter is greater than or equal to the reference threshold; means for integrating said error signal, and for generating an error count signal; and position control servo means for controlling the relative positioning of said probe and said surface responsive to said error count signal.

4,952,858

# MICROLITHOGRAPHIC APPARATUS

Daniel N. Galburt, 520 Belden Hill Rd., Wilton, Conn. 06897

Filed May 18, 1988, Ser. No. 198,545

Int. Cl.<sup>5</sup> G05F 1/00

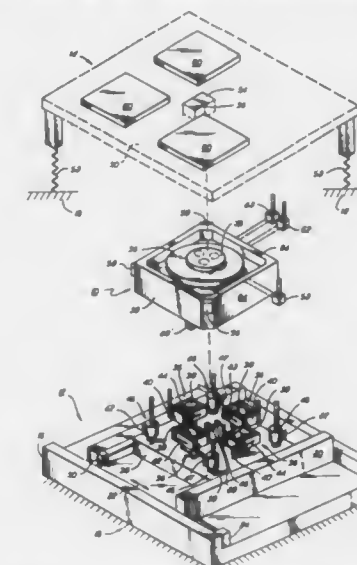
U.S. Cl. 318—647

17 Claims

1. Electro-magnetic alignment apparatus comprising, in combination:

a monolithic stage, a sub-stage, an isolated reference structure, means mounted on said sub-stage for magnetically suspending and positioning said monolithic stage, means mounted on said isolated reference structure for sensing the position of said monolithic stage and outputting a

corresponding signal to said means for suspending said monolithic stage and means for controlling the position of



said sub-stage to follow the approximate position of said monolithic stage.

4,952,859

# STEPPING MOTOR

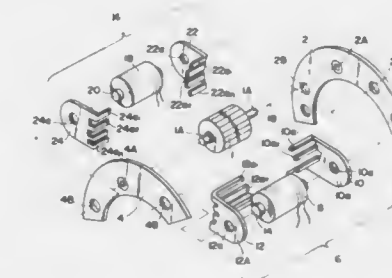
Akira Torisawa, Machida; Katsumi Yoshida, Chichibu; Hiroshi Koizumi, Hanno, and Hiroyuki Yoshikawa, Chichibu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitanm, both of Japan

Filed Nov. 30, 1988, Ser. No. 277,939

Int. Cl.<sup>5</sup> H07P 8/00

U.S. Cl. 318—696

2 Claims



1. A stepping motor comprising: a rotor having a cylindrical surface, a shaft and a plurality of N poles and S poles magnetized on the cylindrical surface, said poles each being provided with a recess at the center portion thereof; a stator unit including a first stator member and a second stator member, said first stator member having a first yoke member provided with a plurality of first teeth arranged arcuately along the outer periphery of said rotor, a second yoke member provided with a plurality of second teeth separated from said first teeth by a predetermined pitch, and a first coil for magnetizing said first and second teeth, said second stator member being disposed at a position opposed to said first stator member with said rotor disposed therebetween, said second stator member having a third yoke member provided with a plurality of arcuately arranged third teeth and a fourth yoke member provided with a plurality of fourth teeth separated from said third



teeth by said predetermined pitch, and a second coil for magnetizing said third and fourth teeth.

4,952,860

## MOTOR CONTROL SYSTEM

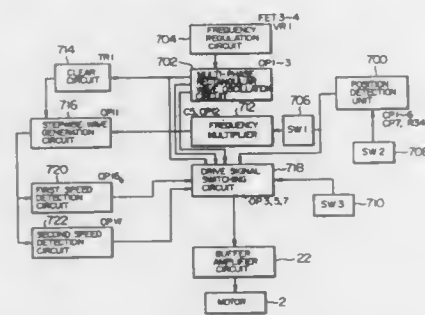
Katsuji Soeda, Sukagawa, Japan, assignor to Yamamoto Electric Corporation, Sukagawa, Japan

Filed Jul. 3, 1989, Ser. No. 375,305

Claims priority, application Japan, May 1, 1989, 01-112726  
Int. Cl.<sup>5</sup> H02F 5/28

U.S. Cl. 318—721

5 Claims



1. A control system for a sync motor, comprising:
  - a motor including a magnetic pole rotor;
  - means for detecting the position of the magnetic poles of the rotor of the motor and producing a position signal;
  - a multi-phase rectangular wave oscillation circuit for generating a multi-phase rectangular wave;
  - a frequency multiplier for multiplying the frequency of said position signal to a predetermined frequency and producing a multiple frequency signal;
  - a clear circuit for producing a phase of said multi-phase rectangular wave signal as a clear signal;
  - a stepwise wave generation circuit for generating a stepwise wave adapted to be cleared by said clear signal, said stepwise wave being changed step-wisely with the same frequency as said multiple frequency in accordance with said multiple frequency signal;
  - a drive signal switching circuit for applying to said motor a drive signal selected from one of a signal corresponding to said position signal and a phase difference signal representing a phase difference between said multi-phase rectangular wave signal and said position signal;
  - a speed detection circuit for producing a first signal before the level of the stepwise wave from said stepwise wave generation circuit reaches a predetermined value, and a second signal when said level reaches the predetermined value; and
  - first instruction means for designating a selected one of validity and invalidity of the drive signal produced from said drive signal switching circuit;
  - said drive signal switching circuit producing a signal corresponding to the position signal in response to said first signal thereby to drive said motor in brushless mode, and a signal corresponding to said phase difference signal in response to said second signal thereby to drive said motor in sync mode.

4,952,861

# PROCESS FOR CHARGING MAINTENANCE-FREE LEAD BATTERIES WITH A FIXED ELECTROLYTE

Karl G. Horn, Kelkheim, Fed. Rep. of Germany, assignor to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

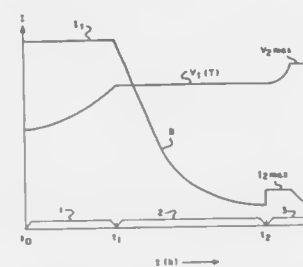
Filed Sep. 6, 1988, Ser. No. 240,922

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732339

Int. Cl.<sup>5</sup> H02J 7/00; H01M 10/44

U.S. Cl. 320—23

27 Claims



1. A process for rapid charging of a maintenance-free lead battery with a fixed electrolyte, comprising the steps of:
  - charging said battery during a first charging state with a constant current until a temperature-dependent voltage is reached;
  - charging said battery during a second charging stage at said temperature-dependent voltage reached during said first charging stage for a defined time period, and in voltage-controlled manner, wherein said charging voltage is continuously adjusted to the temperature of said battery; and
  - charging said battery during a third charging stage for a defined time period, wherein said charging during said third charging stage is a secondary charging according to an I/V characteristic curve which proceeds at a limited current until a maximum voltage is reached, and which then proceeds at said maximum voltage, wherein said maximum voltage is higher than said temperature-dependent voltage of the second charging stage.

4,952,862

# APPARATUS AND METHOD FOR ADAPTIVELY PREDICTING BATTERY DISCHARGE RESERVE TIME

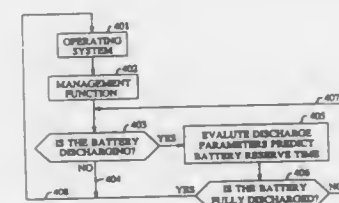
Richard V. Biagetti, Piscataway, N.J., and Anthony M. Pesco, Cedarhurst, N.Y., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 29, 1989, Ser. No. 414,890

Int. Cl.<sup>5</sup> G01N 27/46; H01M 10/48

U.S. Cl. 320—48

19 Claims



1. A method of predicting the time remaining of a battery discharge until an end voltage is attained; comprising the steps of:
  - characterizing the discharge behavior of a discharging battery with a discharge curve having a locus invariant with respect to a magnitude of the discharge current and being variant with respect to a fraction of available charge to an end voltage charge and to a function of a difference be-

tween a plateau voltage and a present voltage of the discharging battery, measuring the plateau voltage of the discharging battery, measuring a present voltage of the discharging battery to locate a point on the discharge curve, using the discharge curve for determining the fraction of available charge to an end voltage charge and expressing the fraction as a dimensionless time ratio, converting the dimensionless time ratio to a time remaining until the discharging battery reaches a selected end voltage.

4,952,863

# VOLTAGE REGULATOR WITH POWER BOOST SYSTEM

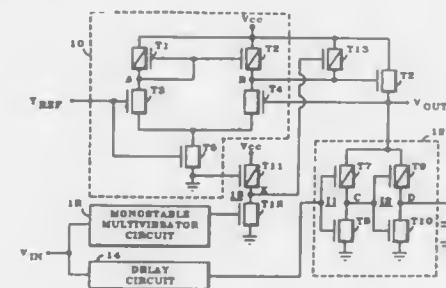
Alfred L. Sartwell, Jericho, and Eadre P. Thoma, Colchester, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1989, Ser. No. 454,097

Int. Cl.<sup>5</sup> G05F 1/56

U.S. Cl. 323—280

22 Claims



22. A voltage regulator system comprising:
  - first means for receiving a power supply voltage,
  - second means for receiving a constant voltage, the constant voltage being of a magnitude different from that of the power supply voltage,
  - a load,
  - a transistor having a gate electrode, a drain electrode coupled to the first means and a source electrode coupled to the load,
  - third means coupled between the second means and the gate electrode of the transistor for setting the voltage of the load to the constant voltage, and
  - fourth means responsive to a control signal for generating a turn-on pulse when the constant voltage is to be initially applied to the load, the fourth means supplying the turn-on pulse to the gate electrode of the transistor so that the load is charged by the supply voltage for the duration of the turn-on pulse, whereby the transistor is controlled by the fourth means to charge the load during the turn-on period and whereby the transistor is controlled by the second means to clamp the voltage of the load to the constant voltage during a steady-state period.

4,952,864

# POWER SUPPLY DOWN-CONVERSION, REGULATION AND LOW BATTERY DETECTION SYSTEM

Benjamin Pless, Menlo Park, and John G. Ryan, San Jose, both of Calif., assignors to Ventritex, Sunnyvale, Calif.

Division of Ser. No. 259,382, Oct. 18, 1988, Pat. No. 4,868,908.

This application Jun. 1, 1989, Ser. No. 360,007

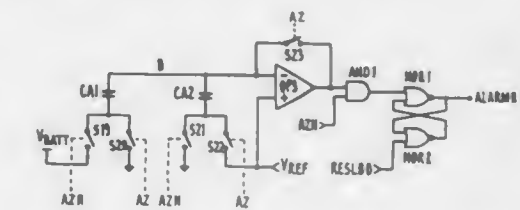
Int. Cl.<sup>5</sup> G05F 5/00

U.S. Cl. 323—299

6 Claims

1. Low voltage detection circuitry for detecting when a voltage signal  $V_{batt}$  drops below a preselected trigger voltage  $V_{trig}$ , the detection circuitry comprising:
  - (a) a switched capacitor voltage divider that generates a

ratioed voltage signal corresponding to changes in the voltage signal  $V_{batt}$ ;  
(b) comparator means for generating a changing output signal in response to changes in the ratioed voltage signal; and



- (c) means for generating a low voltage detect signal in response to a change in the comparator output signal when the ratioed voltage signal drops below the preselected trigger voltage  $V_{trig}$ .

4,952,865

# DEVICE FOR CONTROLLING TEMPERATURE CHARACTERISTICS OF INTEGRATED CIRCUITS

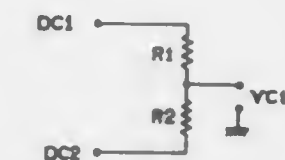
Gérard Pataut, Gif sur Yvette, and Pierre Quentin, Paris, both of France, assignors to Thomson Composants Microondes, Puteaux, France

Filed Dec. 20, 1989, Ser. No. 453,865

Claims priority, application France, Dec. 23, 1988, 88 17091  
Int. Cl.<sup>5</sup> G05F 3/16

U.S. Cl. 323—313

3 Claims



1. A device for controlling temperature characteristics of an integrated circuit supported on a substrate, wherein said device comprises, integrated the same substrate as said integrated circuit to be controlled, a divider bridge formed by four resistors supplied between two stable voltages, said resistors forming pairs of resistors having mutually opposite temperature coefficients, mounted on diagonals of said bridge and delivering at their mid-points two controlling voltages evolving oppositely with temperature.

4,952,866

# VOLTAGE-TO-CURRENT CONVERTERS

Adrianus J. M. Van Tuijl, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 11, 1989, Ser. No. 392,634

Claims priority, application Netherlands, Aug. 19, 1988, 8802055

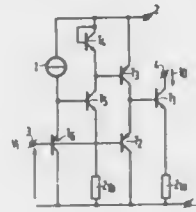
Int. Cl.<sup>5</sup> G05F 3/20

U.S. Cl. 323—315

23 Claims

1. A voltage-to-current converter comprising:
  - an input for receiving an input signal, a first transistor of a first conductivity type having a collector coupled to an output for supplying an output signal, an emitter coupled to a first impedance, and a base coupled to the input via the emitter-base junction of a second transistor of a second conductivity type, which second transistor has its collector coupled to a first power-supply terminal, the base of said first transistor also being coupled to a second power-supply terminal via the collector-emitter path of a third transistor of the second conductivity type, the base of the third transistor being coupled both to the second power-

supply terminal via the emitter-base junction of a diode-connected fourth transistor and to a second impedance via the collector-emitter path of a fifth transistor of the first conductivity type, characterized in that the fourth transistor is of the first conductivity type and in that the fifth transistor has its



base coupled both to the input via the emitter-base junction of a sixth transistor of the second conductivity type, and to the second power-supply terminal via a first current source, said sixth transistor having its collector coupled to the first power-supply terminal.

4,952,867

## BASE BIAS CURRENT COMPENSATOR

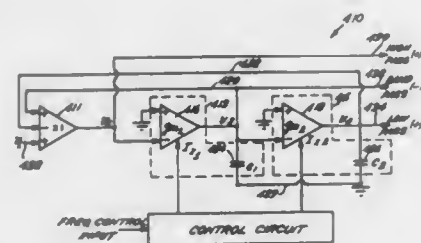
James R. Anderson, Chicago, and Richard Brander, Cicero, both of Ill., assignors to Beltone Electronics Corporation, Chicago, Ill.

Division of Ser. No. 269,618, Nov. 10, 1988, Pat. No. 4,876,499, which is a division of Ser. No. 202,664, Jun. 6, 1988, Pat. No. 4,829,270, which is a division of Ser. No. 838,924, Mar. 12, 1986, Pat. No. 4,792,977. This application Apr. 27, 1989, Ser. No. 343,872

Int. Cl.<sup>5</sup> G05F 3/26

U.S. Cl. 323-273

4 Claims



1. A base bias current compensator to substantially supply base current requirements of a reference transistor which would otherwise have to be supplied by the associated circuitry, said reference transistor having a particular polarity and operating at a predetermined collector current and having a base, and having a reference current gain characteristic, comprising, in combination:

- a current source for substantially supplying a current in a ratio to said predetermined collector current;
- a first transistor, of same polarity as said reference transistor, having a first transistor emitter interconnected to said current source, substantially receiving said current in a ratio to said predetermined collector current, and having a current gain characteristic related to said reference current gain characteristic and having a first transistor base substantially drawing a predetermined fraction of said predetermined collector current;
- a second transistor, of opposing polarity to said reference transistor, having a second transistor collector interconnected to said base of said first transistor for supplying a second collector current to said first transistor base, said second transistor having a second predetermined transconductance characteristic, and a second transistor base and emitter; and
- a third transistor, of same polarity as said second transistor, having a third transistor collector interconnected to said base of said reference transistor, for substantially supply-

ing a predetermined base current to said base of said reference transistor, said third transistor including a base and an emitter interconnected, respectively, to said base and said emitter of said second transistor, said third transistor having a third predetermined transconductance characteristic being in a substantially predetermined ratio to said second transconductance characteristic, whereby a third collector current is provided to said base of said reference transistor which is in a predetermined ratio to said second collector current; and

a feedback amplifier having an input interconnected to said first transistor emitter and an output interconnected to said bases of said second and third transistors, whereby said second collector current may be adjusted to provide said predetermined fraction of said predetermined collector current to said base of said first transistor, and whereby said third collector current is provided to said base of said reference transistor substantially in an amount required for said reference transistor to provide said predetermined collector current.

4,952,868

## MOISTURE SENSING SYSTEM FOR AN IRRIGATION SYSTEM

Robert P. Scherer, III, 619 N. Cataract Ave., San Dimas, Calif. 91773

Continuation-in-part of Ser. No. 864,421, May 19, 1986, Pat. No. 4,837,499. This application Oct. 17, 1988, Ser. No. 258,775

Int. Cl.<sup>5</sup> G01R 27/00; F16K 13/02

U.S. Cl. 324-664

13 Claims



1. A moisture sensing device, comprising:

- a sensor having a pair of concentrically disposed conductors, each said conductor being in the form of a hollow cylinder, and both said conductors being contained in a generally cylindrical enclosure having screen means for permitting moisture to ingress and egress through said sensor, said conductors being separated by a porous layer of dielectric bead-like material to form a capacitor whose resistance will vary in response to the level of moisture present in said dielectric bead material, a porous layer of said bead-like material also being interposed between the outer one of said conductors and said enclosure, said outer conductor being constructed of an electrically conductive, tubular formed mesh material and having a different length than the inner one of said conductors; and
- circuit means connected across said conductors for measuring the variable resistance caused by the level of moisture present in said dielectric bead material.

4,952,869

## DUAL PURPOSE PROBE FOR SIMULTANEOUS VOLTAGE AND CURRENT SAMPLING

John E. B. Tuttle, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 25, 1989, Ser. No. 411,776

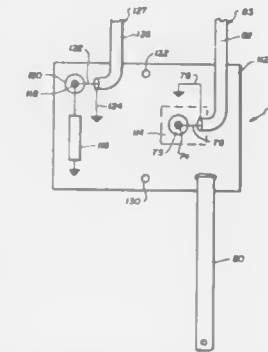
Int. Cl.<sup>5</sup> G01R 1/20, 33/06

U.S. Cl. 324-126

9 Claims

- 1. A dual purpose probe for simultaneously sampling voltage and current from a predetermined circuit point along a conductor, comprising:
  - a circuit board having two sides,
  - a metallic pick up plate on one of said sides for acting as one

plate of a capacitor which is formed when said metallic pick-up plate is placed adjacent to said predetermined circuit point, and  
an inductor disposed on the other side of said circuit board,



4,952,870

## COMPACT TAUT BAND METER MOVEMENT ASSEMBLY

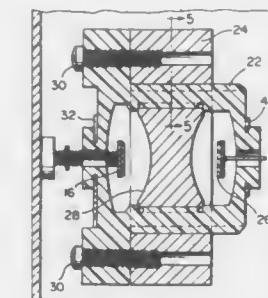
Terry Straner, Ottawa, Ohio, assignor to Triplett Corporation, Bluffton, Ohio

Filed Apr. 14, 1989, Ser. No. 338,169

Int. Cl.<sup>5</sup> G01R 1/00

U.S. Cl. 324-154 R

21 Claims



- a magnet;
- a movement coil having opposite ends defining an axis about which said movement coil rotates;
- first and second spring members having respective first and second ligament wire holding arms;
- a ligament wire held by said ligament wire holding arms;
- a one piece movement frame including means for holding and centering said magnet, including means for holding and centering said first and second spring members, said first and second spring members supporting said movement coil via said ligament wire for permitting rotation of said movement coil around said magnet between said magnet and said movement frame;
- a dial needle attached to said movement coil for movement with said coil for indicating said measured value of said meter assembly on said scale display;
- a magnet ring for receiving, surrounding and attaching to said movement frame without any additional attachment element and for protecting said movement coil from im-

pacts of external forces and for shielding said magnet from magnetic influences outside of said magnet ring.

4,952,871

## METHOD AND APPARATUS OF TESTING PRINTED CIRCUIT BOARDS AND ASSEMBLY EMPLOYABLE THEREWITH

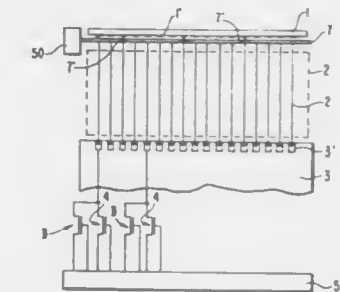
Hubert Driller, and Paul Mang, both of Schmitten, Fed. Rep. of Germany, assignors to Mania Elektronik Automatisierung Entwicklung und Gerätebau GmbH, Wellrod, Fed. Rep. of Germany

Continuation of Ser. No. 401,509, Aug. 30, 1989, abandoned, which is a continuation of Ser. No. 63,658, Jun. 18, 1987, abandoned. This application Jan. 24, 1990, Ser. No. 469,717  
Claims priority, application European Pat. Off., Jun. 25, 1986, 86108680.9

Int. Cl.<sup>5</sup> G01R 1/02, 1/067

U.S. Cl. 324-158 F

23 Claims



- a contact array including a plurality of contact elements contacting respective said test pins for electrically connecting said test pins to respective electric switches of the testing apparatus; and
- means for selectively mechanically interrupting electrical connection between all of the connection points of all of the conductors of the circuit board being tested and the respective electric switches of the testing apparatus, except for predetermined selected such connection points and the respective electric switches, said interrupting means comprising said contact elements being of a resiliently compressible construction with those of said contact elements corresponding to the selected connection points being resiliently compressible to a greater extent than the remainder of said contact elements, and all of said test pins being of the same length.



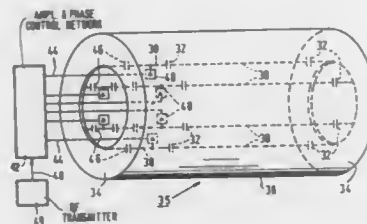
1. A frequency synthesizer for an NMR instrument which comprises:
  - look-up table storage means for storing at successive addressable locations a digital representation of a carrier signal;
  - digital-to-analog converter means connected to receive the digital representation of the carrier signal read-out of the look-up table storage means and convert it to an analog carrier signal;
  - a digital adder having an output which produces a digital number that is the arithmetic sum of digital numbers applied to its first and second inputs, the output of the digital adder being coupled to the look-up table storage means to address the locations therein;
  - a phase latch for storing a digital phase number and for applying the digital phase number to one of the digital adder inputs; and
  - a digital accumulator for continuously adding a digital carrier frequency number which is applied to its input and generating the accumulated digital number at its output.

the output of the digital accumulator being coupled to the other of the digital adder inputs; wherein the addresses applied to the look-up table storage means are advanced at a rate determined by the digital carrier frequency number to thereby produce an analog carrier signal at the output of the digital-to-analog converter which has a frequency that is determined by the digital carrier frequency number, and wherein the phase of the analog carrier signal is determined by the digital phase number.

**4,952,878**  
**MAGNETIC RESONANCE APPARATUS HAVING AN IMPROVED RF COIL**  
Wilhelmus R. M. Mens, and Peter H. Wardenier, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Filed Apr. 19, 1989, Ser. No. 340,328  
Claims priority, application Netherlands, Oct. 24, 1988, 8802608

Int. Cl.<sup>3</sup> G01R 33/20  
U.S. Cl. 324—322

15 Claims

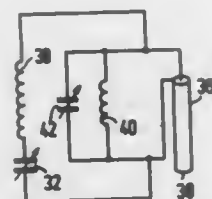


1. A magnetic resonance apparatus having a magnet system for generating a stationary magnetic field, a gradient magnet system and an rf coil system, characterized in that the rf coil system comprises a coil which has means for an individually controllable drive of antenna wires or sub-groups of antenna wires of the coil and a power amplifier incorporated for each of the individually drivable antenna wires in the proximity of the corresponding antenna wire.

**4,952,879**  
**MAGNETIC RESONANCE APPARATUS WITH UNCOUPLED RF COILS**  
Johannes J. Van Vaals, and Anthonie H. Bergman, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, N.Y.  
Filed Apr. 14, 1989, Ser. No. 339,031  
Claims priority, application Netherlands, Apr. 26, 1988, 8801077

Int. Cl.<sup>3</sup> G01R 33/20  
U.S. Cl. 324—322

5 Claims

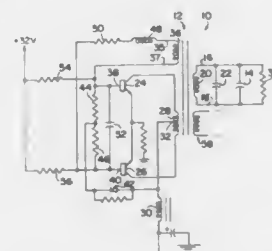


1. A magnetic resonance apparatus having a magnet system for generating a stationary magnetic field in the measuring space, a coil system for generating gradient fields in the measuring space and comprising an rf coil system for excitation and detection of magnetic resonant signals, characterized in that a coil of the rf coil system to be uncoupled is incorporated in a resonant circuit having substantial zero impedance for a resonant frequency and substantial infinite impedance for a

frequency deviating therefrom of a coil to be uncoupled therefrom, said resonant circuit comprising a coaxial cable forming a reactive impedance connected in parallel to the rf coil and having an adjustable reactive impedance connected in parallel thereto forming a tuned circuit therewith in parallel to said coil.

**4,952,880**  
**APPARATUS FOR TESTING AND COUNTING FLAWS IN THE INSULATION OF AN ELECTRICAL CONDUCTOR PASSING THROUGH AN ELECTRODE**  
Henry H. Clinton, 10 Shore Rd., Clinton, Conn. 06413  
Filed Mar. 28, 1989, Ser. No. 328,257  
Int. Cl.<sup>3</sup> G01R 31/02, 31/12  
U.S. Cl. 324—544

8 Claims

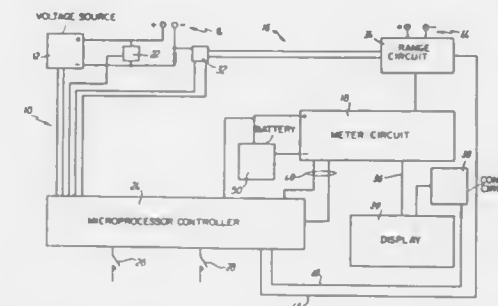


1. Apparatus for testing the insulation on an insulated conductor and for use with an electrode through which the conductor is passed with a continuous motion and adapted to apply a high test voltage to the portion of such insulation instantaneously received therein, said apparatus comprising: oscillator circuit means for producing a high frequency sinusoidal test voltage for transmission to the electrode, said oscillator circuit means further defining a linear oscillator comprising at least two semiconductor switching devices connected in a "push-pull" operating mode and coupled to a center-tapped primary winding of transformer circuit means for producing the high frequency test voltage, said center-tapped primary winding having two ends each respective one of which is coupled to a respective one of said at least two semiconductor switching devices, inductive circuit mean coupled to the center tap of said primary winding for absorbing the difference in the waveform signals produced by said at least two semiconductor switching devices causing a sinusoidal waveform signal to be impressed across said center-tapped primary winding; controller circuit means coupled to said oscillator circuit means for adjusting and maintaining the magnitude of said alternating test voltage at a present desired voltage, and circuit means coupled to said oscillator circuit means for measuring the magnitude of said alternating test voltage to produce an error signal representative of the difference between said desired value and said measured magnitude; said controller circuit means being coupled to said test voltage measuring circuit means and being responsive thereto to adjust the magnitude of said alternating test voltage produced by said oscillator circuit means, said controller circuit means further defining an oscillator control loop circuit means for generating an oscillator control loop voltage and being coupled to said at least two semiconductor switching devices through said inductive circuit means for providing a biasing voltage to said semiconductor switching devices to cause said oscillator circuit means to produce said waveform signal across said center-tapped primary winding at a magnitude to cause said alternating test voltage to maintain a desired preset magnitude, said biasing voltage being proportional and directly related to said oscillator control loop voltage.

**4,952,881**  
**ELECTRICAL TEST DEVICE**  
John Pearson, Matlock, United Kingdom, assignor to Hanning Limited, Uttoxeter, United Kingdom  
Filed Mar. 17, 1989, Ser. No. 325,401  
Claims priority, application United Kingdom, Mar. 24, 1988, 8807021

Int. Cl.<sup>3</sup> G08B 29/00  
U.S. Cl. 324—557

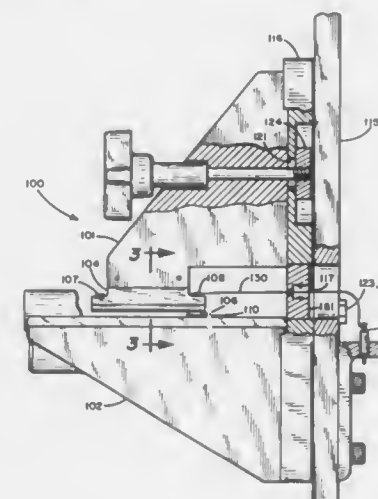
14 Claims



13. Apparatus for testing insulating properties of electrical insulation, said apparatus including voltage applying means for applying a voltage to electrical insulation and imparting a capacitive charge thereto, measuring means for measuring parameters indicative of the electrical resistance of the electrical insulation, display means for displaying a reading representative of the resistance of the electrical insulation, discharge means for discharging the capacitive charge on the electrical insulation, and control means for preventing operation of said display means until after said discharge means has operated to discharge the capacitive charge.

**4,952,882**  
**CAPACITANCE SENSOR ASSEMBLY**  
William N. Mayer, White Bear Lake, Minn.; Roger Oestreich, River Falls, Wis., and Daniel W. Mayer, St. Paul, Minn., assignors to Modern Controls, Inc., Minneapolis, Minn.  
Filed May 26, 1989, Ser. No. 357,208  
Int. Cl.<sup>3</sup> G01R 27/26  
U.S. Cl. 324—670

5 Claims

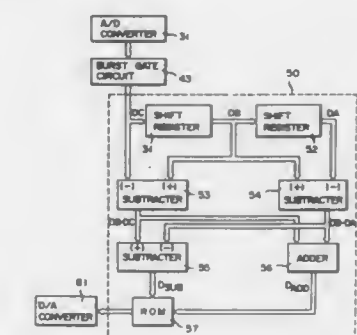


1. A capacitance sensor adapted for attachment to a mounting plate, for measuring changes in thickness of a dielectric film which is passed through the sensor, comprising

(a) a back plate having means for affixing to said mounting plate a long a line of connection;  
(b) a lower housing affixed to said back plate, said lower housing having an elongate upper electrode surface projecting substantially normal to said block plate, said lower housing being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade;  
(c) an upper housing attached to said back plate, said upper housing having an elongate portion projecting substantially normal to said back plate and in substantial alignment with said lower housing electrode surface, said upper housing having an elongate groove facing toward said lower housing electrode surface, and said upper housing being made from a material having a coefficient of linear expansion of less than  $1 \times 10^{-6}$  per degree Centigrade;  
(d) an insulator affixed in said upper housing elongate groove and projecting downwardly toward said lower housing electrode surface, said insulator having a lower edge facing toward said lower housing electrode surface, and said insulator extending beyond the length of said upper housing elongate groove, said insulator being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade; said insulator material having a dielectric temperature characteristic so as to produce a capacitance change with temperature no greater than  $1 \times 10^{-6}$  picofarads per degree Centigrade;  
(e) a sensor electrode affixed to said insulator lower edge, in direct contact with said insulator material, said sensor electrode being made from a material having a coefficient of linear temperature expansion of less than  $1 \times 10^{-6}$  per degree Centigrade.

**4,952,883**  
**PHASE DETECTOR CIRCUIT FOR PERIODIC SIGNAL USING THREE SAMPLING DATA**  
Akihiko Enomoto, Tokyo; Takashi Koga, Yokohama; Minoru Yoneda, Yokohama, and Hiroshi Kobata, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Feb. 23, 1989, Ser. No. 314,118  
Claims priority, application Japan, Feb. 29, 1988, 63-44263  
Int. Cl.<sup>3</sup> H03L 7/00; G01R 25/04  
U.S. Cl. 328—159

20 Claims

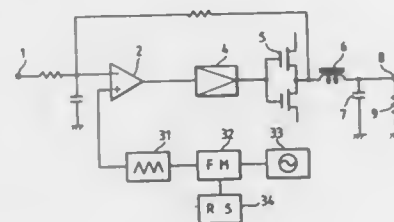


1. A phase detection circuit for detecting the phase shift of an analog input signal subject to sampling, comprising: analog-to-digital converting means for converting the analog input signal into first, second and third digital data according to successive three different sampling points; first subtracter means connected to said analog-to-digital converting means, for subtracting the third data from the second data to produce a first subtraction signal representing a difference between the second and third data;



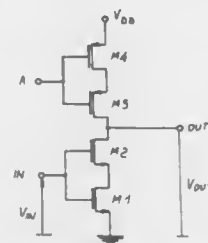
second subtracter means connected to said analog-to-digital converting means, for subtracting the first data from the second data to produce a second subtraction signal representing a difference between the second and first data; and detection means connected to said first and second subtracter means, for detecting a signal representing the phase shift based on the first and second subtraction signals.

**4,952,884**  
**PULSE WIDTH MODULATION AMPLIFIER CIRCUIT**  
Akio Tokumoto, Masayuki Kato, Takeshi Sato, and Tatsuzo Hasegawa, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan  
Filed Aug. 3, 1989, Ser. No. 389,091  
Claims priority, application Japan, Dec. 28, 1988, 63-328810  
Int. Cl.<sup>5</sup> H03F 3/38, 3/217  
U.S. Cl. 330—10 3 Claims



1. In a pulse width modulation amplifier circuit of the type having a carrier frequency generator providing a carrier wave that is pulse width modulated in a pulse width modulator by an input signal, and the pulse width modulated carrier is subsequently amplified and demodulated, the improvement comprising:  
means for frequency modulating said carrier wave with a random signal prior to said carrier wave being applied to said pulse width modulator.

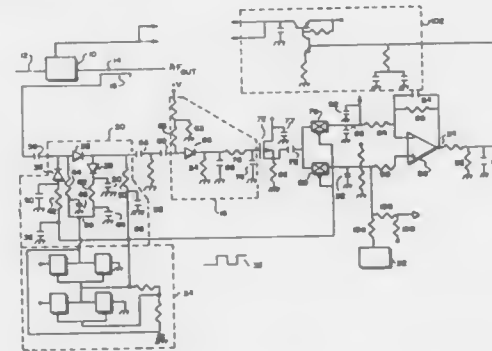
**4,952,885**  
**MOS STAGE WITH HIGH OUTPUT RESISTANCE PARTICULARLY FOR INTEGRATED CIRCUITS**  
Daniele Devecchi, Desio, and Guido Torelli, S. Alessio, both of Italy, assignors to SGS-Thomson Microelectronics srl, Milan, Italy  
Filed Feb. 15, 1989, Ser. No. 311,287  
Claims priority, application Italy, Mar. 28, 1988, 1991 A/88  
Int. Cl.<sup>5</sup> H03F 3/45  
U.S. Cl. 330—277 8 Claims



1. An MOS amplifier stage with high output resistance, particularly for integrated circuits, comprising a first transistor and a second transistor (M1, M2) of identical polarity, connected in series, said first transistor (M1) having its source electrode connected to a first terminal of a supply voltage generator, said second transistor (M2) having its drain electrode connected to an output terminal of the stage and also to a load, wherein the absolute value of the threshold voltage of the second transistor is lower than the threshold voltage of the first transistor and the gate electrodes of said first and second

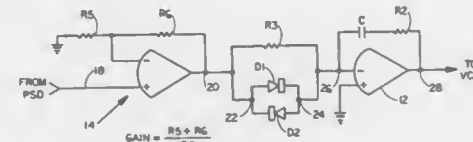
transistors are mutually connected to form a first input terminal.

**4,952,886**  
**RF POWER-CONTROL CIRCUIT**  
Russell Braathen, and Ronald Green, both of Calgary, Canada, assignors to NovAtel Communications Ltd., Calgary, Canada  
Filed Jun. 17, 1988, Ser. No. 208,411  
Int. Cl.<sup>5</sup> H03G 3/30; H03C 1/06  
U.S. Cl. 330—279 23 Claims



1. A controllable gain amplifying circuit, said circuit comprising:  
A. a gain-controllable amplifier adapted for reception of an input signal and a control signal, said gain-controllable amplifier amplifying said input signal to generate an output signal;  
B. means for extracting a portion of said output signal;  
C. means for amplitude modulating said extracted portion with a modulation signal to generate a modulated signal;  
D. a detector connected to receive the modulation signal from the modulated signal;  
E. means for comparing the amplitude of the recovered modulation signal with a reference to generate an error signal; and  
F. means for controlling the gain of said gain-controllable amplifier in response to said error signal.

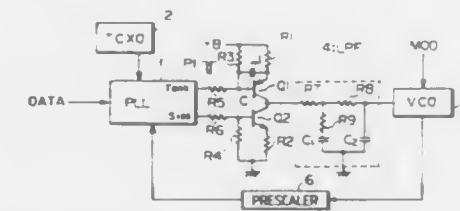
**4,952,887**  
**PHASE-LOCK LOOP CIRCUIT HAVING OUTPUTS IN QUADRATURE**  
James R. Ashley, Tampa, Fla., assignor to Hercules Defense Electronics Systems, Inc., Clearwater, Fla.  
Filed Jan. 9, 1989, Ser. No. 295,087  
Int. Cl.<sup>5</sup> H03L 7/00  
U.S. Cl. 331—17 9 Claims



1. In a phase-lock loop circuit including a phase detector and a voltage controlled oscillator the improvement comprising: amplifier means coupled to directly receive signals from said phase detector;  
integrator means having an output terminal coupled to a control terminal of said voltage controlled oscillator and an input terminal for providing signals at said output terminals that are representative of integrated values of signals coupled to said input terminal;  
non-linear resistance means coupled between amplifier

means and said input terminal of said integrator means, for providing a first resistance value when signals from said amplifier means are of a magnitude below a predetermined value and a second resistance value when signals from said amplifier means are of a magnitude that exceeds said predetermined value, said non-linear resistance means and said integrator means combining to establish a variable gain integrator.

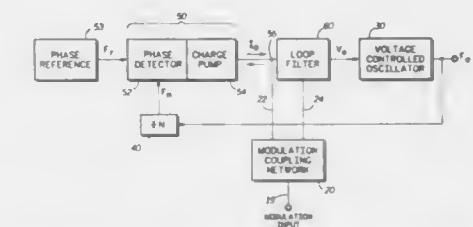
**4,952,888**  
**PHASE LOCKED LOOP FOR DIRECT MODULATION**  
Hideo Izumi, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan  
Filed Sep. 20, 1989, Ser. No. 410,371  
Claims priority, application Japan, Sep. 22, 1988, 63-124102[U]  
Int. Cl.<sup>5</sup> H03C 3/06; H03L 7/085  
U.S. Cl. 332—124 6 Claims



1. A PLL for direct modulation comprising:  
A voltage controlled oscillator circuit having an input terminal for receiving a modulation signal, a control terminal for receiving a control voltage for controlling the frequency of oscillation of said circuit, and an output terminal for providing an output signal;  
a programmable frequency divider having an input terminal for receiving output signals from said voltage controlled oscillator and providing at an output terminal a signal having a frequency  $f_p$ ;  
means coupling the output terminal of said voltage controlled oscillator to the input terminal of said programmable frequency divider;  
a reference frequency oscillator circuit for providing at an output terminal a signal having a frequency  $f_r$ ;  
a low pass filter circuit including capacitor means for storing an electrical charge, said filter circuit having an input terminal coupled to said capacitor means for providing a charging and discharging path for said capacitor means, and said low pass filter circuit having an output terminal coupled to said capacitor means for providing at said output terminal an electrical potential;  
means coupling the output terminal of said low pass filter circuit to said control terminal of said voltage controlled oscillator circuit;  
a power terminal and a ground terminal for application therebetween of an electrical potential;  
a first transistor and a second transistor, each transistor having first and second terminals defining the ends of its main conduction path and a control terminal whose potential relative to said first terminal determines the conductivity of the transistor;  
means coupling the first terminal of said first transistor to said power terminal;  
means coupling the second terminal of said first transistor to said input terminal of said low pass filter circuit;  
means coupling the first terminal of said second transistor to said ground terminal;  
means coupling the second terminal of said second transistor to said input terminal of said low pass filter circuit;  
a phase comparator circuit having a first input terminal coupled to the output terminal of said programmable frequency divider for receiving output signals from said programmable frequency divider, a second input terminal

coupled to the output terminal of said reference frequency oscillator circuit for receiving reference frequency signals, said phase comparator circuit having a first output terminal coupled to the control terminal of said first transistor, a second output terminal coupled to the control terminal of said second transistor, said phase comparator circuit including circuit means for comparing the frequency  $f_p$  of the signals received from said programmable frequency divider with the frequency  $f_r$  of the signals received from said reference frequency oscillator and when  $f_r > f_p$  providing at the first output of said phase comparator a signal which causes said first transistor to conduct and thereby charge said capacitor means in said low pass filter, and when  $f_r < f_p$  providing at the second output terminal of said phase comparator circuit a signal which causes said second transistor to conduct and thereby provide a discharging path for said capacitor means in said low pass filter circuit; and delay circuit means coupled to said first transistor to provide a time delay in the start of conduction of said first transistor.

**4,952,889**  
**LOOP FILTER MODULATED SYNTHESIZER**  
James S. Irwin, Bastrop, Tex., and Wayne P. Shepherd, Sunrise, Fla., assignors to Motorola, Inc., Schaumburg, Ill.  
Filed Apr. 28, 1989, Ser. No. 344,640  
Int. Cl.<sup>5</sup> H03C 3/09; H03L 7/093  
U.S. Cl. 332—128 13 Claims

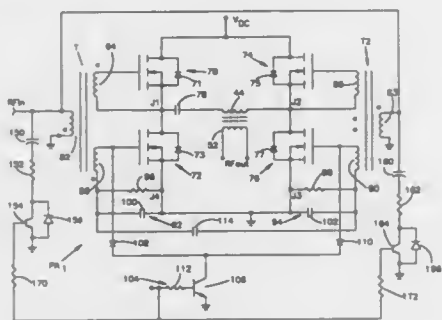


1. A frequency synthesizer for providing a modulated output signal, comprising:  
a filter having an output for controlling a voltage controlled oscillator (VCO) to produce said modulated output signal;  
a phase comparator means for providing an output current to said filter;  
said phase comparator means having a first input for a reference signal and a second input for a signal derived from said modulated output signal;  
first modulation input means including an input for receiving a modulation signal, means for providing a varying current to said filter in response to said modulation signal, and means for summing said varying current and said output current of said phase comparator means in said filter; and second modulation input means for applying a varying voltage to said filter in response to said modulation signal.

**4,952,890**  
**PHASE MODULATION COMPENSATED AMPLITUDE MODULATOR USING DIGITALLY SELECTED AMPLIFIERS**  
Hilmer I. Swanson, Quincy, Ill., assignor to Harris Corporation, Melbourne, Fla.  
Filed Sep. 12, 1989, Ser. No. 404,462  
Int. Cl.<sup>5</sup> H03C 1/04  
U.S. Cl. 332—152 8 Claims

1. A phase modulation compensated RF amplitude modulated amplifier system comprising:  
a common RF driver for supplying a common RF driver signal;  
a plurality of actuatable RF amplifiers each having an input

circuit for receiving said common RF drive signal and each having a fully on condition for amplifying said common drive signal to provide an amplified RF signal and a fully off condition, with each said RF amplifier exhibiting the characteristic that its input circuit has an input impedance which is greater when fully on than that when fully off, thereby tending to provide unwanted phase modulation of said plurality of RF amplifiers;  
means for actuating a selected one or more of said RF amplifiers to be fully on in dependence upon the magnitude of an input signal;



means for combining said amplified RF signals provided by the selected actuated ones of said RF amplifiers to thereby provide a combined signal which is amplitude modulated in accordance with the magnitude of said input signals; and,  
means for selectively adding a compensating impedance to the input circuit of each of said amplifiers that is not actuated to be fully on to thereby compensate for any said unwanted phase modulation of said plurality of RF amplifiers.

4,952,891

## FILTER CIRCUIT WITH AUTOMATIC TUNING

Kenneth W. Moulding, Horley, England, assignor to U.S. Philips Corporation, New York, N.Y.

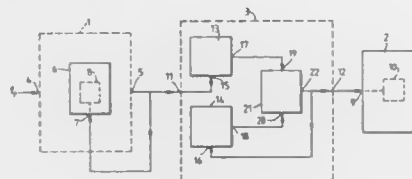
Filed Sep. 22, 1989, Ser. No. 441,354

Claims priority, application United Kingdom, Oct. 21, 1988, 8824756

Int. Cl.<sup>5</sup> H03H 11/04

U.S. Cl. 333—17.1

11 Claims



1. A filter circuit arrangement comprising: a frequency discriminator for producing an output signal representative of a deviation of the frequency of an input signal thereto from the resonant frequency of an input signal thereto from the resonant frequency of a resonant circuit included in said discriminator, said resonant frequency being a function of the value of an electrical parameter of an element of the resonant circuit and being adjustable by applying an adjusting signal to an adjusting signal input of said resonant circuit to thereby adjust the value of said electrical parameter, means coupling an output of the discriminator to the adjusting signal input for applying a signal to said adjusting signal input dependent on said deviation to adjust said resonant frequency towards the frequency of the input signal, a filter circuit wherein the position(s) of the pole(s) and/or zero(s) of the frequency response characteristics

is/are a function of the value of an electrical parameter of an element of said filter circuit and is/are adjustable by applying an adjusting signal to an adjusting signal input of said filter circuit to thereby adjust the value of said electrical parameter of said element of the filter circuit, and an auxiliary circuit having an input coupled to the discriminator output and an output coupled to said filter circuit adjusting signal input for coupling the output of the discriminator to the adjusting signal input of said filter circuit for applying an adjusting signal thereto to adjust said position(s) with the adjustment of the resonant frequency of the resonant circuit, characterized in that the auxiliary circuit comprises first and second further elements which are counterparts of said element of the resonant circuit and said element of the filter circuit, respectively, means for coupling the auxiliary circuit input to an adjusting signal input of the first further element for applying an adjusting signal thereto to thereby adjust a corresponding parameter of the first further element in step with the adjustment of said electrical parameter of said element of the resonant circuit, means for deriving from the first and second further elements a signal dependent on a deviation of the ratio of the value of said corresponding parameter of the first further element to the value of a parameter of the second further element, corresponding to the electrical parameter of said element of the filter circuit, from a specific value and applying said signal to an adjusting signal input of the second further element to adjust said ratio towards said specific value, and means for coupling an output of said signal deriving means to the auxiliary circuit output for adjusting the value of said parameter of said element of the filter circuit in step with the adjustment of the value of said parameter of the second further element.

4,952,892

## WAVE GUIDE IMPEDANCE MATCHING METHOD AND APPARATUS

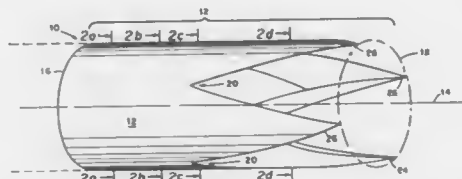
James W. Kronberg, Beech Island, assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 12, 1989, Ser. No. 350,817

Int. Cl.<sup>5</sup> H01P 5/08

U.S. Cl. 333—34

26 Claims



1. A method for matching the impedance of a hollow wave guide to the impedance of free space, said wave guide having a wall with an inside surface and an outside surface, an end portion with a first end continuous with said wave guide and a second end opposite said first end, said second end adjacent free space, which method comprises the step of:

cutting a plurality of grooves in said end portion beginning at said first end on said inside surface of said wall and running longitudinally to said second end, said grooves increasing in width and depth from said first end to said second end, penetrating said wall and intersecting at said second end.

4,952,893

## ATTENUATING CIRCUIT

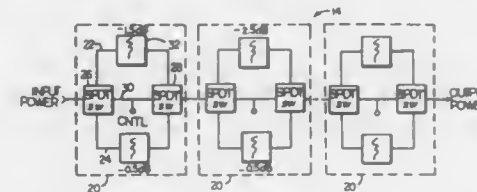
Bernard M. Cuddy, Cambridge, Mass., assignor to Teradyne, Inc., Boston, Mass.

Filed Mar. 13, 1989, Ser. No. 322,661

Int. Cl.<sup>5</sup> H03H 7/24

U.S. Cl. 333—81 R

15 Claims



1. An attenuating circuit for providing a desired relative attenuation comprising:  
an attenuation signal path,  
said attenuation signal path being configured to attenuate a signal by a first amount, and  
a reference signal path,  
said reference signal path being configured to attenuate said signal by a second amount, said desired relative attenuation being equal to said first amount minus said second amount,  
said attenuation signal path and said reference signal path each having a resistance path to ground,  
said attenuating circuit having an input, an output and first and second switches configured to alternately connect said attenuation signal path and said reference signal path between said input and said output, said first and second switches having a significant series impedance.

4,952,894

## WAVEGUIDE FEED NETWORK FOR ANTENNA ARRAY

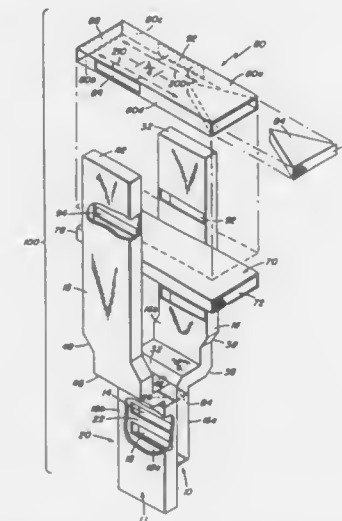
William R. Connerney, Needham, and Jaffar W. Hamandi, Pepperell, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jul. 10, 1989, Ser. No. 377,390

Int. Cl.<sup>5</sup> H01P 5/18

U.S. Cl. 333—113

5 Claims



1. A corporate feed coupler for distributing R.F. energy, such coupler including a pair of primary and a plurality of secondary waveguides, each one of such waveguides having a rectangular cross-section, with a first and a second broad wall,

a first and a second narrow wall and a first and a second end, such coupler comprising:

- a quadrature hybrid junction formed from the pair of primary waveguides, such junction having an input port corresponding to the first end of one of the pair of primary waveguides, to divide R.F. energy applied to the input port equally between the waveguides making up the pair of primary waveguides and to impart a 90° relative phase shift between the R.F. energy in such waveguides, each one of the pair of primary waveguides further being disposed to have facing broad walls adjacent the second ends of such waveguides, the spacing between such broad walls being substantially equal to the broad wall of each one of the secondary waveguides;
- means for supporting each one of the secondary waveguides at a different position spaced along the facing broad walls of the pair of primary waveguides, with the narrow walls of each one of the plurality of secondary waveguides contacting corresponding sections of the broad walls of the pair of primary waveguides; and
- an aperture formed through each contacting narrow wall of each one of the plurality of secondary waveguides and the corresponding section of the broad wall of each one of the pair of primary waveguides to couple R.F. energy from the pair of primary waveguides to each one of the plurality of secondary waveguides, the position along the length of each one of the two apertures in each one of the plurality of secondary waveguides being offset whereby constructive interference is experienced by R.F. energy out of the first end of each one of the plurality of secondary waveguides and destructive interference is experienced by R.F. energy at the second end of each one of the plurality of secondary waveguides.

4,952,895

## PLANAR AIRSTRIPLINE-STRIPLINE MAGIC-TEE

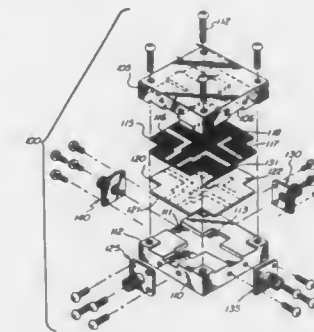
Clifton Quan, Arcadia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 15, 1989, Ser. No. 407,520

Int. Cl.<sup>5</sup> H01P 5/20

U.S. Cl. 333—121

9 Claims



1. A planar magic tee network device employing stripline and double-sided airstripline circuits, comprising:  
means for defining a substantially planar dielectric region characterized by opposed first and second planar surfaces; matching airstripline conductive patterns formed on said respective first and second surfaces to comprise a double-sided airstripline reactive-tee power divider circuit, comprising an airstripline input port and two opposed output ports, whereby RF power entering the device at the airstripline input port will be divided equally and in phase between the output ports;  
means for defining ground plane surfaces for the airstripline circuit and spaced from the respective surfaces of said dielectric region, thereby defining open regions between the second surfaces and the ground plane surfaces whereby the electromagnetic field configurations for said



airstripline circuit are concentrated within said open regions between the respective dielectric surfaces and the ground plane surfaces;

a stripline circuit comprising a stripline conductor disposed within said dielectric region intermediate the respective dielectric surfaces between a stripline port and a stripline balun network, wherein the electromagnetic field configurations of the stripline circuit are concentrated within said dielectric region between said airstripline conductors; and

means for defining an energy coupling region in said airstripline conductor pattern adjacent said stripline balun network to couple RF energy entering the stripline port into said airstripline circuit;

whereby RF energy entering the device at the stripline port will be divided equally between the airstripline output ports but 180° out of phase.

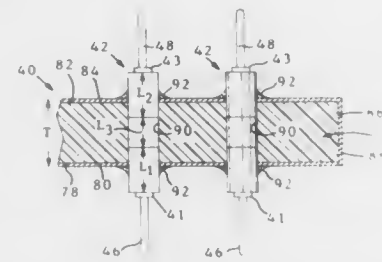
4,952,896

**FILTER ASSEMBLY INSERTABLE INTO A SUBSTRATE**  
Andrew J. Dawson, Jr., Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 31, 1988, Ser. No. 265,083  
Int. Cl.<sup>3</sup> H01P 13/648; H01R 13/66

U.S. Cl. 333—182

7 Claims



1. A filter assembly for an electrical connector comprising: at least one terminal subassembly including a terminal member and a plurality of filter component members mounted thereon, each of said filter component members having opposing end faces and side surfaces and a terminal-receiving aperture extending therethrough between said end faces, each said terminal member including opposed first and second connecting portions and an intermediate portion extending therebetween, said filter component members being mounted on said intermediate portions of respective terminal members, said plurality of filter component members including first and second plurality of filter component members including first and second members being proximate and electrically connected to said first and second terminal connecting portion respectively, and said side surfaces of said first and second component members being conductive, said first and second component members having at least a third member disposed therebetween; and
- a dielectric substrate member having first and second major surfaces and at least one terminal assembly-receiving aperture extending therethrough, said dielectric substrate member including conductive material disposed on said first and second major surfaces;
- said at least one terminal subassembly being disposed and secured in a corresponding one of said at least one substrate aperture such that said first and second filter component members are at least partially disposed in said respective aperture, said conductive side surfaces of said first and second filter component members being mechanically secured to and electrically engaged with said conductive material on said first and second major surfaces respectively; whereby
- a filter assembly is provided having a compact structure and an integral transverse ground means.

4,952,897

**LIMITING CIRCUIT BREAKER**

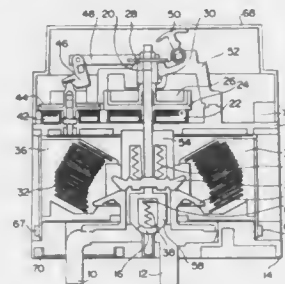
Pierre Barnel, Echirrolles; Francois Lindeberg, Sassenage; Jean-Pierre Nebon, St. Martin-le-Vinoux, and Philippe Perrier, Le Touvet, all of France, assignors to Merlin Gerin

Filed Sep. 15, 1988, Ser. No. 244,478

Claims priority, application France, Sep. 25, 1987, 87 13484  
Int. Cl.<sup>3</sup> H01H 53/00

U.S. Cl. 335—147

7 Claims



1. A limiting circuit breaker with high-speed contact opening control by Thomson effect, comprising, per pole, a movable assembly having a movable main contact bridge forming a main circuit with a pair of stationary main contacts connected to current terminals, a movable arcing contact bridge forming with a pair of stationary arcing contacts an arcing circuit connected in parallel to the main circuit, a movable assembly operating mechanism, for opening the main circuit and the arcing circuit, comprising a Thomson effect propelling part, a locking device of the movable assembly in the open position of the contacts and an unlocking control device, the main contact bridge being disposed between the stationary main contacts and the Thomson effect propelling part, the movable assembly comprising an operating rod securely united to the main contact bridge, the Thomson effect propelling part comprising an annular opening coil surrounding said rod, an opening disk disposed facing the opening coil and movable in relation to said rod, and an annular piston securely united to the operating rod, springs being disposed between the disk and the piston, in such a way that a current supply to the opening coil causes repulsion of the disk and of the piston and movement of the operating rod to the open position of the contacts, said springs returning the disk to the rest position facing the coil at the end of the opening travel.

4,952,898

**TRANSFORMER SECONDARY BUSS ADAPTER APPARATUS**

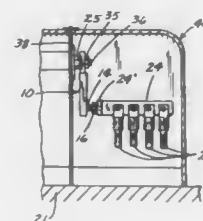
Charles E. Nelson, 2045 Taunton Rd., and Warren D. McClellan, 1538 Tiber Ave., both of Jacksonville, Fla. 32207

Filed Nov. 7, 1989, Ser. No. 434,860

Int. Cl.<sup>3</sup> H01F 15/02, 27/04

U.S. Cl. 336—65

2 Claims



1. Apparatus comprising: a concrete pad;

- an enclosed housing attached to said concrete pad; door means for selectively opening and closing said housing; an electrical transformer having a primary and a secondary coil disposed in and attached to said housing; an electrical inlet line means for delivering high voltage electricity to the primary coil of said transformer; a plurality of electrical outlet line means for delivering low voltage electricity from the transformer secondary coil to residential homes or the like;
- a transformer secondary buss adapter means for connecting said plurality of electrical outlet line means to said secondary coil, said transformer secondary buss adapter means including:
- a rigid member constructed of an electrically conductive material, a top end of said member being substantially flat on two sides thereof and having a hole disposed therethrough;
- a first threaded stud having one end operatively electrically connected to said secondary coil of the transformer, said threaded stud extending through the hole in said rigid member;
- threaded nut means disposed on said threaded stud for holding said rigid member on said stud whereby a good electrical conductive connection is made between said rigid member and said threaded stud;
- a second threaded stud rigidly attached to the bottom of said rigid member;
- insulation means completely surrounding said rigid member on a portion thereof between the hole thereof and the second threaded stud thereof for preventing electricity from being transmitted therethrough;
- a buss bar for connecting a said plurality of electrical line means thereto; and
- means for attaching said buss bar to said second threaded stud whereby a low voltage electrical current will pass from said secondary coil, through said rigid member to said buss bar and from said buss bar out through said plurality of electrical outlet line means.

4,952,899

**SHUNT HOLDING MEANS FOR BALLASTS**

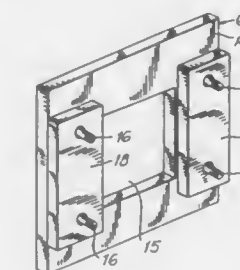
Robert A. Kulka, Livingston, N.J.; Raymond H. Van Wagener, Darien, Conn., and Lothar Freimuth, Franklin Lakes, N.J., assignors to Magnetek Universal Manufacturing Corporation, Paterson, N.J.

Filed Mar. 31, 1989, Ser. No. 331,517

Int. Cl.<sup>3</sup> H01F 21/08, 27/26

U.S. Cl. 336—160

5 Claims



1. A ballast assembly having a magnetic core; a primary winding and a secondary winding, both windings mounted on a central leg of the core; a shunt placed between the windings, the assembly further comprising: wall means placed between the primary and secondary windings, the wall means having a central opening for accepting the central leg of the core therein; and, structure means, precisely positioned integrally with the wall means, for engaging and retaining the shunt thereon, the structure means comprising at least one post, extending outwardly from a front surface of the wall means, the

shunt having at least one hole sized for engaging the post, for holding the shunt at a set distance from the core.

4,952,900

**CONTROLLED SEAL FOR AN EXPULSION FUSE AND METHOD OF ASSEMBLING SAME**

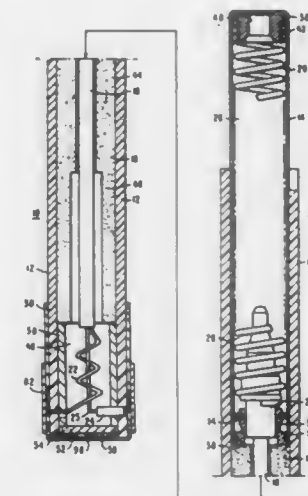
Frank L. Cameron, and George A. Smith, both of N. Huntingdon, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 4, 1989, Ser. No. 445,057

Int. Cl.<sup>3</sup> H01H 71/20, 73/22, 85/02

U.S. Cl. 337—217

21 Claims



1. An electric circuit interrupter, comprising: a tubular insulating casing; a body of arc-extinguishing material disposed inside of and spaced from ends of said tubular insulating casing to form an open -expulsion end in one end of said insulating casing and having an axial opening extending therethrough, a conducting rod axially movable within said axial opening of said body of arc-extinguishing material, a tubular conducting casing seated in the other end of said tubular insulating casing and extending outwardly therefrom, sleeve means abutting said body of arc-extinguishing material in said open expulsion end in said one end of said insulating casing, fusible means extending through said sleeve means and into said open expulsion end, and connected to said conducting rod, biasing means between said conducting rod and an end of said tubular conducting casing remote from said tubular insulating casing and being effective to move said conducting rod away from said fusible means upon fusion of said fusible means, diaphragm means having a first surface and a second surface opposite to said first surface, said first surface abutting said sleeve means and located remote from said body of arc-extinguishing material at said expulsion end, sealant means affixed to said diaphragm means on said second surface of said diaphragm means for sealing off said expulsion end and for retaining said diaphragm means in position during a desired operating condition of said circuit interrupter, and enclosure means on the exterior end of said tubular insulating casing for closing said expulsion end and for cooperating with said diaphragm means and said sealant means to permit a build-up of pressure of gases generated by an arc of said fusible means and said body of arc-extinguishing material in response to an overcurrent until said diaphragm means ruptures and said enclosure means is re-

leased from said expulsion end at a predetermined pressure for said gases.

4,952,901

# BIMETALLIC DISC ASSEMBLY FOR THERMOSTATIC SWITCH AND DISC RETAINER THEREFOR

John J. Chrupcala, and Anthony F. Urban, both of Warren, R.I., assignors to Elmwood Sensors, Inc., Pawtucket, R.I.

Filed Dec. 22, 1989, Ser. No. 455,979

Int. Cl.<sup>3</sup> H01H 37/04, 37/52

U.S. Cl. 337—372

18 Claims



1. A disc retainer for a bimetallic disc-actuated thermostatic switch comprising a central hub portion, at least three fingers which radiate outwardly from said hub portion defining open notches therebetween, a raised disc retainer projection adjacent the terminal end of each of said fingers, each of said disc retainer projections having an inner face which faces inwardly toward said hub portion and a raised disc support shoulder on each of said fingers adjacent the inner face of the disc retainer projection thereon, said disc support shoulders having upper support surfaces thereon which are disposed substantially within a common plane but being raised above the fingers thereof by amounts which are less than the amounts by which the adjacent disc retainer projections are raised above the respective fingers thereof.

4,952,902

# THERMISTOR MATERIALS AND ELEMENTS

Yukio Kawaguchi, and Tohru Kineri, both of Chiba, Japan, assignors to TDK Corporation, Tokyo, Japan

Continuation of Ser. No. 169,041, Mar. 16, 1988. This application Oct. 16, 1989, Ser. No. 421,771

Claims priority, application Japan, Mar. 17, 1987, 62-61996; Nov. 20, 1987, 62-294797; Nov. 20, 1987, 62-294798; Dec. 2, 1987, 62-305327; Feb. 17, 1988, 63-34733

Int. Cl.<sup>3</sup> H01C 7/10

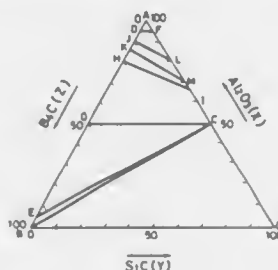
U.S. Cl. 338—22 R

12 Claims

1. A thermistor material in the form of a sintered body comprising

- (A) a matrix comprising at least one oxide selected from the group consisting of oxides of aluminum, of silicon, and of the elements magnesium, calcium, strontium and barium, and
- (B) a conductive path forming substance comprising at least one carbide selected from the group consisting of silicon carbide and boron carbide, wherein the volume ratio of silicon carbide to the matrix is up to about 1.24, and wherein the weight ratios of the matrix, silicon carbide and boron carbide are within the region defined by boundary lines joining corner coordinates (x, y, z) on a triangular plot, where x, y, z are the weight percent respectively

of  $\text{Al}_2\text{O}_3$ , SiC and  $\text{B}_4\text{C}$ , when the matrix is  $\text{Al}_2\text{O}_3$  and the corner coordinates are (95,0,5), (5,0,95), (50,50,0) and (95,5,0) or by the corner coordinates (Aypm/pa, Ay, Az) when the matrix is different from  $\text{Al}_2\text{O}_3$ , where pm is the



theoretical density of the matrix, pa is the theoretical density of  $\text{Al}_2\text{O}_3$ , and A is a value such that  $A \times \text{pm} / \text{pa} + \text{Ay} + \text{Az} = 100$ , and the variables x, y, z have the preceding values specified for the corner coordinates when the matrix is  $\text{Al}_2\text{O}_3$ .

4,952,903

# CERAMIC HEATER HAVING PORTIONS CONNECTING HEAT-GENERATING PORTION AND LEAD PORTIONS

Kazuyoshi Shibata, Nagoya, and Hitoshi Nishizawa, Iwakura, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

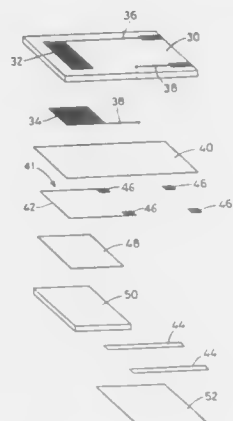
Filed Jan. 23, 1989, Ser. No. 299,531

Claims priority, application Japan, Jan. 28, 1988, 63-17729

Int. Cl.<sup>3</sup> H01L 7/00

U.S. Cl. 338—34

14 Claims



1. A ceramic heater comprising:

- a ceramic body; and
- a heater element formed on the ceramic body, said heater element comprising:
  - (i) a heat-generating portion formed of a cermet containing a ceramic material and a metal material consisting essentially of at least one noble metal;
  - (ii) electrical lead portions formed of a metallic material consisting essentially of at least one base metal, or formed of a cermet containing a ceramic material and said metallic material; and
  - (iii) connecting portions connecting said heat-generating portion to said electrical lead portions.

4,952,904

# ADHESION LAYER FOR PLATINUM BASED SENSORS

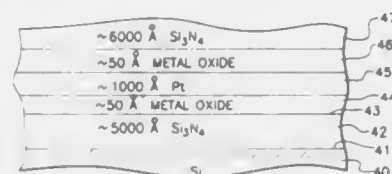
Robert G. Johnson; James O. Holmen, both of Minnetonka, Minn.; Ronald B. Foster, and Uppilli Sridhar, both of Garland, Tex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 23, 1988, Ser. No. 289,098

Int. Cl.<sup>3</sup> H01L 10/10

U.S. Cl. 338—36

22 Claims



1. A thin film platinum on silicon nitride sensor structure with an adhesion enhancement interlayer, the sensor structure comprising:

- a layer of silicon nitride having a surface on which it is desired to deposit an electrically resistive thin film layer of platinum;
- a thin film interlayer of a metal oxide deposited on said silicon nitride surface as an adhesion promoter for platinum; and
- a thin film of platinum deposited on said metal oxide interlayer whereby the metal oxide interlayer enhances the bond of platinum to silicon nitride.

4,952,905

# DATA COMMUNICATION SYSTEM

Colin C. Oliver, Slough, England, assignor to EMI Limited, Middlesex, England

Continuation of Ser. No. 841,222, Mar. 19, 1986, abandoned.

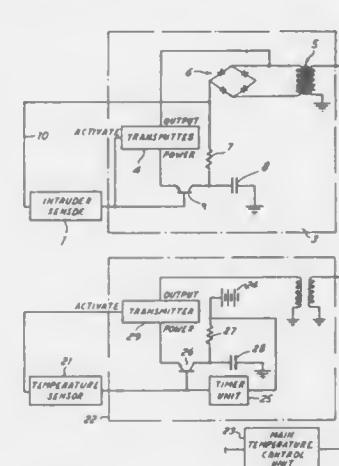
This application Nov. 29, 1988, Ser. No. 282,974

Claims priority, application United Kingdom, Mar. 20, 1985, 8507281

Int. Cl.<sup>3</sup> G08B 13/00

U.S. Cl. 340—310 R

8 Claims



1. An electrical-supply communications system for the transmission of messages, each of a predetermined duration, between elements in an electrical-supply wiring circuit, the system comprising: wiring to provide connection with an electrical-supply; a plurality of elements, each connected to the electrical-supply wiring to effect powering of said element; the elements linked together by the electrical-supply wiring for the transfer therebetween of messages; each element consisting of an electrical appliance with an interface unit; each interface unit having means to transmit a data message to other elements of the communication system, the transmission means includ-

ing means to apply a carrier signal to the electrical-supply wiring; each interface unit also having an individual means to store energy for powering the transmission means within the interface unit, each energy-storage means being connected permanently to a charging source, each energy storage means being arranged to power only the transmission means within the same element in response to an electrical signal emitted by the electrical appliance within said element, each energy storage means having a capacity substantially equivalent to the power needed to operate the transmission means which it is arranged to power for the time interval corresponding to the predetermined duration of a message for the communication system thereby to permit only intermittent operation of each said transmission means.

4,952,906

# STROBE ALARM CIRCUIT

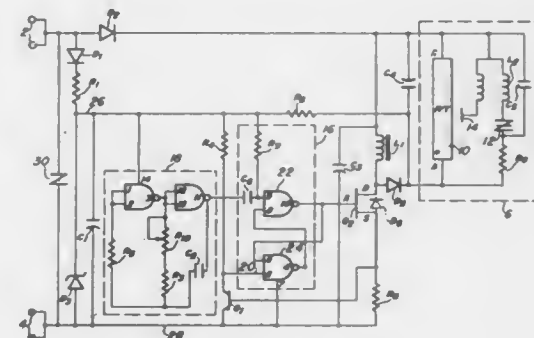
William P. Buyak, New Hartford, and Bruce V. Testa, Cromwell, both of Conn., assignors to General Signal Corporation, Stamford, Conn.

Filed Jan. 27, 1989, Ser. No. 303,887

Int. Cl.<sup>3</sup> G08B 5/00

U.S. Cl. 340—331

12 Claims

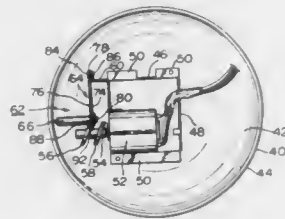


1. A strobe light circuit for flashing a flashtube at a desired frequency, comprising:

- a dc power source for providing power at a predetermined voltage;
- an inductor for storing energy;
- switch means for connecting and disconnecting said inductor across said source to store energy in said inductor during the periods of connection;
- a flash unit which includes said flashtube and is operable to fire said flashtube to generate a light output upon the application across said unit of its threshold firing voltage;
- a capacitor connected in parallel to said flash unit so that said capacitor will cause the firing of said flashtube and the discharge of its stored energy through the flashtube upon the attainment of a voltage across said capacitor corresponding to said threshold firing voltage;
- means for connecting said parallel combination of said flash unit and said capacitor effectively across said inductor when said inductor is disconnected from said power source by said switch means; and
- means for repetitively cycling said switch means between its open and closed state.

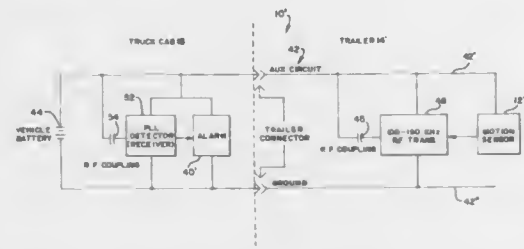


**4,952,907**  
**MOTOR DRIVEN BELL**  
 Yoshikazu Kojima, Urawa, Japan, assignor to Kobishi Electric Co., Ltd., Tokyo, Japan  
 Filed Nov. 14, 1989, Ser. No. 437,077  
 Int. Cl.<sup>3</sup> G10K 1/00  
 U.S. Cl. 340—396 6 Claims



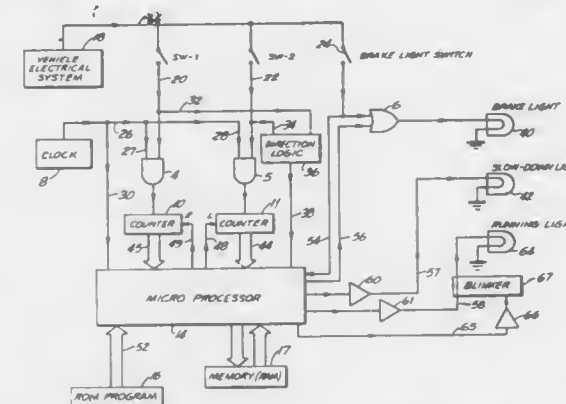
1. A motor driven bell comprising:
  - (a) a gong means having an inner wall;
  - (b) a base mounted within said gong means;
  - (c) a motor mounted on said base within said gong means, the motor having a rotatable driving shaft extending toward said inner wall of the gong means;
  - (d) a pair of cam members operatively connected to said driving shaft of said motor for rotation about the axis of said shaft, each of said cam members having a cam surface, said cam surfaces facing each other in a spaced relation and lying in approximately parallel planes which deviate from a perpendicular position with respect to said driving shaft; and
  - (e) a hammer means comprising (i) a link means connected at one end thereof to said base, the link means extending into the space between the cam surfaces for moving toward and away from the inner wall of said gong means; and (ii) a hammer element for striking against the inner wall of said gong means, the hammer element being connected to the link means whereby the hammer element moves toward and away from said inner wall of said gong means.

**4,952,908**  
**TRAILER STABILITY MONITOR**  
 John A. Sanner, Fort Wayne, Ind., assignor to Navistar International Transportation Corp.  
 Filed Jun. 20, 1988, Ser. No. 209,152  
 Int. Cl.<sup>3</sup> B60R 25/10  
 U.S. Cl. 340—429 23 Claims



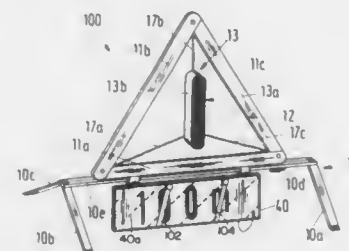
1. A trailer stability monitor for tractor-trailer vehicles comprising a lateral force sensor means mounted on the trailer, r.f. transmitter means coupled to said lateral force sensor means and responsible thereto for transmitting a signal when highway travel associated lateral forces acting on said trailer of a predetermined degree conducive to a rollover are sensed, r.f. receiver means mounted on said tractor for receiving said signal, means directing said signal to said r.f. receiver and alarm means mounted on said tractor and capable of being activated by said r.f. receiver, upon receipt of said signal thereby.

**4,952,909**  
**EARLY WARNING SYSTEM FOR ANTICIPATED VEHICLE BRAKING**  
 Andrew Woerner, Oradell, N.J., and Harold A. Caine, 326 Lena Ave., Freeport, N.Y., assignors to Harold A. Caine, Freeport, N.Y.  
 Filed Nov. 3, 1989, Ser. No. 431,994  
 Int. Cl.<sup>3</sup> B60Q 1/26  
 U.S. Cl. 340—464 19 Claims



1. An early warning system for anticipated braking, comprising:
  - (a) means for energizing a warning signal;
  - (b) first switch means disposed to assume a first state upon slight activation of a vehicle accelerator and a second state upon a release of said accelerator;
  - (c) second switch means disposed to assume one state upon a condition of substantial activation of an accelerator and another state upon a release of said condition of substantial activation;
  - (d) means coupled to said first and second switch means for determining a time interval between when said second switch means goes from said one state to said another state and first switch means goes from said first state to said second state; and
  - (e) means for comparing said time interval to a reference interval and enabling said means for energizing said warning signal when said time interval has a predetermined relationship to said reference interval.

**4,952,910**  
**WARNING TRIANGLE FOR MOTOR VEHICLES**  
 Günter Straten, Mellisdorfer Damm 12, D-2071 Stek-Mellisdorf, and Klaus-Jürgen Kiefer, Jungfernstieg 34, D-2000 Hamburg 36, both of Fed. Rep. of Germany  
 Filed Mar. 2, 1989, Ser. No. 317,936  
 Claims priority, application Fed. Rep. of Germany, Mar. 5, 1988, 3807300  
 Int. Cl.<sup>3</sup> B60Q 7/00  
 U.S. Cl. 340—473 29 Claims

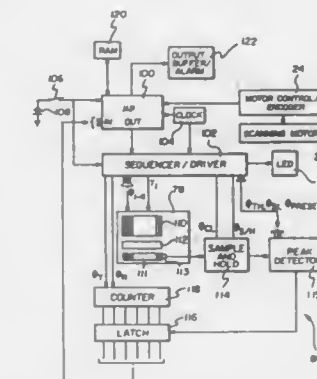


1. A warning triangle for motor vehicles having the shape and color corresponding to the "Danger Spot" warning sign wherein the warning triangle is luminous and the lighting is

supplied with power by means of a cable that is directly or indirectly connectable with the vehicle battery or by means of a power source incorporated into the warning triangle, said warning triangle comprising:
 

- (a) a stand including outwardly folding flat iron struts for supporting the warning triangle;
- (b) three reflector legs arranged in the form of a triangle;
- (c) a white background surface located interjacent said three reflector legs;
- (d) a vertical black bar constructed in the form of a cuboid;
- (e) means for suspending said vertical black bar by said reflector legs on said white background surface, and
- (f) lighting means, said lighting means being located in said cuboid to illuminate said warning triangle.

**4,952,911**  
**SCANNING INTRUSION DETECTION DEVICE**  
 George C. D'Ambrosia, Pennfield, and Christopher A. Ladden, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
 Filed May 18, 1988, Ser. No. 195,741  
 Int. Cl.<sup>3</sup> G08B 13/18  
 U.S. Cl. 340—557 22 Claims



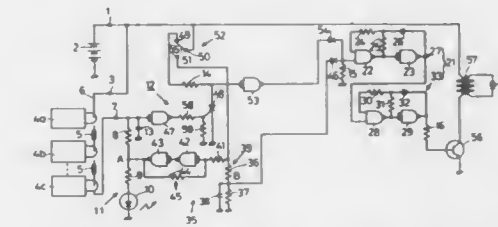
1. An intrusion detection device comprising a radiation emitter arranged to project a beam of radiation toward a field of view, whereby at least a portion of said beam is reflected by at least a portion of the field of view, means for receiving the reflected radiation of said beam reflected from said field of view, means for scanning said field of view with said radiation emitter and said reflection-receiving means, said reflection-receiving means including means for determining by triangulation the distance from said device at which said beam has been reflected from said field of view, means for generating a signal indicative of the distance from said device at which said beam has been reflected from each of a plurality of azimuthal sectors of said scanned field of view, means for storing a plurality of reference signals which are indicative of the distance of reflection of said beam from each azimuthal sector of said field of view during a reference time period, means for comparing a signal with a reference signal from an adjacent azimuthal sector, and means for generating an output signal if one of said signals is different from the reference signal from said adjacent azimuthal sector.

**4,952,912**  
**ALARM SYSTEM**  
 Tsuginobu Tanaka, Tokyo, Japan, assignor to Tanaka Denki Kōdo Co., Ltd., Japan  
 Filed Apr. 11, 1989, Ser. No. 336,584  
 Claims priority, application Japan, Jan. 12, 1989, 1-002473  
 Int. Cl.<sup>3</sup> G08B 13/14, 23/00  
 U.S. Cl. 340—568 1 Claim

1. An alarm system comprising:
  - (a) a closed circuit including an alarm cord, a high resistor

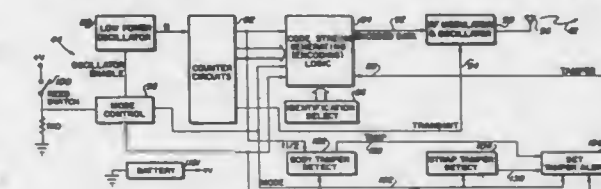
and a luminous element which are sequentially connected to a DC power source means;
 

- (b) a disconnect signal detector means for detecting disconnection of the alarm cord in the closed circuit and for outputting a detection signal, including
  - (i) an inverter circuit means connected to the closed circuit and providing an output signal,
  - (ii) a thyristor to be actuated by application of the output signal of the inverter circuit means to a gate thereof, and
  - (iii) an automatic reset type push-button switch means inserted between an anode of the thyristor and the DC power source means;
- (c) an alarm generator means for producing an alarm sound in response to the detection signal from the disconnect signal detector means;
- (d) a first charging-discharging circuit means connected to the DC power source means through a first transistor which is turned on when the push-button switch means of the disconnect signal detector means is operated;



- (e) a first Schmitt trigger circuit means for transmitting a lighting signal to the luminous element in the closed circuit and also for transmitting a connect signal to the disconnect signal detector means only for a duration of a time period set by the first charging-discharging circuit means when the push-button switch means is operated, and for transmitting a disconnect signal to the disconnect signal detector means after expiration of the time period set by the first charging-discharging circuit means;
- (f) a second charging-discharging circuit means connected to the DC power source means through a second transistor to be turned on when the push-button switch means is operated; and
- (g) a second Schmitt trigger circuit means for providing an alarm signal to cause the alarm generator means to produce the alarm sound to indicate a start of alarm cancellation, said second Schmitt trigger circuit means providing the alarm signal only for a duration of a time period set by the second charging-discharging circuit means when the push-button switch means is operated.

**4,952,913**  
**TAG FOR USE WITH PERSONNEL MONITORING SYSTEM**  
 James D. Pauley, Estes Park, and Allen E. Rippling, Jr., Louisville, both of Colo., assignors to B. I. Incorporated, Boulder, Colo.  
 Continuation of Ser. No. 231,823, Aug. 12, 1988, Pat. No. 4,885,571, which is a continuation of Ser. No. 852,831, Apr. 15, 1986, abandoned. This application Dec. 4, 1989, Ser. No. 446,212  
 Int. Cl.<sup>3</sup> G08B 23/00; H04B 1/34  
 U.S. Cl. 340—573 11 Claims



1. A tag for use with an individual monitoring system, said

individual monitoring system including means for monitoring the presence or absence of an individual wearing said tag within a defined area, said tag including:

a self-contained power source;  
tamper sensing means for sensing any attempt to tamper with the operation of said tag, including any attempt to remove said tag from an individual wearing said tag; and circuit means coupled to said power source for generating an encoded data signal, said encoded data signal comprising a plurality of bits that make up a preselected code word that identifies a particular tag, and at least one tamper bit that identifies any tamper attempt sensed by said tamper sensing means;

whereby said encoded data signal provides an indication, when generated, of whether the operation of the tag identified by said preselected code word has been tampered with.

4,952,914

## WASHER FLUID MONITOR

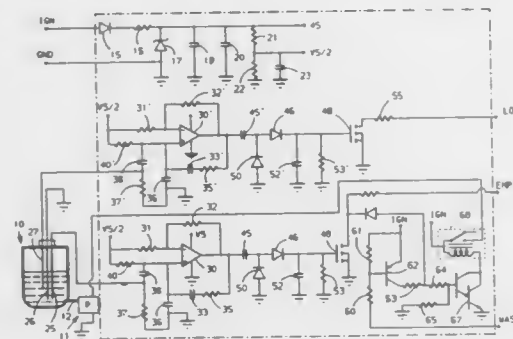
Donald L. Mueller, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 13, 1989, Ser. No. 420,979

Int. Cl.<sup>3</sup> G08B 21/00; H01G 5/28

U.S. Cl. 340—620

4 Claims



1. A washer fluid monitor for a vehicle window washing system having a washer fluid reservoir with an electrically conducting washer fluid therein, a DC electrical supply with supply voltage, intermediate voltage and ground voltage terminals, and means electrically connecting the washer fluid to the ground voltage terminal, the washer fluid monitor comprising, in combination:

first electrically conducting probe connected to the ground voltage terminal and disposed in the washer fluid reservoir above a first predetermined level of washer fluid therein;  
a second electrically conducting probe disposed in the washer fluid reservoir above a second predetermined level of washer fluid therein;  
a Wien bridge oscillator comprising an operational amplifier having power connections to the supply voltage and ground voltage terminals of the DC electrical supply, an inverting input, a non-inverting input and an output, the oscillator further comprising a first resistor connected between the output and the inverting input, a second resistor connected between the inverting input and the intermediate voltage terminal, a first capacitor and third resistor connected in series between the output and the non-inverting input, a second capacitor connected between the non-inverting input and the ground terminal, a fourth resistor connected between the intermediate voltage terminal and the non-inverting input, a third capacitor connected between the non-inverting input and the second electrically conducting probe, and a fifth resistor

connected between the first and second electrically conducting probes; and signal means responsive to oscillation of the Wien bridge oscillator to generate a low washer fluid signal.

4,952,915

## FAILED ELECTRICAL COMPONENT DETECTOR FOR MULTIPHASE ELECTRIC MACHINES

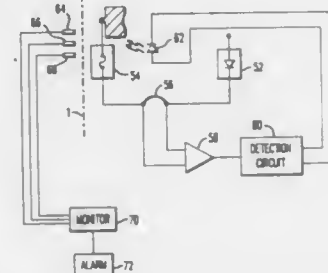
Maurice A. Jenkins, Casselberry, and Robert F. Gray, Winter Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 12, 1988, Ser. No. 193,868

Int. Cl.<sup>3</sup> G08B 21/00

U.S. Cl. 340—639

15 Claims



10. A multiphase brushless exciter having a failed electrical component detector, comprising:

a rotating member;  
a plurality of diodes carried by said rotating member and arranged to rectify alternating multiphase current;  
a plurality of fuses carried by said rotating member with each of said fuses electrically connected in series with one of said diodes;  
a plurality of detection circuits carried by said rotating member, each circuit responsive to one of said series connected diode-fuse combinations for detecting component failures;  
a plurality of light emitting diodes carried by said rotating member such that all of said light emitting diodes for each electrical phase are positioned along a circle having a radius different from the radii of the circles for the other electrical phases, each of said light emitting diodes being responsive to one of the detection circuits;  
a plurality of sensors at least equal in number to the number of electrical phases, said sensors disposed about said rotating member such that each sensor is responsive to only the light emitting diodes of one of said electrical phases; and monitor means responsive to said sensors for indicating the number of failures per electrical phase.

4,952,916

## POWER TRANSMISSION

Lael B. Taplin, Union Lake, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Filed Dec. 4, 1989, Ser. No. 445,354

Int. Cl.<sup>3</sup> G08B 21/00; G01N 22/00

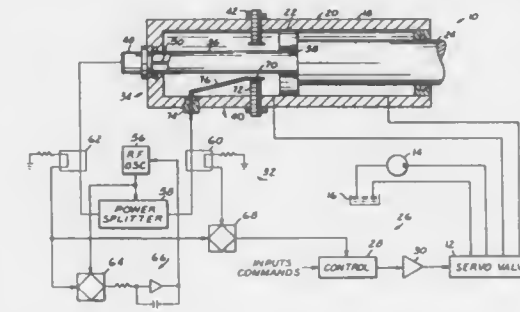
U.S. Cl. 340—686

21 Claims

18. A coaxial transmission line system that comprises:

a coaxial transmission line having a predetermined characteristic impedance and including a center conductor and an outer conductor,  
an rf generator having a characteristic impedance different from that of said transmission line, and  
antenna means coupled to said generator and extending radially into said transmission line for capacitively coupling rf energy from said generator to said center conductor,

said antenna means including a tapering transmission line within said outer conductor for matching said characteristic impedance of said generator to that of said coaxial transmission line.



4,952,917

## DISPLAY SYSTEM WITH LUMINANCE CALCULATION

Shigeru Yabuuchi, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

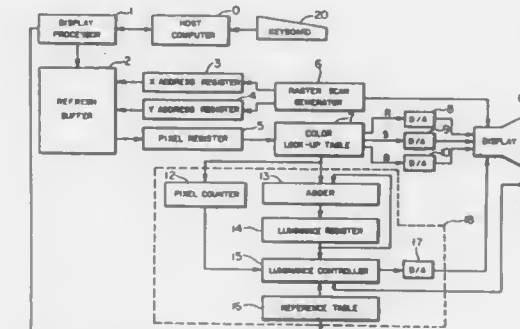
Filed Jan. 14, 1988, Ser. No. 143,956

Claims priority, application Japan, Jan. 19, 1987, 62-8029

Int. Cl.<sup>3</sup> G09G 5/00

U.S. Cl. 340—703

11 Claims



1. A display system comprising:  
image displaying means for displaying a predetermined image on a screen by a raster scan;  
image data generating means or generating predetermined image data to be displayed by said image displaying means;  
storing means for storing information representative of said predetermined image data generated by said image data generating means; and  
image designating means for supplying said information stored in said storing means to said image displaying means in synchronism with said raster scan, said image designating means including luminance calculating means for calculating a value of luminance in accordance with contents of said information stored in said storing means and luminance controlling means for controlling luminance of said screen of said image displaying means in response to said calculated luminance value;  
wherein said luminance calculating means adds luminance data to a sum of previous luminance data each time information for a pixel of said screen is read from said storing means, thereby calculating luminance of the screen for one image to be displayed by said image displaying means.

4,952,918

## DISPLAY AND INPUT APPARATUS

Shigeru Fujita; Hideo Tanaka, and Susumu Harada, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

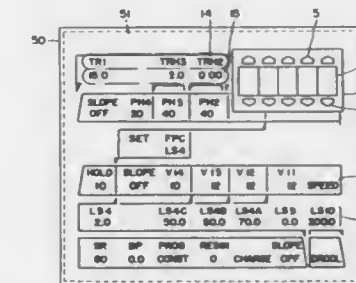
Filed May 9, 1988, Ser. No. 191,967

Claims priority, application Japan, May 11, 1987, 62-113846; May 11, 1987, 62-113848; May 11, 1987, 62-113849

Int. Cl.<sup>3</sup> G09G 1/08

U.S. Cl. 340—706

9 Claims



1. Display apparatus comprising:  
display means adapted to display a plurality of set data items and set display labels corresponding to the set data items, said set data items comprising a plurality of digits arranged as a number, and said set display labels comprising a plurality of characters;  
a transparent touch panel superposed on said display means and including a plurality of touch keys, each of said touch keys corresponding to a set display label, the transparent touch panel also including an input setting key frame including a plurality of input data displays adapted to collectively display an input data item, said input data item comprising a plurality of digits arranged as a number, said input setting key frame also including at least one increment key for incrementing the digits of the input data item, and at least one decrement key for decrementing the digits of the input data item.

4,952,919

## TRACKBALL MECHANISM

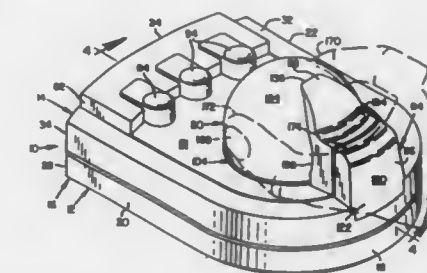
Reuben E. Nippoldt, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 6, 1989, Ser. No. 334,262

Int. Cl.<sup>3</sup> G09G 5/00

U.S. Cl. 340—710

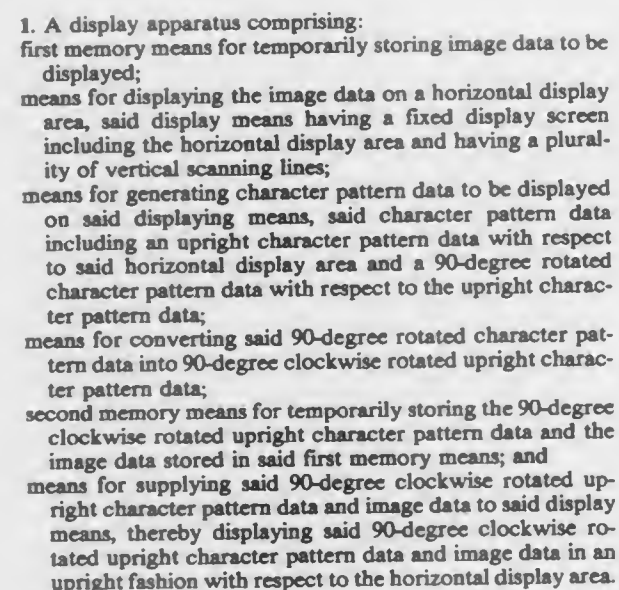
31 Claims



1. An improved trackball mechanism of the type in which a ball is rotatably supported for manipulation by the hand of a user, wherein the improvement comprises:  
a housing substantially enclosing a first segment of the ball so that a second segment of the ball protrudes from the housing; and  
retainer means for retaining the ball in position relative to the housing so that diametrically opposed portions of the



### 13 Claims



## 7 Claims

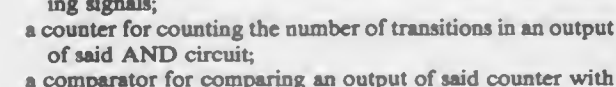


whereby said means for processing outputs a set of actual intensity values having a one-to-one correspondence with the set of physical pixels, each actual intensity value being a function of a predetermined neighborhood of commanded intensity values.

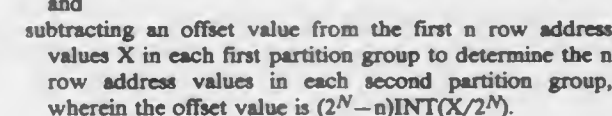
#### 4 Claims

for a number of possible future positions, sampling the terrain data base with line-of-sight rays projected from the

### 7 Claims



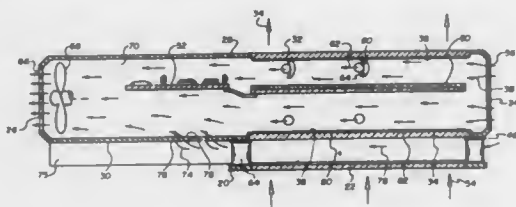
### 13 Claims



U.S. Cl. 340—784 7 Claims

1. A passive, liquid-crystal flat screen apparatus for displaying information, which information can be projected onto a screen, said flat screen apparatus having a flat screen (50) to which an electronic control unit (52) is attached in a housing, and which is also fitted with two polarisation filters (36, 38), both of which are located in a light path, the one in front of and the other behind the flat screen (50), characterized thus: That both the polarisation filters (36, 38) are positioned at such a distance from the flat screen (50) that between the flat screen (50) and each of the polarisation filters (36, 38) there is formed

an air tunnel or canal in which there flows a current of air (arrows 58, 62) which impinges on the inner surfaces of the



polarisation filters (36, 38) and the flat screen (50) and cools them.

4,952,926

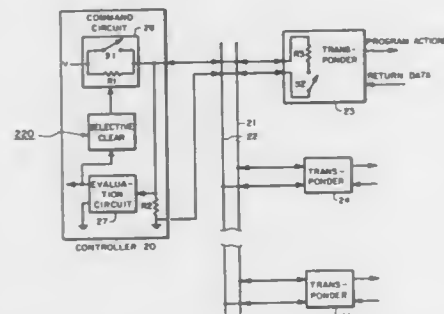
**SELECTIVE CLEARING OF LATCHED CIRCUITS**  
William R. Vogt, Rockaway, N.J., assignor to Baker Industries, Inc., Parsippany, N.J.

Filed Apr. 29, 1988, Ser. No. 187,684

Int. Cl.<sup>3</sup> G08B 29/00; H04Q 9/00

U.S. Cl. 340—825,170

3 Claims



1. An alarm system having a data bus, a controller coupled to the data bus, and a plurality of transponders with different addresses all coupled to the data bus, at least one of said transponders including latch means comprising a first latch to indicate an alarm condition and a second latch to indicate a trouble condition, and means, including two timing means for producing two different duration signals, for effecting clearing of the alarm latch upon receipt of a first clear signal of a first given time duration and for clearing the trouble latch upon receipt of a second clear signal of a duration longer than said first signal, and a selective clear circuit in said controller, for passing the appropriate clear signal to said one transponder only after recognizing the alarm or trouble condition identified at said one transponder.

4,952,927

**PAGING RECEIVER WITH DYNAMICALLY ALLOCATED DISPLAY RATE**

Michael J. DeLuca; Joan S. DeLuca, Boca Raton, and John M. McKee, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 81,762, Aug. 5, 1987, abandoned. This application Aug. 3, 1989, Ser. No. 388,758

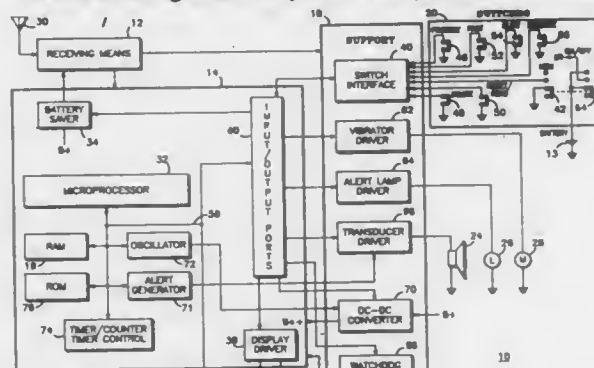
Int. Cl.<sup>3</sup> G08B 5/22

U.S. Cl. 340—825,440

37 Claims

27. A device for displaying data from a paging receiver display, the display having a predetermined number of displayable characters and the paging receiver capable of receiving a plurality of data messages, each data message being comprised of a plurality of alphanumeric characters, the device comprising:

means for selecting a data message to display from the memory;  
means for arranging the data message into a plurality of screens, wherein each screen comprises a sequence of data message characters and wherein each data message character is arranged into only one of the plurality of screens;



means for computing a separate screen timeout value for each screen on the basis of the data message characters within the screen; and  
means for storing each screen with the corresponding screen time out value in a predetermined order.

4,952,928

**ADAPTABLE ELECTRONIC MONITORING AND IDENTIFICATION SYSTEM**

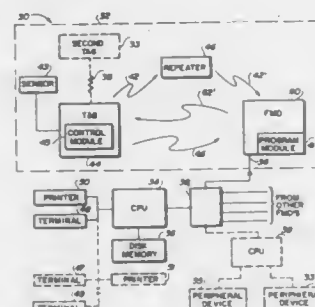
Gary T. Carroll; George J. Pilmanis, both of Boulder, and Vincent D. Stinton, Littleton, all of Colo., assignors to B. I. Incorporated, Boulder, Colo.

Filed Aug. 29, 1988, Ser. No. 237,860

Int. Cl.<sup>3</sup> A61B 5/00; H04B 1/00

U.S. Cl. 340—825,54

27 Claims



1. A personnel monitoring system for monitoring the compliance of a designated individual with a prescribed activity composing:

sensing means carried by the individual for sensing whether the individual is engaging in said prescribed activity;  
transmitting means carried by the individual and coupled to said sensing means for transmitting a unique identifying signal that indicates whether the occurrence of said prescribed activity has been sensed since said unique identifying signal was last transmitted;

local receiving means for receiving and preliminarily processing said identifying signal, including logging the time periods during which each unique identification signal is received;

remote processing means for interrogating said local receiving means on a regular basis and for receiving therefrom the preliminarily processed and logged data relating to said identifying signal received by said remote processing means since said remote processing means was last interrogated by said remote processing means, and for further processing and interpreting said preliminarily processed

and logged data in accordance with at least one of a plurality of control programs that allow said remote processing means to be selectively configured for a particular application, whereby said identifying signal received from said transmitting means can be used and interpreted by said remote processing means for a variety of different purposes as controlled by a selected one or more of said plurality of control programs; and  
report generating means within said remote processing means for generating a report that indicates the time periods during which the individual engaged in the prescribed activity in accordance with the particular application for which the remote processing means is selectively configured.

4,952,929

**SELECTIVE CALL RECEIVING SYSTEM**

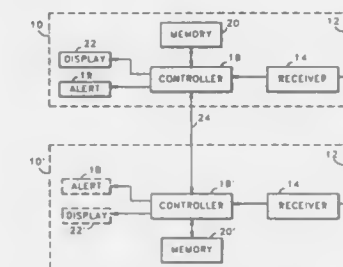
Michael J. DeLuca, Boca Raton, and Courtney S. G. Henry, Coconut Creek, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 17, 1989, Ser. No. 342,767

Int. Cl.<sup>3</sup> H04Q 7/00

U.S. Cl. 340—825,440

18 Claims



9. A radio receiving system, comprising:  
a first selection call receiver for storing radio frequency messages received by said first selective call receiver in a first memory;  
a second selective call receiver for storing radio frequency messages received by said second selective call receiver in a second memory; and  
comparing means for comparing the contents of said first and second memories, for providing an indication if said contents are different, and for transferring that portion contained in said first memory and not contained in said second memory to said second memory.

4,952,930

**MULTIPATH HIERARCHICAL NETWORK**  
Peter A. Franaszek, Katonah, and Christos J. Georgiou, White Plains, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Nov. 18, 1988, Ser. No. 274,101

Int. Cl.<sup>3</sup> H04Q 1/00

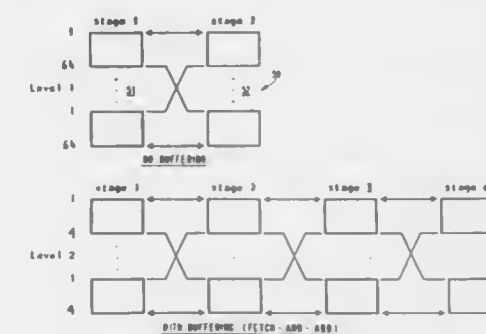
U.S. Cl. 340—825,800

10 Claims

1. A hierarchy of multipath networks for selectively interconnecting a plurality of sources and a plurality of destinations in a communication system comprising:

a first multipath network without buffering and consisting of at least two stages and constituting a fast path for connecting a source to a destination; and  
at least a second multipath network with buffering and

comprising a plurality of stages and constituting an alternate, slower path for connecting a source to a destination



in the event that a connection between the source and the destination is blocked in said fast path.

4,952,931

**SIGNAL ADAPTIVE PROCESSOR**

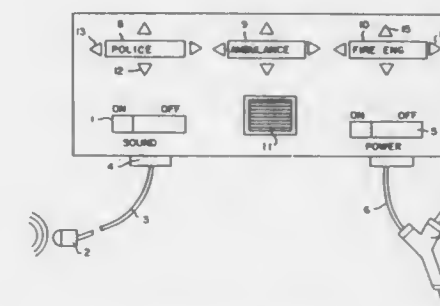
Ahmedelhadi Y. Serageldin, 21 Maplewood St., West Rox, Mass. 02132, and Mostafa E. Ahmed, King Fahd Univ. of Petroleum and Minerals, Dhahran 31261, Saudi Arabia

Continuation-in-part of Ser. No. 16,203, Jan. 27, 1987, abandoned. This application Feb. 26, 1988, Ser. No. 161,462

Int. Cl.<sup>3</sup> G08G 1/00

U.S. Cl. 340—902

3 Claims



1. An early warning system to alert vehicle operators of the presence of emergency vehicles which emit audio warning signals to indicate the type of vehicle and direction from which it is coming comprising:

- a first means comprising of one or more analog to digital converters and a plurality of sensors and;
- a first memory means for storing coded reference signals in fixed templates and;
- a second memory means for temporarily storing a coded template of incoming signals and;
- a third memory means for storing a coded template of the environmental noise and;
- a second input means for selection of the mode of operation as a training mode or hunting mode;
- an output means comprising an audio and visual message display means and;
- a central processing means comprising an arithmetic logic means, plurality of accumulators and working registers, a timing and control unit, a program counter, stack registers, firmware stored in a fourth memory means; the central processing means operates in one of two modes as instructed by the said second input means; in the training mode the central processing means reads a reference signal via the said first input means, encodes it into templates according to an encoding algorithm stored in the said fourth memory means; the said templates are then



stored in the said first memory means in an order selected by instructions from the said second input means; in the hunting mode, the central processing means reads an unknown signal via the said first input means, filters the said signal using an algorithm stored in the said fourth memory means and using parameters stored in the said third memory means, then encodes the said unknown signal into templates according to an encoding algorithm stored in the said fourth memory means; the said templates are then stored in the said second memory means; the said central processing means then compares the template of the incoming unknown signal against the templates stored in the said first memory means and according to a comparison algorithm stored in the firmware in the said fourth memory means; if matching is found the central processing means sends an audio visual signal via the said output means; if no matching is found the template of the said incoming unknown signal is used to update the template stored in the said third memory means.

4,952,932

## INFORMATION INPUT APPARATUS

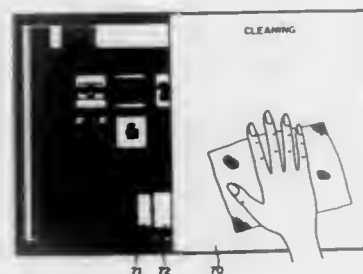
Toshio Sugino, Tokyo, and Yoji Furuya, Inagi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 19, 1988, Ser. No. 183,637

Claims priority, application Japan, Apr. 30, 1987, 62-104790; Nov. 11, 1987, 62-283173

Int. Cl.<sup>5</sup> G09G 1/00

U.S. Cl. 341—23

6 Claims



1. An information processing system in which information is input by touching a surface of an input panel provided on a screen of a display device, comprising:

mode setting means for setting a cleaning mode of the input panel on the screen of the display device;  
input control means for setting an input inhibition area of information on the input panel when the cleaning mode is set by said mode setting means; and  
inhibition area display means for displaying information specifying a display area on the screen of the display device when the cleaning mode is set by said mode setting means, the display area corresponding to the inhibition area on the input panel.

4,952,934

## FIELD PROGRAMMABLE LOGIC AND ANALOGIC INTEGRATED CIRCUIT

Antonio Chiriatti, Reggio Calabria, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Italy

Filed Jan. 16, 1990, Ser. No. 465,703

Claims priority, application Italy, Jan. 25, 1989, 8360 A/89  
Int. Cl.<sup>5</sup> H03M 1/66

U.S. Cl. 341—142

2 Claims

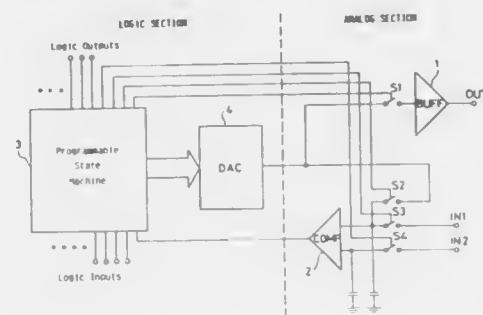
1. A programmable, logic and analogic, integrated device which comprises:

a programmable logic circuit having a plurality of logic inputs which may be accessed through dedicated logic input pins and/or bidirectional logic input/output pins of the device and having at least an input capable of receiving an internally generated logic signal, the programmable logic

circuit being configurable by programming as a state machine capable of performing a certain logic processing in order to generate output logic signals in function of logic signals fed to said logic inputs;

at least a digital-analog converter driven by output logic signals generated by said programmable state machine and stored by a plurality of input registers of said converter and capable of producing an analog signal at an output thereof in function of said driving logic signals;

at least a comparator having a first input, a second input and an output, said first input being connectable to the output of said digital-analog converter or at least to a first analog input pin of the integrated device by means of a first and at least a second integrated analog switches driven by said



state machine, said second input being connectable to at least a second analog input pin of the integrated device by means of at least a third integrated analog switch driven by said state machine;

the output of said comparator being connected to said input of said state machine capable of receiving said logic signal internally generated by said comparator;

said comparator being capable of generating an output logic signal in function of the result of the comparison between two analog signals respectively fed to said two inputs by means of said integrated switches driven by said state machine, said output logic signal generated by the comparator constituting an input logic signal of said state machine.

4,952,935

## RADIOWAVE ABSORBER AND ITS MANUFACTURING PROCESS

Shinnosuke Sawa, Matsuyama; Shunichi Kumaoka, and Teruo Ohno, both of Tokyo, all of Japan, assignors to Shinwa International Co., Ltd., Tokyo, Japan

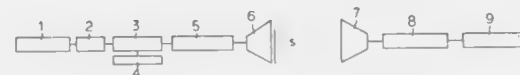
Filed Oct. 26, 1988, Ser. No. 262,777

Claims priority, application Japan, Jul. 18, 1988, 63-178839

Int. Cl.<sup>5</sup> B05D 5/12

U.S. Cl. 342—4

5 Claims



1. A process for manufacturing a radiowave absorber comprising:

the first process of firing at least one kind of ceramic material with a pore- or skeleton-forming material which can be burned away, whereby a sintered porous ceramic matrix is prepared, said ceramic material being selected from natural minerals and clay minerals and artificial ceramic materials; and

the second process of firing said matrix in a furnace containing a reducing atmosphere and having a uniform tempera-

ture, while introducing a gas or mist of a hydrocarbon compound into said furnace.

4,952,936

## MULTIBAND RADAR DETECTOR HAVING PLURAL LOCAL OSCILLATORS

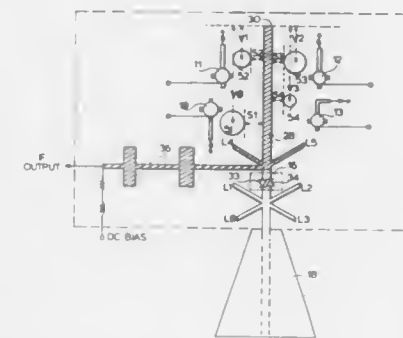
Glen Martinson, Oakville, Canada, assignor to B.E.L-Tronics Limited, Mississauga, Canada

Filed Sep. 12, 1988, Ser. No. 242,533

Int. Cl.<sup>5</sup> G01S 7/285; H04B 1/28

U.S. Cl. 342—20

7 Claims



1. A Multi-Band Radar detector comprising:

a broad band antenna;

a plurality of dielectric resonator local oscillators, each having an output at a respective first predetermined frequency;

a mixer having a radar signal input port, a local oscillator signal input port, and an intermediate frequency signal output port;

means to feed a signal from the antenna to the radar signal input port;

means to feed signals sequentially from said dielectric resonator local oscillators directly to said local oscillators signal input port of said mixer for mixing, each in its turn, with the signal from said antenna;

and means to feed an intermediate frequency signal from said intermediate frequency signal output port of said mixer to signal processing circuitry for actuating an alarm in response to detected radar;

wherein said means to feed signal sequentially from said dielectric resonator local oscillators directly to said local oscillator signal input port of said mixer comprises a feedline for said signals from said dielectric resonator local oscillators together with means to effect electromagnetic coupling between said dielectric resonator local oscillators and said feedline;

and wherein the shortest distance, measured between a tangent to each respective dielectric resonator and said feedline, is selected for each dielectric resonator, so that the electromagnetic coupling coefficient between each respective dielectric resonator and feedline is optimized for mixing a radar frequency signal within a band of interest with the local oscillator signal from a respective dielectric resonator local oscillator.

4,952,937

## REMOTELY MOUNTED POLICE RADAR WARNING RECEIVER

Paul M. Allen, Cincinnati, Ohio, assignor to Cincinnati Microwave, Inc., Cincinnati, Ohio

Filed Nov. 13, 1989, Ser. No. 434,426

Int. Cl.<sup>5</sup> G01S 7/40

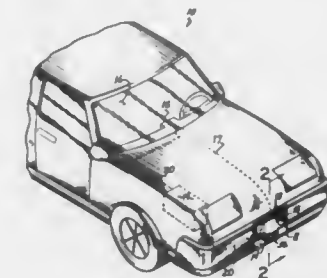
U.S. Cl. 342—20

16 Claims

1. A concealed antenna assembly for a remotely mounted radar warning receiver comprising:

a license plate mounted at one end of a vehicle in substantially vertical orientation;

a radar antenna mounted closely behind the license plate, the radar antenna having a receiving end for receiving radar signals, the receiving end located adjacent a first edge of the license plate; and



a reflector located proximate to the receiving end of the radar antenna at an angle and extending outwardly beyond said first edge of said license plate, said reflector adapted to intercept horizontal radar signals directed toward said end of the vehicle and to reflect said signals into a vertical plane and into the receiving end of said antenna.

4,952,938

## WIRE DETECTOR

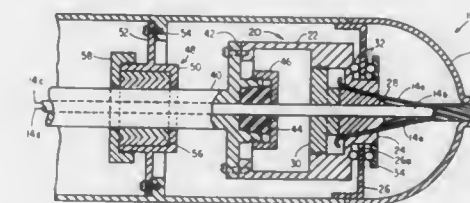
James L. Kirkland, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 650,217

Int. Cl.<sup>5</sup> G01S 13/00

U.S. Cl. 342—22

9 Claims



1. Electromagnetic detection apparatus comprising: an elongated hull and a tow and data link cable attached thereto for towing of said hull in the direction of its longitudinal axis over a generally horizontal surface; at least a portion of said hull comprising a radio wave permeable outer wall section for substantially free rotation about said longitudinal axis relative to said hull, said shield member comprising a radio wave permeable window; a pick-up coil mounted within said shield member; coupling means for electrically connecting said pick-up coil to said cable; and  
eccentric weight means on said shield member for causing said shield member to seek a rest position with said window in a predetermined orientation whereby said coil is responsive to radio wave signals only from a predetermined direction and is shielded from signals from other directions.

4,952,939

## RADAR INTRUSION DETECTION SYSTEM

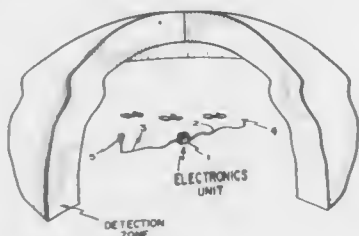
William R. Seed, 115 Priam Way, Nepean, Ontario, Canada (K2H 8S7)

Filed Feb. 16, 1989, Ser. No. 311,271

Int. Cl.<sup>5</sup> G01S 9/42

U.S. Cl. 342-27

5 Claims



1. An intrusion detection system comprising: means transmitting an r.f. signal formed from a continuous wave modified by phase changes at selected instants; means providing a code sequence to control the selected instants; means receiving a portion of the transmitted signal which may have been modified by the presence of a target; and means mixing the received signal with a delayed replica of the transmitted signal to establish a detection zone external to the space between the antennas, the delay establishing the range of the detection zone; whereby the system provides an enhanced response relating to objects in the detection zone.

4,952,940

## RADAR SYSTEM WITH A DIGITAL EXPANDER

Hanspeter Kuepfer, Birmensdorf, Switzerland, assignor to Siemens-Albis, Zurich, Switzerland

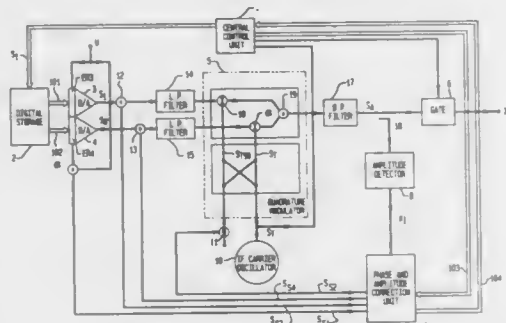
Filed Jan. 18, 1989, Ser. No. 298,440

Claims priority, application Sweden, Jan. 18, 1988, 8800158

Int. Cl.<sup>5</sup> G01S 7/40

U.S. Cl. 342-174

12 Claims



1. A radar system, operating with phase-encoded transmitter pulses, wherein are provided, a digital expander at the transmitter end, and a pulse compression technique at the receiver end for evaluation, wherein, for generating the transmitter pulses a digital storage clocked by a central control unit is provided, from whose contents via a first digital to analog converter an analog baseband signal is derived and via a second digital to analog converter an analog baseband quadrature signal is derived and supplied to a quadrature modulator which on the output side provides a transmitter pulse in an intermediate frequency range via a gate controlled by the central control unit to the actual transmitter, characterized in that calibration signals are generated sequentially when required by means of the two digital to analog converters and different phase positions, in that for each phase position the amplitude value of the

output signal corresponding to the particular calibration signal is measured in an amplitude detector, and in that a multiple regulating circuit is provided in which in a phase and amplitude correction unit setting values are determined, from the particular averaged amplitude measured values, which via setting elements set the required offsets and phase and amplitude symmetry values until the deviations of the output signal in amplitude and phase substantially disappear.

4,952,941

## WEATHER RADAR TEMPERATURE CONTROLLED IMPATT DIODES CIRCUIT AND METHOD OF OPERATION

Don L. Landt, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

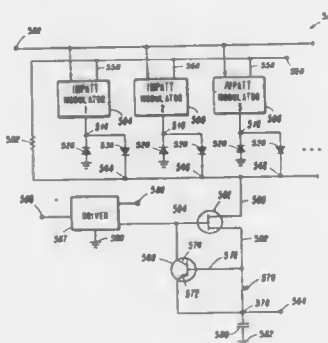
Division of Ser. No. 148,747, Jan. 27, 1988, Pat. No. 4,884,077.

This application Sep. 13, 1989, Ser. No. 406,942

Int. Cl.<sup>5</sup> H04B 6/66

U.S. Cl. 342-202

7 Claims



1. A technique for generating a pulsed RF signal comprising: a. providing an IMPATT diode for generating an RF signal having an input and output end; b. providing a first injection signal operating at a first frequency, for generating an RF signal when input into an IMPATT diode; c. providing a second injection signal operating at a second frequency, for generating an RF signal when input into an IMPATT diode; and d. selectively switching the input of the IMPATT diode from the first signal to the second signal.

4,952,942

## INK JET RECORDING METHOD WITH IMPROVED TONE BY RECORDING YELLOW FIRST

Rieko Kanome, Kawasaki, and Eiichi Suzuki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

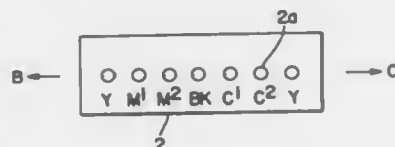
Continuation-in-part of Ser. No. 54,515, May 27, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,398

Claims priority, application Japan, May 29, 1986, 61-122122

Int. Cl.<sup>5</sup> G01D 15/16; B41J 3/04

U.S. Cl. 346-1.1

2 Claims



1. An ink jet recording method, which comprises the steps of: using a yellow ink, a cyan ink and a magenta ink, provided

that at least one of the yellow and cyan inks is provided in a plurality of dye concentrations; modulating the diameters of dots of the inks; and forming a mixed color portion on a recording medium, wherein the relationships between the diameters of ink dots ( $D \mu m$ ) and that between the dye concentrations of inks ( $A \text{ wt}\%$ ) satisfy the formulae:

$$(D_Y/D_Mn) \text{ or } (D_Y/D_{Cn}) < 1 \text{ and } (A_Y/A_{Mn}) \text{ or } (A_Y/A_{Cn}) \geq 3$$

wherein Y denotes yellow ink, Mn denotes magenta ink of low dye concentration and Cn denotes cyan ink of low concentration, and the yellow ink is attached on the recording medium prior to the attachment of other color inks thereon.

4,952,943

## METHOD OF DROP-ON-DEMAND INK JET RECORDING ON SIZED PAPER WITH EXPOSED FIBERS

Kazuo Iwata, Yokohama, and Shinichi Tochihara, Hiratsuka, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 63,393, Jun. 18, 1987, abandoned. This application Aug. 7, 1989, Ser. No. 391,645

Claims priority, application Japan, Jun. 20, 1986, 61-145618

Int. Cl.<sup>5</sup> B41J 2/045

U.S. Cl. 346-1.1

3 Claims

1. A drop-on-demand ink jet recording method wherein, when the volume of ink ejected from an orifice is  $V(\mu m^3)$ , the diameter  $d(\mu m)$  of the ink droplet is defined by the following formula:

$$d = 2(3V/4\pi)^{1/3}$$

and the average velocity of an ink droplet ejected from the orifice to a distance of 0.5 mm is  $v$  (m/sec), which method comprises:

- providing a recording medium which is subjected to sizing and has fibers exposed on the surface, and depositing on the recording medium an ink droplet under conditions which simultaneously satisfy the following formulae:

$$20 \leq d \leq 90$$

$$6 \leq v \leq 15$$

the ink having a surface tension of 35 through 70 dyne/cm at 25° C. and a viscosity of 1.5 through 3.5 cp at 25° C.

4,952,944

## TRANSFER RECORDER WITH HEATER

Toshiharu Imai, and Noriyoshi Ishikawa, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,096

Claims priority, application Japan, Oct. 1, 1987, 62-245811

Int. Cl.<sup>5</sup> G01D 15/10; B41J 2/325

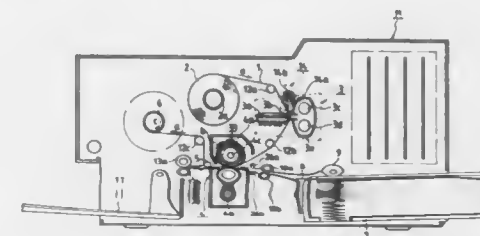
U.S. Cl. 346-25

10 Claims

1. An image recording apparatus for effecting the recording of an image on a recording medium, having:

- conveying means for conveying a transfer recording medium having a transfer recording layer whose transfer characteristic is varied by first energy and second energy differing from said first energy being imparted thereto;
- a recording section having first energy imparting means for imparting said first energy to said transfer recording medium and second energy imparting means for imparting said second energy to said transfer recording medium, said first and said second energy imparting means being provided along the conveyance path of said transfer recording medium conveyed by said conveying means;
- a transfer section for transferring an image formed on said

transfer recording medium in said recording section to the recording medium; and



heating means provided upstream of said recording section with respect to the direction of conveyance of said transfer recording medium for imparting heat energy to said transfer recording medium.

4,952,945

## EXPOSURE APPARATUS USING EXCIMER LASER SOURCE

Ikuro Hikima, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

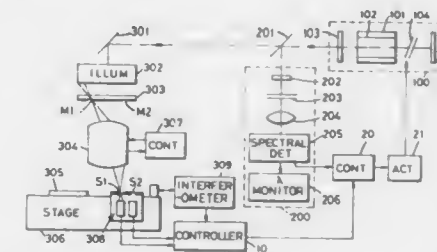
Filed Sep. 19, 1988, Ser. No. 246,197

Claims priority, application Japan, Sep. 25, 1987, 62-240148

Int. Cl.<sup>5</sup> G01D 15/14; G01J 1/20

U.S. Cl. 346-108

11 Claims



1. An exposure apparatus comprising: a projection optical system employing a light beam to project an image of an object on a first plane onto a second plane; laser means for outputting said light beam to said projection optical system; measuring means for detecting fluctuation of an optical characteristic of said projection optical system attributable to deviation of the wavelength of said light beam output from said laser means; and control means responsive to said measuring means for adjusting the wavelength of said light beam.

4,952,946

## SCANNING BEAM POSITION DETECTING APPARATUS FOR USE IN ELECTRONIC PRINTER

Peter P. Clark, Acton; William T. Maloney, Sudbury; Philip R. Norris, North Reading, and William T. Vetterling, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 19, 1988, Ser. No. 259,963

Int. Cl.<sup>5</sup> G01D 15/14; G02B 26/08

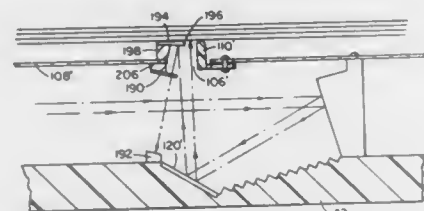
U.S. Cl. 346-108

31 Claims

1. An electronic image printing apparatus for printing images on an image recording medium, said apparatus comprising: a housing assembly; means disposed in said housing assembly for mounting the image recording medium; means for producing at least one writing beam in response to



electronic signals corresponding to an image of a subject selected for printing;  
means for producing a reference beam;  
means for optically directing and scanning the writing and reference beams in synchronism and spaced relation with respect to each other along at least one predetermined scanning path;  
means extending in spaced parallel relation along the entire extent of the scanning path for encoding and reflecting the



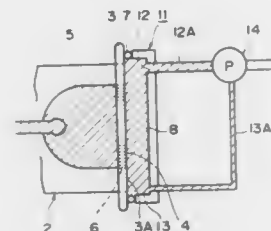
reference beam incident thereon into a plurality of pulses of reflected radiation which pulses are representative of the position of the writing beam along the scanning path;  
means for detecting the reflected reference beam pulses to produce corresponding feedback control signals indicative of the writing beam position along the scanning path, and  
means for effecting the displacement of said scanning path with respect to the image recording medium to provide a two dimensional image scan.

**4,952,947**  
**INK DISCHARGE RECOVERY DEVICE HAVING AT LEAST ONE SUCTION-APPLYING CONDUIT LOCATED AT A PARTICULAR POSITION IN A CAPPING MEMBER AND AN INK JET RECORDING APPARATUS INCORPORATING THE DEVICE**

Masayuki Kyoshima, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 15, 1988, Ser. No. 271,312  
Claims priority, application Japan, Nov. 17, 1987, 62-288433; Nov. 14, 1988, 63-285865  
Int. Cl.<sup>5</sup> B41J 2/165

U.S. Cl. 346—140 R

29 Claims



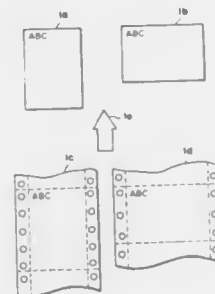
1. A discharge recovery device for an ink jet recording apparatus, the device comprising:  
a cap member for covering a plurality of discharge openings for discharging ink to record on a recording medium;  
suction means for sucking ink and/or air from said plurality of discharge openings through said cap member; and  
a communication port at an upper portion of said cap member above the uppermost of said plural discharge openings for communicating said suction means with the interior of said cap member.

**4,952,948**  
**IMAGE RECORDING APPARATUS**  
Yasuhiro Suzuki, Kawasaki; Koichi Akimoto, Yokohama; Hajime Ohshima, Tokyo; Kazuyuki Honda, and Yukio Isaka, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 313,361, Feb. 21, 1989, which is a continuation of Ser. No. 779,107, Sep. 23, 1985, abandoned. This application Jul. 24, 1989, Ser. No. 384,777  
Claims priority, application Japan, Sep. 25, 1984, 59-198623; Sep. 25, 1984, 59-198624; Sep. 25, 1984, 59-198626  
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346—150

6 Claims



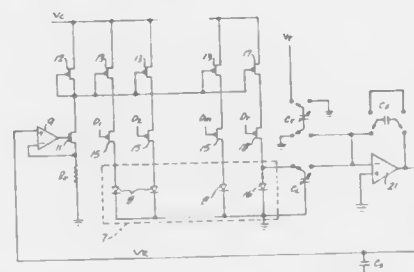
1. An image recording apparatus comprising:  
print data input mean for inputting print data;  
control means for forming dot image data on the basis of print data input through said print data input means, and for developing thus formed dot image data on an image buffer, wherein at least one page of dot image data can be developed; and  
image forming means for forming an image on a record medium on the basis of dot image data developed on said image buffer;  
said control means being adapted to cause a development state of said dot image data on said image buffer to be varied on the basis of inputted page direction information representing a page direction of an image to be formed.

**4,952,949**  
**LED PRINthead TEMPERATURE COMPENSATION**  
John J. Uebbing, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 28, 1989, Ser. No. 442,197  
Int. Cl.<sup>5</sup> G01D 15/14

U.S. Cl. 346—154

25 Claims



21. A temperature compensated LED printhead for a photosensitive printer, having a plurality LED chips on the printhead and a plurality of exposure LEDs on each chip comprising:

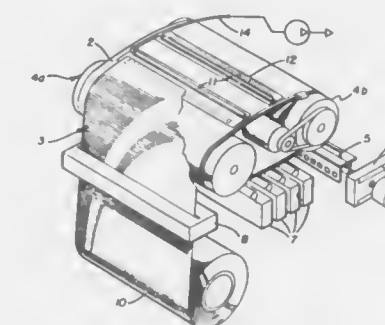
a dummy diode for each chip;  
means for passing current through the diode;  
means for sensing voltage across the diode; and  
means for adjusting the current passed through the exposure

LEDs on the respective chip in response to the sensed voltage.

**4,952,950**  
**PAPER TRANSPORT AND PAPER STABILIZING SYSTEM FOR A PRINTER PLOTTER OR THE LIKE**  
Andreas Bibl, Los Altos; John Higginson, Santa Clara, and Deane Gardner, Cupertino, all of Calif., assignors to Raster-graphics, Inc., Sunnyvale, Calif.  
Division of Ser. No. 166,716, Mar. 11, 1986, Pat. No. 4,878,071.  
This application Mar. 10, 1989, Ser. No. 322,457  
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346—157

21 Claims



1. An improved, high resolution plotter, printer or the like incorporating a transport belt means for invariant registration of a recording material with respect to a writing head comprising:

a recording material;  
writing means disposed for printing information on said recording material;  
toning assembly means operatively connected with said writing means enabling said writing means to selectively apply color fluid to said recording material;  
transport means including a belt having an attach means for providing a vacuum to the entire surface of said recording material adjacent said belt such that said recording material is registered in invariant alignment with respect to said writing means and said toning assembly means;  
drive means for passing said transport means past said writing means and said toning assembly means.

**4,952,951**  
**ELECTROPHOTOGRAPHIC RECORDING APPARATUS**  
Takao Kumasaka, Takahagi; Yuzuru Simazaki, Hitachi, and Kiyohiko Tanno, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan  
Filed Aug. 9, 1989, Ser. No. 391,306  
Claims priority, application Japan, Aug. 12, 1988, 63-199864  
Int. Cl.<sup>5</sup> G01D 15/00

U.S. Cl. 346—160

33 Claims

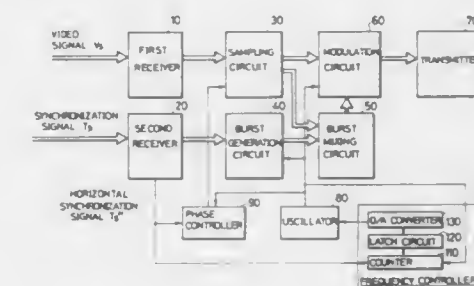


1. An electrophotographic recording apparatus comprising:  
an electrostatic charging means for electrostatically charging a surface of a photosensitive body on a substantially uniform basis;  
an exposure means including a laser exposure section for

exposing said surface of said photosensitive body to an optical image having a high resolution, and a light emitting diode array exposure section for exposing said surface of said photosensitive body to an optical image having a low resolution, said exposure means being adapted to form an electric charge latent image on said surface of said photosensitive body by said laser exposure section and said light emitting diode array exposure section;  
a developing means for effecting developing of said electric charge latent image by using a developer containing at least a toner to thereby form a toner image;  
a transferring/fixing means for transferring and fixing onto a recording sheet of paper the toner image formed on said surface of said photosensitive body.

**4,952,952**  
**METHOD AND APPARATUS FOR VIDEO SIGNAL TRANSMISSION USING MODULATION**  
Sakuyuki Mizuno, Kunitachi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed May 18, 1989, Ser. No. 353,617  
Claims priority, application Japan, May 23, 1988, 63-124023  
Int. Cl.<sup>5</sup> H04N 5/04, 7/12, 7/04, 11/06  
U.S. Cl. 358—148

8 Claims



1. An apparatus for transmitting video signals accompanied by horizontal and vertical synchronization signals using modulation, comprising:  
sampling means for sampling incoming video signals;  
oscillator means for providing sampling clock signals;  
modulation means for modulating sampled video signals at timings given by the sampling clock signals;  
means for controlling the phase relationship between the horizontal synchronization signal and the sampling clock signal; and  
transmitter means for transmitting the modulated video signals from the modulation means.

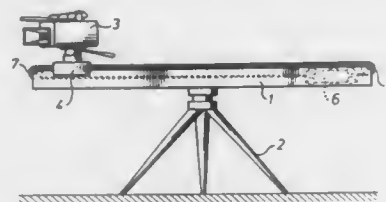
**4,952,953**  
**CAMERA MOUNTING ARRANGEMENT**  
Johan Ridderstolpe, Varhagavägen 5, S-144 00 Rönninge, and Johan Osterman, Linnegatan 78, S-115 23 Stockholm, both of Sweden  
Filed Jun. 28, 1989, Ser. No. 372,590  
Int. Cl.<sup>5</sup> G03B 29/00

U.S. Cl. 354—81

3 Claims

1. A camera mounting arrangement comprising an elongated track comprising a hollow box girder (1), a carriage (4) mounted externally of said box girder for movement over the full length of the box girder, a camera (3) supported on said carriage (4), a counterweight (6) interiorly of said hollow box girder, for movement internally of said hollow box girder over the length of the same, means for connecting said counterweight to said carriage, such that upon a change of camera position relative to the longitudinal center of the track, said counterweight is displaced in the opposite direction, where

said camera and counterweight pass each other with the camera free to move the full distance between the ends of the track, and a vertically upright stand (2) coupled at an upper end



thereof to the open box girder at its longitudinal center, whereby the assembly of said track (1), said carriage (4), said camera (3) and said counterweight (6) is maintained statically balanced relative to said longitudinal center of said track.

4,952,954

## MOTOR DRIVEN CAMERA

Toshiyuki Kitazawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

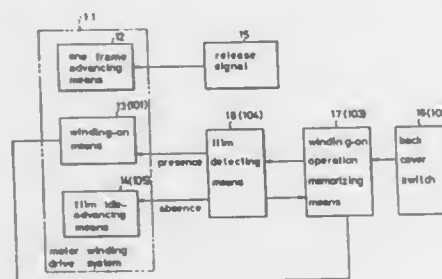
Filed Feb. 8, 1989, Ser. No. 307,492

Claims priority, application Japan, Feb. 9, 1988, 63-16099

Int. Cl.<sup>5</sup> G03B 1/12

U.S. Cl. 354—173.1

19 Claims



1. A motor driven camera with a back cover switch which is actuated by the opening and closing operations of a film back cover of a camera and a winding-on means which advances the film by a predetermined number of frames when the back cover switch is operated by the closing operation of the back cover, the improvement comprising winding-on operation memorizing means for memorizing the operation of the winding-on means, film detecting means for detecting that the film is loaded in the camera and film idle-advancing means for advancing the film by a number of frames less than by the winding-on means only when the winding-on operation memorizing means memorizes the operation of the winding-on mechanism, when the film detecting means detects that the film is loaded in the camera and when the back cover switch is actuated by the movement of the back cover from the open position to the closed position.

4,952,955

## FOCAL LENGTH SWITCH-OVER CAMERA

Michihiro Iwata, Sakai; Haruo Kobayashi, Osaka, and Osamu Hatamori, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 137,092, Dec. 23, 1987, abandoned.

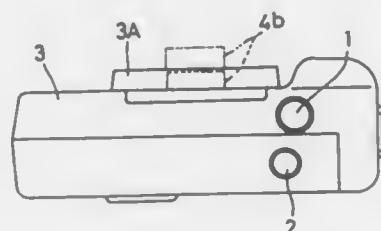
This application Mar. 2, 1989, Ser. No. 318,449

Claims priority, application Japan, Dec. 24, 1986, 61-310594; Dec. 25, 1986, 61-309712; Dec. 26, 1986, 61-309365; Dec. 26, 1986, 61-309367

Int. Cl.<sup>5</sup> G03B 3/00

U.S. Cl. 354—195.1

17 Claims



1. A camera having a photographic optical system capable of switching over a focal length comprising:  
control means;  
cam means operatively connected with said control means;  
a first cam face defined on said cam means for effecting a first focus adjustment in a first focal length from a shortest photographic length to a longest photographic length;  
a second cam face defined on said cam means and aligned with said first cam face in an operative direction of said cam means for switching over from the first focal length to a second focal length;  
a third cam face defined on said cam means and aligned with said second cam face in a peripheral direction of said cam means for effecting a focus adjustment in the second focal length from a second shortest photographic length to a second longest photographic length; and camera follower means driven by said first through third cam faces and connected with said photographic optical system to drive the same.

4,952,956

## FINDER OPTICAL SYSTEM

Juro Kikuchi, Kitatsuru, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

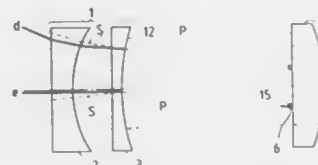
Filed Sep. 13, 1989, Ser. No. 406,514

Claims priority, application Japan, Sep. 17, 1988, 63-233349

Int. Cl.<sup>5</sup> G03B 13/08

U.S. Cl. 354—224

6 Claims



1. A finder optical system, comprising:  
a plurality of optical elements arranged on an optical axis;  
a reflecting surface for indication provided on a surface of one of said plurality of optical elements;  
a semi-transmissive surface provided on the optical axis of an object side of said reflecting surface for indication; and an optical member, changing a polarizing state of light, provided on the optical axis between said reflecting surface for indication and said semi-transmissive surface, said semi-transmissive surface being composed of a surface

different in reflectivity and transmittance in accordance with a direction of polarization of light so that light reflected from said reflecting surface for indication is imaged after reflection from said semi-transmissive surface.

4,952,957

## FOCAL PLANE SHUTTER-TYPE CAMERA

Ichiro Nemoto, Takahito Otori, and Osamu Miyauchi, all of Yotsukaido, Japan, assignors to Seikosha Co., Ltd., Japan

Filed Sep. 7, 1989, Ser. No. 404,323

Claims priority, application Japan, Sep. 13, 1988, 63-120246[U]

Int. Cl.<sup>5</sup> G03B 9/40

U.S. Cl. 354—245

2 Claims



1. A focal plane shutter type camera comprising:  
a baseplate structure member comprised of a first chamber forming section having a baseplate with a shutter opening formed therein and adapted to accommodate shutter controlling members; and  
a lower plate structure member assembled to said baseplate structure member from the first chamber side and provided with a lower plate for partitioning said first and second chambers.

4,952,958

## PHOTO-SENSITIVE PRINTING PLATE AUTOMATIC DEVELOPING APPARATUS

Hisao Ohba, and Kenji Kanichika, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 15, 1989, Ser. No. 366,389

Claims priority, application Japan, Jun. 15, 1988, 63-147849; Jun. 27, 1988, 63-158364

Int. Cl.<sup>5</sup> G03D 3/04; G03B 3/08

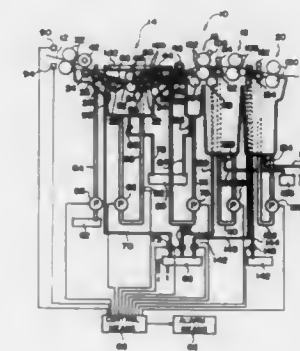
U.S. Cl. 354—322

23 Claims

1. A photo-sensitive printing plate automatic developing apparatus for developing a photo-sensitive printing plate upon which an image has been exposed, using the developing solution in a developing tank, while conveying said photo-sensitive printing plate along a conveyor path passing through the developing tank from an input side to an output side, and then performing at least one of the following processes of washing, rinsing and desensitizing, comprising:

at least one pair of insertion rollers that hold and convey said photo-sensitive printing plate, said rollers being disposed at said input side at which said photo-sensitive printing plate is inserted into said developing tank, and disposed so as to convey said photo-sensitive printing plate downwards at an angle of 20° or less to the horizontal;  
means within said developing tank for conveying said plate comprising at least one pair of squeeze rollers for squeeze-

ing and removing used developing solution from the surface of said photo-sensitive printing plate and replacing it with fresh developing solution to promote development, and disposed so as to hold and convey said photo-sensitive printing plate in a state where said photo-sensitive printing plate in said developing solution of said developing tank



has its minimum radius of a downward curvature in a range of 200 mm to 900 mm; and  
a spray means disposed at least one side of above and below the conveyor path of said photo-sensitive printing plate and provided on the downstream side of said pair of squeeze rollers, for spraying fresh developing solution onto the surface of said photo-sensitive printing plate.

4,952,959

## CAMERA SYSTEM

Nobuyuki Taniguchi, Tondabayashi; Masatake Niwa, Sakai; Akira Fujii, Osaka; Takeo Hoda, Sakai; Masaaki Kakai, Nara; Minoru Sekida, Sakai, and Masayoshi Sahara, Sennan, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

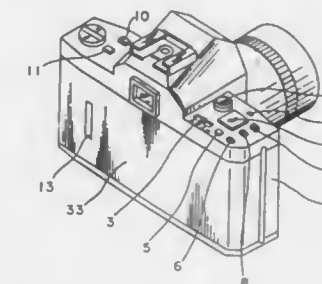
Division of Ser. No. 43,758, Apr. 29, 1987, Pat. No. 4,763,144, which is a division of Ser. No. 888,600, Jul. 23, 1986, Pat. No. 4,712,904, which is a division of Ser. No. 634,474, Jul. 25, 1984, Pat. No. 4,621,914. This application Jul. 15, 1988, Ser. No. 219,754

Claims priority, application Japan, Jul. 27, 1983, 58-138129; Jul. 29, 1983, 58-139600; Aug. 8, 1983, 58-144547; Aug. 8, 1983, 58-144549; Aug. 17, 1983, 58-150572; Jun. 22, 1984, 59-129572; Jun. 25, 1984, 59-131452; Jun. 25, 1984, 59-131453

Int. Cl.<sup>5</sup> G03B 17/00

U.S. Cl. 354—289.12

3 Claims



1. A camera adapted to function with override data, comprising:  
means for covering the upper side of the camera having a projecting portion shaped as a pentagonal prism;  
a first manually operable means located at said covering means on one side of the projecting portion for selecting whether or not an override data setting is carried out;



a second manually operable means located at said covering means on the other side of the projecting portion for changing the override data;  
means for effecting the change in override data when said second manually operable means is manually operated with said first manually operable means kept in manual operation; and  
means for indicating the override data.

4,952,960

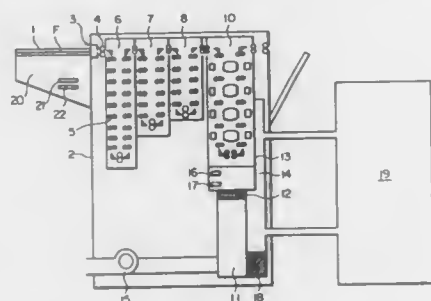
**DRYING AIR CONTROL METHOD IN AN AUTOMATIC DEVELOPING MACHINE AND AN AUTOMATIC DEVELOPING MACHINE EMPLOYING THE METHOD**  
Hiromitsu Kosegi; Shinichi Otani; Teruo Kashino; Masakazu Andoh; Takeo Arai, and Toshiharu Nagashima, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Mar. 27, 1989, Ser. No. 329,419

Claims priority, application Japan, Mar. 30, 1988, 63-77662; May 23, 1988, 63-126592; Jun. 6, 1988, 63-140254; Feb. 17, 1989, 64-37875

Int. Cl.<sup>5</sup> G03D 3/08; F26B 21/08, 21/10

U.S. Cl. 354—299

7 Claims



1. In an automatic developing machine in which a photographic film is dried by a drying unit after development, a method of controlling the temperature and/or humidity of the film drying air in order to prevent variations in the film size before and after the processes of development and drying, which comprises prior computation of said variations in the film size according to a temperature and humidity of outside air, thereby determining the optimum operating condition of said drying unit from a result of said prior computation, and thereafter setting said drying unit with said optimum operating condition so that said automatic developing machine may process said film without variation in said film size.

4,952,961

**APPARATUS FOR PROCESSING A PRINTING PLATE WITH A LIQUID**  
Petrus J. Vlasveld, Garderen, Netherlands, assignor to Machinehandel Houtstra BV, Nijkerk, Netherlands

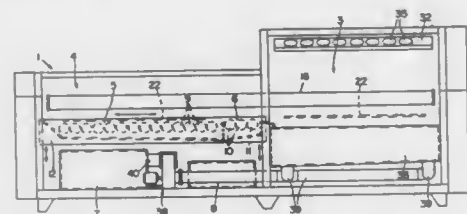
Filed Jul. 11, 1989, Ser. No. 378,410

Claims priority, application Netherlands, Jul. 28, 1988, 8801893

Int. Cl.<sup>5</sup> G03D 5/00; B41N 3/00

U.S. Cl. 354—317

20 Claims



1. Apparatus for processing a printing plate with a liquid.

comprising first and second liquid containing containers each container being open at its upper side, wherein a plurality of rotating brushes is provided in each container, said brushes being at least partially immersed in the liquid, and means for moving the printing plate along the brushes, wherein said means comprises a support table for the printing plate which is coupled with a central guiding beam extending above the containers in a closed processing compartment, the support table is being movable backward and forward in the longitudinal and lateral direction of the guiding beam with respect to the guiding beam over the brushes.

4,952,962

**AUTOMATIC FOCUSING DEVICE**  
Noboru Suzuki, and Shigeo Tohji, both of Tokyo, Japan, assignors to Asahi Kogyo Kogyo Kabushiki Kaisha, Tokyo, Japan

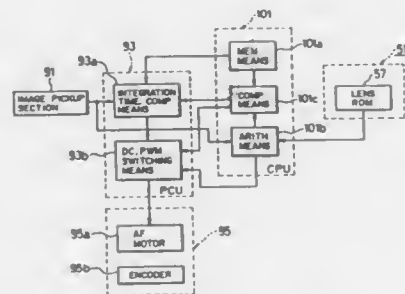
Continuation of Ser. No. 143,905, Jan. 11, 1988, abandoned. This application Jun. 9, 1989, Ser. No. 364,505

Claims priority, application Japan, Jan. 9, 1987, 62-1537[U]; Jan. 10, 1987, 62-2049[U]

Int. Cl.<sup>5</sup> G03 13/36

U.S. Cl. 354—400

11 Claims



1. An automatic focusing device comprising:  
a lens system including a focusing lens;  
means for driving said focusing lens;  
a first means for calculating an amount of defocusing for an object;  
a second means for calculating an amount of drive for moving said focusing lens to a position focused to said object based on the amount of defocusing; and  
a third means for controlling said driving means to gradually vary the movement speed of said focusing lens according to the amount of drive obtained by said second means said driving means moving said focusing lens to the focused position at the movement speed controlled by said third means.

4,952,963

**FOCUS DETECTION APPARATUS FOR CAMERA**  
Akira Akashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 134,856, Dec. 18, 1987, abandoned. This application Aug. 25, 1989, Ser. No. 399,404

Claims priority, application Japan, Jan. 12, 1987, 62-004565; Jan. 12, 1987, 62-004568

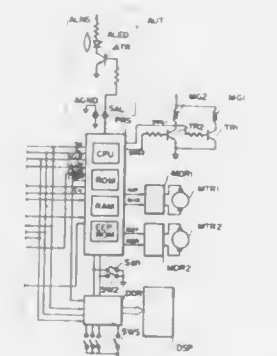
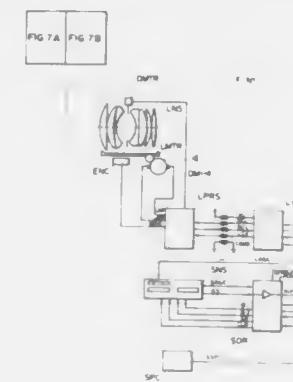
Int. Cl.<sup>5</sup> G03B 3/00; G01J 1/20

U.S. Cl. 354—402

19 Claims

1. A focus detection apparatus comprising:  
(a) a sensor section, having a plurality of pixels, for receiving light incident through an optical system and storing an image signal corresponding to the received light;  
(b) a storage time control circuit for controlling storage time of an image signal on the basis of an output from said sensor section such that a stored image signal has a predetermined level;

(c) a focus detector for detecting a focus state on the basis of outputs from the pixels of said sensor section; and  
(d) a sensor section switching circuit for determining an operation range of said sensor section in accordance with



a detection operation result of said focus detector, and for allowing the focus state detection operation of said focus detector and storage time control on the basis of the determined operation range.

4,952,964

**CAMERA SYSTEM**  
Tadashi Nakagawa, Chiba, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

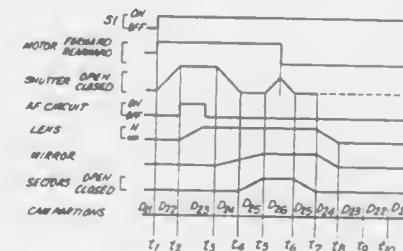
Filed Apr. 17, 1989, Ser. No. 339,040

Claims priority, application Japan, Apr. 27, 1988, 63-105279

Int. Cl.<sup>5</sup> G03B 3/00

U.S. Cl. 354—402

11 Claims



1. In a camera system for use in a camera of the type having a lens with an optical axis and automatic focus adjusting means utilizing the light transmitted through the lens, the combination comprising:

a lens shutter operable while disposed along said optical axis;  
a light-blocking means disposed ahead of the image plane to

be photographed and moveable between blocking and non-blocking positions;

a driving means which operates the lens to effect automatic focusing of the lens utilizing the light transmitted through the lens; and

a control means which is operable upon manual actuation of the camera to open the shutter and provide for automatic focus adjustment utilizing the light transmitted through the lens and said shutter, said control means also being operable to move said light-blocking means to said blocking position when said shutter is opened to provide for said automatic focus adjustment and to subsequently move said light-blocking means to said non-blocking position to provide for exposure operation of said shutter to expose the film in the camera.

4,952,965

**AUTOMATIC FOCUS DETECTING APPARATUS**  
Tokuji Ishida; Masataka Hamada; Toshio Norita; Masayuki Ueyama; Katsumi Kozakai; Hiroshi Ootsuka; Hideo Kajita, and Kenji Ishibashi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

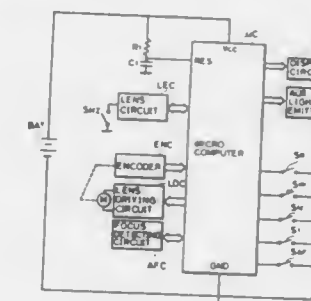
Filed Jan. 23, 1989, Ser. No. 299,646

Claims priority, application Japan, Jan. 21, 1988, 63-11616; Jan. 21, 1988, 63-11617; Jan. 21, 1988, 63-11618; Jan. 21, 1988, 63-11619; Jan. 21, 1988, 63-11620; Jan. 21, 1988, 63-11621; Jan. 21, 1988, 63-11622; Jan. 21, 1988, 63-11623; Jan. 27, 1988, 63-17939; May 13, 1988, 63-117440; May 14, 1988, 63-117325; May 14, 1988, 63-117326; May 14, 1988, 63-117327; May 14, 1988, 63-117328

Int. Cl.<sup>5</sup> G03B 7/00; H01J 1/42

U.S. Cl. 354—403

7 Claims



1. A focus adjusting apparatus comprising:

(a) a photographic lens;

(b) focus detecting means for receiving a light from an object through said photographic lens and detecting a focusing condition of said photographic lens;

(c) a manually operable member, said focus detecting means starting the focus detection in response to manual operation to said operable member;

(d) first driving means for forcibly driving said photographic lens to a predetermined position;

(e) second driving means for driving said photographic lens based on the focusing condition detected by said focus detecting means;

(f) auxiliary light emitting means for emitting an auxiliary light to said object in response to manual operation to said operable member;

(g) selecting means for selecting a first mode in which focus detection under non-emission of the auxiliary light is carried out and a second mode in which focus detection under emission of the auxiliary light is carried out; and

(h) admitting means for admitting the lens drive by said second driving means after the lens drive by said first driving means, wherein

said first driving means drives said photographic lens regardless of the selected mode.

4,952,966

**FOCUS DETECTING DEVICE FOR USE WITH CAMERAS**  
Tokuji Ishida, Daito, and Masataka Hamada, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 921,339, Oct. 20, 1986, abandoned, which is a continuation of Ser. No. 570,012, Jan. 10, 1984, Pat. No. 4,636,624. This application Apr. 11, 1988, Ser. No. 180,290

Claims priority, application Japan, Jan. 10, 1983, 58-2622; Jun. 23, 1983, 58-113936

Int. Cl.<sup>3</sup> G03B 3/00; G01J 1/20; H04N 5/335

U.S. Cl. 354-406 10 Claims



1. An image sensing device comprising: first light sensing means capable of accumulating electric charges in response to light incident thereon, said first light sensing means having a first group of a plurality of light sensing elements extending along a line; second light sensing means capable of accumulating electric charges in response to light incident thereon, said second light sensing means having a second group of a plurality of light sensing elements extending along a line; a first light measuring element exclusively located in the vicinity of said first group of light sensing elements on one side of the line; a second light measuring element exclusively located in the vicinity of said second group of light sensing elements on the other side of the line; means for transferring the charges accumulated by said first and second light sensing means to obtain a signal indicative of the sensed image; and means responsive to said first and second light measuring elements for controlling the charge accumulation period in which said first and second light sensing means carry out the accumulation of electric charges.

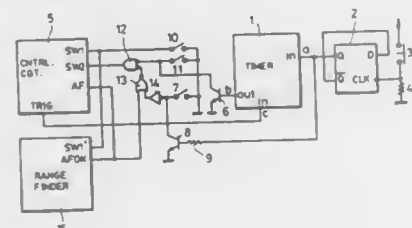
4,952,967

# **TIMER-ASSISTED PHOTOGRAPHING MODE CONTROL DEVICE FOR CAMERA**

Jiro Kazumi, Yokohama; Shinichi Tsujimoto, Tokyo, and Masaaki Ishihara, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,355  
Claims priority, application Japan, Oct. 27, 1987, 62-271365; Jan. 19, 1988, 63-8693

Int. Cl.<sup>3</sup> G03B 17/38 24 Claims  
U.S. Cl. 354-442



1. A timer-assisted photographing mode control device for a camera, comprising: (a) timer circuit means capable of automatically delivering a signal relating to starting of a plurality of exposure operations to effect at least one photographing operation during a predetermined time interval;

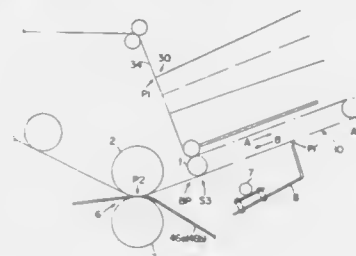
- (b) camera control circuit means having a plurality of operation modes relating to photographing; and
- (c) change-over circuit means for forcibly selecting a predetermined mode from said plurality of operation modes of said camera control circuit means when a timer-assisted photographing operation is to be conducted.

4,952,968

**APPARATUS FOR THE FORMATION OF IMAGES**  
Yoshiaki Ibuchi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 26, 1989, Ser. No. 412,815  
Claims priority, application Japan, Sep. 26, 1988, 63-240540; Sep. 30, 1988, 63-129339

Int. Cl.<sup>3</sup> G03B 27/32, 27/52 3 Claims  
U.S. Cl. 355-27



1. An apparatus for the formation of images, in which a photosensitive sheet coated with pressure-rupturable capsules that are hardened by light is first transported through a light-exposure section to be illuminated by an illuminating means to obtain a latent image, and then temporarily stored in a buffer section, and transported through a pressure-transfer section consisting of a pair of pressure rollers to be pressed against an image-receiving sheet to obtain a colored image on said image-receiving sheet, and is finally wound around a take up rod, said illuminating means selectively illuminating said photosensitive sheet so as to harden some of the pressure-rupturable capsules thereon to form said latent image, and said apparatus comprising:

- a secondary illuminating means for entirely illuminating a predetermined portion of said photosensitive sheet so as to harden all the pressure-rupturable capsules thereon when said portion of said photosensitive sheet is being transported alone through said pressure-transfer section without said image-receiving sheet after the jamming by said image-receiving sheet occurs and the jammed sheet is removed from the body of the apparatus.

4,952,969

# **METHOD FOR FORMING A COLOR IMAGE AND IMAGE FORMING APPARATUS THEREFOR**

Hiroshi Hara, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

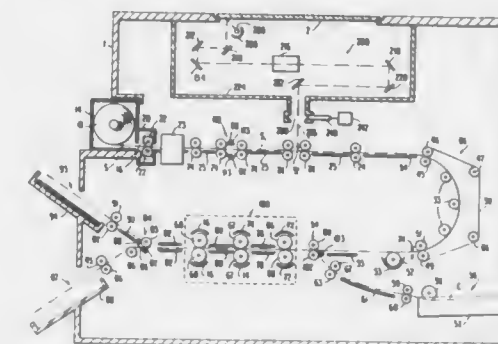
Division of Ser. No. 269,404, Nov. 10, 1988, Pat. No. 4,904,573. This application Jan. 2, 1990, Ser. No. 459,499

Claims priority, application Japan, Nov. 11, 1987, 62-283151; Dec. 1, 1987, 62-304167

Int. Cl.<sup>3</sup> G03B 27/32, 27/52 3 Claims  
U.S. Cl. 355-27

1. An apparatus for forming an image on a heat-developable color light-sensitive material by imagewise exposing said material, uniformly exposing at least a portion of said material, and developing said uniformly exposed and imagewise exposed material by application of heat to form a color image, said apparatus comprising: imagewise exposure means for imagewise exposing said heat-developable color light-sensitive material;

uniform exposure means for uniformly exposing at least a portion of said heat-developable light-sensitive material; transferring means for superposing an image-receiving sheet member onto said imagewise exposed and uniformly exposed heat-developable color light-sensitive material; and



heating means for heating said superposed heat-developable light-sensitive material and said image-receiving sheet member, to develop a color image and transfer said image from said heat-developable light-sensitive material to said image-receiving sheet member.

4,952,970

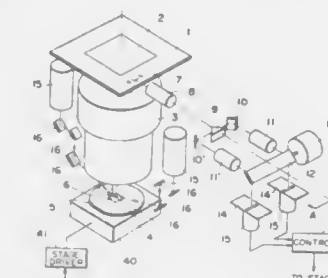
# **AUTOFOCUSING SYSTEM FOR A PROJECTING EXPOSURE APPARATUS**

Akiyoshi Suzuki, Tokyo, and Haruna Kawashima, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 323,213, Mar. 16, 1989, abandoned, which is a continuation of Ser. No. 165,475, Mar. 8, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 427,891

Claims priority, application Japan, Mar. 10, 1987, 62-53042  
Int. Cl.<sup>3</sup> G03B 27/52, 27/70, 27/72

U.S. Cl. 355-43 30 Claims



1. An autofocus system usable in a projection exposure apparatus having a projection optical system for projecting a pattern of a first object upon a second object having a light sensitive surface layer, said apparatus comprising:

- illumination means for illuminating a predetermined pattern of the second object without use of the projection optical system and by use of a light, in a direction which is inclined by a predetermined angle with respect to an optical axis of the projection optical system;
- an optical system for receiving light reflectively scattered by said predetermined pattern and passed through the projection optical system, said optical system forming an image of said predetermined pattern by use of the received light; light receiving means for photoelectrically converting the image of said predetermined pattern and for producing a signal corresponding to the state of the image of said predetermined pattern; and
- adjusting means for adjusting the positional relation between

an imaging plane of the projection optical system and the second object with respect to the direction of the optical axis of the projection optical system, such that an imaging light from the projection optical system can be focused upon the second object.

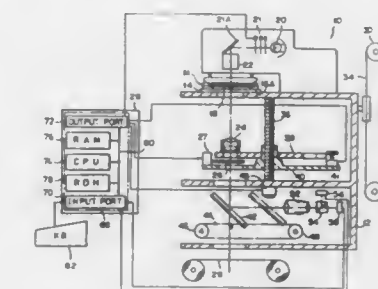
4,952,971

# **AUTOFOCUSING APPARATUS FOR PHOTOGRAPHIC PRINTER**

Yoshio Ozawa, Takashi Yamamoto, and Takao Shigaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 1, 1989, Ser. No. 304,629  
Claims priority, application Japan, Feb. 5, 1988, 63-25512  
Int. Cl.<sup>3</sup> G03B 27/32

U.S. Cl. 355-56 14 Claims



1. An autofocus apparatus suitable for use in an upright printer of the type in which upon changing the enlargement, a conjugate length is altered by changing the position of an original film, and a lens for printing is moved, said printer permitting mounting of a plurality of carriers adapted to hold original films of different sizes thereon respectively and being capable of setting a focusing position on the basis of an AF curve determined when a standard carrier out of said plurality of carriers is mounted, comprising:

- means for setting compensation values for individual carriers, respectively, said compensation values being commensurate with differences between the position of the original film upon mounting of the standard carrier and those of the original film upon mounting of the individual carriers having difference thicknesses other than the standard carrier;
- means for identifying the mounted carrier; and
- means for compensating the AF curve on the basis of a compensation value corresponding to the carrier specified by the identifying means.

4,952,972

# **LIFE EXPIRATION DETECTOR FOR LIGHT SOURCE OF IMAGE PROCESSING APPARATUS**

Akihiko Someya, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

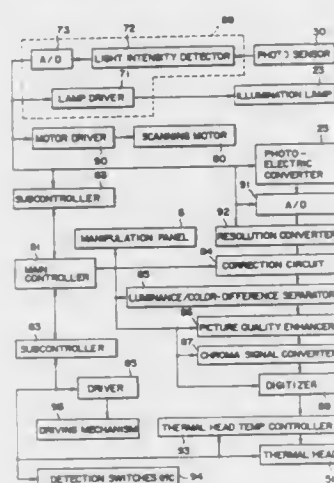
Filed Oct. 24, 1989, Ser. No. 426,046  
Claims priority, application Japan, Oct. 26, 1988, 63-270213  
Int. Cl.<sup>3</sup> G03B 27/74

U.S. Cl. 355-68 9 Claims

1. An apparatus for detecting a life expiration of a light source comprising: means for sensing at least two color components of light obtained from the light source to provide a first color component signal and second color component signal; means for detecting a first amount of said first color component signal and a second amount of said second color component signal; and means for comparing said first amount with said second



amount to detect a specific relation between said first and second amounts; and means for referring said specific relation to a predetermined



value to determine whether or not a life of said light source is expired, and indicating a life expiration of said light source when said specific relation matches said predetermined value.

#### 4,952,973 REMOVABLE COVER SHEET ROLL FOR A CONTACT PRINTER

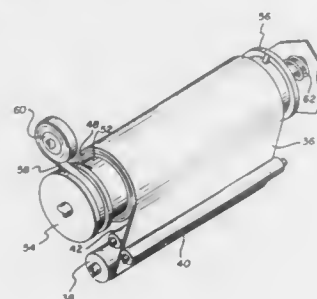
Robert S. Jones, and John J. Maurer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 17, 1989, Ser. No. 438,567

Int. Cl.<sup>5</sup> G03B 27/10, 27/20

U.S. Cl. 355—84

7 Claims



1. In a contact printer comprising means for supporting a film and an original in superposed relationship on a vacuum table, means for providing a source of light for exposing said film through said original, means for moving said light over the surface of said superposed film and original, a substantially impervious, flexible and transparent cover sheet carried by the light moving means, means for applying said cover sheet means over said superposed film and original as said light is scanned across said film and original whereby the vacuum is applied to said film and said original to remove air from therebetween as said film is exposed by said light through said cover sheet and said original, the improvement comprising means for removing and replacing said cover sheet to assure that the optical path for said exposing light remains clear and unobstructed.

#### 4,952,974 DETECTING MEMBER FOR DETECTING THE PRESENCE OF AN EXCHANGEABLE UNIT IN AN IMAGE RECORDING APPARATUS

Seichi Mori, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

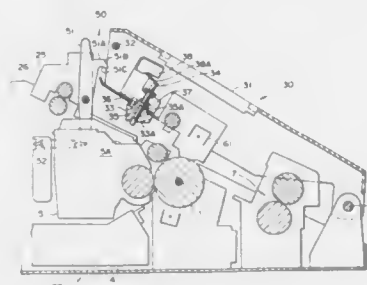
Filed Oct. 17, 1989, Ser. No. 422,592

Claims priority, application Japan, Oct. 17, 1988, 63-135257[U]

Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—200

8 Claims



1. An image recording apparatus employing an electrophotographic process wherein a recording medium is fed along a predetermined feed path, a photoconductive drum, on which a toner image is formed, is arranged below said feed path, and a transfer unit is arranged above said feed path oppositely to said photoconductive drum so as to transfer the toner image formed on said photoconductive drum onto the undersurface of the recording medium; wherein an upper component arranged above said photoconductive drum is arranged openably with respect to a lower component in which said photoconductive drum and a unit which is exchangeable are disposed; and wherein a detecting member which detects the presence of said exchangeable unit, when said upper component is closed with respect to said lower component, is provided to said upper component.

#### 4,952,975 IMAGE FORMING APPARATUS CAPABLE OF ACCURATE TROUBLESHOOTING

Masazumi Ito, and Yoshihiko Yasue, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 22, 1989, Ser. No. 369,856

Claims priority, application Japan, Jun. 28, 1988, 63-159884; Jun. 28, 1988, 63-159885

Int. Cl.<sup>5</sup> G03G 15/00

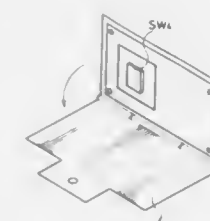
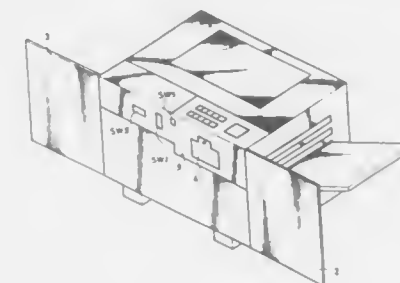
U.S. Cl. 355—206

17 Claims

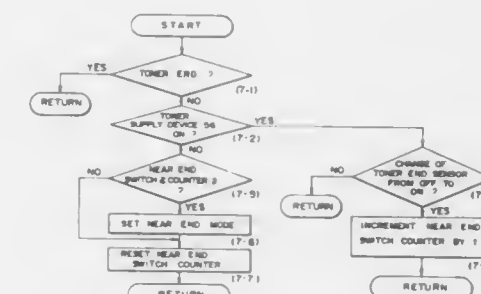
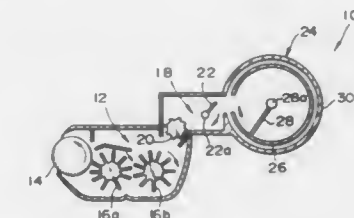
1. An image forming apparatus comprising: image forming means for forming images on a recording paper; trouble detection means for detecting troubles in image forming operation by said image forming means to stop the operation of said image forming means in response to the trouble detection output; counter means for counting the number of times of trouble

occurrence in response to the detection output from said trouble detection means; mode setting means for setting a specific mode; and

condition, and that a toner end condition is sensed when said predetermined extra number of copies have been



control means for allowing operation of said trouble detection means and inhibiting operation of said counter means upon setting of said specific mode.

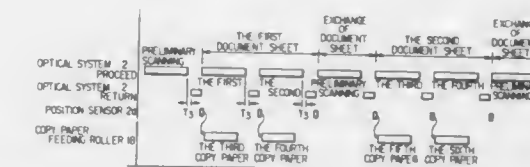


produced in said near toner end condition and then the copier is disabled.

4,952,977  
METHOD OF OPERATING AN ELECTROPHOTOGRAPHIC COPYING APPARATUS WHEREIN ORIGINAL DOCUMENTS ARE REPLACED DURING PRELIMINARY SCANNING, AND APPARATUS FOR CARRYING OUT THE METHOD  
Chiharu Kobayashi, and Masaru Ushio, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan  
Filed Jul. 19, 1988, Ser. No. 221,297  
Claims priority, application Japan, Jul. 21, 1987, 62-181676  
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—235

3 Claims



#### 4,952,976 COPIER WITH A TONER SUPPLY DEVICE

Eiichi Katoh, Yamato, and Hitoshi Hoshi, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,337

Claims priority, application Japan, Jul. 21, 1987, 62-180084

Int. Cl.<sup>5</sup> G03G 21/00

U.S. Cl. 355—206

4 Claims

1. A copier comprising: a developing unit having a developing section, a toner hopper section, and a toner cartridge section; toner lack sensing means for sensing lack of toner in said toner hopper section and producing a toner lack signal; switching means turning on and off as a toner supply operation proceeds after the lack of toner in said toner hopper section has been sensed; and control means for controlling said developing unit, said toner lack sensing means and said switching means such that a near toner end condition is sensed when said toner lack signal is produced and a predetermined extra number of copies is allowed to be produced in said near toner end

1. An electrophotographic copying apparatus comprising a document handling means for feeding a document onto a platen glass and carrying the document away from said platen glass;

a scanning means having a light source and adapted to carry out sequentially a preliminary scanning and an exposure scanning along said platen glass, thereby irradiating the document during said exposure scanning and projecting reflected light from the document onto a moving image forming means; said image forming means forming a copy image in response to the reflected light; a paper feeding means for feeding copy paper to said image forming means; a control having a sensing member for detecting a movement of said scanning means and for controlling the opera-

tion timing of said paper feeding means based on the detection result of said sensing member; said document handling means adapted to replace the irradiated document with a fresh document; and said controlling means further controlling said scanning means to perform said preliminary scanning so that said preliminary scanning is carried out during the replacement of the documents by said document handling means.

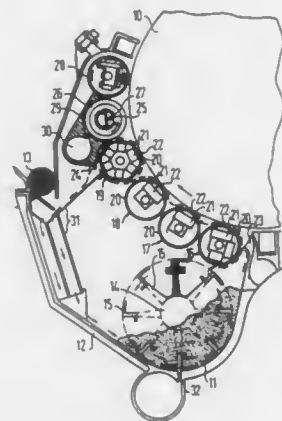
**4,952,979**  
**ISORUNNING-COUNTERRUNNING DEVELOPER STATION FOR AN ELECTROPHOTOGRAPHIC MEANS**  
Rainer Koefflerlein, Muenchen; Bernhard Schlageter, Unterhaching, and Erich Baier, Schwettenkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
PCT No. PCT/DE87/00429, § 371 Date Mar. 22, 1989, § 102(e) Date Mar. 22, 1989, PCT Pub. No. WO88/02507, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 21, 1987, Ser. No. 331,666  
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632441

Int. Cl.<sup>5</sup> G03G 15/09

U.S. Cl. 355—251

9 Claims



**4,952,978**  
**SPEED CONTROL OF COLOR DEVELOPMENT IN ELECTROPHOTOGRAPHIC PROCESS AND APPARATUS**

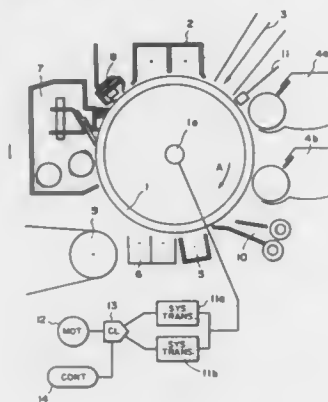
Shigenori Ueda, Kawasaki; Koji Yamazaki, Ebina; Toshiyuki Ehara; Nobuyuki Kume, both of Yokohama, and Nobuo Nakazawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 376,439  
Claims priority, application Japan, Jul. 11, 1988, 63-170835; Sep. 30, 1988, 63-248419

Int. Cl.<sup>5</sup> G03G 15/08

U.S. Cl. 355—245

15 Claims



1. An electrophotographic process using a photosensitive member having an amorphous silicon photosensitive layer, comprising:

uniformly charging the photosensitive member;  
exposing the charged photosensitive member to information light to form an electrostatic latent image; and  
developing the electrostatic latent image using a developing device selected from a plurality of developing devices disposed along a movement direction of the photosensitive member,

wherein a movement speed of the photosensitive member is lower when the selected developing device is closer to a station where said uniform charging step is performed than when another developing device further from the charging station is selected, whereby time periods for a portion of the photosensitive member to move from the charging station to the developing devices are substantially the same.

1. A developer station in an electrophotographic means for the development of charge images applied to charge image carriers (10) with the assistance of a developer mix (11) is taken from a supply chamber (12) in a developer station by a transport drum (14) and is transported to developer drums (16) through 19) that rotate in opposite directions relative to one another and ink the charge image carrier (10), characterized in that the developer mix (11) is first transported to a first isorunning developer drum (16) moving in the same direction as the charge image carrier at a first development gap defined between the first developer drum and the charge image carrier (22); in that further developer drums (17, 18) moving in the same direction as the charge image carrier at further development gaps are provided; and in that the developer mix (11) is then forwarded to a counterrunning developer drum (19) following said further developer drums in a moving direction of the charge image carrier (10) and moving in a direction opposite that of the charge image carrier (10) at a final development gap (22) and means for conducting said developer mix from the counterrunning developer drum back into the supply chamber (12), the isorunning developer drums (16, 17, 18) have a circumferential speed that is noticeably higher than the circumferential speed of the charge image carrier (10).

**4,952,980**  
**LIQUID PROCESSING HEAD FOR AN ELECTROPHOTOGRAPHIC APPARATUS**  
Yosimitu Sato; Keiichi Yamana, and Akira Yoda, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 16, 1988, Ser. No. 194,369  
Claims priority, application Japan, May 20, 1987, 62-122864  
Int. Cl.<sup>5</sup> G03G 15/10

U.S. Cl. 355—256

14 Claims

1. A processing head for use in an electrophotographic apparatus and designed to feed an elongated photosensitive material so as to bring successive frames on said photosensitive material to a developing section to which a developing agent is

supplied by developing agent fluid circuit, thereby to develop images on the successive frames, said processing head comprising:

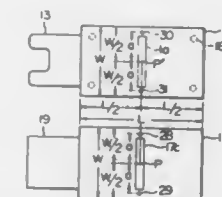
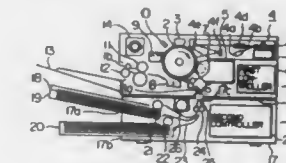
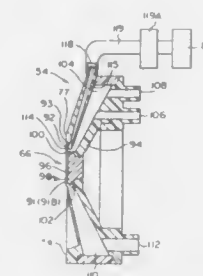
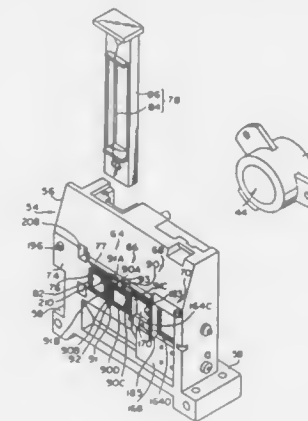
developing mask means having raised mask portions which protrude from said processing head, said raised mask portions for defining and surrounding a frame developing section and aperture, and for contacting said photosensitive material such that a developing agent delivered from a developing agent fluid circuit to said frame developing section and aperture are confined therein;

guide groove means, having raised guide portions which protrude from said processing head, and are sized to substantially surround said developing mask means, for con-

accommodating a recording medium supplying device for supplying said printing device with said recording medium;

said first case being provided with a recording medium ejection opening formed in a wall of said first case to allow a recording medium carrying fixed toner image to be ejected therethrough, and a recording medium inlet opening formed in the bottom wall of said first case and capable of receiving a recording medium to which a toner image is to be fixed;

said second case being provided with a recording medium receiving opening formed in one of the walls of said sec-



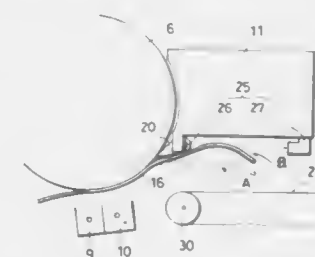
ond case and adapted to receive said recording medium supplied from the outside of said second case and a recording medium supplying opening formed in the top wall of said second case and capable of supplying said recording medium from said recording medium receiving opening into said recording medium inlet opening in said first case; said recording medium inlet opening being formed in substantially the center of said bottom wall of said first case, while said recording medium supplying opening is formed in substantially the center of said top wall of said second case.

**4,952,982**  
**COPYING APPARATUS AND METHOD**  
Shinichiro Tabuchi, Osaka, Japan, assignor to Minolta Camera Co., Ltd., Osaka, Japan  
Filed Mar. 28, 1989, Ser. No. 329,449  
Claims priority, application Japan, Mar. 30, 1988, 63-79846; Mar. 30, 1988, 63-79847

Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—316

20 Claims



tacting said photosensitive material such that there are defined a groove area substantially surrounding said developing mask means and an exhaust opening which opens to an environment which is different from said frame developing section and said developing agent fluid circuit; pressurized air supply port means disposed to communicate with said groove area of said guide groove means at a position which is distant from said exhaust opening; and pressurized air supply means for supplying said guide groove means with pressurized air through said pressurized air supply port means such that any of said developing agent which leaks from said developing mask means into said groove area is purged out of said groove area to said environment through said exhaust opening.

**4,952,981**  
**TONER IMAGE PRINTING APPARATUS**  
Isamu Terashima, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 367,676  
Claims priority, application Japan, Jun. 21, 1988, 63-151318  
Int. Cl.<sup>5</sup> G03G 15/00

U.S. Cl. 355—309

18 Claims

1. A toner image printing apparatus comprising, in combination, a first case accommodating a printing device for forming a toner image on a sheet-type recording medium, and a second case having a top for receiving thereon said first case and

1. A copying apparatus comprising:

a photosensitive member,  
charging means for applying electric charge to said photosensitive member,  
exposure means for exposing said photosensitive member to

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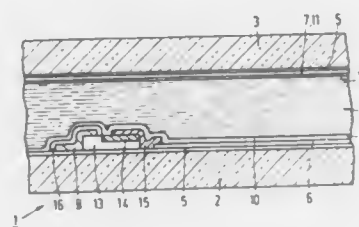
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form an electrostatic latent image corresponding to a document on said photosensitive member, developing means for developing the electrostatic latent image by adhering toner thereon to form a toner image, recording medium feeding means for feeding a recording medium on which the toner image is to be transferred, transfer means for transferring the toner image on the recording medium, separation means for separating the recording medium from said photosensitive member after image transference, transport means for transporting the separated recording medium, detection means for detecting the separated recording medium, discrimination means for discriminating the separation condition of the recording medium as one of multiple states in accordance with the detection result, and control means for controlling at least one of said charging means, said separation means and said transport means in accordance with the discrimination result.

semiconductor layer, and insulating layer covering the cathode layer, and an anode, the anode separated from the cathode by



a distance on the surface of the semiconductor layer equal to the thickness of the insulating layer.

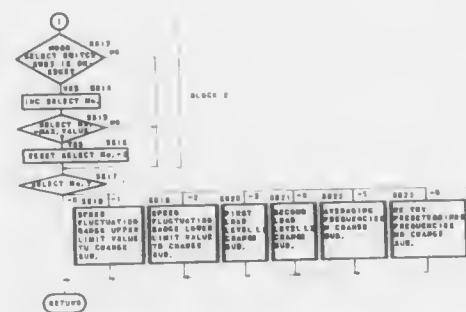
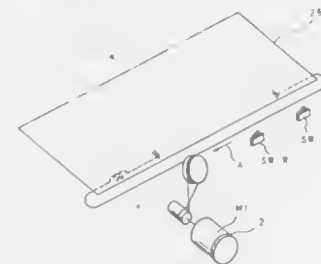
#### 4,952,985 ELECTROPHOTOGRAPHIC COPYING APPARATUS WITH MONITORING OF SCANNING SPEED

Toshikazu Kawaguchi, and Kenzo Nagata, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Nov. 21, 1988, Ser. No. 274,506

Claims priority, application Japan, Nov. 27, 1987, 62-301318; Dec. 19, 1987, 62-322378; Dec. 29, 1987, 62-332692  
Int. Cl.<sup>3</sup> G03G 15/00

U.S. Cl. 355—206

28 Claims



1. An electrophotographic copying apparatus in which an image of an original is copied on a paper, comprising: a photosensitive surface moving at a constant speed; an optical system for transmitting an image from the original to the photosensitive surface; scanning means for relatively moving the original, from a scan start position to a scan end position, the optical system including a light source for illuminating the original so as to project the image of the original onto the photosensitive surface with the scanning means; toner image forming means for forming a toner image on the photosensitive surface based on the image projection by said scanning means; transfer means for transferring the toner image on the photosensitive surface onto the paper;

4,952,983  
MULTI-COLORED IMAGE FORMING APPARATUS  
Masazumi Ito, Katsutoshi Nishimori, and Kimihiko Higashio, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Filed Aug. 29, 1989, Ser. No. 400,004

Claims priority, application Japan, Aug. 30, 1988, 63-215757  
Int. Cl.<sup>3</sup> G03G 15/01

U.S. Cl. 355—328

20 Claims

6. An image forming apparatus for conducting different copy processes for each of a plurality of regions which are subdivided from one original document relative to document scanning direction, comprising:

- a plurality of developing means each having a developer of different colors;
- a plurality of designating means for assigning boundaries of each region perpendicular to the document scanning direction so as to subdivide the original document into said plurality of regions;
- specifying means for specifying a number of regions and pattern of the copy process executed in each region, wherein said pattern of the copy process specifies a particular color to develop an image of each region; and
- means for invalidating at least one of the plurality of designating means so as to achieve agreement between the number of regions specified by the specifying means and the number of the regions subdivided by the designating means when these numbers do not agree.

#### 4,952,984 DISPLAY DEVICE INCLUDING LATERAL SCHOTTKY DIODES

Jan W. D. Martens, and Karel E. Kuijk, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 27, 1988, Ser. No. 250,008  
Claims priority, application Netherlands, Oct. 19, 1987, 8702490

Int. Cl.<sup>3</sup> H01L 27/12, 29/48

U.S. Cl. 357—15

10 Claims

1. A display device comprising an electro-optical display medium between two supporting plates, a system of picture elements arranged in rows and columns, each picture element being defined by two picture electrodes arranged on facing surfaces of the supporting plates, a system of row and column electrodes for driving the picture elements, and a system of switching units, each unit including at least one Schottky diode and each unit arranged in series with a picture element between a row and a column electrode, characterized in that the Schottky diode is a lateral diode comprising a layer of semiconductor material, a Schottky barrier cathode layer on the

paper transport means for transporting the paper to said transfer means in synchronism with the toner image on the photosensitive surface; detection means for detecting a scanning speed of the relative movement of the original by said scanning means; re-try means for controlling the operation of said scanning means so that the scanning means tries again to start the relative movement of the original from the scan start position when the scanning speed detected by said detection means exceeds a predetermined range before the paper transport means starts transporting the paper and after the scanning means starts the relative movement of the original, and count means for counting the number of the attempts to scan by said re-try means.

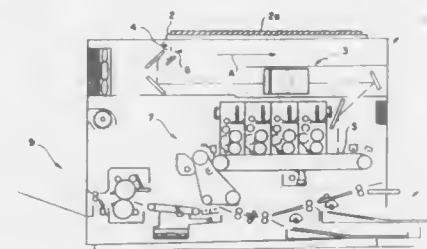
25. An electrophotographic copying apparatus in which an image of an original is copied on a paper, comprising: a photosensitive surface moving at a constant speed; scanning means for relatively moving the original for an optical system including a light source for illuminating the original so as to project the image of the original onto the photosensitive surface; image forming means for forming a copied image according to the image of the original on the paper based on the image projection by said scanning means; detection means for detecting a scanning torque of the relative movement of the original by said scanning means; judgment means for judging whether the scanning torque detected by said detection means exceeds a predetermined range or not; and warning means responsive to the judgment of said judgment means for warning that the scanning torque exceeds a predetermined range.

4,952,986  
COPYING APPARATUS  
Yasutaka Maeda, Ikoma; Hideyuki Nishimura, Yamatokoriyama; Tsuyoshi Miyamoto, Osaka; Kyouchi Takata, Yamatokoriyama; Kiyoshi Inamoto, Sakai; Kazuyuki Ohnishi, Nara; Kazunori Sobda, Nara; Yukihiko Ueno, Hirakata; Taisuke Kamimura, Nara; Yoichi Shimazawa, Nara; Tokiyuki Okano, and Masato Tokishige, both of Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Mar. 29, 1989, Ser. No. 330,367

Claims priority, application Japan, Mar. 29, 1988, 63-77617; Apr. 20, 1988, 63-97497; May 17, 1988, 63-119934  
Int. Cl.<sup>3</sup> G03G 15/00

U.S. Cl. 355—208

10 Claims



4. A copying apparatus comprising: a density detection device for detecting the density of an original to be copied, in a process of prescanning the original; adjusting means for adjusting at least one of the conditions of copying the original, on the basis of a group of detected density data; judging means for judging whether density data obtained from portions of the original exist between two predetermined values or not; and correction means for eliminating, from said group of de-

tected density data, extreme density data which exist beyond the range between said two predetermined values.

#### 4,952,987 COPYING MACHINE HAVING PLURAL DEVELOPING UNITS

Yoshiaki Takano, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

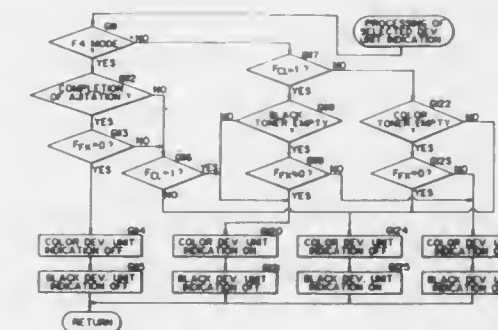
Filed Feb. 22, 1988, Ser. No. 159,061

Claims priority, application Japan, Feb. 24, 1987, 62-39112; Feb. 24, 1987, 62-39113; Feb. 24, 1987, 62-39114; Feb. 24, 1987, 62-39115; Feb. 27, 1987, 62-42693; Feb. 27, 1987, 62-42694

Int. Cl.<sup>3</sup> G03G 21/00, 15/01, 15/06

U.S. Cl. 355—209

10 Claims



1. A copying machine having plural developing means, said copying machine including: a photosensitive medium; said plural developing means for developing a latent image formed on the photosensitive medium, using a toner; plural toner supply means provided in corresponding relation to the plural developing means; selecting means for selecting one of the plural developing means; means for detecting a residual quantity of the toner of each said toner supply means; a plurality of indicating elements each corresponding to a specified developing means; and control means which, when any of the developing means is selected by said selecting means, lights in a first state one of said indicating elements corresponding to the selected developing means and which, when it is detected by said residual toner quantity detecting means that the residual quantity of the toner of the toner supply means corresponding to unselected developing means is below a predetermined value, lights one of said indicating elements corresponding to the unselected developing means in a second state different from the first state.

4,952,988  
IMAGE FORMING APPARATUS HAVING DISPLAY  
DEVICE FOR DISPLAYING PREDETERMINED DATA  
Katsushi Furuichi, Yokohama; Yoshikazu Yokomizo, Kawagoe; Toshio Honma, Tokyo, and Katsumi Murakami, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 106,010, Oct. 7, 1987, abandoned, which is a continuation of Ser. No. 627,563, Jul. 3, 1984, abandoned, which is a continuation of Ser. No. 100,236, Dec. 4, 1979, Pat. No. 4,477,178. This application Mar. 20, 1989, Ser. No. 325,116

Claims priority, application Japan, Dec. 8, 1978, 53-151775; Dec. 10, 1978, 53-152818; Dec. 29, 1978, 53-165093; Dec. 29, 1978, 53-165095

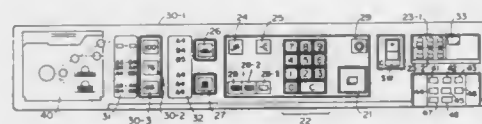
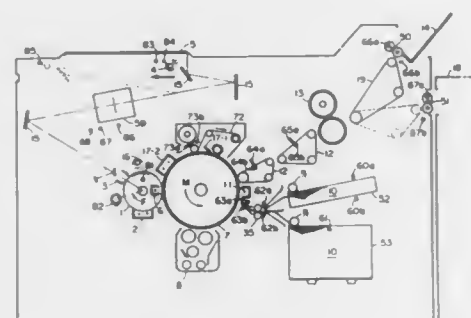
Int. Cl.<sup>3</sup> G03G 21/00

U.S. Cl. 355—209

14 Claims

1. Image forming apparatus comprising:

image forming means for forming an image on a recording medium;  
 data set means for setting a plurality of image formation data necessary to command a desired image formation;  
 first display means for indicating the plurality of image formation data set by said data set means;  
 second display means for indicating a ready condition in which the apparatus is ready to perform an image forming operation after initiation of a supply of electric power to the apparatus;  
 starter means for commanding a start of the image forming operation;  
 timer means operable to initiate a timer operation in response to setting of the image formation data by said data set means;  
 returning means for returning each of the plurality of image formation data automatically to respective predetermined

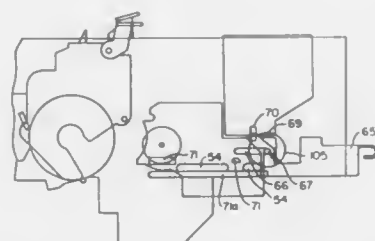
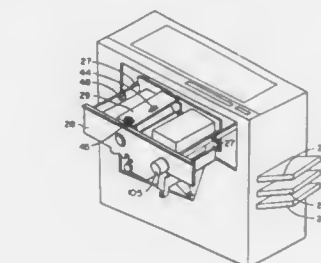


data, if the starter means fails to command the start of an image forming operation during a predetermined period of time of the timer operation by said timer means; and  
 control means for controlling said image forming means to perform an image forming operation in accordance with the plurality of image formation data if said starter means commands the start of an image forming operation after the apparatus has become ready to perform an image forming operation, said control means controlling said data set means to permit said data set means to set the plurality of image formation data even if the apparatus is not ready to perform the image forming operation after initiation of a supply of electric power to the apparatus, said control means controlling said timer means to actuate said timer means after the apparatus has become ready to perform the image forming operation, and said control means further controlling said timer means to reset and to initiate the timer operation again in the event that one of the plurality of image formation data is set by said data set means during the predetermined period of time after the previous data is set by said data set means.

**4,952,989**  
**PHOTORECEPTOR ATTACHMENT DEVICE FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE**  
 Tadaaki Kawano, Nara; Susumu Murakami, Osaka; Fukusaburo Ito, Nara; Hideaki Hagihara, Moriguchi; Takashi Miyaji, Yamatokoriyama, and Masaru Nishijima, Hirakata, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Nov. 18, 1988, Ser. No. 273,672 Continuation of Ser. No. 180,632, Apr. 4, 1988, abandoned, which is a continuation of Ser. No. 70,103, June 29, 1987, abandoned, which is a continuation of Ser. No. 852,229, Apr. 15, 1986, abandoned.  
 Claims priority, application Japan, Apr. 16, 1985, 60-82968; Apr. 16, 1985, 60-82969; Apr. 16, 1985, 60-82970; Apr. 16, 1985, 60-82971; Apr. 16, 1985, 60-82972; Apr. 16, 1985, 60-82973; Apr. 16, 1985, 60-57931

Int. Cl.<sup>5</sup> G03G 15/00, 21/00  
 U.S. Cl. 355—210

1 Claim



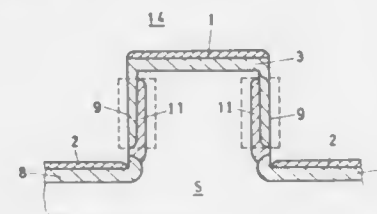
1. An electrophotographic copying machine comprising a recording medium rotatable around an axis,  
 a developing station provided with stirring means for developing electrostatic latent images formed on said recording medium and motion-communicating means for communicating motion of an external power source to said stirring means,  
 a housing which normally contains said recording medium and said developing station therein, and  
 a supporting member supporting both said recording medium and said developing station and being slidable parallel to said axis to assume a pulled-out position outside said housing, said developing station being displaceable on said supporting member between a developing position where said developing station is proximal and opposite to said recording medium and a retracted position separated from said recording medium when said supporting member is in said pulled-out position, said supporting member having gear means mounted thereon which become engaged with said motion-communicating means of said developing station when said developing station is displaced on said supporting member to said retracted position, said developing station being so supported by said supporting member that said stirring means become manually operable only when said supporting member is at said pulled-out position and said developing station is at said retracted position.

**4,952,990**  
**GATE TURN-OFF POWER SEMICONDUCTOR COMPONENT**

Horst Grüning, Baden, Switzerland, assignor to BBC Brown Boveri AG., Baden, Switzerland  
 Continuation of Ser. No. 51,865, May 20, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,916  
 Claims priority, application Switzerland, Jun. 3, 1986, 2233/86

Int. Cl.<sup>5</sup> H01L 29/80  
 U.S. Cl. 357—22

3 Claims

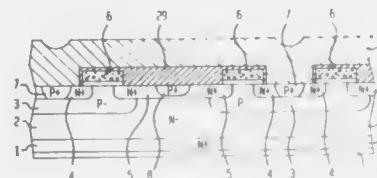


1. Gate turn-off power device of the PCTh (Field Control-led Thyristor) type, comprising:  
 a cathode and an anode;  
 a p-type anode layer;  
 an n-type channel layer situated on top of said anode layer;  
 a plurality of n-type cathode regions and p-type gate regions in an alternating manner on the side of said cathode, said cathode regions being disposed on cathode fingers separated from each other by trenches each having a bottom and sidewalls, said gate regions extending over the bottoms of said trenches;  
 p-type wall layers introduced into the sidewalls of said trenches;  
 said wall layers extending from said gate regions along said sidewalls toward said cathode;  
 said cathode regions extending from the tops of said cathode fingers, overlapping portions of said wall layers along said sidewalls and being separated from said gate regions by non-overlapped portions of said wall layers which contact said gate region; and  
 the overlapped portions of said cathode regions and said wall layers, and the regions of said channel layer located adjacent to said overlapped portions forming a three-layer NPN sequence extending over each of said sidewalls.

**4,952,991**  
**VERTICAL FIELD-EFFECT TRANSISTOR HAVING A HIGH BREAKDOWN VOLTAGE AND A SMALL ON-RESISTANCE**

Chizuru Kayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
 Filed Aug. 23, 1989, Ser. No. 397,232  
 Claims priority, application Japan, Aug. 25, 1988, 63-211858  
 Int. Cl.<sup>5</sup> H01L 29/78  
 U.S. Cl. 357—23.4

4 Claims

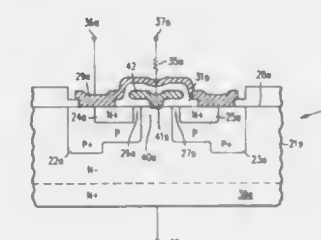


1. A field effect transistor comprising:  
 a first semiconductor region formed on a main surface of a semiconductor substrate of one conductivity type except

for a predetermined portion of said semiconductor substrate, said first semiconductor region being of the other conductivity type;  
 a second semiconductor region formed on said main surface of said semiconductor substrate uncovered by said first semiconductor region, said second semiconductor region having said one conductivity type with an impurity concentration higher than said semiconductor substrate;  
 a third semiconductor region of the other conductivity type formed in said second semiconductor region;  
 a fourth semiconductor region formed on a surface of said first semiconductor region, said fourth semiconductor region being separated from said second semiconductor region and said fourth semiconductor region being of said one conductivity type;  
 a gate electrode formed on said first semiconductor region between said second semiconductor region and said fourth semiconductor region;  
 an insulating film provided on said second semiconductor region and on said third semiconductor region;  
 a first electrode electrically connected to the fourth semiconductor region; and  
 a second electrode electrically connected to the other main surface of said semiconductor substrate.

**4,952,992**  
**METHOD AND APPARATUS FOR IMPROVING THE ON-VOLTAGE CHARACTERISTICS OF A SEMICONDUCTOR DEVICE**  
 Richard A. Blanchard, Los Altos, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.  
 Continuation of Ser. No. 87,055, Aug. 18, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,844  
 Int. Cl.<sup>5</sup> H01L 29/78  
 U.S. Cl. 357—23.4

9 Claims

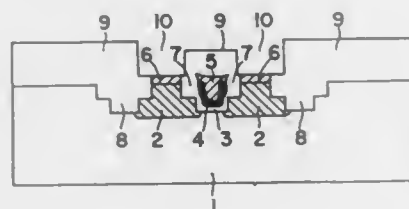


1. A semiconductor device comprising a substrate of first conductivity type, a first region of conductivity type opposite said first conductivity type extending into said substrate from a surface of said substrate, a second region of first conductivity type in said first region and extending into said first region into a depth less than that which said first region extends into said substrate, a drain region adjacent to said first region and extending to said surface, a channel region along said surface between said second region and said drain region, an insulating layer disposed on said surface of said substrate over the channel region, a gate electrode having first and second portions, with said first portion of said gate electrode being disposed on part of said insulating layer and positioned over the channel region, with said second portion of said gate electrode disposed on said surface of said substrate and being positioned adjacent where the drain region extends to said substrate surface, the composition of said gate electrode being such that a Schottky-barrier diode is formed by the contact of said second portion of said gate electrode and said substrate.



**4,952,993**  
**SEMICONDUCTOR DEVICE AND MANUFACTURING METHOD THEREOF**  
 Katsuya Okumura, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Jul. 14, 1988, Ser. No. 218,913  
 Claims priority, application Japan, Jul. 16, 1987, 62-177887  
 Int. Cl.<sup>3</sup> H01L 29/78  
 U.S. Cl. 357—23.9

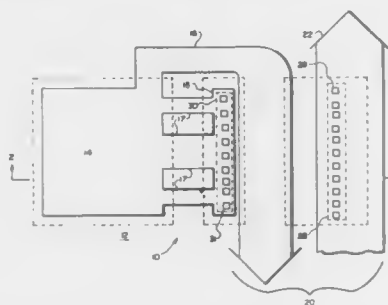
2 Claims



1. A semiconductor device comprising:  
 a semiconductor substrate of one conductivity type;  
 first, second and third recessed portions formed in succession at a predetermined pitch below a surface level of said semiconductor substrate;  
 a first pillarlike remaining region formed between said first and second recessed portions, in which an impurity of an opposite conductivity type is diffused;  
 a second pillarlike remaining region formed between said second and third recessed portions, in which an impurity of said opposite conductivity type is diffused wherein said first and second pillarlike remaining regions are such that their impurity diffused regions extend down to bottom surfaces of respective said recessed portions;  
 a gate region buried in said second recessed portion through an insulating film said gate region comprising:  
 an upper end surface extending to a height of at least the surface level of said semiconductor substrate; and  
 a polysilicon layer on lower and side inner surfaces provided with a tungsten layer thereon, said first and second pillarlike remaining regions being provided with a tungsten layer on each upper surface thereof; and  
 isolation regions buried in said first and third recessed portions.

**4,952,994**  
**INPUT PROTECTION ARRANGEMENT FOR VLSI INTEGRATED CIRCUIT DEVICES**  
 Chong M. Lin, Shrewsbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.  
 Continuation of Ser. No. 606,667, May 3, 1984, abandoned. This application Nov. 16, 1989, Ser. No. 437,302  
 Int. Cl.<sup>3</sup> H01L 29/78  
 U.S. Cl. 357—23.13

13 Claims

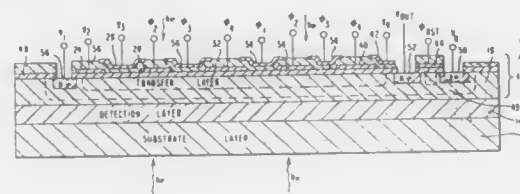


1. An input protection arrangement for an integrated circuit device on a semiconductor substrate of a first conductivity

type having a bonding pad for forming an external electrical connection, said bonding pad being connected to a conducting path on said substrate for electrically connecting said pad to internal circuitry on said integrated circuit, said integrated circuit further including a reference voltage path, said input protection arrangement comprising two regions of a second conductivity type on opposing sides of at least a portion of said conducting path, said region and the area therebetween being covered with a layer of insulating material, each of said regions including an inner portion of enhanced doping level separated from said substrate by a well portion having a reduced doping level, means defining apertures in said insulating material for connecting one of said regions to said pad and means for connecting the other region to said reference voltage path, whereby said regions define source and drain regions and the conducting path defines the gate terminal of an insulated gate field effect transistor which conducts input current associated with voltages in excess of a selected level between said pad and said reference voltage path.

**4,952,995**  
**INFRARED IMAGER**  
 James D. Phillips; Thomas N. Casselman, and Thomas L. Koch, all of Goleta, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.  
 Continuation of Ser. No. 860,967, May 8, 1986, abandoned. This application Oct. 27, 1988, Ser. No. 265,330  
 Int. Cl.<sup>3</sup> H01L 29/78, 29/161, 27/14  
 U.S. Cl. 357—24

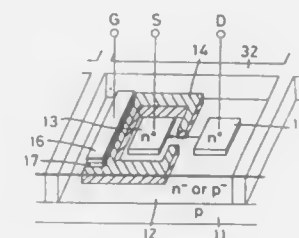
12 Claims



1. A focal plane imager having an output terminal, said focal plane imager operable to sense and distinguish infrared radiation in a first and a second region of the infrared spectrum, said focal plane imager comprising:  
 a substrate layer formed from a material selected from the group of cadmium-zinc-telluride, cadmium telluride, and cadmium selenide;  
 a detection layer operable to detect the occurrence of infrared radiation in said first region of the infrared spectrum and generate free charge carriers in response thereto, said detection layer being disposed immediately adjacent to said substrate layer and receiving support therefrom, said detection layer being formed from p-doped mercury-cadmium-telluride;  
 a transfer layer operable to selectively generate a first signal in response to the infrared radiation detected by said detection layer and deliver said signal to said output terminal, said transfer layer disposed immediately adjacent to said detection layer and formed from an n-doped layer of mercury-cadmium-telluride, said transfer layer being further operable to selectively generate free charge carriers in response to the receipt of infrared radiation in said second region of the infrared spectrum;  
 whereby said focal plane imager is operable to generate a first electrical signal in response to the infrared radiation received by said focal plane imager in said first region of the infrared spectrum and generate a second electrical signal in response to the infrared radiation received by said focal plane imager in said second region of the infrared spectrum.

**4,952,996**  
**STATIC INDUCTION AND PUNCHING-THROUGH PHOTOSENSITIVE TRANSISTOR DEVICES**  
 Jun-Ichi Nishizawa; Takashige Tamamushi, both of Sendai, and Hideo Maeda, Tokyo, all of Japan, assignors to Zaidan Hojin Handotai Kenkyu Shinkokai, Miyagi and Nikon Corporation, Tokyo, both of Japan  
 Filed Jan. 25, 1989, Ser. No. 301,348  
 Claims priority, application Japan, Jan. 29, 1988, 63-17294  
 Int. Cl.<sup>3</sup> H01L 27/14, 31/00  
 U.S. Cl. 357—30

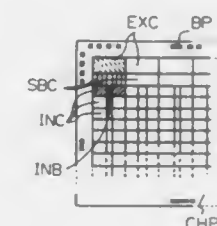
7 Claims



1. A semiconductor device comprising:  
 (a) a semiconductor substrate of a low impurity concentration;  
 (b) a channel region formed on said substrate and having a low impurity concentration;  
 (c) a source region formed in said channel region and having a high impurity concentration of a conductive type opposite to that of said substrate;  
 (d) a drain region formed in said channel region in alignment with said source region along a line substantially parallel to said substrate and having a high impurity concentration of a conductive type opposite to that of said substrate; and  
 (e) an accumulating gate region of the same conductive type as said substrate, said accumulating gate region substantially surrounding one of said source region and said drain region in planes substantially parallel to said substrate and having a predetermined gap leaving a part of said channel region sandwiched between said source region and said drain region, said accumulating gate region also having a portion disposed beneath said one of said source region and said drain region and sandwiched between said one region and said channel region;  
 wherein a current flows from one to the other of said source region and said drain region through said part of said channel region, said accumulating gate region is adapted to accumulate a charge corresponding to an intensity of radiation incident on said device, the potential of said accumulating gate region is variable according to the amount of said accumulated charge and said current is variable according to the potential of said accumulating gate region.

**4,952,997**  
**SEMICONDUCTOR INTEGRATED-CIRCUIT APPARATUS WITH INTERNAL AND EXTERNAL BONDING PADS**  
 Eiji Sugiyama, Kawasaki; Mitsuki Natsume, Machida, and Toshiharu Saito, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
 Division of Ser. No. 229,724, Aug. 4, 1988, which is a continuation of Ser. No. 861,670, May 7, 1986, abandoned, which is a continuation of Ser. No. 509,399, Jun. 30, 1983, abandoned. This application Mar. 20, 1989, Ser. No. 325,914  
 Claims priority, application Japan, Jun. 30, 1982, 57-112778; Jul. 1, 1982, 57-114241; Dec. 29, 1982, 57-233774; Dec. 29, 1982, 57-230288  
 Int. Cl.<sup>3</sup> H01L 27/02  
 U.S. Cl. 357—40

2 Claims



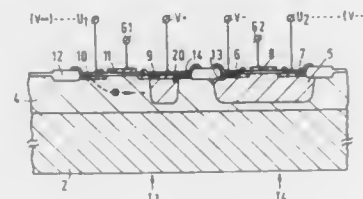
1. An integrated circuit device including external terminal leads, comprising:  
 a substrate;  
 integrated circuits formed on said substrate;  
 a first power supply line layer formed on said substrate; a second power supply line layer formed on said substrate;  
 a plurality of first internal pads formed on said substrate and connected to said first power supply line layer;  
 a plurality of second internal pads formed on said substrate and connected to said second power supply line layer;  
 a package on which said substrate is mounted;  
 conductors;  
 a plurality of first external pads formed on a first peripheral area of said package, said first external pads connected to said first internal pads through said conductors;  
 a second external pad formed on a second peripheral area of said package, said second external pad being connected to one of said second internal pads through one of said conductors and connected to one of the external terminal leads;  
 a third external pad formed on a third peripheral area of said package, said third external pad being connected to one of said second internal pads, not connected to said second external pad, through one of said conductors; and  
 an electroconductive layer formed at substantially entire interface between said substrate and a surface of said package, said electroconductive layer extending to and contacting said second and third external pads.

**4,952,998**  
**INTEGRATED CIRCUIT WITH COMPLEMENTARY MOS TRANSISTORS**  
 Adrianus W. Ludikhuize, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.  
 Filed Apr. 7, 1989, Ser. No. 334,963  
 Claims priority, application Netherlands, Apr. 11, 1988, 8800922  
 Int. Cl.<sup>3</sup> H01L 27/02  
 U.S. Cl. 357—42

4 Claims

1. A semiconductor device comprising at least one pair of complementary insulated gate field effect transistors and having a semiconductor body with a highly doped substrate of a first conductivity type, a less highly doped epitaxial layer of the first conductivity type disclosed on it and adjoining a

surface of the body, and a first region of a second, opposite conductivity type, which also adjoins the surface and is entirely surrounded within the semiconductor body by the epitaxial layer, source and drain zones of the first conductivity type of a first insulated gate field effect transistor of said pair being provided within the first region, and source and drain zones of the second conductivity type of a second insulated gate field effect transistor of said pair being provided beside the



first region, the source zone of the second transistor being located between its drain zone and the first region, and a second region of the second conductivity type provided below only the source zone of the second field effect transistor, characterized in that the second region has substantially the same doping and depth as the first region and is in contact with and electrically connected to the source zone of the second field effect transistor.

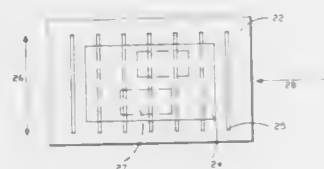
#### 4,952,999 METHOD AND APPARATUS FOR REDUCING DIE STRESS

Murray J. Robinson, Mountain View, and Ywan-Lung Tsay, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 26, 1988, Ser. No. 186,445  
Int. Cl.<sup>5</sup> H01L 23/12, 23/14, 23/54

U.S. Cl. 357—68

11 Claims



1. A die assembly comprising an integrated circuit semiconductor die bonded to a metallic die attach pad, wherein said die attach pad has a plurality of substantially parallel, unidirectional slots extending from a top surface of said die attach pad through to a bottom surface of said die attach pad, said semiconductor die having stress-sensitive components formed in said semiconductor die generally aligned in a stress-sensitive direction, said substantially unidirectional slots being oriented substantially orthogonal to the stress sensitive direction of said stress sensitive components in said semiconductor die.

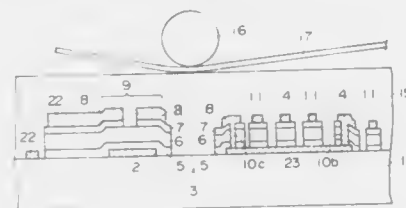
#### 4,953,000 SEMICONDUCTOR DEVICE

Noriyuki Kaifu, Hiratsuka; Masayoshi Murata; Osamu Hamamoto, both of Atsugi, and Katsumi Komiya, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,068  
Claims priority, application Japan, Nov. 14, 1987, 62-288200  
Int. Cl.<sup>5</sup> H01J 40/14

U.S. Cl. 357—71

22 Claims



1. A semiconductor device comprising:  
a semiconductor element; and  
a wiring portion including an intersection of a first and a second lead,  
wherein said intersection comprises a semiconductor layer and an insulating layer which are laminated between said first and second leads, and wherein an average potential of said second lead joined to said insulating layer relative to an average potential of said first lead joined to said semiconductor layer has a direction such that a supply of carriers from said first lead to said semiconductor layer is prevented.

#### 4,953,001 SEMICONDUCTOR DEVICE PACKAGE AND PACKAGING METHOD

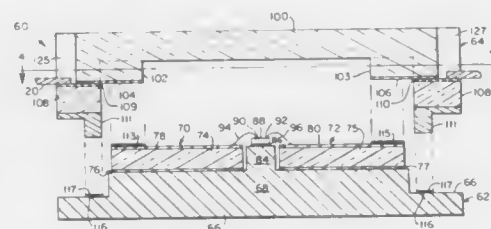
Joseph A. Kaiser, Jr., Framingham, and Bert S. Hewitt, Acton, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 781,315, Sep. 27, 1985, which is a continuation of Ser. No. 432,474, Oct. 4, 1982. This application Nov. 7, 1986, Ser. No. 928,706

Int. Cl.<sup>5</sup> H01L 23/12, 23/04

U.S. Cl. 357—74

3 Claims



1. A semiconductor device package for enclosing: (i) a microstrip transmission line having a lower ground plane conductor separated from an upper strip conductor by a dielectric, and (ii) a semiconductor device having an electrode contact thereof bonded to the upper strip conductor by a conductive interconnect, such package comprising:

- a bottom having disposed thereon the microstrip transmission line and the semiconductor device; and
- a top hermetically sealed to the bottom along a conductive surface, such conductive surface being disposed below the upper strip conductor and lower ground plane conductor; and wherein the regions of the top disposed above the upper strip conductor are comprised essentially of nonconductive material.

#### 4,953,002 SEMICONDUCTOR DEVICE HOUSING WITH MAGNETIC FIELD PROTECTION

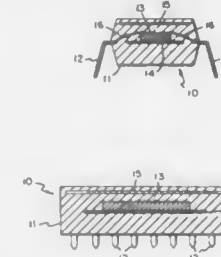
Keith W. Nelson, St. Louis Park; James E. Lenz, Brooklyn Park, both of Minn., and Takeshi Kawai, Kanagawa, Japan, assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 175,702, Mar. 31, 1988, abandoned.  
This application Sep. 5, 1989, Ser. No. 404,003

Int. Cl.<sup>5</sup> H01L 29/46, 23/06

U.S. Cl. 357—74

5 Claims



1. A housing for protecting a selected integrated circuit structure contained therein, said integrated circuit structure having therein at least one magnetizable material with its magnetization orientation confined substantially to a plane as a magnetization plane, said housing comprising:

- a pair of spaced apart layers each formed of a relatively high magnetic permeability material positioned substantially parallel to said magnetization plane between which said integrated circuit structure is secured with each of said layers extending parallel to said magnetization plane to an extent greater than does said magnetizable material in said integrated circuit structure, said housing between said layers being substantially free of magnetic material that is oriented to extend substantially perpendicular to said magnetization plane, and said housing being free of any substantially permanent magnetic materials other than in said integrated circuit structure; and
- a plurality of conductive leads extending past said pair of layers such that portions thereof are externally available, said integrated circuit structure having interconnection regions therein each electrically connected to a selected one of said plurality of conductive leads.

#### 4,953,003 POWER SEMICONDUCTOR DEVICE

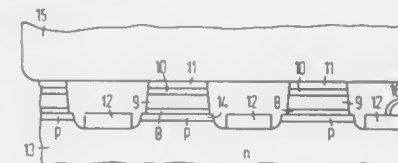
Jon-Willy Johansen, Kirchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 13, 1988, Ser. No. 193,989  
Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717161

Int. Cl.<sup>5</sup> H01L 23/54, 23/48

U.S. Cl. 357—79

17 Claims



1. A power semiconductor device having a pressure contract structure and having a semiconductor body provided with electrodes, in which at least one of the electrodes is formed of several superposed metallization layers, wherein:  
a first one of said several metallization layers is superposed on said semiconductor body and is a first titanium layer;  
a second one of said several metallization layers is superposed on said first titanium layer and is a copper layer, said copper layer having at least the same thickness as the thickness of said first titanium layer;  
a third one of said several metallization layers is superposed on said copper layer and is a second titanium layer; and  
a fourth one of said several metallization layers is arranged over said second titanium layer, said fourth layer being comprised of a conductive material.

posed on a side of said first titanium layer which is remote from said semiconductor body and is a copper layer, said copper layer having at least the same thickness as the thickness of said first titanium layer;  
a third one of said several metallization layers is superposed on said copper layer and is a second titanium layer; and  
a fourth one of said several metallization layers is arranged over said second titanium layer, said fourth layer being comprised of a conductive material.

#### 4,953,004 HOUSING FOR A GATE TURN-OFF POWER THYRISTOR (GTO)

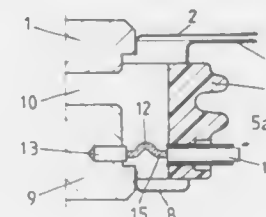
Peter Almenröder, Staufen, and Jiri Dlouhy, Mägenwil, both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Dec. 14, 1988, Ser. No. 284,360  
Claims priority, application Switzerland, Dec. 14, 1987, 4865/87

Int. Cl.<sup>5</sup> H01L 23/42, 23/44, 23/46

U.S. Cl. 357—79

4 Claims



1. A housing for a gate turn-off power thyristor (GTO), comprising:

- (a) an anode contact plate;
- (b) a cathode contact plate, a mounting space being provided between the two plates for the active semiconductor component;
- (c) an insulating ring surrounding the mounting space;
- (d) an anode flange which joins the insulating ring on the anode side to the anode contact plate;
- (e) a cathode flange which joins the insulating ring on the cathode side to the cathode contact plate; and
- (f) an auxiliary cathode connection which is connected to the cathode contact plate;
- (g) the auxiliary cathode connection comprising a bulk conductor which passes out of the housing through the insulating ring to the outside; and
- (h) said bulk conductor extending from the insulating ring through the mounting space and directly connected to the cathode contact plate.

#### 4,953,005 PACKAGING SYSTEM FOR STACKING INTEGRATED CIRCUITS

Randolph S. Carlson, and Charles P. Chase, both of Carson City, Nev., assignors to XOC Devices, Inc., Carson City, Nev.

Continuation-in-part of Ser. No. 39,632, Apr. 17, 1987, Pat. No. 4,862,249. This application Apr. 15, 1988, Ser. No. 182,098

Int. Cl.<sup>5</sup> H01L 23/12, 23/04, 23/14

U.S. Cl. 357—80

39 Claims

1. An apparatus for interconnecting a plurality of electrical circuits in a stack having a top surface and a bottom surface, said stack comprising:

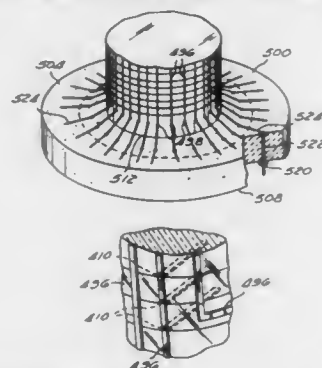
- a plurality of sandwiched structures, each sandwiched structure comprising:
- an electrical circuit having a plurality of electrical interconnections on at least a first surface of a substrate, said elec-



trical circuit constrained to an area having an outer periphery;

a first set of electrical conductors, said first set of electrical conductors electrically connected to said electrical circuit on said first surface of said substrate; and

a first electrically insulating plate adhesively bonded to said electrical circuit, said first electrically insulating plate having a planar surface and an edge, said edge forming an outer periphery of said first insulating plate with dimensions selected so that said outer periphery of said first electrically insulating plate extends beyond the outer periphery of said area in which said electrical circuit is located, and so that exposed portions of a plurality of conductors of said first set of electrical conductors extends beyond the outer periphery of said first electrically insulating plate, said plurality of sandwiched structures positioned with respect to each other in said stack so that said planar surfaces of said first insulating plates are substantially parallel, with at least one edge of each of said

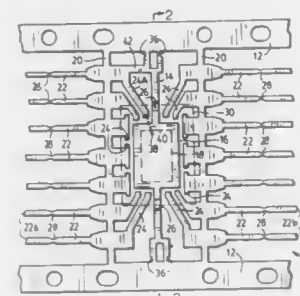


a cylindrical cap for fitting onto the header over the substrate assembly, the cap having a central transparent window.

**4,953,007**  
**PLASTIC ENCAPSULATED INTEGRATED CIRCUIT PACKAGE WITH ELECTROSTATIC SHIELD**  
 George Erdos, Toronto, Canada, assignor to Linear Technology Inc., Burlington, Canada  
 Filed Oct. 21, 1988, Ser. No. 260,640  
 Int. Cl.<sup>5</sup> H01L 23/48

U.S. Cl. 357-84

6 Claims



1. An integrated circuit package comprising:
  - (a) an integrated circuit chip, said chip having a plurality of pins including a ground pin,
  - (b) a thin conductive metal base having upper and lower surfaces, said chip being adhered to said upper surface of said base,
  - (c) a plurality of leads connected to respective ones of said pins and extending laterally outwardly from said chip beyond said base, each lead having a lower surface,
  - (d) each lead having an inner finger formed of the same material as said base, said finger being spaced from said base by a gap, and a connecting member connecting said pins to said fingers,
  - (e) an electrostatic shield directly adhered to the bottom of said base by an adhering material, said shield having a portion extending laterally outwardly beyond said base and extending beneath at least a portion of said leads and underlying a portion of said fingers for attenuating the electromagnetic field between said leads to reduce cross-talk between said leads, said portion having an upper surface which is located in a plane below that of said lower surfaces of said leads,
  - (f) means electrically connecting said shield to said ground pin of said chip,
  - (g) said means electrically connecting said shield to said ground pin comprising a conductive member formed integrally with said base and extending laterally therefrom, and a conductive strip connecting said conductive member to one of said fingers, said one finger being con-

**4,953,006**  
**PACKAGING METHOD AND PACKAGE FOR EDGE-COUPLED OPTOELECTRONIC DEVICE**  
 Tibor F. I. Kovats, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada  
 Filed Jul. 27, 1989, Ser. No. 385,599  
 Int. Cl.<sup>5</sup> H01L 39/02

U.S. Cl. 357-80

13 Claims

1. A package for an edge-coupled optoelectronic device, comprising:
  - a substrate assembly comprising:
    - an electrically insulating substrate;
    - electrical conductors which are supported by the substrate, the conductors defining and extending between device contacts which are adjacent to a device support location on the substrate and terminal contacts which are remote from the device support location; and
    - an electrically insulating cover which extends across the

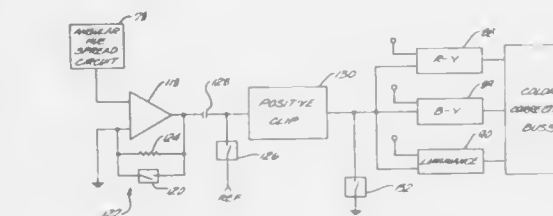
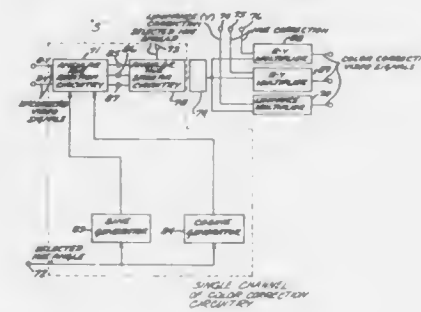
nected to said ground pin of said chip, said conductive member being integral with said conductive strip and said one lead finger, said adhering material being electrically conductive so that said shield is electrically connected to said base;

(h) and a plastic layer completely enveloping said chip, said base, said shield, and those portions of said leads adjacent said chip, to fully encapsulate the same.

**4,953,008**  
**METHOD AND APPARATUS FOR UNIFORM SATURATION, HUE AND LUMINANCE CORRECTION**  
 Michael C. Kaye, Agoura, Calif., assignor to Encore Video, Inc., Hollywood, Calif.  
 Continuation-in-part of Ser. No. 159,587, Dec. 15, 1987, which is a continuation-in-part of Ser. No. 904,692, Sep. 8, 1986, abandoned. This application Apr. 19, 1989, Ser. No. 340,872  
 Int. Cl.<sup>5</sup> H04N 9/64

U.S. Cl. 358-22

11 Claims

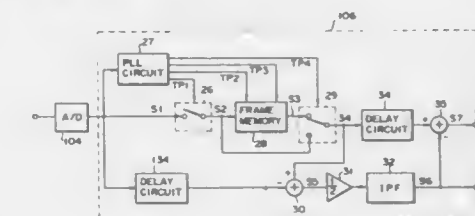


1. A color correction system for manipulating signals representing colors, the system comprising:
  - input means for accepting signals representing colors defining hues and respective saturations;
  - a color correction circuit for accepting the signals from the input, and including:
    - color selection means for producing from the input signals a selected signal at an output proportional to the saturation of a portion of the input single in a selected hue region,
    - signal processing means coupled to the output of the color selection means for accepting the selected signal and for processing the signal to produce an output signal having substantially constant saturation, and
    - means for providing the output signal as a correction signal; and
    - means for combining the signals from the input means with the correction signal and producing resultant signals and for passing the resultant signals to an output.

**4,953,009**  
**SIGNAL SEPARATOR HAVING FUNCTION OF SUBSAMPLING DIGITAL COMPOSITE VIDEO SIGNAL**  
 Masahiro Yamada, Kawasaki; Seijiro Yasuki, and Kiyoshi Hoshino, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Dec. 23, 1988, Ser. No. 288,870  
 Claims priority, application Japan, Dec. 28, 1987, 62-330076  
 Int. Cl.<sup>5</sup> H04N 9/78

U.S. Cl. 358-31

9 Claims



1. A signal separator comprising:
  - an A/D converter for sampling an NTSC composite video signal including a luminance signal component and a color difference signal component at a sampling frequency four times a frequency of a chrominance subcarrier and outputting a digital signal;
  - timing signal generating means for receiving the digital signal output from said A/D converter and generating at least first and second timing signals having the frequency of the chrominance subcarrier;
  - data selecting means for selecting predetermined data of the digital signal output from said A/D converter in accordance with the first timing signal generated by said timing signal generating means and outputting a selected signal;
  - a delay line for delaying the selected signal output from said data selecting means by one frame and outputting a delayed signal;
  - first interpolation means for interpolating the delayed signal output from said delay line by the selected signal output from said data selecting means in accordance with the second timing signal generated by said timing signal generating means and outputting a first interpolated signal;
  - first separation means for separating the color difference signal component from the NTSC composite video signal by mixing the first interpolated signal output from said first interpolation means and the digital signal output from said A/D converter;
  - second interpolation means for interpolating the color difference signal component separated by the first separation means by a predetermined operation and outputting a second interpolated signal; and
  - second separation means for separating the luminance signal component by mixing the first interpolated signal output from the first interpolation means and the second interpolated signal output from the second interpolation means.

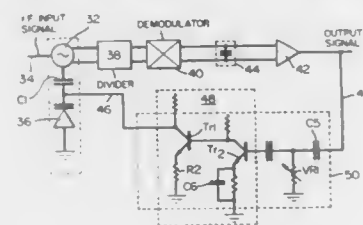
**4,953,010**  
**FM DEMODULATOR INCLUDING INJECTION LOCKED OSCILLATOR/DIVIDER**  
 Nicholas P. Cowley, Wiltshire, England, assignor to Plessey Overseas Limited, Ilford, England  
 Continuation-in-part of Ser. No. 6,652, Mar. 9, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 301,382  
 Int. Cl.<sup>5</sup> H04N 5/44

U.S. Cl. 358-35

6 Claims

1. A demodulator for frequency modulated signals, the demodulator comprising an injection locked oscillator/divider, the oscillator/divider comprising a mixer/oscillator combination having a center frequency of operation and having an input terminal for receiving an input signal to be demodulated, the oscillator/divider having an output terminal means

for providing an output signal, a frequency divider coupled to said output terminal means for dividing the frequency of said output signal, a frequency discriminator coupled to the frequency divider for providing a demodulated output signal, a feedback loop for affording a feedback signal, dependent upon



the demodulated output signal, and a tuning circuit means responsive to the feedback signal and coupled to the injection locked oscillator/divider for constraining the center frequency thereof to track the frequency of the input signal, the tuning circuit means comprising a varactor diode tuning circuit for receiving the feedback signal afforded by the feedback loop.

4,953,011

# COLOR ENHANCING CIRCUIT FOR ENHANCING SATURATION

Takeshi Mori, Machida; Hiroyoshi Fujimori, Hachioji, and Tatsuo Nagasaki, Musashino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

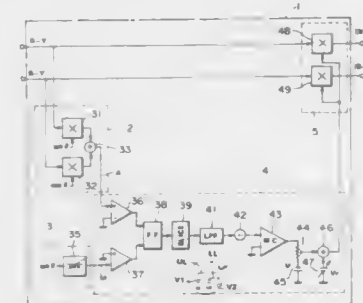
Filed Mar. 11, 1988, Ser. No. 167,821

Claims priority, application Japan, Mar. 24, 1987, 62-69912; Aug. 13, 1987, 62-202730

Int. Cl.<sup>5</sup> H04N 9/68

U.S. Cl. 358—37

23 Claims



1. A color enhancing circuit comprising: chrominance signal modulating means for modulating chrominance signals constituting a color image and for outputting modulated chrominance signals; color designating means for designating a phase of a signal used in modulation and for outputting a designated chrominance signal for modulation corresponding to said phase; hue difference detecting means for detecting a hue difference between said modulated chrominance signals and said designated chrominance signal for modulation; and saturation enhancing means coupled to said hue difference detecting means for enhancing the saturation of a portion of said chrominance signals constituting said color image where said hue difference is small.

## 4,953,012 IMAGE PROCESSING SYSTEM FOR COMBINING A CHARACTER IMAGE WITH AN IMAGE INCLUDING A GRAY LEVEL

Shunichi Abe, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

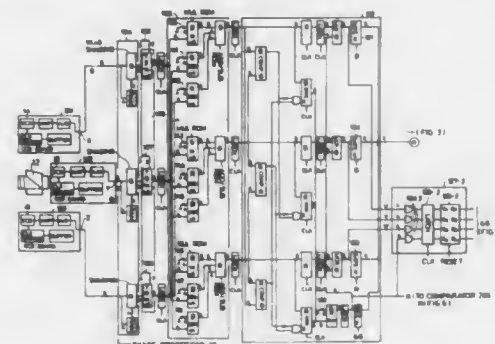
Continuation of Ser. No. 180,640, Apr. 6, 1988, abandoned, which is a continuation of Ser. No. 73,873, Jul. 15, 1987, abandoned, which is a continuation of Ser. No. 585,233, Mar. 1, 1984, abandoned. This application Nov. 14, 1988, Ser. No. 271,362

Claims priority, application Japan, Mar. 8, 1983, 58-37712; Mar. 17, 1983, 58-44992; Mar. 17, 1983, 58-44993

Int. Cl.<sup>5</sup> H04N 1/46, 1/40

U.S. Cl. 358—75

27 Claims



1. An image processing system comprising: first input means for inputting an image signal that may include half-tone portions; second input means for inputting a character signal; process means for processing the image signal inputted by said first input means, said process means including means for half-tone processing the image signal; discrimination means for discriminating the presence of half-tone portions in the image signal inputted by said first input means by analyzing density data of said image signal; and output means for outputting a first signal processed by said half-tone processing means when said discrimination means discriminates the presence of half-tone portions in the image signal input by said first input means and for outputting a second signal not processed by said half-tone processing means when either (a) said discrimination means does not discriminate the presence of half-tone portions in the image signal or (b) the character signal is inputted by said second input means.

11. An image processing system comprising: first input means for inputting an image signal that may include half-tone portions; second input means for inputting a character signal; process means for combining the image signal inputted by said first input means with the character signal inputted by said second input means to produce a combined signal, said process means including means for half-tone processing the image signal; discrimination means for discriminating the presence of half-tone portions in the image signal inputted by said first input means; and output means for outputting a first signal processed by said half-tone processing means when said discrimination means discriminates the presence of half-tone portions in the image signal input by said first input means and for outputting a second signal not processed by said half-tone processing means when either (a) said discrimination means does not discriminate the presence of half-tone portions in the image signal or (b) the character signal is inputted by said second input means.

13. A color image processing system comprising: input means for inputting image information which may include a plurality of color components; means for processing said image information to reproduce a color image; discrimination means for discrimination whether the image information inputted by said input means includes a specific color component; and means for selecting a predetermined sequence of operation of said processing means for processing the image information having the specific color component to reproduce a color image with the specific color component in accordance with the result of the discrimination by said discrimination means.

21. A color image processing system comprising: input means for inputting image information which may include a plurality of color components and which may include half-tone portions and line image portions; means for processing the image information inputted by said input means; first means for discriminating whether the image information inputted by said input means includes a specified one of said plurality of color components; and second means for discriminating the presence of half-tone portions and line image portions in the image information inputted by said input means in accordance with the result of discrimination of a specified color component of the image information by said discrimination means.
23. An apparatus comprising: a) means for inputting image information which includes a plurality of color components; b) means for half-tone processing of the image information inputted by said input means; c) means for discriminating a non-color level of the image information; and d) control means for controlling said processing means in accordance with the level discriminated by said discriminating means.

4,953,013

# COLOR IMAGE PROCESSING DEVICE

Katsuhisa Tsuji, and Tomoko Ogawa, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

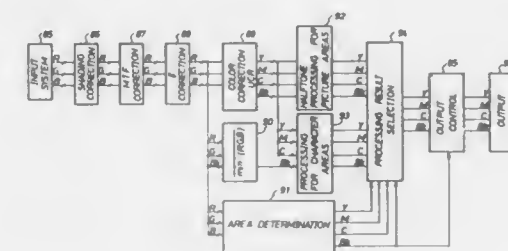
Filed Oct. 5, 1988, Ser. No. 253,620

Claims priority, application Japan, Oct. 8, 1987, 62-252357; Jan. 8, 1988, 63-139350

Int. Cl.<sup>5</sup> H04N 1/46

U.S. Cl. 358—75

13 Claims



7. A color image processing device comprising: read means for reading an original image for each area containing a predetermined number of pixels of the original image and color-separating the read area into red, green and blue components; black component extraction means for extracting the black component of the read area based on the red, green and blue components of the area separated by the read means; character area detection means for detecting whether or not the read area is a character area constituting a part of a character in the original image for each of red, green, blue and black components; black character determining means adapted to determine the

4,953,014

# IMAGE PROCESSING APPARATUS COMPENSATING FOR DISTANCE BETWEEN DOCUMENT PORTIONS READ BY RESPECTIVE SENSORS

Yoichi Takaragi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

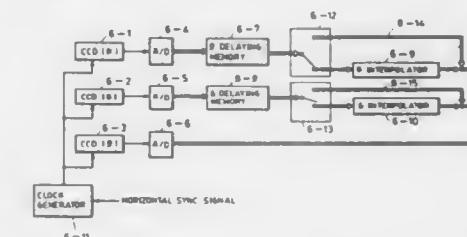
Filed Oct. 11, 1988, Ser. No. 255,466

Claims priority, application Japan, Oct. 23, 1987, 62-268849

Int. Cl.<sup>5</sup> H04N 1/393, 1/46

U.S. Cl. 358—77

20 Claims



1. An image processing apparatus, comprising: a plurality of linear image sensors for reading an original image, which are arranged parallel to each other to read portions of the original image at least one of which portions is at a predetermined distance from others of the portions; setting means for setting a magnification to obtain a magnified image; first compensating means for processing an image signal obtained from at least one of said image sensors so as to compensate for an integer part of the distance between the portions in accordance with the magnification; and second compensating means for processing the image signal obtained from at least one of said image sensors so as to compensate for a decimal part of the distance between the portions in accordance with the magnification.
11. An image processing apparatus, comprising: a plurality of linear image sensors for reading an original image, which are arranged parallel to each other to read portions of the original image at least one of which portions is at a predetermined distance from others of the portions; setting means for setting a magnification to obtain a magnified image; and an interpolator for interpolating image signals of two adjacent lines of the image from one of said image sensors in accordance with the magnification to obtain an image signal on the same line as an image signal from another of said image sensors.



4,953,015

## METHOD FOR PRINTING A COLOR IMAGE WHICH INCLUDES BLACK INK

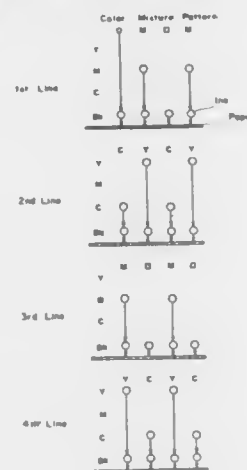
Hideto Hayasaki, Nara; Masaki Takakura, Higashiosaka; Yasukuni Yamane, and Noritoshi Kako, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Dec. 13, 1988, Ser. No. 283,856

Claims priority, application Japan, Dec. 14, 1987, 62-318206; Feb. 12, 1988, 63-31532; Jun. 23, 1988, 63-157534; Jun. 23, 1988, 63-157535

Int. Cl.<sup>5</sup> H04N 1/46

U.S. Cl. 358—79

11 Claims



1. A method for printing a colored image, on a medium using black ink and a plurality of inks of other colors comprising the steps of:

- placing said black ink in the form of dots on the medium so as to produce a black area of the image;
- allotting said plurality of other inks; and
- placing said plurality of other inks on only at least part of the black ink dots in accordance with the allotment so that said other inks which are on said black ink dots are placed in the form of dots which are superimposed on each other the black ink dots.

4,953,016

## TABLE-SHAPED JIG FOR POSITIONING ELEMENTS ON A SUPPORT IN ACCORDANCE TO A REFERENCE LAYOUT

Gerard Boujon, deceased, late of Pully, Switzerland (by Yves Boujon, Jacqueline Boujon, executors); Yves Boujon, Lausanne, and Jacqueline Boujon, Pully, both of Switzerland, assignors to Bobst SA, Switzerland

Filed Jun. 1, 1989, Ser. No. 359,889

Claims priority, application Switzerland, Jun. 1, 1988, 02082/88

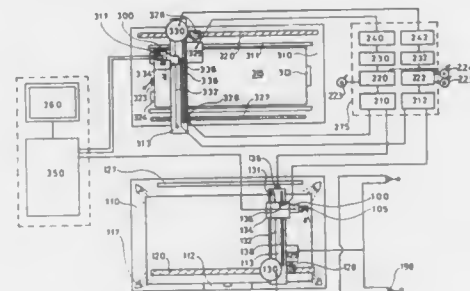
Int. Cl.<sup>5</sup> H04N 7/18

U.S. Cl. 358—93

9 Claims

1. A table-shaped jig for positioning elements on a support in accordance with a reference layout, said jig including a tray on which a reference layout can be arranged; a first video camera; first mounting means for mounting the video camera for movement in a plane parallel to the reference layout, said first mounting means including a crossbar movable along the tray, a first electro-mechanical means for moving the crossbar along said crossbar, and a second electro-mechanical means for moving the carriage along said crossbar; positioning means for actuating the first and second electro-mechanical means for shifting the first video camera in said plane parallel to said layout; an operating plane for holding a chase in a steady position in a second plane; a second video camera; second mounting means for mounting the second video camera for

movement in a plane parallel to said second plane, said second mounting means including a bracket movable along the operating plane, a third electro-mechanical means for moving said bracket along said operating plane, an arm movable along said bracket and supporting said second video camera, and a fourth electro-mechanical means for moving said arm on said bracket; electronic means used for controlling the third and fourth electro-mechanical means for shifting the bracket and arm of the second mounting means in such a way that the second camera will be shifted proportional to the movement of the first video camera which is commanded by said positioning means, said electronic means including a first detector means



for detecting the movement of the carriage along said crossbar, a second detector means for detecting the movement of the crossbar along said tray, third detector means for detecting movement of the arm along said bracket, and fourth detector means for detecting movement of said bracket along said second plane; and electronic video mixing control means for receiving the output of the first and second camera and for displaying said output on a screen, said electronic video control means enabling the transformation of the images recorded by each of the video cameras and the color, contrast, brightness and enlarged signals before combining them by selectively superpositioning and vertical, horizontal, circular and rectangular juxtapositioning on the visual screen.

4,953,017

## SIMULTANEOUS TELEVISION PICTURE AND MEASUREMENT DISPLAY

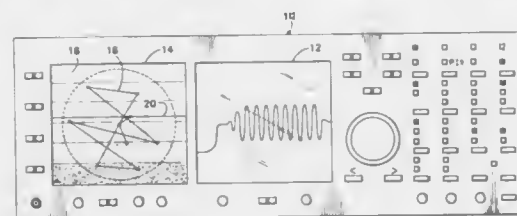
Matthew A. Ivey, Portland, and Davorin Fundak, Aloha, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 12, 1989, Ser. No. 364,752

Int. Cl.<sup>5</sup> H04N 17/02

U.S. Cl. 358—139

9 Claims



1. An improved measurement instrument for displaying a measurement signal representing an attribute of an input video signal, the instrument being of the type having means for deriving timing signals from the input video signal, means for horizontally and vertically driving a display device, and means for controlling the intensity of an image on the display device, wherein the improvement comprises:

- means for generating a vertical sweep signal from the input video signal; and
- means for switching between the vertical sweep signal and the input video signal as an input to the vertically driving

4,953,019

## IMAGE SIGNAL ENCODING APPARATUS

Akihiro Skikakura, Atrugi; Yasuyuki Tanaka, Tokyo; Makoto Shimokoriyama, Kawasaki; Yoshiaki Ishii; Tetsuya Shimizu, both of Yokohama; Shinichi Yamashita, Atrugi, and Akio Fujii, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 275,503, Nov. 23, 1988, abandoned.

This application Nov. 22, 1989, Ser. No. 440,490

Claims priority, application Japan, Nov. 27, 1987, 62-297403; Nov. 27, 1987, 62-297406; Nov. 27, 1987, 62-297408; Nov. 28, 1987, 62-297407

Int. Cl.<sup>5</sup> H04N 7/12

U.S. Cl. 358—133

16 Claims



4,953,018

## TELEVISION TRANSMISSION SYSTEM USING TRANSMISSION OF BASIC PICTURE WEIGHTING FACTORS

Jean B. O. S. Martens, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,548

Claims priority, application Netherlands, May 3, 1988, 8801154

Int. Cl.<sup>5</sup> H04N 7/133

U.S. Cl. 358—133

10 Claims



1. A television transmission system for transmitting a picture represented by a digital picture signal from an encoding station to a decoding station, the encoding station being adapted to partition the picture into sub-pictures of  $N_1 \times N_2$  pixels each for performing a forward transform for generating basic picture weighting factors, the decoding station being adapted to perform an inverse transform for generating a local sub-picture consisting of  $N_1 \times N_2$  pixels, characterized in that for the forward transform

- each sub-picture is multiplied by a reference picture having different values for different pixels, so that each time a product sub-picture is obtained;
- each product sub-picture is multiplied by a number of kernel pictures for generating a number of blocks of product element values corresponding to the number of kernel pictures, each kernel picture being equal to the product of the reference picture and a basic picture from a collection of basic pictures each being formed by an orthogonal polynomial associated with the square value of the reference picture;
- all product element values of a block are added together for generating a weighting factor;
- each weighting factor is multiplied by a kernel picture for generating a number of auxiliary sub-pictures;
- the auxiliary sub-pictures thus obtained are added together.

4,953,020

## TELEVISION TRANSMISSION SYSTEM WITH DIFFERENTIAL ENCODING OF TRANSFORM COEFFICIENTS

Peter H. N. De With, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,551

Claims priority, application Netherlands, May 9, 1988, 8801207

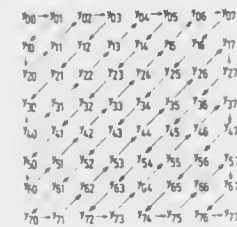
Int. Cl.<sup>5</sup> H04N 7/133

U.S. Cl. 358—133

5 Claims

1. A television transmission system for transmitting a picture represented by a digital picture signal from an encoding station to a decoding station, the encoding station comprising means to divide the picture into sub-pictures of  $N \times N$  picture elements each, a picture transform circuit for performing a two-dimensional forward transform on each sub-picture to be converted into a coefficient array of  $N \times N$  coefficients comprising one DC coefficient and  $(N \times N) - 1$  AC coefficients, means to arrange the coefficients of a coefficient array for generating a coefficient series within which the magnitude variation of the

AC coefficients is monotonous, the decoding station comprising means to compose a local coefficient array comprising  $N \times N$  local coefficients from each received series of coefficients and a coefficient transform circuit for performing a two-dimensional inverse transform on the local coefficient array for generating a local sub-picture comprising  $N \times N$  local picture elements, characterized in that the encoding station also comprises a differential encoding circuit which receives the AC



coefficients of the series arranged monotonously in magnitude, subjects them to a differential encoding for converting the AC coefficients into difference coefficients to be transmitted to the decoding station which in its turn also comprises a differential decoding circuit which receives the transmitted difference coefficients of a series and converts them into local AC coefficients which correspond to the original AC coefficients of the coefficient array, and means to apply the local AC coefficients thus obtained to the composition means.

#### 4,953,021 DEMOMULATOR CIRCUIT FOR TELEVISION MULTI-CHANNEL

Tsutomu Ishikawa; Akira Kabashima, both of Ota, and Hideo Imaizumi, Gunma, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Continuation of Ser. No. 181,477, Apr. 14, 1988, abandoned.

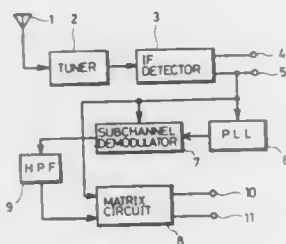
This application Feb. 1, 1990, Ser. No. 472,459

Claims priority, application Japan, Apr. 17, 1987, 62-95578; Apr. 20, 1987, 62-59436[U]; May 20, 1987, 62-123330

Int. Cl.<sup>5</sup> H04N 7/04

U.S. Cl. 358—144

27 Claims



1. A television multi-channel sound signal demodulator circuit comprising:

receiving means for receiving a video signal and a multi-channel sound signal, said multi-channel sound signal comprising at least a main channel signal, an amplitude-modulated sub-channel signal and a stereo pilot signal which are frequency multiplexed;

detecting means for detecting said video signal and multi-channel sound signal which are received by said receiving means;

sub-channel signal demodulating means for demodulating only said amplitude-modulated sub-channel signal of the multi-channel sound signal detected by said detecting means and for outputting a demodulated subchannel signal;

matrixing means for matrixing said main channel signal of the multi-channel sound signal detected by said detecting

means and said demodulated sub-channel signal from said sub-channel signal demodulating means; and noise component removing means for removing a noise component in only said demodulated sub-channel signal, said noise component removing means being a high-pass filter.

4,953,022

#### TELETEXT DECODERS

Richard E. F. Bugg, Coulsdon, England, assignor to U.S. Philips Corporation, New York, N.Y.

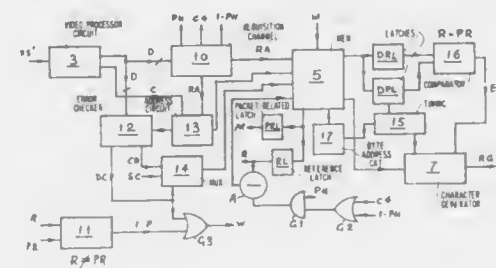
Filed May 23, 1989, Ser. No. 356,026

Claims priority, application United Kingdom, May 27, 1988, 8812592; May 5, 1989, 8910336

Int. Cl.<sup>5</sup> H04N 5/087, 5/04

U.S. Cl. 358—147

13 Claims



1. A teletext decoder for teletext information comprising a plurality of different pages each of which is identified by a respective page number and each of which includes a plurality of data packets each having a respective address; said teletext decoder comprising:

(a) means for selecting a page by its page number,

(b) means for detecting a selected page number when received,

(c) at least one page memory for storing received data packets of a selected page in a respective page memory portion which is identified by the data packet address, the page memory being a write/read random access memory which data packets can be written into at the respective memory portions to over-write, and thereby replace, any data packets currently stored therein, and

(d) control means for permitting utilisation of only the stored data packets of the selected page, said control means comprising:

(i) means for allocating a reference flag number to the selected page on detection of the selected page,

(ii) means for allocating that reference flag number as a packet related flag number to each data packet which is received for the selected page,

(iii) means for inhibiting utilisation of any data packet stored in the page memory whose packet related flag number is not the same as the reference flag number, and

(iv) means for changing the reference flag number for each successively selected page.

4,953,023

#### A CODING APPARATUS FOR ENCODING AND COMPRESSING VIDEO DATA

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 15, 1989, Ser. No. 407,753

Claims priority, application Japan, Sep. 29, 1988, 63-245228; Sep. 29, 1988, 63-245229; Sep. 29, 1988, 63-245230

Int. Cl.<sup>5</sup> H04H 7/12

U.S. Cl. 358—135

5 Claims

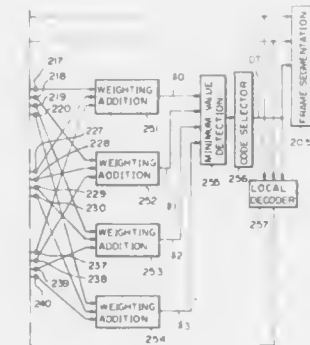
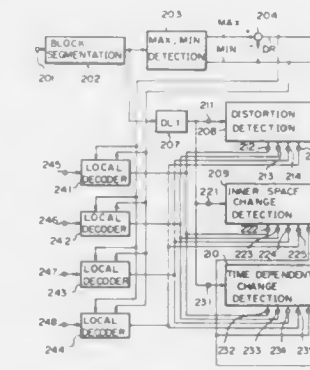
1. A highly efficient coding apparatus for encoding original digital video data having  $n$  bits for each picture element into

compressed video data having a number of bits less than  $n$  for each picture element, comprising:

first detecting means for detecting a first difference between an original digital value of a first picture element to be encoded and an original digital value of a spatially adjacent picture element of said first picture element;

first local decoding means for decoding encoded video data of said spatially adjacent picture element to generate a first decoded value; and

generating means for generating compressed encoded video data of said first picture element so that a difference between a decoded value of said compressed encoded video



data and said first decoded value is closest to said first difference, said generating means including second local decoding means for decoding all compressed encoded data and for generating respective decoded values, first subtracting means for subtracting said first decoded value from each of said respective decoded values to generate first subtracted values, second subtracting means for subtracting each of said first subtracted values from said first difference to generate second subtracted values, minimum detecting means supplied with said second subtracted values for detecting a minimum value thereof and code selecting means for selecting compressed code data corresponding to the detected minimum value.

4,953,024

#### A PREDICTIVE PICTURE ENCODING CIRCUIT WHICH SELECTIVELY SUPPRESSES AND REPLACES PREDICTION ERROR VALUES, AND A CORRESPONDING PREDICTIVE DECODING CIRCUIT

Gaetano Caronna, Geldrop, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

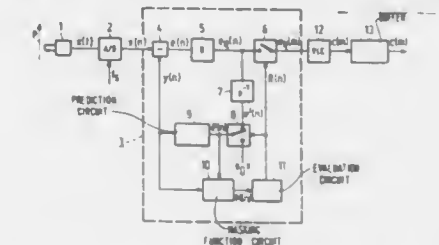
Filed May 3, 1989, Ser. No. 347,314

Claims priority, application Netherlands, Dec. 23, 1988, 880152

Int. Cl.<sup>5</sup> H04N 7/12

U.S. Cl. 358—136

12 Claims



1. A predictive encoding circuit for pixel values of pixels jointly defining a picture, comprising:

(a) an encoding circuit input for receiving pixel values and an encoding circuit output;

(b) difference producer means receiving the pixel value of an actual pixel via a first input and an associated prediction value via a second input, and supplying a prediction error for said actual pixel at its output by difference production of the two values applied thereto;

(c) a prediction circuit having an input and an output and supplying said prediction values at said output;

(d) a first coupling circuit for coupling the output of the difference producer means to the encoding circuit output;

(e) a second coupling circuit for coupling the output of the difference producer means to the input of the prediction circuit; characterized in that:

(f) the first coupling circuit comprises means which are controlled by control signal values for selectively suppressing prediction errors;

(g) the second coupling circuit comprises means for selectively replacing the prediction errors suppressed in the first coupling circuit with replacement prediction errors having a predetermined value and for providing said prediction errors and said replacement prediction errors as output prediction errors;

(h) a masking function circuit is provided for determining the masking function value for the actual pixel, which value is equal to the weighted sum of differences between two pixel values of a predetermined cluster of pixels located in the vicinity of the actual pixel;

(i) an evaluation circuit is provided which receives the masking function values and, in response thereto, determines the control signal value for the actual pixel.

4,953,025

#### APPARATUS FOR DEFINING AN EFFECTIVE PICTURE AREA OF A HIGH DEFINITION VIDEO SIGNAL WHEN DISPLAYED ON A SCREEN WITH A DIFFERENT ASPECT RATIO

Mitsumasa Saitoh, Kanagawa; Seichi Ogawa, Tokyo; Miyuki Yamane, Tokyo, and Hideki Fukasawa, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 17, 1989, Ser. No. 352,931

Claims priority, application Japan, May 20, 1988, 63-121696

Int. Cl.<sup>5</sup> H04N 7/01

U.S. Cl. 358—140

8 Claims

1. An apparatus for converting video signals of a first format, which has a first number of horizontal scanning lines in a field and a picture display of a first aspect ratio, to video signals of



1. A motion signal generating circuit in which motion information contained in a television signal is detected to provide a motion signal, comprising:

- (a) an input terminal for receiving a digitized television signal;
- (b) a motion information detecting circuit connected to said

input terminal and including a frame memory for delaying said digitized television signal one frame period and providing the so-delayed television signal at the output terminal of said frame memory, and a subtraction circuit connected to said input terminal and said field memory to provide as a motion information signal a difference signal representing the difference between said digitized television signal supplied to said input terminal and said delayed television signal;

- (c) a noise eliminator circuit including a first one horizontal sweep period memory for receiving said motion information signal from said motion information detecting circuit and delaying said motion information signal one horizontal sweep period, and a selection circuit for comparing data of said motion information signal with data of said delayed motion information signal and selecting and outputting the signal whose data has a smaller value; and
- (d) a temporal-spatial signal processing circuit connected to said noise eliminator to process the output signal from said selection circuit both in terms of time and space, providing a motion signal.

4,953,033

# IMAGE FORMING APPARATUS FOR FORMING IMAGES BY USE OF FONTS

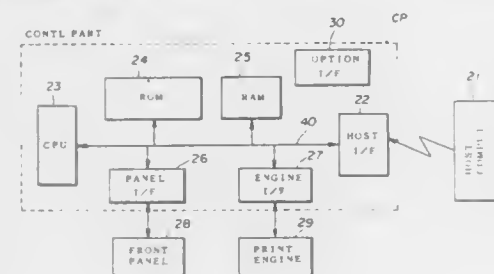
Yumi Sakamoto, Ebina, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 204,049

Claims priority, application Japan, Jun. 19, 1987, 62-151289  
Int. Cl.<sup>5</sup> H04N 1/29; G01D 15/14

U.S. Cl. 358—300

9 Claims



1. An image forming apparatus for forming an image of an input image information by use of a font, said image forming apparatus comprising:

memory means for storing data on bit map fonts and outline fonts;

setting means for setting a minimum size of an outline font which may be used;

first selecting means for selecting a desired kind of font;

second selecting means for selecting a size of the desired kind of font selected by said first selecting means;

image forming means for forming the image of the input image information by use of the desired kind and size of font selected by said first and second selecting means based on corresponding data read out from said memory means; and

converting means for converting data on an outline font into a format of a bit map font,

said memory means comprising first memory means for storing the data on the bit map fonts and the outline fonts and second memory means for storing a converted data obtained from said converting means,

said image forming means making access to said second memory means when said first selecting means selects an outline font.

4,953,034

# SIGNAL REGENERATION PROCESSOR WITH FUNCTION OF DROPOUT CORRECTION

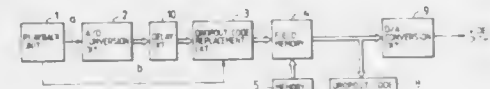
Masao Kanda, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,832

Claims priority, application Japan, Jan. 21, 1988, 63-11511  
Int. Cl.<sup>5</sup> H04N 5/94

U.S. Cl. 358—336

8 Claims



1. A signal regeneration processor for carrying out signal processing for a signal by converting a sample value obtained by sampling after reading a video signal recorded in a recording medium, into a digital data to write it in a memory, and by reading the data written in the memory by means of a prescribed reference signal, comprising:

dropout detection means for generating a dropout detection signal when there occurs a dropout at the time of reading the video signal from said recording medium;

delay means for delaying the digital data to be written in said memory by a prescribed length of time; and

code replacement means for replacing only a prescribed number of low-order bits in an output data of said delay means by a prescribed code in response to the dropout detection signal generated by said dropout detection means,

whereby dropout correction is carried out in accordance with said prescribed code in the data read from said memory.

4,953,035

# METHOD OF RECORDING AND REPRODUCING PICTURE INFORMATION, RECORDING MEDIUM, AND RECORDING MEDIUM PLAYING APPARATUS

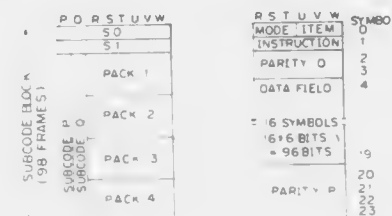
Junichi Yoshio, Tokorozawa, Japan, assignor to Pioneer Electronics Corporation, Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,387

Claims priority, application Japan, Mar. 22, 1988, 63-67598  
Int. Cl.<sup>5</sup> H04N 5/76

U.S. Cl. 358—335

5 Claims



1. A method of recording and reproducing picture information on a recording medium, comprising the steps of:
- recording, in addition to a coded information signal, graphic codes including picture information on said recording medium by inserting said graphic codes in a subcode of said coded information signal, and recording on said recording medium identification information indicating positions of said recording medium in which predetermined sections of said subcode are recorded;
- searching, at a time of playback of said recording medium, said positions in response to a picture information displaying command by using said identification information; and
- generating a picture signal corresponding to said graphic

codes as the subcode obtained by reading information recorded in said positions.

4,953,036

# DIGITAL COPIER HAVING SWITCHABLE PIXEL DENSITIES

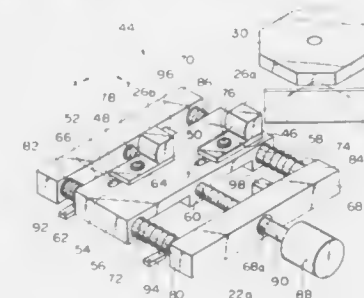
Tsuyoshi Yoshimura, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,008

Claims priority, application Japan, Mar. 25, 1988, 63-71011  
Int. Cl.<sup>5</sup> H04N 1/00

U.S. Cl. 358—400

5 Claims



1. A digital copier capable of printing out image data which are outputted by another machine connected to said copier, comprising:

a reading section for optically reading a document to be copied and outputting the read document in the form of first image data;

an inputting section for receiving and outputting second image data which are fed from said another machine;

a writing section for writing a series of images of one of said first and said second image data, said writing section comprising a light source, illuminating optics for causing light to substantially converge on an optical axis of said light source, a rotatable polygonal mirror located downstream of an optical path of said illuminating optics, reflecting optics for converging in the form of a beam spot the light which is reflected by said polygonal mirror for scanning, and an imaging surface on which said light spot is scanned relative to said imaging surface and focused in the form of a pixel; and

switching means installed in said writing section, responsive to one of said first and second image data, for switching a pixel density for a series of images to one of a plurality of pixel densities selected so that said selected reading section first image data and said inputting section second image data, wherein said illuminating optics comprises a plurality of lenses each having a different focal length, said switching means being constructed to select one of said lenses, and wherein said switching means comprises holder means loaded with at least two of said lenses which are individually positioned on independent optical axes which extend along said optical axis of said illuminating optics, said lenses being individually adjustable in position on said holder means, holder driving means for driving said holder means in a direction perpendicular to said optical axis, and positioning means for selectively stopping said holder means at a predetermined position where an optical axis of one of said two lenses coincides with said optical axis of said illuminating optics and a predetermined position where an optical axis of the other lens coincides with said optical axis.

4,953,037

# ORIGINAL READING APPARATUS

Yoshio Ito; Makoto Takemura, both of Tokyo; Junichi Seta, and Shinichi Otsuki, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

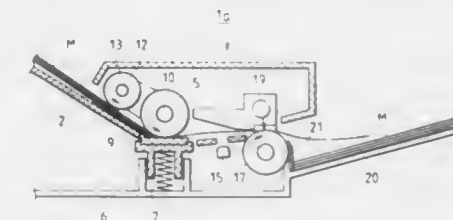
Continuation of Ser. No. 305,114, Feb. 2, 1989, abandoned. This application Dec. 22, 1989, Ser. No. 453,113

Claims priority, application Japan, Feb. 5, 1988, 63-024952; Mar. 30, 1988, 63-077534; Apr. 6, 1988, 63-084257

Int. Cl.<sup>5</sup> H04N 1/12

U.S. Cl. 358—496

15 Claims



1. An original reading apparatus comprising:
- first transport means for transporting an original document;
- second transport means for transporting the original document, transported by said first transport means, to original reading means, said second transport means being composed of a rotary member adapted for transporting the original document by rotation in contact with a glass member of the reading means;
- original detecting means positioned between said first and second transport means; and
- drive means for starting the rotation of said second transport means after the lapse of a predetermined period from the detection of the front end of the original document by said original detecting means, required for said front end to reach the position of said contact.

4,953,038

# SYSTEM INCLUDING A CCD IMAGER DEVICE FOR READING A STORAGE PHOSPHOR RECORD CARRIER

Ulrich Schiebel, and Walter Hillen, both of Aachen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

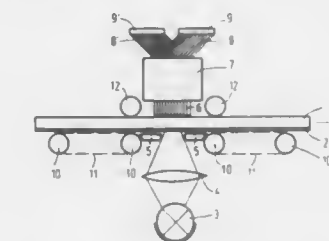
Filed Aug. 25, 1988, Ser. No. 236,575

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1987, 3728750

Int. Cl.<sup>5</sup> H04M 1/024

U.S. Cl. 358—471

9 Claims



1. An imaging device for reading a storage phosphor record carrier having opposing sides, said device comprising a light source which is arranged at one side of the record carrier for optical stimulation of the storage phosphor, a photodetector device which is arranged at the other opposing side of the record carrier for conversion into an electric signal of fluorescent light generated by stimulation of the phosphor, and a drive device for realizing a relative displacement between the record carrier and (1) the light source on one side of the carrier and (2) the photodetector device on the other side of the car-



1. In a tape drive having a take-up and a tape threading arm that transports a leader block, that is connected to magnetic tape on a magnetic tape file reel inserted into said tape drive, along a tape threading path to said take-up reel, apparatus for regulating the threading and unthreading of said magnetic tape on said tape drive comprising:

means for designating a plurality of concatenated segments, which concatenated segments represent said tape threading path;

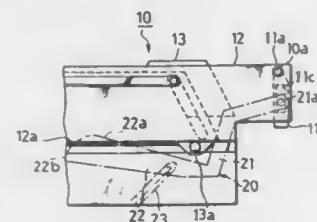
means for storing data indicative of the desired velocity of said magnetic tape along each of said plurality of concatenated segments of said tape threading path;  
 means for measuring the actual velocity of said magnetic tape along each of said concatenated segments of said tape threading path;  
 means for comparing said measured velocity of said magnetic tape with said stored data indicative of the desired velocity of said magnetic tape for each of said concatenated segments; and  
 means for adjusting the actual velocity of said magnetic tape to equal said desired velocity for each of concatenated segments.

**4,953,045**  
**CASSETTE TAPE PLAYER WITH DOOR OPERATING MECHANISM**  
 Haruo Taga, Iwaki, Japan, assignor to Alpine Electronics Inc., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 239,102  
 Claims priority, application Japan, Dec. 25, 1987, 62-196776[U]

Int. Cl.<sup>5</sup> G11B 15/00  
 U.S. Cl. 360—96.5

4 Claims



1. A cassette tape player, comprising:  
 a case defining an opening for inserting a tape cassette;  
 a door for closing said opening, the door having a groove formed in an edge thereof and being pivoted in a direction for opening the door by insertion of a tape cassette in the opening;  
 a cassette moving section for moving an inserted tape cassette to a predetermined position inside said opening, and including an abutting member movable with said cassette moving section;  
 a lever for opening and closing said door, including an arm portion having a pin engaged with said groove, and a pivoting portion for supporting said arm portion and for pivoting upon the arm portion; and  
 wherein said abutting member moves in a straight line in a direction for inserting and ejecting a tape cassette, said abutting member engages said pivoting portion so that said pivoting portion prevents the straight line movement only when said door is closing; and  
 wherein when a tape cassette is ejected from the predetermined position, said pivoting portion is pushed by said abutting member and said arm portion is simultaneously pivoted in a direction for opening the door.

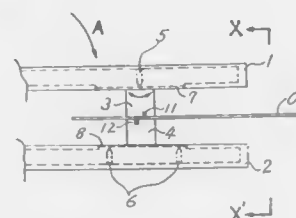
**4,953,046**  
**DEVICE FOR SUPPORTING MAGNETIC HEADS FOR DOUBLE SIDED DISCS**  
 Katsuhiko Taguchi, Chofu, Japan, assignor to Juki Corporation, Chofu, Japan

Continuation of Ser. No. 856,757, Apr. 28, 1986, abandoned.  
 This application Sep. 19, 1989, Ser. No. 409,983

Claims priority, application Japan, Apr. 27, 1985, 60-63996[U]

Int. Cl.<sup>5</sup> G11B 5/48, 21/16  
 U.S. Cl. 360—104

2 Claims



1. A magnetic head supporting system for supporting magnetic heads for double-sided magnetic discs, comprising:  
 a first magnetic head for operative engagement with one side of said double-sided magnetic disc;  
 a first gimbal plate having a first surface upon which said first magnetic head is fixedly secured;  
 first pivot means, comprising a pair of linearly spaced discrete pivots operatively contacting a second surface of said first gimbal plate, for defining a first pivot plane about which said first magnetic head can pivot;  
 a second magnetic head for operative engagement with the other side of said double-sided magnetic disc;  
 a second gimbal plate having a first surface upon which said second magnetic head is fixedly secured; and  
 second pivot means, comprising a pair of linearly spaced discrete pivots operatively contacting a second surface of said second gimbal plate, for defining a second pivot plane, which is disposed substantially perpendicular with respect to said first pivot plane, about which said second magnetic head can pivot;  
 each of said first and second gimbal plates having a substantially square configuration and being provided with a radially inner pair of substantially U-shaped slits and a radially outer pair of substantially U-shaped slits for imparting flexibility to said each of said first and second gimbal plates; and wherein  
 said radially inner and radially outer pairs of U-shaped slits defined within said first gimbal plate are disposed 90° out-of-phase with respect to said radially inner and radially outer pairs of U-shaped slits defined within said second gimbal plate so as to impart flexibility within each of said first and second gimbal plates, relative to each other, in two mutually orthogonal directions.

**4,953,047**  
**MAGNETIC HEAD SANDWICH ASSEMBLY HAVING REDUCED THICKNESS**  
 Akiyoshi Toyama, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Continuation of Ser. No. 564,274, Dec. 22, 1983, abandoned.  
 This application Oct. 6, 1986, Ser. No. 915,926

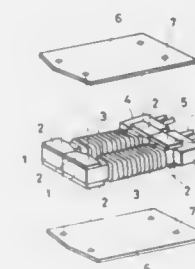
Claims priority, application Japan, Dec. 23, 1982, 57-225018  
 Int. Cl.<sup>5</sup> G11B 5/127

U.S. Cl. 360—110

4 Claims

1. A dimensionally compact magnetic head assembly of reduced thickness, comprising:  
 (a) a pair of C-shaped magnetic cores (1) each having a central body portion and outwardly extending arms at opposite ends thereof to define C-shaped upper and lower

- planar surfaces, said cores being of equal thickness and being disposed facing each other with outer ends of two of said arms lying in close and direct proximity to one another to define a single gap therebetween;
- four pairs of intermediate, planar, non-magnetic, solderable metal plates (2) of equal thickness individually thermally bonded to opposite upper and lower surfaces of each of said core arms;
- a pair of insulated wire coils (3) individually wound around the central body portions of the cores intermediate the arms and bonded metal plates, and



- a pair of planar, non-magnetic, solderable metal connecting plates (6) of equal thickness and configuration respectively overlying and underlying the facingly disposed cores and intermediate plates and soldered to said intermediate plates to define therewith a compact and tightly sandwiched construction of reduced thickness, the intermediate plates being thermally bonded to the core arms prior to the winding of the coils to avoid any thermal deterioration of the coil wire insulation, and wherein the intermediate plates are at least as thick as the coils to provide sufficient coil winding space and to enable the overlaying and underlaying of the planar connecting plates.

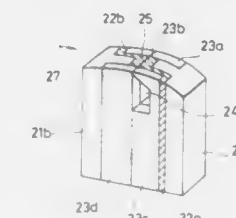
**4,953,048**  
**MAGNETIC HEAD WITH SPECIFIC GAP STRUCTURE**  
 Makoto Kameyama, Urayasu; Kiyozumi Niizuma, Ohmiya; Kenichi Nagasawa, Kawasaki; Takashi Suzuki, Yokohama; Toshio Yamanaka, Kawasaki; Tsuyoshi Orikasa, Kasukabe; Fujihito Ito, Tsurugashima, and Kazuyo Yoshida, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 917,152, Oct. 9, 1986, abandoned. This application May 17, 1989, Ser. No. 353,234

Claims priority, application Japan, Oct. 9, 1985, 60-226568; Dec. 3, 1985, 59-272824; Sep. 13, 1986, 61-216150

Int. Cl.<sup>5</sup> G11B 5/187  
 U.S. Cl. 360—119

20 Claims



1. A magnetic head comprising:  
 a pair of magnetic blocks, each being made of a first magnetic material;  
 a pair of magnetic films, one deposited on each of said magnetic blocks of said pair, each magnetic film being made of a second magnetic material having a high saturation mag-

netic flux density and a low magnetic permeability compared with said first magnetic material;  
 said pair of magnetic films including a magnetic gap arranged therebetween; and  
 a pair of nonmagnetic members, each one of said pair of nonmagnetic members abuts an end of said magnetic gap in a surface of said head, along which a medium slides; each of said pair of magnetic blocks having a given width generally parallel to the magnetic gap;  
 each of said pair of magnetic films extending across only a portion of the width of a respective one of said pair of magnetic blocks;  
 wherein each of said pair of magnetic films includes a first elongated portion extending between a respective one of said nonmagnetic members and the respective one of said pair of magnetic blocks and a second portion being disposed along said magnetic gap, said first elongated portion of each of said pair of magnetic films extending, in the surface of the head, substantially parallel to a sliding direction of the medium.

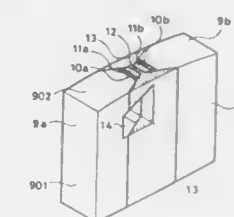
19. A magnetic head comprising:  
 a pair of magnetic blocks, each being made of a magnetic material;  
 a pair of magnetic films, one deposited on each of said magnetic blocks of said pair, each magnetic film being made of a second magnetic material having a high saturation magnetic flux density and a low magnetic permeability compared with said first magnetic material;  
 said pair of magnetic films including a magnetic gap arranged therebetween; and  
 a pair of nonmagnetic members, each one of said pair of nonmagnetic members cuts an end of said magnetic gap in a surface of said head, along which a medium slides; each of said pair of magnetic blocks having a given width generally parallel to the magnetic gap;  
 at least one of said pair of magnetic films extending across only a portion of the width of a respective one of said pair of magnetic blocks;  
 wherein said at least one of said pair of magnetic films includes a first elongated portion extending between a respective one of said nonmagnetic members and the respective one of said pair of magnetic blocks and a second portion being disposed along said magnetic gap, said first elongated portion of said at least one of said pair of magnetic films extending, on the surface of the head, substantially parallel to a sliding direction of the medium.

**4,953,049**  
**METAL-IN-GAP HEAD WITH HEAT RESISTANT LAYERS**  
 Hiroyuki Okuda, Daitoh; Yoshiaki Shimizu, Minoh; Kazuo Ito, Matsubara; Kousou Ishihara, and Takashi Ogura, both of Daitoh, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Jul. 12, 1988, Ser. No. 218,018  
 Claims priority, application Japan, Jul. 14, 1987, 62-175157; Aug. 4, 1987, 62-194893

Int. Cl.<sup>5</sup> G11B 5/147, 5/235  
 U.S. Cl. 360—126

10 Claims



1. A magnetic head having a magnetic gap between a pair of



magnetic core halves opposed to each other through a non-magnetic material, said magnetic head comprising:  
said pair of magnetic core halves made of a ferromagnetic oxide and having gap forming faces to be opposed to each other to form said magnetic gap;  
said gap forming faces being purified at least by etching;  
heat-resistant thin films made of a heat-resistant material provided on said gap forming faces; and  
ferromagnetic thin films made of a ferromagnetic metal material provided on said heat-resistant thin films.

4,953,050

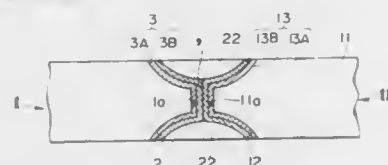
# MAGNETIC HEAD WITH RU CONTAINING SOFT MAGNETIC ALLOY IN GAP

Tatsuo Kumura; Heikichi Sato, both of Miyagi; Yoshiyuki Kanito, Mayagi; Yoshito Ikeda; Etsuo Izu, both of Miyagi, and Masatoshi Hayakawa, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan  
Filed Jan. 10, 1990, this application is a Continuation of Ser. No. 151,860, filed Feb. 3, 1988, now abandoned. Ser. No. 464,678

Claims priority, application Japan, Feb. 4, 1987, 023992  
Int. Cl.<sup>5</sup> G11B 5/147, 5/235

U.S. Cl. 360—126

2 Claims



1. A magnetic head in which a pair of magnetic core halves are abutted to each other, at least one of said core halves being formed by an oxide magnetic core portion and a soft magnetic alloy thin film portion provided on said oxide magnetic core portion, said soft magnetic alloy thin film portion being formed of a first film portion formed of an Fe-Ga-Si system alloy containing a certain amount of Ru, and provided adjacent to said oxide magnetic core portion, and a second film portion formed of a soft magnetic alloy having different composition from said first film portion and facing to another magnetic core half to define a magnetic gap therebetween, the boundary surface between the Fe-Ga-Si system soft magnetic thin film and said oxide magnetic core portion being substantially parallel to a gap surface in the vicinity of the magnetic gap.

4,953,051

# COMPOSITE MAGNETIC HEAD

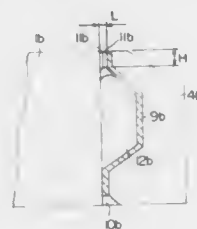
Toshiaki Wada; Masateru Nose; Junichi Nakaoka, and Akio Murata, all of Mishima, Japan, assignors to Sumitomo Special Metal Co. Ltd., Japan

Filed Sep. 22, 1988, Ser. No. 247,518

Claims priority, application Japan, Sep. 24, 1987, 62-240239  
Int. Cl.<sup>5</sup> G11B 5/147

U.S. Cl. 360—126

11 Claims



1. A composite magnetic head which comprises a slider part and a core part, one of said slider part and said core part being made of an oxide magnetic material and the other of said slider part and said core part being made of a non-magnetic ceramic,

said slider part and said core part being shaped to provide a coil groove therebetween for an electromagnetic transducer coil and also providing respective facing surfaces; a shaped layer of a soft magnetic material located on a portion of the facing surface of the part made of non-magnetic ceramic; a glass member located between said facing surfaces for joining said slider part to said core part; a gap-forming medium located between said shaped layer of soft magnetic material and the facing surface of the part made of oxide magnetic material; and an electromagnetic transducer coil wound around said core part and through said coil groove.

4,953,052

# POLE SLIP PROTECTION CIRCUIT FOR PARALLELED GENERATORS

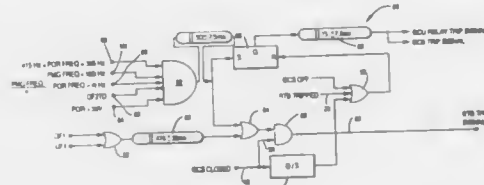
Norman Cartledge; Luiz Andrade, both of Rockford, and James Thom, Freeport, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 19, 1989, Ser. No. 381,855

Int. Cl.<sup>5</sup> H02H 7/06

U.S. Cl. 361—20

21 Claims



1. A protection system for a first generator unit connectable by a first switch to a power generating system having at least one additional generator unit with the at least one additional generator unit being connectable in parallel to the first generator unit with the first switch being opened in response to a first control signal to enable the first generator unit to be disconnected from the parallel connection to the at least one additional generator unit comprising:

- a signal generator for generating a reference signal having a frequency proportional to a frequency of voltage generated by the first generator unit;
- a sensor for sensing a common frequency at a point of reference of voltage generated by the generator units of the power generating system; and
- a controller, responsive to the signal generator and the sensor, for calculating a difference between the frequency of the reference signal and the common frequency and for generating the first control signal in response to the difference being greater than a threshold.

4,953,053

# METHOD AND APPARATUS FOR DETECTING MECHANICAL OVERLOAD OF A HOIST

Richard L. Pratt, Springfield, Ohio, assignor to Harnischfeger Corporation, Brookfield, Wis. and Yaskawa Electric Mfg. Co. Ltd., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,757

Int. Cl.<sup>5</sup> H02H 7/08

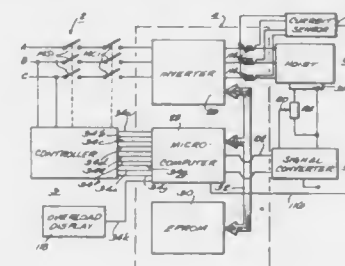
U.S. Cl. 361—31

12 Claims

1. In a method of controlling a hoist for raising and lowering an object, the hoist being loaded by the weight of the object and its raising or lowering, the hoist including and alternating current motor and an adjustable frequency power supply connected to and providing current to the motor, the steps comprising:

- determining the value of the current level of the power

supplied to the motor indicative of a predetermined mechanical overload condition of the hoist;  
providing a reference signal representative of said determined current level and thereby representative of the mechanical overload condition;



sensing the actual current level of the power supplied to the motor and producing an actual current signal representative of said actual current level; and  
comparing the actual current signal with the reference signal and providing an overload output signal if the actual current signal equals or exceeds the reference signal.

4,953,054

# CIRCUIT FOR PROTECTION AGAINST FAULT CURRENTS

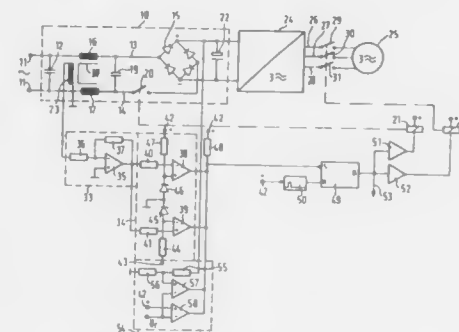
Gerhard Fetzter, Muhlhalderstr. 25, and Axel Behrens, Uhlendstrasse 44, both of 7306 Denkendorf, Fed. Rep. of Germany  
Filed Jun. 16, 1988, Ser. No. 207,733

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1987, 3720312

Int. Cl.<sup>5</sup> H02H 3/08

U.S. Cl. 361—45

11 Claims



1. A circuit arrangement for protection against fault currents in connection with a D.C. power supply having an energy storing means, comprising: first and second substantially identical detector windings positioned on two power supply leads connected with the power supply; a circuit breaker device; a differential current detector winding coupled with said first and second detector windings such that when a current induced in said differential current detector winding exceeds a set value said circuit breaker device is triggered, said circuit breaker device having switching paths adapted to interrupt all supply leads between the power supply and a load connected therewith; a threshold value circuit arranged to be supplied with voltage induced in said differential current detector winding; fault memory means arranged to be changed over between a first condition and a second condition by an output signal of said threshold value circuit, said output signal arriving at said fault memory via a switching input, said fault memory having a second condition for operation of said circuit breaker device, said threshold value circuit including a threshold switch means

for reacting to positive and negative threshold values associated with the two possible fault current directions.

4,953,055

# SYSTEM AND A PROTECTION AND REMOTE POWER-FEEDING DEVICE FOR EQUIPMENT CONNECTED BY TWO TRANSFORMERS TO A FOUR-WIRE TRANSMISSION LINK

Gérard Douhet, Strasbourg, and Yves Daviaud, Fegersheim, both of France, assignors to Societe Anonyme dite : Telic Alcatel, Paris, France

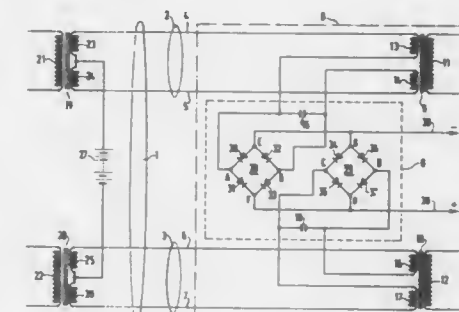
Filed Sep. 9, 1988, Ser. No. 242,453

Claims priority, application France, Sep. 9, 1987, 87 12511

Int. Cl.<sup>5</sup> H02H 1/00

U.S. Cl. 361—62

3 Claims



1. A remote power-feeding and protection system for equipment connected by first and second transformers to a first end of a transmission link, said transmission link comprising two pairs of wires also providing the remote feeding of power to said equipment from a second end of said transmission link, each said transformer being individually connected to a respective one of said pairs of wires at said first end of said transmission link by first and second coupling means each comprising two identical windings serially connected between the two wires of a respective pair through a capacitor situated between the two windings, and each transformer being also connected by means of at least one winding to said equipment, wherein said remote power feeding and protection system comprises:

- a remote power-feeding D.C. generator having a first terminal connected to the two wires of one of the pairs at said second end of the link and a second terminal connected to the two wires of the other of said pairs at said second end of said link, and
- a remote power-feeding extractor protection device comprising first and second rectifier bridges, said first rectifier bridge having two inputs connected to the terminals of the capacitor of said first coupling means and said second rectifier bridge having two inputs connected to the terminals of the capacitor of said second coupling means, and said first and second bridge rectifiers having their output terminals connected in parallel for supplying power to said equipment.

4,953,056

# CURRENT DETECTION APPARATUS FOR USE IN ELECTROMAGNETIC ACTUATOR DRIVE CIRCUIT

Masahiko Yakuwa, and Hideto Iijima, both of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 15, 1988, Ser. No. 144,429

Int. Cl.<sup>5</sup> H01H 9/00

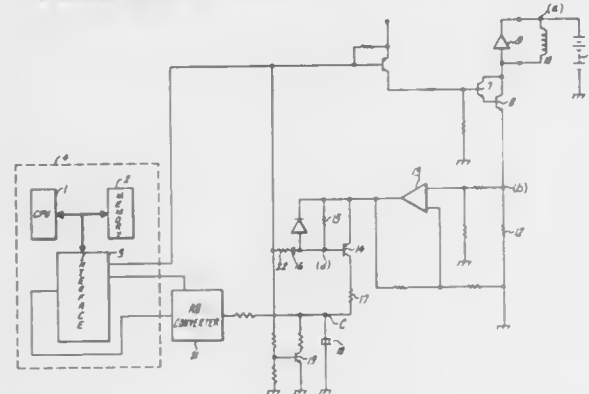
U.S. Cl. 361—154

21 Claims

1. A current detection apparatus for use in an electromagnetic actuator drive circuit, said electromagnetic actuator drive circuit including

solenoid drive means subject to switching regulation by the

presence of a pulse voltage for passing a pulsating solenoid current through a solenoid of an electromagnetic actuator, an electromagnetic valve whose opening is varied according to the solenoid current, pulse voltage generation means for generating the pulse voltage having a constant period and a duty ratio variable in accordance with a predetermined opening of the electromagnetic valve and supplying the pulse voltage to said solenoid drive means, and solenoid current detection means for detecting the pulsating solenoid current,



said current detection apparatus for use in an electromagnetic actuator drive circuit comprising: means for sampling the output of said solenoid current detection means at a predetermined time point in the period when said solenoid drive means is held in an "on" state by the presence of the pulse voltage; calculation means for calculating the average current value of the solenoid current based on the sampling value obtained by said sampling means; and feedback means for correcting the pulse voltage according to the average current value.

4,953,057

# VARIABLE CAPACITOR AND METHOD OF MAKING SAME

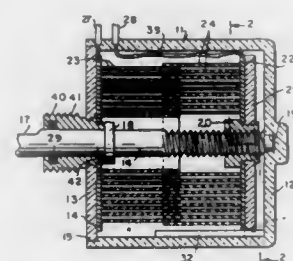
James L. Davidian, 6800 Rolling Hills Dr., Riverside, Calif. 92505

Filed Sep. 26, 1988, Ser. No. 248,609

Int. Cl.<sup>5</sup> H01G 5/02, 7/00

U.S. Cl. 361—279

6 Claims



1. A variable capacitor comprising:
  - a pair of thin flexible interleaved films, each of said films being formed of a dielectric layer and a superposed electrically conductive layer;
  - said films being coiled in a spiral about a common axis in sliding contact with each other;
  - a first conductor element electrically connected to one of said films along a side edge of said film;
  - a second conductor element electrically connected to the other film along a side edge of said other film; and

means for longitudinally adjusting one of said conductor elements relative to the other along said axis.

4,953,058

# MODULAR SEGMENT ADAPTED TO PROVIDE A PASSIVELY COOLED HOUSING FOR HEAT GENERATING ELECTRONIC MODULES

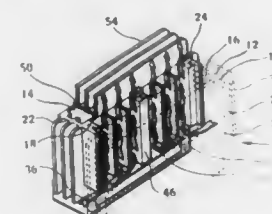
Michael P. Harris, San Diego, Calif., assignor to General Dynamics Corporation, Space Systems Div., San Diego, Calif.

Filed Sep. 1, 1989, Ser. No. 401,719

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—383

26 Claims



1. A modular segment adapted to provide a passively cooled housing for a heat generating electronic assembly and comprising:
  - a generally rectangular vertically extending hollow box beam shaped portion that provides a vertically extending hollow channel;
  - the box beam portion including three vertically extending sidewalls that form a U-shaped section that is closed by a smooth sidewall, the smooth sidewall being adapted to interconnect with a cooperating modular segment;
  - a longitudinally extending base portion that includes a longitudinally extending hollow channel that communicates with the vertical extending hollow channel of the box beam portion;
  - the base portion having a spacer section that extends longitudinally from the lower portion of the smooth sidewall a predetermined distance; and
  - two spaced vertically extending rib members extending from the sidewall of the U-shaped section that opposes the smooth sidewall, whereby the smooth sidewall may be positioned against the vertically extending ribs of another modular segment to provide a housing for an electronic assembly so that vertically extending electronic portions of the electronic assembly may extend upwardly into the vertical extending hollow channel of a box beam portion with such electronic portions being interconnected through the longitudinal extending hollow channel.

4,953,059

# SPRING LOADED MULTI-WEDGE CARD RETAINER

Christopher T. McNulty, Terryville, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 6, 1986, Ser. No. 836,935

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—386

9 Claims

1. A printed circuit board (PCB) heat sink retainer, comprising:
  - a single-open-sided tubular, rectangular channel in a PCB chassis;
  - a plurality of rectangular-tubed wedges, each tube of each wedge having a pair of opposing rectangular sides and two congruently opposing trapezoidal sides formed by nonparallel, slanted end faces which mate with and slidably engage similarly slanted end faces of adjacent wedges alternately flipped for such engagement, said wedges being aligned end-to-end within said channel with a long side of a wedge facing, and in engagement with, a channel side opposite a channel side faced by a long side of a next

adjacent wedge, said plurality of wedges including an entrance wedge fixed in position at a PCB insertion end of said channel and including a movable hollow end wedge, open at one end, at the other end of said channel; and a spring, one end of which rests against said other end of said channel, the other end of said spring being inserted within said movable hollow end wedge, and providing a preinsertion for slidably forcing the ends of said wedges against one another thereby causing oppositely directed lateral



movement of alternate wedges and thereby forcing the long sides of alternate wedges against said facing channel sides such that upon insertion of a PCB heat sink between one of said facing channel sides and one set of alternate wedges, part of the spring force will be transmitted to and exerted by said one set of alternate wedges against a fully inserted heat sink and part of the spring force will be transmitted to and exerted by the other remaining set of alternate wedges against the other facing side of said channel.

4,953,061

# HOLDER FOR PRINTED CIRCUIT BOARD COMPONENTS

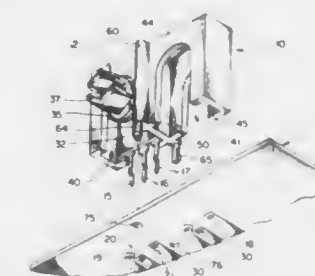
Charles Nitkiewicz, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Jul. 3, 1989, Ser. No. 375,213

Int. Cl.<sup>5</sup> H05K 7/02

U.S. Cl. 361—417

13 Claims



4,953,060

# STACKABLE INTEGRATED CIRCUIT CHIP PACKAGE WITH IMPROVED HEAT REMOVAL

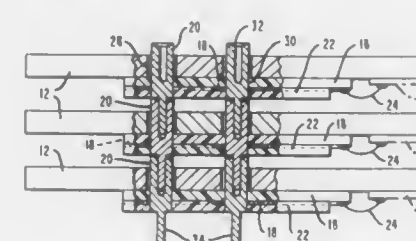
Donald K. Lauffer, San Diego; Ikuro J. Sanwo, San Marcos, and Paul M. Rostek, San Diego, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed May 5, 1989, Ser. No. 347,976

Int. Cl.<sup>5</sup> H05K 7/20

U.S. Cl. 361—388

10 Claims



1. A pin grid array package including an integrated circuit chip having input/output leads, said pin grid array package comprising:
  - carrier means having a centrally located opening carrying the integrated circuit chip;
  - a plurality of input/output pins in said carrier means and spaced around the periphery of said centrally located opening;
  - interconnect means on said carrier means connecting se-

lected ones of said input/output pins to selected leads of the integrated circuit chip; each of said plurality of input/output pins extending through said carrier means with a first portion extending away from a first side of said carrier means and a second portion extending away from a second side of said carrier means, said first portion matable with the second portion of another said pin grid array package and said second portion matable with the first portion of another said pin grid package such that the pin grid array package is stackable with at least another said pin grid array package; and heat sink means, said heat sink means in the form of a cooling-fin on one side of said carrier means having said plurality of input/output pins passing therethrough, said heat sink means extending beyond the periphery of said carrier means, and being in contact with the integrated circuit chip in said centrally located opening for dissipating heat generated by the integrated circuit chip.

4,953,062

# STROBE FLASH LAMP WITH FOCUSED FRONT BEAM AND COLLIMATED LATERAL BEAMS

Thomas R. Sikora, Mesa, Robert I. Nagel, Chandler, both of Ariz., assignor to Tomar Electronics, Inc., Gilbert, Ariz.

Continuation of Ser. No. 196,379, May 20, 1988, Pat. No. 4,870,551. This application Jun. 28, 1989, Ser. No. 373,145

Int. Cl.<sup>5</sup> F21V 5/02

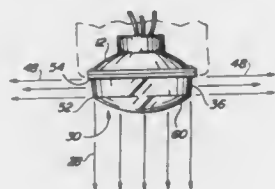
U.S. Cl. 362—263

24 Claims

1. A directional lamp with a forward travelling, enhanced intensity primary beam and at least one enhanced intensity lateral beam, comprising
  - a reflector having an apex and a focal point defining a primary axis along which reflected light is radiated by the reflector, the reflector including a perimeter surface defining a first plane oriented perpendicular to the primary



- axis, the reflector focal point being located in front of the first plane;
- b. a light source positioned in proximity to the reflector focal point and lying substantially entirely in front of the first plane for producing substantially omnidirectional light rays including laterally travelling, vertically diverging rays radiating beyond the reflector perimeter with some of the laterally travelling rays being oriented perpendicular to the primary axis, the light rays directed toward the reflector being intercepted and redirected to form a forward travelling, substantially horizontally oriented enhanced intensity primary beam including a component oriented substantially parallel to the primary axis;



- c. a front lens spaced apart from and positioned in front of the first plane and being optically coupled to the reflector and to the light source for transmitting the primary beam along the primary axis; and
- d. a lateral focussing element extending across at least a part of the space between the first plane and the front lens and laterally offset from the light source for intercepting laterally travelling, vertically diverging rays from the light source along a defined arc and for redirecting the unfocused, vertically diverging intercepted light rays into an enhanced intensity lateral beam angularly spaced apart within a horizontal plane from the primary beam, the lateral beam including a component oriented substantially parallel to a horizontal axis, whereby the lateral beam illuminates a target offset to the side of the primary beam.

4,953,063

## VEHICULAR HEADLAMP

Naohi Nino, Shizuoka, Japan, assignor to Koito Manufacturing Co., Ltd., Tokyo, Japan

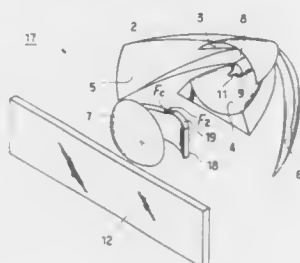
Filed Sep. 22, 1989, Ser. No. 411,287

Claims priority, application Japan, Sep. 27, 1988, 63-241591

Int. Cl.<sup>3</sup> B60Q 1/00

U.S. Cl. 362-61

20 Claims



1. A vehicular headlamp comprising:

a compound light reflector having a concave light reflecting surface which consists of upper, lower, left and right triangular parts which are radially arranged about a given portion of said reflector, said upper and lower parts having a substantially common focus and being so arranged that when light rays are emitted from the position of said common focus, the upper and lower parts reflect the light rays forward to form a horizontal focal line before the common focus, each of said left and right parts being so

shaped and arranged that when cut by a horizontal plane, it shows an elliptic line along the cut edge, and when cut by a vertical plane, it shows a parabolic line along the cut edge, said upper, lower, left and right parts being so arranged as to have their focuses positioned at generally same positions;

a light source positioned at said common focus; and

a converging lens positioned in front of said horizontal focal line and arranged in such a manner that a focus of said converging lens is positioned in the vicinity of said horizontal focal line, wherein the light rays produced by said light source and reflected by said left and right parts are forced to travel beside said converging lens to produce a hot zone in a projected beam pattern and the light rays produced by said light source and reflected by said upper and lower parts are forced to pass through said converging lens to contribute to formation of illuminated zones in the projected beam pattern which are positioned beside said hot zone.

4,953,064

## SUN VISOR FOR MOTOR VEHICLES

Lothar Vleretel, Altförweiler, Fed. Rep. of Germany, and Patrick Welter, Lachambre, France, assignors to Gebr. Happich GmbH, Fed. Rep. of Germany

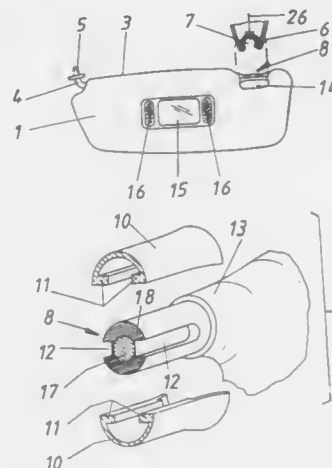
Filed Nov. 22, 1989, Ser. No. 440,243

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839965

Int. Cl.<sup>3</sup> F21V 33/00; B60J 3/00

U.S. Cl. 362-74

16 Claims



1. A sun visor body for motor vehicles, wherein the motor vehicle has on its interior above its windshield an outer support mount with a mounting recess; the visor body having:

a plurality of longitudinal edges; one of the longitudinal edges of the sun visor body having an outer support pin, a sleeve surrounding the pin and adapted to be engaged detachably into the mounting recess in the outer support mount;

the sleeve comprising two half-shells which together surrounding the pin and extend along the pin; each half shell having opposite, second, longitudinal edges, and each second longitudinal edge has a radially inwardly directed extension;

the outer support pin having axially extending grooves in its periphery shaped and placed to receive the extensions for holding the half shells to the pin.

4,953,065

## BRAKE LIGHT DEVICE MOUNTED ON TRUCK FENDER

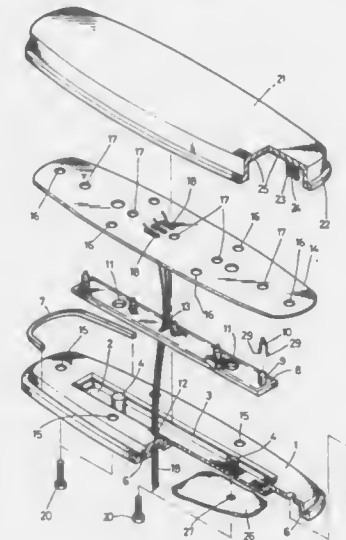
Chung C. Kao, No 2-3, Tsou Tsuoh Luen, Shooei Yuan Li, Tan-sui, Taipei, Taiwan

Filed Aug. 14, 1989, Ser. No. 393,478

Int. Cl.<sup>3</sup> B60Q 1/00

U.S. Cl. 362-83

1 Claim



1. A brake light indicator device adapted to be mounted on a truck fender, comprising:

a base (1) that includes a central wall section having a rear surface seatable against the fender, and a front surface defining a central recess (2); said base further including an annular raised wall section defining an annular rearward-facing recess surrounding the central recess; an annular ledge (3) extending along the periphery of said central recess; and at least two bosses (4) extending outwardly from the central wall section within the central recess; each boss having a blind threaded hole therein communicating with the rear surface of the central wall section, whereby the base can be detachably mounted on a truck fender by means of screws extendable through the fender into the blind holes;

a circuit board (8) having a rear edge surface seated on said ledge (3), a front surface facing outwardly away from the central surface, and a plural number of bulb-accommodating socket holes (3) extending therethrough at spaced points therealong;

a plural number of indicator bulbs seated in said socket holes, with light-emitting areas thereof located outwardly beyond the circuit board front surface; at least one of said bulbs being a vehicle location bulb, and at least one of said bulbs being a brake light bulb;

a reflector plate (14) having a central area thereof overlying the front surface of the circuit board, and a peripheral area thereof seated on the raised wall section of the base, whereby said reflector plate acts as a retainer for the circuit board;

and a hollow concave light-transmitting lens (21) overlying the reflector plate and indicator bulbs, said lens having an inner concave surface facing the reflector plate and an outer convex surface facing away from the reflector plate; said lens including a main lens wall extending generally parallel to the reflector plate, and a rim wall extending rearwardly from said main walls to seat against the front surface of the base in surrounding relation to the raised wall section of the base; and a plural number of projections (23) extending from the inner surface of said plate; each projection having an internally threaded blind hole (24) therein, whereby screws can be extended through the raised section of the base and the reflector plate into said

internally threaded holes to detachably clamp the lens to the reflector plate and base.

4,953,066

## LIGHT ASSEMBLY FOR LIQUID ENVIRONMENT

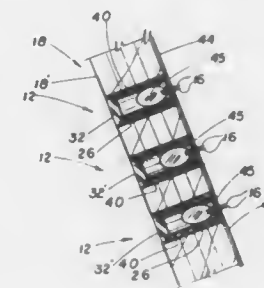
Mike Schiffer, 8397 Rural, Boca Raton, Fla. 33433

Filed Aug. 28, 1989, Ser. No. 399,221

Int. Cl.<sup>3</sup> F21P 1/00; G09F 13/28

U.S. Cl. 362-252

15 Claims



1. A lighting assembly for use in a liquid exposed or other applicable environment, said assembly comprising:

(a) a plurality of light fixtures each connected to a source of electrical power,

(b) a base means structured for support of said plurality of light fixtures in predetermined, spaced relation to one another,

(c) said plurality of light fixtures collectively disposed in an array of predetermined configuration,

(d) each of said light fixtures comprising a sleeve having a first end structured to emit light therefrom and a light source mounted within said sleeve in cooperative relation to said first end so as to direct light therethrough;

(e) each of said sleeves including a closed second end and conductor means connected thereto for electrical interconnection between the respective light source and the source of electrical power, said second end being permanently closed and sealed by a sealing structure applied thereto,

(f) each of said sleeves disposed to position said first end in adjacent relation to an outer exposed surface of said base means so as to direct light outwardly from said exposed surface, and

(g) a cover structure removably mounted in overlying, covering relation to an access opening defined at said first end and formed from a light transmitting material.

4,953,067

## SUSPENSION AND POWER CONNECTOR FOR ILLUMINATED HOUSE NUMBER SIGNS

Deborah Moore, 3561 Beatrice, Detroit, Mich. 48217

Filed Nov. 17, 1989, Ser. No. 437,729

Int. Cl.<sup>3</sup> F21S 1/10

U.S. Cl. 362-431

18 Claims

1. A suspension and power connector for an illuminated house number sign comprising:

a horizontally disposed mount plate having a central aperture;

an upright power connector having a body with a longitudinal axis projected through and supportably engaging said mount plate;

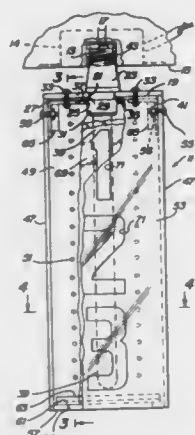
an anchor plate having a central aperture receiving said body and bearing against said mount plate;

a pair of opposed apertured suspension brackets overlying said anchor plate and extending from its opposite ends;

first fastener means securing said brackets and said anchor plate to said mount plate;

a threaded electrical connector at one end of said body upon

said axis, adapted for supported threaded projection into a depending electric socket upon a porch ceiling; and



a depending socket upon the other end of said body electrically connected to said electrical connector adapted to receive an incandescent bulb.

4,953,068

# FULL BRIDGE POWER CONVERTER WITH MULTIPLE ZERO VOLTAGE RESONANT TRANSITION SWITCHING

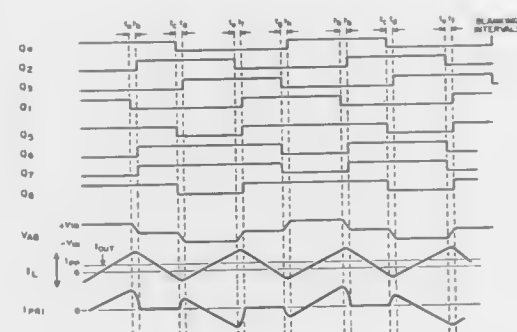
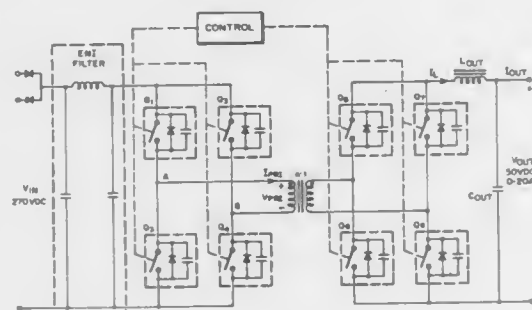
Christopher P. Henze, Lakeville, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Nov. 8, 1989, Ser. No. 433,299

Int. Cl.<sup>5</sup> H02M 3/335

U.S. Cl. 363—17

2 Claims



1. A full bridge power converter constructed to achieve substantially zero voltage, resonant transition switching comprising first and second input lines for receiving an input voltage; first and second output lines for supplying an output voltage; transformer means comprising an input winding with

first and second primary lines and an output winding with first and second secondary lines; first, second, third, fourth, fifth, sixth, seventh and eighth current-switching means, each comprising a current path and a control terminal for controlling the opening and closing said current path, each current-switching means being constructed to provide capacitance across said current path and a diode means that has an anode and a cathode coupled across said capacitance means; output inductance means coupled to one of said output lines for coupling output load current that varies continuously between a first peak of one polarity and a second peak of a polarity opposite to said one polarity thereto; and control means coupled to all of said control terminals for supplying control signals thereto, wherein,

said first current-switching means is connected so that its current path is coupled between said first input line and said first primary line such that its diode has its cathode coupled to said first input line and its anode is coupled to said first primary line,

said second current-switching means is connected so that its current path is coupled between said first primary line and said second input line such that its diode has its cathode coupled to said first primary line and its anode is coupled to said second input line,

said third current-switching means is connected so that its current path is coupled between said first input line and said second primary line such that its diode has its cathode coupled to said first input line and its anode is coupled to said second primary line,

said fourth current-switching means is connected so that its current path is coupled between said second primary line and said second input line such that its diode has its cathode coupled to said second primary line and its anode is coupled to said second input line,

said fifth current-switching means is connected so that its current path is coupled between said first output line and said first secondary line such that its diode has its cathode coupled to said first secondary line and its anode is coupled to said first output line,

said sixth current-switching means is connected so that its current path is coupled between said first secondary line and said second output line such that its cathode is coupled to said first secondary line and its anode is coupled to said second output line,

said seventh current-switching means is connected so that its current path is coupled between said first output line and said second secondary line such that its cathode is coupled to said first output line and its anode is coupled to said second secondary line,

said eighth current-switching means is connected so that its current path is coupled between said second secondary line and said second output line such that its cathode is coupled to said second secondary line and its anode is coupled to said second output line,

wherein said control means supplies control pulses to said control terminals of said current-switching means for controlling said current-switching means for each cycle of said pattern of said pulses so that when:

said input voltage is at an initial first level during a cycle said current paths of said first, fourth, fifth and eighth current-switching means are closed and said current paths of all of said other current-switching means are open, and when,

said input voltage goes to said second level during a cycle, said current paths of said second, fourth, fifth, sixth, seventh and eighth current-switching means are closed and

said input voltage goes to said third level during a cycle, said current paths of said first, fifth and eighth current-switching means are closed, and when

all of said other current-switching means are open, wherein said current path of said first current-switching means is switched and open when said output current reaches said first peak before said current paths of said second, sixth and seventh current-switching means are switched closed, and when

said input voltage goes to said third level during a cycle, said current paths of said second, third, sixth and seventh current-switching means are closed, and all of said other current-switching means are open, wherein said current path of said second current-switching means is switched open when said output current reaches said first peak before said current paths of said first, fifth and eighth current-switching means are switched closed, and when

said input voltage goes back to said initial first level to complete an input voltage cycle said current paths of said third, sixth and seventh current-switching means are switched open when said output current reaches said second peak before said fourth switching means is switched closed.

4,953,069

# METHOD OF OPERATING A THREE-STEP INVERTER

Michael Braun, Herzogenaurach-Niederndorf, and Hans-Dieter Heining, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

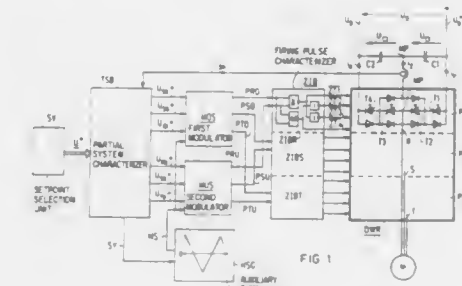
Filed Aug. 30, 1989, Ser. No. 400,327

Claims priority, application European Pat. Off., Aug. 30, 1988, 88114137.8

Int. Cl.<sup>5</sup> H02M 7/515

U.S. Cl. 363—41

9 Claims



1. A method of forming firing pulses for valves in phases of a three-step inverter comprising:

providing first and second cophasal setpoint signal sets, each setpoint signal set having sinusoidal phase signal waveforms with median lines, the median line for the phase signal waveforms of the first setpoint signal set being greater than or equal to the median line for the phase signal waveforms of the second setpoint signal set;

providing a modulation signal having a range that defines upper and lower scanning limits;

forming a first interval value representing a difference between an instantaneous maximum value of the phase signal waveforms of the first setpoint signal set and the upper scanning limit;

forming a second interval value representing a difference between an instantaneous minimum value of the phase signal waveforms of the second setpoint signal set and the lower scanning limit;

decreasing the phase signal waveforms of the first setpoint signal set by the first interval value when the phase signal

waveforms of the first setpoint signal set are greater than the upper scanning limit; and increasing the phase signal waveforms of the second setpoint signal set by the second interval value when the phase signal waveforms of the second setpoint signal set are less than the lower scanning limit; and scanning the phase signal waveforms of the first and second setpoint signal sets with said modulation signal.

4,953,070

# METHOD FOR TRANSVERSE-CURRENT-FREE OPERATION OF A PUSH-PULL CIRCUIT, AND APPARATUS FOR PERFORMING THE METHOD

Michael Lenz, Zorneding, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

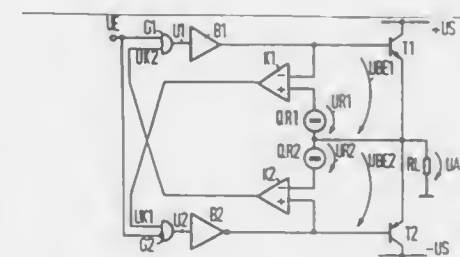
Filed Oct. 12, 1988, Ser. No. 256,745

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1987, 3734500

Int. Cl.<sup>5</sup> H02H 7/122

U.S. Cl. 363—58

4 Claims



1. In a method for transverse-current-free operation of a push-pull circuit configuration having two output transistor arrays of complementary types with output circuits interconnected in series, and a trigger circuit triggering the output transistor arrays with two push-pull signals being derived from one input signal and having mutually associated edges consecutively following one another with temporal separation for detecting output currents of the output transistor arrays, the improvement which comprises releasing the particular triggering push-pull signal for an output transistor array without delay whenever the output current of the complementary output transistor arrays drops below a predetermined positive minimum value, detecting base-to-emitter voltages of the complementary output transistor arrays for determining their output currents, and comparing said base-to-emitter voltages, using respective positive reference voltages as minimum values.

4,953,071

# AUXILIARY EXCITATION CIRCUIT FOR PHASED TRANSFORMERS

Kenneth Lipman, West Hartford, Conn., assignor to International Fuel Cells, Inc., South Windsor, Conn.

Filed Nov. 3, 1989, Ser. No. 431,615

Int. Cl.<sup>5</sup> H02M 7/77

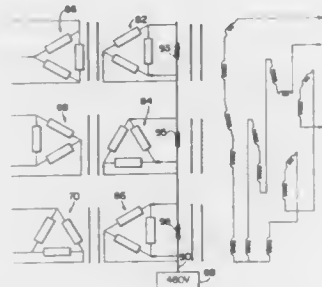
U.S. Cl. 363—72

12 Claims

7. An auxiliary electrical circuit for use in an electrical inverter having a source of direct current (DC) signals, a plurality, N, of addressable electrical switching means where N does not equal two configured in parallel to receive signal from said DC source, the electrical switching means for generating a plurality of output signals phased relative to one another, an output transformer having a plurality of parallel configured input winding sets for receiving and transforming a respective one of three phased electrical switching means output signals, and a plurality of serially configured output winding sets providing three phased fundamental signals as the sum of the transformed signals, said auxiliary electrical circuit comprising:



a plurality of low voltage AC signal sources;  
a plurality of reactors configured in series with said AC sources for receiving signals therefrom;



a plurality of auxiliary winding sets configured in parallel with and identical in phase to a respective one of said output transformer input winding sets.

4,953,072

### NODE FOR SERVICING INTERRUPT REQUEST MESSAGES ON A PENDED BUS

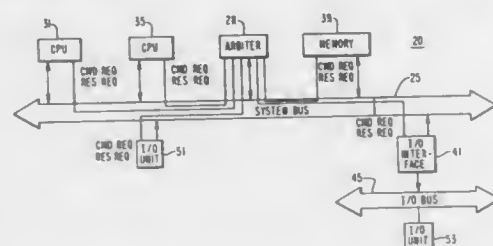
Douglas D. Williams, Pepperell, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed May 1, 1987, Ser. No. 44,755

Int. Cl.<sup>5</sup> G06F 13/14, 13/36, 13/40, 15/16

U.S. Cl. 364—200

30 Claims



1. An interrupt servicing node for servicing an interrupt request message from an interrupting node including ID data identifying the interrupting node, the interrupt servicing node adapted to be coupled to a pended bus for transferring messages between the interrupt servicing node and the interrupting node, the interrupt servicing node comprising:  
means for detecting the interrupt request message on the bus;  
means for providing to the bus an interrupt acknowledge message including destination data specifying the interrupting node at times when the interrupt servicing node is ready to service the interrupt request message from the interrupting node;  
means for obtaining control of the bus at times when the interrupt servicing node is ready to service the interrupt request message and for performing null operations for a predetermined time period before providing the interrupt acknowledge message;  
storage means, coupled to the detecting means and the providing means, including a plurality of node storage elements each corresponding to an interrupting node, for indicating whether an interrupt request is pending from the interrupting node, the storage means including:  
means, coupled to the detecting means, for setting the node storage element corresponding to the interrupting node in response to the detecting of the interrupt request message including the ID data identifying the interrupting node; and  
means, coupled to the providing means, for clearing the node storage element corresponding to the interrupting node in response to the providing of an interrupt ac-

knowledge message including destination data specifying the interrupting node.

4,953,073

### CUP CHIP HAVING TAG COMPARATOR AND ADDRESS TRANSLATION UNIT ON CHIP AND CONNECTED TO OFF-CHIP CACHE AND MAIN MEMORIES

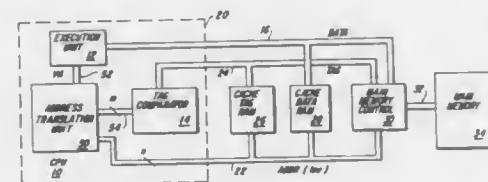
John P. Moussouris, Palo Alto; Lester M. Crudele, San Jose, and Steven A. Przybylski, Menlo Park, all of Calif., assignors to MIPS Computer Systems, Inc., Mountain View, Calif.

Filed Feb. 6, 1986, Ser. No. 827,269

Int. Cl.<sup>5</sup> G06F 9/34, 12/10, 13/16

U.S. Cl. 364—200

2 Claims



1. A computer system comprising:  
an integrated chip having an address generating unit for generating address signals, a tag comparator unit and a first connection means coupled to the address generating unit and including a first group of address leads connected to said tag comparator unit, and a second group of address leads for outside connection;  
first cache memory means including a first cache data memory and a first cache tag memory each disposed externally to the integrated chip;  
data bus means in communication with said first cache data memory and said address generating unit;  
tag bus means in communication with said tag comparator and said first cache tag memory;  
address bus means coupling said first cache tag memory and said first cache data memory to said second group of address leads;  
virtual address bus means in communication with the address generating unit;  
an address translation unit in communication with the virtual address bus means and coupled to each of the first group and second group of address leads;  
wherein the address translation unit translates  $j$  leads and leaves  $k$  leads unaltered; wherein said first group comprises  $m$  address leads and said second group comprises  $n$  address leads; the virtual address bus comprises  $j+k$  leads; and wherein:  
 $n$  is greater than  $k$ ; and  
the first cache memory means is direct mapped into the main memory.

4,953,074

### FUNCTION-DISTRIBUTED CONTROL APPARATUS

Masatsugu Kametani, Ibaraki; Kengo Sugiyama, Abiko, and Takashi Kogawa, Sakura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,805

Claims priority, application Japan, Jul. 8, 1987, 62-168704

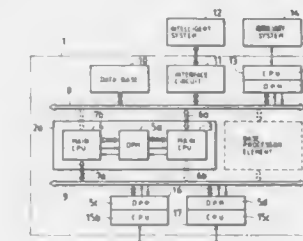
Int. Cl.<sup>5</sup> G06F 15/46, 15/16

U.S. Cl. 364—132

17 Claims

1. A control apparatus for controlling a machine, comprising:  
a first bus;  
a second bus;  
at least one processor element including a first processing unit connected to at least said first bus, a second processing unit connected to at least said second bus, and first communication means connected to said first processing

unit and said second processing unit and including first memory means accessible to both said processing units, said first processing unit deciding a general sequence of motion control of said machine, and said second processing unit obtaining information of said general sequence from said first processing unit and deciding a detailed sequence for effecting said general sequence; and  
a motion control subsystem including a third processing unit and obtaining information of constituent steps of said detailed sequence from said second processing unit and



executing said steps on said machine, said third processing unit being connected to said second bus via second communication means;  
said second communication means including interrupt signal generating means responsive to a request from said third processing unit for transmitting an interrupt signal to said processor element;  
said first bus being connectable to a communication subsystem for communicating with an external system which cooperates with said first processing unit in deciding said general sequence.

4,953,075

### CONTROL SYSTEM FOR A SAMPLE PREPARATION SYSTEM

Vance J. Nau, Cupertino, and Keith H. Grant, Newark, both of Calif., assignors to Spectra Physics, Inc., San Jose, Calif.

Continuation of Ser. No. 71,698, Jul. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 942,196, Dec. 16, 1986, abandoned. This application May 17, 1989, Ser. No. 355,071

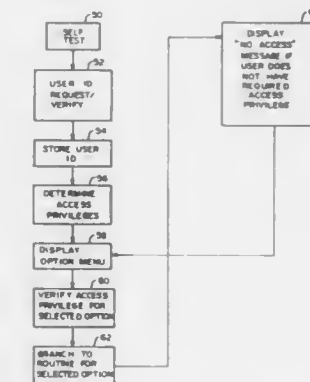
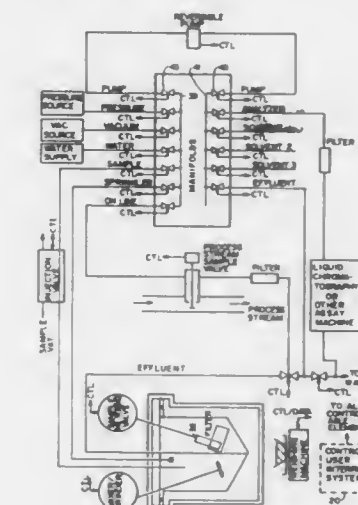
Int. Cl.<sup>5</sup> G05B 9/00

U.S. Cl. 364—140

10 Claims

1. A control system for an apparatus having a plurality of electromechanical devices controlled by said control system, said control system comprising a CPU, interface means for receiving control signals from said CPU and controlling said electromechanical devices using said control signals, a memory, and a display, said CPU including input means for receiving instructions from at least one user of said apparatus, and including software means for controlling said electromechanical devices by causing said CPU to generate the appropriate control signals to control the appropriate selected electromechanical devices to perform one or more selected tasks and to send these control signals to said interface means, wherein said software means includes:  
first means for causing said CPU to execute any of a plurality of preprogrammed command sequences defining a first complexity level in response to instructions by said user, said command sequences causing said CPU to generate the appropriate said control signals to cause said electromechanical devices to perform a predetermined sequence of physical events;  
second means for providing a facility whereby said user may program one or more new command sequences using commands from a set of commands at a second complexity level, each said new command sequence comprising a plurality of said second complexity level commands for execution by said CPU in the order determined by said user to cause said CPU to generate appropriate control signals to cause said electromechanical devices to perform

a sequence of physical acts desired by said user for causing predetermined physical events to be performed by said electromechanical devices; and



third means coupled to said second means for blocking access to selected users.

4,953,076

### VERSATILE TIME DIFFERENCE COMPENSATION METHOD OF A CONTROL SYSTEM

Nobuo Yamamoto, Mukainodanchi, 111-2917, Mawatari, Katasuta-shi, Ibaraki 312, Japan

Filed Apr. 18, 1988, Ser. No. 182,432

Claims priority, application Japan, Apr. 20, 1987, 62-98067

Int. Cl.<sup>5</sup> G05B 11/01, 15/02

U.S. Cl. 364—176

6 Claims

1. A versatile time difference compensation method of a control system comprising the steps of:  
branching a reference value of feedback control into a primary and  $n$  number of branches;  
comparing said primary branch directly to a feedback variable to obtain a primary difference value;  
transmitting said  $n$  number of branches of said reference value through lag elements having various delay times;  
comparing said  $n$  number of branches being transmitted through respective lag elements to said feedback variable to obtain  $n$  difference values;  
transmitting said difference values through various weighting elements to multiply said difference values by various weights and to obtain weighted signals;





Figure 1 is a block diagram of a memory access control system. At the top, a horizontal bar labeled "MEMORY ACCESS" is connected to a central block labeled "MEMORY". The "MEMORY" block contains two sub-blocks: "MEME ES" and "MEME MAGE". A "6. JUMPS" block is connected to "MEME ES", and a "COLLATERAL" block is connected to "MEME MAGE". Below the "MEMORY" block is a block labeled "MEMORY ACCESS CONTROL". This block contains two sub-blocks: "MEME ASSE" and "MEME LITR". A "MEME" block is connected to the "MEMORY ACCESS CONTROL" block. The "MEMORY" block is connected to the "MEMORY ACCESS CONTROL" block via a "MEME" block. The "MEMORY ACCESS CONTROL" block is connected to the "MEMORY" block via a "MEME" block.

(c) calculating a borrowing power for said client account by calculating for each asset an asset loan value equal to the

an execution unit coupled to said data memory, said task queue memory, the said interface unit; and

a data transfer unit, coupled between said execution unit

- product of an asset value and a loan to value ratio, summing such asset loan values and deducting all liabilities;
- (d) comparing the calculated borrowing power with the minimum borrowing power;
- (e) indicating an account imbalance has occurred if the calculated borrowing power for the client account is less than the minimum borrowing power;
- (f) if an account imbalance has occurred, modifying the client account to correct the account imbalance;
- (g) recalculating the client account's borrowing power as in paragraph (c) after modifying the client account;
- (h) comparing the recalculated borrowing power to the minimum borrowing power;
- (i) indicating that the account imbalance cannot be corrected if the recalculated borrowing power is less than the minimum borrowing power; and
- (j) liquidating the assets and satisfying the liabilities if the account imbalance cannot be corrected.

4,953,086

# MONEY EXCHANGING MACHINE FOR EXCHANGING FIRST AND SECOND NATIONS' CURRENCIES BY SORTING, STORING AND PAYING OUT THE CURRENCIES

Kunio Fukatsu, Ebina, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

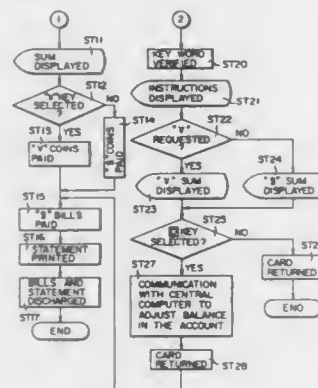
Filed Mar. 30, 1988, Ser. No. 175,314

Claims priority, application Japan, Mar. 31, 1987, 62-78672

Int. Cl.<sup>5</sup> G06F 15/21; G07D 13/00

U.S. Cl. 364-408

17 Claims



1. A money exchanging machine for exchanging first and second nations' currencies for each other comprising: means for receiving the first and second nations' currencies, the first nation's currencies including first currencies having a first denomination, the second nation's currencies including second currencies having a second denomination, at least one of the first and second nations' currencies including third currencies, the third currencies being different than the first and second currencies;
- second means for storing the first currencies;
- second means for storing the second currencies;
- third means for storing the third currencies the third currencies in the third storing means not usable as paying currency;
- sorting means for sorting out the first and second nations' currencies into the first, second and third currencies, the sorting means transporting the first, second and third currencies to the first, second and third storing means, respectively;
- first paying means for paying an amount in the second currencies from the second storing means, the second currencies in the second storing means being usable as paying currency and including the second currencies transported by the sorting means, the amount from the first paying means being equivalent to a calculated total amount of the

first currencies when the first currencies are received by said receiving means and sorted by said sorting means; and second paying means for paying an amount in the first currencies from the first storing means, the first currencies in the first storing means being usable as paying currently and including the first currencies transported by the sorting means, the amount from the second paying means being equivalent to a calculated total amount of the second currencies, when the second currencies are received by the receiving means and sorted by the sorting means.

4,953,087

# THREE-DIMENSIONAL IMAGES OBTAINED FROM TOMOGRAPHIC DATA HAVING UNEQUALLY SPACED SLICES

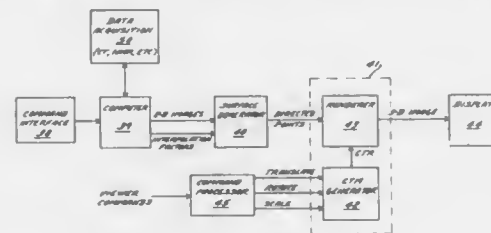
Carl R. Crawford, Milwaukee, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Oct. 24, 1988, Ser. No. 261,532

Int. Cl.<sup>5</sup> G06F 15/42; A61B 6/03

U.S. Cl. 364-413.18

4 Claims



1. A method for generating a three-dimensional representation of the surface of a structure located in a three-dimensional space comprising the steps of:
  - obtaining a plurality of slices at a first slice spacing which collectively contain a first portion of said space;
  - obtaining a plurality of slices at second slice spacing which collectively contain a second portion of said space, said second slice spacing being different from said first slice spacing;
  - dividing said first and second space portions respectively into sets of first and second three-dimensional spatial elements;
  - selecting an interpolating factor which varies as a function of said slice spacing for use in said dividing step to establish a specified relationship between a selected dimension of a first three-dimensional element and a selected dimension of a second three-dimensional element;
  - specifying the location of each of said first and second three-dimensional elements in said space as a function of said interpolation factor;
  - identifying each of said first and second three-dimensional elements which contains a portion of said surface, and generating a data element representing each of said portions; and
  - displaying an image of said surface from said data elements, said image including a plurality of pixels.

4,953,088

# SENTENCE TRANSLATOR WITH PROCESSING STAGE INDICATOR

Hitoaki Suzuki, Shinjoh Shirohiko, Shinji Tokunaga, all of Nara; Tokuyuki Hirai, Yamatokoriyama; Yoji Fukumochi, Nara; Shuzo Kugimiyu, Nara, and Ichiko Seta, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

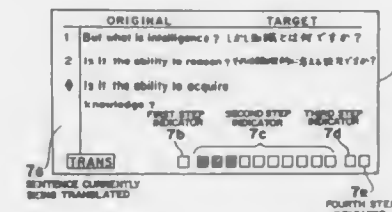
Continuation of Ser. No. 113,121, Oct. 27, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 372,133

Claims priority, application Japan, Oct. 27, 1986, 61-256077; Oct. 27, 1986, 61-256078; Oct. 27, 1986, 61-256079; Nov. 28, 1986, 61-284486

Int. Cl.<sup>5</sup> G06F 15/38

U.S. Cl. 364-419

7 Claims



1. A translation apparatus for displaying a translation for one of a plurality of original sentences into a target sentence and indicating an analysis state of the translation, comprising:
  - dictionary look-up and morpheme analysis means for finding word information corresponding to each word contained in the one original sentence;
  - syntactic analysis means for finding relationships of each said word contained in the one original sentence and determining at least one sentence construction;
  - semantic analysis means for developing one sentence construction determined in said syntactic analysis means having the best meaning;
  - translating means for generating the target sentence of said one sentence construction; and
  - display means for displaying the original sentence, the target sentence and the analysis state of the translation including, sentence display means for displaying the plurality of original sentences, sentence indicator means for indicating the one original sentence that is translated, translation indicator means for indicating that the translation is being performed, first step indicator means for indicating only when the analysis state of the translation is performing said dictionary look-up and morpheme analysis means, second step indicator means for indicating only when the analysis state of the translation is performing said syntactic analysis means, third step indicator means for indicating only when the analysis state of the translation is performing said semantic analysis means, and translated sentence indicator means for indicating only when said translating means is generating the target sentence.
2. A translation apparatus as claimed in claim 1, further comprising:
  - timer means for counting to a predetermined maximum time in response to initiating said syntactic analysis means; and
  - stop means for temporarily stopping said syntactic analysis when said timer means has counted to said predetermined maximum time.

4,953,089

# HYBRID ANALOG DIGITAL CONTROL METHOD AND APPARATUS FOR ESTIMATION OF ABSOLUTE VELOCITY IN ACTIVE SUSPENSION SYSTEMS

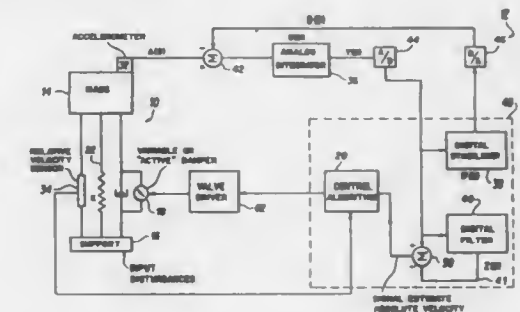
Paul T. Wolfe, Apex, N.C., assignor to Lord Corporation, Erie, Pa.

Filed May 9, 1988, Ser. No. 192,067

Int. Cl.<sup>5</sup> G06F 15/20

U.S. Cl. 364-424.05

14 Claims



1. A method for producing a signal indicative of the absolute velocity of a mass from an accelerometer input signal, including the steps of:
  - providing an analog integrator means for receiving said input signal and producing a time integrated signal;
  - providing a digital feedback means for receiving through an analog to digital converter said time integrated signal to produce a signal which, after passing through a digital to analog converter is fed back to said integrator means to constrain the constant and relatively low frequency components of said integrated signal about an oscillatory voltage range to produce a stable signal; and
  - providing a digital filter means for receiving through said analog to digital converter said stable signal and removing selected constant and low frequency components thereof to produce said signal indicative of the absolute velocity further stabilized about a selected voltage value.

4,953,090

# HYDRAULIC PRESSURE CONTROL FOR REDUCING ENGAGEMENT SHOCK OF AUTOMATIC TRANSMISSION

Yasushi Narita, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

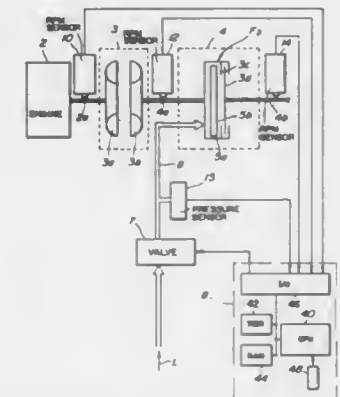
Filed Aug. 27, 1987, Ser. No. 89,860

Claims priority, application Japan, Sep. 4, 1986, 61-206696

Int. Cl.<sup>5</sup> B60K 41/22

U.S. Cl. 364-424.1

5 Claims

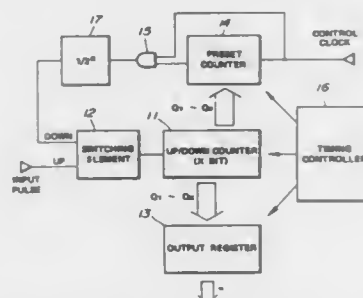


1. A hydraulic pressure control system for reducing engage-



(a) first means for counting the number of pulses in a pulse train signal in each of a plurality of predetermined counting time intervals and outputting a count value represent-

- ing the counted number of pulses whenever a predetermined counting time interval has elapsed;
- (b) second means for storing the count value outputted from the first means and for outputting the stored count value whenever a predetermined counting time interval has elapsed;
- (c) third means for controlling the first and the second means so that the second means outputs a sum of count values whenever the predetermined counting time interval has elapsed; and



- (d) fourth means for subtracting from the sum of count values at the present predetermined counting time interval a value generated during a transition time starting at the end of a previous predetermined counting time interval and ending at the start of a present predetermined counting time interval, whereby the second means outputs a count value corresponding to the frequency of the pulse train signal whenever the present predetermined time counting interval has elapsed.

4,953,096

## TEST METHOD AND APPARATUS FOR DISTRIBUTED SYSTEM

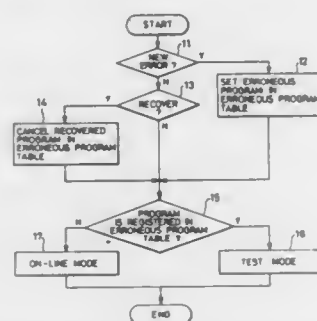
Isao Wachi, Hitachi; Kinji Mori, Yokohama; Masayuki Orimo, Kawasaki; Yasuo Suzuki, Ebina; Katsumi Kawano, Fuchu; Minoru Koizumi, Yokohama; Kozo Nakai, Katsuta, and Hirokazu Kasashima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 12, 1987, Ser. No. 84,693

Claims priority, application Japan, Aug. 15, 1986, 61-191842  
Int. Cl.<sup>5</sup> G06F 11/22

U.S. Cl. 364—550

15 Claims



15. A method for testing a program in a system for processing a plurality of programs, the system having a plurality of subsystems, each subsystem comprising:

- a first step of processing, in each subsystem, a program by the use of data in the system;
- a second step of diagnosing, in each subsystem, a program on the basis of the result of the processing by said first step; and,
- a third step of selectively making, in each subsystem, a

program to one of a processing mode and a test mode in accordance with the step of diagnosing.

4,953,097

## PROCESS CONTROL SYSTEM USING REMOTE COMPUTER AND LOCAL SITE CONTROL COMPUTERS FOR MIXING A PROPPANT WITH A FLUID

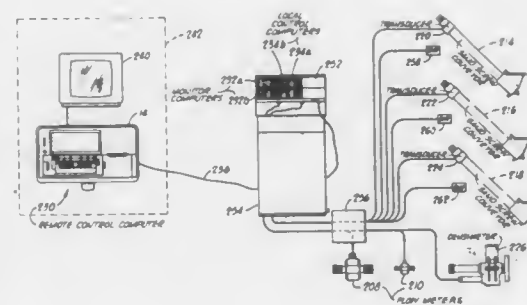
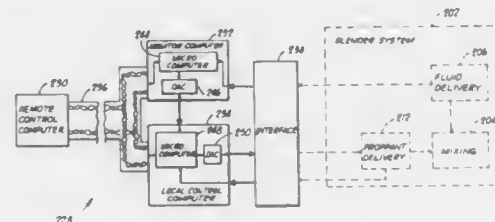
Stephen F. Craia; Mark A. Clark, and Edward L. Woodall, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 947,099, Dec. 24, 1986, Pat. No. 4,916,631.

This application Jul. 25, 1989, Ser. No. 384,740

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.<sup>5</sup> G06F 15/46; G06G 7/58; G05D 11/02, 11/08  
U.S. Cl. 364—502 3 Claims



1. A process control system for controlling the concentration of a proppant slurry to be pumped down a well bore for stimulating production thereof, said system comprising:

- a remote control computer spaced from a location where the process is performed, said remote control computer including means for entering control information, and for computing at least one set point therefrom;
- a monitor computer disposed at the location where the process is performed, said monitor computer including: means for providing real time information about monitored operating characteristics of the process; and means for transmitting said real time information;
- a local control computer disposed at the location where the process is performed, said local control computer including:

means for receiving said real time information from said monitor computer;

- means for receiving feedback information from a controlled characteristic of the process; and
- means for providing, in response to the real time information, to the set point and to the feedback information, a control signal to control the controlled characteristic of the process; and

cable means for connecting said remote control computer to both said monitor computer and said local control computer, said cable means including two, and only two, communication channels defined between said remote control computer and said monitor computer and said local control computer so that each of said monitor com-

puter and said local control computer communicates with said remote control computer through the same two channels.

4,953,098

## HIGHER HARMONIC CONTROL SYSTEM FOR X-WING AIRCRAFT

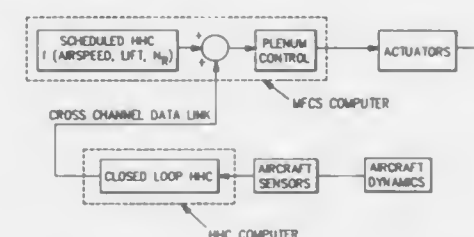
William C. Flecher, Jr., Monroe, and Kenneth C. Arifian, Brookfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 13, 1988, Ser. No. 257,473

Int. Cl.<sup>5</sup> F16F 15/10

U.S. Cl. 364—508

6 Claims



1. A method of actively providing vibration alleviation by reducing vibratory air-loading in the rotor blades of the rotor in an X-Wing aircraft, which includes a series of pneumatic valve control actuators, comprising the following steps:

- (a) providing higher harmonic control (HHC) to the rotor and implementing it in two forms, a scheduled HHC system and a closed loop active HHC; and
- (b) continuously processing vibration and HHC data from sensors monitoring vibrations at selected locations and in selected axes of the aircraft and updating the HHC based on the data a multiple number of times in each rotor revolution and generating corrective factors which are used in the HHC to further alleviate the vibration.

4,953,099

## INFORMATION DISCRIMINATION CELL

Alexander N. Jourjine, Boston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 7, 1988, Ser. No. 203,417

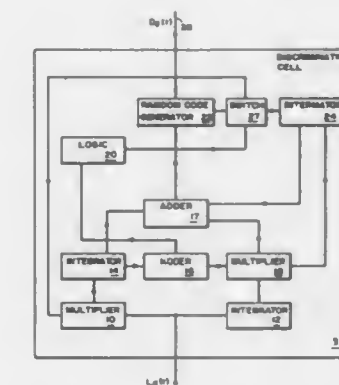
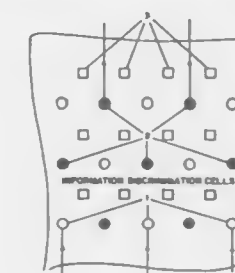
Int. Cl.<sup>5</sup> G06F 15/18

U.S. Cl. 364—513

8 Claims

1. A random code neural network with learning capability for discrimination of the difference between digitally encoded input and digitally encoded memory information comprising: a plurality of input cells, a plurality of memory cells and a plurality of discrimination cells interconnected for communication therebetween to exchange signals in the form of random binary codes, each input cell, memory cell, and discrimination cell including means to emit said signals periodically within time spans of length  $T_p$  within larger

time spans  $T_c$  and including means for learning external input by extremizing a local functional of the total input of



said cell's binary code by adjustment of the position of the time span of duration  $T_p$  within the larger time span  $T_c$ .

4,953,100

## APPARATUS FOR INSPECTING PACKAGED ELECTRONIC DEVICE

Teruhisa Yotsuya, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

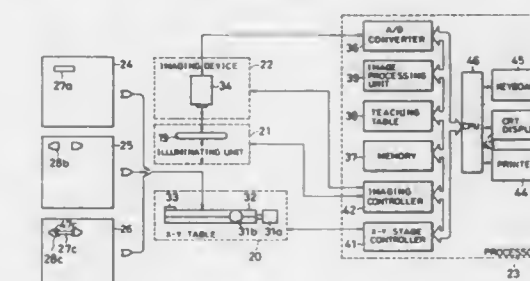
Filed Oct. 5, 1987, Ser. No. 104,149

Claims priority, application Japan, Oct. 3, 1986, 61-236499;  
Oct. 30, 1986, 61-256994; Oct. 30, 1986, 61-256995

Int. Cl.<sup>5</sup> G06F 15/46

U.S. Cl. 364—559

5 Claims



1. A component-mounted printed circuit board inspecting apparatus, comprising:

- image taking means for producing images of a bare printed circuit board and a component-mounted printed circuit board;
- land extracting means for extracting conductor lands on which components are to be mounted from said images produced by the image taking means and for obtaining geometrical data of the conductor lands;
- positional relation determining means for determining posi-



tional relationships between the lands of the component-mounted board and components mounted thereon on the basis of said geometrical data obtained by the land extracting means; and  
decision means for deciding if placement of a component is proper based on said positional relationships obtained by the positional relation determining means.

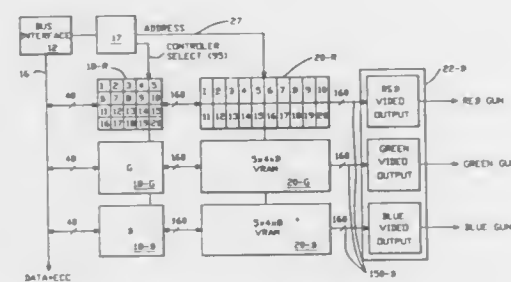
**4,953,101**  
**SOFTWARE CONFIGURABLE MEMORY ARCHITECTURE FOR DATA PROCESSING SYSTEM HAVING GRAPHICS CAPABILITY**  
Brian Kelleher, Mountain View, and Thomas C. Furlong, Half Moon Bay, both of Calif., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Nov. 24, 1987, Ser. No. 124,897

Int. Cl.<sup>5</sup> G06F 15/62

U.S. Cl. 364—518

3 Claims



1. A data processing system, comprising:
  - a data processing unit;
  - a memory module, including an array of K simultaneously accessible memory elements, each memory element storing a multiplicity of data values at specified address locations within a predefined address space, said predefined address space being divided into two portions including a graphics address space and a system memory address space, wherein K is an integer having a value of at least four;
  - partition means, coupled to said data processing means, for storing a boundary address value between said graphics address space and said system memory address space; and
  - a graphics subsystem, coupled to said data processing unit; said graphics subsystem including
    - a set of K parallel graphics processors, coupled to said data processing means and said memory module, for storing and updating pixel values specifying pixels (x,y) of an X×Y raster framebuffer in said graphics address space of said memory module, said set of K parallel graphics processors coupled to said K memory elements for concurrently accessing and updating an update array of K pixel values, said framebuffer being sequentially addressable as a plurality of update arrays which tile the framebuffer, including a plurality of horizontal rows of update arrays forming an array of said update arrays; and
    - system memory access means for reading and storing data in specified address locations in said system memory address space of said memory module and for transmitting said read and stored data to and from said data processing unit;
- wherein each of said K memory elements stores a multiplicity of data values at locations in said graphics address space and a multiplicity of data values in locations in said system memory address space.

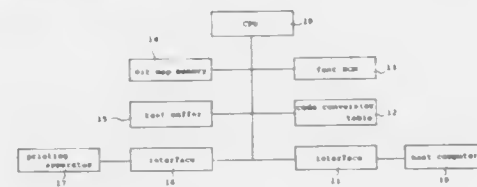
**4,953,102**  
**METHOD FOR PRODUCING CHARACTER PATTERNS**  
Shigeki Kimura, Ibaraki, and Kouichi Shibata, Osaka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan  
Filed Mar. 26, 1986, Ser. No. 844,433

Claims priority, application Japan, Mar. 30, 1985, 60-68077; May 31, 1985, 60-119290

Int. Cl.<sup>5</sup> G01D 15/06

U.S. Cl. 364—518

5 Claims



1. A method for producing character patterns for generation of selected characters on a character display having a plurality of character spaces for characters formed of a plurality of scan lines, said method utilizing a bit map memory having a plurality of character spaces, corresponding with character spaces of the character display, and front memory means having a plurality of storage regions, each including a character pattern storage section for storing a character pattern and a character pattern control data section for storing character pattern control data related to a character pattern stored in the associated character pattern storage section, the character pattern control data including a first portion identifying the number of scan lines before a predetermined scan line at which generation commences for the associated stored character, a second portion identifying the total number of scan lines for the associated stored character, and a third portion identifying the scan line length of the associated bit map memory character space, including the length of a scan line occupied by character bits when the character pattern is generated in said bit map memory and a predetermined additional length, said method comprising the steps of:

- (a) storing in each of a plurality of selected character pattern storage sections a number of scan lines of one of a plurality of character patterns for characters to be generated, the number being equal to no more than the number of scan lines, counted in a direction perpendicular to the direction of scanning, required for scanning the stored character pattern, whereby each stored character pattern determines the length, in said direction perpendicular to the direction of scanning, of the character pattern storage section containing each said stored character pattern;
- (b) storing in the character pattern control data section associated with each character pattern storage section character pattern control data related to the character pattern stored in the associated character pattern storage section;
- (c) for a number of scan line equal to the number of scan lines stored in step (a) during storage of one of the selected character patterns, scanning the character pattern storage section storing the character pattern of said one of the selected characters to provide a character pattern to be displayed in a predetermined character space on the character display;
- (d) substantially simultaneously with step (c), generating in the bit map memory character space corresponding with said predetermined character space a number of scan lines determined by the second portion of the character pattern control data related to the character to be displayed, with the generation commencing at a scan line of said bit map memory corresponding character space which scan line is determined by the first portion of said related character pattern control data and with each scan line continuing for a length determined by the third portion of said related character pattern control data; and

- (e) repeating steps (c) and (d) for each character displayed.

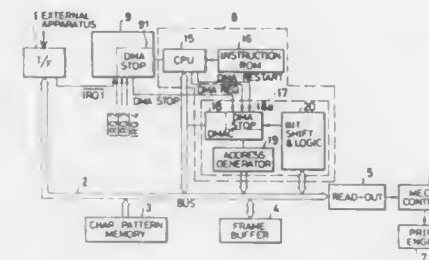
**4,953,103**  
**PAGE PRINTER**  
Masahiro Suzuki, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan and Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 28, 1989, Ser. No. 345,397

Claims priority, application Japan, Apr. 30, 1988, 63-105535  
Int. Cl.<sup>5</sup> G06F 15/00

U.S. Cl. 364—519

8 Claims



1. A page printer, comprising:
  - an interface circuit for receiving data from external apparatus and generating interrupt request signals;
  - a bus, connected to said interface circuit, for transferring data;
  - a character pattern memory, connected to said bus, for storing data such as character patterns;
  - a frame buffer memory, connected to said bus, for reading and writing data;
  - a read-out circuit, connected to said bus, for reading data from said frame buffer memory;
  - a mechanical control circuit for receiving information from said read-out circuit and generating control signals;
  - a printing mechanism for receiving said control signals and printing according to them;
  - a CPU, connected to said bus, for receiving interrupt request signals, processing data, and generating signals including a DMA request signal and a DMA restart signal;
  - a BitBlt circuit, connected to said CPU and said bus, for performing DMA transfers in response to said DMA request signal;
  - a DMA stopping circuit, disposed in said BitBlt circuit, for stopping and restarting said DMA transfers in response to a DMA stop signal and said DMA restart signal;
  - an interrupt controller, connected to said interface circuit and said CPU, for receiving interrupt request signals such as the interrupt request signals generated by said interface circuit, selecting one of them, and sending the selected interrupt request signal to said CPU; and
  - a DMA stop signal generating circuit, disposed in said interrupt controller, for generating said DMA stop signal based on certain of the interrupt request signals received by said interrupt controller.

**4,953,104**  
**PAGE BUFFER FOR AN ELECTRONIC GRAY-SCALE COLOR PRINTER**  
Hurjay Yeh, and Michael A. Pickup, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1989, Ser. No. 353,715

Int. Cl.<sup>5</sup> G06F 15/00

U.S. Cl. 364—519

30 Claims

28. A method of saving printer data in a page buffer of an electronic, gray scale, color printer, said method including the steps of:
  - dividing the buffer into a plurality of memory cells, with each cell corresponding to a predetermined number of adjacent pixels in the printed page;

processing device independent data from another device; and  
storing the processed data in at least a portion of the memory cells, with each cell containing a plurality of bits which correspond to individual pixel locations and which point to additional bit words in the same memory cell which specify the color which is to be printed for that pixel location.

**4,953,105**  
**WORD PROCESSOR WITH A MERGE PRINT FUNCTION RESPONSIVE TO VARIABLE DATA LENGTH**

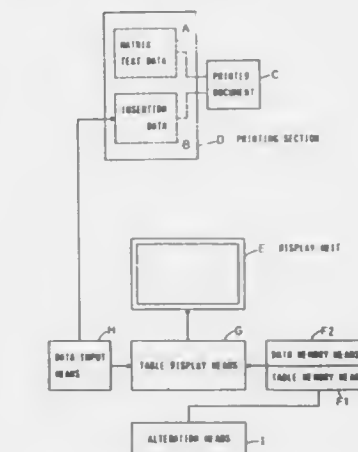
Kelichi Hirata, Kuwana; Tomohiro Ban, Iwakura; Atsuko Kawasumi, Nagayo; Kazuko Nakagawa, Chita; Yukimi Mizutani, Ichinomiya, and Satoru Tsuruki, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 13, 1987, Ser. No. 72,566

Claims priority, application Japan, Jul. 15, 1986, 61-166216  
Int. Cl.<sup>5</sup> G06F 3/09

U.S. Cl. 364—519

12 Claims



1. A data processor with a table edit function, comprising:
  - a display unit;
  - table memory means for storing a table, the table including a plurality of data fields, each data field having a predetermined length;
  - data memory means for storing a plurality of external data to be inserted into the table;
  - table display means for displaying the table on the display unit with each of the plurality of external data inserted in a respective data field of the plurality of data fields;
  - data input means for operatively inputting external data into the table; and
  - alteration means for (i) changing the predetermined length of at least one selected data field of the table during inputting of external data into the table in response to a single operation of a selected one of a group of keys consisting of

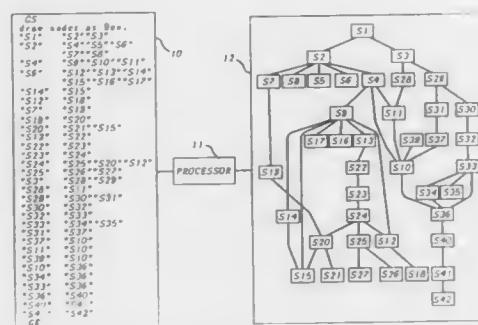
a field expansion key and a field contraction key, such that the alteration means expands the data field by a preset length responsive to a single operation of the field expansion key and contracts the data field by another preset length responsive to a single operation of the field contraction key; and (ii) for controlling the table display means to display the at least one changed selected data field and resultant table.

4,953,106  
**TECHNIQUE FOR DRAWING DIRECTED GRAPHS**  
 Emden R. Gansner, Morristown; Stephen C. North, Califon, and  
 Kiem-Phong Vo, Berkeley Heights, all of N.J., assignors to  
 AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 23, 1989, Ser. No. 355,731  
Int. Cl.<sup>5</sup> G06F 3/14

U.S. Cl. 364—521

### 5 Claims



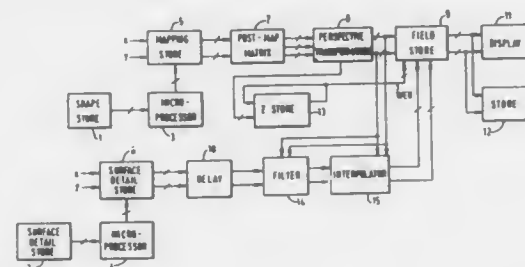
1. A method of making a layout of a directed graph on a computer or microprocessor of any type from a list of nodes and weighted edges of the directed graph, the method comprising the steps of:

- (a) reversing the direction of a subset of edges to break any cycles between nodes in the graph;
- (b) ranking the nodes to minimize a weighted sum of all the lengths of edges in the directed graph, where the length of an edge is the difference in the ranks of its two interconnected nodes and the weighted sum is the sum of the product of the weight and length of each edge;
- (c) ordering nodes within their ranks using any combination of (1) a generalized median value and (2) exchanging adjacent nodes to reduce edge crossings, where the generalized median value of a node is defined to be the median position of the neighbor nodes to which the node is connected in an adjacent rank if the number of neighbor nodes is odd, or a median value between the left and right median position of its neighbor nodes when the number of neighbor nodes is even;
- (d) assigning y-coordinates and x-coordinates to nodes of the directed graph so that nodes on the same rank receive the same y-coordinate and adjacent ranks are appropriately separated, and the x-coordinates minimize the weighted sum of  $L_1$ -lengths of edges while maintaining the relative order and a minimum separation of nodes within the same rank, where an  $L_1$ -length of an edge is the difference in the x-coordinates of its two interconnected end nodes;
- (e) generating spline control points for edges by selecting the control points to avoid incorrect node/edge intersections and sharp turns;
- (f) generating a representation of a layout of the directed graph for a computer peripheral device or another processor.

4,953,107  
VIDEO SIGNAL PROCESSING  
David J. Hedley, Winchester, and John W. Richards, Chilbolton, both of United Kingdom, assignors to Sony Corporation, Tokyo, Japan  
Continuation of Ser. No. 921,237, Oct. 21, 1986, abandoned.  
This application Aug. 28, 1989, Ser. No. 401,555  
Claims priority, application United Kingdom, Oct. 21, 1985,  
8525925

U.S. Cl. 364—522

## 14 Claims



4. Apparatus for generating an image, the apparatus comprising:

- a first store for storing address data defining the three-dimensional shape of an object, including depth information relating thereto;
- a second store for storing video data defining the two-dimensional surface detail of said object;
- first means including a hardware matrix circuit for manipulating said address data to move said object;
- second means for perspective transforming said manipulated address data to form transformed address data defining a two-dimensional image of said object after said manipulation, said two-dimensional image being foreshortened in accordance with said depth information;
- filter means responsive to said second store and said perspective transforming means for filtering said video data in response to said transformed address data to reduce the amount of surface detail where the perspective transforming compresses the size of the object to which surface detail is to be applied;
- interpolating means responsive to said second store and said perspective transforming means for interpolating said video data in response to said transformed address data to derive additional data for the surface detail where the perspective transforming expands the size of the object to which the surface detail is to be applied; and
- a third store in which said video data is written, under control of said transformed address data, in the form of output video data defining a two-dimensional image of said object after said manipulation and said transformation, and with said surface detail.

4,953,108  
DOCUMENT PROCESSOR HAVING A DOCUMENT  
COMPOSITION FUNCTION

Takahiro Kato; Masaki Hamada, both of Tokyo; Hiroshi Takakura, Yokohama, and Yukari Shibuya, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 13, 1987, Ser. No. 72,634

Claims priority, application Japan, Jul. 15, 1986, 61-165996; Jul. 15, 1986, 61-165997; Jul. 15, 1986, 61-165998; Jul. 15, 1986, 61-165999

Int. Cl.<sup>5</sup> G06F 3/14

### 13 Claims

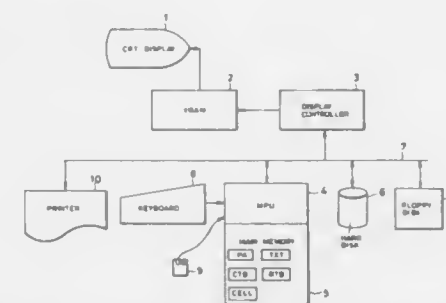
1. A document processor for editing an input document and outputting the resulting information as a document, comprising:

AUGUST 28, 1990

## ELECTRICAL

2607

input means for inputting a document including a figure pattern;  
means for recognizing a table in the document input by said input means;



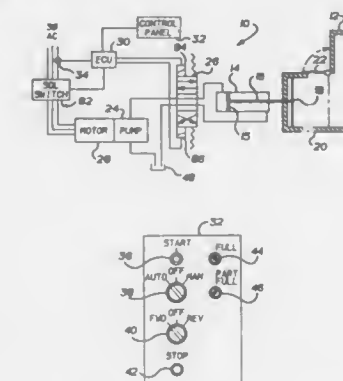
means for storing the table recognized by said recognizing  
 .means in a memory by relating a plurality of cells constituting the table with associated respective coordinate data; and  
 means for composing a document such that the original form of the table stored by said storing means is maintained.

4,953,109  
**AUTOMATED TRASH COMPACTOR SYSTEM**  
 Stephen A. Burgis, Birmingham, Mich., assignor to Design-Rite,  
 Inc., Sterling Heights, Mich.

Filed Oct. 16, 1989, Ser. No. 421,923  
Int. Cl.<sup>5</sup> B30B 15/50

U.S. Cl. 364-550

## 48 Claims



1. An automated trash compaction system for compacting trash in a trash compactor comprising:

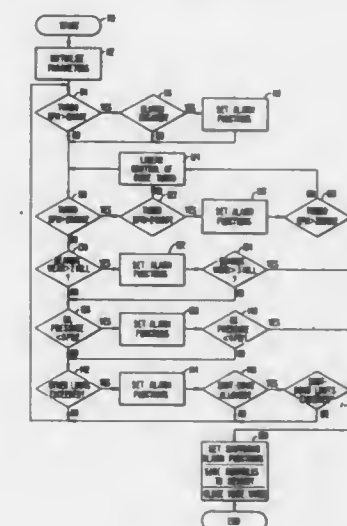
- compactor means connected to said trash container, said compactor means having a ram;
- an hydraulic cylinder for displacing said ram in a forward direction to compact the trash in said trash container and in a reverse direction to return said ram to a retracted position;
- a fluid pump for providing a pressurized fluid to said hydraulic cylinder;
- a solenoid valve disposed between said fluid pump and said hydraulic cylinder, said solenoid valve having at least at first state in response to a ram forward signal directing said pressurized fluid to a forward input of said hydraulic cylinder causing said hydraulic cylinder to displace said ram in said forward direction and switchable to at least a second state in response to a ram reverse signal directing said pressurized fluid to a reverse input of said hydraulic cylinder causing said hydraulic cylinder to displace said ram in said reverse direction;
- and electric motor for actuating said fluid pump;
- a current sensor for generating a current signal having a

value corresponding to the value of the electric current being used by said electric motor; and  
means for generating a start signal; and  
an electronic control unit having means for generating said ram forward signal for a predetermined period of time in response to said start signal, means for generating a part-full signal in response to said ram forward signal and in response to said current signal exceeding a full value, means for generating said reverse signal in response to the expiration of said predetermined period of time, and means for terminating said reverse signal when said current signal exceeds a stop value.

4,953,110  
**TURBOCHARGER CONTROL SYSTEM**  
 Paul W. Chartrand, Reno, Nev., assignor to Globe Turbocharger  
 Specialties, Inc., Reno, Nev.

Filed Jun. 7, 1988, Ser. No. 203,663  
Int. Cl.<sup>5</sup> F02B 37/14; G08B 23/00; G01M 15/00  
U.S. Cl. 364—550 31

### 31 Claims



21. A method for monitoring a certain one of a plurality of operating conditions of a large bore diesel engine system of the type including a compression engine coupled to an exhaust-driven turbocharger that operates to supply compressed air to the compression engine, to provide a warning if one or more of the operating conditions reach a predetermined limit corresponding to the certain one of the plurality of operating conditions, the monitoring method comprising the steps of:

- providing a speed signal indicative of a rotational speed of a rotatable shaft of the turbocharger coupled to the compression engine by an overriding clutch;
- providing an engagement signal indicative of an engagement of the overriding clutch;
- receiving and comparing the speed and the engagement signals respectively with a first and a second warning level;
- issuing a warning signal when the comparison of the first and second signals with the respective warning levels is indicative that a predetermined limit has been equaled or exceeded; and
- warning a user in response to the warning signal.



4,953,111

## DOZE DETECTOR

Norihito Yamamoto, Shiga, and Takahide Tanaka, Kyoto, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

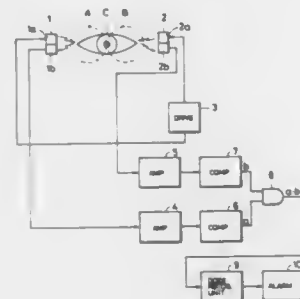
Filed Feb. 11, 1988, Ser. No. 154,720

Claims priority, application Japan, Feb. 12, 1987, 62-30036; Feb. 13, 1987, 62-32084; Mar. 4, 1987, 62-49653; Apr. 15, 1987, 62-92675

Int. Cl.<sup>5</sup> G08B 23/00

U.S. Cl. 364—569

24 Claims



1. A detector for detecting blinks of an eye, comprising: light sensing means comprising first and second light emitting elements and first and second light receiving elements, wherein the first light emitting element projects light onto one half of the eye, the second light emitting element projects light onto the other half of the eye, the first light receiving element receives a first reflected light beam from the one half of the eye, and the second light receiving element receives a second reflected light beam from the other half of the eye, said first light receiving element outputting a first output signal representative of the first reflected light beam and said second light receiving element outputting a second output signal representative of the second reflected light beam; and processing means for processing the first and second output signals so as to determine whether a blink has occurred, and for determining that a blink has occurred only when both said first output signal and said second output signal are representative of a blink; wherein said processing means comprises means for obtaining a Boolean product of the first and second output signals, and wherein said processing means determines whether a blink has occurred using said Boolean product.

4,953,112

## METHOD AND APPARATUS FOR DETERMINING ACOUSTIC PARAMETERS OF AN AUDITORY PROSTHESIS USING SOFTWARE MODEL

Gregory P. Widin, West Lakeland, Minn., and Mats B. Dotevall, Goteborg, Sweden, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 10, 1988, Ser. No. 192,214

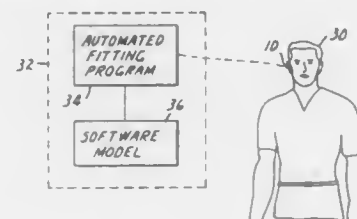
Int. Cl.<sup>5</sup> A61N 1/36; H04R 25/00

U.S. Cl. 364—578

8 Claims

1. For use with an auditory prosthesis having acoustic parameters which at least in part determine at least one of the acoustic fitting functions of said auditory prosthesis, said acoustic parameters being adjustable, a method of determining said acoustic parameters of said auditory prosthesis which will provide a user of said auditory prosthesis with a target auditory response, comprising the steps of: determining said target auditory response of said user; determining said acoustic fitting function of said auditory prosthesis operating in conjunction with said user; and optimizing said acoustic parameters of said auditory prosthesis by comparing the auditory response of said acoustic fitting function with said target auditory response and by adjusting said acoustic parameters to minimize the error of said comparison.

sis by comparing the auditory response of said acoustic fitting function with said target auditory response and by



adjusting said acoustic parameters to minimize the error of said comparison.

4,953,113

## HAND-HELD COMPUTERIZED DATA COLLECTION TERMINAL WITH INDENTED GRIPCONFORMING CONFIGURATION

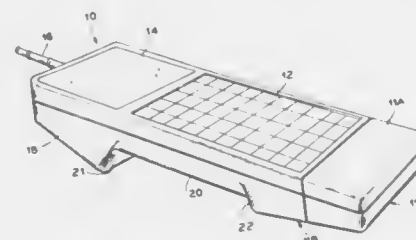
George E. Chadima, Jr., 3624 Skylark La. SE., and Darald R. Schultz, 3861 Trailridge Rd., SE., both of Cedar Rapids, Iowa 52403

Continuation of Ser. No. 104,653, Oct. 2, 1987, abandoned. This application Sep. 7, 1989, Ser. No. 406,822

Int. Cl.<sup>5</sup> G06F 1/00

U.S. Cl. 364—708

17 Claims



1. In a data collection system, a hand-held computerized data collection terminal comprising a terminal casing for housing operating circuitry and having first and second opposite ends along a longitudinal axis of the data collection terminal, and having a frontal side for data entry, said terminal casing itself having a bottom wall which is itself part of the terminal casing for housing the operating circuitry, said bottom wall itself having an exterior providing an underside of the terminal casing which is opposite said frontal side, said casing itself having side walls extending longitudinally of the data collection terminal between said frontal side and said bottom wall of said terminal casing, said bottom wall itself being indented at a portion of the terminal casing intermediate said first and second opposite ends to provide a grip-conforming configuration at the underside of the terminal casing, said bottom wall itself providing downwardly protruding shoulder portions having rounded edges with said indented intermediate bottom wall portion and at said first and second opposite ends of the data collection terminal adjacent the grip-conforming configuration which is to be gripped by one hand to tend to prevent slippage of the terminal casing in either longitudinal direction during gripping support thereof.

4,953,114

## IMAGE SIGNAL PROCESSING APPARATUS

Hiroaki Sato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

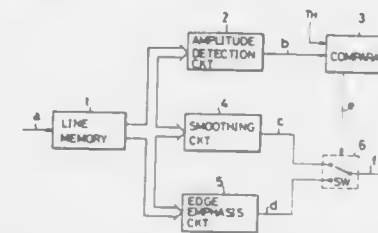
Continuation of Ser. No. 327,376, Mar. 23, 1989, abandoned, which is a continuation of Ser. No. 22,606, Mar. 5, 1987, abandoned, which is a continuation of Ser. No. 674,850, Nov. 26, 1984, abandoned. This application Dec. 29, 1989, Ser. No. 456,615

Claims priority, application Japan, Dec. 2, 1983, 58-227073

Int. Cl.<sup>5</sup> G06K 9/36

U.S. Cl. 382—50

19 Claims



1. An image signal processing apparatus comprising: image signal input means; image discrimination means for discriminating whether an image signal is a dot image or not and for producing an image discrimination signal; image discrimination signal input means for inputting the image discrimination signal; first processing means for processing the image signal input from said image signal input means in a first mode, said first processing means including means for eliminating a predetermined frequency component from the image signal; second processing means for processing the image signal input from said image signal input means in a second mode, said second processing means including means for emphasizing a second predetermined frequency component; selection means for selecting said first or said second processing means to process the image signal, in accordance with the image discrimination signal input from said image discrimination signal input means; and halftone processing means for halftone processing the image signal output from said first or from said second processing means, said halftone processing means being provided in common to said first and second processing means.

4,953,115

## ABSOLUTE VALUE CALCULATING CIRCUIT HAVING A SINGLE ADDER

Toshiyuki Kanoh, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

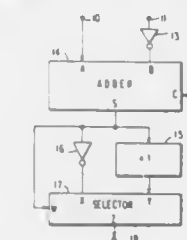
Filed Feb. 9, 1989, Ser. No. 308,296

Claims priority, application Japan, Feb. 9, 1988, 63-26565

Int. Cl.<sup>5</sup> G06F 7/38

U.S. Cl. 364—715.01

7 Claims



1. An absolute value calculating circuit for producing an absolute value of a difference between a first and a second

numerical value which have a predetermined bit length and are represented by 2's complement notation, comprising:

first inverting means for inverting the first numerical value to output an inverted numerical value; first adding means for adding the second numerical value to the inverted numerical value to output an addition result; second inverting means for inverting the addition result to output a first calculation result; second adding means for adding 1 to the addition result to output a second calculation result; and selecting means for selecting and delivering as an absolute value of a difference between the first and second numerical values, one of the first and second calculation results, said selecting means selecting one of the first and second calculation results in accordance with a sign of the addition result.

4,953,116

## DIGITAL WORD OUTPUT HIGH-PASS FILTER APPARATUS

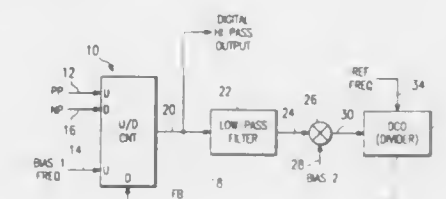
Blaine J. Nelson, Plano, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 19, 1989, Ser. No. 409,177

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.01

8 Claims



4,953,117

## METHOD AND APPARATUS FOR CONVERTING SAMPLING FREQUENCIES

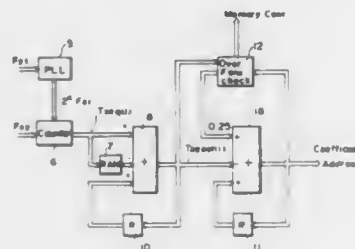
Roger Lagadec, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 288,960

Claims priority, application Japan, Dec. 29, 1987, 62-332395  
Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.10

15 Claims



1. A sampling frequency converter for converting sampled input data having an input sampling frequency into sampled output data having a selected output sampling frequency, said converter comprising:

circuit means for determining a relative ratio between periods of input data samples and output data samples and generating an output signal representing the relative ratio; averaging means for averaging said output signal of said circuit means for a predetermined time duration and generating an averaged output;

filter coefficient generating means responsive to said averaged output for generating data representative of a set of predetermined filter coefficients derived from a low pass filter impulse response; said filter coefficient generating means including an addressable memory for storing said set of predetermined filter coefficients, means for providing a fixed output as a function of said generated averaged output, and adder means for adding the averaged output, said fixed value, and an output of said adder means for generating a memory address for reading out a filter coefficient; and

sampling filter circuit means for converting said sampled input data into said sampled output data in response to said filter coefficients.

4,953,118

## NONRECURSIVE HALF-BAND FILTER

Heinz Gockler, Backnang, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

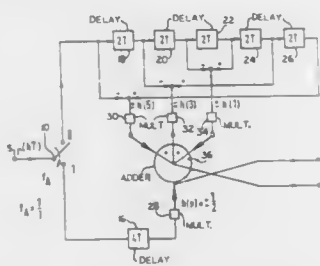
Filed Feb. 17, 1988, Ser. No. 156,797

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705209

Int. Cl.<sup>5</sup> G06F 15/31

U.S. Cl. 364—724.01

12 Claims



1. A nonrecursive half-band filter for filtering a complex-

valued input signal  $\bar{s}_1(kT) = s_{1r} + js_{1i}$ , where the input signal has a sampling rate  $f_A = 1/T$  and where  $k$  is a running index, the filter having a filter length  $N$  and having a pulse response  $h(l)$ , where  $N$  is an odd integer and  $l = -(N-1)/2$  to  $(N-1)/2$ , said filter comprising:

first means for demultiplexing the samples of the input signal to provide a plurality of demultiplexing signals, each demultiplexed signal having a sampling rate of  $f_A/2$ ; and second means, receiving the demultiplexing signals, for generating a filtered complex output signal  $\bar{s}(2kT)$  in accordance with the following relationship, with the symbol  $*$  indicating convolution and with  $\bar{h}(l)$  representing a complex value

$$\begin{aligned} \bar{s}(2kT) &= \bar{s}_1(2kT) * \bar{h}(l) \\ &= s_{1r}(2k) * h_r(l) - s_{1i}(2k) * h_i(l) + \\ &\quad j(s_{1r}(2k) * h_i(l) + s_{1i}(2k) * h_r(l)), \end{aligned}$$

wherein the pulse response  $h(l)$  of the filter is modulated onto a complex carrier with a frequency of  $\pm \frac{1}{2}$  of the sampling rate  $f_A$  to produce

$$h(l) = h(l) \cdot e^{j2\pi l f_A / (4f_A) + \phi_0} = j^{\pm l} \cdot e^{j\phi_0} \cdot h(l)$$

and the zero phase  $\phi_0$  of this frequency is a whole number multiple  $m$  of  $\pi/2$  ( $\phi_0 = m \cdot \pi/2$ , where  $m = 0, 1, 2, 3, \dots$ ), wherein the plurality of demultiplexed signals includes first and second demultiplexed signals, wherein the first means includes means for forming the first and second demultiplexed signals by allocating every second sample of the real component of the input signal to the first demultiplexed signal and allocating the remaining samples of the real component of the input signal to the second demultiplexed signal, and wherein the second means includes

a chain of  $(N-1)/2$  delay members each having a delay of  $2T$ , the chain of delay members receiving the first demultiplexed signal,

means, receiving signals from the chain of delay members, for forming difference signals, the means for forming difference signals including means for forming a first difference signal equal to the output signal from the last delay member in the chain minus the input signal to the first delay member of the chain, means for forming a second difference signal equal to the output signal from the penultimate delay member of the chain minus the input signal to the second delay member of the chain, and means for forming a third difference signal equal to the output signal from the third delay member from the end of the chain minus the input signal to the third delay member of the chain,

means for weighing the difference signals with values  $h(l)$  of the pulse response,

means for summing the weighted difference signals to provide a contribution to one of the real and the imaginary components of the filtered output signal,

a further delay member receiving the second demultiplexed signal, the further delay member having a delay of  $T(N-3)/2$ , and

means for weighing the output signal of the further delay member with the value  $h(0)$  to produce a contribution to the other of the real and the imaginary components of the filtered output signal.

4,953,119

## MULTIPLIER CIRCUIT WITH SELECTIVELY INTERCONNECTED PIPELINED MULTIPLIERS FOR SELECTIVELY MULTIPLICATION OF FIXED AND FLOATING POINT NUMBERS

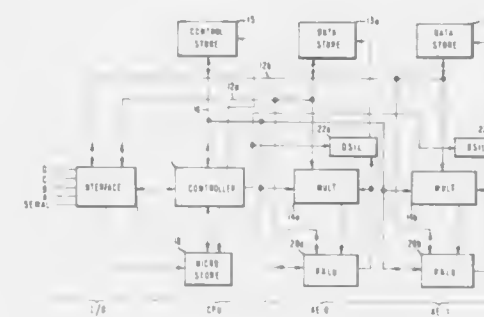
Kenneth J. Wong, Anaheim, and Steven P. Davies, Ontario, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 27, 1989, Ser. No. 303,789

Int. Cl.<sup>5</sup> G06F 7/52

U.S. Cl. 364—754

5 Claims



1. A multiplier circuit for selectively performing real and complex fixed point, and floating-point arithmetic multiplications on a plurality of input words having a predetermined data word length, said multiplier circuit comprising:

input logic means for receiving a plurality of input data words having a predetermined data word length for providing first and second output words comprising least and most significant portions of the input data words;

multiplier means coupled to the input logic means for receiving the first and second output words, and comprising first and second selectively interconnected parallel pipelined multiplier paths configured to implement a modified Booth algorithm for processing the least significant words and most significant words of the first and second output words, respectively, when performing floating-point multiplications, and for processing respective ones of the plurality of input words along the respective multiplier paths when performing fixed-point multiplications;

the first and second multiplier paths each comprising first and second serially connected multipliers having a first pipeline register connected therebetween, and further comprising a second pipeline register connected to an output of the second pipeline register; and

first and second adders respectively coupled to an output of the second multipliers of each path, the adder of the first multiplier path having an output selectively coupleable to an input of the adder of the second multiplier path to provide a carry input thereto;

wherein the multiplier means performs floating-point multiplication when the first and second parallel pipelined multiplier paths and the first and second adders are interconnected, and performs fixed-point multiplication when the first and second parallel pipelined multiplier paths and the first and second adders are selectively disconnected.

4,953,120

## DATA PROCESSING APPARATUS HAVING REPEAT FUNCTION SUPPRESSION FOR CONTINUOUSLY DEPRESSED DATA ENTRY KEYS

Masaki Nishiyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

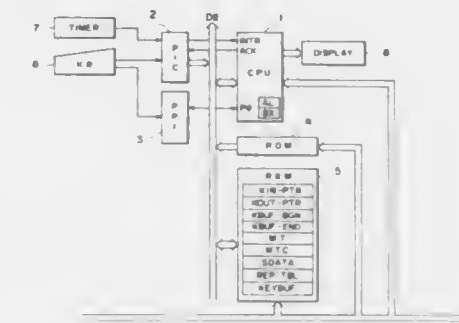
Continuation of Ser. No. 707,861, Mar. 4, 1985, abandoned. This application Apr. 11, 1988, Ser. No. 183,273

Claims priority, application Japan, Mar. 7, 1984, 59-42137; Mar. 7, 1984, 59-42140

Int. Cl.<sup>5</sup> G06F 3/02

U.S. Cl. 364—900

7 Claims



1. A key input apparatus comprising: key entry means, comprising a plurality of keys, for entering key data through keying operations which actuate at least one of said plurality of keys;

first memory means for storing therein the key data entered by said key entry means;

second memory means for storing therein key data entered by said key entry means;

timer means for clearing said key data stored in said second memory means after a predetermined time period corresponding to the kind of key of said key entry means that is actuated, at least some of said keys having different predetermined time periods;

discrimination means for discriminating whether the key data stored in said first memory means is equal to the key data stored in said second memory means;

control means for introducing the key data stored in said first memory means into said second memory means for storage therein when said discrimination means discriminates that key data stored in said first memory means and in said second memory means are not equal; and

processing means for processing the key data stored in said second memory means.

4,953,121

## CIRCUITRY FOR AND METHOD OF CONTROLLING AN INSTRUCTION BUFFER IN A DATA-PROCESSING SYSTEM

Otto Muller, Am Gockenbühl 10, D 7750 Konstanz 16, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 177,309

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 3802025

Int. Cl.<sup>5</sup> G06F 12/08

U.S. Cl. 364—900

27 Claims

1. In a method of controlling instructions in a data-processing system, wherein instructions including branching instructions pointing to an instruction address defining a branch address are loaded in sequence, in response to a loading indicator that is always increased by no more than a prescribed difference in relation to an instruction address (BRA) that is constantly to be increased in accordance with one program run-through and ahead of the instructions address, from instruction addresses in a main memory (MEM) into an instruction buffer memory (IBUF) and addressable therein by an instruction



wherein said means for determining the physical address on said optical disk of the most recent sequential data storage segment into which host data was written having a specified perceived physical address comprises pointer map memory means for storing a map of all available host data perceived physical addresses and the associated physical addresses of the most recent sequential data storage segments on said optical disk wherein host data having the corresponding specified perceived physical addresses have been written, said means for writing host data to a next sequential unwritten data storage element including means for updating said pointer map memory means with the physical address of said next sequential data storage segment such that the perceived physical address specified by said host system for said host data is associated in said pointer map memory means with the physical address on said optical disk of said next sequential data storage segment.

a write-once optical disk including at least one recording surface divided into a plurality of storage segments, including a plurality of sequential data storage segments each having a host data portion and a logical address portion and having a given physical location on said recording surface, and having said physical location of each said data storage segment on said optical disk represented by a physical address different from the physical address

(vi) a memory control means which is made operative by receiving said sync clocks and enable signal reproduced by said control data receiving means and for performing

(vii) a read data transmitting means for frequency modulating serial bit data read out of the memory by said reading operation by said memory control means and for supplying same to said fourth induction coil.

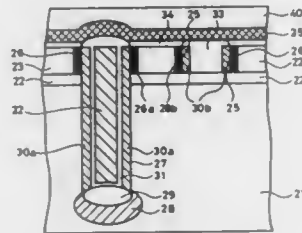
wherein an arrangement of said optical element and said half mirror satisfies the following conditions:

$$\delta T \approx n T \pi$$

where  $\delta_S$ ,  $\delta_M$  and  $\delta_Q$  are phase differences produced by the transparent substrate, the thin film and said optical element, respectively, between a polarized light component of the modulated light beam in the predetermined direction and a polar-

ized light component of the modulated light beam in a direction orthogonal to the predetermined direction,  $\delta_R$  is a phase difference produced by said half mirror between a polarized light component of the reflected light beam in the predetermined direction and a polarized light component of the transmitted light beam in the direction orthogonal to the predetermined direction,  $\delta_T$  is a phase difference produced by said half mirror between a polarized light component of the transmitted light beam in the predetermined direction and a polarized light component of the transmitted light beam in the direction orthogonal to the predetermined direction, and  $n$ ,  $n_R$  and  $n_T$  are each integers.

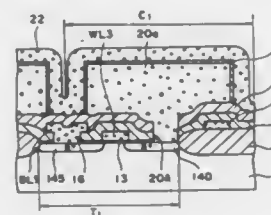
**4,953,125**  
**SEMICONDUCTOR MEMORY DEVICE HAVING IMPROVED CONNECTING STRUCTURE OF BIT LINE AND MEMORY CELL**  
 Yoshinori Okumura; Akihiko Ohsaki; Kazuyuki Sugahara, and Tatsuhiko Ikeda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Mar. 25, 1988, Ser. No. 173,749  
 Claims priority, application Japan, Mar. 25, 1987, 62-72214  
 Int. Cl.<sup>5</sup> G11C 11/40; H01L 29/78  
 U.S. Cl. 365-149 9 Claims



1. A semiconductor device comprising:
  - a semiconductor substrate comprising a first layer of a first conductivity type having a predetermined impurity concentration, a first insulating layer formed on said first layer of the first conductivity type and a second layer of the first conductivity type having a major surface formed on said first insulating layer,
  - said semiconductor substrate having a trench formed through said first layer of the first conductivity type, said first insulating layer and said second layer of the first conductivity type,
  - a first layer of a second conductivity type formed in a region of said second layer of the first conductivity type and in the sidewall portion of said trench,
  - a second layer of the second conductivity type formed spaced apart, by predetermined spacing, from said first layer of the second conductivity type in said second layer of the first conductivity type,
  - a first conductive layer formed adjacent to said second layer of the second conductivity type in said second layer of the first conductivity type,
  - a third layer of the second conductivity type formed on the sidewall of said trench at least on the side of a portion in which said first layer of the second conductivity type is formed,
  - a second insulating layer formed on the sidewall and in the bottom portion of said trench having said third layer of the second conductivity type formed,
  - a second conductive layer formed on the surface of said third insulating layer on the sidewall and the bottom surface of said trench,
  - said third layer of the second conductivity type, said second insulating layer and said second conductive layer constituting a capacitor of a memory cell,
  - a third insulating layer formed in the upper portion of said trench on said major surface, and

a third conductive layer formed on said third insulating layer,  
 said second layer of the first conductivity type, said first layer of the second conductivity type, said second layer of the second conductivity type and said third conductive layer constituting a semiconductor element.

**4,953,126**  
**DYNAMIC RANDOM ACCESS MEMORY DEVICE INCLUDING A STACK CAPACITOR**  
 Taiji Ena, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
 Continuation of Ser. No. 274,279, Nov. 22, 1988, abandoned.  
 This application Dec. 29, 1989, Ser. No. 462,290  
 Claims priority, application Japan, Nov. 25, 1987, 62-296669; Nov. 30, 1989, 62-302464  
 Int. Cl.<sup>5</sup> G11C 11/34, 11/24  
 U.S. Cl. 365-182 18 Claims



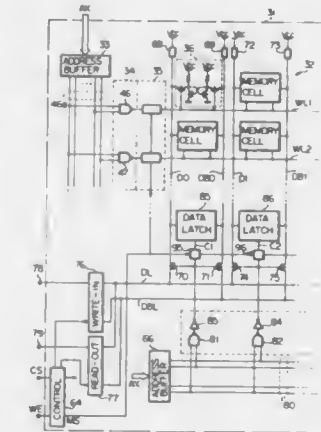
1. A dynamic random access memory device comprising:
  - a semiconductor substrate having a source region and a drain region;
  - a first insulation film formed on a surface of the semiconductor substrate;
  - a gate electrode formed on the first insulation film;
  - a second insulation film formed so as to cover the gate electrode;
  - a bit line formed on the second insulation film, the bit line being in contact with the source region through a first opening formed in at least the second insulation film;
  - a third insulation film formed so as to cover the bit line;
  - a storage electrode formed on the third insulation film and being in contact with the drain region through a second opening formed in at least the second and third insulation films;
  - a dielectric film formed so as to surround the storage electrode; and
  - an opposed electrode formed so as to cover the dielectric film.

**4,953,127**  
**SEMICONDUCTOR MEMORY HAVING DIFFERENT READ AND WRITE WORD LINE VOLTAGE LEVELS**  
 Yasuhiko Nagahashi, and Yasuhiko Rai, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan  
 Filed Oct. 21, 1987, Ser. No. 110,823  
 Claims priority, application Japan, Oct. 21, 1986, 61-251013  
 Int. Cl.<sup>5</sup> G11C 7/00  
 U.S. Cl. 365-189.05 9 Claims

1. A semiconductor memory device fabricated on a semiconductor substrate and having operation modes consisting of a read-out mode and a write-in mode, comprising:
  - (a) a plurality of word lines each extending in a row direction;
  - (b) a plurality of bit lines each extending in a column direction;
  - (c) a plurality of complementary bit lines extending in a column direction and respectively paired with said bit lines to form a plurality of bit line pairs;
  - (d) a memory cell array having a plurality of memory cells arranged in rows and columns, each of said memory cells

having first and second memory nodes were a data bit is stored in the form of complementary voltage levels, two transfer gate transistors having source-drain paths respectively coupled between the first and second memory nodes and one of said bit line pairs and gate electrodes coupled to one of said word lines, and a data bit retaining circuit operative to retain said data bit stored in said first and second memory nodes;

- (e) a word line decoder circuit operative to select one word line based on a row address signal for allowing data bits stored in said memory coupled to said one word line to be transferred to said bit line pairs, respectively, in said read-out mode, said one word line further allowing data bits on said bit line pairs to be memorized in said memory cells coupled to said one word line;
- (f) a word line driving circuit operative to supply said selected one word line with a relatively high voltage level or a relatively low voltage level depending upon said



- operation modes, said relatively high voltage level being produced in said write-in mode, said relatively low voltage level being produced in said read-out mode;
- (g) data input/output means to which or from which a data bit is supplied;
  - (h) a bit line pair decoder circuit operative to select one bit line pair for allowing said selected one bit line pair to electrically connect to said data input/output means,
  - (i) a control circuit operative to produce a mode signal representing said read-out mode or said write-in mode;
  - (j) a plurality of data latch circuits respectively coupled to said bit line pairs and operative to latch data bits on said bit line pairs, respectively, when said data latch circuits are activated; and
  - (k) activation means operative to activate said data latch circuits in said write-mode, except for the data latch circuit coupled to said bit line pair selected by said bit line pair decoder.

**4,953,128**  
**VARIABLE DELAY CIRCUIT FOR DELAYING INPUT DATA**

Hiroaki Kawai, and Masahiko Yoshimoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

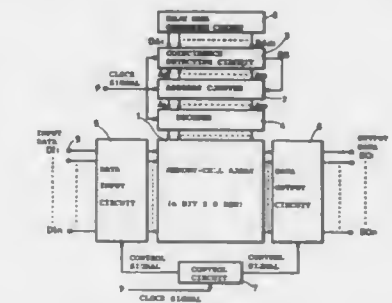
Filed Dec. 16, 1987, Ser. No. 133,790  
 Claims priority, application Japan, Dec. 16, 1986, 61-300382  
 Int. Cl.<sup>5</sup> G11C 7/00

- U.S. Cl. 365-194 9 Claims
8. A variable delay circuit for delaying the transmission of input data blocks received sequentially at uniform time intervals in accordance with a clock signal comprising:
    - memory device means comprising an array of memory cells in a matrix of rows and columns for storing the input data;
    - means for successively writing each received data block to

different specified address locations in said memory device in response to said clock signal;

output means for reading out data blocks stored in said memory device;

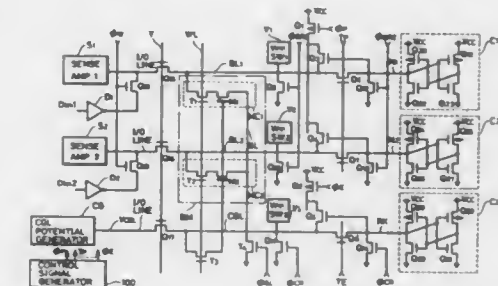
delay setting means for establishing a time delay, equal to a selectable number of said intervals, to transpire for the readout of input data blocks by said output means;



means for setting the number of said different specified address locations for each received data block equal to the number of delay intervals set by said delay setting means; and

means responsive to said clock signal for writing newly received data at the address locations of the last previously read data block address locations in said memory device.

**4,953,129**  
**NONVOLATILE SEMICONDUCTOR MEMORY DEVICE CAPABLE OF RELIABLY WRITING DATA AND A DATA WRITING METHOD THEREFOR**  
 Kazuo Kobayashi; Yasushi Terada, and Takeshi Nakayama, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Apr. 13, 1989, Ser. No. 337,705  
 Claims priority, application Japan, Jul. 29, 1988, 63-191379  
 Int. Cl.<sup>5</sup> G11C 7/00  
 U.S. Cl. 365-203 12 Claims



1. A nonvolatile semiconductor memory device comprising:
  - a plurality of memory cells arrayed in a matrix of rows and columns, for storing information in a nonvolatile manner, a plurality of column signal lines each connected with one column of the plurality of memory cells, a plurality of first latch means provided corresponding to the respective column signal lines, for temporarily storing a potential of the corresponding column signal line, and a plurality of first separating means for separating the column signal lines from the latch means, each of said first latch means having a latch node coupled to the corresponding column signal line through the corresponding separating means, said nonvolatile semiconductor memory device having at least a first operation cycle for writing externally applied data into a memory cell selected by



UMI

1. A process for avoiding clumping of fibers during preparation of a mixture of said fibers and particulates comprising:

- A. passing fibers with a vaporous medium through a turbulent pressure differential in the range of about 10 to about 35 inches of water as a pressure head to form a fiber-entrained-vapor-mixture flowing at a speed sufficient to permit transfer as a fluid in a conduit and having a ratio by volume of vapor to fiber in the range of about 1,300:1 to about 20,000:1;
- B. separating said fiber-entrained-vapor-mixture into a vapor-stream and a fiber-containing stream providing, based upon total weight of solids in said fiber-entrained-vapor-mixture, a recovery of at least 90% by weight of solids;
- C. mixing said fiber-containing stream into said particulates to form a fiber-particulate mixture; wherein rate of addition and agitation are so coordinated that clumping of said fibers is substantially avoided.

4,953,136

## DOWNHOLE SEISMIC EXPLORATION DEVICE AND APPARATUS

Masahiro Kamata, Tokyo; Shitomi Katayama, Kanagawaken, both of Japan; Francis Mons, Bonnelles, France, and Robert Porter, Bellevue, Wash., assignors to Schlumberger Technology Corporation, New York, N.Y.

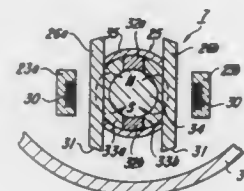
Filed Jul. 18, 1986, Ser. No. 887,307

Claims priority, application Japan, Jul. 24, 1985, 60-161793

Int. Cl.<sup>5</sup> G01V 1/00

U.S. Cl. 367-25

13 Claims



1. A device for use in geophysical exploration of earth formations traversed by a borehole, comprising:
- sensor means having detecting means for detecting seismic acoustic data and having magnetic clamping means for clamping said sensor means to a wall of a borehole;
  - carrier means for carrying said sensor means disposed in an internal space defined by a front end block, a rear end block spaced from said front end block and a pair of side blocks extending in parallel between said front and rear end blocks, said front end block being adapted for connection to a first point of a cable and said rear block being adapted for connection to a second point of said cable, and at least one of said pair of side blocks being formed with a conduit passage for receiving conductors of said cable; and
  - damping means, interposed between said sensor means and said carrier means, for reducing transmission of vibration between the carrier means and said sensor means when said sensor means is clamped to the wall of the borehole.

4,953,137

## METHOD FOR DETERMINING EARTH STRESSES IN FORMATIONS SURROUNDING A CASED WELL

William L. Medlin, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 18, 1990, Ser. No. 467,108

Int. Cl.<sup>5</sup> G01V 1/40

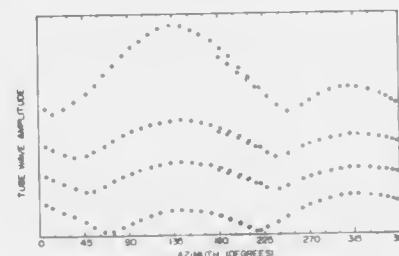
U.S. Cl. 367-31

20 Claims

1. A method of acoustic well logging for identifying horizontal azimuthal direction of maximum and minimum earth stresses behind well casing comprising the steps of:

- (a) traversing a fluid-filled cased well with a well logging tool containing a monopole acoustic energy source,

- (b) rotating said logging tool as it traverses said cased well,
- (c) exciting said monopole acoustic energy source with a plurality of tone bursts of fixed frequency to drive said source to resonate and produce symmetric pressure waves in the fill-fluid within the cased well, the impact of said pressure waves against the casing of said well causing said casing to deflect and produce symmetric cased well tube waves immediately adjacent said source,
- (d) receiving said cased well tube waves by one or more receivers sensitive to asymmetric tube waves located at spaced apart positions along said logging tool, said maximum and minimum earth stresses imparting asymmetry into the amplitudes of said cased well tube waves as they travel along the well casing between said source and said one or more receivers,



- (e) recording the amplitudes of said received cased well tube waves,
- (f) identifying the azimuthal position of said logging tool as it rotates within said well casing,
- (g) identifying the horizontal azimuthal direction of the minimum earth stress behind the well casing from an increased tube wave amplitude which said minimum earth stress imparts to said cased well tube waves as they travel through the well casing between said source and said one or more receivers, and
- (h) identifying the horizontal azimuthal direction of the maximum earth stress behind the well casing from a decreased tube wave amplitude which said maximum earth stress imparts to said cased well tube waves as they travel through the well casing between said source and said one or more receivers.

4,953,138

## ENHANCING SEISMIC REFLECTION EVENTS

Davis W. Ratcliff, New Orleans, La., assignor to Amoco Corporation, Chicago, Ill.

Filed Jun. 28, 1989, Ser. No. 372,975

Int. Cl.<sup>5</sup> G01V 1/28

U.S. Cl. 367-43

9 Claims

7. A method for enhancing attenuated seismic reflection events, in seismic data, representative of sloping formations and faults in the earth's subsurface formations, comprising:

- (a) defining time-space windows encompassing said selected attenuated seismic reflection events therein;
- applying a multichannel filter to the seismic data for passing the selected seismic reflection events within the time-space window of the seismic data;
- (c) multiplying the amplitude of the passed seismic reflection events by an empirically determined amount; and

- (d) combining the multiplied seismic reflection events with the seismic data for obtaining an enhanced structural

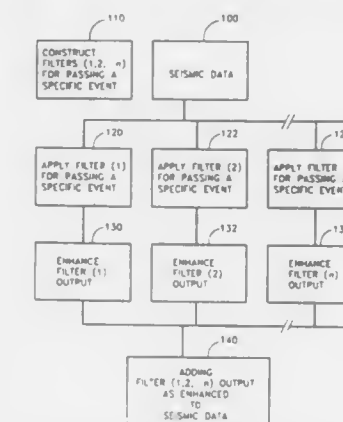


image of sloping formations and faults in the earth's subsurface.

4,953,139

## METHOD FOR RESTORING AND EXTRAPOLATING SEISMIC TRACES

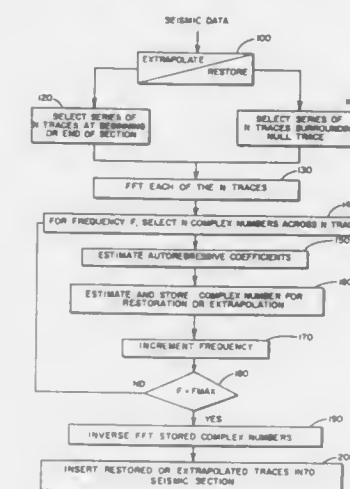
Stanley J. Laster, Dallas; Robert A. Meek, Sanger, and Thomas E. Shirley, Richardson, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 5, 1990, Ser. No. 474,886

Int. Cl.<sup>5</sup> G01V 1/28, 1/36

U.S. Cl. 367-73

4 Claims



1. A method for enhancing a x-t domain seismic record comprising the steps of:

- (a) identifying a null seismic trace for restoration;
- (b) selecting a group of traces surrounding said identified null seismic trace to be restored on said x-t domain seismic record;
- (c) transforming said group of selected traces into the f-x domain by the application of a fast Fourier transform;
- (d) selecting a series of complex numbers corresponding to the selected traces for each frequency component;
- (e) estimating a set of autoregressive coefficients from said series of complex numbers;
- (f) estimating a complex number for the missing number associated with the identified null trace from said series of complex numbers and autoregressive coefficients on either side of the missing number;

- (g) repeating step (d) through (f) for a plurality of frequencies in the f-x domain and
- (h) applying an inverse fast Fourier transform to the estimated complex numbers for said plurality of frequencies to produce restored seismic data for identified seismic traces on said x-t domain seismic record.

4,953,140

## METHOD OF SUBTERRANEAN MAPPING

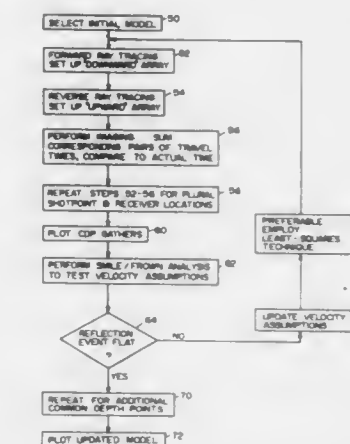
Mark A. Dablain, Plano, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 21, 1989, Ser. No. 396,398

Int. Cl.<sup>5</sup> G01V 1/28

U.S. Cl. 367-73

4 Claims



1. A method for generating an improved cross-sectional depiction of the subterranean structure of the earth, wherein said structure consists of a number of subterranean rock layers characterized by the velocity of seismic energy therein, comprising the steps of:

- (a) recording seismic energy input to the earth at a series of first shotpoint locations, reflected from various interfaces between rock layers within the earth, and detected at various detector locations;
- (b) defining an initial model of the subterranean structure, said model consisting of an assumed sequence of rock layers and corresponding assumptions concerning the velocity of seismic energy therein;
- (c) correcting portions of the modeled structure by:
- generating a first array of calculated downward going travel times corresponding to rays of seismic energy traced from a first shotpoint to various locations in the modeled subterranean structure;
  - generating a second array of calculated upward going travel times corresponding to rays of seismic energy traveling between a first receiver location and said various locations in the modeled subterranean structure;
  - determining a pair of corresponding points in the arrays at which the sum of one of the calculated upward-going travel times and the corresponding one of the downward-going travel times equals the recorded travel time between the corresponding shotpoint and detector locations, and a common depth point corresponding to the determined points in the arrays;
  - repeating said steps (i), (ii) and (iii) to generate a gather of said representations each involving reflection from a common reflecting point;
  - correcting said gather of representations for velocity in the modeled structure, to generate common depth point records; and
  - aligning said depth records corresponding to the common reflecting point records with one another, and
  - varying the assumed velocity of seismic energy in the



- sequence of rock layers assumed in the model used in said correction step until a common depth point reflection event on each of the representations is substantially aligned;
- (d) repeating said steps (i)-(vii) for a number of different shotpoints and detector locations, and repetitively correcting the assumptions of the model concerning the sequence of rock layers and the velocity of seismic energy therein; and
- (e) plotting the corrected model.

4,953,141

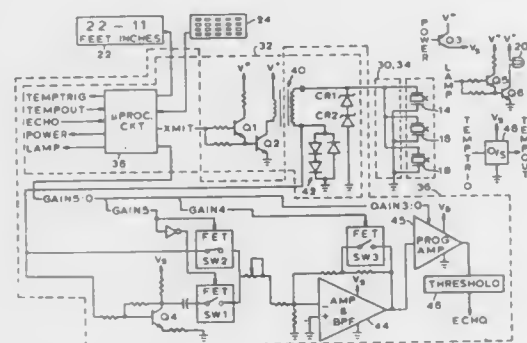
**SONIC DISTANCE-MEASURING DEVICE**  
Joel S. Novak, Sudbury, and Natan E. Parsons, Brookline, both of Mass., assignors to Recurrent Solutions Limited Partnership, Cambridge, Mass.

Filed Aug. 28, 1987, Ser. No. 90,961

Int. Cl.<sup>5</sup> G01S 15/00

U.S. Cl. 367-108

7 Claims



1. A sonic distance measuring device comprising: sonic transducer means including at least two individual sonic transducers for transmitting sound upon application of an electrical drive signal thereto and for producing electrical sense signals upon application of sound waves thereto;
- driver means for repetitively driving said transducers with pulses of oscillatory electrical signals so as to cause the transducers to transmit sound pulses repetitively;
- receiver means for receiving the electrical signals produced by said transducers and amplifying the signals with a gain that changes in steps as a function of time and amplifying the received signals; and
- timing-and-conversion measurement means for repetitively measuring the times between the transmissions of sound pulses by said transducer means and the times at which the subsequent amplified signals reach a predetermined threshold value, and for producing an indication of the distance required for sound to travel in a measured time, only if the measured time is substantially the same in different cycles, whereby noise caused by the gain steps is ignored.

4,953,142

**MODEL-BASED DEPTH PROCESSING OF SEISMIC DATA**

Daniel H. Rimmer, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Jan. 6, 1989, Ser. No. 294,536

Int. Cl.<sup>5</sup> G01V 1/28

U.S. Cl. 367-73

7 Claims

5. A method of depth-processing seismic data to more accurately represent a dipping horizon, comprising the steps of: obtaining seismic shot data for the horizon along a seismic line and determining a seismic horizon therefrom;

estimating a geologic horizon corresponding to the seismic horizon;

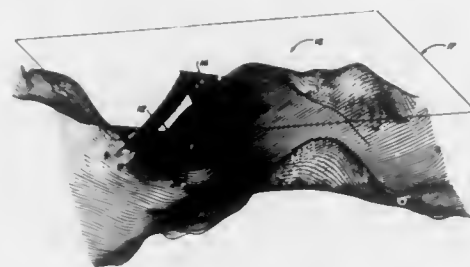
entering the estimated geologic horizon into a three-dimensional seismic model of the horizon;

computing three-dimensional synthetic shot records for the seismic line being processed;

estimating the reflection track or tracks for the seismic line from the computed shot records;

setting up bins along the reflection track;

assigning a bin number to each seismic shot trace;



calculating a two-way time-to-depth static conversion for each computed trace;

incorporating the bin number and the static conversion into the data of each seismic shot trace;

sorting the seismic trace data into the bins;

stacking the seismic binned data;

comparing the seismic shot data with predicted shot data from the model; and

modifying the seismic model to bring it into substantial correspondence with the seismic data.

4,953,143

**MULTIPLE FREQUENCY SYNTHETIC APERTURE SONAR**

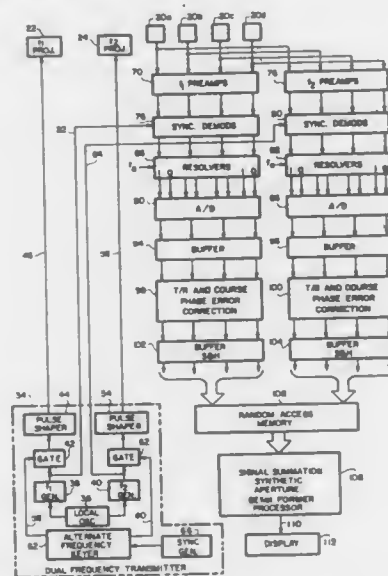
Francis J. Higgins; Chester D. Loggins, Jr., and James T. Christoff, all of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 12, 1981, Ser. No. 237,352

Int. Cl.<sup>5</sup> G01S 15/00

U.S. Cl. 367-88

8 Claims



1. A multiple frequency synthetic aperture sonar for use in conjunction with an underwater vehicle that travels at a pre-

terminated velocity substantially along a horizontal linear course, said sonar comprising:

projector means, carried by said vehicle, for insinuating a predetermined sector laterally of said course;

transmitter means for energizing said projector means so as to alternatively project at a predetermined repetition rate first and second pulses of acoustic energy of first and second frequencies, respectively;

hydrophone means, carried by said vehicle, for receiving acoustic energy returned from within said sector and providing corresponding electrical first and second return signals resulting from said first and second pulses;

means, centered on said first and second frequencies, for separating said first and second return signals for subsequent processing;

first and second processing means for demodulating, resolving and phase error correcting said first and second return signals, respectively, to provide first and second processed return signals;

memory means, for collection and storage of said first and second processed return signals as inputs during a predetermined period between like pulses and reading out said processed return signals during subsequent periods; and

summation means for coherently adding said first and second processed return signals of said predetermined and subsequent periods to provide a synthetic aperture output signal.

4,953,144

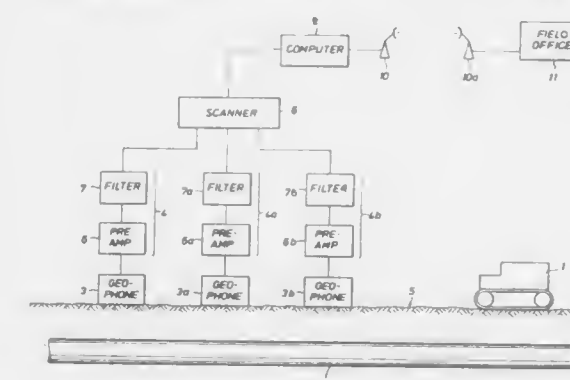
**THIRD-PARTY DETECTION AROUND PIPELINES**  
Robert Wing-Yu Chin; Vitold R. Kruka; Thomas L. Stewart; Robert W. Patterson, and Edward R. Cadena, Jr., all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Sep. 11, 1989, Ser. No. 405,256

Int. Cl.<sup>5</sup> H04B 1/06

U.S. Cl. 367-135

4 Claims



1. A method for determining the presence of a heavy vehicle in the vicinity of a pipeline, comprising:
- spacing geophones along the pipeline;
- detecting background vibration frequencies in the vicinity of said pipeline with said geophones;
- predetermining the vibration frequencies associated with said heavy vehicle;
- discriminating between vibration frequencies associated with said heavy vehicle and background vibration frequencies; and
- determining which geophone is closest to the heavy construction vehicles by the intensity of the vibration.

4,953,145  
**ACTIVE PHASE QUIETING TARGET HIGHLIGHT DETECTOR**

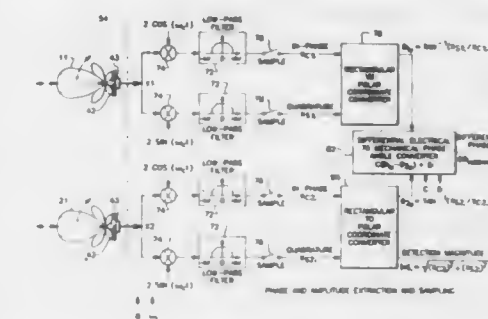
Gerrard M. Carlson, Maple Grove, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 30, 1988, Ser. No. 252,221

Int. Cl.<sup>5</sup> H04B 1/00

U.S. Cl. 367-138

18 Claims



1. An active phase quieting target highlight detector comprising:
- signal detection means for reception of an echo signal;
- extraction means, connected to said detection means, for extracting phase and amplitude information from the echo signal;
- magnitude detection means, connected to said extraction means, for processing said amplitude information;
- phase detection means, connected to said extraction means, for processing said phase information, comprising:
- a phase variance indicator connected to said extraction means; and
- a phase detector connected to said phase variance indicator and to said combining means; and
- combining means, connected to said magnitude detection means and to said phase detection means, for combining signals from said magnitude detection means and phase detection means.

4,953,146

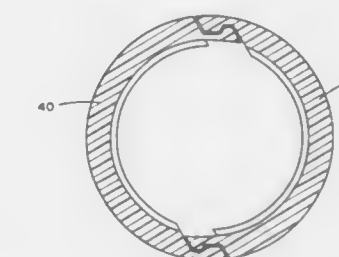
**STREAMLINE SEISMIC STREAMER-CABLE CASING**  
Alan D. McMurry, Friendswood, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Continuation of Ser. No. 279,761, Dec. 5, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 477,171

Int. Cl.<sup>5</sup> H04B 11/00

U.S. Cl. 367-191

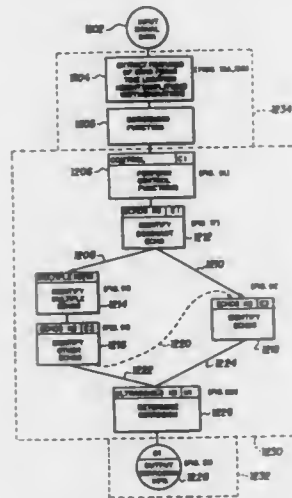
11 Claims



1. An apparatus for balancing a seismic streamer cable, comprising:
- (a) a streamlined housing having a first and a second valve substantially identical to each other and coupled about the streamer cable, the first valve having a socket and a clasp adapted to receive a corresponding socket and clasp on the second valve to rigidly fasten the first and second valve together about the streamer cable; and

- (b) a weight secured about the streamer cable by the first and second valve.

**4,953,147**  
**MEASUREMENT OF CORROSION WITH CURVED**  
**ULTRASONIC TRANSDUCER, RULE-BASED**  
**PROCESSING OF FULL ECHO WAVEFORMS**  
 Wesley N. Cobb, University Heights, Ohio, assignor to The  
 Standard Oil Company, Cleveland, Ohio  
 Filed Nov. 4, 1987, Ser. No. 116,767  
 Int. Cl.<sup>5</sup> G01V 1/40  
 U.S. Cl. 367—35 16 Claims

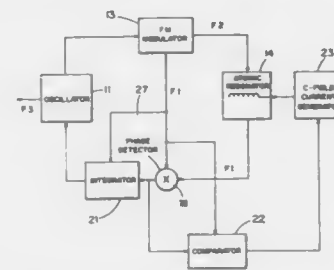


1. An acoustic logging device, comprising:  
 excitation pulse generation means for generating an excitation pulse;  
 transducer means, having a transducer surface and connected to said excitation pulse generation means, for receiving said excitation pulse and for launching in response to said pulse, an acoustic signal from said transducer surface toward a target surface, said target surface reflecting a portion of said acoustic signal back toward said transducer means;  
 full echo waveform detection means for receiving acoustic energy returned from said target surface and for generating a full echo waveform including echo heights, widths and relative positions in time;  
 analysis means for analyzing said full echo waveform to determine the condition of said target surface;  
 said analysis means comprises a rule-based Expert System for analyzing said echo heights, widths, and positions so as to determine the condition of said target surface, and said rule-based expert system having a knowledge source comprising one or more opportunistically executed rules.

**4,953,148**  
**ELIMINATION OF MAGNETIC INFLUENCE ON**  
**ATOMIC CLOCKS**  
 Alexander Lepek, 11 B, Moshe Sharet Boulevard, Jerusalem, Israel, and Avinoam Stern, 3 Haetzal Street, Jerusalem, Israel  
 Filed May 5, 1989, Ser. No. 347,869  
 Claims priority, application Israel, May 6, 1988, 86301  
 Int. Cl.<sup>5</sup> G04B 17/20; H03L 7/26  
 U.S. Cl. 368—202 8 Claims

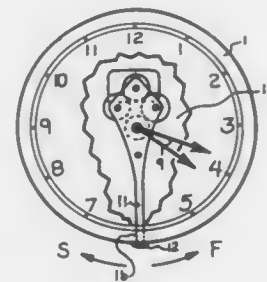
1. An atomic clock system for maintaining a high degree of accuracy when exposed to magnetic disturbances, said system comprising:  
 oscillator means for generating first and second oscillator signals, said first signal being a desired clock signal;  
 frequency modulation means for modulating said second

oscillator signal and providing a modulator output signal, and for providing a synchronizing signal;  
 C-field current generating means for alternatingly generating first and second current signals;  
 atomic resonator means receiving said first and second current signal for generating first and second magnetic fields, respectively, and first and second resonator frequency signals corresponding to said first and second magnetic fields, respectively;  
 phase detection means receiving said first and second resonator frequency signals and said synchronizing signal for producing first and second phase detection output signals corresponding to said first and second resonator frequency signals;



integrator means receiving said synchronizing signal for filtering said first phase detection output signal upon receiving said first phase detection signal under control of said synchronizing signal and producing a correction output signal fed to said oscillator means; and  
 comparator means receiving said synchronizing signal and said first and second phase detection output signals for computing the difference between said first and second phase detection output signals and producing a comparator output signal feeding said C-field current generator for controlling said C-field current generator to maintain said first oscillator signal at a stable frequency.

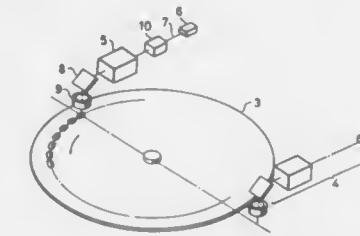
**4,953,149**  
**TWO SPEED CLOCK FOR DAYLIGHT SAVING**  
 Daniel Marvosh, 3085 Claremea La., Pasadena, Calif. 91107  
 Filed Aug. 9, 1989, Ser. No. 395,427  
 The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.  
 Int. Cl.<sup>5</sup> G04B 19/00  
 U.S. Cl. 368—223 5 Claims



1. A clock for daylight saving, said clock being of a character having a quartz crystal which is used as a regulator for an electric oscillatory circuit, the output of which is supplied to a motor having a drive shaft, said clock comprising:  
 (a) a clock movement, including minute and hour hands and an operating gear for turning said minute and hour hands;  
 (b) A gear assembly cooperatively associated with said clock movement, including:

- (i) a drive gear connected to the drive shaft of the motor of the clock;
  - (ii) a first driven gear of a first diameter in engagement with said drive gear; and
  - (iii) a second driven gear of a second diameter in engagement with said drive gear;
- said gear assembly being moveable from a first position wherein said operating gear is in engagement with said first driven gear to a second position wherein said operating gear is in engagement with said second driven gear; and  
 (c) Shift means connected to said gear assembly for moving said gear assembly between said first and second positions.

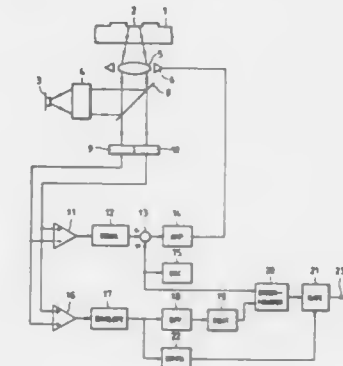
**4,953,150**  
**OPTICAL RECORDING APPARATUS HAVING**  
**IMPROVED ERASING CAPABILITY**  
 Hiraku Sonobe, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 21,554, Mar. 2, 1987, abandoned, which is a continuation of Ser. No. 739,489, May 30, 1985, abandoned, which is a continuation of Ser. No. 420,732, Sep. 21, 1982, abandoned. This application Feb. 2, 1989, Ser. No. 304,908  
 Claims priority, application Japan, Nov. 9, 1981, 56-179423  
 Int. Cl.<sup>5</sup> G11B 11/14  
 U.S. Cl. 369—13 1 Claim



1. An optical recording apparatus for recording information on a magneto-optical recording medium having an original magnetization by applying a light beam to raise the temperature of the recording medium to approximately the Curie temperature in the presence of a DC bias magnetic field and causing inversion of magnetization in a portion of the recording medium at which the light beam is applied, and for erasing the recording medium by applying a light beam to raise the temperature of the recording medium to approximately the Curie temperature in the presence of a DC bias magnetic field and returning the magnetization in said portion to the original magnetization, wherein the threshold energy for erasure is the same as the threshold energy for recording, wherein said apparatus comprises:

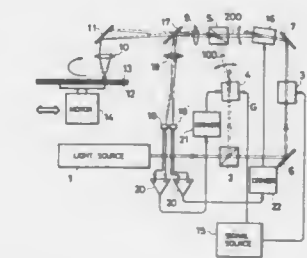
a light source for emitting a light beam;  
 means for projecting the light beam emitted by said light source onto the magneto-optical recording medium as a beam spot;  
 means for scanning the recording medium with the beam spot; and  
 means for changing the power of the light beam emitted by said light source in such a manner that the amount of peak energy given to the recording medium by the light beam at the time of erasure is larger than that at the time of recording, so that the width of the beam spot, defined by said threshold energy, is larger at the time of erasure than at the time of recording.

**4,953,151**  
**APPARATUS FOR DETECTING WHETHER**  
**INFORMATION IS RECORDED ON A STORAGE**  
**DEVICE**  
 Ryoichi Imanaka, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Jul. 22, 1988, Ser. No. 223,694  
 Claims priority, application Japan, Jul. 24, 1987, 62-186237  
 Int. Cl.<sup>5</sup> G11B 7/00  
 U.S. Cl. 369—44.13 8 Claims



1. An apparatus for detecting whether or not an information signal is recorded on a storage disk, the apparatus comprising:  
 (a) means for scanning an information track of the disk with a light beam;  
 (b) means for wobbling the light beam in a direction perpendicular to a longitudinal direction of the track in response to a wobbling signal;  
 (c) means for deriving a reproduced signal from the light beam which was affected by the disk;  
 (d) means for deriving a variation in amplitude of the reproduced signal; and  
 (e) means for detecting a difference between the derived amplitude variation and the wobbling signal and generating a detection signal representative of the detected difference indicative of the presence of said information signal being recorded on said storage disk.

**4,953,152**  
**MASTERING MACHINE FOR MAKING AN ON-LAND**  
**RECORDING MASTER DISK WITH TWO BEAM**  
**ALIGNMENT SERVO LOOPS**  
 Masaru Ito, Sagami-hara; Hitoshi Watanabe; Toshiaki Taki, both of Yauki, and Yoshito Tsunoda, Suginami, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell, Ltd., Osaka, both of Japan  
 Filed Dec. 29, 1987, Ser. No. 138,582  
 Claims priority, application Japan, Jan. 9, 1987, 62-1616  
 Int. Cl.<sup>5</sup> G11B 7/0911  
 U.S. Cl. 369—44.39 31 Claims

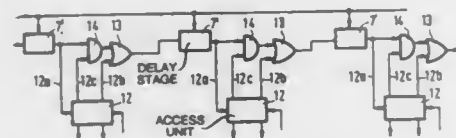


1. A mastering machine for an optical disk comprising:





location of the first as well as the second serial memory, the input and the output of the two serial memories being linked with the central controller and the information stored at the memory locations of the first and second serial memories permitting to be transferred from the first to the last access unit and from the last to the first access unit, respectively, under control of the clock signals, the central controller generating consecutive frame patterns always having equal numbers of time slots, each containing a predetermined number of clock signal periods, in which time slots at least an amount of infor-



mation bits, each having a first or a second binary value, can be written, and each access unit being arranged for rewriting the information bits in a time slot as bits having the same binary value as before they were rewritten or as bits having the second binary value, the locations of the bits that are rewritten as bits having the second binary value being determined by the access unit, characterized in that for at least a plurality of access units means are provided for rewriting information bits in a time slot having the second binary value as bits having a first binary value.

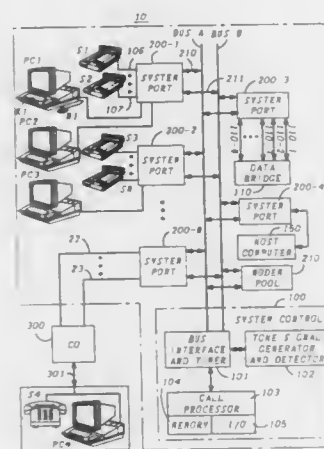
4,953,159

**AUDIOGRAPHICS CONFERRING ARRANGEMENT**  
Charles C. Hayden, Fair Haven; Frederick A. Schmidt, Middletown, and Mark D. Studebaker, Red Bank, all of N.J., assignors to American Telephone and Telegraph Company, Murray Hill, N.J.

Filed Jan. 3, 1989, Ser. No. 293,028  
Int. Cl.<sup>5</sup> H04Q 11/04

U.S. Cl. 370-62

39 Claims



26. An arrangements for processing different categories of messages received via associated logical channels multiplexed over respective communication paths, individual ones of said communications paths being associated with respective ones of a group of data terminals, said arrangement comprising:  
means responsive to receipt of a message from one of said data terminals via its respective one of said communication paths for identifying the category of a message based on the logical channel in which said message was received, and  
means thereafter operative for distributing to other ones of said group of data terminals said received message, said message being sent to said other data terminals via their

respective communication paths and in their logical channels identifying category of said message.

4,953,160

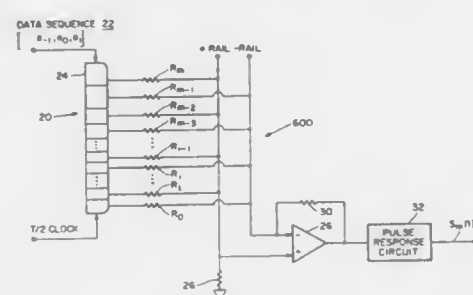
**DIGITAL DATA OVER VOICE COMMUNICATION**  
Dev V. Gupta, Flemington, N.J., assignor to Integrated Network Corporation, Bridgewater, N.J.

Filed Feb. 24, 1988, Ser. No. 159,887

Int. Cl.<sup>5</sup> H04J 1/14

U.S. Cl. 370-76

28 Claims



1. Apparatus for encoding data signals for transmission at a predetermined rate over telephone lines in the presence of voice band telephone signals such that the frequency spectrum of the data signals is substantially removed from the voice band and is shifted to a higher frequency spectrum comprising:

- generator means for generating pulsed data signals;
- coding means for shifting the frequency spectrum of the data signals to produce encoded data signals by forming linear combinations of said pulsed data signals with delayed and advanced versions thereof to encode the pulses in the frequency domain in the form  $\sin^m \theta$  wherein  $\theta = \pi fT/4$ ; and wherein  $m$  is an integer greater than or equal to 1,  $f$  is a frequency variable and  $T$  is the reciprocal of the rate of the data being transmitted.

4,953,161

**MAGNETIC HEAD TRACKING DEVICE USING PLURAL GAPS**

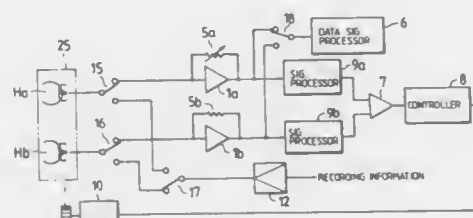
Akiyoshi Toyama, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Selki Seisakusho, Nagano, Japan

Filed Oct. 27, 1988, Ser. No. 263,304

Int. Cl.<sup>5</sup> G11B 5/584, 15/12

U.S. Cl. 360-77.12

9 Claims



1. A recording and reproduction system employing a magnetic head device in which a first gapped portion capable of being selectively changed to function as one of a reading gapped portion and a writing gapped portion, a second gapped portion having a same track width and a same azimuth angle as said first gapped portion and capable of being selectively changed to function as one of a reading gapped portion and a writing gapped portion and means for changing over the functions of said gapped portions; the positions of said gapped portions are different from each other in a width direction of a track of a recording medium and one gapped portion is located

upstream from the other gapped portion, wherein the functions of said gapped portions are set by said changing means at the time of recording of information on said medium so that said gapped portion in an upstream position relative to the direction of running of the track of said medium functions as a writing gapped portion and said gapped portion in the downstream position relative to the running direction functions as a reading gapped portion, to thereby perform a read-after-write operation; and the functions of said gapped portions are set by said changing means at the time of reproduction of information from the track of said medium so that outputs of said gapped portions are compared with each other to perform automatic tracking for said reproduction.

4,953,162

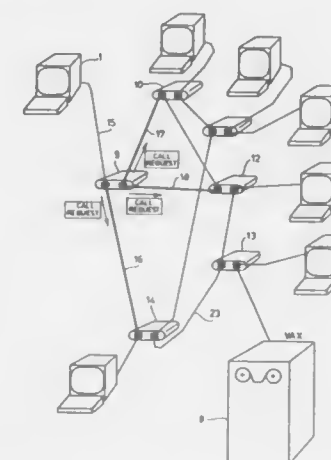
**MULTIPATH LOCAL AREA NETWORK**  
Paul J. Lyons, 425 College Street, and Anthony J. McGregor, Massey University, both of Palmerston North, New Zealand

Filed Aug. 26, 1987, Ser. No. 89,549

Int. Cl.<sup>5</sup> H04J 3/24, 3/02

U.S. Cl. 370-94.1

27 Claims



14. A method for achieving packetised data communications between first and second computer devices connected to respective input/output ports of different intelligent nodes in a multi-path local area network system having a plurality of intelligent nodes with interconnected input/output ports, said method comprising the steps of:

- flood-routing, between nodes throughout said system, a call request message from said first device to said second device and thus identifying an available virtual connection path between said first and second devices via a selected subset of said nodes; and
- thereafter transmitting packetised data from said first device to said second device via said selected subset of nodes.

4,953,163

**TDM TRANSMISSION SYSTEM**

Yukihiko Miyamoto, Tama; Hirokazu Kobayashi, Gyoda, and Syoichi Suzuki, Tokyo, all of Japan, assignors to Kabushiki Kaisha Kenwood, Tokyo, Japan

Division of Ser. No. 55,073, May 28, 1987, Pat. No. 4,884,267.

This application Apr. 20, 1989, Ser. No. 340,668

Claims priority, application Japan, Nov. 20, 1985, 60-177532[U]; Dec. 13, 1985, 60-192087[U]; Dec. 27, 1986, 61-309090[U]; Dec. 27, 1986, 61-309091[U]; Feb. 24, 1987, 62-24939[U]

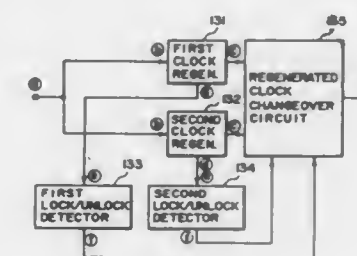
Int. Cl.<sup>5</sup> H04J 3/06

U.S. Cl. 370-100.1

1 Claim

1. A clock regenerating apparatus for a time division multiplex transmission system comprising:  
a plurality of clock regenerating PLL circuits, each being

responsive to the transmission rate of a received time division multiplexed signal to regenerate a clock signal; a lock/unlock detector for identifying which one of said plurality of clock regenerating PLL circuits is locked to the transmission rate and outputting a transmission rate discrimination signal representative of the identified clock regenerating PLL circuit; and



a regenerated clock changeover circuit responsive to said transmission rate discrimination signal for selecting the clock signal regenerated from the identified clock regenerating PLL circuit as a signal processing clock, wherein said lock/unlock detector comprises a plurality of detector units which respectively detects the lock/unlock condition of said plurality of clock regenerating PLL circuits.

4,953,164

**CACHE MEMORY SYSTEM HAVING ERROR CORRECTING CIRCUIT**

Mikio Asakura, Kazuyasu Fujishima, and Yoshio Matsuda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

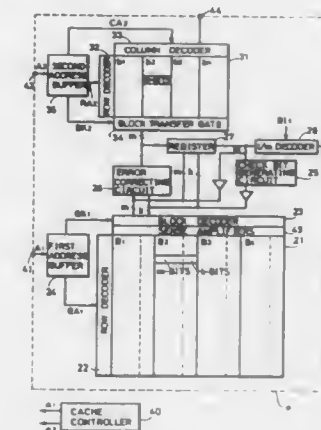
Filed Oct. 6, 1988, Ser. No. 254,233

Claims priority, application Japan, Nov. 12, 1987, 62-287992

Int. Cl.<sup>5</sup> G06F 11/10

U.S. Cl. 371-40.1

12 Claims



1. A semiconductor memory device for storing information bits including a plurality of bits and check bits for detecting and correcting an error in both the information bits and the check bits or an error in the information bits, comprising, on a single chip:  
check bit generating means responsive to said information bits for generating said check bits,  
first storing means for storing a plurality of sets of said information bits and said check bits generated by said check bit generating means,  
error correcting means for detecting and correcting the error in both said information bits and said check bits or



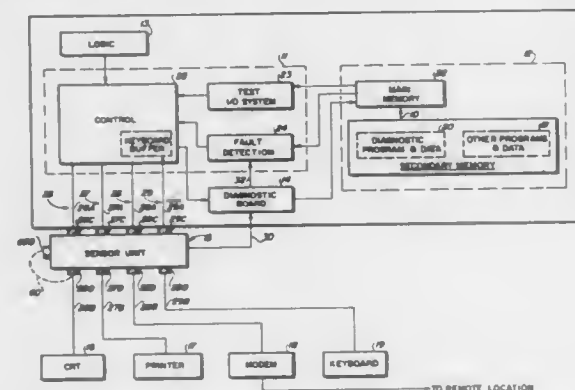
the error in said information bits using said check bits corresponding to said information bits, first transferring means for transferring to said error correcting means said information bits and said check bits corresponding thereto, stored in said first storing means, second storing means to which access can be made faster than the access speed to said first storing means and for storing some of said information bits, said second storing means comprising a cache memory means for accessing data stored therein corresponds to an externally applied address signal, the capacity of said first storing means being less than the capacity of said second storing means, second transferring means for transferring to said second storing means said information bits already corrected for any error by said error correcting means.

4,953,165

**DIAGNOSTIC SYSTEM FOR PERSONAL COMPUTER**  
George V. T. Jackson, Tempe, Ariz., assignor to Southwestern Computer Technologies, Inc., Phoenix, Ariz.  
Filed Jan. 6, 1988, Ser. No. 202,537  
Int. Cl.<sup>3</sup> G06F 11/00

U.S. Cl. 371-16.1

5 Claims



1. In a microcomputer system including housing means
  - a main memory unit carried in said microcomputer housing means for storing data and program instructions,
  - a secondary memory unit carried in said microcomputer housing means for storing data and program instructions to be selectively accessed into said main memory unit,
  - a central processing unit including
    - a control unit for interpreting and executing instructions obtained from said main memory unit, and,
    - a logic unit for performing arithmetic and comparative operations,
  - a least one peripheral unit exterior of said housing means, and
  - a bus leading from said peripheral unit to said central processing unit,
 the improvements in said microcomputer system which enable testing of said peripheral unit for faults therein, said improvements comprising, in combination with said microcomputer system,
  - (a) program means in said secondary memory unit for, when said program means is accessed into said main memory and executed, causing said control unit to direct a diagnostic test signal over said bus to said peripheral unit;
  - (b) sensor means carried by said microcomputer housing means intermediate said peripheral unit and said control unit for identifying said diagnostic test signal in said bus line between said peripheral unit and said control unit and for identifying any peripheral unit test signals directed from said peripheral unit through said bus in response to said diagnostic test signal;

- (c) means for storing said diagnostic and peripheral unit test signal information; and,
- (d) means for recalling said stored diagnostic and peripheral unit signal information; and,
- (e) means for comparing said recalled diagnostic and peripheral, unit signal information with priorly derived predicted test signal information for said diagnostic signal and for generating fault evaluation signals.

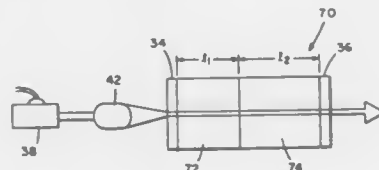
4,953,166

**MICROCHIP LASER**

Aram Mooradian, Winchester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.  
Continuation-in-part of Ser. No. 151,396, Feb. 2, 1988, Pat. No. 4,860,304. This application Feb. 9, 1989, Ser. No. 308,251  
Int. Cl.<sup>3</sup> H01S 3/05, 0/98

U.S. Cl. 372-21

28 Claims



1. Solid state, optically pumped microchip laser comprising: solid state gain medium disposed between two mirrors, the distance between the mirrors selected so that the gain bandwidth of the gain medium is less than or substantially equal to the frequency separation of the cavity modes and such that one cavity mode frequency falls within the gain bandwidth of the medium; and nonlinear optical material disposed to receive light from the gain medium, the nonlinear optical material selected to generate second or higher harmonics of the light from the gain medium, said nonlinear optical material contained within a Fabry-Perot resonator.

4,953,167

**DATA BUS ENABLE VERIFICATION LOGIC**

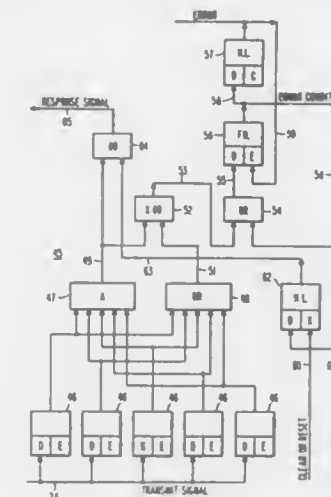
Larry L. Byers, Apple Valley; Wayne A. Michaelson, Circle Pines, and Joseba M. Desubijana, Minneapolis, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.  
Filed Sep. 13, 1988, Ser. No. 244,190  
Int. Cl.<sup>3</sup> G06F 11/00

U.S. Cl. 371-29.5

7 Claims

1. Logic checking circuits for monitoring the status of bus interface logic circuits, comprising:
  - bus interface logic circuits having a plurality of transmit latches for each data word to be transmitted to a bus,
  - a central pipeline controller for issuing a transmit command to each of said latches in said BILC to activate the transmit command,
  - said central pipeline controller having timing means for defining transmit and response times,
  - transmit gating means coupled to the output of said transmit

latches of each data word for determining if all transmit latches of a data word have been activated, and



transmit fault indicating means coupled to the output of said gating means for indicating a transmit error of the data word which occurs during the transmit time.

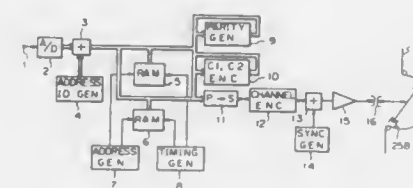
4,953,168

**DIGITAL SIGNAL RECORDING APPARATUS**  
Kentaro Odaka, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,523  
Claims priority, application Japan, Oct. 31, 1987, 62-276931  
Int. Cl.<sup>3</sup> G06F 11/10

U.S. Cl. 371-37.4

10 Claims



1. A digital signal recording apparatus for recording signals which have been digitally sampled at a first predetermined frequency and subject to error correction encoding into units having a second predetermined frequency and in which the first predetermined frequency cannot be evenly divided by the second predetermined frequency, wherein the recording apparatus is of the type which includes an analog to digital converter for converting analog input signals into digital information signals, an encoder for error encoding the digital information signals, memory means for storing the product of the error encoding, an address generator for controlling the write and read operations of the memory means, and recording means for recording the output data of the encoder onto a magnetic tape by means of rotary magnetic heads, the digital signal recording apparatus comprising:
  - integer setting means for setting an integer count value (NB) of at least 2 which is an integer value near the quotient obtained by dividing the first predetermined frequency by the second predetermined frequency;
  - first counter means for counting the number of input samples to be recorded and outputting a corresponding first count signal (NA);
  - means for comparing the count value (NA) of the first count signal (NA) and the count value (NB) selected from the

numerical values of 2 or more set by the integer setting means and outputting a decision signal (S<sub>j</sub>); word number control means supplied with the decision signal (S<sub>j</sub>) for determining the number of samples to be included in the error correcting code unit in response to the decision signal (S<sub>j</sub>); and means controlled by the word number control means for controlling the address to be addressed in the memory means by the address generator.

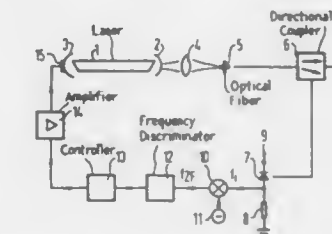
4,953,169

**GAS LASER FREQUENCY STABILIZATION ARRANGEMENT AND METHOD**

Bernd Schlemmer, and Goetz Berenbrock, both of Gevelsberg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Jul. 18, 1988, Ser. No. 220,630  
Claims priority, application Italy, Jul. 27, 1987, 3724848  
Int. Cl.<sup>3</sup> H01S 3/13

U.S. Cl. 372-32

12 Claims



1. A control circuit for stabilizing the frequency of laser emission of a gas laser that has a laser tube and an optical resonator, said control circuit comprising:
  - a photoreceiver means for generating an intermediate frequency signal from two longitudinal laser oscillation modes in said laser emission that are adjacent in frequency;
  - means for supplying a portion of said laser emission to said photoreceiver means;
  - a frequency mixer connected at an output of said photoreceiver means to receive said intermediate frequency signal;
  - a reference signal generator connected to supply a reference frequency signal to a second input of said frequency mixer;
  - a frequency discriminator connected at an output of said frequency mixer to receive said intermediate frequency signal;
  - a final control element connected to receive an output signal from said frequency discriminator, said final control element being adjustable in response to said frequency discriminator output signal to vary an optical length of said optical resonator to stabilize the frequency of said laser emission from said gas laser, said final control element mounted to adjust dimensions of said optical resonator so that a first longitudinal mode of laser oscillation lies in a region of an ascending edge of a gain curve of the laser and so that said first longitudinal mode of oscillation is still guaranteed, said final control element being mounted to adjust the dimensions of said resonator so that a second longitudinal mode of laser oscillation lies in a middle region of said gain curve of said laser shifted toward higher frequencies in comparison to a maximum of said gain curve.

**4,953,170**  
**METHOD FOR FORMING A HETEROEPIITAXIAL STRUCTURE, AND A DEVICE MANUFACTURED THEREBY**

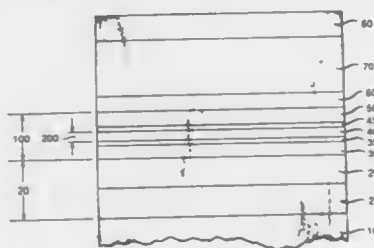
Ralph A. Logan, Morristown; Tawee Tanbun-ek, Summit, and Henryk Temkin, Berkeley Heights, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 15, 1989, Ser. No. 366,829

Int. Cl.<sup>3</sup> H01S 3/19

U.S. Cl. 372-44

9 Claims



1. A method for forming a heteroepitaxial structure, comprising the steps of: placing a substrate in a vapor-phase epitaxial growth chamber; forming, on the substrate, a first layer of III-V compound semiconductor material having at least three elemental components; and forming, on the substrate, a second layer of III-V compound semiconductor material having at least four elemental components such that the composition of the second layer is different from the composition of the first layer, whereby the first and second layers form a heteroepitaxial structure; CHARACTERIZED IN THAT the method additionally comprises, between the first and second layer-forming steps, the step of: forming a binary layer of III-V semiconductor material at least one, but not more than ten, monolayers thick on the substrate, at least one component of the binary layer being common to the first and second layers.

**4,953,171**  
**SEMICONDUCTOR LASER SOURCE UNIT**  
 Tomohiro Nakajima, Matsudo; Kazuyuki Shimada, Chofu; Nobuo Sakuma, Inagi; Seizoh Suzuki, Tokyo, and Katsumi Yamaguchi, Fuchu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

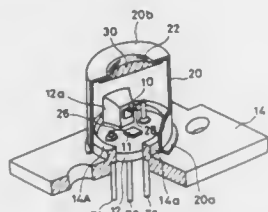
Filed May 11, 1989, Ser. No. 350,598

Claims priority, application Japan, Jun. 3, 1988, 63-136777

Int. Cl.<sup>3</sup> H01S 3/19

U.S. Cl. 372-44

23 Claims



1. A semiconductor laser source unit comprising: a semiconductor laser chip emitting a laser beam; a base member supporting said semiconductor laser chip; a protection cover mounted on said base member so as to cover said semiconductor laser chip, said protection cover having a lid portion formed at an end thereof opposite said base member and a window formed in said lid and facing said laser chip; and a single aspherical lens fastened to the lid portion of said

protection cover so as to cover said window formed in said lid portion, said single aspherical lens collimating said laser beam emitted from said semiconductor laser chip, and said single aspherical lens including an aspherical lens surface having a characteristic represented by the following formula:

$$X = CY^2/[1 + \sqrt{1 - (1 + k)C^2Y^2}] + A_2Y^2 + A_4Y^4 \dots]$$

where X is a distance between a point on said aspherical lens surface and a tangential plane at a vertex of said aspherical lens surface, Y is a height from an optical axis of said aspherical lens, C is a radius of curvature at said vertex, k is a cone factor, and A<sub>2</sub>, A<sub>4</sub> are coefficients.

**4,953,172**  
**GAS LASER**

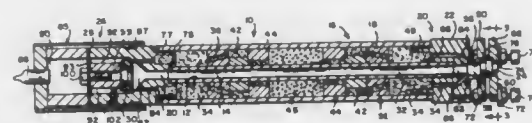
Thomas R. Gurski, 62 Martin Rd., Concord, Mass. 01742, assignor to Thomas R. Gurski, Concord, Mass.

Filed Dec. 22, 1986, Ser. No. 944,987

Int. Cl.<sup>3</sup> H01S 3/22, 3/03, 3/045

U.S. Cl. 372-62

29 Claims



1. A gas laser comprising, (a) a discharge tube with a discharge bore extending axially therethrough; (b) laser gas in said discharge tube bore; (c) an outer tube coextensive with and surrounding said discharge tube, and spaced away from said discharge tube so as to define an annular space therebetween from which said laser gas flows into said discharge tube bore; (d) a first end cap coupled to one end of said discharge tube and one end of said outer tube, said end cap supporting a partially-reflecting mirror and including at least one gas transport passage between said discharge and said annular space; (e) a second cap coupled to the ends of said discharge tube and said outer tube opposite said first cap, said end cap supporting a highly-reflecting mirror and including at least one gas transport passage between said discharge bore and said annular space; and (f) at least one electrically insulating, thermally conducting component in said annular space extending between said discharge tube and said outer tube to provide a thermally conductive path between said discharge tube and said outer tube.

**4,953,173**  
**SEMICONDUCTOR DEVICE**

Takao Fujitsu, Kitakami, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 4, 1988, Ser. No. 228,107

Claims priority, application Japan, Aug. 8, 1987, 62-198443

Int. Cl.<sup>3</sup> H01L 23/48

U.S. Cl. 372-74

3 Claims

1. A semiconductor device comprising a support frame formed from a thin aluminum sheet of rectangular shape and having over one surface thereof a lining of an electrically insulative layer, a plurality of leads formed by pattern etching on the surface of said insulative layer, the leads being electrically insulated from each other and extending from substantially the central part of said frame support to the outer periph-

eral part thereof, outer peripheral edges of the aluminum sheet coinciding with the outer ends of the leads, and a semiconductor element having a plurality of electrodes and mounted on



the central part of said support frame on the insulative side thereof, said electrodes being electrically connected to the inner ends of the corresponding leads.

**4,953,174**  
**PREIONIZATION ELECTRODE FOR PULSED GAS LASER**

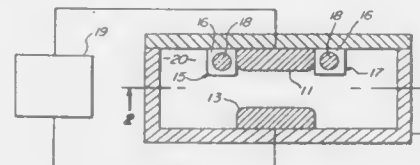
Robert E. Eldridge, Los Angeles; David B. Cohn, Torrance, and Wayne H. Affleck, El Segundo, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 23, 1989, Ser. No. 425,264

Int. Cl.<sup>3</sup> H01S 3/097

U.S. Cl. 372-87

13 Claims



9. A laser comprising: a housing having first and second opposing sides; first and second main electrodes mounted respectively on said first and second opposing sides; and first and second preionization electrodes mounted on either side of one of said first and second main electrodes, said first and second preionization electrodes each comprising a rectangular dielectric tube surrounding a conductive electrode of circular cross-section.

**4,953,175**  
**UNSTABLE LASER RESONATOR WITH OUTPUT COUPLER HAVING RADIALLY VARIABLE REFLECTIVITY**

Sandro De Silvestri, Milan; Paolo Laporta, Cassina de' Pecchi MI, and Orazio Svelto, Segrate MI, all of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rom, Italy

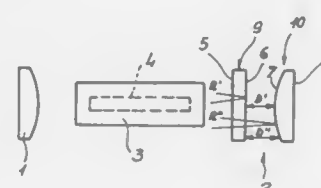
Continuation of Ser. No. 8,593, Jan. 29, 1987, abandoned. This application Jan. 10, 1990, Ser. No. 464,641

Claims priority, application Italy, Jan. 29, 1986, 19223 A/86

Int. Cl.<sup>3</sup> H01S 3/08

U.S. Cl. 372-95

8 Claims



1. Laser apparatus having a radially variable reflectivity, comprising:

a laser cavity having a first mirror at one end thereof, and a beam output mirror system at another end thereof; said output mirror system comprising a first mirror element disposed on an opposite side of said cavity from said first mirror, and a second mirror element disposed on an opposite side of first mirror element from said cavity, said first element having a light reflecting surface with a first radius of curvature, said second mirror element having a second light reflecting surface with a second radius of curvature, said second mirror element being disposed at a centerline distance from said first mirror element;

said centerline distance between said first and second mirror elements being equal to a multiple of the wavelength of the light so as to cause light reflected from said second mirror element reflecting surface to be dephased with respect to light reflected from said first mirror element reflecting surface by a whole number of periods of said light at the centerline between said first and second mirror elements;

said first and second radii of curvature of said first and second mirror element reflecting surfaces having values such that a distance between said first and second mirror elements progressively increases from the centerline to the lateral edge of the output mirror system to reach a value equal to said multiple plus a half period of the wavelength of the light so that light reflected from said second mirror element reflecting surface is dephased with respect to light reflected from said first mirror element reflecting surface by said whole number of periods plus a further half period of said light at a lateral edge of said output mirror system.

**4,953,176**  
**ANGULAR OPTICAL CAVITY ALIGNMENT ADJUSTMENT UTILIZING VARIABLE DISTRIBUTION COOLING**

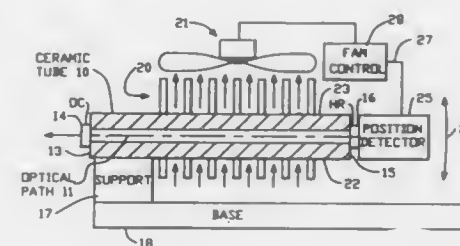
John P. Ekstrand, Palo Alto, Calif., assignor to Spectra-Physics, San Jose, Calif.

Filed Mar. 7, 1989, Ser. No. 319,985

Int. Cl.<sup>3</sup> H01S 3/08, 3/04

U.S. Cl. 372-107

21 Claims



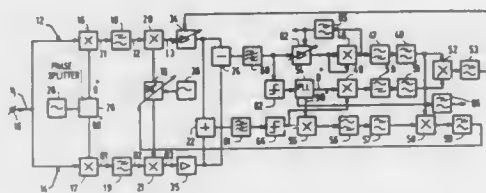
1. A laser apparatus, including a laser beam source for generating a laser beam, and heat incident with the production of the laser beam, the apparatus having an optical path for the laser beam, comprising:

a structural member, having a first end and a second end, the optical path extending between the first end and the second end, the structural member comprising a heat conducting structural material thermally coupled to the laser beam source and characterized by thermal expansion and contraction causing bending of the structural member due to thermal gradients in the structural material; means, mounted on the structural member, for guiding the laser beam along the optical path; detector means, mounted along the optical path of the laser beam, for generating a position signal indicating drift of the laser beam from a preferred position due to a misalignment of the means for guiding caused by bending of the structural member; cooling means, thermally coupled to the structural material



1. A dual branch receiver comprising:  
a signal input terminal for an input signal having a carrier frequency ( $\omega_c$ ),  
a first branch including first and third mixers,  
a second branch including second and fourth mixers,  
two arithmetic combiners for combining signals from said branches to provide respective first and second combiner outputs, the first and second mixers each having a signal input coupled through a respective input signal path to the signal input,  
a first local oscillator for producing a local oscillator signal

( $\omega_o$ ) couples through respective oscillator signal paths to the first and second mixers, a first 90° phase shifter provided in one of the signal paths to the second mixer, the third and fourth mixers being coupled to the first and second mixers, respectively, for receiving a down converted signal therefrom, a second local oscillator coupled to the third mixer and coupled through a quadrature phase shifter to the fourth mixer, one of said arithmetic combiners being a summing



means for obtaining the sum of the signals at the outputs of the third and fourth mixers, the other of said arithmetic combiners being a differencing means for obtaining the difference between the signals at the outputs of the third and fourth mixers, and means for correcting gain and phase errors in said branches, said correcting means being coupled to the summing and differencing means for transforming the outputs thereof to produce signals having terms centered on  $2\Delta\omega$ , where  $\Delta\omega$  equals ( $\omega_o - \omega_c$ ).

4,953,183

# ARRANGEMENT FOR COMBATTING INTERSYMBOL INTERFERENCE AND NOISE

Johannes W. M. Bergmans, Eindhoven, Netherlands, and Yau Cheung Wong, Hong Kong, Hong Kong, assignors to U.S. Philips Corp., New York, N.Y.

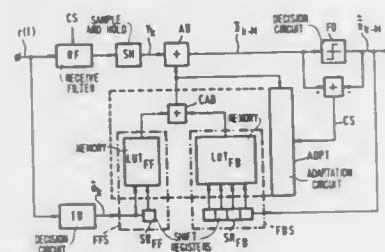
Filed Jan. 13, 1988, Ser. No. 143,913

Claims priority, application Netherlands, Jan. 20, 1987, 8700125

Int. Cl.<sup>5</sup> H04B 1/10

U.S. Cl. 375—101

10 Claims



1. An apparatus for combatting intersymbol interference and noise introduced into a transmitted data signal transmitted at a symbol rate  $1/T$  by a transmission channel having a memory span  $LT$  corresponding to a number  $L$  of consecutive data symbols, which apparatus comprises:

- a receive filter for forming a delayed version of the transmitted data signal and for suppressing noise therein, and having an output at which a delayed and filtered version of the transmitted data signal is provided;
- a first decision circuit for forming a preliminary symbol signal, representing preliminary symbol decisions, in response to the transmitted data signal;
- a second decision circuit for forming a final symbol decision signal representing final symbol decisions, and having an input for receiving an input signal;
- compensating means comprising:
  - a feedforward section for forming a first compensating signal for pre-cursive intersymbol interference in re-

sponse to a number of consecutive preliminary symbol decisions, the feedforward section having a memory span  $MT$  corresponding to a number  $M$  of preliminary symbol decisions, which number  $M$  is smaller than  $L$ ; and

- a feedback section for forming a second compensating signal for post-cursive intersymbol interference in response to a number of consecutive final symbol decisions; the compensating means acting in combination with the receive filter to minimize a predetermined function of a difference between the input signal of the second decision circuit and the final symbol decision signal; and
- a combining circuit for forming the input signal for the second decision circuit from the delayed and filtered version of the transmitted data signal and a sum of the first and second compensating signals.

4,953,184

# COMPLEX BANDPASS DIGITAL FILTER

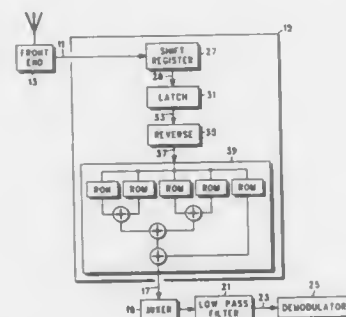
Daniel A. Simone, Barrington, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 1, 1989, Ser. No. 359,547

Int. Cl.<sup>5</sup> H04B 1/10

U.S. Cl. 375—103

20 Claims



1. A radio including a front end, said front end having means responsive to a received signal for providing a digital bit stream comprising a desired signal at an IF frequency,  $f_{IF}$ , and for coupling said digital bit stream to a bandpass digital filter having a complex response symmetric about said  $f_{IF}$ , said digital filter comprising:

- means for providing said digital bit stream to a shift register at a sampling frequency,  $f_s$ , said  $f_s$  being a multiple of  $f_{IF}$ , said shift register having latching means for providing a filter input comprising  $k$  bit signals,  $IN_0-1$ , to an address circuit at a rate of  $f_s/n$ , where  $n$ =a decimation rate;
- said address circuit having means, responsive to said filter input, for providing at least a normal filter address and a reversed filter address to a read-only memory,
- said normal filter address comprising at least  $k$  bit signals,  $NOR_0-NOR_{k-1}$ , so that  $NOR_0=IN_0$ ,  $NOR_1=IN_1$ , ..., and  $NOR_{k-1}=IN_{k-1}$ ;
- said reversed filter address comprising at least  $k$  bit signals,  $REV_0-REV_{k-1}$ , so that  $REV_0=IN_{k-1}$ ,  $REV_1=IN_{k-2}$ , ..., and  $REV_{k-1}=IN_0$ ;
- said read-only memory having means, responsive to said normal filter address, for providing a real, or in-phase, digital filter output comprising  $m$  bit signals,  $REAL_0-1$ , and having means, responsive to said reversed filter address, for providing an imaginary, or quadrature, digital filter output comprising  $m$  bit signals,  $IMAG_0-1$ .

4,953,185

# CLOCK RECOVERY AND HOLD CIRCUIT FOR DIGITAL TDM MOBILE RADIO

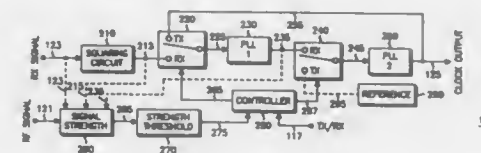
Steven H. Goode, Palatine, Ill., assignor to Motorola Inc., Schaumburg, Ill.

Filed Oct. 5, 1988, Ser. No. 255,576

Int. Cl.<sup>5</sup> H04L 7/00

U.S. Cl. 375—106

44 Claims



1. A synchronization circuit for providing an output sync signal which is in synchronization with an input data signal, said synchronization circuit comprising:

- first sync means for acquiring synchronization with a first input signal, thereby providing a first sync signal;
- second sync means for acquiring synchronization with a second input signal, thereby providing a second sync signal, wherein the second sync means includes means for maintaining a constant frequency, thereby providing a periodic signal having a predetermined stability as said second sync signal when said first sync means has not acquired synchronization to the input data signal;
- means for providing said input data signal as a third input signal; and
- means for controlling said input signal and said sync signals such that said second sync means acquires synchronization to said first sync signal only after said first sync means acquires synchronization to said third input signal.

4,953,186

# PHASE JITTER TRACKER

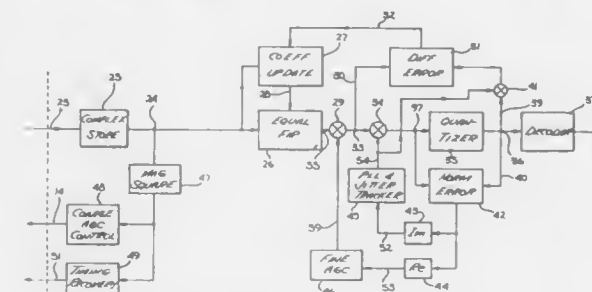
Steve Levy, Nevada City; Dave Hedberg, Danville, both of Calif., and Oscar Agazzi, Scotch Plains, N.J., assignors to Silicon Systems, Inc., Tustin, Calif.

Filed Feb. 19, 1988, Ser. No. 157,986

Int. Cl.<sup>5</sup> H04B 1/10

U.S. Cl. 375—118

26 Claims



15. A circuit for detecting and eliminating frequency jitter in an input signal comprising:

- a first phase locked loop coupled to said input signal for acquiring said frequency jitter and determining the magnitude of said frequency jitter;
- a second loop coupled to said input signal for acquiring the phase of said frequency jitter;
- a subtraction means coupled to said input signal, said first loop and said second loop for subtracting said phase and magnitude of said frequency jitter from said input signal to generate a first error signal;
- combining means coupled to said input signal and said subtraction means for combining said first error signal with said input signal;
- said first loop including sampling means coupled to said

input signal for sampling said input signal and generating a normalized error signal having an imaginary component.

4,953,187

# HIGH SPEED PRESCALER

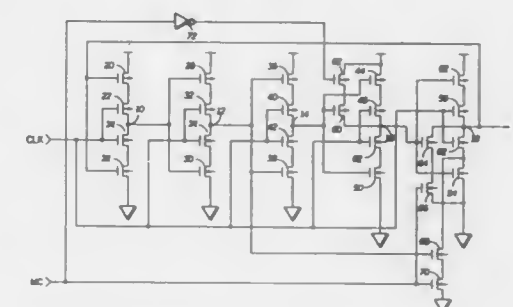
Barry W. Herold, Boca Raton, and Omid Tabernia, Coconut Creek, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 23, 1989, Ser. No. 300,449

Int. Cl.<sup>5</sup> H03K 23/48

U.S. Cl. 377—48

12 Claims



1. A high-speed prescaler circuit, comprising:

an odd plurality of cascaded inverter circuits each having first and second inputs and an output, said first input of each said plurality for receiving an input signal;

an intermediate inverter circuit having a first input for receiving said input signal, a second input coupled to the output of a last one of said plurality of cascaded inverter circuits, and having an output;

an output inverter circuit having first, second, and third inputs and an output, said first input of said output inverter circuit for receiving said input signal and said second input of said output inverter circuit coupled to the output of said intermediate inverter circuit, the output of said output inverter circuit coupled to said second input of a first one of said plurality of cascaded inverter circuits, the output of said output inverter circuit forming an output of said prescaler circuit;

feed forward circuit means having at least a first input coupled to the output of at least a first preselected one of said plurality of cascaded inverter circuits, having an output coupled to the third input of said output inverter circuit for forcing the output of said output inverter circuit to a predetermined state, and at least a second input coupled to receive a control signal, said control said capable of assuming first and second states, the output of said output inverter circuit being forced to said predetermined state once a control signal is in said first state; and

first circuit means having a first input coupled to said control signal, a second input coupled to the output of a last one of said plurality of cascaded inverter circuits, and an output coupled to said intermediate inverter circuit for forcing the output of said intermediate inverter circuit to a predetermined state when said control signal is in said first state and the output of a last one of said plurality of cascaded inverter circuits is in a predetermined state.



4,953,188

## METHOD AND DEVICE FOR PRODUCING PHASE-CONTRAST IMAGES

Augustin Siegel, Oberkochen; Gunter Schmahl, Göttingen, and Dietbert Rudolph, Nordheim, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heldenheim/Brenz, Fed. Rep. of Germany

Filed Jun. 5, 1989, Ser. No. 361,558

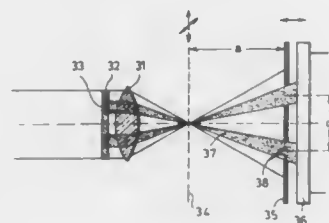
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819603; Jun. 9, 1988, 3819604

Int. Cl.<sup>5</sup> G21K 7/00

U.S. Cl. 378—43

10 Claims

U.S. Cl. 378—129



1. A method for creating phase-contrast images with a microscope which scans the object point-by-point with a cone of illuminating radiation passed through an objective and phase-shifting elements of preselected geometry in the vicinity of its pupil plane, comprising (a) positioning a radiation detector directly behind the plane of the object so that radiation coming from the object impinges upon said detector without passing through any intervening collecting optical system, and (b) adapting the radiation-sensitive area of the detector to encompass the cone of radiation passing through the phase-shifting elements.

4,953,189

## X-RAY RADIOGRAPHY METHOD AND SYSTEM

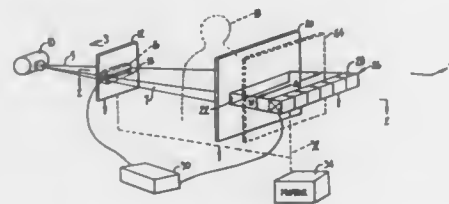
Shih-Ping Wang, Los Altos, Calif., assignor to Hologic, Inc., Waltham, Mass.

Continuation of Ser. No. 797,837, Nov. 14, 1985. This application Oct. 12, 1988, Ser. No. 256,846

Int. Cl.<sup>5</sup> H05G 1/44

U.S. Cl. 378—108

52 Claims



1. A system for imaging an object with penetrating radiation comprising:

- a source which generates a monitoring beam and an imaging beam of penetrating radiation which scan an object one after the other in a scanning direction;
- a receptor which receives said monitoring beam and said imaging beam after said beams have passed through said object, wherein said receptor in response to said imaging beam forms an image of said object and in response to said monitoring beam generates an exposure control signal which varies as a function of a local response of the object to the monitoring beam both in the scanning direction and in a second direction which is transverse to the scanning direction; and
- a modulator which in response to said exposure control signal modulates said imaging beam, differently from any modulating of said monitoring beam, before the imaging beam impinges on said object, the modulation of said imaging beam varying both in the scanning direction and

in said second direction to control the local level of exposure delivered to said receptor by said imaging beam.

4,953,190

## THERMAL EMISSIVE COATING FOR X-RAY TARGETS

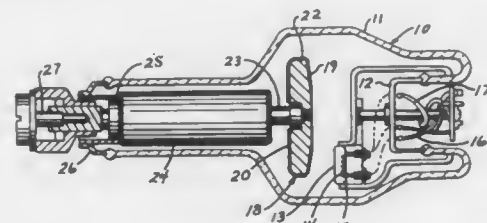
Dennis G. Kukoleck, Broadview Heights, and Peter C. Eloff, Cleveland Heights, both of Ohio, assignors to General Electric Company, Milwaukee, Wis.

Filed Jun. 29, 1989, Ser. No. 373,723

Int. Cl.<sup>5</sup> H01J 35/10

U.S. Cl. 378—129

12 Claims



1. An x-ray tube anode comprised of a body having a surface region for being impinged by electrons to produce x-radiation and a coating distinct from said region for enhancing the thermal emittance of said body, said coating composed of a metal oxide coating comprising:

- Al<sub>2</sub>O<sub>3</sub> present in an amount of 50% to 80% by weight and TiO<sub>2</sub> together with ZrO<sub>2</sub> or La<sub>2</sub>O<sub>3</sub> present in an amount of 50% to 20% by weight with the TiO<sub>2</sub> being present with respect to the ZrO<sub>2</sub> or La<sub>2</sub>O<sub>3</sub> in a ratio in the range of 1:1 to 10:1.

4,953,191

## HIGH INTENSITY X-RAY SOURCE USING LIQUID GALLIUM TARGET

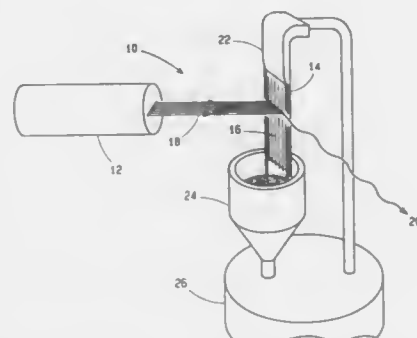
Robert K. Smither, Hinsdale, Ill.; Gordon S. Knapp, Cupertino, Calif.; Edwin M. Westbrook, Chicago, and George A. Forster, Westmont, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 24, 1989, Ser. No. 384,193

Int. Cl.<sup>5</sup> H01J 35/08

U.S. Cl. 378—143

9 Claims



1. An apparatus for the generation of high intensity x-rays comprising:

- means for providing a smooth, non fluctuating flow of liquid metal over a surface, and,
- means for directing an electron beam to impinge on said liquid metal as it flows over said surface to generate high intensity x-rays.

4,953,192

## SCANNING EQUALIZATION RADIOGRAPHY

Donald B. Plewes, Port Credit, Canada, assignor to The University of Rochester, Rochester, N.Y.

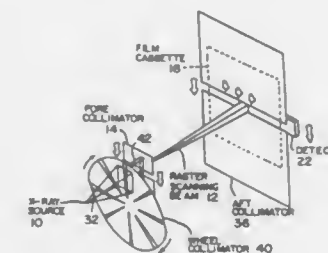
Division of Ser. No. 242,644, Sep. 13, 1988, which is a continuation-in-part of Ser. No. 851,252, Apr. 14, 1986, Pat. No. 4,773,087. This application Sep. 18, 1989, Ser. No. 408,765

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.<sup>5</sup> G21K 5/10

U.S. Cl. 378—146

6 Claims



1. A system for imaging an object with scanning sectors of penetrating radiation which are modulated prior to impinging on the object to control the local exposure time at an imaging receptor without substantially varying the intensity of the radiation contributed to sectors exiting the modulation by respective points at the origin of the radiation, comprising:

- a source which generates penetrating radiation at an origin;
- a scanner-modulator which receives penetrating radiation from said origin and concurrently modulates a plurality of sectors thereof to form respective modulated sectors exiting the scanner-modulator without substantially varying the intensity of the radiation contributed to the sectors exiting the scanner-modulator by respective points at said origin, and scans said object with said exiting sectors to cause respective object-attenuated sectors to emerge from the object; and

an imaging receptor which receives said object-attenuated sectors and forms an image of said object; said scanner-modulator comprising moving modulating elements which mechanically, simultaneously and individually modulate said sectors to control the local exposure time at said imaging receptor; and wherein said sectors of radiation are arrayed in a direction transverse to the direction of said scanning.

4,953,193

## FASTENING COMBINATION HAVING SPECIAL UTILITY IN AFFIXING AN X-RAY MARKING DEVICE TO A CASSETTE ADAPTED TO HOLD X-RAY FILM

Norman L. Robinson, 3006 Friendswood Dr., Arlington, Tex. 76013

Filed Aug. 25, 1988, Ser. No. 236,198

Int. Cl.<sup>5</sup> G03B 42/02

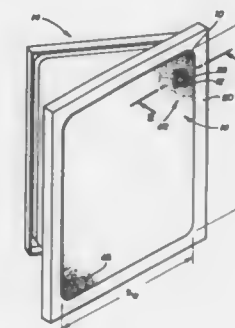
U.S. Cl. 378—162

12 Claims

9. The method of marking X-ray film so as to indicate the orientation of a film cassette at the time that the cassette is exposed to radiation, said cassette having top and bottom faces and a central cavity for holding X-ray film internally in a predetermined position, comprising:

- a. providing a sheet of pile-like material across at least the major portion of the top of the cassette, such that radiation will pass through the sheet in order to reach X-ray film contained within the cavity in the cassette, and the sheet being sufficiently permeable to X-rays as to cause no scattering or filtering of impinging X-rays; and
- b. selectively attaching a marker to a chosen spot on the sheet after the sheet has been attached to the cassette, the size of the marker being small relative to the size of the sheet, and said marker being at least partially opaque to

X-rays, and the marker having a movable element therein which is responsive to gravity, whereby an image of the marker will be manifested on the X-ray film after the cassette has been subjected to radiation that is directed



through the sheet and the top of the cassette, and whereby the movable element that is responsive to gravity will permit a person to subsequently examine the exposed film and ascertain the orientation of the cassette at the time that it is subjected to radiation.

4,953,194

## AUTOMATED DOCUMENTATION SYSTEM FOR A COMMUNICATIONS NETWORK

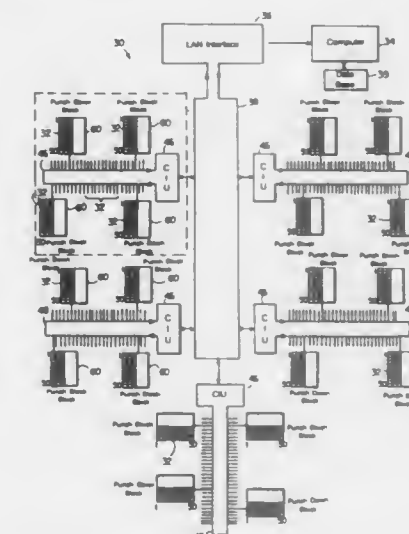
John G. Hansen, Forestdale, and Ronald I. Forth, Sandwich, both of Mass., assignors to Network Devices, Incorporated, Sandwich, Mass.

Filed Sep. 22, 1989, Ser. No. 410,975

Int. Cl.<sup>5</sup> H04M 3/22; H04B 3/46

U.S. Cl. 379—25

24 Claims



1. A system for identifying interconnections between individual conductors in a communications network of the kind in which includes a plurality of multiple conductor links, individual conductors of which are selectively terminated and interconnected at corresponding individual terminals of terminal blocks, comprising

- a controller for broadcasting over a test network that includes said terminal blocks an inquiry that identifies a starting individual conductor, and supervisors associated with said terminal blocks, the supervisor associated with the terminal block that termi-

4,953,200

**PRIVATE BRANCH EXCHANGE CAPABLE OF  
DISCRIMINATING DIFFERENT TYPES OF  
TELEPHONE SETS CONNECTED THERETO**

Hajime Yamasaki, Fukuoka, Japan, assignor to Matsushita  
Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 25, 1989, Ser. No. 342,884

Claims priority, application Japan, Apr. 28, 1988, 63-106357  
Int. Cl.<sup>3</sup> H04M 1/00; H04Q 5/00

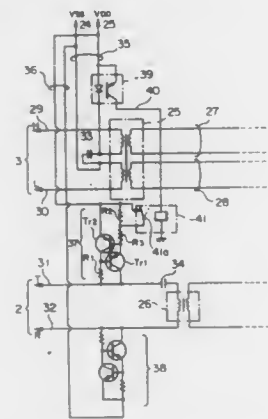
U.S. Cl. 379—156 4 Claims

2. A private branch exchange comprising:  
a power source device for supplying a D.C. loop current  
through a data line for data communication with an extension  
telephone set and through a voice line for transferring  
a voice signal for the extension telephone set;

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current detection means for detecting that the D.C. loop current has been supplied through said data line; and current limiting means for limiting the current supplied from



said power source device through said voice line in accordance with a detected output from said current detection means and also for performing a constant current operation.

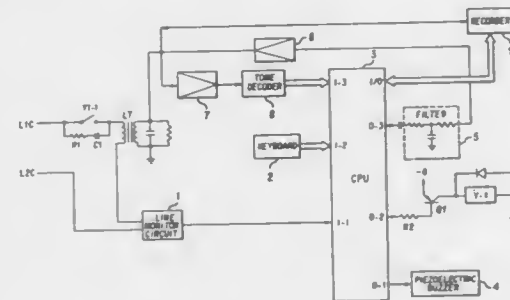
**4,953,201**  
**ADDITIONAL TELEPHONE EQUIPMENT AND METHOD FOR PROTECTING AGAINST NUISANCE CALLS**

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 388,026  
Claims priority, application Japan, Aug. 5, 1988, 63-195386  
Int. Cl.<sup>5</sup> H04M 1/66

U.S. Cl. 379—189

5 Claims



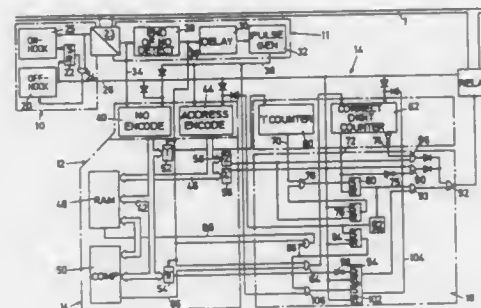
1. An additional telephone equipment for protecting against nuisance calls, comprising:  
means responsive to an incoming call for engaging a telephone line;  
means for generating, selectively, a dummy busy tone or a dummy ringback tone on the telephone line immediately after engaging;  
means for generating an output counter value;  
means for selecting an even or odd number of the counter value; and  
means responsive to said even or odd number for sending out said dummy busy tone or said dummy ringback tone after engaging.

**4,953,202**  
**TELEPHONE LINE ACCESS CONTROL**  
Terence J. Newell, 271 Clarendon Park Rd., Leicester, Great Britain

Filed Jan. 13, 1988, Ser. No. 143,391  
Int. Cl.<sup>5</sup> H04M 1/66

U.S. Cl. 379—200

29 Claims



3. A telephone line access control for preventing unauthorized outgoing calls on that line, comprising:  
a programmable memory for storing a numerical memorized authorization code;  
means for monitoring dialled signals on the line;  
means for encoding the monitored signals;  
means for comparing the encoded signals with:  
(a) an access code and  
(b) the memorized authorization code;  
call barring means including line release means, for effecting temporary line release during or on completion of dialling to prevent at least some types of outgoing calls;  
a switching control responsive to the comparing means for switching the call barring means between a deactivated condition permitting outgoing calls and an activated condition, wherein the switching control is effective  
(a) when the call barring means is deactivated, to switch the call barring means to its activated condition and to actuate the line release means to effect temporary line release when the comparing means indicates that the encoded signals match the access code,  
(b) when the call barring means is activated, to switch the call barring means to its deactivated condition when the comparing means indicates that the encoded signals match the memorized authorization code, and  
(c) whether the call barring means is activated or deactivated, to actuate the line release means to effect temporary line release when the comparing means indicates that the encoded signals match the memorized authorization code; and  
reprogramming means, enabled when the call barring means is in its deactivated condition and the encoded signals match the access code, for replacing the authorization code in the memory with a subsequently dialled monitored and encoded signal.

**4,953,203**  
**HIGH CAPACITY INFORMATION FORWARDING SYSTEM**

James B. Shepard, Pickerington, Ohio, assignor to AT&T Bell Laboratories, Murray Hill, N.J.

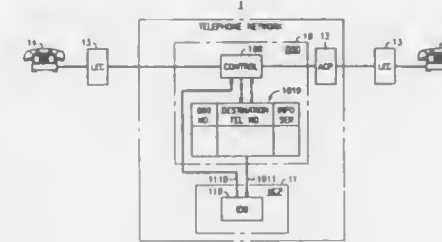
Filed Jul. 26, 1989, Ser. No. 385,127  
Int. Cl.<sup>5</sup> H04M 3/42

U.S. Cl. 379—207

16 Claims

1. A high capacity information forwarding system for use in a telephone network comprising  
means for periodically accessing a centralized data base of the telephone network and translating a predefined telephone number dialed by a call originating telephone station into a destination telephone number of a called telephone station and upon determining an information for

warding service capability of said called telephone station for storing said predefined and translated destination telephone numbers at originating screening offices of the telephone network, and  
means enabled upon subsequent receipt of said dialed predefined telephone number at said originating screening of



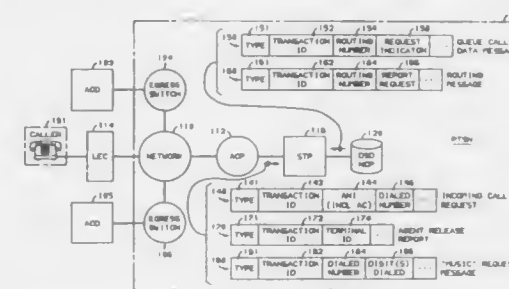
ices for accessing said predefined and translated telephone numbers and establishing a telephone connection between said calling telephone station and said called telephone station identified by said stored destination telephone number and forwarding information associated with said calling telephone to said called telephone station.

**4,953,204**  
**MULTILOCATION QUEUING FOR TELEPHONE CALLS**  
Robert F. Cuschleg, Jr., Columbus, Ohio; Brian D. Freeman, Howell; Kevin B. Kelly, Neptune; Philip J. Patti, Belle Mead; Anthony J. Perinelli, Woodbridge, and Amy K. Shannon, Aberdeen, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 17, 1989, Ser. No. 422,852  
Int. Cl.<sup>5</sup> H04Q 3/64; H04M 3/42

U.S. Cl. 379—266

23 Claims



22. A method of completing a call from a caller over a public switched network to a destination customer served by at least one agent team, comprising:  
determining that no circuits are available for completing the call to said destination customer;  
connecting a type of music, prespecified by said caller, to said caller.

**4,953,205**  
**FLICKERING DEVICE FOR TELEPHONE SETS**  
Tsai T. Yang, Tainan, Taiwan, assignor to Dah Yang Industry Co., Ltd., Taiwan

Filed Jun. 1, 1989, Ser. No. 360,150  
Int. Cl.<sup>5</sup> H04M 1/00

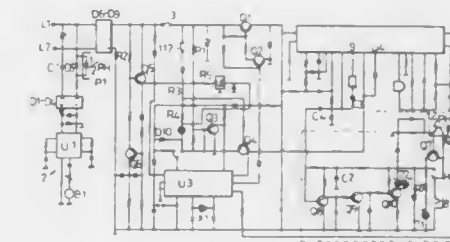
U.S. Cl. 379—376

2 Claims

1. A flickering device for telephone sets having a phone housing, a keyboard provided on a top surface of said phone housing, a handset removably attached to said phone housing, a circuit board with a ringing circuit, a hookswitch, a dialing circuit, a selective circuit and a voice-communicating circuit

respectively disposed thereon, provided in said phone housing and electrically connected to said keyboard and said handset for initiating operations therewith, the flickering device comprising:

transparent means provided as a portion of said phone housing and disposed in an open section of said phone housing; flickering illumination means having a plurality of first light-emitting elements disposed on said circuit board in conjunction with said transparent means and electrically coupled with said ringing circuit and said voice-communicating circuit for being separately activated to flicker in response to a ringing signal from said ringing circuit and a voice-communicating signal from said voice-communicating circuit during a telephone communication, said flickering illumination means including, a photocoupled diode electrically connected to an output of said ringing circuit for being energized to transmit a signal source therefrom, photocoupled transistor means coupled between said photocoupled diode and at least one of said plurality of first light-emitting elements for receiving said signal



source from said photocoupled diode and activating said at least one first light-emitting element to initiate flickering illuminations thereat and said photocoupled diode in response to said signal source, a plurality of second light-emitting elements electrically connected with said voice-communicating circuit through a plurality of transistors arranged in different stages for being activated to initiate flickering illuminations corresponding to a speaking voice from said voice-communicating circuit, and switching means electrically coupled with said photocoupled transistors means and said hookswitch for initiating signal transferring and power supply operations thereof; and external power supply means electrically connected to said flickering illumination means for providing a power supply for said plurality of first and second light-emitting elements and electrically coupled with said switching means whereby, flickering illuminations will be initiated during ringing operations and during communication conversations.

**4,953,206**  
**METHODS OF AND APPARATUS FOR PROVIDING SUBSTANTIALLY ERROR-FREE TRANSMITTED DATA**  
Harold W. Friesen, Dunwoody; Janice B. Haber, Roswell, and Wendell G. Nutt, Dunwoody, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

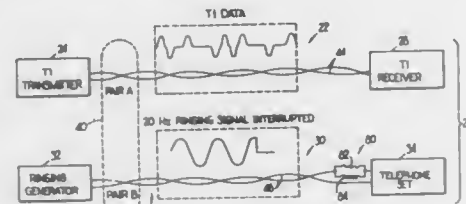
Continuation-in-part of Ser. No. 931,330, Nov. 17, 1986, abandoned. This application Feb. 3, 1989, Ser. No. 307,144  
Int. Cl.<sup>5</sup> H04B 3/32

U.S. Cl. 379—417

14 Claims

7. A system for transmitting voice signals and substantially error-free data signals, said system including:  
a disturbing circuit which includes at least one pair of insulated metallic conductors that are used only for transmitting voice, ringing and pulse dialing signals, and means for transmitting and receiving the voice signals;  
a disturbed circuit which includes at least one other pair of

insulated metallic conductors which are used for transmitting relatively high speed data signals and means for transmitting and receiving the data signals, the frequency content of the data signals being substantially above the voice transmission band; and  
a common sheath system for enclosing at least portions of said at least one pair of conductors which are used for transmitting voice signals and at least portions of said at least one other pair of conductors which are used for transmitting data signals; and



discrete means disposed in said disturbing circuit external to said common sheath system for reducing substantially that frequency content of any disturbing signal which appears on the disturbing circuit and which is in the range of the data signal spectrum to reduce the magnitude of any crosstalk between the at least one pair of conductors and the at least one other pair of conductors during normal functions which cause station generated impulse noise and which are associated with the disturbing pair.

4,953,207

## ELECTRONIC TELEPHONE SET

Frederik Van Dongen, Eindhoven; Philippe B. E. Jansen, Caen, and Petrus J. M. Sijbers, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

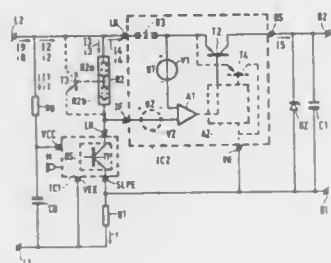
Filed Oct. 24, 1989, Ser. No. 427,440

Claims priority, application Netherlands, Nov. 30, 1988, 8802945

Int. Cl.<sup>5</sup> H04M 1/00

U.S. Cl. 379—395

11 Claims



1. An electronic telephone set which comprises first and second connection points for a telephone line, a transmission circuit including in its send output stage a first transistor whose first main electrode is coupled to the first connection point by means of a first resistor and whose second main electrode is coupled to the second connection point, a supply circuit for peripheral circuits, said supply circuit having a first output terminal coupled to the first main electrode of the first transistor and having a second transistor whose first main electrode is coupled to the second connection point and whose second main electrode is coupled to a second output terminal of the supply circuit, which circuit includes an operational amplifier whose output is coupled to a control electrode of the second transistor, a first voltage source connected between the first main electrode of the second transistor and a first input of the operational amplifier, and wherein a second main electrode of the first transistor is coupled to the second input of the opera-

tional amplifier and, by means of a second resistor, to the second connection point.

4,953,208

## CATV SYSTEM TRANSMITTING A SCRAMBLED TELEVISION SIGNAL

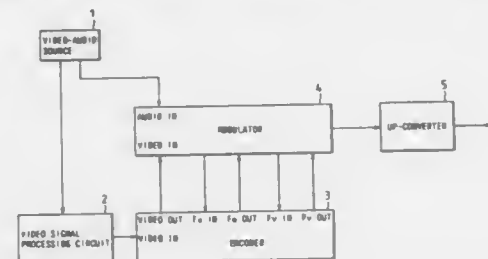
Akira Ideno, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 11, 1989, Ser. No. 448,442

Claims priority, application Japan, Apr. 28, 1989, 1-107875 Int. Cl.<sup>5</sup> H04K 1/00

U.S. Cl. 380—15

8 Claims



1. A method of scrambling a television signal in which a video signal in a horizontal blanking interval and a vertical blanking interval is compressed and a key signal containing information concerning the compression is superimposed on an audio signal in said horizontal blanking interval, wherein the improvement comprises:

superimposing a pseudo-key signal on an audio signal in said vertical blanking interval;  
making said key signal contain information concerning the position of said vertical blanking interval; and  
fixing a video signal at a constant level in a first predetermined number of horizontal scanning periods before a vertical synchronizing signal portion in said vertical blanking interval, while eliminating color bursts at least in said first predetermined number of horizontal scanning periods before said vertical synchronizing signal portion.

4,953,209

## SELF-VERIFYING RECEIPT AND ACCEPTANCE SYSTEM FOR ELECTRONICALLY DELIVERED DATA OBJECTS

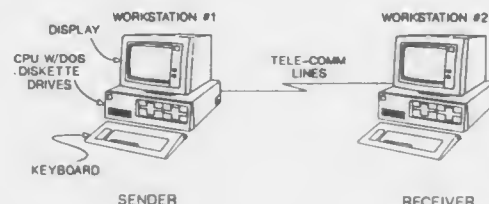
John H. Ryder, Sr., Durham, N.C., and Susanna R. Smith, Tampa, Fla., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,653

Int. Cl.<sup>5</sup> H04L 9/00

U.S. Cl. 380—23

10 Claims



1. In an information communication system, said system including a sender for data objects and a receiver for data objects, said sender and receiver being physically separated from one another, and including means at said sender for preparing data objects for delivery to said receiver and data delivery means for delivering said data objects from said sender to said receiver, a self-enabling subsystem for verifying receipt and acceptance of delivered data objects, comprising:

means at said sender for modifying said data objects for delivery, said modifying rendering said objects into a non-executable state;  
means at said sender for inserting an enabling means into said data object prior to delivery thereof; and  
means at said receiver for loading said modified data object into a computer for display and for operations thereon; and  
means for initially accessing only said enabling means in said data object and for displaying portions of data contained therein in humanly readable form for soliciting a user's response thereto; and  
means for entering a user's response and means for recording said user's response; and means for examining said user's response and  
means conditioned by said examination of said user's response for employing said enabling means and modifying said data object back to an executable state.

4,953,210

## FEATURE NEGOTIATION PROTOCOL FOR A SYNCHRONOUS MODEM

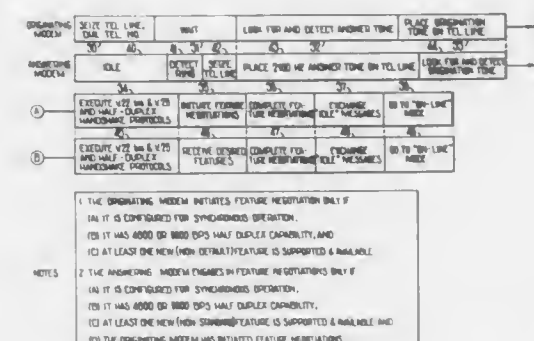
Paul E. McGlynn, Decatur, and Randy D. Nash, Dacula, both of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.

Continuation of Ser. No. 259,882, Oct. 19, 1988, Pat. No. 4,905,282. This application Feb. 22, 1990, Ser. No. 483,536

Int. Cl.<sup>5</sup> H01B 1/38

U.S. Cl. 380—48

28 Claims



1. For use by a first modem, said first modem and a second modem conducting a predetermined handshake sequence, waiting for a predetermined period after completion of said predetermined handshake sequence, and then switching to an online mode of operation, a method for conducting feature negotiations during said predetermined period, comprising the steps of:

if said first modem is not configured to support synchronous operation then, after said predetermined handshake sequence, switching to said online mode of operation;  
if said first modem is not configured to support at least one non-default feature then, after said predetermined handshake sequence, switching to said online mode of operation;  
if said first modem is configured to support both synchronous operation and at least one non-default feature then executing the following feature negotiation protocol:  
(a) generating a first modem list of features which are supported by said first modem;  
(b) sending said first modem list to said second modem;  
(c) waiting for a reply from said second modem;  
(d) if said predetermined period expires before said first modem receives said reply from said second modem then switching to said online mode of operation and using a predetermined set of default features;

(e) if said reply is received from said second modem then inspecting said reply from said second modem;  
(f) if said reply is a predetermined reply then, after said predetermined period, switching to said online mode of operation and using said features on said first modem list;  
(g) if said reply is a second modem list of features, all of which are supported by said first modem, then sending said predetermined reply to said second modem and, after said predetermined period, switching to said online mode of operation and using said features on said second modem list; and  
(h) if said reply is a second modem list of features, less than all of which are supported by said first modem, then generating a first modem list specifying said features on said second modem list which are supported by said first modem and returning to step (b).

4,953,211

## ENCRYPTION APPARATUS

Andrew S. Repton, and Martin Lysejko, both of Lincoln, assignors to Marconi Electronic Devices Limited, England

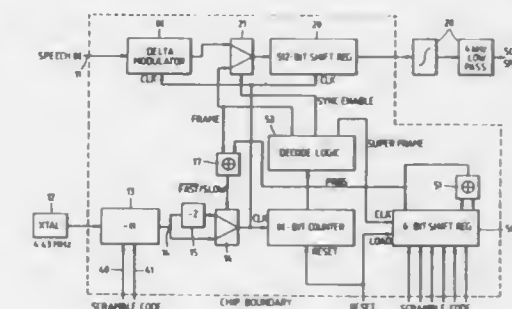
Filed Jul. 5, 1989, Ser. No. 375,575

Claims priority, application United Kingdom, Jul. 13, 1988, 8816636

Int. Cl.<sup>5</sup> H04L 9/00

U.S. Cl. 380—50

6 Claims



1. Encryption apparatus, comprising:  
(a) means for sampling a signal to be encrypted at two differing rates, and for reading the sampled signal into storage means at one of said rates and reading it out of said storage means at the other of said rates, said sampled signal being expanded in time in a downward dispersion, and being alternately compressed in time in an upward dispersion, each pair of upward and downward dispersions occurring in frames;  
(b) means for generating a pseudo-random binary number;  
(c) means for defining a superframe structure consisting of a predetermined number of said frames; and  
(d) means operative for setting a starting point of each individual superframe as one of said upward and downward dispersions in dependence on a digit of said pseudo-random binary number.

4,953,212

## AUTO VOICE CHANGING APPARATUS

Hiroshi Otsubo, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 25, 1989, Ser. No. 426,261

Claims priority, application Japan, Nov. 29, 1988, 63-299705; Aug. 11, 1989, 1-206833

Int. Cl.<sup>5</sup> H04S 1/00

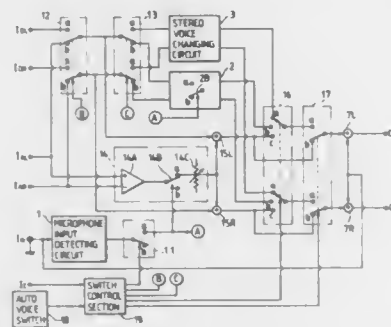
U.S. Cl. 381—1

8 Claims

1. An auto voice changing apparatus comprising:  
a microphone input detecting circuit for outputting a switching signal when a sound signal is included in an input signal from a microphone;



- a switching signal switch for controlling the transmission of the switching signal outputted from this microphone input detecting circuit;
- a multi-sound voice changing circuit for outputting a music signal reproducing music information of a reproducing disk when no switching signal of said microphone input detecting circuit is supplied, said multi-sound voice changing circuit outputting a play signal by removing the sound signal from the music signal reproducing the music information of said reproducing disk when the switching signal of said microphone input detecting circuit is supplied;
- a stereo voice changing circuit for outputting the play signal by removing the sound signal from the music signal reproducing the music information of said reproducing disk;
- a voice switch for switching the music signal reproducing the music information of said reproducing disk to said



- multi-sound voice changing circuit or said stereo voice changing circuit;
- a selecting switch for selecting the output signal of said multi-sound voice changing circuit or the play signal of said stereo voice changing circuit;
- an adder for adding the sound signal from said microphone to the output signal of said multi-sound voice changing circuit selected by this selecting switch or the play signal of said stereo voice changing circuit;
- an auto voice switch for outputting an operating signal in an operating state thereof and a non-operating signal in a non-operating state thereof; and
- a switch control section for discriminating a control signal reproducing control information of said reproducing disk and setting said switching signal switch, said voice switch and said selecting switch to predetermined operating states thereof in accordance with the output signal of said auto voice switch.

#### 4,953,213 SURROUND MODE STEREOGRAPHIC REPRODUCING EQUIPMENT

Akira Tasaki, and Tomohiro Takegawa, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan  
Filed Sep. 26, 1989, Ser. No. 412,751

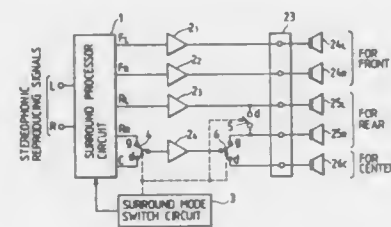
Claims priority, application Japan, Jan. 24, 1989, 1-5991[U]  
Int. Cl.<sup>5</sup> H04R 5/02

U.S. Cl. 381—24

3 Claims

1. In surround mode stereophonic reproducing equipment which can be used in the Dolby surround mode and another surround mode other than the Dolby surround mode, surround mode stereophonic reproducing equipment comprising:  
two front power amplifiers for driving right and left front speakers, and two rear power amplifiers for driving right and left rear speakers, wherein  
said right and left rear speakers are driven jointly with one of said two rear power amplifiers and a center speaker is driven with the other rear power amplifier when the

Dolby surround mode is selected, and said right and left rear speakers are driven independently of each other with



said two rear power amplifiers when a surround mode other than said Dolby surround mode is selected.

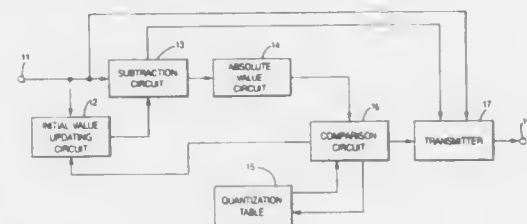
#### 4,953,214 SIGNAL ENCODING AND DECODING METHOD AND DEVICE

Nobuyasu Takeguchi, Osaka; Tooshihide Akiyama, Hirakata, and Kenichi Takahashi, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Filed Jul. 21, 1988, Ser. No. 222,171

Claims priority, application Japan, Jul. 21, 1987, 62-181520; Sep. 21, 1987, 62-236526; Dec. 8, 1987, 62-309922  
Int. Cl.<sup>5</sup> G10L 5/00; G06F 15/40

U.S. Cl. 381—31

7 Claims



1. A method of encoding an image and/or audio signal which is represented by quantized amplitude values at a plurality of sampling points and decoding the encoded signal, comprising the steps of:

an encoding step comprising the substeps of:  
previously preparing a quantization table which has an ordered set of  $n$  quantization scales each having at least one quantization level identified by an index value, where  $n$  is a predetermined integer, said quantization level being defined by an amplitude range defined by a predetermined threshold value and having a representative value which is a single predetermined amplitude value in said amplitude range;

transmitting an amplitude value of a given sampling point as an initial value;

subtracting said initial value from an amplitude value of a next sampling point which is defined as an  $m$ -th sampling point counting from the sampling point of the initial value to calculate a difference value therebetween, where  $m$  is an integer between 1 and  $n$ , and calculating a sign and an absolute value of said difference value;

comparing the absolute value of said difference value with a threshold value of a quantization level in an  $m$ -th quantization scale of said ordered set of  $n$  quantization scales in said quantization table to find a matching quantization level having an amplitude range in which the absolute value of said difference value is included, and outputting an index value and a representative value of the matching quantization level when the matching quantization level is found in the  $m$ -th quantization scale and, when no matching quantization level is found in

- the  $m$ -th quantization scale, return to the subtracting step after incrementing the value of  $m$  by 1;  
transmitting the index value of the matching quantization level and the sign of said difference value; and  
repeating the foregoing substeps after setting a sum of the representative value of the matching quantization level and said initial value as a new initial value; and  
a decoding step comprising the substeps of:  
previously preparing the same quantization table as that used in the encoding step;  
receiving a transmitted initial value;  
receiving a transmitted index value and a transmitted sign and determining a sampling point number  $m$  and a representative value corresponding to the transmitted index value by using said quantization table;  
interpolating an amplitude value of each  $m-1$  sampling points between an initial sampling point of said initial value and an  $m$ -th sampling point counting from the initial sampling point by using said initial value and a product of the representative value and the sign of the  $m$ -th sampling point; and  
repeating the foregoing substeps after setting the sum of said initial value and the representative value of the  $m$ -th sampling point as a new initial value.

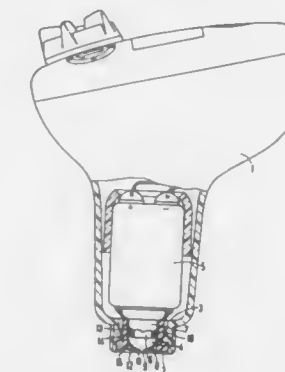
#### 4,953,215 ARRANGEMENT TO PREVENT THE INTRUSION OF FOREIGN MATTER INTO AN ELECTRO-ACOUSTICAL TRANSDUCER

Hans-Joachim Weiss, New Providence, N.J.; Christof Haertl, Neunkirchen, and Juergen Wagner, Kueps, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,389  
Int. Cl.<sup>5</sup> H04R 25/02

U.S. Cl. 381—68

14 Claims



1. A hearing aid comprising:  
a housing containing a sound-conducting channel;  
an electro-acoustic transducer having a projection which extends into said channel; and  
a nonporous membrane substantially covering said projection and having  
at least one bore communicating with said channel, said bore having a diameter which is at least about nine hundredths of a millimeter and is at most about six tenths of a millimeter, and  
a thickness which is much less than said diameter.

#### 4,953,216 APPARATUS FOR THE TRANSMISSION OF SPEECH

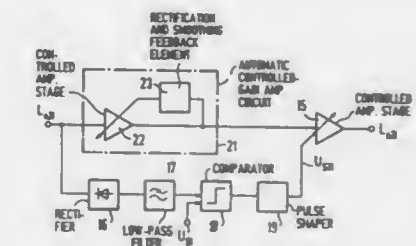
Guenther Beer, Spardorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 298,758  
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1988, 3802903

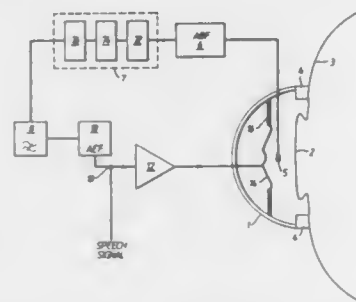
Int. Cl.<sup>5</sup> H04R 25/00; H03G 5/00

U.S. Cl. 381—68.4

3 Claims



quency filter means comprising a resistive-capacitive combination and an amplifier having inverting and non-inverting inputs with a negative feedback loop, an input of the filter means being provided on one side of



said resistive-capacitive combination and the other side of said combination being connected to said inverting input and the non-inverting input being connected to reference potential via a resistive connection.

4,953,218

#### FOREGROUND MUSIC SYSTEM USING CURRENT AMPLIFICATION

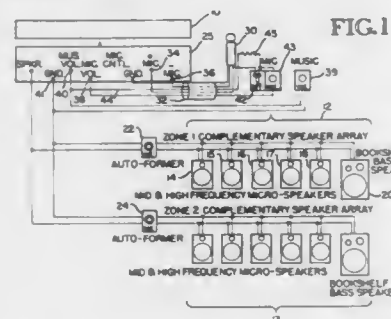
Robert K. Hughes, Jr., 8739 17th N.W., Seattle, Wash. 98117  
Continuation of Ser. No. 726,051, Apr. 23, 1985, abandoned.

This application Jul. 16, 1987, Ser. No. 74,274

Int. Cl.<sup>5</sup> H04R 27/00

U.S. Cl. 381—82

2 Claims



1. A foreground music system for coverage of a large acoustic environment such as a restaurant or retail store, the system being responsive to electrical input signals from a source thereof such as a tape player, comprising:

- a plurality of at least six (6) low impedance speakers of approximately eight (8) ohms resistance each, wired in parallel, such that the effective impedance of the plurality of speakers as a whole is substantially less than eight ohms, said speakers being located at selected points throughout said acoustic environment and arranged to form a speaker array which provides substantially uniform sound coverage of said acoustic environment;
- a single current-limited signal amplifier having a low voltage, high current output for amplifying the electrical input signals and applying the amplified signals to said plurality of speakers for reproduction thereof, said current amplifier including a negative feedback circuit which reduces the output impedance of the signal amplifier to approximately that of the effective impedance of said plurality of speakers, wherein the output voltage from the signal amplifier is sufficiently low and the output current is sufficiently high that adequate power is available to drive said plurality of speakers without a voltage transformer at the output of the signal amplifier;
- means directly coupling the output of the signal amplifier simultaneously to all of said low impedance speakers in

the speaker array without any impedance-matching transformers or other impedance-matching means;

amplifier protection means for monitoring just the distortion component, if any, of the output signal from the signal amplifier and for developing an error signal therefrom, the error signal having an amplitude directly related to the amplitude of said distortion component, the amplifier protection means including a feedback circuit for attenuating the electrical input signals with said error signal so as to restrict the operation of the signal amplifier to its linear mode and maintain the output of the signal amplifier substantially at its maximum average operating level, thereby preventing overdriving and subsequent damage to the signal amplifier.

4,953,219

#### STEREO SIGNAL REPRODUCING SYSTEM USING REVERB UNIT

Junichi Kasai, and Wataru Yagihashi, both of Kanagawa, Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

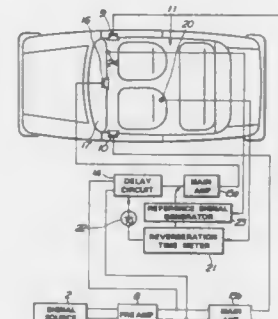
Filed May 17, 1988, Ser. No. 194,937

Claims priority, application Japan, Jun. 26, 1987, 62-158887

Int. Cl.<sup>5</sup> H04B 1/00; H03G 3/00

U.S. Cl. 381—86

13 Claims



1. An automotive audio system provided within a vehicular cabin having a variable reverberation time due to changing conditions therein comprising:
  - an audio signal source adapted to generate audio outputs for reproduction;
  - a first audio signal path, connected with said signal source to receive said audio signal, for providing an audio output to the vehicular cabin;
  - a second audio signal path, connected with said source to receive said audio signal, for providing a delayed audio output so as to generate an audio ambience effect in cooperation with said non delayed audio output of the first path;
  - measuring means for measuring a reverberation time within said vehicular cabin; and
  - delaying means, associated with said second path, for delaying the audio signal in the second path compared to the audio output of said first path by a period of time determined within said vehicular cabin as measured by said measuring means to generate an ambience effect.

#### 4,953,220 MOBILE SPEAKER SYSTEM HAVING AN ILLUMINATION EFFECT

Fumio Murayama; Tomiaki Ando, and Chulchi Endo, all of Yamagata, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

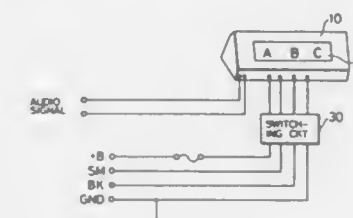
Filed Mar. 31, 1988, Ser. No. 175,796

Claims priority, application Japan, Apr. 3, 1987, 62-50726[U]; Apr. 3, 1987, 62-50727[U]; Apr. 3, 1987, 62-50728[U]

Int. Cl.<sup>5</sup> H04B 1/00

U.S. Cl. 381—86

10 Claims



1. A speaker apparatus mounted in a vehicle, said apparatus comprising:
  - a speaker cabinet exteriorly mounted on a rear tray of said vehicle and having a panel to be illuminated attached to a rear surface thereof so as to be visible from behind said vehicle;
  - an audio speaker, for reproducing sound mounted in said speaker cabinet;
  - means for illuminating said panel with a plurality of colors for a decorative effect said illuminating means comprising a plurality of light sources mounted within said speaker cabinet; and
  - means, connected to said illumination means, for selectively switching on and off said illumination means to illuminate said panel with selected colors in response to characteristics of said vehicle to indicate a function of said vehicle.

#### 4,953,221 CONSTANT POWER RATIO AUTOMATIC GAIN CONTROL

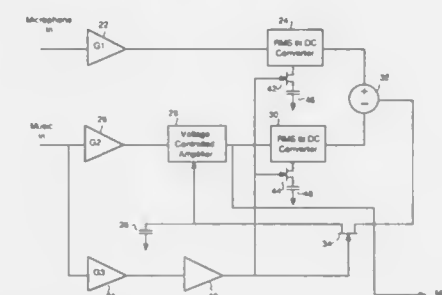
Arthur C. Holly; Charles R. Culbertson, both of Austin, and David L. Ham, San Antonio, all of Tex., assignors to Walkaway Technologies, Inc., San Antonio, Tex.

Filed Jun. 15, 1989, Ser. No. 367,301

Int. Cl.<sup>5</sup> H03G 3/00

U.S. Cl. 381—108

8 Claims



1. An automatic gain control system for controlling an audio system comprising:
  - first and second input channels for receiving first and second input signals, respectively, said first input signal being an audio signal, said second input signal being a feedback signal, said first and second input channels comprising

first and second RMS to DC converters, respectively, for detecting said first and second input signals;

an output channel carrying a control signal for controlling a sound producing device;

means for detecting ambient noise and sound produced by said sound producing device and for generating said feedback signal therefrom; and

control means responsive to said first and second input signals, said control means generating said control signal, said control signal causing said sound producing device to produce sound at a constant ratio relative to said detected ambient noise, said control means for producing said control signal comprising a voltage controlled amplifier.

4,953,222

#### MULTIPLE CHANNEL GATED AMPLIFIER SYSTEM

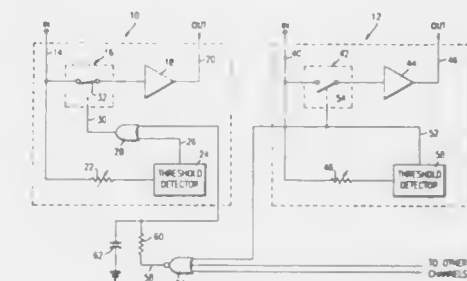
John H. Roberts, Hickory, Miss., assignor to Peavey Electronics Corporation, Meridian, Miss.

Filed Jan. 1, 1988, Ser. No. 200,836

Int. Cl.<sup>5</sup> H03G 3/20

U.S. Cl. 381—110

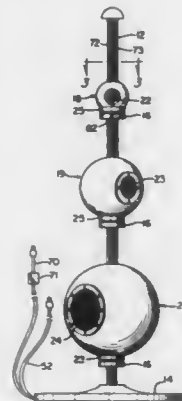
12 Claims



1. A gated amplifier system comprising the combination of at least a pair of amplifier means, each having an audio input for receiving an audio input signal and an output for producing an amplified output of the audio input signal,
  - first threshold detecting means associated with a first amplifier means for detecting only an audio input signal of high threshold for the first amplifier means which must be exceeded during live musical performances to produce a second output from said first amplifier,
  - second threshold detecting means associated with a second amplifier means for detecting only an audio input signal of high threshold for the second amplifier means which must be exceeded when said first amplification means detects an audio signal exceeding said high threshold to produce a sound output from said second amplifier means,
  - first gating means responsive to detection of an audio input signal of high threshold by the first threshold detecting means for passing the audio input signal of the first amplifier means for amplification,
  - second gating means responsive to detection of an audio input signal of high threshold level by the second threshold detecting means for passing the audio input signal of the second amplifier means for amplification, and
  - further gating means responsive to the absence of detection of audio input signal of high threshold level by the first threshold detection means for conditioning the second gating means to pass audio input signals of low signal level to the second amplifier means for amplification.



**4,953,223**  
**SPEAKER MOUNTING SYSTEM**  
 George G. Householder, 1432 Reservoir Ave., Roslyn, Pa. 19001  
 Filed Sep. 8, 1988, Ser. No. 241,465  
 Int. Cl.<sup>3</sup> H04R 1/20, 1/24, 1/26  
 U.S. Cl. 381-188 10 Claims



7. A speaker mounting system comprising in combination:  
 an elongated standard including means supporting said standard in upstanding relation, electrical conductors extending through longitudinal grooves for the substantial length of said standard, and means for supplying an audio signal to said conductors;  
 a plurality of collars disposed in surrounding relation to said standard, each collar having at least one commutator ring therein electrically connected to said conductors, and releasable locking means adjustably fixing each said collar at a selected position on said support; and  
 a plurality of speaker housings, each housing disposed on one of said collars in surrounding relation to said standard, a speaker component mounted in each of said housings having electrical terminals in contact with said commutator rings, each said housing being rotatable with respect to said collar on which it is mounted, said releasable locking means being independently adjustable to vary the spacing between said speaker housings.

**4,953,224**  
**PATTERN DEFECTS DETECTION METHOD AND APPARATUS**

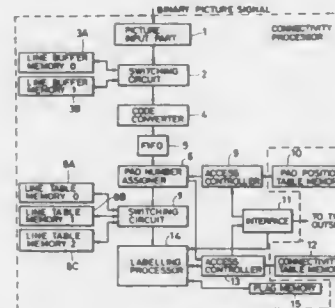
Toshiaki Ichinose; Takanori Ninomiya, both of Yokohama, and Yasuo Nakagawa, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Continuation of Ser. No. 779,126, Sep. 23, 1985, abandoned. This application Feb. 16, 1988, Ser. No. 158,125  
 Claims priority, application Japan, Sep. 27, 1984, 59-200401; Oct. 10, 1984, 59-208177

Int. Cl.<sup>3</sup> G06K 9/00

- U.S. Cl. 382-8 7 Claims  
 1. An apparatus for detecting a defect of a pattern comprising:

image pickup means for sensing an optical image of a pattern on an XY plane by scanning individual lines along the X-direction and line-by-line along a subscanning Y-direction for providing an electrical image signal;  
 a binary digitizing circuit which transforms said electrical image signal into corresponding binary signals representing picture elements;  
 a connection data generator including:  
 a pad position table memory for storing pad position coordinates (Xi, Yi) with representative pad numbers Ni,  
 line segment generation means for generating a start position u and an end position v, in the X coordinate, of a

line segment of the pattern detected along a main scanning line,  
 pad number assigning means for assigning said pad number Ni as labels to a line segment when said pad position coordinates (Xi, Yi) satisfy a condition  $u \leq Xi \leq v$ ,  
 labelling means for determining that a label representation M corresponds to the minimum label value representation of a first label value M<sub>0</sub> and a second label value M<sub>1</sub> when a corresponding first line segment is determined as being connected along the subscanning direction Y to a corresponding second line segment, said first label M<sub>0</sub> and second label M<sub>1</sub> correspond to the detection of line segments, as represented by pad numbers Ni, detected along respective adjacent scanning lines, and wherein said label representation M corresponds to a label value M<sub>2</sub> when said first line segment is connected to said second line segment and one of said two line



segments has the label value representation M<sub>2</sub> and the other one of said line segments has no representative label value assigned, and assigning M to said first and second line segments, and  
 a connectivity table memory for storing the connection data signals representative of a connectivity relationship expressed by said minimum label signal M as a data D(I) corresponding to address A(I) of said first and second label signals M<sub>0</sub> and M<sub>1</sub>, respectively, showing said pad positions; and  
 comparison means for comparing said connection data signals read out from said connectivity table memory of said connection data generator with design data signals expressed in the form of a cyclic list of symbols assigned to pads in the connectivity relationship, whereby a determination of a defect of the pattern is made based on the output of said comparison means.

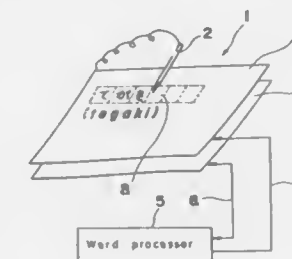
**4,953,225**  
**HANDWRITTEN CHARACTER-RECOGNIZING APPARATUS FOR AUTOMATICALLY GENERATING AND DISPLAYING CHARACTER FRAMES**  
 Fumio Togawa, Nara, and Hitoshi Hirose, Higashiosaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Oct. 14, 1988, Ser. No. 257,842  
 Claims priority, application Japan, Oct. 16, 1987, 62-262538; Nov. 25, 1987, 62-296876

Int. Cl.<sup>3</sup> G06K 9/00

- U.S. Cl. 382-13 11 Claims  
 1. A handwritten character-recognizing apparatus comprising:

writing/displaying means for writing and displaying character information thereon;  
 input means for writing said character information in one of said plurality of character frames on said writing/displaying means;  
 a central processing unit having discriminating means for discriminating whether said input means has moved from said one character frame to an adjacent character frame; character recognizing means having a plurality of standard

characters stored therein for comparing said character information in said one character frame with said plurality of standard characters and displaying one of said standard characters on said writing/displaying means which corresponds with said character information in said one character frame in response to said input means being discriminated to have moved to said adjacent character frame by said discriminating means; and

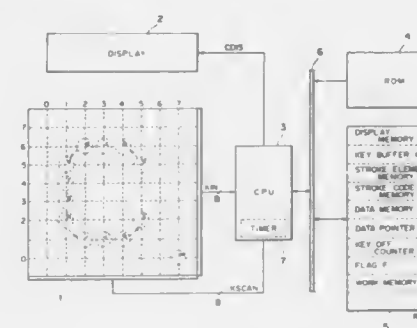


character frame generating means for automatically generating and displaying an additional character frame to said plurality of character frames in a position adjacent to the last character frame of said plurality of character frames in response to said discriminating means discriminating that said input means has moved from the one character frame to said adjacent character frame.

**4,953,226**  
**ELECTRONIC APPARATUS WITH HAND-WRITTEN PATTERN RECOGNITION FUNCTION**  
 Shigeru Matsuyama, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 287,638, Dec. 21, 1988, abandoned, which is a continuation of Ser. No. 865,451, May 21, 1986, abandoned. This application Aug. 10, 1989, Ser. No. 393,032  
 Claims priority, application Japan, May 31, 1985, 60-116719  
 Int. Cl.<sup>3</sup> G06K 9/00

U.S. Cl. 382-13

5 Claims



1. An electronic apparatus with a pattern recognition function, comprising:  
 coordinate input means for inputting coordinate data comprising a plurality of areas, wherein one of said plurality of areas is a specific area;  
 judging means for judging whether a coordinate datum which has just been input by said coordinate input means is identical to a previously input coordinate datum;  
 memory means for storing each input coordinate datum except for successive identical coordinate data in response to a judgment by said judging means;  
 pattern recognition means for recognizing a pattern on the basis of the coordinate data stored in said memory means and  
 control means for controlling said pattern recognition means to execute pattern recognition processes in response to

coordinate data being input by said specific area of said coordinate input means.

**4,953,227**  
**IMAGE MOSAIC-PROCESSING METHOD AND APPARATUS**  
 Makoto Katsuma, Wako; Hiroyuki Kimura, Yokohama; Kazunori Urushihara, Inagi; Susumu Matsumura, Yokohama; Hiroshi Ohmura, Wako; Shunichi Tamai, Kawasaki, and Hideki Tanaka, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Jan. 28, 1987, Ser. No. 7,785  
 Claims priority, application Japan, Jan. 31, 1986, 61-020519; Jan. 31, 1986, 61-020520; Feb. 27, 1986, 61-042510; Feb. 27, 1986, 61-042511

Int. Cl.<sup>3</sup> G06K 9/36

- U.S. Cl. 382-18 21 Claims  
 1. An image processing method comprising the steps of:  
 dividing an original image into plural areas each composed of plural pixels, wherein image data of each of the plural pixels is multi-level image data representing an image density;  
 changing a shape of the area in accordance with a contrast of the original image; and  
 conversion processing, including defining the multi-level image data of a predetermined pixel within each area as a representative value, the image data of the plural pixels within the area into said representative value.

**4,953,228**  
**APPARATUS FOR DETECTING PATTERN OF CREST LINE**  
 Mineo Shigemitsu; Ryol Onda, both of Mitaka; Toshi Minami, and Osamu Nakamura, both of Tokyo, all of Japan, assignors to Secom Co., Ltd., Tokyo, Japan  
 Filed Jun. 3, 1988, Ser. No. 202,282  
 Claims priority, application Japan, Jun. 11, 1987, 62-144012  
 Int. Cl.<sup>3</sup> G06K 9/00

U.S. Cl. 382-22

4 Claims



1. An apparatus for detecting a pattern of crest lines, which pattern is divided into a plurality of picture elements on a picture image thereof, each picture element having a shading value, each shading value being one of a predetermined number of values, comprising:  
 means for storing said each shading value in correspondence to each picture element having said shading value, in order;  
 means for calculating a first group of evaluated values for each direction of a plurality of predetermined directions in a unit area consisting of a group of said picture elements, each of which is adjacent to one another, each of said first group of evaluated values being an evaluated shading value in each series of picture elements along one direction of said plurality of predetermined directions;

means for selecting a second group of values, each of which value is a largest difference in said first group of evaluated values for each direction; and  
means for selecting a direction corresponding to a maximum value in said second group of values,  
thereby determining a direction of crest lines of a pattern of crest lines in said unit area.

4,953,229

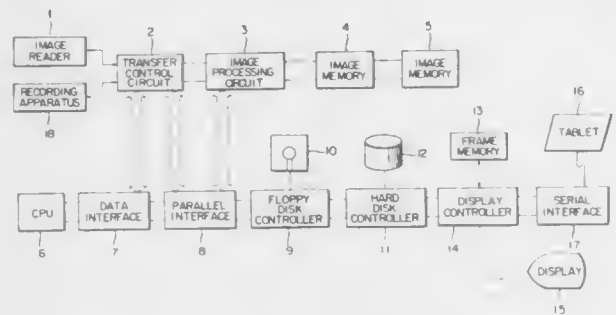
**IMAGE PROCESSING APPARATUS**  
Yoshinori Abe, and Masahiko Matsunawa, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 353,142, May 15, 1989, abandoned, which is a continuation of Ser. No. 136,431, Dec. 17, 1987, abandoned, which is a continuation of Ser. No. 21,613, Mar. 2, 1987, abandoned, which is a continuation of Ser. No. 700,448, Feb. 11, 1985, abandoned.

Filed Oct. 31, 1989, Ser. No. 430,096  
Claims priority, application Japan, Feb. 16, 1984, 59-25994; Feb. 16, 1984, 59-25995

Int. Cl.<sup>5</sup> G06K 9/36  
U.S. Cl. 382-41

15 Claims



1. An apparatus for processing an image comprising  
an image reader for reading an original image and outputting first image data based thereon to an image memory for storing said first image data,  
a data interface comprising means for converting said first image data into second image data by reducing the number of pixels of said first image data,  
a frame memory for storing said second image data,  
a first processing part comprising a display and an operating means, said first processing part processing said second image data to display said second image data from said frame memory on said display,  
said operating means providing a layout command for assigning a new location to at least some elements of said image so that second image data can be relocated to said new location and  
a second processing part for processing said first image data stored in said image memory so that said first image data is displayed in said new location, assigned to said second image data, in accordance with said layout command.

4,953,230

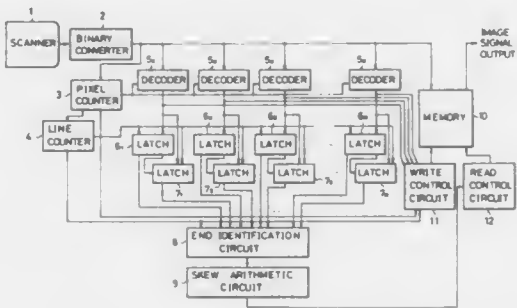
**DOCUMENT IMAGE PROCESSING SYSTEM**  
Morisumi Kurose, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 150,501, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 858,536, Apr. 29, 1986, abandoned, which is a continuation of Ser. No. 464,763, Feb. 7, 1983, abandoned. This application Aug. 21, 1989, Ser. No. 396,828

Claims priority, application Japan, Feb. 5, 1982, 57-17250  
Int. Cl.<sup>5</sup> G06K 4/32

U.S. Cl. 382-46

7 Claims



1. A system for processing a document image which is obtained by optically reading a document including at least one character line to be processed, comprising:

scanning means provided fixed in space for scanning the document to be processed in a first direction while causing a relative motion in a second direction, which is perpendicular to said first direction, between said scanning means and said document at constant speed, thereby obtaining document image data of said document, said scanning means including a first plurality of photoelectric elements arranged in the form of a single array in said first direction;

means for storing said document image data;  
detecting means including a plurality of blocks for detecting the end positions of a character line of said document with reference to a first reference line extending in said first direction and a second reference line extending in said second direction from said document image data;  
determining means for determining the amount of skew of said document image using the detected end positions of character line of said document; and  
correcting means for correcting the skew of said document image by shifting said document image data in said second direction on a block by block basis without rotation in accordance with the amount of skew thus determined by said determining means;

wherein said skew is an angular displacement of the character line relative to the first and second scanning directions and said detecting means in connected between said scanning means and said determining means and said skew is corrected by shifting each of blocks of image data which lags behind a leading left-most or right-most block of image data forwardly in said second direction proportionately over a corresponding amount depending on a distance between each of said blocks of image data and said leading left-most or right-most block of image data.

# DESIGN PATENTS

GRANTED AUG. 28, 1990

## ERRATA

For  
CLASS

D26-147

See  
PATENT NO.

310,206



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## DESIGNS

AUGUST 28, 1990

310,130

### SALT BLOCK

Albert F. van Kooten, Gooz, Netherlands, assignor to Akzo Salt and Basic Chemicals B.V., Netherlands

Filed May 7, 1987, Ser. No. 49,067

Claims priority, application Netherlands, Nov. 7, 1986, 61572

Term of patent 14 years

U.S. Cl. D1—100



310,131

### FRONT SHOE SOLE

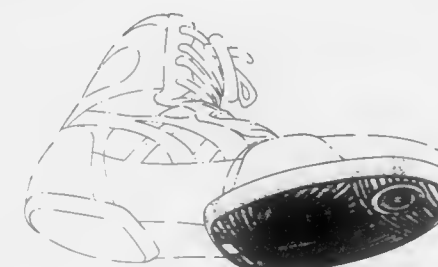
Yoshiaki Hase, Akashi, Japan, assignor to ASICS Corporation, Hyogo, Japan

Filed Jun. 16, 1987, Ser. No. 62,550

Claims priority, application Japan, Dec. 17, 1986, 61-49918

Term of patent 14 years

U.S. Cl. D2—320



310,132

### HEEL SOLE

Yoshiaki Hase, Akashi, Japan, assignor to Asics Corporation, Hyogo, Japan

Filed Jun. 16, 1987, Ser. No. 62,661

Claims priority, application Japan, Dec. 17, 1986, 61-49919

Term of patent 14 years

U.S. Cl. D2—320



310,133

### COMBINED GLOVE AND FORM

Fung-Bor Chen, Sandy; Wu-Nan Huang, Salt Lake City, both of Utah, and Carl M. Rogers, Ware Shoals, S.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Apr. 8, 1987, Ser. No. 35,945

Term of patent 14 years

U.S. Cl. D2—617



310,134

### CRUTCH COVER

Marian F. Van Dyke, 943 S. Zephyr Ct., Lakewood, Colo. 80221

Filed Sep. 25, 1986, Ser. No. 911,444

Term of patent 14 years

U.S. Cl. D3—10



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OFFICIAL GAZETTE

AUGUST 28, 1990

310,135

UMBRELLA HANDLE

Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', Incorporated,  
Loveland, Ohio

Filed Dec. 19, 1988, Ser. No. 286,485

Term of patent 14 years

U.S. Cl. D3—12



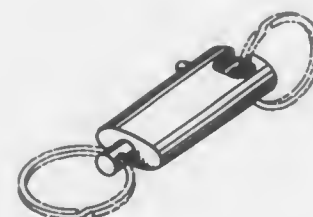
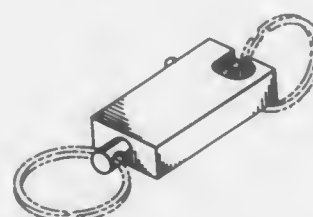
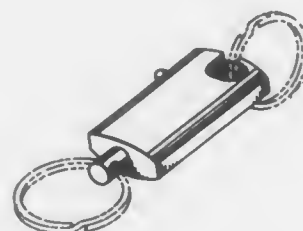
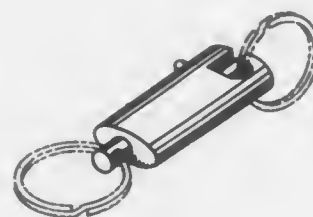
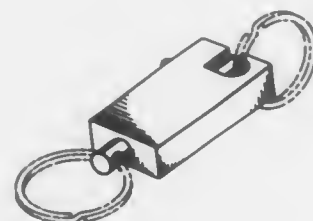
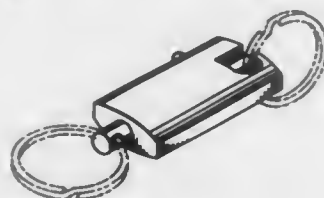
310,136

KEY RING HOLDER

Summer MacDonald, P.O. Box 2552, Providence, R.I. 02906  
Filed May 7, 1987, Ser. No. 46,896

Term of patent 14 years

U.S. Cl. D3—61



AUGUST 28, 1990

U.S. PATENT AND TRADEMARK OFFICE

2653

310,137

TOILETRY KIT

David W. Maya, 3018 Kingsley Rd., Shaker Heights, Ohio 44122 Miryam M. Moharram, 3312 Phaeton Ct., Plano, Tex. 75023  
Filed Jul. 17, 1986, Ser. No. 886,436

Term of patent 14 years

U.S. Cl. D3—39



310,139

TOOTHBRUSH

Miryam M. Moharram, 3312 Phaeton Ct., Plano, Tex. 75023  
Filed Feb. 29, 1988, Ser. No. 161,896

Term of patent 14 years

U.S. Cl. D4—104



310,138

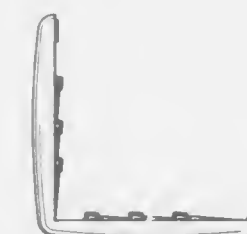
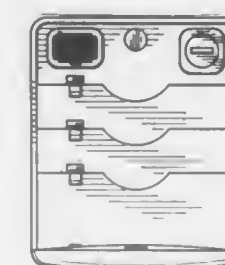
COMBINED CREDIT CARD CASE AND ALARM

Murray Peters, 214 Queenslands Place S.E., Calgary, Alberta,  
Canada (T2S 4E2), and Art Peters, 1035 Lk. Christina Way  
S.E., Calgary, Alberta, Canada (T2J 2R4)

Filed Sep. 14, 1988, Ser. No. 244,462

Term of patent 14 years

U.S. Cl. D3—56



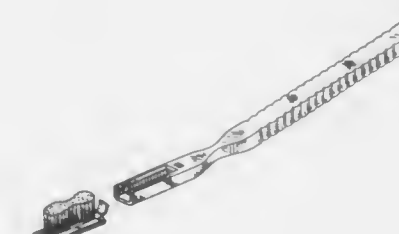
310,140

TOOTHBRUSH OR SIMILAR ARTICLE

Mark A. Borque, 400 E. Santa Clara, New Iberia, La. 70560  
Filed Mar. 4, 1988, Ser. No. 164,121

Term of patent 14 years

U.S. Cl. D4—104





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310,141  
CHAIR

Andras Dozza-Farkas, Munich, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland  
Filed Mar. 30, 1987, Ser. No. 32,088

Claims priority, application Switzerland, Dec. 30, 1986, 008001

The portion of the term of this patent subsequent to Jul. 31, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D6—366



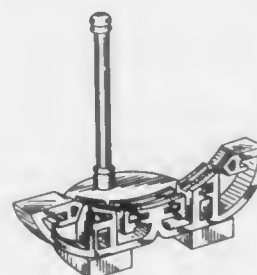
310,144  
PLATE STAND

Gunars Mencis, Lockport; John L. DeCosta, Evanston, and Melvin Schlicker, Hawthorne Woods, all of Ill., assignors to Van Hygan & Smythe, Niles Chicago, Ill.

Filed Sep. 15, 1987, Ser. No. 96,847

Term of patent 14 years

U.S. Cl. D6—449



310,142

CHAIR OR SIMILAR ARTICLE

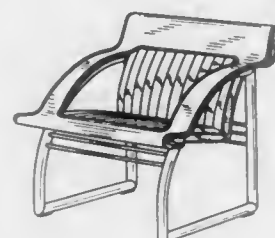
Gerd Lange, Kapsweyer, Fed. Rep. of Germany, assignor to De Sede AG, Klingnau, Switzerland

Filed May 21, 1987, Ser. No. 52,359

Claims priority, application Switzerland, Dec. 30, 1986, 115636

Term of patent 14 years

U.S. Cl. D6—379



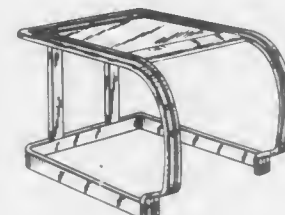
310,145  
NESTABLE TABLE

David P. G. Williams, Darien, Conn., assignor to Mohasco Upholstered Furniture Corporation, Fairfax, Va.

Filed Oct. 3, 1988, Ser. No. 251,875

Term of patent 14 years

U.S. Cl. D6—484



310,143

SOFA OR SIMILAR ARTICLE

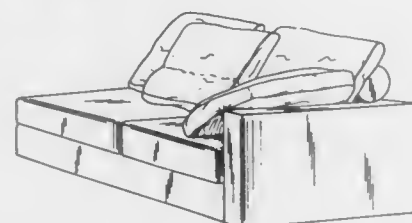
Hans Hopfer, Paris, France, assignor to Alex Synn AG, Cham, Switzerland

Filed Mar. 7, 1988, Ser. No. 165,164

Claims priority, application Int'l Pat. Institute, Sep. 7, 1987, DM/009239

Term of patent 14 years

U.S. Cl. D6—381



310,146  
PLANT HANGER

Dale De Vries, and Dean De Vries, both of 3160 Waverly Street, Vancouver, British Columbia, Canada (V5S 1G2)

Filed Jun. 1, 1988, Ser. No. 200,787

Claims priority, application Canada, Dec. 9, 1987, 09-12-87-2

Term of patent 14 years

U.S. Cl. D6—513



310,147

WALL MOUNTED BATHROOM ACCESSORY

Willard Azron, P.O. Box 161, Glencoe, Ill. 60022

Filed Jun. 8, 1988, Ser. No. 203,866

Term of patent 14 years

U.S. Cl. D6—524



310,149

APPLE SHAPED BEACH BLANKET WITH STORAGE POCKET

Alice J. Radziewicz, and Leonard Radziewicz, both of 61 Millay Rd., Morganville, N.J. 07751

Filed Dec. 8, 1988, Ser. No. 281,507

Term of patent 14 years

U.S. Cl. D6—608



310,150

MICROWAVE OVEN

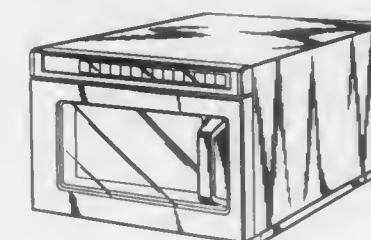
Masuo Ichihara; Hisayoshi Matoba; Kensuke Mizuma, and Tomoyasu Hiratsuka, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 10, 1988, Ser. No. 205,098

Claims priority, application Japan, Jan. 7, 1988, 63-221

Term of patent 14 years

U.S. Cl. D7—351



310,148

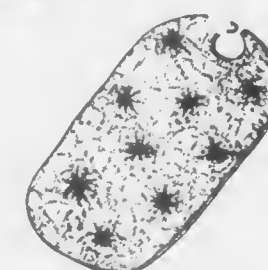
POTATO SHAPED COMFORTER

Brian G. Cleary, and Christina J. Mellen, both of 12301 Jerome St., Garden Grove, Calif. 92641

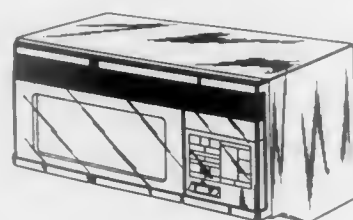
Filed Feb. 29, 1988, Ser. No. 162,359

Term of patent 14 years

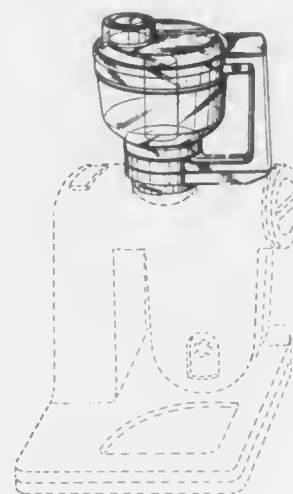
U.S. Cl. D6—600



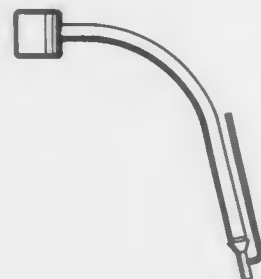
**310,151**  
**MICROWAVE OVEN**  
 Masayoshi Kubo; Masuo Ichihara; Kensuke Mizuma, and Hisayoshi Matoba, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Jun. 10, 1988, Ser. No. 205,099  
 Claims priority, application Japan, Dec. 29, 1987, 62-53880  
 Term of patent 14 years  
 U.S. Cl. D7—351



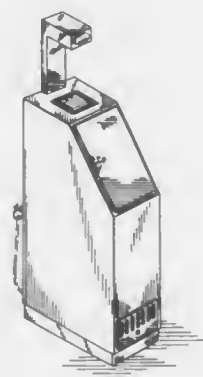
**310,153**  
**FOOD PROCESSING ATTACHMENT FOR A KITCHEN MACHINE**  
 Helmut Kaiser, Wolfratshausen, Fed. Rep. of Germany, assignor to Bosch-Siemens Hausgeräte GmbH, Munich, Fed. Rep. of Germany  
 Filed Aug. 10, 1987, Ser. No. 84,494  
 Claims priority, application Fed. Rep. of Germany, Feb. 9, 1987, MR 17061  
 Term of patent 14 years  
 U.S. Cl. D7—412



**310,152**  
**COMBINED STEAM AND AIR CONVEYING PIPE FOR AN ESPRESSO MACHINE**  
 Gotthard C. Mahlich, Kronberg, and Michael Borgmann, Solingen, both of Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany  
 Filed May 27, 1987, Ser. No. 54,585  
 Claims priority, application Fed. Rep. of Germany, Jan. 6, 1987, 5MR9740  
 Term of patent 14 years  
 U.S. Cl. D7—398



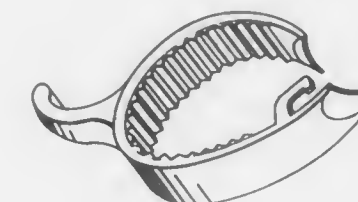
**310,154**  
**BUTTER OR CONDIMENT DISPENSER**  
 Andrew M. Stein, Massapequa Park, N.Y., assignor to Six Corners Development Company, Amityville, N.Y.  
 Filed Oct. 8, 1987, Ser. No. 106,196  
 Term of patent 14 years  
 U.S. Cl. D7—590



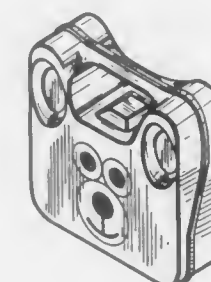
**310,155**  
**WINE BOTTLE HOLDER OR THE LIKE**  
 Noel H. deNevers; James H. Gardner, and Robert M. Norton, all of Salt Lake City, Utah, assignors to Aurora Design Associates, Inc., Salt Lake City, Utah  
 Filed Oct. 11, 1988, Ser. No. 256,365  
 Term of patent 14 years  
 U.S. Cl. D7—608



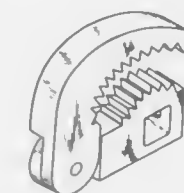
**310,158**  
**BOTTLE OPENER**  
 An-Gen Chan, 1F, 14, Alley 2, Lane 340, Tungshun Street, Sec. 2, Taipei City, Taiwan  
 Filed Sep. 6, 1988, Ser. No. 241,127  
 Term of patent 14 years  
 U.S. Cl. D8—41



**310,156**  
**LUNCH BOX**  
 Pi S. Chen, No. 5, Lane 86, Chung Shang Road, Je Te Hsiang, Tainan Hsiang, Taiwan  
 Filed Apr. 1, 1987, Ser. No. 32,397  
 Term of patent 14 years  
 U.S. Cl. D7—627



**310,157**  
**WRENCH HEAD**  
 George W. Reilly, 6 Hemlock Rd., W. Nyack, N.Y. 10994, and Jesse L. Colodner, Pearl River, N.Y., assignors to George W. Reilly, West Nyack, N.Y.  
 Filed Mar. 31, 1988, Ser. No. 176,389  
 Term of patent 14 years  
 U.S. Cl. D8—23



**310,159**  
**DOOR JAMB SPREADER**  
 James W. Priola, 6945 Via Mariposa Sur, Bonsall, Calif. 92003  
 Filed Jan. 29, 1987, Ser. No. 8,642  
 Term of patent 14 years  
 U.S. Cl. D8—51

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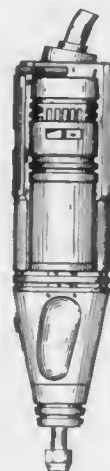


310,160  
ROTARY TOOL

Madhu Patel, Skokie, Ill., assignor to Sears, Roebuck and Co.,  
Chicago, Ill.

Filed Aug. 10, 1987, Ser. No. 83,103  
Term of patent 14 years

U.S. Cl. D8—61

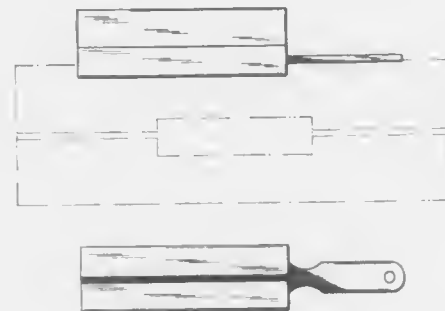


310,162  
FILE FOR A CEMENT FINISHING TROWEL

Thomas M. DeJohn, 703 Franklin Ave., Canonsburg, Pa. 15317

Filed Jun. 14, 1988, Ser. No. 206,686  
Term of patent 14 years

U.S. Cl. D8—90

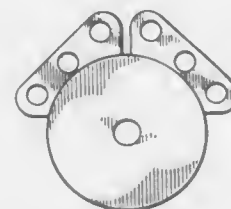
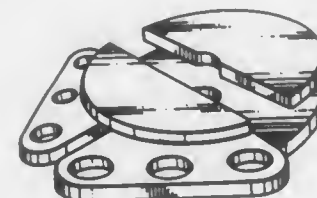


310,163  
BRAKE FOR EMERGENCY DESCENT DEVICE OR  
SIMILAR ARTICLE

Armand Dale, #1121-3100 Carling Avenue, Nepean, Ontario,  
Canada (K2B 6J6)

Filed Sep. 21, 1987, Ser. No. 99,201  
Claims priority, application Canada, Apr. 7, 1987, 07-04-87-10  
Term of patent 14 years

U.S. Cl. D8—360

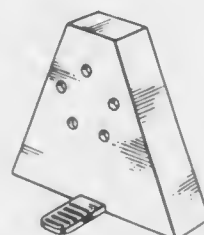


310,161  
LUG NUT HOLDER FOR TIRE INSTALLATION OR  
REMOVAL

Edward K. Blair, P.O. Box k732, Gardnerville, Nev. 89410

Filed Aug. 26, 1986, Ser. No. 90,149  
Term of patent 14 years

U.S. Cl. D8—71

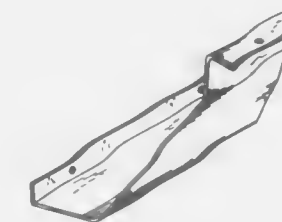


310,164  
WALL MOUNTED ARTICLE STORAGE SHELF

Maxine T. Keel, Rte. 3, Box 281, Ashford, Ala. 36312

Filed Aug. 13, 1986, Ser. No. 896,336  
Term of patent 14 years

U.S. Cl. D8—380

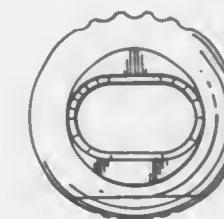
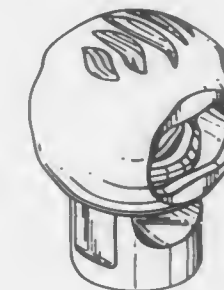


310,166  
CORD CLAMP

Gerhard Fildan, Dr.-Körner-Str. 64, Trumau, Austria

Filed Nov. 18, 1988, Ser. No. 273,866  
Term of patent 14 years

U.S. Cl. D8—383



310,165  
BATHROOM SHELF BRACKET

Marie F. Cobb, 51 Warner St., Newport, R.I. 02840

Filed Jul. 21, 1988, Ser. No. 222,232  
Term of patent 14 years

U.S. Cl. D8—381

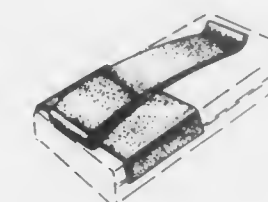


310,167  
RADAR WARNING RECEIVER VISOR CLIP

Frederick J. Reber, II, Cincinnati, Ohio, assignor to Cincinnati  
Microwave, Inc., Cincinnati, Ohio

Filed Nov. 21, 1988, Ser. No. 274,045  
Term of patent 14 years

U.S. Cl. D8—395



310,168  
SEALANT APPLICATOR

Robert E. Monteneri, Sr., Southington, Conn., assignor to Loc-  
tite Corporation, Newington, Conn.

Filed Oct. 15, 1987, Ser. No. 109,633  
Term of patent 14 years

U.S. Cl. D9—448



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310,169  
BOTTLE

Mathias M. Kowolik, Loveland, Ohio, and John Pardo, Yonkers, N.Y., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 31, 1988, Ser. No. 238,944  
Term of patent 14 years

U.S. Cl. D9—367

310,172  
FUNNEL FOR NEW OIL CONTAINERS

Fred Parker, 515 S. Polinsettia Ave., Compton, Calif. 90221  
Filed Jul. 21, 1988, Ser. No. 222,233

Term of patent 14 years

U.S. Cl. D9—447



## 310,170

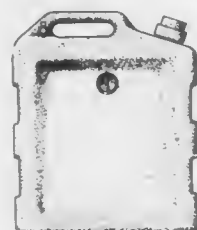
## COMBINED DRAIN OIL COLLECTION AND STORAGE CONTAINER

Richard O. Bartz, Edina, Minn., assignor to Innovative Technology, Inc., Minneapolis, Minn.

Filed Nov. 30, 1987, Ser. No. 126,674

Term of patent 14 years

U.S. Cl. D9—374

310,171  
BOTTLE

John M. Cusenza, Woodland Hills, Calif., assignor to Fourth Systema, Woodland Hills, Calif.

Filed Mar. 12, 1987, Ser. No. 24,804

Term of patent 14 years

U.S. Cl. D9—377

310,173  
CLOCK

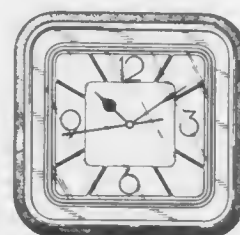
Hisako Sugano, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Aug. 25, 1986, Ser. No. 899,991

Claims priority, application Japan, Feb. 25, 1986, 61-6505

Term of patent 14 years

U.S. Cl. D10—24

310,174  
WRISTWATCH

C. Michael Jacobi, Middlebury, Conn., and M. Amelia Kennedy, Rochester, N.Y., assignors to Timex Corporation, Waterbury, Conn.

Filed Mar. 12, 1987, Ser. No. 26,345

Term of patent 14 years

U.S. Cl. D10—32

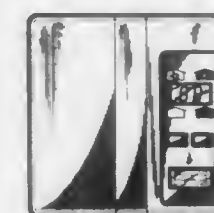
310,177  
THERMOSTAT

David Benson, 5170 Hingston, Montreal, Quebec, Canada (H3X 3R4), and Don Tardio, 2562 Taillon, Apt. 4, Montreal, Quebec, Canada (H1L 4J7)

Filed Nov. 6, 1987, Ser. No. 117,311

Term of patent 14 years

U.S. Cl. D10—50



## 310,175

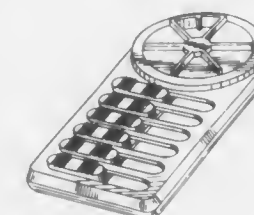
## BOARD GAME SCORING DEVICE

James H. Nugent, Avon, Conn., assignor to Horn Abbot Ltd., Toronto, Canada

Filed Nov. 16, 1987, Ser. No. 121,148

Term of patent 14 years

U.S. Cl. D10—46.1



## 310,178

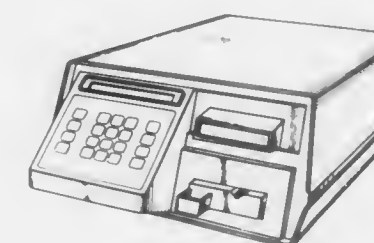
## SPECTROPHOTOMETER

Kenneth D. Collister, and Robert L. Terry, both of Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Mar. 9, 1987, Ser. No. 23,868

Term of patent 14 years

U.S. Cl. D10—81



## 310,176

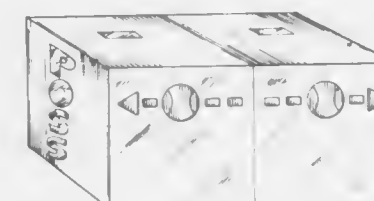
## BASKETBALL POSSESSION INDICATOR

Robert M. Wolfe, 210-A Park Ave., Raleigh, N.C. 27605

Filed Jul. 25, 1988, Ser. No. 223,779

Term of patent 14 years

U.S. Cl. D10—46.1



## 310,179

## DESK LETTER SCALE

Richard M. Hansen, 415 Oakwood Dr., Troy, Ill. 62294

Filed Feb. 24, 1987, Ser. No. 18,011

Term of patent 14 years

U.S. Cl. D10—87



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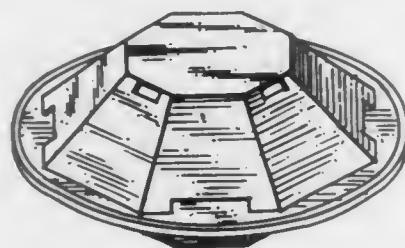
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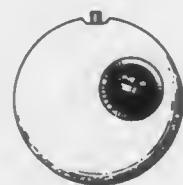
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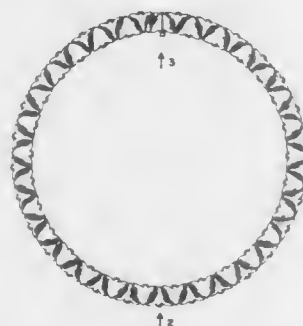
310,180  
**EMERGENCY SIGNAL FLOAT**  
 Norm Etkin, 1880 Harbor Island Dr., San Diego, Calif. 92101  
 Filed Mar. 7, 1988, Ser. No. 164,644  
 Term of patent 14 years  
 U.S. Cl. D10—107



310,181  
**WATCH CASE BACK**  
 Pierre A. Nobs, Zurich, Switzerland, assignor to Panalec, Ltd.,  
 Wanchai, Hong Kong  
 Filed Apr. 27, 1987, Ser. No. 43,471  
 Term of patent 14 years  
 U.S. Cl. D10—128



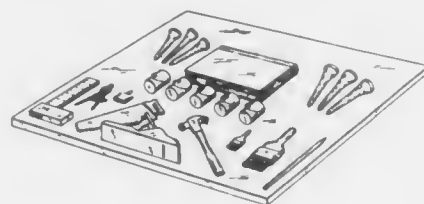
310,182  
**NECKLACE**  
 Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari  
 S.p.A., Rome, Italy  
 Filed Apr. 30, 1987, Ser. No. 44,113  
 Claims priority, application Italy, Oct. 31, 1986, 36212-B/86  
 Term of patent 14 years  
 U.S. Cl. D11—3



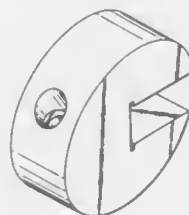
310,183  
**BRACELET**  
 Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari  
 S.p.A., Rome, Italy  
 Filed Jul. 13, 1988, Ser. No. 218,044  
 Claims priority, application Int'l Pat. Institute, Jan. 14, 1988,  
 DM/010065  
 Term of patent 14 years  
 U.S. Cl. D11—4



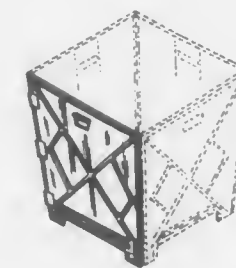
310,184  
**GOLF TEE REPAIR KIT NOVELTY PLAQUE**  
 George Dutko, 1811 W. Porter Ave., Chesterton, Ind. 46304  
 Filed Nov. 25, 1988, Ser. No. 276,336  
 Term of patent 14 years  
 U.S. Cl. D11—133



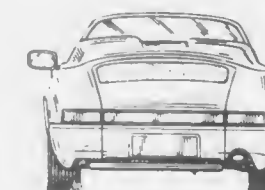
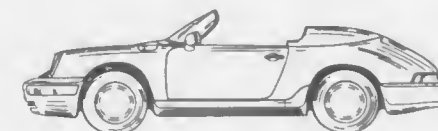
310,185  
**FLAGHOLDER**  
 Gary R. Tick, 319 N. Navarra Dr., Scotts Valley, Calif. 95066  
 Filed Jul. 1, 1988, Ser. No. 216,732  
 Term of patent 14 years  
 U.S. Cl. D11—182



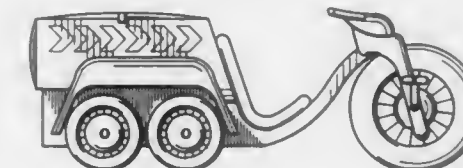
310,186  
**SIDEWALL OF A PLANTER BOX**  
 Phil Lee, Moorpark, and Bert Inoue, Simi Valley, both of Calif.,  
 assignors to Dura Lee Ltd., Agoura, Calif.  
 Filed May 17, 1985, Ser. No. 735,759  
 Term of patent 14 years  
 U.S. Cl. D11—164



310,187  
**AUTOMOBILE**  
 Benjamin Dimson, Tiefenbrunn/Muehlhausen, Fed. Rep. of  
 Germany, assignor to Dr. Ing. H.C.F. Porsche Aktiengesell-  
 schaft, Fed. Rep. of Germany  
 Filed Nov. 10, 1987, Ser. No. 119,329  
 Claims priority, application Fed. Rep. of Germany, May 12,  
 1987, MR6234  
 Term of patent 14 years  
 U.S. Cl. D12—91



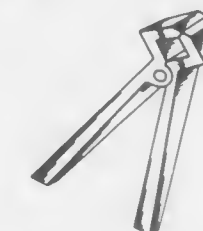
310,188  
**FIVE WHEELED CHILD'S CYCLE**  
 Jon Grabau, 615 Augusta, San Antonio, Tex. 78215  
 Filed Jan. 14, 1988, Ser. No. 143,684  
 Term of patent 14 years  
 U.S. Cl. D12—108



310,189  
**AUTOMOBILE TIRE**  
 Jinuosuke Takakura; Masabu Miyawaki, both of Sakai, and  
 Norio Yoshikawa, Osaka, all of Japan, assignors to Kubota,  
 Ltd. and Kyowa, Ltd., both of Osaka, Japan  
 Filed Sep. 23, 1987, Ser. No. 100,136  
 Claims priority, application Japan, Mar. 23, 1987, 62-10919  
 Term of patent 14 years  
 U.S. Cl. D12—148



310,190  
**PEDAL CLAMP BICYCLE STAND**  
 Donald S. Coates, 1308 W. Katella, Anaheim, Calif. 90802  
 Filed Jul. 18, 1988, Ser. No. 221,183  
 Term of patent 14 years  
 U.S. Cl. D12—120



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**310,191**  
**FRONT WHEEL COVER**  
 Toshiyuki Yamada, Saitama; Nakoto Kitagawa, Tokyo, and  
 Toshio Kurihara, Saitama, all of Japan, assignors to Honda  
 Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Nov. 16, 1987, Ser. No. 121,004  
 Term of patent 14 years  
 U.S. Cl. D12—126



**310,194**  
**AUTOMOBILE WINDSHIELD WIPER HOLDER**  
 Jan Wilsaard, Kullavik, Sweden, assignor to Aktiebolaget  
 Volvo, Gothenburg, Sweden  
 Filed Feb. 5, 1988, Ser. No. 153,016  
 Claims priority, application Fed. Rep. of Germany, Aug. 5,  
 1987, URA 1117/87  
 Term of patent 14 years  
 U.S. Cl. D12—155



**310,195**  
**WINDSHIELD COVER**  
 Avi Ruimi, Tarzana, Calif., assignor to Auto Shade, Inc., North  
 Hollywood, Calif.  
 Filed Dec. 16, 1988, Ser. No. 285,493  
 Term of patent 14 years  
 U.S. Cl. D12—155



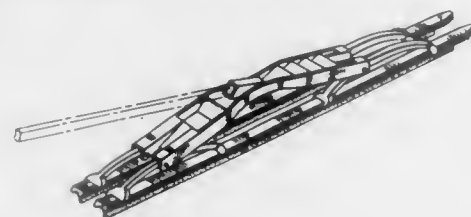
**310,192**  
**MOTORCYCLE TIRE**  
 Shinsuke Hayama, Hyogo, Japan, assignor to Sumitomo Rubber  
 Industries, Ltd., Hyogo, Japan  
 Filed Nov. 6, 1987, Ser. No. 119,104  
 Claims priority, application Japan, May 7, 1987, 62-17847  
 Term of patent 14 years  
 U.S. Cl. D12—147



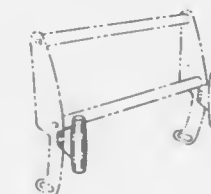
**310,196**  
**AUTOMOBILE LUGGAGE CARRIER SLAT**  
 John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich.  
 48236  
 Filed Jun. 1, 1988, Ser. No. 200,782  
 Term of patent 14 years  
 U.S. Cl. D12—157



**310,193**  
**TWIN AUTOMOTIVE WINDSHIELD WIPER**  
 Pierre Charet, 12490 SW 95 Ter., Miami, Fla. 33186; Duke  
 Kraai, 10055 SW 213 Ter., Miami, Fla. 33189  
 Filed Oct. 23, 1987, Ser. No. 111,795  
 Term of patent 14 years  
 U.S. Cl. D12—155



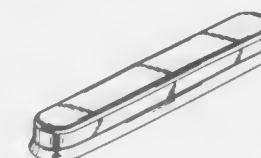
**310,197**  
**BUMPER GUARD FOR PUSH BARS**  
 Daniel J. McNamara, 3306 Viola Dr., Riverside, Calif. 92501  
 Filed Sep. 4, 1987, Ser. No. 93,382  
 The portion of the term of this patent subsequent to Aug. 28,  
 2004, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D12—167



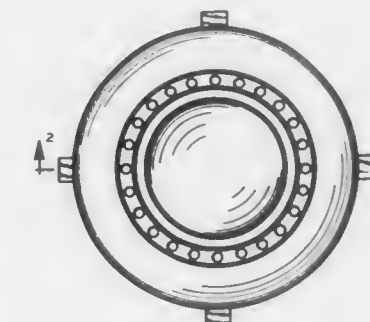
**310,198**  
**VEHICLE BUMPER GUARD**  
 Daniel J. McNamara, 3306 Viola Dr., Riverside, Calif. 92501  
 Filed Sep. 4, 1987, Ser. No. 93,387  
 The portion of the term of this patent subsequent to Aug. 28,  
 2004, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D12—167



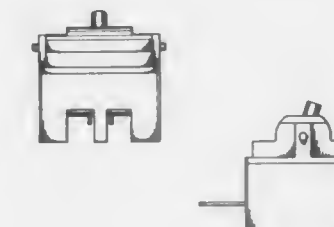
**310,199**  
**BRAKE SHOE**  
 Ray H. Herner, Brookville, Ohio, assignor to Mosier Industries  
 Inc., Brookville, Ohio  
 Filed Mar. 16, 1988, Ser. No. 169,334  
 Term of patent 14 years  
 U.S. Cl. D12—180



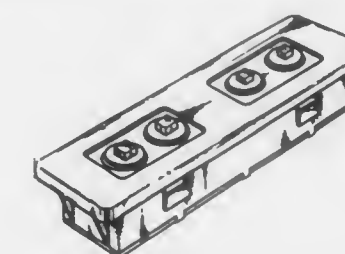
**310,200**  
**STROLLER WHEEL HUB**  
 Harry J. Giambrose, Kettering, Ohio, assignor to Spalding &  
 Evenflo Companies, Inc., Tampa, Fla.  
 Filed Oct. 20, 1988, Ser. No. 260,333  
 Term of patent 14 years  
 U.S. Cl. D12—210



**310,201**  
**SWITCH**  
 W. Barry Krause, Spotsylvania, Va., assignor to Tower Manu-  
 facturing Corporation, Providence, R.I.  
 Filed Jul. 29, 1987, Ser. No. 79,871  
 Term of patent 14 years  
 U.S. Cl. D13—169



**310,202**  
**SET OF AUTOMOBILE WINDOW SWITCHES IN A  
 COMMON HOUSING**  
 Yoon-Gi Sack, Sinbanpo 7th Apartment 301-608, 130-17, Cham-  
 won-Dong, Seocho-Ku, Seoul, Rep. of Korea  
 Filed Jul. 29, 1988, Ser. No. 225,962  
 Claims priority, application Rep. of Korea, Apr. 21, 1988,  
 88-5478  
 Term of patent 14 years  
 U.S. Cl. D13—171

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OFFICIAL GAZETTE

AUGUST 28, 1990

310,203

BATTERY CHARGER

Yoichi Takahashi, Kyoto, and Kazuhiko Miyahara, Kanagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Osaka and Cannon Kabushiki Kaisha, Tokyo, both of, Japan  
Filed Dec. 14, 1988, Ser. No. 284,867

Claims priority, application Japan, Jun. 15, 1988, 63-23747  
Term of patent 14 years

U.S. Cl. D13—107



310,206

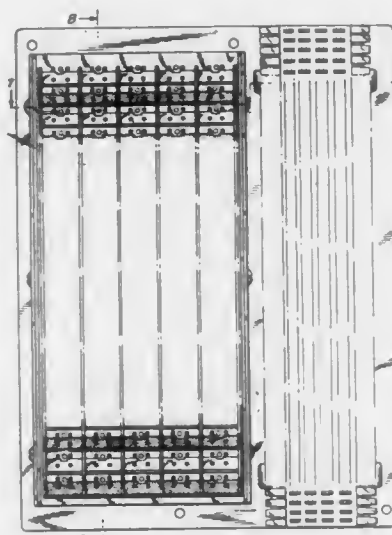
TELEPHONE CIRCUIT PROTECTOR BLOCK

Helmuth Newwirth, Garden City, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.

Filed Mar. 2, 1987, Ser. No. 20,687

Term of patent 14 years

U.S. Cl. D13—147



310,204

PORTABLE BATTERY BOOSTER

John H. Roberts, Jr., Fullerton, Calif., assignor to Mac Auto Equipment Inc., Santa Ana, Calif.

Filed Oct. 14, 1987, Ser. No. 108,563

Term of patent 14 years

U.S. Cl. D13—109

310,205

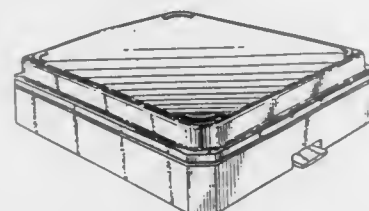
RECHARGEABLE BATTERY PACK FOR KITCHEN APPLIANCE

James A. Hedrington, Chippewa Falls, and Roger L. Kelly, Eau Claire, both of Wis., assignors to National Presto Industries, Inc., Eau Claire, Wis.

Filed Oct. 12, 1988, Ser. No. 256,929

Term of patent 14 years

U.S. Cl. D13—110



310,207

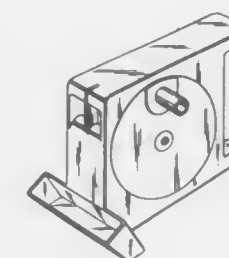
RETRACTABLE AUTOMOTIVE BATTERY CABLE HOUSING

Martin Sheps, Poway, Calif., assignor to Westway Products Corporation, San Juan Capistrano, Calif.

Filed Sep. 19, 1988, Ser. No. 246,537

Term of patent 14 years

U.S. Cl. D13—184



310,210

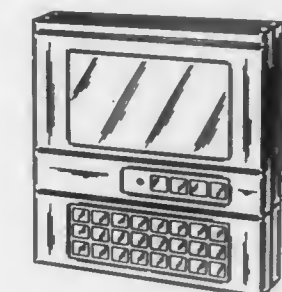
DISPLAY WITH KEYBOARD FOR PROGRAMMABLE CONTROLLER

Katsuhiko Ishida, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Feb. 6, 1989, Ser. No. 307,583

Term of patent 14 years

U.S. Cl. D14—100



310,208

PERSONAL COMPUTER

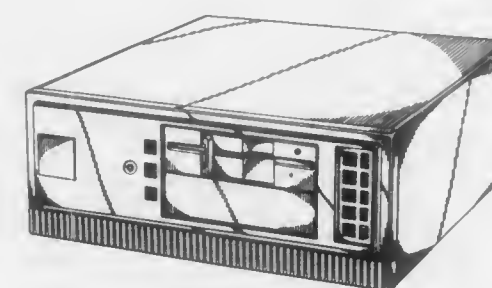
Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 14, 1987, Ser. No. 132,146

Claims priority, application Italy, Jun. 22, 1987, 53454/87[U]

Term of patent 14 years

U.S. Cl. D14—100



310,211

ACCESS SECURITY CONTROL TERMINAL

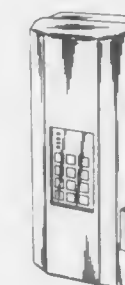
Zenya Tanbe, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 14, 1988, Ser. No. 167,418

Claims priority, application Japan, Sep. 14, 1987, 62-37252

Term of patent 14 years

U.S. Cl. D14—105



310,209

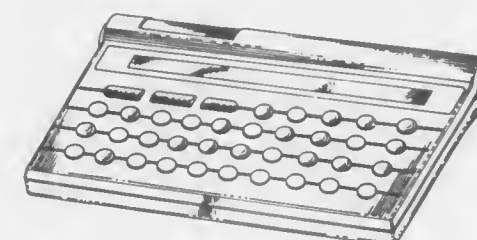
HAND HELD ELECTRONIC DICTIONARY

Robert L. Kasprzycki, Pompey, N.Y., assignor to Smith Corona Corporation, New Canaan, Conn.

Filed Jan. 5, 1989, Ser. No. 293,901

Term of patent 14 years

U.S. Cl. D14—100



310,212

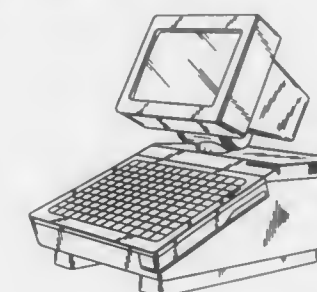
RETAIL TERMINAL OR SIMILAR ARTICLE

Donald L. Forsythe, Byesville, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 14, 1988, Ser. No. 181,341

Term of patent 14 years

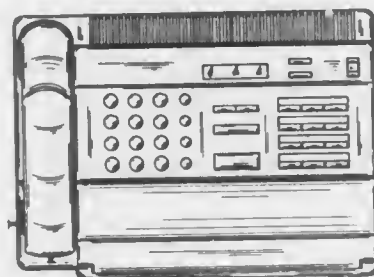
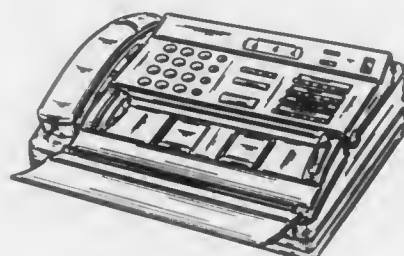
U.S. Cl. D14—106



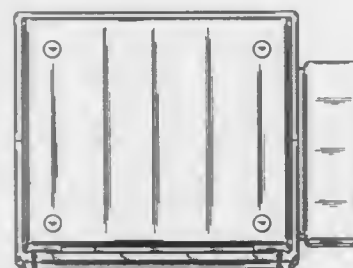
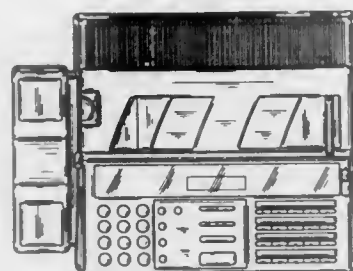
310,213  
**WORD PROCESSOR**  
 Akira Tsukada; Kazumi Osaka; Shinsaku Hino, and Tatsumi Wada, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Nov. 10, 1988, Ser. No. 269,980  
 Claims priority, application Japan, May 13, 1988, 63-19041  
 Term of patent 14 years  
 U.S. Cl. D14—106



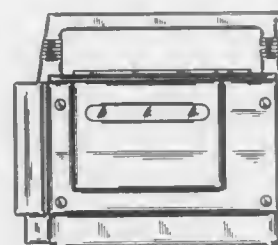
310,215  
**COMBINED FACSIMILE AND TELEPHONE**  
 Akira Tsukada, and Shinsaku Hino, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Dec. 19, 1988, Ser. No. 286,484  
 Claims priority, application Japan, Jul. 11, 1988, 63-27734  
 Term of patent 14 years  
 U.S. Cl. D14—118



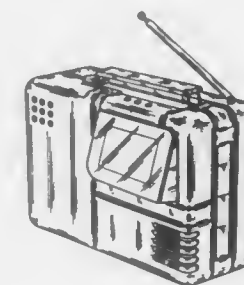
310,214  
**FACSIMILE MACHINE**  
 Akira Tsukada, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan  
 Filed Aug. 2, 1988, Ser. No. 227,358  
 Claims priority, application Japan, Feb. 5, 1988, 63-4559  
 Term of patent 14 years  
 U.S. Cl. D14—118



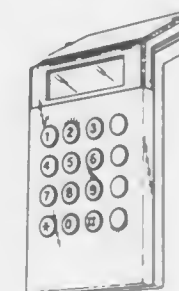
310,216  
**COMBINED VIDEO TAPE RECORDER AND LCD TELEVISION**  
 Hiroshi Ooi; Fumitoshi Sakata, and Sho Okamura, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Nov. 22, 1988, Ser. No. 274,942  
 Claims priority, application Japan, May 26, 1988, 63-20781  
 Term of patent 14 years  
 U.S. Cl. D14—129



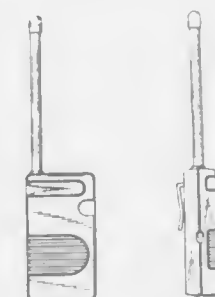
310,217  
**COMBINED VIDEO TAPE RECORDER AND TELEVISION**  
 Taisuke Saeki; Yoshiaki Kobayashi; Yoshito Fujii; Hiroshi Kajimoto, and Atsushi Hayakawa, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Dec. 15, 1988, Ser. No. 285,953  
 Claims priority, application Japan, Jun. 27, 1988, 63-25508  
 Term of patent 14 years  
 U.S. Cl. D14—129



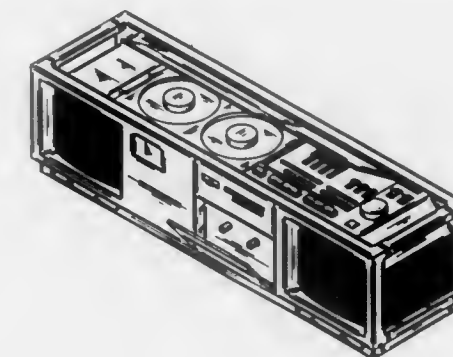
310,219  
**MASTER UNIT FOR AN INTERCOMMUNICATION SYSTEM**  
 Martin F. Carlile, Doncaster, England, assignor to Tunstall Telecom Limited, Whitley Bridge, England  
 Filed Nov. 12, 1987, Ser. No. 120,089  
 Claims priority, application United Kingdom, May 13, 1987, 1042137  
 Term of patent 14 years  
 U.S. Cl. D14—159



310,218  
**MONITOR TRANSMITTER**  
 Patrick J. Murphy, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.  
 Filed Oct. 11, 1988, Ser. No. 256,279  
 Term of patent 14 years  
 U.S. Cl. D14—137



310,220  
**COMBINED TAPE RECORDER, RADIO AND COMPACT DISC PLAYER**  
 Yoshitsugu Hirose; Nobuyuki Tani, and Yasuo Matsudaira, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Mar. 1, 1988, Ser. No. 162,474  
 Claims priority, application Japan, Sep. 3, 1987, 62-36263  
 Term of patent 14 years  
 U.S. Cl. D14—163



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310,221

## TAPE PLAYER

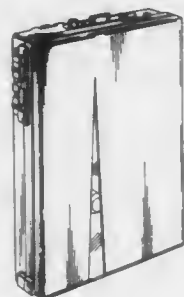
Masahiko Kobayashi, Kamakura, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 7, 1988, Ser. No. 241,398

Claims priority, application Japan, Mar. 15, 1988, 63-10144

Term of patent 14 years

U.S. Cl. D14-165



310,223

## HEADPHONES

Paul Chadnow, Los Angeles, Calif., assignor to Avatar Mfg. Co. Limited, Kowloon, Hong Kong

Filed May 10, 1988, Ser. No. 192,496

Claims priority, application United Kingdom, Nov. 10, 1987, 1046175

Term of patent 14 years

U.S. Cl. D14-205



310,224

## HINGED COMMUNICATIONS ANTENNA

Gershon N. Cooper, Los Angeles, Calif., assignor to Alliance Research Corporation, Chatsworth, Calif.

Filed Oct. 7, 1988, Ser. No. 254,670

Term of patent 14 years

U.S. Cl. D14-230



310,222

## COMBINED TUNER, AMPLIFIER, RECORD PLAYER AND TAPE DECK

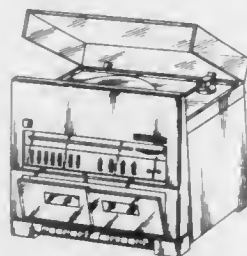
Shinichi Aoki, Yokohama, and Akihiko Konno, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 7, 1988, Ser. No. 178,447

Claims priority, application Japan, Oct. 15, 1987, 41892

Term of patent 14 years

U.S. Cl. D14-168



310,225

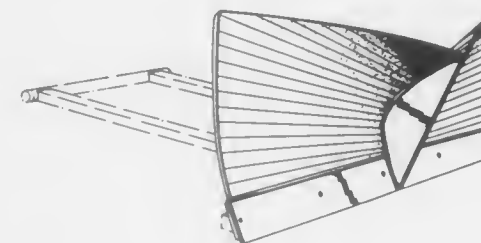
## SNOW PLOW BLADE

Ronald D. Eberle, 495 Oak St., Grainfield, Kans. 67737

Filed Nov. 19, 1987, Ser. No. 122,428

Term of patent 14 years

U.S. Cl. D15-11



310,226

## INDUSTRIAL SEWING MACHINE

Toyokichi Gotou, Souka, Japan, assignor to Newlong Machine Works, Ltd., Tokyo, Japan

Filed Jul. 17, 1986, Ser. No. 886,774

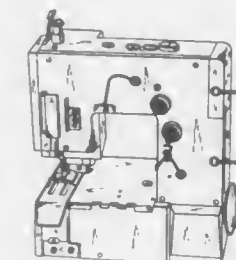
Claims priority, application Japan, Mar. 25, 1986, 61-10511

The portion of the term of this patent subsequent to Jul. 3, 2004,

has been disclaimed.

Term of patent 14 years

U.S. Cl. D15-69



310,227

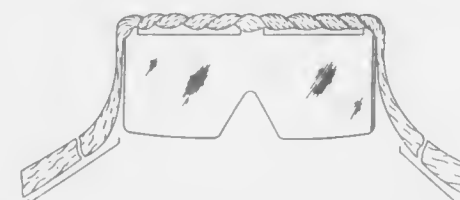
## EYEGLASSES

Linda M. Green, 7332 Oakbay Dr., Noblesville, Ind. 46060

Filed Sep. 24, 1987, Ser. No. 100,442

Term of patent 14 years

U.S. Cl. D16-107



310,228

## END PIECE FOR EYEGLASS TEMPLES

Helmut Wiedmann, Heilbronn, Fed. Rep. of Germany, and Wilhelm Anger, St. Moritz-Savretta, Switzerland, assignors to Eyemetrics-Systems AG, Chur, Switzerland

Filed May 22, 1987, Ser. No. 52,962

Term of patent 14 years

U.S. Cl. D16-123



310,229

## END PIECE FOR EYEGLASS TEMPLES

Wilhelm Anger, St. Moritz-Savretta, Switzerland, assignor to Eyemetrics-Systems AG, Chur, Switzerland

Filed Feb. 26, 1987, Ser. No. 19,340

Term of patent 14 years

U.S. Cl. D16-123



310,230

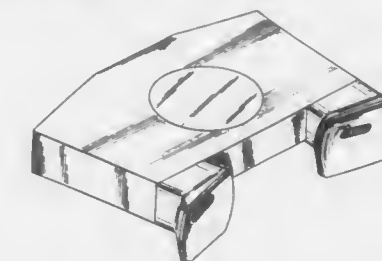
## SIGHTING INSTRUMENT FOR RELOCATION OF SITE

Carey P. Huston, Tulsa, Okla., assignor to Zebco Corporation, Tulsa, Okla.

Filed Jul. 28, 1988, Ser. No. 225,131

Term of patent 14 years

U.S. Cl. D16-130



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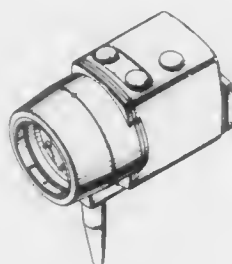
## TELEVISION CAMERA FOR AN ENDOSCOPE

Michio Imada, Kodaira; Nobuyoshi Yazawa, and Takeshi Asaka, both of Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed May 18, 1987, Ser. No. 51,601

Claims priority, application Japan, Nov. 20, 1986, 61-046006  
Term of patent 14 years

U.S. Cl. D16—202



310,234

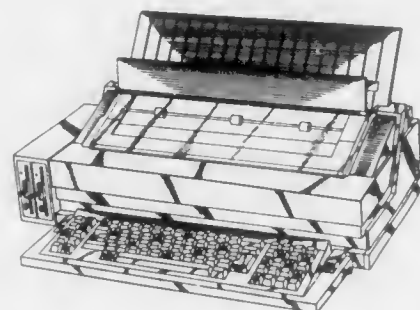
## ELECTRONIC TYPEWRITER

Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Sep. 12, 1988, Ser. No. 243,016

Claims priority, application Italy, Mar. 15, 1988, 52973/88[U]  
Term of patent 14 years

U.S. Cl. D18—1



310,232

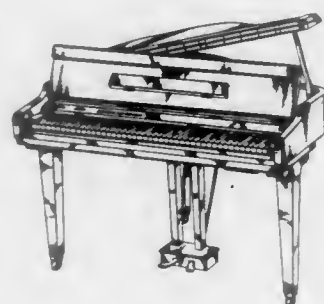
## ELECTRONIC BABY GRAND PIANO

Jung H. Dong, Seoul, Rep. of Korea, assignor to Samick Music Corporation, La Puente, Calif.

Filed Jul. 1, 1988, Ser. No. 214,376

Term of patent 14 years

U.S. Cl. D17—8



310,235

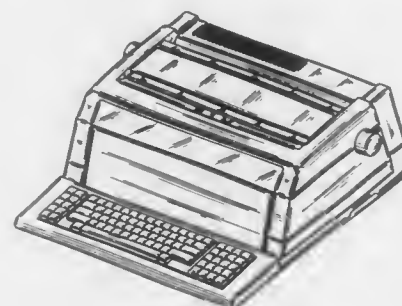
## TYPEWRITER

Hiroshi Sakaguchi, and Keiichi Koyama, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Dec. 19, 1988, Ser. No. 286,488

Claims priority, application Japan, Jul. 11, 1988, 63-27733  
Term of patent 14 years

U.S. Cl. D18—1



310,233

## GUITAR PICK

Alfred D. Farnell, Jr., 1748 Esteban, P.O. Box 5142, Laughlin, Nev. 89029

Filed Oct. 26, 1987, Ser. No. 112,759

Term of patent 14 years

U.S. Cl. D17—20



310,236

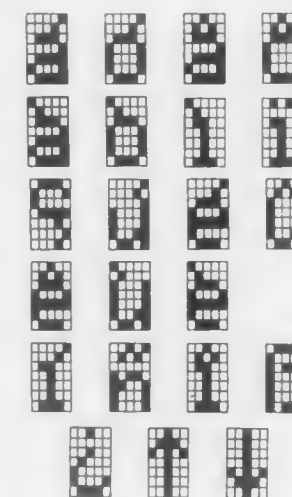
## FONT OF TYPE

Kenneth D. Collister, Elkhart, Ind., assignor to Miles Inc., Elkhart, Ind.

Filed Dec. 5, 1988, Ser. No. 280,477

Term of patent 14 years

U.S. Cl. D18—26



310,238

## COMBINED SHEET FEEDER AND EDITING DEVICE FOR A COPYING MACHINE

Tomohiko Hirata, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,558

Claims priority, application Japan, May 13, 1988, 63-18790  
Term of patent 14 years

U.S. Cl. D18—42



310,239

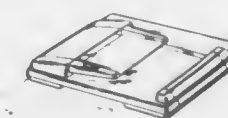
## ORIGINAL SHEET FEEDING DEVICE FOR COPYING MACHINE

Tomohiko Hirata, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,651

Claims priority, application Japan, May 13, 1988, 63-18792  
Term of patent 14 years

U.S. Cl. D18—42



310,237

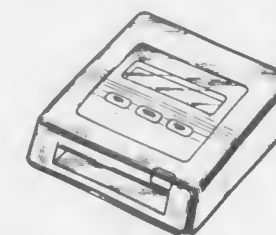
## COPIER CONTROL DEVICE

Yosuke Ohsawa, Tokyo, and Tomohiko Hirata, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,180

Claims priority, application Japan, Jan. 22, 1988, 63-2201  
Term of patent 14 years

U.S. Cl. D18—41





310,240

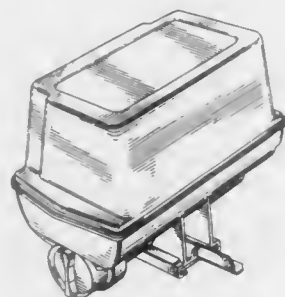
## TONER CARTRIDGE

Philip N. Smith, Valencia, Calif., assignor to Dataproducts Corporation, Woodland Hills, Calif.

Filed Dec. 2, 1988, Ser. No. 278,935

Term of patent 14 years

U.S. Cl. D18—43



310,243

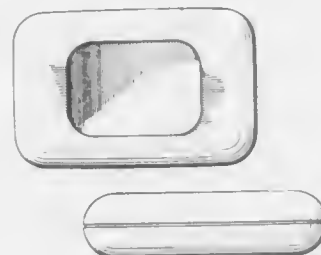
## DISPENSER FOR ASSORTED OFFICE ARTICLES

Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Jun. 11, 1987, Ser. No. 60,408

Term of patent 14 years

U.S. Cl. D19—75



310,241

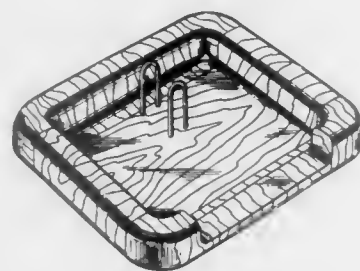
## CALENDAR PAD HOLDER

Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Division of Ser. No. 741,455, Jun. 5, 1985, Pat. No. Des. 302,177. This application Jan. 19, 1989, Ser. No. 299,245

Term of patent 14 years

U.S. Cl. D19—20



310,242

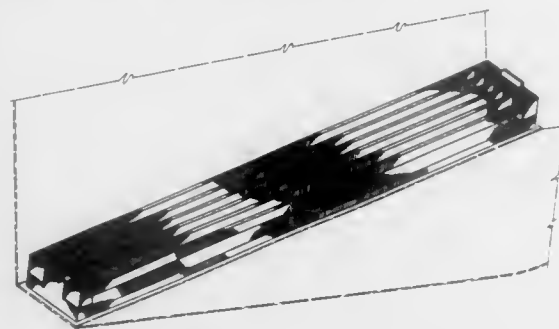
## MAGAZINE BINDER

Charles A. Beck, 2815 Monterey Ave., Costa Mesa, Calif. 91626

Filed Jun. 2, 1988, Ser. No. 201,617

Term of patent 14 years

U.S. Cl. D19—32



310,244

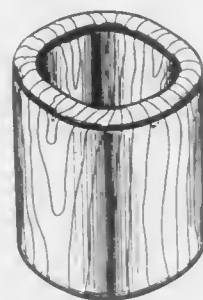
## PENCIL CUP

Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Division of Ser. No. 741,455, Jun. 5, 1985. This application Jan. 19, 1989, Ser. No. 299,247

Term of patent 14 years

U.S. Cl. D19—85



310,245

## SHOW-CASE FOR POSTER PUBLICITY

Alexander E. N. von Canal, Koblenz, Fed. Rep. of Germany, assignor to DPW Deutsche Plakat-Werbung GmbH & Co., Koblenz, Fed. Rep. of Germany

Filed Apr. 16, 1987, Ser. No. 38,911

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1986, 5 MR 664

Term of patent 14 years

U.S. Cl. D20—21



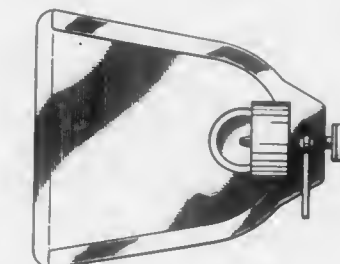
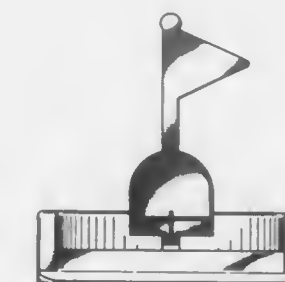
310,246

## GOLF PUTTING PRACTICE DEVICE

William J. Maloney, II, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

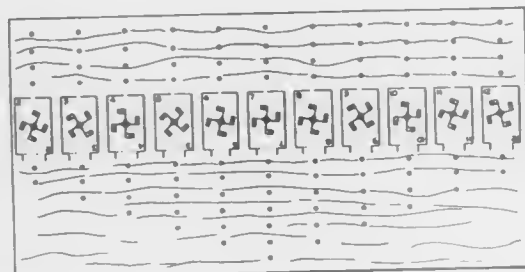
Filed Jul. 8, 1987, Ser. No. 70,884

Term of patent 14 years



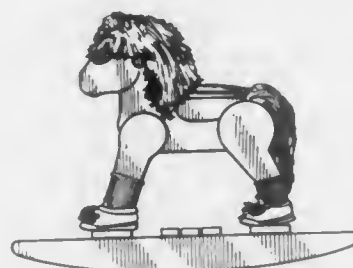
310,247  
GAME BOARD

James M. Goplin, P.O. Box 1033, Hettinger, N. Dak. 58639  
Filed Nov. 19, 1987, Ser. No. 122,656  
Term of patent 14 years  
U.S. Cl. D21—20



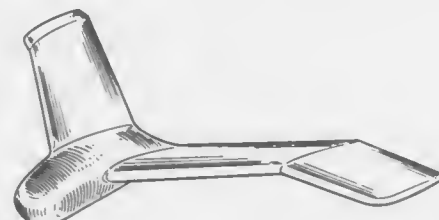
310,250  
TOY RIDING HORSE

Patrice K. Shoemaker, 4070 Barbarosa Ave., Miami, Fla. 33133  
Filed Apr. 18, 1988, Ser. No. 182,746  
Term of patent 14 years  
U.S. Cl. D21—70



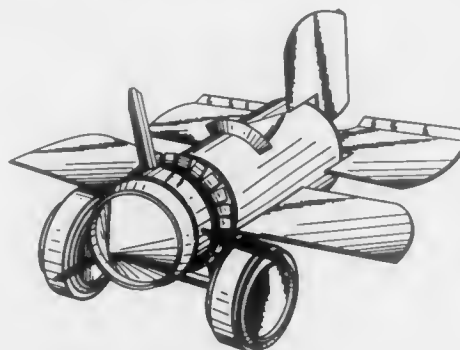
310,251  
TOY GLIDER

Joseph Kenyan, East Bentleigh; David Woodhead, and Brett Saraghi, both of Carlton North, all of Australia, assignors to D'Abico Holdings Pty. Limited, Hawthorn, Australia  
Filed Oct. 21, 1988, Ser. No. 260,665  
Term of patent 14 years  
U.S. Cl. D21—87



310,252  
TOY AIRPLANE

Edmund G. Zimmerman, 245 Iolani Ave., #101, Honolulu, Hi. 96813  
Filed Aug. 24, 1988, Ser. No. 236,113  
Term of patent 14 years  
U.S. Cl. D21—90



310,248  
GAME PLAYING CARD

Alcione M. Leite, 307 W. 7th St., Newton, Kans. 67114  
Filed Aug. 8, 1986, Ser. No. 894,844  
Term of patent 14 years  
U.S. Cl. D21—42



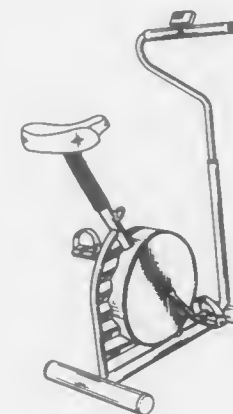
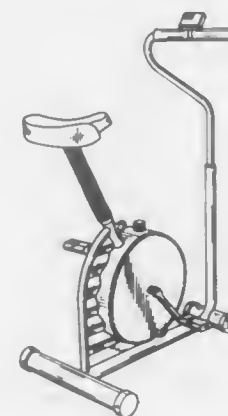
310,249  
BINGO CARD MARKER

Raymond LaLonde, 110 King Street, Apt. 2, Sudbury, Ontario, Canada (P3C 2V6)  
Filed Nov. 10, 1988, Ser. No. 269,977  
Claims priority, application Canada, May 20, 1988, 20-05-88-3  
Term of patent 14 years  
U.S. Cl. D21—51



310,253  
EXERCISE CYCLE

George Bersonnet, River Heights, and William T. Dalebout, Logan, both of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah  
Filed Jan. 12, 1989, Ser. No. 296,983  
Term of patent 14 years  
U.S. Cl. D21—194



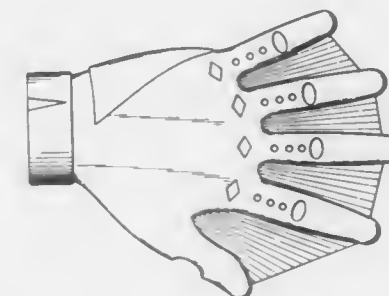
310,254  
GOLF CLUB HEAD

Shigeki Take, Higashikurume, and Kanji Iinuma, Musashino, both of Japan, assignors to Daiwa Golf Co., Ltd., Tokyo, Japan  
Filed Nov. 13, 1987, Ser. No. 119,993  
Claims priority, application Japan, May 13, 1987, 62-18651  
Term of patent 14 years  
U.S. Cl. D21—214



310,255  
SWIM GLOVE

Charles Gammon, 891 Smokey Ln., Grants Pass, Oreg. 97526  
Filed Feb. 12, 1988, Ser. No. 155,492  
Term of patent 14 years  
U.S. Cl. D21—239



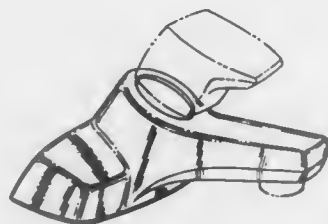
310,256  
FISHING ROD HOLDER

Jivco Erdetean, 12758 29 Mile Rd., Romeo, Mich. 48065  
Filed Sep. 16, 1987, Ser. No. 97,088  
Term of patent 14 years  
U.S. Cl. D22—147

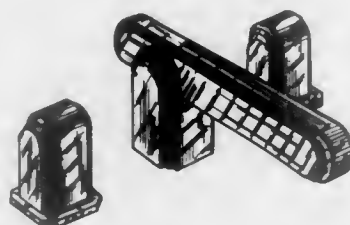




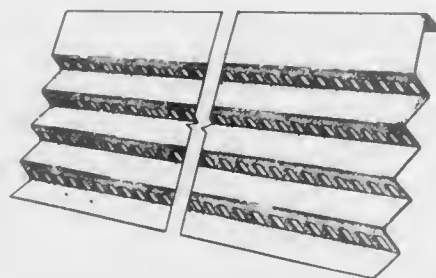
310,257  
**FAUCET SHELL**  
 Anthony G. Spangler, Sheridan, Ind., assignor to Masco Corporation of Indiana, Indianapolis, Ind.  
 Filed Apr. 1, 1987, Ser. No. 39,348  
 Term of patent 14 years  
 U.S. Cl. D23—238



310,258  
**FAUCET SET**  
 Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.  
 Filed Apr. 16, 1987, Ser. No. 39,642  
 Term of patent 14 years  
 U.S. Cl. D23—242



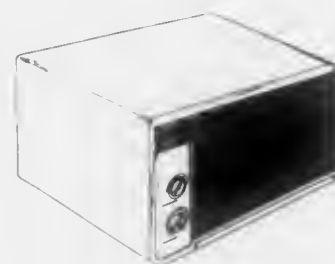
310,259  
**ROOF GUTTER GUARD**  
 William G. Hitchins, "Fiddawn", New Cascade Road, Norfolk Island,  
 Filed Jan. 12, 1987, Ser. No. 2,342  
 Term of patent 14 years  
 U.S. Cl. D23—367



310,260  
**WATER HEATER**  
 Gary W. Gauer, Cottage Grove, and Jerome A. Grunstad, Inver Grove Heights, both of Minn., assignors to Ecodyne Corporation, St. Paul, Minn.  
 Filed Jul. 13, 1987, Ser. No. 72,581  
 Term of patent 14 years  
 U.S. Cl. D23—321



310,261  
**AIR CONDITIONER**  
 Suk J. Choi, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea  
 Filed Dec. 7, 1988, Ser. No. 280,999  
 Term of patent 14 years  
 U.S. Cl. D23—353



310,262  
**CASING FOR A FAN OR HEATER**  
 Lionel Lemire, 504 Foritana Road S.E., Calgary, Alberta, Canada (T2A 2B6)  
 Filed Dec. 5, 1988, Ser. No. 280,255  
 Term of patent 14 years  
 U.S. Cl. D23—377



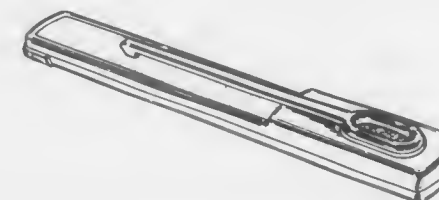
310,263  
**FINGER SPLINT**  
 Kenneth W. Ellis, #1 Schroeder Estates, Kearney, Nebr. 68847  
 Continuation-in-part of Ser. No. 203,940, Jun. 8, 1988, abandoned. This application May 15, 1989, Ser. No. 351,554  
 Term of patent 14 years  
 U.S. Cl. D24—64



310,264  
**CRYOGENIC VIAL**  
 Richard A. Leoncavallo, Pittsford, and Paul V. Comeau, Macedon, both of N.Y., assignors to Nalge Company, Rochester, N.Y.  
 Filed Mar. 4, 1987, Ser. No. 21,437  
 Term of patent 14 years  
 U.S. Cl. D24—29



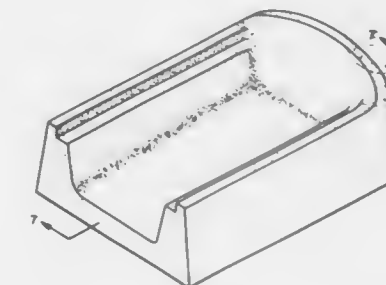
310,265  
**IMMUNOASSAY TEST KIT**  
 Dennis M. Mochnal, Clinton; Henry A. Graham, Jr., Annandale; Walter J. Yarrow, Jr., Lambertville, all of N.J.; C. Minot Dole, Purdy's, N.Y., and Joseph R. Paradis, Hilton Head Island, S.C., assignors to Ortho Diagnostic Systems Inc., Raritan, N.J.  
 Filed Sep. 21, 1987, Ser. No. 99,842  
 Term of patent 14 years  
 U.S. Cl. D24—17



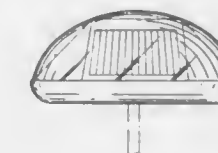
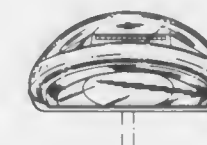
310,266  
**RESTAURANT**  
 Thomas P. Matthews, Jr., Castlerock, and Robert W. Schnautz, III, Denver, both of Colo., assignors to Palmetto Properties, Inc., Englewood, Colo.  
 Filed Jul. 27, 1986, Ser. No. 224,786  
 Term of patent 14 years  
 U.S. Cl. D25—33



310,267  
**RETAINING WALL BLOCK**  
 Philip A. Zeidman, 237 Hoff Rd., Santa Rosa, Calif. 95409  
 Filed Apr. 7, 1989, Ser. No. 334,984  
 Term of patent 14 years  
 U.S. Cl. D25—113



310,268  
**SOLAR POWERED OUTDOOR LIGHT**  
 Ram Shalvi, Stanley, Hong Kong, assignor to Solar Wide Industrial Limited, Kowloon, Hong Kong  
 Filed Oct. 12, 1988, Ser. No. 257,028  
 Claims priority, application Switzerland, Sep. 19, 1988, 116971; United Kingdom, Sep. 19, 1988, 1053626  
 Term of patent 14 years  
 U.S. Cl. D26—67



310,269  
LAMP OR SIMILAR ARTICLE  
Michael P. Jackson, 8412 Ranchito Ave., Panorama City, Calif. 91402  
Filed Mar. 22, 1988, Ser. No. 171,543  
Term of patent 14 years  
U.S. Cl. D26—99



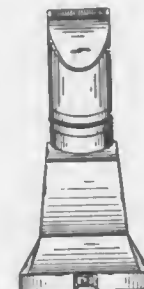
310,271  
COMBINATION SHAVER AND SHAVING CREAM DISPENSER  
Jeff A. Jacobson, 409 Emerald Bay, Laguna Beach, Calif. 92651  
Filed Dec. 1, 1988, Ser. No. 278,927  
Term of patent 14 years  
U.S. Cl. D28—46



310,272  
COMBINED HAIR TRIMMER WITH CHARGING STAND THEREFORE  
George P. Gallanis, Sterling; Stephen Gatz, Galt, and Kenneth M. Hattori, Bensenville, all of Ill., assignors to Wahi Clipper Corporation, Sterling, Ill.  
Filed Aug. 3, 1987, Ser. No. 80,576  
Term of patent 14 years  
U.S. Cl. D28—53



310,270  
SUNTAN LOTION APPLICATOR  
Ernie A. Bacal, 99-637 Pohuli St., Aiea, HI. 96701; George K. F. Lau, 1179 Olowalu Way, Honolulu, HI. 96825, and Randy W. Rock, 1720 Ala Moana Blvd., Apt. D-106, Honolulu, HI. 96815  
Filed Oct. 28, 1988, Ser. No. 264,507  
Term of patent 14 years  
U.S. Cl. D28—7



310,273  
DENTAL FLOSS CONTAINER  
Kathleen C. Woodman, El Dorado Hills, Calif., assignor to Dentolife, Inc., El Dorado Hills, Calif.  
Filed Aug. 17, 1987, Ser. No. 86,033  
Term of patent 14 years  
U.S. Cl. D28—64



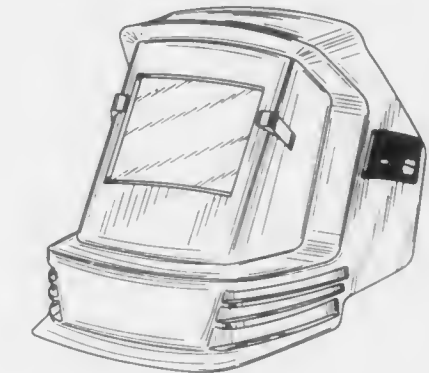
310,274  
DENTAL FLOSSER  
Lester R. Wisegerber, 38 Brown Ln., Dayton, Tex. 77535  
Filed Jan. 5, 1988, Ser. No. 141,464  
Term of patent 14 years  
U.S. Cl. D28—64



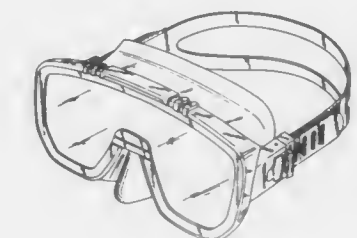
310,275  
COSMETIC CONTAINER  
Cheng-Yuan Su, No. 124, Sec. 4, Tung Ta Rd., Hsinchu, Taiwan, Taiwan  
Filed Jun. 17, 1988, Ser. No. 208,275  
Term of patent 14 years  
U.S. Cl. D28—76



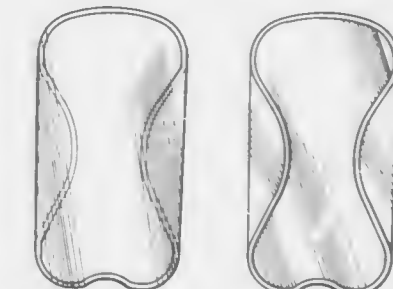
310,276  
WELDING MASK  
Rupert Fuerthbauer, Lichtensteig, and Hans Huesler, Bronschhofen, both of Switzerland, assignors to Optrel AG, Wattwil, Switzerland  
Filed Jul. 21, 1988, Ser. No. 222,222  
Term of patent 14 years  
U.S. Cl. D29—9



310,277  
DIVING MASK  
Taizo Sugita, Ichikawa, Japan, assignor to Kinugawa Pacific Co., Ltd., Tokyo, Japan  
Filed Sep. 21, 1988, Ser. No. 247,309  
Claims priority, application Japan, Aug. 16, 1988, 63-32606  
Term of patent 14 years  
U.S. Cl. D29—9



310,278  
SHIN GUARD  
Patrick A. Quinlan, Killmountain, Bandon, CoCork, Ireland  
Filed Jul. 6, 1988, Ser. No. 215,917  
Term of patent 14 years  
U.S. Cl. D29—10



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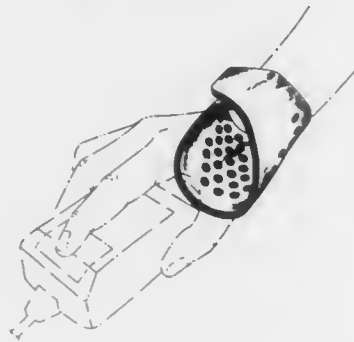
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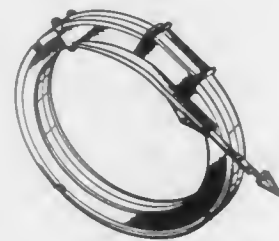
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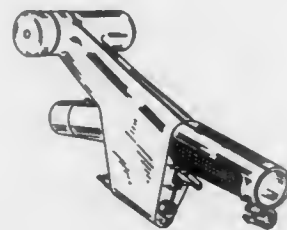
310,279  
**COMPUTER OPERATOR GLOVE**  
 Walter I. Bieger, 1689 West County Rd. F, St. Paul, Minn. 55112  
 Filed Sep. 8, 1988, Ser. No. 241,933  
 Term of patent 14 years  
 U.S. Cl. D29—20



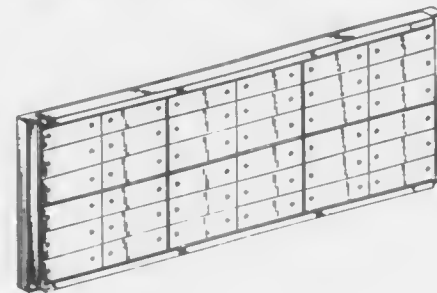
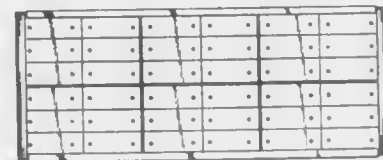
310,280  
**TAPE HOUSING FOR PIPE CLEANING**  
 Nicholas W. Moss, Cherry Hill, N.J., assignor to Cohra Products, Inc., Willingboro, N.J.  
 Filed Dec. 4, 1986, Ser. No. 938,176  
 Term of patent 14 years  
 U.S. Cl. D32—14



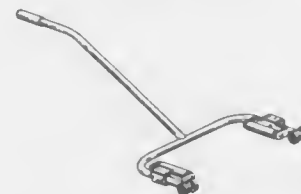
310,281  
**CARPET CLEANER HANDLE**  
 Gordon W. Goodrich, Grand Rapids, Mich., assignor to Bissell, Inc., Grand Rapids, Mich.  
 Filed Mar. 20, 1987, Ser. No. 28,299  
 Term of patent 14 years  
 U.S. Cl. D32—34



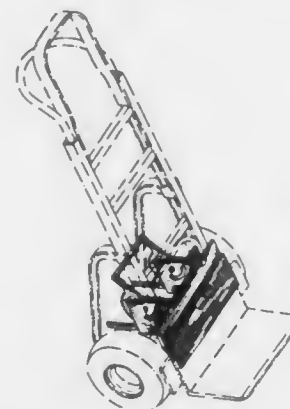
310,282  
**COUNTER REFLECTOR FOR USE IN DRYING WEBS**  
 Per Persson, Trollhättan, Sweden, assignor to Infrarodteknik AB, Sweden  
 Filed Oct. 27, 1986, Ser. No. 924,582  
 Claims priority, application United Kingdom, Apr. 28, 1986, 1033737  
 Term of patent 14 years  
 U.S. Cl. D32—35



310,283  
**TIRE AND WHEEL CADDIE**  
 Paul E. Faykosh, Pemberville, and John C. Hoiles, Wayne, both of Ohio, assignors to Fayjay Tool, Inc., Wayne, Ohio  
 Filed Jun. 30, 1988, Ser. No. 213,592  
 Term of patent 14 years  
 U.S. Cl. D34—23



310,284  
**PUSHER PLATE ATTACHMENT FOR HAND TRUCK**  
 Donald C. Boyer, 132 Wynnwood Ave., Tonawanda, N.Y. 14150  
 Filed Oct. 5, 1988, Ser. No. 254,114  
 Term of patent 14 years  
 U.S. Cl. D34—27



## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF AUGUST, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: See—  
 Henricson, Kaj O.; Kokkonen, Seppo K.; Pikka, Olavi E.; Qvintus, Harri T.; Ruuskanen, Erkki A.; and Savolainen, Erkki E., 4,952,314, Cl. 210-404.000.
- A. O. Smith Corp.: See—  
 Akkala, Marc W.; and Hughes, Dennis R., 4,951,614, Cl. 122-17.000.
- A. P. Green Industries, Inc.: See—  
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- A.R.M.I.N.E.S.: See—  
 Gilbert, Yvon, 4,951,497, Cl. 73-105.000.
- Aaron, Charles D., Jr.: See—  
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- Aarts, Mathias L. C., to Product Suppliers AG. Method of, and apparatus for, leak testing a package. 4,951,496, Cl. 73-49.300.
- Abbott, Greg: See—  
 Dara, Prithipal; and Abbott, Greg, 4,952,758, Cl. 200-51.090.
- Abbott Laboratories: See—  
 Brynes, Paul J.; Molina, Cynthia M.; Martinus, Janis A.; Vaughan, Kenward S.; and Smith, Catherine M., 4,952,336, Cl. 252-301.160.
- Pezzoli, Paul A.; Smith, Gary N.; and Montgomery, Jerold, 4,951,845, Cl. 215-250.000.
- Wang, Chao-Huei J.; Stroupe, Stephen D.; and Jolley, Michael E., 4,952,691, Cl. 540-589.000.
- Abdel-Malik, Magdy M.: See—  
 Yalpani, Mansur; and Abdel-Malik, Magdy M., 4,952,684, Cl. 536-18.700.
- Abdulali, Iqbal F.; and Touma, Alfred S., to Foster Wheeler Energy Corporation. Fluidized bed reactor utilizing an internal solids separator. 4,951,611, Cl. 122-4.00D.
- Abe, Akira: See—  
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- Takada, Shunji; Nishikawa, Toshihiro; Sakanoue, Kei; and Abe, Akira, 4,952,490, Cl. 430-567.000.
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 Shiohara, Tomoo; and Abe, Hiroshi, 4,952,625, Cl. 524-586.000.
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- Abe, Kouzou: See—  
 Iwata, Yasuo; Koizumi, Michio; Kosugi, Kimihiro; Abe, Kouzou; and Majima, Takashi, 4,952,087, Cl. 400-616.100.
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- Abraham, Carl J.; and Newman, Malcolm. Storage battery having a protective shield. 4,952,468, Cl. 429-175.000.
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- Abraham, Thomas E.; Malfait, Jacques L.; and White, Arnold J., to General Foods, Inc. Process for producing instantized parboiled rice. 4,952,416, Cl. 426-462.000.
- Abu Garcia Produktion AB: See—  
 Moosberg, Borje, 4,951,899, Cl. 242-255.000.
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- Acer Incorporated: See—  
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- Roun, Ben, 4,952,752, Cl. 174-35.00R.
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- Achleitner, Erwin; and Weber, Gerald, to Siemens Aktiengesellschaft. Hot start method for a combustion engine. 4,951,633, Cl. 123-491.000.
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- Ackeret, Peter, to IDN Inventions and Development of Novelties AG. Storage container for compact cassettes. 4,951,820, Cl. 206-387.000.
- ACS Industries, Inc.: See—  
 MacNeill, Gerald F., 4,951,954, Cl. 277-230.000.
- Acticiel S.A.: See—  
 Normand, Gerard; and Persuy, Michel, 4,951,950, Cl. 273-149.00P.
- Adachi, Keiichi: See—  
 Katoh, Kazunobu; and Adachi, Keiichi, 4,952,484, Cl. 430-496.000.
- Yamaguchi, Jun; Shinozaki, Fumiaki; Okazaki, Masaki; and Adachi, Keiichi, 4,952,480, Cl. 430-281.000.
- Adachi, Yuuma, to Fuji Photo Film Co., Ltd. Method of adjusting radiation image read-out conditions and image processing conditions. 4,952,807, Cl. 250-327.200.
- Adamache, Ion I., to Canterra Energy Ltd. Recovery of elemental sulphur from products containing contaminated elemental sulphur by froth flotation. 4,952,307, Cl. 209-166.000.
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- Adams, Mary. Periodic reminder system. 4,951,968, Cl. 281-45.000.
- Adams, Michael J.; and Mace, David A. H., to British Telecommunications public limited company. Optical power limiter. 4,952,016, Cl. 350-96.120.
- Advanced Dielectric Technologies, Inc.: See—  
 Walters, Glenn J., 4,952,420, Cl. 427-97.000.
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 Schmitz, William E., 4,952,856, Cl. 318-471.000.
- Aerohydro, Inc.: See—  
 Leitcher, John S., Jr., 4,953,094, Cl. 364-472.000.
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 Wrobel, Walter-Gerhard, 4,952,771, Cl. 219-121.670.
- Aetna Bearing Company: See—  
 Harrington, Richard F.; and Selgrad, James, 4,951,796, Cl. 192-98.000.
- Affleck, Wayne H.: See—  
 Eldridge, Robert E.; Cohn, David B.; and Affleck, Wayne H., 4,953,174, Cl. 372-87.000.
- Agazzi, Oscar: See—  
 Levy, Steve; Hedberg, Dave; and Agazzi, Oscar, 4,953,186, Cl. 375-118.000.
- Agency of Industrial Science and Technology: See—  
 Okimoto, Kunio; Sato, Tomio; Yamakawa, Toshio; and Horiishi, Nanao, 4,952,331, Cl. 252-62.540.
- Agfa-Gevaert Aktiengesellschaft: See—  
 Renner, Gunter; Sobel, Johannes; Wagner, Klaus; Junkers, Gunter; and Sommer, Friedhelm, 4,952,487, Cl. 430-546.000.
- Agfa-Gevaert N.V.: See—  
 Hamade, Marc F.; and Boeve, Gerard J., 4,952,005, Cl. 350-6.100.
- Ahmed, Mostafa E.: See—  
 Serageldin, Ahmedelhadi Y.; and Ahmed, Mostafa E., 4,952,931, Cl. 340-902.000.
- Ahuja, Suresh K.: See—  
 Fuller, Timothy J.; Smith, Thomas W.; Prest, William M., Jr.; Nelson, Robert A.; McGrane, Kathleen M.; and Ahuja, Suresh K., 4,952,477, Cl. 430-109.000.
- Aiba, Masaaki: See—  
 Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikeyu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.
- Aida, Shunishi: See—  
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- Aikawa, Masatoshi: See—  
 Yamada, Akira; Umeki, Tsunenori; and Aikawa, Masatoshi, 4,952,522, Cl. 437-34.000.
- Aikins, Brian S., to John Fluke Mfg. Co., Inc. Molded gasket for instrument housing. 4,951,834, Cl. 220-80.000.
- Air Products and Chemicals, Inc.: See—  
 DiMartino, Stephen P., Sr., 4,952,219, Cl. 55-16.000.
- Lai, Ta-Wang; and Vijayendran, Bheema R., 4,952,656, Cl. 525-328.200.

Langsam, Michael; Burgoyne, William F., Jr.; Casey, Jeremiah P.; and Ford, Michael E., 4,952,220, Cl. 55-158.000.  
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 Ajinomoto Company, Inc.: See—  
 Koike, Toshio, 4,951,513, Cl. 73-864.250.  
 Akademia Nauk SSSR: See—  
 Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., 4,952,349, Cl. 264-45.100.  
 Akaishi, Tsuneshi: See—  
 Amao, Kenji; Ohya, Kazuyoshi; Mizoguchi, Kenji; Akaishi, Tsuneshi; and Takeuchi, Takayoshi, 4,951,383, Cl. 29-721.000.  
 Akama, Hiroshi: See—  
 Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; Teshima, Nobue; Nakajima, Fumito; Mizoguchi, Tadaaki; and Nitta, Masahiro, 4,952,548, Cl. 502-217.000.  
 Akao, Shinichi: See—  
 Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,951,441, Cl. 52-741.000.  
 Akashi, Akira, to Canon Kabushiki Kaisha. Focus detection apparatus for camera. 4,952,963, Cl. 354-402.000.  
 Ake, Bjorkman, to Lumalamp Aktiebolag. Method for the manufacture of compact low-pressure mercury discharged lamp. 4,952,187, Cl. 44-22.000.  
 Akebono Brake Industry Co., Ltd.: See—  
 Maehara, Toshifumi, 4,951,771, Cl. 180-197.000.  
 Okubo, Satomi, 4,952,003, Cl. 303-119.000.  
 Akebono Research and Development Centre Ltd.: See—  
 Maehara, Toshifumi, 4,951,771, Cl. 180-197.000.  
 Okubo, Satomi, 4,952,003, Cl. 303-119.000.  
 Akiba, Yutaka: See—  
 Okino, Hironobu; Fujiwara, Akio; Akiba, Yutaka; Kasukabe, Susumu; Fujita, Tsuyoshi; Mitani, Masao; and Hirota, Kazuo, 4,952,272, Cl. 156-630.000.  
 Akimoto, Akira, to Fuji Jukogyo Kabushiki Kaisha. Intake air calculating system for automotive engine. 4,951,499, Cl. 73-118.200.  
 Akimoto, Koichiro: See—  
 Suzuki, Yasuhiro; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,952,948, Cl. 346-150.000.  
 Akiyama, Toshihide: See—  
 Takeguchi, Nobuyasu; Akiyama, Toshihide; and Takahashi, Kenichi, 4,953,214, Cl. 381-31.000.  
 Akiyoshi, Toyama, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Magnetic head tracking device using plural gaps. 4,953,161, Cl. 360-77.120.  
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 Akzo America Inc.: See—  
 Weil, Edward D.; Tomko, John; and Jaffe, Fred, 4,952,646, Cl. 525-507.000.  
 Akzo, N.V.: See—  
 Redpath, James; Logan, Robert T.; Roy, Robert G.; and McGarry, George, 4,952,571, Cl. 514-254.000.  
 van Broekhoven, Emanuel H., 4,952,382, Cl. 423-244.000.  
 Alberts, Jack B.: See—  
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 Alcan International Limited: See—  
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 Alcatel N.V.: See—  
 Rein, Wolf-Heider, 4,952,085, Cl. 400-120.000.  
 Alchas, Paul G., to Becton, Dickinson and Company. Parenteral fluid administration set. 4,952,210, Cl. 604-251.000.  
 Alcon Corporation: See—  
 Seabra, Helio L., 4,951,391, Cl. 29-890.140.  
 Alden Laboratories: See—  
 Hanson, Chris A., 4,952,439, Cl. 428-72.000.  
 Alexander, Richard A.; Knight, Charles E.; and Whitehurst, Darrell D., to Mobil Oil Corp. Removal of diamondoid compounds from hydrocarbonaceous fractions. 4,952,747, Cl. 585-803.000.  
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 Alfred Teves GmbH: See—  
 Reinartz, Hans-Dieter; Steffes, Helmut; and Kilb, Philipp, 4,951,470, Cl. 60-562.000.  
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 Allan, Gregory R.: See—  
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 Allegheny Ludlum Corporation: See—  
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 McCarty, Robert S., 4,951,459, Cl. 60-39.030.  
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 Nelson, Peter H.; Gu, Chee-Liang L.; Allison, Anthony C.; Eugui, Elsie M.; and Lee, William A., 4,952,579, Cl. 514-233.500.  
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 Hillinger, George, 4,951,533, Cl. 81-177.100.  
 Almenrader, Peter; and Dlouhy, Jiri, to BBC Brown Boveri AG. Housing for a gate turn-off power thyristor (GTO). 4,953,004, Cl. 357-79.000.  
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 Altech Controls Corp.: See—  
 Alsenz, Richard H., 4,951,475, Cl. 62-117.000.  
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 Schultz, David H.; Mattson, Steven W.; and Heinz, Donald E., 4,951,925, Cl. 256-65.000.  
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- Boisurge, Inc.: See—  
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- Booth, Christopher G.; and Rowe, Raymond C., to Imperial Chemical Industries PLC. Ocular treatment. 4,952,212, Cl. 604-294.000.
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- Booth, Robert J.: See—  
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- Boothe, David V.; and Barnwell, David R., to Steel Master Transfer Inc. Conveyor construction. 4,951,809, Cl. 198-841.000.
- Borders, Thomas H.: See—  
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- Borrelli, Nicholas F.: See—  
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- Borromeo, Lucio, to JT S.p.A. Handlebars for cycles, particularly bicycles for triathlons and speed trials. 4,951,525, Cl. 74-551.100.
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- Borzum, Alexander. Single cut die set. 4,951,538, Cl. 83-388.000.
- Bose, Ajit K.; and Schulte, Joseph J., to Union Camp Corporation. Thermal insulation batt. 4,952,441, Cl. 428-121.000.
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- Bowser, George H.; and Pyzewski, Stanley J., to PPG Industries, Inc. Insulated window units. 4,952,430, Cl. 428-34.000.
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- Boyer, John S., to University of Delaware. Thermocouple psychrometer. 4,952,071, Cl. 374-24.000.
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- Brackeen, Marcus; and Howard, Harry R., Jr., to Pfizer Inc. Novel resolution process for racemic spiro-hydantoins. 4,952,694, Cl. 546-15.000.
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- Brander, Richard: See—  
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- Brandt, Edwin R.: See—  
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- Brasher, Donald C.: See—  
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- Braun, Michael; and Heining, Hans-Dieter, to Siemens Aktiengesellschaft. Method of operating a three-step inverter. 4,953,069, Cl. 363-41.000.
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   Healey, Peter; and Smith, David W., 4,952,010, Cl. 350-37.770.  
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Chen, Frank J., to Exxon Chemical Patents Inc. Organo-Al-chloride catalyzed poly-n-butenes process. 4,952,739, Cl. 585-18.000.

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Meyer, Willy; and Oertle, Konrad, 4,952,726, Cl. 562-870.000.

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Clark, Roger: See—  
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Clinton, Henry H. Apparatus for testing and counting flaws in the insulation of an electrical conductor passing through an electrode. 4,952,880, Cl. 324-544.000.

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Cochrane, Benjamin A. Snap-on closure with corking skirt. 4,951,830, Cl. 215-256.000.

Cohn, David B.: See—  
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- Murayama, Jin; and Kudoh, Yoshimitsu, 4,953,028, Cl. 358-213.310.
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- Shibahara, Yoshihiko; Nozawa, Yasushi; and Mihayashi, Keiji, 4,952,485, Cl. 430-502.000.
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- Yuito, Fumio, 4,951,893, Cl. 242-58.100.
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- Fujian Xianyou Electric Machine Plant: See—  
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- Fujimori, Naoji: See—  
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- Fujioka, Teruhiko, to Tenryu Technics Co., Ltd. Chip feeder for chip mounter. 4,952,113, Cl. 414-416.000.
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- Fujisawa Pharmaceutical Co., Ltd.: See—  
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- Fujita, Shigeru; Tanaka, Hideo; and Harada, Susumu, to Toshiba Kikai Kabushiki Kaisha. Display and input apparatus. 4,952,918, Cl. 340-706.000.
- Fujita, Tsuyoshi: See—  
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- Fujita-Yamaguchi, Yoko: See—  
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- Fujitsu Limited: See—  
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- Goto, Hiroshi, 4,952,521, Cl. 437-33.000.
- Sugiyama, Eiji; Natsume, Mitsuaki; and Saito, Toshiharu, 4,952,997, Cl. 357-40.000.
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- Fukuda, Morio: See—  
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- Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Toru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.
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- Fukui, Wataru: See—  
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- Matsuoka, Atsuko; and Fukui, Wataru, 4,951,628, Cl. 123-414.000.
- Fukumochi, Yoji: See—  
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- Fukushima, Motoo; Takahashi, Masaharu; and Itoh, Kunio, to Shin-Etsu Chemical Co., Ltd. Acryl rubber foaming compositions and foamed acryl rubber. 4,952,609, Cl. 521-94.000.
- Fuller, Timothy J.; Smith, Thomas W.; Prest, William M., Jr.; Nelson, Robert A.; McGrane, Kathleen M.; and Ahuja, Suresh K., to Xerox Corporation. Toner and developer compositions with semicrystalline polyolefin resins. 4,952,477, Cl. 430-109.000.
- Fulton Thermatec Corporation: See—  
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- Funabashi, Tetsuji: See—  
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- Fundak, Davorin: See—  
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- Furlong, Thomas C.: See—  
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- Furuichi, Katsushi; Yokomizo, Yoshikazu; Honma, Toshio; and Murakami, Katsumi, to Canon Kabushiki Kaisha. Image forming apparatus having display device for displaying predetermined data. 4,952,988, Cl. 355-209.000.
- Furukawa Electric Co., Ltd.: See—  
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- Furukawa, Kenji; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; and Kikuchi, Makoto, to Chisso Corporation. Ferroelectric chiral smectic liquid crystal composition. 4,952,335, Cl. 252-299.610.
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- Futamura, Shoji, to Institute of Technology Precision Electrical Discharge Works. Electrical discharge machining control circuit. 4,952,790, Cl. 219-69.130.



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Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., 4,952,705, Cl. 548-525.000.  
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Hall, Walter L.: See—  
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Haneishi, Tatsuo; Nakajima, Mutsuo; Torikata, Akio; Okazaki, Takao; Tohjiyamori, Manbu; and Kawakubo, Katsuhiko, to Sankyo Company Limited. Imidazoleidone compounds useful as herbicides. 4,952,234, Cl. 71-92.000.

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Hansen, Ove; Nielsen, G. Skov; and Wagstaff, Brian, to Niro Atomizer, Inc. Process and apparatus for producing particulate frozen high water content food products. 4,951,472, Cl. 62-63.000.

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Hanz, Bernard; and Houdayer, Michel, to Commissariat à l'Energie Atomique. Apparatus for improving quality of metal or ceramic powders produced. 4,952,144, Cl. 425-10.000.

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Harada, Chikao, to Colin Electronics Co., Ltd. Pulse wave detecting apparatus having placement-condition detecting means. 4,951,679, Cl. 128-672.000.

Harada, Susumu: See—  
Fujita, Shigeru; Tanaka, Hideo; and Harada, Susumu, 4,952,918, Cl. 340-706.000.

Haraguchi, Hitoshi, to Otis Elevator Company. Load distribution detecting system for elevator. 4,951,786, Cl. 187-1.00R.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corp. Heat transfer to endothermic reaction zone. 4,951,613, Cl. 122-4.00D.

Harari, Isaac: See—  
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Harbeck, Gerald R., Jr., to MSP Products, Inc. Method for constructing fire-stop collar assembly. 4,951,442, Cl. 52-745.000.

Harben, Grover S., III; Petty, Gene; and Sosbee, Jerry, to Grover S. Harben, III. Apparatus and process for harvesting hearts and livers of poultry. 4,951,352, Cl. 17-11.000.

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Luxton, Martin J.; Meredith, William C. S.; and Harrod, Andrew, 4,952,616, Cl. 523-141.000.

Harsco Corporation: See—  
Madison, Harry, 4,951,573, Cl. 104-9.000.

Hartmann, Heinrich: See—  
Seelmann-Eggebert, Hans-Peter; Boeckh, Dieter; Hartmann, Heinrich; Trieselt, Wolfgang; and Kud, Alexander, 4,952,655, Cl. 526-318.400.

Hartung, Christoph, to Metz Mannheim GmbH. Fish tank for intensive fish fattening and process for operating such a fish tank. 4,951,606, Cl. 119-3.000.

Haruta, Masahiro: See—  
Yuasa, Satoshi; Nishimura, Yukuo; Haruta, Masahiro; Yoshinaga, Yoko; and Munakata, Hirohide, 4,952,035, Cl. 350-354.000.

Hasegawa, Hideo; Takahashi, Toshio; and Miyagawa, Masayuki, to Mitsubishi Plastics Industries Limited. Apparatus for forming a blown bottle with a handle. 4,952,133, Cl. 425-503.000.

Hasegawa, Tatsuzo: See—  
Tokumo, Akio; Kato, Masayuki; Sato, Takeshi; and Hasegawa, Tatsuzo, 4,952,884, Cl. 330-10.000.

Hashimoto Corporation: See—  
Hashimoto, Kazuo, 4,953,201, Cl. 379-189.000.

Hashimoto, Gaku: See—  
Watanabe, Eifu; and Hashimoto, Gaku, 4,952,180, Cl. 440-77.000.

Hashimoto, Kazuo, to Hashimoto Corporation. Additional telephone equipment and method for protecting against nuisance calls. 4,953,201, Cl. 379-189.000.

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Hashimoto, Tadahiko: See—  
Azusawa, Noboru; Hashimoto, Tadahiko; Shiraiishi, Hisayoshi; and Nagae, Yoshiharu, 4,952,034, Cl. 350-351.000.

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Hatagishi, Yuji: See—  
Nagasaka, Yasuhiro; Hatagishi, Yuji; and Manabe, Naoki, 4,952,166, Cl. 439-364.000.

Hatamori, Osamu: See—  
Iwata, Michihiro; Kobayashi, Haruo; and Hatamori, Osamu, 4,952,955, Cl. 354-195.100.

Hatayama, Katsuo: See—  
Kawashima, Yutaka; Sato, Masakazu; Kawase, Masahiro; Watanabe, Yoshiaki; and Hatayama, Katsuo, 4,952,689, Cl. 540-200.000.

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Nishino, Kenichi; Shibata, Takashi; Aoki, Sanzi; Mishima, Yasuhiro; Iwai, Hisayuki; and Hatta, Ken, 4,952,652, Cl. 523-522.000.

Hattori, Masayuki: See—  
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Haug, Edward J.: See—  
Briggs, John A.; Deyo, Roderic C.; and Haug, Edward J., 4,952,152, Cl. 434-69.000.

Haug, Michael: See—  
Andree, Roland; Haug, Michael; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,952,235, Cl. 71-94.000.

Hausmann, August: See—  
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Hawkins, Albert P.; and Santwyk-Anderson, David, to CRA Services Ltd. Apparatus for classifying particulate material, 4,951,825, Cl. 209-558.000.

Hay, Robert A., II: See—  
Moore, Eugene R.; and Hay, Robert A., II, 4,952,672, Cl. 528-481.000.

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Hayakawa, Takashi: See—  
Orita, Hideo; Shimizu, Masao; Hayakawa, Takashi; and Takehira, Katsuomi, 4,952,712, Cl. 552-307.000.

Hayasaka, Hideto; Takakura, Masaki; Yamane, Yasukuni; and Kako, Noritoshi, to Sharp Kabushiki Kaisha. Method for printing a color image which includes black ink, 4,953,015, Cl. 358-79.000.

Hayashi, Asazi: See—  
Yanaga, Yukio; Hayashi, Asazi; Kamata, Shizue; and Imanara, Toru, 4,952,319, Cl. 210-640.000.

Hayashi, Hideharu; and Yanase, Takeshi, to Yazaki Corporation. Electric connection box, 4,952,753, Cl. 174-52.100.

Hayashi, Koichi; and Suzuki, Takeshi, to Toto, Ltd. Ceramic products and process for producing the same, 4,952,537, Cl. 501-127.000.

Hayashi, Mariko; Kimura, Naofumi; and Ichimura, Yukiko, to Sharp Kabushiki Kaisha. Two celled liquid crystal display device with dependency of birefringence on wavelength larger in first cell, 4,952,029, Cl. 350-335.000.

Hayashi, Seiichi, to Kabushiki Kaisha Komatsu Seisakusho. Laser-beam processing method and system, 4,952,770, Cl. 219-121.670.

Hayashi, Tsutomu; Wakatsuki, Goroei; and Katahira, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Hydrostatic continuously variable transmission, 4,951,469, Cl. 60-489.000.

Hayashi, Yasushi, to Kabushiki Kaisha Toshiba. Display apparatus having horizontal/vertical conversion display functions, 4,952,920, Cl. 340-727.000.

Hayashida, Shigeru: See—  
Kigasawa, Kazuo; Ohtani, Hideaki; Tanada, Makoto; and Hayashida, Shigeru, 4,952,560, Cl. 514-2.000.

Hayden, Charles C.; Schmidt, Frederick A.; and Studebaker, Mark D., to American Telephone and Telegraph Company. Audiographics conferencing arrangement, 4,953,159, Cl. 370-62.000.

Hayes, Earl J., Sr., to AMP Incorporated. Sealed electrical connector employing insulation displacement terminals, 4,952,169, Cl. 439-403.000.

Hayes Microcomputer Products, Inc.: See—  
McGlynn, Paul E.; and Nash, Randy D., 4,953,210, Cl. 380-48.000.

Hays, Bill J. Clutch assembly with improved dual frictional facings, 4,951,793, Cl. 192-70.270.

Healey, Peter; and Smith, David W., to British Telecommunications public limited company. Optical space switch, 4,952,010, Cl. 350-3.770.

Heck, James V.; and Ratcliffe, Ronald W., to Merck & Co., Inc. 2-quaternary heteroarylalkylthio carbanenems having an acid moiety substituent, 4,952,397, Cl. 424-114.000.

Heckle, William A.; Mathews, Marion J., III; and Peoples, P. Robert, to Monsanto Company. Acrylonitrile dimerization process and method of treating residual catalyst, 4,952,541, Cl. 502-22.000.

Hedberg, Dave: See—  
Levy, Steve; Hedberg, Dave; and Agazzi, Oscar, 4,953,186, Cl. 375-118.000.

Hedley, David J.; and Richards, John W., to Sony Corporation. Video signal processing, 4,953,107, Cl. 364-522.000.

Hedike, Rolf, to BTS Broadcast Television Systems GmbH. Manual rotary sphere control of an electronic equipment with touch sensing of scale marks, 4,952,081, Cl. 388-825.000.

Hedike, Rolf; and Fach, Reinhard, to Robert Bosch GmbH. Time code reader in a device for reproducing video signals from magnetic tape, 4,953,040, Cl. 360-33.100.

Heep, Dieter; Vogel, Paul; and Stengel, Joachim, to Waeschle Maschinenfabrik GmbH. Pipe switch for plants for pneumatically conveying bulk material, 4,952,100, Cl. 406-182.000.

Heffernan, James G.; Cleare, Michael J.; and Picker, Donald H., to Johnson Matthey PLC. Monoclonal antibody-platinum co-ordination compound complex, 4,952,676, Cl. 530-389.000.

Heidelberger Druckmaschinen AG: See—  
Rodi, Anton; Muller, Hans; and Lehnert, Michael, 4,951,567, Cl. 101-216.000.

Heilmann, Steven M.: See—  
Francis, Cecil V.; Heilmann, Steven M.; Krepski, Larry R.; and Rasmussen, Jerald K., 4,952,640, Cl. 525-328.200.

Heim, Philippe; and Riess, Gerard, to Norsolor. Process for the manufacture of an impact resistant thermoplastic resin, 4,952,635, Cl. 525-243.000.

Heinen, Jeffrey L., to Kimberly-Clark Corporation. Apparatus for compressing material into a tampon, 4,951,368, Cl. 28-118.000.

Heining, Hans-Dieter: See—  
Braun, Michael; and Heining, Hans-Dieter, 4,953,069, Cl. 363-41.000.

Heinz, Donald E.: See—  
Schultz, David H.; Mattson, Steven W.; and Heinz, Donald E., 4,951,925, Cl. 256-65.000.

Heitkampfer, Peter: See—  
Muller, Klaus-Helmut; Konig, Klaus; and Heitkampfer, Peter, 4,952,701, Cl. 548-263.800.

Heliott, Michael W.: See—  
Login, Robert B.; and Heliott, Michael W., 4,952,559, Cl. 512-10.000.

Hemel, Ralf; and Melzer, Jaroslav, to BASF Aktiengesellschaft. Process for controlling the addition of retention aids in papermaking, 4,952,280, Cl. 162-198.000.

Hemmingsen, Peter: See—  
Renn, Donald W.; Lauterbach, George E.; and Hemmingsen, Peter, 4,952,686, Cl. 536-114.000.

Hendershot, Robert V., to Candy Mfg. Co., Inc. Zero back lash phase adjusting mechanism, 4,951,518, Cl. 74-395.000.

Henderson, Dewey D., to Dayco Products, Inc. Belt tensioner and method of making the same, 4,952,197, Cl. 474-135.000.

Henderson, Tom. Environmental leakage protector for reciprocating rod fluid displacement arrangements, 4,951,743, Cl. 166-84.000.

Hendricks, Ross D., to Excellon Automation. Modular feeding tray for vibrating conveyors, 4,952,109, Cl. 414-224.000.

Henning, Jerry: See—  
Cross, James; Henning, Jerry; Rhoades, James J.; Chubb, Arthur B.; and Olsen, David B., 4,951,540, Cl. 83-397.000.

Henning Rainer: See—  
Lerch, Ulrich; Henning Rainer; and Kaiser, Joachim, 4,952,598, Cl. 514-414.000.

Hennson International: See—  
Duret, Francois; and Blouin, Jean-Louis, 4,952,149, Cl. 433-215.000.

Henricson, Kaj O.; Kokkonen, Seppo K.; Pikka, Olavi E.; Qvintus, Harri T.; Ruuskanen, Erkki A.; and Savolainen, Erkki E., to A. Ahlstrom Corporation. Apparatus for treating pulp, 4,952,314, Cl. 210-404.000.

Henry, Charles H.; Kazarinov, Rudolf F.; and Olsson, Nils A., to AT&T Bell Laboratories. Polarization independent semiconductor optical amplifier, 4,952,017, Cl. 350-96.150.

Henry, Courtney S. G.: See—  
DeLuca, Michael J.; and Henry, Courtney S. G., 4,952,929, Cl. 340-825.440.

Hensens, Otto D.; Liesch, Jerrold M.; Milligan, James A.; Del Val, Sagrario M.; Schwartz, Robert E.; and Wichmann, Carol, to Merck & Co., Inc. Antifungal agent, 4,952,604, Cl. 514-459.000.

Henze, Christopher P., to Unisys Corporation. Full bridge power converter with multiple zero voltage resonant transition switching, 4,953,068, Cl. 363-17.000.

Hepworth Minerals & Chemicals Limited: See—  
Luxton, Martin J.; Meredith, William C. S.; and Harrod, Andrew, 4,952,616, Cl. 523-141.000.

Heraeus Sepatech GmbH: See—  
Schmeisser, Holger; and Kohn, Heinz-Gerhard, 4,952,127, Cl. 494-1.000.

Herbst, Bettina S.: See—  
Planker, Siegfried; Warning, Klaus; Herbst, Gunter H., deceased; Herbst, Ulrike M.; Herbst, Bettina S.; and Schaeffer, Georg, 4,952,697, Cl. 546-265.000.

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Herbst, Ulrike M.: See—  
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Hercules Defense Electronics Systems, Inc.: See—  
Ashley, James R., 4,952,887, Cl. 331-17.000.

Herlitz, Gerhard, to B. Braun-SSC AG. Color marks on catheter guide wire, 4,951,686, Cl. 128-772.000.

Herold, Barry W.; and Tahernia, Omid, to Motorola, Inc. High speed prescaler, 4,953,187, Cl. 377-48.000.

Herrington, Richard A.; Widman, Kevin L.; Flaugh, Jeffrey R.; and Enk, Allan T., to Libbey-Owens-Ford Co. Apparatus for processing glass, 4,952,227, Cl. 65-162.000.

Herrmann, Dieter, to U.S. Philips Corporation. Circuit for limiting current peaks at turn-on of a switching transistor, 4,952,819, Cl. 307-282.000.

Hertelendy, Chris. Electrical connector, 4,952,167, Cl. 439-395.000.

Hesse, Michael; and Becker, Rainer, to BASF Aktiengesellschaft. Preparation of polyunsaturated hydrocarbons, 4,952,742, Cl. 585-534.000.

Hessler, Karl-Heinz: See—  
Weigand, Peter; Langen, Harald; Kupka, Hans J.; Rossel, Gerhard; Weigand, Walter; Wittenbeck, Rudiger; and Hessler, Karl-Heinz, 4,952,108, Cl. 414-172.000.

Hettich, Gerhard: See—  
Dorfler, Reiner; Hettich, Gerhard; and Schmid, Hans-Dieter, 4,951,502, Cl. 73-146.500.

Hewitt, Bert S.: See—  
Kaiser, Joseph A., Jr.; and Hewitt, Bert S., 4,953,001, Cl. 357-74.000.

Hewlett-Packard Company: See—  
Dysart, John A.; Showman, Peter S.; Crow, William M.; Williams, Peter M.; McBride, Brian W.; Senior, John R. F.; Whelan, Charles H.; and Murdoch, Brian, 4,953,080, Cl. 364-200.000.

Loewen, Victor D., 4,952,799, Cl. 250-231.160.

Meloy, Sue A.; and Coutant, Deborah S., 4,953,084, Cl. 364-200.000.

Uebbing, John J., 4,952,949, Cl. 346-154.000.

Heywang, Gerhard: See—  
Kohler, Burkhard; Heywang, Gerhard; and Zirngiebl, Eberhard, 4,952,624, Cl. 524-160.000.

Hi-Speed Checkweigher Co., Inc.: See—  
Zimmerman, Scott E.; and Specker, Alex J., 4,951,763, Cl. 177-164.000.

Hibino, Minoru: See—  
Yokoyama, Seiko; Tanooka, Hikomi; Hibino, Minoru; and Arakawa, Junichi, 4,952,775, Cl. 219-213.000.

Hicks, Roy L.; and McDonnell, James F., Jr., to Dow Chemical Company. The storage, transportation and installation container for ion-exchange membranes, 4,952,297, Cl. 204-255.000.

Hiestand, Karl, to SMW Schneider & Weisshaupt GmbH. Apparatus for actuating the clamping jaws of a chuck, 4,951,535, Cl. 82-142.000.

Higashimura, Hideaki, to Sumitomo Electric Industries, Ltd. Anti-skid control device, 4,953,092, Cl. 364-426.020.

Higashio, Kimihiko: See—  
Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, 4,952,983, Cl. 355-328.000.

Higgins, Francis J.; Loggins, Chester D., Jr.; and Christoff, James T., to United States of America, Navy. Multiple frequency synthetic aperture sonar, 4,953,143, Cl. 367-88.000.

Higginson, John: See—  
Bibl, Andreas; Higginson, John; and Gardner, Deane, 4,952,950, Cl. 346-157.000.

High Performance Tube, Inc.: See—  
Keyes, John M., 4,951,742, Cl. 165-184.000.

Higuchi, Yasushi: See—  
Ebata, Shuji; and Higuchi, Yasushi, 4,952,665, Cl. 528-219.000.

Hikami, Toshiya; Yoshida, Koji; Obara, Yuichi; and Fuse, Kenichi, to Furukawa Electric Co., Ltd. Zero insertion force connector actuated by a stored shape member, 4,952,162, Cl. 439-161.000.

Hikima, Ikuo, to Nikon Corporation. Exposure apparatus using excimer laser source, 4,952,945, Cl. 346-108.000.

Hilfman, Lee: See—  
Johnson, Russell W.; and Hilfman, Lee, 4,952,746, Cl. 585-802.000.

Hill, Paul M.: See—  
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Hill, Theodore B.: See—  
Scott, Daniel G.; Mong, William K.; Krampitz, Mark S.; Hill, Theodore B.; and Spalding, Willard P., 4,951,554, Cl. 92-103.00F.

Hillen, Walter: See—  
Schiebel, Ulrich; and Hillen, Walter, 4,953,038, Cl. 358-471.000.

Hillinger, George, to Alltrade, Inc. Screwdriver with enhanced grip handle, 4,951,533, Cl. 81-177.100.

Hillman, Lawrence M. Sailboat mast deck sealing assembly, 4,951,588, Cl. 114-93.000.

Himes, John L., Jr.: See—  
French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., 4,952,164, Cl. 439-215.000.

Hinshaw, Jerald C.: See—  
Wardle, Robert B.; Hinshaw, Jerald C.; and Edwards, William W., 4,952,644, Cl. 525-410.000.

Hinton, Harvard S.; Lentine, Anthony L.; and Miller, David A. B., to AT&T Bell Laboratories. Monolithic apparatus comprising optically interconnected quantum well devices, 4,952,791, Cl. 250-211.00J.

Hirahata, Shigeru: See—  
Suzuki, Tohru; Sugiyama, Masato; Matono, Takaaki; Hirahata, Shigeru; and Kaizaki, Kazuhiro, 4,953,032, Cl. 358-105.000.

Hirai, Tadaaki: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Hirai, Takayuki, to Bridgestone Corporation. Tire constituting member winding tension controlling apparatus, 4,951,895, Cl. 242-75.510.

Hirai, Tokuyuki: See—  
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Hirai, Yosinori: See—  
Nakagawa, Yutaka; Matsumoto, Tetsuro; Souda, Yuji; and Hirai, Yosinori, 4,952,030, Cl. 350-337.000.

Hiramoto, Yukio: See—  
Ishikawa, Masahiro; Fujiki, Norio; Hiramoto, Yukio; and Tanaka, Yoichi, 4,953,095, Cl. 364-484.000.

Hirano, Makoto: See—  
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Hirano, Yoshihide, to Sanshin Kogyo Kabushiki Kaisha. Ignition control for an engine to prevent overheating and backfiring, 4,951,624, Cl. 123-198.00D.

Hirasawa, Hideaki: See—  
Ueda, Nobuo; and Hirasawa, Hideaki, 4,952,052, Cl. 353-27.00R.

Hirata, Keiichi; Ban, Tomohiro; Kawasumi, Atsuko; Nakagawa, Kazuko; Mizutani, Yukimi; and Tsuruki, Atoru, to Brother Kogyo Kabushiki Kaisha. Word processor with a merge print function responsive to variable data length, 4,953,105, Cl. 364-519.000.

Hirata, Masahiro; Misonou, Masao; and Kawahara, Hideo, to Saint-Gobain Recherche. Production of a transparent electric conductor, 4,952,423, Cl. 427-109.000.

Hirata, Yukimasa: See—  
Kawarabayashi, Waichiro; Matsubara, Koichi; Yoshioka, Toshihiro; Yamagata, Hikaru; Takahashi, Shigeru; Hirata, Yukimasa; and Shirane, Yoshiko, 4,951,415, Cl. 47-60.000.

Hirayama, Hirozo: See—  
Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, 4,951,758, Cl. 175-40.000.

Hirose, Hitoshi: See—  
Togawa, Fumio; and Hirose, Hitoshi, 4,953,225, Cl. 382-13.000.

Hirose, Toshifumi; Kawakubo, Kawakubo; and Isayama, Katsuhiko, to Kanegafuchi Chemical Industry Co., Ltd. Curable polymer composition, 4,952,643, Cl. 525-407.000.

Hirota, Kazuo: See—  
Okino, Hironobu; Fujiwara, Akio; Akiba, Yutaka; Kasukabe, Susumu; Fujita, Tsuyoshi; Mitani, Masao; and Hirota, Kazuo, 4,952,272, Cl. 156-630.000.

Hirukawa, Itsushi; Aoki, Satoshi; and Kudoh, Noboru, to Sanshin Kogyo Kabushiki Kaisha. Method of controlling ignition of internal combustion engine, 4,951,640, Cl. 123-335.000.

Hiruma, Eikyuu: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Hitachi, Ltd.: See—  
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Hitachi Koki Co., Ltd.: See—  
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Yokokawa, Syuho; Fukazawa, Shinichi; Kikuchi, Yasuo; Suzuki, Takashi; and Nakajima, Isao, 4,952,782, Cl. 219-469.000.

Hitachi, Ltd.: See—  
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Bando, Akira; Nagura, Osamu; Saito, Keiji; Miyashita, Ikuro; Nagai, Hashime; Nakagawa, Hiroto; and Oono, Yasuteru, 4,952,852, Cl. 318-140.000.

Ichinose, Toshiaki; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,953,224, Cl. 382-8.000.

Ito, Masaru; Watanabe, Hitoshi; Tai, Toshiaki; and Tsunoda, Yoshito, 4,953,152, Cl. 369-44.390.

Kametani, Masatsugu; Sugiyama, Kengo; and Kogawa, Takashi, 4,953,074, Cl. 364-132.000.

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Nagai, Toshiaki, 4,952,125, Cl. 418-194.000.

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Okino, Hironobu; Fujiwara, Akio; Akiba, Yutaka; Kasukabe, Susumu; Fujita, Tsuyoshi; Mitani, Masao; and Hirota, Kazuo, 4,952,272, Cl. 156-630.000.

Suzuki, Tohru; Sugiyama, Masato; Matono, Takaaki; Hirahata, Shigeru; and Kaizaki, Kazuhiro, 4,953,032, Cl. 358-105.000.

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Wachi, Isao; Mori, Kinji; Orimo, Masayuki; Suzuki, Yasuo; Kawano, Katsumi; Koizumi, Minoru; Nakai, Kozo; and Kasashima, Hirokazu, 4,953,096, Cl. 364-550.000.

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Hitachi, Ltd.: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi;

Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.  
Hitachi Maxell, Ltd.: See—  
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Hitachi Metals, Ltd.: See—  
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Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Toru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239,000.

Immel, Otto; and Schwarz, Hans-Helmut, to Bayer Aktiengesellschaft. Ruthenium catalyst, process for its preparation and process for the preparation of a mixture of cyclohexylamine and dicyclohexylamine using the ruthenium catalyst, 4,952,549, Cl. 502-330,000.

Imperial Chemical Industries PLC: See—  
Booth, Christopher G.; and Rowe, Raymond C., 4,952,212, Cl. 604-294,000.

Metcalfe, Ronald; and Waite, Frederick A., 4,952,456, Cl. 428-413,000.

In Focus Systems, Inc.: See—  
Gulick, Paul E.; and Conner, Arlie R., 4,952,036, Cl. 350-335,000.

Ina, Hideki; Sakai, Fumio; and Nakano, Hitoshi, to Canon Kabushiki Kaisha. Alignment method and a projection exposure apparatus using the same, 4,952,060, Cl. 356-407,000.

INA Walzlager Schaeffler KG: See—  
Lingner, Horst, 4,952,079, Cl. 384-575,000.

Schaeffler, Georg, 4,951,619, Cl. 123-90,550.

Inaba, Nobuaki: See—  
Matsuda, Kazuo; Inaba, Nobuaki; Kaminishi, Masashi; Funabashi, Tetsuji; and Tanaka, Nobukazu, 4,952,364, Cl. 264-40,100.

Inagaki, Kazuhiro: See—  
Kishi, Katsutoshi; Tachi, Shigeyuki; Inagaki, Kazuhiro; and Saruwatari, Yoshinori, 4,951,360, Cl. 19-225,000.

Inamoto, Kiyoshi: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohda, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208,000.

Inamoto, Yoshiko: See—  
Sakane, Kazuo; Kawabata, Kohji; Miyai, Kenji; and Inamoto, Yoshiko, 4,952,578, Cl. 514-202,000.

Indyke, David M., to Ethyl Corporation. Polyimide foams and their production, 4,952,611, Cl. 521-185,000.

Infrared Engineering Limited: See—  
Edgar, Roger F., 4,952,061, Cl. 356-407,000.

Ingersoll-Rand Company: See—  
McCarney, Clifford A., 4,952,096, Cl. 405-259,000.

Ingve, Thomas: See—  
Ashworth, John; and Ingve, Thomas, 4,951,873, Cl. 239-67,000.

Inkrott, Kenneth E., to Phillips Petroleum Company. Polyolefin polymerization process and catalyst, 4,952,737, Cl. 568-851,000.

Inman, Joel D.; Pedersen, Gary W.; and McKibben, Timothy J., to Anago, Inc. Thermal pack, 4,951,666, Cl. 128-402,000.

Innes, R. A.: See—  
Zones, Stacey I.; and Innes, R. A., 4,952,744, Cl. 585-640,000.

Innovations International Trading Corporation: See—  
Brown, Gregory, 4,951,965, Cl. 280-801,000.

Ino, Kazuo: See—  
Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, 4,953,049, Cl. 360-126,000.

Inotsume, Fusako: See—  
Katsu, Toshiyuki; and Inotsume, Fusako, 4,953,132, Cl. 365-228,000.

Inouchi, Katsuyoshi. Method and apparatus for heating and generating infrared rays, 4,951,649, Cl. 126-91,00A.

Inoue, Akira: See—  
Hata, Tsugunori; Inoue, Akira; Teramoto, Toshihiko; Ogura, Kazuhiko; and Kubomoto, Isamu, 4,951,871, Cl. 237-12,100.

Inoue, Eisuke: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366,000.

Inoue, Hiroshi; Mihara, Tetsushi; Mizutome, Atsushi; Taniguchi, Osamu; and Onitsuka, Yoshihiro, to Canon Kabushiki Kaisha. Display device, 4,952,032, Cl. 350-350,005.

Inoue, Hiroshi, to Canon Kabushiki Kaisha. Information recording and reproducing apparatus having switching means for disabling control of medium drive by a phase locked loop in a playback mode, 4,952,786, Cl. 235-480,000.

Inoue MTP Kabushiki Kaisha: See—  
Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohya, Tetsuo; Ohya, Makoto; and Kozaki, Norio, 4,952,358, Cl. 264-134,000.

Inoue, Noriyuki; Yagihara, Morio; Okada, Hisashi; Matsushita, Tetunoti; Nagaoka, Satoshi; and Kojima, Tetsuro, to Fuji Photo Film Co., Ltd. Direct positive silver halide photosensitive material and method for forming direct positive image, 4,952,483, Cl. 430-378,000.

Inoue, Tatsuo: See—  
Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Teruki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93,000.

Institut Francais du Pétrole: See—  
Goldenberg, Emmanuel, 4,952,139, Cl. 431-353,000.

Institute of Technology Precision Electrical Discharge Works: See—  
Futamura, Shoji, 4,952,790, Cl. 219-69,130.

Instituto de Investigacion Y Desarrollo Quimicobiologico S.A.: See—  
Torija, Carlos F.; and Galiano Ramos, Joaquin A., 4,952,592, Cl. 514-338,000.

Integrated Network Corporation: See—  
Gupta, Dev V., 4,953,160, Cl. 370-76,000.

Interlake Companies, Inc.: See—  
Collins, Ellsworth H.; Mattingly, James F.; and Reed, David B., 4,951,808, Cl. 198-781,000.

International Business Machines Corporation: See—  
Alvarez, Manuel J., II; and Jackson, Earl W., Jr., 4,953,077, Cl. 364-200,000.

Erdelyi, Charles K.; and Reed, Timothy P., 4,952,818, Cl. 307-270,000.

Feal, Brice J.; Hanrahan, Donald J.; and Shippy, David J., 4,953,081, Cl. 364-200,000.

Fieschi, Jacques; Glisse, Michel; and Le Pennec, Jean-Francois, 4,953,180, Cl. 375-7,000.

Franaszek, Peter A.; and Georgiou, Christos J., 4,952,930, Cl. 340-825,800.

Gatto, Jeffrey V.; and Wilson, Joseph T., III, 4,951,859, Cl. 226-74,000.

Ryder, John H., Sr.; and Smith, Susanna R., 4,953,209, Cl. 380-23,000.

Sartwell, Alfred L.; and Thoma, Endre P., 4,952,863, Cl. 323-280,000.

International Copper Research Association, Inc.: See—  
Sorenson, John R. J.; and Oberley, Larry W., 4,952,607, Cl. 514-589,000.

International Ferry Freight Limited: See—  
Dudding, Sheron L., 4,951,724, Cl. 141-383,000.

International Fuel Cells, Inc.: See—  
Lipman, Kenneth, 4,953,071, Cl. 363-72,000.

International Mobile Machines Corporation: See—  
Kaewell, John D., Jr.; Schreier, Nicholas C.; and Roller, James J., 4,953,197, Cl. 379-58,000.

Interpump - S.p.A.: See—  
Arsi, Giuseppe, 4,951,877, Cl. 239-240,000.

Inui, Toshiharu; and Ishikawa, Noriyoshi, to Canon Kabushiki Kaisha. Transfer recorder with heater, 4,952,944, Cl. 346-25,000.

Irie, Yukio: See—  
Bando, Ko; Senoo, Yoshimasa; Noji, Minoru; Ootsuki, Kazuo; Ekimoto, Hisao; and Irie, Yukio, 4,952,409, Cl. 424-450,000.

Irvin Industries, Inc.: See—  
Lobanoff, Mark; and Gavagan, James A., 4,952,008, Cl. 296-97,800.

Irwin, James S.; and Shepherd, Wayne P., to Motorola, Inc. Loop filter modulated synthesizer, 4,952,889, Cl. 332-128,000.

Isacoff, Eric G.: See—  
Byers, Michael J.; Isacoff, Eric G.; and Naples, John O., 4,952,506, Cl. 435-240,250.

Isaka, Yukio: See—  
Suzuki, Yasuhiro; Akimoto, Koichiro; Ohshima, Hajime; Honda, Kazuyuki; and Isaka, Yukio, 4,952,948, Cl. 346-150,000.

Isayama, Katsuhiko: See—  
Hirose, Toshifumi; Kawakubo, Kawakubo; and Isayama, Katsuhiko, 4,952,643, Cl. 525-407,000.

Ishibashi, Hiroyuki: See—  
Watanabe, Yoji; and Ishibashi, Hiroyuki, 4,951,627, Cl. 123-339,000.

Ishibashi, Kenji: See—  
Ishida, Tokuji; Hamada, Masataka; Norita, Toshio; Ueyama, Masayuki; Kozakai, Katsumi; Ootsuka, Hiroshi; Kajita, Hideo; and Ishibashi, Kenji, 4,952,965, Cl. 354-403,000.

Ishida, Hideki: See—  
Takahara, Ichiro; Azumi, Masaaki; Shigetomi, Kazuo; Kamimura, Takaya; and Ishida, Hideki, 4,953,154, Cl. 369-195,000.

Ishida Scales Mfg. Co., Ltd.: See—  
Naito, Kazufumi; and Nishide, Seiji, 4,951,765, Cl. 177-211,000.

Ishida, Tokuji; Hamada, Masataka; Norita, Toshio; Ueyama, Masayuki; Kozakai, Katsumi; Ootsuka, Hiroshi; Kajita, Hideo; and Ishibashi, Kenji, to Minolta Camera Kabushiki Kaisha. Automatic focus detecting apparatus, 4,952,965, Cl. 354-403,000.

Ishida, Tokuji; and Hamada, Masataka, to Minolta Camera Kabushiki Kaisha. Focus detecting device for use with cameras, 4,952,966, Cl. 354-406,000.

Ishigaki, Yukinobu, to Victor Company of Japan, Ltd. Spread spectrum communication system, 4,953,178, Cl. 375-1,000.

Ishihara, Kousou: See—  
Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, 4,953,049, Cl. 360-126,000.

Ishihara, Masaaki: See—  
Kazumi, Jiro; Tsujimoto, Shinichi; and Ishihara, Masaaki, 4,952,967, Cl. 354-442,000.

Ishii, Hiroshi; Ueda, Tetsuyuki; and Sawai, Hiroyuki, to Sharp Kabushiki Kaisha. Moving apparatus for optical systems, 4,952,011, Cl. 350-6,500.

Ishii, Kazuo: See—  
Kato, Eiichi; and Ishii, Kazuo, 4,952,475, Cl. 430-96,000.

Ishii, Mitsuaki: See—  
Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492,000.

Ishii, Yoshiki: See—  
Skikakura, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, 4,953,019, Cl. 358-133,000.

Ishikawa, Masaaki: See—  
Ishikawa, Yasunori; Murayama, Noboru; Suzuki, Koichi; Kuwata, Koji; Shimura, Hiroshi; and Ishikawa, Masaaki, 4,953,196, Cl. 379-53,000.

Ishikawa, Masahiro; Fujiki, Norio; Hiramoto, Yukio; and Tanaka, Yoichiro, to Nissan Motor Co., Ltd. Apparatus and method for measuring the frequency of a pulse signal, 4,953,095, Cl. 364-484,000.

Ishikawa, Noriyoshi: See—  
Inui, Toshiharu; and Ishikawa, Noriyoshi, 4,952,944, Cl. 346-25,000.

Ishikawa, Shinji: See—  
Kobayashi, Kazuo; Fukazawa, Masashi; and Ishikawa, Shinji, 4,952,735, Cl. 568-560,000.

Ishikawa, Tsutomu; Kabashima, Akira; and Imaizumi, Hideo, to Sanyo Electric Co., Ltd. Demodulator circuit for television multi-channel, 4,953,021, Cl. 358-144,000.

Ishikawa, Yasunori; Murayama, Noboru; Suzuki, Koichi; Kuwata, Koji; Shimura, Hiroshi; and Ishikawa, Masaaki, to Ricoh Company, Ltd. Image transmission system, 4,953,196, Cl. 379-53,000.

Ishikawa, Yoshikazu: See—  
Sasajima, Koji; and Ishikawa, Yoshikazu, 4,951,468, Cl. 60-487,000.

Ishikawa, Yoshitomo: See—  
Itano, Katashi; Shirai, Toshikazu; Ishikawa, Yoshitomo; and Nakao, Yoji, 4,951,386, Cl. 29-783,000.

Ishikawajima-Harima Heavy Industries Co., Ltd.: See—  
Shoda, Takuo; and Yamada, Jiro, 4,951,881, Cl. 241-23,000.

Ishimaru, Yoshiharu; Yamato, Motoyuki; and Chono, Koji, to Nippon Zeon Co., Ltd. Process for preparing shaped article having thick section, 4,952,348, Cl. 264-40,600.

Ishioka, Sachio: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366,000.

Ishizuka, Shigeo: See—  
Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Ito, Naoki, 4,952,155, Cl. 439-49,000.

Ishizuka, Yusaku: See—  
Ozaki, Shoichi; Watanabe, Yutaka; Awaya, Akira; and Ishizuka, Yusaku, 4,952,717, Cl. 558-155,000.

Isley, John P.: See—  
Gerken, Steven L.; Bell, Brian M.; and Isley, John P., 4,951,417, Cl. 47-1,420.

Isozaki, Kei; Matsunaga, Hirotsugu; and Imamura, Yasuo, to Denki Kagaku Kogyo Kabushiki Kaisha. Sintered body having high corrosion resistance and containing ZRb2, 4,952,532, Cl. 501-87,000.

Isozumi, Shuzoo; and Konishi, Keiichi, to Mitsubishi Denki Kabushiki Kaisha. Device for waterproofing around terminal bolt, 4,952,831, Cl. 310-71,000.

Isozumi, Shuzoo: See—  
Morishita, Akira; and Isozumi, Shuzoo, 4,951,515, Cl. 74-7,00E.

Issac, Otto: See—  
Sauerbier, Dieter; Molge, Klaus; Weigert, Werner; and Issac, Otto, 4,952,575, Cl. 514-110,000.

Isuzu Motors Limited: See—  
Kawamura, Hideo, 4,951,769, Cl. 180-65,400.

Itano, Katashi; Shirai, Toshikazu; Ishikawa, Yoshitomo; and Nakao, Yoji, to Mazda Motor Corporation. Apparatus for disassembling bearing caps and assembling metals, 4,951,386, Cl. 29-783,000.

Ito, Fujihiro: See—  
Kameyama, Makoto; Niizuma, Kiyozumi; Nagasawa, Kenichi; Suzuki, Takashi; Yamanaka, Toshio; Orikasa, Tsuyoshi; Ito, Fujihiro; and Yoshida, Kazuyo, 4,953,048, Cl. 360-119,000.

Ito, Fukusaburo: See—  
Kawano, Tadaaki; Murakami, Susumu; Ito, Fukusaburo; Hagihara, Hideaki; Miyaji, Takashi; and Nishijima, Masaru, 4,952,989, Cl. 355-210,000.

Ito, Hiroshi: See—  
Shirai, Kanji; Maruyama, Kazuharu; Ito, Hiroshi; Kitamura, Hajime; and Yutaka, Owashi, 4,952,131, Cl. 425-190,000.

Ito, Kiyohiko: See—  
Okazaki, Iwao; Abe, Koichi; Nakajima, Shoji; Ito, Kiyohiko; Nishino, Satoru; and Minamizawa, Hidehito, 4,952,449, Cl. 428-147,000.

Ito, Masaru; Watanabe, Hitoshi; Tan, Toshiaki; and Tsunoda, Yoshito, to Hitachi, Ltd.; and Hitachi Maxell, Ltd. Mastering machine for making an on-land recording master disk with two beam alignment servo loops, 4,953,152, Cl. 369-44,390.

Ito, Masazumi; and Yasue, Yoshihiko, to Minolta Camera Kabushiki Kaisha. Image forming apparatus capable of accurate troubleshooting, 4,952,975, Cl. 355-206,000.

Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, to Minolta Camera Kabushiki Kaisha. Multi-colored image forming apparatus, 4,952,983, Cl. 355-328,000.

Ito, Naoki: See—  
Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Ito, Naoki, 4,952,155, Cl. 439-49,000.

Ito, Takayuki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Zoom lens system for use in compact camera, 4,952,038, Cl. 350-427,000.

Ito, Takayuki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Macro-adapted zoom lens system capable of high zoom ratio while covering wide angles, 4,952,039, Cl. 350-428,000.

Ito, Yoshio; Takemura, Makoto; Sata, Junichi; and Otsuki, Shinnichi, to Canon Kabushiki Kaisha. Original reading apparatus, 4,953,037, Cl. 358-496,000.

Itoh, Kunio: See—  
Fukushima, Motoo; Takahashi, Masaharu; and Itoh, Kunio, 4,952,609, Cl. 521-94,000.

Itoh, Tomio, to Mitsuya Tekko Co., Ltd. Apparatus for producing tube, 4,952,202, Cl. 493-299,000.

Ivey, Matthew A.; and Fundak, Davorn, to Tektronix, Inc. Simultaneous television picture and measurement display, 4,953,017, Cl. 358-139,000.

Ivy Steel Products, Inc.: See—  
Grayson, Boyd H.; and Beak, Richard J., 4,952,098, Cl. 405-262,000.

Iwahara, Masahiro, to Idemitsu Petrochemical Company, Limited. Process for producing alkoxyalkyl group substituted phenols, 4,952,736, Cl. 568-628,000.

Iwai, Hisayuki: See—  
Nishino, Kenichi; Shibata, Takashi; Aoki, Sanji; Mishima, Yasuhiro; Iwai, Hisayuki; and Hatta, Ken, 4,952,652, Cl. 523-522,000.

Iwamoto, Nobuya; and Umesaki, Norimasa, to Sumitomo Cement Co., Ltd. Bonding composition for ceramics comprising metal oxide melt and method for bonding ceramics, 4,952,454, Cl. 428-446,000.

Iwano, Kazuko; and Suzumeji, Momoko, to Kao Corporation. Nacreous pigment containing a dye and cosmetic composition comprising the same, 4,952,245, Cl. 106-404,000.

Iwasa, Yoshio: See—  
Aruga, Tatsuo; and Iwasa, Yoshio, 4,951,616, Cl. 123-195,00A.

Jingu, Nobuhisa; and Iwasa, Yoshio, 4,951,623, Cl. 123-193,00H.

Iwasaki, Katsunori; Tanigawa, Shigeo; and Tokunaga, Masaaki, to Hitachi Metals, Ltd. Magnetically anisotropic hotworked magnet and method of producing same, 4,952,251, Cl. 148-101,000.

Iwasaki, Katsunori: See—  
Tokunaga, Masatoshi; Nozawa, Yasuto; and Iwasaki, Katsunori, 4,952,239, Cl. 148-302,000.

Iwasaki, Tameo; and Takashima, Kohji, to Tanabe Seiyaku Company, Ltd. Phenyl benzothiophene hypolipidemic derivatives, 4,952,602, Cl. 514-443,000.

Iwata, Kazuo; and Tochihiro, Shinichi, to Canon Kabushiki Kaisha. Method of drop-on-demand ink jet recording on sized paper with exposed fibers, 4,952,943, Cl. 346-1,100.

Iwata, Michihiro; Kobayashi, Haruo; and Hatamori, Osamu, to Minolta Camera Kabushiki Kaisha. Focal length switch-over camera, 4,952,955, Cl. 354-195,100.

Iwata, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Ignition control system for an internal combustion engine, 4,951,630, Cl. 123-435,000.

Iwata, Toshio; and Fukui, Wataru, to Mitsubishi Denki Kabushiki Kaisha. Rotational position detector device for an internal combustion engine. 4,951,639, Cl. 123-613.000.

Iwata, Yasuo; Koizumi, Michio; Kosugi, Kimihiro; Abe, Kouzou; and Majima, Takashi, to Citizen Watch Co., Ltd. Printer for use with continuous form. 4,952,087, Cl. 400-616.100.

Izatt, Reed M.: See—  
Bradshaw, Jerald S.; Bochenska, Maria; Krakowiak, Krzysztof E.; Biernat, Jan F.; Tarbet, Bryon J.; Bruening, Ronald L.; and Izatt, Reed M., 4,952,321, Cl. 210-670.000.

Izu, Etsuo: See—  
Kumura, Tatsuo; Sato, Heikichi; Kunito, Yoshiyuki; Ikeda, Yoshito; Izu, Etsuo; and Hayakawa, Masatoshi, 4,953,050, Cl. 360-126.000.

Izumi, Hideo, to Alps Electric Co., Ltd. Phase locked loop for direct modulation. 4,952,888, Cl. 332-124.000.

J.R. Simplot Company: See—  
Araquistain, Mark E.; and Brandt, Edwin R., 4,951,479, Cl. 62-239.000.

J.S. Staedtler GmbH & Co.: See—  
Groetsch, Gerald, 4,952,088, Cl. 401-195.000.

Jackson, Earl W., Jr.: See—  
Alvarez, Manuel J., II; and Jackson, Earl W., Jr., 4,953,077, Cl. 364-200.000.

Jackson, George V. T., to Southwestern Computer Technologies, Inc. Diagnostic system for personal computer. 4,953,165, Cl. 371-16.100.

Jacob, Heinz: See—  
Adams, Helmar; Boegelein, Georg; and Jacob, Heinz, 4,952,875, Cl. 324-220.000.

Jacobine, Anthony F.; and Nakos, Steven T., to Loctite Corporation. Crosslinking of (meth) acryloxyalkenylene functional siloxane prepolymers. 4,952,711, Cl. 522-99.000.

Jacobs, Robert S.; and Faulkner, D. John, to University of California, The Regents of the, Manoalide analogs. 4,952,605, Cl. 514-473.000.

Jacobs, Stephen M.; McTavish, Mary S.; and Doljack, Frank A., to Raychem Corporation. Method of making a PTC conductive polymer electrical device. 4,951,382, Cl. 29-611.000.

Jacobs, Stephen M.; McTavish, Mary S.; and Doljack, Frank A., to Raychem Corporation. Method of making a PTC conductive polymer electrical device. 4,951,384, Cl. 29-611.000.

Jacobson, Jeff A.; and Duffield, James R., to Jacobson, Jeffrey A. Counter stress beam hangers. 4,951,855, Cl. 223-88.000.

Jacobson, Jeffrey A.: See—  
Jacobson, Jeff A.; and Duffield, James R., 4,951,855, Cl. 223-88.000.

Jacobson, Peter E., to Honeywell Inc. Gimbal module. 4,951,521, Cl. 74-479.000.

Jaeger, Hans-Ulrich: See—  
Fikentscher, Rolf; Oftring, Alfred; Bochnitschek, Werner; Braun, Gerold; Perner, Johannes; Kaluza, Ulrich; and Jaeger, Hans-Ulrich, 4,952,332, Cl. 252-95.000.

Jaffe, Fred: See—  
Weil, Edward D.; Tomko, John; and Jaffe, Fred, 4,952,646, Cl. 525-507.000.

Jakob Maul GmbH: See—  
Brand, Winfried, 4,951,764, Cl. 177-210.000.

James L. Taylor Mfg. Co.: See—  
Mortoly, John L., deceased; and Quick, Bradley S., 4,952,269, Cl. 156-350.000.

James River Corporation: See—  
Kozbur, Nestor; and Shankel, Richard, 4,951,891, Cl. 242-56.200.

Kuchenbecker, Morris W.; and Block, Steven J., 4,951,824, Cl. 206-625.000.

Janssen Pharmaceutica N.V.: See—  
Boeckx, Gustaaf M.; Raeymaekers, Alfons H. M.; and Sipido, Victor, 4,952,570, Cl. 514-242.000.

Japan Electronic Control Systems Company, Limited: See—  
Nakaniwa, Shinpei; Araki, Akihiko; and Hoshino, Yukio, 4,951,635, Cl. 123-492.000.

Japan Exlan Company Limited: See—  
Uchida, Akiyoshi, 4,952,453, Cl. 428-364.000.

Japan Medical Supply Co., Ltd.: See—  
Sugiyama, Masafumi; and Nagatsuma, Yoshiko, 4,952,322, Cl. 210-679.000.

Japan Synthetic Rubber Co., Ltd.: See—  
Kasai, Kiyoshi; Hattori, Masayuki; Tadenuma, Hiroshi; and Yasukawa, Shiro, 4,952,651, Cl. 526-201.000.

Jariwalla, Raxit: See—  
Sabin, Robert; Jariwalla, Raxit; and Lawson, Stephen, 4,952,396, Cl. 424-946.000.

Jarvenkyla, Jyri; and Sillanpaa, Pauli, to Uponor N.V. Method and apparatus for the production of pipe. 4,952,362, Cl. 264-209.200.

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- Kawasaki Steel Corporation: See—  
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- Yukumoto, Masao; Ozawa, Michiharu; and Kan, Takahiro, 4,951,736, Cl. 164-428.000.
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- Kawase, Susumu: See—  
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- Kayama, Chizuru, to NEC Corporation. Vertical field-effect transistor having a high breakdown voltage and a small on-resistance. 4,952,991, Cl. 357-23.400.
- Kaye, Michael C., to Encore Video, Inc. Method and apparatus for uniform saturation, hue and luminance correction. 4,953,008, Cl. 358-22.000.
- Kazama, Yasuo: See—  
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- Kazman, William S.: See—  
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- Keiper, Francis P., Jr., to Lear Siegler Jennings Corp. Apparatus and method for detecting digital carrier synchronization problems. 4,953,181, Cl. 375-10.000.
- Kelleher, Brian; and Furlong, Thomas C., to Digital Equipment Corporation. Software configurable memory architecture for data processing system having graphics capability. 4,953,101, Cl. 364-518.000.
- Keller, Michael R.: See—  
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- Keller, Paul M.; Ellis, Ronald W.; Lowe, Robert S.; Riemen, Mark W.; and Davison, Andrew J., to Merck & Co., Inc. Vaccine against varicella-zoster virus. 4,952,674, Cl. 530-326.000.
- Keller, Wilhelm A. Viscous material dispenser with vented delivery piston. 4,951,848, Cl. 222-386.000.
- Kelley, Wayne R.: See—  
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- Kelly, Kevin B.: See—  
Cuschleg, Robert F., Jr.; Freeman, Brian D.; Kelly, Kevin B.; Patti, Philip J.; Perinelli, Anthony J.; and Shannon, Amy K., 4,953,204, Cl. 379-266.000.
- Kelly, Sarah E., to Pfizer Inc. Intermediates for making 2-oxindole-1-carboxamides. 4,952,703, Cl. 548-431.000.
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- Kempkes, Duane E. Packing corners for photographs. 4,951,821, Cl. 206-453.000.
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- Kenney, Claire L. Infant feeding chair. 4,951,997, Cl. 297-188.000.
- Keogh, Michael J., to Union Carbide Chemicals and Plastics Company Inc. Flame retardant compositions. 4,952,428, Cl. 428-461.000.
- Keren, Hanan, to Elscint Ltd. Hyperthermic power delivery system. 4,951,688, Cl. 128-804.000.
- Kern, Joseph W.: See—  
Van Pelt, Richard W.; Wong, Patrick K.; and Kern, Joseph W., 4,953,044, Cl. 360-73.090.
- Kerr, John B.: See—  
Ciccione, Joseph P.; DeCastro, Emory S.; and Kerr, John B., 4,952,289, Cl. 204-129.000.
- Kessler, Eduard: See—  
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- Kettner, Charles A.; and Korant, Bruce D., to Du Pont de Nemours, E. I., and Company. Peptide substrates for detecting virus-specified protease activity. 4,952,493, Cl. 435-5.000.
- Key Keepr, Inc.: See—  
Gebert, Paul, 4,951,819, Cl. 206-37.200.
- Keyes, John M., to High Performance Tube, Inc. Refractory heat exchange tube. 4,951,742, Cl. 165-184.000.
- Keys, James F., to Standard Products Company, The. Glass run molding. 4,951,418, Cl. 49-440.000.
- Khaw, Ban A.: See—  
Berger, Harvey J.; Khaw, Ban A.; Pak, Koon Y.; and Strauss, H. William, 4,952,393, Cl. 424-1.100.
- Kiefer, Klaus-Jürgen: See—  
Straten, Gunter; and Kiefer, Klaus-Jürgen, 4,952,910, Cl. 340-473.000.
- Kigasawa, Kazuo; Ohtani, Hideaki; Tanada, Makoto; and Hayashida, Shigeru, to Takeda Chemical Industries, Ltd. Ointment base. 4,952,560, Cl. 514-2.000.
- Kikuchi, Juro, to Olympus Optical Co., Ltd. Finder optical system. 4,952,956, Cl. 354-224.000.
- Kikuchi, Makoto: See—  
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- Kikuchi, Yasuo: See—  
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- Kikuda, Yukio, to Kabushiki Kaisha Toshiba. Bar code generating apparatus for image communication terminal device. 4,952,785, Cl. 235-432.000.
- Kilb, Philipp: See—  
Reinartz, Hans-Dieter; Steffes, Helmut; and Kilb, Philipp, 4,951,470, Cl. 60-562.000.
- Kim, Byoung Y.: See—  
Desurvire, Emmanuel; Kim, Byoung Y.; and Shaw, Herbert J., 4,952,059, Cl. 356-350.000.
- Kim, Dong S. T. Golf club. 4,951,953, Cl. 273-80.00B.
- Kim, Myung H. Combination ladder and height adjustable scaffold. 4,951,780, Cl. 182-27.000.
- Kimball, Spencer D.: See—  
Krapcho, John; Barrish, Joel C.; and Kimball, Spencer D., 4,952,692, Cl. 540-491.000.
- Kimberly-Clark Corporation: See—  
Heinen, Jeffrey L., 4,951,368, Cl. 28-118.000.
- Kimura, Hiroyuki: See—  
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- Kimura, Naofumi: See—  
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- Kimura, Shigeki; and Shibata, Kouichi, to Mita Industrial Co., Ltd. Method for producing character patterns. 4,953,102, Cl. 364-518.000.
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Lloyd, Bruce L., 4,951,365, Cl. 24-68.0CD.
- Kineri, Tohru: See—  
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- King, Donald E., to AyrKing Corporation. Auger-type flour sifter. 4,952,309, Cl. 209-235.000.
- King, Patrick D.; Winter, Bruce; and Olsen, Leo T., to Flo-Con Systems, Inc. Tube holder and method. 4,951,851, Cl. 222-591.000.
- King, Thomas V.: See—  
Vallee, Bert L.; and King, Thomas V., 4,952,403, Cl. 424-422.000.
- Vallee, Bert L.; and King, Thomas V., 4,952,404, Cl. 424-422.000.
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- Kioka, Mamoru; and Kashiwa, Norio, to Mitsui Petrochemical Industries, Ltd. Process for producing olefin polymers or copolymers and catalyst components used therefor. 4,952,649, Cl. 526-125.000.
- Kipfelsberger, Christian; and Kupczyk, Andreas, to RXS Schrumpteknik-Carnitoren GmbH, Firma. Heat-shrinkable envelope. 4,952,438, Cl. 428-68.000.



Kipfelsberger, Christian: See—  
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Kirin Brewery Co., Ltd.: See—  
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Kirk, Derrick L.; and Murray, Henry, to National Research Development Corporation. Fetal monitoring during labor. 4,951,680, Cl. 128-698.000.

Kirk, Karl D.: See—  
Ouriel, Kenneth; Kirk, Karl D.; and Lamond, Donald, 4,952,215, Cl. 606-159.000.

Kirkham, Steven C., to Komatsu Dresser Company. Hydraulic system and manifold assembly. 4,951,709, Cl. 137-561.00A.

Kirkland, James L., to United States of America, Navy. Wire detector. 4,952,938, Cl. 342-22.000.

Kirshnamurthy, Ramachandran; and MacLean, Donald L., to BOC Group, Inc. The Method and apparatus of producing carbon dioxide in high yields from low concentration carbon dioxide feeds. 4,952,223, Cl. 62-18.000.

Kirsten, Rolf: See—  
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Nakagawa, Asaharu, 4,952,158, Cl. 439-96.000.

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Kiuchi, Naoyuki, to Daifuku Co., Ltd. Method for testing internal combustion engine. 4,951,498, Cl. 73-117.300.

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Tschannen, Roland; Fraefel, Wolfgang; Schmidt, Richard R.; Klager, Rudolf; and Zimmermann, Peter, 4,952,683, Cl. 536-186.000.

Klazura, Kenneth. Transmission assembly. 4,951,527, Cl. 74-606.00R.

Klein, Gerhard: See—  
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Klein, John F.: See—  
Curreri, Victor; Klein, John F.; Dubois, Janine E.; and Larson, David J., Sr., 4,952,780, Cl. 219-390.000.

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Vaahs, Tilo; Kleiner, Hans-Jerg; Peuckert, Marcellus; and Bruck, Martin, 4,952,670, Cl. 528-32.000.

Kleinevoss, Albert: See—  
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Nir, Zvi; and Rentsch, Wolfgang, 4,952,452, Cl. 428-332.000.

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Klock, Jurgin; Fischer, Gerhard; and Grubisic, Vatroslav, to Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung E.V. Process and apparatus for testing the axles and/or springs and/or adjacent components of commercial vehicles. 4,951,504, Cl. 73-118.100.

Knackstedt, Wilhelm: See—  
Beckmann, Rolf; and Knackstedt, Wilhelm, 4,952,460, Cl. 428-429.000.

Knape, Michael, to VTM-Verfahrenstechnik AG. Method for producing plastic components. 4,952,264, Cl. 156-164.000.

Knapp, Gordon S.: See—  
Smith, Robert K.; Knapp, Gordon S.; Westbrook, Edwin M.; and Forster, George A., 4,953,191, Cl. 378-143.000.

Kniep, Claus: See—  
Weber, Jurgin; Weber, Kampmann, Detlef; and Kniep, Claus, 4,952,734, Cl. 564-471.000.

Knight, Charles E.: See—  
Alexander, Richard A.; Knight, Charles E.; and Whitehurst, Darrell D., 4,952,747, Cl. 585-803.000.

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Knight, Clifton T.: See—  
Lipp, Charles W.; Knight, Clifton T.; Lafitte, Larry L.; and Hunt, Marion H., 4,952,218, Cl. 48-86.00R.

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Detzel, Roger A.; Knoebel, Paul S.; and Walker, David J., 4,951,714, Cl. 138-106.000.

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Knuuttila, Pekka; Halme, Erkki; Lahtinen, Leila; and Koskimies, Salmie, to Neste Oy. Catalyst system for selective alkylation of toluene. 4,952,546, Cl. 502-174.000.

Kobata, Hiroshi: See—  
Enomoto, Akihiko; Koga, Takashi; Yoneda, Minoru; and Kobata, Hiroshi, 4,952,883, Cl. 328-159.000.

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Sakurabayashi, Akira, 4,952,281, Cl. 162-270.000.

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Iwata, Michihiro; Kobayashi, Haruo; and Hatamori, Osamu, 4,952,955, Cl. 354-195.100.

Kobayashi, Hirokazu: See—  
Miyamoto, Yukihiko; Kobayashi, Hirokazu; and Suzuki, Syoichi, 4,953,163, Cl. 370-100.100.

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Kobayashi, Kozo: See—  
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Kobayashi, Reichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, to NEC Home Electronics Ltd.; and Nippon Hoso Kyokai. Video ghost signal cancelling circuit having variable delay lines. 4,953,026, Cl. 358-167.000.

Kobayashi, Takeshi: See—  
Tezuka, Motohiko; Tabuchi, Junichi; Okubo, Yoshihide; and Kobayashi, Takeshi, 4,952,433, Cl. 428-42.000.

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Kobayashi, Yasuo, to NEC Corporation. Semiconductor memory device with improved address wiring arrangement. 4,953,134, Cl. 365-230.030.

Kobishi Electric Co., Ltd.: See—  
Kojima, Yoshikazu, 4,952,907, Cl. 340-396.000.

Koch, Thomas L.: See—  
Phillips, James D.; Casselman, Thomas N.; and Koch, Thomas L., 4,952,995, Cl. 357-24.000.

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Koenig, Larry E. Power auger machine with bearing shield. 4,951,884, Cl. 241-101.200.

Koga, Takashi: See—  
Enomoto, Akihiko; Koga, Takashi; Yoneda, Minoru; and Kobata, Hiroshi, 4,952,883, Cl. 328-159.000.

Kogasaka, Yoshihiro, to Fuji Photo Film Co., Ltd. Electric heat-sealing heater having a flexible heat accumulating sealing surface. 4,952,777, Cl. 219-243.000.

Kogawa, Takashi: See—  
Kametani, Masatsugu; Sugiyama, Kengo; and Kogawa, Takashi, 4,953,074, Cl. 364-132.000.

Kohler, Burkhard; Heywang, Gerhard; and Zirmiebl, Eberhard, to Bayer Aktiengesellschaft. Polyarylene sulfide mixtures with reduced radical formation under highly accelerated weathering. 4,952,624, Cl. 524-160.000.

Kohn, Heinz-Gerhard: See—  
Schmeisser, Holger; and Kohn, Heinz-Gerhard, 4,952,127, Cl. 494-1.000.

Kohno, Satoshi, to Atsugi Motor Parts Company, Limited. Friction clutch for transmission. 4,951,553, Cl. 192-70.130.

Koike, Toshio, to Ajinomoto Company, Inc. Automatic preparation apparatus and filter therefor. 4,951,513, Cl. 73-864.250.

Koier, Josef; and Steinhardt, Helmut, to TRW Daut & Rietz GmbH. Electrical coupling device. 4,952,176, Cl. 439-681.000.

Koito Manufacturing Co., Ltd.: See—  
Nino, Naohi, 4,953,063, Cl. 362-61.000.

Koizumi, Hiroshi: See—  
Torisawa, Akira; Yoshida, Katsumi; Koizumi, Hiroshi; and Yoshikawa, Hiroyuki, 4,952,859, Cl. 318-696.000.

Koizumi, Michio: See—  
Iwata, Yasuo; Koizumi, Michio; Kosugi, Kimihiro; Abe, Kouzou; and Majima, Takashi, 4,952,087, Cl. 400-616.100.

Koizumi, Minoru: See—  
Wachi, Isao; Mori, Kinji; Orimo, Masayuki; Suzuki, Yasuo; Kawano, Katsumi; Koizumi, Minoru; Nakai, Kozo; and Kasashima, Hirokazu, 4,953,096, Cl. 364-550.000.

Koizumi, Mitsuyoshi: See—  
Noguchi, Minoru; Shishido, Hiroaki; and Koizumi, Mitsuyoshi, 4,952,058, Cl. 356-237.000.

Kojima, Tetsuro: See—  
Inoue, Noriyuki; Yagihara, Morio; Okada, Hisashi; Matsushita, Tetunoti; Nagaoaka, Satoshi; and Kojima, Tetsuro, 4,952,483, Cl. 430-378.000.

Kojima, Yoshikazu, to Kobishi Electric Co., Ltd. Motor driven bell. 4,952,907, Cl. 340-396.000.

Kokkonen, Seppo K.: See—  
Henricson, Kaj O.; Kokkonen, Seppo K.; Pikka, Olavi E.; Qvintus, Harri T.; Ruuskanen, Erkki A.; and Savolainen, Erkki E., 4,952,314, Cl. 210-404.000.

Kokubun, Hitoshi, to Oki Electric Industry Co., Ltd. Voltage detection circuit and comparison voltage generator therefor. 4,952,821, Cl. 307-350.000.

Komatsu Dresser Company: See—  
Kirkham, Steven C., 4,951,709, Cl. 137-561.00A.

Komatsu, Yasuhiro, to Hosiden Electronics Co., Ltd. Card connector. 4,952,161, Cl. 439-155.000.

Komatsubara, Michiro: See—  
Nishiike, Ujiihiro; Komatsubara, Michiro; Iida, Yoshiaki; and Matoba, Isao, 4,952,253, Cl. 148-113.000.

Komendowski, Henry: See—  
Weiler, Gerhard H.; and Komendowski, Henry, 4,951,659, Cl. 128-200.180.

Komiyama, Katsumi: See—  
Kaifu, Noriyuki; Murata, Masayoshi; Hamamoto, Osamu; and Komiyama, Katsumi, 4,953,000, Cl. 357-71.000.

Komline-Sanderson Engineering Corporation: See—  
Gordon, John; and Sodalbers, Erich W., 4,951,805, Cl. 198-525.000.

Komori, Shinji: See—  
Takata, Hidehiro; Komori, Shinji; Tamura, Toshiyuki; Yamasaki, Tetsuo; and Shima, Kenji, 4,953,083, Cl. 364-200.000.

Kondo, Sadao: See—  
Tomida, Mamoru; Kondo, Sadao; Ueno, Masato; Suzuki, Takamasa; Tukahara, Masamitsu; and Asakawa, Yosiyuki, 4,951,962, Cl. 280-689.000.

Kondo, Tetsujiro, to Sony Corporation. A coding apparatus for encoding and compressing video data. 4,953,023, Cl. 358-135.000.

Kong, Cheung T. Measurement and dispensing unit. 4,951,839, Cl. 222-47.000.

Konica Corporation: See—  
Kobayashi, Chiharu; and Ushio, Masaru, 4,952,977, Cl. 355-235.000.

Kosugi, Hiromitsu; Otani, Shinichi; Kashino, Teruo; Andoh, Masakazu; Arai, Takeo; and Nagashima, Toshiharu, 4,952,960, Cl. 354-299.000.

Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,952,470, Cl. 430-56.000.

Konig, Klaus: See—  
Muller, Klaus-Helmut; Konig, Klaus; and Heitkamper, Peter, 4,952,701, Cl. 548-263.800.

Konishi, Keiichi: See—  
Isozumi, Shuzou; and Konishi, Keiichi, 4,952,831, Cl. 310-71.000.

Konishi, Kunihiko: See—  
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; Teshima, Nobue; Nakajima, Fumito; Mizoguchi, Tadaaki; and Nitta, Masahiro, 4,952,548, Cl. 502-217.000.

Konishi, Masataka: See—  
Ohkuma, Hiroaki; Konishi, Masataka; Matsumoto, Kiyoshi; Oki, Toshikazu; and Hoshino, Yutaka, 4,952,572, Cl. 514-279.000.

Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, 4,952,709, Cl. 549-292.000.

Konishiroku Photo Industry Co., Ltd.: See—  
Abe, Yoshinori; and Matsunawa, Masahiko, 4,953,229, Cl. 382-41.000.

Koocher, Martin, to Crystal Diagnostics, Inc. Assays for qualitative and quantitative detection of organic and inorganic analytes of diverse

chemical classes via the selective formation and growth of light scattering crystals. 4,952,513, Cl. 436-36.000.

Koom, Maarten; and Sikkema, Sape, to C. van der Lely N.V. Mowing machine. 4,951,450, Cl. 56-13.600.

Kopfle, James F. Golf ball teeing device. 4,951,947, Cl. 273-32.500.

Kopia, Jochen: See—  
Gerharz, Norbert; Kessler, Eduard; Kleinevoss, Albert; Kleudgen, Hans; Kopia, Jochen; and Stein, Bernd, 4,952,343, Cl. 264-109.000.

Kopitar, Zdravko: See—  
Zmitek, Janko; Milovac, Jenny; Kopitar, Zdravko; Zorz, Mirjan; and Rusjakovski, Boris, 4,952,565, Cl. 514-58.000.

Koplin, Karl-Heinz: See—  
Armbruster, Franz; Buck, Hartmut; Fasteding, Henning; Pubrl, Wenzel; Renner, Stefan; and Koplin, Karl-Heinz, 4,952,829, Cl. 310-68.000.

Korant, Bruce D.: See—  
Kettner, Charles A.; and Korant, Bruce D., 4,952,493, Cl. 435-5.000.

Korber, Hans: See—  
Basedow, Hans; Korber, Hans; Koster, Reinhard; Kruse, Ruth; and Lorenz, Dieter, 4,951,766, Cl. 180-6.500.

Kordomenos, Panagiotis I.; and Rytz, Rose A., to Du Pont de Nemours, E. I., and Company. Polyester graft copolymers, flexible coating compositions comprising same and branched polyester macromonomers for preparing same - II. 4,952,626, Cl. 525-28.000.

Korteweg, Wayne, to GAM-MED Packaging Corporation. Dry handle swab assembly and unit. 4,952,204, Cl. 604-1.000.

Kosaka, Hideyuki: See—  
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,951,441, Cl. 52-741.000.

Koshikawa, Shozo: See—  
Nakabayashi, Nobuo; Koshikawa, Shozo; and Ogawa, Tetsuro, 4,952,323, Cl. 210-691.000.

Koshikawa, Takeo: See—  
Imanari, Makoto; Koshikawa, Takeo; Yamauchi, Akihiro; Hanada, Masayuki; Fukuda, Morio; and Nagano, Kiyoshi, 4,952,545, Cl. 502-73.000.

Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touro; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Kosi, Cesar U.: See—  
Samera, Edward, Jr.; and Kosi, Cesar U., 4,951,580, Cl. 110-246.000.

Koskimies, Salmie: See—  
Knuuttila, Pekka; Halme, Erkki; Lahtinen, Leila; and Koskimies, Salmie, 4,952,546, Cl. 502-174.000.

Kosten, Richard B.: See—  
Krasznai, Charles Z.; Kosten, Richard B.; Barker, Ron; and Gerke, Burton E., Jr., 4,951,348, Cl. 15-414.000.

Koster, Reinhard: See—  
Basedow, Hans; Korber, Hans; Koster, Reinhard; Kruse, Ruth; and Lorenz, Dieter, 4,951,766, Cl. 180-6.500.

Kosugi, Hiromitsu; Otani, Shinichi; Kashino, Teruo; Andoh, Masakazu; Arai, Takeo; and Nagashima, Toshiharu, to Konica Corporation. Drying air control method in an automatic developing machine and an automatic developing machine employing the method. 4,952,960, Cl. 354-299.000.

Kosugi, Kimihiro: See—  
Iwata, Yasuo; Koizumi, Michio; Kosugi, Kimihiro; Abe, Kouzou; and Majima, Takashi, 4,952,087, Cl. 400-616.100.

Kosugi, Mitsuo: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tetsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Kotake, Naoyuki, to Nitto Kohki Co., Ltd. Pipe coupling. 4,951,710, Cl. 137-614.000.

Kothe, Steven A.: See—  
Markofsky, Sheldon B.; and Kothe, Steven A., 4,952,700, Cl. 548-240.000.

Kousaka, Fumio: See—  
Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohyama, Tetsuo; Ohya, Makoto; and Kozaki, Norio, 4,952,358, Cl. 264-134.000.

Koval, Vladimir P.: See—  
Drobachenko, Valery P.; Lukonina, Olga A.; Koval, Vladimir P.; Sokolov, Vladimir I.; and Maltsev, Boris A., 4,952,099, Cl. 406-50.000.

Kovats, Tibor F. I., to Northern Telecom Limited. Packaging method and package for edge-coupled optoelectronic device. 4,953,006, Cl. 357-80.000.

Kowa Company Ltd.: See—  
Aizu, Yoshihisa; Ogino, Kouji; and Sugita, Toshiaki, 4,952,050, Cl. 351-221.000.

Koyama, Nobuhiko: See—  
Sato, Hidenori; Umeno, Takashi; Nosaka, Michiyasu; and Koyama, Nobuhiko, 4,951,643, Cl. 123-520.000.

Koyama, Osamu, to Canon Kabushiki Kaisha. Opto-magnetic signal reproducing apparatus for reading, by differential detection using a



magneto-optical effect, information magnetically recorded on a record medium. 4,953,124, Cl. 365-122.000.

Koyanagi, Masaharu, to Futaba Denshi Kogyo Kabushiki Kaisha. Keyboard switch. 4,952,762, Cl. 200-517.000.

Kozai, Kiyoto, to Ricoh Company, Ltd. Control over surface temperature of a fixing roller of a heat roller type fixing device. 4,952,781, Cl. 219-469.000.

Kozakai, Katsumi: See—  
Ishida, Tokuji; Hamada, Masataka; Norita, Toshio; Ueyama, Masayuki; Kozakai, Katsumi; Ootsuka, Hiroshi; Kajita, Hideo; and Ishibashi, Kenji, 4,952,965, Cl. 354-403.000.

Kozaki, Norio: See—  
Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohya, Tetsuo; Ohya, Makoto; and Kozaki, Norio, 4,952,358, Cl. 264-134.000.

Kozbur, Nestor; and Shankel, Richard, to James River Corporation. Web splitter and groover system. 4,951,891, Cl. 242-56.200.

Krafft, Terry E.: See—  
Rich, Jonathan D.; Krafft, Terry E.; McDermott, Philip J.; and Chang, Tony C., 4,952,708, Cl. 549-241.000.

Kraft General Foods, Inc.: See—  
Moorman, Charles T.; Sabadics, Joseph L.; and Royal, T. Anthony, 4,951,561, Cl. 99-471.000.

Krakowiak, Krzysztof E.: See—  
Bradshaw, Jerald S.; Bochenka, Maria; Krakowiak, Krzysztof E.; Biernat, Jan F.; Tarbet, Bryon J.; Bruening, Ronald L.; and Izatt, Reed M., 4,952,321, Cl. 210-670.000.

Krall, Kenneth. Wrap dispenser. 4,951,858, Cl. 225-19.000.

Kramer, Arthur W.: See—  
Ellingson, Frederick J.; Kapoor, Anoop; Kramer, Arthur W.; and Sherwood, Donald G., 4,952,072, Cl. 376-261.000.

Kramptz, Mark S.: See—  
Scott, Daniel G.; Mong, William K.; Kramptz, Mark S.; Hill, Theodore B.; and Spalding, Willard P., 4,951,554, Cl. 92-103.00F.

Kramss, Richard H.: See—  
Trybulski, Eugene J.; Kramss, Richard H.; and Brabander, Herbert J., 4,952,600, Cl. 514-424.000.

Krapcho, John; Barrish, Joel C.; and Kimball, Spencer D., to E. R. Squibb & Sons, Inc. Benzazepine derivatives. 4,952,692, Cl. 540-491.000.

Krasznai, Charles Z.; Kosten, Richard B.; Barker, Ron; and Gerke, Burton E., Jr., to Black & Decker Inc. Rotatable indexable accessory vacuum cleaner tool. 4,951,348, Cl. 15-414.000.

Krepiski, Larry R.: See—  
Francis, Cecil V.; Heilmann, Steven M.; Krepiski, Larry R.; and Rasmussen, Jerald K., 4,952,640, Cl. 525-328.200.

Kresse, Horst: See—  
Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Pelzl, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zschke, Horst, 4,952,699, Cl. 548-136.000.

Kreuz, Detlef: See—  
Dietrich, Anton; and Kreuz, Detlef, 4,951,349, Cl. 16-228.000.

Kreuziger, Wolf-Dieter. Method and apparatus for mixing viscous or pasty materials. 4,952,065, Cl. 366-139.000.

Krimmer, Hans-Peter; and Drauz, Karlheinz, to Degussa Aktiengesellschaft. Derivatives of 2-pyrrolidone-5-carboxylic acid and method of obtaining them. 4,952,706, Cl. 548-534.000.

Krohn, Gunter: See—  
Diekmann, Helmut; Krohn, Gunter; and Cramer, Wilhelm, 4,951,646, Cl. 126-39.00J.

Kronberg, James W., to United States of America, Energy. Wave guide impedance matching method and apparatus. 4,952,892, Cl. 333-34.000.

Kruka, Vitold R.: See—  
Chin, Robert Wing-Yu; Kruka, Vitold R.; Stewart, Thomas L.; Patterson, Robert W.; and Cadena, Edward R., Jr., 4,953,144, Cl. 367-135.000.

Krupp Koppers GmbH: See—  
Puppel, Guenter, 4,952,750, Cl. 585-816.000.

Krupp Widia GmbH: See—  
von Haas, Rainer; and Ruther, Gunter, 4,951,578, Cl. 409-136.000.

Kruse, Ruth: See—  
Basedow, Hans; Korber, Hans; Koster, Reinhard; Kruse, Ruth; and Lorenz, Dieter, 4,951,766, Cl. 180-6.500.

Kubo, Kazuo: See—  
Tsuboi, Noboru; Kubo, Kazuo; and Nishitani, Kunihiko, 4,951,638, Cl. 123-559.100.

Kubo, Masaki: See—  
Tsukamoto, Koziro; Tatsuno, Yuzo; Kubo, Masaki; and Kumano, Yosio, 4,951,568, Cl. 101-415.100.

Kubogochi, Hisasi; and Sato, Youji, to Nifco, Inc. Fastener having separate portions for engaging two panels to be secured together. 4,952,106, Cl. 411-48.000.

Kuboki, Yoshinori, to Kabushiki Kaisha Sangi. Fine filling method and fine filler for dental purposes. 4,952,148, Cl. 433-228.100.

Kubomoto, Isamu: See—  
Hata, Tsugunori; Inoue, Akira; Teramoto, Toshihiko; Ogura, Kazuhiko; and Kubomoto, Isamu, 4,951,871, Cl. 237-12.100.

Kubota Ltd.: See—  
Hata, Tsugunori; Inoue, Akira; Teramoto, Toshihiko; Ogura, Kazuhiko; and Kubomoto, Isamu, 4,951,871, Cl. 237-12.100.

Kuchenbecker, Morris W.; and Block, Steven J., to James River Corporation. Carton having an opening feature and a carton blank. 4,951,824, Cl. 206-625.000.

Kud, Alexander: See—  
Seelmann-Eggebert, Hans-Peter; Boeckh, Dieter; Hartmann, Heinrich; Trieselt, Wolfgang; and Kud, Alexander, 4,952,655, Cl. 526-318.400.

Kudoh, Koichi: See—  
Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,952,470, Cl. 430-56.000.

Kudoh, Noboru: See—  
Hirukawa, Itsushi; Aoki, Satoshi; and Kudoh, Noboru, 4,951,640, Cl. 123-335.000.

Kudoh, Yoshihiko: See—  
Kawabata, Hidetsugu; Kudoh, Yoshihiko; Murakami, Motoyoshi; Miyatake, Norio; and Yamamoto, Masakazu, 4,952,295, Cl. 204-192.150.

Kudoh, Yoshimitsu: See—  
Murayama, Jin; and Kudoh, Yoshimitsu, 4,953,028, Cl. 358-213.310.

Kuechler, Manfred: See—  
Grolig, Gerhard; Boening, Peter; Kuechler, Manfred; and Reinhard, Guenter, 4,952,258, Cl. 156-99.000.

Kuehl, Fred H. Controllable pitch propeller assembly. 4,952,083, Cl. 416-157.00R.

Kuepfer, Hanspeter, to Siemens-Albis. Radar system with a digital expander. 4,952,940, Cl. 342-174.000.

Kufner, Franz-Josef: See—  
Orsos, Kalman; Dietrich, Gerhard; Berndt, Alfons; and Kufner, Franz-Josef, 4,952,773, Cl. 219-124.340.

Kugimiya, Shuzo: See—  
Suzuki, Hitoshi; Shiotani, Shinobu; Tokunaga, Shinji; Hirai, Tokuyuki; Fukumochi, Yoji; Kugimiya, Shuzo; and Sata, Ichiko, 4,953,088, Cl. 364-419.000.

Kuijk, Karel E.: See—  
Martens, Jan W. D.; and Kuijk, Karel E., 4,952,984, Cl. 357-15.000.

Kukolek, Dennis G.; and Eloff, Peter C., to General Electric Company. Thermal emissive coating for x-ray targets. 4,953,190, Cl. 378-129.000.

Kulchin & Associates: See—  
Kulchin, Steven A., 4,952,097, Cl. 405-262.000.

Kulchin, Steven A., to Kulchin & Associates. Permanent concrete wall construction and method. 4,952,097, Cl. 405-262.000.

Kulka, Robert A.; Van Wagener, Raymond H.; and Freimuth, Lothar, to Magnetek Universal Manufacturing Corporation. Shunt holding means for ballasts. 4,952,899, Cl. 336-160.000.

Kulkaski, Richard: See—  
Szapucki, Mathew; and Kulkaski, Richard, 4,951,869, Cl. 232-15.000.

Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, to Canon Kabushiki Kaisha; and Nippon Oil & Fats Co., Ltd. Ceramic and circuit substrate and electronic circuit substrate by use thereof. 4,952,538, Cl. 501-136.000.

Kumano, Yosio: See—  
Tsukamoto, Koziro; Tatsuno, Yuzo; Kubo, Masaki; and Kumano, Yosio, 4,951,568, Cl. 101-415.100.

Kumaoka, Shunichi: See—  
Sawa, Shinnosuke; Kumaoka, Shunichi; and Ohno, Teruo, 4,952,935, Cl. 342-4.000.

Kumasaka, Takao; Simazaki, Yuzuru; and Tanno, Kiyohiko, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Electrophotographic recording apparatus. 4,952,951, Cl. 346-160.000.

Kume, Nobuyuki: See—  
Ueda, Shigenori; Yamazaki, Koji; Ehara, Toshiyuki; Kume, Nobuyuki; and Nakazawa, Nobuo, 4,952,978, Cl. 355-245.000.

Kummann, Paul, to Linde Aktiengesellschaft. Process and apparatus for the separation of hydrocarbons. 4,952,305, Cl. 208-340.000.

Kumura, Tatsuo; Sato, Heikichi; Kunito, Yoshiyuki; Ikeda, Yoshito; Izu, Etsuo; and Hayakawa, Masatoshi, to Sony Corporation. Magnetic head with Ru containing soft magnetic alloy in gap. 4,953,050, Cl. 360-126.000.

Kunichika, Kenji: See—  
Ohba, Hisao; and Kunichika, Kenji, 4,952,958, Cl. 354-322.000.

Kunihiro, Yukitoshi: See—  
Arao, Yuzuru; Shibata, Morio; Yamaguchi, Shigeru; Nakamura, Hirofumi; Shibata, Tsuneo; and Kunihiro, Yukitoshi, 4,951,559, Cl. 99-348.000.

Kunito, Yoshiyuki: See—  
Kumura, Tatsuo; Sato, Heikichi; Kunito, Yoshiyuki; Ikeda, Yoshito; Izu, Etsuo; and Hayakawa, Masatoshi, 4,953,050, Cl. 360-126.000.

Kunz, Peter, to Georg Fischer Aktiengesellschaft. Multiway cock. 4,951,711, Cl. 137-625.470.

Kupczyk, Andreas: See—  
Kipfelsberger, Christian; and Kupczyk, Andreas, 4,952,438, Cl. 428-68.000.

Winterhoff, Hans; Kipfelsberger, Christian; and Kupczyk, Andreas, 4,952,437, Cl. 428-68.000.

Kupka, Hans J.: See—  
Weigand, Peter; Langen, Harald; Kupka, Hans J.; Rossel, Gerhard; Weigand, Walter; Wittenbeck, Rudiger; and Hessler, Karl-Heinz, 4,952,108, Cl. 414-172.000.

Kuraray Co., Ltd.: See—  
Hosoda, Hiroyasu, 4,952,613, Cl. 523-109.000.

Kuroda, Hobuyuki: See—  
Shikatani, Yutaka; Kuroda, Hobuyuki; Kataoka, Naoki; Shimo, Yoshiyuki; Matsuura, Kazuo; Kawamata, Etsuo; and Kobayashi, Hiroshi, 4,952,667, Cl. 528-230.000.

Kurono, Hidehiro; Ikeda, Yoshihiro; Nakayama, Katsumi; and Sakaki, Seiichi, to Honda Giken Kogyo Kabushiki Kaisha. Grinding fluid feeder apparatus. 4,951,426, Cl. 51-267.000.

Kurono, Masayasu: See—  
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromoto; Mitani, Takahiko; Nakano, Kazumasa; and Ninomiya, Naohisa, 4,952,568, Cl. 514-103.000.

Kurose, Morisumi, to Ricoh Company, Ltd. Document image processing system. 4,953,230, Cl. 382-46.000.

Kurt, Gottfried, to Asea Brown Boveri Ltd. Horizontal-axis oil-lubricated cylindrical roller-bearing arrangement. 4,952,077, Cl. 384-462.000.

Kusche, David W.; Stiller, Gordon L.; and Habeck, Steven W., to Brunswick Corporation. Evaporable foam pattern for casting an engine block of a two-cycle engine. 4,951,733, Cl. 164-246.000.

Kushida, Takeo: See—  
Kanemasa, Yasumasa; and Kushida, Takeo, 4,951,916, Cl. 251-129.100.

Kusuda, Hidefumi: See—  
Seio, Mamoru; Kusuda, Hidefumi; and Kawabata, Masami, 4,952,481, Cl. 430-284.000.

Kuwata, Koji: See—  
Ishikawa, Yasunori; Murayama, Noboru; Suzuki, Koichi; Kuwata, Koji; Shimura, Hiroshi; and Ishikawa, Masaaki, 4,953,196, Cl. 379-53.000.

Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Ito, Naoki, to Yazaki Corporation. Electrical connector. 4,952,155, Cl. 439-49.000.

Kwan, Tak M.: See—  
Tong, Hing Y.; Kwan, Tak M.; and Lunn, Gerald K., 4,953,027, Cl. 358-188.000.

Kwiatkowski, Kurt v.; Gorissen, Erich; and Unger, Udo, to Vits Maschinenbau GmbH. Apparatus for the heat treatment and/or drying of a web of material passing continuously through. 4,952,145, Cl. 432-59.000.

Kyorin Pharmaceutical Co., Ltd.: See—  
Matsukubo, Hiroshi; Matsumoto, Toyomi; Miyashita, Mitsutomo; Okamura, Kyuya; Taga, Fukutaro; Sekiguchi, Haruo; and Hamada, Katsuhiko, 4,952,591, Cl. 514-321.000.

Kyoshima, Masayuki, to Canon Kabushiki Kaisha. Ink discharge recovery device having at least one suction-applying conduit located at a particular position in a capping member and an ink jet recording apparatus incorporating the device. 4,952,947, Cl. 346-140.00R.

Kyowa Hakko Kogyo Kabushiki Kaisha: See—  
Yasuzawa, Toru; Sano, Hiroshi; Nakano, Hirofumi; Ichikawa, Shunji; and Shuto, Katsuichi, 4,952,576, Cl. 514-172.000.

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 Mita, Kiroyuki; and Kobayashi, Kozo, to Sony Corporation. Energy-dispersal signal rejection circuit and method, 4,953,179, Cl. 375-1.000.  
 Mitani, Masao: See—  
 Okino, Hironobu; Fujiwara, Akio; Akiba, Yutaka; Kasukabe, Susumu; Fujita, Tsuyoshi; Mitani, Masao; and Hirota, Kazuo, 4,952,272, Cl. 156-630.000.  
 Mitani, Takahiko: See—  
 Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromoto; Mitani, Takahiko; Nakano, Kazumasa; and Ninomiya, Naohisa, 4,952,568, Cl. 514-103.000.  
 Mitchell, Robert C.: See—  
 Brown, Thomas H.; Mitchell, Robert C.; Smith, Ian R.; and Young, Rodney C., 4,952,589, Cl. 514-310.000.  
 Mitshi Kensetsu Kabushiki Kaisha: See—  
 Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,951,441, Cl. 52-741.000.  
 Mitsubishi Denki K.K.: See—  
 Tamura, Yoh, 4,952,923, Cl. 340-731.000.  
 Mitsubishi Denki Kabushiki Kaisha: See—  
 Asakura, Mikio; Fujishima, Kazuyasu; and Matsuda, Yoshio, 4,953,164, Cl. 371-40.100.  
 Ezumi, Koji; Miyazaki, Masaaki; Washino, Shoichi; and Kako, Hajime, 4,951,647, Cl. 123-494.000.  
 Isozumi, Shuzoo; and Konishi, Keiichi, 4,952,831, Cl. 310-71.000.  
 Iwata, Toshio, 4,951,630, Cl. 123-435.000.  
 Iwata, Toshio; and Fukui, Wataru, 4,951,639, Cl. 123-613.000.  
 Kawai, Hiroyuki; and Yoshimoto, Masahiko, 4,953,128, Cl. 365-194.000.  
 Kobayashi, Kazuo; Terada, Yasushi; and Nakayama, Takeshi, 4,953,129, Cl. 365-203.000.  
 Matsuoka, Atsuko; and Fukui, Wataru, 4,951,628, Cl. 123-414.000.  
 Mohri, Naotake; and Saito, Nagao, 4,952,768, Cl. 219-69.150.  
 Morimoto, Hiroaki; Onoda, Hiroshi; and Nishioka, Tadashi, 4,952,421, Cl. 427-43.100.  
 Morishita, Akira; and Isozumi, Shuzoo, 4,951,515, Cl. 74-7.00E.  
 Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.  
 Okuda, Hiroshi, 4,951,625, Cl. 123-198.00C.

Okumura, Yoshinori; Ohsaki, Akihiko; Sugahara, Kazuyuki; and Ikeda, Tatsuhiko, 4,953,125, Cl. 365-149.000.  
 Shirakawa, Hiroyuki, 4,952,830, Cl. 310-68.00B.  
 Sugiyama, Takeshi, 4,952,171, Cl. 439-522.000.  
 Takaishi, Tadao; and Umecaki, Tomokazu, 4,951,641, Cl. 123-647.000.  
 Takata, Hidehiro; Komori, Shinji; Tamura, Toshiyuki; Yamasaki, Tetsuo; and Shima, Kenji, 4,953,083, Cl. 364-200.000.  
 Uemoto, Kazuhiko; and Tanaka, Toshiaki, 4,952,767, Cl. 219-69.110.  
 Yamada, Akira; Umeki, Tsunenori; and Aikawa, Masatoshi, 4,952,522, Cl. 437-34.000.  
 Mitsubishi Gas Chemical Company, Inc.: See—  
 Masumoto, Mitsuhiro; and Kanayama, Satoshi, 4,952,664, Cl. 528-199.000.  
 Mitsubishi Gas Chemical Company, Ltd.: See—  
 Ebata, Shuji; and Higuchi, Yasushi, 4,952,665, Cl. 528-219.000.  
 Mitsubishi Jidosha Kogyo Kabushiki Kaisha: See—  
 Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.  
 Mitsubishi Jukogyo Kabushiki Kaisha: See—  
 Imanari, Makoto; Koshikawa, Takeo; Yamauchi, Akihiro; Hanada, Masayuki; Fukuda, Morio; and Nagano, Kiyoshi, 4,952,545, Cl. 502-73.000.  
 Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.  
 Mitsubishi Kasei Corporation: See—  
 Yanaga, Yukio; Hayashi, Asazi; Kamata, Shizue; and Imanara, Toru, 4,952,319, Cl. 210-640.000.  
 Mitsubishi Paper Mills, Ltd.: See—  
 Tsukamoto, Kozio; Tatsuno, Yuzo; Kubo, Masaki; and Kumano, Yosio, 4,951,568, Cl. 101-415.100.  
 Mitsubishi Petrochemical Co., Ltd.: See—  
 Imanari, Makoto; Koshikawa, Takeo; Yamauchi, Akihiro; Hanada, Masayuki; Fukuda, Morio; and Nagano, Kiyoshi, 4,952,545, Cl. 502-73.000.  
 Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.  
 Mitsubishi Petrochemical Engineering Co., Ltd.: See—  
 Imanari, Makoto; Koshikawa, Takeo; Yamauchi, Akihiro; Hanada, Masayuki; Fukuda, Morio; and Nagano, Kiyoshi, 4,952,545, Cl. 502-73.000.  
 Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.  
 Mitsubishi Plastics Industries Limited: See—  
 Hasegawa, Hideo; Takahashi, Toshio; and Miyagawa, Masayuki, 4,952,133, Cl. 425-503.000.  
 Mitsuboshi Belting Ltd.: See—  
 Nosaka, Sokichi; Hamura, Takeshi; and Nagai, Takaji, 4,952,261, Cl. 156-138.000.  
 Mitsui Petrochemical Industries, Ltd.: See—  
 Kawarabayashi, Waichiro; Matsubara, Koichi; Yoshioka, Toshihiro; Yamagata, Hikaru; Takahashi, Shigeru; Hirata, Yukimasa; and Shirane, Yoshiko, 4,951,415, Cl. 47-60.000.  
 Kioka, Mamoru; and Kashiwa, Norio, 4,952,540, Cl. 502-9.000.  
 Kioka, Mamoru; and Kashiwa, Norio, 4,952,649, Cl. 526-125.000.  
 Mitsui Toatsu Chemicals, Inc.: See—  
 Nagata, Teruyuki; Tamaki, Akihiro; Kajimoto, Nobuyuki; and Wada, Masaru, 4,952,731, Cl. 564-402.000.  
 Ozaki, Shoichi; Watanabe, Yutaka; Awaya, Akira; and Ishizuka, Yusaku, 4,952,717, Cl. 558-155.000.  
 Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 4,952,648, Cl. 525-539.000.  
 Mitsuoka, Shigeaki: See—  
 Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.  
 Mitsuya Tekko Co., Ltd.: See—  
 Itoh, Tomio, 4,952,202, Cl. 493-299.000.  
 Mitzel, Wilhelm; Leuthold, Karl-Heinz; and Geier, Josef, to GAO Gesellschaft für Automation und Organisation mbH. Apparatus and a method for separating sheet material, 4,951,933, Cl. 271-146.000.  
 Miura, Kazuo: See—  
 Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, 4,951,471, Cl. 62-51.200.  
 Miwa, Tsutomu. Suspended type air-dam skirt, 4,951,994, Cl. 296-180.100.  
 Miyagawa, Masashi; Takenouchi, Masanori; and Ohkuma, Norio, to Canon Kabushiki Kaisha. Transfer recording medium comprising a

layer changing its transferability when provided with light and heat, 4,952,478, Cl. 430-138.000.  
 Miyagawa, Masayuki: See—  
 Hasegawa, Hideo; Takahashi, Toshio; and Miyagawa, Masayuki, 4,952,133, Cl. 425-503.000.  
 Miyahara, Junji; and Kitada, Akira, to Fuji Photo Film Co., Ltd. Radiographic intensifying screen and process for the preparation of the same, 4,952,813, Cl. 250-483.100.  
 Miyai, Kenji: See—  
 Sakane, Kazuo; Kawabata, Kohji; Miyai, Kenji; and Inamoto, Yoshiko, 4,952,578, Cl. 514-202.000.  
 Miyaji, Takashi: See—  
 Kawano, Tadaaki; Murakami, Susumu; Ito, Fukusaburo; Hagihara, Hideaki; Miyaji, Takashi; and Nishijima, Masaru, 4,952,989, Cl. 355-210.000.  
 Miyamoto, Tsuyoshi: See—  
 Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohma, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.  
 Miyamoto, Yukihiko; Kobayashi, Hirokazu; and Suzuki, Syoichi, to Kabushiki Kaisha Kenwood. TDM transmission system, 4,953,163, Cl. 370-100.100.  
 Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., to G. D. Searle & Co. Substituted dihydrobenzopyrans, 4,952,705, Cl. 548-525.000.  
 Miyashita, Ikuro: See—  
 Bando, Akira; Nagura, Osamu; Saito, Keiji; Miyashita, Ikuro; Nagai, Hashime; Nakagawa, Hiroto; and Oono, Yasuteru, 4,952,852, Cl. 318-140.000.  
 Miyashita, Mitsutomo: See—  
 Matsukubo, Hiroshi; Matsumoto, Toyomi; Miyashita, Mitsutomo; Okamura, Kyuya; Taga, Fukutaro; Sekiguchi, Haruo; and Hamada, Katsuhiko, 4,952,591, Cl. 514-321.000.  
 Miyatake, Norio: See—  
 Kawabata, Hidetsugu; Kudoh, Yoshihiko; Murakami, Motoyoshi; Miyatake, Norio; and Yamamoto, Masakazu, 4,952,295, Cl. 204-192.150.  
 Miyauchi, Osamu: See—  
 Nemoto, Ichiro; Otoro, Takahito; and Miyauchi, Osamu, 4,952,957, Cl. 354-245.000.  
 Miyazaki, Harutoshi: See—  
 Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, 4,951,758, Cl. 175-40.000.  
 Miyazaki, Masaaki: See—  
 Ezumi, Koji; Miyazaki, Masaaki; Washino, Shoichi; and Kako, Hajime, 4,951,647, Cl. 123-494.000.  
 Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.  
 Miyazaki, Tetsuro: See—  
 Kobayashi, Reichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, 4,953,026, Cl. 358-167.000.  
 Miyazaki, Toshihiko: See—  
 Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Miyazaki, Toshihiko; Nishimura, Yukuo; and Nakagiri, Takashi, 4,952,027, Cl. 350-174.000.  
 Miyoshi, Takahito; Matsufuji, Akihiro; and Yamamoto, Nobuyuki, to Fuji Photo Film Co., Ltd. Magnetic recording medium, 4,952,458, Cl. 428-323.000.  
 Mizoguchi, Kenji: See—  
 Amao, Kenji; Ohyama, Kazuyoshi; Mizoguchi, Kenji; Akaishi, Tsuneshi; and Takeuchi, Takayoshi, 4,951,383, Cl. 29-721.000.  
 Mizoguchi, Tadaaki: See—  
 Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; Teshima, Nobue; Nakajima, Fumito; Mizoguchi, Tadaaki; and Nitta, Masahiro, 4,952,548, Cl. 502-217.000.  
 Mizuno, Chiaki: See—  
 Ono, Toshio; Mizuno, Chiaki; Tamai, Yasuo; and Ogawa, Hiroshi, 4,952,064, Cl. 366-76.000.  
 Mizuno, Sakuyuki, to Kabushiki Kaisha Toshiba. Method and apparatus for video signal transmission using modulation, 4,952,952, Cl. 358-148.000.  
 Mizutani, Yukimi: See—  
 Hirata, Keiichi; Ban, Tomohiro; Kawasumi, Atsuko; Nakagawa, Kazuko; Mizutani, Yukimi; and Tsuruki, Atoru, 4,953,105, Cl. 364-519.000.  
 Mizutome, Atsushi: See—  
 Inoue, Hiroshi; Mihara, Tadashi; Mizutome, Atsushi; Taniguchi, Osamu; and Onitsuka, Yoshihiro, 4,952,032, Cl. 350-350.00S.  
 Mobil Oil Corp.: See—  
 Alexander, Richard A.; Knight, Charles E.; and Whitehurst, Darrell D., 4,952,747, Cl. 585-803.000.  
 Alexander, Richard A.; and Knight, Charles E., 4,952,748, Cl. 585-803.000.  
 Alexander, Richard A.; Knight, Charles E.; and Whitehurst, Darrell D., 4,952,749, Cl. 585-803.000.  
 Bortz, Robert W.; and Graziani, Kenneth R., 4,952,303, Cl. 208-216.00R.  
 Dablain, Mark A., 4,953,140, Cl. 367-73.000.  
 Harandi, Mohsen N.; and Owen, Hartley, 4,951,613, Cl. 122-4.00D.  
 Huang, Yun-Yang; LaPierre, Rene B.; and McHale, William D., 4,952,543, Cl. 502-35.000.  
 Jennings, Alfred R., Jr., 4,951,751, Cl. 166-285.000.

Laster, Stanley J.; Meek, Robert A.; and Shirley, Thomas E., 4,953,139, Cl. 367-73.000.  
 Leach, Lyle A., 4,952,302, Cl. 208-85.000.  
 Medlin, William L., 4,953,137, Cl. 367-31.000.  
 Mockel-Weber, Julia: See—  
 Mulhaupt, Rolf; and Mockel-Weber, Julia, 4,952,645, Cl. 525-438.000.  
 Modak, Shanta M.: See—  
 Fox, Charles L., Jr.; and Modak, Shanta M., 4,952,411, Cl. 424-618.000.  
 Mode, Duane R., to Waldorf Corporation. Pre-glued tapered tray with gussets and flanges, 4,951,868, Cl. 229-112.000.  
 Modern Controls, Inc.: See—  
 Mayer, William N.; Oestreich, Roger; and Mayer, Daniel W., 4,952,882, Cl. 324-670.000.  
 Moffatt, Barbara A.: See—  
 Studier, F. William; Davanloo, Paricheh; Rosenberg, Alan H.; Moffatt, Barbara A.; and Dunn, John J., 4,952,496, Cl. 435-91.000.  
 Mohler, Werner: See—  
 Leuchs, Hans-Jürgen; Mohler, Werner; and Erle, Hanns-Eberhard, 4,952,730, Cl. 564-302.000.  
 Mohri, Naotake; and Saito, Nagao, to Mitsubishi Denki Kabushiki Kaisha; and Mohri, Naotake. Electric discharge machining electrode, 4,952,768, Cl. 219-69.150.  
 Moire, Claudine: See—  
 Lang, Gerard; Forester, Serge; LaGrange, Alain; Moire, Claudine; and DeFlandre, Andre, 4,952,391, Cl. 424-45.000.  
 Moise, Norton L.: See—  
 Griffin, Arthur F.; and Moise, Norton L., 4,952,922, Cl. 340-729.000.  
 Molge, Klaus: See—  
 Sauerbier, Dieter; Molge, Klaus; Weigert, Werner; and Issac, Otto, 4,952,575, Cl. 514-110.000.  
 Molina, Cynthia M.: See—  
 Brynes, Paul J.; Molina, Cynthia M.; Martinus, Janis A.; Vaughan, Kenward S.; and Smith, Catherine M., 4,952,336, Cl. 252-301.160.  
 Molino, Bruce F.: See—  
 Klein, Scott I.; Molino, Bruce F.; Czekaj, Mark; Gardner, Charles J.; and Pelletier, Jeffrey C., 4,952,562, Cl. 514-18.000.  
 Mondet, Jean J.: See—  
 Aubry, Jacques A.; and Mondet, Jean J., 4,952,120, Cl. 416-114.000.  
 Mong, William K.: See—  
 Scott, Daniel G.; Mong, William K.; Krampitz, Mark S.; Hill, Theodore B.; and Spalding, Willard P., 4,951,554, Cl. 92-103.00F.  
 Mons, Francis: See—  
 Kamata, Masahiro; Katayama, Shitomi; Mons, Francis; and Porter, Robert, 4,953,136, Cl. 367-25.000.  
 Monsanto Company: See—  
 Cartier, George E.; Kavanagh, Dean L.; and Moran, James R., 4,952,457, Cl. 428-425.600.  
 Fields, Donald L., Jr.; Grabiak, Raymond C.; and Riley, Dennis P., 4,952,723, Cl. 562-17.000.  
 Heckle, William A.; Mathews, Marion J., III; and Peoples, P. Robert, 4,952,541, Cl. 502-22.000.  
 Montedison S.p.A.: See—  
 Foa, Marco; Casagrande, Francesco; Coassolo, Alfredo; and Chapoy, L. Lawrence, 4,952,661, Cl. 528-125.000.  
 Montgomery, Jerold: See—  
 Pezzoli, Paul A.; Smith, Gary N.; and Montgomery, Jerold, 4,951,845, Cl. 215-250.000.  
 Moch Domsjo AB: See—  
 Gidlund, Claes-Göran; and Ostman, Håkan E., 4,952,276, Cl. 162-49.000.  
 Moody, Monty L. Sun visor with eyeshield and method therefor, 4,951,316, Cl. 2-10.000.  
 Moon, Seaton: See—  
 Kittle, Carl E.; Harken, Daniel J.; and Moon, Seaton, 4,951,775, Cl. 180-244.000.  
 Mooradian, Aram, to Massachusetts Institute of Technology. Microchip laser, 4,953,166, Cl. 372-21.000.  
 Moore, Arnold P.; and Linn, Nobel, Jr. Oil drain funnel, 4,951,721, Cl. 141-98.000.  
 Moore Business Forms, Inc.: See—  
 Whited, Freddie L., 4,951,971, Cl. 283-80.000.  
 Moore, Dan T., III; Collins, Edward A.; and Wheeler, Maurice E., to Soundwich Incorporated. Sound damping composition and method of using the composition, 4,952,610, Cl. 521-99.000.  
 Moore, Deborah. Suspension and power connector for illuminated house number signs, 4,953,067, Cl. 362-431.000.  
 Moore, Eugene R.; and Hay, Robert A., II, to Dow Chemical Company. The Method for the devolatilization of thermoplastic materials, 4,952,672, Cl. 528-481.000.  
 Moorman, Charles T.; Sabadies, Joseph L.; and Royal, T. Anthony, to Kraft General Foods, Inc. Apparatus for fluid-solid bed processing, 4,951,561, Cl. 99-471.000.  
 Moo-berg, Borje, to Abu Garcia Produktion AB. Dual-type gear unit for a multiplier reel, 4,951,899, Cl. 242-255.000.  
 Moradi-Araghi, Ahmad: See—  
 Stahl, G. Allan; Westerman, I. John; Hsieh, Henry L.; and Moradi-Araghi, Ahmad, 4,951,921, Cl. 252-8.551.  
 Moran, James R.: See—  
 Cartier, George E.; Kavanagh, Dean L.; and Moran, James R., 4,952,457, Cl. 428-425.600.  
 Moransais, Charles. Display rack, 4,951,827, Cl. 211-59.100.



Morell, Joseph: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,951,402, Cl. 36-50.000.  
Morey, Norman E. Sign attachment. 4,951,906, Cl. 248-201.000.  
Morgan Corporation: See—  
Mountz, Elton E.; and Whiteman, Paul L., 4,952,009, Cl. 296-181.000.  
Morgan, Kirk M.; and Wyszynski, Richard E. Eye patch with hydrocolloid adhesive. 4,951,658, Cl. 128-163.000.  
Morgan, Richard A.; and Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Modified polytetrafluoroethylene resins and blends thereof. 4,952,630, Cl. 525-72.000.  
Morgan, Richard A.; and Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Modified polytetrafluoroethylene resins and blends thereof. 4,952,636, Cl. 525-276.000.  
Morgan, William K. Adjustable basketball goal. 4,951,944, Cl. 273-1.50R.  
Mori, Kinji: See—  
Wachi, Isao; Mori, Kinji; Orimo, Masayuki; Suzuki, Yasuo; Kawano, Katsumi; Koizumi, Minoru; Nakai, Kozo; and Kasashima, Hirokazu, 4,953,096, Cl. 364-550.000.  
Mori, Mitsuyoshi, to Kabushiki Kaisha Daikin Seisakusho. Modulation valve device. 4,951,795, Cl. 192-87.180.  
Mori, Nobufumi, to Fuji Photo Film Co., Ltd. Noise erasing method for stimuable phosphor sheets. 4,952,806, Cl. 250-327.200.  
Mori, Seichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Detecting member for detecting the presence of an exchangeable unit in an image recording apparatus. 4,952,974, Cl. 355-200.000.  
Mori, Takashi: See—  
Ibe, Hiroyuki; and Mori, Takashi, 4,951,422, Cl. 51-165.710.  
Mori, Takeshi; Fujimori, Hiroyoshi; and Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Color enhancing circuit for enhancing saturation. 4,953,011, Cl. 358-37.000.  
Morimoto, Hiroaki; Onoda, Hiroshi; and Nishioka, Tadashi, to Mitsubishi Denki Kabushiki Kaisha. Method for repairing a pattern. 4,952,421, Cl. 427-43.100.  
Morimoto, Yasuhiro; Saito, Mitsuru; Yoshida, Tadahi; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Interchangeable film back or still video back still camera system. 4,953,029, Cl. 358-229.000.  
Morioka, Koji, to Taikisha Ltd. Gas cleaning apparatus containing a centrifugal type paint mist separator. 4,952,221, Cl. 55-240.000.  
Morishita, Akira; and Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Starter with planet gear speed reducer. 4,951,515, Cl. 74-7.00E.  
Morita, Kazuhiko: See—  
Kawamata, Toshio; and Morita, Kazuhiko, 4,952,444, Cl. 428-141.000.  
Morita, Tsuyoshi; Enomoto, Masaru; and Shimazu, Kyotaro, to Dainippon Ink and Chemicals, Inc. Process for producing high impact styrene resin by continuous bulk polymerization. 4,952,627, Cl. 525-52.000.  
Morriss, Robert B.; Cronnelly, Roy; and Miller, Ronald Dean, to University of California, The Regents of the. Edrophonium-atropine composition and therapeutic uses thereof. 4,952,586, Cl. 514-304.000.  
Mortara, David W., to Mortara Instrument. Electrocardiographic recording method and apparatus. 4,951,681, Cl. 128-710.000.  
Mortara Instrument: See—  
Mortara, David W., 4,951,681, Cl. 128-710.000.  
Mortensen, James D.; and Mortensen, Theresa L. Novelty undergarment. 4,951,321, Cl. 2-408.000.  
Mortensen, Theresa L.: See—  
Mortensen, James D.; and Mortensen, Theresa L., 4,951,321, Cl. 2-408.000.  
Mortimer Technology Holdings Limited: See—  
Dodson, Christopher E., 4,952,140, Cl. 34-10.000.  
Mortoly, Harriet E., executrix: See—  
Mortoly, John L., deceased; and Quick, Bradley S., 4,952,269, Cl. 156-350.000.  
Mortoly, John L., deceased (by Mortoly, Harriet E., executrix); and Quick, Bradley S., to James L. Taylor Mfg. Co. Automatic clamp adjuster. 4,952,269, Cl. 156-350.000.  
Moser, Bernhard: See—  
Peetz, Wolfgang; Moser, Bernhard; and Haussmann, August, 4,951,761, Cl. 175-398.000.  
Mosier, Donald E., to Rockwell International Corporation. Graphic dot flare apparatus. 4,952,921, Cl. 340-728.000.  
Moskovsky Geologorazvedochny Institut Imeni Sergo Ordjonikidze: See—  
Drobadenko, Valery P.; Lukonina, Olga A.; Koval, Vladimir P.; Sokolov, Vladimir I.; and Maltsev, Boris A., 4,952,099, Cl. 406-50.000.  
Motorola, Inc.: See—  
DeLuca, Michael J.; DeLuca, Joan S.; and McKee, John M., 4,952,927, Cl. 340-825.440.  
DeLuca, Michael J.; and Henry, Courtney S. G., 4,952,929, Cl. 340-825.440.  
Goode, Steven H., 4,953,185, Cl. 375-106.000.  
Herold, Barry W.; and Tahernia, Omid, 4,953,187, Cl. 377-48.000.  
Irwin, James S.; and Shepherd, Wayne P., 4,952,889, Cl. 332-128.000.  
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N. Schlumberger & Cie: See—  
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Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Touru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.  
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Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,952,538, Cl. 501-136.000.  
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Kosugi, Hiromitsu; Otani, Shinichi; Kashino, Teruo; Andoh, Masakazu; Arai, Takeo; and Nagashima, Toshiharu, 4,952,960, Cl. 354-299.000.  
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Sugiyama, Masafumi; and Nagatsuma, Yoshiko, 4,952,322, Cl. 210-679.000.  
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Nagura, Osamu: See—  
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Nakagawa, Tadashi, to Seikosha Co., Ltd. Camera system. 4,952,964, Cl. 354-402.000.  
Nakagawa, Yasuo: See—  
Ichinose, Toshiaki; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,953,224, Cl. 382-8.000.  
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Nakagawa, Yutaka; Matsumoto, Tetsuro; Souda, Yuji; and Hirai, Yosinori, to Asahi Glass Company, Ltd. Liquid crystal display device with a 50°-80° twist angle. 4,952,030, Cl. 350-337.000.  
Nakagiri, Takashi: See—  
Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Miyazaki, Toshihiko; Nishimura, Yukuo; and Nakagiri, Takashi, 4,952,027, Cl. 350-174.000.  
Nakahara, Toshiaki: See—  
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Nakahata, Hideaki: See—  
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Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; Teshima, Nobue; Nakajima, Fumito; Mizoguchi, Tadaaki; and Nitta, Masahiro, 4,952,548, Cl. 502-217.000.  
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Nakajima, Mutsuo: See—  
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Nakakura, Hirofumi: See—  
Arao, Yuzuru; Shibata, Morio; Yamaguchi, shigeru; Nakakura, Hirofumi; Shibata, Tsuneo; and Kunihiro, Yukitoshi, 4,951,559, Cl. 99-348.000.  
Nakamura, Hidetoshi: See—  
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Nakamura, Koichi: See—  
Aono, Toshiaki; and Nakamura, Koichi, 4,952,479, Cl. 430-203.000.  
Nakamura, Osamu: See—  
Shigemitsu, Mineo; Onda, Ryo; Minami, Toshi; and Nakamura, Osamu, 4,953,228, Cl. 382-22.000.  
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Nakanishi, Shinpei; Araki, Akihiko; and Hoshino, Yukio, to Japan Electronic Control Systems Company, Limited. Fuel injection control system for internal combustion engine with compensation of overshooting in monitoring of engine load. 4,951,635, Cl. 123-492.000.



Nakano, Hirofumi: See—  
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Nakano, Hitoshi: See—  
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Nakano, Kazumasa: See—  
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Nakao, Yoji: See—  
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Nakaoka, Junichi: See—  
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Nakata, Akira: See—  
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Nakatsuji, Tadao: See—  
Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Toru; Mitsuoka, Shigeki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Nakayama, Katsumi: See—  
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Nakayama, Takeshi: See—  
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Nakazawa, Nobuo: See—  
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Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.

Nakos, Steven T.: See—  
Jacobine, Anthony F.; and Nakos, Steven T., 4,952,711, Cl. 522-99.000.

Nalco Chemical Company: See—  
Fong, Dodd W., 4,952,642, Cl. 525-344.000.

Nance, Paul: See—  
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; Weber, Roland; and Nance, Paul, 4,952,827, Cl. 307-571.000.

Naples, John O.: See—  
Byers, Michael J.; Isacoff, Eric G.; and Naples, John O., 4,952,506, Cl. 435-240.250.

Napp Systems (USA), Inc.: See—  
Seio, Mamoru; Kusuda, Hideo; and Kawabata, Masami, 4,952,481, Cl. 430-284.000.

Nappi, John J., Sr.: See—  
Liberty Products, Inc. Self-cleaning entry carpet assembly, 4,951,345, Cl. 15-302.000.

Narita, Yasushi: See—  
Nissan Motor Co., Ltd. Hydraulic pressure control for reducing engagement shock of automatic transmission, 4,953,090, Cl. 364-424.100.

Nash, Randy D.: See—  
McGlynn, Paul E.; and Nash, Randy D., 4,953,210, Cl. 380-48.000.

National Cycle, Inc.: See—  
Willey, Barry A., 4,952,006, Cl. 296-91.000.

National-Oilwell: See—  
Johnson, Jerry E., 4,951,707, Cl. 137-516.290.

National Research Development Corporation: See—  
Kirk, Derrick L.; and Murray, Henry, 4,951,680, Cl. 128-698.000.

Klinner, Wilfred E., 4,951,453, Cl. 56-364.000.

National Semiconductor Corporation: See—  
Robinson, Murray J.; and Tsay, Ywan-Lung, 4,952,999, Cl. 357-68.000.

Nativi, Larry A.: See—  
Drain, Kieran F.; and Nativi, Larry A., 4,952,342, Cl. 264-22.000.

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Sugiyama, Eiji; Natsume, Mitsuaki; and Saito, Toshiharu, 4,952,997, Cl. 357-40.000.

Nau, Vance J.; and Grant, Keith H.: See—  
Spectra Physics, Inc. Control system for a sample preparation system, 4,953,075, Cl. 364-140.000.

Navistar International Transportation Corp.: See—  
Sanner, John A., 4,952,908, Cl. 340-429.000.

NCR Corporation: See—  
Elliott, Blaine K.; and Briggs, Duane A., 4,951,400, Cl. 34-15.000.

Lauffer, Donald K.; Sanwo, Ikuo J.; and Rostek, Paul M., 4,953,060, Cl. 361-388.000.

Wilson, Hillis L.; Yaichuk, Peter W.; Davenport, Michael B.; Stare, Jack W.; and Bossack, Thomas J., 4,951,564, Cl. 101-93.120.

Nebon, Jean-Pierre: See—  
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NEC Corporation: See—  
Hoshi, Katsuji, 4,952,826, Cl. 307-530.000.

Kanoh, Toshiyuki, 4,953,115, Cl. 364-715.010.

Kashimura, Masahiko, 4,953,133, Cl. 365-230.060.

Kayama, Chizuru, 4,952,991, Cl. 357-23.400.

Kobayashi, Yasuo, 4,953,134, Cl. 365-230.030.

Nagahashi, Yasuhiko; and Rai, Yasuhiko, 4,953,127, Cl. 365-189.050.

Nomura, Masahiro; and Maehashi, Yukio, 4,953,082, Cl. 364-200.000.

Tashiro, Yoshiharu, 4,952,028, Cl. 350-320.000.

Yoshida, Hiroshi, 4,952,825, Cl. 307-475.000.

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Kobayashi, Reiichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, 4,953,026, Cl. 358-167.000.

Negishi, Kozaburo: See—  
Sanden Corporation. Refrigerator with efficient cold accumulator, 4,951,481, Cl. 62-406.000.

Neil, Jeffrey T.: See—  
GTE Laboratories Incorporated. Hot isostatic pressing, 4,952,353, Cl. 264-65.000.

Nelson A. Taylor Co., Inc.: See—  
Duffy, Keith, 4,952,350, Cl. 264-45.700.

Nelson, Blaine J.: See—  
Rockwell International Corporation. Digital word output high-pass filter apparatus, 4,953,116, Cl. 364-724.010.

Nelson, Charles E.; and McClellan, Warren D.: See—  
Transformer secondary buss adapter apparatus, 4,952,898, Cl. 336-65.000.

Nelson, Keith W.; Lenz, James E.; and Kawai, Takeshi: See—  
Honeywell Inc. Semiconductor device housing with magnetic field protection, 4,953,002, Cl. 357-74.000.

Nelson, Peter H.; Gu, Chee-Liang L.; Allison, Anthony C.; Eugui, Elsie M.; and Lee, William A.: See—  
Syntex (U.S.A.) Inc. Method of treating diseases by administering morpholino-ethyl ester of mycophenolic acid or derivatives thereof, 4,952,579, Cl. 514-233.500.

Nelson, Robert A.: See—  
Fuller, Timothy J.; Smith, Thomas W.; Prest, William M., Jr.; Nelson, Robert A.; McGrane, Kathleen M.; and Ahuja, Suresh K., 4,952,477, Cl. 430-109.000.

Nelson, Shelby W.: See—  
Toe-in tool, 4,951,532, Cl. 81-44.000.

Nemirovsky, Mario: See—  
Porter, Robert S.; Goler, Vernon; Miller, Gary L.; Groves, Stanley E.; and Nemirovsky, Mario, 4,952,367, Cl. 364-200.000.

Nemoto, Ichiro: See—  
Otor, Takahito; and Miyachi, Osamu, to Seikosha Co., Ltd. Focal plane shutter-type camera, 4,952,957, Cl. 354-245.000.

Nerger, Klaus K.: See—  
Mannesmann Aktiengesellschaft. Apparatus for balancing of positional tolerances, 4,952,117, Cl. 414-732.000.

Neri, Carlo: See—  
Greco, Alberto; Busetto, Carlo; Cassar, Luigi; and Neri, Carlo, 4,952,619, Cl. 524-96.000.

Nerrinck, Bernard: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,951,402, Cl. 36-50.000.

Neste Oy: See—  
Knuutila, Pekka; Halme, Erkki; Lahtinen, Leila; and Koskimies, Salme, 4,952,546, Cl. 502-174.000.

Network Devices, Incorporated: See—  
Hansen, John G.; and Forth, Ronald I., 4,953,194, Cl. 379-25.000.

Neubert, Gerhard: See—  
Auchter, Gerhard; Schwerzel, Thomas; Blum, Rainer; Neubert, Gerhard; Wistuba, Eckehardt; and Osterloh, Rolf, 4,952,623, Cl. 524-517.000.

New England Deaconess Hospital Corporation: See—  
Babayan, Vigen K.; Blackburn, George L.; and Bistran, Bruce R., 4,952,606, Cl. 514-552.000.

New York University: See—  
Mathews, Rita W.; and Johnson, Alan J., 4,952,675, Cl. 530-383.000.

Newcon Company: See—  
Haglund, Raymond E.; and Carlsen, Norman H., Jr., 4,951,919, Cl. 251-328.000.

Newell, Terence J.: See—  
Telephone line access control, 4,953,202, Cl. 379-200.000.

Newman, Malcolm: See—  
Abraham, Carl J.; and Newman, Malcolm, 4,952,468, Cl. 429-175.000.

Newton, John J., Jr.: See—  
Harrell, Donald R.; and Newton, John J., Jr., 4,951,318, Cl. 2-49.00R.

Ng, John S.: See—  
Campbell, Arthur L.; Mueller, Richard A.; Ng, John S.; and Partis, Richard A., 4,952,724, Cl. 562-471.000.

Ng, Norman: See—  
Smart Kids, Inc. Illuminated coffee brewing apparatus, 4,951,556, Cl. 99-285.000.

NGK Insulators, Ltd.: See—  
Shibata, Kazuyoshi; and Nishizawa, Hitoshi, 4,952,903, Cl. 338-34.000.

Tsuno, Nobuo, 4,951,920, Cl. 251-368.000.

NGK Spark Plug Co., Ltd.: See—  
Matsumura, Shuzo; and Suzuki, Takahiro, 4,952,837, Cl. 313-135.000.

Niagara Mohawk Power Corporation: See—  
Fini, Anselmo, 4,951,503, Cl. 73-23.100.

Nicholson, James: See—  
Method of bonding orthodontic brackets, 4,952,142, Cl. 433-9.000.

Nickerson Machinery Co.: See—  
Lundquist, Lynn, 4,952,132, Cl. 425-197.000.

Nickolay, Helmut: See—  
Grau, Gerhard; Lattner, Manfred; and Nickolay, Helmut, 4,951,357, Cl. 19-0.250.

Nielsen, G. Skov: See—  
Hansen, Ove; Nielsen, G. Skov; and Wagstaff, Brian, 4,951,472, Cl. 62-63.000.

Niemeyer, Torsten: See—  
Bocker, Jurgen; Orth, Hans; Niemeyer, Torsten; and Tripptrap, Peter, 4,951,572, Cl. 102-476.000.

Niemeyer, Trenton A.: See—  
Filon Corporation. Mask and method of manufacture, 4,951,664, Cl. 128-206.240.

Nifco, Inc.: See—  
Kubogochi, Hisasi; and Sato, Youji, 4,952,106, Cl. 411-48.000.

Nihei, Masao: See—  
Ohi Seisakusho Co., Ltd. Seat slide device with walk-in mechanism and inertia locking type seatbelt retractor, 4,951,966, Cl. 280-807.000.

Nihon Seiki Company, Ltd.: See—  
Ohtsuka, Naotoshi, 4,951,519, Cl. 74-425.000.

Niizuma, Kiyozumi: See—  
Kameyama, Makoto; Niizuma, Kiyozumi; Nagasawa, Kenichi; Suzuki, Takashi; Yamana, Toshio; Orikasa, Tsuyoshi; Ito, Fujihiko; and Yoshida, Kazuyo, 4,953,048, Cl. 360-119.000.

Nikolaissen, Johnny: See—  
Norsk Hydro A.S. Method for purifying calcium nitrate melt/solution which is separated from the mixture obtained by the solution of rock phosphate with nitric acid, 4,952,379, Cl. 423-162.000.

Nikon Corporation: See—  
Hikima, Ikuo, 4,952,945, Cl. 346-108.000.

Nishi, Kenji, 4,952,815, Cl. 250-548.000.

Nishizawa, Jun-ichi: See—  
Tamamushi, Takashige; and Maeda, Hideo, 4,952,996, Cl. 357-30.000.

Nino, Naohi: See—  
Koito Manufacturing Co., Ltd. Vehicular headlamp, 4,953,063, Cl. 362-61.000.

Ninomiya, Naohisa: See—  
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromoto; Mitani, Takahiko; Nakano, Kazumasa; and Ninomiya, Naohisa, 4,952,568, Cl. 514-103.000.

Ninomiya, Takanori: See—  
Ichinose, Toshiaki; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,953,224, Cl. 382-8.000.

Nipon Mektron Ltd.: See—  
Kobayashi, Kazuo; Fukazawa, Masashi; and Ishikawa, Shinji, 4,952,735, Cl. 568-560.000.

Nippoldt, Reuben E.: See—  
Tektronix, Inc. Trackball mechanism, 4,952,919, Cl. 340-710.000.

Nippon A.B.S.: See—  
Arikawa, Teturo; and Maeda, Yasuhiro, 4,952,002, Cl. 303-116.000.

Nippon Air Brake Co., Ltd.: See—  
Tamamori, Hideo, 4,951,516, Cl. 74-110.000.

Nippon Cable System: See—  
Shiota, Makoto; Tomizawa, Yukio; and Ohoka, Yoshiaki, 4,951,523, Cl. 74-502.500.

Nippon Hoso Kyokai: See—  
Kobayashi, Reiichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, 4,953,026, Cl. 358-167.000.

Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tetsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tetsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Nippon Hypox Laboratories Incorporated: See—  
Sato, Toshio; and Matsumoto, Hitoshi, 4,952,564, Cl. 514-57.000.

Nippon Kayaku Kabushiki Kaisha: See—  
Bando, Ko; Senoo, Yoshimasa; Noji, Minoru; Ootsuki, Kazuo; Ekimoto, Hisao; and Irie, Yukio, 4,952,409, Cl. 424-450.000.

Nippon Oil Company, Limited: See—  
Shikatan, Yutaka; Kuroda, Hobuyuki; Kataoka, Naoki; Shimo, Yoshiyuki; Matsuura, Kazuo; Kawamata, Etsuo; and Kobayashi, Hiroshi, 4,952,667, Cl. 528-230.000.

Nippon Oil & Fats Co., Ltd.: See—  
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,952,538, Cl. 501-136.000.

Nippon Sheet Glass Co., Ltd.: See—  
Oikawa, Masahiro; Yamasaki, Tetsuya; Tanaka, Kouji; and Okuda, Eiji, 4,952,037, Cl. 350-413.000.

Nippon Telegraph and Telephone Corporation: See—  
Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Teruaki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93.000.

Nippon Zeon Co., Ltd.: See—  
Ishimaru, Yoshiharu; Yamato, Motoyuki; and Chono, Koji, 4,952,348, Cl. 264-40.600.

Maeda, Akio; and Ueshima, Kei, 4,952,633, Cl. 525-187.000.

Nippondenso Co., Ltd.: See—  
Sato, Hidenori; Umeno, Takashi; Nosaka, Michiyasu; and Koyama, Nobuhiko, 4,951,643, Cl. 123-520.000.

Nir, Zvi; and Rentsch, Wolfgang: See—  
Kil Industries Ltd. Aluminum profile coated with organic resin and non-leaving pigments, 4,952,452, Cl. 428-332.000.

Niro Atomizer, Inc.: See—  
Hansen, Ove; Nielsen, G. Skov; and Wagstaff, Brian, 4,951,472, Cl. 62-63.000.

Nishi, Kenji: See—  
Nikon Corporation. Focusing device for projection exposure apparatus, 4,952,815, Cl. 250-548.000.

Nishide, Seiji: See—  
Naito, Kazufumi; and Nishide, Seiji, 4,951,765, Cl. 177-211.000.

Nishiike, Ujihiro: See—  
Komatsubara, Michiro; Iida, Yoshiaki; and Matoba, Isao, to Kawasaki Steel Corporation. Grain-oriented silicon steel sheet having a low iron loss free from deterioration due to stress-relief annealing and a method of producing the same, 4,952,253, Cl. 148-113.000.

Nishijima, Masaru: See—  
Kawano, Tadaaki; Murakami, Susumu; Ito, Fukusaburo; Hagihara, Hideaki; Miyaji, Takashi; and Nishijima, Masaru, 4,952,989, Cl. 355-210.000.

Nishikawa, Toshihiro: See—  
Takada, Shunji, to Fuji Photo Film Co., Ltd. Photographic light-sensitive material and method of developing the same, 4,952,491, Cl. 430-570.000.

Nishikawa, Toshihiro: See—  
Takada, Shunji; Nishikawa, Toshihiro; Sakanoue, Kei; and Abe, Akira, 4,952,490, Cl. 430-567.000.

Nishimori, Kadotaro: See—  
Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, 4,952,983, Cl. 355-328.000.

Nishimura, Hideyuki: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohma, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.

Nishimura, Yukuo: See—  
Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Miyazaki, Toshihiro; Nishimura, Yukuo; and Nakagiri, Takashi, 4,952,027, Cl. 350-174.000.

Yuasa, Satoshi: See—  
Nishimura, Yukuo; Haruta, Masahiro; Yoshinaga, Yoko; and Munakata, Hirohide, 4,952,035, Cl. 350-354.000.

Nishinaga, Hiroshi: See—  
Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Teruaki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93.000.

Nishino, Kenichi: See—  
Shibata, Takashi; Aoki, Sanji; Mishima, Yasuhiro; Iwai, Hisayuki; and Hatta, Ken, to Toyota Jidosha Kabushiki Kaisha, and Takeda Chemical Industries, Ltd. Unsaturated polyester compositions and molded products therefrom, 4,952,652, Cl. 523-522.000.

Nishino, Satoru: See—  
Okazaki, Iwao; Abe, Koichi; Nakajima, Shoji; Ito, Kiyohiko; Nishino, Satoru; and Minamizawa, Hidehiko, 4,952,449, Cl. 428-147.000.

Nishio, Tatsuji: See—  
Tire puncture mending tool, 4,951,531, Cl. 81-15.700.

Nishio, Tomoyuki: See—  
Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, 4,951,507, Cl. 73-497.000.

Nishioka, Tadashi: See—  
Morimoto, Hiroaki; Onoda, Hiroshi; and Nishioka, Tadashi, 4,952,421, Cl. 427-43.100.

Nishitani, Kunihiko: See—  
Tsuboi, Noboru; Kubo, Kazuo; and Nishitani, Kunihiko, 4,951,638, Cl. 123-559.100.

Nishiyama, Masaki: See—  
Canon Kabushiki Kaisha. Data processing apparatus having repeat function suppression for continuously depressed data entry keys, 4,953,120, Cl. 364-900.000.

Nishiyama, Ryoji: See—  
Nishizawa, Hiroyuki; Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.

Nishizawa, Hiroyuki: See—  
Kashiwabara, Kimito; Nako, Osamu; Ishii, Mitsuaki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, and Mitsubishi Denki Kabushiki Kaisha. Fuel injection device for an internal combustion engine, 4,951,634, Cl. 123-492.000.

Nishizawa, Hitoshi: See—  
Shibata, Kazuyoshi; and Nishizawa, Hitoshi, 4,952,903, Cl. 338-34.000.

Nishizawa, Jun-ichi: See—  
Tamamushi, Takashige; and Maeda, Hideo, to Zaidan Hojin Handotai Kenkyu Shinkokai, and Nikon Corporation. Static induction and punching-through photosensitive transistor devices, 4,952,996, Cl. 357-30.000.

Niskanen, Don L.: See—  
Teleflex Incorporated. Remote control assembly including rotating slide snap, 4,951,524, Cl. 74-502.400.

Nissan Chemical Industries Ltd.: See—  
Ikeda, Hisao; Suzuki, Fumio; Watanabe, Yoshitane; Matsumura, Mitsunobu; Takahashi, Yasuhiro; Murakami, Hiroshi; and Maeda, Koichi, 4,952,279, Cl. 162-175.000.

Nissan Motor Co., Ltd.: See—  
Aruga, Tatsuo; and Iwasa, Yoshio, 4,951,616, Cl. 123-195.00A.

Etoh, Yoshiyuki, 4,953,093, Cl. 364-426.040.

Ishikawa, Masahiro: See—  
Fujiki, Norio; Hiramoto, Yukio; and Tanaka, Yoichi, 4,953,095, Cl. 364-484.000.

Jingu, Nobuhisa; and Iwasa, Yoshio, 4,951,623, Cl. 123-193.00H.

Kasai, Junichi; and Yagihashi, Wataru, 4,953,219, Cl. 381-86.000.

Narita, Yasushi, 4,953,090, Cl. 364-424.100.

Takahashi, Yoshio; Yanagisawa, Takashi; and Fujisawa, Eiichi, 4,951,622, Cl. 123-193.00H.

Ueki, Akihiro; and Sugano, Kazuhiko, 4,951,528, Cl. 74-868.000.

Uno, Takaaki; Yamahata, Hiroshi; and Chiba, Kazuo, 4,951,930, Cl. 267-293.000.

Yamamoto, Akihiko; Shibuya, Naoharu; Takahashi, Eiji; and Hagi, Fumio, 4,951,476, Cl. 62-163.000.

Nissso Corporation: See—  
Yamauchi, Toshio, 4,951,509, Cl. 73-730.000.

Nissui Kako Co., Ltd.: See—  
Yokoi, Hidetoshi; Niwa, Mikiya; Nomura, Yasuo; and Takahasi, Takeshi, 4,952,354, Cl. 264-69.000.

Nitkiewicz, Charles: See—  
Zenith Electronics Corporation. Holder for printed circuit board components, 4,953,061, Cl. 361-417.000.



Nitta, Masahiro: See—  
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; Teshima, Nobue; Nakajima, Fumito; Mizoguchi, Tadaaki; and Nitta, Masahiro, 4,952,548, Cl. 502-217.000.

Nittetsu Jitsugyo Co., Ltd.: See—  
Hamada, Takatoshi; and Huang, Wen-Ho, 4,951,757, Cl. 173-115.000.

Nitto Kohki Co., Ltd.: See—  
Fukuda, Kenji; and Kazama, Yasuo, 4,952,159, Cl. 409-138.000.

Kotake, Naoyuki, 4,951,710, Cl. 137-614.000.

Nitzberg, Leonard R.; and Manhradt, Paul D. Fuel dispensing nozzle having a flow rate limiter, 4,951,722, Cl. 141-206.000.

Niwa, Masatake: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Kakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,952,959, Cl. 354-289.120.

Niwa, Mikiya: See—  
Yokoi, Hidetoshi; Niwa, Mikiya; Nomura, Yasuo; and Takahashi, Takeshi, 4,952,354, Cl. 264-69.000.

Nix, Robert J.: See—  
Cheung, Nelson; and Nix, Robert J., 4,952,271, Cl. 156-502.000.

NKK Corporation: See—  
Matsumoto, Kazuaki; Suzuki, Shinichi; and Tagawa, Hisatoshi, 4,952,250, Cl. 148-12.00F.

Nobileau, Philippe C., to Vetco Gray Inc. Casing hanger packoff retrieving tool, 4,951,988, Cl. 294-86.150.

Noble, Roger K.: See—  
Schwartz, Robert E.; Noble, Roger K.; and Keller, Michael R., 4,952,137, Cl. 431-202.000.

Noel, Gert, to Noel, Marquet & Cie. S.A. Foam panel and block constructions, 4,952,450, Cl. 428-174.000.

Noel, Marquet & Cie. S.A.: See—  
Noel, Gert, 4,952,450, Cl. 428-174.000.

Noguchi, Minoru; Shishido, Hiroaki; and Koizumi, Mitsuyoshi, to Hitachi, Ltd. Method and apparatus for detecting abnormal patterns, 4,952,058, Cl. 356-237.000.

Noguchi, Satoshi: See—  
Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, 4,951,471, Cl. 62-51.200.

Noji, Minoru: See—  
Bando, Ko; Senoo, Yoshimasa; Noji, Minoru; Ootsuki, Kazuo; Ekimoto, Hisao; and Irie, Yukio, 4,952,409, Cl. 424-450.000.

Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, to Mitshi Kensetsu Kabushiki Kaisha. Damping device in a structure and damping construction and damping method using those devices, 4,951,441, Cl. 52-741.000.

Nojima, Shigeru: See—  
Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Tsuru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Nomura, Masahiro; and Machashi, Yukio, to NEC Corporation. Master processor providing tokens to dataflow processor for controlling instructions execution and data store operation, 4,953,082, Cl. 364-200.000.

Nomura, Sachio: See—  
Tomihashi, Nobuyuki; Yamana, Masayuki; Araki, Takayuki; and Nomura, Sachio, 4,952,653, Cl. 526-249.000.

Nomura, Yasuo: See—  
Yokoi, Hidetoshi; Niwa, Mikiya; Nomura, Yasuo; and Takahashi, Takeshi, 4,952,354, Cl. 264-69.000.

Nonaka, Yasuhiko: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Noonan, Jeffrey P.: See—  
Buchwald, Randall H.; Stormont, Robert S.; and Noonan, Jeffrey P., 4,951,672, Cl. 128-653.05C.

Stormont, Robert S.; Noonan, Jeffrey P.; and Pelc, Norbert J., 4,952,877, Cl. 324-312.000.

Noranda, Inc.: See—  
Perron, Donald; and Metka, Robert G., 4,951,511, Cl. 73-863.560.

Nordischer Maschinenbau Rud Baader GmbH & Co. KG: See—  
Callens, Hans; Meyer, Detlef; and Muuhs, Peter, 4,951,354, Cl. 17-46.000.

Norimatsu, Takashi: See—  
Takabayashi, Youjiro; and Norimatsu, Takashi, 4,951,546, Cl. 84-718.000.

Norita, Toshio: See—  
Ishida, Tokuji; Hamada, Masataka; Norita, Toshio; Ueyama, Masayuki; Kozakai, Katsumi; Ootsuka, Hiroshi; Kajita, Hideo; and Ishibashi, Kenji, 4,952,965, Cl. 354-403.000.

Norka, Joseph C.: See—  
Chaplin, Gregory D.; Rensel, John D.; and Norka, Joseph C., 4,951,892, Cl. 242-57.100.

Norlund, Tore, to Armerad Betong Vagcorbattringar AB. Method of bringing gases into contact with compostible material or partially composted material, and an arrangement for carrying out the method, 4,952,230, Cl. 71-9.000.

Normand, Gerard; and Persuy, Michel, to Acticiel S.A. Manual playing card dealing appliance for the production of programmed deals, 4,951,950, Cl. 273-149.00P.

Norris, Philip R.: See—  
Clark, Peter P.; Maloney, William T.; Norris, Philip R.; and Vetterling, William T., 4,952,946, Cl. 346-108.000.

Norsk Hydro A.S.: See—  
Nikolaisen, Johnny, 4,952,379, Cl. 423-162.000.

Norsolor: See—  
Heim, Philippe; and Riess, Gerard, 4,952,635, Cl. 525-243.000.

North American Philips Corporation: See—  
Erhardt, Robert A., 4,952,848, Cl. 315-307.000.

Fellows, Mark W.; Wong, John M.; and Toy, Edmond, 4,952,849, Cl. 315-307.000.

North, Stephen C.: See—  
Gansner, Emden R.; North, Stephen C.; and Vo, Kiem-Phong, 4,953,106, Cl. 364-521.000.

Northern Telecom Limited: See—  
Abraham, Thomas, 4,952,274, Cl. 156-643.000.

Kovats, Tibor F. I., 4,953,006, Cl. 357-80.000.

Norton Company: See—  
Szymanski, Thomas; Butcher, Kenneth R.; and Remus, Donald J., 4,952,389, Cl. 423-625.000.

Nosaka, Michiyasu: See—  
Sato, Hidenori; Umeno, Takashi; Nosaka, Michiyasu; and Koyama, Nobuhiko, 4,951,643, Cl. 123-520.000.

Nosaka, Sokichi; Hamura, Takeshi; and Nagai, Takaji, to Mitsuboshi Belting Ltd. Toothed belt manufacture including disposing stitched joint in mandrel groove, 4,952,261, Cl. 156-138.000.

Nose, Masateru: See—  
Wada, Toshiaki; Nose, Masateru; Nakaoka, Junichi; and Murata, Akio, 4,953,051, Cl. 360-126.000.

Nothnick, Carl E., to Westinghouse Electric Corp. High density surface acoustic waveguide channelizer, 4,952,833, Cl. 310-313.00D.

Nova International Corporation C.C.: See—  
Rohald, Stanley S.; and De Wet, Llewellyn, 4,951,484, Cl. 70-59.000.

Novak, Joel S.; and Parsons, Natan E., to Recurrent Solutions Limited Partnership. Sonic distance-measuring device, 4,953,141, Cl. 367-108.000.

NovAtel Communications Ltd.: See—  
Braathen, Russell; and Green, Ronald, 4,952,886, Cl. 330-279.000.

Novet, Hanspeter; and Ruppen, Bruno, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Endless storage and conveyor chain in an ammunition magazine, 4,951,547, Cl. 89-34.000.

Nozawa, Yasushi: See—  
Shibahara, Yoshihiko; Nozawa, Yasushi; and Mihayashi, Keiji, 4,952,485, Cl. 430-502.000.

Nozawa, Yasuto: See—  
Tokunaga, Masatoshi; Nozawa, Yasuto; and Iwasaki, Katsunori, 4,952,239, Cl. 148-302.000.

Nuclear Packaging, Inc.: See—  
Temus, Charles J.; Burnham, Ronald E.; and Allan, Gregory R., 4,952,339, Cl. 252-632.000.

Nunes, Anthony M. Composite hinge pin, 4,951,350, Cl. 16-263.000.

Nutt, Wendell G.: See—  
Friesen, Harold W.; Haber, Janice B.; and Nutt, Wendell G., 4,953,206, Cl. 379-417.000.

N.V. Bekaert S.A.: See—  
Dambre, Paul, 4,952,249, Cl. 148-11.50Q.

Ny, Tor: See—  
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NY Zoological Society: See—  
Hume, Ian D.; and Pahl, Lester I., 4,952,418, Cl. 426-636.000.

Oba, Masao: See—  
Takeuchi, Kunihiro; Oba, Masao; and Horinouchi, Shinichi, 4,953,123, Cl. 365-66.000.

Obara, Yuichi: See—  
Hikami, Toshiya; Yoshida, Koji; Obara, Yuichi; and Fuse, Kenichi, 4,952,162, Cl. 439-161.000.

Obayashi, Yoshiaki: See—  
Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Tsuru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Obenshain, James R., to Cedar Works, Inc., The. Stake supported mailbox post, 4,951,904, Cl. 248-156.000.

Ober, Howard R. Combination leaf and lawn debris comminuting vacuum and wood chipper, 4,951,882, Cl. 241-55.000.

Oberley, Larry W.: See—  
Sorenson, John R. J.; and Oberley, Larry W., 4,952,607, Cl. 514-589.000.

Occidental Chemical Corporation: See—  
Maul, James J.; and Tang, David Y., 4,952,719, Cl. 558-425.000.

Octanorm-Vertriebs-GmbH fur Bauelemente: See—  
Staeger, Johannes E. O., 4,951,440, Cl. 52-646.000.

Octopedia GmbH: See—  
Basedow, Hans; Korber, Hans; Koster, Reinhard; Kruse, Ruth; and Lorenz, Dieter, 4,951,766, Cl. 180-6.500.

Oda, Kazuo, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire and method of manufacturing same, 4,952,260, Cl. 156-130.000.

Odaka, Kentaro, to Sony Corporation. Digital signal recording apparatus, 4,953,168, Cl. 371-37.400.

Oertle, Konrad: See—  
Meyer, Willy; and Oertle, Konrad, 4,952,726, Cl. 562-870.000.

Oestreich, Roger: See—  
Mayer, William N.; Oestreich, Roger; and Mayer, Daniel W., 4,952,882, Cl. 324-670.000.

Ofting, Alfred: See—  
Fikentscher, Rolf; Ofting, Alfred; Bochnitschek, Werner; Braun, Gerold; Perner, Johannes; Kaluza, Ulrich; and Jaeger, Hans-Ulrich, 4,952,332, Cl. 252-95.000.

Ogami, Mitsui, to Sharp Kabushiki Kaisha. Medicine injector and method of using same, 4,952,124, Cl. 417-474.000.

Ogawa, Hirofumi: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Ogawa, Hiroshi: See—  
Ono, Toshio; Mizuno, Chiaki; Tamai, Yasuo; and Ogawa, Hiroshi, 4,952,064, Cl. 366-76.000.

Ogawa, Seiichi: See—  
Saitoh, Mitsumasa; Ogawa, Seiichi; Yamane, Miyuki; and Fukasawa, Hideki, 4,953,025, Cl. 358-140.000.

Ogawa, Tetsuro: See—  
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Ogawa, Tomoko: See—  
Tsuji, Katsuhisa; and Ogawa, Tomoko, 4,953,013, Cl. 358-75.000.

Ogino, Kouji: See—  
Aizu, Yoshihisa; Ogino, Kouji; and Sugita, Toshiaki, 4,952,050, Cl. 351-221.000.

Ogino, Masanori; Yamada, Takeo; and Ikeda, Miyuki, to Hitachi, Ltd. Horizontal deflection circuit, 4,952,850, Cl. 315-387.000.

Ogura, Kazuhiko: See—  
Hata, Tsugunori; Inoue, Akira; Teramoto, Toshihiko; Ogura, Kazuhiko; and Kubomoto, Isamu, 4,951,871, Cl. 237-12.100.

Ogura, Tadashi: See—  
Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, 4,951,471, Cl. 62-51.200.

Ogura, Takashi: See—  
Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, 4,953,049, Cl. 360-126.000.

Ohba, Hisao; and Kunichika, Kenji, to Fuji Photo Film Co., Ltd. Photo-sensitive printing plate automatic developing apparatus, 4,952,958, Cl. 354-322.000.

Ohi Seisakusho Co., Ltd.: See—  
Nihei, Masao, 4,951,966, Cl. 280-807.000.

Ohio Medical Instrument Co., Inc.: See—  
Comparetto, John E., 4,952,214, Cl. 606-87.000.

Ohkase, Wataru, to Tel Sagami Limited. Wafer support device, 4,952,115, Cl. 414-618.000.

Ohkawa, Yuzo, to Mazda Motor Corporation. Automatic transmission, 4,952,200, Cl. 475-47.000.

Ohki, Junichi; and Uyama, Shintaro, to Jidosha Kiki Co., Ltd. Brake booster with key member having an elastic member, 4,951,550, Cl. 91-369.300.

Ohki, Nobutaka: See—  
Tsukahara, Jiro; Ohki, Nobutaka; and Yamada, Makoto, 4,952,474, Cl. 430-138.000.

Ohkuma, Hiroaki; Konishi, Masataka; Matsumoto, Kiyoshi; Oki, Toshiyuki; and Hoshino, Yutaka, to Bristol-Myers Company. BU-3420T antifungal antibiotic, 4,952,572, Cl. 514-279.000.

Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, to Bristol Myers Company. Antitumor antibiotic BU-3285T compounds, 4,952,709, Cl. 549-292.000.

Ohkuma, Norio: See—  
Miyagawa, Masashi; Takenouchi, Masanori; and Ohkuma, Norio, 4,952,478, Cl. 430-138.000.

Ohmori, Yoshinori: See—  
Yoshino, Akira; Ohmori, Yoshinori; and Ohnishi, Toshiharu, 4,951,603, Cl. 118-719.000.

Ohmura, Hiroshi: See—  
Katsuma, Makoto; Kimura, Hiroyuki; Urushihara, Kazunori; Matsumura, Susumu; Ohmura, Hiroshi; Tami, Shunichi; and Tanaka, Hideki, 4,953,227, Cl. 382-18.000.

Ohnishi, Kazuyuki: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohma, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.

Ohnishi, Masanori; Kasahara, Toshiaki; Saga, Kouichi; and Li, Xin-he, to Diesel Kiki Co., Ltd. Unit fuel injector, 4,951,874, Cl. 239-88.000.

Ohnishi, Toshiharu: See—  
Yoshino, Akira; Ohmori, Yoshinori; and Ohnishi, Toshiharu, 4,951,603, Cl. 118-719.000.

Ohno, Hiroshi: See—  
Yakuwa, Masahiko; Kawanabe, Tomohiko; Igarashi, Hisashi; and Ohno, Hiroshi, 4,951,632, Cl. 123-479.000.

Ohno, Teruo: See—  
Sawa, Shinnosuke; Kumaoka, Shunichi; and Ohno, Teruo, 4,952,935, Cl. 342-4.000.

Ohoka, Yoshiaki: See—  
Shiota, Makoto; Tomizawa, Yukio; and Ohoka, Yoshiaki, 4,951,523, Cl. 74-502.500.

Ohsaki, Akihiko: See—  
Okumura, Yoshinori; Ohsaki, Akihiko; Sugahara, Kazuyuki; and Ikeda, Tatsuhiko, 4,953,125, Cl. 365-149.000.

Ohshima, Hajime: See—  
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Ohtani, Hideaki: See—  
Kigasawa, Kazuo; Ohtani, Hideaki; Tanada, Makoto; and Haya-shida, Shigeru, 4,952,560, Cl. 514-2.000.

Ohtsuka, Naotoshi, to Ohtsuka, Naotoshi; Horiya, Yoshio; and Nihon Seiki Company, Ltd. Rotation transmitter, 4,951,519, Cl. 74-425.000.

Ohya, Makoto: See—  
Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohya, Tetsuo; Ohya, Makoto; and Kozaki, Norio, 4,952,358, Cl. 264-134.000.

Ohya, Tetsuo: See—  
Amao, Kenji; Ohya, Tetsuo; Mizoguchi, Kenji; Akaishi, Tsuneshi; and Takeuchi, Takayoshi, 4,951,383, Cl. 29-721.000.

Ohya, Tetsuo: See—  
Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohya, Tetsuo; Ohya, Makoto; and Kozaki, Norio, 4,952,358, Cl. 264-134.000.

Oi, Hisaichi: See—  
Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, 4,951,758, Cl. 175-40.000.

Oikawa, Masahiro; Yamasaki, Tetsuya; Tanaka, Kouji; and Okuda, Eiji, to Nippon Sheet Glass Co., Ltd. Plate microlens and method for manufacturing the same, 4,952,037, Cl. 350-413.000.

Oikawa, Morio, to Ricoh Company, Ltd. Paper stacker for an image forming apparatus, 4,951,935, Cl. 271-208.000.

Okada, Hisashi: See—  
Inoue, Noriyuki; Yagihara, Morio; Okada, Hisashi; Matsushita, Tetunori; Nagaoka, Satoshi; and Kojima, Tetsuro, 4,952,483, Cl. 430-378.000.

Okada, Junji, to Olympus Optical Co., Ltd. Circuitry for driving ultrasonic motor, 4,952,834, Cl. 310-316.000.

Okamura, Kyuya: See—  
Matsukubo, Hiroshi; Matsumoto, Toyomi; Miyashita, Mitsutomo; Okamura, Kyuya; Taga, Fukutaro; Sekiguchi, Haruo; and Hamada, Katsuhiko, 4,952,591, Cl. 514-321.000.

Okano, Tokiyuki: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohma, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.

Okazaki, Iwao; Abe, Koichi; Nakajima, Shoji; Ito, Kiyohiko; Nishino, Satoru; and Minamizawa, Hidehito, to Toray Industries, Inc. Biaxially oriented polyester film, 4,952,449, Cl. 428-147.000.

Okazaki, Katsumi: See—  
Hashimoto, Noboru; Yuzuriha, Yasuhiro; Okazaki, Katsumi; and Fukube, Tsugio, 4,951,642, Cl. 123-657.000.

Okazaki, Masaki: See—  
Yamaguchi, Jun; Shinozaki, Fumiaki; Okazaki, Masaki; and Adachi, Keiichi, 4,952,480, Cl. 430-281.000.

Okazaki, Takao: See—  
Haneishi, Tatsu; Nakajima, Mitsuo; Torikata, Akio; Okazaki, Takao; Tohjiyamori, Manbu; and Kawakubo, Katsuhiko, 4,952,234, Cl. 71-92.000.

Okazaki, Yoji: See—  
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Oki Electric Industry Co., Ltd.: See—  
Kokubun, Hitoshi, 4,952,821, Cl. 307-350.000.

Suzuki, Masahiro, 4,953,103, Cl. 364-519.000.

Oki, Toshikazu: See—  
Ohkuma, Hiroaki; Konishi, Masataka; Matsumoto, Kiyoshi; Oki, Toshikazu; and Hoshino, Yutaka, 4,952,572, Cl. 514-279.000.

Okimoto, Kunio; Sato, Tomio; Yamakawa, Toshio; and Horiishi, Nanao, to Agency of Industrial Science and Technology. Composite magnetic compacts and their forming methods, 4,952,331, Cl. 252-62.540.

Okina, Toyohiko; Goto, Hiroshi; Kousaka, Fumio; Teranishi, Akinori; Kawabata, Satoshi; Ohya, Tetsuo; Ohya, Makoto; and Kozaki, Norio, to Inoue MTP Kabushiki Kaisha. Method of manufacturing an interior member for vehicles, 4,952,358, Cl. 264-134.000.

Okino, Hironobu; Fujiwara, Akio; Akiba, Yutaka; Kasukabe, Susumu; Fujita, Tsuyoshi; Mitani, Masao; and Hirota, Kazuo, to Hitachi, Ltd. Method of manufacturing probing head for testing equipment of semi-conductor large scale integrated circuits, 4,952,272, Cl. 156-630.000.

Okita, Tsutomu, to Fuji Photo Film Co., Ltd. Adhesive for a base-mounted flexible magnetic disc, 4,952,435, Cl. 428-64.000.

Okajima, Sumio: See—  
Yuhara, Yukitomo; and Okajima, Sumio, 4,951,692, Cl. 132-293.000.

Okay, Sevgin: See—  
Peterson, George P.; and Okay, Sevgin, 4,951,740, Cl. 165-32.000.

Okubo, Satomi, to Akebono Brake Industry Co., Ltd., and Akebono Research and Development Centre Ltd. Apparatus for controlling brake fluid pressure of motor vehicle, 4,952,003, Cl. 303-119.000.



Okubo, Yoshihide: See—  
Tezuka, Motohiko; Tabuchi, Junichi; Okubo, Yoshihide; and Kobayashi, Takeshi, 4,952,433, Cl. 428-42.000.

Okuda, Eiji: See—  
Okawa, Masahiro; Yamasaki, Tetsuya; Tanaka, Kouji; and Okuda, Eiji, 4,952,037, Cl. 350-413.000.

Okuda, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Internal combustion engine stop device. 4,951,625, Cl. 123-198.000.

Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, to Sanyo Electric Co., Ltd. Metal-in-gap head with heat resistant layers. 4,953,049, Cl. 360-126.000.

Okuda, Masaharu: See—  
Soshi, Fujio; Okuda, Masaharu; and Asami, Koichiro, 4,951,600, Cl. 118-696.000.

Okumura, Katsuya, to Kabushiki Kaisha Toshiba. Semiconductor device and manufacturing method thereof. 4,952,993, Cl. 357-23.900.

Okumura, Yoshinori; Ohsaki, Akihiko; Sugahara, Kazuyuki; and Ikeda, Tatsuhiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device having improved connecting structure of bit line and memory cell. 4,953,125, Cl. 365-149.000.

Okura Techno-Research Kabushiki Kaisha (Okura Techno-Research Company Ltd.): See—  
Atsushi, Ogura, 4,952,463, Cl. 428-552.000.

Okusa, Naoya; and Kanada, Taira, to Daiichi Pure Chemicals Co., Ltd. Immunoassay making use of latex agglutination. 4,952,520, Cl. 436-533.000.

Okuyama, Shinichi: See—  
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Olin Corporation: See—  
Cherukuri, Satyam C., 4,952,531, Cl. 501-69.000.

Lin, Lifun; Chao, Chung-Yao; and Polan, Ned W., 4,952,285, Cl. 204-27.000.

Oliver, Colin C., to EMI Limited. Data communication system. 4,952,905, Cl. 340-310.000.

Olm, Jaroslav J., to Textron, Inc. Single stage snowthrower. 4,951,403, Cl. 37-262.000.

Olsen, Charles A., to Hubbell Incorporated. Marine hull inlet for electrical cables. 4,952,160, Cl. 439-142.000.

Olsen Controls, Inc.: See—  
Olsen, Zenny; Sperbeck, Albert J.; Hamman, Eric; and D'Angelo, Gary, 4,951,549, Cl. 91-363.000.

Olsen, David B.: See—  
Cross, James; Henning, Jerry; Rhoades, James J.; Chubb, Arthur B.; and Olsen, David B., 4,951,540, Cl. 83-397.000.

Olsen, Leo T.: See—  
King, Patrick D.; Winter, Bruce; and Olsen, Leo T., 4,951,851, Cl. 222-591.000.

Olsen, Robert C.: See—  
Butkus, Robert A.; Olsen, Robert C.; and Sambrailo, William K., 4,951,823, Cl. 206-586.000.

Olsen, Roger A., to Minnesota Mining and Manufacturing Company. Hydrocolloid/adhesive composition. 4,952,618, Cl. 524-17.000.

Olsen, Zenny; Sperbeck, Albert J.; Hamman, Eric; and D'Angelo, Gary, to Olsen Controls, Inc. Digital servo valve system. 4,951,549, Cl. 91-363.000.

Olshansky, Robert; and Hill, Paul M., to GTE Laboratories, Incorporated. Wideband subcarrier multiplexed optical communication system operating over more than one octave. 4,953,156, Cl. 370-3.000.

Olson, Richard E.: See—  
Cuomo, John; Greenberg, Richard S.; and Olson, Richard E., 4,952,232, Cl. 71-92.000.

Olsson, Nils A.: See—  
Henry, Charles H.; Kazarinov, Rudolf F.; and Olsson, Nils A., 4,952,017, Cl. 350-96.150.

Olympus Optical Co., Ltd.: See—  
Igarashi, Tsutomu, 4,952,040, Cl. 350-432.000.

Kikuchi, Juro, 4,952,956, Cl. 354-224.000.

Mori, Takeshi; Fujimori, Hiroyoshi; and Nagasaki, Tatsuo, 4,953,011, Cl. 358-37.000.

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Omron Tateisi Electronics Co.: See—  
Yamamoto, Norihito; and Tanaka, Takahide, 4,953,111, Cl. 364-569.000.

Yotsuya, Teruhisa, 4,953,100, Cl. 364-559.000.

Onda, Ryoi: See—  
Shigemitsu, Mineo; Onda, Ryoi; Minami, Toshi; and Nakamura, Osamu, 4,953,228, Cl. 382-22.000.

Onitsuka, Yoshihiro: See—  
Inoue, Hiroshi; Mihara, Tadashi; Mizutome, Atsushi; Taniguchi, Osamu; and Onitsuka, Yoshihiro, 4,952,032, Cl. 350-350.005.

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Ono, Shoichi: See—  
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Ono, Toshiro; Mizuno, Chiaki; Tamai, Yasuo; and Ogawa, Hiroshi, to Fuji Photo Film Co., Ltd. Method for preparing magnetic coating compositions. 4,952,064, Cl. 366-76.000.

Onoda, Hiroshi: See—  
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Oono, Yasuteru: See—  
Bando, Akira; Nagura, Osamu; Saito, Keiji; Miyashita, Ikuro; Nagai, Hashime; Nakagawa, Hiroto; and Oono, Yasuteru, 4,952,852, Cl. 318-140.000.

Ootsuka, Hiroshi: See—  
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Ootsuki, Kazuo: See—  
Bando, Ko; Senoo, Yoshimasa; Noji, Minoru; Ootsuki, Kazuo; Ekimoto, Hisao; and Irie, Yukio, 4,952,409, Cl. 424-450.000.

Opsal, Jon; Rosencwaig, Allan; and Smith, Walter L., to Thermo-Wave, Inc. Method and apparatus for evaluating surface and subsurface features in a semiconductor. 4,952,063, Cl. 356-432.000.

Optical Coating Laboratory, Inc.: See—  
Temple, Michael D.; and Seddon, Richard I., 4,951,604, Cl. 118-723.000.

Opticorp, Inc.: See—  
Frieder, Philip M.; and Walach, Michael, 4,952,048, Cl. 351-177.000.

Optische Werke G. Rodenstock: See—  
Barth, Rudolf; and Pfeiffer, Herbert, 4,952,047, Cl. 351-169.000.

Dietrich, Anton; and Kreuz, Detlef, 4,951,349, Cl. 16-228.000.

Orcheski, Conrad J.: See—  
Shukla, Kailash C.; Hurley, James R.; Orcheski, Conrad J.; and Grimanis, Michael P., 4,951,648, Cl. 126-21.00A.

Orenid, Inc.: See—  
Zatopek, Edward J.; and Guglielmo, Alfred R., 4,951,911, Cl. 248-362.000.

Orikasa, Tsuyoshi: See—  
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Orimo, Masayuki: See—  
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Orita, Hideo; Shimizu, Masao; Hayakawa, Takashi; and Takehira, Katsumi, to Director-General of Agency of Industrial Science and Technology. Process for the preparation of 2,3-dimethoxy-5-methylbenzoquinone. 4,952,712, Cl. 552-307.000.

Orsos, Kalman; Dietrich, Gerhard; Berndt, Alfons; and Kufner, Franz-Josef, to Degenderfer Werft und Eisenbau GmbH. Automatic arc-welding machine operating with rod electrodes and a preferred application thereof. 4,952,773, Cl. 219-124.340.

Orth, Hans: See—  
Bocker, Jurgen; Orth, Hans; Niemeyer, Torsten; and Tripptrap, Peter, 4,951,572, Cl. 102-476.000.

Osada, Hideharu. Method of finishing the surface of a structure. 4,952,104, Cl. 404-66.000.

Osborne, Robert L.: See—  
Twerdichlib, Michael; Osborne, Robert L.; and Rozelle, Paul F., 4,951,500, Cl. 73-119.00R.

Osgood, James E.: See—  
Hollan, Brad L.; and Osgood, James E., 4,951,990, Cl. 294-119.100.

O'Shea, Patrick; and Devine, John, to 501 Tillotson Limited. Choke for internal combustion engine. 4,951,926, Cl. 261-64.400.

Oshima, Yoshitomo; and Egami, Hideo, to Fuji Photo Film Co., Ltd. Method of drawing film. 4,952,363, Cl. 264-288.400.

Oster, Craig D.; Quinn, Gerald W.; and Wilson, Rodney J., to Minnesota Mining and Manufacturing Company. Hot melt applicator with anti-drip mechanism. 4,951,846, Cl. 222-146.500.

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Auchter, Gerhard; Scherz, Thomas; Blum, Rainer; Neubert, Gerhard; Wistuba, Eckehardt; and Osterloh, Rolf, 4,952,623, Cl. 524-517.000.

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Otake, Satoshi: See—  
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Otis Engineering Corporation: See—  
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Otara, Takahito: See—  
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Otsubo, Hiroshi, to Pioneer Electronic Corporation. Auto voice changing apparatus. 4,953,212, Cl. 381-1.000.

Otsuki, Shinnichiro: See—  
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Ott, Donald G.; and Benziger, Theodore M., to United States of America, Energy. Preparation of 1,3,5-triamino-2,4,6-trinitrobenzene from 3,5-dichloranisole. 4,952,733, Cl. 564-406.000.

Ottomanelli, Joseph V.: See—  
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Ouriel, Kenneth; Kirk, Karl D.; and Lamond, Donald, to Boisure, Inc. Valvulotome with leaflet disruption heads and fluid supply. 4,952,215, Cl. 606-159.000.

Outboard Marine Corporation: See—  
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Owen, Hartley: See—  
Harandi, Mohsen N.; and Owen, Hartley, 4,951,613, Cl. 122-4.00D.

Owens-Corning Fiberglass Corporation: See—  
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Watanabe, Kenji; Sakaegi, Yuji; and Ozaki, Seichi, 4,953,043, Cl. 360-66.000.

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McCulloch, Charles E.; and Peabody, Michael, 4,951,804, Cl. 198-457.000.

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Pelzl, Gerhard: See—  
Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Pelzl, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zschke, Horst, 4,952,699, Cl. 548-136.000.

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Heckle, William A.; Mathews, Marion J., III; and Peoples, P. Robert, 4,952,541, Cl. 502-22.000.

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Peterson, Ronald L., 4,952,376, Cl. 422-186.300.

Perret, Michel, to Societe Anonyme dite: Alstom. Control device for controlling a circuit breaker. 4,952,759, Cl. 200-82.00R.

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Barnel, Pierre; Lindeperg, Francois; Nebon, Jean-Pierre; and Perrier, Philippe, 4,952,897, Cl. 335-147.000.

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Piacenza, Giorgio. Mechanical-storage multi-level carpark. 4,952,112, Cl. 414-251.000.

Piao, Lin C. Electronic water flow control device. 4,951,915, Cl. 251-14.000.

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Yeh, Huijay; and Pickup, Michael A., 4,953,104, Cl. 364-519.000.

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Pioneer Electronic Corporation: See—  
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Suzuki, Masami, 4,953,153, Cl. 369-49.000.

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Twiney, Robert C.; and Salloway, Anthony J., 4,953,217, Cl. 381-72.000.

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Pomeroy, Ronald H.: See—  
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Popov, Oleg A., to Microscience, Inc. Plasma generation in electron cyclotron resonance. 4,952,273, Cl. 156-643.000.

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Gregory, Paul E.; and Vinson, Kenneth D., 4,952,278, Cl. 162-141.000.

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R.E.In. S.p.A.: See—  
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RXS Schrupftechnik-Garnituren GmbH, Firma: See—  
Kipfelsberger, Christian; and Kupczyk, Andreas, 4,952,438, Cl. 428-68.000.

RXS Schrupftechnik-Garnituren GmbH, Firma: See—  
Winterhoff, Hans; Kipfelsberger, Christian; and Kupczyk, Andreas, 4,952,437, Cl. 428-68.000.

Ryan, John G.: See—  
Pless, Benjamin; and Ryan, John G., 4,952,864, Cl. 323-299.000.

Ryder, John H., Sr.; and Smith, Susanna R., to International Business Machines Corp. Self-verifying receipt and acceptance system for electronically delivered data objects. 4,953,209, Cl. 380-23.000.

Rye, Glen. Vapor seal outlet box. 4,952,754, Cl. 174-53.000.

Ryntz, Rose A.: See—  
Kordomenos, Panagiotis I.; and Ryntz, Rose A., 4,952,626, Cl. 525-28.000.

Rytlewski, Gary L., to Schlumberger Technology Corporation. Angularly shaped unitary structured base strip comprised of a specific material adapted for phasing charges in a perforating gun. 4,951,744, Cl. 175-4.570.

S.A.R. S.p.A.: See—  
Ruscitti, Tommaso; Cutilli, Davide; and De Leonardis, Demetrio, 4,951,842, Cl. 222-321.000.

S.C.A.C. Societa Cementi Armati Centrifugati SpA: See—  
Zan, Amilcare Molin, 4,952,129, Cl. 425-88.000.

S. C. Johnson & Son, Inc.: See—  
Hakemi, Hassan A.; Rasoul, Husam A. A.; and Stackman, Robert W., 4,952,334, Cl. 252-299.010.

Saab, Nabil. Method, system and emulsifier substance for treatment of materials containing harmful substances. 4,952,315, Cl. 210-610.000.

Sabadics, Joseph L.: See—  
Moorman, Charles T.; Sabadics, Joseph L.; and Royal, T. Anthony, 4,951,561, Cl. 99-471.000.

Sabala, Edwin K. Apparatus for interchangeable outdoor illuminated signs. 4,951,405, Cl. 40-551.000.



Sabin, Robert; Jariwalla, Raxit; and Lawson, Stephen, to Linus Pauling Institute of Science & Medicine; and Sabin, Robert. Method of using phytic acid for inhibiting tumor growth. 4,952,396, Cl. 424-946.000.

Saccarello, Luisa, to Seuref A.G. Process for the preparation of (1,4-diaryl-pyrazol-3-yl)-acetic acids. 4,952,702, Cl. 548-378.000.

Sack, Wieland; and Anthonen, Reiner, to Felix Schoeller, Jr. GmbH & Co., KG. Support material for thermally developable photographic layers. 4,952,486, Cl. 430-532.000.

Saddier, Michael E., to Michael Earl Saddler. Automatic pulse tone arrow. 4,951,952, Cl. 273-416.000.

Sadler, Stanley. Snowboard. 4,951,960, Cl. 280-607.000.

SAES Getters SpA: See—  
Ferrario, Bruno; and Doni, Fabrizio, 4,951,652, Cl. 126-200.000.

Saga, Kouichi: See—  
Ohnishi, Masanori; Kasahara, Toshiaki; Saga, Kouichi; and Li, Xin-he, 4,951,874, Cl. 239-88.000.

Sage, Ian C.: See—  
Bradshaw, Madeline J.; Raynes, Edward P.; Bishop, David I.; Sage, Ian C.; and Jenner, John A., 4,952,337, Cl. 252-299.630.

Sage Products, Inc.: See—  
Harrell, Donald R.; and Newton, John J., Jr., 4,951,318, Cl. 2-49.00R.

Sahara, Masayoshi: See—  
Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Kakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi, 4,952,959, Cl. 354-289.120.

Saint-Gobain Recherche: See—  
Hirata, Masahiro; Misonou, Masao; and Kawahara, Hideo, 4,952,423, Cl. 427-109.000.

St. Pierre, Philippe D., to General Electric Company. Refractory metal oxide coated abrasives and grinding wheels made therefrom. 4,951,427, Cl. 51-293.000.

Saito, Hitoshi: See—  
Kanto, Junpei; and Saito, Hitoshi, 4,952,553, Cl. 503-227.000.

Saito, Keiji: See—  
Bando, Akira; Nagura, Osamu; Saito, Keiji; Miyashita, Ikuro; Nagai, Hashime; Nakagawa, Hiroto; and Oono, Yasuteru, 4,952,852, Cl. 318-140.000.

Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Miyazaki, Toshihiko; Nishimura, Yukuo; and Nakagiri, Takashi, to Canon Kabushiki Kaisha. Device for measuring light absorption characteristics of a thin film spread on a liquid surface, including an optical device. 4,952,027, Cl. 350-174.000.

Saito, Mitsuru: See—  
Morimoto, Yasuhiro; Saito, Mitsuru; Yoshida, Tadahiro; and Taniguchi, Nobuyuki, 4,953,029, Cl. 358-229.000.

Saito, Nagao: See—  
Mori, Naotake; and Saito, Nagao, 4,952,768, Cl. 219-69.150.

Saito, Toshiharu: See—  
Sugiyama, Eiji; Natsume, Mitsuaki; and Saito, Toshiharu, 4,952,997, Cl. 357-40.000.

Saitoh, Mitsumasa; Ogawa, Seiichi; Yamane, Miyuki; and Fukasawa, Hideki, to Sony Corporation. Apparatus for defining an effective picture area of a high definition video signal when displayed on a screen with a different aspect ratio. 4,953,025, Cl. 358-140.000.

Saka, Tsutomu; and Sato, Katsuaki, to Honda Giken Kogyo Kabushiki Kaisha. Toothed sintered pulley. 4,952,199, Cl. 474-152.000.

Sakaegi, Yuji: See—  
Watanabe, Kenji; Sakaegi, Yuji; and Ozaki, Seiichi, 4,953,043, Cl. 360-66.000.

Sakaguchi, Michiaki: See—  
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,952,538, Cl. 501-136.000.

Sakaguchi, Noboru, to Shimano Industrial Company Limited. Double bearing reel. 4,951,898, Cl. 242-255.000.

Sakai Chemical Industry Co., Ltd.: See—  
Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Toru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Sakai, Fumio: See—  
Ina, Hideki; Sakai, Fumio; and Nakano, Hitoshi, 4,952,060, Cl. 356-407.000.

Sakai, Yoichi: See—  
Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Teruaki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93.000.

Sakaki, Yasunori; Tagomori, Tsutomu; and Yamada, Eisaku, to Strapack Corporation. Band feeding and tightening apparatus in strapping machine. 4,952,270, Cl. 156-361.000.

Sakakibara, Hisao, to Brother Kogyo Kabushiki Kaisha. Text processing system for cyclically shifting format memory. 4,952,082, Cl. 400-76.000.

Sakamaki, Iwao, to Sakamaki Mfg. Co., Ltd. Chuck for tools. 4,951,955, Cl. 279-62.000.

Sakamaki Mfg. Co., Ltd.: See—  
Sakamaki, Iwao, 4,951,955, Cl. 279-62.000.

Sakamaki, Yasuhisa; Ozaki, Yukio; and Tanno, Norihiko, to Sumitomo Pharmaceuticals Co., Ltd. Stabilized anthracycline preparation containing L-cysteine. 4,952,566, Cl. 514-34.000.

Sakamoto, Toshihiko; and Ono, Hideki, to Semiconductor Energy Laboratory Co., Ltd. Structure for supporting vehicle suspension system. 4,951,964, Cl. 280-788.000.

Sakamoto, Yumi, to Ricoh Company, Ltd. Image forming apparatus for forming images by use of fonts. 4,953,033, Cl. 358-300.000.

Sakane, Kazuo; Kawabata, Kohji; Miyai, Kenji; and Inamoto, Yoshiko, to Fujisawa Pharmaceutical Co., Ltd. Cephem compound and a process for preparation thereof. 4,952,578, Cl. 514-202.000.

Sakanoue, Kei: See—  
Takada, Shunji; Nishikawa, Toshihiro; Sakanoue, Kei; and Abe, Akira, 4,952,490, Cl. 430-567.000.

Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; and Yoshida, Satoshi, to Canon Kabushiki Kaisha. Electrophotographic magnetic toner containing polyalkylene and vinyl polymer. 4,952,476, Cl. 430-106.600.

Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, to Daikin Industries, Ltd. Cryogenic refrigerator. 4,951,471, Cl. 62-51.200.

Sakuma, Nobuo: See—  
Nakajima, Tomohiro; Shimada, Kazuyuki; Sakuma, Nobuo; Suzuki, Seizoh; and Yamaguchi, Katsumi, 4,953,171, Cl. 372-44.000.

Sakurabayashi, Akira, to Kobayashi Engineering Works, Ltd. Sheet curls reformer. 4,952,281, Cl. 162-270.000.

Salloway, Anthony J.: See—  
Twiney, Robert C.; and Salloway, Anthony J., 4,953,217, Cl. 381-72.000.

Salmon, Carl, to Salmon, Carl. Cleaning attachment. 4,951,346, Cl. 15-322.000.

Salomon S.A.: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,951,402, Cl. 36-50.000.

Boussemart, Jean-Pierre; and Gorliez, Jean-Philippe, 4,951,961, Cl. 280-636.000.

Salter, Robert S.: See—  
Bulatovic, Srdjan; and Salter, Robert S., 4,952,329, Cl. 252-61.000.

Salzer, Donald E.: See—  
Gustafson, Kenneth L.; Romano, Timothy S.; Maassen, Nevil Q.; and Salzer, Donald E., 4,952,810, Cl. 250-352.000.

Sambrailo, William K.: See—  
Butkus, Robert A.; Olsen, Robert C.; and Sambrailo, William K., 4,951,823, Cl. 206-586.000.

Samera, Edward, Jr.; and Kosi, Cesar U., to Westinghouse Electric Corp. Waste feed arrangement. 4,951,580, Cl. 110-246.000.

Samshima, Kenji: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Samshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Sandall, Vern R. Scope with powered zoom. 4,952,041, Cl. 350-560.000.

Sanden Corporation: See—  
Matsushita, Takashi, 4,951,794, Cl. 192-84.00C.

Negishi, Kozaburo, 4,951,481, Cl. 62-406.000.

Sanden Corporation: See—  
Tomimatsu, Shigenao, 4,951,477, Cl. 62-217.000.

Sander, Rainald: See—  
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; Weber, Roland; and Nance, Paul, 4,952,827, Cl. 307-571.000.

Sandoz AG: See—  
Hansen, Guenter; Schefczik, Ernst; Eitzbach, Karl-Heinz; Reichelt, Helmut; and Loeffler, Hermann, 4,952,681, Cl. 534-766.000.

Sandpipe Computer & Model Services Limited: See—  
Sheffield, Lance R., 4,951,872, Cl. 238-10.00E.

Sandven, Ole A.: See—  
Sharpe, Patrick E.; and Sandven, Ole A., 4,951,888, Cl. 241-296.000.

Sandvik AB: See—  
Lundell, Lars-Gunnar, 4,951,762, Cl. 175-410.000.

Sanghvi, Narendra T.: See—  
Fry, Francis J.; and Sanghvi, Narendra T., 4,951,653, Cl. 128-24.00A.

Sank, Gerald W.: See—  
Luebke, Clement J.; Sank, Gerald W.; and Slade, Frank A., 4,951,645, Cl. 126-20.100.

Sankyo Company Limited: See—  
Haneishi, Tatsuo; Nakajima, Mutsuo; Torikata, Akio; Okazaki, Takao; Tohjiyamori, Manbu; and Kawakubo, Katsuhiko, 4,952,234, Cl. 71-92.000.

Sanmartin, Marie-Louise; and Fries, Jean-Francois. Insulation assembly designed for thermal protection of a structure subjected to conditions of intense thermal aggression. 4,952,440, Cl. 428-116.000.

Sanner, John A., to Navistar International Transportation Corp. Trailer stability monitor. 4,952,908, Cl. 340-429.000.

Sano, Hiroshi: See—  
Yasuzawa, Toru; Sano, Hiroshi; Nakano, Hirofumi; Ichikawa, Shunji; and Shuto, Katsuichi, 4,952,576, Cl. 514-172.000.

Sanshin Kogyo Kabushiki Kaisha: See—  
Hirano, Yoshihide, 4,951,624, Cl. 123-198.00D.

Hirukawa, Itsushi; Aoki, Satoshi; and Kudoh, Noboru, 4,951,640, Cl. 123-335.000.

Torigai, Katsumi, 4,951,465, Cl. 60-323.000.

Watanabe, Eifu; and Hashimoto, Gaku, 4,952,180, Cl. 440-77.000.

Santa Barbara Research Center: See—  
Gustafson, Kenneth L.; Romano, Timothy S.; Maassen, Nevil Q.; and Salzer, Donald E., 4,952,810, Cl. 250-352.000.

Phillips, James D.; Casselman, Thomas N.; and Koch, Thomas L., 4,952,995, Cl. 357-24.000.

Santalucia, John: See—  
Tavss, Edward A.; Temin, Samuel C.; Santalucia, John; and Carroll, David L., 4,951,841, Cl. 222-107.000.

Santel, Hans-Joachim: See—  
Andree, Roland; Haug, Michael; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,952,235, Cl. 71-94.000.

Muller, Klaus-Helmut; Fest, Christa; Kirsten, Rolf; Pfister, Theodor; Riebel, Hans-Jochem; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,952,233, Cl. 71-92.000.

Santucci, Donald: See—  
Denemark, Philip W.; and Santucci, Donald, 4,951,362, Cl. 24-16.0PB.

Santwyk-Anderson, David: See—  
Hawkins, Albert P.; and Santwyk-Anderson, David, 4,951,825, Cl. 209-558.000.

Sanwa Kagaku Kenkyusho Co., Ltd.: See—  
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromoto; Mitani, Takahiko; Nakano, Kazumasa; and Ninomiya, Naohisa, 4,952,568, Cl. 514-103.000.

Sanwo, Ikuro J.: See—  
Lauffer, Donald K.; Sanwo, Ikuro J.; and Rostek, Paul M., 4,953,060, Cl. 361-388.000.

Sanyo Electric Co., Ltd.: See—  
Amao, Kenji; Ohyama, Kazuyoshi; Mizoguchi, Kenji; Akaishi, Tsuneshi; and Takeuchi, Takayoshi, 4,951,383, Cl. 29-721.000.

Ishikawa, Tsutomu; Kabashima, Akira; and Imaizumi, Hideo, 4,953,021, Cl. 358-144.000.

Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, 4,953,049, Cl. 360-126.000.

Takahara, Ichiro; Azumi, Masaaki; Shigetomi, Kazuo; Kamimura, Takaya; and Ishida, Hideki, 4,953,154, Cl. 369-195.000.

Sarma, Srinivasan V.: See—  
Carnarius, Michael E.; and Sarma, Srinivasan V., 4,952,290, Cl. 204-149.000.

Sartwell, Alfred L.; and Thoma, Endre P., to International Business Machines Corporation. Voltage regulator with power boost system. 4,952,863, Cl. 323-280.000.

Saruwatari, Yoshinori: See—  
Kishi, Katsutoshi; Tachi, Shigeyuki; Inagaki, Kazuhiro; and Saruwatari, Yoshinori, 4,951,360, Cl. 19-225.000.

Sasajima, Koji; and Ishikawa, Yoshikazu, to Honda Giken Kogyo Kabushiki Kaisha. Method of determining duty ratio used for operational control of a solenoid. 4,951,468, Cl. 60-487.000.

Sasaki, Fumiyoshi: See—  
Kobayashi, Reiichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, 4,953,026, Cl. 358-167.000.

Sasaki, Nobuyuki: See—  
Sibata, Kenichiro; Sasaki, Nobuyuki; Yazu, Shuji; and Jodai, Tetsuji, 4,952,555, Cl. 505-1.000.

Sasaki, Seiichi: See—  
Kurono, Hidehiro; Ikeda, Yoshihiro; Nakayama, Katsumi; and Sasaki, Seiichi, 4,951,426, Cl. 51-267.000.

Sata, Ichiko: See—  
Suzuki, Hitoshi; Shiotani, Shinobu; Tokunaga, Shinji; Hirai, Tokuyuki; Fukumochi, Yoji; Kugimiya, Shuzo; and Sata, Ichiko, 4,953,088, Cl. 364-419.000.

Sata, Junichi: See—  
Ito, Yoshio; Takemura, Makoto; Sata, Junichi; and Otsuki, Shinnichirou, 4,953,037, Cl. 358-496.000.

Sato, Heiichi: See—  
Kumura, Tatsuo; Sato, Heiichi; Kunito, Yoshiyuki; Ikeda, Yoshii; Izu, Etsuo; and Hayakawa, Masatoshi, 4,953,050, Cl. 360-126.000.

Sato, Hiidenori; Umeno, Takashi; Nosaka, Michiyasu; and Koyama, Nobuhiko, to Nippondenso Co., Ltd. Fuel vapor treatment apparatus. 4,951,643, Cl. 123-520.000.

Sato, Hiroaki, to Canon Kabushiki Kaisha. Image signal processing apparatus. 4,953,114, Cl. 382-50.000.

Sato, Katsuaki: See—  
Saka, Tsutomu; and Sato, Katsuaki, 4,952,199, Cl. 474-152.000.

Sato, Masakazu: See—  
Kawashima, Yutaka; Sato, Masakazu; Kawase, Masahiro; Watanabe, Yoshiaki; and Hatayama, Katsuo, 4,952,689, Cl. 540-200.000.

Sato, Takeshi: See—  
Tokumo, Akio; Kato, Masayuki; Sato, Takeshi; and Hasegawa, Tatsuo, 4,952,884, Cl. 330-10.000.

Sato, Tomio: See—  
Okimoto, Kunio; Sato, Tomio; Yamakawa, Toshio; and Horiishi, Nanao, 4,952,331, Cl. 252-62.540.

Sato, Toshio; and Matsumoto, Hitoshi, to Dainippon Ink and Chemicals, Inc.; and Nippon Hypox Laboratories Incorporated. Antiallergic agent. 4,952,564, Cl. 514-57.000.

Sato, Yosimitu; Yamana, Keiichi; and Yoda, Akira, to Fuji Photo Film Co., Ltd. Liquid processing head for an electrophotographic apparatus. 4,952,980, Cl. 355-256.000.

Sato, Youji: See—  
Kubogochi, Hisasi; and Sato, Youji, 4,952,106, Cl. 411-48.000.

Sauerbier, Dieter; Molge, Klaus; Weigert, Werner; and Issac, Otto, to Asta Pharma Aktiengesellschaft. Solutions of oxaphosphorins having improved stability and process for the preparation thereof. 4,952,575, Cl. 514-110.000.

Saunders, John: See—  
Baker, Raymond; Saunders, John; and Swain, Christopher, 4,952,587, Cl. 514-305.000.

Saunders, William T.; and Livingston, Warren D., to Weirton Steel Company. Composite-coated flat-rolled steel can stock and can product. 4,952,461, Cl. 428-458.000.

Sauter, Hubert: See—  
Schuetz, Franz; Sauter, Hubert; Schirmer, Ulrich; Wolf, Bernd; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,952,720, Cl. 560-106.000.

Sauter, Josephus C. H. M., to U.S. Philips Corporation. Box of sheet material for packing articles. 4,951,813, Cl. 206-45.190.

Savolainen, Erkki E.: See—  
Henricson, Kaj O.; Kokkonen, Seppo K.; Pikka, Olavi E.; Qvintus, Harri T.; Ruuskanen, Erkki A.; and Savolainen, Erkki E., 4,952,314, Cl. 210-404.000.

Sawa, Shinnosuke; Kumaoka, Shunichi; and Ohno, Teruo, to Shinwa International Co., Ltd. Radiowave absorber and its manufacturing process. 4,952,935, Cl. 342-4.000.

Sawada, Hiroshi: See—  
Eguchi, Takao; Nagaike, Masaru; Shitanda, Motoshi; and Sawada, Hiroshi, 4,951,388, Cl. 29-832.000.

Sawada, Yasuhiro: See—  
Azuma, Yusaku; Tanita, Takeo; Yamamoto, Toshihiro; Kasai, Shozo; Yasuhara, Masateru; and Sawada, Yasuhiro, 4,951,517, Cl. 74-209.000.

Sawai, Hiroyuki: See—  
Ishii, Hiroyuki; Ueda, Tetuyuki; and Sawai, Hiroyuki, 4,952,011, Cl. 350-6.500.

Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromoto; Mitani, Takahiko; Nakano, Kazumasa; and Ninomiya, Naohisa, to Sanwa Kagaku Kenkyusho Co., Ltd. Remedies and preventives for diabetic diseases. 4,952,568, Cl. 514-103.000.

Sawdey, Michael: See—  
Loskutoff, David J.; Ny, Tor; and Sawdey, Michael, 4,952,512, Cl. 435-320.000.

Sawyer, Willard H.; Bearden, Roby, Jr.; Chianelli, Russell R.; and Winter, William E., Jr., to Exxon Research and Engineering Company. Slurry hydroprocessing process. 4,952,306, Cl. 208-216.00R.

Sayles, David C., to United States of America, Army. Mechanical enhancement of the burning rate of solid propellants by means of shrink tubes or spheres. 4,952,341, Cl. 264-3.100.

Scensny, Patricia M.: See—  
Belly, Robert T.; Scensny, Patricia M.; Wu, Annie L.; and Chen, Chung-yuan, 4,952,495, Cl. 435-18.000.

Schaab, Carl K.: See—  
Taranuji, Christopher; and Schaab, Carl K., 4,952,400, Cl. 424-401.000.

Schabert, Hans-Peter; Laurer, Erwin; and Strickroth, Erich, to Siemens Aktiengesellschaft; and Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH. Remote-controllable screw connection. 4,951,974, Cl. 285-39.000.

Schaeffer, Georg: See—  
Planker, Siegfried; Warning, Klaus; Herbst, Gunter H.; decessed, Herbst, Ulrike M.; Herbst, Bettina S.; and Schaeffer, Georg, 4,952,697, Cl. 546-265.000.

Schaeffler, Georg, to INA Walzlager Schaeffler KG. Self-adjusting hydraulic valve tappet. 4,951,619, Cl. 123-90.550.

Schafer, Herbert; and Strohmayer, Rodolph, to Didier-Werke AG. Refractory plate assembly for a sliding closure unit. 4,951,853, Cl. 222-600.000.

Schafer, Wolfgang: See—  
Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Pelzl, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zschke, Horst, 4,952,699, Cl. 548-136.000.

Schaper, Uwe: See—  
Peter, Cornelius; Ursel, Eckhard; and Schaper, Uwe, 4,951,772, Cl. 180-197.000.

Schauer, Friedrich; and Berthold, Hans, to Kabelmetal Electro GmbH. Method of making an electrical through connection between a flat conductor and a round conductor. 4,952,256, Cl. 156-49.000.

Schefczik, Ernst: See—  
Hansen, Guenter; Schefczik, Ernst; Eitzbach, Karl-Heinz; Reichelt, Helmut; and Loeffler, Hermann, 4,952,681, Cl. 534-766.000.

Schenfele, Robert D.: See—  
Lewis, David F.; Schenfele, Robert D.; and Winkler, Thomas, 4,952,244, Cl. 106-135.000.

Scherer, Robert P., III. Moisture sensing system for an irrigation system. 4,952,868, Cl. 324-664.000.

Schering Aktiengesellschaft: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmiechen, Ralph; Seidelmann, Dieter; Schneider, Herbert H.; and Stephens, David N., 4,952,698, Cl. 548-131.000.

Schering-Plough Corp.: See—  
Babad, Esther; Carruthers, Nicholas; and Steinman, Martin, 4,952,729, Cl. 564-274.000.

Scheuneman, James H.: See—  
Purdham, David M.; Scheuneman, James H.; Byers, Larry L.; Sych, Terence; and Tsang, Kwisook, 4,953,131, Cl. 365-222.000.

Schiebel, Ulrich; and Hillen, Walter, to U.S. Philips Corporation. System including a CCD imager device for reading a storage phosphor record carrier. 4,953,038, Cl. 358-471.000.

Schiefer, Bernhard: See—  
Schwarz, Hans-Georg; Shah, Vinay; and Schiefer, Bernhard, 4,951,929, Cl. 266-286.000.



Schieferly, Stephen B.; and Weldon, Steven M., to AMP Incorporated. Cover assembly. 4,952,168, Cl. 439-467.000.  
 Schiffer, Mike. Light assembly for liquid environment. 4,953,066, Cl. 362-252.000.  
 Schimmel, Paul R.: See—  
 Jasin, Maria; and Schimmel, Paul R., 4,952,501, Cl. 435-69.200.  
 Schirmer, Ulrich: See—  
 Schuetz, Franz; Sauter, Hubert; Schirmer, Ulrich; Wolf, Bernd; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,952,720, Cl. 560-106.000.  
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Rikimaru, Horiaki; Nakatsuji, Tadao; Umaba, Toshikatsu; Nagano, Kazuhiko; Mishina, Kazuya; Shimizu, Hiromitsu; Nojima, Shigeru; Iida, Kozo; Obayashi, Yoshiaki; Seto, Toru; Mitsuoka, Shigeaki; Hanada, Masayuki; Fukuda, Morio; Nagano, Kiyoshi; Imanari, Makoto; Koshikawa, Takeo; and Yamauchi, Akihiro, 4,952,381, Cl. 423-239.000.

Shimizu, Masao: See—  
Orita, Hideo; Shimizu, Masao; Hayakawa, Takashi; and Takehira, Katsuomi, 4,952,712, Cl. 552-307.000.

Shimizu, Tetsuya: See—  
Skikakura, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, 4,953,019, Cl. 358-133.000.

Shimizu, Yoshiaki: See—  
Okuda, Hiroyuki; Shimizu, Yoshiaki; Ino, Kazuo; Ishihara, Kousou; and Ogura, Takashi, 4,953,049, Cl. 360-126.000.

Shimo, Yoshiyuki: See—  
Shikatani, Yutaka; Kuroda, Hobuyuki; Kataoka, Naoki; Shimo, Yoshiyuki; Matsuura, Kazuo; Kawamata, Etsuo; and Kobayashi, Hiroshi, 4,952,667, Cl. 528-230.000.

Shimokoriyama, Makoto: See—  
Skikakura, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, 4,953,019, Cl. 358-133.000.

Shimura, Hiroshi: See—  
Ishikawa, Yasunori; Murayama, Noboru; Suzuki, Koichi; Kuwata, Koji; Shimura, Hiroshi; and Ishikawa, Masaaki, 4,953,196, Cl. 379-53.000.

Shin-Etsu Chemical Co., Ltd.: See—  
Fukushima, Motoo; Takahashi, Masaharu; and Itoh, Kunio, 4,952,609, Cl. 521-94.000.

Hongu, Tatsuhiko, 4,952,533, Cl. 501-90.000.

Shin-Etsu Handotai Company Limited: See—  
Ibe, Hiroyuki; and Mori, Takashi, 4,951,422, Cl. 51-165.710.

Shin, Yong W. Process for producing a low density foamed polyethylene. 4,952,352, Cl. 264-51.000.

Shinbach, Edward S.: See—  
Bradshaw, Thomas I.; and Shinbach, Edward S., 4,952,023, Cl. 350-102.000.

Shinkai, Ichiro: See—  
Lynch, Joseph E.; Volante, Ralph P.; Laswell, William L.; and Shinkai, Ichiro, 4,952,288, Cl. 204-59.00R.

Shinnick, Thomas; and Houghten, Richard, to Scripps Clinic and Research Foundation. Mycobacterial recombinants and peptides. 4,952,395, Cl. 424-92.000.

Shinozaki, Fumiaki: See—  
Yamaguchi, Jun; Shinozaki, Fumiaki; Okazaki, Masaki; and Adachi, Keiichi, 4,952,480, Cl. 430-281.000.

Shinozaki, Shinichiro: See—  
Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, 4,951,471, Cl. 62-51.200.

Shinwa International Co., Ltd.: See—  
Sawa, Shinnosuke; Kumaoka, Shunichi; and Ohno, Teruo, 4,952,935, Cl. 342-4.000.

Shioda, Takuo; and Yamada, Jiro, to Ishikawajima-Harima Heavy Industries Co., Ltd. Process for crushing hafnium crystal bar. 4,951,881, Cl. 241-23.000.

Shiohara, Tomoo; and Abe, Hiroshi, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Process for improving the flowability of ultrahigh-molecular-weight polyethylene composition. 4,952,625, Cl. 524-586.000.

Shiota, Makoto; Tomizawa, Yukio; and Ohoka, Yoshiaki, to Nippon Cable System; and Kawasaki Heavy Industries, Ltd. Control cable. 4,951,523, Cl. 74-502.500.

Shiotani, Shinobu: See—  
Suzuki, Hitoshi; Shiotani, Shinobu; Tokunaga, Shinji; Hirai, Tokuyuki; Fukumochi, Yoji; Kugimiya, Shuzo; and Sata, Ichiko, 4,953,088, Cl. 364-419.000.

Shiozaki, Tomoo: See—  
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Ship Systems, Inc.: See—  
Dunne, Brian B., 4,951,901, Cl. 244-3.230.

Shipley Company Inc.: See—  
Bladon, John J.; Robinson, John N.; and Rousseau, Michael, 4,952,286, Cl. 204-15.000.

Shippy, David J.: See—  
Feal, Brice J.; Hanrahan, Donald J.; and Shippy, David J., 4,953,081, Cl. 364-200.000.

Shirai, Kanji; Maruyama, Kazuharu; Ito, Hiroshi; Kitamura, Hajime; and Yutaka, Owashi, to Toshiba Kikai Kabushiki Kaisha. Metal mold exchanging apparatus for use in injection molding machines. 4,952,131, Cl. 425-190.000.

Shirai, Toshikazu: See—  
Itano, Katashi; Shirai, Toshikazu; Ishikawa, Yoshitomo; and Nakao, Yoji, 4,951,386, Cl. 29-783.000.

Shiraishi, Hisayoshi: See—  
Azusawa, Noboru; Hashimoto, Tadahiko; Shiraishi, Hisayoshi; and Nagae, Yoshiharu, 4,952,034, Cl. 350-351.000.

Shiraishi, Takayuki: See—  
Kobayashi, Atsuhito; Ono, Shoichi; Shiraishi, Takayuki; and Hosayama, Kohei, 4,952,800, Cl. 250-238.000.

Shirakawa, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Brushless motor with hall elements. 4,952,830, Cl. 310-68.00B.

Shirane, Yoshiko: See—  
Kawarabayashi, Waichiro; Matsubara, Koichi; Yoshioka, Toshihiro; Yamagata, Hikaru; Takahashi, Shigeru; Hirata, Yukimasa; and Shirane, Yoshiko, 4,951,415, Cl. 47-60.000.

Shirley, Thomas E.: See—  
Laster, Stanley J.; Meek, Robert A.; and Shirley, Thomas E., 4,953,139, Cl. 367-73.000.

Shirtum, Robert P.; and Wernli, Walter, to Dow Chemical Company, The. Aliphatic, non-hydrolyzable chloride-containing epoxy resins and process for their production. 4,952,647, Cl. 525-523.000.

Shishido, Hiroaki: See—  
Noguchi, Minoru; Shishido, Hiroaki; and Koizumi, Mitsuyoshi, 4,952,058, Cl. 356-237.000.

Shitanda, Motoshi: See—  
Eguchi, Takao; Nagaike, Masaru; Shitanda, Motoshi; and Sawada, Hiroshi, 4,951,388, Cl. 29-832.000.

Shone, Robert L.: See—  
Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., 4,952,705, Cl. 548-525.000.

Showman, Peter S.: See—  
Dysart, John A.; Showman, Peter S.; Crow, William M.; Williams, Peter M.; McBride, Brian W.; Senior, John R. F.; Whelan, Charles H.; and Murdoch, Brian, 4,953,080, Cl. 364-200.000.

Shukla, Kailash C.; Hurley, James R.; Orcheski, Conrad J.; and Grimanis, Michael P., to Tecogen, Inc. Conveyor oven. 4,951,648, Cl. 126-21.00A.

Shultz, William E. Valve spring compression tool. 4,951,373, Cl. 29-217.000.

Shuto, Katsuichi: See—  
Yasuzawa, Toru; Sano, Hiroshi; Nakano, Hirofumi; Ichikawa, Shunji; and Shuto, Katsuichi, 4,952,576, Cl. 514-172.000.

Shutt, George V., to Zimmer, Inc. Arthroscopic sheath with quick coupling socket. 4,951,977, Cl. 285-316.000.

Sibata, Kenichiro; Sasaki, Nobuyuki; Yazu, Shuji; and Jodai, Tetsuji, to Sumimoto Electric Industries, Ltd. Superconducting material  $Ba_{1-x}(Y_{1-y}W_y)CuO_2$  ( $y = Ti, Zr, Hf, Si, Ge, Sn, Pb, or Mn$ ) and a process for preparing the same. 4,952,555, Cl. 505-1.000.

Sical AB: See—  
Litzberg, Lennart, 4,951,738, Cl. 165-1.000.

Sid Harvey, Inc.: See—  
Lindtveit, Herbert, 4,952,311, Cl. 210-232.000.

Siegel, Augustin; Schmahl, Gunter; and Rudolph, Dietbert, to Carl-Zeiss-Stiftung. Method and device for producing phase-contrast images. 4,953,188, Cl. 378-43.000.

Siekmann Fittings GmbH & Co. KG: See—  
Fragge, Hermann; Westerkamp, Ewald; and Willenborg, Felix, 4,951,493, Cl. 72-69.000.

Siemens Aktiengesellschaft: See—  
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; Weber, Roland; and Nance, Paul, 4,952,827, Cl. 307-571.000.

Siemens Aktiengesellschaft: See—  
Achleitner, Erwin; and Weber, Gerald, 4,951,633, Cl. 123-491.000.

Adams, Helmar; Boegelein, Georg; and Jacob, Heinz, 4,952,875, Cl. 324-220.000.

Beer, Guenther, 4,953,216, Cl. 381-68.400.

Braun, Michael; and Heining, Hans-Dieter, 4,953,069, Cl. 363-41.000.

Johansen, Jon-Willy, 4,953,003, Cl. 357-79.000.

Koeflerlein, Rainer; Schlageter, Bernhard; and Baier, Erich, 4,952,979, Cl. 355-251.000.

Lenz, Michael, 4,953,070, Cl. 363-58.000.

Schabert, Hans-Peter; Laurer, Erwin; and Strickroth, Erich, 4,951,974, Cl. 285-39.000.

Schlemmer, Bernd; and Berenbrock, Goetz, 4,953,169, Cl. 372-32.000.

Weiss, Hans-Joachim; Haerli, Christof; and Wagner, Juergen, 4,953,215, Cl. 381-68.000.

Siemens-Albis: See—  
Kuepfer, Hanspeter, 4,952,940, Cl. 342-174.000.

Siemens-Bendix Automotive Electronics Limited: See—  
Cook, John E., 4,951,637, Cl. 123-520.000.

Sieverin, Walter J. Powered logsplitter. 4,951,726, Cl. 144-366.000.

Sigma Industry Co., Ltd.: See—  
Marai, Masaru, 4,952,044, Cl. 351-41.000.

Signode Corporation: See—  
Cheung, Nelson; and Nix, Robert J., 4,952,271, Cl. 156-502.000.

Ribaldo, David A., 4,951,562, Cl. 100-8.000.

Sijbers, Petrus J. M.: See—  
Van Dongen, Frederik; Jouen, Philippe B. E.; and Sijbers, Petrus J. M., 4,953,207, Cl. 379-395.000.

Sikkema, Sape: See—  
Koom, Maarten; and Sikkema, Sape, 4,951,450, Cl. 56-13.600.

Sikora, Thomas R., to Tomar Electronics, Inc. Strobe flash lamp with focussed front beam and collimated lateral beams. 4,953,062, Cl. 362-263.000.

Silcox, John: See—  
Lee, Kevin C.; Lee, Charles A.; and Silcox, John, 4,952,446, Cl. 428-220.000.

Silicon Systems, Inc.: See—  
Levy, Steve; Hedberg, Dave; and Agazzi, Oscar, 4,953,186, Cl. 375-118.000.

Siliconix Incorporated: See—  
Blanchard, Richard A., 4,952,992, Cl. 357-23.400.

Sillanpaa, Pauli: See—  
Jarvenkyla, Jyri; and Sillanpaa, Pauli, 4,952,362, Cl. 264-209.200.

Silverman, Michael W., to Pin Dot Products. Contoured support cushions. 4,951,336, Cl. 5-481.000.

Simazaki, Yuzuru: See—  
Kumasaka, Takao; Simazaki, Yuzuru; and Tanno, Kiyohiko, 4,952,951, Cl. 346-160.000.

Simmonds Precision Products, Inc.: See—  
Spillman, William B., Jr., 4,952,797, Cl. 250-227.210.

Simon, Robert C., Jr.: See—  
Poirier, David C.; Matheny, Mark T.; Martin, Harold M.; Wroblewski, Gerald J.; and Simon, Robert C., Jr., 4,951,773, Cl. 180-197.000.

Simone, Daniel A., to Motorola, Inc. Complex bandpass digital filter. 4,953,184, Cl. 375-103.000.

Simons, Donald M., to Du Pont de Nemours, E. I., and Company. Estriol derivatives. 4,952,569, Cl. 424-88.000.

Singer, Mary E.: See—  
Finnerty, William R.; and Singer, Mary E., 4,952,500, Cl. 435-69.100.

Sinisi, David B.: See—  
Barkus, Lee A.; and Sinisi, David B., 4,952,172, Cl. 439-532.000.

Sinterstahl Gesellschaft m.b.H.: See—  
Knoess, Walter, 4,951,798, Cl. 192-107.00M.

Siol, Werner; and Terbrack, Ulrich, to Rohm GmbH Chemische Fabrik. Compatible polymer mixtures. 4,952,455, Cl. 428-373.000.

Sipido, Victor: See—  
Boeckx, Gustaaf M.; Raeymaekers, Alfons H. M.; and Sipido, Victor, 4,952,570, Cl. 514-242.000.

Sircar, Jagadish C.; and Pinter, Garry W., to Warner-Lambert Company. Oxazolo-pyrimidine derivatives. 4,952,693, Cl. 544-255.000.

Sirko, Carol A. Greeting card. 4,952,091, Cl. 402-79.000.

Skalet, Detlef, to Hoechst Aktiengesellschaft. Apparatus for carrying out membrane separation processes. 4,952,313, Cl. 210-321.760.

Skenazi, Andre; Strauven, Ivan A.; and Cauwe, Michel L., to Metallurgie Hoboken-Overpelt. Zinc alloys for electrochemical battery cans. 4,952,368, Cl. 420-513.000.

Skikakura, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, to Canon Kabushiki Kaisha. Image signal encoding apparatus. 4,953,019, Cl. 358-133.000.

Skinner, Daniel S., Jr.: See—  
De Leon, Jose; Ferguson, Thomas H.; and Skinner, Daniel S., Jr., 4,952,419, Cl. 427-2.000.

Skogler, Nicholas: See—  
Levine, Michael; Russo, James; Rigotti, Victor; and Skogler, Nicholas, 4,951,473, Cl. 62-82.000.

Slade, Frank A.: See—  
Luebke, Clement J.; Sank, Gerald W.; and Slade, Frank A., 4,951,645, Cl. 126-20.100.

Sladek, David T., to Thayer Medical Corporation. Quick-connect adapter valve for connecting nebulizer and fluid ventilator hose. 4,951,661, Cl. 128-202.270.

Slautterback Corporation: See—  
Faulkner, W. Harrison, III, 4,951,917, Cl. 251-129.150.

Slongo, Mario: See—  
Bernier, Godwin; and Slongo, Mario, 4,952,620, Cl. 524-99.000.

Smal, Jean: See—  
DeMeys, Pierre; Smal, Jean; and Fujita-Yamaguchi, Yoko, 4,952,567, Cl. 514-54.000.

Smart Kids, Inc.: See—  
Ng, Norman, 4,951,556, Cl. 99-285.000.

Smejkal, Hellmuth: See—  
Eysn, Manfred; Fuhrmann, Ernest; Grabner, Hans; Hollwarth, Ernst; and Smejkal, Hellmuth, 4,951,928, Cl. 266-225.000.

SMF International: See—  
Cendre, Andree; and Boulet, Jean, 4,951,760, Cl. 175-269.000.

Smith, Burton H., to Raytheon Company. Waveguide structures and methods of manufacture for traveling wave tubes. 4,951,380, Cl. 29-600.000.

Smith, Catherine M.: See—  
Byrnes, Paul J.; Molina, Cynthia M.; Martinus, Janis A.; Vaughan, Kenward S.; and Smith, Catherine M., 4,952,336, Cl. 252-301.160.

Smith, Christopher J. B., IV, to Pro Stretch, Inc. Exercise shoe. 4,951,938, Cl. 272-96.000.

Smith, David W.: See—  
Healey, Peter; and Smith, David W., 4,952,010, Cl. 350-3.770.

Smith, Floyd D.: See—  
McNab, Donald R.; and Smith, Floyd D., 4,951,569, Cl. 101-483.000.

Smith, Frank W.: See—  
Calawa, Arihur R.; Smith, Frank W.; Manfra, Michael J.; and Chen, Chang-Lee, 4,952,527, Cl. 437-107.000.

Smith, Gary N.: See—  
Pezzoli, Paul A.; Smith, Gary N.; and Montgomery, Jerold, 4,951,845, Cl. 215-250.000.

Smith, George A.: See—  
Cameron, Frank L.; and Smith, George A., 4,952,900, Cl. 337-217.000.

Smith, Harrison C. Convertible container for carrying clothes and carrying and protecting various lengthy items. 4,951,816, Cl. 206-279.000.

Smith, Ian R.: See—  
Brown, Thomas H.; Mitchell, Robert C.; Smith, Ian R.; and Young, Rodney C., 4,952,589, Cl. 514-310.000.

Smith Kline & French Laboratories Limited: See—  
Brown, Thomas H.; Mitchell, Robert C.; Smith, Ian R.; and Young, Rodney C., 4,952,589, Cl. 514-310.000.

Smith, Martin L.: See—  
Boyes, Michael; Lloyd, Alan M.; Smith, Martin L.; and Constable, Alan, 4,951,650, Cl. 126-92.00R.

Smith, Ray E., to Pro-Max Performance, Inc. Scratch remover and polish containing oleic diethanolamide, an abrasive alumina and a bentonite. 4,952,240, Cl. 106-8.000.

Smith, Susanna R.: See—  
Ryder, John H., Sr.; and Smith, Susanna R., 4,953,209, Cl. 380-23.000.

Smith, Thomas W.: See—  
Fuller, Timothy J.; Smith, Thomas W.; Prest, William M., Jr.; Nelson, Robert A.; McGrane, Kathleen M.; and Ahuja, Suresh K., 4,952,477, Cl. 430-109.000.

Smith, Walter L.: See—  
Opsal, Jon; Rosencwaig, Allan; and Smith, Walter L., 4,952,063, Cl. 356-432.000.

Smith, William J.: See—  
Miller, Harmon R.; Smith, William J.; and Stanley, Hollie M., 4,951,433, Cl. 52-126.600.

Smithers, Robert K.; Knapp, Gordon S.; Westbrook, Edwin M.; and Forster, George A., to United States of America, Energy. High intensity x-ray source using liquid gallium target. 4,953,191, Cl. 378-143.000.



Smithgall, David H., Sr.: See—  
Frazee, Ralph E., Jr.; and Smithgall, David H., Sr., 4,952,226, Cl. 65-3.120.

SMW Schneider & Weisshaupt GmbH: See—  
Hiestand, Karl, 4,951,535, Cl. 82-142.000.

Snelgrove, R. Vernon: See—  
Cipriano, Robert A.; Snelgrove, R. Vernon; and McCullough, Francis P., Jr., 4,952,466, Cl. 429-104.000.

Snider, Dale. Feminine tampon coated with beeswax. 4,952,211, Cl. 604-285.000.

Snowdrift Corp. N.V.: See—  
Fritz, Karl, deceased, 4,952,763, Cl. 219-10.55A.

Sobel, Johannes: See—  
Renner, Gunter; Sobel, Johannes; Wagner, Klaus; Junkers, Gunter; and Sommer, Friedhelm, 4,952,487, Cl. 430-546.000.

Socarides, Charles W.: See—  
Epstein, Jack; Epstein, Morris; and Socarides, Charles W., 4,951,969, Cl. 283-67.000.

Societe Ameca: See—  
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Societe Anonyme dite: ALCATEL CIT: See—  
Gauthier, Claude; and Baland, Guy, 4,952,795, Cl. 250-214.00A.

Societe Anonyme dite: Alstom: See—  
Perret, Michel, 4,952,759, Cl. 200-82.00R.

Societe Anonyme dite: Compagnie Generale d'Electricite: See—  
Le Sergeant, Christian; Ramos, Josiane; and Barre, Gilles, 4,952,225, Cl. 65-312.000.

Societe Anonyme dite: Compagnie Industrielle de Materiel de Transport C.I.M.T. Lorraine: See—  
Setan, Claude, 4,951,560, Cl. 105-340.000.

Societe Anonyme dite: SAFT: See—  
Buchel, Jean-Pierre; Crepy, Gilles; Danel, Veronique; and de Guibert, Anne, 4,952,467, Cl. 429-112.000.

Societe Anonyme dite: Telic Alcatel: See—  
Douhet, Gerard; and Daviaud, Yves, 4,953,055, Cl. 361-62.000.

Societe Generale: See—  
Kiss, Gunter H., 4,952,356, Cl. 264-113.000.

Societe Mancelle de Fonderie: See—  
Daumas, Claude G., 4,952,282, Cl. 164-245.000.

Societe Manzoni Bouchot: See—  
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Societe Nationale Elf Aquitaine: See—  
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Juge, Sylvain; and Legras, Yvonne, 4,952,740, Cl. 558-83.000.

Societe Nationale Industrielle et Aerospatiale des Poudres et Explosifs: See—  
Aubry, Jacques A.; and Mondet, Jean J., 4,952,120, Cl. 416-114.000.

Sodtalbers, Erich W.: See—  
Gordon, John; and Sodtalbers, Erich W., 4,951,805, Cl. 198-525.000.

Soeda, Katsuji, to Yamamoto Electric Corporation. Motor control system. 4,952,860, Cl. 318-721.000.

Sohda, Kazunori: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouchi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohda, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.

Sohn, Daniel D.: See—  
Miyano, Masateru; Shone, Robert L.; and Sohn, Daniel D., 4,952,705, Cl. 548-525.000.

Soken Kagaku Kabushiki Kaisha: See—  
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Sokolov, Vladimir I.: See—  
Drobachenko, Valery P.; Lukonina, Olga A.; Koval, Vladimir P.; Sokolov, Vladimir I.; and Maltsev, Boris A., 4,952,099, Cl. 406-50.000.

Solco Basel AG: See—  
Tschannen, Roland; Fraefel, Wolfgang; Schmidt, Richard R.; Klager, Rudolf; and Zimmermann, Peter, 4,952,683, Cl. 536-186.000.

Solex Research Corporation of Japan: See—  
Watanabe, Morio; and Sei, Renpei, 4,952,378, Cl. 423-139.000.

Solheim, Odd. Fire extinguishing plant for three extinguishing agents. 4,951,754, Cl. 169-15.000.

Somekh, Sasson: See—  
Maydan, Dan; Somekh, Sasson; Wang, David N.; Cheng, David; Toshima, Masato; Harari, Isaac; and Hoppe, Peter D., 4,951,601, Cl. 118-719.000.

Someya, Akihiko, to Kabushiki Kaisha Toshiba. Life expiration detector for light source of image processing apparatus. 4,952,972, Cl. 355-68.000.

Sommer, Friedhelm: See—  
Renner, Gunter; Sobel, Johannes; Wagner, Klaus; Junkers, Gunter; and Sommer, Friedhelm, 4,952,487, Cl. 430-546.000.

Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, to Sekisui Kagaku Kogo Kabushiki Kaisha. Method of drilling a branch line aperture after internal lining of a pipeline and a water plug used in the method. 4,951,758, Cl. 175-40.000.

Sonobe, Hiraku, to Canon Kabushiki Kaisha. Optical recording apparatus having improved erasing capability. 4,953,150, Cl. 369-13.000.

Sony Corporation: See—  
Hedley, David J.; and Richards, John W., 4,953,107, Cl. 364-522.000.

Kato, Naoya; Kakinuma, Koichiro; Naganuma, Tohru; Ando, Makoto; and Majima, Osamu, 4,953,031, Cl. 358-300.000.

Kondo, Tetsujiro, 4,953,023, Cl. 358-135.000.

Kumura, Tatsuo; Sato, Heikichi; Kunito, Yoshiyuki; Ikeda, Yoshito; Izu, Etsuo; and Hayakawa, Masatoshi, 4,953,050, Cl. 360-126.000.

Lagadee, Roger, 4,953,117, Cl. 364-724.100.

Lee, Robert A., 4,952,185, Cl. 445-2.000.

Mita, Kiroyuki; and Kobayashi, Kozo, 4,953,179, Cl. 375-1.000.

Odaka, Kentaro, 4,953,168, Cl. 371-37.400.

Saitoh, Mitsumasa; Ogawa, Seiichi; Yamane, Miyuki; and Fukasawa, Hideki, 4,953,025, Cl. 358-140.000.

Soos, James L.: See—  
McDonald, Alexander C.; and Soos, James L., 4,952,324, Cl. 210-697.000.

Soper, Jesse S.: See—  
Walsh, Michael J.; and Soper, Jesse S., 4,951,467, Cl. 60-361.000.

Sorenson, John R. J.; and Oberley, Larry W., to International Copper Research Association, Inc. Copper complex for treating cancer. 4,952,607, Cl. 514-589.000.

Sorg, Volkmar R. Polishing apparatus. 4,951,420, Cl. 51-58.000.

Sorin Biomedica S.p.A.: See—  
Zantonelli, Piero; and Graglia, Sergio, 4,952,312, Cl. 210-321.740.

Sorkilmo, Clayton O. Door lock security apparatus. 4,951,982, Cl. 292-343.000.

Sosbee, Jerry: See—  
Harben, Grover S., III; Petty, Gene; and Sosbee, Jerry, 4,951,352, Cl. 17-11.000.

Soshi, Fujio; Okuda, Masaharu; and Asami, Koichiro, to Taikisha, Ltd. Painting machine and control unit for use in a painting booth. 4,951,600, Cl. 118-696.000.

Sossamon, Terry. Drill-operated adapter for unwinding fishing line from reels. 4,951,890, Cl. 242-47.000.

Souda, Yuji: See—  
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Moore, Dan T., III; Collins, Edward A.; and Wheeler, Maurice E., 4,952,610, Cl. 521-99.000.

Sourgen, Laurent: See—  
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Jackson, George V. T., 4,953,165, Cl. 371-16.100.

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Barletta, Anthony; Ottomaneli, Joseph V.; and Spector, George, 4,951,817, Cl. 206-305.000.

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Ekstrand, John P., 4,953,176, Cl. 372-107.000.

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Nau, Vance J.; and Grant, Keith H., 4,953,075, Cl. 364-140.000.

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Spence, Floyd G.; de Alvare, Louis R.; and Allen, Robert J., to BASF Corporation. Azo colorants for ball point pen and ribbon inks. 4,952,677, Cl. 534-573.000.

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Olsen, Zenny; Sperbeck, Albert J.; Hamman, Eric; and D'Angelo, Gary, 4,951,549, Cl. 91-363.00R.

Sperry Marine Inc.: See—  
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Johnson, Robert G.; Holmen, James O.; Foster, Ronald B.; and Sridhar, Uppili, 4,952,904, Cl. 338-36.000.

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Stacheli, Christoph: See—  
Binder, Rolf; Hanselmann, Daniel; Schlepfer, Walter; and Stacheli, Christoph, 4,951,358, Cl. 19-80.00R.

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Harris, Jonathan H.; Marse, Allan V.; Tenhover, Michael A.; and Wilson, Richard M., 4,952,465, Cl. 429-60.000.

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Keys, James F., 4,951,418, Cl. 49-440.000.

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Wilson, Hillis L.; Yaichuk, Peter W.; Davenport, Michael B.; Stare, Jack W.; and Bossack, Thomas J., 4,951,564, Cl. 101-93.120.

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Teppo, David S.; Demmon, Thomas R.; DeKraker, Larry; and Steffens, James P., 4,951,995, Cl. 297-411.000.

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Gerharz, Norbert; Kessler, Eduard; Kleinevoss, Albert; Kleudgen, Hans; Kopia, Jochen; and Stein, Bernd, 4,952,343, Cl. 264-109.000.

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Steinberg, Howard N.: See—  
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Steinman, Martin: See—  
Babad, Esther; Carruthers, Nicholas; and Steinman, Martin, 4,952,729, Cl. 564-274.000.

Steinort, Hans, to Senkingswerk GmbH. Tunnel-type washing machine with eccentric auger axis. 4,951,458, Cl. 68-27.000.

Stelco Inc.: See—  
Hone, Michel R.; and Martel, Jacques R., 4,951,694, Cl. 134-64.00R.

Stengel, Joachim: See—  
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Stephens, Albert L., Jr. Releasable loop retainer. 4,951,361, Cl. 24-3.00K.

Stephens, David N.: See—  
Biere, Helmut; Huth, Andreas; Rahtz, Dieter; Schmichen, Ralph; Seidelmann, Dieter; Schneider, Herbert H.; and Stephens, David N., 4,952,698, Cl. 548-131.000.

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Stern, Avinoam: See—  
Lepek, Alexander; and Stern, Avinoam, 4,953,148, Cl. 368-202.000.

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Dube, Ghyslain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,952,237, Cl. 75-10.190.

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Stewart, Thomas L.: See—  
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Bito, Laszlo Z.; and Stjerschantz, Johan W., 4,952,581, Cl. 514-236.200.

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Blevins, Bruce D.; and Stone, Steven, 4,951,413, Cl. 43-43.130.

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Stormont, Robert S.: See—  
Buchwald, Randall H.; Stormont, Robert S.; and Noonan, Jeffrey P., 4,951,672, Cl. 128-653.05C.

Stout, John D.: See—  
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Kemmer, Rudolf; Zuidhof, Pieter; and Stouten, Johannes J., 4,952,794, Cl. 250-213.0VT.

Stoyan, Nick. Corneal contact lens and method for treating myopia. 4,952,045, Cl. 351-160.00R.

Straight, Michael R.: See—  
Roimestad, Gerald C.; and Straight, Michael R., 4,951,807, Cl. 198-778.000.

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Andree, Roland; Haug, Michael; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,952,235, Cl. 71-94.000.

Muller, Klaus-Helmut; Fest, Christa; Kirsten, Rolf; Pfister, Theodor; Riebel, Hans-Jochem; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,952,233, Cl. 71-92.000.

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Straten, Gunter; and Kiefer, Klaus-Jurgen. Warning triangle for motor vehicles. 4,952,910, Cl. 340-473.000.

Strauer, Terry, to Triplett Corporation. Compact taut band meter movement assembly. 4,952,870, Cl. 324-154.00R.

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Berger, Harvey J.; Khaw, Ban A.; Pak, Koon Y.; and Strauss, H. William, 4,952,393, Cl. 424-1.100.

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Stromdahl, Carl A., to Conjet A.B. Device for working at a hard material, 4,951,428, Cl. 51-436.000.

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Wang, Chao-Huei J.; Stroupe, Stephen D.; and Jolley, Michael E., 4,952,691, Cl. 540-589.000.

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Hayden, Charles C.; Schmidt, Frederick A.; and Studebaker, Mark D., 4,953,159, Cl. 370-62.000.

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Leedke, David L.; and Studenberg, Fred J., 4,952,070, Cl. 370-110.400.

Studier, F. William; Davanloo, Parichehreh; Rosenberg, Alan E.; Mofatt, Barbara A.; and Dunn, John J., to Associated Universities, Inc. Cloning and expression of the gene for bacteriophage T7 RNA polymerase, 4,952,496, Cl. 435-91.000.

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Schwiwara, Harry; and Stuempke, Manfred, 4,952,150, Cl. 433-220.000.

Sucht, Gayle A.; and Mattis, John S., to Raychem Corporation. Coaxial cable connector, 4,952,174, Cl. 439-584.000.

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Sugimoto, Atsushi; and Marvin, Jack C., to Chicago Bridge & Iron Technical Service Company. Mobil power source for producing welding current for automatic, semi-automatic and manual welding, 4,952,774, Cl. 219-133.000.

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Sibata, Kenichiro; Sasaki, Nobuyuki; Yazu, Shuji; and Jodai, Tetsuji, 4,952,555, Cl. 505-1.000.

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Sumitomo Electric Industries Ltd.: See—  
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Sumitomo Pharmaceuticals Co., Ltd.: See—  
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Sumitomo Rubber Industries, Ltd.: See—  
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Supron, Steven A. Moistening apparatus, 4,951,598, Cl. 118-244.000.

Surka, Ebon: See—  
Young, William O., Jr.; and Surka, Ebon, 4,951,894, Cl. 242-58.600.

Suttie, David G., to Amchem Company Limited. Machining method and apparatus, 4,952,789, Cl. 219-121.680.

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Suzuki, Eiichi: See—  
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Ikeda, Hisao; Suzuki, Fumio; Watanabe, Yoshitane; Matsumura, Mitsunobu; Takahashi, Yasuhiro; Murakami, Hiroshi; and Maeda, Koichi, 4,952,279, Cl. 162-175.000.

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Suzuki, Masami, to Pioneer Electronic Corporation. Data reproducing device controlling image display dependent upon loss of time data, 4,953,153, Cl. 369-49.000.

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Kaneko, Mitsuyoshi; Suzuki, Ryooji; and Aoki, Shinji, 4,952,231, Cl. 71-59.000.

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Suzuki, Shinichi: See—  
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Suzuki, Takahiro: See—  
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Suzuki, Takamasu: See—  
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Suzumeji, Momoko: See—  
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Svadenak, Rudolf E.: See—  
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Swanson, Hilmer I., to Harris Corporation. Phase modulation compensated amplitude modulator using digitally selected amplifiers, 4,952,890, Cl. 332-152.000.

Sweers, Ronald L. Chimney and wall flashing system, 4,951,431, Cl. 52-58.000.

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Hardt, Jean; and Hoefling, Erich, 4,951,847, Cl. 222-386.500.

Sych, Terence: See—  
Purdham, David M.; Scheuneman, James H.; Byers, Larry L.; Sych, Terence; and Tsang, Kwisook, 4,953,131, Cl. 365-222.000.

Syntex (U.S.A.) Inc.: See—  
McMillan, William A., 4,951,684, Cl. 128-758.000.

Nelson, Peter H.; Gu, Chee-Liang L.; Allison, Anthony C.; Eugui, Elsie M.; and Lee, William A., 4,952,579, Cl. 514-233.500.

Synthetic Products Company: See—  
Grossman, Richard F., 4,952,634, Cl. 525-190.000.

Sypula, Donald; and Mammino, Joseph, to Xerox Corporation. Polymer electrodeposition process, 4,952,293, Cl. 204-180.700.

Szapucki, Mathew; and Kulkaski, Richard. Coin telephone collection box, 4,951,869, Cl. 232-15.000.

Szostak, Rosemarie: See—  
Nair, Vinayak; and Szostak, Rosemarie, 4,952,385, Cl. 423-326.000.

Szymanski, Thomas; Butcher, Kenneth R.; and Remus, Donald J., to Norton Company. Alumina particles, 4,952,389, Cl. 423-625.000.

Taboada, Vincent C. Accordion pleated vehicle cover, 4,951,993, Cl. 296-136.000.

Tabuchi, Junichi: See—  
Tezuka, Motohiko; Tabuchi, Junichi; Okubo, Yoshihide; and Kobayashi, Takeshi, 4,952,433, Cl. 428-42.000.

Tabuchi, Shinichi; to Minolta Camera Co., Ltd. Copying apparatus and method, 4,952,982, Cl. 355-316.000.

Tachi, Shigeyuki: See—  
Kishi, Katsutoshi; Tachi, Shigeyuki; Inagaki, Kazuhiro; and Saruwatari, Yoshinori, 4,951,360, Cl. 19-225.000.

Tachibana, Takaaki: See—  
Hanafusa, Kunio; Fukuhara, Naoshige; and Tachibana, Takaaki, 4,951,986, Cl. 293-120.000.

Tacito, Louis D.: See—  
Beck, Martin H.; Tacito, Louis D.; Arseneau, Warren; Booth, Robert J.; and Jasim, Khalid, 4,952,268, Cl. 156-295.000.

Tack, Newton G. Toilet seat return device, 4,951,325, Cl. 4-251.000.

Taddia, Pierino; and Boriani, Silvano, to G.D. Societa per Azioni. Discrete strip of paper material from which to fashion a rigid box with hinged lid, in particular a flip-flop cigarette packet, and the packet obtained by folding such a strip of material, 4,951,862, Cl. 229-160.100.

Tadenuma, Hiroshi: See—  
Kasai, Kiyoshi; Hattori, Masayuki; Tadenuma, Hiroshi; and Yasukawa, Shiro, 4,952,651, Cl. 526-201.000.

Taga, Fukutaro: See—  
Matsukubo, Hiroshi; Matsumoto, Toyomi; Miyashita, Mitsutomo; Okamura, Kyuya; Taga, Fukutaro; Sekiguchi, Haruo; and Hamada, Katsuhiro, 4,952,591, Cl. 514-321.000.

Taga, Haruo, to Alpine Electronics Inc. Cassette tape player with door operating mechanism, 4,953,045, Cl. 360-96.500.

Tagawa, Hisatoshi: See—  
Matsumoto, Kazuaki; Suzuki, Shinichi; and Tagawa, Hisatoshi, 4,952,250, Cl. 148-12.00F.

Tagomori, Tsutomu: See—  
Sakaki, Yasunori; Tagomori, Tsutomu; and Yamada, Eisaku, 4,952,270, Cl. 156-361.000.

Taguchi, Katsuhiko, to Juki Corporation. Device for supporting magnetic heads for double sided discs, 4,953,046, Cl. 360-104.000.

Tahernia, Omid: See—  
Herold, Barry W.; and Tahernia, Omid, 4,953,187, Cl. 377-48.000.

Taii, Toshiaki: See—  
Ito, Masaru; Watanabe, Hitoshi; Taii, Toshiaki; and Tsunoda, Yoshito, 4,953,152, Cl. 369-44.390.

Taishin Ltd.: See—  
Morioka, Koji, 4,952,221, Cl. 55-240.000.

Soshi, Fujio; Okuda, Masaharu; and Asami, Koichiro, 4,951,600, Cl. 118-696.000.

Taisho Pharmaceutical Co., Ltd.: See—  
Kawashima, Yutaka; Sato, Masakazu; Kawase, Masahiro; Watanabe, Yoshiaki; and Hatayama, Katsuo, 4,952,689, Cl. 540-200.000.

Takabayashi, Youjiro; and Norimatsu, Takashi, to Yamaha Corporation. Electronic stringed musical instrument, 4,951,546, Cl. 84-718.000.

Takada, Shunji; Nishikawa, Toshihiro; Sakanoue, Kei; and Abe, Akira, to Fuji Photo Film Co., Ltd. Photographic light-sensitive material and method of developing the same, 4,952,490, Cl. 430-567.000.

Takada, Shunji: See—  
Nishikawa, Toshihiro; and Takada, Shunji, 4,952,491, Cl. 430-570.000.

Takahara, Ichiro; Azumi, Masaaki; Shigetomi, Kazuo; Kamimura, Takaya; and Ishida, Hideki, to Sanyo Electric Co., Ltd. Pickup transport device for optical disc apparatus, 4,953,154, Cl. 369-195.000.

Takahashi, Akira: See—  
Minamiya, Katsumi; Takahashi, Akira; and Murakami, Koichi, 4,952,639, Cl. 525-327.900.

Takahashi, Eiji: See—  
Yamamoto, Akihiko; Shibuya, Naoharu; Takahashi, Eiji; and Hagi, Fumio, 4,951,476, Cl. 62-163.000.

Takahashi, Kenichi: See—  
Takeguchi, Nobuyasu; Akiyama, Toshihide; and Takahashi, Kenichi, 4,953,214, Cl. 381-31.000.

Takahashi, Masaharu: See—  
Fukushima, Motoo; Takahashi, Masaharu; and Itoh, Kunio, 4,952,609, Cl. 521-94.000.

Takahashi, Shigeru: See—  
Kawarabayashi, Waichiro; Matsubara, Koichi; Yoshioka, Toshihiro; Yamagata, Hikaru; Takahashi, Shigeru; Hirata, Yukimasa; and Shirane, Yoshiko, 4,951,415, Cl. 47-60.000.

Takahashi, Toshio: See—  
Hasegawa, Hideo; Takahashi, Toshio; and Miyagawa, Masayuki, 4,952,133, Cl. 425-503.000.

Takahashi, Tsuneo; Nishio, Tomoyuki; Ikegami, Masayuki; and Gunji, Takahiro, to Honda Giken Kogyo Kabushiki Kaisha. Gas rate sensor, 4,951,507, Cl. 73-497.000.

Takahashi, Yasuhiro: See—  
Ikeda, Hisao; Suzuki, Fumio; Watanabe, Yoshitane; Matsumura, Mitsunobu; Takahashi, Yasuhiro; Murakami, Hiroshi; and Maeda, Koichi, 4,952,279, Cl. 162-175.000.

Takahashi, Yasuo; and Hojima, Toshinari, to Kato Hatsujo Kaisha, Ltd. Hose clamp, 4,951,363, Cl. 24-20.00R.

Takahashi, Yoshio; Yanagisawa, Takashi; and Fujisawa, Eiichi, to Nissan Motor Co., Ltd. Cylinder head for DOHC internal combustion engine with four valves per cylinder, 4,951,622, Cl. 123-193.00H.

Takahasi, Takeshi: See—  
Yokoi, Hidetoshi; Niwa, Mikiya; Nomura, Yasuo; and Takahasi, Takeshi, 4,952,354, Cl. 264-69.000.

Takaishi, Tadao; and Umezaki, Tomokazu, to Mitsubishi Denki Kabushiki Kaisha. Ignition coil assembly structure for an internal combustion engine, 4,951,641, Cl. 123-647.000.

Takakura, Hiroshi: See—  
Kato, Takahiro; Hamada, Masaki; Takakura, Hiroshi; and Shibuya, Yukari, 4,953,108, Cl. 364-523.000.

Takakura, Masaki: See—  
Hayasaka, Hideto; Takakura, Masaki; Yamane, Yasukuni; and Kato, Noritoshi, 4,953,015, Cl. 358-79.000.

Takano, Kouichi. Louver device formed by sheet-like material, 4,951,728, Cl. 160-166.100.

Takano, Yoshiaki, to Minolta Camera Kabushiki Kaisha. Copying machine having plural developing units, 4,952,987, Cl. 355-209.000.

Takaragi, Yoichi, to Canon Kabushiki Kaisha. Image processing apparatus compensating for distance between document portions read by respective sensors, 4,953,014, Cl. 358-77.000.

Takasaki, Yukio: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikyu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsu; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Takashima, Kohki: See—  
Iwasaki, Tameo; and Takashima, Kohki, 4,952,602, Cl. 514-443.000.

Takata, Hidehiro; Komori, Shinji; Tamura, Toshiyuki; Yamasaki, Tetsuo; and Shima, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Data driven processor, 4,953,083, Cl. 364-200.000.

Takata, Kyouichi: See—  
Maeda, Yasutaka; Nishimura, Hideyuki; Miyamoto, Tsuyoshi; Takata, Kyouichi; Inamoto, Kiyoshi; Ohnishi, Kazuyuki; Sohma, Kazunori; Ueno, Yukihiko; Kamimura, Taisuke; Shimazawa, Yoichi; Okano, Tokiyuki; and Tokishige, Masato, 4,952,986, Cl. 355-208.000.

Takeda Chemical Industries, Ltd.: See—  
Kigasawa, Kazuo; Ohtani, Hideaki; Tanada, Makoto; and Hayashida, Shigeru, 4,952,560, Cl. 514-2.000.

Nishino, Kenichi; Shibata, Takashi; Aoki, Sanzi; Mishima, Yu-ahiro; Iwai, Hisayuki; and Hatta, Ken, 4,952,652, Cl. 523-522.000.

Takegawa, Tomohiro: See—  
Tasaki, Akira; and Takegawa, Tomohiro, 4,953,213, Cl. 381-24.000.

Takeguchi, Nobuyasu; Akiyama, Toshihide; and Takahashi, Kenichi, to Matsushita Electric Industrial Co., Ltd. Signal encoding and decoding method and device, 4,953,214, Cl. 381-31.000.

Takehira, Katsuomi: See—  
Orita, Hideo; Shimizu, Masao; Hayakawa, Takashi; and Takehira, Katsuomi, 4,952,712, Cl. 552-307.000.

Takei, Humihiko; and Takeya, Hiroyuki, to Takei, Humihiko; and Iiden Co., Ltd. Superconductive oxide crystal and a production process thereof, 4,952,390, Cl. 423-593.000.

Takei, Yoshiaki: See—  
Tarnaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, 4,952,470, Cl. 430-56.000.

Takemura, Makoto: See—  
Ito, Yoshio; Takemura, Makoto; Sata, Junichi; and Otsuki, Shinnichiro, 4,953,037, Cl. 358-496.000.

Takenouchi, Masanori: See—  
Miyagawa, Masashi; Takenouchi, Masanori; and Ohkuma, Norio, 4,952,478, Cl. 430-138.000.

Taketoshi, Kazuhisa: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikyu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki;



Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Takeuchi, Kunihiko; Oba, Masao; and Horinouchi, Shinichi, to Tokyo Keiki Company, Ltd. Memory system to perform data transfer by a contactless electromagnetic induction coupling system using induction coils. 4,953,123, Cl. 365-66.000.

Takeuchi, Shinji, to Daiwa Seiko, Inc. Drag mechanism for a spinning reel. 4,951,897, Cl. 242-246.000.

Takeuchi, Tadashi, See—

Denda, Toshio; and Takeuchi, Tadashi, 4,951,447, Cl. 53-502.000.

Takeuchi, Takayoshi, See—

Amao, Kenji; Ohyama, Kazuyoshi; Mizoguchi, Kenji; Akaishi, Tsuneshi; and Takeuchi, Takayoshi, 4,951,383, Cl. 29-721.000.

Takeya, Hiroyuki, See—

Takei, Humihiko; and Takeya, Hiroyuki, 4,952,390, Cl. 423-593.000.

Talwar, Ashok K., to American Nucleonics Corporation. Interference cancelling system and method. 4,952,193, Cl. 455-63.000.

Tamai, Shunichi, See—

Katsuma, Makoto; Kimura, Hiroyuki; Urushihara, Kazunori; Matsumura, Susumu; Ohmura, Hiroshi; Tamai, Shunichi; and Tanaka, Hideki, 4,953,227, Cl. 382-18.000.

Tamai, Yasuo, See—

Ono, Toshio; Mizuno, Chiaki; Tamai, Yasuo; and Ogawa, Hiroshi, 4,952,064, Cl. 366-76.000.

Tamaki, Akihiro, See—

Nagata, Teruyuki; Tamaki, Akihiro; Kajimoto, Nobuyuki; and Wada, Masaru, 4,952,731, Cl. 564-402.000.

Tamaki, Kiyoshi; Kudoh, Koichi; Etoh, Yoshihiko; and Takei, Yoshiaki, to Konica Corporation. Electrophotographic photosensitive member. 4,952,470, Cl. 430-56.000.

Tamamori, Hideo, to Nippon Air Brake Co., Ltd. Force multiplication mechanism. 4,951,516, Cl. 74-110.000.

Tamamushi, Takashige, See—

Nishizawa, Jun-ichi; Tamamushi, Takashige; and Maeda, Hideo, 4,952,996, Cl. 357-30.000.

Tamura Electric Works, Ltd., See—

Kai, Osamu, 4,951,799, Cl. 194-317.000.

Tamura, Toshiyuki, See—

Takata, Hidehiro; Komori, Shinji; Tamura, Toshiyuki; Yamasaki, Tetsuo; and Shima, Kenji, 4,953,083, Cl. 364-200.000.

Tamura, Yoh, to Mitsubishi Denki K.K. Display apparatus with image expanding capability. 4,952,923, Cl. 340-731.000.

Tanabe, Masaaki, See—

Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Tetsuaki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93.000.

Tanabe Seiyaku Company, Ltd., See—

Iwasaki, Tameo; and Takashima, Kohki, 4,952,602, Cl. 514-443.000.

Tanabe, Yoshimitsu, See—

Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; and Yamaguchi, Akihiro, 4,952,648, Cl. 525-539.000.

Tanada, Makoto, See—

Kigasawa, Kazuo; Ohtani, Hideaki; Tanada, Makoto; and Hayashida, Shigeru, 4,952,560, Cl. 514-2.000.

Tanaka Denki Koono Co., Ltd., See—

Tanaka, Tsuginobu, 4,952,912, Cl. 340-568.000.

Tanaka, Grant, See—

Kamikawa, Neil; Nakagawa, Arthur; Tanaka, Grant; and Yamada, Ken, 4,952,057, Cl. 356-73.100.

Tanaka, Hideki, See—

Katsuma, Makoto; Kimura, Hiroyuki; Urushihara, Kazunori; Matsumura, Susumu; Ohmura, Hiroshi; Tamai, Shunichi; and Tanaka, Hideki, 4,953,227, Cl. 382-18.000.

Tanaka, Hideo, See—

Fujita, Shigeru; Tanaka, Hideo; and Harada, Susumu, 4,952,918, Cl. 340-706.000.

Tanaka, Kouji, See—

Oikawa, Masahiro; Yamasaki, Tetsuya; Tanaka, Kouji; and Okuda, Eiji, 4,952,037, Cl. 350-413.000.

Tanaka, Nobukazu, See—

Matsuda, Kazuo; Inaba, Nobuaki; Kaminishi, Masashi; Funabashi, Tetsuji; and Tanaka, Nobukazu, 4,952,364, Cl. 264-40.100.

Tanaka, Nobuyuki, to Fuji Photo Film Co., Ltd. Method of judging the presence or absence of a limited irradiation field, method of selecting a correct irradiation field, and method of judging correctness or incorrectness of an irradiation field. 4,952,805, Cl. 250-327.200.

Tanaka, Shinya; and Yano, Koichi, to Canon Kabushiki Kaisha. Non-contact eye pressure meter. 4,951,670, Cl. 128-648.000.

Tanaka, Tadaaki, See—

Kobayashi, Reichi; Tanaka, Tadaaki; Sasaki, Fumiyoshi; and Miyazaki, Tetsuro, 4,953,026, Cl. 358-167.000.

Tanaka, Takahide, See—

Yamamoto, Norihito; and Tanaka, Takahide, 4,953,111, Cl. 364-569.000.

Tanaka, Toshiaki, See—

Uemoto, Kazuhiko; and Tanaka, Toshiaki, 4,952,767, Cl. 219-69.110.

Tanaka, Tsuginobu, to Tanaka Denki Koono Co., Ltd. Alarm system. 4,952,912, Cl. 340-568.000.

Tanaka, Yasuyuki, See—

Skikawa, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, 4,953,019, Cl. 358-133.000.

Tanaka, Yoichiro, See—

Ishikawa, Masahiro; Fujiki, Norio; Hiramoto, Yukio; and Tanaka, Yoichiro, 4,953,095, Cl. 364-484.000.

Tanbun-ek, Tawee, See—

Logan, Ralph A.; Tanbun-ek, Tawee; and Temkin, Henryk, 4,953,170, Cl. 372-44.000.

Taneya, Shoichi, See—

Sakitani, Katsumi; Kang, Yoon M.; Shinozaki, Shinichiro; Taneya, Shoichi; Miura, Kazuo; Ogura, Tadashi; and Noguchi, Satoshi, 4,951,471, Cl. 62-51.200.

Tang, David Y., See—

Maul, James J.; and Tang, David Y., 4,952,719, Cl. 558-425.000.

Tanganon, Gregory L.; Jones, Vincent L.; and Forrest, Stephen R., to Hughes Aircraft Company. Current summed optoelectronic crossbar switch. 4,953,155, Cl. 370-1.000.

Tanigawa, Shigeho, See—

Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 4,952,251, Cl. 148-101.000.

Taniguchi, Haruyuki, See—

Watanabe, Kenichi; Edahiro, Takeshi; and Taniguchi, Haruyuki, 4,951,959, Cl. 280-96.100.

Taniguchi, Nobuyuki; Niwa, Masatake; Fujii, Akira; Hoda, Takeo; Kakai, Masaaki; Sekida, Minoru; and Sahara, Masayoshi; to Minolta Camera Kabushiki Kaisha. Camera system. 4,952,959, Cl. 354-289.120.

Taniguchi, Nobuyuki, See—

Morimoto, Yasuhiro; Saito, Mitsuru; Yoshida, Tadahiho; and Taniguchi, Nobuyuki, 4,953,029, Cl. 358-229.000.

Taniguchi, Osamu, See—

Inoue, Hiroshi; Mihara, Tadashi; Mizutome, Atsushi; Taniguchi, Osamu; and Onitsuka, Yoshihiro, 4,952,032, Cl. 350-350.005.

Tanikawa, Hirohide, See—

Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; and Yoshida, Satoshi, 4,952,476, Cl. 430-106.600.

Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuhiro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, to Hitachi, Ltd. and Nippon Hoso Kyokai. Photoconductive device and method of operating the same. 4,952,839, Cl. 313-366.000.

Tanita, Takeo, See—

Azuma, Yusaku; Tanita, Takeo; Yamamoto, Toshihiro; Kasai, Shozo; Yasuhara, Masateru; and Sawada, Yasuhiro, 4,951,517, Cl. 74-209.000.

Taniyama, Yoshiharu, to Kabushiki Kaisha Toshiba. Separation unit. 4,951,936, Cl. 271-307.000.

Tanno, Kiyohiko, See—

Kumasaka, Takao; Simazaki, Yuzuru; and Tanno, Kiyohiko, 4,952,951, Cl. 346-160.000.

Tanno, Norihiko, See—

Sakamaki, Yasuhisa; Ozaki, Yukio; and Tanno, Norihiko, 4,952,566, Cl. 514-34.000.

Tanooka, Hikomi, See—

Yokoyama, Seiko; Tanooka, Hikomi; Hibino, Minoru; and Arakawa, Junichi, 4,952,775, Cl. 219-213.000.

Tapco Products Company, Inc., See—

Cross, James; Henning, Jerry; Rhoades, James J.; Chubb, Arthur B.; and Olsen, David B., 4,951,540, Cl. 83-397.000.

Tapin, Jean. Biocidal composition with copper algicide. 4,952,398, Cl. 71-67.000.

Taplin, Lael B., to Vickers, Incorporated. Power transmission. 4,952,916, Cl. 340-686.000.

Tararuj, Christopher; and Schaab, Carl K., to Webcraft Technologies, Inc. Powder and microcapsule fragrance enhanced sampler. 4,952,400, Cl. 424-401.000.

Tarbet, Bryon J., See—

Bradshaw, Jerald S.; Bochenska, Maria; Krakowiak, Krzysztof E.; Biernat, Jan F.; Tarbet, Bryon J.; Bruening, Ronald L.; and Izatt, Reed M., 4,952,321, Cl. 210-670.000.

Tarnoff, Howard R.; and Reiling, Victor G., to Main Street Toy Company, Inc. Deformable article. 4,952,190, Cl. 446-267.000.

Tasaki, Akira; and Takegawa, Tomohiro, to Pioneer Electronic Corporation. Surround r de stereophonic reproducing equipment. 4,953,213, Cl. 381-24.000.

Tashiro, Yoshiharu, to NEC Corporation. Method for driving an optoelectronic switching device. 4,952,028, Cl. 350-320.000.

Tatsumi, Eiji, See—

Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,951,441, Cl. 52-741.000.

Tatsuno, Yuzo, See—

Tsukamoto, Koziro; Tatsuno, Yuzo; Kubo, Masaki; and Kumano, Yosio, 4,951,568, Cl. 101-415.100.

Tavss, Edward A.; Temin, Samuel C.; Santalucia, John; and Carroll, David L., to Colgate-Palmolive Company. Dispensing container made from an ethylene vinyl alcohol containing laminated material and the material therefor. 4,951,841, Cl. 222-107.000.

Taylor, Harris, See—

Russo, Roger A.; and Taylor, Harris, 4,951,909, Cl. 248-206.200.

Taylor, Jewell A.; and Bretl, Robert J., to Lock-R-Lox, Inc. Push-button padlocks having swivel-only shackles. 4,952,228, Cl. 70-25.000.

Taylor, William, See—

Peters, Ronald L.; Peters, Rudolph; and Taylor, William, 4,951,860, Cl. 227-177.000.

TDK Corporation, See—

Kawaguchi, Yukio; and Kineri, Tohru, 4,952,902, Cl. 338-22.00R.

Tecogen, Inc., See—

Shukla, Kailash C.; Hurley, James R.; Orcheski, Conrad J.; and Grimanis, Michael P., 4,951,648, Cl. 126-21.00A.

Tektronix, Inc., See—

Frisch, Arnold M., 4,952,820, Cl. 307-311.000.

Ivey, Matthew A.; and Fundak, Davorin, 4,953,017, Cl. 358-139.000.

Nippoldt, Reuben E., 4,952,919, Cl. 340-710.000.

Tel Sagami Limited, See—

Ohkase, Wataru, 4,952,115, Cl. 414-618.000.

Teleflex Incorporated, See—

Niskanen, Don L., 4,951,524, Cl. 74-502.400.

Tellerman, Jacob, to MTS Systems Corporation. Compact head, signal enhancing magnetostriuctive transducer. 4,952,873, Cl. 324-207.130.

Tellis, Cyril; Hori, Saburo; and Milks, David, to Union Carbide Chemicals and Plastics Company Inc. Control ACR product yields by adjustment of severity variables. 4,952,745, Cl. 585-648.000.

Temin, Samuel C., See—

Tavss, Edward A.; Temin, Samuel C.; Santalucia, John; and Carroll, David L., 4,951,841, Cl. 222-107.000.

Temkin, Henryk, See—

Logan, Ralph A.; Tanbun-ek, Tawee; and Temkin, Henryk, 4,953,170, Cl. 372-44.000.

Temperature Adjusters, Inc., See—

Childs, Henry T., 4,951,582, Cl. 110-317.000.

Temple, Michael D.; and Seddon, Richard L., to Optical Coating Laboratory, Inc. System and method for vacuum deposition of thin films. 4,951,604, Cl. 118-723.000.

Templet, Vicki, to Wallace Computer Services, Inc. Double envelope construction for facsimile handling and method. 4,951,863, Cl. 229-72.000.

Temus, Charles J.; Burnham, Ronald E.; and Allan, Gregory R., to Nuclear Packaging, Inc. Dewatering nuclear wastes. 4,952,339, Cl. 252-632.000.

Tenhover, Michael A., See—

Harris, Jonathan H.; Marse, Allan V.; Tenhover, Michael A.; and Wilson, Richard M., 4,952,465, Cl. 429-60.000.

Tenhundfeld, John H.; Melchior, Daniel R.; and Duckworth, Michael A., to Amana Refrigeration, Inc. Modular blower and heater assembly for air conditioner. 4,951,737, Cl. 165-1.000.

Tenney, Brian J.; and Tenney, Kerry L. Multi-functional space saving container system. 4,951,832, Cl. 220-23.830.

Tenney, Kerry L., See—

Tenney, Brian J.; and Tenney, Kerry L., 4,951,832, Cl. 220-23.830.

Tennikova, Tatiana B., See—

Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenki, Boris G., 4,952,349, Cl. 264-45.100.

Tenryu Technics Co., Ltd., See—

Fujioka, Teruhiko, 4,952,113, Cl. 414-416.000.

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Wardle, Robert B.; Hinshaw, Jerald C.; and Edwards, William W., 4,952,644, Cl. 525-410.000.

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Cartledge, Norman; Andrade, Luiz; and Thom, James, 4,953,052, Cl. 361-20.000.

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Berger, Jean L.; and Arques, Marc, 4,952,788, Cl. 250-208.100.

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Iwasaki, Katsunori; Tanigawa, Shigeo; and Tokunaga, Masaaki, 4,952,251, Cl. 148-101.000.

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Tokyo Keiki Company, Ltd.: See—  
Takeuchi, Kunihiro; Oba, Masao; and Horinouchi, Shinichi, 4,953,123, Cl. 365-66.000.

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Sikora, Thomas R., 4,953,062, Cl. 362-263.000.  
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Tomida, Yoshinori: See—  
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Tomihashi, Nobuyuki; Yamana, Masayuki; Araki, Takayuki; and Nomura, Sachio, to Daikin Industries, Ltd. Process for preparing fluorine-containing copolymers. 4,952,653, Cl. 526-249.000.

Tomimatsu, Shigenao, to Sanden Corporation. Air conditioning system. 4,951,477, Cl. 62-217.000.

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Ohkuma, Hiroaki; Tomita, Koji; Konishi, Masataka; and Kamei, Hideo, 4,952,709, Cl. 549-292.000.

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Tomizawa, Yukio: See—  
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Tong Ho Musical & Wooden Works Co., Ltd.: See—  
Chen, Wen-Tsung, 4,951,542, Cl. 84-293.000.

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Okazaki, Iwao; Abe, Koichi; Nakajima, Shoji; Ito, Kiyohiko; Nishino, Satoru; and Minamizawa, Hidehito, 4,952,449, Cl. 428-147.000.

Torelli, Guido: See—  
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Haneishi, Tatsuo; Nakajima, Mutsuo; Torikata, Akio; Okazaki, Takao; Tohji, Shigeo; Manbu; and Kawakubo, Katsuhiko, 4,952,234, Cl. 71-92.000.

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Maydan, Dan; Somekh, Sasson; Wang, David N.; Cheng, David; Toshima, Masato; Harari, Isaac; and Hoppe, Peter D., 4,951,601, Cl. 118-719.000.

Toto, Ltd.: See—  
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Touma, Alfred S.: See—  
Abdullaly, Iqbal F.; and Touma, Alfred S., 4,951,611, Cl. 122-4.00D.

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Rouleau, Patrick; Rouleau, Alain; and Touret, Jean-Pierre, 4,952,203, Cl. 493-480.000.

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Fellows, Mark W.; Wong, John M.; and Toy, Edmond, 4,952,849, Cl. 315-307.000.

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Toyoda Gosei Co., Ltd.: See—  
Kasugai, Joji, 4,952,347, Cl. 264-26.000.

Tomida, Mamoru; Kondo, Sadao; Ueno, Masato; Suzuki, Takamasa; Tukahara, Masamitsu; and Asakawa, Yosiyuki, 4,951,962, Cl. 280-689.000.

Toyosawa, Manabu, to Daiya Sangyo Co. Ltd. Cooker for use in microwave oven. 4,952,765, Cl. 219-10.55E.

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Yamazaki, Koji; Okuyama, Shinichi; Watanuki, Kazuhiko; and Toyoshima, Ken, 4,951,381, Cl. 29-603.000.

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Luft, Gerhard; and Trabold, Peter, 4,952,727, Cl. 562-891.000.

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Dicker, David, 4,951,864, Cl. 229-80.000.

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Seelmann-Eggebert, Hans-Peter; Boeckh, Dieter; Hartmann, Heinrich; Trieselt, Wolfgang; and Kud, Alexander, 4,952,655, Cl. 526-318.400.

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Trumpf GmbH & Co.: See—  
Erlenmaier, Werner, 4,951,375, Cl. 29-568.000.

Truzschler GmbH & Co. KG: See—  
Leifeld, Ferdinand; and Hosel, Fritz, 4,951,359, Cl. 19-98.000.

TRW Daut & Rietz GmbH: See—  
Koener, Josef; and Steinhardt, Helmut, 4,952,176, Cl. 439-681.000.

Trybalski, Eugene J.; Kramss, Richard H.; and Brabander, Herbert J., to American Cyanamid Company. 3- or 4-substituted oxotremorine derivatives and a method of treating central cholinergic dysfunction therewith. 4,952,600, Cl. 514-424.000.

Tsang, Kwisook: See—  
Purdham, David M.; Scheuneman, James H.; Byers, Larry L.; Sych, Terence; and Tsang, Kwisook, 4,953,131, Cl. 365-222.000.

Tsay, Ywan-Lung: See—  
Robinson, Murray J.; and Tsay, Ywan-Lung, 4,952,999, Cl. 357-68.000.

Tschannen, Roland; Fraefel, Wolfgang; Schmidt, Richard R.; Klager, Rudolf; and Zimmermann, Peter, to Solco Basel AG. Process for the preparation of sphingosine derivatives. 4,952,683, Cl. 536-186.000.

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Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Pelzl, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zschke, Horst, 4,952,699, Cl. 548-136.000.

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Tsuboi, Noboru; Kubo, Kazuo; and Nishitani, Kunihiro, to Kabushiki Kaisha Kobe Seiko Sho. Screw type mechanical supercharger. 4,951,638, Cl. 123-559.100.

Tsuji, Katsuhisa; and Ogawa, Tomoko, to Ricoh Company, Ltd. Color image processing device. 4,953,013, Cl. 358-75.000.

Tsuji, Kazutaka: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

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Kazumi, Jiro; Tsujimoto, Shinichi; and Ishihara, Masaaki, 4,952,967, Cl. 354-442.000.

Tsukahara, Jiro; Ohki, Nobutaka; and Yamada, Makoto, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, a disulfonamide reducing agent and polymerizable compound. 4,952,474, Cl. 430-138.000.

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Tsuned, Masayuki, to Daifuku Co., Ltd. Conveyor system using automotive cart. 4,951,574, Cl. 104-295.000.

Tsunekawa, Yuzo: See—  
Tsuruta, Hikaru; Tsunekawa, Yuzo; and Torii, Yoshinao, 4,952,266, Cl. 156-243.000.

Tsuno, Nobuo, to NGK Insulators, Ltd. Backflow-preventing valves for injection-molding machines. 4,951,920, Cl. 251-368.000.

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Hirata, Keiichi; Ban, Tomohiro; Kawasumi, Atsuko; Nakagawa, Kazuko; Mizutani, Yukimi; and Tsuruki, Atoru, 4,953,105, Cl. 364-519.000.

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Meyers, Theodore W.; and Shelton, Steven R., 4,951,914, Cl. 249-11.000.

Tukahara, Masamitsu: See—  
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Turner, Thomas M., Jr.: See—  
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Twiney, Robert C.; and Salloway, Anthony J., to Plessey Overseas Limited. Noise reduction system. 4,953,217, Cl. 381-72.000.

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Kobayashi, Waichi; Otaka, Satoshi; and Nagai, Masaaki, 4,952,243, Cl. 106-672.000.

Uchida, Akiyoshi, to Japan Exlan Company Limited. Acrylic fibers with high physical properties. 4,952,453, Cl. 428-364.000.

Uda, Tsuyoshi: See—  
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Ueda, Shinji: See—  
Mihayashi, Keiji; Abe, Akira; Shibara, Yoshihiko; Ueda, Shinji; Aida, Shunishi; and Fujimoto, Hiroshi, 4,952,488, Cl. 430-551.000.

Ueda, Tetuyuki: See—  
Ishii, Hiroshi; Ueda, Tetuyuki; and Sawai, Hiroyuki, 4,952,011, Cl. 350-6.500.

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- Vallee, Bert L.; and King, Thomas V., to President and Fellows of Harvard College. Promotion of healing of meniscal tissue, 4,952,404, Cl. 424-422.000.
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Takabayashi, Youjiro; and Norimatsu, Takashi, 4,951,546, Cl. 84-718.000.

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Yamane, Kouichi: See—  
Nishizawa, Hiroyuki; Kashiwabara, Kimoto; Nako, Osamu; Ishii, Mitsuki; Yamane, Kouichi; Miyazaki, Masaaki; and Nishiyama, Ryoji, 4,951,634, Cl. 123-492.000.

Yamane, Miyuki: See—  
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Yamane, Yasukuni: See—  
Hayasaka, Hideto; Takakura, Masaki; Yamane, Yasukuni; and Kako, Noritoshi, 4,953,015, Cl. 358-79.000.

Yamasaki, Hajime, to Matsushita Electric Industrial Co., Ltd. Private branch exchange capable of discriminating different types of telephone sets connected thereto. 4,953,200, Cl. 379-156.000.

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Takata, Hidehiro; Komori, Shinji; Tamura, Toshiyuki; Yamasaki, Tetsuo; and Shima, Kenji, 4,953,083, Cl. 364-200.000.

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Oikawa, Masahiro; Yamasaki, Tetsuya; Tanaka, Kouji; and Okuda, Eiji, 4,952,037, Cl. 350-413.000.

Yamashita, Shinichi: See—  
Skikakura, Akihiro; Tanaka, Yasuyuki; Shimokoriyama, Makoto; Ishii, Yoshiaki; Shimizu, Tetsuya; Yamashita, Shinichi; and Fujii, Akio, 4,953,019, Cl. 358-133.000.

Yamashita, Takashi: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

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Hoshi, Takashi; Sakai, Yoichi; Tanabe, Masaaki; Inoue, Tatsuo; Kamakura, Takeshi; Iijima, Teruaki; Nishinaga, Hiroshi; and Yamashita, Tetsuro, 4,953,199, Cl. 379-93.000.

Yamato, Motoyuki: See—  
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Imanari, Makoto; Koshikawa, Takeo; Yamauchi, Akihiro; Hanada, Masayuki; Fukuda, Morio; and Nagano, Kiyoshi, 4,952,545, Cl. 502-73.000.

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Yamauchi, Toshio, to Nissho Corporation. Fluid-pressure detector. 4,951,509, Cl. 73-730.000.

Yamazaki, Junichi: See—  
Tanioka, Kenkichi; Kosugi, Mitsuo; Yamazaki, Junichi; Shidara, Keiichi; Taketoshi, Kazuhisa; Kawamura, Tatsuro; Hiruma, Eikyuu; Suzuki, Shiro; Yamashita, Takashi; Aiba, Masaaki; Ikeda, Yochizumi; Hirai, Tadaaki; Takasaki, Yukio; Ishioka, Sachio; Makishima, Tatsuo; Sameshima, Kenji; Uda, Tsuyoshi; Goto, Naohiro; Nonaka, Yasuhiko; Inoue, Eisuke; Tsuji, Kazutaka; and Ogawa, Hirofumi, 4,952,839, Cl. 313-366.000.

Yamazaki, Koji; Okuyama, Shinichi; Watanuki, Kazuhiko; and Toyoshima, Ken, to Alps Electric Co., Ltd. Method of manufacturing a magnetic head slider. 4,951,381, Cl. 29-603.000.

Yamazaki, Koji: See—  
Ueda, Shigenori; Yamazaki, Koji; Ehara, Toshiyuki; Kume, Nobuyuki; and Nakazawa, Nobuo, 4,952,978, Cl. 355-245.000.

Yanaga, Yukio; Hayashi, Asazi; Kamata, Shizue; and Imanara, Toru, to Mitsubishi Kasei Corporation. Process for separating liquid mixture. 4,952,319, Cl. 210-640.000.

Yanagisawa, Takashi: See—  
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Yanase, Takeshi: See—  
Hayashi, Hideharu; and Yanase, Takeshi, 4,952,753, Cl. 174-52.100.

Yang, Chi-Kuo. Anti-slipping telescopic centerpost of multiple-fold umbrella. 4,951,695, Cl. 135-25.00R.

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Yano, Koichi: See—  
Tanaka, Shinya; and Yano, Koichi, 4,951,670, Cl. 128-648.000.

Yaskawa Electric Mfg. Co. Ltd.: See—  
Pratt, Richard L., 4,953,053, Cl. 361-31.000.

Yasue, Yoshihiko: See—  
Ito, Masazumi; and Yasue, Yoshihiko, 4,952,975, Cl. 355-206.000.

Yasuhara, Masateru: See—  
Azuma, Yusaku; Tanita, Takeo; Yamamoto, Toshihiro; Kasai, Shozo; Yasuhara, Masateru; and Sawada, Yasuhiro, 4,951,517, Cl. 74-209.000.

Yasuhara, Minoru: See—  
Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, 4,951,758, Cl. 175-40.000.

Yasukawa, Shiro: See—  
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Yasuki, Seiji: See—  
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Yau-Young, Annie, to Liposome Technology, Inc. Method of treating *M. avium* infection. 4,952,405, Cl. 424-423.000.

Yazaki Corporation: See—  
Hayashi, Hideharu; and Yanase, Takeshi, 4,952,753, Cl. 174-52.100.

Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Ito, Naoki, 4,952,155, Cl. 439-49.000.

Nagasaka, Yasuhiro; Hatagishi, Yuji; and Manabe, Naoki, 4,952,166, Cl. 439-364.000.

Tsunoda, Mitsunori; and Yoneyama, Norihiro, 4,951,716, Cl. 138-162.000.

Yazu, Shuji: See—  
Sibata, Kenichiro; Sasaki, Nobuyuki; Yazu, Shuji; and Jodai, Tetsuji, 4,952,555, Cl. 505-1.000.

Yeakey, Ernest L.: See—  
Speranza, George P.; Grigsby, Robert A., Jr.; and Yeakey, Ernest L., 4,952,732, Cl. 564-390.000.

Yee, Ian Y. K.: See—  
Lin, Charles W. C.; and Yee, Ian Y. K., 4,952,275, Cl. 156-666.000.

Yeh, Hurjay; and Pickup, Michael A., to Eastman Kodak Company. Page buffer for an electronic gray-scale color printer. 4,953,104, Cl. 364-519.000.

Yoda, Akira: See—  
Sato, Yosimitu; Yamana, Keiichi; and Yoda, Akira, 4,952,980, Cl. 355-256.000.

Yokogawa Electric Corporation: See—  
Hanaoka, Yuzuru; Murayama, Takeshi; and Matsuura, Tamizo, 4,952,126, Cl. 422-70.000.

Yokohama Rubber Co., Ltd.: See—  
Maeda, Akio; and Ueshima, Kei, 4,952,633, Cl. 525-187.000.

Yokoi, Hidetoshi; Niwa, Mikiya; Nomura, Yasuo; and Takahashi, Takeshi, to Nissui Kako Co., Ltd; and Nachi-Fujikoshi Corporation. Degating method. 4,952,354, Cl. 264-69.000.

Yokokawa, Syuho; Fukazawa, Shinichi; Kikuchi, Yasuo; Suzuki, Takashi; and Nakajima, Isao, to Hitachi Koki Co., Ltd. Fixing unit for electrophotographic device. 4,952,782, Cl. 219-469.000.

Yokomizo, Yoshikazu: See—  
Furuichi, Katsushi; Yokomizo, Yoshikazu; Honma, Toshio; and Murakami, Katsumi, 4,952,988, Cl. 355-209.000.

Yokoyama, Seiko; Tanooka, Hikomi; Hibino, Minoru; and Arakawa, Junichi, to Matsushita Electric Works, Ltd. Floor heating panel. 4,952,775, Cl. 219-213.000.

Yoneda, Minoru: See—  
Enomoto, Akihiko; Koga, Takashi; Yoneda, Minoru; and Kobata, Hiroshi, 4,952,883, Cl. 328-159.000.

Yoneyama, Norihiro: See—  
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Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Peilz, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zschke, Horst, to VEB Werk fuer Fernsehelektronik im VEB Kombinat Mikroelektronik. Liquid-crystalline, 2,5-disubstituted, 1,3,4-thiadiazoles with extended smectic C phases. 4,952,699, Cl. 548-136.000.

Yoon, Cheong-Sook. Inner rim of a cap. 4,951,320, Cl. 2-181.200.

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Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,951,441, Cl. 52-741.000.

Yoshida, Hiroshi, to NEC Corporation. Semiconductor integrated circuit having signal level conversion circuit. 4,952,825, Cl. 307-475.000.

Yoshida Industry Co., Ltd.: See—  
Yuhara, Yukitomo; and Okojima, Sumio, 4,951,692, Cl. 132-293.000.

Yoshida, Katsumi: See—  
Torisawa, Akira; Yoshida, Katsumi; Koizumi, Hiroshi; and Yoshikawa, Hiroyuki, 4,952,859, Cl. 318-696.000.

Yoshida, Kazuyo: See—  
Kameyama, Makoto; Niizuma, Kiyozumi; Nagasawa, Kenichi; Suzuki, Takashi; Yamanaka, Toshio; Orikasa, Tsuyoshi; Ito, Fujihiko; and Yoshida, Kazuyo, 4,953,048, Cl. 360-119.000.

Yoshida Kogyo K.K.: See—  
Wake, Kiyoyasu, 4,951,485, Cl. 70-68.000.

Yoshida, Koji: See—  
Hikami, Toshiya; Yoshida, Koji; Obara, Yuichi; and Fuse, Kenichi, 4,952,162, Cl. 439-161.000.

Yoshida, Satoshi, to Casio Computer Co., Ltd. Electronic musical instrument. 4,951,545, Cl. 84-646.000.

Yoshida, Satoshi: See—  
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; and Yoshida, Satoshi, 4,952,476, Cl. 430-106.600.

Yoshida, Tadahiro: See—  
Morimoto, Yasuhiro; Saito, Mitsuru; Yoshida, Tadahiro; and Taniguchi, Nobuyuki, 4,953,029, Cl. 358-229.000.

Yoshihara, Kenzo, to Kabushiki Kaisha Nippon Conlux. Coin validator. 4,951,800, Cl. 194-317.000.

Yoshikawa, Hiroyuki: See—  
Torisawa, Akira; Yoshida, Katsumi; Koizumi, Hiroshi; and Yoshikawa, Hiroyuki, 4,952,859, Cl. 318-696.000.

Yoshikawa, Kikuo, to Canon Kabushiki Kaisha. Cassette loading apparatus. 4,953,042, Cl. 360-96.500.

Yoshimoto, Masahiko: See—  
Kawai, Hiroyuki; and Yoshimoto, Masahiko, 4,953,128, Cl. 365-194.000.

Yoshimura, Kunitoshi; Nakata, Akira; Terai, Hitoshi; and Iida, Sakayu, to Hokkai Can Co., Ltd.; and Kirin Brewery Co., Ltd. Easy-open container. 4,951,836, Cl. 220-271.000.

Yoshimura, Tsuyoshi, to Ricoh Company, Ltd. Digital copier having switchable pixel densities. 4,953,036, Cl. 358-400.000.

Yoshimura, Yukio: See—  
Sonku, Masahisa; Yoshimura, Yukio; Yasuhara, Minoru; Kitahashi, Naoki; Hirayama, Hirozo; Miyazaki, Harutoshi; and Oi, Hisaichi, 4,951,758, Cl. 175-40.000.

Yoshinaga, Yoko: See—  
Yuasa, Satoshi; Nishimura, Yukuo; Haruta, Masahiro; Yoshinaga, Yoko; and Munakata, Hirohide, 4,952,035, Cl. 350-354.000.

Yoshino, Akira; Ohmori, Yoshinori; and Ohnishi, Toshiharu, to Daidousanso Co., Ltd. Apparatus for producing semiconductors. 4,951,603, Cl. 118-719.000.

Yoshio, Junichi, to Pioneer Electronics Corporation. Method of recording and reproducing picture information, recording medium, and recording medium playing apparatus. 4,953,035, Cl. 358-335.000.

Yoshioka, Toshihiro: See—  
Kawarabayashi, Waichiro; Matsubara, Koichi; Yoshioka, Toshihiro; Yamagata, Hikaru; Takahashi, Shigeru; Hirata, Yukimasa; and Shirane, Yoshiko, 4,951,415, Cl. 47-60.000.

Yoshizawa, Hisae: See—  
Nakagawa, Yukiya G.; and Yoshizawa, Hisae, 4,952,804, Cl. 250-307.000.

Yotsuya, Teruhisa, to Omron Tateisi Electronics Co. Apparatus for inspecting packaged electronic device. 4,953,100, Cl. 364-559.000.

Young, Arthur: See—  
West, Paul E.; Charette, Wilfred P.; and Young, Arthur, 4,952,857, Cl. 318-561.000.

Young, Chung I.; and Enanoza, Rudyard M., to Minnesota Mining and Manufacturing Company. Suspension polymerization. 4,952,650, Cl. 526-194.000.

Young Engineering, Inc.: See—  
Young, William O., Jr.; and Surka, Eburn, 4,951,894, Cl. 242-58.600.

Young, Rodney C.: See—  
Brown, Thomas H.; Mitchell, Robert C.; Smith, Ian R.; and Young, Rodney C., 4,952,589, Cl. 514-310.000.

Young, Terence P.; and Croston, Ian R., to GEC-Marconi Limited. Optical in line filters. 4,952,018, Cl. 350-96.150.

Young, William O., Jr.; and Surka, Eburn, to Young Engineering, Inc. Method and apparatus for handling rolls of textile fabrics and other webs. 4,951,894, Cl. 242-58.600.

Yu-fang, Ye; and Yu-jing, Ye, to Fujian Xianyou Electric Machine Plant. Brushless generator with front cover inner-stator mount. 4,952,828, Cl. 310-68.00D.

Yu-jing, Ye: See—  
Yu-fang, Ye; and Yu-jing, Ye, 4,952,828, Cl. 310-68.00D.

Yu, Zeng-gi: See—  
Collins, George J.; McNeil, John R.; and Yu, Zeng-gi, 4,952,294, Cl. 204-192.110.

Yuasa, Satoshi; Nishimura, Yukuo; Haruta, Masahiro; Yoshinaga, Yoko; and Munakata, Hirohide, to Canon Kabushiki Kaisha. Optical element and device using same. 4,952,035, Cl. 350-354.000.

Yuhara, Yukitomo; and Okojima, Sumio, to Yoshida Indutry Co., Ltd. Vanity case. 4,951,692, Cl. 132-293.000.

Yuito, Fumio, to Fuji Photo Film Co., Ltd. Method and apparatus for splicing webs. 4,951,893, Cl. 242-58.100.

Yukumoto, Masao; Ozawa, Michiharu; and Kan, Takahiro, to Kawasaki Steel Corporation. Cooling roll for producing quenched thin metal tape. 4,951,736, Cl. 164-428.000.

Yutaka, Owashi: See—  
Shirai, Kanji; Maruyama, Kazuharu; Ito, Hiroshi; Kitamura, Hajime; and Yutaka, Owashi, 4,952,131, Cl. 425-190.000.

Yuzuriha, Yasuhiro: See—  
Hashimoto, Noboru; Yuzuriha, Yasuhiro; Okazaki, Katsumi; and Fukube, Tsugio, 4,951,642, Cl. 123-657.000.

Zago, Lino: See—  
Lopoli, Giuseppe; and Zago, Lino, 4,951,883, Cl. 241-101.00B.

Zaidan Hojin Handotai Kenyu Shinkokai: See—  
Nishizawa, Jun-ichi; Tamamushi, Takashige; and Maeda, Hideo, 4,952,996, Cl. 357-30.000.

Zalenski, Thomas C.: See—  
Purcell, Alexander M.; and Zalenski, Thomas C., 4,952,757, Cl. 178-19.000.

Zambon S.p.A.: See—  
Della Bella, Davide; Carenzi, Angelo; Chiarino, Dario; and Pellacini, Franco, 4,952,596, Cl. 514-365.000.

Zan, Amilcare Molin, to S.C.A.C. Societa Cementi Armati Centrifugati SpA. Plant to manufacture elongated elements of prestressed reinforced concrete. 4,952,129, Cl. 425-88.000.

Zana, Lawrence J., to Westinghouse Electric Corp. Automatic seam tracker and real time error cumulative control system for an industrial robot. 4,952,772, Cl. 219-124.340.

Zanakis, Michael F.; and Femano, Philip A. Biomagnetic analytical system using fiber-optic magnetic sensors. 4,951,674, Cl. 128-653.00R.

Zantonelli, Piero; and Graglia, Sergio, to Sorin Biomedica S.p.A. Method for winding the fibres of exchange devices, such as blood

oxygenators and the like, and an exchange device produced by this method. 4,952,312, Cl. 210-321.740.

Zappe, Inc.: See—  
Zappe, Richard P., 4,951,412, Cl. 43-37.000.

Zappe, Richard P., to Zappe, Inc. Fish catching device. 4,951,412, Cl. 43-37.000.

Zardi, Umberto, to Ammonia Casale S.A.; and Zardi, Umberto. System for reducing energy consumption improving reactors for heterogeneous catalytic synthesis and related reactors. 4,952,375, Cl. 422-148.000.

Zarini, Franco: See—  
Alpegiani, Marco; Franceschi, Giovanni; Perrone, Ettore; Zarini, Franco; and Della Bruna, Constantino, 4,952,577, Cl. 514-192.000.

Zaschke, Horst: See—  
Yong, Bak G.; Demus, Dietrich; Kresse, Horst; Madicke, Annelore; Pelzl, Gerhard; Schafer, Wolfgang; Tschierske, Carsten; and Zaschke, Horst, 4,952,699, Cl. 548-136.000.

Zatopek, Edward J.; and Guglielmo, Alfred R., to Orenid, Inc., a part interest. Portable game support. 4,951,911, Cl. 248-362.000.

Zeiler, Hans-Joachim: See—  
Groche, Klaus; Petersen, Uwe; Zeiler, Hans-Joachim; and Metzger, Karl G., 4,952,695, Cl. 546-156.000.

Zeldis, Jerome B.; Gale, Robert P.; and Steinberg, Howard N., to Beth Israel Hospital Association. Assay to detect the presence of live non-A, non-B hepatitis agents in vitro. 4,952,494, Cl. 435-5.000.

Zeller, Norbert: See—  
Kalchauer, Wilfried; Pachaly, Bernd; and Zeller, Norbert, 4,952,658, Cl. 528-34.000.

Zenith Electronics Corporation: See—  
Greiner, Siegfried M.; and Capek, Raymond G., 4,952,188, Cl. 445-30.000.

Nitkiewicz, Charles, 4,953,061, Cl. 361-417.000.

Zimmer, Gero, to Productech Inc. Heated tool with heated gas source. 4,952,778, Cl. 219-243.000.

Zimmer, Inc.: See—  
Shutt, George V., 4,951,977, Cl. 285-316.000.

Zimmerman, Scott E.; and Specker, Alex J., to Hi-Speed Checkweigher Co., Inc. Checkweigher. 4,951,763, Cl. 177-164.000.

Zimmermann, Peter: See—  
Tschannen, Roland; Fraefel, Wolfgang; Schmidt, Richard R.; Klager, Rudolf; and Zimmermann, Peter, 4,952,683, Cl. 536-186.000.

Zimpro/Passavant Inc.: See—  
Cooley, Curtis D., 4,952,316, Cl. 210-616.000.

Zinser Textilmaschinen GmbH: See—  
Blosl, Karl, 4,951,455, Cl. 57-308.000.

Grau, Gerhard; Lattner, Manfred; and Nickolay, Helmut, 4,951,357, Cl. 19-0.250.

Zirngiebl, Eberhard: See—  
Kohler, Burkhard; Heywang, Gerhard; and Zirngiebl, Eberhard, 4,952,624, Cl. 524-160.000.

Zivin, Robert A.: See—  
Seolnick, Edward M.; and Zivin, Robert A., 4,952,561, Cl. 514-12.000.

Zmitek, Janko; Milovac, Jenny; Kopitar, Zdravko; Zorz, Mirjan; and Rusjakovski, Boris. Inclusion complex of ibuprofen with beta-cyclodextrin, a process for preparing the same and a pharmaceutical preparation containing the same. 4,952,565, Cl. 514-58.000.

Zones, Stacey I.; and Innes, R. A., to Chevron Research Company. New zeolite SSZ-23 and its use in conversion of lower alkanols into hydrocarbons. 4,952,744, Cl. 585-640.000.

Zorz, Mirjan: See—  
Zmitek, Janko; Milovac, Jenny; Kopitar, Zdravko; Zorz, Mirjan; and Rusjakovski, Boris, 4,952,565, Cl. 514-58.000.

Zucker, Adi: See—  
Klein, Shlomo; and Zucker, Adi, 4,952,179, Cl. 440-36.000.

Zuidhof, Pieter: See—  
Kemmer, Rudolf; Zuidhof, Pieter; and Stouten, Johannes J., 4,952,794, Cl. 250-213.0VT.

3T S.p.A.: See—  
Borromeo, Lucio, 4,951,525, Cl. 74-551.100.

501 Tillotson Limited: See—  
O'Shea, Patrick; and Devine, John, 4,951,926, Cl. 261-64.400.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF AUGUST, 1990

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ajiki, Yoshio; and Kajiwara, Shigemasa, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating and interrupting mechanism for internal combustion engine. Re. 33,310, Cl. 123-90.160.

BASF Aktiengesellschaft: See—  
Hisgen, Bernd; Portugall, Michael; and Steinberger, Rolf, Re. 33,315, Cl. 528-170.000.

Cominco Ltd.: See—  
Dunlop, John A.; Smyth, Robert W.; and Toop, Gerald W., Re. 33,313, Cl. 75-77.000.

Cowles, John C., to Mars Incorporated. Vending machine power switching apparatus. Re. 33,314, Cl. 318-98.000.

Dunlop, John A.; Smyth, Robert W.; and Toop, Gerald W., to Cominco Ltd. Method for making low alpha count lead. Re. 33,313, Cl. 75-77.000.

Elliot, Robert B. Vibratory roller with axially spaced zig zag impact bars and wire rope cleaners. Re. 33,312, Cl. 404-124.000.

Hisgen, Bernd; Portugall, Michael; and Steinberger, Rolf, to BASF Aktiengesellschaft. Wholly aromatic mesomorphic polyester amide imides and the preparation thereof. Re. 33,315, Cl. 528-170.000.

Honda Giken Kogyo Kabushiki Kaisha: See—  
Ajiki, Yoshio; and Kajiwara, Shigemasa, Re. 33,310, Cl. 123-90.160.

Kajiwara, Shigemasa: See—  
Ajiki, Yoshio; and Kajiwara, Shigemasa, Re. 33,310, Cl. 123-90.160.

Katsuta, Yuji; Kita, Sumio; and Takano, Sakuharu, to Sharp Kabushiki Kaisha. Apparatus for cataloging and retrieving image data. Re. 33,316, Cl. 364-521.000.

Kita, Sumio: See—  
Katsuta, Yuji; Kita, Sumio; and Takano, Sakuharu, Re. 33,316, Cl. 364-521.000.

Mars Incorporated: See—  
Cowles, John C., Re. 33,314, Cl. 318-98.000.

Portugall, Michael: See—  
Hisgen, Bernd; Portugall, Michael; and Steinberger, Rolf, Re. 33,315, Cl. 528-170.000.

Sharp Kabushiki Kaisha: See—  
Katsuta, Yuji; Kita, Sumio; and Takano, Sakuharu, Re. 33,316, Cl. 364-521.000.

Smyth, Robert W.: See—  
Dunlop, John A.; Smyth, Robert W.; and Toop, Gerald W., Re. 33,313, Cl. 75-77.000.

Steinberger, Rolf: See—  
Hisgen, Bernd; Portugall, Michael; and Steinberger, Rolf, Re. 33,315, Cl. 528-170.000.

Takano, Sakuharu: See—  
Katsuta, Yuji; Kita, Sumio; and Takano, Sakuharu, Re. 33,316, Cl. 364-521.000.

Toop, Gerald W.: See—  
Dunlop, John A.; Smyth, Robert W.; and Toop, Gerald W., Re. 33,313, Cl. 75-77.000.

Wilkins, Vaughn D. Binocular eyeglasses for image magnification. Re. 33,311, Cl. 351-41.000.

Yuda, Lawrence F. Robotic gripper. Re. 33,317, Cl. 294-88.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

Advanced Composite Materials: See—  
Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., B1 4,789,277, Cl. 409-131.000.

Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., to BBC Brown, Boveri & Company Limited. Liquid crystal display having degree of twist and thickness for improved multiplexing. B1 4,697,884, 8-28-90, Cl. 350-334.000.

Bastian, John M.; Pflieger, David C.; and Seitz, Robert F., to Hamilton Industries, Inc. Movable table with stabilizing apparatus. B1 4,819,569, 8-28-90, Cl. 108-113.000.

BBC Brown, Boveri & Company Limited: See—  
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., B1 4,697,884, Cl. 350-334.000.

Beatty, Ronald L.: See—  
Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., B1 4,789,277, Cl. 409-131.000.

Coffey, Barry W. Nickel strip formulation. B1 4,720,332, 8-28-90, Cl. 204-146.000.

Dziedzic, Chester J.: See—  
Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., B1 4,789,277, Cl. 409-131.000.

Hamilton Industries, Inc.: See—  
Bastian, John M.; Pflieger, David C.; and Seitz, Robert F., B1 4,819,569, Cl. 108-113.000.

Heimgartner, Dieter: See—  
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., B1 4,697,884, Cl. 350-334.000.

Kaufman, Meinolph: See—  
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., B1 4,697,884, Cl. 350-334.000.

Pflieger, David C.: See—  
Bastian, John M.; Pflieger, David C.; and Seitz, Robert F., B1 4,819,569, Cl. 108-113.000.

Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., to Advanced Composite Materials. Method of cutting using silicon carbide whisker reinforced ceramic cutting tools. B1 4,789,277, 8-28-90, Cl. 409-131.000.

Scheffer, Terry J.: See—  
Amstutz, Hermann; Heimgartner, Dieter; Kaufman, Meinolph; and Scheffer, Terry J., B1 4,697,884, Cl. 350-334.000.

Seitz, Robert F.: See—  
Bastian, John M.; Pflieger, David C.; and Seitz, Robert F., B1 4,819,569, Cl. 108-113.000.

## LIST OF DESIGN PATENTEEES

Aaron, Willard. Wall mounted bathroom accessory. 310,147, 8-28-90, Cl. D6-524.000.

Aktiebolaget Volvo: See—  
Wilsaard, Jan, 310,194, Cl. D12-155.000.

Akzo Salt and Basic Chemicals B.V.: See—  
van Kooten, Albert F., 310,130, Cl. D1-100.000.

Alex Synn AG: See—  
Hopfer, Hans, 310,143, Cl. D6-381.000.

Alliance Research Corporation: See—  
Cooper, Gershon N., 310,224, Cl. D14-230.000.

Anger, Wilhelm, to Eyemetrics-Systems AG. End piece for eyeglass temples. 310,229, 8-28-90, Cl. D16-123.000.



- Anger, Wilhelm: See—  
Wiedmann, Helmut; and Anger, Wilhelm, 310,228, Cl. D16-123.000.
- Aoki, Shinichi; and Konno, Akihiko, to Kabushiki Kaisha Toshiba. Combined tuner, amplifier, record player and tape deck. 310,222, 8-28-90, Cl. D14-168.000.
- Asaka, Takeshi: See—  
Imada, Michio; Yazawa, Nobuyoshi; and Asaka, Takeshi, 310,231, Cl. D16-202.000.
- Asics Corporation: See—  
Hase, Yoshiaki, 310,131, Cl. D2-320.000.  
Hase, Yoshiaki, 310,132, Cl. D2-320.000.
- Aurora Design Associates, Inc.: See—  
deNevers, Noel H.; Gardner, James H.; and Norton, Robert M., 310,155, Cl. D7-608.000.
- Auto Shade, Inc.: See—  
Ruimi, Avi, 310,195, Cl. D12-155.000.
- Avatar Mfg. Co. Limited: See—  
Chudnow, Paul, 310,223, Cl. D14-205.000.
- Bacal, Ernie A.; Lau, George K. F.; and Rock, Randy W. Suntan lotion applicator. 310,270, 8-28-90, Cl. D28-7.000.
- Bartz, Richard O., to Innovative Technology, Inc. Combined drain oil collection and storage container. 310,170, 8-28-90, Cl. D9-374.000.
- Beck, Charles A. Magazine binder. 310,242, 8-28-90, Cl. D19-32.000.
- Becton, Dickinson and Company: See—  
Chen, Fung-Bor; Huang, Wu-Nan; and Rogers, Carl M., 310,133, Cl. D2-617.000.
- Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Electronic typewriter. 310,234, 8-28-90, Cl. D18-1.000.
- Bensoussan, David; and Tardio, Don. Thermostat. 310,177, 8-28-90, Cl. D10-50.000.
- Bersonnet, George; and Dalebout, William T., to Proform Fitness Products, Inc. Exercise cycle. 310,253, 8-28-90, Cl. D21-194.000.
- Bieger, Walter I. Computer operator glove. 310,279, 8-28-90, Cl. D29-20.000.
- Bissell, Inc.: See—  
Goodrich, Gordon W., 310,281, Cl. D32-34.000.
- Blair, Edward K. Lug nut holder for tire installation or removal. 310,161, 8-28-90, Cl. D8-71.000.
- Borgmann, Michael: See—  
Mahlich, Gotthard C.; and Borgmann, Michael, 310,152, Cl. D7-398.000.
- Borque, Mark A. Toothbrush or similar article. 310,140, 8-28-90, Cl. D4-104.000.
- Bosch-Siemens Hausgerate GmbH: See—  
Kaiser, Helmut, 310,153, Cl. D7-412.000.
- Bott, John A. Automobile luggage carrier slat. 310,196, 8-28-90, Cl. D12-157.000.
- Boyer, Donald C. Pusher plate attachment for hand truck. 310,284, 8-28-90, Cl. D34-27.000.
- Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Necklace. 310,182, 8-28-90, Cl. D11-3.000.
- Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Bracelet. 310,183, 8-28-90, Cl. D11-4.000.
- Cain, Ann S., to 'lotes', incorporated. Umbrella handle. 310,135, 8-28-90, Cl. D3-12.000.
- Cannon Kabushiki Kaisha: See—  
Takahashi, Yoichi; and Miyahara, Kazuhiko, 310,203, Cl. D13-107.000.
- Canon Kabushiki Kaisha: See—  
Hirata, Tomohiko, 310,238, Cl. D18-42.000.  
Hirata, Tomohiko, 310,239, Cl. D18-42.000.  
Ohsawa, Yosuke; and Hirata, Tomohiko, 310,237, Cl. D18-41.000.
- Carlisle, Martin F., to Tunstall Telecom Limited. Master unit for an intercommunication system. 310,219, 8-28-90, Cl. D14-159.000.
- Chan, An-Gen. Bottle opener. 310,158, 8-28-90, Cl. D8-41.000.
- Chen, Fung-Bor; Huang, Wu-Nan; and Rogers, Carl M., to Becton, Dickinson and Company. Combined glove and form. 310,133, 8-28-90, Cl. D2-617.000.
- Chen, Pi S. Lunch box. 310,156, 8-28-90, Cl. D7-627.000.
- Choi, Suk J., to Goldstar Co., Ltd. Air conditioner. 310,261, 8-28-90, Cl. D23-353.000.
- Chudnow, Paul, to Avatar Mfg. Co. Limited. Headphones. 310,223, 8-28-90, Cl. D14-205.000.
- Cincinnati Microwave, Inc.: See—  
Reber, Frederick J., II, 310,167, Cl. D8-395.000.
- Cleary, Brian G.; and Mellen, Christina J. Potato shaped comforter. 310,148, 8-28-90, Cl. D6-600.000.
- Coates, Donald S. Pedal clamp bicycle stand. 310,190, 8-28-90, Cl. D12-120.000.
- Cobb, Marie F. Bathroom shelf bracket. 310,165, 8-28-90, Cl. D8-381.000.
- Cobra Products, Inc.: See—  
Moss, Nicholas W., 310,280, Cl. D32-14.000.
- Collister, Kenneth D.; and Terry, Robert L., to Miles Inc. Spectrophotometer. 310,178, 8-28-90, Cl. D10-81.000.
- Collister, Kenneth D., to Miles Inc. Font of characters. 310,236, 8-28-90, Cl. D18-26.000.
- Colodner, Jesse L.: See—  
Reilly, George W.; and Colodner, Jesse L., 310,157, Cl. D8-23.000.
- Comeau, Paul V.: See—  
Leoncavallo, Richard A.; and Comeau, Paul V., 310,264, Cl. D24-29.000.
- Cooper, Gershon N., to Alliance Research Corporation. Hinged communications antenna. 310,224, 8-28-90, Cl. D14-230.000.
- Cusenza, John M., to Fourth Systema. Bottle. 310,171, 8-28-90, Cl. D9-377.000.
- D'Abico Holdings Pty. Limited: See—  
Kenyan, Joseph; Woodhead, David; and Saraghi, Brett, 310,251, Cl. D21-87.000.
- Daiwa Golf Co., Ltd.: See—  
Take, Shigeki; and Inuma, Kanji, 310,254, Cl. D21-214.000.
- Dale, Armand. Brake for emergency descent device or similar article. 310,163, 8-28-90, Cl. D8-360.000.
- Dalebout, William T.: See—  
Bersonnet, George; and Dalebout, William T., 310,253, Cl. D21-194.000.
- Dataproducts Corporation: See—  
Smith, Philip N., 310,240, Cl. D18-43.000.
- De Sede AG: See—  
Lange, Gerd, 310,142, Cl. D6-379.000.
- DeCosta, John L.: See—  
Mencis, Gunars; DeCosta, John L.; and Schlicker, Melvin, 310,144, Cl. D6-449.000.
- DeJohn, Thomas M. File for a cement finishing trowel. 310,162, 8-28-90, Cl. D8-90.000.
- deNevers, Noel H.; Gardner, James H.; and Norton, Robert M., to Aurora Design Associates, Inc. Wine bottle holder or the like. 310,155, 8-28-90, Cl. D7-608.000.
- Dentolife, Inc.: See—  
Woodman, Kathleen C., 310,273, Cl. D28-64.000.
- De Vries, Dale; and De Vries, Dean. Plant hanger. 310,146, 8-28-90, Cl. D6-513.000.
- De Vries, Dean: See—  
De Vries, Dale; and De Vries, Dean, 310,146, Cl. D6-513.000.
- Dimson, Benjamin, to Dr. Ing. H.C.F. Porsche Aktiengesellschaft. Automobile. 310,187, 8-28-90, Cl. D12-91.000.
- Dr. Ing. H.C.F. Porsche Aktiengesellschaft: See—  
Dimson, Benjamin, 310,187, Cl. D12-91.000.
- Dole, C. Minot: See—  
Mochnal, Dennis M.; Graham, Henry A., Jr.; Yarrow, Walter J., Jr.; Dole, C. Minot; and Paradis, Joseph R., 310,265, Cl. D24-17.000.
- Dong, Jung H., to Samick Music Corporation. Electronic baby grand piano. 310,232, 8-28-90, Cl. D17-8.000.
- Doza-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 310,141, 8-28-90, Cl. D6-366.000.
- DPW Deutsche Plakat-Werbung GmbH & Co.: See—  
von Canal, Alexander E. N., 310,245, Cl. D20-21.000.
- Dura Lee Ltd.: See—  
Lee, Phil; and Inoue, Bert, 310,186, Cl. D11-164.000.
- Dutko, George. Golf tee repair kit novelty plaque. 310,184, 8-28-90, Cl. D11-133.000.
- Eberle, Ronald D. Snow plow blade. 310,225, 8-28-90, Cl. D15-11.000.
- Ecodyne Corporation: See—  
Gauer, Gary W.; and Grunstad, Jerome A., 310,260, Cl. D23-321.000.
- Eldon Industries, Inc.: See—  
Evenson, Mel, 310,241, Cl. D19-20.000.  
Evenson, Mel, 310,243, Cl. D19-75.000.  
Evenson, Mel, 310,244, Cl. D19-85.000.
- Ellis, Kenneth W. Finger splint. 310,263, 8-28-90, Cl. D24-64.000.
- Erdelean, Jivco. Fishing rod holder. 310,256, 8-28-90, Cl. D22-147.000.
- Etkin, Norm. Emergency signal float. 310,180, 8-28-90, Cl. D10-107.000.
- Evenson, Mel, to Eldon Industries, Inc. Calendar pad holder. 310,241, 8-28-90, Cl. D19-20.000.
- Evenson, Mel, to Eldon Industries, Inc. Dispenser for assorted office articles. 310,243, 8-28-90, Cl. D19-75.000.
- Evenson, Mel, to Eldon Industries, Inc. Pencil cup. 310,244, 8-28-90, Cl. D19-85.000.
- Eyemetrics-Systems AG: See—  
Anger, Wilhelm, 310,229, Cl. D16-123.000.
- Wiedmann, Helmut; and Anger, Wilhelm, 310,228, Cl. D16-123.000.
- Farnell, Alfred D., Jr. Guitar pick. 310,233, 8-28-90, Cl. D17-20.000.
- Fayjay Tool, Inc.: See—  
Faykosh, Paul E.; and Hoiles, John C., 310,283, Cl. D34-23.000.
- Faykosh, Paul E.; and Hoiles, John C., to Fayjay Tool, Inc. Tire and wheel caddy. 310,283, 8-28-90, Cl. D34-23.000.
- Fildan, Gerhard. Cord clamp. 310,166, 8-28-90, Cl. D8-383.000.
- Forsythe, Donald L., to NCR Corporation. Retail terminal or similar article. 310,212, 8-28-90, Cl. D14-106.000.
- Fourth Systema: See—  
Cusenza, John M., 310,171, Cl. D9-377.000.
- Fuerthbauer, Rupert; and Huesler, Hans, to Optrel AG. Welding mask. 310,276, 8-28-90, Cl. D29-9.000.
- Fujii, Yoshito: See—  
Saeki, Taisuke; Kobayashi, Yoshiaki; Fujii, Yoshito; Kajimoto, Hiroshi; and Hayakawa, Atsushi, 310,217, Cl. D14-129.000.
- Gallanis, George P.; Gatz, Stephen; and Hattori, Kenneth M., to Wahl Clipper Corporation. Combined hair trimmer with charging stand therefore. 310,272, 8-28-90, Cl. D28-53.000.
- Gammon, Charles. Swim glove. 310,255, 8-28-90, Cl. D21-239.000.
- Gardner, James H.: See—  
deNevers, Noel H.; Gardner, James H.; and Norton, Robert M., 310,155, Cl. D7-608.000.
- Gatz, Stephen: See—  
Gallanis, George P.; Gatz, Stephen; and Hattori, Kenneth M., 310,272, Cl. D28-53.000.

- Gauer, Gary W.; and Grunstad, Jerome A., to Ecodyne Corporation. Water heater. 310,260, 8-28-90, Cl. D23-321.000.
- Giambrone, Harry J., to Spalding & Evenflo Companies, Inc. Stroller wheel hub. 310,200, 8-28-90, Cl. D12-210.000.
- Giroflex Entwicklungs AG: See—  
Doza-Farkas, Andras, 310,141, Cl. D6-366.000.
- Goldstar Co., Ltd.: See—  
Choi, Suk J., 310,261, Cl. D23-353.000.
- Goodrich, Gordon W., to Bissell, Inc. Carpet cleaner handle. 310,281, 8-28-90, Cl. D32-34.000.
- Goplin, James M. Game board. 310,247, 8-28-90, Cl. D21-20.000.
- Gotou, Toyokichi, to Newlong Machine Works, Ltd. Industrial sewing machine. 310,226, 8-28-90, Cl. D15-69.000.
- Grabun, Jon. Five wheeled child's cycle. 310,188, 8-28-90, Cl. D12-108.000.
- Graham, Henry A., Jr.: See—  
Mochnal, Dennis M.; Graham, Henry A., Jr.; Yarrow, Walter J., Jr.; Dole, C. Minot; and Paradis, Joseph R., 310,265, Cl. D24-17.000.
- Green, Linda M. Eyeglasses. 310,227, 8-28-90, Cl. D16-107.000.
- Grunstad, Jerome A.: See—  
Gauer, Gary W.; and Grunstad, Jerome A., 310,260, Cl. D23-321.000.
- Hansen, Richard M. Desk letter scale. 310,179, 8-28-90, Cl. D10-87.000.
- Hase, Yoshiaki, to Asics Corporation. Front shoe sole. 310,131, 8-28-90, Cl. D2-320.000.
- Hase, Yoshiaki, to Asics Corporation. Heel sole. 310,132, 8-28-90, Cl. D2-320.000.
- Hattori, Kenneth M.: See—  
Gallanis, George P.; Gatz, Stephen; and Hattori, Kenneth M., 310,272, Cl. D28-53.000.
- Hayakawa, Atsushi: See—  
Saeki, Taisuke; Kobayashi, Yoshiaki; Fujii, Yoshito; Kajimoto, Hiroshi; and Hayakawa, Atsushi, 310,217, Cl. D14-129.000.
- Hayama, Shinsuke, to Sumitomo Rubber Industries, Ltd. Motorcycle tire. 310,192, 8-28-90, Cl. D12-147.000.
- Hedington, James A.; and Kelly, Roger L., to National Presto Industries, Inc. Rechargeable battery pack for kitchen appliance. 310,205, 8-28-90, Cl. D13-110.000.
- Hemer, Ray H., to Mosier Industries Inc. Brake shoe. 310,199, 8-28-90, Cl. D12-180.000.
- Hino, Shinsaku: See—  
Tsukada, Akira; and Hino, Shinsaku, 310,215, Cl. D14-118.000.  
Tsukada, Akira; Osaka, Kazumi; Hino, Shinsaku; and Wada, Tsumi, 310,213, Cl. D14-106.000.
- Hirata, Tomohiko, to Canon Kabushiki Kaisha. Combined sheet feeder and editing device for a copying machine. 310,238, 8-28-90, Cl. D18-42.000.
- Hirata, Tomohiko: See—  
Ohsawa, Yosuke; and Hirata, Tomohiko, 310,237, Cl. D18-41.000.
- Hiratsuka, Tomoyasu: See—  
Ichihara, Masuo; Matoba, Hisayoshi; Mizuma, Kensuke; and Hiratsuka, Tomoyasu, 310,150, Cl. D7-351.000.
- Hirose, Yoshitsugu; Tani, Nobuyuki; and Matsudaira, Yasuo, to Sharp Corporation. Combined tape recorder, radio and compact disc player. 310,220, 8-28-90, Cl. D14-163.000.
- Hitchins, William G. Roof gutter guard. 310,259, 8-28-90, Cl. D23-367.000.
- Hoiles, John C.: See—  
Faykosh, Paul E.; and Hoiles, John C., 310,283, Cl. D34-23.000.
- Honda Giken Kogyo Kabushiki Kaisha: See—  
Yamada, Toshiyuki; Kitagawa, Makoto; and Kurihara, Toshio, 310,191, Cl. D12-126.000.
- Hopfer, Hans, to Alex Synn AG. Sofa or similar article. 310,143, 8-28-90, Cl. D6-381.000.
- Horn Abbot Ltd.: See—  
Nugent, James H., 310,175, Cl. D10-46.100.
- Huang, Wu-Nan: See—  
Chen, Fung-Bor; Huang, Wu-Nan; and Rogers, Carl M., 310,133, Cl. D2-617.000.
- Huesler, Hans: See—  
Fuerthbauer, Rupert; and Huesler, Hans, 310,276, Cl. D29-9.000.
- Huston, Carey P., to Zebco Corporation. Sighting instrument for relocation of site. 310,230, 8-28-90, Cl. D16-130.000.
- I.W. Industries: See—  
Strignano, Joseph, 310,258, Cl. D23-242.000.
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Blanc, Henri: See—  
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,306, Cl. 70.000.  
DiGiorgio, Antonio; and DiGiorgio, Renato, to Laboratoire de Physiologie Vegetale. Carnation named Digisun. 7,307, 8-28-90, Cl. 70.000.  
DiGiorgio, Renato: See—  
DiGiorgio, Antonio; and DiGiorgio, Renato, 7,307, Cl. 70.000.  
Ellison, J. Howard; and Kinelski, John J., to Rutgers University. Asparagus plant. 7,311, 8-28-90, Cl. 89.000.  
Fruehwirth, Franz, to Paul Ecke Ranch, Inc. Poinsettia plant 127. 7,308, 8-28-90, Cl. 86.000.  
Fruehwirth, Franz, to Paul Ecke Ranch, Inc. Poinsettia plant '7-81'. 7,309, 8-28-90, Cl. 86.000.  
Kinelski, John J.: See—  
Ellison, J. Howard; and Kinelski, John J., 7,311, Cl. 89.000.  
Laboratoire de Physiologie Vegetale: See—  
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,306, Cl. 70.000.  
DiGiorgio, Antonio; and DiGiorgio, Renato, 7,307, Cl. 70.000.  
Neuhaus, Wilhelm, to Paul Ecke Ranch, Inc. Poinsettia plant '15-84'. 7,310, 8-28-90, Cl. 86.000.  
Paul Ecke Ranch, Inc.: See—  
Fruehwirth, Franz, 7,308, Cl. 86.000.  
Fruehwirth, Franz, 7,309, Cl. 86.000.  
Neuhaus, Wilhelm, 7,310, Cl. 86.000.  
Rutgers University: See—  
Ellison, J. Howard; and Kinelski, John J., 7,311, Cl. 89.000.

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## CLASSIFICATION OF PATENTS

ISSUED AUGUST 23, 1990

NOTE—First number, class; second number, subclass; third number, patent number

CLASS 2	799	4,951,387	412	4,951,446	117.3	4,951,498	415.1	4,951,568	198 DC	4,951,625	
10	4,951,316	832	4,951,388	502	4,951,447	118.1	4,951,504	483	4,951,569	300	4,951,626
16	4,951,317	863	4,951,389	532	4,951,448	118.2	4,951,499			335	4,951,640
49 R	4,951,318	889.1	4,951,390			119 R	4,951,500		CLASS 102	339	4,951,627
171	4,951,319	890.039	4,951,371	16	4,952,219	146.5	4,951,502	202.11	4,951,570	414	4,951,628
181.2	4,951,320	890.132	4,951,372	158	4,952,220	146.8	4,951,501	402	4,951,571		4,951,629
408	4,951,321	890.14	4,951,391	240	4,952,221	151.5	4,951,505	476	4,951,572	435	4,951,630
439	4,951,322	895.211	4,951,392			314	4,951,506		CLASS 104	446	4,951,631
						497	4,951,507	9	4,951,573	479	4,951,632
						505	4,951,508	295	4,951,574	491	4,951,633
CLASS 4	90.4	4,951,393	1	4,952,222	730	4,951,509			CLASS 105	492	4,951,634
251	4,951,323	223	4,951,394	2	4,951,449	861.23	4,951,512			494	4,951,647
	4,951,324	360	4,951,395	13.6	4,951,450	862.04	4,951,510	340	4,951,560	497	4,951,636
494	4,951,325			16.5	4,951,451	863.56	4,951,511	406.1	4,951,575	520	4,951,637
498	4,951,326			341	4,951,452	864.25	4,951,513		CLASS 106	559.1	4,951,638
560	4,951,328	17 R	4,951,396	364	4,951,453					613	4,951,639
568	4,951,329	494	4,951,397					8	4,952,240	647	4,951,641
		630	4,951,398	84	4,951,454	5.37	4,951,514	35	4,952,241	657	4,951,642
		706	4,951,399	308	4,951,455	7 E	4,951,515	135	4,952,244		
93 R	4,951,330			354	4,951,456		4,951,516	404	4,952,245		
109	4,951,331						4,951,517	672	4,952,243		
120	4,951,332	10	4,952,140				4,951,518	709	4,952,242		
417	4,951,333	15	4,951,400				4,951,519				
431	4,951,334	77	4,951,401				4,951,520		CLASS 108		
434	4,951,337						4,951,521				
450	4,951,335						4,951,522	113	BI 4,819,569		
481	4,951,336						4,951,524	131	4,951,576		
							4,951,523		CLASS 109		
							4,951,525	51	4,951,577		
CLASS 12	77	4,951,338					4,951,526		CLASS 110		
							4,951,527				
CLASS 15							4,951,528	212	4,951,579		
88.3	4,951,339	124.1	4,951,404				4,951,529	246	4,951,580		
97.3	4,951,340	551	4,951,405				4,951,530	262	4,951,581		
228	4,951,341	576	4,951,406				4,951,531	317	4,951,582		
246	4,951,342	608	4,951,407				4,951,532	346	4,951,583		
250.32	4,951,343	641	4,951,408				4,951,533		CLASS 111		
257 R	4,951,344						4,951,534				
302	4,951,345	90	4,951,409				4,951,535	101	4,951,584		
322	4,951,346						4,951,536		CLASS 112		
340.3	4,951,347						4,951,537	121.27	4,951,585		
414	4,951,348						4,951,538	147	4,951,586		
							4,951,539		CLASS 114		
228	4,951,349						4,951,540				
254	4,951,351						4,951,541	20.1	4,951,587		
263	4,951,350						4,951,542	93	4,951,588		
							4,951,543	103	4,951,589		
CLASS 17							4,951,544	227	4,951,590		
11	4,951,352						4,951,545	274	4,951,591		
46	4,951,353						4,951,546	294	4,951,592		
51	4,951,354						4,951,547	297	4,951,593		
51	4,951,355						4,951,548	361	4,951,594		
74	4,951,356						4,951,549		CLASS 116		
							4,951,550				
CLASS 19							4,951,551	200	4,951,595		
0.25	4,951,357						4,951,552	321	4,951,596		
80 R	4,951,358						4,951,553		CLASS 118		
98	4,951,359						4,951,554	58	4,951,597		
225	4,951,360						4,951,555	244	4,951,598		
							4,951,556	657	4,951,599		
CLASS 24							4,951,557	696	4,951,600		
3 K	4,951,361						4,951,558	719	4,951,601		
16 PB	4,951,362						4,951,559		4,951,602		
20 R	4,951,363						4,951,560		4,951,603		
68 CD	4,951,365						4,951,561		4,951,604		
68 SK	4,951,364						4,951,562		4,951,605		
							4,951,563		4,951,606		
CLASS 26							4,951,564		4,951,607		
28	4,951,366						4,951,565		4,951,608		
							4,951,566		4,951,609		
CLASS 27							4,951,567		4,951,610		
19	4,951,367						4,951,568		4,951,611		
							4,951,569		4,951,612		
CLASS 28							4,951,570		4,951,613		
118	4,951,368						4,951,571		4,951,614		
							4,951,572		4,951,615		
CLASS 29							4,951,573		4,951,616		
25.35	4,951,370						4,951,574		4,951,617		
33 M	4,951,369						4,951,575		4,951,618		
217	4,951,373						4,951,576		4,951,619		
240	4,951,374						4,951,577		4,951,620		
568	4,951,375						4,951,578		4,951,621		
	4,951,376						4,951,579		4,951,622		
593	4,951,378						4,951,580		4,951,623		
596	4,951,377						4,951,581		4,951,624		
597	4,951,379						4,951,582		4,951,625		
600	4,951,380						4,951,583		4,951,626		
603	4,951,381						4,951,584		4,951,627		
611	4,951,382						4,951,585		4,951,628		
	4,951,384						4,951,586		4,951,629		
721	4,951,383						4,951,587		4,951,630		
754	4,951,385						4,951,588		4,951,631		
783	4,951,386						4,951,589		4,951,632		

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262	4,952,097	190	4,952,131	9	4,952,142	CLASS 455	4,952,603	119	4,952,687
	4,952,098	197	4,952,132	32	4,952,143		4,952,604	186	4,952,683
	CLASS 406	383	4,952,412	77	4,952,146	63	4,952,193		CLASS 540
50	4,952,099	503	4,952,133	215	4,952,149	CLASS 464	4,952,605	134	4,952,688
182	4,952,100	525	4,952,134	220	4,952,150	60	4,952,194	200	4,952,689
		543	4,952,135	223	4,952,151	181	4,952,195	357	4,952,690
	CLASS 408			228.1	4,952,148	CLASS 474	4,952,608	491	4,952,692
83.5	4,952,103	6	4,952,413		CLASS 434	32	4,952,609	589	4,952,691
115 R	4,952,101	93	4,952,414	69	4,952,152	70	4,952,196		CLASS 544
204	4,952,102	285	4,952,415	259	4,952,153	135	4,952,197	255	4,952,693
	CLASS 409	462	4,952,416	376	4,952,154	138	4,952,198		CLASS 546
		572	4,952,417			152	4,952,199	15	4,952,694
131	B1 4,789,277	636	4,952,418		CLASS 435	47	4,952,200	156	4,952,695
135	4,952,105			5	4,952,493	182	4,952,201	265	4,952,697
136	4,951,578			18	4,952,494	CLASS 475	4,952,211	269	4,952,696
138	4,952,159	2	4,952,419	34	4,952,495	299	4,952,202	131	4,952,698
	CLASS 411	43.1	4,952,421	69.1	4,952,497	480	4,952,203	136	4,952,699
48	4,952,106	67	4,952,422	69.2	4,952,500	CLASS 494	4,952,217	240	4,952,700
103	4,952,107	109	4,952,423	76	4,952,501	1	4,952,217	263.8	4,952,701
386	4,952,110	142	4,952,424	91	4,952,502	CLASS 501	4,952,217	378	4,952,702
	CLASS 414	213	4,952,425	161	4,952,503	39	4,952,530	431	4,952,703
111	4,952,111	258	4,952,426	163	4,952,504	69	4,952,531	519	4,952,704
172	4,952,108			172.3	4,952,499	87	4,952,532	525	4,952,705
224	4,952,109	34	4,952,430	209	4,952,505	90	4,952,533	534	4,952,706
251	4,952,112	34.1	4,952,429	240.25	4,952,506	94	4,952,534		CLASS 549
416	4,952,113	40	4,952,431	240.27	4,952,507	96	4,952,535	221	4,952,707
608	4,952,114	34.8	4,952,432	252.3	4,952,508	127	4,952,536	241	4,952,708
618	4,952,115	42	4,952,433	287	4,952,509	136	4,952,537	292	4,952,709
694	4,952,116	54	4,952,434	296	4,952,510	153	4,952,538	416	4,952,710
732	4,952,117	64	4,952,435	314	4,952,511	CLASS 502	4,952,539	307	4,952,712
788.2	4,952,118	68	4,952,436	320	4,952,512	9	4,952,540		CLASS 556
	CLASS 416				CLASS 436	22	4,952,541	60	4,952,713
3	4,952,119	72	4,952,438		4,952,439	27	4,952,542	179	4,952,714
114	4,952,120	83	4,952,442	36	4,952,513	35	4,952,543	409	4,952,715
157 R	4,952,083	116	4,952,440	80	4,952,514	68	4,952,544	482	4,952,716
	CLASS 417	121	4,952,441	169	4,952,515	73	4,952,545		CLASS 558
273	4,952,121	131	4,952,443	170	4,952,516	174	4,952,546	83	4,952,740
356	4,952,122	141	4,952,444	518	4,952,517	213	4,952,547	155	4,952,717
380	4,952,123	147	4,952,449	532	4,952,518	217	4,952,548	388	4,952,718
474	4,952,124	156	4,952,445	533	4,952,519	304	4,952,549	425	4,952,719
		157.4	4,952,450		4,952,520	328.2	4,952,550		CLASS 560
	CLASS 418	218	4,952,451		CLASS 437	204	4,952,551	106	4,952,720
194	4,952,125	220	4,952,446	33	4,952,521	227	4,952,552	131	4,952,721
	CLASS 420	323	4,952,447	34	4,952,522	CLASS 505	4,952,553	250	4,952,722
513	4,952,368		4,952,448	53	4,952,523	1	4,952,554		CLASS 562
	CLASS 422	332	4,952,452	67	4,952,524	4,952,555	4,952,555	17	4,952,723
24	4,952,369	364	4,952,453	69	4,952,525	4,952,556	4,952,556	60	4,952,725
28	4,952,370	373	4,952,455	89	4,952,526	4,952,557	4,952,557	125	4,952,726
62	4,952,371	413	4,952,456	107	4,952,527	CLASS 512	4,952,559	471	4,952,724
70	4,952,372	425.6	4,952,457	194	4,952,528	27.1	4,952,558	870	4,952,727
81	4,952,373	426	4,952,459	209	4,952,529	125	4,952,559	891	4,952,727
99	4,952,374	429	4,952,460		CLASS 439	194	4,952,560		CLASS 564
110	4,952,375	446	4,952,454	49	4,952,155	201	4,952,561	12	4,952,728
148	4,952,376	458	4,952,461	66	4,952,156	249	4,952,562	274	4,952,729
186.3	4,952,376	461	4,952,462	92	4,952,157	307.7	4,952,563	302	4,952,730
	CLASS 423	542.2	4,952,463	96	4,952,158	318.4	4,952,564	390	4,952,732
		552		142	4,952,160	CLASS 528	4,952,565	402	4,952,731
139	4,952,378			155	4,952,161	27	4,952,567	406	4,952,733
162	4,952,379	60	4,952,465	161	4,952,162	32	4,952,568	471	4,952,734
210	4,952,380	104	4,952,466	211	4,952,163	34	4,952,569		CLASS 568
239	4,952,381	112	4,952,467	215	4,952,164	45	4,952,570	560	4,952,735
244	4,952,382	175	4,952,468	247	4,952,165	125	4,952,571	628	4,952,736
277	4,952,383	213	4,952,469	354	4,952,166	170	4,952,572	851	4,952,737
306	4,952,384			395	4,952,167	182	4,952,573		CLASS 585
326	4,952,385	56	4,952,470	403	4,952,168	193	4,952,574	3	4,952,738
327	4,952,388	59	4,952,471	467	4,952,169	199	4,952,575	18	4,952,739
484	4,952,386			509	4,952,170	219	4,952,576	516	4,952,741
531	4,952,387	67	4,952,473	522	4,952,171	222	4,952,577	534	4,952,742
593	4,952,390	96	4,952,475	532	4,952,172	226	4,952,578	541	4,952,743
625	4,952,389	106.6	4,952,476	583	4,952,173	230	4,952,579	640	4,952,744
	CLASS 424	109	4,952,477	584	4,952,174	235	4,952,580	648	4,952,745
		138	4,952,478	681	4,952,175	239	4,952,581	802	4,952,746
1.1	4,952,393			828	4,952,176	242	4,952,582	803	4,952,747
45	4,952,391	203	4,952,479	856	4,952,177	254	4,952,583		CLASS 604
57	4,952,464	281	4,952,480		4,952,178	255	4,952,584	1	4,952,204
58	4,952,392	284	4,952,481		CLASS 440	279	4,952,585	67	4,952,205
85.91	4,952,394	325	4,952,482	36	4,952,179	292	4,952,586	110	4,952,206
88	4,952,395	378	4,952,483	77	4,952,180	304	4,952,587	164	4,952,207
92	4,952,396	496	4,952,484	89	4,952,181	305	4,952,588	187	4,952,208
114	4,952,397	502	4,952,485		CLASS 441	309	4,952,589	218	4,952,209
195.1	4,952,399	532	4,952,486	64	4,952,183	310	4,952,590	251	4,952,210
401	4,952,400	546	4,952,487	77	4,952,184	311	4,952,591	285	4,952,211
405	4,952,401	551	4,952,488		CLASS 445	315	4,952,592	294	4,952,212
419	4,952,402	567	4,952,489	2	4,952,185	321	4,952,593		CLASS 606
422	4,952,403			22	4,952,186	338	4,952,594	79	4,952,213
	4,952,404	570	4,952,491	30	4,952,187	340	4,952,595	87	4,952,214
423	4,952,405			36	4,952,188	355	4,952,596	159	4,952,215
425	4,952,406				CLASS 446	363	4,952,597		
440	4,952,407	89	4,952,492	241	4,952,189	398	4,952,598		
450	4,952,408	183	4,952,136	267	4,952,190	410	4,952,599		
	4,952,409	202	4,952,137	324	4,952,191	414	4,952,600		
465	4,952,410	255	4,952,138		CLASS 432	424	4,952,601		
618	4,952,411	353	4,952,139		4,952,141	427	4,952,602		
946	4,952,396				CLASS 433	443	4,952,602		
	CLASS 425	59	4,952,144						
10	4,952,144	103	4,952,147						
82.1	4,952,128								
88	4,952,129								
117	4,952,130	8	4,952,141						

## CLASSIFICATION OF DESIGNS

D1—	100	310,130	D8—	627	310,156	D11—	3	310,182	D14—	100	310,208	D18—	1	310,234	353	310,261
D2—	320	310,131		23	310,157		4	310,183		105	310,209		26	310,235	367	310,259
		310,132		41	310,158		133	310,184		106	310,210		41	310,236	377	310,262
D3—	617	310,133		51	310,159		164	310,185			310,211		42	310,237	41	310,263
	10	310,134		61	310,160		182	310,186			310,212			310,238	29	310,264
	12	310,135		71	310,161		91	310,187			310,213			310,239	64	310,265
	39	310,137		90	310,162		108	310,188			310,214			310,240	33	310,266
	56	310,138		360	310,163		120	310,189			310,215			310,241	113	310,267
D4—	61	310,136		380	310,164		126	310,190			310,216			310,242	67	310,268
	104	310,139		381	310,165		147	310,191			310,217			310,243	99	310,269
		310,140		383	310,166		155	310,192			310,218			310,244	7	310,270
D6—	366	310,141		395	310,167		157	310,193			310,219			310,245	46	

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

### PATENTS

01 :	4,951,514	4,951,601	4,952,206	4,953,079	4,952,291	4,951,719
	4,951,814	4,951,604	4,952,216	4,953,080	4,952,345	4,951,782
	4,951,833	4,951,669	4,952,228	4,953,084	4,952,493	4,951,819
	4,951,910	4,951,673	4,952,229	4,953,101	4,952,519	4,952,062
	4,952,042	4,951,684	4,952,252	4,953,119	4,952,569	4,952,192
	4,952,254	4,951,723	4,952,255	4,953,122	4,952,628	4,952,385
	4,952,341	4,951,727	4,952,289	4,953,149	4,952,812	4,952,395
	4,952,725	4,951,729	4,952,317	4,953,155	4,952,812	4,952,402
	4,952,747	4,951,743	4,952,333	4,953,174	4,952,812	4,952,402
	4,952,748	4,951,770	4,952,373	4,953,176	4,952,812	4,952,402
	4,952,836	4,951,787	4,952,386	4,953,181	4,952,812	4,952,402
	4,952,749	4,951,793	4,952,405	4,953,186	4,952,812	4,952,402
02 :	Re.33,312	4,951,815	4,952,459	4,953,189	4,952,812	4,952,402
	4,951,651	4,951,818	4,952,462	4,953,199	4,952,812	4,952,402
	4,951,823	4,951,823	4,952,464	4,953,206	4,952,812	4,952,402
04 :	4,951,316	4,951,830	4,952,494	4,953,210	4,952,812	4,952,402
	4,951,326	4,951,831	4,952,508	4,953,211	4,952,812	4,952,402
	4,951,459	4,951,832	4,952,512	4,953,212	4,952,812	4,952,402
	4,951,483	4,951,833	4,952,518	4,953,213	4,952,812	4,952,402
	4,951,521	4,951,835	4,952,567	4,953,214	4,952,812	4,952,402
	4,951,661	4,951,839	4,952,579	4,953,215	4,952,812	4,952,402
	4,951,951	4,951,855	4,952,586	4,953,216	4,952,812	4,952,402
	4,951,996	4,951,858	4,952,605	4,953,217	4,952,812	4,952,402
	4,952,101	4,951,860	4,952,615	4,953,218	4,952,812	4,952,402
	4,952,376	4,951,875	4,952,666	4,953,219	4,952,812	4,952,402
	4,953,062	4,951,876	4,952,715	4,953,220	4,952,812	4,952,402
	4,953,165	4,951,891	4,952,744	4,953,221	4,952,812	4,952,402
05 :	4,951,989	4,951,901	4,952,784	4,953,222	4,952,812	4,952,402
	4,952,134	4,951,913	4,952,799	4,953,223	4,952,812	4,952,402
	4,952,607	4,951,917	4,952,810	4,953,224	4,952,812	4,952,402
06 :	Re.33,311	4,951,937	4,952,814	4,953,225	4,952,812	4,952,402
	4,951,317	4,951,946	4,952,823	4,953,226	4,952,812	4,952,402
	4,951,321	4,951,977	4,952,835	4,953,227	4,952,812	4,952,402
	4,951,333	4,951,978	4,952,838	4,953,228	4,952,812	4,952,402
	4,951,344	4,951,983	4,952,843	4,953,229	4,952,812	4,952,402
	4,951,350	4,951,990	4,952,851	4,953,230	4,952,812	4,952,402
	4,951,361	4,951,993	4,952,857	4,953,231	4,952,812	4,952,402
	4,951,382	4,952,007	4,952,864	4,953,232	4,952,812	4,952,402
	4,951,384	4,952,012	4,952,868	4,953,233	4,952,812	4,952,402
	4,951,409	4,952,025	4,952,895	4,953,234	4,952,812	4,952,402
	4,951,425	4,952,033	4,952,922	4,953,235	4,952,812	4,952,402
	4,951,434	4,952,045	4,952,949	4,953,236	4,952,812	4,952,402
	4,951,482	4,952,046	4,952,950	4,953,237	4,952,812	4,952,402
	4,951,491	4,952,063	4,952,952	4,953,238	4,952,812	4,952,402
	4,951,508	4,952,065	4,952,955	4,953,239	4,952,812	4,952,402
	4,951,512	4,952,067	4,952,957	4,953,240	4,952,812	4,952,402
	4,951,533	4,952,097	4,953,008	4,953,241	4,952,812	4,952,402
	4,951,556	4,953,041	4,953,041	4,953,242	4,952,812	4,952,402
	4,951,575	4,953,057	4,953,057	4,953,243	4,952,812	4,952,402
	4,951,577	4,953,058	4,953,058	4,953,244	4,952,812	4,952,402
	4,951,580	4,953,073	4,953,073	4,953,245	4,952,812	4,952,402
	4,951,588	4,953,075	4,953,075	4,953,246	4,952,812	4,952,402
	4,951,593	4,953,078	4,953,078	4,953,247	4,952,812	4,952,402
	4,951,596	4,953,096	4,953,096	4,953,248	4,952,812	4,952,402

## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

18	4,952,791 4,952,848 4,952,849 4,952,867 4,952,890 4,953,052 4,953,061 4,953,184 4,953,185 4,953,191 4,951,417 4,951,653 4,951,870 4,952,213 4,952,442 4,952,502 4,952,853 4,952,908 4,951,629 4,951,737 4,951,775 4,952,371 4,952,921 4,952,941 4,953,113 4,951,365 4,952,151 4,952,434 4,952,594 4,951,808 4,952,000 4,952,001 4,952,067 4,952,167 4,952,309 4,951,324 4,951,393 4,951,607 4,951,749 4,951,750 4,951,911 4,952,218 4,952,242 4,952,425 4,952,617 4,952,718 4,953,138 4,951,342 4,952,686 4,953,094 4,951,472 4,951,739 4,951,857 4,951,889 4,952,191 4,952,248 4,952,408 4,952,409 4,952,426 4,952,469 4,952,511 4,952,536 4,952,544 4,952,700 4,952,833 4,951,351 4,951,380 4,951,466 4,951,591 4,951,648 4,951,654 4,951,656 4,951,671 4,951,675 4,951,677 4,951,690 4,951,706 4,951,856 4,951,908 4,951,940 4,951,968 4,952,273 4,952,286 4,952,299 4,952,353 4,952,403 4,952,404 4,952,406 4,952,420 4,952,422 4,952,448 4,952,457 4,952,499 4,952,513 4,952,517 4,952,527 4,952,606 4,952,682 4,952,707 4,952,844 4,952,893 4,952,894 4,952,931 4,952,946 4,952,994 4,953,001 4,953,072 4,953,099 4,953,141 4,953,156	26	4,953,166 4,953,172 4,953,194 4,953,340 4,951,367 4,951,416 4,951,431 4,951,467 4,951,478 4,951,522 4,951,524 4,951,538 4,951,540 4,951,618 4,951,636 4,951,657 4,951,662 4,951,773 4,951,784 4,951,788 4,951,804 4,951,809 4,951,843 4,951,873 4,951,878 4,951,905 4,951,906 4,951,925 4,951,931 4,951,963 4,951,975 4,951,976 4,951,991 4,951,995 4,952,008 4,952,102 4,952,110 4,952,146 4,952,195 4,952,300 4,952,355 4,952,413 4,952,424 4,952,547 4,952,556 4,952,672 4,952,677 4,952,693 4,952,916 4,953,067 4,953,091 4,953,109 4,951,436 4,951,449 4,951,462 4,951,532 4,951,587 4,951,664 4,951,667 4,951,687 4,951,837 4,951,846 4,951,919 4,952,023 4,952,119 4,952,177 4,952,320 4,952,357 4,952,414 4,952,529 4,952,574 4,952,612 4,952,615 4,952,618 4,952,640 4,952,650 4,952,882 4,952,904 4,953,002 4,953,068 4,953,112 4,953,131 4,953,145 4,953,167 4,952,142 4,952,603 4,952,604 4,951,720 4,951,949 4,952,197 4,952,534 4,952,723 4,951,811 4,951,957 4,951,821 4,951,826 4,951,850 4,951,947 4,951,998 4,951,337 4,952,043 4,953,005 4,953,110 4,951,330 4,952,423 4,952,268 4,952,340 4,952,351	34	4,952,550 4,952,769 4,951,329 4,951,385 4,951,361 4,951,570 4,951,589 4,951,609 4,951,611 4,951,612 4,951,613 4,951,663 4,951,674 4,951,805 4,951,841 4,951,869 4,951,938 4,951,953 4,951,997 4,951,999 4,952,014 4,952,017 4,952,019 4,952,059 4,952,118 4,952,128 4,952,210 4,952,223 4,952,226 4,952,288 4,952,302 4,952,392 4,952,397 4,952,400 4,952,428 4,952,436 4,952,441 4,952,482 4,952,543 4,952,554 4,952,559 4,952,580 4,952,588 4,952,600 4,952,692 4,952,704 4,952,729 4,952,739 4,952,792 4,952,862 4,952,899 4,952,909 4,952,926 4,953,039 4,953,106 4,953,159 4,953,160 4,953,170 4,953,198 4,953,215 4,953,233 4,951,327 4,953,334 4,951,366 4,951,371 4,951,430 4,951,494 4,951,503 4,951,543 4,951,557 4,951,564 4,951,595 4,951,756 4,951,763 4,951,780 4,951,817 4,951,859 4,951,884 4,951,907 4,951,909 4,951,941 4,951,969 4,952,022 4,952,026 4,952,051 4,952,075 4,952,103 4,952,201 4,952,215 4,952,222 4,952,236 4,952,269 4,952,293 4,952,303 4,952,308 4,952,311 4,952,318 4,952,350 4,952,352 4,952,380 4,952,383 4,952,384 4,952,388 4,952,396 4,952,411 4,952,446 4,952,468 4,952,477 4,952,492	37	4,952,495 4,952,496 4,952,510 4,952,516 4,952,535 4,952,552 4,952,581 4,952,637 4,952,646 4,952,657 4,952,675 4,952,685 4,952,708 4,952,719 4,952,780 4,952,873 4,952,911 4,952,930 4,952,973 4,953,077 4,953,081 4,953,104 4,953,177 4,951,355 4,951,457 4,951,501 4,951,536 4,951,539 4,951,890 4,952,325 4,952,401 4,952,597 4,952,668 4,952,694 4,953,089 4,953,209 4,953,332 4,951,341 4,951,379 4,951,418 4,951,427 4,951,461 4,951,463 4,951,474 4,951,486 4,951,489 4,951,658 4,951,682 4,951,701 4,951,704 4,951,708 4,951,714 4,951,731 4,951,755 4,951,845 4,951,861 4,951,882 4,951,884 4,951,892 4,951,904 4,951,918 4,951,927 4,951,929 4,951,939 4,951,942 4,951,973 4,952,134 4,952,136 4,952,214 4,952,227 4,952,262 4,952,326 4,952,327 4,952,328 4,952,330 4,952,359 4,952,366 4,952,389 4,952,465 4,952,504 4,952,530 4,952,585 4,952,593 4,952,610 4,952,621 4,952,659 4,952,870 4,952,914 4,952,937 4,953,053 4,953,147 4,953,190 4,953,203 4,953,204 4,951,583 4,951,584 4,951,668 4,951,697 4,951,753 4,951,921 4,952,137 4,952,370 4,952,509 4,952,741 4,953,097 4,953,407 4,951,480 4,951,767 4,952,036 4,952,090	42	4,952,132 4,952,153 4,952,760 4,952,820 4,952,919 4,953,017 Re.33,314 4,951,325 4,951,389 4,951,554 4,951,581 4,951,678 4,951,689 4,951,865 4,951,880 4,951,888 4,952,004 4,952,009 4,952,020 4,952,068 4,952,072 4,952,073 4,952,141 4,952,156 4,952,164 4,952,168 4,952,169 4,952,170 4,952,172 4,952,175 4,951,452 4,952,186 4,952,190 4,952,219 4,952,220 4,952,246 4,952,290 4,951,645 4,952,393 4,952,430 4,952,497 4,952,506 4,952,524 4,952,557 4,952,561 4,952,562 4,952,582 4,952,626 4,952,656 4,952,674 4,952,772 4,952,798 4,952,802 4,952,840 4,952,856 4,952,896 4,952,900 4,953,197 4,953,223 4,952,419 4,951,954 4,952,669 4,953,291 Re.33,317 4,951,400 4,952,143 4,951,573 4,951,582 4,951,696 4,951,722 4,951,956 4,952,278 4,952,338 4,952,671 4,952,766 4,951,370 4,951,397 4,951,408 4,951,433 4,951,460 4,951,475 4,951,488 4,951,505 4,951,541 4,951,576 4,951,579 4,951,666 4,951,707 4,951,713 4,951,740 4,951,744 4,951,745 4,951,746 4,951,747 4,951,748 4,951,751 4,951,752 4,951,922 4,951,924 4,951,944 4,952,066 4,952,135 4,952,147	49	4,952,275 4,952,297 4,952,301 4,952,306 4,952,324 4,952,360 4,952,367 4,952,374 4,952,466 4,952,631 4,952,647 4,952,714 4,952,732 4,952,737 4,952,738 4,952,758 4,952,004 4,952,801 4,952,817 4,952,889 4,953,116 4,953,130 4,953,137 4,953,139 4,953,140 4,953,144 4,953,146 4,953,193 4,953,221 4,951,319 4,951,452 4,952,041 4,952,152 4,952,321 4,952,644 4,951,645 4,951,952 4,952,764 4,952,797 4,952,818 4,952,863 4,951,592 4,951,807 4,951,816 4,951,828 4,952,092 4,952,096 4,952,217 4,952,507 4,952,793 4,952,869 4,952,802 Re.33,313 4,951,398 4,951,429 4,951,443 4,951,530 4,953,223 4,951,834 4,951,849 4,951,879 4,951,923 4,952,111 4,952,116 4,952,339 4,952,394 4,952,515 4,952,713 4,952,892 4,951,727 4,951,377 4,952,755 4,951,413 4,951,573 4,952,636 4,952,745 4,953,135 4,951,368 4,951,374 4,951,527 4,951,558 4,951,586 4,951,608 4,951,614 4,951,620 4,951,672 4,951,681 4,951,683 4,951,702 4,951,733 4,951,774 4,951,777 4,951,778 4,951,797 4,951,803 4,951,824 4,952,083 4,952,181 4,952,182 4,952,316 4,952,415 4,952,447 4,952,629 4,952,663 4,952,876 4,952,877 4,953,087 4,953,167	50	4,952,644 4,951,645 4,952,393 4,952,430 4,952,497 4,952,506 4,952,524 4,952,557 4,952,561 4,952,562 4,952,582 4,952,626 4,952,656 4,952,674 4,952,772 4,952,798 4,952,802 4,952,840 4,952,856 4,952,896 4,952,900 4,953,197 4,953,223 4,952,419 4,951,954 4,952,669 4,953,291 Re.33,317 4,951,400 4,952,143 4,951,573 4,951,582 4,951,696 4,951,722 4,951,956 4,952,278 4,952,338 4,952,671 4,952,766 4,951,370 4,951,397 4,951,408 4,951,433 4,951,460 4,951,475 4,951,488 4,951,505 4,951,541 4,951,576 4,951,579 4,951,666 4,951,707 4,951,713 4,951,740 4,951,744 4,951,745 4,951,746 4,951,747 4,951,748 4,951,751 4,951,752 4,951,922 4,951,924 4,951,944 4,952,066 4,952,135 4,952,147	51	4,952,863 4,951,592 4,951,807 4,951,816 4,951,828 4,952,092 4,952,096 4,952,217 4,952,507 4,952,793 4,952,869 4,952,802 Re.33,313 4,951,398 4,951,429 4,951,443 4,951,530 4,953,223 4,951,834 4,951,849 4,951,879 4,951,923 4,952,111 4,952,116 4,952,339 4,952,394 4,952,515 4,952,713 4,952,892 4,951,727 4,951,377 4,952,755 4,951,413 4,951,573 4,952,636 4,952,745 4,953,135 4,951,368 4,951,374 4,951,527 4,951,558 4,951,586 4,951,608 4,951,614 4,951,620 4,951,672 4,951,681 4,951,683 4,951,702 4,951,733 4,951,774 4,951,777 4,951,778 4,951,797 4,951,803 4,951,824 4,952,083 4,952,181 4,952,182 4,952,316 4,952,415 4,952,447 4,952,629 4,952,663 4,952,876 4,952,877 4,953,087 4,953,167
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## DESIGN PATENTS

01 :	310,164	310,240		310,250	22 :	310,140	310,206		310,212
06 :	310,148	310,241	15 :	310,252	26 :	310,196	310,209		310,283
	310,159	310,242		310,270		310,218	310,218	40 :	310,230
	310,171	310,243	17 :	310,144		310,256	310,246	41 :	310,255
	310,172	310,244		310,147	27 :	310,170	310,258	42 :	310,162
	310,180	310,267		310,160		310,260	310,264	44 :	310,136
	310,185	310,269		310,179		310,279	310,284	48 :	310,139
	310,186	310,271		310,272	31 :	310,263	310,176	49 :	310,133
	310,190	310,273	18 :	310,178	32 :	310,161	310,247		310,188
08 :	310,134	310,134		310,184		310,233	310,135		310,155
09 :	310,145	310,145		310,227	34 :	310,149	310,137		310,155
	310,198	310,168		310,236		310,265	310,167		310,253
	310,204	310,174		310,257		310,280	310,169	51 :	310,201
	310,207	310,175	20 :	310,225	36 :	310,154	310,199	55 :	310,205
	310,223	310,266		310,248		310,157	310,200		
	310,224	310,193							

## PLANT PATENTS

06 :	7,308	7,309	34	7,311			
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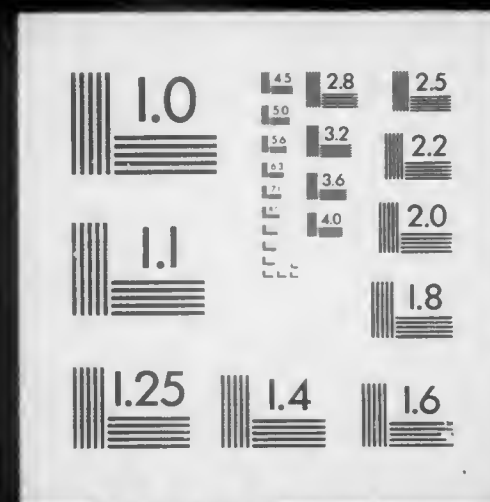
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